

Toliara Project PFS confirms status as a world-class mineral sands development

Highlights

- Post-tax / pre-debt (real) NPV @ 10% discount rate of US\$671m, measured at FID
- Revenue to cost of sales ratio of 3.06
- Stage 1 capex cost of US\$439m – to establish a 13Mtpa mining processing operation
- Stage 2 capex cost of US\$67m - increases operation to 19Mtpa
- Mineral Resources forming basis of PFS comprise of 588Mt @ 6.6% Heavy Mineral, from existing Measured & Indicated resources, for an initial LOM of 33 years
- Mineral Separation Plant recoveries of 93.9% ilmenite, 79.0% zircon and 73.7% rutile
- Annual averages (excluding first and last partial operating years):
 - Production of 806kt ilmenite (sulphate, slag and chloride), 54kt zircon and 8kt rutile
 - Revenue US\$254m – 62% ilmenite, 34% zircon and 4% rutile
 - Operating costs of US\$77m or US\$82m incl. 2% royalties
 - Non-operating costs of US\$7m (community, external affairs, marketing etc.)
 - EBITDA US\$165m, NPAT US\$110m
 - Free cash flow US\$133m
- An animated video of the Toliara Project can be viewed at 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 the Pre-Feasibility Study (PFS) on its Toliara Project in Madagascar. The PFS confirms the Company's view that this is a world class mineral sands project with estimated post-tax/pre-debt (real) NPV₁₀ of US\$671 million and a sector leading average revenue to cost ratio of 3.06 over the 33-year initial mine life.

Managing Director of Base Resources, Tim Carstens, said:

"We are delighted to be able to share these PFS findings. They confirm our long-held view, which informed the project's acquisition by Base Resources in early 2018, that the Toliara Project is one of the best mineral sands development opportunities in the world."

"The release of the PFS findings today is a significant milestone for Base Resources as it provides a clear basis for understanding our value proposition as we progress towards becoming a multi-operation mining company."

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

"Base Resources' Toliara Project PFS work has been completed to a high standard with the assistance of a group of highly experienced independent consultants, including: Mineral Technologies, Lycopodium, IHC Robbins, Aurecon and PRDW."

"The team is already working on the Definitive Feasibility Study which we aim to complete by the end of 2019, ahead of a planned final investment decision in Q1 2020. This could see us in operation at Toliara by the end of 2021. In full production, the Toliara Project will export over 860kt of product, generating around US\$250m of revenue and NPAT of US\$110m annually. The PFS presents an initial 33-year mine life, however, with only 46% of the existing Ranobe deposit Mineral Resources being utilised, there is significant potential to extend this further, which will be investigated with further drilling during the DFS."

“Importantly, the project will bring significant stimulus to the Malagasy economy, particularly for the communities near the planned operation, with an estimated construction workforce peaking at 1,600 and an ongoing operational workforce of over 1,100. Consistent with our approach at the Company’s Kwale Operations in Kenya, we will strive to ensure as much local content as possible, creating many more indirect employment opportunities, as well as implementing a suite of high impact community development initiatives.”

Investment evaluation

NPV₁₀ (at a discount rate of 10%), post tax, real	US\$ millions	671
<i>NPV₈ (at a discount rate of 8%), post tax, real</i>	<i>US\$ millions</i>	<i>926</i>
<i>NPV₁₂ (at a discount rate of 12%), post tax, real</i>	<i>US\$ millions</i>	<i>483</i>
<i>NPV₁₀ – TZMI Q1-2019 price forecast, post tax, real</i>	<i>US\$ millions</i>	<i>737</i>
IRR	%	22.4
Initial (Stage 1) Capex	US\$ millions	439
Stage 2 Capex	US\$ millions	67
Capital Payback Period (Stage 1 and 2)	Years	4.0
LOM Operating Costs + Royalties	US\$/t ore mined	4.49
LOM Operating Costs + Royalties (A)	US\$/t produced	95
LOM Revenue (B)	US\$/t produced	292
LOM Cash Margin (B-A)	US\$/t produced	197
LOM Revenue : Cost of Sales Ratio (B/A)	Ratio : 1	3.06
LOM Free Cash Flow	US\$ millions	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)		FY2022	FY2023	FY2024	FY2025 onward
	Total	annual ave*	Ops Yr1	Ops Yr2	Ops Yr3	annual ave†
Ore mined (Mt)	587.7	18.3	8.7	12.9	12.9	18.7
HM%	6.6%	6.6%	8.1%	9.1%	9.7%	6.4%
HMC produced (kt)	37,110	1,155	654	1,130	1,222	1,154
Period	33 years	31 years	1 year	1 year	1 year	29 years
Produced (kt):						
Sulphate ilmenite	9,362	293	112	294	300	293
Slag ilmenite	8,977	281	108	282	288	281
Chloride ilmenite	7,396	232	88	233	237	231
Total ilmenite	25,736	806	308	809	825	805
Zircon	1,730	54	14	53	61	54
Rutile	266	8	2	8	7	8

* 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.



This document is to be read together with the supporting slides titled “Toliara Project PFS Summary Outcomes”, which discloses details of the material assumptions and underlying methodologies for deriving the above forecast financial information and production targets, including material price assumptions and operating cost assumptions.

Reasonable basis for forward looking statements

This document and the 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 and the forecast financial information included in this document and the supporting slides. 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.

This document and the supporting slides have been prepared in accordance with the requirements of the JORC Code 2012 and the ASX Listing Rules.

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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.

Toliara Project Pre-Feasibility Study

Summary outcomes

21 March 2019



**BASE
RESOURCES**



Disclaimer & Important Notices

This document has been prepared by Base Resources Limited (**Base Resources**). The information included in this document relates to the outcomes of the Pre-Feasibility Study for the Toliara Project and is, by its nature, preliminary information and conclusions presented should be viewed in this light. Information in this document should be read in conjunction with other announcements made by Base Resources to ASX.

Base Resources has used reasonable endeavours to ensure this document is based on information that was current as of the date of the document. Statements contained in this document represent the reasonable judgments of Base Resources within the time and budget context of preparation of the Pre-Feasibility Study using the information available at the time of its preparation.

The estimated Mineral Resources underpinning production targets in this document have been prepared by a competent person in accordance with the requirements of the JORC Code 2012.

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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. 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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Introduction

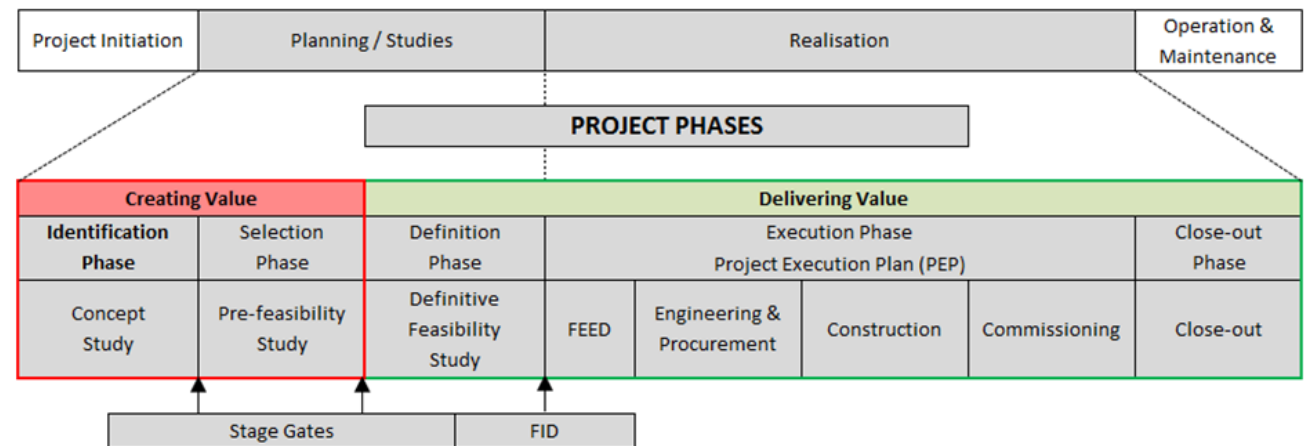
To fully capitalise on Base Resources' capability built from the Kwale development in Kenya, Base Resources acquired the Toliara Project in January 2018. Project development immediately commenced - identifying value adding options and evaluating them before selecting the best options to progress through the pre-feasibility study

- 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 Operations and the final completion test was completed, and normal operations were established by mid 2015.
- To fully capitalise on Base Resources' organisational capability, business model and financial platform built at Kwale Operations, Base Resources has been seeking the right growth opportunity from which to drive shareholder value and, after extensive evaluation of many opportunities, in early 2018 acquired the Toliara Project in Madagascar.
- Project development of the Toliara Project immediately started following a clearly defined Base Resources Project Development System.
- A concept study that tabled a number of options was completed in April 2018. These options were evaluated during the first part of the Pre-Feasibility Study (**PFS**) and the selected option(s) were then engineered to a higher certainty level to confirm the business case of the Toliara Project.

PFS Objectives

- Confirm the business case for further investment.
- Determine the single most valuable option to be detailed further and optimised in the Definition Phase.
- Identify any emerging fatal flaws and critical issues.
- Assess and provide mitigation plans for risks.
- Prepare a detailed workplan for the Definition Phase.
- Progress all long lead-time work.

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



Introduction

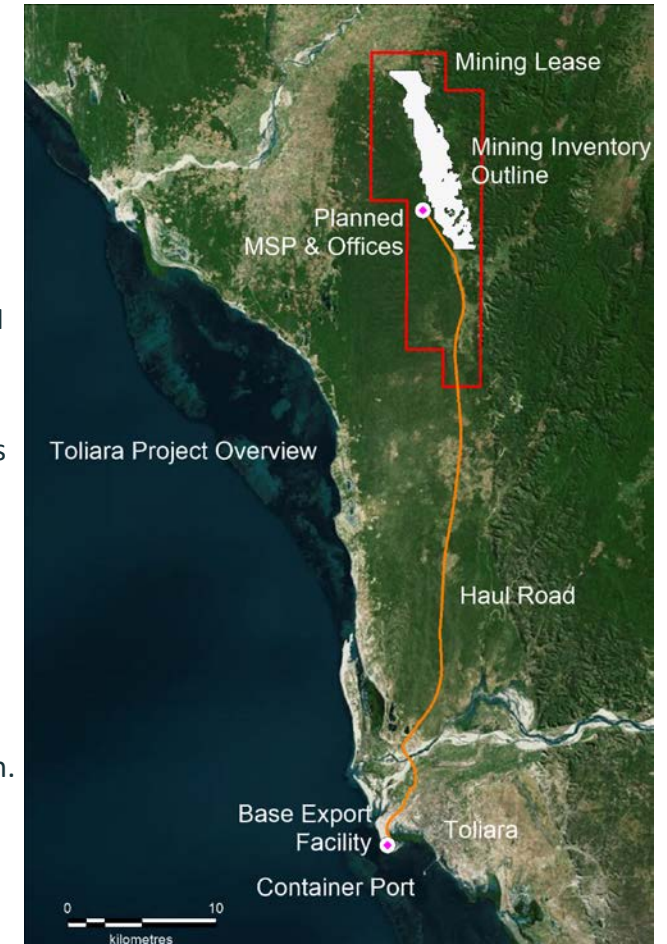
The world class mineral sands Ranobe deposit is located in south west Madagascar, 55km north of the regional port town of Toliara, 18km inland, approximately 640km southwest of Antananarivo, the capital of Madagascar

The Toliara Project

- The Ranobe deposit, which is the basis for the Toliara Project, is situated immediately west of a prominent north-south escarpment.
- The mineralised dune is approximately 16km long, 1 to 2km wide and averages 20 to 30m in thickness. 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 bankable feasibility study was 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 (**AMED**) Fund II purchased a majority stake in WTR and subsequently increased the project scale from a mining rate of 8Mtpa to 12Mtpa. A feasibility study was completed by Hatch.
- **Base Resources** acquired the project in January 2018. The Toliara Project is held by Base Resources' Malagasy subsidiary, Base Toliara SARL (**Base Toliara**).

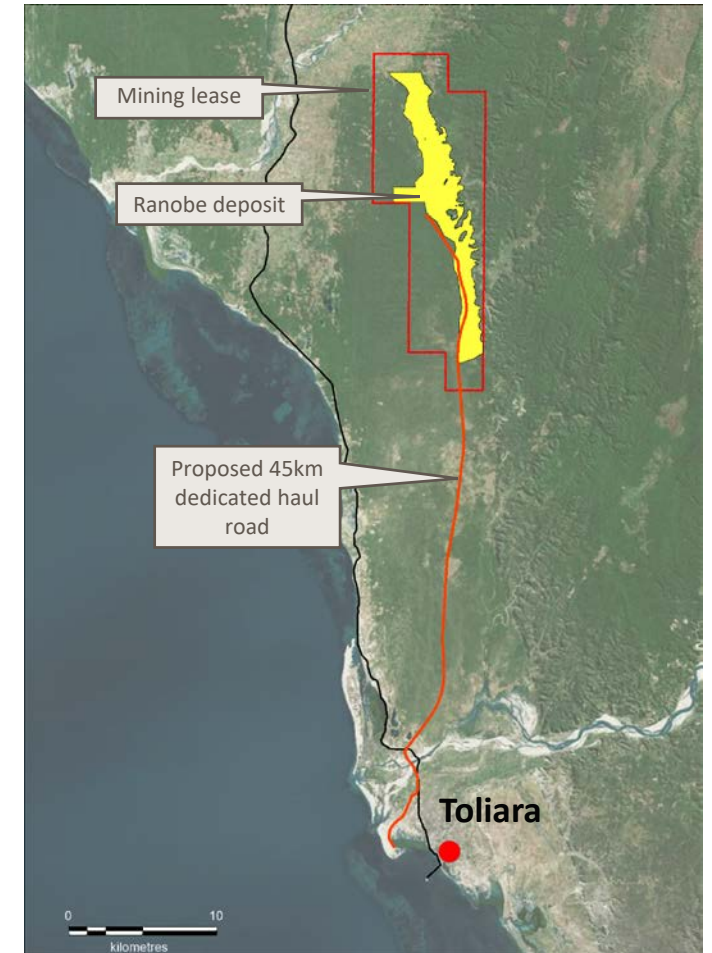
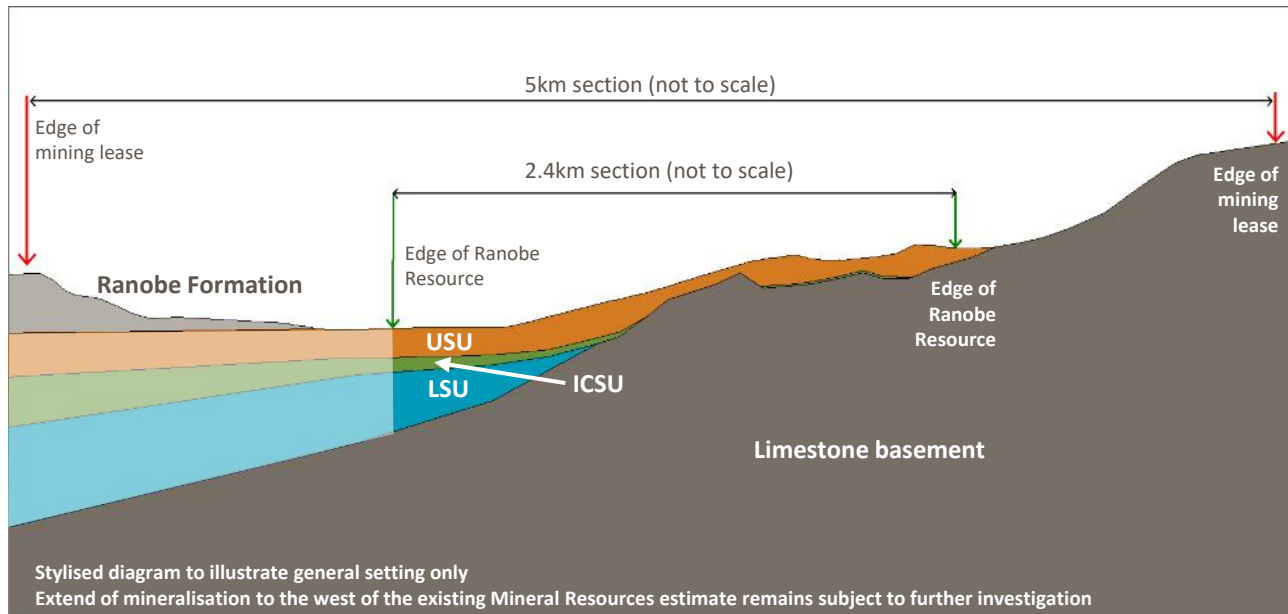


Geology and Mineral Resources

Located 55 kms 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 containing approximately 5% slime or clay (SL) and approximately 6% HM, 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 material averaging 4% HM and 25% SL deposited in a low energy lagoonal environment.
- **Lower sand unit (LSU)** - orange brown to yellow brown medium grained quartz sand with moderately low slimes content. It averages 4% HM and 6% SL. Onlaps the limestone basement.
- The resource thickness generally increases to the west.



Geology and Mineral Resources

A mining lease exists over the entirety of the current Ranobe deposit Mineral Resources estimate

Tenure

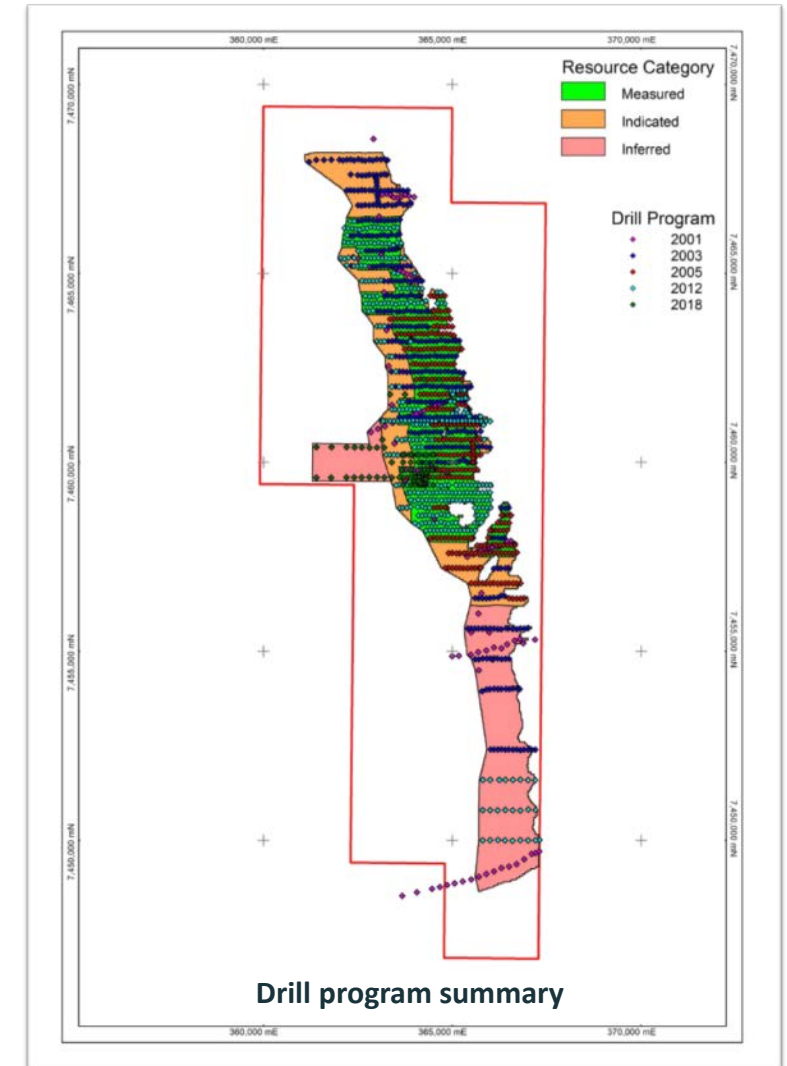
- The instrument securing the resource is Permis D'Exploitation 37242 (**PE 37242**), which is a mining lease under Malagasy law.
- PE 37242 has a term of 40 years from 21 March 2012 (the date of grant of the original pre-consolidation mining lease). PE 37242 may be renewed in units of 20 years thereafter.
- PE 37242 permits exploitation of ilmenite, zircon, leucoxene, rutile, guano, basalt, and limestone.

Drilling

- The Ranobe Deposit has had five reverse circulation drilling exploration programs, the first four by Toliara Sands (or its predecessors) and the last by Base Toliara.
- All drilling programs used Wallis Drilling to perform the drilling.
- Further drilling is planned (approximately 20,000m) to commence during the DFS to complete mineralogy definition, convert Inferred resource to Indicated category, explore western extensions and for better boundary definition.

Historical drilling

Program	Company	# Holes	# Metres
2001	Toliara Sands	121	3,081
2003	Toliara Sands	400	9,424
2005	Toliara Sands	288	6,135
2012	Toliara Sands	363	8,088
2018	Base Toliara	78	3,617
Total		1,250	30,345



Geology and Mineral Resources

The Mineral Resource estimate stands at 1,290Mt at 5.1% HM and 6.4% SL, including 790Mt at 5.8% HM in the Measured & Indicated categories

Resource

- An independent (IHC Robbins) November 2018 JORC compliant Mineral Resources 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.
- The USU Measured and Indicated subset of the Mineral Resources estimate is 720Mt of material @ 6.1% HM.

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 detailed information on the Ranobe deposit Mineral Resources, refer to Base Resources' market 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 market announcement and all material assumptions and technical parameters underpinning the estimates in that market announcement continue to apply and have not materially changed.

Mineral Resources basis of PFS

The total mining inventory, being the Mineral Resources that form the basis of the PFS, stands at 588Mt at 6.6% Heavy Mineral, from Measured and Indicated USU material only

Mineral Resources for the purposes of the PFS

The internal mining inventory utilised for the purposes of the PFS was prepared on the following basis:

- The internal mining inventory was derived from the IHC Robbins JORC compliant Mineral Resources estimate (Measured & Indicated USU only).
- The Resource model was optimised to generate pit shells via industry standard Lerch Grossman algorithm, having considered the following modifying factors (which are materially consistent with those described further in the Marketing, Product Recoveries and Operating Costs analyses):
 - Base Resources' internal product pricing forecasts.
 - PFS test-work derived recoveries.
 - Operating costs based on Kwale Operations' experience, adapted for the Toliara Project.
- A shortlist of four pit shells (60%, 65%, 70% and 75% of revenue) were scheduled at high level and input into the detailed financial model to select the optimum pit.
- 70% revenue pit shell selected on the basis of better financial metrics (weighted towards NPV and revenue:cost ratio) and a detailed block model and mining schedule was then developed. This included planned dilution of approximately 5% of sub-economic material near the pit floor to cater for mineable pit floor slopes, which results in some mining blocks partly comprising material from lower geological units.
- A 95% mining recovery has been applied to the total volume of the scheduled mining blocks in recognition of mining losses near pit edges and floor which, on balance, offsets the dilution material tonnage.

The outcome of the above is an internal mining inventory of 588Mt of which 367Mt is classified as Measured and 220Mt is classified as Indicated. With further planned drilling and resource definition during 2019 expected to add to the mining inventory, a JORC compliant Ore Reserve is proposed to be generated prior to FID.

Toliara Project PFS Mining Inventory

Category	Mining Inventory			M&I [†] Resources	Conversion
	Measured	Indicated	Total M&I [†]		
Zone	USU	USU	USU	USU	
Tonnes (Mt)	367	220	588	720	82%
HM %	6.9	6.0	6.6	6.1	
HM tonnes (Mt)	25	13	39	44	89%
Slimes %	4.7	5.3	4.9	3.9	
OS %	0.3	0.5	0.1	0.3	
Ilmenite % of HM	75	73	74	74	
Rutile* % of HM	1.9	2.1	2.0	2.0	
Zircon % of HM	5.9	5.7	5.9	5.8	

Table subject to rounding differences

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

† Measured and Indicated Mineral Resources.

Refer further to page 7 for detail of the Ranobe deposit Mineral Resources estimate.

Mining Approach

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

Planned mining activity cycle

- **Scrub clearing** – removal of trees and scrub by dozers, front end loader (**FEL**) and dump truck. Stockpiled for community use or mulching.
- **Topsoil stripping** – via FEL, dozer and dump truck with dust suppression and grader use. Stockpiled for later rehabilitation or directly placed onto rehabilitation areas. The aim is to preserve seed viability by minimizing time in stockpile.
- **Mining** – via D11 dozers, in 200m x 100m blocks, into the dozer-trap mining unit (**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 wet concentration plant (**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 level, and worked by dozer into fine tails evaporation ponds.
- **Fine tailing** – Flocculated clay tailings from the thickener at the WCP is pumped to evaporation ponds built on coarse tails. Initially, until enough coarse tails area is available, some ponds will be constructed on ore, and the dried tails removed to allow mining later on. 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 dozer into the coarse tails to make a nominal 2m thick water retention layer at the surface, graded into final landform and topsoil replaced on top via FEL, dump truck and dozer or grader. Then the area will be ready for rehabilitation.
- The process from scrub clearing to final rehabilitation is expected to take 3-4 years



Mining Schedule

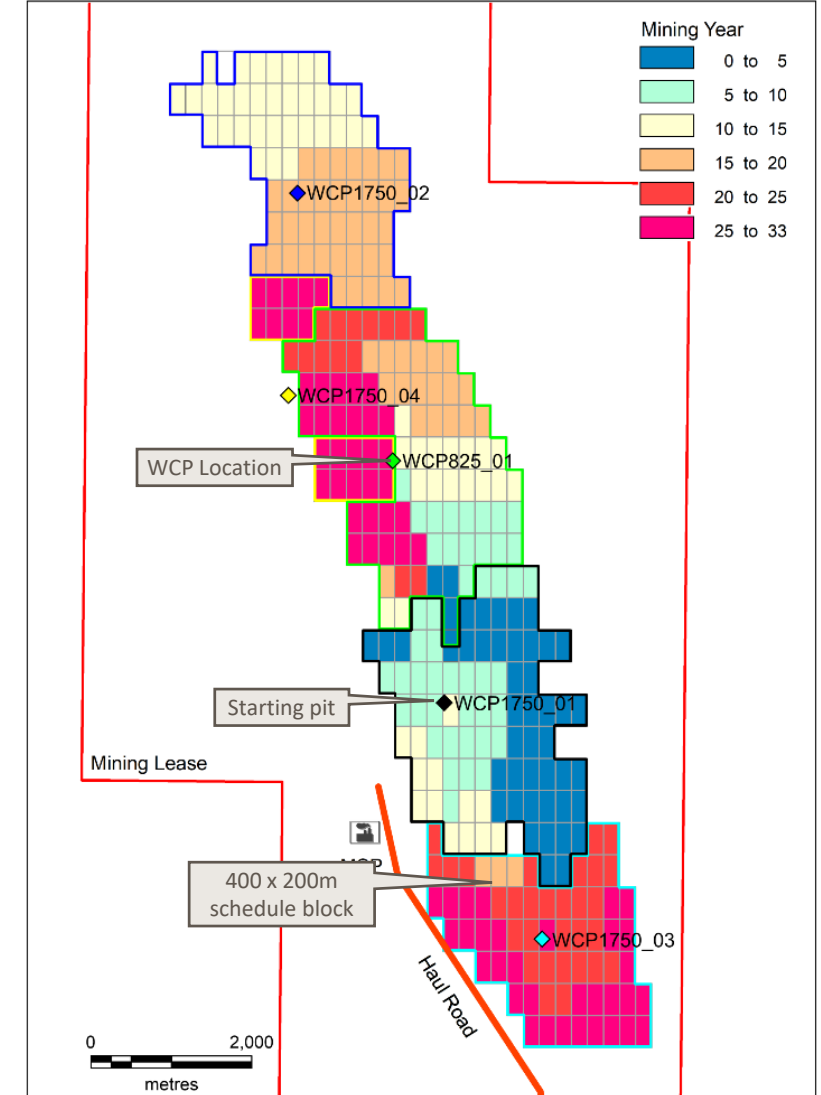
Mining will involve D11 dozers feeding a DMU to deliver 13Mtpa to the WCP in the first 3.5 years before increasing to 19Mtpa for the remaining of the mine life

Mining Schedule

- **Stage 1:** 0-3.5 years - Single DMU and Wet Concentration Plant (WCP), D11 dozer fleet of 3 feeding the initial wet concentrator plant (WCP1) at 1,750tph, or 13Mtpa. Mining of high grades (avg 9.1% HM).
- **Stage 2:** 3.5-32.5 years – Additional DMU (DMU2) and WCP (WCP2) operating at 825 tph. Combined mining rate of 2,475tph or 19Mtpa, total D11 fleet of 4. Avg grade of 6.4% HM.
- 1,750tph **WCP1 moves** in operating years 11, 19, 29.
- 825tph WCP2 does not move.
- The increase to a 19Mtpa mining rate is subject to obtaining appropriate environmental permitting.

Water Consumption

- **Stage 1:** 660m³ per hour.
- **Stage 2:** 882m³ per hour.
- Approved **bore-field abstraction:** 886 m³ per hour.



Proposed Mining Schedule

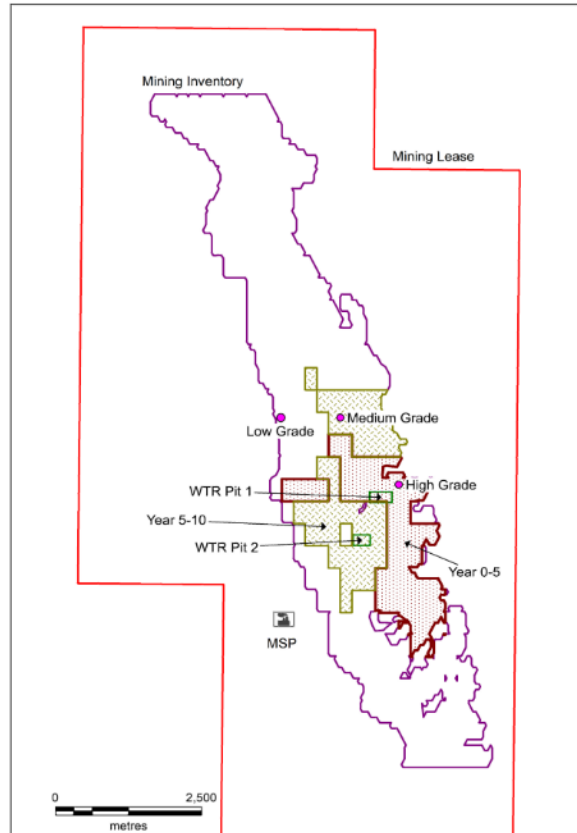
Metallurgical Testwork and Flowsheet Design

Building on historical testwork, the primary focus of the 2018 metallurgical testwork program was to advance flowsheet design for the WCP and MSP and estimate the resultant recoveries and final product qualities

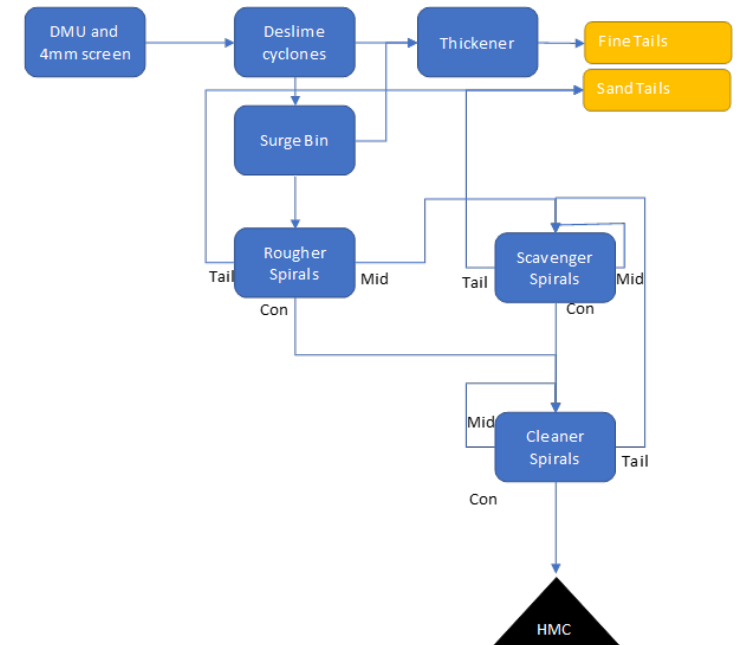
Wet Concentrator Plant

- In early 2018, Base Toliara generated **3 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' resource **mineralogy methodology**, MinModel, was adapted for the Ranobe deposit and used to estimate WCP performance during the testwork to ensure consistency between Resource definition and process design selection.
- The selected **three stage spiral wet gravity circuit** was tested on the three bulk samples using a combination of MG12 and VHG spirals. This was performed by Mineral Technologies in Brisbane.
- The testwork results were **modelled** using industry proven programs to determine the flowsheet design, mass balance and resultant performance metrics.
- **Heavy Mineral Concentrate (HMC) samples** were produced from these bulk samples for further confirmatory MSP testwork and market sample generation - to be undertaken during the DFS.
- Pilot tests on oversize removal, **fines removal and fines thickening** were also undertaken to verify design.

Source of Bulk Testwork Samples



WCP Flowsheet

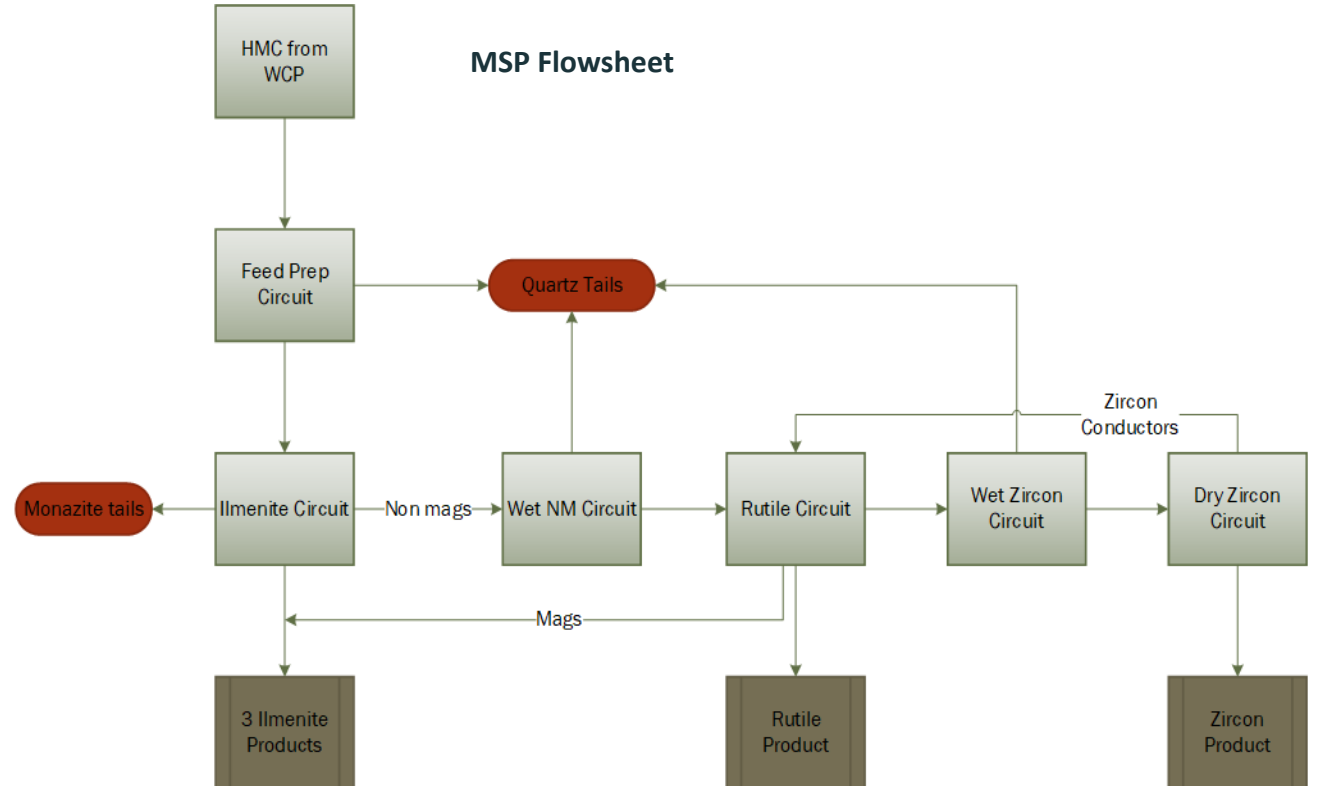


Metallurgical Testwork and Flowsheet Design

Building on historical testwork, the primary focus of the 2018 metallurgical testwork program was to advance flowsheet design for the WCP and MSP and estimate the resultant recoveries and final product qualities

Mineral Separation Plant

- In 2013, previous owners, World Titanium Resources, generated bulk HMC samples from two test pits. Two of these were used for design testwork and to estimate recoveries.
- A comprehensive and iterative series of tests were completed to establish flowsheets for each stage consistent with the design intent:
 - **Feed preparation** – removal of coarse and fine quartz using wet gravity.
 - **Ilmenite circuit** – produce three ilmenite products under varying ore / market conditions and generate a non magnetic stream – magnetic and electrostatic separation.
 - **Wet Non-Magnetic circuit** – remove residual quartz to enable efficient rutile separation – wet gravity separation.
 - **Rutile circuit** – produce a rutile product and a non conductor zircon stream – electrostatic separation.
 - **Wet zircon circuit** – remove alumina silicates – wet gravity separation.
 - **Dry zircon circuit** – remove Fe and Ti contaminants to produce a zircon product – 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 TiO₂ recovery.

Mineral Separation Plant

- **Ilmenite recovery** – derived from the MSP testwork and calculated on a contained basis, an average total recovery (from two bulk samples processed) of **93.6%** 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 contained basis, giving an average total recovery (from two bulk samples processed) of **59.5%**.
- **Zircon recovery** - derived from the MSP testwork, a recovery was calculated for each sub circuit that were multiplied together to give an overall zircon recovery of **79.0%**.
- Leucoxene is also 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 **53.4%** was calculated. No leucoxene is produced as a finished product, instead it is distributed to ilmenite and rutile, 76% and 24% respectively. This increases the recoveries of ilmenite product and rutile product by 0.3% and 14.2% respectively in the MSP.

WCP Recoveries

	Low Grade Ore	Medium Grade Ore	High Grade Ore	Avg	PFS Design
Rutile	97.1	95.8	93.8	95.6	92.4
Zircon	98.5	98.6	98.7	98.6	97.2
Ilmenite	97.1	96.6	96.4	96.7	95.0
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	93.6	93.9
Zircon	79.0	N/A
Rutile	59.5	73.7
Leucoxene	53.4	-

Ilmenite Splits

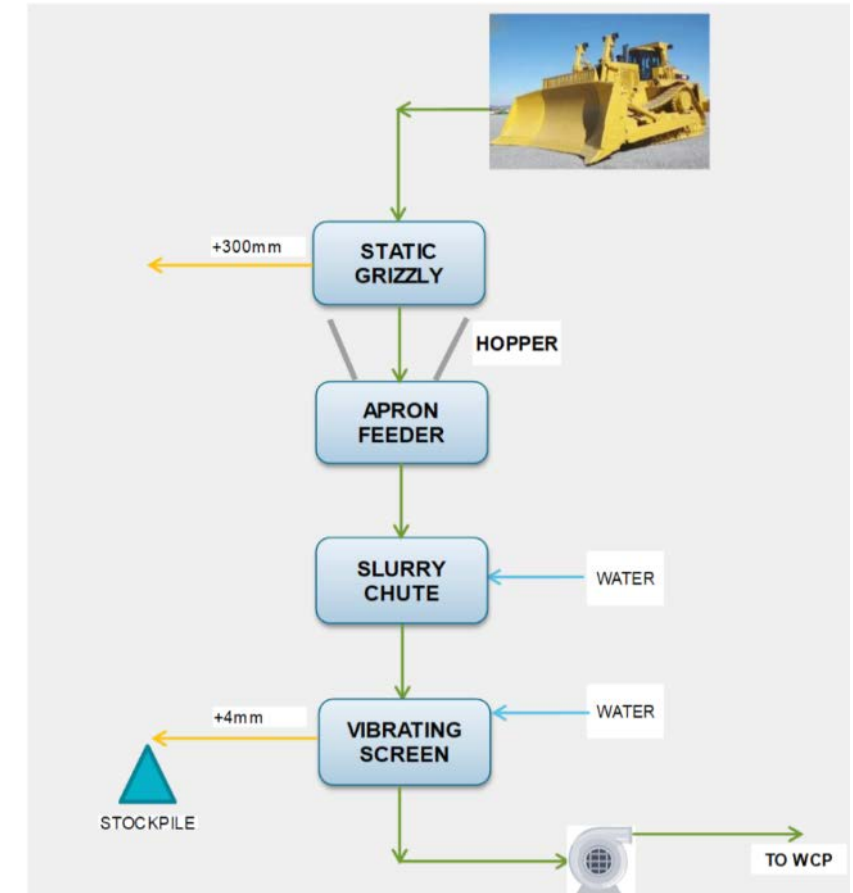
Ilmenite	Proportion %	Target %TiO ₂
Sulphate ilmenite	36.5	48.3
Slag ilmenite	35.0	50.5
Chloride ilmenite	28.4	57.0

Process Engineering – DMU

The processing plants designed during the PFS include the two mining units and associated pumping system, two wet concentrator plants (1750tph and 825tph), 140tph mineral separation plant, water circuit, tails disposal and electrical reticulation

Dozer-Trap Mining Unit (DMU)

- The existing **Kwale Operations DMU** built by Piacentini, which is now redundant, will be refurbished and relocated to Toliara (1750tph). A second and smaller DMU (825tph) will be built and commissioned in year 3.5.
- A **4mm screen** will be installed on the DMU hopper to remove all +4mm material in the mining area.
- **ROM booster pumps** are required 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 dozers), which is anticipated to be every 2-4 weeks.



Process Engineering - WCP

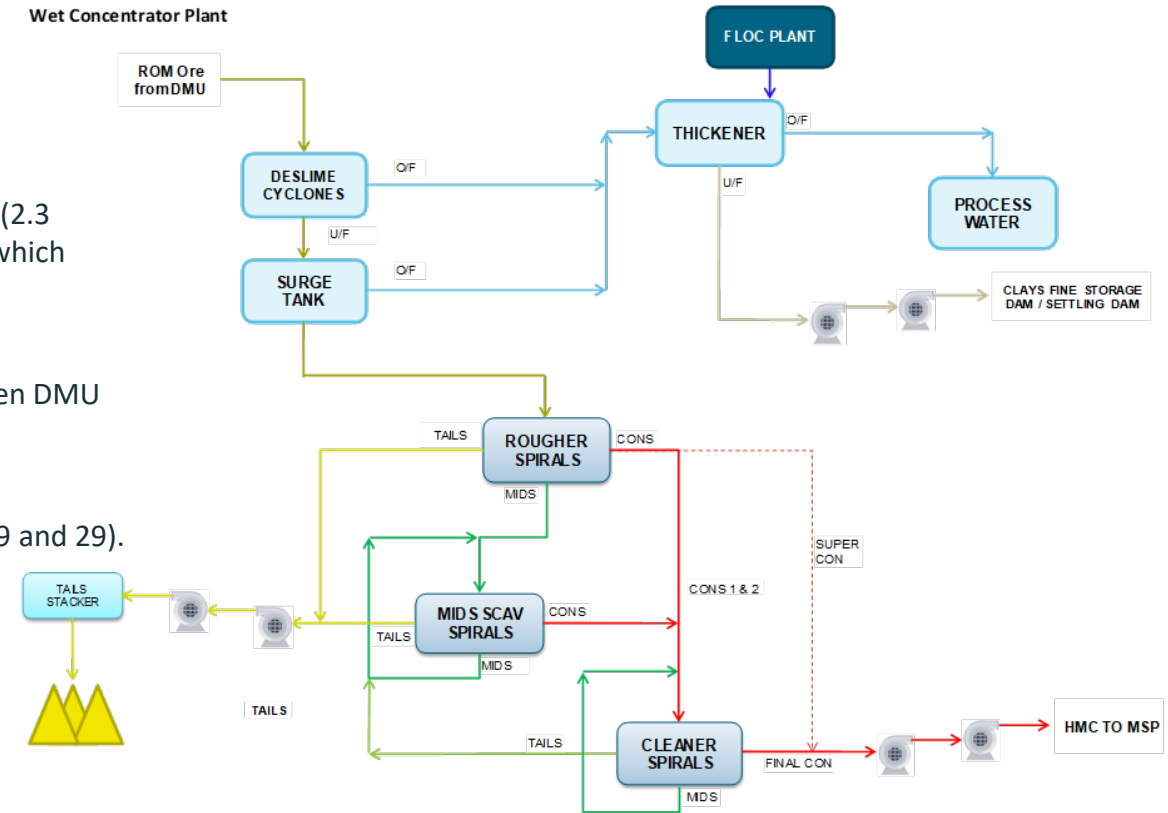
The processing plants designed during the PFS include the two mining units and associated pumping system, two wet concentrator plants (1750tph and 825tph), 140tph mineral separation plant, water circuit, tails disposal and electrical reticulation

Wet Concentrator Plant (WCP)

- The **flowsheet** developed is a **simple three stage spiral circuit** and produces a total mineral concentrate grade >90%.
- De-sliming** cyclone and thickening circuit designed for wide range of ore clay content.
- Triple start MG12 spirals were selected for the **rougher** (2.5 tonnes per start) and **scavenger** (2.3 tonnes per start) duties. This combines two traditional separation stages into a single stage which reduces pumping and plant footprint (reducing capex as well as opex).
- The **cleaner** spirals are twin start VHG.
- Design incorporates a constant density **surge tank** that will provide a one hour buffer between DMU and WCP.
- HMC is pumped to the MSP surge tank with standby capacity to stack HMC at each WCP.
- WCP1 is designed with some **modular elements** to facilitate relocation in future years (11, 19 and 29).



Wet Concentrator Plant



Process Engineering - MSP

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

Mineral Separation Plant (MSP)

- Ilmenite (sulphate, chloride, slag), rutile and zircon **final products** will be produced at the MSP.
- **Ongoing test work** program at IHC Robbins to **verify** the flowsheet.
- **Tall building** (~50m) design adopted with multiple machine floors to reduce operating cost (reduced materials handling equipment and drives).
- The MSP is not relocatable and **all major mine infrastructure is located at the MSP** site (including power generation, administration, workshops, stores and camp).
- Final products will be stored in **1000t bins** (500t 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.

Electrical

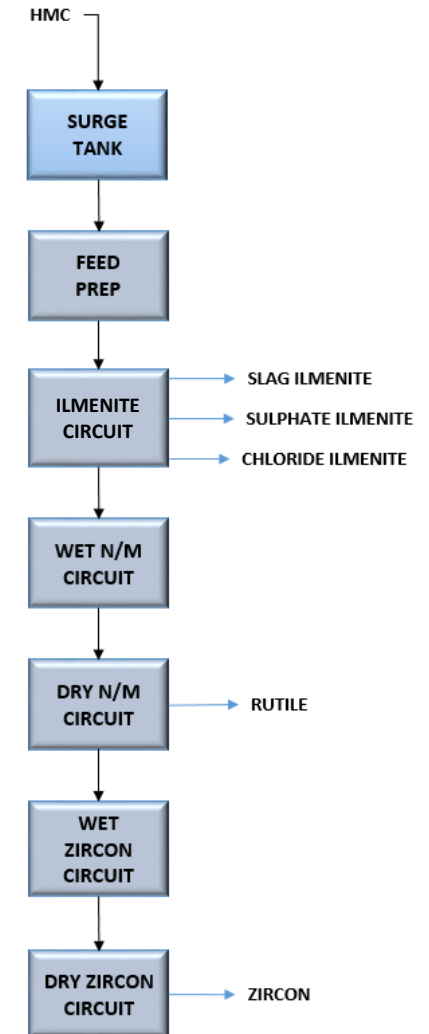
- Majority of the power requirements are in **pumping**.
- Site HV reticulation is at **11kV**.

Control Systems

- **Fully automated** supported by instruments measuring density, flow, level, temperature, tonnage etc..
- The operator interface system is typical of SCADA (supervisory control and data acquisition) systems. The SCADA monitors and controls instruments in the plant through a programmable logic controller located in instrument junction boxes inside each switchroom.

PFS design outputs

- A number of deliverables were produced as part of the PFS design progression:
 - Processing plant 3D models
 - Process design criteria [2]
 - Process flowsheets [9]
 - Mechanical equipment list [2]
 - WCP and MSP general arrangement drawings [53]
 - MSP earthworks arrangement drawings [36]
 - Electrical load list [2]
 - Single line diagrams [24]



Marketing – Product Quality

Testwork indicates the targeted specifications for all products are achievable and suitable for a wide range of applications

Ilmenite Quality

- Producing three ilmenite products with qualities that specifically target different ilmenite markets maintains flexibility and optimizes overall revenue value.
- Processing plant design flexibility and testwork indicates that qualities can be adjusted to respond to ore variations and market requirements.
- Sulphate ilmenite** – similar quality to Kwale Operations ilmenite which suits a major portion of accessible market for sulphate pigment production in China.
- Slag ilmenite** – a higher TiO_2 (>50%) makes this attractive to chloride and sulphate slag producers.
- Chloride ilmenite** – a >57% TiO_2 suits direct feed chloride pigment production as well as Chinese slag production.
- Initial marketing samples for all ilmenite products have been sent to customers for assessment. Feedback to date, confirms suitability for target applications.

Zircon Quality

- Testwork indicates that a good standard grade zircon product (>65.5% $\text{ZrO}_2+\text{HfO}_2$ and <600ppm U+Th) will be produced.
- The quality is acceptable to all key end use sectors, particularly in China.
- Elevated levels of U+Th (above an industry norm of 500 ppm for premium zircon) may limit access to some geographic markets (e.g. Japan and USA will not currently be accessible).

Rutile Quality

- Testwork to date indicates that a rutile suitable for chloride pigment production will be produced.
- A TiO_2 of 95.0% is able to be produced (with an option to go down to 93.5% if significant recovery benefits can be achieved). DFS testwork to confirm final specifications.

Indicative Product Specifications

ILM %	Kwale Typical	Sulphate Ilmenite	Slag Ilmenite	Chloride Ilmenite
TiO_2	48.2	48.3	50.5	57.0
Cr_2O_3	0.09	0.1	0.1	0.1
CaO	< 0.01	n/a	n/a	< 0.01
MgO	0.8	0.6	0.5	0.3
MnO	0.6	0.8	1.0	1.5
Fe_2O_3	20.0	18.9	26.6	30.7
FeO	25.5	29.6	18.6	6.0
U + Th	60ppm	35ppm	63ppm	177ppm

Zircon %	
$\text{ZrO}_2+\text{HfO}_2$	> 65.5
TiO_2	< 0.15
Fe_2O_3	< 0.15
Al_2O_3	< 1.3
U + Th	< 600ppm

Infrastructure

Existing infrastructure required for the development of the Toliara Project is limited. The project scope addresses this through building a product haul and access road, a dedicated export facility, a hybrid power plant, a 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 abnormal construction loads (northern section) or road train product haulage. The 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 and unreliable and currently not adequate for the new export facility site.
- There is limited existing accommodation at Toliara for the anticipated non-local construction and initial operations personnel requirements.
- There is no suitable sewage treatment facilities in the area but there is a recycling plant some 10 kms north of Toliara.
- Toliara has a diesel bulk storage facility at the port but currently no HFO storage capacity.

Roads

- Initial construction access will be via the RN9 and by upgrading an existing road westwards and then extending it to the planned mine site. Early haul road construction (see below) will allow later construction access (particularly for the larger abnormal loads).
- A 45 km long, sealed, dedicated, haul and permanent access road, including a new 630 metre long concrete bridge over the Fiherenana river, will be built. Provision is made for several community crossing points as well as a safe RN9 cross over. The bridge will be designed to withstand 1:100 year floods.



Infrastructure

Sufficient engineering design and market testing has been undertaken to ensure PFS accuracy level Capex and Opex estimates for the new infrastructure requirements

Water

- Ground water modelling (by Knight Piesold) has confirmed the ability to sustainably source the required make-up water for the 19Mtpa from two borefields within the mining permit area.
- Raw water requirement is 882m³/hr. The net groundwater abstraction associated with this equates to approximately 9% of the estimated recharge.
- Installation of production bores to enable step testing is planned during the DFS / FEED phase.

Power

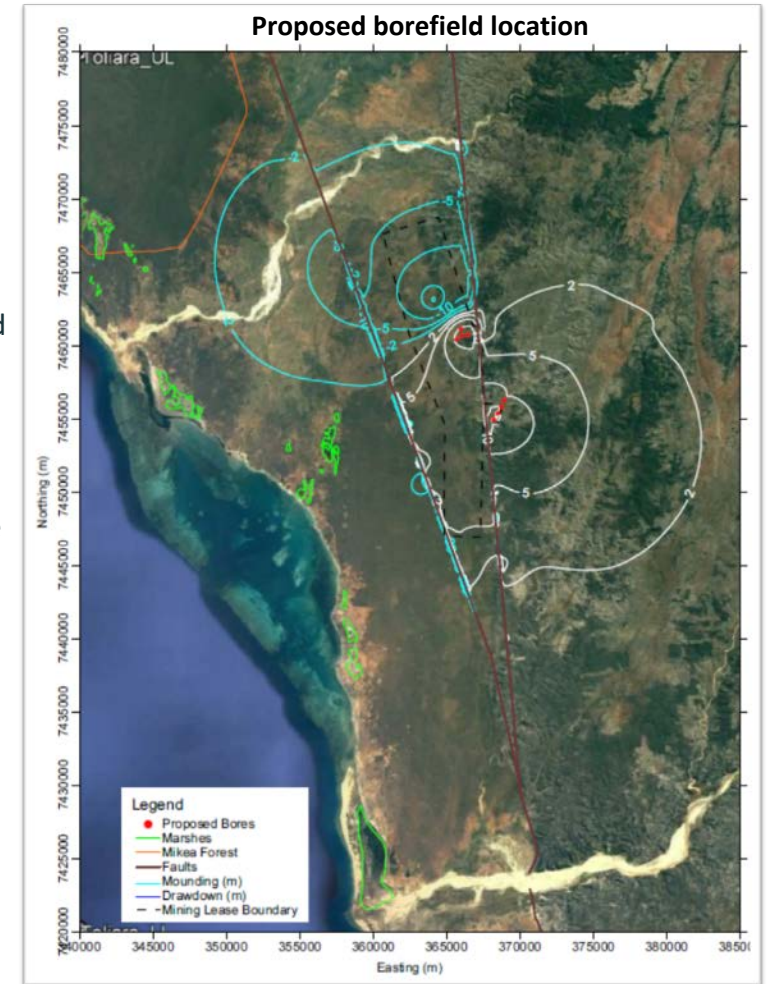
- Power for the mine site will be supplied by an Independent Power Producer (IPP). Generation will be based on a hybrid HFO, solar PV and battery system located near the MSP and camp. Design will aim at optimising solar contribution.
- Total installed power (Stage 1 and Stage 2) is estimated at 18 MW with an average usage of ~ 12MW.
- Stage 1 (1st 3.5 years) installed power is estimated at 14.5 MW with an average usage of ~ 9.5MW.
- Export facility power will be self generated using high speed diesel generators with a small contribution of solar for the offices.

Camp

- An operations camp will be constructed to house up to 668 persons during construction or 234 during operations for expatriate and non-local skilled personnel. Malagasy 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 longer lasting block building methodology.

Waste Treatment

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



Infrastructure

Sufficient engineering design and market testing has been undertaken to ensure PFS accuracy level Capex and Opex estimates for the new infrastructure requirements

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, landscaping etc all as required for future operations.

Product Haulage

- Approximately 860kt of product annually will be hauled from mine to the export facility by a transport contractor utilising 90 tonne 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 of rutile, with a separate shed to store 15kt of zircon.
- Ground improvement is required for the shed foundations.
- Material handling operations will utilise front end loaders fitted with push arms, similar to Kwale Operations.
- A 550m long jetty with conveyor will load vessels up to Ultramax draft (63kt) moored on a multi-buoy mooring berth.
- A medium size tug and a mooring line handling vessel are provided for.



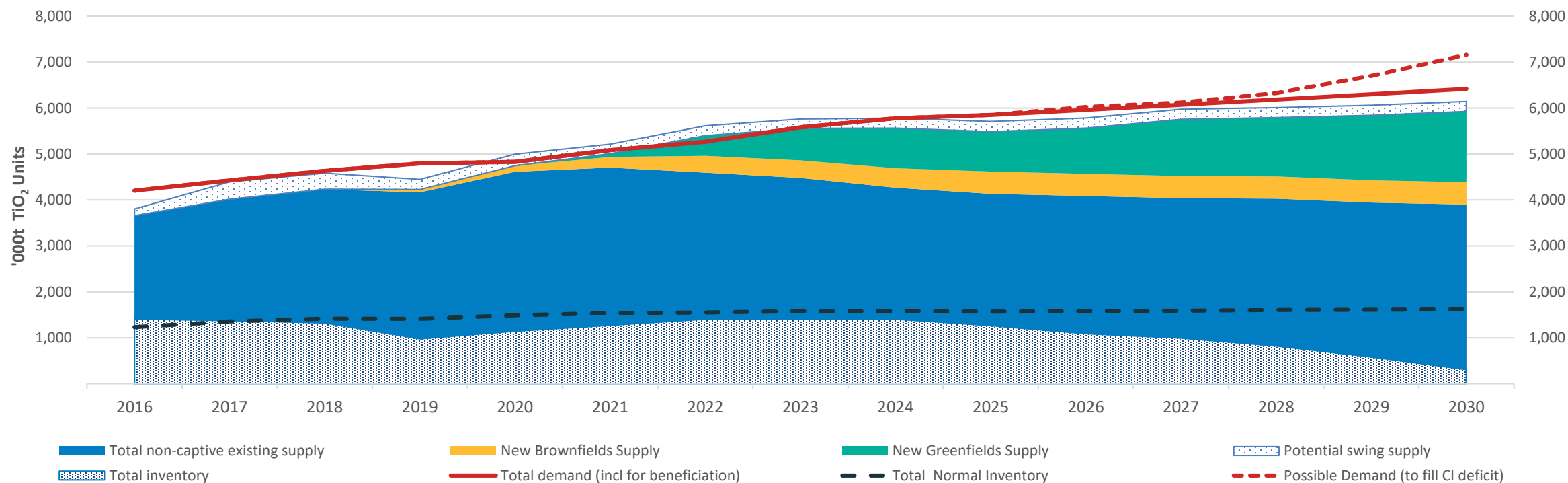
Proposed export facility storage shed and jetty

Marketing Outlook – Sulphate TiO₂ Feedstock

Future sulphate feedstock supply deficit is forecast, providing robust support for 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 (FOB) are generally required to stimulate swing supply.
- Demand for sulphate ilmenite as a feedstock for chloride feedstock production is expected to grow strongly 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.



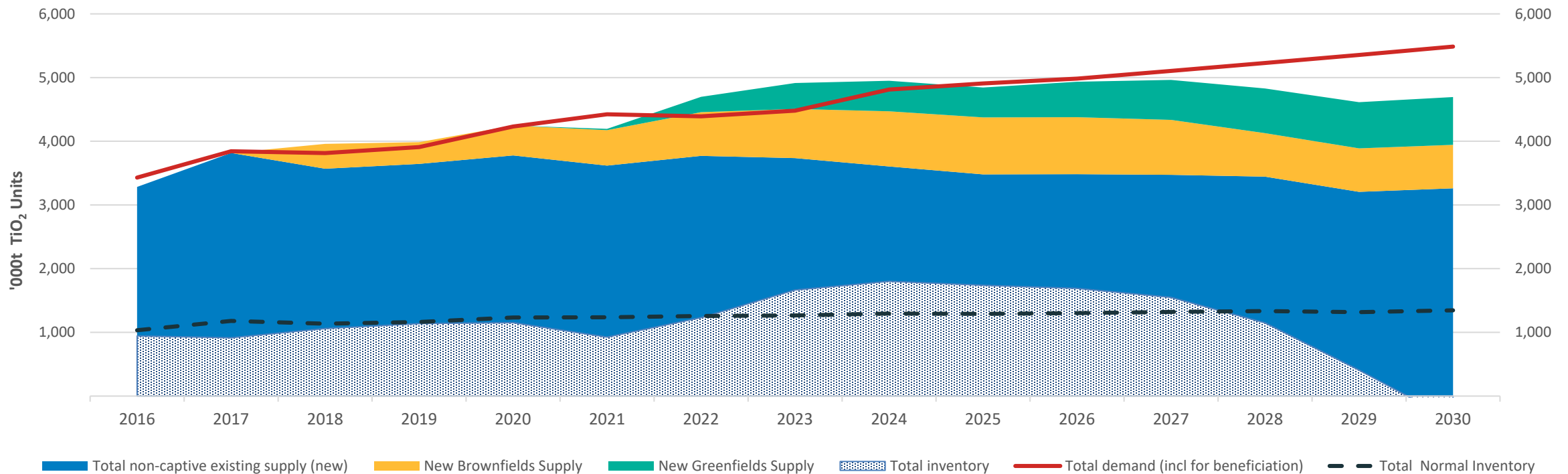
* Base Resources internal analysis. Refer to page 24 for the applicable methodology for this analysis.

Marketing Outlook – Chloride TiO_2 Feedstock

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

Chloride Ilmenite and Rutile

- Longer term deficits for chloride pigment feedstocks are forecast, which support a positive outlook for rutile and chloride ilmenite from the Toliara Project.
- Toliara Project chloride ilmenite will add ~ <3% to overall chloride feedstock supply.
- Demand for chloride ilmenite, driven by major pigment or feedstock producers, would easily absorb this and these producers have the capacity (and preference) to consume much more chloride ilmenite than is currently forecast to be available.
- 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.



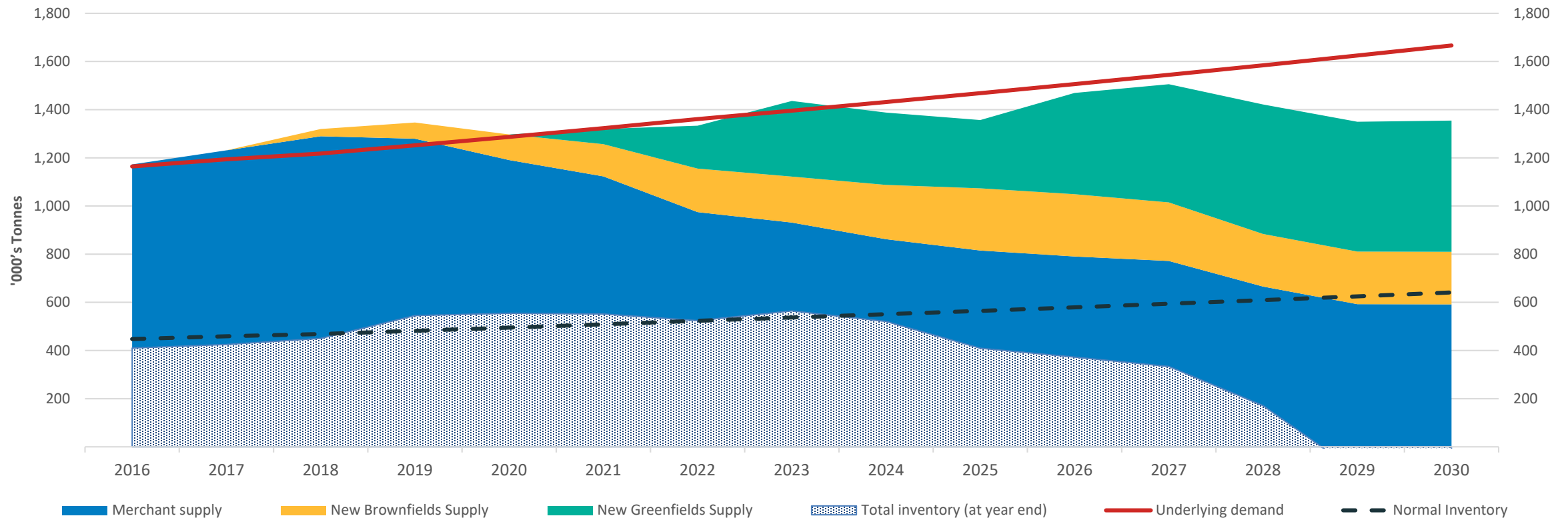
* Base Resources internal analysis. Refer to page 24 for the applicable methodology for this analysis.

Marketing Outlook - Zircon

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 major suppliers to manage this in the medium term.
- In the long term there are emerging shortages forecast.



* Base Resources internal analysis. Refer to page 24 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

PFS 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 the TZMI long-term inducement rutile price on a historical relative economic value basis, using a discount multiple of 4.7, consistent with Base Resources' internal price forecast methodology, resulting in a lower price than forecast by TZMI.
- Prices transition between 2030 and 2035 in a straight line.
- All 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 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	\$154	\$174	\$183	\$174
Slag ilmenite	\$162	\$183	\$193	\$183
Chloride ilmenite	\$241	\$256	\$233	\$238
Rutile	\$1,267	\$1,321	\$1,142	\$1,198
Zircon	\$1,822	\$1,650	\$1,450	\$1,576

Execution Strategy

Toliara Project is a complex “greenfields” project that will be constructed on a remote site in a developing country with limited construction resources. The execution strategy factors this in, incorporates Base Resources’ experience delivering and operating Kwale Operations and ensures a well defined approach through distinct project development phases

Toliara Project Execution Strategy

A number of factors drive the preferred 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 a high cost option with minimal increase in 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 Kwale Operations project delivery and operation.
- **Outsourcing** or fixed price where Base Resources doesn’t have the requisite knowledge (e.g. power supply) or competitive value is tied to a contractor's unique methods or capability (e.g. marine and power).

The preferred broad delivery approach is as follows:

- Mining – **Owner Implementation**.
- Processing plants and field services – **EPCM**.
- Infrastructure – **EPCM**.
- Jetty, shiploader and marine infrastructure (export facility) – **EPC**.
- Power supply – **IPP**.

Project Development Phases

Definition Phase (DFS) defines the selected investment option further, ensures requisite scope definition, confirms the business case and plans for the Execution Phase.

FEED and Early Works. To meet the overall schedule the export facility shed piling, road, bridge, jetty and power plant construction are proposed to start immediately following FID. Therefore construction (of the camp) as well as FEED work needs to start prior to FID.

Final Investment Decision (FID). The Board considers the DFS, market conditions and funding availability in order to make a FID. Three months are allowed between the end of the DFS and FID (March 2020).

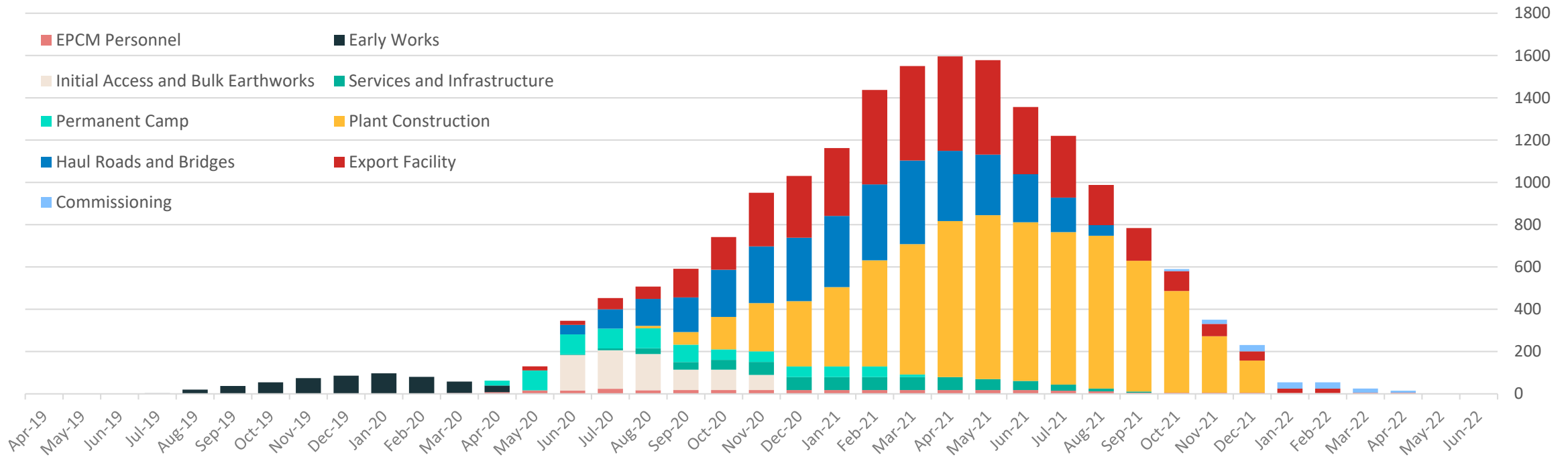
Implementation is planned in two stages.

- **Stage 1** includes DMU1, WCP1, MSP, roads, bridge and export facility and all of the associated infrastructure and is scheduled over 24 months from April 2020 to March 2022.
- **Stage 2** comprises the construction of a second DMU and WCP during the 2024 calendar year.

Transport and logistics will be a significant component of the Toliara Project and an experienced logistics contractor will be engaged to manage freight forwarding, clear customs and organise road transport to site.

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 1,600

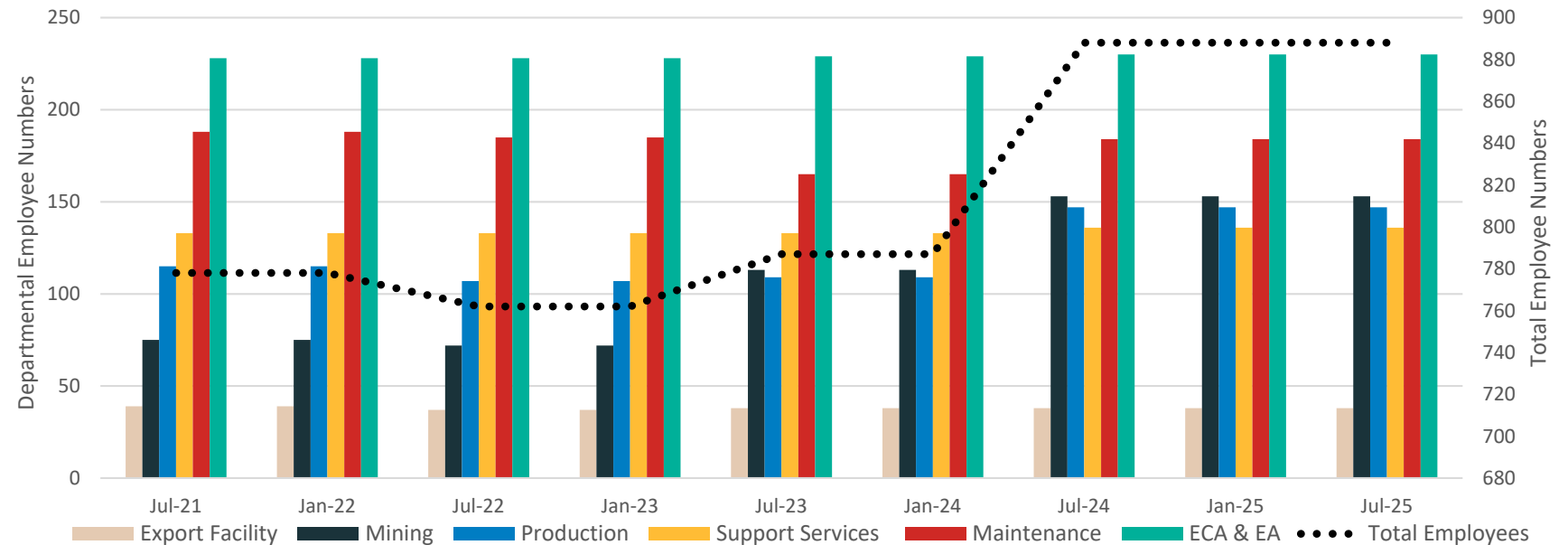


- Peak workforce of approximately 1,600 personnel excluding Base Toliara's operational, community, environmental and administration personnel.
- Approximately 700 to 800 non-local Toliara contractor personnel (including expatriates) along with 600 to 700 local unskilled workers will be on site for over 15 months.
- The camp facilities to be completed early and are sized to cater for the non-local workforce and supervisory staff working on the process plant site facilities.
- Local Toliara people and the contractors working on facilities, other than the process plant site construction activities, will be accommodated within the existing Toliara and local towns.

Operational Workforce

A detailed manning ramp-up plan has been developed using Kwale Operations experience to estimate the requirements for the operational phase. A total of 778 employees is forecast for start-up at October 2021, plus an additional 253 contractors (combined workforce of 1,031)

Oct 2021 Start-up	No. of People
Unskilled	333
Semi-skilled	277
Professional	45
Supervisors	76
Superintendents	33
Managers	14
Total Employees	778
Contractors	253
Combined workforce	1,031



- A combined workforce of 1,031 is expected to be in place for the late 2021 start up, increasing to 1,140 once the second mining unit and concentrator is installed.
- 610 unskilled and semi skilled people are expected to be employed mainly sourced from the local Toliara region. 71 expatriates are estimated to be required at start up in 2021 reducing to 27 by the time the second mining unit and concentrator are in operation.
- Accommodation objectives balance a number of factors including community impact, benefit to the community, availability of accommodation, fit for work imperative, attraction and retention of requisite capability.
- On-site camp accommodation is planned for expatriate FIFO, shift workers working night shifts, rostered 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.

Operational Management and Readiness

Early capability and capacity building programs are underway in order to develop Toliara regional skills in semi-skilled, skilled and professional categories prior to the operational phase

Operating Philosophy

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

- Mining – owner operator.
- Processing – owner operator.
- Administration – owner operator.
- Product transportation – contractor.
- Export facility operation (Land) – owner operator.
- Export facility operation (Marine) – owner operator or contractor (TBC).
- Power generation – Independent Power Provider (IPP).
- Laboratory Services – contractor.
- Camp services – contractor.

Operating and Construction Readiness

The skills required to commission, start up and continuously operate the Toliara Project are not readily available in Toliara and need to be augmented with specific mining and processing training and work experience in order to reach acceptable capability.

A comprehensive **early capacity building** program is underway:

- Registering of > 5000 local people for traineeships – February 2019.
- Progressing approximately 1000 people through a selection process to select between 200 and 500 people to train – April 2019.
- Commencing construction and operational traineeships.

Planned **traineeships** over the next three years include:

- Heavy Mobile Equipment – Operators.
- Apprentices – Kenya and Madagascar.
- Graduates – Kenya (Mets/Chem Engineers, Mining Engineers, Mechanical Engineers (planners), Safety and Environmental Professionals).
- Wet Trades.
- Basic safety training.
- Language skills and soft skills.
- Camp operations.
- Lifting.
- Marine.
- HDPE.
- Supervisor.

Stakeholder Engagement

Stakeholder Mapping

Stakeholder mapping is undertaken to understand the potential for persons, organisations and institutions to play a supportive or disruptive role in development of the Toliara Project. The process of identifying the various stakeholders requires in-depth analysis of the stakeholders' ability to influence Toliara Project development and implementation.

A stakeholder mapping exercise, concentrating on high-level stakeholders, was completed immediately following project acquisition by Base Resources. In conjunction with previous mapping performed during the Environmental and Social Impact Assessment (ESIA) study by WTR, Base Resources has been able to establish a sound understanding of the "on ground" situation in the Toliara Project area. A further stakeholder mapping exercise is currently being undertaken to provide more insight into local communities and the dynamics shaping communities' perceptions and influence. This is planned for completion by end Q2 2019.

Consultation Process

Community consultation programs have been commenced to improve information sharing and bring communities and other stakeholders closer to the project. The structural elements of the Community Stakeholder Engagement Plan (CSEP) are being developed with some activities already underway. An overview of the CSEP process and participants is as follows:

- The SCRC (or the **Regional Coordination Committee** in English) was established by the Government to manage stakeholder engagement during the WTR era and assist with organising WTR's activities such as exploration and ESIA studies. It comprises 45 members and sits monthly to discuss progress, grievances and give feedback. The Chief of Region (the senior most administrative position in the region) is the Chairman. Its current function remains focusing on high-level communication and information sharing amongst regional players.
- The **Resettlement Working Groups** (RWGs – one for the mine site and the other representing those along the haul road and at the export facility site) are committees that have been established to bring together communities that will be subject to resettlement requirements of the project, enabling them to participate in 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 that have a participatory role in delivering positive resettlement outcomes aligned to IFC Performance Standard 5 – Involuntary Resettlement.

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 of obtaining surface rights is:

- Establish title/ownership – only a small number of land parcels required for the Toliara Project have an existing title (106 of 1041), the rest are held through customary interests.
Completed
- Agree/determine land value. There are two options available for this, both of which are being progressed in parallel:
 - Private treaty negotiations directly with landowners. **In progress**
 - Compulsory acquisition of land through process called Declaration of Public Utility (**DUP**), described further below. In order to call upon the Government to acquire land under the DUP, Base Toliara must have first attempted to reach agreement via private treaty negotiations. **In progress**
- As Base Toliara can't own land, it must fund the Government (on the basis of values determined above) to:
 - Acquire land titles where available; or
 - Acquire the customary interests where no land title exists.
- Where the Government acquires customary interests, a title must be created for that land in the name of the State.
- Negotiate a lease with the Government for the surface rights to the land held by the Government.

Subsequently, a total of **20 households** on the land to be acquired for the Toliara Project will be relocated in compliance with IFC Standards. The above process does not extend to dealing with livelihood replacement, the relocation of tombs and other requirements under IFC Standards which Base Resources seeks to comply with. Activities of the RWG run in parallel seeking to ensure legal and IFC compliance.

Land Acquisition - DUP Process

An overview of the Declaration of Public Utility (DUP) process:

- The process commences with public notification of the intention to undertake compulsory acquisition. **Completed**
- Affected persons are given 30 days to register their interest. **Completed**
- Following this, the DUP Decree is issued and land parcel identification and socio-economic studies are completed. **Completed** (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).
- A list of land interests is prepared and posted in the community for a 30 day public review period. **Completed 18 February 2019**
- Following the review process the issuance of the Act of Transferability confirms land parcels impacted by the Project. This Act must be issued within 12 months of issuance of the DUP Decree or it expires. **Application in progress**
- Concurrently the Evaluation and Compensation Committee (**CAE**) is established to manage the final steps. The CAE is responsible for confirmation of eligibility of landowners of each of the parcels listed and the evaluation of any associated private assets. Following this, negotiation of compensation rates is undertaken, culminating in agreed amounts for the various assets involved. **CAE established – eligibility and values being determined**
- Once compensation amounts are finalised the CAE will advise Base Toliara of the total cost of compensation.
- Following payment of the compensation amount to the Government, the compulsory acquisition is finalised by transfer of title to the Government.

Community Development & Local Content

Community Development

Base Resources recognises that community development plays a significant role in building positive relationships with local people and ensuring they also benefit from development of the Toliara Project mineral resource.

Base Resources' approach is focused on reaching out to communities in specific areas of development:

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

A Community Development Management Plan for the Toliara Project will be developed based on a needs assessment carried out in consultation with affected communities, NGOs and regional authorities.

Funding for community development activities will be by way of:

- Malagasy law requires distribution of 70% of mineral royalties to communities in the impacted region, specifically those communes affected by the Project.
- Annual community development expenditure of \$2 million from commencement of operations.
- Expenditure of \$2.5 million prior to the commencement of operations.

Employment & Local Content

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

Base Resources has developed a Labour, Recruitment and Influx Management Plan (**LRIMP**) which 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.

The procurement of goods and services from locally based organisations to allow for greater 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 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 just 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, it is within the Madagascar and Indian Ocean Islands Biodiversity Hotspot as designated by Conservation International. Despite tremendous 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 124,000km², and it falls into the deserts and succulent shrublands habitat type of Madagascar, and is 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, and very little is 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.

Environment

Regulatory Framework

- Environment Permit No 55-15/MEEMF/ONE/DG/PE granted and valid.
- Approved Environmental Management Plan (EMP) in place.
- The Construction Environment and Social Management Plan (ESMP), to be prepared during DFS and submitted to Office National Pour l'Environnement (**ONE**) three months prior to commencement of construction, will present project changes for Stage 1 of the Project. Future changes will be presented during subsequent Construction and Operational ESMPs prepared ahead of future phases.
- Operational ESMPs will be prepared and submitted to ONE three months prior to commencement of operations.

Base Resources is committed to international best practice

The Toliara Project will develop and operate a comprehensive Environmental and Social Management System (ESMS) developed to meet the requirements of:

- Base Resources policies.
- Malagasy legislative requirements.
- International best practice, including:
 - Equator Principles.
 - IFC Performance Standards.
 - EHS Guidelines.

Environmental and Social Management System

- ESMS will give effect to Base Resources' commitments.
- ESMS based on a "Plan-Do-Check-Act" business performance improvement cycle utilising risk and impact assessment as a key tool.

ESMS components will include:

- Baseline studies – update of previous studies, new studies and modelling.
- Comprehensive environmental monitoring program, including an ecological monitoring program.
- Environmental programs to support Base Resources' commitment to improving biodiversity, promoting conservation and sustainability.
- Establishment of an indigenous tree nursery to research propagation methods of the region's unique flora.
- Establishment of biodiversity corridors.
- 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 recently concluded Presidential elections (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. Parliamentary elections are to be conducted in May 2019.

Government support

The President has expressed support for development of the Toliara Project both during the election campaign and subsequently. This, combined with statements from key advisers, is considered to represent a genuine commitment by the Government to support the Project's development.

A structured and intensive stakeholder engagement strategy is focused on rapidly establishing and building relationships with the relevant national and local government authorities.

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

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 expropriation is considered low.

A royalty is payable to the Government based on the value of the product extracted. The Mining Code 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. 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.

LGIM Explained

Overview

The Large Mining Investment Law, or **LGIM**, 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 LGIM

- Guaranteed stability of taxes and 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.

LGIM application process

Base Toliara is preparing its application for certification under the LGIM, with this application planned to be finalised and submitted in the coming quarter. 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.

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.

Key Project Development Approvals Required

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

Key approval	Notes
EXPORT FACILITY:	
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	
LAND ACQUISITION (EXPORT FACILITY, ROAD AND MINE SITE):	
Private contracts and agreement	Used to acquire private 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>) in favour of Base Toliara. Applies to haulage road and mine site
HAULAGE ROAD:	
MOU	Establishes the basis for the construction and use of the haulage route
Design and construction approvals	

Key approval	Notes
CAMP:	
Design and construction approvals, and issue of construction permit	
Borehole construction and water extraction	
MINE CONSTRUCTION:	
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>)	
LARGE MINING LAW:	
Large Mining Investment Law (LGIM) certification	Provides, financial and legal stability regime for large scale mining investments, favourable customs regime, guaranteed foreign exchange rights and certain tax benefits

Capital Cost

Capital cost is estimated at \$439m (+20%/-10%) based on preliminary engineering and budget quotes from vendors

Basis of Estimate

- The estimates for quantities are based on preliminary engineering drawings for earthworks, concrete, steelwork, mechanical and electrical for the WCP, MSP, product storage shed, export facility, haul roads and general infrastructure.
- An extensive Budget Quotation Request process was conducted for major contract packages to establish unit rates that reflect the market conditions in Madagascar for all earthworks, concrete, SMP and buildings contractors.
- Export facility rates used market rates determined by engineering consultants verified by a construction contractor (Stefanutti Stocks) in Q4 2018.
- Budget quotes were received (Q4 2018) for all major mechanical and electrical equipment vendor packages.
- The estimate base date is Q4 2018 and includes 15% contingencies but excludes VAT (which, being refundable, is included in working capital), escalation, currency fluctuations and Pre-FID costs.
- Exchange rate exposure – 89% is USD based cost and 10% AUD 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.

Capital Cost Estimate (USD)

Main Area	Stage 1	Stage 2
Mineral Process Plants	93	30
Plant Infrastructure	41	3
Plant Services & Utilities	4	1
Haul Road and Bridge	34	0
Permanent Accommodation	12	0
Product Storage & Export Facility	90	0
Mining Equipment	23	13
Management Costs (EPCM)	23	6
Owner's Costs (see table on the right)	64	6
Contingency (15%)	55	8
PROJECT TOTAL	439	67

Stage 1 Owners Cost Estimate (USD)

Owners costs	Stage 1
Integrated Management Team - Labour	11
Integrated Management Team - Expenses	2
Initial Clearing for mining, TSF & Starter Pit	3
Camp operating (based on Kwale + \$2m fuel)	6
Spares, tools and 1st fills	7
Owner's local operational activities	19
Owner's External Affairs, Enviro, Community	11
Light Vehicles	2
1% customs stamp duty on value of imports	1
Owner's Project Costs - Plant Mobile Equipment	2
STAGE 1 OWNERS COST TOTAL	64

Operating Costs

Estimated operating costs have been derived from 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 and assumptions
Power	671	20	1.14	24	Power sourced from IPP and based on a solar hybrid solution using HFO as a fuel source. Assumes a HFO price of \$0.73/L, which results in an average power price of \$0.20/kWhr.
Maintenance	577	18	0.98	21	Maintenance is based on Kwale Operations experience and scaled where appropriate.
Labour – Expatriates	122	4	0.21	4	Operations commence with 71 expats, dropping to 27 after four years before reaching a steady state of 6 senior managers from FY31 onwards.
Labour – Nationals	186	6	0.32	7	Operations commence with 707 national employees, before peaking at 861 in FY25 following completion of the Stage 2 expansion.
Fuel – Drying	187	6	0.32	7	Diesel for the MSP drying process. Cost based on Kwale Operations usage and a delivered diesel fuel price is \$0.88/L.
Fuel – Mobile Equipment	167	5	0.28	6	Mobile equipment fuel burn rates are based on Kwale Operations and a delivered diesel fuel price is \$0.88/L.
Product Transport & Port Rates	200	6	0.34	7	All products transported in bulk to the export facility at an estimated cost of \$3.99/t.
Flocculant	11	1	0.02	1	Flocculant usage between 0.08 and 0.12kg/t slime at cost of \$3.67/kg.
Other Operating Costs	358	11	0.61	12	Other fixed operating costs, including insurance, camp management and laboratory.
Total Operating Costs	2,479	77	4.22	89	
Royalties	162	5	0.27	6	Government royalty rate of 2%.
Total Operating Costs (incl. Royalties)	2,641	82	4.49	95	

Investment Evaluation

The Toliara Project has an assessed NPV of US\$671 million (10% discount rate, pre-debt, post tax real) and an IRR of 22.4%

A discounted cash flow analysis has been undertaken on the Toliara Project, incorporating the estimated capital costs, operating costs and revenue assumptions based on Base Resources' internal product price forecast.

Key assumptions:

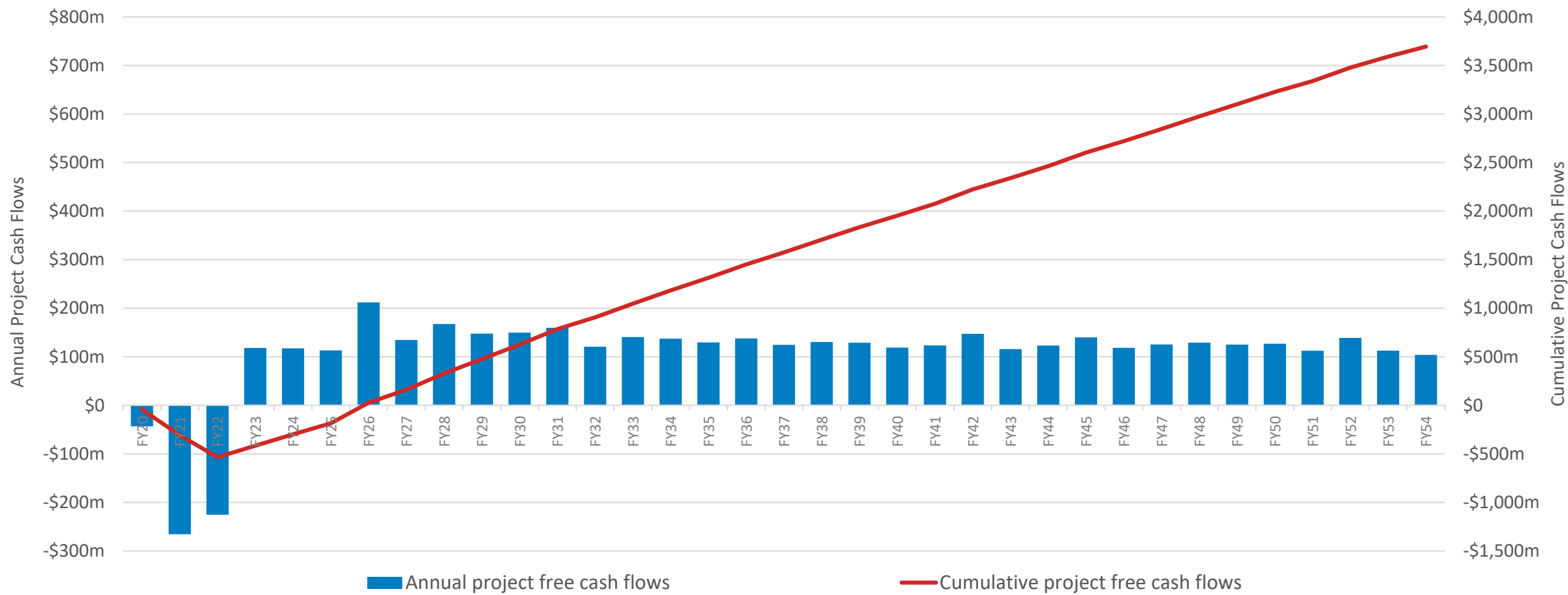
- Net present value (**NPV**) is measured from FID, currently assumed to be 1 April 2020.
- Stage 1 capex cost of \$439m.
- Stage 2 capex cost of \$67m - incurred in operating year three and self-funded from operating cash flows.
- Mining inventory of 588Mt @ 6.6% HM for a 33 year LOM.
- Product shipments commence in early CY2022, with total annual shipments fluctuating in a tight band between 830kt and 920kt.
- Base Resources internal price forecasts – moving to TZMI long term inducement prices from 2035.
- Average annual operating costs of \$77m, or \$82m including royalties.
- Average annual non-operating costs of \$7m.
- Tax depreciation = accounting depreciation = majority spread over LOM.
- Corporate income tax rate of 20%.
- Government mineral royalties of 2%.

	Unit	Total
NPV₁₀ (at a discount rate of 10%) post tax, real	US\$ millions	671
*NPV ₈ (at a discount rate of 8%) post tax, real	US\$ millions	926
*NPV ₁₂ (at a discount rate of 12%) post tax, real	US\$ millions	483
*NPV ₁₀ – TZMI Q1-2019 price forecast, post tax, real	US\$ millions	737
IRR	%	22.4
Initial (Stage 1) Capex	US\$ millions	439
Stage 2 Capex	US\$ millions	67
Capital Payback Period (Stage 1 and 2)	Years	4.0
LOM Operating Costs + Royalties	US\$/t ore mined	4.49
LOM Operating Costs + Royalties (A)	US\$/t produced	95
LOM Revenue (B)	US\$/t produced	292
LOM Cash Margin (B-A)	US\$/t produced	197
LOM Revenue : Cost of Sales Ratio (B/A)	Ratio : 1	3.06
LOM Free Cash Flow	US\$ millions	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.

Investment Evaluation – Free Cash Flows

Strong forecast project free cash flows* result in capital payback (for both stage 1 and 2 capex) occurring after four years of operation



*Free cash flows is calculated as all project cash flows (including all revenues, operating and non-operating costs, income, tax, capex and working capital) except cash flows from financing activities

Investment Evaluation – Mining & Production Profile

Mining starts in October 2021, MSP production commencing in January 2022 and a current LOM of 33 years. Production remains steady over LOM

Production Profile	Life of Mine (LOM)		FY2022 Operating Yr1	FY2023 Operating Yr2	FY2024 Operating Yr3	FY2025 onward annual ave†
	Total	annual ave*				
Ore mined (Mt)	588	18.3	8.7	12.9	12.9	18.7
HM%	6.6%	6.6%	8.1%	9.1%	9.7%	6.4%
HMC produced (kt)	37,110	1,155	654	1,130	1,222	1,154
Period	33 years	31 years	1 year	1 year	1 year	29 years
Produced (kt):						
Sulphate ilmenite	9,362	293	112	294	300	293
Slag ilmenite	8,977	281	108	282	288	281
Chloride ilmenite	7,396	232	88	233	237	231
Total ilmenite	25,736	806	308	809	825	805
Rutile	266	8	2	8	7	8
Zircon	1,730	54	14	53	61	54

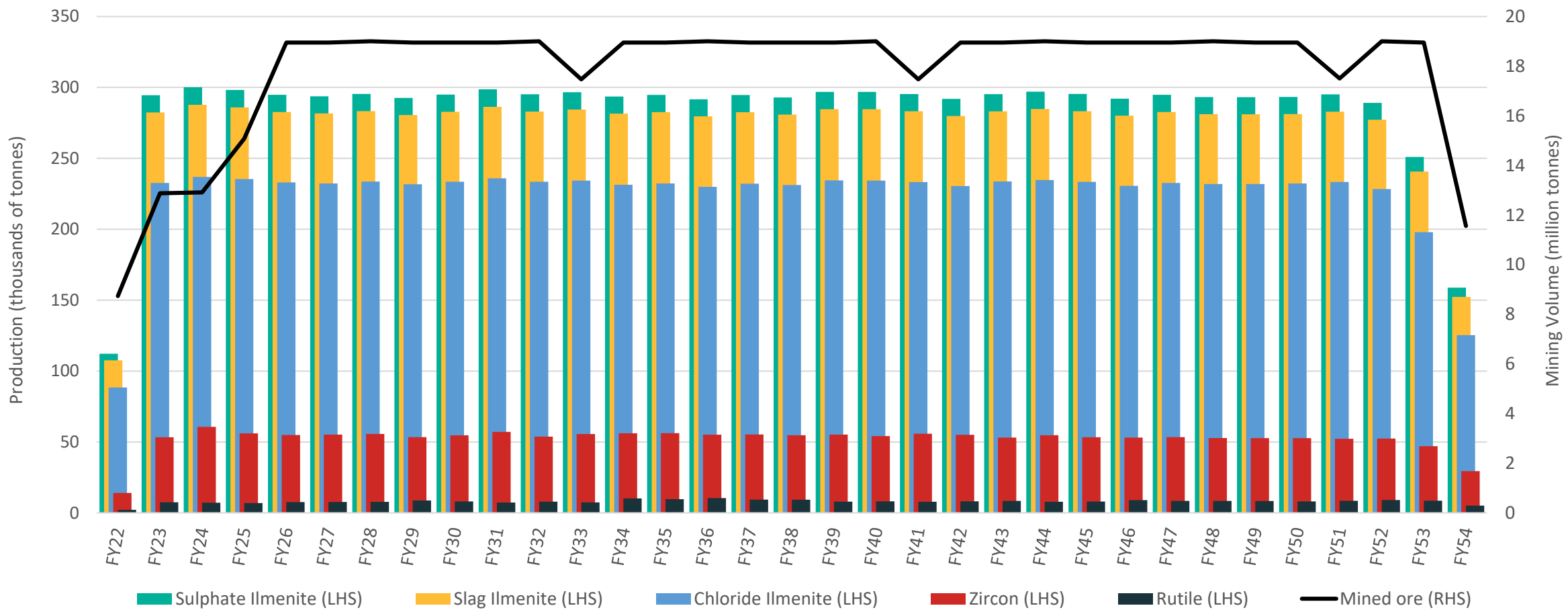
* Does not include the first and last years of operation as these are both partial operating years.

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

Production forecasts are based on the Measured and Indicated Resources discussed on page 8.

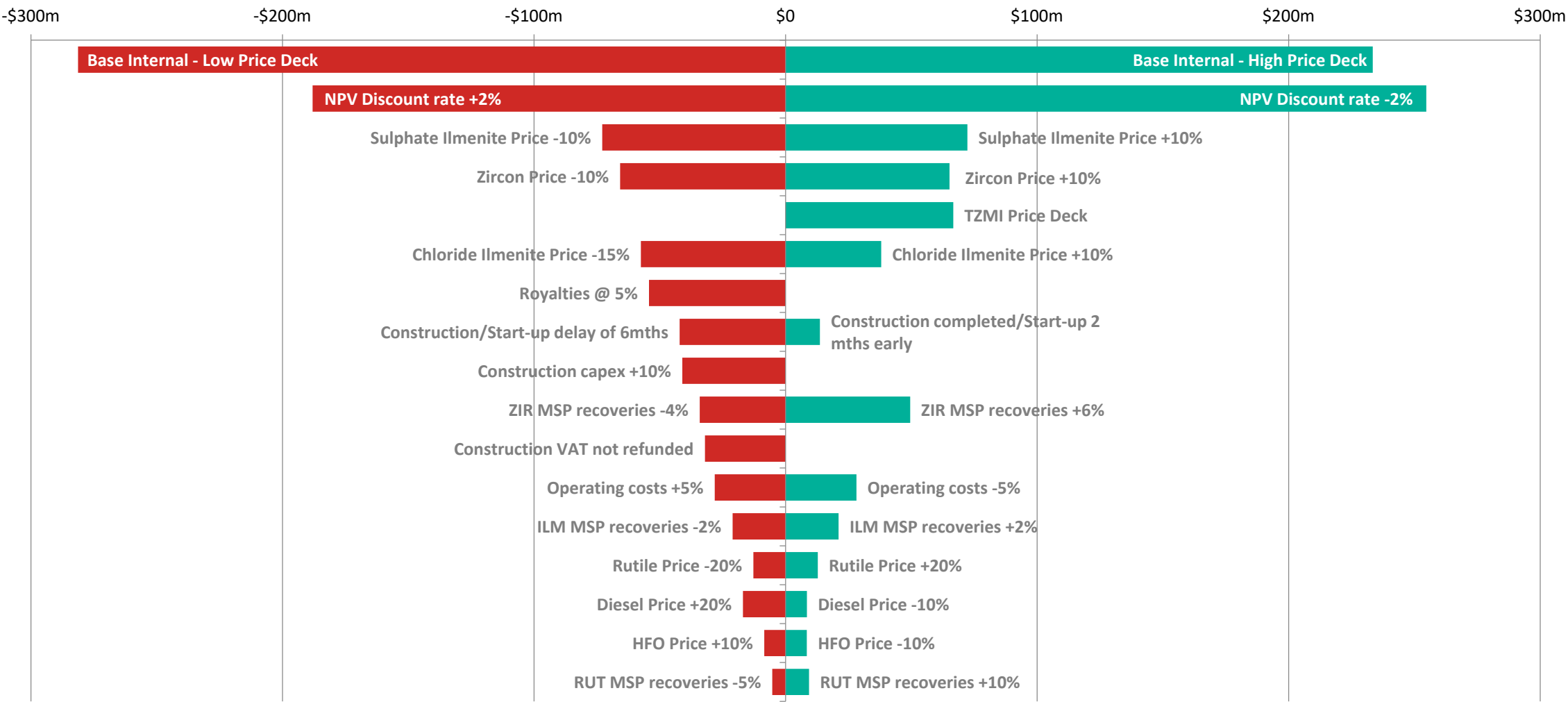
Investment Evaluation – Mining & Production Profile

Stage 2 mining and concentrator starts in January 2025, lifting mining volume to 19Mtpa. Dips in mining volume are due to primary concentrator moves



Investment Evaluation - Sensitivities

NPV Sensitivities against base case - Post tax / Pre debt (real), 10% discount rate, USD millions



Pre-FID Expenditure

Pre-FID expenditure of \$34.3m (from April 2019) is required to fund progression of the Project including early work activities required to meet overall project schedule timelines. The early works include FEED (haul road, bridge, export facility shed piling, accommodation camp) and commencement of the camp construction

Pre-FID Budget

- The project implementation strategy has been further developed during the PFS and the total planned pre-FID spend is forecast as US\$43.4 million, of which US\$9.1 million has been incurred to the end of March 2019.
- This includes certain early works.

Early Works

- To meet the project schedule and to de-risk key elements of the Project, the period between completion of the DFS and FID is planned to continue to progress engineering design work (FEED).
- Accommodation camp** detailed design, contractor procurement and construction of bulk earthworks and construction of two 16 bed blockwork dormitories.
- The **road, bridge, export facility shed piling, 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 during the four month period between DFS completion and FID is planned.

Pre-FID Budget (USD M)	Budget	Expenditure	Forecast
Description	Jan'18-Mar'20	Jan'18-Mar'19	Apr'19-Mar'20
Integrated Management Team (PD)	5.5	2.6	2.9
Exploration & Resource Definition	2.3	0.8	1.5
Mining	0.3	0.2	0.1
Metallurgical Testwork	1.1	0.9	0.2
Infrastructure	11.6	1.1	10.5
Engineering Consultants	7.3	2.2	5.1
Community	1.7	0.4	1.3
Environment	1.6	0.3	1.3
Government & Legal	1.0	0.6	0.4
Land Acquisition	10.0	0.0	10.0
Training	1.0	0.0	1.0
TOTAL PROJECT VALUE	43.4	9.1	34.3

Funding

Base Resources does not have the financial capacity to internally fund the Toliara Project development. External funding in the form of some mix of debt, JV interest and/or equity will be required

The required funding for the Toliara Project can be broken down into three elements:

1. Deferred acquisition consideration of \$17m payable on receiving LGIM certification (\$7m) and on FID (\$10m).
2. Pre-FID funding of \$34m to advance the project, including land acquisition (\$10m), DFS completion (\$15m) and early construction works and FEED (\$9m).
3. Construction and operational start-up funding of \$590m, consisting of:
 - Capex of \$439m.
 - Working capital of \$110m, including an estimated \$58m for VAT (legally refundable but assumed for the purposes of funding analysis to not be recovered until operating year five).
 - Debt establishment and servicing during construction of \$41m (based on the funding mix assumed below).

It is expected that deferred acquisition consideration and pre-FID costs will be funded internally from cash generated by Kwale Operations or utilisation of the existing \$75m 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 in arriving at the \$590m of construction and start-up funding:

- 40% Equity - \$236m sourced from cash generated from Kwale Operations (including the current \$75m RCF) and a capital raising of approximately \$100m.
- 60% Debt - \$354m sourced from traditional banks, DFIs and export credit agencies.

Financial modelling confirms the project's ability to comfortably support this debt load. The Company has appointed advisors to lead the debt funding and, to date, have held preliminary discussions with a select group of lenders and political risk insurance providers.

Opportunities for JV participation in conjunction with substantial offtake arrangements have been identified and will be explored further following release of the PFS.

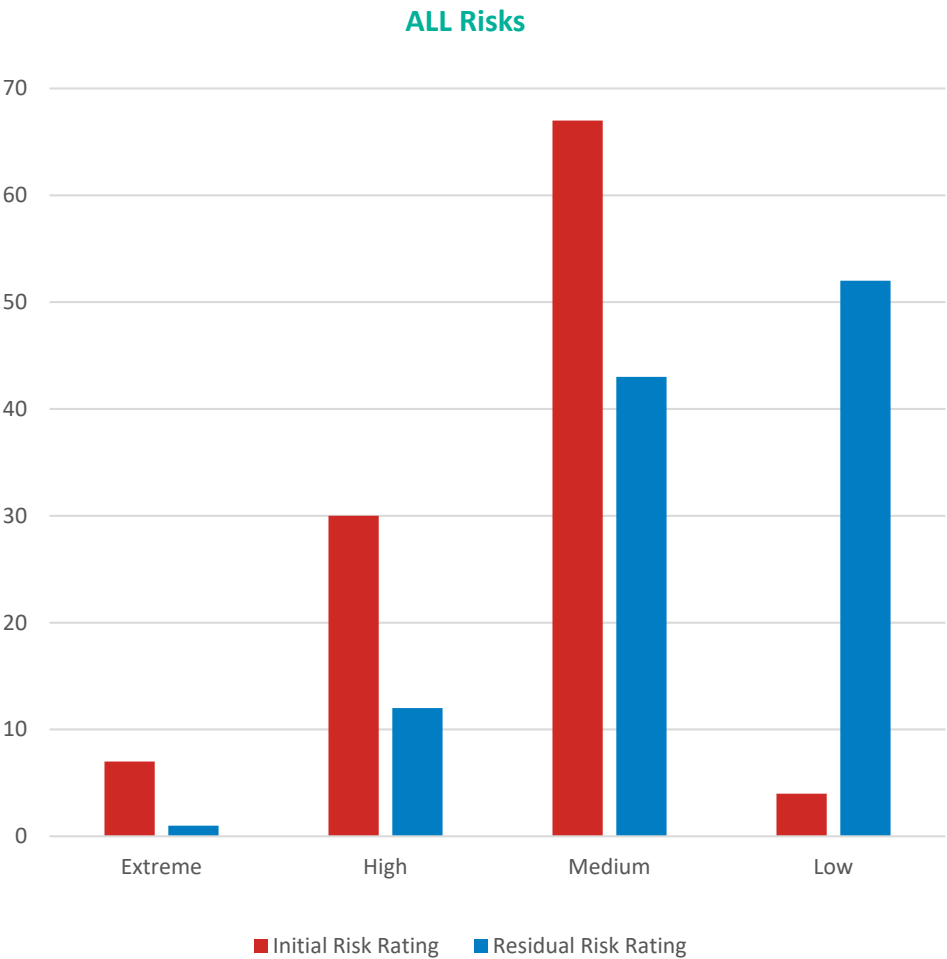
On the basis of the project economics established by the PFS (in particular free cash flow generation), the robust market outlook for mineral sands products (refer Marketing analysis), the Company's sound financial position (net cash and cash generation from Kwale Operations), track record of successfully developing and implementing and repaying financing on a similar project (Kwale Operations), prior success in capital raising 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

The risk assessment process captured 108 risks of which 37 had an initial risk rating of “high” or “extreme” but, after factoring in identified mitigations, this reduces to 14 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 in the DFS phase for management 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 Project moving to the DFS phase.



Pre-FID Risks

Of the 48 pre-FID risks identified, 19 have an initial risk rating of “high” or “extreme”, but this reduces to seven 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).
- **Land acquisition not finalised** in time for construction activities to commence as planned (Initial rating: high -> Residual rating: high).

Government & Legal Risks

- **Increased Government of Madagascar economic participation** 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. (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).
- The Project may not receive **certification under the LGIM regime**, or there may be a significant delay in obtaining certification. There is also the risk that the newly elected Government seeks to alter key aspects of the LGIM, which could impact the economics and/or fundability of the project and brings a heightened risk of delay in assessment and certification of the project under the LGIM. (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).
- **Insufficient debt and political risk insurance capacity** for the Project's size and Madagascan risk at a sensible cost (Initial rating: high -> Residual rating: high).

Post-FID Risks

Of the 60 post-FID risks currently identified, 18 have an initial risk rating of “high” or “extreme”, but this reduces to seven risks after factoring in identified mitigations

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).
- Lower sulphate and/or slag ilmenite prices driven by **short term market over-supply** as the Toliara Project commences production and, in conjunction with Kwale Operations, Base Resources will then be producing ~ 800kt-1Mtpa of these products during the overlap years, expected from 2022 until at least 2024. Alternatively, short term over-supply resulting from higher than expected ilmenite coming into the market from unforeseen sources may occur. (Initial rating: high -> Residual rating: high).

Health & safety risks

- **Potential for fatal (or resulting in multiple severe injuries) traffic accidents** with pedestrians and other vehicles when transporting product by road train from the mine site to the export facility (Initial rating: extreme -> Residual rating: high).
- **Fatalities or serious injuries during construction** (Initial rating: extreme -> Residual rating: high).

Environment risks

- Obtaining the necessary approvals to **increase the mining rate** from the currently approved 12Mtpa to 19Mtpa (2475 tph) from operating year 4 (Initial rating: high -> Residual rating: high).

Government & Legal Risks

- **VAT** incurred during the project construction phase (US\$58m) is **not refunded** by the Government despite legal entitlement (Initial rating: extreme -> Residual rating: high).

Project Execution Risks

- There are a number of factors associated with **project execution in Madagascar** that could contribute to delay or extension. Including community unrest, extreme weather events, logistics, port clearances and industrial action. These will be addressed in the DFS and further mitigations will be developed.

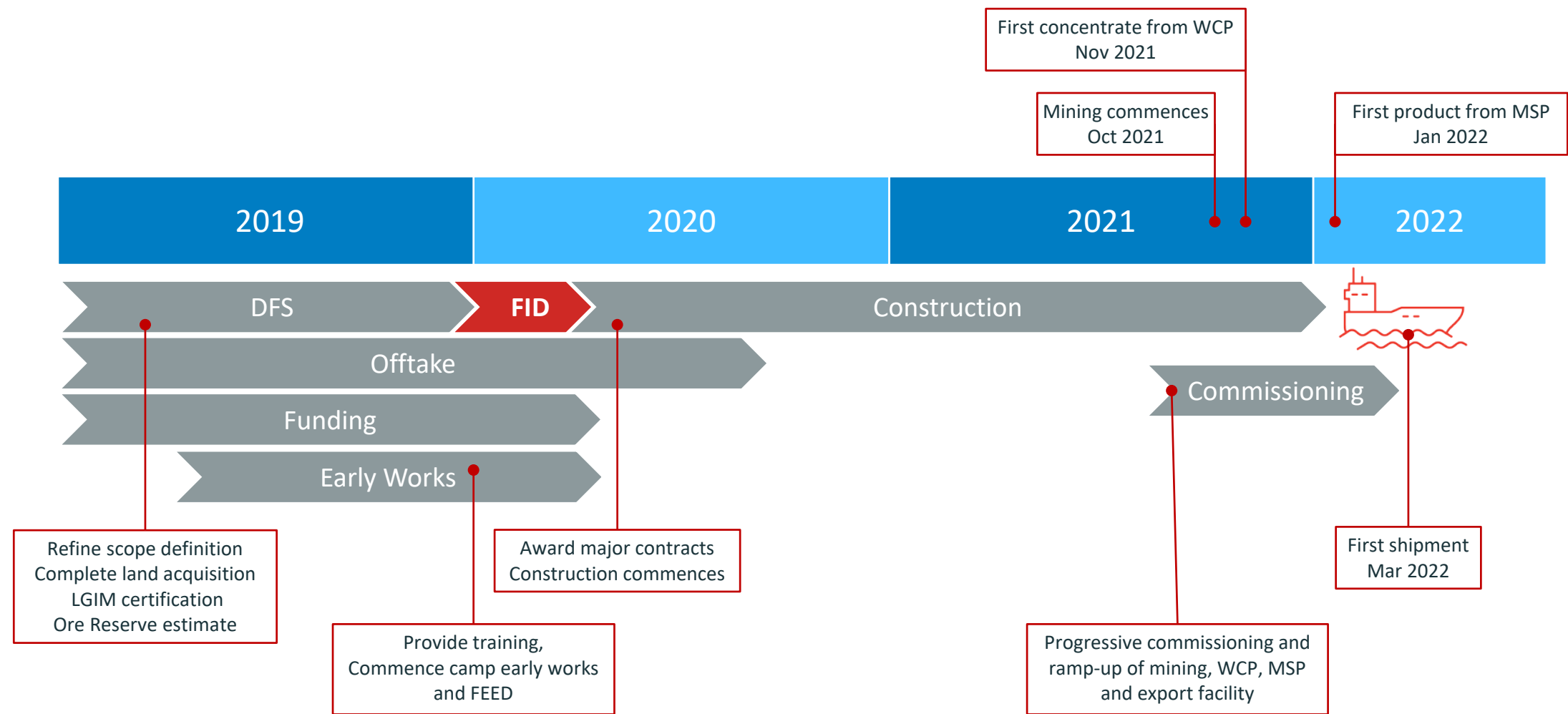
Opportunities

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

- **Increasing the Mineral Resource** estimate through additional drilling. The present Mineral Resources estimate remains open to the west and only a small amount of material from the ICSU and nothing from the LSU mineralised zones.
- **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 projects contribution to regional and national betterment and Base Resources' reputation and strength of licence to operate.
- Reduction in operating costs by adopting **co-disposal of coarse and fine tailings**. If applicable to the Toliara Project, this will result in significant cost savings as well as a more flexible end land-use applications.
- 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.
- **Consolidation of HMC pipelines once WCP2 commences**, as opposed to the current design of separate standalone HMC pipelines for each concentrator. This will reduce capital costs slightly and operating costs through pumping efficiencies.
- **Optimise the design of the product storage sheds** at the mine site and export facility to reduce dead space and ultimately the shrink the shed footprints, resulting in capital cost savings and reduction in visual impact.

Indicative Timeline

Base Resources is working towards being in a position to make a FID in early 2020. On this basis, the Toliara Project could be in operation at the end of 2021



This timetable is indicative only and remains subject to the impact of many variables outside the control of Base Resources, including those factors highlighted in the Risks analysis

Glossary

Term	Meaning
\$ or US\$ or USD	United States Dollars
Al₂O₃	Aluminum oxide
Base Toliara	Base Toliara SARL
Base Resources or the Company	Base Resources Limited (ABN 88 125 546 910)
CAE	Evaluation and compensation committee
CaO	Calcium
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
Cr₂O₃	Chromium
CSEP	Community stakeholder engagement plan
CTR	Committee for transparency in recruitment
CY	Calendar year
DFI	Development finance institution
DFS	Definitive feasibility study
DMU	Dozer mining unit

Term	Meaning
DUP	Compulsory acquisition of land through the process called Declaration of Public Utility
EI	Electrical and instrumentation
EMP	Environmental management plan
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
Fe₂O₃	Iron (III) oxide
FID	Financial investment decision by the Board of Base Resources to commence construction of the Toliara Project
FOB	Free on board
FY	Financial year. 1 July to 30 June.
Government	Government of Madagascar
HDPE	High density polyethylene pipe
HFO	Heavy fuel oil
HiTi	High grade leucoxene
HM	Heavy mineral

Glossary

Term	Meaning
HMC	Heavy mineral concentrate
ICSU	Intermediate clay sand unit
IFC	International finance corporation
Indicated Resource	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
Inferred Resource	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
IPP	Independent power producer
IRR	Internal rate of return
JORC	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
JV	Joint venture
kt	Thousand tonnes
kV	Kilovolts

Term	Meaning
Kwale Operations	Base Resources' mineral sands operations in Kwale county, Kenya
kWhr	Kilo watt hour
LGIM	Large Mining Investment Law
LOM	Life of mine
LRIMP	Labour, recruitment and influx management plan
LSU	Lower sand unit
M&I	Measured and Indicated Resource
Measured Resource	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
MG12 spirals	A new high-performance spiral separator from Mineral Technologies
MgO	Magnesium oxide
Mineral Resource	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
MnO	Manganese oxide

Glossary

Term	Meaning
MRNL	Madagascar Resources NL
MSP	Mineral separation plant
Mt	Million tonnes
Mtpa	Million tonnes per annum
MW	Megawatt
NGO	Non-governmental organisation
NPV	Net present value
ONE	Office National Pour l'Environnement
Opex	Operating expenditure
OS	Oversize
PFS	Pre-feasibility study
RCF	Revolving credit facility
ROM	Run of mine
RWG	Resettlement working groups
SCRC	Regional coordination committee in Toliara
SL	Slime or clay
SMP	Structural mechanical and pipework
Solar PV	Solar photovoltaic system
t	Metric tonne

Term	Meaning
TiO₂	Titanium dioxide
Toliara Project	The mineral sands development project, based on the Ranobe deposit, located in south west Madagascar, 45km north of the regional port town of Toliara
TSF	Tailings storage facility
tph	Tonnes per hour
TZMI	TZ Minerals International. An independent consulting group.
WCP	Wet concentration plant
WTR	World Titanium Resources Limited
USU	Upper sand unit
U + Th	Uranium and thorium
VAT	Value added tax
ZrO₂+HfO₂	Zirconium and hafnium