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RESEARCH
INDEPENDENT INVESTMENT RESEARCH

Sheffield Resources Limited (ASX: SFX)

April 2023

INDEPENDENT
INVESTMENT RESEARCH

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INDEPENDENT INVESTMENT RESEARCH

Sheffield Resources Limited (ASX: SFX)

Comprehensive Update - April 2023

Note: This report is based on information provided by the company as at April 11, 2023

Investment Profile	
Share Price - April 11, 2023	A$0.515
12 Month L/H	A$0.40/ A$0.665
Unrisked Base Case Valuation	A$2.21
Risked Base Case Valuation	A$1.10
Issued Capital:	
Ordinary Shares	392.6 m
Unlisted Options - Total	3.0 m
Unlisted Options - In Money	0.7 m
Performance Rights	4.5 m
Fully Diluted	400.2 m
Market Capitalisation UD	A$202.2 m
Cash December 31, 2022	A$5.3 m
Subsequent Raises	A$22.7 m
Cash on in money option conversion	A$0.23 m

Board and Management
Mr Bruce Griffin: Executive Chairman
Mr Ian Macliver: Non-Executive Director
Mr John Richards: Non-Executive Director
Ms Vanessa Kickett: Non-Executive Director
Mr Gordon Cowe: Non-Executive Director
Mr Mark Di Silvio: CFO/Company Secretary

Major Shareholders	
Yanshan Iron	9.9%
Mr. W Yovich & Mrs J Yovich	8.0%
Blackrock Investments	6.4%
Top 20	54%
Board and Management	0.1%

Share Price Performance

The investment opinion in this report is current as at the date of publication. Investors and advisers should be aware that over time the circumstances of the issuer and/or product may change which may affect our investment opinion.

THUNDERBIRD IS A GOER, EXPANDING THE PORTFOLIO

Sheffield Resources ("Sheffield" or "the Company"), is an ASX listed heavy mineral sands ("HMS") developer, with first production from the 50% owned Thunderbird Mineral Sands Project ("Thunderbird") expected in Q4, CY2023, and first customer deliveries in Q1, 2024. Thunderbird, which is 50% owned through Kimberley Mineral Sands Pty Ltd ("KMS"), an incorporated JV with YGH Australia Investment Pty Ltd ("Yansteel"), is shaping up to be a significant global producer of zircon, and is expected to provide a strong dividend stream to Sheffield (potentially up to A$130 million pa for a staged operation), with payment of dividends possibly commencing in FY2025.

This is an opportune time for a new zircon project - current resources are diminishing, only a few other new projects are coming on stream with demand continuing to rise, resulting in historically strong prices.

Thunderbird is a low cost project, with a revenue to costs ratio of >2, has a long life (30-40 years), and has the resources and exploration/evaluation potential to increase both the throughput and mine life.

Construction at Thunderbird, located between the ports at Broome and Derby in NW Western Australia is on target and now ~75% compete. 100% of the ilmenite for the LOM, and 75% of the zircon for the first five years is covered by offtake agreements, comprising ~80% of the value for this initial period. The ilmenite offtake is with Yansteel, and due to them having mineral separation facilities, has allowed for just concentrates being produced on site, cutting capital and operating costs as well as simplifying the Project.

Thunderbird is also fully funded, with available facilities more than covering some recent cost increases, and with the Company estimating that there will be ~A$54 million of available contingency and working capital proceeds at practical completion. Through the Yansteel investment, and the sale of Eneabba and McCalls, Sheffield was able to fund their equity share of the Thunderbird development without going to the market.

Given the above the Company does not expect to have to dip into the recently raised A$22.7 million to cover any possible cash shortfall at KMS - the raise is slated for project generation, general working capital purposes, and planned activities on the recently optioned South Atlantic Mineral Sands Project ("South Atlantic") located in SE Brazil, close to Rio Grande, the 3rd largest port in Brazil, and capable of handling up to Panamax size vessels.

The option is initially for 20%, with the potential to go ultimately to a 100% ownership of the project. It is also reasonably priced, involving a US$2.5 million loan to the vendors to undertake studies during the 18 month option period (which will be converted to shares if the option is exercised), and then US$12.5 million payable in tranches to earn the 20%.

South Atlantic is a well-advanced project, having seen considerable previous work, including that by the vendors, and has an exploration target of 500 to 720 Mt @ 3.2% to 4.0% total heavy minerals ("THM"), with ilmenite (a vital ingredient in the pigment industry) making up ~80% of the valuable heavy mineral ("VHM") assemblage, but with the potential for zircon and rutile credits. Given the status, we would expect that relatively minimal work will be required to estimate mineral resources, and complete a definitive feasibility study ("DFS") for a dredging operation.

Last but not least, the Company is run by an experienced Board and Management, with extensive mineral sands experience, that has brought Thunderbird to fruition. They are also aware of, and have acted upon developing strong ESG credentials.

VALUATION

We have undertaken a valuation of Sheffield, including a DCF valuation of KMS. This has been predicated on two operations - a single stage, 12 Mtpa operation, and a two stage operation, with a ramp up to 24 Mtpa from year 5. These valuations are:

- **Unrisked - A$1.34/share (single phase) to A$2.21/share (two phase); and,**
- **Risked - A$0.84/share (single phase) to A$1.10/share (two phase).**

SWOT ANALYSIS

Strengths

- **Thunderbird well advanced and within budget and time:** Despite price inflation and shortages in services, the development of Thunderbird is on track as planned, and despite some cost increases, still well within the available funding requirements.
- **Very attractive economics:** The results of the various studies have resulted in very attractive and robust economics for Thunderbird, including the NPV/capex ratio, revenue/cost ratio and providing a long life, strong cash generating operation that will comfortably absorb adverse movements in key parammeters.
- **Quality products:** Metallurgical test work has demonstrated that the Project has the capability to produce highly marketable products over the range of commodities to be produced – this has been confirmed by the offtake agreements in place.
- **Proven mining destination with low sovereign risk:** Western Australia is a proven mining destination and host to a number of world class deposits, with well developed mining legislation.
- **Experienced people with skin in the game:** Company personnel have significant experience in the resources game, including in mineral sands.
- **Quality register:** With entities such as BlackRock and Yansteel on the register, the Company is well supported.

Weaknesses

- **Reliance on trucked LNG:** The area is not served by the electricity grid or a gas pipeline, hence gas needs to be liquefied, and trucked over 900 km to site for regasification - this makes power relatively expensive, however it is the same system as used by the towns of Derby and Broome.

Opportunities

- **Forecast price increases:** A key opportunity is to take advantage of forecast increasing VHM prices – it appears that we have seen the worst in the market and Sheffield's timing will be ideal to take benefit from a projected supply deficit in a number of VHM products.
- **Resource expansion:** Exploration work in the broader Dampier HMS Project area surrounding Thunderbird has discovered new high grade mineralisation, highlighting resource expansion possibilities.
- **Other project development**: By all indications South Atlantic looks to be a quality project, and provides significant upside for Sheffield.

Threats/Risks

- **Prices and exchange rates:** These are threats facing any mining company, however the robust nature of Thunderbird somewhat shields it from these – the project should be able to readily absorb adverse movements in product prices.
- **Costs:** Again a factor to consider when assessing a resources company, however as for prices the robustness of Thunderbird largely shields it against adverse movements in costs.
- **Environmental issues at South Atlantic:** The South Atlantic project lies close to the coast and wetlands, and there also is a locally imposed mining ban - it is thought that this may not impact on Federally granted mining tenements, however is to be ascertained.

SHEFFIELD AND KMS OVERVIEW

STRATEGY AND PROJECT OVERVIEW

- The overall strategy is to grow the Company into a significant mineral sands producer, with activities largely concentrated on the 50% Thunderbird Mineral Sands Project, 50% owned through Kimberley Mineral Sands, an incorporated JV with Yansteel - Thunderbird is located on the Dampier Peninsula on NW Western Australia (Figure 1), with ready access to both Broome and Derby.
- As part of the growth strategy, the company has recently entered into, by the way of a US$2.5 million loan to the vendor, a binding option agreement to initially earn 20% of the South Atlantic HMS Project, located on the south-east coast of Brazil (Figures 11 and 12) - should the option be exercised, Sheffield will then be required to spend a further US$12.5 million to earn the 20% interest.
- First production from KMS, which has a planned 36 year mine life and for which construction is 75% complete, is expected in Q4, 2023 (with first deliveries in Q1, 2024), with the Project to produce heavy mineral sands concentrates for export through the nearby ports of Broome and Derby.
- Following the successful commissioning of Thunderbird, we would expect KMS to look at advancing other prospects, including, but not limited to the high value Night Train, for which an Inferred Mineral Resource has been estimated.
- Cashflow, in the form of dividends from KMS, will also leave Sheffield in a healthy position to explore other opportunities to grow the Company - we expect dividends, which will be fully franked, to commence in 2028 at the latest, and a few years earlier dependent whether or when the planned Phase 2 expansion of Thunderbird goes ahead.
- Current planned RoM production from Thunderbird is at a nameplate ~12 mtpa for the first four years, and expanding to ~24 mtpa from possibly year 5 to year 37 - the decision when to expand will depend on a decision by the JV partners, and will depend upon market and economic conditions.
- We would expect that any second stage will be funded from cashflow.
- The single stage option is robust by itself, and forms a solid base for growth..

FINANCIAL POSITION

- As of December 31, 2022 the Company had A$5.245 million in cash and no debt, and the 50% share in the fully funded KMS.
- As announced on February 28, 2023, Sheffield has placed 36 million shares at A$0.50/ share for A$18 million, and undertook a 1 for 14 entitlement issue at the same price to raise a further A$12 million - A$4.68 million (39%) was subscribed for - funds are to be used in the growth strategy and for general working capital purposes.
- The company is of the view, that despite recently announced ~10% increases in the pre-production costs at KMS, such costs are more than covered by the funding arrangements in place for KMS (with ~$54 million to still be available at practical completion), and that the funds from the recent capital raising will be for Sheffield's use only - our modelling indicates that this is reasonable.
- On the flip side, with only limited un-contracted and fixed price expenditure required until the completion of the ramp up at Thunderbird, if any further capital raisings are necessary, they should only have a limited dilutionary effect.
- Significant outgoings during the 12 months to December 31, 2022 included equity contributions of A$33.771 million towards KMS, with this funded by the sale of the non-core Eneabba and McCalls projects for A$36 million cash in 2022 - no capital raisings were required to fund the Company's equity position in KMS.
- Projected staff/administration costs are expected to be ~A$2.5 million going forward.

CAPITAL STRUCTURE

- Following the recent capital raising Sheffield has 392.63 million shares, 3.04 million options (including employee options) and 4.51 million performance rights on issue.
- The top shareholders include Yansteel with 9.9%, Mr Walter and Mrs Jeanette Yovich with combined holdings of 8.0% and Blackrock Investments with 6.4%.
- Total insiders interests are 0.1%, with the top 20 holding 54%.

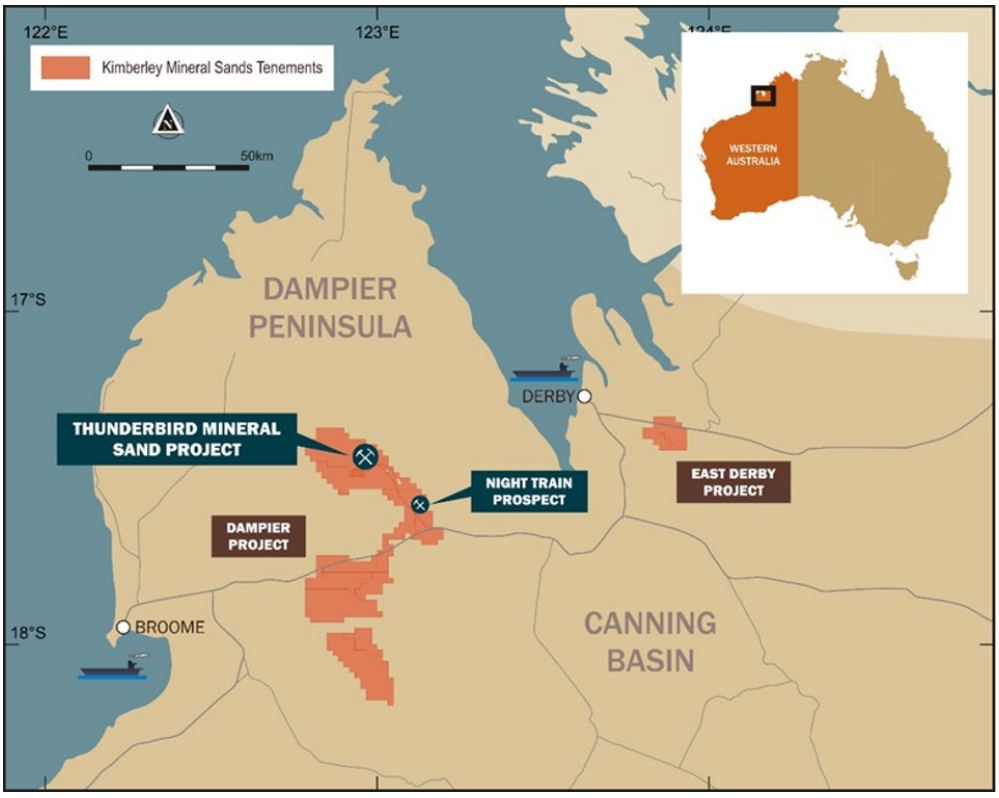
- All though the insiders holding may seem low, it needs to be remembered that the board has been refreshed, with the company founders having now left.
- The Company has 2,750 shareholders.

THUNDERBIRD HMS DEVELOPMENT PROJECT - SFX 50%

LOCATION AND TENURE

- Thunderbird is part of the overall 50% held Kimberley Mineral Sands Joint Venture with Yansteel, which includes one granted Mining Lease ("ML"), seven granted Miscellaneous Licences ("L") and 14 granted Exploration Licences ("EL", Figure 1).

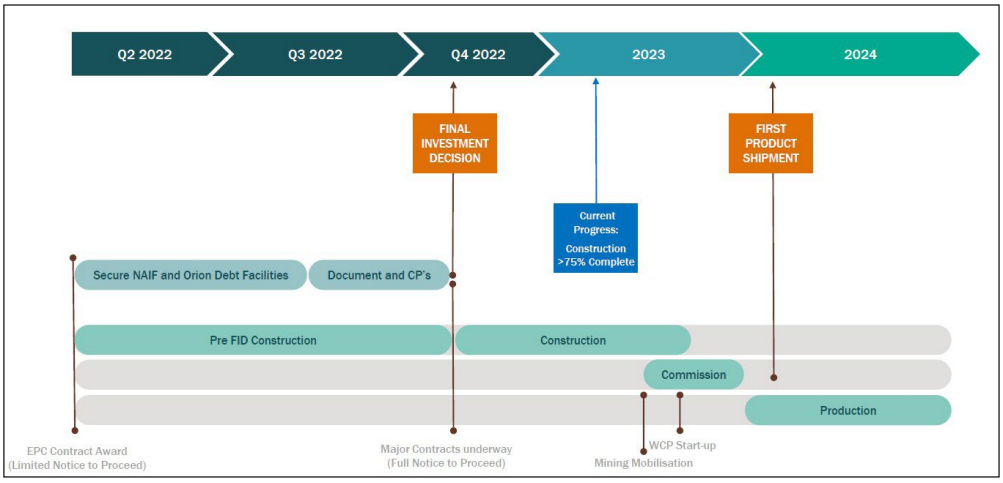
Figure 1: Kimberley Mineral Sands tenement map



Source: Sheffield

- The Project is located on the Dampier Peninsula, midway between the regional towns of Broome and Derby, accessible from the Great Northern Highway via a 30 km access road that meets the highway halfway between both towns – the Project is located approximately 140 km by road from both towns.
- The Project is slated for practical completion in early late CY2023, with first shipments planned for Q1, 2024 (Figure 2).

Figure 2: Proposed Thunderbird timeline



Source: Sheffield

PROJECT HISTORY

- After applying for the EL over what is now the Thunderbird Project in 2010, the tenement, E04/2083 was granted on September 7, 2011.
- Following the discovery of Thunderbird, first pass and follow up drilling was used in the initial Mineral Resource Estimate ("MRE"), which was announced on December 18, 2012 – ongoing drilling has continued to increase both the size and confidence in the Resource with this now standing at 3.23 Bt @ 6.9% HM; in addition Night Train has an MRE of 130 Mt @ 3.3% HM.
- Sheffield completed a Scoping Study in early 2014, which envisaged a 20.8 Mtpa, 32 year operation, with an up front capital cost of A$294 million.
- This led into a Pre-Feasibility Study ("PFS"), as released to the market in May 2015, and which resulted in a capital cost of A$367 million – this was updated in October 2015, with the updated study delivering significantly reduced capital costs of A$271.3 million, for a 40 year life staged operation, initially mining at 12 mtpa and then increasing to 18 mtpa.
- Subsequent work was incorporated into the BFS, released in March 2017, with an updated BFS released in July 2019, and further updated in early 2022, with a simplified flowsheet.
- This later updated DFS was undertaken following the JV with Yansteel, which was entered into in 2021.

KEY MILESTONES

Yansteel Joint Venture

- Key to advancing the Project was the 2020 to 2021 progress of the incorporated JV with Yansteel, with this being first announced on August 11, 2020, and which gained FIRB approval as announced to the market on December 15, 2020.
- The Yansteel JV, which was executed in March 2021, included:
  - The formation of the 50:50 operating company, Kimberley Mineral Sands Pty Ltd,
  - Payment of A$130 million by Yansteel to acquire the 50% interest in KMS; and,
  - Later execution of a binding offtake agreement to acquire titanium products - this was initially to be in the form of LTR ilmenite, however later the decision was made, given that Yansteel has mineral separation and LTR facilities in China, to export an ilmenite concentrate.
- The JV has subsequently progressed the project, through updating the BFS, completing offtake agreements and securing financing, to making the FID in October 2022 - early stage works had commenced prior to the FID, including construction of the access road and accommodation village amongst others.

Offtake Agreements

- Part of the updated DFS and FID included changing the mix of products (this is discussed later) to concentrates, rather than separated final products.
- A summary of the offtake agreements is presented in Table 1 - at present binding offtake agreements are in place for ~80% of the Stage 1 output by value.

Table 1: Offtake summary

Offtake summary		
Product (% of BFS Revenue)	**Binding Agreement (% of Stage 1 output)**	**Offtake Parties and Notes**
Zircon concentrate	75%, 5 years	Binding offtake with three Chinese concentrate processors for Stage 1 production
Magnetic concentrate (ilmenite)	100%	Yansteel - Take or pay for 100% of Stage 1 for life of mine, with first right of refusal for concentrate from any future expansions
Paramag concentrate	-	None in place as yet, however expected revenue is ~4% of total

Source: Sheffield

Estimated Capital Expenditure & Project Financing

- The Company has completed the estimated funding requirements of A$484 million, including A$315 million in debt, and A$169 million in equity.

- A$130 million in equity financing was provided through Yansteel's consideration for the acquisition of 50% of the Project with Sheffield's estimated contribution being A$10 million following the FID, and 50% of the balance for a total of A$33.77 million - contributions had been completed by December 31, 2022.
- Total uses as of the time of the October 2022 FID, as presented in Table 5 include:
  - Up-front capital expenditure, including A$24 m contingency - A$379 million,
  - Working capital - A$22 million,
  - Financing costs - A$43 million; and,
  - Cost overrun facility - A$40.0 million.
- Subsequent adjustments were announced on February 14, 2023, however with Management confirming that project delivery is still expected within the A$484 million of available funding - this includes allowances for A$24 million in contingency on the up-front capital, and a cost overrun facility of A$40 million with the NAIF debt.
- Expected total direct expenditures are now expected to be A$407 million (up from A$379 million inc contingency), which includes cost inflation (being felt generally throughout the resources sector), and with $27 million of this being due to changing of costs and timing of pre-strip and pre-production activities.
- Remaining contingency and working capital of A$54 million represents around 40% of the current uncommitted expenditure.
- However any further over runs will have to be contributed 50/50 as equity by the partners.

Debt Funding

- Debt funding is in place, with the first drawdown of A$72 million announced to the market on October 31, 2022.
- Details of the two senior debt facilities, which are secured over the assets of KMS, are presented below.

Table 2: Debt facilities summary

Debt facilities summary		
Facility	**Amount**	**Details**
Orion Production Linked Facility	Up to US$110 m (A$155 m @ 0.71 AUD/USD)	Interest - SOFR (minimum of 2%) + 5% Tenor - Up to 7 years from the date of financial close (subject to any earlier repayments and prepayments Royalty Rate: 1.6% of FOB gross revenue (0.35% escalation provision applies where a Facility default circumstance takes place) Royalty Scope: Limited to Stage 1 production capacity (i.e. capped at an annual production rate of 8.2 m tonnes of ore) Term: 25 years (subject to a buyback provision, curtailing the Term to 12.5 years). Commencement: Earlier of full repayment of facility obligations or 7 years following the date of the Production Linked Facility agreement.
NAIF Infrastructure Development	A$120 m + A$40 m cost overrun facility	Interest and fees - Customary for a facility of this nature Term - Up to 12 years from the date of financial close

Source: Sheffield

EPC Contract

- In March 2022 it was announced that KMS had executed an engineering, procurement and construction contract ("EPC contract") with GR Engineering Services ("GRES", ASX: GNG).
- This is a fixed price contract for approximately A$179.5 million, for the processing plant with works well underway.

Power and Gas Agreements

- Power and LNG supply agreements were announced to the market in September 2022.
- A 15 year binding power purchase agreement was signed with Pacific Energy Pty Ltd ("PEL"), with PEL to build, own and operate ("BOO") a 16 megawatt power station to supply electricity to the Project.

- The PEL facilities include the generators, LNG storages (with capacity for up to 10 days storage) and gasification facilities, with provisions also for future expansions, and the potential provision of renewable energy solutions.
- LNG is to be initially supplied under a binding five year agreement (with the ability to extend for a further five years) with the Woodside/EDL Joint Venture ("WEJV") for the supply of approximately 650 terajoules per annum to site.
- The gas is to be transported from the WEJV's Pluto LNG truck loading facility near Karattha to Thunderbird using a purpose built road tanker fleet.

Mining Services Contract

- In October 2022 the Company announced the signing of a nine year mining services agreement with Piacentini and Son Pty Ltd ("Piacentini"), with this also to include the supply of a mining fleet to support dozer push mining.
- This will include supplying a Mining Unit Plant ("MUP"), and undertake mining activities including excavating and delivering to the MUP, and then delivering processed material to the Wet Concentrator Plant.
- There is the option to extend the agreement by a further five years.

Port Agreements

- Agreements are in place with the ports at Broome and Derby for the export of the bulk materials.

ESG Factors

- The Company is cognisant of the importance of having strong ESG processes and agreements in place, with these vital in the development of Thunderbird.
- On the environmental front, a detailed Public Environmental Review was undertaken, with this instrumental in the granting of the full Federal and State environmental approvals, with processes also designed to mirror the Equator Principles..
- Another key factor is the ongoing rehabilitation of the mine site, leading to the minimisation of disturbed areas (refer to Figure 3).
- KMS has strong relationships with the Traditional Owners, with a Co-existence Agreement in place - this includes several facets, including, amongst others:
  - The payment of cash royalties across a 36 year mine life,
  - Targeting 40% Aboriginal employment by year 8; and,
  - Setting up an Aboriginal Training Fund and Business Support programmes.

2022 BANKABLE FEASIBILITY STUDY/FID

- Sheffield completed an original BFS which was released to the market on March 24, 2017 - this has subsequently been updated, with the most recent updated study being released to the market in March 2022 - this was used as the basis for the Final Investment Decision ("FID") as made in October 2022.
- Financial results and metrics of the 2022 BFS are shown in Table 3, with a comparison of the various development studies in Table 4.

Table 3: Financial results and metrics, Thunderbird 2022 BFS

Financial results and metrics, Thunderbird 2022 BFS		
$A m, Real 2022 Prices	Years 1 to 4	Years 5 to 10
Revenue	1,338	3,521
Royalties	(76)	(207)
Net Revenue	1,262	3,314
Opex: Mining	(219)	(481)
Opex: Processing	(148)	(408)
Opex: Logistics	(177)	(314)
Opex: Site G&A	(97)	(156)
Total	(641)	(1,361)
EBITDA	621	1,953
Revenue to Cost Ratio1	2.03	2.43

Source: Sheffield

Table 4: Study comparisons

Study comparisons				
Metric	**2022 FID**	**2022 BFS**	**2019 BFSU**	**2017 BFS**
NPV_8 Post Tax	A$1.39 B	A$1.28 B	A$0.98 B	A$0.62 B
IRR post-tax	26.6%	27.50%	24.00%	20.60%
Project Capital (Stage 1)	A$379 m	A$361 m	A$392 m	A$463 m
Total Funding Requirement (Stage 1)	A$484 m	A$484 m	A$478 m	A$579 m
Stage 2 Capex	A$258 m	A$258 m		
LoM Sustaining Capex (Stages 1 and 2)	A$108 m	A$108 m		
Life of Mine (LOM) Revenue		A$16.8 B	A$15.1 B	A$13.6 B
LOM Operating Costs	A$7.7 B	A$7.7 B	A$7.2 B	A$7.6 B
EBITDA		A$8.1 B	A$6.8 B	A$5.1 B
Revenue to Cost Ratio (Year 1 - 10)	2.5	2.4	2.3	2.1
Capex Payback (Stage 1 & 2; years)		5	5.25	6
Product sales (avg kt pa; all products)	1,365	1,365	1,163	775
Process Rate (Stage 1; tonnes per hr)	1,085	1,085	1,085	788
Mine Life	36 years	36 years	37 years	42 years
Long Term Average FX Rate (A$/US$)	0.75	0.75	0.75	0.75
Long Term Zircon Price - FOB (TZMI)	US$1,607	US$1,516	US$1,469	US$1,387

Source: Sheffield

- The current studies envisages a two stage operation;
  - Stage 1, mining at up to 11.6 Mtpa for years one to four; and,
  - Stage 2, mining at up to 24.4 Mtpa for years five to 36.
- Changes in the proposed development which have resulted in the changes to costs and returns include:
  - Increased wet concentrator plant ("WCP") throughput to 1,085 dry tph feed from 788 tpa dry feed; and,
  - Removal of the mineral separation plants and LTR ilmenite plant, so as only concentrates are produced on site.
- The Stage 1 capital cost and total funding requirements breakdown is presented in Table 5 - the capex estimates were undertaken by GRES as part of the EPC agreement with Sheffield.
- Total sustaining capex requirements are estimated at A$108 million for the life of mine.

Table 5: Capital cost estimate, Thunderbird 2022 BFS

Capital cost estimate, Thunderbird 2022 BFSU and FID			
Description	**BFS - A$M**	**FID - A$M - Not Itemised**	**Notes**
Direct Costs			
Wet Concentrator Plant (WCP)	64.4		
Concentrate Upgrade Plant (CUP)	26.7		
Plant Area Infrastructure & Power Reticulation	17.9		
Process Water Systems	11.7		
EPCM, Commissioning and Indirects	49.9		
Sub-Total - Processing	**170.6**	**185**	**Fixed price EPC**
Village Infrastructure	23.3		
Mine Access Road	27.7		
Sub-Total - General Infrastructure	**51.0**		
Ops Readiness, Village Services, G and A and First Fills	60.3		
Site Prep and Infrastructure, Tailings Dam and Borefield	31.9		
Mining Services Mobilisation	14.6		
Sub-Total - Owners Costs	**106.8**	**170**	**Infra and owners costs - FID**

Capital cost estimate, Thunderbird 2022 BFSU and FID			
Description	**BFS - A$M**	**FID - A$M - Not Itemised**	**Notes**
Contingency	32.8	24	10% Contingency
Total Stage 1 Upfront Capex	**361.2**	**379**	
Working Capital	20.4	22	Indicative provision during start-up & commissioning
Financing Costs	62.1	43	Includes interest during construction, fees, expert costs etc
Cost Overrun Facility	40.0	40	Estimate on direct capex
Sub-Total - Other Funding Requirements	**122.5**	**105**	
Total Uses	**483.7**	**484**	

Source: Sheffield

- Operating costs are presented in Table 6.

Table 6: Estimated operating costs, Thunderbird 2022 BFS - A$/ROM tonne

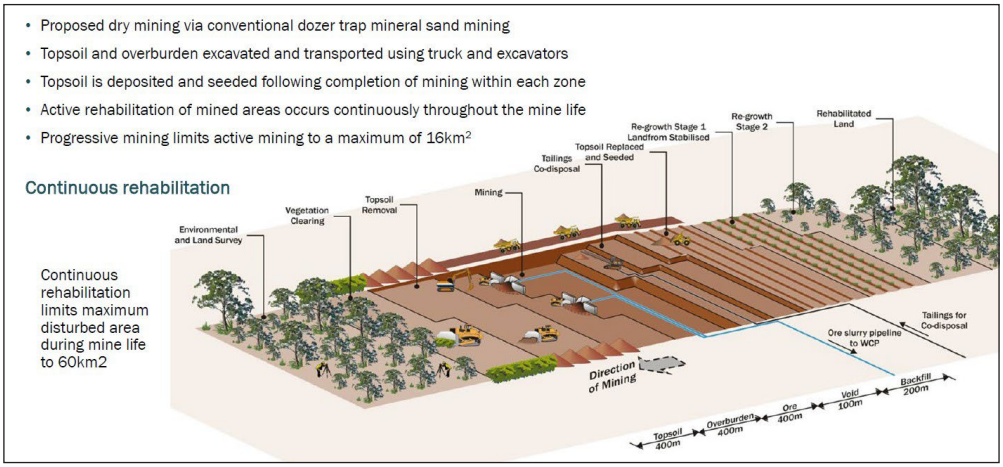
Estimated operating costs, Thunderbird 2022 BFS - A$/ ROM tonne			
Area	**Stage 1**	**Stage 2**	**LOM**
Mining	5.06	4.50	4.53
Processing	3.42	2.98	3.00
Product Logistics	2.31	1.05	1.12
Site G&A	4.09	1.10	1.26
Total	**14.87**	**9.62**	**9.91**

Source: Sheffield, IIR analysis.

Mining

- Mining, will be largely free dig (with some ripping required in harder layers) by industry standard dozer trap dry mining and is being contracted out - due to the age, the mineralisation is harder than typical for mineral sands deposits.
- Soil and overburden will be removed and stockpiled using loaders and 100 t off-highway trucks - ~6% of the overburden will require hard ripping.
- Ore, in the initial phase, will be fed through a dozer trap into a single in-pit mining unit plant ("MUP") – this will be expanded to two units in the second phase of operations, doubling the throughput - the planned average feed rate is 1,470 dry tph for each unit, well within the nameplate capacity of 1,800 dry tph
- The MUP will then feed ore to the wet concentrator plant ("WCP") for the start of the beneficiation process - the planned throughput for each WCP is 1,085 dry tph of -2 mm/-38 µm material - this is an increase of 38% to that envisaged in the 2017 BFS.
- The LoM strip ratio is 1.1:1, with the proposed schedule shown in Figure 3.

Figure 3: Schematic mining schedule

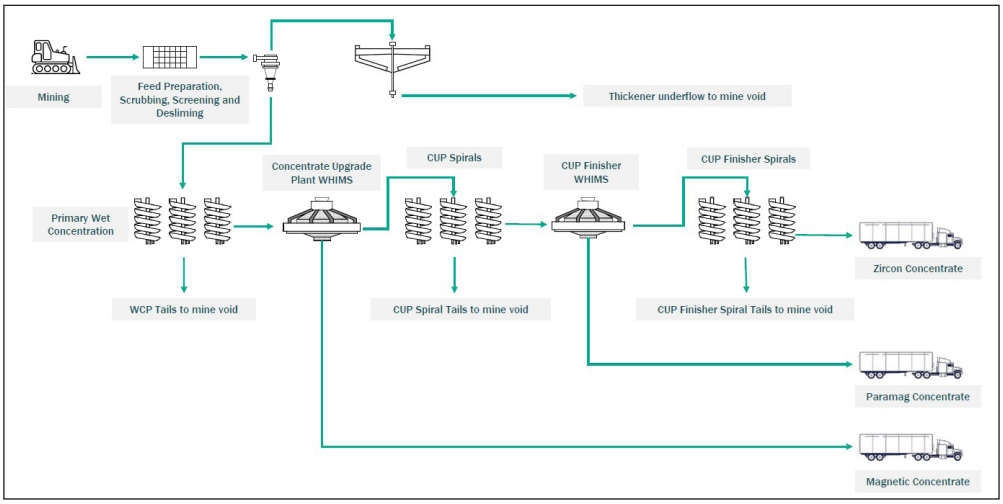


Source: Sheffield

Metallurgical Processing

- The proposed flow sheet has been revised to provide three concentrate streams – this is shown schematically in Figure 4:
  - Zircon concentrate, containing ~43% ZrO_2, ~16% TiO_2 and rare earth oxides,
  - Magnetic concentrate, containing ilmenite $(Fe,Ti)O_3$ and titano-hematite; and,
  - Paramagnetic concentrate, containing reject streams of ZrO_2 and TiO_2 units, and rare earth oxides.
- This has been based on completed metallurgical test work which included testing a 40 tonne bulk sample using full scale or scalable equipment – this also involved variability test work on three 5 tonne samples from various areas of the deposit, which largely followed the full design flowsheet.
- Material is scrubbed and screened in the MUP, with the -38 µm material being disposed of to slimes, and the +2 mm being rejected as oversize.
- The rejected material will be deposited in a tailings storage facility ("TSF") until such time as a suitable mine void is developed for tailings disposal – this is expected to take around 2.5 to 3 years.
- Ore material is then conveyed to the WCP and concentrate upgrade plant ("CUP"), which use a combination of gravity (spirals) and magnetic circuits to concentrate and then separate the magnetic (ilmenite) and non-magnetic (zircon, leucoxene) minerals into concentrates for sale and then further processing by the customers.
- As discussed earlier, previous plans to include mineral separation plants and low temperature roasting ("LTR") for treatment of ilmenite were dropped, largely due to the requirements of customers, which also lowers capital and operating costs, and simplifies the metallurgical processing.

Figure 4: Proposed process route



Source: Sheffield

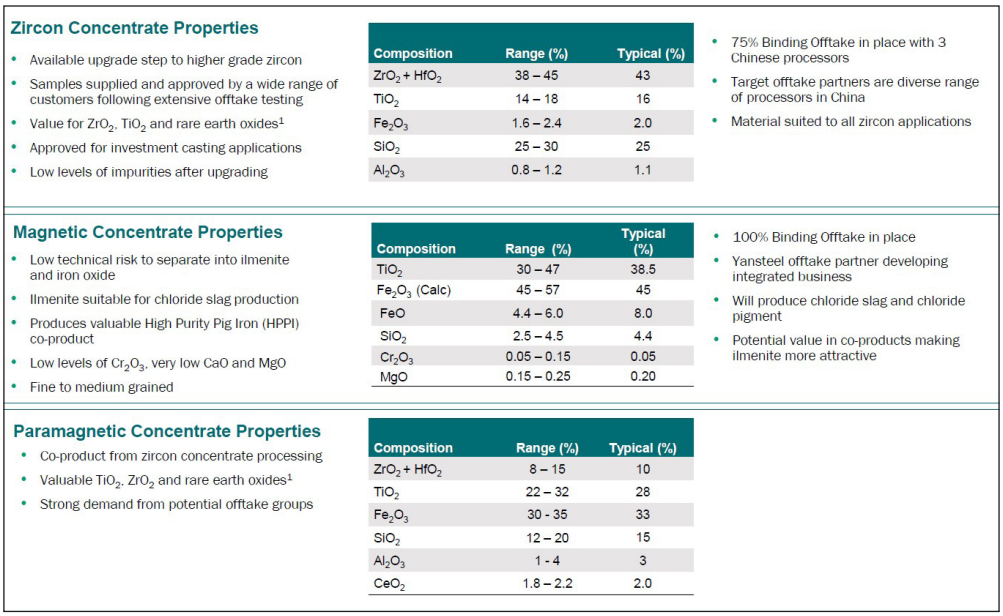
- Recoveries for the various products are as shown in Table 7, with expected product grades presented in Figure 5.
- It needs to be noted that zirconium grades are presented in terms of the oxide, ZrO_2, which contains 74.03% Zr, whereas the actual mineral is zircon ($ZrSiO_4$), which contains 49.77% Zr at the pure Zr end member - zircon can contain trace amounts of Hf.
- As an example, 43% ZrO_2 equates to 74.03/49.77 * 43% zircon, or 63.96% zircon.

Table 7: Product recoveries

Product recoveries	
	LOM
Zircon to Zircon Concentrate	80%
Ilmenite to Magnetic Concentrate	85%

Source: Sheffield.

Figure 5: Product specifications and uses



Zircon Concentrate Properties

- Available upgrade step to higher grade zircon
- Samples supplied and approved by a wide range of customers following extensive offtake testing
- Value for ZrO_2, TiO_2 and rare earth oxides[1]
- Approved for investment casting applications
- Low levels of impurities after upgrading

Composition	Range (%)	Typical (%)
$ZrO_2 + HfO_2$	38 – 45	43
TiO_2	14 – 18	16
Fe_2O_3	1.6 – 2.4	2.0
SiO_2	25 – 30	25
Al_2O_3	0.8 – 1.2	1.1

- 75% Binding Offtake in place with 3 Chinese processors
- Target offtake partners are diverse range of processors in China
- Material suited to all zircon applications

Magnetic Concentrate Properties

- Low technical risk to separate into ilmenite and iron oxide
- Ilmenite suitable for chloride slag production
- Produces valuable High Purity Pig Iron (HPPI) co-product
- Low levels of Cr_2O_3, very low CaO and MgO
- Fine to medium grained

Composition	Range (%)	Typical (%)
TiO_2	30 – 47	38.5
Fe_2O_3 (Calc)	45 – 57	45
FeO	4.4 – 6.0	8.0
SiO_2	2.5 – 4.5	4.4
Cr_2O_3	0.05 – 0.15	0.05
MgO	0.15 – 0.25	0.20

- 100% Binding Offtake in place
- Yansteel offtake partner developing integrated business
- Will produce chloride slag and chloride pigment
- Potential value in co-products making ilmenite more attractive

Paramagnetic Concentrate Properties

- Co-product from zircon concentrate processing
- Valuable TiO_2, ZrO_2 and rare earth oxides[1]
- Strong demand from potential offtake groups

Composition	Range (%)	Typical (%)
$ZrO_2 + HfO_2$	8 – 15	10
TiO_2	22 – 32	28
Fe_2O_3	30 - 35	33
SiO_2	12 – 20	15
Al_2O_3	1 - 4	3
CeO_2	1.8 – 2.2	2.0

Source: Sheffield

Product Logistics

- Products are planned to be trucked to either Derby or Broome to be loaded onto ships for export largely to Asian markets - a 20 year Derby Port Facility Agreement has now been executed, providing the Company with long term access.
- Derby has historically been used as a bulk terminal, using both direct loading (significantly affected by tides) and transhipment – the Company's activities will require refurbishment of the current ship loader and conveyor, with transhipment using barges to the customers' vessels which will be moored 20 km to 30 km offshore.

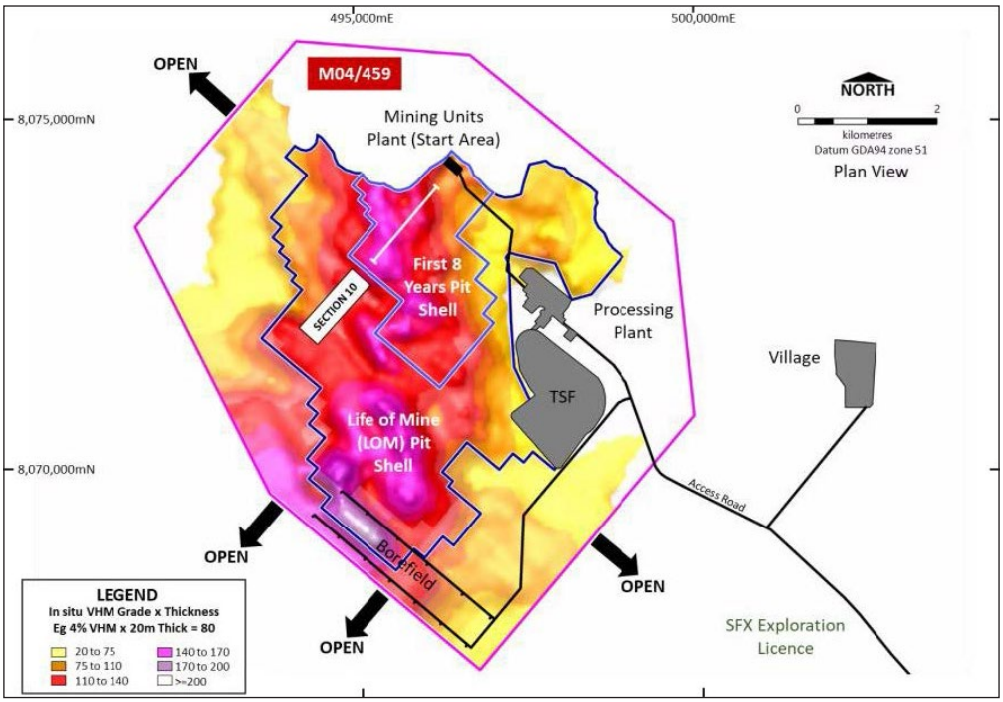
Infrastructure

- Power requirements are as discussed earlier.
- Operations at the port facilities are expected to be supplied from the existing power infrastructure.
- The accommodation camp is located some 8 km from the processing plant – this caters for 300 construction workers and 180 operations personnel.
- The operation will be largely drive-in/drive-out ("DIDO") from regional towns and localities, with some key personnel on a fly-in/fly-out ("FIFO") roster.
- Water will be supplied from both mine dewatering and make-up bore fields adjacent to the mining void, however after 32 years it is expected that the dewatering volumes will exceed process water requirements, and thus will need to be injected back into the aquifer.
- Steady state operation water requirements are ~10.7 GL/year, with the water being of good quality and low salinity.

GEOLOGY AND MINERALISATION

- The tenements are located over deeply weathered units of the Cretaceous Canning Basin, which in the vicinity of Thunderbird dip very gently to the southwest.
- The HMS mineralisation largely occurs in a unit referred to as the Broome Sandstone, characterised by brown/orange loose sands up to 90 m thick (these are generally free digging, but with some minor ripping required in the near surface material) – not all of the Broome Sandstone is mineralised however, with the mineralised part being locally referred to as the Thunderbird Formation.
- The mineralised horizon occurs as a laterally extensive, thick sheet like body, and has been defined for a distance of between 2.5 km and 5.5 km down dip (NE/SW), and 8 km along the NW/SE strike (Figure 6).

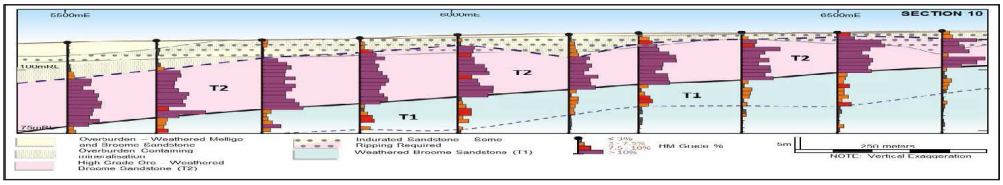
Figure 6: Thunderbird plan showing grade x thickness and proposed site layout



Source: Sheffield

- Structurally the basin units form a broad NW striking anticline, with stratigraphy being folded from flat to a very gentle 4° dip to the SW.
- The deposit properties, including morphology and grade, are interpreted to indicate a potential off-shore, sub-wave base depositional environment.
- The average thickness of the mineralisation is 47 m, with an average depth to the top of 21 m - around 32% of the resource area is within 6 m of the surface, with the mineralisation being open along strike and down dip.
- The dominant valuable heavy minerals include ilmenite ($FeTiO_3$), zircon ($ZrSiO_4$), leucoxene (a weathering product of ilmenite, with higher but variable TiO_2 grades), rutile (TiO_2) and anatase (TiO_2).

Figure 7: Typical SW-NE cross section, Thunderbird



Source: Sheffield

RESOURCES AND RESERVES

- The most recent MRE for Thunderbird was released to the market on January 1, 2019 - this incorporated an initial MRE for Night Train, and the MRE for Thunderbird as originally released to the market on July 5, 2016, with this presented in Table 8.
- This is shown at high and low cut-off grades - at both Thunderbird and Night Train the high grade Resources form coherent zones within the broader deposits.
- In addition to the MRE, and exploration target of 3.0 Mt to 4.0 Mt at 3.0% to 4.0% HM has been estimated at Night Train (Figure 9).
- The most recent Ore Reserve update was released to the market on March 22, 2022, with this completed as part of an updated to the BFS that incorporated a simplified flow sheet (Table 9).
- At 754 Mt, including 30% in the Proved category, the Reserves are sufficient to carry the planned 36 year long life operation, with higher grade Proven Reserves more than sufficient to feed the first 10 years of the planned operation.

Table 8: Thunderbird Mineral Resource Estimate - 2019

Thunderbird Mineral Resource Estimate										
Cut-off (HM%)	Category	Resource Tonnes (Mt)	Insitu HMS (Mt)	HM (%)	Zircon (%)	HiTi Leuc (%)	Leuc (%)	Ilmenite (%)	Slimes (%)	Osize (%)
T'Bird >3%	Measured	510	45	8.9	0.71	0.2	0.19	2.4	18	12
	Indicated	2,120	140	6.6	0.55	0.18	0.2	1.8	16	9
	Inferred	600	38	6.3	0.53	0.17	0.2	1.7	15	8
	Total	**3,230**	**223**	**6.9**	**0.57**	**0.18**	**0.2**	**1.9**	**16**	**9**
Night Train >1.2%	Inferred	130	4.2	3.3	0.45	0.18	1.5	0.71	8.7	2.2
	Total	**130**	**4.2**	**3.3**	**0.45**	**0.18**	**1.5**	**0.71**	**8.7**	**2.2**
All Dampier (low cutoff grade)	Measured	510	45	8.9	0.71	0.2	0.19	2.4	18	12
	Indicated	2,120	140	6.6	0.55	0.18	0.2	1.8	16	9
	Inferred	730	42	5.8	0.51	0.17	0.43	1.6	13	7.2
	Total	**3,360**	**227**	**6.8**	**0.57**	**0.18**	**0.25**	**1.9**	**15**	**8.7**
T'Bird >7.5%	Measured	220	32	14.5	1.07	0.31	0.27	3.9	16	15
	Indicated	640	76	11.8	0.9	0.28	0.25	3.3	14	11
	Inferred	180	20	10.8	0.87	0.27	0.26	3	13	9
	Total	**1,050**	**127**	**12.2**	**0.93**	**0.28**	**0.26**	**3.3**	**15**	**11**
Night Train >2%	Inferred	50	3	5.9	0.82	0.33	2.9	1.06	10.2	2.2
	Total	**50**	**3**	**5.9**	**0.82**	**0.33**	**2.9**	**1.06**	**10.2**	**2.2**
All Dampier (high cutoff grade)	Measured	220	32	14.5	1.07	0.31	0.27	3.9	16	15
	Indicated	640	76	11.8	0.9	0.28	0.25	3.3	14	11
	Inferred	230	23	9.7	0.85	0.28	0.83	2.6	12	7.2
	Total	**1,090**	**130**	**11.9**	**0.92**	**0.29**	**0.38**	**3.2**	**14**	**11**

Source: Sheffield (note - rounding errors may occur)

Table 9: Thunderbird Ore Reserves - 2022

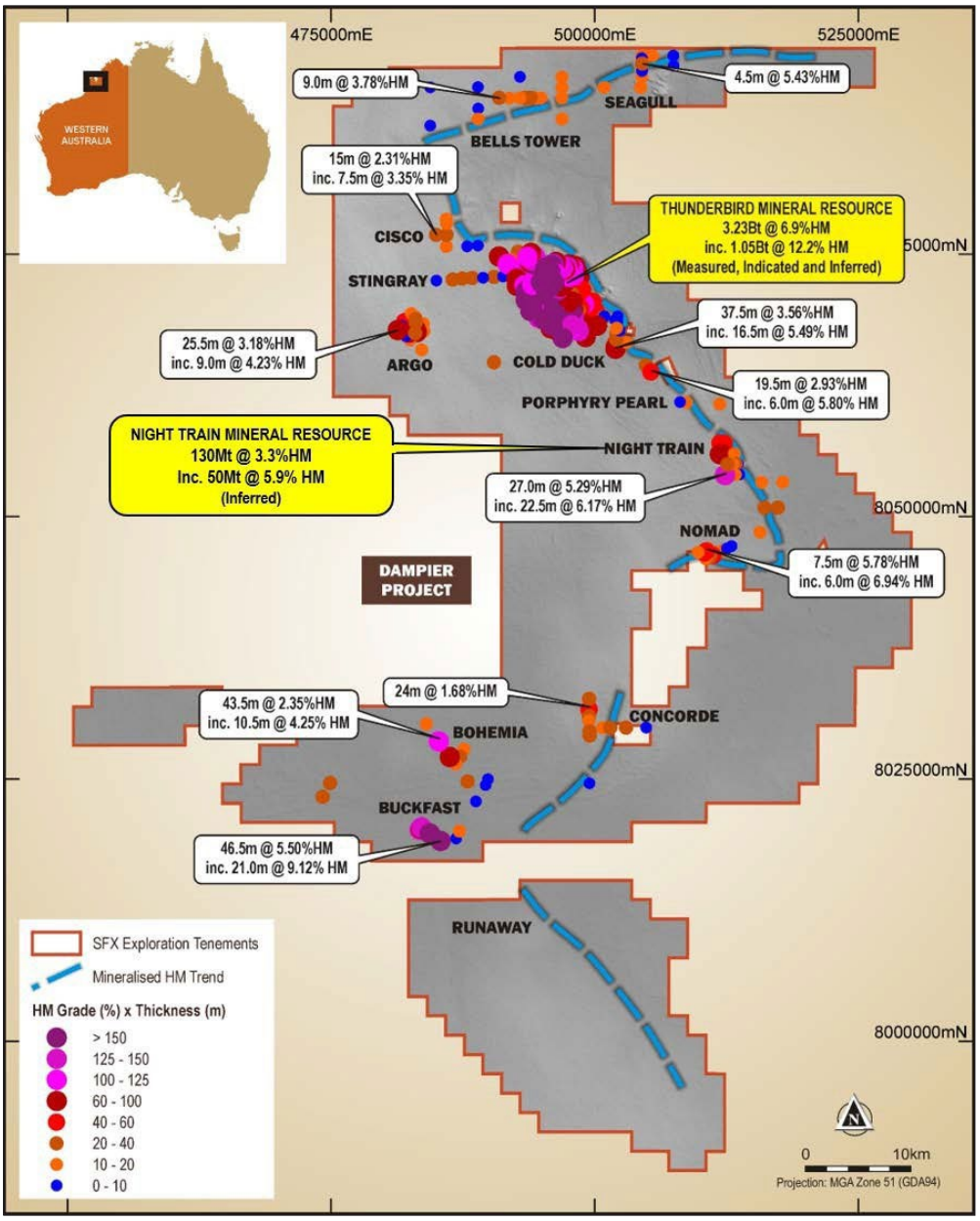
Thunderbird Ore Reserves									
Category	Resource Tonnes (Mt)	Insitu HMS (Mt)	HM Grade (%)	Zircon (%)	HiTi Leuc (%)	Leuc (%)	Ilmenite (%)	Slimes (%)	Osize (%)
Proved	239	30	12.9	0.96	0.29	0.28	3.4	16	14
Probable	514	53.4	10.1	0.79	0.26	0.27	2.9	15	11
Total	754	83.8	11.0	0.84	0.27	0.27	3.1	15	12

Source: Sheffield

UPSIDE POTENTIAL

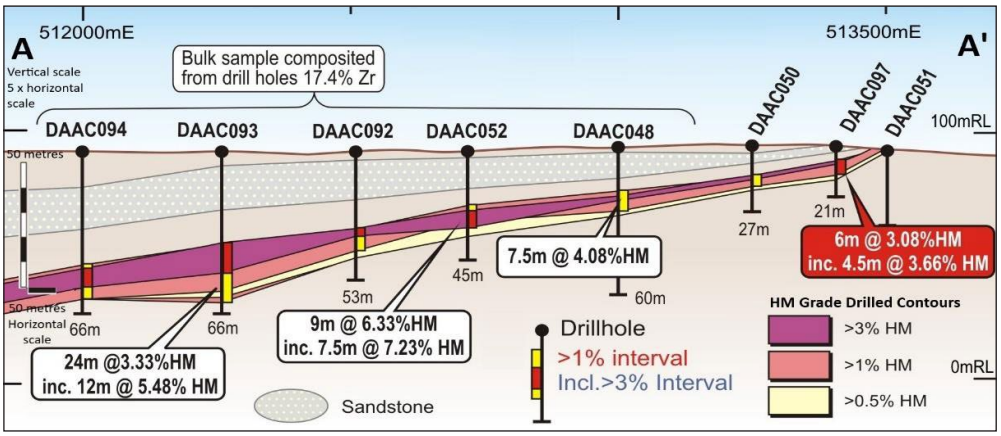
- Work by Sheffield has highlighted the potential for the Canning Basin to be a globally significant mineral sands province - work to date has identified 14 zones of mineralisation along a 120 km trend from Seagull in the north to Runaway in the south (Figure 8).
- This includes the Night Train deposit, located some 20 km SE of Thunderbird, and within 2 km of the planned site access road – the location is shown in Figure 8, a drilling plan in Figure 10 and a section in Figure 9.
- As mentioned previously the Company has published an initial MRE and exploration target for Night Train with the MRE presented in Table 8.
- Drilling has highlighted the quality of the prospect, with some results shown in Figure 8 - others include 27 m @ 5.29% HM (including 22.5 m @ 6.17% HMS) from 49.5 m in hole DAAC114, which occurs at the south-western extremity of the drilled portion of the deposit, highlighting the upside potential.
- Mineralisation, which has been defined for a strike length of over 5 km and a width of between 1.5 km and 2.0 km is open to the north and south and down dip to the west.
- Preliminary metallurgical test work undertaken on a 100 kg drill sample composite in 2016 showed that high quality zircon that meets ceramic specifications can be produced.
- Other prospects have also provided very encouraging intersections,

Figure 8: Dampier regional targets



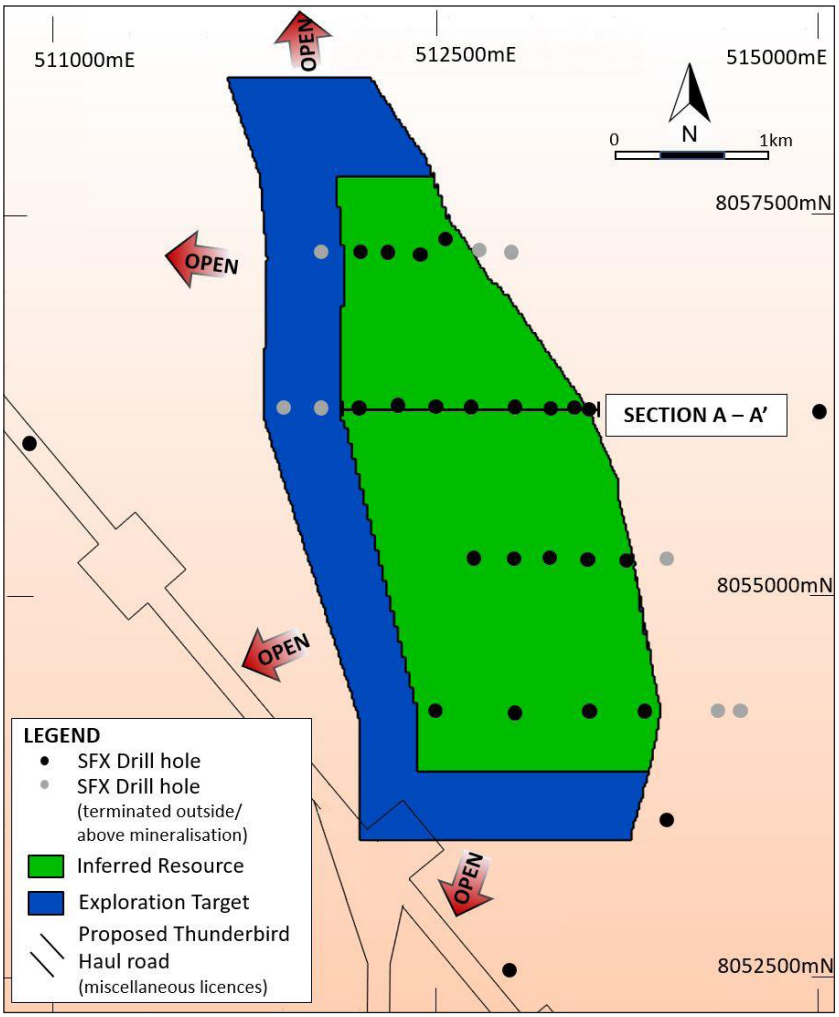
Source: Sheffield

Figure 9: Night Train Section D-D', looking north



Source: Sheffield

Figure 10: Night Train plan, showing Resource and exploration target areas



Source: Sheffield

SOUTH ATLANTIC HMS PROJECT (SFX EARNING 20%)

LOCATION AND ACCESS

- The Project is located in the state of Rio Grande do Sol, in Southern Brazil (Figures 11 and 12) - it is located along the eastern side of Lagoa dos Patos, with the centre of the package ~340 km by road (BR-101 and BR-290) from the state capital, Porte Alegre - the prospects extend for a strike length of ~80 km along the Rio Grande do Sol Coastal Plain (Figure 12).
- The town of Sao Jose do Norte, at the southern end of the tenement packages, has regular vehicular and passenger ferry services to the port city of Rio Grande, on the south side of the entrance to Lagoa do Patos.
- Rio Grande is the third largest port in Brazil, and has the capacity to handle Panamax sized vessels - Lagoa do Patos is navigable by ocean going vessels to Porto Alegre in the north.

Figure 11: South Atlantic Project location

Source: Sheffield

- The tenements are in good standing, and 100% held by the vendor Rio Grande Mineração S/A ("RGM").
- One issue that will have to be resolved (with the resolution being one of the conditions of the exercise of the option), is legislation limiting mining activities put in place by the local municipality - whether this can legally affect Federally granted tenements is to be determined.

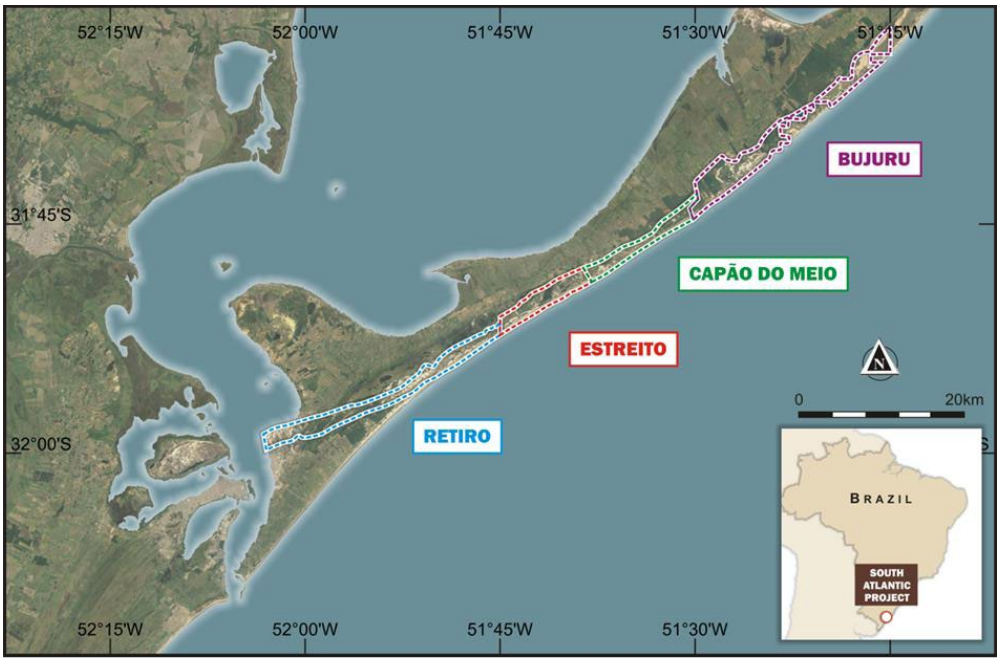
OPTION AGREEMENT

- The Company has signed a binding option agreement ("RGM Option Agreement") with Mineração Santa Elina Indústria e Comércio S/A ("MSP Group", 75%) and Kromus Xi Fundo De Investimento Em Participações SA (25%), the owners of RGM.
- As part of the agreement Sheffield has provided RGM with an unsecured US$2.5 million loan to be used to fund project related activities, and assist Sheffield with due diligence.
- The US$2.5 million, of which US$1.0 million was paid on close, with the remaining US$1.5 million as required over an 18 month period, gives Sheffield the option to acquire 20% of RGM, with exercise, upon the payment of a further US$12.5 million, giving Sheffield 20% of RGM.
- The commencement of the option period shall be dependent upon the execution of a formal shareholders agreement and a framework agreement for the resultant joint venture.
- In addition to the US$2.5 contribution by Sheffield, the existing shareholders of RGM are providing US$3 million, which ensures sufficient funds to carry out an agreed work programme.
- The work programme will include, amongst others, obtaining regulatory approvals, drilling, resource definition and definitive feasibility studies, following which Sheffield shall have the choice to withdraw and retain a 20% interest (else sell it back to RGM for US$15 million), or continue.
- Should Sheffield elect to proceed, there is the option to increase the holding in RGM to up to 80% - this will depend upon, amongst others, project financing being secured; there is also an option in place to acquire the remaining 20%.
- Further details of the agreement are included in the Sheffield release of February 28, 2023.
- MSP Group is a privately owned Brazilian Group, with investments in mining, power generation and agribusiness - they have an overall strategy of investing in earlier stage projects, and the partnering to advance the projects, and then divesting the advanced projects.

GEOLOGY, MINERALISATION AND PREVIOUS WORK

- Four main deposits have been defined within the project area - Retiro, Estreito, Capao do Mejo and Bujuru (Figure 12).
- The HMS deposits are typical strand lines in style formed along the barrier beach shoreline, with the action of wind and sea currents along with changes in sea levels due to glaciation concentrating the heavy minerals into the placers seen today.
- Four main types of sedimentary units have been recognised:
  - Biege, well sorted aeolian sands, with generally low grades of around 1%, and rarely up to 2-3% THM,
  - Fine-grained, beige sea sands with grades of up to 10% THM ,
  - Low THM grade beige to greenish beige clayey sands and sands; and,
  - Greyish beige to black clayey sands, with THM grades of up to 3.5% in some locations.

Figure 12: Key prospects, South Atlantic



Source: Sheffield

- Significant historic work has been undertaken, with the original discovery in 1958, however given ASX and ASIC requirements the results of a significant portion cannot be publicly disclosed.
- RTZ Mineração Ltda ("RTZ") undertook exploration drilling commencing in 1988, which resulted in the discovery and definition of Retiro and Estreito - this was followed by a pilot plant trial in 1989, which produced one tonne of HM concentrate that was subject to mineral separation test work.
- Paranapanema SA undertook exploration work in the 1990s, resulting in bulk sampling programmes in 1992 and 1999.
- More recently work, including environmental, technical and economic studies was undertaken by RGM, which acquired the Project in 2014; work also included extensive air core drilling and bulk sample test work.
- RGM completed a programme of sonic drilling over Retiro and Bujuru, and test pitting over Bujuru in 2022 to investigate grade discrepancies between the 2014 aircore drilling and test pitting, and the pre-2014 drilling.
- Pre-RGM drilling has included 471 holes over Retiro and 286 holes over Bujuru by RTZ and Paranapanema (prior to 2014), and 192 holes by Sibelco in 2014.
- As part of the due diligence process, Sheffield has estimated exploration targets for Retiro and Bujuru (Tables 10 and 11).
- Retiro has a strike length of some 30 km, a width of between 800 to 1,000 m and a thickness of five to 10 m on average; the measurements for Bujuru are 27 km, 1,400 to 2,000 m and 2 to 7 m.

- The results show an ilmenite rich deposit, however with the potential for credits from rutile and zircon - both high value minerals.

Table 10: Retiro Exploration Target

Deposit	Classification	Cut off (THM%)	Material (Mt)	In Situ HM (Mt)	THM (%)	HM Assemblage					Non Valuable HM (%)
						Ilmenite (%)	Altered Ilmenite (%)	Zircon (%)	HiTi / Rutile (%)	Leuco-xene (%)	
Retiro	Exploration Target	2.0	250	10	3.9	49	5	5	3	0	38
	Exploration Target	1.0	380	12	3.0	49	5	5	3	0	38

Notes:

(1) Exploration Target reported at a lower cut-off grade of 1% HM and an upper cut-off-grade of 2% HM.

(2) Mineral assemblage is reported as a percentage of in situ HM content.

(3) The Exploration Target is reported at a cut-off grade range of 1% HM to 2% HM. The potential quantity and grade of the Exploration Target is conceptual in nature and is therefore an approximation. There has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource. The Exploration Target, being conceptual in nature, takes no account of geological complexity, possible mining method or metallurgical recovery factors. The Exploration Target was estimated in order to provide an assessment of the potential scale of exploration for the South Atlantic Project.

Source: Sheffield

Table 11: Bujuru Exploration Target

Deposit	Classification	Cut off (THM%)	Material (Mt)	In Situ HM (Mt)	THM (%)	HM Assemblage					Non Valuable HM (%)
						Ilmenite (%)	Altered Ilmenite (%)	Zircon (%)	HiTi / Rutile (%)	Leuco-xene (%)	
Bujuru	Exploration Target	2.0	250	10	4.0	53	6	6	3	0	32
	Exploration Target	1.0	340	11	3.3	53	6	6	3	0	32

Notes:

(1) Exploration Target reported at a lower cut-off grade of 1% HM and an upper cut-off-grade of 2% HM.

(2) Mineral assemblage is reported as a percentage of in situ HM content.

(3) The Exploration Target is reported at a cut-off grade range of 1% HM to 2% HM. The potential quantity and grade of the Exploration Target is conceptual in nature and is therefore an approximation. There has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource. The Exploration Target, being conceptual in nature, takes no account of geological complexity, possible mining method or metallurgical recovery factors. The Exploration Target was estimated in order to provide an assessment of the potential scale of exploration for the South Atlantic Project.

Source: Sheffield

WHY SOUTH ATLANTIC?

- South Atlantic presents an advanced project, with an initial stake that can be acquired for a reasonable price should it stack up - it has been a project held in private hands that has flown under the radar.
- The exploration targets define a globally significant project, with grades and potential in ground values similar to other ilmenite-rich development projects.
- Significant work has been undertaken to date, and thus it is expected (as recognised in the option agreement terms) to take reasonably limited capital to take the project through to a completed feasibility study and permitting, and hence there is the opportunity for relatively rapid value accretion to Sheffield.
- The recent capital raising by the Company has included sufficient funds for the US$15 million required to earn the initial 20%.
- The project is well sited with regards to infrastructure, importantly including ports, and in a mature mining destination.

SHEFFIELD VALUATION

- We have updated our valuation for Sheffield, with this largely based on the value in KMS, which has been calculated using a DCF valuation, with a 8% real discount rate - a summary is shown in Table 10.
- We have risked the KMS technical valuations to arrive at a market value - the risk multiplier used reflects project stage amongst others.
- For KMS, we have effectively modelled two projects:
  - A standalone single phase project, based on the first phase of the two phase project as presented in the updated DFS and FID documents - this has an annual mining rate averaging ~12 Mtpa RoM for 36 years, and forms the base case; and,
  - An expansion case, based on doubling throughput to ~24 Mtpa RoM from year 5.

- Although the FID case is predicated on Phase 2 production commencing in Year 5, the Company has stated that this is open to change, and could well be pushed back depending upon the markets and global economy, and the wishes of the JV - this is reflected in the risk factors used - our rule of thumb is that a "shovel ready" project is risked at 40% of technical value.
- We have also undertaken a DCF valuation on our modelled dividends (fully franked) payable by KMS to SFX - as for the project valuation these are split between Phase 1 and Phase 2, and risked accordingly (Table 12) - these are close to the project DCF valuations.
- We would expect the market valuation to approach the technical valuation with successful project implementation, and production demonstrated to meet forecasts.

Table 12: Sheffield valuation

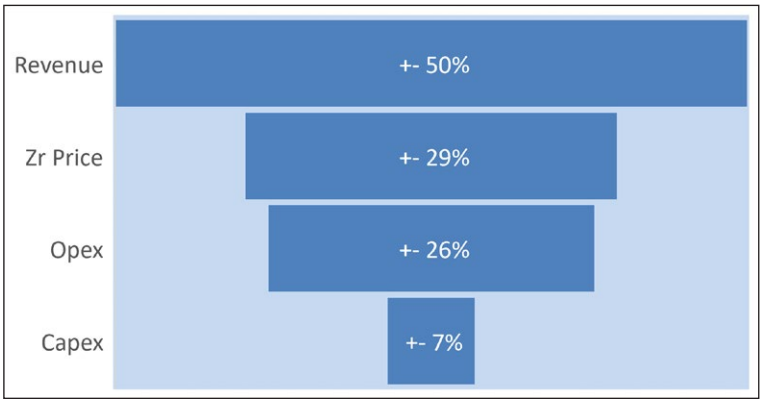
Sheffield valuation						
Item	**Total**	**Equity Stake**	**Equity Value ps**	**Tech Risk Factor**	**Risked**	**Risked/ Share**
Kimberley Sands Project Single Phase	A$986 m	50%	A$1.256	60%	A$296 m	A$0.754
Kimberley Sands Project Phase 2	A$681 m	50%	A$0.868	30%	A$102 m	A$0.260
Night Train	A$40 m	50%	A$0.051	100%	A$20 m	A$0.051
Other KMS Exploration	A$20 m	50%	A$0.025	100%	A$10 m	A$0.025
Head Office	-A$23 m	100%	-A$0.059	100%	-A$23 m	-A$0.059
Cash - 31/12/22	A$5 m	100%	A$0.013	100%	A$5 m	A$0.013
March 2023 Raise	A$23 m	100%	A$0.058	100%	A$23 m	A$0.058
Total	**A$1,732 m**		**A$2.212**		**A$433 m**	**A$1.102**
Total Valuation on Single Phase KMS	**A$1,051 m**		**A$1.344**		**A$331 m**	**A$0.842**
Project Modelling Parameters	Shares	393 m	Post Tax	Funded		
	Discount Rate	8.00%	AUD/USD	0.725		
SFX Franked Dividend - Phase 1	A$473 m	100%	A$1.205	60%	A$284 m	A$0.723
SFX Franked Dividend - Phase 2	A$439 m	100%	A$1.117	30%	A$132 m	A$0.335
SFX Franked Dividend - Total	A$912 m	100%	A$2.322		A$416 m	A$1.058

Source: IIR analysis

- Valuation methods for the individual components include:
  - Thunderbird - DCF, 8% real DR,
  - Night Train - ~A$10/per tonne payable HM,
  - Other KMS exploration - nominal,
  - Head Office - DCF, 8% real, A$2.5 million per annum over the life of Thunderbird,
  - Cash - 31/12/22 - actual; and,
  - March 2023 capital raise - actual.
- We have not included the significant tax credits within Sheffield - these were not carried into KMS, we have assumed that the KMS dividends will be fully franked, and it would be some time that they would be used otherwise.
- In the KMS valuation we have used parameters as presented by the Company, with two main differences:
  - We have used an AUD/USD exchange rate of 0.725, as compared to 0.75 used by Sheffield; and,
  - We have used flat commodities pricing (based on long term prices), including US$754/tonne for zircon concentrate, US$134/tonne for magnetic concentrate, and US$108/tonne for paramag concentrate - the Company has used forecast prices.
- Forecast production and cash flow figures for the two phase operation are presented at the end of this document.
- One point to note when assessing mineral sands operations is that revenue can be "lumpy" - products are commonly despatched as a series of relatively few high value shipments throughout the year, with various payment terms.
- As an example, a shipment may be sent out close to the end of a reporting period, with payment not due until the following quarter; as such the actual revenue and receivables should be considered together to get a realistic feel for cashflows.

- One figure of interest is the "revenue to cost" ratio – this is a factor commonly used in HMS operations given different product mixes, and figures of >2:1 places Thunderbird in a very competitive position amongst global producers.
- We have completed a sensitivity analysis for Sheffield and Thunderbird - Figure 13 shows the leverage of Thunderbird to 20% changes in key parameters, with Table 12 exhibiting the leverage to concurrent changes in revenue factors and operating costs for the unrisked single stage Thunderbird operation.
- In Table 13, revenue factors include product prices and volumes and exchange rates (and take into account royalties as they rely on the revenue), and costs are direct site costs, excluding royalties.
- The leverage factors shown in Figure 13 and Table 13 can, with reasonable confidence, be applied to any of the project or Company valuation outcomes, given the dominance of the Thunderbird valuation in the overall Sheffield valuation.

Figure 13: Thunderbird value leverage to 20% changes in key parameters



Source: Sheffield

Table 13: Leverage to change in revenue and cost parameters

Leverage to change in revenue and cost parameters						
		Change in Site Operating Costs				
	0%	-20%	-10%	0%	10%	20%
Change in Revenue	-20%	-24%	-37%	-50%	-63%	-76%
	-10%	1%	-12%	-25%	-38%	-51%
	0%	26%	13%	0%	-13%	-26%
	10%	51%	38%	25%	12%	-1%
	20%	76%	63%	50%	37%	24%

Source: IIR analysis

- Table 14 shows the effect of revenue and opex factors to the Sheffield risked per share valuation based on the two phase operation - in this case, allowing for other items such as cash and exploration, a 20% decrease in Thunderbird revenue results in a 44% decrease in the risked per share valuation, and a 20% decrease in operating costs leads to 21% increase in per share valuation, relatively close to the project valuation changes of 50% and 26% respectively.
- What this shows is a robust project, albeit strongly leveraged to revenue factors, but with being able to withstand concurrent 20% negative movements in both revenue and costs.

Table 14: Sheffield share price sensitivity - two phase Thunderbird

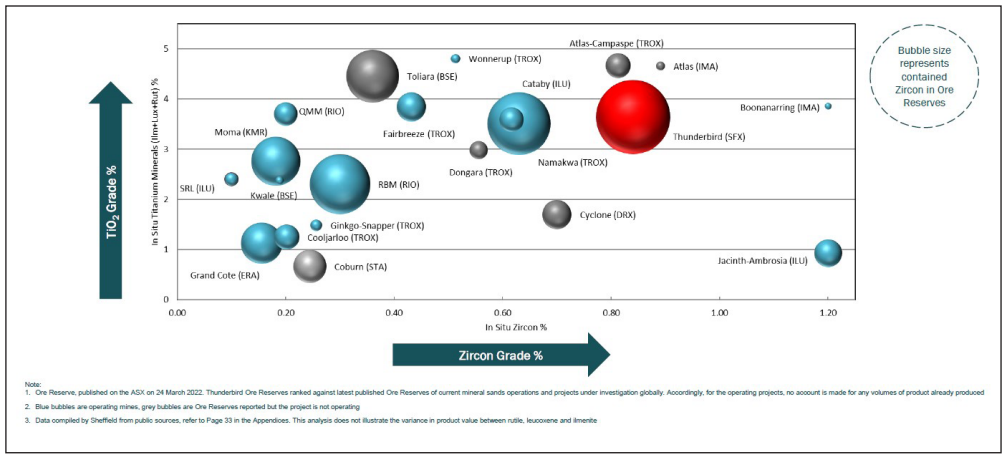
Sheffield share price sensitivity - two phase Thunderbird						
		Change in Site Operating Costs				
	$1.06	-20%	-10%	0%	10%	20%
Change in Revenue	-20%	$0.84	$0.72	$0.61	$0.49	$0.37
	-10%	$1.09	$0.97	$0.85	$0.74	$0.62
	0%	$1.34	$1.22	$1.10	$0.99	$0.87
	10%	$1.58	$1.47	$1.35	$1.23	$1.12
	20%	$1.83	$1.71	$1.60	$1.48	$1.36

Source: IIR analysis

DEPOSIT COMPARISON

- Figure 14 presents a graph of zircon grade vs total titanium minerals grade for a galaxy of HMS deposits - this shows the relatively high grades for both zircon and titanium minerals for Thunderbird.
- Reserves for selected deposits are presented in Table 15, however we have included Resources for major projects where Reserves have not been publicly released.

Figure 14: Comparison of HMS deposits



Source: Sheffield

Table 15: Comparison of selected Zr/Ti deposits

Comparison of selected Zr/Ti deposits							
Company	**Deposit**	**Type**	**Stage**	**Tonnage Mt**	**Total Ti %**	**Zircon %**	**Total VHM Mt**
Base	Kwale	Reserves	Operating	40	1.87%	0.16%	0.8
Base	Ranobe	Reserves	Pre-development	904	4.59%	0.36%	44.8
Diatreme	Cyclone	Reserves	Pre-development	138	1.72%	0.72%	3.4
Iluka	Perth Basin	Reserves	Operating	128	4.43%	0.73%	6.6
Image	Atlas	Reserves	Development	5	6.05%	1.09%	0.4
Image	Boonanarring	Reserves	Operating	1.2	3.77%	1.54%	0.06
Image	Biddaminna	Resources	Studies	109	2.20%	0.12%	2.7
Sheffield	Thunderbird	Reserves	Development	753	3.60%	0.84%	33.5
Sheffield	Retiro	ET	Evaluation	380	1.56%	0.18%	6.6
Sheffield	Bujuru	ET	Evaluation	340	2.05%	0.20%	7.6
Sierra Rutile	Area 1	Reserves	Operating	48	2.08%	0.12%	1.1
Sierra Rutile	Sembehan	Reserves	Pre-development	174	2.38%	0.10%	4.3
Strandline	Coburn	Reserves	Producing	523	0.66%	0.25%	4.8
Sovereign	Kasiya Total	Resources	Studies	1,775	1.02%	0.00%	18.2
Tronox	Cooljarloo	Reserves	Operating	361	1.24%	0.09%	4.8
Tronox	Atlas-Campaspe	Reserves	Development	107	4.57%	0.66%	5.6
Tronox	KZN	Reserves	Operating	217	3.77%	0.42%	9.1
Tronox	Namakwa	Reserves	Operating	703	3.56%	0.64%	29.6
Rio Tinto	QMM	Resources	Pre-development	1,439	4.05%	0.20%	61.2
Rio Tinto	Richards Bay	Reserves	Operating	1,284	1.77%	0.31%	26.7

Source: IIR Analysis

BOARD AND MANAGEMENT

- **Mr Bruce Griffin – Executive Chairman:** Bruce Griffin most recently held the position of Senior Vice President Strategic Development of Lomon Billions Group, the world's third largest producer of high-quality titanium dioxide pigments. Bruce previously held executive management positions in several resource companies, including acting as the Chief Executive Officer and a director of TZ Minerals International Pty. Ltd. (TZMI), the leading

independent consultant on the global mineral sands industry, World Titanium Resources, a development stage titanium project in Africa and as Vice President Titanium for BHP Billiton.

- **Ian MacLiver – Non-Executive Director:** Ian Macliver is the Chairman of Grange Consulting Group Pty Ltd & Grange Capital Partners. Prior to establishing Grange he held positions in various listed and corporate advisory companies. His experience covers all areas of corporate activity including capital raisings, acquisitions, divestments, takeovers, business and strategic planning, debt and equity reconstructions, operating projects and financial review and valuations. Mr Macliver is the Non-Executive Chairman of MMA Offshore Limited.
- **Mr John Richards – Lead Independent Non-Executive Director:** John Richards is an economist with more than 35 years' experience in the resources industry; holding various positions within mining companies, investment banks and private equity groups. He has been involved in a wide range of mining M&A transaction in multiple jurisdictions. Mr Richards is an Independent Non-Executive Director; holding previous positions at Normandy Mining Ltd, Standard Bank, Buka Minerals and Global Natural Resources Investments; he is a Non-Executive Director of Northern Star Limited and a Non-Executive Chair of Sandfire Resources Limited.
- **Ms Vanessa Kickett – Non-Executive Director:** Vanessa Kickett has extensive experience and involvement with Aboriginal engagement, native title and heritage matters throughout Western Australia. A member of the Whadjuk Noongar community, Mrs Kickett is currently Deputy Chief Executive Officer of the South West Aboriginal Land and Sea Council, responsible for the recent implementation and operation of the South West (Western Australia) native title settlement. Mrs Kickett has also held a variety of roles in the public sector, leading the development of heritage and native title policy and frameworks on behalf of Water Corporation in Western Australia.
- **Mr Gordon Cowe – Non-Executive Director:** A qualified mechanical engineer with over 30 years' experience, Gordon has had significant involvement in leading business start-up, planning and delivery of multiple complex projects including Mining & Mineral Processing, Oil & Gas and Resources based infrastructure projects globally. He has enjoyed an extensive career with leading contractors (including Bechtel and Worley Parsons) and project owners on a wide range of projects
- **Mr Mark Di Silvio – CFO/Company Secretary:** Mr Di Silvio is a CPA and MBA qualified finance professional with over 30 years' resources industry experience. Mr Di Silvio's professional career includes operations and project development experience both in Australia and overseas, including senior finance roles with Woodside Petroleum Limited in Australia and Africa prior to joining Central Petroleum Limited and Centamin Plc as CFO. Mr Di Silvio has significant commercial and financial management experience including project financing, commercial agreement structuring and product offtake agreements.

BACKGROUND – THE MINERAL SANDS INDUSTRY

Introduction

- The mineral sands industry is the key supplier of zircon and titanium dioxide minerals worldwide - these are key feedstocks for industrial uses, with Australia being a major global producer, particularly of zircon.
- In 2022 global production included 1.4 Mt of zirconium ores and concentrates and 8.9 Mt of titanium dioxide feedstock - Australia was the largest producer of zirconium, with 500 kt, and fourth in titanium feedstocks with 660 kt.
- Iluka is currently the world's largest producer of zircon, with 302,700 t mined in CY2022.
- China was the lead producer of titanium feedstocks with 3.4 Mt, followed by Mozambique with 1.2 Mt, with Mozambique production sourced from Kenmare's Moma operation; South Africa is also a significant producer, with 900,000 tonnes production in 2022, mainly from mines operated by Tronox (Namakwa Sands and KZN) and Rio (Richards Bay Minerals).
- Given the usage for the minerals, the markets can be considered a proxy for global GDP, and with intensity of usage strongly linked to per capita GDP.
- 2022 global sales for mineral sands products were estimated at US$4.5 billion for titanium feedstocks and US$1.7 billion for zircon.

Zircon

- The market is supplied by the one product, zircon ($ZrSiO_4$), which is an opaque hard wearing mineral with thermal stability and chemical resistance - there are no practical substitutes for the mineral.
- The major use for zircon is in ceramics, with this comprising some 50% of global demand, with approximately 90% of the ceramics demand from tile manufacture.
- Other uses include chemicals and metals (20%), refractory linings (18%) and for use in foundry castings (11%).
- China is the largest market, comprising ~50%, with this region seeing significant growth, largely due to the rapid urbanisation during the 2000's driving increased demand for tiles and other ceramics – tiles comprise approximately 75% of all floor coverings in China.
- Other major markets include Europe, SE Asia, the Middle East and India.
- Urbanisation, and hence the construction industry, is seen to be the key driver of zircon demand, largely due to increasing demand for tiles and other ceramic products.
- With several current operations running down, and only few new operations coming on stream, the short to medium term outlook for the zircon market should be considered strong.

Titanium Dioxide

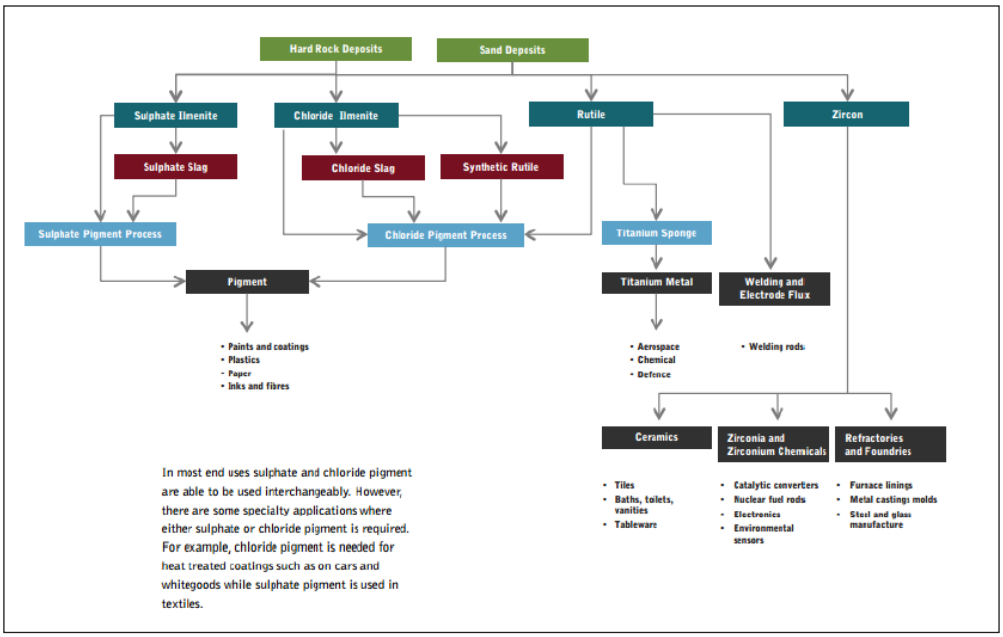
- The majority (90%) of titanium dioxide is used in the pigment industry, being used in various products, including paints, coatings, paper and inks.
- It is a key white pigment in that it has a high refractive index (whiteness), provides UV protection and is non-toxic.
- Other uses include as a metal (military, aerospace and specialty applications) and for welding rod core wire.
- There are two main pigment production routes – chloride and sulphate, with chloride generally being cleaner and requiring higher grade feedstocks.
- The majority of Chinese capacity is for sulphate grade feedstock; western producers generally use the chloride process.
- Unlike zircon, where the market is supplied by a single product, the titanium dioxide market is fed by a number of products feeding the different processing routes.
- Key products sold are shown in Table 16 - note that market shares are 2018 figures - with an overview of the industry in Figure 15.
- What can be seen is that 25% of the products sold to end users and pigment manufacturers are upgraded products, with the remaining 75% being raw materials.
- In addition, approximately 46% of feedstocks are chloride grade and 54% sulphate grade.

Table 16: Titanium dioxide products

Titanium dioxide products			
Product, approximate market share	TiO_2%	Notes	End Uses
Rutile – 8%	95-97	Mined product, chloride feedstock	Pigments, metal
Synthetic rutile – 8%	88-95	Upgraded from ilmenite in a furnace	Pigments
Ilmenite			
Sulphate – 45%	52-54	Processed to pigment - sulphate processing	Pigments
Chloride – 10%	58-62	Processed to pigment - chloride processing	
Slag			
Sulphate – 10%	80-85	Typically upgraded from rock sulphate ilmenite in a furnace	Pigments
Chloride – 16%	85-90	Typically upgraded from sand sulphate ilmenite in a furnace	
Upgraded – 3%	95	Upgraded from ilmenite	

Source: Iluka - 2018 figures

Figure 15: Mineral sands industry overview

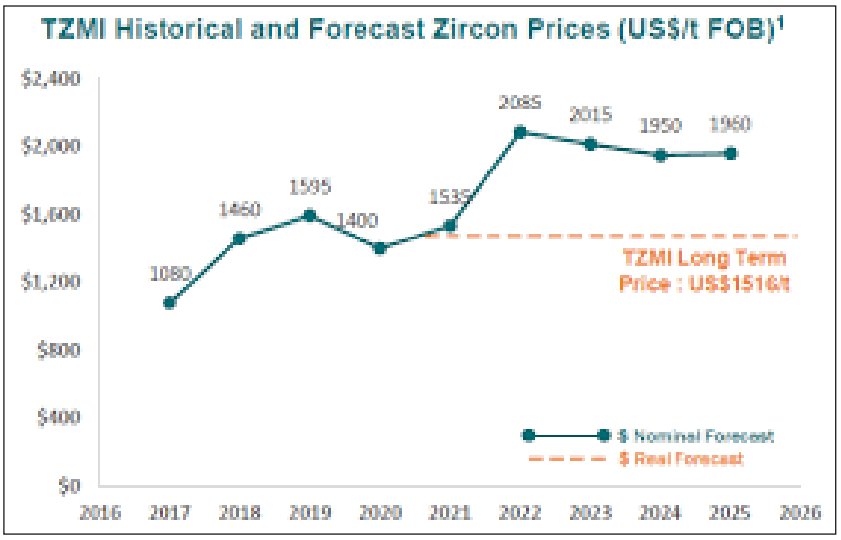


Source: Iluka

Pricing

- The mineral sands market is relatively opaque – prices are generally fixed between the producer and buyer, and until 2009-2010 were largely on long term contracts, leading to relatively stable prices - this section will largely concentrate on zircon.
- More recently, changes in demand and supply have led to contracts more commonly being negotiated quarterly or half yearly.
- The recent price history includes:
  - 2000 - 2010 - zircon price increases of ~12% CAGR due to China driven demand with the rapid urbanisation; during the same period titanium feedstock prices followed annual GDP growth of around 3%,
  - 2010 - 2012 - price increases due to supply constraints, which enabled producers to negotiate pricing away from long term contracts (which were also a disincentive to bringing on long term production),
  - 2013 - 2016 - fall in prices due to adverse global economic conditions - this also resulted in operations being curtailed, and the selling from stockpiles (particularly of zircon, and particularly by Rio Tinto); and,
  - Overall recovery of prices from 2016 to the present, with a hiatus due to COVID-19.
- The running down of stockpiles and closure of operations has lead to a forecast of shortages especially for the higher grade zircon and rutile - this has been borne out by strongly increasing prices over the last year or so.
- Recent and forecast prices for zircon are shown in Figure 16.
- Zircon has performed strongly since 2000 when the price was ~US$250/tonne - our analysis indicates a 10% CAGR price increase, not taking into account the 2012-2013 spike, which appears to be a sustainable growth profile.

Figure 16: Zircon Prices



Source: Sheffield

PROFIT & LOSS ($M) - ALL FINANCIAL FIGURES ARE ATTRIBUTABLE TO SFX					
Y/E June	**2024**	**2025**	**2026**	**2027**	**2028**
Revenue	62.0	171.9	180.4	187.7	261.8
Operating Costs	-35.3	-88.3	-83.3	-84.5	-101.3
Royalties	-4.7	-13.1	-13.7	-14.3	-19.9
EBITDA	**22.0**	**70.6**	**83.4**	**88.9**	**140.6**
D and A	-5.7	-5.9	-7.1	-9.6	-10.0
EBIT	**16.3**	**64.7**	**76.3**	**79.3**	**130.6**
Interest	-5.2	-13.6	-12.5	-11.3	-10.0
EBT	**11.1**	**51.1**	**63.8**	**68.0**	**120.7**
Tax	0.0	-13.5	-19.5	-20.8	-36.6
NPAT	**11.1**	**37.6**	**44.3**	**47.2**	**84.0**

BALANCE SHEET ($M)					
Y/E June	**2024**	**2025**	**2026**	**2027**	**2028**
Assets	**217.8**	**265.3**	**302.7**	**336.9**	**426.7**
Cash	18.7	57.1	61.8	23.0	105.5
Receivables	5.1	14.1	14.8	15.4	21.5
PPE	194.0	194.1	226.1	298.5	299.7
Liabilities	**149.3**	**142.1**	**126.6**	**110.6**	**95.0**
Creditors	4.3	10.9	10.3	10.4	12.5
Debt	144.9	131.3	116.4	100.2	82.5
Net Assets	**68.5**	**123.2**	**176.1**	**226.3**	**331.7**

CASHFLOW ($M)					
Y/E June	**2024**	**2025**	**2026**	**2027**	**2028**
Revenue	62.0	171.9	180.4	187.7	261.8
Operating Costs	-35.3	-88.3	-83.3	-84.5	-101.3
Interest	-13.6	-12.5	-11.3	-10.0	-8.5
Royalties	-4.7	-13.1	-13.7	-14.3	-19.9
Income Taxes	0.0	0.0	-13.5	-19.5	-20.8
Cashflows from operating activities	**8.4**	**58.1**	**58.7**	**59.4**	**111.3**
Proceeds From Sale of Project Equity	0.0	0.0	0.0	0.0	0.0
Capital Expenditure	-31.0	-6.0	-39.0	-82.0	-11.2
Cashflows from investing activities	**-31.0**	**-6.0**	**-39.0**	**-82.0**	**-11.2**
Equity Issues	0.0	0.0	0.0	0.0	0.0
Equity Issue Fees	0.0	0.0	0.0	0.0	0.0
Debt Raised	40.0	0.0	0.0	0.0	0.0
Debt Facilitation Fees	-2.4	0.0	0.0	0.0	0.0
Debt Repayments	-12.6	-13.7	-14.9	-16.2	-17.6
Cashflows from financing activities	**25.0**	**-13.7**	**-14.9**	**-16.2**	**-17.6**
Total Cashflows Attrib SFX	**2.4**	**38.4**	**4.8**	**-38.8**	**82.5**

RATIOS AND DIVIDENDS					
Y/E June	**2024**	**2025**	**2026**	**2027**	**2028**
Dividend to SFX	0.0	38.4	4.8	0.0	82.5
Weighted Shares on Issue	393	393	393	393	393
Dividend per Share	0.00	0.09	0.01	0.00	0.20
Revenue to Costs Ratio	1.6	1.7	1.9	1.9	2.2
ROE	16.24%	30.53%	25.17%	20.85%	25.34%
ROA	5.11%	14.18%	14.64%	14.01%	19.69%
Interest Cover Ratio	1.62	5.65	7.39	8.93	16.50

PRODUCTION - 100% BASIS					
Y/E June	**2024**	**2025**	**2026**	**2027**	**2028**
Ore Mined Mt	4.4	11.4	11.4	11.8	18.1
Waste Mined Mt	4.3	10.3	9.2	9.2	9.2
Strip Ratio	0.98 x	0.90 x	0.81 x	0.78 x	0.51 x
Zircon Con Produced kt	69	193	204	213	297
Mag Con Produced kt	258	707	733	761	1,059
Paramag Con Produced kt	31	84	89	93	128
Total Concentrate Produced kt	358	983	1,025	1,066	1,483
Zircon Con Revenue A$m	35.9	100.4	106.1	110.5	154.4
Mag Con Revenue A$m	23.8	65.3	67.7	70.3	97.8
Paramag Con Revenue A$m	2.3	6.2	6.6	6.9	9.5

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For further information, please contact IIR at: client.services@independentresearch.com.au

Independent Investment Research LLC
Independent Investment Research (Aust.) Pty Limited

NEW YORK OFFICE
Phone: +1 917 336 0818

SYDNEY OFFICE
Level 1, 350 George Street
Sydney NSW 2000
Phone: +61 2 8001 6693
Main Fax: +61 2 8072 2170
ABN 11 152 172 079

MELBOURNE OFFICE
Level 7, 20–22 Albert Road
South Melbourne VIC 3205
Phone: +61 3 8678 1766
Main Fax: +61 3 8678 1826

MAILING ADDRESS
PO Box H297 Australia Square
NSW 1215