



**Breakaway
Research**

November 2013

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Company Information

ASX Code	SFX
Share Price	A\$0.50
Ord Shares	118.3m
Un-listed Options	8.0m
Market Cap	A\$63.2m
Diluted MCAP	A66.1m
Cash (Sept 13)	A\$5.3m
Total Debt	A\$0m
Enterprise Value	A\$57.8m

Directors

Chairman	Will Burbury
Managing Director	Bruce McQuitty
Technical Director	David Archer

Substantial Share Holders

Bruce McQuitty	6.51%
Will Burbury	6.51%
David Archer	6.49%

Company Details

Address	14 Prowse Street West Perth WA 6005
Phone	+618 6424 8440
Web	www.sheffieldresources.com.au

1 Year Price Chart



Source: Bloomberg

Sheffield Resources (SFX)

World class HMS project keeps getting better

Recommendation: Speculative BUY

Key Points

- **JORC Resource of 1.37Bt @ 6.1% HM including high grade core of 517Mt @ 10.1% HM**
- **Recent drill program likely to lead to a resource upgrade (in size and category)**
- **Scoping Study well advanced and due for completion in Q1 2014**
- **Metallurgical test work confirms high quality zircon, rutile, ilmenite and leucoxene products achievable via conventional processing**
- **Red Bull nickel project and Mt Vettel iron ore project provide near term potential for significant discoveries**

Sheffield Resource's Thunderbird deposit is a world class mineral sands asset. A Scoping Study is well advanced, supported by metallurgical studies which indicate a suite of high quality TiO₂ products can be produced using conventional processing methods. A JORC Resource upgrade is likely to be announced in the coming weeks following the completion of a recent drill campaign where some of the most impressive intersections seen to date have been recorded. The company also has multiple earlier stage projects which are shaping up to be significant assets in their own right.

Company Overview

Sheffield Resources (ASX: SFX) is a West Australian focused exploration company with a portfolio of projects prospective for mineral sands, iron ore, nickel, potash and talc.

The Company's primary focus is the world class Dampier HMS project which hosts JORC Resource of 1.37Bt @ 6.1% HM including a high grade core of 517Mt @ 10.1% HM. This resource is already sufficient for a +30 year mine life however; mineralisation is still open in most directions. Completion of a recent drilling campaign will likely to lead a resource upgrade (in both size and category) early in 2014.

A Scoping Study designed to broadly assess the economics of the Thunderbird deposit is well advanced. This has been supported by metallurgical test work which indicates high quality TiO₂ products can be achieved using conventional processing techniques. Feasibility level studies are set to begin 1H2014.

Elsewhere, Sheffield has multiple projects which are at various stages of advancement. Of particular interest is the 'Red Bull' nickel prospect where recent drilling has intersected a highly encouraging nickel anomaly and the Mt Vettel iron ore prospect where rock chip sampling has defined high grade haematite over a strike length of at least 1km.



Investment Thesis

*'Thunderbird' is
Sheffield's flagship
project*

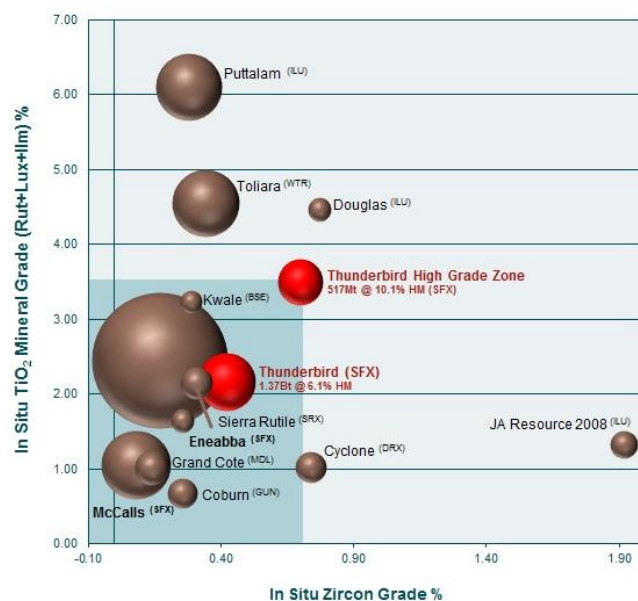
Sheffield Resources has a quality pipeline of West Australian based projects however it is the Dampier HMS project (host to the Thunderbird deposit) which is shaping up to become a world class company making asset.

Thunderbird hosts a JORC Resource of 1.37Bt @ 6.1% HM which includes a 'high grade core' of 517Mt @ 10.1% HM for 52Mt of 'in-situ' heavy minerals.

The grade and size of the Thunderbird resource bode well for favourable economics once in production (this will be assessed during the feasibility stage). The chart below illustrates the Thunderbird deposit (the total resource and the 'high grade' core) relative to its peers, and demonstrates the deposit to be amongst the highest in terms of in-situ zircon and TiO_2 grades.

Global Peer comparison

*Grade and size of
Thunderbird bode well
for favourable
economics*



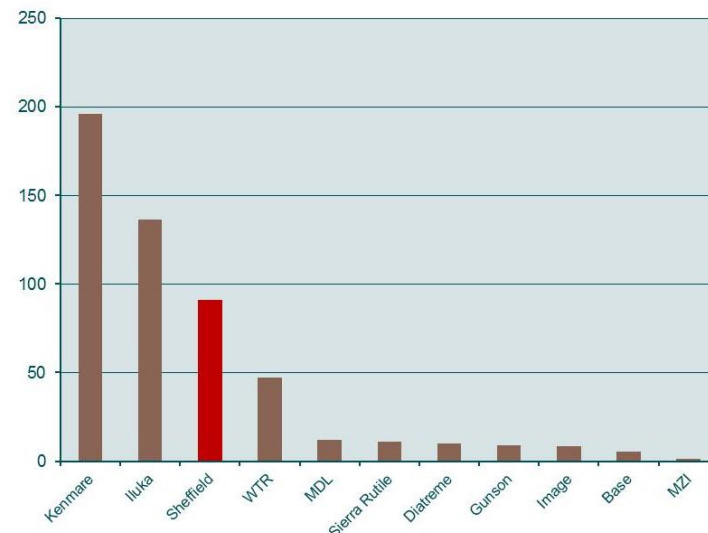
Source: Sheffield Resources

*Only deposits of >100Mt are shown

The chart below further emphasises Sheffield's position in becoming a globally significant mineral sand player with its Valuable Heavy Mineral (VHM) content now at a total of 90Mt.

Peer comparison of Total Valuable Heavy Mineral (VHM) in Resources (Mt)

*Valuable Heavy
Mineral content
comparable to that of
Iluka*

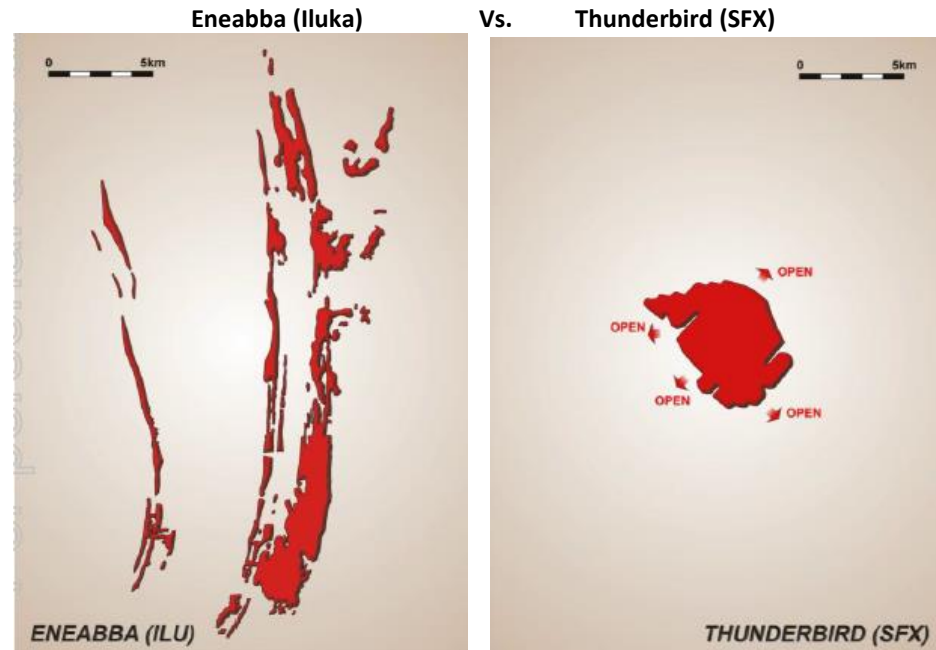


Source: Sheffield Resources



A further comparison is made to Iluka's Eneabba deposit as shown below:

Thunderbird deposit concentrated over a relatively small area



Source: Sheffield Resources

Eneabba – Iluka

- 20-30Mt VHM mined 1974-2013
- Complex geometry
- Multiple deposits

Thunderbird - Sheffield

- 35Mt VHM and growing
- Simple geology
- Concentrated ore body

40% of the resource is covered by less than 3m of overburden

Sheffield's Thunderbird deposit occurs as a coherent high grade zone covering an area of around 4km x 5km which is still open in most directions. The average thickness of mineralised zone is 38m with approximately 40% of the deposit covered by less than 3m of overburden. This favourable geometry should contribute to cost effective mining methods relative to that of Iluka's Eneabba deposit (which has been in production since 1974).

High quality products achievable through conventional processing

Breakaway is also encouraged by initial metallurgical test work which has demonstrated that mineralisation from the Thunderbird deposit has the potential to generate high quality products (zircon, rutile, ilmenite and leucoxene) using conventional processing methods. These results are significant and underscore Thunderbird as a world class mineral sands deposit. A further 15t bulk sample will soon be sent for additional test work, the results of which will form the basis for process design as part of the Scoping Study (currently underway) and pre-feasibility studies (due to commence early 1H2014).

Additional projects in the portfolio

Quality project pipeline

The quality of Sheffield's project pipeline should not be underestimated. A recent rock chip sample program at the Mt Vettel project (close to Atlas Iron's Mt Webber project) has recently identified a coherent zone of iron mineralisation outcropping over a total strike length of 1km. Of 47 samples taken, 37 of the samples averaged **61.24% Fe**.

Elsewhere, Sheffield's Red Bull Nickel Project (close to Sirius Resources flagship Nova/Bollinger nickel deposit) has returned encouraging Ni assays from early stage shallow drill programs. These anomalous nickel zones may represent the chemical halo around a deeper sulphide source. Deeper drilling is planned in the near term.



Project Review

Sheffield Resources has a 100% interest in a portfolio of prospective projects encompassing multiple commodities. The project locations are shown on the map below:

- **Mineral Sands** - Dampier, Eneabba, Yandanooka, Durack, West Mine North, Ellengail, Drummond Crossing, Irwin and McCalls projects
- **Nickel** – Red Bull Project
- **Iron Ore** – North Pilbara Iron Project
- **Potash** – Oxley Project
- **Talc** – Moora Talc Belt Project, Fowlers

Sheffield Resources - Project Locations

Projects concentrated within WA



Source: Sheffield Resources



Heavy Mineral Sands (HMS)

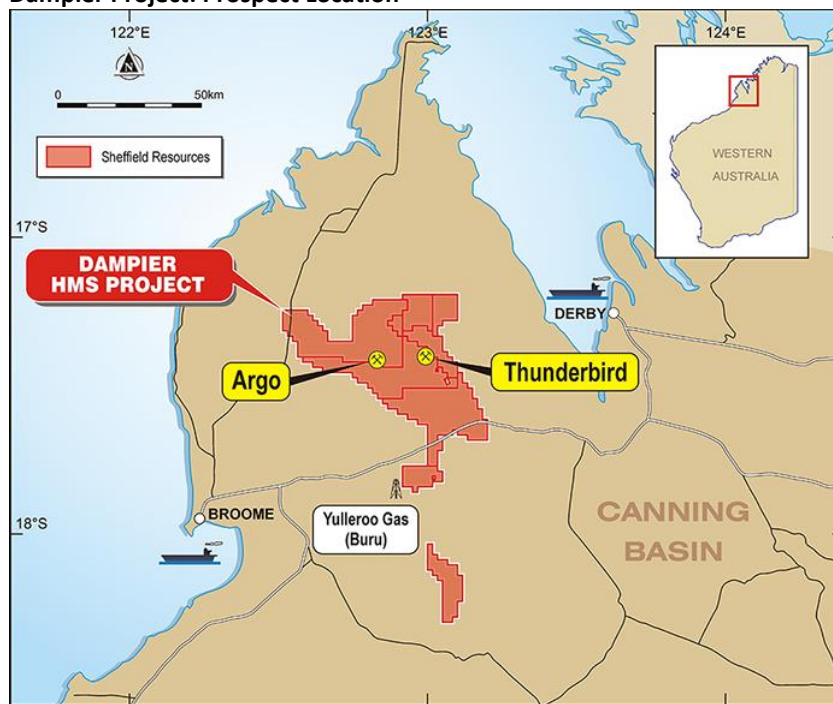
Dampier Project

The Company's prize asset is the Dampier Heavy Mineral Sands (HMS) project, located in the Northern WA within the Canning Basin.

Dampier Project: Prospect Location

Dampier hosts the Argo and Thunderbird prospects

Accessible to ports



Source: Sheffield Resources

Dampier hosts two significant HMS projects located in close proximity to each other. The most advanced and the priority for the company is the Thunderbird deposit which hosts an Indicated and Inferred JORC Resource of 1.37Bt @ 6.1% HM, containing 84Mt of valuable heavy minerals.

Within this resource, Sheffield has identified a 'higher grade core' containing **517Mt @ 10.1% HM** for 3.6Mt of zircon, 0.8Mt of rutile, 2.2Mt of leucoxene and 15.2Mt of ilmenite (@ 7.5% HM cut off).

Resource of 517Mt @ 10.1% HM using a 7.5% cut-off

Thunderbird Deposit: JORC Resource

Mineral Resource				In-Situ HM (Mt)	Heavy Mineral Assemblage			
Resource Category	Cut-off HM%	Million tonnes (Mt)	HM %		Zircon %	Rutile %	Leucoxene %	Ilmenite %
Indicated	2.0	299	7.2	21.5	6.9	1.6	4.3	29
Inferred	2.0	1,075	5.8	61.9	6.9	1.6	4.3	29
Total	2.0	1,374	6.1	83.4	6.9	1.6	4.3	29
Indicated	7.5	137	11.5	15.8	6.9	1.6	4.3	29
Inferred	7.5	379	9.6	36.5	6.9	1.6	4.3	29
Total	7.5	517	10.1	52.3	6.9	1.6	4.3	29

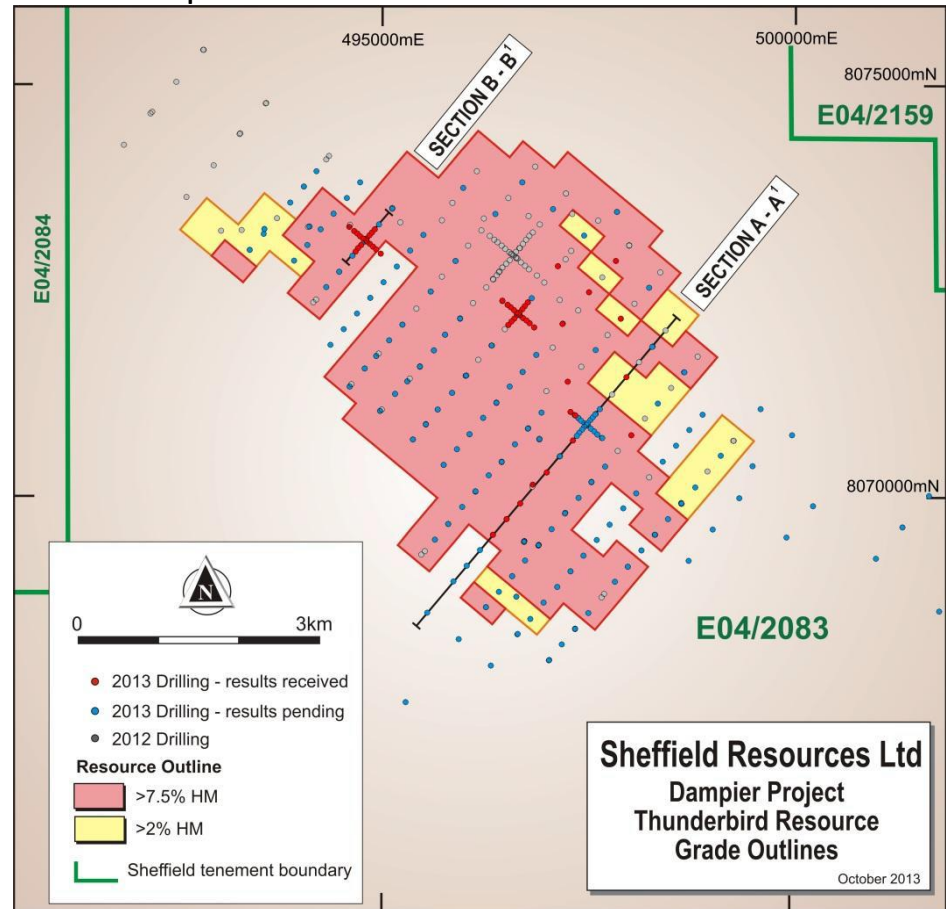
Source: Sheffield Resources



The Thunderbird deposit currently encompasses an area ~4km x 5km with mineralisation interpreted to still be open in most directions. The resource demonstrates excellent grade continuity with an average thickness of 38m.

Thunderbird Deposit: Grade Outline

Resource still open in most directions

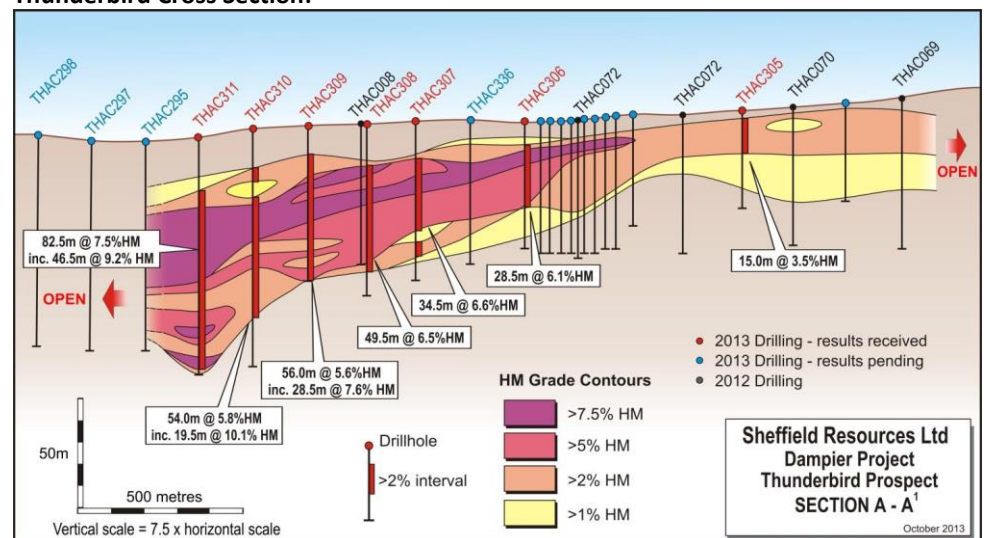


Source: Sheffield Resources

The image below shows a cross section of the deposit along the A-A section (highlighted above) and illustrates the high grade, shallow dipping nature of the ore body, extending from surface and plunging to the south-west.

Thunderbird Cross Section:

High grade, shallow dipping ore body



Source: Sheffield Resources



Current Drill Program Completed – Assays Pending

270 holes designed to upgrade the current JORC Resource

Sheffield has completed approximately 270 drill holes at Thunderbird this year, designed to upgrade the resource to mostly 'Indicated' as well targeting further zones of mineralisation along strike, which currently fall outside of the resource model.

The first 40% of the assays have now been received with the company reporting highly encouraging intercepts. Highlights include:

Highest grade x width samples recorded to date

82.5m @ 7.53% HM from 24m (THAC311)	40.5m @ 9.3% HM from 1.5m (THAC246)
43.5m @ 8.99% HM from 22.5m (THAC188)	56m @ 10.0% HM from 30m (THAC344)
42m @ 8.01% HM from 3m (THAC187)	42m @ 8.61% HM from 9.5m (THAC244)
36m @ 8.61% HM from 1.5m (THAC177)	36m @ 8.19% HM from 15m (THAC242)
46.5m @ 7.55% HM from 14.5m (THAC197)	63m @ 7.41% HM from 18m (THAC345)

Only 40% of assays received to date

Breakaway is particularly encouraged by 82.5m @ 7.53% HM interval which was intercepted at the southwest margin of the current resource model (highlighted on the left hand side of the previous image). **This intercept is the largest intercept recorded by the company** to date in terms of interval and contained HM and demonstrates that the mineralisation is still open down dip.

The remaining 60% of the assay results are yet to be released to market however Breakaway anticipates further high grade results, especially from hole THAC295, THAC297, THAC298 which are along strike from the 82.5m interval. Once all assays have been received (and released to market), the current JORC resource will be updated with likely upgrades in both size and category.

High grade and width assays likely along strike

Scoping Study

A Scoping Study is currently underway, primarily focused on the economic viability of mining and treating the high grade core of the Thunderbird deposit. The updated JORC resource (expected early in 2014) will be used as the basis for the Scoping Study and will pave the way for commencement of a Pre-Feasibility Study (PFS).

Scoping Study well advanced

Initial metallurgical test work on a 6 tonne bulk sample has already demonstrated that high quality products (zircon, rutile, ilmenite, and leucoxene) can be produced using conventional processing technology. An additional 15 tonne bulk sample will be sent for further test work in the coming months. Indicative specifications of the zircon and ilmenite products are outlined below:

Metallurgical test work indicates high quality products achievable

Primary Zircon Specifications

ZrO ₂ %	Fe ₂ O ₃ %	TiO ₂ %	Al ₂ O ₃ %	P ₂ O ₅ %
66.2	0.05	0.09	0.10	0.1%

Primary Ilmenite Specifications

TiO ₂ %	FeO%	Fe ₂ O ₃ %	SiO ₂ %	Al ₂ O ₃ %	Cr ₂ O ₃ %	ZrO ₂ %
50.1	8.0	36.4	1.6	0.3	0.05	<0.01

Source: Sheffield Resources



Products may receive a premium to the prevailing price

Breakaway is particularly encouraged by the high quality, premium grade, zircon product produced (containing 66.2% ZrO_2), which should meet the specifications for the premium zircon market and thus sell at a premium to the prevailing zircon price. The primary Ilmenite products demonstrate low contaminate levels and are expected to meet the specifications of the sulphate Ilmenite market.

Argo Prospect

Argo is an early stage prospect

The nearby Argo prospect is located 12km west of Thunderbird and represents an earlier stage opportunity. Limited drilling has been undertaken to date however encouraging historical results include 12m @ 3.49% HM from 42m and 7.5m @ 3.44% HM from 27m. Sheffield will continue to advance this project at a steady pace however it will remain a secondary focus for the company.

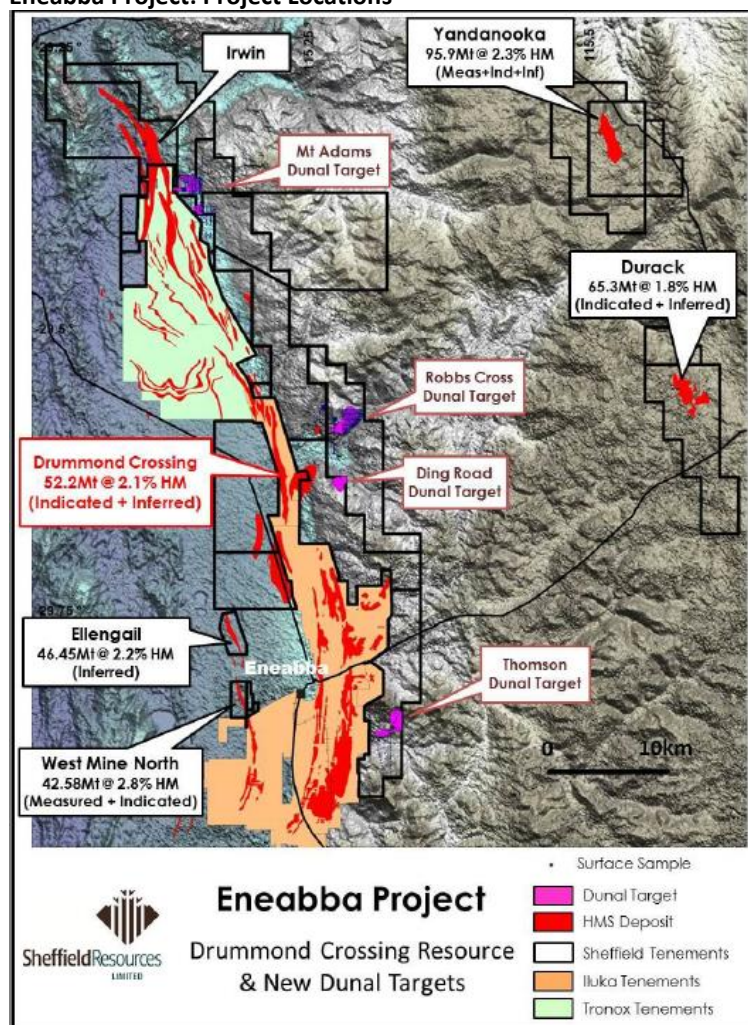
Eneabba Project

The largest grouping of tenements in Sheffield's portfolio lies within the North Perth Basin, encompassing approximately 2,500km² of tenure and is host to eight advanced exploration projects. The West Mine North, Ellengail, BeeKeepers, Yandanooka, Durack, Drummond Crossing, and Irwin projects are all located in the Eneabba region and as such have been grouped together in the 'Eneabba Project'.

Advanced minerals sands projects

Close to existing infrastructure and neighbouring operations

Eneabba Project: Project Locations



Source: Sheffield Resources



The Eneabba Project currently hosts a total JORC Resource of **302Mt @ 2.2% HM** (for 5.8Mt of valuable heavy minerals). Encouragingly, all these deposits are located close to existing mineral sands operations, as well as close to established infrastructure.

A scoping study carried out in 2012 (based on a 112Mt resource) has demonstrated robust returns and pre-feasibility studies are now underway.

*Scoping Study
demonstrates robust
returns*

West Mine North Prospect: Bulk Sample Test Work



Source: Sheffield Resources

McCalls Project

The McCalls deposit is located 110km north of Perth near the town of Gingin and comprises three granted exploration licences. The project was originally explored by BHP in the 1990's where a large low grade (1-1.5% HM) deposit was outlined over an area of approximately 30km².

*Very large, low grade
deposit*

Sheffield Resources subsequently undertook a 30 hole drill campaign at McCalls designed to infill the earlier broadly spaced holes drilled by BHP. Encouragingly, all holes returned significant mineralisation (>1% HM) with all but 2 holes ending in mineralisation. In 2012, Sheffield announced a JORC Resource of **4.4Bt @ 1.2% HM** for 53Mt of contained HM including 43Mt of chloride ilmenite and 3.5Mt of zircon.

*Mineral assemblage is
particularly high in
ilmenite*

The McCalls resource far exceeded management expectations in terms of size and mineral assemblage. Although the overall grade of the deposit is comparatively low, the key feature is the particularly high proportion of the ilmenite (80.8% of the heavy minerals) for ~42Mt of contained ilmenite. This makes McCalls one of the largest accumulations of chloride grade ilmenite in the world.

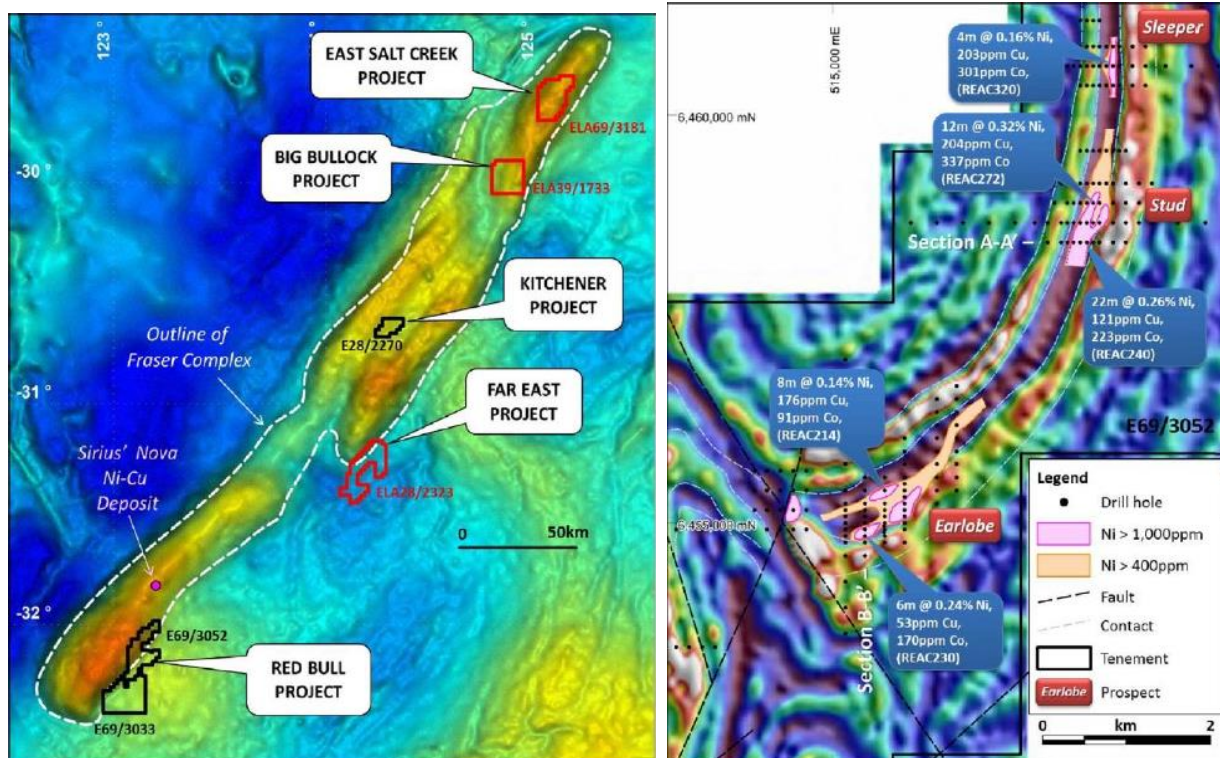
*Close to established
infrastructure*

The McCalls project is situated next to existing infrastructure such as main roads, rail and power. The railway line is located 10km to the east of the project and connects to both the Fremantle port 160km to the south and the Geraldton port, 345km to the north. This railway also passes within 1km of Tiwest's Chandala synthetic rutile plant at Muchea, 75km to the south of McCalls.

Red Bull Nickel Project

The Red Bull project encompasses three exploration licences and a further three licence applications totalling 1,400km². The licences cover highly prospective ground within the Fraser Range with one of the licences located just 20km south of the recent Nova-Bollinger Ni-Cu sulphide deposits.

Geophysical Plan of the Fraser Range and Aeromagnetic Image of Red Bull



Source: Sheffield Resources

Sheffield has identified three high priority anomalies (which occur within a 8km strike length of a layered mafic-ultramafic sequence) named 'Earlobe', 'Stud' and 'Sleeper'. These prospects have been collectively called the "Northern Targets".

Highlights from an ongoing aircore drill program include:

Stud

- 22m @ 0.26% Ni from 32m (including 8m @ 0.41% Ni)
- 12m @ 0.32% Ni from 37m
- 8m @ 0.15% Ni from 22m

Earlobe

- 6m @ 0.24% Ni from 52m

Sleeper

- 4m @ 0.16% Ni from 44m

Low grade nickel over broad widths may indicate a 'chemical halo' from deeper source

Most holes were drilled to a depth of ~70m, reaching the base of the weathered zone. These highly anomalous nickel intervals (highlighted above) are significant as **they may represent the chemical halo around a deeper sulphide source**. Further interpretation of the data and ground geophysics will be undertaken, ahead of the next drilling program.

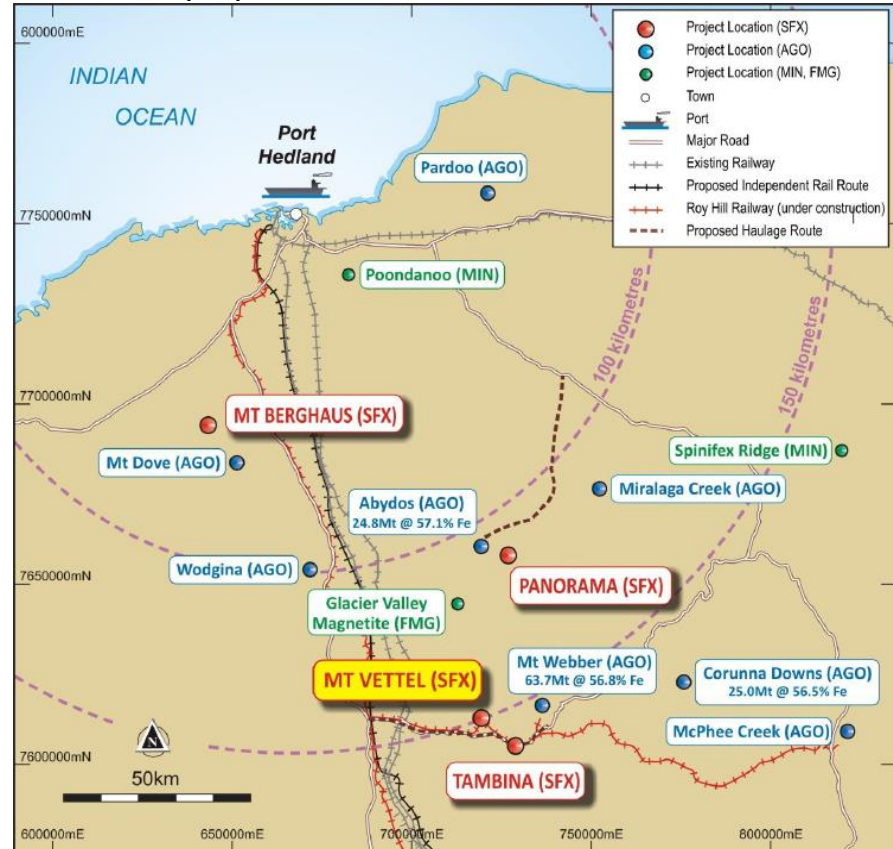


Additional Projects

North Pilbara Iron Project

Sheffield has four strategic prospects within its 'North Pilbara Iron Project' at various stages of advancement. Breakaway is particularly encouraged by the Mt Vettel prospect which is located ~150km south of Port Hedland and just 20km to the west of Atlas Iron's (ASX:AGO) Mt Webber iron project.

Sheffield's Iron prospect locations



Source: Sheffield Resources

Mt Vettel is close to neighbouring iron ore operations

High grade rock chips over 1km strike

Sheffield recently completed a helicopter-supported mapping and sampling program at Mt Vettel which identified a coherent zone of iron mineralisation outcropping over a total strike length of 1km. Of 47 samples taken, 37 of the samples averaged **61.24% Fe, 0.038% P, 0.98% Al₂O₃, 4.77% SiO₂, and 6.52% LOI (Loss on Ignition).**

The low contaminant and high iron content of the samples bodes well for delineating a project with potential to mine direct shipping ore (DSO) for shipping out of Port Hedland. This potential is enhanced by the location of the prospect which is within trucking distance of the port and adjacent to Atlas's proposed haul roads for the Mt Webber project (which is currently in development).

Upcoming field work

Drill program scheduled for 1H2014

Sheffield will continue with ongoing mapping and sampling programs at Mt Vettel ahead of a drill program scheduled for H1 2014.



Oxley Potash Project

Sheffield's Oxley potash project consists of a group of seven tenements located near 'Three Springs', 100km south east of Geraldton.

*Unconventional style
of potash
mineralisation*

The potash is an unconventional, hard rock style of mineralisation, hosted by a series of ultrapotassic microsyenite lava flows which contain over 90% sanidine (potash) feldspar. Sheffield has pegged the entire 32km strike extent of this prospective horizon within the northern portion of the Moora Basin.

An initial 17-hole RC drilling program was completed in mid-2013 with highlights of:

- **75m @ 8.38% K₂O** from 7 to 82m, including 17m @ 10.1% K₂O from 50m
- **72m @ 8.53% K₂O** from 35 to 107m, including 11m @ 10.1% K₂O from 40m
- **48m @ 9.84% K₂O** from 3 to 51m, including 39m @ 10.4% K₂O from 6m

Test work underway

*Metallurgical test
work underway*

Sheffield has recently begun metallurgical test work on the sanidine feldspar to determine the process for extracting potash.

The Oxley project has similarities to Verde Potash's (TSX: NPK) Cerrado Verde hard rock potash project located in Brazil, which hosts a resource of 71Mt @ 9.22% K₂O (Indicated) and 2,763Mt @ 8.91% K₂O (Inferred). The potash mineralisation at Cerrado Verde is associated with metamorphosed sedimentary rocks composed of quartz, chlorite, muscovite, and microcline feldspar.

Moora Talc Belt Project

Sheffield has a dominant tenement position totalling 1,152km² over the Moora Talc Belt, located 200km north of Perth.

*Located close to
adjacent Talc
operations*

The Moora Talc Belt is best known for the large Three Springs mine deposit which is located in the northern half of the belt. Before the recent sale of its global talc business to French group Imery, the mine was owned by Rio Tinto Limited (through subsidiary Luzenac Australia Pty Ltd) which purchased it from WMC Ltd in 2001.

Three Springs is renowned for producing high purity talc and has been operating since 1948. It is the largest talc mine in the southern hemisphere and the second largest in the world. The global significance of this operation is reflected in the fact that the current and prior operators are major mining houses.

*Simple mining
methods*

Like hematite iron ore mines in the Pilbara, high grade talc is a simple "dig and deliver" product. Imery's Three Springs mine is an open cut operation which supplies raw talc to its operations in Europe and USA. The talc is extracted, crushed and screened then trucked 150km north to Geraldton as a lump product. Milling at its processing operations in Europe and the USA comprises relatively simple micronising of the lump product to various specialised fines products.

Work is ongoing

The work to date on Sheffield's Moora Talc project has outlined deposits of talc with high chemical purity but sub-optimal brightness due, in part, to deep weathering. More exploration and understanding of the region is required.



Directors

Executive Chairman

Will Burbury practised as a corporate lawyer with a leading Australian law firm prior to entering the mining and exploration industry in 2003. During his career, he has been actively involved in the identification and financing of many Australian and African resources projects. He has held senior management positions and served on the boards of several private and publicly listed companies. Mr Burbury was previously Chairman of Warwick Resources Limited prior to its merger with Atlas Iron Limited in 2009. He was also formerly a director of Lonrho Mining Limited (ASX: LOM) and an executive of Nkwe Platinum Ltd (ASX: NKP).

Managing Director

Bruce McQuitty has 28 years' experience in the mining and civil construction industries and was previously Managing Director of Warwick Resources Limited prior to its merger with Atlas Iron Limited in 2009. Mr McQuitty has also held senior positions with Consolidated Minerals, Renison Goldfields and Gympie Gold Limited and has significant technical expertise in exploration, project generation, feasibility, underground mining and engineering geology. Mr McQuitty has managed exploration teams in Australia and overseas and holds a Masters of Economic Geology and a Bachelor of Science.

Technical Director

David Archer is a geologist with 22 years' experience in exploration and mining in Australia. He has held senior positions with major Australian mining companies, including Renison Goldfields and has spent the last ten years as a director of Archer Geological Consulting, specialising in project generation, geological mapping and project evaluation. Mr Archer was a consultant to Atlas Iron Limited (ASX: AGO) and Warwick Resources Limited and was responsible for significant iron ore discoveries for both companies in the Pilbara. He was also involved in the discovery of the Magellan lead mine and the Raleigh and Paradigm gold mines.



Analyst Verification

We, Grant Craighead and Andrew McLeod, as the Research Analysts, hereby certify that the views expressed in this research accurately reflect our personal views about the subject securities or issuers and no part of analyst compensation is directly or indirectly related to the inclusion of specific recommendations or views in this research.

Disclosure

Breakaway Investment Group (AFSL 290093) may receive corporate advisory fees, consultancy fees and commissions on sale and purchase of the shares of Sheffield Resources and may hold direct and indirect shares in the company. It has also received a commission on the preparation of this research note.

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