30 January 2018

ASX Code:
SFX

Directors:

Mr Will Burbury
Non-Executive Chairman

Mr Bruce McFadzean
Managing Director

Mr Bruce McQuitty
Non-Executive Director

Mr David Archer
Technical Director

Registered Office:

Level 2, 41-47 Colin Street
West Perth WA 6005

Share Registry:

Link Market Services
Level 12, QV1 Building
250 St Georges Terrace
Perth WA 6000

Capital Structure:
Ordinary Shares: 228.3M
Unlisted Options: 14.1M
Unlisted Rights: 1.7M

Market Capitalisation:
A$160 million

Cash Reserves:
A$31.6 million
(as at 31 December 2017)

Investor Relations:

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QUARTERLY ACTIVITIES REPORT FOR THE PERIOD ENDED 31 DECEMBER 2017

HIGHLIGHTS

Thunderbird Mineral Sands Project

- Further binding offtake agreements secured, exceeding 50% of total Stage 1 revenue
- Offtake negotiations for remaining Stage 1 zircon and ilmenite products progressing on-track
- US$200M debt facility mandated in place with Taurus Mining Finance
- GR Engineering selected as preferred EPC Tenderer during the quarter
- 328 room Thunderbird Accommodation Village acquired and ready to install
- EPA recommends approval of Thunderbird Mineral Sands Project
- Native Title appeal upheld and referred to National Native Title Tribunal
- Investment in Aboriginal training continues into 2018
- Early Works Program underway at Thunderbird

Eneabba Mineral Sands Project

- Maiden Mineral Resource estimates for Robbs Cross and Thomsons deposits. Eneabba HMS Project now has Mineral Resources containing over 7.6 million tonnes of heavy mineral (in Measured, Indicated and Inferred categories) from seven deposits, including 897kt of zircon, 540kt of rutile, 323kt of leucoxene and 4,703kt of ilmenite.

Corporate Activities

- Placement and SPP raises $32 million (before costs) to advance Thunderbird
- Successful spin-out of Sheffield gold and base metals assets with Carawine Resources listing in December 2017
- Cash position of A$31.6 million as at 31 December 2017

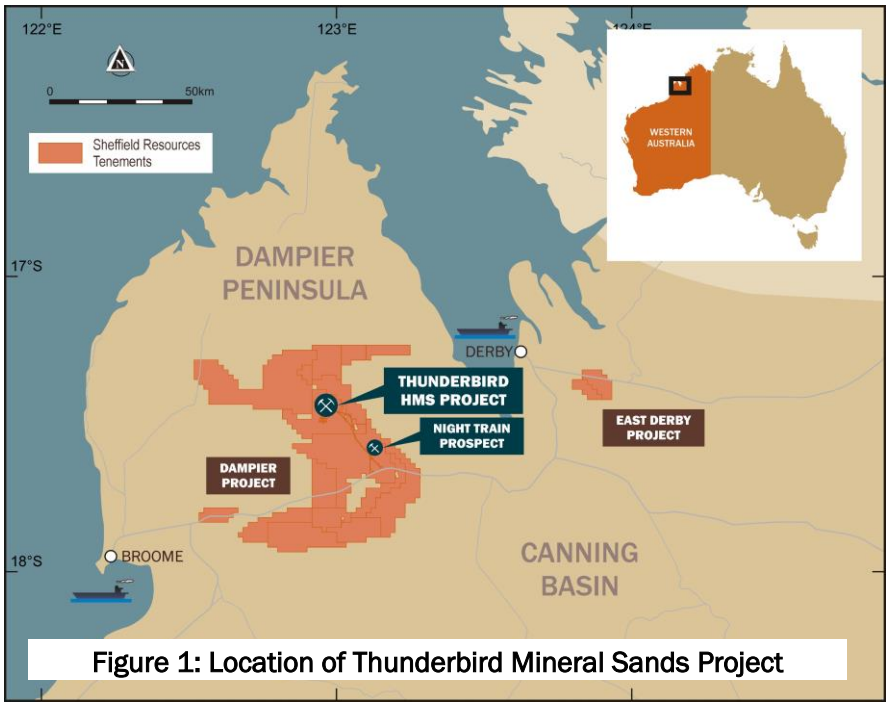


Figure 1: Location of Thunderbird Mineral Sands Project

OPERATIONAL SUMMARY

During the December quarter, Sheffield Resources Limited ("Sheffield" or "the Company") continued progress toward development of its world class Thunderbird Mineral Sands Project (Thunderbird), located in the Canning Basin in northern Western Australia (Figure 1). A number of milestones for offtake, financing and construction readiness were delivered during the quarter, as described below.

The Company welcomed several major new off-take partners, with a number of binding offtake agreements signed with the following parties:

- **CFM Minerales s.a** – minimum annual supply of 4,000 tonnes of premium zircon;
- **Hainan Wensheng High-Tech Materials Company Limited** - minimum annual supply of 27,000 tonnes of zircon concentrate;
- **Nanjing Rzisources International Trading Co Ltd** - minimum annual supply of 15,000 tonnes of premium zircon and 23,000 tonnes of zircon concentrate

With the conclusion of the above agreements, 100% of zircon concentrate and approximately 75% of premium zircon for Stage 1 of Thunderbird has been secured under binding agreements (see ASX announcements dated 30 October 2017, 12 December 2017 and 22 December 2017). Thunderbird product demand remains strong as Sheffield's negotiations toward agreement on the remaining premium zircon and ilmenite products remain on track.

Financing arrangements to support the development of Thunderbird advanced during the quarter with Sheffield executing a US$200M debt financing mandate with Taurus Mining Finance Fund. Due diligence processes are well advanced with the Company affirming a significant and cost effective solution to advance the development of Thunderbird.

Construction readiness activities continued during the quarter, with Sheffield announcing the appointment of GR Engineering Services Limited (GRES) as preferred engineering, procurement and construction (EPC) contractor. Sheffield has entered into an Early Works Agreement and Key Term Sheet with GRES. Early engineering and design works for Thunderbird commenced during the quarter. Additionally, Sheffield was successful in sourcing a modern 328 room accommodation village and associated infrastructure for Thunderbird during the December quarter.

Initial earthworks and site access arrangements for Thunderbird are now underway, in accordance with the State Government approved Minor or Preliminary Works (MoPW) Licence. In conjunction with the early works program, Sheffield has committed further funding to advance Aboriginal training in readiness for construction activities at Thunderbird.

Environmental permitting activities continued to advance with the Environmental Protection Agency (EPA) recommending approval of Thunderbird Project during the December quarter. The environmental approvals process is expected to conclude in early Q2 2018.

In December 2017, the Full Federal Court of Australia set aside a previous order made by the court, in finding that good faith procedural obligations continue to apply following a future act determination application (FADA). Subsequently, the court ordered that the matter be remitted to the National Native Title Tribunal (NNTT) to reconsider the previous good faith finding to include the negotiation period post FADA. It is anticipated the NNTT will hear the case in the current quarter.

Subsequent to the end of the quarter, Mineral Resource estimates were completed for the Robbs Cross and Thomsons deposits at the Eneabba HMS Project, located about 110km north of Perth in Western Australia's Midwest region. At Robbs Cross, immediately north of Sheffield's Drummond Crossing deposit, Mineral Resources comprising 17.8 million tonnes @ 1.9% heavy mineral (HM) above a 1.4% HM cut-off (Indicated and Inferred) have been estimated. At Thomsons, Mineral Resources comprising 26 million

tonnes @ 2.0% heavy mineral (HM) above a 1.4% HM cut-off (Inferred) have been estimated. Both deposits have high components of valuable heavy minerals (VHM), with mineralisation near-surface. The addition of Robbs Cross and Thomsons brings total Mineral Resources for Sheffield's Eneabba HMS Project to over 7.6 million tonnes contained HM (Measured, Indicated and Inferred) in seven deposits, including 897kt of zircon, 540kt of rutile, 323kt of leucoxene and 4,703kt of ilmenite (see below, and Appendix 1 and Appendix 2, for further details).

The Company was successful in achieving a number of strategic corporate objectives during the quarter. In December 2017, Sheffield completed the divestment of its portfolio of gold and base metal assets, with the highly successful spin out of Carawine Resources Limited ("Carawine") and subsequent Initial Public Offer of Carawine. Also during the quarter, the Company concluded an oversubscribed equity placement and share purchase plan, raising $32 million (before costs).

THUNDERBIRD MINERAL SANDS PROJECT

Project Construction Readiness

During the December quarter, following conclusion of a detailed tender process targeting the selection of an engineering, procurement and construction (EPC) contractor, Sheffield appointed GR Engineering Services Limited (GRES) as preferred EPC tenderer. An Early Works Agreement and Key Term Sheet is in place and GRES are advancing engineering and design activities in preparation for construction of Stage 1 of Thunderbird. Front end engineering design work to support the low temperature roast (LTR) process is well underway

A number of contracting activities continue to progress well, including the negotiation of electricity and gas supply arrangements and mining services arrangements with shortlisted counterparties.

Early Works Program

Initial earthworks and site access to support Thunderbird were initiated during the December quarter. The early works program is being undertaken in accordance with the State Government approved MoPW program, with activity during the quarter focussed on upgrading site access roads and clearing areas in preparation for accommodation village installation. Kimberley based earthmoving contractors and businesses have been engaged to carry out the work program, delivering economic benefits to the region.

Figure 2 & 3: Site access and clearance of accommodation area underway at Thunderbird

Accommodation Village

During the quarter, Sheffield acquired a modern 328-room accommodation village and associated infrastructure for Thunderbird. The quality and modern amenities include an industrial scale kitchen, dining areas and laundry facilities, providing Sheffield with a significant opportunity to realise a cost effective solution for Thunderbird accommodation. The village installation is expected to commence during Q1 2018 as part of the Minor or Preliminary Works and in readiness for the proposed EPC schedule.

Work Ready Program

The construction Work Ready Program (WRP), launch in mid-2017, was completed in the quarter with 14 participants successfully graduating from the program. The program was delivered in partnership with local employment and training organisations Winun Ngari Aboriginal Corporation, based in Derby, and Nirrumbuk Aboriginal Corporation, based in Broome.

Following the successful completion of the WRP, Sheffield affirmed its ongoing commitment to Aboriginal employment and training, with the establishment of a Group Training Program and a further investment of $750,000. The Group Training Program will employ trainees with Broome-based Nirrumbuk Group Training and will rotate trainees through a variety of activities including Early Works at the Thunderbird Project and placements with other Kimberley based construction business. At the completion of the program, trainees will have gained a Certificate 3 in Civil Construction and the opportunity to secure construction roles on the Thunderbird Project.

Figure 4 & 5: Trainees and mentors from Derby based Winun Ngari Aboriginal Corporation and Broome based Nirrumbuk Aboriginal Corporation

Sustainability

Permitting activities continued to advance throughout the quarter with the Environmental Protection Agency (EPA) recommending approval of Thunderbird Project. The environmental approval process for Thunderbird is targeted for completion in early Q2 2018.

In the June quarter, the NNTT found in favour of Sheffield with positive good faith decision, followed by the substantive Native Title determination, enabling the grant of the mining lease. During the December quarter, a decision of the Full Federal Court set aside a previous order made by Justice Barker, in finding that good faith procedural obligations continue to apply after a future act determination application (FADA) has been made. Subsequently, the court ordered that the matter be remitted to the National Native Title Tribunal (NNTT) to reconsider the previous good faith finding to include the negotiation period post FADA.

The significance of this decision for Sheffield is that it changes the previously understood construction of the Native Title Act, which was that the obligation to negotiate in good faith ceased to apply once a FADA has been made. This hearing by the NNTT is anticipated in Q1 2018.

Sheffield continued its engagement with a range of stakeholders throughout the Kimberley community during the quarter. The Thunderbird Project continues to have strong and wide local community support.

Marketing and Offtake

Significant offtake milestones were achieved in the December quarter, with Sheffield securing further binding offtake agreements for the future sales of 50,000 tonnes of zircon concentrate and 19,000 tonnes of premium zircon, (see ASX announcement dated 30 October, 12 December, and 22 December 2017). Total binding offtake agreements now represent 100% of zircon concentrate and 75% of the premium zircon produced from Stage 1 of the Thunderbird Project. Negotiations continue with suitable counterparties for the remainder of the premium zircon and LTR ilmenite.

Market conditions for TiO_2 products have remained steady during the December quarter with prices and demand remaining strong. This situation is expected to continue well into 2018.

Supply shortages have continued to positively impact pricing for zircon products throughout the December quarter of 2017. Continued supply constraints and limited surplus stock is expected to place further upward price pressure on zircon material into 2018.

Project Financing

In October 2017, Sheffield concluded a debt financing process, culminating in the appointment of Taurus Mining Finance Fund as mandated lead arranger and underwriter of a US$200M debt finance facility package to support the development of Thunderbird (see ASX announcement dated 18 October 2017). Due diligence activities are well advanced ahead of concluding a full form debt facility agreement.

EXPLORATION ACTIVITIES

DAMPIER REGIONAL MINERAL SANDS

Planning and permitting for regional exploration on the Dampier project continued during the quarter, with programs expected to commence during H1 2018.

DERBY EAST PROJECT

Sheffield is investigating the potential of the Derby East Project tenements, located 25km east of Derby, to yield commercial quantities of sand for construction purposes. Work to date has been encouraging (see Sheffield's September, 2017 Quarterly Report for details), with further drilling required to better define the potential quantities of these sands, along with additional test work designed to assess suitability for specific end-use requirements.

Sheffield will continue to evaluate the opportunity presented by this deposit.

ENEABBA MINERAL SANDS

During the quarter maiden Mineral Resource estimates incorporating results from recent exploration drilling were completed at the Robbs Cross and Thomsons HMS deposits, within Sheffield's 100% owned Eneabba Project located about 110km north of Perth in Western Australia's Midwest region (Figure 6).

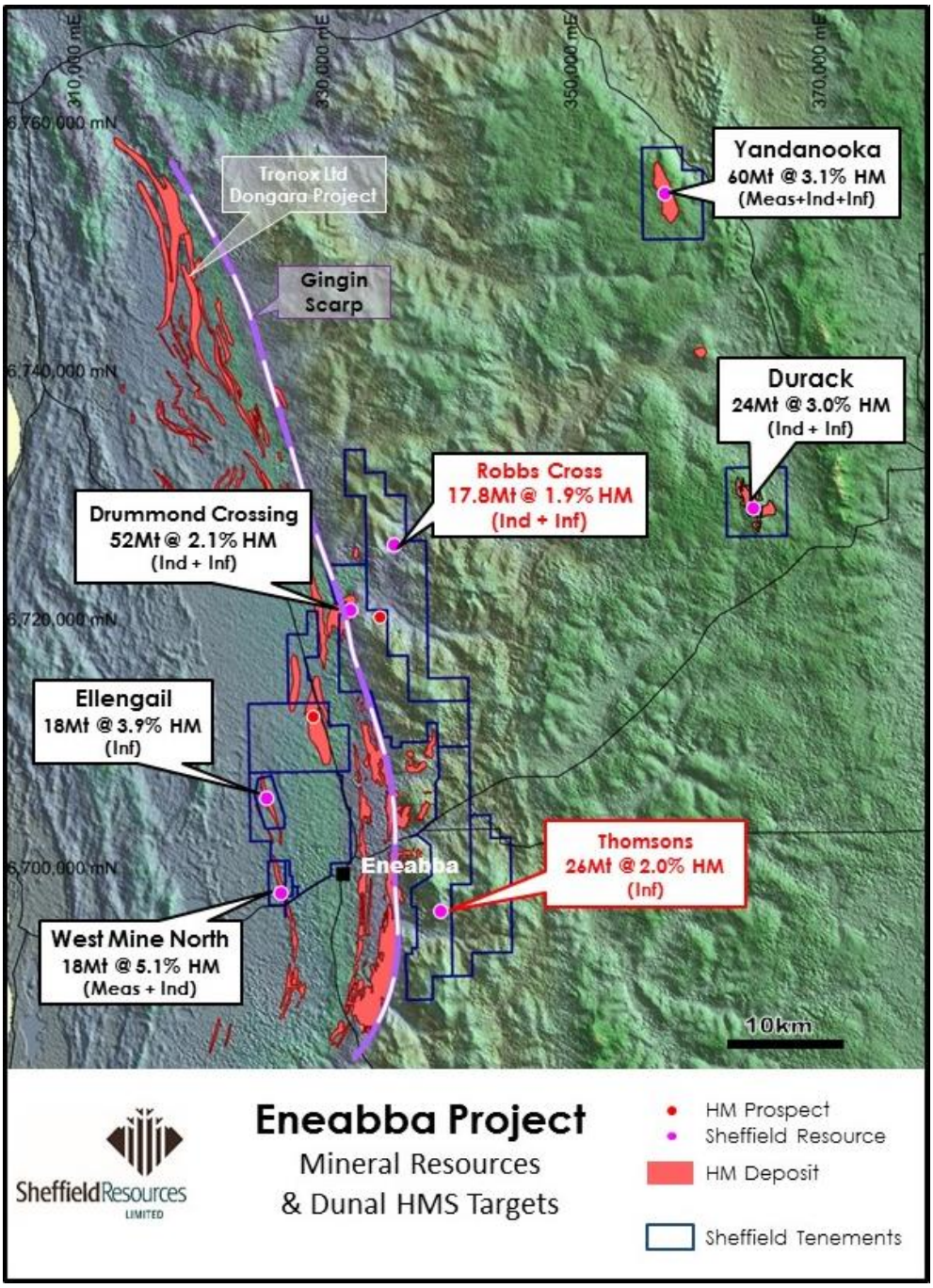


Figure 6: Eneabba Project Mineral Resources & Dunal HMS Targets

At Robbs Cross, immediately north of Sheffield's Drummond Crossing deposit, Mineral Resources comprising 17.8 million tonnes @ 1.9% heavy mineral (HM) above a 1.4% HM cut-off (Indicated and Inferred) have been estimated, containing 0.3 million tonnes of HM (Tables 1 & 3, Appendix 2). Significantly, and typical of other dunal-style deposits in the Eneabba Region, Robbs Cross has a high component of valuable heavy minerals (VHM) in its mineral assemblage, comprising 15% zircon, 12% rutile, 4.8% leucoxene and 48% ilmenite, with contained VHM totalling 269,000t (Table 3).

At Thomsons, Mineral Resources comprising 26 million tonnes @ 2.0% heavy mineral (HM) above a 1.4% HM cut-off (Inferred) have been estimated, containing 0.5 million tonnes of HM (Tables 2 & 3, Appendix 2). The Thomsons mineral assemblage also has a high component of VHM, comprising 19% zircon, 14% rutile, 5.4% leucoxene and 42% ilmenite, with contained VHM totalling 415,000t (Table 3).

The addition of Robbs Cross and Thomsons brings total Mineral Resources for Sheffield's Eneabba HMS Project to over 7.6 million tonnes contained HM (Measured, Indicated and Inferred) in seven deposits, including 897kt of zircon, 540kt of rutile, 323kt of leucoxene and 4,703kt of ilmenite (Appendix 1).

Table 1: Robbs Cross Deposit Mineral Resource Summary (1.4% HM cut-off)[1]

	Mineral Resources[2]				Valuable HM Grade (In-situ)[3]				
Resource Category	Material Mt	HM %	SL %	OS %	Zircon %	Rutile %	Leucoxene %	Ilmenite %	Total VHM %
Indicated	14.0	1.9	6.0	6.2	0.27	0.24	0.09	0.88	1.48
Inferred	3.8	2.0	6.3	8.1	0.29	0.22	0.08	1.02	1.61
Total	**17.8**	**1.9**	**6.0**	**6.6**	**0.28**	**0.23**	**0.09**	**0.91**	**1.51**

1. *See below and Appendix 1 and Appendix 2 for further details.*
2. *Tonnes and grades have been rounded to reflect the relative accuracy and confidence level of the estimate, thus the sum of columns may not equal.*
3. *The in-situ grade is determined by multiplying the percentage of HM by the percentage of each valuable heavy mineral within the heavy mineral assemblage at the resource block model scale.*

Table 2: Thomsons Deposit Mineral Resource Summary (1.4% HM cut-off)[1]

	Mineral Resources[2]				Valuable HM Grade (In-situ)[3]				
Resource Category	Material Mt	HM %	SL %	OS %	Zircon %	Rutile %	Leucoxene %	Ilmenite %	Total VHM %
Inferred	26	2.0	18	6.9	0.38	0.28	0.11	0.85	1.61
Total	**26**	**2.0**	**18**	**6.9**	**0.38**	**0.28**	**0.11**	**0.85**	**1.61**

1. *See below and Appendix 1 and Appendix 2 for further details.*
2. *Tonnes and grades have been rounded to reflect the relative accuracy and confidence level of the estimate, thus the sum of columns may not equal.*
3. *The in-situ grade is determined by multiplying the percentage of HM by the percentage of each valuable heavy mineral within the heavy mineral assemblage at the resource block model scale.*

Robbs Cross

The Robbs Cross Mineral Resource is based on 52 air core holes drilled by Sheffield, of which 18 holes were completed in 2015 (see ASX announcement dated 23 July 2015) and 34 holes in 2017 (see September 2017 Quarterly Report dated 31 October 2017). Holes were drilled as NQ diameter, with nominal drill spacing at 200m x 200m to 300m x 300m, reduced to 60m spacing where confirmation of geological boundaries was required.

Samples were collected at 1.5m intervals down hole and assayed using screen sizes at <45µm (slimes) and 1mm (oversize), with the HM component of the + 45µm / 1mm fraction determined using tetrabromoethane (TBE) at 2.96g/ml. The VHM component of the HM was determined by QEMSCAN™ with TiO_2 breakpoints applied to distinguish rutile (>95% TiO_2), leucoxene (85-95% TiO_2) and ilmenite (<55-85% TiO_2).

A lenticular body of mineralisation was defined from the drill hole data, interpreted to represent a dunal HM deposition style, striking north-south and dipping east at about 5 degrees. At a 1.4% HM cut-off the mineralisation covers a lateral extent of 1.5km east-west by 1.5km north-south and is open to the east and south. The mineralised domain is up to 22.5m thick, with an average thickness of 8.5m. Overburden ranges in thickness from 0m to 16.5m with an average of 10m. Robbs Cross contains a significant component of VHM, including 50Kt of zircon, 41Kt of rutile, 16Kt of leucoxene and 162Kt of ilmenite (Table 4).

Thomsons

The Thomsons Mineral Resource is based on 58 air core holes drilled by Sheffield, of which 25 were completed in 2015 (see ASX announcement dated 23 July 2015) and 33 holes completed in 2017 (see September 2017 Quarterly Report dated 31 October 2017). Holes were drilled as NQ diameter, with drill spacing nominally 450m x 450m up to 700m x 570m, reduced to 170m spacing where confirmation of geological boundaries was required.

Samples were collected at 1.5m intervals down hole and assayed using screen sizes at <45µm (slimes) and 1mm (oversize), with the HM component of the + 45µm / 1mm fraction determined using tetrabromoethane (TBE) at 2.96g/ml. The VHM component of the HM was determined by QEMSCAN™ with TiO_2 breakpoints applied to distinguish rutile (>95% TiO_2), leucoxene (85-95% TiO_2) and ilmenite (<55-85% TiO_2).

Two mineralisation styles are interpreted at Thomsons. The main, dunal domain, has dimensions of between 0.7km and 1.1km east-west by 1.6km north-south, with a second smaller area located to the west of the main zone with dimensions of 0.4km east-west and 1.1km north-south. Dunal HM mineralisation maximum thickness is 16.5m, averaging 6.8m with overburden thickness ranging from 0m to about 7.5m with an average thickness of 2.1m. The dunal domain contains a significant component of VHM, including 93Kt of zircon, 68Kt of rutile, 26Kt of leucoxene and 184Kt of ilmenite (Table 4).

Beneath the dunal material is a domain interpreted to relate to reworked "fluviatile" HM mineralisation. This strikes discontinuously. For resource estimation an area with lower slimes was defined, which extends for 4 km east-west by 3.3 km north-south and from 13.5 m to 31.5 m below the surface. The mineralised fluviatile domain has a maximum thickness of 22.5 m and an average thickness of 9.5m. The fluviatile domain contains 4Kt of zircon, 3Kt of rutile, 1Kt of leucoxene and 35Kt of ilmenite.

Additional details of the Robbs Cross and Thomsons Mineral Resources are included in the JORC (2012) Tables attached as Appendix 2 and 3 respectively.

Table 3. Robbs Cross and Thomsons Mineral Resource Tables (1.4% HM cut-off) [1,2].

Deposit (cut-off)	Mineral Resource Category	Material Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade (%)	Mineral Assemblage[3]				Slimes (%)	Osize (%)
					Zircon (%)	Rutile (%)	Leuc (%)	Ilmenite (%)		
Robbs Cross	Indicated	14.0	0.3	1.9	15	13	5	47	6.0	6.2
	Inferred	3.8	0.1	2.0	14	11	4.1	50	6.3	8.1
	Total	**17.8**	**0.3**	**1.9**	**15**	**12**	**4.8**	**48**	**6.0**	**6.6**
Thomsons Dunal	Inferred	22	0.5	2.1	20	15	5.7	40	16	7.0
Thomsons Fluviatile	Inferred	4	0.1	1.5	7	6	2.5	60	27	6.0
Thomsons	**Total**	**26**	**0.5**	**2.0**	**19**	**14**	**5.4**	**42**	**18**	**6.9**

1. *See Appendix 2 for further details.*
2. *Tonnes and grades have been rounded to reflect the relative accuracy and confidence level of the estimate, thus the sum of columns may not equal.*
3. *Estimates of Mineral Assemblage are represented as the percentage of HM grade. Determination was by QEMSCAN, with TiO2 minerals defined according to the following ranges: Rutile >95% TiO2; Leucoxene 85-95% TiO2; Ilmenite <55-85% TiO2.*

Table 4: Robbs Cross and Thomsons Deposit contained Valuable HM (VHM) Resource Inventory (1.4% cut-off)[1]

Deposit	Mineral Resource Category	Zircon (kt)	Rutile (kt)	Leucoxene (kt)	Ilmenite (kt)	Total VHM (kt)
Robbs Cross	Indicated	38	33	13	123	208
	Inferred	11	8	3	38	61
	Total	**50**	**41**	**16**	**162**	**269**
Thomsons Dunal	Inferred	93	68	26	184	371
Thomsons Fluviatile	Inferred	4	3	1	35	43
Thomsons	**Total**	**97**	**71**	**28**	**219**	**415**

1. *Contained VHM estimate are sourced from Table 3, note tonnes and grades have been rounded to reflect the relative accuracy and confidence level of the estimate, thus the sum of columns may not equal.*

Further Work

Future work for the Eneabba Project will initially concentrate on a review of the remainder of the Project's Mineral Resources (Yandanooka, Durack, West Mine North and Ellengail) to enable reporting under the JORC Code (2012).

CASH POSITION AND CORPORATE ACTIVITIES

As at 31 December 2017, Sheffield held cash reserves of approximately $31.6 million (unaudited). During the quarter, the Company completed a share placement to professional and sophisticated investors, raising a total of $30 million to advance the development of Thunderbird. Additionally, the Company concluded a $2 million underwritten share purchase plan which was significantly oversubscribed (see ASX announcement dated 25 October 2017 and 16 November 2017).

During the quarter, Sheffield concluded a debt financing process, culminating in the appointment of Taurus as mandated lead arranger and underwriter of a US$200M debt finance facility package to support the development of the Thunderbird Mineral Sands Project (see ASX announcement dated 18 October 2017). In conjunction with mandated debt facility arrangements, Sheffield continues to advance discussions with a number of strategic partners with a view to participation in the development of the Thunderbird project.

Spin-Out of Carawine Resources

During the December quarter, Sheffield concluded the demerger of its portfolio of gold and base metal assets, held by its 100% owned subsidiary Carawine Resources Limited ("Carawine") by way of distributing the 20 million shares it holds in Carawine in specie to eligible Sheffield shareholders on a pro rata basis. Following a successful Initial Public Offer that raised $7 million, Carawine listed and commenced trading on the ASX on 14 December 2017 (see ASX:CWX announcement 14 December 2017).

Mr Bruce McFadzean
Managing Director
30 January 2018

Schedule 1: Interests in Mining Tenements at the end of the quarter as required under ASX Listing Rule 5.3.3

Project	Tenement	Holder	Interest	Location[3]	Status
Mineral Sands	E04/2455	Sheffield Resources Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2456	Sheffield Resources Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2081[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2083[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2084[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2159[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2171[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2192[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2193[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2194[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2348[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2349[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2350[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2390[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2399[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2400[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	L04/84[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	L04/85[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	L04/86[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	L04/92[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	L04/93[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Granted
Mineral Sands	E04/2478	Sheffield Resources Ltd	100%	Canning Basin	Pending
Mineral Sands	L04/82	Sheffield Resources Ltd	100%	Canning Basin	Pending
Mineral Sands	L04/83	Sheffield Resources Ltd	100%	Canning Basin	Pending
Mineral Sands	E04/2494[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Pending
Mineral Sands	M04/459[2]	Thunderbird Operations Pty Ltd	100%	Canning Basin	Pending
Mineral Sands	E70/3762	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	E70/3813	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	E70/3814	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	E70/3929	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	E70/3967	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	E70/4190	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	E70/4584	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	E70/4292	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	E70/4719	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	E70/4747	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	L70/150	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	M70/872[1]	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	M70/965[1]	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	M70/1153[1]	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	R70/35[1]	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	E70/4922	Sheffield Resources Ltd	100%	Perth Basin	Granted
Mineral Sands	E70/3859	Sheffield Resources Ltd	100%	Perth Basin	Pending

Notes:
[1]Iluka Resources Ltd (ASX: ILU) retains a gross sales royalty of 1.5% in respect to tenements R70/35, M70/872, M70/965 & M70/1153.
[2]Thunderbird Operations Pty Ltd is a 100% owned subsidiary of Sheffield Resources Ltd.

In December 2017, Carawine Resources Limited demerged from the Group. The tenements applicable to the transaction included: E28/2374-I, E28/2563, E39/1733, E45/4844, E45/4845, E45/4847, E45/4871, E45/4881, E45/4955, E45/4958, E45/4959, E45/5145, E46/1041-I, E46/1042, E46/1044-I, E46/1069, E46/1099, E46/1116, E46/1119, E46/1194, E46/1239, E69/3033, E69/3052, E69/3521, EL5523. Refer www.carawine.com.au for further details.

Details of tenements and/or beneficial interests acquired/disposed of during the quarter are provided in Section 10 of the Company's accompanying Appendix 5B notice.

COMPLIANCE STATEMENTS

MINERAL RESOURCES

The information in this report that relates to the estimation of Mineral Resources for the Robbs Cross and Thomsons deposits (Eneabba Project) is based on information compiled by Mrs Christine Standing, who is a Member of the Australasian Institute of Mining and Metallurgy (AusIMM) and the Australian Institute of Geoscientists (AIG). Mrs Standing is a full-time employee of Optiro Pty Ltd and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which she is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code (2012)"). Mrs Standing consents to the inclusion in this report of the matters based on her information in the form and context in which it appears.

PREVIOUSLY REPORTED INFORMATION

This report includes information that relates to Exploration Results, Mineral Resources and Ore Reserves prepared and first disclosed under the JORC Code (2012) and a Bankable Feasibility Study. The information was extracted from the Company's previous ASX announcements as follows:

- September 2017 Quarterly Report: "QUARTERLY ACTIVITIES REPORT FOR THE PERIOD ENDED 30 SEPTEMBER 2017" 31 October, 2017
- Thunderbird Ore Reserve: *"THUNDERBIRD ORE RESERVE UPDATE"* 16 March, 2017
- Thunderbird Bankable Feasibility Study: *"THUNDERBIRD BFS DELIVERS OUTSTANDING RESULTS"* 24 March, 2017
- McCalls Mineral Resource: *"QUARTERLY ACTIVITIES REPORT FOR THE PERIOD ENDED 30 JUNE 2016"* 25 July 2016.
- Thunderbird Mineral Resource: *"SHEFFIELD DOUBLES MEASURED MINERAL RESOURCE AT THUNDERBIRD"* 5 July, 2016
- Robbs Cross and Thomsons Discovery: "NEXT GENERATION OF MINERAL SANDS DISCOVERIES AT ENEABBA" 23 July, 2015

This report also includes information that relates to Exploration Results and Mineral Resources which were prepared and first disclosed under the JORC Code 2004. The information has not been updated since to comply with the JORC Code 2012 on the basis that the information has not materially changed since it was last reported. The information was extracted from the Company's previous ASX announcements as follows:

- Drummond Crossing Mineral Resource and Sampling Results from Dunal-Style HM Targets, Eneabba Project: *"1Mt HEAVY MINERAL RESOURCE ADDED TO ENEABBA PROJECT"*, 30 October 2013.
- Yandanooka Mineral Resource: *"YANDANOOKA RESOURCE UPGRADE AND METALLURGICAL RESULTS"*, 30 January 2013.
- Durack Mineral Resource: *"ENEABBA PROJECT RESOURCE INVENTORY EXCEEDS 5MT HEAVY MINERAL"*, 28 August 2012.
- West Mine North Mineral Resource: *"WEST MINE NORTH MINERAL RESOURCE ESTIMATE EXCEEDS EXPECTATIONS"*, 7 November 2011.
- Ellengail Mineral Resource: *"1MT CONTAINED HM INFERRED RESOURCE AT ELLENGAIL"*, 25 October 2011.

These announcements are available to view on Sheffield's website www.sheffieldresources.com.au

The Company confirms that it is not aware of any new information or data that materially affects the information included in the relevant market announcements and, in the case of estimates of Mineral Resources, Ore Reserves and the Bankable Feasibility Study, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the relevant original market announcements.

CAUTIONARY STATEMENTS AND RISK FACTORS

The contents of this report reflect various technical and economic conditions at the time of writing. Given the nature of the resources industry, these conditions can change significantly over relatively short periods of time. Consequently, actual results may vary from those contained in this report.

Some statements in this report regarding estimates or future events are forward-looking statements. They include indications of, and guidance on, future earnings, cash flow, costs and financial performance. Forward-looking statements include, but are not limited to, statements preceded by words such as "planned", "expected", "projected", "estimated", "may", "scheduled", "intends", "anticipates", "believes", "potential", "predict", "foresee", "proposed", "aim", "target", "opportunity", "could", "nominal", "conceptual" and similar expressions. Forward-looking statements, opinions and estimates included in this report are based on assumptions and contingencies which are subject to change without notice, as are statements about market and industry trends, which are based on interpretations of current market conditions. Forward-looking statements are provided as a general guide only and should not be relied on as a guarantee of future performance. Forward-looking statements may be affected by a range of variables that could cause actual results to differ from estimated results, and may cause the Company's actual performance and financial results in future periods to materially differ from any projections of future performance or results expressed or implied by such forward-looking statements. So there can be no assurance that actual outcomes will not materially differ from these forward-looking statements.

APPENDIX 1: Ore Reserves and Mineral Resources

Sheffield announced an updated Ore Reserve totalling 680.5 million tonnes @ 11.3% HM for the Thunderbird heavy mineral sands deposit, in the Kimberley Region of Western Australia, on 16 March 2017, and has since completed a Bankable Feasibility Study for development of the deposit (the Thunderbird Mineral Sands Project). The Proved and Probable Ore Reserve estimate is based on that portion of the current July, 2016 Thunderbird deposit Measured and Indicated Mineral Resources within scheduled mine designs that may be economically extracted, considering all "Modifying Factors" in accordance with the JORC Code (2012).

Sheffield also has a number of Mineral Resource estimates for heavy mineral sands deposits within its Eneabba and McCalls Projects located in the Mid-West Region of Western Australia.

Ore Reserves

Dampier Project Ore Reserves [1,4]

Deposit	Ore Reserve Category	Ore Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade (%)	Valuable HM Grade (In-situ)[2]				Slimes (%)	Osize (%)
					Zircon %	HiTi Leuc %	Leuc %	Ilmenite %		
Thunderbird	Proved	235.8	31.4	13.3	1.00	0.29	0.26	3.55	16.5	13.7
	Probable	444.8	45.4	10.2	0.80	0.26	0.26	2.85	15.2	11.0
	Total	**680.5**	76.8	**11.3**	**0.87**	**0.27**	**0.26**	**3.10**	**15.7**	**12.0**

Deposit	Ore Reserve Category	Ore Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade (%)	Mineral Assemblage[3]				Slimes (%)	Osize (%)
					Zircon (%)	HiTi Leuc (%)	Leuc (%)	Ilmenite (%)		
Thunderbird	Proved	235.8	31.4	13.3	7.5	2.2	1.9	26.7	16.5	13.7
	Probable	444.8	45.4	10.2	7.8	2.5	2.6	28.0	15.2	11.0
	Total	**680.5**	76.8	**11.3**	**7.7**	**2.4**	**2.3**	**27.4**	**15.7**	**12.0**

1) Ore Reserves are presented both in terms of in-situ VHM grade, and HM assemblage. Tonnes and grades have been rounded to reflect the relative accuracy and confidence level of the estimate, thus the sum of columns may not equal. Ore Reserve is reported to a design overburden surface with appropriate consideration of modifying factors, costs, mineral assemblage, process recoveries and product pricing.
2) The in-situ grade is determined by multiplying the HM Grade by the percentage of each valuable heavy mineral within the heavy mineral assemblage.
3) Mineral Assemblage is reported as a percentage of HM Grade, it is derived by dividing the in-situ grade by the HM grade.
4) Ore Reserves reported for the Dampier Project were prepared and first disclosed under the JORC Code (2012)

Mineral Resources

Dampier Project Mineral Resources [1,2,5]

Deposit (cut-off)	Mineral Resource Category	Material Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade (%)	Mineral Assemblage[3]				Slimes (%)	Osize (%)
					Zircon (%)	HiTi Leuc (%)	Leuc (%)	Ilmenite (%)		
Thunderbird (> 3% HM)	Measured	510	45	8.9	8.0	2.3	2.2	27	18	12
	Indicated	2,120	140	6.6	8.4	2.7	3.1	28	16	9
	Inferred	600	38	6.3	8.4	2.6	3.2	28	15	8
	Total	3,230	223	6.9	8.3	2.6	2.9	28	16	9
Thunderbird (>7.5% HM)	Measured	220	32	14.5	7.4	2.1	1.9	27	16	15
	Indicated	640	76	11.8	7.6	2.4	2.1	28	14	11
	Inferred	180	20	10.8	8.0	2.5	2.4	28	13	9
	Total	1,050	127	12.2	7.6	2.3	2.1	27	15	11

Eneabba Project Mineral Resources [2,4,6]

Deposit (cut-off)	Mineral Resource Category	Material Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade (%)	Mineral Assemblage[3]				Slimes (%)	Osize (%)
					Zircon (%)	Rutile (%)	Leuc (%)	Ilmenite (%)		
Yandanooka (> 0.9% HM)	Measured	3	0.1	4.1	10	1.9	2.2	72	15	14
	Indicated	90	2.1	2.3	12	3.7	3.7	69	16	15
	Inferred	3	0.03	1.2	11	3.9	4.6	68	18	21
	Total	96	2.2	2.3	12	3.6	3.7	69	16	15
Durack (>0.9% HM)	Indicated	50	1.0	2.0	14	2.8	4.6	70	15	21
	Inferred	15	0.2	1.2	14	2.4	6.7	67	14	17
	Total	65	1.2	1.8	14	2.8	4.9	70	15	20
Drummond Crossing (>1.1% HM)	Indicated	49	1.0	2.1	14	10	3.6	53	16	9
	Inferred	3	0.05	1.5	13	9.9	2.8	55	16	8
	Total	52	1.1	2.1	14	10	3.6	53	16	9
Ellengail (>0.9% HM)	Inferred	46	1.0	2.2	9	8.7	1.9	64	16	2
	Total	46	1.0	2.2	9	8.7	1.9	64	16	2
Robbs Cross (>1.4% HM)	Indicated	14	0.3	1.9	15	13	5	47	6.0	6.2
	Inferred	4	0.1	2.0	14	11	4.1	50	6.3	8.1
	Total	18	0.3	1.9	15	12	4.8	48	6.0	6.6
Thomsons (>1.4% HM)	Inferred	26	0.5	2.0	19	14	5.4	42	18	6.9
	Total	26	0.5	2.0	19	14	5.4	42	18	6.9
West Mine North (>0.9% HM)	Measured	6	0.4	5.6	4	9.6	9.5	54	15	1
	Indicated	36	0.8	2.3	7	9.6	5.4	60	13	3
	Total	43	1.2	2.8	6	9.6	6.6	58	13	3
All Eneabba (various)	Measured	9	0.5	5.2	5.9	7.7	7.7	59	15	5
	Indicated	239	5.2	2.2	12	6.1	4.2	64	15	13
	Inferred	97	1.9	1.9	12	9.5	3.5	57	16	7
	Total	346	7.6	2.2	12	7.1	4.2	62	15	11

McCalls Project Mineral Resources [2,4,6]

Deposit (cut-off)	Mineral Resource Category	Material Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade (%)	Mineral Assemblage[3]				Slimes (%)	Osize (%)
					Zircon (%)	Rutile (%)	Leuc (%)	Ilmenite (%)		
McCalls (>1.1% HM)	Indicated	2,214	31.7	1.4	5.1	3.2	2.7	76.8	21.7	1.3
	Inferred	1,436	18.7	1.3	5.0	3.2	3.1	80.3	25.5	1.1
	Total	**3,650**	**50.4**	**1.4**	**5.1**	**3.2**	**2.9**	**78.5**	**23.2**	**1.2**

1) The Dampier Project Mineral Resources are reported inclusive of (not additional to) Ore Reserves. The Mineral Resource reported above 3% HM cut-off is inclusive of (not additional to) the Mineral Resource reported above 7.5% HM cut-off.
2) All tonnages and grades have been rounded to reflect the relative accuracy and confidence level of each estimate and to maintain consistency throughout the table, therefore the sum of columns may not equal.
3) Estimates of Mineral Assemblage are represented as the percentage of HM grade. For Dampier the mineral assemblage was determined by screening and magnetic separation. Magnetic fractions were analysed by QEMSCAN for mineral determination as follows: >90% liberation and; Ilmenite 40-70% TiO_2; Leucoxene 70-94% TiO_2; High Titanium Leucoxene (HiTi Leucoxene) >94% TiO_2 and Zircon 66.7% ZrO_2+HfO_2. The non-magnetic fraction was analysed by XRF and minerals determined as follows: Zircon $ZrO2+HfO_2/0.667$ and HiTi Leucoxene $TiO_2/0.94$. For Eneabba & McCalls determination was by QEMSCAN, with TiO_2 minerals defined according to the following ranges: Rutile >95% TiO_2; Leucoxene 85-95% TiO_2; Ilmenite <55-85% TiO_2
4) West Mine North, Durack, Drummond Crossing, Robbs Cross, Thomsons and McCalls are reported below a 35% Slimes upper cutoff.
5) Mineral Resources for Dampier, McCalls, Robbs Cross and Thomsons were prepared and first disclosed under the JORC Code (2012).
6) Mineral Resources reported for Yandanooka, Durack, Drummond Crossing, Ellengail and West Mine North were prepared and first disclosed under the JORC Code 2004. These have not been updated since to comply with the JORC Code 2012 on the basis that the information on which the Resource estimates are based has not materially changed since it was last reported.

The Company's Ore Reserves and Mineral Resources Statement is based on information first reported in previous ASX announcements by the Company. These announcements are listed below and are available to view on Sheffield's website www.sheffieldresources.com.au . Mineral Resources and Ore Reserves reported for the Dampier Project and Mineral Resources reported for McCalls, Robbs Cross and Thomsons were prepared and first disclosed under the JORC Code (2012). Mineral Resources reported for Yandanooka, Durack, Drummond Crossing, Ellengail and West Mine North were prepared and first disclosed under the JORC Code (2004), these have not been updated since to comply with the JORC Code (2012) on the basis that the information on which the Mineral Resource estimates are based has not materially changed since it was last reported.

The Company confirms that it is not aware of any new information or data that materially affects the information included in the relevant original market announcements and that all material assumptions and technical parameters underpinning the estimates in the relevant original market announcement continue to apply and have not materially changed.

The Competent Persons for reporting of Mineral Resources and Ore Reserves in the relevant original market announcements are listed below. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the relevant original market announcement.

Item	Name	Company	Professional Affiliation
Mineral Resources Reporting	Mr Mark Teakle Mr David Boyd	Sheffield Resources Sheffield Resources	MAIG, MAusIMM MAIG
Mineral Resources Estimation	Mrs Christine Standing Mr Tim Journeaux Mr Trent Strickland	Optiro QG QG	MAusIMM, MAIG MAusIMM MAusIMM
Ore Reserves	Mr Per Scrimshaw	Entech	MAusIMM

Ore Reserves and Mineral Resources prepared and first disclosed under the JORC Code (2012):

Item	Report Title	Report Date	Competent Person(s)
Thunderbird Ore Reserve	Thunderbird Ore Reserve Update	16 March 2017	P. Scrimshaw
Thunderbird Mineral Resources	Sheffield Doubles Measured Mineral Resource At Thunderbird	5 July 2016	M. Teakle C. Standing
McCalls Mineral Resources	Quarterly Activities Report For The Period Ended 30 June 2016	20 July 2016	D. Boyd T. Journeaux
Robbs Cross Mineral Resource	Quarterly Activities Report For The Period Ended 31 December 2017	25 January 2017	C. Standing
Thomsons Mineral Resource	Quarterly Activities Report For The Period Ended 31 December 2017	25 January 2017	C. Standing

Mineral Resources prepared and first disclosed under the JORC Code (2004):

Item	Report Title	Report Date	Competent Person(s)
Ellengail Mineral Resource	1Mt Contained HM Inferred Resource at Ellengail	25 October 2011	M. Teakle T. Strickland
West Mine North Mineral Resource	West Mine North Mineral Resource Estimate Exceeds Expectations	7 November 2011	M. Teakle T. Strickland
Durack Mineral Resource	Eneabba Project Resource Inventory Exceeds 5Mt Heavy Mineral	28 August 2012	M. Teakle T. Strickland
Yandanooka Mineral Resource	Yandanooka Resource Upgrade and Metallurgical Results	30 January 2013	M. Teakle T. Strickland
Drummond Crossing Mineral Resource	1Mt Heavy Mineral Resource Added to Eneabba Project	30 October 2013	M. Teakle T. Strickland

APPENDIX 2: Robbs Cross and Thomsons Mineral Resources JORC Code (2012) Table 1 Reports

Robbs Cross

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• NQ (70 mm) diameter aircore drilling used to collect a at source rotary split 1-3 kg samples at 1.5 m intervals down-hole. • Mineral sands industry-standard drilling technique. • See below for sample and assay QAQC procedures and analysis. • Of the 52 drillholes used in the Mineral Resource estimate, 18 (35%) were drilled by Sheffield in 2015 and 34 (65%) were drilled in 2017. The same drilling and sampling techniques were employed in both programmes.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• Aircore system using a blade (face sampling) drill bit, NQ size. • System used as an industry standard for HMS deposits.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• Rotary splitter beneath the splitter used to collect a 1-3 kg sub-sample from 1.5 m intervals. • Sample weight was recorded at the laboratory. • Duplicate samples for Sheffield holes were collected at the drill site (see below) to enable analysis of data precision. • Sample condition of Sheffield holes (wet to dry and good to poor qualitative recovery) was logged at the drill site. Analysis shows no material bias in the differing sample conditions logged. • Bulk samples collected in 3 m composite intervals from cyclone, capturing remaining material. • The sample quality is considered appropriate for the Mineral Resource estimation and classification applied.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the*	• Every drill sample was washed and panned, then geologically logged on-site in 1.5 m intervals. • Sheffield record primary, secondary and oversize lithology, qualitative hardness, grainsize, rounding, sorting, and washability, visual estimates of HM%, SL% and OS%, and depth to water table. • The entire length of the drillhole is logged;

Criteria	JORC Code explanation	Commentary
	relevant intersections logged.	minimum (nominal) interval length is 1.5 m. • Logging is suitable such that interpretations of grade and deposit geology can be used to support the Mineral Resource estimation and classification applied.
Sub-sampling techniques and sample preparation	• *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	<u>HM%, SL% OS% Determination</u> Drill site • A 1-3 kg sample was collected at 1.5 m intervals in numbered bags at the drill site via rotary splitter at the cyclone discharge point. Sheffield drillholes • Duplicate samples (field duplicates) collected at drill site for 1 in every 40 samples. • Reference blank (builders sand) material samples inserted 1 each in every 40 samples. • Samples submitted to Diamantina Laboratories for heavy liquid separation (HLS) determination of weight per cent heavy mineral (HM%), slimes (SL%) and oversize (OS%) at a screen split of -45 µm, +45 µm and +1 mm. Diamantina Laboratories • The 2-3 kg drill sample is sub-sampled via a rotary splitter to approx. 200 g for analysis. • The 200 g sub-sample is soaked overnight in water then screened and weighed. • HM%, SL% and OS% calculated as percentage of total sample weight (see below). Laboratory repeats were conducted for 1 in 39 samples in 2015 and 1 in every 25 samples in 2017. • Laboratory internal standard inserted (nominally) 1 in every 39 samples. • Laboratory provides a sachet containing the Heavy Mineral Concentrate (HMC) for each sample – this was used in HM assemblage determination (see below). All • Visual estimates of HM%, SL% and OS% logged at the drill site are compared against laboratory results to identify significant errors. • Spacing of duplicate, standard, blank and laboratory repeat samples for Sheffield holes are designed to identify sample misplacement or misallocation during sample collection and laboratory analysis. • Analysis of field duplicate samples and laboratory repeats for Sheffield data, are sufficient to show the data has acceptable precision, indicating the sub-sampling and sample preparation techniques are appropriate for the deposit style and the

Criteria	JORC Code explanation	Commentary
		Mineral Resource estimation and classification applied. <u>HM Assemblage Determination</u> • Heavy Mineral Concentrate (HMC) from individual samples is combined according to HM grade and weight into (nominal) >20 g composite samples for HM assemblage determination. • Weighed HMC composite is split via a micro-riffle to ensure HM%, SL% and OS% of the final composite sample can be correctly calculated. • HM assemblage determination was by QEMSCAN™ to determine the component mineralogy. This method has rigorous (laboratory) internal quality control measures, and this in comparison with visual observations of HM concentrate is considered sufficient to show the data has acceptable precision, indicating the sub-sampling and sample preparation techniques are appropriate for the deposit style and the Mineral Resource estimation and classification applied.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	<u>HM%, SL% and OS% Determination</u> • Assay and laboratory procedures are industry standard, although method specifics and heavy liquid composition can vary. • Sheffield drillholes contributed 100% of the assay database. • SL% was determined using a 45 µm screen. • OS% was determined using a 1 mm screen. • HM% was determined using heavy liquid TBE (2.96 g/ml). • The method produces a total grade as weight per cent of the primary sample. • Method does not determine the relative amounts of valuable (saleable or marketable) and non-valuable heavy mineral species. See below for details of HM assemblage determination. • Reference field blank material samples inserted at the drill site 1 each in every 40 samples. • The blank material used is commercially available builder's sand. • Reference blanks are examined for performance over time and within laboratory batches. Batches or sub-batches are re-analysed if unacceptable QAQC data are returned. • In total QAQC samples represent 11% of the total assay database. • Analysis of reference blanks and laboratory standards, repeats show the data to be of acceptable accuracy and

Criteria	JORC Code explanation	Commentary
		precision for the Mineral Resource estimation and classification applied. HM Assemblage Determination • HM assemblage was determined from Sheffield drillholes. • Heavy Mineral Concentrate (HMC) from individual samples is combined according to HM grade and weight into (nominal) >20 g composite samples for HM assemblage determination. • Weighed HMC is split via a micro-riffle to ensure HM%, SL% and OS% of the final homogenised composite sample can be correctly calculated. • HM assemblage determination was by the QEMSCAN™ process which uses observed mass and chemistry to classify particles according to their average chemistry, and then report mineral abundance by % mass. • For the TiO_2 minerals specific breakpoints are used to distinguish between rutile (>95% TiO_2), leucoxene (85-95% TiO_2) and ilmenite (<55-85% TiO_2). • Reference material is not used, other measures of accuracy and the method design are considered sufficient to establish acceptable accuracy of the data for the Mineral Resource estimation and classification applied.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Sheffield data was logged electronically using "validation at point of entry" systems prior to storage in the Company's drillhole database, which is managed by Company personnel and an external consultancy. • Documentation related to data custody and validation is maintained by the Company. • A copy ("snapshot") of the Mineral Resource database is retained separately from the primary drillhole database. • All drillholes were included in the drill database. • The verification and treatment of the data is considered sufficient for the Mineral Resource estimation and classification applied.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• For the 52 Sheffield drillholes the collar locations were surveyed by Sheffield employees using a handheld Garmin GPS system with expected accuracy of +/- 5 m horizontal. • Easting and northing coordinate system is MGA Zone 50 (GDA94). Drillhole collar elevation for the Mineral Resource estimation was determined by projection of surveyed drillhole collars to a regional (Landgate) SRTM Digital Elevation Model (DEM).

Criteria	JORC Code explanation	Commentary
		• Holes RCAC026, RCAC027, RCAC028 and RCAC029 were given a nominal collar elevation of 150 mRL as the SRTM DEM model terminates south of their location and vertical accuracy of the hand-held GPS is poor. These drill holes are not situated within the Mineral Resource region. • The Mineral Resource estimate uses SRTM DEM model as surface topography. RL by hand-held GPS units has poor accuracy and the DEM model provides consistent spatial topography over the project area. • The quality and accuracy of the topographic control is considered sufficient for the Mineral Resource estimation and classification applied
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• Drillholes are at spacing of 200 mE by 200 mN to 300 mE by 400 mN. Where appropriate, hole spacing was reduced to as little as 60 m to confirm the geological constraints. • The drill database used for the Mineral Resource estimate comprises 52 holes, totalling 1,167 m with 778 samples assayed (excluding standards, blanks and duplicates). • Samples for HM assemblage determination are composited on intervals according to a combination of grade and geology appropriate to reflect the resource estimation domains. Samples have been composited from individual drillholes, or when not possible, are from proximal drillholes using intervals within the same geological and grade domains. • Seven composites from 20 drillholes were used to estimate the mineral assemblage of the Mineral Resource. • The data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource estimation and classification applied.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• All drilling is vertical making it normal to the horizontal orientation of geology and mineralisation.
Sample security	• *The measures taken to ensure sample security.*	• Sample security is not considered a significant risk given the location of the deposit and bulk-nature of mineralisation. Nevertheless, the use of recognised

Criteria	JORC Code explanation	Commentary
		transport providers, sample dispatch procedures directly from the field to the laboratory, and the large number of samples are considered sufficient to ensure appropriate sample security.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• All data has been validated by at least two Company geologists, and was reviewed by the Competent Person for the Mineral Resource estimate.

Section 2 Reporting of Exploration Results

(Criteria in this section apply to all succeeding sections)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The drillholes used for Mineral Resource definition are entirely within 100% Sheffield Resources held Exploration Licence E70/4292. • E70/4292 was granted on the 05/10/2012 and was due to expire on the 2/10/2022. This tenement contains the Robbs Cross HMS prospect • E70/4292 forms part of Sheffield's Eneabba Project which is centred along the Brand Highway in the Midwest region of Western Australia. • There are no known or experienced impediments to obtaining a licence to operate in the area. • Sheffield has been operating successfully in the region for more than 6.5 years.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Sheffield carried out the initial exploration at the Robbs Cross prospect via soil sampling and aerial photograph assessment.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• Sheffield's Eneabba Project forms part of the Swan Coastal Plain bounded to the east by the Gingin Scarp within the Northern Perth Basin. The Gingin Scarp is a remnant feature of the marine incursion which resulted in the reworking of older rocks and ended in the deposition of heavy mineral sand enriched beach placers within Cainozoic sediments. Heavy mineral sand mining is prolific within the Swan Coastal Plain sediments. • The Robbs Cross deposit is in a newly interpreted heavy mineral trap site located to the north of Eneabba and to east of the Gingin Scarp and adjacent to westerly to south-westerly trending paleo-drainage. • Sheffield is exploring for Cainozoic heavy mineral sands associated with re-worked aeolian dunal occurrences that have stripped lighter material and enabled heavy mineral accumulations
Drillhole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the*	• Attached diagrams show the location of and distribution of drillholes in relation to the Mineral Resource.

Criteria	JORC Code explanation	Commentary
	following information for all Material drillholes: • easting and northing of the drillhole collar • elevation or RL (elevation above sea level in metres) of the drillhole collar • dip and azimuth of the hole • down hole length and interception depth • hole length.	• Sheffield has previously reported deposit information including significant intersects and collar information for Robbs Cross (ASX announcement 23 July 2015, Quarterly Report 30 September 2017).
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.*	• Not applicable
Relationship between mineralisation widths and intercept lengths	• *If the geometry of the mineralisation with respect to the drillhole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	• Mineralisation and stratigraphy is assumed to be sub-horizontal, flat lying and therefore vertical drillholes are approximate to true thickness.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• Plan included in report.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• All results have been reported
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• Sheffield has previously reported deposit information for Robbs Cross (ASX announcement 23 July 2015, Quarterly Report 30 September 2017). • Where relevant this information has been included or referred to elsewhere in this Table.
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).*	• Additional exploration work will be planned in the future.

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in section 2, also apply to this section)

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its*	• Drillhole data was extracted directly from the Company's drillhole database which includes internal data validation

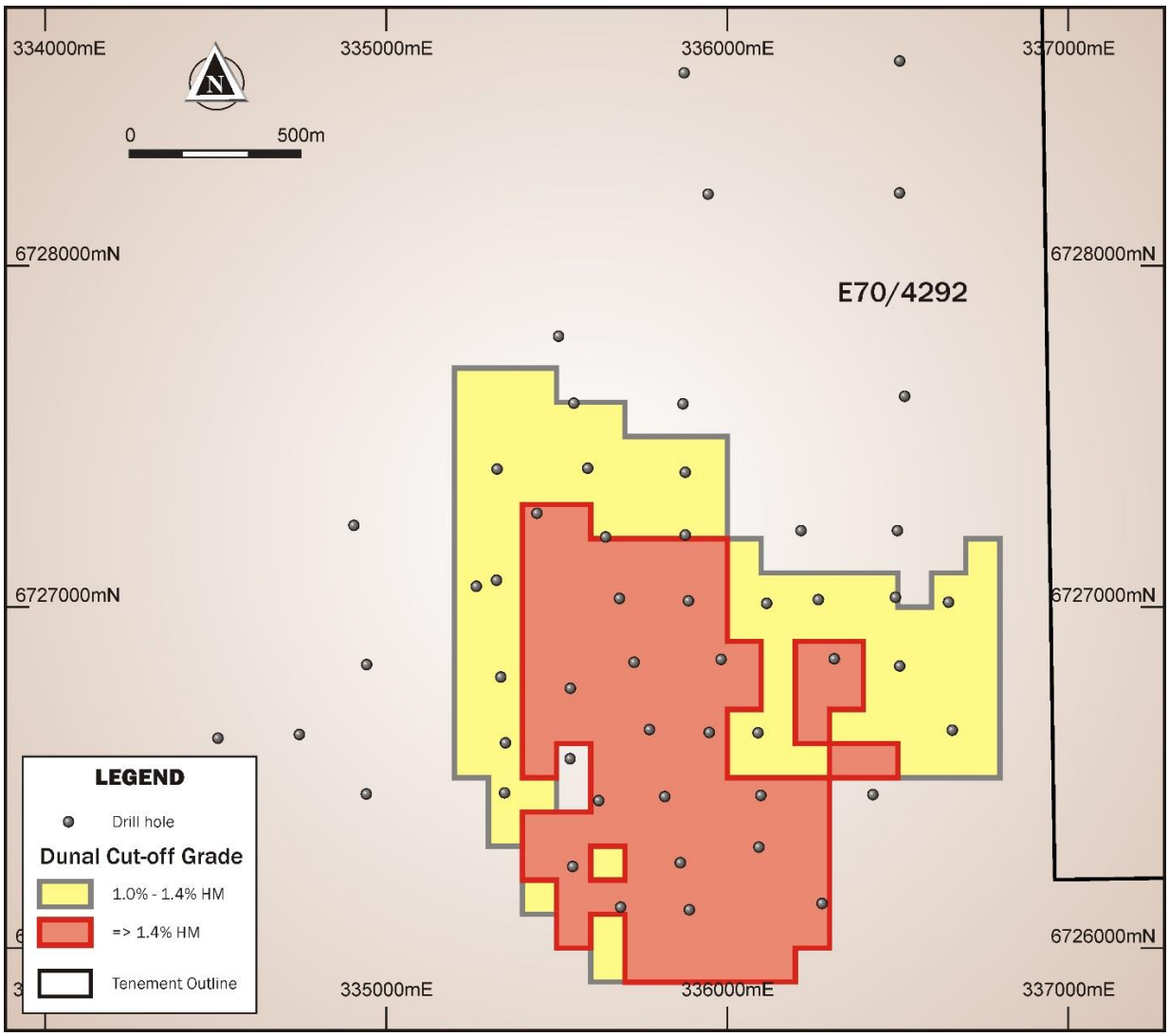
Criteria	JORC Code explanation	Commentary
	initial collection and its use for Mineral Resource estimation purposes. • *Data validation procedures used.*	protocols. • Validation of the exported data was confirmed using mining software (Micromine) validation protocols, and visually in plan and section views. • Compilation of data external to the drill database (e.g. HM assemblage source data) was cross-checked manually, and through statistical comparison. • A copy ("snapshot") of the Mineral Resource database is retained separately to the primary drillhole database. • Data was further validated by Optiro upon receipt, and prior to use in the estimation.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	• Mrs Standing has not visited the Robbs Cross site, but has visited mineral sands deposits within the Eneabba region and the primary assay laboratory.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• The mineralised horizon was interpreted on a cross-sectional basis by Sheffield using Micromine software based on the logging and grade information according to the deposit geology described above. • Microscope analysis was used to assess shape and composition of the heavy minerals. Geological domaining was not required as the HM concentrations are solely of dunal origin. • The mineralised domain was interpreted at a nominal >0.9% HM cut-off with a minimum width of 3 m.
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• Mineralisation is interpreted over a lateral extent of 1.5 km east-west by 1.5 km north-south and is open at depth in the east and open to the south. • The key HM domain is up to 22.5 m thick but with an average thickness of 8.5 m. • Overburden thickness ranges from 0 m to about 16.5 m with an average of 10 m.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.*	• HM, slimes and oversize quantities were estimated using ordinary kriging (OK) into blocks of 100 mE by 100 mN by 3 mRL. Zircon, rutile, leucoxene, ilmenite and REE percentages were estimated using inverse distance (ID) cubed into the parent blocks. • Block dimensions were selected from kriging neighbourhood analysis and reflect the variability of the deposit and the model's practicality for future mine planning. Sub-cells to a minimum dimension of 20 mE by 20 mN by 1 mRL were used to represent volume. For the definition of the topographical surface and soil horizon (of 20 cm) sub-celling was reduced to 10 mE by 10 mN by

Criteria	JORC Code explanation	Commentary
	• *Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	0.2 mRL. • The nominal drill spacing is approximately 200 m by 200 m, with the margins of the deposit drilled at a spacing of 300 m by 400 m. Hole spacing was reduced in places to confirm the geological constraints (down to 60 m). • A maximum extrapolation distance of 200 m was applied around the drillholes. • Data analysis and estimation was undertaken using Snowden Supervisor and Datamine software. • Drill samples were all taken over 1.5 m intervals and compositing was not required for estimation. • Wireframe interpretations of mineralisation were made by Sheffield based on geological logging and heavy mineral (HM) content, using a threshold of ~0.9% HM to define the mineralised horizon. • Optiro assessed the robustness of this domain by critically examining the geological interpretation and by using a variety of measures, including statistical and geostatistical analysis. The mineralised domain is considered geologically robust in the context of the resource classification applied to the estimate. • All variables were estimated separately and independently. • Grade capping was applied to SL% and OS%. The top-cut levels were determined using a combination of top cut analysis tools, including grade histograms, log probability plots and the coefficient of variation. • Variogram analysis was undertaken to determine the kriging estimation parameters used for OK estimation of HM, slimes and oversize. • HM mineralisation continuity was interpreted from variogram analyses to have an along strike range of 475 m and an across strike range of 345 m. • Kriging neighbourhood analysis was performed in order to determine the block size, sample numbers and discretisation levels. • Three estimation passes were used for HM; the first search was based upon the variogram ranges; the second search was two times the initial search and the third search was up to six times the initial search, with reduced sample numbers required for estimation. The majority of blocks (77%) were estimated in the first

Criteria	JORC Code explanation	Commentary
		pass, 13% in the second pass and 10% in the third pass. • The HM, slimes and oversize estimated block model grades were visually validated against the input drillhole data and comparisons were carried out against the declustered drillhole data and by northing, easting and elevation slices. • The VHM estimated block model grades were visually validated against the input drillhole data and comparisons were carried out against the drillhole data and by northing and easting slices.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• Tonnages are estimated on a dry basis
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• The Mineral Resource estimate for the Robbs Cross deposit has been reported above a cut-off grade of 1.4% HM (to represent the resource that may be extracted under current market conditions). • These parameters have been selected by Sheffield in consultation with Optiro based on current experience and preliminary economic assessments carried out by Sheffield for HM deposits elsewhere in Western Australia. They represent that proportion of the deposit considered to have reasonable prospects of eventual economic extraction.
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous.*	• In determining the criteria for reasonable prospects for eventual economic extraction, potential mining methods considered are wet, dredge mining or dry dozer-trap operations, similar to those commonly and currently in use in HM mining operations both in Australia and globally. • The thickness, areal extent, and continuous nature of the mineralisation at Robbs Cross are such that non-selective bulk mining methods can be appropriately considered. • These assumptions were also considered when determining resource block sizes, and resource classification. • On the basis of these assumptions, the Company considers there are no mining factors which are likely to affect the assumption that the deposit has reasonable prospects for eventual economic extraction.
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for*	• Sheffield has not conducted mineral characterisation test work on samples from Robbs Cross. • To date, the Company considers there

Criteria	JORC Code explanation	Commentary
	eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous.	are no metallurgical factors which are likely to significantly affect the assumption that the deposit has reasonable prospects for eventual economic extraction.
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation.*	• There are no known environmental impediments to the project's viability from the currently available data.
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• No direct measurements of bulk density have been taken. • Bulk density is assumed from an industry-standard formula which accounts for the HM and slimes content of sand deposits. The resultant values are considered to be consistent with observations of the material compared with other similar HM deposits with known bulk density values. • A recommendation for future work is that confirmatory bulk density information is acquired.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• The estimate has been classified according to the guidelines of the JORC Code (2012), into Indicated and Inferred Resources taking into account data quality, data density, geological continuity, grade continuity and confidence in estimation of heavy mineral content and mineral assemblage. In plan, polygons were used to define zones of different classification. • Indicated Mineral Resources are defined where drilling is generally at a spacing of approximately 200 m to 300 m. • Inferred Mineral Resources are defined around the margins of Indicated Mineral Resources, where the drill spacing is at around 400 m.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• The Mineral Resource has been reviewed internally as part of normal validation processes by Optiro. • No external audit or review of the current Mineral Resource has been conducted.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person.* • *The statement should specify whether it relates to global or local estimates, and, if*	• The assigned classification of Indicated and Inferred reflects the Competent Persons' assessment of the accuracy and confidence levels in the Mineral Resource estimate. • The estimate is suitable for input into long term planning studies.

Criteria	JORC Code explanation	Commentary
	local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used. • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• No production has occurred from the deposit.



Plan of Robbs Cross Dunal Mineral Resource above 1.0% HM (yellow) cut-off grade and above a 1.4% HM (red)

Thomsons

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• NQ (70 mm) diameter aircore drilling used to collect a at source rotary split 1-3 kg samples at 1.5 m intervals down-hole. • Mineral sands industry-standard drilling technique. • See below for sample and assay QAQC procedures and analysis. • Of the 58 holes used in the Mineral Resource estimate, 25 (43%) were drilled by Sheffield in 2015 and 33 (57%) were drilled by Sheffield (2017). The same drilling and sampling techniques have been employed in both programmes.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• Aircore system using a blade (face sampling) drill bit, NQ size. • System used as an industry standard for HMS deposits.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• Rotary splitter beneath the splitter used to collect a 1-3 kg sub-sample from 1.5 m intervals. • Sample weight was recorded at the laboratory. • Duplicate samples for Sheffield holes were collected at the drill site (see below) to enable analysis of data precision. • Sample condition of Sheffield holes (wet to dry and good to poor qualitative recovery) was logged at the drill site. Analysis shows no material bias in the differing sample conditions logged. • Bulk samples collected in 3 m composite intervals from cyclone, capturing remaining material. • The sample quality is considered appropriate for the Mineral Resource estimation procedure and classification applied.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• Every drill sample was washed and panned, then geologically logged on-site in 1.5 m intervals. • Sheffield record primary, secondary and oversize lithology, qualitative hardness, grainsize, rounding, sorting, and washability, visual estimates of HM%, SL% and OS%, and depth to water table. • The entire length of the drillhole is logged; minimum (nominal) interval length is 1.5

Criteria	JORC Code explanation	Commentary
		m. • Logging is suitable such that interpretations of grade and deposit geology can be used to support the Mineral Resource estimation procedure and classification applied.
Sub-sampling techniques and sample preparation	• *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	<u>HM%, SL% OS% Determination</u> Drill site • A 1-3 kg sample was collected at 1.5 m intervals in numbered bags at the drill site via rotary splitter at the cyclone discharge point. Sheffield drillholes • Duplicate samples (field duplicates) collected at drill site for 1 in every 40 samples. • Reference blank (builders sand) material samples inserted 1 each in every 40 samples. • Samples submitted to Diamantina Laboratories for heavy liquid separation (HLS) determination of weight per cent total heavy mineral (HM%), slimes (SL%) and oversize (OS%) at a screen split of -45 µm, +45 µm and +1 mm. Diamantina Laboratories • The 2-3 kg drill sample is sub-sampled via a rotary splitter to approx. 200 g for analysis. • The 200 g sub-sample is soaked overnight in water then screened and weighed. • HM%, SL% and OS% calculated as percentage of total sample weight (see below). Laboratory repeats were conducted for 1 in 38 samples in 2015 and 1 in every 28 samples in 2017. • Laboratory internal standard inserted (nominally) 1 in every 39 samples. • Laboratory provides a sachet containing the Heavy Mineral Concentrate (HMC) for each sample – this was used in HM assemblage determination (see below). All • Visual estimates of HM%, SL% and OS% logged at the drill site are compared against laboratory results to identify significant errors. • Spacing of duplicate, standard, blank and laboratory repeat samples for Sheffield holes are designed to identify sample misplacement or misallocation during sample collection and laboratory analysis. • Analysis of field duplicate samples and laboratory repeats for Sheffield data, are sufficient to show the data has acceptable precision, indicating the sub-sampling and sample preparation techniques are appropriate for the deposit style and the Mineral Resource estimation procedure

Criteria	JORC Code explanation	Commentary
		and classification applied. **HM Assemblage Determination** • Heavy Mineral Concentrate (HMC) from individual samples is combined according to HM grade and weight into (nominal) >20 g composite samples for HM assemblage determination. • Weighed HMC composite is split via a micro-riffle to ensure HM%, SL% and OS% of the final composite sample can be correctly calculated. • HM assemblage determination was by QEMSCAN™ to determine the component mineralogy. This method has rigorous (laboratory) internal quality control measures, and this in comparison with visual observations of HM concentrate is considered sufficient to show the data has acceptable precision, indicating the sub-sampling and sample preparation techniques are appropriate for the deposit style and the Mineral Resource estimation procedure and classification applied.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	**HM%, SL% and OS% Determination** • Assay and laboratory procedures are industry standard, although method specifics and heavy liquid composition can vary. • Sheffield drillholes contributed 100% of the assay database. • SL% was determined using a 45 µm screen. • OS% was determined using a 1 mm screen. • HM% was determined using heavy liquid tetrabromoethane (TBE) (2.96 g/ml). • The method produces a total grade as weight per cent of the primary sample. • Method does not determine the relative amounts of valuable (saleable or marketable) and non-valuable heavy mineral species. See below for details of HM assemblage determination. • Reference blank material samples inserted at the drill site 1 each in every 40 samples (Sheffield). • The blank material used is commercially available builder's sand. • Reference blanks are examined for performance over time and within laboratory batches. Batches or sub-batches are re-analysed if unacceptable QAQC data are returned. • In total QAQC samples represent 10% of the total assay database. • Analysis of reference blanks and laboratory standards, repeats show the data to be of acceptable accuracy and precision for the Mineral Resource

Criteria	JORC Code explanation	Commentary
		estimation and classification applied. **HM Assemblage Determination** • HM assemblage was determined from Sheffield drillholes. • Heavy Mineral Concentrate (HMC) from individual samples are combined according to HM grade and weight into (nominal) >20 g composite samples for HM assemblage determination. • Weighed HMC is split via a micro-riffle to ensure HM%, SL% and OS% of the final homogenised composite sample can be correctly calculated. • HM assemblage determination was by the QEMSCAN™ process which uses observed mass and chemistry to classify particles according to their average chemistry, and then report mineral abundance by % mass. • For the TiO_2 minerals specific breakpoints are used to distinguish between rutile (>95% TiO_2), leucoxene (85-95% TiO_2) and ilmenite (<55-85% TiO_2). • Reference material is not used. Other measures of accuracy and the method design are considered sufficient to establish acceptable accuracy of the data for the Mineral Resource estimation and classification applied.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Sheffield data was logged electronically using "validation at point of entry" systems prior to storage in the Company's drillhole database, which is managed by Company personnel and an external consultancy. • Documentation related to data custody and validation is maintained by the Company. • A copy ("snapshot") of the Mineral Resource database is retained separately from the primary drillhole database. • All drillholes were included in the drill database. • The verification and treatment of the data is considered sufficient for the Mineral Resource estimation and classification applied.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• For the 58 Sheffield drillholes the collar locations were surveyed by Sheffield employees using a handheld Garmin GPS system with expected accuracy of +/- 5 m horizontal. • Easting and northing coordinate system is MGA Zone 50 (GDA94). Drillhole collar elevations for the Mineral Resource estimation were determined by projection of surveyed drillhole collars to a regional (Landgate) SRTM Digital Elevation Model (DEM). • The Mineral Resource estimate uses the

Criteria	JORC Code explanation	Commentary
		SRTM DEM model as surface topography. Elevation measurement by hand-held GPS units has poor accuracy and the DEM model provides consistent spatial topography over the project area. • The quality and accuracy of the topographic control is considered sufficient for the Mineral Resource estimation and classification applied
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• Drillholes are concentrated in E70/4190 (totalling 50 holes) and E70/4747 (totalling 8 holes) with a spacing of 450 mE by 450 mN up to 700 mE by 570 mN. When appropriate holes spacing was closed to confirm the geological constraints (down to 170 m) • The drill database used in the Mineral Resource estimate comprises 58 holes, totalling 1,707 m, with 1,138 samples assayed. Within E70/4190 there are 50 holes for 1,485 m (990 samples, 1 sample of which was not assayed) and within E70/4747 there are 8 holes for 222 m (148 samples). • Samples for HM assemblage determination are composited on intervals according to a combination of grade and geology appropriate to reflect the resource estimation domains. Samples have been composited from individual drillholes, or when not possible, are from proximal drillholes using intervals within the same geological and grade domains. • 8 composites from 21 drillholes were used to estimate the mineral assemblage of the Mineral Resource. • The data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource estimation and classification applied.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• All drilling is vertical making it normal to the horizontal orientation of geology and mineralisation.
Sample security	• *The measures taken to ensure sample security.*	• Sample security is not considered a significant risk given the location of the deposit and bulk-nature of mineralisation. Nevertheless, the use of recognised transport providers, sample dispatch procedures directly from the field to the laboratory, and the large number of samples are considered sufficient to

Criteria	JORC Code explanation	Commentary
		ensure appropriate sample security.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• All data has been validated by at least two Company geologists, and was reviewed by the Competent Person for the Mineral Resource estimate.

Section 2 Reporting of Exploration Results

(Criteria in this section apply to all succeeding sections)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The drillholes used for Mineral Resource definition are entirely within 100% Sheffield Resources held Exploration Licences • E70/4190 was granted on the 27/06/2012 and is due to expire on the 26/06/2022. E70/4747 was granted on the 27/10/2016 is due to expire on the 26/10/2021. Both of these tenements contain the Thomsons deposit. • E70/4190 and E70/4747 form part of Sheffield's Eneabba Project which is centred along the Brand Highway in the Midwest region of Western Australia. • There are no known or experienced impediments to obtaining a licence to operate in the area. • Sheffield has been operating successfully in the region for more than 6.5 years.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Sheffield carried out the initial exploration at the Thomsons prospect via soil sampling and aerial photograph assessment.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• Sheffield's Eneabba Project forms part of the Swan Coastal Plain bounded to the east by the Gingin Scarp within the Northern Perth Basin. The Gingin Scarp is a remnant feature of the marine incursion which resulted in the reworking of older rocks and ended in the deposition of heavy mineral sand enriched beach placers within Cainozoic sediments. Heavy mineral sand mining is prolific within the Swan Coastal Plain sediments. • The Thomsons deposit is in a newly interpreted heavy mineral trap site located to the north of Eneabba and to east of the Gingin Scarp and adjacent to westerly to south-westerly trending paleo-drainage. • Sheffield is exploring for Cainozoic heavy mineral sands associated with re-worked aeolian dunal occurrences that have stripped lighter material and enabled heavy mineral accumulations

Drillhole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drillholes:*
	  • easting and northing of the drillhole collar
	  • elevation or RL (elevation above sea level in metres) of the drillhole collar
	  • dip and azimuth of the hole
	  • down hole length and interception
		• Attached diagrams show the location of and distribution of drillholes in relation to the Mineral Resource.
		• Sheffield has previously reported deposit information including significant intersects and collar information for Thomsonss (ASX announcement 23 July 2015, Quarterly Report 30 September 2017).

Criteria	JORC Code explanation	Commentary
	depth • hole length.	
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.*	• Not applicable
Relationship between mineralisation widths and intercept lengths	• *If the geometry of the mineralisation with respect to the drillhole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	• Mineralisation and stratigraphy are assumed to be sub-horizontal, flat-lying and therefore vertical drillholes are approximate to true thickness.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• Plan included in report.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• All results have been reported.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• Sheffield has previously reported deposit information for the Thomsons deposit (ASX announcement dated 23 July 2015, Quarterly Report 30 September 2017). • Where relevant this information has been included or referred to elsewhere in this Table.
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).*	• Additional exploration work will be planned in the future.

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in section 2, also apply to this section)

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• Drillhole data was extracted directly from the Company's drillhole database which includes internal data validation protocols. • Validation of the exported data was confirmed using mining software (Micromine) validation protocols, and visually in plan and section views. • Compilation of data external to the drill database (e.g. HM assemblage source data) was cross-checked manually, and

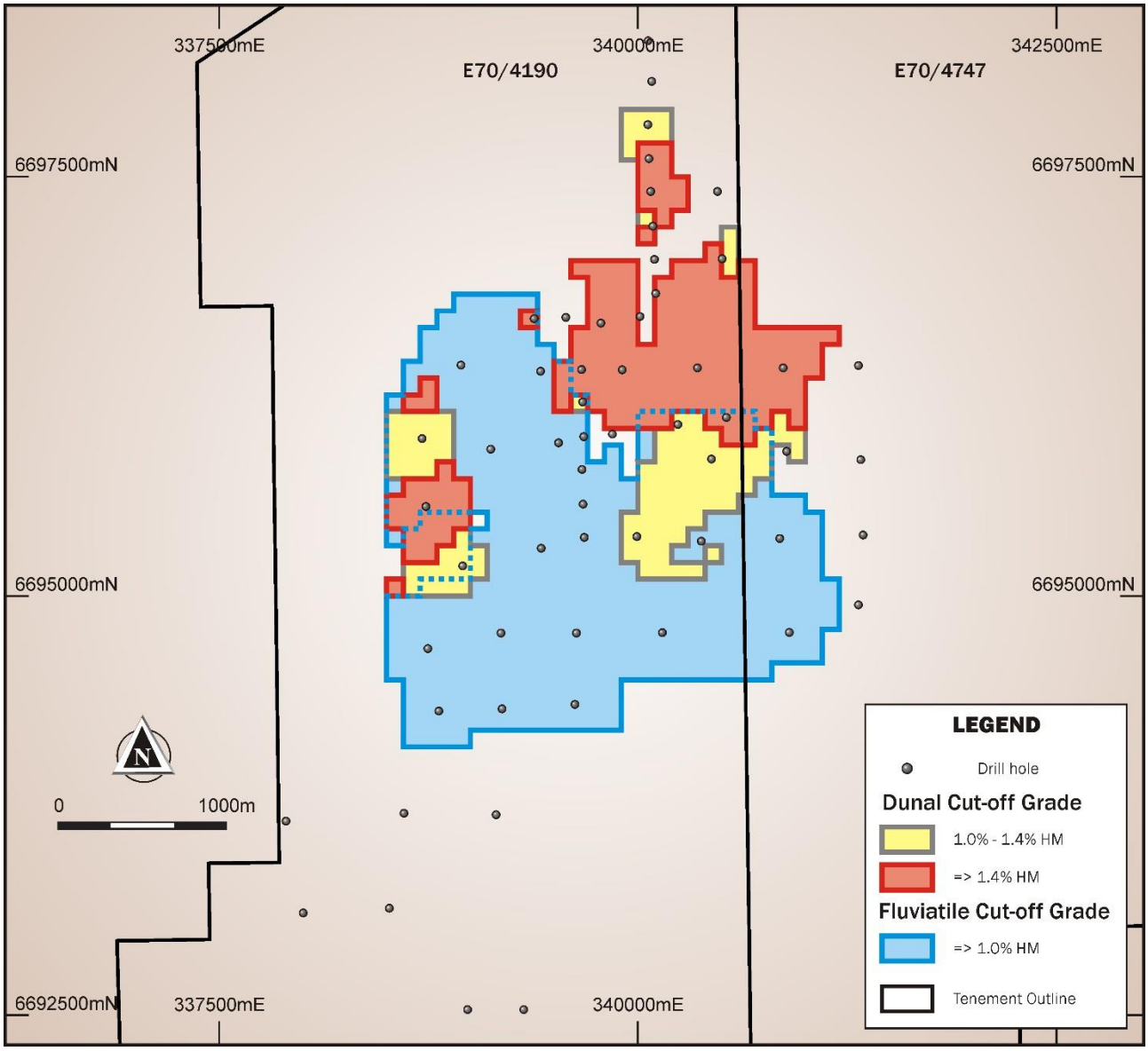
Criteria	JORC Code explanation	Commentary
		through statistical comparison. • A copy ("snapshot") of the Mineral Resource database is retained separately to the primary drillhole database. • Data was further validated by Optiro upon receipt, and prior to use in the estimation.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	• Mrs Standing has not visited the Thomsons site, but has visited mineral sands deposits within the Eneabba region and the primary assay laboratory.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• The mineralised horizon was interpreted on a cross-sectional basis by Sheffield using Micromine software based on the logging and grade information according to the deposit geology described above. • Microscope analysis was used to assess shape and composition of the heavy minerals. This identified a dunal sub-rounded geological domain and a fluviatile sub-angular geological domain. • The mineralised domains were defined using a threshold of ~0.9% HM within the dunal and fluviatile sediments. In addition, a slimes cut-off grade of approx. 34% was used to define an area of lower slimes contents within the fluviatile sediments for resource estimation.
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• Dunal mineralisation is interpreted over two regions. The main zone between 0.7 km and 1.1 km east-west by 1.6 km and a second smaller zone 0.4 km by 1.1 km to the west. • The dunal HM domain is up to 16.5 m thick and averages 6.8 m. • The fluviatile zone strikes discontinuously due to erosion. For resource estimation an area with lower slimes was defined which extends for 4 km east-west by 3.3 km north-south and from 13.5 m to 31.5 m below the surface. • The fluviatile HM domain is up to 22.5 m thick and averages 9.5 m. • Overburden thickness ranges from 0 m to about 7.5 m with an average of 2.1 m over the dunal mineralisation.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine*	• HM, slimes and oversize quantities were estimated using ordinary kriging (OK) into blocks of 100 mE by 100 mN by 3 mRL. Zircon, rutile, leucoxene, ilmenite and REE percentages were estimated using inverse distance (ID) cubed into the parent blocks. • Block dimensions were selected from kriging neighbourhood analysis and reflect the variability of the deposit and the model's practicality for future mine planning. Sub-cells to a minimum

Criteria	JORC Code explanation	Commentary
	production records and whether the Mineral Resource estimate takes appropriate account of such data. • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	dimension of 20 mE by 20 mN by 1 mRL were used to represent volume. For the definition of the topographical surface and soil horizon (of 20 cm) sub-celling was reduced to 10 mE by 10 mN by 0.2 mRL. • The nominal drill spacing is approximately 450 mE by 450mN with the margins of the deposit drilled at a spacing of 700 mE by 570 mN • A maximum extrapolation distance of 200 m was applied around the drillholes. • Data analysis and estimation was undertaken using Snowden Supervisor and Datamine software. • Drill samples were all taken over 1.5 m intervals and compositing was not required for estimation. • Wireframe interpretations of mineralisation were made by Sheffield based on geological logging and total heavy mineral (HM) content, using a threshold of ~0.9% HM to define the mineralised horizon within the dunal and fluviatile sediments. In addition, a slimes cut-off grade of approx. 34% was used to define an area of lower slimes contents within the fluviatile sediments for resource estimation. • Optiro assessed the robustness of this domain by critically examining the geological interpretation and by using a variety of measures, including statistical and geostatistical analysis. The mineralised domains are considered geologically robust in the context of the resource classification applied to the estimate. • All variables were estimated separately and independently. • Grade capping was applied to SL% and OS%. The top-cut levels were determined using a combination of top cut analysis tools, including grade histograms, log probability plots and the coefficient of variation. • Variogram analysis was undertaken to determine the kriging estimation parameters used for OK estimation of HM, slimes and oversize. • HM mineralisation continuity was interpreted from variogram analyses to have an along strike range of 680 m to 890 m and an across strike range of 365 m to 570 m • Three estimation passes were used for HM; the first search was based upon the variogram ranges; the second search was two times the initial search and the

Criteria	JORC Code explanation	Commentary
		third search was up to six times the initial search, with reduced sample numbers required for estimation. Approximately 23% of the HM block grades were estimated in the first pass, 46% in the second pass and 31% in the third pass. • The HM, slimes and oversize estimated block model grades were visually validated against the input drillhole data and comparisons were carried out against the declustered drillhole data and by northing, easting and elevation slices. • The VHM estimated block model grades were visually validated against the input drillhole data and comparisons were carried out against the drillhole data and by northing and easting slices.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• Tonnages are estimated on a dry basis.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• The Mineral Resource estimate for the Thomsons deposit has been reported above a cut-off grade of 1.4% HM (to represent the resource that may be extracted under current market conditions). The Mineral Resource is reported within tenements E70/4190 and E70/4747 • These parameters have been selected by Sheffield in consultation with Optiro based on current experience and preliminary economic assessments carried out by Sheffield for HM deposits elsewhere in Western Australia.
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous.*	• In determining the criteria for reasonable prospects for eventual economic extraction, potential mining methods considered are wet, dredge mining or dry dozer-trap operations, similar to those commonly and currently in use in HM mining operations both in Australia and globally. • The thickness, areal extent, and continuous nature of the mineralisation at Thomsons are such that non-selective bulk mining methods can be appropriately considered. • These assumptions were also considered when determining resource block sizes, and resource classification. • On the basis of these assumptions, the Company considers there are no mining factors which are likely to affect the assumption that the deposit has reasonable prospects for eventual economic extraction.

Criteria	JORC Code explanation	Commentary
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous.*	• Sheffield has not conducted mineral characterisation test work on samples from Thomsons. • To date, the Company considers there are no metallurgical factors which are likely to significantly affect the assumption that the deposit has reasonable prospects for eventual economic extraction.
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation.*	• There are no known environmental impediments to the project's viability from the currently available data.
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• No direct measurements of bulk density have been taken. • Bulk density is assumed from an industry-standard formula which accounts for the HM and slimes content of sand deposits. The resultant values are considered to be consistent with observations of the material compared with other similar HM deposits with known bulk density values. • A recommendation for future work is that confirmatory bulk density information is acquired.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• The estimate has been classified according to the guidelines of the JORC Code (2012), into Inferred Resources taking into account data quality, data density, geological continuity, grade continuity and confidence in estimation of heavy mineral content and mineral assemblage. In plan, polygons were used to define zones of different classification. • Inferred Resources are defined where the drill spacing is within 700 m.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• The Mineral Resource has been reviewed internally as part of normal validation processes by Optiro. • No external audit or review of the current Mineral Resource has been conducted.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which*	• The assigned classification of Inferred reflects the Competent Persons' assessment of the accuracy and confidence levels in the Mineral Resource estimate. • The estimate is suitable for input into long term planning studies. • No production has occurred from the

Criteria	JORC Code explanation	Commentary
	should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used. • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	deposit.



Plan of Thomsons Dunal Mineral Resource above 1.0% HM (yellow) cut-off grade, above a 1.4% HM (red) and Fluviatile Mineral Resource above 1.0% HM (blue)

Appendix 3: BFS Final Product Specifications
(refer to ASX announcement dated 12 October 2016 for further details)

Premium zircon

ZrO_2+HfO_2	TiO_2	Fe_2O_3	SiO_2	Al_2O_3	D_{50}
66.3%	0.14%	0.08%	32.5%	0.1%	59µm

- High grade 66.3% ZrO_2+HfO_2
- Low in key impurities iron and titanium
- Very low in aluminium impurities
- Good opacity, similar to other competing products

LTR Ilmenite

TiO_2	FeO	Fe_2O_3	FeO:Fe_2O_3	Cr_2O_3	CaO	MgO	D_{50}
56.1%	22.0%	18.5%	1.2	0.03%	0.01%	0.21%	67µm

- High titanium grade (56.1% TiO_2)
- Low in key contaminant Cr_2O_3
- Very low in alkalis CaO and MgO
- Consistent homogenous product
- LTR Ilmenite feedstock can produce high grade TiO_2 slag (88% TiO_2) and HPPI co-product
- Soluble in sulphuric acid, TiO_2 solubility > 95%
- Highly reactive (FeO:Fe_2O_3 of 1.2)

HiTi88

TiO_2	Fe_2O_3	Cr_2O_3	CaO	MgO	SiO_2	Al_2O_3	D_{50}
87.8%	2.9%	0.07%	0.04%	0.00%	3.4%	0.5%	71µm

- High titanium grade (87.8% TiO_2)
- Suitable for flux cored wire welding market or titanium sponge markets.
- Blended feedstock for processing via the chloride process.
- Low in key contaminants Cr_2O_3
- Very low in alkalis CaO and MgO

Zircon Concentrate

ZrO_2+HfO_2	TiO_2	Fe_2O_3	SiO_2	Al_2O_3	CeO_2	D_{50}
43.7%	20.1%	0.9%	23.3%	1.7%	0.2%	62µm

- Initially focussing on a ZrO_2 rich (~44%) concentrate for process upgrading by the customer.
- Target zirconium chemicals industry

Titanomagnetite

Fe	TiO_2	P	SiO_2	Al_2O_3	Cr_2O_3	MnO	D_{50}
56.2%	11.3%	0.05%	7.8%	0.9%	0.05%	0.20%	67µm

- Co-product produced as from magnetic separation post the LTR process
- Targeting steel feeds industry, protection against erosion of the blast furnace hear