HASTINGS
Technology Metals Limited

29th January 2019

RESERVES INCREASE BY 34% TO 10.35MT COVERING 10-YEARS OPERATION AT YANGIBANA PROJECT

- **Probable Ore Reserves increase 34% to 10.35 million tonnes at 1.22%TREO including 0.43%Nd_2O_3+Pr_6O_{11}**
- **Updated Ore Reserve extends mine life by 3 years, supporting a +10-year operational life for the Project**
- **Updated Ore Reserve increases project NPV to AUD516M confirming outstanding project economics**
- **Includes the first Ore Reserves from joint venture ground**

Introduction

The Directors of Hastings Technology Metals Limited (ASX:HAS) are pleased to announce a further increase in the Probable Ore Reserves at the Yangibana Project in the Gascoyne region of Western Australia. Total Probable Ore Reserves have increased to **10.35 million tonnes at 1.22%TREO including 0.43%Nd_2O_3+Pr_6O_{11}**, a 34% increase on the figures established in July 2018, as reported in the ASX release entitled "50% Increase In Ore Reserves At Yangibana Project to 7.74 Million Tonnes" dated 31st July 2018.

Probable Ore Reserves

Based on Pre-Feasibility level studies (PFS) information and recent geological, geotechnical, metallurgical and environmental work, independent consultants Snowden Mining Industry Consultants (Snowden) has completed an updated mining reserve estimate based on Measured and Indicated Mineral Resources at each of Bald Hill, Fraser's, Auer, Auer North, Yangibana, Yangibana West and Yangibana North deposits. This mining reserve estimate used Whittle pit optimisation software to maximise ore recovery using conventional drill and blast, load and haul mining methods.

Modifying Factors used to estimate the new Ore Reserves are provided in the Table 1 Section 4 of the JORC Code (2012) at the end of this announcement.

The bulk of the near surface mineralisation (at least to 100m vertical depth) is hosted by iron oxides and hydroxides termed ironstone, being the alteration products of the primary hosts ferro carbonatite and phoscorite intrusive veins. The main rare earths-bearing mineral

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is monazite which itself has locally undergone alteration at shallow depths (to 25m depth) to its hydrous equivalent rhabdophane and to rare earths-bearing Al-phosphates such as florencite.

The seven deposits considered in this new mining plan have different degrees of weathering with each of the deposits hosted by:

- An upper horizon comprising saprolite that does not require blasting,
- A transition zone of decreasing alteration that will require blasting, and
- Deeper, fresh granite that will require blasting.

The deposits occur in a range of dips as shown in Table 1, with Fraser's having the most extreme variation from 5° towards its north-eastern end to 65° at its south-western end.

Average true thickness varies from 2.2m to 3.5m throughout the Ore Reserve deposits although locally true thicknesses in excess of 20m occur.

Table 1 - Basic dimensions of the Yangibana deposits hosting Ore Reserves

Deposit	Declination (degs)	Ave true thickness (m)
Bald Hill	10 to 60	3.5
Fraser's	5 to 65	3.3
Auer	60 to 80	3.2
Auer North	65 to 85	3.5
Yangibana	30 to 65	2.2
Yangibana West	10 to 35	2.9
Yangibana North	5 to 20	3.2

Competent Person Statements

The information in this announcement that relates to Mineral Resources is based on information compiled by Lynn Widenbar. Mr. Widenbar is an independent consultant to the Company and a member of the Australasian Institute of Mining and Metallurgy (AusIMM). Mr Widenbar has sufficient experience relevant to the styles of mineralisation and types of deposits which are covered in this announcement and to the activity which they are 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"). Consents to include statements in this announcement have been provided in previous announcements entitled "Final 2017 JORC Resource Update Including Auer and Auer North Results" dated 22nd November 2017; "Yangibana Project Resources Now Exceed 20.5 Million Tonnes" dated 12th October 2017; "Another Major Increase In JORC Resources From Current Yangibana Drilling" dated 24th July 2017 and "Increase in Measured and Indicated Resources at Yangibana Project" dated 22nd November 2018.

The information in this announcement that relates to the Ore Reserves at Bald Hill, Fraser's, Auer, Auer North, Yangibana, Yangibana West and Yangibana North is based on information reviewed or work undertaken by Mr. Frank Blanchfield, Fellow of the Australasian Institute of Mining and Metallurgy, and an employee of Snowden Mining Industry Consultants. Mr.Blanchfield has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the preparation of mining studies to qualify as a Competent Person as defined by the JORC Code 2012. Mr. Blanchfield consents to the inclusion in this announcement of the matters based on his information in the form and context in which it appears.

The scientific and technical information in this announcement and that relates to process metallurgy is based on information reviewed by Ms. Narelle Marriott (Principal Engineer – Beneficiation) and Mr. Zhaobing (Robin) Zhang (Process Engineering Manager) of Hastings Technology Metals Limited. Both Ms. Marriott and Mr. Zhang are members of the AusIMM. Each has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined by the JORC Code 2012. Ms. Marriott and Mr. Zhang consent to the inclusion in this announcement of the matters based on their information in the form and context in which it appears.

Competent Persons Site Visits

Of the competent persons having input to the Probable Ore Reserve estimation, independent consultant Mr. Lynn Widenbar visited site in December 2016 to assess all deposits to assist his work on the resource estimations. Mr. Frank Blanchfield of Snowden Mining Industry Consultants (Snowden) visited site in December 2016 and October 2018 to assess potential mining and infrastructure sites. Snowden has undertaken all geotechnical work on site with various geoscientists providing input to the mining studies. Hastings employee Ms. Narelle Marriott, CP for beneficiation, visited site in August 2016. Mr. Robin Zhang, CP for hydrometallurgy, has not visited site.

Mineral Resources

The Probable Ore Reserves quoted in this document are derived from Measured and Indicated Resources as reported in the ASX announcement titled "Increase in Measured and Indicated Resources at Yangibana Project" dated 22nd November 2018. The current total Mineral Resources for the Yangibana Project that include the Probable Ore Reserves are as shown in Table 2.

Table 2 - Yangibana Project – Total JORC Mineral Resources October 2018

Category	Tonnes	%TREO	%Nd_2O_3+Pr_6O_{11}
Measured	4,727,000	1.17	0.42
Indicated	8,652,000	1.24	0.41
Inferred	8,294,000	1.09	0.36
TOTAL	21,673,000	1.17	0.39

These resources are located at twelve different deposits within the overall project area as shown in Figure 1.

Probable Ore Reserves have been derived from the Measured and Indicated Mineral Resources at Bald Hill (M09/157 and M09/162 – Table 3), Fraser's (M09/158 – Table 4), Auer (E09/1989 – Table 5), Auer North (E09/1989 and E09/2018 – Table 6), Yangibana (M09/165 – Table 7) and Yangibana West (M09/160 – Table 8) within tenements in which Hastings holds 100% interest, and from the eastern extension of Yangibana (M09/163 – Table 7) and Yangibana North (M09/159 – Table 9) in which Hastings holds a 70% interest.

Table 3 - Yangibana Project – Bald Hill JORC Mineral Resources October 2018

Category	Tonnes	%TREO	$\%Nd_2O_3+Pr_6O_{11}$
Measured	3,345,000	0.99	0.40
Indicated	1,419,000	1.05	0.41
Inferred	1,487,000	0.90	0.34
TOTAL	6,251,000	0.98	0.39

Table 4 - Yangibana Project – Fraser's JORC Mineral Resources October 2018

Category	Tonnes	%TREO	$\%Nd_2O_3+Pr_6O_{11}$
Measured	398,000	1.55	0.66
Indicated	407,000	1.53	0.65
Inferred	670,000	0.71	0.30
TOTAL	1,475,000	1.17	0.49

Table 5 - Yangibana Project – Auer JORC Mineral Resources October 2018

Category	Tonnes	%TREO	$\%Nd_2O_3+Pr_6O_{11}$
Indicated	1,004,000	1.09	0.39
Inferred	1,000,000	1.09	0.37
TOTAL	2,004,000	1.09	0.38

Table 6 - Yangibana Project – Auer North JORC Mineral Resources October 2018

Category	Tonnes	%TREO	$\%Nd_2O_3+Pr_6O_{11}$
Indicated	462,000	1.09	0.37
Inferred	220,000	0.92	0.29
TOTAL	682,000	1.03	0.35

Table 7 - Yangibana Project – Yangibana JORC Mineral Resources October 2018

Category	Tonnes	%TREO	$\%Nd_2O_3+Pr_6O_{11}$
Indicated	1,318,000	0.86	0.41
Inferred	851,000	0.81	0.39
TOTAL	2,169,000	0.84	0.40

Of the total resources at Yangibana, 1,900,000 tonnes are within Mining Lease 09/165 held 100% by Hastings and 269,000 tonnes are within Mining Lease 09/163 in which Hastings holds a 70% interest.

Table 8 - Yangibana Project – Yangibana West JORC Mineral Resources October 2018

Category	Tonnes	%TREO	$\%Nd_2O_3+Pr_6O_{11}$
Measured	114,000	1.58	0.45
Indicated	1,665,000	1.24	0.34
Inferred	758,000	1.34	0.35
TOTAL	2,536,000	1.29	0.35

Yangibana West lies within Mining Lease 09/160 held 100% by Hastings. The mineralisation is continuous and extends into Mining Lease 09/159, in which Hastings holds a 70% interest, as Yangibana North.

Table 9 - Yangibana Project – Yangibana North JORC Mineral Resources October 2018

Category	Tonnes	%TREO	$\%Nd_2O_3+Pr_6O_{11}$
Measured	871,000	1.64	0.43
Indicated	1,924,000	1.84	0.47
Inferred	632,000	1.85	0.47
TOTAL	3,427,000	1.79	0.46

JORC Mineral Resources at Simon's Find are shown in Table 10. These resources are located within Mining Lease 09/158 and Exploration Licence 09/1943, both held 100% by Hastings.

Table 10 - Yangibana Project – Simon's Find JORC Mineral Resources October 2018

Category	Tonnes	%TREO	$\%Nd_2O_3+Pr_6O_{11}$
Indicated	454,000	0.64	0.35
Inferred	855,000	0.67	0.35
TOTAL	1,309,000	0.66	0.35

JORC Inferred Mineral Resources at Gossan, Lion's Ear, Hook and Kane's Gossan are shown in Table 11. These deposits are all within Mining Lease 09/159 in which Hastings holds a 70% interest.

Table 11 - Yangibana Project – Gossan, Lion's Ear, Hook and Kane's Gossan JORC Inferred Resources October 2018

Inferred	Tonnes	%TREO	$\%Nd_2O_3+Pr_6O_{11}$
Gossan	289,000	1.52	0.33
Lion's Ear	710,000	1.54	0.39
Hook	289,000	1.52	0.33
Kane's Gossan	574,000	1.04	0.29

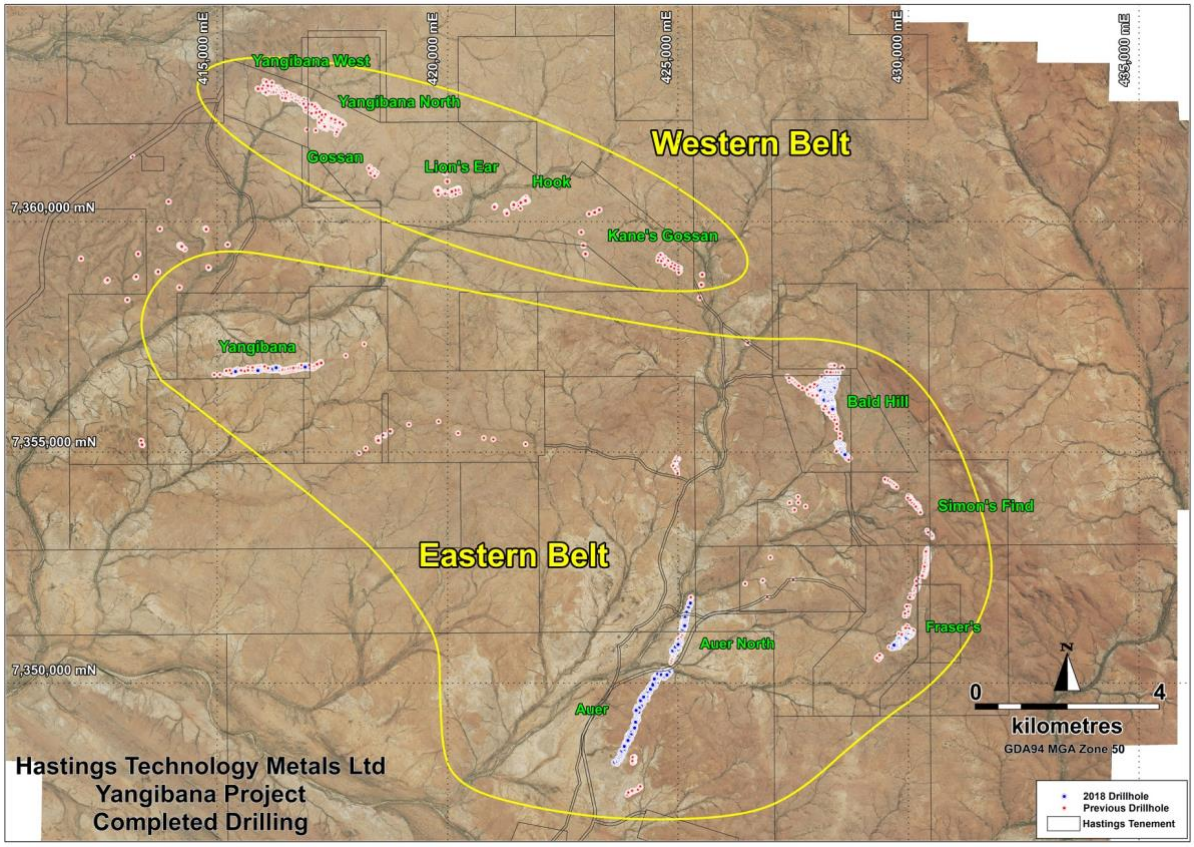

Figure 1 - Yangibana Project **– Location of the Deposits Hosting JORC Resources**

As indicated previously, the Mineral Resources are reported inclusive of the Probable Ore Reserves.

Study Background

The 650 sq km Yangibana Tenements comprise a number of ore deposits that have now been upgraded to Ore Reserve status, plus numerous prospects that have received little evaluation to date and others that are yet to be tested. Of the deposits with Ore Reserves, Bald Hill, Fraser's, Auer, Auer North, Yangibana, and Yangibana West are within tenements 100% owned by Hastings, while Yangibana North and the eastern extremity of Yangibana are within tenements in which Hastings holds a controlling 70% interest.

A Definitive Feasibility Study (DFS) completed in November 2017 detailed the Project, which will produce a Mixed Rare Earth Carbonate (MREC) rich in Neodymium (Nd) and Praseodymium (Pr), critical materials used in the manufacture of permanent magnets. The DFS produced a maiden Ore Reserve for the Bald Hill and Fraser's deposits (both 100% Hastings), which underpinned the first 5 years of mine life.

Ore Reserves from Auer, Auer North, Yangibana and Yangibana West (all 100% Hastings) were incorporated in July 2018 following completion of the required geotechnical investigations, mine design and mining cost estimates to a PFS level.

The January 2019 Probable Ore Reserves are based on the results of the November 2018 updated measured and indicated resource announcement.

Additional Ore Reserves from Auer and Auer North (Hastings 100% interest) plus those from the Yangibana North deposit (Hastings 70% interest) have been added to the Ore Reserve base.

Each of the studies has evaluated the development of the mine, process plant (incorporating beneficiation and hydrometallurgy) and supporting infrastructure. The Project is designed to treat 1 Million tonnes per annum (tpa) of ore with a processing plant that can produce up to 15,000t of Mixed Rare Earths Carbonate (MREC) per annum. The current Ore Reserves of 10.35 Million tonnes support a mine life of +10 years.

Since acquiring an interest in the Project in 2012, Hastings has completed exploration programmes including:

- Mapping,
- Rock chip sampling,
- Hyperspectral survey and interpretation,
- Topographic and aerial photo surveys, and
- Aeromagnetic and radiometric survey and interpretation.

Eight phases of drilling including reverse circulation and diamond drilling have been completed by Hastings with more than 1,500 holes for 80,000m completed to date with coverage shown in Figure 1.

Figure 1 also shows the split between the Western and Eastern Belts. There is a significant difference in the mineralogy between these belts, with the Western Belt hosting higher Total Rare Earths Oxide (TREO) grades but with a lower proportional content of neodymium plus praseodymium compared to the Eastern Belt. As a consequence, MREC produced from the Western Belt is of lower value than that produced from the Eastern Belt.

Each phase of drilling has increased JORC resources of the various deposits and provided samples for metallurgical test work.

The Company has completed extensive DFS testwork to define the metallurgy for the Yangibana Project, culminating in pilot plant tests on a composite sample of material from Bald Hill and Fraser's. This testwork has defined a process route entailing crushing, grinding, flotation, acid bake with water leach and precipitation of a Mixed Rare Earths Carbonate. Further PFS-level metallurgical testwork has established that the ore from each of Auer, Auer North, and Yangibana plus the shallower, low-siderite-bearing ore from Yangibana West and Yangibana North is compatible with this processing route.

Approximately 1 million tonnes per annum of ore will be brought to the Run Of Mine (ROM) pad where the process flowsheet begins. Figure 2 provides a schematic of the overall Project layout including pits, roads and processing plant sites.

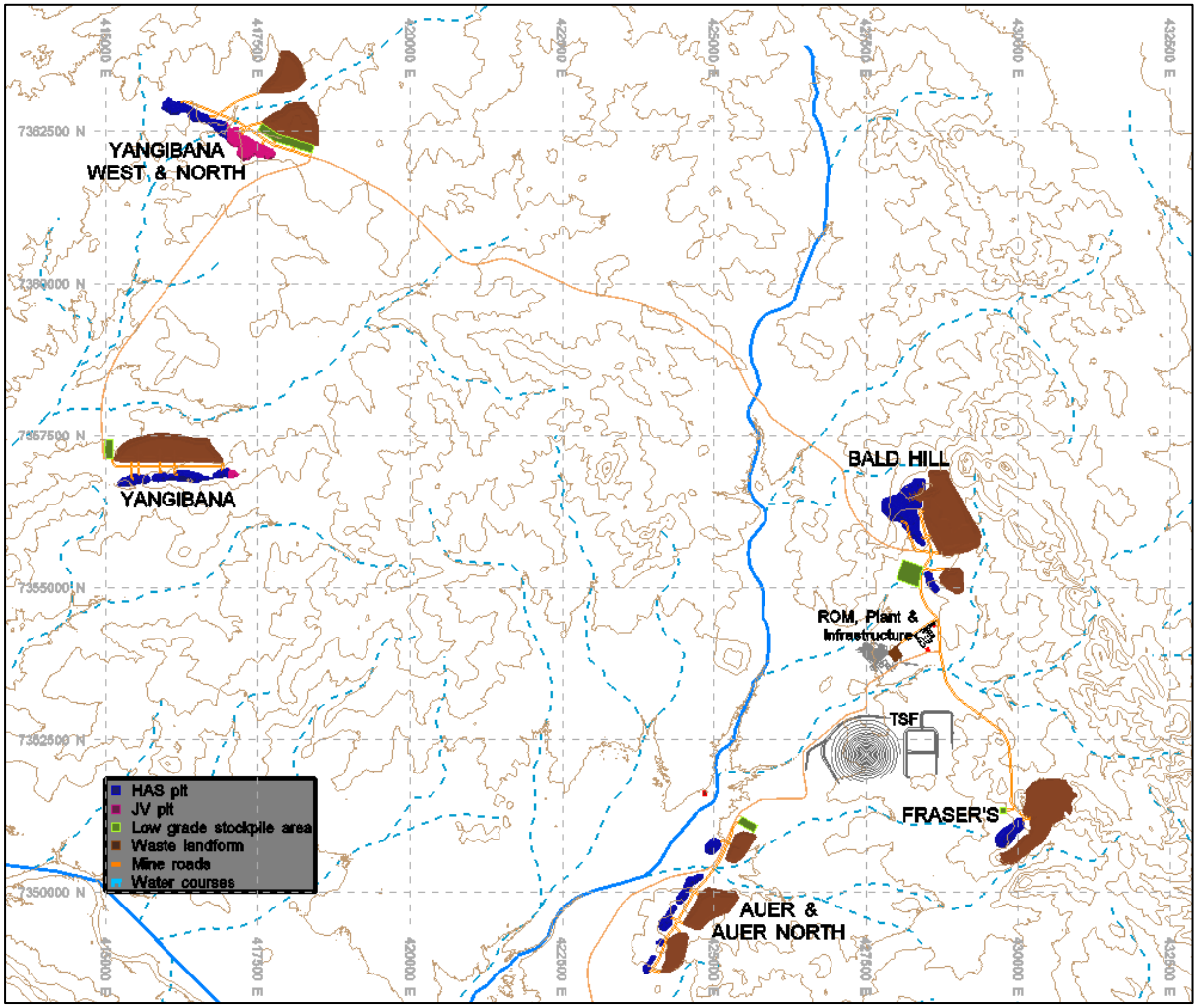

Figure 2 - Yangibana Project Layout Plan

Early stages of the processing of the ore comprise comminution and beneficiation. The resulting beneficiated concentrate is upgraded by 20 times from the ROM ore, as demonstrated through the DFS, to a 25% TREO concentrate. This concentrate is further processed on site through a hydrometallurgical process that involves acid bake, water leaching, impurity removal and precipitation to produce up to 15,000 tpa of MREC. The MREC will contain 8,850 tpa Total Rare Earths Oxides, of which up to 3,400 tpa will be neodymium oxide (Nd_2O_3) + praseodymium oxide (Pr_6O_{11}).

The scope of work required for environmental approvals has been substantially completed and the Project is progressing through a Public Environmental Review (PER) level of assessment by both the State and Commonwealth Governments. Auer and Yangibana deposits will require additional approval. Pit dewatering studies are still required to meet the State approval submission requirements. All other environmental considerations in the PFS have been addressed and demonstrated that there are no significant environmental issues that would preclude a future approval being issued by State and Commonwealth Governments.

Cut-Off Parameters

A cut-off grade of 0.2% Nd_2O_3+Pr_6O_{11} has been used to interpret the mineralisation of potential economic interest as neodymium (Nd) and praseodymium (Pr) are the most important sources of potential revenue from the project. The cut-off coincides generally with the visual geology of the deposits, with target minerals being hosted predominantly by ironstone, and to a much lesser extent by phoscorite or carbonate. A 0.5m "skin" of waste material on both the footwall and hangingwall has been added to the interpreted mineralisation during the resource estimation process to account for dilution during the mining process. This dilution averages approximately 30% over the total resources.

The cut-off grade for the project was determined based on calculating revenue from recovered metal and selling and processing costs on a block-by-block (diluted) basis (parameters are below). Blocks with revenue greater than the sum of the processing and selling costs (approximately A$90/t ore) were considered to be above the cut-off for processing.

Mining Factors

Mining Recovery and Dilution

The ironstone unit that hosts the bulk of the rare earths is visually distinct from the host rock providing good visual control for ore identification. RC grade control drilling will be carried out prior to mining to clearly delineate the mining boundaries of the blocks containing economic rare earths against blocks containing uneconomic waste material.

Blasting and mining near and in the ore zones is planned to minimise dilution and allow removal of the hanging-wall waste to expose and selectively mine the ore. Due to the high value of the ore, a high ore recovery is the focus of mining. As such, a 0.5m skin of waste material (dilution) was added to the ore zones on both the hangingwall and footwall sides to enable a 98% ore recovery assumption. This dilution was incorporated in the estimation of resources at each deposit.

Based on geotechnical studies pit optimisations incorporated a conservative 28^o overall wall angle in the saprolite, and 35-40^o to weathered and fresh granite. A 2% ore loss was also applied to each deposit.

Ground Water

Ground water at all deposits sits at approximately 45m below the natural surface level. Pits will be dewatered ahead of mining using bores or by in-pit pumping from sumps to dedicated temporary storage facilities at the pit edge. Stormwater will be managed in-pit using sumps pumped externally to the pit.

Waste Material

Waste from each pit is stored in adjacent waste dumps. Some of the Bald Hill pit is backfilled to minimise haulage distances. Ore is transferred either directly to the Run-Of-Mine (ROM)

pad or to low-grade stockpiles by mining trucks. For pits remote from the plant the long hauls are achieved by road trains.

Optimisation Parameters

Pit optimisations were completed using the Whittle optimisation software to determine the economic mining limits for each deposit. Only Measured and Indicated Resources as reported in the ASX release titled "Increase In Measured and Indicated Resources at Yangibana Project" dated 22nd November 2018 were considered for processing.

Pits were then designed in stages to enable the required ore tonnages and grades and waste volumes to be optimised based on plant requirements.

Pit optimisation studies and designs have defined the total Probable Ore Reserves for the Yangibana Project as shown in Table 12. (Note that rounding discrepancies may appear in the following tables.)

Table 12 - Yangibana Project - Probable Ore Reserves December 2018

Deposit	Tonnes	%TREO	%$Nd_2O_3+Pr_6O_{11}$	$Nd_2O_3+Pr_6O_{11}$ as a % of TREO
Bald Hill	4,405,000	1.02	0.41	40
Fraser's	638,000	1.61	0.68	42
Auer	728,000	1.12	0.41	37
Auer North	148,000	1.24	0.47	38
Yangibana	986,000	0.93	0.44	47
Yangibana West	1,478,000	1.23	0.34	28
Yangibana North	1,964,000	1.72	0.44	26
TOTAL	**10,345,000**	**1.22**	**0.43**	35

Probable Ore Reserves within tenements held 100% by Hastings are shown in Table 13 with those within tenements in which Hastings holds a 70% interest being shown in Table 14.

Table 13 - Yangibana Project - Probable Ore Reserves Within Tenements Held 100% by Hastings, December 2018

Deposit	Tonnes	%TREO	%$Nd_2O_3+Pr_6O_{11}$	$Nd_2O_3+Pr_6O_{11}$ as a % of TREO
Bald Hill	4,405,000	1.02	0.41	40
Fraser's	638,000	1.61	0.68	42
Auer	728,000	1.12	0.41	37
Auer North	148,000	1.24	0.47	38
Yangibana	876,000	0.97	0.46	47
Yangibana West	1,478,000	1.23	0.34	28
TOTAL	**8,273,000**	**1.11**	**0.42**	

Table 14 - Yangibana Project - Probable Ore Reserves Within Tenements Held 70% by Hastings, December 2018

Deposit	Tonnes	%TREO	%Nd_2O_3+Pr_6O_{11}	Nd_2O_3+Pr_6O_{11} as a percent of TREO
Yangibana	110,000	0.60	0.28	47
Yangibana North	1,964,000	1.72	0.44	26
TOTAL	**2,074,000**	**1.66**	**0.43**	

Table 13 represents the Eastern Belt Ore Reserves (Hastings 100%) and the grades of Nd_2O_3+Pr_6O_{11} and TREO. The fraction of Nd_2O_3+Pr_6O_{11} calculated as a percentage of TREO is also displayed. Table 14 represents the Western Belt Ore Reserves (Hastings 70%, JV 30%) and the grades of Nd_2O_3+Pr_6O_{11} and TREO. The fraction of Nd_2O_3+Pr_6O_{11} calculated as a percentage of TREO is also displayed.

Metallurgical Factors and Assumptions

A DFS was completed in November 2017 based on the Bald Hill and Fraser's deposits and this is now progressing through detailed design. The metallurgical flowsheet developed from that study has been used as the basis for PFS-level assessments of the satellite deposits. The metallurgical performance of samples from each satellite deposit has been assessed through standard bench-scale flowsheets, with the results of the testwork, as well as impacts on operating costs being used for the prefeasibility-level study on each satellite deposit.

Process and Flowsheet

The metallurgical process comprises ore beneficiation followed by hydrometallurgical (hydromet) extraction to produce a valuable Mixed Rare Earths Carbonate (MREC) product. The beneficiation of ore includes crushing, grinding, rougher flotation, regrinding and cleaner flotation.

The hydromet processes include acid bake, water leach, impurity removal and MREC product precipitation.

The simple and effective metallurgical process flowsheet developed with the best known available technology and industrial practice by the Hastings Technical Team, has been well tested in both laboratory scale and pilot scale during the Bald Hill and Fraser's DFS. The unit processes selected for inclusion in the beneficiation and hydromet flowsheet are based on known technologies, both in rare earths (RE) industries and other mining applications.

Ore Feed Chemistry Tolerances

Assessment of satellite deposit mineralogy has shown the main RE-bearing mineral in the ore is monazite, which is consistent with the DFS ore sources. The main gangue minerals are iron oxides and hydroxides, biotite and apatite. Iron carbonate (siderite) has been identified at depth in Yangibana West and Yangibana North. The siderite boundary has been mapped and higher siderite-bearing ores have been excluded from the planned mill feed ore.

The ratio of RE elements contained in the monazite differs from that of Bald Hill and Fraser's. This is reflected in the financial analysis but has no impact on the performance of the beneficiation flowsheet. Compared to DFS ore source concentrate, there may be some variation on concentrate mineralogy. This can be managed in the hydromet circuit through varying process conditions.

Testwork

Pilot plant campaigns for both the beneficiation flowsheet and the hydromet flowsheet have proved the circuits can be run on a continuous basis and that the selected unit processes are able to selectively concentrate the RE-bearing mineral monazite and remove or control the major product impurities of manganese, iron, thorium and uranium within acceptable product ranges. Over 50 kg of high-purity MREC produced from the pilot plant was sent to 11 customers for evaluation. The product quality is acceptable to separation plant operators.

Bench-scale testwork for the satellite deposits was mostly carried out in 2017 and 2018 at a number of commercial laboratories in Australia. Beneficiation testwork has been completed at KYSPY Met and ALS Metallurgy. Hydromet testwork has been completed at SGS Minerals Metallurgy and ANSTO.

Assessment of metallurgical processing performance of all satellite deposits was based on batch testwork, using the standard DFS comminution and flotation flowsheet, and comparison against the performance achieved with DFS ore sources. A standard acid bake and water leach test was completed for assessment of the hydromet performance. Liquor chemistry post-water leach was used to compare against DFS ore sources. A dedicated programme to understand the impact on the precipitation circuit performance from varying levels of Mn in the leach liquor was also undertaken.

Assessment of comminution requirements was undertaken on samples from each satellite deposit using a standard suite of comminution tests including SMC, Bond Ball Mill work index, Bond Crusher work index, and abrasion index. All results indicate that the satellite deposits are suitable for processing through the comminution circuit as designed in the DFS.

Detailed mineralogy and variability testwork has been carried out on multiple samples from each satellite deposit.

The metallurgical recovery for the additional production targets is 88.5% through the beneficiation circuit and 86.1% through the hydrometallurgy circuit, giving an overall metallurgical recovery of 76.2%.

Environmental Factors

Ongoing environmental studies include data from the 2014 Pre-Feasibility Study (PFS), but has been updated to reflect work carried out on the satellite deposits:

- Baseline flora and fauna: Flora and fauna surveys have been conducted over 55,650 ha of tenements. No significant impact will occur to conservation significant terrestrial

flora or fauna. Subterranean fauna sampling has been completed at Yangibana West and is currently underway in the Auer, Auer North and Yangibana areas.

- Baseline ground and surface water: A hydrology study has determined that mining and the majority of infrastructure falls outside flood impact zones. Water from fractured rock aquifers will meet approximately 20% of the project's water demands. The remaining 80% of water demands will be sourced from the paleochannel bore field. A pit dewatering assessment and post-closure pit lake modelling has been completed for Yangibana West and is planned to be undertaken for Auer, Auer North and Yangibana pit areas.
- Baseline soil and radiation: Topsoil analysis was conducted and mapped over all but the Yangibana area, which is planned. Baseline radiation surveys and radiation waste characterisation studies have determined that naturally occurring radioactive materials (NORM) are associated with the orebody. Additional radiation surveys are required over Auer, Auer North and Yangibana.
- Waste rock geochemical characterisation: Yangibana West pit lithologies have been characterised geochemically and classify as benign and non-acid forming. The mineralogy of the project is not associated with asbestiform minerals. Erodibility parameters were determined for waste rock and topsoil, and inform the waste rock landforms' design for Yangibana West. Waste rock geochemical characterisation for Auer, Auer North and Yangibana are initiated.
- Baseline air quality: A baseline air quality assessment and greenhouse gas emissions assessment have been completed. A radiation impact assessment has determined that dust containing NORM will not pose a risk to the surrounding environment.
- Cultural heritage: No impacts to known significant heritage sites will occur as a result of implementing the project. Heritage surveys are currently underway for waste rock landform areas.
- Closure: A landform evolution study has identified landform design specifications that aim to ensure site landforms will maintain their integrity for 1,000 years post-closure. A landform evolution study will be revised if waste rock characterisation studies' findings in Auer, Auer North and Yangibana differ from those of the DFS ore sources.
- The closure plan will be updated subject to outcomes of ongoing studies.
- Permits required and status of permits: A formal environmental impact assessment is currently set at a Public Environmental Review (PER) level of assessment by both the State and Commonwealth Governments of the DFS ore sources and Yangibana West. The PER documentation is currently being assessed. Referral for Auer, Auer North and Yangibana will occur under the *Environmental Protection Act (WA 1986)*.

Market Assessment

The Yangibana project will produce a mixed rare earths carbonate (MREC) that has a high neodymium (Nd) and praseodymium (Pr) content (averaging 35% with a maximum of 41% of TREO content) as the predominant value elements. It is estimated that Pr_6O_{11}, Nd_2O_3, Tb_4O_7

and Dy_2O_3 will contribute between 85% and 90% of the economic value per kilogram of production.

- With Nd_2O_3 and Pr_6O_{11} oxides, substantial supply shortages and rapid demand growth are anticipated in the decade of the 2020s.
- Adamas Intelligence* supplied non-disclosable price forecasts for RE oxides in November 2018 covering the period 2018 to 2025.
- The plant has a design capacity of 15,000 t of MREC per annum.
- The MREC, when further processed and separated, results in TREO of 8,500t per annum.

Hastings has previously announced that four offtake MOUs have been entered into with customers covering approximately 11,000 t of the planned annual MREC production volume, The MREC product price is based on the average of last 3 months separated oxide prices referenced to Asian Metals published prices. Of these four MOU's, one has progressed to the signing of an offtake contract with Sky Rock Rare Earth New Materials Co Ltd, as announced on the 29th November 2018.

*Adamas Intelligence is an independent research and advisory service group that provides data-backed insight, analysis and forecasting in select emerging areas such as the rare earths industry. The company monitors key industry and market developments to support its price forecasting.

Social

Hastings is implementing a Stakeholder Engagement Plan. The overall response to the project has been very positive. A Land Access Agreement has been negotiated and ratified with the pastoral lessee. A Native Title Agreement has been negotiated and ratified with the Native Title claimants as reported in the ASX announcement titled "Hastings Signs Native Title Agreement with Thiin-Mah Warriyangha, Tharrkari and Jiwarli People" dated 14th November 2017.

The workforce will be recruited from the region, and where this is not possible, more broadly with most plant operations specialists sourced from Perth.

Hastings is currently developing systems and processes to ensure it maintains its social licence to operate, to ensure its workforce are competent in their respective roles and have a culture of safety and compliance.

Infrastructure

The Yangibana project is located approximately 200 km north of Gascoyne Junction in the Upper Gascoyne region. The process plant is located on a greenfield site and all supporting infrastructure must be constructed. The proposed infrastructure for the project will include:

- Comminution plant
- Beneficiation plant
- Hydrometallurgy plant

- Access and site roads
- Water supply borefield
- Tailings storage facility (TSF) and evaporation plant
- Mining buildings
- Fuel storage
- Security and fencing
- Borefield
- Employee housing and transportation
- Water treatment and mine site sewage
- Data and communications infrastructure
- LNG fuelled power station.

As of December 2018, early site works include the construction of the water supply bore and pipeline, the 240-room accommodation village and the access road from the Cobra–Gifford Creek Road to the plant site. Of the above, construction has started on the bore and pipeline and off-site fabrication of the accommodation village buildings has commenced with the first deliveries to site. Designs have been completed for the site access road. Additionally, for the longest lead item, the kiln, an order has been placed with FLSmidth.

Cost Assumptions

The key Ore Reserve parameters developed from the current evaluation are shown in Table 15 below.

Table 15 - Yangibana Project – PFS Ore Reserve Parameters

Pre-Feasibility Study Parameters	**Parameter**
Status of JORC Resources used for financial evaluation	Measured and Indicated
Mining Method	Open Pits
Mining Dilution – 0.5m skin on HW and FW incorporated in resource estimation	variable
Mining Recovery	98%
Processing Route	Flotation, Acid Bake – Water Leach and MREC Precipitation
Overall Processing Recovery (TREO) – Ore to MREC	76.2%
Maximum Target Production Rate (Mixed Rare Earths Carbonate)	15,000 tpa
Maximum Target Contained Nd_2O_3+Pr_6O_{11}	3,400 tpa
Pre-Production Capital Costs*	A$335.12m
Production Capital Costs	A$21.37
Operating Costs*	A$17.71/kgTREO
Basket Value of MREC product (inc separation costs)	US$28.38/kgTREO
Exchange Rate US$:A$	0.71
Discount Rate	8%

*Based on 2017 DFS.

This financial evaluation evaluates the production targets based on all deposits incorporated in the mine plan that established Probable Ore Reserve of 10.35 million tonnes.

A summary of the Mineral Resources of the deposits included in this evaluation and their utilisation as Probable Reserves in the financial evaluation is provided in Table 16.

Table 16 - Yangibana Project – Current Resources to Ore Reserves

Deposit	**Mineral Resources (t)**				**Ore Reserves(t)**
	Measured	Indicated	Inferred	Total	Probable Ore Reserves
Bald Hill (100%)	3,345,000	1,419,000	1,487,000	6,251,000	4,405,000
Fraser's (100%)	398,000	407,000	255,000	1,060,000	638,000
Auer (100%)		1,004,000	1,000,000	2,004,000	728,000
Auer North (100%)		462,000	220,000	682,000	148,000
Yangibana (100%)		1,184,000	716,000	1,900,000	876,000
Yangibana West (100%)	114,000	1,665,000	758,000	2,536,000	1,478,000
Yangibana (70%)		134,000	135,000	269,000	110,000
Yangibana North (70%)	871,000	1,924,000	632,000	3,427,000	1,964,000
Total	4,728,000	8,196,000	5,203,000	18,129,000	10,345,000

Resources shown in this table do not represent the total Mineral Resources and are inclusive of Ore Reserves. Deposits not used in the economic evaluation have been excluded from Mineral Resources in this table. Rounding errors may appear.

Revenue Factors

The PFS financial model assumes an average long-term US$/A$ exchange rate of 0.71 and uses Adamas Intelligence price forecasts for rare earths prices in 2021. Financial evaluation of the Probable Ore Reserves in the PFS results in the economic outcome shown in Table 17.

Table 17 - Yangibana Project – PFS Financial Evaluation Results

Operating Life	12 years
Net Present Value (NPV)	A$516 M
Internal Rate of Return (IRR)	32.0%
Payback Period	2.7 years

The economic model assumes Mojito Resources will participate in the development of the deposits held by Hastings (70%) in joint venture with Mojito Resources (30%) under the 'Yangibana Joint Venture Agreement'. As set out in Table 16, the specific deposits to which the joint venture applies are Yangibana and Yangibana North. If there is a mine development by the joint venture, not only will there need to be a Mining Joint Venture Agreement agreed and put in place to replace the existing joint venture documentation and regulate the

arrangements between the participants for the mine development, but arrangements will also need to be established to determine how the Yangibana production and tenements the subject of the joint venture fit with the broader 100% Hastings group owned production and tenements. No costs or revenue ascribed to the 30% interest in the deposits held by Mojito Resources are reported in the financial modelling. If Mojito Resources did not participate in any development of the joint venture deposits and the development of those deposits was to proceed on a 100% basis by Hastings, then the economic model would need to be updated to allocate those costs and revenues to Hastings.

Production Targets

The current Ore Reserve Statement has ore reserve estimates resulting from the design of several open pits that will produce MREC over the current life of the project.

In this Ore Reserve Statement;

- Probable Ore Reserves are derived from Measured and Indicated Mineral Resources.
- No Inferred Mineral Resources are included in the Ore Reserves.

The Ore Reserves classifications are considered appropriate because;

- All the pits are well drilled and geologically understood.
- Extensive metallurgical test work and the results of two phases of pilot plant testwork support the estimation.

Capital and Operating costs are derived by independent third-party industry recognised specialists. The current Capex of $335M remains unchanged from the previous 2017 DFS.

Operating costs reflect the mining and infrastructure setup costs of all pits within the mining schedule. Processing operating costs remain unchanged from the previous 2017 DFS study.

Additionally, over the life of the project a $17M allowance has been made in the operating cost for miscellaneous mining items for all the open pits within the mining schedule, including;

- Clearing and grubbing;
- Topsoil to stockpiles;
- Haul Road formation;
- Haul Road earthworks cut and fill
- Culvert construction
- Construction of settling ponds; and
- Construction of drainage ponds.

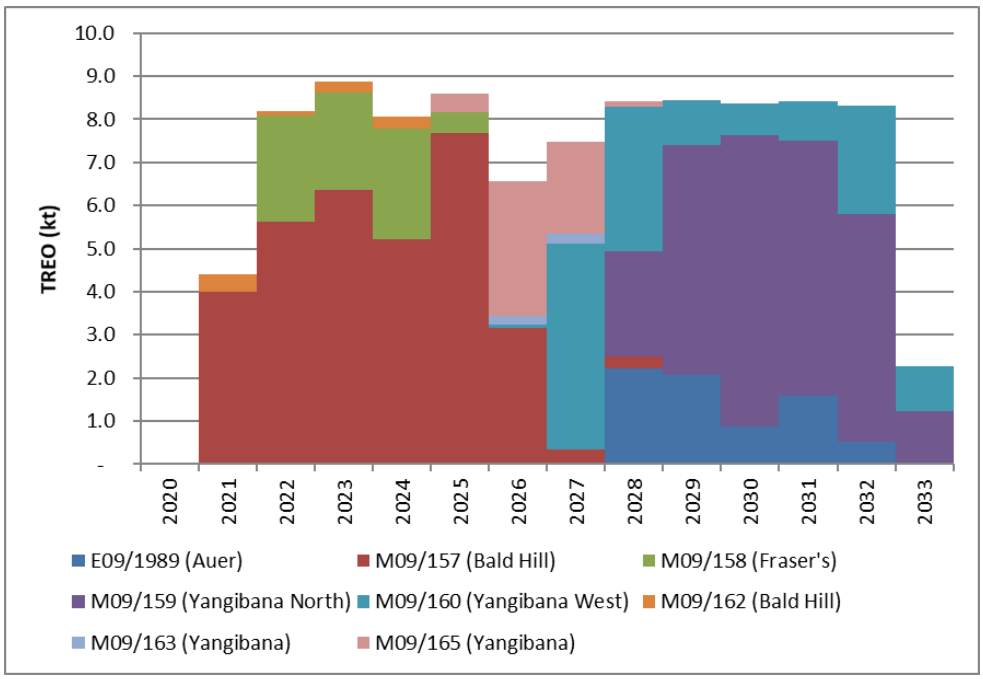

Figure 3 - Yangibana Project Annualised TREO Production Targets

Current production targets on an annualised basis are listed in Figure 3 above to produce up to 15,000 tpa of MREC. The MREC will contain up to 8,850 tpa Total Rare Earths Oxides, of which up to 3,400 tpa will be neodymium oxide (Nd_2O_3) + praseodymium oxide (Pr_6O_{11}).

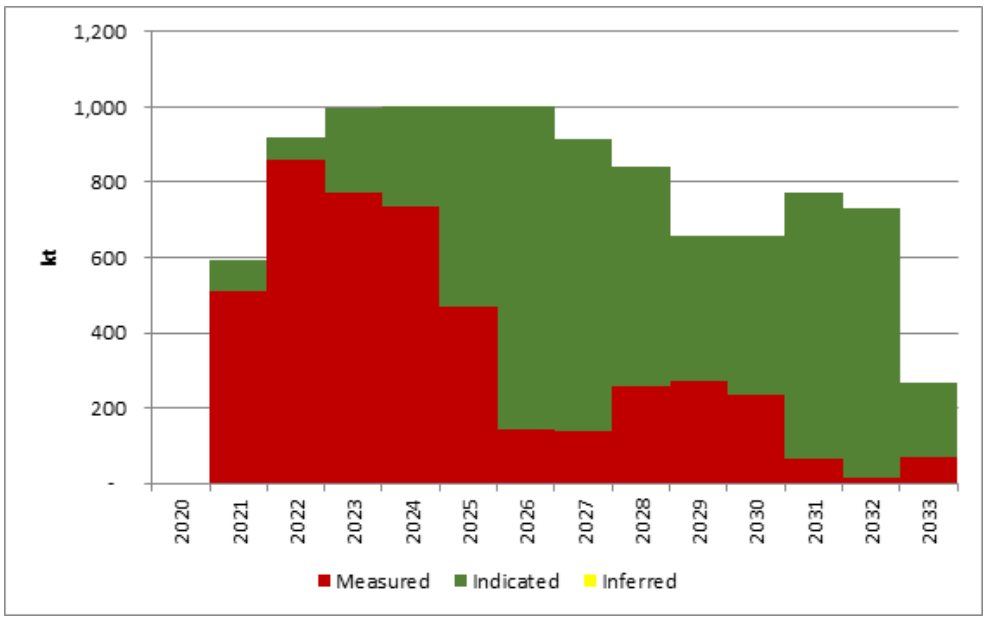

Figure 4 - Yangibana Project Mining of Resource Categories

Figure 4 shows the various resource category tonnages to be mined on an annualised basis. Over the life of the project, it is anticipated that approximately 4.54Mt of the total Measured resources and 5.81Mt of the total Indicated resources listed in Table 2 will be mined.

100% of the Probable Ore Reserves are derived from Measured and Indicated Mineral Resources only.

Audits and Reviews

No external audits or reviews have been carried out on the latest reserve estimation.

Relative Accuracy/Confidence

The estimates in this study relating to mining, processing and cost performance are underpinned by an updated PFS that has a confidence range of +/-25%.

The DFS was completed in November 2017 and stated a capital cost of A$335m, which remains the basis for this reserve increase announcement. Capital and Operating reviews are ongoing by the Owners Team and the engineering consultants, DRA Global.

The as yet completed reviews have highlighted areas in the Capital Cost requiring further assessment which were identified by both the Owners Team and DRA Global. The Owners' Team are working in parallel with DRA Global on an updated Capital and Operating cost to further enhance the project. It is now estimated that an updated Capital and Operating Cost will be completed during Q2 2019.

As stated in the ASX release dated 27 July 2018, the company signed an exclusive mandate appointing German state bank, KFW-Ipex Bank ("KfW") to provide project finance loan advisory services in relation to securing approval from Euler Hermer Aktiengesellschaft ("Euler Hermes") as mandated by the German Federal Government as administrators of the Untied Loan Guarantee scheme ("UFK Scheme"). Upon approval from Euler Hermes and the authorised committees of KfW, the Bank has indicated that it will provide senior debt facilities of up to A$250m for the project, representing two thirds of the total project capex. The loan application process is ongoing and KfW appointed their independent technical expert which commenced due diligence in October last year. In addition, the company is in discussions with a number of equity investors in Australia and Asia to raise A$100m to cover the balance of the capex requirement. It is expected that the capital raise exercise will be carried out over the course of the next 6 months.

TERMINOLOGY USED IN THIS REPORT

Total Rare Earths Oxides, TREO, is the sum of the oxides of the light rare earth elements lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), and samarium (Sm) and the heavy rare earth elements europium (Eu), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb), lutetium (Lu), and yttrium (Y).

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About Hastings Technology Metals

Yangibana Project

Hastings Technology Metals (ASX:HAS, the Company) is advancing the Yangibana Rare Earths Project towards production following the completion of a positive Definitive Feasibility Study in November 2017. The Yangibana Project hosts rare earths deposits rich in neodymium and praseodymium, elements vital to permanent magnets that provide many critical components of wide ranging high-tech products, including electric vehicles, renewable energy wind turbines, robotics, medical applications and others. The Company aims to be the next significant producer of neodymium and praseodymium outside of China.

The established Yangibana reserves and resources are predominantly within tenements held 100% by Hastings, with the majority in granted Mining Leases. Lesser resources are held in a joint venture in which Hastings holds a 70% interest and as the majority participant, has been appointed as the manager of the joint venture.

The November 2017 Yangibana Project DFS established JORC Probable Ore Reserves of 5.15 million tonnes at 1.12% total rare earths oxides (TREO) including 0.41% neodymium and praseodymium oxides (Nd_2O_3+Pr_6O_{11}). This Ore Reserve was the basis of the initial operation at a planned production rate of up to 15,000 tonnes per annum (tpa.) MREC including 3,400 tpa. of Nd_2O_3+Pr_6O_{11}. The July 2018 Yangibana Probable Ore Reserve increased to 7.74 million tonnes at 1.13%TREO including 0.43%Nd_2O_3+Pr_6O_{11} and this January 2019 Probable Ore Reserve has increases this to 10.35 million tonnes at 1.22%TREO including 0.43%Nd_2O_3+Pr_6O_{11} as reported in this release. The increase in Probable Ore Reserves is demonstrated by additional Pre-Feasibility Study work that supports extension of production over more than 10 years.

Including the above Ore Reserves, the Project has JORC Measured Mineral Resources of 4.7 million tonnes at 1.17% TREO including 0.42%Nd_2O_3+Pr_6O_{11}, JORC Indicated Mineral Resources of 8.6 million tonnes at 1.24% TREO including 0.41%Nd_2O_3+Pr_6O_{11}, and JORC Inferred Mineral Resources of 8.4 million tonnes at 1.09% TREO including 0.36%Nd_2O_3+Pr_6O_{11}, providing total JORC Measured, Indicated and Inferred Mineral Resources of 21.7 million tonnes at 1.17% TREO including 0.39%Nd_2O_3+Pr_6O_{11}.

Many more areas of the Company's deposits have the potential for additional resources and exploration programmes are in place to evaluate these areas in future plus the numerous other targets identified to date.

JORC Code, 2012 Edition – Table 1

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 (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *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.*	• Samples used to assess the numerous deposits of the Yangibana Project have been derived from both reverse circulation (RC) and diamond drilling. Eight drilling programmes have been completed to date with more than 1,500 holes drilled for 80,000m. • Samples from each metre were collected in a cyclone and split using a 3-level riffle splitter. Field duplicates, blanks and Reference Standards were inserted at a rate of approximately 1 in 20. • RC and diamond drilling leading to the establishment of JORC Resources has been carried out at Bald Hill, Frasers's, Yangibana West, Auer, Auer North, Yangibana, and Simon's Find within tenements held 100% by Hastings, and at Yangibana North, Gossan, Lion's Ear, Hook and Kane's Gossan. In addition, drilling has been carried out at Hatchett, Demarcay, Mosander, Terry's Find and Yangibana South prospects.
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).*	• Reverse Circulation drilling at the various targets utilised a nominal 5 1/4 inch diameter face-sampling hammer. • Diamond drilling at the various targets has been HQ diameter.
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.*	• Recoveries are recorded by the geologist in the field at the time of drilling/logging. • If poor sample recovery is encountered during drilling, the geologist and driller have endeavoured to rectify the problem to ensure maximum sample recovery. Visual assessment is made for moisture and contamination. A cyclone and splitter were used to ensure representative samples and were routinely cleaned. • Sample recoveries to date have generally been high, and moisture in samples minimal. Insufficient data is available at present to determine if a relationship exists between recovery and grade.
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.*	• All drill chip samples are geologically logged at 1m intervals from surface to the bottom of each individual hole to a level that support appropriate future Mineral Resource studies. • Logging is considered to be semi-quantitative

Criteria	JORC Code explanation	Commentary
	• *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	given the nature of reverse circulation drill chips. • All RC drill holes in the current programme are logged in full.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *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.*	• The RC drilling rig is equipped with an in-built cyclone and triple tier riffle splitting system, which provided one bulk sample of approximately 25kg, and a sub-sample of 2-4kg per metre drilled. • All samples were split using the system described above to maximise and maintain consistent representivity. Most samples were dry. For wet samples the cleanliness of the cyclone and splitter was constantly monitored by the geologist and maintained to avoid contamination. • Bulk samples were placed in green plastic bags, with the sub-samples collected placed in calico sample bags. • Field duplicates were collected directly from the splitter as drilling proceeded through a secondary sample chute. These duplicates were designed for lab checks as well as lab umpire analysis. • A sample size of 2-4kg was collected and considered appropriate and representative for the grain size and style of mineralisation.
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.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *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.*	• Genalysis (Perth) was used for all analysis work carried out on the 1m drill chip samples and the rock chip samples. The laboratory techniques below are for all samples submitted to Genalysis and are considered appropriate for the style of mineralisation defined at the Yangibana REE Project: FP6/MS • Blind field duplicates were collected at a rate of approximately 1 duplicate for every 20 samples that are to be submitted to Genalysis for laboratory analysis. Field duplicates were split directly from the splitter as drilling proceeded at the request of the supervising geologist.
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.*	• At least two company personnel verify all significant intersections. • All geological logging and sampling information is completed firstly on to paper logs before being transferred to Microsoft Excel spreadsheets. Physical logs and sampling data are returned to the Hastings head office for scanning and storage. Electronic copies of all information are backed up daily. • No adjustments of assay data are considered necessary.
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.*	• Final drillhole collars completed during 2014 were collected by MHR Surveyors using DGPS utilising a locally established control point. Accuracies of the drillhole collar locations collected by MHR

Criteria	JORC Code explanation	Commentary
	• *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	Surveyors is less than 0.1m. Drillhole collar positions from 2015 onwards were collected using a Trimble RTX R1 GNSS receiver, with accuracy of approximately 50cm. • Elevation data was recorded by both MHR Surveyors and the Trimble receiver, but the topographic control for all drillholes is based on the high-resolution DTM undertaken by the Company, with Relative Level (RL) assigned to each borehole based on the DTM using Mapinfo Discover 3D. • Down hole surveys are conducted by the drill contractors using a Reflex electronic single-shot camera with readings for dip and magnetic azimuth nominally taken every 30m down hole, except in holes of less than 30m. The instrument is positioned within a stainless-steel drill rod so as not to affect the magnetic azimuth. • Grid system used is MGA 94 (Zone 50)
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.*	• Hole collars were initially laid out at 50m centres. In areas considered to have potential to increase to Measured plus Indicated resources intermediate holes have been drilled to provide 37.5m hole spacing. Collar locations were varied slightly dependent on access at a given site. • No sample compositing is used in this report, all results detailed are the product of 1m downhole sample intervals.
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.*	• Most drill holes in the current programme are vertical (subject to access to the preferred collar position) or collared at -60º or -70º in steeper mineralised areas such as Auer and Auer North.

Sample security	• *The measures taken to ensure sample security.*	• The chain of custody is managed by the project geologist who places calico sample bags in polyweave sacks. Up to 10 calico sample bags are placed in each sack. Each sack is clearly labelled with:
		  ◦ Hastings Technology Metals Ltd
		  ◦ Address of laboratory
		  ◦ Sample range
		• Samples were delivered by Hastings personnel to the Nexus Logistics base in order to be loaded on the next available truck for delivery to Genalysis. The freight provider delivers the samples directly to the laboratory. Detailed records are kept of all samples that are dispatched, including details of chain of custody.

Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• No audit of sampling data has been completed to date but a review will be conducted once all data

Criteria	JORC Code explanation	Commentary
		from Genalysis (Perth) has been received. Data is validated when loading into the database and will be validated again prior to any Resource estimation studies.

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

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.*	• Drilling has been undertaken on numerous tenements within the Yangibana Project. • All Yangibana tenements are in good standing and no known impediments exist • Mining Leases 09/159 (Yangibana North) and M09/163 (Eastern extension of Yangibana) are under a joint venture agreement in which Hastings holds a 70% interest. Based on the 'Yangibana Joint Venture Agreement' dated 2 March 2011, no encumbrances to mining pits partially on the JV ground are known. If there is a mine development, there need to be a Mining Joint Venture Agreement put in place and further details confirmed. • A Native Title Agreement has been negotiated and ratified with the Native Title claimants as reported in the ASX announcement titled "Hastings Signs Native Title Agreement with Thiin-Mah Warriyangha, Tharrkari and Jiwarli People" dated 14th November 2017..
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Ten of the Yangibana prospects were previously drilled to a limited extent by Hurlston Pty Limited in joint venture with Challenger Pty Limited in the late 1980s. Auer and Auer North were first drilled by Hastings in 2016. Simon's Find was first drilled by Hastings in 2017.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The Yangibana ironstones within the Yangibana Project are part of an extensive REE-mineralised system associated with the Gifford Creek Carbonatite Complex. • These ironstone lenses have been explored previously for base metals, manganese, uranium, diamonds and rare earths. • The ironstones are considered by GSWA to be coeval with the numerous carbonatite sills that occur within Hastings tenements, or at least part of the same magmatic/hydrothermal system.

Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:*
	  ○ *easting and northing of the drill hole collar*
	  ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole*
		• N/A

Criteria	JORC Code explanation	Commentary
	collar ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• All intervals reported are composed of 1m downhole intervals and as such are length weighted. A lower cut-off grade of 0.20%Nd_2O_3+Pr_6O_{11} has been used for assessing significant intercepts, and no upper cut-off grade was applied. • Maximum internal dilution of 1m was incorporated in reported significant intercepts. • The basis for the metal equivalents used for reporting are provided in the body of the ASX announcement.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole 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 (eg 'down hole length, true width not known').*	• True widths for mineralisation have not been calculated and as such only downhole lengths have been reported. • It is expected that true widths will be less than downhole widths, due to the apparent dip of the mineralisation.
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.*	• Appropriate maps and sections are available in the body of this ASX announcement.
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.*	• Reporting of results in this report is considered balanced.
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.*	• Geological mapping has continued in the vicinity of the drilling as the programme proceeds.

Criteria	JORC Code explanation	Commentary
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions, depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Numerous targets exist for expansion of the current JORC Resources within the Yangibana Project, as extensions to defined deposits, new targets identified from the Company's various remote sensing surveys, and conceptual as yet untested targets at depth.

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.*	• Data was provided as a validated Access Database and was digitally imported into Micromine Mining software. Micromine validation routines were run to confirm validity of all data. • Individual drill logs from site have been checked with the electronic database on a random basis to check for validity. • Analytical results have all been electronically merged to avoid any transcription errors.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• The Competent Person visited site from 15-16th December 2016 and reviewed geology, drilling etc.
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.*	• Confidence in the geological interpretation is considered to be high. • Detailed geological logging and surface mapping allows extrapolation of drill intersections between adjacent sections. • Alternative interpretations would result in similar tonnage and grade estimation techniques. • Geological boundaries are determined by the spatial locations of the various mineralised structures. • Continuous ironstone units comprising iron oxides and hydroxides, minor quartz rich zones, and locally carbonate and apatite host the rare earths mineralisation and are the key factors providing continuity of geology and grade. The mineralised zones may be described as visually distinctive anastomosing iron rich veins with excellent strike and down dip continuity.
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.*	• Bald Hill mineralisation dips shallowly (maximum 30º) but variably to the southwest and ranges from 1m to 10m thick. Maximum depth of the resource is to a vertical depth of 80 metres below surface. • Fraser's mineralisation dips steeply (70-80º) in the western portion becoming more shallow (to 30º) in the east and ranges from 1m to 6m thick. Maximum depth of the resource is to a vertical depth of 140 metres below surface. • Yangibana West mineralisation dips shallowly (maximum 30º) but variably to the south and ranges from 1m to 5m thick. Maximum depth of the resource is to a vertical depth of 100 metres below surface. • Auer has three discontinuous, steeply dipping zones of mineralisation extending North-South over a total strike length of approximately 3.5 km and to a depth of 150m below surface.

Criteria	JORC Code explanation	Commentary
		• Auer North has two discontinuous, steeply-dipping zones of mineralisation extending north-south over a total strike length of approximately 1.4 km and has been tested to a depth of 120m below surface. • Yangibana mineralisation strikes east-west over a length of approximately 2 km, dipping at 40 to 45° to the north. The zone extends to a depth of approximately 150m. The zone is relatively thin, typically 2 to 3m. • Simon's Find consists of 3 separate mineralisation zones over a total strike length of 2 km. The zones vary in dip from 40 to 80° to the south and west, and extend approximately 100m below surface. The zones are relatively thin, typically 2 to 5m. • Yangibana North mineralisation dips shallowly (maximum 30^{o}) but variably to the south and ranges from 1m to 5m thick. Maximum depth of the resource is to a vertical depth of 140 metres below surface. • Gossan – the Inferred Resources at Gossan are based on limited drilling that has identified mineralisation over 300m of strike length, 100m down dip and ranging from 1-4m wide. Maximum depth of the resource is to a vertical depth of 80 metres below surface. • Lion's Ear - the Inferred Resources at Lion's Ear are based on limited drilling that has identified mineralisation over 520m of strike length, 80m down dip and ranging from 1-4m wide. Maximum depth of the resource is to a vertical depth of 140 metres below surface. • Hook - the Inferred Resources at Hook are based on limited drilling that has identified mineralisation over 380m of strike length, 100m down dip and ranging from 1-4m wide. Maximum depth of the resource is to a vertical depth of 130 metres below surface. • Kane's Gossan - the Inferred Resources at Kane's Gossan are based on limited drilling that has identified mineralisation over 550m of strike length, 100m down dip and ranging from 1-4m wide. Maximum depth of the resource is to a vertical depth of 130 metres below surface.
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.* • *Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation,*	• Due to the variable dip and strike of the various deposits, an "unfolding" technique has been used to simplify setup of search ellipse and modelling parameters • Statistical analysis and variography has been carried out in unfolded coordinates to define parameters for an Ordinary Kriging estimation. • All analysis and estimation has been constrained by the geological interpretation of the ironstone units. Separate estimation has been carried out for 0.5m thick dilution skins on the hangingwall and footwall of the mineralisation. • Kriging Neighbourhood Analysis was carried out for each deposit to determine optimal search and kriging parameters • All estimation was carried out using Micromine software (MM 2016 Sp5) • Kriging parameters were defined using Nd_2O_3 and Pr_6O11 as the primary variables. • Estimation has been carried out for the following variables : • Ce_2O_3_ppm, Dy_2O_3_ppm, Er_2O_3_ppm, Eu_2O_3_ppm, Gd_2O_3_ppm, Ho_2O_3_ppm, La_2O_3_ppm, Lu_2O_3_ppm, Nd_2O_3_ppm, Pr_6O_{11}_ppm, Sm_2O_3_ppm, Tb_4O7_ppm, Tm_2O_3_ppm, Y_2O_3_ppm, Yb_2O_3_ppm, ThO_2_ppm, U_3O_8_ppm, Al_per, Ca_per, Fe_per, Mg_per, Nb_ppm,

Criteria	JORC Code explanation	Commentary

	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.*
		P_per, S_per, Si_per, Sr_ppm, Ta_ppm, Zr_ppm
		• Drill hole spacing is variable, and the block sizes were chosen to reflect the best compromise between spacing and the necessity to define the geological detail of each deposit. In general, block sizes are 12.5 m along strike, 10m down dip and 2.5 across strike.
		• As there are no extreme values no capping has been applied.
		• Block model validation has been carried out by several methods, including:
		  ○ Drill Hole Plan and Section Review
		  ○ Model versus Data Statistics by Domain
		  ○ Easting, Northing and RL swathe plots
		• All validation methods have produced acceptable results.

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.*	• A nominal downhole cut-off of 0.20% Nd_2O_3+Pr_6O_{11} has been used in conjunction with logging of ironstone to define mineralised intersections.
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. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	• Mining is assumed to be by conventional open pit mining methods • Based on previous and on-going mining studies by Snowden, a 0.5m dilution skin has been added to both the footwall and hangingwall contacts of the mineralisation. • The dilution material is independently interpolated and is subsequently added to the mineralised domain to produce a diluted resource.
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. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• Beneficiation and hydrometallurgical test work has been carried out on samples from the Eastern Belt (comprising Bald Hill, Bald Hill Southeast and Fraser's deposits). Mineralisation at Auer and Auer North is considered compatible with the Eastern Belt-style mineralisation, based on variability testwork. Testwork on samples from Yangibana West and Yangibana North show that the shallow, low-siderite mineralisation is compatible with the proposed processing route. • Test work to date has shown that the rare earths mineralisation (largely monazite) can be upgraded readily using standard froth flotation techniques and readily available reagents.
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. While at this stage the determination of potential environmental impacts,*	• Environmental studies have been carried out on site with site-wide flora and fauna surveys completed. No significant impacts will occur to flora or fauna species or their habitats. • Subterranean fauna studies have located both troglofauna and stygofauna within the deposits. Extensive regional surveys have demonstrated the area to be a small portion of a much larger system. The deposits are not characterised as prime habitat for the subterranean fauna. • Waste characterisation and closure aspects have been

Criteria	JORC Code explanation	Commentary
	particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	assessed in detail for four deposits. Similar lithologies at other deposits have enabled correlations to be made. • Preliminary water modelling studies have shown that water drawdown may impact pastoral bores and potential groundwater dependent ecosystems. Further work is planned to substantiate this assessment and consider mitigation measures if required.
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.*	• Bulk density/specific gravity have been measured by the Company on core from Yangibana North, and at independent laboratories on core from Bald Hill South, Fraser's, Auer, Auer North, Yangibana, and Yangibana West. Samples have been taken from each of oxidised, partially oxidised and fresh mineralisation with results feeding into the resource estimations. • Bulk density/specific gravity measurements have also been carried out at an independent laboratory on samples of oxidised, partially oxidised and fresh host rock, granite. • In situ bulk densities for the individual deposits have ranged from 2.30 to 2.80 tonnes per cubic metre and have been assigned into the models based on weathering surfaces and assigned rock types.

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 Mineral Resource has been classified in the Measured, Indicated and Inferred categories, in accordance with the 2012 Australasian Code for Reporting of Mineral Resources and Ore Reserves (JORC Code). A range of criteria has been considered in determining this classification including:
		  ○ Geological and grade continuity
		  ○ Data quality.
		  ○ Drill hole spacing.
		  ○ Modelling technique and kriging output parameters.
		• The Competent Person is in agreement with this classification of the resource.

Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• No audit of the current resources has been carried out at this time.
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. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if 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*	• The relative accuracy of the various resource estimates is reflected in the JORC resource categories. • At the Measured and Indicated Resource classification level, the resources represent local estimates that can be used for further mining studies. • Inferred Resources are considered global in nature.

Criteria	JORC Code explanation	Commentary
	be compared with production data, where available.	

Section 4 Estimation and Reporting of Ore Reserves

(Criteria listed in section 1, and where relevant in sections 2 and 3 also apply to this section.)

Item	Comments
Mineral Resource for conversion to Mineral Reserves	The resource models used for mine planning were: • Bald Hill – BH_ALL_30_09_2018.dm • Fraser's – FR_ALL_30_09_2018.dm • Yangibana West – Y_30_09_2018.dm • Yangibana North - Y_30_09_2018.dm • Yangibana – Y_30_09_2018.dm • Auer/Auer North – AU_ALL_01_10_2018.dm Only Measured and Indicated Resources were considered for inclusion in the Ore Reserve.
Site visits	Site visits were completed by the following Competent Persons: Competent Persons / Items / Date of site visit Frank Blanchfield / Mining / October 2018 Lynn Widenbar / Resources / December 2016 Narelle Marriott / Metallurgy beneficiation / August 2016 Robin Zhang / Hydrometallurgy / N/A The hydrometallurgy Competent Person did not visit the site and was comfortable relying on the report of staff who have visited the site.
Study status	The Yangibana REO Project has previously had a Definitive Feasibility Study (DFS) released in November 2017, based on the Bald Hill and Fraser's deposits only. This Ore Reserve additionally includes satellite deposits at Auer, Auer North, Yangibana, Yangibana West and Yangibana North, and includes joint venture ground. These additional satellite deposits have been assessed to a prefeasibility-level study. The satellite deposit metallurgical assessment has been completed using the process flowsheet developed for Bald Hill and Fraser's, assessing each deposit's suitability for processing through this flowsheet. A forward execution work programme is being developed from the PFS study. Some environmental assessments are ongoing; initial results indicate there are currently no encumbrances to the project from the environmental assessments.
Cut-off parameters	The cut-off grade of 0.2% Nd_2O_3+Pr_6O_{11} for the geological resource is used as neodymium (Nd) and praseodymium (Pr) are the most important sources of potential revenue from the project. The cut-off coincides generally with the visual geology of the deposits, with target minerals being hosted predominantly by ironstone, and to a much lesser extent by phoscorite or carbonate. The cut-off grade for the project was determined based on calculating revenue from recovered metal, selling and processing costs on a block-by-block (diluted) basis (parameters are below). Blocks with revenue greater than the sum of the processing and selling costs (approximately $90/t ore) were considered to be above the cut-off for processing.
Mining factors and assumptions	The following Modifying Factors were considered in relation to the development of the Yangibana Ore Reserves: • Geotechnical: For pit optimisation, a 28° overall wall angle was applied for saprolite, and 35° to 40° was applied to weathered and fresh granite. • Dilution and ore loss: Dilution was applied by adding a 50 cm skin on the hangingwall and footwall sides of the orebody. A 2% ore loss was additionally applied to the deposits. Bald Hill – Measured and Indicated Resources only Item / Geological model / Mining model / Difference Tonnes (kt) / 3,819 / 4,669 / 22% TREO (%) / 1.21 / 1.00 / -17%

Item	Comments

Nd_2O_3 (ppm)	3,876	3,227	-17%
Pr_6O_{11} (ppm)	915	761	-17%

Fraser's – Measured and Indicated Resources only

Item	Geological model	Mining model	Difference
Tonnes (kt)	686.1	787.7	15%
TREO (%)	1.78	1.54	-13%
Nd_2O_3 (ppm)	6,004	5,204	-13%
Pr_6O_{11} (ppm)	1,546	1,338	-13%

Yangibana West – Measured and Indicated Resources only

Item	Geological model	Mining model	Difference
Tonnes (kt)	1,165	1,544	33%
TREO (%)	1.56	1.22	-22%
Nd_2O_3 (ppm)	3,310	2,587	-22%
Pr_6O_{11} (ppm)	952	743	-22%

Yangibana North – Measured and Indicated Resources only

Item	Geological model	Mining model	Difference
Tonnes (kt)	1,586	2,017	27%
TREO (%)	2.13	1.7	-20%
Nd_2O_3 (ppm)	4,214	3,369	-20%
Pr_6O_{11} (ppm)	1,292	1,031	-20%

Yangibana – Indicated Resources only

Item	Geological model	Mining model	Difference
Tonnes (kt)	1,033	1,293	25%
TREO (%)	1.06	0.85	-20%
Nd_2O_3 (ppm)	4,306	3,466	-20%
Pr_6O_{11} (ppm)	754	606	-20%

Auer/Auer North – Indicated Resources only

Item	Geological model	Mining model	Difference
Tonnes (kt)	1,135	1,437	27%
TREO (%)	1.33	1.08	-19%
Nd_2O_3 (ppm)	3,748	3,036	-19%
Pr_6O_{11} (ppm)	1,015	822	-19%

Thickness isopachs of in-pit ore at a 0.2% Nd_2O_3+Pr_6O_{11} cut-off show each deposits' average true thickness in metres. The thin ore lodes at Yangibana are mostly >2 m thickness. All the ore lodes in Auer average 3.2m with most lodes at Auer North greater than 2m thickness. Average lode thickness across all deposits is about 3.2m. Processing parameters, sales parameters and administration costs are detailed below. Cut-off grades are detailed above.

Metallurgical factors and assumptions

A DFS was completed in November 2017 on the Bald Hill and Fraser's deposits and this is now progressing to detailed design. The metallurgical flowsheet developed from that study has been used for the basis of assessment for the prefeasibility studies of the satellite deposits. The metallurgical performance of samples from each satellite deposit has been assessed through the standard bench-scale flowsheet, the results of the testwork, as well as impacts on operating costs have been used for the prefeasibility-level study on each satellite deposit.

Process and flowsheet

The metallurgical process comprises ore beneficiation followed by hydrometallurgical (hydromet) extraction to produce a valuable Mixed Rare Earths Carbonate (MREC) product. The beneficiation unit processes include crushing, grinding, rougher flotation, regrinding and cleaner flotation.

The hydromet unit processes include acid bake, water leach, impurity removal and MREC product precipitation.

The simple and effective metallurgical process flowsheet developed with the best known available technology and industrial practice by the Hastings Technical Team, has been well tested in both laboratory scale and pilot scale during the Bald Hill and Fraser's DFS. The unit processes selected for inclusion in the beneficiation and hydromet process flowsheet are based on known technologies, both in the rare earths (RE) industries and other mining applications.

Item	Comments
	Ore feed chemistry tolerances Assessment of satellite deposit mineralogy has shown the main RE-bearing mineral in the ore is monazite, which is consistent with the DFS ore sources. The main gangue minerals are iron oxides and hydroxides, biotite-type minerals and apatite. Iron carbonate (siderite) has been identified at depth in Yangibana West and Yangibana North. The siderite boundary has been mapped and higher siderite-bearing portions have been excluded from the planned mill feed ore. The ratio of RE elements contained in the monazite differs from that of Bald Hill and Fraser's. This is reflected in the financial analysis but has no impact on the performance of the beneficiation flowsheet. Compared to DFS ore source concentrate, there may be some variation on concentrate mineralogy. This can be managed in the hydromet circuit through varying process conditions. Where required limits have been set for TREO and deleterious elements in the beneficiation circuit feed and these limits have been taken into account in the mine development and ore scheduling process. **Testwork** Pilot plant campaigns for both the beneficiation flowsheet and the hydromet flowsheet have proved the circuits can be run on a continuous basis and that the selected unit processes are able to selectively concentrate the RE-bearing mineral monazite and remove or control the major product impurities of manganese, iron, thorium and uranium within acceptable product range. Over 50 kg of high-purity MREC produced from the pilot plant was sent to 11 customers for evaluation. The product quality is acceptable to separation plant operators. Bench-scale testwork for the satellite deposits was mostly carried out in 2017 and 2018 at a number of commercial laboratories in Australia. Beneficiation testwork has been completed at KYSPY Met and ALS Metallurgy. Hydromet testwork has been completed at SGS Minerals Metallurgy and ANSTO. Assessment of metallurgical processing performance of all satellite deposits was based on batch testwork, using the standard DFS comminution and flotation flowsheet, and comparison against the performance achieved with DFS ore sources. A standard acid bake and water leach test was completed for assessment of the hydromet performance. Liquor chemistry post-water leach was used to compare against DFS ore sources. A dedicated programme to understand the impact on precipitation circuit performance from varying levels of Mn in the leach liquor was also undertaken. Assessment of comminution requirements was undertaken using a standard suite of comminution tests including SMC, Bond Ball Mill work index, Bond Crusher work index, and abrasion index. **Deposit** / **No. of comminution samples Completed** Bald Hill: 8 Fraser's: 5 Auer: 4 Auer North: 4 Yangibana: 5 Yangibana West: 3 Yangibana North: 1 All results indicate that the satellite deposits are suitable for processing through the comminution circuit as designed in the DFS.

<table>
<tr><th>Item</th><th>Comments</th></tr>
<tr><td>Metallurgical factors and assumptions (cont'd)</td><td>Detailed mineralogy and variability testwork have been carried out on multiple samples for each deposit, as shown below.
<table>
<tr><th rowspan="2">Deposit</th><th colspan="3">No. of samples</th></tr>
<tr><th>Mineralogy</th><th>Variability</th><th>Composite</th></tr>
<tr><td>Bald Hill</td><td>10</td><td>8</td><td>2</td></tr>
<tr><td>Fraser's</td><td>5</td><td>5</td><td>2</td></tr>
<tr><td>Auer</td><td>18</td><td>18</td><td>1</td></tr>
<tr><td>Auer North</td><td>8</td><td>8</td><td>1</td></tr>
<tr><td>Yangibana</td><td>12</td><td>12</td><td>2</td></tr>
<tr><td>Yangibana West</td><td>6</td><td>2</td><td rowspan="2">3</td></tr>
<tr><td>Yangibana North</td><td>8</td><td>4</td></tr>
</table>
Overall Metallurgical recovery
The metallurgical recovery for the additional production targets is 88.5% TREO recovery in the beneficiation circuit, 86.1% TREO recovery in the hydrometallurgy circuit, giving an overall metallurgical recovery of 76.2%.</td></tr>
<tr><td>Environmental</td><td>This feasibility study (FS) was updated for the Environmental and Social Baseline section and includes data from the 2014 prefeasibility study (PFS), but has been updated to reflect:

Baseline flora and fauna: Flora and fauna surveys have been conducted over 55,650 Ha of tenements. No significant impact will occur to conservation significant terrestrial flora or fauna. Subterranean fauna sampling has been completed at Yangibana West and is currently underway in the Auer, Auer North and Yangibana areas.
Baseline ground and surface water: A hydrology study has determined that mining and the majority of infrastructure falls outside flood impact zones. Water from fractured rock aquifers will meet approximately 20% of the project's water demands. The remaining 80% of water demands will be sourced from the paleochannel borefield. A pit dewatering assessment and post-closure pit lake modelling has been completed for Yangibana West and is planned to be undertaken for Auer, Auer North and Yangibana pit areas.
Baseline soil and radiation: Topsoil analysis was conducted and mapped over all but the Yangibana area, which is planned. Baseline radiation surveys and radiation waste characterisation studies have determined that naturally occurring radioactive materials (NORM) are associated with the orebody. Additional radiation surveys are required over Auer, Auer North and Yangibana.
Waste rock geochemical characterisation: Yangibana West pit lithologies have been characterised geochemically and classify as benign and non-acid forming. The mineralogy of the project is not associated with asbestiform minerals. Erodibility parameters were determined for waste rock and topsoil, and inform the waste rock landforms' design for Yangibana West. Waste rock geochemical characterisation for Auer, Auer North and Yangibana are initiated.
Baseline air quality: A baseline air quality assessment and greenhouse gas emissions assessment have been completed. A radiation impact assessment has determined that dust containing NORM will not pose a risk to the surrounding environment.
Cultural heritage: No impacts to known significant heritage sites will occur as a result of implementing the project. Heritage surveys are currently underway for waste rock landform areas.
Closure: A landform evolution study has identified landform design specifications that aim to ensure site landforms will maintain their integrity for 1,000 years post-closure. A landform evolution study will be revised if waste rock characterisation studies' findings in Auer, Auer North and Yangibana differ from those of the DFS ore sources.
The closure plan will be updated subject to outcomes of ongoing studies.
Permits required and status of permits: A formal environmental impact assessment is currently set at a Public Environmental Review (PER) level of assessment by both the State and Commonwealth Governments of the DFS ore sources and Yangibana West. The PER
</td></tr>
</table>

<table>
<tr><th>Item</th><th>Comments</th></tr>
<tr><td></td><td>documentation is currently being assessed. Referral for Auer, Auer North and Yangibana will occur under the Environmental Protection Act (WA 1986).</td></tr>
<tr><td>Infrastructure</td><td>The Yangibana project is located approximately 200 km north of Gascoyne Junction in the Upper Gascoyne region. The process plant is located on a greenfield site and all supporting infrastructure must be constructed. The proposed infrastructure for the project will include:
Comminution plant
Beneficiation plant
Hydrometallurgy plant
Access and site roads
Water supply borefield
Tailings storage facility (TSF) and evaporation plant
Mining buildings
Fuel storage
Security and fencing
Borefield
Employee housing and transportation
Water treatment and mine site sewage
Data and communications infrastructure
LNG fuelled power station.
As of December 2018 early site works include the construction of the water supply bore and pipeline, the 240-room accommodation village and the access road from the Cobra – Gifford Creek Road to the plant site. Of the above, construction has started on the bore and pipeline and off-site fabrication and delivery to site of the accommodation village buildings. Designs have been completed for the access road. Additionally, for the long lead item, the kiln, an order has been placed with FLSmidth.</td></tr>
<tr><td>Costs</td><td>Operating costs
This summary excludes any costs incurred by the third party participant in the 'Yangibana Joint Venture Agreement that holds a 30% interest in the relevant tenements.
<u>Mining</u>
A contract mining cost for mining at Bald Hill and Fraser’s of A$4.12/DMT mined was estimated by Snowden based upon quotations received in 2017.
<u>Process</u>
Based on FS modelling, processing costs are the same for both Bald Hill and Fraser’s:
A$108.2/t ore
A$11.54/kg TREO in MREC for the processing. Since the TREO content of the carbonate is constant, the yield to carbonate will vary with TREO head grade and recovery.
Selling costs
A state royalty cost of 2.5% and a Native Title royalty of 0.7% were applied. No other royalties were considered for ore processed. Additionally, a separation charge (inclusive of impurity removal) of A$3.87/TREO in carbonate was applied, based on industry benchmarking. For modelling purposes, this cost was applied to each RE oxide separately.

Opex summary (LOM – unescalated)
<table>
<tr><th>Item</th><th>A$M</th><th>Average A$/t of ore</th></tr>
<tr><td>Mining costs</td><td>565</td><td>54.6</td></tr>
<tr><td>Labour</td><td>205</td><td>19.8</td></tr>
<tr><td>Flights, messing and accommodation</td><td>57</td><td>5.5</td></tr>
<tr><td>Power</td><td>105</td><td>10.2</td></tr>
<tr><td>Process fuel</td><td>59</td><td>5.7</td></tr>
<tr><td>Maintenance</td><td>39</td><td>3.8</td></tr>
<tr><td>Consumables</td><td>25</td><td>2.4</td></tr>
<tr><td>Equipment hire</td><td>33</td><td>3.2</td></tr>
<tr><td>Product transport</td><td>26</td><td>2.5</td></tr>
<tr><td>Contract/General expenses</td><td>55</td><td>5.3</td></tr>
</table></td></tr>
</table>

Item	Comments

Costs (cont'd)

Exploration programs (ongoing)	25	2.4
Corporate costs	27	2.6
Mine closure costs	34	3.3
Reagents	462	44.7
Total operating costs	**1718**	**166.0**

Other operating costs (LOM – unescalated)

Item	A$M
Taxation	505.5
Total royalties	130.4

Capital costs summary

Pre-production capital costs (LOM – unescalated)

Description	A$M
Mining	4.2
Process plant	144.4
Non-process infrastructure	22.0
TSF	89.9
Total direct costs	260.6
Indirect costs	30.9
Subtotal – Project costs	291.4
Contingency	43.7
Total pre-production project costs (-5% +15%)	**335.1**

Production capital costs (LOM – unescalated)

Item	A$M
Plant sustaining	5.5
TSF and evaporation pond – additional cells and lifts	3.2
Shire access road upgrade	12.7
Total LOM production costs	**21.4**
Total project capital costs	**356.5**

Note 1: Pre-production Capital costs based on Yangibana Project DFS published November 2017. Major plant sustaining capital costs are not predicted to occur within the first six-year mine life of the process plant. The FS has costed all light vehicle and mobile plant on a hire basis within the operating cost estimate.

Revenue factors

The project will provide a MREC product for sale.

The separated oxide prices used for the economic evaluation are the Adamas Intelligence forecasts for the period 2018 to 2025. Annual year-on-year escalation was applied on an individual RE oxide basis, as supplied in the forecasts. The derived MREC basket price applied in the evaluation, using the formula stated in revenue factors, is shown below:

TREO basket price used in evaluation

Project (LOM)	2021	LOM
Basket Value (US$/kg TREO)	28.38	31.51

The annual MREC production volume (as kg TREO) is calculated through the application of beneficiation and hydrometallurgy elemental recovery factors (derived from pilot plant and laboratory testing) to a quarterly mining schedule.

The MREC revenue is calculated as:

TREO Basket Price
minus Customer Separation Quote
minus Customer Impurity Removal Charges
= MREC Product Price

Item	Comments
	Hastings has previously announced that four offtake memorandums of understanding (MOUs) have been entered with Qiandong Rare Earth Group, China Rare Earth Holdings Limited, Thyssenkrupp Raw Materials GmbH and one MOU has progressed with the signing of an offtake contract with Baotou Sky Rock Rare Earth. In total these agreements account for approximately 11,000 t of the total planned 15,000 MREC annual tonnes.
Market assessment	The Yangibana project will produce a MREC that has a high neodymium (Nd) and praseodymium (Pr) content (up to 41% of TREO content) as the predominant value elements. It is estimated that Pr_6O_{11}, Nd_2O_3, Tb_4O_7 and Dy_2O_3 will contribute between 85% and 90% of the economic value per kilogram of production. • It is particularly in the Nd_2O_3 and Pr_6O_{11} oxides where substantial supply shortages and rapid demand growth are anticipated in the decade of the 2020s. • Adamas Intelligence supplied real price forecasts for RE oxides in November 2018 covering the period 2018 to 2025. • The plant will have a design capacity of 15,000 t of MREC per annum. • The plant will have a design capacity of 8,500 t per annum of TREO. Hastings has previously announced that four offtake MOUs have been entered with customers covering approximately 11,000 t of the planned annual MREC production volume, with separated oxide prices used for MREC product pricing to be confirmed. One MOU has now progressed to signing of an offtake contract.
Economic	The economic model has been developed based on the 100% Hastings held tenements and the proportion (70%) held by Hastings, of the Joint Venture held tenements. The economic model assumes Mojito Resources will participate in the development of the deposits held by Hastings (70%) in joint venture with Mojito Resources (30%) under the 'Yangibana Joint Venture Agreement'. As set out in Table 16, the specific deposits to which the joint venture applies are Yangibana and Yangibana North. If there is a mine development by the joint venture, not only will there need to be a Mining Joint Venture Agreement agreed and put in place to replace the existing joint venture documentation and regulate the arrangements between the participants for the mine development, but arrangements will also need to be established to determine how the Yangibana production and tenements the subject of the joint venture fit with the broader 100% Hastings group owned production and tenements. No costs or revenue ascribed to the 30% interest in the deposits held by Mojito Resources are reported in the financial modelling. If Mojito Resources did not participate in any development of the joint venture deposits and the development of those deposits was to proceed on a 100% basis by Hastings, then the economic model would need to be updated to allocate those costs and revenues to Hastings. The key financial metrics for the Hastings share of the Yangibana Ore Reserves are IRR of 32% and NPV of A$516 million. • A NPV discount rate of 8% was used for the financial analysis. • A US$:A$ exchange rate of 0.71:1 was used for the financial analysis. A sensitivity analysis on the NPV is provided below. The Ore Reserve was also evaluated on a flat growth basis (Adamas Intelligence 2019 prices applied without any growth, NdPr Oxide price = US$58/kg) and was found to still be economically viable. A sensitivity analysis was undertaken on the key parameters that are ranked below, with the greatest impact on the NPV of the project.

Item	Units	Low		Mode		High	
		Input	NPV	Input	NPV	Input	NPV
RE Oxide Price escalation	%	-5%	**28**	100%	**516**	2%	**760**
Nd_2O_3, Pr_6O_{11} oxide price	%	-30%	**130**	100%	**516**	15%	**710**

Item	Comments							
	Nd_2O_3, Pr_6O_{11} oxide price	%	-20%	**259**	100%	**516**	10%	**645**
	Nd_2O_3, Pr_6O_{11} oxide price	%	-10%	**388**	100%	**516**	5%	**581**
	Exchange rate (A$-US$)	A$/US$	0.64	**566**	0.71	**516**	0.75	**369**
	Mining costs	%	70%	**660**	100%	**516**	130%	**338**
	Capex	%			100%	**516**	30%	**457**
	Nd_2O_3 beneficiation recovery	%	73%	**351**	88%	**516**	90%	**539**
	The low-high case range was based on the following: • Oxide price growth rates – The high and the low case was selected as one standard deviation lower or higher from the mean growth rate predicted by the Adamas Intelligence forecasts • Mining costs – The low and high case for mining costs were assessed on the basis of a ± 30% accuracy. • Capital expenditure – The high case was assessed on the basis of 30% increase. • Metallurgical Recovery – the low and high case for beneficiation was assessed based on the range of test results observed in laboratory test work under varying process conditions.							
Social	Hastings is implementing a Stakeholder Engagement Plan. The overall response to the project has been very positive. A Land Access Agreement has been negotiated and ratified with the pastoral lessee. A Native Title Agreement has been negotiated and ratified with the Native Title claimants. The workforce will be recruited from the region, and where this is not possible, more broadly with most plant operations specialists sourced from Perth. Hastings is currently developing systems and processes to ensure it maintains its social licence to operate, to ensure its workforce are competent in their respective roles and have a culture of safety and compliance.							
Classification	The Mineral Reserve is classified as a Probable Ore Reserve using the guidelines of the JORC Code (2012 Edition). The conversion of Measured Resources to Probable Reserves is primarily based on the need for production reconciliation of the selective ore deposit and reconciliation of the complex processing method.							
Audits or reviews	No external audits or reviews of the 2019 PFS have been undertaken.							
Relative accuracy/ confidence	The estimates in this study relating to mining, processing and cost performance are underpinned by an updated PFS which has a confidence range of ±25%.							