



22 March 2022

ASX: GRR

## Southdown Magnetite Project Prefeasibility Study

Southdown Project, Western Australia

- The Prefeasibility Study identifies a reduced-capital development option for the Southdown Magnetite Project (anticipated to deliver reductions in capital spend from A\$2.9B down to A\$1.39B).
- It focuses on a production rate of 5 million tonnes per annum of high-quality magnetite concentrate at 69.5 % Fe, which attracts a significant price premium in the market.
- The concentrator design utilises dry grinding technology to improve efficiency and reduce power and water demand, while still achieving a high-quality product.
- The reduced water demand can be met with a combination of ground water and recycled water.
- Early works are underway to confirm the potential of power supply via a transmission line to connect to the Southwest Interconnected System at Muja, in order to access significant renewable energy through a 3<sup>rd</sup> party provider.
- Studies indicate Cape size vessels can be loaded in King George Sound using transhipment methods.
- Work is underway to seek revisions to current environmental approvals for the new aspects of the project, with a new approval required for the transhipping operation.

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The Prefeasibility Study referred to in this ASX release has been undertaken for the purpose of initial evaluation of a potential development option for the Southdown Magnetite Project in Western Australia. It is a preliminary technical and economic study of the potential viability of the Southdown Project, completed to a level of accuracy of +/- 25%. Further work will be required to improve the accuracy and reduce the technical, financial, environmental and stakeholder risks related to this development option.



Grange Resources Limited (ASX:GRR) (Grange) is pleased to announce that a Prefeasibility Study (PFS 2022) has been completed to assess capital reduction options for the Southdown Magnetite Project (**Southdown** or the **Project**).

A Definitive Feasibility Study completed in 2012 (DFS 2012, see ASX announcement May 2012) defined a project to produce 10 million tonnes per annum (mtpa) of high-grade magnetite concentrate at 69.5% iron, over a potential mine life of 14 years.

PFS 2022, completed in February 2022, has identified a reduced-capital development option. This involves a smaller 5mtpa concentrate production operation within the constraints of existing mineral resources and ore reserves; and is anticipated to deliver reductions in capital spend from A\$2.9B down to A\$1.39B. This alternative case extends the life of mine from 14 years to 28 years for the western zone, and potentially more than 50 years for the total resource (see Project Details below). It is planned to be a pit to port operation involving:

- an open cut mine with contract mining
- a concentrator including dry grinding and wet separation techniques
- slurry and return water pipelines from/to the Port at Albany
- a transshipping operation to export concentrate in Cape size vessels
- a transmission line for power supply by a 3<sup>rd</sup> party to access a significant component of renewable energy
- a mix of recycled and groundwater to supply reduced water needs.

The 10mtpa DFS 2012 remains the base option, and the decision as to whether the alternative option is further studied to definitive feasibility will be an issue considered together by the joint venture partners.

Commenting on the results of PFS 2022, Grange CEO Mr Honglin Zhao stated:

*“PFS 2022 considers innovation in the process to enable a reduction in the capital required to enable the project to proceed.*

*Southdown is a world-class magnetite deposit that is becoming increasingly relevant as steel markets continue to demand premium iron ore products. At almost 70% iron content, Southdown’s concentrate product will be one of the highest-grade seaborne iron ores in the world.”*

### Project Summary

- Southdown is an advanced project with excess of A\$180m spent to date on drilling, test work, land acquisition, permitting and engineering studies.
- The project has defined Mineral Resources of more than 1.2 billion tonnes at 33.7% DTR, and Ore Reserves of 388 million tonnes at 35.6% DTR, prepared in accordance with JORC 2012 (see ASX announcement February 2014).



- DFS 2012 was completed in April 2012 based on a design to produce at a nominal rate of 10mtpa of concentrate at a premium quality specification of 69.5% Fe, which attracts a significant price premium in the market.
- PFS 2022 was completed in February 2022 based on a design to produce at a nominal rate of 5mtpa of concentrate, with a mine life of 28 years within the current permitted area, with potential to extend to more than 50 years.
- PFS 2022 generates an NPV of A\$243 million at a nominal discount rate of 10%, and an ungeared internal rate of return (IRR) of 12%, based on average price assumptions from long term forecasts of US\$102.52/tonne FOB Albany, at an AUD:USD exchange rate of \$0.71. By comparison, an NPV of A\$2,071 would be achieved based on the average realised 65% index prices over past three years.
- Initial capital expenditure is estimated at A\$1.39 billion and sustaining capex at A\$203 million.
- C1 operating costs are estimated at A\$60.61 per tonne of concentrate delivered at the ships rail in Albany, with an all-in sustaining cost of A\$84.12.
- All primary environmental approvals are in place and being maintained in good stead for the existing DFS 2012, with a revision of the existing land-side approval in preparation to include the new aspects, and a new approval required for the marine transshipment operations.
- All land required for the DFS 2012 project site, slurry and water pipelines has been secured, with negotiations progressing to secure new areas identified in PFS 2022
- Aboriginal heritage issues have been successfully resolved or in progress for DFS 2012, with engagement ongoing in relation to new areas and sites identified in PFS 2022.

### **Detailed Project Information for the 5mtpa Alternative Development Option**

Just 90km from Albany in Western Australia's Great Southern region, Southdown is a joint venture (JV) between Grange (70%) and SRT Australia Pty Ltd (30%). SRT is jointly owned by the Sojitz Corporation, a Japanese global trading company, and Kobe Steel, the third largest Japanese steel maker.

The Southdown Magnetite Project is an advanced project with more than 1.2 billion tonnes of high-quality mineral resources, including ore reserves of 388Mt. A Definitive Feasibility Study completed in 2012 (DFS 2012, see ASX announcement May 2012) defined a project to produce 10 million tonnes per annum (mtpa) of high-grade magnetite concentrate at 69.5% iron, over a potential mine life of 14 years.

In February 2022 Grange completed a prefeasibility level study into an alternative development option based on a reduction of the nominal concentrate production rate to



5mtpa. DFS 2012 is the base case option for the JV.

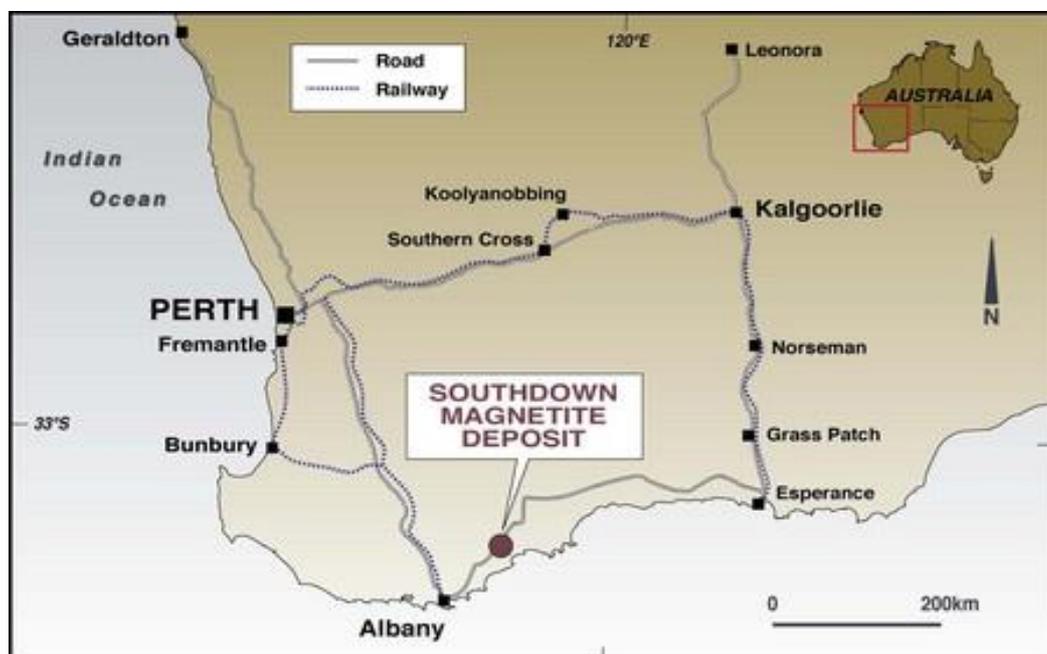
Grange recognises and respect the Traditional Owners of this Country and their connection to the lands, waters and skies. Grange would like to acknowledge the support and assistance of the Wagyl Kaip and Southern Noongar Native Title claimants, and the Menang people in the development to date of the Southdown Project.

Grange would like to thank and acknowledge that the following organisations were engaged in the Grange's development of the PFS 2022:

- Wood (principal and process), and its subconsultant GHD (non-process infrastructure),
- Ausenco (pipeline),
- BMT (marine),
- Snowden Optiro (mining)
- and many specialists in individual areas.

## Location

The Project is located ~90km northeast of Albany in the southwest corner of Western Australia. The Southdown deposit extends approximately 12km in length, under Mining Lease (M70/1309) and Retention Licence (R70/61) covering an area of more than 120 square kilometres on largely freehold farming property.



*Figure 1: Southdown Magnetite Project Location*



### Mineral Resource & Ore Reserve

The Project contains a total resource of 1.25 Bt of magnetite ore grading at Davis Tube Recovery (DTR) of 33.7%. This resource has been defined using geological boundaries and a cut-off grade of 10 weight percent Davis Tube Concentrate (DTC) and includes minor internal dilution. A resource statement prepared in accordance with JORC 2012 has been declared for the Project. The mineral resource consists of alternating bands of magnetite hosted in clinopyroxene and primary quartz located within SDJV mining lease, M70/1309 and Exploration Licence R70/61 (see ASX announcement, 28 February 2014).

The metallurgical plant has been designed to achieve 69.5% Fe in the final concentrate (see ASX announcement, April 2012).

Mineral Resource Category	Tonnes (Mt)	DTR (%)	DTC Conc. Fe (%)
Measured	423.0	37.8	69.6
Indicated	86.8	38.7	69.7
Inferred	747.1	30.9	69.5
<b>Total</b>	<b>1256.9</b>	<b>33.7</b>	<b>69.5</b>

*Table 1: Southdown Magnetite Mineral Resource*

Ore Reserve Category	Tonnes (Mt)	DTR (%)
Proven	384.6	35.6
Probable	3.1	41.7
<b>Total</b>	<b>387.7</b>	<b>35.6</b>

*Table 2: Southdown Magnetite Ore Reserve*

*An additional 24.4 Mt of Inferred Resources is included within the designed pit.*

A detailed statement of the Mineral Resources and Ore Reserves can be found in the ASX announcement dated 28 February 2014. Grange confirms in reproducing the Mineral Resources and Ore Reserves in this subsequent report, that it is not aware of any new information or data that materially affects the information included, and all the material assumptions and technical parameters underpinning the estimates in this report continue to apply and have not materially changed. Grange confirms that all material environmental approvals and tenure have been maintained in compliance and terms extended as required to retain currency.



## Mining

Mining will be undertaken by conventional bulk mining methods utilising drill and blast, hydraulic face shovels and dump trucks coupled to a run of mine (ROM) stockpile. Ore will be trucked directly from the blasted faces to either direct tip into the primary crusher or onto the ROM stockpile, as proposed within DFS 2012, but with a reduced mining rate to satisfy a nominal concentrate production rate of 5mtpa.

The reserve within mine lease M70/1309 has the capacity to provide a nominal 5mtpa of concentrate for up to 28 years of mine life. This study uses contractor mining.



*Figure 2: Proposed Mine Layout for the 5mtpa PFS 2022*

## Processing

The magnetite mineralisation will be crushed in a two-stage process, and progressively ground, sized, and magnetically separated using a dry processing technology to produce an interim dry magnetite product. This will then be mixed with water for final magnetic separation and grinding to produce the final product. Process waste (tailings) will be produced in dry and wet components, with the wet tailings deposited in slurry form into a Tailings Storage Facility, and the dry majority of waste sent to the waste rock dump.

An additional concentrate storage dam will be constructed on site to accommodate a reduction in size of the storage shed at the Albany Port.

The magnetite concentrate will be transported as slurry by a buried pipeline approximately 110 km to a concentrate dewatering and storage facility at the Albany Port. This pipeline will remain sized for a nominal 10mtpa production rate as proposed in the DFS 2012 to facilitate later expansion.

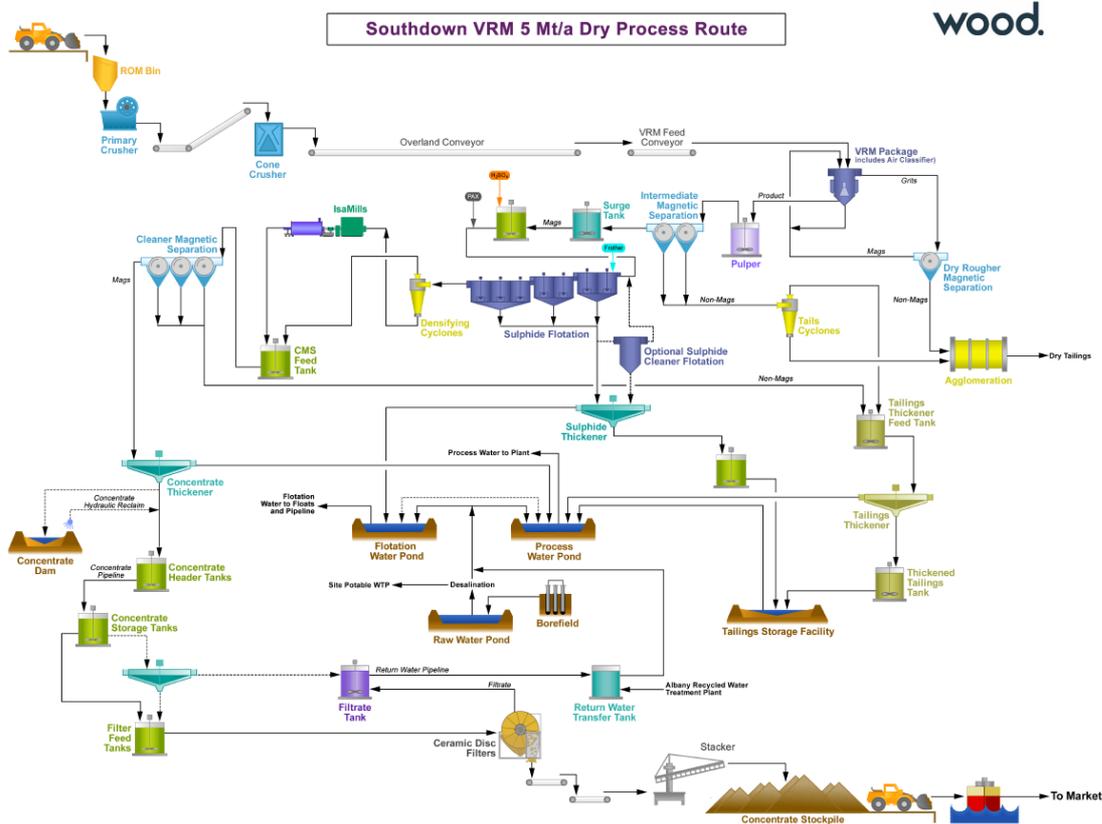


Figure 3: Proposed Concentrator Flowsheet for the 5mtpa PFS 2022

**Port Facilities**

Relative to DFS 2012 this study is investigating a transshipping methodology with reduced on-site storage capacity required at the Port of Albany. This would involve the use of existing land within the Port, subject to commercial agreements with Southern Ports Authority, significantly reducing the development cost required for DFS 2012. It would incorporate the addition of a new wharf at Albany Port’s Berth 5, a filtration plant, a concentrate stockpile shed and a ship loading facility. The magnetite concentrate will be loaded onto a Transshipment Vessel (TSV) and transferred to the larger Cape sized vessels located at an anchorage point in the King George Sound.

In addition to port access and commercial agreement negotiations to further DFS 2012, studies are underway in conjunction with Southern Ports Authority to identify appropriate anchorage points, assess the environmental, community and visual impacts, and facilitate new environmental and operational approvals.

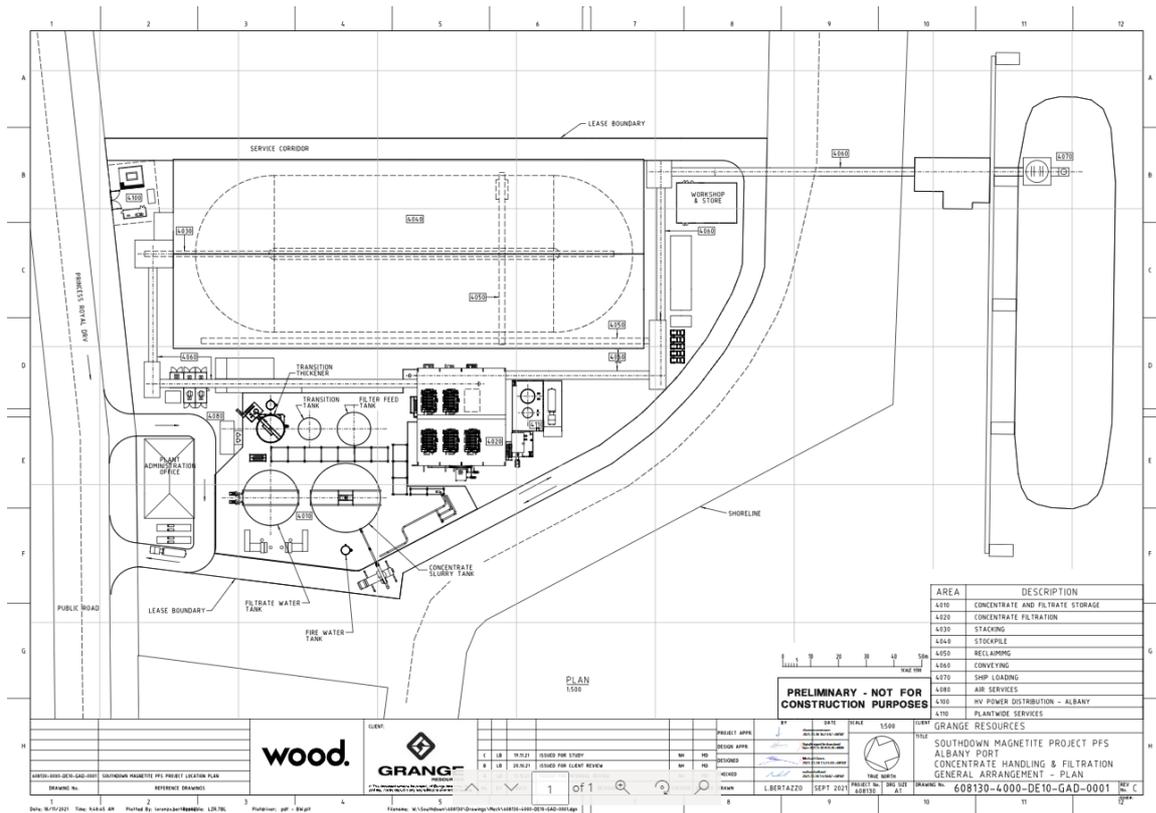


Figure 4: Proposed Port Facility Layout for the 5mtpa PFS 2022

## Water

With the introduction of dry grinding and a reduced capacity in the concentrator, the annual make-up water demand for the 5mtpa option has been reduced from 12 gigalitres per year to 4.26 gigalitres per year, and therefore, construction and operation of a desalination plant would not be required for this option. This can be supplied from a combination of recycled water and various potential groundwater sources in the region. Ground water sources are deep in the sequence, below a clay layer which is expected to restrict any significant impact on the surface water table, environment, or other users. Hydrogeological and environmental studies are underway to confirm predicted negligible environmental impact, as well as negotiations with landowners and stakeholders to gain land access. To align existing ministerial environmental approvals and to maintain security of water supply for project expansion in the long term, approval will be sought to increase the limit of project water requirement in the current mine site approval (Ministerial Statement 816) to align with that already granted for the project's associated desalination plant (Ministerial Statement 904).



## Power

After an evaluation process, it was confirmed the most capital effective solution to delivering reliable power supply with access to a significant component of renewable energy is to establish a transmission line connection to Western Power's Southwest Interconnected System (SWIS), as it was for the DFS 2012. A third-party provider has been engaged to undertake early works to assess the currency of the transmission line route. These works are ongoing, including environmental surveys and assessments, with landholder and other stakeholder negotiations underway.

PFS 2022 has estimated the installed load at the mine/concentrator site to be 87.6 megawatts. In Albany, a new 22 kV connection at the existing WP Albany 132/22 kV substation would service the port facilities with installed capacity of 13.3 MW.



*Figure 5: Proposed Transmission Line Route for the 5mtpa PFS 2022*

## Environmental Approvals

All material commonwealth and state primary approvals for the DFS 2012 have been secured and maintained in good standing.

While PFS 2022 has been designed within the constraints of the current approvals as far as is possible, some aspects will require revisions to the current approval. The key changes relate to the adoption of groundwater and recycled water to supply the site, seeking approval for all sources to ensure maximum flexibility with minimal potential environmental and social impacts. In addition, approval will be required for project facilities to be constructed and operated at Albany Port Berth 5 and transhipping.

Spring surveys and other baseline studies are in progress. Engagement will continue with stakeholders including landholders, Aboriginal representatives, businesses, government and the wider community.



## Capital Cost Estimate

A capital cost estimate (Capex) was developed for PFS 2022 on the principle of gross maximum price (GMP) basis and will be developed further in a definitive feasibility study if the proposal set out in PFS 2022 is progressed. The capital cost estimate summarised by section in Table 3, is reported in Q4-2021, Australian dollars (A\$) and is derived from a number of currencies and exchange rates.

The total cost estimate covers the engineering design, construction and commissioning of the Project, together with the required facilities and infrastructure.

Capital Cost Area	Total Cost (A\$M)
Mine	23.14
Concentrator	426.55
Pipeline	269.42
Product handling and storage (Port of Albany)	140.31
Plant improvement / infrastructure	81.14
Offsite infrastructure	8.45
General and allowances	59.23
Indirect and owners costs and contingencies	385.72
<b>Total Project</b>	<b>1,393.96</b>

*Table 3: PFS 2022 Capital Costs*

## Operating Cost Estimate

The operating costs were developed by specialist contributors. They utilised the mine schedule, process design criteria and other design documents to support the nominal production of 5mtpa of concentrate and its subsequent logistics to the port and the material handling onto Cape size ships.

The operating cost (Opex) estimate is presented in Australian dollars (A\$) and uses prices obtained at the time. The below table summarises the average operating costs for PFS 2022 to produce 5mtpa of dry concentrate.



Project Cost Area	A\$/t Concentrate
Mining costs	21.75
Concentrator	25.71
Port	4.75
Transshipment	5.30
Overheads	3.10
<b>Total</b>	<b>60.61</b>
Royalties	7.75
Rehabilitation	2.32
Depreciation	11.93
Sustaining CAPEX	1.51
<b>All Cost Total (Ex Albany)</b>	<b>84.12</b>

*Table 4: PFS 2022 Opex costs*

### Economic Evaluation

Revenues were estimated using forecast nominal benchmark iron ore prices and exchange rates provided in commissioned marketing reports from leading experts and independent consultants. The respective reports analyse the steel consumption / production, iron ore market overview, pellet feed demand, value-in-use analysis and future price forecast of the Southdown product.

A financial model has been developed with inputs generated from first principles and the findings of PFS 2022.

The project free cash flows (after tax) were subjected to a discounted cash flow analysis using a discount factor of 10% nominal. The net present value (NPV) of project Free Cash Flow for the 28-year plan is estimated at \$243 million as at the prefeasibility study date, generating an IRR of 12% per annum. This is represented by some \$4.78 billion of Free Cash Flow over this plan, excluding initial capital and is based upon Operating Sales less Opex, Sustaining Capex and ongoing rehabilitation expenditure. For the 28 year mine plan the average concentrate price assumed for this product grade is US\$102.52/tonne FOB at a AUD:USD exchange rate of \$0.71.

Table 5 highlights the sensitivity to the commodity price and the potential upside during periods of elevated Fe ore prices. The high premium for quality concentrate is anticipated to continue based on a growing demand to reduce waste and improve energy efficiency.



	2012 DFS		2022 PFS	
	Long Term Forecast	Long Term Forecast	Average over past 5 years of 65% Index grossed up to 69.5% Fe	Average over past 3 years of 65% Index grossed up to 69.5% Fe
Basis of Fe Price				
Avg LOM Price - US\$/t concentrate	126	102.52	126.19	146.81
Project free cash flow – A\$ M	5,481	3,184	6341	9116
Net present value – A\$ M @10%	979	243	1316	2071
Payback – years	7.6	9	6	5.25
Internal rate of return – %	16.3	12.44	22.46	27.98
Unit rate – A\$/t concentrate	66.5	60.61	60.61	60.61
All in sustaining costs (AISC)– A\$/t concentrate		84.12	84.12	84.12

*Table 5: Comparison of Project Financial Metrics*

### Project Opportunity

The Project provides an investment opportunity for its owners to develop a high grade (69.5% Fe) magnetite concentrate operation. This project will provide high quality raw material for the production of quality Blast Furnace, Direct Reduction pellets, and sinter feed in a market which continues to demand high quality products which attract a significant premium in the market.

The proximity of the Project to established infrastructure in the Albany region, the size of its resource and relative ease of ore extraction combined with Australia's stable political and regulatory environment is a major positive for the Project. It offers the potential for steel groups to enter into long-term off-take agreements with a view to ensuring a secure continuum of iron ore concentrate supply.



## About Grange Resources

Grange Resources Limited (Grange or the Company), ASX Code: GRR, is Australia's most experienced magnetite producer with more than 50 years of mining and production from its Savage River mine and has a projected mine life beyond 2030. Grange produces a high-quality iron ore pellet with low levels of impurities that support reduced environmental impacts for end users.

Grange's operations consist principally of owning and operating the Savage River integrated iron ore mining and pellet production business located in the north-west region of Tasmania. The Savage River magnetite iron ore mine is a long-life mining asset. At Port Latta, on the north-west coast of Tasmania, Grange owns a downstream pellet plant and port facility producing more than two million tonnes of premium quality iron ore pellets annually.

Grange has a combination of spot and contracted sales arrangements in place to deliver its pellets to customers throughout the Asia Pacific region. In addition, Grange is a majority joint venture partner in a major magnetite development project at Southdown, near Albany in Western Australia.

This announcement was approved for release by the Board of Directors.

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