



**Breakaway  
Research**

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### Company Information

ASX Code	CAP
Share Price	A\$0.11
Ord Shares	124m
Options	4.1m
<b>Market Cap (FD)</b>	<b>A\$14.09m</b>
Cash (Dec '13)	A\$6.23m
Total Debt	A\$0m
<b>Enterprise Value</b>	<b>A\$7.86m</b>

### Board and Management

Non-Exec Chairman	Nick Sheard
Managing Director	Quentin Hill
Non-Exec. Director	Bob Hair
Non-Exec. Director	Bin Cai
Non-Exec. Director	Dr. Neil Williams
Non-Exec. Director	Paul Cholakas
Exploration Manager	Doug Brewster
Company Secretary	Chris Powell

### Substantial Share Holders

Silvergate	17.2%
Conglin Group	11.4%
NEFCO	4.5%
Board and Management (inc. options)	15.5%

### Company Details

Address	Level 6, 345 Ann Street Brisbane Qld 4000 Australia
Phone	+617 3220 2022
Web	www.carpentariaex.com.au

### 1 Year Price Chart



# Carpentaria Exploration (CAP)

*Iron Ore Development Project With Infrastructure  
Prospective Gold Tenements*

**Recommendation: Speculative BUY**

## Key Points

- **Key Hawsons Iron Ore Project near Broken Hill, with potential access to infrastructure to support an 8-10Mtpa magnetite concentrate operation**
- **Current JORC compliant inferred resources of 1.4B tonnes for 220Mt of premium magnetite concentrate**
- **Indicative economics point to a viable project**
- **Prospective intrusion related and porphyry related gold projects in the Lachlan and New England Fold Belts of New South Wales**
- **Gold projects located over historical workings, with encouraging exploration results to date**

*Carpentaria Exploration is primarily a western New South Wales iron ore developer, with 60% ownership of the Hawsons Iron Ore Project. The Project, for which positive economics are indicated, is well served by infrastructure, including power, rail, port and a skilled workforce in Broken Hill. Carpentaria also has a second string to its bow, actively exploring a package of tenements in New South Wales prospective for intrusion related gold and porphyry related gold/copper deposits.*

## Company Overview

Carpentaria Exploration (ASX: CAP), along with 40% JV partner Pure Metals, continues to assess development of the Hawsons Iron Ore Project, located near Broken Hill in western New South Wales. The Company has recently completed a positive project review, and now is looking to progress through the feasibility phase, for which funding is required. A key to the project is that it is well served by infrastructure, with potential available capacity for production of up to 8-10Mtpa, thus minimising capex and lead times. In this, Carpentaria is unique when compared to its peers. There are also potential infrastructure synergies with other projects and companies in the region.

With Pure Metals currently managing the Hawsons project, Carpentaria has the resources to actively explore its package of 100% held intrusion related gold and porphyry related copper/gold projects in central and northern NSW. These prospective projects are largely located over areas of known mineralisation, however with little modern exploration.

The Company has a Board and management team with a proven track record in industry and government that has pro-actively managed projects.

We see short term price appreciation on the back of obtaining a partner to fund the Hawsons DFS and any exploration success on the gold projects, with medium to longer term appreciation to be driven by ongoing advancement of all projects. Accordingly, we rate Carpentaria as a Speculative Buy.



## Summary and Investment Thesis

### Two-Pronged Approach, Viable Projects

*Two pronged approach – iron ore and gold*

The Hawsons Iron Ore Project (“Hawsons” or “the Project”), of which Carpentaria holds 60%, is the key project. This is a large scale, long term project that requires significant capital expenditure. It has the potential for significant value add in the longer term, with ongoing project advancement.

The second string to Carpentaria’s bow is the portfolio of 100% owned NSW gold exploration projects, which it is currently exploring. The Company has targeted areas of known mineralisation that could be classified as intrusion-related gold systems (“IRGS”), as well as porphyry-related gold-copper mineralisation. Our view is that exploration success on any of these projects should provide the shorter term “sizzle” in the price.

### Company Strategy and Activities

*Pro-active strategy in project advancement*

On the broader front, since the 2007 IPO, Carpentaria has had a strategy of rolling over projects, driven by the experienced and pro-active Board and management team. Rather than “flogging a dead horse”, the Company has either sold, joint ventured out or dropped projects that it considers will not give returns to shareholders, and then actively sought new projects. Carpentaria has made discoveries, including Hawsons, which is now its key project.

*Key strategy now to develop the Hawsons Project using existing infrastructure*

Carpentaria’s primary strategy and focus now is to develop the Hawsons Project, initially using existing infrastructure. Although the Company has recently completed a project study, various regulations do not permit the release of proposed production and financial results for studies made using inferred resources; therefore any numbers below are our estimates. The Company released a positive pre-feasibility study in 2011 for a larger 20Mtpa operation under the previous regulatory regime.

*Available infrastructure capacity for 8-10Mtpa*

The Company has identified power, rail and port capacity to possibly support an 8-10Mtpa concentrate operation, with concentrate being railed to Port Pirie for transhipment to Capesize vessels offshore.

*Funding required for BFS – looking for project equity partner*

To develop the strategy the Company will need funding to initially carry out a definitive feasibility study (“DFS” ~A\$25-30 million), and then development funding to cover our estimated \$1.5 - \$1.7 billion capex of the project. The Hawsons JV is actively seeking an equity partner to take the project forward, and the advantages the project has due to access to existing infrastructure should make it an attractive proposition.

*Increasing Chinese reliance on the seaborne trade*

Given falling Australian DSO grades, declining Chinese magnetite production and increasing Chinese reliance on the seaborne trade we see future potential for an increase in demand for premium quality magnetite ore from Chinese steel mills, which would be natural equity partners for the project. We see synergies here with Pure Metals and major shareholder Conglin having links to Chinese steel mills.

*Potential for future project expansions*

There is also the potential to expand the project in the future – this will require new infrastructure, possibly including a slurry pipeline, and either a new port facility or expansions at Port Pirie. There is the possibility of new infrastructure being developed in the region by a 3<sup>rd</sup> party. Hawsons is one of a number of projects in the region; therefore there are potential synergies in developing joint infrastructure.

Carpentaria continues to actively explore their other properties.



## Ready Infrastructure For Hawsons

*Conceptual Hawsons project planned around available infrastructure*

Carpentaria has planned its proposed Hawsons operation around existing infrastructure, with this access to infrastructure a key positive for the Project, and which makes it unique in the region. This infrastructure includes the Trans-Australian Railway, port facilities at Port Pirie and readily available grid power. In addition to significantly cutting capital costs, this should also decrease the project development time. The Company has signed MoU's with rail and port operators.

A potential water source some 80km to the south of Hawsons has been identified, however the water is saline and some desalination may be required for processing purposes.

In addition there is a ready residential workforce in Broken Hill, located some 60km to the NE, thus obviating the need for onsite accommodation.

## Simple Mineralisation

*Simple mineralisation, low BWI, potential for low cost mining and processing*

The mineralisation at Hawsons is hosted in 400-500m thick sequences of moderately dipping ironstone. This will allow for low strip ratio open cut mining, with minimal dilution, thus offsetting the low concentrate recoveries of 15.3%. The material is also soft and has a low Bond Work Index ("BWI") of 6-7kWh/t, again helping to keep operating costs in check through low power requirements when compared with banded iron style magnetite deposits, which commonly have BWI's of greater than 20kWh/t.

Another positive of the style of mineralisation is that it should only take limited drilling to increase the confidence of the resource – this has been already shown by a good conversion from exploration target to inferred resource in the "Core" and "Fold" areas with 400 x 100m spaced drilling.

*Potential for premium, low contaminant concentrate*

Metallurgical testwork to date indicates upgrading to a premium 69% Fe, low contaminant concentrate using an industry standard 38µm grind.

## Positive Indicative Economics

*Our view, on indicative figures, is that the project is economically viable*

Given that Carpentaria is unable to release results from their recent revised project study, we have estimated the economics of the project, using various public sources. We note that these figures are indicative only.

Our view is that the capital expenditure will be in the order of \$1.5-\$1.7, using a capital intensity of \$150-\$170/tonne of concentrate produced for a 10Mtpa, 20 year operation. Similar planned projects, but with the need to build infrastructure, have a capital intensity in the order of \$200-\$270/tonne of product.

We estimate total cost of production (CFR Tianjin) in the order of A\$90/tonne, with revenue of A\$130/tonne. Total costs include:

- FOB operating costs of A\$62/tonne, including royalties
- Initial and sustaining capital amortised at A\$12/tonne
- Sea freight of A\$16/tonne.

Revenues are based on a long term US\$100/tonne, 62% Fe fines CFR (Tianjin) price (US\$1.61/dmtu) adjusted for grade, and a long term AUD/USD exchange rate of 0.85:1.



## Peer Comparison

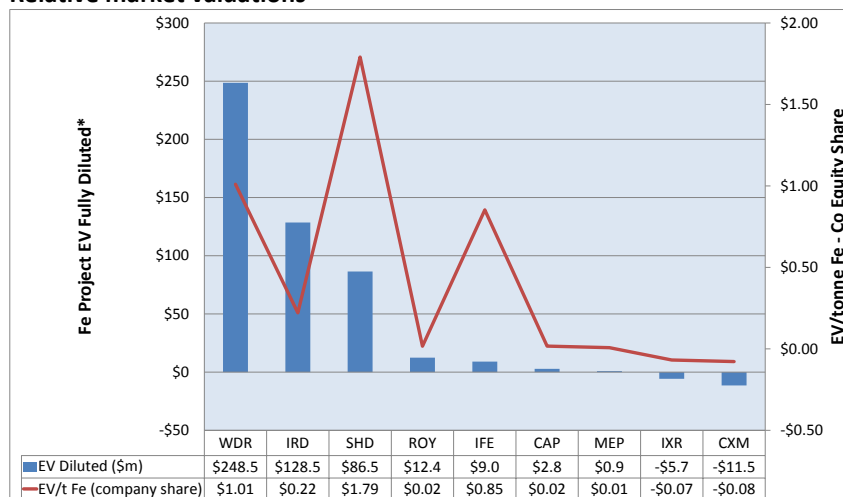
The table and chart below present a number of companies which are either operating in South Australia or have sedimentary iron deposits.

### Peer Comparison

Company	Project/ Area	Project Stage, Iron Resources	Comments	Infrastructure
<b>Carpentaria Exploration</b>	Hawsons Braemar, NSW	PFS Completed 1.4Bt @ 20% <sup>1</sup>	Potential for up to 10Mtpa, our estimates \$1.5-\$1.7Bn capex.	Slurry pipeline (~60km) to existing standard gauge rail, rail (350km) to transshipment port, Port Pirie
<b>Centrex Minerals</b>	Eyre Peninsular, SA	PFS 1.03Bt @ 27%	JV's with Chinese partners who are operators. Proposed 10Mtpa, \$2.6Bn project at Fusion	Proposed slurry pipelines to CXM owned proposed Port Spencer, eastern Eyre Peninsular
<b>IMX Resources</b>	Cairn Hill et al, Coober Pedy, SA	Producer, 1.7Mtpa DSO 586Mt @ 27.8%	Significant part of value in Tanzanian nickel. Cu in Fe ore	Rail to Port Adelaide
<b>Ironclad Mining</b>	Wilcherry Hill, Eyre Peninsular, SA	Developer 37Mt @ 36.2%		Double road trains - closed containers - to transshipment port at Lucky Bay, Eyre Peninsular
<b>Iron Road</b>	Eyre Peninsular, SA	DFS for 20Mtpa 3,69Bt @ 15.8%	Capex of A\$4Bn on 2014 21.5Mtpa BFS	New ~100km standard gauge rail from site to proposed capesize Port Hardy, eastern Eyre Peninsula
<b>Minotaur Exploration</b>	Mutooroo, Braemar, SA	Scoping 1,5Bt @ 20% <sup>1</sup>	Significant shareholdings, other exploration projects – est \$10m	Looking at options. 40.9% holder of project in JV with Sumitomo
<b>Royal Resources</b>	Razorback Braemar, SA	PFS completed 3.9Bt @ 19.8%	MOU with Braemar Infrastructure, Looking at 9.3Mtpa – A\$1.2Bn	Looking at outsourcing infrastructure to Braemar Infrastructure – 350km slurry pipeline and new transshipment port proposed
<b>Sherwin Iron</b>	Roper River NT	Bulk (200kt) sampling 100Mt @ 48.3%	Adjacent to WDR's project area	Possible ~200km slurry pipeline to new barge facility, Gulf of Carpentaria. Now trucking to Darwin Port
<b>Western Desert</b>	Roper Bar, NT	Producer, 1.5Mtpa 611Mt @ 40.3%	1.5Mtpa DSO operation, aiming for 3Mtpa, then looking at beneficiation	165km private haul road to private port at Bong Bong, Gulf of Carpentaria

1: Grades for Minotaur and Carpentaria estimated from DTR recoveries and Royal Resources resource grade.

### Relative market valuations



Source: IRESS, company reports

\*EV is market capitalization (FD) less net cash less other projects. Indicative value for other projects – CAP - \$5m, MEP - \$10m, WDR - \$5, IXR - \$5m

Two of these, Western Desert and Sherwin Iron are currently mining DSO material in their Roper River area operations; however there are large resources of iron in the Sherwin Iron Formation that the companies are looking at beneficiating.



*Company analogues include Royal Resources*

The closest analogues to Carpentaria are Royal Resources and Minotaur, which both have projects in the Braemar Iron Formation. Royal are looking at a similar project scope to Carpentaria, however they are investigating the use of proposed new 3<sup>rd</sup> party infrastructure, including a slurry pipeline and transshipment port to be built and operated by Braemar Infrastructure.

*We would expect a re-rating of Hawsons with resource upgrading and progress through to a BFS*

We have calculated relative market valuations and enterprise value per tonne of contained iron for the companies' share of the iron projects. In doing so we have estimated the iron grade for Carpentaria and Minotaur so as we can get a direct comparison with the others that have supplied grades. These two have provided DTR figures only, and the estimated grade of 20% we have used is based on Royal Resources.

This method of relative valuation is indicative only, and needs to be treated with caution, however we would expect a rerating of Carpentaria's EV/t with upgrading of the resource and progress through to a BFS, as has been the case with Iron Road.

We note CXM's negative EV – this is by virtue of a cash position of \$50m relative to a market capitalisation of \$38m. In the current market we have seen a number of examples of companies with large cash reserves being valued on cash, with no value being ascribed to projects, even those with merit. There is a similar case with IXR.

## Risks

*We see little technical risks at Hawsons*

We see only little technical risk for Hawsons, given the simple mineralisation and results of work to date. This work also indicates the potential for considerable resource expansions, and only limited drilling is required to upgrade the level confidence of the existing inferred resource. The only concern we have is the low DTR recovery, although this is somewhat mitigated by the low strip ratio and softness of the mineralisation, and is similar to peers.

*Significantly de-risked with regards to infrastructure*

A key to any bulk commodities is infrastructure. By virtue of having infrastructure in place, Carpentaria is largely de-risked in this regard and unique amongst its peers. However, our understanding of Port Pirie is that there may be issues in stockpile placements, and the movement of ore from the stockpiles to the barge loading facilities. Flinders Ports is however looking at various operational and expansion options.

*Key risk will be obtaining funding for the DFS, and potential project development*

Another key risk is obtaining funding for what is one of a number of broadly similar projects, and hence a competitive market for capital in the wider region. This is exacerbated by the current tight capital market. On the other hand, the access to infrastructure makes Carpentaria a potentially more attractive proposition to any incoming partners due to a lower capital cost and shorter development timeframe.

Permitting is another risk to consider in all potential mineral resources projects. Again this is somewhat mitigated by Hawsons being granted the status of "NSW State Significant Project", which demonstrates the NSW Government's support for the project. Native Title has also been extinguished over the project area, and the EIS is well underway with completion planned for early 2015.

As in all resources projects, product pricing and exchange rate movements are risks. Analyst views are for long term 62% CFR prices in the order of US\$100/tonne, levels at which Hawsons will in our view remain viable, when associated with forecast AUD: USD exchange rates at or below current levels.

*Exploration is the key risk for the other projects*

Finally, the key risk for Carpentaria's other projects is exploration risk, typical for early stage exploration properties.



## Project Review

### Introduction

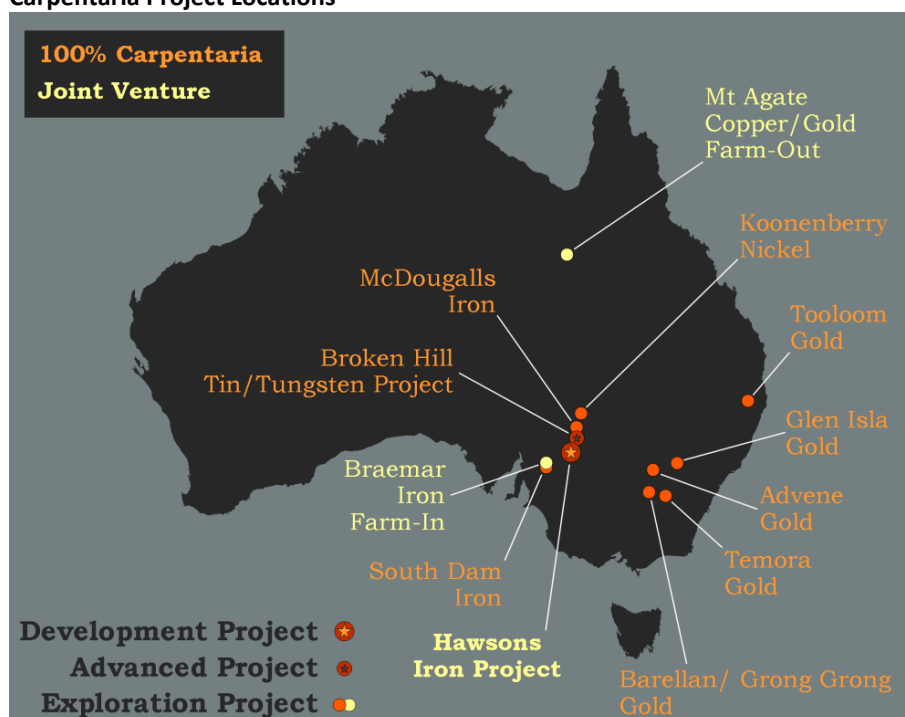
Carpentaria has a diverse range of exploration projects, largely in NSW and SA. The key projects covered in this report include:

*Carpentaria has a diverse portfolio of properties*

- Iron ore – Hawsons NSW, Braemar South, SA, a Carpentaria discovery
- Intrusion-Related Gold – Central Lachlan Gold Project, NSW (Grong Grong, Barellan and Advene), Tooloom, NSW
- Porphyry Related Gold-Copper – Temora, NSW

Carpentaria's main focus is on the Hawsons Iron Ore Project, which is managed by their JV partner, Pure Metals. Over the last year Carpentaria has picked up projects considered prospective for the relatively recently recognised IRGS types of mineralisation, over which the Company is carrying out ongoing exploration.

### Carpentaria Project Locations



Source: Carpentaria Exploration

### Hawsons Iron Ore Project (CAP 60%, Pure Metals 40%)

*CAP has a 60% interest in the Hawsons Iron Ore Project*

Carpentaria Exploration is in a 60:40 Joint Venture with Pure Metals covering four Exploration Licences (510 km<sup>2</sup>) and one Mining Lease Application (187 km<sup>2</sup>) approximately 60km SW of Broken Hill in western New South Wales.

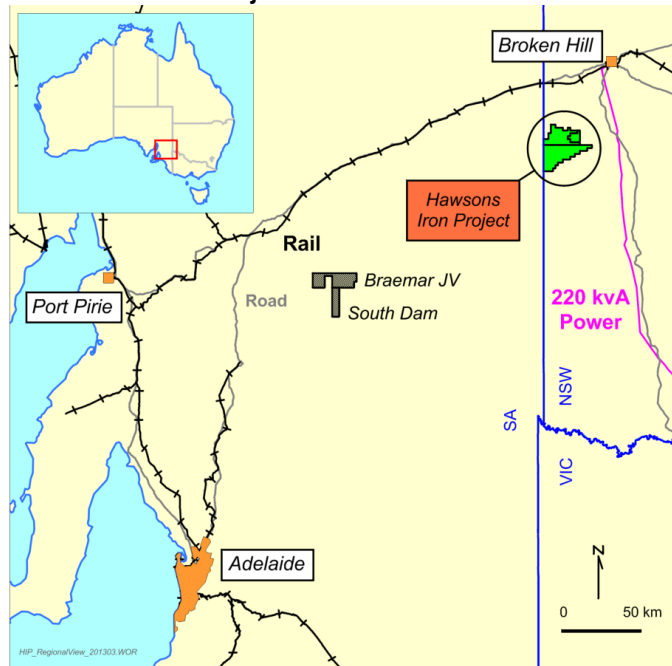
*The Hawsons project includes three EL's and one MLA*

The area is part of a new iron ore province covering the Braemar Iron Formation, with other ASX-listed players including Royal Resources and Minotaur Exploration.





### Hawsons Iron Ore Project Tenements



Source: Carpentaria Exploration

### Ownership

The Project is held 60% by Carpentaria and 40% by Pure Metals, a private Company associated with Silvergate Capital Ltd, which holds a 17.2% interest in Carpentaria.

*Carpentaria are in a 60:40 JV with Pure Metals*

Pure Metals entered into the Joint Venture on May 6, 2013 through buying the previous JV partners Bonython Mineral Group's ("BMG") 40% from the BMG liquidators, and accepting, amongst others, the following terms from Carpentaria:

- Pure Metals to sole fund \$5 million to progress the feasibility studies over a term of 12 months (this term ends on May 6, 2013), after which both parties shall fund pro-rata
- Pure Metals to reimburse Carpentaria \$3.8 million in previous exploration costs in two tranches – these payments have been completed with \$1 million being paid on May 6, 2013, and the second, \$2.8 million tranche payment being announced to the market on September 30, 2013
- Any equity interest in the Project from new partners to be split pro-rata between Carpentaria and Pure Metals

### Strategy and Work Programme

Carpentaria recently completed a revised study for the Project, however the Company cannot publicly release results as the resource is only Inferred. Our view is that the strategy will be to initially produce and ship potentially 8-10mtpa of high grade magnetite concentrate largely using existing infrastructure through Port Pirie. The scale of the project has been designed around the existing infrastructure capacity.

Future options include expansion of the project, utilising new infrastructure, possibly provided by a 3<sup>rd</sup> party, or by expansions to existing infrastructure.

The Joint Venture now plans to progress to a DFS, with Carpentaria expecting that this will cost in the order of \$25-30 million. Timing will depend on funding; including attracting another equity partner, ideally one that will require offtake such as a steel mill.

*Our view is that the strategy will be to produce 8-10Mtpa of concentrate*

*DFS will cost in the order of \$25-30 million – timing is contingent upon obtaining funding*



*Additional drilling is required to upgrade the resource, however will not be too onerous*

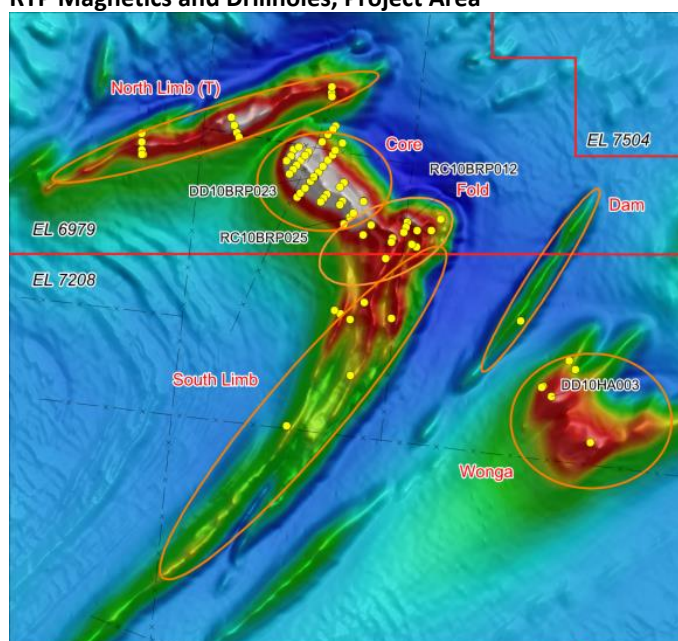
Given that the current resource is in the Inferred category, this will require additional drilling to upgrade areas to the Indicated and Measured categories to allow reserves to be calculated. The style and continuity of the mineralisation lends itself to excellent resource conversion rate – this was previously evidenced by excellent conversions from targets to inferred resources at the “Core” and “Fold” anomalies, and we infer that any such drilling programme will not be too onerous, and will return positive results.

## Geology, Mineralisation and Resources

*The Project is located over the laterally extensive Neoproterozoic Braemar Iron Formation*

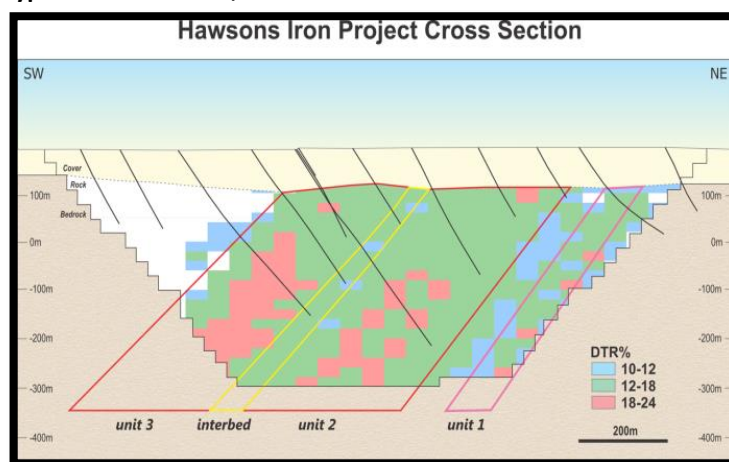
The Project is located over the Neoproterozoic Braemar Iron Formation, a unit within the Adelaide Fold Belt. The unit has been folded and metamorphosed to upper greenschist facies and forms a series of laterally strike extensive magnetite-bearing siltstones. The Braemar Ironstone is expressed in aeromagnetic data as a series of parallel, narrow high amplitude magnetic anomalies.

### RTP Magnetics and Drillholes, Project Area



Source: Carpentaria Exploration

### Typical Cross Section, Core Area



Source: Carpentaria Exploration

*Mineralisation is hosted in a series of up to 500m thick, moderately dipping units*

At the key “Core” area, the mineralisation comprises two 300m thick, 45° SW dipping units, separated by approximately 50m of lower grade magnetite bearing material. This geometry will allow for a relatively low strip ratio (after an initial pre-strip) and a low





dilution open pit operation. The mineralisation is overlain by up to 80m of cover and oxidised siltstone.

Mineralisation is open along strike and at depth, and the 2011 initial JORC-compliant resource exhibited a good conversion from exploration target to Inferred resource.

Current resource and exploration targets are given below.

#### Hawsons Iron Ore Project Resources

Category	Tonnage Mt	Magnetite DTR%	Contained Con Mt	Fe%	Al <sub>2</sub> O <sub>3</sub> %	P <sub>2</sub> O <sub>5</sub> %	SiO <sub>2</sub> %	LOI%
Inferred	1,400	15.5 <sup>1</sup>	217	69.9	0.22	0.002	2.5	-3.0
Exploration Target <sup>2</sup>	6,000-11,000	14-17	840 – 1,870	69-71%	N/A	N/A	N/A	N/A

Source: Carpentaria Exploration

1: 12% DTR cutoff, 38µm grind

2: Inclusive of inferred resources

Premium concentrate,  
low contaminants

#### Metallurgy and Processing

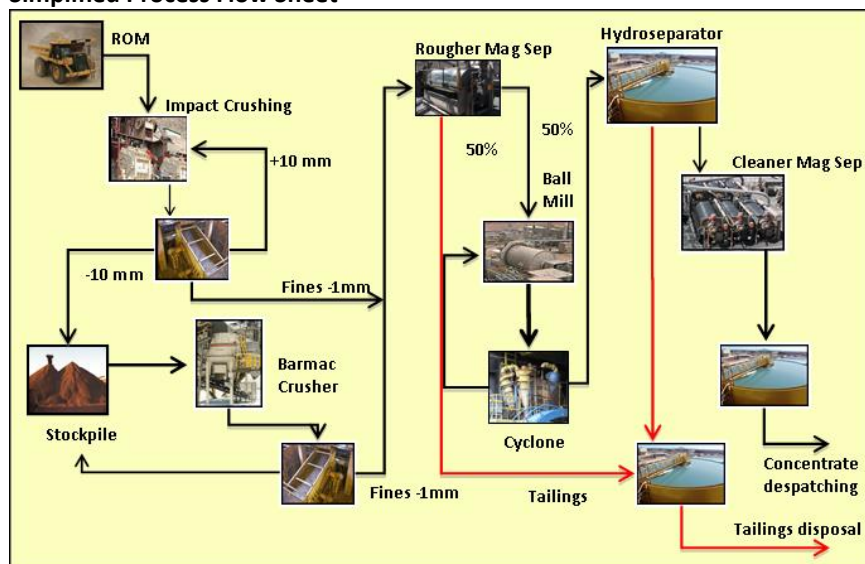
Testwork to date, including pilot ball mill testing and hydro-separator work indicates a high liberation with the potential to produce a high quality, low contaminant magnetite concentrate using a grind size of 38µm, which is a similar grind size to existing operations, including Savage River.

A noticeable feature of the mineralisation is the low BWI, which is in the order of 6-7kWh/t, as compared to a range of 16.0-29.0kWh/T that is typical of banded-iron style iron ore deposits. The upshot is that the energy required to crush the ore is only around a quarter of that of other operations, with concomitant decrease in power costs, a significant cost centre of magnetite operations.

Low BWI of 7kWh/t,  
compared to typical BIF  
figures of 16-29kWh/t

Recent work has resulted in a simplified flowsheet to that used in the original PFS, largely due to the low BWI, which will allow a single stage mill operation, potentially cutting capital and operating costs.

#### Simplified Process Flow Sheet



Source: Carpentaria Exploration

Flowsheet simplified –  
should result in lower  
capex and opex



## Infrastructure

### Introduction

*Infrastructure, at least for initial production, is largely in place*

The key to any successful bulk commodities project is access to infrastructure – in effect these projects are infrastructure plays, and dependent upon sourcing the significant capital required to develop the required infrastructure. Carpentaria is relatively fortunate in this respect, in that infrastructure, at least for the base case 8-10Mtpa scenario is largely in place, and the required capital has the potential to be significantly less than for some other comparable projects.

Expanded production will require new infrastructure to be utilised. Options include a possible collaboration with Braemar Infrastructure (a private entity 20% held by Gordon Toll who have an MOU with Royal Resources), which is looking at a slurry pipeline to a new transshipment port on the Spencer Gulf, servicing cape-size vessels moored offshore.

Carpentaria's plan for the base 8-10Mtpa case is:

*Plans include utilising Trans-Australian Railway and Port Pirie*

- Transport concentrate via slurry pipeline from a minesite concentrator 60km north to a loading facility adjacent to the standard gauge Trans-Australian Railway,
- Rail dried concentrate 350 km by rail in 1.8km (120 wagon, 10,000t) trains to a stockyard in Port Pirie,
- Tranship using 10-20,000t barges from existing berths (channel dredging will be required) to a capesize vessel moored at an offshore transshipment vessel.

### Slurry Pipeline

*Potential to use a slurry pipeline, initially from the minesite to railhead, and then potentially from minesite to port*

The Company is considering transporting magnetite concentrate from the proposed beneficiation plant to the railhead using a slurry pipeline, which will also incorporate a return water pipeline. Such pipelines are well proven, low operating cost ways of transporting concentrates, with examples including Grange Resources' Savage River to Port Latta pipeline in Tasmania and a number of examples up to ~400km long in Brazil.

Longer term expansion of the Project may also include a longer slurry pipeline to a new port facility.

Being buried they are environmentally low impact, with the main impacts being during construction. They are also low maintenance facilities, with the concentrate self-coating and hence protecting the inside wall of the pipe from wear. As an example, the Savage River pipeline has operated for over 40 years without any major issues.

### Rail

*Capacity on rail to support an 8-10Mtpa operation*

In the initial stage of production Carpentaria is looking at operating on the open access interstate rail network (managed by the Australian Rail Track Corporation ("ARTC"), and termed the Designated Interstate Rail Network ("DIRN")), and currently has an MoU in place with Genesee Wyoming Australia ("GWA") to provide the above rail services. The line is standard gauge, with the ability to take 25t axle loads.

There apparently is currently 13Mtpa spare freight capacity on the interstate line, so, assuming existing requirements do not increase significantly, there is the capacity to move 8-10Mtpa from the railhead to Port Pirie. Extra capacity on lines can be relatively cheaply added through the construction of passing loops or improved signalling.



## Port

Carpentaria has signed an MoU with Flinders Ports to use existing port facilities at Port Pirie, located on the eastern side of the Spencer Gulf. This would require transshipping, utilising 10-20,000t barges or self-propelled transshipment vessels transporting concentrate to an offshore mooring/loading facility for loading onto capesize vessels.

Transshipment is currently used by Arrium (ex OneSteel) out of their Whyalla facility.

WPG Resources ("WPG"), prior to the sale of their Peculiar Knob Project to Arrium in 2011, had in place an approved development application for transporting 3.3mtpa of DSO iron ore from their Peculiar Knob Project, utilising the existing berth 7 at Port Pirie. According to WPG, the existing berth 7 facilities are able to handle up to 6-7mtpa through transshipment using a single 10,000t self-propelled transshipment vessel.

Flinders Ports is investigating various options for expanding Port Pirie to up to 20Mtpa, so as it can be developed as a key export port for the region.

## Power

The proposed operation is only 35km from the grid power line that serves Broken Hill. The Company understands that there is available power to support up to a 10Mtpa operation; upgrading would be required to feed a larger operation.

## Water

Carpentaria is currently testing an aquifer located some 80km south of Hawsons, with results to date being positive. This is a saline aquifer, and some desalination would be required.

## Workforce

Being located only 60km from Broken Hill, there will be an available trained workforce. The location will also mean that there will be no requirements for on-site accommodation.

## Indicative Economics

The figures provided below have been estimated by Breakaway and should be considered as indicative only. They have been derived from comparisons with other planned and operating ventures.

The key aspect for Carpentaria is the potentially low capital cost by virtue of using existing infrastructure. From the peer table above, it can be seen that the estimated capital intensity for an all-in project, including rail/slurry pipeline and port, is in the order of A\$200 to A\$270 per annual tonne of concentrate. At the other end of the spectrum, Royal Resources are looking at the option of using proposed third party slurry pipeline and port infrastructure, and thus have a capital intensity of A\$130/annual tonne.

Our view is the capital intensity for Carpentaria, with only some port and infrastructure work required, will be in the order of A\$150-A\$170/annual tonne, or A\$1.5-A\$1.7B for a 10Mtpa concentrate project.

We estimate that indicative CFR costs, including State Government royalties, will be in the order of A\$78/tonne of concentrate. These costs are comparable with those for other planned southern Australian operations.

*Current port capacity for up to 7Mtpa utilising a single transshipment vessel*

*Flinders Ports investigating up to 20Mtpa expansion at Port Pirie*

*Project is 35km from grid power*

*Aquifer identified 80km to the south*

*Ready workforce in Broken Hill*

*Our view is a capital cost in the order of A\$1.5-A\$1.7Bn for a 10Mtpa operation, CFR operating costs of A\$78/tonne of concentrate*



### Indicative Margin (figures rounded to nearest dollar)

Item	Our Estimates – 10Mtpa Con	Per Tonne Figures	Notes
Mining Opex	A\$22/tonne	A\$22	Strip Ratio of 0.46:1, ore concentration ratio of 6.5:1
Beneficiation	A\$10/tonne	A\$10	
Miscellaneous, G & A	A\$4/tonne	A\$4	
Land Transport, Port	A\$22/tonne	A\$22	
<b>Total Opex, FOB</b>	<b>A\$58/tonne</b>	<b>A\$58</b>	
Sea Freight	A\$16/tonne	A\$16	US\$50,000/day capesize charter, offload Tianjin, China
<b>Total Opex CFR</b>	<b>A\$74/tonne</b>	<b>A\$74</b>	
Project Capex	A\$1.6B	A\$8	Capex amortised over 20 years @ 10Mtpa = 200Mt
Sustaining capex @ 3% of revenue	-	\$4	
Royalty @ 4%	-	\$4	Calculated on revenue less transport
<b>Total costs/tonne con</b>	<b>-</b>	<b>\$90</b>	
69% Concentrate price, based on CFR price of US\$1.60/dmtu to Tianjin, ER of AUD:USD 0.85:1	-	\$130	Based on long term \$100/t price for 62% fines
<b>Ungeared margin</b>	<b>-</b>	<b>\$40</b>	

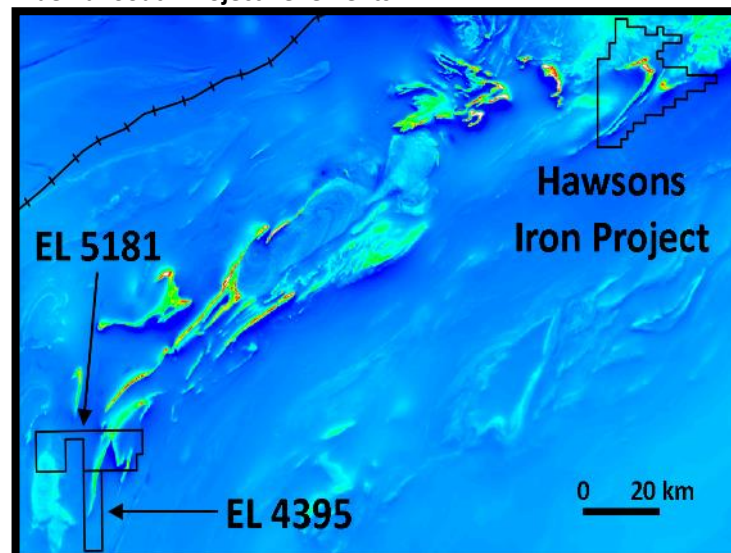
Source: Breakaway analysis

*We estimate a total cost of production (CFR Tianjin) of A\$90/tonne, including capex amortised over the life of mine, resulting in a healthy margin*

### South Dam (CAP 100%)/Braemar JV (CAP earning up to 100%)

The Braemar South Project is located at the southern end of the Braemar Iron Formation, approximately 200km north of Adelaide, and 50km south of the trans Australian rail line. The project comprises two contiguous licences; EL 5181 (Braemar JV, CAP earning 60%) and EL 4359 (South Dam, CAP 100%).

#### Braemar South Project Tenements



Source: Carpentaria Exploration

*The South Dam project is located at the southern end of the Braemar Formation*

The terms of the Braemar JV are that Carpentaria can earn 60% from partners Maosen Australia Pty Ltd by drilling to define a 200Mt inferred magnetite resource by April 2015, and making a cash payment of \$100,000. Carpentaria can then earn up to 100% through additional work.

*Carpentaria earning 60% of the Braemar JV*



*An exploration target of 200-850Mt of concentrate has been identified*

An exploration target of 1.7-3.1 billion tonnes at an estimated DTR of 12-27% for between 200Mt and 850Mt of 63-67% magnetite concentrate has been calculated for the project.

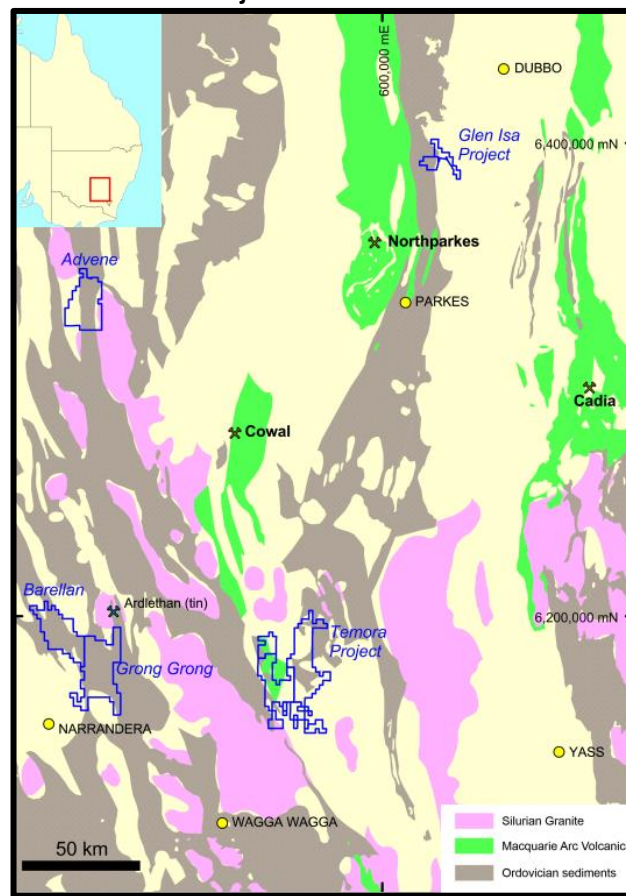
One potential issue regards processing – the magnetite is finer grained than that at Hawsons, and thus may require different and potentially higher cost processing.

## **Other Projects**

### **Central Lachlan Gold Project (CAP 100%), Tooloom (CAP 100%)**

The Central Lachlan Gold Project includes five areas, Grong Grong, Advene, Barellan, Temora and Glen Isla all located in the Lachlan Fold Belt in central and southern NSW. Tooloom, currently under application, is located in the New England Fold Belt in northern NSW.

#### **Lachlan Fold Belt Projects**



Source: Carpentaria Exploration

*The Company has a portfolio of prospective gold projects in the Lachlan and New England Fold Belts*

Grong Grong, Advene, Barellan and Tooloom are considered prospective for intrusion related and orogenic structurally related gold systems (“IRGS” and “OGS”), and contain known mineralisation, whereas Temora and Glen Isla are considered prospective for porphyry and related copper-gold mineralisation.

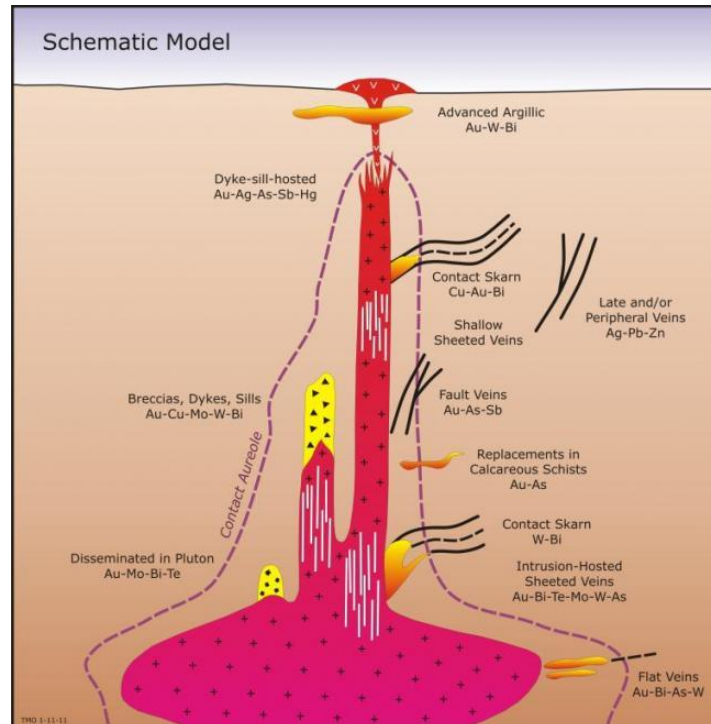
*These are considered prospective for IRGS and porphyry related mineralisation*

IRGS systems are a recently categorised group of deposit styles, with major deposits including Fort Knox (150Mt @ 0.8g/t Au) and Pogo (10Mt @ 15g/t Au) in the Tintina Gold Belt in Alaska. Reinterpretation of Kidston in North Queensland has also led to this being classed as an IRGS. They commonly form around and above small granitic plutons, are marked by a distinct metal zonation over relatively short distances, with a number of different deposit types being attributed to the broader classification.





## Conceptual IRGS Model



Source: Thomson Resources website (5/2/14), after work by Jim Lang and Tim Baker "Intrusion-related gold systems" in *Mineralium Deposita*, V36.

### Advene (CAP 100%)

The Advene area comprises mildly magnetic and potentially altered Ordovician sediments, forming a roof to an underlying Siluro-Devonian granite intrusion, a geological setting consistent with IRGS systems. EL8095 was granted in the June quarter, 2013, and work to date has included geochemical sampling. A topographic feature, the 12km long N-S trending Goobothery Ridge possibly represents a contact metamorphosed roof zone to the underlying granite. This feature has never been systematically explored, with Carpentaria now targeting it in their work.

There are a number of historical workings along the Josephine Moulder ("JM") lode, a north-south trending quartz/sulphide breccia sheet hosted in the regional Yalgogrin fault system. Recent work by Carpentaria has extended the strike of known mineralisation from 500m to 2,000m, and also delineated a new lode, Josephine Moulder East ("JME"), some 200m to the east of JM. In addition, Mt. Wilga, another historic working, is located some 800m to the SE of JM.

This work has included soils and rock chip sampling, with up to 204g/t gold in rock chips. The mineralisation is open north and south along strike, with the only drilling being that carried out by Aberfoyle in the 1980's, from which positive results were never followed up.

Recent soil sampling by Carpentaria has delineated a new soil anomaly to the west of JM, which is open to the west. This sampling has returned very high grades of up to 1.5g/t gold. Carpentaria plans include further extensional and infill sampling, mapping and then reverse circulation drilling.

*IRGS systems are a recently identified type, and include a number of deposit styles spatially related to intrusives*

*Advene is interpreted as being located in the metamorphosed roof zone of a granite intrusion*

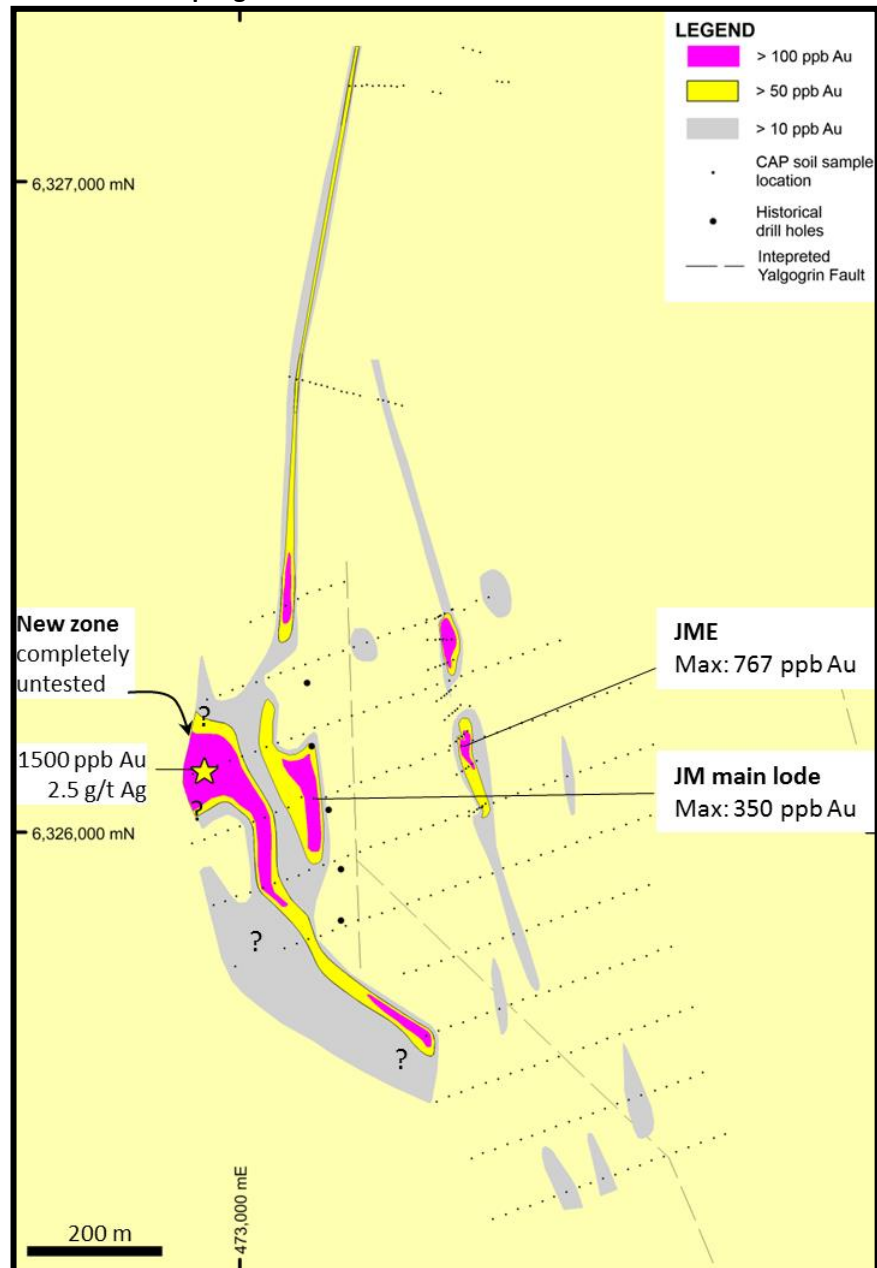
*The area has a number of historical workings, and only minimal modern exploration has been carried out over the area*





### Advene Soil Sampling

*Recent work has identified new gold in soil anomalies at Advene*



Source: Carpentaria Exploration

### Barellan and Grong Grong (CAP 100%)

*Barellan and Grong Grong are located over areas of known gold mineralisation, and close to the Ardlethan tin mine*

The Grong Grong licence (EL 8189) was granted in December 2013, and is adjacent to the Barellan licence (EL 7896), for a combined area of 702km<sup>2</sup>. The licences cover an area of highly deformed and granite intruded Ordovician metasediments, with a number of known mineral occurrences, including the 16,000oz Harry Smith prospect, under which two holes intersected 21m @ 2.5g/t and 20m @ 2.2g/t gold, open along strike and down dip. There are also a number of other little explored gold occurrences.

The area is adjacent to the previously operated Ardlethan Tin Mine; another pointer to the IRGS prospectivity given that IRGS mineralisation commonly has a special association with tin and tungsten mineralisation.

Carpentaria is currently finalising access arrangements for Grong Grong. Once this is complete it is planned to carry out surface geochemical sampling to define targets for future drilling.



*The Temora Project is located over the historic Mother Shipton Mine, and is prospective for porphyry related Cu/Au mineralisation*

### **Temora Project (CAP 100%)**

The 510km<sup>2</sup> Temora Gold-Copper Project is located approximately 80km north of Wagga Wagga in southern NSW, and was granted in early 2011. Following the recent completion of arbitration with the NSW Government, access is now expected to be granted by the end of March 2014 after three years of delays.

The Company plans to drill test the historic and prospective Mother Shipton hard rock and colluvial gold prospect, however is currently delayed trying to get access to the Crown Land on which the prospect is located.

Mother Shipton historically produced 30,000oz of gold, and there are also untested shallow drill intersections including 4m @ 3.95g/t gold.

Mother Shipton is centred over a monzodiorite/gabbro, which is intruding a broad zone of silica/sericite/pyrite alteration in a volcanic sedimentary pile. These features, along with the magnetic signature of the intrusive, are commonly associated with porphyry Cu-Au mineralisation in NSW.

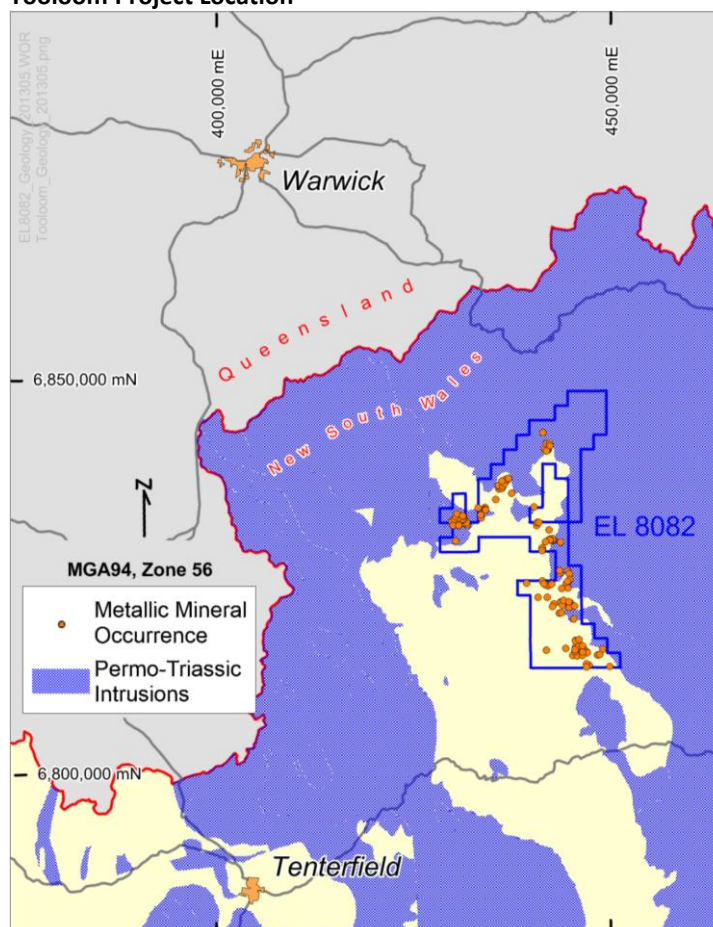
The nearby former Gidginbung Mine produced around 700,000oz of gold.

### **Tooloom Project (CAP 100%)**

*Tooloom EL granted, data review under way*

The Tooloom Project, located over the New England Fold Belt in northern NSW, is considered prospective for IRGS mineralisation, and contains 130 known mineral occurrences. The lease was recently granted, and Carpentaria is currently carrying out a data compilation and review prior to commencing fieldwork.

#### **Tooloom Project Location**



Source: Carpentaria



## **Breakaway's View**

*Carpentaria has an attractive portfolio of diverse development and exploration projects*

Carpentaria has an attractive portfolio of diverse development and exploration projects. These include the flagship Hawsons project, a Carpentaria discovery, which has advantages when compared to other projects in the region, by having access to infrastructure, a key part of any bulk commodities project. The project also has very good technical merit.

*Key is funding the Hawsons DFS*

The key to Carpentaria is now funding, initially for feasibility studies for Hawsons. This may be difficult in the current market (and also by virtue of Chinese parties being spooked by the ongoing problems at Citic Pacific's Sino Project in the Pilbara). There are also a number of similar iron ore projects in the region around Hawsons vying for funding.

The access to existing infrastructure is a key advantage however, and thus makes the project potentially more attractive to new partners by virtue of lower capex requirements and shorter development times. The simple mineralisation and metallurgy are also desirable features, potentially resulting in relatively low mine-site operating costs. Our estimates indicate a financially robust project at forecast iron ore prices and exchange rates.

*We see increased demand for premium magnetite concentrates in the medium to long term*

With China relying more and more on the seaborne iron ore trade (and the big four producers), DSO grades falling and domestic magnetite production falling, we do see increased demand from Chinese steel producers for premium magnetite concentrates sourced from non-big four suppliers in the medium to longer term. We consider steel producers to be the ideal equity/funding partner for Hawsons.

By virtue of Conglin and Pure Metals, Carpentaria do have links into the Chinese mills, which should be useful in brokering any agreements, and retaining fair value for existing shareholders.

*The gold exploration projects have good technical merit*

Our view is that the gold exploration projects have good technical merit, and any exploration success will provide short term share price appreciation. These projects have been acquired recently, and demonstrate the pro-active strategy of the Company in acquiring assets that have the potential to increase shareholder value, whilst prudently discarding those that the Company considers have been tested.

*We see potential for short and medium to long term share price appreciation, and rate Carpentaria as a Speculative Buy*

The above point confirms our view of the experience and quality of company personnel.

We see good potential for appreciation in the Company's share price, which we believe reflects current bottom of market valuations. Potential short term "sizzle" will come from exploration success on the gold projects, and also from attracting funding for Hawsons. Medium to long term appreciation will come from continued advancement of all projects.

As such we rate Carpentaria as a **Speculative Buy**.



## **Board and Management**

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### *Managing Director*

#### **Quentin Hill**

**Quentin Hill** was appointed Managing Director in September 2013. A geologist with over 17 years' experience across a range of commodities around Australia, Quentin has held technical positions with leading mining companies and in government. In his most recent role with Carpentaria as Principal Geologist – New Business, Quentin was a key member of the commercial team, having finalised negotiations over the Hawsons Iron Project Joint Venture. Quentin was Carpentaria's Senior Geologist when the Company listed on the Australian Securities Exchange in 2007 and was integral in the discovery of the flagship Hawsons Iron Project near Broken Hill, also overseeing the successful resource drilling.

### *Chairman*

#### **Nick Sheard**

**Nick Sheard** was Carpentaria's founding Executive Chairman and led the Company's Initial Public Offering in November 2007, maintaining a successful exploration program funded through discovery, strategic project acquisitions and divestments. Nick moved into his new role of Chairman in September 2013. He has over 30 years experience in the industry – most recently Vice President -Exploration for Inco Limited, formerly the world's second largest producer of nickel. Prior to that Nick was the Global Exploration manager for MIM Holdings Limited, after being initially employed by MIM as Chief Geophysicist. Mr Sheard is a Non-Executive Director of Mirabela Nickel Ltd.

### *Non-Executive Director*

#### **Bob Hair**

**Bob Hair** is by background a lawyer with over 17 years' experience in the resources sector. Previously a lawyer, director of subsidiary companies and Commercial Manager and General Manager in the MIM group in Australia, Asia, Europe, North America, South America, and GM Commercial for the ASX listed Highlands Pacific Limited. Mr Hair is Company Secretary of Washington Resources Limited and a Non-Executive Director of Washington Resources Limited and Northern Uranium Limited.

### *Non-Executive Director*

#### **Bin Cai**

**Mr Cai** is the Managing Director of Conglin International Investment Group Pty Ltd based in Brisbane. The Conglin Group is Carpentaria's largest shareholder. Mr Cai has an outstanding record of successful strategic investments in emerging Australian resources companies based on his 17 years' experience in resources investment.

### *Non-Executive Director*

#### **Dr Neil Williams**

Recently retired as Chief Executive Officer of the Australian government's geoscience agency, Geoscience Australia, **Dr Williams** has had a distinguished career spanning all aspects of mineral exploration, both in Australia and internationally. Dr Williams has won numerous Australian and international awards in his field. He has also had a distinguished academic career, currently serving as an Honorary Professorial Fellow at the University of Wollongong, as well as a number of other industry and management bodies including the Queensland Exploration Council.

### *Non-Executive Director*

#### **Paul Cholakos**

**Paul Cholakos** has 25 years industry experience, successfully managing complex development projects for leading oil and gas and diversified mining companies. He holds Master of Business Administration and Bachelor of Engineering degrees. Paul currently serves as Executive General Manager, Project Development of major Australian oil and gas company Oil Search.

### *Exploration Manager*

#### **Doug Brewster**

**Doug Brewster** is a career exploration geologist with 20 years Australian and international experience and is an Eastern Australian exploration specialist. Doug worked initially for CRAE (now Rio Tinto) and then in a senior role at Delta Gold (now Barrick) where he assisted rebuilding their east Australian exploration effort in the late 1990s. He has subsequently operated as a successful mineral exploration consultant providing services to a number of major and junior mining companies. He is experienced in gold, base-metal massive sulphide, porphyry copper, iron-oxide



copper-gold, uranium, diamond, clay and mineral sand exploration. Doug is a member of the Australian Institute of Geoscientists (AIG).

*Company Secretary*

**Chris Powell**

**Chris Powell** has had previous experience across a number of industries in similar roles. He has a wealth of administration and financial knowledge gathered through employment in Senior Management roles in New Zealand and Australia. Chris holds a Diploma of Management and is a member of the Australian Institute of Management (FAIM).

*Hawsons Project  
Manager*

**Ray Koenig**

**Ray Koenig** trained as a metallurgist at Ballarat School of Mines and at the University of Melbourne and has worked in the mining industry for over 45 years in operational, technical and project management roles. His experience in iron ore covers both magnetite and hematite projects in the operational, study and design areas. His early experience at Savage River Mines in Tasmania as Chief Metallurgist and then as Pellet Plant and Port Superintendent has led to further work both in hematite at Robe River optimising production, Channar Iron as due diligence for the Chinese investors and at Hope Downs providing due diligence for both Hancock Prospecting and the banks. He was technical manager for due diligence on the Southdown magnetite project and has provided reviews and valuations for iron ore mines in Australia and overseas. He is now the Project Director for the Hawsons Iron Project.



### **Analyst Verification**

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

### **Disclosure**

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

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