

## Attractive Deal; Funded to Decision to Mine

### Investment Highlights

We believe the recent deal by Cradle Resources (CXX) to sell up to a 50% interest in the Panda Hill Niobium project to Tremont Investments Limited ("Tremont") represents an attractive deal for CXX shareholders. The deal provides a clear path to de-risk the project and potentially provides sufficient funding to reach a decision to mine. It also brings with it a highly successful African mining partner to assist in the project's development. We understand that Tremont conducted an extensive due diligence process on the project prior to the deal, which we believe is a further tick of approval. We continue to rate CXX a Speculative Buy with a price target range of \$0.39-\$0.61/sh.

- Deal Takes Panda Hill Through to Decision to Mine:** Under the agreement, Tremont can earn up to a 50% share in the Panda Hill project in four stages through spending US\$20m. Each stage will consist of US\$5m to earn a 12.5% interest and will progressively de-risk the project. The first US\$5m, which has already been paid, will be used on metallurgy and resource conversion. We have previously identified metallurgical studies as a key area where improvements can be achieved. A Pre-feasibility Study (PFS) is anticipated to be completed by the end of Stage 2 with the Definitive Feasibility Study (DFS) by the end of Stage 3. This is expected to allow for a decision to mine with the final \$5m to be used as part of development expenditure.
- Strong African Partner:** Tremont, CXX's partner, is an African focused mining platform backed by Denham Capital. Its advisors are Pangea Exploration, who have developed in excess of 16 properties in southern and eastern Africa at various stages from development to exploration, in a variety of commodities including gold, vanadium, copper, titanium and coal. Pangea is headed up by South African based Rob Still who has a vast experience in mining, specialising in mining finance. Pangea's geologist, Anton Esterhuizen is recognised as one of the leading authorities in geology in the world and has had a successful career in industrial minerals, coal, base metals and precious metals exploration.
- Sufficient Funding for CXX:** CXX has successfully raised an additional \$3.6m (before costs) at \$0.20/sh through a placement to sophisticated investors. Part of this funding is to be used to payback a short term \$1.5m loan while the Company was in ASX-trading suspension. The remaining funds are expected to provide sufficient working capital until a decision to mine.
- Robust Niobium Project:** We continue to believe that the Panda Hill Niobium project is an attractive opportunity. The scoping study released in January examined a base case, with moderate capital and operating costs, and a second modular option, which is expected to decrease the upfront capital costs by ~30% to US\$125m (from US\$185m). Further optimisations will likely be examined in the PFS.
- Valuation:** Based on CXX's transaction with Tremont our base case valuation decreased slightly to \$0.39/sh (from \$0.42/sh). Our expanded case has reduced to \$0.61/sh (from \$0.67/sh).
- Catalysts:** (1) End September Metallurgical Testwork results (2) Ongoing Drill results (3) Q1/CY15 Preliminary Feasibility Study results (4) Q4/CY15 Definitive Feasibility Study results (5) late 2H/CY2015 Development Decision/Financing (6) 2017 Production.

25 June 2014

12mth Rating

**SPEC BUY**

Price	A\$	0.20
Target Price	A\$	\$0.39-\$0.61
12m Total Return	%	95-205

RIC: CXX.AX

BBG: CXX AU

Shares o/s	m	128.7
Free Float	%	56
Market Cap.	A\$m	25.7
Net Debt (Cash)	A\$m (est)	2.5
52wk High/Low	A\$	0.31/0.15

**Valuation:**

Methodology		DCF
Value per share	A\$	0.39-0.61

**Analyst:**

**Simon Tonkin**

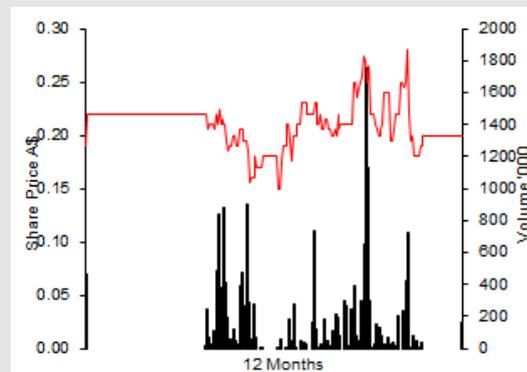
**Phone:**

**(+61 8) 9225 2816**

**Email:**

**stonkin@psl.com.au**

### 12 Month Share Price Performance



Performance %	1mth	3mth	12mth
Absolute	n/a	n/a	0
Rel. S&P/ASX 300	n/a	n/a	0

## Investment Highlights

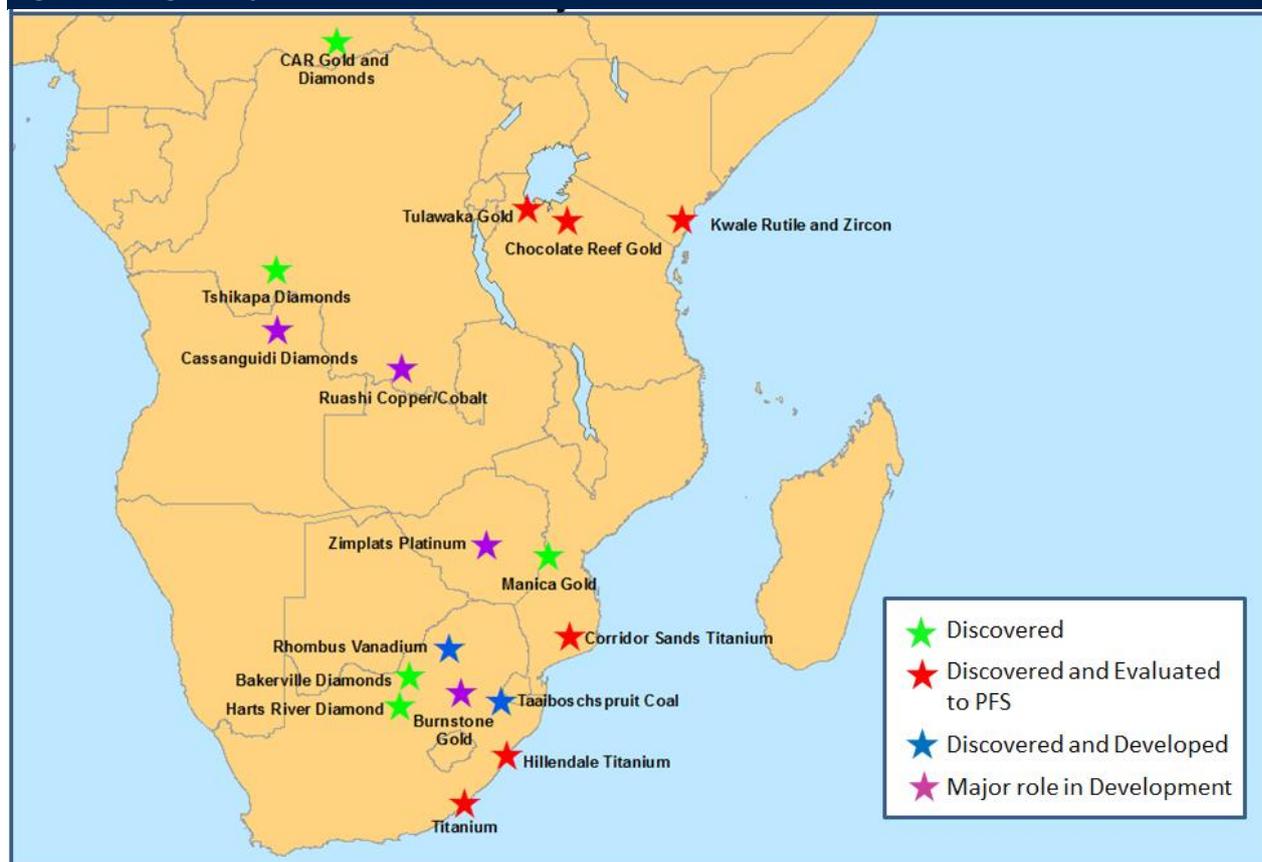
**Deal Takes Panda Hill Project to Decision to Mine:** Under the agreement, Tremont can earn up to a 50% share in the Panda Hill project in four stages through spending US\$20m. The four phases are:

- **Phase 1 (US\$5m earning 12.5%)** – Used for metallurgical and resource conversion.
- **Phase 2 (US\$5m earning 25%)** – Used for completion of Pre-feasibility Study (PFS). Expected to be completed by Q1/CY15.
- **Phase 3 (US\$5m earning 37.5%)** – To be used towards completion of the Definitive Feasibility Study (DFS). Expected to be completed by late CY2015.
- **Phase 4 (US\$5m earning 50%)** – Used for project development funding.

We see the four stages as progressively de-risking the Panda Hill Niobium project. Improvements in metallurgy would increase project economics and provide comfort to Tremont and CXX shareholders.

**Strong African Mining Partner:** CXX has chosen a strong African development focused partner. This will assist in moving the project forward quickly toward a development decision. Tremont's advisors are Pangea Exploration, who have developed in excess of 16 properties in southern and eastern Africa at various stages from development to exploration, in a variety of commodities including gold, vanadium, copper, titanium and coal (Figure 1). Pangea is headed up by South African based Rob Still who has a vast experience in mining, specialising in mining finance. Anton Esterhuizen is recognised as one of the leading geologists in the world and has had a successful career focusing on industrial minerals, coal, base metals and precious metals exploration.

Figure 1: Pangea Projects Southern Africa



Source: Cradle Resources

**Robust Niobium Project; Low Upfront Capital Costs:** In Figure 2, we outline the parameters used in the independent scoping study released in January 2014, which demonstrates a robust Ferroniobium project. Based on these parameters we calculate an NPV of \$332m for the project. The NPV improves to \$466m at the time of a decision to mine. The capital costs were reduced by c19% to US\$185m from previous estimates (Scoping study accuracy of  $\pm$  30% with a 20% contingency). Importantly, the scoping study also outlined a staged case which would start at 1Mtpa for the first three years and then moving to 2.3Mtpa. That case has an upfront capital estimate of US\$125m. Given that CXX has a partner to share the upfront capital requirements, the Company's attributable capital would be US\$62.5m. If CXX was able to secure debt finance for half of this value, it would mean an equity requirement for CXX of cUS\$31.25m. We are currently assuming that CXX uses 100% equity at a 10% discount to the current share price.

**Figure 2: Scoping Study Estimates**

**Panda Hill Niobium Project - Model Assumptions**

FeNb Matte Price	\$/kg Nb	40
Startup	(year)	2017
Mine Life	(years)	28
Throughput	(Mt)	2
Grades (Yr 1-5)	% Nb <sub>2</sub> O <sub>5</sub>	0.71
Grade (LOM avg)	% Nb <sub>2</sub> O <sub>5</sub>	0.57
Recoveries	%	62%
Recovered Metal (Yr 1-5 avg pa)	t Nb	5364
Recovered Metal (LOM avg pa)	t Nb	4851
Matte Grade	%	66
Ferroniobium (LOM pa)	t FeNb	7350
<b>Costs</b>		
Mining	US\$/t	6.1
Processing	US\$/t	30.3
G&A	US\$/t	7.3
Total Costs	US\$/t	43.7
Capex (upfront)	US\$m	185
Sustaining Capex	US\$mpa	3
<b>Financials</b>		
Revenue (LOM Avg pa)	US\$m	188
Costs (LOM Avg pa)	US\$m	88
Gross Profit	US\$m	100
Royalties	US\$m	6
EBITDA	US\$m	95
Tax Rate	%	30%
Royalties	%	3.00%
<b>Project NPV (Based on Decision to Mine)</b>		
NPV (8% Discount)	US\$m	\$693
NPV (10% Discount)	US\$m	\$565
NPV (12% Discount)	US\$m	\$466
NPV (15% Discount)	US\$m	\$357
<b>Project NPV (Discounted Back to Today)</b>		
NPV (8% Discount)	US\$m	\$550
NPV (10% Discount)	US\$m	\$424
NPV (12% Discount)	US\$m	<b>\$332</b>
NPV (15% Discount)	US\$m	\$235

Source: Cradle Resources/Patersons Securities



## Valuation

### Base Case

Based on CXX's transaction with Tremont, our valuation decreased slightly to \$0.39/sh (from \$0.42/sh – Figure 4). The decrease is mainly a result of using a slightly lower CXX share price (\$0.20 vs \$0.22/sh) to raise equity to fund project capital expenditure. We have conservatively assumed that the project is financed using 100% equity for CXX's share, raised at a 10% discount to the current share price. We acknowledge that the final debt/equity mix will be very different; however, this will become clearer as the project is de-risked.

**Figure 4: Cradle Resources – Base Case Sum-Of-Parts Valuation**

<b>Sum-Of-Parts Valuation</b>	<b>US\$m</b>	<b>A\$m</b>	<b>A\$/sh</b>
Panda Hill Project (@12%) CXX Share	\$166	\$177	0.25
Exploration	\$0.0	\$0.0	0.00
Cash	\$2.3	\$2.5	0.00
Debt	0	0	0
CXX Share Payment Remaining 50% option (US\$9m cash + US\$5m in shares)	(7)	(7)	(0)
Unpaid Capital (To Decision to Mine)	\$1.1	\$1.2	0.00
CXX Share of Funding (100% Equity)	\$93	\$98	0.14
<b>Net Asset Value (NAV)</b>	<b>\$255</b>	<b>\$271</b>	<b>0.39</b>

Source: Patersons Securities

The Panda Hill Niobium project is at a relatively early stage of development with the PFS expected to be released in Q1/CY2015. We have calculated CXX share of the project (50%) is worth \$177m based on our discounted cashflow analysis at a 12% discount rate. The higher discount rate is used due to the stage of development and we would consider moving towards a lower discount rate (8-10%) once the project reaches the DFS stage. In our model, we have assumed that Panda Hill Tanzania, which is the holding company of the asset, exercises its four year option to acquire the remaining 50% of Panda Hill. The cost to acquire the remainder of the project is \$14m (CXX's share \$7m).

We estimate CXX's cash position at \$2.5m. This includes the recent placement of \$3.6m, however, we have taken out the \$1.5m in relation to a short term loan used by the Company to fund activities during its time in ASX-trading suspension (June Q 2014). We have also included US\$375,000 in the cash position, this is 7.5% of the first US\$5m payment by Tremont as outlined in the terms of the agreement. 7.5% of the remaining US\$15m to be paid by Tremont for its earn-in is expected to total US\$1.13m.

The financials appear particularly attractive with strong sales revenue of US\$150-\$215m per annum with an EBITDA of US\$112m per annum over the first five years. The tax rate is 30% with a royalty rate of 3%.

## Upside Case/Staged Case

In our upside case we have assumed a staged production scenario with 1Mtpa for the first three years followed by 2.3Mtpa for the remainder of the mine life. We have incorporated the Tremont deal and our valuation for the upside case has decreased slightly to \$0.61/sh (from \$0.67/sh – Figure 5). This decrease is a result of the lower share price and the lower capital requirements which benefit both CXX and Tremont. The upside case attempts to take into consideration that there are elements in the scoping study that appear to be conservative, or require further optimisation, and we have incorporated these into our upside case. We have increased recoveries to 65% LOM (from 62%), this consists of 55% (from 50%) recovery from the weathered carbonatite and 68% (from 65%) recovery from the primary carbonatite. Dependent on the results from the Stage 1 expenditure by Tremont, this could be proved achievable. We have also reduced operating costs by 15% assuming that further cost savings can be made in reagents, power and labour. Finally, we have assumed upfront capital of US\$125m for 1Mtpa and then an additional US\$60m to increase production to 2.3Mtpa. The result is an NPV (@12%) of US\$239m for CXX's 50% and an NAV of \$0.61/sh for CXX.

**Figure 5: Cradle Resources – Upside Case Sum-Of-Parts Valuation**

<b>Sum-Of-Parts Valuation</b>	<b>US\$m</b>	<b>A\$m</b>	<b>A\$/sh</b>
Panda Hill Project (@12%) CXX Share	\$239	\$255	0.49
Exploration	\$0.0	\$0.0	0.00
Cash	\$2.3	\$2.5	0.00
Debt	0	0	0
option (US\$9m cash + US\$5m in shares)	(7)	(7)	(0)
Unpaid Capital (To Decision to Mine)	\$1.1	\$1.2	0.00
CXX Share of Funding (100% Equity)	\$63	\$66	0.13
<b>Net Asset Value (NAV)</b>	<b>\$298</b>	<b>\$318</b>	<b>0.61</b>

Source: Patersons Securities

## Niobium Market

**Major Uses:** Niobium adds significant value to steel products which include: additional strength, durability, anti-corrosion properties, heat resistance and reduced weight. Steel production accounts for 90% of Niobium applications. The US lists Niobium as a strategic metal; however, they do not currently have a stockpile.

The principal Niobium products are:

1) **Standard Grade Ferroniobium** (~66% Nb) makes up 90% of the market. This product is used in stainless steels, heat resistant steels and high strength low alloy steel. Major Industries: automotive, heavy engineering, petrochemical, power plants and oil and gas pipelines.

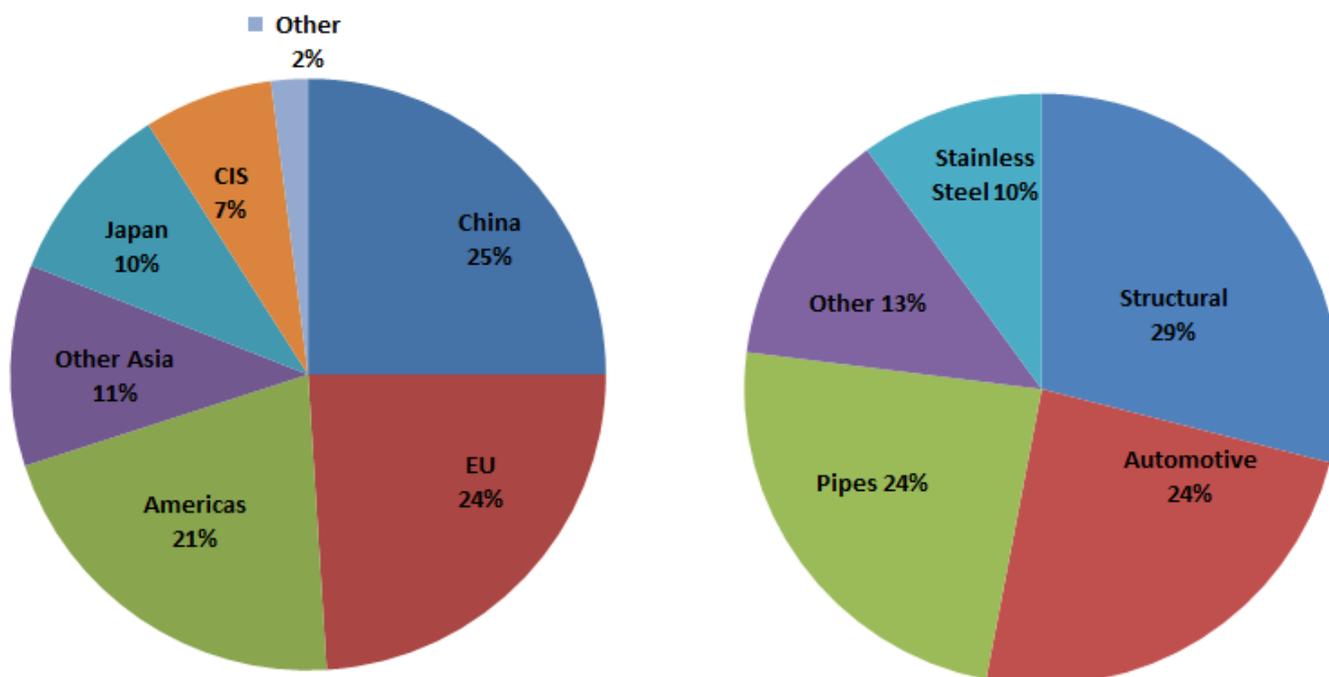
2) **Vacuum Grade Ferroniobium** (99% Nb) makes up 3% of the market and is used in super alloys e.g., Aircraft engines, power generation and petrochemical sector.

3) **Niobium Metals and Alloys** (50-60% Nb) makes up 3-4% of the market and is used in particle accelerators, MRI etc.

4) **Niobium Chemicals** which are used in catalysts and ceramics and makes up 3-4% of the market. Used in optical and electronics.

Major consumers are shown in Figure 6 with China, the European Union (EU), America's and Japan/Other Asia all above 20%.

Figure 6: Global Consumption by Country (left) and Uses (right)



Source: Cia. Brasileira de Metalurgia & Mineracao (CBMM)

**Supply:** Primary world supply of Niobium stands at 51,000t Nb with annual average increase of 10%pa over the past decade (Figure 7).

**Figure 7: World Mine Production and Reserves of Niobium**

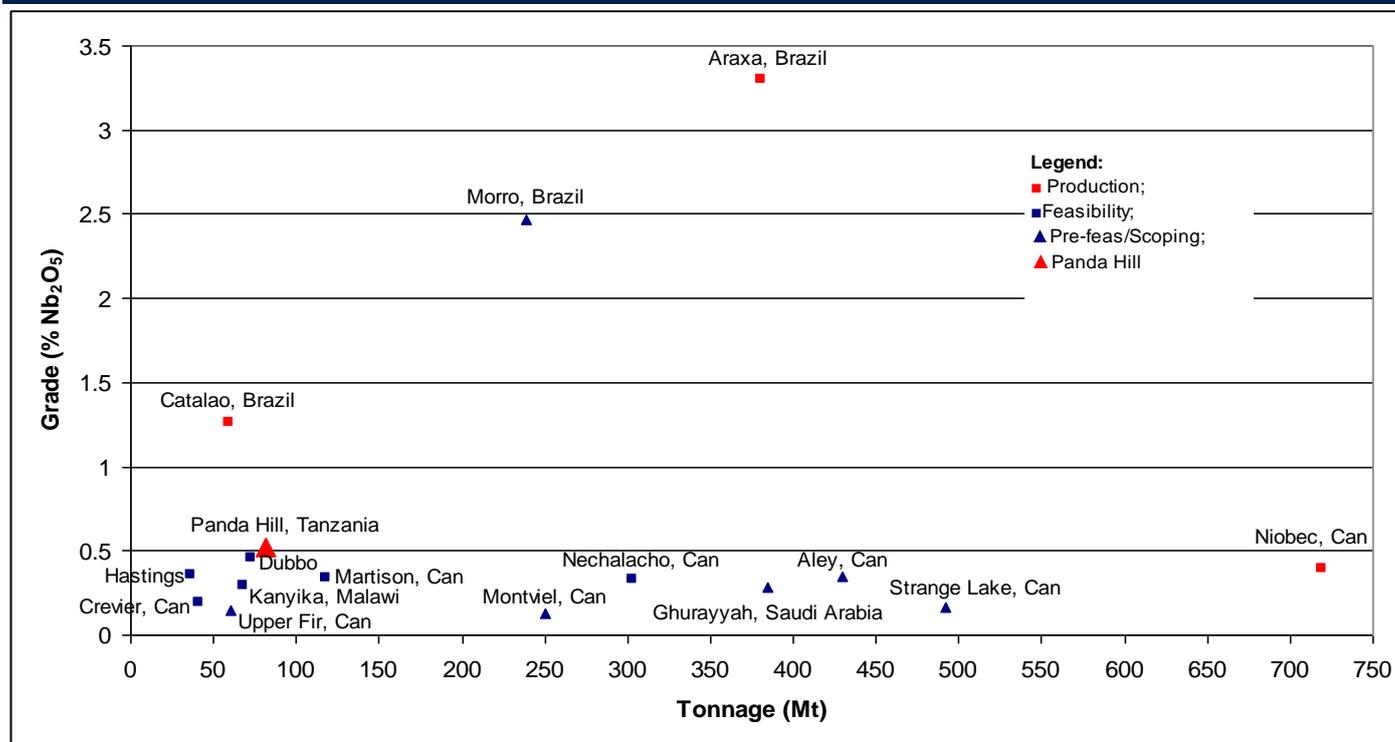
**World Mine Production and Reserves:**

	Mine production		Reserves <sup>8</sup>
	2012	2013 <sup>e</sup>	
United States	—	—	—
Brazil	45,000	45,000	4,100,000
Canada	4,710	5,000	200,000
Other countries	375	700	NA
World total (rounded)	50,100	51,000	>4,300,000

Source: USGS 2014 Mineral Commodity Summary  
(<http://minerals.usgs.gov/minerals/pubs/commodity/niobium/mcs-2014-niobi.pdf>)

There are three existing producers (CBMM, IAMGOLD, Anglo America), of which Niobec (IAMGOLD) produces from a carbonatite very similar to the primary mineralisation at Panda Hill. Brazil is the largest Niobium producer in the world, accounting for over 90% of the world's output, where production is estimated to increase by a further 33% from 2016 (Figure 8 – red squares Araxa and Catalao). Most Niobium deposits were discovered in the 1960's with no new producers since 1976 (although the market has grown substantially). Undeveloped Niobium deposits are characterised by low grade, difficult metallurgy and/or high capital costs. CXX's Panda Hill project (Figure 8 – large red triangle) is the highest grade development prospect (outside of Morro, Brazil). It currently has a lower tonnage than many of the other potential projects, however, it is near surface and is an open cut development proposition with good potential to significantly expand the resource.

**Figure 8: Global Niobium Projects Resource (Mt) vs Grade (% Nb<sub>2</sub>O<sub>5</sub>) Selected Projects**



Source: Patersons Securities

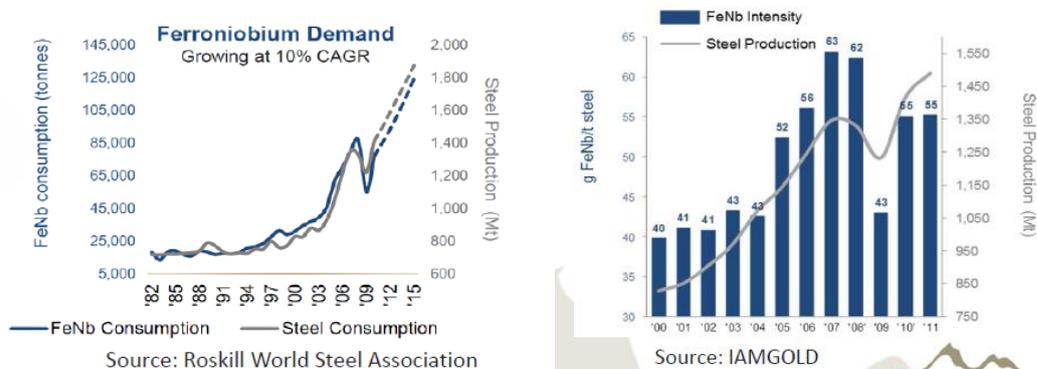
**Demand:** The demand for ferroniobium has grown at a compound annual growth rate (CAGR) of 10% per annum over the last decade and is expected to continue at a similar rate. This has been driven by increased global demand for steel as well as the demand for high quality steel. The demand is being driven by the construction, automotive, oil and gas and the shipbuilding sectors. High strength low alloy steel is used in applications where lightweight steel is required and is subject to high stress. Typically, Niobium content is a small proportion of the overall costs to steel production, with less than 0.5% of the total cost of structural steel containing less than 0.1% Nb. Therefore according to producer IAMGold, Niobium demand is considered relatively insensitive to changes in price. Major importers of ferroniobium are China, Netherlands, Singapore and the US. Major HSLA steel manufacturers are: Arcelor Mittal, CMC Steel, Gallatin Steel (joint venture between ArcelorMittal and Gerdau Long Steel North America), Nucor Steel, SSAB (Sweden and USA), Steel Dynamics, WCI Steel, US Steel.

The following materials can be substituted for niobium, but a performance or cost penalty may ensue: molybdenum and vanadium, as alloying elements in high-strength low-alloy steels; tantalum and titanium, as alloying elements in stainless and high-strength steels; and ceramics, molybdenum, tantalum, and tungsten in high temperature applications.

**Pricing:** The Niobium market is opaque with limited pricing information available. Probably the most reliable source is publicly released information by IAMGold in respect to its Niobec mine. In the March Q 2014, Niobec sold 1.5m kilograms for US\$62m which equates to a price of US\$41.33/kg Nb. We currently use a niobium price of US\$40/kg Nb in our financial model. Pricing has remained relatively stable from 1990's to mid-2006 with significant recent growth due to a concerted effort to market the benefits of Niobium to steelmakers. Long term Niobium pricing indicates a price of circa US\$45,000/t. Niobium growth is expected to increase by 10% per annum, however there has been a short term decrease in Niobium exports from Brazil, which may have the potential to create a shortage.

**Outlook:** The outlook for prices is promising considering the past demand growth of 10%pa CAGR expected from the use of Niobium in steel (Figure 9).

**Figure 9: Ferro Niobium Demand**



Source: Cradle Resources Presentation

## Company Overview

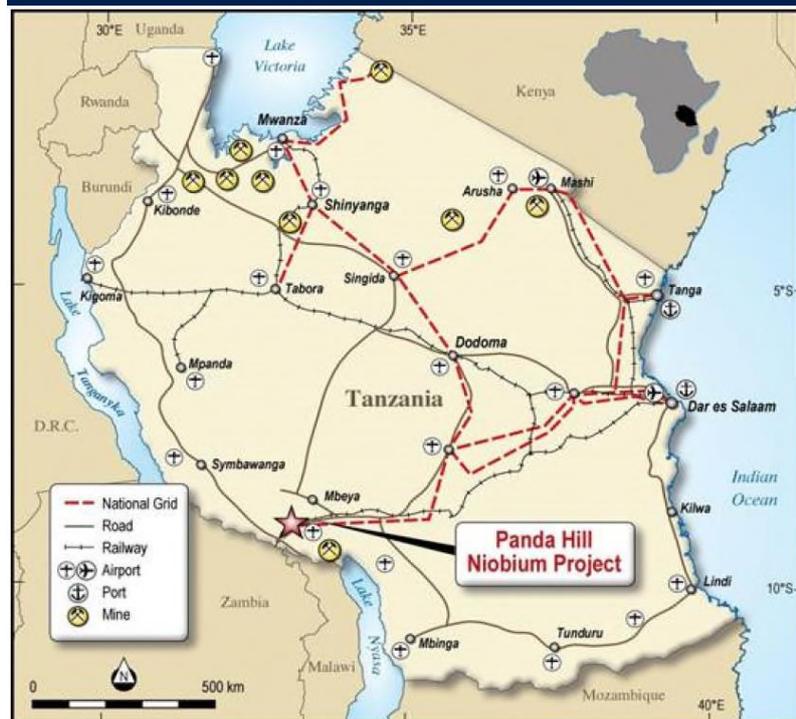
In July 2013, CXX acquired a 50% interest (with an option to acquire the balance within four years) in the Panda Hill Niobium Project in Tanzania. In terms of the Tremont transaction, CXX's ownership will be transferred into a newly incorporated entity known as Panda Hill Tanzania (PHT). It is envisaged that if Tremont is pleased with the economics of the project that it could exercise the project option early. A total of US\$14m (US\$9m cash and US\$5m shares) is payable to the vendors to exercise the option and with PHT moving to 100% ownership of the project. The Panda Hill project is one of a handful of Niobium developers in the world with the market tightly controlled by three large producers and 90% of supply coming from Brazil. The outlook for Niobium is robust given its unique characteristics of strengthening steel while reducing its mass as well as being anti-corrosive. Main areas of growth are in the construction, automotive, oil and gas as well as shipbuilding and aeronautics industries.

## Panda Hill Niobium Project

### Background

The Panda Hill Niobium project is located 26km from the district capital Mbeya in south west Tanzania (Figure 9). The project was first identified by the Geological Survey of Tanzania (GST) who conducted significant exploration work from 1954 to 1963 including excavating numerous pits, development of two shafts and trial mining and construction of a trial gravity and flotation plant on site. Several other companies also completed drilling and metallurgical work in the 70s, 80s and early 2000s. Most recently, the project has been locked up by a single private owner from 2005 who missed the opportunity to realise value during the commodities boom. In June 2012, Panda Hill Mining Pty Ltd acquired an option over the project and arranged an initial JORC resource calculation, a preliminary mine plan and project costs. CXX has acquired 50% of the project from the vendor, which includes three granted mining licences, and is currently in the process of exercising its option to acquire an additional 1%. As shown in Figure 10, the project is well located being in close proximity to established infrastructure (Power, Rail, International Airport, and an Industrial Area).

**Figure 10: Panda Hill Location and Infrastructure**



Source: Cradle Resources - Independent Geologists Report May 2013

## Key Terms of the Tremont Deal

On 11 June 2014, CXX announced that Tremont has the right to contribute US\$20m to acquire a 50% interest in the Panda Hill project, by sole funding development expenditure in four stages. The Tremont interest will be acquired by subscribing for shares in the newly incorporated company (Panda Hill Tanzania Limited or "PHT") into which all of CXX's interest (50% ownership and 50% option) in the Panda Hill project will be transferred.

The four phases are:

- **Phase 1 (US\$5m earning 12.5%)** – Used for metallurgical and resource conversion.
- **Phase 2 (US\$5m earning 25%)** – Used for completion of Pre-feasibility Study (PFS). Expected to be completed by September 2014.
- **Phase 3 (US\$5m earning 37.5%)** – To be used towards completion of the Definitive Feasibility Study (DFS). Expected to be completed by Q2 CY2015.
- **Phase 4 (US\$5m earning 50%)** – Used for development.

The first US\$5m has already been paid. Tremont may elect to make the subsequent subscriptions at the relevant time above, or may at any time accelerate the subscriptions by paying the balance of the US\$20m not already subscribed. PHT will pay Cradle 7.5% of the funds subscribed by Tremont (US\$1.5 million in aggregate) as partial reimbursement of previous development expenditure.

The Board of PHT will consist of 2 representatives from each Party and one agreed independent Director. There will be a Technical Committee to supervise implementation of budgets and work programs with 2 representatives from each Party. Certain significant decisions concerning the operation of PHT will require unanimous approval.

After Tremont ceases sole funding, the Parties will contribute pro-rata to cash calls by PHT (in accordance with their equity interests) or dilute. Any shortfall in pro-rata contribution can be taken up by the funding party or placed to third parties at the best price achievable.

Each Party will have a pre-emptive right to market its share of production from the Project (based on percentage shareholding calculated each quarter).

After sole funding, Tremont may elect to roll up its shareholding in PHT to an equivalent shareholding in CXX (adjusted to take into account the value of any other assets or liabilities of CXX, as determined by an independent expert if required). Any roll up will be subject to relevant regulatory approvals (at the time) including CXX shareholder approval. If there is a successful takeover of CXX, Tremont may implement the roll up or require CXX to purchase its shareholding in PHT for an amount that places Tremont in the same economic position as if it had been able to implement the roll up.

The Parties will have pre-emptive rights over the sale of other shares in PHT. A shareholding greater than 75% of PHT can drag along the minority shareholders. If a shareholder holding 25% or more of the shares in PHT sells prior to completion of funding of development of the Project, the remaining shareholders can tag along in the sale.

## Panda Hill Acquisition Details

On 25 July 2013, CXX completed the acquisition of a 50% interest in the Panda Hill Niobium project with the right to acquire the balance. The consideration paid to Panda Hill Mining Pty Ltd (owned by the shareholders of Verona Capital Pty Ltd) was 37.5m CXX shares (escrowed) and 37.5m performance shares (Figure 11). CXX has a 4 year option to acquire the balance of the project for approximately US\$14m, of which US\$9m is payable in cash and US\$5m in shares or capped royalty. For simplicity, we have used \$14m in cash in our valuation.

The Class A performance rights are expected to be allotted shortly which were conditional on completion of the scoping study. These shares to be issued will be subject to ASX imposed escrow until 1 August 2015. There are a further 18.75m performance rights (Class B performance) to be issued on completion of the DFS if the NPV (10%) is >US\$400m. Between the range of US\$300-US\$400m a pro-rata conversion applies.

In October 2013, CXX agreed to issue 2.625m performance rights to certain employees and consultants. The principal terms and conditions of the performance rights include continuous employment with or provision of services to the Company, and the fulfilment of specific project-related milestones. A total of 787,000 of these performance rights are also expected to be allotted.

We outline CXX's updated capital structure in Figure 11, which includes the share placement and the conversion of Class A performance shares.

**Figure 11: Cradle Resources – Updated Capital Structure**

Class of Security	Code	Number Issued	Tradeable or Restricted	Period of Restriction
Ordinary Shares	CXX	53,690,017	Tradeable	n/a
Placement Shares (@\$0.20/sh)	CXX	18,000,000	Tradeable	n/a
Cleansing Prospectus Shares	CXX	100	Tradeable	n/a
Escrowed Ordinary Shares	CXX	37,500,000	Restricted	Ends 31 July 2015
Class A Performance Shares (to be allotted)	CXX	18,750,000	Restricted	Ends 31 July 2015
Performance Rights (to be converted to ordinary shares)	CXX	787,500	Tradeable	n/a
<b>Basic Shares on Issue</b>	<b>CXX</b>	<b>128,727,617</b>		
Performance Rights		1,837,500	Restricted	n/a
Class B Performance Shares	n/a	18,750,000	Restricted	Ends 31 July 2015
<b>Total Shares (inc. Performance Shares and Rights)</b>		<b>149,315,117</b>		

Options	Code	Number Issued	Tradeable or Restricted	Period of Restriction
Listed Options (ex. \$0.2667 exp 24/1/15)	CXXO	17,947,506	Tradeable	n/a
Unlisted Options (ex. \$0.2667 exp 31/5/16)	n/a	7,687,500	Unlisted	n/a
<b>Total</b>		<b>25,635,006</b>		

Source: Cradle Resources Cleansing Prospectus

## Resource

The Panda Hill deposit is hosted within the Panda Hill carbonatite, an alkaline igneous intrusion of approximately 1.3km in diameter composed primarily of coarse crystalline calcite with broad zones containing the Niobium mineral pyrochlore. The Panda Hill carbonatite intrudes gneisses and amphibolites and is interpreted to have formed in the vent of an alkaline volcano which has been almost completely eroded exposing the crystalline plug. The three active Niobium mines in the world are all hosted in carbonatite. Niobec mines primary carbonatite and CBMM/Anglo American produce from the weathered carbonatite.

CXX updated the Panda Hill resource in November 2013. The updated Resource contains 81.8Mt at 0.52% Nb<sub>2</sub>O<sub>5</sub> for 423,000t of contained Nb<sub>2</sub>O<sub>5</sub> at a 0.30% Nb<sub>2</sub>O<sub>5</sub> cut off (Figure 12). This represents a 50% metal increase compared to the 2012 Resource of 56Mt at 0.50% Nb<sub>2</sub>O<sub>5</sub> for 280,000t of Nb<sub>2</sub>O<sub>5</sub>.

The 2013 Resource incorporates a Weathered Carbonatite zone. This zone is characterised by near surface material which has been enriched relative to the underlying primary carbonatite material.

**Figure 12: Panda Hill Updated Resource Estimate**

Table 1 2013 Panda Hill 2013 Resource – Reported Above a 0.3% Nb <sub>2</sub> O <sub>5</sub> Lower Cut-off			
Combined			
Lower Cut-off (Nb <sub>2</sub> O <sub>5</sub> %)	Million Tonnes	Nb <sub>2</sub> O <sub>5</sub> %	Nb <sub>2</sub> O <sub>5</sub> Content (KT)
Indicated	5.4	0.62	33
Inferred	76.4	0.51	390
<b>Total</b>	<b>81.8</b>	<b>0.52</b>	<b>423</b>
Weathered Carbonatite			
Lower Cut-off (Nb <sub>2</sub> O <sub>5</sub> %)	Million Tonnes	Nb <sub>2</sub> O <sub>5</sub> %	Nb <sub>2</sub> O <sub>5</sub> Content (KT)
Indicated	2.1	0.77	16
Inferred	8.6	0.81	69
<b>Total</b>	<b>10.7</b>	<b>0.80</b>	<b>86</b>
Primary Carbonatite			
Lower Cut-off (Nb <sub>2</sub> O <sub>5</sub> %)	Million Tonnes	Nb <sub>2</sub> O <sub>5</sub> %	Nb <sub>2</sub> O <sub>5</sub> Content (KT)
Indicated	3.2	0.52	17
Inferred	67.8	0.47	319
<b>Total</b>	<b>71.1</b>	<b>0.47</b>	<b>336</b>

Note: Figures have been rounded.

Source: Cradle Resources

## Metallurgical Testwork

Tremont's first US\$5m contribution will be used to conduct more detailed metallurgical testwork with results expected at the end of July and September. These results will be included as part of the PFS due in Q1/2015.

CXX has conducted preliminary metallurgical testwork on the primary carbonatite and mineralogy testwork on the weathered carbonatite. The primary carbonatite makes up +80% of the Panda Hill deposit with grades around 0.5% Nb<sub>2</sub>O<sub>5</sub> and a recovery of 65% used in the scoping study. The weathered carbonatite represents about 19% of the deposit and is higher grade (0.8% Nb<sub>2</sub>O<sub>5</sub>) with a recovery of 50% used in the scoping study. There is scope to improve on recoveries from the weathered and primary material as demonstrated in recent testwork.

In November 2013, CXX released results from testwork conducted at SGS Lakefield on the primary carbonatite ore. A total of 18 bench scale open circuit were undertaken to investigate various circuit configurations and reagent regimes. The final locked cycle test was carried out on fresh carbonatite and achieved a niobium recovery of 70% at a concentrate grade of 59% Nb<sub>2</sub>O<sub>5</sub>. An earlier lock cycle test carried out on primary carbonatite (which is a combination of fresh and lightly oxidised material) achieved recoveries of 60% at a concentrate grade of 46%. There is good scope to improve on the result significantly.

In January 2014, results were released on mineralogy testwork conducted on the weathered material. The weathered cap consists of a combination of breccias, oxidised carbonatites, and limonitic clay types. The theoretical maximum niobium recovery in the flotation circuit, based on the mineralogy work, is between 75% and 82%, at a 55% Nb<sub>2</sub>O<sub>5</sub> grade. This is compared to the theoretical average for the fresh ore at between 85-95%. We note that desliming and other parts of the circuit are anticipated to cost about 20% in recovery in weathered material. Existing Niobium producers are recovering about 50 to 60% overall in weathered material so CXX's mineralogy results are in line with this.

## Risks

**Financing Risk:** CXX may from time to time need to access the equity/debt markets to finance its exploration and development activities. There can be no assurances that this capital will be available at a reasonable cost; therefore, substantial future dilution could result. The deal with Tremont to earn 50% will significantly reduce CXX's capital contribution to move the project into production. As discussed previously in the expanded/lower capital case, CXX would only need to contribute cUS\$30m.

**Country Risk:** Country risks include: (i) potential difficulties in enforcing agreements and collecting receivables through foreign local systems. (ii) potential difficulties in protecting rights and interests in assets (iii) increases in costs for transportation and shipping and (iv) restrictive Government actions such as imposition of trade quotas, tariffs and other taxes. Tanzania ranks 74/96 in the Fraser Institute mining survey (2013).

**Renewal of Title:** Since granting of the Panda Hill Licences there have been previous delays in the development of the Panda Hill Project as a result of delays in agreeing terms with the Tanzanian authorities for the relocation of the Songwe Prison. Following meetings with the Ministry of Mines officials in Tanzania, including the Minister for Mining, CXX does not believe that this will have consequences for renewal of the Panda Hill Licences. However, any application for renewal of any licence comprising the Panda Hill Project involves the exercise of discretion by the relevant government authority. There is no assurance that such renewals will be given as a matter of course and there is no assurance that new conditions will not be imposed in connection with the renewal.

**Metallurgical Risk:** Metallurgical testwork from five bulk samples conducted in 2001 by Euromet suggested that fenite and oxide material yielded poor results using conventional processing due to the refractory nature of that particular ore. It will be important to better map this material. There is some enrichment of other metals in the deposit including rare earth elements, phosphate and their concentration should be monitored. At high enough concentrations these could impact the processing of the material.

**Commodity Risk:** The Niobium market appears to be relatively stable and appears to have a strong growth profile. However, should the world economy continue to slow then steel production may fall which could adversely impact Niobium demand.

**Foreign Exchange Risk:** The majority of CXX's cash reserves are held in Australian dollars. Therefore, with the majority of costs in US dollars, there is currency risk should the US dollar strengthen, which could adversely affect the purchasing power of CXX's cash.

**Tenure:** The three mining licences that host the Panda Hill Niobium project are due to expire on 15 November 2016 and will therefore require renewal. The renewal should be straight forward, however, there are risks associated with this including changes to economic parameters which could be considered under the new mining code.

**Exploration Risk:** Exploration is inherently risky and there is no guarantee that an economic deposit will be delineated. Further drilling is needed to follow-up targets which may or may not result in further discoveries.

**Stock recommendations:** Investment ratings are a function of Patersons expectation of total return (forecast price appreciation plus dividend yield) within the next 12 months. The investment ratings are Buy (expected total return of 10% or more), Hold (-10% to +10% total return) and Sell (> 10% negative total return). In addition we have a Speculative Buy rating covering higher risk stocks that may not be of investment grade due to low market capitalisation, high debt levels, or significant risks in the business model. Investment ratings are determined at the time of initiation of coverage, or a change in target price. At other times the expected total return may fall outside of these ranges because of price movements and/or volatility. Such interim deviations from specified ranges will be permitted but will become subject to review by Research Management. This Document is not to be passed on to any third party without our prior written consent.

**1300 582 256**  
**patersons@psl.com.au**  
**www.psl.com.au**

---

### Research

Rob Brierley – Head of Research	Phone: (+61 8) 9263 1611	Email: rbrierley@psl.com.au
Tony Farnham – Economist	Phone: (+61 2) 9258 8973	Email: tfarnham@psl.com.au
Andrew Quin – Research Strategy Coordinator	Phone: (+61 8) 9263 1152	Email: aquin@psl.com.au
Kien Trinh – Senior Quantitative Analyst	Phone: (+61 3) 9242 4027	Email: ktrinh@psl.com.au
Max Bong – Associate Analyst	Phone: (+61 8) 9263 1647	Email: mbong@psl.com.au
Lisa Moylan – Associate Analyst	Phone: (+61 2) 9258 8960	Email: lmoylan@psl.com.au
Jon Scholtz – Associate Analyst	Phone: (+61 8) 9225 2836	Email: jscholtz@psl.com.au

### Metals and Mining

Simon Tonkin – Senior Resources Analyst	Phone: (+61 8) 9225 2816	Email: stonkin@psl.com.au
Matthew Trivett – Research Analyst	Phone: (+61 7) 3737 8053	Email: mtrivett@psl.com.au

### Oil and Gas

Philipp Kin – Oil and Gas Analyst	Phone: (+61 8) 9263 1664	Email: pkin@psl.com.au
-----------------------------------	--------------------------	------------------------

### Industrials

Martyn Jacobs – Industrial Analyst	Phone: (+61 3) 9242 4172	Email: mjacobs@psl.com.au
Ben Kakoschke – Industrial Analyst	Phone: (+61 3) 9242 4181	Email: bkakoschke@psl.com.au
Conor O'Prey – Industrial Analyst	Phone: (+61 2) 8238 6214	Email: coprey@psl.com.au

### Institutional Dealing

Dan Bahen	Phone: (+61 8) 9263 1274	Email: dbahen@psl.com.au
Michael Brindal	Phone: (+61 8) 9263 1186	Email: mbrindal@psl.com.au
Artie Damaa	Phone: (+61 2) 8238 6215	Email: adamaa@psl.com.au
Paul Doherty	Phone: (+61 3) 8803 0108	Email: pdoherty@psl.com.au
Trent Foxe	Phone: (+61 2) 8238 6265	Email: tfoxe@psl.com.au
Peter Graham	Phone: (+61 3) 9242 4129	Email: pgraham@psl.com.au
Chris Kelly	Phone: (+61 3) 9242 4078	Email: ckelly@psl.com.au
Jeremy Nugara	Phone: (+61 3) 8803 0166	Email: jnugara@psl.com.au
Phil Schofield	Phone: (+61 2) 8238 6223	Email: pschofield@psl.com.au
Josh Welch	Phone: (+61 8) 9263 1668	Email: jwelch@psl.com.au
Rob Willis	Phone: (+61 7) 3737 8021	Email: rwillis@psl.com.au
Sandy Wylie	Phone: (+61 8) 9263 1232	Email: swylie@psl.com.au

*Disclosure: The preparation of this report was funded by the Company in accordance with the terms of an agreement with Patersons. This report was prepared by Patersons and not by the Company.*

**Important Notice:** Copyright 2014. The contents contained in this report are owned by Patersons Securities Limited ('Patersons') and are protected by the Copyright Act 1968 and the copyright laws of other countries. The material contained in this report may not be copied, reproduced, republished, posted, transmitted or distributed in any way without prior written permission from Patersons. Modification of the materials or use of the materials for any other purpose is a violation of the copyrights and other proprietary rights of Patersons.

**Disclaimer:** Patersons believes that the information or advice (including any financial product advice) contained in this report has been obtained from sources that are accurate at the time of issue, but it has not independently checked or verified that information and as such does not warrant its accuracy or reliability. Except to the extent that liability cannot be excluded, Patersons accepts no liability or responsibility for any direct or indirect loss or damage caused by any error in or omission from this report. You should make and rely on your own independent inquiries. If not specifically disclosed otherwise, investors should assume that Patersons is seeking or will seek corporate finance business from the companies disclosed in this report.

**Warning:** This report is intended to provide general securities advice, and does not purport to make any recommendation that any securities transaction is appropriate to your particular investment objectives, financial situation or particular needs. Prior to making any investment decision, you should assess, or seek advice from your adviser, on whether any relevant part of this report is appropriate to your individual financial circumstances and investment objectives.

**Disclosure:** Patersons, its director and/or employees may earn brokerage, fees, commissions and other benefits as a result of a transaction arising from any advice mentioned in this report. Patersons as principal, its directors and/or employees and their associates may hold securities in the companies the subject of this report, as at the date of publication. These interests did not influence Patersons in giving the advice contained in this report. Details of any interests may be obtained from your adviser. Patersons as principal, its directors and/or employees and their associates may trade in these securities in a manner which may be contrary to recommendations given by an authorised representative of Patersons to clients. They may sell shares the subject of a general 'Buy' recommendation, or buy shares the subject of a general 'Sell' recommendation.

**Stock recommendations:** Investment ratings are a function of Patersons expectation of total return (forecast price appreciation plus dividend yield) within the next 12 months. The investment ratings are Buy (expected total return of 10% or more), Hold (-10% to +10% total return) and Sell (> 10% negative total return). In addition we have a Speculative Buy rating covering higher risk stocks that may not be of investment grade due to low market capitalisation, high debt levels, or significant risks in the business model. Investment ratings are determined at the time of initiation of coverage, or a change in target price. At other times the expected total return may fall outside of these ranges because of price movements and/or volatility. Such interim deviations from specified ranges will be permitted but will become subject to review by Research Management. This Document is not to be passed on to any third party without our prior written consent.