19 May 2016

Frieda River Study Received

Highlands Pacific Ltd (ASX:HIG) has received the "Frieda River Project Feasibility Study" (the **Study**) from PanAust Limited (**PanAust**), a wholly-owned subsidiary of Guangdong Rising Assets Management Co Ltd (**GRAM**).

Highlands holds a 20% interest in the Frieda River joint venture, with PanAust, which is the manager of the project, holding 80%. PanAust has been working on a feasibility study since acquiring its interest in the Frieda River project in August 2014.

The Study contemplates a project comprised of a large-scale, open-pit mining operation feeding ore to a conventional process plant with nominal throughput capacity of 40 million tonnes per annum. Average annual production of metal in concentrate is 175,000 tonnes of copper and 250,000 ounces of gold, with an initial mine life of 17 years. The project will have an average life of mine C1 cash cost of US$0.69/lb[1] of copper and an all in sustaining cost of US$1.23/lb[2] of copper.

(There is a low level of geological confidence associated with inferred mineral resources and there is no certainty that further exploration work will result in the determination of indicated mineral resources or that the production target itself will be realised.)

The Study concludes that the project will have an estimated initial pre-production capital cost of US$3.6 billion, excluding mobile mining fleet and an oil fired power generation facility. An additional US$2.3 billion will be spent over the life of the mine on development and sustaining capital.

The project capital cost compares with the US$1.7 billion estimate of the previous development concept announced by PanAust in September 2014. The higher capex of the updated development concept reflects the larger annual production capacity of the project, additional spending on waste and tailings management solutions and increased construction costs.

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[1] C1 cash cost: Brook Hunt convention for the reporting of direct cash costs comprising: mine site, product transportation and freight, treatment and refining charges and marketing costs; based on payable metal content and metal prices of US$3.30/lb copper, US$1,455/oz gold and US$23/oz silver.

[2] All-in sustaining cost: the C1 cash cost plus royalties, corporate support and shared services costs; and, sustaining capital; and lease principal and interest charges.

PanAust has estimated the updated project will generate a net present value (NPV) of US$820 million, using a discount rate of 7.8%, a copper price of US$3.30/lb, a gold price of US$1,455/oz and a silver price of US$23/oz. The Internal Rate of Return for the project based on those parameters is 10.8%. This NPV is calculated from a start date of June 2018 when the project may commence construction. The NPV as of June 2016 is US$705m and assumes there is no expenditure from now until June 2018.

PanAust on behalf of the Frieda River Joint Venture intends to use the Study to support an application, which Highlands intends to support, for a Special Mining Lease, to be submitted to the PNG Government by June 30, 2016. A condition of Exploration License EL58 is that such application be lodged on or before 30 June 2016.

The application process and associated community consultation and environmental studies are anticipated to take approximately two years. Following permitting, construction would take approximately six years, leading to potential production in 2024-25.

Joint venture partner commitment to development of the project remains subject to a range of challenges, including debt and equity funding, commodity prices, design refinement, environmental and community approvals. PanAust has stated that the future development of the project ultimately would be subject to a final investment decision by the project proponents, the grant of an SML and all necessary permits, approvals and agreements required from the PNG Government, landowners and other stakeholders. It also will be affected by such matters as government infrastructure support and the level of ownership that the national government elects to acquire in the project.

The Study also is to be subjected to a peer review by an independent expert, as required under the joint venture agreement.

Highlands notes the initial results of the Study, and that the metal price assumptions adopted in the financial analysis are above current market prices. It also recognizes that project funding remains challenging in the current economic climate.

Further refinement will be required to enhance the economics of the project over the coming months and years while the process of negotiating a special mining lease is completed. Highlands, however, remains hopeful that, with further work, the project can be viably developed and can create significant value for Highland's shareholders by providing highly leveraged exposure to future increases in metal prices.

Highlands has a number of options with respect to the future funding of the project. These include (among others) raising equity, participation in any project funding that may be arranged, and choosing to withdraw from funding the project development and instead allowing its interest to be diluted to a minimum 5% holding.

In the short term, Highlands needs to resolve the issue of the funding responsibility for the project. Under the joint venture agreement, PanAust is solely responsible for certain project costs. There are continuing discussions between the parties as to the cutoff point for the sole funding. It is critical that this is resolved expeditiously between the parties as joint venturers and Highlands will be working to do so. Highlands will be acting consistent with its duties to protect the interests of all its shareholders. PanAust has obligations to Highlands under the joint venture agreement and we expect PanAust to comply with them.

Highlands Pacific Managing Director John Gooding said the PanAust Study demonstrated that there was significant potential value to be derived from the Frieda River project under the right conditions.

"This is one of the biggest undeveloped copper projects in the world, and this study represents an important step in the process towards developing the project profitably and in the interests of all stakeholders," he said.

Forward-Looking Statements

This announcement includes certain “Forward-Looking Statements”. All statements, other than statements of historical fact, included herein, including without limitation, statements regarding forecast production performances, potential mineralisation, exploration results and future expansion plans and development objectives of Highlands Pacific Limited are forward-looking statements that involve various risks and uncertainties. There can be no assurance that such statements will prove to be accurate and actual results and future events could differ materially from those anticipated in such statements.

HIGHLANDS PACIFIC

ASX Code: HIG
PoMSox Code: HIG
Shares on Issue: 928 million
Performance Rights: 29.8 million

Directors
Ken MacDonald, Chairman
John Gooding, Managing Director
Mike Carroll
Dan Wood
Bart Philemon

Management
Craig Lennon, CFO & Co.Sec
Larry Queen, Chief Geologist
Peter Jolly, GM Projects
Ron Gawi, GM Port Moresby
Leslie Nand, GM Exploration Projects
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About Highlands Pacific Limited
Highlands Pacific is a PNG incorporated and registered mining and exploration company listed on the ASX and POMSoX exchanges. Its major assets are interests in the producing US$2.1bn Ramu nickel cobalt mine and the Frieda River copper gold project; with exploration in progress in the Star Mountains. Highlands also has exploration tenements on Normanby Island (Sewa Bay).

Star Mountains Prospects*
The Star Mountains exploration tenements, which include Nong River EL1312, Mt Scorpion EL1781, Munbil EL2001 and Tifalmin EL1392, are located approximately 20km north of the Ok Tedi mine, in the West Sepik Province, PNG. They lie within the highly prospective New Guinean Orogenic Belt, which hosts the Grasberg, Ok Tedi, Porgera and Hidden Valley mines, as well as the Frieda deposit. The joint venture with partner Anglo American substantiates the world class potential and has enabled an extensive exploration program to be commence in 2015.

Ramu Nickel Cobalt Mine
The producing Ramu nickel cobalt mine is located 75km west of the provincial capital of Madang, PNG. Highlands 8.56% interest in Ramu will increase to 11.3% at no cost to Highlands after repayment of its share of the project debt. Highlands also has an option to acquire an additional 9.25% interest in Ramu at fair market value, which could increase the company's interest in the mine to 20.55%, if the option is exercised. The project's operator and majority owner is Hong Kong and Shanghai listed Metallurgical Corporation of China Limited (MCC).

Frieda River Copper/Gold Project*
The Frieda River copper gold project is located 175kms north-west of the Porgera gold mine and 75km north-east of the Ok Tedi mine. Highlands has a 20% interest in the project and Frieda River Limited (FRL) (a wholly owned subsidiary of PanAust Limited which in turn is a wholly owned subsidiary of Guangdong Rising Assets Management Co. Ltd.) 80%. FRL will be responsible for 100% of the costs incurred by the Frieda River Joint Venture to finalise the definitive feasibility study for FRL's development concept and fund the cost of an independent expert to be appointed by the joint venture to provide a peer review. FRL will also be responsible for 100% of the costs to maintain the Frieda River project site, assets and community relations programmes up to the point in time of lodgment of the Mining Lease or Special Mining Lease application with the requisite definitive feasibility study.

* Subject to the right of the Independent State of Papua New Guinea to acquire up to a 30% equity interest in any mining development in the country.

Disclaimer

This schedule is a brief summary prepared by Highlands of the Study. Highlands provides this summary on the basis that it is not responsible for the Study conclusions and statements which appear in this schedule. Highlands excludes all warranties in respect of the Study and disclaims all liability in respect of the Study. Any person who relies on the Study does so at their own risk.

Key Financial and Performance Metrics

Description	Unit	First 5 years	Life of mine
C1 cash cost[3]	US$/lb Cu	0.66	0.69
All in sustaining cost[4] (AISC)	US$/lb Cu	1.46	1.23
Total on-site operating costs	US$/t processed	15.31	14.79
Post tax NPV at a real discount rate of 8% [5]	US$ million	-	820
Post tax NPV at a real discount rate of 0%	US$ billion	-	6.7
Pre-production capital cost[6]	US$ billion	-	3.6
Development and sustaining capital over the life of mine	US$ billion	-	2.3
Capital Intensity (pre-production capital)	US$/tpaCuEq		17,000
Project internal rate of return (IRR) (real terms)	%	-	11%
Payback period (post production)	Years	-	6
Average copper recovery	%	83	84
Average gold recovery	%	65	65
Average annual copper in concentrate	ktpa	190	175
Average annual gold in concentrate	kozpa	260	250
Total mill feed (life of mine average grades: 0.50% copper, 0.29g/t gold)	Mt	210	700
Total waste mined	Mt	150	470
Strip ratio (waste:ore)	Ratio	0.7	0.7
Mine Life	Years	17	

[3] C1 cash cost: Brook Hunt convention for the reporting of direct cash costs comprising: mine site, product transportation and freight, treatment and refining charges and marketing costs; based on payable metal content and metal prices of US$3.30/lb copper, US$1,455/oz gold and US$23/oz silver.

[4] All-in sustaining cost: the C1 cash cost plus royalties, corporate support and shared services costs; and, sustaining capital; and lease principal and interest charges.

[5] NPV calculated at June 2018 when construction may commence.

[6] Excludes the capital cost of the mine mobile fleet and modular power generation.

Project Detail

Overview

The Study contemplates the mining of the Horse-Ivaal-Trukai, Ekwai and Koki (HITEK) deposits, which together hold a global Mineral Resource estimated at more than 2.7 billion tonnes of mineralisation at an average grade of 0.42% copper and 0.23g/t gold, containing 12 million tonnes of copper and 19 million ounces of gold.

The initial mine life of the project is estimated at 17 years with 700Mt of mill feed, which represents approximately a quarter of the global Mineral Resource. Mill feed over the life of mine includes 608Mt of the Horse-Ivaal-Trukai (HIT) Ore Reserves as well as 92Mt of Inferred Mineral Resource.

The mineralisation can be processed using proven, conventional milling and flotation to yield high quality concentrate free of deleterious elements. The Project is designed to limit fugitive sediment emissions from site and the potential for acid rock drainage using an integrated storage facility. Mine waste rock and process tailings will be stored subaqueously in the facility which is designed to Australian National Committee on Large Dams Incorporated (ANCOLD) standards.

The remote location and absence of existing infrastructure demands a significant capital investment in supporting infrastructure to develop the Project. The Project is highly leveraged to scale based on the trade-off between initial capital investment, long-term operating costs and revenue. The Project will require regional infrastructure including an ocean port, two river ports, an airport, communication systems and near-site road development.

The Project scope is defined by seven main areas:

- Transport logistics (ocean port, river ports, main access road, airport)
- Mine operations (open-pit)
- Process plant (crusher, coarse ore stockpile, concentrator)
- Integrated storage facility (impoundment, embankment, supporting facilities)
- Power supply (IFO and hydroelectric power facility)
- Non-process infrastructure (accommodation, support facilities)
- Temporary facilities (construction camps, laydown).

Economic Analysis

Economic analysis of the Frieda River Project (the Project) was undertaken using both traditional cash flow and real options analysis. The Project returns a post-tax net present value (NPV) of US$820 million in real 2016 dollars at a real discount rate of 7.84% (10.0% nominal), and an internal rate of return (IRR) of 10.8% (real). This NPV is calculated at June 2018 when the project may commence construction, not back to present. The NPV to June 2016 is US$705m and assumes there is no expenditure from now until June 2018.

The Project achieves an average C1 cash cost for the life of mine (LOM) of US$0.69 per pound (lb) copper and an all-in sustaining cost (AISC) of US$1.23/lb. During the first five years of production, after initial ramp-up, C1 costs are US$0.66/lb and AISC is US$1.46/lb copper.

Summary of Copper Price Sensitivities

Description	Unit	3.30	2.50	2.75	3.00	3.25	3.50
AISC (after by-product credits)	US$/lb copper	1.23	1.21	1.22	1.23	1.23	1.24
Annual NPAT	US$M	270	70	130	190	250	310
Post-tax NPV at a real discount rate of 7.8%	US$M	820	(445)	(60)	340	730	1,130
Post-tax NPV 0	US$M	6,670	3,460	4,400	5,430	6,440	7,500
Project IRR (real terms)	%	10.8	6.1	7.6	9.1	10.4	11.8
Payback period (post production)	Years	6	10	8	7	6	6

Risk Management

The PanAust Limited Enterprise Risk Management framework was used to establish a Frieda River Project risk register for the study. Material Project risks are risks that may have a significant economic, environmental and/or social impact on the Project that could substantively influence the assessment and decisions of stakeholders. Material risks relate to:

- Implementation delays and prolongation costs adversely impacted by riverine logistics operations during construction
- Protecting the downstream water quality in the Frieda and Sepik rivers
- Ensuring appropriate landowner benefit sharing
- Managing the timely construction and operation of the integrated storage facility
- Achieving target ramp-up and operation costs, metallurgical recoveries and name-plate production.

Risk control action plans have been developed to mitigate identified risks for the Project. Independent review panels comprising international experts with significant relevant experience, globally and in PNG, were formed to assist with the identification of material risks and developing suitable risk control action plans.

Project Ownership and Tenure

The feasibility study was managed by Frieda River Limited (a wholly owned subsidiary of PanAust Limited which in turn is a wholly owned subsidiary of Guangdong Rising Assets Management Co. Ltd.) and supported by numerous consultants and contractors with specific experience providing specialist services in PNG.

Geology and Mineral Resource Estimate

The Frieda River Copper-Gold Project exploits the HITEK porphyry copper-gold deposits which contain an estimated total combined Measured, Indicated and Inferred Mineral Resource of 2,750 million tonnes. HITEK is a large-scale porphyry-style copper-gold deposit with low concentrations of deleterious elements.

The Mineral Resource estimates are reported under the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (The JORC Code, 2012 Edition). The estimate was based on data from 464 diamond core drill holes.

Please refer to Table 1 attached.

Site Access and Layout

The site layout is designed to reduce the number of catchments impacted, limit the impact and cost of bulk earthworks and reduce the energy required for material handling.

The major infrastructure will be developed in the Ubai Valley, downstream of the open-pit and includes the primary crusher, mine infrastructure area, coarse ore stockpile, process plant, administration building, site accommodation village and other non-process infrastructure.

Personnel will access the site using the Kaugumi Creek airport (suitable for operating 50-seat fixed wing aircraft) and the main access road.

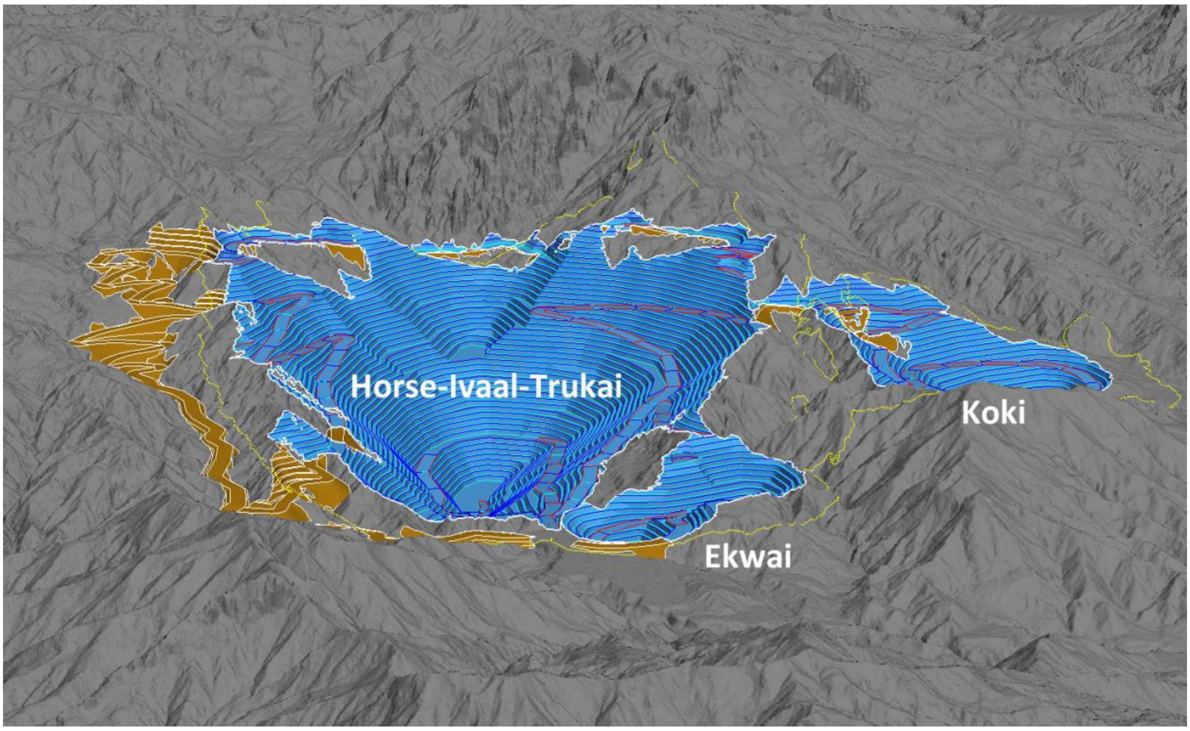
Mine Operations

The proposed open-pit mine is a large-scale truck and shovel operation. A mine production schedule was developed based on an average of 190,000t per day total material movement prioritising higher-grade mineralisation and deferring waste. A total mill feed of 700Mt was estimated with an average grade of 0.50% copper and 0.29g/t gold and an average strip ratio of 0.67:1 (waste:ore) over a 17-year mine life.

The open-pit design was based on an open-pit shell selected to balance net present value and mine life using operating costs derived from first principles. The mine production schedule was optimised using mine scheduling software at a processing rate of 40Mtpa with the pre-strip commencing in Year -1 and mineral processing commencing in Year 1. Stockpiling options were not considered due to the limited area available, acid generating potential of the material mined and the associated rehandling cost.

The proposed mining operation includes the following key elements:

- Drill and blast: rotary drills will drill single pass 17m holes which will be loaded with bulk explosives by a third-party
- Load: 650t hydraulic shovels will load 220t trucks using double side loading where possible
- Haul: 220t rear dump trucks will haul mill feed 1km to the ROM and waste 7km to the integrated storage facility before the waste crushing system commences in Year 5
- Open-pit dewatering: a dedicated drill fleet will drill 150m drain holes on 50m horizontal spacing every 15m bench vertically
- Open-pit water treatment: a lime dosing plant will be operational in Year 2 to decrease the pH of the open-pit water and limit the soluble metal content
- Surface water management: open-pit staging minimises the interactions with the water courses before significant rock and lined structures are created to divert the surface water in Year 9.



Isometric view of the HITEK open-pit design

Mineral Processing

The Frieda River porphyry mineralisation can be processed using proven, conventional milling and flotation technology to yield high quality concentrate free of deleterious elements. The process plant design is based on a 28MW, 40ft diameter SAG mill and two 16MW, 26ft diameter ball mills in parallel, providing a nominal processing rate of 40Mtpa (5,000tph).

Annual copper in concentrate production ranges from 94,000t in Year 1 of production to 210,000t, depending on the mineralised material feed grade and hardness, with a life of mine average of 175,000t excluding the first year of ramp up. Annual gold concentrate production ranges from 140,000oz in Year 1 of production to 360,000oz, with a life of mine average of 250,000oz.

Processing includes the following key components:

- Primary crushers: two 60” x 89” gyratory crushers
- Overland conveying: two primary conveyors with a total capacity of 8,000tph
- Coarse ore stockpile: approximately 180,000t of total stockpile capacity (approximately 36 hours) with 40% live capacity (approximately 14 hours) with three reclaim feeders
- Grinding: one 28MW, 40ft diameter SAG mill and two 16MW, 26ft diameter ball mills
- Flotation: conventional circuit using rougher flotation, regrinding of rougher concentrate followed by cleaner scalping flotation and three stages of cleaner flotation
- Concentrate dewatering: high rate thickeners and horizontal pressure filters
- Tailings thickeners: three 50m diameter high rate thickeners.

The copper flotation test work confirmed that a conventional flow sheet would produce a high quality concentrate, free of deleterious elements. The optimum concentrate grade varies depending on mineralised material type treated ranging from 23% to 27% copper and averaging 25.5% copper over life of mine.

Waste Rock, Tailings and Water Management

Mine waste rock and process tailings will be stored subaqueously within an engineered integrated storage facility in the Nena Valley and designed to ANCOLD standards. The integrated storage facility will retain natural sediment and surface water and provide water to a hydroelectric power generation facility.

An upstream–faced, asphalt core rock fill embankment will be constructed in the Nena Valley to approximately 277m RL (171m high) to create sufficient storage capacity for 1,210 million tonnes of material. The integrated storage facility embankment will be founded on soil-like materials (less than 1MPa) and has been designed to withstand a maximum credible earthquake peak ground acceleration of 0.91g.

The starter embankment will have one year of storage capacity and will need to be constructed to approximately 202m RL (96m high). A campaign development philosophy will be used thereafter to raise the integrated storage facility embankment until it reaches the ultimate embankment elevation.

Prior to construction of the spillway in approximately Year 9, surface water will be managed by an integrated scheme of decant intakes and power intakes using a store and release operating philosophy. Water balance analysis indicates the differing intake capacities would be able to drawdown all stored water within 90 days. The spillway will be constructed during the final campaign build.

The integrated storage facility will be a large structure, which is designed not to fail or cause unintended environmental or safety impacts. To avoid such impacts the facility has been designed by a team of recognised international experts using current best practice design methods and the most advanced proven modelling software. The design team includes experts who have published works that are currently used at leading universities and have developed design practices that are considered current world's best practice.

Power Supply

There is no existing power supply network in the region. The proposed hybrid power generation scheme consists of an IFO reciprocating engine power station and a hydroelectric power facility utilising water from the integrated storage facility. The initial peak Project demand load is 130MW (1,000GWh/annum) increasing to 140MW (1,100GWh/a) in Year 12. Power represents 51% of the processing cost for the first five years of operation and 36% for the life of mine.

A 147MW IFO power station (using predominantly modular 10MW generating sets) will be located adjacent to the confluence of the Nena and Ok Binai rivers to supply the initial power for operations.

Hydroelectric power generation will gradually increase from 75MW and 511Gwh/a in Year 5 to a peak of up to 102MW and 722 Gwh/a in Year 11.

The hydroelectric power facility will be designed to maximise the generation potential of the scheme by: utilising 98% of the available water and converting this to electrical energy; minimising the spill from the integrated storage facility reservoir; and maintaining a safe operating water level.

The hydroelectric power facility will produce an average of 60% of the Project's electrical demand once the integrated storage facility reservoir is completed and will be operated in conjunction with the IFO power station.

A diesel generator power station with installed generating capacity of 15MVA, will supply emergency power to essential services at the mine, process plant and site accommodation village during outages of the transmission line, hydroelectric power facility or IFO power station. This emergency power station will also provide base-load power for the first four years of operation in the event of an IFO generating unit being out of service due to maintenance.

Transport Logistics

The transport logistics operation is based on a combination of riverine (4,700dwt barges with tugs) and overland transport (truck and pipeline) operations over a combined distance of approximately 700km.

Outbound copper-gold concentrate will be transported by pipeline from the mine site processing plant to a filter plant and storage facility located at the Sepik River port. From there it will be barged down the Sepik River to the Bismarck Sea and along the coast to a concentrate export facility at Cape Moem for loading onto ocean going vessels and shipping to customers

Inbound general cargo will be consolidated from suppliers at an off-site receipting centre located in Southeast Asia. From there it will be shipped to the Port of Wewak where it will be loaded onto barges for transport to the Sepik River port, and then onto road transport for delivery to mine stores. Inbound diesel and IFO will be shipped from Southeast Asia to the Port of Wewak where it will be loaded into wing tanks on barges for transport to the Sepik River port. From there it will be transferred to mine site storage tanks by pipeline.

Riverine accessibility (availability) along the Sepik River is estimated at 95% based on critical depth of 2.4m at the 95th percentile flow rate13. Payloads can be reduced to decrease the draught and enable limited operations to continue during low flow conditions.

Environment

PNG has a well-established legislative framework for the approval and regulation of mining projects. An Environmental Impact Statement (EIS) is being prepared for the Project under the provisions of the *Environment Act 2000* and in accordance with the Conservation and Environment Protection Agencies (CEPA) guidelines. Preparation of the EIS is well advanced with the Project description available and the fieldwork completed.

Landowner and Community

The landowner and community engagement strategy supports the Project's goals of:

- Securing a Special Mining Lease and other associated tenements
- Negotiating a fair and durable compensation agreement with landowners
- Understanding and managing socio-economic impacts and opportunities
- Ensuring an enduring social licence to operate throughout the Project's implementation and into operations.

The socioeconomic setting for the Project can be divided into distinct geographic footprints: mine site; road and river port infrastructure corridor; the Sepik River barging corridor; and the broader regional and national environment.

Potential socioeconomic benefits include: improved access to services; better infrastructure and village amenities; improved health, education and human resource development; heightened economic activity and access to cash; greater mobility; reduced isolation; and attention for vulnerable groups.

Potential adverse socioeconomic impacts include: inward migration; loss of culture; reduced law and order; an increase in community disharmony and loss of social capital; lifestyle diseases and sexually transmitted diseases; and potential impacts from unplanned environmental damage.

Marketing

The Project is designed to produce a copper-gold concentrate for export to custom smelters. Concentrate production is planned to average approximately 670,000 dry metric tonnes per annum (dmtpa) peaking at 860,000dmtpa containing on average, excluding the first year of ramp up, 175,000 tonnes of copper and 250,000 ounces of gold.

Frieda River concentrate will be highly sought after by custom smelters due to:

- The Project's location: close to key markets in China, Japan, South Korea, India and Southeast Asia
- The concentrate quality: test work indicates that Project concentrate will be low in deleterious elements
- Concentrate grade in the range of 23-27% copper.

Capital Cost Estimate

Pre-Production Capital Cost Estimate

Description	Cost (US$ million)
Direct costs	2,310
Indirect and Owner's costs	1,270
Contingency	430
Total	**4,010**
Total less leasing costs	**3,605**

Sustaining Capital Cost Estimate

Facility	Cost (US$ million) (a)
Integrated storage facility embankment	880
Mining mobile equipment fleet	440
Hydroelectric power facility (Year 5)	250
Mine waste management (Year 5) *(b)*	250
Process plant grinding expansion (Year 12)	100
Allowance for maintenance and upgrades	390
Total	**2,320**

(a) Sustaining capital includes direct, indirect and contingency
(b) Waste management system including rope supported conveyor and waste barges in the integrated storage facility

Life of Mine Capital Cost Estimate Summary

Capital cost by type	Cost (US$ million)	% cost
Pre-production	4,010	63
Sustaining	2,320	37
Total	**6,330**	100

Operating Cost Estimate

Operating cost estimate per tonne processed

US$/t processed	Production Years 2-4*(a)*	Production Years 5-9*(b)*	Average (life of mine)
Mining (per tonne of material mined)	2.31	2.59	2.44
Mining	4.16	4.47	4.07
Process	6.29	4.75	5.18
Logistics	0.93	0.92	0.93
General and administration	1.71	1.60	1.65
Total on-site operating costs	**13.09**	**11.74**	**11.83**
Realisation charges	3.35	3.03	2.96
Total including realisation charges	**16.44**	**14.77**	**14.79**

(a) Steady-state intermediate fuel oil power generation operating cost. Oil price assumed is US$80/barrel (Brent crude).
(b) Steady-state hydroelectric power generation operating cost.

Operating cost estimate per pound of copper

US$/lb copper	Production Years 2-4 *(a)*	Production Years 5-9*(b)*	Average (life of mine)
Mining	0.42	0.49	0.46
Process	0.64	0.52	0.59
Logistics	0.09	0.10	0.11
General and administration	0.17	0.18	0.19
Total on-site operating costs	**1.33**	**1.30**	**1.35**
Realisation charges	0.34	0.33	0.34
Total operating cost	**1.67**	**1.72**	**1.69**
Deduct by-product credits *(c)*	-0.91	-1.09	-0.99
C1 cash cost *(d)*	**0.76**	**0.63**	**0.69**

(a) Steady-state intermediate fuel oil power generation operating cost.
(b) Steady-state hydroelectric power generation operating cost.
(c) By-product credits based on US$1,455/oz gold and US$23/oz silver.
(d) Brook Hunt convention for the reporting of direct cash costs comprising: mine site, product transportation and freight, treatment and refining charges and marketing costs. Based on payable metal content and metal prices of US$3.30/lb copper, US$1,455/oz gold and US$23/oz silver.

Project Implementation

Project implementation will be completed over six years with four years of construction. Project implementation includes the detailed engineering, pre-construction enabling works, construction, commissioning and operational readiness activities leading to the ramp-up of production.

The critical path of the Project is linked to:

- Process plant critical detailed engineering (12 months)
- Process plant earthworks procurement and mobilisation (12 months)
- Process plant earthworks (18 months)
- Process plant construction (32 months)
- Process plant commissioning (4 months).

Future Work Plan (Project Approvals)

The study supports proceeding with the future work plan and permitting phases progressing concurrently. This includes:

- Submitting the application for a Special Mining Lease (SML) by 30 June 2016[12]
- Submitting the Environmental Impact Statement (EIS) in Q4 calendar 2016
- Undertaking the next phase of site geotechnical investigations for the crusher, coarse ore stockpile, concentrator, integrated storage facility, main access road and non-process infrastructure locations
- Undertaking the next phase of ground topographical survey of the key areas
- Incorporating the data from the recently completed Ekwai and Koki resource drilling programs into an update of the HITEK Mineral Resource and Ore Reserve in Q4 calendar 2016
- Continuing safe operation of the Project site
- Completing the exploration access track between the Frieda River port and the mine site
- Continuing government, landowner, community and other stakeholder engagement programs
- Seeking State or other third-party funding for the provision of Project infrastructure: the ocean port and elements of the river port; airport; main access road; power supply including the integrated storage facility; information technology; and communications
- Seeking formal advice from the State on its intentions regarding the future level of equity participation and its financing plan
- Maintaining the risk register to reflect any changes to the material Project risks
- Undertaking basic engineering using the next phase of geotechnical investigation to increase the level of definition in Project quantities.

Project Background

Mineralisation in the Frieda River area was first identified in the 1960s and has been the focus of several phases of exploration and studies by previous owners creating an extensive and valuable database.

Highlands has been involved with the project over the past 20 years. As part of the Joint Venture with PanAust Highlands provided valuable technical input and in-country knowledge that included joint risk assessments and technical review meetings.

On 1 November 2013, PanAust Limited announced it had entered into a share sale and purchase agreement with a subsidiary of Glencore Xstrata plc to acquire its interest in the Frieda River Copper-Gold Project. The transaction completed on 25 August 2014.

On 2 September 2014, PanAust announced its development concept that would form the basis for its feasibility study. That concept included a preliminary capital cost estimate of approximately US$1.7 billion (2013 dollars including 15% contingency on direct development costs), excluding mining fleet and power station.

Preliminary analysis indicated that the base case development concept would be robust at a copper price of US$2.80/lb (and gold price of US$1,300/oz). The following table summarises the key life-of-mine parameters for the 2014 concept:

Total mill feed (Measured and Indicated Resources: see Appendix I)	600Mt @ 0.50% Cu, 0.30g/t Au
Processing rate	30Mtpa $^{+}/_{-}$ 20%
Waste:ore strip ratio	0.7:1
Average annual copper in concentrate production (tonnes)	125,000
Average annual gold in concentrate production (ounces)	200,000
C1 cash cost[1] (US$/lb copper)	1.30 – 1.40
All-in sustaining cost (US$/lb copper)	1.60 – 1.70
Project development capital cost (US$Bn)	circa 1.7

[1] Assumes US$1,300/oz gold price

Since it commenced work on the Project PanAust has expended 235,000 man hours and invested around US$65 million, including through:

- Mineral Resource, geotechnical and hydrogeological drilling programs
- Various specialist technical studies
- Inter-discipline, multiple account assessments to resolve key design decisions based on safety, environmental, technical, economic and social elements
- External, standalone peer reviews of geology, mine, process plant, ISF, power generation and transmission, and logistics strategy to validate design

- Community and related stakeholder engagement
- Benchmarking of design components based on similar size projects within the region
- Generating over 800 drawings to support the feasibility study
- Developing a 3D NavisWorks model of the Project site.

PanAust has built on the body of Frieda River Project knowledge and improved on previous feasibility study work by way of the activities listed below:

- An updated Mineral Resource estimate
- A reduced environmental footprint: reduced disturbance footprint and bulk earthworks quantities; and mine water management and storage of waste rock and tailings limited to a single catchment
- Reduced implementation risk: a staged mine waste management plan starting with a traditional truck and shovel operation, followed by expansion to a rope-supported conveyor system supported by low-cost hydroelectric power
- Improved Project understanding through development of a three-dimensional numeric groundwater model to predict open-pit water inflows; and bathymetric survey, hydrology investigations and a dredging assessment to design the logistics on the Sepik and Frieda rivers.

The current project scope has evolved over the course of the study from that originally identified at the outset. The key changes embraced are:

- the increase in scale to drive unit operating costs down
- the incorporation of additional Mineral Resources (Ekwai and Koki) in the mine plan
- a revised waste management plan
- the incorporation of hydroelectric power generation from the ISF
- the development of a new concentrate handling port at Cape Moem
- the installation of pipelines to convey both concentrate and fuels (diesel and IFO) between the Sepik River port and the mine site
- The construction of a new airport to handle 50 seat passenger aircraft.

SUMMARY OF MINERAL RESOURCES AND ORE RESERVES

Following are the Frieda River Limited statements of Mineral Resources and Ore Reserves for material Frieda River, Papua New Guinea projects as at 16 May 2016, reported under The JORC Code, 2012 Edition.

Mineral Resources

Mineral Resources reported for the Horse-Ivaal-Trukai (HIT) deposit in May 2016 represent an updated Mineral Resource model. The updates include refined geology modelling, use of estimation domaining and parameters and an improved approach to the classification of the Mineral Resource.

Mineral Resources for Ekwai and Koki have not been previously reported by Frieda River Limited (or PanAust), however have been reported previously by Highland Pacific Limited. The reported Mineral Resources are unchanged from previous reporting.

Frieda River, Papua New Guinea

Horse-Ivaal-Trukai (HIT) Mineral Resource

Horse-Ivaal-Trukai (HIT) (0.2% copper cut-off)	31 May 2016			31 December 2014		
Class	**Tonnes (Mt)**	**Cu (%)**	**Au (g/t)**	**Tonnes (Mt)**	**Cu (%)**	**Au (g/t)**
Measured	829	0.49	0.27	780	0.51	0.28
Indicated	1,018	0.40	0.19	410	0.44	0.20
Sub-total (M+I)	**1,846**	**0.44**	**0.23**	**1,190**	**0.49**	**0.25**
Inferred	273	0.39	0.18	920	0.39	0.17
TOTAL	**2,119**	**0.43**	**0.22**	**2,110**	**0.44**	**0.22**

Koki Mineral Resource

Koki (0.2% copper cut-off)	31 May 2016		
Class	**Tonnes (Mt)**	**Cu (%)**	**Au (g/t)**
Measured	-	-	-
Indicated	-	-	-
Sub-total (M+I)	**-**	**-**	**-**
Inferred	452	0.37	0.25
TOTAL	**452**	**0.37**	**0.25**

Ekwai Mineral Resource

Ekwai (0.2% copper cut-off)	31 May 2016		
Class	**Tonnes (Mt)**	**Cu (%)**	**Au (g/t)**
Measured	-	-	-
Indicated	-	-	-
Sub-total (M+I)	**-**	**-**	**-**
Inferred	170	0.38	0.23
TOTAL	**170**	**0.38**	**0.23**

Ore Reserves

Frieda River, Papua New Guinea

Horse-Ivaal-Trukai (HIT)	31 May 2016			
Class	Tonnes (Mt)	Cu (%)	Au (g/t)	Ag (g/t)
Proved	469	0.51	0.30	-
Probable	139	0.41	0.16	-
TOTAL	**608**	**0.49**	**0.27**	**-**

General notes

- The Measured and Indicated Mineral Resources are inclusive of those Mineral Resources modified to produce the Ore Reserves.
- The Mineral Resources and Ore Reserves estimates are reported on a 100% ownership basis. Frieda River Limited has an 80% interest in Frieda River (HIT, Koki and Ekwai).
- The tonnes and grades are stated to a number of significant digits reflecting the confidence of the estimate. Since each number and total is rounded individually, the table may show apparent inconsistencies between the sum of rounded components and the corresponding rounded total.
- The Frieda River Ore Reserve is estimated at commodity prices of US$3.30/lb copper and US$1,455/oz gold subject to a floating value based cut-off grade. The representative average copper only cut-off grade of 0.2% Cu.

Competent Person Statements

- **Mineral Resources**

The data in this report that relate to Mineral Resources for Frieda River deposits (Horse-Ivaal-Trukai, Koki and Ekwai) are based on information reviewed by Mr Shaun Versace who is a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM).

Mr Versace is a full time employee of PanAust Limited. Mr Versace has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves.

Mr Versace consents to the inclusion in the report of the Mineral Resources in the form and context in which they appear.

- **Ore Reserves**

The data in this report that relate to Ore Reserves for the Frieda River Project are based on information reviewed by Mr Scott Cowie who is an Australasian Institute of Mining and Metallurgy Chartered Professional, (MAusIMM(CP), 206253.

Mr Cowie is a full time employee of PanAust Limited. Mr Cowie has sufficient experience relevant to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves.

Mr Cowie consents to the inclusion in the report of the Ore Reserves in the form and context in which they appear.

JORC 2012 Edition Table 1 Reporting for Mineral Resources

Horse-Ivaal-Trukai - Frieda River, Papua New Guinea

Section 1. Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes or hand-held XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.	The sampling used for Mineral Resource estimation at Horse – Ivaal – Trukai (HIT) deposit at Frieda River, consists of diamond core drilling with core diameters between PQ (~85mm) and NQ (~47mm). Drilling was undertaken from 1969 to 2011 and consists of a total of 634 drill holes with 161,433m of core. The drilling can be split into five phases (1a, 1b, 2, 3 and 4) based on the year drilled and the nature and quality of the sampling and assay techniques. The standard drill sample interval is 2m length, regardless of core diameter. The 2m assay interval was cut in half using a diamond blade core saw prior to sample preparation and analysis. The diamond core assay samples form the basis for the copper, gold, minor and deleterious element estimates for the HIT deposit. Bulk density and moisture content measurements were taken using a wax sealed immersion technique on 0.1m length whole core samples and, together with supporting whole tray method determinations, form the basis for the dry bulk density estimates for the HIT deposit. Approximately 10,000 density samples were analysed across a range of rock types, alterations and depths. Metallurgical, geotechnical and environmental samples and logging have been collected from the diamond core drilling. Geotechnical sampling includes rock strength and material handling properties (plus oriented core and acoustic televiewer logging), metallurgical samples include flotation tests and crushing/grinding and liberation tests, and environmental samples have been taken to test the environmental properties of the rocks.
	• Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Geochemical assay samples have been subjected to varying levels of quality assurance/quality control (QAQC) over different drill phases. The types of assay QAQC includes certified reference materials (standards), field duplicates, crush stage replicates and blanks. A program of twin drilling has been undertaken by Xstrata. Two matrix matched company standards were generated by Xstrata using coarse pulp rejects, principally composed of the rock type Horse Microdiorite with potassic alteration (chosen as it is not prone to oxidation). Two standards were certified by Ore Research Ltd., the high grade FXC09 and the lower grade XFR-Y. Sieve tests were performed on the pulverised samples during Phase 4 (representing 83% of the samples used for the Mineral Resource estimate). The target was 90% of material passing 10 mesh and 40 mesh; this was routinely achieved. Failures in the 10 mesh sieve triggered inspection and adjustment of the jaws of the Boyd crusher. The dry bulk density wax sealed immersion technique samples were checked and compared to whole tray dry bulk density measurements. An approximate +5% bias was detected in wax coated immersion samples above the gypsum-anhydrite surface; this has led to a correction to dry bulk density estimates. The bias is likely due to sample selection favouring higher density samples for the wax immersion technique. Drill collar positions have been surveyed and checked using subsequently improved survey methods over the

Criteria	JORC Code explanation	Commentary
		different drill phases. All collar locations are surveyed to a high level of accuracy with less than 1m differences between original and check surveys in 95% of the cases where check surveys have been undertaken. Downhole surveys using a single shot Eastman camera have been taken approximately every 50m downhole. The films have been checked by Xstrata personnel and no issues were detected. Downhole surveys were not undertaken for Phase 1a holes, a practice that was common at the time, and this has contributed to the decision not to use the Phase 1a holes in the Mineral Resource estimate. Original laboratory assay files have been checked by Xstrata personnel against the assays used for the Mineral Resource estimate and no issues were detected. The majority of geochemical assay samples have had rigorous quality assurance and quality control checks and those samples that don't have QAQC checks, or have material errors in QAQC, have been removed from the estimate. The samples that have questionable QAQC had their confidence downgraded and used for lower Mineral Resource classification than they would otherwise achieve, given their sample spacing and distribution.
	• Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1m samples from which 3kg was pulverised to produce a 30g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.	Sample preparation is performed in a dedicated laboratory facility on site using experienced staff sourced through Astrolabe in Madang. Core is marked up into 2m intervals, photographed, logged, sawn and dried in a wood fired oven in which the temperature is kept below 115°C to prevent loss of volatile native elements. A two stage primary crushing circuit reduces the fragment size to less than 5mm. A LM5 ring mill pulveriser is used to pulverise the sample to -150#. Each 2m sample produces 8 to 10kg of material. A 1kg subsample is riffle split into a sealed plastic bag and despatched to Astrolabe Pty Ltd (Astrolabe) laboratory for assay. The 9kg (approx.) reject sample is stored on site. Every tenth sample has two 1kg subsamples collected, the second of which is submitted as part of a separate batch for assay by Astrolabe. The result is used to check for bias and repeatability of the onsite preparation protocols. Astrolabe pulverise the 1kg of sample to -200# and take a final 250g split for assay. A cone splitter was introduced into the process after the -2mm roll crusher stage during Drilling Phase 3. Phase 4 drilling, which constitutes 83% of the drill metres contributing to the resource assessment, echoed earlier methodology, with half core being crushed, pulverised and sub-sampled on site. New in Phase 4 was the use of the Boyd crusher to grind to -2mm in a single step, and sub-sampled using the integrated Rotating Sample Divider. The second sub-sampling step, from 3.5kg down to 200g, is done by scooping directly from the bowl of the LM5, as before. Copper was analysed by aqua regia digest/solvent extraction for Phase 1 samples, aqua regia digest/atomic absorption spectroscopy for Phase 2 samples, and aqua regia digest/inductively coupled plasma – optical emission (ICP-OES) spectroscopy for Phase 3 and 4 samples. Gold was analysed by 20 gram fire assay for Phase 1 samples and 50 gram fire assay for Drilling Phase 2, 3 and 4 samples. A default suite of elements was Cu, Pb, Zn, Ag, Mo and S. The primary laboratory for Phase 4 assay work was ALS in Townsville. Check assay samples were sent to Genalysis in Perth and Townsville. The standard assay suite was gold by 50g fire assay (Method code Au-AA26) and copper and minor/deleterious elements by multi element ICP OES (method ME-ICP41). This uses an aqua regia digest, consistent with the phase 1 to phase 3 work. Copper values greater than 0.5% were reassayed by method Cu-OG46, which employs a more precise dilution and AA finish.

Criteria	JORC Code explanation	Commentary
		Sequential copper assays from samples collected during Drilling Phase 4 were undertaken on composites made from seven adjacent two metre pulps. The compositing and sub-sampling was performed by ALS in Townsville, using intervals and assigning sample numbers provided by the geology team on site. The sequential copper assay consisted of the following steps: 1. Citric acid leach. Liquor assayed 2. Residue subjected to dilute H2SO4 leach. Liquor assayed 3. Rinse, residue subjected to dilute cyanide leach. Liquor assayed 4. Rinse, residue subjected to four acid digest and assay. The initial citric acid step was added in March 2010 to check for the presence of copper oxide and carbonate minerals.
Drilling techniques	• Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).	All holes at Frieda River were drilled using a triple tube diamond drilling technique with core sizes ranging from PQ (~85mm core diameter) to NQ (~47mm core diameter). The core is typically oriented using Ezi-mark orientation markers, although the fractured nature of the rock above the gypsum-anhydrite dissolution boundary makes orientation of the core difficult. Below the GpAh dissolution surface, where the RQD is typically 100, orientation marks work well.
Drill sample recovery	• Method of recording and assessing core and chip sample recoveries and results assessed.	Recoveries are measured and recorded by core length on both in the engineering log on a run by run basis, and in the geological log on a per sample interval basis.
	• Measures taken to maximise sample recovery and ensure representative nature of the samples.	Triple tube wireline drilling was employed for Phase 2 to 4 drill holes.
	• Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	Scatter plots of copper grade versus core recovery indicate lower grades at lower core recoveries; however this effect is due to low core recoveries in friable alluvium and highly oxidised material, where low copper and gold grades exist. Overall core recovery is approximately 90% in the mineralised parts of the deposit (supergene and hypogene) and no bias due to low core recovery can be detected. AMC (2013) noted that "*An analysis of copper and gold grades versus (core) recovery exhibits a relatively small range in grade variation, over the recovery range from 0 – 100%. Average copper and gold grade is lower when the core recovery is below 15% and above 70%. There is no obvious bias. Based on the documented analysis findings, AMC considers that the core recovery is reasonable.*"
Logging	• Whether core and chip samples have been geologically and geotechnically logged to a level of	Core logging has been performed to a sufficiently high standard. Visual logging codes are validated from multiple sources of data, including geochemistry, sequential copper and sulphur assays (testing for the presence of oxidised copper minerals) and have good agreement with rock mechanical properties, such as hardness and RQD, and

Criteria	JORC Code explanation	Commentary
	detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.	metallurgical properties, such as correlated high flotation test results with the potassically altered Horse Microdiorite. All drill core from Phase 2 and onwards has been systematically logged using standard procedures. Significant effort in standardising geological description has been made, including re-logging historical core and re-coding historical drill hole logs by the previous owner of the deposit. The logging codes used have adopted and refined the system instituted by Cyprus in 1998, providing historical continuity and internal consistency. Phase 2 logs have been recoded or relogged as necessary. Core from Phase 2 onwards is preserved on site and digital core photography is available for most holes. Core handling, core photography and logging procedures are well developed and of a high standard. The core is stored at Frieda River Base camp in three covered core stores.
	• Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography. • The total length and percentage of the relevant intersections logged.	Logging is qualitative and quantitative; lithology and alteration were logged qualitatively and mineralisation, geotechnical, structural and some aspects of petrology were logged quantitatively. 100% of the core was logged. Most drill holes have been digitally photographed.
Sub-sampling techniques and sample preparation	• If core, whether cut or sawn and whether quarter, half or all core taken.	The same sampling protocol has been in use for all the drilling used in the Mineral Resource estimate: 1. 2m intervals are sawn in half lengthways with a diamond saw 2. Half core is dried and the whole interval jaw crushed to 90% passing -10 mesh 3. A 3.5kg sub-sample is taken and ground to finer than -40 mesh in a ring mill. Since 2007, the circuit has been modified using a combination Boyd Crusher and rotating sample divider to produce an approximate 3kg split at -10 mesh in a single pass. This is pulverised in an LM5 mill as before, then a 250g split is taken from the bowl and dispatched to the primary laboratory. The LM5 product is tested to ensure greater than 90% of material passes -40 mesh, which it comfortably achieves. Reject splits are retained on site, where they are used for magnetic susceptibility measurement and then archived.
	• If non-core, whether riffled, tube sampled, rotary split, etc. And whether sampled wet or dry.	All samples used to inform the Mineral Resource estimate are diamond core samples.
	• For all sample types, the nature, quality and appropriateness of the sample preparation technique.	The nature, quality and appropriateness of the sample preparation technique have been independently verified by Golder Associates (2011) and by Frieda River Limited (FRL) staff (2015).
	• Quality control procedures adopted for all sub-sampling stages to maximise representivity of	A sampling procedure was adopted at the nearby Nena deposit from a sampling audit undertaken by Francis Pitard Sampling Consultants The sampling protocol for Nena was adopted for the HIT deposit; this was considered conservative as the HIT deposit exhibited lower heterogeneity than the Nena deposit. Sampling and comminution

Criteria	JORC Code explanation	Commentary
	samples.	stages were selected to keep the theoretical sampling error within acceptable limits. Quality control for subsampling includes size screening at two stages with a target of 90% passing 10 mesh (for crushing) and 40 mesh (for grinding) with 83% of samples subject to screening. A total of 1,434 coarse crush stage replicates (-2mm after the Boyd Crushing stage) were analysed from Phase 4 drill samples. Analysis of the results indicates acceptable precision for copper and gold.
	• Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.	Xstrata procedures called for field duplicates to be selected at approximately 1 for every 100 regular samples with the remaining half core submitted as the field duplicate. Despite this requirement there are no field duplicates for drilling Phase 4, only crush stage replicates.
	• Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the grain sizes at each stage of the subsampling process. The sampling program was audited by sampling consultant Dr Francis Pitard in 1994 and sampling practices since that time have followed the recommendations. The error arising from sampling is reasonably assumed to be less than ±5%.
Quality of assay data and laboratory tests	• The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.	The digestion technique of aqua regia is considered a near total digest for copper which when assayed using a suitable instrument, such as atomic absorption spectroscopy or inductively coupled plasma – optical emission spectroscopy, produces a suitable assay for copper, silver, molybdenum, arsenic and other minor and deleterious elements. Gold was assayed by fire assay, a total gold determination technique. Generally the larger the charge of material being assayed the more reliable the assay result. The fire assay charge of material was 50g for the majority of samples (approximately 90%) used for the Mineral Resource estimate. The remaining used a 25g charge.
	• For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.	The magnetic susceptibility of the rocks at the HIT deposit was determined by a hand held instrument. The results of the magnetic susceptibility readings are not used directly to inform the Mineral Resource estimate but do provide secondary geological information that can be used to help constrain geological boundaries (ie presence of magnetite in potassically altered rocks). Magnetic susceptibility meters typically contain self-calibrating features. The model or models of the magnetic susceptibility meters used at HIT are unknown.
	• Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been	Phase 1a - no QAQC information is available for checking Phase 1 assays for accuracy and precision. Apparently no quality control samples such as standards, duplicates or blanks were used during this program. Therefore assay data from drill phase 1a was not suitable for Mineral Resource estimation and was excluded from the estimate. The absence of down hole surveys is another contributing factor to the Phase 1a holes not being used for the Mineral Resource estimate. Phase 1b - Twin hole program concluded that 25 holes from Phase 1b were considered adequate for Indicated and

Criteria	JORC Code explanation	Commentary
	established.	Inferred Mineral Resources only. A re-assay of the second half of Phase 1b core indicated an unacceptable low bias for copper of approximately 30%. The copper assays have been removed from the data set. The gold assays showed acceptable accuracy and precision and have been retained. Phase 2 to 4 - QAQC data from these drill phases show acceptable precision and no obvious bias and, therefore, assay data from these drill phases were used in the estimation of Measured, Indicated and Inferred Mineral Resources.
Verification of sampling and assaying	• The verification of significant intersections by either independent or alternative company personnel.	Independent reviews by Golder Associates (2011 and prior) included site visits. The core was reviewed and found to be adequately logged and sampled. FRL staff and contractors reviewed the core and five new drill holes at HIT in 2015 and found the HIT core to be adequately logged and sampled.
	• The use of twinned holes.	During 2010, a program of twinning some of the old diamond drill holes was undertaken. Seven of the Phase 1b holes were twinned, a total of 2,338m, or 23% of the Phase 1b program. On the basis of the twin results, it was concluded that 25 of the phase 1b holes had assays of adequate quality to be included in the Mineral Resource estimate. These 25 drill holes from Phase 1b have been used for block grade interpolation; however, for Mineral Resource Classification they have been used for Indicated and Inferred only.
	• Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Documentation of primary data, data entry procedures and data storage protocols are available in the QAQC appendix attached to the FRL feasibility study report.
	• Discuss any adjustment to assay data.	There have been no recorded instances of adjusting assay data. FRL has not adjusted any assay data, and previous assay results have been checked against the original certified assay results from the assay labs. Some transcription errors in the non-economic elements were detected and corrected.
Location of data points	• Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.	Xstrata used various methods to survey the collar position of the drill holes. All drill holes are either surveyed using laser theodolite and EDM or TOTAL Station in closed traverses, or using differential Global Positioning System (GPS) receiver. Accuracy of the collar positions is estimated to be better than 1m. Collars are cross-referenced to the relevant survey documents, which are scanned into a digital archive. Several drill hole locations were confirmed by Golder as being approximately correct using a hand-held GPS in 2011 and the same was confirmed by FRL staff in 2015.
	• Specification of the grid system used.	PNG94, with height defined relative to Mean Sea Level at Aitape, PNG.
	• Quality and adequacy of topographic control.	Topography has been measured using a highly accurate and precise LiDAR survey with ground survey points.
Data spacing and distribution	• Data spacing for reporting of Exploration Results.	There are no Exploration Results being reported.

Criteria	JORC Code explanation	Commentary
	• Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.	The HIT deposit has been drilled on an approximate grid of 75m x 75m at the deposit centre, which coincides with the Mineral Resource classified as Measured. Drill sections are mostly oriented 030°True North (TN) to 210°TN and spaced 75m apart. There are considerable local variations to this scheme caused by topography and constraints on drill pads in mountainous terrain. Most samples are collected at 2m interval and composited to 4m for estimation.
	• Whether sample compositing has been applied.	The typically 2m length samples have been composited to 4m length, with composites 'broken' on estimation unit domain boundaries. Composites with less than 1m length are excluded from the estimate.
Orientation of data in relation to geological structure	• Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.	The majority of holes are oriented at a dip of 50° to 55° and azimuth 210° from true north. Twenty holes from Phase 2 to 4 (6,939m) are drilled on the historical Horse Grid, oriented 080° TN to 260° TN. A further 108 Phase 2 to Phase 4 holes, totalling 32,561m, were drilled more than ten degrees off the Ivaal grid, providing some security against directional bias in the dataset.
	• If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	The orientation between key mineralising structures and drill holes is adequate to fairly test the structures.
Sample security	• The measures taken to ensure sample security.	A chain of custody was maintained by the use of commercial grade tamper proof security tags for transport of the samples between site and laboratory. The sample security was then maintained at the laboratory through NATA and ISO accredited systems. Assay results were reported as signed certificates of analysis which were imported directly into the database. Xstrata used the Microsoft SQL 2008 R2 database software for a secure centralisation of drill hole information, with the SQL Server Express 2008 R2 to update the database structure and to build custom views and queries since 2010. Xstrata internal software, Frieda River Exploration and Drilling (FRED) web interface, was used as the data management interface. This database manages all drill hole data including the geological data, chemical analysis results, geotechnical data, magnetic susceptibility data, etc. FRL is maintaining ongoing electronic sample security though the use of a commercial geological database, acQuire, using the Microsoft SQL 2008 database engine. The data is managed by full time geological data managers.

Criteria	JORC Code explanation	Commentary
Audits or reviews	• The results of any audits or reviews of sampling techniques and data.	"*Golder conducted a review of on-site sampling and data during 16 to 19 July 2011 and found the sampling technique and data capture and storage of a high standard. The sampling procedure is well documented and considered to be appropriate. It is carried out in a systematic manner consistent with the written protocols. The procedures are routinely audited and there is a high awareness of the importance of maintaining consistent procedures.*" Golder Associates (2011).

Section 2: Reporting of Exploration Results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.	The Frieda River Project is located in the northern foothills of Central Range in western Papua New Guinea, West Sepik Province at approximately latitude 4.699 south, longitude 141.763 east, between 500m to 1,200m above sea level. The area is remote from roads and facilities and is by air from Mt Hagen in the Highlands or Wewak on the northern coast. The reported Mineral Resources are secured by Exploration License 58 (EL58) covering an area of 150.6km^2. FRL is the manager of the Frieda River Joint Venture, with the participants holding interests in EL58 representing their interests in the joint venture. FRL holds an 80% interest in EL58, with Highlands Frieda Limited (a subsidiary of Highlands Pacific Limited) holding the remaining 20%.
	• The security of the tenure held at the time of reporting along with any known impediments to obtaining a Licence to operate in the area.	Exploration License 58 is securely held. There are no known impediments to obtaining a mining licence to operate in the area.
Exploration done by other parties	• Acknowledgment and appraisal of exploration by other parties.	Exploration drilling has been undertaken in the Frieda River area since 1969 by various parties: • Exploration was first carried out by Mount Isa Mines Ltd in 1968. • Sumitomo Metal Mining Co Ltd and Mount Isa Mines Ltd between 1974 and 1987. • Highlands Gold Ltd completed a 36 drill hole campaigns during 1993 to 1997. • Cyprus-Amax Minerals entered into a joint venture agreement with Highlands Pacific Ltd and OMRO Frieda and drilled 19 holes between 1998 and 1999. • In 2002, Highlands Pacific Ltd entered into joint venture agreement with Noranda Pacific and OMRO Frieda Co Ltd, and in 2005, Noranda Pacific Ltd merged with Falconbridge and Xstrata entered the Project through acquisition of Falconbridge in 2006. A total of 371 holes have been drilled between 2002 and 2011.
Geology	• Deposit type, geological setting and style of mineralisation.	Frieda River is an island arc porphyry copper-gold deposit. Mineralisation is mainly hosted by the Horse Microdiorite, which intruded into older diorites and volcanics of the Frieda River Igneous Complex.
Drill hole Information	• A summary of all information material to the understanding of the exploration results including a tabulation of all holes	A table of the drill hole collars is included in an appendix to the report.
Data aggregation methods	• In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg	No grade truncations have been applied. A cut-off grade of 0.2% total copper has been applied to the reported Mineral Resource.

Criteria	JORC Code explanation	Commentary
	cutting of high grades) and cut-off grades are usually Material and should be stated.	
	• Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.	The deposit style (copper porphyry) precludes short intercepts. Statistically significant grade outliers are rare for gold only and where they do occur, a limiting function in the estimation software (the 'high yield' function) prevents the high grade from being extended over large volumes. No aggregation methods have been applied.
	• The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used.
Relationship between mineralisation widths and intercept lengths	• These relationships are particularly important in the reporting of Exploration Results. • If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported. • If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').	The mineralisation widths of this porphyry copper style deposit are very large (in the order of 100s of metres) and the sample interval is 2 metres. The sampling intervals are considered appropriate to determine the geological and grade continuity and provide adequate resolution on domain boundaries. The deposit has a northwest trending steeply dipping geometry. Drill holes are typically drilled perpendicular to the main geometry. The majority of holes are oriented at a dip of 50° to 55° and azimuth 210° TN. Twenty holes from Phase 2 to 4 (6,939m) are drilled on the historical Horse Grid, oriented 080° TN to 260° TN. A further 108 Phase 2 to Phase 4 holes, totalling 32,561m, were drilled more than ten degrees off the Ivaal grid, providing some security against directional bias in the dataset.
Diagrams	• Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	Exploration results are not being reported.

Criteria	JORC Code explanation	Commentary
Balanced reporting	• Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.	Exploration results are not being reported.
Other substantive exploration data	• Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	Metallurgical test work, geotechnical, hydrogeological and other mining studies are included in the Processing and Mining chapters of the feasibility study. There are no over-riding factors from that which affect the Mineral Resource.
Further work	• The nature and scale of planned further work. • Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas.	A levelling program is proposed to allow the 'geological' sequential copper assays to be compared with the 'metallurgical' sequential copper assays. This will reduce uncertainty in the metallurgical recovery calculations and provide supporting evidence for metallurgical recovery in the Ore Reserve.

Section 3: Estimation and reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	• Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral	Geological logs, driller's reports, survey certificates and other relevant drill-hole data are physically collated in well maintained files for each individual drill hole. These folders have also been scanned and catalogued digitally. The geological, survey, analytical and meta-data for the Project are maintained in electronic files. Internal checks of the analytical database consistency were made in 2015 by FRL staff. Some aspects (weathering based on acid and cyanide soluble copper) were checked in every drill hole with available assays; other aspects such

Criteria	JORC Code explanation	Commentary
	Resource estimation purposes.	as lithology, alteration, down hole surveys and mineralogy were checked by randomly selecting 5% of drill holes and making spot checks of the correspondence between assay certificates and electronic data. Down hole surveys were checked by identifying any intervals with >5° deviation in dip or >10° deviation in azimuth; data errors were corrected using the scanned survey records. FRL staff made a comprehensive random check of drill core during the 2015 site visit. Core from HIT and surrounding areas within the FRIC were relogged to check for consistency. No material issues were detected. Checks were made against the logs and 3D models. The hard copy drill hole information and scanned copies are well organised and considered to be in acceptable condition. The storage of this information is considered appropriate. A review of the database against the drill holes found no major discrepancy for the drill holes checked.
	• Data validation procedures used.	Internal database checks include correcting primary key violations, object and record tracking and a suite of drill hole checks including overlapping intervals.
Site visits	• Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Golder Associates conducted site visits to Frieda River in 2009 and in 2011. The outcome found no issues that required urgent attention. The highest priority items noted related to the arsenic and molybdenum exploratory data analysis. The average molybdenum grade assayed in all drill core samples is 32ppm and arsenic 7ppm. The checks on the data have identified no material issues. Mr Leaman and Mr Carpenter of FRL conducted a site visit in 2015. The outcome was that some lithology codes to the west of HIT were inconsistent with the rocks, principally differentiating extrusive versus intrusive igneous rocks. The issues were confined to a mixed lithology zone on the western edge of the planned HIT open-pit and do not affect the Mineral Resource estimate. No other issues were detected.
Geological interpretation	• Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The observed geological continuity within the HIT porphyry potassic and phyllic zones is high, with a readily identifiable late stage barren intrusive (the Flimtem Trachyandesite) that has been modelled out. The confidence within the core of the system is high. Around the margins of the phyllic alteration zone is a barren alteration type called the quartz-illite-pyrite. The geological process that formed this alteration type is unknown, with two current hypotheses. The first is that it is a post-mineralisation low temperature highly acidic phase that has stripped the copper from the rocks. The second is that it is a contemporaneous coaxial alteration type between phyllic and propylitic assemblages. Either way it introduces uncertainty in the orientation, shape and nature of the contacts. This uncertainty is reflected in the estimate having a low classification around the margin.
	• Nature of the data used and of any assumptions made.	The data upon which the estimate is based is almost entirely the drill holes. The logged geological data from the drilling is descriptive in nature. Multiple layers of information exist from the geological logging, geochemical assays, core photographs and engineering properties of the rocks, which has been used to check on interpretations.
	• The effect, if any, of alternative interpretations on Mineral Resource estimation.	Alternative estimation was performed by consultants Hellman & Schofield Pty Ltd from Sydney, Australia. The estimate was entirely unconstrained by any boundaries. The results indicate very similar overall tonnes and grade, with differences only in the classifications. The deposit, with its continuous nature, large amounts of drilling and

Criteria	JORC Code explanation	Commentary
		coefficient of variation less than one for the valuable domains, appears resistant in overall tonnes and grade to alternative interpretations.
	• The use of geology in guiding and controlling Mineral Resource estimation.	A combination of lithology, alteration, weathering and structural features form the basis for copper, gold, density, total sulphur, and copper oxide and point load index estimation domains. The majority of boundaries are hard boundaries, ie only data within the domain is used to inform the domain. This is based on the known geological or geochemical processes that formed the boundaries.
	• The factors affecting continuity both of grade and geology.	Physical and geochemical boundaries affect the geological and grade continuity at HIT. Physical boundaries include the Horse-Ivaal fault and the Trukai-Ivaal fault, both of which have identifiable lithology and alteration offsets. A sharp contact exists between the mineralised Horse Ivaal and Trukai porphyries and the post mineralisation Flimtem Trachyandesite (FT) intrusives. The FT has a variable thickness that ranges in drill holes from a single sample (2.0m) thick intercept up to 170m thick, depending on the true thickness and orientation of the drill hole. The FT has been modelled using geology indicators by Ordinary Kriging with intercepts treated as hard boundaries to honour the observed field relationship. A high grade contemporaneous intrusive called the Hornblende Monzonite intrudes between two FT duke swarms at Horse and has been modelled separately. Notable geochemical discontinuities are observed in the weathering horizons, with rapid changes in copper and total sulphur contents in the extremely weathered portions of the profile. The copper oxide content is strongly influenced by the weathering and a sharp basal contact exists on the change between supergene and hypogene mineralisation. A contact that is both physical and geochemical in nature exists at the gypsum anhydrite dissolution surface, a boundary above which sulphates have been dissolved from the rock. This has resulted in highly fractured rocks which have RQD values of zero, as well as a notable density bias and step change in the total sulphur. The gypsum anhydrite dissolution surface is also important for the rock hardness, measured by point load index.
Dimensions	• The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.	The Frieda River Mineral Resource has the following maximum extents: Along strike (SE-NW) = 3000m Across strike (NE-SW) = 1000m RL = 1300 to -360m.
Estimation and modelling techniques	• The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation	The Mineral Resource of Horse-Ivaal-Trukai was estimated using established geostatistical techniques following comprehensive statistical and exploratory data analysis. The evaluation of appropriate geological groupings for combination into statistical estimation populations was undertaken through the iterative statistical definition of Estimation Domains for copper, gold, density, total sulphur, copper oxide and point load index. Four metre down hole composites truncated at estimation domains have been used for the estimation. A minimum of 1m in length was required for a composite. Three dimensional experimental variograms were generated and modelled. The variogram models were validated

Criteria	JORC Code explanation	Commentary
	from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.	by the 'leave-one-out' validation technique with two additional tests using data exclusion with radii at 50m and 100m for the high-value domains. Block grade interpolation was carried out using three-pass ordinary kriging in parent blocks of 25m x 25m x 15m down to regular sub blocks of 5m x 5m x 5m. Each pass reflected the various ranges established by the variogram models for each element and domain. Maptek Vulcan mining software (version 9.1.0) has been used for block grade interpolation and Mineral Resource classification. No direct grade capping was done; the extended influence of the high grade outlier composites was restricted in the kriging plans where necessary. The impact of this restriction was assessed by interpolating auxiliary block models without restrictions to the outliers and also by close visual inspection of the results. An inverse distance weighted copper estimate was also obtained without the restriction to outliers and served as reference for checking the presence of bias at the global scale. The block grade dilution related to the geology boundaries was taken up in the final block grades by considering the proportion of each geological population within each block. This approach accounts for grade dilution related to geological contacts. The proportion of each lithological, mineral and alteration domain is stored on a block by block basis from the interpreted solids. For the interpolation of total copper grades, each domain had its own interpolated variable that was used to derive the final block grade by weighting the interpolated grades based on the proportions of each domain within the block. This approach was used for total copper, gold and molybdenum. The final block grade for Total Copper at HIT is calculated using the following equation: $$TCu\ (\%) = \frac{\sum_{i=0}^{n} L(i) \times Cu(i)\ \times \rho_i}{\sum_{i=0}^{n} L(i)\ \times \rho_i}$$ where $L(i)$ is the proportion of each domain within a particular block, $Cu(i)$ is the estimated copper grade for each domain, ρ_i is the block density and $TCu\ (\%)$ is the final volume-weighted estimated copper grade. This methodology produces a Mineral Resource inventory that represents a reasonable expectation of what can be recovered during mining.
	• The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Check estimates using an inverse distance weighted method were used to compare the composite data against the ordinary kriged estimates in swath plots. No issues were detected. The HIT deposit has not been mined in the past and reconciliation with production data is not possible.
	• The assumptions made regarding recovery of by-products.	It is assumed that the concentrations of silver and molybdenum are too low to be economically recovered as a by-product.
	• Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage	The concentration of deleterious elements arsenic and antimony are low enough to indicate the concentrate would not attract a penalty.

Criteria	JORC Code explanation	Commentary
	characterisation).	
	• In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	The block size is 25m x 25m x 15m. The highest drilling density is approximately 75m x 75m. Search distances range from 50 – 80% of the variogram model range for the highest confidence first pass of estimates. Search distances increase to 150% of the variogram model range for the lowest confidence third pass of estimates.
	• Any assumptions behind modelling of selective mining units.	It is assumed that the drilling is representative of the selective mining unit of 25m x 25m x 15m. Therefore the Mineral Resource at the 0.2% total copper cut-off is assumed to approximate the recoverable portion.
	• Any assumptions about correlation between variables.	Copper and gold exhibit a strong correlation (r ~0.7). This observation forms the basis for the decision that the copper estimation domains should be used for the gold estimation domains.
	• Description of how the geological interpretation was used to control the resource estimates.	Four interpretations on Lithology, Alteration, Weathering and Structural zone have been used in various combinations to define nine estimation domains for copper, gold, density and copper oxide. Four subdomains are defined for the total sulphur and point load index estimates. The domains were determined based on an exploratory data analysis of the assay data.
	• Discussion of basis for using or not using grade cutting or capping.	Grade cutting was not used as the sampling and assaying is considered representative of the deposit. A software-specific method of 'high yield samples' has been used. The method works by restricting the distance over which samples with specified 'high' grades can extend. The method prevents rare high grade samples 'smearing' across large distances.
	• The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Estimate and sample statistics were compared and no material discrepancies were noted. There has been no production at HIT or anywhere else within EL58 so reconciliation is not possible.
Moisture	• Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are based on volume measurements converted using dry bulk densities.
Cut-off parameters	• The basis of the adopted cut-off grade(s) or quality parameters applied.	The Mineral Resource model is constrained by assumptions about geological mineralisation controls. The tabulated Mineral Resources are based on cut-off grades of 0.2% Cu.
Mining factors or assumptions	• Assumptions made regarding possible mining methods, minimum mining dimensions and	The kriged block dimension is identical to that to be employed in future mine planning and is currently envisaged as the selective-mining unit (SMU) for the projected operation. Open-pit mining method is assumed to be adapted for this deposit.

Criteria	JORC Code explanation	Commentary
	internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	
Metallurgical factors or assumptions	• The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	Process route for the HIT mineralisation is currently defined as a milling and standard flotation operation based on comminution and flotation test work results. Recovery factors have been updated to reflect the latest available data. No high levels of penalty elements have been recovered in flotation test work.

Criteria	JORC Code explanation	Commentary
Environmental factors or assumptions	• Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	FRL is not aware of any environmental issues that would affect the eventual economic extraction of the deposit. The environmental factors are being assessed as part of the statutory processes required.
Bulk density	• Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.	Density data has been collected from both waxed and whole tray methods. A comparative study from 7,445 samples was carried out and on the results from the study, bulk density data is interpolation using ordinary kriging by density estimation domains in the block model. Post processing involved subtracting 0.13g/cm^3 from the estimated block density of mineral zones above the gypsum-anhydrite surface. Fresh rock density estimates were not altered. The density measuring method is considered appropriate and the number and distribution of measurements are considered adequate for the Mineral Resource estimation.
	• The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.	The wax immersion method adequately accounts for void spaces when determining the bulk density. The whole tray method adequately accounts for void spaces and fractured rocks when determining the bulk density.

Criteria	JORC Code explanation	Commentary
	• Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Blocks that were not estimated were assigned a default value based on averages of wax immersion and whole tray density tests. Based on the results from the whole tray and wax immersion methods a post processing step is used to subtract 0.13g/cc from the density estimates above the gypsum/anhydrite surface.
Classification	• The basis for the classification of the Mineral Resources into varying confidence categories.	The approach to the Mineral Resource classification for the Frieda River Project deposits is mainly based on kriging performance indicators. Each successive estimate pass stipulated a minimum number of samples, minimum number of drill holes and maximum search radius. The kriging variance was used to confirm maximum estimation error for each pass to ensure the error did not exceed the stated acceptable accuracy. Samples were used to spatially constrain the Measured, Indicated and Inferred Mineral Resources. 25 drill holes from Phase 1b have not been considered for classifying Mineral Resources as Measured, they have been considered for Indicated and Inferred only.
	• Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).	The quality, quantity and appropriateness of the drilling and assaying at the HIT deposit is adequate to support Measured, Indicated and Inferred Mineral Resources. Quality Assurance/Quality Control procedures are of a satisfactory degree and rigour to support the highest level of Mineral Resource classification where the spacing and distribution of the drilling is in the order of 75m x 75m spacing. The quantity and nature of the deleterious elements do not pose a significant risk to the processing at the HIT deposit. The core recovery is considered sufficient to support geological interpretation and provide unbiased grade estimates.
	• Whether the result appropriately reflects the Competent Person's view of the deposit.	The results reflect the view of the Competent Person.
Audits or reviews	• The results of any audits or reviews of Mineral Resource estimates.	An independent expert peer review was carried out by Quantitative Geoscience (QG) in 2015.
Discussion of relative accuracy/confidence	• Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify	The HIT deposit is a global Mineral Resource with no production data. The Mineral Resource estimate is currently supported by a substantial geological and drill hole data and analytical results. The accuracy and confidence level of the Mineral Resource may be classed as follows: • Measured Mineral Resource: ± 10% grade and tonnes at a 95% confidence interval for a three month production interval • Indicated Mineral Resource: ± 20% grade and tonnes at a 95% confidence interval for a three month production interval • Inferred Mineral Resource: ± 50% grade and tonnes at a 95% confidence interval for a three month production

Criteria	JORC Code explanation	Commentary
	the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.	interval.
	• The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.	The Mineral Resource estimate is a global estimate for all domains within the Whittle Shell 37 'sup_pit37_case_07.00t' with a 0.2% total copper cut-off.
	• These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	The HIT deposit is undeveloped and have no production data.

Ekwai - Frieda River, Papua New Guinea

Section 1. Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes or hand-held XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling. • Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used. • Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1m samples from which 3kg was pulverised to produce a 30g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.	The sampling used for Mineral Resource estimation for Ekwai at Frieda River, PNG, consists of diamond core drilling with core diameters between PQ (~85mm) and NQ (~47mm) with the majority being HQ (~61mm). Holes generally drilled steep to moderately angled to the WSW. Sampling consisted of cut half core. Consistency of sampling method maintained reasonably well since sampling began at Frieda River in 1968. Copper was analysed by aqua regia digest/solvent extraction for Phase 1 samples, aqua regia digest/atomic absorption spectroscopy for Phase 2 samples, and aqua regia digest/inductively coupled plasma – optical emission (ICP-OES) spectroscopy for Phase 3 and 4 samples. Gold was analysed by 20 gram fire assay for Phase 1 samples and 50 gram fire assay for Drilling Phase 2, 3 and 4 samples. A default suite of elements was Cu, Au, Pb, Zn, Ag, Mo and As. The primary laboratory for Phase 4 assay work was ALS in Townsville. Check assay samples were sent to Genalysis in Perth and Townsville. The standard assay suite was gold by 50g fire assay (Method code Au-AA26) and copper and minor/deleterious elements by multi element ICP OES (method ME-ICP41). This uses an aqua regia digest, consistent with the phase 1 to phase 3 work. Copper values greater than 0.5% were reassayed by method Cu-OG46. Sampling technique is considered appropriate for deposit type. Well documented core handling and sampling procedures for Phase 4. Samples with missing or questionable QAQC had their confidence downgraded and used for lower Mineral Resource classification than they would otherwise achieve, given their sample spacing and distribution.
Drilling techniques	• Drill type (eg core, reverse	All holes at Frieda River are drilled with triple tube wireline diamond drilling with core sizes ranging from PQ

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	circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).	(~85mm core diameter) to NQ (~47mm core diameter). Diamond drilling mainly HQ core size totalling 28 holes for 6,171m. Phase 1a 1969 to 1971 CEC 4 diamond drill holes for 573m. Phase 1b 1976 to 1982 FEPL 2 diamond drill holes for 578m. Phase 2 1993 to 1997 HIG no drilling. Phase 3 1998 to 1999 Cyprus 2 diamond drill holes for 589m. Phase 4 2002 to 2012 Noranda-Xstrata 20 diamond drill holes for 4,432m. Drilling technique is considered most appropriate for deposit type. A suite of percussion holes, the SPH series, was excluded from the Mineral Resource estimate due to suspect data. No oriented core.
Drill sample recovery	• Method of recording and assessing core and chip sample recoveries and results assessed. • Measures taken to maximise sample recovery and ensure representative nature of the samples. • Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	No core recovery information was available. Sample recovery at the neighbouring HIT deposit is acceptable, implying acceptable recovery at Ekwai because the drilling at both deposits was done by the same companies at the same time and the lithologies and rock properties are similar. Triple tube wireline drilling was employed for Phase 2 to 4 drill holes to maximise core recovery.
Logging	• Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies. • Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography. • The total length and percentage of the relevant intersections logged.	Core logging has been performed to a sufficiently high standard. All drill core from Phase 2 and onwards has been systematically logged using standard procedures. The logging codes used have adopted and refined the system instituted by Cyprus in 1998, providing historical continuity and internal consistency. The core is stored at Frieda River Base camp in three covered core stores. Logging is qualitative and quantitative; lithology and alteration were logged qualitatively and mineralisation, geotechnical, structural and some aspects of petrology were logged quantitatively. Most drill holes have been digitally photographed.

Criteria	JORC Code explanation	Commentary
Sub-sampling techniques and sample preparation	• If core, whether cut or sawn and whether quarter, half or all core taken. • If non-core, whether riffled, tube sampled, rotary split, etc. And whether sampled wet or dry. • For all sample types, the nature, quality and appropriateness of the sample preparation technique. • Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples. • Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling. • Whether sample sizes are appropriate to the grain size of the material being sampled.	The same sampling protocol has been in use for all the drilling used in the Mineral Resource estimate: 1. 2m intervals are sawn in half lengthways with a diamond saw 2. Half core is dried and the whole interval jaw crushed to 90% passing -10 mesh. 3. A 3.5kg sub-sample is taken and ground to finer than -40 mesh in a ring mill. Since 2007, the circuit has been modified using a combination Boyd Crusher and rotating sample divider to produce an approximate 3kg split at -10 mesh in a single pass. This is pulverised in an LM5 mill as before, then a 250g split is taken from the bowl and dispatched to the primary laboratory. The LM5 product is tested to ensure greater than 90% of material passes -40 mesh. All samples used to inform the Mineral Resource estimate are diamond core samples. The nature, quality and appropriateness of the sample preparation technique have been independently verified by Golder Associates (2011) and by FRL staff (2015). The sample sizes are considered appropriate for the grain sizes at each stage of the subsampling process. The sampling program was audited by sampling consultant Dr Francis Pitard in 1994 and sampling practices since that time have followed the recommendations.

Criteria	JORC Code explanation	Commentary
Quality of assay data and laboratory tests	• The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total. • For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc. • Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.	The analytical procedures for Phase 4 uses an aqua regia digest with inductively coupled plasma – optical emission spectroscopy for copper and a 50g fire assay for gold. Phase 2 and 3 use an aqua regia digest with atomic absorption spectroscopy for copper and a 50g fire assay. Phase 1 used an aqua regia digest with solvent extraction for copper and a 20g fire assay for gold. The technique is considered total for copper and gold at Frieda river. Phase 1a - No QAQC information is available for checking Phase 1 assays for accuracy and precision. Phase 1b - No QAQC information is available for checking Phase 1 assays for accuracy and precision. Phase 2 to 4 - QAQC data from these drill phases show acceptable precision and no obvious bias.
Verification of sampling and assaying	• The verification of significant intersections by either independent or alternative company personnel. • The use of twinned holes. • Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols. • Discuss any adjustment to assay data.	There has been no verification of intersections by non-company personnel and there are no twinned holes.

Criteria	JORC Code explanation	Commentary
Location of data points	• Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation. • Specification of the grid system used. • Quality and adequacy of topographic control.	DGPS in PNG94 Zone 54 grid projection by qualified surveyors. Down hole surveys were historically taken every 50m by single shot Eastman camera surveys. Half way through Phase 4 moved to 50m intervals with the REFLEX EZ-SHOT. A detailed Digital Elevation Model (DEM) was generated by from LIDAR data and incorporates ground survey points. Location methods used to determine accuracy of drill hole collars is considered appropriate. Down hole surveys are absent for Phase 1a drilling.
Data spacing and distribution	• Data spacing for reporting of Exploration Results. • Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied. • Whether sample compositing has been applied.	Drill hole section spacing is 100m. On section spacing is irregular due to topography but is generally similar to the section line spacing. 100m spacing is appropriate for assessment of geological and grade continuity for this type of deposit. Drilling depth is generally to 200m RL. No sample compositing.
Orientation of data in relation to geological structure	• Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type. • If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	Moderate to steep dip drilling to WSW at right angles to mineralisation. Drill hole angle relative to mineralisation has been a compromise to accommodate the vertical nature and strike dimensions of a wide intrusive body. Drilling orientations are appropriate with no bias.

Criteria	JORC Code explanation	Commentary
Sample security	• The measures taken to ensure sample security.	A chain of custody was maintained by the use of commercial grade tamper proof security tags for transport of the samples between site and laboratory. FRL is maintaining ongoing electronic sample result security though the use of a commercial geological database, acQuire, using the Microsoft SQL 2008 database engine. The data is managed by full time geological data managers.
Audits or reviews	• The results of any audits or reviews of sampling techniques and data.	The Xstrata HIT Feasibility Study was supplied to the consultant who performed the Ekwai Mineral Resource estimate. It is the presumption that comments and conclusions can be applied to Ekwai. Xstrata expressed concern about the documentation for the Phase 1a drilling at HIT and excluded the drill holes. The holes have been retained for Ekwai (14% of total) based on Xstrata's statement "there is no explicit reason to doubt the veracity of the assay data" but the inclusion has impacted on classification. Golder Associates : "External Review of Feasibility Level Mineral Resources" – identified no significant risks to sample preparation and assays.

Section 2: Reporting of exploration results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings. • The security of the tenure held at the time of reporting along with any known impediments to obtaining a Licence to operate in the area.	The Frieda River Project area is located in the northern foothills of Central Range in western Papua New Guinea, West Sepik Province at approximately latitude 4.699 south, longitude 141.763 east, between 500m to 1,200m above sea level. The area is remote from roads and facilities and is by air from Mt Hagen in the Highlands or Wewak on the northern coast. The reported Mineral Resources are secured by Exploration License 58 covering an area of 150.6km^2. Frieda River Limited (FRL) is the manager of the Frieda River Joint Venture, with the participants holding interests in EL58 representing their interests in the joint venture. FRL holds an 80% interest in EL58, with Highlands Frieda Limited (a subsidiary of Highlands Pacific Limited) holding the remaining 20%. Exploration License 58 is securely held. There are no known impediments to obtaining a mining licence to operate in the area.

Criteria	JORC Code explanation	Commentary
Exploration done by other parties	• Acknowledgment and appraisal of exploration by other parties.	Exploration drilling has been undertaken in the Frieda River area since 1969 by various parties: • Exploration was first carried out by Mount Isa Mines Ltd in 1968 • Sumitomo Metal Mining Co Ltd and Mount Isa Mines Ltd between 1974 and 1987 • Highlands Gold Ltd completed a 36 drill hole campaigns during 1993 to 1997 • Cyprus-Amax Minerals entered into a joint venture agreement with Highlands Pacific Ltd and OMRO Frieda and drilled 19 holes between 1998 and 1999 • In 2002, Highlands Pacific Ltd entered into joint venture agreement with Noranda Pacific and OMRO Frieda Co Ltd, and in 2005, Noranda Pacific Ltd merged with Falconbridge and Xstrata entered the Project through acquisition of Falconbridge in 2006. A total of 371 holes have been drilled between 2002 and 2011.
Geology	• Deposit type, geological setting and style of mineralisation.	The Frieda River Igneous Complex ("FRIC") represents the remains of a solitary strato-volcano associated with an island arc subduction setting. It intrudes meta-sedimentary basement of Cretaceous age. The FRIC is a sub-vertical intrusion and covers an area of 17 by 7km with a NW elongate axis. The FRIC comprises diorites and andesite cross cut by later Flimtem trachyandesite dykes. The intrusive is multi-phased ranging in ages between 13.1 and 17.3ma. Deformation is confined to late stage brittle structures. The Horse Microdiorite is the main intrusive phase related to mineralisation in the general area and represents a hornblende-biotite phyric microdiorite porphyry. Overprinting alteration is of a typical porphyry system with the majority of the mineralisation associated with the potassic and phyllic alteration phases. Mineralisation comprises chalcopyrite disseminations and thin quartz veins with chalcopyrite veinlet and blebs. Lithology is the main control on mineralisation with alteration providing control within the dominant mineral-hosting lithologies namely the HMD. The Ekwai porphyry system is considered to be a satellite intrusive to the main HMD Porphyry, responsible for hosting the HIT deposit. Higher grade mineralisation appears as a discrete zone on the western (?footwall) side of the deposit, possibly indicating a structural control. More diffuse broader lower grade mineralisation occurs in the eastern (?hangingwall) half of the deposit.
Drill hole Information	• A summary of all information material to the understanding of the exploration results including a tabulation of all holes	A table of the drill hole collars is included in the Mineral Resource report
Data aggregation methods	• In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and	No grade truncations have been applied. A cut-off grade of 0.2% total copper has been applied to the reported Mineral Resource. The deposit style (copper porphyry) precludes short intercepts. No metal equivalent values have been used.

Criteria	JORC Code explanation	Commentary
	should be stated. • Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail. • The assumptions used for any reporting of metal equivalent values should be clearly stated.	
Relationship between mineralisation widths and intercept lengths	• These relationships are particularly important in the reporting of Exploration Results. • If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported. • If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').	Exploration results are not being reported.
Diagrams	• Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	Exploration results are not being reported.

Criteria	JORC Code explanation	Commentary
Balanced reporting	• Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.	Exploration results are not being reported.
Other substantive exploration data	• Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	Metallurgical test work, geotechnical, hydrogeological and other mining studies have been performed for the nearby HIT. Given the similarities and proximity of the deposits it is implied that similar characteristics will be found at Ekwai as are observed at HIT.
Further work	• The nature and scale of planned further work. • Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas.	FRL is conducting a drilling program to be completed calendar Q4 2016, including a twin drill hole.

Section 3: Estimation and reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	• Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes. • Data validation procedures used.	For the Mineral Resource estimate, data was exported from the supplied database and re-imported into an HS&C Access database with indexed fields. Additional error checking was performed using the Surpac database audit option. Manual checking of logging codes was performed for consistency. Manual checking of assay grades was performed for plausibility. Data was converted to a local orthogonal E-W grid.
Site visits	• Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits have been completed by Highlands Pacific on numerous occasions. Visits have reviewed drill core, geological mapping and interpretation. A site visit was completed Simon Tear in 2001. FRL completed site visits in 2015 and 2016.
Geological interpretation	• Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit. • Nature of the data used and of any assumptions made. • The effect, if any, of alternative interpretations on Mineral Resource estimation. • The use of geology in guiding and controlling Mineral Resource estimation. • The factors affecting continuity both of grade and geology.	Simple porphyry copper model exposed at surface with an elongate strike in the NNW –SSE direction. Proximal to the much larger HIT deposit. No hard boundaries designed. No supergene blanket zone is interpreted to exist.
Dimensions	• The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the	1000m by 300m to a depth of 450m. Outcropping at surface with a range of elevation from 600 to 150m RL.

Criteria	JORC Code explanation	Commentary
	Mineral Resource.	
Estimation and modelling techniques	• The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used. • The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data. • The assumptions made regarding recovery of by-products. • Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation). • In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed. • Any assumptions behind modelling of selective mining units. • Any assumptions about correlation between variables. • Description of how the	GS3M modelling software; Surpac block model; Orthogonal model based on the HIT local grid. 1,385 4m down hole composites used. Data visually trimmed to remove small amount of peripheral barren material. No top cutting applied; the coefficients of variation for the relevant composite datasets suggest that the data is not sufficiently skewed to warrant top cutting. (coefficient of variation of 1.1 and 1.2 for Cu & Au respectively). Reasonable correlation between gold and copper. No assumption on gold recovery. No domaining used, modelling unconstrained. Geostatistics were performed for copper and gold on composite data. Variography was poor to modest mainly due to a lack of drilling. Ordinary Kriging estimation method used. Maximum extrapolation from nearest drill hole is 100m. The search ellipse was orientated to follow the strike and vertical nature of the porphyry intrusive. A 3 pass search strategy was used. Search parameters 125m by 50m by 75m with a 30% expansion; a 45° search rotation about the Z axis, ie to local grid SE. Minimum data 16 with 4 octants decreasing to 8 data with 2 octants. Parent Block size 25m (east) by 25m (north) by 15m (elevation) with no sub-blocking (designed to be compatible with on the HIT block model). Check Model confirmed global Mineral Resource estimates; used a flat search designed to reflect data point distribution (125 by 125 by 15m) with a 30% expansion. Model validation has consisted of visual comparison of block grades and composite values and indicated a reasonable match. Comparison of summary statistics for block grades and composite values has indicated the composite mean is greater than the block grade mean for both copper and gold. No deleterious elements or acid mine drainage factored in. No published historic Mineral Resource estimate. Drill hole spacing along strike is 100m and nominally 100m on section.

Criteria	JORC Code explanation	Commentary
	geological interpretation was used to control the resource estimates. • Discussion of basis for using or not using grade cutting or capping. • The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	
Moisture	• Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry weight basis.
Cut-off parameters	• The basis of the adopted cut-off grade(s) or quality parameters applied.	0.2% copper. Block centroid below topographic surface. No segregation for different oxidation levels. Cut-off the same as that used for the HIT deposit. Fixed density of 2.57t/$m^{3.}$ The cut-off grade at which the Mineral Resource is quoted reflects the intended bulk-mining approach.
Mining factors or assumptions	• Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case,	An open-pit mining scenario is assumed, using a selective mining unit of 25 x 25 x 15m.

Criteria	JORC Code explanation	Commentary
	this should be reported with an explanation of the basis of the mining assumptions made.	
Metallurgical factors or assumptions	• The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	Mineralisation is similar to the HIT deposit which has had substantial test work completed. No assumptions have been made for Ekwai but application of HIT assumptions would be reasonable.
Environmental factors or assumptions	• Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered	Studies of the general Frieda River area have been completed by FRL. No assumptions have been made for Ekwai but application of HIT assumptions would be reasonable. There are carbonate rocks in the vicinity that could potentially provide material for control of any acid mine drainage.

Criteria	JORC Code explanation	Commentary
	this should be reported with an explanation of the environmental assumptions made.	
Bulk density	• Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples. • The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit. • Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Average dry density value based on HIT densities and a literature search; a value of 2.57t/m^3 used for all oxidised & fresh rock types.
Classification	• The basis for the classification of the Mineral Resources into varying confidence categories. • Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data). • Whether the result appropriately reflects the Competent Person's view of the	Mineral Resources have been classified on the estimation search pass category subject to assessment of other impacting factors such as drill hole spacing (variography), core handling and sampling procedures, QAQC outcomes, density measurements, geological model (and nearby mineralisation) and check Mineral Resource estimates. For Ekwai the entire Mineral Resource has been classified as Inferred based on uncertainties with Phase 1a drill assays. The classification appropriately reflects the Competent Person's view of the deposit.

Criteria	JORC Code explanation	Commentary
	deposit.	
Audits or reviews	• The results of any audits or reviews of Mineral Resource estimates.	There are no audits or reviews of the Ekwai Mineral Resource.
Discussion of relative accuracy/confidence	• Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate. • The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used. • These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	The geological nature of the deposit, composite/block grade comparison and the low coefficients of variation lend themselves to reasonable level of confidence in the Mineral Resource estimates. The lateral margins to the deposit are geologically undefined, more detailed drilling may cause either an increase or decrease in the Mineral Resource estimate. Modelling of the unconstrained composite data does seem to have limited any smearing of grade beyond a reasonable geological limit. The impact of oxidation is known at HIT to impact the metallurgical recovery of copper and gold. Given the same mineralisation style, lithology, alteration and weathering at Ekwai as HIT it is assumed the metallurgical recoveries will be similar in the various domains. There may be some small scale clustering of grade or localised domains of different grade that is not detectable on the current 100m spaced drilling. This is thought unlikely in a copper porphyry situation. The possibility of thick unconsolidated overburden is considered unlikely as the deposit generally lies on the crest of a hill away from any valley floor. The Mineral Resource estimates are considered to be accurate globally, but there is some uncertainty in the local estimates due to the current drill hole spacing and a lack of geological definition. No mining of the deposit has taken place so no production data is available for comparison.

Koki - Frieda River, Papua New Guinea

Section 1. Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes or hand-held XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling. • Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used. • Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1m samples from which 3kg was pulverised to produce a 30g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.	The sampling used for Mineral Resource estimation for Koki at Frieda River, PNG, consists of diamond core drilling with core diameters between PQ (~85mm) and NQ (~47mm) with the majority being HQ (~61mm). Holes generally drilled steep to moderately angled to the WSW. Sampling consisted of cut half core. Consistency of sampling method maintained reasonably well since sampling began at Frieda River in 1968. Copper was analysed by aqua regia digest/solvent extraction for Phase 1 samples, aqua regia digest/atomic absorption spectroscopy for Phase 2 samples, and aqua regia digest/inductively coupled plasma – optical emission (ICP-OES) spectroscopy for Phase 3 and 4 samples. Gold was analysed by 20 gram fire assay for Phase 1 samples and 50 gram fire assay for Drilling Phase 2, 3 and 4 samples. A default suite of elements was Cu, Au, Pb, Zn, Ag, Mo and As. The primary laboratory for Phase 4 assay work was ALS in Townsville. Check assay samples were sent to Genalysis in Perth and Townsville. The standard assay suite was gold by 50g fire assay (Method code Au-AA26) and copper and minor/deleterious elements by multi element ICP OES (method ME-ICP41). This uses an aqua regia digest, consistent with the phase 1 to phase 3 work. Copper values greater than 0.5% were reassayed by method Cu-OG46. Sampling technique is considered appropriate for deposit type. Well documented core handling and sampling procedures for Phase 4. Samples with missing or questionable QAQC had their confidence downgraded and used for lower Mineral Resource classification than they would otherwise achieve, given their sample spacing and distribution.
Drilling techniques	Drill type (eg core, reverse	All holes at Frieda River are drilled with triple tube wireline diamond drilling with core sizes ranging from PQ

Criteria	JORC Code explanation	Commentary
	circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).	(~85mm core diameter) to NQ (~47mm core diameter). Diamond drilling mainly HQ core size totalling 49 holes for 12,924m. Phase 1a 1969 to 1971 CEC 37 diamond drill holes for 9,121m. Phase 1b 1976 to 1982 FEPL no drilling. Phase 2 1993 to 1997 HIG 4 diamond drill holes for 1,574m. Phase 3 1998 to 1999 Cyprus 2 diamond drill holes for 555m. Phase 4 2002 to 2012 Noranda-Xstrata ("XS") 6 diamond drill holes for 1,674m. Drilling technique is considered most appropriate for deposit type. A suite of percussion holes, the SPH series, was excluded from the Mineral Resource estimates due to suspect data. No oriented core.
Drill sample recovery	• Method of recording and assessing core and chip sample recoveries and results assessed. • Measures taken to maximise sample recovery and ensure representative nature of the samples. • Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	No core recovery information was available. Sample recovery at the neighbouring HIT deposit is acceptable, implying acceptable recovery at Koki because the drilling at both deposits was done by the same companies at the same time and the lithologies and rock properties are similar. Triple tube wireline drilling was employed for Phase 2 to 4 drill holes to maximise core recovery.
Logging	• Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies. • Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography. • The total length and percentage of the relevant intersections logged.	Core logging has been performed to a sufficiently high standard. All drill core from Phase 2 and onwards has been systematically logged using standard procedures. The logging codes used have adopted and refined the system instituted by Cyprus in 1998, providing historical continuity and internal consistency. The core is stored at Frieda River Base camp in three covered core stores. Logging is qualitative and quantitative; lithology and alteration were logged qualitatively and mineralisation, geotechnical, structural and some aspects of petrology were logged quantitatively. Most drill holes have been digitally photographed.

Criteria	JORC Code explanation	Commentary
Sub-sampling techniques and sample preparation	• If core, whether cut or sawn and whether quarter, half or all core taken. • If non-core, whether riffled, tube sampled, rotary split, etc. And whether sampled wet or dry. • For all sample types, the nature, quality and appropriateness of the sample preparation technique. • Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples. • Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling. • Whether sample sizes are appropriate to the grain size of the material being sampled.	The same sampling protocol has been in use for all the drilling used in the Mineral Resource estimate: 1. 2m intervals are sawn in half lengthways with a diamond saw 2. Half core is dried and the whole interval jaw crushed to 90% passing -10 mesh. 3. A 3.5kg sub-sample is taken and ground to finer than -40 mesh in a ring mill. Since 2007, the circuit has been modified using a combination Boyd Crusher and rotating sample divider to produce an approximate 3kg split at -10 mesh in a single pass. This is pulverised in an LM5 mill as before, then a 250g split is taken from the bowl and dispatched to the primary laboratory. The LM5 product is tested to ensure greater than 90% of material passes -40 mesh. All samples used to inform the Mineral Resource estimate are diamond core samples. The nature, quality and appropriateness of the sample preparation technique have been independently verified by Golder Associates (2011) and by FRL staff (2015). The sample sizes are considered appropriate for the grain sizes at each stage of the subsampling process. The sampling program was audited by sampling consultant Dr Francis Pitard in 1994 and sampling practices since that time have followed the recommendations

Criteria	JORC Code explanation	Commentary
Quality of assay data and laboratory tests	• The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total. • For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc. • Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.	The analytical procedures for Phase 4 uses an aqua regia digest with inductively coupled plasma – optical emission spectroscopy for copper and a 50g fire assay for gold. Phase 2 and 3 use an aqua regia digest with atomic absorption spectroscopy for copper and a 50g fire assay. Phase 1 used an aqua regia digest with solvent extraction for copper and a 20g fire assay for gold. The technique is considered total for copper and gold at Frieda river. Phase 1a - No QAQC information is available for checking Phase 1 assays for accuracy and precision. Phase 1b - No QAQC information is available for checking Phase 1 assays for accuracy and precision. Phase 2 to 4 - QAQC data from these drill phases show acceptable precision and no obvious bias.
Verification of sampling and assaying	• The verification of significant intersections by either independent or alternative company personnel. • The use of twinned holes. • Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols. • Discuss any adjustment to assay data.	There has been no verification of intersections by non-company personnel and there are no twinned holes.

Criteria	JORC Code explanation	Commentary
Location of data points	• Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation. • Specification of the grid system used. • Quality and adequacy of topographic control.	DGPS in PNG94 Zone 54 grid projection by qualified surveyors. Down hole surveys were historically taken every 50m by single shot Eastman camera surveys. Half way through Phase 4 moved to 50m intervals with the REFLEX EZ-SHOT. A detailed Digital Elevation Model (DEM) was generated by from LIDAR data and incorporates ground survey points. Location methods used to determine accuracy of drill hole collars is considered appropriate. Down hole surveys are absent for Phase 1a drilling.
Data spacing and distribution	• Data spacing for reporting of Exploration Results. • Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied. • Whether sample compositing has been applied.	Drill hole section spacing is 200m. On section spacing is irregular due to topography but is generally 100m. 200 by 100m spacing is appropriate for assessment of geological and grade continuity for this type of deposit. Drilling depth is generally to 200m RL. No sample compositing.
Orientation of data in relation to geological structure	• Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type. • If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	Moderate to steep dip drilling to WSW at right angles to mineralisation. Drill hole angle relative to mineralisation has been a compromise to accommodate the vertical nature and strike dimensions of a wide intrusive body. Drilling orientations are appropriate with no bias.

Criteria	JORC Code explanation	Commentary
Sample security	• The measures taken to ensure sample security.	A chain of custody was maintained by the use of commercial grade tamper proof security tags for transport of the samples between site and laboratory. FRL is maintaining ongoing electronic sample result security though the use of a commercial geological database, acQuire, using the Microsoft SQL 2008 database engine. The data is managed by full time geological data managers.
Audits or reviews	• The results of any audits or reviews of sampling techniques and data.	The Xstrata HIT Feasibility Study was supplied to the consultant who performed the Koki Mineral Resource estimate. It is the presumption that comments and conclusions can be applied to Koki. Xstrata expressed concern about the documentation for the Phase 1a drilling at HIT and excluded the drill holes. The holes have been retained for Koki (71% of total) based on Xstrata's statement "*there is no explicit reason to doubt the veracity of the assay data*" but the inclusion has impacted on classification Golder Associates: *External Review of Feasibility Level Mineral Resource*s – identified no significant risks to sample preparation and assays.

Section 2: Reporting of exploration results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings. • The security of the tenure held at the time of reporting along with any known impediments to obtaining a Licence to operate in the area.	The Frieda River Project area is located in the northern foothills of Central Range in western Papua New Guinea, West Sepik Province at approximately latitude 4.699 south, longitude 141.763 east, between 500m to 1,200m above sea level. The area is remote from roads and facilities and is by air from Mt Hagen in the Highlands or Wewak on the northern coast. The reported Mineral Resources are secured by Exploration License 58 covering an area of 150.6km^2. Frieda River Limited (FRL) is the manager of the Frieda River Joint Venture, with the participants holding interests in EL58 representing their interests in the joint venture. FRL holds an 80% interest in EL58, with Highlands Frieda Limited (a subsidiary of Highlands Pacific Limited) holding the remaining 20%. Exploration License 58 is securely held. There are no known impediments to obtaining a mining licence to operate in the area.

Criteria	JORC Code explanation	Commentary
Exploration done by other parties	• Acknowledgment and appraisal of exploration by other parties.	Exploration drilling has been undertaken in the Frieda River area since 1969 by various parties: • Exploration was first carried out by Mount Isa Mines Ltd in 1968 • Sumitomo Metal Mining Co Ltd and Mount Isa Mines Ltd between 1974 and 1987 • Highlands Gold Ltd completed a 36 drill hole campaigns during 1993 to 1997 • Cyprus-Amax Minerals entered into a joint venture agreement with Highlands Pacific Ltd and OMRO Frieda and drilled 19 holes between 1998 and 1999 • In 2002, Highlands Pacific Ltd entered into joint venture agreement with Noranda Pacific and OMRO Frieda Co Ltd, and in 2005, Noranda Pacific Ltd merged with Falconbridge and Xstrata entered the Project through acquisition of Falconbridge in 2006. A total of 371 holes have been drilled between 2002 and 2011.
Geology	• Deposit type, geological setting and style of mineralisation.	The Frieda River Igneous Complex ("FRIC") represents the remains of a solitary strato-volcano associated with an island arc subduction setting. It intrudes meta-sedimentary basement of Cretaceous age. The FRIC is a sub-vertical intrusion and covers an area of 17 by 7km with a NW elongate axis. The FRIC comprises diorites and andesite cross cut by later Flimtem trachyandesite dykes. The intrusive is multi-phased ranging in ages between 13.1 and 17.3ma. Deformation is confined to late stage brittle structures. The Horse Microdiorite is the main intrusive phase related to mineralisation in the general area and represents a hornblende-biotite phyric microdiorite porphyry. Overprinting alteration is of a typical porphyry system with the majority of the mineralisation associated with the potassic and phyllic alteration phases. Mineralisation comprises chalcopyrite disseminations and thin quartz veins with chalcopyrite veinlet and blebs. Lithology is the main control on mineralisation with alteration providing control within the dominant mineral-hosting lithologies namely the HMD. The Koki porphyry system is considered to be a satellite intrusive to the main HMD Porphyry, responsible for hosting the HIT deposit. Higher grade mineralisation appears as a discrete zone on the western (?footwall) side of the deposit, possibly indicating a structural control. More diffuse broader lower grade mineralisation occurs in the eastern (?hangingwall) half of the deposit.
Drill hole Information	• A summary of all information material to the understanding of the exploration results including a tabulation of all holes	A table of the drill hole collars is included in the Mineral Resource report.
Data aggregation methods	• In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and	No grade truncations have been applied. A cut-off grade of 0.2% total copper has been applied to the reported Mineral Resource. The deposit style (copper porphyry) precludes short intercepts. No metal equivalent values have been used.

Criteria	JORC Code explanation	Commentary
	should be stated. • Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail. • The assumptions used for any reporting of metal equivalent values should be clearly stated.	
Relationship between mineralisation widths and intercept lengths	• These relationships are particularly important in the reporting of Exploration Results. • If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported. • If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').	Exploration results are not being reported.
Diagrams	• Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	Exploration results are not being reported.

Criteria	JORC Code explanation	Commentary
Balanced reporting	• Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.	Exploration results are not being reported.
Other substantive exploration data	• Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	Metallurgical test work, geotechnical, hydrogeological and other mining studies have been performed for the nearby HIT. Given the similarities and proximity of the deposits it is implied that similar characteristics will be found at Koki as are observed at HIT.
Further work	• The nature and scale of planned further work. • Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas.	FRL are conducting a drilling program to be completed calendar Q4 2016.

Section 3: Estimation and reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	• Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes. • Data validation procedures used.	For the Mineral Resource estimate, data was exported from the supplied database and re-imported into an HS&C Access database with indexed fields. Additional error checking was performed using the Surpac database audit option. Manual checking of logging codes was performed for consistency. Manual checking of assay grades was performed for plausibility. Data was converted to a local orthogonal E-W grid.
Site visits	• Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits have been completed by Highlands Pacific on numerous occasions. Visits have reviewed drill core, geological mapping and interpretation. A site visit was completed Simon Tear in 2001. FRL completed site visits in 2015 and 2016.
Geological interpretation	• Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit. • Nature of the data used and of any assumptions made. • The effect, if any, of alternative interpretations on Mineral Resource estimation. • The use of geology in guiding and controlling Mineral Resource estimation. • The factors affecting continuity both of grade and geology.	Simple porphyry copper model exposed at surface with an elongate strike in the NNW –SSE direction. Proximal to the much larger HIT deposit. No hard boundaries designed. No supergene blanket zone is interpreted to exist.
Dimensions	• The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the	1400m by 800m to a depth of 650m. Outcropping at surface with a range of elevation from 700m RL to 50m RL.

Criteria	JORC Code explanation	Commentary
	Mineral Resource.	
Estimation and modelling techniques	• The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used. • The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data. • The assumptions made regarding recovery of by-products. • Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation). • In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed. • Any assumptions behind modelling of selective mining units. • Any assumptions about correlation between variables. • Description of how the	GS3M modelling software; Surpac block model; Orthogonal model based on the HIT local grid. 3,626 4m down hole composites used. No top cutting applied; the coefficients of variation for the relevant composite datasets suggest that the data is not sufficiently skewed to warrant top cutting. (coefficient of variation of 1.1 and 1.2 for Cu & Au respectively). Reasonable correlation between gold and copper. No assumption on gold recovery. No domaining used, modelling unconstrained. Geostatistics were performed for copper and gold on composite data. Variography was poor to modest mainly due to a lack of drilling. Ordinary Kriging estimation method used. Maximum extrapolation from nearest drill hole is 100m. The search ellipse was orientated to follow the strike and vertical nature of the porphyry intrusive. A 3 pass search strategy was used. Search parameters 125m by 50m by 75m with a 30% expansion; a 45° search rotation about the Z axis, ie to local grid SE. Minimum data 16 with 4 octants decreasing to 8 data with 2 octants. Parent Block size 25m (east) by 25m (north) by 15m (elevation) with no sub-blocking (designed to be compatible with on the HIT block model). Check Model confirmed global Mineral Resource estimates; used a flat search designed to reflect data point distribution (125 by 125 by 15m) with a 30% expansion. Model validation has consisted of visual comparison of block grades and composite values and indicated a reasonable match. Comparison of summary statistics for block grades and composite values has indicated the composite mean is greater than the block grade mean for both copper and gold. No deleterious elements or acid mine drainage factored in. Previous published estimate used only 30 holes and generated a Mineral Resource of 274Mt @ 0.4% Cu & 0.3g/t Au; a sectional polygonal model with a nominal 0.2% Cu cut-off. Drill hole spacing along strike is 200m and 100m on section.

Criteria	JORC Code explanation	Commentary
	geological interpretation was used to control the resource estimates. • Discussion of basis for using or not using grade cutting or capping. • The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	
Moisture	• Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry weight basis.
Cut-off parameters	• The basis of the adopted cut-off grade(s) or quality parameters applied.	0.2% copper. Block centroid below topographic surface. No segregation for different oxidation levels. Cut-off the same as that used for the HIT deposit. Fixed density of 2.57t/m^3. The cut-off grade at which the Mineral Resource is quoted reflects the intended bulk-mining approach.
Mining factors or assumptions	• Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always	An open-pit mining scenario is assumed, using a selective mining unit of 25 x 25 x 15m.

Criteria	JORC Code explanation	Commentary
	be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	
Metallurgical factors or assumptions	• The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	Mineralisation is similar to the HIT deposit which has had substantial test work completed. No assumptions have been made for Koki but application of HIT assumptions would be reasonable.
Environmental factors or assumptions	• Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these	Studies of the general Frieda River area have been completed by FRL. No assumptions have been made for Koki but application of HIT assumptions would be reasonable. There are carbonate rocks in the vicinity that could potentially provide material for control of any acid mine drainage.

Criteria	JORC Code explanation	Commentary
	aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	
Bulk density	• Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples. • The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit. • Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Average dry density value based on HIT densities and a literature search; a value of 2.57t/m^3 used for all oxidised & fresh rock types.
Classification	• The basis for the classification of the Mineral Resources into varying confidence categories. • Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data). • Whether the result appropriately reflects the	Mineral Resources have been classified on the estimation search pass category subject to assessment of other impacting factors such as drill hole spacing (variography), core handling and sampling procedures, QAQC outcomes, density measurements, geological model (and nearby mineralisation) and check Mineral Resource estimates. For Koki the entire Mineral Resource has been classified as Inferred based on uncertainty with Phase 1a drill hole assays. The classification appropriately reflects the Competent Person's view of the deposit.

Criteria	JORC Code explanation	Commentary
	Competent Person's view of the deposit.	
Audits or reviews	• The results of any audits or reviews of Mineral Resource estimates.	There are no audits or reviews of the Koki Mineral Resource.
Discussion of relative accuracy/confidence	• Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate. • The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used. • These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	The geological nature of the deposit, composite/block grade comparison and the low coefficients of variation lend themselves to reasonable level of confidence in the Mineral Resource estimates. The lateral margins to the deposit are geologically undefined, more detailed drilling may cause either an increase or decrease in the Mineral Resource estimate. Modelling of the unconstrained composite data does seem to have limited any smearing of grade beyond a reasonable geological limit. The impact of oxidation is known at HIT to impact the metallurgical recovery of copper and gold. Given the same mineralisation style, lithology, alteration and weathering at Koki as HIT it is assumed the metallurgical recoveries will be similar in the various domains. There may be some small scale clustering of grade or localised domains of different grade that is not detectable on the current 200m spaced drilling. This is thought unlikely in a copper porphyry situation. The possibility of thick unconsolidated overburden is considered unlikely as the deposit generally lies on the crest of a hill away from any valley floor. The Mineral Resource estimates are considered to be accurate globally, but there is some uncertainty in the local estimates due to the current drill hole spacing and a lack of geological definition. No mining of the deposit has taken place so no production data is available for comparison.

The JORC Code, 2012 Edition Table 1 Reporting for Ore Reserves

Horse-Ivaal-Trukai (HIT) - Frieda River, Papua New Guinea

Section 4. Estimation and Reporting of Ore Reserves

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	• Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve. • Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Frieda River Horse-Ivaal-Trukai deposit estimate is based on the 31 December 2015 Mineral Resource estimate. Shaun Versace is the Competent Person responsible for the Mineral Resource estimate. The Mineral Resource estimate is derived from a model prepared by PanAust. The PanAust geology group is familiar with the deposit and was responsible for providing guidance to the geological interpretation and domain wireframe generation used in the creation of the model. The Mineral Resource model for use in Ore Reserves is an Ordinary Kriged model, rotated minus (-) 60 degrees and has a regular block framework of 25m x 25m x 15m. Densities are estimated by domain where sufficient data exists. Otherwise, density is assigned using the mean value in each domain respective on Lithology, Alteration, Weathering and Structural zone. The Mineral Resource model is re-blocked at 25m x 25m x 15m dimensions for use in the Ore Reserve model. The Mineral Resource is inclusive of the Ore Reserve. The process and assumptions used to convert the Mineral Resource to an Ore Reserves is detailed in the comprehensive Technical Summary (Appendix 1).
Site visits	• Comment on any site visits undertaken by the Competent Person and the outcome of those visits. • If no site visits have been undertaken indicate why this is the case.	PanAust staff responsible for the preparation of the Ore Reserve estimate made several visits to the Frieda River Project (the Project) area. The Competent Person has visited the Frieda River project area on two occasions.
Study status	• The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves. • The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have	The Frieda River Project is a greenfield project which hosts the Horse-Ivaal-Trukai, Ekwai, Trukai (HIT) porphyry copper-gold deposits. The Ore Reserves are supported by a feasibility study (Study) completed on 16 May 2016. The Study included the development of detailed open-pit designs and estimates, life of mine (LOM) production plan and cash flow model. The Study considers a processing plant capacity of 40Mtpa.

Criteria	JORC Code explanation	Commentary
	been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.	
Cut-off parameters	• The basis of the cut-off grade(s) or quality parameters applied.	The variable economic cut-off was determined from the non-mining breakeven value for those Ore Reserve model blocks having a minimum grade of 0.15% Cu for supergene type and 0.2% Cu for primary type. The test work demonstrated that the metallurgical recovery models are unreliable below these minimum copper grades and blocks below this grade are therefore excluded from the Ore Reserve. The non-mining breakeven cut-off was calculated for each block in the Ore Reserve model and incorporates metal price, selling cost, product transport cost, ore processing cost, integrated storage facility (ISF) construction cost, logistics, general and administration costs and mine fleet sustaining capital costs. Revenue from copper and gold is considered in this calculation. Silver is excluded. Only blocks having a positive value and above the minimum grades are reported in the Ore Reserve. Mining costs are not considered in the cut-off grade criteria. The impact of mining costs is accounted for in the calculation of the optimal open-pit shell including differences between ore and waste mining due to drill and blast practices and haul distances.
Mining factors or assumptions	• The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design). • The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc. • The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production	The Project comprises a large-scale conventional open-pit mine using truck and shovel with 15m high benches. The majority of the ore and waste material is drilled and blasted before being excavated by hydraulic shovels and excavators. The Project is designed to feed ore into a 40Mtpa conventional comminution and flotation process plant producing a copper-gold concentrate for export to custom smelters. The waste rock mined and tailings will be stored subaqueous within an engineered integrated storage facility (ISF). Slope design recommendations for final open-pit walls have been provided by Pells Sullivan Meynink (PSM). Slope design parameters are supported by drill hole information, acoustic televiewer surveys, geotechnical mapping and field observations. The slope design parameters were applied to the open-pit optimisation and design used for this Ore Reserve estimate. The Mineral Resource model incorporates an allowance for dilution through re-blocking of the model to 25m x 25m x 15m. Similarly to the Mineral Resource model, the Ore Reserve model is regularised at 25m x 25mx 15m to align with the assumed selective mining unit (SMU and mining bench height. Two sources of dilution were considered, the first source of dilution was caused by the barren Flimtem Trachyandesite (FT) intrusions, while the second is the internal dilution as an effect of the reblocking process. The combined dilution caused by these two processes was estimated to be 5%. Dilution caused by FT intrusions was estimated by calculating the portion of each Mineral Resource block affected by FT intrusions. Subsequently, the estimated grades and density were diluted by the weighted average of the block

Criteria	JORC Code explanation	Commentary
	drilling. • The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate). • The mining dilution factors used. • The mining recovery factors used. • Any minimum mining widths used. • The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion. • The infrastructure requirements of the selected mining methods.	volume. Internal dilution is included in the Ore Reserve estimate through the interpolation and re-blocking process. The regular sub blocks of 5m x 5m x 5m were re-blocked to the parent blocks size of 25m x 25m x 15m. The effect external dilution has been excludes, this is assumed to be accounted as part of the estimated 5% dilution caused by the FT intrusions and the regularisation process. The Ore Reserve is not modified to account for ore loss. It is understood that the mineralisation is presented as a large and homogeneous ore body. The Project has assumed that a closely spaced grade control drilling program prior to mining will minimise potential ore losses and support this assumption. The Ore Reserve is estimated within an open-pit design prepared by, PanAust's technical services group and Andrew Vidale Consulting Services (AVCS) in 2016. Optimisation of the open-pit limits was completed using the Lerchs Grossman algorithm as implemented in Geovia's Whittle software and was verified using Maptek OptiPit and AVCS MaxFlow. The results generated were consistent between the three software packages. The open-pit optimisation process only considered Measured and Indicated Mineral Resource. The open-pit optimisation generated a range of open-pit shells that indicated relative open-pit value. A multi-criteria decision analysis methodology was applied to select the open-pit shell used for design. The optimal open-pit shell selected for open-pit design corresponds to a copper price of US$2.24/lb copper and US$828/oz gold. A detailed open-pit design was prepared from the selected open-pit shell and used for Ore Reserve estimation. The open-pit design includes 43m ramps and safety berms on the open-pit walls to accommodate the selected mine fleet. No minimum mining width was specified in the open-pit optimisation. The open-pit designed process considered access and allowed sufficient working area to accommodate large mining equipment. Smaller mining fleets were estimated for pre-stripping and mining areas with a reduced mining width. A life of mine production schedule was prepared in 2016 using the open-pit design and Ore Reserve model that forms the basis for the current Ore Reserve estimate. The production schedule demonstrates that ore can be delivered to the processing plant in sufficient quantity each year over the mine life to satisfy the assumptions associated with the costs and revenues used in the Ore Reserve estimate. The waste movement required to extract the Ore Reserve is 415Mt. The Inferred Mineral Resource is not considered for conversion to Ore Reserve. The HIT open-pit design contains approximately 12Mt of Inferred Mineral Resource and this small quantity has no significant impact on the project value.

Criteria	JORC Code explanation	Commentary
Metallurgical factors or assumptions	• The metallurgical process proposed and the appropriateness of that process to the style of mineralisation. • Whether the metallurgical process is well-tested technology or novel in nature. • The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied. • Any assumptions or allowances made for deleterious elements. • The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole. • For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	The metallurgical process design is appropriate for treatment of porphyry copper-gold mineralisation. The process plant design and technology is conventional and consists of crushing, grinding, and sulphide flotation processes for production of a copper-gold concentrate of averaging approximately 25.5% copper. The design and the equipment are proven and consistent with existing operations treating large porphyry deposits throughout the world. Extensive metallurgical test-work was undertaken for materials characterisation (hardness, mineralogy, mineral liberation) and process development on variability samples representing the major weathering, lithology and alteration units. This characterisation determined two metallurgical ore types; oxidized and primary. These ore types are defined by the content of acid soluble copper as a proportion of the total copper content. The oxidized ore type contains greater than or equal to 3% of acid soluble copper and primary ore contains less than 3% acid soluble copper. Metallurgical recovery factors are applied to both ore types. The oxidised ore copper recovery is a function of acid soluble copper and pyrite content defined by the sulphur to copper ratio proxy. The oxidised ore gold recovery is proportional to copper recovery with a similar function applied. The primary ore copper and gold recovery was determined from test-work and found to be within a tight band of results, hence a fixed recovery for copper and gold is applied. All samples tested and concentrates produced were free of deleterious elements such as; arsenic, lead, zinc, or others. The concentrations of deleterious elements were lower than the ones that attract penalties during downstream treatment. Bench and pilot scale test-work on large ore type composites and period composites confirmed the results of the variability test-work.

Criteria	JORC Code explanation	Commentary
Environmental	• The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	The Frieda River Project's Amended Environmental Inception Report was approved on the 8th December 2014 by the PNG Department of Environment and Conservation (now the Conservation and Environmental Protection Agency). Comprehensive environmental baseline data has been collected over a period of eight years including terrestrial ecology, aquatic ecology, soil, water and sediment quality and the near-shore marine environment. Geochemical characterisation studies on waste rock and tailings were conducted between 2009 and 2011. These studies have informed the development waste management strategies proposed within the feasibility study. The key strategy for limiting impact on the environment is the subaqueous deposition of mine waste rock and tailings within the integrated storage facility, and active treatment of open-pit water. The Frieda River Project's Environmental Impact Statement is planned to be completed by Q4 2016. It is being completed in accordance with PNG Government guidelines and the approved terms of reference detailed within the Amended Environmental Inception Report. Further geochemical characterisation studies on waste rock are currently underway to inform the Environmental Impact Statement.
Infrastructure	• The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.	The Frieda River Project is a greenfield project, all the infrastructure necessary to support the mining operations is required to be constructed. These costs to construct this infrastructure have been included within the feasibility study that supports this Ore Reserve estimate.

Criteria	JORC Code explanation	Commentary
Costs	• The derivation of, or assumptions made, regarding projected capital costs in the study. • The methodology used to estimate operating costs. • Allowances made for the content of deleterious elements. • The source of exchange rates used in the study. • Derivation of transportation charges. • The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc. • The allowances made for royalties payable, both Government and private.	All costs and revenues are prepared in real 2016 US dollars. Costs estimates were estimated from first principles and benchmarked against similar mining operations; including PanAust existing operations in Laos (Phu Kham and Ban Houayxai mines), Lihir and Ok Tedi (including a site visit to Ok Tedi by team members). *Open-pit optimisation inputs* Selling costs, smelting and refining charges were assumed to be consistent to the existing sales contract terms for PanAust. Concentrate transport charges were derived from costs calculated in the Study. There are no cost penalties for deleterious elements based on test work results. A royalty of 2% from the gross revenue to be paid to the Government of Papua New Guinea (PNG). The life of mine operating costs used for the open-pit optimisation were: • Mining: US$2.06/t ore mined and US$2.74/t waste mined • Ore processing: $4.70/t processed • Logistics: US$1.10/t mined • General and administrative: US$$1.70/t processed. Sustaining capital included: • Estimate of $1.22/t mined for the ongoing construction of the integrated storage facility. • Estimate of $0.80/t ore processed for minor infrastructure works and maintenance of the ore processing plant • Estimate of $0.53/t mined for the ongoing replacement of the mining equipment fleet *Final feasibility study cost estimates:* The life of mine operating costs finalised in the Study used for the economic evaluation are: • Mining: US$2.34/t ore mined • Mining: US$3.93/t ore processed • Ore processing: $5.12/t processed • Support costs: US$$2.62/t processed • Realisation costs: US$3.10/t processed

Criteria	JORC Code explanation	Commentary
Revenue factors	• The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc. • The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Revenue calculations were based on the Ore Reserve block model grades, long term metal prices for copper and gold, and contractual terms for treatment charges and metal payables. These values were incorporated into the calculation used to determine the economically mineable portion of the deposit. Revenue prices for Copper (US$3.30/lb) and gold (US$1,455/oz) were used to prepare the Ore Reserve estimate. These metal prices are based on the long term market assessment developed by Wood Mackenzie, Copper and Gold Market Study, May 2016. Smelting and refining charges assumed in the Ore Reserve estimate were based on existing contract terms and PanAust's assessment of future copper concentrate sale terms.
Market assessment	• The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future. • A customer and competitor analysis along with the identification of likely market windows for the product. • Price and volume forecasts and the basis for these forecasts. • For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Copper concentrate is widely traded in international markets. Phu Bia Mining, part of the PanAust Group, has established long term sales contracts of copper concentrate from the existing operations, this supports an existing market for the concentrate to be produced by FRL. Specialised market research also suggests a decrease in supply for copper concentrate from 2019, this demand is expected to remain consistent for the life of the mine.
Economic	• The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc. • NPV ranges and sensitivity to variations in the significant assumptions and inputs.	All costs and revenues were prepared on a US dollar basis and no cost escalations have been used. FRL maintains a financial model that is used to estimate the value of the Frieda River Project. This model shows a net present value (NPV) that exceeds that carrying value of the asset. A range of sensitivities were performed to evaluate the robustness of the project to changes in key assumptions and benchmarking data. Theses sensitivities included; metal prices, metallurgical recoveries, operating cost and development capital.

Criteria	JORC Code explanation	Commentary
Social	• The status of agreements with key stakeholders and matters leading to social licence to operate.	The Company maintains its social and business licenses to operate through structured engagement with all levels of government, landowners, communities and other stakeholders. There are no known social issues that threaten the license to operate.
Other	• To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves: • Any identified material naturally occurring risks. • The status of material legal agreements and marketing arrangements. • The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.	The Horse-Ivaal-Trukai, Mineral Resource is located on Exploration License 58. The Special Mining Lease (SML) is to be submitted to the Government of Papua New Guinea's Mineral Resources Authority by 30 June 2016 along with the Companies Proposals for Development. Upon the grant of a Special Mining Lease, the Government of Papua New Guinea has a right to acquire, at cost, up to a 30% interest in the Frieda River Project which, if exercised in full, would reduce PanAust's holding to 55% and Highlands Pacific to 15%.

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th colspan="3">Commentary</th></tr>
<tr><td rowspan="1">Classification</td><td>• The basis for the classification of the Ore Reserves into varying confidence categories.
• Whether the result appropriately reflects the Competent Person’s view of the deposit.
• The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).</td><td colspan="3">All critical assumptions applied to mining, ore processing, tailings and waste rock storage, cost and revenue are support by the estimates in the Feasibility Study and it is considered to be at a level of confidence appropriate for an Ore Reserve estimate. The confidence classification is therefore dependent on the category of the Mineral Resource estimate.
• The Proved Ore Reserve estimate is the economically mineable part of the Measured Mineral Resource Estimate.
• The Probable Ore Reserve estimate is the economically mineable part of the Indicated Mineral Resource Estimate.
• No Probable Ore Reserves were derived from the Measure Mineral Resource Estimate.
These classifications appropriately reflect the Competent Person’s understanding of the deposit.</td></tr>
<tr><td>Audits and reviews</td><td>• The results of any audits or reviews of Ore Reserve estimates.</td><td colspan="3">The open-pit optimisation, the open-pit design and life of mine inputs and assumptions were independently reviewed in 2016.
The Ore Reserve estimate has been prepared internally by PanAust. No external audit has been performed.
There is no information that contradicts any of the assumptions or models used in the preparation of the estimate or indicate any significant errors in the estimation process.</td></tr>
<tr><td rowspan="3">Discussion of relative accuracy/confidence.
Rated between 1 and 5 with 1 being the highest level of accuracy / confidence.</td><td rowspan="3">• Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed</td><td>Criteria</td><td>Risk Rating</td><td>Comment on Uncertainty and Controls</td></tr>
<tr><td colspan="3">The discussion of relative accuracy/confidence relates to global estimates.</td></tr>
<tr><td>Mineral Resource</td><td>3</td><td>In the absence of close spaced grade control drilling there is an inherent level of uncertainty with the Mineral Resource Estimate. The Mineral Resource model for the HIT deposit was developed from a robust exploration data set.
The Mineral Resource model and estimation process was independently reviewed by QG Consulting Australia Pty Ltd.</td></tr>
</table>

Criteria	JORC Code explanation	Commentary		
	appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate. • The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used. • Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage. • It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and	Project Status	3	There are inherent levels of uncertainty for the project development until PNG government permitting applications are approved. The Frieda River Project is a greenfield project. Frieda River Limited holds 80% of Exploration License 58 and Highlands Frieda Limited holds 20%. The tenement expires on 14 November 2017. The submission of the SML application will ensure compliance with a condition of EL58 which hosts the Horse-Ivaal-Trukai deposits. An exploration camp is operated by FRL and an exploration access track is being constructed from the Frieda River port to the mine site.
		Cut-off Parameters	3	Uncertainty relates to the underlying assumptions used to develop the revenue and cost models. The selected open-pit shell equates to a copper price (US$2.24/lb copper and US$828/oz gold) that is below the value assumed for this Ore Reserve estimate (US$3.30/lb copper and US$1,455/oz gold). Cash flow modelling for the Frieda River Project demonstrates that the project is feasible based on the scope of works described in the Study.

Criteria	JORC Code explanation	Commentary		
	confidence of the estimate should be compared with production data, where available.	Mining Factors	3	Uncertainty relates to the underlying assumptions used to complete geotechnical, dilution and recovery assessment, water and waste management designs. The geotechnical slope stability recommendations were provided by an independent geotechnical consultant, (PSM) based extensive field work, 3D modelling and risk assessments. Additional sources of dilution are unlikely based on the current assumptions in the Mineral Resource estimate. Ore loss is considered to be low due to the nature and size of the ore body. Water management (both groundwater and surface water) is considered in the open-pit designs and is included in the cost estimates for the Study. The waste management plan includes the use of a rope suspended conveyor and loading barges disposing waste into the integrated storage facility from Year 5. A truck and dozer operation is proposed for the first five years to de-risk this strategy.

Criteria	JORC Code explanation	Commentary		
		Metallurgy Factors	2	Uncertainty relates to the underlying assumptions used to estimate the metallurgical recoveries. The configuration of ore processing plant was developed by internal and independent experienced professionals and benchmarked from existing operations under similar conditions Harder ore is expected as the open-pit deepens. Additional grinding capacity is included in the Study scope and costs estimates to offset the reduced milling rate for harder ores. Uncertainty associated with metallurgical recoveries below 0.2% Cu for supergene and 0.15%Cu for primary types has been removed by applying a minimum copper grade criteria to the selection of mineralised rock reported in the Ore Reserve. Comminution and flotation test work and an independent peer review support the metallurgical recoveries for the oxide and primary ore types. The mine plans considers the impact of the two ore types.
		Environmental	3	Uncertainty relates to the construction and operation in the high rainfall climate and steep terrain. Tailings disposal, waste rock management and water management practices are based on the high standards and experience from the PanAust's existing operations. Experienced internal and independent personnel have developed the environmental designs and action plans for the Project.

Criteria	JORC Code explanation	Commentary		
		Infrastructure	4	The uncertainty relates to the remoteness and lack of infrastructure supporting the project development. The Study defines the infrastructure required to develop the project: ocean port, river ports, airport, main access road, power station and the integrated storage facility. The Project is designed to limit fugitive sediment emissions from the mine site and the potential for acid rock drainage using an integrated storage facility. Mine waste rock and process tailings will be stored subaqueously in the facility designed to Australian National Committee on Large Dams Incorporated (ANCOLD) standards.
		Cost Estimates	3	Uncertainty relates to the underlying assumptions used to develop the cost models. Cost estimates are considered reliable based on benchmarking data and independent review. Some uncertainty may exist with regards to the estimation of future costs. However, these risks are considered to be consistent with industry practices and market-related price movements for goods and consumables.
		Revenue	3	Uncertainty relates to the future market supply and demand. Long term prices for copper and gold are recommended by Wood MacKenzie, *Copper and Gold Market Study*, 2016. Residual uncertainties for copper and gold prices exist. However, these risks are considered to be consistent with industry practices and market-related supply and demand movements.

Criteria	JORC Code explanation	Commentary		
		Market assessment	1	Uncertainty relates to the future sales agreements. The copper concentrate market is considered low risk. Existing long term contracts exist for the concentrate produced by PanAust. Independent and renowned market specialists have forecasted a deficit in copper supply beyond 2019. No deleterious elements are expected in the copper concentrate produced at the Frieda River Project.
		Economic	4	Uncertainty relates to the influence of external market influences. The Net Present Value of the Frieda River Project is supported by the assumptions outlined in the Study.
		Social	3	Uncertainty relates to the completion of the Special Mining Lease (SML) application including the Mine Development Forum. The support of host communities is anchored in transparent and effective stakeholder engagement, including community development programs, capacity building initiatives, compensation, dispute resolution and grievance management.
		Classification	2	Uncertainty relates to the assumptions in the modifying factors described above. The Ore Reserve classification reflects the level of confidence in the Modifying Factors and is based on the underlying Mineral Resource classification.

Competent Person's Consent Form

Pursuant to the requirements of Clause 9 of the JORC Code 2012 Edition (Written Consent Statement)

Report name

Summary of Mineral Resources and Ore Reserves, Frieda River Copper-Gold Project, PNG, Feasibility Study Report

(*Insert name or heading of Report*) ('Report')

PanAust Limited

(*Insert name of company releasing the Report)*

Horse-Ivaal-Trukai, Ekwai and Koki

(Insert name of the deposit to which the Report refers)

May 2016

(Date of Report)

Statement

I/We,

Mr Shaun Nicholas Versace

(*Insert full name(s)*)

confirm that I am the Competent Person for the Report and:

- I have read and understood the requirements of the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012 Edition).
- I am a Competent Person as defined by the JORC Code, 2012 Edition, having five years' experience that is relevant to the style of mineralisation and type of deposit described in the Report, and to the activity for which I am accepting responsibility.
- I am a Member or Fellow of *The Australasian Institute of Mining and Metallurgy* or the *Australian Institute of Geoscientists* or a 'Recognised Professional Organisation' (RPO) included in a list promulgated by ASX from time to time.
- I have reviewed the Report to which this Consent Statement applies.

I am a full time employee of

PanAust

(Insert company name)

to prepare the documentation for

Horse-Ivaal-Trukai, Ekwai and Koki

(Insert deposit name)

on which the Report is based, for the period ended

May 2016

(Insert date of Mineral Resource/Ore Reserve statement)

I have disclosed to the reporting company the full nature of the relationship between myself and the company, including any issue that could be perceived by investors as a conflict of interest.

I verify that the Report is based on and fairly and accurately reflects in the form and context in which it appears, the information in my supporting documentation relating to Mineral Resources.

I consent to the release of the Report and this Consent Statement by the directors of:

Frieda River Limited

(Insert reporting company name)

[signature]

Signature of Competent Person:

13/05/2016

Date:

Member Australasian Institute of Mining and Metallurgy

Professional Membership:
(insert organisation name)

111474

Membership Number:

[signature]

Signature of Witness:

James Carpenter, Brisbane, Australia

Print Witness Name and Residence:
(eg town/suburb)

Frieda River

Competent Person's Consent Form

Pursuant to the requirements of Clause 9 of the JORC Code 2012 Edition (Written Consent Statement)

Report name

Summary of Mineral Resources and Ore Reserves, Frieda River Copper-Gold Project, PNG, Feasibility Study Report

(Insert name or heading of Report) ('Report')

PanAust Limited

(Insert name of company releasing the Report)

Horse-Ivaal-Trukai, Ekwai and Koki

(Insert name of the deposit to which the Report refers)

May 2016

(Date of Report)

Statement

I/We,

Mr Scott Alexander Cowie

(Insert full name(s))

confirm that I am the Competent Person for the Report and:

- I have read and understood the requirements of the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012 Edition).
- I am a Competent Person as defined by the JORC Code, 2012 Edition, having five years' experience that is relevant to the style of mineralisation and type of deposit described in the Report, and to the activity for which I am accepting responsibility.
- I am a Member or Fellow of *The Australasian Institute of Mining and Metallurgy* or the *Australian Institute of Geoscientists* or a 'Recognised Professional Organisation' (RPO) included in a list promulgated by ASX from time to time.
- I have reviewed the Report to which this Consent Statement applies.

I am a full time employee of

PanAust

(Insert company name)

to prepare the documentation for

Horse-Ivaal-Trukai

(Insert deposit name)

on which the Report is based, for the period ended

May 2016

(Insert date of Mineral Resource/Ore Reserve statement)

I have disclosed to the reporting company the full nature of the relationship between myself and the company, including any issue that could be perceived by investors as a conflict of interest.

I verify that the Report is based on and fairly and accurately reflects in the form and context in which it appears, the information in my supporting documentation relating to Mineral Resources.

I consent to the release of the Report and this Consent Statement by the directors of:

Frieda River Limited

(Insert reporting company name)

[signature]	13/05/2016
Signature of Competent Person:	Date:
Member Australasian Institute of Mining and Metallurgy (CP)	206253
Professional Membership: *(insert organisation name)*	Membership Number:
[signature]	Brett Raughan Brisbane, Australia.
Signature of Witness:	Print Witness Name and Residence: (eg town/suburb)

HOLEID	East PNG94	North PNG94 N	RL PNG94	Hole Depth m	Year Drilled	Drill Phase	Use MII	Use II
001-HO96	585527.40	9480102.00	541.58	250.45	1996	Phase2	Yes	Yes
001-IV95	584913.10	9480527.00	591.99	331.90	1995	Phase2	Yes	Yes
001NOR02	584268.30	9480510.00	688.35	410.90	2002	Phase4	Yes	Yes
001-TK97	583687.70	9480064.00	938.60	151.40	1997	Phase2	Yes	Yes
002-IV95	584740.20	9480603.00	644.83	100.00	1995	Phase2	Yes	Yes
002NOR02	583938.60	9480474.00	779.60	350.90	2002	Phase4	Yes	Yes
002-TK97	583791.30	9480228.00	916.63	151.40	1997	Phase2	Yes	Yes
003-IV95	584700.40	9480518.00	678.55	124.50	1995	Phase2	Yes	Yes
003NOR02	584018.30	9480385.00	815.39	350.70	2002	Phase4	Yes	Yes
003-TK97	583854.80	9480422.00	813.82	41.60	1997	Phase2	Yes	Yes
004-IV95	584643.10	9480429.00	683.72	153.60	1995	Phase2	Yes	Yes
004NOR02	584034.90	9480666.00	715.03	311.10	2002	Phase4	Yes	Yes
004-TK97	583854.80	9480422.00	813.82	151.40	1997	Phase2	Yes	Yes
005-IV95	584613.60	9480677.00	628.99	106.20	1995	Phase2	Yes	Yes
005NOR02	583960.50	9480698.00	739.96	356.80	2002	Phase4	Yes	Yes
005-TK97	583958.10	9480536.00	770.54	165.00	1997	Phase2	Yes	Yes
006ANOR02	583696.10	9480419.00	775.39	137.80	2002	Phase4	Yes	Yes
006BNOR02	583696.10	9480419.00	775.39	250.30	2002	Phase4	Yes	Yes
006-IV95	584592.00	9480338.00	717.29	147.40	1995	Phase2	Yes	Yes
007-IV95	584448.90	9480540.00	651.29	369.30	1995	Phase2	Yes	Yes
007NOR03	584180.80	9480365.00	716.82	250.50	2003	Phase4	Yes	Yes
008-IV96	584640.50	9480518.00	719.46	507.40	1996	Phase2	Yes	Yes
008NOR03	583787.90	9480612.00	754.12	351.20	2003	Phase4	Yes	Yes
009-IV96	585018.90	9480332.00	597.86	450.40	1996	Phase2	Yes	Yes
009NOR03	583584.60	9480557.00	811.58	250.00	2003	Phase4	Yes	Yes
010-IV96	584755.20	9480467.00	644.74	400.00	1996	Phase2	Yes	Yes
010NOR03	584199.20	9480873.00	755.89	218.00	2003	Phase4	Yes	Yes
011-IV96	584636.60	9480272.00	724.60	319.50	1996	Phase2	Yes	Yes
011NOR03	583856.30	9480731.00	762.40	250.00	2003	Phase4	Yes	Yes
012-IV96	584941.40	9480196.00	615.00	217.10	1996	Phase2	Yes	Yes
012NOR03	584603.50	9480970.00	677.64	137.00	2003	Phase4	Yes	Yes
013-IV96	584592.60	9480642.00	630.00	30.00	1996	Phase2	Yes	Yes
014-IV96	584590.60	9480643.00	629.42	300.10	1996	Phase2	Yes	Yes
015-IV96	584845.80	9480327.00	678.65	320.00	1996	Phase2	Yes	Yes
016-IV96	584768.70	9480342.00	644.53	300.50	1996	Phase2	Yes	Yes
017-IV96	584874.50	9480409.00	625.78	450.50	1996	Phase2	Yes	Yes
018-IV96	584737.50	9480286.00	687.32	300.50	1996	Phase2	Yes	Yes
019-IV96	584710.60	9480377.00	677.69	320.00	1996	Phase2	Yes	Yes
020-IV96	584813.70	9480411.00	632.00	57.20	1996	Phase2	Yes	Yes
021-IV96	584813.70	9480411.00	631.72	250.40	1996	Phase2	Yes	Yes
022-IV97	585228.20	9480079.00	603.81	300.40	1997	Phase2	Yes	Yes
023-IV97	584663.00	9480149.00	748.89	250.00	1997	Phase2	Yes	Yes
024-IV97	584740.20	9480152.00	711.85	245.10	1997	Phase2	Yes	Yes
025-IV97	584566.90	9480417.00	734.17	300.00	1997	Phase2	Yes	Yes
026-IV97	584603.30	9480205.00	744.67	290.00	1997	Phase2	Yes	Yes
027-IV97	585483.70	9480234.00	585.43	320.50	1997	Phase2	Yes	Yes

028-IV97	585386.60	9480062.00	578.11	270.00	1997	Phase2	Yes	Yes
029-IV97	585272.30	9479863.00	541.97	200.10	1997	Phase2	Yes	Yes
030-IV97	585674.40	9480269.00	540.23	290.00	1997	Phase2	Yes	Yes
031-IV97	585600.50	9480135.00	592.00	12.30	1997	Phase2	Yes	Yes
032-IV97	585610.40	9480141.00	597.46	365.50	1997	Phase2	Yes	Yes
033-IV97	585708.70	9480024.00	554.23	277.05	1997	Phase2	Yes	Yes
034-IV97	585811.20	9480214.00	555.70	397.25	1997	Phase2	Yes	Yes
053NOR05	583121.30	9480640.00	1133.08	382.70	2005	Phase4	Yes	Yes
057NOR05	582922.00	9480893.00	1309.67	507.25	2005	Phase4	Yes	Yes
066NOR05	583109.70	9480572.00	1103.44	287.60	2005	Phase4	Yes	Yes
073NOR05	583195.80	9481122.00	961.62	254.40	2005	Phase4	Yes	Yes
076NOR05	583058.80	9480647.00	1146.75	314.10	2005	Phase4	Yes	Yes
123XC07	585158.10	9480776.00	613.22	323.40	2007	Phase4	Yes	Yes
125XC07	584817.30	9481096.00	752.28	252.90	2007	Phase4	Yes	Yes
126XC07	584469.70	9480773.00	649.32	350.10	2007	Phase4	Yes	Yes
127XC07	584335.50	9480641.00	657.01	405.90	2007	Phase4	Yes	Yes
129XC07	583632.60	9480906.00	879.71	346.70	2007	Phase4	Yes	Yes
131XC08	584864.70	9480508.00	599.72	303.10	2008	Phase4	Yes	Yes
132XC08	584991.00	9480428.00	599.20	306.00	2008	Phase4	Yes	Yes
133XC08	585116.60	9480345.00	561.36	312.50	2008	Phase4	Yes	Yes
134XC08	585282.60	9480333.00	537.15	317.40	2008	Phase4	Yes	Yes
135XC08	584957.00	9480364.00	647.11	401.00	2008	Phase4	Yes	Yes
136XC08	585675.90	9480116.00	598.92	340.50	2008	Phase4	Yes	Yes
137XC08	584531.20	9480529.00	653.68	298.40	2008	Phase4	Yes	Yes
138XC08	585218.20	9480207.00	576.27	304.20	2008	Phase4	Yes	Yes
139XC08	585642.30	9480051.00	573.86	324.10	2008	Phase4	Yes	Yes
140XC08	585180.90	9480150.00	585.58	302.50	2008	Phase4	Yes	Yes
141XC08	584567.00	9480580.00	646.25	305.90	2008	Phase4	Yes	Yes
142XC08	584919.50	9480293.00	676.98	348.00	2008	Phase4	Yes	Yes
143XC08	585736.20	9480174.00	613.68	413.97	2008	Phase4	Yes	Yes
144XC08	585145.40	9480087.00	595.75	214.80	2008	Phase4	Yes	Yes
145XC08	584667.00	9480615.00	647.30	318.00	2008	Phase4	Yes	Yes
146XC08	585791.70	9480155.00	611.32	343.30	2008	Phase4	Yes	Yes
147XC08	584717.20	9480246.00	672.90	243.30	2008	Phase4	Yes	Yes
148XC08	584682.80	9480797.00	615.47	306.70	2008	Phase4	Yes	Yes
149XC08	585398.20	9479969.00	586.35	301.20	2008	Phase4	Yes	Yes
150XC08	585048.00	9480228.00	634.01	321.70	2008	Phase4	Yes	Yes
151XC08	585891.90	9480051.00	594.47	324.35	2008	Phase4	Yes	Yes
152XC08	585398.30	9479969.00	586.42	305.60	2008	Phase4	Yes	Yes
153XC08	584451.90	9480809.00	667.65	300.20	2008	Phase4	Yes	Yes
154XC08	584967.10	9479958.00	621.57	303.30	2008	Phase4	Yes	Yes
155XC08	585469.90	9479903.00	529.86	299.60	2008	Phase4	Yes	Yes
156XC08	585398.30	9479969.00	586.42	310.20	2008	Phase4	Yes	Yes
157XC08	584435.30	9480661.00	649.45	248.40	2008	Phase4	Yes	Yes
158XC08	585103.50	9479999.00	580.14	126.00	2008	Phase4	Yes	Yes
159XC08	585558.50	9479912.00	481.58	196.20	2008	Phase4	Yes	Yes
160XC08	584346.70	9480525.00	671.13	374.10	2008	Phase4	Yes	Yes
161XC08	585652.90	9479792.00	550.31	58.10	2008	Phase4	Yes	Yes

162XC08	585449.30	9480165.00	596.69	369.00	2008	Phase4	Yes	Yes
163XC08	585656.40	9479789.00	550.42	326.90	2008	Phase4	Yes	Yes
164XC08	585649.60	9479919.00	476.76	40.10	2008	Phase4	Yes	Yes
165XC08	585346.10	9480136.00	623.49	328.00	2008	Phase4	Yes	Yes
166XC08	583855.20	9480554.00	757.03	270.00	2008	Phase4	Yes	Yes
167XC08	585008.60	9480071.00	658.96	324.00	2008	Phase4	Yes	Yes
168XC08	585599.90	9480324.00	585.89	300.00	2008	Phase4	Yes	Yes
169XC08	585549.10	9479744.00	560.56	312.00	2008	Phase4	Yes	Yes
170XC08	584162.90	9480488.00	771.67	330.00	2008	Phase4	Yes	Yes
171XC08	585052.80	9480231.00	634.42	452.00	2008	Phase4	Yes	Yes
172XC08	585456.10	9480353.00	538.27	308.70	2008	Phase4	Yes	Yes
173XC08	584772.30	9480500.00	645.79	344.50	2008	Phase4	Yes	Yes
174XC08	585149.90	9480434.00	566.76	466.80	2008	Phase4	Yes	Yes
175XC08	585550.70	9479742.00	560.63	78.70	2008	Phase4	Yes	Yes
175XC08B	585550.70	9479742.00	560.63	363.50	2008	Phase4	Yes	Yes
176XC08	585076.70	9480459.00	575.69	512.35	2008	Phase4	Yes	Yes
177XC08	583779.50	9480623.00	756.71	310.00	2008	Phase4	Yes	Yes
178XC08	584828.90	9480447.00	610.06	194.90	2008	Phase4	Yes	Yes
179XC08	585914.70	9479948.00	548.55	278.80	2008	Phase4	Yes	Yes
180XC08	585599.90	9480324.00	585.89	317.00	2008	Phase4	Yes	Yes
181XC08	585857.50	9480279.00	503.76	352.84	2008	Phase4	Yes	Yes
182XC08	585329.70	9480423.00	549.86	470.40	2008	Phase4	Yes	Yes
183XC08	584489.80	9480457.00	678.61	313.00	2008	Phase4	Yes	Yes
184XC08	585893.70	9480052.00	594.44	307.10	2008	Phase4	Yes	Yes
185XC08	584780.30	9480432.00	617.63	440.20	2008	Phase4	Yes	Yes
186XC08	584040.80	9480536.00	753.33	34.00	2008	Phase4	Yes	Yes
187XC08	584616.20	9480688.00	627.84	286.00	2008	Phase4	Yes	Yes
188XC08	585391.30	9480214.00	584.87	445.00	2008	Phase4	Yes	Yes
189XC08	585239.70	9480253.00	569.73	454.00	2008	Phase4	Yes	Yes
190XC08	584040.80	9480536.00	753.33	481.60	2008	Phase4	Yes	Yes
191XC08	585380.40	9480416.00	535.94	387.85	2008	Phase4	Yes	Yes
192XC08	585416.30	9480273.00	554.40	424.80	2008	Phase4	Yes	Yes
193XC08	585018.30	9480487.00	580.76	450.00	2008	Phase4	Yes	Yes
194XC08	584833.30	9480614.00	601.78	467.90	2008	Phase4	Yes	Yes
195XC08	585129.60	9480546.00	565.95	475.60	2008	Phase4	Yes	Yes
196XC08	584965.60	9480543.00	583.14	194.60	2008	Phase4	Yes	Yes
197XC08	584919.30	9480607.00	586.46	461.40	2008	Phase4	Yes	Yes
198XC08	584765.50	9480642.00	610.51	450.20	2008	Phase4	Yes	Yes
199XC08	584718.70	9480679.00	611.20	600.10	2008	Phase4	Yes	Yes
200XC08	585062.20	9480547.00	572.40	457.90	2008	Phase4	Yes	Yes
201XC09	585250.50	9480136.00	611.76	405.10	2009	Phase4	Yes	Yes
202XC09	584683.90	9480799.00	615.68	433.80	2009	Phase4	Yes	Yes
203XC09	584472.60	9480586.00	645.39	383.20	2009	Phase4	Yes	Yes
204XC09	584367.50	9480692.00	657.00	449.60	2009	Phase4	Yes	Yes
205XC09	584868.70	9480511.00	599.45	315.80	2009	Phase4	Yes	Yes
206XC09	585061.70	9480547.00	572.73	298.20	2009	Phase4	Yes	Yes
207XC09	584398.20	9480595.00	651.18	450.30	2009	Phase4	Yes	Yes
208XC09	585240.10	9480254.00	569.64	167.40	2009	Phase4	Yes	Yes

209XC09	584701.20	9480516.00	678.84	523.10	2009	Phase4	Yes	Yes
210XC09	585110.00	9480236.00	622.33	622.00	2009	Phase4	Yes	Yes
211XC09	585327.30	9480261.00	558.99	450.60	2009	Phase4	Yes	Yes
212XC09	584272.20	9480433.00	681.88	356.90	2009	Phase4	Yes	Yes
213XC09	585519.80	9480163.00	586.46	547.20	2009	Phase4	Yes	Yes
214XC09	584138.70	9480391.00	736.86	350.30	2009	Phase4	Yes	Yes
216XC09	584522.60	9480688.00	638.42	334.40	2009	Phase4	Yes	Yes
217XC09	584772.30	9480500.00	645.79	475.80	2009	Phase4	Yes	Yes
218XC09	585528.50	9480102.00	542.12	389.80	2009	Phase4	Yes	Yes
219XC09	584139.90	9480395.00	736.68	443.10	2009	Phase4	Yes	Yes
220XC09	584790.10	9480231.00	654.06	452.40	2009	Phase4	Yes	Yes
221XC09	585472.80	9479904.00	530.12	436.40	2009	Phase4	Yes	Yes
222XC09	584206.30	9480265.00	715.83	164.20	2009	Phase4	Yes	Yes
223XC09	585190.40	9480337.00	559.26	427.00	2009	Phase4	Yes	Yes
224XC09	583719.60	9480653.00	771.00	354.00	2009	Phase4	Yes	Yes
225XC09	585174.50	9480499.00	559.42	654.30	2009	Phase4	Yes	Yes
227XC09	584207.60	9480269.00	715.71	202.10	2009	Phase4	Yes	Yes
228XC09	585947.90	9479902.00	518.63	326.50	2009	Phase4	Yes	Yes
230XC09	585656.60	9479791.00	550.25	359.40	2009	Phase4	Yes	Yes
232XC09	583853.10	9480423.00	813.63	192.90	2009	Phase4	Yes	Yes
233XC09	584816.90	9480740.00	602.95	170.50	2009	Phase4	Yes	Yes
233XC09B	584815.50	9480741.00	603.05	86.60	2009	Phase4	Yes	Yes
235XC09	585548.10	9479740.00	560.83	313.20	2009	Phase4	Yes	Yes
240XC09	583723.50	9480653.00	770.77	478.00	2009	Phase4	Yes	Yes
241XC09	585808.90	9479881.00	467.56	320.50	2009	Phase4	Yes	Yes
242XC09	584767.70	9480645.00	610.34	363.00	2009	Phase4	Yes	Yes
246XC09	585953.00	9479903.00	519.32	495.60	2009	Phase4	Yes	Yes
247XC09	584267.90	9480508.00	688.61	622.70	2009	Phase4	Yes	Yes
248XC09	584816.30	9480742.00	603.07	597.20	2009	Phase4	Yes	Yes
249XC09	585469.90	9479903.00	529.81	511.70	2009	Phase4	Yes	Yes
250XC09	584465.00	9480772.00	649.52	365.30	2009	Phase4	Yes	Yes
251XC09	585507.30	9479838.00	487.31	310.80	2009	Phase4	Yes	Yes
252XC09	583985.40	9480457.00	771.73	295.60	2009	Phase4	Yes	Yes
254XC09	585159.20	9480771.00	612.97	363.30	2009	Phase4	Yes	Yes
256XC09	584591.20	9480336.00	717.87	320.70	2009	Phase4	Yes	Yes
257XC09	583958.10	9480536.00	770.56	407.90	2009	Phase4	Yes	Yes
258XC09	584857.50	9480219.00	632.49	601.90	2009	Phase4	Yes	Yes
260XC09	585332.50	9479856.00	515.30	368.30	2009	Phase4	Yes	Yes
262XC09	584591.60	9480335.00	718.69	483.70	2009	Phase4	Yes	Yes
265XC09	585695.40	9480386.00	542.75	255.30	2009	Phase4	Yes	Yes
267XC09	584884.80	9479765.00	699.80	400.50	2009	Phase4	Yes	Yes
268XC09	585337.80	9479857.00	515.35	600.20	2009	Phase4	Yes	Yes
270XC09	585891.20	9480052.00	594.56	350.10	2009	Phase4	Yes	Yes
273XC09	585161.60	9480770.00	612.96	156.10	2009	Phase4	Yes	Yes
277XC09	584638.80	9480518.00	719.35	600.00	2009	Phase4	Yes	Yes
278XC09	585676.80	9479699.00	601.36	349.60	2009	Phase4	Yes	Yes
279XC09	583728.70	9480159.00	917.81	492.30	2009	Phase4	Yes	Yes
280XC09	585015.10	9480486.00	580.63	979.40	2009	Phase4	Yes	Yes

282XC09	584172.90	9480607.00	688.76	404.30	2009	Phase4	Yes	Yes
286XC09	584422.70	9479814.00	860.83	503.30	2009	Phase4	Yes	Yes
287XC09	584472.30	9480940.00	756.03	450.30	2009	Phase4	Yes	Yes
291XC09	584436.40	9480661.00	648.94	427.40	2009	Phase4	Yes	Yes
296XC09	584425.60	9479813.00	861.14	591.30	2009	Phase4	Yes	Yes
299XC09	584150.20	9481088.00	831.38	450.20	2009	Phase4	Yes	Yes
300XC09	584473.00	9480585.00	645.00	933.80	2009	Phase4	Yes	Yes
302XC09	585250.90	9480723.00	675.45	404.40	2009	Phase4	Yes	Yes
308XC09	583591.40	9480500.00	818.63	325.60	2009	Phase4	Yes	Yes
310XC09	584142.70	9480309.00	731.37	215.20	2009	Phase4	Yes	Yes
318XC09	584821.10	9480747.00	603.21	601.30	2009	Phase4	Yes	Yes
320XC09	585151.80	9480111.00	600.19	801.00	2009	Phase4	Yes	Yes
321XC09	585602.90	9480224.00	548.43	489.10	2009	Phase4	Yes	Yes
326XC10	585558.90	9480255.00	571.12	400.50	2010	Phase4	Yes	Yes
327XC10	585057.90	9480325.00	572.53	425.30	2010	Phase4	Yes	Yes
328XC10	585745.40	9480364.00	512.65	337.40	2010	Phase4	Yes	Yes
329XC10	584073.30	9480336.00	779.39	243.10	2010	Phase4	Yes	Yes
330XC10	585599.80	9480225.00	549.19	221.40	2010	Phase4	Yes	Yes
331XC10	585526.30	9480105.00	542.12	143.10	2010	Phase4	Yes	Yes
332XC10	584821.20	9480748.00	603.11	234.90	2010	Phase4	Yes	Yes
333XC10	585189.50	9480335.00	559.29	302.70	2010	Phase4	Yes	Yes
334XC10	585112.00	9480239.00	621.87	301.20	2010	Phase4	Yes	Yes
335XC10	583803.50	9480539.00	760.92	550.60	2010	Phase4	Yes	Yes
336XC10	584520.20	9480691.00	638.24	309.70	2010	Phase4	Yes	Yes
337XC10	584687.80	9480802.00	615.78	86.70	2010	Phase4	Yes	Yes
338XC10	584716.90	9480676.00	611.23	346.40	2010	Phase4	Yes	Yes
339XC10	584619.50	9480690.00	627.70	362.70	2010	Phase4	Yes	Yes
340XC10	585110.30	9480235.00	622.21	540.00	2010	Phase4	Yes	Yes
341XC10	585188.50	9480333.00	559.56	486.00	2010	Phase4	Yes	Yes
342XC10	584821.00	9480748.00	603.12	454.30	2010	Phase4	Yes	Yes
343XC10	584447.20	9480540.00	650.93	346.80	2010	Phase4	Yes	Yes
344XC10	584454.20	9480814.00	667.64	292.80	2010	Phase4	Yes	Yes
345XC10	584749.70	9480768.00	611.43	316.10	2010	Phase4	Yes	Yes
346XC10	584346.50	9480525.00	670.85	23.20	2010	Phase4	Yes	Yes
347XC10	584043.90	9480540.00	753.30	251.60	2010	Phase4	Yes	Yes
348XC10	584683.90	9480344.00	700.60	309.90	2010	Phase4	Yes	Yes
349XC10	585038.70	9480705.00	584.36	432.90	2010	Phase4	Yes	Yes
350XC10	585127.60	9480544.00	566.06	441.20	2010	Phase4	Yes	Yes
351XC10	584346.50	9480525.00	670.85	38.60	2010	Phase4	Yes	Yes
352XC10	584749.80	9480768.00	611.34	563.60	2010	Phase4	Yes	Yes
353XC10	585390.50	9480214.00	584.81	125.30	2010	Phase4	Yes	Yes
354XC10	584043.30	9480539.00	753.16	405.50	2010	Phase4	Yes	Yes
355XC10	584591.10	9480640.00	630.23	388.90	2010	Phase4	Yes	Yes
356XC10	584846.80	9480549.00	603.95	468.60	2010	Phase4	Yes	Yes
357XC10	585218.40	9480207.00	576.24	441.10	2010	Phase4	Yes	Yes
358XC10	585110.00	9480236.00	622.33	14.80	2010	Phase4	Yes	Yes
359XC10	585152.90	9480436.00	566.74	591.30	2010	Phase4	Yes	Yes
360XC10	585520.80	9480166.00	586.21	163.30	2010	Phase4	Yes	Yes

361XC10	583853.00	9480422.00	814.01	151.70	2010	Phase4	Yes	Yes
362XC10	584682.90	9480341.00	701.17	301.10	2010	Phase4	Yes	Yes
363XC10	585675.90	9480117.00	598.72	440.20	2010	Phase4	Yes	Yes
364XC10	584219.60	9480353.00	706.87	324.20	2010	Phase4	Yes	Yes
365XC10	583986.50	9480459.00	771.23	147.10	2010	Phase4	Yes	Yes
366XC10	584750.00	9480768.00	611.17	353.27	2010	Phase4	Yes	Yes
367XC10	585127.60	9480544.00	566.06	448.40	2010	Phase4	Yes	Yes
368XC10	584618.70	9480688.00	627.77	492.80	2010	Phase4	Yes	Yes
369XC10	583853.50	9480422.00	813.95	222.60	2009	Phase4	Yes	Yes
370XC10	584892.90	9480321.00	688.50	253.70	2010	Phase4	Yes	Yes
371XC10	584718.20	9480676.00	611.36	278.10	2010	Phase4	Yes	Yes
372XC10	584073.60	9480479.00	762.28	402.60	2010	Phase4	Yes	Yes
373XC10	585486.50	9480235.00	585.42	183.80	2010	Phase4	Yes	Yes
374XC10	583777.30	9480623.00	756.54	363.70	2010	Phase4	Yes	Yes
375XC10	584640.20	9480521.00	719.31	136.20	2010	Phase4	Yes	Yes
376XC10	585271.30	9480334.00	538.04	501.50	2010	Phase4	Yes	Yes
377XC10	585173.70	9480500.00	559.33	476.30	2010	Phase4	Yes	Yes
378XC10	584890.00	9480716.00	595.05	284.60	2010	Phase4	Yes	Yes
379XC10	584944.50	9480256.00	653.64	173.60	2010	Phase4	Yes	Yes
380XC10	585485.90	9480235.00	585.47	241.49	2010	Phase4	Yes	Yes
381XC10	583777.10	9480622.00	756.50	122.70	2010	Phase4	Yes	Yes
382XC10	584607.70	9480840.00	639.95	184.40	2010	Phase4	Yes	Yes
383XC10	584914.40	9480312.00	683.23	184.60	2010	Phase4	Yes	Yes
384XC10	584890.00	9480716.00	595.05	388.20	2010	Phase4	Yes	Yes
385XC10	584033.50	9480661.00	714.72	178.60	2010	Phase4	Yes	Yes
386XC10	585117.60	9480346.00	561.34	550.70	2010	Phase4	Yes	Yes
387XC10	584607.00	9480839.00	639.97	134.40	2010	Phase4	Yes	Yes
388XC10	585736.30	9480174.00	613.76	358.10	2010	Phase4	Yes	Yes
389XC10	584520.30	9480517.00	658.40	280.20	2010	Phase4	Yes	Yes
390XC10	585063.50	9480548.00	572.30	405.30	2010	Phase4	Yes	Yes
391XC10	585751.60	9479877.00	469.02	306.60	2010	Phase4	Yes	Yes
392XC10	583849.00	9480670.00	745.14	339.33	2010	Phase4	Yes	Yes
393XC10	585266.10	9480336.00	538.32	415.90	2010	Phase4	Yes	Yes
394XC10	585615.90	9480146.00	598.23	121.10	2010	Phase4	Yes	Yes
395XC10	584072.70	9480480.00	762.22	167.90	2010	Phase4	Yes	Yes
396XC10	585604.60	9480225.00	548.80	309.80	2010	Phase4	Yes	Yes
397XC10	585175.00	9480498.00	559.09	544.10	2010	Phase4	Yes	Yes
398XC10	585052.80	9480090.00	630.12	521.00	2010	Phase4	Yes	Yes
399XC10	585587.50	9479891.00	479.83	184.47	2010	Phase4	Yes	Yes
400XC10	584942.40	9480189.00	615.54	397.70	2010	Phase4	Yes	Yes
401XC10	583762.50	9480746.00	786.66	150.40	2010	Phase4	Yes	Yes
402XC10	585350.30	9480291.00	548.71	448.40	2010	Phase4	Yes	Yes
403XC10	585450.20	9480161.00	597.03	100.20	2010	Phase4	Yes	Yes
404XC10	585751.60	9479877.00	468.96	345.80	2010	Phase4	Yes	Yes
405XC10	584518.80	9480515.00	658.41	374.60	2010	Phase4	Yes	Yes
406XC10	584833.20	9480437.00	612.64	537.70	2010	Phase4	Yes	Yes
407XC10	585383.20	9480056.00	579.42	415.10	2010	Phase4	Yes	Yes
408XC10	584942.50	9480189.00	615.47	442.30	2010	Phase4	Yes	Yes

409XC10	584343.00	9480509.00	670.64	533.10	2010	Phase4	Yes	Yes
410XC10	583946.60	9480666.00	726.73	258.00	2010	Phase4	Yes	Yes
411XC10	585310.30	9479952.00	527.94	194.20	2010	Phase4	Yes	Yes
412XC10	585732.80	9479977.00	531.30	58.00	2010	Phase4	Yes	Yes
415XC10	585708.10	9480027.00	552.80	380.00	2010	Phase4	Yes	Yes
416XC10	585293.50	9480216.00	586.65	254.08	2010	Phase4	Yes	Yes
418XC10	584029.20	9480439.00	773.80	284.60	2010	Phase4	Yes	Yes
420XC10	585052.70	9480090.00	629.27	414.40	2010	Phase4	Yes	Yes
421XC10	585819.70	9479859.00	463.58	126.10	2010	Phase4	Yes	Yes
422XC10	584942.60	9480189.00	615.48	559.20	2010	Phase4	Yes	Yes
426XC10	585348.10	9480138.00	622.95	241.30	2010	Phase4	Yes	Yes
427XC10	585174.10	9479978.00	561.62	185.70	2010	Phase4	Yes	Yes
429XC10	585093.80	9480442.00	577.15	459.20	2010	Phase4	Yes	Yes
430XC10	584089.90	9480451.00	778.97	471.60	2010	Phase4	Yes	Yes
434XC10	585834.00	9479733.00	529.84	129.70	2010	Phase4	Yes	Yes
435XC10	584700.10	9480543.00	692.06	613.40	2010	Phase4	Yes	Yes
436XC10	585296.30	9480220.00	586.46	91.30	2010	Phase4	Yes	Yes
437XC10	585831.70	9480125.00	597.74	310.30	2010	Phase4	Yes	Yes
439XC10	585708.60	9480024.00	553.37	427.80	2010	Phase4	Yes	Yes
440XC10	585735.00	9479978.00	531.29	331.72	2010	Phase4	Yes	Yes
442XC10	584942.90	9480190.00	615.56	175.40	2010	Phase4	Yes	Yes
448XC10	585695.40	9480385.00	542.74	209.70	2010	Phase4	Yes	Yes
449XC10	584518.80	9480518.00	658.57	469.60	2010	Phase4	Yes	Yes
450XC10	585390.60	9480011.00	597.47	108.20	2010	Phase4	Yes	Yes
454XC10	583857.70	9480558.00	756.62	205.40	2010	Phase4	Yes	Yes
456XC10	585273.50	9479494.00	703.83	109.30	2010	Phase4	Yes	Yes
457XC10	585550.20	9479743.00	560.53	202.40	2010	Phase4	Yes	Yes
459XC10	584872.10	9480408.00	626.06	464.90	2010	Phase4	Yes	Yes
462XC10	585175.30	9479979.00	561.50	98.80	2010	Phase4	Yes	Yes
465XC10	585675.40	9480271.00	540.71	536.00	2010	Phase4	Yes	Yes
466XC10	585550.20	9479743.00	560.53	290.30	2010	Phase4	Yes	Yes
467XC10	585391.40	9480013.00	597.31	107.60	2010	Phase4	Yes	Yes
468XC10	585707.90	9480027.00	552.80	273.20	2010	Phase4	Yes	Yes
470XC10	583869.20	9480646.00	738.72	266.00	2010	Phase4	Yes	Yes
471XC10	584030.50	9480841.00	857.45	400.60	2010	Phase4	Yes	Yes
473XC10	585337.80	9479826.00	512.44	330.00	2010	Phase4	Yes	Yes
474XC10	584974.00	9480351.00	648.16	610.30	2010	Phase4	Yes	Yes
478XC10	584779.50	9480294.00	687.56	159.00	2010	Phase4	Yes	Yes
479XC10	585738.20	9480174.00	613.95	373.00	2010	Phase4	Yes	Yes
482XC10	584673.00	9480613.00	647.49	136.40	2010	Phase4	Yes	Yes
483XC10	585553.90	9480173.00	589.10	116.70	2010	Phase4	Yes	Yes
484XC10	585694.00	9480384.00	542.75	356.90	2010	Phase4	Yes	Yes
486XC10	585731.10	9480297.00	530.62	305.60	2010	Phase4	Yes	Yes
488XC10	585710.40	9480031.00	553.63	94.30	2010	Phase4	Yes	Yes
489XC10	585106.80	9479732.00	636.47	220.00	2010	Phase4	Yes	Yes
490XC10	583823.20	9480692.00	758.68	263.70	2010	Phase4	Yes	Yes
492XC10	584807.90	9481022.00	719.60	385.00	2010	Phase4	Yes	Yes
494XC10	585835.50	9480126.00	597.99	297.00	2010	Phase4	Yes	Yes

495XC10	584639.80	9480518.00	719.45	214.98	2010	Phase4	Yes	Yes
497XC10	585016.60	9480392.00	630.10	142.70	2010	Phase4	Yes	Yes
500XC10	585113.10	9480238.00	622.17	122.00	2010	Phase4	Yes	Yes
501XC10	583966.00	9480598.00	730.03	235.10	2010	Phase4	Yes	Yes
502XC10	583793.10	9480231.00	916.74	379.20	2010	Phase4	Yes	Yes
505XC10	585352.30	9479599.00	652.20	160.20	2010	Phase4	Yes	Yes
506XC10	584222.00	9480205.00	717.77	282.10	2010	Phase4	Yes	Yes
507XC10	585354.70	9480035.00	592.92	284.69	2010	Phase4	Yes	Yes
509XC10	584872.80	9480410.00	625.78	109.20	2010	Phase4	Yes	Yes
510XC10	585858.20	9480239.00	517.25	350.60	2010	Phase4	Yes	Yes
512XC10	584485.20	9480321.00	785.66	526.40	2010	Phase4	Yes	Yes
513XC10	584139.60	9480393.00	736.71	528.00	2010	Phase4	Yes	Yes
515XC10	584334.00	9481057.00	822.36	285.00	2010	Phase4	Yes	Yes
516XC10	584693.50	9479878.00	768.72	540.00	2010	Phase4	Yes	Yes
517XC10	583950.20	9480381.00	821.03	305.20	2010	Phase4	Yes	Yes
518XC10	584909.10	9480617.00	588.52	302.30	2010	Phase4	Yes	Yes
521XC10	584047.20	9480391.00	808.99	137.80	2010	Phase4	Yes	Yes
522XC10	584221.90	9480205.00	717.89	540.00	2010	Phase4	Yes	Yes
525XC10	584485.70	9480323.00	785.14	268.60	2010	Phase4	Yes	Yes
527XC10	583691.40	9480067.00	938.07	202.40	2010	Phase4	Yes	Yes
529XC10	585053.70	9480089.00	630.24	100.10	2010	Phase4	Yes	Yes
530XC10	583781.20	9480446.00	798.13	201.00	2010	Phase4	Yes	Yes
532XC10	585182.80	9480150.00	585.30	84.40	2010	Phase4	Yes	Yes
533XC10	583918.80	9480311.00	851.96	325.00	2010	Phase4	Yes	Yes
534XC10	585590.30	9479891.00	479.59	87.00	2010	Phase4	Yes	Yes
535XC10	584437.10	9480666.00	649.43	88.40	2010	Phase4	Yes	Yes
536XC10	584365.60	9480693.00	657.07	100.30	2010	Phase4	Yes	Yes
538XC11	584858.30	9480314.00	685.55	106.40	2011	Phase4	Yes	Yes
539XC11	584087.50	9479970.00	764.06	400.00	2011	Phase4	Yes	Yes
542XC11	585009.60	9480807.00	602.14	361.50	2011	Phase4	Yes	Yes
543XC11	583617.90	9480155.00	841.72	335.30	2011	Phase4	Yes	Yes
549XC11	585252.30	9480420.00	548.34	300.00	2011	Phase4	Yes	Yes
551XC11	583923.80	9479752.00	882.25	335.00	2011	Phase4	Yes	Yes
554XC11	584678.20	9480615.00	647.22	115.30	2011	Phase4	Yes	Yes
557XC11	583704.50	9480427.00	775.09	171.70	2011	Phase4	Yes	Yes
558XC11	584780.00	9480294.00	687.73	605.00	2011	Phase4	Yes	Yes
560XC11	584266.00	9480573.00	666.94	350.40	2011	Phase4	Yes	Yes
561XC11	584392.20	9480136.00	837.39	500.60	2011	Phase4	Yes	Yes
563XC11	584892.40	9480321.00	688.80	190.40	2011	Phase4	Yes	Yes
565XC11	583953.00	9480381.00	820.56	133.40	2011	Phase4	Yes	Yes
567XC11	584408.10	9480465.00	663.20	140.00	2011	Phase4	Yes	Yes
568XC11	585735.40	9480174.00	613.94	200.50	2011	Phase4	Yes	Yes
571XC11	585675.10	9480119.00	599.13	195.10	2011	Phase4	Yes	Yes
573XC11	585250.30	9480138.00	611.49	100.40	2011	Phase4	Yes	Yes
574XC11	584400.90	9480715.00	653.97	139.40	2011	Phase4	Yes	Yes
576XC11	585151.60	9480262.00	608.00	61.40	2011	Phase4	Yes	Yes
579XC11	585556.10	9480255.00	571.34	150.00	2011	Phase4	Yes	Yes
580XC11	585147.30	9480263.00	607.48	61.40	2011	Phase4	Yes	Yes

582XC11	585332.10	9480150.00	629.08	100.40	2011	Phase4	Yes	Yes
584XC11	585581.20	9480015.00	556.12	130.40	2011	Phase4	Yes	Yes
585XC11	584483.20	9480323.00	785.28	125.60	2011	Phase4	Yes	Yes
586XC11	583924.90	9480415.00	796.19	151.40	2011	Phase4	Yes	Yes
588XC11	585523.70	9480065.00	533.90	100.40	2011	Phase4	Yes	Yes
589XC11	585386.50	9480213.00	584.69	70.40	2011	Phase4	Yes	Yes
591XC11	585599.70	9480322.00	585.87	120.50	2011	Phase4	Yes	Yes
592XC11	584967.60	9480543.00	583.08	200.00	2011	Phase4	Yes	Yes
593XC11	585675.40	9480271.00	540.72	140.90	2011	Phase4	Yes	Yes
594XC11	584791.50	9480233.00	653.91	61.20	2011	Phase4	Yes	Yes
595XC11	583921.80	9480310.00	851.66	190.30	2011	Phase4	Yes	Yes
596XC11	585390.00	9480008.00	597.47	172.20	2011	Phase4	Yes	Yes
597XC11	584917.70	9480368.00	678.95	190.60	2011	Phase4	Yes	Yes
600XC11	585128.80	9480167.00	586.03	90.00	2011	Phase4	Yes	Yes
601XC11	584736.10	9480599.00	645.75	82.00	2011	Phase4	Yes	Yes
603XC11	585642.10	9480046.00	574.24	356.20	2011	Phase4	Yes	Yes
604XC11	584829.30	9480606.00	603.23	160.00	2011	Phase4	Yes	Yes
605XC11	584685.20	9480346.00	700.75	130.00	2011	Phase4	Yes	Yes
606XC11	584654.50	9480293.00	737.87	91.40	2011	Phase4	Yes	Yes
607XC11	584990.60	9480434.00	599.23	81.80	2011	Phase4	Yes	Yes
608XC11	584493.10	9480462.00	677.74	76.40	2011	Phase4	Yes	Yes
610XC11	584995.30	9480157.00	601.22	111.30	2011	Phase4	Yes	Yes
612XC11	584958.60	9480364.00	647.09	100.40	2011	Phase4	Yes	Yes
613XC11	584568.00	9480421.00	734.23	91.80	2011	Phase4	Yes	Yes
614XC11	585175.90	9479982.00	561.54	127.40	2011	Phase4	Yes	Yes
615XC11	584970.90	9480548.00	582.76	106.90	2011	Phase4	Yes	Yes
616XC11	584700.90	9480542.00	691.93	83.90	2011	Phase4	Yes	Yes
618XC11	585249.80	9480135.00	612.12	100.40	2011	Phase4	Yes	Yes
621XC11	584995.80	9480158.00	601.30	82.50	2011	Phase4	Yes	Yes
623XC11	583821.60	9481232.00	1020.84	419.30	2011	Phase4	Yes	Yes
625XC11	584003.20	9480541.00	755.83	400.00	2011	Phase4	Yes	Yes
626XC11	583760.40	9480744.00	786.43	310.40	2011	Phase4	Yes	Yes
627XC11	584170.40	9480789.00	800.86	440.40	2011	Phase4	Yes	Yes
631XC11	585251.50	9480414.00	544.10	351.80	2011	Phase4	Yes	Yes
639XC11	584264.40	9479812.00	911.62	375.55	2011	Phase4	Yes	Yes
648XC11	584524.90	9480559.00	647.01	150.00	2011	Phase4	Yes	Yes
653XC11	584716.10	9479589.00	800.29	250.20	2011	Phase4	Yes	Yes
656XC11	584256.00	9481297.00	891.07	200.35	2011	Phase4	Yes	Yes
C001-IV	585016.20	9480333.00	597.64	374.00	1998	Phase3	Yes	Yes
C002-PR	583024.70	9481593.00	1259.49	282.40	1998	Phase3	Yes	Yes
C003-TK	584147.80	9480589.00	697.68	124.95	1998	Phase3	Yes	Yes
C004-TK	584147.80	9480589.00	697.68	359.10	1998	Phase3	Yes	Yes
C005-ED	583123.30	9481242.00	1044.10	293.80	1998	Phase3	Yes	Yes
C006-PR	583413.70	9481538.00	1032.60	240.10	1998	Phase3	Yes	Yes
C007-ED	583123.30	9481242.00	1044.10	275.85	1998	Phase3	Yes	Yes
C010-PR	583228.70	9481482.00	1132.60	252.10	1998	Phase3	Yes	Yes
C014-IV	584796.10	9479960.00	667.53	229.55	1998	Phase3	Yes	Yes
C016-IV	584427.20	9480209.00	823.83	201.95	1998	Phase3	Yes	Yes

C019-ED	582988.40	9480684.00	1175.54	350.00	1998	Phase3	Yes	Yes
C029-IV	584343.90	9480742.00	672.13	191.00	1998	Phase3	Yes	Yes
C047-TT	583776.00	9479869.00	901.89	229.10	1998	Phase3	Yes	Yes
C059-TK	584299.30	9480587.00	661.57	407.80	1999	Phase3	Yes	Yes
C065-TK	584010.40	9480628.00	720.27	388.00	1999	Phase3	Yes	Yes
C066-TK	584069.40	9480482.00	761.82	392.80	1999	Phase3	Yes	Yes
C068-PR	583408.00	9481259.00	1037.65	272.00	1999	Phase3	Yes	Yes
C071-TK	583657.80	9480026.00	947.57	344.25	1999	Phase3	Yes	Yes
DDH069D	584944.00	9480191.00	614.95	345.00	1976	Phase1b	No	Yes
DDH070D	585225.30	9480085.00	600.53	234.90	1976	Phase1b	No	Yes
DDH072D	584828.60	9480607.00	602.38	300.10	1976	Phase1b	No	Yes
DDH073D	585081.60	9480464.00	574.58	350.10	1976	Phase1b	No	Yes
DDH074D	584827.80	9480610.00	602.79	245.50	1976	Phase1b	No	Yes
DDH075D	585081.50	9480468.00	574.67	246.30	1976	Phase1b	No	Yes
DDH076D	585327.60	9480261.00	555.72	300.50	1976	Phase1b	No	Yes
DDH078D	585325.30	9480264.00	555.54	200.00	1976	Phase1b	No	Yes
DDH080D	584523.80	9480693.00	638.65	291.80	1976	Phase1b	No	Yes
DDH081D	584475.90	9480002.00	856.79	294.80	1976	Phase1b	No	Yes
DDH082D	584524.70	9480689.00	638.64	296.00	1976	Phase1b	No	Yes
DDH083D	584410.40	9480463.00	663.57	137.80	1976	Phase1b	No	Yes
DDH084D	584174.40	9480791.00	800.77	114.00	1976	Phase1b	No	Yes
DDH085D	584334.30	9481057.00	822.77	202.00	1976	Phase1b	No	Yes
DDH088AD	584716.60	9480680.00	611.00	31.80	1977	Phase1b	No	Yes
DDH088BD	584717.00	9480679.00	611.38	465.30	1977	Phase1b	No	Yes
DDH091AD	584952.20	9480516.00	594.00	117.80	1977	Phase1b	No	Yes
DDH091BD	584951.60	9480516.00	593.55	400.40	1977	Phase1b	No	Yes
DDH092D	585042.00	9480705.00	584.36	440.80	1977	Phase1b	No	Yes
DDH093D	584864.30	9480413.00	623.63	450.30	1977	Phase1b	No	Yes
DDH094D	584790.90	9480230.00	634.41	400.80	1977	Phase1b	No	Yes
DDH096D	585050.30	9480091.00	631.91	178.90	1978	Phase1b	No	Yes
DDH098D	584490.50	9480324.00	785.18	309.30	1978	Phase1b	No	Yes
DDH100D	584605.10	9480837.00	641.20	369.50	1978	Phase1b	No	Yes
DDH101D	584901.90	9480715.00	593.86	405.50	1978	Phase1b	No	Yes
DDH102D	585263.60	9480476.00	562.25	400.00	1978	Phase1b	No	Yes

Ekwai 2013 HS Mineral Resource Estimate collars

Hole ID	East PNG94	North PNG94	RL PNG94	Hole Depth	Year Drilled	Azim	Dip
DDH033D	585624.81	9480996	534.4499	187	1970	79.63	-46
DDH037D	586178.6	9480940.4	499.7449	147.1	1970	101.63	-46
DDH038D	586178.6	9480940.4	499.7449	92.2	1970	281.63	-46
DDH039D	586454.73	9480916.8	476.539	146.3	1970	281.63	-81
DDH120D	586122.64	9480701.1	563.6766	314.5	1981	259.63	-50
DDH127D	586205.25	9480555.5	504.8405	263.4	1982	259.63	-45
C069-EK	586274.79	9480398.1	451.0775	205.4	1999	119.64	-50
C074-EK	586242.28	9480248.8	469.3741	383.1	1999	309.64	-55
077NOR06	586384.08	9480038.7	431.3403	250	2006	79.61	-56
078NOR06	586456.75	9480049.9	450.1929	250.2	2006	76.61	-55
079NOR06	586236.21	9480016.4	468.2167	200.7	2006	80.61	-55
080NOR06	586217.14	9480219.5	471.7972	250.6	2006	82.61	-56
081NOR06	586037.21	9480685.6	574.7767	300.1	2006	260.01	-55
082NOR06	585895.76	9480664.1	539.7008	99.6	2006	261.61	-57
083NOR06	586122.41	9480604	546.2357	253.6	2006	260.61	-58
084NOR06	586040.53	9480586.7	555.8079	250	2006	259.61	-56
085NOR06	585913.97	9480778.6	610.4088	252	2006	260.01	-55
086NOR06	586039.31	9480480.6	502.2685	277.6	2006	261.61	-56
088NOR06	586147.13	9480498.9	490.0463	250.7	2006	259.61	-55
096NOR06	585999.05	9480788.7	600.7845	254	2006	260.01	-55
097NOR06	585944.89	9480860.6	558.0189	250.2	2006	260.01	-55
098NOR06	586205.38	9480822.4	554.5092	300	2006	259.7	-55
099NOR06	586045.86	9480897	561.1657	259.9	2006	259.7	-55
128XC07	586214.32	9480217.5	473.754	333.6	2007	260.01	-50
130XC07	586008.32	9481041.2	581.334	186.1	2007	260.01	-50
548XC11G	586014.84	9480679.3	582.168	83	2011	180	-90
553XC11G	586108.14	9480732.5	576.814	80	2011	180	-90
559XC11G	585784.34	9480739.2	642.25	50	2011	180	-90

Koki 2013 HS Mineral Resource Estimate collars

Hole ID	East PNG94	North PNG94	RL PNG94	Hole Depth	Year Drilled	Azim	Dip
DDH006D	585477.4	9481639.2	607.3497	224.8	1969	79.63	-45
DDH007AD	585477.4	9481639.2	607.3497	177.3	1969	259.63	-45
DDH007BD	585477.4	9481639.2	607.3497	198.7	1969	259.63	-45
DDH007D	585479.38	9481635.5	608.8385	196.7	1969	282.63	-45
DDH008D	585435.54	9482006.6	556.2537	210.4	1969	79.63	-43
DDH009D	585435.54	9482006.6	556.2537	215	1969	259.63	-45
DDH011D	585407.65	9482155.1	543.0099	367.9	1969	79.63	-45
DDH014D	585407.65	9482155.1	543.0099	218.5	1969	259.63	-45
DDH015D	585425.25	9482327.5	529.3128	276.5	1969	79.63	-45
DDH016D	585425.25	9482327.5	529.3128	87	1969	259.63	-45
DDH021D	585446.1	9481254.1	561.1594	256.9	1970	79.63	-47
DDH022D	585446.1	9481254.1	561.1594	185.6	1970	259.63	-45
DDH024D	585467.91	9481437.8	631.7834	114.9	1970	259.63	-45

DDH025D	585467.91	9481437.8	631.7834	304.3	1970	77.63	-45
DDH026D	585428.72	9482511.4	518.2882	339.1	1970	259.63	-46
DDH027D	585428.72	9482511.4	518.2882	169.2	1970	79.63	-46
DDH028D	585428.72	9482511.4	518.2882	249.4	1970	4.63	-90
DDH031D	585137.94	9481939.6	592.7308	141.4	1970	259.63	-46
DDH032D	585624.81	9480996	534.4499	184.7	1970	259.63	-46
DDH036D	585137.94	9481939.6	592.7308	520.3	1970	79.63	-79
DDH043D	585017.53	9482070.7	593.5213	244.8	1970	79.63	-50
DDH044D	585017.53	9482070.7	593.5213	156.4	1970	259.63	-45
DDH049D	585494.54	9481853.2	569.5444	220.8	1970	79.63	-45
DDH050D	585494.54	9481853.2	569.5444	340.5	1971	259.63	-45
DDH051D	585090.9	9481761.3	661.6588	508.4	1971	79.63	-70
DDH056D	585028.18	9482244.9	630.7739	391.1	1971	79.63	-44
DDH057D	585028.18	9482244.9	630.7739	176.2	1971	259.63	-73
DDH058D	584960.36	9481899.4	688.5776	396.2	1971	259.63	-80
DDH059D	585408.15	9482728.8	503.207	223.1	1971	79.63	-46
DDH060D	585408.15	9482728.8	503.207	243.2	1971	259.63	-46
DDH061D	585192.51	9482451.7	566.9924	365.1	1971	259.63	-45
DDH062D	584944.99	9482054.8	639.5373	243.8	1971	259.63	-42
DDH063D	585143.01	9481941.4	597.674	91.4	1971	79.63	0
DDH064D	585143.01	9481941.4	597.674	92.4	1971	79.63	0
DDH065D	584822.87	9482203	628.2016	220.1	1971	79.63	-44
DDH066D	584822.87	9482203	628.2016	269.1	1971	259.63	-45
DDH067D	584932.69	9482388.6	596.4711	299.8	1971	259.63	-45
001-KK97	585310.79	9481983.6	638.0161	400	1997	257.72	-50
002-KK97	585606.82	9482037.3	614.8337	400.2	1997	263.72	-50
003-KK97	585176.03	9482111.4	572.2358	373.8	1997	259.72	-50
004-KK97	585200.42	9482268.4	606.8003	400.39	1997	264.72	-50
C025-KO	584673.94	9482298.4	618.2124	325.8	1998	344.64	-55
C026-KK	585211.39	9481392.2	643.5432	229.5	1998	254.64	-55
116XC07	584563.43	9482671.1	687.3741	306.4	2007	207	-50
117XC07	584303	9482666	695.1062	192.5	2007	210	-50
118XC07	584852.33	9482704.1	588.0246	309.5	2007	26.5	-50
119XC07	584135.82	9482748.2	674.4767	249.7	2007	206.3	-50
120XC07	584856.59	9482706.8	588.7466	311	2007	209.7	-50
121XC07	584438.98	9482464.4	735.6963	304.7	2007	211.1	-60