NI 43-101 Technical Report Updated Resource Estimate Yandera Copper Project Papua New Guinea

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Appendices

Appendix A: Certificates of Qualified Persons

1 Summary

This report has been prepared pursuant to the requirements of Canadian National Instrument 43-101 – Standards of Disclosure for Mineral Projects (NI 43-101). This report is an Updated Resource Estimate (Technical Report on Resources) for Marengo Mining Limited (Marengo) by SRK Consulting (U.S.), Inc. (SRK) on the Yandera Copper Project (Yandera or Project) located in Madang Province, Papua New Guinea (PNG). This report provides mineral resource estimates, and a classification of resources prepared in accordance with the Canadian Institute of Mining (CIM) Metallurgy and Petroleum, Standards on Mineral Resources and Reserves: Definitions and Guidelines, May 10, 2014.

This 2015 Measured and Indicated copper-equivalent (CuEq) resource estimate for Yandera represents an update of a 2012 resource estimate, which was evaluated on a copper-only basis without the contributing value of ancillary molybdenum (Mo) and gold (Au) that would be produced with the copper (Cu). Other enhancements to the new resource estimate include:

- Incorporation of positive infill/upgrade drilling results from 2012 in the principal resource areas (Gremi, Imbruminda, and Omora) and also at the Dimbi and Rima advanced exploration prospects;
- Refinement of the resource tonnage from the addition of nearly 4,000 new density measurements;
- A reconstruction of the geologic framework focused on host rock and structural controls from the first-time application of oriented drill core data; and
- Remodeling of oxide to support future copper oxide leaching options.

1.1 Property Description and Ownership

The Yandera Project is located in the southwest part of Madang Province in the central highlands of PNG at an elevation ranging from 1,800 to 2,200 m above mean sea level in steep terrain with high annual rainfall. The project is located at longitude 145.12°E and latitude 5.75°S, which is about 95 kilometers (km) southwest of the city of Madang.

Access to the site is by helicopter only. Road access to the site is in development as a refurbishment and extension of a pre-existing road. Marengo has an access arrangement with various native tribes in the area to facilitate near-term road construction.

Marengo holds three non-contiguous exploration licenses (EL): EL 1335 (Yandera), EL 1854 (Lila/Cape Rigny), and EL 2261 (Koinambe). The total tenement package covers 624.03 km^2, but the vast majority of work to date and all the resources on the property have been within EL 1335. EL 1854 is currently under review for renewal.

Marengo currently holds 100% ownership of the land tenements. There are no other royalties, back-in rights, or other encumbrances on the property, except the Mining Lease royalty to the government of PNG, which is 2%.

In the EL agreements, the state (PNG) reserves the right to purchase up to 30% equity interest in any mineral discovery arising from the EL prior to commencement of mining. The purchase price would be equal to the State's pro-rata accumulated exploration expenditures and thereafter its pro-rata share of exploration and development costs.

1.2 Geology and Mineralization

Yandera is an igneous-intrusive-hosted, structurally-controlled Cu porphyry system with ancillary Mo and Au comprised of a series of adjacent vertically oriented deposits along recognized structural trends. Mineralization is concentrated in several deposits, namely, Imbruminda, Gremi, Omora, and Dimbi. Imbruminda, Gremi, and Omora are contiguous and separated from Dimbi by a low-grade central silica-rich zone, which is bounded on three sides by high angle faults. The bulk of the mineralization is adjacent to these major structures on a NW-SE trend. Locally, north-northeast-trending cross faults bound mineral domains and reflect the structural complexity of the district.

Mineralization is related to multiple pulses of intrusive activity and hydrothermal alteration/mineralization. Elevated grade has spatial correlation with late dacite intrusions and polymictic breccias with over-printing phyllic alteration. Broad tabular zones of copper mineralization extend from surface to depths of over 500 m and have been drill-defined to a strike length of over 5 km.

All of the Yandera porphyry-hosted Cu deposits lie within the Miocene Bismarck Intrusive complex. This complex is a batholith comprised predominantly of granodiorite with lesser amounts of gabbro and quartz monzogranite. The Bismarck Intrusive complex is bounded to the north by the northwest striking Ramu Fault Zone and the upthrust sediments and ophiolites of the Ramu Ophiolite Complex. There is an interpreted flexure in the Ramu Fault zone to the north of Yandera which may have played an important role controlling extension and mineralization at Yandera.

Early interpretations suggested a major shift in plate movement north of PNG at the time of intrusive emplacement when the major principal stress direction changed from predominantly left-lateral strike slip to a stress field more dominantly compressive. The strike-slip movement is interpreted to have arranged the mineral deposits in a NW-SE orientation, while compression and subsequent relaxation appear to have had the most pronounced impact on the mineralization timing.

1.3 Status of Exploration, Development and Operations

The Yandera Project is currently in the advanced exploration stage of development. The EL is fully covered by regional airborne geophysics including airborne magnetics and radiometrics. The airborne surveys have been supplemented by surface mapping and surface geochemistry to define drilling targets.

All drilling on the Project includes 575 drillholes that total 177,946 m of drilled length, of which Marengo has drilled 471 that total 144,728 m. Since the 2012 resource estimate, Marengo completed drilling programs in 2012, 2013, and 2014 that added 97 drillholes and 24,652 m of drilled length to the Project database. The majority of these drillholes were completed in 2012, and many of them were for geotechnical engineering purposes. Drill core is preserved in a secure core storage facility at the Yandera Camp, soon to be transferred to the Frog Camp.

There has been no mining carried out to date apart from two shallow excavations for bulk metallurgical samples carried out in the Gremi deposit. In 2015-2016, Marengo plans to upgrade and extend the existing unpaved road from near the project site in the highlands to a network of paved surfaces that connect to the cities of Madang and Lae. Base operations for exploration are currently being shifted from Yandera Camp to Frog Camp. Until the access road is upgraded, helicopter-assisted mapping, surface sampling and core drilling continue at the site.

1.4 Mineral Processing and Metallurgical Testing

Previous technical studies have included sulfide flotation testing for Cu, Mo, and Au recovery. Yandera sulfide material appears amenable to flotation processing. Test results of the Cu and Mo concentrates do not have deleterious elements at concentrations that will incur smelter penalties.

A portion of the deposit is oxide. Flotation testing of oxide Cu material demonstrated poor recovery. There have been no leaching tests on the oxide material to date, but Marengo is currently evaluating oxide leaching options.

There have been three metallurgical test work programs on Yandera mineralized material and one bulk sampling event:

- AMEC-Minproc performed comprehensive comminution studies and preliminary flotation and magnetic separation studies;
- NFC/Nerin did flotation test work and mineralization assessment;
- AMS/Marengo performed extensive flotation test work; and
- Bulk sampling of Adit Alpha and Adit Bravo at Gremi.

1.4.1 AMEC-Minproc

Three samples from Omora and three samples from Gremi were used for comminution and metallurgical test work by ALS-Ammtec in 2009, supervised by AMEC-Minproc. Comminution tests indicated that the material is of medium to high hardness with Bond Rod Mill Work Index of 14 kWh/t and Bond Ball Mill Work Index of 15 kWh/t. The samples had relatively low abrasion characteristics.

Bulk flotation tests, consisting of a rougher-scavenger circuit indicated Cu recoveries over 91%, and Mo recoveries of approximately 80%. Gold and silver also were recovered in the concentrate. Cleaning tests of the bulk concentrate indicated that the concentrate weight could be reduced without loss of metals.

Magnetic separation testing indicated that a concentrate of >60% Fe could be made, but SiO_2 values were above the penalty limit of 4.5%.

1.4.2 NFC/Nerin

China Nonferrous Metal Industry's Foreign Engineering and Construction Co. Ltd (NFC) commissioned Beijing General Research Institute of Mining and Metallurgy (BGRIMM) to run flotation test work. The samples for this test work were obtained from 2,260 m of full core, totaling approximately 22 t. Samples were from 14 drillholes located specifically for metallurgical test work (YM-005 to YM-018) and spaced to get representative samples on the Omora, Gremi, and Imbruminda deposits. 80% of each meter of sample was sent to BREIMM, with the remaining 20% sent to ALS-Ammtech in Perth.

Initial test work was done on the Imbruminda sample. Mineralogical tests indicate the main Cu minerals are chalcopyrite and bornite. Molybdenite is the main Mo mineral. Magnetite is the primary Fe mineral. Extensive test work was done on the I sample including optimizing the grind size, reagent selection, and flotation time. Both open and closed circuit flotation tests were run. Test work produced a process flow sheet that included: 1) Grinding to 60% passing 0.074 mm; 2) Cu and Mo bulk concentrate flotation; 3) Cu and Mo separation; and 4) Magnetic separation of Fe in the flotation tailings.

1.4.3 AMS/Marengo

Testing on the remaining 20% of the core was run parallel to the NFC/Nerin test program at ALS-Ammtec in Perth under the supervision of Arccon Mining Services (AMS) and Marengo. The AMS/Marengo test work concentrated on optimizing the rougher-scavenger recovery. Flotation slurry density, grind size, and collector reagents were all evaluated. Results of this optimization indicate: 1) copper recovery of 96% in hypogene samples; 2) good molybdenum recovery in hypogene and mixed samples; 3) flotation recovery of Cu and Mo in oxides low at 60% to 65%; and 4) reasonable rougher concentrate grades for Cu and Mo.

1.4.4 Bulk Sampling for Metallurgical Testing

In late 2010 and early 2011, Adit Alpha was driven a total distance of 49.4 m at Gremi to acquire a bulk sample for metallurgical testing of sulfide (hypogene) material. Adit Alpha was collared too high on the ridge, and thus the entire length of the adit was in oxide and mixed-oxide material.

In 2011, a second adit, Adit Bravo, was driven lower on the ridge to obtain hypogene material for bulk metallurgical testing. The total length of Adit Bravo was 70.1 m. A total of about 48 t of hypogene material was recovered from the end of the adit, and it was sent to ALS-Ammtec for metallurgical testing. Head grades of the sample were 0.36% Cu, 180 ppm Mo, and 0.14 ppm Au.

Two Locked Cycle Flotation Tests were run on the Bravo Adit ore. The flow sheet for the testwork included a rougher cell, two stages of copper cleaning, and seven stages of molybdenum cleaning with regrinding between the 3rd and 4th moly cleaners. The rougher feed was ground to 80% passing 150 µm. The rougher concentrate was reground to 80% passing 40 µm. Results of the tests were approximately 95% recovery of Cu with a 40% Cu grade concentrate. Au recovery was greater than 80% to the copper concentrate. Mo recovery varied from 78.6% to 86.0% in the two tests with a 46% to 43.3% Mo concentrate respectfully.

1.4.5 Recovery Estimate Assumptions

For optimized pits and CoG calculations, SRK applied the following recoveries in sulfides and mixed ores: copper, 90%; molybdenum, 85%; and gold, 65%.

Vat leaching is a relatively low cost method of oxide copper production, especially in ore types expected to have low acid consumption, such as Yandera oxide. To simplify the costs used to develop optimized pits and CoGs, the same processing cost used in the flotation plant (US$7.50/t) was used for vat leaching of oxide. Vat leaching costs are expected to be much lower than flotation costs. Therefore, to compensate for the high vat leaching costs applied in this study, SRK used 90% recovery for Cu in oxide ore. No recovery of Mo and Au are expected from oxide leaching.

1.5 Mineral Resource Estimate

The resource block model was informed by 35,250 samples from 553 drillholes at an average drillhole spacing of less than 30 m in the principal resource areas (Gremi, Imbruminda, and Omora) and less than 100 m in other deposits within the model space. Drilling techniques included exclusively HQ- and NQ-sized diamond drill core. Samples were collected as one-half core splits using a diamond-bladed saw on 2 to 3 m intervals. Sampling produced an approximate 1.5 kg mass, of which a 250 g split was pulverized to produce a charge for fire assay for gold, and four acid digestion and multi-element analysis with ICP-AES or ICP-OES for all other elements. Quality control data for the analytical database have been reviewed by the Qualified Person and were deemed acceptable for resource estimation.

Mineral resources were estimated by ordinary kriging (OK) using MineSight® software in 25 m x 25 m x 10 m blocks (XYZ), constrained by grade shells based on a 0.15% Cu cut-off. Grade estimates within the grade shells were based on capped, 5 m composited assay data. Capping was conducted prior to compositing.

The resource model was validated by visual inspection, statistical comparisons of block values to source data and comparison of Kriged results to other interpolation methods and swath plots. Resources were classified into Measured, Indicated and Inferred categories based on CIM Definition Standards (CIM, 2014) sufficient for NI 43-101 and JORC reporting.

A minimum of three drillholes were required for the assignment of Measured Mineral Resources within a drill data spacing of 50 m. Indicated resources were also classified with a minimum of three drillholes within a drill data spacing of 100 m. Inferred resources represent material estimated by as few as one drillhole at a distance greater than 100 m from source data but within the copper mineral domain (gradeshell) and within the potential mining shape. The high percentage of Measured and Indicated resources compared to Inferred in this model represents a previous drilling bias toward defining reserves (there are no current reserves) rather than developing and expanding resources. Gremi, Omora, and Imbruminda, are densely drilled, resulting in high resource classification in those areas with only minor inter-deposit drilling and step-out exploration.

In order to establish a reasonable prospect of eventual economic extraction in an open pit/sulfide flotation and oxide-leach context, the mineral resources presented above are reported within a potentially mineable open pit configuration at a copper price of US$3.50/lb Cu, a molybdenum price of US$15/lb Mo and a gold price of US$1,500/oz Au; metallurgical recoveries of 90% for Cu, 85% for Mo and 65% for Au; mining cost of US$2.50/t of material mined; and process and G&A costs of US$10/t of material processed. Additional factors include a 2% royalty to the PNG government and a pit slope of 45 degrees.

The resources are reported within the pit configuration above an internal CuEq CoG of 0.15% CuEq. The metal prices, recoveries, and costs listed above were used to define CuEq cut-off.

The metal ratios used for reporting CuEq are:

*CuEq = Cu% + (Mo% * 4.05) + (Au ppm * 0.45)*

These metal ratios were developed using the metal prices and recovery assumptions listed above. Recoveries are based on metallurgical test work carried out by Marengo in 2011.

The Mineral Resource Statement, with an effective date of May 1, 2015, is presented in Table 1.5.1. The resource has been reported as a total, and as oxide and non-oxide components, as these material types will have different metallurgy and will have different recovery characteristics and costs.

Table 1.5.1: Mineral Resource Statement for the Yandera Copper, Molybdenum, Gold Deposit, Madang Province, Papua New Guinea [0.15 CuEq (%) Cut-off] SRK Consulting, May 1, 2015

Zone	Classification	Mass (kt)	Metal Grades				Contained Metal				
			Cu (%)	Mo (%)	Au (ppm)	CuEq (%)	Cu (kt)	Mo (kt)	Au (kg)	Au (koz)	CuEq (kt)
Total Resource	Measured	195,267	0.37	0.013	0.076	0.46	723	25	14,803	476	890
	Indicated	434,874	0.32	0.008	0.069	0.38	1,379	37	29,940	963	1,663
	Measured & Indicated	**630,142**	**0.33**	**0.010**	**0.071**	**0.41**	**2,103**	**62**	**44,743**	**1,439**	**2,554**
	Inferred	117,474	0.30	0.005	0.052	0.34	348	6	6,055	195	401
Oxide Resource	Measured	22,426	0.38	0.00	0.000	0.38	86	0	0	0	86
	Indicated	38,715	0.33	0.00	0.000	0.33	127	0	0	0	127
	Measured & Indicated	**61,141**	**0.35**	**0.00**	**0.000**	**0.35**	**212**	**0**	**0**	**0**	**212**
	Inferred	10,765	0.28	0.00	0.000	0.28	30	0	0	0	30
Non-oxide Resource	Measured	172,841	0.37	0.014	0.086	0.47	638	25	14,803	476	805
	Indicated	396,160	0.32	0.009	0.076	0.39	1,253	37	29,940	963	1,537
	Measured & Indicated	**569,001**	**0.33**	**0.011**	**0.079**	**0.41**	**1,890**	**62**	**44,743**	**1,439**	**2,342**
	Inferred	106,709	0.30	0.006	0.057	0.35	318	6	6,055	195	371

- Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. There is no certainty that any part of the Mineral Resources estimated will be converted into a Mineral Reserves estimate;
- Resources stated as contained within a potentially economically minable open pit; pit optimization was based on assumed copper, molybdenum, and gold prices of US$3.50/lb, US$15/lb, and US$1,500/oz, respectively, recoveries of 90% for Cu, 85% for Mo, 65% for Au, a mining cost of US$2.50/t, an ore processing cost of US$10/t, and a pit slope of 45°;
- Resources are reported above a 0.15% CuEq CoG;
- CuEq grades reported above were calculated using the formula CuEq = Cu% + (Mo% * 4.05) + (Au ppm * 0.45); and
- Numbers in the table have been rounded to reflect the accuracy of the estimate and may not sum due to rounding.

1.6 Mineral Reserve Estimate

There have been no mineral reserves estimated for this project.

1.7 Mining Methods

An open-pit truck-and-shovel operation is anticipated for this project. CoG calculations used this mining method as the basis of costs.

1.8 Recovery Methods

Metal recovery of sulfide mineralization (Cu, Au, Mo) would likely be by conventional crushing, grinding, and flotation to produce a Cu-Au concentrate and separate Mo concentrate. Recovery of copper oxide would be by acid vat leach. CoG calculations used these process methods for the basis of costs.

1.9 Project Infrastructure

There are two active exploration camps servicing the exploration activities at the Yandera Project: Yandera Camp and Frog Camp. The camps have non potable water systems, diesel generated power and limited radio, internet and cell communications. These facilities are currently accessible by helicopter and by unpaved road to the Yandera Camp. In 2015-2016, Marengo plans to upgrade and extend the existing unpaved road from near the project site in the highlands to a network of paved surface roads that connects to the cities of Madang and Lae. Preliminary engineering and construction planning is underway at this time for the road improvements.

1.10 Environmental Studies and Permitting

Marengo currently holds EL's on three tenements. An EL entitles the holder to exclusively explore for minerals for a period of two years, and it also entitles the lease holder the right to apply for a mining lease or special mining lease. Once an Environmental Impact Statement (EIS) has been submitted and a Feasibility Study has been completed, Marengo will need to apply for a mining lease or special mining lease. At this stage there are a number of permits that are required.

Prior to completion of this report, Marengo initiated environmental studies to be used for an EIS. Consultant Coffey Environments partially completed investigations on archeology and material culture; aquatic biodiversity; terrestrial vegetation and fauna; land and resource use; water resource use; noise, vibration, and blast overpressure; air quality, greenhouse gas and energy consumption; social impact assessment; sediment characterization and transport; streambed sediment quality; soil characterization and rehabilitation; health and nutrition; nearshore marine characterization survey/Madang Harbor studies; geochemical characterization of waste rock; and geochemical characterization of tailings. Marengo is currently collecting water quality data for baseline studies.

1.11 Conclusions

The Measured and Indicated Mineral Resource estimate for the Yandera deposit in the highlands of PNG is approximately 630 Mt at a grade of 0.41% CuEq, with contributions to the CuEq coming from low-grade Mo and Au. The resource is reported within a potentially mineable open pit configuration. Of the total resource, approximately 10% of the tonnes reside in oxide, where Cu is potentially recoverable by acid leach. The majority of the resource is in sulfide, recoverable by conventional flotation to produce a concentrate. Sulfide recoveries used in this study were: Copper, 90%; Molybdenum, 85%; and Gold, 65%. Exploration is ongoing at Yandera, as well as further metallurgical and geotechnical characterization to advance the project.

There are logistical, environmental and socio-political challenges for constructing and operating a mine in the highlands of PNG; however, Marengo has been active at the site for more than ten years, and building on a more than 25 year exploration presence in the district established by previous operators. Marengo's exploration team is almost exclusively comprised of PNG nationals and most of the labor and logistical support for the Project are locally employed.

Steep terrain poses both challenges and opportunities for mine development that will be addressed as the project proceeds. SRK is of the opinion that Yandera is a project of merit and there are no material technical, environmental or socio-political obstacles to project development.

1.12 Recommended Work Programs

1.12.1 Data Collection for Preliminary Economic Assessment

Marengo has already initiated studies to facilitate project advancement in the areas of road access, mineral processing, tailings management, power and water supply, and social/environmental compliance. The following are specific activities recommended to provide economic inputs for a preliminary economic assessment (PEA).

Drilling

SRK has identified a number of areas within the potential future mining footprint that lack drill data. These "conversion" targets along with some proximal step-out drilling have potential to improve preliminary economics at the next level of study.

Two types of drilling are recommended to support a PEA:

- **Conversion Drilling**: Target generation and drilling to convert waste to ore and immediately impact project profitability by connecting future pits and improving the strip ratio; and
- **Step-out Drilling**: exploration of contiguous prospects with surface mapping and sampling to define drill targets that would expand the future pit shape.

Marengo should consider using small portable equipment for some of this drilling work. The initial exploration could be done with small-diameter core to determine presence or absence of mineralization in shallow holes at low cost. Positive results would then be followed up with larger equipment for larger samples and deeper testing.

Also, to improve the quality and usability of future drill data, SRK recommends:

- Establish a lithology and alteration library of core samples, and maintain consistency in future geological logging;
- Increase the insertion rate of blank samples to average at least one blank per batch of fire assay and ICP samples. Continue including Certified Reference Material samples in the core sample sequence. Include coarse reject duplicate samples, and use these as check assay samples to send to a second accredited and independent laboratory to maintain the original pulp sample set;

- Orient some future dill holes in the main mineralized areas perpendicular to the typical NE-SW drilling pattern. Analysis of oriented core in 2015 suggests that higher grade mineralization may occur in structures on this azimuth, which has potentially been missed by previous drilling; and
- Investigate the installation of a portable on-site analytical laboratory. Portable facilities are available at reasonable costs to collect real-time analytical data to direct drilling activities. Current turn-around times for drilling data are prohibitive.

Oxide Leach Characterization

Preliminary evaluations indicate a positive future return from leaching of copper in oxide that would otherwise be mined as waste. SRK recommends that a spatially representative sampling program of copper in oxide be undertaken commensurate with metallurgical testwork. Metallurgical work should include a size sensitivity analysis, acid consumption, and an assessment of vat leach viability.

Oxide characterization should begin with analyzing future drill samples for acid-soluble copper to determine the ratio of oxide to total copper, and correlate the new results with S:Cu values. These data will allow for a more accurate determination of the oxide leach boundary leading to a better estimate the tonnes and recovery of oxide copper.

1.12.2 PEA

In parallel with PEA data collection, SRK recommends scoping-level trade-off studies in the areas of:

- Mine design (conventional open pit vs. underground or combination, truck vs. conveyor);
- Processing: (milling +/- leaching, highlands vs. lowlands plant siting, etc.);
- Power Supply: (diesel vs. LNG, line power vs. generators, fuel supply options);
- Tailings management: (on land impoundment vs offshore, conventional vs. dry stack);
- Access: (optimized route selection for roads and pipelines); and
- Purchase/Offtake: (develop preliminary smelter terms).

At the conclusion of the data collection and trade-off studies, a PEA would be prepared to demonstrate future economic potential.

1.12.3 Resource Expansion and Regional Exploration

Pending positive results from the PEA, Marengo should carry out additional work on advanced exploration prospects to expand the resource. Advanced prospects include Rima and Frog. In parallel, Marengo should continue to develop grass-roots exploration prospects through traditional targeting, mapping, sampling and drilling. Identified grass-roots prospects include Pomiea, Biom,Queen Bee, and a number of other early stage target prospecting areas

1.13 Costs

Table 1.13.1 is a breakdown of the anticipated costs for the above recommendations. The schedule to complete the PEA is two to three years. Development of Advanced Prospects and regional exploration is projected on a three to five year timeline.

Table 1.13.1: Cost Estimates for Recommended Work Programs

Work Program	Estimated Cost (US$)	Assumptions/Comments
Data Collection for PEA		
Conversion Drilling	2,400,000	Approx. 6,000 m
Step-out Exploration Drilling	2,260,000	Approx. 5,500 m
Oxide Characterization	150,000	Broad spaced sampling and column testing
Subtotal Data Collection	**$4,810,000**	
PEA		
Conceptual Trade-Off Studies	50,000	Specialist contractor/engineer
Preliminary Economic Analysis	150,000	Specialist contractor/engineer
Advanced Prospects and Regional Exploration	3,000,000	Mapping, sampling, drilling
Subtotal PEA	**$3,200,000**	
Total	**$8,010,000**	

Source: SRK, 2015

2 Introduction

2.1 Terms of Reference and Purpose of the Report

This report was prepared as a National Instrument 43-101 (NI 43-101) Technical Report – Updated Resource Estimate (Technical Report) for Marengo Mining Limited (Marengo) by SRK Consulting (U.S.), Inc. (SRK) on the Yandera Copper Project (Yandera or Project) located in Madang Province, PNG.

The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in SRK's services, based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This report is intended for use by Marengo subject to the terms and conditions of its contract with SRK and relevant securities legislation. The contract permits Marengo to file this report as a Technical Report with Canadian securities regulatory authorities pursuant to NI 43-101, Standards of Disclosure for Mineral Projects. Except for the purposes legislated under provincial securities law, any other uses of this report by any third party is at that party's sole risk. The responsibility for this disclosure remains with Marengo. The user of this document should ensure that this is the most recent Technical Report. This report provides mineral resource estimates and a classification of resources prepared in accordance with the Canadian Institute of Mining (CIM) Metallurgy and Petroleum, Standards on Mineral Resources and Reserves: Definitions and Guidelines, May 10, 2014.

2.2 Qualifications of Consultants (SRK)

The Consultants preparing this technical report are specialists in the fields of geology, exploration, mineral resource and mineral reserve estimation and classification, underground mining, geotechnical, environmental, permitting, metallurgical testing, mineral processing, processing design, capital and operating cost estimation, and mineral economics.

None of the Consultants or any associates employed in the preparation of this report has any beneficial interest in Marengo. The Consultants are not insiders, associates, or affiliates of Marengo. The results of this Technical Report are not dependent upon any prior agreements concerning the conclusions to be reached, nor are there any undisclosed understandings concerning any future business dealings between Marengo and the Consultants. The Consultants are being paid a fee for their work in accordance with normal professional consulting practice.

The following individuals, by virtue of their education, experience and professional association, are considered Qualified Persons (QP) as defined in the NI 43-101 standard, for this report, and are members in good standing of appropriate professional institutions. The QP's are responsible for specific sections as follows:

- J.B. Pennington, M.Sc. C.P.G., is the QP responsible for background Sections 2 and 3, co-authorship of resource geology and modeling Section 14, and authored portions of Sections 1, 25, and 26 summarized therefrom, of this Technical Report.
- Kent W. Hartley B.Sc. Eng., P.E., is the QP responsible for non-applicable items, and mineral processing and metallurgy Sections 13, 15 through 19, 21 through 24, and portions of Sections 1, 25, and 26 summarized therefrom, of this Technical Report.

- Justin Smith, B.Sc., P.E., SME-RM is the QP who collaborated on resource modeling and co-authored Section 14 of this Technical Report.
- Nathan Chutas, Ph.D., C.P.G., is the QP responsible for project background, geology and exploration, and environmental Sections 4 through 9, 20, and portions of Sections 1, 25, and 26 summarized therefrom, of this Technical Report.
- Brooke Miller M.Sc., C.P.G., is the QP responsible for drilling, data validation and verification Sections 10 through 12, and portions of Sections 1, 25, and 26 summarized therefrom, of this Technical Report.

Allan Moran B.Sc., C.P.G., is the Senior Reviewer responsible for SRK's internal review of this Technical Report.

2.3 Details of Inspection

SRK participated in a visit to the Yandera site November 7-15, 2014, with meetings, field and core inspections taking place November 10-14, 2014 with the other days being dedicated to travel.

Table 2.3.1.: Site Visit Participants

Personnel	Company	Expertise	Date(s) of Visit	Details of Inspection
Jay Pennington	SRK Consulting	Resource Geology	November 10-14, 2014	Full-time accommodation at the Yandera Camp. Review of core stored at the Camp. Review of data collection method, maps and cross-sections, and digital database. One-day inspection of active drilling at Rima and a field traverse from Rima to Frog Camp.

Source: SRK, 2015

2.4 Sources of Information

The sources of information include data and reports supplied by Marengo personnel as well as documents cited throughout the report and referenced in Section 27.

2.5 Effective Date

The effective date of this report is May 1, 2015.

2.6 Units of Measure

The metric system has been used throughout this report. Tonnes are metric of 1,000 kg, or 2,204.6 lb. All currency is in U.S. dollars (US$) unless otherwise stated.

3 Reliance on Other Experts

The Consultant's opinion contained herein is based on information provided to the Consultants by Marengo throughout the course of the investigations. SRK has relied upon the work of Columbia Basin Resources Inc. for input on property ownership, history, geology, and permitting in support of this Technical Report.

The Consultants used their experience to determine if the information from previous reports was suitable for inclusion in this technical report and adjusted information that required amending. This report includes technical information, which required subsequent calculations to derive subtotals, totals and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, the Consultants do not consider them to be material.

SRK has relied on Columbia Basin Resources Inc. and Marengo Mining Limited for information pertaining to property ownership and agreements. These items have not been independently reviewed by SRK, and SRK did not seek an independent legal opinion of these items.

4 Property Description and Location

4.1 Project Location

The Project is located in the southwestern portion of the province of Madang in PNG within the Bismarck Mountain range, at elevations ranging from 1,500 to 2,400 m above mean sea level. The project is located at about longitude 145.12°E and latitude 5.75°S, which is about 95 km southwest of the city of Madang. The location of the project relative to other major mineral projects on the island of New Guinea is shown in Figure 4.1.1.

4.2 Mineral Titles

Marengo has three non-contiguous exploration licenses (EL): EL 1335 (Yandera), EL 1854 (Lila/Cape Rigny), and EL 2261 (Koinambe) as listed in Table 4.2.1 and shown in Figure 4.2.1. The total tenement package covers 624.03 km^3, but the vast majority of work to date and all the resources on the property have been within EL 1335. EL 1854 is currently under review for renewal.

Table 4.2.1: Marengo Mineral Titles and Status

Exploration License	Name	Sub-blocks	Square km	Original Grant Date	Expiry Date	Status
1335	Yandera	72	245.52	November 20, 2003	November 19, 2015	Current
1854	Lila/ Cape Rigny	7	87	July 29, 2011	July 27, 2013 (1)	Under Review
2261	Koinambe	104	353.64	June 29, 2012	June 28, 2016	Current
		183	624.03			

(1) Tenement EL 1854 has been under review for renewal, but the renewal has not yet been issued.
Source: Marengo, 2015

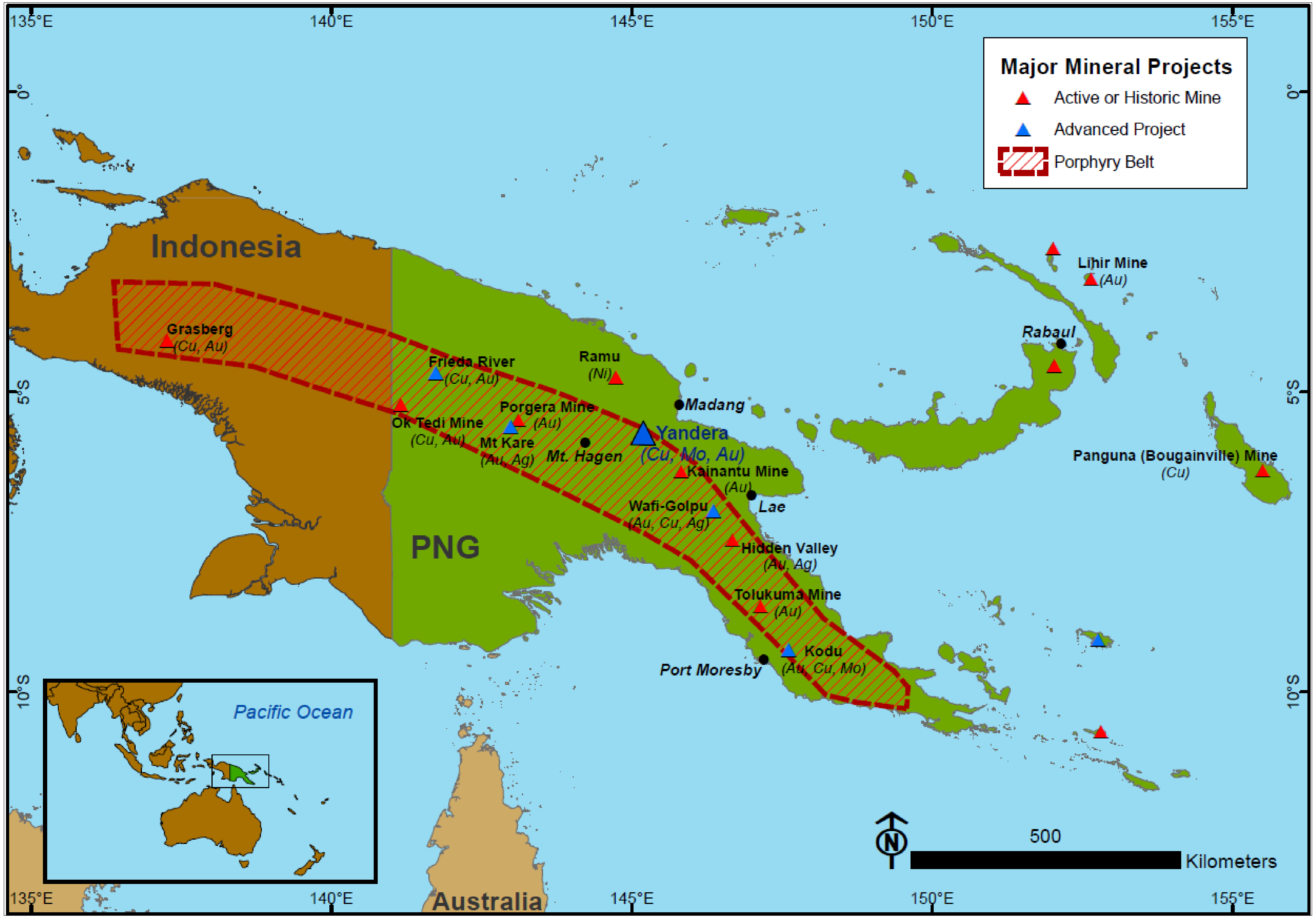
4.2.1 Nature and Extent of Issuer's Interest

In PNG, the national government owns mineral rights for all property. Individuals and groups are allowed to own the surface. The PNG Mining Act of 1992 grants the holder of an EL access to the property for exploration purposes.

In the Yandera resource area, Marengo works with the Yandera Land Owner Association (YLOA) to coordinate access for work on the property. The YLOA works with Tribes and Clans for access. Although landowners are not entitled mineral rights, they are entitled to compensation for work-related disturbances that occur on their property, as specified by the government of PNG. Prior to developing a mine, Marengo is required to negotiate compensation with the local land owner association (LOA) for land owners that would be affected.

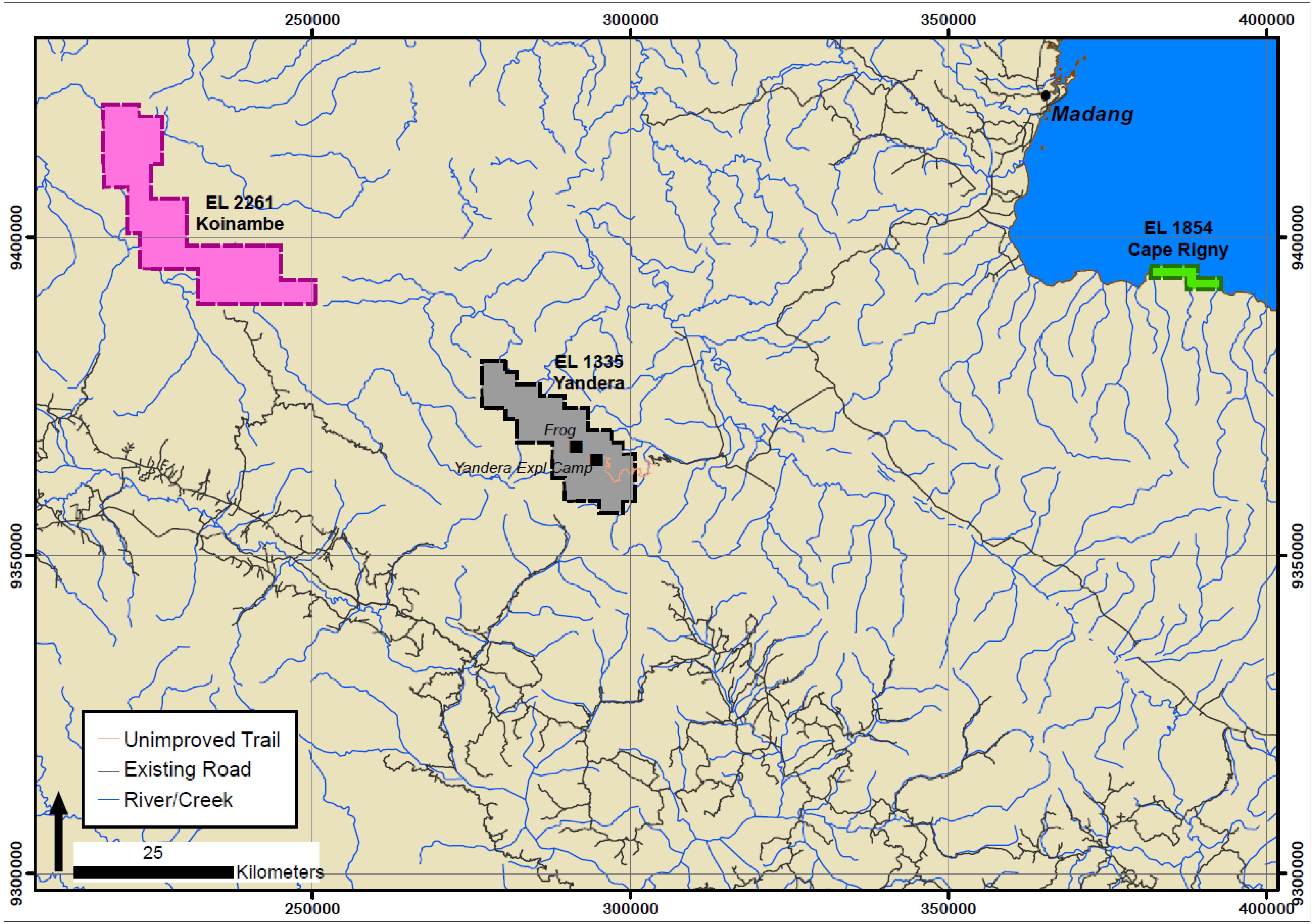
An EL entitles the holder to exclusively explore for minerals for a period of two years, and gives the holder the right to apply for a mining lease or special mining lease. The mining lease permits the holder to exclusively mine the lease for a period of up to 20 years, with the right to apply for 10 year extensions, and the special mining lease permits the holder to exclusively mine the lease for a period of up to 40 years with the right to apply for a renewal of up to 20 years.

Once an EL is granted, it must be renewed every two years, or at the end of each term. Holders are required to pay rental for each EL, and are required to accumulate a minimum amount of expenditures for each EL as shown in Table 4.2.1.1. EL 1335 is in its sixth term.



Source: Marengo, 2015

Figure 4.1.1: Project Location Map



Source: Marengo, 2015

Figure 4.2.1: Land Tenure Map

Table 4.2.1.1: Rentals and Expenditure Requirements for Exploration Licenses (1)

Term	Rental per Sub-block	Minimum Expenditures for Each Sub-block per Year
First	90	400
Second	180	1,000
Third and successive terms	470	2,000

(1) Values are reported in PNG Kina.

4.3 Royalties, Agreements and Encumbrances

Marengo currently holds 100% ownership of the land tenements. There are no other royalties, back-in rights, or other encumbrances on the property, except the Mining Lease royalty to the government of PNG, which is 2%.

In the EL agreements, the state (PNG) reserves the right to purchase up to 30% equity interest in any mineral discovery arising from the EL prior to commencement of mining. The purchase price would be equal to the State's pro-rata accumulated exploration expenditures and thereafter its pro-rata share of exploration and development costs.

4.4 Environmental Liabilities and Permitting

4.4.1 Environmental Liabilities

There are no known environmental liabilities for the Yandera project.

4.4.2 Required Permits and Status

An environmental permit is required when undertaking drilling to be permitted to "discharge wastes into the environment." Marengo currently holds a permit for drilling and a permit for water extraction. Marengo was issued these permits under Section 65 of the PNG Environment Act 2000, and they expire on August 3, 2017.

If the project advances into development, there are a number of other permits and licenses that would be required.

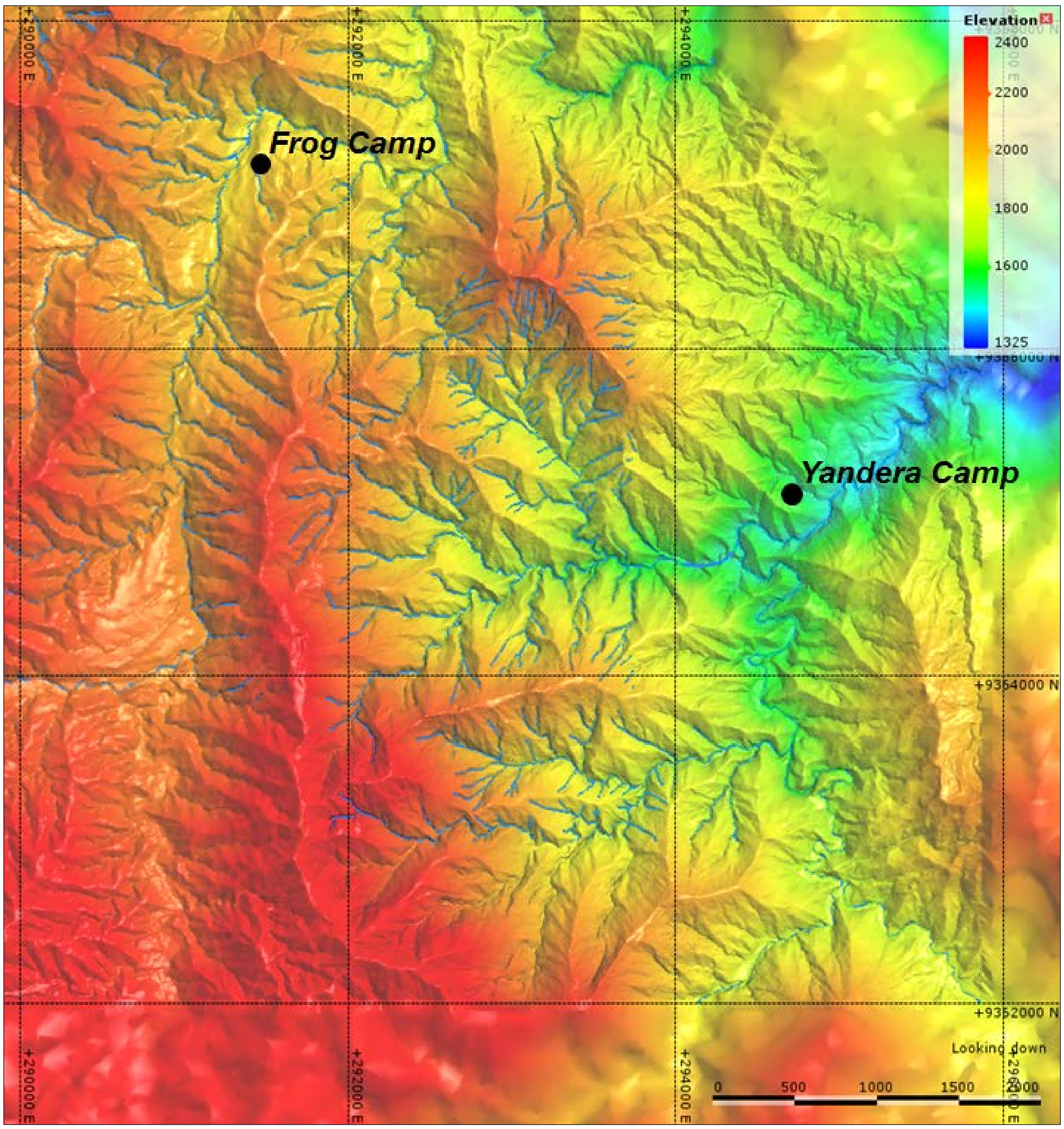
4.5 Other Significant Factors and Risks

The Project is located in steep terrain, with high seismicity and high annual rainfall, which provides some current logistical challenges and risk to future development and operations.

5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

5.1 Topography, Elevation and Vegetation

The project is located in the Bismarck Mountain Range at an average elevation of 1,900 m, with the highest elevation in the resource area up to about 2,760 m and the lowest elevation in the resource area down to about 1,350 m. Local relief can reach 600 m, and much of the terrain is steep (with significant portions of the project with slopes greater than 40°). An image of topography with color-shaded elevation is presented in Figure 5.1.1.



Source: SRK, 2015

Figure 5.1.1: Project Area Topography

Most of the project area is covered with dense tropical vegetation. Clearings in this vegetation are associated with villages, local dwellings, camps, or isolated portions of the hillslopes used to grow fruits and vegetables. A labeled photograph of the Yandera Field Camp is provided in Figure 5.1.2.

Source: SRK, 2015

Figure 5.1.2: Yandera Camp Photo

5.2 Accessibility and Transportation to the Property

The project is located approximately 95 km to the southwest from the coastal city of Madang (population approximately 30,000), which is the capital city of Madang Province. The project is also approximately 235 km to the northwest of Lae (population of about 100,000), which is known as the largest port city in PNG and an important industrial center. Both cities have active port facilities with tidewater access, and there is a maintained road between them.

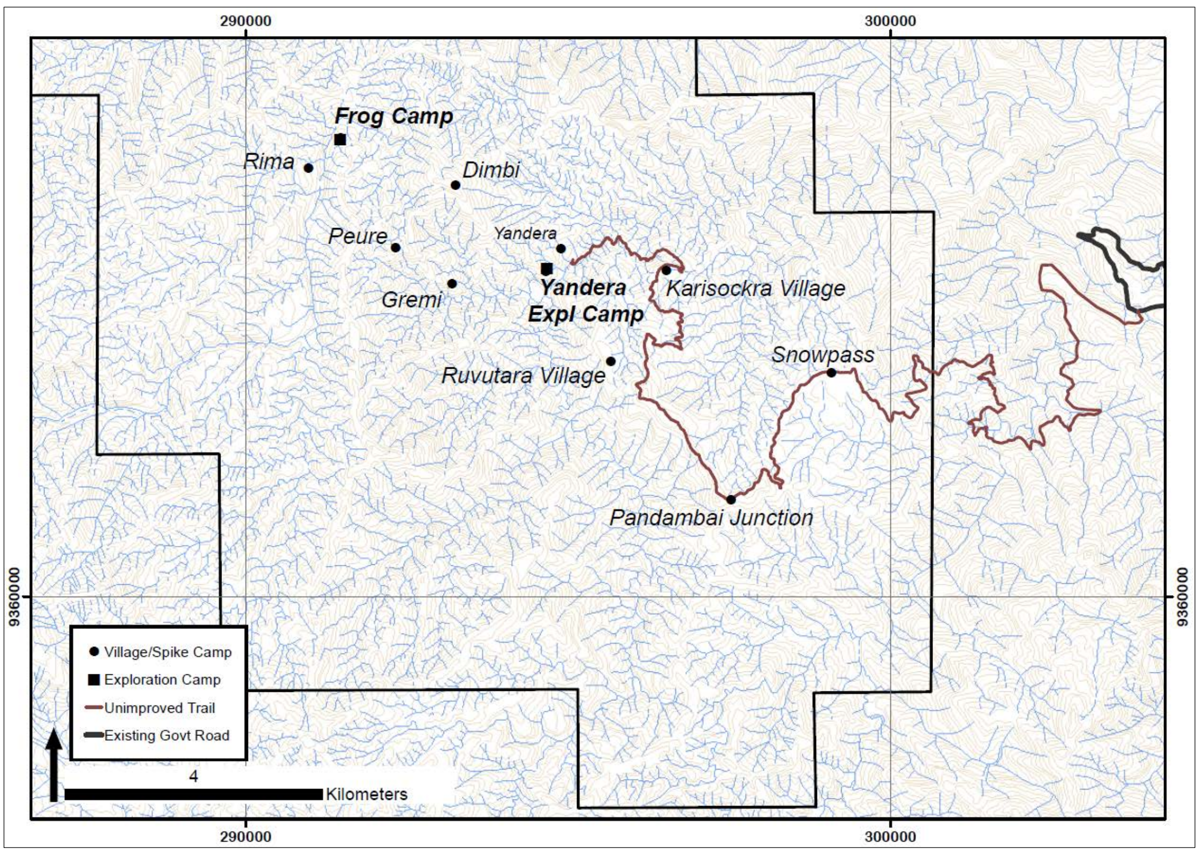
There are several other population centers in the vicinity of the property; however these areas are located within the mountains. The two largest are Mt Hagen (population of about 46,000), which is about 100 km to the southwest of the property, and the other is Goroka, (population of about 20,000), which about is about 47 km to the southeast of the property.

Within EL 1335, the largest population center is the village of Yandera (population approximately 1,500), which lies about 2 km east of the footprint of the Mineral Resource. Much of the remaining population in the project area live in dwellings dispersed along walking trails.

Marengo currently uses Madang as its logistical base of operations. Materials and labor are transported from Madang to the project site via helicopter, with a departure point of Madang airport or, more commonly, from a lay-down yard ('Lay Down 3') that is accessible via road that travels through the village of Usino.

The Ramu River is a prominent northwest trending river that drains to the northwest, and eventually reaches the ocean near the northwest corner of Madang Province. Lay Down 3 and Usino are both on the northeast side of the Ramu River.

Marengo has almost exclusively accessed the property via helicopter, as there are no conveniently located landing strips with capacity for reasonable sized fixed-wing aircraft. The closest existing road that could access the property is located to the east of EL 1335, near the village of Bundi. Locals from Yandera Village use an existing trail that passes through Snowpass to reach Bundi. Some locals also use trails to travel southward through Pandambai Junction to reach Goroka or the smaller road-accessible village of Kundiawa. The existing trails and road are mainly used for walking and are not currently in a condition suitable for bringing in personnel or materials with this ground network. The unimproved highlands trail to the south end of EL 1335 and the Yandera Camp is shown in Figure 5.2.1.



Source: Marengo, 2015

Figure 5.2.1: Site Access Map

5.3 Climate and Length of Operating Season

Climate at the project site is that of a high-elevation tropical, equatorial environment. Humidity is high, and precipitation is frequent. Skies tend to be clear early in the morning, but by late morning and for the remainder of the day, cloudy, reduced visibility conditions are common.

Average annual temperature is around 18°C, with average highs around 25°C and average lows down to 12°C. Rainfall in the project area ranges between 3 to 5 m/y, with higher quantity of precipitation in the rainy season (typically from December through March). The project is area is not typically affected by tropical cyclone activity.

Climate in the coastal city of Madang has an average high of 29.8°C and an average low of 23°C. Average annual precipitation in Madang is about 3.5 m, with the rainy season typically starting in October and ending in May.

In most years, the field activities at site will ramp up in March and ramp down in late November. This is largely a response to the onset of the rainy season, when visibility and flying conditions can severely limit the helicopter accessibility. Exploration activities (mapping, sampling, drilling, etc.) are typically very limited during the rainy season due to poor helicopter flying conditions, but the base camp is still accessible and some activities carry on year-round.

5.4 Sufficiency of Surface Rights

Currently the surface rights for the project are sufficient to continue exploration work. If and when the project moves to apply for an special mining lease, there will need to be additional arrangements and agreements with current landowners through a LOA.

5.5 Infrastructure Availability and Sources

Currently the project is helicopter-supported in virtually all aspects. Fuel, materials, equipment, and personnel are flown to camp directly from Madang or from ‘lay-down’ locations accessible by the roads connecting Madang and Lae. These lay-down locations are typically a 20 to 25 minute helicopter flight one way.

Much of the recent helicopter support has been provided by Hevilift in the form of a Bell 407. There are not sufficiently long flat areas to utilize sizeable fixed-wing aircraft.

There are some government maintained roads to the east of EL 1335, but at present these roads have not been improved or extended to the point that materials can be brought into any of the camps on a safe and regular basis.

Locals in the vicinity of the Yandera project sell fresh fruit and vegetables to the camp, but other staples such as rice and meats have to be flown in.

Power for the camp facilities is provided with a diesel-powered generators.

There are no overhead telephone lines, however there is a Digicel tower that provides mobile access for a large portion of the project area.

6 History

6.1 Prior Ownership and Ownership Changes

In 1965, Kennecott acquired the EL to work on the property. They continued ownership and operated until 1973, when Triako Mines acquired the property and had its operator, Amdex, complete the work programs. Amdex jointly worked with Broken Hill Proprietary Company (BHP) on the property from 1974 to 1977. In 1978 Amdex joint-ventured with Buka Minerals. Work and ownership between Amdex and Buka Minerals continued until 1984, when they dropped the property. The property sat idle until 1999, when Highland Pacific and Cyprus Amax acquired an EL and worked on the property, dropping it before 2000. The property then sat idle until Belvedere Limited acquired the EL for the property. In 2005, Belvedere formed a joint-venture with Marengo, who operated the property. In 2006, Marengo acquired 100% the property through purchase of Belvedere's interest. Since that time, Marengo has been the sole owner and operator on the property.

6.2 Exploration and Development Results of Previous Owners

Geologists from the Australian Bureau of Mineral Resources first investigated outcrops of copper mineralization near Yandera village in the mid-1950s and early 1960s. Kennecott Exploration ran the first systematic exploration of the project area from 1965 to 1972. Over the course of their work, they completed geochemical sampling of stream sediment, soil, and rock; completed detailed geological mapping; completed several ground-based magnetic and induced polarization surveys; and completed 14 diamond drill holes that total 2,276 m drilled length.

From 1973 to 1977, Broken Hill Proprietary Company Limited (BHP) and Amdex Mining Limited jointly completed 82 diamond drillholes that total about 27,620 m drilled length. This joint-venture completed additional geochemical sampling, mapping, and contour trenching programs. The results of this was the identification of the Imbruminda, Gremi, and Omora prospect areas. After BHP left the venture, Amdex continued to drill 10 holes, which total 3,323 m of drilled length, and explore with surface mapping, sampling, and some ground geophysics until they dropped the property in 1984.

In 1999, Highlands Pacific/Cyprus Amax completed surface mapping, sampling, and trenching. Historic Mineral Resource and Reserve Estimates

6.3 Historic Mineral Resource and Reserve Estimates

Excerpted from the 2012 Ravensgate Report (Ravensgate, 2012):

> *Several resource estimates were completed for the project in the 1970s, however these pre-date all versions of modern reporting Codes. In 2007 an indicated resource of 163 Mt at 0.49% Cu equivalent and inferred resource of 497 Mt at 0.48% Cu equivalent was estimated by Golder Associates (Golder) in accordance with JORC (2004).*
>
> *A resource estimate at Yandera prepared in accordance with JORC (2004) guidelines was completed by Golder in August 2008. This resource was based on 175 diamond drill holes (57,000 metres) including drilling completed by Marengo from 2006 to 2008. The interpolation method used by Golder was by ordinary kriging and included estimations for Cu, Mo and Au. Rhenium was also estimated using a linear regression based on Mo grades.*

In 2011, Golder completed a JORC (2004) compliant resource based on 345 diamond drill holes (113,715 m), which included drilling from 2006 to January 2011. Golder used an OK interpolation method, which included separate estimations for Cu, Mo, Au, and Ag (Rhenium was estimated from a linear regression based on Mo grades). In this resource, all Au, Ag, and Re resources were Inferred. The mineral resource form Cu and Mo as stated by Golder in 2011 is presented in Table 6.3.1.

Table 6.3.1: Yandera Mineral Resource Statement by Golder 2011 at 0.2% Copper Equivalent Cut-off Grade

Resource Category	Mass	Grade			Contained Metal	
0.20 CuEq% Cut-off	**Mt**	**CuEq%**	**Cu ppm**	**Mo ppm**	**Cu (kt)**	**Mo (kt)**
Measured	132	0.53	3,700	167	488	22
Indicated	490	0.35	2,772	89	1,358	44
Combined Measured + Indicated	**622**	**0.39**	**2,968**	**108**	**1,846**	**67**
Inferred	1,017	0.33	2,840	68	2,888	69

Source: Golder, 2011

A sensitivity analysis of resources over a range of CoGs is presented in the Golder report (Golder, 2011) and not reiterated here.

In 2012, Ravensgate completed a JORC compliant resource based on 462 diamond drill holes (145,258 m), which included additional drilling from February 2011 to February 2012. Ravensgate used an OK interpolation method, which included separate estimations for Cu, Mo, and Au. The mineral resource form Cu, Mo, and Au as stated by Ravensgate in 2012 is presented in Table 6.3.2. Note this statement uses a copper CoG.

Table 6.3.2: Yandera Mineral Resource Estimate by Ravensgate 2012 at 0.2% Copper Cut-off Grade

Resource Category	Mass	Grade			Contained Metal		
0.20 Cu% Cut-off	**Mt**	**Cu %**	**Mo ppm**	**Au ppm**	**Cu (kt)**	**Mo (kt)**	**Au (t)**
Measured	314	0.38	104.6	0.085	1,193	33	27
Indicated	172	0.35	52.7	0.048	602	9	8
Combined Measured + Indicated	**486**	**0.37**	**105.2**	**0.09**	**1,798**	**51**	**44**
Inferred	347	0.31	37.8	0.03	1,076	13	10

Source: Ravensgate, 2012

A sensitivity analysis of resources over a range of cut-off grades is presented in the Ravensgate report (Ravensgate, 2012) and not reiterated here.

The above stated historical resources are historically reported information only. SRK makes no representation of any historical resource estimates (including those stated in Section 6.3 of this report), or any assumptions or parameters made by its authors. It is therefore not possible to determine what additional work is required to upgrade or verify these historical estimates as current mineral resources or mineral reserves. The reader of this report should not rely on the above tonnage and grade figures being CIM complaint resources, as no SRK QP has evaluated the data used to derive those estimates of tonnage and grade. No attempt has been made by SRK to classify any historical estimate as current mineral resources or mineral reserves and Marengo is not treating any historical estimate as current mineral resources or mineral reserves. The estimate of tonnes and grade are presented here only as documentation of what was historical reported for the property.

SRK is presenting current CIM complaint mineral resources sufficient for NI 43-101 reporting in Section 14 of this report.

6.4 Historic Production

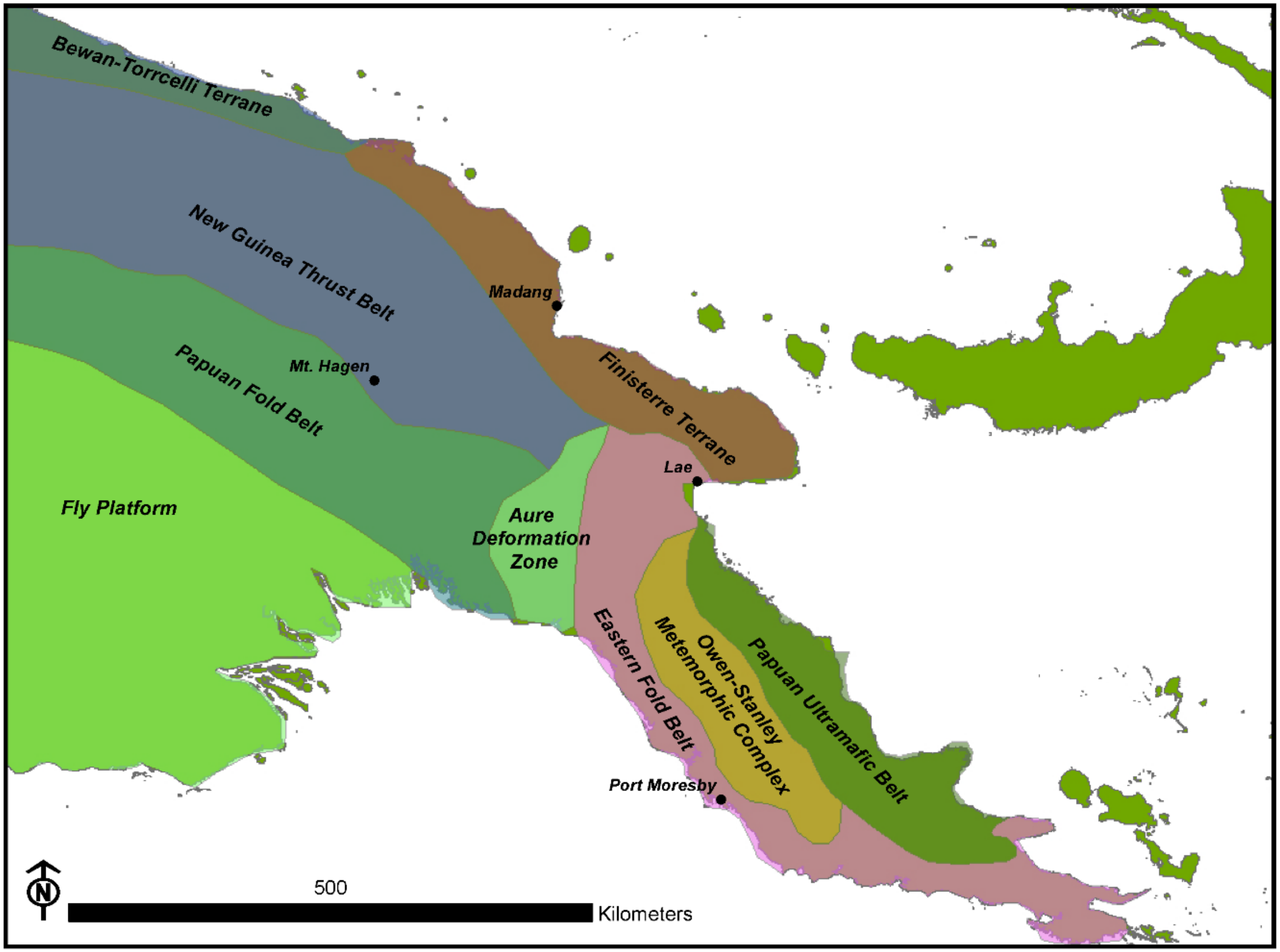
There is no known historic production at the property.

7 Geological Setting and Mineralization

7.1 Regional Geology

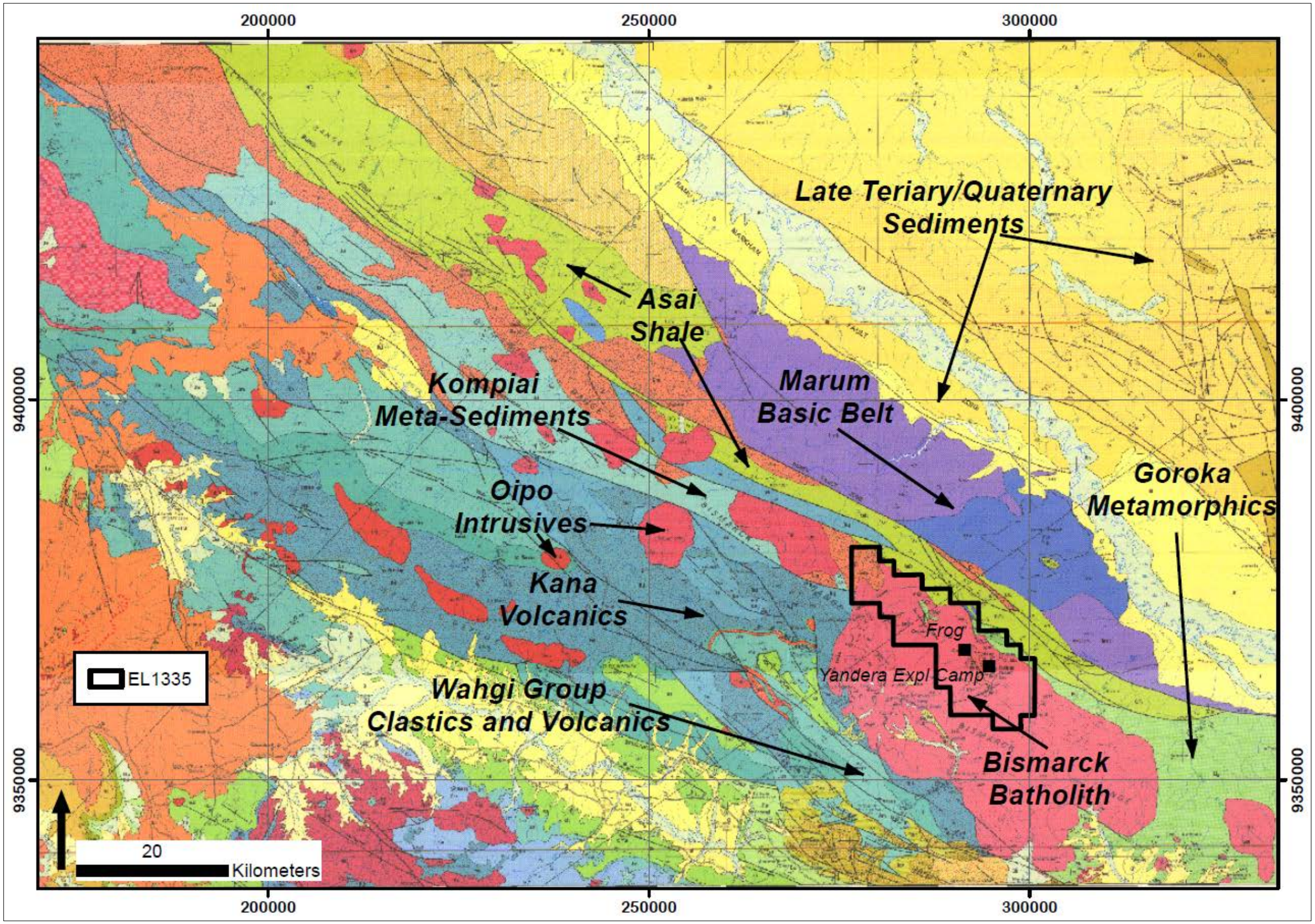
The island of New Guinea is a zone of complex interaction between the Indo-Australian and Pacific plates. The result is a number of microplates accommodating the large-scale compression and transpression by rotation, subduction, dip-slip and strike slip movement, and localized temporal extension. The resultant New Guinea Mobile Belt (regionally divided into packages of fold and thrust belts) encompasses the mountainous region running centrally through the length of the island, and it includes slices of metamorphic basement, ophiolites, and a myriad of intrusive and sedimentary packages. A simplified illustration of the major litho-tectonic terranes of New Guinea is shown in Figure 7.1.1 (after Dow, 1977).

The property lies within the New Guinea Mobile Belt, which stretches from the southeastern portion of the island, through the central mountain ranges, into Indonesia, and to the west of Freeport's Grasberg Cu-Au deposit. On top of metamorphosed late Paleozoic and early Mesozoic schists, marbles, and granodiorite lie successive packages of Triassic to Jurassic volcanic, volcanogenic, and clastic sediments; and Jurassic to Cretaceous clastic, volcanic, and volcanogenic sediments. Early Tertiary (Eocene to Miocene) carbonates and clastic sediments overly the Mesozoic sediments. Middle Tertiary (Miocene) granodiorites and diorites, such as the Bismarck Intrusive Complex, intrude older sedimentary and metamorphic packages along a strong northwest structural fabric (e.g., Ramu fault), which generated low-grade metamorphic conditions in some of the late Mesozoic sediments (e.g., Asai shale) and emplaced the Miocene Marum Basic Belt. Late Tertiary (Pliocene) clastic-dominated sediments rest on some of these hypabyssal units. Pleistocene clastic units with local Quaternary volcanics and localized alluvium cap the stratigraphy. Regional geology is shown in Figure 7.1.2 (after Bain and Mackenzie, 1975).



Source: Marengo, 2015

Figure 7.1.1: Geologic Terranes of New Guinea



Source: SRK, 2015

Figure 7.1.2: Regional Geology Map

7.2 Local Geology

The bulk of the property and the current resource lie within the Bismarck intrusive complex. In this portion of the complex, porphyritic quartz diorite phases (POD on Figure 7.3.1) intrude the 12 to 14 Ma (Grant and Neilson, 1978; and Page, 1976) host granodiorite (HGR), which comprises the bulk of the Bismarck Intrusive Complex. At the northeast boundary of the Bismarck Intrusive Complex is a package of moderately metamorphosed late Paleozoic and early Triassic sediments whose contact with the Bismarck Intrusive Complex strikes northeasterly, parallel to a very strong regional trend, i.e. the Ramu Fault Zone. This northwest trending structural zone juxtaposed the Miocene Ramu Ophiolite Complex (within the Marum Basic Belt), which hosts the Ramu Nickel deposit, against the late Mesozoic sediments that are the northeast boundary of the Bismarck Intrusive Complex. Local geology is shown in Figure 7.2.1 (after Timm, 2012).

The geometry of the Bismarck intrusive complex and fold and thrust belts reflect large-scale orientation of NE-SW directed subduction. Changes in the regional stress resulted in a shift to dominantly strike-slip movement along features like the Ramu Fault Zone. Younger intrusive bodies, faults, and mineralized veins observed at Yandera suggest locally there was a period of N-S directed compression followed by a period of NE-SW directed compression (or NW-SE extension), before the onset of some of broader regional tectonic relaxation.

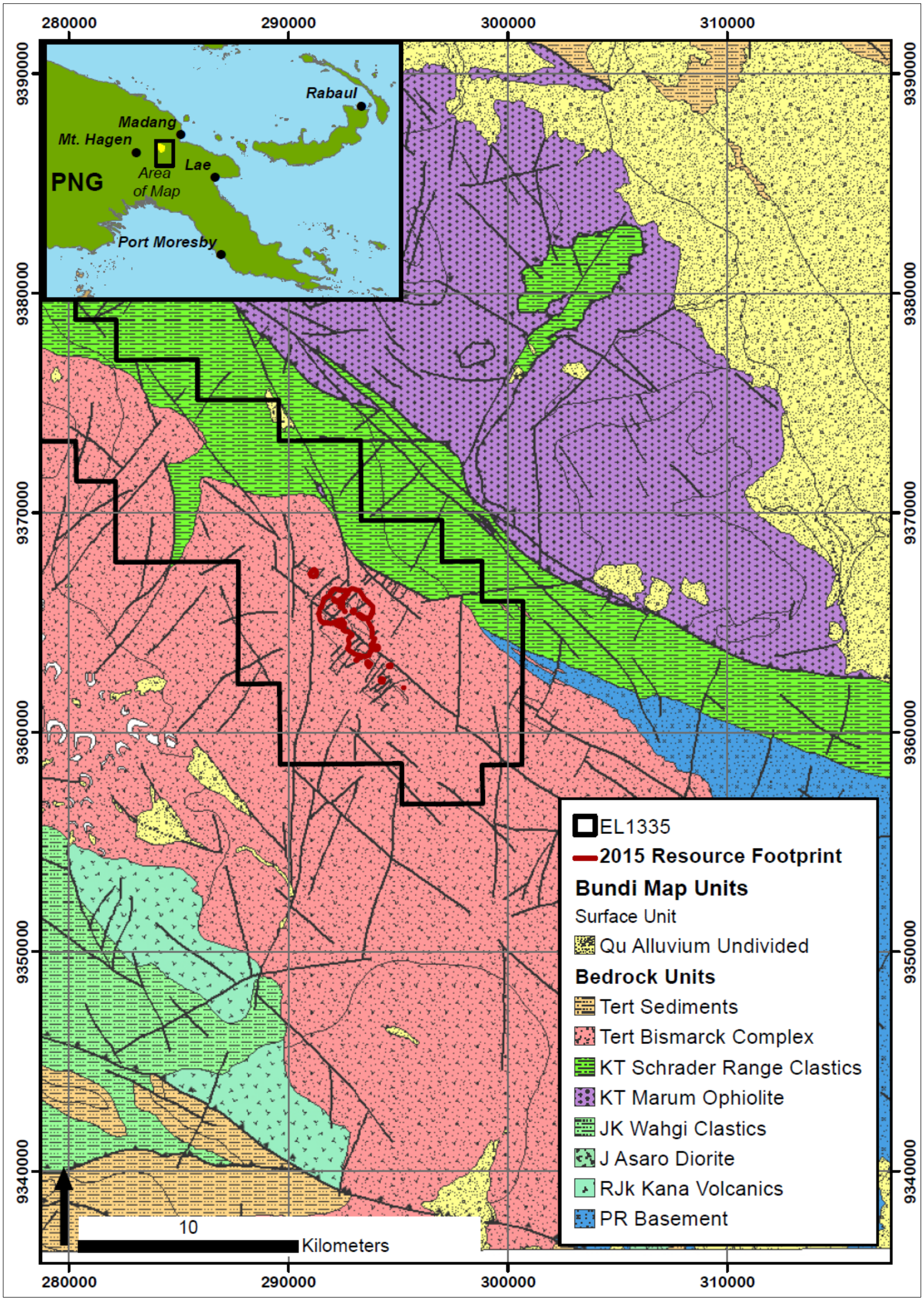
7.3 Property Geology

A number of younger igneous units, including a later porphyritic quartz diorite (POK), porphyritic dacite (PDA), andesite (PAN), microdiorite (POM), and some leucocratic quartz diorite (PLQ), intrude the volumetrically larger quartz diorite porphyry (POD) phases at the property. The younger igneous phases are generally tabular in geometry, sub-vertical, and likely reflect structural zones that were important at the time of emplacement of each. A map of the property geology is provided in Figure 7.3.1.

Within and around the large bodies of POD there are domains of porphyry-style alteration. Within a broad envelope of propylitic alteration, there are more limited domains of potassic alteration and phyllic alteration. Domains of phyllic alteration commonly envelope structures as well as some of the younger intrusive units within domains of potassic and even propylitic alteration. A map of the property alteration is provided in Figure 7.3.2.

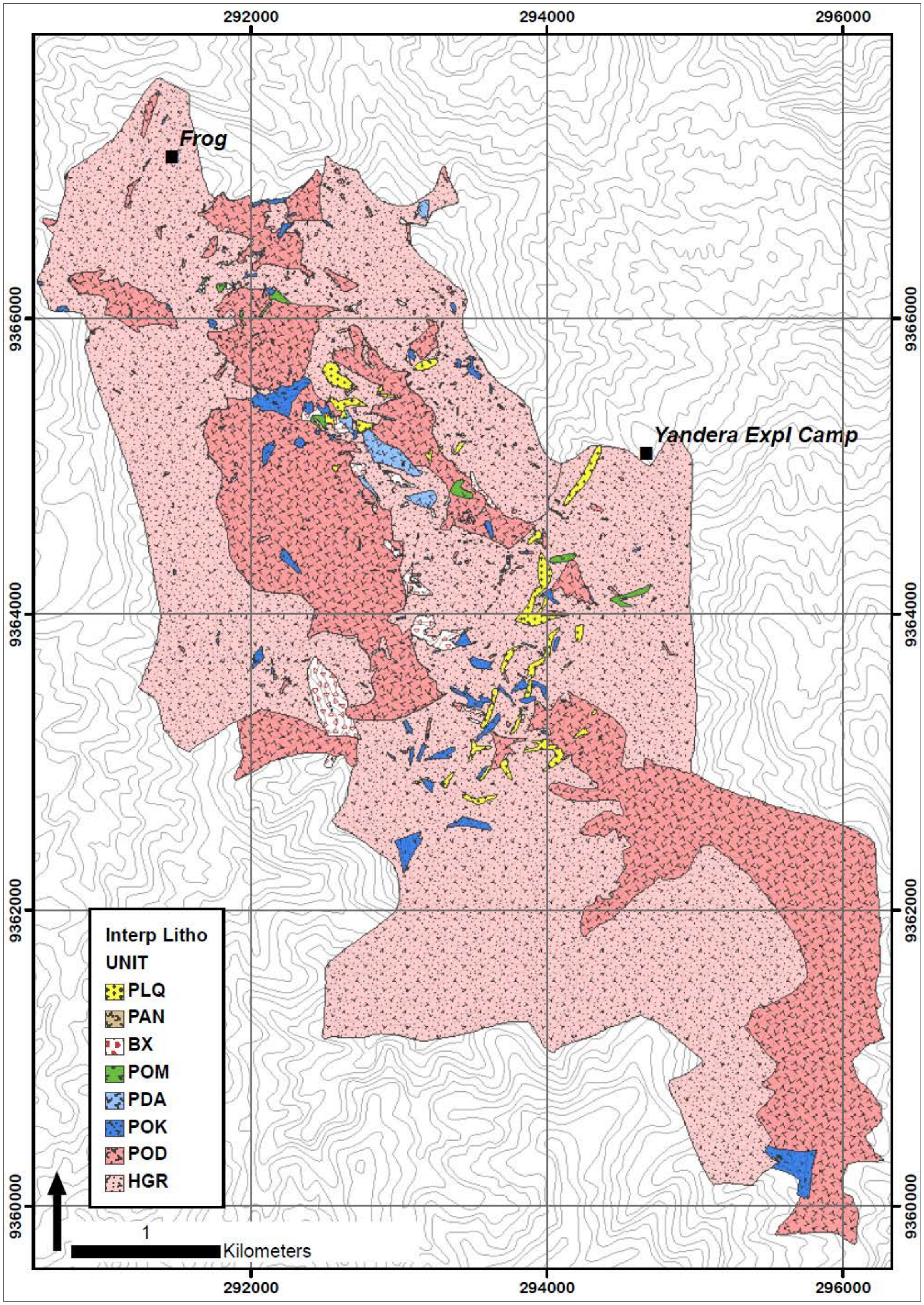
In association with some of these intrusive units, particularly the porphyritic dacite, there are localized hydrothermal or intrusive breccias. These breccias are commonly closely associated with zones of phyllic alteration. Tectonic breccias observed at the property commonly appear very planar, and sometimes have envelopes of phyllic alteration.

While there is a prominent northwest striking structural trend (300°), there are several other important structural trends including a prominent north-northwesterly trend (330° to 360°) and a northeasterly trend (030°). The northwest trend appears to be the oldest of the three, and reflects the regional-scale structural grain. The north-northwesterly trend cuts the northwesterly trend in a number of locations, but there are some instances when the northwest trend offsets the north-northwesterly trend. The northeast appears to be one of the youngest trends, and it is reflected by a number of veins and fractures throughout the property, as well as some prominent sub-vertical dikes of PLQ.



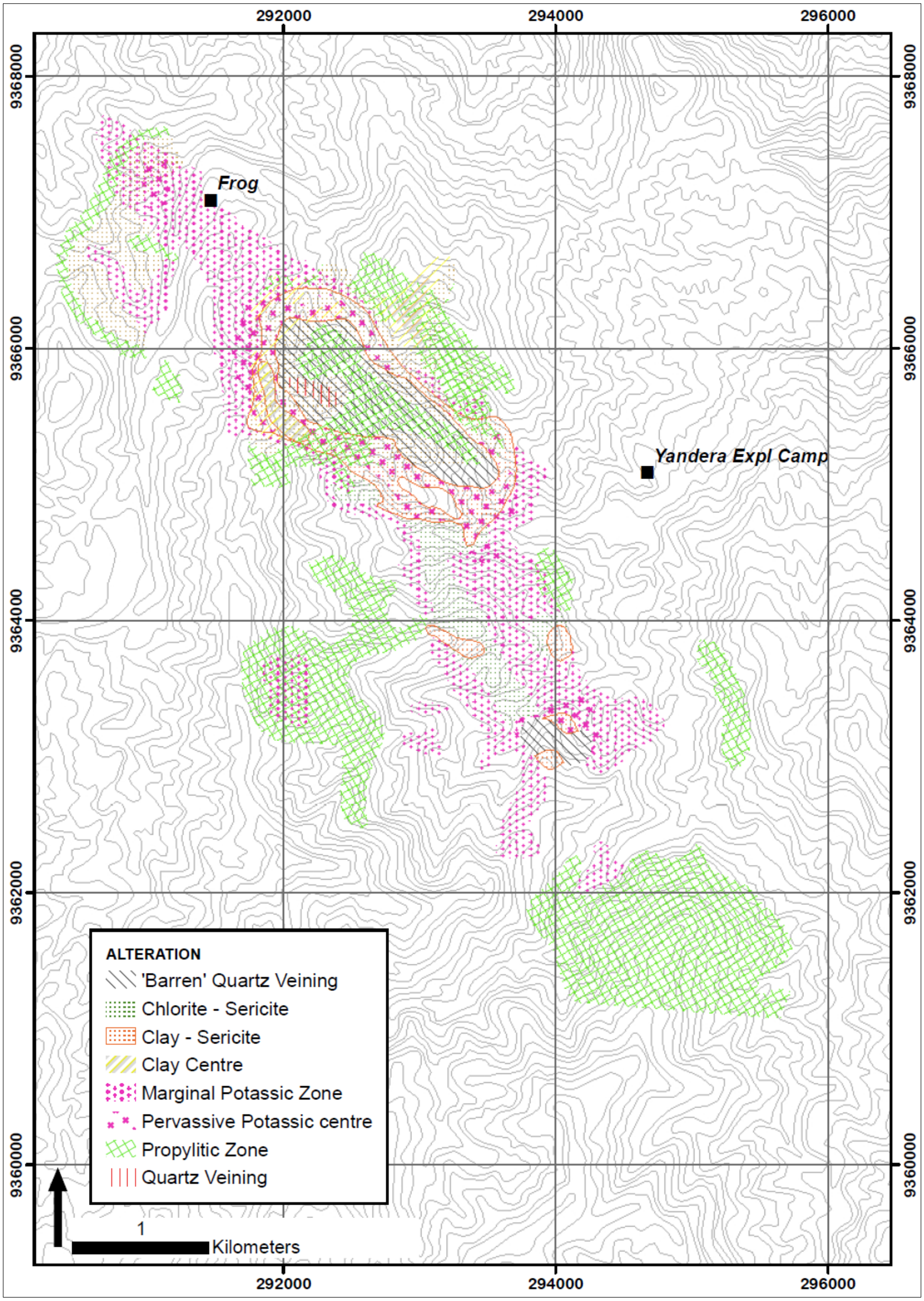
Source: SRK, 2015

Figure 7.2.1: Local Geology Map



Source: SRK, 2015

Figure 7.3.1: Property Geology Map



Source: SRK, 2015

Figure 7.3.2: Property Alteration Map

Work on some of the smaller intrusive bodies indicates that they may be as young as 7.1 to 6.3 Ma (Roberts, 2012), which suggests that mineralization may be younger than previous workers appreciated (Titley et al. 1978; and Watmuff, 1978).

7.4 Significant Mineralized Zones

As noted above, this property displays alteration styles in hypabyssal and porphyritic rocks typically observed in porphyry copper systems. Previous work has identified a number of prospects within and around these altered domains, including mineralized zones at Gremi, Omora, Imbruminda, Dimbi, Frog, and Rima. A number of these areas have distinct styles of copper mineralization but do not appear to fit into the classic porphyry model. These main mineralized zones, overlain on property geology, are shown in Figure 7.4.1.

Early in the copper mineralization history there likely were some more typical porphyry-style mineralization events, with better mineralization associated with potassically altered cores. However, younger structurally controlled mineralizing events cut these older systems with phyllic alteration that locally enhanced zones of copper mineralization.

Previous work has been guided with a typical porphyry copper model, including the presence of an interpreted northwesterly elongated ‘barren quartz core’ located between Imbruminda/Gremi and Dimbi. Recent work has led geologists to re-interpret this zone as a structurally bounded block with elevated density of quartz veining with some silicification and evidence of weak to moderate copper mineralization. Work to date on this block is very sparse, and additional work in this zone may show that the bounding structures brought in excess silica remobilized copper mineralization proximal to these structures.

Mineralization is most commonly hosted in breccias, porphyritic dacite, porphyritic microdiorite, quartz diorite porphyry, and less commonly the granodiorite host. Recent interpretive geologic work suggests that higher grade copper mineralization is commonly associated with phyllic alteration in association with breccias likely related to emplacement of porphyritic dacite.

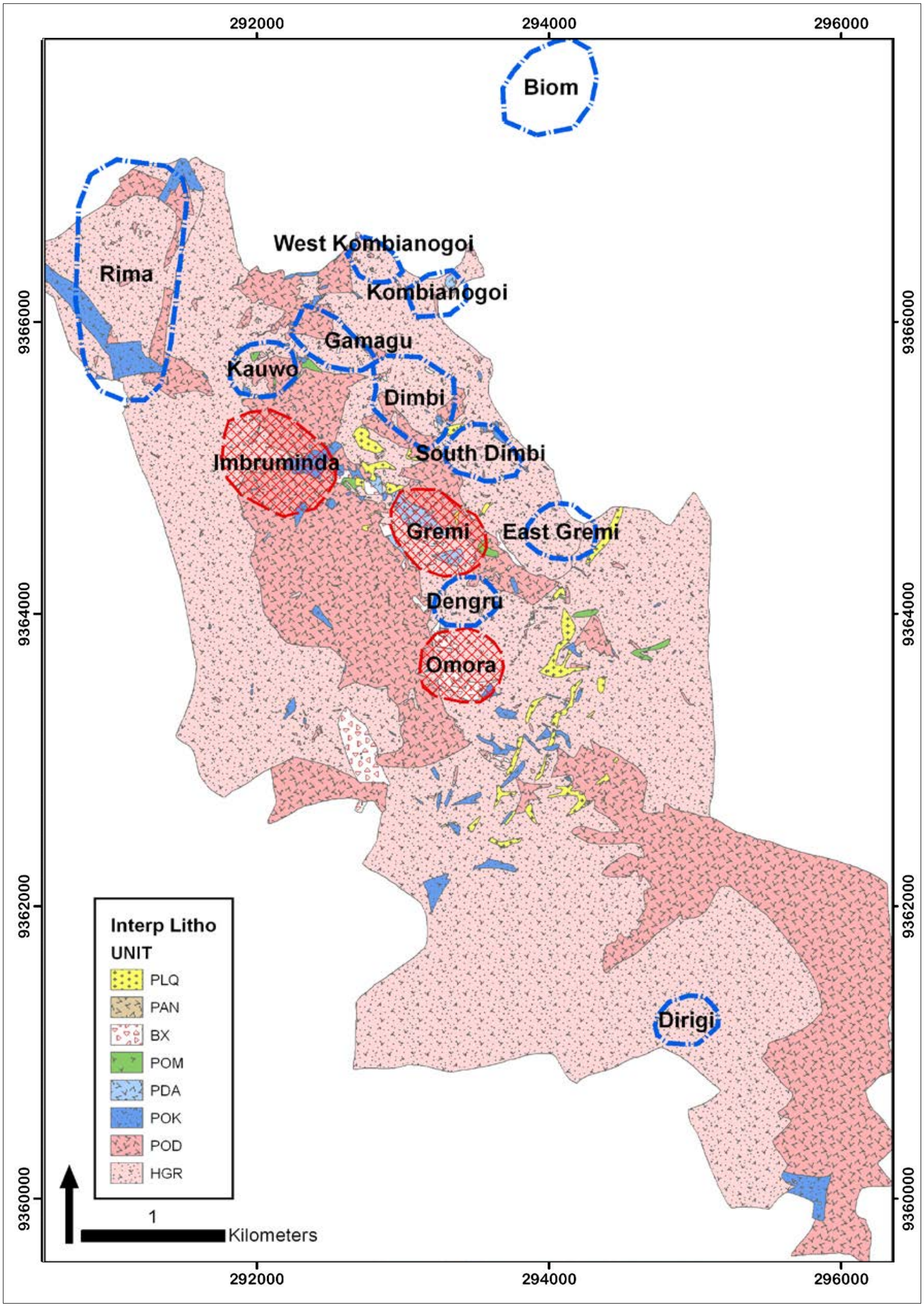
The most common sulfide minerals in mineralized domains are pyrite, chalcopyrite, bornite, and molybdenite, with varying abundances between prospect areas. For example, bornite is more prominent in the Imbruminda area, while chalcopyrite is by far the dominant copper mineral at Dimbi and Omora. Previous workers have interpreted these changes as evidence of typical zonation in a porphyry system; however some of these differences may alternatively be explained as structural blocks that have been up-thrown or down-thrown to expose different portions of the mineralized system.

Recent work suggests that large-scale structure is very important to controls for mineralization. Mineralization at Gremi and Dimbi roughly follow a northwest trend; however, higher grade copper mineralization at Imbruminda is coincident with the intersection of a mineralized north-northwesterly trend and a mineralized northwesterly trend.

Analysis of structural data from oriented core indicate that the largest population of veins, dominantly mineralized, in the resource area strike northeasterly, and dip steeply (~70°+) to the SE or NW. The orientation of these veins is sub-parallel to the most populous drill azimuth in the Property. Locally, such as at Rima, mineralized veins and veinlets strike nearly north-northwesterly and dip steeply (77°+) to the west.

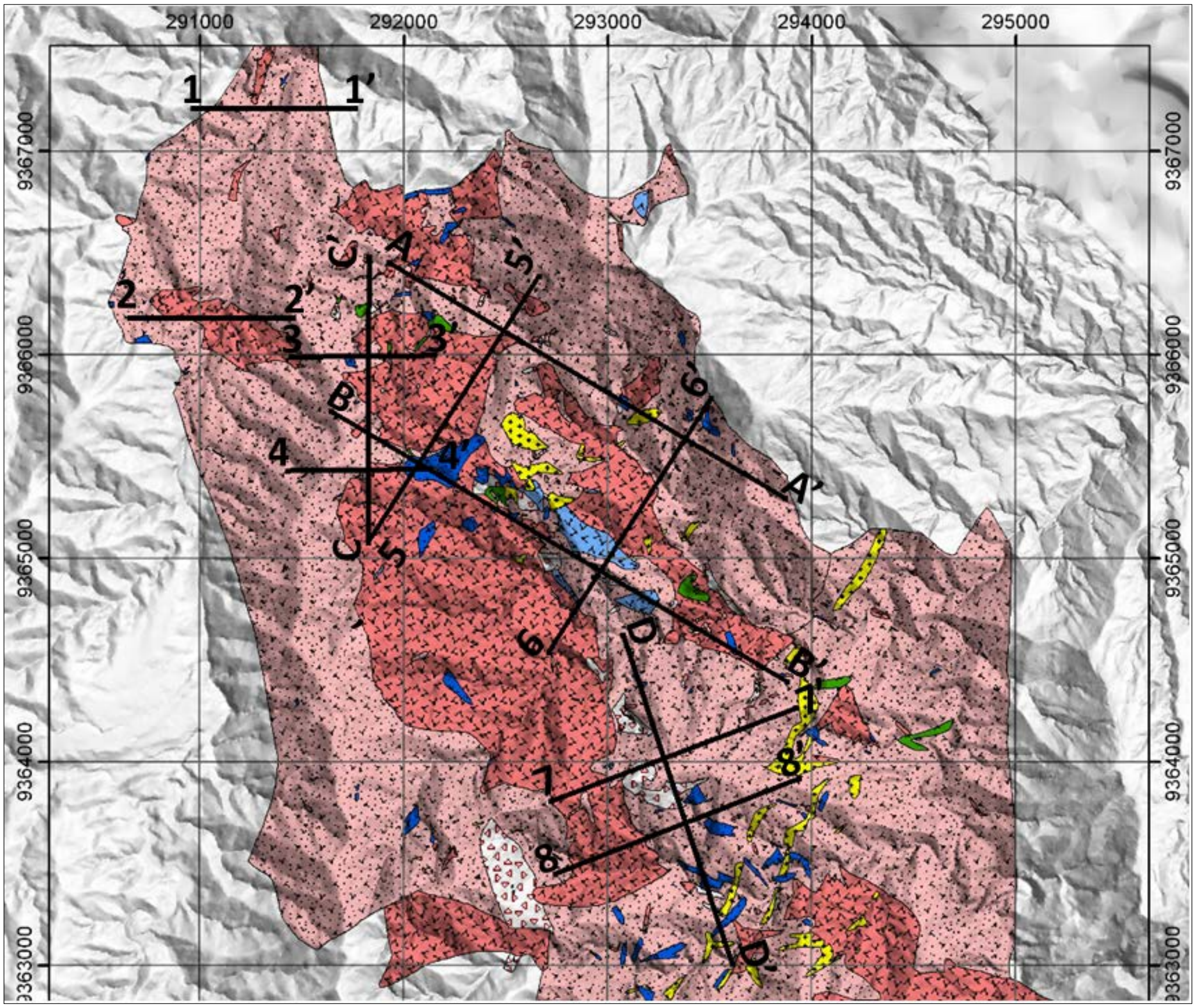
Most of the known copper mineralization is hypogene, and near-surface sulfides have been oxidized to varying depths and degrees. For example, oxide mineralization at Gremi reaches depths of up to 50 m, while oxide mineralization at Dimbi is significantly shallower. To date, no supergene enrichment blanket has been identified at the property.

Property geology is depicted in a set of cross sections, preceded by a cross section index shown in Figure 7.4.2. The geologic cross sections are presented in Figures 7.4.3 through 7.4.11.



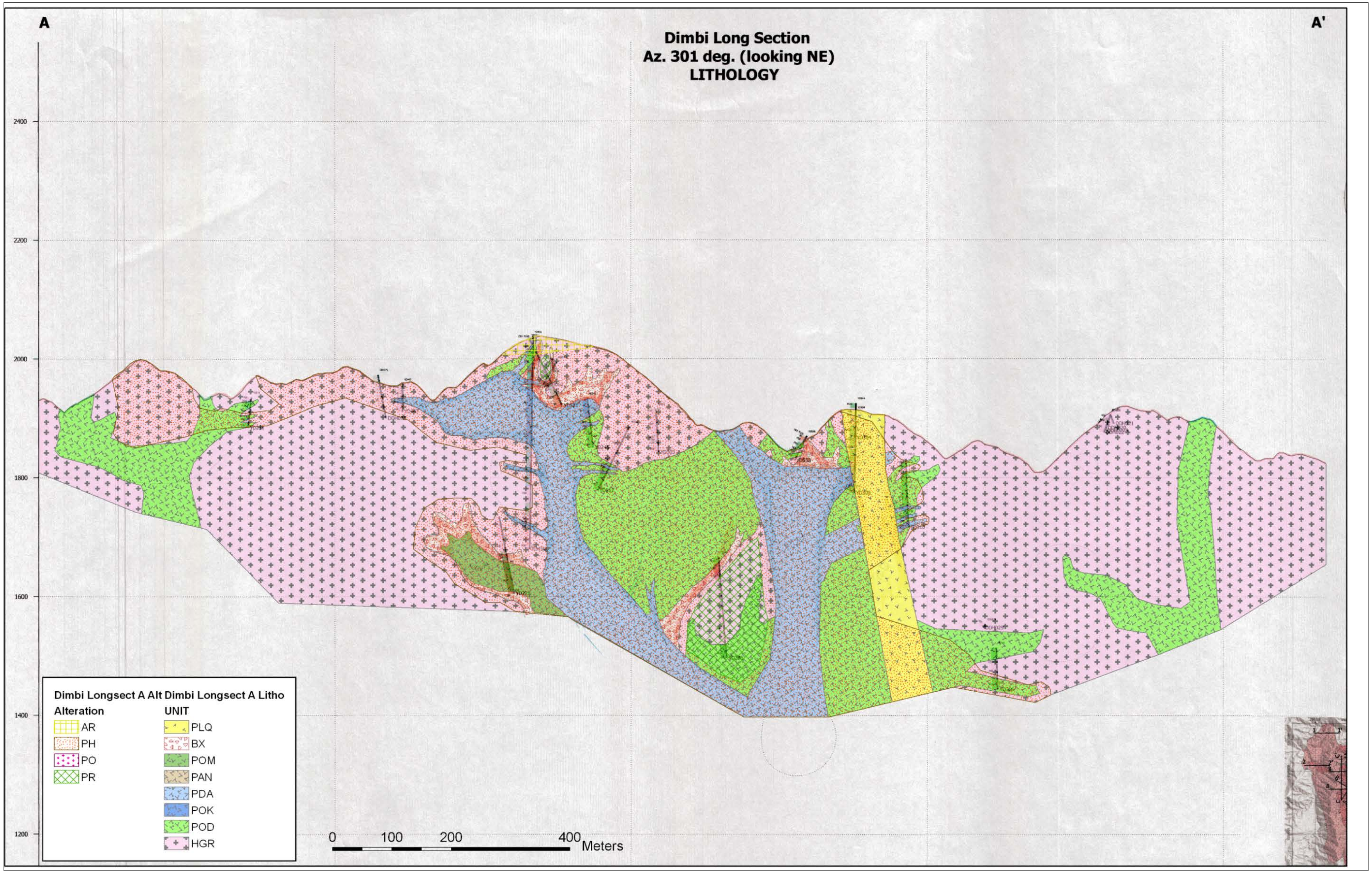
Source: SRK, 2015

Figure 7.4.1: Main Mineralized Zones



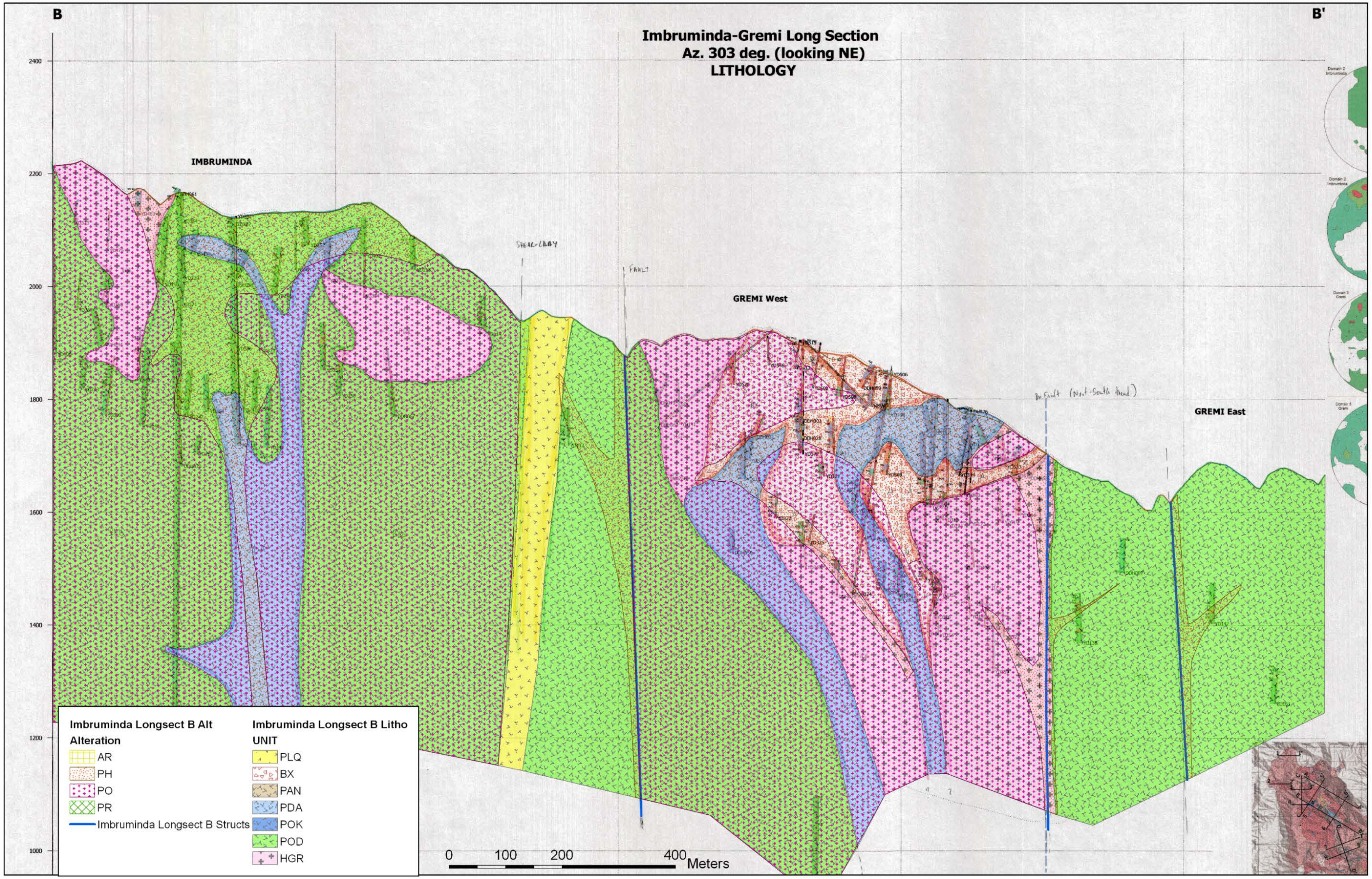
Source: SRK, 2015

Figure 7.4.2: Property Geology and Cross Section Index Map



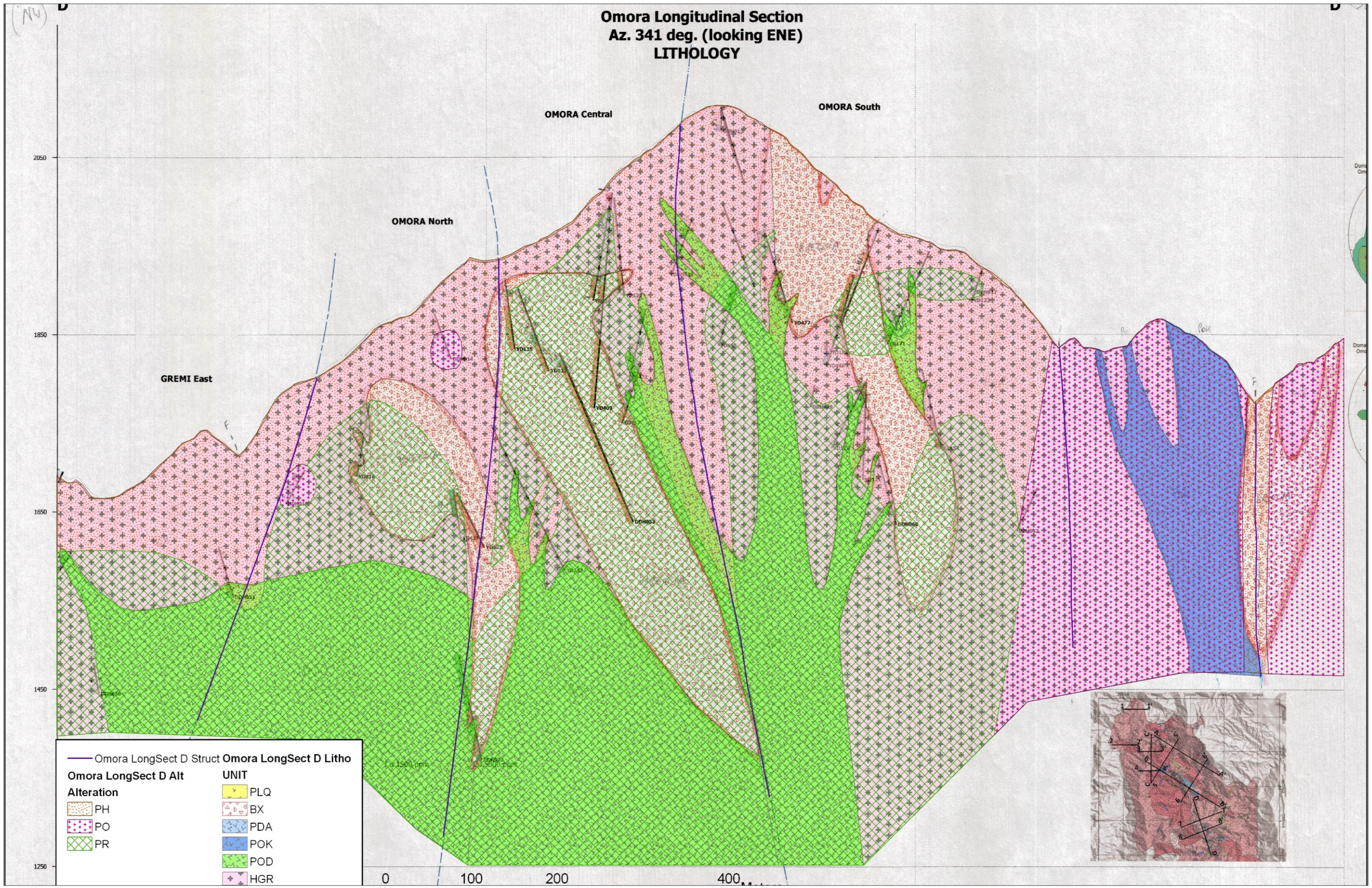
Source: Marengo, 2015

Figure 7.4.3: Geologic Cross Section A-A' – Dimbi Longitudinal Section



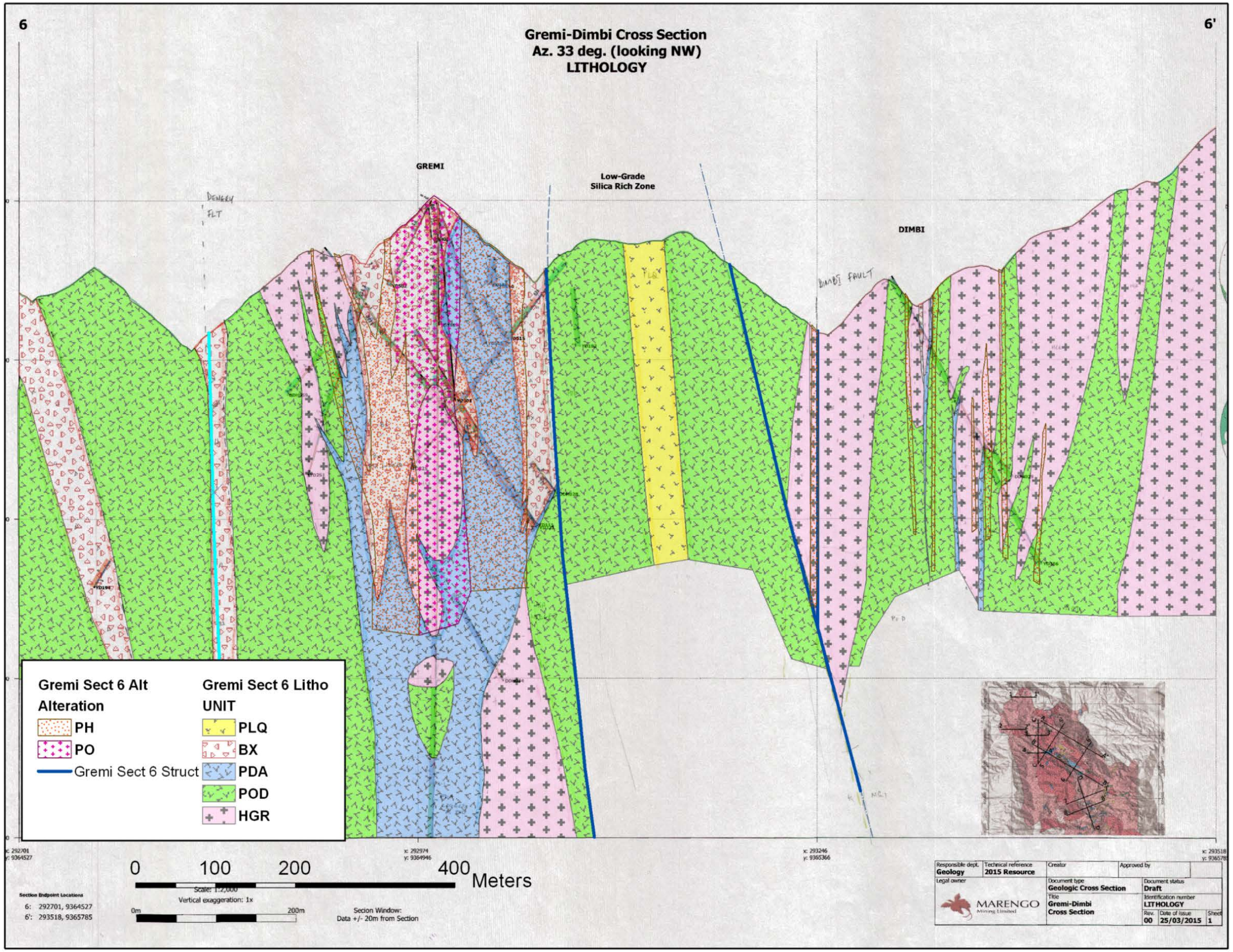
Source: Marengo, 2015

Figure 7.4.4: Geologic Cross Section B-B' – Gremi Longitudinal Section



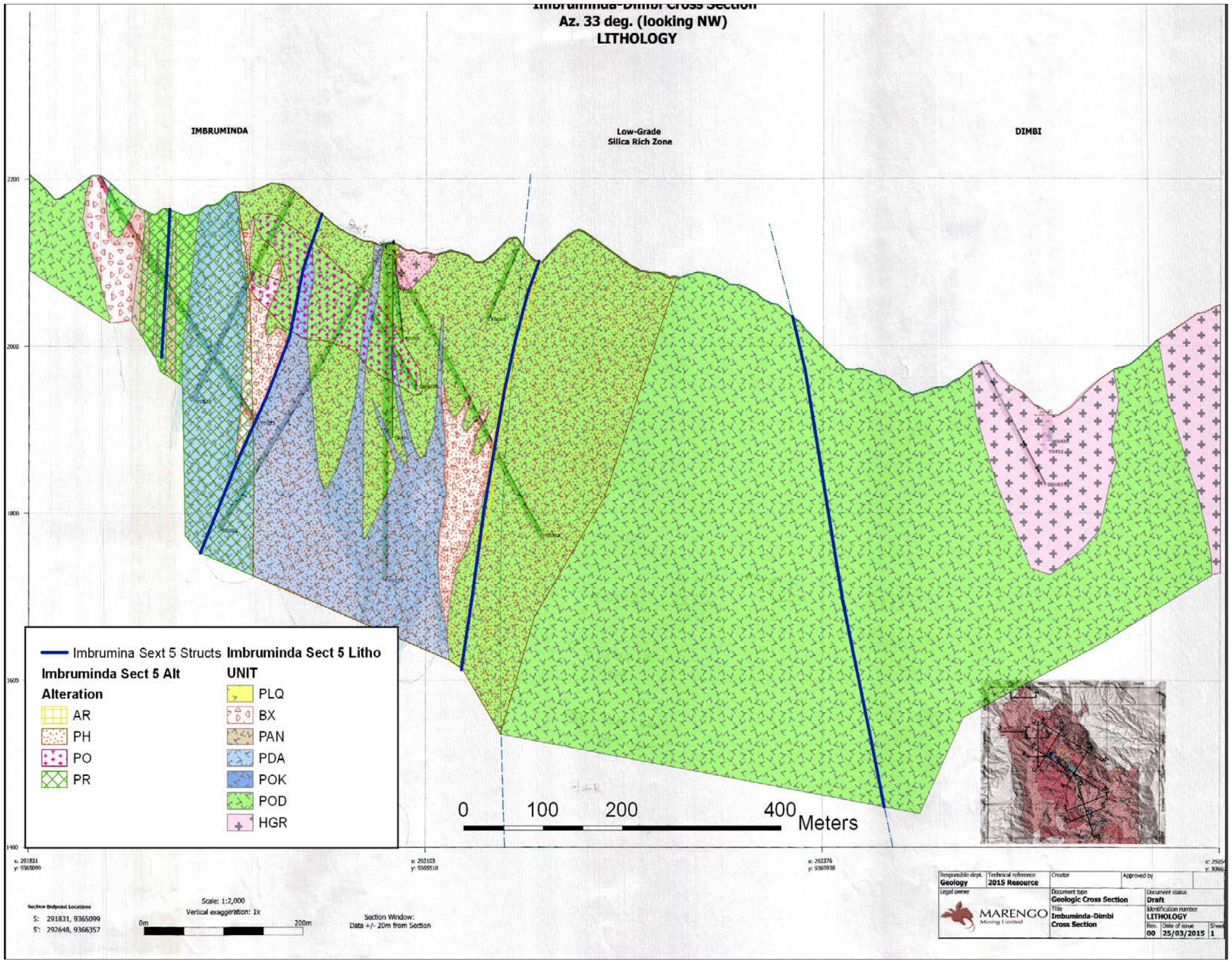
Source: Marengo, 2015

Figure 7.4.5: Geologic Cross Section D-D' – Omora Longitudinal Section



Source: Marengo, 2015

Figure 7.4.6: Geologic Cross Section 6-6'' – Gremi-Dimbi Cross Section



Source: Marengo, 2015

Figure 7.4.7: Geologic Cross Section 5-5'' – Imbruminda-Dimbi Cross Section

8 Deposit Type

8.1 Mineral Deposit

In general terms, the mineral system could be classified as a porphyry copper deposit. The system has many of the characteristics of a typical porphyry system, including an association with porphyritic phases of dioritic to granodioritic intrusive phases, and typical alteration assemblages associated with potassic, phyllic, and propylitc altered rocks. However, there are some key differences between Yandera and typical zoned porphyry systems, including strong structural controls on mineralization, and an association between phyllic alteration and elevated copper grades.

8.2 Geological Model

The porphyry system at Yandera is hosted in late intrusive phases and structures that disrupt the Bismarck granodiorite. Mineralization appears locally controlled by porphyritic dacite and associated intrusive breccia bodies. The occurrence of these intrusive bodies and later alteration appears to be controlled by a strong northwest trend that intersects and/or is intersected by north and north-easterly trends. Higher grade copper mineralization appears to be concentrated near the intersection of these trends, such as at Imbruminda, within broader zones of potassic and phyllic alteration.

9 Exploration

9.1 Relevant Exploration Work

Typical exploration work at Yandera consists of surface mapping and sampling, with the results being used to generate drill targets. Previous campaigns have collected geophysical data, mostly airborne, although there was an IP survey in 2009. Some of the previous explorers, such as Kennecott, BHP, and Amex, excavated ‘contour’ trails across selected ridges to expose weathered bedrock, which they subsequently mapped and sampled. Regional exploration activities by various predecessors is presented in Figure 9.1.1.

Exploration activities by Marengo between 2012 and the date of this report include surface mapping and sampling campaigns (Figure 9.1.2) with a focus on exposures in the bottoms of drainages. In addition to the field work, Marengo embarked on a process of re-interpreting existing surface data and geophysical data.

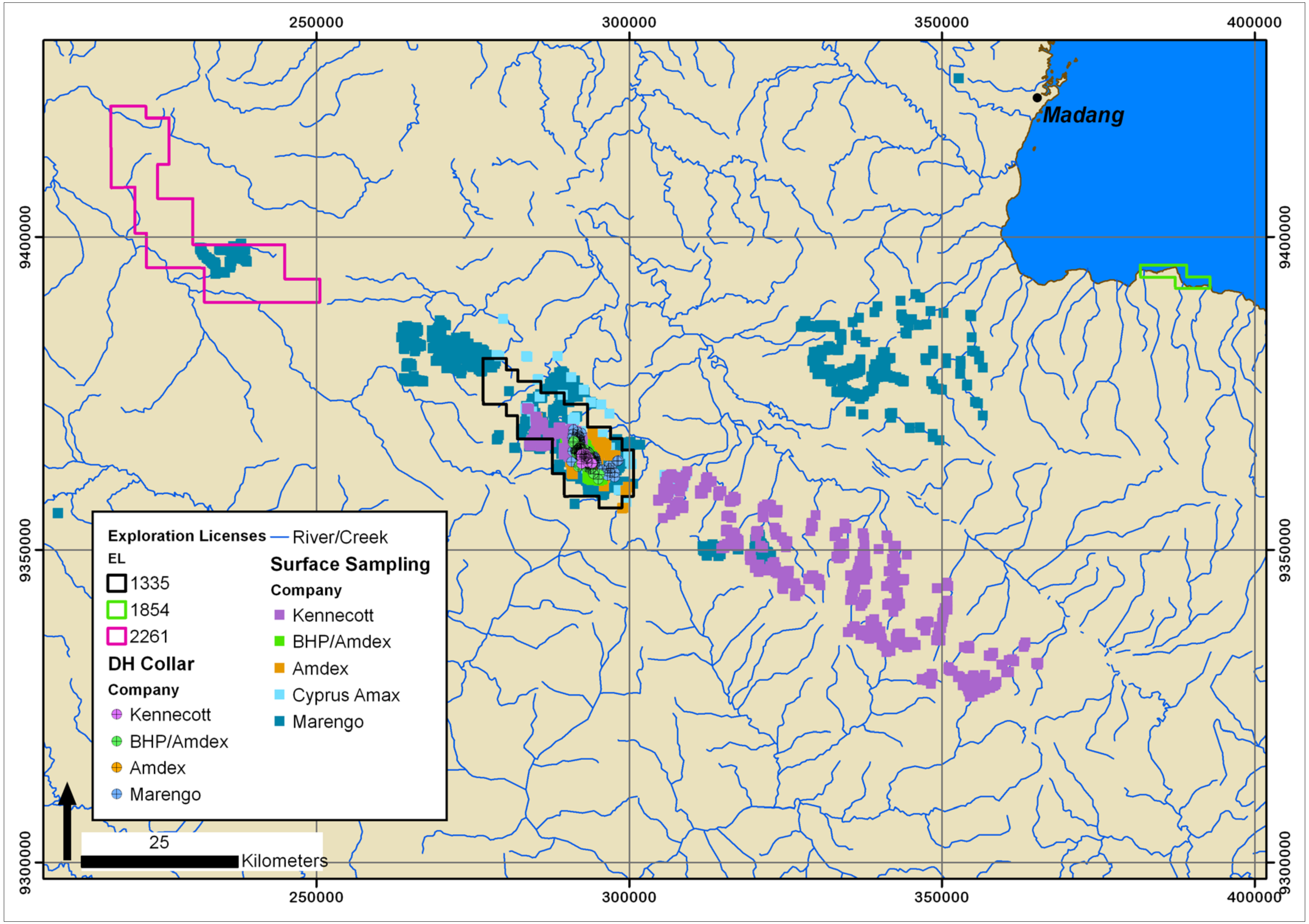
Exploration at Yandera by Marengo since the 2012 Ravensgate report has been within EL 1335, and focused almost exclusively on the areas within or at the periphery of the existing resource. Recent mapping and sampling campaigns have focused on fresh rock outcrops exposed in the drainages in these areas to collect the highest quality surface data available.

9.2 Sampling Methods and Sample Quality

Most of the surface samples in the recent campaigns have been collected as ‘grab’ or ‘chip’ samples and/or ‘channel’ samples. In the case of a grab or chip sample, a geologist would collect enough exposed rock to obtain about a kilogram of material with a hammer and chisel from the outcrop. In the case of channel samples, geologists would collect chips of material across specified horizontal length (commonly between 1.5 and 10 m) of an exposure at chest to waist height so that there was at least a kilogram of material. As such, analytical results from rocks should be representative of a localized average.

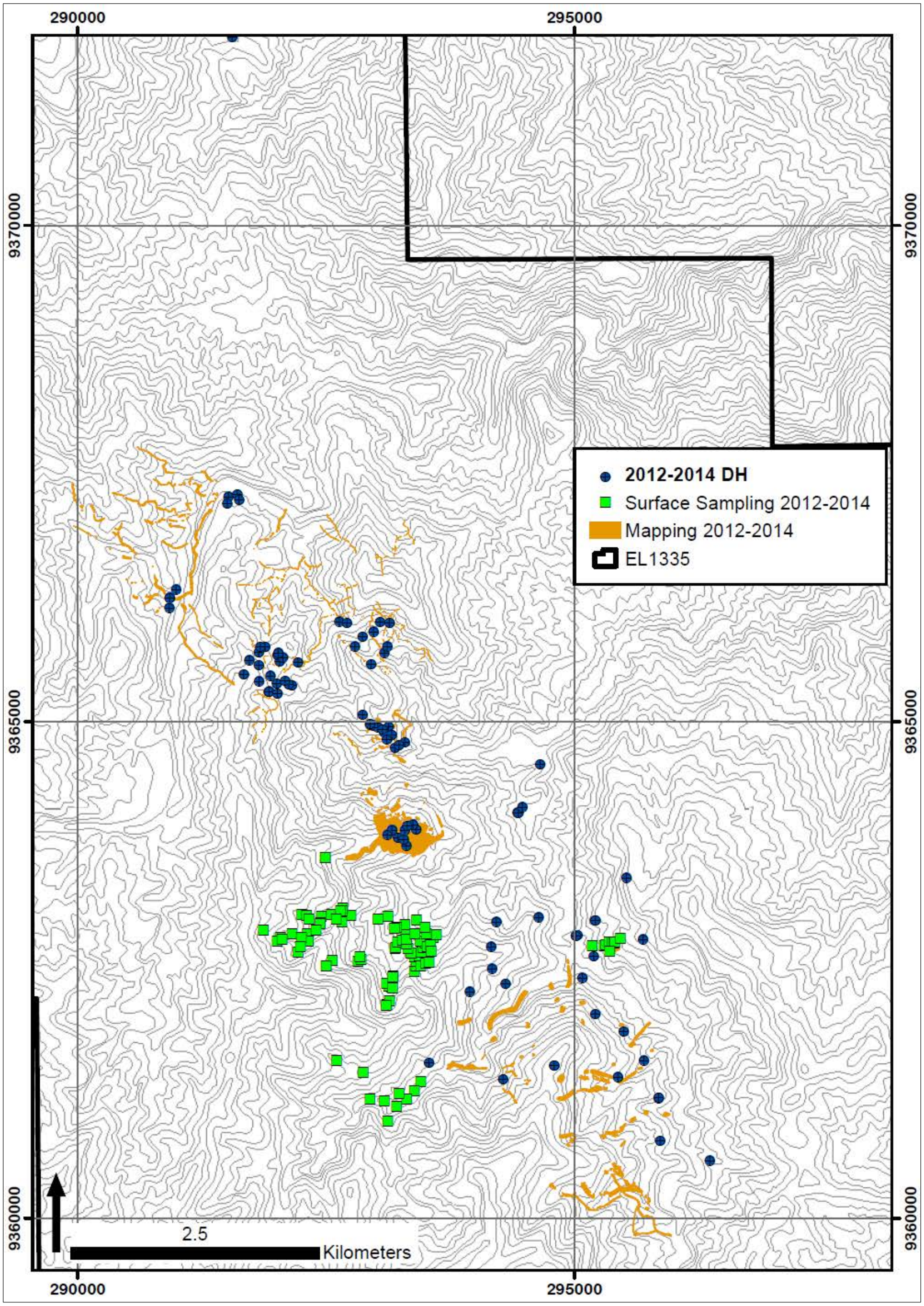
One of the biases of focusing mapping and sampling efforts in the drainages is that in some instances the better mineralized material may be eroded at a higher rate than unmineralized material. Thus, the Inferred amount of mineralization is some locations might not be representative.

In general, sampling over the known resource area has been fairly thorough, although there are some 300 m or greater sampling gaps in the Dimbi Frog, Rima, and Imbruminda areas. Soils samples collected by BHP and Amdex over the Gremi area were collected with relatively dense sample spacing along contours lines (~7 m) that were on the order of 100 m apart. Sampling along contours across other portions is less dense with samples along contours on the order of 50 to 60 m apart with sampling lines over 200 m apart in some areas. Outside of the resource area, sample density drops off dramatically.



Source: Marengo, 2015

Figure 9.1.1: Regional Exploration Work By Company



Source: Marengo, 2015

Figure 9.1.2: Marengo 2012-2014 Surface Exploration

9.3 Significant Results and Interpretation

Mapping and sampling in the vicinity of Dimbi during 2012 and 2013 resulted in targets that produced drilled intersections of copper mineralization expanding the new 2015 resource in the Dimbi area.

Mapping and sampling in the Omora area during 2012 and 2013 resulted in targets that produced drilled intersections of copper mineralization that enhanced the new 2015 resource in the Omora area. Additionally, surface work in the Omora area improved the understanding of the relevance of breccia-hosted mineralization.

Surface work in the Rima and Frog area resulted in a number of samples with anomalous copper. Follow-up mapping and sampling in 2014 resulted in drilled intersections of copper mineralization near Rima Creek, as well as a better understanding of the structural controls for copper mineralization. Additional mapping in the Rima and Frog area also demonstrated that potassic alteration is more widespread in this area than previously recognized.

Re-examination of geophysical data in 2014 and 2015 resulted in the generation of a number of regional targets at intersections of linear features observed in magnetics, radiometrics, topography, and geology. Using an exploration model emphasizing the importance of structural trends in this mineral system, these intersections may be more prospective than previously understood.

SRK considers the surface exploration and sampling as adequate to define geological and mineralogical information to assist in drilling target definition; and they are appropriate exploration techniques for the geology and the terrain.

10 Drilling

10.1 Type and Extent

All drillholes at the Project and therefore all of the drill holes used in the resource estimate were drilled with a diamond core rig. The majority of the drilled length was completed with triple-tube HQ tooling, with a nominal 6.1 cm core diameter. The drillers reduced to triple-tube NQ tooling (4.5 cm diameter) if dictated by ground conditions. Typically, the planned total depths of the drillholes did not exceed the pullback capability of the rigs advancing HQ tooling, and therefore, the ground conditions were the only factor that would require NQ coring.

The drilling contractor for the 2012-2014 programs was Quest Exploration Drilling (QED), based in Lae, PNG. Table 10.1.1 is a summary of all Project area drilling, with the main resource areas highlighted. Marengo has completed 471 drillholes that total 138,428 m of drilled length. Since the previous MRE, Marengo completed drilling programs in 2012, 2013, and 2014 that added 97 drillholes and 24,652 m of drilled length to the Project database. The Project drillhole collar locations are shown in Figure 10.1.1, which highlights the recent drilling programs. Table 10.1.2 presents Marengo's 2012-2014 drillholes by purpose and deposit area. The majority of these drillholes were completed in 2012, and many of them were for geotechnical engineering purposes, and not directly applicable to the MRE. The recent Marengo drilling is shown in Figure 10.1.2.

Table10.1.1: Summary of Yandera Drilling by Deposit Area and Property Owner

Area	Owner	Drillholes	Total Length (m)
Dimbi	BHP/ Amdex JV	7	2,187
Dimbi	Marengo	31	10,238
Dirigi	BHP/ Amdex JV	4	1,667
Dirigi	Marengo	19	6,663
Frog	BHP/ Amdex JV	2	406
Frog	Marengo	23	2,891
Gremi	Kennecott	7	1,017
Gremi	BHP/ Amdex JV	26	8,583
Gremi	Marengo	98	32,453
Imbruminda	Kennecott	2	361
Imbruminda	BHP/ Amdex JV	27	8,913
	Marengo	144	52,258
Kombruku	Marengo	12	3,509
Mangiai	Marengo	9	1,158
Mumnogoi	BHP/ Amdex JV	8	2,625
Mumnogoi	Marengo	12	3,581
Omora	Kennecott	2	593
Omora	BHP/ Amdex JV	16	6,160
Omora	Marengo	93	26,370
Ongoma	Marengo	2	77
Queen Bee	Marengo	1	39
Rima	Marengo	4	1,005
TAI-YOR	Marengo	21	4,186
Windi	Marengo	2	300
Yandera	Kennecott	1	305
Yandera	BHP/ Amdex JV	2	402
Database Total:		**575**	**177,946**
Resource Area Total		**453**	**149,133**

Source: SRK, 2015

Table10.1.2: 2012-2014 Marengo Drilling Programs

Year	Purpose	Area	Drillholes	Length (m)
2012	Resource, n = 50	Dirigi	2	429
		Gremi	17	3,788
		Imbruminda	19	5,857
		Omora	11	3,139
		TAI-YOR	1	356
	Geotechnical	Frog, others	13	843
	Exploration	Dirigi, others	20	7,311
2012	**Total**		**83**	**21,722**
2013	Exploration	Dimbi	9	1,833
2014	Exploration	Rima	4	1,005
2012-2014	**Total**		**96**	**24,560**

Source: SRK, 2015

10.2 Procedures

The procedures documented in this section are from an internal document provided by Marengo (2014) and additional information from Project staff and SRK's site visit.

Drillhole collar elevations in a number of instances differ from native topography because extensive cut and fill is required to build drill pads. Collar surveys were completed for most holes by a PNG surveyor using Differential GPS, however holes drilled in 2013 and 2014 were surveyed using a handheld GPS. The 2013 and 2014 drillholes will be surveyed with DGPS that Marengo has acquired and trained personnel to use.

Collar elevations were validated against the high-resolution topographic surface and drillhole locations before resource estimation began.

Drillholes were oriented at surface with a compass. Downhole surveys- were collected with a Reflex multi-shot tool. Deviation in the drillhole was tracked while drilling to monitor for anomalies or suspicious measurements.

Core is typically drilled in 3 m runs, and placed in core boxes after the core is oriented. At the drill site, geotechnical and structural logging is completed and includes a summary of lithology. In case of disturbance during transport to the logging facility, the summary log is used as a guide to restore the core samples to the original configuration. The core box numbering and length intervals are verified at the drill site, and again when the boxes are laid out in sequence at the logging facility. The core is transported by helicopter to the Frog Camp logging facility.

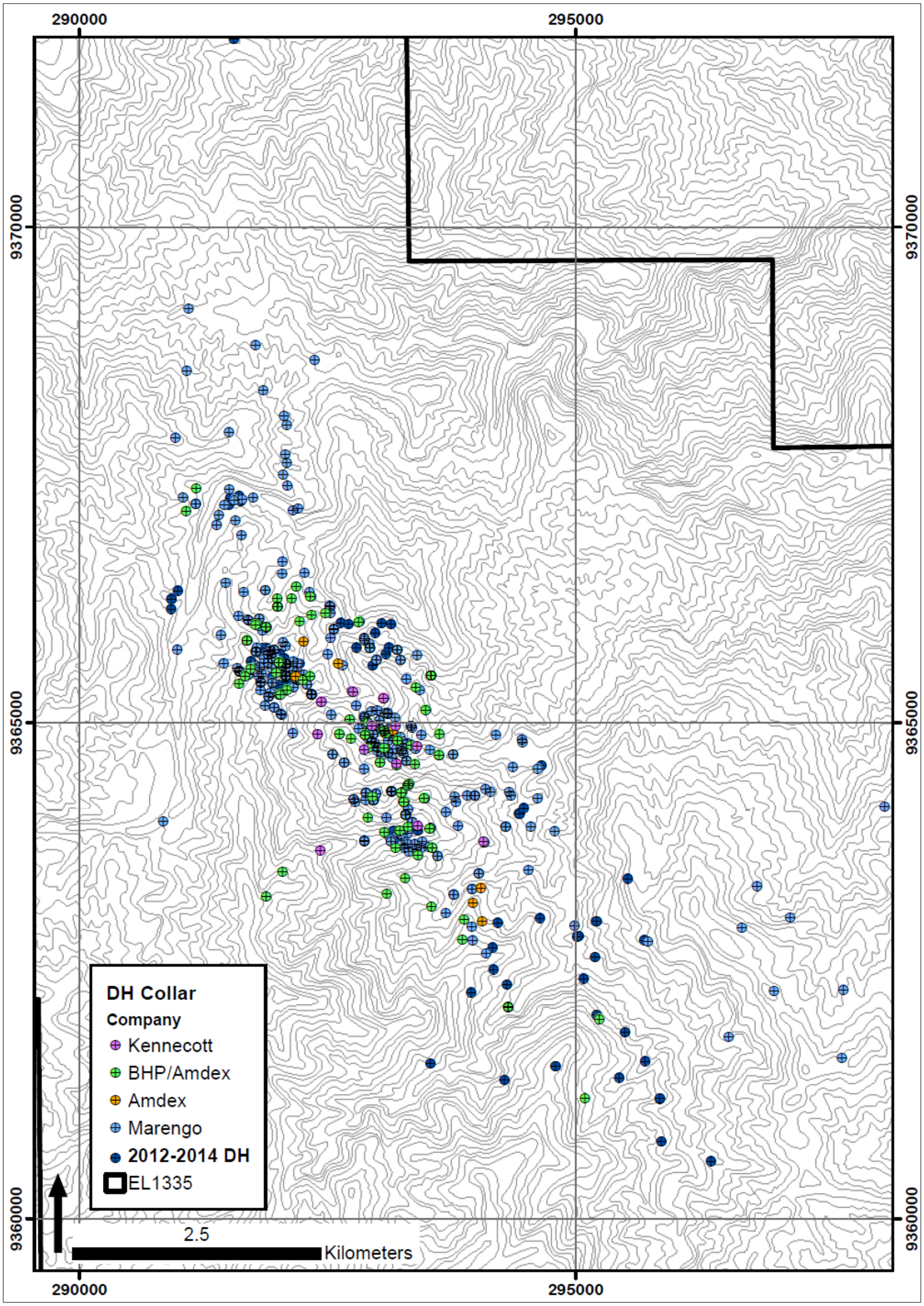
At the Frog Camp logging facility, high resolution photography of the core is completed and verified for quality before logging. Magnetic susceptibility logging is completed by logging technicians, and detailed geological logging is completed by geologists. The logging geologist marks a cut line on the core to ensure unbiased sampling.

Drill sample intervals are determined by the logging geologist, and assigned a sequential sample number with a "MY" prefix. After every 10th or 20th drill core sample, a standard sample is included in the sample sequence. For 2 m sample intervals, the insertion rate is one standard sample per 20 drill core samples, but for previous work, when the typical sample intervals were 3 m, one standard was inserted after every tenth drill core sample. Sample intervals and standard samples are marked with aluminum tags in the core boxes. All core is saw split, and all equipment including core saw is cleaned after each sample interval is cut. After cutting, the left side of core is sampled, and the right side is retained for archival. After the analytical data is received, geologists complete advanced geological logging, and technicians photograph the half core.

All analytical results were sent to Marengo's Perth office, and later distributed to Project staff. Data is imported to Maxwell Geoservices Datashed software, which includes data validation and reporting tools. Geological data is also added to the Datashed database after tabulation from paper drill logs.

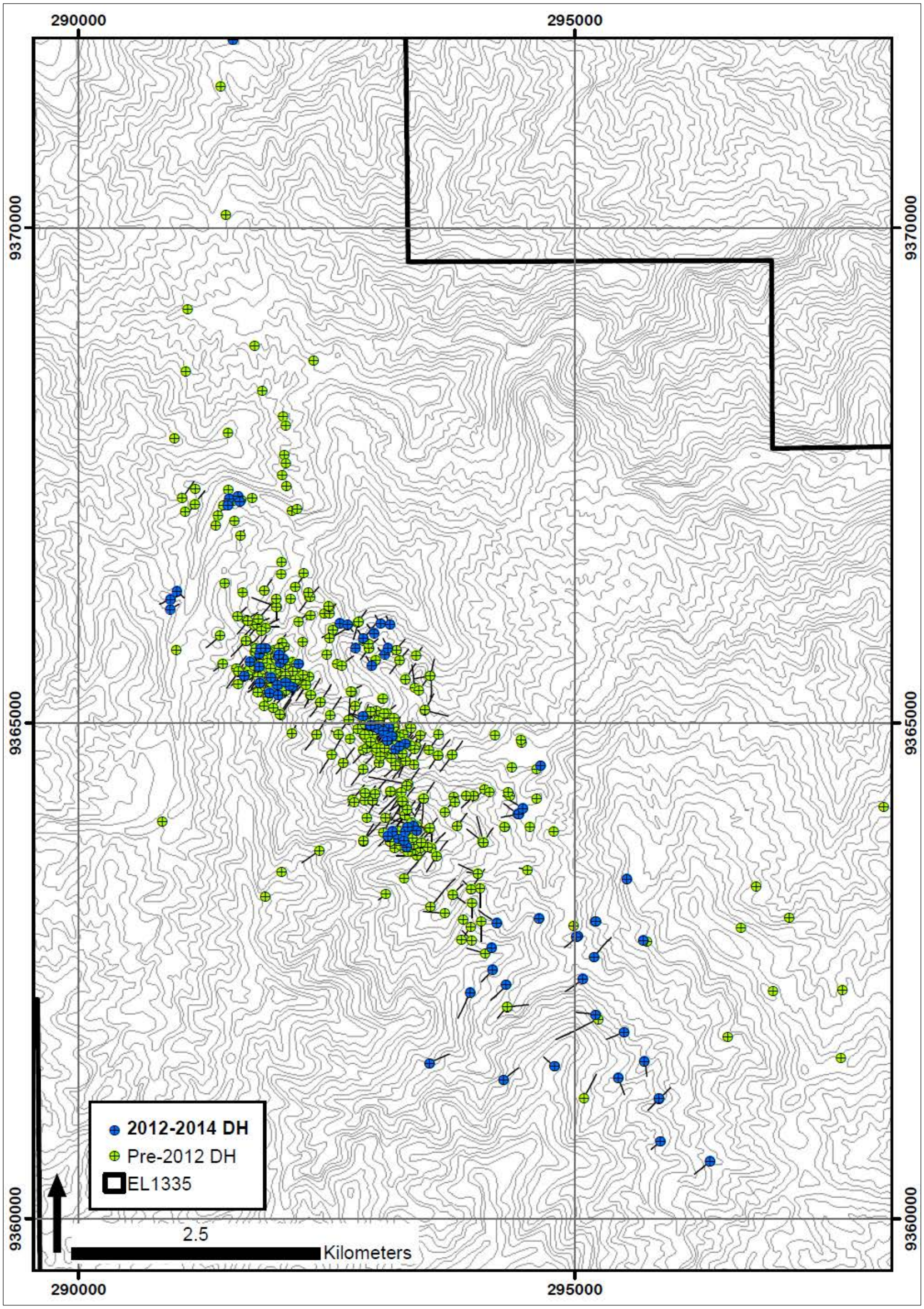
Though there is much agreement in lithology nomenclature through the drilling programs, there are some minor intrusive units that have been identified differently between some of drilling campaigns. Generally, these differences can be rectified with the use of core photography.

Alteration identified in the logging is not as consistent as the lithology. There are several factors that have led to complications, including inconsistent methodology of categorizing alteration for logged intervals and over-interpretation on the drill logs. First, the alteration described in historic logging was generally focused on the strongest style of alteration visible in the core, which did not distinguish early alteration from later alteration. Later drilling campaigns attempted to differentiate the sequential alteration assemblages, although this resulted in an over-estimation of the abundance of interpreted early potassic alteration. In the later drilling campaigns that categorized the age relationships of the alteration, the alteration category that appears to have the least amount of interpretation is the Alteration 2.



Source: Marengo, 2015

Figure 10.1.1: Location of Drill Hole Collars by Company



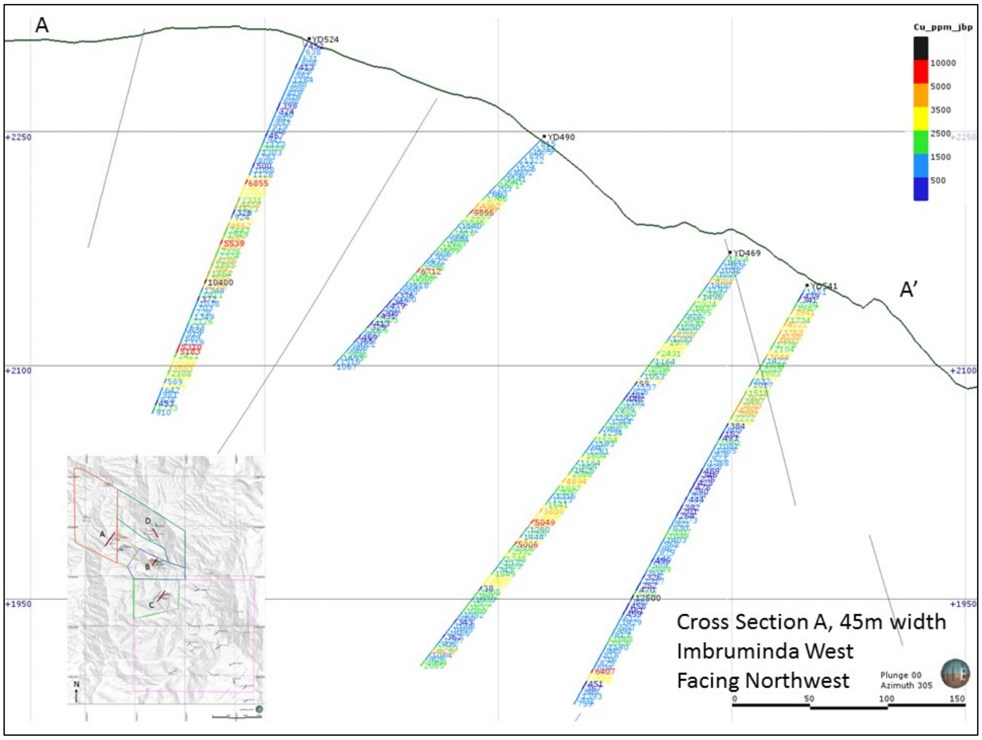
Source: Marengo, 2015

Figure 10.1.2: Recent Marengo Drilling from 2012-2014

10.3 Interpretation and Relevant Results

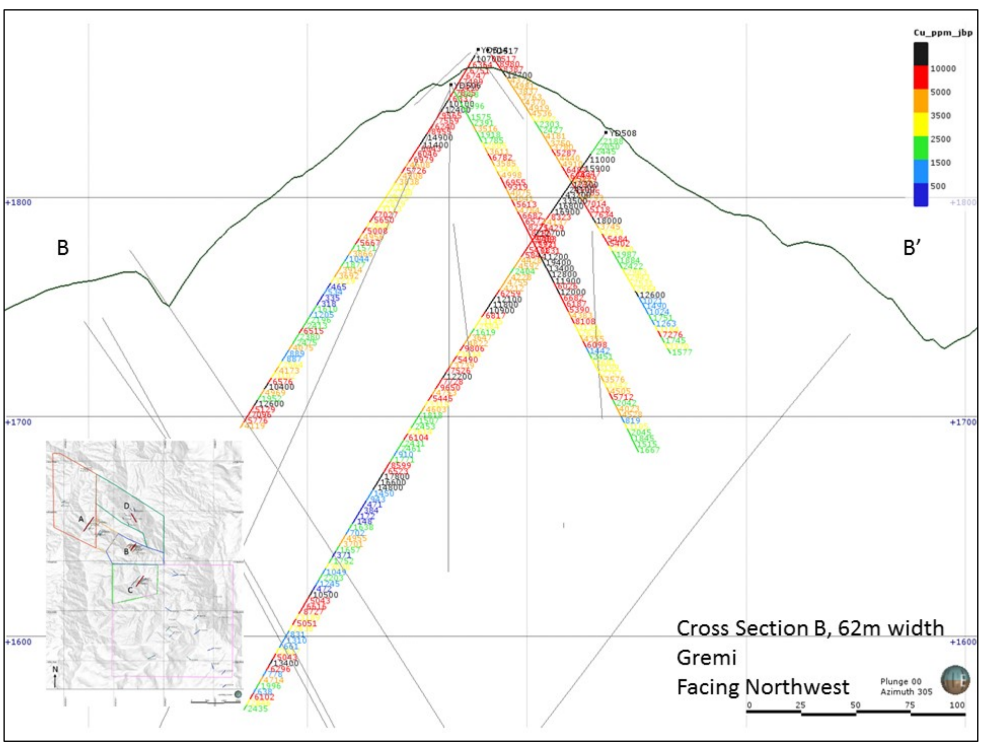
Copper grades in select recent drillholes are shown in cross section, in Figures 10.3.1 through 10.3.4. On the cross sections, a plan map of all 2012-2014 drillholes is included, with model domain boundaries and cross section locations for reference. Example drilling in the main deposit areas is shown, but there are many additional drillholes that tested exploration targets beyond the main resource. All relevant drillholes in the database were considered for geological interpretation and resource estimation.

SRK considers the drilling method and procedures appropriate for the geology and style of mineralization. The drilling procedures generate samples that are sufficient for use in resource estimation.



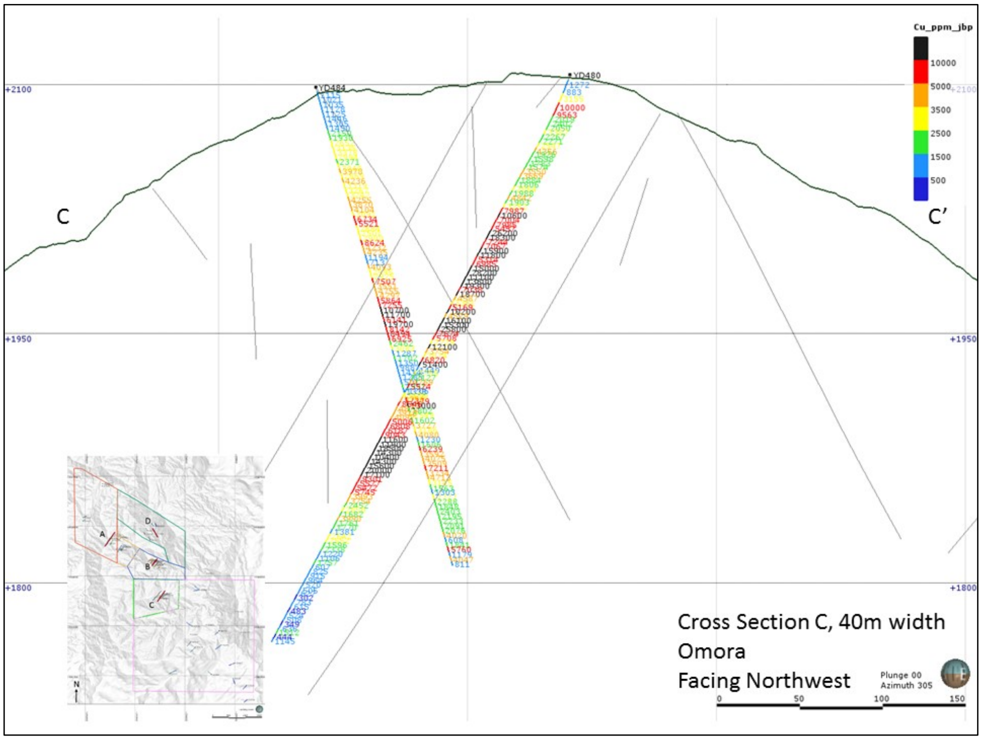
Source: SRK, 2015

Figure 10.3.1: Cross section A, Drillholes YD469, YD490, YD524, and YD541



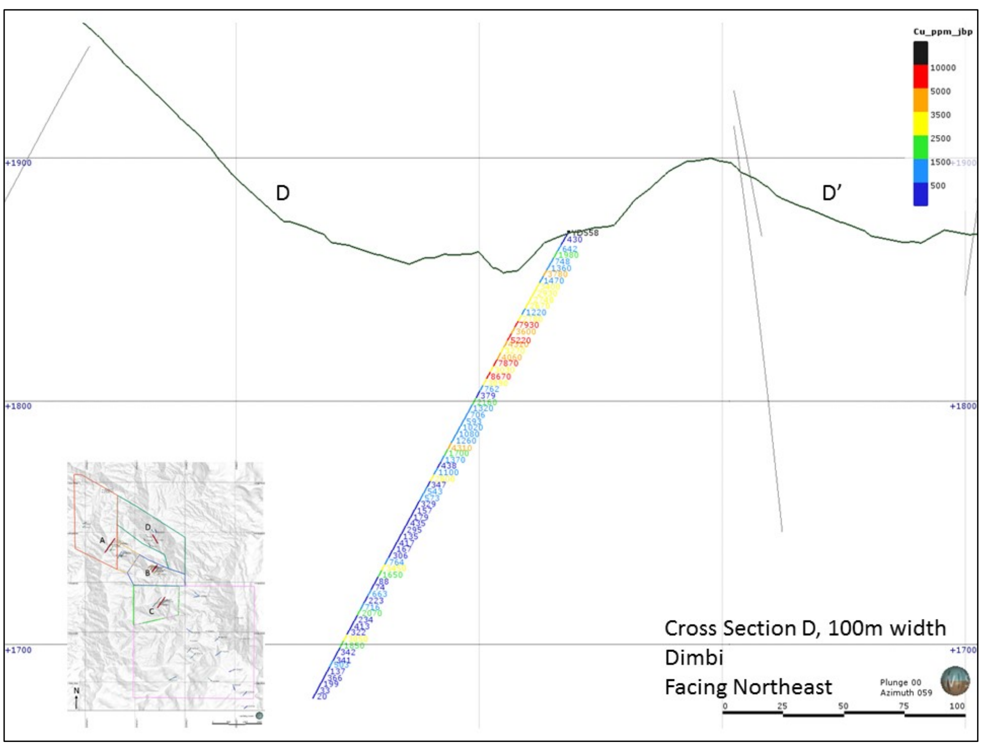
Source: SRK, 2015

Figure 10.3.2: Cross section B, Drillholes YD506, YD508, YD514, and YD517



Source: SRK, 2015

Figure 10.3.3: Cross section C, Drillholes YD480 and YD484



Source: SRK, 2015

Figure 10.3.4: Cross section D, Drillhole YD558

11 Sample Preparation, Analysis and Security

11.1 Security Measures

Sample security and quality assurance includes Marengo Chain of Custody and supervision of drill core from initial production through sample shipment. From the drill site, Marengo geologists or techs transport core to the Frog Camp Core Yard for detailed logging followed by saw splitting and sampling the left side. Samples are prepared at the Intertek labs in Frog Camp and Lae, PNG. Prepared samples are usually transported to Lae via road by Marengo, but occasionally other carriers are contracted for sample shipment.

11.2 Sample Preparation for Analysis

Drillhole sample preparation was completed by Intertek at the Frog Camp and Lae preparation labs. Intertek is an international analytical corporation and is independent from Marengo and any of its affiliates. Intertek's Frog Lab is managed and staffed by Intertek. Initial crushing was completed on site to reduce shipping costs.

The sample preparation code for drill core samples is SP123, and included:

- At the Frog Lab
  - Initial crushing stage is 100% passing 6 mm;
  - Secondary jaw crush to 100% passing 10 mesh (2 mm);
  - Using a riffle splitter, a 1,500 to 2,000 g split was taken from the crushed coarse reject; and
  - Select core samples were used for specific gravity determination.
- At the Lae prep lab
  - The split was pulverized to 95% passing -200 mesh (75 µm) in a ring and puck mill; and
  - A 250 to 300 g sample was taken to send to Intertek's laboratory in Jakarta for analysis.

11.3 Sample Analysis

Geochemical drillhole sample analysis was completed by Intertek in Jakarta, Indonesia. This lab is ISO 17025 accredited and meets international quality standards.

For determination of the base metals, 4-acid digestion and multi-element ICP-OES analysis of a 0.5 g charge was completed. In Marengo documents, the method code is IC30. In Intertek's current schedule of fees, the method code is 4A/OE01 for 34 element multi-element analysis. Gold fire assay (FA50/GF) on a 50 g charge was used for gold determination. Although the lower method detection limit (MDL) for Au is listed as 1 ppb (0.001 ppm), reported results indicate a higher MDL of 5 ppb (0.005 ppm). Method detection limits and cut-off grades of the elements of interest are summarized in Table 11.3.1.

The laboratory reports sent to Marengo include internal blank and standard sample results, and duplicate pulp analysis results.

Marengo uses the specific gravity determination method detailed by the Australasian Institute of Mining and Metallurgy (AusIMM) (2001), and includes analysis of reference samples of intact granodiorite with known specific gravity values.

Table 11.3.1: Method Detection Limits for Key Elements

Description	Copper (ppm Cu)	Moly (ppm Mo)	Sulfur (% S)	Gold FA (ppm Au) (2)
Lower MDL	1	2	0.005	0.001
Upper MDL	10,000	10,000	10	n/a
Cut-off Grade (1)	1500	25.0	0.10	0.025

(1) Economic CoG for copper is shown. Grade shell threshold values for moly and gold are included.
(2) Fire assay with gravimetric finish. The minimum value reported in the database is 0.005 ppm. Gold grades of Yandera samples are much less than the upper MDL.
Source: SRK, 2015

11.4 Quality Assurance/Quality Control Procedures

The 2012, 2013, and 2014 drilling programs have a total of 7,089 drill samples. Sample batches included Certified Reference Material (CRM) standards and blanks, duplicate analysis, and check assay analysis at a second independent laboratory for Quality Assurance/Quality Control (QA/QC).

Samples from the Alpha and Bravo Adits at Gremi were collected to target material for bulk metallurgical testing (discussed in more detail in Section 13). Results from the 210 adit samples were not used in the mineral resource estimate, but the interpreted oxide and transition boundaries were included in the oxide model. The sample suite included 13 internal duplicates and 10 check assays of pulp samples, but no blank or CRM samples. Because these samples were not used for resource estimation, results are not presented in this report.

Surface samples were also analyzed by Intertek, which completed duplicate pulp analysis and sent a subset of samples for check analysis at a second lab. The surface geochemistry QA/QC results are not included in the MRE, and are not discussed in this report.

11.4.1 Standards

There are 186 standard samples in the 2012-2014 drillhole assay data set. The average CRM insertion rate from the three drilling programs is 2.6%, which is lower than current industry standards. About 94% of the standard samples analyzed with 2012-2014 drill samples were from the following materials:

- OREAS 501 (n = 91, 49%); and
- OREAS 503 (n = 84, 45%).

These CRMs are made from porphyry-hosted Cu-Au-Mo sulfide mineralization similar to that found at the Project.

The following standards, which have been discontinued by the supplier, were also run with recent drilling samples, but these constitute only about 6% of the standard sample data set:

- OREAS 50c (n = 5, 2.7%);
- OREAS 52c (n = 5, 2.7%); and
- OREAS 54Pa (n = 1, 0.5%).

Performance of OREAS 501 and OREAS 503 are discussed below. Copper results are the most important, because most of the Project's value is from contained copper mineralization. Molybdenum and gold are lesser components of the resource. Sulfur results are also presented below, because the Cu:S ratio was used as a guide for modeling oxide and defining metallurgical material types.

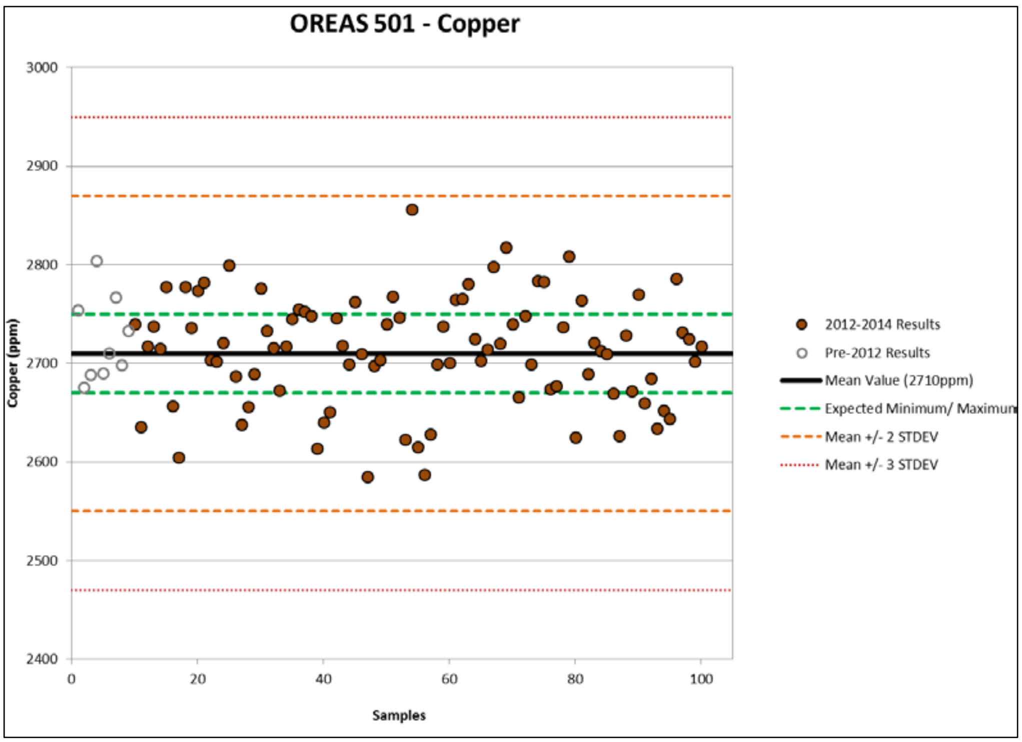
Table 11.4.1.1 shows the mean values the four elements of interest of the three main CRM. This table also included the economic CoG of copper, and grades of interest for molybdenum, gold, and sulfur.

Table 11.4.1.1: Mean Values of CRM in 2012-2014 Drilling Program

	Copper (ppm Cu)	Moly (ppm Mo)	Gold (ppm Au)	Sulfur (% S)
OREAS 501	2710	59.2	0.204	0.364
OREAS 503	5660	390	0.687	0.732
Cut-off Grade (1)	1500	25.0	0.025	0.10

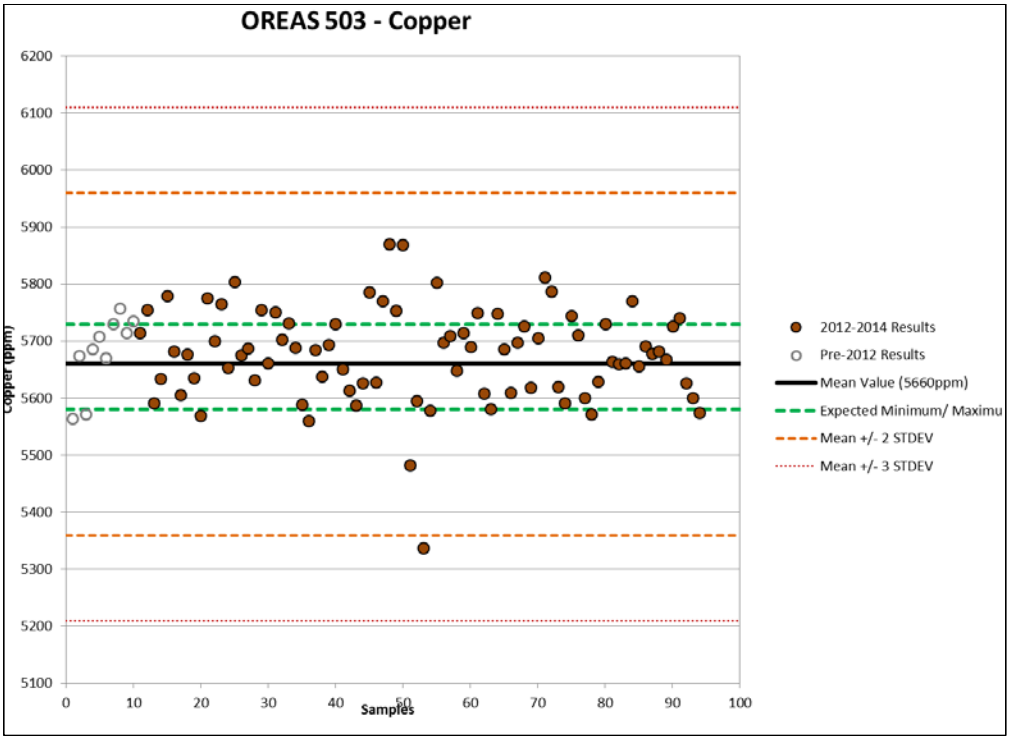
(1) Economic CoG for copper is shown. Grade shell threshold values for moly and gold are included.
Source: SRK, 2015

The range of copper, moly, gold, and sulfur values in the CRM samples are appropriate to assess the analytical capability of the laboratory in the range of values typical at the Project. Copper results for CRM 501 and 503 are shown in Figure 11.4.1.1 and 11.4.1.2. For both CRM, all but one sample was within two standard deviations of the certified mean value.



Source: SRK, 2015

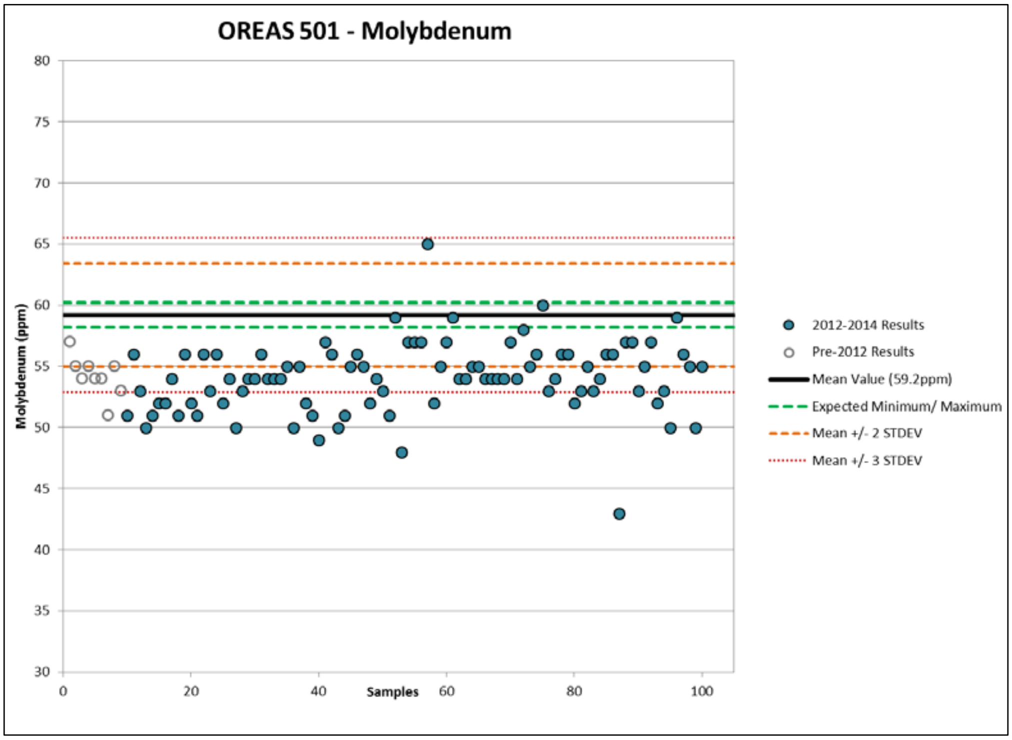
Figure 11.4.1.1: Copper Results for OREAS 501



Source: SRK, 2015

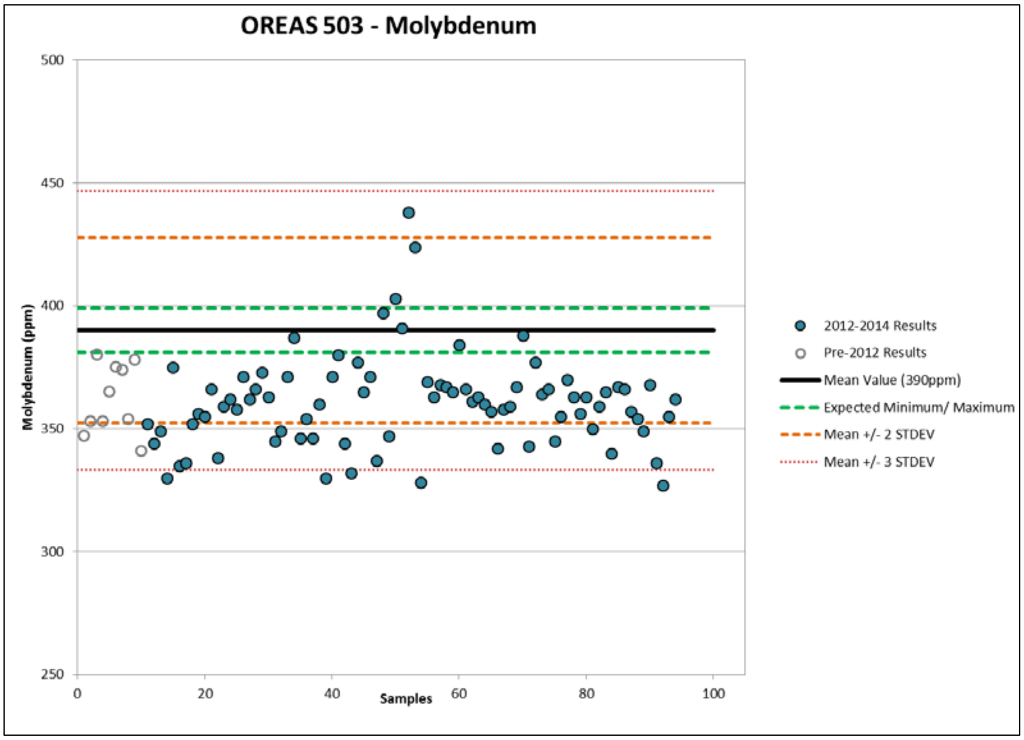
Figure 11.4.1.2: Copper Results for OREAS 503

Molybdenum results are shown in Figure 11.4.1.3 and 11.4.1.4 and the results were generally two to three standard deviations less than the certified mean value for both CRMs. The results appear to be biased low, which could be caused by incomplete acid digestion of the silicate minerals that host molybdenite. Gold results are shown in Figure 11.4.1.5 and Figure 11.4.1.6. While most of the gold values are within acceptable limits from the certified mean value, they show more variability than the base metal values and have a slight low bias. The variability and low bias in gold could indicate incomplete fusion during the fire assay process. Several samples have reported gold values near the method detection limit. These results could indicate a sample mix-up at the analytical lab, or that the CRM used was actually blank material.



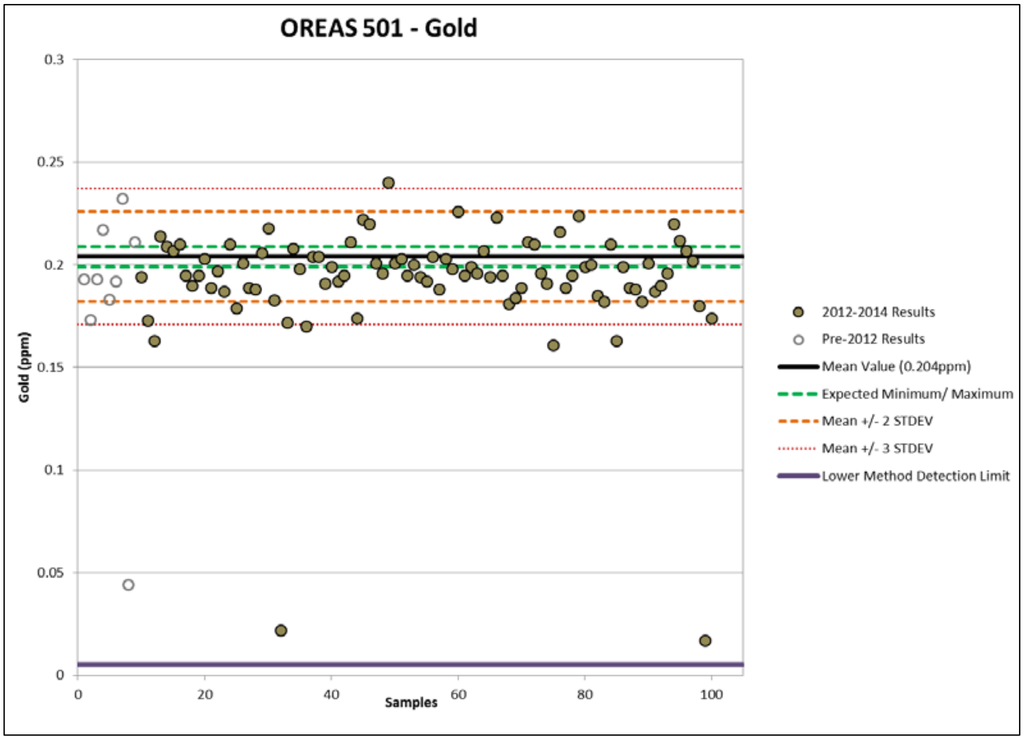
Source: SRK, 2015

Figure 11.4.1.3: Molybdenum Results for OREAS 501



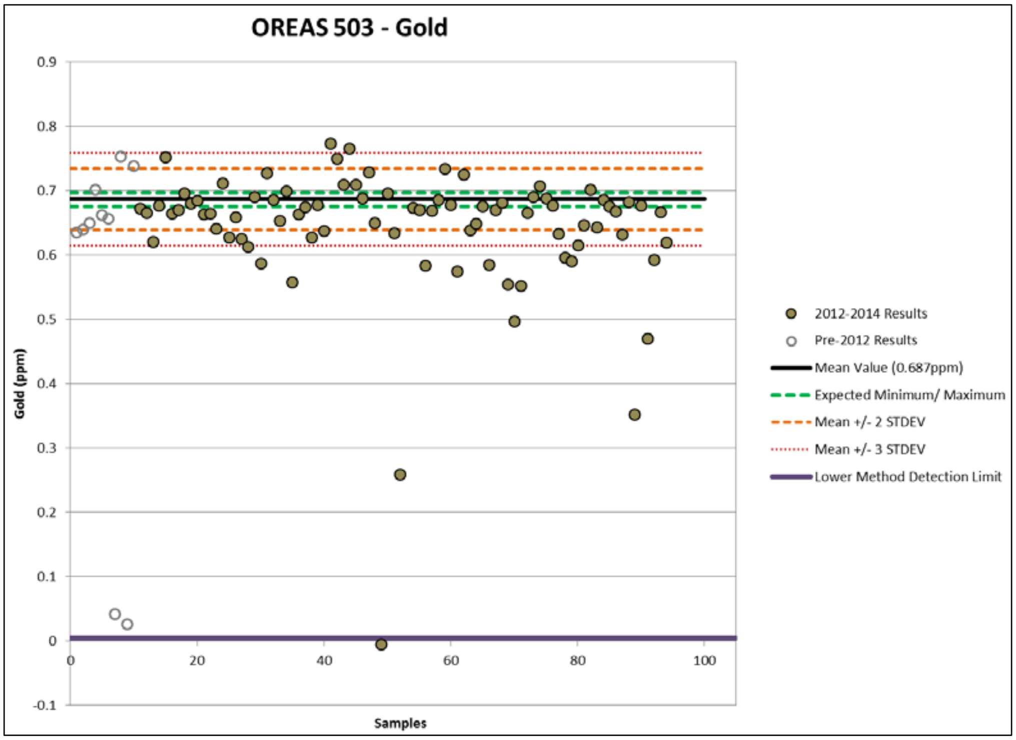
Source: SRK, 2015

Figure 11.4.1.4: Molybdenum Results for OREAS 503



Source: SRK, 2015

Figure 11.4.1.5: Gold Results for OREAS 501

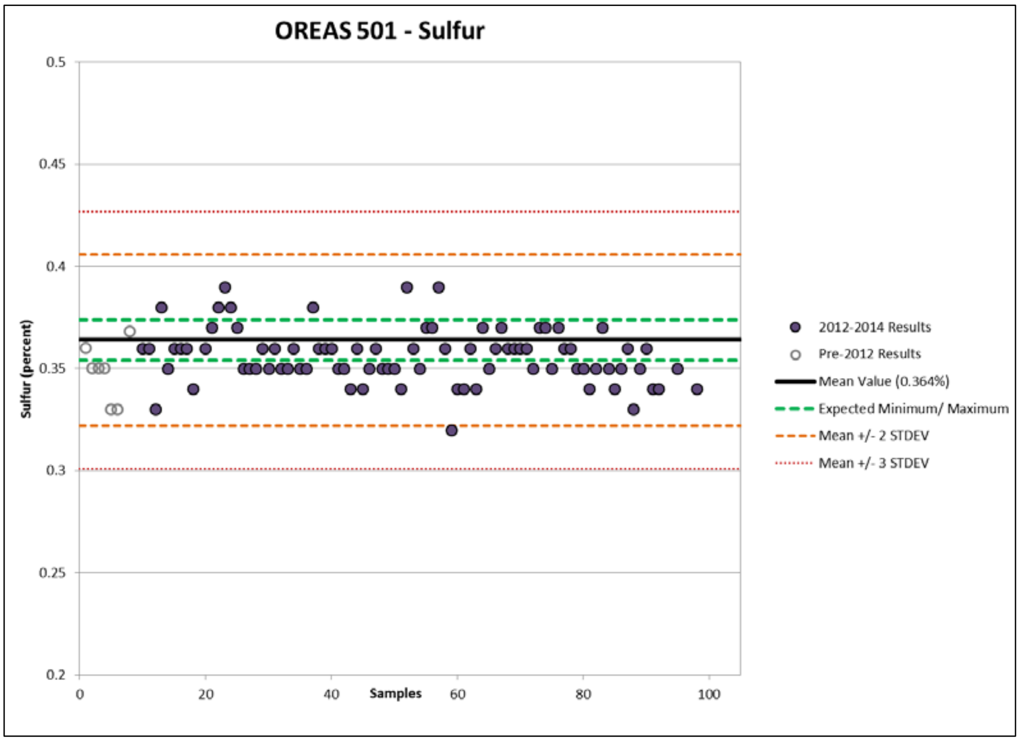


Source: SRK, 2015

Figure 11.4.1.6: Gold Results for OREAS 503

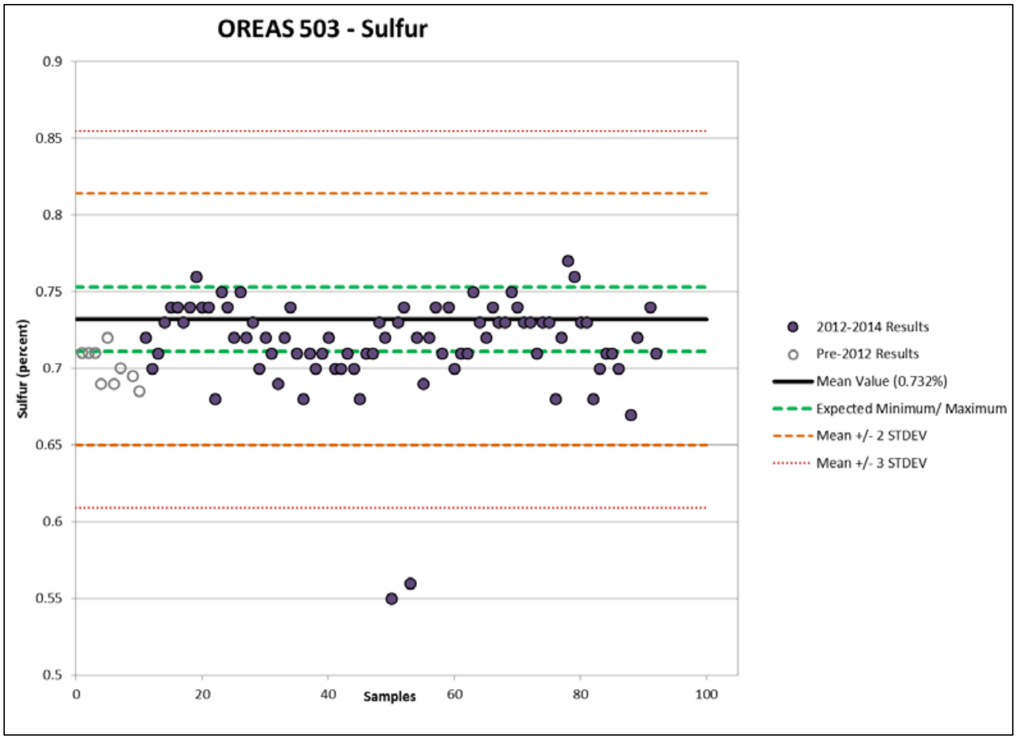
The main CRMs have certified sulfur values in addition to the metals discussed above. Sulfur values are currently applied to define metallurgical material types, and although sulfur is not reported in the Mineral Resource Estimation, it is an important component of the oxide model.

Figure 11.4.1.7 and Figure 11.4.1.8 show the sulfur results for OREAS 501 and OREAS 503, respectively. Generally, the CRM samples performed well with respect to total sulfur. Although there is a slight low bias in sulfur results, most of the sulfur values for OREAS 503 are within two standard deviations from the certified mean value. Sulfur results from OREAS 501 are all within two standard deviations from the mean value, and also have a slight low bias.



Source: SRK, 2015

Figure 11.4.1.7: Sulfur Results for OREAS 501



Source: SRK, 2015

Figure 11.4.1.8: Sulfur Results for OREAS 503

11.4.2 Blanks

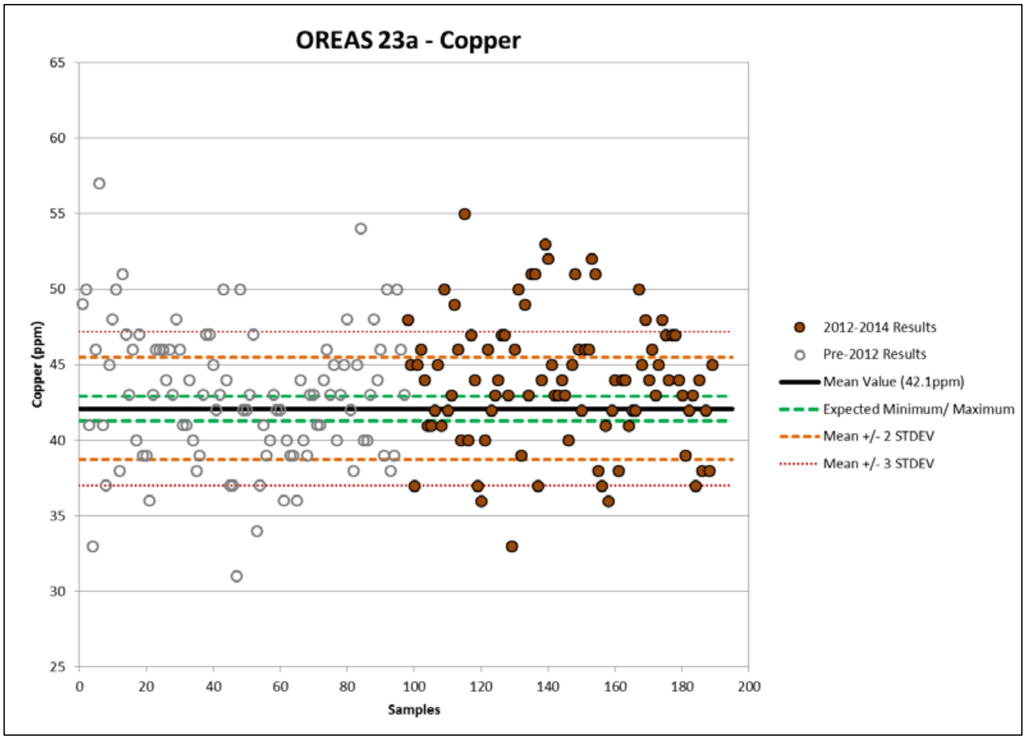
Marengo included samples of OREAS 23a pulverized granite blank reference material in the sample suite. The certified values and lower method detection limits are listed in Table 11.4.2.1. This material is suitable for assessing the risk of cross contamination or sample mix-ups at the lab, and the mean values are much lower than the values of interest for each metal.

Table 11.4.2.1: Certified Values and Method Detection Limits for Blank Samples

Description	Copper (ppm Cu)	Moly (ppm Mo)	Gold (ppm Au)	Sulfur (% S)
OREAS 23a	42.1	9.6	0.003	--
Lower Method Detection Limit	2	1	0.005	0.010

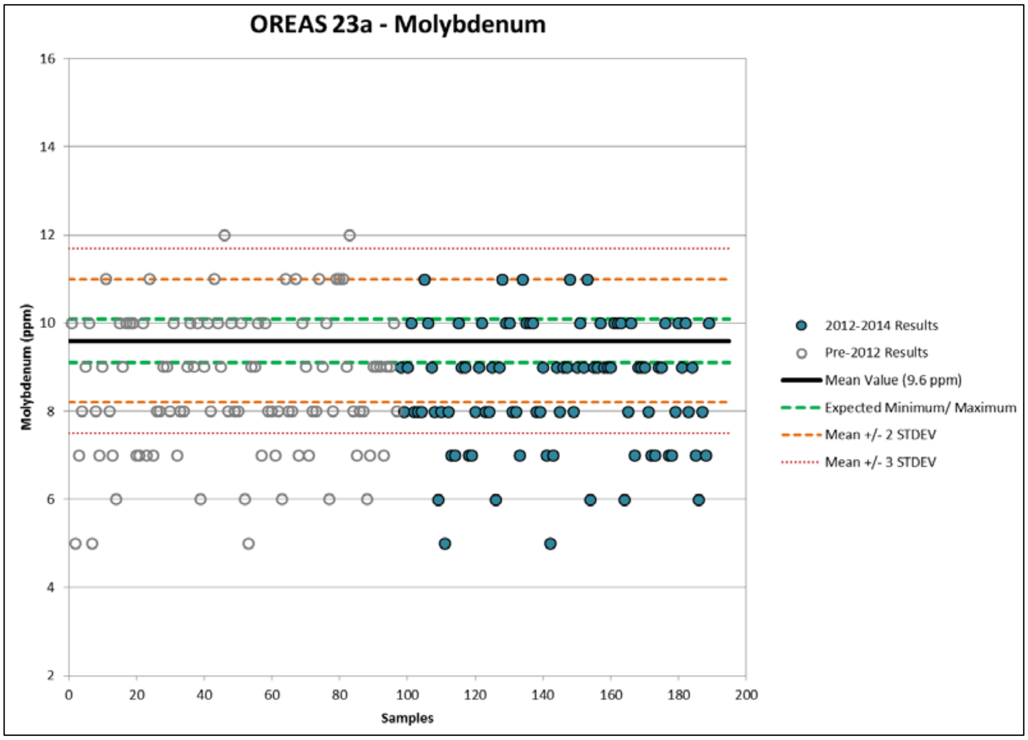
Source: SRK, 2015

Results for copper, moly, gold and sulfur for the 92 blank samples are shown in Figure 11.4.2.1 through Figure 11.4.2.4. The average blank sample insertion rate is 1.3%, which is less than the current industry standard. Results for copper and molybdenum are variable, and many are more than three standard deviations from the mean value. Because the mean values are much greater than the method detection limits, the variability is not from lack of analytical precision. The variability may indicate cross-contamination during analysis. None of the values are so far from the mean that they indicate a sample mix-up. Gold values are also variable, but most are less than 10 times the method detection limit, and are acceptable. Sulfur values are near the lower method detection limit, and do not indicate cross contamination.



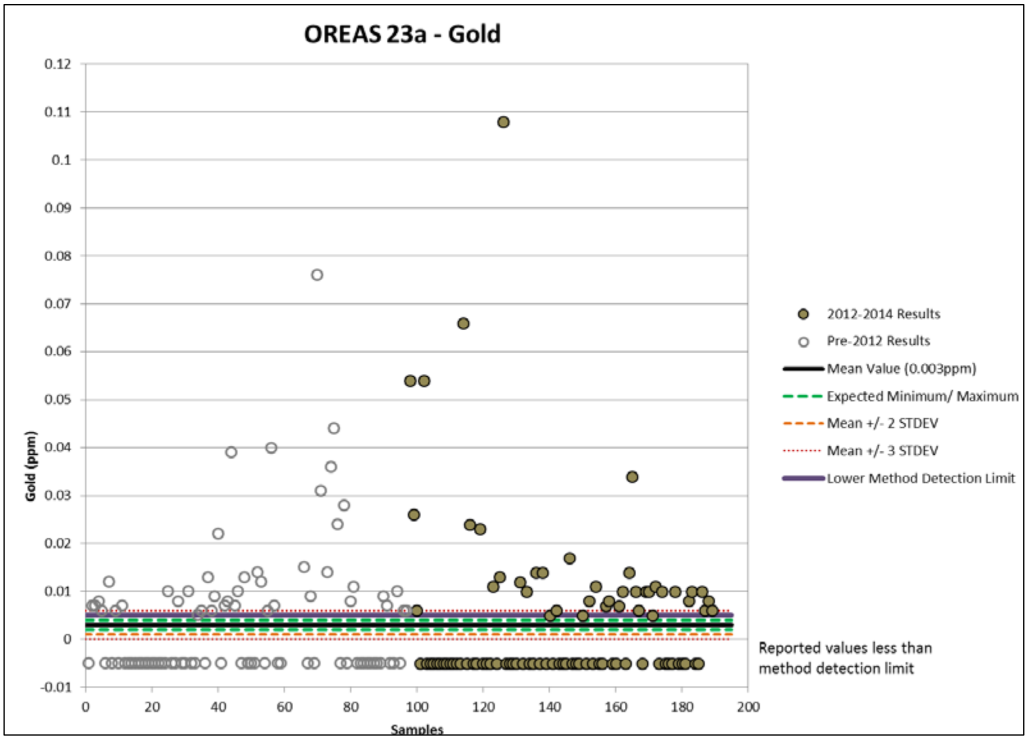
Source: SRK, 2015

Figure 11.4.2.1: Copper Results for OREAS 23a Blank Samples



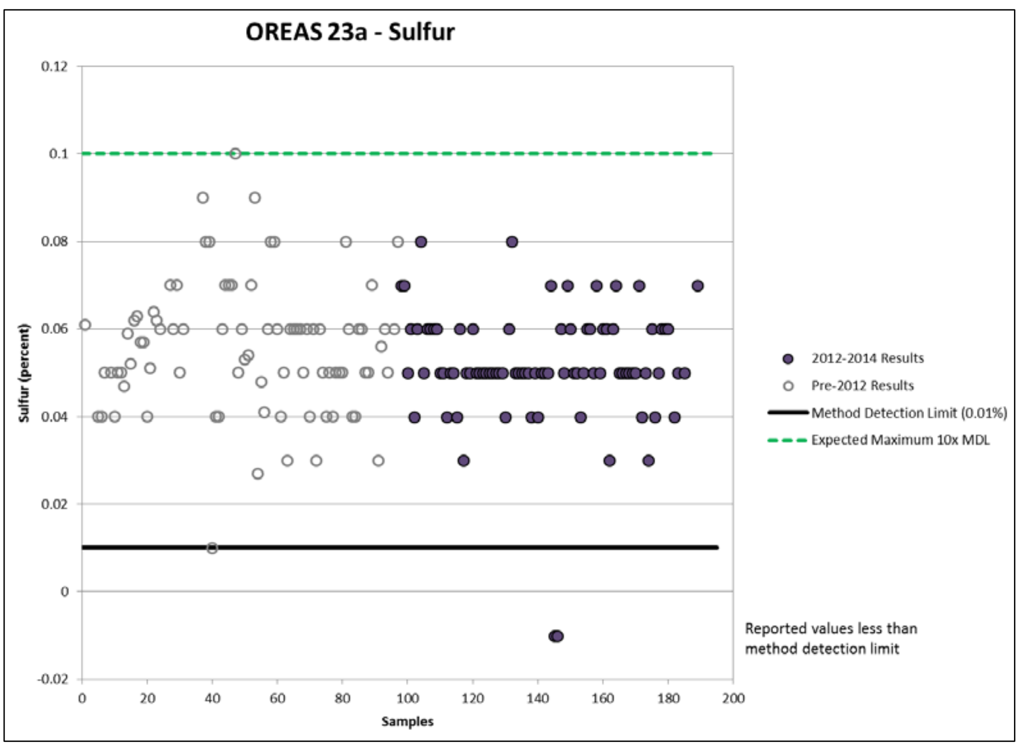
Source: SRK, 2015

Figure 11.4.2.2: Moly Results for OREAS 23a Blank Samples



Source: SRK, 2015

Figure 11.4.2.3: Gold Results for OREAS 23a Blank Samples



Source: SRK, 2015

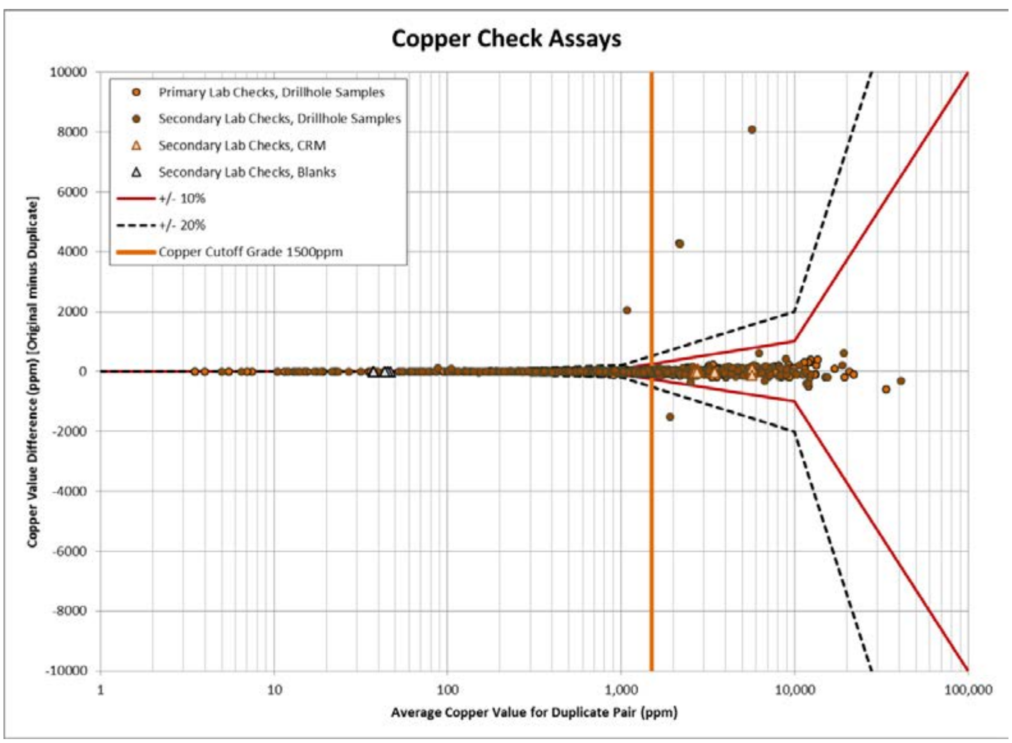
Figure 11.4.2.4: Sulfur Results for OREAS 23a Blank Samples

11.4.3 Duplicates

Check assays were completed at Genalysis, in Perth, Australia, on select pulp samples. For the recent drilling, there are 359 drillhole samples with check assay data for copper, about 5.1% of the total. There are also 16 CRM and 9 blank samples with copper check assay data. The CRM and blank samples performed very well. There are 445 pulp sample duplicate pairs with copper data. Most of these were done for Intertek's internal QA/QC, but about 6 pairs were from duplicate pulp sample splits to verify the quality of pulverization and sub-splitting from the 1,500 to 2,000 g coarse reject sample split. Charts in Figure 11.4.3.1 and Figure 11.4.3.2 show the sample pair difference vs. the average value, and the Relative Percent Difference (RPD) vs. average value. The equation for RPD is:

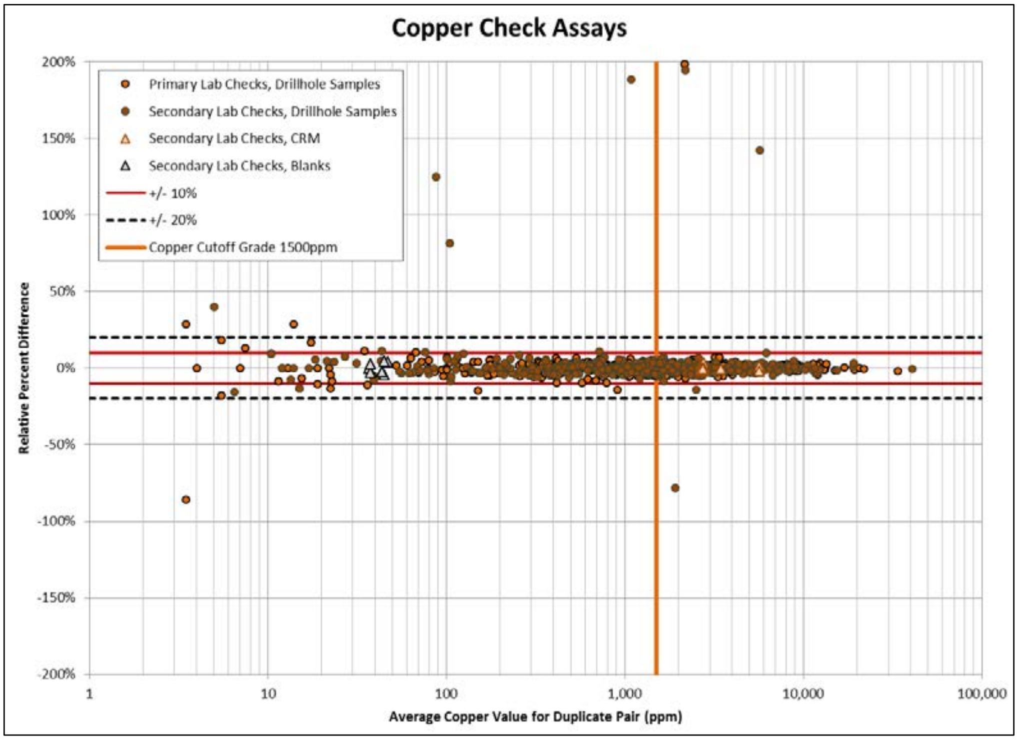
RPD = (Original - Duplicate) / Average

For sample pairs with average copper values greater than the economic CoG (1,500 ppm), there are four secondary laboratory check samples and one internal lab check sample with relative differences greater than 10% of the mean value. For sample pairs with mean copper values less than 1,500 ppm, there are six secondary lab check samples and twelve internal lab check samples with relative differences greater than 10% of the mean value. For the entire drillhole check assay data set, about 6% of the sample pairs vary by more than 10% from the mean value. All of the blank and CRM duplicate samples are within 10% of each pair's mean value. Variation in a small percentage of duplicate samples is statistically valid, and most of the results indicate consistent check assay results. The range of copper values in the selected duplicate samples is representative of the deposit.



Source: SRK, 2015

Figure 11.4.3.1: Difference vs. Average Value for Drillhole and CRM Duplicate Pairs



Source: SRK, 2015

Figure 11.4.3.2: Relative Percent Difference vs. Average Value for Drillhole and CRM Duplicate Pairs

Seven duplicate pulp samples were made from coarse rejects at Intertek. The adequacy of the crushing stage is ambiguous from this small sample set. The duplicate sample pairs have copper values within 10% of each other, and gold, moly, and sulfur values within 20% of each other. Duplicate coarse reject sample pairs that vary by 20% of each other or less demonstrate adequate crushing to homogenize the sample before splitting it to generate the sub-sample for analysis.

11.4.4 Actions

The cause of apparent low bias in some of the CRM results is unclear. Marengo should continue to use four-acid digestion to completely dissolve the silicate host rock and get representative copper and molybdenum values.

11.4.5 Results

Marengo's protocol for recent drillhole samples provides verification for most of the sample preparation and analysis stages. To provide validation of all stages, the following procedures could be implemented.

Duplicate and check analysis:

- Coarse reject duplicates on 5% of the drill samples to monitor the quality of the crushing stage; and
- Use the coarse reject duplicates as check assay samples at a second independent lab, to maintain the primary set of pulp samples for additional analysis.

Blank and CRM Samples:

- Include coarse blank samples in future drillhole sample analysis, to evaluate cross contamination risk in the prep stage; and
- Increase the insertion rate of both blanks and standards to about 4% to 5%.

On average, each batch of fire assay samples should have one blank and one standard sample. There should also be enough CRM samples to include an average of two or three in each batch of ICP samples. The CRM results assess the lab's analytical capability at a range of grades representative of the deposit.

Marengo should continue to evaluate assay QA/QC data as results are received, and include data review in the process of adding new analytical results to the resource database.

11.5 Opinion on Adequacy

It is SRK's opinion that the sample security at the Project is adequate to maintain Chain of Custody until the analytical samples are relinquished for shipment to the analytical laboratory. The quality of sample preparation and analytical procedures meets or exceeds current industry standards, and the resulting data is suitable to use in a Mineral Resource Estimation.

12 Data Verification

The emphasis on data verification was the recent drilling, from 2012-2014. However, SRK verified data from all phases of drilling, as summarized below.

12.1 Procedures

SRK verified drillhole collar locations against a high-resolution topographic surface. Several holes that appeared much higher or lower than current topography were reconciled, realizing that a number of drill sites required extensive earth work for construction. The apparent discrepancies were from cut or fill from pad construction. A second collar location survey was completed for recent drilling, but results indicated incorrect X-Y locations for many drillholes. Original collar survey results were more consistent, and were maintained in the database. Downhole survey results appeared reasonable when displayed in 3-D modeling software. Several drillholes with unusual trajectory were verified, and match the source data. A summary of geological and analytical data verification follows.

For YD467-YD563, 10 holes (10%) were selected from the main resource areas to compare the electronic geological database and original drill logs. This group of drillholes was completed after 2011, and not included in a previous resource estimation. Results are summarized in Table 12.1.1. Three of ten drillholes had the same lithology and alteration data in the database as in the logs, and two of these had matching oxidation data. Five holes had different lithology and alteration data in the database than in the logs, due to reinterpretation of original logging. Two drillholes were missing scanned logs, and could not be compared to the database. However, digital copies of all analytical laboratory certificates were available, and the gold, copper, and molybdenum values in the database matched the certificates for all drillholes. This group of drillholes is about 17% of the database, but several of these were short geotechnical holes to support infrastructure design.

Marengo drilling completed prior to 2012 was included in a previous resource estimation, which also required data verification. Because this data had been previously reported, a target was set of about 5% of the drillholes for data verification for this report. Table 12.1.2 has a summary of the results. Although the digital geological database matched the source logs better for this group, the copper, moly and gold values differed from the assay certificates for some drillholes. In the observed cases, base metal values were up to 70 ppm lower in the database than on the assay certificates. It is possible that ME-ICP analysis was re-run for some of these, and the assay certificates available for review are not from the final results in the database. Marengo drilling prior to 2012 comprises 65% of the holes in the database, including several exploration holes outside the resource area, and metallurgical holes without analytical data from an accredited laboratory.

Historical drilling completed by Kennecott and BHP was also included in previous resource estimations, and a target was set of about 5% of the drillholes for data verification for this report. Data verification results are summarized in Table 12.1.3. For one of the six holes selected, there was no analytical data in the database. Another two did not have lithology logs or assay certificates available for verification, but they have data in the database. Generally, about half of the geological data verified matched the source logs. Discrepancies are due to data entry errors, additional interpretation without updating the drillhole logs, and missing information. Historical drillholes (n = 104) comprise 18% of the drillholes in the database.

Table 12.1.1: Summary of 2012-2014 Drillhole Data Verification

Hole ID	Deposit	Year Drilled	Purpose	Lithology	Alteration	Oxidation	Gold FA	Copper	Moly
YD471	Omora	2012	Resource	Correct	Correct	Incorrect	Correct	Correct	Correct
YD472	Imbruminda	2012	Resource	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct
YD485	Omora	2012	Resource	--	--	--	Correct	Correct	Correct
YD514	Gremi	2012	Resource	--	--	--	Correct	Correct	Correct
YD516	Dirigi	2012	Exploration	Incorrect	Incorrect	Correct	Correct	Correct	Correct
YD525	Gremi	2012	Resource	Incorrect	Correct	Incorrect	Correct	Correct	Correct
YD539	Imbruminda	2012	Resource	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct
YD546	Imbruminda	2012	Resource	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct
YD556	Dimbi	2013	Exploration	Correct	Correct	Correct	Correct	Correct	Correct
YD562	Rima	2014	Exploration	Correct	Correct	Correct	Correct	Correct	Correct

Source: SRK, 2015

Table 12.1.2: Summary of 2006-2011 Drillhole Verification

Hole ID	Deposit	Year Drilled	Purpose	Lithology	Alteration	Oxidation	Gold FA	Copper	Moly
YD116	Imbruminda	2006	Resource	Correct	Correct	Correct	Correct	Correct	Correct
YD135	Omora	2007	Resource	Correct	Correct	Correct	Correct	Correct	Correct
YD139	Gremi	2007	Resource	Correct	Correct	Correct	Correct	Correct	Correct
YD154	Gremi	2008	Resource	Incorrect	Correct	Correct	Correct	Correct	Correct
YD164	Omora	2008	Resource	Correct	Correct	Correct	Correct	Correct	Correct
YD208	Imbruminda	2008	Resource	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct
YD213	Imbruminda	2008	Resource	--	--	--	Correct	Correct	Correct
YD245	Dimbi	2009	Resource	Correct	Correct	Correct	Correct	Correct	Correct
YD258	Imbruminda	2010	Resource	Correct	Correct	Correct	Incorrect	Incorrect	Incorrect
YD261	Imbruminda	2010	Resource	Correct	Correct	Correct	Correct	Incorrect	Incorrect
YD294	Gremi	2010	Resource	Correct	Correct	Correct	Correct	Incorrect	Incorrect
YD297	Frog	2010	Resource	Correct	Correct	Correct	Correct	Incorrect	Incorrect
YD312	Dimbi	2010	Resource	Correct	Correct	Correct	--	--	--
YD351	Gremi	2011	Resource	Correct	Correct	Incorrect	--	--	--
YD365	Dimbi	2011	Exploration	Correct	Correct	Correct	Correct	Incorrect	Incorrect
YD375	Imbruminda	2011	Resource	--	--	--	Correct	Incorrect	Incorrect
YD382	Omora	2011	Resource	--	--	--	--	--	--
YD403	Gremi	2011	Resource	Correct	Incorrect	--	Correct	Incorrect	Incorrect
YD453	Imbruminda	2011	Resource	--	--	--	Incorrect	Incorrect	Incorrect
YD457	Omora	2011	Resource	Incorrect	Correct	Incorrect	Incorrect	Incorrect	Incorrect

Source: SRK, 2015

Table 12.1.3: Summary of Pre-Marengo Drillhole Verification

Hole ID	Owner	Deposit	Year Drilled	Lithology	Alteration	Oxidation	Gold FA	Copper	Moly
DDH008	Kennecott	Gremi	1967	--	--	--	--	--	--
DDH013	BHP JV	Omora	1973	Correct	Incorrect	--	Correct	Correct	Correct
DDH027	BHP JV	Gremi	1974	Incorrect	Incorrect	--	--	--	--
DDH062	BHP JV	Dimbi	1975	Correct	Incorrect	Correct	Correct	Correct	Correct
DDH066	BHP JV	Imbruminda	1975	Incorrect	Incorrect	Correct	Correct	Correct	Correct
DDH102	BHP JV	Imbruminda	1980	--	--	--	--	--	--

Source: SRK, 2015

12.2 Limitations

Source documents for several of the historical drillholes were not available, but geological logs and assay certificates were available for all Marengo drillholes. Criteria for logging lithology and alteration were not consistent for all geologists on the project, and the resulting database is also not entirely consistent. During detailed geological interpretation, the Project team found many discrepancies between lithology and alteration in neighboring drillholes. This was largely due to different interpretations by logging geologists over time, and evolution of the working model. Because some geological data in the database was inconsistent, it was not applied directly to the geological model. Instead, during this 2015 modeling effort, Marengo geologists revisited core photography and reconciled previous discrepancies to build cross sectional interpretations. These revised cross sections were used to underpin the geologic model.

Logged lithology, alteration, or oxidation were missing in about 20% of the Marengo drillholes checked. As data is tabulated from drill logs to add to the database, it should be verified against core photos and logs from nearby drillholes. This could improve consistency in the data set, and would make it more applicable for future geological modeling.

Analytical data in the database should be audited against final assay certificates, to ensure that only validated final results will be used for future resource estimations. We predict that the effect of observed errors on the resource is minimal.

12.3 Opinion on Data Adequacy

Data in the analytical database are fundamentally correct and suitable for use in resource modeling. Following corrections and exclusions in the geologic data set, it is SRK's opinion that the Yandera dataset is suitable for modeling.

13 Mineral Processing and Metallurgical Testing

Previous technical studies (Ravensgate, 2012 and Golder, 2011) included sulfide flotation testing for copper, molybdenum, and gold recovery. Yandera sulfide material appears amenable to flotation processing. A portion of the mineralization is oxide. Flotation of oxide Cu material had poor recovery. There have been no leaching tests on the oxide material to date, but Marengo is currently evaluating oxide leaching options.

13.1 Testing and Procedures

There have been three metallurgical test work programs on Yandera mineralized material and one bulk sampling event:

- AMEC-Minproc performed comprehensive comminution studies and preliminary flotation and magnetic separation studies;
- NFC/Nerin did flotation test work and mineralization assessment;
- AMS/Marengo performed extensive flotation test work; and
- Bulk Sampling of Adit Alpha and Adit Bravo at Gremi.

Highlights of the testing programs are discussed below.

13.1.1 AMEC-Minproc

Three samples from Omora and three samples from Gremi were used for comminution and metallurgical test work by ALS-Ammtec in 2009, supervised by AMEC-Minproc. Comminution tests indicated the material is of medium to high hardness with Bond Rod Mill Work Index of 14 kWh/t and Bond Ball Mill Work Index of 15 kWh/t. The samples had relatively low abrasion characteristics.

Bulk flotation test tests, consisting of a rougher-scavenger circuit indicated Cu recoveries over 91% and Mo recoveries of approximately 80%. Gold and silver also were recovered in the concentrate. Cleaning tests of the bulk concentrate indicated that the concentrate weight could be reduced without loss of metals.

Magnetic separation testing indicated that a concentrate of >60% Fe could be made, but SiO_2 values were above the penalty limit of 4.5%.

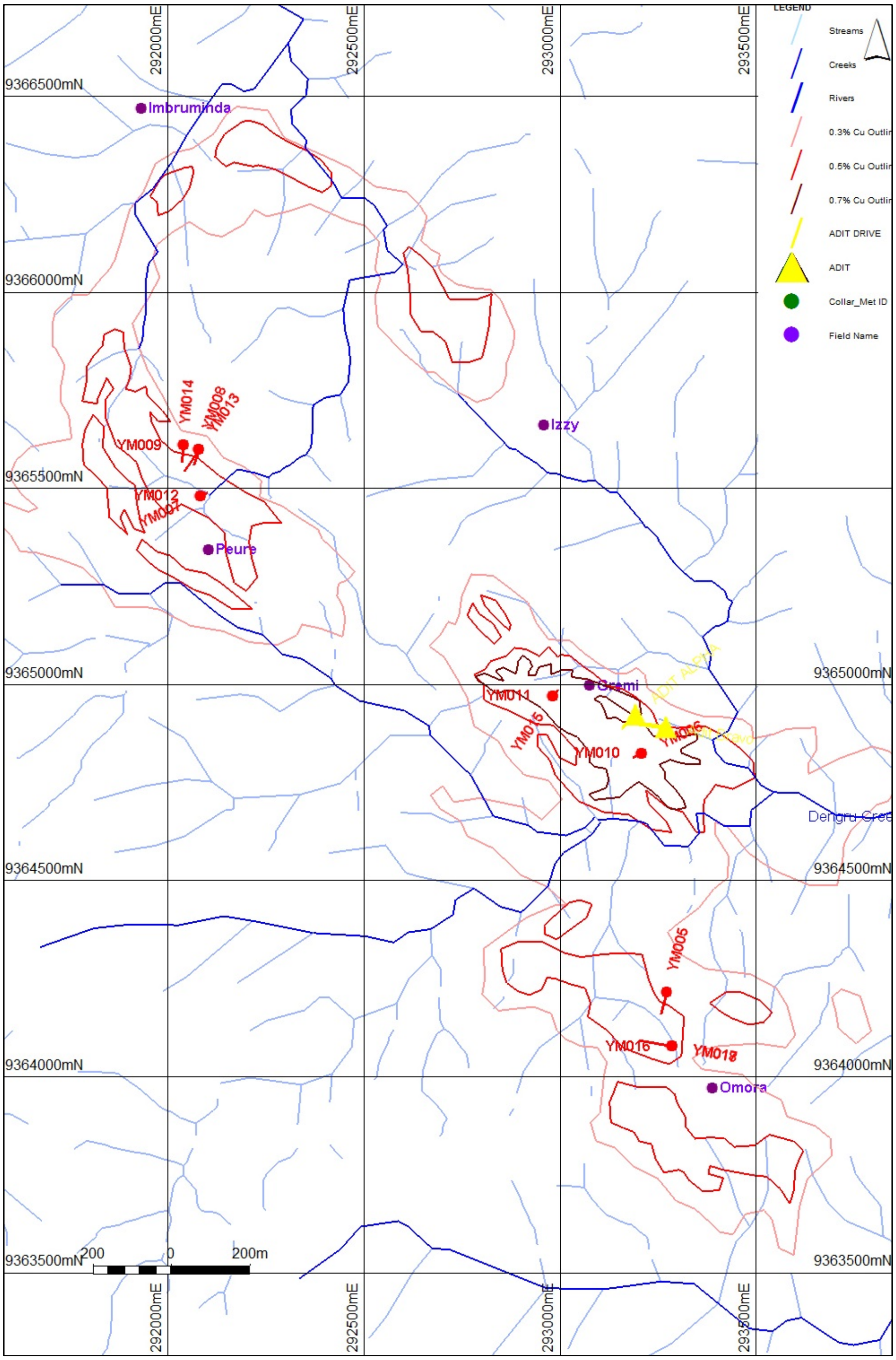
13.1.2 NFC/Nerin

China Nonferrous Metal Industry's Foreign Engineering and Construction Co. Ltd (NFC) commissioned Beijing General Research Institute of Mining and Metallurgy (BGRIMM) to run flotation test work. The samples for this test work were obtained from 2,260 m of full core, totaling approximately 22 t. Samples were from 14 drillholes located specifically for metallurgical test work (YM-005 to YM-018) and spaced to get representative samples on the Omora, Gremi and Imbruminda deposits. Metallurgical hole locations are shown in Figure 13.1.2.1. A total of 80% of each meter of sample was sent to BREIMM, with the remaining 20% sent to ALS-Ammtech in Perth.

Samples were combined into five groups:

- OX - Oxide;
- MX - Mixed;

- G - Gremi Sulfide;
- I - Imbruminda Sulfide; and
- O - Omora Sulfide.



Source: NFC/Nerin, 2012

Figure 13.1.2.1: Metallurgical Drillhole Locations

Initial test work was done on the Imbruminda sample. Mineralogical tests indicate the main Cu minerals are chalcopyrite and bornite. Molybdenite is the main Mo mineral. Magnetite is the primary Fe mineral. Extensive test work was done on the "I" sample including optimizing the grind size, reagent selection and flotation time. Both open and closed circuit flotation tests were run. Test work produced a process flow sheet that included:

- Grinding to 60% passing 0.074 mm;
- Cu and Mo bulk concentrate flotation;
- Cu and Mo separation; and
- Magnetic separation of Fe in the flotation tailings.

Table 13.1.2.1 contains the recovery of the closed circuit testing

Table 13.1.2.1: Closed Circuit Flotation Test Results

Concentrate	Feed Grade (%)	Recovery (%)	Concentrate Grade (%)
Copper	0.60	88.275	30.72
Molybdenum	0.021	80.44	50.67
Iron	1.65	18.87	65.29

Source: SRK, 2015

The same flow sheet developed for the I sample was then used on the other four samples. Results are summarized in Table 13.1.2.2.

Table 13.1.2.2: Results of Closed Cycle Tests

Sample	Feed Grade		Recovery (in concentrate)	
	Cu	Mo	Cu	Mo
OX	0.76	0.018	54.512	55.90
MX	0.37	0.087	80.960	90.83
G	0.65	0.028	89.658	81.39
O	0.33	0.016	84.044	82.156

Source: SRK, 2015

13.1.3 AMS/Marengo

Testing on the remaining 20% of the core was run parallel to the NFC/Nerin test program at ALS-Ammtec in Perth under the supervision of Arccon Mining Services (AMS) and Marengo. The AMS/Marengo test work concentrated on optimizing the rougher-scavenger recovery. Flotation slurry density, grind size and collector reagents were all evaluated. Results of this optimization indicate:

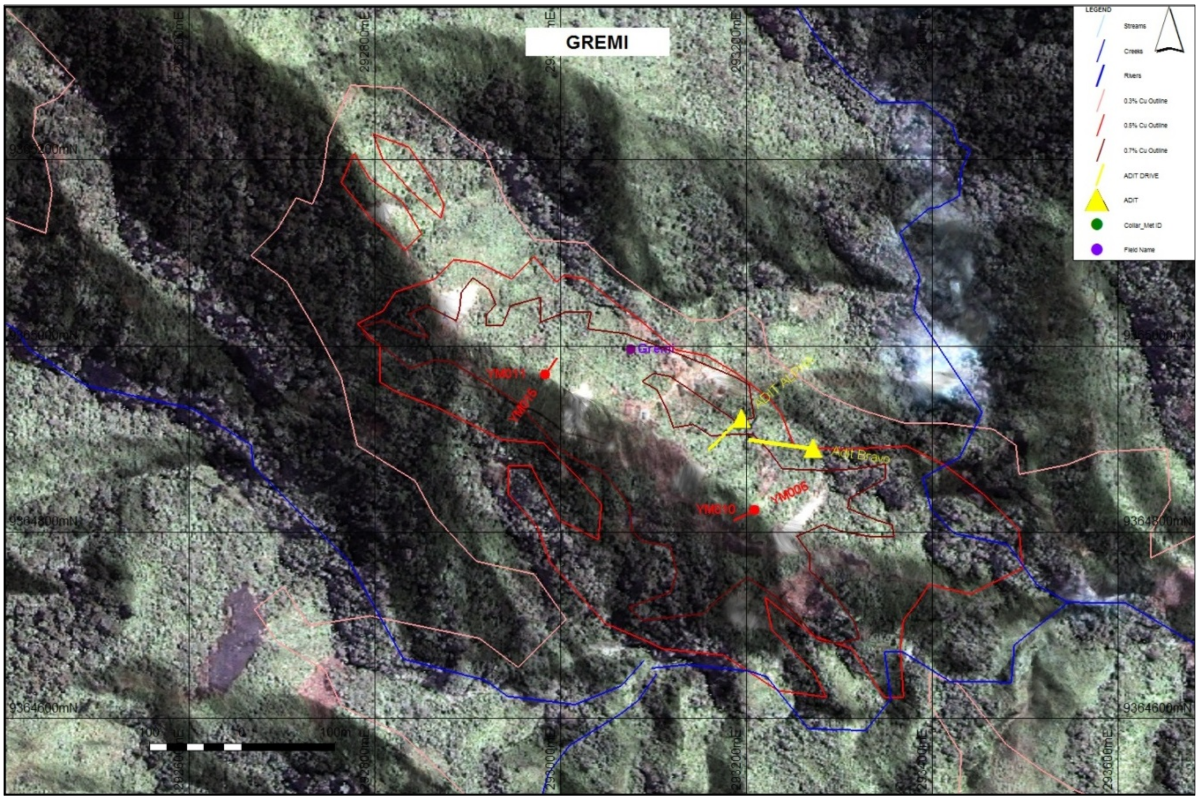
- Copper recovery of 96% in hypogene samples;
- Good molybdenum recovery in hypogene and mixed samples;
- Flotation recovery of Cu and Mo in oxides low at 60 to 65%; and
- Rougher concentrate grades for Cu and Mo were reasonable.

13.1.4 Bulk Sampling for Metallurgical Testing

In late 2010 and early 2011, Adit Alpha was driven a total distance of 49.4 m at Gremi to acquire a bulk sample for metallurgical testing of sulfide (hypogene) material. Adit Alpha was collared too high on the ridge, and thus the entire length of the adit was in oxide and mixed-oxide material.

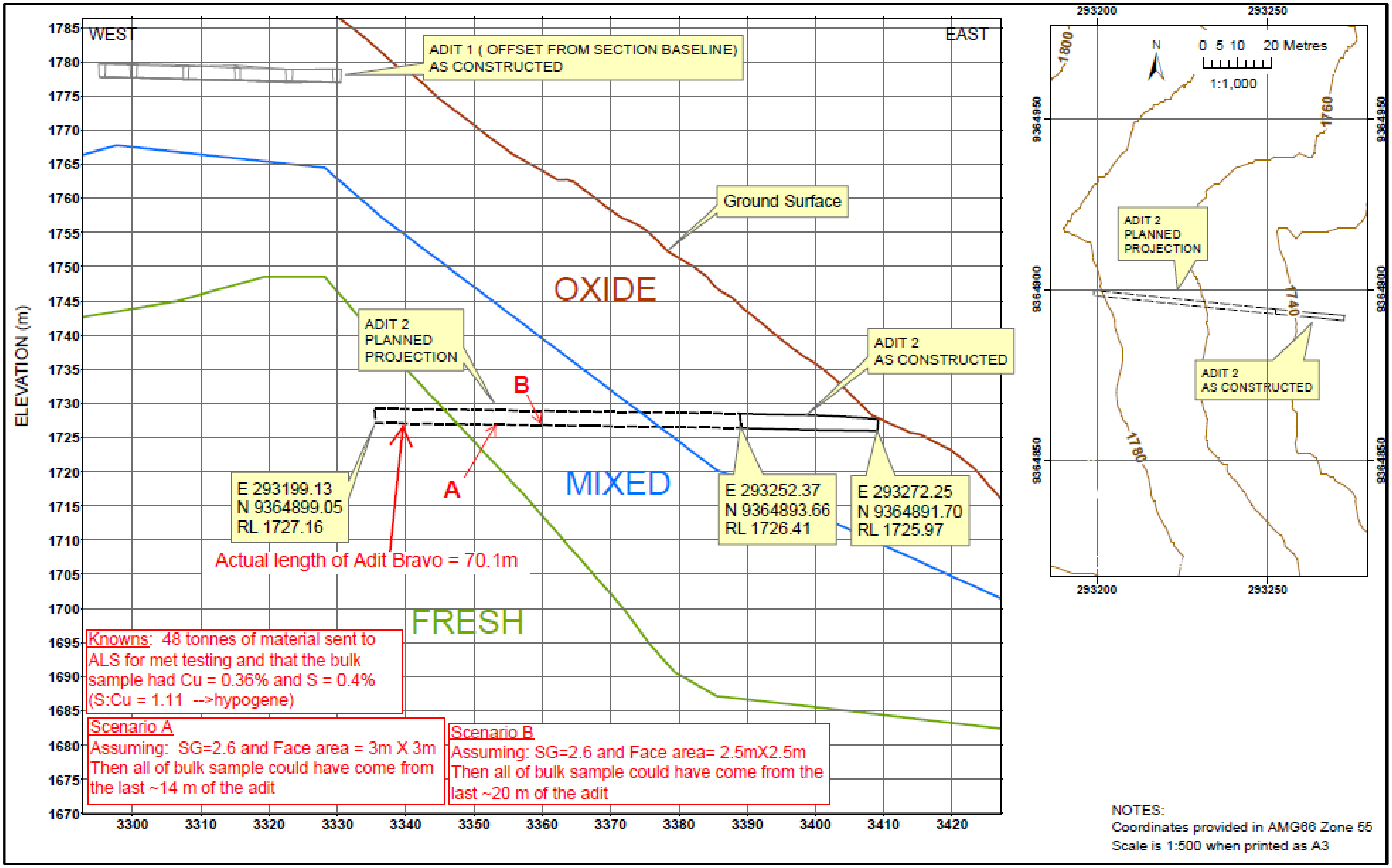
In 2011, a second adit, Adit Bravo, was driven lower on the ridge to obtain hypogene material for bulk metallurgical testing. The total length of Adit Bravo was 70.1 m. A total of about 48 t of hypogene material was recovered from the end of the adit, and it was sent to ALS for metallurgical testing.

Location details of the excavations are presented in plan in Figure 13.1.4.1 and shown in section in Figure 13.1.4.2.



Source: NFC/Nerin, 2012

Figure 13.1.4.1: Locations of Bulk Sample Excavations - Adit Alpha and Adit Bravo



Source: Golder, 2011

Figure 13.1.4.2: Schematic Cross Section of the Adits Excavated for Bulk Metallurgical Testing

13.2 Recovery Estimate Assumptions

It is likely that at full scale production the recovery will be lower than bench scale tests described above, and smelter deductions will also lower net payable metal. Therefore, for optimized pits and CoG calculations, SRK used the following recoveries in sulfides and mixed ores:

- Copper, 90%
- Molybdenum, 85%
- Gold, 65%

There have been no reported acid leach tests of Yandera oxide ore. Vat leaching is a relatively low cost method of oxide copper production, especially because this ore type is expected to have low acid consumption.

To simplify the costs used in the optimized pits, the same processing costs as used in the flotation plant (US$7.50/t) was used in vat leaching. Vat leaching costs are expected to be much lower. To compensate for the higher cost, the copper recovery used was probably higher than anticipated in actual production. SRK used the following recoveries in oxide ore:

- Copper, 90%
- Molybdenum, 0%
- Gold, 0%

13.3 Significant Factors

Test results of the copper and molybdenum concentrates do not have deleterious elements at concentrations that will incur smelter penalties.

No tests have been run to determine copper recovery using leaching of the oxide material. SRK recommends a pilot leach tests be run to determine if acid leaching is a viable recovery method for this resource.

SRK considers the metallurgical recovery information sufficient for use in determining CuEq cut-offs in the resource estimation that incorporate Mo and Au.

14 Mineral Resource Estimate

14.1 Introduction

A Mineral Resource Estimation for the Yandera deposit was most recently completed by the Australian mining consulting firm Ravensgate (2012). In February 2015, SRK Consulting was contracted by Marengo to prepare a new Technical Report on Resources compliant with the guidance of National Instrument 43-101 (NI 43-101) that included the new geologic information gathered since the completion of the 2012 report. Working closely with the Marengo staff and consultants, SRK generated a new block model that included independent analysis of the project database, geostatistical analysis of the data, construction of 3D solids with Leapfrog™ modeling software, and estimation of a 3D block model with MineSight® software.

In preparing the current resource statement, SRK has used engineering experience and informed assumptions to define the appropriate CoG to reflect the mining and process methods and costs anticipated as the project advances. This report provides a mineral resource estimate and a classification of resource reported in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves, May 10, 2014 (CIM, 2014). The resource estimate and related geologic modeling were conducted by, or under the supervision of, J.B. Pennington, M.Sc., C.P.G., and Justin Smith, B.Sc., P.E., both of SRK Consulting (U.S.), Inc., Reno, Nevada. Mr. Pennington and Mr. Smith are Qualified Persons, and are independent of Marengo for purposes of NI 43-101.

The Mineral Resource estimate was based on a 3D geological model of major structural features and geologically controlled alteration and mineralization. A total of ten mineral domains were interpreted from mineralized drill intercepts, comprised mostly of 3 m core samples. The block size of the model is 25 m x 25 m x 10 m. The project is in metric units. Copper, molybdenum, and gold were estimated into model blocks using OK. Oxide, non-oxide, and transition material types were modeled according to geologic logging and sulfur:copper ratios characteristic of the three metallurgical material types summarized later in Table 14.7.1. Density was determined from 3,985 samples which, within the variogram range of the data, were interpolated into the block model using OK. The remainder of the data was assigned the average estimated density corresponding to its location within the oxide, transition, or non-oxide zones.

Cautionary Note to U.S. Investors concerning estimates of Measured and Indicated Resources and Inferred Resources: This report uses the terms "Measured" and "Indicated resources." These terms are recognized and required by Canadian regulations; The SEC does not recognize them and U.S. investors are cautioned not to assume that any part or all of mineral resources in these categories will ever be converted into reserves. This section also uses the term "Inferred resources." This term is recognized and required by Canadian regulations; the SEC does not recognize it. "Inferred resources" have a great amount of uncertainty as to their existence, and great uncertainty as to their economic and legal feasibility. It cannot be assumed that all or any part of an Inferred Mineral Resource will ever be upgraded to a higher category. Under Canadian rules, estimates of Inferred Mineral Resources may not form the basis of feasibility or prefeasibility studies, except in rare cases. U.S. investors are cautioned not to assume that part or all of an Inferred resource exists, or is economically or legally minable. **Reserves meeting the requirements of the**

Securities and Exchange Commission's Industry Guide 7 for the Yandera project have not been determined.

14.2 Project Coordinates

The coordinate system of the project is AGD66 zone 55 as established by BHP. Before operations would begin the project would be converted to the gazetted national datum for PNG, PNG94, to generate a local grid with sufficiently low distortion.

14.3 Drillhole Database

The resource block model was informed by 35,250 samples from 553 drillholes at an average drillhole spacing of less than 30 m in the principal resource areas (Gremi, Imbruminda and Omora) and less than 100 m in other deposits within the model space. The majority of the drilling done to date is represented by fans of angled holes perpendicular to the main trend of the district (NW-SE). The holes have intersected mineralization at variable angles producing both true- and apparent-thickness intercepts. Drilling in the resource area under semi-transparent topography is shown in Figure 14.3.1.

Drilling techniques included exclusively HQ- and NQ-sized diamond drill core. Samples were collected a one-half core splits using a diamond-bladed saw on 2 to 3 m intervals. Sampling produced an approximate 1.5 kg mass, of which a 250 g split was pulverized to produce a charge for fire assay for gold and four acid digestion and multi-element analysis with ICP-AES or ICP-OES for all other elements. Quality control data for the analytical database have been reviewed by the Qualified Person and were deemed acceptable for resource estimation.

14.4 Topography

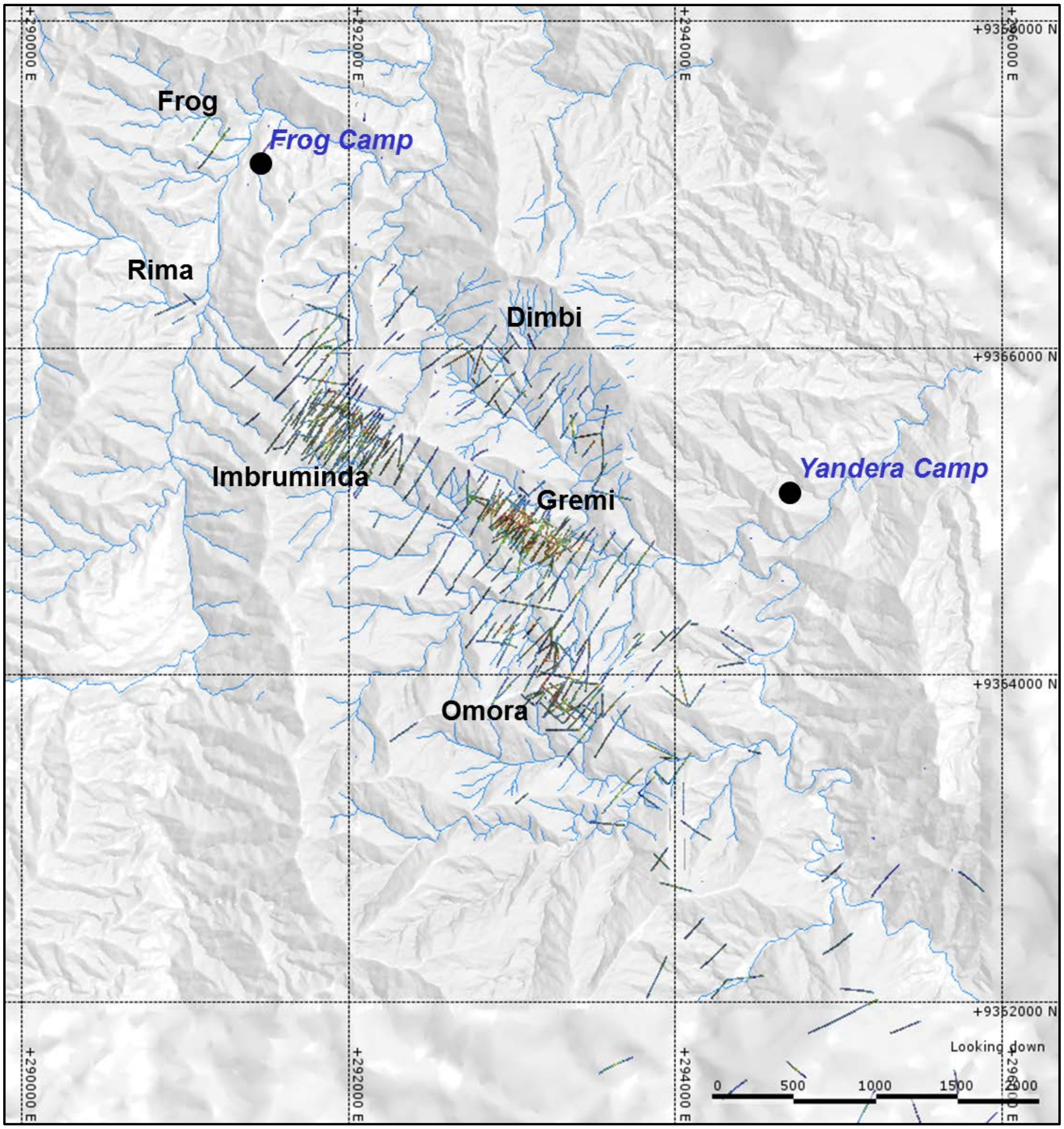
The topographic surface used for this resource report was taken from two sources provided by Marengo. The first was a regional survey at a lower precision of 40 m contours referred to as the Bundi surface, which is from the 2012 1:100,000 Bundi quad published by the Mineral Resources Authority of PNG (Timm, 2012). The second surface provided by Marengo was a much higher resolution surface (1 m contours) referred to as the LiDAR survey that covered a much smaller arear directly covering the model area. SRK patched the high resolution LiDAR surface into the Lower Resolution Bundi surface, which then served as the basis for SRK's work.

14.5 Geologic Model

Yandera is a porphyry copper deposit that, until this 2015 effort, was interpreted as a typical zoned porphyry system, where it was assumed there was a late, barren core surrounded by a concentric pattern of potassic and phyllic alteration. Based on the combined work from SRK and Marengo for this report, it became apparent that the deposit is more complex and structurally controlled and the application of the underlying geology would need to be updated to refine the block model.

Yandera is an igneous-hosted, structurally-controlled copper porphyry system comprised of a series of adjacent deposits along recognized structural trends. Mineralization is related to multiple pulses of intrusive rock and hydrothermal alteration. Grade has spatial correlation with late dacite intrusions and polymictic breccias with over-printing phyllic alteration.

Within the modeled area, broad tabular zones of copper mineralization extend from surface to depths of over 500 m and have been drill-defined to a strike length of over 5km.

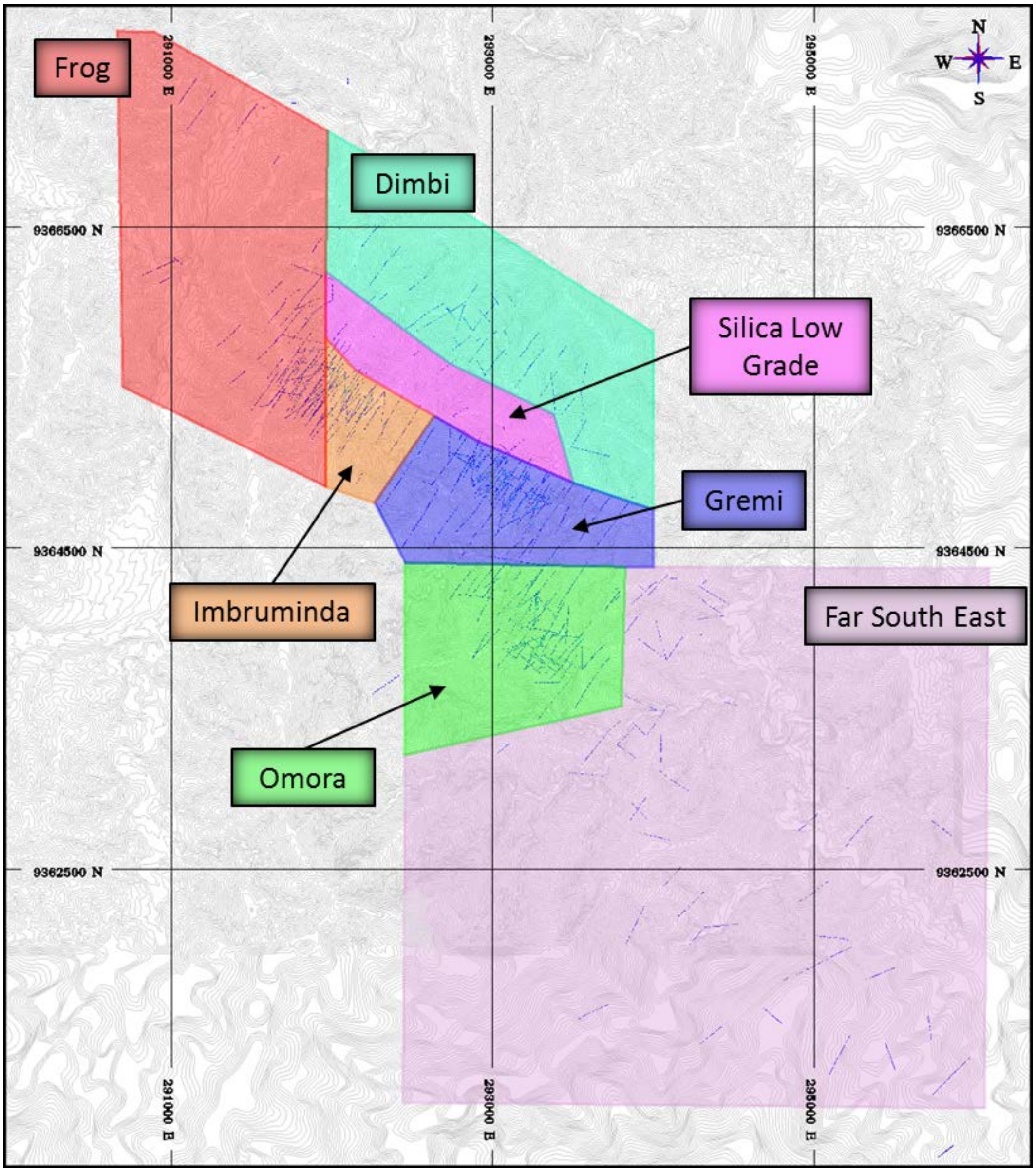


Source: SRK, 2015

Figure 14.3.1: Resource Area Drilling

14.6 Mineral Domains

Modeling began with an analysis of the deposit's structural controls which included a considerable amount of oriented drill core data that had not previously been used for modeling at Yandera. Based on the analysis of this structural data and taking into account the sample grades and lithology data, the deposit was divided into seven areas that were used to control the initial geostatistical evaluation. These model areas are shown in Figure 14.6.1.



Source: SRK, 2015

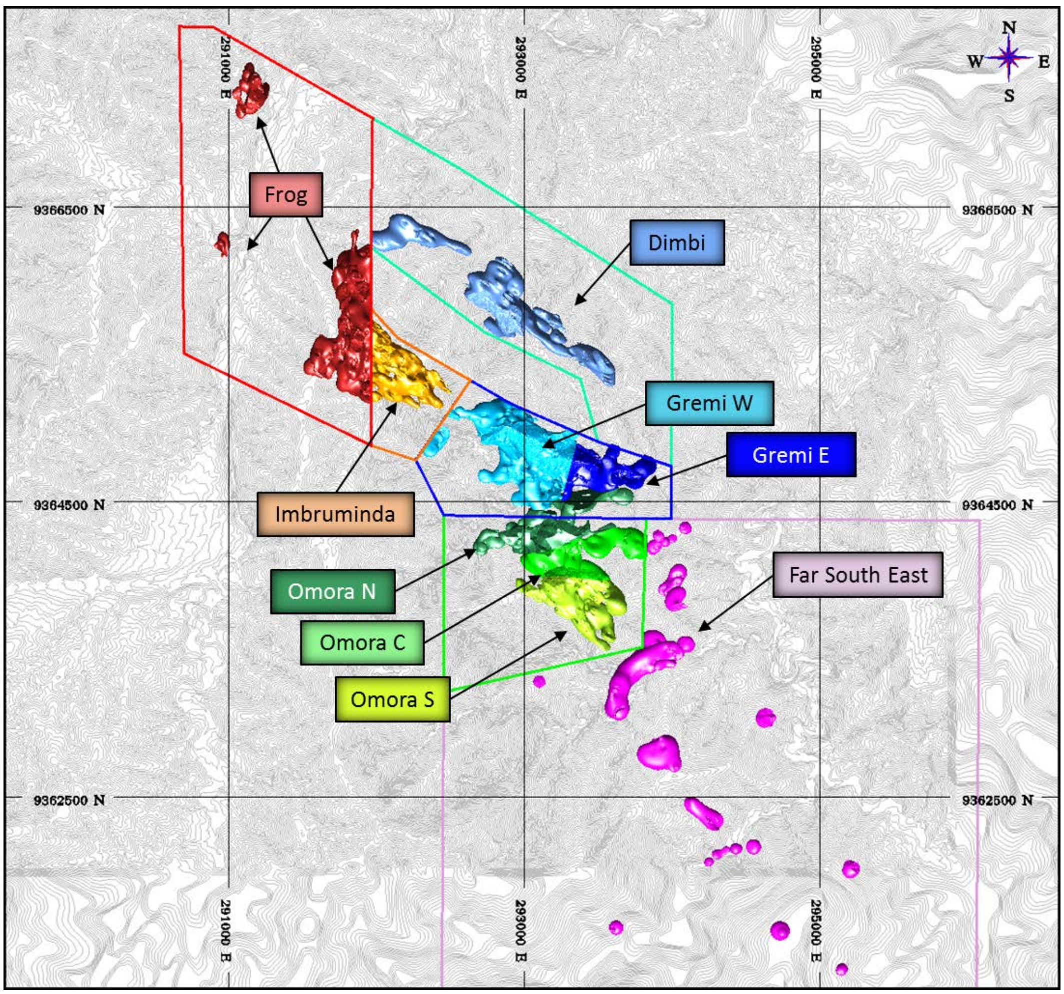
Figure 14.6.1: Yandera Model Areas

Box Plots were examined for each model area to determine if there were distinct populations within the separate Model Areas. From the statistics in combination structural interpretations, it was determined that the Gremi Model Area would be broken into two separate domains and the Omora

Model Area would be broken into three separate domains. For each metal (Cu, Mo, Au), nine gradeshells were generated to control the interpolation. These gradeshells are commonly referred to as interpolation domains in this report.

To generate gradeshells for each metal, the raw assay data was converted to 5 m fixed length composites in Leapfrog™ modeling software and closed wireframes were built for each metal using both explicit and implicit modeling methods. The exercise took into account grade, structure, and lithology.

For the primary metal, copper, wireframes were constructed around composites using a cut-off of 0.15% Cu. This cut-off was determined based on early estimates of the project economics. Low grade intervals that are internal to the overall gradeshell were included in the domain to account for internal dilution that would be expected during mining. The nine copper interpolation domains relative to their corresponding Model Areas are shown in Figure 14.6.2.



Source: SRK, 2015

Figure 14.6.2: Copper Interpolation Domains within Yandera Model Areas

For molybdenum and gold, wireframes were constructed around composites using a cut-off of 25 ppm Mo, and 0.025 ppm Au. These relatively low CoGs were chosen in order to generate wireframes that approximated of the volume of the copper gradeshells. By insuring that the blocks containing estimated copper grades were also populated with ancillary metal grades, even at low concentrations, SRK was able to account for the molybdenum and gold that could potentially be recovered as a byproduct during eventual copper extraction. The resulting nine Mo interpolation domains and nine Au interpolation domains are similar to those shown for copper in Figure 14.6.2.

Detailed geostatistics were then analyzed using the assay intervals that fell within each of these interpolation domains to determine high grade capping values. The capped grades were used to generate a new set of fixed 5 m length composites within each domain for interpolation.

14.7 Oxide Modeling

Metallurgical material types determine ore processing methods and metal recovery. The main goal of oxide modeling was to define a horizon at the top of material suitable for sulfide flotation processing, referred to interchangeably here as non-oxide or hypogene. Oxidized material above the hypogene may be suitable for acid-leach processing.

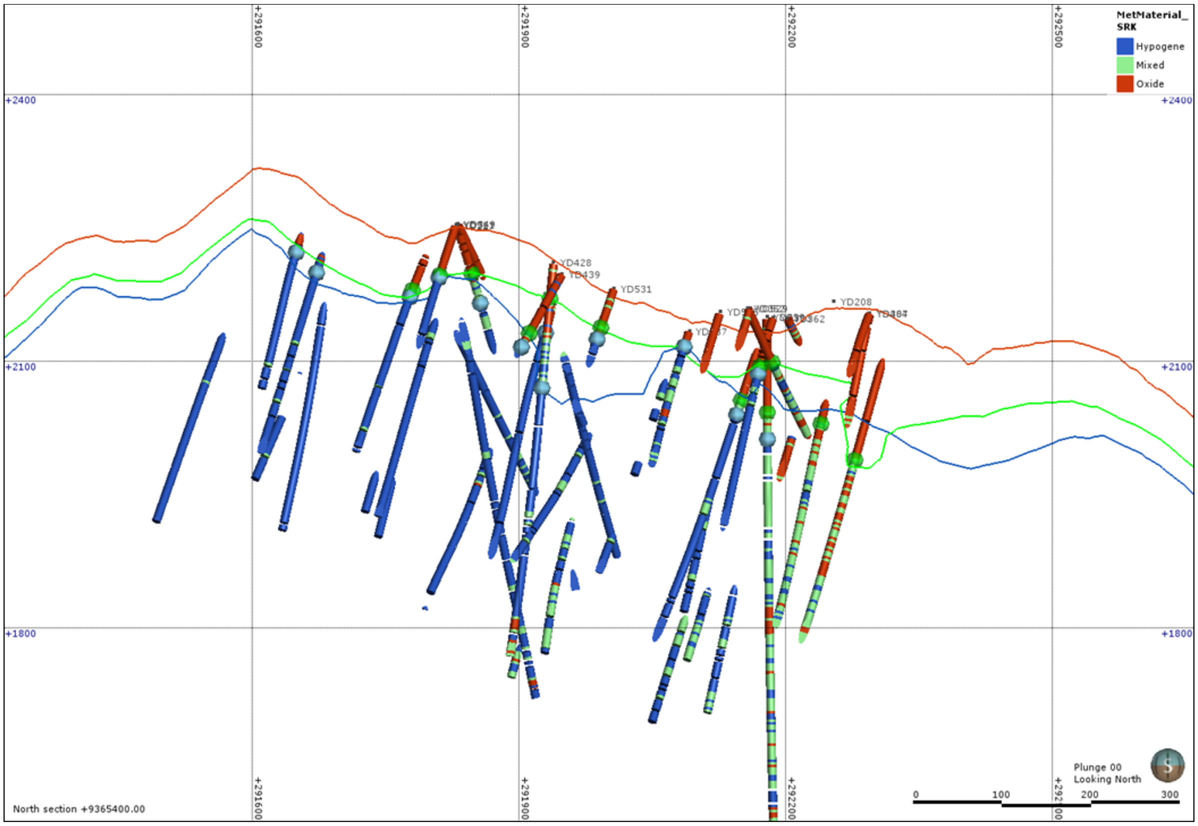
The metallurgical materials defined by recent test work (ARCCON, 2013) are summarized in Table 14.7.1. Although the empirically determined S:Cu threshold is different in Gremi than in the rest of the deposit, this difference does not result in a significantly different depth to the modeled bottom of oxidation. The S:Cu ratios change by orders of magnitude, and the ratio values change abruptly, rather than gradationally between material types. Note that the stated copper recovery for oxide material in Table 14.7.1 was not used for resource reporting; those recoveries were established using the full body of metallurgical data available.

Table 14.7.1: Metallurgical Materials and Approximate Copper Recoveries by Flotation

S:Cu	Material	Recovery of Copper by Flotation
< 0.3	Oxide, Gremi	60% to 65%
< 0.5	Oxide, Others	60% to 65%
0.3 to 0.9	Transition, Gremi	80%
0.5 to 0.9	Transition, Others	80%
>0.9	Non-Oxide, All	>95%

Source: SRK, 2015

Geological logging included visual estimation of oxidation extent, but the appearance of the material does not always correlate with the metallurgical material type. Using the calculated S:Cu values and deposit area coding, material types were assigned to sample intervals according to the table above. Only Marengo drillhole samples have sulfur data, and samples with either sulfur or copper results below the method detection limit were not assigned a material type. There were 47,157 samples with a material type assigned according to ratio values, and an additional 212 channel samples from Alpha and Bravo Adits at Gremi with assigned material types. Using Leapfrog™ software, contact points between oxide/ transition and transition/ non-oxide horizons were generated. This process did not generate single contact points for each drillhole, and additional geological and geochemical interpretation was required to build boundary surfaces. To constrain the oxide boundary in areas without sufficient drillhole data, the interpolation between contact points included an offset from the topographic surface. This approach ensured that the oxidation horizon would be below topography, and did not require extensive digitization. An example of the resulting modeled metallurgical materials is shown in Figure 14.7.1.



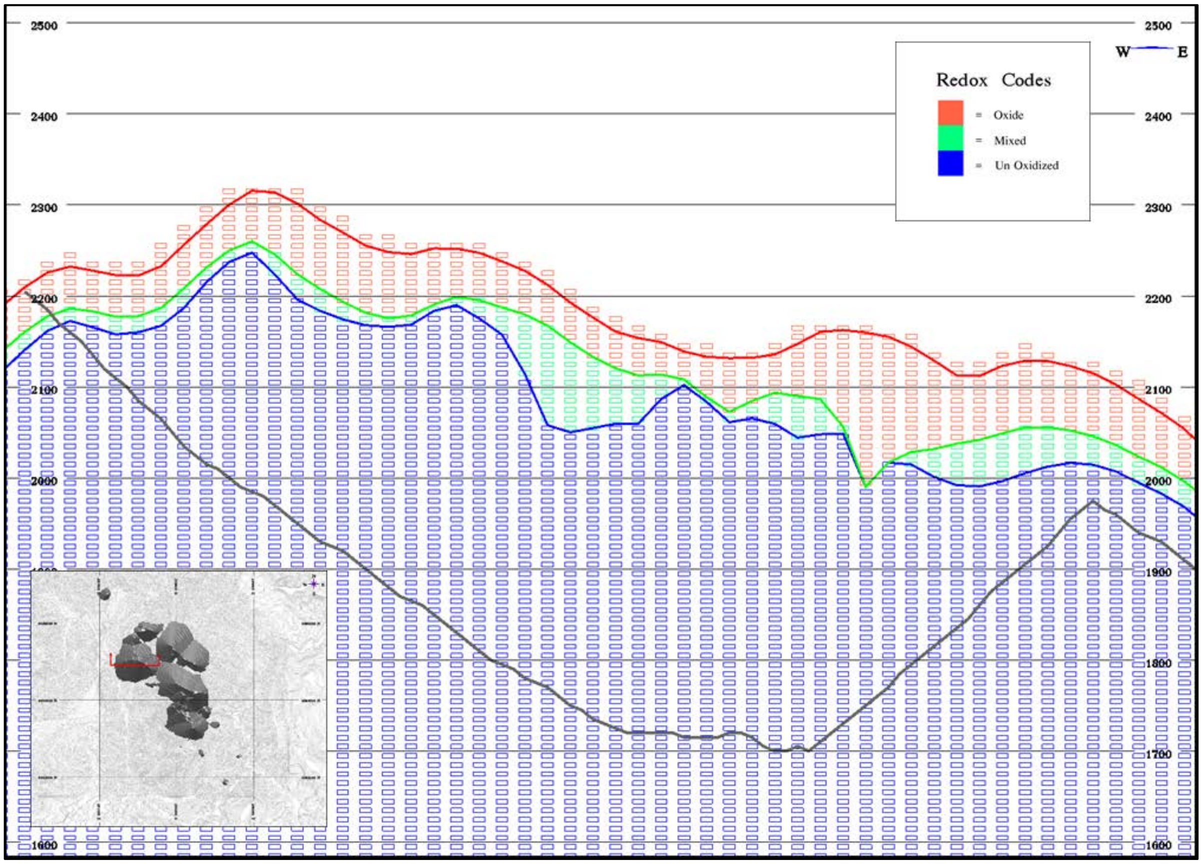
Source: SRK, 2015

Figure 14.7.1: Modeled Oxidation Boundaries with Drillhole Contact points, East-West Section at 9,365,400 m North

The S:Cu value is a defensible proxy for material type definition in lieu of acid-soluble copper data, especially for oxidized material. Oxidation strongly depletes sulfur in all deposit settings. Therefore, the maximum depth of sulfur depletion is a reliable indicator for the bottom of oxidation. This parameter was used to validate the S:Cu interpretation during modeling and therefore, the depth of modeled oxidation is unlikely to change significantly with the addition of acid-soluble copper data to the data set.

From testwork, copper recovery for transition material is comparable to recovery for hypogene material, and the transition zone is typically less than 20 m thick. Therefore, transition material was grouped with hypogene material for resource reporting. For flotation processing, weakly to moderately oxidized material can be blended with hypogene material without detriment to overall copper recovery.

The modeled oxide and transition boundary surfaces were used to code the block model by majority. The default code assigned to all blocks was hypogene, then all blocks with more than 50% volume above the transition boundary were coded as transition material. Next, all blocks with more than 50% volume above the oxide boundary were coded as oxide material. This approach ensured that the bottom of oxide boundary had priority over the other material types, to reflect the limited metal recovery of the material and to honor available data. Topography was coded to blocks as a separate item, and was not applied for oxidation coding. The resulting oxide coding in the block model at the same section location as the figure above is shown in Figure 14.7.2.



Source: SRK, 2015

Figure 14.7.2: Oxidation Coding in 2015 Block Model, East-West Section at 9,365,400 m North

Oxidation extent influences material density. The modeled oxidation zones were used to assign average density values to blocks without interpolated values. The density modeling process is discussed in Section 14.13.

14.8 Block Model

The resource block model was informed by 35,250 samples from 553 drillholes at an average drillhole spacing less than 30 m in the principal resource areas (Gremi, Imbruminda, and Omora) and less than 100 m in other deposits within the model space. Based on this drillhole spacing and anticipated surface mining methods and bench heights, it was decided that a 25 m x 25 m x 10 m (XYZ) block size would be appropriate. To properly account for the volume of material within the interpolation domains, the percentage of each block within the domain was stored to the model for each element. Estimated grades then only apply to the portion of the block corresponding to that elements block percentage. This is referred to as an “ore percent” model.

The model extents, which include all of the model areas, are listed in Table 14.8.1. The Yandera 3D block model items and definitions for the 2015 SRK resource model are included in Table 14.8.2.

Table 14.8.1: Yandera 3D Block Model Extents

Coordinate	Minimum (m)	Maximum (m)	Size (m)	No. Blocks
Easting	290,000	296,250	25	250
Northing	9,360,750	9,368,000	25	290
Elevation	700	2,800	10	210
Total No. Blocks				**15,225,000**

Source: SRK, 2015

Table 14.8.2: Yandera 3D Block Model Items

Item	Min	Max	Prec.	Description
TOPO	0	100	0.1	Percentage of each block below topography
MAREA	0	10	1	Model Area - Based on Structure
CLASS	0	5	1	Material Classification (1=Measured, 2=Indicated, 3= Inferred)
REDOX	0	5	1	Oxidation State for Block (1=Oxide, 2=Mixed, 3=Non-Oxide)
SG	0	5	0.001	Specific Gravity - OK interpolation
CUEQ	0	10	0.0001	CuEq Grade (%)
CUEQ%	0	100	0.1	Percentage of each block within the union of all grade domains
CUEQT	0	2000	0.01	CuEq Tonnes
CUDOM	0	100	1	Copper Interpolation Domain
CUDM%	0	100	0.1	Percentage of each block within the copper domain
CUDIL	0	5	0.0001	Diluted Copper Grade (%) – Not Used
CUOK	0	5	0.0001	Copper Grade (%) - Estimated with OK
CUNN	0	5	0.0001	Copper Grade (%) - Estimated with NN
CUTON	0	2000	0.01	Tonnes of Copper in block
CUDCL	0	1000	1	Distance to closest composite for Cu OK estimation
CUDAV	0	1000	1	Average distance to composites for Cu OK estimation
CUNCP	0	20	1	Number of composites used for Cu OK estimation
CUNDH	0	10	1	Number of drillholes used for Cu OK estimation
CUPAS	0	5	1	Interpolation pass for Cu OK Estimation
MODOM	0	100	1	Moly Interpolation Domain
MODM%	0	100	0.1	Percentage of each block within the Moly domain
MODIL	0	5	0.0001	Diluted Moly Grade (%) – Not Used
MOOK	0	5	0.0001	Moly Grade (%) - Estimated with OK
MONN	0	5	0.0001	Moly Grade (%) - Estimated with NN
MOTON	0	2000	0.01	Tonnes of Moly in block
MODCL	0	1000	1	Distance to closest composite for Mo OK estimation
MODAV	0	1000	1	Average distance to composites for Mo OK estimation
MONCP	0	20	1	Number of composites used for Mo OK estimation
MONDH	0	10	1	Number of drillholes used for Mo OK estimation
MOPAS	0	5	1	Interpolation pass for Mo OK Estimation
AUDOM	0	100	1	Gold Interpolation Domain
AUDM%	0	100	0.1	Percentage of each block within the Gold domain
AUDIL	0	4	0.0001	Diluted Gold Grade (ppm) – Not Used
AUOK	0	4	0.0001	Gold Grade (ppm) - Estimated with OK
AUNN	0	4	0.0001	Gold Grade (ppm) - Estimated with NN
AUOZ	0	2000	0.01	Troy ounces of Gold in block
AUDCL	0	1000	1	Distance to closest composite for Au OK estimation
AUDAV	0	1000	1	Average distance to composites for Au OK estimation
AUNCP	0	20	1	Number of composites used for Au OK estimation
AUNDH	0	10	1	Number of drillholes used for Au OK estimation
AUPAS	0	5	1	Interpolation pass for Au OK Estimation
PIT	0	2	1	Flag for blocks in resource pit. (1 = In Pit)
CUDIF	0	100	1	Difference between NN and OK Copper grades in model

Source: SRK, 2015

14.9 Assay Capping

To prevent extremely high grade values from over-influencing block grade estimates, the assay grades before compositing were capped within each interpolation domain. To determine the appropriate capping values, Log Cumulative Probability Plots (CPPs) were generated for all of the assays by domain. Statistical outliers of the raw assays in each domain were capped. The results of the capping exercise are listed in Tables 14.9.1 through 14.9.3 for each set of mineral domains.

Table 14.9.1: Copper Assay Capping Values by Cu Interpolation Domain

Cu Interpolation Domain	Cu Cap (%)
Frog	2.50
Imbruminda	3.00
Gremi East	1.80
Gremi West	3.20
Omora North	2.00
Omora Central	2.00
Omora South	2.00
Dimbi	3.00
Far South East	1.00

Source: SRK, 2015

Table 14.9.2: Molybdenum Assay Capping Values by Mo Interpolation Domain

Mo Interpolation Domain	Mo Cap (%)
Frog	0.20
Imbruminda	0.30
Gremi East	0.10
Gremi West	0.30
Omora North	0.09
Omora Central	0.20
Omora South	0.70
Dimbi	0.30
Far South East	0.07

Source: SRK, 2015

Table 14.9.3: Gold Assay Capping Values by Au Interpolation Domain

Au Interpolation Domain	Au Cap (ppm)
Frog	2.00
Imbruminda	2.80
Gremi East	0.55
Gremi West	4.00
Omora North	1.00
Omora Central	2.00
Omora South	0.40
Dimbi	1.10
Far South East	No Cap

Source: SRK, 2015

14.10 Compositing

The raw assay database was back-coded with the mineral domain wireframes described in Section 14.6, resulting in 35,250 copper assays within the Cu mineral domains, 32,895 molybdenum assays within the Mo mineral domains, and 38,453 gold assays within the Au mineral domains. The Mo and Au domains had a larger volume than the Cu domain. These coded assays were then composited by mineral domain to a fixed 5 m down-hole length. This resulted in a unique composite file for each economic metal that could then be used in interpolation.

Summary statistics for each composite file are provided in Table 14.10.1 through Table 14.10.3.

Table 14.10.1: Yandera Copper Composite Statistics by Cu Mineral Domain

Mining Area	No. Composites	Minimum (Cu%)	Maximum (Cu%)	Mean (Cu%	Co. of Variation
10 Frog	3,406	0.0	2.50	0.31	0.71
20 Imbruminda	2,568	0.018	3.00	0.37	0.79
31 Gremi East	651	0.018	1.71	0.32	0.65
32 Gremi West	4,887	0.032	3.20	0.41	0.75
41 Omora North	796	0.041	1.60	0.32	0.69
42 Omora Central	610	0.024	1.95	0.36	0.73
43 Omora South	1,436	0.021	2.00	0.40	0.82
50 Dimbi	1,267	0.021	2.69	0.39	0.89
70 Far South East	676	0.027	0.89	0.26	0.51

Source: SRK 2015

Table 14.10.2: Yandera Molybdenum Composite Statistics by Mo Mineral Domain

Mining Area	Valid	Minimum (Mo%)	Maximum (Mo%)	Mean (Mo%)	Co. of Variation
10 Frog	2,884	0.000	0.148	0.010	1.33
20 Imbruminda	2,512	0.000	0.300	0.015	1.47
31 Gremi East	757	0.001	0.100	0.012	1.03
32 Gremi West	4,784	0.000	0.293	0.016	1.41
41 Omora North	683	0.000	0.089	0.009	1.17
42 Omora Central	540	0.000	0.200	0.018	1.57
43 Omora South	929	0.000	0.684	0.030	2.44
50 Dimbi	1,295	0.000	0.185	0.012	1.51
70 Far South East	672	0.000	0.069	0.008	0.84

Source: SRK 2015

Table 14.10.3: Yandera Gold Composite Statistics by Au Mineral Domain

Au Mineral Domain	No. Composites	Minimum (Au ppm)	Maximum (Au ppm)	Mean (Au ppm)	Co. of Variation
10 Frog	4,540	0.000	1.79	0.088	1.25
20 Imbruminda	3,618	0.000	2.75	0.145	1.37
31 Gremi East	794	0.000	0.47	0.068	0.92
32 Gremi West	4,728	0.000	1.49	0.101	1.23
41 Omora North	735	0.001	0.93	0.106	1.31
42 Omora Central	483	0.006	1.48	0.099	1.75
43 Omora South	675	0.000	0.32	0.046	0.74
50 Dimbi	1,789	0.000	0.89	0.080	1.25
70 Far South East	107	0.009	0.33	0.049	0.76

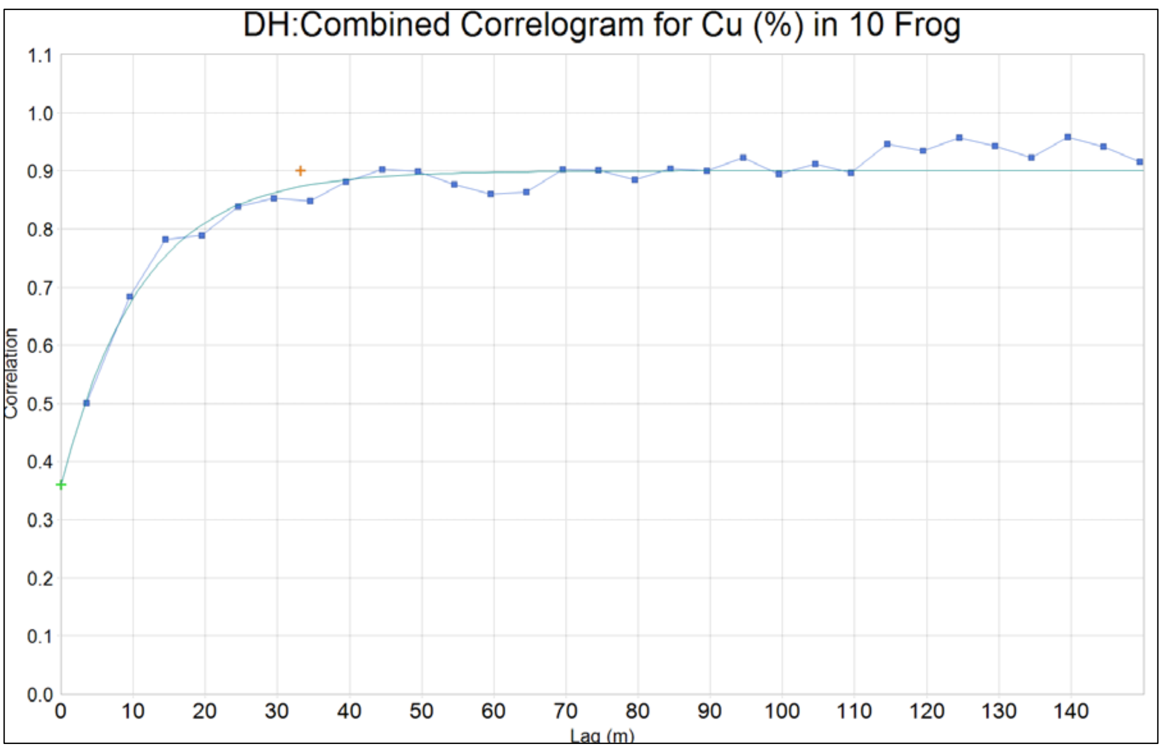
Source: SRK 2015

14.11 Variogram Analysis and Modeling

Variography was carried out on the 5 m composites by interpolation domain. To facilitate this work SRK used the MineSight® Data Analysis tool kit to develop a series of correlograms, (semi-variograms where the sill has been normalized to 1.0), for each mineral domain.

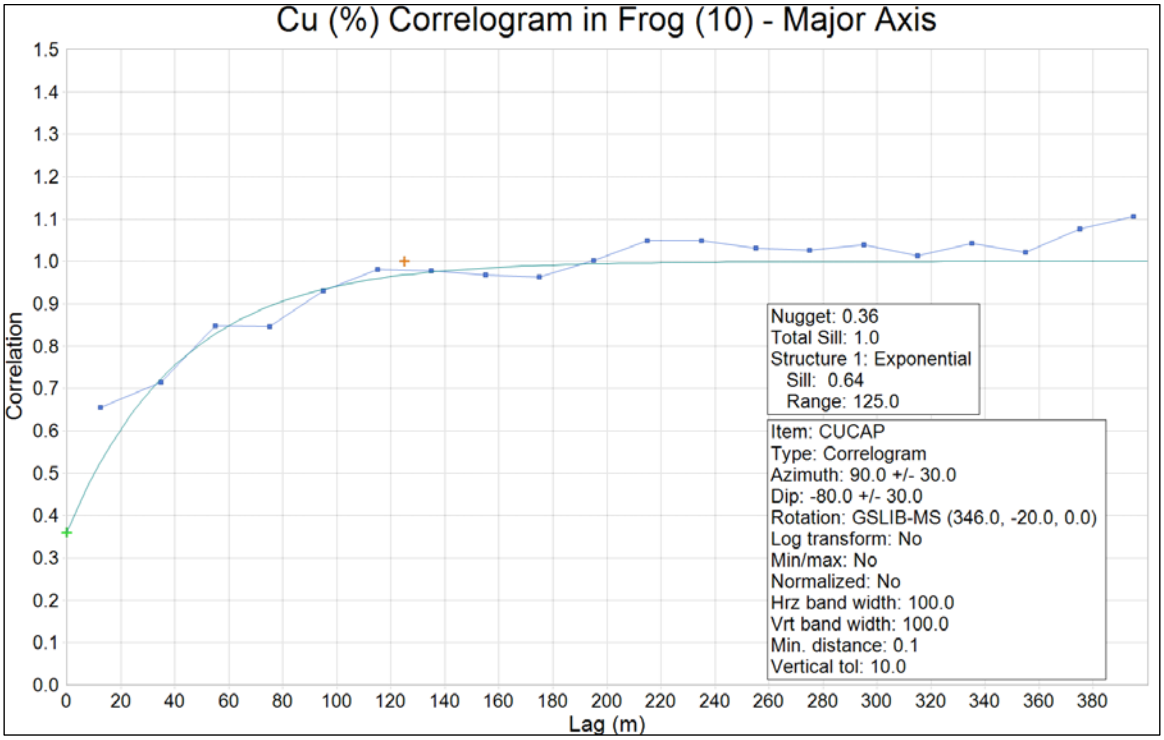
Before developing the 3D correlograms for each mineral domain, the nugget effect was determined by calculating a downhole variogram. The nugget value was then applied to the variogram models.

The variogram for each interpolation domain was controlled fundamentally by a geologic interpretation (lithology, structure, alteration) of that domain. From that original starting orientation, variograms were then adjusted slightly by changing the search directions by a few degrees around each axis to investigate if the initial directions could be improved. In addition to the geologic based variography, an array of variograms was run in all directions in 200 to 300 windows for every interpolation domain. These variograms were then inspected individually and also run through MineSight's 3D Variogram Modeling tool to determine if there was correlation of data in a direction different from those that were initially interpreted. Once this work was completed a final set of directions and search ranges were chosen. The downhole, major, semi-major, and minor direction correlograms for the Frog Cu Interpolation Domain are provided as an example in Figure 14.11.1 through Figure 14.11.4.



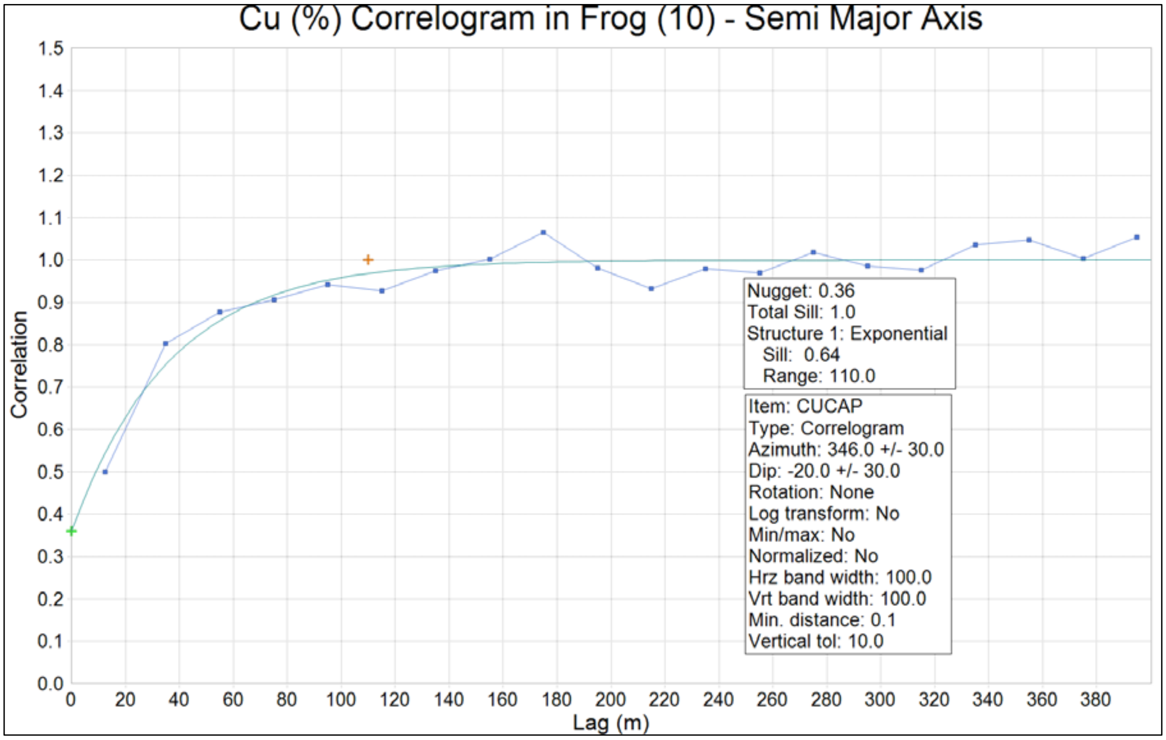
Source: SRK, 2015

Figure 14.11.1: Copper Downhole Correlogram - Frog Interpolation Domain



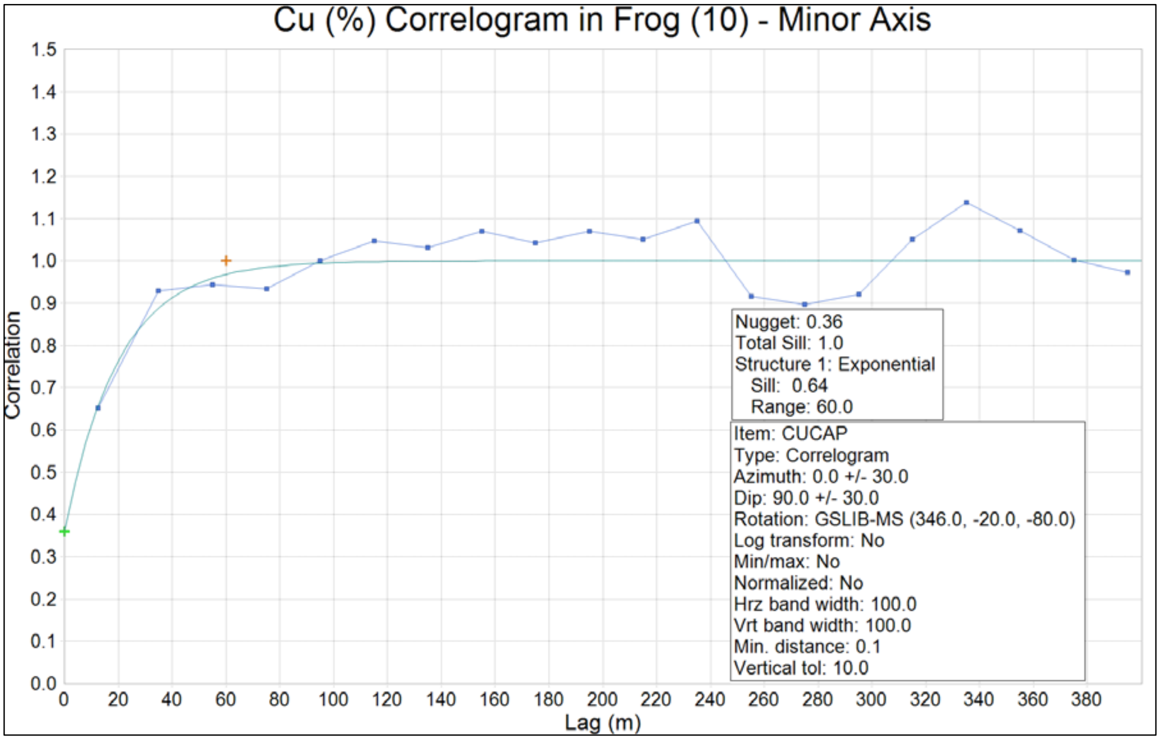
Source: SRK, 2015

Figure 14.11.2: Copper Correlogram - Major Axis - Frog Interpolation Domain



Source: SRK, 2015

Figure 14.11.3: Copper Correlogram - Semi Major Axis - Frog Interpolation Domain



Source: SRK, 2015

Figure 14.11.4: Copper Correlogram - Minor Axis - Frog Interpolation Domain

The variogram parameters for the copper, molybdenum, and gold interpolation domains are provided in Table 14.11.1,Table 14.11.2, and Table 14.11.3, respectively.

Table 14.11.1: Copper Variogram Parameters by Cu Interpolation Domain

Copper Interpolation Domain	Frog	Imbruminda	Gremi East	Gremi West	Omora North	Omora Central	Omora South	Dimbi	Far South East
Major Axis Rotation (deg)	318.73	306	300	300	110	137	137	160	80
Semi Major Axis Rotation (deg)	67.73	-70	-25	-25	10	-40	-40	-35	-10
Minor Axis Rotation (deg)	-64.5	60	80	80	80	60	60	30	90
Major Axis Range (m)	125	180	145	145	100	160	160	140	285
Semi Major Axis Range (m)	110	150	130	130	100	95	95	55	150
Minor Axis Range (m)	60	25	105	105	40	70	70	45	50
Nugget Effect	0.36	0.3	0.35	0.35	0.45	0.28	0.28	0.44	0.55

Source: SRK, 2015

Table 14.11.2: Molybdenum Variogram Parameters by Mo Interpolation Domain

Molybdenum Interpolation Domain	Frog	Imbruminda	Gremi East	Gremi West	Omora North	Omora Central	Omora South	Dimbi	Far South East
Major Axis Rotation (deg)	186.28	306	300	145.41	110	137	137	160	80
Semi Major Axis Rotation (deg)	-9.39	-80	90	-37.16	30	-40	-40	-35	-10
Minor Axis Rotation (deg)	-86.55	40	0	-73.99	-40	30	30	30	90
Major Axis Range (m)	190	170	220	225	90	200	200	140	285
Semi Major Axis Range (m)	170	120	65	180	80	125	125	55	150
Minor Axis Range (m)	60	50	45	55	55	50	50	45	50
Nugget Effect	0.4	0.55	0.45	0.4	0.5	0.1	0.1	0.44	0.55

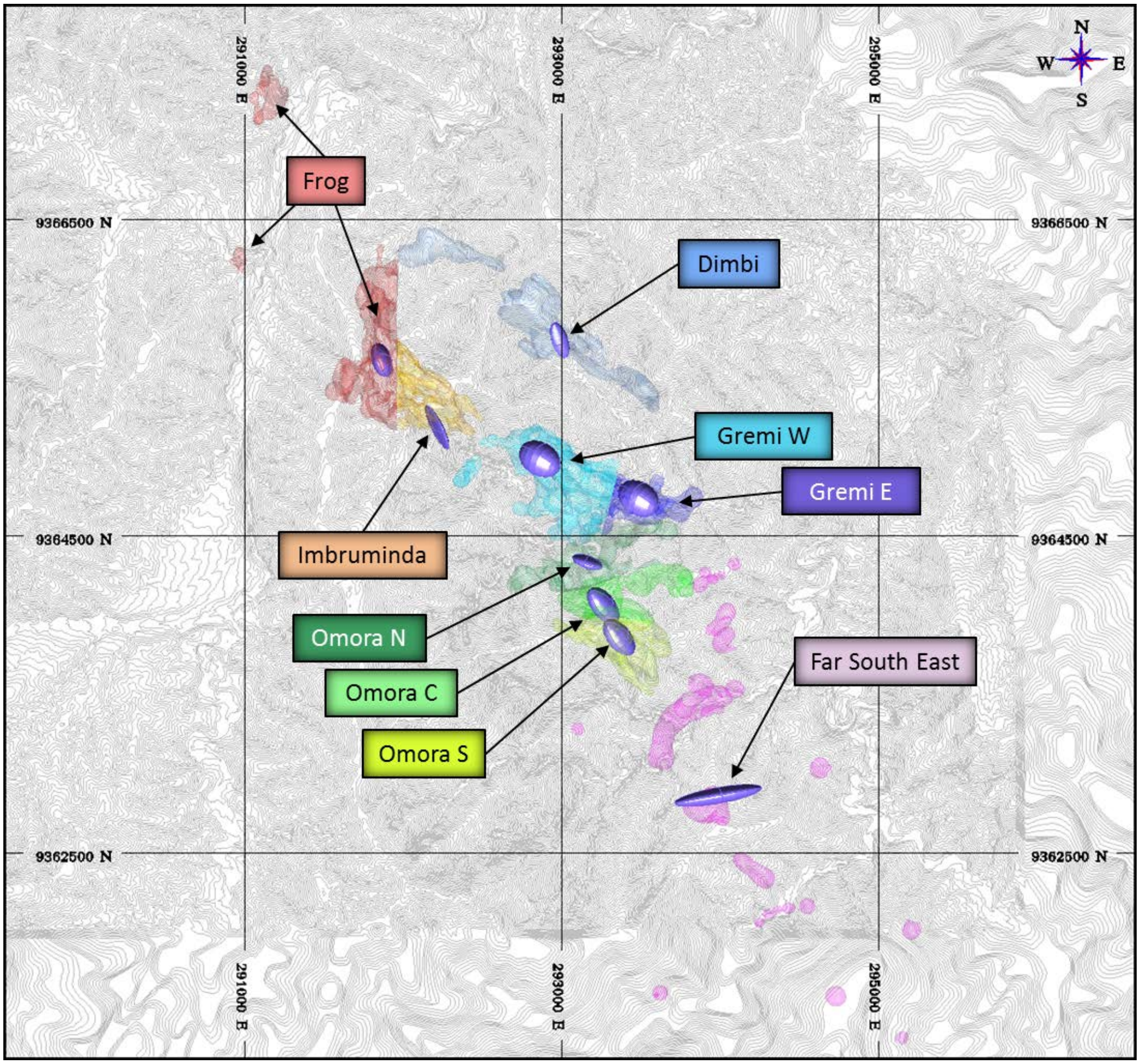
Source: SRK, 2015

Table 14.11.3: Gold Variogram Parameters by Au Interpolation Domain

Gold Interpolation Domain	Frog	Imbruminda	Gremi East	Gremi West	Omora North	Omora Central	Omora South	Dimbi	Far South East
Major Axis Rotation (deg)	140	297	309	309	80	28	28	309	320
Semi Major Axis Rotation (deg)	10	-40	70	70	-40	-20	-20	70	0
Minor Axis Rotation (deg)	-40	70	-70	-70	70	-80	-80	-70	90
Major Axis Range (m)	300	300	250	250	125	130	130	250	200
Semi Major Axis Range (m)	150	110	120	120	65	68	68	120	170
Minor Axis Range (m)	80	50	90	90	40	30	30	90	55
Nugget Effect	0.3	0.2	0.3	0.3	0.25	0.25	0.25	0.3	0.75

Source: SRK, 2015

As a reference, Figure 14.11.5 has been included to show the copper variogram search ellipses defined in Table 14.11.3 relative to their corresponding Cu Interpolation Domains.



Source: SRK, 2015

Figure 14.11.5: Copper Search Ellipses Relative to Copper Interpolation Domains

14.12 Grade Estimation

Copper, molybdenum, and gold grades were estimated using a three pass OK method within each mineral interpolation domain. Grade estimation was repeated using polygonal methods (nearest neighbor - NN) to facilitate model validation. The SRK polygonal method used one composite to estimate each block and applied anisotropy that approximated the directional distance weighting used in the OK estimate.

The first pass was limited to data very close to the composites at approximately one third of the variogram range and required at least four composites from a minimum of two holes. This distance factor was adjusted until the SRK QP was satisfied that the blocks estimated in the first pass represented an appropriate volume given the density of the source data. This short first pass ensures that blocks close to composite data have grades consistent with the composite data.

The second interpolation pass was limited to data within roughly two thirds the variogram range and required at least three composites from two drillholes. This distance factor was adjusted until the estimated blocks filled a volume appropriate given the density of the source data.

The third pass was given a large search radius and a minimum of one composite from one drillhole to ensure that all blocks within the interpolation domain were estimated.

The key interpolation parameters for the copper OK estimate are shown in Table 14.12.1.

Table 14.12.1: Ordinary Kriging Interpolation Parameters for the Yandera Copper Estimation

Interpolation Domain	Frog			Imbruminda			Gremi East			Gremi West			Omora North			Omora Central			Omora South			Dimbi			Far South East		
Composite Domains Used	Frog			Imbruminda			Gremi East			Gremi West			Omora North			Omora Central & South			Omora Central & South			Dimbi			Far South East		
Interpolation Pass	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long
Search Parameters																											
Rotation - Major (^{o})	319	319	319	306	306	306	300	300	300	300	300	300	110	110	110	137	137	137	137	137	137	160	160	160	80	80	80
Rotation - Semi Major (^{o})	68	68	68	-70	-70	-70	-25	-25	-25	-25	-25	-25	10	10	10	-40	-40	-40	-40	-40	-40	-35	-35	-35	-10	-10	-10
Rotation - Minor (^{o})	-64.5	-64.5	-64.5	60	60	60	80	80	80	80	80	80	80	80	80	60	60	60	60	60	60	30	30	30	90	90	90
Search Range Factor	0.33	0.93	5.00	0.33	0.83	5.00	0.33	0.83	5.00	0.20	0.60	5.00	0.50	1.25	5.00	0.33	1.00	5.00	0.33	1.00	6.00	0.67	2.00	5.00	0.60	2.00	5.00
Search Distance - Major (m)	42	117	625	60	150	900	49	121	725	29	87	725	50	125	500	54	160	800	54	160	960	94	280	700	171	570	1425
Search Distance - Semi Major (m)	37	103	550	50	125	750	44	109	650	26	78	650	50	125	500	32	95	475	32	95	570	37	110	275	90	300	750
Search Distance - Minor (m)	20	56	300	9	21	125	35	88	525	21	63	525	20	50	200	24	70	350	24	70	420	30	90	225	30	100	250
Min No. Comps to Estimate	4	3	1	4	3	1	4	3	1	4	3	1	4	3	1	4	3	1	4	3	1	4	3	1	4	3	1
Max No. Comps to Estimate	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Max No. Comps per Hole	3	2	2	3	2	2	3	2	2	3	2	2	3	2	2	3	2	2	3	2	2	3	2	2	3	2	2
Split Octant Declustering																											
Max No. Composites Per Octant	3	3	2	3	3	2	3	3	2	3	3	2	3	3	2	3	3	2	3	3	2	3	3	2	3	3	2
Max No. Adjacent Empty Octants	8	10	15	8	10	15	8	10	15	8	10	15	8	10	15	8	10	15	8	10	15	8	10	15	8	10	15
Correlogram Parameters																											
1st Structure Range - Major (m)	125	125	125	45	45	45	50	50	50	50	50	50	100	100	100	160	160	160	160	160	160	140	140	140	285	285	285
1st Structure Range - Semi Major (m)	110	110	110	40	40	40	75	75	75	75	75	75	100	100	100	95	95	95	95	95	95	55	55	55	150	150	150
1st Structure Range - Minor (m)	60	60	60	13	13	13	70	70	70	70	70	70	40	40	40	70	70	70	70	70	70	45	45	45	50	50	50
1st Structure Sill (m)	0.64	0.64	0.64	0.52	0.52	0.52	0.5	0.5	0.5	0.5	0.5	0.5	0.55	0.55	0.55	0.72	0.72	0.72	0.72	0.72	0.72	0.56	0.56	0.56	0.45	0.45	0.45
2nd Structure Range - Major (m)		N/A		180	180	180	145	145	145	145	145	145		N/A			N/A			N/A			N/A			N/A	
2nd Structure Range - Semi Major (m)				150	150	150	130	130	130	130	130	130															
2nd Structure Range - Minor (m)				25	25	25	105	105	105	105	105	105															
2nd Structure Sill (m)				0.18	0.18	0.18	0.15	0.15	0.15	0.15	0.15	0.15															
Nugget Effect	0.36	0.36	0.36	0.3	0.3	0.3	0.35	0.35	0.35	0.35	0.35	0.35	0.45	0.45	0.45	0.28	0.28	0.28	0.28	0.28	0.28	0.44	0.44	0.44	0.55	0.55	0.55
Outlier Restrictions																											
Composite outlier CoG (%)	999	2	1.5	999	2.25	1.25	999	1.2	0.8	999	2.3	1.75	999	1.5	0.75	1.5	0.9	0.4	999	1.5	1	999	2	1	0.4	0.3	0.2
Outlier Distance of Influence (m)	-999	-75	-50	-999	-75	-50	-999	-75	-50	-999	-20	-10	-999	-20	-10	70	-20	-10	-999	-20	-10	-999	-20	-10	-30	-75	-50

A positive distance of influence means an outlier composite is not used beyond the distance of influence. A negative value means an outlier grade is capped to the CoG beyond the distance of influence
Source: SRK, 2015

SRK applied outlier restrictions to each interpolation run. These outlier restrictions limit the composites distance of influence above a specified grade and can either make those composites invisible to blocks beyond a certain distance, or cap those values to a lower grade beyond a given distance. These outlier restrictions were adjusted for each run until the resulting grades validated both visually and statistically.

14.13 Density Modeling

Following Marengo's 2012 exploration drilling, there was a high priority placed on density sampling. This density sampling program increased the original data set from approximately 200 samples to one that now contains 3,985 density measurements. The new sampling is well distributed within the modeled volume of rock and facilitated interpolation of density, rather than a strict assignment by material type as had been done previously.

Due to the relatively low variance, spacing, and quantity of the density samples, SRK conducted variography on all of the density samples to determine appropriate search distances for density interpolation. Once the ranges were determined, SRK used the major controlling structures within each Model Area to develop the rotation angles to be used for interpolation in those domains. Using the variogram parameters listed in Table 14.13.1 a single pass OK interpolation was completed within each Model Area.

Table 14.13.1: Density Variogram Parameters by Model Area

Model Area	Frog	Imbruminda	Gremi	Omora	Dimbi	Barren	Far South East
Major Axis Rotation (deg)	0	115	115	90	120	120	7
Semi Major Axis Rotation (deg)	-15	-18	-18	-20	-5	-5	0
Minor Axis Rotation (deg)	0	0	0	0	0	0	0
Major Axis Range (m)	210	210	210	210	210	210	210
Semi Major Axis Range (m)	190	190	190	190	190	190	210
Minor Axis Range (m)	60	60	60	60	60	60	60
Nugget Effect	0.2	0.2	0.2	0.2	0.2	0.2	0.2

Source: SRK, 2015

Approximately 82% of the model blocks (above and below cut-off) inside the resource pit shape were interpolated from density data measured in drill core. The remaining 18% were assigned based on oxidation material type using the mean values listed in Table 14.13.2.

Table 14.13.2: SG Summary Statistics by Level of Oxidation

Level of Oxidation	No. Blocks	Minimum	Maximum	Mean
Oxide	45,704	1.77	3.24	2.51
Transition	18,917	2.04	3.49	2.58
Non-oxide	336,179	2.06	3.53	2.63
All	400,800	1.77	3.53	2.62

Source: SRK, 2015

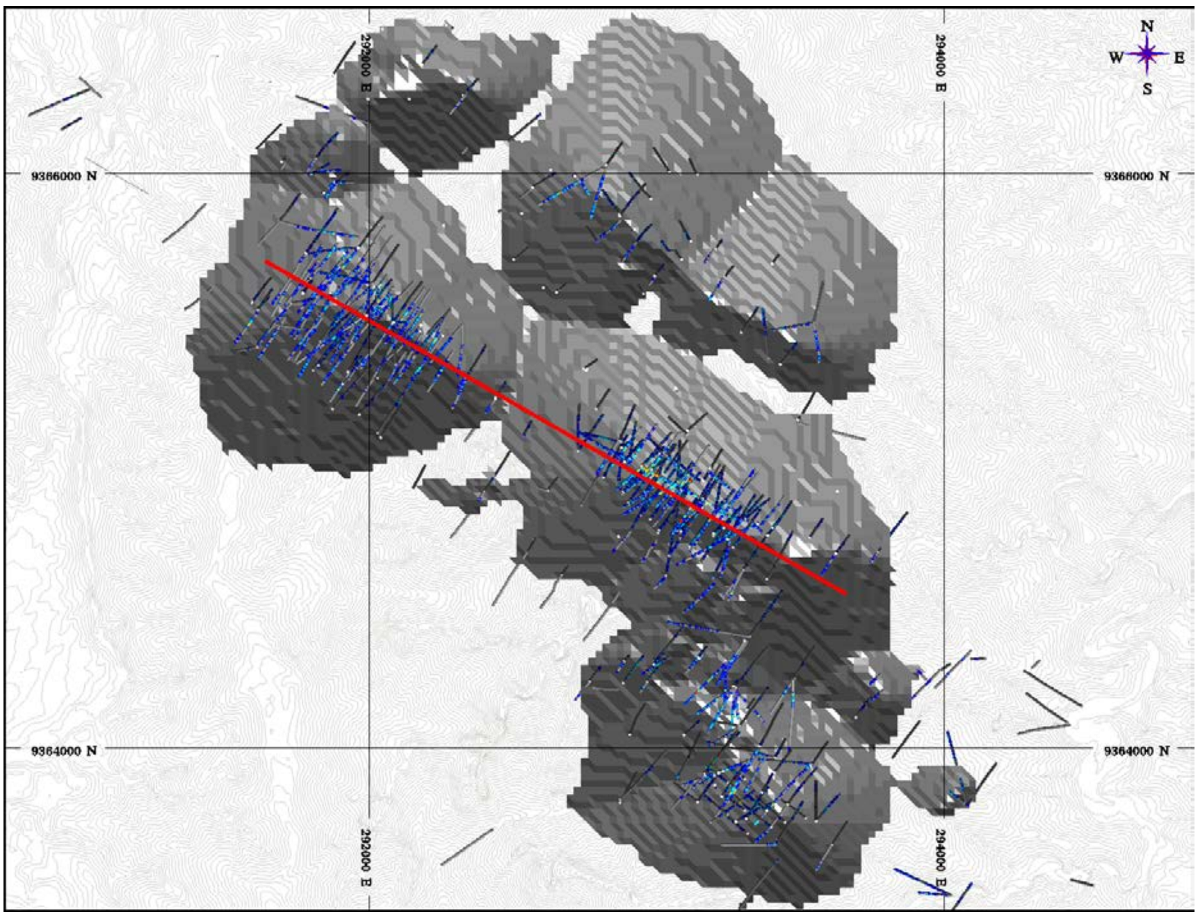
14.14 Model Validation

Various measures were implemented to validate the Yandera resource block model. These measures included the following:

- Comparison of drillhole composites with resource block grade estimates from all zones visually in section;
- Statistical comparisons between block and composite data using distribution analyses;
- Statistical comparisons between the OK and NN models; and
- Swath plot analysis (drift analysis) comparing the inverse distance model with the NN model and composite grades.

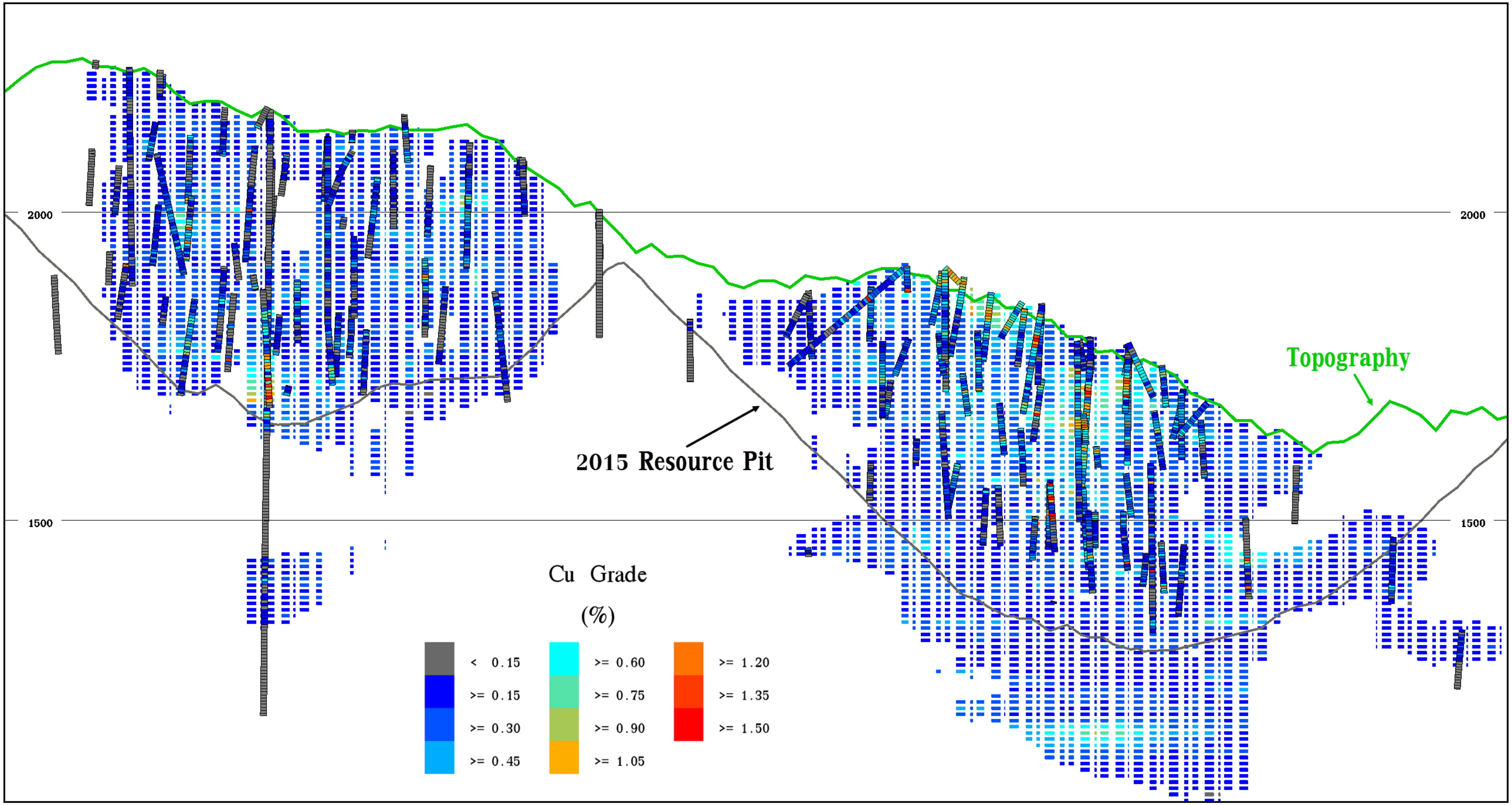
14.14.1 Visual Comparison

Visual comparisons between the block grades and underlying composite grades in section show close agreement. A sectional view through both the Gremi and Imbruminda model areas displaying both block and drillhole composite grades is provided in Figure 14.14.1.1. Figure 14.14.1.2 provides a plan view showing the location of this longitudinal section.



Source: SRK, 2015

Figure 14.14.1.1: Visual Grade Validation - Plan View

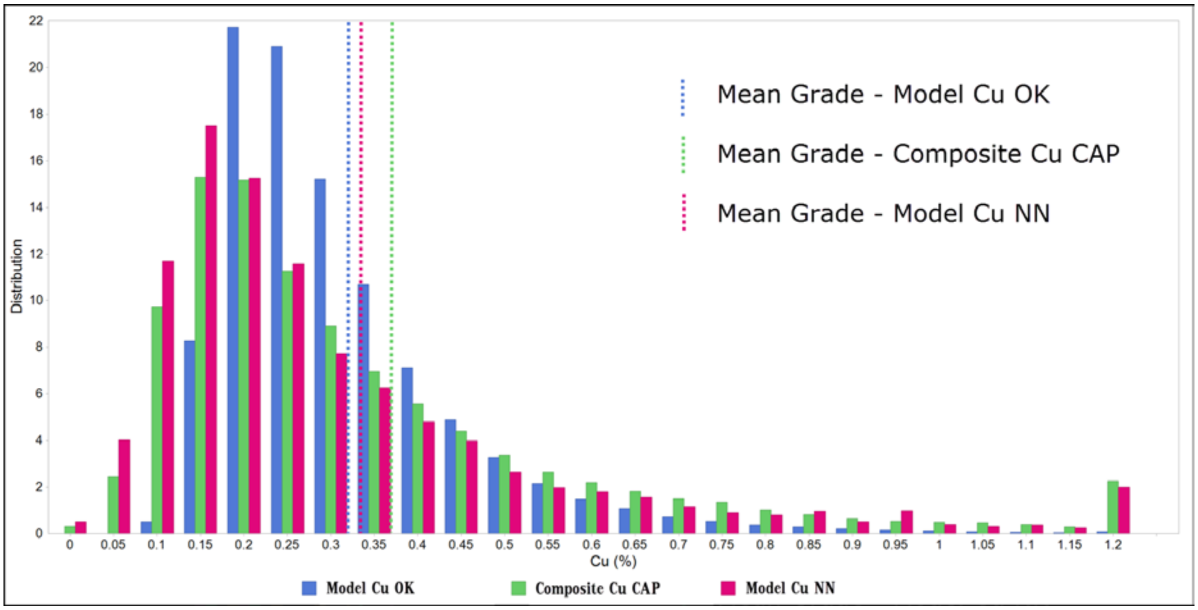


Source: SRK, 2015

Figure 14.14.1.2: Visual Grade Validation – Longitudinal Section View

14.14.2 Comparative Statistics

SRK conducted statistical comparisons between the OK blocks contained within mineral domains and their underlying composite grades. A histogram comparing block and composite copper grades is provided in Figure 14.14.2.1. The comparison shows that the model OK grade distribution for copper is appropriately smoothed towards the mean grades when compared with the underlying composite or NN distributions. The pull of the OK grades away from zero are expected as the gradeshell constraining the interpolation was built around 0.15% Cu grades.



Source: SRK, 2015

Figure 14.14.2.1: Model Validation - Modeled Cu OK vs. Cu NN vs. Composite Cu CAP

SRK ran additional statistics by interpolation domain for each model element comparing the Cu NN and Cu OK grades. The NN interpolation method provides a declustered representation of the sample grades and therefore, the resulting mean grades of any other method should be similar to the mean grade of the NN estimate at a zero CoG. To ensure that the OK estimate was close to the NN estimate, SRK applied outlier restrictions pass by pass in the interpolation until the estimated OK mean was within acceptable tolerances of the NN mean, approximately +/- 5%. The global difference between the NN and OK estimates for copper was 0.0%. For Molybdenum, the global mean OK grade was 3.2% less than the NN estimate. For gold, the global mean OK grade was 0.2% greater than the NN estimate.

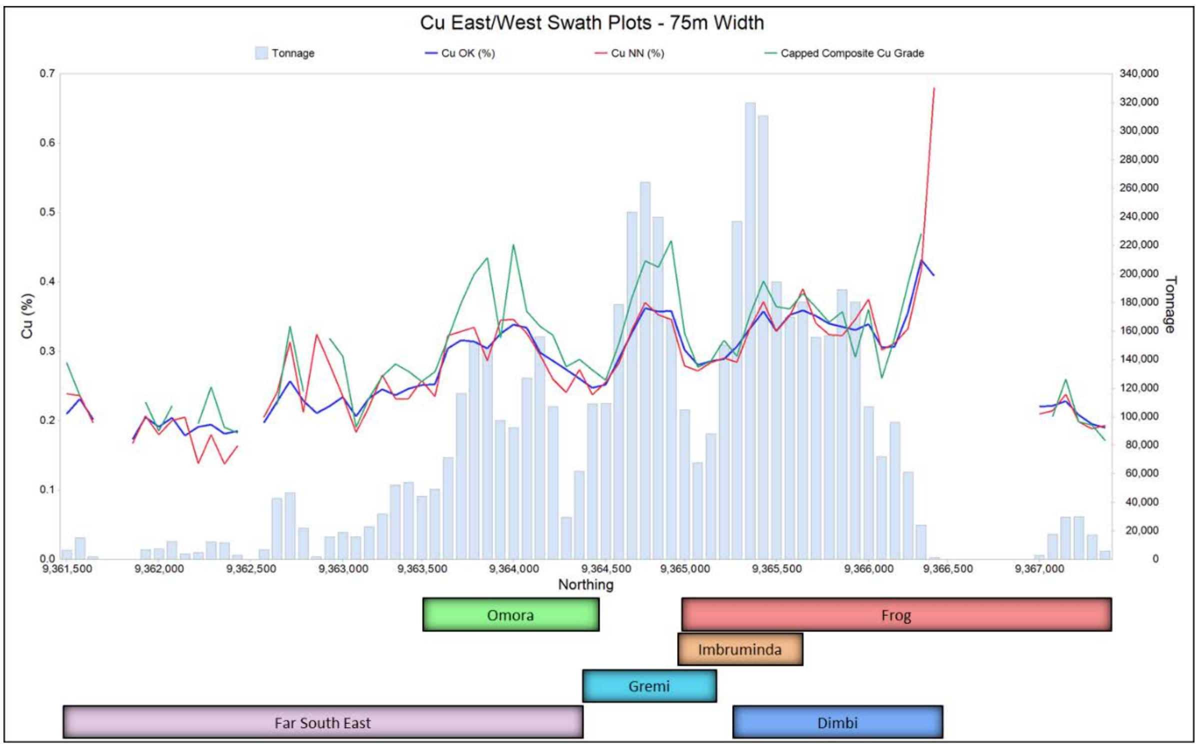
14.14.3 Swath Plots

A swath plot is a graphical display of the grade distribution derived from a series of bands, or swaths, generated in several directions through the deposit. Using the swath plot, grade variations from the OK model are compared to the distribution derived from the NN grade model and source composites.

On a local scale, the NN model does not provide reliable estimations of grade, but on a much larger scale it represents an unbiased estimation of the grade distribution based on the underlying data. Therefore, if the OK model is unbiased, the grade trends may show local fluctuations on a swath plot, but the overall trend of the OK should be similar to the NN distribution of grade.

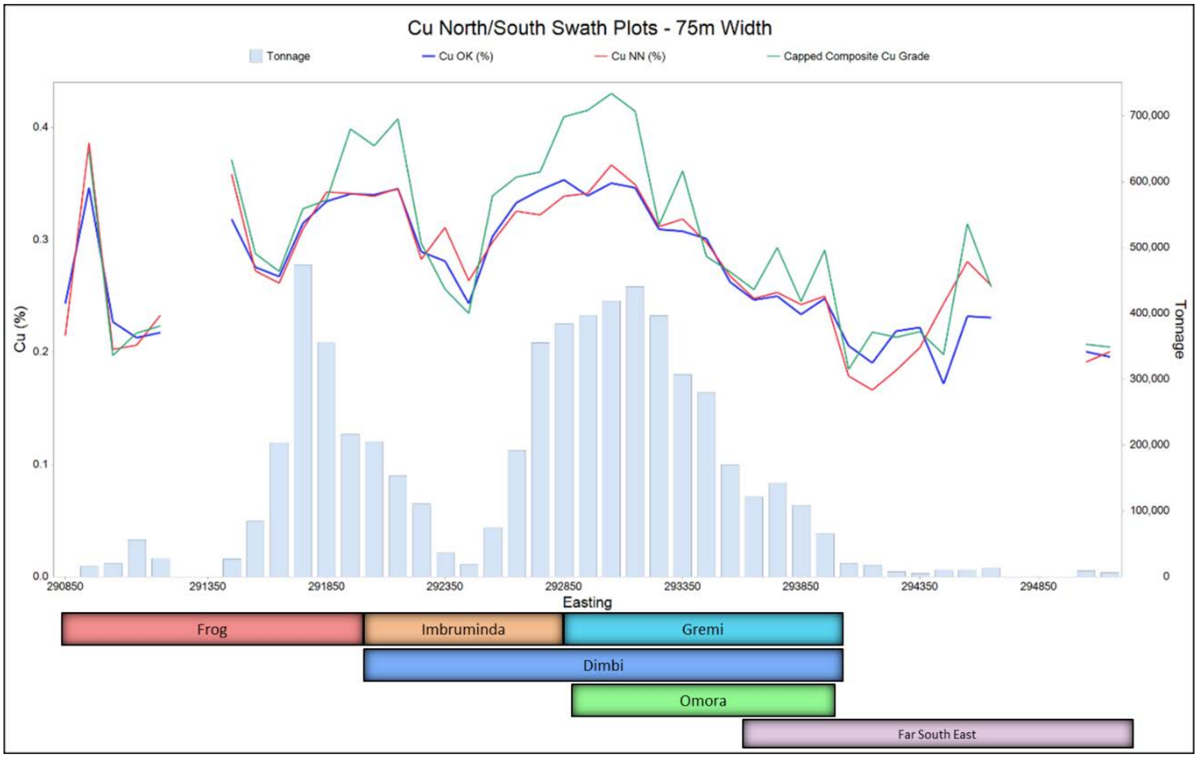
Swath plots were generated for copper, molybdenum, and gold along east-west and north-south directions, and also for elevation. Swath widths were 75, 75, and 60 m wide for east-west, north-south and elevation, respectively. Items plotted include Cu, Mo, and Au grades by OK and NN for all estimated blocks as well as the corresponding capped metal grades in composites. The swath plots for copper are shown in Figure 14.14.3.1 through Figure 14.14.3.3.

According to the swath plots, there is good correlation between the modeling methods. The degree of smoothing in the NN model is evident in the peaks and valleys shown in some swath plots; however, this comparison shows close agreement between the OK and NN models in terms of overall grade distribution as a function of easting, northing, and elevation; especially where there are high tonnages (vertical bars on the plots). The plots also demonstrate the high degree of variance of the input composites and the model smoothing of the composite grades.



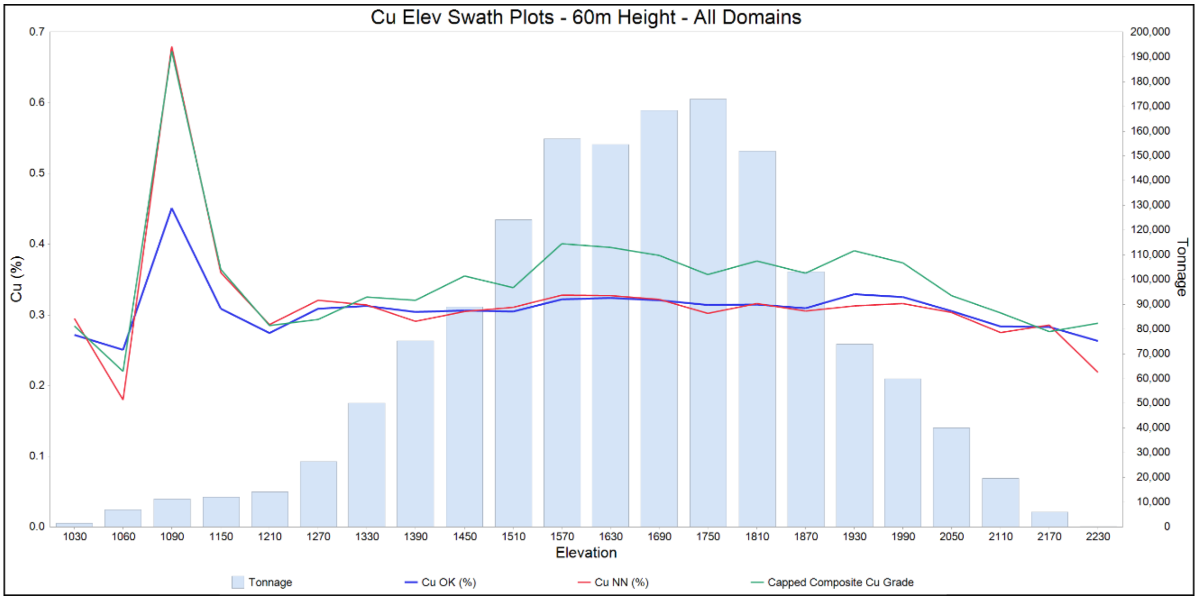
Source: , 2015

Figure 14.14.3.1: East/West Copper Swath Plot – 75 m



Source: SRK, 2015

Figure 14.14.3.2: North/South Copper Swath Plot – 75 m



Source: SRK, 2015

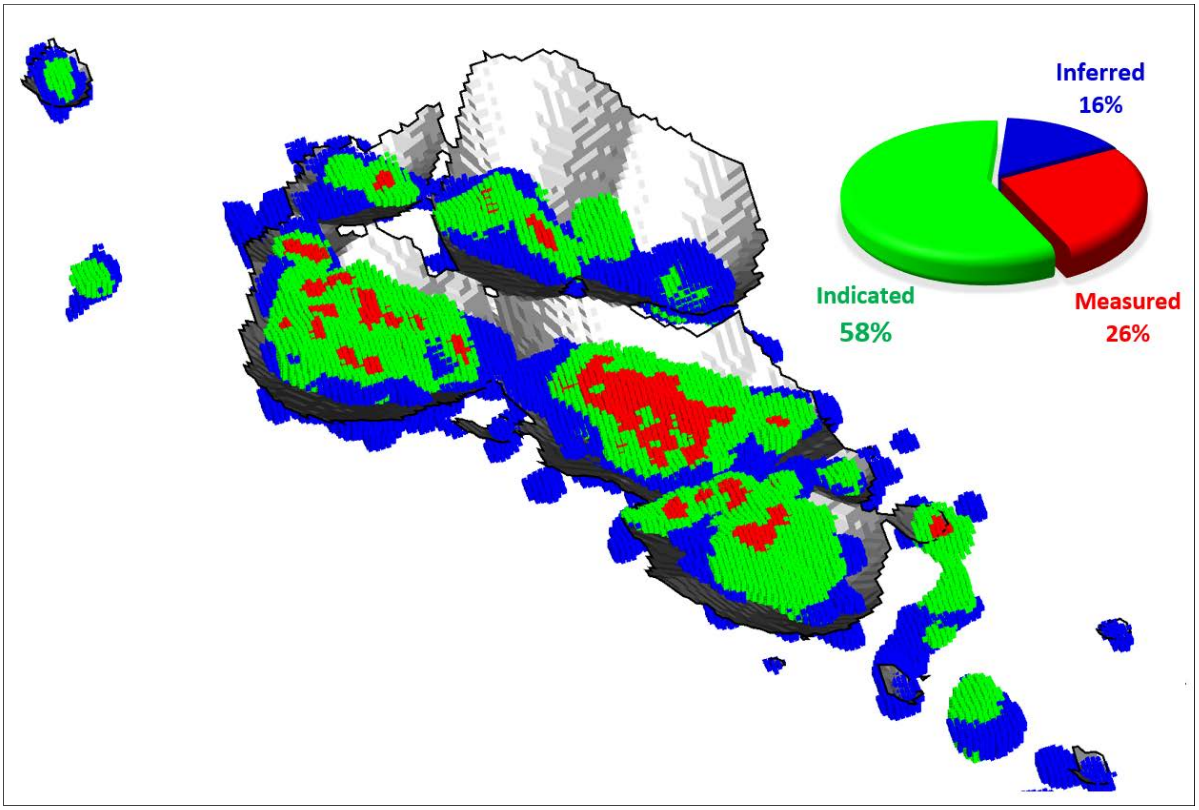
Figure 14.14.3.3: Elevation Copper Swath Plot – 60 m – All Domains

14.15 Resource Classification

Resources were classified into Measured, Indicated and Inferred categories based on based on CIM Definition Standards compliant with NI 43-101 reporting. A minimum of three drillholes were required for the assignment of Measured Mineral Resources within a drill data spacing of 50 m. Indicated resources were also classified with a minimum of three drillholes but within a drill data spacing of 100 m. Inferred resources represent material estimated by as few as one drillhole at a distance greater than 100 m from source data, but within the copper interpolation domain and within the potential mining shape.

Classification using a purely statistical approach occasionally produces artifacts, blocks that fail mathematical criteria but are clearly related to adjacent blocks. Therefore, to finalize classification, SRK generated wireframes for Measured and Indicated categories. The wireframes were based on a block's interpolation pass, number of drillholes, and average distance to data; as well as and interpretation of geologic continuity. By building classification wireframes based on a combination of statistics and geology, blocks of contiguous confidence are appropriately categorized and facilitate future mine planning.

An oblique view of model blocks showing the distribution of Measured, Indicated and Inferred categories is provided Figure 14.15.1. The high percentage of Measured and Indicated resources compared to Inferred in this model represents a previous drilling bias toward defining reserves rather than developing and expanding resources. Gremi, Omora, and Imbruminda, are densely drilled, resulting in high resource classification in those areas with only minor inter-deposit drilling and step-out exploration.



Source: SRK. 2015

Figure 14.15.1: Yandera Estimated Blocks Colored by Classification Code

14.16 Mineral Resource Statement

The Mineral Resource statement for the Yandera deposit is presented in Table 14.16.1, which includes a separate statements for oxide and sulfide material. To comply with NI 43-101, and satisfy the guideline that reported mineralization have "reasonable prospect for eventual economic extraction," SRK reports Mineral Resources within a Lerchs-Grossmann (LG) optimized pit shape. The optimized pit defining the mineral resource is shown in Figure 14.16.1

Table 14.16.1: Mineral Resource Statement for the Yandera Copper, Molybdenum, Gold Deposit, Madang Province, Papua New Guinea [0.15 CuEq (%) Cut-off] SRK Consulting, May 1, 2015

Zone	Classification	Mass (kt)	Metal Grades				Contained Metal				
			Cu (%)	Mo (%)	Au (ppm)	CuEq (%)	Cu (kt)	Mo (kt)	Au (kg)	Au (koz)	CuEq (kt)
Total Resource	Measured	195,267	0.37	0.013	0.076	0.46	723	25	14,803	476	890
	Indicated	434,874	0.32	0.008	0.069	0.38	1,379	37	29,940	963	1,663
	Measured & Indicated	**630,142**	**0.33**	**0.010**	**0.071**	**0.41**	**2,103**	**62**	**44,743**	**1,439**	**2,554**
	Inferred	117,474	0.30	0.005	0.052	0.34	348	6	6,055	195	401
Oxide Resource	Measured	22,426	0.38	0.00	0.000	0.38	86	0	0	0	86
	Indicated	38,715	0.33	0.00	0.000	0.33	127	0	0	0	127
	Measured & Indicated	**61,141**	**0.35**	**0.00**	**0.000**	**0.35**	**212**	**0**	**0**	**0**	**212**
	Inferred	10,765	0.28	0.00	0.000	0.28	30	0	0	0	30
Non-oxide Resource	Measured	172,841	0.37	0.014	0.086	0.47	638	25	14,803	476	805
	Indicated	396,160	0.32	0.009	0.076	0.39	1,253	37	29,940	963	1,537
	Measured & Indicated	**569,001**	**0.33**	**0.011**	**0.079**	**0.41**	**1,890**	**62**	**44,743**	**1,439**	**2,342**
	Inferred	106,709	0.30	0.006	0.057	0.35	318	6	6,055	195	371

- Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. There is no certainty that any part of the Mineral Resources estimated will be converted into a Mineral Reserves estimate;
- Resources stated as contained within a potentially economically minable open pit; pit optimization was based on assumed copper, molybdenum, and gold prices of US$3.50/lb, US$15/lb, and US$1,500/oz, respectively, recoveries of 90% for Cu, 85% for Mo, 65% for Au, a mining cost of US$2.50/t, an ore processing cost of US$10/t, and a pit slope of 45°;
- Resources are reported above a 0.15% CuEq CoG;
- CuEq grades reported above were calculated using the formula CuEq = Cu% + (Mo% * 4.05) + (Au ppm * 0.45); and,
- Numbers in the table have been rounded to reflect the accuracy of the estimate and may not sum due to rounding.

14.16.1 Calculation of Cut-off Grade

An internal CoG of 0.15% CuEq was applied to report resources. The CoG for the resource was determined using a copper sales price of US$3.50/lb, copper recovery of 90%, ore and waste mining costs of US$2.50/t, processing and G&A costs of US$10/t, and a 2% royalty. The calculation for determining the CoG was:

$$\textit{Internal CoG} = \frac{\textit{Mining Cost ore - Mining Cost waste + Processing and G\&A Costs}}{\textit{Cu Price x (Process Recovery – Royalty) x 22.046}}$$

14.16.2 Pit Limited Resource

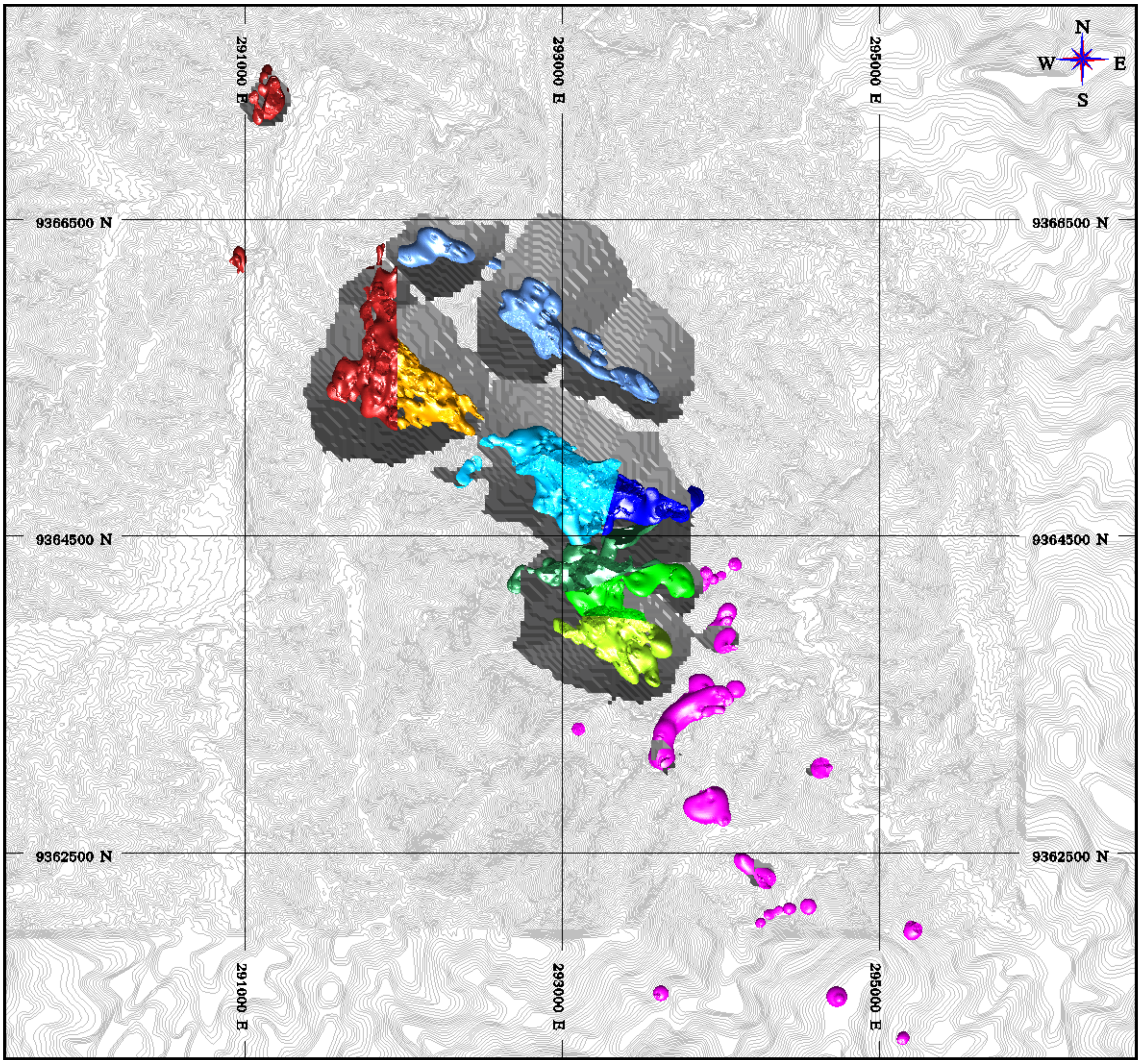
Pit optimization was performed on the Yandera model using MineSight Economic Planner (MSEP). MSEP employs the industry-accepted Lerchs-Grossmann algorithm, which determines the maximum pit extents by optimizing the stripping ratio. Blocks classified as Measured, Indicated, and Inferred were all used to define the resource pit shell. Input criteria for the pit optimization, including prices and recoveries for all metals, are described in the footnotes of the resource statement. It was assumed for this study that molybdenum and gold would not be recovered from oxide material.

14.16.3 Calculation of Copper Equivalent

The following metal ratios were used for reporting CuEq in the resource statement:

*CuEq = Cu% + (Mo% * 4.05) + (Au ppm * 0.45)*

These metal ratios were developed using the metal prices and recovery assumptions listed in the CoG calculation above. Recoveries are based on metallurgical test work carried out by Marengo in 2011.



Source: SRK, 2015

Figure 14.16.1: Yandera 2015 Resource Pit in Plan with 1500 ppm Copper Interpolation Domains

14.17 Mineral Resource Sensitivity

Per industry standards, the Yandera Mineral Resource is reported below at variable cut-offs within the 2015 Resource Pit at incremental CoGs to demonstrate the sensitivity of the resource. These sensitivities are provided for the total resource, oxide resource, and non-oxide resource in Table 14.17.1.

Table 14.17.1: Yandera Total MI&I Resource Sensitivity within the 2015 SRK Resource Pit

Resource	Cut-off Grade CuEq (%)	Mass (kt)	Metal Grades Cu (%)	Mo (%)	Au (ppm)	CuEq (%)	Contained Metal CuEq (kt)
Total Resource	0.100	787,170	0.31	0.009	0.068	0.38	3,004
	0.125	765,778	0.32	0.009	0.068	0.39	2,980
	0.150	747,616	0.33	0.009	0.068	0.40	2,955
	0.175	725,802	0.33	0.009	0.068	0.40	2,919
	0.200	693,387	0.34	0.009	0.070	0.41	2,858
	0.225	648,358	0.35	0.010	0.072	0.43	2,762
	0.250	594,373	0.37	0.010	0.076	0.44	2,634
	0.275	535,263	0.38	0.011	0.080	0.46	2,479
	0.300	477,047	0.40	0.012	0.085	0.48	2,311
Oxide Resource	0.100	72,249	0.34	0.000	0.000	0.34	242
	0.125	72,093	0.34	0.000	0.000	0.34	242
	0.150	71,906	0.34	0.000	0.000	0.34	242
	0.175	70,625	0.34	0.000	0.000	0.34	240
	0.200	65,828	0.35	0.000	0.000	0.35	231
	0.225	58,357	0.37	0.000	0.000	0.37	215
	0.250	49,788	0.39	0.000	0.000	0.39	194
	0.275	41,568	0.42	0.000	0.000	0.42	173
	0.300	34,206	0.44	0.000	0.000	0.44	152
Non Oxide Resource	0.100	714,921	0.31	0.010	0.075	0.39	2,761
	0.125	693,685	0.32	0.010	0.075	0.39	2,738
	0.150	675,710	0.33	0.010	0.075	0.40	2,713
	0.175	655,177	0.33	0.010	0.076	0.41	2,679
	0.200	627,559	0.34	0.010	0.077	0.42	2,628
	0.225	590,001	0.35	0.011	0.079	0.43	2,548
	0.250	544,585	0.37	0.011	0.083	0.45	2,440
	0.275	493,695	0.38	0.012	0.087	0.47	2,306
	0.300	442,841	0.39	0.013	0.092	0.49	2,160

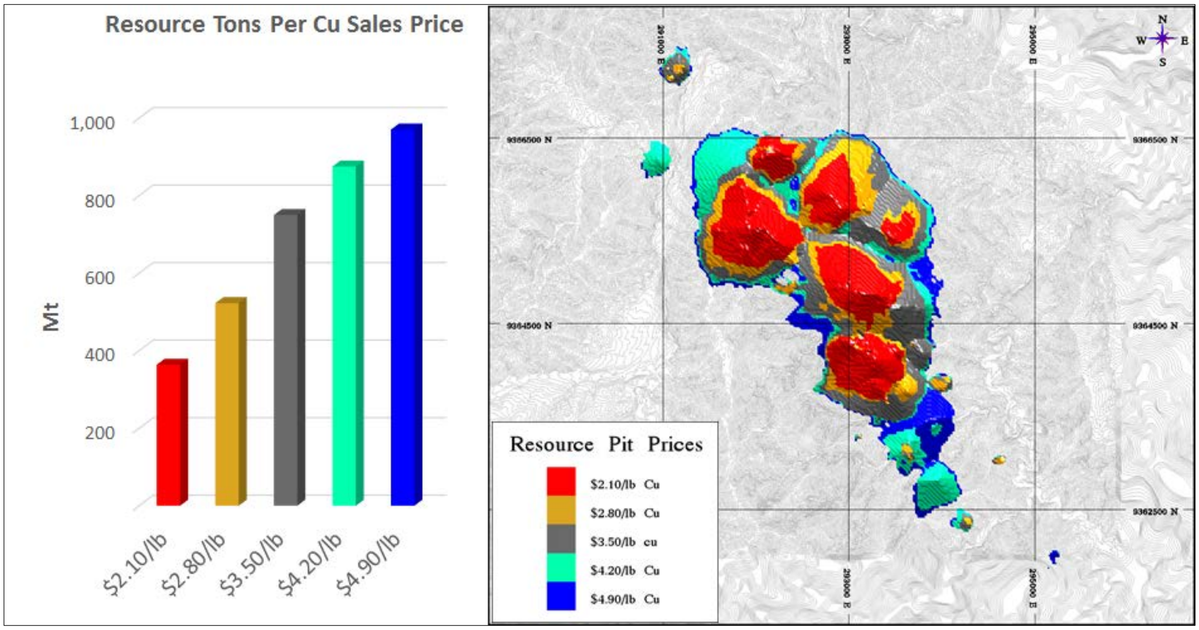
Source: SRK, 2015

14.18 Relevant Factors

For this study, SRK did not identify any environmental, permitting, legal, title, taxation, marketing, or other non-technical factors that could affect resources.

14.19 Resource Potential

In addition to the in-pit resource sensitivity, SRK generated a series of pits at varying metal sales prices (Figure 14.19.1). The bar graph indicates the number of potential resource tonnes over a range of metal prices. The analysis highlights target areas for further exploration. For example, areas between pits that may contain metal but have not been adequately tested represent immediate drill targets to increase the resource. Similarly, any other prospects that are contiguous to this pit shape and could potentially share stripping with known mineralization become high priority targets.



Source: SRK, 2015

Figure 14.19.1: Optimized Pit Price Sensitivity

With respect to regional exploration, there is a significant area within the current EL that has not been explored. Marengo has broad geophysical coverage of the entire EL 1335, and has generated targets for surface reconnaissance and follow-up. A map of these targets is presented in Section 26 of this report.

15 Mineral Reserve Estimate

Mineral Reserves were not produced as part of this report.

16 Mining Methods

Other than conceptual open pit mining as a pit shell to constrain the Mineral Resource, mining methods, designs, schedules, and other mining engineering parameters have not been considered as part of this report.

17 Recovery Methods

For the purposes of this report, it was assumed that acid leaching could be used for oxide material and that a mill would be used to process the sulfide material. No work has been done to quantify the costs and/or fatal flaws with those methods and therefore a discussion on recovery methods is not included in this report.

18 Project Infrastructure

Currently the project is helicopter-supported in virtually all aspects. Fuel, materials, equipment, and personnel are flown to camp from ‘lay-down’ locations accessible by roads from Madang and Lae. These lay-down locations are typically a 20 minute helicopter ride in each direction.

Much of the recent helicopter support has been provided by Hevilift in the form of a Bell 407. There are not sufficiently long flat areas to utilize sizeable fixed-wing aircraft.

There are some government maintained roads to the east of EL 1335, but at present these roads have not been improved or extended to the point that materials can be brought into any of the camps on a safe and regular basis.

Locals in the vicinity of the Yandera project sell fresh fruit and vegetables to the camp, but other staples such as rice and meats have to be brought in to camp.

Power for the camp facilities is provided with a diesel-powered generator.

19 Market Studies and Contracts

This section is not relevant to the current Yandera Project. No marketing studies or economic analysis have been undertaken for the Project at this stage of development.

20 Environmental Studies, Permitting and Social or Community Impact

Environmental studies and permitting requirements are stated in Section 4.4 of this report.

20.1 Required Permits and Status

Marengo currently holds Exploration Licenses (EL) on three tenements. An EL entitles the holder to exclusively explore for minerals for a period of two years, and it also entitles the lease holder the right to apply for a mining lease or special mining lease. Once an Environmental Impact Statement (EIS) has been submitted and a Feasibility Study has been completed, Marengo will need to apply for a mining lease or special mining lease. At this stage there are a number of permits that are required.

20.2 Environmental Study Results

Prior to completion of this report, Marengo initiated environmental studies to be used for an EIS. Coffey Environments partially completed investigations on archaeology and material culture; aquatic biodiversity; terrestrial vegetation and fauna; land and resource use; water resource use; noise, vibration, and blast overpressure; air quality, greenhouse gas and energy consumption; social impact assessment; sediment characterization and transport; streambed sediment quality; soil characterization and rehabilitation; health and nutrition; nearshore marine characterization survey/Madang Harbour studies; geochemical characterization of waste rock; and geochemical characterization of tailings. Marengo is still collecting water quality data for baseline studies.

21 Capital and Operating Costs

This section is not relevant to the current Yandera Project. No economic analysis has been undertaken for the Project.

22 Economic Analysis

This section is not relevant to the current Yandera Project. No economic analysis has been undertaken for the Project.

23 Adjacent Properties

There has been no exploration of interest in the properties adjacent to the Yandera EL 1335, in which the Yandera Cu-Mo-Au deposit has been modeled. The nearest mining activity is Ramu Nickel, a nickel-laterite operation also located in Madang Province approximately 25 km north of Yandera. There is potential for the Yandera Project to share infrastructure with Ramu Nickel if Yandera advances to mining status.

24 Other Relevant Data and Information

There is no other data or information beyond that which has been described herein, which is relevant to this report.

25 Interpretation and Conclusions

The resource estimate for the Yandera deposit in the highlands of PNG is approximately 630 Mt at a grade of 0.41% CuEq, with contributions to the CuEq coming from low-grade Mo and Au. The resource is reported within a potentially mineable open pit configuration. Of the total resource, approximately 10% of the tonnes reside in oxide, where Cu is potentially recoverable by acid leach. The majority of the resource is in sulfide, which recent metallurgical test work demonstrates is recoverable by conventional flotation to produce a concentrate. Exploration is ongoing at Yandera, as well as further metallurgical, geotechnical and environmental characterization to advance the project.

There are logistical, environmental and socio-political challenges for constructing and operating a mine in the highlands of PNG; including, steep terrain, high rainfall, poor infrastructure, and private land ownership. However, Marengo has been active at the site for more than ten years, and building on a more than 25 year exploration presence in the district established by previous operators. Marengo's exploration team is almost exclusively comprised of PNG nationals and most of the labor and logistical support are locally sourced.

Steep terrain poses both challenges and opportunities for mine development that will be addressed as the project advances. SRK is of the opinion Yandera is a project of merit warranting further study. There are no material technical, environmental or socio-political obstacles to project development.

26 Recommendations

26.1 Recommended Work Programs

26.1.1 Data Collection for Preliminary Economic Assessment

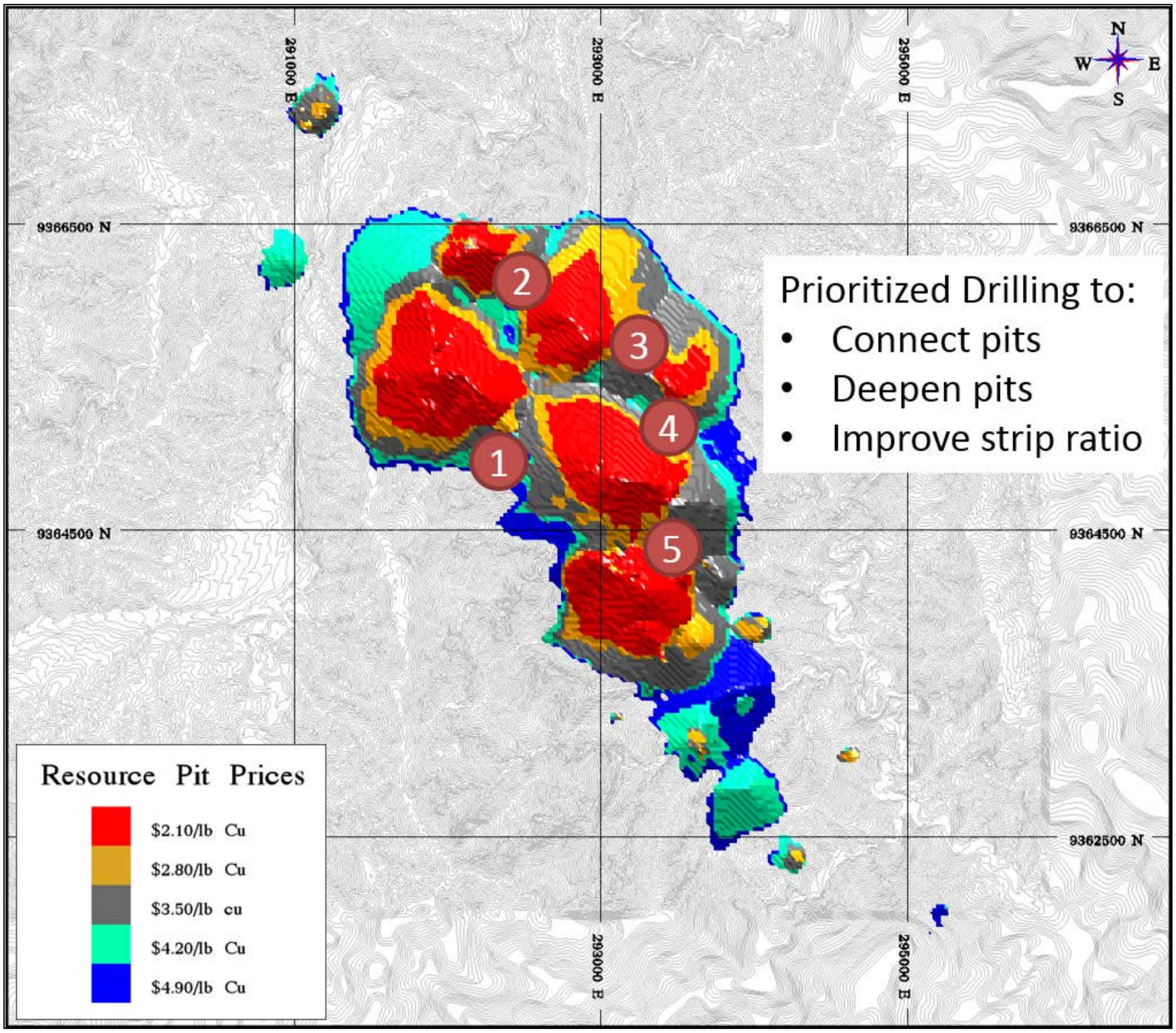
Marengo has already initiated studies to facilitate project advancement in the areas of road access, mineral processing, tailings management, power and water supply, and social/environmental compliance. The following are specific activities recommended to provide economic inputs for a PEA.

Drilling

SRK has identified a number of areas within the potential future mining footprint that lack drill data. These “conversion” targets along with some proximal step-out drilling have potential to improve preliminary economics at the next level of study. These targets are shown in Figures 26.1.1.1 and 26.1.1.2 and are described below.

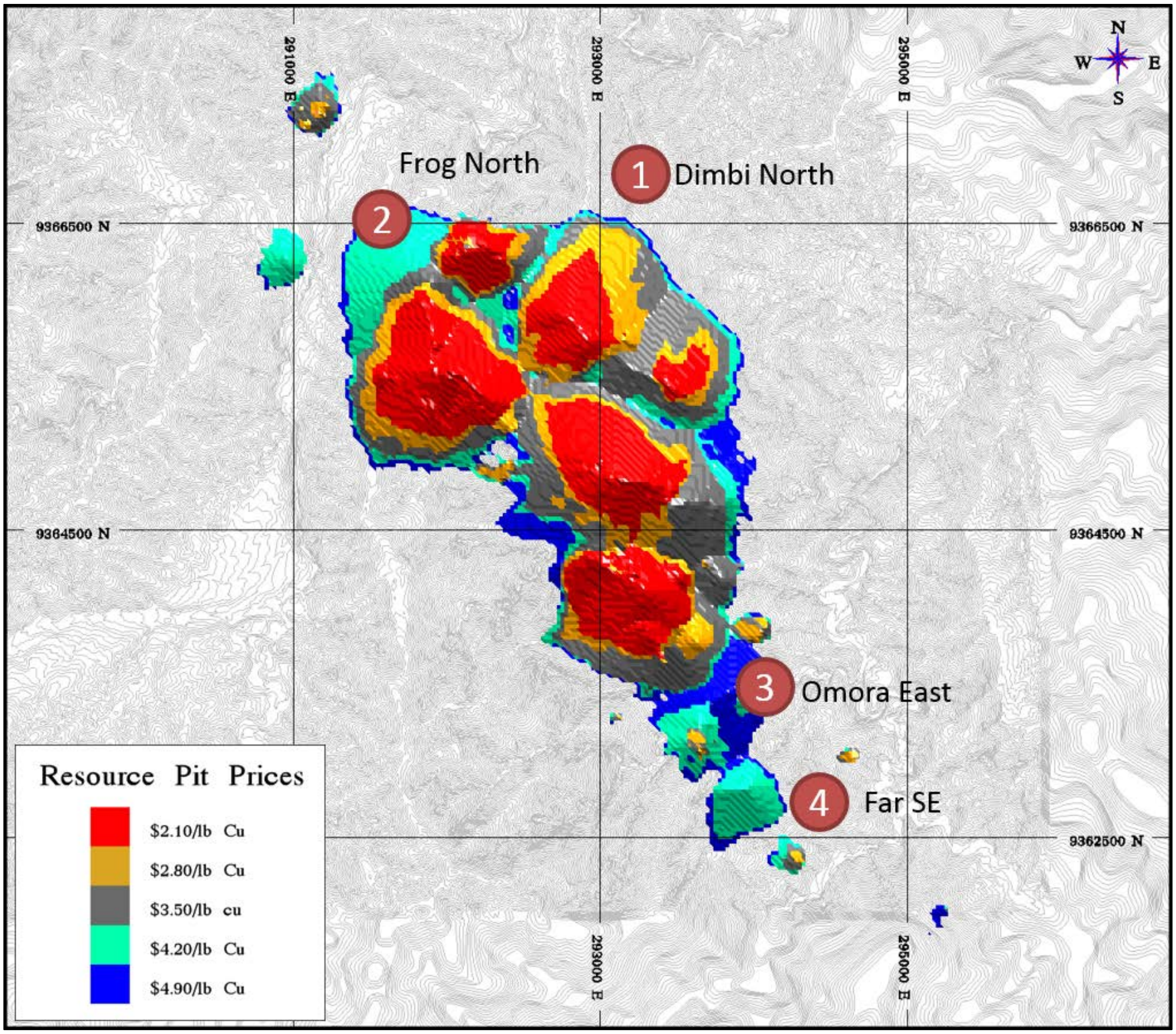
Two types of drilling are recommended to support a PEA:

- **Conversion Drilling**: Target generation and drilling to convert waste to mineralization and immediately impact project profitability by connecting future pits and improving the strip ratio;
- **Step-out Drilling**: exploration of contiguous prospects with surface mapping and sampling to define drill targets that would expand the future pit shape.



Source: SRK, 2015

Figure 26.1.1.1: Conversion Drilling Targets



Source: SRK, 2015

Figure 26.1.1.2: Step-Out Drilling Targets

Marengo should consider using small portable equipment for some of this drilling work. The initial exploration could be done with small-diameter core to determine presence or absence of mineralization in shallow holes at low cost. Positive results would then be followed up with larger equipment for larger samples and deeper testing.

Also, to improve the quality and usability of future drill data, SRK recommends:

- Establish a lithology and alteration library of core samples, and maintain consistency in future geological logging;
- Increase the insertion rate of blank samples to average at least one blank per batch of fire assay and ICP samples. Continue including Certified Reference Material samples in the core sample sequence. Include coarse reject duplicate samples, and use these as check assay samples to send to a second accredited and independent laboratory to maintain the original pulp sample set;

- Orient some future dill holes in the main mineralized areas perpendicular to the typical NE-SW drilling pattern. Analysis of oriented core in 2015 suggests that higher grade mineralization may occur in structures on at this azimuth, which has potentially been missed by previous drilling;
- Investigate the installation of a portable on-site analytical laboratory. Portable facilities are available at reasonable costs to collect real-time analytical data to direct drilling activities. Current turn-around times for drilling data are prohibitive.

Oxide Leach Characterization

Preliminary evaluations indicate a positive future return from leaching of copper in oxide that would otherwise be mined as waste. SRK recommends that a spatially representative sampling program of copper in oxide be undertaken commensurate with metallurgical testwork. Metallurgical work should include a size sensitivity analysis, acid consumption and an assessment of vat leach viability.

Oxide characterization should begin with analyzing future drill samples for acid-soluble copper to determine the ratio of oxide to total copper, and correlate the new results with S:Cu values. These data will allow for a more accurate determination of the oxide leach boundary leading to a better estimate the tonnes and recovery of oxide copper.

26.1.2 PEA

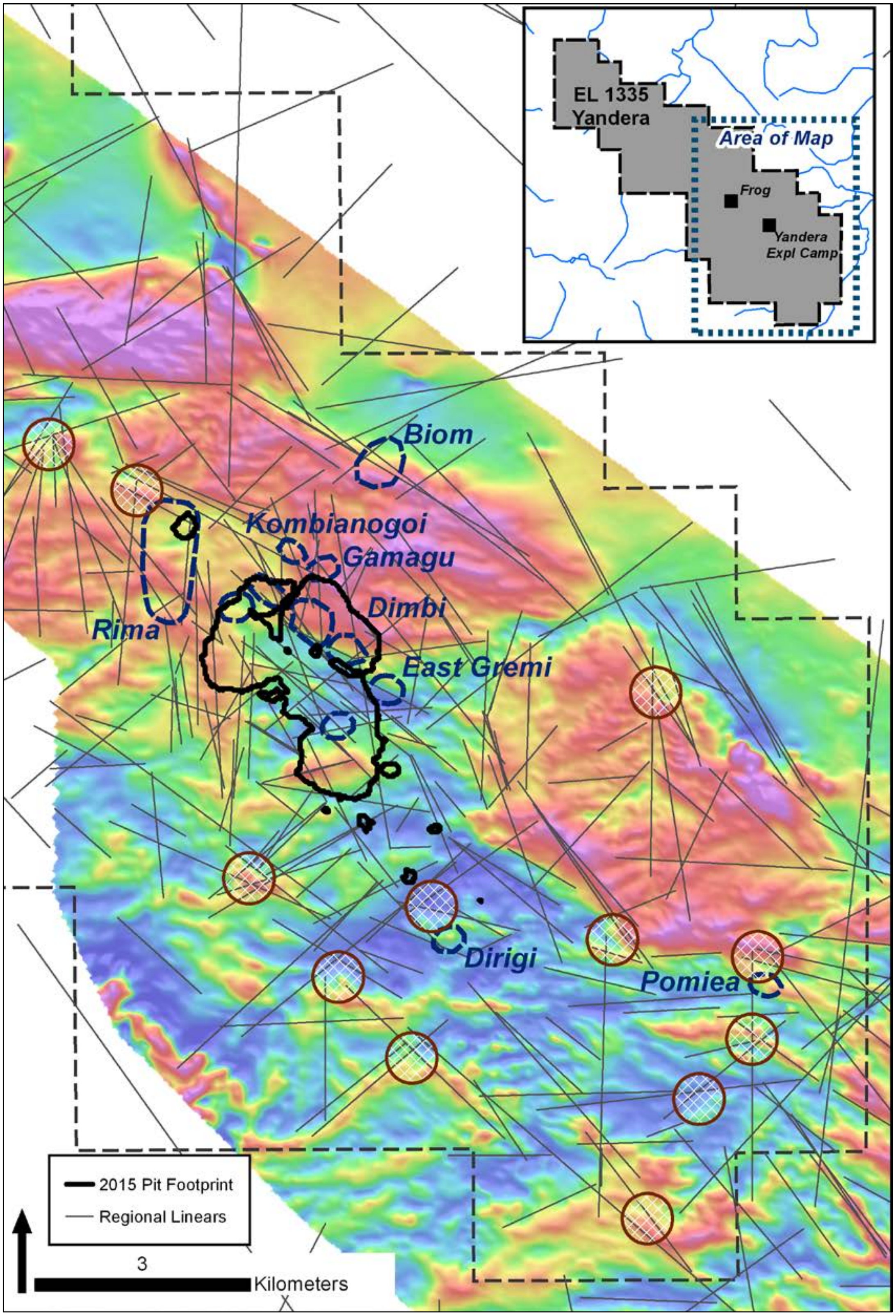
In parallel with PEA data collection, SRK recommends scoping-level trade-off studies in the areas of:

- Mine design (conventional open pit vs. underground or combination, truck vs. conveyor);
- Processing: (milling +/- leaching, highlands vs. lowlands plant siting, etc.);
- Power Supply: (diesel vs. LNG, line power vs. generators, fuel supply options);
- Tailings management: (on land impoundment vs offshore, conventional vs. dry stack);
- Access: (optimized route selection for roads and pipelines);
- Purchase/Offtake: (develop preliminary smelter terms)

At the conclusion of the data collection and trade-off studies, a PEA would be prepared to demonstrate future economic potential.

26.1.3 Resource Expansion and Regional Exploration

Pending positive results from the PEA, Marengo should carry out additional work on advanced exploration prospects to expand the resource. Advanced prospects include Rima and Frog. In parallel, Marengo should continue to develop grass-roots exploration prospects through traditional targeting, mapping, sampling and drilling. Identified grass-roots prospects include Pomiea, Biom and Queen Bee.



Source: Marengo, 2015

Figure 26.1.3.1: Regional Exploration Targets from Airborne Magnetics and Linears

26.2 Costs

Table 26.2.1 is a breakdown of the anticipated costs for the above recommendations. The schedule to complete the PEA is two to three years. Development of Advanced Prospects and regional exploration is projected on a three to five year timeline.

Table 26.2.1: Cost Estimates for Recommended Work Programs

Work Program	Estimated Cost (US$)	Assumptions/Comments
Data Collection for PEA		
Conversion Drilling	2,400,000	Approx. 6,000 m
Step-out Exploration Drilling	2,260,000	Approx. 5,500 m
Oxide Characterization	150,000	Broad spaced sampling and column testing
Subtotal Data Collection	**$4,810,000**	
PEA		
Conceptual Trade-Off Studies	50,000	Specialist contractor/engineer
Preliminary Economic Analysis	150,000	Specialist contractor/engineer
Advanced Prospects and Regional Exploration	3,000,000	Mapping, sampling, drilling
Subtotal PEA	**$3,200,000**	
Total	**$8,010,000**	

Source: SRK, 2015

27 References

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28 Glossary

The mineral resources and mineral reserves have been classified according to the “CIM Definition Standards for Mineral Resources and Mineral Reserves” (May 10, 2014). Accordingly, the Resources have been classified as Measured, Indicated or Inferred, the Reserves have been classified as Proven, and Probable based on the Measured and Indicated Resources as defined below.

28.1 Mineral Resources

A **Mineral Resource** is a concentration or occurrence of solid material of economic interest in or on the Earth’s crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.

An **Inferred Mineral Resource** is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

An **Indicated Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.

A **Measured Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation. A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.

28.2 Mineral Reserves

A **Mineral Reserve** is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

The reference point at which Mineral Reserves are defined, usually the point where the ore is delivered to the processing plant, must be stated. It is important that, in all situations where the reference point is different, such as for a saleable product, a clarifying statement is included to ensure that the reader is fully informed as to what is being reported. The public disclosure of a Mineral Reserve must be demonstrated by a Pre-Feasibility Study or Feasibility Study.

A **Probable Mineral Reserve** is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proven Mineral Reserve.

A **Proven Mineral Reserve** is the economically mineable part of a Measured Mineral Resource. A Proven Mineral Reserve implies a high degree of confidence in the Modifying Factors.

28.3 Definition of Terms

The following general mining terms may be used in this report.

Table 28.3.1: Definition of Terms

Term	Definition
Assay	The chemical analysis of mineral samples to determine the metal content.
Capital Expenditure	All other expenditures not classified as operating costs.
Composite	Combining more than one sample result to give an average result over a larger distance.
Concentrate	A metal-rich product resulting from a mineral enrichment process such as gravity concentration or flotation, in which most of the desired mineral has been separated from the waste material in the ore.
Crushing	Initial process of reducing ore particle size to render it more amenable for further processing.
Cut-off Grade (CoG)	The grade of mineralized rock, which determines as to whether or not it is economic to recover its gold content by further concentration.
Dilution	Waste, which is unavoidably mined with ore.
Dip	Angle of inclination of a geological feature/rock from the horizontal.
Fault	The surface of a fracture along which movement has occurred.
Footwall	The underlying side of an orebody or stope.
Gangue	Non-valuable components of the ore.
Grade	The measure of concentration of gold within mineralized rock.
Hangingwall	The overlying side of an orebody or slope.
Haulage	A horizontal underground excavation which is used to transport mined ore.
Hydrocyclone	A process whereby material is graded according to size by exploiting centrifugal forces of particulate materials.
Igneous	Primary crystalline rock formed by the solidification of magma.
Kriging	An interpolation method of assigning values from samples to blocks that minimizes the estimation error.
Level	Horizontal tunnel the primary purpose is the transportation of personnel and materials.
Lithological	Geological description pertaining to different rock types.
LoM Plans	Life-of-Mine plans.
LRP	Long Range Plan.
Material Properties	Mine properties.
Milling	A general term used to describe the process in which the ore is crushed and ground and subjected to physical or chemical treatment to extract the valuable metals to a concentrate or finished product.
Mineral/Mining Lease	A lease area for which mineral rights are held.
Mining Assets	The Material Properties and Significant Exploration Properties.
Ongoing Capital	Capital estimates of a routine nature, which is necessary for sustaining operations.
Ore Reserve	See Mineral Reserve.
Pillar	Rock left behind to help support the excavations in an underground mine.

Term	Definition
RoM	Run-of-Mine.
Sedimentary	Pertaining to rocks formed by the accumulation of sediments, formed by the erosion of other rocks.
Shaft	An opening cut downwards from the surface for transporting personnel, equipment, supplies, ore and waste.
Sill	A thin, tabular, horizontal to sub-horizontal body of igneous rock formed by the injection of magma into planar zones of weakness.
Smelting	A high temperature pyrometallurgical operation conducted in a furnace, in which the valuable metal is collected to a molten matte or doré phase and separated from the gangue components that accumulate in a less dense molten slag phase.
Stope	Underground void created by mining.
Stratigraphy	The study of stratified rocks in terms of time and space.
Strike	Direction of line formed by the intersection of strata surfaces with the horizontal plane, always perpendicular to the dip direction.
Sulfide	A sulfur bearing mineral.
Tailings	Finely ground waste rock from which valuable minerals or metals have been extracted.
Thickening	The process of concentrating solid particles in suspension.
Total Expenditure	All expenditures including those of an operating and capital nature.
Variogram	A statistical representation of the characteristics (usually grade).

28.4 Abbreviations

The following abbreviations may be used in this report.

Table 28.4.1: Abbreviations

Abbreviation	Unit or Term
A	ampere
AA	atomic absorption
A/m^2	amperes per square meter
ANFO	ammonium nitrate fuel oil
Ag	silver
Au	gold
AuEq	gold equivalent grade
°C	degrees Centigrade
CCD	counter-current decantation
CIL	carbon-in-leach
CoG	cut-off grade
cm	centimeter
cm^2	square centimeter
cm^3	cubic centimeter
cfm	cubic feet per minute
ConfC	confidence code
CRec	core recovery
CSS	closed-side setting
CTW	calculated true width
°	degree (degrees)
dia.	diameter
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
FA	fire assay
ft	foot (feet)
ft^2	square foot (feet)
ft^3	cubic foot (feet)
g	gram
gal	gallon

Abbreviation	Unit or Term
g/L	gram per liter
g-mol	gram-mole
gpm	gallons per minute
g/t	grams per tonne
ha	hectares
HDPE	Height Density Polyethylene
hp	horsepower
HTW	horizontal true width
ICP	induced couple plasma
ID2	inverse-distance squared
ID3	inverse-distance cubed
IFC	International Finance Corporation
ILS	Intermediate Leach Solution
kA	kiloamperes
kg	kilograms
km	kilometer
km^2	square kilometer
koz	thousand troy ounce
kt	thousand tonnes
kt/d	thousand tonnes per day
kt/y	thousand tonnes per year
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
kWh/t	kilowatt-hour per metric tonne
L	liter
L/sec	liters per second
L/sec/m	liters per second per meter
lb	pound
LHD	Long-Haul Dump truck
LLDDP	Linear Low Density Polyethylene Plastic
LOI	Loss On Ignition
LoM	Life-of-Mine
m	meter
m^2	square meter
m^3	cubic meter
masl	meters above sea level
MARN	Ministry of the Environment and Natural Resources
MDA	Mine Development Associates
mg/L	milligrams/liter
mm	millimeter
mm^2	square millimeter
mm^3	cubic millimeter
MME	Mine & Mill Engineering
Moz	million troy ounces
Mt	million tonnes
MTW	measured true width
MW	million watts
m.y.	million years
NGO	non-governmental organization
NI 43-101	Canadian National Instrument 43-101
OSC	Ontario Securities Commission
oz	troy ounce
%	percent
PLC	Programmable Logic Controller
PLS	Pregnant Leach Solution
PMF	probable maximum flood
ppb	parts per billion
ppm	parts per million

Abbreviation	Unit or Term
QA/QC	Quality Assurance/Quality Control
RC	rotary circulation drilling
RoM	Run-of-Mine
RQD	Rock Quality Description
SEC	U.S. Securities & Exchange Commission
sec	second
SG	specific gravity
SPT	standard penetration testing
st	short ton (2,000 pounds)
t	tonne (metric ton) (2,204.6 pounds)
t/h	tonnes per hour
t/d	tonnes per day
t/y	tonnes per year
TSF	tailings storage facility
TSP	total suspended particulates
µm	micron or microns
V	volts
VFD	variable frequency drive
W	watt
XRD	x-ray diffraction
y	year

Appendices

Appendix A: Certificates of Qualified Persons

SRK Consulting (US) Inc.
5250 Neil Road, Suite 300
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reno@srk.com
www.srk.com

CERTIFICATE OF QUALIFIED PERSON

I, J.B. Pennington, M.Sc., C.P.G.do hereby certify that:

1. I am Principal Mining Geologist of SRK Consulting (U.S.), Inc., 5250 Neil Road, Suite 300, Reno, Nevada 89502.
2. This certificate applies to the technical report titled "NI 43-101 Technical Report, Updated Resource Estimate, Yandera Copper-Molybdenum-Gold Project, Papua New Guinea" with an Effective Date of May 1, 2015 (the "Technical Report").
3. I graduated with a Bachelor of Science Degree in Geology from Tulane University, New Orleans, La. in 1985. In addition, I have obtained a Master of Science Degree in Geology from Tulane University, New Orleans, La., USA; 1987. I am a Certified Professional Geologist through membership in the American Institute of Professional Geologists, C.P.G. #11245. I have been employed as a geologist in the mining and mineral exploration business, continuously, for the past 28 years, since my undergraduate graduation from university. My relevant experience includes
   - Project Geologist, Archaen gold exploration with Freeport-McMoRan Australia Ltd. Perth Australia, 1987-1989;
   - Exploration Geologist, polymetallic regional exploration, Freeport-McMoRan Inc; Papua, Indonesia, 1990-1994;
   - Chief Mine Geologist, mine geology and resource estimation, Grasberg Cu-Au Deposit, Freeport-McMoRan Inc, Papua, Indonesia 1995-1998;
   - Corporate Strategic Planning: Geology and Resources, Freeport-McMoRan Inc., New Orleans, LA., 1999;
   - Independent Consultant: Geology, Steamboat Springs, CO., 2000;
   - Senior Geologist, environmental geology and mine closure, MWH Consulting, Inc., Steamboat Springs, CO., 2000-2003;
   - Principal Mining Geologist, precious and base metal exploration, resource modeling, and mine development, SRK Consulting (U.S.), Inc., 2004 to present;
   - Experience in the above positions working with, reviewing and conducting resource estimation and feasibility studies in concert with mining and process engineers; and
   - As a consultant, I have participated in the preparation of NI 43-101 Technical reports from 2006-2015.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I visited the Yandera property on November 10 to 14, 2015.
6. I am responsible for background Sections 2 and 3, co-authorship of resource geology and modeling Section 14, and authored portions of Sections 1, 25 and 26 summarized therefrom, of this Technical Report
7. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101 and Form 43-101F1 and the sections of the Technical Report I am responsible for have been prepared in compliance with that instrument and form.

10. As of the aforementioned Effective Date, to the best of my knowledge, information and belief, the sections of the Technical Report I am responsible for contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 19th Day of June, 2015.

"Signed and Sealed"

J.B. Pennington, M.Sc., C.P.G.

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CERTIFICATE OF QUALIFIED PERSON

I, Kent W. Hartley B.Sc. Eng., P.E.do hereby certify that:

1. I am Principal Consultant of SRK Consulting (U.S.), Inc., 5250 Neil Road, Suite 300, Reno, Nevada 89502.
2. This certificate applies to the technical report titled “NI 43-101 Technical Report, Updated Resource Estimate, Yandera Copper-Molybdenum-Gold Project, Papua New Guinea” with an Effective Date of May 1, 2015 (the “Technical Report”).
3. I graduated with a degree in Mining Engineering from Michigan Technological University in 1979 I am a registered Professional Engineer in Nevada, license number 021612. I have worked as an Engineer for a total of 30+ years since my graduation from university. My relevant experience includes mine planning and project engineering at a number of open pit and underground mines as well as construction management and cost estimating experience.
4. I have read the definition of “qualified person” set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
5. I did not visit the Yandera property.
6. I am responsible for non-applicable items and mineral processing and metallurgy Sections 13, 15 through 19, 21 through 24, and portions of Sections 1, 25 and 26 summarized therefrom, of this Technical Report.
7. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101 and Form 43-101F1 and the sections of the Technical Report I am responsible for have been prepared in compliance with that instrument and form.
10. As of the aforementioned Effective Date, to the best of my knowledge, information and belief, the sections of the Technical Report I am responsible for contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 19th Day of June, 2015.

“Signed and Sealed”

____

Kent W. Hartley B.Sc. Eng., P.E.

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CERTIFICATE OF QUALIFIED PERSON

I, Justin Smith, B.Sc., P.E., SME-RM, do hereby certify that:

1. I am Mining Engineer of SRK Consulting (U.S.), Inc., 5250 Neil Road, Suite 300, Reno, Nevada 89502.
2. This certificate applies to the technical report titled "NI 43-101 Technical Report, Updated Resource Estimate, Yandera Copper-Molybdenum-Gold Project, Papua New Guinea" with an Effective Date of May 1, 2015 (the "Technical Report").
3. I graduated with a B.Sc. degree in Mining Engineering from the Colorado School of Mines in 2009. I am a licensed Professional Mining Engineer in the State of Nevada, license # 23214. In addition, I am a Registered Member of the Society for Mining, Metallurgy and Exploration, registered member # 4152085RM. I have worked as a Mining Engineer for a total of six years since my graduation from university. My relevant experience includes assisting with resource modeling and mine planning at several porphyry copper operations in Arizona, Utah, and the Democratic Republic of Congo. Additionally, I have been a contributor to several precious and base metal technical reports in Nevada, Alaska, Arizona, Nebraska, Idaho, and Peru.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I did not visit the Yandera property.
6. I collaborated on resource modeling and co-authored Section 14 of this Technical Report.
7. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101 and Form 43-101F1 and the sections of the Technical Report I am responsible for have been prepared in compliance with that instrument and form.
10. As of the aforementioned Effective Date, to the best of my knowledge, information and belief, the sections of the Technical Report I am responsible for contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 19th Day of June, 2015.

"Signed and Sealed"

Justin Smith, B.Sc., P.E., SME-RM

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CERTIFICATE OF QUALIFIED PERSON

I, Brooke J. Miller M.Sc., C.P.G.do hereby certify that:

1. I am a Senior Consultant of SRK Consulting (U.S.), Inc., 5250 Neil Road, Suite 300, Reno, Nevada 89502.
2. This certificate applies to the technical report titled "NI 43-101 Technical Report, Updated Resource Estimate, Yandera Copper-Molybdenum-Gold Project, Papua New Guinea" with an Effective Date of May 1, 2015 (the "Technical Report").
3. I graduated with a Bachelor of Arts degree in Geology from Lawrence University in 2002. In addition, I have obtained a Master of Science degree in Geological Sciences from The University of Oregon in 2004. I am a Certified Professional Geologist of the American Institute of Professional Geologists (AIPG). I have worked as a Geologist for over 9 years since my graduation from university. My relevant experience includes mapping, drill core logging, and sampling at copper-moly porphyry deposits in exploration and development stages.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have not visited the Yandera property.
6. I am responsible for drilling, data validation and verification Sections 10 through 12, and portions of Sections 1, 25 and 26 summarized therefrom, of this Technical Report.
7. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101 and Form 43-101F1 and the sections of the Technical Report I am responsible for have been prepared in compliance with that instrument and form.
10. As of the aforementioned Effective Date, to the best of my knowledge, information and belief, the sections of the Technical Report I am responsible for contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 19th Day of June, 2015.

"Signed and Sealed"

____

Brooke J. Miller, M.Sc., C.P.G. 11668

Columbia Basin Resources Inc.

1205 E 42nd Ave
Spokane, WA 99203
PH: 206-618-2385
www.columbiabasinresources.com

CERTIFICATE OF QUALIFIED PERSON

I, Nathan Chutas, Ph.D., C.P.G. do hereby certify that:

1. I am President and Chief Geologist of Columbia Basin Resources Inc, 1205 E 42nd Ave, Spokane, WA 99203, USA.
2. This certificate applies to the technical report titled “NI 43-101 Technical Report, Updated Resource Estimate, Yandera Copper Project, Papua New Guinea” with an Effective Date of May 1, 2015 (the “Technical Report”).
3. I graduated from the University of Mount Union in 1997 with Bachelor of Science degrees in Geology and Chemistry. In addition, I have obtained a Master of Science in Geological Sciences from the University of Washington in 2000 and a Doctor of Philosophy in Geological Sciences from the University of Washington in 2004. I am a Certified Professional Geologist of the American Institute of Professional Geologists. I have worked as a Geologist for a total of 16 years since my graduation from university. My relevant experience includes geologic work on a variety of base and precious metal projects and properties, including a number of porphyry and other igneous-related and structurally controlled systems in the Western United States, Alaska, the Philippines, and Mexico; six years of managing exploration projects; authoring and editing numerous geologic reports; and recently working on the porphyry system that is the subject of this report.
4. I have read the definition of “qualified person” set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
5. I visited the Yandera property on 23 July, 2014 for 11 days.
6. I am responsible for project background, geology and exploration, and environmental Sections 4 through 9, 20, and portions of Sections 1, 25 and 26 summarized therefrom, of this Technical Report.
7. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
8. I have had prior involvement with the property that is the subject of the Technical Report. The nature of my prior involvement was technical as I was contracted to organize and evaluate their large body of data 2014. Additionally, I provided software and field training for a number of their geology staff in 2014 and 2015.
9. I have read NI 43-101 and Form 43-101F1 and the sections of the Technical Report I am responsible for have been prepared in compliance with that instrument and form.
10. As of the aforementioned Effective Date, to the best of my knowledge, information and belief, the sections of the Technical Report I am responsible for contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 19th Day of June, 2015.

Nathan Chutas, Ph.D., C.P.G.