M3-PN170038
October 24, 2017
Revision 0

ARCHITECTURE
ENGINEERING
CONSTRUCTION MANAGEMENT

North Island Copper and Gold Project

NI 43-101 Technical Report
Preliminary Economic Assessment

British Columbia, Canada

Laurie Tahija, Q.P. MMSA
Daniel Roth, P. Eng.
Brian Game, P. Geo
Tom Shouldice, P. Eng.
Phil Burt, P. Geo.
John Nilsson, P. Eng.
Ben Wickland, P. Eng.

NORTHISLE
COPPER AND GOLD INC.

DATE AND SIGNATURES PAGE

The effective date of this report is October 24, 2017. The effective date of the North Island Mineral Resource Estimate is March 24, 2017. See Appendix A, Preliminary Economic Assessment Contributors and Professional Qualifications, for certificates of qualified persons. These certificates are considered the date and signature of this report in accordance with Form 43-101F1.

NORTH ISLAND COPPER AND GOLD PROJECT
NI 43-101 TECHNICAL REPORT
PRELIMINARY ECONOMIC ASSESSMENT

TABLE OF CONTENTS

SECTION PAGE

LIST OF FIGURES AND ILLUSTRATIONS

LIST OF TABLES

TABLE DESCRIPTION PAGE

LIST OF APPENDICES

1 SUMMARY

1.1 PROPERTY DESCRIPTION AND OWNERSHIP

The North Island Copper and Gold Project (also referred to as the "North Island Project," "NorthIsle Project" or the "Project") is located on northern Vancouver Island, British Columbia, Canada approximately 20 km south of Port Hardy. The Project area is located approximately at latitude 50° 40' North and longitude 127° 45' West, and stretches 50 km northwest of the past producing Island Copper Mine along the northern shore of Holberg Inlet.

1.1.1 Mineral Tenures, Surface Rights and Royalties

The North Island Project is a 33,447-hectare contiguous block of 212 mixed legacy and cell mineral claims 100% owned by North Island Mining Corp., a wholly owned subsidiary of NorthIsle Copper and Gold Inc. To maintain the claims in good standing, certain annual cash payments (cash in lieu of work) or equivalent exploration expenses in on-the-ground exploration work must be applied to the claims. The Project claims are located on Crown land and the surface rights are unencumbered, notwithstanding any ongoing First Nations treaty negotiations.

With the exception of 16 claims comprising the Red Dog option, NorthIsle, through North Island Mining Corp., 100% owns the claims forming the North Island Project subject to a 10% net profit royalty. There are no additional royalties, back-in rights, payments or other agreements and encumbrances to which the property is subject other than the Red Dog option agreement.

1.1.2 Permits and the Environment

Exploration activities to date have been undertaken in accordance with the appropriate British Columbia regulations and no existing environmental liabilities are apparent on the property. The North Island Project is located within an overlap area of the separately claimed traditional territories of the Quatsino First Nation ("Quatsino"), the Kwakiutl First Nation ("Kwakiutl") and the Tlatlasikwala First Nation ("Tlatlasikwala").

1.2 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

Project access from Port Hardy is via paved roads and then well-maintained logging roads. The Hushamu Deposit is accessed from Port Hardy by a paved road to Coal Harbour and then well-maintained logging roads that include the Coal Harbour Main Road, the Wanokana Road, and the Hushamu Main Road, which extends to the mouth of the Hushamu Valley. The Red Dog Deposit is accessible from Port Hardy by the Holberg Road to a point about 45 km from Port Hardy where forestry access road NE 62 leads northward to the property.

Climate in the Project area is typical of coastal areas of British Columbia with an annual precipitation of 3,911 mm, and a daily average temperature of 8.3°C (Environment Canada 1971-2000). The topography of the Project area is characterized by north and northwest trending ridgelines with broad intervening valleys that typically contain small streams or rivers. Elevations range from sea level, at Holberg Inlet to 720 m above sea level.

The Port Hardy area has a long history of mining from the Island Copper Mine, which ceased operations in 1995. The area also has a long history of heavy industry from logging operations. Port Hardy has sufficiently established infrastructure that would be able to provide for development of a mining operation. The region also has well-established road and power networks, much of which is a legacy of the Island Copper Mine.

1.3 GEOLOGY AND MINERALIZATION

1.3.1 Hushamu Deposit

The dominant rocks are from the early to mid-Jurassic Bonanza Group volcanics and the Mid-Jurassic Island Plutonic Suite. The five major lithological units in the vicinity of the deposit are: andesite, diorite, quartz-feldspar porphyry, hydrothermal breccia and late breccia. The massive andesite is the host to most of the alteration and mineralization. The dominant structures are northwest and northeast normal and strike slip faults. The dominant fault is referred to as the Hushamu Fault, which occupies the main valley at the north side of the Deposit.

There are four main alteration styles in the Hushamu Deposit; silica-clay-pyrite (SCP), silica-clay-zunyite (SCZ), chlorite-magnetite (CMG), and propylitic. Phyllic and advanced argillic alterations have also been observed locally on the property, but are not dominant.

Three mineralized zones have been recognized in the Hushamu Deposit; the Leached Zone, Supergene Zone and Hypogene Zone. The Leached Zone is typical of evolved porphyries, where the leached cap has not been removed by erosion and/or glacial processes. The rock is generally bleached and the majority of sulphide minerals have been removed. Copper has been completely to partially removed but molybdenite and gold remain. The Supergene Zone is characterized by very weak supergene enrichment of copper in the form of chalcocite +/- covellite near the base of the leach cap. In the Hypogene Zone, copper mineralization occurs as blebby and vein chalcopyrite and lesser bornite. The copper grade is highest in chlorite-magnetite altered volcanics with lesser copper in silica-clay-pyrite alteration.

1.3.2 Red Dog Deposit

Red Dog is underlain by andesitic to basaltic flows, tuff breccias and tuffs of the lower Jurassic-age Bonanza Group that have been intruded by four compositionally different intrusions that are part of the Jurassic-age Island Intrusions. The main intrusive phase associated with the Red Dog Deposit mineralization is the Rose Porphyry, a granite porphyry characterized by phenocrysts of orthoclase and rounded quartz eyes in a felsic groundmass. The dominant structures at Red Dog are normal south-facing faults having normal and/or strike slip movement resulting in a series of west-northwest blocks.

There are six main alteration types present at Red Dog. These are from oldest to youngest: Hornfels (H); Intermediate Argillic (CMG): Quartz-Magnetite Breccia (QMB); Advanced Argillic (SCP); Propyllitic (PROP); and Zeolite-Carbonate.

The Red Dog Deposit occurs predominantly in an approximately 350-metre-long by 150-metre-wide west-northwest trending quartz-magnetite breccia localized in altered Bonanza Group rocks adjacent to quartz-feldspar porphyritic dykes. Chalcopyrite and pyrite as disseminations, blebs and fracture fillings are present in equal amounts in the breccia along with lesser amounts of molybdenite.

1.4 DEPOSIT TYPES

The Hushamu and Red Dog Deposits host porphyry copper-gold-molybdenum mineralization similar in grade, and in the case of Hushamu size, to the past producing Island Copper Mine located approximately 30 km to the east. Over the life of the operation Island Copper produced 345 million metric tonnes of ore with average grades of 0.41% copper, 0.017% molybdenum, 0.19 g/t gold and 1.4 g/t silver (Perelló et al., 1995).

1.5 HISTORY AND EXPLORATION

1.5.1 Hushamu

Prior to NorthIsle's involvement, exploration at Hushamu was conducted by Utah Construction and Mining Co. (Utah), BHP, Moraga Resources (Moraga), Jordex Resources, Lumina Copper Corp., Western Copper Corp. and IMA Exploration Inc. from 1965-2008. Work completed by these companies included soil geochemical surveys, prospecting, geological mapping, ground and airborne geophysical surveys, core drilling, resource estimation and preliminary metallurgical work.

In the fall of 2011, Western Copper through a plan of arrangement, created NorthIsle Copper and Gold Inc. in order to advance the property. During 2011-2012, NorthIsle re-logged the historical core from Hushamu, carried out additional drilling to better define the northern and southern limits, completed approximately 12 km of induced polarization survey over the projected northwest extension of mineralization and generated an updated NI 43-101 resource calculation.

In 2014, NorthIsle drilled four holes at Hushamu to test an induced polarization chargeability anomaly in an undrilled area immediately northwest of the known deposit, and one hole to collect a metallurgical sample from the main deposit in an area where earlier drill-holes are widely spaced. The 2014 drill holes, except for the metallurgical hole, are not part of the current block model. There is no recorded production from the Hushamu Deposit.

1.5.2 Red Dog

Prior to NorthIsle's involvement, exploration at Red Dog was conducted by Westcoast Mining and Exploration, City Services Ltd., Westminex Development, Utah, Crew Capital and Moraga from 1966-1991. Work completed by these companies included soil geochemical surveys, prospecting, geological mapping, ground geophysical surveys, core drilling and a preliminary scoping study.

In March 2015, NorthIsle optioned the Red Dog property and in April 2015 conducted a limited program of soil and rock geochemical sampling and reconnaissance geological mapping. In September 2015, a second program of geological mapping was conducted on the property by NorthIsle.

From July to August 2016, a diamond drilling program, totaling 1,112 metres in seven holes was conducted by NorthIsle. Most of the drilling was directed at the Red Dog Zone in order to verify historical copper-gold mineralization and to provide data for a NI 43-101 compliant resource estimation. There is no recorded production from the Red Dog Deposit.

1.6 DRILLING

A total of 226 holes (44,632 m) have been completed at the North Island Project including 143 holes (32,877 m) at the Hushamu Deposit and 38 holes (6,382 m) at the Red Dog Deposit that were utilized in their respective resource calculations.

Core logging conducted by NorthIsle encompassed lithological and geotechnical logging of recovered core which included description of mineralogy and major geological features, simple RQD calculations, core recovery, structural data and specific gravity calculations. The information was input into a digital core logging platform (GeoSpark Logger). Drill collars were determined by either hand-held GPS, or by a surveyor using a differential GPS utilizing a base station and a rover. A Reflex single-shot survey tool was used at 30-metre downhole intervals to provide in-hole survey data.

Drill core generated by previous operators was halved by a jaw-type splitter and sampled by personnel from these operators predominantly at 10 feet (3.05 metres) intervals, a sample interval appropriate for porphyry style mineralization. The NorthIsle drill core was halved using a core saw and sampled from top to bottom generally at 2 metre intervals for HQ core and 3-metre intervals for NQ core.

1.7 SAMPLE PREPARATION, ANALYSES, AND SECURITY

Throughout the history of the drilling at Hushamu, geochemical analyses have been performed at Chemex Labs, and later ALS Chemex Labs. All samples collected by NorthIsle in 2011 and 2012 were prepared and analyzed at ALS Chemex Laboratories Ltd. in North Vancouver, B.C., as the primary lab and duplicate samples were sent to Acme Analytical Labs Ltd. in Vancouver, B.C., as the secondary lab.

Throughout the history of the drilling at Red Dog, geochemical analysis was done by either Chemex Labs, Utah Mines Ltd. Laboratory at the Island Copper Mine, or Acme Analytical Labs Ltd. In 2016, all samples collected by NorthIsle were prepared and analyzed by Bureau Veritas Mineral Laboratories (BVL) in Vancouver, B.C., as the primary lab and duplicate samples were sent to ALS in North Vancouver, B.C., as the secondary lab.

NorthIsle core samples were placed in poly ore sample bags with a uniquely-numbered sample tag and secured with nylon zip tags. Sample bags were then placed in rice bags. Sample shipments were palletized and shrink-wrapped and were transported directly by bonded transport from NorthIsle's core logging facility to the appropriate lab in Vancouver.

Limited information is available on the sample preparation, analyses and security methods used on the property in work prior to Western Copper's work in 2007. Conventional sample handling practices of the era were used on the property. No special security precautions were noted in the sampling, shipping, and analysis of the samples from the deposits. No irregularities were found in the historical data, and some check assays were performed.

There is limited available information on any quality assurance/quality control (QA/QC) programs for the work programs prior to Western Copper's work in 2007. NorthIsle inserted suites of certified reference material (standards), blanks and duplicates into the core sample sequence every 20 samples.

1.8 DATA VERIFICATION

All drill data is recorded directly into a computer in digital form. Data from third parties such as laboratories are generally supplied in digital and printed form. All data are verified by NorthIsle personnel.

A number of data verification programs have been performed over the Project history, primarily in support of technical reports. No material errors or omissions were noted during these reviews.

In the 2011 re-logging program by NorthIsle at Hushamu, 11 drill holes were re-sampled in their entirety to verify historic analytical results. In general, geochemical results from re-assaying correlate well with the historical results. In the 2016 verification drilling by NorthIsle at Red Dog, four holes were twinned to verify historic analysis. In general, analytical results from all four verification holes correlate well with the historical results. Based on the correlations between the historical grades and the NorthIsle re-assay grades, all the historical data from the Hushamu and Red Dog Deposits were accepted into the final database.

1.9 MINERAL RESOURCE ESTIMATE

In 2015, Burt Consulting Services ("BCS") was retained to update an earlier Hushamu NI 43-101 compliant resource estimation subsequent to new drilling and a re-analysis of the alteration domains. The estimate was compiled using assay data from 143 drill holes (32,877 metres), comprising 10,759 samples. Five main alteration domains (OVER, LEA, QFPP, SCP and CMG) were modeled from the drill data and used as estimation constraints. All other alterations outside of these domains were considered to be within the PRO alteration domain. The CMG, SCP and PRO domains exhibited similar copper statistics so were treated as one domain in the estimation. Grade capping was applied to the raw data, non-assayed sample intervals were given a zero value and five metre downhole composites were created.

A block model was prepared constrained by an earlier pit model which encompassed nearly all of the drilling. The final model size was 2,500 metres E, 2,300 metres N and 765 metres vertical. Block sizes were 20 metres horizontal and 15 metres vertical. Sub-blocking of 5 metres horizontal and 3.75 metres vertical was used at domain boundaries.

An inverse distance squared algorithm was used for block estimation of Cu, Au, Mo and Re using two search ellipsoids determined from a combination of the variogram results, historical estimations and a visual examination of the copper values. For the Indicated Resource Category, a minimum of four and a maximum of 16 composites were used to estimate each block using a 150 m x 75 m x 60 m horizontal search ellipsoid. A maximum of three composites per drill hole were allowed to estimate each block. The Inferred Resource Category used a horizontal search ellipsoid of 400 m x 200 m x 160 m. While a minimum of four and maximum of 16 composites were used to estimate each block, in this case, four composites were allowed per drill hole. Blocks were estimated for LEA and QFPP separately and SCP, CMG and PRO domains were estimated as one. Partial percentages were calculated for each block within each domain and used in the final volume calculations. Specific gravity for each domain was determined from 689 measurements.

The model was queried and tabulated for various cut-off copper values. The 0.15% Cu cut-off is as shown in Table 1-1.

Table 1-1: Hushamu Resource Estimate at a 0.15% Cu Cut-off

Indicated Resource					
Domain	Tonnes x 10^6	%Cu	ppm Au	%Mo	%Re
LEA	1.14	0.19	0.29	0.010	0.54
CMG-SCP-PRO	304.04	0.24	0.28	0.008	0.37
QFP	0	0	0	0	0
Total	305.18	0.24	0.28	0.008	0.37
Inferred Resource					
LEA	0.34	0.19	0.25	0.012	0.63
CMG-SCP-PRO	188.30	0.19	0.24	0.007	0.35
QFP	0	0	0	0	0
Total	188.64	0.19	0.24	0.007	0.35

1.10 MINING METHOD

The Hushamu and Red Dog Deposits will be mined by conventional truck and shovel methods. Indicated and Inferred Mineral Resources have been used to develop mine designs and a production schedule to provide 75,000 t/d to the concentrator over a 22-year mine life. The overall mining rate will peak at 64 million t/a. The Hushamu open pit will be mined in four development phases initially providing 50,000 t/d while Red Dog will provide 25,000 t/d. Pit rim crushers will be located at both deposits with overland conveyors to the processing facilities.

The mine will operate four production drills, three hydraulic shovels and two wheel loaders. The truck fleet will peak at 18-220 t class units. Waste rock from Hushamu will be placed in the tailings dam construction and within the Mine Waste Storage Facility (MWSF) to be covered with tailings and overburden capping.

1.11 MINERAL PROCESSING AND METALLURGICAL TESTING

Five metallurgical test programs have been conducted on zones of the North Island copper and gold Project. These programs have documented sample locations from the Hushamu and Red Dog zones. The testing was focused on global entities that represent two geological lithologies. Extensive variability or comminution studies have not been performed.

The metallurgical testing has focused on a flotation process to recover a copper concentrate with by-product credits for gold and molybdenum. Cyanide leaching of some flotation streams has been investigated to enhance overall gold recoveries, however results have been poor to date.

The largest metallurgical testing programs have been performed on the Hushamu zone: ALS test program KM3409 and the BML test program BL0059. These programs culminated with locked cycle tests (LCT) to demonstrate concentrate grades and recoveries. The Red Dog zone testing was limited to rougher tests in the Bacon Donaldson work and rougher cleaner tests in the BML 2017 program.

At the current stage of development, bulk flotation with extensive regrinding provides the best metallurgical result. Table 1-2 displays locked cycle test results. Further process development is warranted to improve gold recovery and assess molybdenum concentrate production.

Table 1-2: Expected Metallurgical Results Based on Samples and Testing to Date

	Deposit	Comp	Feed Grade Assays			PG	Con Grade			Recovery		
			Cu (%)	Mo (%)	Au (g/t)	µm K80	Cu (%)	Mo (%)	Au (g/t)	Cu (%)	Mo (%)	Au (%)
Base Met Labs BL0059	Hushamu	SCP	0.24	0.006	0.25	100	19.2	0.770	10.4	75	66	34
		CMG	0.30	0.014	0.34	100	21.7	0.410	13.8	78	55	44
Base Met Labs BL0137	Red Dog	MC1	0.32	0.007	0.54	100	24.2	-	14.3	86	-	33

The concentrate was relatively low in deleterious elements. There were some elements that may attract some smelter penalties, specifically: arsenic, bismuth, selenium, and fluorine.

1.12 PROCESSING

The process plant designed for the NorthIsle Copper-Gold Project consists of a conventional copper/molybdenum/pyrite flotation process that has been used successfully by the mining industry for many years. Concentrates, copper/gold, molybdenum, and pyrite will be produced as saleable products.

The design basis for the processing plant was 75,000 mtpd or 27,375,000 mtpy at 92% availability. Design ore grade to the process plant was estimated to average 0.19% copper, 0.24 gpt gold, and 0.008% molybdenum with an overall estimated recovery of approximately 77% for copper, 39% for gold, and 60% for molybdenum.

Mineralized material will be processed from the Hushamu and the Red Dog Deposits. Run-of-Min (ROM) ore from the Hushamu Deposit will be crushed and stored in a stockpile ahead of the process plant. ROM ore from the Red Dog Deposit will be crushed and conveyed to the stockpile ahead of the process plant. Ore from the mine will be delivered

24 hours per day. Ore will be reclaimed from the stockpile and sent to a conventional SAG/Ball mill grinding for processing to a size suitable for flotation.

Flotation begins with bulk copper-molybdenum flotation to produce a bulk copper-molybdenum concentrate followed by the separation of molybdenum from copper in a molybdenum flotation circuit to produce a final copper/gold concentrate and a molybdenum concentrate. Pyrite from the bulk copper-molybdenum flotation rougher tails will be removed in a pyrite scavenger flotation circuit to produce tailings with low sulfide content. The tailings will be cycloned and the underflow recovered as sand for tailings dam construction and the overflow and remaining tailings will be sent to the Mine Waste Storage Facility (MWSF). Concentrate from the pyrite scavenger flotation and tails from the bulk cleaner circuit will be combined and processed in a pyrite upgrade flotation step to produce a clean saleable pyrite concentrate. Tailings from the pyrite upgrade circuit will be thickened and sent to the MWSF.

Copper/gold and pyrite flotation concentrates will be filtered and loaded into highway haul trucks and transported to market. Molybdenum concentrate will be filtered, dried and packaged for transport to market.

1.13 INFRASTRUCTURE

1.13.1 Power Supply

A new 36 km 138 kV power line will be constructed from an existing BC Hydro electrical substation in Port Hardy to feed the mine site. A new 28 km 34.5 kV powerline will be constructed for site distribution.

1.13.2 Water Availability

Water balance modelling results indicate that there is generally an excess of water generated at the mine facilities, particularly in the winter months. Discharge of excess water from the mine site, following treatment as necessary, will be required. Make up water for process plant operations can be met without the need for water to be sourced from outside of the mine. Average annual site precipitation is 3.9 m.

1.13.3 Mine Waste Storage Facility

The proposed MWSF will be located in the Hushamu Valley immediately south east of the Hushamu Pit. The MWSF will include two cross valley dams located approximately 2.5 km apart. Each dam will include a till starter dam, and will be raised by centreline method using cycloned tailings sand for the downstream shell, till for the core, and waste rock as upstream support. Final dam heights will be 195 m and 280 m. The total area of the facility will be approximately 6.4 km^2. The MWSF will store waste rock from the Hushamu pit and tailings as sand for dam construction and as cyclone overflow and whole tailings between the dams. Waste rock and tailings between the dams will be submerged to control acid generation. The facility becomes a landform on closure.

1.13.4 Transportation and Logistics

The Port Hardy area of northern Vancouver Island where the NorthIsle mine will be constructed is well-serviced by all-weather paved public highways to within about 30 km of the mine-site. Access to the mine from the public highways will be from improved gravel woodlands operation roads. The Port of Naniamo, which is a major general cargo and container port, is approximately 400 km from the NorthIsle mine-site via public highways. There are a number of tug and barge operators that provide service to Port Hardy and Port McNeil that can be utilized to transport bulk materials and equipment to the Project.

1.14 CAPITAL AND OPERATING COSTS

1.14.1 Initial Capital Expenditures

Table 1-3 shows a summary of the initial capital expenditures for the Project.

Table 1-3: Initial Capital Expenditures

Initial Capital Expenditures	CAD$ Millions
Mine	$149.2
Pre-Production	$125.6
Process	$1.024.9
Owner's Cost	$44.5
Total	**$1,344.2**

1.14.2 Operating Costs

The mine operating costs were calculated to average CAD$2.02 per tonne moved.

Table 1-4: Mine Operating Costs

Area	Unit Cost (CAD$/t moved)
Drilling	0.13
Blasting	0.27
Loading	0.27
Hauling	0.67
Support	0.54
Mine General	0.14
Total Cost	2.02

The process operating costs were calculated to average CAD$4.88/tonne ore.

Table 1-5: Process Operating Costs

Area	CAD$/tonne ore
Salaries & Wages	0.54
Power	1.55
Liners	0.34
Grinding Media	1.06
Reagents	0.85
Maintenance Parts & Repairs	0.44
Supplies & Services	0.10
Total	4.88

1.15 ECONOMIC ANALYSIS

Economic evaluations were generated incorporating forecasts for metal prices using the long term (Base Case), the SEC price and Spot Price. The spot price case is from September 6, 2017. Note that the preliminary economic assessment is preliminary in nature. It includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary economic assessment will be realized.

Table 1-6: Economic Evaluations

Parameter	Unit	Base Case	SEC	Spot Price
Copper	US$ per lb	$3.10	$2.50	3.12
Gold	US$ per oz	$1300	$1,213.12	1,333.10
Molybdenum	US$ per lb	$9.00	$7.03	7.14
Pyrite	US$ per tonne	$86	$86	$86
Exchange rate ($US/$1CAD)		0.75	0.75	0.75
Economic Result (After tax)				
Net Revenue	CAD$ M	2,349	1,339	2,342
NPV 8%	CAD$ M	550	34	549
IRR	%	14.3	8.4	14.3
Pay back	Years	5.1	7.9	5.0

1.16 CONCLUSIONS AND RECOMMENDATIONS

The North Island Project hosts significant bulk tonnage copper-gold-molybdenum porphyry style mineralization in the Hushamu and Red Dog Deposits. The Project is located in the politically stable province of British Columbia on northern Vancouver Island where perennial access and logistics are straightforward and relatively inexpensive. The region has a long and enduring history of exploration and open pit mining with the past producing Island Copper Mine located approximately 30 km to the east.

With an after-tax IRR of 14.3%, the results of the study are promising. The project merits further development, including the following action items:

- Drill additional holes to convert resources at the Hushamu Deposit from the Inferred to Indicated categories.
- Metallurgical testing be continued in advance of the Engineering Pre-Feasibility Study, using representative composite samples, to determine the process engineering design criteria for unit processes.
- Develop the Mine Waste Storage Facility to a Pre-Feasibility level; evaluate the existing pit as a potential site to store tailings.
- Undertake geotechnical assessments to provide detailed recommendations for open pit wall slope design criteria at the Pre-Feasibility level of study.
- Pursue additional permits for Project development, including environmental permits and additional environmental baseline surveys.

- Conduct a power supply study to confirm the electrical power supply capability to the Project and the necessary modifications and upgrades.
- Perform a study to evaluate the existing facilities and to establish the extent and cost of refurbishment or replacement necessary to provide reliable and safe operations for the NorthIsle Project
- Review the proposed navigation route to establish and confirm the operating procedures, conditions and limitations for the shipping through the Quatsino Sound and Narrows.
- Perform a marketing study for the products of the project.

2 INTRODUCTION

2.1 PURPOSE AND BASIS OF REPORT

The purpose of the report is to provide an updated resource and estimate at a preliminary economic assessment level for the Project, and to provide the results of studies carried out to date on the Project.

2.2 SOURCES OF INFORMATION

NorhtIsle previously filed Technical Reports on the North Island Project, including the following:

- Giroux, G., and Casselman, S., (2012): Updated Resource Report for the Hushamu Deposit, Northern Vancouver Island, British Columbia, Canada for Northisle Copper and Gold Inc.
- Game, B. and Burt, P, (2017): Technical Report Copper-Gold Resource Estimate Red Dog Property, Northern Vancouver Island for NorthIsle Copper and Gold Inc.

Additional information was obtained by M3 or provided by NorthIsle, and is contained herein.

2.3 QUALIFIED PERSONS

The Qualified Persons for this Technical Report are as follows:

- Laurie Tahija, of M3 Engineering – Recovery Methods and Process Operating Costs
- Daniel Roth, of M3 Engineering – Project Infrastructure; Capital Costs and Economic Analysis
- Brian Game, of GeoMinEx Consultants – Geology, Exploration and Environmental
- Tom Shouldice, of Base Metallurgical Laboratories – Mineral Processing and Metallurgical Testing
- Phil Burt, of Phil Burt Consulting Services – Mineral Resource Estimates
- John Nilsson – Mining Methods and Costs
- Ben Wickland, of Golder Associates Ltd. – Mine Waste Storage Facility

Table 2-1: Areas of Responsibility and Site Visit Dates

QP Name	Certification	Site Visit Date	Area of Responsibility
Laurie Tahija	Q.P. of MMSA	Not Applicable	Sections 17, 21.4.1-21.4.2, and corresponding sections of 1, 25 and 26.
Daniel Roth	P. Eng.	April 12, 2017	Sections 1, 2, 3, 18, 21, 22, 24, 27, and corresponding sections of 25 and 26.
Brian Game	P. Geo.	June 3 to July 13, 2017	Sections 4, 5, 6, 7, 8, 9, 10, 11, 12, 19, 20, 23, and corresponding sections of 1, 25 and 26
Tom Shouldice	P. Eng.	Not Applicable	Section 13, and corresponding sections of 1, 25 and 26.
Phil Burt	P. Geo.	Summer of 1979	Section 14, and corresponding sections of 1, 25 and 26.
John Nilsson	P. Eng.	April 12, 2017	Sections 15, 16, 21.2.4, 21.3.1, 21.4.3, and corresponding sections of 1 and 26.
Ben Wickland	P. Eng.	April 12, 2017	Sections 1.13.3, 18.3 and 26.3.

2.4 TERMS AND DEFINITIONS

The report considers CAD Dollars ($) only. Unless otherwise noted, all units are metric. However, as noted and as standard for projects of this nature, certain statistics are reported as avoirdupois or English units, grades are described in terms of percent (%), grams per metric tonne (g/t) or troy ounces per short ton (oz/t). Salable base metals are described in terms of metric tonnes and English pounds. Salable precious metals are described in terms of troy ounces. Table 2-2 shows the abbreviations used in this report.

Table 2-2: Terms and Abbreviations

Abbreviation	Unit or Term
$	Canadian Dollars
CAD$	Canadian Dollars
US$	United States Dollars
% (grade)	Percent by weight (grade)
2-D	Two-Dimensional
3-D	Three-Dimensional
4WD	Four-Wheel Drive
AA	Atomic Adsorption
AAS	Atomic Absorption Spectrometry
ABA	Acid Base Accounting
AG	Autogenous Grinding
Ag	Silver
AgEq	Silver Equivalent
AGP	Acid Generation Potential
ANP	Acid Neutralization Potential
ARD	Acid Rock Drainage
AT	Assay Ton
Au	Gold
cfm	Cubic feet per minute
Chemex	ALS Chemex
CMG	Chlorite Magnetite
CO_3	Carbonate
COG	Cutoff grade
Company	NorthIsle Copper and Gold Inc.
Cu	Copper
CV	Coefficient of Variation (standard deviation/mean)
DDH	Diamond Drill Hole
dmt	Dry metric tonne
dmt/h	Dry metric tonnes per hour
dmtpd	Dry metric tonnes per day

Abbreviation	Unit or Term
dmtpy	Dry metric tonnes per year
EIA	Environmental Impact Assessment
EIS	Environmental Impact Study
EPCM	Engineering, Procurement and Construction Management
FA	Fire Assay
Fe	Iron
g	gram
g Ag/t	grams of silver per metric tonne
g AgEq/t	grams of silver equivalent per metric tonne
g Au/t	grams of gold per metric tonne
g/cm^3	grams per cubic centimetre
g/t	grams per metric tonne
g/t Ag	grams of silver per metric tonne
g/t Au	grams of gold per metric tonne
GPS	Global Positioning System
ha	hectare
HC	Humidity Cell
HG	High Grade
HP / hp	Horsepower
ICP	Inductively-Coupled Plasma
ICP	induced-coupled polarization
ID^3	Inverse Distance Cubed
Inspectorate	Inspectorate, a division of Bureau Veritas; formerly BSI Inspectorate
IRR	Internal Rate of Return
Ja	joint alteration
Jn	joint number
Jr	joint roughness
Jw	joint water reduction factor
k	thousands

Abbreviation	Unit or Term
kg	kilograms
kg/t	kilograms per metric tonne
km	kilometre
km^2	square kilometre
kPa	kilopascal
kV	kilovolt
kW	kilowatt
kW-h	Kilowatt-hour
L	Liters
LG	Low Grade
lb	pound
LOM	Life of Mine
m	metre
m^3	cubic metre
M m^3	millions of cubic metres
m^3/h	cubic metres per hour
Ma	Million years old
masl	metres above sea level
MG	Medium Grade
Mn	Manganese
Mt	Megatonnes, or one thousand metric tonnes
MTPD	Metric Tonnes per Day
MW	megawatt
MWMP	Meteoric Water Mobility Procedure
MY	Million years old
MWSF	Mine Waste Storage Facility
NGO	non-governmental organizations
NNP	Net Neutralization Potential
NPV	Net Present Value
NSR	Net Smelter Return
opt	Troy ounces per English ton
oz/t	troy ounce per short ton
PA	Preliminary Assessment or Preliminary Economic Assessment
PAX	Potassium Amyl Xanthate
Pb	Lead
PEA	Preliminary Economic Assessment
ppb	part per billion

Abbreviation	Unit or Term
ppm	Part per million
PROP	Propylitic
PSD	Particle Size Distribution
QA/QC	Quality Assurance/Quality Control
QFP	Quartz Feldspar Porphyry
RC	Reverse Circulation
RMR	rock mass rating
ROM	Run of Mine
rpm	revolutions per minute
RQD	rock quality designation
S	Sulphur
S/R	Strip Ratio
Sb	Antimony
SCP	Silica Clay Pyrite
SRF	stress reduction factor
t/d	metric tonnes per day
t/h	metric tonnes per hour
tonne	metric tonne
tonnes	dry metric tonnes (where one tonne = 1.1023 short tons)
tpa	Tonnes per annum
tpy	Tonnes per year
US$ / USD	United States Dollars
UTM	Universal Transverse Mercator coordinate system
VFD	Variable Frequency Drive
WCN	WCM Minerals
wmt	Wet Metric Tonne
XRD	X-Ray Diffraction
XRF	X-Ray Fluorescence
Zn	Zinc
µm	micrometre or micron

3 RELIANCE ON OTHER EXPERTS

No experts were relied upon other than the Qualified Persons for this report.

4 PROPERTY DESCRIPTION AND LOCATION

4.1 PROPERTY AREA AND LOCATION

The North Island Project is located in northern Vancouver Island, British Columbia, Canada in the Nanaimo Mining Division, approximately 20 km south of Port Hardy. The Project area is centred approximately at latitude 50° 40' North and longitude 127° 45' West, covered by topographic map sheets 92L/12 and 102I/09, and stretches 50 km northwest of the past producing Island Copper Mine, along the northern shore of Holberg Inlet (Figure 4-1).

4.2 CLAIMS AND TITLE

The North Island Project is a contiguous 33,447-hectare block of mineral titles 100% owned by North Island Mining Corp., a wholly owned subsidiary of NorthIsle Copper and Gold Inc. The Project consists of 212 mineral claims which includes the more recently optioned Red Dog property consisting of 16 mineral claims, measuring 400 hectares (Figure 4-2). Table 4-1 lists the details of the Project mineral tenures. This information has been verified from the B.C. Government Mineral Titles Online website (http://webmap.em.gov.bc.ca).

Table 4-1: North Island Project Claim Statistics

Tenure Number	Claim Name	Issue Date	Good to Date	Area (ha)
229789	EXPO 1013 FR.	1983/Aug/22	2017/Dec/11	25.00
229790	EXPO 1014 FR.	1983/Aug/22	2017/Dec/11	25.00
229791	EXPO 1015 FR.	1983/Aug/22	2017/Dec/11	25.00
231651	HEP #36	1966/Sep/20	2017/Dec/11	25.00
231667	HEP #54	1966/Sep/20	2017/Dec/11	25.00
231668	HEP #55	1966/Sep/20	2017/Dec/11	25.00
231669	HEP #56	1966/Sep/20	2017/Dec/11	25.00
231671	HEP #58	1966/Sep/20	2017/Dec/11	25.00
231672	HEP #59	1966/Sep/20	2018/Dec/11	25.00
231680	RED DOG 1	1966/Dec/13	2026/May/23	25.00
231681	RED DOG 2	1966/Dec/13	2026/May/23	25.00
231682	RED DOG 3	1966/Dec/13	2026/May/23	25.00
231683	RED DOG 4	1966/Dec/13	2026/May/23	25.00
231684	RED DOG 5	1966/Dec/13	2026/May/23	25.00
231685	RED DOG 6	1966/Dec/13	2026/May/23	25.00
231686	RED DOG 7	1966/Dec/13	2026/May/23	25.00
231687	RED DOG 8	1966/Dec/13	2026/May/23	25.00
231688	RED DOG 9	1966/Dec/13	2026/May/23	25.00
231689	RED DOG 10	1966/Dec/13	2026/May/23	25.00
231690	RED DOG 11	1966/Dec/13	2026/May/23	25.00
231691	RED DOG 12	1966/Dec/13	2026/May/23	25.00
231703	RED DOG 14	1967/May/23	2026/May/23	25.00
231704	RED DOG FR.	1967/May/23	2026/May/23	25.00
231933	EXPO 190	1967/Oct/10	2018/Dec/11	25.00
231934	EXPO 191	1967/Oct/10	2018/Dec/11	25.00
231961	EXPO 218	1967/Oct/10	2018/Dec/11	25.00
231963	EXPO 220	1967/Oct/10	2018/Dec/11	25.00
231965	EXPO 222	1967/Oct/10	2018/Dec/11	25.00
231966	EXPO 223	1967/Oct/10	2018/Dec/11	25.00
231968	EXPO 225	1967/Oct/10	2018/Dec/11	25.00
231980	EXPO 227	1967/Oct/19	2018/Dec/11	25.00
231982	EXPO 229	1967/Oct/19	2018/Dec/11	25.00

Tenure Number	Claim Name	Issue Date	Good to Date	Area (ha)
231984	EXPO 231	1967/Oct/19	2018/Dec/11	25.00
231990	EXPO 237	1967/Oct/19	2018/Dec/11	25.00
231991	EXPO 238	1967/Oct/19	2018/Dec/11	25.00
231995	EXPO 242	1967/Oct/19	2017/Dec/11	25.00
231997	EXPO 244	1967/Oct/19	2018/Dec/11	25.00
232000	EXPO 247	1967/Oct/19	2018/Dec/11	25.00
232001	EXPO 248	1967/Oct/19	2018/Dec/11	25.00
232002	EXPO 249	1967/Oct/19	2018/Dec/11	25.00
232004	EXPO 251	1967/Oct/19	2018/Dec/11	25.00
232005	EXPO 252	1967/Oct/19	2018/Dec/11	25.00
232006	EXPO 253	1967/Oct/19	2018/Dec/11	25.00
232007	EXPO 254	1967/Oct/19	2018/Dec/11	25.00
232008	EXPO 255	1967/Oct/19	2018 Dec/11	25.00
232011	EXPO 258	1967/Oct/19	2018/Dec/11	25.00
232015	EXPO 262	1967/Oct/19	2018/Dec/11	25.00
232017	EXPO 264	1967/Oct/19	2018/Dec/11	25.00
232019	EXPO 266	1967/Oct/19	2018/Dec/11	25.00
232020	EXPO 267	1967/Oct/19	2018/Dec/11	25.00
232021	EXPO 268	1967/Oct/19	2018/Dec/11	25.00
232022	EXPO 269	1967/Oct/19	2018/Dec/11	25.00
232024	EXPO 271	1967/Oct/19	2018/Dec/11	25.00
232025	EXPO 272	1967/Oct/19	2018/Dec/11	25.00
232026	EXPO 273	1967/Oct/19	2018/Dec/11	25.00
232027	EXPO 274	1967/Oct/19	2018/Dec/11	25.00
232028	EXPO 275	1967/Oct/19	2018/Dec11	25.00
232030	EXPO 278	1956/Oct/19	2018/Dec/11	25.00
232037	EXPO 285	1967/Oct/19	2018/Dec/11	25.00
232041	EXPO 289	1967/Oct/19	2018/Dec/11	25.00
232044	EXPO 292	1967/Oct/19	2018/Dec/11	25.00
232045	EXPO 293	1967/Oct/19	2018/Dec/11	25.00
232046	EXPO 294	1967/Oct/19	2018/Dec/11	25.00
232105	EXPO 312	1967/Nov/13	2018/Dec/11	25.00
232107	EXPO 314	1967/Nov/13	2018/Dec/11	25.00
232212	RED DOG 29 FR	1967/Dec/01	2026/May/23	25.00
232220	EXPO 326	1967/Dec/18	2018/Dec/11	25.00
232228	EXPO 504 FR	1967/Dec/18	2018/Dec/11	25.00
232271	RED DOG 13 FR.	1968/Jun/17	2026/May/23	25.00
232275	EXPO 1008 FR	1968/Dec/05	2018/Dec/11	25.00
232276	EXPO 1011 FR	1968/Dec/05	2018/Dec/11	25.00
232277	EXPO 1012 FR	1968/Dec/05	2018/Dec/11	25.00
232306	DON 9 FR	1969/Nov/21	2018/Dec/11	25.00
232307	DON 10 FR	1969/Nov/21	2018/Dec/11	25.00
232308	DON 11 FR	1969/Nov/21	2018/Dec/11	25.00
232309	DON 12 FR	1969/Nov/21	2018/Dec/11	25.00
232310	DON 13 FR	1969/Nov/21	2018/Dec/11	25.00
371777	APPLE BAY THREE	1999/Sep/18	2017/Dec/11	200.00
374744	APPLE BAY FOUR	2000/Mar/11	2017/Dec/11	400.00
377240	APPLE BAY TWO	2000/May/17	2017/Dec/11	500.00
394718	APPLE BAY NINETEEN	2002/Jul/05	2017/Dec/11	500.00
398335	APPLE BAY TWENTY	2002/Nov/16	2017/Dec/11	500.00
402033	APPLE BAY TWENTY-THREE	2003/Apr/26	2017/Dec/11	400.00

Tenure Number	Claim Name	Issue Date	Good to Date	Area (ha)
402037	APPLE BAY TWENTY-SEVEN	2003/Apr/29	2017/Dec/11	250.00
402513	NORTHWEST 900	2003/May/27	2017/Dec/11	250.00
405216	NORTHWEST 901	2003/Sep/19	2017/Dec/11	25.00
501677		2005/Jan/12	2017/Dec/11	81.85
506021	Wanakana Central	2005/Feb/06	2017/Dec/11	348.31
512085	FILL 1	2005/May/05	2018/Dec/01	511.67
512087	FILL 2	2005/May/05	2018/Dec/01	511.90
512088	FILL 3	2005/May/05	2018/Dec/01	143.38
512089	FILL 4	2005/May/05	2018/Dec/01	511.95
512091	FILL 5	2005/May/05	2018/Dec/01	511.96
512092	FILL 6	2005/May/05	2018/Dec/01	512.08
512093	FILL 7	2005/May/05	2018/Dec/01	512.20
512094	FILL 8	2005/May/05	2018/Dec/01	512.23
512095	FILL 9	2005/May/05	2017/Dec/01	163.89
512096	FILL 10	2005/May/05	2017/Dec/11	512.77
512102	FILL 11	2005/May/05	2017/Dec/01	225.59
512104	FILL 13	2005/May/05	2017/Dec/01	430.72
512105	FILL 14	2005/May/05	2018/Dec/01	328.07
512107	FILL 15	2005/May/05	2018/Dec/01	61.51
512108	FILL 15	2005/May/05	2018/Dec/01	512.25
512109	FILL 16	2005/May/05	2018/Dec/01	512.22
512110	FILL 17	2005/May/05	2018/Dec/01	511.95
512111	FILL 18	2005/May/05	2018/Dec/01	511.85
512113	FILL 18	2005/May/05	2018/Dec/01	512.04
512114	FILL 19	2005/May/05	2018/Dec/01	511.87
512115	FILL 20	2005/May/05	2017/Dec/01	368.51
512116	FILL 21	2005/May/05	2017/Dec/01	225.11
512117	FILL 22	2005/May/05	2017/Dec/01	122.76
512118	FILL 23	2005/May/05	2017/Dec/01	164.17
512120	FILL 24	2005/May/05	2017/Dec/01	245.80
512122	FILL 25	2005/May/05	2018/Apr/01	245.75
512952		2005/May/18	2018/Jan/13	81.97
512963		2005/May/18	2018/Jan/13	81.97
512964		2005/May/18	2018/Jan/13	81.97
512966		2005/May/18	2019/Jan/12	61.48
512967		2005/May/18	2018/Jan/13	61.48
512968		2005/May/18	2018/Jan/13	61.47
512972		2005/May/18	2019/Jan/12	81.95
512980		2005/May/19	2018/Jan/13	81.93
512983		2005/May/19	2018/Jan/13	81.95
512984		2005/May/19	2018/Jan/13	40.97
512986		2005/May/19	2018/Jan/13	40.96
512988		2005/May/19	2018/Jan/13	40.96
512989		2005/May/19	2018/Jan/13	20.48
512990		2005/May/19	2018/Jan/13	40.96
512993		2005/May/19	2018/Jan/13	40.97
512994		2005/May/19	2018/Jan/13	81.96
512996		2005/May/19	2018/Jan/13	81.96
512999		2005/May/19	2018/Jan/13	40.97
513006		2005/May/19	2019/Jan/12	20.49
513013		2005/May/19	2018/Jan/13	40.97

Tenure Number	Claim Name	Issue Date	Good to Date	Area (ha)
513026		2005/May/19	2018/Jan/13	20.49
513053		2005/May/19	2018/Jan/13	61.44
513057		2005/May/19	2019/Jan/12	40.96
513060		2005/May/19	2018/Jan/13	40.96
513062		2005/May/19	2018/Jan/13	40.97
513065		2005/May/19	2018/Jan/13	61.46
513066		2005/May/19	2018/Jan/13	20.49
513067		2005/May/19	2018/Jan/13	81.96
513068		2005/May/19	2018/Jan/13	81.97
513071		2005/May/19	2018/Jan/13	81.95
513072		2005/May/19	2019/Jan/12	81.93
513075		2005/May/19	2018/Jan/13	61.44
513076		2005/May/19	2018/Jan/13	40.96
513077		2005/May/19	2018/Jan/13	20.48
513078		2005/May/19	2018/Jan/13	81.93
513080		2005/May/19	2018/Jan/13	20.49
513082		2005/May/19	2018/Jan/13	40.96
513086		2005/May/19	2018/Jan/13	20.48
513087		2005/May/19	2018/Jan/13	40.95
513089		2005/May/19	2018/Jan/13	40.95
513090		2005/May/19	2018/Jan/13	40.96
513091		2005/May/19	2019/Jan/12	61.43
513092		2005/May/19	2018/Jan/13	40.95
513093		2005/May/19	2018/Jan/13	81.90
513094		2005/May/19	2018/Jan/13	81.88
513104		2005/May/19	2018/Jan/13	20.47
513107		2005/May/19	2019/Jan/12	40.95
513108		2005/May/19	2018/Jan/13	40.96
513109		2005/May/19	2018/Jan/13	184.29
513172		2005/May/21	2018/Jan/13	40.98
513758	RED DOG NORTH	2005/Jun/01	2018/Dec/11	429.61
513760	HEP 2.2	2005/Jun/01	2017/Dec/11	20.46
513909		2005/Jun/03	2017/Dec/11	511.70
513910		2005/Jun/03	2017/Dec/11	347.91
513911		2005/Jun/03	2017/Dec/11	61.38
513912		2005/Jun/03	2017/Dec/11	40.92
513913		2005/Jun/03	2017/Dec/11	20.46
513914		2005/Jun/03	2017/Dec/11	81.85
513926		2005/Jun/04	2017/Dec/11	286.51
513927		2005/Jun/04	2017/Dec/11	409.30
513929		2005/Jun/04	2018/Dec/11	430.36
513930		2005/Jun/04	2017/Dec/11	389.32
513931		2005/Jun/04	2018/Dec/11	696.95
515275		2005/Jun/25	2017/Dec/11	470.91
515276		2005/Jun/25	2017/Dec/11	655.55
515277		2005/Jun/25	2017/Dec/11	245.85
515278		2005/Jun/25	2018/Dec/11	655.92
515279		2005/Jun/25	2017/Dec/11	184.47
515280		2005/Jun/25	2017/Dec/11	471.44
515281		2005/Jun/25	2017/Dec/11	614.93
515282		2005/Jun/25	2018/Dec/11	676.19

Tenure Number	Claim Name	Issue Date	Good to Date	Area (ha)
515283		2005/Jun/25	2018/Dec/11	553.44
515284		2005/Jun/25	2017/Dec/11	902.62
515285		2005/Jun/25	2017/Dec/11	102.42
515313		2005/Jun/26	2017/Dec/11	163.85
515593		2005/Jun/30	2017/Dec/11	656.14
515594		2005/Jun/30	2017/Dec/11	164.03
515595		2005/Jun/30	2018/Dec/11	615.08
515596		2005/Jun/30	2017/Dec/11	451.08
516074		2005/Jul/05	2018/Dec/11	553.63
516075		2005/Jul/05	2018/Dec/11	102.38
516076		2005/Jul/05	2017/Dec/11	245.87
516077		2005/Jul/05	2017/Dec/11	389.65
516078		2005/Jul/05	2018/Dec/11	286.99
516079	QUATSE LAKE TOO	2005/Jul/05	2017/Dec/11	143.49
516081		2005/Jul/05	2017/Dec/11	491.18
515527		2005/Jul/09	2017/Dec/11	163.94
516529	APPLE BAY 9PLUS	2005/Jul/09	2017/Dec/11	20.49
516930	NORTH RG	2005/Jul/11	2017/Dec/11	204.54
517055	NEW 402513	2005/Jul/12	2017/Dec/11	143.20
517076	NEW RD	2005/Jul/12	2017/Dec/11	20.46
517123	RD NORTHEAST	2005/Jul/12	2018/Dec/11	204.60
517213	HOLBERG	2005/Jul/12	2018/Dec/11	143.52
517236	NUMMIS	2005/Jul/12	2017/Dec/11	41.02
517541	APPLE BAY TEN	2005/Jul/12	2017/Dec/11	20.51
518531		2005/Jul/29	2018/Apr/01	511.76
525702	HUSHAMU NORTHEAST	2006/Jan/17	2017/Dec/11	307.12
1019755		2013/May/24	2019/Oct/11	81.85

To maintain the North Island mineral tenures in good standing with respect to the British Columbia Government, certain annual cash payments (cash in lieu of work) or equivalent exploration expenses in on-the-ground exploration work must be applied to the claims (supported by assessment reports in the case of exploration work). Expenses from valid exploration programs can be applied to the mineral titles within one calendar year of when the work was performed and can extend the expiration dates of the property for up to a maximum of 10 years.

By virtue of the Mineral Tenure Act of the Province of British Columbia and their property purchase agreement, NorthIsle has the right to access the land it legally owns for the purposes of conducting mineral exploration. The surface rights holder for the land covered by the North Island Project claims are property of the “Crown”, i.e. the Province of British Columbia (notwithstanding any ongoing First Nations treaty negotiations).

With the exception of the 16 claims comprising the Red Dog option, NorthIsle, through North Island Mining Corp., 100% owns the claims forming the North Island Project subject to a 10% net profit royalty. There are no additional royalties, back-in rights, payments or other agreements and encumbrances to which the property is subject other than the Red Dog option agreement.

NorthIsle (the Optionee) has an underlying option agreement for the 16 claims comprising the Red Dog property with Tanya Veerman of West Vancouver, B.C. and William Botel of Christine Lake, B.C. (the Optionor) dated February 11, 2015 to acquire a 100% undivided interest in the Property subject to the following conditions:

a) NorthIsle to expend a total of $375,000 on the Property in exploration and development expenses as follows:

i. To expend a sufficient amount on assessment work to be filed or payment of cash in lieu sufficient to maintain the Property until May 22, 2016 on or before May 15, 2015
ii. $25,000 on or before January 31, 2106
iii. $100,000 on or before January 31, 2017 and
iv. $250,000 on or before January 31, 2018

b) NorthIsle to make payments to the Optionor as follows:

i. $15,000 on or before January 31, 2016
ii. $20,000 on or before January 31, 2017
iii. $25,000 on or before January 31, 2018

c) NorthIsle to issue 200,000 common shares to the Optionor on receipt of regulatory approval

NorthIsle has also agreed to pay the Optionor an NSR of 3%. Two-thirds, or 2% of this royalty can be bought out at any time for $1,000,000 for each on-third, for a total of $2,000,000 if two-thirds of the royalty is purchased.

Figure 4-1: Location Map

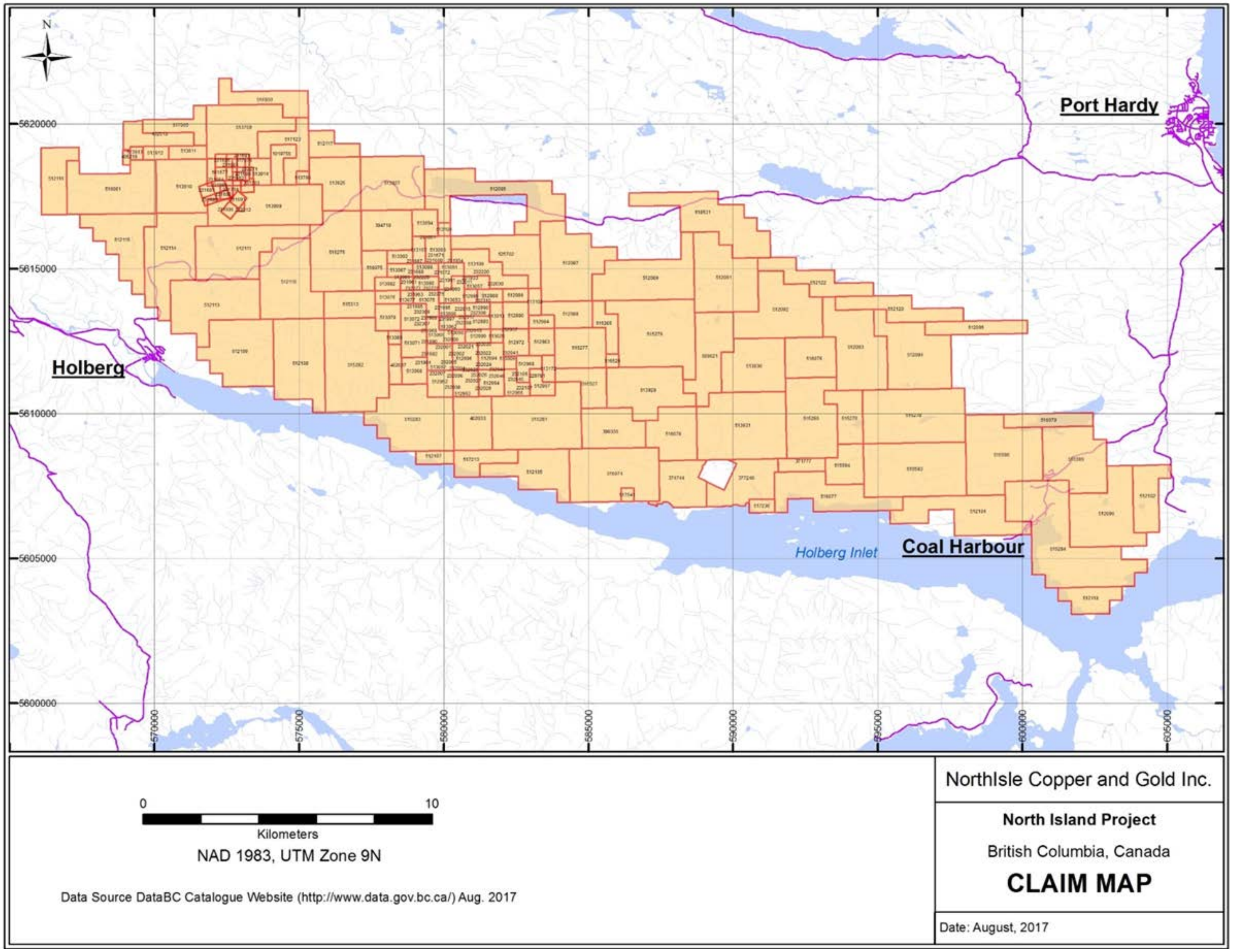


Figure 4-2: Claim Map

4.3 ENVIRONMENTAL LIABILITY, PERMITS, BONDS AND OTHER SIGNIFICANT RISK FACTORS

The authors, not experts in political, environmental and societal matters, are required by NI 43-101 to comment on the environmental, permitting, First Nations treaty negotiations, societal and community factors related to the Project. To this end, the authors have relied on British Columbia and federal publications, reports and websites, guidance by NorthIsle and a general working knowledge of the mineral exploration industry in British Columbia. The authors have reviewed these data and believe them to be accurate and reliable in their collection and disclosure.

Potential environmental liabilities associated with historic exploration at the property have not been investigated thoroughly or verified by the authors, but no significant environmental liabilities are apparent. There are no tailings ponds, waste deposits or other significant natural features on the claims that may impact future development of the property. In 2011, a non-permit Preliminary Field Reconnaissance archeological survey of three proposed IP geophysical grids was carried out over the Hushamu Deposit and two peripheral mineralized zones. No archeological studies have been carried out over the Red Dog Deposit.

To conduct exploration work on the North Island Project, NorthIsle must obtain permits from the BC Ministry of Energy, Mines and Petroleum Resources. NorthIsle has received all necessary permits to conduct the mineral exploration to date. Forestry tenures and logging roads cover much of the property, and are held and managed by two divisions of Western Forest Products Ltd.

The North Island Project is located within an overlap area of the separately claimed traditional territories of the Quatsino First Nation ("Quatsino"), the Kwakiutl First Nation ("Kwakiutl") and the Tlatlasikwala First Nation ("Tlatlasikwala") (Treaty Negotiations in British Columbia Map: www.aadnc-aadnc.gc.ca).

According to information supplied to the authors, NorthIsle has initiated discussions and maintains an ongoing dialogue with the Quatsino, the Kwakiutl and the Tlatlasikwala. The company has, and continues to actively employ and support local First Nations individuals and businesses. The Quatsino own the surface rights and remaining infrastructure facilities of the past producing Island Copper Mine. NorthIsle rents a building at the former mine site as an office and core facility.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

The North Island Project area is accessible by way of an extensive network of radio controlled logging roads. The Hushamu Deposit is accessed from Port Hardy by a paved road to Coal Harbour and then well-maintained logging roads that include the Coal Harbour Main Road, the Wanokana Road, and the Hushamu Main Road, which extends to the mouth of the Hushamu Valley. Lesser-used N and NW sections of the Hushamu Main Road lead to Hushamu Lake and Hepler Creek. The top of Hushamu Mountain is accessed via Clesklagh Road and the decommissioned (semi-permanent in Wester Forest Products classification) CL130 Road.

The Red Dog Deposit is accessible from Port Hardy by the Holberg Road to a point about 45 km from Port Hardy where forestry access road NE 62 leads northward to the property. Several now recently re-opened forestry roads provide access to historical drill sites on the property. Tide water is 15 km away by road at Holberg.

Logging has been active across the Project area for many decades. Secondary growth is dense and movement through the bush away from abandoned roads or creek beds can be difficult particularly in areas of the most recent logging. Western Forest Products is the main forestry tenure holder. The vegetation throughout the Project area consists of predominantly second-growth fir, hemlock, spruce and cedar.

Climate in the Project area is typical of coastal areas of British Columbia with an annual precipitation of 3,911 mm, and a daily average temperature of 8.3°C (Environment Canada 1971-2000). Winters are very wet, with 75% of the annual precipitation occurring from October to March, mostly as rainfall at lower elevations (Port Hardy is at sea level), but with significantly increasing percentage of snowfall accumulations above 300 metres elevation. Generally, exploration and development work is possible for most of the year with adequate winter equipment.

The topography of the West Block of the Hushamu Property is characterized by north and northwest trending ridgelines with broad intervening valleys that typically contain small streams or rivers. Elevations range from sea level, at Holberg Inlet to 720 m above sea level. Ridges typically reach 100 to 300 m above valley floors. The Hushamu Deposit is situated in a northwest trending valley with Hushamu Lake in the valley bottom. The deposit occurs under the lake and the hillside of Hushamu Mountain south of the lake. The highest peak at Hushamu Mountain is 690 m.

The Red Dog Property area is characterized by moderate relief in the order of 360 metres between valley bottoms and hill tops. Slopes are generally moderate although some areas of the west and east slope of Red Dog Hill are precipitous. The main Red Dog mineralization crops out on the summit of Red Dog Knoll at an elevation of 470 metres.

The most accessible major supply centre is Port Hardy (population 4,000), approximately 30 kilometres to the east where supplies and services adequate to explore the Project can be found. The communities of Port McNeil (population 3,000), Port Alice (population 1,350), Coal Harbour (population 200) and Quatsino (population 250), all within 45 minutes' drive from Port Hardy, also provide a variety of services. Port Hardy provides all but the most specialized supplies and services, including a skilled labour force for mining and exploration, and was formerly the main residential and supply centre for the past producing Island Copper Mine.

Due to the relatively moderate terrain, there exist ample areas for all aspects of a large mining operation, including areas for plant, waste and tailings disposal, and other recovery designs. Water for mining purposes is abundant. The region also has well-established road and power networks, much of which is a legacy of the Island Copper Mine which ceased operations in 1995. A large wind farm development operated by Sea Breeze Power Corp. is located about 5 km from Red Dog Hill and could provide the power generation capabilities for the development and operation of any large mining operation.

6 HISTORY

6.1 HUSHAMU

In 1962, the British Columbia Department of Mines and the Geological Survey of Canada jointly flew an airborne magnetic survey covering the northern part of Vancouver Island. This survey delineated a belt of north-westerly-trending magnetic highs north of Holberg and Rupert Inlets. The results prompted an exploration rush, mostly focused for skarn-type iron deposits (Muntanion and Witherley, 1982).

In 1965, local prospector, Gordon Melbourne, staked a magnetic anomaly at Bay Lake near the eastern end of Rupert Inlet and discovered chalcopyrite in float. Utah Construction and Mining Co. (Utah) optioned the property in January 1966 and conducted geological mapping, soil sampling and ground geophysics, followed by diamond drilling. The discovery hole – the eighty-second hole of the program – was drilled in February 1967 and intersected 88 m grading 0.45% Cu. This discovery resulted in the development of the Island Copper Mine, with production beginning in October 1971 and continuing through December 1995. In 1984, BHP Minerals acquired Utah to form BHP-Utah Mines Ltd (BHP-Utah), which then operated the mine. Over the life of the operation, the mine produced 345 million metric tonnes of ore with average grades of 0.41% copper, 0.017% molybdenum, 0.19 g/t gold and 1.4 g/t silver (Perelló et al., 1995). The Island Copper Mine is located about 29 kilometres east of the Hushamu Deposit.

The Hushamu Deposit was originally discovered in 1968. Between 1966 and 1977, Utah conducted numerous exploration programs and drilled 146 diamond drill holes in the Hushamu and Hep Creek valleys. Highlights of the work on Hushamu include:

- Eight drill holes, 557 metres in 1968. Hole EC-19 returned between 0.10 and 0.42% Cu throughout its length. Due to difficult ground conditions and small core diameter, four holes were lost.
- Nine drill holes, 873 metres in 1969
- Six drill holes, 1,077 metres, in 1971
- Eight drill holes, 1,112 metres in 1972
- Nineteen drill holes at Hushamu; two drill holes at South Hushamu, for a total of 3,106 metres in 1973.
- Nineteen drill holes, 3,885 metres in 1974
- Seven drill holes, 885 metres in 1976/77 at Hushamu and South-east Hushamu (also known as South-East McIntosh Mountain)

In 1980, Utah examined the epithermal gold potential of Hushamu Mountain and Pemberton Hills' (7 km ESE of Hushamu) alteration systems. Between 1980 and 1985, Utah and BHP conducted detailed soil surveys, extensive rock sampling, ground geophysical surveys and drilled an additional 12 drill holes, 10 of which were at Hushamu and South-east Hushamu for a total of 1,454 m.

In 1987, BHP-Utah optioned the Expo Property, including the Hushamu area, to Moraga Resources Ltd. (Moraga). In 1991, the shares of Moraga were purchased by Jordex Resources Inc. From 1987 to 1994 numerous phases of exploration were conducted and the option agreement was vested.

During this period Moraga/Jordex focused their drilling efforts on the Hushamu Deposit and nearby McIntosh Mountain area completing 45 holes for 13,668 m (Giroux and Pawliuk, 2003). From 1991 to 1993, Jordex conducted a number of advanced studies on the deposit including initiating a metallurgical study (Melis and Cron, 1992), a study of ore transport alternatives (Fernie, 1991), a preliminary mining study (Graham, 1993) and a resource estimate (Giroux, 1993). The resource was upgraded to NI 43-101 compliance in 2003 (Giroux and Pawliuk, 2003). At the time, the Hushamu Deposit was estimated to contain 231 mt of Measured and Indicated resource grading of 0.28% Cu and 0.31 g/t Au.

Just prior to closure of the Island Copper Mine, in 1994 and 1995, Jordex sought partners to provide capital to bring the Hushamu Deposit into production and utilize the Island Copper mill (Jordex Correspondence, 1994-1996). Ultimately, no partner was found and the mill was decommissioned as scheduled. In the following few years, Jordex continued to examine the potential of the Expo Property (Fingler, 1996; Roscoe and Cargill, 1996) and flew a 156-km helicopter-borne geophysical survey (Woolham, 1997).

Lumina Copper Corp. purchased Jordex in 2003 to acquire the core Hushamu claim holdings. In 2005, the company was re-organized to Lumina Resources Corp. (Lumina). Lumina carried out property-wide exploration in 2005 consisting of historic data compilation, 2,687 line-km of helicopter-borne geophysical survey over the entire property, core re-logging, diamond drilling at Hushamu and NW Expo (18 holes, 3,155.2 m), geological mapping, prospecting and soil sampling (Baker, 2005a).

In 2007, Western Copper Corporation (Western Copper) acquired Lumina and its interests in the Hushamu Property. From February through April of that year, Western Copper drilled 15 holes totalling 4,360.3 metres at the NW Expo and Cougar areas.

In 2008, IMA Exploration Inc. (IMA) optioned the property from Western Copper and completed a drilling program consisting of 2 holes for 513 m at Hushamu and 11 holes for 4,610 m at NW Expo. The drilling at Hushamu was designed to confirm the grade continuity of the core portion of the mineralized zone and to specifically test for rhenium and molybdenum, which had never been systematically evaluated. The 2 holes at Hushamu returned:

- HI08-03 – 179.3 m @ 0.471 g/t Au, 0.423% Cu, 0.011% Mo, 0.436 g/t Re
- HI08-08 – 164.0 m @ 0.505 g/t Au, 0.303% Cu, 0.007% Mo and 0.419 g/t Re

IMA Gold relinquished the option in late 2010. In the fall of 2011, Western Copper, through a plan of arrangement, created NorthIsle Copper and Gold Inc. in order to advance the property. During 2011-2012, NorthIsle re-logged the historical core from Hushamu, carried out additional drilling to better define the northern and southern limits, completed approximately 12 km of induced polarization survey over the projected northwest extension of mineralization and generated an updated NI 43-101 resource estimate (Giroux, 1993).

In 2014, NorthIsle drilled five holes at Hushamu. The purpose of the drill program was twofold; to test a previously undrilled area immediately northwest of the known deposit where an induced polarization program in 2012 identified a roughly 1.5 kilometres northwesterly trending chargeability anomaly defined by greater than 15mv/v; the secondary purpose was to collect a metallurgical sample from the main deposit in an area where earlier drill-holes are widely spaced. There is no recorded production from the Hushamu Deposit.

6.2 RED DOG

The Red Dog Deposit is a geochemical find having been first detected by a regional program in 1962. Follow-up on a 1962 anomaly during the 1966 field season lead to the discovery of mineralization in the bed of a creek and the subsequent staking of the Red Dog claims by prospectors Heinz Veerman and William Botel. The property was initially explored by the owners under the name Westcoast Mining and Exploration ("Westcoast"). Three holes were drilled with a winkie drill in 1967 but core recovery was very poor.

From 1968 to 1970, Westcoast conducted surface exploration and a two-phased diamond drill program. The property was geologically mapped on a scale of 1 inch to 400 feet, soil sampled and covered by magnetometer and very low frequency electromagnetic ("VLF-EM") geophysical surveys. Between 168 and 1970, 24 diamond drill holes totalling 2,175 metres were drilled.

From 1972 to 1977 the property was optioned by City Services Ltd. ("City") who remapped the property, relogged the previous drill holes and drilled three new diamond drill holes totalling 903 metres. In 1973, City was joined by

Westminex Development ("Westminex"). A program of rock geochemistry and 7.7 kilometres of road-based induced polarization ("IP") surveying was done. At the completion of this work, three deep core holes as well as a grid-based IP survey was recommended, but not done.

In 1974, Westminex drilled the three core holes recommended in 1973, totalling 613 metres, as well as two winkie holes.

No further work was done on Red Dog until 1982 when it was optioned by Utah. Utah conducted a program of grid-based dipole-dipole IP over Red Dog Hill which revealed three main anomalous zones. As well, Utah completed 1,723 metres of diamond drilling in 13 holes over two phases which included the deepening of an earlier hole.

In 1983, Utah conducted their final work program at Red Dog which consisted of five diamond drill holes totalling 780 metres to test IP anomalies on the south slope of Red Dog Hill. The IP anomalies were found to be caused by a zone of advanced argillic alteration associated with moderate disseminated pyrite with occasional primary bornite. No mineralization of possible economic importance was found and the intensity of alteration and pyrite were seen to adequately explain the IP anomaly.

In 1988, Crew Capital Corp. held an option on the property and drilled four core holes on Red Dog Hill, totalling 1,041.8 metres, to test the depth and eastern extent of the mineralization previously outlined on the top of Red Dog Hill.

In 1990, Moraga Resources Ltd. ("Moraga") held an option on the property and drilled 1,850.6 metres in 10 holes and deepened an earlier hole. The main objective of Moraga's 1989 program was to delineate the areal extent of the copper-gold bearing quartz-magnetite breccia on Red Dog Hill and to sample the peripheral mineral zone on the East slope of Red Dog Hill.

A final drilling program was undertaken by Moraga in 1991. A total of 1,240.88 metres of core was drilled in eight holes with the objective of the program being to provide information on the lateral continuity of the copper-gold mineralization in the Red Dog Zone, and to some degree the location of the mineralization/waste contact. In addition, one hole was drilled in the peripheral Slide Creek Zone to test its depth and lateral extent. Moraga completed a scoping study on the mineralization and concluded the deposit might be feasible as a small open pit mine, but decided to return the property to its owner.

In March 2015, NorthIsle optioned the Red Dog property from William Botel and Tanya Veerman and in April 2015 conducted a limited program of soil and rock geochemical sampling and reconnaissance geological mapping. The purpose of the geochemical sampling was to determine if the still open copper and gold mineralization at Red Dog continued westward to NorthIsle's Island Copper claims where a prominent IP chargeability anomaly was detected by a 2012 survey. In total, 30 soil samples and 11 rock samples were collected. Geological mapping focused on confirming the existence of the previously reported abrupt change in alteration from intermediate argillic alteration to high level advanced argillic alteration, which marks the south boundary of the Red Dog Deposit. Samples of the advanced argillic alteration lying to the south of the Red Dog Deposit were analyzed by PIMA spectral analyses to compare the Red Dog alteration to the high-level alteration overlying the porphyry copper mineralization at the nearby Hushamu Deposit. Results of the soil sampling suggest the Red Dog mineralization continues west and northwest towards the 2102 chargeability anomaly and warrants further exploration. Rock sampling showed that rocks with appreciable copper and gold are localized near the Red Dog Deposit and in areas with high copper and gold in soils. Geological mapping found the alteration zone surrounding the Red Dog Deposit significantly larger than previously documented and the advanced argillic alteration is likely fault bounded to the copper-gold mineralization hosting potassic and intermediate argillic alteration.

In September 2015, a second program of geological mapping was conducted on the property by NorthIsle with the objective of better defining the contacts between the alteration types identified by the April 2015 program and to extend mapping to the east of the Slide Zone. To help characterize the alteration types, spectral analyses and a thin section study were conducted. A total of 41 grab samples from the Red Dog area were analyzed by TerraSpec spectral analysis and eight thin sections were prepared and analyzed by Vancouver Petro Graphics.

From July to August 2016, a diamond drilling program, totaling 1,112 metres in seven holes was conducted by NorthIsle. Most of the drilling was directed at the Red Dog Deposit in order to verify historical copper-gold mineralization and to provide data for a 43-101 compliant resource estimation. There is no recorded production from Red Dog.

7 GEOLOGICAL SETTING AND MINERALIZATION

7.1 REGIONAL GEOLOGY

The regional geology of the Rupert area was mapped by Nixon et al. (2006) and the following summary is a synopsis of Nixon's paper. Figure 7-1 shows the bedrock geology of northern Vancouver Island and the location of NorthIsle's North Island project.

Vancouver Island is comprised of Upper Paleozoic to Lower Mesozoic rocks of Wrangellia – a tectonostratigraphic terrane that occurs discontinuously northwards as far as Alaska. This terrane was amalgamated to the Alexander Terrane of the Alaskan Panhandle (together comprising the Insular Superterrane) by Late Carboniferous time. Subsequently, these terranes were accreted to North America between the Middle Jurassic and the Mid-Cretaceous. Thus, Vancouver Island records an early allochthonous history, and a later history with commonality to the North American margin.

The pre-accretion history of Wrangellia is represented by the Paleozoic Sicker Group and the Middle Triassic Karmutsen Formation. The Sicker Group comprises marine Devonian to Early Permian volcanic and sedimentary rocks that host VMS deposits such as Myra Falls. The Karmutsen conformably overlies the Sicker Group and comprises basaltic and minor basaltic and minor sedimentary rocks that underlie about 50% of Vancouver Island. This unit is up to 6,000 metres thick. Richards et al. (1991) argued that the Karmutsen was initiated by, and extruded above a mantle plume and recent geochemical data support an oceanic plateau origin for the Karmutsen (Greene et al., 2006). The Karmutsen is in turn conformably overlain by the Quatsino Formation of limestone consistent with a period of quietude following impingement of a mantle plume.

The Bonanza Arc (DeBari et al., 1999) formed along the length of Vancouver Island during accretion of Wrangellia. Owing to later tilting, products of this arc from various crustal depths are all preserved. These include the Westcoast Crystalline Complex, Island Intrusions and the Bonanza Group volcanic rocks. DeBari et al. (1999) argue that all these components have similar ages and geochemical signatures and they are therefore all products of a single arc. Ages for these rocks range from ca 190 to 169 Ma. Intrusive rocks of the Island intrusions are responsible for porphyry copper mineralization on Vancouver Island.

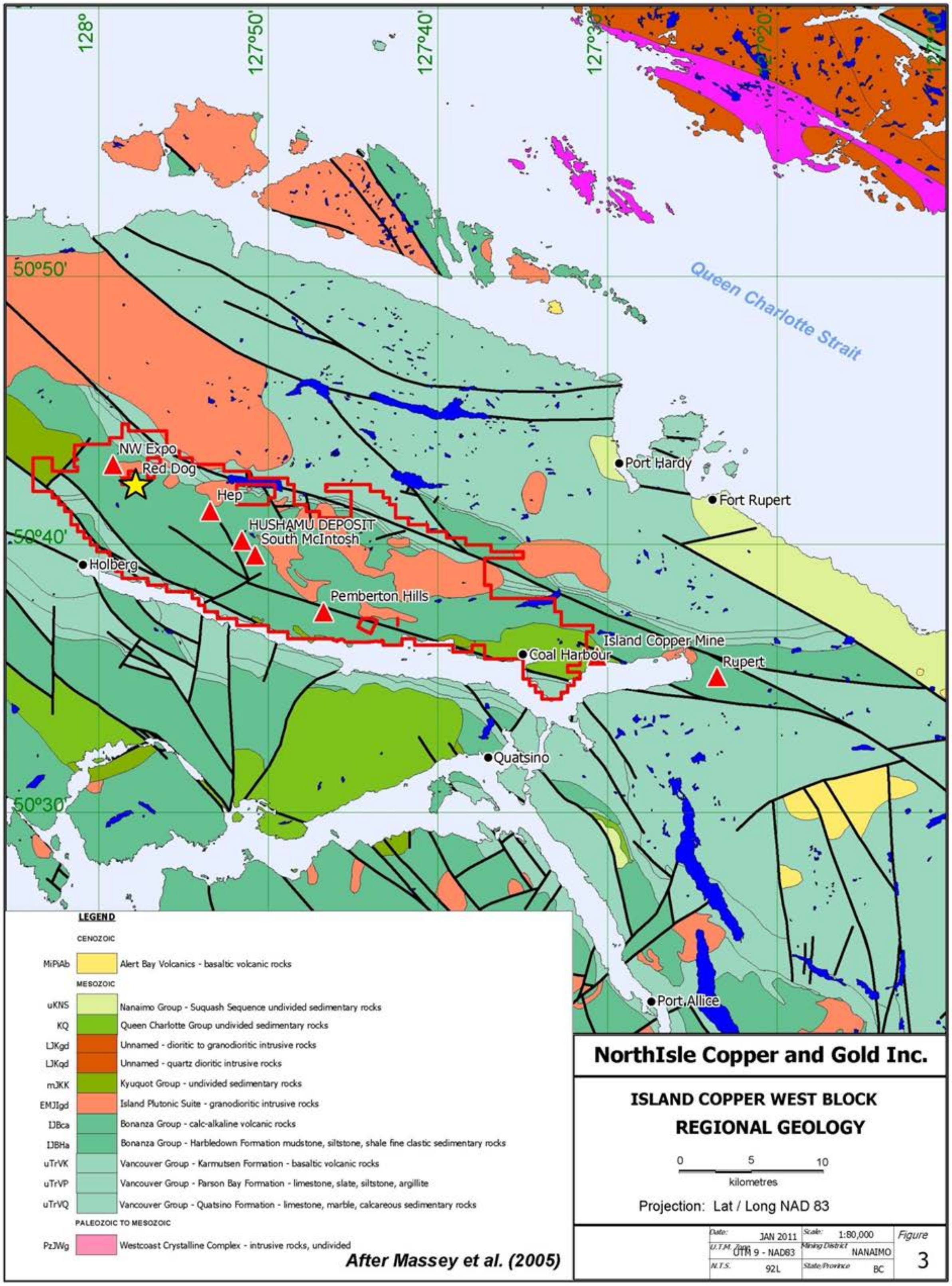


Figure 7-1: Regional Geology Map

7.2 PROPERTY GEOLOGY: HUSHAMU

The following sections on Hushamu are adapted from Casselman, 2012.

In the vicinity of the Hushamu Deposit, the dominant rocks are from the early to Mid-Jurassic Bonanza Group volcanics and the Mid-Jurassic Island Plutonic Suite. Five major lithologic units are noted on the Hushamu property; massive andesite, diorite, quartz-feldspar porphyry, hydrothermal breccia, and late breccia. The massive andesite can be further broken down into an amygdaloidal unit, a feldspar-phyric unit and a tuffaceous unit and is the host rock to most of the porphyry alteration and mineralization (Halle and Halle, 2012).

Of particular importance to the mineralizing event is the amygdaloidal unit of the andesite. It contains coarse phenocrysts of a combination of locally shattered, altered pyroxenes and, more rarely, feldspars. Coarse, ovate, often mafic-cored quartz grains are currently termed amygdules, but these may be devitrification features. Halle and Halle (2012) believe this unit has been historically mistaken as quartz-feldspar porphyry or monzonite though some did recognize the shattered grains and called it “hybridized quartz-feldspar porphyry.” This unit is of importance as it is the primary host for Cu-Au-Mo mineralization, possibly due to its porosity and/or mafic content, and it is frequently overprinted by silica-clay alteration.

The feldspar-phyric unit of the andesite is rarer and occurs primarily in the top 100 metres of the silica cap of the deposit. It is possible that this unit is a silica-clay altered version of the amygdaloidal unit and, as such, may be the volcanic subtype of the silica cap (Halle and Halle, 2012).

These rocks were subsequently intruded by diorite and a quartz-feldspar porphyritic sub-volcanic intrusive of the Hushamu Creek Pluton. The Hushamu Creek Pluton diorite is a large, northwest-trending, fine to medium grained, diorite to quartz diorite, sometimes displaying weak feldspar porphyritic textures, and is largely unmineralized. East of Hushamu Mountain, on regional geology maps, the intrusion is reduced to a series of narrow dikes that run parallel to Hushamu valley.

The quartz-feldspar porphyry sub-volcanic occurs as dikes and irregular bodies at the southern edge of the northwest-trending diorite stocks, and can be traced northwest along the Hushamu valley, where they are truncated by the West Fault. They are characterized by coarse, subhedral quartz and feldspar phenocrysts set in a very fine-grained matrix, often with diorite and/or andesite inclusions. The unit is weakly altered, pyritized, and locally mineralized. This unit was historically believed to be co-magmatic with Bonanza Group volcanics and thus responsible for Cu-Au-Mo mineralization (Nixon, 2006). Halle and Halle (2012) did not find evidence to support this assertion during re-logging of Hushamu core.

The Bonanza Volcanic rocks in the deposit area have undergone intense hydrothermal fluid brecciation that has completely altered and/or obliterated the original rock textures. The resultant hydrothermal breccia was cross-cut by later, vertically oriented, decimetre-scale phreato-magmatic intrusive breccia bodies. The resultant silica-clay alteration assemblages from both events are observed in drill core to overprint earlier chlorite-magnetite alteration. The juxtaposition of this advanced argillic alteration phase onto an earlier chloritic phase can be explained by a “telescoping model” suggested by Perello (1992), occurring during uplift and erosion of active hydrothermal systems. The most extreme and texturally destructive variety of this alteration/lithology appears to dip shallowly to the northeast.

The late breccia units tend to have steep contacts with the hydrothermal host, typically in excess of 60 to 70 degrees. On surface, these relatively narrow bodies appear to strike 45 to 70 degrees. The breccia matrix is mainly zunyite and/or massive pyrite, locally grading from one to the other, or displaying sharp, re-brecciated contacts. These units are estimated to account for 5% of Hushamu Deposit geology.

7.2.1 Alteration: Hushamu

There are four main alteration styles in the Hushamu Deposit; silica-clay-pyrite (SCP), silica-clay-zunyite (SCZ), chlorite-magnetite (CMG), and propylitic. Phyllic and advanced argillic alterations have also been observed locally on the property, but are not dominant (Halle and Halle, 2012).

The SCP alteration is found mainly on Hushamu Mountain and consists of quartz, kaolinite and/or prophyllite and/or dickite. Pyrite typically comprises 10 to 20% of the rock. SCP alteration is texturally destructive and is locally overprinted by SCZ alteration. Apart from pyrite content, these two alteration types are similar in mineralogical make-up and can grade from one to the other over a short distance. The SCZ is pyrite poor (generally less than 1%) and can have appreciable amounts of zunyite. It is believed that the copper-destructive SCZ "overprint" is in some way related to the late breccia intrusive bodies. SCZ zones are currently limited to Hushamu Mountain and may also be related to a minor vuggy silica style alteration, previously noted by Perello (1992).

The intense silica-clay alteration overprints earlier chlorite alteration of the andesite including the copper-bearing chlorite magnetite (CMG) alteration and the weakly mineralized, peripheral, propylitic alteration. The dark green CMG typically displays abundant cross-cutting quartz stockwork veins that may include magnetite, chalcopyrite, lesser bornite, molybdenite, and minor pyrite. The CMG alteration grades outward into lighter green propylitic alteration. The propylitic alteration is characterized by locally abundant epidote and cross-cutting magnesium carbonate veins. Propylitic alteration is most common in the Hushamu shear zone footwall to the northwest.

Phyllic alteration is observed in the northwest of the Hushamu Deposit and is characterized by abundant sericite and disseminated pyrite. This alteration zone is believed to be structurally controlled.

7.2.2 Structure: Hushamu

In the Hushamu area, three dominant deformational events have been described (Nixon et al, 1994). The first resulted in east to northeast directed compression, resulting in northwest-trending thrust faulting. These structures are noted to be the primary control on the emplacement of mineralizing porphyry bodies of the Island Plutonic Suite. In the area around the Hushamu Deposit, the Nahwitti Fault and possibly the Hushamu Fault are examples of this.

The second event is a north-directed compressional event, resulting in west-northwest-trending strike-slip faulting. An interpreted fault west of Hushamu Mountain, forming part of the Hepler Creek drainage is a result of this event, and is called the Hepler Fault. This event may have offset some of the porphyry systems, and in the Hushamu area a strike-slip offset on the order of thousands of metres is likely.

The third and last event was a north to north-northwest extensional event resulting in northeast to east-northeast-striking normal faults. These structures offset earlier emplaced porphyry systems. The Mead Creek-West Fault and the Hushamu Creek Pluton Fault are examples of these structures.

7.2.3 Mineralization: Hushamu

Three mineralized zones have been recognized in the Hushamu Deposit: The Leached Zone, Supergene Zone and Hypogene Zone (Halle and Halle, 2012).

The Leached Zone is typical of evolved porphyries, where the leached cap has not been removed by erosion and/or glacial processes. The rock is generally bleached, the majority of sulphide minerals have been removed, abundant clay minerals formed by the leaching process and silica-rich minerals remaining. This zone generally occurs at the top of the deposit, however there are minor discontinuous, leached zones throughout Hushamu Mountain. Copper has been completely to partially removed but molybdenite and gold remain.

The Supergene Zone is characterized by very weak supergene enrichment of copper in the form of chalcocite +/- covellite. The zone generally occurs from 60 metre depth to 90 metres below surface. In one hole, EC-187, supergene mineralization was noted at 200 metres depth in fractured rocks proximal to the West Fault.

In the Hypogene Zone, copper mineralization occurs as blebby and vein chalcopyrite and lesser bornite. The copper grade is highest in chlorite-magnetite altered volcanics with lesser copper in silica-clay-pyrite alteration. Molybdenite and related rhenium concentrations are highest in the silica altered rocks, however molybdenite is also present in quartz veins in the chlorite-magnetite altered rocks. Sulphide mineralization decreases where silica flooding is extreme; in the late vertical breccias (and surrounding rocks), and in propylitized units.

Sulphide mineralization in historical core that has been exposed to the elements has been intensely oxidized and leached by weathering processes. Abundant chalcanthite, brocanthite, and other sulfates are observed as precipitates on the core.

7.3 PROPERTY GEOLOGY: RED DOG

The oldest rocks exposed on the Red Dog property are the lower Jurassic age Bonanza Group. These rocks underlie most of the southern portion of the property and prior to alteration were dominantly of andesitic to basaltic andesitic composition (Figure 7-2). Most of the volcanic rocks are auto brecciated flows, tuff-breccia and much lesser fine tuffs and very fine-grained sills. Due to later alteration and the general monotonous makeup of the Bonanza Group rocks, subdivision of the volcanic package is problematic and conclusive bedding attitudes are difficult to distinguish at the scale of current property mapping. Based on mapping by Nixon et al. (2006) the Bonanza Group rocks in the area of Red Dog dip gently to the southwest.

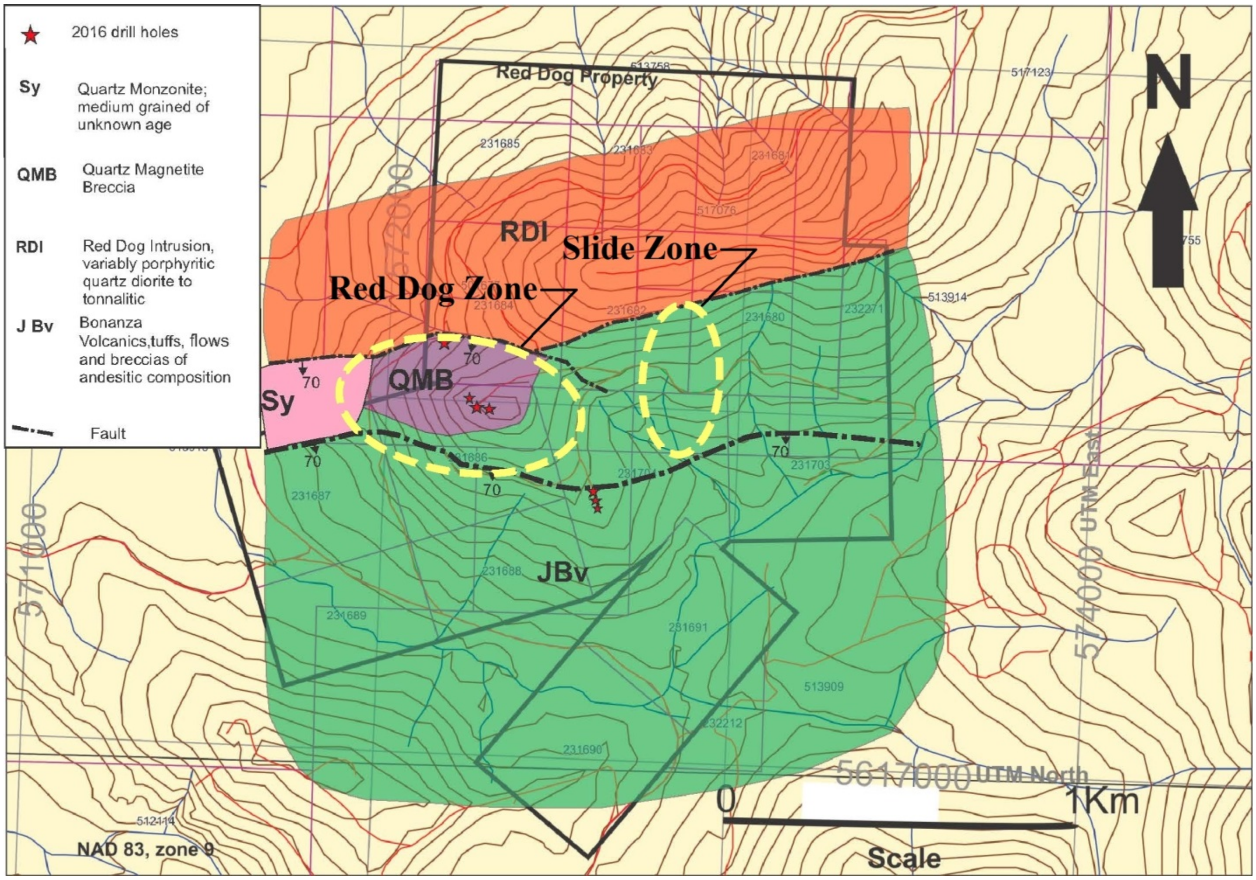


Figure 7-2: Property Geology Map

Intruding the Bonanza Group are five intrusive events. The oldest are the Red Dog Intrusions of likely Jurassic age. This rock type crops out on Red Dog Mountain and forms a westerly trending elongate stock occupying the northern half of the property. In addition to the main body, there are numerous porphyry dykes compositionally similar to the Red Dog Intrusion cutting the Bonanza Group rocks. These dykes, referred to as Red Dog Porphyry, range from a few metres to tens of metres thick, strike westerly and dip steeply to the north. From their relationship with the mineralized wall rock, these dykes appear to be late mineralization phase intrusions.

The Red Dog intrusive is invariably porphyritic ranging from crowded (>50% phenocrysts) to sparse porphyritic texture (<25% phenocrysts) depending on the distance from its contact with the Bonanza Group rocks and dyke thickness. Where little altered, it consists of tabular phenocrysts of plagioclase to 4 mm, lesser fine-grained hornblende and rounded quartz phenocrysts in a fine grained felted matrix of the same minerals. The rock contains less than 10% potassium feldspar and best fits the tonalite composition. The contact of the main Red Dog Intrusion with the Bonanza Group is near vertical in the eastern part of the property; however, west of the prominent gully separating the main part of Red Dog Mountain and Red Dog Knoll, the contact is a southwest dipping fault based on drill results reported by J.B. Richards (1991) and the 2016 drilling.

The second intrusion, recently recognized from the 2016 drilling, is referred to as the Rose Porphyry, named for its distinctive pale greyish pink colour. It is characterized by its coarse porphyritic texture of rounded quartz eyes and medium to coarse grained feldspar in a felsic groundmass of the same minerals. Any original mafic minerals are altered to sericite and chlorite. Quartz vein stockworks are developed throughout and the rock is well to moderately mineralized with magnetite, chalcopyrite, pyrite and lesser molybdenite. It has been observed in contact with the Quartz Magnetite Breccia with contacts often brecciated and obscured by intense silicification. The relationship between the Rose Porphyry and the Red Dog Intrusions is unclear and requires further study. The Rose Porphyry may represent a phase of the Red Dog intrusions that is intermediate in age between the main stock and the younger Red Dog Porphyry dykes or be related to another intrusion not present within the near surface of the deposit.

A third intrusion occurs in the southeastern part of the property. The rock is given the generic name Feldspar Porphyry as it is ubiquitously altered and occurs as a white to pale grey coloured rock comprised of tabular, 2 to 3 mm plagioclase phenocrysts in a fine grained felsic ground mass. The mafic minerals, which form both 1-2 mm phenocrysts and part of the groundmass are completely altered to chlorite. Fine grained disseminated pyrite forms about 3% and is often oxidized to limonite. Quartz forms about 5% of the rock and is confined to the matrix. Based on the low potassium feldspar content, the rock is classified as a diorite porphyry.

The Feldspar Porphyry is poorly exposed in one creek where it forms a continuous outcrop for over 50 metres. Much of its assumed areal extent is covered by Quaternary lacustrine and sandy sedimentary rocks. Based on the 2016 drilling to the southeast of the Red Dog knoll, it is likely that the Feldspar Porphyry is not a single body, but rather a dyke swarm cutting Bonanza Group rocks.

The fourth intrusion is in the western part of the property on the flank of Red Dog Mountain. It forms a small stock-like body that may extend to the southeast under the hill based on reported historical drill results by J.B. Richards (1990, 1991). The intrusion is a medium grained hypidiomorphic granular textured quartz monzonite. It is the least altered of the intrusions and appears to postdate the mineralization. It has characteristic pink colour due to hematization of the potassium feldspar. The contact between the quartz monzonite and the Red Dog Intrusion is covered by Quaternary Sedimentary rocks and thus the relationship between the two intrusions is unclear. It may be that the fault identified in historical drilling separating the Bonanza Group from the Red Dog Intrusion also separates the quartz monzonite from the Red Dog Intrusion.

The fifth and youngest of the youngest intrusions are the basalt dykes that for the most part trend westerly and are near vertical to steeply dipping both to the north and south. They are rarely more than three metres thick. The basalt dykes, which are very fine grained and dark grey to black in colour, are of uncertain age, but cut all rock types. They are not common, and are volumetrically unimportant at Red Dog.

The youngest unit at Red Dog is Quaternary semi-consolidated siltstones, sandstones, conglomerates, breccia and lacustrine clay. This unit rests on the basement units and is in turn overlain by younger glacial till. It forms apron-like benches on the lower to mid slopes of Red Dog Mountain and Knoll. Higher on the hillsides it is dominantly interbedded clast supported conglomerate, breccia, coarse sandstone and finer siltstone. The siltstones are clay-rich and are probably responsible for the numerous slide events that have occurred both recently and in the past. The thickest sections occur in the stream basin of the northwest side of Red Dog Knob and the upper and lower southeast slopes of Red Dog Knob. The thickness of the Quaternary Sedimentary rocks is variable ranging from a few metres to over 10 metres.

7.3.1 Alteration: Red Dog

There are six main alteration types present on the Red Dog property (McClintock, 2016). These are from oldest to youngest: Hornfels (H); Intermediate Argillic (CMG): Quartz-Magnetite Breccia (QMB); Advanced Argillic (SCP); Propyllitic (PROP); and Zeolite-Carbonate (Figure 7-3).

The Hornfels facies alteration forms a band of alteration within the Bonanza Group rocks approximately 300 metres wide parallel to the contact with the Red Dog Intrusive. Within the contact metamorphic band, the andesite has been thermally altered to an assemblage of albite, actinolite, biotite and lesser chlorite. Spectral analysis found minor amounts of scapolite. Magnetite, primarily as disseminated grains is ubiquitous. Minor pyrite is present as hairline width fracture filling. The rock is very fine grained, very well indurated and most primary textures are destroyed.

The Hornfels is best developed in the eastern part of the Red Dog Intrusive-Bonanza Group contact. To the west, the Hornfels becomes overprinted with Intermediate Argillic Alteration (CMG). The transition zone is marked by inter fingering of the CMG alteration along more porous volcanic units such as tuffs and breccias as well as along fracture zones. Remnants of the earlier Hornfels alteration persist to the west side of the property within more massive and less fractured units of the Bonanza.

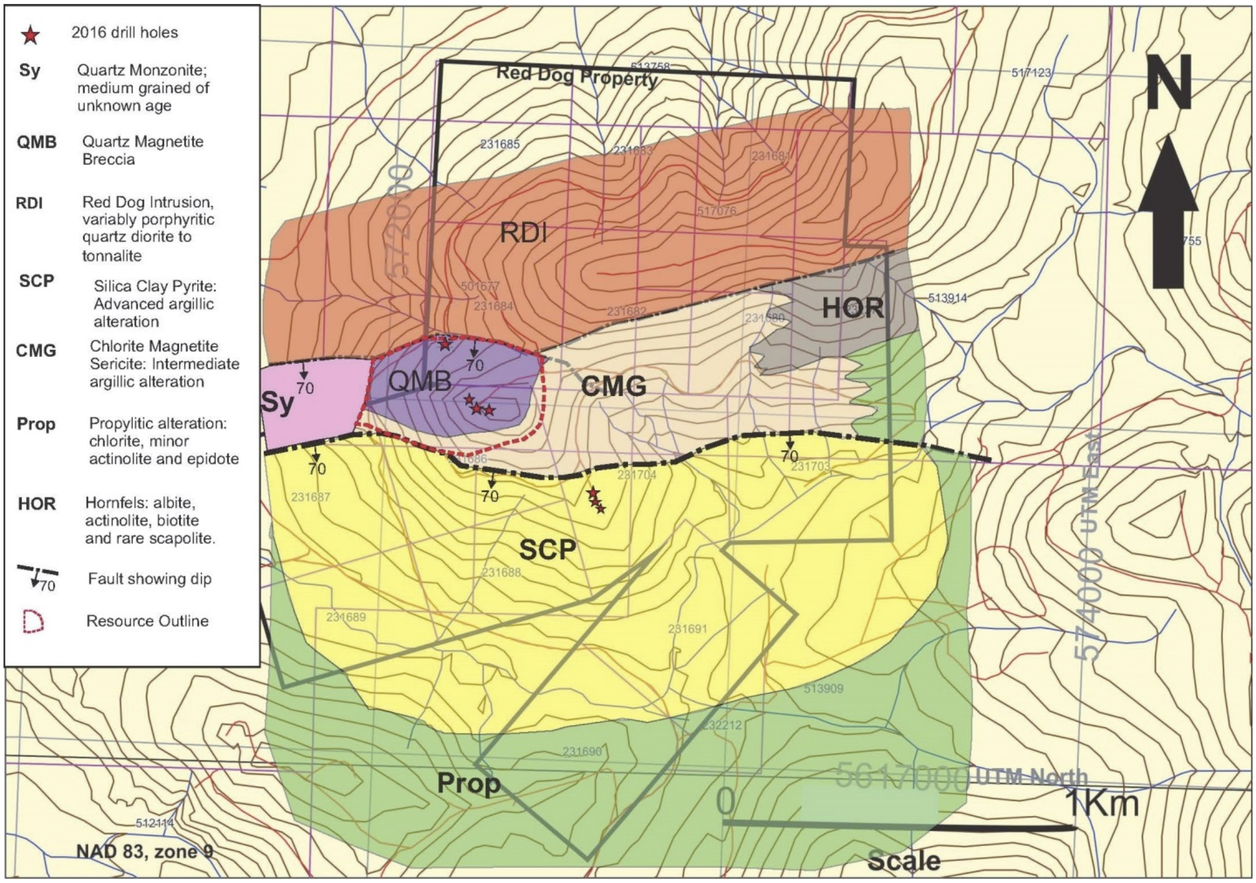


Figure 7-3: Alteration Map

The CMG alteration is characterized by pervasive replacement of the primary mafic minerals and plagioclase by sericite, chlorite, quartz and secondary magnetite. Quartz occurs both as pervasive replacement and as veins. Magnetite occurs as pervasive alteration and secondary veins. Associated with the CMG alteration is pyrite with variable amounts of chalcopyrite. Chalcopyrite is generally in areas of the most intense alteration especially where secondary quartz is present as veins. For the most part, CMG alteration is restricted to the Bonanza Group rocks and does not extend into the Red Dog Intrusion dykes more than a few metres. It appears that the fluids responsible for the alteration were limited to the fractured contacts of the dykes suggesting that the dykes predate the mineralizing event.

The Quartz-Magnetite Breccia (QMB) forms a 350 metre by 150-metre-wide, west-northwest trending body. To the south and east of the breccia is gradational into intense CMG alteration. To the north, the Quartz-Magnetite Breccia is in fault contact with the Red Dog Intrusion. To the west, the breccia is terminated by the post mineralization quartz monzonite (syenite). The Quartz-Magnetite Breccia is hosted in the Bonanza andesite, but does extend into dyke margins of the Rose Porphyry dykes.

The QMB is best described as a pseudo breccia composed of fine to very fine grained saccharoidal quartz surrounding fragments of magnetite, chlorite, lesser sericite, chalcopyrite and pyrite. On its margins, the breccia is transitional into a quartz stockwork hosted by CMG altered Bonanza Volcanic rock or Rose Porphyry.

Advanced Argillic Alteration (SCP) forms a large area mainly to the south of the CMG alteration. This alteration is primarily hosted in the Bonanza rocks although it locally extends into dykes of the Red Dog Intrusion and into contact areas of the Feldspar Porphyry.

Based on TerraSpec analysis, and supported by thin section examination of SCP samples, the main alteration minerals are pyrophyllite, diaspore, pervasive silicification, kaolinite and pyrite. Topaz and alunite and occasionally zunyite are also present.

The contact between the CMG and SCP is an area of overprinting of the CMG by SCP where the younger alteration follows fracture zones and more permeable pyroclastic units of the Bonanza Group. The contact is much sharper than that between the Hornfels and the CMG. The transition between the CMG and the SCP occurs within a distance of 10 to 15 metres based on exposures in the creeks draining the south slope of Red Dog Mountain.

The SCP alteration occurs over a broad area in the southern half of the property. In areal extent, it is the most prominent alteration type on the property. The SCP is transitional to the south and southwest into Propyllitic Alteration.

Propyllitic alteration on the property varies in composition depending on the host rock. In the Bonanza Group rocks, it consists of extensive chloritization of the primary mafic minerals, with epidote and pyrite generally occurring in cross-cutting fractures. In the intrusions, it consists of incipient to complete chloritization of the mafic minerals and incipient sausseritization and sericitization of the plagioclase phenocrysts. Intensity of the alteration is dependent on the distance from the contact with the Bonanza Group rocks. Pyrite in the intrusions is generally as disseminations with minor dry fracture fillings.

The youngest alteration is Zeolite-Carbonate alteration consisting of late veins cutting all rock types. The principal zeolite is laumontite. The carbonate mineral occurring with the zeolite is often pale pink in colour.

7.3.2 Structure: Red Dog

The dominant structures on the Red Dog property are normal south-facing faults having normal and/or strike slip movement resulting in a series of west-northwest blocks. Within the main area of interest on the property, there are two such major faults (Figure 7-3). The northernmost of these faults lies north of the Red Dog Knoll and separates the Red Dog Intrusion from the QMB and CMG altered Bonanza Volcanic rock. The fault has a steep 70-degree dip to the south-southwest. The fault was confirmed by the 2016 drilling as observed in drill hole RD16-06 (McClintock, 2016).

The second major fault is located south of Red Dog Knoll separating CMG alteration to the north from SCP alteration to the south. Drill holes RD16-04, RD16-05 and RD16-05A all intersected this fault system (McClintock, 2016). The fault consists of three parallel strands over a north-south horizontal distance of 30 metres. Each fault is 5 to 10 metres thick consisting of alternating gouge and crushed rock. Movement on the fault is primarily normal with some strike slip component.

7.3.3 Mineralization: Red Dog

Past exploration work at Red Dog has centred on two areas; the original discovery area referred to as the Slide Zone and the Red Dog Zone (Figure 7-3). Both mineralized zones are bordered to the north by the Red Dog Intrusion, a weakly altered and mineralized porphyritic intrusion of tonalitic composition. The two mineralized zones are predominantly hosted in altered Bonanza Group rocks south of the stock. This alteration contains variable amounts of pyrite, chalcopyrite with lesser amounts of bornite and molybdenite. The width of the zone of altered rock ranges from about 100 to 300 metres.

The Red Dog Zone is located at the west side of the property. Historical and recent drilling has mainly focused on the Red Dog Zone. The Red Dog Zone occurs predominantly in an approximately 350-metre-long by 150-metre-wide west-northwest trending quartz-magnetite breccia localized in altered Bonanza Group rocks adjacent to quartz-feldspar porphyritic dykes. Chalcopyrite and pyrite as disseminations, blebs and fracture fillings are present in equal amounts in the breccia along with lesser amounts of molybdenite.

The Slide Zone lies about 400 metres east of the Red Dog Zone. It is underlain by altered Bonanza Group rocks. Mineralization consists of pyrite, chalcopyrite occurring as disseminations and fractures and molybdenite along joints and fractures. A number of steeply dipping late trachyte dykes oriented north-easterly cut the mineralization. No historical grade or tonnage estimates have been calculated for the zone due to the difficulty in connecting geology and mineralization between holes.

8 DEPOSIT TYPES

The Hushamu and Red Dog Deposits host porphyry copper-gold mineralization similar in grade, and in the case of Hushamu size, to the past producing Island Copper Mine located approximately 30 km to the east. Over the life of the operation, Island Copper produced 345 million metric tonnes of ore with average grades of 0.41% copper, 0.017% molybdenum, 0.19 g/t gold and 1.4 g/t silver (Perelló et al., 1995).

Porphyry deposits are important producers of copper, gold, molybdenum and silver. These deposits are well studied, and are directly related to mesozonal to epizonal intrusions that vary in composition and tectonic settings. British Columbia examples include the aforementioned Island Copper, Galore Creek, Highland Valley, Kemess, Mt. Milligan, Afton and Endako, while important worldwide deposits include Ok Tedi, Bingham Canyon, Grasberg, Pebble and Oyu Tolgoi. These deposits are typically located in orogenic belts at convergent plate boundaries and are associated with subduction related magmatism. The deposits are directly related to epizonal stocks of widely variable composition that intrude coeval volcanic piles or other country rock. The causative intrusions are commonly multi-episodal and range from fine to coarse grained equigranular to porphyritic stocks, dyke complexes, and breccias (Giroux and Pawliuk, 2005).

Mineralization identified at Hushamu and Red Dog is best characterized as calcalkalic porphyry deposit type. Calcalkalic porphyry deposits commonly form in sub-circular zones of brecciated and hydrothermally altered rock in and around the apex of a quartz diorite to quartz monzonite stock. The style of mineralization is largely dependent on depth of formation. Deposits developed in relatively high-level, subvolcanic environments are commonly associated with multiple dyke and breccia phases. However, deposits formed at greater depth are more often associated with broad zones of faulting in plutonic rocks (Pantelyev, 1995). The deposits form as concentrations of quartz, quartz-sulphide and sulphide veinlets and stockworks and as sulphide disseminations in broad potassic and phyllic alteration zones. They are commonly surrounded by a halo of propylitic alteration. The principal economic minerals are chalcopyrite, molybdenite, lesser bornite and trace gold or electrum. Pyrite is an important constituent, particularly in the propylitic alteration zone.

Metal ratios vary considerably from deposit to deposit and, locally, within a given deposit. Although some calcalkalic occurrences contain a significant trace of gold and silver, it is not always present. In general, deposits formed at relatively shallow depth appear to be more likely to be enriched in gold.

9 EXPLORATION

9.1 HUSHAMU

NorthIsle took over exploration activities on the property in the fall of 2011. A considerable amount of historical exploration and drilling, dating back to 1965, has been carried out on the property prior to NorthIsle's involvement, as documented in the Exploration History section of the report.

Since taking over the Project, NorthIsle (and Western Copper) completed a re-logging of 107 of the pre-2008 drill holes. This historic core had been in storage outdoors and many of the boxes were in poor condition. The process of re-logging first required careful re-establishing of core boxes' labels by determining the hole numbers, core box numbers, footage block depth, sample numbers, and sample starting and ending points. At all times during this process, the observations were corroborated and confirmed with the historical drill log geology and sample information. The re-labeled boxes were then organized and stacked in newly erected, covered, core racks in chronological order in preparation for re-logging and sampling. If unable to ascertain sufficient information to conclusively identify a hole, box, or sample interval, these boxes were not included in the re-log and not sampled. Approximately 75.6% of the historical samples were deemed suitable for re-sampling, amounting to some 5,800 re-samples.

The re-logging involved logging observations of rock type, alteration and mineralization. Re-sample intervals were then laid out remaining true to the original sample intervals. A new, unique sample number was assigned. The core was then photographed. The re-sampling involved cutting the remaining half core with a core saw to collect a quarter sample.

The re-logging program provided an opportunity to apply consistent logging descriptions to the somewhat varied, and sometimes conflicting, historical observations.

In 2012 and 2014, NorthIsle completed drill programs on the Deposit. The results of these programs are discussed in the Drilling section of the report.

9.2 RED DOG

NorthIsle optioned the Red Dog property in 2015 and commenced work in the spring and fall of 2015, including programs of geological mapping and limited geochemical soil and rock sampling. Prior to NorthIsle's involvement, a considerable amount of exploration work and drilling had been carried out at Red Dog, dating back to 1966, as documented in the Historical Exploration section of the report.

In 2016, NorthIsle completed a drill program at Red Dog. The results of this program are discussed in the Drilling section of the report.

10 DRILLING

10.1 2012, 2014 DRILLING: HUSHAMU

The following sections on Hushamu are adapted from Casselman, 2012 and McClintock, 2015.

Prior to drilling in 2012 by NorthIsle, a total of 126 drill holes, amounting to 26,832.88 m of drilling, was completed in the exploration of the deposit. In 2012, NorthIsle drilled 18 holes for a total of 5,438.74 m of HQ-size core. Figure 10-1 illustrates the drill hole locations for the Hushamu Deposit.

Drill core prior to mid-1973 was all BQ size (36.5 mm); all core after mid-1973 and up to NorthIsle's drilling was NQ size (47.6 mm). Historic drill core exhibited signs of intense weathering and oxidation due to being stored outdoors in the humid environment of northern Vancouver Island. This core will be of limited value for future metallurgical testing due to this oxidation.

The objective of the 2012 drill program was to fill gaps in the historic drill pattern and to delineate the margins of the deposit in the south and north and to produce an updated NI 43-101 Resource Estimate for the Hushamu Deposit. Figure 10-2 and Figure 10-3 show drill sections through the Hushamu Deposit and illustrate the geometry of the deposit and the distribution of the copper and gold mineralization.

In 2012, down-hole orientation surveys were completed on all holes using Reflex Instruments EZ Shot system. Two holes drilled in the deposit in 2008, HI08-03 and HI08-08, have also had down-hole orientation surveys using the Reflex Instruments Maxibor II system. All other historic holes have not been systematically surveyed by down-hole orientation surveys. Certain of these holes have had acid tests taken at the bottom of the hole to determine the dip at that location, but there is no azimuth information. Drill holes generally deviated to varying degrees and the deeper the hole, the greater the deviation. In general, holes tend to flatten out and swing to the right, although they can deviate in any direction. The direction and amount of deviation is dependent on a number of factors such as the clockwise rotation of the drill rods, anisotropic characteristics of the rock, underground cavities, and the pressure put on the drill head when drilling.

Only the collars of the 2008 drill holes HI08-03 and HI08-08 have been surveyed professionally; all other drill hole collars have not been professionally surveyed. Collar locations for these holes have been surveyed using a hand-held GPS. Off-the-shelf, modern hand-held GPS units can generally be expected to return accuracy in the x-y direction on the order of 2 to 5 m. Elevation accuracy, however, is much less accurate and probably >5 m.

In 2014, NorthIsle completed 5 holes for a total of 1,834.74 metres. The majority of the drilling was designed to test the Induced Polarization (IP) and magnetic anomalies lying northwest of the Hushamu Deposit. It was hoped that the IP anomaly might be sourced from a faulted offset of the main Hushamu Deposit. A single hole was drilled in the northern part of the Hushamu Deposit with a dual purpose of filling in an area of wide spacing in the drill pattern and to collect core that could be used for a future metallurgical sample.

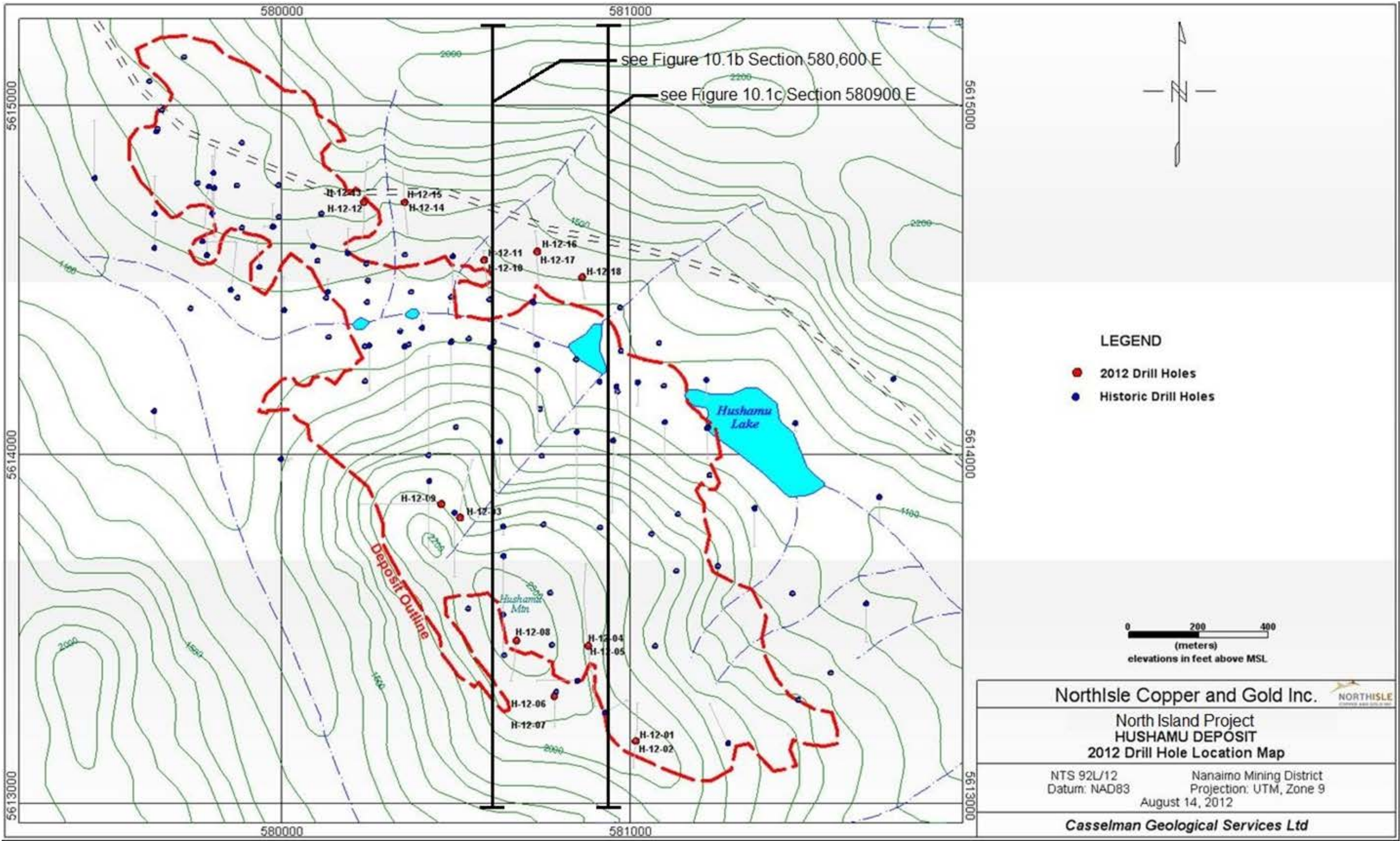


Figure 10-1: 2012 Drill Hole Location Map

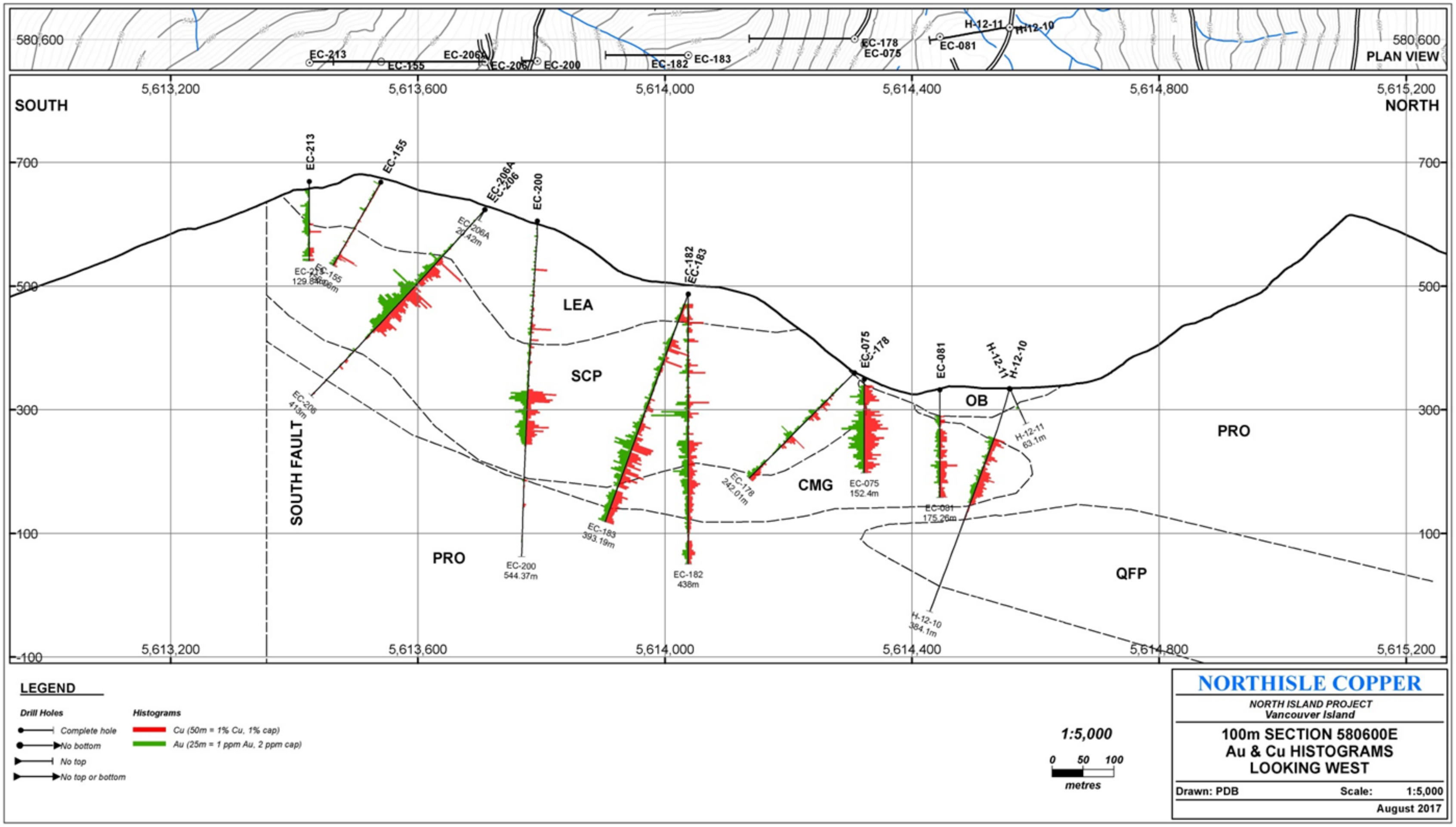


Figure 10-2: Section 580,600 E

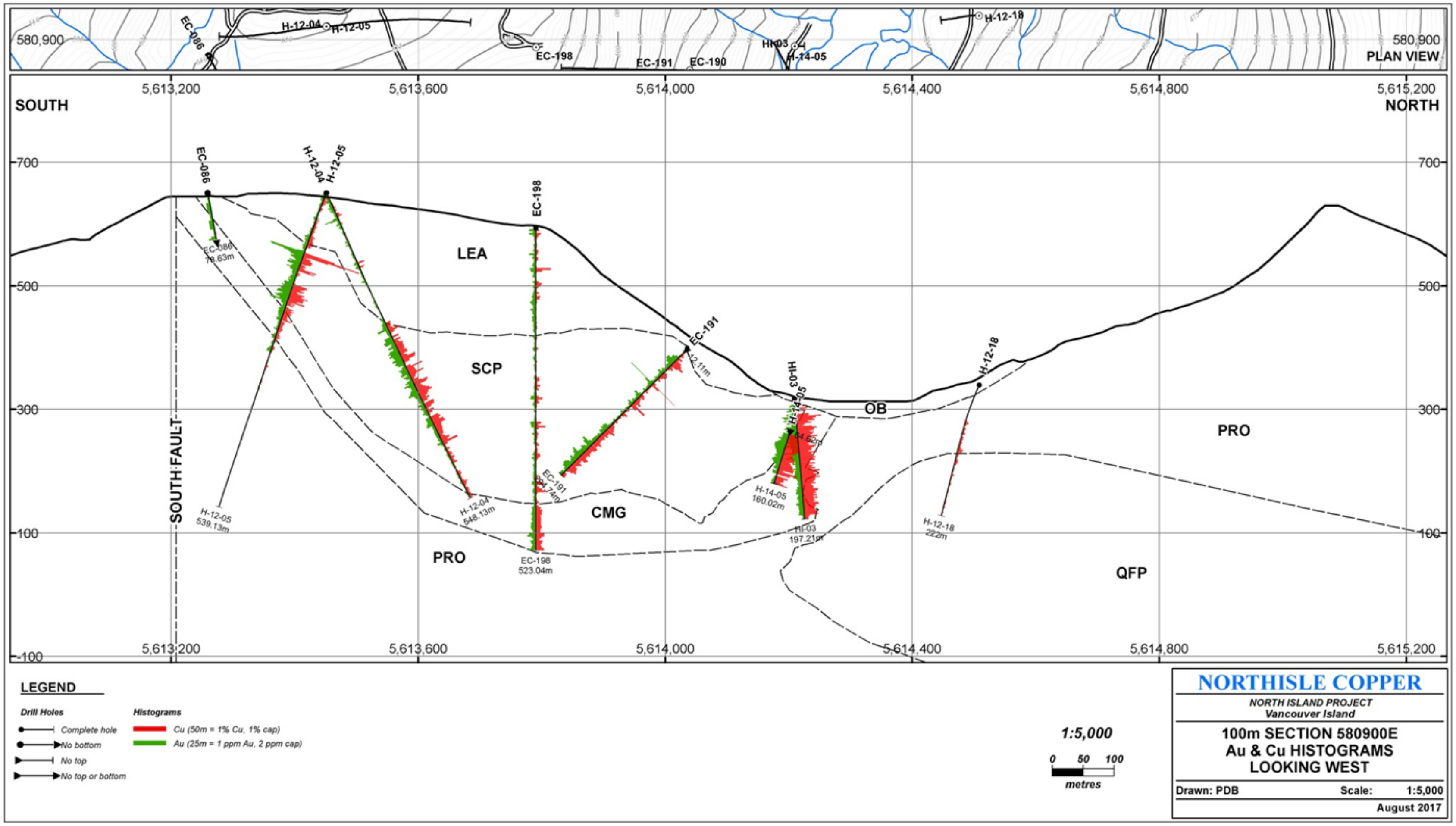


Figure 10-3: Section 580,900 E

10.2 DRILLING: RED DOG DEPOSIT

Sporadically since 1968, a total of 74 diamond drill holes (10,397 metres) have been drilled property-wide. The primary focus of drill testing has been the Red Dog Deposit centred on the Red Dog Hill area.

Figure 10-4 and Figure 10-5 illustrate the drill hole locations for the Red Dog property.

Porphyry copper-gold mineralization was first discovered at Red Dog in 1966. Diamond drill programs from the early 1970's to 1991 have included a total of 9,285 metres in 67 holes (Westcoast Mining 2,175 metres in 24 holes (1968-1970)); (Cities Services 903 metres in 3 holes (1972)); (Westminex Development 613 metres in 3 holes (1974)); (Utah Mines 2,503 metres in 18 holes (1982-1983)); (Moraga Resources 3,091 metres in 19 holes (1990-1991)). Most of the drilling was directed at porphyry copper-gold in the Red Dog Hill area.

No detailed records are available to the authors for drilling carried out by Westcoast Mining, Cities Services or Westminex Development from 1968 to 1974. Drilling carried out in 1982, 1983, 1988, 1989 and 1990 was a combination of BQ (36.5 mm), NQ (47.6 mm) and HQ (63.5mm) size depending upon era and drilling conditions. Drilling contractors included D.W. Coates Enterprises Ltd in 1982, Tonto Drilling Ltd. in 1983 and 1988 and Olympic Drilling Ltd. in 1990 and 1991. All the documented drill programs utilized a Longyear 38 drill outfitted either with skids for dragging from set-up to set-up or outfitted for helicopter moves. Core logging for all but the 1991 program was done in empirical and hand split core was stored at a variety of locations. No core remains from the historical drill programs.

A review of available assessment reports (AR numbers 10,982, 11,048, 12,027, 18,023, 20,610 and 21,352) indicates that all mineralized core was split and sampled predominantly at 10 feet (3.05 metres) or 3 metre intervals, a sample interval appropriate for porphyry style mineralization.

From an examination of historical drill logs, drill recoveries were in general good. However, intervals of poor core recovery occur due to the highly-fractured nature of some rock units, and a number of holes were terminated in badly broken and faulted ground.

10.3 NORTHISLE DRILLING 2016: RED DOG

A diamond drill program, consisting of 7 holes totaling 1,112.1 metres of HQ and NQ drill core, was conducted at Red Dog by NorthIsle from July 9 to August 13, 2016. The primary purpose of the 2016 drilling was to verify the results of historical drilling at the Red Dog Zone and provide assay data for a NI 43-101 resource estimate calculation for the Red Dog Zone. Figure 10-4 and Figure 10-5 illustrate the drill hole locations for the Red Dog property.

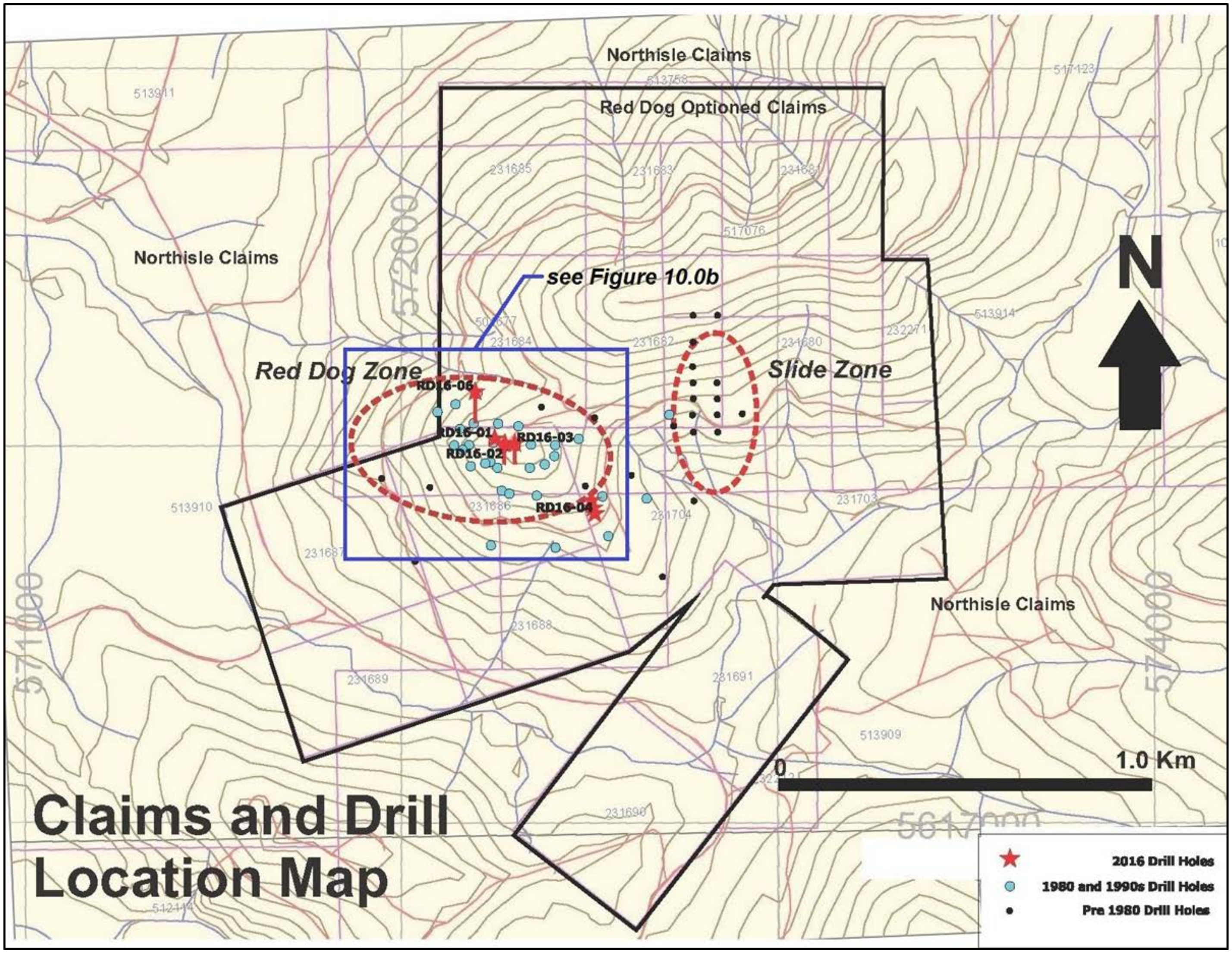


Figure 10-4: Red Dog Deposit Drill Hole Location Map

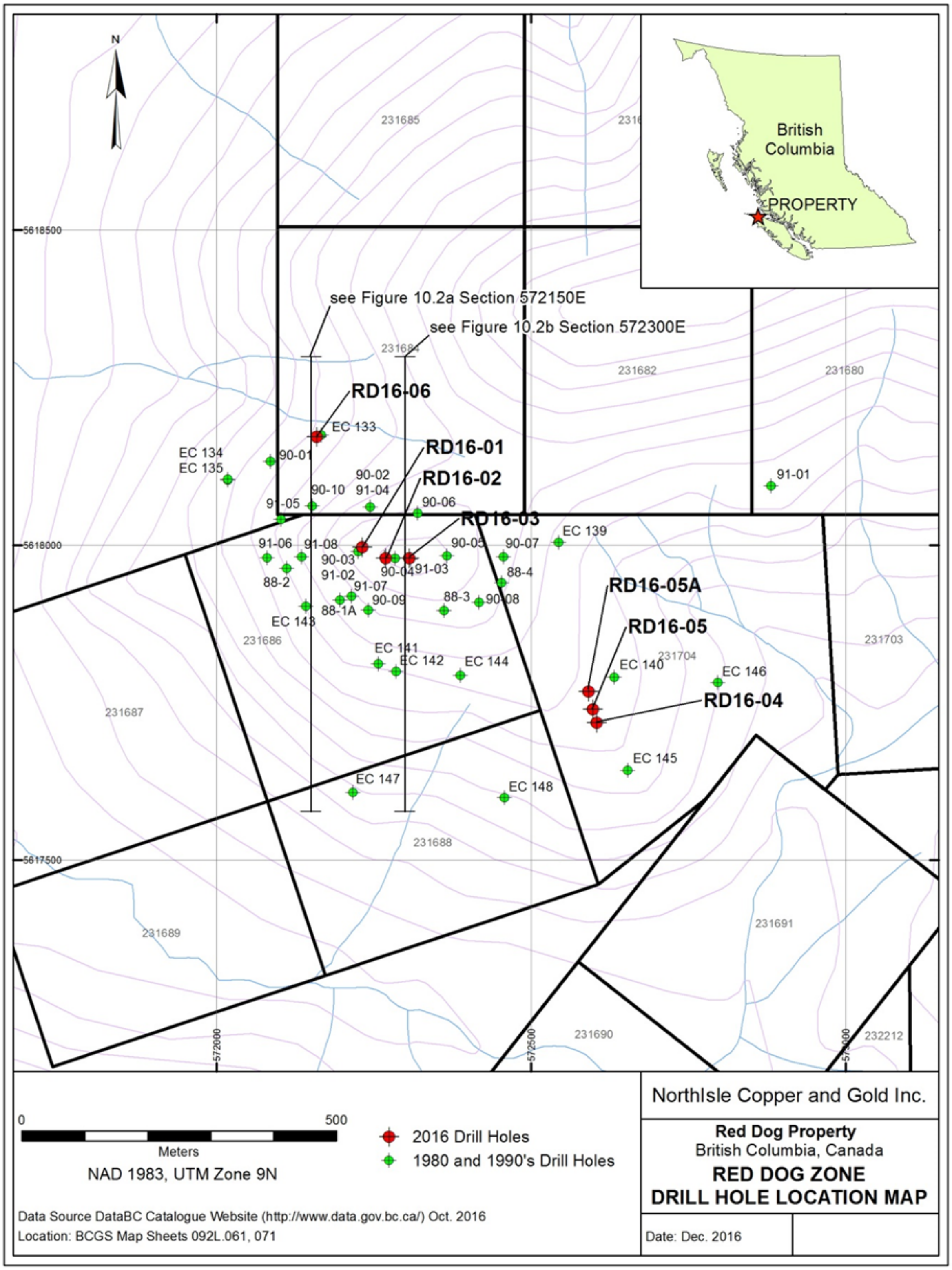


Figure 10-5: Red Dog Deposit Drill Hole Location Map

The 2016 Red Dog drill program was performed by Kluane Drilling Ltd. of Whitehorse, Yukon. Kluane used one KD-1000 drill rig mounted on skids. Core logging and sampling supervision was completed by NorthIsle and assaying was performed by Bureau Veritas Mineral Laboratories of Vancouver, B.C.

A core logging facility and office space are rented by NorthIsle in a building at the former mine site of the Island Copper Mine. Here, the core is measured, geologically examined, logged and marked for sampling. Core samples are selected and bagged; the half core that remains after sampling is stacked by hole in core racks in a large warehouse space adjoining the core logging facility.

A Reflex single-shot survey tool was used at 30 metre downhole intervals to provide in-hole survey data. Drill hole locations were determined by a handheld Garmin GPS and were later adjusted by a precision differential GPS method utilizing a base station and a rover operated by a technician from Bazett Land Surveying Inc. of Port Hardy, B.C.

Four holes (RD-16-01, RD-16-02, RD-16-03 and RD-16-06) totaling 629 metres were drilled in 2016 as twin holes to verify the results of historical drilling at the Red Dog Zone. Three of the four holes occur in an east-west line through the centre of the historical resource. The fourth verification hole was drilled at the northern end of the historical resource. The 2016 holes were placed from two metres to seven metres from the historical collars, and drilled at the same azimuth and dip as the corresponding historical hole. The variation in distance was the result of the larger drill used in the 2016 drilling that could not safely be placed in all cases within two metres of the original drill collar. Figure 10-6 and Figure 10-7 show drill sections through the Red Dog Zone and illustrate the geometry of the quartz-magnetite breccia and the distribution of the copper and gold mineralization.

A fifth drill hole planned to test for deep porphyry copper mineralization south of the historical resource area was abandoned short of its target depth after three attempts due to heavily faulted ground. The maximum depth of the three attempted holes was 207.8 metres, well short of the target depth of 500 metres.

The 2016 drilling has successfully verified the historical drilling at the Red Dog Zone where copper and gold mineralization occurs in an approximately 350-metre-long by 150-metre-wide west-northwest trending quartz-magnetite breccia localized in altered Bonanza Group rocks adjacent to feldspar porphyry dykes. The lateral and vertical extents of the Red Dog Zone mineralized body appear to be largely outlined; however, verification hole RD-16-03, which successfully penetrated a fault that had terminated historical hole DDH- 91-03, continued in strong copper-gold mineralization for an additional 28.6 metres potentially extending the depth level of the Red Dog Zone.

Three holes (RD-16-04, RD-16-05 and RD-16-05A) were drilled to test for deeply buried porphyry copper mineralization to the south of the Red Dog Zone. Due to poor ground conditions, all three drill holes were lost at depths of 150.8, 124 and 207.8 metres respectively, well before the targeted depth of 500 metres. Hole RD-16-04 intersected anomalous levels of copper over the final 50 metres of the hole, indicating that the deep porphyry target remains a viable exploration target for future drilling.

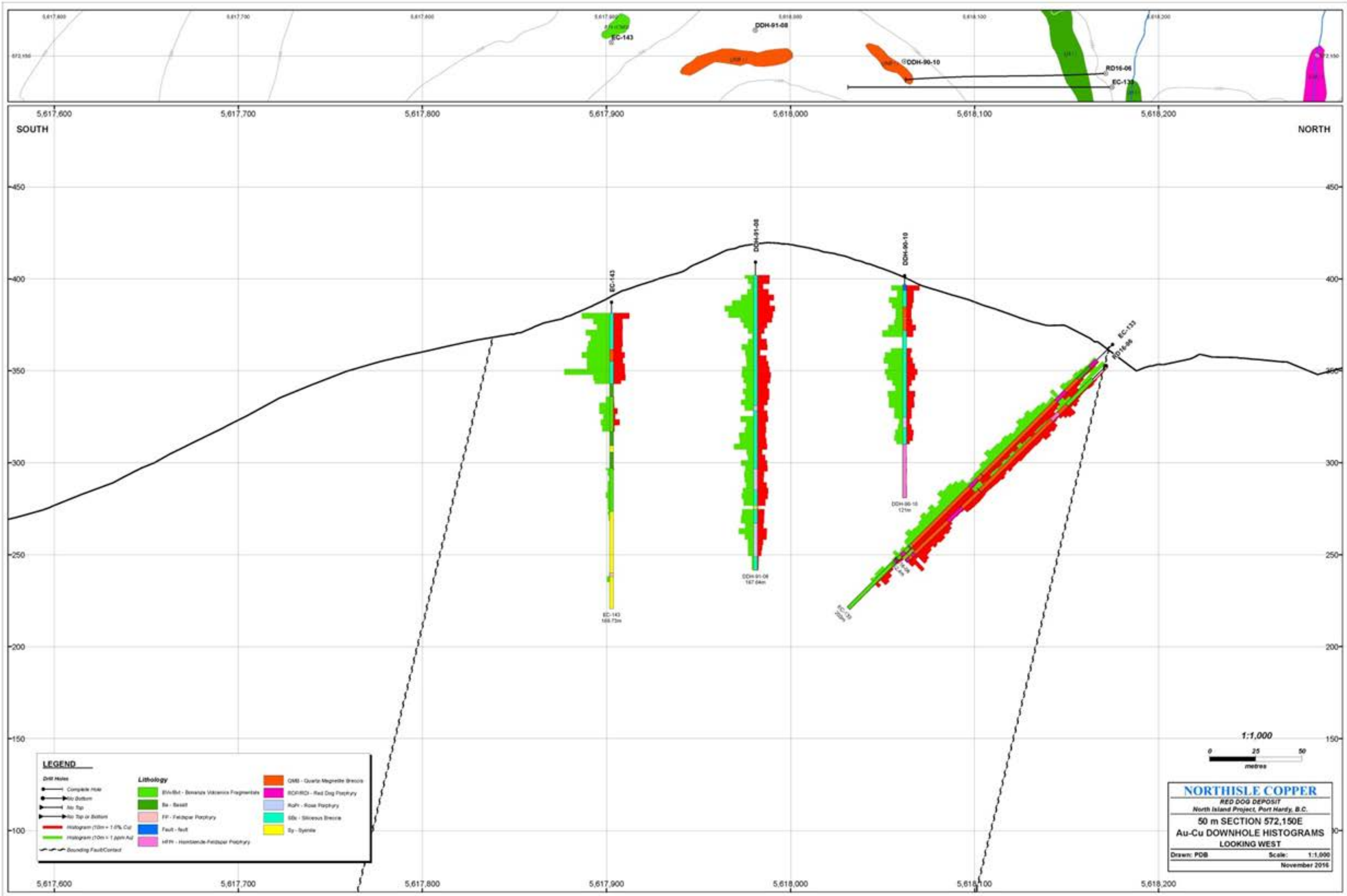


Figure 10-6: Section 572150E

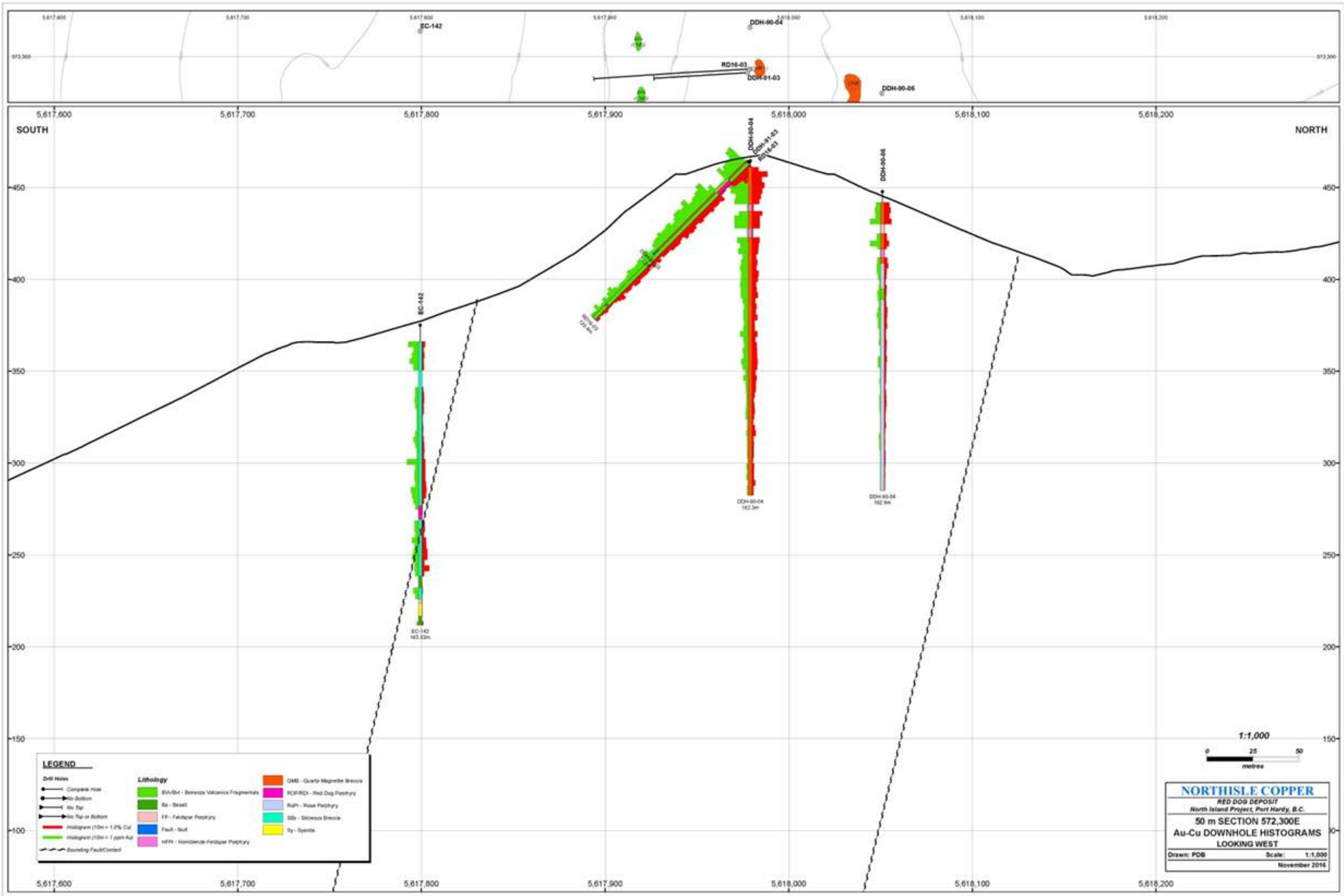


Figure 10-7: Section 572300E

10.4 2016 CORE LOGGING PROCEDURE: RED DOG

Core logging included lithological and geotechnical logging of recovered core which included description of mineralogy and major geological features such as dykes, faults (gouge rock), simple Rock Quality Designation (RQD) calculations, core recovery, structural data and specific gravity calculations. The information was input into a digital core logging platform (GeoSpark Logger).

Logging of each hole was carried out in two phases. In phase one, core, recoveries, RQD, hardness, breakage, joint counts and specific gravity calculations were determined. Phase one also included photographing the core for a visual record. Core recoveries were calculated using the total length of rock core contained in a run divided by the length of the run, multiplied by 100% to get recovery.

In general, core recoveries from the HQ core for the four confirmation holes were good, with recoveries in the 80% range. Core losses occurred in fractured and faulted zones where the rock was crushed and chloritized and in some near-surface, strongly weathered intervals. Fragments may have ground together in the core tube with minor losses occurring. Chalcopyrite and molybdenite can occur in sheared and broken rock formations where the rock is friable and easily ground up and carried out of the hole with the drill fluids. These losses can be mitigated by capable drillers paying careful attention to ground conditions, but any potential losses are always difficult to quantify. At Red Dog, such difficult ground conditions were encountered periodically in the four confirmation drill holes. Three attempts were made to complete the deeper exploration hole south of the historical resource, but all three holes were lost due to bad (faulted) ground conditions. It is reasonable, on a global basis, to accept copper and gold values from core samples as closely approximating in situ values.

RQD calculations were performed using D.U. Deere's method where all pieces longer than 10 cm in length of intact and competent core in a run were identified and then summed up. The sum of the length was then divided by the length of the run all multiplied by 100 to calculate percent.

Specific gravity calculations were performed every 10 metres of the core with samples collected from mineralized and relatively unmineralized core and the various rock lithologies. The specific gravity is calculated by weighing a specific length of sample in air and then weighing the same sample in water. Weight determinations were made using an A&D balance, Model EJ-6100, with accuracy to 0.1 grams.

In the second phase, the lithological description of recovered core was recorded, which primarily included rock type, colour, texture, oxidation depths, sulphide content, alteration and description of major geological features such as intrusive dykes, faults, quartz veining density and foliation relative to core axis. Phase two also included marking the core for sampling and the entire hole was sampled from top to bottom at two metre intervals. A total of 554 samples were collected from the 2016 drilling.

11 SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 HUSHAMU: PRE-2102

The following sections on Hushamu are adapted from Casselman, 2012.

Drill core prior to 1985 was sampled generally in 10-foot (3.05 m) intervals, although geological and metallurgical zone boundaries were respected. From 1985 to the present, sample intervals were nominally 3.0 m, with the exception of the two holes in 2008, which were sampled at 2.0 m intervals, while still respecting geological and metallurgical zone boundaries.

Throughout the history of the drilling at Hushamu, geochemical analyses have been performed at Chemex Labs, and later ALS Chemex Labs. All samples collected by NorthIsle in 2011 and 2012 were analyzed at ALS Chemex Laboratories Ltd. (ALS Chemex) in North Vancouver, B.C., as the primary lab and duplicate samples were sent to Acme Analytical Labs Ltd. (Acme Labs) in Vancouver, B.C., as the secondary lab.

11.2 2011 RE-LOGGING AND 2012 DRILLING: HUSHAMU

For the 2012 program, drill core sample intervals were marked by the geologist and the holes were sampled in their entirety from top to bottom. A total of 2,146 samples were collected in 2012. The geologists recorded core logging information using a Microsoft Access based program called GeoSpark Logger created by GeoSpark Consulting Inc. The core was then cut in half using a core saw with one half remaining in the box, onsite and the other half sent to ALS Chemex for analysis. Every 20th sample of core was further quartered for “Duplicate Samples” with one quarter going to ALS Chemex, one quarter going to Acme Laboratories and half remaining in the box onsite.

Each sample was placed in a poly ore sample bag with the uniquely-numbered sample tag and secured with nylon zip tags. Sample bags were then placed in rice bags. Sample shipments were delivered by a NorthIsle representative to Van Kam Freightways Ltd, where they were palletized and shrink-wrapped for delivery to the appropriate lab in Vancouver.

At ALS Chemex, all samples were dried and weighed, then crushed to better than 70% minus < 2mm. An appropriate split (generally 250 grams) was then pulverized to >85% was <75um. Copper and molybdenum were analyzed by ALS Chemex process ME-OG62. This process involved a four-acid digestion and analysis by Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES) with results reported in percent (%). Gold was analyzed by ALS Chemex process Au-AA25, which involved fire assay of a 30-gram sample of the pulp and an atomic absorption (AA) finish to a 0.01 ppm detection limit; results were reported in parts per million (ppm). Rhenium was analyzed by process Re-OG62, which involved four acid digestion and ICP-mass spectroscopy (ICP-MS) finish; results were reported in ppm.

For the duplicate sample checks sent to Acme Labs the sample was crushed and pulverized and the pulps were analyzed by multi-element procedure 1EX. This process involved four acid digestion and ICP-MS finish to capture 46 elements. Samples were analyzed for gold by fire assay and AA finish on a 30-gm sample, according to Acme procedure 3B. Copper and molybdenum were also assayed by four acid digestion and ICP-ES finish according the Acme procedure 7TD.

For the 2011 and 2012 programs a set of 4 sample standards and one blank were included with each of the sample shipments to Chemex and Acme. The standards were prepared and certified by WCM Minerals of Burnaby, BC.

Conventional sample handling practices of the era were used on the property in work prior to Western Coppers’ work in 2007. No special security precautions were noted in the sampling, shipping, and analysis of the samples from the deposit. No irregularities were found in the historical data, and some check assays were performed.

ALS Chemex and Acme Labs are independent of NorthIsle. Both labs are ISO 9001 accredited. The 2011 and 2012 sampling and shipping procedure appears to have been handled in a secure manner. There has been no indication from either of the labs that samples or shipments had been tampered with.

11.3 RED DOG 1966-1991

Information available regarding sample preparation and analysis for diamond drilling at Red Dog between 1968 and 1991 is covered in assessment reports by Muntanion and Witherly (1982), Muntanion (1983), Richards and Muntanion (1983) and Richards (1988, 1990 and 1991). The reports indicate that analysis was done by either Chemex Labs Ltd. of North Vancouver, B.C., Utah Mines Ltd. Laboratory at the Island Copper Mine, or Acme Analytical Laboratories of Vancouver, B.C. Core samples were collected by splitting the core with a jaw-type splitter. One half of the core was shipped for sample preparation and analysis while the other half of the core was returned to the core box.

11.4 2016 DRILLING: RED DOG

After geotechnical and geological logging, 2016 drill core sample intervals were marked directly on the core with lumber crayons. Each sample is marked with a Bureau Veritas Mineral Laboratories ("BVL") paper sample tag to be included in the sampling bag for analysis and a portion of the sample tag displaying the sample number, and the sample interval (From-To) was stapled into the wooden core box at the start of the interval.

Once the sampling intervals have been selected by the geologist, they are moved to the cutting room where each length of core is cut in half lengths using an electric diamond blade circular saw. A cut half core sample was then placed into a plastic sample bag, the paper sample tag placed in the bag and the sample ID written on the outside of the bag. Each sample bag is secured with a "zap" strap to prevent any material entering or exiting the bag. Individual samples were combined in a large rice bag and the top of the rice bag sealed with a "zap" strap and a numbered security tag. Several rice bags are then placed on a wooden pallet and wrapped with plastic sealing for shipment.

Suites of certified reference material (standards), blanks and duplicates were added into the core sample sequence every 20 samples. The reference material was 100 grams of either WCM Minerals CU 181 or CU 184 and the blank material used was dolomite landscaping material. Duplicate samples were created by quartering one sample of half core onsite with both quarters sent directly to BVL for duplicate analysis and a pulp duplicate subsequently sent from BVL to ALS for check analysis.

The core samples were transported directly by bonded transport from NorthIsle's core logging facility to BVL in Vancouver, B.C. for sample preparation and analysis. BVL is ISO 9001:2008 accredited. The authors are not aware of any relationship between BVL and NorthIsle.

On receipt of the samples in Vancouver, BVL confirmed the security numbers of the sacks received, the individual sample numbers and the integrity of each sample. No breaks in the chain of custody of the samples have been recorded.

Upon receipt by BVL, all core samples were dried, and then 1kg crushed to 80% passing 10 mesh. A 250g split of the material was then pulverized until 85% passes 200 mesh. The pulverized samples were treated to a 4 Acid Digestion (Code MA200) where a 0.25 g split is heated in HNO3-HClO4-HF to fuming and taken to complete dryness. The residue was dissolved in HCl and solutions were then analyzed by ICP-MS for 45 elements, including copper, to low detection limits. For gold, a 50 g split of the pulverized material was analyzed by fire assay fusion with atomic absorption finish (Code FA350-Au).

At BVL, a suite of blanks, reference materials and duplicate samples were inserted by the lab into the sample stream. The results reported from the lab control samples were within the limits of instrumental and analytical accuracy. No corrective actions were taken by the lab. Control samples submitted by the Company are reported in the Data Verification section of this report.

Pulp duplicate samples were shipped by BVL to ALS for check assaying. At ALS, a 0.25 g split is treated to a 4 Acid Digestion (Code ME-MS61). The residue was dissolved in HCl and solutions were then analyzed by ICP-MS and ICP-AES for 48 elements to low detection limits. For copper, a prepared sample is digested with a 4 Acid Digestion (Code Cu-OG62) and then evaporated to incipient dryness. The residue was dissolved in HCl and solutions were then analyzed by ICP-AES. Total gold content in the samples was determined by subjecting a 50 g split to fire assay and ICP-AES finish (Code Au-ICP22).

11.5 OPINION ON ADEQUACY

In the opinion of the authors, the sampling methods, analytical procedures and security protocols employed by NorthIsle during their 2011-2012 and 2016 drilling and re-logging programs are accepted industry practise and have produced samples of appropriate quality and reliability for the purposes of resource estimation. There is no reason to believe that either sampling integrity or security was jeopardized at any time during the sampling programs.

12 DATA VERIFICATION

12.1 2011 RE-LOGGING PROGRAM: HUSHAMU

The following section is adapted from Casselman, 2012.

In the 2011 re-logging program by NorthIsle, 11 drill holes were re-sampled in their entirety to verify historic analytical results (Halle and Halle, 2011). Five holes were selected from the drill campaigns by Moraga Resources from 1988 to 1993, and six holes were chosen from drilling conducted by Utah Mines Inc. from 1971 to 1982. The holes were selected to represent an even distribution throughout the Hushamu Deposit. A summary of the results is included below in Table 12-1.

Table 12-1: Drill Hole Re-Sampling Comparison

	Historic Values			2011 Re-Sample		
Hole	Au ppm	Cu ppm	Mo ppm	Au ppm	Cu ppm	Mo ppm
EC-O69	0.150	2907	195	0.323	3172	144.6
EC-070	0.049	789	144.9	0.091	479.8	169.7
EC-084	0.379	2540	71.7	0.352	2269	76.2
EC-095	0.081	304.5	48.2	0.042	232.1	58.1
EC-108	0.120	1275	61.9	0.156	1086	62.6
EC-137A	0.042	1108	27.8	0.057	1128	33.6
EC-159	0.010	195	7.02	0.014	184	8.20
EC-160	0.117	1563	25.6	0.114	1406	35.8
EC-186	0.219	2294	25.8	pending	2356	29.3
EC-198	0.170	740.2	88.6	0.168	567.2	80.76
EC-206	0.244	1204	77.9	0.227	962.7	80.1

In general, geochemical results from re-assaying correlate well with the historical results. Certain discrepancies are observed in the six older Utah Mines holes and are explained by a few samples not analyzed in the historic programs and by higher detection limits at the labs, historically resulting in not being able to accurately detect very low-grade samples. More complete data sets of the five more recent Moraga Resources drill holes returned better correlations. In general, molybdenum and gold values correlated very well with the historical dataset. Halle and Halle (2011) attributed the lower copper values in the re-sampling of certain holes to oxidation of copper sulphide to copper sulphate and removal of the copper sulphate.

12.2 2012 DRILLING: HUSHAMU

The following section is adapted from Casselman, 2012.

For the 2012 drill program, Quality Control (QC) was maintained on site by the Project geologists sampling and logging the core. A QC sample insertion rate of 1/20 each for blanks, duplicates and standards was maintained throughout the sampling stream. Blank material consisted of a limestone material collected at a site approximately 50 km from the Hushamu Deposit. Duplicate core samples were quartered onsite with one quarter sent directly to ALS Chemex and the other quarter sent directly to Acme Labs. Two separate standards were purchased from WCM Minerals: CU 181 and CU 184. These were inserted into each batch of 20 samples in an alternating manner. Analysis of the QAQC data was performed by H. Brown of NorthIsle (Brown, 2012) and her memo is summarized in Table 12-2.

Table 12-2: Summary of QAQC Sampling for 2102 Hushamu Drilling

Sample Type	Number of Samples	% of Samples
QC - Blanks	117	4.7
QC - Duplicates	117	4.7
QC - Standards	114	4.6
ORIG - Core	2146	86.0
Total Samples	2494	100

12.2.1 Blanks

Blank samples were analyzed two ways: Failure Charts showing blank sample values for each element of interest plotted with a “Failure Line” at three times the detection limit of each element, and in Smear Charts plotting blank samples paired with the samples directly preceding them. See Figure 12-1 through Figure 12-8.

Overall, blank samples showed good performance with respect to testing the labs’ procedures and analytical techniques. Blanks were 100% passing for gold (Au), 95% passing for copper (Cu), 98.3% passing for molybdenum (Mo) and 93.2% passing for rhenium (Re). There is no contamination visible in the Smear Chart for Mo as evidenced by the horizontal plot line of the paired data. There is slight smear visible for Au and Re due to two higher grade preceding values (e.g.: for Au, a 2.31 ppm sample has elevated the blank to 0.02 ppm) and minor to moderate levels of smear visible for Cu. The highest grade of Cu reported in a blank sample is 78.7 ppm, still well below even low-grade ore values.

The few blank samples that showed smear effects from preceding samples were well below low grade ore values for each element. Erratic values in the blank sample could be due to contamination during the core cutting and sample bagging procedure as the core cutters were initially using the same gloves to insert blanks as they had been using to cut core.

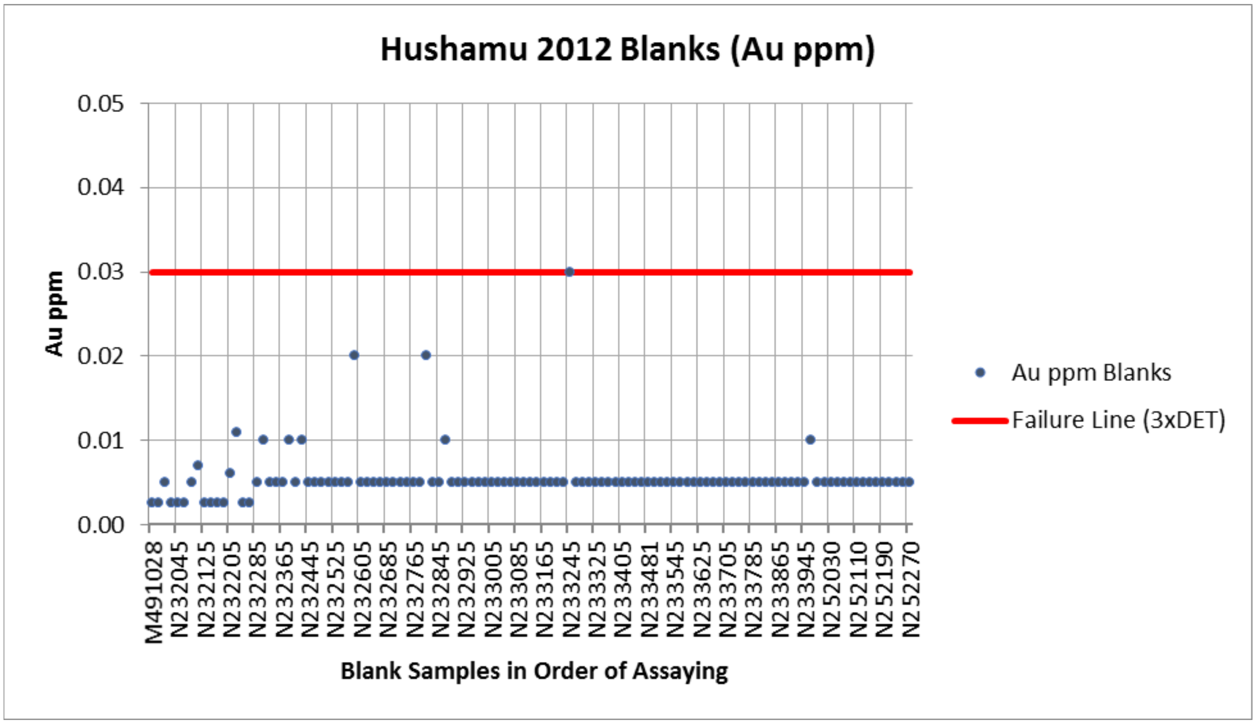


Figure 12-1: Blank Samples (Au ppm)

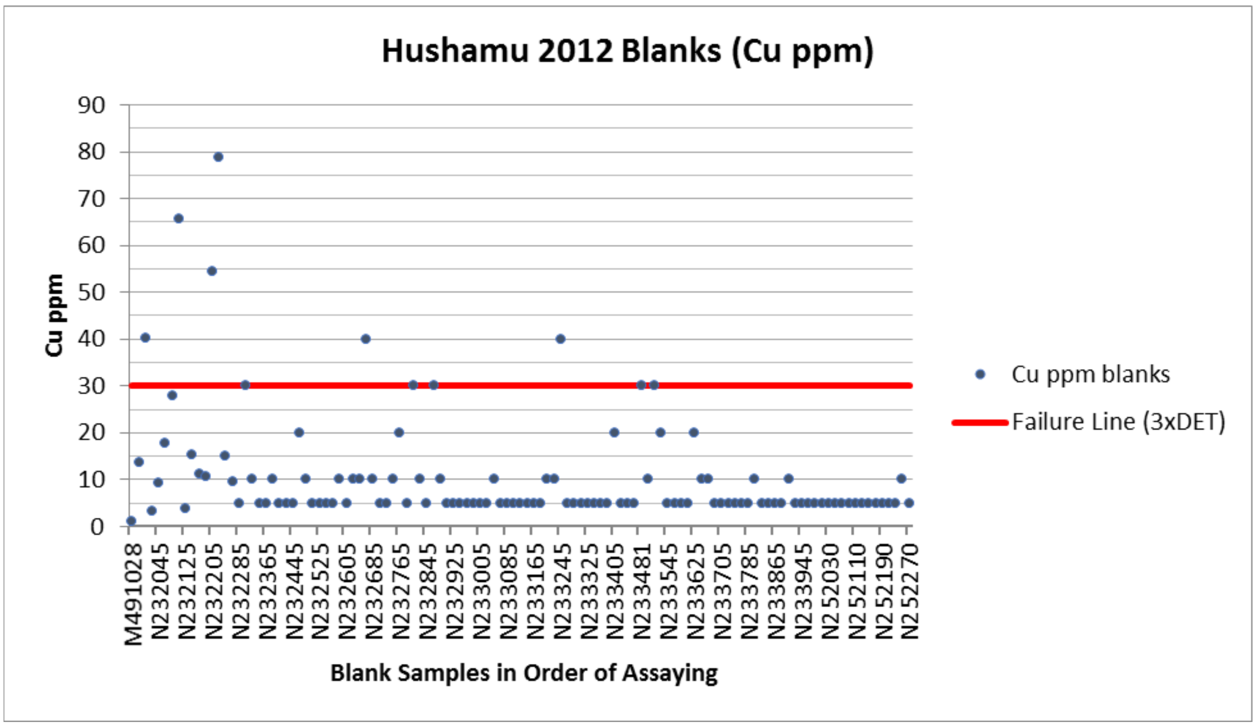


Figure 12-2: Blank Samples (Cu ppm)

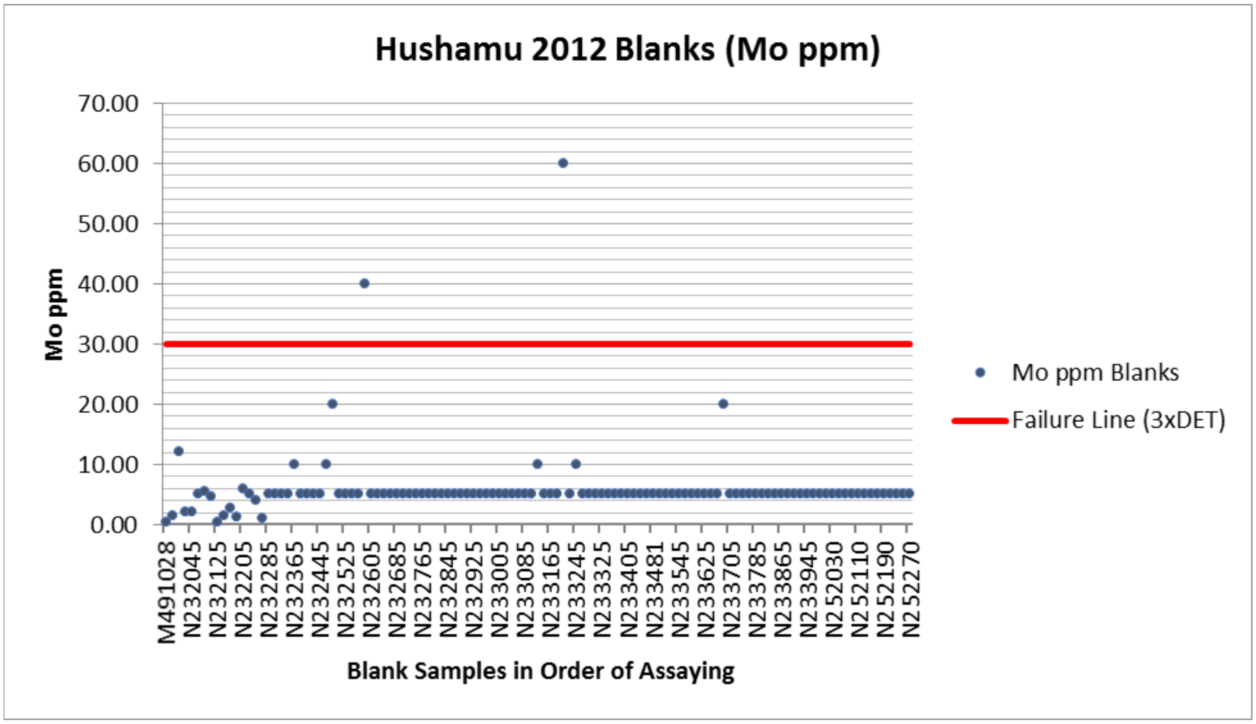


Figure 12-3: Blank Samples (Mo ppm)

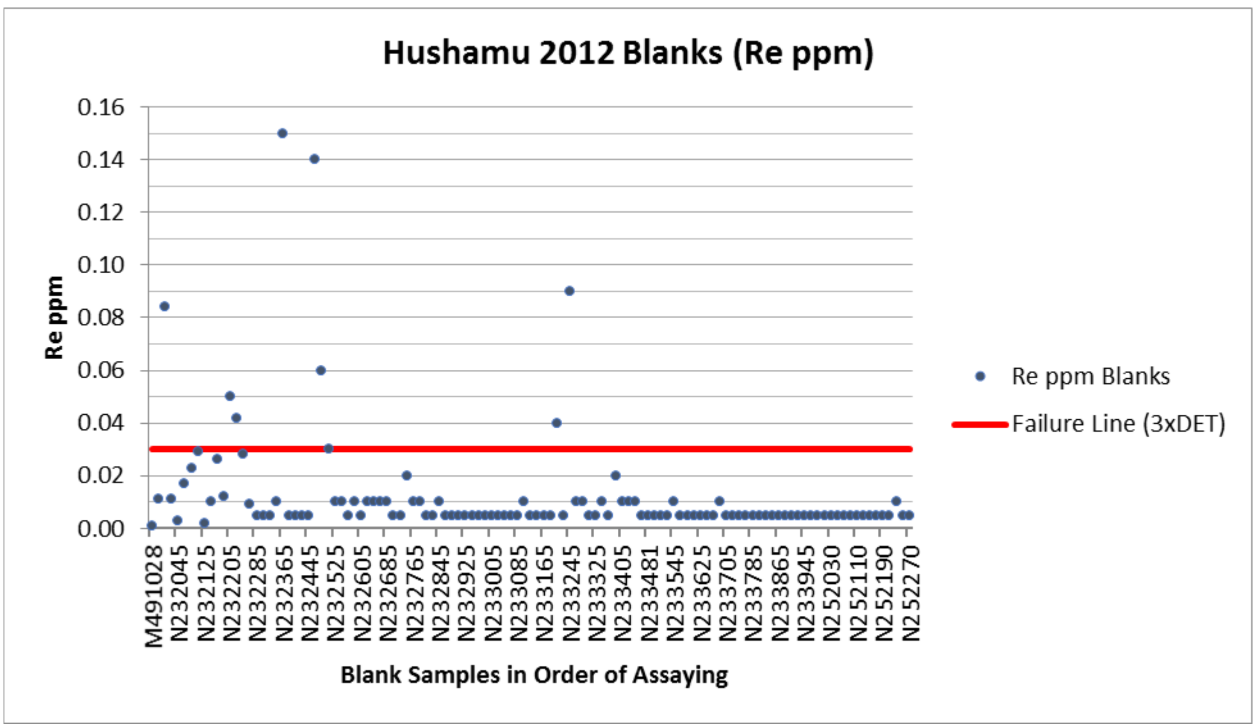


Figure 12-4: Blank Samples (Re ppm)

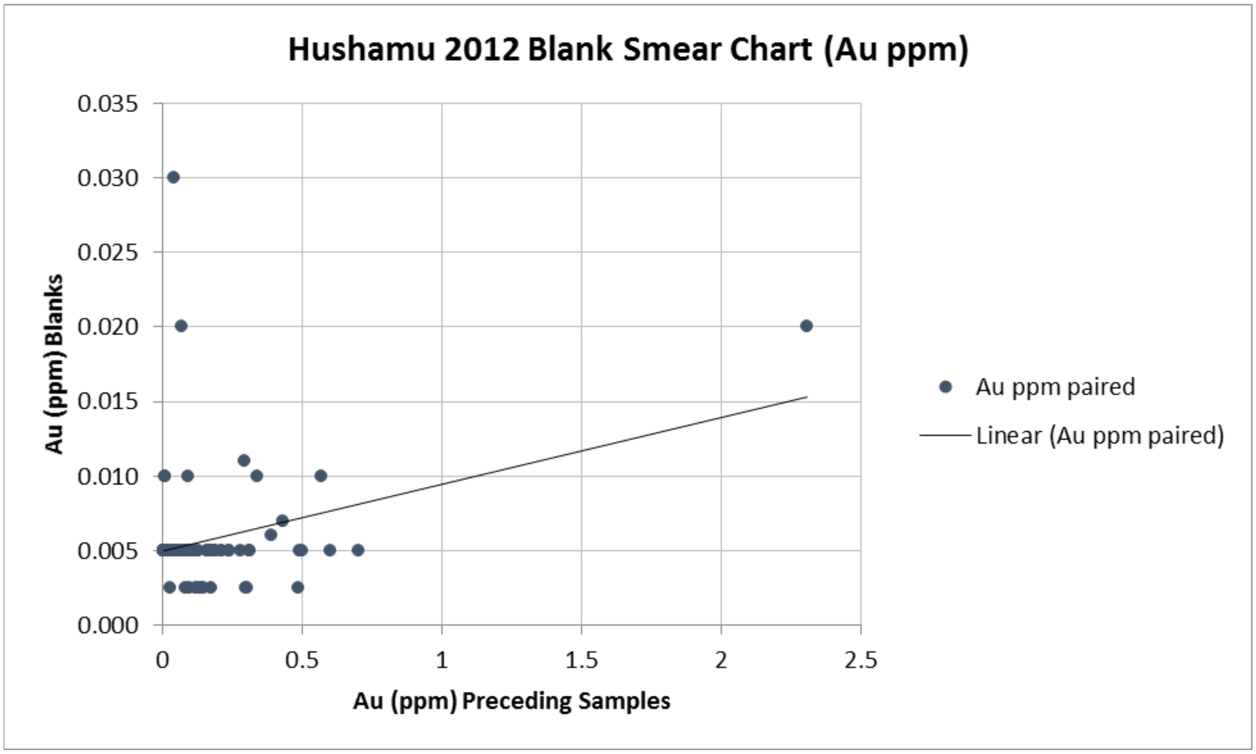


Figure 12-5: Blank Smear Chart (Au ppm)

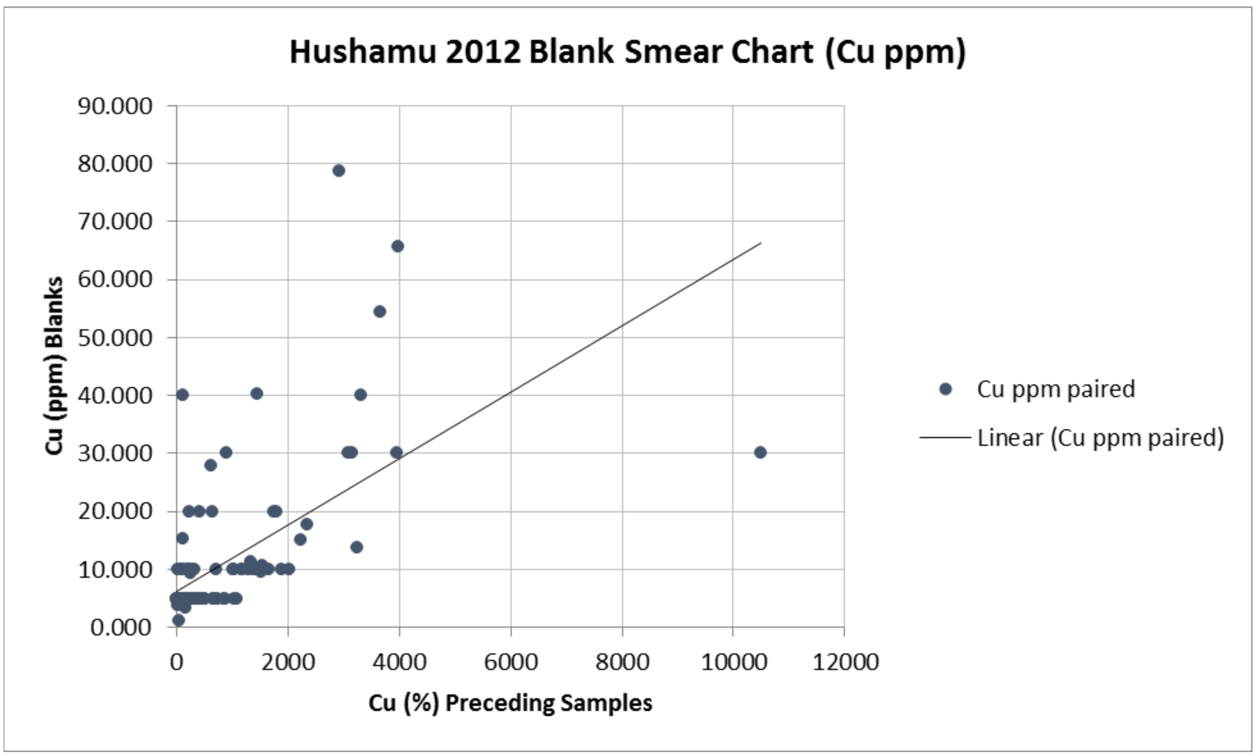


Figure 12-6: Blank Smear Chart (Cu ppm)

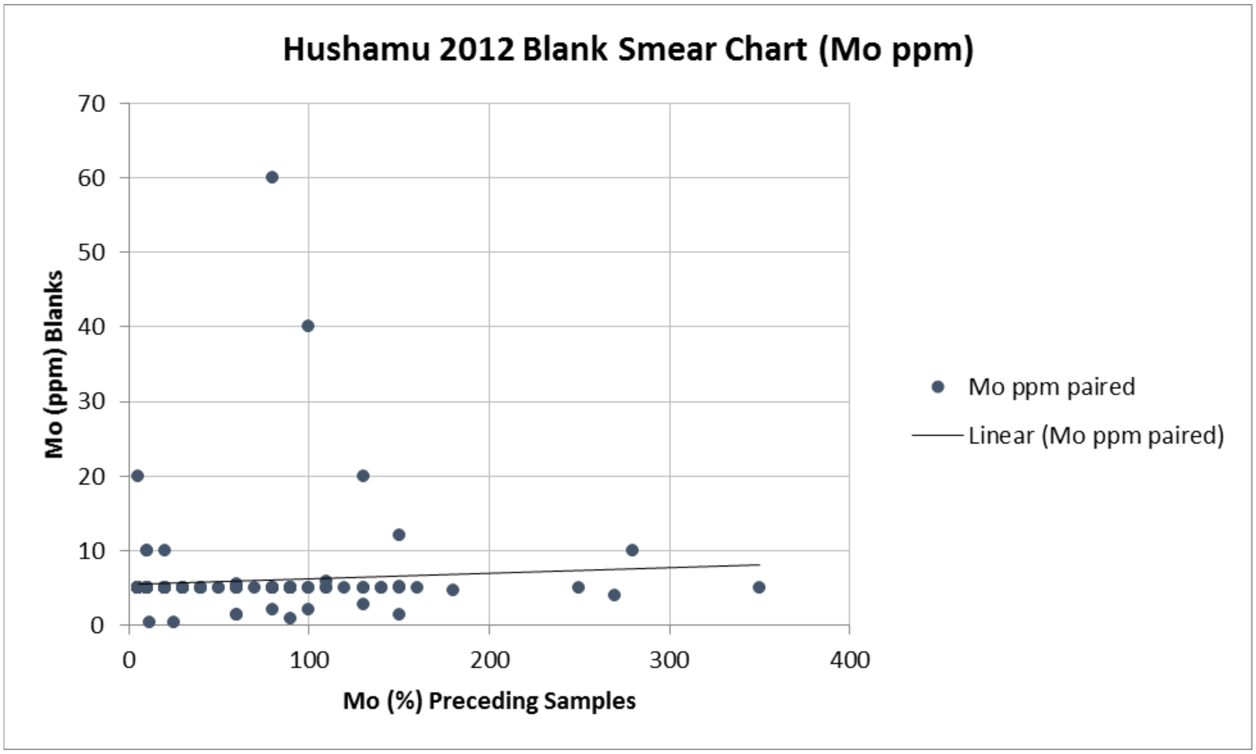


Figure 12-7: Blank Smear Chart (Mo ppm)

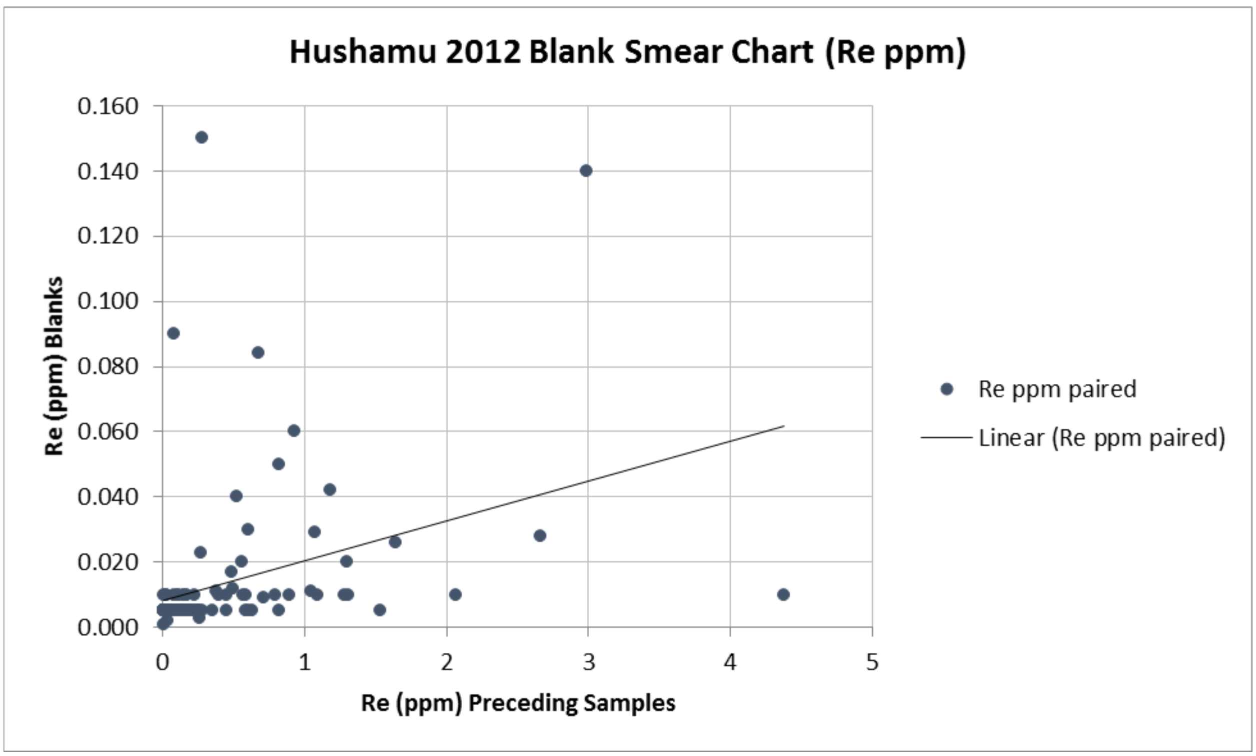


Figure 12-8: Blank Smear Chart (Re ppm)

12.2.2 Duplicates

The results from quartered coarse duplicate samples sent to two different labs were analyzed using Max-Min Charts showing each duplicate pair plotted as maximum and minimum values with a 20% Pass/Fail (P/F) line and as Q-Q scatterplots showing each sample as a pair plotted about a line, Y=X. See Figure 12-9 through Figure 12-16.

The Max-Min pairs showed a good correlation with only a small amount, less than ten percent, plotting above the 20% P/F line for each element, Au, Cu, Mo and Re respectively. The Q-Q scatterplots also showed good correlation of the original sample and the duplicate sample. The best correlation was shown by Cu, the worst by Re, but still within acceptable limits.

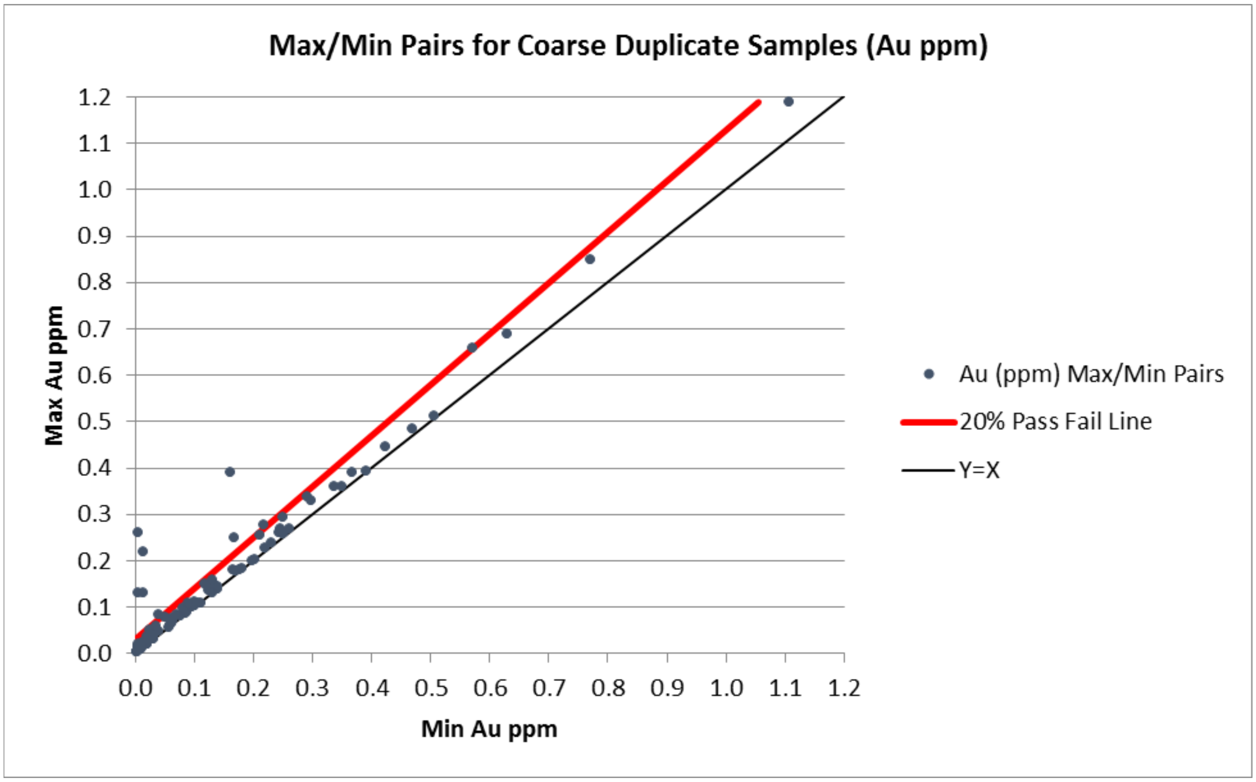


Figure 12-9: Max/Min Pairs for Coarse Duplicate Samples Au (ppm)

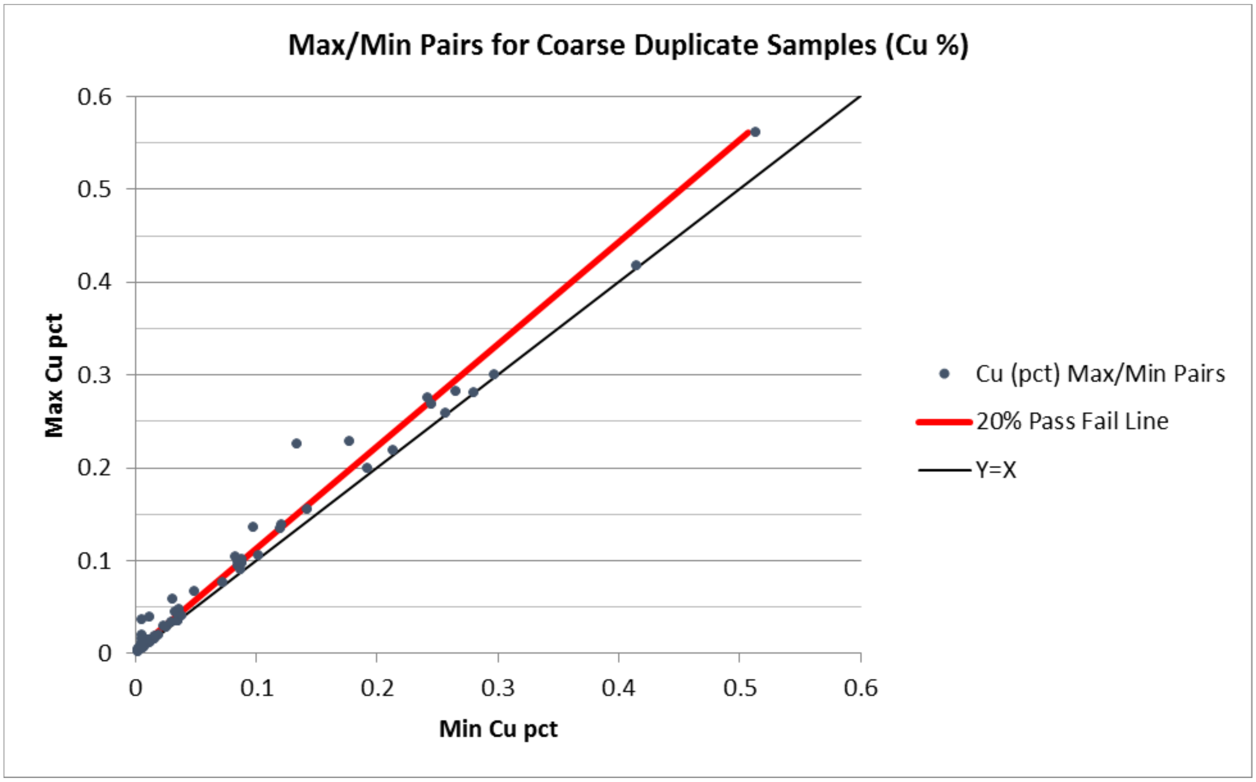


Figure 12-10: Max/Min Pairs for Coarse Duplicate Samples (Cu %)

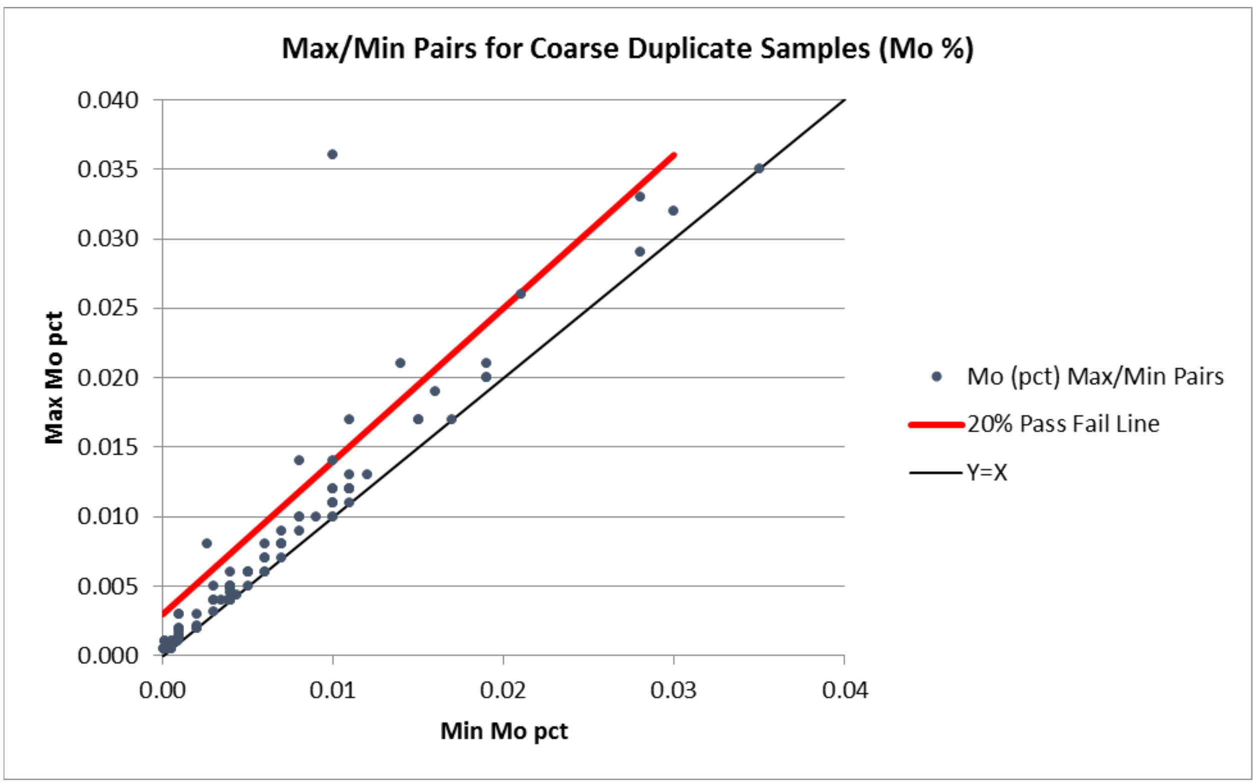


Figure 12-11: Max/Min Pairs for Coarse Duplicate Samples Mo (Mo %)

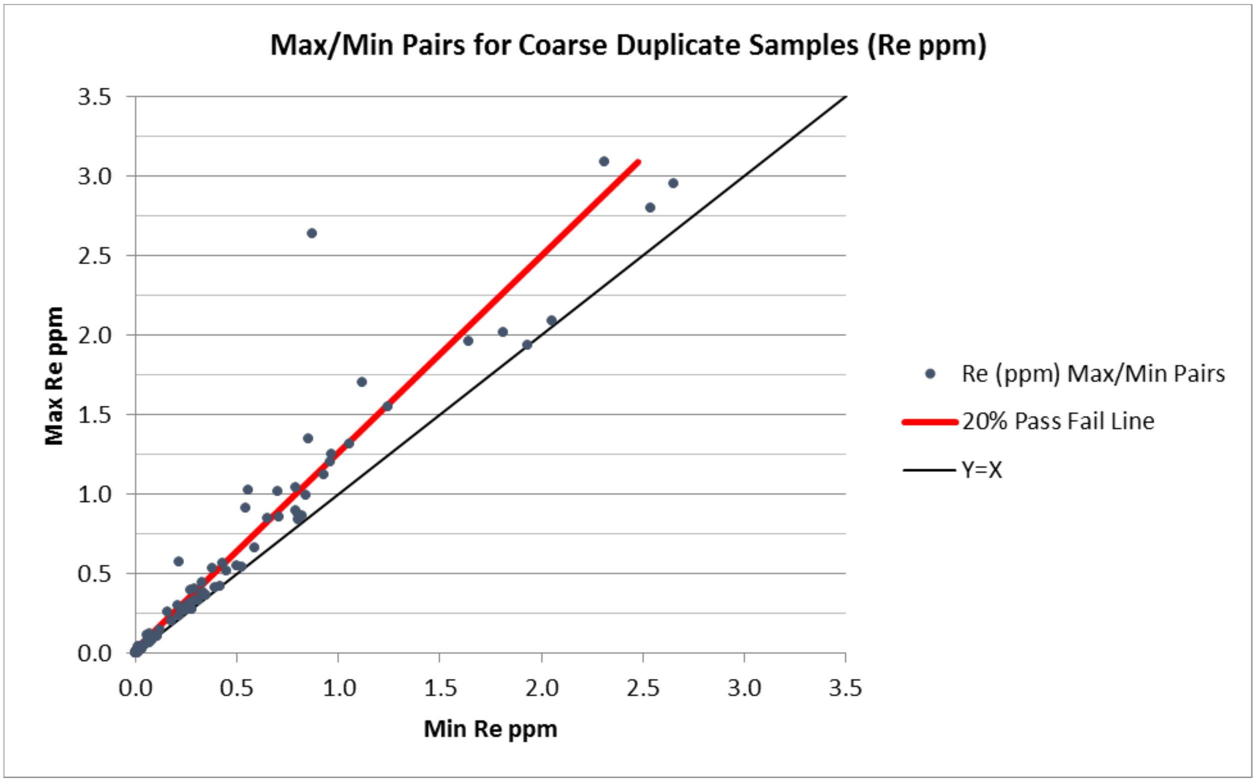


Figure 12-12: Max/Min Pairs for Coarse Duplicates Re (ppm)

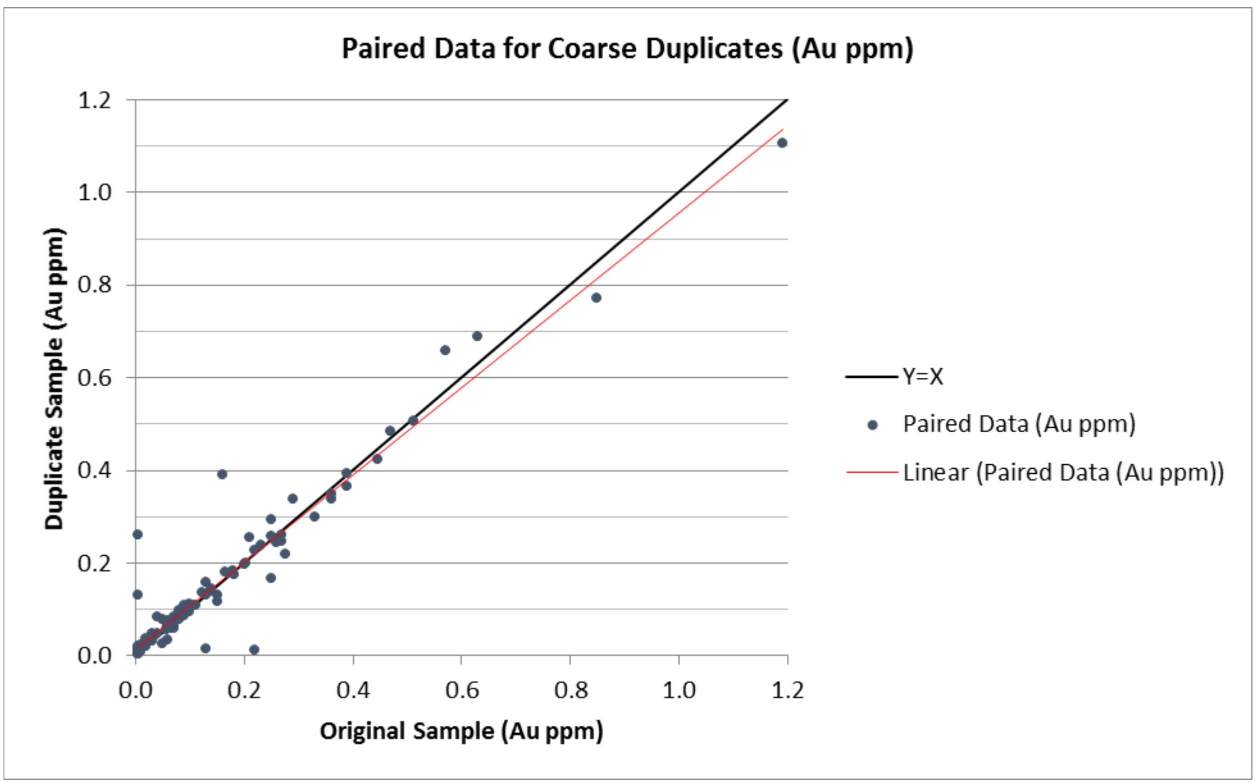


Figure 12-13: Paired Data for Coarse Duplicates Au (ppm)

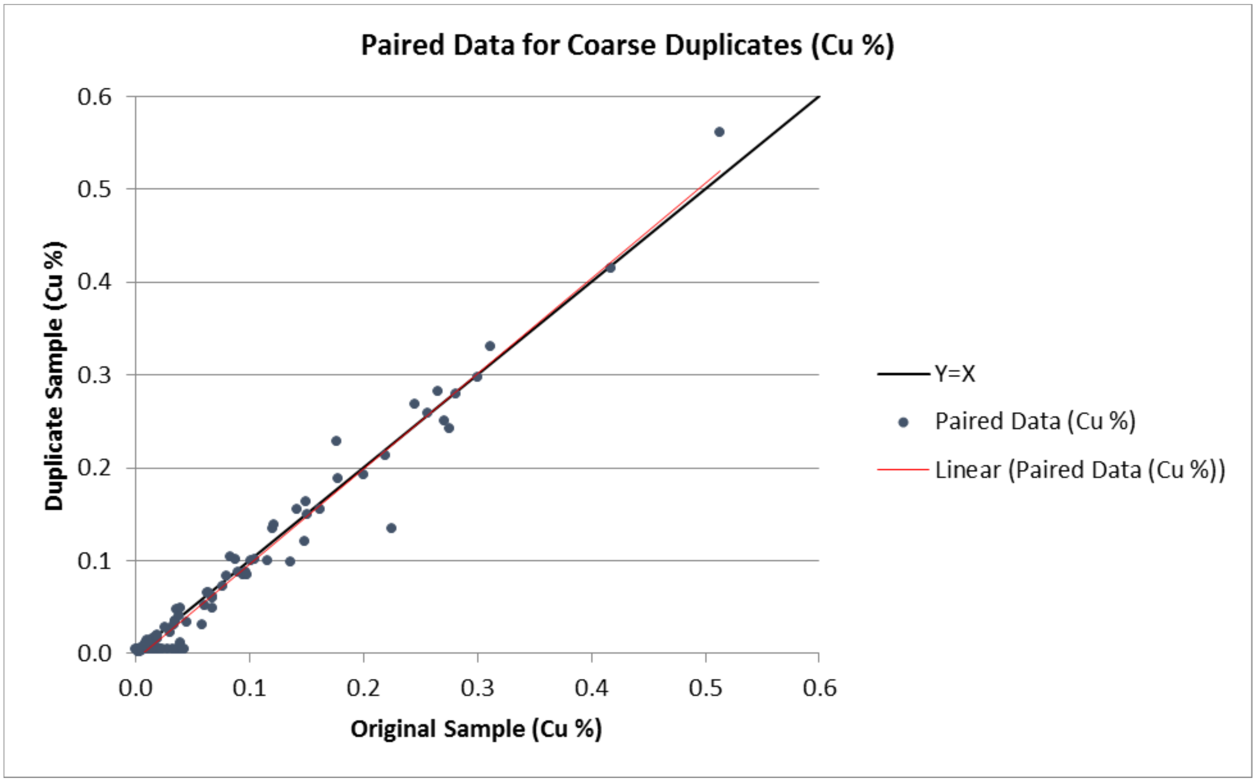


Figure 12-14: Paired Data for Coarse Duplicates (Cu %)

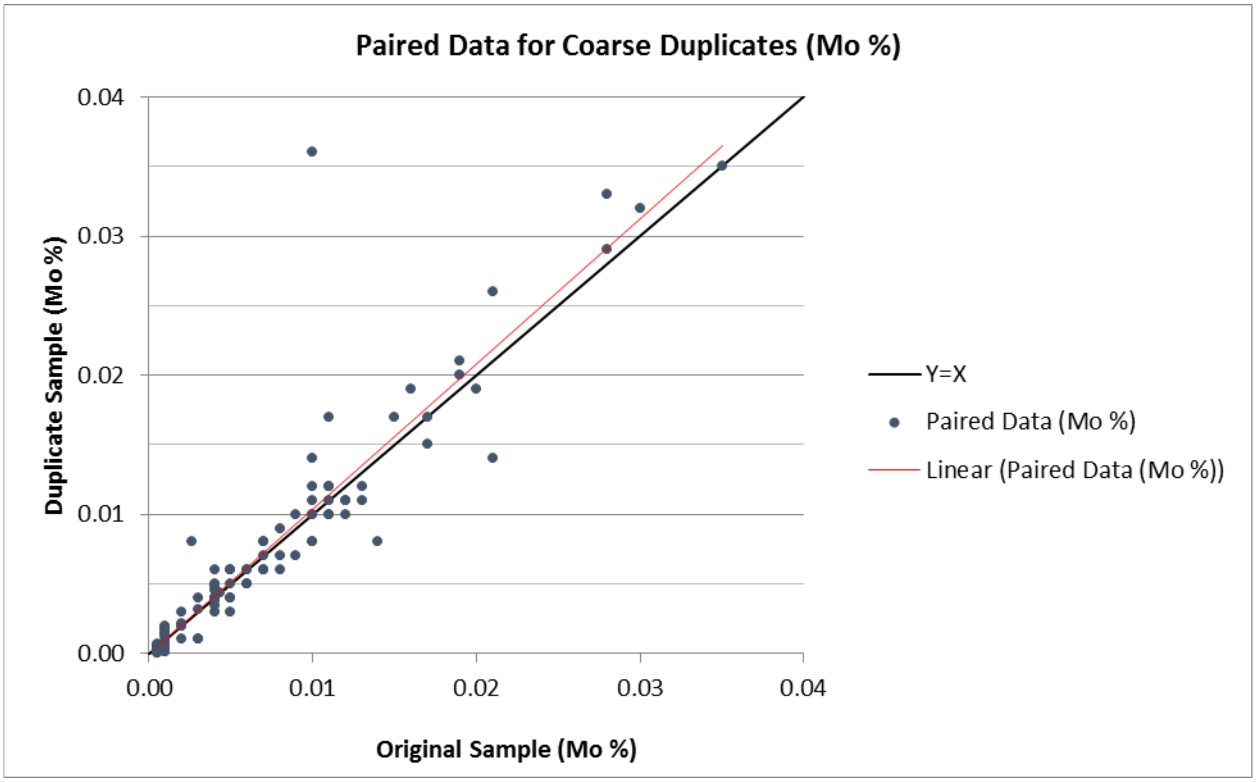


Figure 12-15: Paired Data for Coarse Duplicates (Mo %)

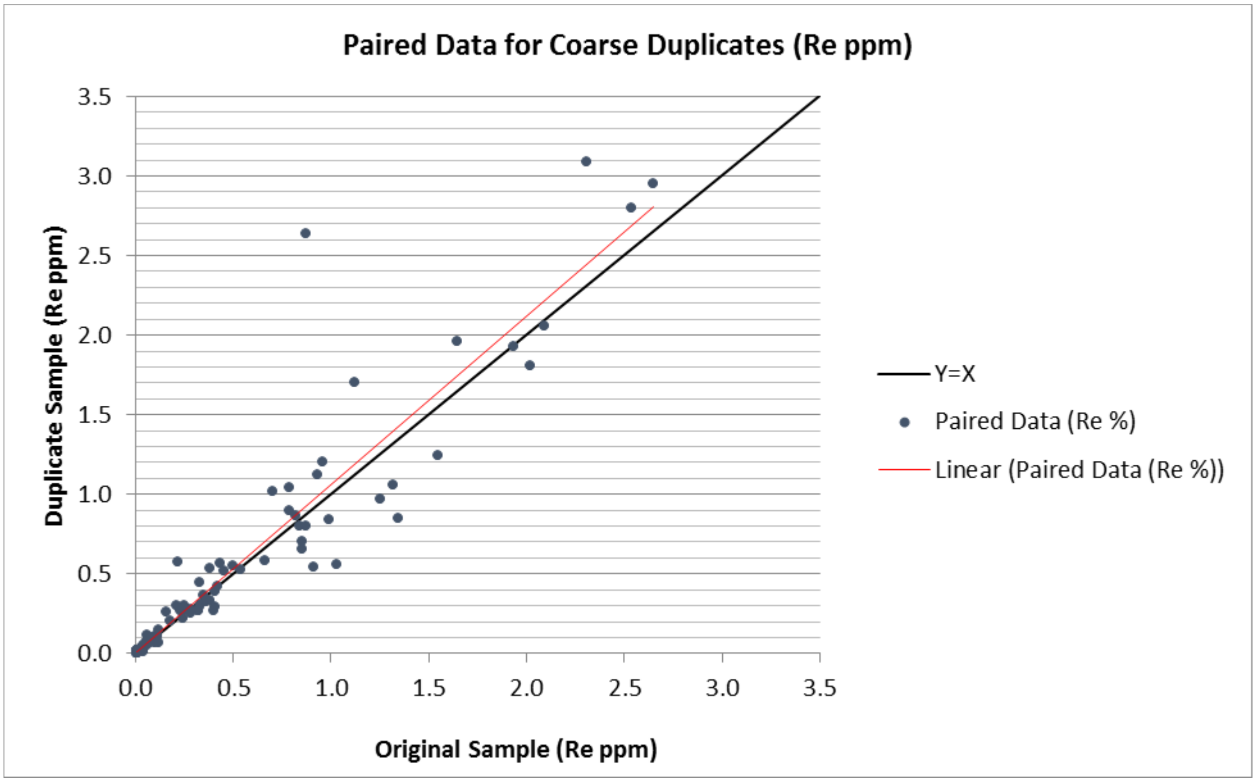


Figure 12-16: Paired Data for Coarse Duplicates (Re ppm)

12.2.3 Standards

As shown in Table 12-3, two Certified Reference Materials (CRM's) were used during the 2012 Hushamu drilling program: CU 181 and CU 184. Brown (2012) created Control Charts for the Standards for each of the elements, Cu, Au and Mo. The charts included the Best Value (BV), taken from the certificate of analysis provided by the manufacturer, WCM Minerals, and lower and upper warning limit, LWL and UWL respectively, representing a warning range of +/- two standard deviations and a lower and upper control limit, LCL and UCL respectively, representing a control range of +/- three standard deviations.

Table 12-3: Summary of Hushamu CRM Performance for 2012

Standard	Certified Element	Best Value (BV)	Average Value	+/- 3 Standard Deviations	# Failures	+/- 2 Standard Deviations	# Warnings
CU 181	Au (ppm)	0.59	0.59	0.68/0.5	2	0.65/0.53	4
CU 181	Cu (%)	0.59	0.578	0.65/0.53	2	0.63/0.55	1
CU 181	Mo (%)	0.084	0.081	0.092/0.076	2	0.089/0.079	8
CU 184	Au (ppm)	0.19	0.194	0.234/0.146	0	0.219/0.161	4
CU 184	Cu (%)	0.192	0.192	0.204/0.18	2	0.2/0.184	8
CU 184	Mo (%)	0.04	0.038	0.046/0.034	2	0.044/0.036	3

12.2.3.1 CU 181

There were 56 samples of CU 181 used for the 2012 Hushamu drilling program. CU 181 is certified for Au, Ag, Cu, and Mo, but since Ag was not consistently assayed throughout the program and is not a potential resource material for this Project, it was not included in this study. Analysis was done for Au, Cu and Mo only. See Figure 12-17 through Figure 12-19.

Overall, CU 181 showed good precision and decent accuracy for gold, with only two values plotting outside the acceptable range of three standard deviations. One of the samples, N232590, failed for all the elements of interest and appears to have been mis-labeled as CU 181 and should in fact be CU 184. Four other samples plotted just outside the warning range of two standard deviations. No areas of high or low bias were visible.

Copper values for CU 181 showed similar behavior to the gold values as described above. Again, two samples plotted outside the acceptable range of three standard deviations, one being the incorrectly labeled standard, N232590 and the other being an anomalous high value for N233970. Only one other standard sample returned a value close to the lower warning limit of two standard deviations, but still within the acceptable range. Overall, there is slightly lower bias of copper values in comparison to the best value of the standard listed on the certificate of analysis, indicating a slight problem with the accuracy of the standard for copper.

Most molybdenum values for CU 181 were well within acceptable limits and behaved in a similar manner to the copper values above. There was the same failure for N232590 (mis-labeled as CU 184) and one other failure as with copper above: an anomalous high Mo value for sample 233970. Two samples plotted just within or right at the upper and lower control limits. Six other samples plotted just outside or right at the warning limit range of two standard deviations. As with copper, there is a slightly low bias of molybdenum values compared to the Best Value.

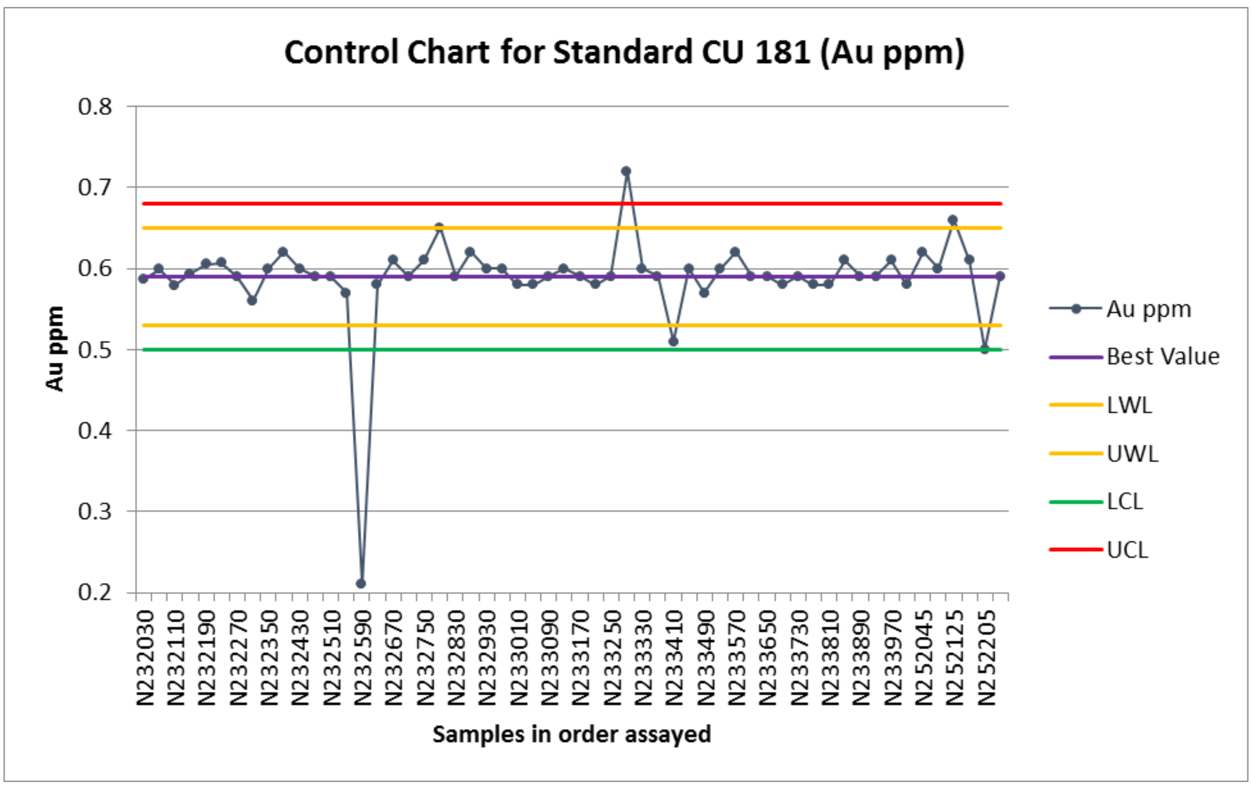


Figure 12-17: Standard CU 181 (Au ppm)

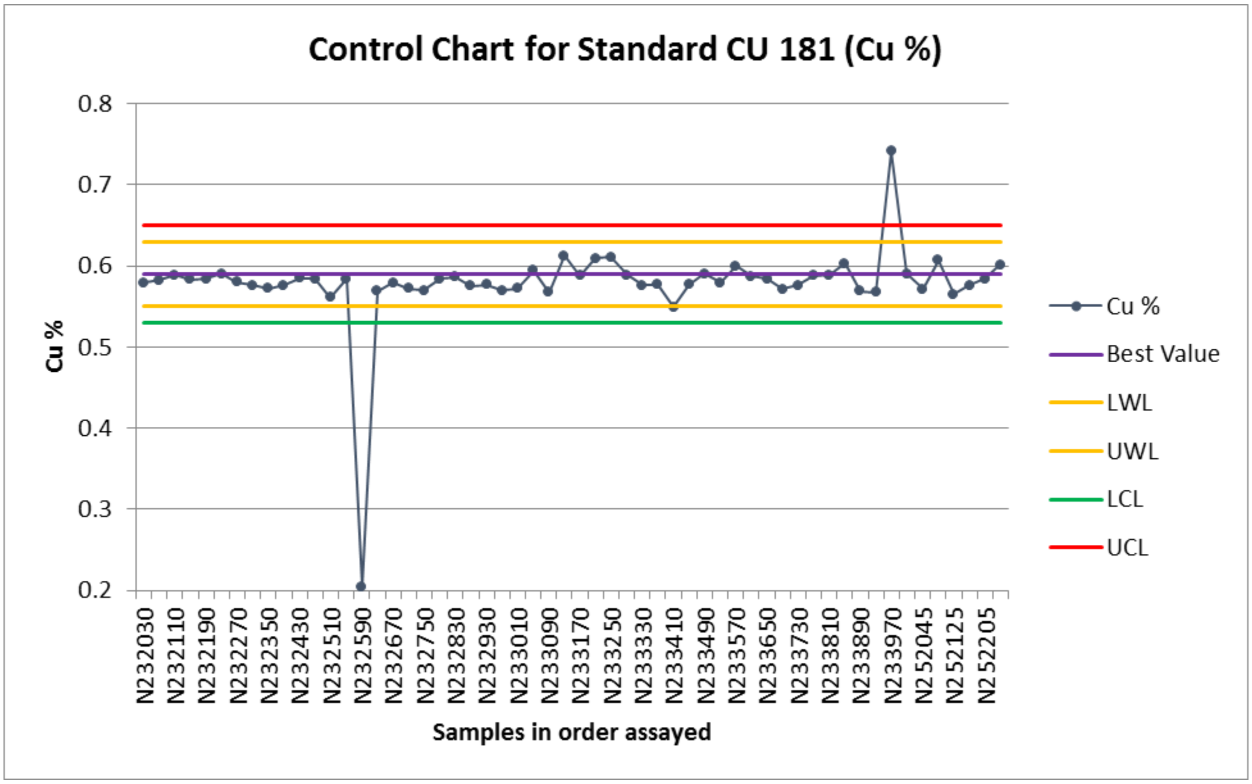


Figure 12-18: Standard CU 181 (Cu %)

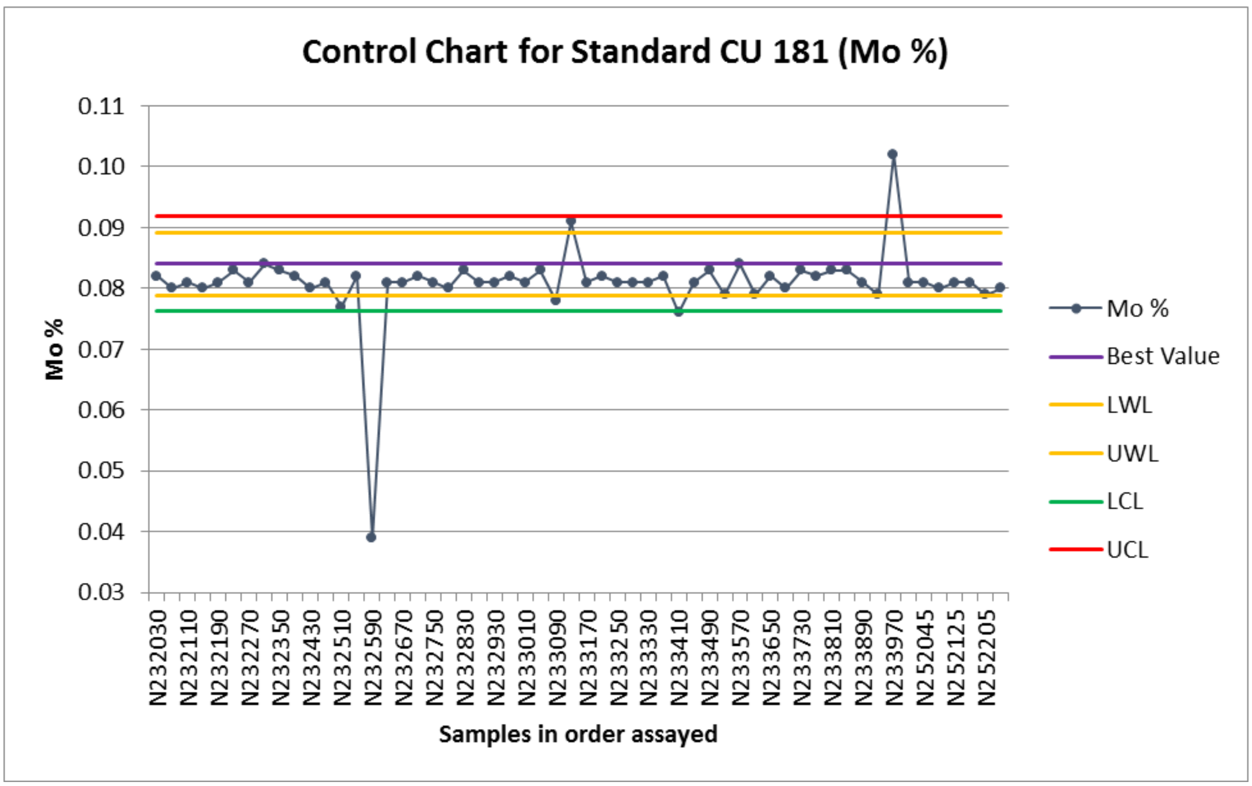


Figure 12-19: Standard CU 181 (Mo %)

12.2.3.2 CU 184

There were 59 samples of CU 184 used for the 2012 Hushamu drilling program. CU 184 is certified for Au, Ag, Cu and Mo, but since Ag was not consistently assayed throughout the program and is not a potential resource material for this Project, it was not included in this study. Analysis was done for Au, Cu and Mo only. See Figure 12-20 through Figure 12-22.

Gold values for CU 184 had decent accuracy and precision, with slightly more variation overall, but within the acceptable limits. There were no failures outside the control limit range of three standard deviations and only four samples plotted just outside the warning limits of two standard deviations. No bias in the values was visible.

Copper values for CU 184 also had good correlation with the Best Value for the standard, with no visible high or low bias. There were two failures that plotted outside the control limits of three standard deviations: N233630 and N252105. Eight samples plotted outside the warning limits of two standard deviations, but were still within the acceptable range.

Molybdenum values for CU 184 had good precision overall, but with a somewhat low bias when compared to the Best Value. The same two samples that failed for Cu also failed for Mo: N233630 and N252105, indicating a possible issue with the ore grade assays for those samples in particular. Three other samples plotted at or just over the warning range of two standard deviations.

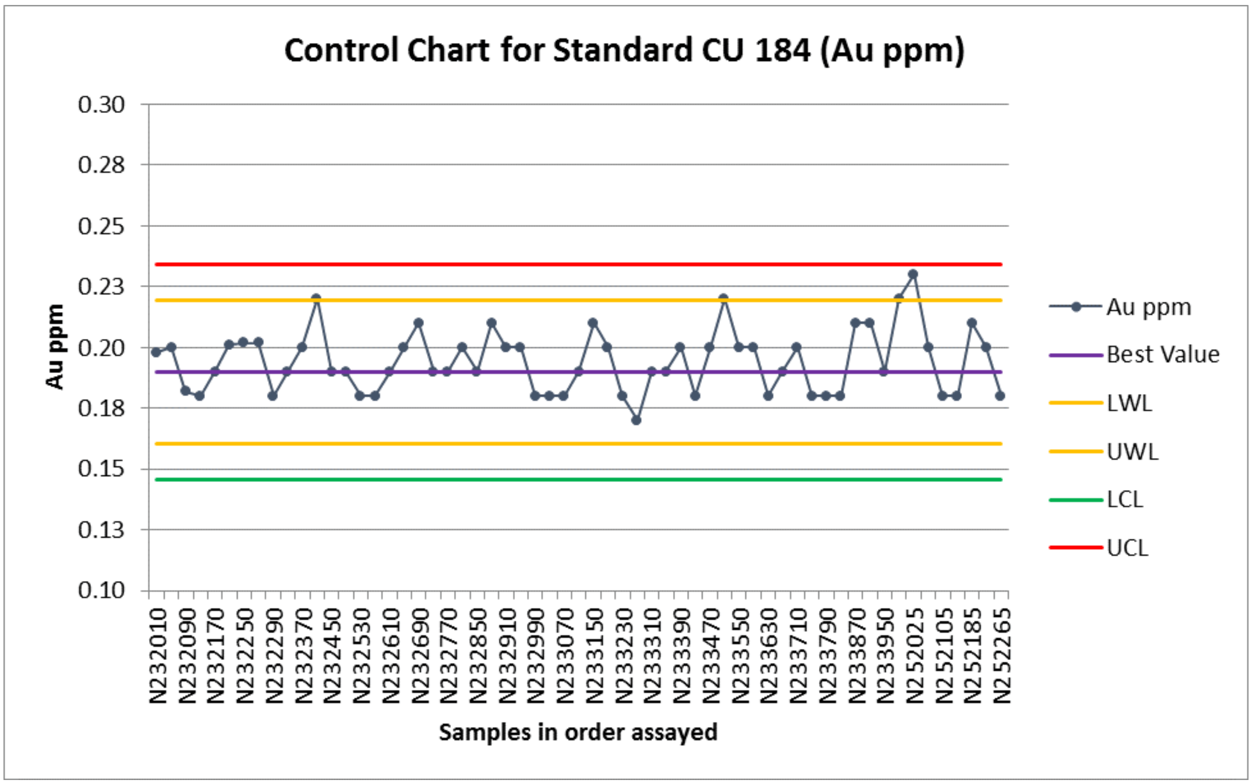


Figure 12-20: Standard CU 184 (Au ppm)

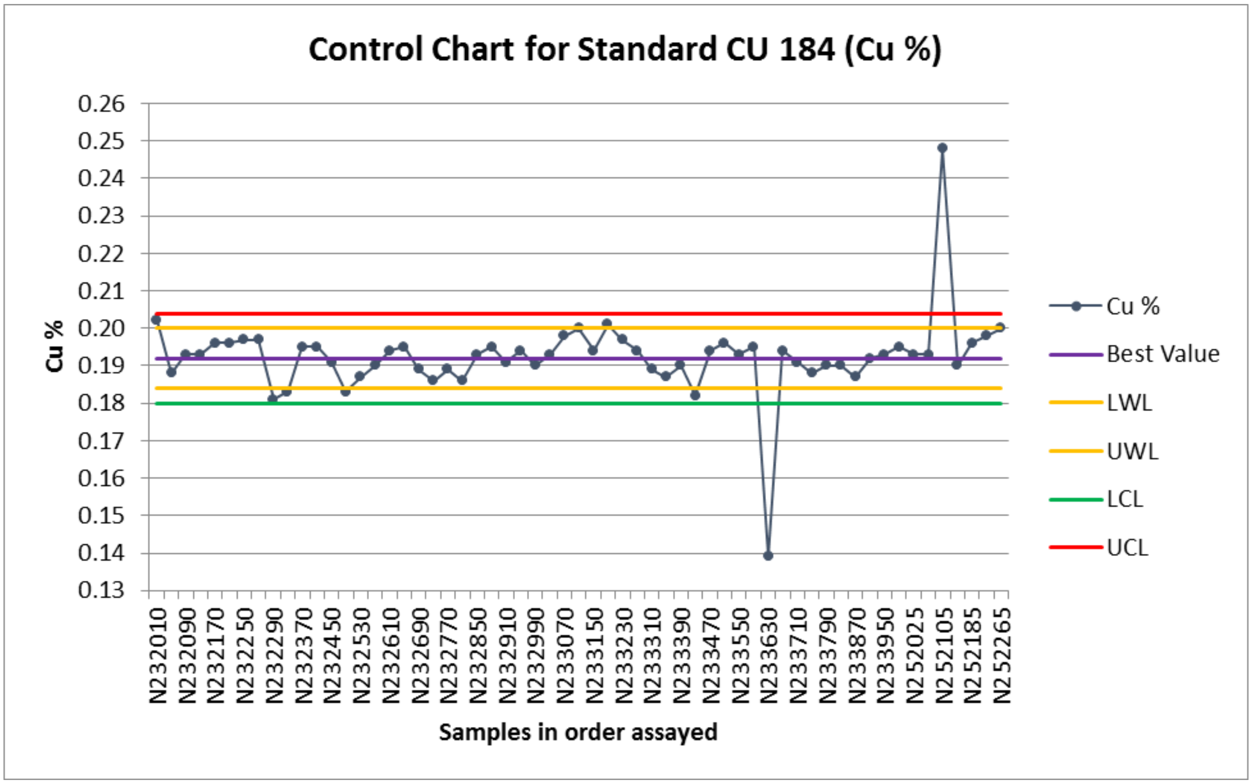


Figure 12-21: Standard CU 184 (Cu %)

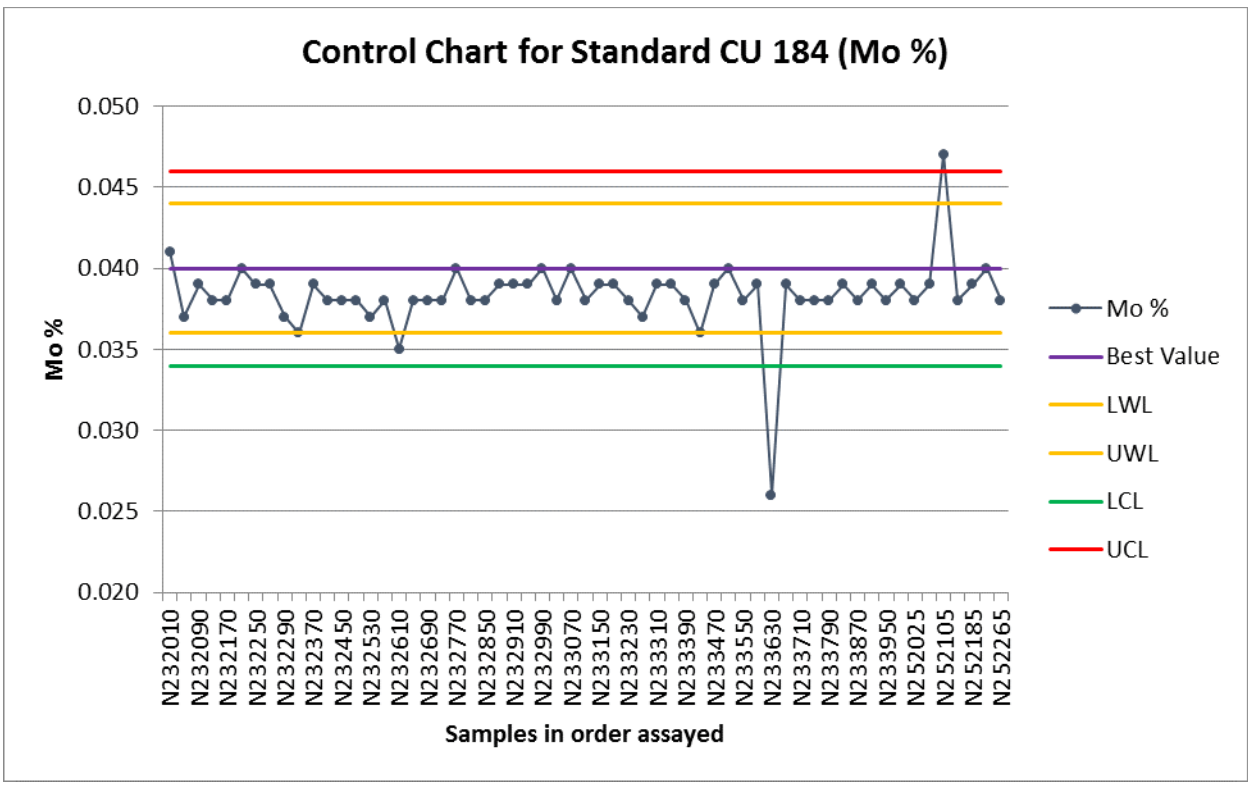


Figure 12-22: Standard CU 184 (Mo %)

12.3 DRILL HOLES FROM 1968-1991: RED DOG

None of the original analytical certificates for the drilling done between 1968 and 1991 are available for review. However, assessment reports contain photocopies of drill logs with assays for the 1982, 1983, 1988 and 1990 drilling and photocopies of analytical certificates for the 1991 drilling. The digital assay database for all historical drill holes contains 1,959 assay records. As part of this study, the authors performed a review of the entire drill hole database against photocopied versions of the drill logs and assay records. The authors found 38 assays missing, four incorrect intervals (mostly conversion errors) and 28 incorrect assay values within the database. These errors were corrected for the final database.

12.4 2016 DRILLING: RED DOG

In the 2016 verification drilling by NorthIsle, four holes were twinned to verify historic analysis. Three of the four historical drill holes selected for twinning occur in an east-west line through the centre of the historical resource. The fourth verification hole was drilled at the northern end of the historical resource (Figures 10-4 and 10-5). The 2016 holes were located from two to seven metres from the historical collars, and drilled at the same azimuth and dip as the corresponding historical hole. The variation in distance was the result of the larger drill rig used in 2016 that could not safely be placed in all cases within two metres of the original hole. A summary of the results is included in Table 12-4.

Table 12-4: Drill Hole Comparison

Historic Drill Hole	2016 Drill Hole	From (m)	To (m)	Width (m)	Cu (%)	Au (g/t)
DDH90-03		3.0	201.0	198.0	0.36	0.61
	RD-16-01	1.5	200.0	198.5	0.31	0.47
EC132A/132		9.14	155.14	146.0	0.31	0.51
	RD-16-02	8.0	154.0	146.0	0.33	0.52
DDH-91-03		1.2	71.1	69.9	0.33	0.50
	RD-16-03	1.2	100.8	99.6	0.28	0.48
	including	1.2	72.0	70.8	0.30	0.55
EC 133		30.5	152.4	121.9	0.31	0.46
	RD-16-06	30.0	152.0	122.0	0.30	0.41

In general, analytical results from all four verification holes correlate well with the historical results. The discrepancy observed between verification hole RD-16-01 and historical hole DDH-90-03 can be largely explained by a six-metre section of leached core present in RD-16-01 and not present in DDH-90-03. Verification hole RD-16-03 returned a similar result to historical hole DDH-91-03 to a depth of about 72 metres where DDH-91-03 terminated in a fault. The 2016 drill hole successfully penetrated the fault and continued in strong mineralization for an additional 28.6 metres.

As shown in Table 12-5, the digital database supplied to the authors by NorthIsle contains 554 assay records for the 2016 drilling, including 446 core samples and 108 Quality Analysis/Quality Control ("QA/QC") samples. As part of this study, the authors performed a review of the entire drill hole database against original copies of the drill logs and assay records. No material errors within the database were found.

In support of the core sample analysis program; blank samples, certified reference materials (standards), sample and pulp duplicates were included in the samples submitted to BVL. For the 2016 diamond drill program, approximately one in five analysis represents QA/QC data verification.

Table 12-5: Summary of QA/QC Sampling for 2016 Red Dog Drilling

Sample Type	Number of Samples	% of Samples
QC -Blanks	22	4
QC – Duplicates	25	4.5
QC – Pulp Duplicates	35	6.3
QC - Standards	26	4.7
ORIG - Core	446	80.5
Total Samples	554	100

12.4.1 Blanks

Blank material was sourced from dolomite landscaping material and inserted by the geologist into the sample stream every 20 samples to verify that the laboratory equipment was properly cleaned between samples and to detect any contamination during preparation.

In total, NorthIsle assayed 22 blank samples, representing approximately 4% of the assay database. All 22 samples were above the ultra trace detection limit of 0.1 ppm for copper and 3 of the 22 samples were above the 2-ppb detection limit for gold with the average value of samples above the detection limit being 4.07 ppm copper and 2.7 ppb gold respectively, well below even low-grade ore values. The copper and gold values reported for the blank samples are plotted on the control charts in Figure 12-23 and Figure 12-24. There is no reason not to rely on the results of the blank samples.

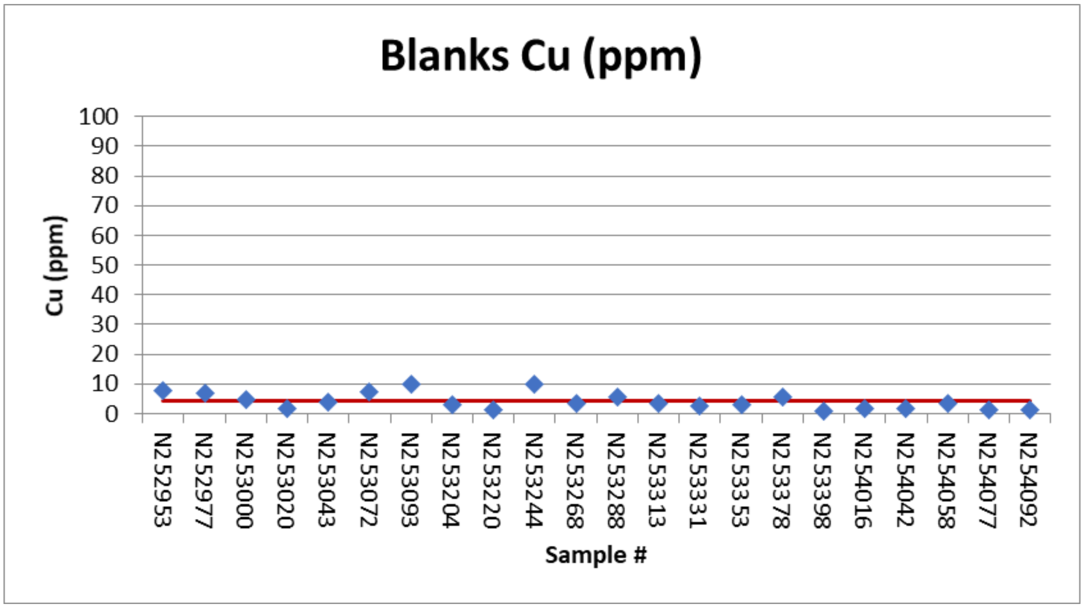


Figure 12-23: Blank Samples (Cu ppm)

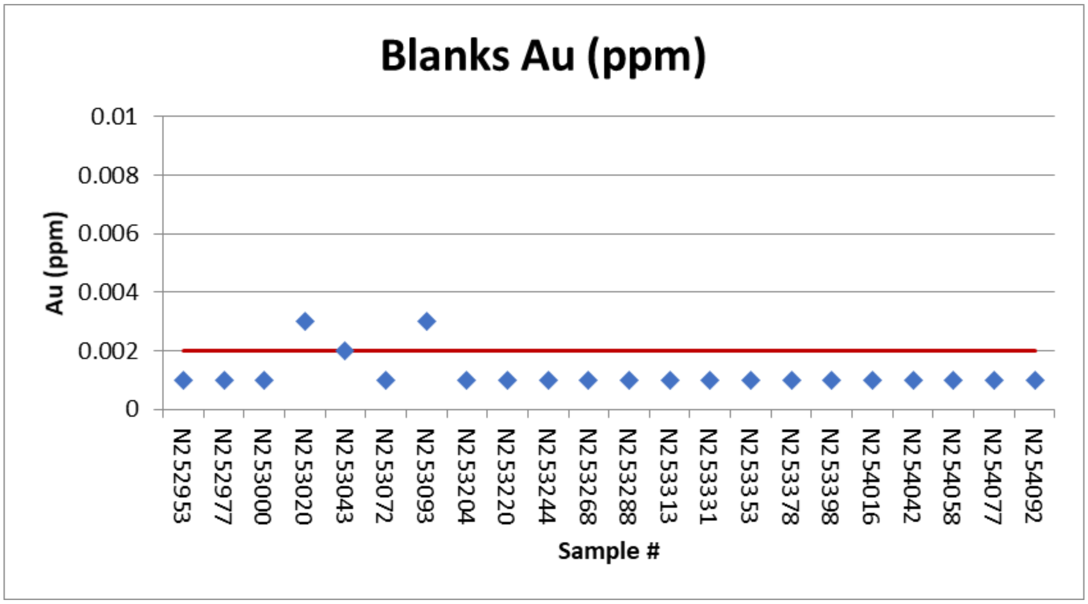


Figure 12-24: Blank Samples (Au ppm)

12.4.2 Duplicates

Quartered coarse duplicate samples were inserted into the sample stream every 20 samples to establish sample variance through the sample preparation and sample analysis process.

NorthIsle assayed 25 duplicate samples, representing approximately 4.5% of the assay database. The accepted limit for duplicates was established at +/- 20% relative pair difference. Duplicate sample analysis for copper and gold was in general good. The duplicate control samples, with 1 exception for copper and 3 exceptions for gold, are found to be within acceptable levels of reproducibility. See Figure 12-25 and Figure 12-26.

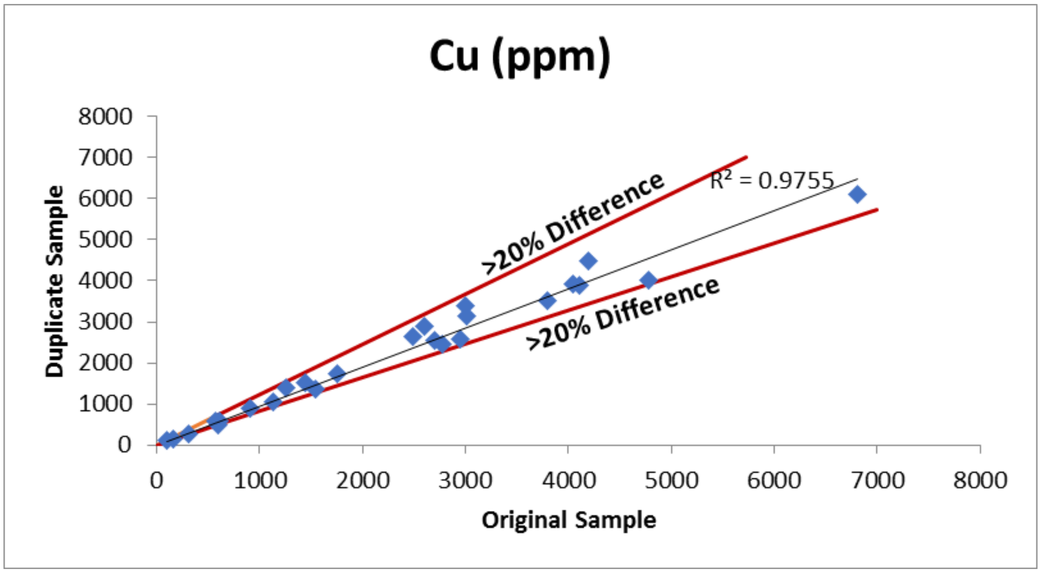


Figure 12-25: Duplicate Samples (Cu ppm)

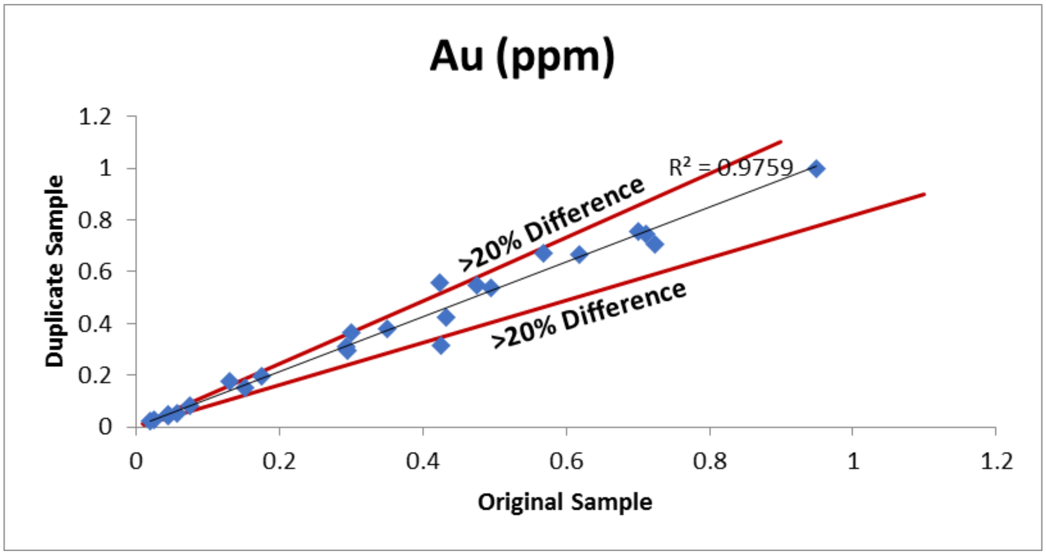


Figure 12-26: Duplicate Samples (Au ppm)

12.4.3 Pulp Duplicates

A portion of pulp from samples randomly selected by NorthIsle (35 samples representing approximately 6.3% of all 2016 samples) were collected by BVL and shipped to ALS for analysis to provide a second independent laboratory check for comparison purposes.

A comparison of BVL copper and gold results with the ALS results for the checked pulps reveals a strong degree of reproducibility with gold and copper values on average, slightly higher from BVL. See Figure 12-27 and Figure 12-28.

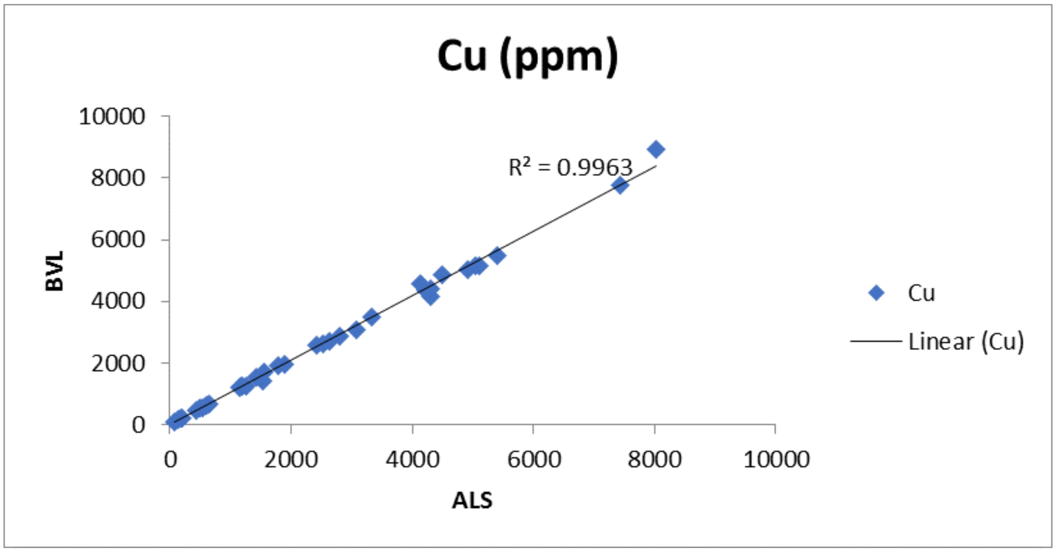


Figure 12-27: Pulp Duplicate Samples (Cu ppm)

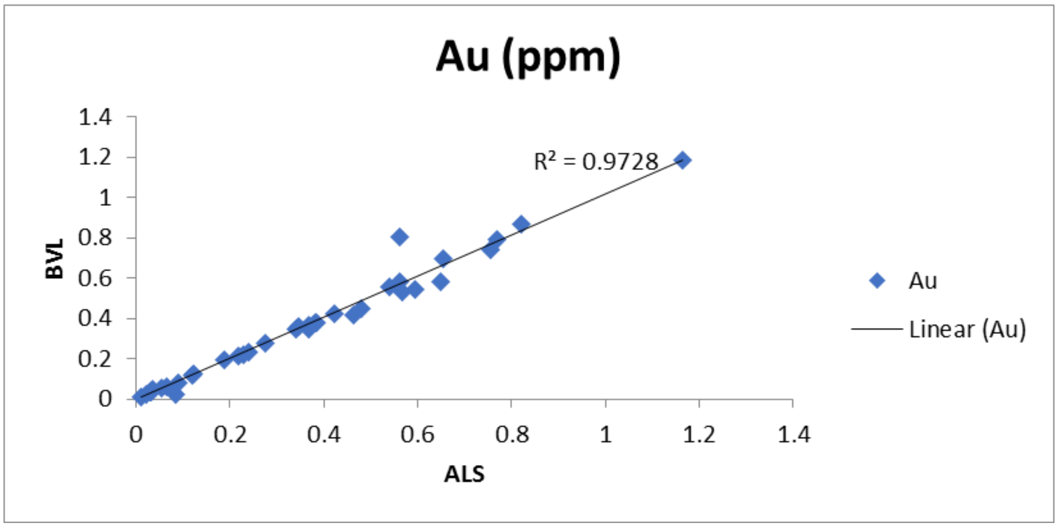


Figure 12-28: Pulp Duplicate Samples (Au ppm)

12.4.4 Standards or Reference Material

Two analytical standards were obtained from WCM Minerals as CU 181 and CU 184. The selected standards provide a good reflection of the average copper and gold grade ranges encountered. See Figure 12-29 through Figure 12-32.

The analytical standards were inserted by the geologist into the sample stream in an alternating manner every 20 samples to test the accuracy and precision of the analysis. In total, 13 analyses of CU 181 and 13 analyses of CU 184 have been conducted, representing a frequency of approximately 4.7% of the samples analyzed. The acceptable criterion for the standards is the mean value +/- two standard deviations. Table 12-6 presents the recommended mean grade and accepted standard deviation range for the standard used.

Table 12-6: Standard Reference Material for Copper and Gold

Standard	Certified Element	Recommended Value	1sd	2sd	2sd low limit	2sd high limit
CU 181	Au (ppm)	0.59	0.03	0.06	0.53	0.65
CU 181	Cu (%)	0.59	0.02	0.04	0.55	0.63
CU 184	Au (ppm)	0.19	0.015	0.03	0.22	0.16
CU 184	Cu (%)	0.192	0.004	0.008	0.2	0.184

Review of the CU 181 and CU 184 data from BVL indicates that three apparently erroneous samples exist (for Cu analysis from CU 184), corresponding to 11.5% of the total standard analysis. Generally, the standards perform within two standard deviations, indicating reasonable accuracy and precision.

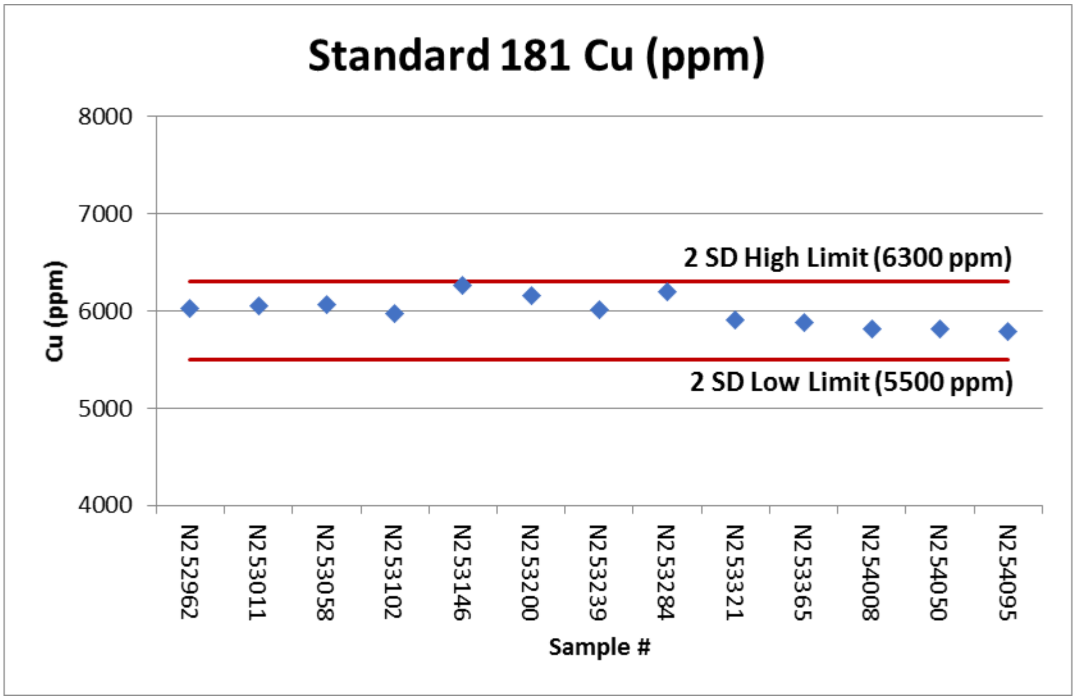


Figure 12-29: Standard CU 181 (Cu ppm)

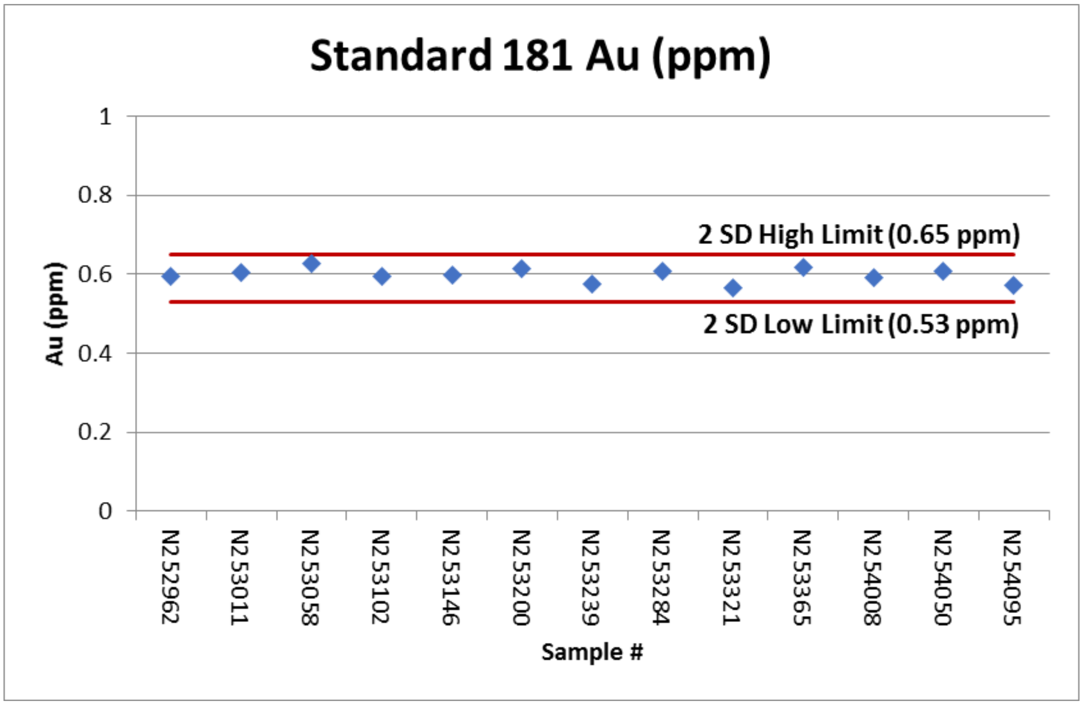


Figure 12-30: Standard CU 181 (Au ppm)

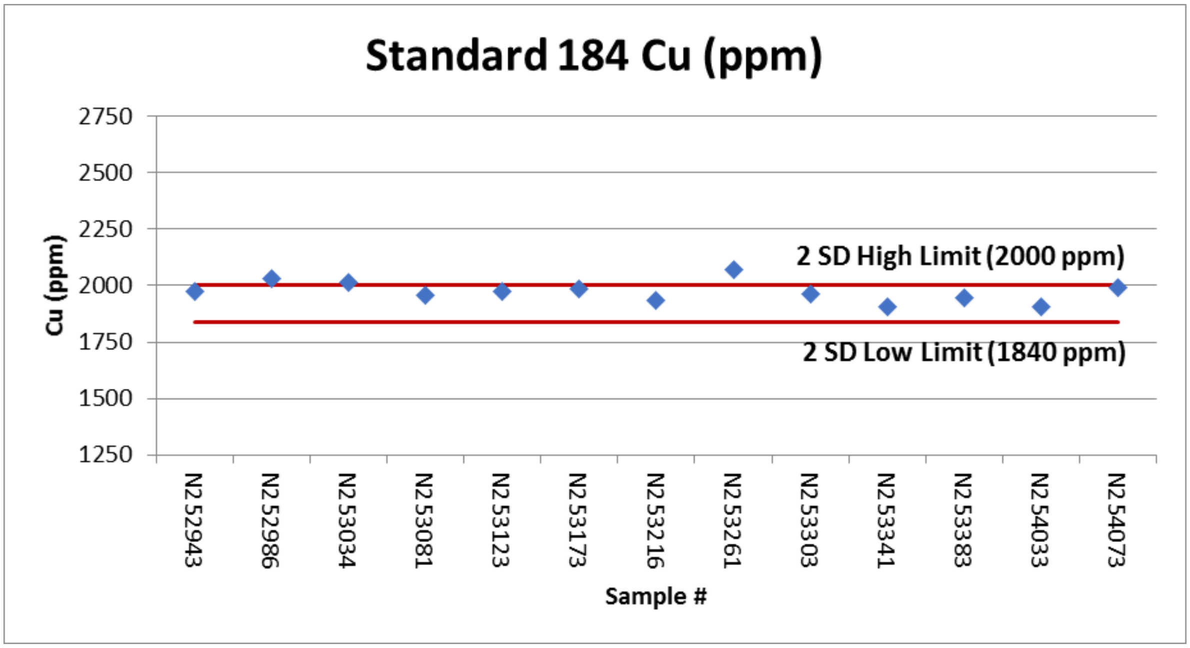


Figure 12-31: Standard CU 184 (Cu ppm)

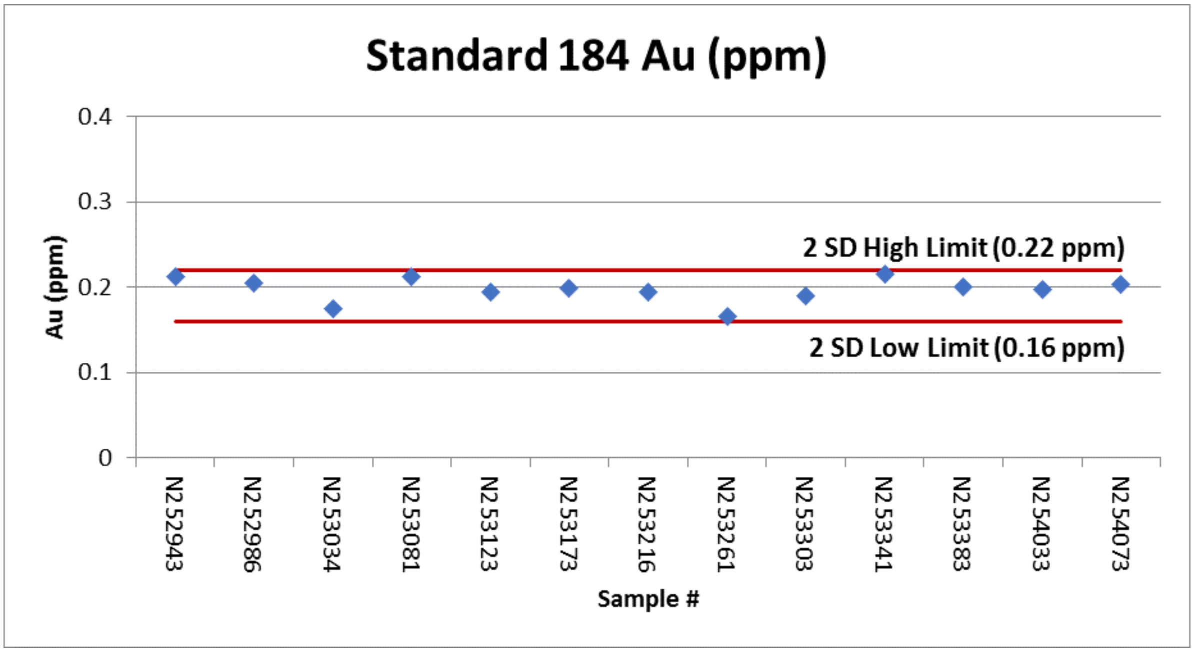


Figure 12-32: Standard CU 184 (Au ppm)

12.5 OPINION ON DATA ADEQUACY

The authors have no reason not to rely on the QA/QC procedures performed by NorthIsle. There were no limitations on, or failure to conduct, the data verification outlined above. In the opinion of the authors, the program of Quality Analysis/Quality Control employed by NorthIsle at the North Island Project is accepted industry practice and would produce analytical data of appropriate quality and reliability for the purposes of resource estimation.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 METALLURGICAL TESTING

Five metallurgical test programs have been conducted on zones of the North Island copper and gold project. These programs have documented sample locations from the Hushamu and Red Dog zones. Table 13-1 displays a summary of the test programs used for this assessment.

Table 13-1: Summary of Metallurgical Programs

Date	Title	Laboratory/ Project No.	Author	No. of Samples	No. of Tests
July 4, 1989	Metallurgical Investigation of Red Dog Property Progress Report	Bacon, Donaldson & Associates Ltd. M89-127	E. Henrioulle M.J.V.Beattie	6	9 – Rougher Flotation
Dec. 18, 2012	Pre-Feasibility Metallurgical Study of the Island Copper Deposit – prepared for Western Copper and Gold Corporation	ALS Metallurgy Kamloops KM3409	R. Sloan H. Johnston	2	2 – SMC, Bond Ball 10 – Rougher Flotation 12 – Cleaner Flotation 2 – LCT Flotation 1 – Leach Cyanide
May 24, 2013	Preliminary Assessment of the NorthIsle Copper and Gold Inc.	ALS Metallurgy Kamloops KM3695	T. Shouldice B. Angove	5	11 – Rougher Flotation
Mar. 2, 2016	Metallurgical Assessment of North Island Project – prepared for NorthIsle Copper and Gold Inc.	Base Metallurgical Laboratories Ltd. BL0059	T. Shouldice H. Coombs	2	6 – Rougher Flotation 9 – Cleaner Flotation 6 – LCT Flotation 1 – Cyanide Leach 2 – Bond Ball
Feb. 2, 2017	Preliminary Metallurgical Assessment of the Red Dog Project – prepared for NorthIsle Copper and Gold Inc.	Base Metallurgical Laboratories Ltd. BL0137	T. Shouldice B. Angove	1	1 – Bond Ball 6 – Rougher Flotation 3 – Batch Cleaner 3 – Cyanide Leach

Note: Abbreviation LCT- Locked cycle test.

The metallurgical testing has focused on a flotation process developed to recover and produce a copper concentrate with by-product credits of gold and molybdenum. Cyanide leaching of some flotation streams has been investigated to increase overall gold recoveries. The metallurgical studies were primarily conducted to develop a suitable process. Extensive variability or comminution studies have not been performed.

The largest metallurgical testing programs that have been performed on samples from the Hushamu zone include the ALS test program KM3409 and the BML test program BL0059. These programs culminated with locked cycle tests (LCT) to demonstrate concentrate grades and recoveries. The Red Dog zone testing was limited to rougher tests in the Bacon Donaldson work and rougher-cleaner tests in the BML 2017 program.

13.2 MINERALOGICAL DATA

Quantitative mineralogy was performed in several programs for the Hushamu zone. A single composite sample was analyzed for the Red Dog zone.

13.2.1 Hushamu Zone

The Hushamu Deposit includes two types of mineralizations based on geological classification described as Silica-Clay-Pyrite (SCP) and Chlorite-Magnetite Alteration (CMG). Sulphide values for the SCP mineralization ranged from 17 to 19 percent while the CMG mineralization ranges from 1 to 10 percent with an average of 7 percent. The primary sulphide mineral is pyrite and chalcopyrite is the primary copper mineral. There were trace levels of secondary enriched copper sulphides in some samples. On average, the ratio of pyrite to copper sulphides by mass was 8 to 1 based on a combination of both mineralization types.

Mineral liberation data for the Hushamu zone indicated that the copper sulphides were finely disseminated. For the SCP mineralization, copper sulphides were 31 percent liberated at a grind size of 146 µm K_{80}. Similarly, the copper sulphide liberation was 36 percent at a primary grind size of 113 µm K_{80} for the CMG mineralization. The analysis also showed that copper sulphides were interlocked primarily with non-sulphide gangue, but there was also significant interlocking with pyrite as well.

13.2.2 Red Dog

A single mineralogical analysis was performed on the Red Dog zone using a global composite. The sample had very similar sulphide mineral content to the CMG mineralization type when compared to the Hushamu zone. Pyrite was the most abundant sulphide mineral and copper occurred principally as chalcopyrite. The pyrite to chalcopyrite ratio for the sample was 7 to 1.

This data indicated more favourable copper sulphide liberation when compared to the Hushamu zone. At a grind size of 156µm K_{80}, copper sulphides were nearly 60 percent liberated. Better metallurgical performance would be expected from this zone if assessed by equal conditions as performed in BL0059.

13.3 ORE HARDNESS

For the Hushamu zone, comminution testing indicated the SCP sample was relatively soft, having a Bond ball mill Work Index of 13.0 kWh/tonne. The CMG zone was harder with a Bond ball mill Work Index of 16.1 kWh/tonne. Similarly, the Red Dog zone had a Bond ball mill Work Index of 15.8 kWh/tonne for the composite sample.

13.4 FLOTATION RESULTS

A summary of the flotation test results is displayed in Table 13-2. Shown in the table are the relevant flotation results by composite.

Table 13-2: Summary Flotation Test Data

Program	Deposit	Comp	Feed Grade Assays			PG	Con Grade			Recovery		
			Cu	Mo	Au	µm K80	Cu	Mo	Au	Cu	Mo	Au
Bacon, Donaldson M89-127	Red Dog	A	0.62	0.007	0.89	~75	4.28	0.035	-	89	47	19
		B	0.31	0.010	0.62	~75	1.22	0.024	-	92	78	-
		C	0.38	0.011	0.62	~75	1.70	0.037	-	95	69	55
		D	0.71	0.009	1.30	~75	2.13	0.024	-	94	82	-
		E	0.38	0.003	0.48	~75	2.58	0.025	-	93	67	-
		F	0.21	0.001	0.29	~75	1.16	0.008	-	86	41	52
ALS Metallurgy KM3409	Hushamu	SCP	0.24	0.012	0.33	111	29.0	0.210	11.9	76	11	25
		CMG	0.25	0.008	0.29	129	27.0	0.28	15.6	78	26	40
ALS Metallurgy KM3695	Hushamu	Hi08-03	0.49	0.011	0.61	113	1.96	0.050	2.31	79	70	70
		Leach Cap	0.04	0.018	0.28	109	0.38	0.060	1.19	71	21	33
		EC217	0.25	0.006	0.17	109	1.51	0.050	1.28	74	91	85
		EC216	0.37	0.006	0.54	111	2.33	0.050	1.88	67	69	44
		EC215	0.33	0.011	0.43	111	2.42	0.060	2.54	87	71	85
Base Met Labs BL0059	Hushamu	SCP	0.24	0.006	0.25	100	19.2	0.770	10.4	75	66	34
		CMG	0.30	0.014	0.34	100	21.7	0.410	13.8	78	55	44
Base Met Labs BL0137	Red Dog	MC1	0.32	0.007	0.54	100	24.2	-	14.3	86	-	33

Rougher flotation testing was performed to determine the initial flotation response for both zones. Figure 13-1 displays copper rougher metallurgical performance for all programs and all samples. All rougher tests are displayed with varying composites, grind sizes and chemical conditions.

The copper metallurgical performance, in general, was fairly consistent considering the diverse range in primary grind sizes tested, differing chemical conditions and varying feed grades of the samples. Copper recovery was between 70 and 95 percent, with the average result for Hushamu of 85 percent to a rougher concentrate having 19 percent mass recovery. The observed performance for the Red Dog zone was better, averaging 92 percent at a rougher mass recovery of 17 percent.

The primary grind size had an inversely proportional relationship with copper recovery. Large reductions in grind size were required to achieve small improvements in copper recovery.

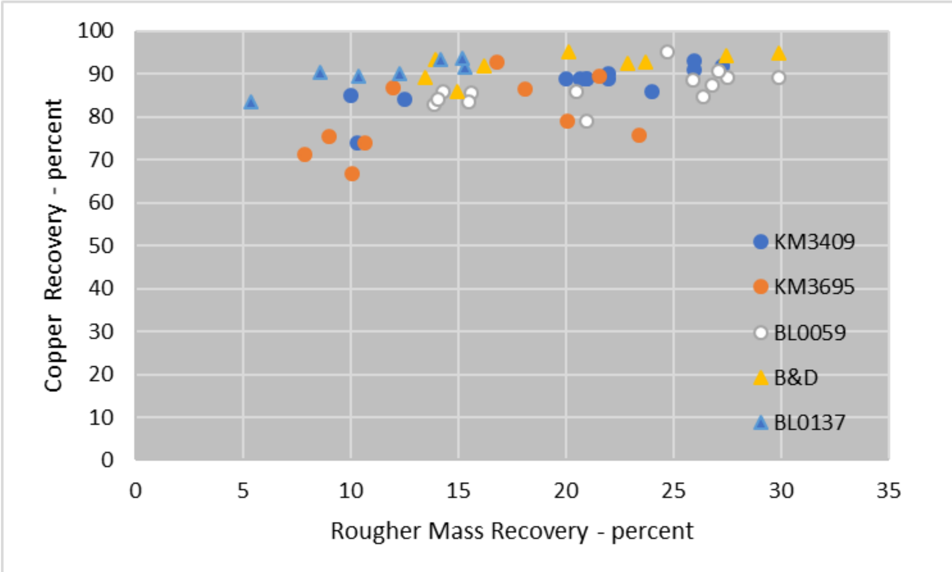


Figure 13-1: Copper Rougher Performance for all Composites and Test Conditions

Gold recovery to the rougher concentrate was sensitive to the mass recovery, with the best gold recoveries achieved at the highest mass recoveries. Testing on several individual samples indicated a strong relationship between sulphur and gold recovery to the rougher concentrate. Sulphur recovery was targeted to greater than 90 percent in order to achieve maximum recovery to the rougher concentrate. Figure 13-2 displays the gold recovery performance of the bulk rougher. Note that some programs had multiple tests on the same composite. BL0137 had only one composite, demonstrating the effect of mass recovery.

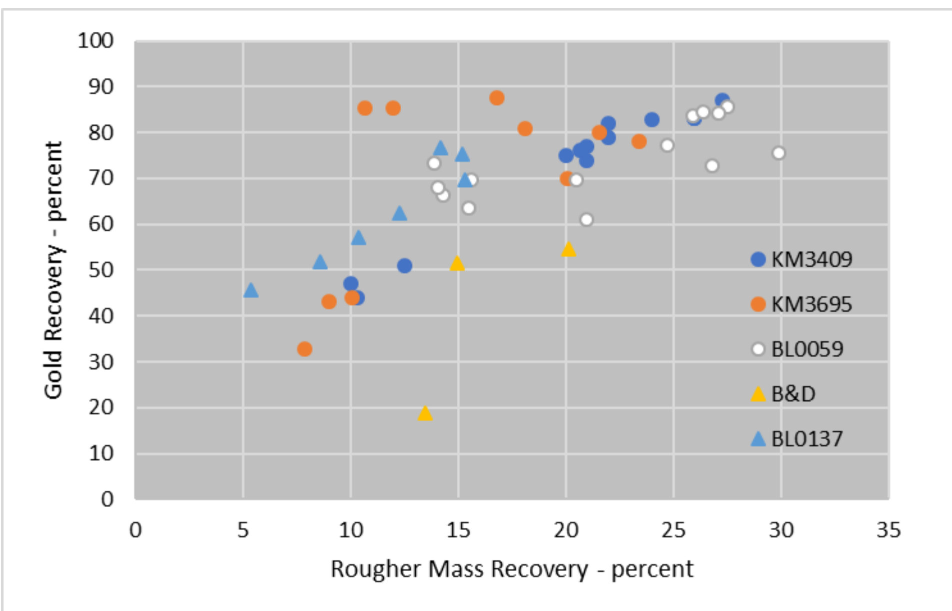


Figure 13-2: Gold Performance for all Composites and Test Conditions

The average Hushamu gold recovery to the rougher concentrate was 74 percent at a rougher mass recovery of 19 percent. The sulphur recovery to the same rougher concentrate was 92 percent. The Red Dog zone had recovered 56 percent of the gold from the feed to the rougher concentrate at a mass recovery of 16 percent.

Early batch cleaning testing had indicated that high grade copper concentrates could be produced at relatively high copper recovery, however, gold was not well recovered to this concentrate. To maximize gold recovery, metallurgical testing has investigated two process directions:

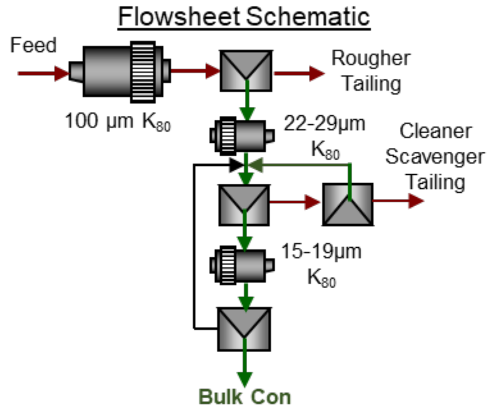
- Selective flotation of a copper-molybdenum-gold concentrate followed by the flotation of a gold bearing pyrite concentrate. Fine regrinding and cyanide leaching of the pyrite concentrate was investigated as means to extract the gold.

- Bulk flotation of copper sulphides, molybdenite, gold and pyrite subsequent fine regrinding and recovery of a copper-gold-molybdenum concentrate.

By either process, high sulphide recovery to rougher flotation concentrates could be achieved. Both process methods also demonstrated that marketable copper concentrates could be produced; however, gold recovery to the copper concentrate has not significantly improved. To achieve copper concentrates greater than 20 percent, the use of relatively high pH was need in the cleaner and regrinding circuits along with small dosages of cyanide to enhance the depression of pyrite. A summary of reagents and conditions is shown in Figure 13-3.

To enhance gold recovery, cyanide leaching of the pyrite concentrate (KM3409) and leaching of bulk cleaner tailings from the high pyrite SCP mineralization was investigated (BL0059). The leaching results were similar, less than 40 percent of the gold was extracted. Diagnostic leaching and mineralogy examination of the cleaner tailings stream indicated that gold was occurring as very tiny inclusions in both pyrite and non-sulphide gangue and would likely require more complicated processing methods to improve the gold extraction rates. This may include ultra fine grinding and leaching, pressure oxidation (POX) and cyanide leach or bio-oxidation and leaching.

At the current stage of development, bulk flotation with extensive regrinding provides the best metallurgical result. A schematic of the flowsheet along with conditions is displayed in Figure 13-3. Table 13-3 displays the expected metallurgical results with the current flowsheet. At the current stage of process development, no copper molybdenum separation testing was conducted.



Conditions Summary

Stage	pH	Reagent Addition - g/tonne			
		Lime	PAX	Fuel Oil	NaCN
Primary Grind	10.3-10.4	1000-1400	-	10	-
Roughers	10.5	√	13	-	-
Regrind 1	10.3-10.5	150-250	-	10	-
Cleaner 1	10.5	√	0.5	-	-
Cleaner Scav	10.5	√	5-7	-	-
Regrind 2	11.1-11.5	100-200	-	-	0-10
Cleaners 2/3	11.0-11.5	-	2	-	-

Note: In Test 21, Moly Flo was used instead of Fuel Oil.

Figure 13-3: Schematic of Flowsheet and Reagent Summary

Table 13-3: Expected Metallurgical Results Based on Samples and Testing to Date

	Deposit	Comp	Feed Grade Assays			PG µm K80	Con Grade g/t or %			Recovery - %		
			Cu	Mo	Au		Cu	Mo	Au	Cu	Mo	Au
Base Met Labs BL0059	Hushamu	SCP	0.24	0.006	0.25	100	19.2	0.770	10.4	75	66	34
		CMG	0.30	0.014	0.34	100	21.7	0.410	13.8	78	55	44
Base Met Labs BL0137	Red Dog	MC1	0.32	0.007	0.54	100	24.2	-	14.3	86	-	33

a) Gold assay values are shown in g/tonne, all other values are in percent
b) Hushamu data is based on locked cycle tests from BL059. Red Dog values are estimated from batch cleaner tests.

The cleaner test results for Red Dog are conservative. Comparing batch test results to locked cycle test results, copper and gold recovery would increase to the final concentrate due to the recycling of the cleaner tailings streams. Reviewing the batch cleaner data, copper and gold recoveries could increase by a maximum of 2 percent and 3 percent respectively.

13.5 MINOR ELEMENT ANALYSIS OF THE CONCENTRATE

A minor element analysis of the concentrate was performed in KM3409 on an SCP concentrate from locked cycle test 25. No similar test was done on the lower sulphide content CMG concentrate. The data from that report is reproduced below.

Table 13-4: Minor Elements – Test 25 from KM3409

Element	Symbol	Unit	Test 25 Bulk Con I-V	Element	Symbol	Unit	Test 25 Bulk Con I-V
Copper	Cu	%	28.3	Manganese	Mn	%	<0.01
Gold	Au	g/t	11.7	Molybdenum	Mo	%	0.3
Silver	Ag	g/t	22	Mercury	Hg	g/t	<1
Iron	Fe	%	27.4	Nickel	Ni	g/t	60
Antimony	Sb	%	0.01	Palladium	Pd	g/t	0.04
Arsenic	As	g/t	2626	Phosphorus	P	g/t	<20
Bismuth	Bi	g/t	221	Platinum	Pt	g/t	0.05
Cadmium	Cd	g/t	20	Rhenium	Re	g/t	24.2
Calcium	Ca	%	0.14	Selenium	Se	g/t	247
Carbon	C	%	0.13	Silicon	Si	%	1.1
Cobalt	Co	g/t	61	Silver	Ag	g/t	21
Fluorine	Fe	g/t	163	Sulphur	S	%	39.5
Lead	Pb	g/t	314	Zinc	Zn	g/t	1488
Magnesium	Mg	%	0.02				

The concentrate was relatively low in deleterious elements. There were some elements that may attract some smelter penalties, specifically: arsenic, bismuth, selenium, and fluorine. Levels of these should be monitored in future test programs.

14 HUSHAMU MINERAL RESOURCE ESTIMATE

In 2013, NorthIsle, retained Burt Consulting Services to provide an internal audit of a 2012 resource estimate (Giroux Consultants Ltd.) as well as examine and comment on the general characteristics of the drilling and geological modeling of the Hushamu deposit. Several recommendations were provided following the audit. These included re-modeling the geological domains and more definition drilling to upgrade the resource classification to "Indicated" from "Inferred."

Following the drilling of seven additional holes and a re-defining of the alteration zones, Burt Consulting Services was again retained in 2015 to re-model the domains and to provide an updated resource estimate to form the basis of a PEA report.

The Red Dog resource was the subject of an earlier published 43-101 Technical Report by Game and Burt, March 2017 and is provided at the end of this section.

14.1 DRILL HOLES

Drill collar, downhole surveys, lithological data and assay results were provided by NorthIsle. This information was originally obtained from several previous operator's drill logs and was verified by Giroux Consultants Ltd. in 2012.

Table 14-1: DDH Program Summaries

Company	Years Drilled	Number of holes	Total Length (m)	Number of samples	Total Sample Length (m)	Percent Sampled
Utah Mines	1968-1985	69	10,816	3,354	9,020	83
Moraga	1992-1982	45	13,180	4,448	12,751	97
Lumina	1994-2005	11	2,450	736	2,157	88
IMA	2008	2	513	250	498	97
NorthIsle	2012-2014	25	7,276	2734	6,948	95
TOTAL		152	34,235	11,522	31,374	Avg. 92

Of the 152 drill holes drilled in the area, only 143 were used in the estimation. The other nine were outside of the block model area.

Collar elevations that were provided by NorthIsle were based on a seemingly smoothed survey performed in 2005. A more detailed orthophotogrammic analysis was completed by Eagle Mapping Ltd. in 2011 from aerial photography flown in 1996. All drill collars elevations were recalculated to fit the 2011 DEM surface.

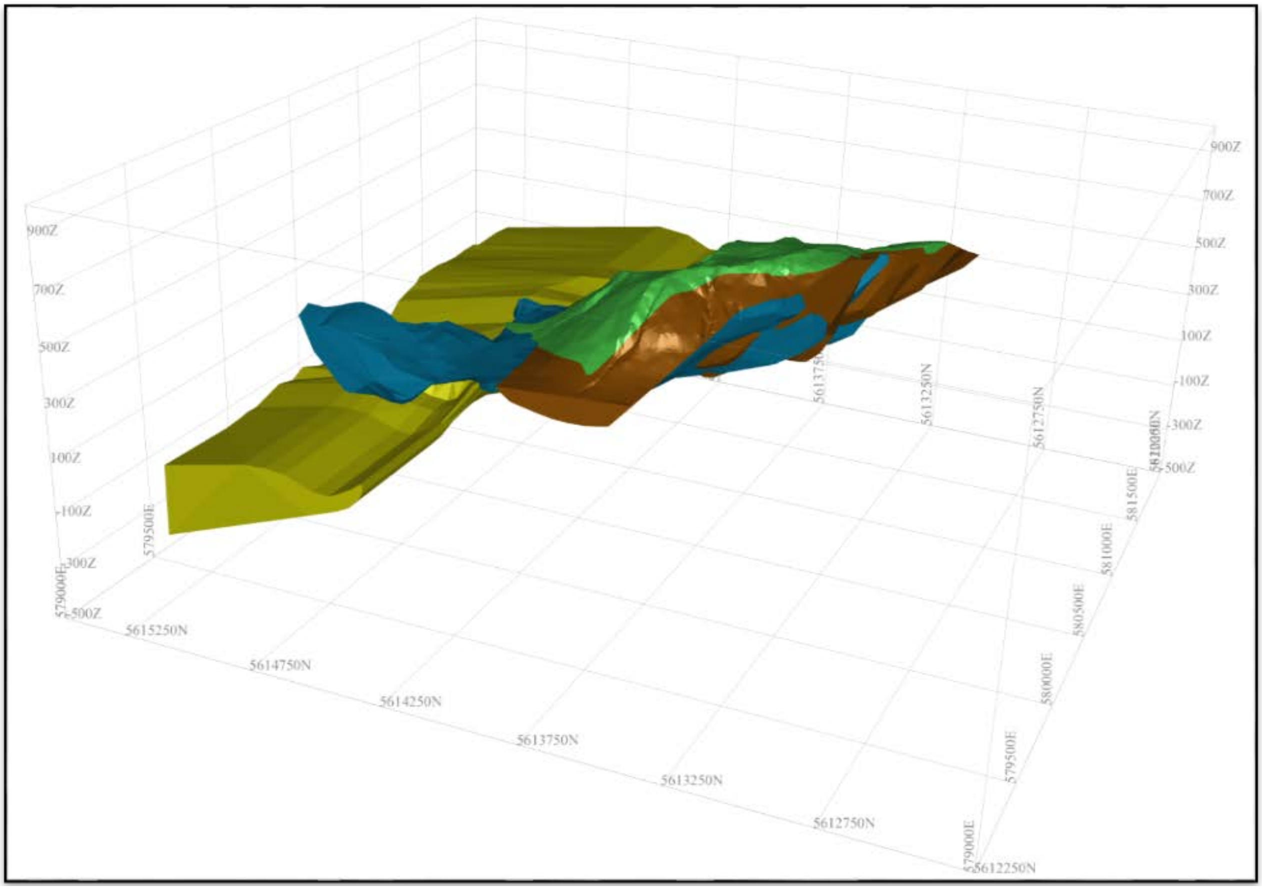
14.2 GEOLOGICAL MODELING

The drill hole data supplied by NorthIsle included alteration intervals. These had been modeled in the past but additional drilling and a re-examination by NorthIsle geologists rendered the older model obsolete. The geological domains were subsequently re-modeled by snapping the alteration boundaries to drill hole intercepts. A combination of geology and alteration delineated several domains:

- Overburden - Including drill hole casing
- LEA - Leached Silica-Clay overprint
- QFPP - Quartz Feldspar Porphyry intrusive
- SCP - Silica-Clay-Pyrite
- CMG - Chlorite-Magnetite
- PRO - Propyllitic

- HFLS - Hornfels
- POT – Potassic

The overburden, LEA, QFPP, SCP and CMG zones were each modeled in 3D, the other alteration packages, outside of the modeled zones were considered to be within the PRO alteration domain.



Note: Yellow=QFPP, green=LEA, blue=CMG, brown=SCP. Horizontal grid is 500m, vertical grid is 100m.

Figure 14-1: Oblique Image of the Solids Looking NE

The south fault was also modeled which constrained the estimate in that direction. The surface limits of a previously determined Whittle Pit was used to further constrain the PRO alteration package.

14.3 ASSAYS AND DATA ANALYSIS

Prior to the block model estimation, drill holes that were either within or passed through the block model limits were tagged to be used in the estimate. This precluded nine of the 152 drill holes. The assay data was constrained to the block model limits within the modelled domains and then examined by statistical analysis, histograms, cumulative frequency and log-probability plots. The grade distribution for each zone was examined to determine if any grade capping was required to limit the effects of high grade outliers. Table 14-2 provides a listing of the normal statistics for each lithological domain and Figure 14-2 through Figure 14-3 are box and whisker plots of the statistical data.

Table 14-2: Normal Statistics by Zone

Domain	Element	Number	Minimum	Maximum	Mean	Standard Deviation	Variance	Coef. of Variation
All	Cu (%)	10611	0.001	1.90	0.12	0.145	0.021	1.204
	Au (ppm)	10290	0.001	2.500	0.159	0.200	0.040	1.264
	Mo (%)	9467	0.001	0.120	0.007	0.008	0.0006	1.075
	Re (ppm)	8715	0.001	22.5	0.371	0.580	0.336	1.260
LEA	Cu (%)	1709	0.001	1.00	0.032	0.013	0.004	1.951
	Au (ppm)	1690	0.003	1.280	0.116	0.130	0.017	1.119
	Mo (%)	1638	0.001	0.091	0.007	0.008	0.0005	0.808
	Re (ppm)	1496	0.001	7.62	0.452	0.624	00.389	1.380
CMG	Cu (%)	2534	0.002	1.48	0.24	0.15	0.022	0.617
	Au (ppm)	2370	0.003	1.640	0.276	0.229	0.052	0.827
	Mo (%)	2362	0.001	0.078	0.006	0.005	0.00002	0.889
	Re (ppm)	1833	0.002	4.10	0.312	0.364	0.133	1.164
SCP	Cu (%)	3026	0.001	1.90	0.128	0.152	0.023	1.183
	Au (ppm)	3010	0.001	2.40	0.21	0.137	0.219	1.044
	Mo (%)	2888	0.001	0.12	0.011	0.010	0.00009	0.877
	Re (ppm)	2702	0.001	10.2	0.631	0.631	0.398	0.999
PRO	Cu (%)	2773	0.001	1.21	0.07	0.100	0.010	1.399
	Au (ppm)	2694	0.001	2.500	0.048	0.110	0.012	2.263
	Mo (%)	2037	0.001	0.052	0.003	0.004	0.00001	1.255
	Re (ppm)	2246	0.001	2.040	0.084	0.160	0.026	1.889
QFP	Cu (%)	415	0.001	0.249	0.04	0.04	0.0018	1.009
	Au (ppm)	374	0.003	0.342	0.022	0.040	0.002	1.805
	Mo (%)	395	0.001	0.017	0.002	0.002	0.000005	1.05
	Re (ppm)	288	0.002	0.583	0.051	0.089	0.008	1.731

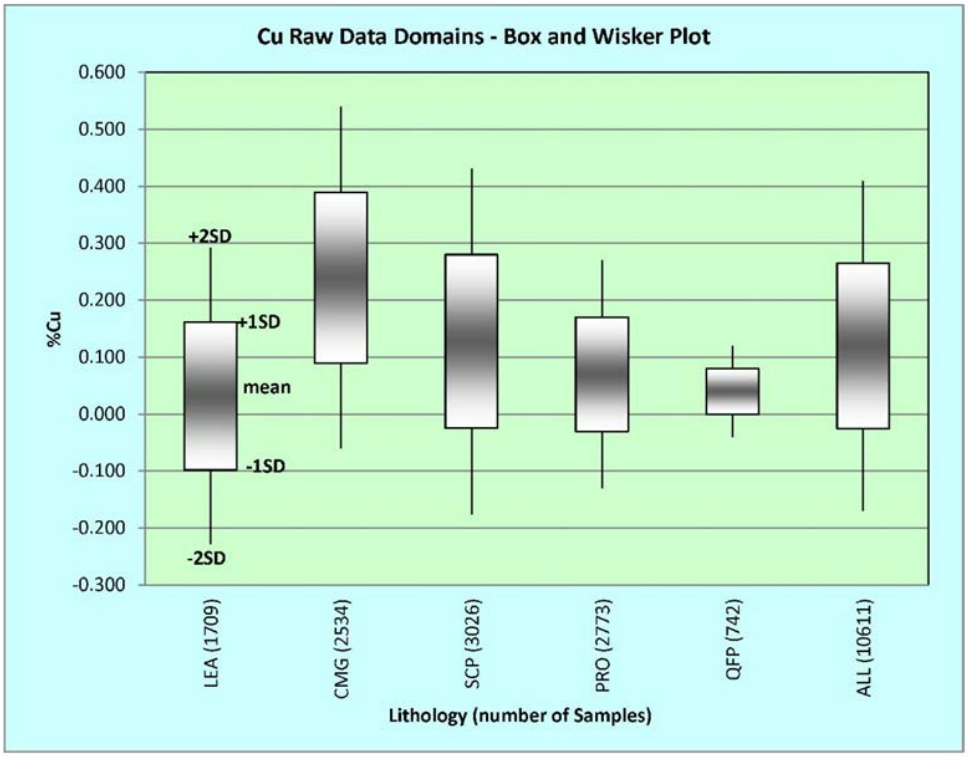


Figure 14-2: Cu Box Whisker Plot of Normal Statistics by Domain

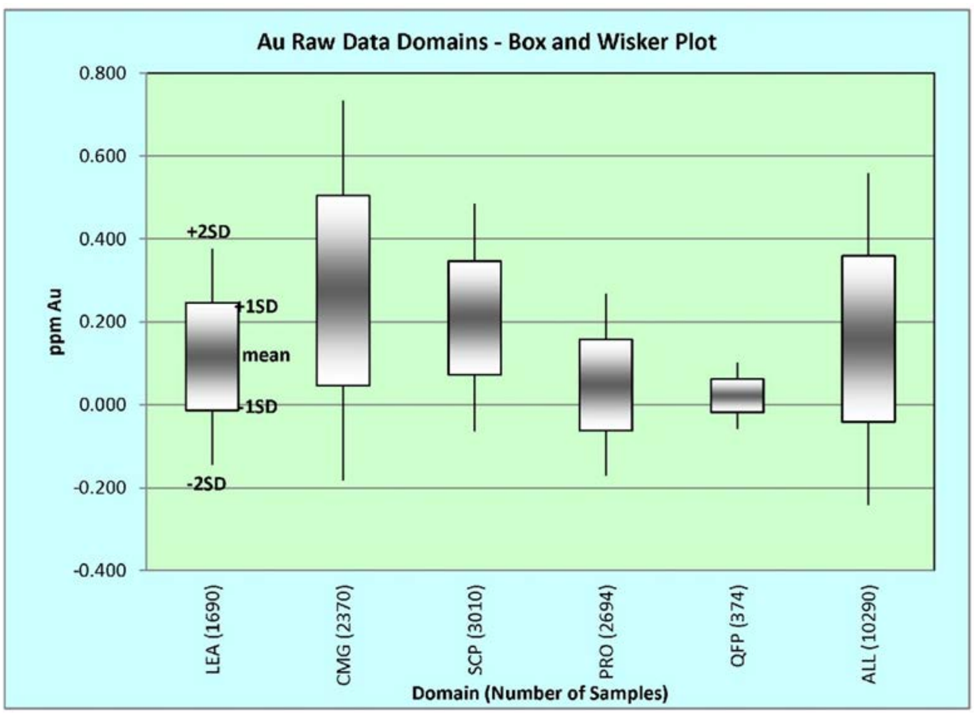


Figure 14-3: Au Box and Whisker Plot of Normal Statistics by Domain

In most domains, all four elements exhibit log-probability plots (Figure 14-4 through Figure 14-7) that are consistent with a single log-normal population with the below detection limit data missing (hence the tail-off at the lower values). In some cases, another higher value population is also indicated. Mo and Re both have higher values in the LEA and SCP domains whereas Cu and Au are highest in the CMG and SCP domains. This can also be observed in correlation coefficient tables.

High capping of each element was based on three to four standard deviations as seen in the plots and checked against cumulative frequency diagrams. Previous resource estimates also capped the high values and are consistent with these results. Table 14-3 lists the capping used for each domain.

Table 14-3: High Cutting by Zone

Domain	Element	Cap Value	Number Affected
LEA	Cu (%)	0.63	2
	Au (ppm)	1.30	0
	Mo (%)	0.07	4
	Re (ppm)	7.00	1
CMG	Cu (%)	1.05	2
	Au (ppm)	1.60	1
	Mo (%)	0.13	0
	Re (ppm)	7.0	0
SCP	Cu (%)	1.10	2
	Au (ppm)	1.75	6
	Mo (%)	0.11	1
	Re (ppm)	7.0	1
PRO	Cu (%)	1.05	1
	Au (ppm)	1.60	1
	Mo (%)	0.13	0
	Re (ppm)	7.0	0
QFP	Cu (%)	0.63	0
	Au (ppm)	1.30	0
	Mo (%)	0.07	0
	Re (ppm)	7.0	0

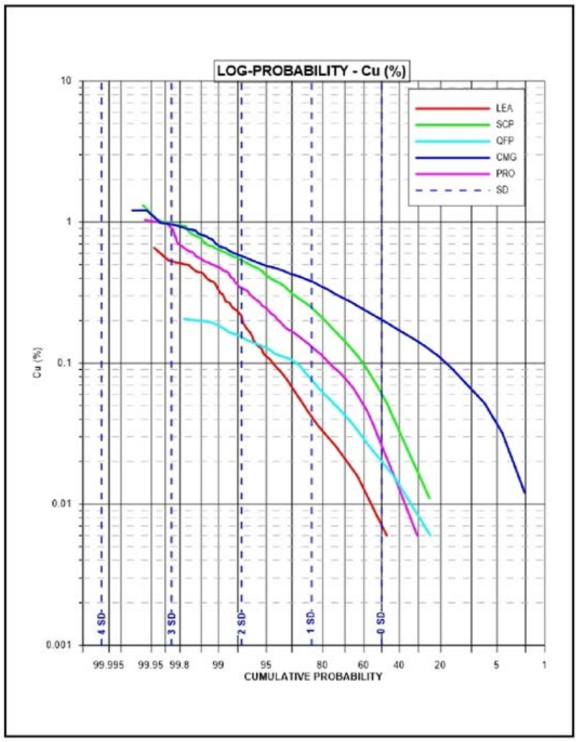


Figure 14-4: Cu Log-Probability Plot by Domain

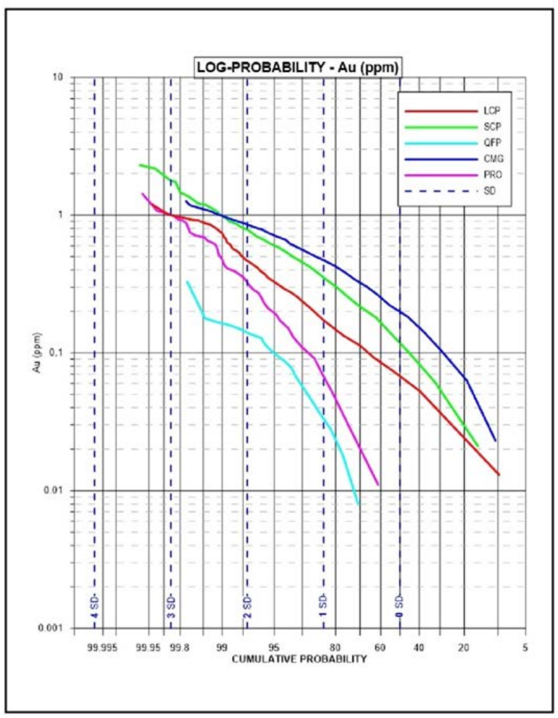


Figure 14-5: Au Log-Probability Plot by Domain

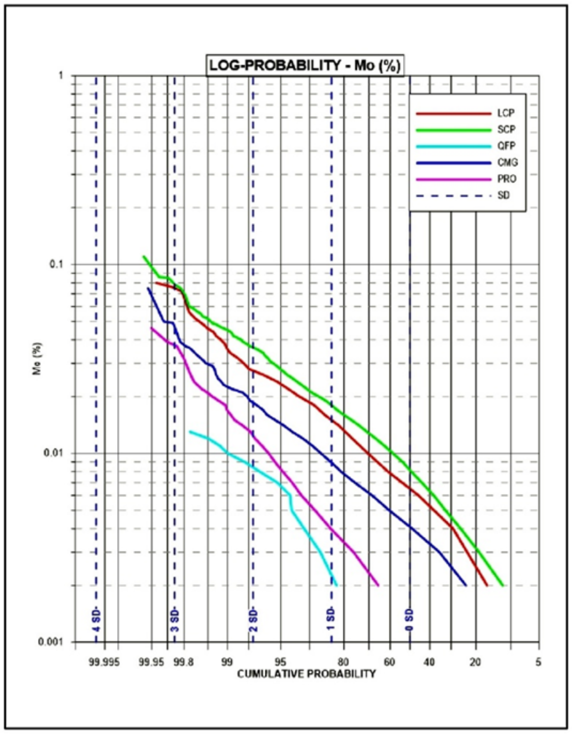


Figure 14-6: Mo Log-Probability Plot by Domain

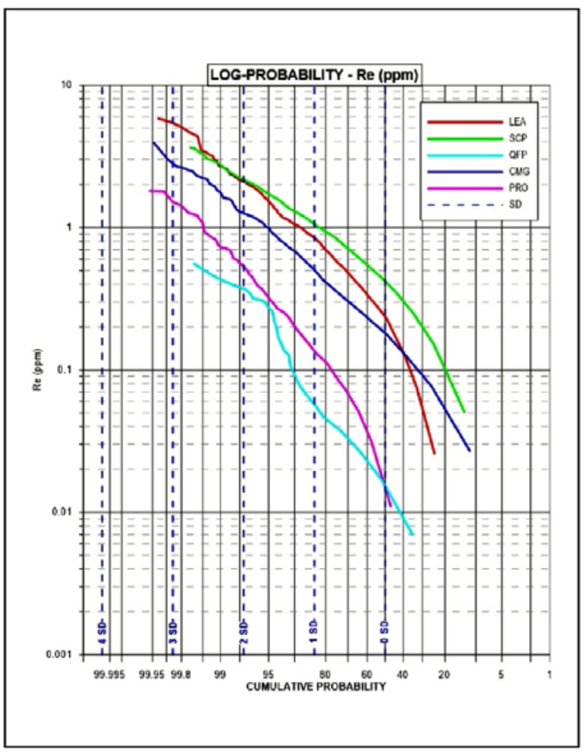


Figure 14-7: Re Log-Probability Plot by Domain

Raw assays to be used in the block estimation were composited down hole into equal 5 metre intervals using the cut data. Intervals that were not assayed for gold, molybdenum or rhenium were given a value of zero.

A statistical analysis of the resulting composites was carried out to compare with the raw data to ensure that the compositing process kept the integrity of the original data. Table 14-4 lists the summary statistics for the composited assays.

Table 14-4: Composited Data - Summary Statistics

Statistic	Cu	Au	Mo	Re
Number of samples	6499	6499	6499	6499
Minimum value	0	0	0	0
Maximum value	1.03	1.536	0.0826	4.805
Mean	0.11	0.137	0.006	0.274
Median	0.06	0.071	0.004	0.090
Variance	0.017	0.031	0.00005	0.190
Standard Deviation	0.130	0.177	0.0070	0.436
Coefficient of Variation	1.184	1.288	1.192	1.593

Comparing the composited data to the raw data statistics indicates that in all cases the compositing smoothed the data where the maximum, mean and standard deviations were reduced. This is an expected effect of the compositing process. Figure 14-8 and Figure 14-9 provide a simple visual comparison of the two data sets using log-copper histograms. The similarities in the histogram shapes suggest that the two data sets are consistent and the composited data is acceptable for use in the block model estimation.

The histograms exhibit two log-normal populations; one with an approximate mean of 0.18% Cu and the other having a mean of approximately 0.01 % Cu. This likely reflects the lithological domains where CMG and SCP make up the higher population and LEA, PRO and QFP make up the lower.

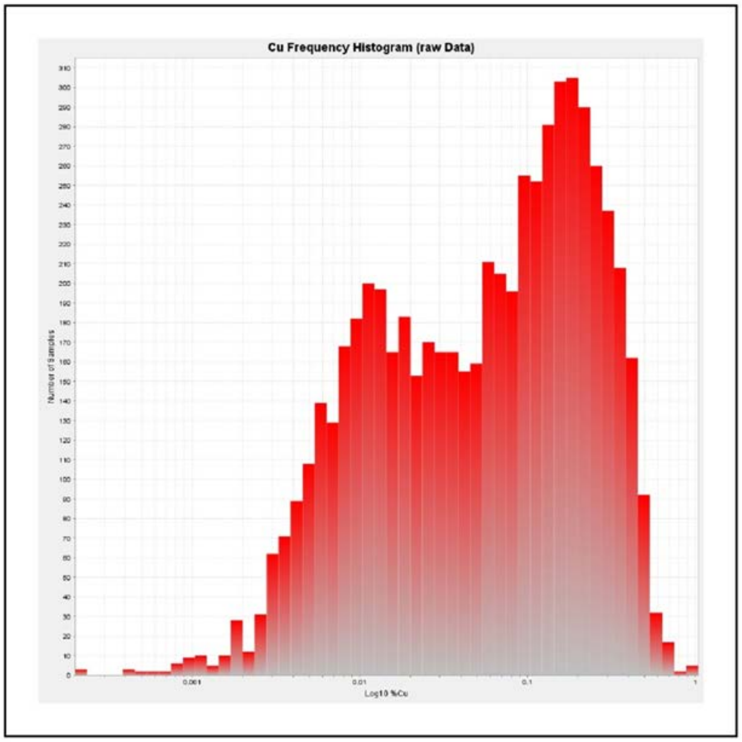


Figure 14-8: Histogram of Log Cu – Raw Data

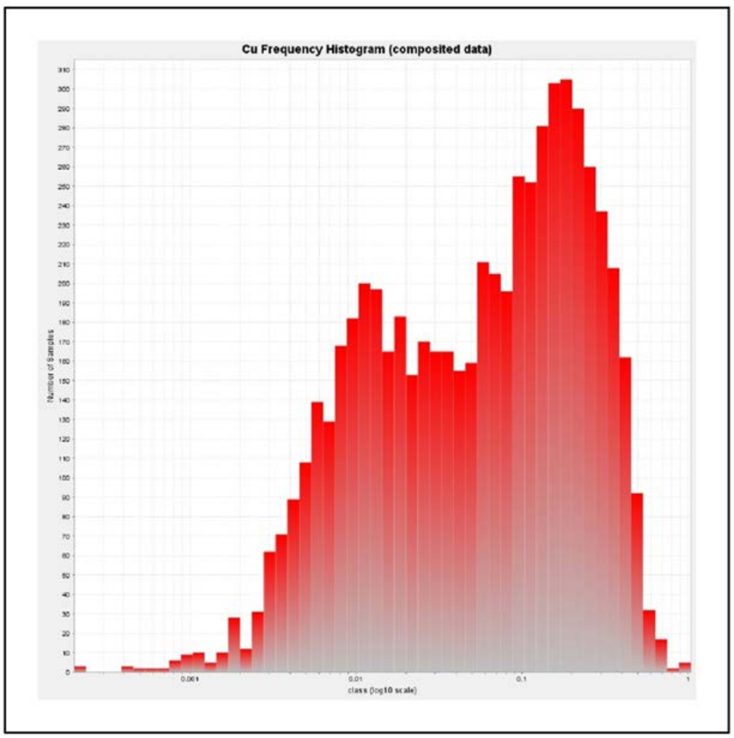


Figure 14-9: Histogram of Log Cu – Composited Data

Examination of the raw and composited assays in the 3D environment suggests that the majority of the copper mineralized material lies within the CMG and SCP domains which is also reflected in the high mean values seen in the statistical analysis.

These two domains are nearly flat-lying longitudinally and in cross section, CMG is essentially flat and the eastern half of the SCP has a variable dip to the northeast. Figure 14-10 through Figure 14-12 provide a visual of the greater than 0.15% Cu assays in longitudinal and cross sections with approximate copper trends.

In keeping with an open pit mining method and the fact that the greatest part of the copper mineralization is within the western part of the deposit, the search ellipses were kept horizontal.

The block model was designed to encompass all of the drill holes then constrained to a volume that would cover a historical pit provided by NorthIsle staff. Table 14-5 provides a listing of the block model parameters and Figure 14-13 is an isometric view of the constrained block model.

Table 14-5: Block Model Parameters

Parameter	X	Y	Z
Minimum (m)	579,300	5,612,900	-50
Maximum (m)	581,800	5,651,200	715
Length (m)	2,500	2,300	765
Block Size (m)	20	20	15
Direction	090°	000°	-90
Sub-blocks (m)	5	5	3.75
Number of Full Blocks	115	125	51
Total Number of Full Blocks	1,902,950		

Sub-blocking to one quarter of the maximum block size was used to minimize any domain boundary errors.

The drill spacing is an average of 100 metres east-west and 200 metres north-south with some in-fill holes at 50-metre spacing. Geological continuity has been well established from diamond drilling and geological mapping across the entire deposit for approximately 1,400 metres towards 330°, 600 metres towards 060° and 125 metres vertically.

Pairwise relative semivariograms were constructed for copper within the CMG domain. The main axis of anisotropy from the models was at an azimuth of 150° a 0° dip at a lag of 72 metres and a range of 160 metres. This is in keeping with the average drill and sample spacing. The search ellipsoids used for estimating blocks was a combination of the variogram results and historical analysis of the same data. An inverse distance squared (1/D2) algorithm was used for the estimation rather than Kriging.

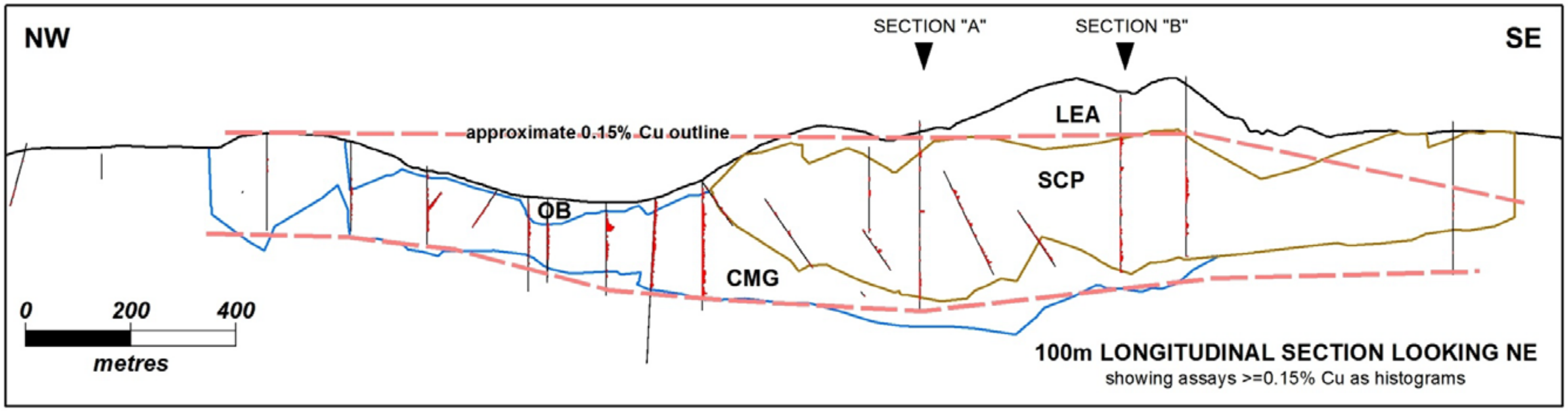


Figure 14-10: Longitudinal Section Showing Copper Trends

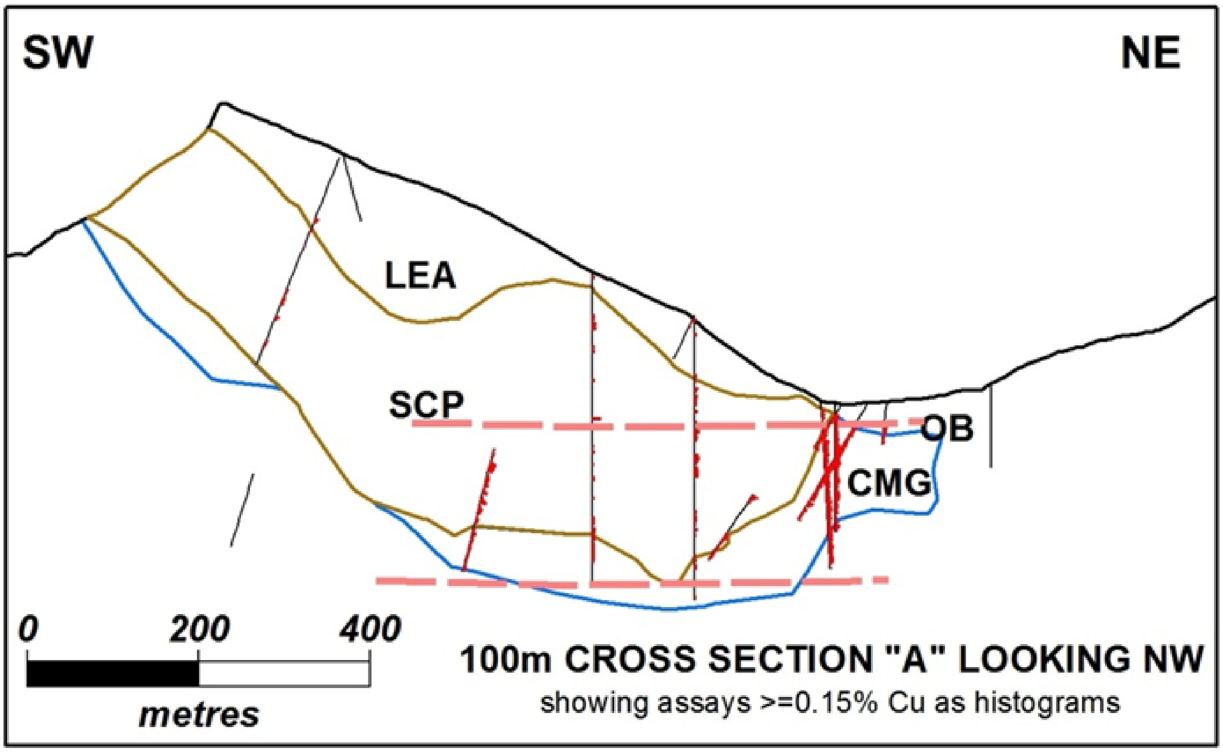


Figure 14-11: Cross Section “A” Showing Horizontal Copper Trend

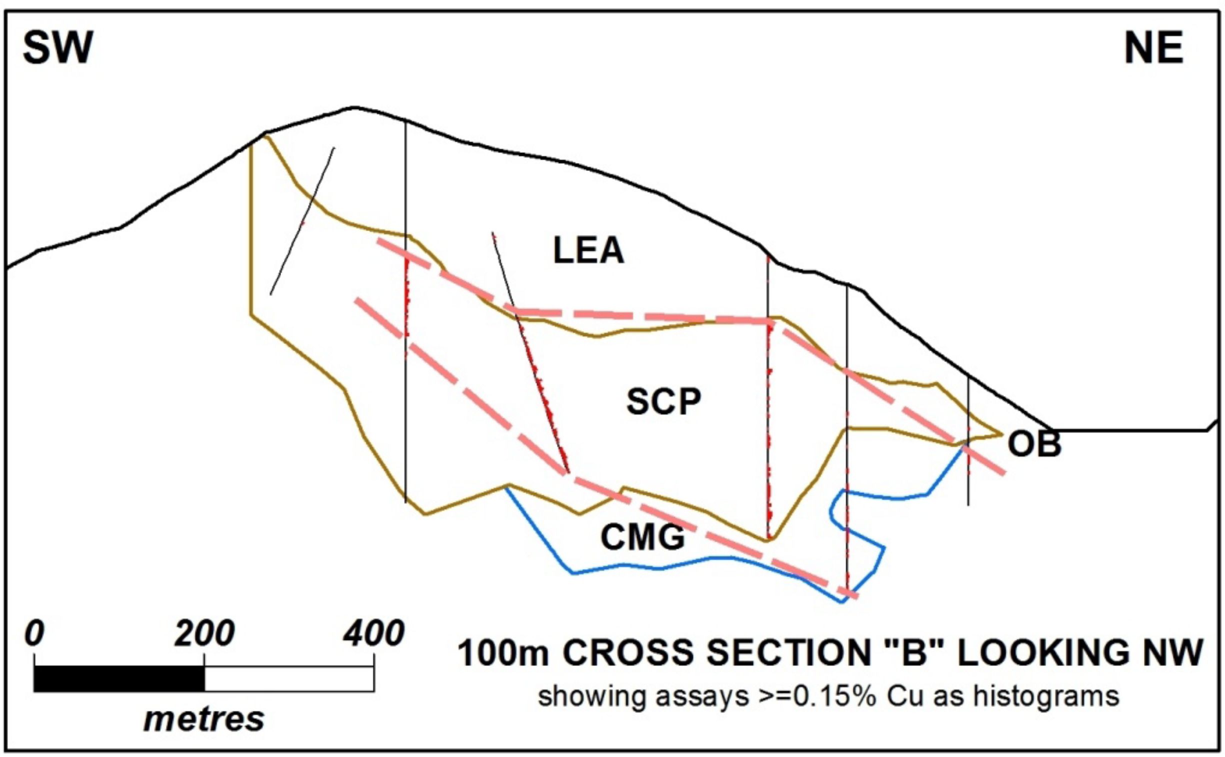


Figure 14-12: Cross Section “B” Showing Dipping Copper Trend

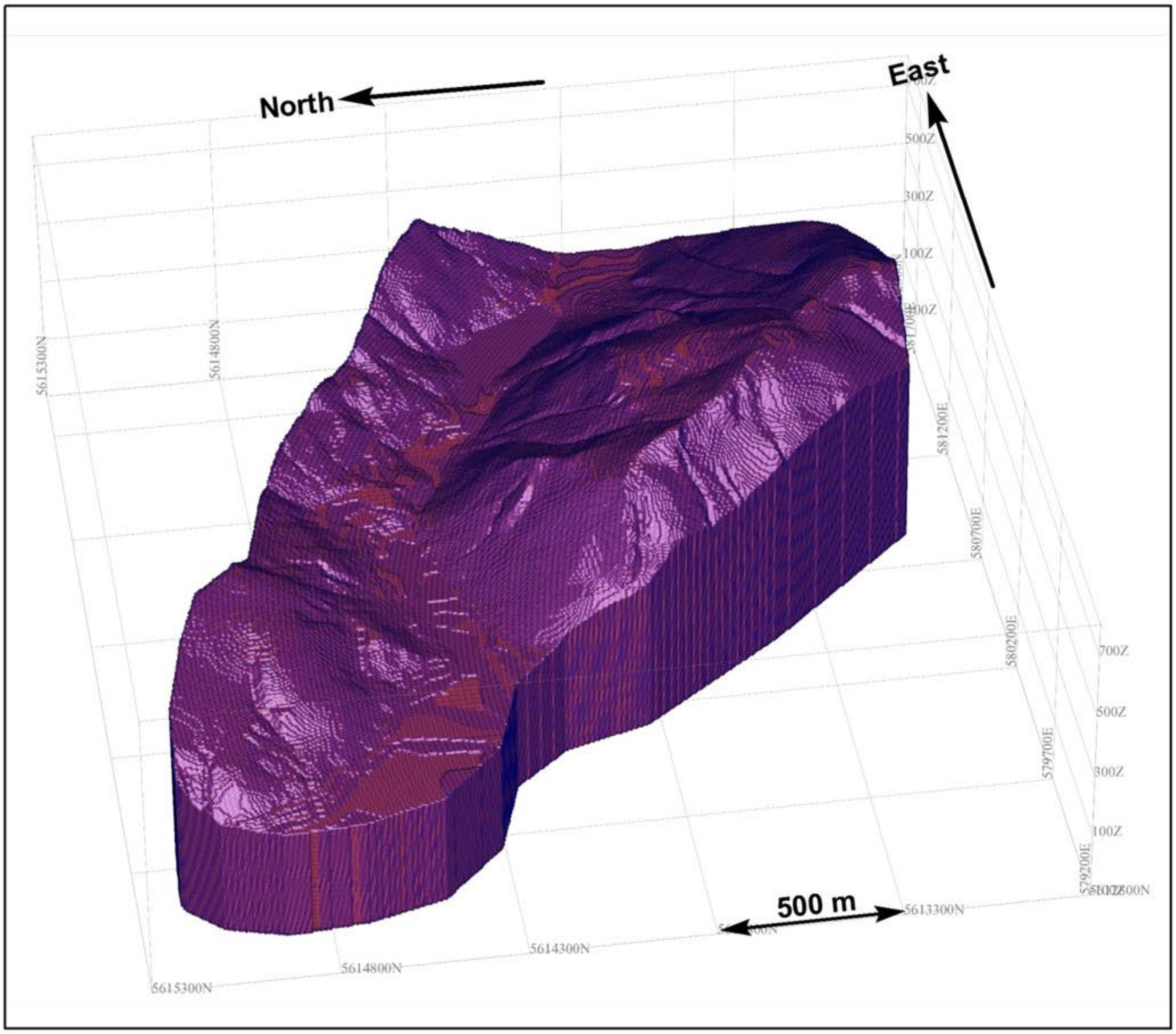


Figure 14-13: Block Model Isometric View Looking East (above surface blocks removed)

Two search ellipsoids were used to select composited assay points to estimate each block. The "Indicated Resource" blocks were estimated by a smaller volume ellipsoid and the "Inferred Resource." The parameters are found as Table 14-6. While the search parameters were kept the same for each geological zone, the LEA and QFP domains were estimated separately from the others so that the assays from neighbouring domains did not affect the estimate. The SCP, CMG and PRO domains with similar statistics were estimated as one.

Table 14-6: Estimation Search Parameters

Parameter	Indicated Resource	Inferred Resource
Major Axis Length / Direction/ Dip	150m / 330°/ 0°	400m / 330°/0°
Semi-Major Axis Length / Direction	75m / 060°/ 0°	200m / 060°/0°
Minor Axis Length / Direction/ Dip	60m / 000°/ -90°	160m / 000°/ -90°
Maximum Number of Samples Reporting	16	16
Minimum Number of Samples Reporting	4	4
Maximum Number of Samples per Hole	3	4
Search Algorithm	$1/D^2$	$1/D^2$

Six hundred and eighty-nine specific gravity measurements were taken from various rock and alteration types during the 2012 and 2014 drilling campaigns. The results are in Table 14-7. Since the CMG, SCP and PRO domains were amalgamated, the weighted averages of these were used for tonnage calculations. As the overburden was also modelled, an arbitrary low value was attached to this unit.

Table 14-7: Specific Gravity by Rock Type

Rock	Number	Mean	Max	Min	SD
ARG	3	2.62	2.73	2.53	0.10
CMG	68	2.77	3.20	2.09	0.16
HFL	81	2.67	3.06	2.39	0.12
LEA	98	2.61	2.91	2.27	0.13
PHY	38	2.75	2.98	2.57	0.10
POT	28	2.72	2.98	2.49	0.11
PRO	131	2.77	3.97	2.15	0.16
SCP	149	2.74	3.44	1.76	0.18
QFP	89	2.60	2.86	2.44	0.08
Final Specific Gravities for Tonnage Determination					
OVER		2.00			
QFPP		2.60			
LEA		2.61			
CMG/SCP/PRO		2.71			

For each domain two block estimation passes were carried out, one at the 150-metre search radius and one at the 400-metre radius. Upon completion of the estimation runs, the block model was visually examined in plan and section to verify that the block model results were consistent with the raw data. Figure 14-14 and Figure 14-15 provide examples in cross-section of the block estimation with the raw copper data. Simple statistics were also calculated for the composited input data and the final block copper results. Table 14-8 is a comparison of the three data sets for the CMG-SCP-PRO domain.

Table 14-8: Copper Statistics for Raw, Composited and Block Model Data - CMG-SCP-PRO Domain

Statistic	Raw data	Down Hole Composites	Block Model
Number of samples	8,337	4,811	165,681
Minimum value (%Cu)	0	0.0001	0.0005
Maximum value (%Cu)	1.90	1.03	0.66
Mean (%Cu)	0.14	0.14	0.09
Median (%Cu)	0.10	0.10	0.07
Variance	0.02	0.019	0.006
Standard Deviation (%Cu)	0.15	0.14	0.078
Coefficient of Variation	1.06	0.98	0.894

As expected, since the compositing and block estimation are averaging processes, all statistical parameters were reduced.

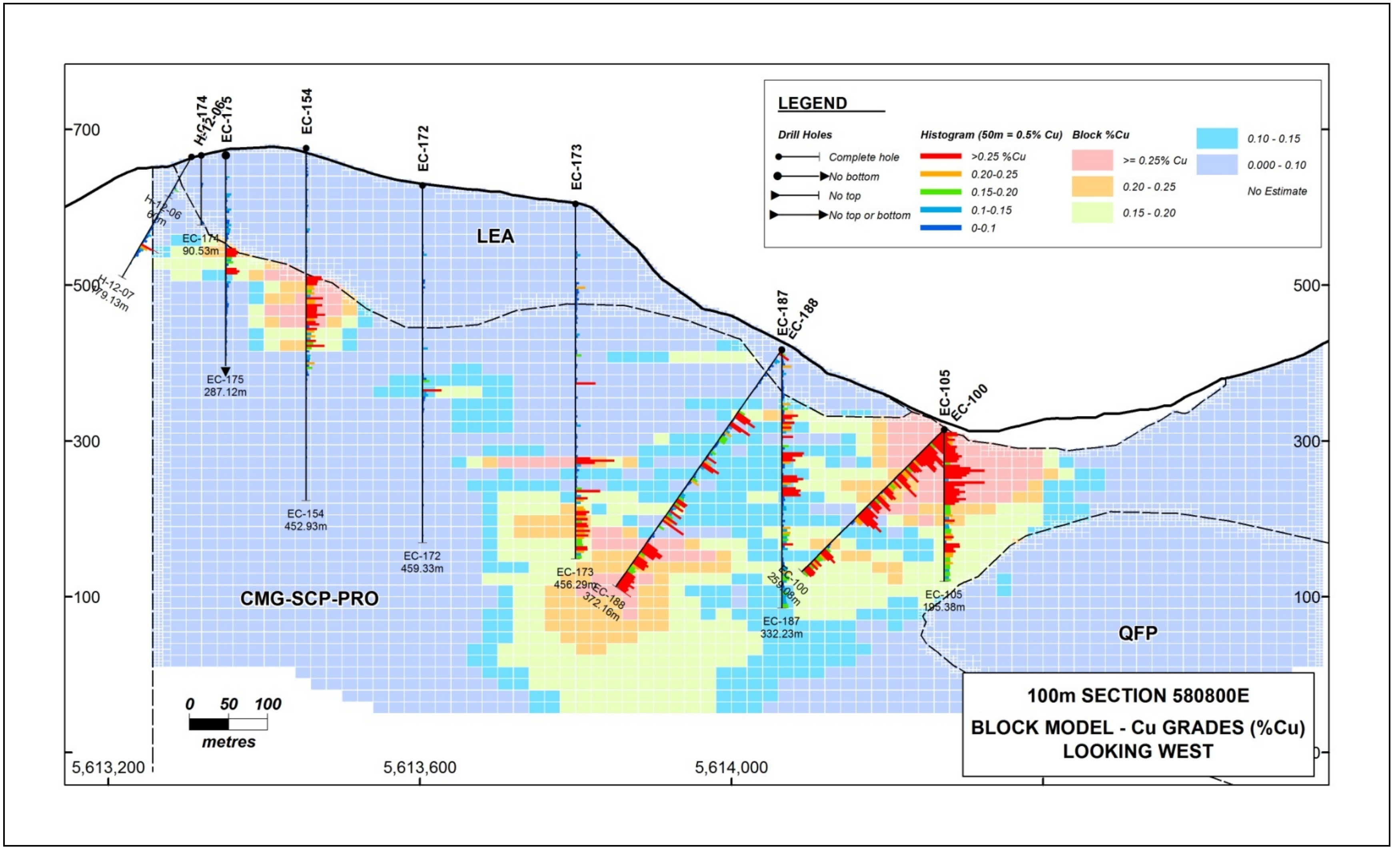


Figure 14-14: Section 580,800E, Blocks Coloured by Grade Estimates

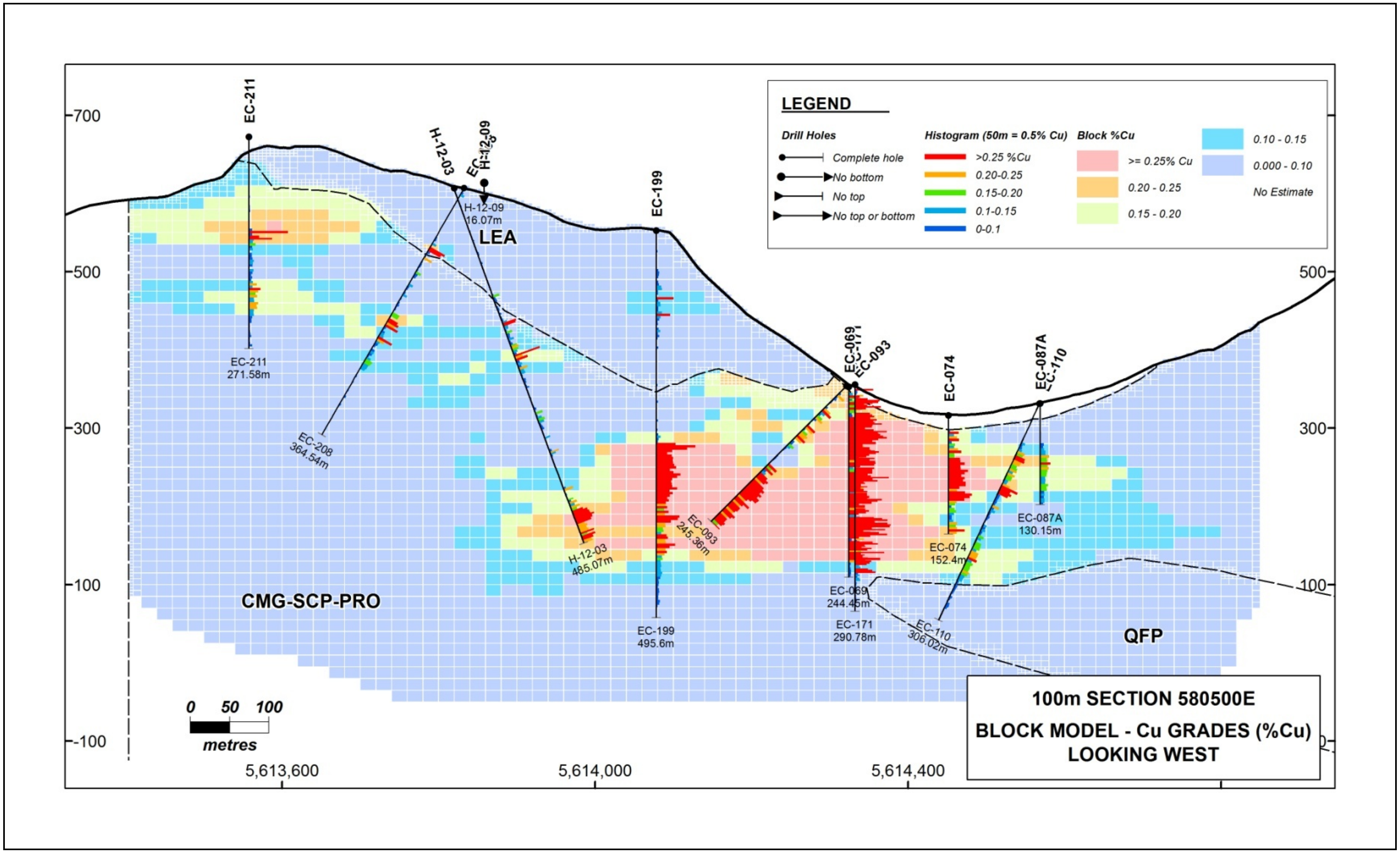


Figure 14-15: Section 580,500E, Blocks Coloured by Grade Estimates

14.4 RESOURCE ESTIMATE

Block counting and was performed for blocks within each geological zone north of the South Fault and above -50 metre elevation. The 150-metre search radius with a minimum of two drill holes reporting to each block was considered to be an Indicated Resource as per the 2014 CIM Resource Standards. An Inferred Resource was considered to be those blocks not in the Indicated category, within a 400-metre search ellipsoid and a minimum of one hole reporting.

During the reporting procedure, each block volume was multiplied by its partial percentage for that domain where a multiplier of 1 means the entire block is within the domain and a multiplier of 0.7 means that 70% of the block is in that zone. This adjusted for the domain and block model edges.

Inferred Resource blocks identify those areas that are currently under-drilled but contain values greater than 0.10% Cu. In-fill drilling to 100-metre spacing should upgrade most of these to an Indicated category.

For each geological domain, the model was queried using several grade cut-offs. The estimation for Indicated Resources can be found as Table 14-9. Results for Inferred Resources are as shown in Table 14-10. Overburden was not included in the final estimation.

Table 14-9: Hushamu Resource Estimate - Indicated Resource

LEA					
Cut-off (g/t Cu)	Tonnes[1]	%Cu	ppm Au	%Mo	%Re
0.10	4,917,000	0.14	0.20	0.008	0.43
0.15	1,138,000	0.19	0.29	0.010	0.54
0.20	330,000	0.24	0.44	0.010	0.55
0.25	126,000	0.28	0.56	0.008	0.46
CMG-SCP-PRO					
0.10	446,434,000	0.20	0.24	0.008	0.36
0.15	304,042,000	0.24	0.28	0.008	0.37
0.20	185,841,000	0.28	0.33	0.009	0.37
0.25	104,219,000	0.32	0.39	0.009	0.38
QFP					
0.10	1,542,000	0.11	0.08	0.004	0.03
0.15	0	0	0	0	0
0.20	0	0	0	0	0
0.25	0	0	0	0	0
Total Indicated Resource					
0.10	452,894,000	0.20	0.23	0.008	0.36
0.15	305,180,000	0.24	0.28	0.008	0.37
0.20	186,171,000	0.27	0.33	0.009	0.37
0.25	104,344,000	0.31	0.39	0.009	0.38

*Note: Bolded quantities include approximate cut-off grades.

Table 14-10: Hushamu Resource Estimate - Inferred Resource

LEA					
Cut-off (g/t Cu)	Tonnes1	%Cu	ppm Au	%Mo	%Re
0.10	2,280,000	0.12	0.19	0.008	0.32
0.15	338,000	0.19	0.25	0.012	0.63
0.20	115,000	0.22	0.27	0.012	0.72
0.25	0	0	0	0	0
CMG-SCP-PRO					
0.10	423,136,000	0.15	0.18	0.006	0.33
0.15	188,297,000	0.19	0.24	0.007	0.35
0.20	52,801,000	0.23	0.33	0.007	0.37
0.25	6,862,000	0.30	0.42	0.012	0.81
QFP					
0.10	1,866,000	0.12	0.10	0.005	0.15
0.15	0	0	0	0	0
0.20	0	0	0	0	0
0.25	0	0	0	0	0
Total Inferred Resource					
0.10	427,282,000	0.15	0.18	0.006	0.33
0.15	**188,636,000**	**0.19**	**0.24**	**0.007**	**0.35**
0.20	52,915,000	0.23	0.32	0.007	0.37
0.25	6,862,000	0.30	0.42	0.012	0.81

1. Tonnages have been rounded to the nearest 1,000 tonnes so may not add up.
2. Classification is compliant with the "CIM Resource Definition Standards, 2014"
3. It is assumed that with continued exploration, most of the Inferred Resource could be upgraded to an Indicated Resource category.
4. Bolded numbers include approximate cut-off grades.

As a check on the classification procedure, the results were examined in plan and section to ensure that the blocks were classified properly. Figure 14-16 and Figure 14-17 are two examples of sections where blocks greater than or equal to 0.10% Cu are coloured by classification.

A simplified grade-tonnage graph for the Indicated Resource can be found as Figure 14-18.

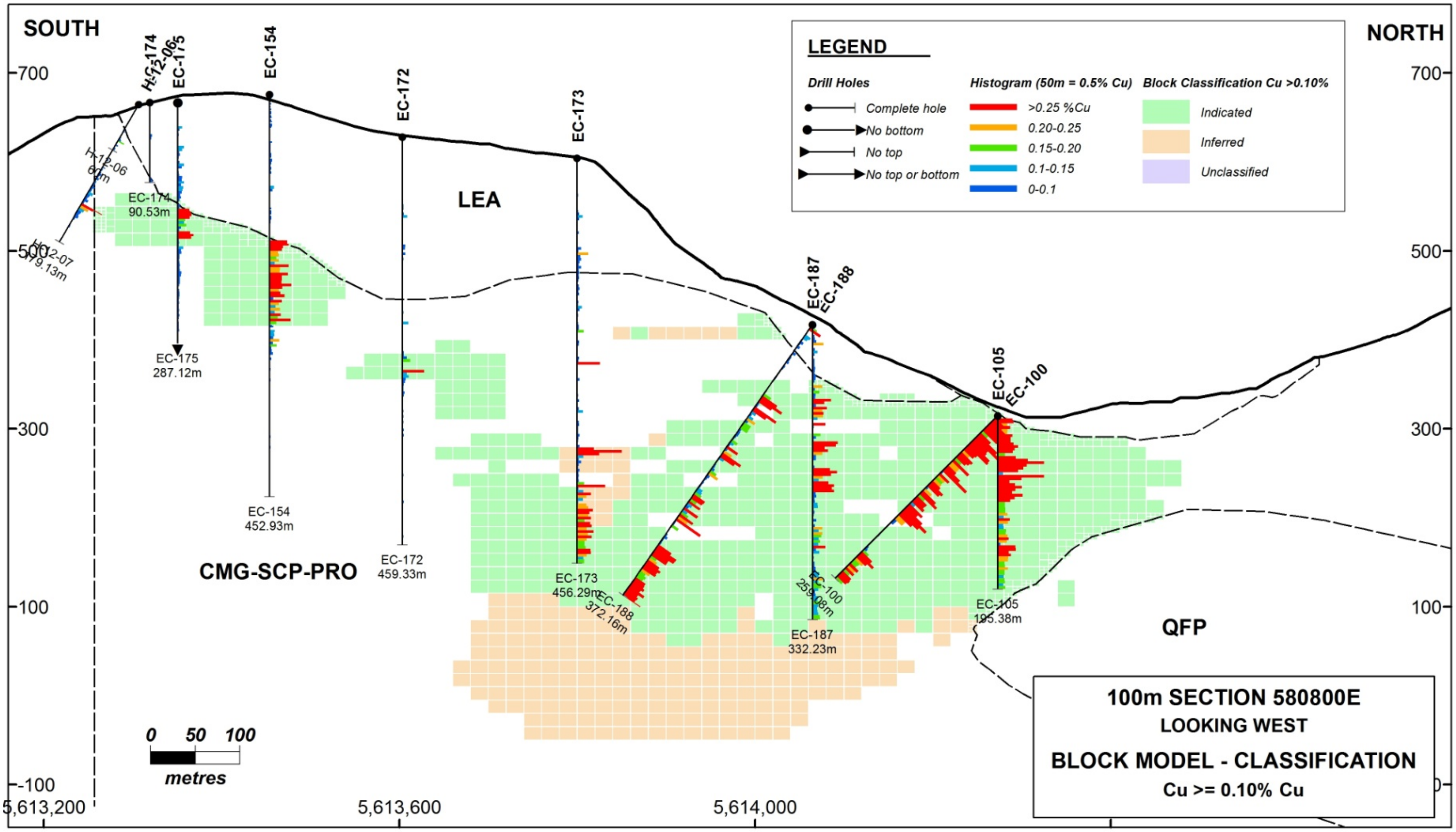


Figure 14-16: **Section 580,800 Blocks Coloured by Classification (≥0.1**0% Cu)

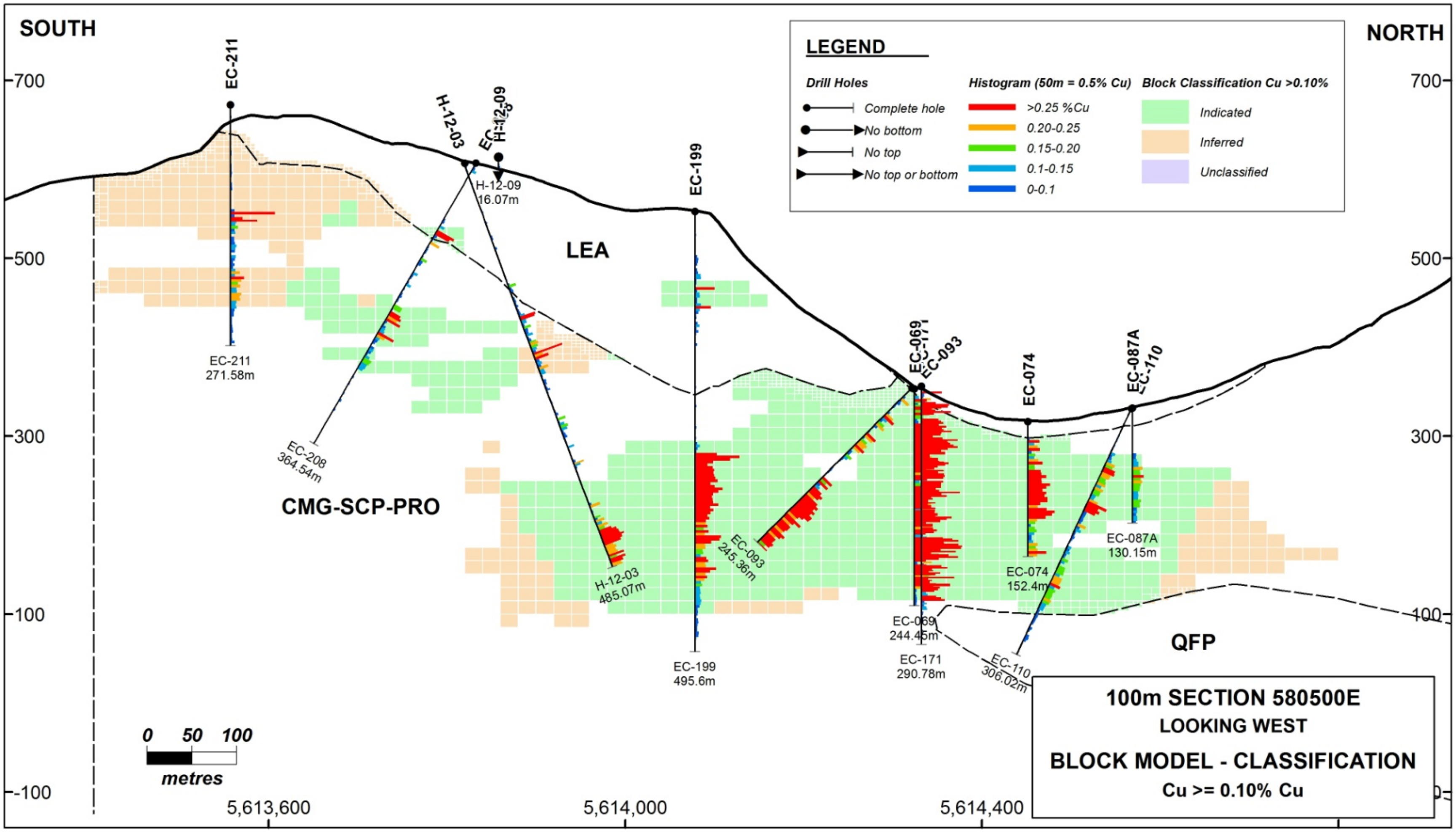


Figure 14-17: **Section 580,500 Blocks Coloured by Classification (≥0.10% Cu)**

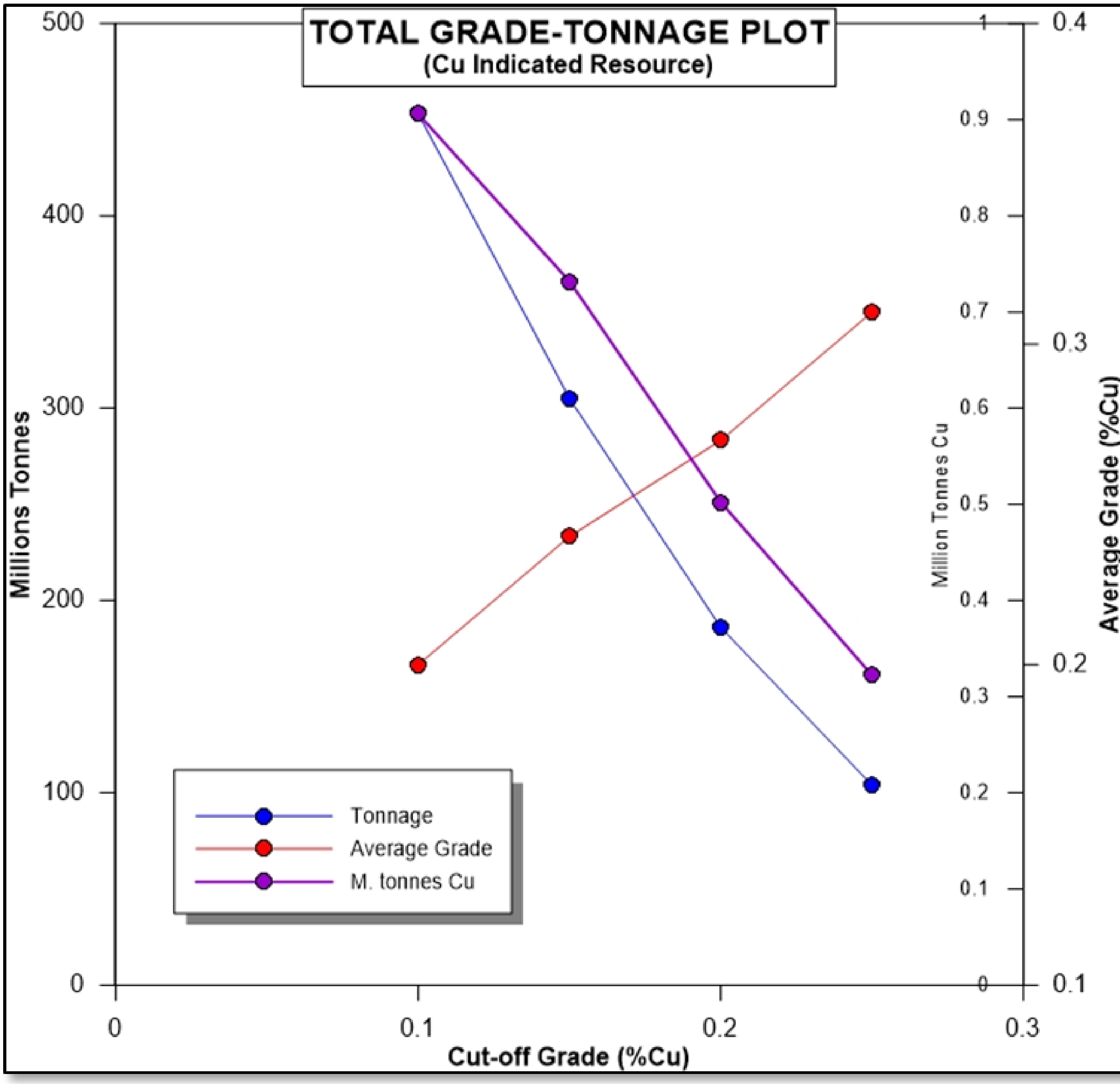


Figure 14-18: Grade Tonnage Curves – Indicated Cu

14.5 DISCUSSION

Once the estimation was completed and examined in detail, several items were noted that could improve the model.

While the estimation was carried out using a horizontal search, copper values within the SCP domain seem to exhibit a north-easterly dip (see Figure 14-11 and Figure 14-12). Any future estimates might take this into account but it would probably have little effect on the estimate.

Modeling of the geological domains was carried out on north-south sections but the mineralization trends were southeast-northwest. Both the domain and block modelling could be adjusted to the mineralization trend although this would likely have a minimal affect on the estimate.

Prior to compositing the assays to equal length intervals downhole, any missing values (mostly Au, Mo and Re) were given a value of zero. This does have a great effect on the resulting estimate for those elements where the average grades are reduced. This resource estimate is probably underestimating the grades for those elements. If the missing assays are left as blanks in the downhole composites, the resulting resource estimate would likely overestimate the grades of those elements. The estimated Au, Mo and Re grades can therefore be considered to be conservative.

A summary table for the Red Dog resource is as Table 14-11. Bolded rows can be assumed to be reasonable cut-off grades as per this PEA.

Table 14-11: Red Dog Resource Summary

Indicated Resource				
Cut-off (g/t Cu)	Tonnes	%Cu	ppm Au	%Mo
0.10	**54,490, 000**	**0.22**	**0.31**	**0.004**
0.15	36,568,000	0.27	0.38	0.005
0.20	23,633,000	0.32	0.46	0.007
0.25	15,553,000	0.38	0.54	0.008
0.30	11,042,000	0.42	0.60	0.009
Inferred Resource				
Cut-off (g/t Cu)	Tonnes	%Cu	ppm Au	%Mo
0.10	**2,979,000**	**0.17**	**0.25**	**0.002**
0.15	1,774,000	0.20	0.30	0.003
0.20	848,000	0.23	0.33	0.003
0.25	107,000	0.28	0.36	0.007
0.30	27,000	0.33	0.39	0.009

Game, B. and Burt, P. 2017

15 MINERAL RESERVE ESTIMATES

No Mineral Reserves have been estimated for this report.

16 MINING METHODS

16.1 SUMMARY

Preliminary mine designs have been developed for Red Dog and Hushamu deposits based upon Indicated and Inferred Resources. Resource models were imported to Minesight® mine planning software where a Lerchs Grossman algorithm was applied to an NSR model to determine possible pit limits.

The mine plan was developed to mine Red Dog concurrently with Hushamu in the early years of the mine life until Red Dog Resources were depleted. The assumed processing rate is 75,000 t/d. The overall mining rate peaks at 64 million t/a in the initial years, averaging 54 million t/a over the first 12 years of the total mine life of 22 years.

The mine will be a conventional truck and shovel operation with electrified pit operations at Hushamu. Waste rock will be placed in construction and storage within the Mine Waste Storage Facility (MWSF). A low-grade stockpile will be located at the pit rim on the northwest side of Hushamu. An overburden stockpile will be located adjacent to the low-grade stockpile for use in reclamation of the MWSF at the end of the mine life.

The total resources processed in the conceptual mine plan are shown in Table 16-1.

Table 16-1: Mineral Resources Included in the Mine Plan

Indicated Resources	ROM t x 1000	Cu %	Au g/t	Mo %
Hushamu Starter Pit	80,097.0	0.24	0.27	0.007
Hushamu Phase 1 Expansion	97,217.0	0.20	0.18	0.007
Hushamu Phase 1.5 Expansion	119,509.0	0.18	0.28	0.011
Hushamu Phase 2 Expansion	109,134.0	0.17	0.25	0.008
Red Dog	50,549.0	0.22	0.32	0.005
Total	456,506.0	0.20	0.25	0.008
Inferred Resources	ROM t x 1000	Cu %	Au g/t	Mo %
Hushamu Starter Pit	2,530.0	0.12	0.15	0.015
Hushamu Phase 1 Expansion	12,802.0	0.13	0.12	0.010
Hushamu Phase 1.5 Expansion	40,554.0	0.14	0.22	0.012
Hushamu Phase 2 Expansion	84,859.0	0.14	0.21	0.008
Red Dog	2,152.0	0.17	0.27	0.003
Total	142,897.0	0.14	0.20	0.009

16.2 PIT OPTIMIZATION

Pit optimization was undertaken to locate feasible pit limits for design purposes. A series of 30 nested pits were developed using a Lerchs Grossman algorithm. Revenue factors ranged from 0.1 to 1.0.

16.2.1 Metallurgy

Preliminary metallurgical recovery and concentrate characteristics were provided by Base Metallurgical Laboratories Ltd. Initial values used for NSR model development are shown in Table 16-2.

Metallurgical ore types for Hushamu have been classified according to alteration in the case of Silica-Clay-Pyrite (SCP) overprint alteration and Chlorite-Magnetite alteration (CMG). For the purposes of the NSR model the leach cap has not been assigned recoveries and the blocks within areas coded Quartz Feldspar Porphyry (QFP) and Propylitic (PROP) have been included with the CMG.

Table 16-2: Pit Optimization Metallurgical Assumptions

Metallurgical Recovery		Hushamu CMG	Hushamu SCP	Red Dog
Copper Recovery	%	78.0	75.0	86.0
Gold Recovery	%	44.0	34.0	33.0
Copper Concentrate				
Copper Concentrate Grade	%	21.7	19.2	24.2
Moisture Content	%	9.00	9.00	9.00

Molybdenum was not included in the NSR model for the purposes of pit optimization but has been carried in the resource reporting and scheduling.

Metal prices assumptions, exchange rate, smelter terms and transportation charges are summarized in Table 16-3.

Table 16-3: NSR Calculation Inputs for Copper Concentrate

		Hushamu CMG	Hushamu SCP	Red Dog
Exchange Rate	$/$	$1.30	$1.30	$1.30
Metallurgical Recovery				
Copper Recovery	%	78.0	76.0	86.0
Gold Recovery	%	44.0	34.0	33.0
Silver Recovery	%			
Metal Pricing				
Copper Price	US$/lb	$2.95	$2.95	$2.95
Gold Price	US$/ounce	$1,291.00	$1,291.00	$1,291.00
Copper Concentrate				
Copper Concentrate Grade	%	21.7	19.2	24.2
Moisture Content	%	9.00	9.00	9.00
Copper Concentrate Handling				
Transportation Losses		0.15%	0.15%	0.15%
Concentrate Transported and Treated	dmt/t ore	0.00904	0.00794	0.00479
Truck Haulage to Storage Facility	US$/wmt	$1.64	$1.64	$1.64
Concentrate Storage	US$/wmt	$10.40	$10.40	$10.40
Ship Loading	US$/wmt	$11.55	$11.55	$11.55
Ocean Freight	US$/wmt	$45.00	$45.00	$45.00
Umpiring & Sampling	US$/wmt	$1.08	$1.08	$1.08
Insurance	US$/wmt	$4.47	$3.86	$4.66
Total Concentrate Handling	US$/wmt	$74.13	$73.52	$74.33
Total	US$/dmt	$81.46	$80.79	$81.68
Copper Concentrate Treatment and Refining				
Deduction for Copper	unit	1.00	1.00	1.00
Copper Payment	%	95.4%	94.8%	95.9%
Treatment Charges	US$/dmt	$90.00	$90.00	$90.00
Gold Deduction	g/t	-	-	-
Gold Payment	%	95.0%	95.0%	95.0%
Copper Refining Cost	US$/payable lb	$0.0900	$0.0900	$0.0900
Gold Refining Cost	US$/payable oz	$6.00	$6.00	$6.00
Royalty Copper	%	0.0%	0.0%	1.0%
Royalty Gold	%	0.0%	0.0%	1.0%
Royalty Silver	%	0.0%	0.0%	1.0%

16.2.2 Operating Costs

Preliminary pit optimization operating cost assumptions are summarized in Table 16-4.

Table 16-4: Pit Optimization Operating Cost Assumptions

Processing Operating Costs		Hushamu Ore		Red Dog Ore	
General & Administration	$/t milled	$0.600		$0.600	
Ore Overland Haul	$/t milled	$0.000		$1.500	
Tailings	$/t milled	$0.000		$0.000	
Mill Operating	$/t milled	$5.300		$5.300	
Subtotal	$/t milled	$5.900		$7.400	
Sustaining Capital	$/t milled	$0.000		$0.000	
Total Processing	$/t milled	$5.900		$7.400	
Base Mine Operating Costs		Hushamu		Red Dog	
		Ore	Waste	Ore	Waste
Mine General	$/t mined	$0.050	$0.050	$0.050	$0.050
Shovel/ Loaders	$/t mined	$0.330	$0.330	$0.330	$0.330
Contract Services	$/t mined	$0.010	$0.010	$0.010	$0.010
Service Equipment	$/t mined	$0.035	$0.035	$0.035	$0.035
Road & Pit Maintenance	$/t mined	$0.140	$0.140	$0.140	$0.140
Pit Electrics	$/t mined	$0.150	$0.150	$0.150	$0.150
Engineering	$/t mined	$0.020	$0.020	$0.020	$0.020
Geology	$/t mined	$0.010	$0.010	$0.010	$0.010
Environment & Reclamation	$/t mined	$0.018	$0.018	$0.018	$0.018
Drilling	$/t mined	$0.170	$0.170	$0.170	$0.170
Blasting	$/t mined	$0.225	$0.225	$0.225	$0.225
Hauling - Base	$/t mined	$0.250	$0.250	$0.250	$0.250
Dewatering	$/t mined	$0.050	$0.050	$0.050	$0.050
Mining to Pit Crest	$/t mined	$1.458	$1.458	$1.458	$1.458
Ex-pit Haulage to Crusher		$0.100		$0.100	
Ex-pit Haulage to Dump			$0.250		$1.650
Sustaining Capital	$/t mined	$0.250	$0.250	$0.250	$0.250
Total Base Mining	$/t mined	$1.808	$1.958	$1.808	$3.358
Entrance Bench	bench	310	310		
Increment to Depth	$/t/bench	$0.030	$0.030	$0.000	$0.000
Increment Up	$/t/bench	$0.025	$0.025	$0.000	$0.000

16.2.3 Geotechnical Assumptions

Geotechnical assessment of mine wall slopes and stockpile foundations have not been undertaken at Hushamu or Red Dog. They are recommended for the next phase of project development. Assumptions made for the Preliminary Economic Assessment (PEA) are shown in Table 16-5 and Table 16-6.

Table 16-5: Hushamu Wall Slope Assumptions – Pit Optimization and Preliminary Phase Designs

SLOPC	Description	Bench Face BFA	Bench Height meters	Berm Interval	Berm Interval meters	Berm Width BERM	Inter-ramp Angle	Overall Slope Angle	Stack Height meters	Geotech Berm meters
1	Overburden	65.0	15	1	15	12.0	38	38		
2	Leach Zone	65.0	15	1	15	8.0	45	42	80	20.0
3	Hypogene	70.0	15	1	15	8.0	48	45	100	20.0

Table 16-6: Red Dog Wall Assumptions – Pit Optimization and Preliminary Phase Designs

Description	Bench Face BFA	Bench Height meters	Berm Interval	Berm Interval meters	Berm Width BERM	Inter-ramp Angle	Overall Slope Angle
Rock	70.0	10	2	20	10.0	49	45

16.2.4 Pit Optimization Results

The distribution of Indicated and Inferred resources above a $5.90/t NSR value at Hushamu are shown in Figure 16-1 and Figure 16-2.

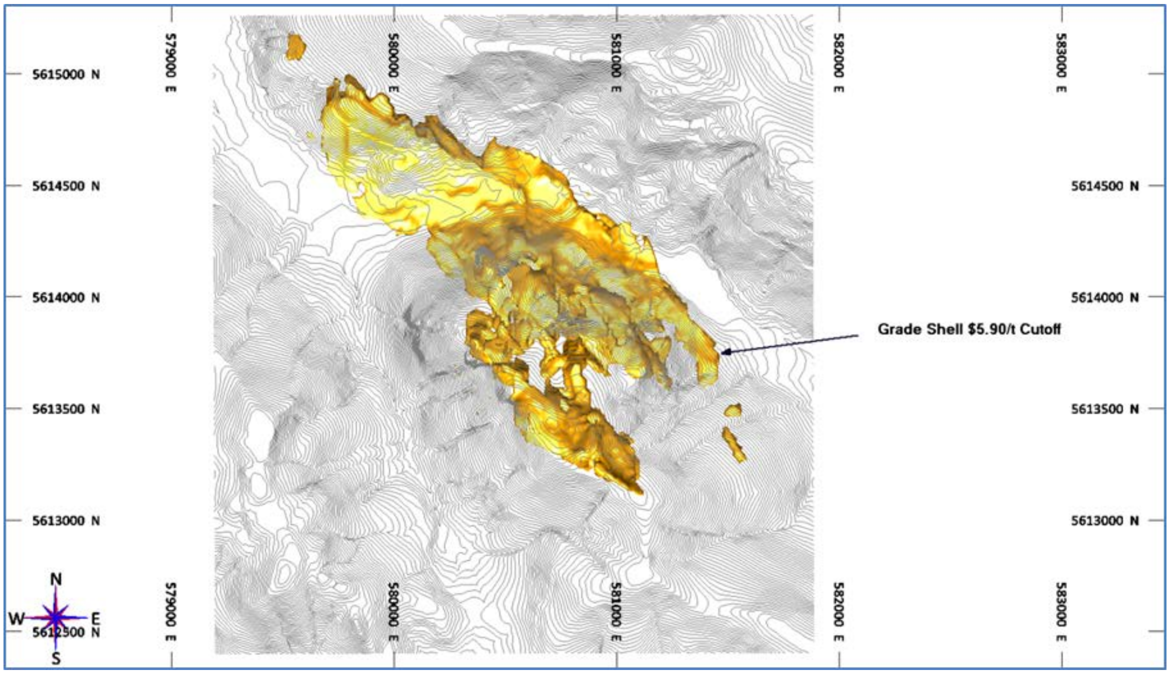


Figure 16-1: Indicated Resources Hushamu

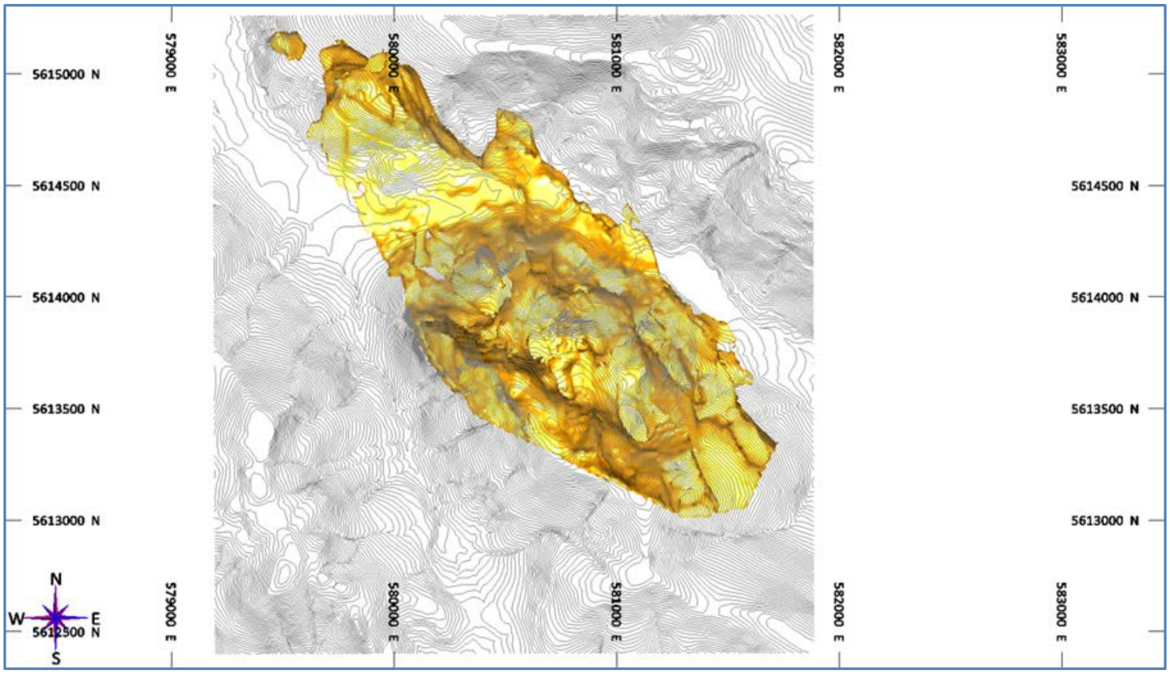


Figure 16-2: Indicated and Inferred Resources Hushamu

Nested pit shells for Hushamu are shown in the Sections and plans of the figures Figure 16-3 and Figure 16-4.

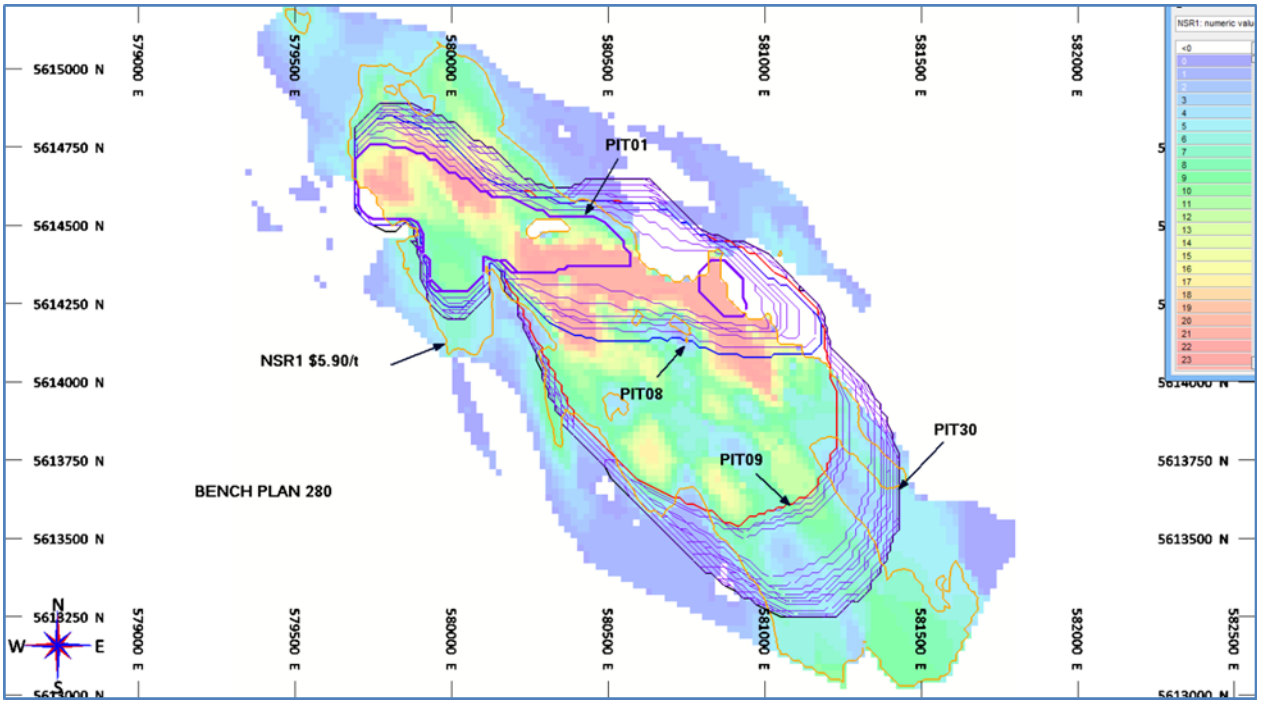


Figure 16-3: Bench Plan 280 Nested Pits

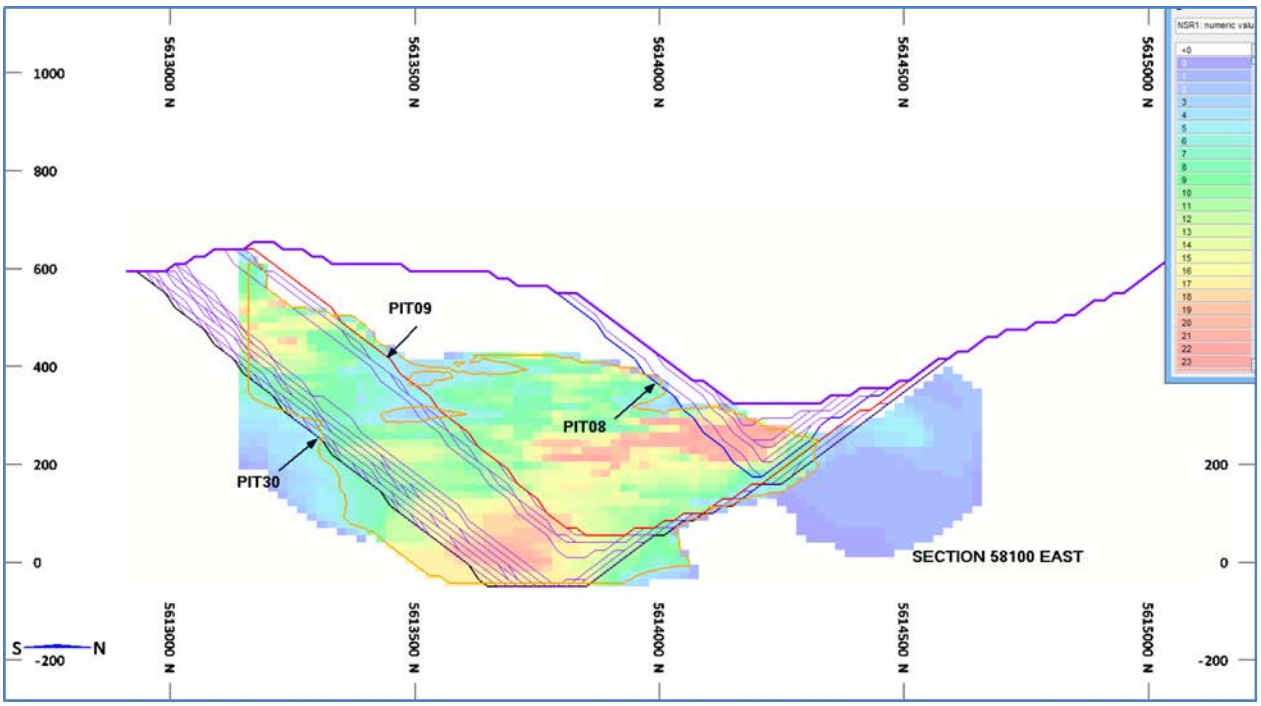


Figure 16-4: Section 581000 East Nested Pits

The nested pit resource summary for Hushamu is shown in Table 16-7.

Table 16-7: Lerchs Grossman Nested Pit Summary NSR $5.90/t Cutoff

SHELL	RUN OF MINE (kTONNES)	WASTE TOTAL (kTONNES)	ROM S/R	CU %	AU g/t	MO %	TOTAL (kTONNES)	Incremental						
								ORE (kTONNES)	CU	AU	MO	WASTE (kTONNES)	TOTAL (kTONNES)	S/R
1	50,186	12,271	0.24	0.229	0.183	0.005	62,457	50,186	0.23	0.18	0.005	12,271	62,457	0.24
2	78,622	32,119	0.41	0.238	0.228	0.005	110,741	28,436	0.25	0.31	0.007	19,848	48,284	0.70
3	104,040	46,030	0.44	0.233	0.232	0.006	150,070	25,418	0.22	0.24	0.007	13,911	39,329	0.55
4	122,144	57,200	0.47	0.229	0.233	0.006	179,344	18,104	0.21	0.24	0.007	11,170	29,274	0.62
5	137,236	67,275	0.49	0.226	0.231	0.006	204,511	15,092	0.20	0.22	0.008	10,075	25,167	0.67
6	140,744	69,551	0.49	0.225	0.230	0.006	210,295	3,508	0.19	0.19	0.006	2,276	5,784	0.65
7	159,498	87,062	0.55	0.224	0.232	0.007	246,560	18,754	0.21	0.24	0.009	17,511	36,265	0.93
8	177,167	102,978	0.58	0.221	0.233	0.007	280,145	17,669	0.20	0.24	0.012	15,916	33,585	0.90
9	511,564	350,638	0.69	0.185	0.244	0.009	862,202	334,397	0.17	0.25	0.010	247,660	582,057	0.74
10	518,041	354,780	0.68	0.184	0.243	0.009	872,821	6,477	0.15	0.19	0.009	4,142	10,619	0.64
11	535,858	365,038	0.68	0.183	0.242	0.009	900,896	17,817	0.15	0.19	0.006	10,258	28,075	0.58
12	541,927	369,496	0.68	0.183	0.241	0.009	911,423	6,069	0.16	0.20	(0.000)	4,458	10,527	0.73
13	558,940	381,622	0.68	0.182	0.240	0.009	940,562	17,013	0.14	0.20	0.009	12,126	29,139	0.71
14	630,057	432,362	0.69	0.177	0.235	0.009	1,062,419	71,117	0.14	0.20	0.007	50,740	121,857	0.71
15	648,678	444,296	0.68	0.176	0.233	0.009	1,092,974	18,621	0.14	0.18	0.009	11,934	30,555	0.64
16	671,901	463,092	0.69	0.175	0.232	0.008	1,134,993	23,223	0.14	0.18	0.006	18,796	42,019	0.81
17	682,411	470,966	0.69	0.175	0.231	0.008	1,153,377	10,510	0.14	0.17	0.008	7,874	18,384	0.75
18	691,746	479,342	0.69	0.174	0.230	0.008	1,171,088	9,335	0.14	0.18	0.001	8,376	17,711	0.90
19	707,038	495,111	0.70	0.174	0.228	0.008	1,202,149	15,292	0.15	0.16	0.008	15,769	31,061	1.03
20	711,624	498,432	0.70	0.174	0.228	0.008	1,210,056	4,586	0.14	0.17	0.008	3,321	7,907	0.72
21	718,524	504,713	0.70	0.173	0.227	0.008	1,223,237	6,900	0.14	0.17	(0.002)	6,281	13,181	0.91
22	736,689	524,193	0.71	0.172	0.226	0.008	1,260,882	18,165	0.14	0.17	0.008	19,480	37,645	1.07
23	748,324	534,114	0.71	0.172	0.225	0.008	1,282,438	11,635	0.13	0.16	0.002	9,921	21,556	0.85
24	750,854	536,335	0.71	0.172	0.225	0.008	1,287,189	2,530	0.14	0.17	0.008	2,221	4,751	0.88
25	751,784	536,933	0.71	0.172	0.225	0.008	1,288,717	930	0.17	0.06	0.008	598	1,528	0.64
26	760,433	548,539	0.72	0.171	0.224	0.008	1,308,972	8,649	0.15	0.17	0.008	11,606	20,255	1.34
27	762,228	550,156	0.72	0.171	0.224	0.008	1,312,384	1,795	0.13	0.14	0.008	1,617	3,412	0.90
28	763,240	551,293	0.72	0.171	0.224	0.008	1,314,533	1,012	0.17	0.15	0.008	1,137	2,149	1.12
29	768,087	556,448	0.72	0.171	0.223	0.008	1,324,535	4,847	0.14	0.11	0.008	5,155	10,002	1.06
30	769,980	558,782	0.73	0.171	0.223	0.008	1,328,762	1,893	0.13	0.18	(0.033)	2,334	4,227	1.23

Analysis of the value created in a theoretical schedule discounted at 8% showed that 95% of the cumulative present value was captured by PIT10 in the nested pit sequence. As the pits increased in size to the southeast, more low-grade resources at higher strip ratios were included within the pit limit.

For design purposes, a pit limit was established between PIT08 and PIT10 on the south and west sides expanding to the north to PIT30.

Nested pits for Red Dog are shown in the bench plan in Figure 16-5.

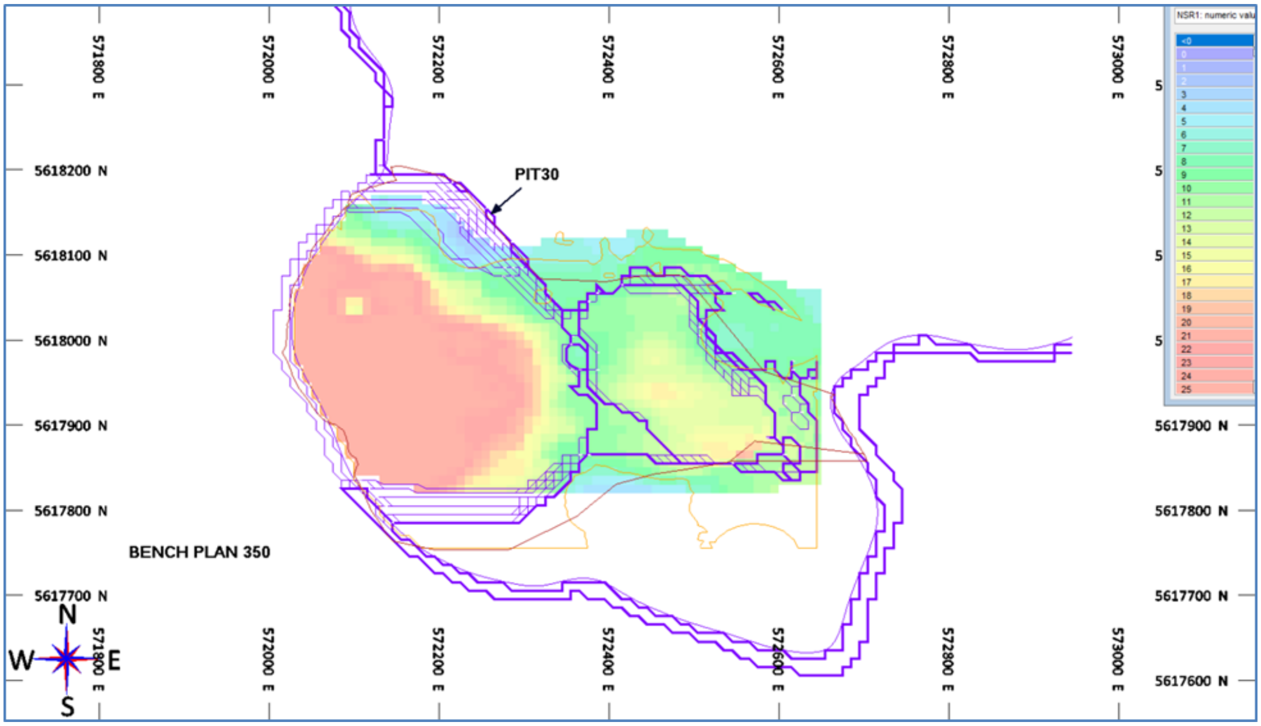


Figure 16-5: Bench Plan 350

The unsmoothed PIT30 shell was used as a guide for pit design at Red Dog expanding to provide access to the pit from the east. Resources scheduled in this deposit were maximized.

16.3 MINE DESIGN

16.3.1 General Design Criteria

The Hushamu and Red Dog open pits will be conventional truck and shovel operations utilizing 220 tonne class trucks and electric hydraulic front shovels and rotary drills. The bench height at Hushama will be 15 m and at Red Dog it will be 10 m. Road allowances have been made to 34 m width. Single benching has been applied at Hushamu and double benching has been applied at Red Dog. Geotechnical berms of 20 m width have been located on the high wall at Hushamu. Primary crushers will be located adjacent to each pit. Ore will be conveyed to the plant site at Hushamu.

The final design of the Hushamu pit is shown in Figure 16-6. The crest of the pit is at 645 m elevation and the pit bottom is -20 m elevation. The overall high wall slope is 42 degrees. The overall final pit dimensions are 2300 m in length by 1275 m in width.

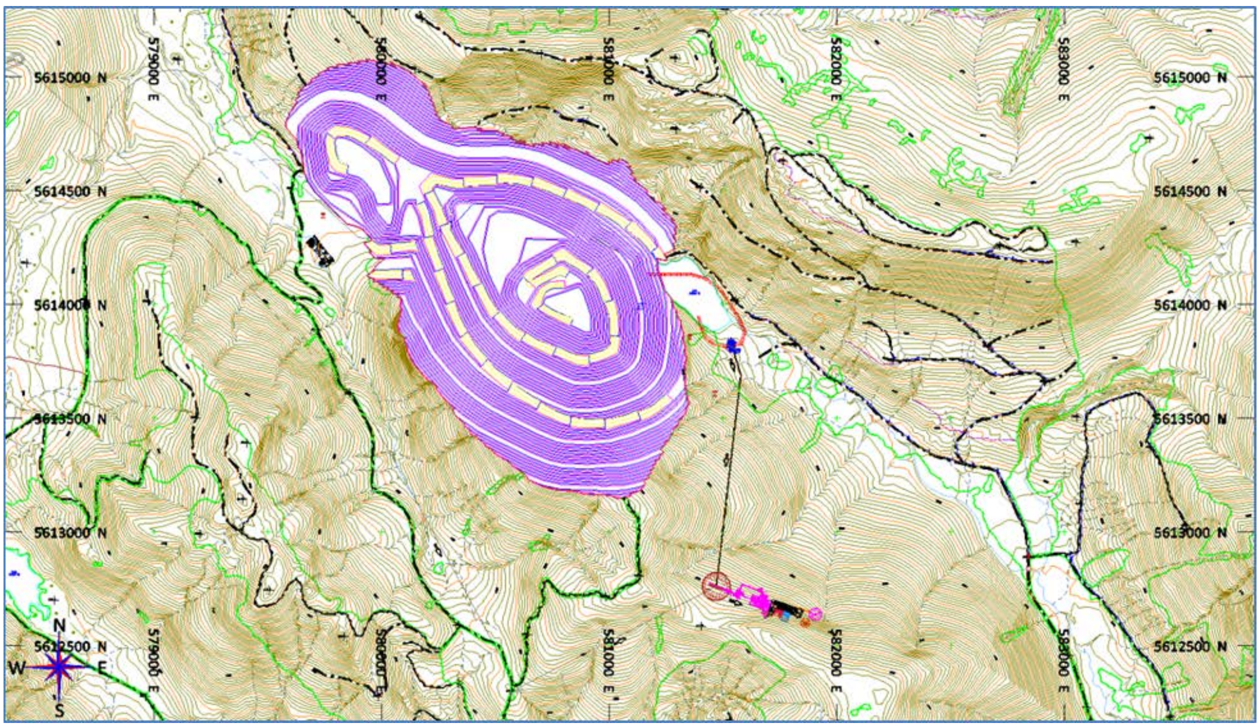


Figure 16-6: Hushamu Pit Design

The Red Dog design is shown in Figure 16-7. The pit design bottom is at 240 m elevation and the pit crest is at 440 m elevation. Overall dimensions are 780 m length by 470 m width. Access to the pit will be from the east where the primary crusher will be located. This pit will be developed in a single phase.

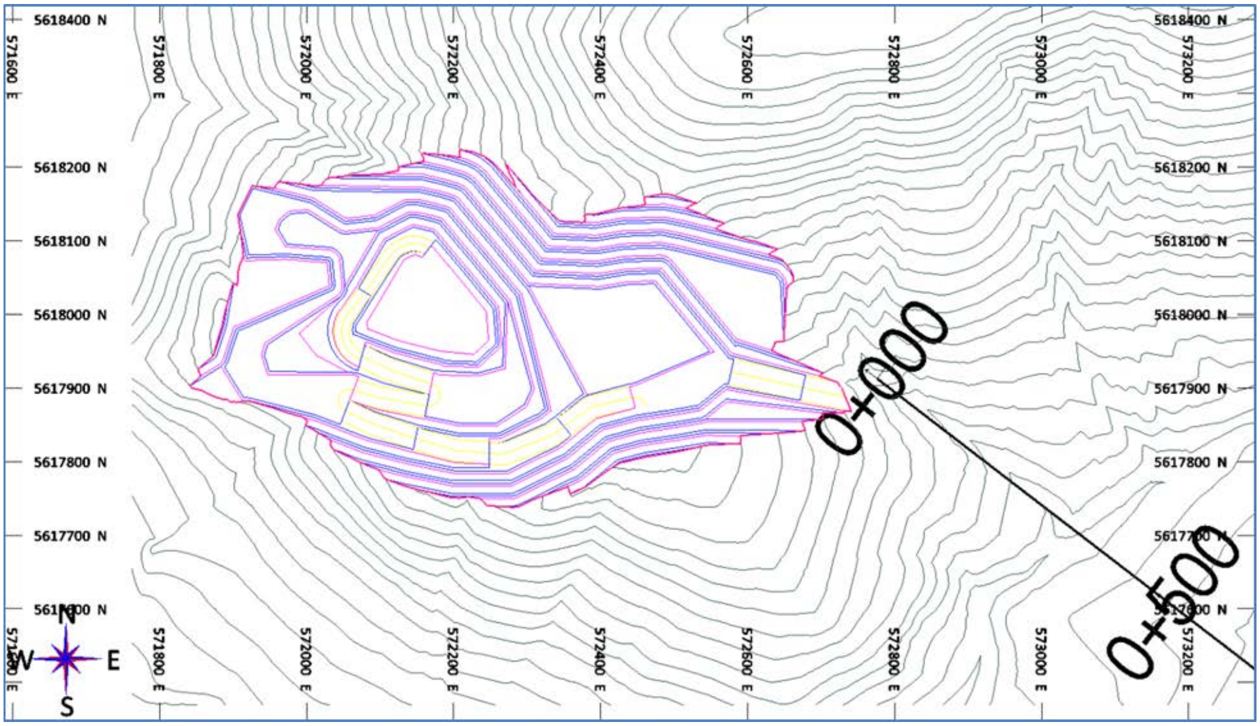


Figure 16-7: Red Dog Pit Design

16.3.2 Phase Development

The Hushamu open pit will be developed in 4 phases. The Starter Pit will be developed as shown in Figure 16-8 accessing resources in the center of the deposit. A haulage road will remain in the high wall to access the subsequent development phase to the south.

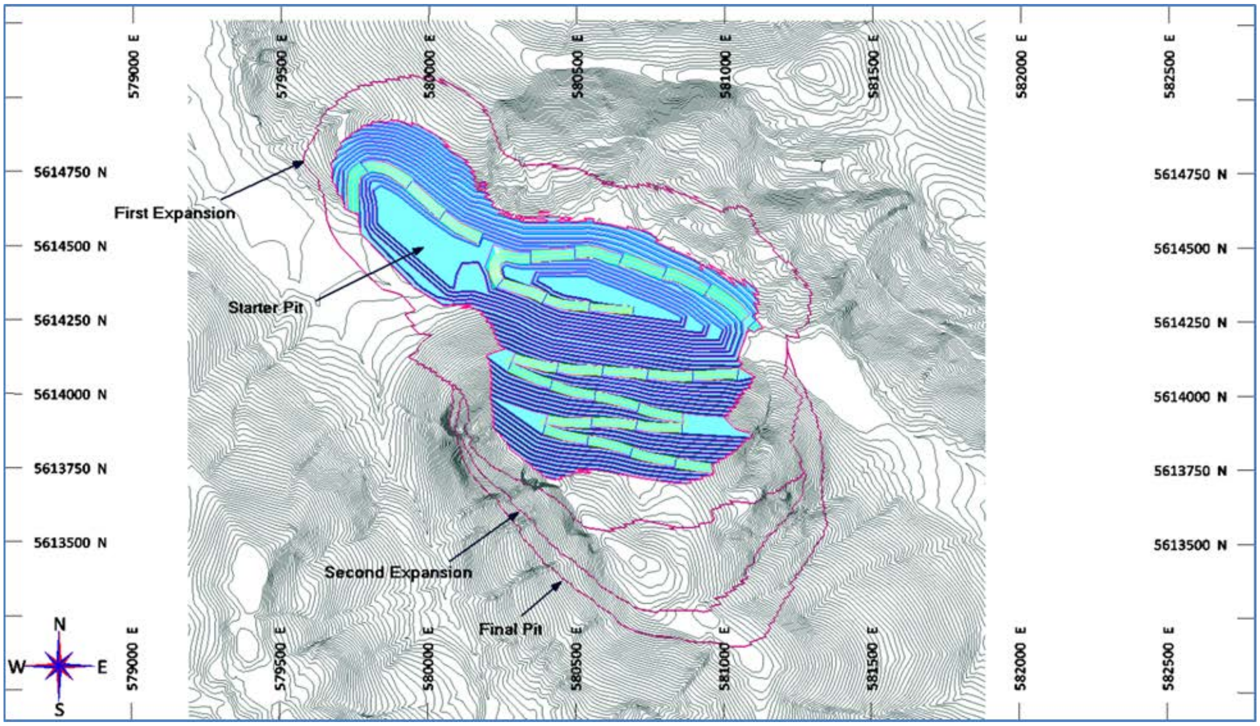


Figure 16-8: Hushamu Starter Pit

The first expansion of the Hushamu open pit is shown in Figure 16-9. This expansion is radial about the Starter Pit expanding the pit in all directions and to depth. This pit phase reaches the final wall on the north leaving an access road allowance of 40 m width.

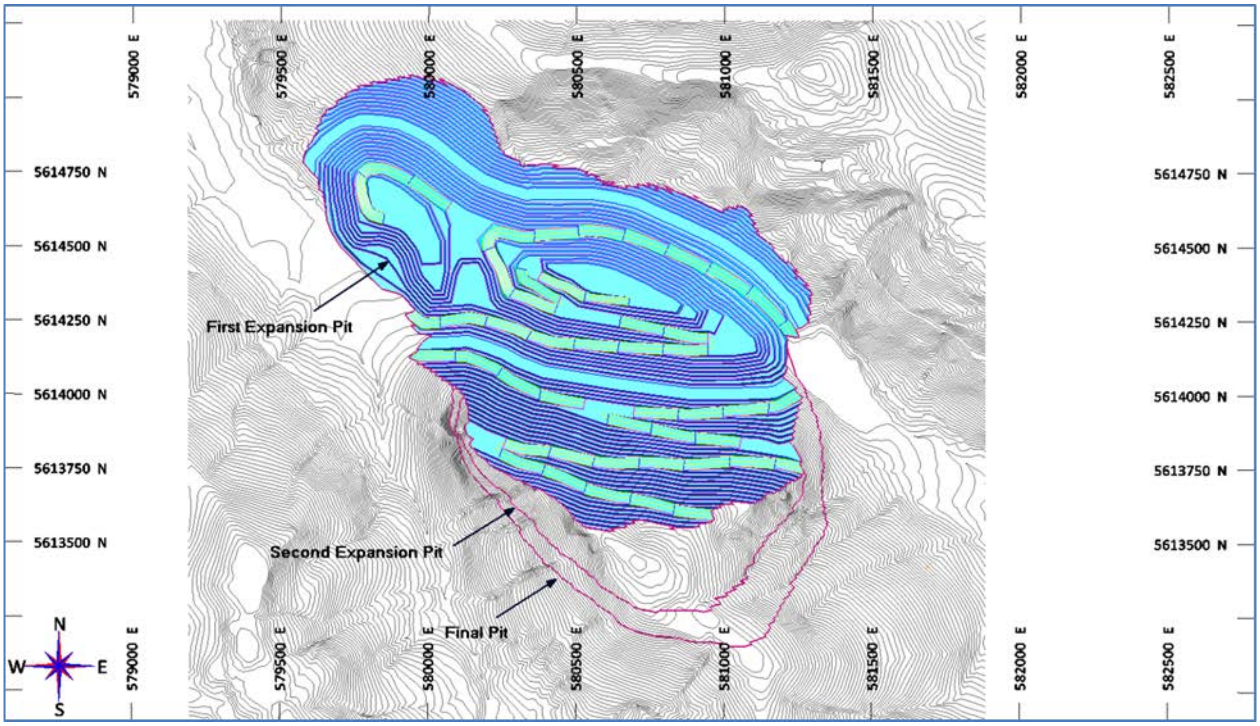


Figure 16-9: Hushamu First Expansion

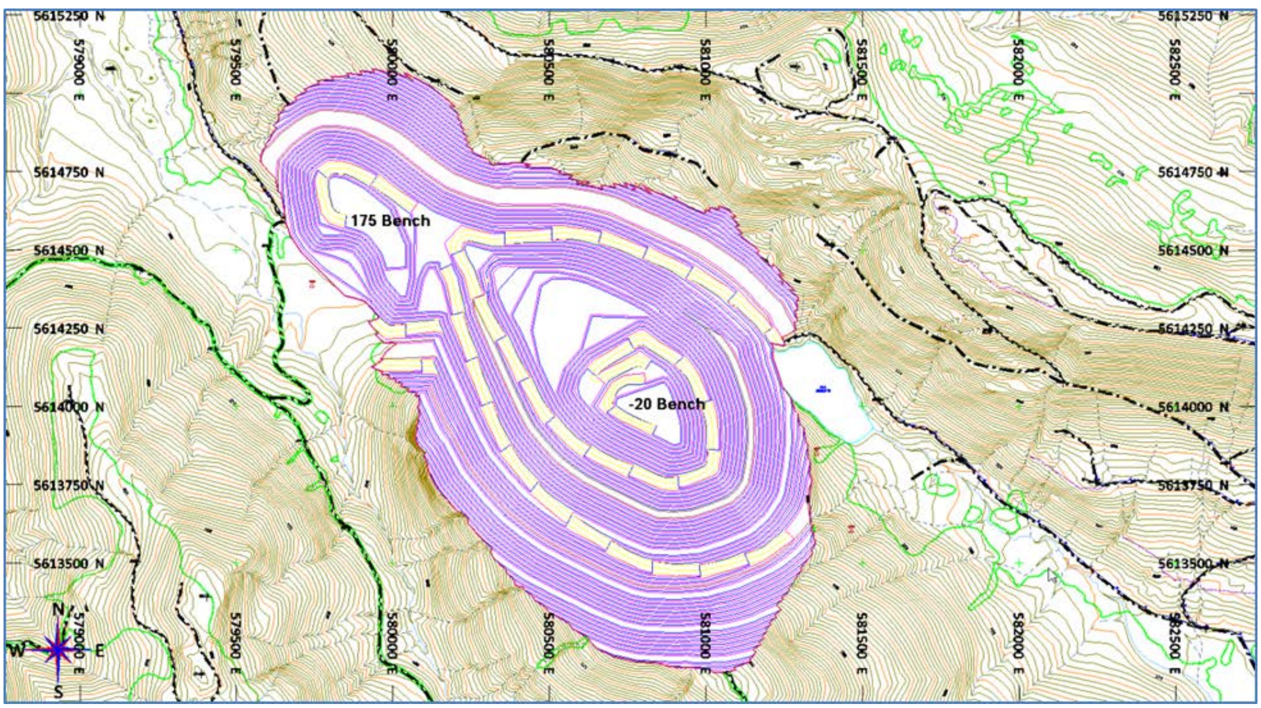


Figure 16-10: Hushamu Final Pit Expansion Merged

The section and plan in Figure 16-11 and Figure 16-12 show the 4 development phases and the resource distribution of the deposit.

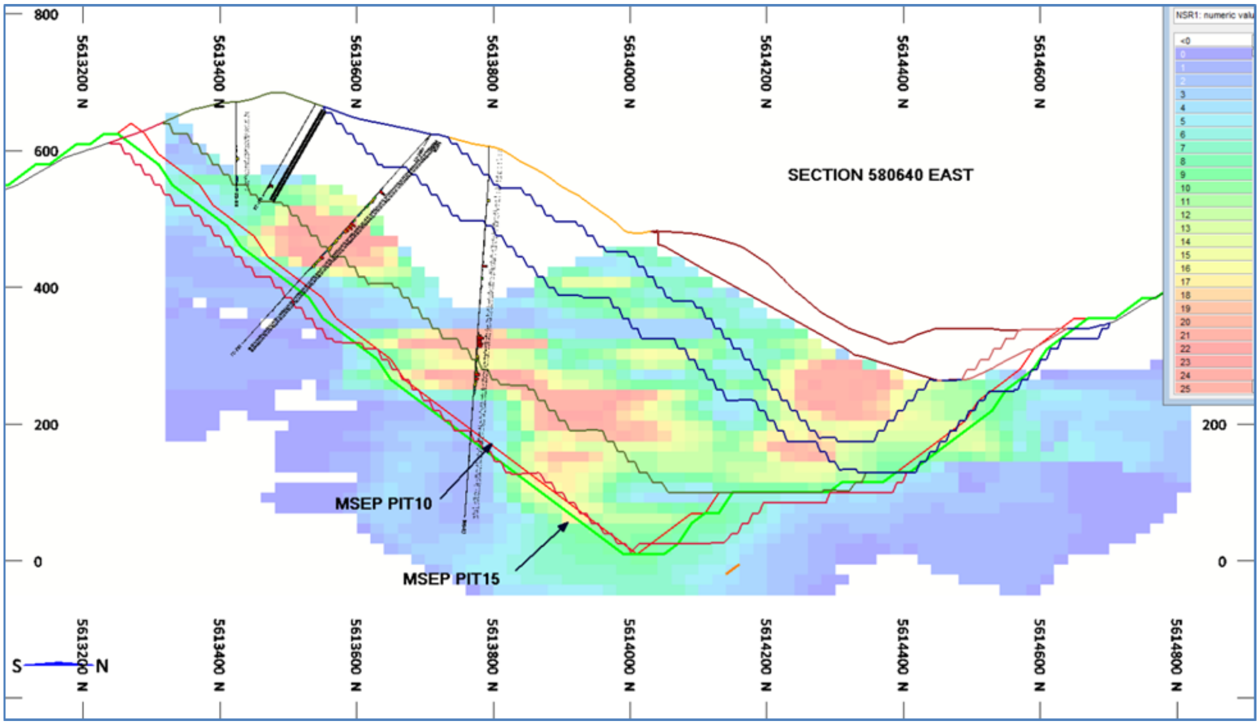


Figure 16-11: Section 580640 East

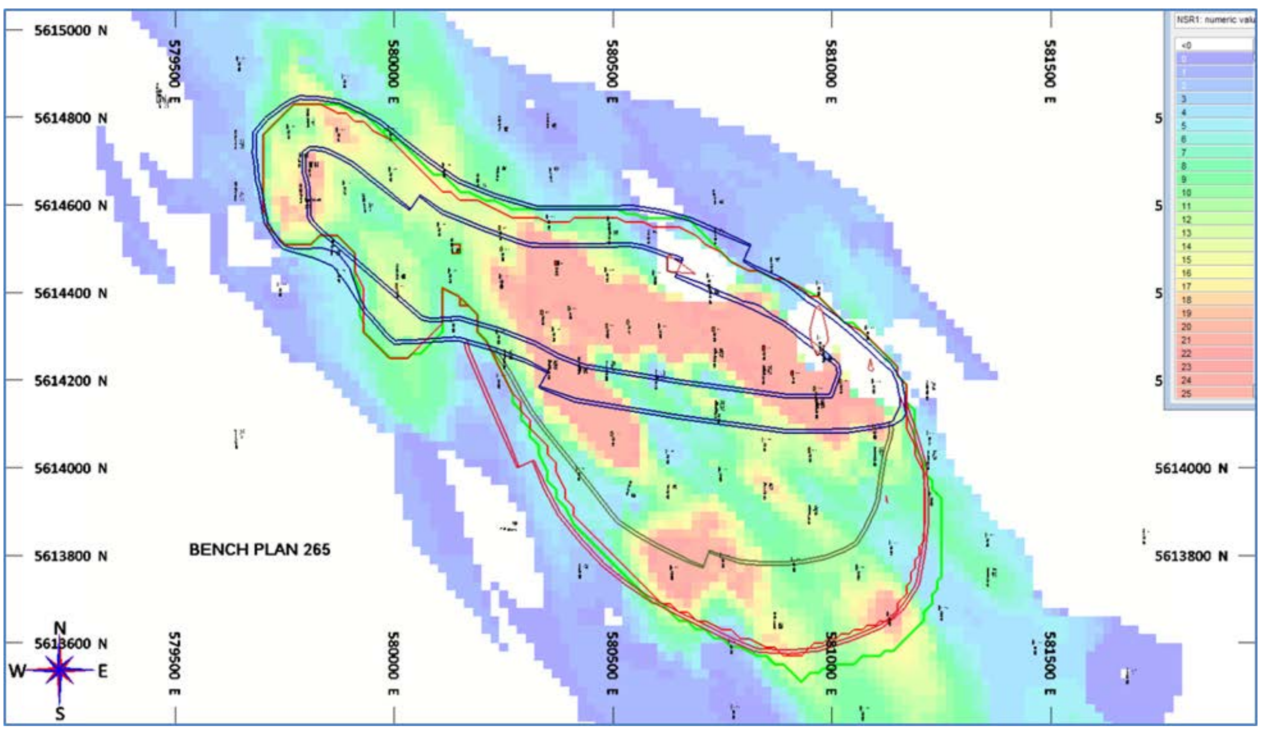


Figure 16-12: Bench Plan 265

16.4 WASTE ROCK AND STOCKPILE FACILITIES

Waste rock will be placed in the MWSF as construction material or fill buttressing the dam on the upstream side of Dam 1 and Dam 2.

Overburden will be stockpiled north of the open pit to be used for reclamation on the MWSF at the end of the mine life.

Low-grade will be stockpiled north of the pit to be reclaimed as required for processing. The 325-m elevation haulage road will be used to transport stockpile material to the crusher.

The waste for the Red Dog Deposit will be stored adjacent to the Red Dog pit, then re-handled to the pit at closure.

16.5 PRODUCTION SCHEDULE

The production schedule is summarized in Table 16-1. Initial overall processing targets were set for 75,000 t/d. Cutoff grade scheduling bins were set for Low Grade, Medium Grade and High Grade based upon NSR cutoffs of $5.90/t, $8.00/t and $10.00/t. Red Dog ore was scheduled with a target of 25,000 t/d. Material from Hushamu was then scheduled to mill feed to the maximum capacity of the grinding circuit.

Table 16-8: Mine Production Schedule

Schedule - Mine			Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Mine Production																
LG MG HG	LG MG HG	t x 1000	-	1,210.0	25,352.6	27,374.1	27,373.4	27,630.4	28,758.6	28,560.7	27,322.4	27,299.5	27,094.4	27,595.3	27,563.5	27,477.4
	Cu	%	-	0.14	0.20	0.24	0.22	0.22	0.20	0.19	0.20	0.20	0.19	0.17	0.17	0.13
	Au	g/t	-	0.17	0.22	0.27	0.27	0.26	0.25	0.25	0.22	0.23	0.22	0.20	0.23	0.25
	Mo	%	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Overburden		t x 1000	-	608.0	4,200.5	9,167.3	1,268.2	720.1	1,851.7	2,456.1	5,432.1	1,053.8	41.8	228.0	278.3	141.9
Waste		t x 1000	18,250.0	33,846.0	34,321.8	27,333.6	30,670.8	28,699.0	20,489.7	20,083.2	18,345.5	22,746.6	23,963.8	23,276.7	19,608.2	17,077.8
Total		t x 1000	18,250.0	35,664.0	63,875.0	63,875.0	59,312.5	57,049.5	51,100.0	51,100.0	51,100.0	51,100.0	51,100.0	51,100.0	47,450.0	44,697.0
Stockpile Addition																
Stockpile	LG MG HG	t x 1000	-	1,210.0	-	-	-	255.4	1,383.6	1,185.7	-	-	-	220.3	188.5	102.4
	Cu	%	-	0.14	-	-	-	0.10	0.10	0.10	-	-	-	0.09	0.08	0.08
	Au	g/t	-	0.17	-	-	-	0.10	0.09	0.10	-	-	-	0.14	0.16	0.17
	Mo	%	-	0.013	-	-	-	0.010	0.007	0.006	-	-	-	0.011	0.014	0.012
Stockpile Recovery																
Stockpile	LG MG HG	t x 1000	-	-	131.0	0.9	1.6	-	-	-	52.6	75.5	280.6	-	-	-
	Cu	%	-	-	0.18	0.18	0.18	-	-	-	0.18	0.18	0.18	-	-	-
	Au	g/t	-	-	0.22	0.22	0.22	-	-	-	0.22	0.22	0.22	-	-	-
	Mo	%	-	-	0.017	0.017	0.017	-	-	-	0.017	0.017	0.016	-	-	-
Milling																
	Feed	t x 1000	-	-	25,483.6	27,375.0	27,375.0	27,375.0	27,375.0	27,375.0	27,375.0	27,375.0	27,375.0	27,375.0	27,375.0	27,375.0
	Cu	%	-	-	0.20	0.24	0.22	0.22	0.21	0.20	0.20	0.20	0.19	0.17	0.17	0.13
	Au	g/t	-	-	0.22	0.27	0.27	0.26	0.26	0.25	0.22	0.23	0.22	0.20	0.23	0.25
	Mo	%	-	-	0.009	0.006	0.008	0.007	0.007	0.008	0.008	0.007	0.007	0.009	0.011	0.012

Schedule - Mine			Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Total
Mine Production																
LG MG HG	LG MG HG	t x 1000	27,433.8	27,410.5	27,401.4	27,403.9	27,432.5	27,376.1	27,406.7	27,446.1	27,445.5	22,030.3	-	-	-	599,399.0
	Cu	%	0.16	0.18	0.18	0.17	0.18	0.15	0.17	0.20	0.18	0.16	-	-	-	0.18
	Au	g/t	0.28	0.30	0.28	0.24	0.23	0.22	0.22	0.24	0.22	0.20	-	-	-	0.24
	Mo	%	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	-	-	-	0.008
Overburden		t x 1000	2.1	0.3	18.9	178.8	163.9	492.1	-	-	-	-	-	-	-	28,304.0
Waste		t x 1000	7,659.1	7,648.2	8,786.7	14,217.3	6,679.6	11,357.8	5,076.3	1,581.9	2,361.5	494.7	-	-	-	404,576.0
Total		t x 1000	35,095.0	35,059.0	36,207.0	41,800.0	34,276.0	39,226.0	32,483.0	29,028.0	29,807.0	22,525.0	-	-	-	1,032,279.0
Stockpile Addition																
Stockpile	LG MG HG	t x 1000	58.8	35.5	26.4	28.9	57.5	1.1	31.7	71.1	70.5	-	-	-	-	4,927.3
	Cu	%	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	-	-	-	-	0.11
	Au	g/t	0.17	0.15	0.14	0.14	0.12	0.14	0.13	0.10	0.09	-	-	-	-	0.12
	Mo	%	0.014	0.009	0.008	0.008	0.004	0.007	0.006	0.005	0.002	-	-	-	-	0.009
Stockpile Recovery																
Stockpile	LG MG HG	t x 1000	-	-	-	-	-	-	-	-	-	4,385.1	-	-	-	4,927.3
	Cu	%	-	-	-	-	-	-	-	-	-	0.10	-	-	-	0.11
	Au	g/t	-	-	-	-	-	-	-	-	-	0.11	-	-	-	0.12
	Mo	%	-	-	-	-	-	-	-	-	-	0.008	-	-	-	0.009
Milling																
	Feed	t x 1000	27,375.0	27,375.0	27,375.0	27,375.0	27,375.0	27,375.0	27,375.0	27,375.0	27,375.0	26,415.4	-	-	-	599,399.0
	Cu	%	0.16	0.18	0.18	0.17	0.18	0.15	0.17	0.20	0.18	0.15	-	-	-	0.18
	Au	g/t	0.28	0.30	0.28	0.24	0.23	0.22	0.23	0.24	0.22	0.18	-	-	-	0.24
	Mo	%	0.014	0.011	0.008	0.008	0.006	0.009	0.009	0.008	0.005	0.004	-	-	-	0.008

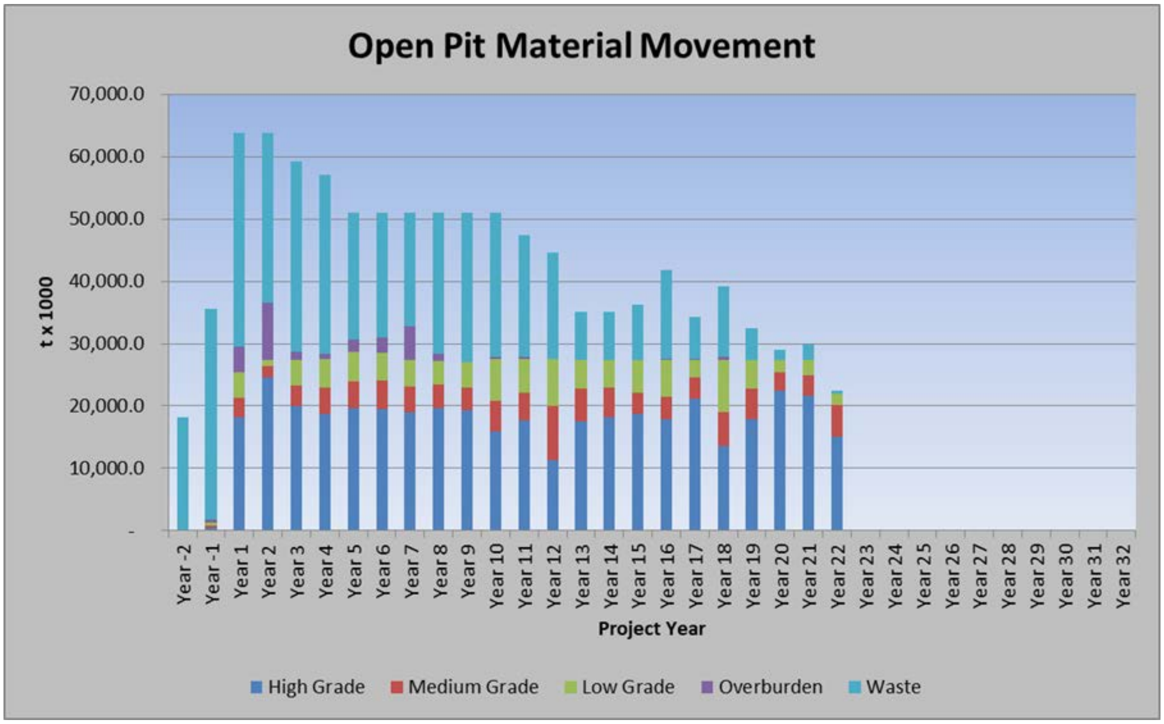


Figure 16-13: Material Movement Schedule

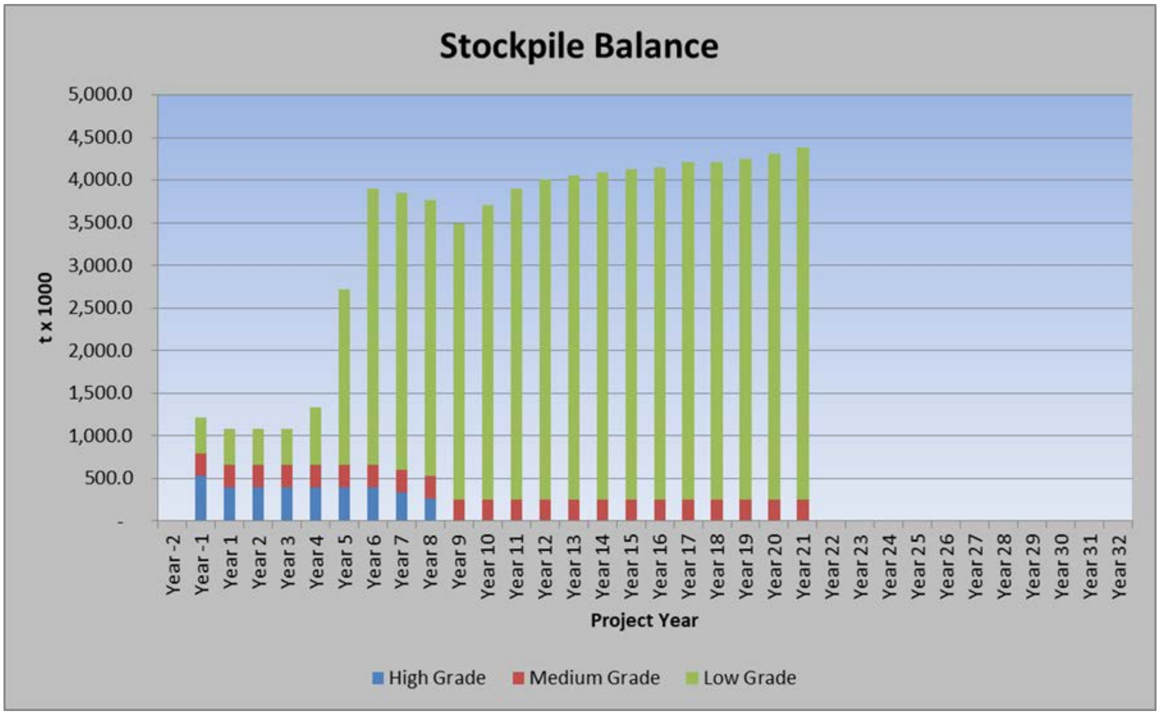


Figure 16-14: Stockpile Balance

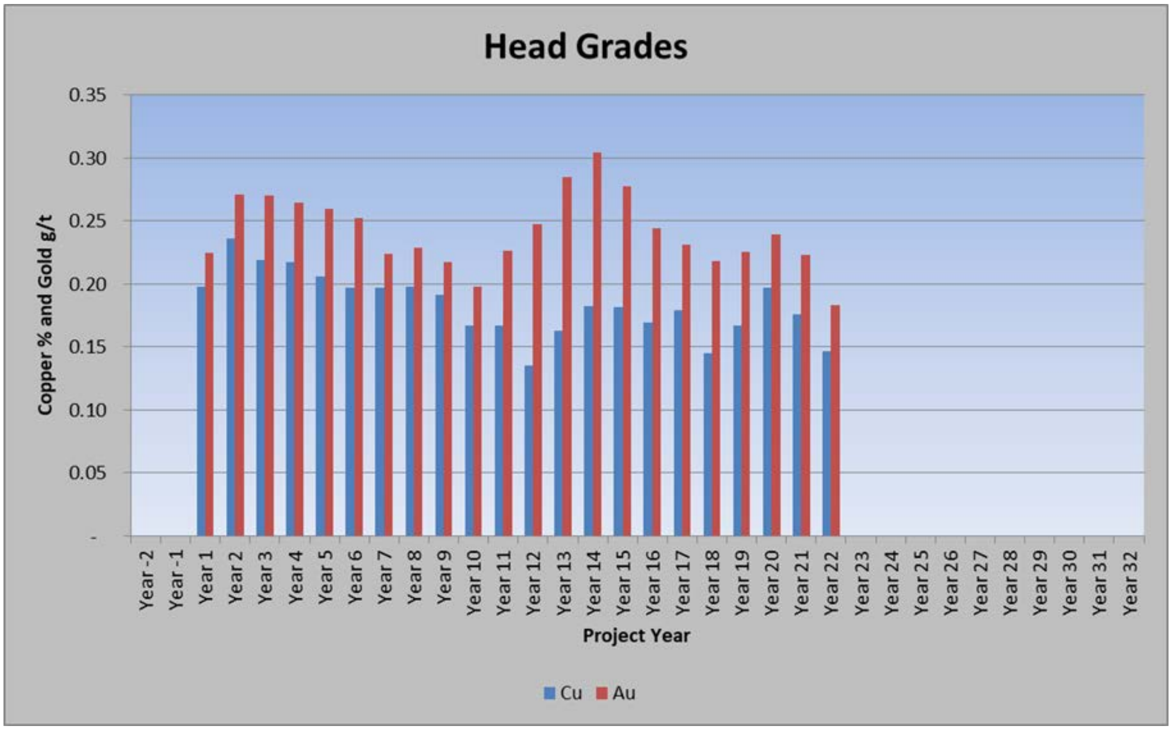


Figure 16-15: Head Grades

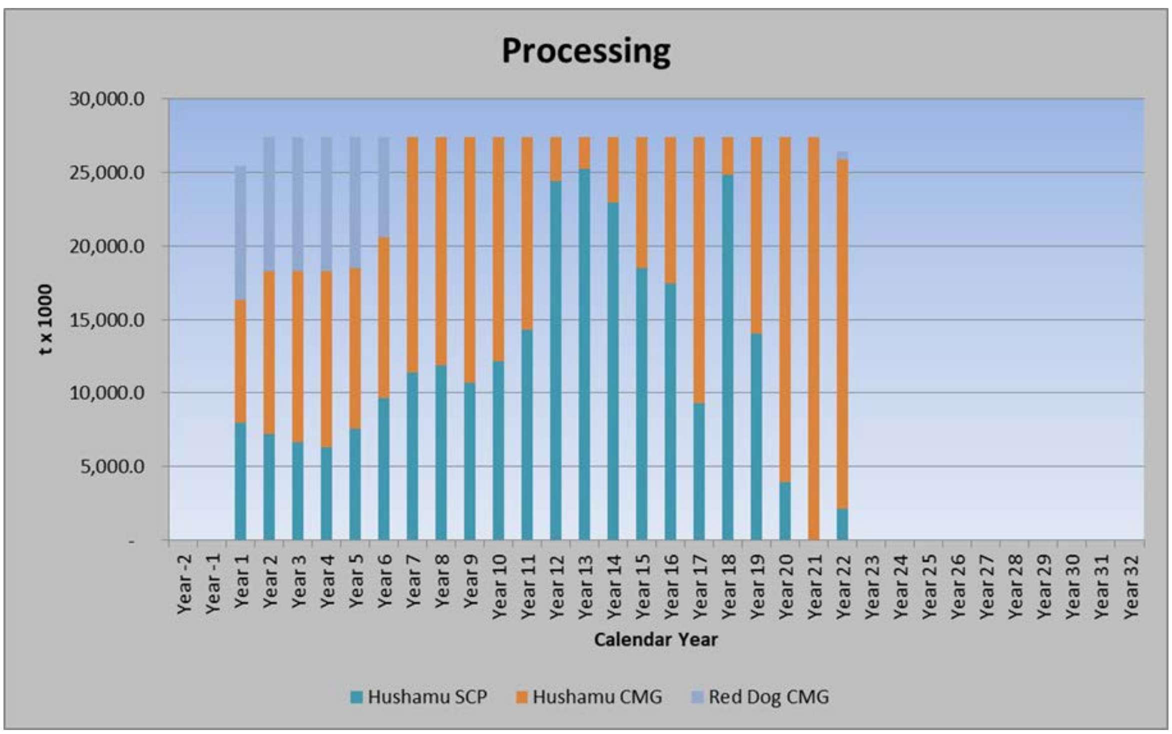


Figure 16-16: Processing Throughput

16.6 MATERIAL HANDLING

The primary crusher at Hushamu will be located at the 340-m elevation approximately 200 m east of the crest of the final pit limit. The Red Dog primary crusher will be located approximately 100 m from the crest of the pit. Crushed material will be transported by overland conveyor to the concentrator located above the TMF at approximately the 580-m elevation.

16.7 MINING EQUIPMENT

16.7.1 Drilling and Blasting

Blasthole drilling will be carried out with diesel rotary drills at Red Dog and electric rotary drills at Hushamu. The production blast patterns will be equivalent to 8.2 m x 9.4 m on a 15-m bench for a powder factor of 0.25 kg/t, assuming a 60% emulsion mix for water resistance. Buffer rows will be drilled at reduced burden and spacing and line holes will be drilled and blasted using a diesel hydraulic percussion drill prior to production blasting.

Explosives will be delivered, loaded to the borehole and initiated by a supplier. Drilling and blasting will be supervised by the drilling and blasting foreman.

16.7.2 Loading

The loading fleet at Hushamu will consist of three 29 m^3 hydraulic shovels and two 20 m^3 wheel loaders. It is proposed to locate a wheel loader at Red Dog where it can move between multiple operating faces at various elevations with considerable flexibility. A service road along the conveyor alignment will provide access to move trucks, shovels and support equipment back and forth to the mine maintenance facilities at Hushamu. The shovels will be located at Hushamu where multiple pit phases will be active at various elevations over the life of mine.

16.7.3 Hauling

The haulage truck size was standardized for both mines. A 220-tonne capacity truck is proposed for haulage of ore and waste. Pioneering areas will be developed using smaller contractor equipment until adequate space is available for the primary fleet. The fleet will build over time peaking at 18 units in Year 1 of the mine plan. Major rebuild allowances have been made for trucks at 75,000 hours on an as required basis.

16.7.4 Support Equipment

The support equipment fleet will include wheel dozers, track dozers, graders, water and sand trucks as well as a collection of smaller support equipment items as shown in Table 16-9.

Table 16-9: Mine Equipment Fleet Requirement

Mine Equipment Requirement																									
Typical Unit	Equipment Requirement	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22
Rotary Blasthole Drill	Atlas Copco Pit Viper 271	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Hydraulic Drill	Atlas Copco FlexiRoc D60	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Hydraulic Shovel	Komatsu PC5500 LS D	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Hydraulic Shovel	Komatsu PC4000 LS D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haul Truck	Komatsu 830E-AC	5	12	18	18	18	18	18	18	18	18	18	18	17	16	13	13	13	13	13	13	13	13	13	13
Track Dozer	Komatsu D375A-6	3	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	4	4	4
Wheel Dozer	Komatsu WD600-6	0	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2
Grader	Komatsu GD825A2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Water Truck	Komatsu HD785-7 with 20,000 Gal	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Sand Truck	Komatsu HD785-7	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Blasthole Stemmer	Komatsu SK820-6 Skid Steer Loader	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Wheel Loader	Komatsu WA600-6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Haul Truck	Komatsu HD465-7E0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Excavator	Komatsu PC800SE-8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Vibratory Compactor	Caterpillar CP64	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Backhoe	Komatsu WB97R5E0X	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cable Reeler	WA600 w CWS Reeler	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Fuel and Lube Truck	Russel	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Flatbed Hiab Truck	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Snow Plow and Sand Truck	Kenworth	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rough Terrain Crane	Linkbelt Rough Terrain RTC 8090	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rough Terrain Forklift	Hyster 700 / IMAC TM35	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Shop Forklift	Taylor-360M Forklift	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mechanics Truck	8100 National	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Welding Truck	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Engineering Pickup	0	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Pit Services Pickup	0	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Engineering Pickup	0	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Pit Services Pickup	0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Pit Services Bus	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pit Services Bus	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Shovel Crew Flat Deck	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Shovel Crew Hiab	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Surface Crew Hiab	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Surface Crew Stinger	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Lighting Tower	Amida	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Hydraulic Hammer	TB-XC Hydraulic Breaker	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mine Rescue Vehicle	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

16.7.5 Mine Dewatering

The Hushamu Red Dog site is subject to a significant amount of precipitation on an annual basis. Mine dewatering will be required to depressurize wall slopes and to manage surface accumulations within the open pit footprint. Collected water will be pumped to the processing plant as make-up water or to the TMF for reclaim to process.

16.7.6 Geotechnical Review

No wall slope or stockpile geotechnical assessments were available for incorporation in this Preliminary Economic Assessment. Recommendations for future work include:

- Condemnation drilling in any proposed stockpile areas.
- Foundation condition assessments in overburden and low-grade stockpile areas.
- Wall slope assessments based upon preliminary pit limits developed in this study along with a description of the detailed design elements to be used in the implementation of these recommendations.
- Additional overburden material characterization for dam construction purposes.

17 RECOVERY METHODS

The North Island Copper and Gold Project (the “Project”) will consist of an open-pit mine, mineralized material processing facility, and miscellaneous infrastructure and support facilities. The Project is located approximately 27 kilometres west of Port Hardy, British Columbia, Canada, along the north shore of Holberg Inlet in Northern Vancouver Island. Copper, gold and molybdenum mineralized material will be mined.

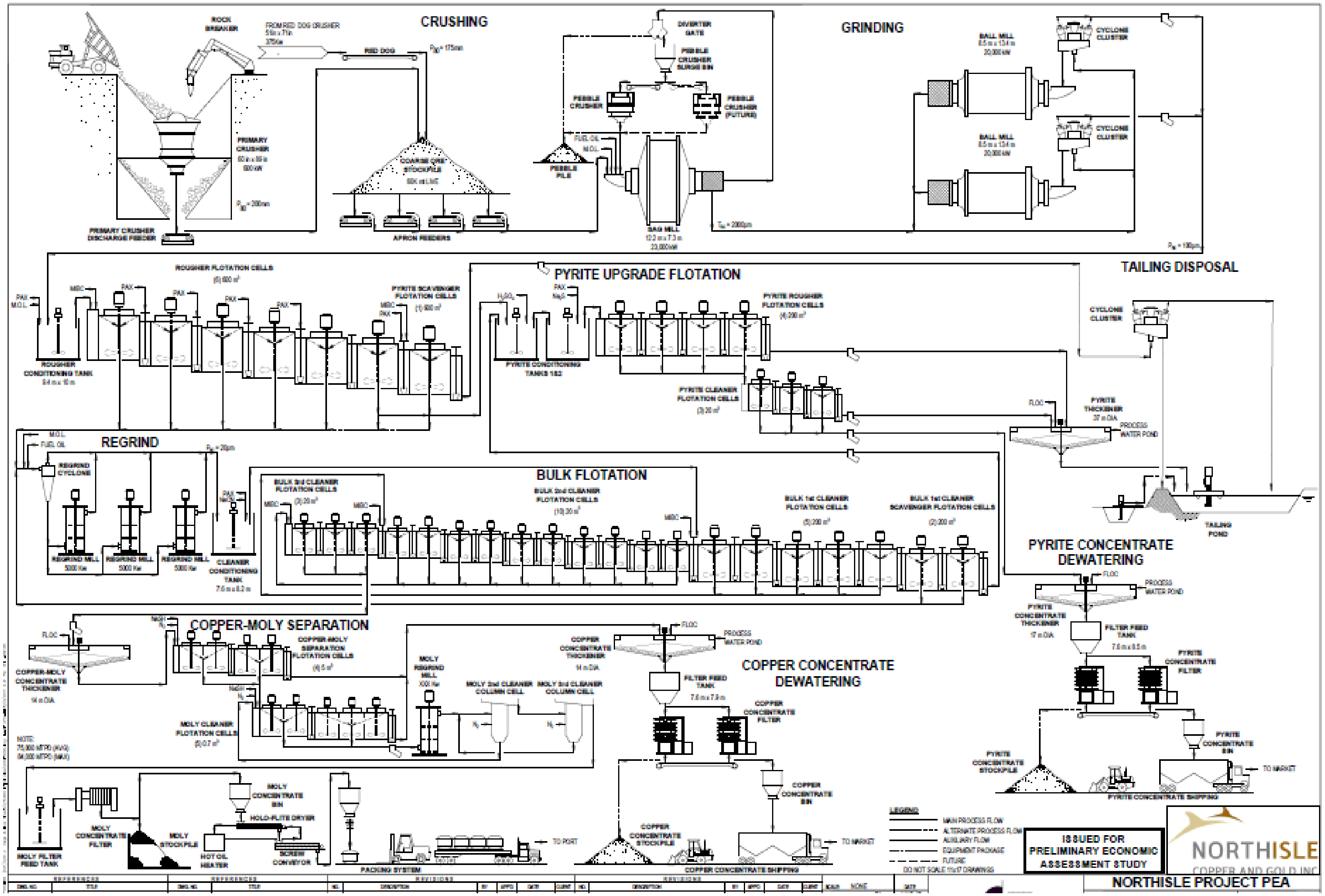
The Project mineralized material facility will produce copper/gold, molybdenum and pyrite concentrates. The nominal capacity of the mineralized material processing facility is 75,000 dry metric tonnes per day (dmtpd) or 27,375,000 dry metric tonnes per year (dmtpy). The plant capacity will fluctuate according to the hardness of the mineralized material type being milled, up to a maximum of 84,000 tonnes per day when soft mineralized material is being milled.

Sufficient mineralized material is available for approximately 22 years at this production rate. The Life-of-Mine ore grade is 0.19% copper, 0.24 g/t gold and 0.008% molybdenum. The milling process will sequentially extract the Cu-Au and sulfide minerals into separate Cu-Au and molybdenum mineral concentrates via the flotation process. The Cu-Au concentrate will be loaded onto trucks for shipment to the port of export and the molybdenum concentrate will be sent to a packaging system and bagged in super sacks for shipment by trucks to market.

A marketable pyrite concentrate will be produced by floating pyrites from the bulk flotation tailings via a pyrite upgrade flotation circuit. The clean pyrite concentrate will be thickened, filtered and loaded into over-the-highway trucks for shipment. The selected process design basis and the main physical features of the mineralized material processing facility are outlined here.

A summary diagram of the overall process flowsheet is presented in Figure 17-1. Process unit operations that will be used include:

- Primary crushing
- SAG mill grinding
- Ball mill grinding
- Bulk rougher flotation
- Bulk flotation concentrate regrinding
- Bulk 1st, 2nd and 3rd cleaner flotation
- Pyrite upgrade rougher flotation
- Pyrite upgrade cleaner flotation
- Copper-moly separation flotation
- Moly cleaner flotation
- Cu-Au concentrate dewatering
- Moly concentrate dewatering
- Pyrite concentrate dewatering
- Tailings handling and disposal



Source: M3, 2017

Figure 17-1: Overall Process Flow Sheet

17.1 PROCESS DESCRIPTION

The following items summarize the process operations required to extract copper, gold and molybdenum from the NorthIsle mineralized material:

- Reducing the size of the ore from Run-of-Mine (ROM) to minus 200 mm using a primary gyratory crusher.
- Stockpiling primary crushed ore from both the Hushamu and Red Dog deposits and then reclaiming it with feeders and conveyor belts.
- Grinding of the ore in a semi-autogenous (SAG) mill - ball mill circuit prior to processing in a flotation circuit. The SAG mill will operate in closed circuit with a trommel screen and pebble crushers (SABC circuit). The ball mills will operate in closed circuit with hydrocyclones to deliver a product size of 100 microns to the flotation circuit.
- Concentration and separation of the copper and molybdenum sulphide minerals by froth flotation. The copper and molybdenum minerals will first be concentrated into a bulk copper/molybdenum concentrate. The molybdenum mineral will then be separated from the copper minerals in a molybdenum flotation circuit. The bulk (copper-moly) flotation circuit will consist of rougher flotation in mechanical flotation cells, first cleaner flotation in mechanical cells, concentrate regrind, second cleaner flotation and third cleaner flotation. The molybdenum flotation circuit will consist of a copper-moly concentrate thickener, molybdenum rougher flotation, first cleaner flotation, concentrate regrind, second and third cleaner flotation circuits. The first two stages of flotation will be in mechanical cells, while the final two stages will be carried out in column cells.
- Final copper concentrate will be thickened, filtered, and loaded in over-the-highway trucks for shipment. Final molybdenum concentrate will be filtered, dried, and packaged into super sacs for shipment, also in over-the-highway trucks.
- Pyrite from the bulk Cu-Mo rougher flotation tails will be removed in a pyrite scavenger flotation circuit to produce pyrite flotation tailings with a low sulfide sulfur concentration. The tailings will be cycloned with the underflow recovered as sand for tailings dam construction and overflow reporting to the tailings disposal impoundment site.
- Pyrite scavenger flotation concentrate will be combined with the bulk cleaner flotation tailings and sent to a pyrite upgrade flotation circuit where pyrite will be floated to produce a marketable pyrite concentrate. The pyrite upgrade flotation tailings, which will still have some pyrite, would be deposited sub-aqueously with the fine fraction of the pyrite scavenger flotation tailings in the Mine Waste Storage Facility.
- Final clean pyrite concentrate will be thickened, filtered and loaded into over-the-highway trucks for shipment.
- Water from tailings and concentrate dewatering will be recycled for reuse in the process. Plant water stream types include: process water, fresh water, potable water, and fire water.
- Storage, preparation, and distribution of reagents used in the sulfide ore process. Reagents include: Potassium amyl xanthate (PAX) collector, methyl isobutyl carbinol (MIBC, frother), quick lime (CaO), fuel oil (molybdenum collector), NASH, sodium cyanide, sodium sulfide, sulfuric acid, nitrogen, antiscalant and flocculant.

17.1.1 Reagents Storage and Handling

Reagents requiring handling, mixing, and distribution in the NorthIsle processing plant are presented in Table 17-1 below together with their usage rates.

Table 17-1: NorthIsle Reagents

Reagent Identification	Function	Usage Rate, kg/tonne mill feed
PAX (Potassium Amyl Xanthate)	Collector	0.050
Lime	pH Modifier	0.900
Sulfuric Acid	pH Modifier	0.25
MIBC	Frother	0.100
Sodium Cyanide	Cu Depressant	0.010
Sodium Sulfide	Pyrite Activator	0.050
Flocculant	Particle Settling Aid	0.100
Fuel Oil	Moly Collector	0.020
Antiscalant	Scale Building Control	0.005

17.1.2 Water Systems

The water system for the NorthIsle Project site will consist of three types of water: fresh water from wells, process water (reclaim), and mine site excess water.

Fresh water from three wells will be pumped to the fresh water transfer tank from where it will be pumped to the fresh/fire water tank for distribution.

Process water will be supplied from the reclaim water pond to the process water tank from where it will be distributed for use in the plant. Process water to the reclaim water pond would come from the tailings pond, pyrite concentrate dewatering, pyrite tailings dewatering and copper concentrate dewatering. Fresh water make-up to the process water tank will come from the fresh/fire water tank or excess mine site water.

17.2 PROCESS DESIGN CRITERIA

Table 17-2 and Table 17-3 are summaries of the main components of the process design criteria used for the study.

Table 17-2: Process Design Criteria Main Components

Description	Design
Capacity	
Tonnes per day, nominal	75,000
Tonnes per year	27,375,000
Availability (excluding start-up)	
Primary Crushing	75%
Grinding and Flotation	92%
Concentrate Handling	85%
Primary Crushing	
Feed F_{80}, mm	1000
Product P_{80}, mm	200
Crushing work index, kWh/t (assumed)	5.45
SAG Mill Grinding	
Feed F_{80}, mm	175
SAG Mill SMCT	
A x b (SCP)	61.2
A x b (CMG)	51.6
Ore SG	2.75
Ball Mill Grinding	
Feed F80, microns	2,000
Product P_{80}, microns	100
Ball Mill Work Index, kWh/t, (SCP)	13.2
Ball Mill Work Index, kWh/t, (CMG)	16.1
Ball Mill Work Index, kWh/t, (Red Dog)	15.8
80th percentile (design) Work Index	15.3

Table 17-3: Flotation Design Basis

	Lab Time, (min)	Plant Scale-Up Factor	Aeration Factor (%)	Flowrate (m^3/hr)	Cell Volume (m^3)	Number of Cells	Installed Retention Time (min)
Conditioning tank	5						
Rougher	8	2	10	8456	600	6	23.2
Pyrite Scavenger	1	2	10	6457	600	1	5.1
Bulk Flotation							
Conditioning tank	5						
1st cleaner	5	3	15	4316	200	5	12.1
1st Cleaner Scavenger	2	3	15	3843	200	2	5.9
2nd cleaner	4	3	15	831	20	10	12.6
3rd cleaner	3	3	15	254	20	3	12.3
Pyrite Upgrade							
Conditioning tank	5						
Pyrite rougher	5	2	10	8634	200	4	11.3
Pyrite upgrade cleaner	3	3	10	305	20	3	10.7
Copper-Moly Separation							
Copper-moly separation (rougher)	5	3	15	53.3	4	4	19.5
Moly 1st cleaner	4	3	15	13.1	0.7	5	14.1
2nd cleaner	-	-	-	-	-	-	-
3rd cleaner	-	-	-	-	-	-	-

Table 17-4: Metal Production Design Rate

LOM Head Grades	Cu	Au	Mo
(%, gpt)	0.19	0.24	0.008

Table 17-5: Metallurgical Performance Estimate

Product	Geological		Assays, gpt or %					Recovery, %				
		% Mass Pull	Cu	Mo	Fe	S	Au	Cu	Mo	Fe	S	Au
Zone	Type											
Hushamu	CMG	0.9	21.7	0.41			13.8	78	55			44
Hushamu	SCP	1.2	19.2	0.77			10.4	75	65			34
Red Dog	-	1.2	24.2				14.3	88	*55*			*35*

Note: Hushamu data is based on locked cycle tests. Red Dog data is an estimate made from batch testing.

Table 17-6: Metal Production Design

Basic Design	Cu	Au	Mo
Mine Head Grades (%)	0.19	-	0.008
Mine Head Grades (g/t)	-	0.24	-
Overall Plant Recovery (%)	77.4	38.8	59.5
Production, average tpd, Cu & Mo oz/d Au	110	225	3.6

18 PROJECT INFRASTRUCTURE

18.1 POWER SUPPLY

A new 36 km 138 kV power line will be constructed from an existing BC Hydro electrical substation in Port Hardy to feed the mine site, as shown in Figure 18-1. A new 28 km 34.5 kV powerline will be constructed for site distribution.

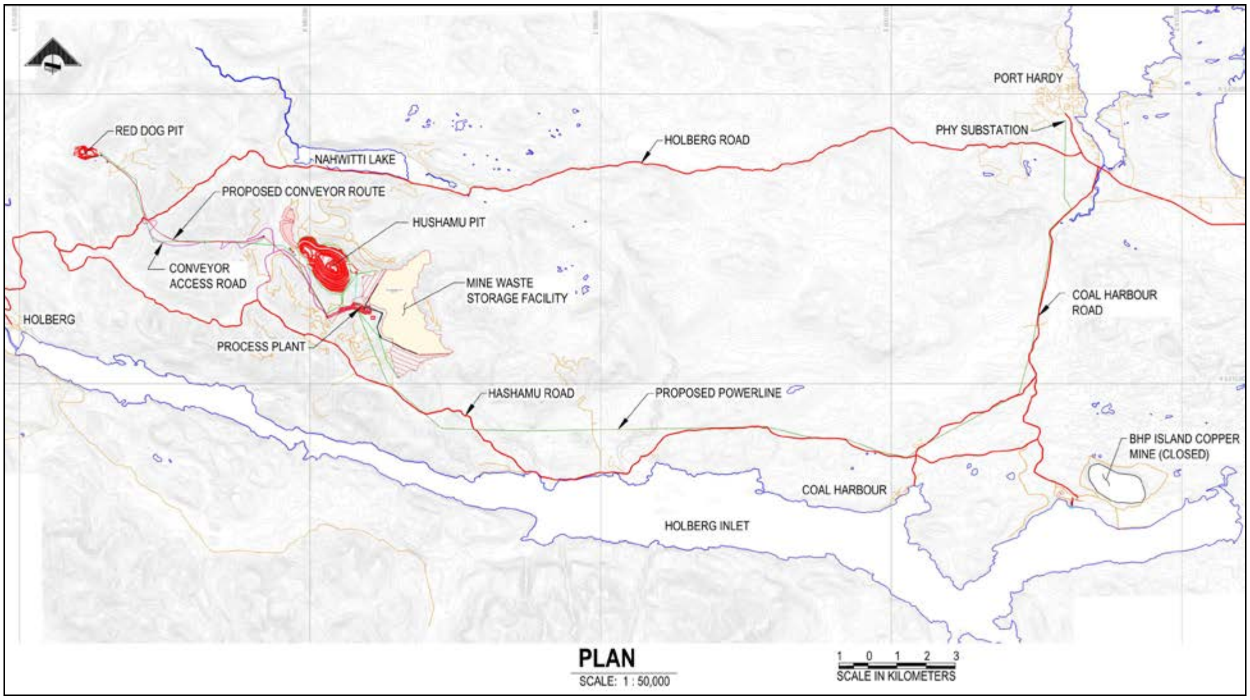


Figure 18-1: General Site Plan and Powerline

18.2 WATER AVAILABILITY

Water balance modelling results indicate that there is generally an excess of water generated at the mine facilities, particularly in the winter months. Discharge of excess water from the mine site, following treatment as necessary, will be required. Make up water for process plant operations can be met without the need for water to be sourced from outside of the mine. Average annual site precipitation is 3.9 m.

18.3 MINE WASTE STORAGE FACILITY

The proposed Mine Waste Storage Facility (MWSF) will be located in the Hushamu Valley to the east and south of the Hushamu Pit, shown in Figure 18-2.

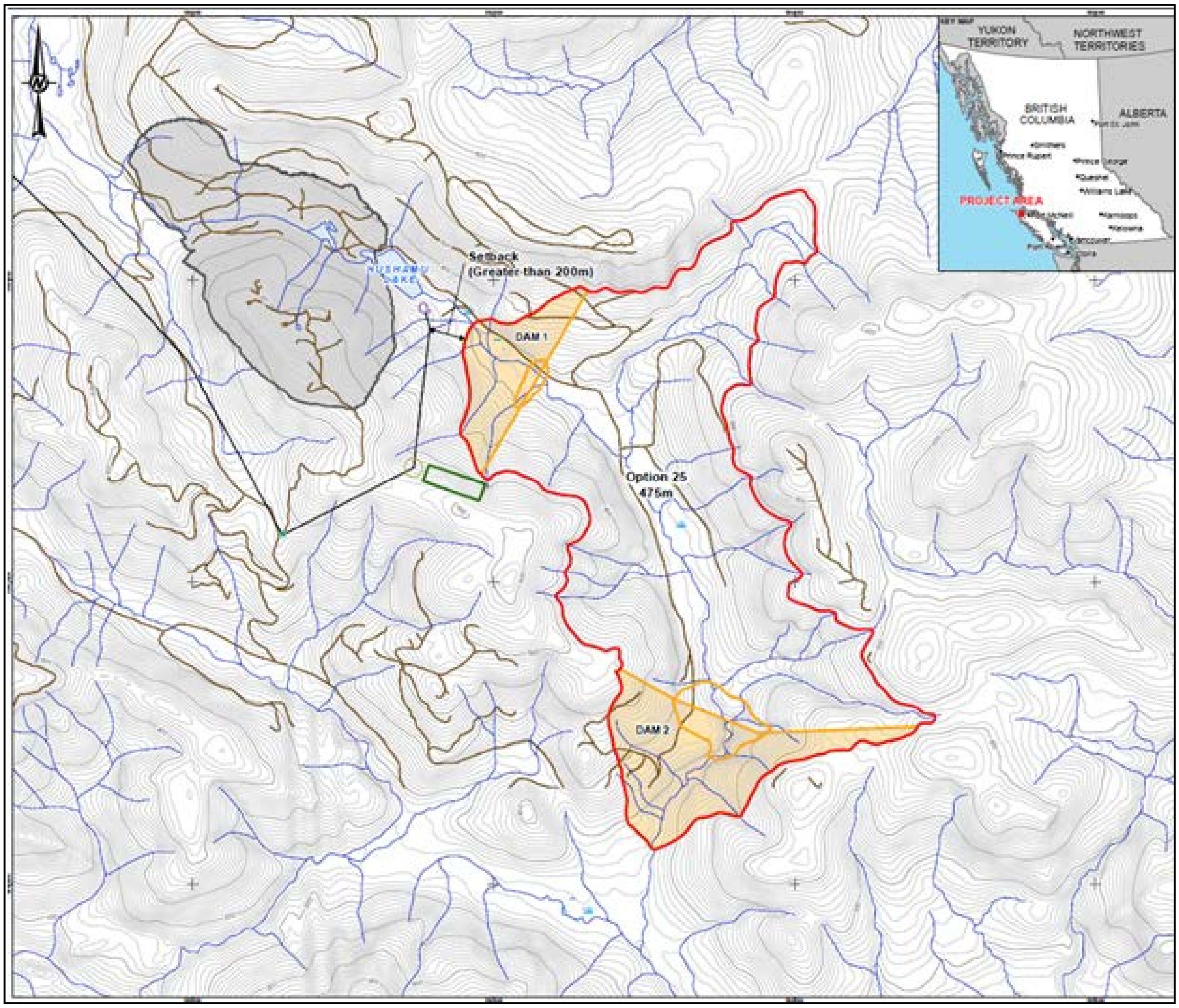


Figure 18-2: Mine Waste Storage Facility

The conceptual design for the MWSF for this PEA is based on desktop studies, interpretation of satellite imagery and topographic contours, and also on a site inspection by Ben Wickland, P.Eng. on April 12, 2017. No site investigations for geotechnical conditions were conducted to support the conceptual design. Similarly, limited geochemical characterization of the mine wastes was available for this study.

The MWSF will be defined by two dams that cross the Hushamu Valley approximately 2.5 km apart. The MWSF will store 396 Mt of waste rock from the Hushamu pit, and also 450 Mt of tailings from milling of ore from the Red Dog and Hushamu Deposits. Waste rock from the Red Dog Deposit and overburden from pit stripping will not be stored in the MWSF. The waste for the Red Dog Deposit will be stored adjacent to the Red Dog pit, then re-handled to the pit at closure. Overburden from the Hushamu pit will be stored in a stockpile adjacent the pit and will be used for closure of the MWSF.

Site features considered relevant to the MWSF design include:

- The site falls within the Cascadia subduction zone and the MWSF will be subject to large earthquakes.

- 3,911 mm average annual precipitation, with 3,818 mm as rainfall and 930 mm as snowfall, as reported by the Holberg Fire Department (Golder 2013).
- The site is in mountainous terrain with relief from approximately 150 to 725 masl, with several landslides observed on the valley walls, often associated with access roads.
- Reports by others indicate the MWSF site is located above barriers to anadromous fish (fish that migrate from the sea to rivers and streams to spawn) (Golder 2013).
    - Drainage to the north of the Hushamu pit passes over the Hepler fish barrier to Nahwitti Lake.
    - Drainage to the south end of the Hushamu Valley passes over the Hushamu fish barrier to Holberg Inlet.

The MWSF site location was selected based on a siting options study (Golder 2013) for having reduced environmental impacts related to a) non-anadromous fish bearing waters, and b) a single watershed with reduced requirements for water management. The site meets storage criteria and is close to the Hushamu Deposit. Scenarios for use of the Island Copper pit for tailings storage were also considered, though not advanced for this PEA. Similarly, tailings disposal technologies for thickening, paste, and filtering were evaluated with respect to environmental, technical and economic benefits. These studies have resulted in the conceptual MWSF design carried in this PEA.

The conceptual level design of the MWSF includes a dam development sequence, stability analyses, yearly mass balance, and a preliminary water balance. Volumetric models for the MWSF were developed from publicly available topographic data to estimate quantities for dam construction and struck level storage capacity estimates using GoldTail, a proprietary software for tailings deposition planning (Golder 2017).

A typical dam section is shown in Figure 18-3 and dam geometry is shown in Table 18-1. The outer shells of the dam will be constructed of compacted sand from cyclone classification of the tailings. The core of the dam will be till, extending from the starter dam. Waste rock will be placed against the upstream face of the till core, and tailings are deposited between the dams. The waste rock will effectively widen the dam and provide containment to the tailings. The waste between the dams is flooded to limit acid generation, with operation of a reclaim pond in the central portion of the facility. The sand shells of the dams will have under drains, and require downstream ponds for capture and return of seepage and sand transport water. Classification by cyclones is required to produce sand of a suitable quality for dam construction. The outer sand shells of the dams will be maintained in a drained, unsaturated condition as a primary control against liquefaction under earthquake and static loading. The sand in the dams is compacted as a secondary control on liquefaction, should the sand become saturated. The mass balance for the dams indicates recovery of approximately 27% of the total tailings mass as sand is required over the life of mine.

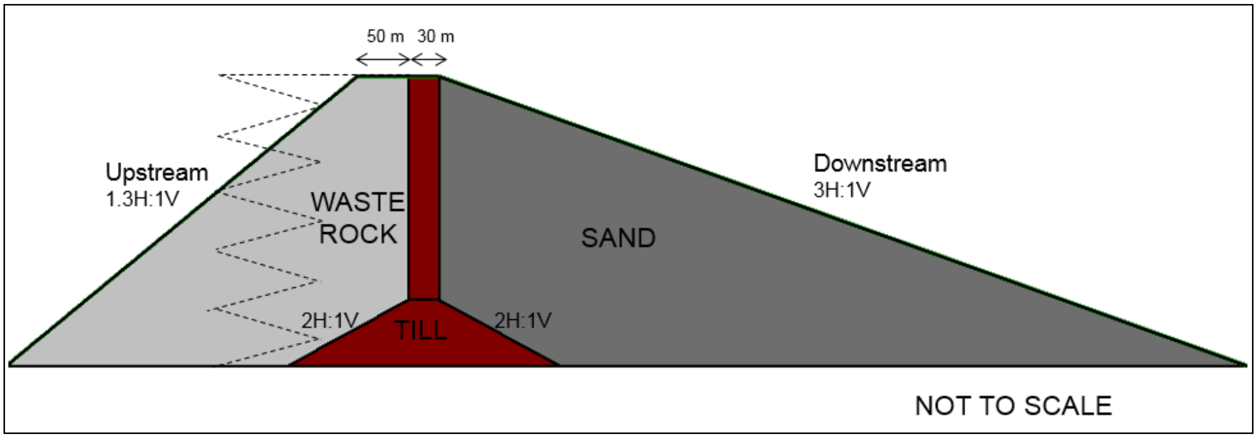


Figure 18-3: Conceptual Dam Section

Table 18-1: Summary of Mine Waste Storage Facility Dam Geometry

Dam	Height (m)	Crest Elevation (masl)	Crest Length (m)	Crest Width (m)	Upstream Slope (xH:1V)	Downstream Slope (xH:1V)	Construction
Dam 1 Starter	30	310	370	30	2	2	Till embankment
Dam 1 Sand Dam	195	475	2,100	80	-	3	Centerline raise of downstream sand shell and till core
Dam 2 Starter	117	310	570	30	2	2	Till embankment
Dam 2 Sand Dam	280	475	1,420	80	-	3	Centerline raise of downstream sand shell and till core

masl = metres above sea level

Limited test data indicates the tailings will be potentially acid generating, and waste rock will be potentially acid generating to non-potentially acid generating. The MWSF is therefore designed for subaqueous storage of waste to limit potential for acid generation. The sand for the dams is assumed to be non-acid generating.

The site is in the Cascadia subduction zone and the MWSF will be subject to large earthquakes. Preliminary dam slope stability analyses by pseudo-static limit equilibrium methods indicate the dams will meet criteria for stability in response to earthquake loading. The analyses were based on the dam conceptual section and model geometry, assumed material properties and assumed foundation conditions. Given the magnitude of the earthquake peak ground acceleration at the site (> 0.38 g), and given the size of the proposed dams, a dynamic deformation analysis is required to support further development of the design. Recommendations are provided in Section 26.

The final total area of the MWSF will be near 6.4 km^2 and will produce on the order of 25 M m^3 of run-off per year, considering an average of 3.9 m of rain per year. The closure concept for the MWSF is to create a landform by covering the dams to protect against erosion, drawing down the water pond, placing a soil cover over the waste, and installing a spillway in rock adjacent to Dam 2 for controlled release of run-off.

18.4 TRANSPORTATION AND LOGISTICS

The Port Hardy area of northern Vancouver Island where the NorthIsle mine will be constructed is well-serviced by all-weather paved public highways to within about 30 km of the mine-site. Access to the mine from the public highways will be from improved gravel woodlands operation roads. The Port of Naniamo, which is a major general cargo and container port, is approximately 400 km from the NorthIsle mine-site via public highways. There are a number of tug and barge operators that provide service to Port Hardy and Port McNeil that can be utilized to transport bulk materials and equipment to the Project. Transportation of equipment and bulk materials during construction and operating phases of NorthIsle Project is outlined below.

18.4.1 Construction Phase

1. Materials and equipment from Canadian and offshore sources will be transported to site by over-the-highways transport services.

2. To the extent practical, shipments of over-weight/over-dimension equipment will be consolidated and transported to Rupert Inlet via the Quatsino Sound by ship and off-loaded by ship's gear onto barges and then transported by heavy haul equipment approximately 30 km to site. When this is not practical, over-weight/over-dimension equipment will be received at the Port of Naniamo and transferred to heavy haul equipment to make the transit to the Project site.

3. Bulk material and large equipment received in the Vancouver area from suppliers and fabricators will be loaded onto barges to be delivered to the existing/new barge ramp facilities in Port McNeil, then transported by highways haulage equipment to the Project site.

18.4.2 Operating Phase

1. Lime and grinding media will be shipped from the delta area near Vancouver in modified sea containers by barge (approximately 4,000 tonne class barges) to Port McNeil (approximately 50 km from the Project site) and transferred onto highway haulage units for transport to the Project site.

2. The containers will be off-loaded at site by a heavy forklift and the containers, as needed, will be placed on container tipping systems to empty the containers into the receiving and storage facilities. Empty containers are returned to Port McNeil for backhaul to the commodity suppliers.

3. Bulk bag molybdenum oxide is shipped to the Vancouver delta area for on-shipment via the barge backhaul service.

4. Wherever practical, shipment of other supplies and equipment to support operations will be consolidated at the barging facility in the Vancouver delta area to provide economic transport to site.

18.5 CONCENTRATE RECEIVING, STORAGE AND LOADOUT FACILITIES

During the operation of BHP's Island Copper mine, copper concentrates were shipped through the Quatsino Sound to Asia via bulk carrier vessels (up to 32,000 DWT handy-size vessels) from the marine terminal owned and operated by BHP on Rupert Inlet. Concentrates were stored in a concentrate receiving, storage and loadout facility ahead of the ship loader and marine facility. After closure of the mine, most of the onshore storage facilities were demolished but the ship loader and marine terminal remain in place.

The industrial site where the concentrator, concentrate receiving, storage and loadout facilities, along with other structures were located, was transferred to the Quatsino First Nation while ownership of the ship loader and marine structure remains with BHP. NorthIsle proposes to establish a new concentrate receiving, storage and loadout facility at the existing industrial site under a commercial agreement to be negotiated with the Quatsino First Nation.

The existing ship loader is not in operating condition and will need to be refurbished or replaced. The existing marine terminal will require significant repair and refurbishment to provide a safe reliable berthing and loadout facility. The PEA assumes that a suitable commercial arrangement to refurbish and operated these facilities will be negotiated between Northisle & BHP at a future date.

Per discussions with the BC Port Authority, the Quatsino Sound continues to be an active shipping route although no ships of the handy-size class have made the passage for about a decade. At a future stage of project development, the Port authority will conduct a survey of the proposed shipping route and establish operating parameters and conditions for shipments through the Quatsino Sound.

19 MARKET STUDIES AND CONTRACTS

There has been no work on market studies and there are no outstanding contracts at the North Island Project.

20 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

20.1 ENVIRONMENTAL STUDIES

NorthIsle conducted preliminary water monitoring from the two main creeks in the Hushamu watershed, Hepler and Hushamu creek, over a period of five months in 2011-2012. A total of 10 collection stations were established (Figure 20-1) and samples were collected to measure pH values and stream discharge rates (Table 20-1). Water quality from the Hushamu watershed is poor, with pH values ranging from a low of 3.89 to a high of 5.93.

Table 20-1: Stream Discharge and pH Values, Hushamu Watershed, 2011-2012

	Stream Discharge (m^3/s)									
Sampling Date	H1	H2	H3	W4-S	W4-D	W5	W7	H8	H9	H10
Sep 2011	-	0.09	0.032	-	-	-	-	0.187	0.127	-
Oct 2011	-	0.33	0.095	-	-	-	-	0.122	0.236	-
Nov 2011	-	1.02	0.211	-	-	-	-	0.225	0.584	-
Jan 2012	-	0.51	0.026	-	-	-	-	0.146	0.380	-
Feb 2012	0.607	0.34	0.015	-	-	-	-	0.084	0.220	0.570
	Laboratory measured pH (pH units)									
Sep 2011	4.55	4.30	4.99	4.30	4.50	4.58	4.41	3.89	4.27	5.21
Oct 2011	4.38	4.69	5.21	4.42	5.03	4.56	4.72	4.17	4.49	5.03
Nov 2011	4.59	4.47								
Jan 2012										
Feb 2012										

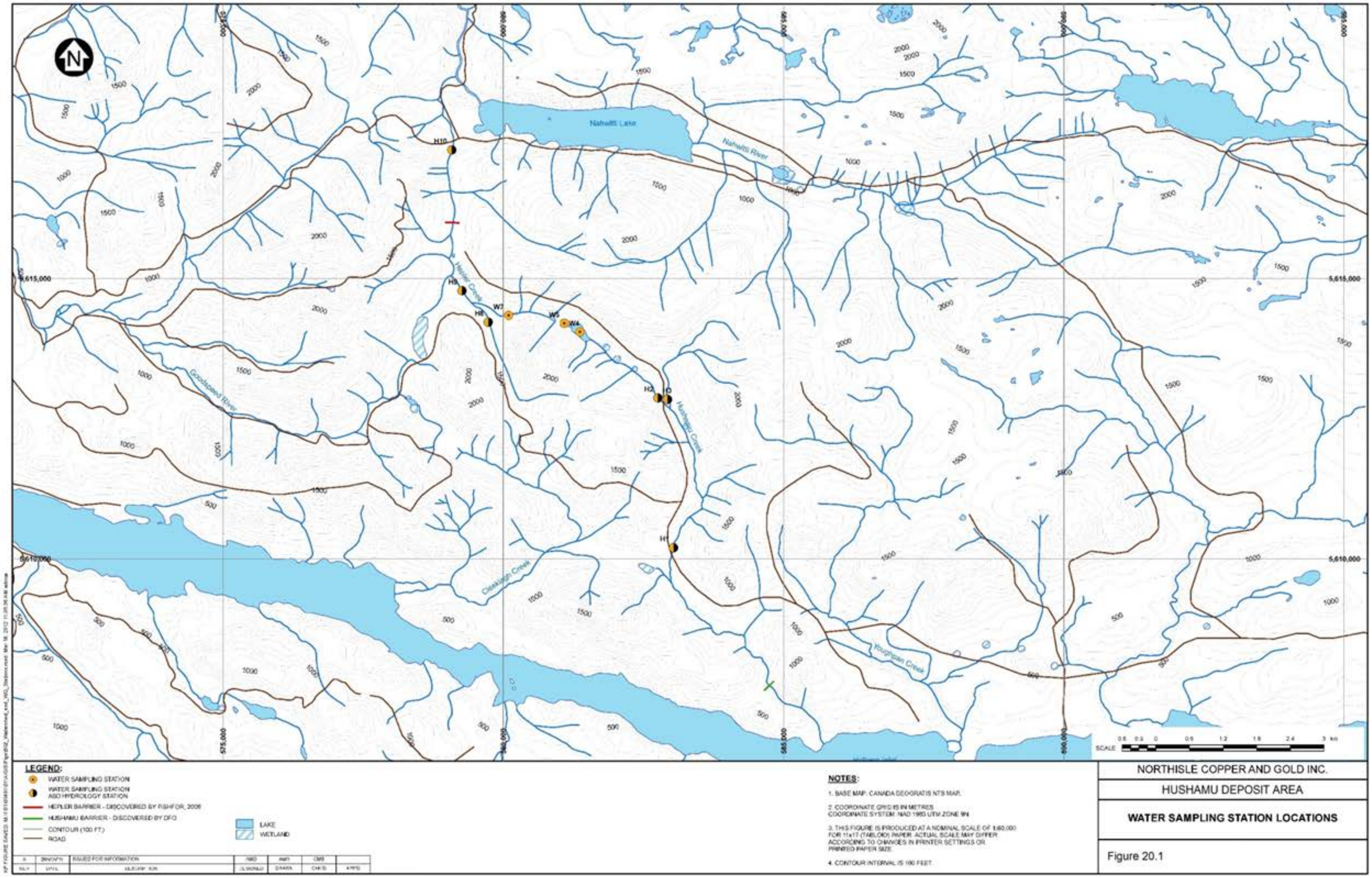


Figure 20-1: Water Sampling Station Locations

20.2 LICENSING AND PERMITTING

There has been no permitting (other than permitting for exploration activities and drilling) at the North Island Project.

Mining projects in BC are subject to regulation under federal and provincial legislation to protect workers and the environment. This section discusses the principal licences and permits that may be required for the Project.

The development schedule is based on the current provincial and federal approval processes. The Project development schedule milestones as outlined below suggests complete approval with necessary permits, licences and authorizations to start construction.

Some key milestones for NorthIsle are:

- Completion of the PEA,
- The Project Description to BCEAO (to be developed and submitted after the PEA)
- Pre-Feasibility Study (timeline to be established and based upon review of the Project Description by BCEAO)
- Complete feasibility study (timeline to be determined)
- Submission of EA (to be determined, predicated on completion of FS)

20.2.1 British Columbia Environmental Assessment Act Process

The BCEAA requires that certain large-scale project proposals undergo an EA and obtain an Environmental Assessment Certificate before they can proceed. Proposed mining developments that exceed a threshold criterion of 75,000 t/a, as stipulated in the Reviewable Project Regulations, are required under the Act to obtain an Environmental Assessment Certificate from the Ministers of Environment and Energy, Mines and Petroleum Resources before the issuance of any permits to construct or operate. The NorthIsle Project will thus require an Environmental Assessment Certificate, because its proposed production rate exceeds the threshold criterion.

20.2.2 Authorizations Required

Major federal and provincial licences, permits, and approvals will be required to construct, operate, decommission, and close the Project. Government regulatory processes evolve over time. Minor permits, licences, approvals, consents, and authorizations, and potential amendments will be required throughout the life of the mine.

20.3 SOCIAL AND COMMUNITY IMPACT

There has been no work involving social and community impact at the North Island Project.

21 CAPITAL AND OPERATING COSTS

21.1 INTRODUCTION

The North Island Coper and Gold Project is an open pit mine, with a concentrator processing nominally 75,000 tonnes per day.

21.1.1 Currency

All values are expressed in Canadian Dollar currency based on end of third quarter 2017. Canadian to US exchange rate is based on $1.33CAD = $1.00US.

21.2 INITIAL CAPITAL COSTS

The capital cost for initial development of the North Island Project is summarized in Table 21-1.

Table 21-1: Capital Cost Summary

Cost Item	Total ($M CAD)
Process Plant and Infrastructure	
Project Directs	$680.1
Project Indirects	$174.0
Contingency	$170.8
Subtotal	$1,024.9
Mine	
Mine Equipment	$149.2
Mine Preproduction	$125.6
Subtotal	$274.8
Owner's Costs	$44.5
Total	$1,344.2

21.2.1 Labour Rates

Burdened labour rates used in the process plant and infrastructure capital cost estimate are shown in Table 21-2.

Table 21-2: Burdened Labour Rates

Trade	Labour Rate ($CAD / hour)
Civil Work	$102.94
Concrete Forming	$103.10
Concrete Placing	$103.10
Reinforcing Steel	$111.26
Structural Steel	$111.26
Equipment Installation	$111.26
Piping	$111.26
Electrical/Instrumentation	$111.26
Instrumentation	$104.15

21.2.2 Contingency

Contingency is a cost that statistically will occur based on historical data. The term is not used to cover changes in scope, errors, or lack of sufficient information to meet a desired accuracy range. Contingency is used to cover items of cost which fall within the scope of work, but are not known or sufficiently detailed at the time that the estimate is developed (e.g. geotechnical data).

21.2.3 Estimate Accuracy

The accuracy of this estimate for those items identified in the scope of work is within the range of plus 30% to minus 25%; i.e. the cost could be 25% lower than the estimate or it could be 30% higher. Accuracy accounts for bidding climate variances from estimate date to actual construction date. Accuracy is an issue separate from contingency.

21.2.4 Mining Capital Cost Estimate

Mining mobile equipment fleet requirements have been estimated on an annual basis for the proposed production schedule. Budgetary pricing estimates for the mobile equipment has been provided by EMG Mining Consultants of Tempe Arizona. Delivered and erected prices provided included estimated freight to Vancouver and barging to site. The exchange rates applied were 1.09 Euro/US$ and $1.30 CAD$/US$.

The mine equipment fleet will include items listed in Table 16-9. However, some items included in this list will be captured in other capital or operating cost centers. The crushing plant, rough terrain forklift and crane will be purchased for construction and the low bed and tire manipulator can be provided by contractors.

Initial equipment capital costs excluding taxes and contingency are summarized in the Table 21-3.

Table 21-3: Mine Capital Cost Summary

Initial Mine Equipment Capital Cost Summary				
		Year -2	Year -1	Total
Code	Area	($ x 1000)	($ x 1000)	($ x 1000)
1	Management	$ -	$ -	$ -
2	Operations	$3,737.4	$417.3	$4,154.7
3	Engineering	$3,422.2	$ -	$1,560.0
4	Geology	$ -	$ -	$ -
5	Technical Services	$ -	$ -	$ -
6	Drilling	$10,109.2	$3,920.5	$14,029.7
7	Blasting	$57.1	$57.1	$114.1
8	Loading	$15,789.1	$15,789.1	$31,578.2
9	Hauling	$28,150.2	$39,410.3	$67,560.5
10	Services	$13,990.4	$10,474.5	$24,464.9
11	Dewatering	$ -	$ -	$ -
12	Maintenance	$3,875.8	$ -	$3,875.8
13	Tire Shop	$ -	$ -	$ -
	Total Capital Costs	$79,131.3	$70,068.7	$149,200.0
	Cumulative Capital Cost	$79,131.3	$149,200.0	

Mine dewatering costs are assumed to be included in the cost center for processing freshwater supply.

Pre-production stripping costs in Table 21-4 have been estimated based upon using the mine equipment fleet. Some additional contractor forces may be required in initial development areas of the upper benches and for access construction. Additional engineering at the Pre-feasibility level is required in these areas to improve cost estimate details for this development.

Table 21-4: Capitalized Preproduction Operating Costs

Summary		Year -2	Year -1	Total
Engineering & Geology	$ X 1000	$2,473.0	$2,473.0	$4,946.0
Mine General	$ X 1000	$4,187.2	$5,444.7	$9,631.9
Drilling	$ X 1000	$2,799.4	$4,839.8	$7,639.2
Blasting	$ X 1000	$6,466.7	$10,414.8	$16,881.6
Loading - Shovels and Loaders	$ X 1000	$5,080.9	$9,341.7	$14,422.6
Hauling	$ X 1000	$10,576.8	$25,370.2	$35,947.1
Contract Services	$ X 1000	$1,177.7	$1,177.7	$2,355.5
Road & Pit Maintenance	$ X 1000	$13,843.2	$19,902.3	$33,745.4
Total	$ X 1000	$46,604.9	$78,964.2	$125,569.1

21.2.5 Owner's Costs

Owner's costs were provided by NorthIsle Copper and Gold Inc. as shown in Table 21-5.

Table 21-5: Owner's Costs

Cost Item	Total ($M CAD)
Capital spares and mobile plant equipment	$12.9
First fills and consumables	$13.5
Spare parts at 3% of plant equipment	$5.6
Special Tools, shop tools & furnishings	$3.0
General goods and services	$3.5
Salary, benefits, payroll adds	$6.0
Total	**$44.5**

21.3 SUSTAINING CAPITAL COSTS

Two areas of sustaining capital costs are mining and the staged progression of the Mine Waste Storage Facility (MWSF).

21.3.1 Mining Sustaining Capital Costs

Sustaining capital costs are provided for equipment additions primarily in the truck fleet as well as ancillary support equipment replacements. Major equipment will undergo rebuilds on a scheduled basis. Allowances have been made for these rebuilds at 40% of new delivered machine costs. See Table 21-6 and Table 21-7.

Table 21-6: Sustaining Mine Equipment Capital Costs

Sustaining Mine Equipment Capital Cost Summary		
		Additions & Replacements
Code	Area	($x1000)
1	Management	$ -
2	Operations	$5,240.5
3	Engineering	$7,020.0
4	Geology	$ -
5	Technical Services	$ -
6	Drilling	$3,920.5
7	Blasting	$456.4
8	Loading	$20,743.1
9	Hauling	$33,780.2
10	Services	$18,874.5
11	Dewatering	$ -
12	Maintenance	$ 8,583.9
13	Tire Shop	$ -
	Total Capital Costs	$ 98,619.1

Table 21-7: Capital Cost Summary – Rebuild Program

Area	$ x 1000
Rotary Blasthole Drill	$ 6,156.0
Hydraulic Shovel	$12,822.0
Wheel Loader	$3,912.0
Haul Truck	$28,886.0
Track Dozer	$6,300.0
Wheel Dozer	$2,166.0
Grader	$4,543.0
Total Capital Costs	$64,785.0

21.3.2 MWSF Sustaining Capital Costs

Sustaining capital costs for the MWSF are based on the total earthworks installed per annum to raise the overall height of the MWSF. Material take offs (MTOs) were provided by Golder. Costs are outlined in Table 21-8 as Q3 2017 Canadian dollars.

Table 21-8: TMF Sustaining Capital Costs

Year	Total ($M CAD)
1	$0
2	$1.95
3	$1.58
4	$1.91
5	$1.39
6	$1.51
7	$1.62
8	$1.73
9	$1.02
10	$2.04
11	$2.22
12	$1.17
13	$1.25
14	$1.26
15	$1.31
16	$1.33
17	$1.42
18	$1.42
19	$1.62
20	$0.82
21	$0.82
22	$1.67
Total	$31.06

21.4 OPERATING COSTS

Table 21-9 summarizes the average LOM operating costs estimated for the NorthIsle mine. The average mine operating costs is CAD$8.66 per tonne of ore.

Table 21-9: Operating Costs

Area	CAD$/ore tonne
Mine	3.32
Processing	4.88
Water Treatment Plant	0.08
General & Administrative	0.38
Total Mine Operating Costs	8.66

21.4.1 Processing Operating Costs

The average process plant operating costs over the life of the NorthIsle mine is approximately CAD$4.88 per tonne ore processed and are summarized by area in Table 21-10.

Table 21-10: Process Operating Costs by Area

Area	CAD$/tonne
Crushing	0.32
Grinding	2.96
Flotation through Tailings Disposal	1.45
Ancillaries	0.15
Total Process Operating Costs	4.88

Table 21-11 below represents the process plant operating cost by element of expense.

Table 21-11: Process Operating Costs by Area

Area	CAD$/tonne
Labor	0.54
Power	1.55
Liners	0.34
Grinding Media	1.06
Reagents	0.85
Maintenance Parts & Repairs	0.44
Supplies & Services	0.10
Total Process Operating Costs	4.88

The annual water treatment costs are estimated at approximately CAD$2.1 million or CAD$0.08/tonne ore.

21.4.2 General and Administrative

The General and Administrative (G&A) costs to support the North Island operations is CAD$0.383/tonne ore including CAD$0.170/tonne ore for labor and fringes. General and Administrative costs include employee salaries and benefits.

21.4.3 Mining Operating Cost Estimate

Mine operating cost estimates have been developed for each unit operation based on the LOM Operating Plan. Staffing levels, consumables, and maintenance costs have been estimated for each cost center. The estimates have been prepared in 2017 Canadian dollars. No allowances have been made at this level of study for escalation and contingency.

21.4.3.1 Basis of Estimate

The work schedule proposed for operations is a 4-shift rotation, with 12-hour shifts operating 24 hrs/day, 365 days/year. The mine workforce will peak at 280 employees including 20 in management, 17 in engineering, 170 in operations and 73 in maintenance.

Operating costs have been estimated on an annual basis. The shovel and drill fleet will be electric. The balance of the fleet will be diesel powered. The assumed electricity price was $0.0607 kW/hr and fuel price was $0.96/l. The truck fleet will be using a blended LNG/diesel mix of 55% LNG. The LNG price assumed for this study was $12.00/GJ resulting in a blended equivalent diesel price of $0.67/l for the haulage fleet.

Pit rim crushers will be located at Hushamu and Red Dog reducing the cost of ore haulage. The cost of overland conveying is included in the processing costs.

Ongoing major equipment component rebuild cost estimates were provided by EMG Mining Consultants. Mine maintenance employees will undertake routine component replacements and scheduled serving.

Explosives supply to the borehole will be contracted as a full-service supply contract.

21.4.3.2 Summary

LOM operating cost after pre-production costs will total $2.0 billion. The average unit costs of operation are summarized in Table 21-12 and Figure 21-1 below. The average LOM operating costs are estimated to be $2.01/t.

Table 21-12: Unit Operating Costs Year 1 to 22

Summary		
Engineering & Geology	$/T Mined	0.06
Mine General	$/T Mined	0.14
Drilling	$/T Mined	0.13
Blasting	$/T Mined	0.27
Loading - Shovels and Loaders	$/T Mined	0.27
Hauling	$/T Mined	0.67
Contract Services	$/T Mined	0.03
Road & Pit Maintenance	$/T Mined	0.45
Pit Electrics	$/T Mined	0.01
Total	$/T Mined	2.01

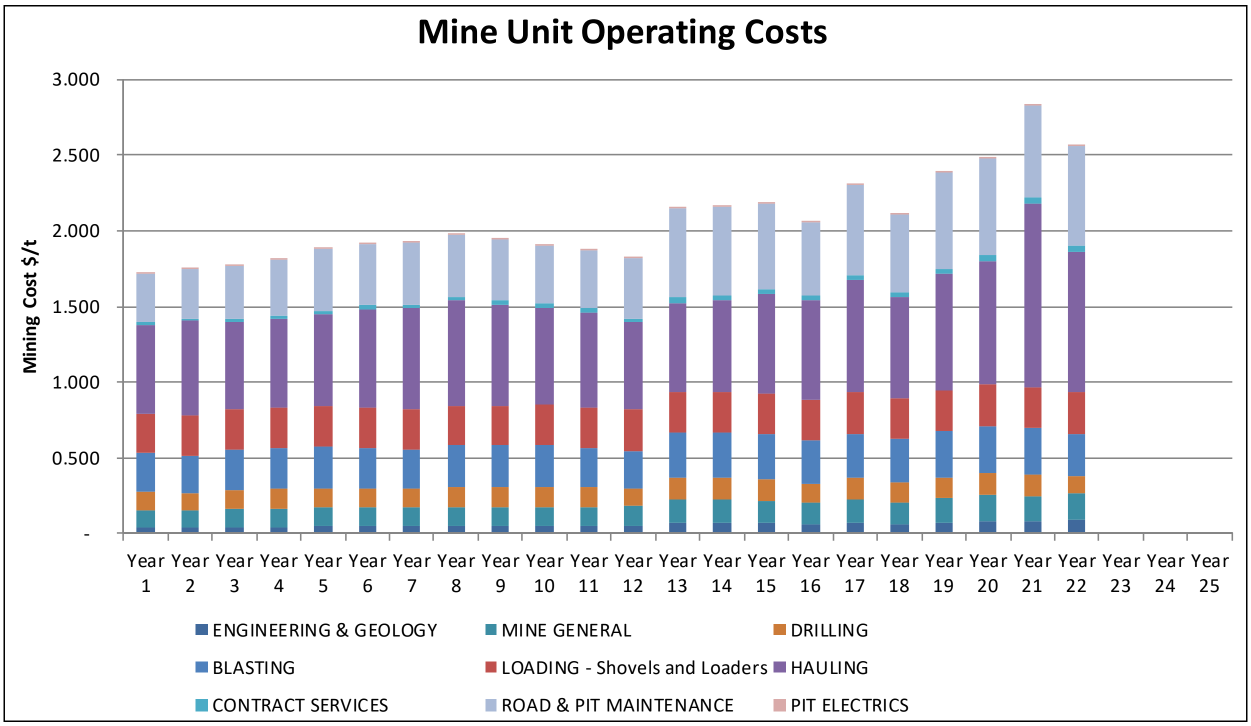


Figure 21-1: Mine Unit Operating Costs

22 ECONOMIC ANALYSIS

22.1 INTRODUCTION

The financial evaluation presents the determination of the Net Present Value (NPV) and sensitivities for the Project. Annual cash flow projections were estimated over the life of the mine based on the estimates of capital expenditures, production costs and sales revenue. The sales revenue is based on the production of copper, molybdenum and pyrite concentrate also containing gold. The estimates of capital expenditures and site production costs have been developed specifically for this Project and have been presented in earlier sections of this report.

Note that the preliminary economic assessment is preliminary in nature. It includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary economic assessment will be realized.

22.2 MINE PRODUCTION STATISTICS

Mine production is reported as ore and waste from the mining operation. The annual production figures were obtained from the mine plan as reported earlier in this report.

The life of mine ore and waste quantities and ore grade are presented in Table 22-1.

Table 22-1: Life of Mine Ore, Waste and Metal Grades

	Tonnes (000's)	Copper %	Gold g/t	Molybdenum %	Sulfur %
Ore Tonnes	599,399	0.18%	0.24	.008%	9.0%
Waste Tonnes	432,880				

22.3 PLANT PRODUCTION STATISTICS

Ore will be processed using crushing, grinding and flotation technology to produce metals in a flotation concentrate. Three concentrate products will be produced: copper concentrate containing gold, molybdenum concentrate and a pyrite concentrate.

The estimated metal recoveries for these concentrates are presented in Table 22-2.

Table 22-2: Metal Recovery Factors

	Copper %	Gold %	Moly %	Sulfur %
Copper Concentrate	77.5	38.4		
Molybdenum Concentrate			59.5	
Pyrite Concentrate				14.0

The estimated life of mine production for these concentrates is presented in Table 22-3 with the approximate metal contained.

Table 22-3: Life of Mine Concentrate Summary

	Tonnes (000's)	Copper (klbs)	Gold (kozs)	Moly (klbs)	Sulfur (klbs)
Copper Concentrate	3,410	1,879,586	1,788		-
Molybdenum Concentrate	59			64,721	
Pyrite Concentrate	14,143				16,650,232

22.3.1 Smelter Return Factors

Copper, molybdenum and pyrite concentrates are shipped to a smelter and the terms are negotiable at the time of the agreement. A smelter may impose a penalty either expressed in higher treatment charges or in metal deductions to treat concentrates that contain higher than specified quantities of certain elements. The NorthIsle concentrates are assumed to be relatively clean concentrates that do not pose special restrictions on smelting and refining. The smelter terms and payable metals calculated in the financial evaluation are presented in Table 22-4.

Table 22-4: Smelter Return Factors

Copper Concentrate	
Payable copper in concentrate	96.5 %
Payable gold in concentrate	97.5 %
Payable silver in concentrate	95.0 %
Treatment charge (CAD$/tonne)	$107.00
Refining charge – Cu (CAD$/lb)	$0.11
Refining charge – Au (CAD$/oz)	$7.92
Refining charge – Ag (CAD$/oz)	$0.67
Transportation charges (CAD$/wmt)	$87.16
Moisture (%)	8.0 %
Molybdenum Concentrate	
Payable molybdenum in concentrate	85.0 %
Treatment charge ($/tonne)	$0.00
Transportation charges ($/wmt)	$87.16
Moisture (%)	8.0 %
Pyrite Concentrate	
Payable pyrite concentrate	100.0 %
Treatment charge ($/tonne)	$0.00
Transportation charges ($/wmt)	$87.16
Moisture (%)	8.0 %

22.4 CAPITAL EXPENDITURE

22.4.1 Initial and Sustaining Capital

The financial indicators have been determined with 100% equity financing. The total capital carried in the financial model for the initial capital and sustaining capital is shown in Table 22-5.

Table 22-5: Initial and Sustaining Capital Summary

Period	Amount (CAD$000)
Year -2	$236,492
Year -1	$1,000,827
Year 1	$156,657
Year 2	$2,728
Year 3	$1,837
Year 4	$2,188
Year 5	$2,224
Year 6	$2,406
Year 7	$6,462
Year 8	$2,514
Year 9	$7,531
Year 10	$2,095
Year 11	$9,308
Year 12	$7,388
Year 13	$2,145
Year 14	$5,357
Year 15	$10,270
Year 16	$6,176
Year 17	$2,201
Year 18	$3,308
Year 19	$8,388
Year 20	$2,552
Year 21	$819
Year 22	$1,671
Total	$1,483,544

22.4.2 Working Capital

A 20-day delay of receipt of revenue from sales is used for accounts receivables. A delay of payment for accounts payable of 30 days is also incorporated into the financial model. Inventory and parts are estimated at CAD$22.7 million. All the working capital is recaptured at the end of the mine life and the final value of these accounts is $0.

22.4.3 Salvage Value

An allowance for salvage value has been included in the cash flow analysis of CAD$25.0 million.

22.5 REVENUE

Annual revenue is determined by applying estimated metal prices to the annual payable metal estimated for each operating year. Sales prices have been applied to all life of mine production without escalation or hedging. The revenue is the gross value of payable metals sold before treatment and transportation charges. Metal sales prices used in the evaluation are as follows:

- Copper: CAD$4.13/lb (US$3.10/lb)
- Gold: CAD$1,733.33/oz (US$1,300.00/oz)
- Molybdenum: CAD$12.00/lb (US$9.00/lb)
- Pyrite: CAD$114.67/dmt (US$86/dmt)

22.6 OPERATING COST

Life of mine cash operating costs include mine operations, process plant operations, general administrative costs, smelting and refining charges and shipping charges. Table 22-6 shows the estimated operating cost by area per metric ton of ore processed.

Table 22-6: Operating Cost

Operating Cost	CAD$/ore tonne
Mine	$3.32
Process Plant	$4.88
Water Treatment	$0.08
General Administration	$0.38
Smelting/Refining Treatment	$3.74
Total Operating Cost	$12.40

22.6.1 Total Cash Cost

The average total cash cost over the life of the mine is estimated to be CAD$13.06/t of ore processed. The total cash cost is the total cash operating cost plus royalties, property tax and tailings infrastructure, salvage value and reclamation and closure costs.

22.6.1.1 Royalty

Royalty payments are based on net profits and NSR at market prices; the life of mine royalty payments are estimated to be CAD$347.3 million.

22.6.1.2 Depreciation

Depreciation is calculated using the declining balance method starting with first year of production. The last year of production is the catch-up year if the assets are not fully depreciated by that time.

22.6.2 Reclamation and Closure

An allowance for the cost of final reclamation and closure of the property has been estimated at CAD$71.0 million at the end of the mine life.

22.7 TAXATION

The NorthIsle Project is evaluated with a 25% corporate income tax based on taxable income and is approximately CAD$751.2 million of the life of the mine. In addition, a BC mining royalty is being estimated at CAD$373.0 million for the life of the mine.

22.8 PROJECT FINANCING

For the purposes of this study, it is assumed investment in the NorthIsle mine will be financed with equity.

22.9 NET INCOME AFTER TAX

Net income after tax is approximately $2.35 billion for the life of the mine.

22.10 NPV, IRR AND PAYBACK (YEARS)

The base case economic analysis indicates that the Project has an after tax NPV at 8% discount rate of CAD$550.4 million, IRR of 14.3% and a payback of 5.1 years. Sensitivity analyses are presented in Table 22-7.

22.11 SENSITIVITY

Sensitivity analyses are presented in Table 22-7, Figure 22-1 and Figure 22-2.

Table 22-7: Sensitivity Analysis After Taxes (in Thousands of CAD$)

Change in Metal Prices	NPV @ 8%	IRR %	Payback (yrs)
Base Case	$550,393	14.3%	5.1
20%	$1,249,455	21.7%	3.6
10%	$902,301	18.1%	4.1
0%	$550,393	14.3%	5.1
-10%	$190,687	10.2%	6.7
-20%	($207,010)	5.5%	9.0
Change in Operating Cost	NPV @ 8%	IRR %	Payback (yrs)
Base Case	$550,393	14.3%	5.1
20%	$263,112	11.1%	6.2
10%	$407,626	12.7%	5.6
0%	$550,393	14.3%	5.1
-10%	$692,505	15.8%	4.7
-20%	$832,953	17.3%	4.3
Change in Initial Capital	NPV @ 8%	IRR %	Payback (yrs)
Base Case	$550,393	14.3%	5.1
20%	$369,038	11.5%	6.1
10%	$460,511	12.8%	5.6
0%	$550,393	14.3%	5.1
-10%	$639,509	16.0%	4.6
-20%	$726,860	18.2%	4.1

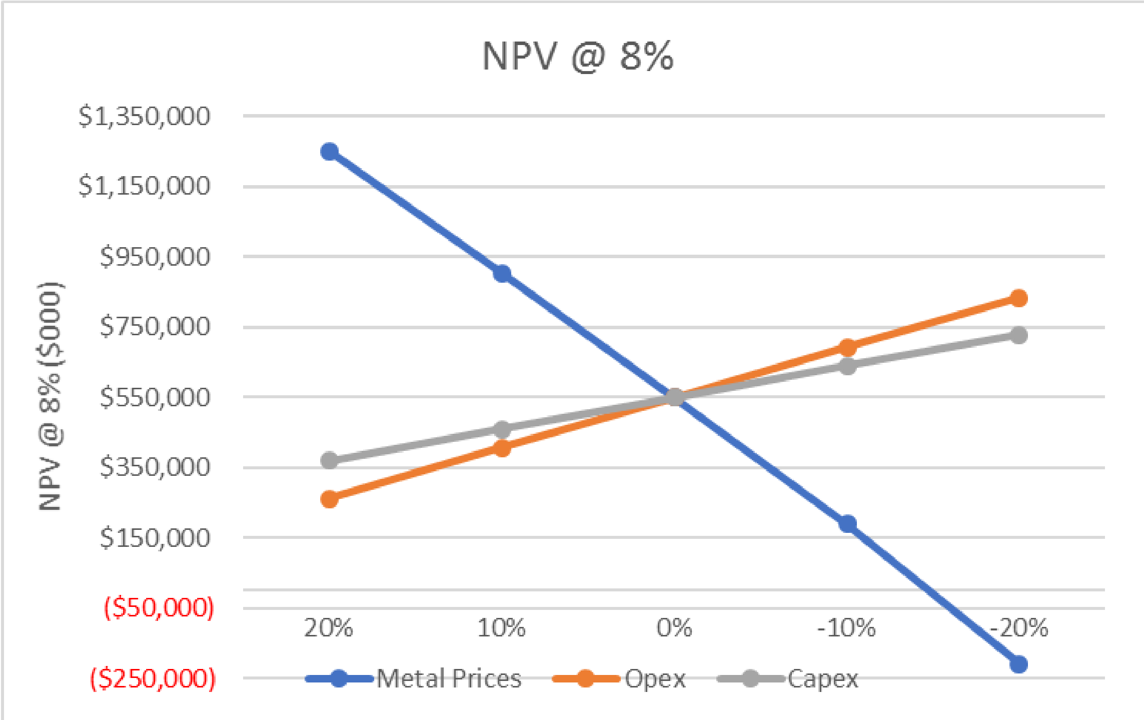


Figure 22-1: NPV at 8%

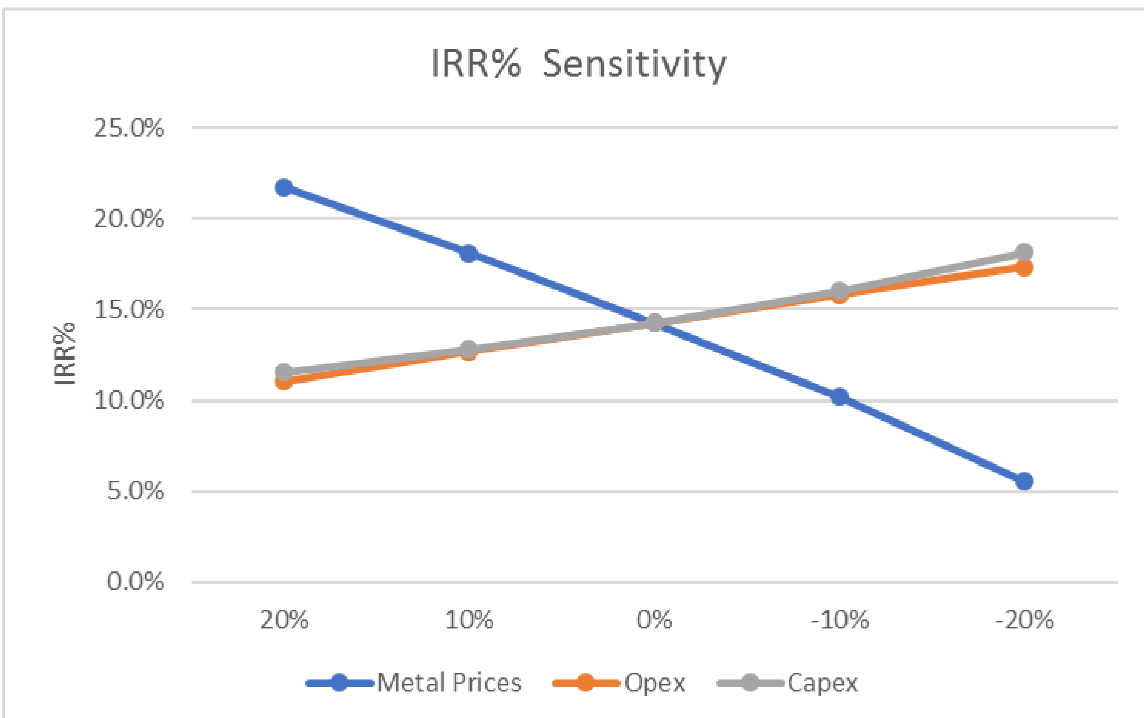


Figure 22-2: IRR% Sensitivity

Table 22-8: Financial Model

Mining Operations	Total	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22
High Grade Ore																									
Beginning Inventory (kt)	408,515	408,515	408,515	407,989	389,853	365,228	345,162	326,419	306,681	287,146	268,128	248,516	229,153	213,277	195,582	184,277	166,715	148,508	129,755	111,919	90,698	77,140	59,337	36,804	15,085
Mined (kt)	408,515	-	526	18,136	24,625	20,066	18,744	19,738	19,535	19,019	19,612	19,363	15,876	17,695	11,305	17,561	18,207	18,753	17,836	21,221	13,559	17,803	22,533	21,719	15,085
Ending Inventory (kt)	-	408,515	407,989	389,853	365,228	345,162	326,419	306,681	287,146	268,128	248,516	229,153	213,277	195,582	184,277	166,715	148,508	129,755	111,919	90,698	77,140	59,337	36,804	15,085	0
Copper Grade (%)	0.22%	0.00%	0.18%	0.23%	0.25%	0.26%	0.27%	0.24%	0.23%	0.24%	0.24%	0.23%	0.21%	0.21%	0.20%	0.20%	0.22%	0.22%	0.21%	0.20%	0.20%	0.20%	0.22%	0.19%	0.18%
Gold Grade (g/t)	0.29	-	0.22	0.27	0.29	0.33	0.33	0.32	0.30	0.27	0.26	0.26	0.24	0.26	0.34	0.34	0.37	0.33	0.29	0.26	0.28	0.27	0.26	0.25	0.24
Molybdenum Grade (%)	0.01%	0.00%	0.02%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%
Sulfur Grade (%)	9.00%	0.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Contained Copper (klbs)	1,992,386	-	2,077	92,373	135,488	115,028	110,214	105,125	99,549	98,896	102,378	96,281	74,928	80,201	48,745	77,679	90,125	91,180	82,148	94,145	58,313	78,760	107,769	92,631	58,354
Contained Gold (kozs)	3,782	-	4	159	227	211	202	202	190	163	163	159	123	147	122	192	216	202	167	176	122	154	191	176	115
Contained Molybdenum (klbs)	72,799	-	193	2,970	3,298	3,209	2,912	3,227	3,502	3,197	3,010	2,986	2,643	3,620	3,328	5,463	4,773	3,429	2,962	3,151	3,254	3,796	4,287	2,421	1,168
Contained Sulfur (klbs)	81,055,831	-	104,367	3,598,460	4,885,912	3,981,400	3,719,009	3,916,242	3,876,042	3,773,622	3,891,278	3,842,004	3,149,962	3,511,007	2,243,133	3,484,424	3,612,605	3,720,947	3,538,940	4,210,505	2,690,236	3,532,314	4,470,954	4,309,346	2,993,121
Medium Grade Ore																									
Beginning Inventory (kt)	92,887	92,887	92,887	92,625	89,367	87,557	84,326	80,059	75,840	71,189	67,109	63,285	59,754	54,732	50,373	41,751	36,515	31,706	28,401	24,799	21,456	16,081	11,043	8,227	5,060
Mined (kt)	92,887	-	262.00	3,258.18	1,809.64	3,231.38	4,266.64	4,219.27	4,650.93	4,080.36	3,823.64	3,530.73	5,021.93	4,358.95	8,622.27	5,236.06	4,808.60	3,305.03	3,602.10	3,342.95	5,375.00	5,038.51	2,816.21	3,166.28	5,060.32
Ending Inventory (kt)	-	92,887	92,625	89,367	87,557	84,326	80,059	75,840	71,189	67,109	63,285	59,754	54,732	50,373	41,751	36,515	31,706	28,401	24,799	21,456	16,081	11,043	8,227	5,060	-
Copper Grade (%)	0.12%	0.00%	0.12%	0.13%	0.13%	0.12%	0.12%	0.13%	0.12%	0.12%	0.11%	0.13%	0.12%	0.11%	0.10%	0.11%	0.11%	0.12%	0.11%	0.12%	0.11%	0.12%	0.12%	0.12%	0.12%
Gold Grade (g/t)	0.16	-	0.14	0.12	0.13	0.13	0.13	0.12	0.14	0.14	0.17	0.14	0.14	0.18	0.20	0.20	0.20	0.18	0.18	0.15	0.18	0.16	0.14	0.12	0.12
Molybdenum Grade (%)	0.01%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	0.00%
Sulfur Grade (%)	9.00%	0.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Contained Copper (klbs)	238,066	-	719	9,165	5,000	8,759	11,589	11,695	12,267	10,925	9,605	9,765	13,442	10,803	19,314	12,302	11,490	8,399	9,049	8,595	13,246	12,919	7,226	8,401	13,391
Contained Gold (kozs)	471	-	1	13	8	13	17	17	21	18	21	16	23	25	55	34	31	19	20	16	32	25	13	13	20
Contained Molybdenum (klbs)	16,956	-	61	821	277	579	649	627	650	654	692	549	1,101	1,140	2,138	1,629	1,003	583	626	427	1,006	803	345	243	354
Contained Sulfur (klbs)	18,430,248	-	51,985	646,475	359,062	641,158	846,569	837,170	922,818	809,608	758,670	700,553	996,431	864,884	1,710,795	1,038,916	954,103	655,770	714,714	663,295	1,066,486	999,719	558,780	628,241	1,004,048
Low Grade Ore																									
Beginning Inventory (kt)	97,997	97,997	97,997	97,575	93,617	92,677	88,601	83,980	79,179	74,804	70,580	66,716	62,516	55,818	50,309	42,759	38,123	33,728	28,385	22,419	19,550	11,108	6,542	4,445	1,885
Mined (kt)	97,997	-	422.00	3,958.49	939.80	4,076.09	4,620.27	4,801.75	4,374.81	4,223.29	3,864.15	4,200.28	6,697.80	5,509.37	7,549.89	4,636.48	4,394.61	5,343.08	5,965.78	2,868.97	8,442.49	4,565.59	2,096.66	2,560.50	1,884.87
Ending Inventory (kt)	-	97,997	97,575	93,617	92,677	88,601	83,980	79,179	74,804	70,580	66,716	62,516	55,818	50,309	42,759	38,123	33,728	28,385	22,419	19,550	11,108	6,542	4,445	1,885	(0)
Copper Grade (%)	0.09%	0.00%	0.10%	0.10%	0.08%	0.10%	0.10%	0.10%	0.10%	0.10%	0.09%	0.09%	0.09%	0.08%	0.08%	0.08%	0.09%	0.09%	0.09%	0.09%	0.09%	0.09%	0.09%	0.09%	0.10%
Gold Grade (g/t)	0.13	-	0.11	0.09	0.14	0.10	0.10	0.09	0.10	0.11	0.14	0.11	0.14	0.16	0.17	0.17	0.15	0.14	0.14	0.12	0.14	0.13	0.10	0.09	0.09
Molybdenum Grade (%)	0.01%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	0.01%	0.01%	0.01%	0.00%	0.00%
Sulfur Grade (%)	9.00%	0.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Contained Copper (klbs)	194,005	-	930	9,096	1,719	8,544	10,119	10,668	9,375	8,984	7,269	8,535	12,805	10,079	13,567	8,401	8,270	10,193	11,227	5,665	16,054	9,075	4,223	5,172	4,035
Contained Gold (kozs)	404	-	1	11	4	13	14	14	14	15	17	15	29	28	41	25	21	24	27	11	39	19	7	8	6
Contained Molybdenum (klbs)	19,021	-	85	978	203	1,050	970	739	593	828	772	604	1,600	1,698	2,073	1,473	828	940	1,012	250	1,258	585	233	122	128
Contained Sulfur (klbs)	19,444,153	-	83,731	785,427	186,472	808,761	916,735	952,744	868,031	837,967	766,707	833,402	1,328,949	1,093,145	1,498,017	919,951	871,960	1,060,151	1,183,705	569,248	1,675,124	905,886	416,010	508,043	373,988
Total Ore																									
Beginning Inventory (kt)	599,399	599,399	599,399	598,189	572,836	545,462	518,089	490,458	461,700	433,139	405,817	378,517	351,423	323,828	296,264	268,787	241,353	213,942	186,541	159,137	131,705	104,329	76,922	49,476	22,030
Mined (kt)	599,399	-	1,210	25,353	27,374	27,373	27,630	28,759	28,561	27,322	27,300	27,094	27,595	27,564	27,477	27,434	27,410	27,401	27,404	27,433	27,376	27,407	27,446	27,446	22,030
Ending Inventory (kt)	-	599,399	598,189	572,836	545,462	518,089	490,458	461,700	433,139	405,817	378,517	351,423	323,828	296,264	268,787	241,353	213,942	186,541	159,137	131,705	104,329	76,922	49,476	22,030	(0)
Copper Grade (%)	0.18%	0.00%	0.14%	0.20%	0.24%	0.22%	0.22%	0.20%	0.19%	0.20%	0.20%	0.19%	0.17%	0.17%	0.13%	0.16%	0.18%	0.18%	0.17%	0.18%	0.15%	0.17%	0.20%	0.18%	0.16%
Gold Grade (g/t)	0.24	-	0.17	0.22	0.27	0.27	0.26	0.25	0.25	0.22	0.23	0.22	0.20	0.23	0.25	0.28	0.30	0.28	0.24	0.23	0.22	0.22	0.24	0.22	0.20
Molybdenum Grade (%)	0.01%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	0.00%
Sulfur Grade (%)	9.00%	0.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Contained Copper (klbs)	2,424,457	-	3,726	110,634	142,207	132,331	131,922	127,489	121,190	118,805	119,253	114,581	101,175	101,082	81,626	98,382	109,884	109,772	102,424	108,404	87,613	100,753	119,219	106,204	75,780
Contained Gold (kozs)	4,657	-	6	183	239	238	233	232	226	197	201	190	175	200	218	251	268	244	215	203	192	198	211	196	141
Contained Molybdenum (klbs)	108,775	-	339	4,769	3,778	4,837	4,531	4,593	4,745	4,680	4,474	4,139	5,343	6,458	7,539	8,564	6,603	4,952	4,601	3,828	5,518	5,184	4,865	2,786	1,649
Contained Sulfur (klbs)	118,930,232	-	240,083	5,030,363	5,431,446	5,431,319	5,482,313	5,706,155	5,666,891	5,421,196	5,416,655	5,375,959	5,475,342	5,469,037	5,451,945	5,443,291	5,438,668	5,436,868	5,437,360	5,443,048	5,431,846	5,437,919	5,445,744	5,445,630	4,371,156
Waste (kt)	432,880	18,250	34,454	38,522	36,501	31,939	29,419	22,341	22,539	23,778	23,800	24,006	23,505	19,886	17,220	7,661	7,649	8,806	14,396	6,843	11,850	5,076	1,582	2,361	495
Total Material Mined	1,032,279	18,250	35,664	63,875	63,875	59,313	57,050	51,100	51,100	51,100	51,100	51,100	51,100	47,450	44,697	35,095	35,059	36,207	41,800	34,276	39,226	32,483	29,028	29,807	22,525
Total Material Moved	1,046,125	18,250	35,664	64,006	63,876	59,314	57,050	51,100	51,100	51,153	51,175	51,381	51,100	51,100	49,966	35,095	35,059	36,207	41,800	34,276	39,226	32,483	29,028	29,807	26,910
Process Plant																									
Ore Processed (kt)	599,399	-	-	25,484	27,375	27,375	27,375	27,375	27,375	27,375	27,375	27,375	27,375	27,375	27,375	27,375	27,375	27,375	27,375	27,375	27,375	27,375	27,375	27,375	26,415
Copper Grade (%)	0.18%	0.00%	0.00%	0.20%	0.24%	0.22%	0.22%	0.21%	0.20%	0.20%	0.20%	0.19%	0.17%	0.17%	0.13%	0.16%	0.18%	0.18%	0.17%	0.18%	0.15%	0.17%	0.20%	0.18%	0.15%
Gold Grade (g/t)	0.24	-	-	0.22	0.27	0.27	0.26	0.26	0.25	0.22	0.23	0.22	0.20	0.23	0.25	0.28	0.30	0.28	0.24	0.23	0.22	0.23	0.24	0.22	0.18
Molybdenum Grade (%)	0.008%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	0.00%
Sulfur Grade (%)	9.000%	0.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Contained Copper (klbs)	2,424,457	-	-	111,151	142,211	132,337	131,362	124,415	118,649	119,013	119,551	115,670	100,754	100,737	81,442	98,276	109,817	109,722	102,370	108,290	87,611	100,690	119,076	106,062	85,250
Contained Gold (kozs)	4,657	-	-	184	239	238	232	228	222	197	202	192	174	199	218	251	267	244	215	203	192	198	211	196	156
Contained Molybdenum (klbs)	108,775	-	-	4,817	3,778	4,838	4,477	4,380	4,585	4,699	4,502	4,240	5,290	6,400	7,511	8,546	6,596	4,947	4,596	3,823	5,517	5,180	4,857	2,783	2,414

Mining Operations	Total	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22
Contained Sulfur (klbs)	118,930,229	-	-	5,056,355	5,431,624	5,431,636	5,431,633	5,431,633	5,431,633	5,431,633	5,431,633	5,431,634	5,431,633	5,431,633	5,431,633	5,431,633	5,431,633	5,431,633	5,431,633	5,431,633	5,431,633	5,431,633	5,431,633	5,431,633	5,241,226
Metal Recovery %																									
Copper	77.5%	0.0%	0.0%	79.9%	79.9%	79.9%	80.0%	79.8%	78.9%	76.8%	76.7%	76.8%	76.7%	76.4%	75.3%	75.2%	75.5%	76.0%	76.1%	77.0%	75.3%	76.5%	77.6%	78.0%	77.9%
Gold	38.4%	0.0%	0.0%	36.9%	37.7%	37.9%	38.1%	37.7%	37.7%	39.9%	39.7%	40.1%	39.6%	38.8%	35.1%	34.8%	35.6%	37.2%	37.6%	40.6%	34.9%	38.9%	42.6%	44.0%	43.0%
Molybdenum	59.5%	0.0%	0.0%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%	59.5%
Sulfur	14.0%	0.0%	0.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
Recovered Metal																									
Copper Concentrate (kt)	3,410			161	206	192	191	180	170	166	166	161	140	140	111	134	150	151	141	151	120	140	168	150	121
Copper Conc. Grade (%)	25.0%			25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Copper (klbs)	1,879,586	-	-	88,843	113,590	105,794	105,040	99,243	93,657	91,349	91,698	88,866	77,249	76,993	61,344	73,938	82,897	83,359	77,892	83,367	65,954	76,988	92,367	82,722	66,434
Gold (kozs)	1,788	-	-	68	90	90	88	86	84	78	80	77	69	77	76	87	95	91	81	83	67	77	90	86	67
Molybdenum Concentrate (kt)	59			3	2	3	2	2	2	3	2	2	3	3	4	5	4	3	2	2	3	3	3	2	1
Molybdenum Conc. Grade (%)	50.0%			50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Molybdenum (klbs)	64,721	-	-	2,866	2,248	2,878	2,664	2,606	2,728	2,796	2,679	2,523	3,148	3,808	4,469	5,085	3,925	2,943	2,735	2,275	3,283	3,082	2,890	1,656	1,436
Pyrite Concentrate (kt)	14,143			601	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	623
Pyrite Conc. Grade (%)	53%	0%	0%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%
Sulfur (klbs)	16,650,232	-	-	707,890	760,427	760,429	760,429	760,429	760,429	760,429	760,429	760,429	760,429	760,429	760,429	760,429	760,429	760,429	760,429	760,429	760,429	760,429	760,429	760,429	733,772
Payable Metals																									
Copper Concentrate																									
Copper (klbs)	1,813,800	-	-	85,733	109,614	102,091	101,364	95,770	90,379	88,152	88,488	85,755	74,545	74,299	59,197	71,350	79,996	80,442	75,166	80,449	63,646	74,293	89,134	79,827	64,109
Gold (kozs)	1,743	-	-	66	88	88	86	84	82	77	78	75	67	75	74	85	93	89	79	80	65	75	88	84	65
Molybdenum Concentrate																									
Molybdenum (klbs)	55,013	-	-	2,436	1,911	2,447	2,264	2,215	2,319	2,377	2,277	2,144	2,676	3,237	3,799	4,322	3,336	2,502	2,324	1,934	2,790	2,620	2,457	1,407	1,221
Pyrite Concentrate (kt)	14,143	-	-	601	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	623
Metal Prices																									
Copper		$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13	$4.13
Gold		$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33	$1,733.33
Molybdenum		$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00
Pyrite		$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67	$114.67
Revenues ($000)																									
Copper Concentrate																									
Copper	$7,497,040	$0	$0	$354,364	$453,071	$421,976	$418,971	$395,849	$373,567	$364,362	$365,752	$354,455	$308,121	$307,101	$244,682	$294,915	$330,649	$332,493	$310,685	$332,523	$263,069	$307,079	$368,422	$329,950	$264,985
Gold	$3,021,380	$0	$0	$114,778	$151,971	$152,385	$149,469	$145,359	$141,416	$132,651	$135,161	$129,779	$116,306	$130,563	$129,085	$147,339	$160,990	$153,806	$136,711	$139,450	$113,465	$130,116	$151,715	$145,683	$113,181
Molybdenum Concentrate																									
Molybdenum	$660,157	$0	$0	$29,232	$22,931	$29,359	$27,174	$26,582	$27,824	$28,520	$27,321	$25,732	$32,107	$38,843	$45,582	$51,863	$40,032	$30,023	$27,894	$23,202	$33,485	$31,436	$29,479	$16,888	$14,648
Pyrite Concentrate	$1,621,745	$0	$0	$68,949	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$74,066	$71,470
Total Revenues	$12,800,322	$0	$0	$567,323	$702,039	$677,786	$669,680	$641,857	$616,874	$599,600	$602,300	$584,033	$530,599	$550,573	$493,415	$568,184	$605,738	$590,389	$549,356	$569,241	$484,085	$542,698	$623,682	$566,587	$464,283
Operating Cost																									
Mining	$1,992,214	-	-	110,000	111,661	105,176	103,409	96,546	98,096	98,361	101,157	99,884	97,700	96,124	91,429	75,708	76,092	79,166	86,232	79,228	82,893	77,595	72,134	84,413	69,210
Process Plant	$2,923,392	-	-	125,378	133,577	133,577	133,576	133,572	133,532	133,396	133,396	133,396	133,396	133,396	133,396	133,396	133,396	133,396	133,396	133,396	133,396	133,396	133,396	133,396	129,246
Water Treatment Plant	$45,401	-	-	1,930	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,073	2,001
G&A	$229,616	-	-	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437
Treatment & Refining Charges																									
Copper Concentrates																									
Treatment Charges	$364,899	$0	$0	$17,248	$22,052	$20,539	$20,392	$19,267	$18,182	$17,734	$17,802	$17,252	$14,997	$14,947	$11,909	$14,354	$16,093	$16,183	$15,122	$16,185	$12,804	$14,946	$17,932	$16,059	$12,897
Copper Refining Charges	$206,754	$0	$0	$9,773	$12,495	$11,637	$11,554	$10,917	$10,302	$10,048	$10,087	$9,775	$8,497	$8,469	$6,748	$8,133	$9,119	$9,170	$8,568	$9,170	$7,255	$8,469	$10,160	$9,099	$7,308
Gold Refining Charges	$14,151	$0	$0	$538	$712	$714	$700	$681	$662	$621	$633	$608	$545	$612	$605	$690	$754	$720	$640	$653	$531	$609	$711	$682	$530
Silver Refining Charges	$0																								
Transportation	$321,018	$0	$0	$15,174	$19,400	$18,069	$17,940	$16,950	$15,996	$15,602	$15,661	$15,178	$13,194	$13,150	$10,477	$12,628	$14,158	$14,237	$13,303	$14,238	$11,264	$13,149	$15,776	$14,128	$11,346
Molybdenum Concentrate																									
Treatment Charges	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Transportation	$5,527	$0	$0	$245	$192	$246	$228	$223	$233	$239	$229	$215	$269	$325	$382	$434	$335	$251	$234	$194	$280	$263	$247	$141	$123
Pyrite Concentrate																									
Treatment Charges	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Transportation	$1,331,332	$0	$0	$56,602	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$60,803	$58,671
Total Operating Cost	$7,434,305	$0	$0	$347,324	$373,402	$363,271	$361,113	$351,468	$350,317	$349,315	$352,278	$349,621	$341,911	$340,336	$328,258	$318,657	$323,260	$326,437	$330,808	$326,377	$321,738	$321,740	$323,668	$331,233	$301,771
Royalty	$347,293	$0	$0	$2,099	$2,446	$2,310	$2,151	$3,864	$20,817	$20,720	$24,225	$21,956	$17,610	$18,845	$13,702	$21,522	$24,106	$22,037	$18,398	$20,938	$13,836	$18,473	$25,853	$20,404	$13,981
Property Tax	$0			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Mining Operations	Total	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22
Salvage Value	-$25,000			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Reclamation & Closure	$71,000			$0	$0	$0	$0	$0	$0	$0	$0	$5,000	$8,000	$3,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Production Cost	$7,827,598	$0	$0	$349,423	$375,848	$365,581	$363,264	$355,332	$371,134	$370,035	$376,502	$376,576	$367,521	$362,182	$341,961	$340,179	$347,366	$348,474	$349,207	$347,315	$335,574	$340,213	$349,521	$351,637	$315,751
Operating Income	$4,972,724	$0	$0	$217,900	$326,191	$312,205	$306,416	$286,525	$245,740	$229,565	$225,798	$207,457	$163,078	$188,391	$151,455	$228,004	$258,371	$241,915	$200,149	$221,926	$148,511	$202,484	$274,162	$214,949	$148,532
BC Mining Royalty	$373,001			$4,400	$6,573	$6,290	$6,171	$5,808	$5,331	$5,006	$5,000	$0	$0	$9,475	$20,510	$32,160	$36,026	$32,979	$27,608	$31,286	$20,675	$27,634	$38,670	$30,489	$20,909
Net Income before Depreciation	$4,599,723	$0	$0	$213,500	$319,619	$305,915	$300,244	$280,717	$240,409	$224,559	$220,797	$207,457	$163,078	$178,916	$130,945	$195,845	$222,345	$208,936	$172,541	$190,639	$127,836	$174,850	$235,491	$184,460	$127,622
Capital Cost Depreciation	$1,499,841	$0	$0	$187,469	$313,046	$299,625	$294,073	$274,909	$48,506	$5,129	$4,475	$5,239	$4,453	$5,667	$6,097	$5,109	$5,171	$6,446	$6,378	$5,334	$4,827	$5,717	$4,926	$3,899	$3,342
Total Depreciation	$1,499,841	$0	$0	$187,469	$313,046	$299,625	$294,073	$274,909	$48,506	$5,129	$4,475	$5,239	$4,453	$5,667	$6,097	$5,109	$5,171	$6,446	$6,378	$5,334	$4,827	$5,717	$4,926	$3,899	$3,342
Net Income After Depreciation	$3,099,882	$0	$0	$26,031	$6,573	$6,290	$6,171	$5,808	$191,902	$219,430	$216,322	$202,217	$158,625	$173,249	$124,848	$190,735	$217,174	$202,490	$166,163	$185,306	$123,009	$169,133	$230,565	$180,561	$124,280
Income Taxes	$751,216	$0	$0	$0	$0	$0	$0	$0	$32,691	$53,606	$52,830	$50,554	$39,656	$43,312	$31,212	$47,684	$54,294	$50,623	$41,541	$46,326	$30,752	$42,283	$57,641	$45,140	$31,070
Net Income after Taxes	$2,348,666	$0	$0	$26,031	$6,573	$6,290	$6,171	$5,808	$159,212	$165,824	$163,492	$151,663	$118,968	$129,937	$93,636	$143,052	$162,881	$151,868	$124,622	$138,979	$92,257	$126,850	$172,924	$135,420	$93,210
Cash Flow																									
Net Income before Depreciation	$4,599,723	$0	$0	$213,500	$319,619	$305,915	$300,244	$280,717	$240,409	$224,559	$220,797	$207,457	$163,078	$178,916	$130,945	$195,845	$222,345	$208,936	$172,541	$190,639	$127,836	$174,850	$235,491	$184,460	$127,622
Working Capital																									
Account Receivable	$0	$0	$0	-$31,086	-$7,382	$1,329	$444	$1,525	$1,369	$947	-$148	$1,001	$2,928	-$1,094	$3,132	-$4,097	-$2,058	$841	$2,248	-$1,090	$4,666	-$3,212	-$4,438	$3,129	$5,606
Accounts Payable	$0	$0	$0	$28,547	$2,143	-$833	-$177	-$793	-$95	-$82	$244	-$218	-$634	-$129	-$993	-$789	$378	$261	$359	-$364	-$381	$0	$158	$622	-$2,422
Inventory - Parts, Supplies	$0	$0	-$11,354	-$11,354	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Working Capital	$0	$0	-$11,354	-$13,893	-$5,238	$496	$267	$732	$1,274	$864	$96	$783	$2,294	-$1,224	$2,139	-$4,886	-$1,679	$1,102	$2,608	-$1,454	$4,285	-$3,211	-$4,279	$3,750	$3,184
Capital Expenditures																									
Initial Capital																									
Mine	$149,236	$82,941	$66,294	$0																					
Pre-production	$125,569	$46,605	$78,964	$0																					
Concentrator	$1,024,939	$102,494	$819,951	$102,494																					
Owners Cost	$44,522	$4,452	$35,618	$4,452																					
Sustaining Capital																									
Mine	$108,221			$49,711	$780	$257	$282	$837	$895	$4,840	$780	$6,514	$57	$7,083	$6,220	$895	$4,093	$8,958	$4,846	$780	$1,890	$6,771	$1,732	$0	$0
Process Plant	$0			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tailing Core	$31,057			$0	$1,948	$1,580	$1,906	$1,387	$1,511	$1,622	$1,734	$1,018	$2,038	$2,224	$1,169	$1,250	$1,264	$1,312	$1,330	$1,421	$1,417	$1,617	$819	$819	$1,671
Total Capital Expenditures	$1,483,544	$236,492	$1,000,827	$156,657	$2,728	$1,837	$2,188	$2,224	$2,406	$6,462	$2,514	$7,531	$2,095	$9,308	$7,388	$2,145	$5,357	$10,270	$6,176	$2,201	$3,308	$8,388	$2,552	$819	$1,671
Cash Flow before Taxes	$3,116,179	-$236,492	-$1,012,182	$42,950	$311,653	$304,574	$298,324	$279,225	$239,277	$218,962	$218,378	$200,708	$163,277	$168,384	$125,696	$188,814	$215,309	$199,768	$168,973	$186,985	$128,813	$163,251	$228,661	$187,391	$129,135
Cumulative Cash Flow before Taxes		-$236,492	-$1,248,674	-$1,205,724	-$894,071	-$589,497	-$291,173	-$11,948	$227,329	$446,290	$664,669	$865,377	$1,028,653	$1,197,038	$1,322,734	$1,511,547	$1,726,856	$1,926,625	$2,095,598	$2,282,583	$2,411,396	$2,574,647	$2,803,307	$2,990,698	$3,119,833
Taxes																									
Income Taxes	$751,216	$0	$0	$0	$0	$0	$0	$0	$32,691	$53,606	$52,830	$50,554	$39,656	$43,312	$31,212	$47,684	$54,294	$50,623	$41,541	$46,326	$30,752	$42,283	$57,641	$45,140	$31,070
Cash Flow after Taxes	$2,364,963	-$236,492	-$1,012,182	$42,950	$311,653	$304,574	$298,324	$279,225	$206,586	$165,356	$165,548	$150,153	$123,621	$125,072	$94,484	$141,130	$161,016	$149,146	$127,432	$140,659	$98,061	$120,968	$171,019	$142,251	$98,065
Cumulative Cash Flow after Taxes		-$236,492	-$1,248,674	-$1,205,724	-$894,071	-$589,497	-$291,173	-$11,948	$194,638	$359,994	$525,542	$675,695	$799,316	$924,388	$1,018,872	$1,160,001	$1,321,017	$1,470,163	$1,597,595	$1,738,254	$1,836,315	$1,957,282	$2,128,302	$2,270,552	$2,368,618
Economic Indicators before Taxes																									
NPV @ 0%	$3,116,179																								
NPV @ 5%	$1,380,440																								
NPV @ 8%	$806,148																								
NPV @ 10%	$531,505																								
IRR	16.2%																								
Payback	5.0			1.0	1.0	1.0	1.0	1.0	0.0	-	-	-	-												
Economic Indicators after Taxes																									
NPV @ 0%	$2,364,963																								
NPV @ 5%	$1,006,871																								
NPV @ 8%	$550,393																								
NPV @ 10%	$329,846																								
IRR	14.3%																								
Payback	5.1			1.0	1.0	1.0	1.0	1.0	0.1	-	-	-													

23 ADJACENT PROPERTIES

There are a number of mineral occurrences on northern Vancouver Island, adjacent and in the vicinity of NorthIsle's North Island Project. The most significant occurrence is the past producing Island Copper Mine, which produced 345 million metric tonnes of ore with average grades of 0.41% copper, 0.017% molybdenum, 0.19 g/t gold and 1.4 g/t silver (Perelló et al., 1995). The Island Copper deposit is a porphyry Cu-Mo-Au occurrence.

There are eight other much less developed porphyry Cu-Mo-Au Minfile occurrences in the vicinity of the North Island Project. They are:

- Yankee Girl prospect; Fe, Cu (Minfile 092L062)
- Hep prospect; Cu, Mo (Minfile 092L078)
- Bay 21 prospect; Cu, Ag, Au, (Minfile 092L099)
- Bay 4 prospect; Fe, Cu, Au, Ti (Minfile 092L136)
- Bay 29 prospect; Fe, Cu (Minfile 092L139)
- Bay 56 prospect; Cu, Mo (Minfile 092L135)
- Road prospect; Cu, Mo, Fe (Minfile 092L160)
- Rupert prospect; Cu, Mo (Minfile 092L278)

There are also 12 skarn-type Minfile occurrences in the region, which are not well developed. They are as follows:

- Caledonia prospect; Zn, Ag, Cu, Pb, Au (Minfile 092L061)
- HPH1 prospect; Ag, Pb, Zn, Cu, Au, Magnetite, Fe (Minfile 092L069)
- South Shore prospect; Ag, Pb, Zn, Cu (Minfile 092L074)
- Dorlon prospect; Au, Zn, Ag, Cu, Pb, Cd, Magnetite, Fe (Minfile 092L076)
- Rainbow 1-4 prospect; Cu, Zn, Ag, Pb, Au, Magnetite (Minfile 092L159)
- Mo prospect; Ag, Pb, Zn, Magnetite (Minfile 092L181)
- A prospect; Zn, Cu, Pb, Ag, Au (Minfile 092L239)
- South Shore (Ras 4) prospect; Zn, Ag, Cu, Pb, Cd (Minfile 092L244)
- South Shore (HSW 3) prospect; (Ag, Zn, Pb, Cu (Minfile 092L245)
- Cranberry prospect; Cu, Ag, Au (Minfile 092L315)
- Swamp prospect; Cu, Ag, Au, Magnetite, Fe (Minfile 092L317)
- South prospect; Cu, Ag, Au, Magnetite, Fe (Minfile 092L318)

There is also one epithermal Au-Ag-Cu high sulphidation occurrence, the Knob Hill prospect (Minfile 102I005) which contains Cu, Zn, Pb, Au, Ag, and Mo.

24 OTHER RELEVANT DATA AND INFORMATION

There is no additional information or explanation necessary to make the technical report understandable and not misleading.

25 INTERPRETATION AND CONCLUSIONS

The North Island Project hosts significant bulk tonnage copper-gold-molybdenum porphyry style mineralization in the Hushamu and Red Dog Deposits. The Project is located in the politically stable province of British Columbia on northern Vancouver Island where perennial access and logistics are straightforward and relatively inexpensive. The region has a long and enduring history of exploration and open pit mining with the past producing Island Copper Mine located approximately 30 km to the east.

The Project property holdings consist of 212 contiguous mineral claims totalling 33,447-hectares 100% owned by North Island Mining Corp., a wholly owned subsidiary of NorthIsle Copper and Gold Inc. With the exception of 16 claims comprising the Red Dog property option, NorthIsle 100% owns the claims forming the North Island Project subject to a 10% net profit royalty. There are no additional royalties, back-in rights, payments and encumbrances to which the property is subject other than the Red Dog option agreement.

The permits held by NorthIsle were sufficient to ensure that exploration activities were conducted within the regulatory framework required by the British Columbia Government. Additional permits will be required for Project development. Preliminary water monitoring studies were conducted in 2011-2012. Additional environmental baseline surveys will be required for Project development.

The exploration programs completed to date on the Project are appropriate to the porphyry copper-gold-molybdenum style of the mineralization. Work completed in the period of 1965 to date has consisted of geological mapping, prospecting, rock sampling, soil geochemical sampling, ground and airborne geophysical surveys, petrographic studies, core sampling for metallurgical testing, re-logging and re-sampling of historic drill core and core drilling. Completed exploration programs were appropriate to the mineralization style. To date, two deposits, Hushamu and Red Dog have been identified.

Sampling methods are acceptable, meet industry-standard practise, and are appropriate for Mineral Resource estimation purposes. The quality of NorthIsle's analytical data is reliable and sample preparation, analysis and security is performed in accordance with exploration best practises and industry standards.

Historic drill core has been validated by NorthIsle's re-logging, re-assaying and twin drill hole programs, and data from these programs are reliable and can be used for Mineral Resource estimation.

Using a cut-off of 0.15% Cu the Hushamu resource estimate returned an Indicated Resource of 305 million metric tonnes at 0.24% Cu and an Inferred Resource of 189 million metric tonnes at 0.19% Cu. The Red Dog Deposit is estimated to contain an Indicated Resource of 54 million metric tonnes at 0.22% Cu and an Inferred Resource of 3 million metric tonnes at 0.17% Cu using a cut-off of 0.10% Cu.

The process plant designed for the NorthIsle Copper-Gold Project consists of a conventional copper/moly/pyrite flotation process that has been used successfully by the mining industry for many years. Concentrates, copper/gold, moly, and pyrite will be produced as saleable products.

Make up water for process plant operations can be met without the need for water to be sourced from outside of the mine.

26 RECOMMENDATIONS

26.1 RESOURCE DEFINITION

- Drill additional holes to convert resources at the Hushamu Deposit from the Inferred to Indicated categories. It is estimated that an additional 40 holes (15,000 metres) of drilling will be required for this. Estimated cost for resource definition: $3,000,000.

26.2 METALLURGICAL TESTING

The metallurgical testing studies conducted for the NorthIsle Gold-Copper PEA were primarily to develop a suitable process. Extensive variability and comminution studies were not conducted. It is therefore recommended that metallurgical testing be continued in advance of the Engineering Pre-Feasibility Study, using representative composite samples, to determine the process engineering design criteria for unit processes. This work should include:

- Ore hardness and comminution testing including the determination of crushing work index, Bond ball mill work index, Bond rod mill work index, Bond abrasion index tests, JK Drop Weight tests and SMC tests to obtain specific equipment design parameters.
- A grind size variability test to confirm the grind size distribution for optimum flotation recovery (especially for gold and molybdenum).
- A grind size variability test to confirm the grind size distribution for regrinding copper concentrate and the pyrite concentrate to maximize recoveries and concentrate grade.
- Flotation testing to evaluate the relationship between gold recovery and mass pull into the pyrite concentrate.
- Variability testing of identified ore types to determine the effectiveness of the selected process for each ore type.
- Locked cycle flotation testing to determine the optimal time, reagent selection and dosages, and demonstrate concentrate grades and recoveries.
- Liquid/solid separation tests to develop data for design of thickening, filtration and mixing equipment to process and dewater the NorthIsle mineralized material and provide samples for geotechnical studies.
- Molybdenite flotation tests to confirm molybdenite separation performance.
- Evaluation of deleterious elements in the final concentrates (copper and pyrite) to ensure that smelter specifications are achieved.
- Confirmation testing using site water to determine if the test results are similar to the results achieved with laboratory water.

The approximate cost of this test work would be $750,000

26.3 MINE WASTE STORAGE FACILITY

Recommendations for development of the MWSF design to Pre-Feasibility/Feasibility level include:

- Definition of borrow sources for the dam construction.
  - Starter dam borrow sources to be defined.
  - Sand mass balance for dam construction to be confirmed.
- Update of dam sizing considering criteria for freeboard and site specific topographic survey.
- Geotechnical and hydrogeological site and laboratory investigations of dam site foundation conditions following the recommendations by the Engineers and Geoscientists of British Columbia to satisfy the design engineer.
- Update to the facility water balance.
- Development of a site-specific seismic hazard assessment.
- Laboratory studies for geochemical and geotechnical characterization of the tailings and waste rock, including whole tailings and fractions of tailings classified by cyclone (overflow and underflow).
- Cyclone pilot plant testing to demonstrate quality and recovery rates for sand.
- Engineering design analyses for seepage, dam stability, dam deformation including dynamic loading by earthquake, and a facility water balance. Environmental studies may drive the engineering design.
- Hydrogeologic model of the facility.
- Consideration of other opportunities for mine waste storage for the Project, including:
  - Use of the Island Copper Pit.
  - Mixing of tailings and waste rock to use the 25% void space of the rock.

The approximate cost of this work would likely be in the range of $1,000,000 to $2,500,000.

26.4 MINING

- Geotechnical assessments should be undertaken to provide detailed recommendations for open pit wall slope design criteria at the Pre-Feasibility level of study. These studies should include assessments of hydrology conditions and overburden characterization in support of construction material allocation and interim pit slope stability. Foundation conditions should also be evaluated in support of stability analyses for temporary low grade and overburden stockpiles. The approximate cost of this work would be $1,000,000 to $2,000,000.

26.5 PERMITTING

- The permits held by NorthIsle for the Project are sufficient to ensure that exploration activities are conducted within the regulatory framework of the British Columbia Government. Additional permits will be required for Project development.
- Environmental permits for Project development have to be secured. This will require additional environmental baseline surveys to ensure compliance with environmental design and permit criteria.

26.6 INFRASTRUCTURE

- In support of further NorthIsle Project development, BC Hydro will need to conduct a power supply study to confirm the electrical power supply capability to the Project and the necessary modifications and up-grades, and associated costs to existing power infrastructure to meet the Project power requirements. The approximate cost of this work would be $200,000.
- Historically, copper concentrates were shipped from the former Island Copper marine terminal on Rupert Inlet via the Quatsino Sound and Narrows to overseas markets in handy-size vessels up to 32,000 DWT. No ship of this capacity has made this transit for over a decade. To support the development of the NorthIsle Project, the Pacific Pilotage Authority will need to review the proposed navigation route to establish and confirm the operating procedures, conditions and limitations for the shipping through the Quatsino Sound and Narrows. The approximate cost of this work would be $200,000.
- The existing marine terminal and ship loader on Rupert Inlet, owned by BHP, has been out of service for more than a decade. A study is required to evaluate the existing facilities and to establish the extent and cost of refurbishment or replacement necessary to provide reliable and safe operations for the NorthIsle Project. The approximate cost of this work would be $150,000.

26.7 MARKET RESEARCH STUDY

- A marketing study should be performed for the products of this project. The approximate cost of this study would be $100,000.

27 REFERENCES

Burgert, A., and Houle, J., (2011): 2011 Technical Report on the Island Copper Property for Northisle Copper and Gold Inc. and North Island Mining Corp.

De Bari, S.M., Anderson, R.G., and Mortensen, J.K., (1999): Correlation Among Lower to Upper Crustal Components in an Island Arc: The Jurassic Arc, Vancouver Island, Canada: Canadian Journal of Earth Sciences, v. 36, pp. 1371-1413.

Game, B. and Burt, P, (2017): Technical Report Copper-Gold Resource Estimate Red Dog Property, Northern Vancouver Island for NorthIsle Copper and Gold Inc.

Giroux, G.H. and Pawliuk, D.J., (2003): A Resource of Hushamu Copper – Gold Deposit, for CRS Copper Resource Corp. and First Trimark Ventures Inc.

Giroux, G., and Casselman, S., (2012): Updated Resource Report for the Hushamu Deposit, Northern Vancouver Island, British Columbia, Canada for Northisle Copper and Gold Inc.

Golder (Golder Associates Ltd.) 2013. Mine Waste Storage Siting Study, Hushamu Copper-Gold Project. Draft Report. 28 February 2013. Rev C. Doc. No. 1214270015-005-R-RevC-2000.

Golder 2017. Mine Waste Storage Facility – 75,000 Tonnes Per Day Mine Plan – North Island Project, Holberg Inlet, British Columbia. 25 August 2017. Technical Memorandum: 1668435-101-TM-RevA-1000.

Greene, A.R., Scoates, J.S., Nixon, G.T., and Weis, D., (2006): Picritic Lavas and Basal Sills in the Karmutsen Flood Basalt Province, Wrangellia, Northern Vancouver Island, BC, British Columbia Geological Survey, pp. 39-54.

Henrioulle, E., and Beattie, M.J.V. (1989): Metallurgical Investigation of Red Dog Property Progress Report; Bacon, Donaldson & Associates Ltd. Project Number: M89-127.

McClintock, J.A. (2014): 2014 Technical Report on the Drilling at the Hushamu Deposit, Nanaimo Mining Division, British Columbia Ministry of Energy, Mines and Petroleum Resources Assessment Report for Northisle Copper and Gold Inc.

McClintock, J.A. (2016): 2016 Assessment Report on Drilling at the Red Dog Property, Nanaimo Mining Division, British Columbia Ministry of Energy, Mines and Petroleum Resources Assessment Report for Northisle Copper and Gold Inc.

McClintock, J.A., (2015): Technical Report on Geochemical Sampling and Mapping of the Red Dog Property, Nanaimo Mining Division, British Columbia Ministry of Energy, Mines and Petroleum Resources Assessment Report for Northisle Copper and Gold Inc.

McClintock, J.A., (2016): Technical Report on Geological Mapping and Spectral Analysis on the Red Dog Property, Nanaimo Mining Division, British Columbia Ministry of Energy, Mines and Petroleum Resources Assessment Report for Northisle Copper and Gold Inc.

Muntanion, H.R., (1983): Drilling Report on the Expo Group A, Nanaimo Mining Division, British Columbia Ministry of Energy Mines and Petroleum Resources, Report 11,048 part 1 and 2, for Utah Mines Ltd., and Heinz Veerman and William Botel.

Muntanion, H.R., and Witherley, K.E., (1982): Geophysical, Geochemical and Drilling Report on the Expo Group A Owned by Utah Mines Ltd. And Heinz Veerman and William Botel Located 7 Kilometres Northeast of Holberg, B.C.

and Expo Groups B, C and D, owned by Utah Mines Ltd., Located 5 Kilometres North to 20 Kilometres east of Holberg, B.C., Nanaimo Mining Division, British Columbia Ministry of Energy Mines and Petroleum Resources, Report 10,982.

Nixon, G.T, et al., (2006): Geology of the Holberg-Winter Harbour Area, Northern Vancouver Island, British Columbia Ministry of energy, Mines and Petroleum Resources, Geoscience Map 20011-3.

Nixon, G.T., Hammack, J.L., Koyanagi, V.M., Payie, G.J., Haggart, J.W., Orchard, M.J., Tozer, T., Archibald, D.A., Friedman, R.M., Palfy, J., and Cordey, F., (2000): Geology of the Quatsino-Port McNeil Map Area, Northern Vancouver Island, British Columbia Ministry of Energy and Mines and Petroleum Resources Geoscience Map 2000-6.

Nixon, G.T., Hammack, J.L., Payie, G.J., Snyder, L.D., Koyanagi, V.M., Hamilton, J.V., Panteleyev, A., Massey, N.W.D., Haggart, J.W., and Archibald, D.A., (1997): Geology of Northern Vancouver Island; Preliminary Compilation, British Columbia Ministry of Energy, Mines and Petroleum Resources, Open File 1997-13.

Nixon, G.T., Kelman, M.C., Stevenson, D., Stokes, L.A., and Johnston, K.A., (2006): Preliminary Geologyof the Nimpkish Map Area (NTS 092L/07), Northern Vancouver Island, British Columbia, British Columbia Geological Survey, pp. 135-152.

Perelló, J., Fleming, J.A., O'Kane, K.P., Burt, P.D., Clarke, G.A., Himes, M.D., and Reeves, A.T., (1995): Porphyry Copper-Gold-Molybdenum Deposits in the Island Copper Cluster, Northern Vancouver Island, British Columbia, Porphyry Deposits of the Northwest Cordillera of North America, CIM Special Volume 46, pp. 214-238.

Richards, J.B. (1991): Assessment and Drilling Report on the Red Dog Project, located on Vancouver Island, B.C., British Columbia Ministry of Energy, Mines and Petroleum Resources Report 21,352 for Moraga Resources Ltd.

Richards, J.B., (1988): Drilling Report on the Red Dog Project Located on Vancouver Island, B.C., British Columbia Ministry of Energy, Mines and Petroleum Resources, Report 18,023 for Crew Capital Corporation.

Richards, J.B., (1990): Assessment and Drilling Report on the Red Dog Project, Located on Vancouver Island, B.C., British Columbia Ministry of Energy, Mimes and Petroleum Resources, Report 20,610 for Moraga Resources Ltd.

Richards, J.B., and Muntanion, H.R., (1983): Drilling Report on Red Dog 9, 12 and Red Dog Fr. Mineral Claims, Nanaimo Mining Division, B.C., British Columbia Ministry of Energy, Mines and Petroleum Resources, Report 12027 for Utah Mines Ltd.

Richards, M.A., Jones, D.L., Duncan, R.A., and DePaolo, D.J., (1991): A Mantle Plume Initiation Model for the Wrangellia Flood Basalt and Other Oceanic Plateaus; Science, v. 254, pp. 263-267.

Shouldice, T. and Angove, B. (2013): Preliminary Assessment of the NorthIsle Copper and Gold Inc.; ALS Metallurgy Kamloops. Project Number: KM3695.

Shouldice, T. and Angove, B. (2017): Preliminary Metallurgical Assessment of the Red Dog Project – prepared for NorthIsle Copper and Gold Inc.; Base Metallurgical Laboratories Ltd. Project Number: BL0137.

Shouldice, T. and Coombs, H. (2016): Metallurgical Assessment of North Island Project – prepared for NorthIsle Copper and Gold Inc.; Base Metallurgical Laboratories Ltd. Project Number: BL0059.

Sillitoe, R.H., (1993): Gold-Rich Porphyry Copper Deposits: Geological Model and Exploration Implications, in Kirkham, R.V., Sinclair, W.D., Thorpe, R.I., and Duke, J.M., eds., Mineral Deposit Modeling, 40. Geological Association of Canada, Special Paper, pp.465-478.

Sinclair, A.J., (1976): Applications of Probability Graphs in Mineral Exploration, Association of Exploration Geochemists, Special Volume No. 4.

Sloan, R. and Johnston, H. (2012): Pre-Feasibility Metallurgical Study of the Island Copper Deposit – prepared for Western Copper and Gold Corporation. ALS Metallurgy Kamloops. Project Number: KM3409.

APPENDIX A

PRELIMINARY ECONOMY ASSESSMENT CONTRIBUTORS AND PROFESSIONAL QUALIFICATIONS

CERTIFICATE OF QUALIFIED PERSON

I, Brian D. Game, P.Geo. do hereby certify that:

1. I am an independent consulting geologist, and principal of GeoMinEx Consultant Inc., with a business office at #1411-409 Granville Street, Vancouver, British Columbia, Canada V6C 1T2.

2. I am a graduate of the University of British Columbia, Vancouver BC, with a Bachelor of Science in Geology (1985).

3. I am a registered Professional Geologist in good standing with the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC), member number 19896.

4. I have worked as a geologist continuously since my graduation from university in 1985 and have been involved in projects and evaluations exploring for gold and base metals in Canada, United States, Mexico, South America and Central America, Philippines and Albania.

5. 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.

6. I am responsible for the preparation of Sections 4, 5, 6, 7, 8, 9, 10, 11, 12, 19, 20, 23, and corresponding sections of 1, 25 and 26 of the technical report titled "North Island Copper and Gold Project NI 43-101 Technical Report Preliminary Economic Assessment" for Northisle Copper and Gold Inc. dated October 24, 2017 ("Technical Report").

7. I personally inspected the North Island Property on August 11-12, 2016 and conducted drilling programs at Hushamu from August 14 to September 26, 2014 and at Hushamu and Red Dog from June 3-July 13, 2017.

8. I previously co-authored a technical report titled "43-101 Technical Report Copper-Gold Resource Estimate Red Dog Property" prepared for Northisle Copper and Gold Inc. with effective date March 24, 2017.

9. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

10. I am independent of Northisle Copper and Gold Inc. applying all the tests in section 1.5 of NI 43-101.

11. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with the instrument and form.

12. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their website accessible by the public, of the Technical Report.

" signed & sealed"

Brian Game, B.Sc. P.Geo.
Dated at Vancouver, B.C.
October 24, 2017

CERTIFICATE OF QUALIFIED PERSON

I, Philip Burt, P.Geo. do hereby certify that:

1. I am currently employed as a geological consultant and sole proprietor of Burt Consulting Services located at 2281 Carol Road Oakville Ontario Canada, L6J 6B5
2. I graduated with:
   - a Diploma of Mining Engineering Technology from British Columbia Institute of Technology in 1971.
   - a Bachelor of Science degree in Geology from the University of British Columbia in 1980.
3. I am a registered professional engineer in good standing in the following jurisdictions:
   - Saskatchewan, Canada (No. 10902)
   - Ontario, Canada (No. 1741)

   I am also a Fellow of the Society of Economic Geologists.
4. I have practiced geology, project management and computer applications for 49 years.
5. 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.
6. I am responsible for Section 14 and corresponding sections of 1, 25 and 26 of the technical report titled “North Island Copper and Gold Project NI 43-101 Technical Report Preliminary Economic Assessment” for NorthIsle Copper and Gold Inc. dated October 24, 2017 (“Technical Report”).
7. I have not had prior involvement with the property that is the subject of the Technical Report. I briefly visited the North Island Project site in 1979.
8. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
9. I am independent of NorthIsle Copper and Gold Inc. and all their subsidiaries as defined by Section 1.5 of NI 43-101.
10. I have read the National Instrument 43-101 and Form 43-101F1. The sections of the Technical Report that I am responsible for have been prepared in compliance with that instrument and form.
11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their website accessible by the public, of the Technical Report.

Dated 24 October 2017.

“Signed and Sealed”
Signature of Qualified Person

Philip Burt
Print Name of Qualified Person

CERTIFICATE OF QUALIFIED PERSON

I, Laurie M. Tahija, Q.P., do hereby certify that:

1. I am currently employed as Vice President at M3 Engineering & Technology Corp. located at 2051 West Sunset Rd, Suite 101, Tucson, AZ 85704.
2. I am a graduate of Montana College of Mineral Science and Technology, in Butte, Montana and received a Bachelor of Science degree in Mineral Processing Engineering in 1981.
3. I am recognized as a Qualified Professional (QP) member (#01399QP) with special expertise in Metallurgy/Processing by the Mining and Metallurgical Society of America (MMSA):
4. I have practiced mineral processing for 35 years. I have over twenty (20) years of plant operations and project management experience. I have been involved in projects from construction to startup and continuing into operation. I have worked on scoping, pre-feasibility and feasibility studies for mining projects in the United States and Latin America, as well as worked on the design and construction phases of some of these projects.
5. 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.
6. I am responsible for Section 17, 21.4.1-21.4.2 and corresponding sections of 1, 25 and 26 of the technical report titled “North Island Copper and Gold Project NI 43-101 Technical Report Preliminary Economic Assessment” for NorthIsle Copper and Gold Inc. dated October 24, 2017 (“Technical Report”).
7. I have not had prior involvement with the property that is the subject of the Technical Report.
8. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information required to be disclosed to make the report not misleading.
9. I am independent of the issuer applying all of the tests in section 1.5 of National Instrument 43-101.
10. I have read the National Instrument 43-101 and Form 43-101F1. The sections of the Technical Report that I am responsible for have been prepared in compliance with that instrument and form.
11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their website accessible by the public, of the Technical Report.

Dated 24 October 2017.

“Signed”
Signature of Qualified Person

Laurie Tahija
Print Name of Qualified Person

CERTIFICATE OF QUALIFIED PERSON

I, Daniel Roth, PE, P.Eng. do hereby certify that:

1. I am currently employed as a project manager and civil engineer at M3 Engineering & Technology Corp. located at 2051 West Sunset Rd, Suite 101, Tucson, AZ 85704.
2. I graduated with a Bachelor's of Science degree in Civil Engineering from The University of Manitoba in 1990.
3. I am a registered professional engineer in good standing in the following jurisdictions:
    - British Columbia, Canada (No. 38037)
    - Alberta, Canada (No. 62310)
    - Ontario, Canada (No. 100156213)
    - Yukon, Canada (No. 1998)
    - New Mexico, USA (No. 17342)
    - Arizona, USA (No. 37319)
    - Alaska, USA (No. 102317)
    - Minnesota, USA (No. 54138)
4. I have practiced engineering and project management for 25 years. I joined M3 Engineering in November 2003.
5. 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.
6. I am responsible for Sections 1, 2, 3, 18, 21, 22, 24, 27 and corresponding sections of 25 and 26 of the technical report titled "North Island Copper and Gold Project NI 43-101 Technical Report Preliminary Economic Assessment" for NorthIsle Copper and Gold Inc. dated October 24, 2017 ("Technical Report").
7. I have not had prior involvement with the property that is the subject of the Technical Report. I visited the North Island Project site on April 12, 2017.
8. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
9. I am independent of NorthIsle Copper and Gold Inc. and all their subsidiaries as defined by Section 1.5 of NI 43-101.
10. I have read the National Instrument 43-101 and Form 43-101F1. The sections of the Technical Report that I am responsible for have been prepared in compliance with that instrument and form.
11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their website accessible by the public, of the Technical Report.

Dated 24 October 2017.

"Signed"
Signature of Qualified Person

Daniel Roth
Print Name of Qualified Person

CERTIFICATE OF QUALIFIED PERSON

I, Thomas Shouldice, P.Eng. do hereby certify that:

1. I am currently employed as a Metallurgical Consultant, my office is located at 1215 Canyon Ridge Place, Kamloops, BC. I graduated with a Bachelor's of Science degree in Metallurgical Engineering from Queen's University, Kinston Ontario, Canada.
2. I am a registered professional engineer in good standing in the following jurisdictions:
   - British Columbia, Canada (No. 27489)

   I am also a member in good standing with the Society of Mining, Metallurgy and Exploration.
3. I have practiced engineering and project management for 24 years. I have held positions at operating mills (7 years) and been employed in the metallurgical testing and consulting business (17 years) with G&T Metallurgical Service, ALS Metallurgy, Base Metallurgical Laboratories Ltd., and TS Technical Services Ltd.
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 am responsible for Section 13 and corresponding sections of 1, 25 and 26 of the technical report titled "North Island Copper and Gold Project NI 43-101 Technical Report Preliminary Economic Assessment" for NorthIsle Copper and Gold Inc. dated October 24, 2017 ("Technical Report").
6. I have not had prior involvement with the property that is the subject of the Technical Report. I have not visited the North Island Project site.
7. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
8. I am independent of NorthIsle Copper and Gold Inc. and all their subsidiaries as defined by Section 1.5 of NI 43-101.
9. I have read the National Instrument 43-101 and Form 43-101F1. The sections of the Technical Report that I am responsible for have been prepared in compliance with that instrument and form.
10. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their website accessible by the public, of the Technical Report.

Dated 24 October 2017.

"Signed"
Signature of Qualified Person

Tom Shouldice
Print Name of Qualified Person

CERTIFICATE OF QUALIFIED PERSON

I, John Nilsson, P. Eng. do hereby certify that:

1. I am currently the President of Nilsson Mine Services Ltd. with a business address at 20263 Mountain Place, Pitt Meadows, B.C. Canada, V3Y 2T9
2. I graduated with a Bachelor's of Science degree in Geology from Queen's University in 1977. In addition, I obtained a Masters degree in Mining Engineering from Queen's University in 1990.
3. I am a member in good standing of the Association of Professional Engineers and Geoscientists of British Columbia (License No. 20697)
4. I have worked as a geologist and mining engineer since graduation from university.
5. 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.
6. I am responsible for Sections 15, 16, 21.2.4, 21.3.1, 21.4.3 and corresponding sections of 1 and 26 of the technical report titled "North Island Copper and Gold Project NI 43-101 Technical Report Preliminary Economic Assessment" for NorthIsle Copper and Gold Inc. dated October 24, 2017 ("Technical Report").
7. I have not had prior involvement with the property that is the subject of the Technical Report. I visited the North Island Project site on April 12, 2017.
8. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
9. I am independent of NorthIsle Copper and Gold Inc. and all their subsidiaries as defined by Section 1.5 of NI 43-101.
10. I have read the National Instrument 43-101 and Form 43-101F1. The sections of the Technical Report that I am responsible for have been prepared in compliance with that instrument and form.
11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their website accessible by the public, of the Technical Report.

Dated 24 October 2017.

"Signed and Sealed"

John Nilsson P.Eng.

CERTIFICATE OF QUALIFIED PERSON

I, Ben Wickland, P.Eng. do hereby certify that:

1. I am currently employed as a senior geotechnical engineer at Golder Associates Ltd. located at 200-2920 Virtual Way, Vancouver, BC, V5M 0C4.
2. I graduated with a Bachelor's of Science degree in Civil Engineering from the University of Saskatchewan in 1998, and a Doctor of Philosophy (Mining Engineering) from the University of British Columbia, 2006.
3. I am a registered professional engineer in good standing in the following jurisdictions:
   - British Columbia, Canada (Registration No. 31172)
   - Yukon Territory, Canada (Registration No. 2270)

   I am also Licensee in good standing with NWT/NU, Registration No. L2010.
4. I have practiced engineering for 13 years. I joined Golder Associates Ltd. in April 2006.
5. 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.
6. I am responsible for Sections 1.13.3, 18.3 and 26.3 of the Technical Report titled "North Island Copper and Gold Project NI 43-101 Technical Report Preliminary Economic Assessment" for NorthIsle Copper and Gold Inc. dated October 24, 2017 ("Technical Report").
7. I have previously completed studies for the Hushamu Copper-Gold Project in 2012, and 2013 which are referenced in this study. Other than the 2013 mine waste siting study, I have had no prior involvement with the Hushamu property that is the subject of the Technical Report. I visited the North Island Project site on April 12, 2017.
8. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
9. I am independent of NorthIsle Copper and Gold Inc. and all their subsidiaries as defined by Section 1.5 of NI 43-101.
10. I have read the National Instrument 43-101 and Form 43-101F1. The sections of the Technical Report that I am responsible for have been prepared in compliance with that instrument and form.
11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their website accessible by the public, of the Technical Report.

Dated 24 October 2017.

"signed and sealed"
Signature of Qualified Person

Ben Wickland, P.Eng.
Print Name of Qualified Person