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North Island Copper and Gold Project

NI 43-101 Technical Report
Preliminary Economic Assessment

British Columbia, Canada

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NORTHISLE COPPER AND GOLD INC.

DATE AND SIGNATURES PAGE

The effective date of this report is February 4, 2021. The issue date of this report is March 18, 2021. See Appendix A, Study 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
FORM 43-101F1 TECHNICAL REPORT
PRELIMINARY ECONOMIC ASSESSMENT

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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 Project is a 33,397-hectare contiguous block of 210 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.

NorthIsle, through North Island Mining Corp., 100% owns the claims forming the Project subject to a 10% net profit royalty, except for the 16 claims that comprise the Red Dog option, which are subject to a 3% Net Smelter Returns Royalty ("NSR"), of which 2% could be repurchased for a one-time $2M payment. There are no additional royalties, back-in rights, payments or other agreements and encumbrances to which the property is subject.

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 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. Two of the 2014 drill holes are not part of the current block model.

In 2017, NorthIsle drilled five holes at Hushamu including three holes to test an area of the Hushamu Deposit previously determined to be low-grade mineralization based on three widely spaced vertical historical holes. Another hole was drilled to test for continuation of copper, gold, and molybdenum mineralization to the southeast of the known deposit but was abandoned prematurely due to driller error. A single hole was drilled in the northern portion of the Hushamu Deposit to collect a metallurgical sample of the two main alteration types in the deposit. The 2017 holes have been included in 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 m 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.

In 2017, NorthIsle attempted one drill hole to test for deeply buried copper, gold and molybdenum porphyry mineralization south of the Red Dog Deposit. The hole was lost prematurely and did not reach the target depth. There is no recorded production from the Red Dog Deposit.

1.6 DRILLING

A total of 232 holes (46,478 m) have been completed at the 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 m 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 ft (3.05 m) 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 m intervals for HQ core and 3 m 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 and Bureau Veritas Mineral Laboratories (BVL). All samples collected by NorthIsle in 2011. 2012 and 2014 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. All samples collected by NorthIsle in 2017 were prepared and analyzed by BVL in Vancouver, B.C.

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 2020, 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 148 drill holes (34,433 m), comprising 11,314 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 5 m 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 m E, 2,300 m N and 765 m vertical. Block sizes were 20 m horizontal and 15 m vertical. Sub-blocking of 5 m horizontal and 3.75 m 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 0.10% Cu cut-off is as shown in Table 1-1.

Table 1-1: Hushamu Resource Estimate at a 0.10% Cu Cut-off

Indicated Resource					
Domain	**Tonnes x 10^6**	**% Cu**	**ppm Au**	**% Mo**	**ppm Re**
LEA	8.84	0.14	0.22	0.008	0.29
CMG-SCP-PRO	462.48	0.20	0.24	0.004	0.03
QFP	1.54	0.11	0.08	0	0
Total	**472.85**	**0.20**	**0.23**	**0.008**	**0.35**
Inferred Resource					
LEA	2.17	0.13	0.18	0.008	0.66
CMG-SCP-PRO	410.26	0.15	0.18	0.006	0.30
QFP	1.86	0.12	0.10	0.005	0.15
Total	**414.29**	**0.15**	**0.18**	**0.006**	**0.29**

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 eighteen 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

Six metallurgical test programs have been conducted on zones of the 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. Recent tests completed by SGS focused on improved recovery of copper, gold and pyrite concentrate.

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 and cleaner tests in the BML 2017 program. The metallurgical tests completed by SGS in 2020 started with batch rougher and cleaner tests and were completed with locked cycle tests. Results from the locked cycle tests were used to determine the expected metallurgical results.

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 2020 Testing

Deposit	Comp	Feed Grade Assays			PG	Con Grade			Recovery		
		Cu (%)	Mo (%)	Au (g/t)	µm K80	Cu (%)	Mo (%)	Au (g/t)	Cu (%)	Mo (%)	Au (%)
Hushamu	CMG	0.33	0.008	0.36	100	24	0.5	15.3	86	74	49
	SCP	0.36	0.009	0.40	100	27	0.5*	14.9	86	74*	43
Red Dog	Reddog	0.33	0.004	0.51	100	27	0.3	24.5	90	73	53

Note: Moly concentrate grade and recovery are estimated for SCP ore based on previous testwork

The concentrate produced in the recent testing remained 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 flotation process that has been used successfully by the mining industry for many years. Concentrates, copper/gold and molybdenum will be produced as saleable products.

The design basis for the processing plant was 75,000 t/d or 27,375,000 t/y at 93% availability. Design ore grade to the process plant was estimated to average 0.18% copper, 0.24 g/t gold, and 0.008% molybdenum with an overall estimated recovery of approximately 86% for copper, 47% for gold, and 60% for molybdenum.

Mineralized material will be processed from the Hushamu and the Red Dog Deposits. Run-of-Mine (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 circuit 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 cell to produce tailings with low sulfide content. The tailings will be classified using cyclones 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). Pyrite scavenger flotation concentrate will be thickened and deposited sub-aqueously with the fine fraction of the pyrite scavenger flotation tailings in the MWSF.

Copper/gold concentrate 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 Project is proposed for development is well-serviced by all-weather paved public highways to within about 30 km of the mine site. Access to the site from 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 Project 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 Equipment*	$17.8
Pre-Production	$130.9
Process Plant and Infrastructure	$1,235.4
Owner's Cost	$57.9
Total	**$1,442.0**

*Primary mining equipment is included in operating costs on a leased basis.

1.14.2 Operating Costs

The mine operating costs were calculated to average CAD$2.11 per tonne moved based on all years of operation as well as pre-production. (Note that pre-production operating expenses are capitalized in the financial model.) Leased primary mine equipment will cost an additional CAD$0.21 per tonne for leasing primary mining equipment.

Table 1-4: Mine Operating Costs

Area	Unit Cost (CAD$/t mined)
Drilling	0.13
Blasting	0.35
Loading	0.24
Hauling	0.69
Support	0.49
Mine General	0.21
Total Mining Cost (Excluding Equipment Lease)	**2.11**
Mine Equipment Lease	**0.21**
Total Cost	**2.32**

The process operating costs were calculated to average CAD$5.52/tonne ore.

Table 1-5: Process Operating Costs

Area	CAD$/tonne ore
Salaries & Wages	0.50
Power	1.84
Liners	0.36
Grinding Media	1.03
Reagents	1.20
Maintenance Parts & Repairs	0.48
Supplies & Services	0.10
Total	**5.52**

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 February 2, 2021. 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	Base Case	SEC	Spot Price (02.02.2021)
Copper Price (US$/lb)	$3.25	$2.84	$3.51
Gold Price (US$/oz)	$1,650.00	$1,491.97	$1,835.60
Molybdenum Price (US$/lb)*	$10.00	$10.25	$10.03
CAD:USD Exchange rate	0.75	0.75	0.75
Average Annual Revenue (CAD$M)	$648.6	$578.4	$704.9
Economic Result (after tax)			
Avg. Annual Free Cash Flow (CAD$M)	$223.6	$182.8	$256.7
NPV (5%) (CAD$M)	$1,682.5	$1,137.4	$2,116.4
NPV (8%) (CAD$M)	$1,059.4	$632.2	$1,396.1
NPV (10%) (CAD$M)	$759.1	$388.7	$1,049.0
IRR	19.0%	14.7%	22.3%
Payback	3.9	5.0	3.5

*Rhenium is a credit in the moly concentrate at a price of US$1,256.00/kg for all cases.

1.16 CONCLUSIONS AND RECOMMENDATIONS

The 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 19.0%, 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 at the Island Copper Mine 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.
- Evaluate technologies to reduce greenhouse gas emissions, including but not limited to, trolley-assisted haulage, and hydrogen fuel cell technology for haulage units.
- 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.
- Develop a conceptual design and costs to establish copper concentrate receiving, storage and loadout facilities on Holberg Inlet to ship product from the 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

This report was prepared by M3 Engineering & Technology Corp. (M3) for North Island Mining Corp., a wholly owned subsidiary of NorthIsle Copper and Gold Inc. 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

NorthIsle previously filed Technical Reports on the 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.
- M3 (2017): North Island Copper and Gold Project, NI 43-101 Technical Report – Preliminary Economic Assessment.

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 (see also Table 2-1):

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

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

QP Name	Company	Certification	Site Visit Date	Area of Responsibility
Laurie Tahija	M3	Q.P. of MMSA	N/A	Sections 13, 17, 21.5.1 and corresponding sections of 1, 25, 26 and 27.
Daniel Roth	M3	P.Eng.	April 12, 2017	Sections 2, 3, 18, 21, 22, 24 and corresponding sections of 1, 25, 26 and 27.
Brian Game	GeoMinEx	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, 26 and 27.
John Nilsson	Nilsson Mine Services Ltd.	P.Eng	N/A	Sections 15, 16, 21.3.5, 21.3.6, 21.4.1, 21.5.3, and corresponding sections of 1, 25, 26 and 27.
Phil Burt	Phil Burt Consulting Services	P.Geo.	Summer of 1979	Section 14, and corresponding sections of 1, 25, 26 and 27.
Ben Wickland	Golder Associates Ltd.	P.Eng.	April 12, 2017	Sections 1.13.3, 18.3, 26.3 and corresponding sections of 27.

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 (%), or grams per metric tonne (g/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

Abbreviation	Unit or Term
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
dmtpy	Dry metric tonnes per year
EIA	Environmental Impact Assessment
EIS	Environmental Impact Study

Abbreviation	Unit or Term
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
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

Abbreviation	Unit or Term
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
PA	Preliminary Assessment or Preliminary Economic Assessment
PAX	Potassium Amyl Xanthate
Pb	Lead
PEA	Preliminary Economic Assessment
ppb	part per billion
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

Abbreviation	Unit or Term
Sb	Antimony
SCP	Silica Clay Pyrite
SRF	stress reduction factor
t/a	metric tonnes per year (annum)
t/d	metric tonnes per day
t/h	metric tonnes per hour
tonne	metric tonne
tpa	Tonnes per annum
tpy	Tonnes per year
US$ / USD	United States Dollars

Abbreviation	Unit or Term
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 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 Project is a contiguous 33,397-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 210 mineral claims which includes the 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)
229791	EXPO 1015 FR.	1983/Aug/22	2022/Dec/11	25.00
231651	HEP #36	1966/Sep/20	2022/Dec/11	25.00
231667	HEP #54	1966/Sep/20	2022/Dec/11	25.00
231668	HEP #55	1966/Sep/20	2022/Dec/11	25.00
231669	HEP #56	1966/Sep/20	2022/Dec/11	25.00
231671	HEP #58	1966/Sep/20	2022/Dec/11	25.00
231672	HEP #59	1966/Sep/20	2022/Dec/11	25.00
231680	RED DOG 1	1966/Dec/13	2027/May/23	25.00
231681	RED DOG 2	1966/Dec/13	2027/May/23	25.00
231682	RED DOG 3	1966/Dec/13	2027/May/23	25.00
231683	RED DOG 4	1966/Dec/13	2028/May/23	25.00
231684	RED DOG 5	1966/Dec/13	2028/May/23	25.00
231685	RED DOG 6	1966/Dec/13	2028/May/23	25.00
231686	RED DOG 7	1966/Dec/13	2028/May/23	25.00
231687	RED DOG 8	1966/Dec/13	2028/May/23	25.00
231688	RED DOG 9	1966/Dec/13	2028/May/23	25.00
231689	RED DOG 10	1966/Dec/13	2029/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	2022/Dec/11	25.00
231934	EXPO 191	1967/Oct/10	2022/Dec/11	25.00
231961	EXPO 218	1967/Oct/10	2022/Dec/11	25.00
231963	EXPO 220	1967/Oct/10	2022/Dec/11	25.00
231965	EXPO 222	1967/Oct/10	2022/Dec/11	25.00
231966	EXPO 223	1967/Oct/10	2022/Dec/11	25.00
231968	EXPO 225	1967/Oct/10	2022/Dec/11	25.00
231980	EXPO 227	1967/Oct/19	2022/Dec/11	25.00
231982	EXPO 229	1967/Oct/19	2022/Dec/11	25.00
231984	EXPO 231	1967/Oct/19	2022/Dec/11	25.00
231990	EXPO 237	1967/Oct/19	2022/Dec/11	25.00

Tenure Number	Claim Name	Issue Date	Good to Date	Area (ha)
231991	EXPO 238	1967/Oct/19	2022/Dec/11	25.00
231995	EXPO 242	1967/Oct/19	2022/Dec/11	25.00
231997	EXPO 244	1967/Oct/19	2022/Dec/11	25.00
232000	EXPO 247	1967/Oct/19	2022/Dec/11	25.00
232001	EXPO 248	1967/Oct/19	2022/Dec/11	25.00
232002	EXPO 249	1967/Oct/19	2022/Dec/11	25.00
232004	EXPO 251	1967/Oct/19	2022/Dec/11	25.00
232005	EXPO 252	1967/Oct/19	2022/Dec/11	25.00
232006	EXPO 253	1967/Oct/19	2022/Dec/11	25.00
232007	EXPO 254	1967/Oct/19	2022/Dec/11	25.00
232008	EXPO 255	1967/Oct/19	2022 Dec/11	25.00
232011	EXPO 258	1967/Oct/19	2022/Dec/11	25.00
232015	EXPO 262	1967/Oct/19	2022/Dec/11	25.00
232017	EXPO 264	1967/Oct/19	2022/Dec/11	25.00
232019	EXPO 266	1967/Oct/19	2022/Dec/11	25.00
232020	EXPO 267	1967/Oct/19	2022/Dec/11	25.00
232021	EXPO 268	1967/Oct/19	2022/Dec/11	25.00
232022	EXPO 269	1967/Oct/19	2022/Dec/11	25.00
232024	EXPO 271	1967/Oct/19	2022/Dec/11	25.00
232025	EXPO 272	1967/Oct/19	2022/Dec/11	25.00
232026	EXPO 273	1967/Oct/19	2022/Dec/11	25.00
232027	EXPO 274	1967/Oct/19	2022/Dec/11	25.00
232028	EXPO 275	1967/Oct/19	2022/Dec/11	25.00
232030	EXPO 278	1956/Oct/19	2022/Dec/11	25.00
232037	EXPO 285	1967/Oct/19	2022/Dec/11	25.00
232041	EXPO 289	1967/Oct/19	2022/Dec/11	25.00
232044	EXPO 292	1967/Oct/19	2022/Dec/11	25.00
232045	EXPO 293	1967/Oct/19	2022/Dec/11	25.00
232046	EXPO 294	1967/Oct/19	2022/Dec/11	25.00
232105	EXPO 312	1967/Nov/13	2022/Dec/11	25.00
232107	EXPO 314	1967/Nov/13	2022/Dec/11	25.00
232212	RED DOG 29 FR	1967/Dec/01	2026/May/23	25.00
232220	EXPO 326	1967/Dec/18	2022/Dec/11	25.00
232228	EXPO 504 FR	1967/Dec/18	2022/Dec/11	25.00
232271	RED DOG 13 FR.	1968/Jun/17	2026/May/23	25.00
232275	EXPO 1008 FR	1968/Dec/05	2022/Dec/11	25.00
232276	EXPO 1011 FR	1968/Dec/05	2022/Dec/11	25.00
232277	EXPO 1012 FR	1968/Dec/05	2022/Dec/11	25.00
232306	DON 9 FR	1969/Nov/21	2022/Dec/11	25.00
232307	DON 10 FR	1969/Nov/21	2022/Dec/11	25.00
232308	DON 11 FR	1969/Nov/21	2022/Dec/11	25.00
232309	DON 12 FR	1969/Nov/21	2022/Dec/11	25.00
232310	DON 13 FR	1969/Nov/21	2022/Mar/11	25.00
371777	APPLE BAY THREE	1999/Sep/18	2022/Dec/11	200.00
374744	APPLE BAY FOUR	2000/Mar/11	2022/Dec/11	400.00
377240	APPLE BAY TWO	2000/May/17	2022/Dec/11	500.00
394718	APPLE BAY NINETEEN	2002/Jul/05	2022/Dec/11	500.00
398335	APPLE BAY TWENTY	2002/Nov/16	2022/Dec/11	500.00
402033	APPLE BAY TWENTY-THREE	2003/Apr/26	2022/Dec/11	400.00
402037	APPLE BAY TWENTY-SEVEN	2003/Apr/29	2022/Dec/11	250.00
402513	NORTHWEST 900	2003/May/27	2022/Dec/11	250.00

Tenure Number	Claim Name	Issue Date	Good to Date	Area (ha)
405216	NORTHWEST 901	2003/Sep/19	2022/Dec/11	25.00
501677		2005/Jan/12	2022/Dec/11	81.85
506021	Wanakana Central	2005/Feb/06	2022/Dec/11	348.31
512085	FILL 1	2005/May/05	2022/Dec/01	511.67
512087	FILL 2	2005/May/05	2022/Dec/01	511.90
512088	FILL 3	2005/May/05	2022/Dec/01	143.38
512089	FILL 4	2005/May/05	2022/Dec/01	511.95
512091	FILL 5	2005/May/05	2022/Dec/01	511.96
512092	FILL 6	2005/May/05	2022/Dec/01	512.08
512093	FILL 7	2005/May/05	2022/Dec/01	512.20
512094	FILL 8	2005/May/05	2022/Dec/01	512.23
512095	FILL 9	2005/May/05	2022/Dec/01	163.89
512096	FILL 10	2005/May/05	2022/Dec/11	512.77
512102	FILL 11	2005/May/05	2022/Dec/01	225.59
512104	FILL 13	2005/May/05	2022/Dec/01	430.72
512105	FILL 14	2005/May/05	2022/Dec/01	328.07
512107	FILL 15	2005/May/05	2022/Dec/01	61.51
512108	FILL 15	2005/May/05	2022/Dec/01	512.25
512109	FILL 16	2005/May/05	2022/Dec/01	512.22
512110	FILL 17	2005/May/05	2022/Dec/01	511.95
512111	FILL 18	2005/May/05	2022/Dec/01	511.85
512113	FILL 18	2005/May/05	2022/Dec/01	512.04
512114	FILL 19	2005/May/05	2022/Dec/01	511.87
512115	FILL 20	2005/May/05	2022/Dec/01	368.51
512116	FILL 21	2005/May/05	2022/Dec/01	225.11
512117	FILL 22	2005/May/05	2022/Dec/01	122.76
512118	FILL 23	2005/May/05	2022/Dec/01	164.17
512120	FILL 24	2005/May/05	2022/Dec/01	245.80
512122	FILL 25	2005/May/05	2022/Apr/01	245.75
512952		2005/May/18	2022/Jan/13	81.97
512963		2005/May/18	2022/Jan/13	81.97
512964		2005/May/18	2022/Jan/13	81.97
512966		2005/May/18	2022/Jan/12	61.48
512967		2005/May/18	2022/Jan/13	61.48
512968		2005/May/18	2022/Jan/13	61.47
512972		2005/May/18	2022/Jan/12	81.95
512980		2005/May/19	2022/Jan/13	81.93
512983		2005/May/19	2022/Jan/13	81.95
512984		2005/May/19	2022/Jan/13	40.97
512986		2005/May/19	2022/Jan/13	40.96
512988		2005/May/19	2022/Jan/13	40.96
512989		2005/May/19	2022/Jan/13	20.48
512990		2005/May/19	2022/Jan/13	40.96
512993		2005/May/19	2022/Jan/13	40.97
512994		2005/May/19	2022/Jan/13	81.96
512996		2005/May/19	2022/Jan/13	81.96
512999		2005/May/19	2022/Jan/13	40.97
513006		2005/May/19	2022/Jan/12	20.49
513013		2005/May/19	2022/Jan/13	40.97
513026		2005/May/19	2022/Jan/13	20.49
513053		2005/May/19	2022/Jan/13	61.44

Tenure Number	Claim Name	Issue Date	Good to Date	Area (ha)
513057		2005/May/19	2022/Jan/12	40.96
513060		2005/May/19	2022/Jan/13	40.96
513062		2005/May/19	2022/Jan/13	40.97
513065		2005/May/19	2022/Jan/13	61.46
513066		2005/May/19	2022/Jan/13	20.49
513067		2005/May/19	2022/Jan/13	81.96
513068		2005/May/19	2022/Jan/13	81.97
513071		2005/May/19	2022/Jan/13	81.95
513072		2005/May/19	2022/Jan/12	81.93
513075		2005/May/19	2022/Jan/13	61.44
513076		2005/May/19	2022/Jan/13	40.96
513077		2005/May/19	2022/Jan/13	20.48
513078		2005/May/19	2022/Jan/13	81.93
513080		2005/May/19	2022/Jan/13	20.49
513082		2005/May/19	2022/Jan/13	40.96
513086		2005/May/19	2022/Jan/13	20.48
513087		2005/May/19	2022/Jan/13	40.95
513089		2005/May/19	2022/Jan/13	40.95
513090		2005/May/19	2022/Jan/13	40.96
513091		2005/May/19	2022/Jan/12	61.43
513092		2005/May/19	2022/Jan/13	40.95
513093		2005/May/19	2022/Jan/13	81.90
513094		2005/May/19	2022/Jan/13	81.88
513104		2005/May/19	2022/Jan/13	20.47
513107		2005/May/19	2022/Jan/12	40.95
513108		2005/May/19	2022/Jan/13	40.96
513109		2005/May/19	2022/Jan/13	184.29
513172		2005/May/21	2022/Jan/13	40.98
513758	RED DOG NORTH	2005/Jun/01	2022/Dec/11	429.61
513760	HEP 2.2	2005/Jun/01	2022/Dec/11	20.46
513909		2005/Jun/03	2022/Dec/11	511.70
513910		2005/Jun/03	2022/Dec/11	347.91
513911		2005/Jun/03	2022/Dec/11	61.38
513912		2005/Jun/03	2022/Dec/11	40.92
513913		2005/Jun/03	2022/Dec/11	20.46
513914		2005/Jun/03	2022/Dec/11	81.85
513926		2005/Jun/04	2022/Dec/11	286.51
513927		2005/Jun/04	2022/Dec/11	409.30
513929		2005/Jun/04	2022/Dec/11	430.36
513930		2005/Jun/04	2022/Dec/11	389.32
513931		2005/Jun/04	2022/Dec/11	696.95
515275		2005/Jun/25	2022/Dec/11	470.91
515276		2005/Jun/25	2022/Dec/11	655.55
515277		2005/Jun/25	2022/Dec/11	245.85
515278		2005/Jun/25	2022/Dec/11	655.92
515279		2005/Jun/25	2022/Dec/11	184.47
515280		2005/Jun/25	2022/Dec/11	471.44
515281		2005/Jun/25	2022/Dec/11	614.93
515282		2005/Jun/25	2021/Dec/11	676.19
515283		2005/Jun/25	2022/Dec/11	553.44
515284		2005/Jun/25	2022/Dec/11	902.62

Tenure Number	Claim Name	Issue Date	Good to Date	Area (ha)
515285		2005/Jun/25	2022/Dec/11	102.42
515313		2005/Jun/26	2022/Dec/11	163.85
515593		2005/Jun/30	2022/Dec/11	656.14
515594		2005/Jun/30	2022/Dec/11	164.03
515595		2005/Jun/30	2022/Dec/11	615.08
515596		2005/Jun/30	2022/Dec/11	451.08
516074		2005/Jul/05	2022/Dec/11	553.63
516075		2005/Jul/05	2022/Dec/11	102.38
516076		2005/Jul/05	2022/Dec/11	245.87
516077		2005/Jul/05	2022/Dec/11	389.65
516078		2005/Jul/05	2022/Dec/11	286.99
516079	QUATSE LAKE TOO	2005/Jul/05	2022/Dec/11	143.49
516081		2005/Jul/05	2022/Dec/11	491.18
516527		2005/Jul/09	2022/Dec/11	163.94
516529	APPLE BAY 9PLUS	2005/Jul/09	2022/Dec/11	20.49
516930	NORTH RG	2005/Jul/11	2022/Dec/11	204.54
517055	NEW 402513	2005/Jul/12	2022/Dec/11	143.20
517076	NEW RD	2005/Jul/12	2022/Dec/11	20.46
517123	RD NORTHEAST	2005/Jul/12	2022/Dec/11	204.60
517213	HOLBERG	2005/Jul/12	2022/Dec/11	143.52
517236	NUMMIS	2005/Jul/12	2022/Dec/11	41.02
517541	APPLE BAY TEN	2005/Jul/12	2022/Dec/11	20.51
518531		2005/Jul/29	2022/Apr/01	511.76
525702	HUSHAMU NORTHEAST	2006/Jan/17	2022/Dec/11	307.12
1019755		2013/May/24	2022/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 Project claims are property of the “Crown”, (i.e., the Province of British Columbia), notwithstanding any ongoing First Nations treaty negotiations.

NorthIsle, through North Island Mining Corp., 100% owns the claims forming the Project subject to a 10% net profit royalty, except for the 16 claims that comprise the Red Dog option, which are subject to a 3% NSR. Two-thirds, or 2% of this NSR can be bought out at any time for $1,000,000 for each one-third, for a total of $2,000,000 if two-thirds of the royalty is purchased.

There are no additional royalties, back-in rights, payments or other agreements and encumbrances to which the property is subject.

Figure 4-1: Location Map

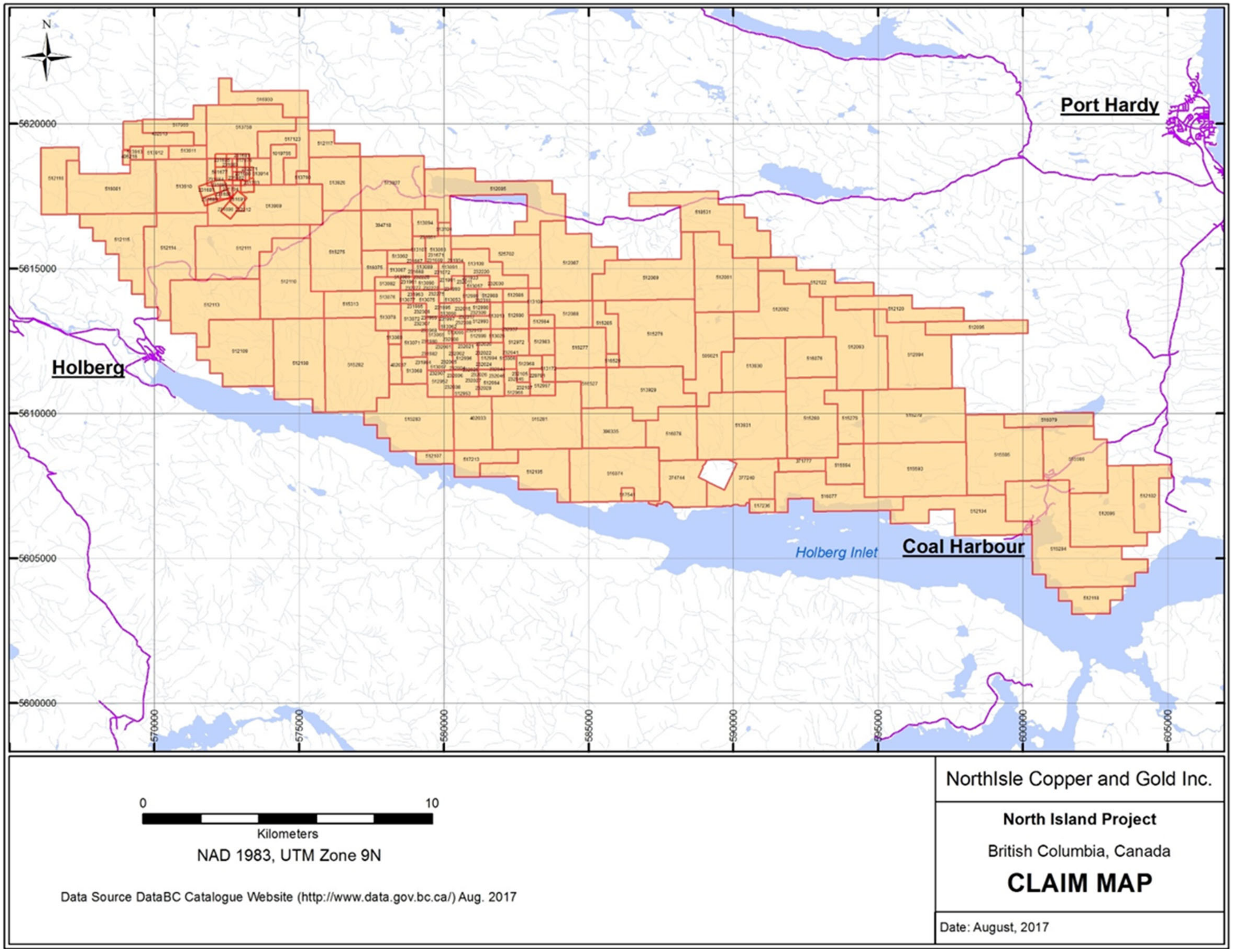


Figure 4-2: Claim Map

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 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 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 majority of the surface rights and remaining infrastructure.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

The 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 Western 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 m 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 on the order of 360 m 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 m.

The most accessible major supply centre is Port Hardy (population 4,000), approximately 30 km by road 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, ample areas exist 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 on 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 km 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 m 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 m in 1969
- Six drill holes, 1,077 m, in 1971
- Eight drill holes, 1,112 m in 1972
- Nineteen drill holes at Hushamu; two drill holes at South Hushamu, for a total of 3,106 m in 1973.
- Nineteen drill holes, 3,885 m in 1974
- Seven drill holes, 885 m 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 m 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 km 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.

In 2017, NorthIsle drilled five holes at Hushamu including three holes to test an area of the Hushamu Deposit previously determined to be low-grade mineralization based on three widely spaced vertical historical holes. Another hole was drilled to test for continuation of copper, gold, and molybdenum mineralization to the southeast of the known deposit but was abandoned prematurely due to driller error. A single hole was drilled in the northern portion of the Hushamu Deposit to collect a metallurgical sample of the two main alteration types in the deposit. The 2017 holes are included in the current block model. 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 led 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 1968 and 1970, 24 diamond drill holes totalling 2,175 m 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 m. In 1973, City was joined by Westminex Development ("Westminex"). A program of rock geochemistry and 7.7 km 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 m, 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 m 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 m 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 m, 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 m 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 m 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 the area at NorthIsle's current 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 2012 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 m 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.

In 2017, NorthIsle attempted one drill hole to test for deeply buried copper, gold and molybdenum porphyry mineralization south of the Red Dog Deposit. The hole was lost prematurely and did not reach the target depth. There is no recorded production from the Red Dog Deposit.

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 the 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 m 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.

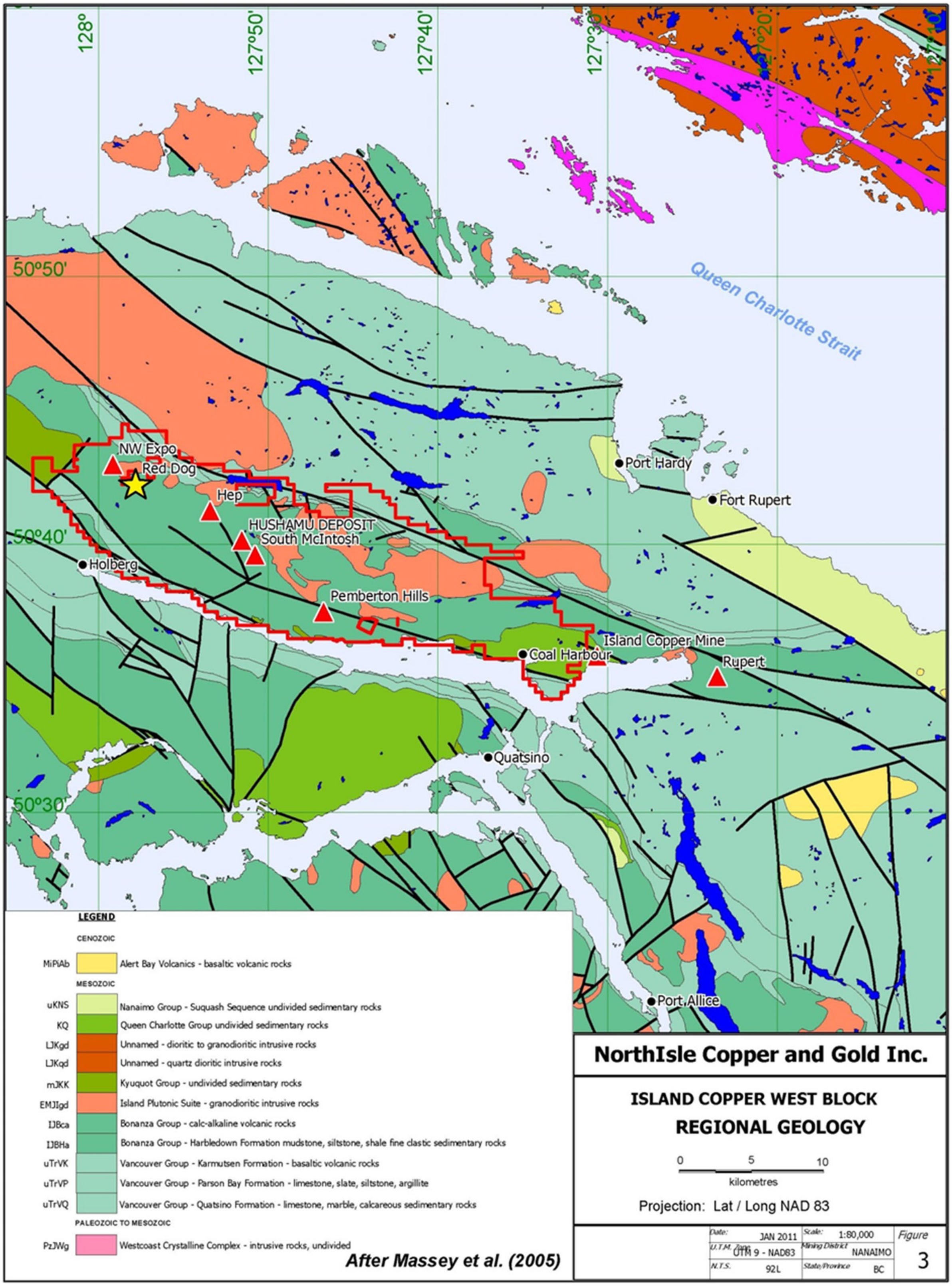


Figure 7-1: Regional Geology Map

7.2 PROPERTY GEOLOGY: HUSHAMU

The following sections on Hushamu are adapted from Giroux and 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 m 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 m depth to 90 m 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.

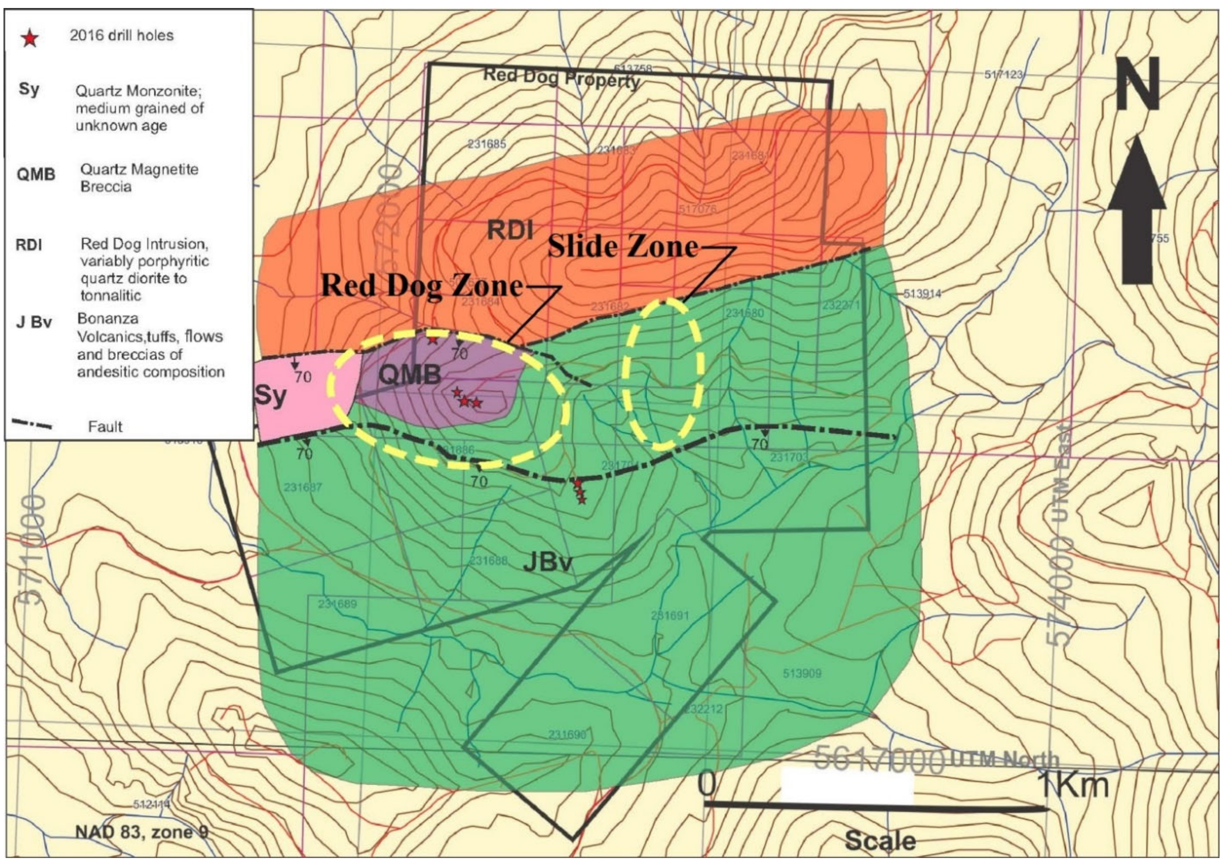


Figure 7-2: Property Geology Map

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 m. 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 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 3 m 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 m.

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); Propylitic (PROP); and Zeolite-Carbonate (Figure 7-3).

The Hornfels facies alteration forms a band of alteration within the Bonanza Group rocks approximately 300 m 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 interfingering 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.

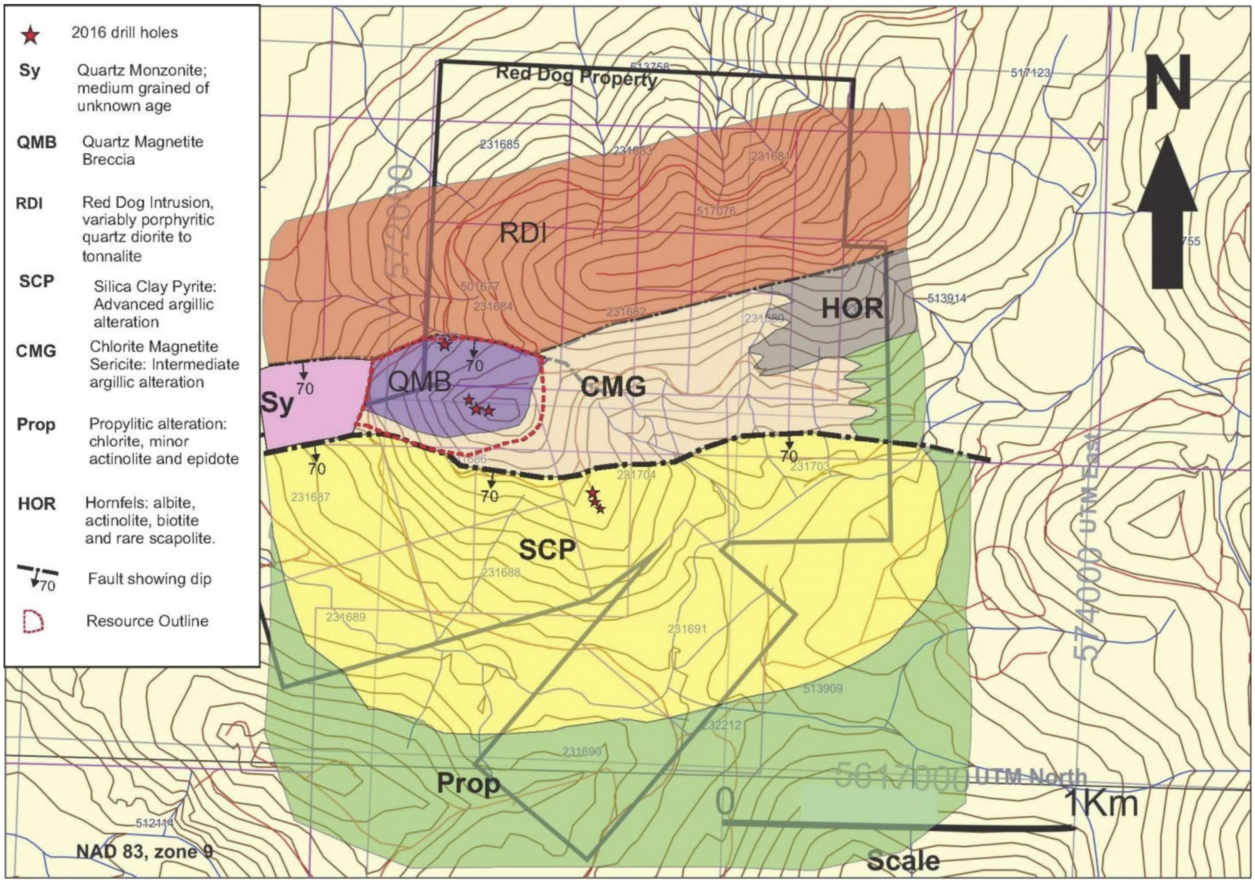


Figure 7-3: Alteration Map

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 m by 150-m-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 m 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 m. Each fault is 5 to 10 m 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 m.

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-m-long by 150-m-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 m 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, 2014, and 2017 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. In 2017, NorthIsle attempted one drill hole to test for deeply buried copper, gold and molybdenum porphyry mineralization south of the Red Dog Deposit. The hole was lost prematurely and did not reach the target depth.

10 DRILLING

10.1 2012, 2014, 2017 DRILLING: HUSHAMU

The following sections on Hushamu are adapted from Giroux and Casselman, 2012 and McClintock, 2015, 2017.

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 five NQ and HQ holes (H14-01C, H14-02, H14-03, H14-04 and H14-05) for a total of 1,835 m. 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.

Copper mineralization and the favourable CMG alteration was encountered in drill holes H14-01C, H14-02 and H14-03, and requires further investigation by drilling.

The 2014 Hushamu drill program was performed by Kluane Drilling Ltd. of Whitehorse, Yukon. Kluane used one KD1000 drill rig mounted on skids. Core logging and sampling supervision was completed by NorthIsle and assaying was performed by ALS Laboratories Ltd. of North Vancouver, B.C.

Core logging was conducted in 2014 at the former mine site of the Island Copper Mine, and in 2017 at Northisle's core facility at the Quatsino Industrial Site. The core was 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 an area adjoining the core logging facility.

For both the 2014 and 2017 drill campaigns, a Reflex single-shot survey tool was used at 30 m downhole intervals to provide in-hole survey data. Drill hole locations were determined by a handheld Garmin GPS.

The 2017 Hushamu drill program was performed by Peak Drilling Ltd. of Courtenay, B.C. using a drill rig mounted on skids. Core logging and sampling was completed by NorthIsle and assaying was performed by Bureau Veritas Laboratories, Vancouver. B.C.

Five NQ and HQ diamond drill holes, totaling 1,556 m, tested the Hushamu deposit in 2017. Core hole H17-01 collected a metallurgical sample. Core holes H17-02, H17-03 and H17-04 tested an area in the south-central part of the Hushamu deposit previously determined to be low-grade mineralization based on three widely spaced vertical historical holes, and core hole H17-05 was drilled to test for continuation of copper, gold and molybdenum mineralization to the southeast of the known deposit. Indication of mineralization continuing to the south east was suggested by a shallow historical hole drilled about 200 m to the northeast of the collar of H17-05.

The results from the three holes in the south-central part of the deposit demonstrated that this previously believed low-grade area contains appreciable copper, gold, and molybdenum mineralization. The 2017 drilling confirmed that the three historical vertical holes, upon which the low-grade nature of the area was based, had passed along near vertical post mineral breccia dykes and their associated sulphide destructive alteration. Further, the 100 to 150-m-thick previously assumed Leach Cap in the southern area of the deposit was found to contain significant areas of copper, gold, and molybdenum sulphide mineralization. Oxidation and leaching of sulphide were found to be restricted to relatively narrow north-easterly dipping fault zones. Determining the amount of mineralization above cut-off between the three historical drill holes and what part of the previously assumed Leach Cap is actually mineralization will require in-fill drilling of southerly oriented angle holes.

Core hole H17-05 was drilled to test for continuation of copper, gold, and molybdenum mineralization to the southeast of the known deposit. Indication of mineralization continuing to the south east was suggested by a shallow historical hole drilled about 200 m to the northeast of the collar of H17-05. The 2017 hole was lost at 225 m due to intensely fractured and faulted rock in the upper part of the hole. Copper, gold, and molybdenum values were encouraging over the final 125 m with grades increasing towards the end of the hole. The hole should be re-drilled to its originally planned depth of 400 m, and a further 100 m step-out hole to the southeast is recommended.

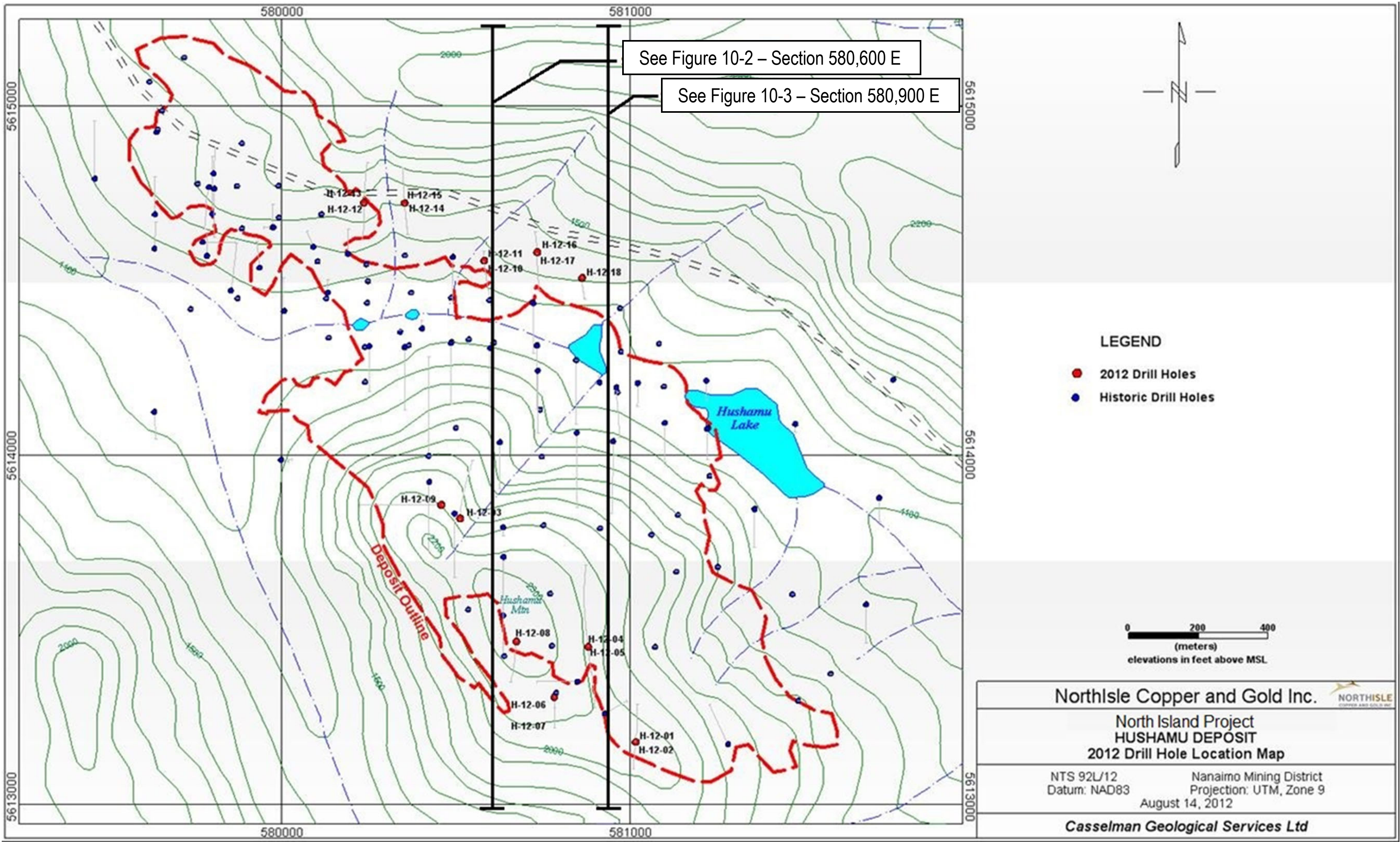


Figure 10-1: 2012 Drill Hole Location Map

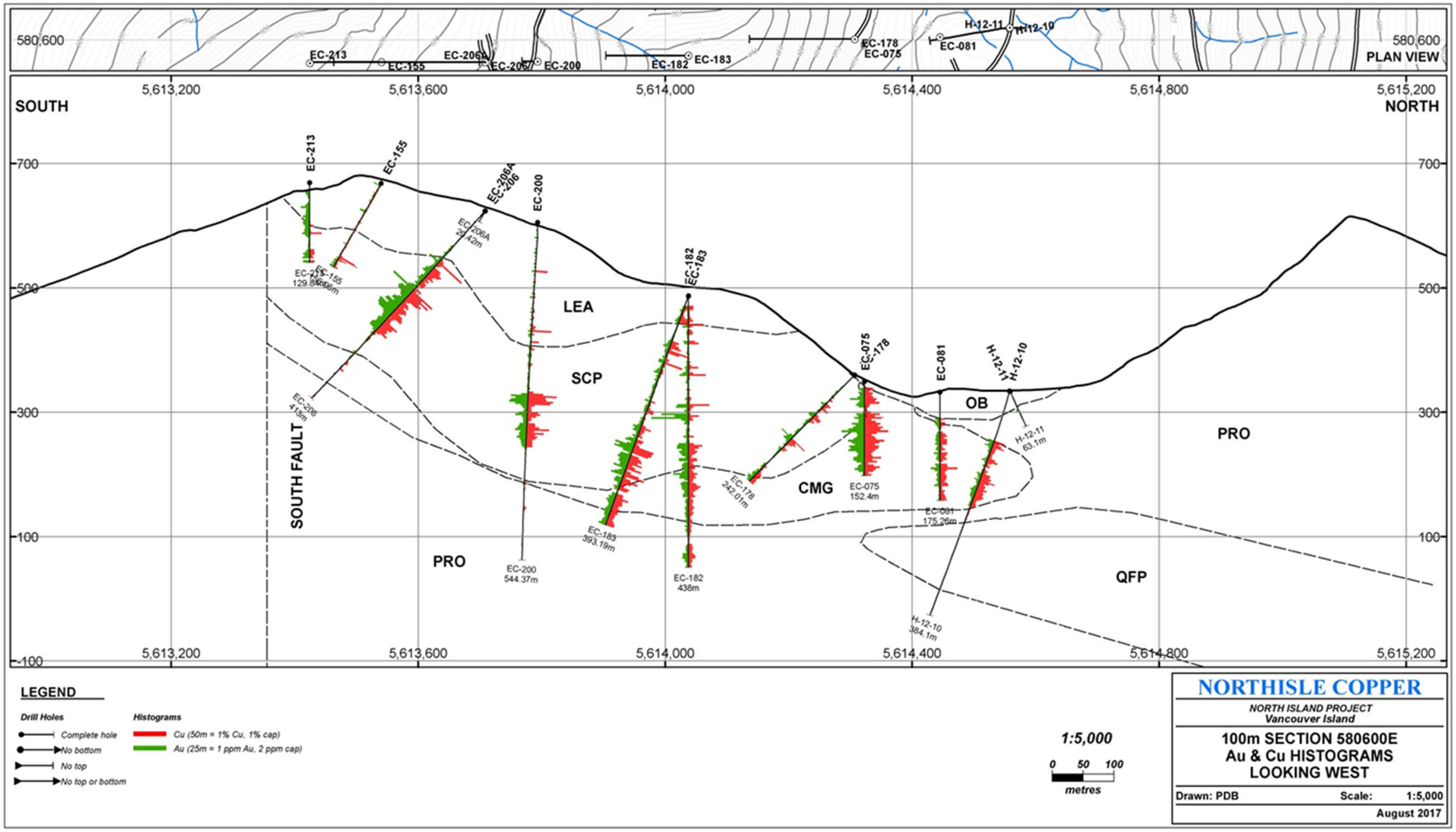


Figure 10-2: Section 580,600 E

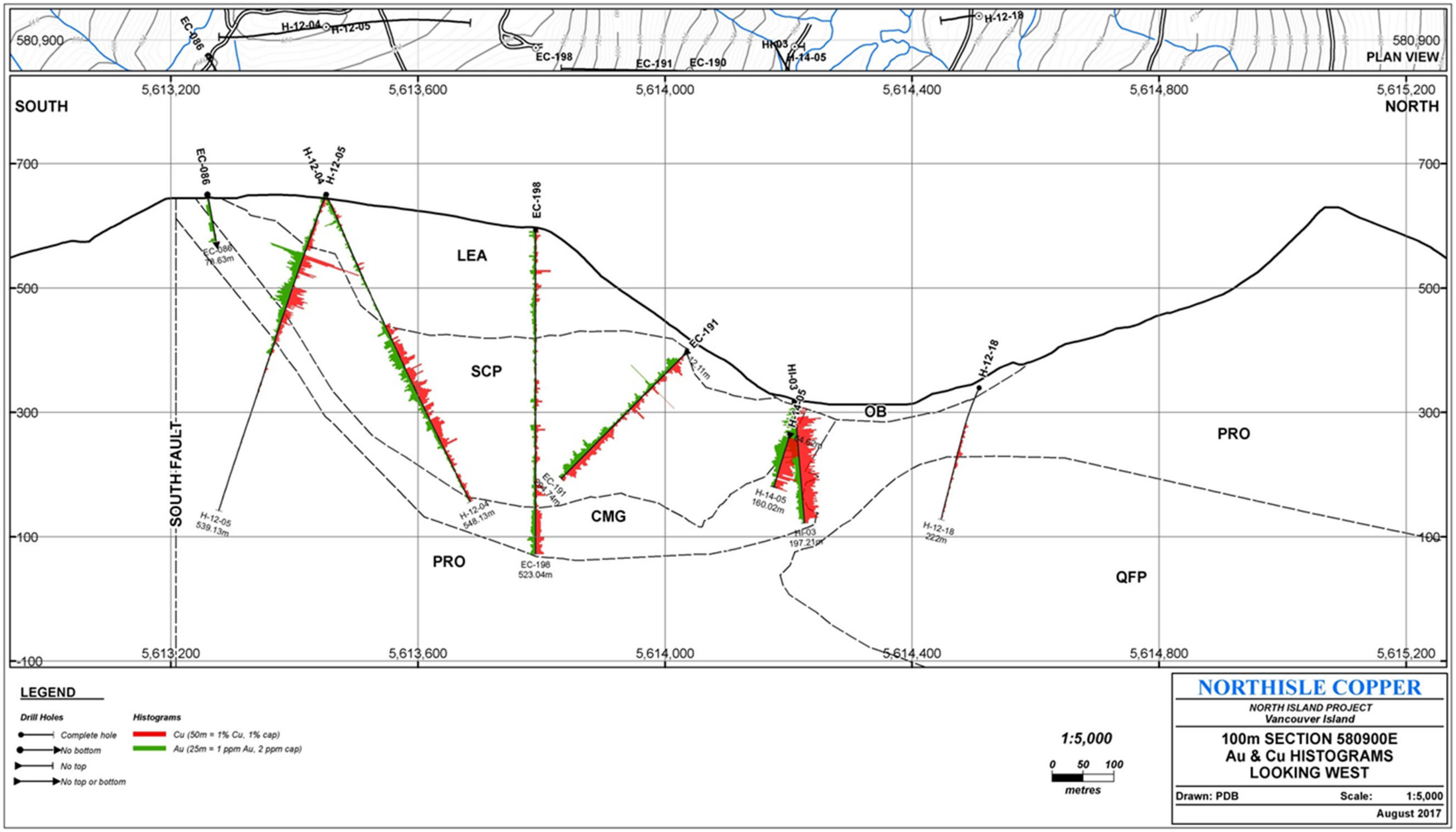


Figure 10-3: Section 580,900 E

10.2 DRILLING: RED DOG DEPOSIT

Sporadically since 1968, a total of 74 diamond drill holes (10,397 m) 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 m in 67 holes (Westcoast Mining 2,175 m in 24 holes (1968-1970)); (Cities Services 903 m in 3 holes (1972)); (Westminex Development 613 m in 3 holes (1974)); (Utah Mines 2,503 m in 18 holes (1982-1983)); (Moraga Resources 3,091 m 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 (63.5 mm) 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 m) or 3 m 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 m 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.

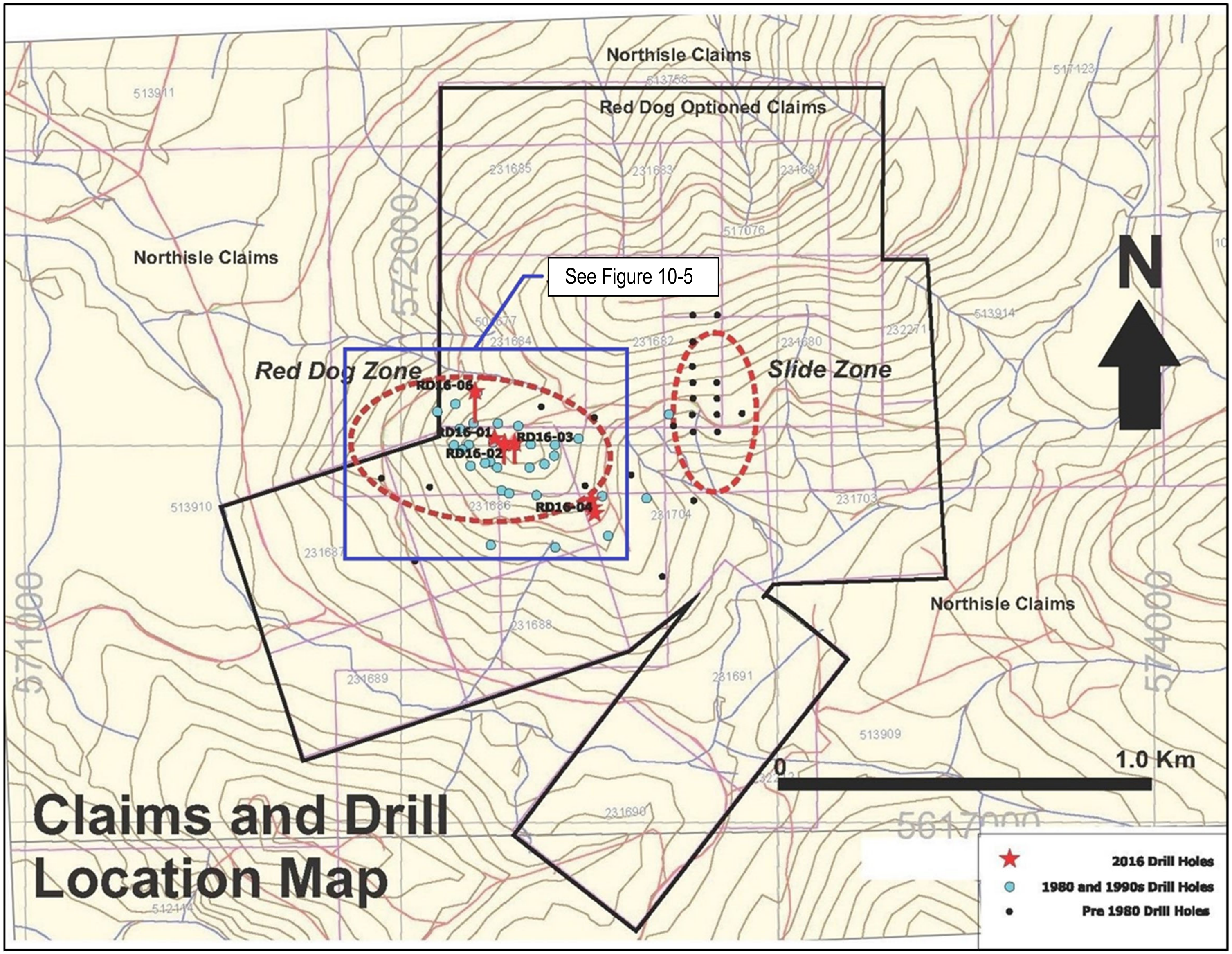


Figure 10-4: Red Dog Deposit Drill Hole Location Map

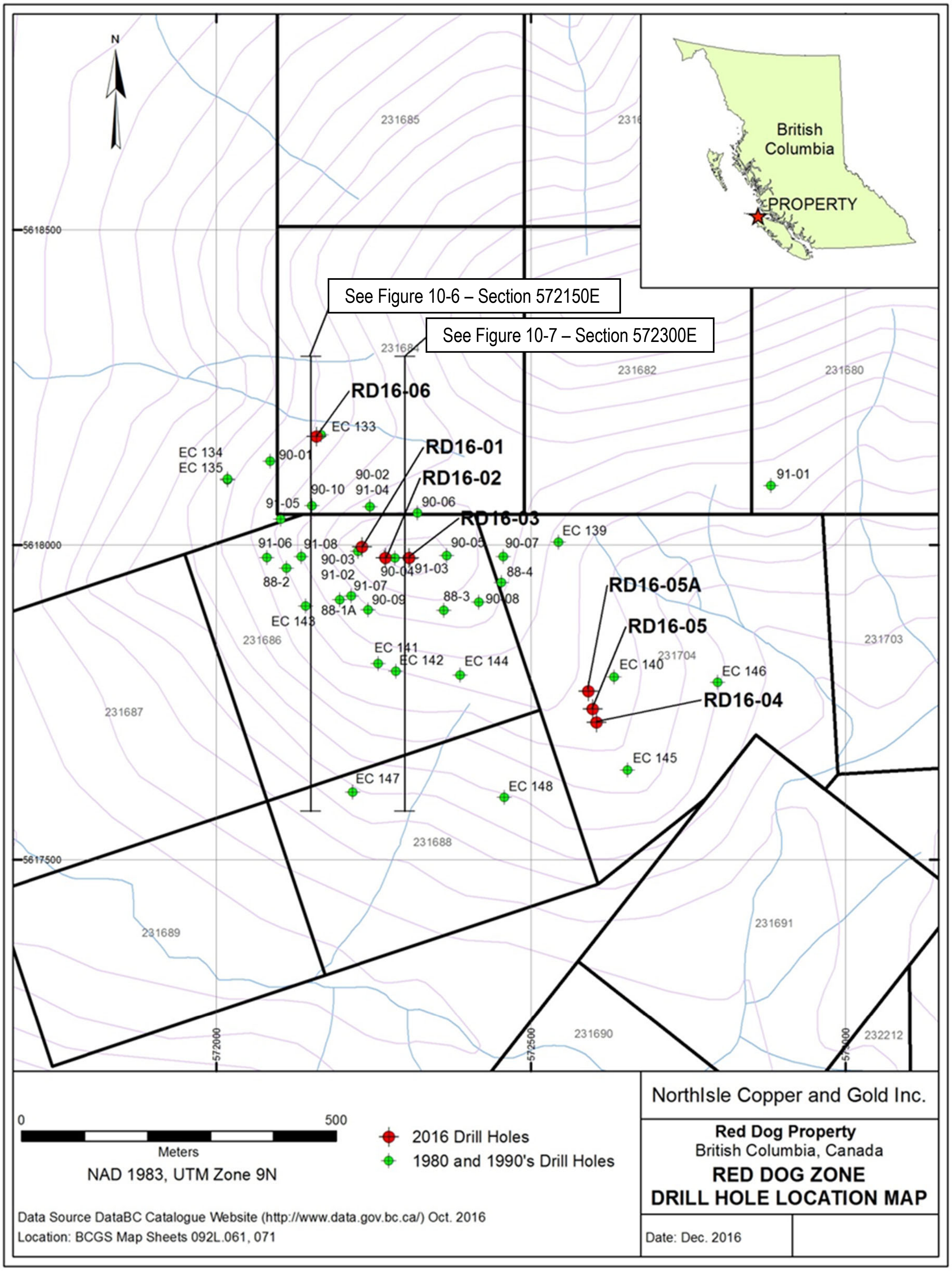


Figure 10-5: Red Dog Deposit Drill Hole Location Map

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 were rented by NorthIsle in a building at the former mine site of the Island Copper Mine. Here, the core was measured, geologically examined, logged and marked for sampling. Core samples were selected and bagged; the half core that remained after sampling was 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 m 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 m 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 2 m to 7 m 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 2 m 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 m, well short of the target depth of 500 m.

The 2016 drilling has successfully verified the historical drilling at the Red Dog Zone where copper and gold mineralization occurs in an approximately 350-m-long by 150-m-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 m potentially extending the depth level of the Red Dog Zone.

Four holes (RD-16-04, RD-16-05, RD-16-05A, and RD-17-01) were drilled to test for deeply buried porphyry copper mineralization to the south of the Red Dog Zone. Due to a combination of poor ground conditions and driller error, all four drill holes were lost at depths of 150.8, 124, 207.8, and 290 m respectively, well before the targeted depth of 500-600 m. Hole RD-16-04 intersected anomalous levels of copper over the final 50 m of the hole, and hole RD-17-01 intersected two intervals with elevated copper and gold at 118 to 126 m and 154-192 m, indicating that the deep porphyry target remains a viable exploration target for future drilling.

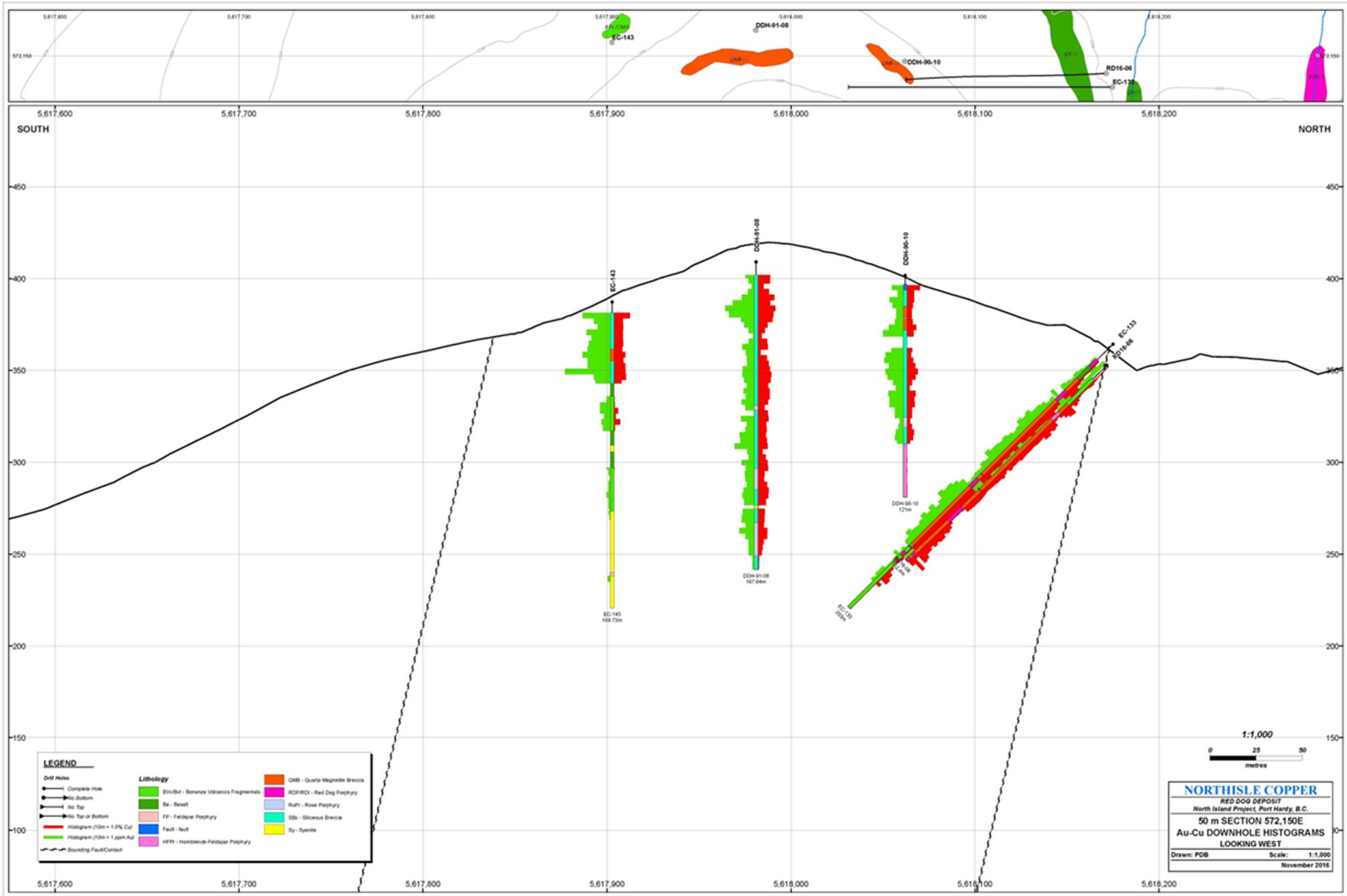


Figure 10-6: Section 572150E

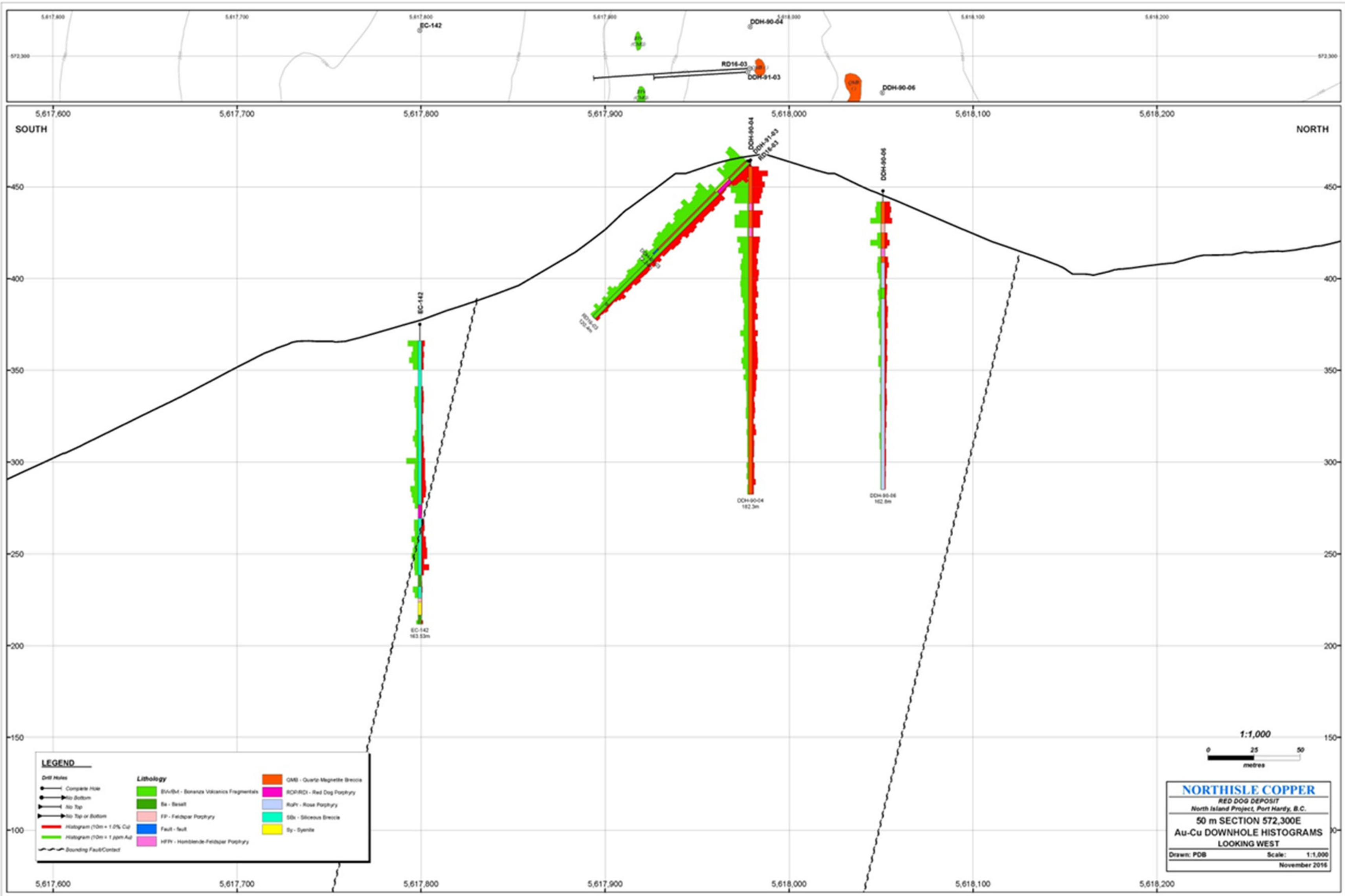


Figure 10-7: Section 572300E

10.4 2016 CORE LOGGING PROCEDURE: HUSHAMU, 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.

Core recoveries from the 2014 and 2017 Hushamu drilling were good, with recoveries generally in the >90% range. Minor core losses occurred in faulted zones where rock was crushed and broken.

In general, core recoveries from the HQ core from Red Dog 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. It is reasonable, on a global basis, to accept copper and gold values from core samples as closely approximating in situ values.

Four attempts (three in 2016 and one in 2017) were made to complete the deeper exploration holes south of the historical resource, but all four holes were lost due to bad (faulted) ground conditions.

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 m 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 g.

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-2012

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

Drill core prior to 1985 was sampled generally in 10-ft (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 <2 mm. An appropriate split (generally 250 g) was then pulverized to >85% passing 75 um. 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 g 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 to 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 2014 & 2017 DRILLING: HUSHAMU

After geotechnical and geological logging, 2014 and 2017 drill core sample intervals were marked directly on the core with lumber crayons. Each 2014 sample is marked with an ALS Laboratories Ltd ("ALS") paper sample tag and each 2017 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 g of either WCM Minerals CU 181 or CU 184 in 2014, and WCM CU 184 in 2017. 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 either ASL or BVL for duplicate analysis.

The core samples were transported directly by bonded transport from NorthIsle's core logging facility to ALS or BVL in Vancouver, B.C. for sample preparation and analysis. ALS is ISO 9001:2015 and BVL is ISO 9001:2008 accredited. The authors are not aware of any relationship between ALS or BVL and NorthIsle.

On receipt of the samples in Vancouver, ALS and 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 ALS, 632 of the 2014 core samples were dried, and then crushed to 70% passing through a 2 mm sieve and split in a riffle splitter to obtain 250 g. This 250 g was then pulverized to 85% passing through 75 microns. The pulverized samples were subjected to ALS's multi-element package which includes Re (Code ME-MS41). This analysis is an aqua regia digestion followed by ICP-MS. A 30-gram sub sample of the pulps were analyzed for gold concentrations by fire assay with an atomic absorption finish (Code Au-AA23). The 57 samples from drill hole H-14-05 were analysed with ALS's multi-element package ME ICP 61, which has a four-acid digestion. These 57 samples were treated differently as the hole is located in the current resource and the analytical procedure matches that used in the surrounding drill-holes.

Upon receipt by BVL, all 2017 core samples were dried, and then 1 kg crushed to 80% passing 10 mesh. A 250 g 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 ALS and 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.

11.4 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.

11.5 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 g 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 1 kg crushed to 80% passing 10 mesh. A 250 g 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-HCIO4-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).

11.6 OPINION ON ADEQUACY

In the opinion of the authors, the sampling methods, analytical procedures and security protocols employed by NorthIsle during their 2011-2012, 2014, 2016, and 2017 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 Giroux and 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 Giroux and 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 2012 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.

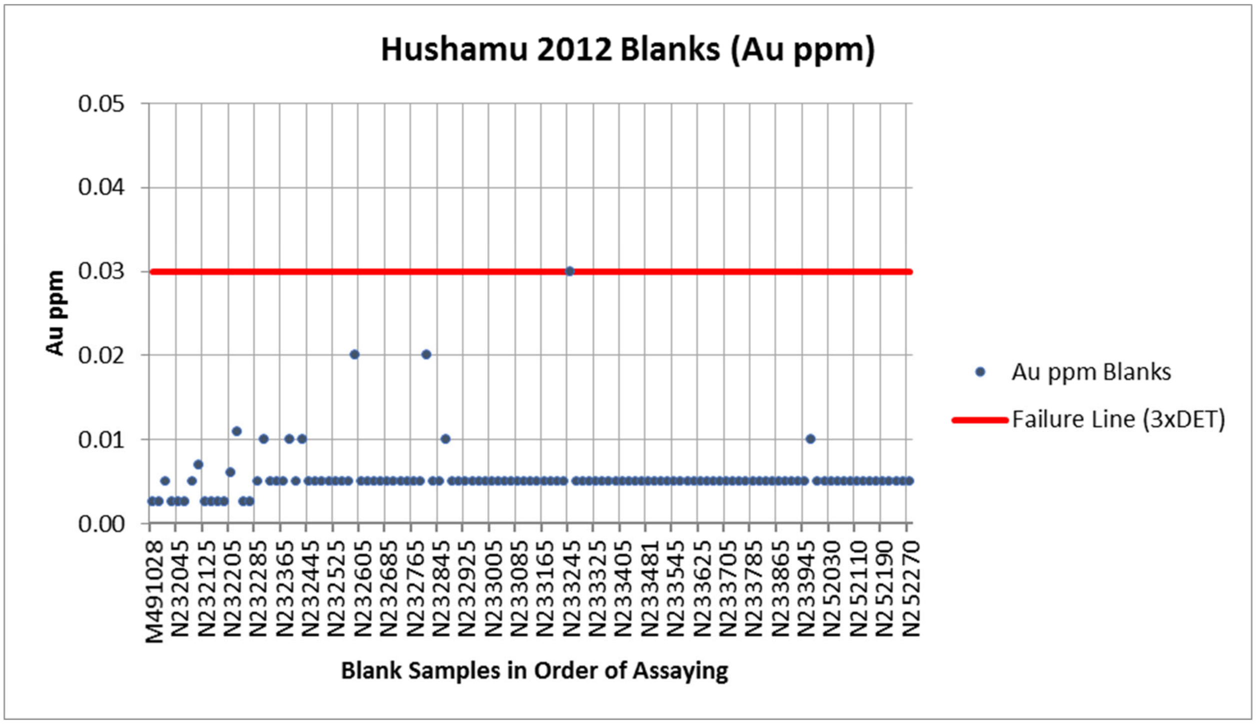


Figure 12-1: Blank Samples (Au ppm)

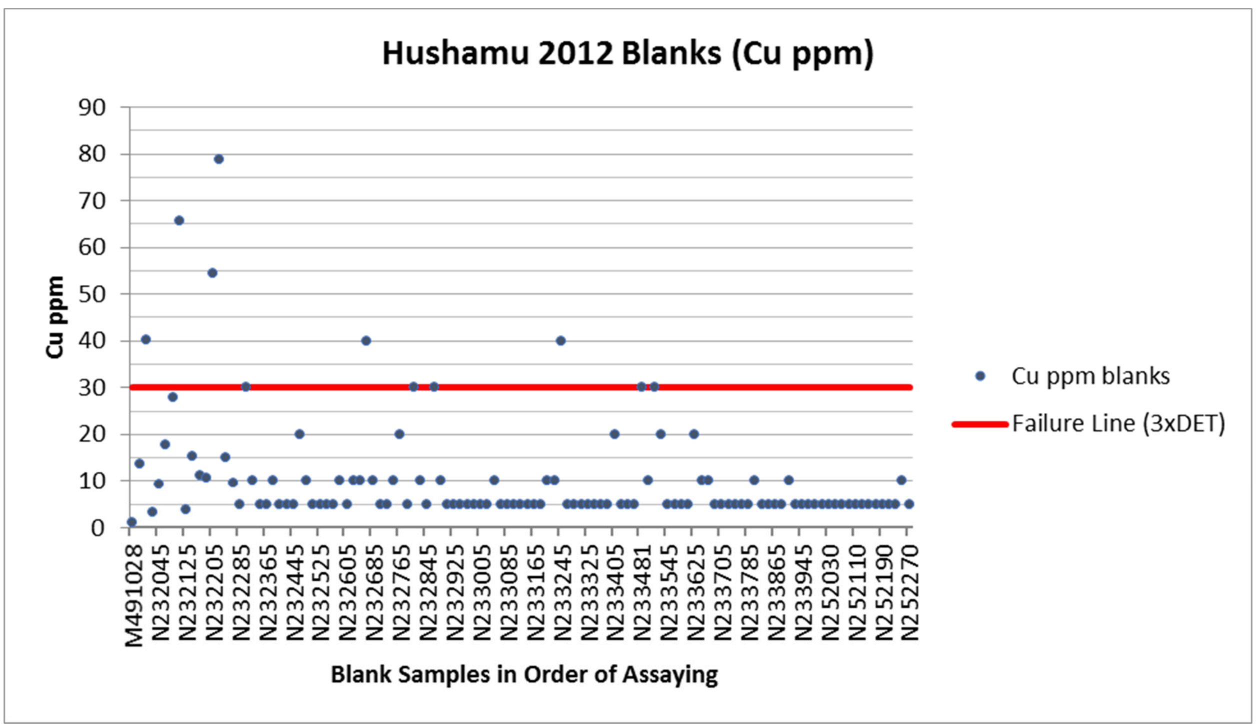


Figure 12-2: Blank Samples (Cu ppm)

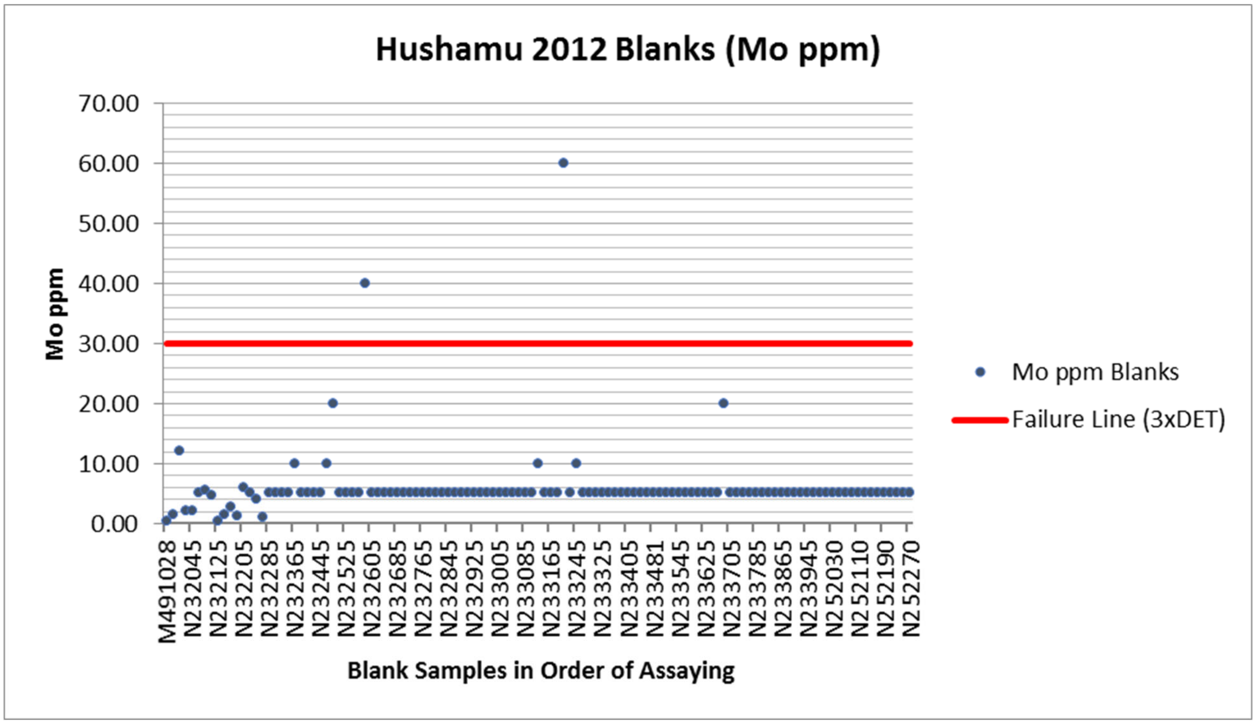


Figure 12-3: Blank Samples (Mo ppm)

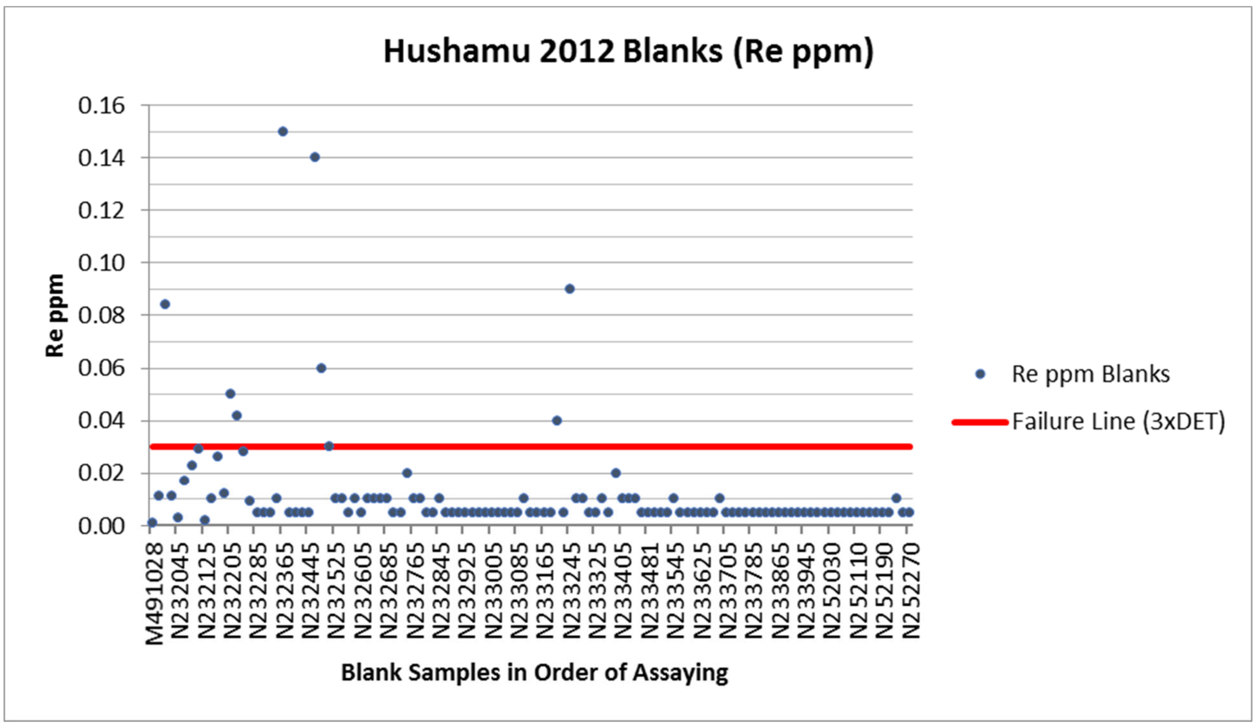


Figure 12-4: Blank Samples (Re ppm)

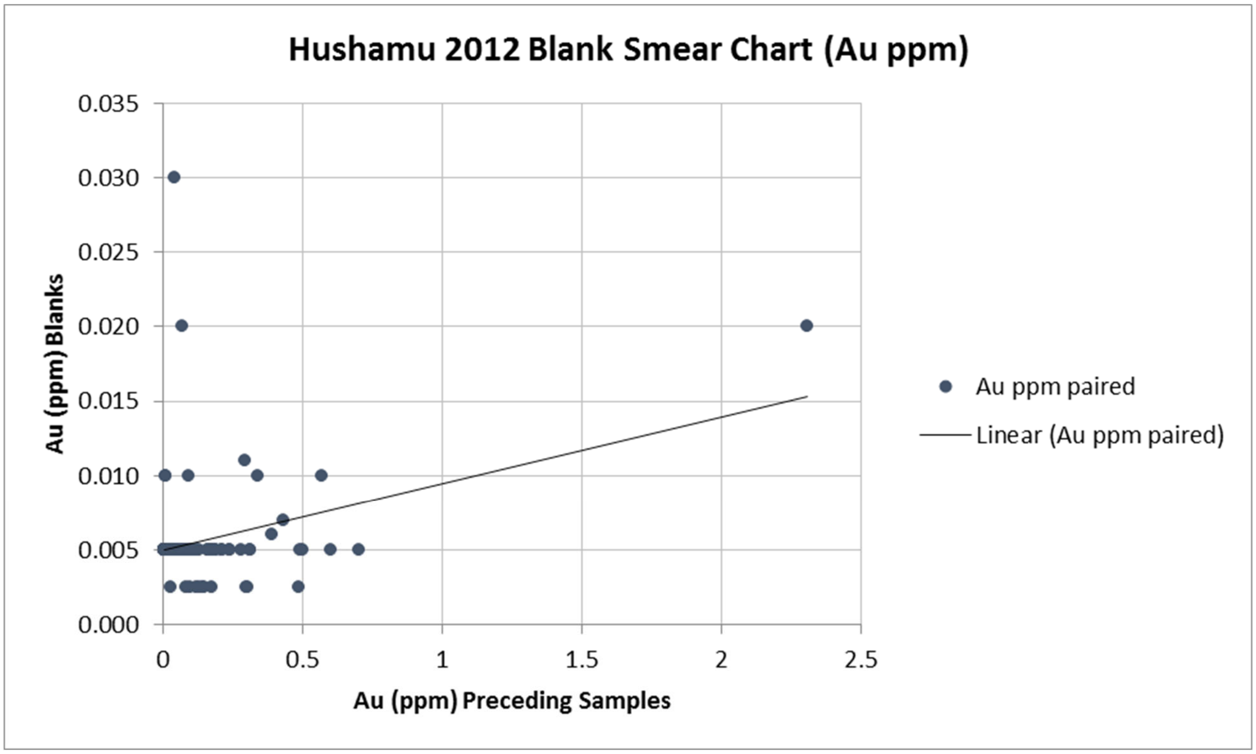


Figure 12-5: Blank Smear Chart (Au ppm)

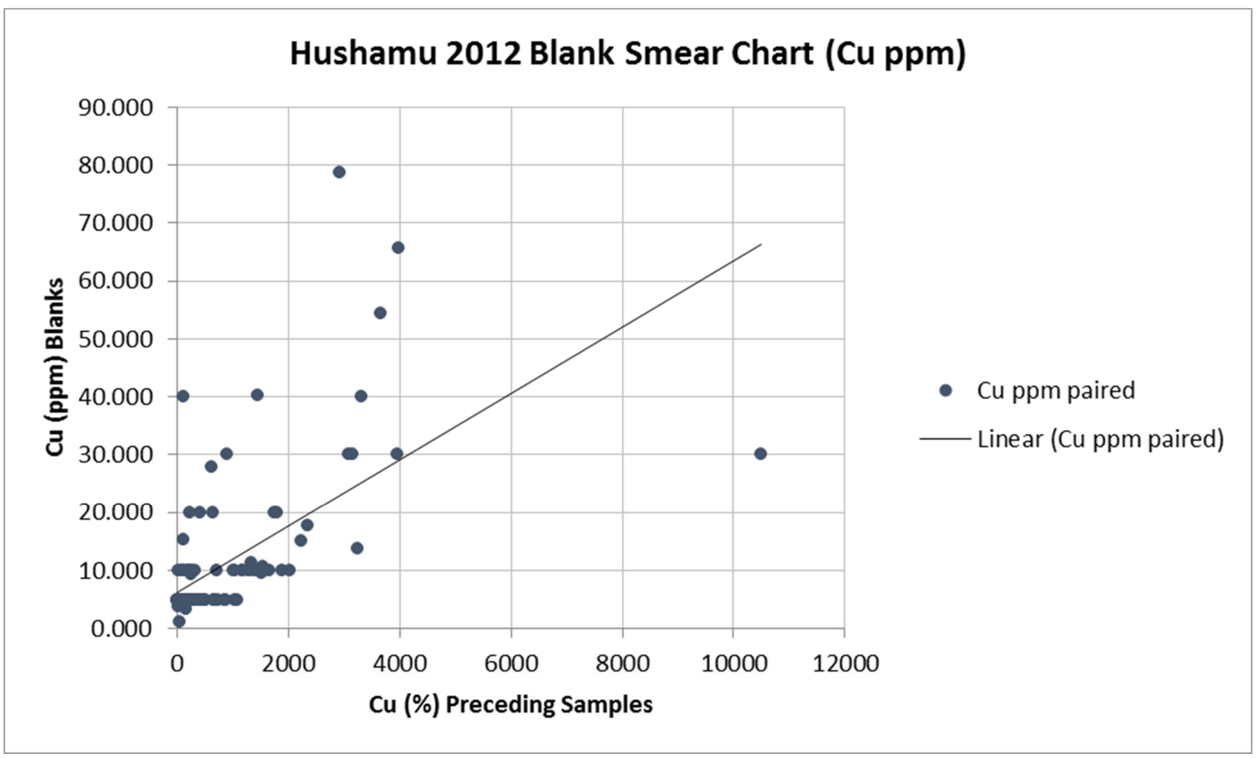


Figure 12-6: Blank Smear Chart (Cu ppm)

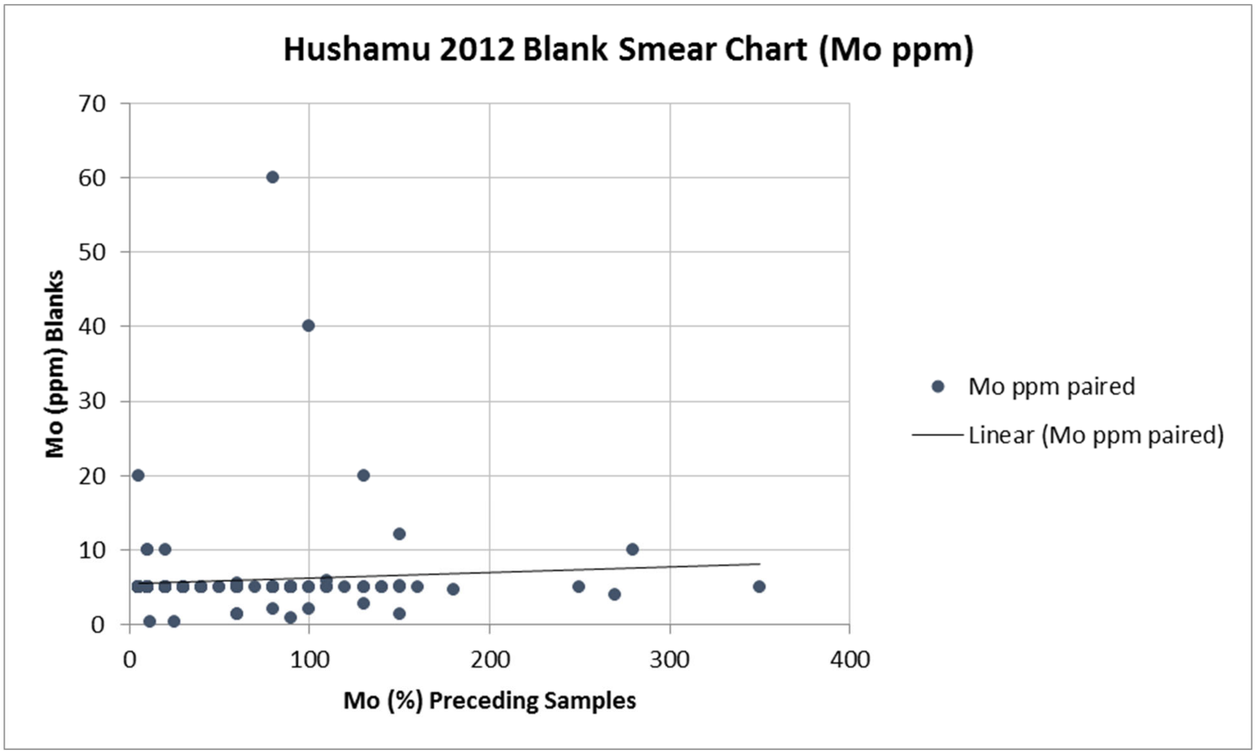


Figure 12-7: Blank Smear Chart (Mo ppm)

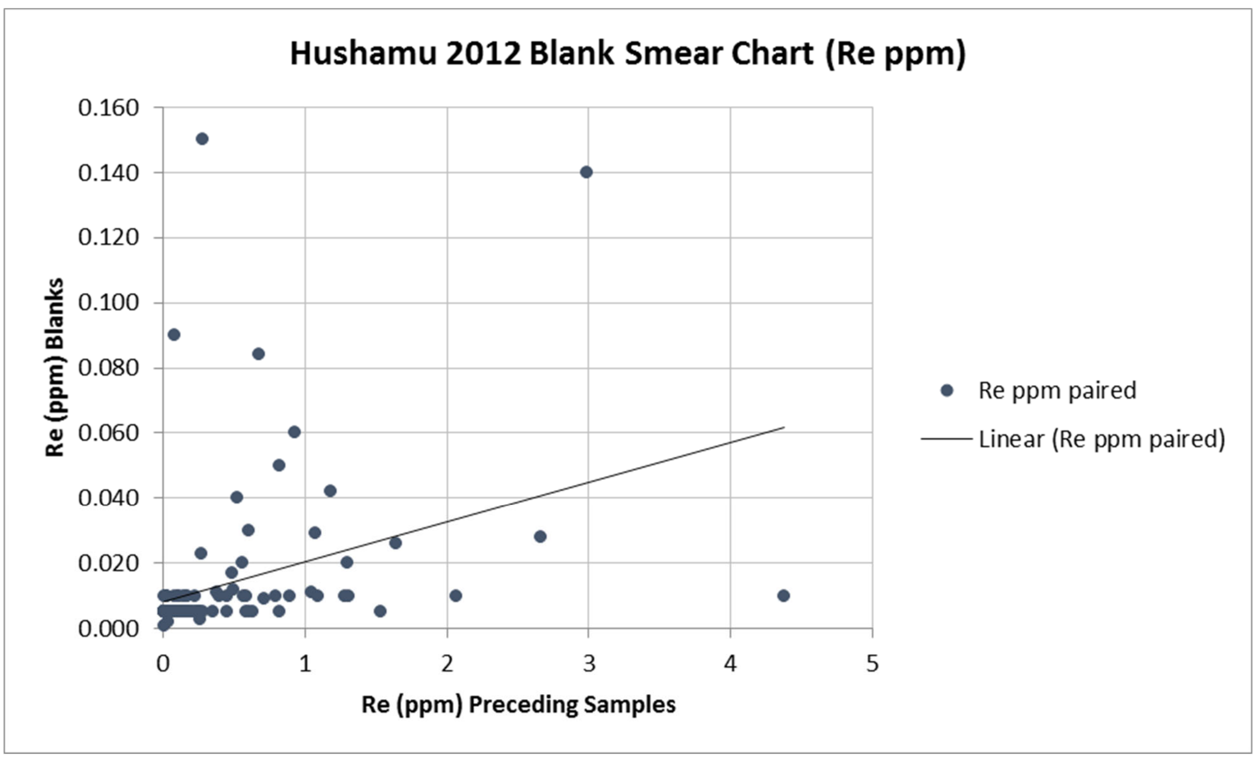


Figure 12-8: Blank Smear Chart (Re ppm)

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.

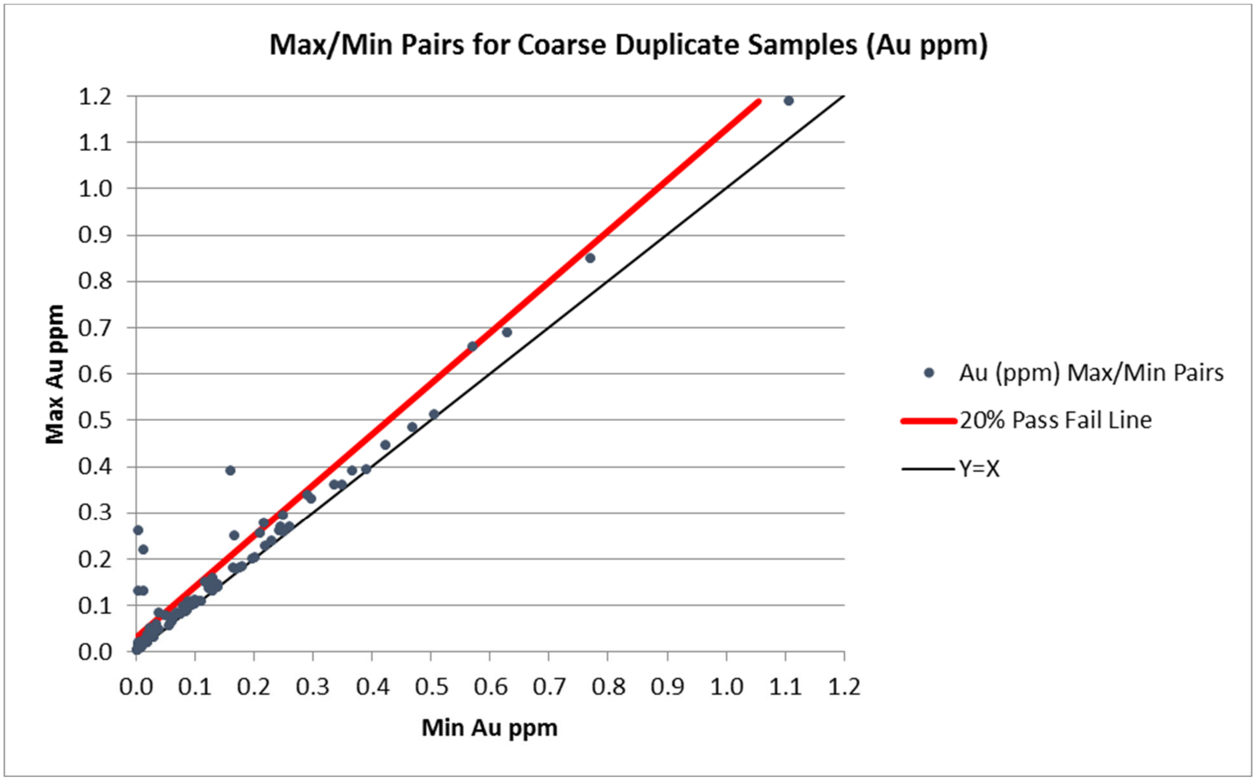


Figure 12-9: Max/Min Pairs for Coarse Duplicate Samples Au (ppm)

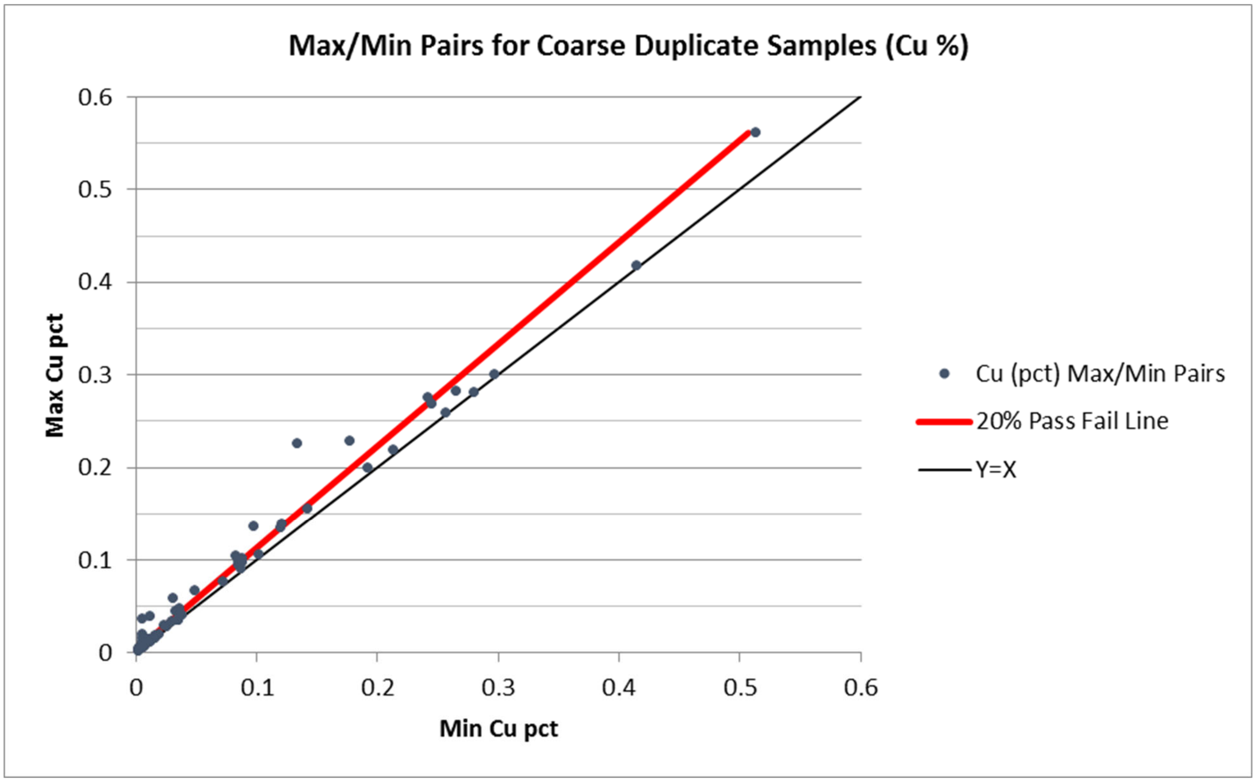


Figure 12-10: Max/Min Pairs for Coarse Duplicate Samples (Cu %)

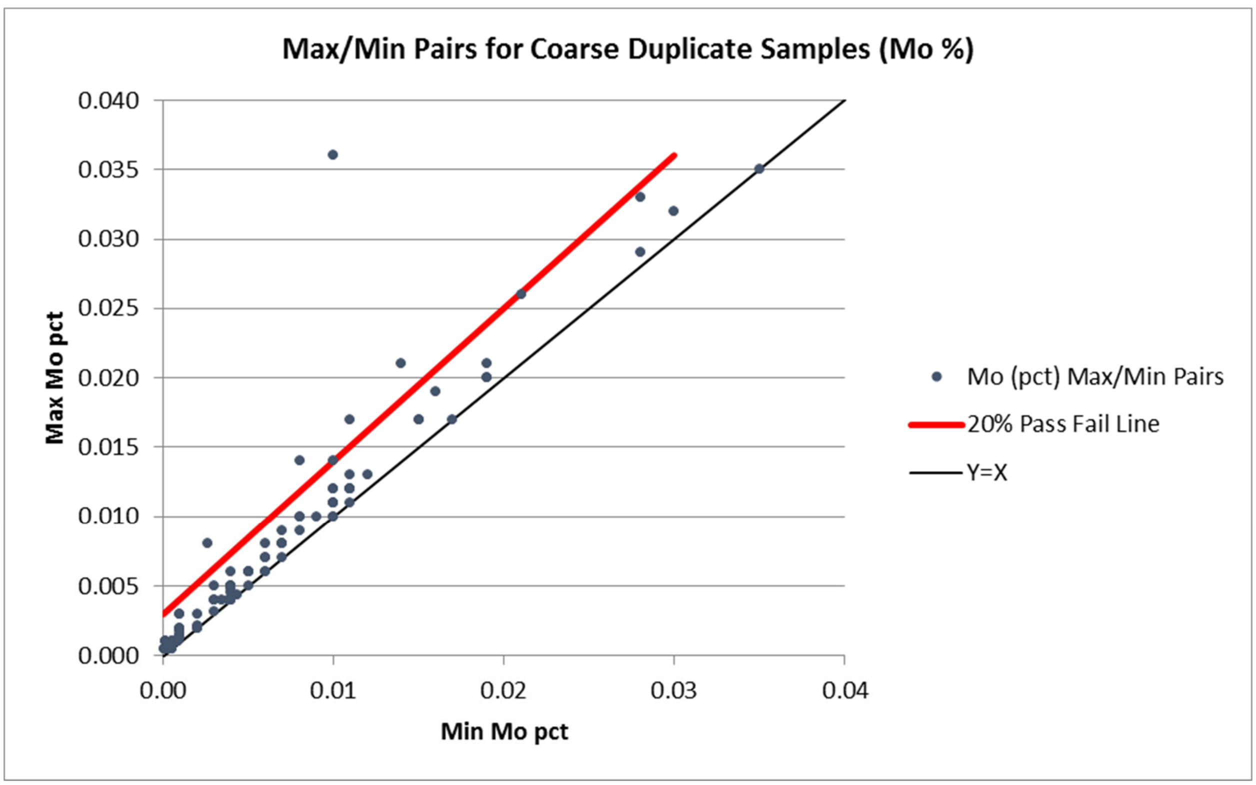


Figure 12-11: Max/Min Pairs for Coarse Duplicate Samples Mo (Mo %)

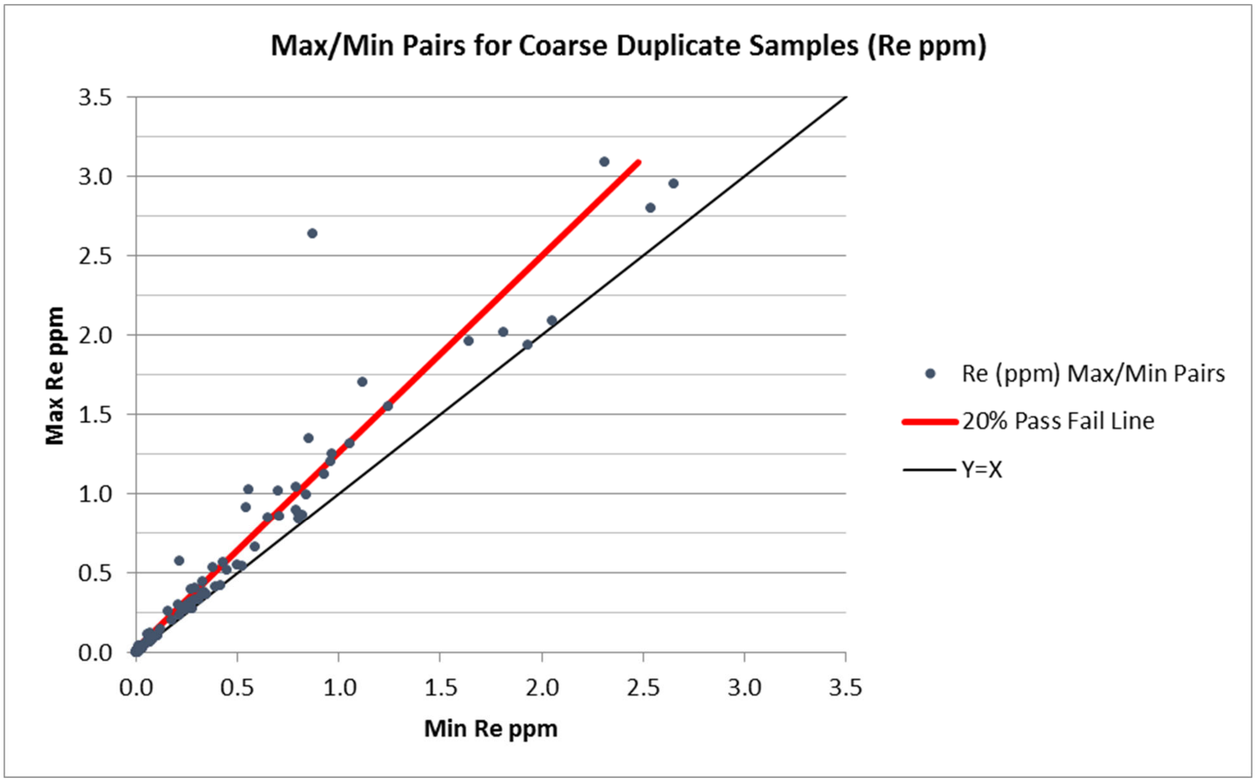


Figure 12-12: Max/Min Pairs for Coarse Duplicates Re (ppm)

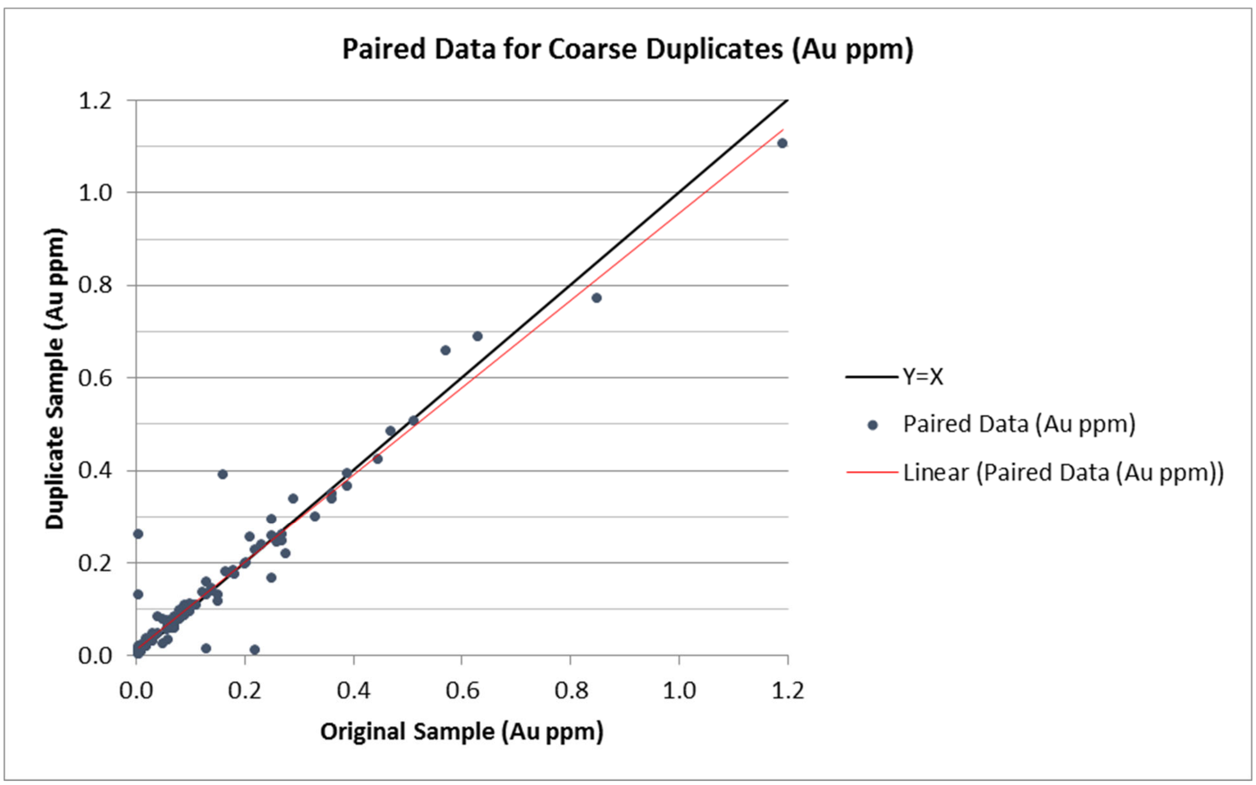


Figure 12-13: Paired Data for Coarse Duplicates Au (ppm)

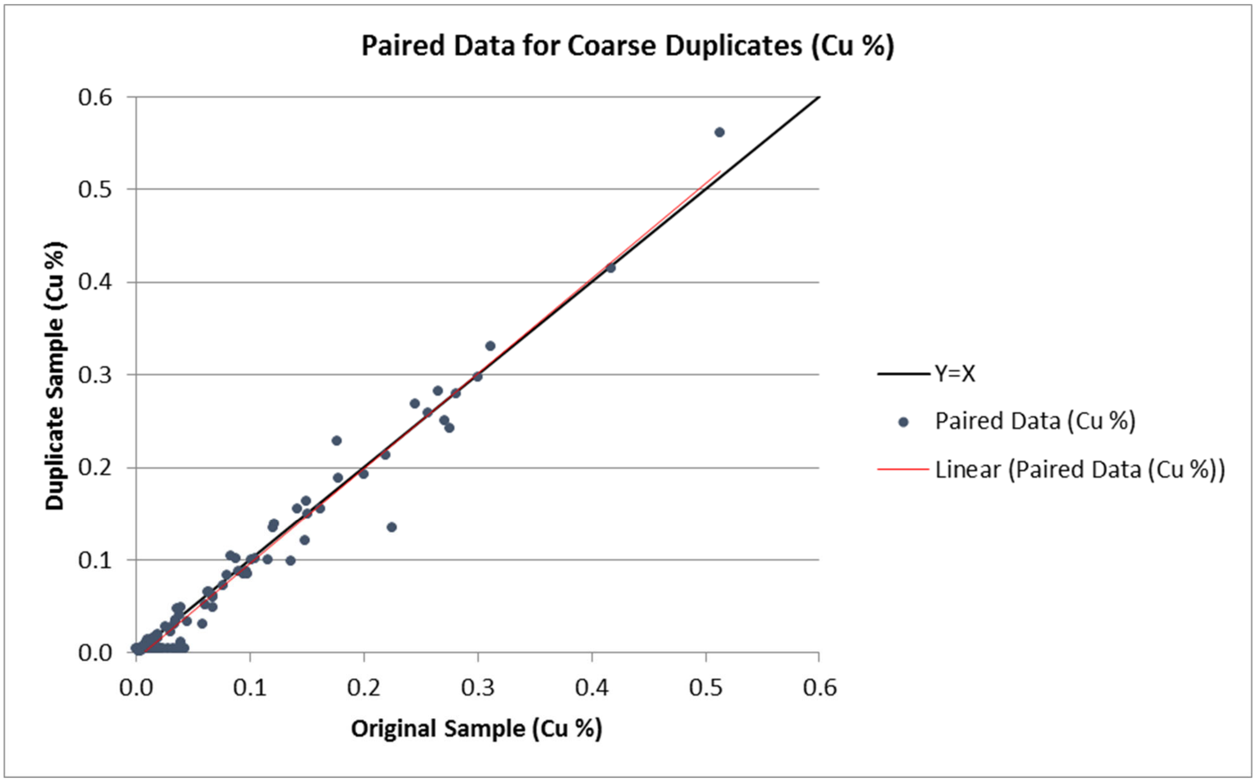


Figure 12-14: Paired Data for Coarse Duplicates (Cu %)

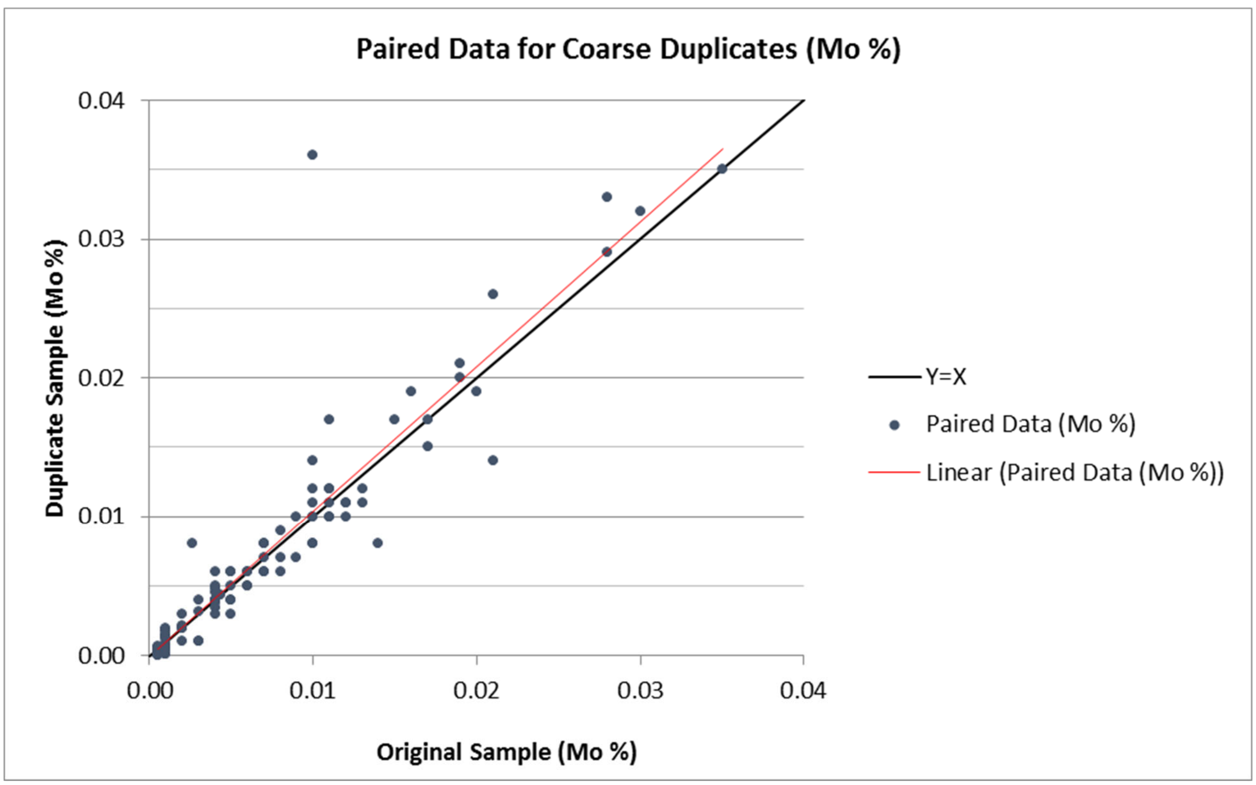


Figure 12-15: Paired Data for Coarse Duplicates (Mo %)

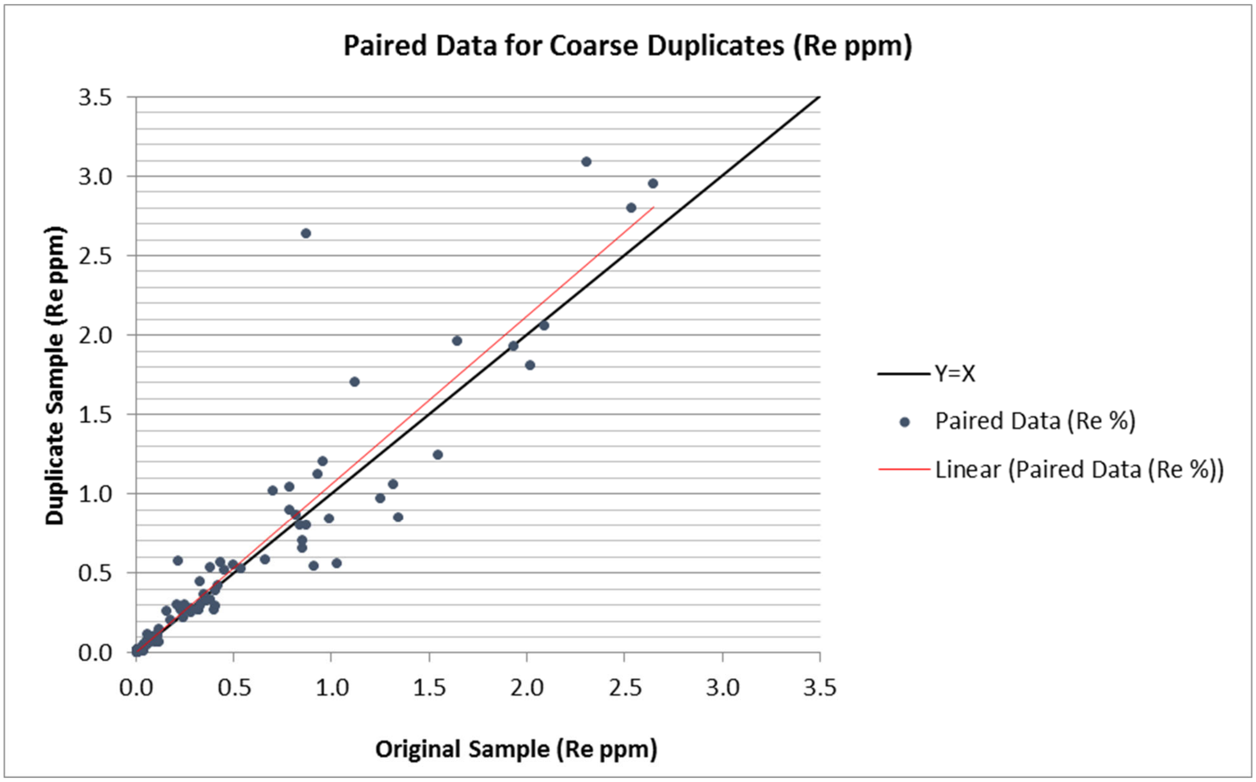


Figure 12-16: Paired Data for Coarse Duplicates (Re ppm)

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.

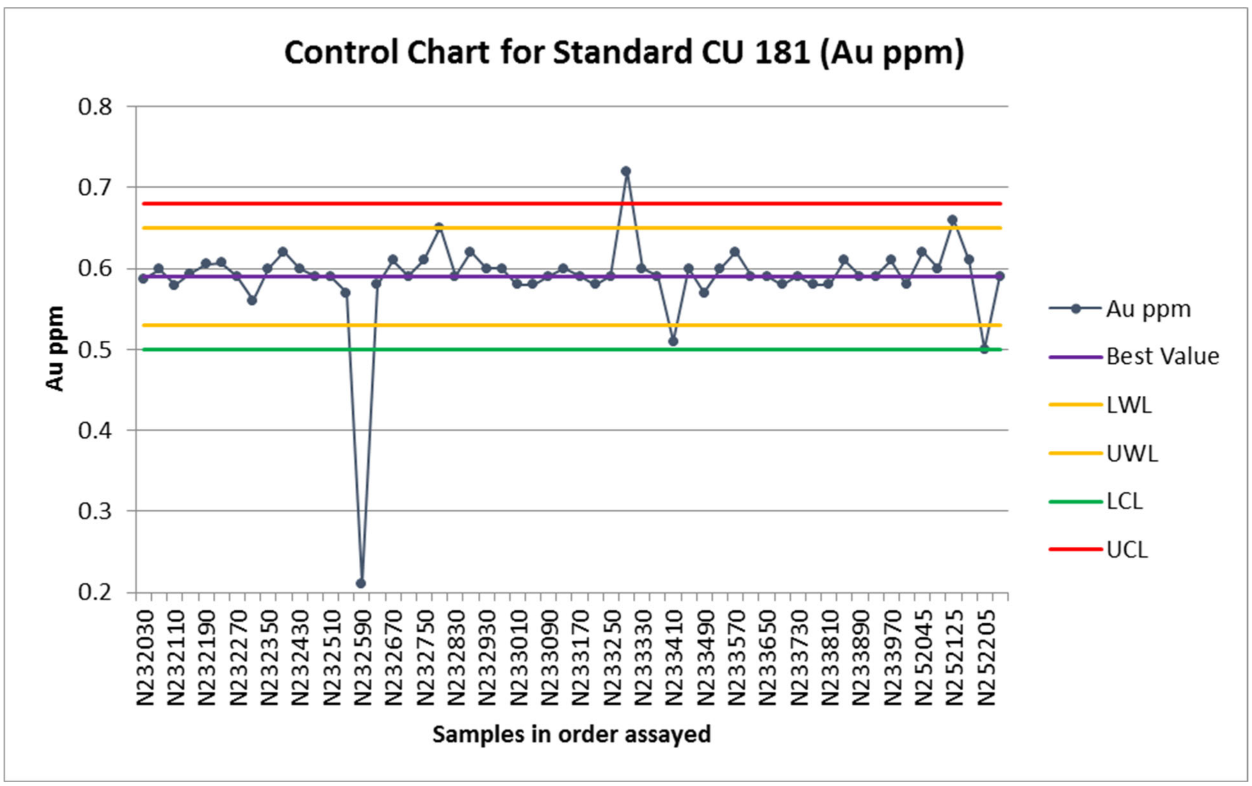


Figure 12-17: Standard CU 181 (Au ppm)

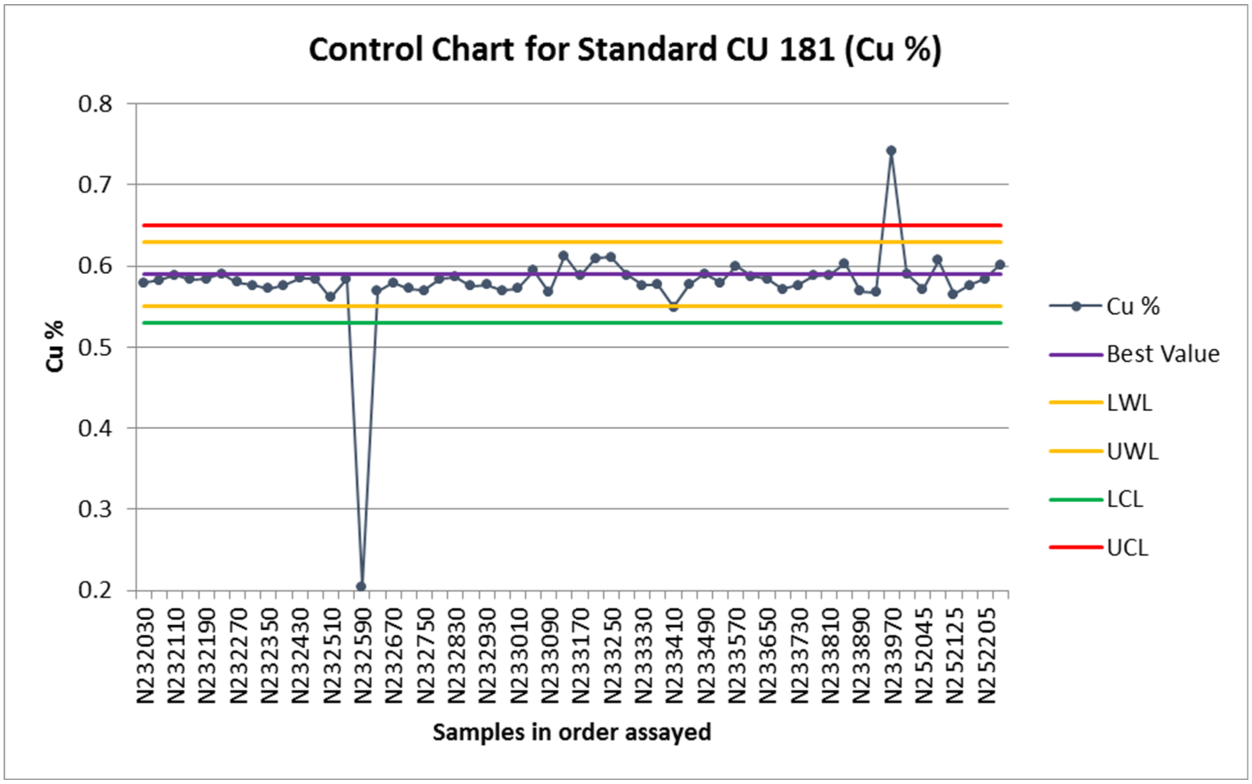


Figure 12-18: Standard CU 181 (Cu %)

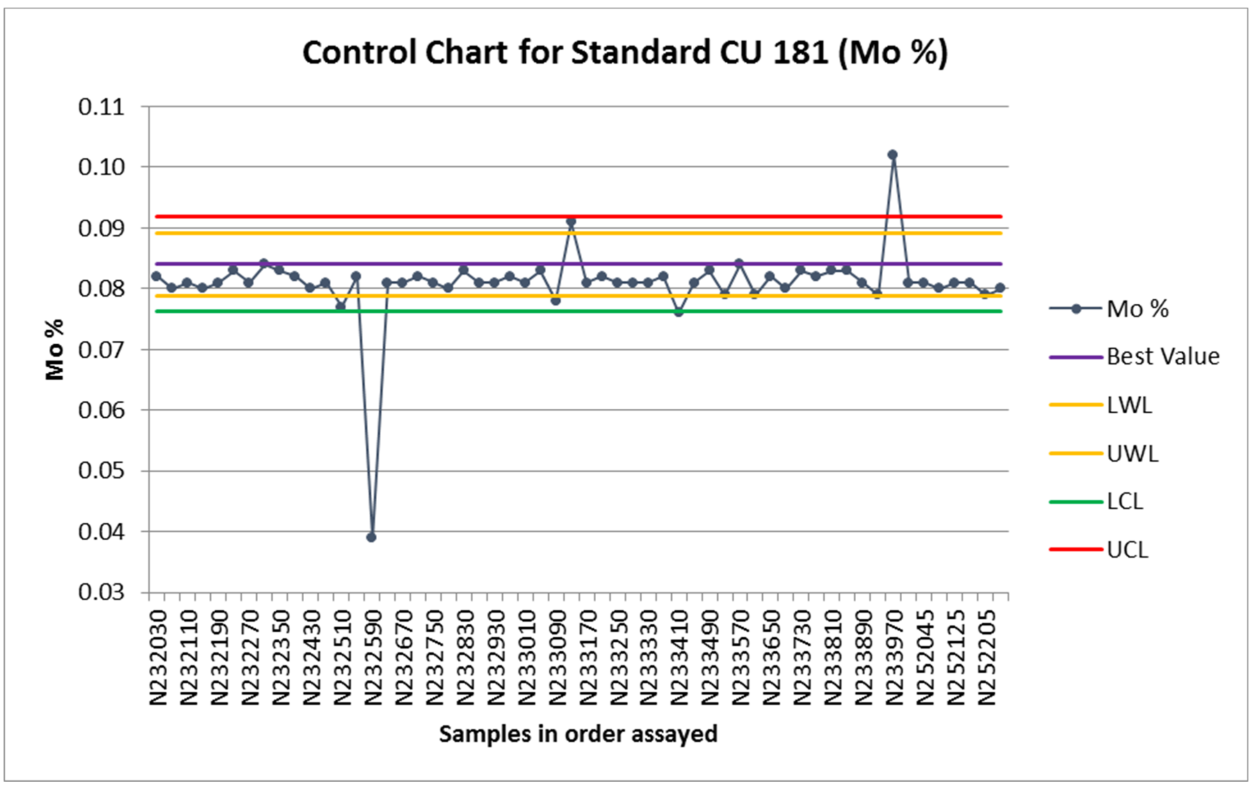


Figure 12-19: Standard CU 181 (Mo %)

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.

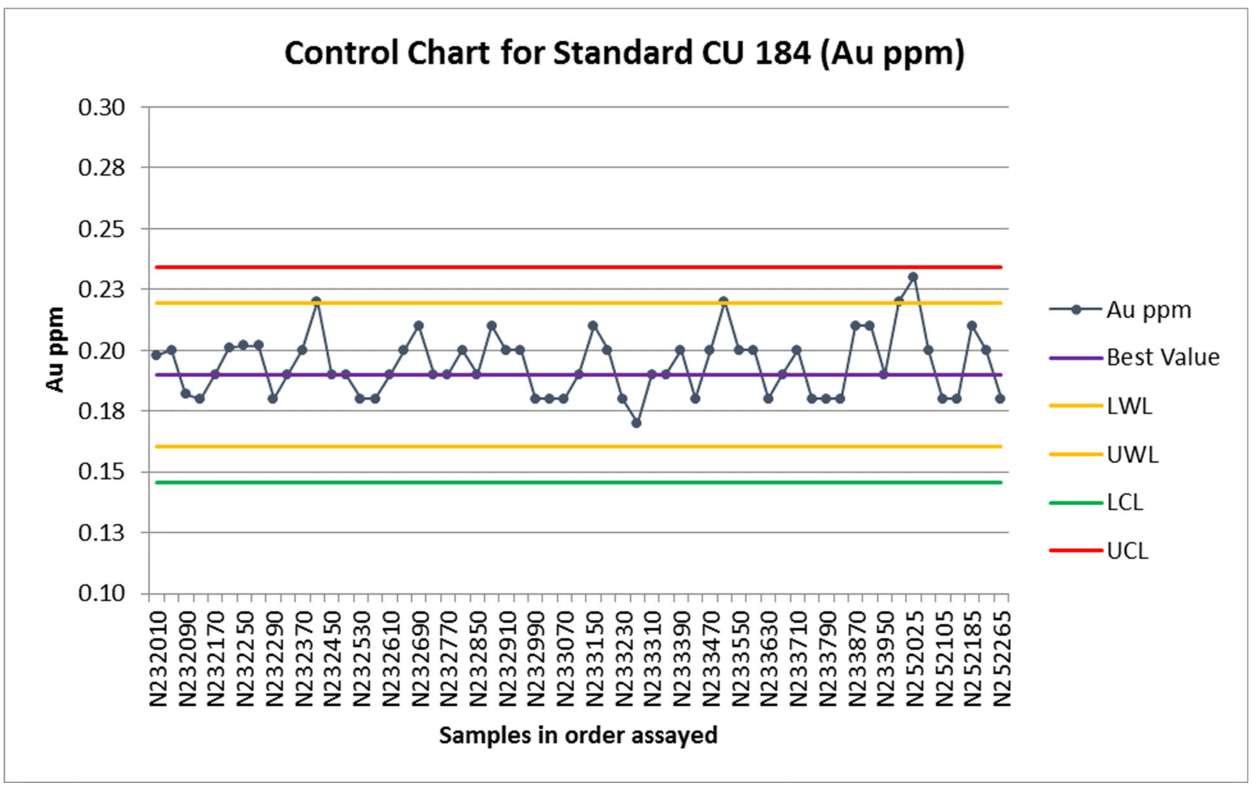


Figure 12-20: Standard CU 184 (Au ppm)

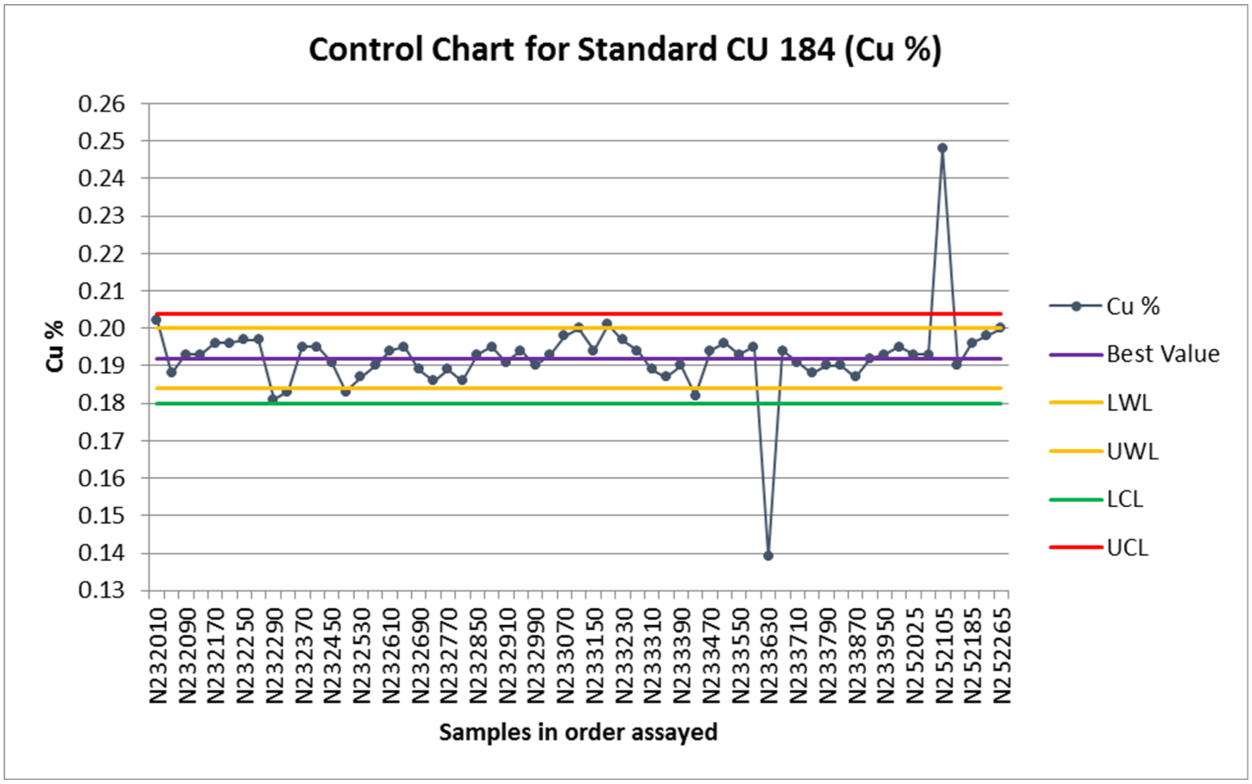


Figure 12-21: Standard CU 184 (Cu %)

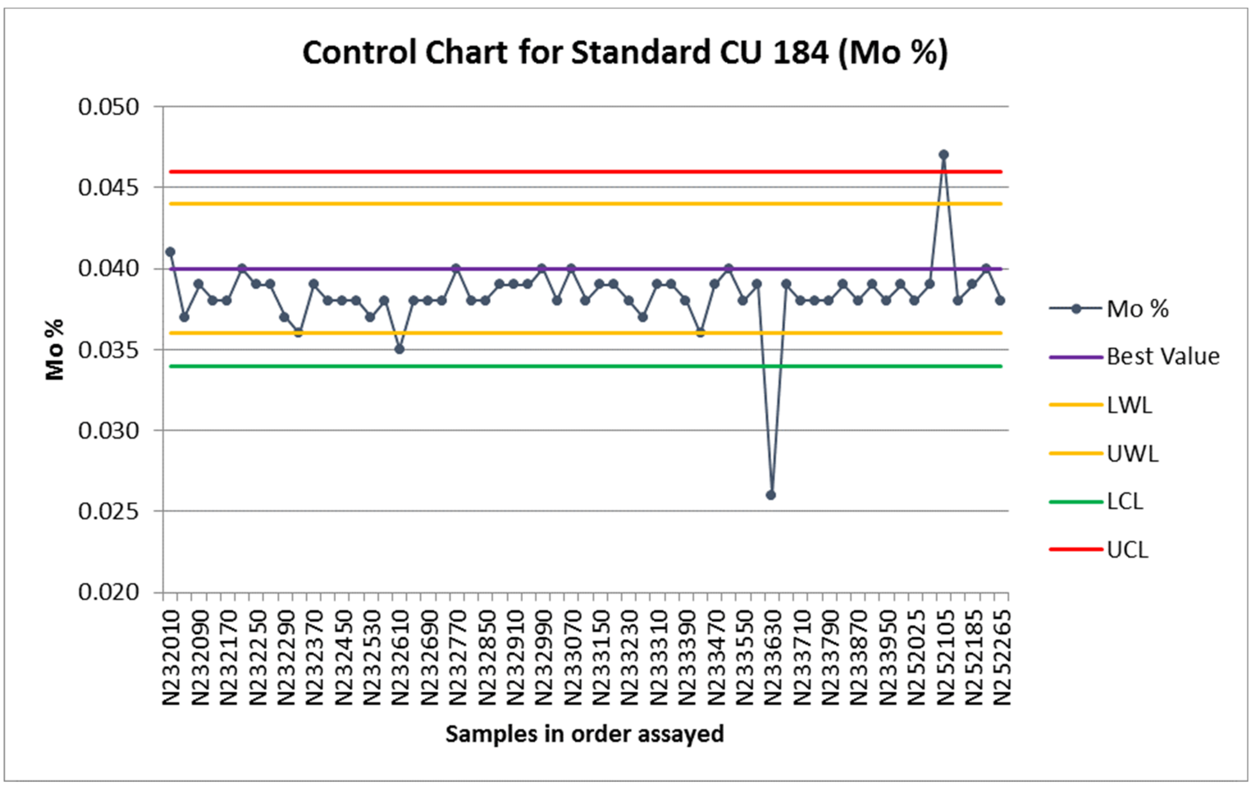


Figure 12-22: Standard CU 184 (Mo %)

12.3 2014 DRILLING HUSHAMU

As part of the 2014 drilling program, blank samples, and sample standards produced by WCM Minerals of WCM Sales Ltd of Burnaby, B.C. were included in each of the batches of samples. These standards were certified by WCM to contain the following values:

Table 12-4: Sample Standard certified values

Standard	Au g/t	Cu percent	Mo percent	Ag g/t
STD 181	0.59	0.59	0.0105	28
STD 184	0.19	0.192	0.0035	13

A total of 32 standards and 33 blank samples were sent to the labs inserted in the sample batches.

The sample standards returned results that are considered very reasonable and expected. Most of the average values for Cu, Au, and Ag are within 1 standard deviation of WCM's certified value. Copper values in both the high and low sample show a slight downward drift over the course of the program. Molybdenum values in the high sample are consistently lower than the WCM Minerals stated value for the high standard. The cause for the lower Mo values reported by ALS Labs is not known.

Of the 33 blanks, none of the samples show any significant deviation from the expected near nil values and show no discernable contamination or carry over occurred from the sample run prior to the blank sample. Further, there is no indication of instrument error or sample mix up in the laboratory.

In addition to the standards and blanks, a duplicate sample was taken of every 20th sample. The comparison of the duplicate samples shows no bias. In general, the correlation co-efficiency is greater than 90% and the T-Tests show very high probability that the samples are from the same population. The only sample of concern was a single sample where the original sample had a much higher copper value than the duplicate.

12.4 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.

12.5 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 (Figure 10-4 and Figure 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 12-5.

Table 12-5: 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 6 m 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 m 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 m.

As shown in Table 12-6, 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 12-6: 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**

12.5.1 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.

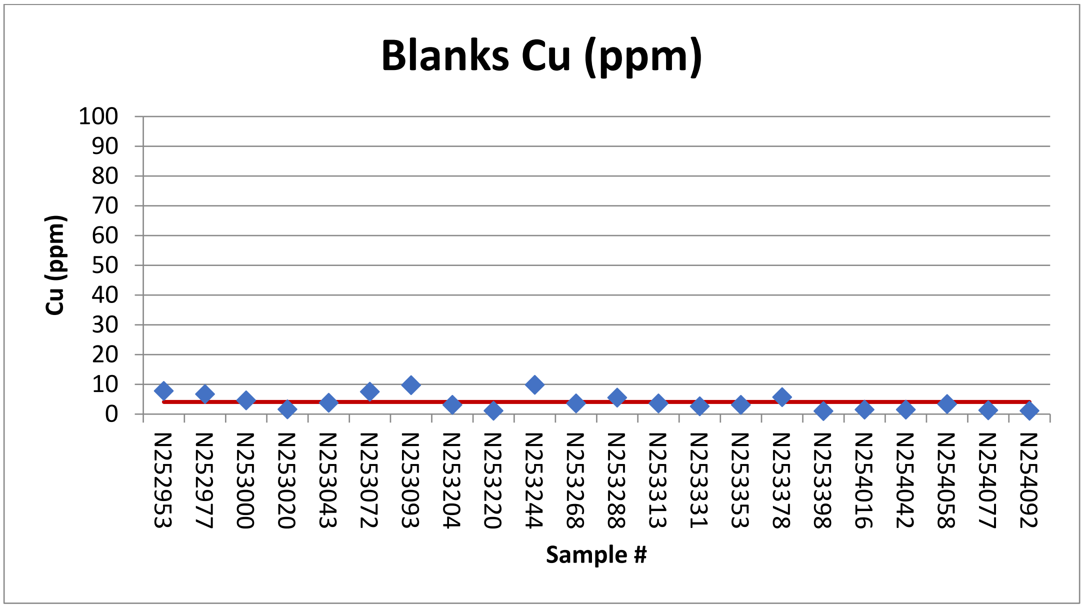


Figure 12-23: Blank Samples (Cu ppm)

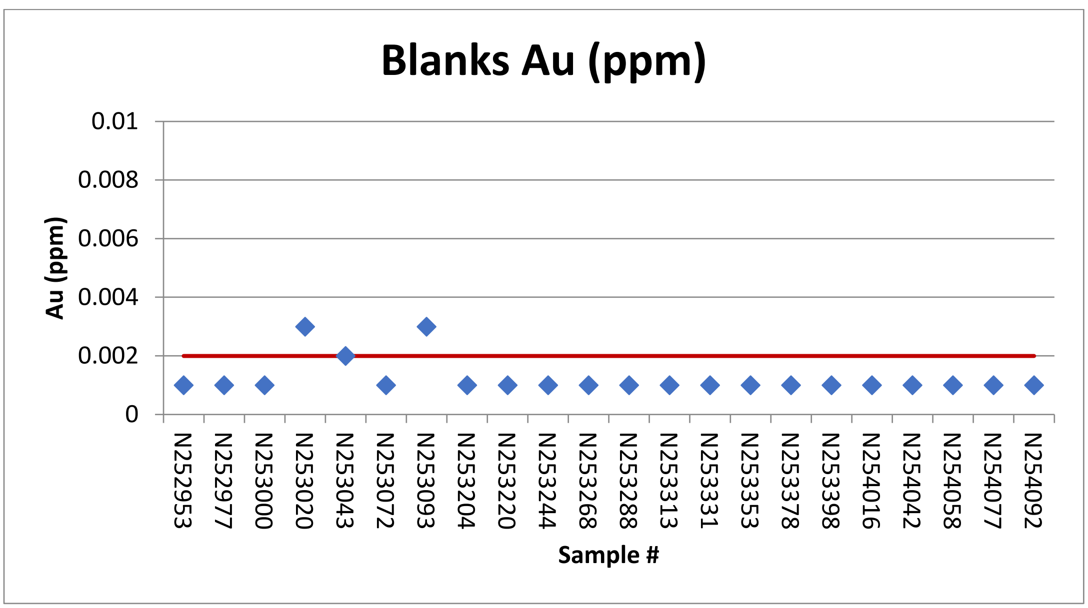


Figure 12-24: Blank Samples (Au ppm)

12.5.2 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.

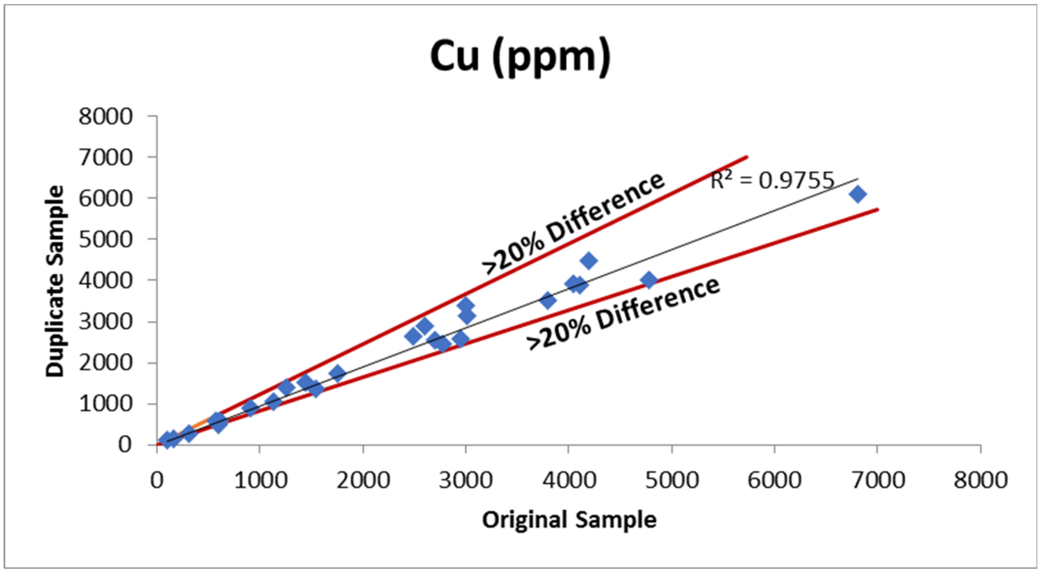


Figure 12-25: Duplicate Samples (Cu ppm)

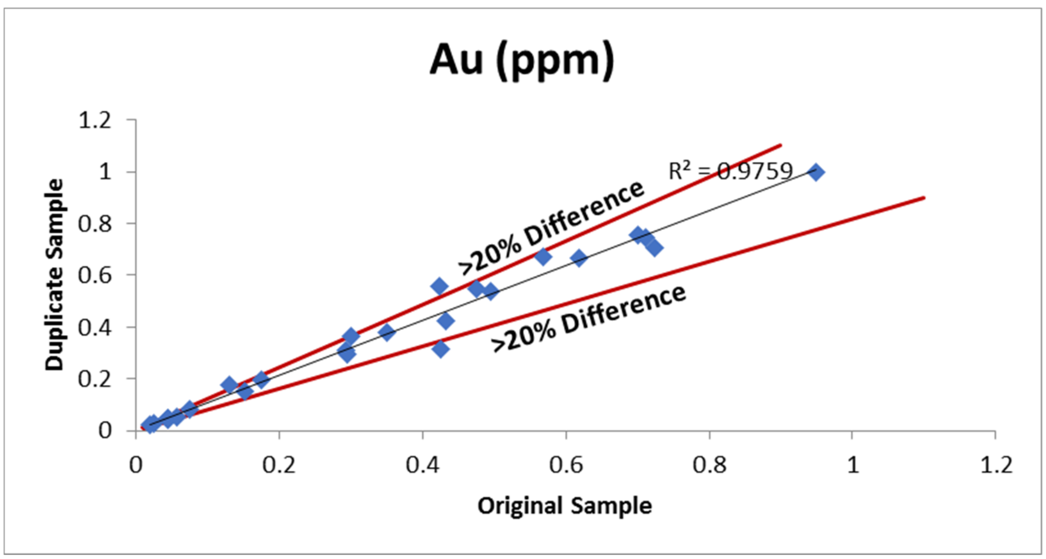


Figure 12-26: Duplicate Samples (Au ppm)

12.5.3 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.

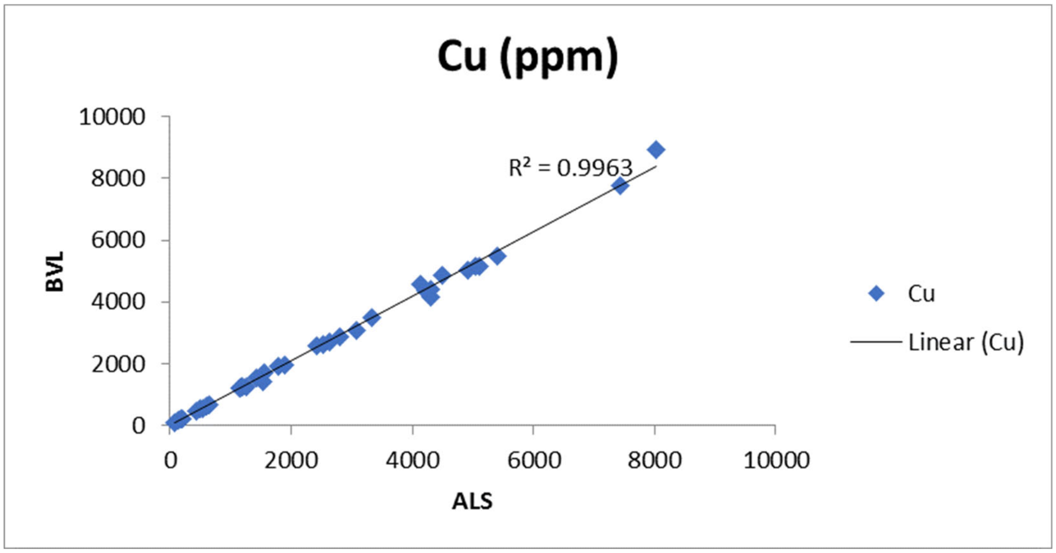


Figure 12-27: Pulp Duplicate Samples (Cu ppm)

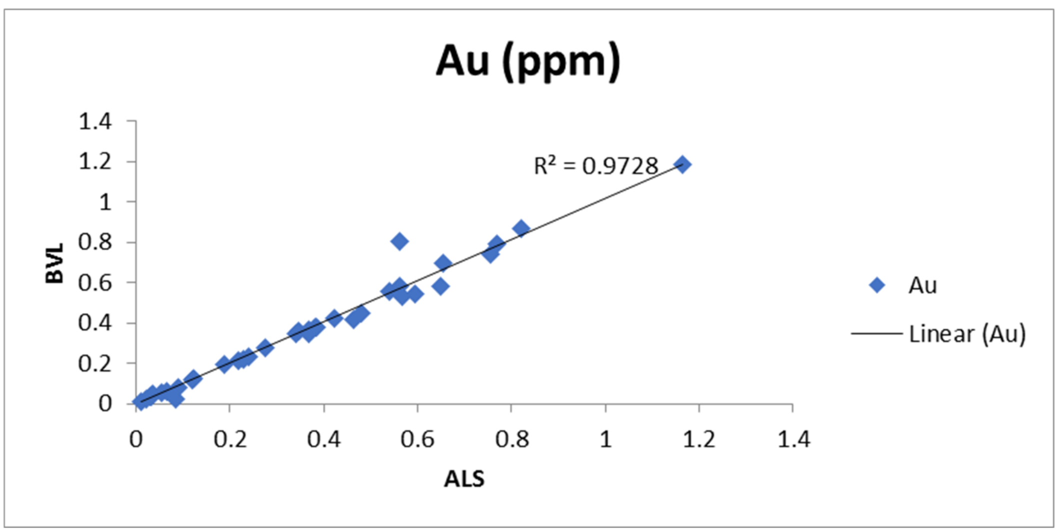


Figure 12-28: Pulp Duplicate Samples (Au ppm)

12.5.4 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 12-7 presents the recommended mean grade and accepted standard deviation range for the standard used.

Table 12-7: 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.

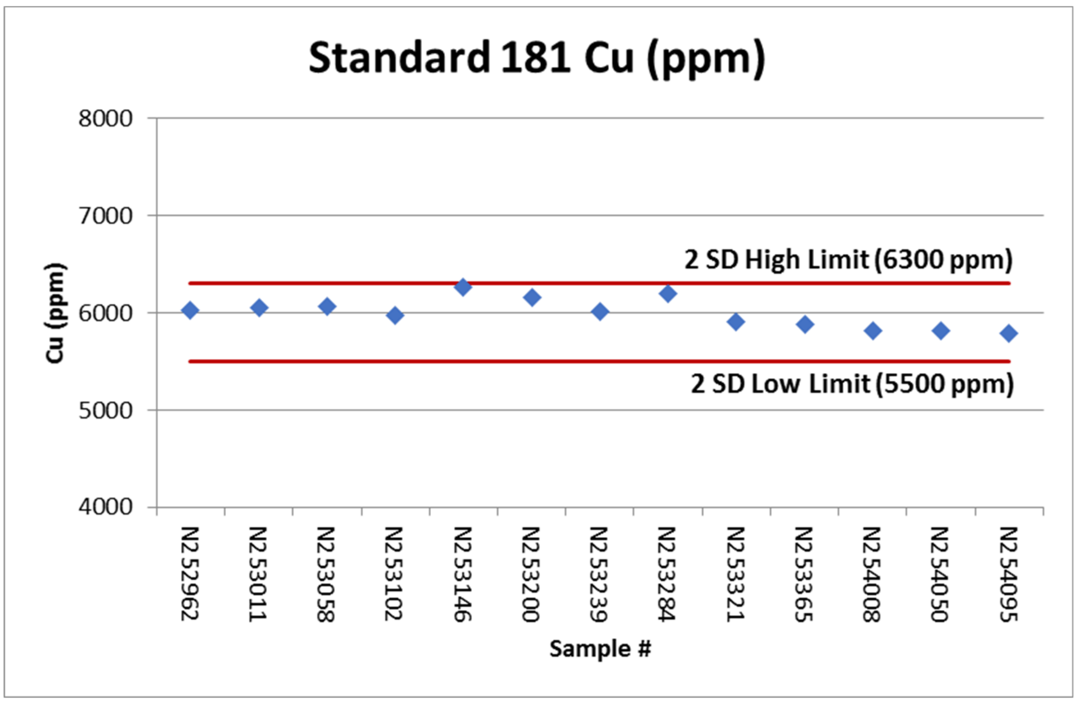


Figure 12-29: Standard CU 181 (Cu ppm)

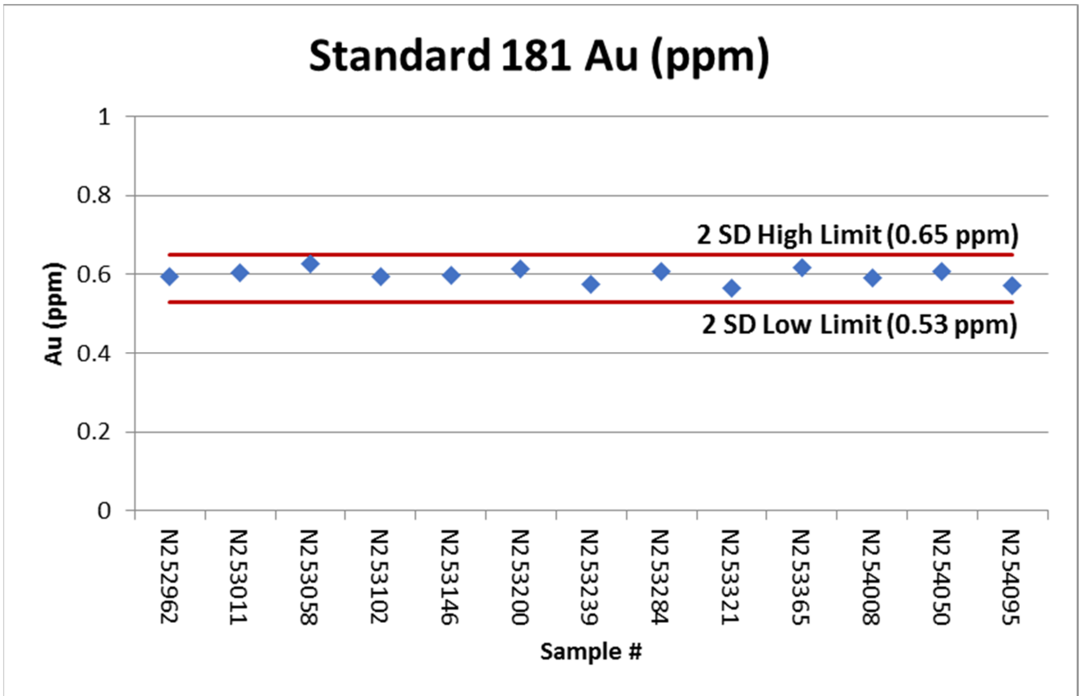


Figure 12-30: Standard CU 181 (Au ppm)

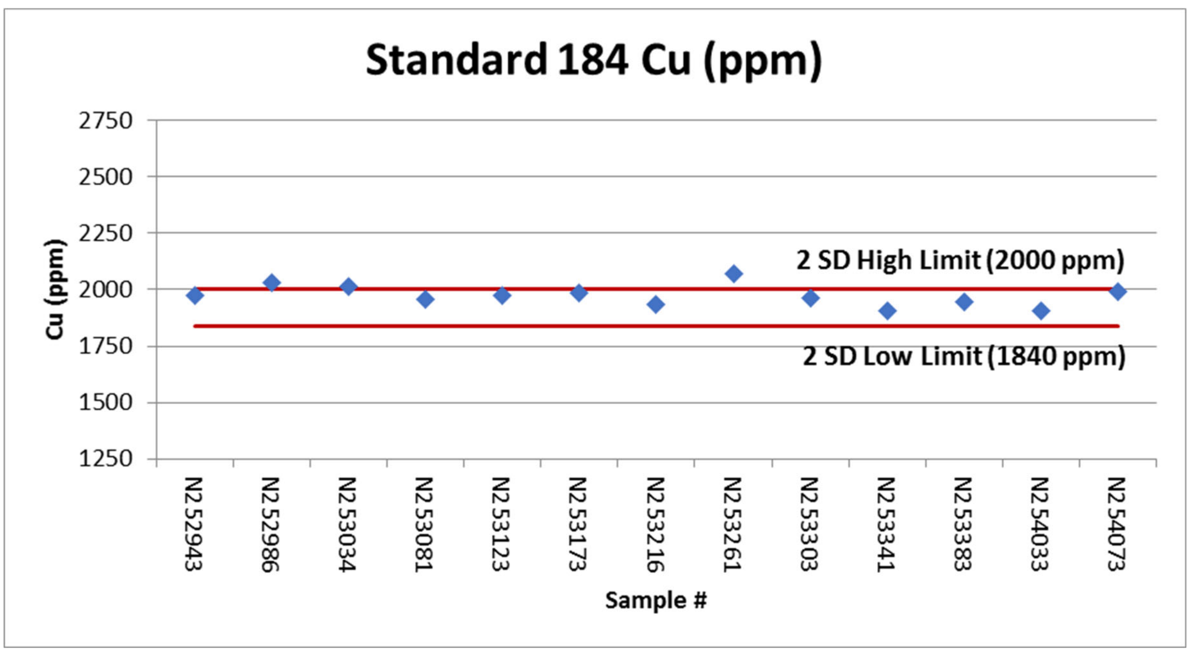


Figure 12-31: Standard CU 184 (Cu ppm)

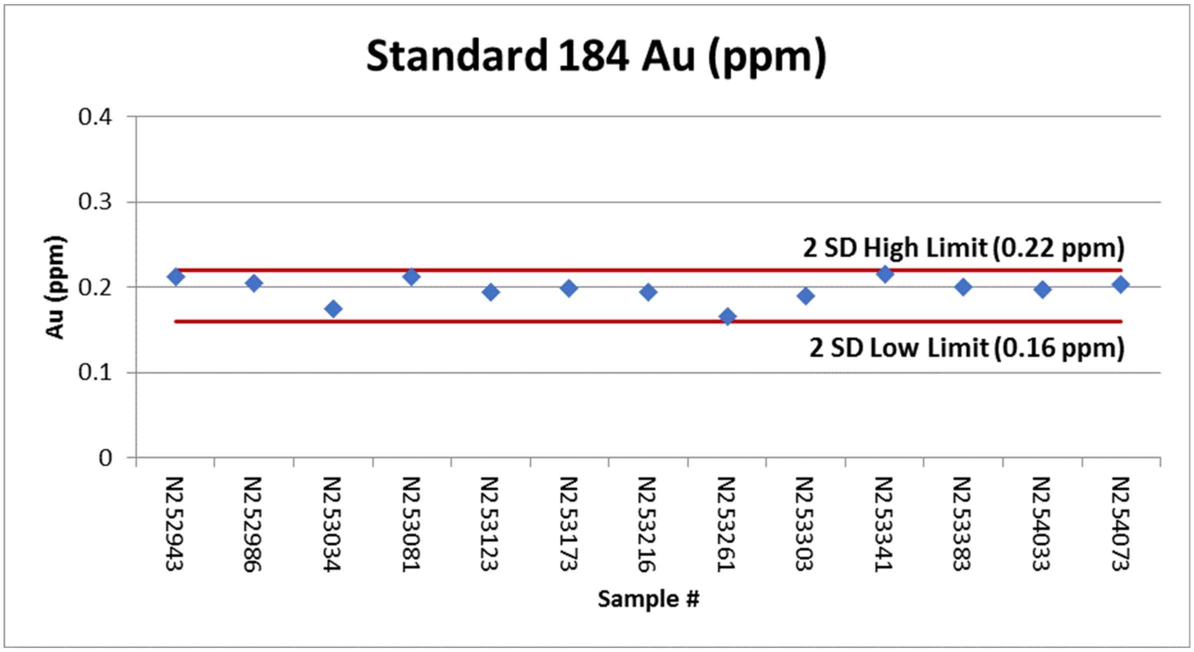


Figure 12-32: Standard CU 184 (Au ppm)

12.6 2017 DRILLING: HUSHAMU

As part of the 2017 drilling program, samples of core standards and blank material were inserted into the sample stream. The standard pulps consisted of a low standard and a high standard produced by WCM Minerals of WCM Sales Ltd of Burnaby, B.C. One of each was inserted with every 20 core samples. Due to a laboratory mix up by the supplier of the standard, the high sample inadvertently included some samples with near blank values. For this reason, the high standard was not used for QA/QC in this program.

A total of 13 standards and 22 blank samples were sent to the lab inserted in the sample batches.

In addition to the standards and blanks, a duplicate sample was taken of every 20th sample. The duplicates consisted of quartering rather than halving the core. One quarter was shipped with the other samples while the other quarter was held back and sent to the laboratory in a later shipment.

The QA/QC program did not identify any problems or inconsistency in the analyses of samples. There was a slight drift with time in copper values. Minor time related drift may be related to contamination caused by inadequate cleaning of equipment between samples.

12.7 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 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

Six 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
Dec. 1, 2020	The mineralogy and Flotation on samples from the North Island Copper and Gold deposit	SGS Minerals, Vancouver	J. Ding	3	8 – Rougher Flotation 12 – Cleaner Flotation 7 – LCT Flotation 5 – Pyrite Cleaner Flotation

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, and batch cleaner test followed by a locked cycle test in the SGS 2020 program.

The metallurgical tests completed in 2020 have been performed on samples from the Hushamu zone and the Red Dog zone. The program focused on improved recovery of copper and pyrite concentrate with by-product credits of gold and molybdenum. Rougher and cleaner optimization tests were performed to develop the flotation conditions and flowsheet, followed by locked cycle tests to estimate the final copper cleaner concentrate grade and recovery.

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 mineralization 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 the primary copper mineral is chalcopyrite. 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.

SGS analyzed composites from SCP and CMG by QEMSCAN (Quantitative Evaluation of Minerals by Scanning Electron Microscopy). Copper occurs predominantly as chalcopyrite with the other copper mineral content at <0.01%. The modal compositions of mineral class show that pyrite is the major sulphide. Quartz and clays are the major gangue minerals for SCP while quartz, clays, sericite/muscovite, chlorite, and biotite are the major gangue minerals for CMG.

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.

13.2.3 Chalcopyrite and Exposure

Chalcopyrite liberation is 65.1% for SCP and 55.3% for CMG, with liberation increasing by size to 75.3% in the minus 75-micron fraction for the SCP composite and 75.7% for the CMG composite. Chalcopyrite as complex particles is high at 20.6% for SCP and 34.9% for CMG, indicating that a finer regrind may be required to produce high grade cleaner concentrate. Chalcopyrite exposure, where the particles are >20% exposed is good is good at 91.2% in the SCP composite but lower in the CMG composite at 74.1%. However, totally locked particles are low with only 0.41-1.72% being completely locked.

13.2.4 Pyrite Association and Exposure

Pyrite liberation is good, with 89.4% for SCP and 82.1% for CMG, where both increase with decreasing size at >90% liberated in the minus 75-micron fraction. Pyrite exposure is also extremely good, with particles >20% exposed at 99.05% for the SCP composite and 95.55% for the CMG composite, with only 0.01-0.18% being completely locked.

13.2.5 Grain Size

Chalcopyrite has a P_{50} of 32 microns for SCP and 27 microns for CMG, whereas the pyrite is coarser at 77 microns and 55 microns for the SCP and CMG composites respectively.

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
SGS 16726-01	Hushamu	SCP-LCT1	0.33	0.009	0.42	76	23.9	0.238	14.3	86	31	41
		SCP-LCT2	0.33	0.008	0.38	76	22.9	0.175	13.6	88	27	46
		CMG-LCT1	0.31	0.008	0.33	76	23.8	0.480	14.9	87	69	51
		CMG-LCT2	0.32	0.008	0.37	76	25.8	0499	16.9	86	65	49
SGS 16726-01	Hushamu	SCP-LCT3	0.36	0.009	0.40	100	26.4	0.151	14.9	86	19	43
		CMG-LCT3	0.33	0.008	0.36	100	23.9	0.464	15.3	86	71	49
SGS 16726-01	Red Dog	Red Dog-LCT1	0.33	0.004	0.51	100	26.5	0.298	24.5	90	74	53

13.4.1 Early Flotation Test Work Results

Rougher flotation testing was performed to determine the initial flotation response for both zones. Figure 13-1 displays copper rougher metallurgical performance for early 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.

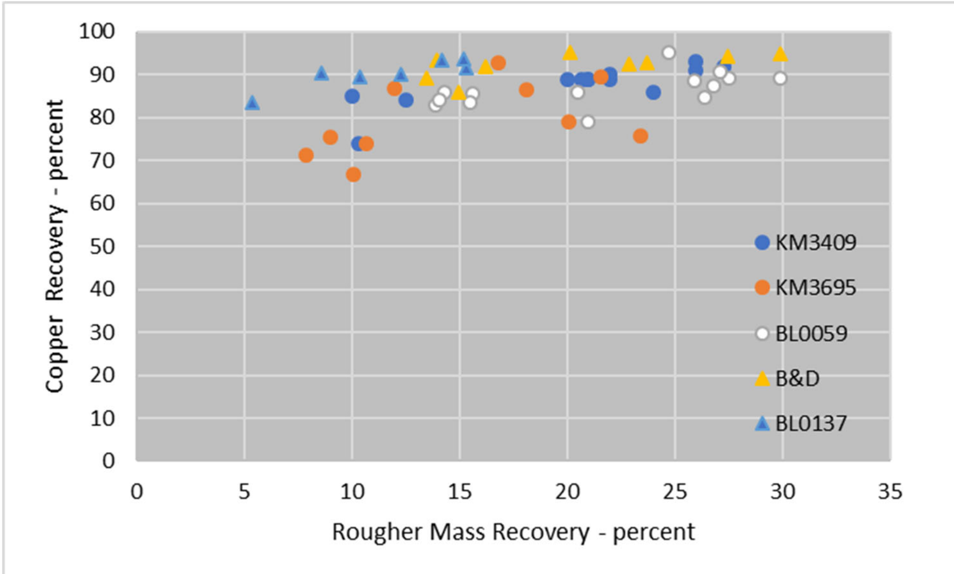


Figure 13-1: Copper Rougher Performance for all Composites and Test Conditions

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.

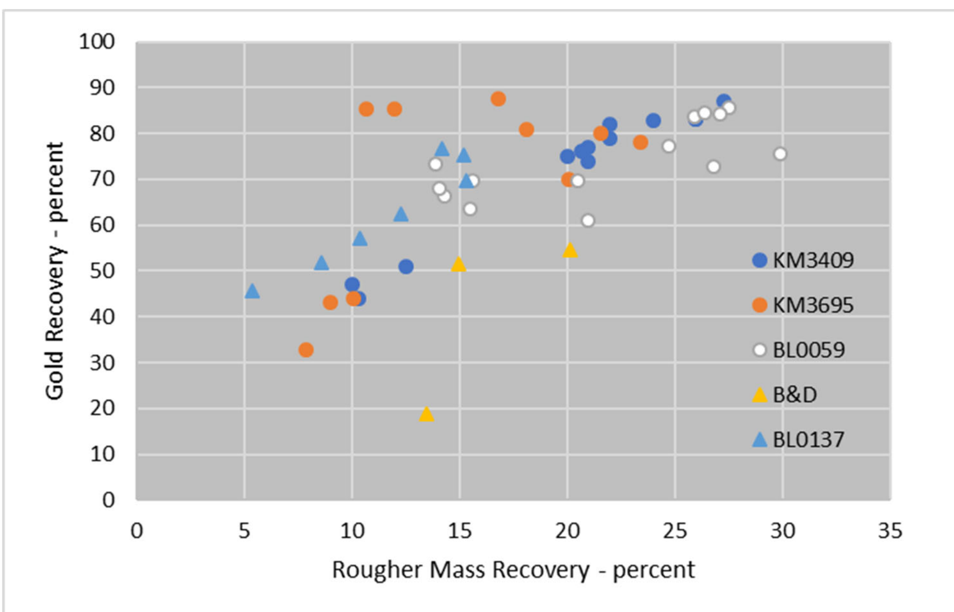


Figure 13-2: Gold Performance for all Composites and Test Conditions

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.

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.

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

	Deposit	Comp	Feed Grade Assays			PG	Con Grade g/t or %			Recovery - %		
			Cu	Mo	Au	µm K80	Cu	Mo	Au	Cu	Mo	Au
Base Met Labs BL0059	**Hushamu**	**SCP** **CMG**	**0.24** **0.30**	**0.006** **0.014**	**0.25** **0.34**	**100** **100**	**19.2** **21.7**	**0.770** **0.410**	**10.4** **13.8**	**75** **78**	**66** **55**	**34** **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.

13.4.2 2020 Flotation Test Work Results

The metallurgical tests completed in 2020 were performed on two samples from the Hushamu zone and one sample from the Red Dog zone. The program focused on improved recovery of copper and pyrite concentrate with by-product credits of gold and molybdenum. Relevant flotation results for locked cycle test are shown in Table 13-2.

A simple conventional copper flotation flowsheet was used that floated all sulfides into rougher concentrate and rejected pyrite in cleaner stages. Rougher and cleaner optimization tests were performed on the Hushamu composites to develop the flotation conditions and flowsheet. A batch cleaner test was completed on the Red Dog composite using the flotation conditions developed for SCP and CMG composites. Locked cycle tests were completed on SCP, CMG, and Red Dog composites to estimate the final copper cleaner concentrate grade and recovery.

Two primary grind sizes were targeted for this test work, 75 microns and 100 microns. The copper rougher concentrate was reground to a k80 of 20 microns with lime, cyanide, and fuel oil and followed by three stages of cleaning to produce a final copper concentrate. Figure 13-3 shows the flow sheet used for the locked cycle tests. Additional factors tested included: two collector types (PAX and 3418A), two fuel oil types (kerosene and MolyF), pH (10 and 10.5), pH modifier (lime and soda ash), and clay depressant (CMC). A summary of reagents and conditions for the locked cycle tests are shown in Table 13-4.

Observations made based on cleaner tests include:

- Fuel Oil MolyF was more effective in promoting molybdenum flotation than kerosene
- The addition of cyanide in the regrind mill (10 g/t) was critical in rejecting the pyrite in the cleaner stages. Omission of cyanide resulted in lower copper cleaner concentrate grade.

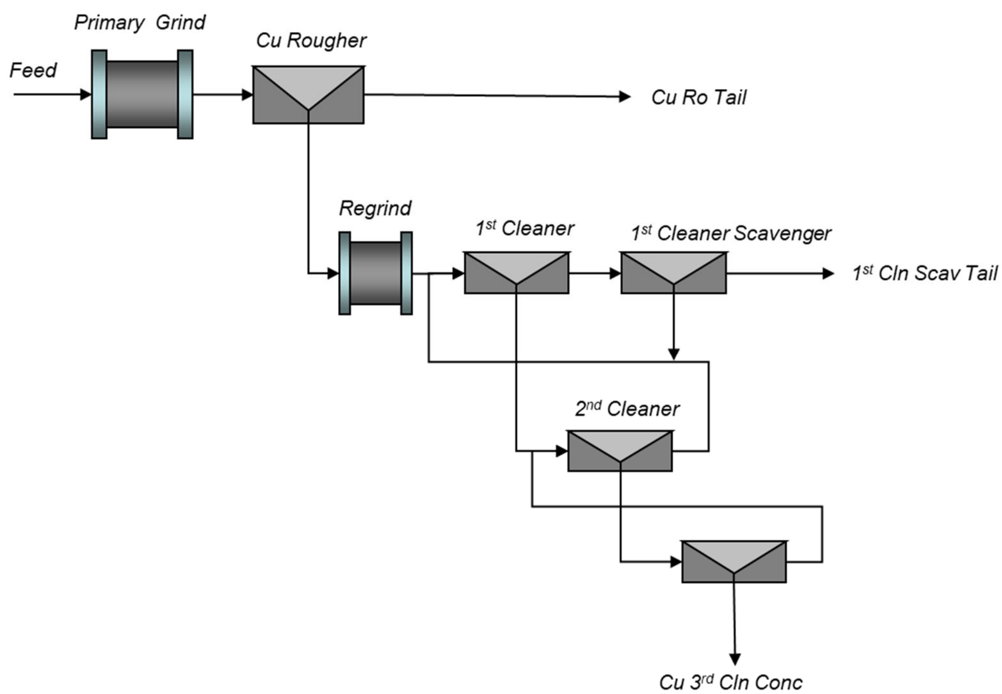


Figure 13-3: Schematic of Locked Cycle Test Flowsheet

Table 13-4: Summary Conditions of Locked Cycle Flotation Tests

Stage	Flotation Conditions	CMG-LCT1	CMG-LCT2	CMG-LCT3	SCP-LCT1	SCP-LCT2	SCP-LCT3	Reddog-LCT1
Primary Grind	Size, µm (k_{80})	76	76	100	76	76	100	100
	Lime, g/t	1400	800	1400	1400	1400	1400	1400
	MolyF, g/t	15	15	15	15	15	15	15
	pH	10.5	9.0	10.6	9.7	9.6	9.9	11.2
Cu Roughing	3418A, g/t	40	40.0	40	40	40	40	40
	pH	10.5	9.5	10.5	10.5	10.5	10.5	11
Cu Regrind	Size, µm (k_{80})	19.7	18.5	17.7	20.9	18.0	20.6	18.0
	Lime, g/t	400	400	400	400	400	700	700

Stage	Flotation Conditions	CMG-LCT1	CMG-LCT2	CMG-LCT3	SCP-LCT1	SCP-LCT2	SCP-LCT3	Reddog-LCT1
	MolyF, g/t	10	10	10	10	10	10	10
	NaCN, g/t	10	10	10	10	10	10	10
	pH	10.5	9.0	10.6	9.7	9.6	9.9	11.2
Cu Cleaning	MolyF, g/t	7.5	7.5	7.5	7.5	12.5	7.5	7.5
	3418A, g/t	10.5	10.5	11	11	11	12.5	12.5
	pH	11	11	11	11	11	11	11.3

The composites responded well to the conventional flotation. The results indicated that a coarser primary grind did not impact flotation. The final copper recoveries from locked cycle tests were higher for all composites when compared to the previous 2015/2016 test work. The molybdenum recovery for the Hushamu SCP sample tested was very low compared to the CMC sample and earlier testwork. For the purposes of this study it is assumed that molybdenum recovery for the SCP ore will be the same as for the CMG ore which results in a LOM weighted average recovery of 59.5%.

At the current stage of development, bulk flotation, regrinding followed by cleaner flotation provides the best metallurgical results. At the current stage of process development, no copper molybdenum separation testing was conducted.

Table 13-5: Expected Metallurgical Results Based on 2020 Testing

CMG

Concentrate	Concentrate Grade						Metal Recovery					
	Cu	Mo	Au	Fe	S	Re	Cu	Mo	Au	Fe	S	Re
	%	%	g/t	%	%	g/t	%	%	%	%	%	g/t
copper	24.0	0.05	15.4	31.0	33.6	4.5	85.5	7.1	48.9	4.1	10.4	13.6
moly*	2.9	56.9	5.8	35.0	58.3	2,434	0.1	74.4	0.2	0.0	0.0	63.5

SCP

Concentrate	Concentrate Grade						Metal Recovery					
	Cu	Mo	Au	Fe	S	Re	Cu	Mo	Au	Fe	S	Re
	%	%	g/t	%	%	g/t	%	%	%	%	%	g/t
copper	26.6	0.02	14.9	32.5	36.5	1.5	86.2	1.9	43.1	4.1	4.8	4.4
moly*	2.9	18.7	5.8	35.0	58.3	822	0.1	20.4	0.1	0.0	0.0	20.8

Reddog

Concentrate	Concentrate Grade						Metal Recovery					
	Cu	Mo	Au	Fe	S	Re	Cu	Mo	Au	Fe	S	Re
	%	%	g/t	%	%	g/t	%	%	%	%	%	g/t
copper	26.7	0.03	24.7	31.5	34.0	4.1	89.7	7.3	52.8	3.3	9.2	13.9
moly*	2.9	34.7	5.8	35.0	58.3	2,090	0.1	73.3	0.1	0.0	0.1	61.5

LOM weighted average

Concentrate	Concentrate Grade						Metal Recovery					
	Cu	Mo	Au	Fe	S	Re	Cu	Mo	Au	Fe	S	Re
	%	%	g/t	%	%	g/t	%	%	%	%	%	g/t
copper	25.4	0.03	15.9	31.7	35.0	3.1	86.1	4.5	46.8	4.0	6.6	9.4
moly*	2.9	37.9	5.8	35.0	58.3	1,685	0.1	*59.5*	0.1	0.04	0.1	43.8

Ref. BL 0137; 90% of the Moly is recovered in the reverse moly flotation
SME Mineral Processing & Extractive Metallurgy Handbook, 80% of the Rhenium is recovered in moly concentrate
* M3 estimated Au, Ag, Fe and S in Moly concentrate
*Mo and Re grade estimated

13.4.3 Pyrite Flotation

Pyrite flotation was completed on the copper first cleaner tailings from selected locked cycle tests and the results are summarized in Table 13-6.

Table 13-6: Summary Results of Pyrite Flotation

	Py Conc. Mass	Py Conc. Grade				Py Conc. Recovery (Circuit)		
	%	Cu, %	Au, g/t	Fe, g/t	S, %	Cu, %	Au, %	S, %
SCP-F11	14.3	0.10	0.82	36.9	43.1	4.4	30.8	78.2
CMG-F13	5.9	0.16	1.58	42.6	49.2	3.1	23.4	75.1
Red Dog-F2	5.9	0.11	1.32	41.9	48.0	1.9	11.8	67.8

13.5 MINOR ELEMENT ANALYSIS OF THE CONCENTRATE

A minor element analysis of the concentrate was performed in CMG, SCP, and Red Dog concentrate from locked cycle tests (CMG-LCT3), SCP-LCT3 & Red Dog- LCT1. The data from that report is reproduced in Table 13-7.

Table 13-7: Minor Elements – Average, (CMG-LCT3), SCP-LCT3 & Red Dog- LCT1

Element	Symbol	Unit	Test 25 Bulk Con I-V	Element	Symbol	Unit	Test 25 Bulk Con I-V
Copper	Cu	%	24.4	Manganese	Mn	g/t	17.3
Gold	Au	g/t	15.6	Molybdenum	Mo	%	0.304
Silver	Ag	g/t	19.6	Mercury	Hg	g/t	<0.3
Iron	Fe	%	30.8	Nickel	Ni	g/t	<26
Antimony	Sb	%	<0.002	Barium	Ba	g/t	14.8
Arsenic	As	g/t	<30	Phosphorus	P	g/t	<200
Bismuth	Bi	g/t	<200	Thallium	Tl	g/t	<30
Cadmium	Cd	g/t	13.9	Rhenium	Re	g/t	15.5
Calcium	Ca	%	0.101	Selenium	Se	g/t	122.1
Aluminum	Al	%	1.004	Vanadium	V	g/t	<40
Cobalt	Co	g/t	37.9	Sodium	Na	g/t	<190
Lead	Pb	g/t	336	Zinc	Zn	g/t	0.131
Magnesium	Mg	%	0.108				
Beryllium	Be	g/t	<0.05	Uranium	U	g/t	<45
Chrome	Cr	g/t	21.8	Iridium	Y	g/t	1.2
Lithium	Li	g/t	<20	Potassium	K	%	<0.70

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

13.6 MAGNETITE CONTENT

SGS testwork included Satmagan analysis on the three feed composites to determine magnetite content. Both the CMG and Red Dog composites have appreciable magnetite. The results are summarized in Table 13-8.

Table 13-8: Satmagan Analysis Results

Sample	% Fe_3O_4	% Fe mag
Red Dog	4.6	3.3
SCP	1.0	0.7
CMG	2.9	2.1

It is recommended that testwork be completed to optimize the flotation conditions in the next phase of the project.

14 MINERAL RESOURCE ESTIMATES

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 drilling several more holes to upgrade some of the resource classification from "Inferred" to "Indicated".

Following the drilling of seven additional holes and re-defining the alteration zones, Burt Consulting Services was again retained in 2015 to re-model the geological domains and to provide an updated resource estimate which would ultimately be used in the 2017 PEA report.

Five drill holes were completed by Northisle in 2017 and an update to the earlier resource estimate was requested.

The Red Dog resource was the subject of an earlier published 43-101 Technical Report by Game and Burt, March 2017. The estimate 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 provides a list of all drill campaigns.

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	1968-1977	69	10,816	2,995	9,018	83
Moraga	1982-1992	45	13,180	4,429	12,694	96
Lumina	1994-2005	11	2,460	736	2,157	88
IMA	2008	2	513	250	498	97
NorthIsle	2012-2014	25	7,276	2734	6,948	95
Northisle	2017	5	1,556	504	1,467	94
TOTAL		**157**	**35,800**	**11,522**	**31,374**	**Avg. 92**

Note: number of samples and sample lengths do not include duplicates and standards.

Of the 157 drill holes drilled in the area, only 148 were used in the estimation. The other nine were collared 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 collar elevations were adjusted to fit the 2011 DEM surface.

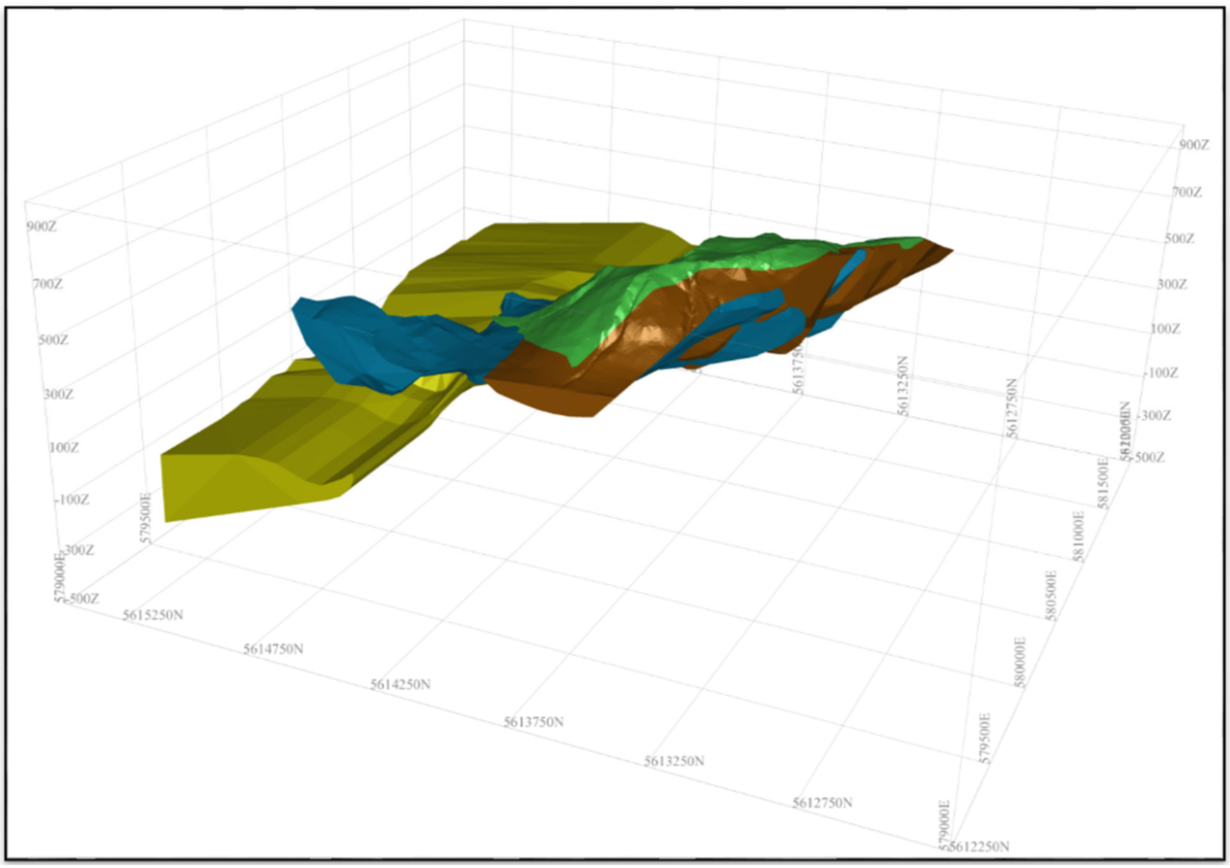
14.2 GEOLOGICAL MODELING

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

- Overburden – Including drill hole casing
- LEA – Leached Silica-Clay overprint

- QFP – Quartz Feldspar Porphyry intrusive
- SCP – Silica-Clay-Pyrite
- CMG – Chlorite-Magnetite
- PRO – Propyllitic
- HFLS – Hornfels
- POT – Potassic

Originally five main domains; overburden, LEA, QFP, SCP and CMG were modeled, all other alteration types were considered to be within the PRO alteration domain. Further examination of the alteration morphology combined with statistical analysis of the copper and gold contents suggested that the SCP, CMG and PRO domains have "soft" boundaries where complex alteration overprinting resulted in metal contents that were not severely affected across domain boundaries. Assays used in block estimation need not be restricted to those domains separately.



Note: Yellow=QFP, green=LEA, blue=CMG, brown=SCP, all others=PRO. Horizontal grid is 500m, vertical grid is 100m.

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

To that end, only three domains were considered to have hard boundaries: QFP, LEA and SCP-CMG-PRO. A major near vertical, 120°-trending fault (South Fault) has been interpreted to effectively limit the mineralization to north of the fault. This was also modeled to constrain the estimate in that direction. The vertical limits of a previously determined Whittle Pit was used to further constrain the final model. The five 2017 drill holes did not change the previously modeled domain boundaries significantly with 3 of the 5 holes crossing boundaries as predicted. The other two holes indicated that the LEA-SCP boundary could be 20 to 30 m higher in elevation than what was originally modeled. Since there can be considerable interfingering between the two alteration zones, it was decided to leave the boundary as originally modeled, although further drilling in those areas may require the boundary to be moved.

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 157 drill holes. While the three main zones have been defined for estimation purposes, the original modelled zones (LEA, QFP, CMG, SCP and PRO) were still considered to be separate domains for statistical analysis and grade capping. An additional domain was formed from the combined SCP-CMG-PRO zones to be used in the final block estimation. The assay data was constrained to the block model limits within each of alteration 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 domain and Figure 14-2 and Figure 14-3 provide box and whisker plots of the statistical data for copper and gold.

The addition of 504 samples from the 2017 drilling to the previous 11,1018 samples did not affect the statistics significantly.

Table 14-2: Normal Statistics by Zone

Domain	Element	Number	Minimum	Maximum	Mean	Standard Deviation	Variance	Coef. of Variation
All[1]	Au (ppm)	10775	0.001	2.5	0.160	0.198	0.039	1.239
	Cu (%)	11096	0.001	1.9	0.119	0.145	0.021	1.218
	Mo (%)	9946	0.001	0.120	0.001	0.008	0.00006	1.054
	Re (ppm)	8696	0.001	22.5	0.372	0.580	0.336	1.559
LEA	Au (ppm)	1886	0.003	1.305	0.123	0.132	0.006	2.095
	Cu (%)	1905	0.001	1.0	0.035	0.074	0.006	2.095
	Mo (%)	1834	0.001	0.091	0.010	0.008	0.00006	0.797
	Re (ppm)	1496	0.001	7.62	0.452	0.624	0.389	1.380
CMG	Au (ppm)	2422	0.003	1.64	0.278	0.228	0.052	0.819
	Cu (%)	2586	0.002	1.48	0.244	0.150	0.022	0.614
	Mo (%)	2414	0.001	0.078	0.006	0.005	0	0.879
	Re (ppm)	1833	0.002	4.40	0.313	0.364	0.133	1.164
SCP	Au (ppm)	3257	0.001	2.4	0.205	0.213	0.045	1.039
	Cu (%)	3273	0.001	1.9	0.124	0.150	0.022	1.211
	Mo (%)	3114	0.001	0.12	0.011	0.009	0	0.875
	Re (ppm)	2702	0.001	10.2	0.631	0.631	0.398	0.999
PRO	Au (ppm)	2683	0.001	2.5	0.049	0.110	0.012	2.259
	Cu (%)	2762	0.001	1.21	0.071	0.100	0.010	1.396
	Mo (%)	2034	0.001	0.052	0.003	0.004	0	1.255
	Re (ppm)	2234	0.001	2.04	0.085	0.160	0.026	1.884
CMG-SCP-PRO	Au (ppm)	8376	0.001	2.5	0.175	0.212	0.045	1.209
	Cu (%)	8637	0.001	1.9	0.143	0.152	0.023	1.068
	Mo (%)	7562	0.001	0.120	0.007	0.008	0	1.087
	Re (ppm)	6780	0.001	10.2	0.364	0.508	0.258	1.396
QFP	Au (ppm)	374	0.003	0.342	0.022	0.040	0.002	1.805
	Cu (%)	415	0.001	0.249	0.042	0.043	0.002	1.009
	Mo (%)	395	0.001	0.017	0.002	0.002	0	1.052
	Re (ppm)	288	0.002	0.583	0.051	0.089	0.008	1.731

Note 1: All Domain includes samples south of the South Fault.

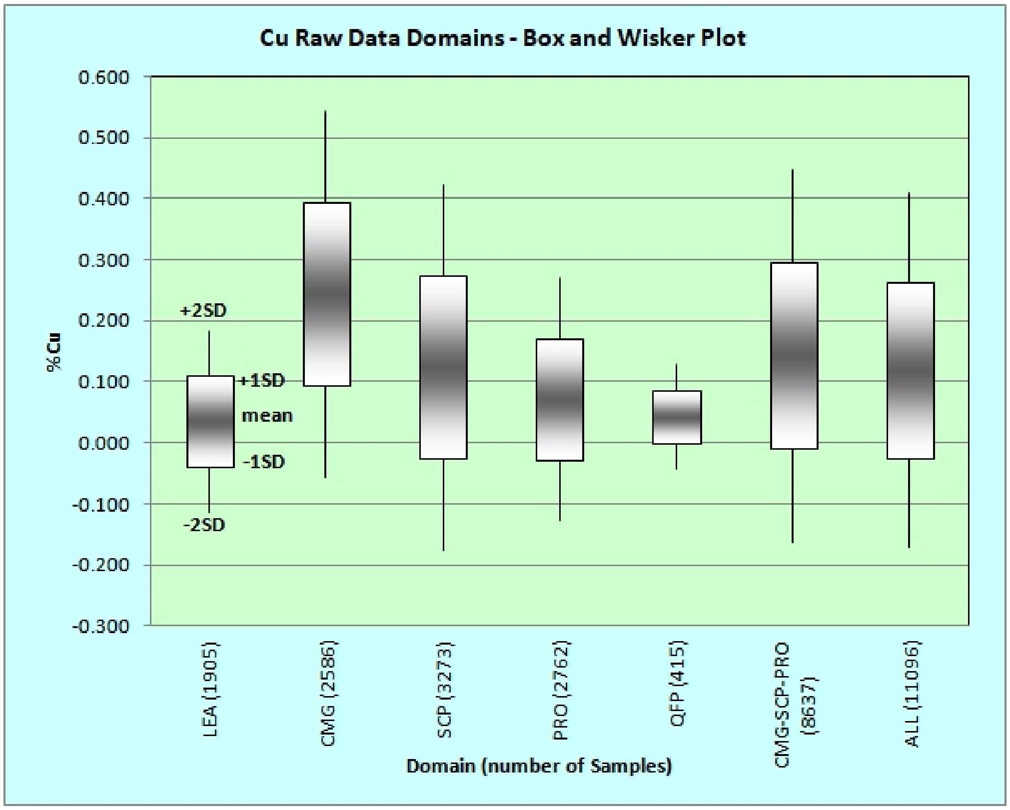


Figure 14-2: Cu Box Whisker Plot of Normal Statistics by Domain

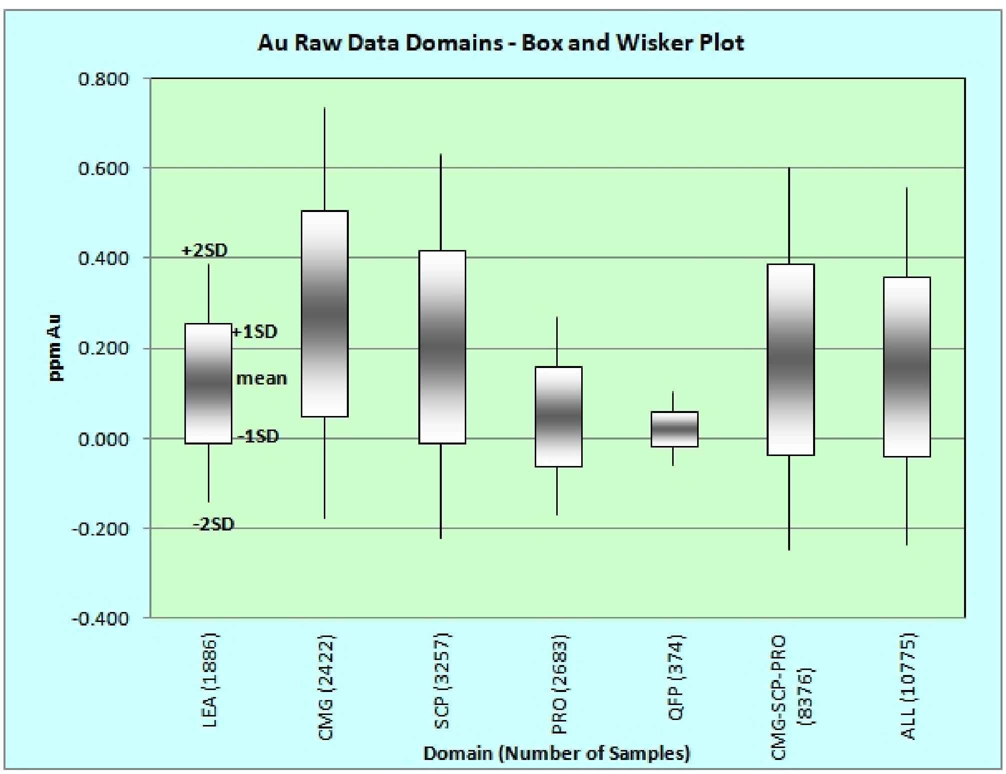


Figure 14-3: Au Box and Whisker Plot of Normal Statistics by Domain

Except for the combined CMG-SCP-PRO domain, 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 near and below detection limit data missing (hence the tail-off at the lower values). In some cases, an additional population with a high mean value is also indicated. This is particularly evident in the QFP domain with the Mo and Re log-probability plots and a detailed examination of the plots suggested that there are three log-normal populations present. This also evident in the drill hole data with a string of much higher Re assays in a single drill hole. This suggests that the drill log for that hole may be in error.

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 where, for all data, coefficients for Au-Cu correlate at 0.75 and Re-Mo at 0.72.

High capping of each element was based on three to four standard deviations on log-probability graphs and checked against cumulative frequency diagrams. Previous resource estimates also capped high values and are used here for consistency. Assays within each domain were capped separately and then used for down hole compositing. Table 14-3 provides the capping values used for each domain.

Table 14-3: High Cutting by Zone

Domain	Element	Cap Value	Number Affected
LEA	Cu (%)	0.63	7
	Au (ppm)	1.30	1
	Mo (%)	0.07	5
	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

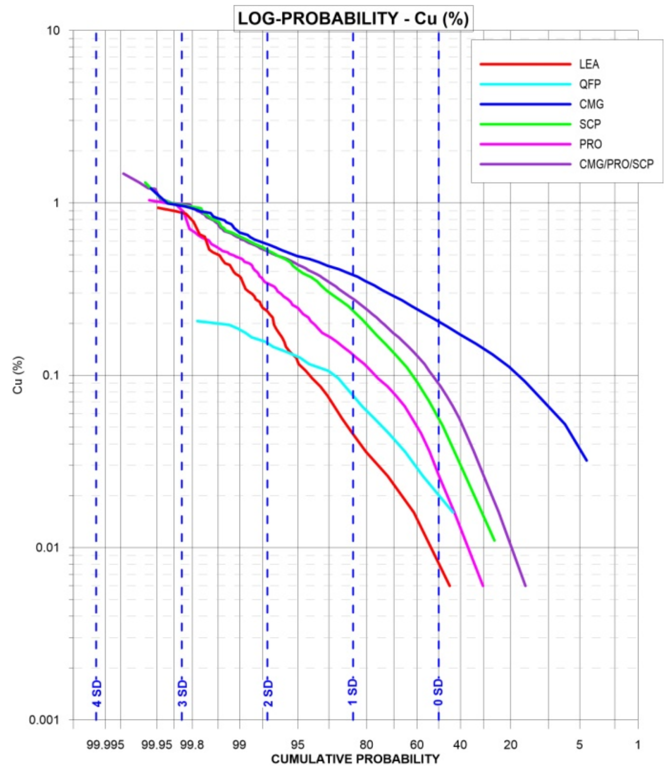


Figure 14-4: Cu Log-Probability Plot by Domain

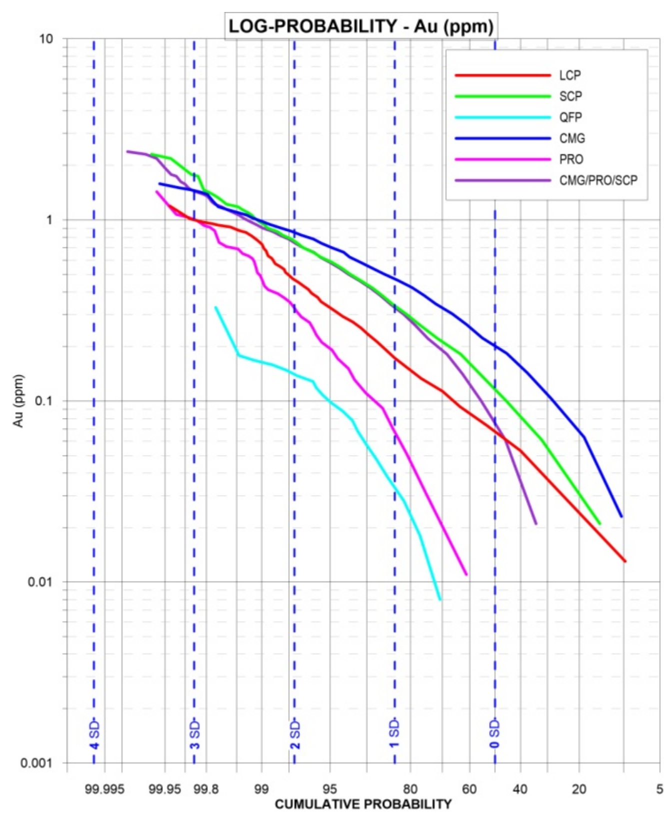


Figure 14-5: Au Log-Probability Plot by Domain

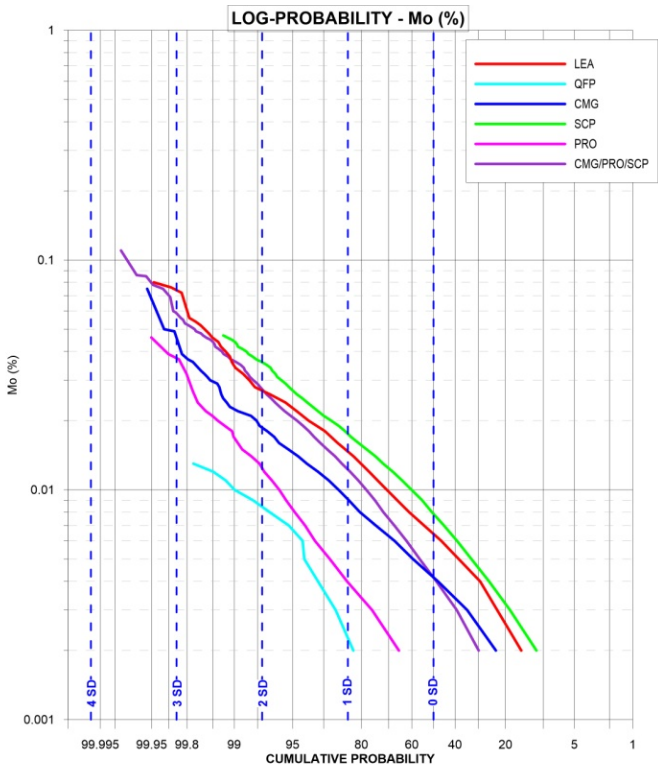


Figure 14-6: Mo Log-Probability Plot by Domain

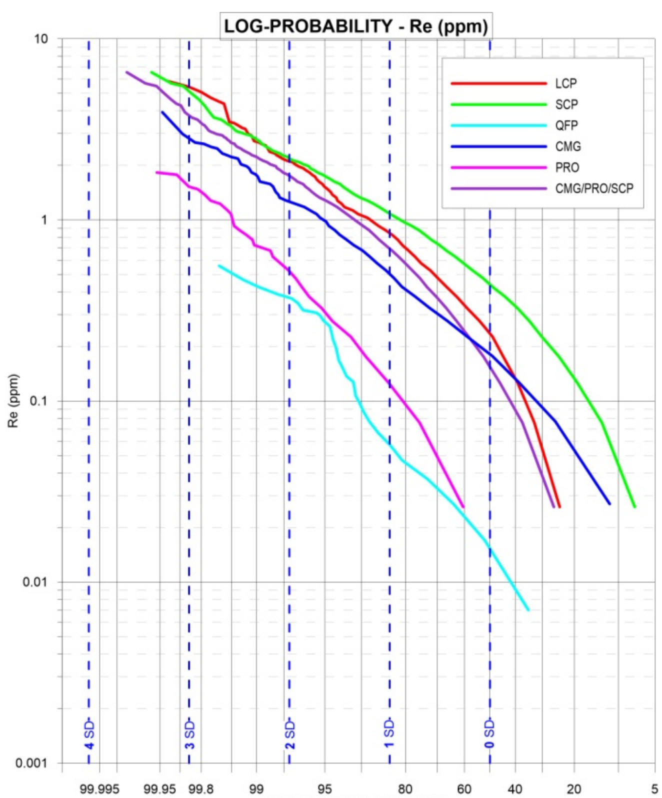


Figure 14-7: Re Log-Probability Plot by Domain

Raw assays to be used in the block estimation were composited down hole into equal 5 m intervals using the cut data. Short composite intervals (generally at the hole bottom) were also kept in the database. Samples that were not assayed for copper, 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	Au	Cu	Mo	Re
Number of samples	6793	6793	6793	6793
Minimum value	0	0	0	0
Maximum value	1.536	1.028	0.083	4.805
Mean	0.139	0.109	0.006	0.262
Median	0.074	0.055	0.004	0.076
Variance	0.031	0.017	0.00005	0.185
Standard Deviation	0.175	0.129	0.0070	0.430
Coefficient of Variation	1.260	1.191	1.162	1.643

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 and any data spikes are smoothed. 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 and the smoothing effect of compositing is readily apparent.

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.

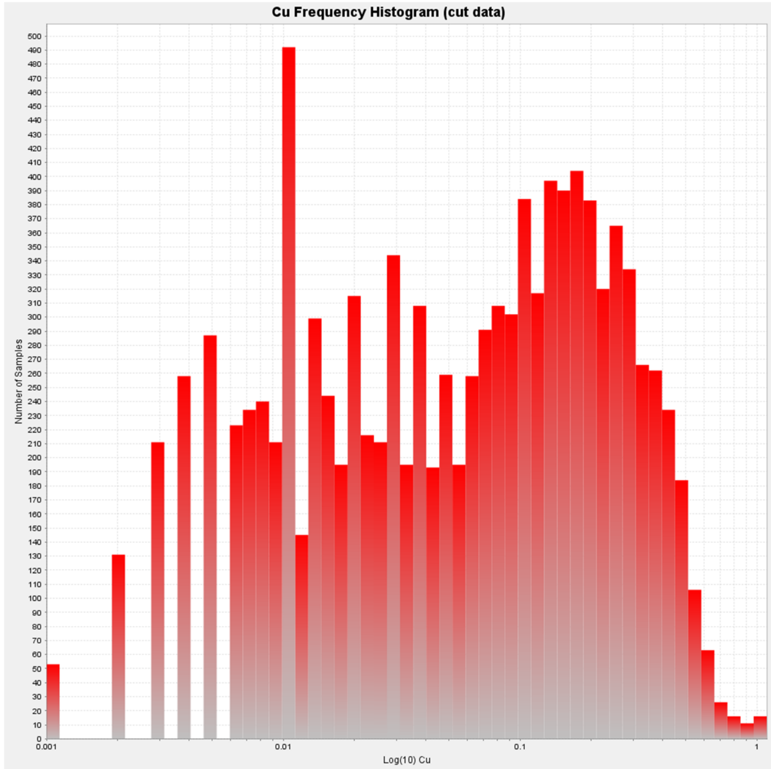


Figure 14-8: Histogram of Log Cu – Cut Raw Data

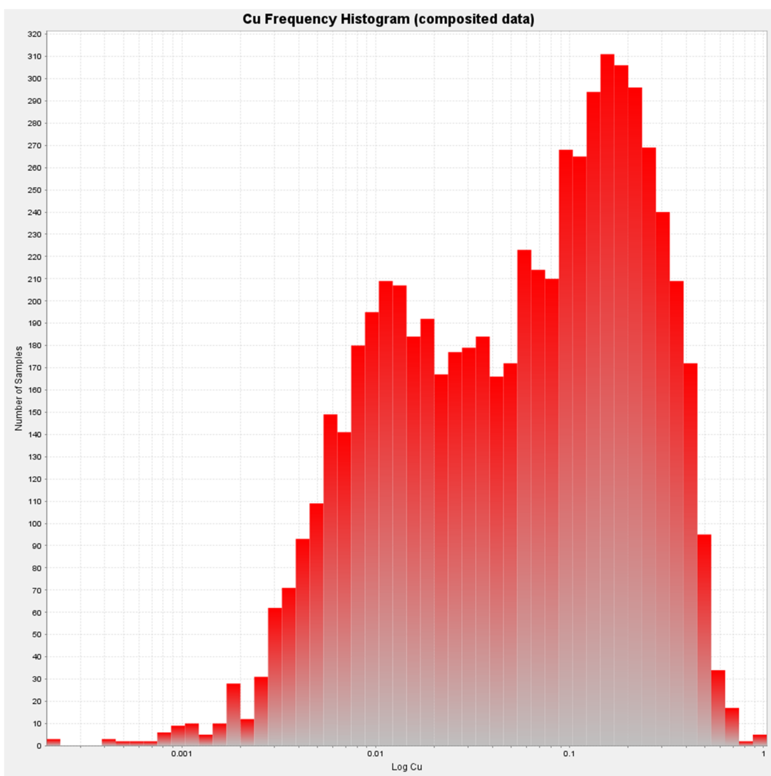


Figure 14-9: Histogram of Log Cu – Composited Data

Examination of the raw and composited assays in the 3D environment suggests that the majority of the copper mineralization is hosted by 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 view of the greater than 0.10% Cu assays in longitudinal and cross sections with approximate copper trends outlined.

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)	No	No	No
Number of Full Blocks	115	125	51
Total Number of Full Blocks	**1,902,950**		
Blocks below surface and in pit area	**251,070**		

While sub-blocking was used in previous block models to minimize domain boundary errors, current parameters required that all blocks be equal size.

The drill spacing is an average of 100 m east-west and 200 m north-south with some in-fill holes at 50 m spacing. Geological continuity has been well established from diamond drilling and geological mapping across the entire deposit for approximately 1,400 m towards 330°, 600 m towards 060° and 125 m 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 m and a range of 160 m. 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.

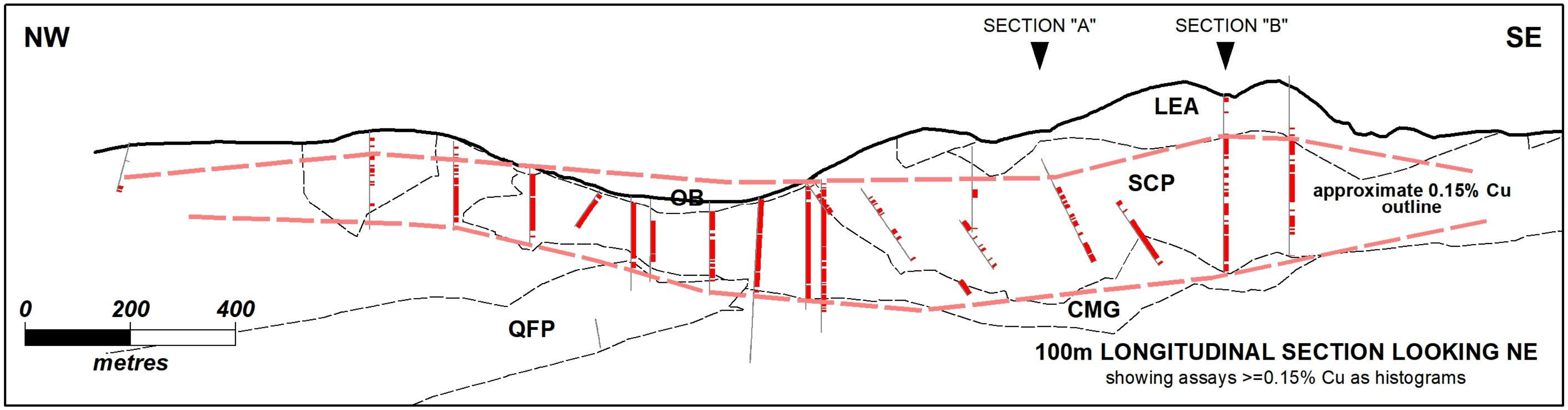


Figure 14-10: Longitudinal Section Showing Copper Trends

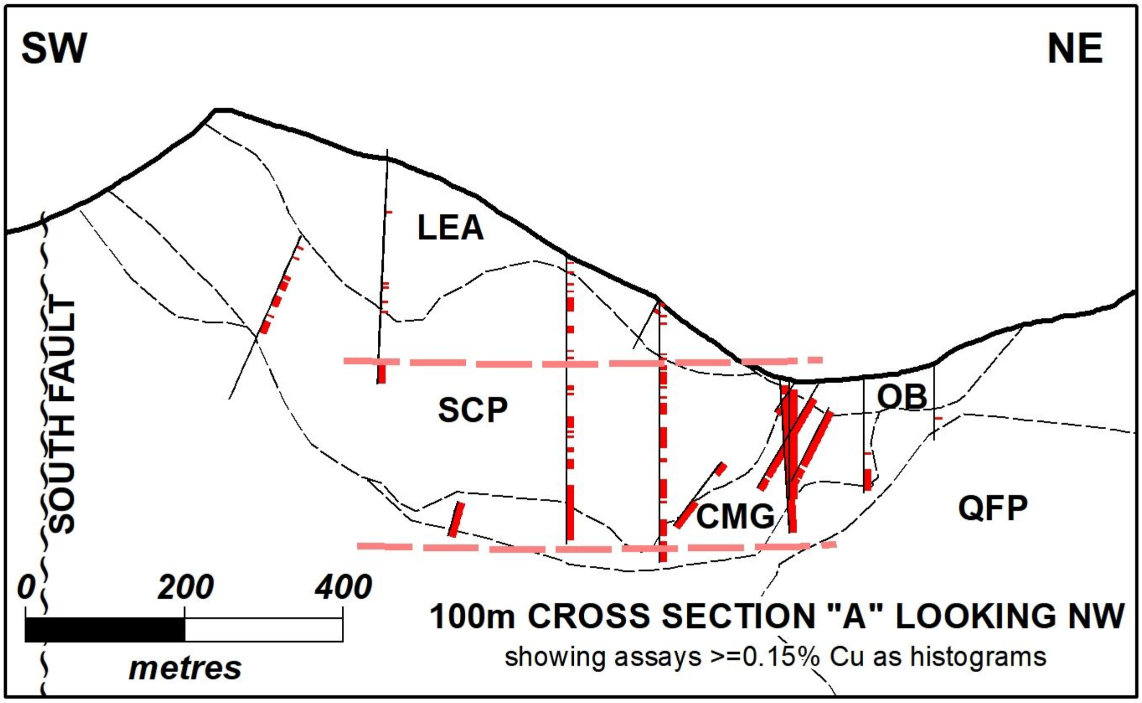


Figure 14-11: Cross Section "A" Showing Horizontal Copper Trend

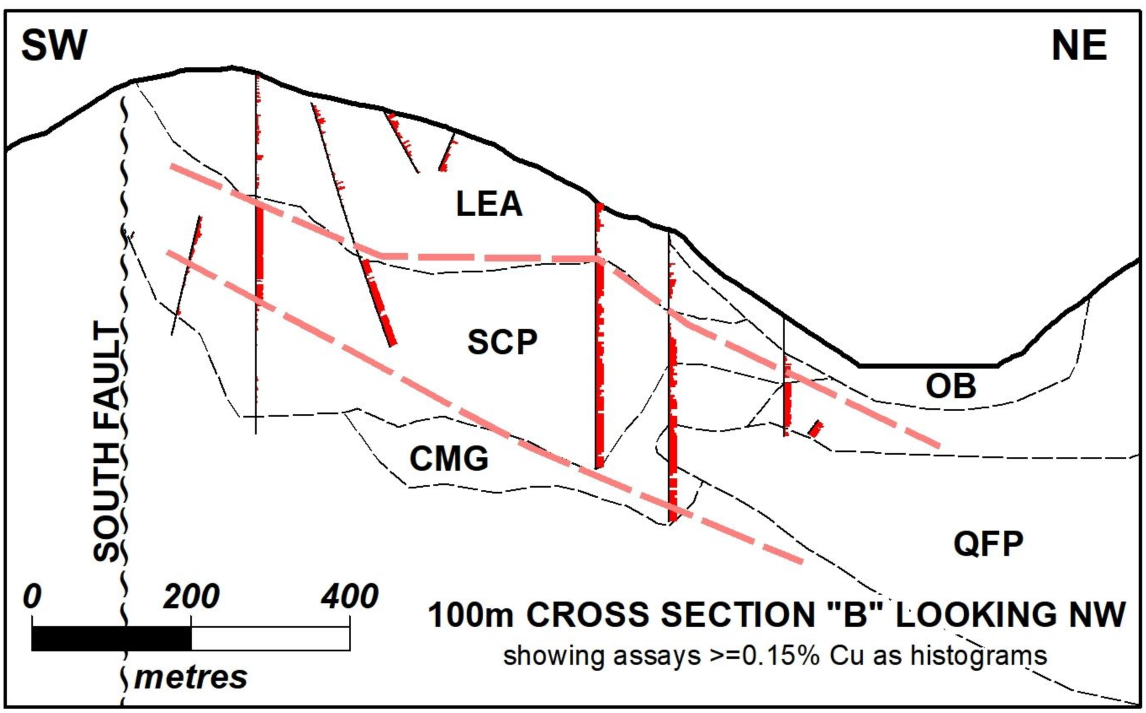


Figure 14-12: Cross Section "B" Showing Dipping Copper Trend

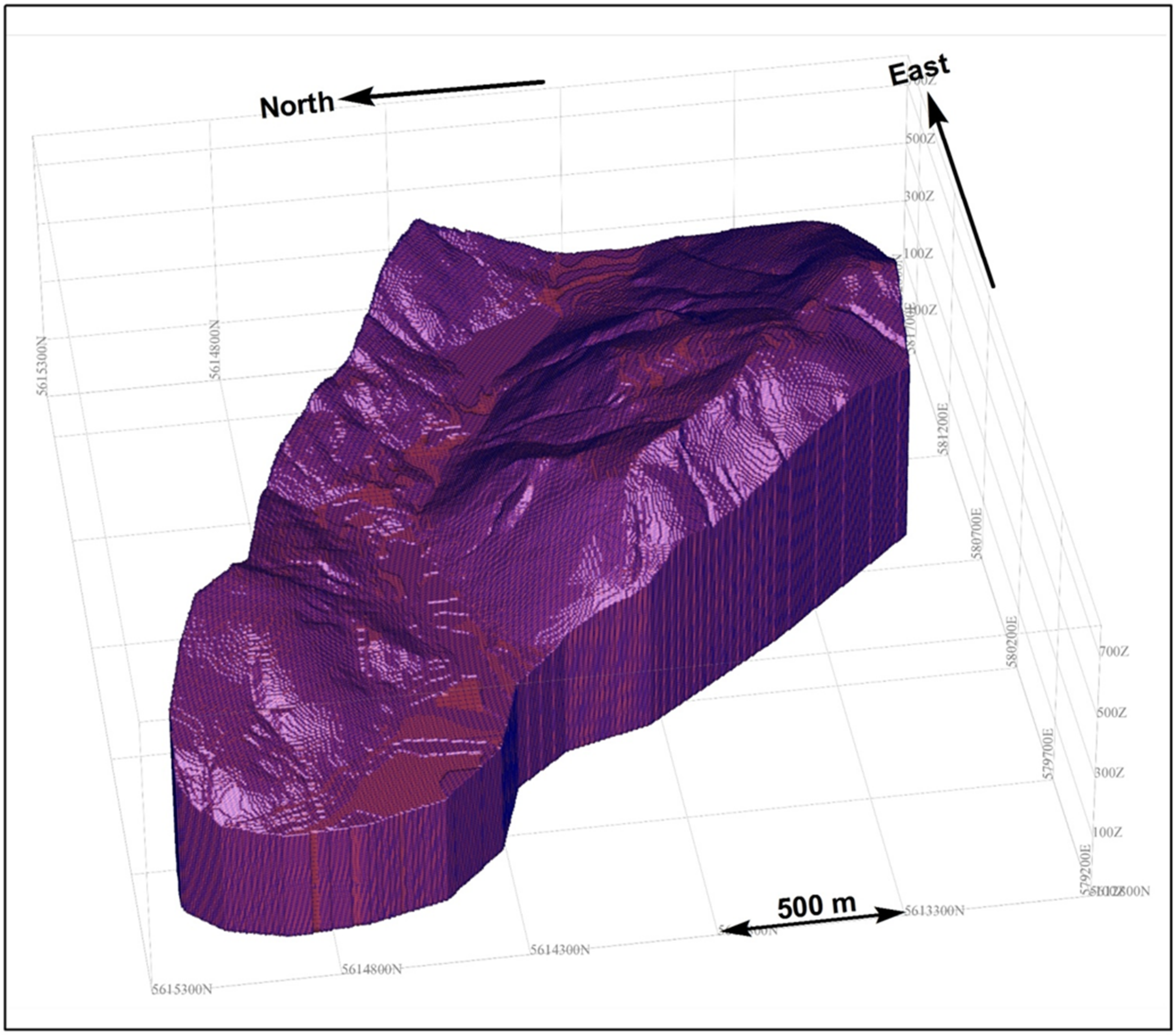


Figure 14-13: Block Model Isometric View Looking East (above surface blocks removed)

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 than 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 considered to have "hard" boundaries so were estimated separately where only assays that were contained in their respective solid models were used in the estimate. For the SCP, CMG and PRO domains the similar statistics and morphology were considered to have "soft" boundaries so all assays within those solid models were used to estimate those blocks.

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
Sample Weighting Algorithm	$1/D^2$	$1/D^2$

Eight hundred and forty specific gravity measurements were taken from various rock and alteration types during the 2012, 2014 and 2017 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. Overburden was modelled to provide partial percentages for other domains but was not used in the final estimation.

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	75	2.78	3.20	2.09	0.15
HFL	81	2.67	3.06	2.39	0.12
LEA	149	2.63	3.01	2.27	0.12
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	242	2.74	4.07	1.76	0.18
QFP	89	2.60	2.86	2.44	0.08
Final Specific Gravities for Tonnage Determination					
QFPP		2.60			
LEA		2.63			
CMG/SCP/PRO		2.74			

For each domain two estimation passes were carried out, one at the 150 m search radius and one at the 400 m 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. These sections also contain two holes from the 2017 drilling campaign. Simple statistics were calculated for the cut raw dataset, the down-hole composited data and the final block model 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 (cut)	Down Hole Composites	Block Model
Number of samples	8,637	5,040	166,666
Minimum value (%Cu)	0.001	0.0001	0
Maximum value (%Cu)	1.1	1.03	0.66
Mean (%Cu)	0.14	0.14	0.09
Median (%Cu)	0.10	0.10	0.07
Variance	0.02	0.02	0.006
Standard Deviation (%Cu)	0.15	0.14	0.078
Coefficient of Variation	1.06	1.00	0.907

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

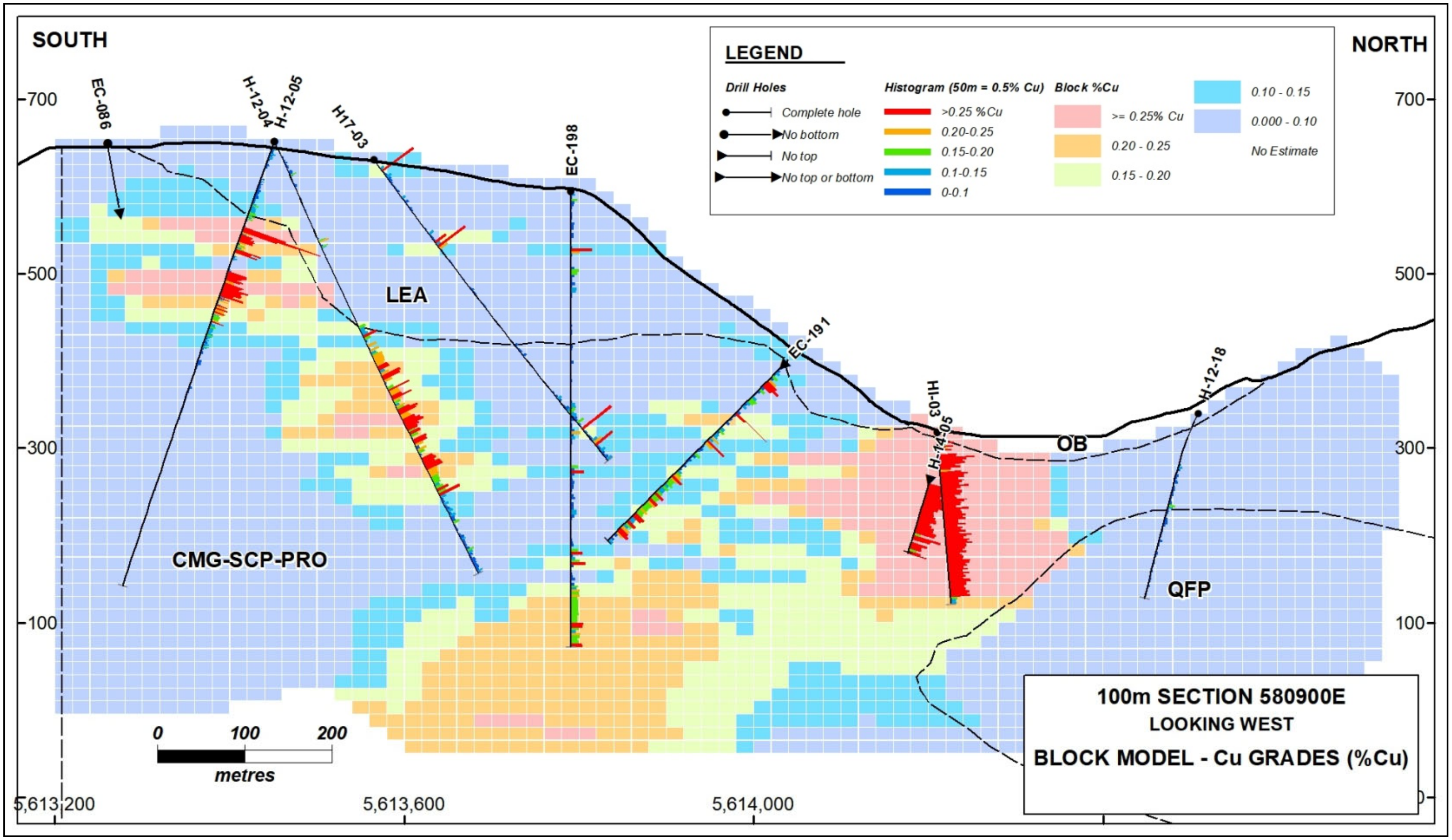


Figure 14-14: Section 580,900E, Blocks Coloured by Grade Estimates

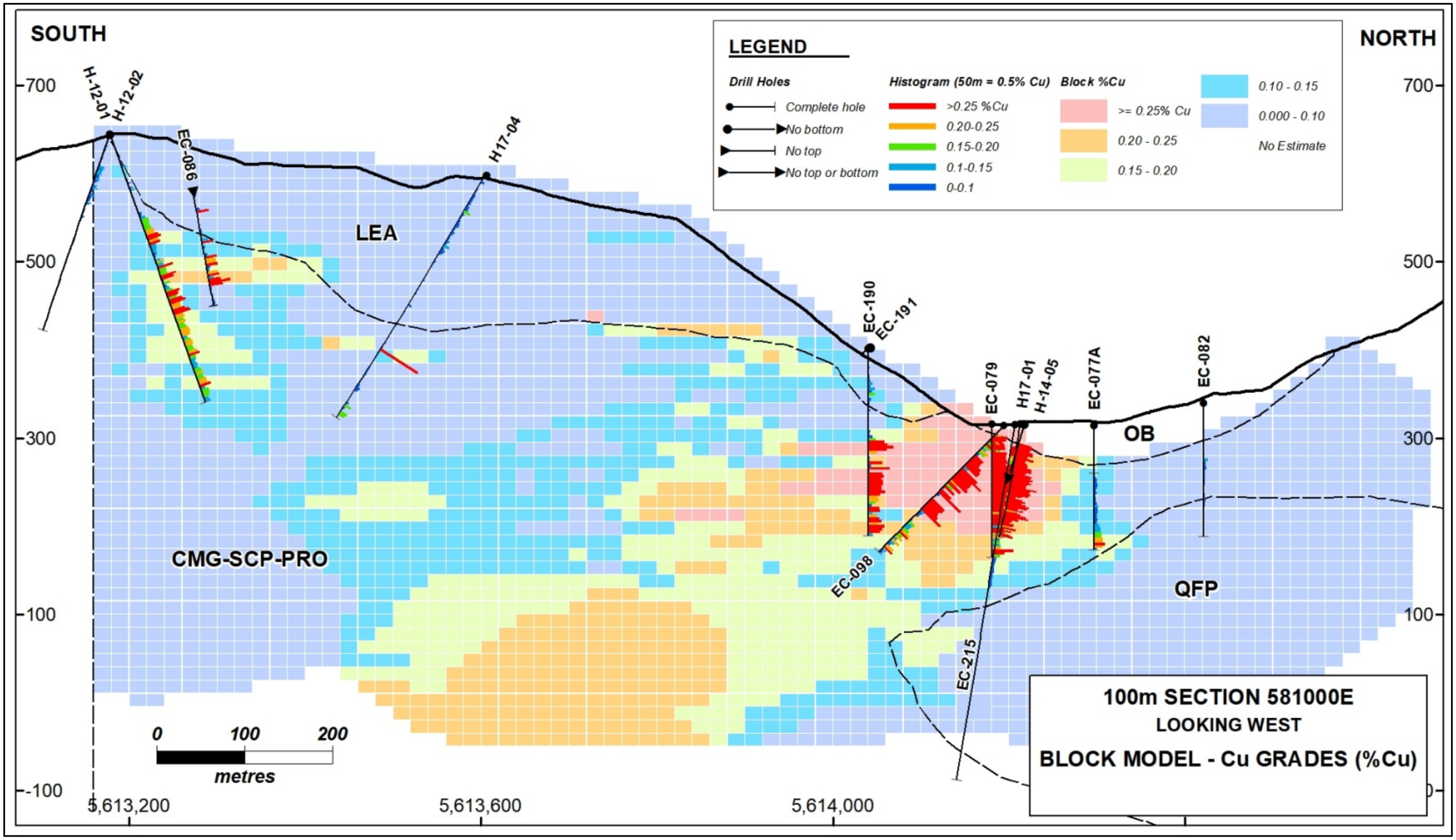


Figure 14-15: Section 581,000E, Blocks Coloured by Grade Estimates

14.4 RESOURCE ESTIMATE

Block counting and was performed for blocks within each geological zone north of the South Fault and above -50 m elevation. The 150 m 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 m 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 boundaries.

Inferred Resource blocks identify those areas that are currently under-drilled but contain values greater than 0.10% Cu. In-fill drilling to 100 m spacing should upgrade most of these to an Indicated category. A comparison of the 2015 and 2020 estimates does show that this was the case.

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]**	**ppm Au**	**% Cu**	**% Mo**	**ppm Re**
0.10	**8,843,000**	**0.21**	**0.14**	**0.008**	**0.29**
0.15	2,050,000	0.30	0.19	0.009	0.34
0.20	490,000	0.44	0.24	0.009	0.41
0.25	142,000	0.56	0.28	0.008	0.41
CMG-SCP-PRO					
0.10	**462,475,000**	**0.24**	**0.20**	**0.008**	**0.35**
0.15	310,105,000	0.28	0.24	0.008	0.36
0.20	188,231,000	0.33	0.28	0.009	0.37
0.25	105,811,000	0.39	0.32	0.009	0.38
QFP					
0.10	**1,536,000**	**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	**472,854,000**	**0.23**	**0.20**	**0.008**	**0.35**
0.15	312,155,000	0.28	0.23	0.008	0.36
0.20	188,721,000	0.33	0.27	0.009	0.37
0.25	105,953,000	0.39	0.31	0.009	0.38

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 indicate appropriate cut-off grades as per this report.

Table 14-10: Hushamu Resource Estimate – Inferred Resource

Cut-off (g/t Cu)	Tonnes[1]	ppm Au	% Cu	% Mo	ppm Re
LEA					
0.10	**2,169,000**	**0.18**	**0.13**	**0.008**	**0.26**
0.15	372,000	0.26	0.19	0.011	0.58
0.20	115,000	0.27	0.22	0.012	0.72
0.25	0	0	0	0	0
CMG-SCP-PRO					
0.10	**410,265,000**	**0.18**	**0.15**	**0.006**	**0.30**
0.15	184,355,000	0.24	0.19	0.007	0.33
0.20	50,618,000	0.32	0.23	0.007	0.36
0.25	6,146,000	0.42	0.29	0.012	0.81
QFP					
0.10	**1,859,000**	**0.10**	**0.12**	**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	**414,293,000**	**0.18**	**0.15**	**0.006**	**0.29**
0.15	184,727,000	0.24	0.19	0.007	0.33
0.20	50,734,000	0.32	0.22	0.007	0.36
0.25	6,146,000	0.42	0.29	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 indicate appropriate cut-off grades as per this report.

As a check on the classification procedure, the results were examined in plan and section to ensure that the blocks were classified as expected. 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. It can be seen in the figures that the blocks agree with the drill hole copper histograms.

Another check on the validity of the modeling is to compare the 2017 drill results with the 2015 block model. Figure 14-18 and Figure 14-19 provide examples of the comparison. In both cases, the 2015 block model estimated high copper values in the vicinity of a 2017 drill hole which returned high copper assays at that location. This confirms that the 2015 model was valid and the 2020 model has refined the estimate.

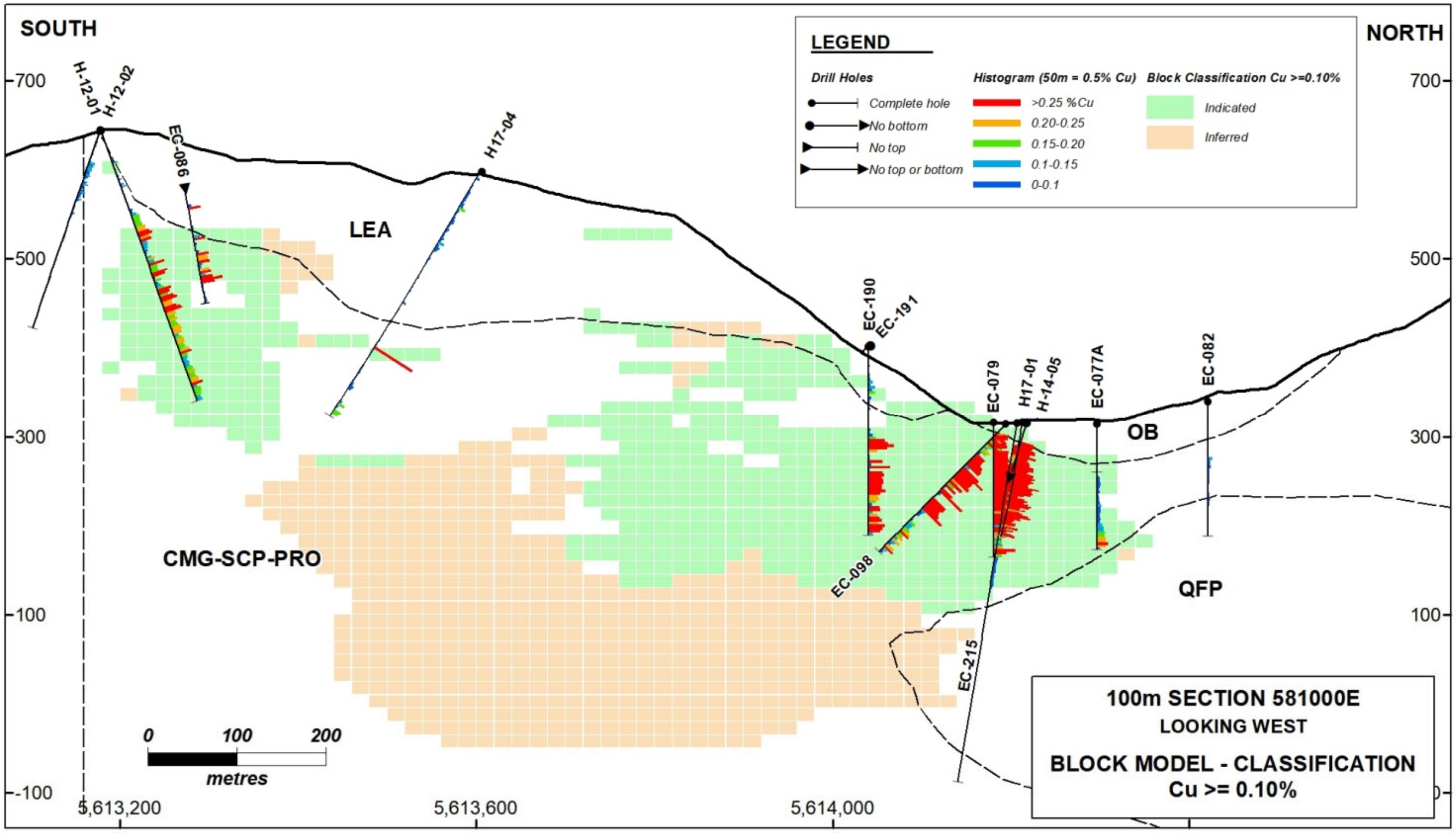


Figure 14-16: Section 581,000 Blocks Coloured by Classification (≥0.10% Cu)

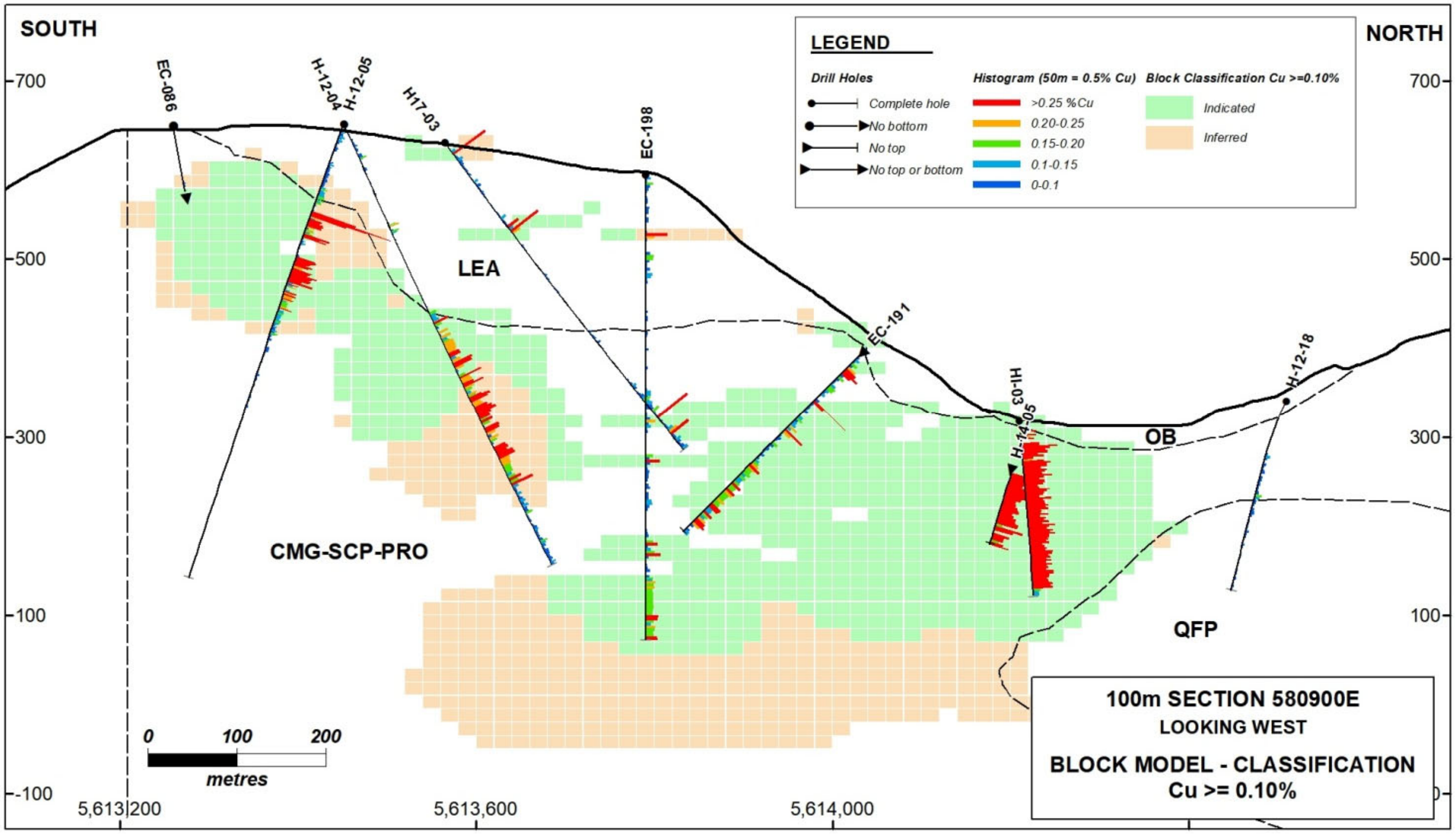


Figure 14-17: Section 580,900 Blocks Coloured by Classification (≥0.10% Cu)

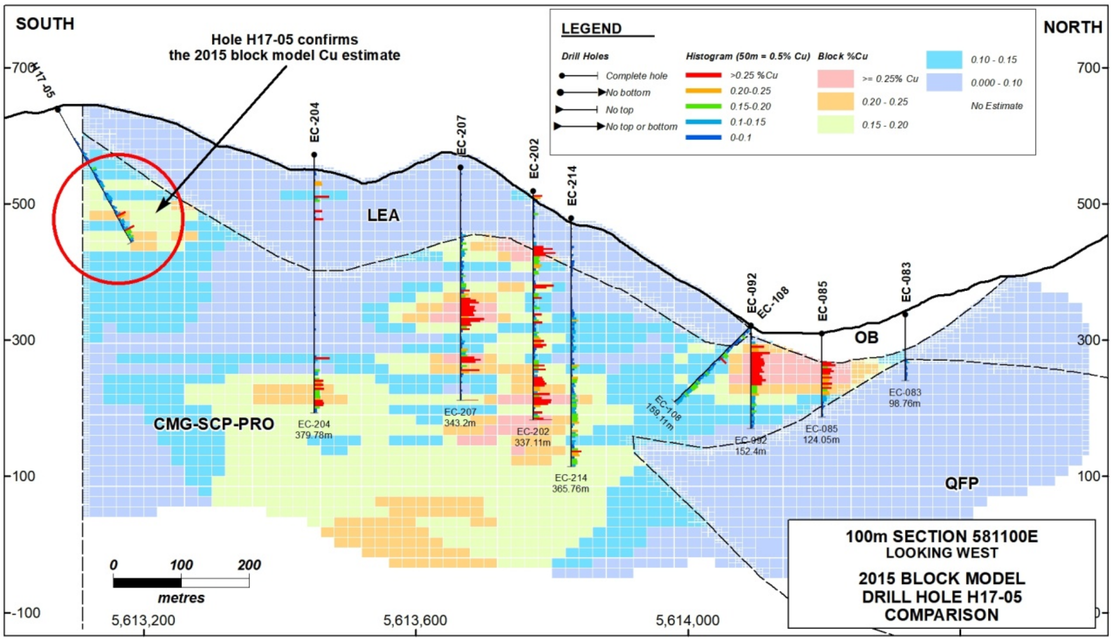


Figure 14-18: Section 581,100E Comparison of 2017 drilling against 2015 block model Cu

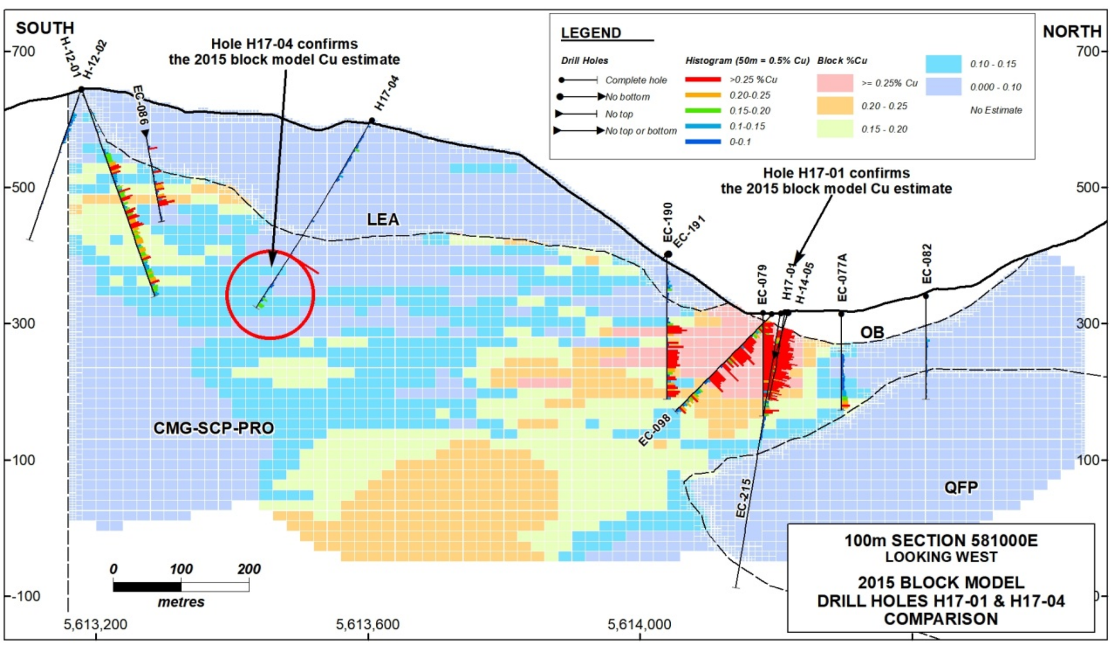


Figure 14-19: Section 581,000E Comparison of 2017 drilling against 2015 block model Cu

14.5 DISCUSSION

Comparing the 2017 drill results to the 2015 block model estimates suggests that that model was valid and this updated model is also valid but has been refined somewhat.

In comparing the 2015 and 2021 resource estimates, the addition of the five 2017 drill holes had the expected result of moving many of the Inferred blocks into the Indicated category. While the estimated grades did not change, the tonnages changed with, at a 0.10% Cu cut-off, an increase of 20 Mt in the Indicated category accompanied by a decrease of 13 Mt in the Inferred category. The addition of 7 Mt is likely a combination of the high assays in the 2017 drilling and as a result of removing sub-blocking from the model (estimated to be an addition of approximately 5 Mt).

Once the estimation was completed and examined in detail, several items were noted that might improve and further refine the estimate.

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

Modeling of the geological domains was originally carried out on north-south sections to be consistent with previous models, but the mineralization trends southeast-northwest. Both the domain and block modeling could be adjusted to the mineralization trend. While this would likely have a minimal affect on the final resource estimate, block continuity might be improved.

Prior to compositing the assays to equal length intervals downhole, any missing values (Mo and Re) were given a value of zero. The 2017 samples were analysed for Cu and Au only. This does have a large effect on the resulting estimate for those elements where the average grades are reduced. This resource estimate is thus probably underestimating the grades for those elements. On the other hand, if the missing assays are left as blanks in the raw database, downhole compositing would average across the missing data, resulting in a resource estimate that would likely overestimate the grades of those elements. The estimated Au, Mo and Re grades can therefore be considered to be conservative.

The Red Dog resource is summarized in 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

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15 MINERAL RESERVE ESTIMATES

No mineral reserves have been calculated for this Preliminary Economic Assessment.

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 Hexagon Mining MinePlan™ 3D mine planning software where a Lerchs-Grossmann 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 tonnes per annum (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	83,530.0	0.24	0.27	0.007
Hushamu Phase 1 Expansion	96,273.0	0.20	0.19	0.007
Hushamu Phase 1.5 Expansion	126,312.0	0.18	0.27	0.011
Hushamu Phase 2 Expansion	115,483.0	0.17	0.25	0.008
Red Dog	50,885.0	0.22	0.32	0.005
Total	**472,483.0**	**0.20**	**0.25**	**0.008**
Inferred Resources	**ROM (t x 1000)**	**Cu (%)**	**Au (g/t)**	**Mo (%)**
Hushamu Starter Pit	2,973.0	0.12	0.15	0.016
Hushamu Phase 1 Expansion	13,068.0	0.13	0.13	0.010
Hushamu Phase 1.5 Expansion	35,037.0	0.14	0.23	0.012
Hushamu Phase 2 Expansion	76,598.0	0.14	0.20	0.007
Red Dog	2,172.0	0.17	0.27	0.003
Total	**129,848.0**	**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 M3 based on preliminary testwork. Pit optimization in this section was carried out based on early data that was later refined and updated for Sections 13, 21 and 22 of this technical report. This section does not take into account that later metallurgical testwork. 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	Units	Hushamu CMG	Hushamu SCP	Red Dog
Copper Recovery	%	85.6	86.4	89.8
Gold Recovery	%	49.1	43.3	53.0
Copper Concentrate				
Copper Concentrate Grade	%	21.7	19.2	24.2
Moisture Content	%	8.00	8.00	8.00

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

	Units	Hushamu CMG	Hushamu SCP	Red Dog
Exchange Rate	**$/$**	**$1.30**	**$1.30**	**$1.30**
Metallurgical Recovery				
Copper Recovery	%	85.6	86.4	89.8
Gold Recovery	%	49.1	43.3	53.0
Metal Pricing				
Copper Price	US$/lb	$3.00	$3.00	$3.00
Gold Price	US$/ounce	$1,500.00	$1,500.00	$1,500.00
Copper Concentrate				
Copper Concentrate Grade*	%	21.7	19.2	24.2
Moisture Content	%	8.00	8.00	8.00
Copper Concentrate Handling				
Transportation Losses		0.15%	0.15%	0.15%
Truck Haulage to Storage Facility	US$/wmt	$2.31	$2.31	$2.31
Concentrate Storage & Port Charges	US$/wmt	$34.00	$34.00	$34.00
Ocean Freight	US$/wmt	$30.80	$30.80	$30.80
Umpiring & Sampling	US$/wmt	$1.08	$1.08	$1.08
Insurance	US$/wmt	$5.17	$5.17	$5.17
Total Concentrate Handling	US$/wmt	$73.36	$72.64	$73.70
Total	**US$/dmt**	**$79.74**	**$78.95**	**$80.10**
Copper Concentrate Treatment and Refining				
Deduction for Copper	unit	1.00	1.00	1.00
Copper Payment	%	97.5%	97.5%	97.5%
Treatment Charges	US$/dmt	$50.05	$50.05	$50.05
Gold Payment	%	95.0%	95.0%	95.0%
Copper Refining Cost	US$/payable lb	$0.0501	$0.0501	$0.0501
Gold Refining Cost	US$/payable oz	$3.85	$3.85	$3.85
Royalty Copper	**%**	**0.0%**	**0.0%**	**1.0%**
Royalty Gold	**%**	**0.0%**	**0.0%**	**1.0%**

*Listed copper concentrate grade was taken from historical data.

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	**Units**	**Hushamu Ore**		**Red Dog Ore**	
General & Administration	$/t milled	$0.450		$0.450	
Tailings	$/t milled	$0.000		$0.000	
Mill Operating	$/t milled	$5.060		$5.060	
Subtotal	$/t milled	**$5.510**		**$5.510**	
Sustaining Capital	$/t milled	$0.000		$0.000	
Total Processing	$/t milled	**$5.510**		**$5.510**	
Base Mine Operating Costs	**Units**	**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 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 (m)	Berm Interval	Berm Interval (m)	Berm Width BERM	Inter-ramp Angle	Overall Slope Angle	Stack Height (m)	Geotech Berm (m)
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 (m)	Berm Interval	Berm Interval (m)	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 $5.51/t NSR value at Hushamu are shown in Figure 16-1 and Figure 16-2. Note that these figures are based on the NSR cut-off and not a 0.10% cut-off shell.

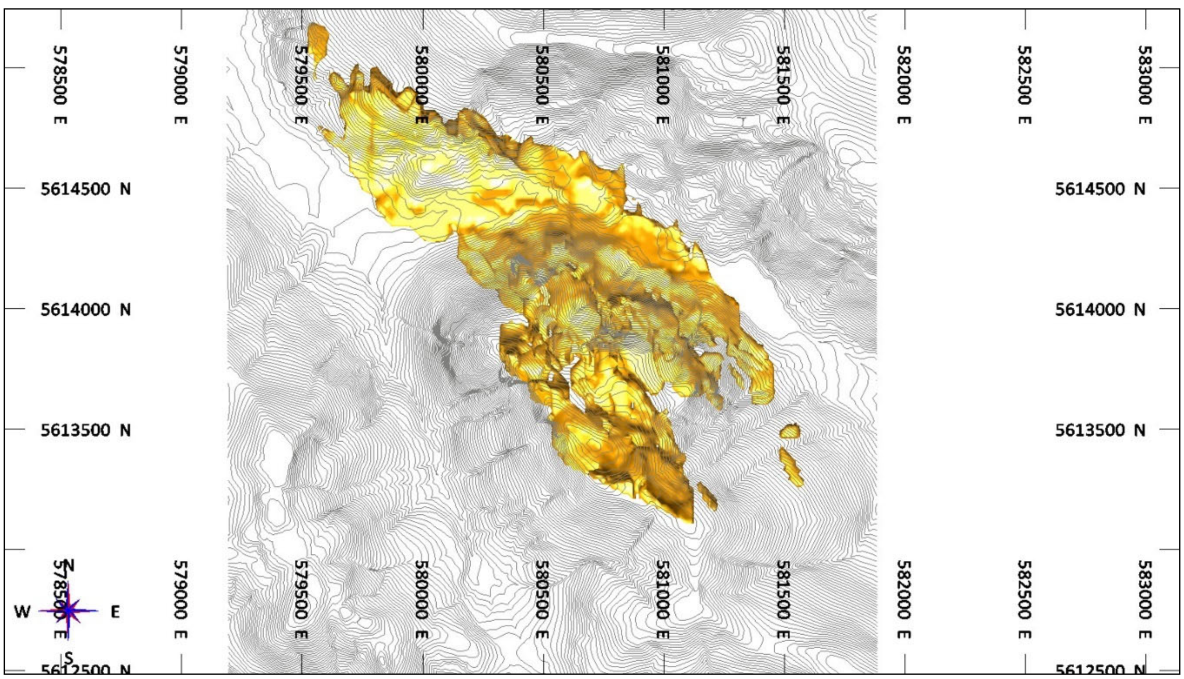


Figure 16-1: Indicated Resources Hushamu

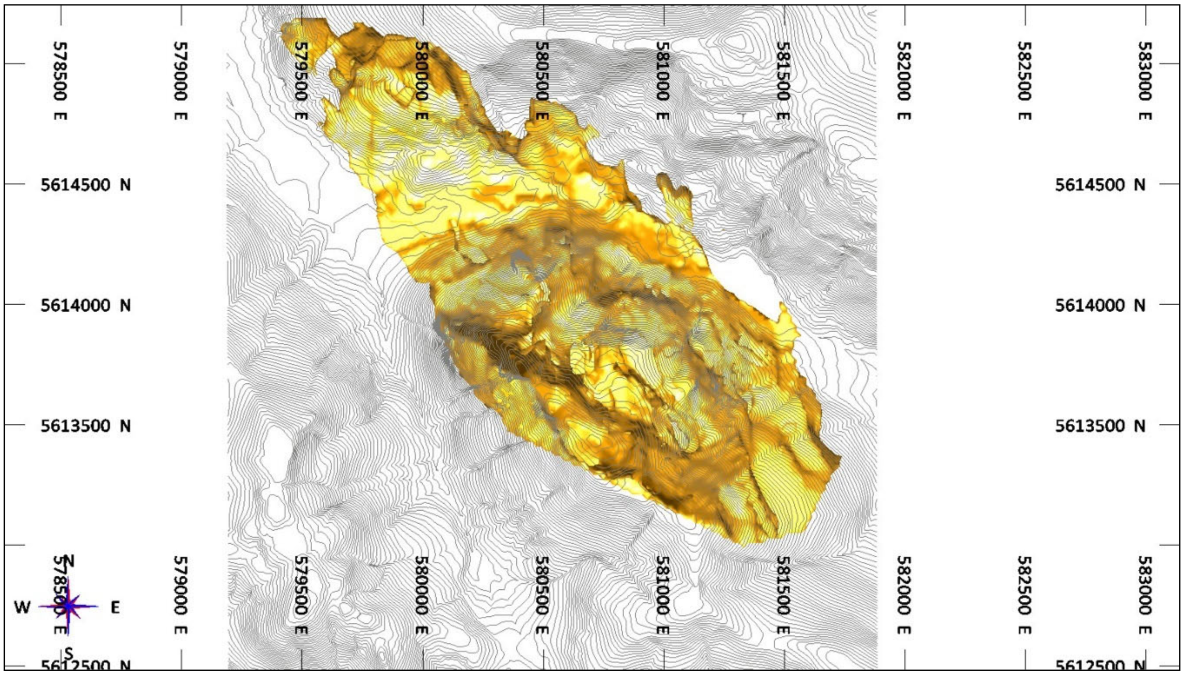


Figure 16-2: Indicated and Inferred Resources Hushamu

Nested pit shells and NSR for Hushamu are shown in plan view and section view in Figure 16-3 and Figure 16-4.

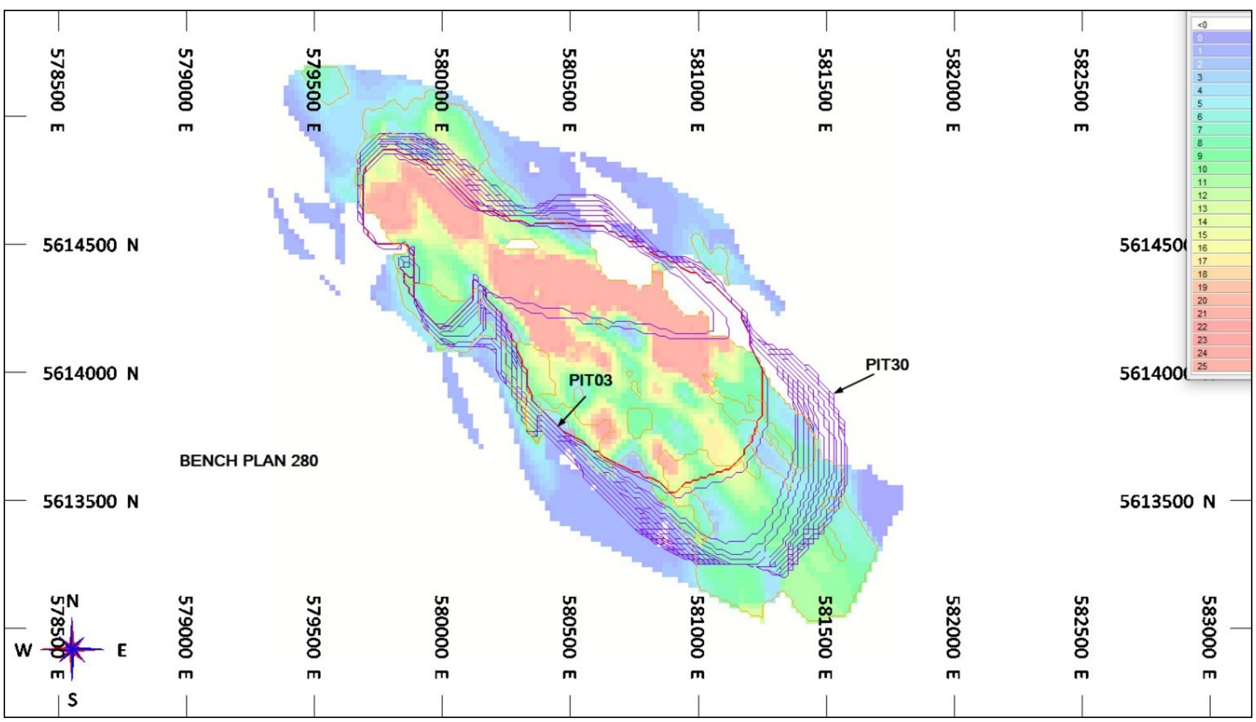


Figure 16-3: Bench Plan 280 Nested Pits

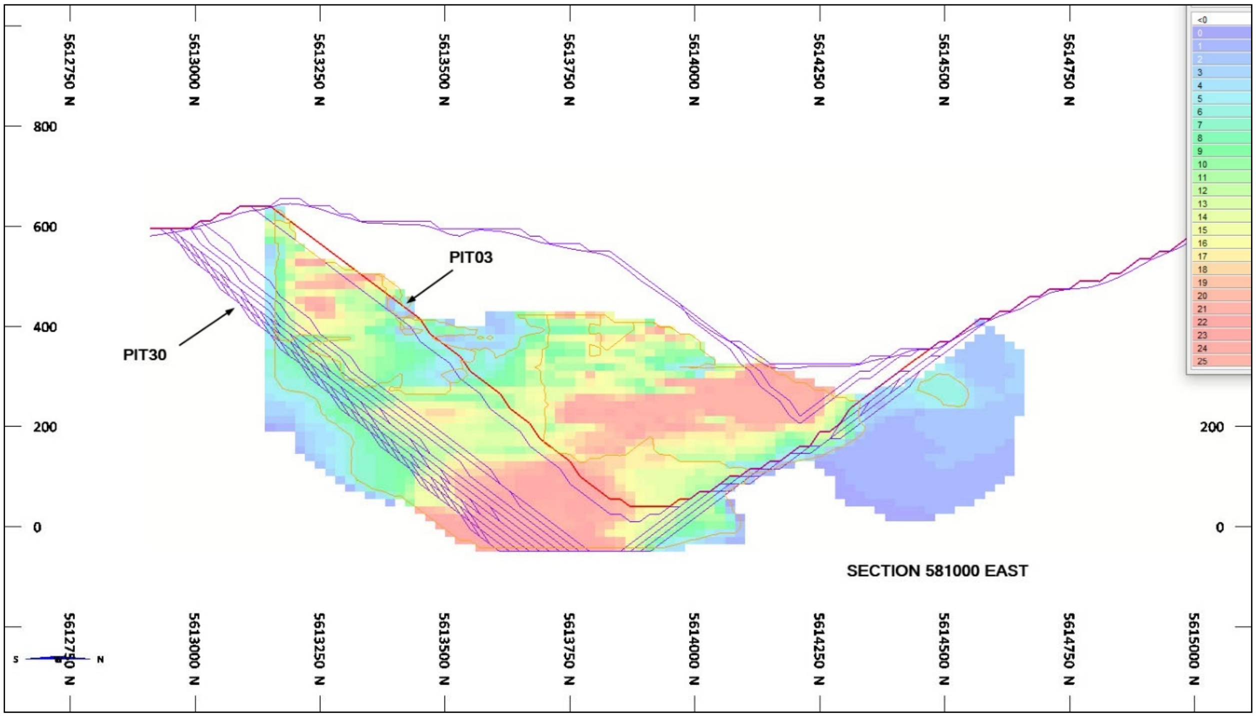


Figure 16-4: Section 581000 East Nested Pits

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

Table 16-7: Lerchs Grossmann Nested Pit Summary NSR $5.51/t Cutoff

SHELL	RUN OF MINE (kt)	WASTE TOTAL (kt)	ROM S/R	CU (%)	AU (g/t)	MO (%)	TOTAL (kt)	Incremental						
								(kt)	CU	AU	MO	WASTE (kt)	TOTAL (kt)	S/R
1	140,907	47,708	0.34	0.214	0.209	0.006	188,615	140,907	0.21	0.21	0.006	47,708	188,615	0.34
2	166,348	61,968	0.37	0.211	0.211	0.006	228,316	25,441	0.19	0.22	0.008	14,260	39,701	0.56
3	606,463	309,149	0.51	0.171	0.226	0.009	915,612	440,115	0.16	0.23	0.010	247,181	687,296	0.56
4	635,120	322,992	0.51	0.169	0.223	0.009	958,112	28,657	0.14	0.18	0.006	13,843	42,500	0.48
5	767,292	378,747	0.49	0.162	0.215	0.008	1,146,039	132,172	0.13	0.17	0.007	55,755	187,927	0.42
6	801,938	395,640	0.49	0.160	0.213	0.008	1,197,578	34,646	0.12	0.16	0.006	16,893	51,539	0.49
7	836,980	415,432	0.50	0.159	0.210	0.008	1,252,412	35,042	0.13	0.15	0.006	19,792	54,834	0.56
8	872,824	435,097	0.50	0.158	0.207	0.008	1,307,921	35,844	0.13	0.14	0.006	19,665	55,509	0.55
9	891,892	446,526	0.50	0.157	0.205	0.008	1,338,418	19,068	0.12	0.13	0.003	11,429	30,497	0.60
10	908,379	458,994	0.51	0.157	0.204	0.008	1,367,373	16,487	0.13	0.15	0.008	12,468	28,955	0.76
11	931,541	472,133	0.51	0.155	0.203	0.008	1,403,674	23,162	0.10	0.15	0.004	13,139	36,301	0.57
12	941,451	479,438	0.51	0.155	0.202	0.008	1,420,889	9,910	0.13	0.14	(0.002)	7,305	17,215	0.74
13	958,510	488,924	0.51	0.154	0.201	0.008	1,447,434	17,059	0.11	0.11	0.008	9,486	26,545	0.56
14	969,622	499,370	0.52	0.154	0.200	0.008	1,468,992	11,112	0.13	0.15	(0.001)	10,446	21,558	0.94
15	976,493	504,216	0.52	0.154	0.199	0.008	1,480,709	6,871	0.13	0.10	0.007	4,846	11,717	0.71
16	989,938	511,363	0.52	0.153	0.198	0.007	1,501,301	13,445	0.10	0.11	0.000	7,147	20,592	0.53
17	997,543	521,690	0.52	0.153	0.198	0.007	1,519,233	7,605	0.14	0.15	0.007	10,327	17,932	1.36

SHELL	RUN OF MINE (kt)	WASTE TOTAL (kt)	ROM S/R	CU (%)	AU (g/t)	MO (%)	TOTAL (kt)	Incremental						
								(kt)	CU	AU	MO	WASTE (kt)	TOTAL (kt)	S/R
18	1,000,873	524,565	0.52	0.153	0.198	0.007	1,525,438	3,330	0.12	0.11	0.007	2,875	6,205	0.86
19	1,008,916	528,643	0.52	0.152	0.197	0.007	1,537,559	8,043	0.09	0.11	0.007	4,078	12,121	0.51
20	1,010,809	530,496	0.52	0.152	0.197	0.007	1,541,305	1,893	0.15	0.09	0.007	1,853	3,746	0.98
21	1,012,980	532,152	0.53	0.152	0.196	0.007	1,545,132	2,171	0.11	0.10	(0.039)	1,656	3,827	0.76
22	1,021,499	541,971	0.53	0.152	0.196	0.007	1,563,470	8,519	0.12	0.12	0.007	9,819	18,338	1.15
23	1,025,315	545,700	0.53	0.152	0.195	0.007	1,571,015	3,816	0.12	0.09	0.007	3,729	7,545	0.98
24	1,027,730	548,961	0.53	0.152	0.195	0.007	1,576,691	2,415	0.11	0.15	0.007	3,261	5,676	1.35
25	1,030,991	552,331	0.54	0.152	0.195	0.007	1,583,322	3,261	0.12	0.10	0.007	3,370	6,631	1.03
26	1,034,549	555,027	0.54	0.151	0.195	0.007	1,589,576	3,558	0.12	0.08	0.007	2,696	6,254	0.76
27	1,037,617	558,058	0.54	0.151	0.194	0.007	1,595,675	3,068	0.08	0.13	(0.027)	3,031	6,099	0.99
28	1,043,097	566,381	0.54	0.151	0.194	0.007	1,609,478	5,480	0.11	0.16	0.007	8,323	13,803	1.52
29	1,045,898	568,810	0.54	0.151	0.194	0.007	1,614,708	2,801	0.11	0.08	0.007	2,429	5,230	0.87
30	1,047,272	570,962	0.55	0.151	0.194	0.007	1,618,234	1,374	0.15	0.12	0.007	2,152	3,526	1.57

Analysis of the value created in a theoretical schedule discounted at 8% showed that 95% of the cumulative present value was captured by PIT8 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.

The current design for the Mine Waste Storage Facility (MWSF) will store 393 Mt of waste rock from the Hushamu pit, and also 600 Mt of tailings from milling of ore from the Red Dog and Hushamu Deposits, with 450 Mt tailings in the impoundment and 150 Mt tailings as sand in the dams. For design purposes, a pit limit was established at approximate location PIT03 and the cutoff grade applied for scheduling mill feed was $7.75/t NSR for copper and gold concentrate.

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

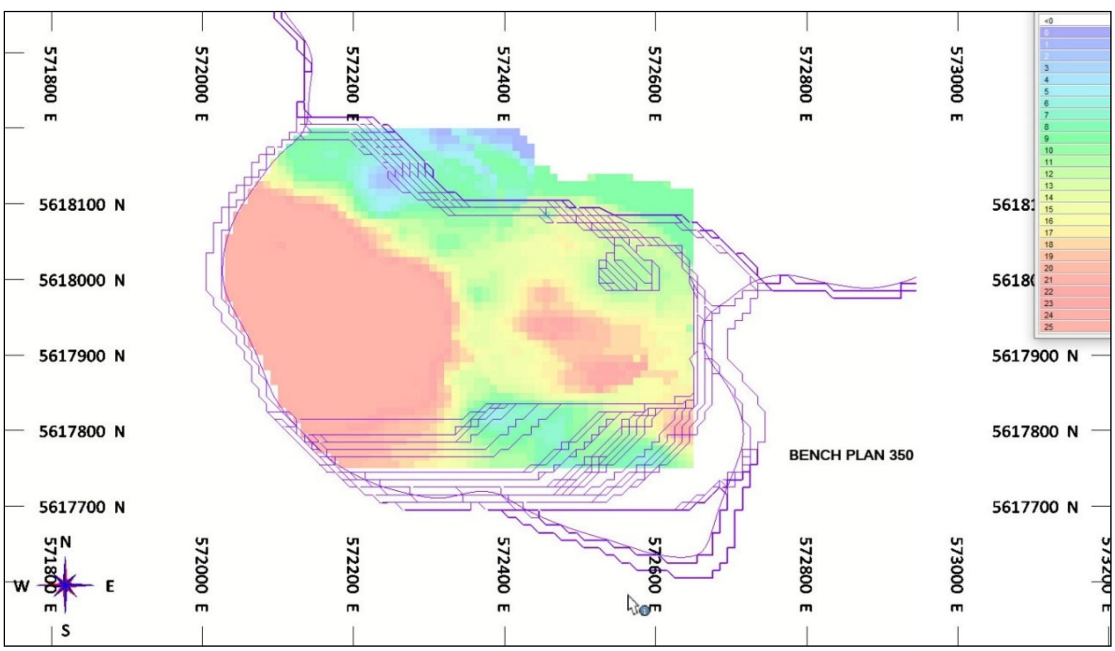


Figure 16-5: Bench Plan 350

The unsmoothed PIT30 shell was used as a guide for pit design to the west and to depth at Red Dog. Access to the pit will be from the east and the pit design was constrained to the higher-grade material in this area.

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 2,300 m in length by 1,275 m in width.

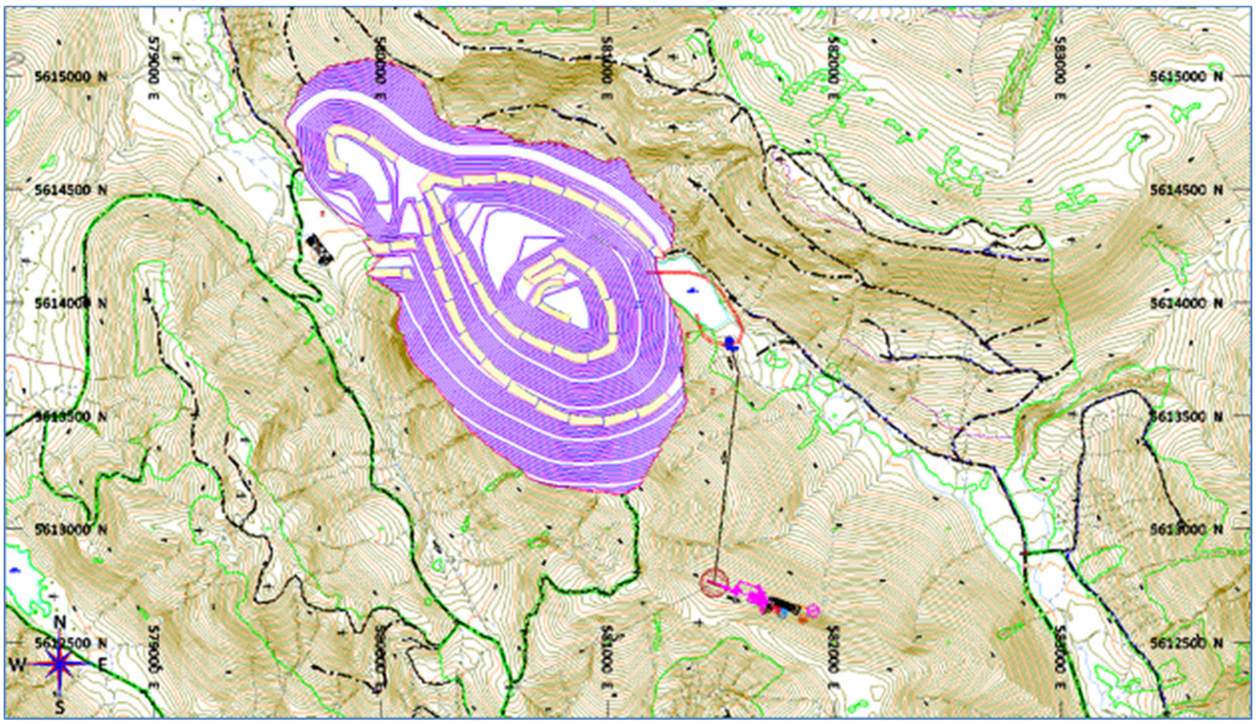


Figure 16-6: Hushamu Pit Design

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.

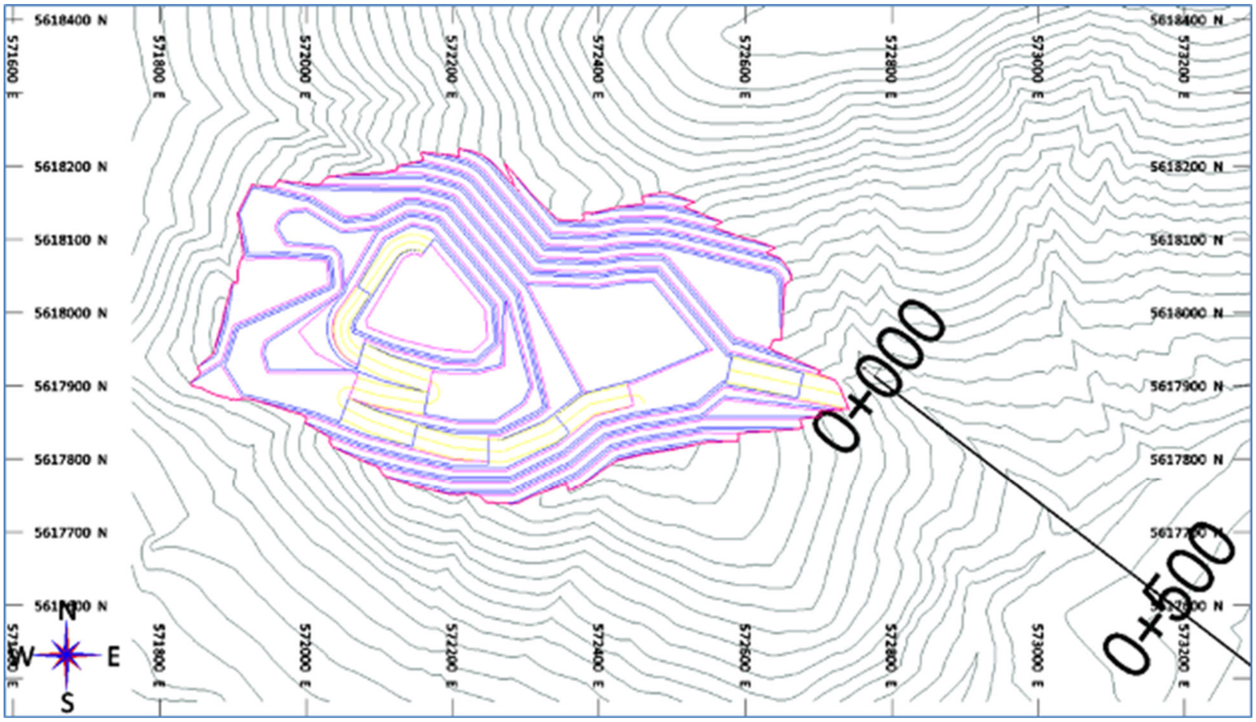


Figure 16-7: Red Dog Pit Design

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.

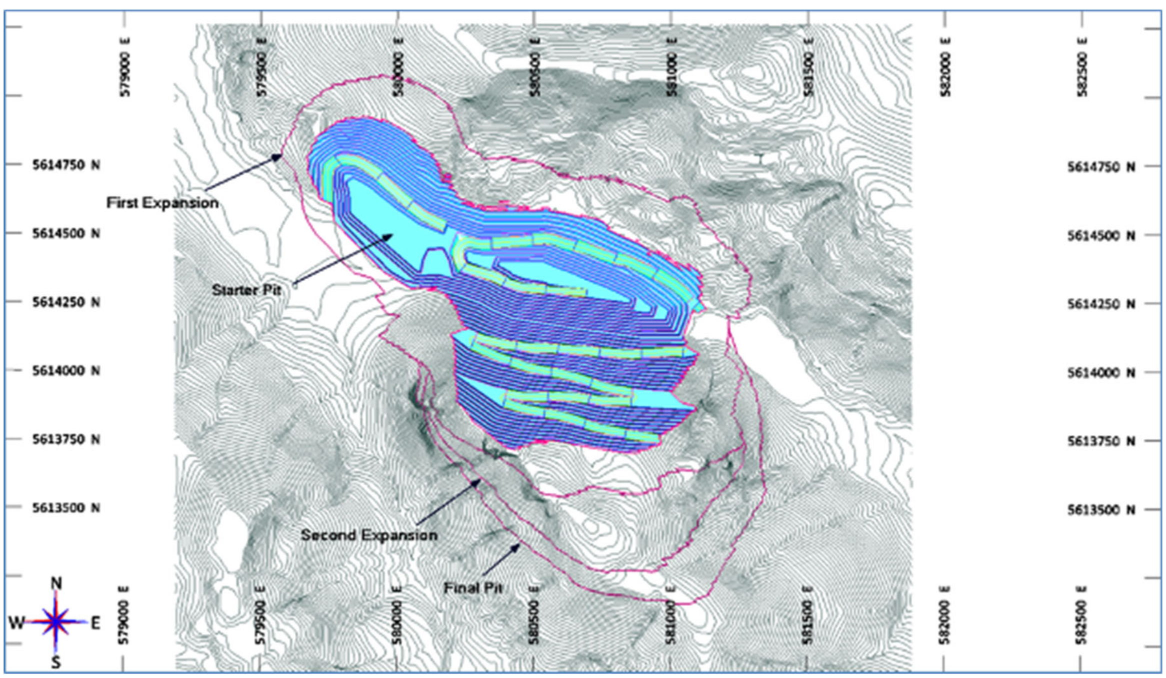


Figure 16-8: Hushamu Starter Pit

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.

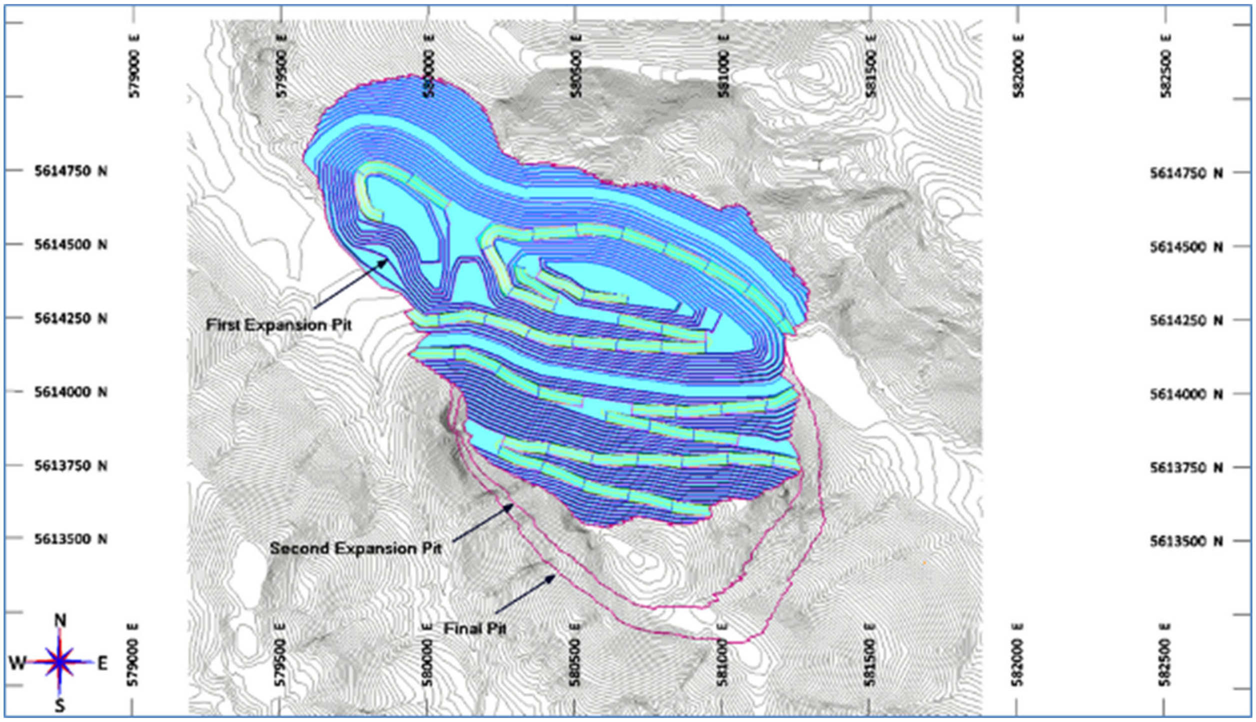


Figure 16-9: Hushamu First Expansion

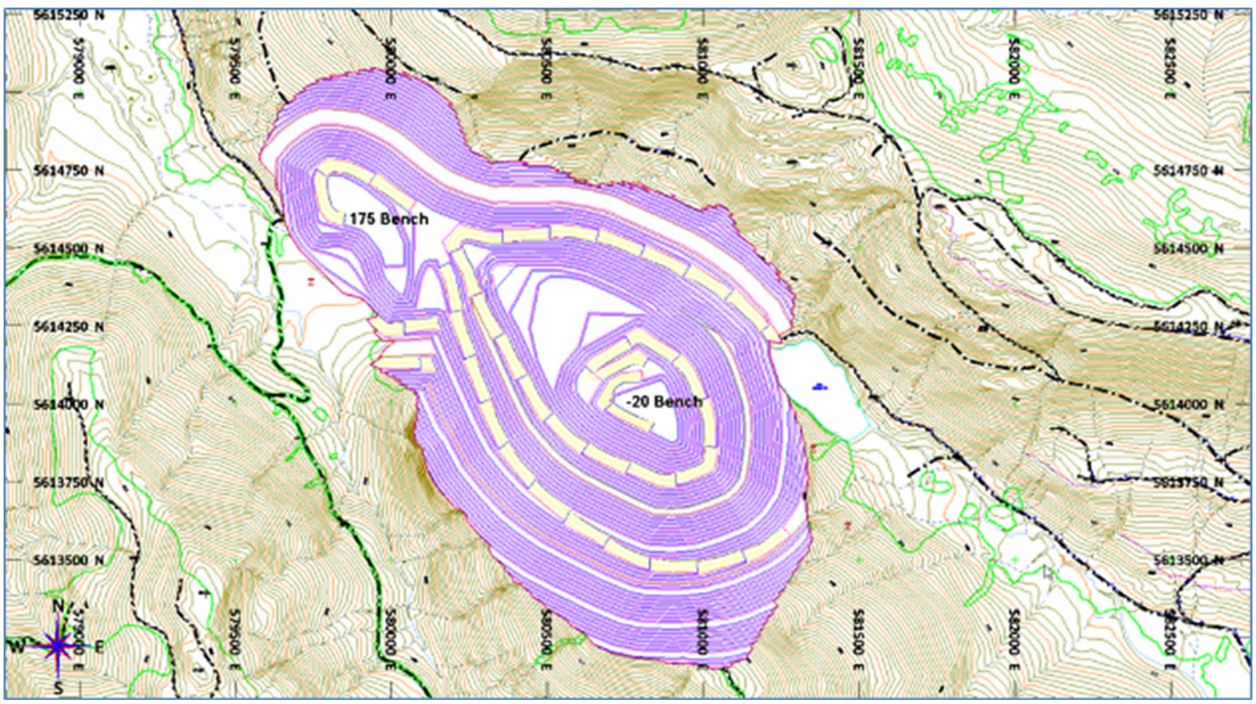


Figure 16-10: Hushamu Final Pit Expansion Merged

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

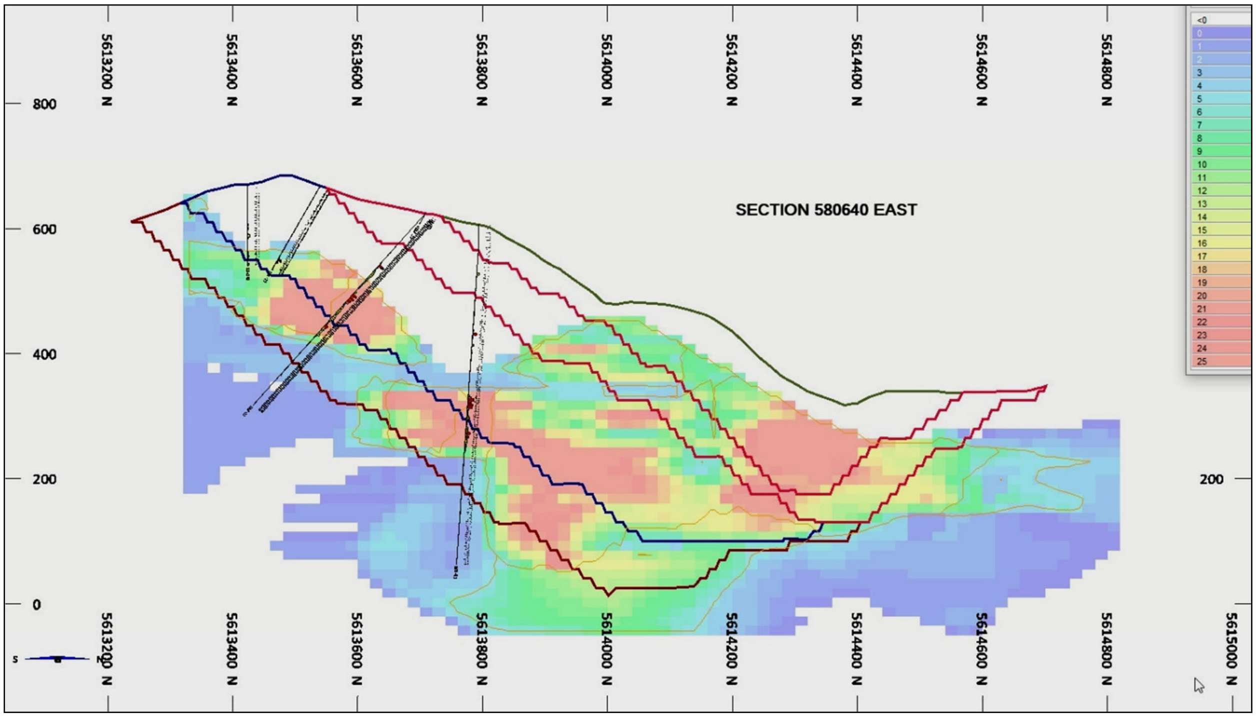


Figure 16-11: Section 580640 East

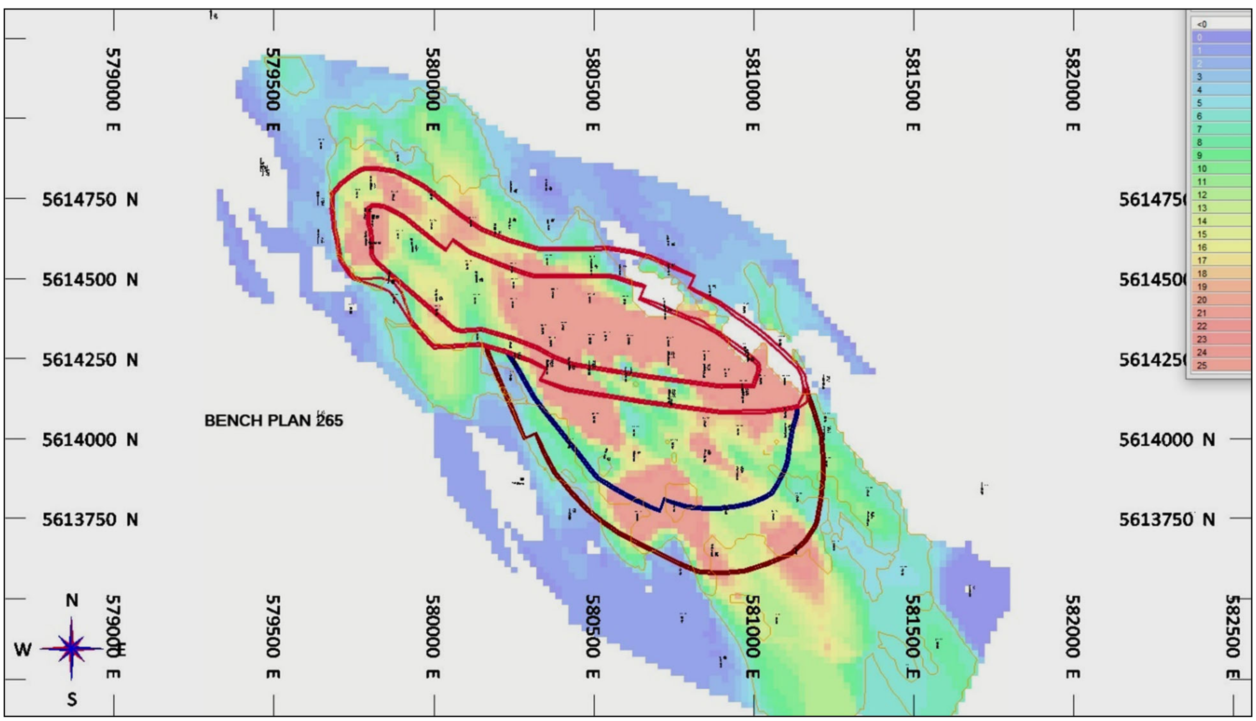


Figure 16-12: Bench Plan 265

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 16-8 and Figure 16-13 through Figure 16-16.

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 $7.75/t, $10.25/t and $12.75/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	-	1,828.0	26,937.6	29,794.1	27,291.0	27,762.4	28,981.9	29,019.7	27,933.9	27,923.3	27,656.7	26,235.6	25,846.1	28,900.5
	Cu	%	-	0.14	0.20	0.23	0.22	0.22	0.20	0.19	0.20	0.20	0.19	0.17	0.17	0.14
	Au	g/t	-	0.17	0.22	0.27	0.28	0.27	0.25	0.25	0.22	0.23	0.22	0.20	0.23	0.24
	Mo	%	-	0.014	0.009	0.006	0.008	0.008	0.008	0.008	0.008	0.008	0.007	0.009	0.010	0.012
Overburden		t x 1000	-	608.0	4,200.5	9,167.3	1,268.2	720.1	1,851.8	2,456.1	5,432.1	1,053.8	41.8	228.0	278.3	141.9
Waste		t x 1000	18,250.0	33,227.0	32,737.9	24,917.6	30,752.3	28,566.9	20,266.4	19,620.2	17,733.0	22,123.9	23,402.5	24,634.4	21,324.6	15,655.7
Total		t x 1000	**18,250.0**	**35,663.0**	**63,876.0**	**63,879.0**	**59,311.5**	**57,049.5**	**51,100.0**	**51,096.0**	**51,099.0**	**51,101.0**	**51,101.0**	**51,098.0**	**47,449.0**	**44,698.0**
Stockpile Addition																
Stockpile	LG MG HG	t x 1000	-	1,828.0	1,453.9	2,419.0	-	387.4	1,606.9	1,644.7	558.9	548.3	281.7	- 0.0	-	1,525.5
	Cu	%	-	0.14	0.11	0.11	-	0.10	0.10	0.10	0.10	0.09	0.09	-	-	0.08
	Au	g/t	-	0.17	0.09	0.13	-	0.09	0.09	0.10	0.10	0.13	0.11	-	-	0.15
	Mo	%	-	0.014	0.012	0.008	-	0.009	0.007	0.006	0.008	0.009	0.007	-	-	0.012
Stockpile Recovery																
Stockpile	LG MG HG	t x 1000	-	-	-	-	84.0	-	-	-	-	-	-	1,139.4	1,528.9	-
	Cu	%	-	-	-	-	0.18	-	-	-	-	-	-	0.14	0.14	-
	Au	g/t	-	-	-	-	0.22	-	-	-	-	-	-	0.16	0.15	-
	Mo	%	-	-	-	-	0.016	-	-	-	-	-	-	0.011	0.010	-
Milling																
	Feed	t x 1000	-	-	25,483.7	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	0.25	0.22	0.22	0.21	0.20	0.20	0.20	0.19	0.17	0.17	0.14
	Au	g/t	-	-	0.23	0.28	0.28	0.27	0.26	0.26	0.23	0.23	0.22	0.20	0.22	0.25
	Mo	%	-	-	0.009	0.006	0.008	0.008	0.008	0.008	0.008	0.008	0.007	0.009	0.010	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	28,151.8	27,459.6	27,317.0	26,616.4	26,870.1	26,531.0	26,958.3	27,231.9	27,124.3	21,954.9	-	-	-	602,325.9
	Cu	%	0.16	0.18	0.18	0.17	0.18	0.14	0.17	0.20	0.18	0.16	-	-	-	0.18
	Au	g/t	0.28	0.30	0.28	0.25	0.23	0.22	0.23	0.24	0.22	0.20	-	-	-	0.24
	Mo	%	0.014	0.011	0.008	0.007	0.006	0.009	0.009	0.008	0.005	0.003	-	-	-	0.008
Overburden		t x 1000	2.1	0.3	18.9	178.8	163.8	492.2	-	-	-	-	-	-	-	28,304.0
Waste		t x 1000	6,941.0	7,600.1	8,871.2	15,003.8	7,240.1	12,202.8	5,524.7	1,796.1	2,682.7	570.1	-	-	-	401,645.1
Total		t x 1000	**35,095.0**	**35,060.0**	**36,207.0**	**41,799.0**	**34,274.0**	**39,226.0**	**32,483.0**	**29,028.0**	**29,807.0**	**22,525.0**	**-**	**-**	**-**	**1,032,275.0**
Stockpile Addition																
Stockpile	LG MG HG	t x 1000	776.8	84.6	-	-	-	-	-	-	-	-	-	-	-	13,115.7
	Cu	%	0.08	0.08	-	-	-	-	-	-	-	-	-	-	-	0.10
	Au	g/t	0.16	0.14	-	-	-	-	-	-	-	-	-	-	-	0.12
	Mo	%	0.013	0.009	-	-	-	-	-	-	-	-	-	-	-	0.010
Stockpile Recovery																
Stockpile	LG MG HG	t x 1000	-	-	58.0	758.6	504.9	844.0	416.7	143.1	250.7	5,420.1	-	-	-	11,148.5
	Cu	%	-	-	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.09	-	-	-	0.11
	Au	g/t	-	-	0.12	0.11	0.11	0.11	0.11	0.11	0.11	0.11	-	-	-	0.13
	Mo	%	-	-	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	-	-	-	0.010
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	27,375.0	-	-	-	600,358.6
	Cu	%	0.16	0.18	0.18	0.17	0.18	0.14	0.17	0.20	0.18	0.14	-	-	-	0.18
	Au	g/t	0.28	0.30	0.28	0.24	0.23	0.21	0.22	0.24	0.22	0.18	-	-	-	0.24
	Mo	%	0.014	0.011	0.008	0.007	0.006	0.009	0.009	0.008	0.005	0.005	-	-	-	0.008

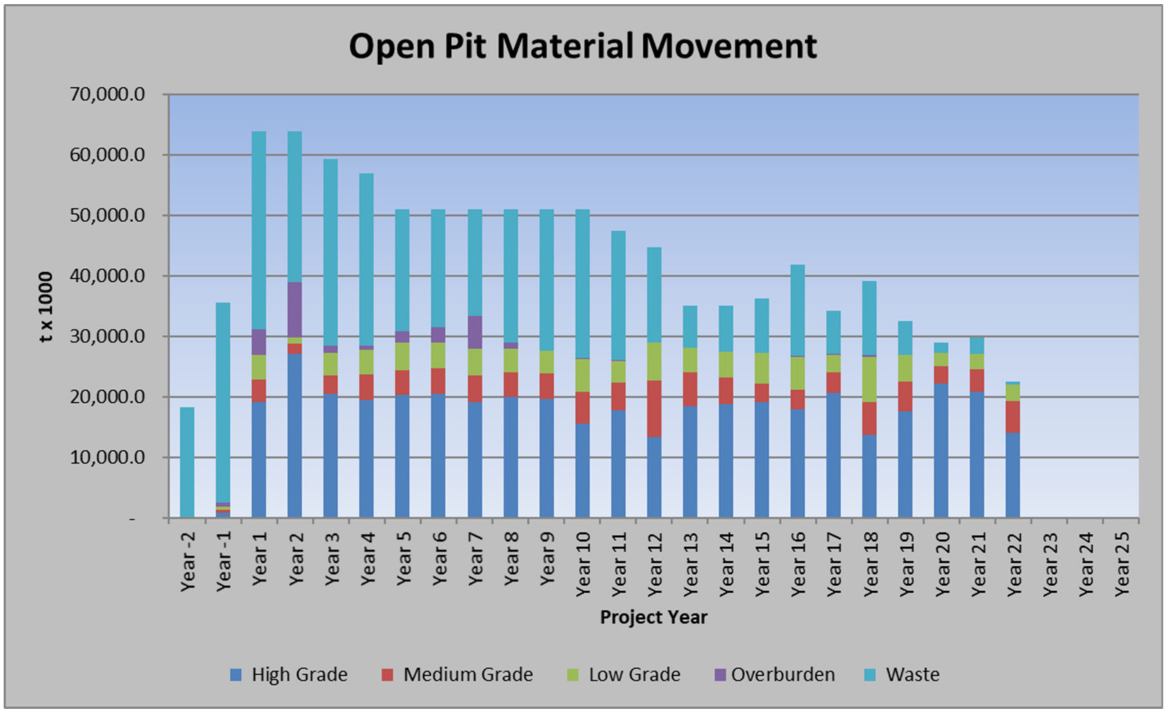


Figure 16-13: Material Movement Schedule

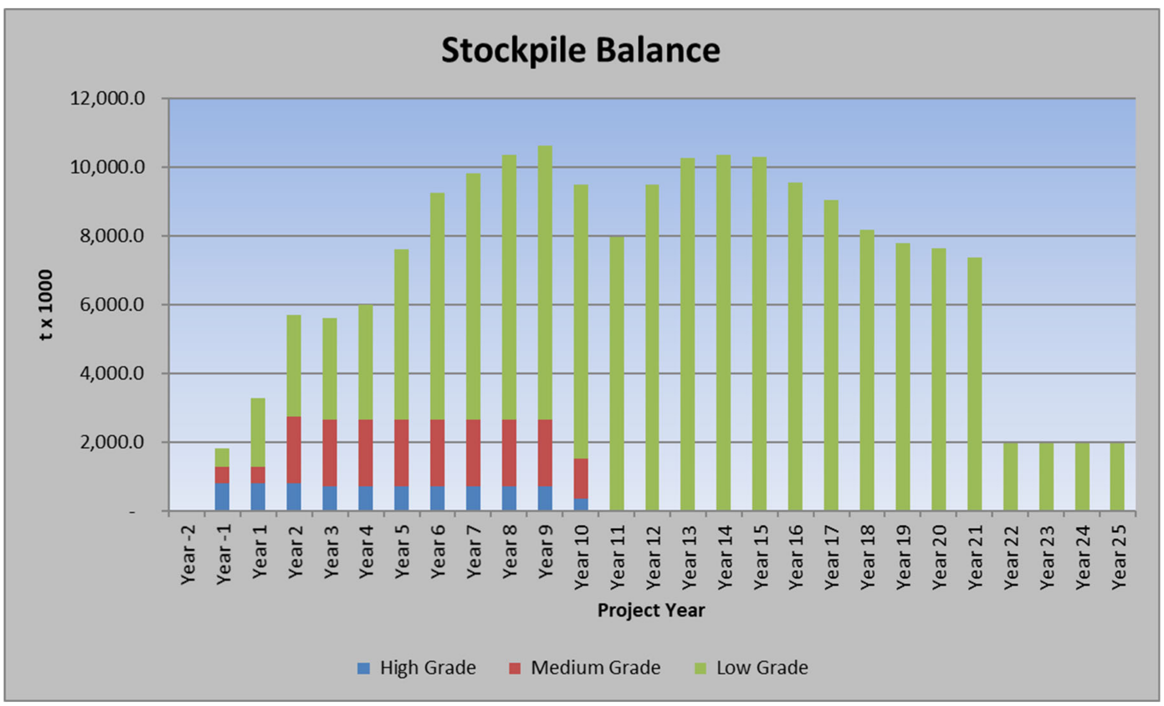


Figure 16-14: Stockpile Balance

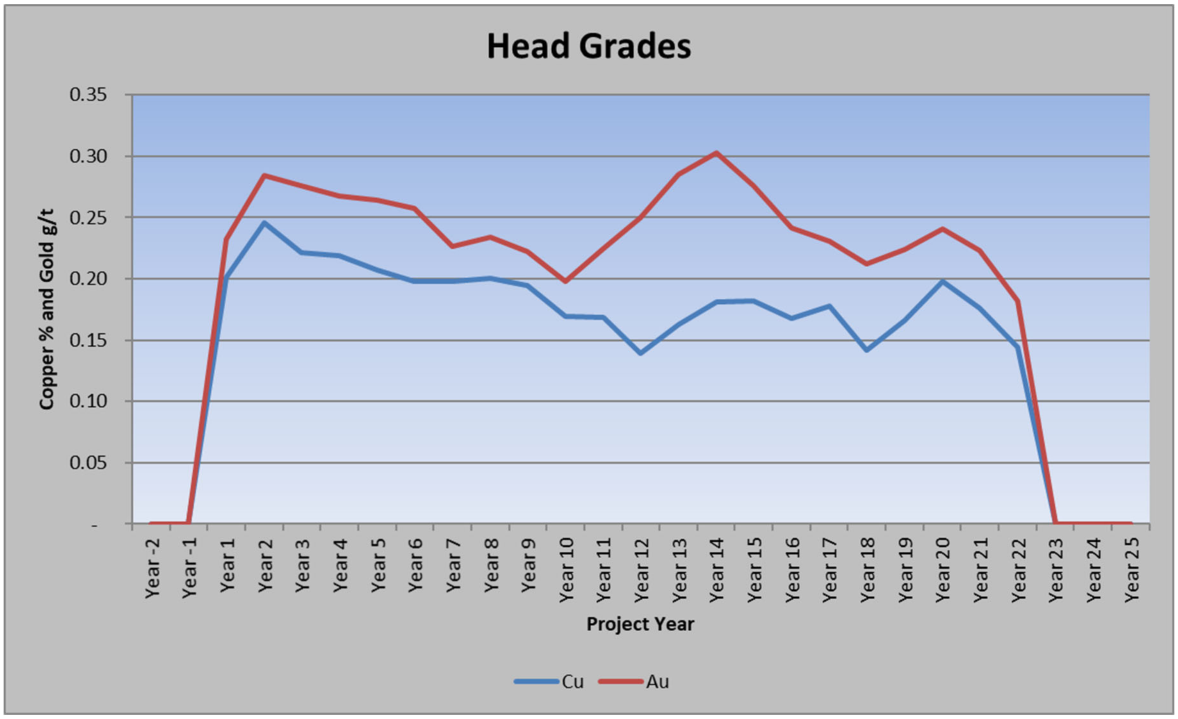


Figure 16-15: Head Grades

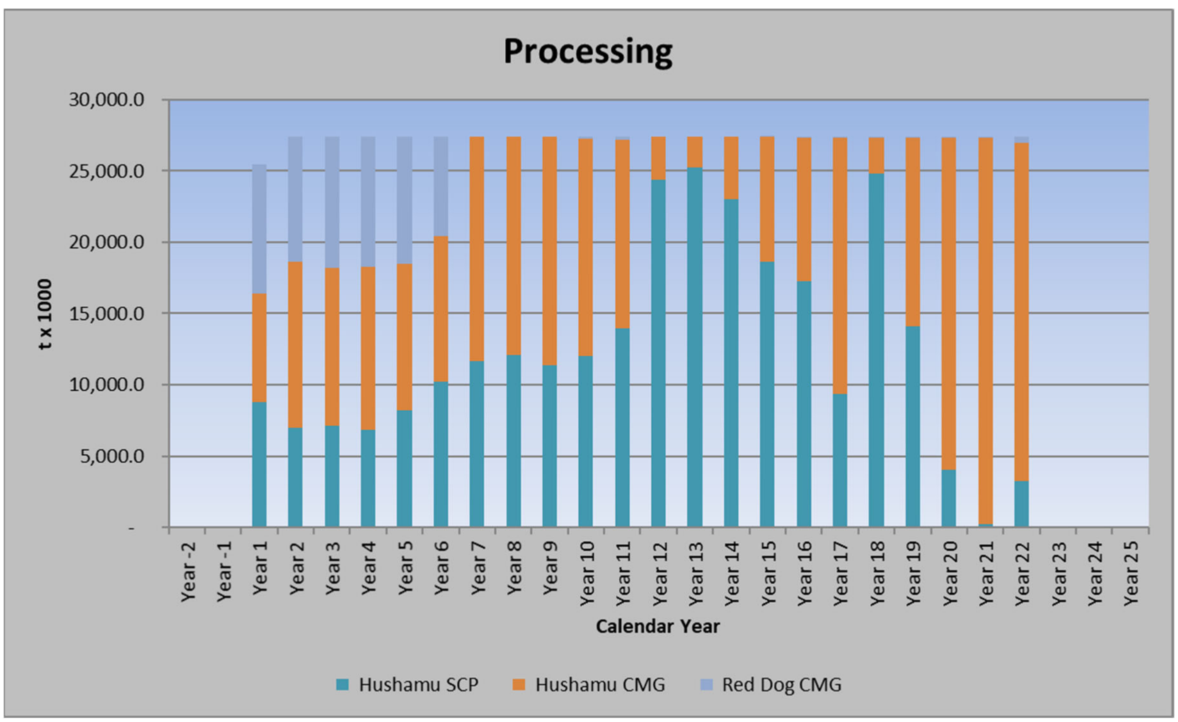


Figure 16-16: Processing Throughput

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 MWSF 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. Note that some items such as Engineering Pickup are shown on multiple rows to capture their use for different functions.

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	Epiroc 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	Epiroc 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
Wheel Loader	Komatsu WA1200-6	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
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		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		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		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		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		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		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		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		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		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		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		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		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		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 MWSF 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.

16.8 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 mine plan developed in the Preliminary Economic Assessment includes 22% Inferred resources. Infill drilling should be undertaken to upgrade these resources to indicated classification if they are to be included in future studies. Consideration should also be given to undertaking additional drilling to upgrade Indicated resources in the starter pit area to Measured classification.
- Future resource models should be developed with consideration given to the proposed bench heights to be used in the mine planning models. Large scale bulk mining equipment will be used to extract mineral resources in these deposits.

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 km 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.

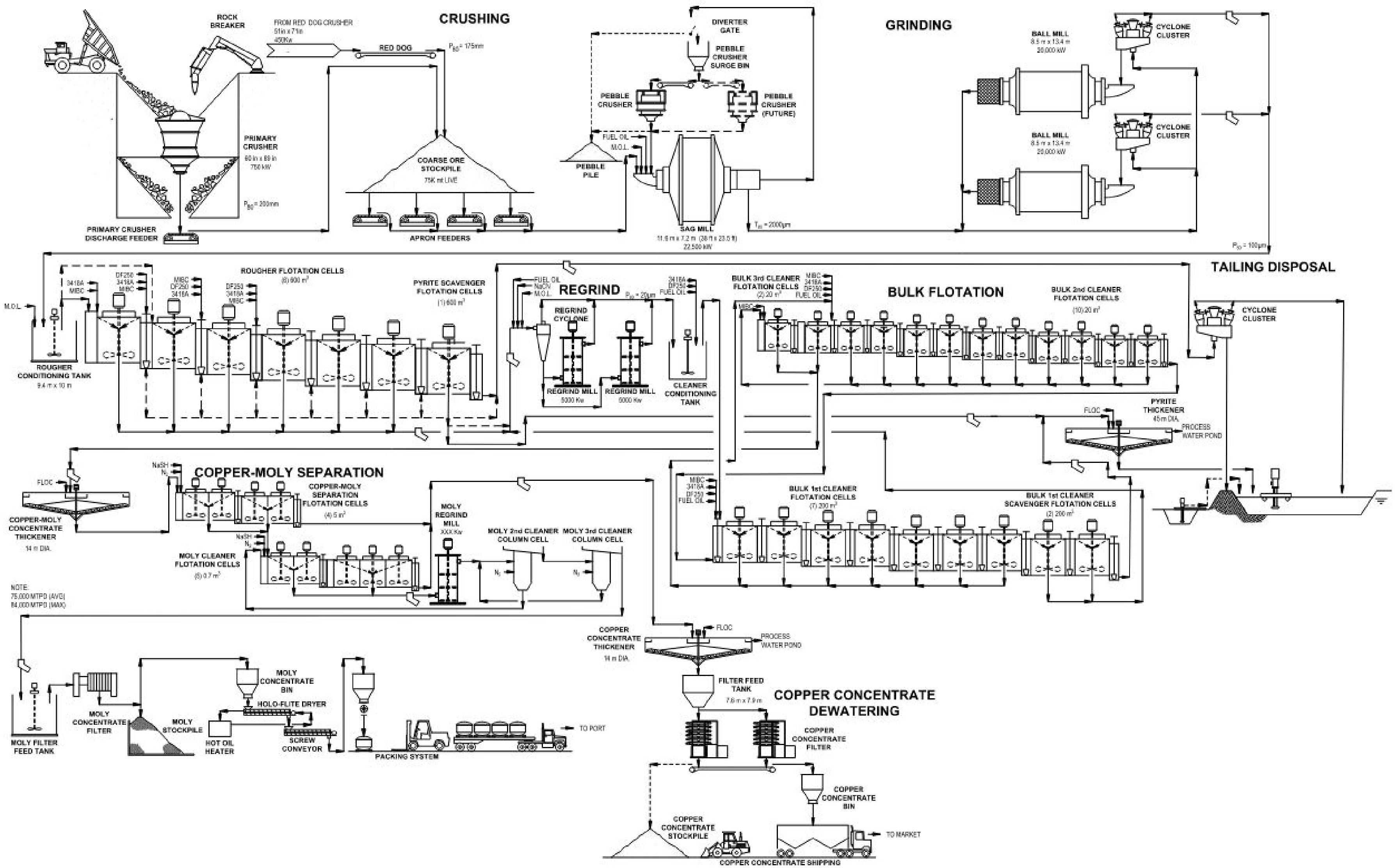
The Project mineralized material facility will produce copper/gold and molybdenum concentrates. The nominal capacity of the mineralized material processing facility is 75,000 dry metric tonnes per day (dmtpd) or 27,375,000 dry metric tonnes per year (dmtpy). The plant capacity will fluctuate according to the hardness of the mineralized material type being milled, up to a maximum of 84,000 tonnes per day (t/d) 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. Rhenium is considered in the financial analysis as a credit to the treatment charges.

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
- Pyrite scavenger rougher flotation
- Bulk flotation concentrate regrinding
- Bulk 1st, 2nd, and 3rd cleaner flotation
- Copper-moly separation flotation
- Moly cleaner flotation
- Cu-Au concentrate dewatering
- Moly concentrate dewatering
- Tailings handling and disposal



Source: M3, 2021

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 thickened and deposited sub-aqueously with the fine fraction of the pyrite scavenger flotation tailings in the Mine Waste Storage Facility.
- 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: methyl isobutyl carbinol (MIBC, frother), quick lime (CaO), fuel oil (molybdenum collector), NASH, sodium cyanide, sodium-diisobutyl dithiophosphinate (Aerophine 3418A or equivalent) promoter, polyglycol (DF250, frother), nitrogen, antiscalant and flocculant.

17.1.1 Reagents Storage and Handling

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

Table 17-1: Project Reagents

Reagent Identification	Function	Usage Rate, kg/t mill feed
Lime	pH Modifier	0.900
MIBC	Frother	0.050
Sodium Cyanide	Cu Depressant	0.010
Aerophine 3418A or equivalent	Promoter	0.050
Fuel Oil	Moly Collector	0.030
NaSH (sodium hydrosulphide)	Copper depressor	0.015
Na_2S (sodium sulphide)	Copper depressor	0.020
Flocculant	Particle Settling Aid	0.050

17.1.2 Water Systems

The water system for the 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 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	93%
Concentrate Handling	85%
Primary Crushing	
Feed F_{80}, mm	1,000
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 F_{80}, 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
80^{th} 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	10	2.5	10	8365	600	6	25.8
Pyrite Scavenger	2	2	10	6388	600	1	5.6
Bulk Flotation							
Conditioning tank	5						
1st cleaner	6	3	15	4274	200	7	19.7
1st Cleaner Scavenger	2	3	15	3805	200	2	6.3
2nd cleaner	4	3	15	824	20	10	14.6
3rd cleaner	2	3	15	251	20	2	9.6
Copper-Moly Separation							
Copper-moly separation (rougher)	5	3	15	53	5	4	22.8
Moly 1st cleaner	4	3	15	13	0.7	5	15.8
2nd cleaner	-	-	-	-	-	-	-
3rd cleaner	-	-	-	-	-	-	-

Notes: Based on SGS LCT tests CMG-LCT3, SCP-LCT3 and Reddog-LCT-1, with k_{80} = 100 microns
600 m^3 cells will have outside launders increasing volume to 630 m^3 for calculating retention time

Table 17-4: Metallurgical Performance Estimate

CMG

Concentrate	Concentrate Grade						Metal recovery %					
	Cu	Mo	Au	Fe	S	Re	Cu	Mo	Au	Fe	S	Re
	%	%	g/t	%	%	g/t	%	%	g/t	%	%	g/t
copper	24.0	0.05	15.4	31.0	33.6	4.5	85.5	7.1	48.9	4.1	10.4	13.6
moly*	2.9	56.9	5.8	35.0	58.3	2,434	0.1	74.4	0.2	0.0	0.0	63.5

SCP

Concentrate	Concentrate Grade						Metal recovery %					
	Cu	Mo	Au	Fe	S	Re	Cu	Mo	Au	Fe	S	Re
	%	%	g/t	%	%	g/t	%	%	g/t	%	%	g/t
copper	26.6	0.02	14.9	32.5	36.5	1.5	86.2	1.9	43.1	4.1	4.8	4.4
moly*	2.9	18.7	5.8	35.0	58.3	822	0.1	20.4	0.1	0.0	0.0	20.8

Reddog

Concentrate	Concentrate Grade						Metal recovery %					
	Cu	Mo	Au	Fe	S	Re	Cu	Mo	Au	Fe	S	Re
	%	%	g/t	%	%	g/t	%	%	g/t	%	%	g/t
copper	26.7	0.03	24.7	31.5	34.0	4.1	89.7	7.3	52.8	3.3	9.2	13.9
moly*	2.9	34.7	5.8	35.0	58.3	2,090	0.1	73.3	0.1	0.0	0.1	61.5

LOM weighted average

Concentrate	Concentrate Grade						Metal Recovery %					
	Cu	Mo	Au	Fe	S	Re	Cu	Mo	Au	Fe	S	Re
	%	%	g/t	%	%	g/t	%	%	g/t	%	%	g/t
copper	25.4	0.03	15.9	31.7	35.0	3.1	86.1	4.5	46.8	4.0	6.6	9.4
moly*	2.9	37.9	5.8	35.0	58.3	1,685	0.1	46.9	0.1	0.04	0.1	43.8

Ref. BL 0137; 90% of the Moly is recovered in the reverse moly flotation

SME Mineral Processing & Extractive Metallurgy Handbook, 80% of the Rhenium is recovered in moly concentrate

*Mo and Re grade estimated

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.

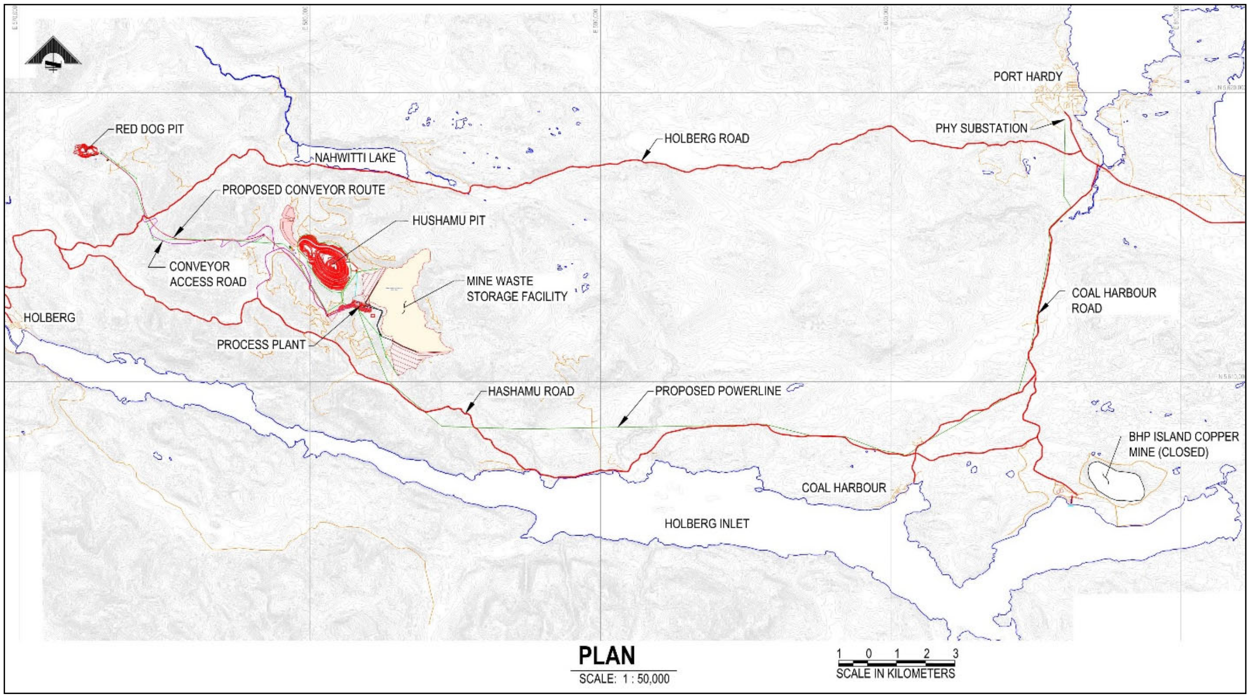


Figure 18-1: General Site Plan and Powerline

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.

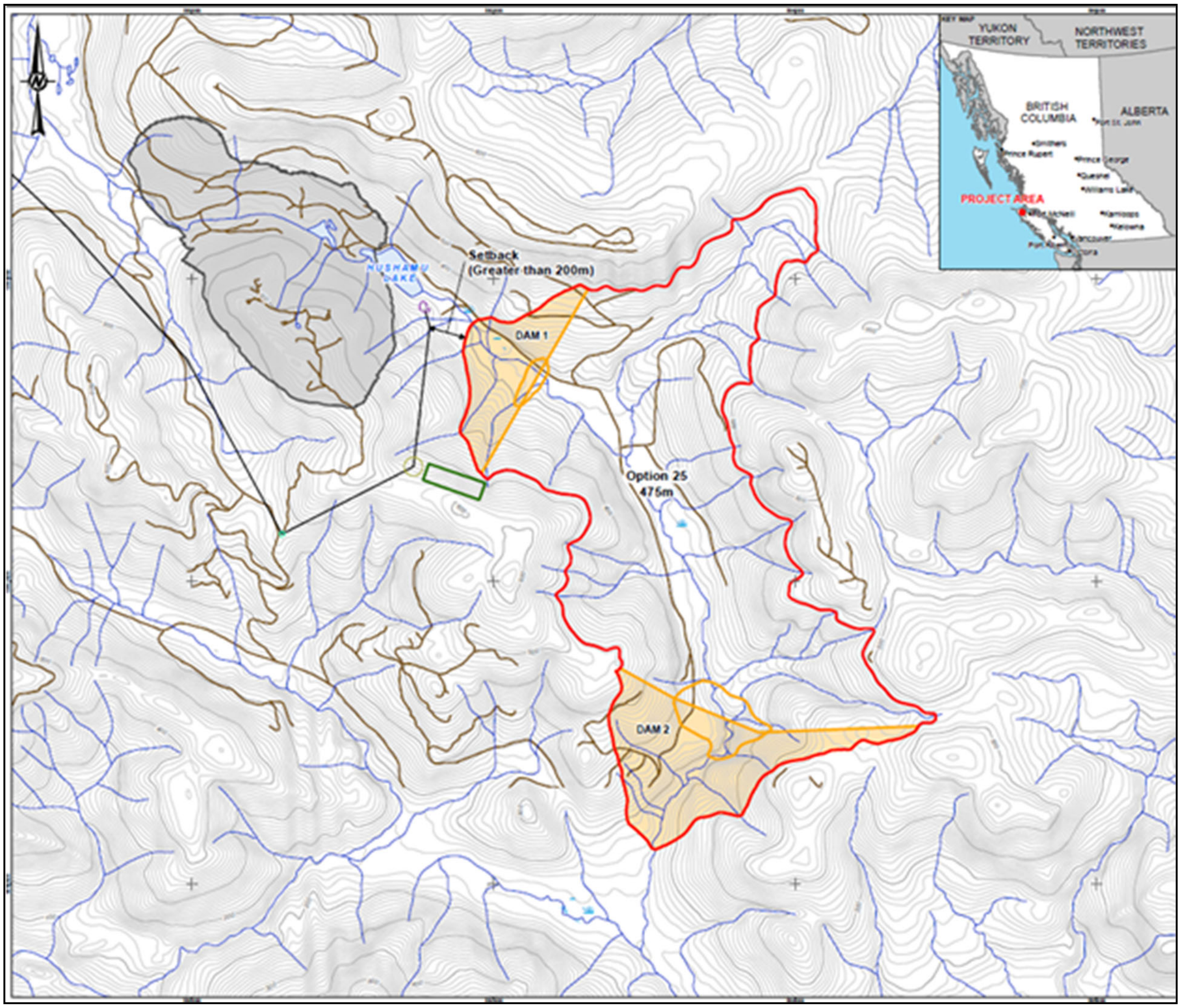


Figure 18-2: Mine Waste Storage Facility

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 393 Mt of waste rock from the Hushamu pit, and also 600 Mt of tailings from milling of ore from the Red Dog and Hushamu Deposits, with 450 Mt tailings in the impoundment and 150 Mt tailings as sand in the dams. 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 Red Dog pit. Overburden from the Hushamu pit will be stored in a stockpile adjacent the pit and will be used for dam construction and 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. The maximum credible earthquake (84^{th} percentile) has a peak ground acceleration of 0.57 g based on a deterministic site-specific assessment presented in Golder (2021a).
- 3,911 mm average annual precipitation, with 3,818 mm as rainfall and the remainder 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 potential for 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. 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, 2021b).

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 will be deposited between the dams. The waste rock will effectively widen the dam section and improve stability. 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 underdrains 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.

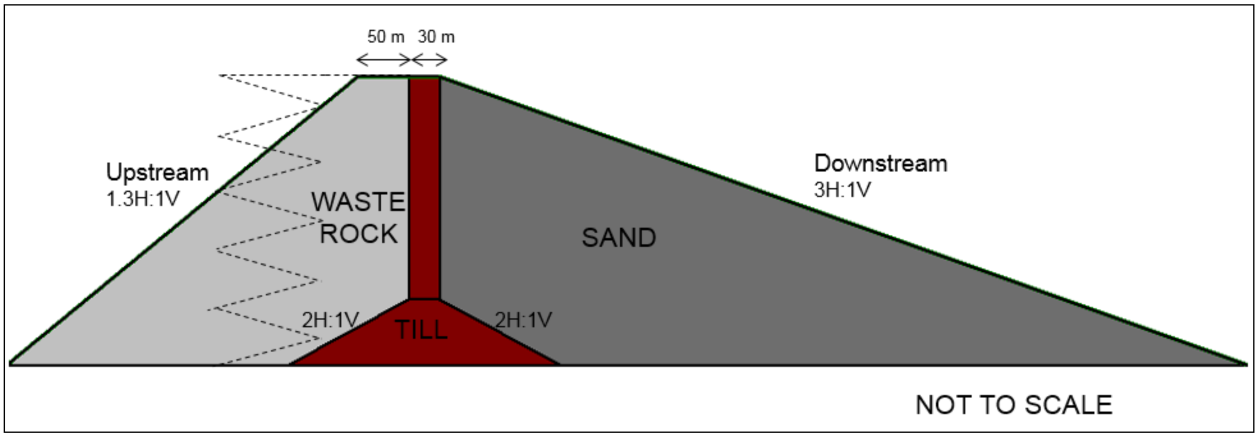


Figure 18-3: Conceptual Dam Section

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, and a deterministic seismic hazard analysis which indicated a maximum credible earthquake (84^{th} percentile) with a peak ground acceleration of 0.57 g. Given the size of the proposed dams and the seismic hazard at the site, 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 Project is proposed for development 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 the 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 Nanaimo 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 & 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, although they are no longer functional.

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 & 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 FN. NorthIsle & Quatsino FN have had preliminary discussions on conceptual plans to develop such a facility.

BHP has announced that the existing ship-loading facilities and marine structure will be demolished and the site will be reclaimed. After reclamation, the site will be transferred back to the province of British Columbia. A new marine terminal and ship-loader facility will be constructed to load-out NorthIsle copper concentrate under an extension of the contemplated arrangement described above for concentrate storage.

The construction of a combined concentrate receiving, storage, and load-out facility, contemplated to be owned by the Quatsino FN, is a potentially attractive opportunity for enterprise building that will be economically beneficial for all parties.

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 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*										

*Note: Stream drainage was measured but no pH values were measured in January or February 2012

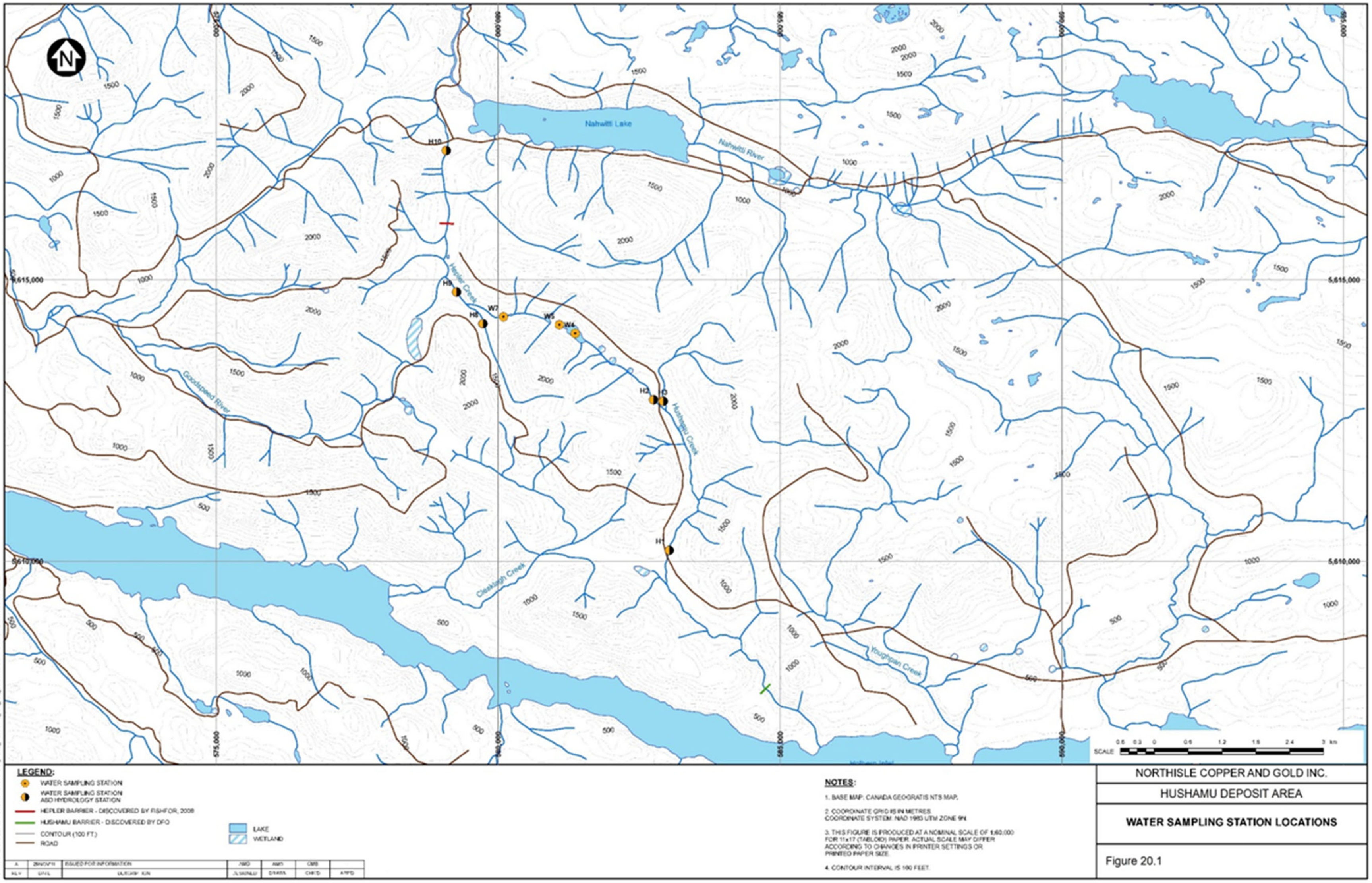


Figure 20-1: Water Sampling Station Locations

20.2 LICENSING AND PERMITTING

There has been no permitting (other than permitting for exploration activities and drilling) at the 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 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 limited work involving social and community impact at the 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.

21.2 CURRENCY

All values are expressed in Canadian Dollar currency based on first quarter 2021. Canadian to US exchange rate is based on CAD$1.33 = US$1.00. Mining costs were based on an exchange rate of CAD$1.30 per USD.

21.3 INITIAL CAPITAL COSTS

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

Table 21-1: Capital Cost Summary

Cost Item	Total ($M CAD)
Process Plant and Infrastructure	
Project Directs	$762.8
Project Indirects	$225.5
Contingency	$247.1
Subtotal	$1,235.4
Mine	
Mine Equipment*	$17.8
Mine Preproduction	$130.9
Subtotal	$148.7
Owner's Costs	$57.9
Total	$1,442.0

*Primary mining equipment is included in operating costs on a leased basis.

21.3.1 Labour Rates

Burdened construction labour rates used in the process plant and infrastructure capital cost estimate are shown in Table 21-2. The rates were provided in Q1 2021 by a BC industrial contractor experienced in the scope and scale of the Project.

Table 21-2: Burdened Labour Rates

Trade	Labour Rate ($CAD / hour)
Civil Work	$105.61
Concrete	$109.01
Architectural	$113.77
Structural Steel	$116.59
Equipment Installation	$118.11
Piping	$116.59
Electrical	$115.13
Instrumentation	$116.22

21.3.2 Basis of Capex

Documents developed included the process design criteria, flowsheet, equipment list, general arrangements, civil earthwork drawings, overall electrical one line diagram and duty specifications for the major process equipment.

Civil, concrete and structural steel material takeoffs (MTOs) were developed from general arrangement drawings. Mechanical, electrical and I&C material and labour is included as allowances based on experience with similar installations.

Budgetary quotes were received for all major process equipment.

21.3.3 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).

21.3.4 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.

21.3.5 Mining Capital Cost Estimate – Analysis if Equipment Purchased (Not Leased)

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 Euros/US$ and CAD$1.30/US$.

The mine equipment fleet will include items listed in Section 16 of this study (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. Note that this is what equipment would cost if purchased. The economic analysis in Section 22 is based off of leasing primary mining equipment as described in Section 21.3.6.

Table 21-3: Initial Mine Equipment Capital Cost Summary

	Year -2	Year -1	Total
Area	**($ x 1000)**	**($ x 1000)**	**($ x 1000)**
Operations	$3,912.2	$459.0	**$4,371.3**
Engineering	$3,422.2	-	**$3,422.2**
Drilling	$12,820.6	$4,934.8	**$17,755.4**
Blasting	$57.7	$57.7	**$115.5**
Loading	$18,778.7	$18,778.7	**$37,557.4**
Hauling	$26,815.8	$37,542.1	**$64,357.8**
Services	$14,693.6	$11,312.6	**$26,006.2**
Dewatering	$250.0	$250.0	**$500.0**
Maintenance	$4,462.8	-	**$4,462.8**
Total Capital Costs	**$84,963.6**	**$73,084.9**	**$158,048.5**
Cumulative Capital Cost	**$84,963.6**	**$158,048.5**	**-**

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

21.3.6 Mining Equipment Leasing Costs

Major mining equipment including blasthole drills, shovels, trucks, dozers, graders, water truck and sand truck may be acquired through leasing arrangements. For the purposes of the financial analysis all major equipment required in pre-production through to Year 1 of the mine plan is assumed leased. The assumed terms of the 7-year (84 month) leasing arrangement include a 15% down payment, a LIBOR rate of 1.75% and 300 basis points. These assumptions result in an annual leasing rate of 4.75%. The value of the equipment being leased is $191.7 million. The cost of the leasing arrangement over 7 years will be $28.9 million. In the financial analysis the overall mining related capital cost reduction of $191.7 million is offset by an operating cost increase of $220.6 million for major mining equipment leasing.

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	$2,564.0	$2,564.0	**$5,128.0**
Mine General	$ X 1000	$4,347.6	$5,604.9	**$9,952.5**
Drilling	$ X 1000	$2,844.0	$4,889.3	**$7,733.4**
Blasting	$ X 1000	$8,014.7	$13,255.9	**$21,270.6**
Loading - Shovels and Loaders	$ X 1000	$4,672.7	$8,492.4	**$13,165.1**
Hauling	$ X 1000	$10,956.2	$26,147.1	**$37,103.3**
Contract Services	$ X 1000	$1,177.7	$1,177.7	**$2,355.5**
Road & Pit Maintenance	$ X 1000	$14,046.9	$20,117.2	**$34,164.1**
Total	$ X 1000	**$48,623.7**	**$82,248.7**	**$130,872.4**

21.3.7 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)
Spares and mobile plant equipment	$27.1
First fills and consumables	$15.9
Shop tools and furnishings	$6.5
Post startup modifications	$2.0
General goods and services	$6.4
Total	**$57.9**

21.4 SUSTAINING CAPITAL COSTS

Three areas of sustaining capital costs are:

- Mining equipment rebuilds,
- Staged progression of the Mine Waste Storage Facility (MWSF), and
- Process plant upgrades and additional infrastructure.

21.4.1 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

Area	Additions & Replacements ($x1000)
Operations	$5,315.2
Engineering	$7,020.0
Drilling	$4,934.8
Blasting	$462.0
Loading	$24,223.1
Hauling	$32,178.9
Services	$20,517.3
Dewatering	$2,000.0
Maintenance	$9,700.6
Total Capital Costs	**$104,351.9**

Table 21-7: Capital Cost Summary – Rebuild Program

Area	$ x 1000
Rotary Blasthole Drill	$7,776.0
Hydraulic Shovel	$15,816.0
Wheel Loader	$4,304.0
Haul Truck	$27,495.0
Track Dozer	$7,176.0
Wheel Dozer	$2,454.0
Grader	$4,917.0
Total Capital Costs	**$69,938.0**

21.4.2 MWSF Sustaining Capital Costs

Sustaining capital costs for the MWSF are $2,500,000 per year based on the total earthworks installed per annum to raise the overall height of the MWSF. Material take offs (MTOs) were provided by Golder.

21.4.3 Process Plant and Infrastructure Sustaining Capital Costs

The following sustaining capital allowances are included in the financial model for surface water infrastructure and process plant mobile equipment:

Table 21-8: Process Plant and Infrastructure Sustaining Capital Costs

Year	CAD$
Years 2-6	$100,000/year
Year 7	$10,000,000
Year 8-13	$100,000/year
Year 14	$10,000,000
Years 15-22	$100,000/year

21.5 OPERATING COSTS

Table 21-9 summarizes the average LOM operating costs estimated for the Project. The average total mine operating cost is CAD$9.81 per tonne of ore.

Table 21-9: Operating Costs

Area	CAD$/ore tonne
Mine	3.47
Mine Major Equipment Lease	0.37
Processing	5.52
Water Treatment Plant	0.06
General & Administrative	0.38
Total Mine Operating Costs	**9.81**

21.5.1 Processing Operating Costs

The average process plant operating costs over the life of the Project is approximately CAD$5.52 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	0.33
Grinding	3.17
Flotation through Tailings Disposal	1.86
Ancillaries	0.16
Total Process Operating Costs	**5.52**

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

Table 21-11: Process Operating Costs by Element of Expense

Area	CAD$/tonne
Labor	0.50
Power	1.84
Liners	0.36
Grinding Media	1.03
Reagents	1.20
Maintenance Parts & Repairs	0.48
Supplies & Services	0.10
Total Process Operating Costs	5.52

The annual water treatment costs are estimated at approximately CAD$1.7 million or CAD$0.06/tonne ore.

21.5.2 General and Administrative

The General and Administrative (G&A) costs to support the North Island operations is CAD$0.38/tonne ore including CAD$0.17/tonne ore for labor and fringes. General and Administrative costs include employee salaries and benefits.

21.5.3 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.

21.5.3.1 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 $0.069 kW/hr and fuel price was $0.785/l. The truck fleet will be using a blended LNG/diesel mix of 55% LNG. The LNG price assumed for this study was $13.26/GJ resulting in a blended equivalent diesel price of $0.62/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.

21.5.3.2 Summary

LOM operating cost after pre-production costs will total $2.1 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 $2.09/t based on years 1 to 22. Note that pre-production operating expenses are capitalized in the financial model; the mine operating costs were calculated to average CAD$2.11 per tonne moved based on all years of operation as well as pre-production. Leased primary mine equipment will cost an additional CAD$0.21 per tonne for leasing primary mining equipment. See Table 21-13.

Table 21-12: Unit Operating Costs Year 1 to 22 (Excluding Pre-Production)

Category	Units	Value
Engineering & Geology	$/t Mined	0.06
Mine General	$/t Mined	0.14
Drilling	$/t Mined	0.13
Blasting	$/t Mined	0.35
Loading - Shovels and Loaders	$/t Mined	0.24
Hauling	$/t Mined	0.69
Contract Services	$/t Mined	0.03
Road & Pit Maintenance	$/t Mined	0.45
Pit Electrics	$/t Mined	0.01
Total	**$/t Mined**	**2.09**

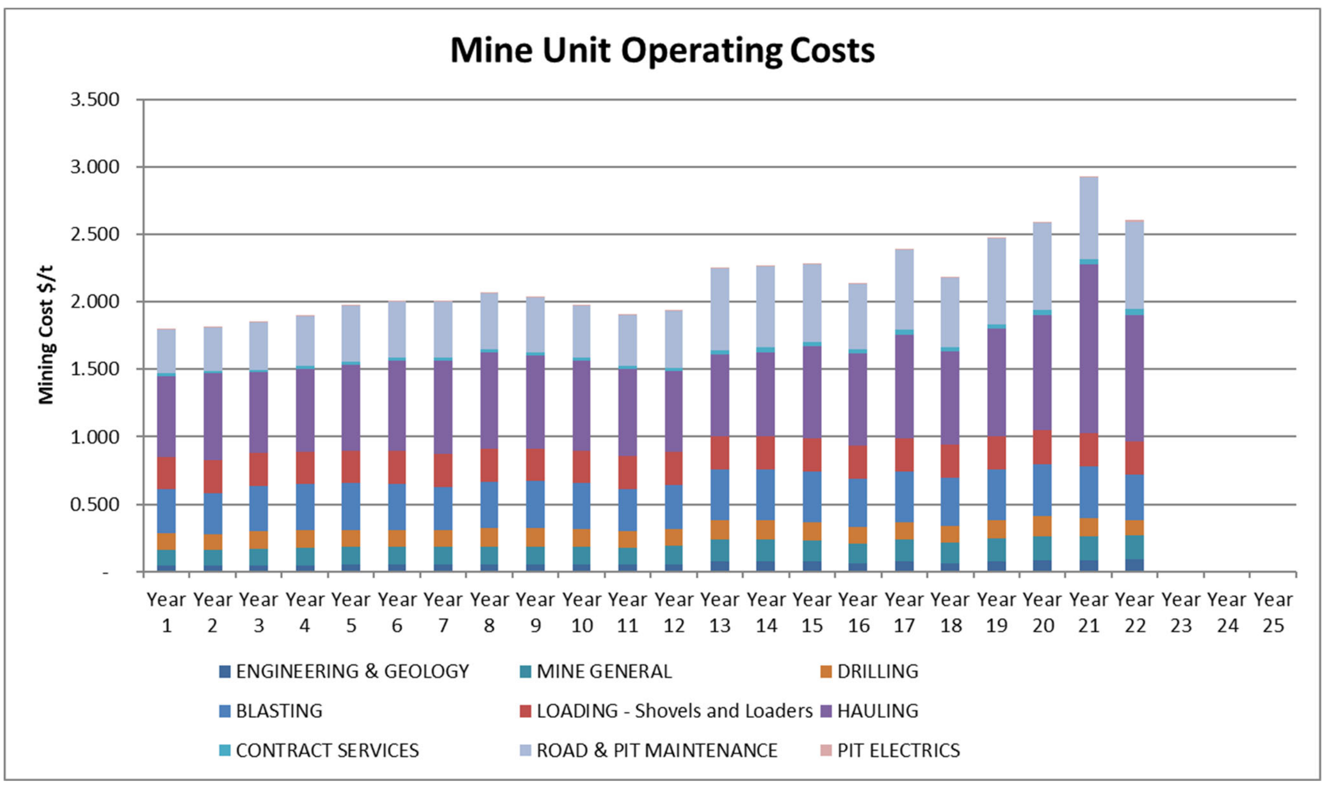


Figure 21-1: Mine Unit Operating Costs

Table 21-13: Mine Operating Costs (Including Pre-Production and Leased Primary Equipment)

Area	Unit Cost (CAD$/t mined)
Drilling	0.13
Blasting	0.35
Loading	0.24
Hauling	0.69
Support	0.49
Mine General	0.21
Total Mining Cost (Excluding Equipment Lease)	**2.11**
Mine Equipment Lease	**0.21**
Total Cost	**2.32**

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 concentrate containing gold and molybdenum concentrate containing rhenium. 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 %
Ore Tonnes	602,326	0.18%	0.24	.008%
Waste Tonnes	429,949	-	-	-

22.3 PLANT PRODUCTION STATISTICS

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

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

Table 22-2: Metal Recovery Factors

	Copper %	Gold %	Moly %
Copper Concentrate	86.4	46.8	-
Molybdenum Concentrate	-	-	59.5

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)
Copper Concentrate	3,826	2,108,765	2,198	-
Molybdenum Concentrate	59	-	-	64,981

22.3.1 Smelter Return Factors

Copper and molybdenum 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 Project 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)	$75.00
Refining charge – Cu (CAD$/lb)	$0.08
Refining charge – Au (CAD$/oz)	$6.41
Refining charge – Ag (CAD$/oz)	$1.28
Transportation charges (CAD$/wmt)	$83.20
Moisture (%)	8.0 %
Molybdenum Concentrate	
Payable molybdenum in concentrate	85.0 %
Treatment charge ($/tonne)	$0.00
Transportation charges ($/wmt)	$85.35
Rhenium Credit ($/mt of moly)	$389.22
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	$195,271
Year -1	$1,117,374
Year 1	$129,602
Year 2	$3,380
Year 3	$2,863
Year 4	$2,883
Year 5	$3,438
Year 6	$3,687

Period	Amount (CAD$000)
Year 7	$20,142
Year 8	$12,158
Year 9	$11,252
Year 10	$3,105
Year 11	$21,473
Year 12	$13,446
Year 13	$5,631
Year 14	$32,933
Year 15	$22,120
Year 16	$15,229
Year 17	$3,380
Year 18	$4,731
Year 19	$5,348
Year 20	$4,525
Year 21	$2,600
Year 22	$2,600
Total	**$1,639,171**

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$4.33/lb (US$3.25/lb)
- Gold: CAD$2,200.00/oz (US$1,650.00/oz)
- Molybdenum: CAD$13.33/lb (US$10.00/lb)

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	$3.47
Mine Major Equipment Lease	$0.37
Process Plant	$5.52
Water Treatment	$0.06
General Administration	$0.38
Smelting/Refining Treatment	$1.31
Total Operating Cost	**$11.12**

22.6.1 Total Cash Cost

The average total cash cost over the life of the mine is estimated to be CAD$12.08/t of ore processed. The total cash cost is the total cash operating cost plus royalties, property tax, salvage value and reclamation and closure costs.

22.6.1.1 Royalty

NorthIsle, through North Island Mining Corp., 100% owns the claims forming the Project subject to a 10% net profit royalty, except for the 16 claims that comprise the Red Dog option, which are subject to a 3% Net Smelter Returns Royalty ("NSR"), of which 2% could be repurchased for a one-time $2M payment. There are no additional royalties, back-in rights, payments or other agreements and encumbrances to which the property is subject. The life of mine royalty payments are estimated to be CAD$531.2 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 Project is evaluated with a 25% corporate income tax based on taxable income and is approximately CAD$1.2 billion of the life of the mine. In addition, a BC mining royalty is being estimated at CAD$656 million for the life of the mine.

22.8 PROJECT FINANCING

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

22.9 NET INCOME AFTER TAX

Net income after tax is approximately $3.5 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$1,059.4 million, after-tax IRR of 19.0% and a payback of 3.9 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 Millions of CAD$)

Change in Metal Prices	NPV @ 8%	IRR %	Payback (yrs)
Base Case	$1,059.4	19.0%	3.9
20%	$1,833.7	26.5%	2.9
10%	$1,447.2	22.8%	3.4
0%	$1,059.4	19.0%	3.9
-10%	$666.8	15.0%	4.9
-20%	$265.4	10.8%	6.5
Change in Operating Cost	**NPV @ 8%**	**IRR %**	**Payback (yrs)**
Base Case	$1,059.4	19.0%	3.9
20%	$729.3	15.6%	4.7
10%	$894.6	17.3%	4.3
0%	$1,059.4	19.0%	3.9
-10%	$1,223.4	20.7%	3.7
-20%	$1,386.0	22.3%	3.5
Change in Initial Capital	**NPV @ 8%**	**IRR %**	**Payback (yrs)**
Base Case	$1,059.4	19.0%	3.9
20%	$874.9	15.7%	4.7
10%	$967.5	17.2%	4.4
0%	$1,059.4	19.0%	3.9
-10%	$1,150.2	21.1%	3.6
-20%	$1,238.9	23.6%	3.3

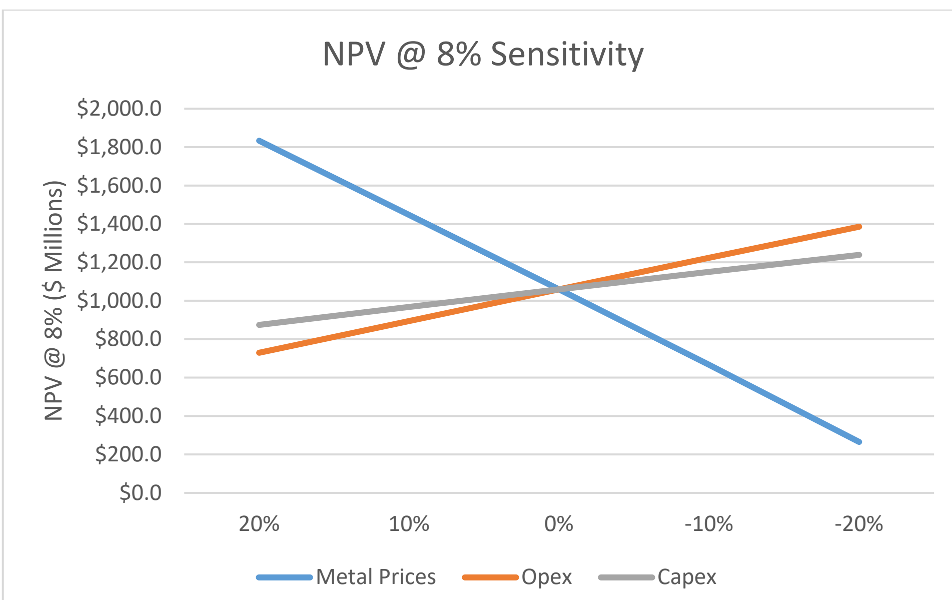


Figure 22-1: NPV at 8%

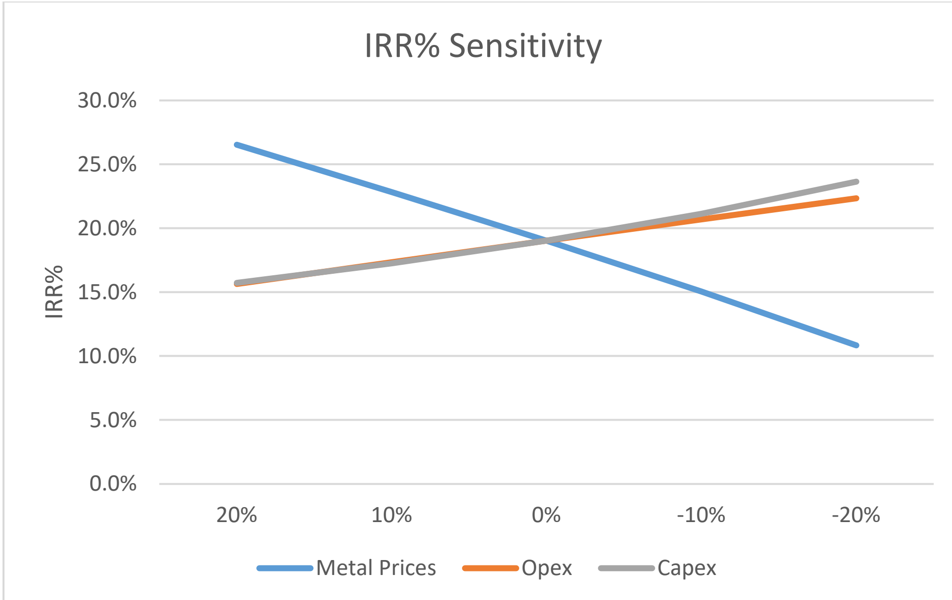


Figure 22-2: IRR% Sensitivity

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	Year 23	Year 24	Year 25
High Grade Ore																												
Beginning Inventory (kt)	416,475	416,475	416,475	415,670	396,589	369,468	349,003	329,554	309,294	288,803	269,679	249,748	230,031	214,418	196,678	183,357	164,834	146,077	126,907	108,925	88,275	74,600	56,974	34,782	14,007	(0)	(0)	(0)
Mined (kt)	416,475	-	805	19,082	27,120	20,465	19,449	20,260	20,490	19,125	19,931	19,717	15,614	17,740	13,321	18,523	18,757	19,170	17,982	20,650	13,675	17,626	22,192	20,775	14,007	-	-	-
Ending Inventory (kt)	-	416,475	415,670	396,589	369,468	349,003	329,554	309,294	288,803	269,679	249,748	230,031	214,418	196,678	183,357	164,834	146,077	126,907	108,925	88,275	74,600	56,974	34,782	14,007	(0)	(0)	(0)	(0)
Copper Grade (%)	0.22%	0.00%	0.18%	0.23%	0.25%	0.26%	0.26%	0.24%	0.23%	0.24%	0.24%	0.23%	0.21%	0.20%	0.19%	0.20%	0.22%	0.22%	0.21%	0.20%	0.19%	0.20%	0.22%	0.20%	0.18%	0.00%	0.00%	0.00%
Gold Grade (g/t)	0.29	-	0.22	0.27	0.29	0.33	0.33	0.32	0.30	0.27	0.27	0.26	0.25	0.26	0.32	0.33	0.37	0.33	0.29	0.26	0.27	0.27	0.27	0.26	0.25	-	-	-
Molybdenum Grade (%)	0.008%	0.000%	0.016%	0.008%	0.006%	0.007%	0.007%	0.008%	0.008%	0.008%	0.007%	0.007%	0.008%	0.009%	0.013%	0.014%	0.012%	0.008%	0.007%	0.007%	0.011%	0.010%	0.009%	0.005%	0.003%	0.000%	0.000%	0.000%
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%	9.00%	9.00%	9.00%
Contained Copper (klbs)	2,019,403	-	3,106	96,371	147,669	116,994	112,318	106,678	102,698	99,112	104,039	98,070	73,715	79,486	54,588	80,020	91,235	92,546	81,958	92,171	57,169	77,997	106,822	89,553	55,087	-	-	-
Contained Gold (kozs)	3,877	-	6	168	250	216	207	207	199	167	171	166	123	149	139	199	220	204	167	173	120	154	190	172	111	-	-	-
Contained Molybdenum (klbs)	75,733	-	290	3,288	3,697	3,273	3,130	3,427	3,757	3,306	3,240	3,195	2,705	3,696	3,896	5,723	4,859	3,507	2,958	3,033	3,284	3,801	4,249	2,341	1,078	-	-	-
Contained Sulfur (klbs)	82,635,229	-	159,725	3,786,075	5,381,100	4,060,647	3,858,990	4,019,948	4,065,577	3,794,646	3,954,552	3,912,150	3,097,968	3,519,834	2,643,079	3,675,274	3,721,621	3,803,691	3,567,937	4,097,325	2,713,365	3,497,211	4,403,151	4,122,173	2,779,190	-	-	-
Medium Grade Ore																												
Beginning Inventory (kt)	95,784	95,784	95,784	95,299	91,530	89,812	86,682	82,482	78,273	73,982	69,492	65,423	61,227	56,052	51,451	42,013	36,482	32,037	28,932	25,681	22,319	16,873	11,985	9,125	5,340	(0)	(0)	(0)
Mined (kt)	95,784	-	485.00	3,768.74	1,717.92	3,129.94	4,199.93	4,209.06	4,290.85	4,490.46	4,069.01	4,195.88	5,175.18	4,601.09	9,437.48	5,531.30	4,444.87	3,105.13	3,251.08	3,361.39	5,446.76	4,887.55	2,860.22	3,785.24	5,339.56	-	-	-
Ending Inventory (kt)	-	95,784	95,299	91,530	89,812	86,682	82,482	78,273	73,982	69,492	65,423	61,227	56,052	51,451	42,013	36,482	32,037	28,932	25,681	22,319	16,873	11,985	9,125	5,340	(0)	(0)	(0)	(0)
Copper Grade (%)	0.12%	0.00%	0.12%	0.13%	0.13%	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%	0.13%	0.12%	0.11%	0.10%	0.10%	0.11%	0.11%	0.11%	0.11%	0.11%	0.12%	0.12%	0.13%	0.13%	0.00%	0.00%	0.00%
Gold Grade (g/t)	0.15	-	0.15	0.12	0.13	0.13	0.13	0.12	0.14	0.14	0.16	0.13	0.14	0.17	0.19	0.20	0.19	0.17	0.17	0.16	0.18	0.15	0.15	0.12	0.13	-	-	-
Molybdenum Grade (%)	0.008%	0.000%	0.012%	0.013%	0.006%	0.009%	0.008%	0.008%	0.007%	0.008%	0.007%	0.007%	0.010%	0.012%	0.011%	0.013%	0.009%	0.008%	0.007%	0.005%	0.008%	0.007%	0.005%	0.004%	0.003%	0.000%	0.000%	0.000%
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%	9.00%	9.00%	9.00%
Contained Copper (klbs)	244,993	-	1,268	10,658	4,855	8,373	11,190	11,570	11,227	12,203	10,505	11,932	14,091	11,242	20,887	12,485	10,364	7,698	7,881	8,479	12,768	12,492	7,472	10,604	14,751	-	-	-
Contained Gold (kozs)	475	-	2	15	7	13	18	17	19	20	21	18	23	25	58	35	27	17	18	17	32	24	13	15	22	-	-	-
Contained Molybdenum (klbs)	17,446	-	130	1,042	246	597	729	710	626	743	672	623	1,102	1,177	2,286	1,645	905	539	517	371	999	755	330	295	406	-	-	-
Contained Sulfur (klbs)	19,004,988	-	96,232	747,777	340,862	621,029	833,333	835,143	851,373	890,978	807,357	832,529	1,026,837	912,929	1,872,545	1,097,497	881,932	616,106	645,065	666,953	1,080,724	969,768	567,514	751,052	1,059,453	-	-	-
Low Grade Ore																												
Beginning Inventory (kt)	90,067	90,067	90,067	89,529	85,442	84,486	80,790	76,677	72,164	67,926	63,607	59,683	55,939	50,492	46,987	40,845	36,748	32,490	27,448	22,065	19,206	11,797	7,352	5,172	2,608	0	0	0
Mined (kt)	90,067	-	538.00	4,087.30	955.82	3,695.70	4,113.48	4,512.58	4,238.68	4,318.75	3,923.63	3,743.89	5,446.89	3,505.30	6,142.10	4,097.44	4,258.05	5,041.55	5,383.16	2,858.47	7,409.09	4,445.03	2,180.17	2,563.65	2,608.47	-	-	-
Ending Inventory (kt)	-	90,067	89,529	85,442	84,486	80,790	76,677	72,164	67,926	63,607	59,683	55,939	50,492	46,987	40,845	36,748	32,490	27,448	22,065	19,206	11,797	7,352	5,172	2,608	0	0	0	0
Copper Grade (%)	0.09%	0.00%	0.10%	0.11%	0.08%	0.10%	0.10%	0.10%	0.10%	0.10%	0.09%	0.09%	0.09%	0.08%	0.08%	0.08%	0.08%	0.09%	0.08%	0.09%	0.09%	0.09%	0.10%	0.10%	0.10%	0.00%	0.00%	0.00%
Gold Grade (g/t)	0.12	-	0.12	0.09	0.13	0.11	0.09	0.09	0.10	0.10	0.13	0.11	0.12	0.15	0.15	0.16	0.14	0.13	0.14	0.12	0.14	0.12	0.11	0.10	0.10	-	-	-
Molybdenum Grade (%)	0.008%	0.000%	0.012%	0.012%	0.009%	0.013%	0.009%	0.007%	0.006%	0.008%	0.009%	0.007%	0.010%	0.012%	0.012%	0.013%	0.009%	0.008%	0.007%	0.005%	0.006%	0.006%	0.005%	0.002%	0.003%	0.000%	0.000%	0.000%
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%	9.00%	9.00%	9.00%
Contained Copper (klbs)	180,959	-	1,135	9,593	1,773	7,829	9,319	10,298	9,326	9,584	7,436	7,834	10,684	6,361	11,008	7,287	7,812	9,520	9,881	5,574	13,917	8,910	4,609	5,429	5,842	-	-	-
Contained Gold (kozs)	354	-	2	12	4	13	12	13	13	14	17	14	22	16	30	21	20	22	24	11	32	18	8	8	8	-	-	-
Contained Molybdenum (klbs)	16,437	-	142	1,069	198	1,050	829	659	550	756	783	549	1,200	915	1,559	1,210	805	870	839	286	1,038	585	252	134	159	-	-	-
Contained Sulfur (klbs)	17,870,753	-	106,748	810,986	189,649	733,285	816,179	895,366	841,020	856,908	778,509	742,847	1,080,750	695,506	1,218,690	812,997	844,865	1,000,322	1,068,104	567,165	1,470,081	881,965	432,580	508,669	517,562	-	-	-
Total Ore																												
Beginning Inventory (kt)	602,326	602,326	602,326	600,498	573,560	543,766	516,475	488,713	459,731	430,711	402,777	374,854	347,197	320,962	295,116	266,215	238,063	210,604	183,287	156,670	129,800	103,269	76,311	49,079	21,955	-	-	-
Mined (kt)	602,326	-	1,828	26,938	29,794	27,291	27,762	28,982	29,020	27,934	27,923	27,657	26,236	25,846	28,900	28,152	27,460	27,317	26,616	26,870	26,531	26,958	27,232	27,124	21,955	-	-	-
Ending Inventory (kt)	-	602,326	600,498	573,560	543,766	516,475	488,713	459,731	430,711	402,777	374,854	347,197	320,962	295,116	266,215	238,063	210,604	183,287	156,670	129,800	103,269	76,311	49,079	21,955	-	-	-	-
Copper Grade (%)	0.18%	0.00%	0.14%	0.20%	0.23%	0.22%	0.22%	0.20%	0.19%	0.20%	0.20%	0.19%	0.17%	0.17%	0.14%	0.16%	0.18%	0.18%	0.17%	0.18%	0.14%	0.17%	0.20%	0.18%	0.16%	0.00%	0.00%	0.00%
Gold Grade (g/t)	0.24	-	0.17	0.22	0.27	0.28	0.27	0.25	0.25	0.22	0.23	0.22	0.20	0.23	0.24	0.28	0.30	0.28	0.25	0.23	0.22	0.23	0.24	0.22	0.20	-	-	-
Molybdenum Grade (%)	0.008%	0.000%	0.014%	0.009%	0.006%	0.008%	0.008%	0.008%	0.008%	0.008%	0.008%	0.007%	0.009%	0.010%	0.012%	0.014%	0.011%	0.008%	0.007%	0.006%	0.009%	0.009%	0.008%	0.005%	0.003%	0.000%	0.000%	0.000%
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%	0.00%	0.00%	0.00%
Contained Copper (klbs)	2,445,356	-	5,509	116,621	154,297	133,196	132,827	128,546	123,251	120,899	121,980	117,836	98,489	97,089	86,483	99,792	109,411	109,764	99,720	106,224	83,853	99,399	118,903	105,587	75,680	-	-	-
Contained Gold (kozs)	4,706	-	10	195	261	243	237	237	232	201	209	197	168	190	227	255	267	243	210	201	184	196	211	195	140	-	-	-
Contained Molybdenum (klbs)	109,615	-	562	5,399	4,141	4,920	4,689	4,796	4,932	4,804	4,695	4,367	5,007	5,788	7,741	8,578	6,569	4,915	4,314	3,690	5,321	5,141	4,832	2,771	1,644	-	-	-
Contained Sulfur (klbs)	119,510,970	-	362,704	5,344,838	5,911,611	5,414,961	5,508,502	5,750,458	5,757,970	5,542,532	5,540,418	5,487,526	5,205,556	5,128,269	5,734,314	5,585,768	5,448,418	5,420,120	5,281,106	5,331,444	5,264,169	5,348,944	5,403,245	5,381,894	4,356,205	-	-	-
Waste (kt)	429,949	18,250	33,835	36,938	34,085	32,021	29,287	22,118	22,076	23,165	23,178	23,444	24,862	21,603	15,798	6,943	7,600	8,890	15,183	7,404	12,695	5,525	1,796	2,683	570	-	-	-
Total Material Mined	1,032,275	18,250	35,663	63,876	63,879	59,312	57,050	51,100	51,096	51,099	51,101	51,101	51,098	47,449	44,698	35,095	35,060	36,207	41,799	34,274	39,226	32,483	29,028	29,807	22,525	-	-	-
Total Material Moved	1,051,986	18,250	35,663	63,876	63,879	59,396	57,050	51,100	51,096	51,099	51,101	51,101	52,237	53,766	48,473	35,095	35,060	36,265	42,558	34,779	40,070	32,900	29,171	30,058	27,945	-	-	-
Process Plant																												
Ore Processed (kt)	600,359	-	-	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	27,375	-	-	-
Copper Grade (%)	0.18%	0.00%	0.00%	0.20%	0.25%	0.22%	0.22%	0.21%	0.20%	0.20%	0.20%	0.19%	0.17%	0.17%	0.14%	0.16%	0.18%	0.18%	0.17%	0.18%	0.14%	0.17%	0.20%	0.18%	0.14%	0.00%	0.00%	0.00%
Gold Grade (g/t)	0.24	-	-	0.23	0.28	0.28	0.27	0.26	0.26	0.23	0.23	0.22	0.20	0.22	0.25	0.28	0.30	0.28	0.24	0.23	0.21	0.22	0.24	0.22	0.18	-	-	-
Molybdenum Grade (%)	0.008%	0.000%	0.000%	0.009%	0.006%	0.008%	0.008%	0.008%	0.008%	0.008%	0.008%	0.007%	0.009%	0.010%	0.012%	0.014%	0.011%	0.008%	0.007%	0.006%	0.009%	0.009%	0.008%	0.005%	0.005%	0.000%	0.000%	0.000%
Sulfur Grade (%)		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%	9.00%	9.00%	9.00%
Contained Copper (klbs)	2,441,251	-	-	113,209	148,388	133,520	131,949	124,879	119,632	119,659	120,941	117,247	102,040	101,722	83,749	98,410	109,256	109,886	101,303	107,278	85,614	100,269	119,202	106,110	86,989	-	-	-
Contained Gold (kozs)	4,699	-	-	191	251	243	236	232	226	199	206	196	174	198	220	251	266	243	213	203	187	197	212	196	160	-	-	-
Contained Molybdenum (klbs)	109,212	-	-	5,019	3,733	4,950	4,611	4,562	4,719	4,707	4,586	4,325	5,273	6,121	7,354	8,348	6,553	4,927	4,470	3,793	5,495	5,226	4,861	2,822	2,756	-	-	-
Contained Sulfur (klbs)	119,120,636	-	-	5,056,361	5,431,636	5,431,628	5,431,633	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	5,431,624	5,431,633	5,431,633	5,431,633	5,431,633	5,431,633	5,431,633	5,431,633	-	-	-
Metal Recovery %																												
Copper	86.4%	0.0%	0.0%	87.4%	87.1%	87.2%	87.2%	87.2%	87.0%	85.9%	86.0%	85.9%	86.0%	86.0%	86.3%	86.3%	86.3%	86.1%	86.1%	85.9%	86.3%	86.0%	85.7%	85.6%	85.8%	0.0%	0.0%	0.0%
Gold	46.8%	0.0%	0.0%	48.5%	48.9%	48.9%	48.9%	48.6%	47.9%	46.6%	46.5%	46.7%	46.6%	46.2%	43.9%	43.8%	44.2%	45.2%	45.5%	47.1%	43.9%	46.1%	48.2%	49.1%	48.5%	0.0%	0.0%	0.0%
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%	0.0%	0.0%	0.0%
Sulfur	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	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**	**Year 23**	**Year 24**	**Year 25**
Recovered Metal																												
Copper Concentrate (kt)	3,826			179	235	211	209	198	189	187	189	183	159	159	131	154	171	172	158	167	134	156	185	165	135	-	-	-
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%	25.0%	25.0%	25.0%
Copper (klbs)	2,108,765	-	-	98,908	129,306	116,457	115,053	108,906	104,034	102,834	103,952	100,751	87,726	87,520	72,286	84,965	94,258	94,661	87,235	92,129	73,915	86,247	102,180	90,839	74,602	-	-	-
Gold (kozs)	2,198	-	-	92	122	119	115	113	109	93	96	91	81	91	96	110	118	110	97	96	82	91	102	96	78	-	-	-
Molybdenum Concentrate (kt)	59			2.709	2	3	2	2	3	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%	50.0%	50.0%	50.0%
Molybdenum (klbs)	64,981	-	-	2,986	2,221	2,946	2,743	2,714	2,808	2,800	2,729	2,574	3,137	3,642	4,376	4,967	3,899	2,932	2,660	2,257	3,269	3,110	2,892	1,679	1,640	-	-	-
Pyrite Concentrate (kt)	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrite Conc. Grade (%)	0%	0%	0%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%
Sulfur (klbs)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Payble Metals																												
Copper Concentrate																												
Copper (klbs)	2,034,958	-	-	95,446	124,780	112,381	111,026	105,094	100,393	99,235	100,314	97,225	84,656	84,457	69,756	81,991	90,959	91,347	84,182	88,904	71,328	83,229	98,604	87,660	71,991	-	-	-
Gold (kozs)	2,143	-	-	90	119	116	113	110	106	90	94	89	79	89	94	107	115	107	94	93	80	89	100	94	76	-	-	-
Mollybdenum Concentrate																												
Molybdenum (klbs)	55,234	-	-	2,538	1,888	2,504	2,332	2,307	2,387	2,380	2,319	2,188	2,667	3,096	3,719	4,222	3,314	2,492	2,261	1,919	2,779	2,643	2,458	1,427	1,394	-	-	-
Pyrite Concentrate (kt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metal Prices																												
Copper	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33	$4.33
Gold	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00
Molybdenum	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33	$13.33
Pyrite	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67	$66.67
Revenues ($000)																												
Copper Concentrate																												
Copper	$8,818,153	$0	$0	$413,598	$540,713	$486,984	$481,114	$455,409	$435,037	$430,019	$434,692	$421,309	$366,843	$365,980	$302,275	$355,294	$394,156	$395,839	$364,789	$385,252	$309,088	$360,658	$427,283	$379,860	$311,961	$0	$0	$0
Gold	$4,714,947	$0	$0	$198,172	$262,682	$255,007	$247,504	$242,207	$232,772	$199,008	$205,915	$196,046	$174,037	$195,754	$206,946	$235,289	$252,678	$235,442	$207,231	$205,125	$175,965	$194,974	$218,961	$206,466	$166,765	$0	$0	$0
Mollybdenum Concentrate																												
Molybdenum	$736,450	$0	$0	$33,843	$25,173	$33,383	$31,091	$30,760	$31,821	$31,739	$30,924	$29,167	$35,554	$41,279	$49,591	$56,297	$44,189	$33,225	$30,142	$25,581	$37,052	$35,243	$32,779	$19,030	$18,588	$0	$0	$0
Pyrite Concentrate	$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	$0	$0	$0
Total Revenues	**$14,269,551**	**$0**	**$0**	**$645,613**	**$828,568**	**$775,373**	**$759,710**	**$728,377**	**$699,630**	**$660,766**	**$671,532**	**$646,522**	**$576,434**	**$603,013**	**$558,812**	**$646,880**	**$691,023**	**$664,506**	**$602,162**	**$615,957**	**$522,104**	**$590,874**	**$679,022**	**$605,356**	**$497,314**	**$0**	**$0**	**$0**
Operating Cost																												
Mining Operation	$2,085,954	-	-	114,845	116,074	110,205	108,288	100,918	102,404	102,421	105,534	104,149	103,317	102,447	94,030	79,043	79,649	82,874	90,889	83,334	87,570	81,516	75,623	88,058	72,766	-	-	-
Mining Major Equipment Lease	$220,609	19,817	30,931	35,131	27,408	27,408	27,408	27,408	17,737	7,362	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Process Plant	$3,316,901	-	-	142,012	151,489	151,511	151,506	151,498	151,407	151,089	151,089	151,089	151,096	151,099	151,089	151,089	151,089	151,090	151,092	151,091	151,092	151,091	151,090	151,090	151,109	-	-	-
Water Treatment Plant	$36,379	-	-	1,544	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	1,659	-	-	-
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	$286,956	$0	$0	$13,459	$17,596	$15,847	$15,656	$14,820	$14,157	$13,993	$14,146	$13,710	$11,938	$11,910	$9,836	$11,562	$12,826	$12,881	$11,871	$12,537	$10,058	$11,736	$13,904	$12,361	$10,152	$0	$0	$0
Copper Refining Charges	$158,157	$0	$0	$7,418	$9,698	$8,734	$8,629	$8,168	$7,803	$7,713	$7,796	$7,556	$6,579	$6,564	$5,421	$6,372	$7,069	$7,100	$6,543	$6,910	$5,544	$6,469	$7,663	$6,813	$5,595	$0	$0	$0
Gold Refining Charges	$14,090	$0	$0	$592	$785	$762	$740	$724	$696	$595	$615	$586	$520	$585	$618	$703	$755	$704	$619	$613	$526	$583	$654	$617	$498	$0	$0	$0
Silver Refining Charges	$0																											
Transportation	$343,797	$0	$0	$16,125	$21,081	$18,986	$18,757	$17,755	$16,961	$16,765	$16,947	$16,426	$14,302	$14,269	$11,785	$13,852	$15,367	$15,433	$14,222	$15,020	$12,051	$14,061	$16,659	$14,810	$12,163	$0	$0	$0
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	$0	$0	$0
Transportation	$5,434	$0	$0	$250	$186	$246	$229	$227	$235	$234	$228	$215	$262	$305	$366	$415	$326	$245	$222	$189	$273	$260	$242	$140	$137	$0	$0	$0
Rhenium Credit	-$22,944	$0	$0	-$1,054	-$784	-$1,040	-$969	-$958	-$991	-$989	-$963	-$909	-$1,108	-$1,286	-$1,545	-$1,754	-$1,377	-$1,035	-$939	-$797	-$1,154	-$1,098	-$1,021	-$593	-$579	$0	$0	$0
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	$0	$0	$0
Transportation	$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	$0	$0	$0
Total Operating Cost	**$6,674,948**	**$19,817**	**$30,931**	**$340,759**	**$355,627**	**$344,755**	**$342,340**	**$332,655**	**$322,503**	**$311,279**	**$307,489**	**$304,919**	**$299,003**	**$297,988**	**$283,697**	**$273,379**	**$277,802**	**$281,387**	**$286,616**	**$280,992**	**$278,055**	**$276,713**	**$276,911**	**$285,393**	**$263,936**	**$0**	**$0**	**$0**
Royalty	$531,236	$0	$0	$2,163	$2,483	$2,460	$19,696	$29,997	$30,890	$33,671	$30,636	$28,241	$22,977	$24,228	$22,765	$32,005	$33,085	$31,403	$26,084	$28,815	$20,783	$26,842	$34,579	$27,595	$19,842	$0	$0	$0
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	$0	$0	$0
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	-$10,000	-$10,000	-$5,000
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	$15,000	$20,000	$20,000
Total Production Cost	**$7,252,185**	**$19,817**	**$30,931**	**$342,922**	**$358,110**	**$347,215**	**$362,036**	**$362,653**	**$353,392**	**$344,950**	**$338,125**	**$338,160**	**$329,980**	**$325,216**	**$306,462**	**$305,384**	**$310,887**	**$312,789**	**$312,699**	**$309,807**	**$298,838**	**$303,555**	**$311,489**	**$312,988**	**$283,778**	**$5,000**	**$10,000**	**$15,000**
Operating Income	$7,017,366	-$19,817	-$30,931	$302,691	$470,458	$428,158	$397,674	$365,724	$346,238	$315,816	$333,407	$308,363	$246,454	$277,798	$252,349	$341,497	$380,136	$351,717	$289,463	$306,150	$223,266	$287,319	$367,533	$292,368	$213,536	-$5,000	-$10,000	-$15,000
BC Mining Royalty	$655,979			$6,097	$9,459	$8,612	$8,347	$7,914	$0	$0	$45,523	$42,946	$35,662	$36,862	$34,017	$47,823	$49,438	$46,930	$39,041	$43,106	$31,111	$40,146	$51,686	$41,257	$30,001	$0	$0	$0
Net Income before Depreciation	$6,361,387	-$19,817	-$30,931	$296,594	$461,000	$419,546	$389,326	$357,810	$346,238	$315,816	$287,884	$265,417	$210,791	$240,936	$218,333	$293,674	$330,699	$304,787	$250,422	$263,044	$192,155	$247,174	$315,846	$251,110	$183,535	-$5,000	-$10,000	-$15,000
Capital Cost Depreciation	$1,639,301	$0	$0	$268,866	$451,541	$410,933	$314,747	$2,181	$2,557	$6,953	$8,255	$9,004	$7,529	$11,015	$11,623	$10,125	$15,892	$17,465	$16,858	$13,488	$11,299	$9,811	$8,490	$7,017	$5,913	$17,739	$0	$0
Total Depreciation	$1,639,301	$0	$0	$268,866	$451,541	$410,933	$314,747	$2,181	$2,557	$6,953	$8,255	$9,004	$7,529	$11,015	$11,623	$10,125	$15,892	$17,465	$16,858	$13,488	$11,299	$9,811	$8,490	$7,017	$5,913	$17,739	$0	$0
Net Income After Depreciation	$4,722,087	-$19,817	-$30,931	$27,728	$9,459	$8,612	$74,580	$355,629	$343,680	$308,863	$279,629	$256,413	$203,262	$229,921	$206,710	$283,549	$314,807	$287,322	$233,564	$249,556	$180,856	$237,362	$307,357	$244,093	$177,622	-$22,739	-$10,000	-$15,000
Income Taxes	$1,175,087	$0	$0	$0	$0	$0	$2,017	$86,929	$85,920	$77,216	$69,907	$64,103	$50,816	$57,480	$51,677	$70,887	$78,702	$71,831	$58,391	$62,389	$45,214	$59,341	$76,839	$61,023	$44,405	$0	$0	$0
Net Income after Taxes	**$3,547,000**	**-$19,817**	**-$30,931**	**$27,728**	**$9,459**	**$8,612**	**$72,563**	**$268,700**	**$257,760**	**$231,647**	**$209,722**	**$192,310**	**$152,447**	**$172,441**	**$155,032**	**$212,661**	**$236,105**	**$215,492**	**$175,173**	**$187,167**	**$135,642**	**$178,022**	**$230,518**	**$183,070**	**$133,216**	**-$22,739**	**-$10,000**	**-$15,000**
Cash Flow																												
Net Income before Depreciation	$6,361,387	-$19,817	-$30,931	$296,594	$461,000	$419,546	$389,326	$357,810	$346,238	$315,816	$287,884	$265,417	$210,791	$240,936	$218,333	$293,674	$330,699	$304,787	$250,422	$263,044	$192,155	$247,174	$315,846	$251,110	$183,535	-$5,000	-$10,000	-$15,000
Working Capital																												
Account Recievable	$0	$0	$0	-$35,376	-$10,025	$2,915	$858	$1,717	$1,575	$2,130	-$590	$1,370	$3,840	-$1,456	$2,422	-$4,826	-$2,419	$1,453	$3,416	-$756	$5,143	-$3,768	-$4,830	$4,037	$5,920	$27,250	$0	$0
Accounts Payable	$0	$1,629	$913	$25,465	$1,222	-$894	-$199	-$796	-$834	-$922	-$312	-$211	-$486	-$83	-$1,175	-$848	$364	$295	$430	-$462	-$241	-$110	$16	$697	-$1,764	-$21,693	$0	$0
Inventory - Parts, Supplies	$0	$0	-$12,335	-$12,335	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$24,670	$0	$0
Total Working Capital	$0	$1,629	-$11,422	-$22,246	-$8,803	$2,021	$660	$921	$741	$1,207	-$901	$1,159	$3,354	-$1,540	$1,247	-$5,674	-$2,055	$1,748	$3,846	-$1,218	$4,901	-$3,879	-$4,814	$4,734	$4,157	$30,227	$0	$0

Mining Operations	Total	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Capital Expenditures									
Initial Capital									
Mine	$17,838	$17,321	$517	$0	$0				
Pre-production	$130,872	$48,624	$82,249	$0	$0				
Concentrator	$1,235,351	$123,535	$988,281	$123,535	$0				
Owners Cost	$11,582	$5,791		$5,791	$0				
Sustaining Capital			$46,328						
Mine	$122,799			$276	$780	$263	$283	$838	$1,087
Process Plant	$21,900			$0	$100	$100	$100	$100	$100
Tailing Core	$52,500			$0	$2,500	$2,500	$2,500	$2,500	$2,500
Total Capital Expenditures	**$1,639,171**	**$195,271**	**$1,117,374**	**$129,602**	**$3,380**	**$2,863**	**$2,883**	**$3,438**	**$3,687**
Cash Flow before Taxes	$4,722,217	-$213,459	-$1,159,727	$144,746	$448,817	$418,705	$387,103	$355,293	$343,292
Cumulative Cash Flow before Taxes		-$213,459	-$1,373,187	-$1,228,440	-$779,624	-$360,919	$26,184	$381,477	$724,768
Taxes									
Income Taxes	$1,175,087	$0	$0	$0	$0	$0	$2,017	$86,929	$85,920
Cash Flow after Taxes	**$3,547,130**	**-$213,459**	**-$1,159,727**	**$144,746**	**$448,817**	**$418,705**	**$385,087**	**$268,364**	**$257,372**
Cumulative Cash Flow after Taxes		**-$213,459**	**-$1,373,187**	**-$1,228,440**	**-$779,624**	**-$360,919**	**$24,167**	**$292,531**	**$549,903**
Economic Indicators before Taxes									
NPV @ 0%	$4,722,217								
NPV @ 5%	$2,296,923								
NPV @ 8%	$1,494,262								
NPV @ 10%	$1,109,947								
IRR	21.7%								
Payback	3.9								
Economic Indicators after Taxes									
NPV @ 0%	**$3,547,130**								
NPV @ 5%	**$1,682,489**								
NPV @ 8%	**$1,059,408**								
NPV @ 10%	**$759,091**								
IRR	**19.0%**								
Payback	**3.9**								

Mining Operations	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
Capital Expenditures										
Initial Capital										
Mine										
Pre-production										
Concentrator										
Owners Cost										
Sustaining Capital										
Mine	$7,642	$9,558	$8,652	$505	$18,873	$10,846	$3,031	$20,433	$19,520	$12,629
Process Plant	$10,000	$100	$100	$100	$100	$100	$100	$10,000	$100	$100
Tailing Core	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500
Total Capital Expenditures	**$20,142**	**$12,158**	**$11,252**	**$3,105**	**$21,473**	**$13,446**	**$5,631**	**$32,933**	**$22,120**	**$15,229**
Cash Flow before Taxes	$296,881	$274,825	$255,324	$211,041	$217,923	$206,134	$282,369	$295,711	$284,415	$239,038
Cumulative Cash Flow before Taxes	$1,021,650	$1,296,474	$1,551,798	$1,762,839	$1,980,762	$2,186,896	$2,469,265	$2,764,975	$3,049,390	$3,288,428
Taxes										
Income Taxes	$77,216	$69,907	$64,103	$50,816	$57,480	$51,677	$70,887	$78,702	$71,831	$58,391
Cash Flow after Taxes	**$219,666**	**$204,917**	**$191,221**	**$160,225**	**$160,443**	**$154,456**	**$211,482**	**$217,009**	**$212,584**	**$180,647**
Cumulative Cash Flow after Taxes	**$769,569**	**$974,486**	**$1,165,707**	**$1,325,932**	**$1,486,375**	**$1,640,831**	**$1,852,313**	**$2,069,322**	**$2,281,906**	**$2,462,553**

Mining Operations	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25
Capital Expenditures									
Initial Capital									
Mine									
Pre-production									
Concentrator									
Owners Cost									
Sustaining Capital									
Mine	$780	$2,131	$2,748	$1,925	$0	$0			
Process Plant	$100	$100	$100	$100	$100	$100			
Tailing Core	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$0	$0	$0
Total Capital Expenditures	**$3,380**	**$4,731**	**$5,348**	**$4,525**	**$2,600**	**$2,600**	**$0**	**$0**	**$0**
Cash Flow before Taxes	$258,446	$192,325	$237,947	$306,508	$253,244	$185,091	$25,227	-$10,000	-$15,000
Cumulative Cash Flow before Taxes	$3,546,874	$3,739,199	$3,977,146	$4,283,654	$4,536,898	$4,721,989	$4,747,217	$4,737,217	$4,722,217
Taxes									
Income Taxes	$62,389	$45,214	$59,341	$76,839	$61,023	$44,405	$0	$0	$0
Cash Flow after Taxes	**$196,057**	**$147,111**	**$178,606**	**$229,669**	**$192,221**	**$140,686**	**$25,227**	**-$10,000**	**-$15,000**
Cumulative Cash Flow after Taxes	**$2,658,610**	**$2,805,721**	**$2,984,327**	**$3,213,996**	**$3,406,217**	**$3,546,903**	**$3,572,130**	**$3,562,130**	**$3,547,130**

23 ADJACENT PROPERTIES

There are a number of mineral occurrences on northern Vancouver Island, adjacent and in the vicinity of the 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 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.

NorthIsle, through North Island Mining Corp., 100% owns the claims forming the Project subject to a 10% net profit royalty, except for the 16 claims that comprise the Red Dog option, which are subject to a 3% Net Smelter Returns Royalty (“NSR”), of which 2% could be repurchased for a one-time $2M payment. There are no additional royalties, back-in rights, payments or other agreements and encumbrances to which the property is subject.

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 0.10% Cu the Hushamu resource estimate returned an Indicated Resource of 473 million metric tonnes at 0.20% Cu and an Inferred Resource of 414 million metric tonnes at 0.15% Cu. The Red Dog Deposit was the subject of an earlier resource estimate (Game, B. and Burt, P. (2017)) that returned 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. While the earlier report used a Cu cut-off of 0.20% as being optimal, a subsequent PEA (M3, 2017) suggested that a 0.10% Cu cut-off was appropriate for Red Dog. For comparison, Table 25-1 shows the Red Dog resource at different cut-offs.

Table 25-1: Red Dog Resource (2017)

Indicated Resource				
Cut-off (%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 (%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

The process plant designed for the Project consists of a conventional copper/moly flotation process that has been used successfully by the mining industry for many years. 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 infill and step out holes to convert resources at the Hushamu Deposit from the Inferred to Indicated categories and expand the resource to the southeast of the known deposit. It is estimated that an additional 40 holes (15,000 m) 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 to determine the optimum process and the optimum process design criteria, for unit processes and to evaluate the variability in the metallurgical response for the various ore types that will be used as the basis for the next Study. Tests should include:

- Mineralogy data should be collected and analyzed to determine the optimum primary grind size for liberation. In addition, further tests are required to optimize the regrind size.
  - Mineralogical studies should also be conducted for flotation tailings, as needed, to evaluate potential minerals that generate ARD and mobilized metals.
- 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 and tailings handling.
- A grind size variability test to confirm the grind size distribution for regrinding copper concentrate to maximize recoveries and concentrate grade.
- Variability testing of identified ore types to determine the effectiveness of the selected process for each ore type over the life of the mine based on metal grades, ore types, presence of impurities, etc.
- 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 using bulk samples that have been generated using the selected optimum processing methods:
  - Settling and filtration tests on flotation concentrate.
  - Settling and filtration tests on tailings.
  - Geochemical properties of tailings and waste rock.
- Molybdenite flotation tests to confirm molybdenite separation performance.

- Evaluation of deleterious elements in the final concentrates (copper and molybdenum) 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.
- Conduct testing required to determine the optimum treatment method and develop the process design criteria for effluent water treatment if determined to be required.

The approximate cost of this test work would be around $850,000.

26.3 MINE WASTE STORAGE FACILITY

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

- Topographic survey.
- Geotechnical and hydrogeological site and laboratory investigations of dam site foundation conditions following guidance by the Engineers and Geoscientists of British Columbia.
  - Development of a site-specific seismic hazard assessment for input ground motions for deformation analyses.
- 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).
- Engineering design analyses for seepage, deposition planning and mass balance, dam staging, dam stability, dam deformation including dynamic loading by earthquake.
- Hydrogeologic model of the facility.
- Development of water balance and water management system designs for water diversion, reclaim from the MWSF impoundment, and reclaim of seepage from the MWSF dams including sand transport water.
- Definition of source terms and prediction of geochemistry for the facility.
- Design of tailings process including and transport to the cyclone station, classification, and transport of sand to the dams and tailings to the impoundment.
- Definition of borrow sources for the dam construction.
  - Starter dam borrow sources to be defined.
  - Sand mass balance for dam construction to be confirmed.
- Design of haul roads for moving waste rock and overburden till to dam sites impoundment.
- Design of monitoring instrumentation.
- Closure plan including spillway sizing.
- Breach analyses.

- Operations, Maintenance, and Surveillance Manual.
- Emergency Preparedness and Response Plan.
- 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 $2,000,000 to $3,500,000.

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.

NorthIsle will be undertaking a study of trolley assisted haulage. Possible benefits may include diesel fuel related greenhouse gas reduction and overall reduced energy costs. This study will also review alternative technologies such as hydrogen fuel cells for haulage units. This study would cost around $150,000 to complete.

26.5 ENVIRONMENTAL

The Project will require baseline studies and additional water monitoring results. This work should be started in 2021 in consultation with the Project's environmental consultants.

26.6 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 must be secured. This will require additional environmental baseline surveys to ensure compliance with environmental design and permit criteria. The approximate cost of this environmental baseline work would be in the range of $500,000 to $750,000.

26.7 INFRASTRUCTURE

- In support of further 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 $250,000.
- 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 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 $250,000.

- Develop a conceptual design and costs to establish copper concentrate receiving, storage and loadout facilities on Holberg Inlet to ship product from the 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.

26.8 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.

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Appendix A

Study Contributors and Professional Qualifications

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 39 years. I have over twenty (20) years of plant operations and project management experience at a variety of mines including both precious metals and base metals. I have worked both in the United States (Nevada, Idaho, California) and overseas (Papua New Guinea, China, Chile, Mexico) at existing operations and at new operations during construction and startup. My operating experience in precious metals processing includes heap leaching, agitation leaching, gravity, flotation, Merrill-Crowe, and ADR (CIC & CIL). My operating experience in base metal processing includes copper heap leaching with SX/EW and zinc recovery using ion exchange, SX/EW, and casting. I have been responsible for process design for new plants and the retrofitting of existing operations. 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 Sections 13, 17, 21.5.1 and corresponding sections of 1, 25, 26 and 27 of the technical report titled “North Island Copper and Gold Project, NI 43-101 Technical Report, Preliminary Economic Assessment, British Columbia, Canada” dated effective February 4, 2021 (“Technical Report”).
7. I have had prior involvement with the property that is the subject of the Technical Report. I signed off as a Qualified Person on the 2017 preliminary economic assessment, Section 17, on the property.
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 18 March 2021.

“signed”
Signature of Qualified Person

Laurie Tahija
Print Name of Qualified Person

CERTIFICATE OF QUALIFIED PERSON

I, Daniel Roth, P.E., 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 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 worked continuously as a design engineer, engineering and project manager since 1990, a period of 30 years. I have worked in the minerals industry as a project manager for M3 Engineering & Technology Corporation since 2003, with extensive experience in hard rock mine process plant and infrastructure design and construction, environmental permitting review, as well as development of capital cost estimates, operating cost estimates, financial analyses, preliminary economic assessments, pre-feasibility and feasibility studies.
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 2, 3, 18, 21, 22, 24 and corresponding sections of 1, 25, 26 and 27 of the technical report titled "North Island Copper and Gold Project, NI 43-101 Technical Report, Preliminary Economic Assessment, British Columbia, Canada" dated effective February 4, 2021 (the "Technical Report").
7. I have prior involvement with the property that is the subject of the Technical Report. I was one of the Qualified Persons responsible for the 2017 preliminary economic assessment for the property. I visited the 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 Western and its subsidiaries as defined by Section 1.5 of NI 43-101.
10. I have read NI 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 this 18th day of March, 2021.

"Signed"
Signature of Qualified Person

Daniel Roth
Print Name of Qualified Person

CERTIFICATE OF QUALIFIED PERSON

I, Brian 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, 26 and 27 of the technical report titled "North Island Copper and Gold Project, NI 43-101 Technical Report, Preliminary Economic Assessment, British Columbia, Canada" for Northisle Copper and Gold Inc. February 4, 2021 ("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 technical reports 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, and "North Island Copper and Gold Project NI 43-101 Technical Report Preliminary Economic Assessment" prepared for Northisle Copper and Gold Inc. with effective date October 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.

<u>" signed & sealed"</u>
Brian Game, B.Sc. P.Geo.
Dated at Vancouver, B.C.
March 18, 2021

CERTIFICATE OF QUALIFIED PERSON

John Nilsson, MSc., P.Eng.

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

1. I am a Professional Engineer, President of:

   Nilsson Mine Services Ltd.
   20263 Mountain Place
   Pitt Meadows, B.C.
   Canada

2. I graduated from Queen's University with a Bachelor of Science degree Geology in 1977 and subsequently a Master of Science degree through the Department of Mine Engineering in 1990.
3. I am a member in good standing of the Engineers & Geoscientists British Columbia (License #20697).
4. I have worked as a geologist and then a mining engineer for a total of 43 years on mining related precious and base metal projects in North America, Central America, South America, Africa, Europe and Asia.
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 a contributing author for the preparation of the technical report titled "North Island Copper and Gold Project, NI 43-101 Technical Report, Preliminary Economic Assessment, British Columbia, Canada" dated effective February 4, 2021, and am responsible for Sections 15, 16, 21.3.5, 21.3.6, 21.4.1, 21.5.3, and corresponding sections of 1, 25, 26 and 27.
7. I have prior involvement with the property that is the subject of the Technical Report. I was one of the Qualified Persons responsible for the 2017 preliminary economic assessment for the property. I visited the project site on April 12, 2017.
8. 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.
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 National Instrument 43-101 and Form 43-101F1, and the Technical Report has 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 websites accessible by the public, of the Technical Report.

Signed and dated this 18th day of March, 2021.

"signed"
Signature of Qualified Person

John W. Nilsson, MSc., P.Eng
Print Name of Qualified Person

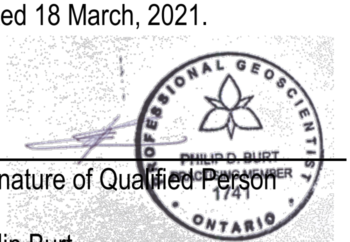
CERTIFICATE OF QUALIFIED PERSON

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 Geoscientist in the following jurisdictions:
    - Saskatchewan, Canada (No. 10902, lifetime member, non-practicing)
    - Ontario, Canada (No. 1741, practicing, in good standing)

    I am also a Lifetime Fellow of the Society of Economic Geologists.
4. I have practiced geology, project management and computer applications for 50 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, 26 and 27 of the technical report titled “North Island Copper and Gold Project, NI 43-101 Technical Report, Preliminary Economic Assessment, British Columbia, Canada” dated effective February 4, 2021 (“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 1980.
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 18 March, 2021.



Signature of Qualified Person

Philip Burt
Print Name of Qualified Person

CERTIFICATE OF QUALIFIED PERSON Ben Wickland

I, Ben Wickland, state that:

(a) I am a Senior Geotechnical Engineer at:
Golder Associates Ltd.
200-2920 Virtual Way
Virtual Way, Vancouver, BC, V5M 0C4.

(b) This certificate applies to the technical report titled North Island Copper and Gold Project NI 43-101 Technical Report Preliminary Economic Assessment, British Columbia, Canada with an effective date of: February 4, 2021.

(c) I am a "qualified person" for the purposes of National Instrument 43-101 (the "Instrument"). My qualifications as a qualified person are as follows. I graduated with a Bachelor's of Science degree in Civil Engineering from the University of Saskatchewan in 1998, and a Doctor of Philosophy in Mining Engineering from the University of British Columbia, 2006. I am a Professional Engineer registered with Engineers and Geoscientists of British Columbia, Association of Professional Engineers and Geoscientists of Saskatchewan, Engineers Yukon, and the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists. My relevant experience after graduation (1998 to 2021) for the purpose of the Technical Report includes study of and concept through detail design of mine waste storage facilities.

(d) My most recent personal inspection of the North Island Project site described in the Technical Report occurred on 12 April 2017 and was for a duration of 1 day.

(d) I am responsible for Sections 1.13.3, 18.3, 26.3, and related portions in Section 27 of the Technical Report.

(e) I am independent of the issuer as described in section 1.5 of the Instrument.

(f) My prior involvement with the property that is the subject of the Technical Report is as follows. I have previously completed studies for the Hushamu Copper-Gold Project in 2012, 2013, and in 2017 (renamed North Island Project) which form the basis of the current study. Other than these studies, I have had no prior involvement with the North Island Project that is the subject of the Technical Report.

(g) I have read National Instrument 43-101. The parts of the Technical Report for which I am responsible has been prepared in compliance with this Instrument; and

(h) At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the parts of Technical Report for which I am responsible, contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated at Vancouver, BC this 18th of March, 2021.

"signed and sealed"

Ben Wickland, Ph.D., P.Eng.