NI 43-101 Technical Report on the Copperwood Copper Project Michigan, USA

Prepared for:

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IMPORTANT NOTICE

This report was prepared as a National Instrument 43-101 Technical Report, in accordance with Form 43-101F1, for Highland Copper Company Inc. by G Mining Services Inc. The quality of information, conclusions, and estimates contained herein is based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report.

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NI 43-101 Technical Report – Copperwood Copper Project

Michigan, USA

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1 EXECUTIVE SUMMARY

1.1 Introduction

G Mining Services Inc. ("GMSI") was commissioned by Highland Copper Company Inc. ("Highland") to provide mineral resources estimate for the Copperwood copper Project located in the Upper Peninsula, Michigan, USA. This independent technical report was prepared to support the mineral resource estimate for the project prepared by GMSI and disclosed by Highland on October 19, 2017.

1.2 Project Description and Location

Highland acquired the Copperwood Project through the acquisition of all of the outstanding shares of Copperwood Resources Inc. (CRI), formerly known as Orvana Resources US Corp. The Copperwood Project is located in northwest Michigan, USA, in Ironwood and Wakefield townships, Gogebic County. A general property location map is shown in Figure 4.1. The coordinate central to the project area is approximately 270,000 meters (m) East, 5,173,500 m North (UTM Zone 16, NAD83 datum).

1.3 Ownership

On June 17, 2014, Highland acquired the Copperwood Project from Orvana Minerals Corp. (Orvana) through the acquisition of all the shares of CRI, the lease holder of the mineral rights and owner of the surface rights comprising the Copperwood Project.

Throughout this report, unless otherwise indicated, activities performed prior to June 17, 2014 refer to events and work done during the period when Orvana owned the Copperwood Project; activities completed after June 17, 2014 refer to events and work done during the period after Highland acquired CRI from Orvana.

1.4 Deposits

The Copperwood Project comprises the Copperwood Deposit and the Satellite Deposits. The Copperwood Deposit consists of four metallic and non-metallic mineral leases totaling contiguous 1,904 contiguous hectares under two 20-year lease agreements with Keweenaw Land Association Limited (KLA), a 20-year lease agreement with Sage Minerals Inc. (Sage) and a 30-year mineral lease agreement with A. M. Chesbrough LLC (Chesbrough). The mineral rights' boundaries and lease details are summarized in

Table 1.1. The sections, surveyed as part of the Public Lands Survey System, are identified at corners with federal monuments. The Satellite Deposits consist of options to convert an additional 595 ha into mineral leases on mineralized zones adjacent to the Copperwood Deposit.

1.5 Geological Setting

The Copperwood Project is situated on the flank of the 2,200 kilometre long Mesoproterozoic midcontinent rift system of North America and is hosted in the Nonesuch Formation, a package of lacustrine and fluvial sediments, which form part of the Oronto Group post-rifting basin fill. Mineralization is hosted within two sedimentary sequences termed the Lower Copper Bearing Sequence (LCBS) and Upper Copper Bearing Sequence (UCBS) at the base of the Nonesuch Formation.

The LCBS is composed of the Domino, Red Massive and the Gray Laminated units. The Domino unit is the principal copper host at Copperwood and is characterized by black shale with a mean thickness of 1.6 meters (m). The Red Massive sub-unit comprises siltstone to sandstone and has a mean thickness of 0.3 m. The Gray Laminated sub-unit is a gray laminated siltstone and has a mean thickness of 1.0 m.

The UCBS is composed of the Upper Transition, Thinly, Brown Massive and Upper Zone of Values units. The Upper Transition unit comprises thinly bedded siltstone to sandstone and black shale with a mean thickness of 1.0 m. The Thinly unit is characterized by black shale with a mean thickness of 0.1 m. The Brown Massive unit is characterized by brownish red siltstone with a mean thickness of 1.1 m and one- to two-centimeter thick calcareous nodules. The Upper Zone of Values unit is composed by laminated, greenish black, shaley siltstone with a mean thickness of 0.5 m. The UCBS is separated from the LCBS by thinly to medium bedded red siltstone, grey siltstone, and sandstone. The thickness between the UCBS and the LCBS gradually decreases from 6.0 m in the western part of the Deposit to 0.5 m in the eastern part of the Deposit.

The LCBS and UCBS at Copperwood has been delineated by drilling over an area of approximately 3,049 m east-west and 1,130 m north-south. The Copperwood and Satellite Deposits are hosted within the limbs of the broad, gently northwest-plunging Presque Isle Syncline. The LCBS dips gently and subcrops beneath 20 to 35 m of unconsolidated glacial sediments along the southern edge of the Copperwood Project area.

1.6 Mineralization

The mineralization at Copperwood has been interpreted as a sediment-hosted stratiform copper deposit of the reduced facies class. Well known reduced-facies sediment-hosted stratiform copper deposits include most of the deposits within the Central African Copperbelt and the Kupferschiefer (Poland and Germany), Redstone (Canada) and nearby White Pine (Michigan).

Sediment-hosted stratiform copper deposits consist of copper and copper-iron sulphide minerals hosted by siliciclastic or dolomitic rocks in which a relatively thin copper-bearing zone is mostly conformable with stratification of the host sedimentary rocks. Copper in chalcocite occurs as disseminations and seams along bedding planes. Chalcocite is the only observed copper-sulphide bearing mineral present at Copperwood.

1.7 Historical Exploration Work

Historical exploration at Copperwood has been completed through surface drilling programs conducted in 1956, 1957, 1959, 2008, 2009, 2010, 2011, 2013 and 2017. In 1958, AMAX sunk an exploration shaft and completed test mining from a 620 meter exploration drift.

To date, there have been no surface geochemical exploration programs nor have there been any surface or airborne geophysical exploration programs conducted on the Copperwood Project.

Historical exploration drilling on the Copperwood Project property and surrounding leases was completed during two separate phases of activity; the first phase by USMR and Bear Creek Mining (BCM) was performed from 1956 to 1959, while the second phase was performed by Orvana starting in 2008 and completed in 2013.

Between 1956 and 1959, USMR and BCM drilled 184 core holes in the Western Syncline area. Ninety-six of these drill holes were drilled in the Copperwood Deposit area. USMR drilled forty-two holes in the “main” area and 31 holes in Section 5 from 1956 to 1958. BMC drilled 23 holes in Section 6 in 1959. USMR drilled 88 drill holes in the satellite deposits from 1956 to 1957. The core diameter for these holes varied between 3.01 cm (AX size core) and 4.20 cm (BX size core).

The second phase of drilling at Copperwood commenced in 2008, with Orvana drilling five core holes for environmental purposes. These drill holes intersected significant copper mineralization. Orvana subsequently completed 82 drill holes in 2009. Orvana drilled 24 additional core holes during 2010 to firm up the resource, to collect metallurgical and geotechnical data and to investigate a suspected fault. Another 15 core holes were drilled during 2010 to verify copper mineralization in the Section 6 area. In 2013, Orvana drilled 21 core holes to collect additional metallurgical and geotechnical data. The core diameter for the Orvana drill holes was 4.80 cm (NQ size core) for the 2008 to 2010 drilling and 6.35 cm (HQ size core) for the 2013 drilling program.

1.8 Highland Copper Exploration Work

In 2017, CRI, Highland's subsidiary, carried out a drilling program comprising of 33 HQ-diameter and three PQ-diameter drill holes for a total of 6,784 meters of core. The drilling provided 527 samples for copper and silver assaying and 607 kg taken for metallurgical testing. The 2017 drill program was designed to upgrade the Inferred Mineral Resources at the eastern section of the deposit (as per the 2015-resource estimate), obtain metallurgical samples and carry out geotechnical studies to refine the mining plan.

1.8.1 Sampling and Analysis

Sampling by Highland comprised half- and quarter-split core samples collected from the 2017 surface diamond-drill program. Sample intervals were variable and honoured logged lithologic intervals. Extensive specific gravity measurements and core recovery observations and measurements were collected.

Activation Laboratories Ltd. ("Actlab") in Thunder Bay, Ontario, Canada was used as the primary laboratory for the final preparation of samples and assays for the Highland program. Actlab is accredited by the Standards Council of Canada and conforms to requirements of CAN P 1579 (ISO/IEC 17025:2005). Accreditation includes the analytical procedures used for the samples.

All samples for geotechnical and metallurgical testing were shipped to specialized laboratories. For an improved understanding of the ore geotechnical characteristics, 19 holes were televiewed and subsequently cemented.

1.8.2 Sample Security

A Highland geologist supervised the extraction of the mineralized intervals from the drill casing to ensure recovery and correct orientation during boxing. Each core box containing the mineralized core was sealed with shrink wrap and a sticker initialed by the driller's helper and the on-site geologist. A chain of custody form for the mineralized core boxes was filled out with a signature from the driller. Core boxes were immediately transported by the geologist via pick-up truck to a secured building in White Pine.

1.9 Data Verification

GMSI has reviewed the available data used in the mineral resource estimate, including drill logs, assay certificates, down-hole surveys, and additional information sources. Approximately 50% of the entire assay database was investigated against the original assay certificates for possible typographical errors, wrong sample numbers or duplicates in 2015. Additionally, seventy-six (76) drill holes were randomly selected to compare with original lithological logs. Very few minor errors were found in less than half of a percent of the data investigated. Drill hole collars from 2017 were visited, and drill core was viewed during November 2017 by the GMSI QP and Highland representatives. GMSI QP is of the opinion that the drill hole database is in good condition and could be used with confidence in the Mineral Resource estimate.

1.10 Mineral Resource Estimate

The estimate was conducted in a block model characterised by three key units of the Lower Copper Bearing Sequence (LCBS: Gray Laminated, Red Massive, and Domino beds) and a single unit representing the Upper Bearing Copper Sequence (UCBS). Lithological solids were built in Leapfrog GEO™ for each unit of the LCBS, and a single unit with a minimum thickness of 2.2 m was created for the UCBS. Hanging wall and footwall dilutions zones were also incorporated into the block model. Uncapped raw assays were composited to produce a single composite per unit, per drill hole. Variography studies highlighted a near horizontally isotropic distribution of copper and a low nugget effect on copper and silver grades. Block sizes of 20 m by 20 m horizontally, with a 2.5 m height were used in the block model. Bulk density was assigned based on rock type, derived from core measurements. Copper and silver grades were estimated using the Ordinary Kriging (OK) interpolation method in three successive passes, using ellipse ranges of 175 m, 250 m, and 350 m.

To define resource categories, GMSI outlined groups of globally similar interpolation passes. Measured Mineral Resources thus constitute the bulk of the mineral resources in the Copperwood Deposit area (as defined below) and include blocks interpolated generally in the first pass. Indicated Mineral Resources are located at the periphery of the measured category where blocks are generally interpolated in the second pass and are limited to the Copperwood Deposit. All other interpolated blocks are categorized in the Inferred Mineral Resource category, including all blocks in the Satellite Deposits.

Resources are reported using a cut-off grade of 1.0% Cu, based on an underground "room and pillar" mining scenario. Mineral Resources were classified according to the CIM Definition Standards on Mineral Resources and Mineral Reserves.

The total Measured & Indicated Mineral Resources at Copperwood are reported at 42.5 million tonnes grading an average 1.59% copper and 3.9 g/t silver containing 1.5 billion pounds of copper and 5.4 million ounces of silver using a cut-off grade of 1.0% Cu for the LCBS and UCBS combined. Inferred Mineral Resources are reported at 4.9 million tonnes grading an average 1.34% copper and 1.78 g/t silver containing 146 million pounds of copper and 0.3 million ounces of silver using a cut-off grade of 1.0% Cu.

The Satellite Deposits Inferred Mineral Resources are reported at 39.3 million tonnes grading 1.20% copper and 2.74 g/t silver containing 1.04 billion pounds of copper and 3.4 million ounces of silver using a cut-off grade of 1.0% Cu for the LCBS and UCBS combined. A summary of mineral resource estimates is presented in Table 1.1.

Table 1.1: Mineral Resource Estimate - Copperwood Project 1.0% Cu Cut-off Grade – October 18, 2017

Deposits	Resource Category	Tonnage (Mt)	Copper Grade (%)	Silver Grade (g/t)	Copper Contained (M lbs)	Silver Contained (M oz)
LCBS	Measured	26.8	1.69	4.59	1,000	4.0
	Indicated	11.6	1.50	2.68	383	1.0
	M + I	**38.4**	**1.63**	**4.02**	**1,383**	**5.0**
	Inferred	4.6	1.36	1.69	138	0.3
UCBS	Measured	-	-	-	-	-
	Indicated	4.1	1.19	3.33	107	0.4
	M + I	**4.1**	**1.19**	**3.33**	**107**	**0.4**
	Inferred	0.3	1.05	3.23	8	0.0
Satellite LCBS	Inferred	33.2	1.21	2.37	885	2.5
Satellite UCBS	Inferred	6.1	1.15	4.75	155	0.9

Notes on Mineral Resources:

1) Mineral Resources are reported using a copper price of 3.00$/lb and a silver price of 18$/oz.
2) A payable rate of 96.5% for copper and 90% for silver was assumed.
3) The Copperwood feasibility study reported metallurgical testing with recovery of 86% for copper and 50% for silver.
4) Cut-off grade of 1.0% copper was used, based on an underground “room and pillar” mining scenario.
5) Operating costs are based on a processing plant located at the Copperwood site.
6) An NSR sliding scale royalty is applicable and equivalent to 3.0% at $3.00/lb.
7) Measured, Indicated and Inferred Mineral Resources have a drill hole spacing of 175 m, 250 m and 350 m, respectively.
8) No mining dilution and mining loss were considered for the Mineral Resources.
9) Rock bulk densities are based on rock types.
10) Classification of Mineral Resources conforms to CIM definitions.
11) The qualified person for the estimate is Mr. Réjean Sirois, eng., Vice President Geology and Resources for GMSI. The estimate has an effective date of October 18, 2017.
12) Mineral resources that are not mineral reserves do not have demonstrated economic viability. The estimate of mineral resources may be materially affected by environmental, permitting, legal, title, taxation, sociopolitical, marketing, or other relevant issues.
13) LCBS : Lower Copper Bearing Sequence.
14) UCBS : Upper Copper Bearing Sequence.
15) The quantity and grade of reported inferred resources in this estimation are uncertain in nature and there has been insufficient exploration to define these inferred resources as indicated or measured mineral resources.

1.11 Historical Environmental Work

Orvana commenced with collecting base line data for an Environmental Impact Assessment (EIA) in 2008. Collection of environmental data has continued throughout the subsequent years. Data collected to date includes surface and ground water monitoring sites and wells, stream and wetland mapping, terrestrial and aquatic flora and fauna identification studies and acid rock drainage and metals leaching analysis on samples of various mineralized and waste rock types present at Copperwood.

All work undertaken on the Copperwood Project to date has been performed in compliance with Michigan State Department of Environmental Quality (MDEQ) regulations. The Project holds the following permits from the MDEQ:

- April 30, 2012 – Part 632 Mining Permit for Copperwood Project, Upper Peninsula, Michigan, USA.
- November 13, 2012 - National Pollutant Discharge Elimination System permits for treated sanitary and process wastewaters related to the proposed Copperwood copper mine, Upper Peninsula, Michigan, USA.
- July 17, 2012 – Air Quality Division Permit to Install 180-11.
- February 22, 2013 - Wetlands Part 303 and the Inlands Lakes and Streams Part 301 permits for the proposed Copperwood copper mine.
- June 24, 2013 – Part 315 Dam Safety Permit.

Highland is currently considering the amendment of some permits considering the ongoing feasibility study.

1.12 Metallurgical Work

Metallurgical work is currently being undertaken as part of the ongoing feasibility study, and will be reported within the next NI 43-101 report due in 2018.

1.13 Mining Operations

There is no current mining activity on the Copperwood Project and there is no record or evidence of historical mining activity on the Copperwood Project. The vertical shaft, exploration drifts and stopes developed by AMAX in 1958 were purely for exploration purposes.

1.14 Conclusions

The resource estimate was prepared in accordance with CIM Standards on Mineral Resources and Reserves (adopted May 10, 2014) and is reported in accordance with the NI 43-101. The mineral estimate was prepared by Mr. Réjean Sirois, Eng., Vice President, Geology and Resources of G Mining Services Inc., an independent "qualified person" as defined in NI 43-101. GMSI makes the following conclusions:

- GMSI validated the drill hole database used for the resource estimation and concluded that it could be used with confidence in the Mineral Resource estimate;
- There is a good confidence in the Ordinary Kriging interpolation method used;
- An underground room & pillar mining scenario is judged to be the most adapted to the geometry and dip of the LCBS, as well as to the tonnage of the deposits;
- The following conceptual mining parameters were used to calculate block values: 1) An NSR sliding scale royalty equivalent to 3.0% at $3.00/lb, 2) No mining loss/dilution, 3) Copper price of 3.00$/lb and a silver price of 18$/oz, 4) Recovery of 86% for copper and 50% for silver, 5) A payable rate of 96.5% for copper and 90% for silver, 6) A cut-off grade of 1.0% Cu, and 7) Operating costs based on a plant located at Copperwood;
- Measured & Indicated Mineral Resources at Copperwood are reported at 42.5 million tonnes grading an average 1.59% copper and 3.9 g/t silver containing 1.5 billion pounds of copper and 5.4 million ounces of silver using a cut-off grade of 1.0% Cu for the LCBS and UCBS combined. Inferred Mineral Resources are reported at 4.9 million tonnes grading an average 1.34% copper and 1.78 g/t silver containing 146 million pounds of copper and 0.3 million ounces of silver using a cut-off grade of 1.0% Cu.
- The Satellite Deposits Inferred Mineral Resources are reported at 39.3 million tonnes grading 1.20% copper and 2.74 g/t silver containing 1.04 billion pounds of copper and 3.4 million ounces of silver using a cut-off grade of 1.0% Cu for the LCBS and UCBS combined.
- A large proportion of the high-grade copper and silver resources are located in the western part of the Copperwood Deposit, with grades ranging from 1.5% to 2.5% copper and 4.0 to 16.0 g Ag/t. Section 5 also contributes significantly to the overall tonnage at Copperwood.
- Further upside exists east of Section 5, where the LCBS and UCBS converge. This introduces the possibility of mining the "full column" as undertaken often at White Pine. Also, remaining Inferred Resources in Section 5 should be upgraded to Indicated with further drilling to add additional tonnage to the mine life.

- GMSI believes that there are no significant risks or uncertainties associated with the Project's mineral resource estimate or its potential economic viability.

1.15 Recommendations

GMSI recommends that further work is undertaken to compliment the ongoing feasibility study, focusing on further upgrades of Inferred resources into the Indicated category, and structural geology studies. The following work is recommended for the Copperwood Project:

- Infill resource drilling at Copperwood Deposit (Section 5 area) to upgrade current Inferred Mineral Resources to Indicated category.
- Consider undertaking a structural review of the Copperwood Deposit to confirm and refine the current interpretation of the thrust fault (T1). This thrust fault displaces the LCBS and UCBS in the western portion of the deposit, and adds uncertainty to the mine plan in regard to its exact location.
- Consider exploring the area east of Section 5, where the UCBS and LCBS converge and the grade of the UCBS improves dramatically. There is no pre-existing drilling for 1.8 km eastwards of Section 5, and provides an opportunity to mine both the LCBS and UCBS as a single unit (as seen at White Pine). This has the potential to add significant tonnage to the Copperwood Deposit, and the life of the mine.
- Undertake test work to determine the regional principle stress directions from down-hole hydraulic fracturing, to aid in mine designs.

Recommendations in 2015 included metallurgical and geotechnical drilling, which has been undertaken as part of the ongoing feasibility study.

2 INTRODUCTION

2.1 Terms of Reference

GMSI was retained by Highland as an independent qualified entity to provide an estimation of mineral resource for the Copperwood Project located in the western Upper Peninsula, Michigan, USA. Highland acquired all rights, title and interest in the Copperwood Project from Orvana through the acquisition in June 2014 of all the outstanding shares of CRI from Orvana. Most of the exploration work on Copperwood was done by Orvana through its operating US subsidiary. Throughout this report, unless otherwise indicated, activities done before June 17, 2014 refer to events and work done during the period when Orvana owned the Copperwood Project. Activities done after June 17, 2014 refer to events and work done during the period after Highland acquired CRI.

This Technical Report was prepared by GMSI in accordance with the following documents published by the Canadian Securities Administrators (CSA) authorities:

- National Instrument 43-101 (NI 43-101) – Standards of Disclosure for Mineral Projects (effective date June 30, 2011);
- Form 43-101F1 – Specific requirements for the preparation and contents of a technical report (effective date June 30, 2011); and
- Companion Policy 43-101CP – Views of the CSA on how certain provisions of NI 43-101 are to be interpreted and applied (effective date June 30, 2011).

Additionally, GMSI has also prepared this report in accordance with guidelines for scientific and technical disclosure on mineral properties published by the TSX Venture Exchange (TSXV):

- Appendix 3F – Mining Standards Guidelines (effective date June 14, 2010).

The information and data contained in this report were obtained from Highland; sources included the previously published NI 43-101 technical reports and references cited in those reports. The most recent technical report stating a Mineral Resource estimate for the Copperwood Project was written by GMSI in 2015. Previous technical reports include Marston and Marston Inc. (now part of Golder Associates Ltd.) in March 2011 and Golder Associates Ltd., 2014, in connection with the acquisition of CRI, which only reported historical estimates for the Copperwood Deposit.

2.2 Effective Date

The effective date of this technical report, titled NI 43-101 Technical Report on the Copperwood Project, Michigan, USA, is October 18, 2017.

There were no material changes to the scientific and technical information on the Copperwood Project between the effective date and the signature date of the technical report.

2.3 Qualified Person and Current Personal Inspection

The Independent QP responsible for the preparation of the report is Mr. Réjean Sirois, Eng., Vice President Geology and Resources at GMSI.

Mr. Sirois met with Highland personnel, including Mr. Carlos H. Bertoni, Vice President, Exploration at the Project office in Calumet, Michigan between January 13th and January 17th, 2014 to discuss the Copperwood Project. The purpose of the visit was to familiarize the QP with the general geology of the area and detailed geology of the Copperwood Project property, to review the project exploration history, to review available information and to discuss procedures and methods applied during the past exploration programs.

A second site visit was performed from November 6th to November 9th, 2017 by Mr. Réjean Sirois, Eng. and Mr. James Purchase of GMSI. The purpose of the second site visit was to look at new drill hole sites, review new drill core and assist in discussions related to the ongoing feasibility study.

2.4 Data Sources

GMSI has sourced information from previous technical reports and appropriate reference documents as cited in the text and summarized in Section 27 of this report. GMSI has relied upon other experts in the fields of mineral tenure, surface rights, permitting and environment as outlined in Section 3.

Orvana issued a number of NI 43-101 reports regarding the Copperwood Project.

AMEC produced a Mineral Resource estimate as part of an NI 43-101 technical report in April 2010. The April 2010 AMEC technical report addressed the resource in the project area on lands covering portions of Sections 1 and 2 of Township 49N, R46W and Sections 35 and 36 of Township 50N Range 46W. The April 2010 AMEC technical report concluded that there was an NI 43-101 compliant resource for the Copperwood

Project with both Measured Mineral Resources and Indicated Mineral Resources. The Technical Report had an effective date of April 30, 2010.

A second NI 43-101 Mineral Resource estimate technical report was prepared in 2011 by AMEC, covering an additional 229 ha from the nearby Section 6 property and surrounding Satellite Deposits, was issued in January 2011. The resources on the Satellite Deposits, including Section 6, were evaluated by AMEC in an NI 43-101 technical report published on January 27, 2011. The technical report had an effective date of January 24, 2011.

Another NI 43-101 Mineral Resource estimate technical report was prepared in March 2011 by Marston and covered what was called the Copperwood Main, Bridge and Section 6 areas. The technical report had an effective date of January 25, 2011.

In addition to these NI 43-101 Mineral Resource estimate technical reports issued, Orvana also issued a Scoping study (effective date of September 24, 2010, authored by AMEC), Prefeasibility Study (effective date of July 29, 2011, authored by KD Engineering, Marston and Knight Piesold) and Feasibility Study (effective date of March 21, 2012, authored by KD Engineering, Golder and Milne and Associates Inc.) reports for the Copperwood Project.

Golder Associates prepared a NI 43-101 technical report in March 2014 for Highland in connection with TSX Venture acceptance of Highland's acquisition of the Copperwood Project. The Golder report reported the mineral resources as historical estimates for the Copperwood Project. The Golder technical report has an effective date of March 17, 2014.

GMSI prepared a NI 43-101 technical report in June 25, 2015 for Highland as a review of the Copperwood Project resources using then current market conditions and included recommendations of further work. This GMSI report had effective date of April 15, 2015.

2.5 Language, Currency and Measurement Unit Standards

Unless otherwise indicated this technical report uses Canadian English spelling, USA dollar currency and System International (metric) units. Coordinates in this technical report are presented in metric units metres (m) or kilometres (km) using the Universal Transverse Mercator (UTM) projection (UTM Zone 16, NAD83 datum). Elevations are reported as metres above mean sea level (mamsl).

The previous Copperwood Project technical reports used a combination of metric and imperial units; however, to reduce confusion and avoid the use of mixed measurement units, GMSI has converted imperial units from these reports to metric wherever possible.

The previous Copperwood Project technical reports presented coordinates using State Plane coordinates (Michigan North Zone, NAD83) in international feet, and elevations were derived using GEOID03 and NAVD88. These coordinates were converted by Coleman Engineering Co. of Ironwood, Michigan, contracted by Highland Copper Company Inc. (Highland). In the current report, GMSI has used these coordinates in metrics units and the UTM projection (UTM Zone 16, NAD83 datum).

A list of the main abbreviations and terms used throughout this Report is presented in Table 2.1.

Table 2.1: List of Main Abbreviations

Abbreviations	Full Description
%	Percent
°	Degrees (Azimuth or Dip)
°C	Degrees Celsius
3D	Three Dimensional
Ag	Silver
amsl	Above Mean Sea Level
AX	AX Size Core; Core Diameter 3.01 cm
BCM	Bear Creek Mining
BX	BX Size Core; Core Diameter 4.20 cm
cm	Centimetre
CIM	Canadian Institute of Mining Metallurgy and Petroleum
CoV	Coefficient of Variation
CPG	Certified Professional Geologist
CRI	Copperwood Resources Inc. (formerly known as Orvana Resources US Corp.)
CRM	Control Reference Material
CSA	Canadian Securities Administrators
Cu	Copper
E	East
EIA	Environmental Impact Assessment
Eng	Engineering
Fe-O	Iron Oxide
Ga	Billion years
GMSI	G Mining Services Inc.

Abbreviations	Full Description
g/t	Grams per Tonne
GEOID03	National Geodetic Survey Geoid 03
ha	Hectares
Highland	Highland Copper Company Inc.
HQ	HQ Size Core; Core Diameter 6.35 cm
ICP OES	Inductively Coupled Plasma Optical Emission Spectrometry
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
KLA	Keweenaw Land Association, Ltd.
km	kilometre
km^2	square kilometre
LiDAR	Light Detection and Ranging
LCBS	Lower Copper Bearing Sequence
LLC	Limited Liability Company
MDEQ	Michigan Department of Environmental Quality
m	Metre
mm	Millimetre
Mt	Million Tonnes
N	North
NAD83	North American Datum 1983
NAVD88	North American Vertical Datum 1988
NI 43-101	National Instrument 43-101
NI 43-101CP	National Instrument 43-101 Companion Policy
NI 43-101F1	National Instrument 43-101 Form 1
NQ	NQ Size Core; Core Diameter 4.80 cm
NREPA	Natural Resources and Environment Protection Act
NSR	Net Smelter Return
OK	Ordinary Kriging
Orvana	Orvana Minerals Corp.
PE	Professional Engineer
QA/QC	Quality Assurance/Quality Control
QP	Qualified Person
REI	Resource Exploration Inc
R&P	Room and Pillar
S	South
Sage	Sage Minerals, Inc.
SG	Specific Gravity

Abbreviations	Full Description
t	Tonnes
UCBS	Upper Copper Bearing Sequence
US$	United States Dollars
USA	United States of America
USMR	United States Metals Refining Company
UTM	Universal Transverse Mercator
W	West
wt.%	Weight Percent

3 RELIANCE ON OTHER EXPERTS

This report was prepared under the supervision of Mr. Réjean Sirois, Eng., Vice President Geology and Resources of GMSI, an independent QP under the guidelines and definitions presented in NI 43-101 and supporting documents NI 43-101CP and Form 43-101F1. In preparing this report, the GMSI QP has relied on assistance and information from various parties and sources. Sources of information are acknowledged throughout the report, where the information is relied upon.

The QP has relied upon information provided by experts as allowed under Item 5 of Form 43-101F1. Specifically, this report contains information relating to mineral titles, legal agreements as well as permitting and regulatory matters in the State of Michigan. The GMSI QP is not qualified to verify these matters and has relied upon information provided by Highland including lease agreements and legal opinions concerning Highland's mineral and surface rights prepared by Kendricks, Bordeau, Adamini, Greenlee & Keefe, P.C., a Michigan law firm.

4 PROPERTY DESCRIPTION AND LOCATION

4.1 Location

The Copperwood Project is situated within northwestern Michigan, USA, Gogebic County, Ironwood and Wakefield townships as shown in Figure 4.1.

Surface and mineral rights in Michigan are located and described with reference to a grid established by the federal government as part of the Public Lands Survey System. Townships are squares of 36 square miles (93 km^2) comprising 6 x 6 arrays of 36 sections, named according to distance and direction from a principal meridian and baseline. Sections are one-mile square (2.6 km^2), and can be divided into quarters, labeled NE, NW, SE, and SW. Each quarter can also be split into halves or quarters, which are labeled according to the side or corner of the quarter section they encompass (e.g., NE 1/4 of the NW 1/4).

4.2 Mineral Tenure

The Copperwood Project comprises the Copperwood Deposit and the Satellite Deposits. The Copperwood Deposit consists of four metallic and non-metallic mineral leases totaling contiguous 1,904 contiguous hectares under two 20-year lease agreements with Keweenaw Land Association Limited (KLA), a 20-year lease agreement with Sage Minerals Inc. (Sage) and a 30-year mineral lease agreement with A. M. Chesbrough LLC (Chesbrough). The mineral rights' boundaries and lease details are summarized in Table 1.1. The sections, surveyed as part of the Public Lands Survey System, are identified at corners with federal monuments. The Satellite Deposits consist of options to convert an additional 595 ha into mineral leases on mineralized zones adjacent to the Copperwood Deposit.

In Michigan, as with many other states, mineral rights are distinct from surface rights. Mineral rights may be sold or retained separately from the surface rights, in which case, the mineral rights are said to be severed. The Copperwood Deposit mineral rights are severed.

Figure 4.1: Project Location and Infrastructure

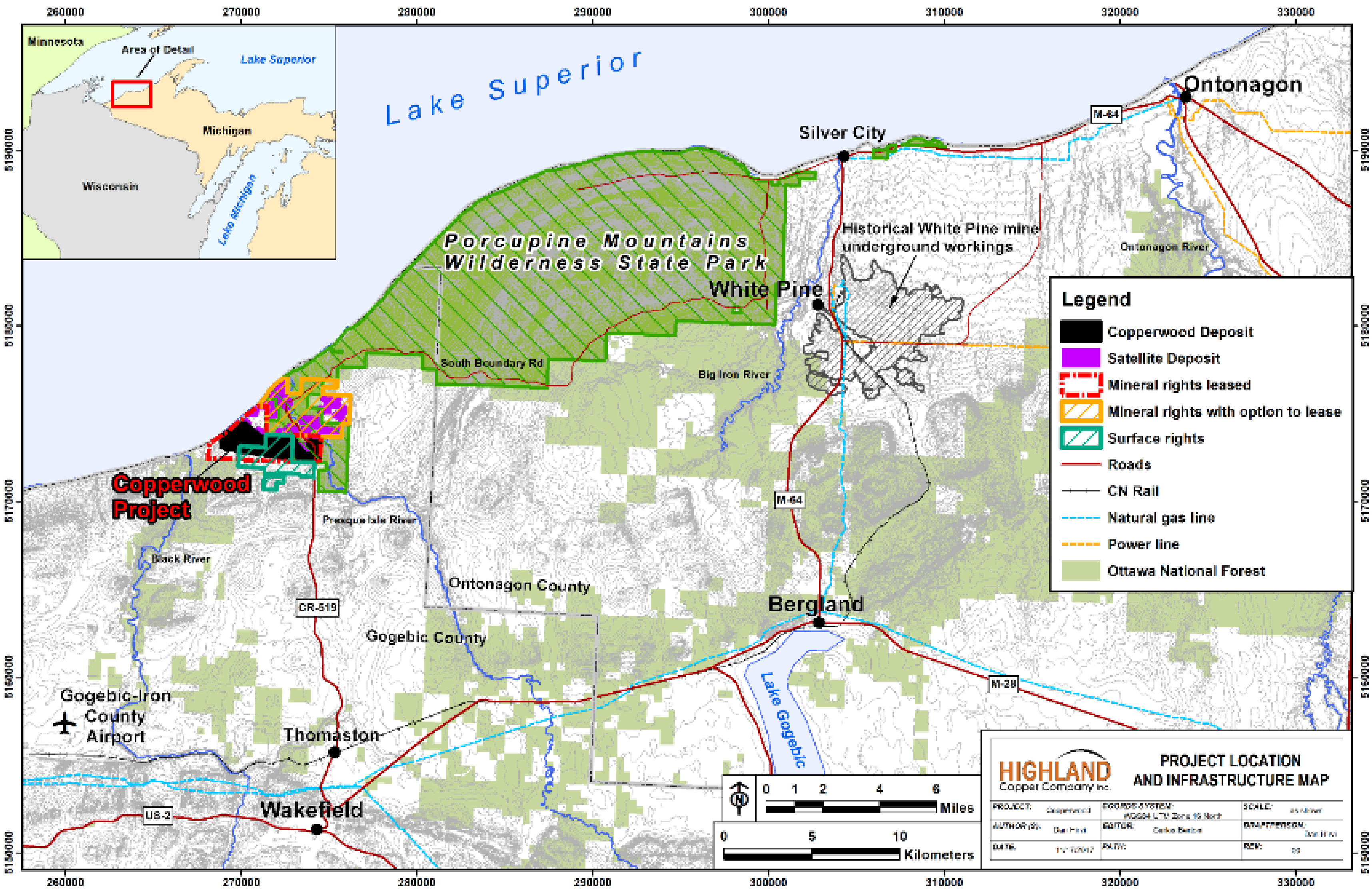


Table 4.1: Copperwood Mineral Tenure

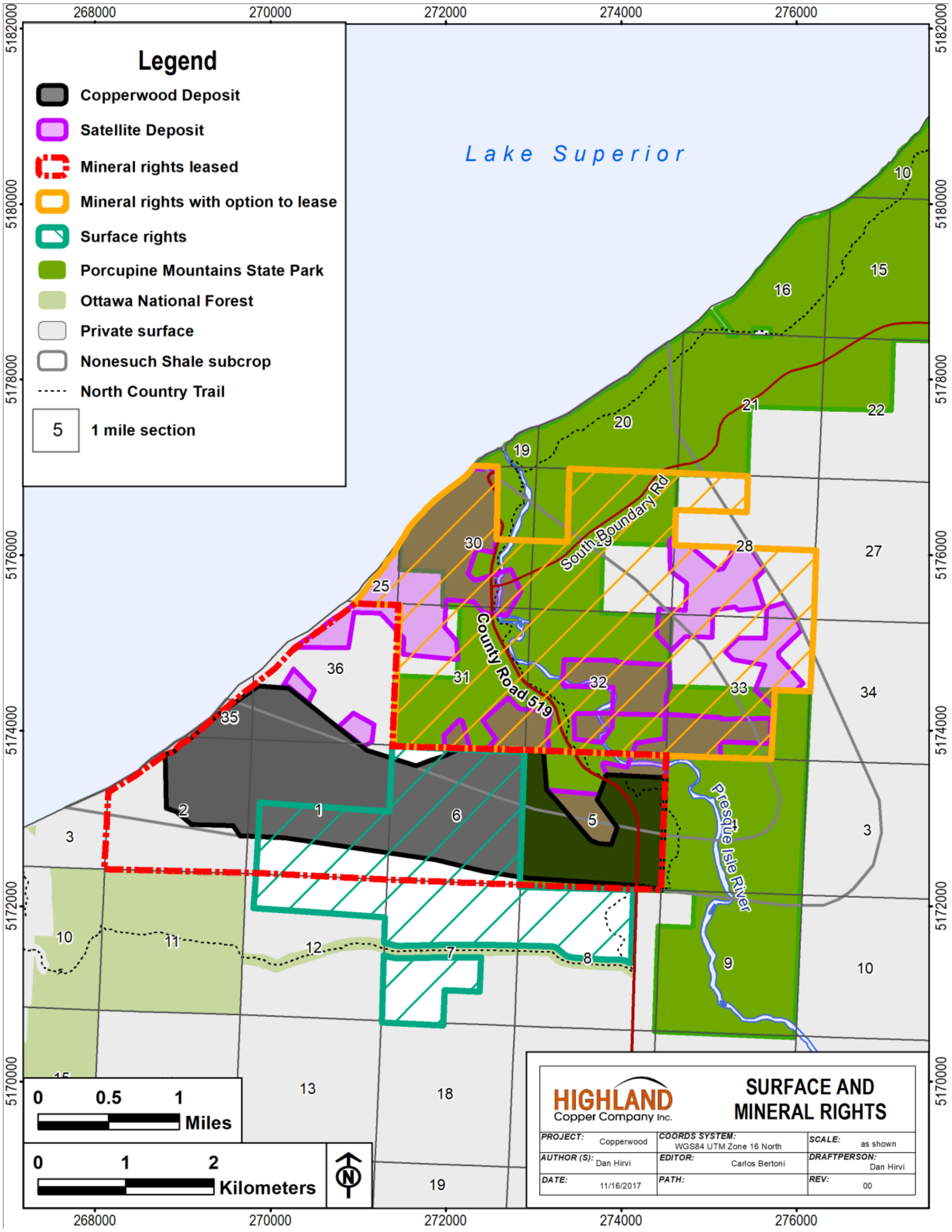
Township & Range	Sections	Area (ha)	Status
50N 46W	36	214.5	20-Year Lease ending in 2028
49N 46W	2	221.8	
50N 46W	35	28.3	20-Year Lease ending in 2028
49N 46W	1	247.3	
49N 45W	6	229.0	30-Year Lease ending in 2036
49N 45W	5	247.0	20-year Lease ending in 2037
50N 45W	29 (fraction)	226.6	
50N 45W	31	243.2	
50N 45W	33 (fraction)	226.6	
50N 46W	25 (fraction)	20.5	
50N 45W	28, 30, 32	595	Option to lease

4.3 Surface Rights

CRI holds approximately 700 ha of land that provides full access rights to the Copperwood Project and provide space for surface infrastructure for the potential future mine site. These lands are described below and depicted in Figure 4.2:

- The entire Section 6, Township 49 North, Range 45 West, Wakefield Township;
- The North Half, the Southwest Quarter, and the Northeast Quarter of the Southeast Quarter, Section 7, Township 49 North, Range 45 West, Wakefield Township;
- The North Half of Section 8, Township 49 North, Range 45 West, Wakefield Township, except the portion lying East of the County Road 519 right of way;
- The North Half of the North Half, Section 12, Township 49 North, Range 46 West, Ironwood Township;
- The South Half of Section 1, Township 49 North, Range 46 West, Ironwood Township, Gogebic County, Michigan;
- A 200.00 by 300.00 foot (61 by 91 m) parcel in Government Lot 2, Section 2, Township 49 North, Range 46 West, Ironwood Township, Gogebic County, Michigan;
- An easement for ingress, egress, utilities and underwater pipe installation over Government Lot 2, Section 2, Township 49 North, Range 46 West, Ironwood Township, Gogebic County, Michigan.

Figure 4.2: Project Location with Lease Information - Surface and Mineral Rights



4.4 Agreements, Royalties and Encumbrances

The Copperwood Project consists of four metallic mineral leases totaling 1,188 ha, as well as one option to lease up to an additional approximate 595 ha.

4.4.1 Mining Leases

Mining Lease between CRI and Keweenaw Land Association, Limited (KLA) dated September 10, 2008, concerning:

- Section 1, Township 49 North, Range 46 West, Ontonagon Township, Gogebic County;
- Section 35, Township 50 North, Range 46 West, Ontonagon Township, Gogebic County;

Mining Lease between CRI and Sage Minerals Inc., (Sage) dated October 16, 2008, concerning:

- Section 2, Township 49 North, Range 46 West, Ontonagon Township, Gogebic County; and
- Section 36, Township 50 North, Range 46 West, Ontonagon Township, Gogebic County;

Mining Lease between CRI and A.M. Chesbrough, LLC dated September 30, 2010, concerning:

- Limit pre-production mining to upper bench levels unaffected pit water;
- Section 6, Township 49 North, Range 45 West, Wakefield Township, Gogebic County.

Mining Lease between CRI and KLA dated March 31, 2016, concerning the following properties located in Ironwood and Wakefield Townships, Gogebic County, State of Michigan :

- Section 5, T49N, R 45W;
- The Entire (except the W/2 of the NW/4) Section 29, T50N, R 45W;
- Section 31, T50N, R 45W;
- The Entire (except the E/2 of the SE/4) Section 33, T50N, R 45W;
- The Entire Fractional Section 25, T50N, R 46W.

To maintain its rights under the leases, CRI must pay an annual rent as shown in Table 4.2, Table 4.3 and Table 4.5.

In addition to the lease payments, CRI must pay to the mineral right owners (Sage, KLA and Chesbrough) a sliding scale net smelter return (NSR) royalty on production from its leases. The royalty rate ranges from 2% to 4% on a sliding scale based on adjusted copper prices. Initially the royalty will be:

- 2% NSR for an invoiced copper price below a lower bench mark price; and,
- 4% NSR for an invoiced copper price above an upper bench mark price.

Table 4.2: KLA and Sage 2008 Mining Lease Payment Schedules

Date	Amount
Commencement Date	$10,000
1st Anniversary of Commencement Date	$15,000
2nd Anniversary of Commencement Date	$20,000
3rd Anniversary of Commencement Date	$25,000
4th Anniversary of Commencement Date	$30,000
5th through 10th Anniversary of Commencement Date	$40,000
11th through 15th Anniversary of Commencement Date	$50,000
16th through 20th Anniversary of Commencement Date	$90,000

Table 4.3: Chesbrough 2010 Mining Lease Payment Schedule

Date	Amount
Commencement Date	$12,500
1st through 4th Anniversary of Commencement Date	$9,000
5th through 10th Anniversary of Commencement Date	$11,250
11th through 15th Anniversary of Commencement Date	$15,000
16th through 20th Anniversary of Commencement Date	$18,750
21st through 25th Anniversary of Commencement Date	$22,500
26th through 30th Anniversary of Commencement Date	$26,250

Table 4.4: KLA 2017 Mining Lease Payment Schedule

Date	Amount
Commencement Date	$35,000
1st Anniversary of Commencement Date	$52,500
2nd Anniversary of Commencement Date	$70,000
3rd Anniversary of Commencement Date	$87,500
4th Anniversary of Commencement Date	$105,000
5th through 10th Anniversaries of Commencement Date	$140,000
11th through 15th Anniversaries of Commencement Date	$175,000
16th and later Anniversaries of Commencement Date	$315,000

For an invoiced copper price greater than the lower benchmark price and less than the upper benchmark price, the following equation is used:

$$\frac{2\% * \text{invoiced copper price}}{\text{lower benchmark copper price}}$$

Invoiced copper is the price per pound of copper shown on a concentrate invoice. The lower and upper benchmark prices are subject to adjustment for inflation on a quarterly basis based on the Producer Price Index – Finished Goods, prepared by the USA Department of Labour. Benchmark prices are initially set at $2/lb copper and $4/lb copper, respectively.

All lease payments may be applied as a credit against the royalties during production.

4.4.2 Options to Lease

CRI is party to an option to lease agreement with Sage covering approximately 595 ha located within Wakefield Township, Gogebic County, Michigan, with an effective date of October 16, 2008. The option is for a twenty-year term (subject to termination in whole or in part by CRI on 60 days' notice and termination in whole by the option or for breach of the optionor agreement) and provide for option payment as described in Table 4.5.

Table 4.5: Payment Schedule on Option to Lease Agreement

Date	Amount
On effective date	$6.18 per ha
On 1st through 5th anniversaries of effective date	$6.18 per ha
On 6th through 10th anniversaries of effective date	$12.36 per ha
On 11th through 15th anniversaries of effective date	$18.53 per ha
On 16th and later anniversaries of effective date	$24.71 per ha

CRI has the right to exercise the Sage option at any time during the term and to enter into a mining lease and net smelter return royalty agreements in respect of the covered mineral hectares. The sliding scale NSR royalty is on the same terms as those applicable to the mining leases set out above.

4.4.3 Encumbrances

As security for the payment and performance of obligations under agreements with Osisko Gold Royalties Ltd. including a net smelter royalty deed, CRI has granted to Osisko a security interest in CRI's right, title and interest in and to (1) the above-mentioned mineral leases, and (2) all profits and income that at any time arise from the mineral leases or from the sale of minerals that are located in, on or under the leased area.

There are no other known encumbrances on the mineral rights that are subject to the mining leases.

4.4.4 Osisko Royalty

On June 30th, 2016, CRI granted to Osisko Gold Royalties Inc. a 3.0% net smelter return royalty on all metals produced from the mineral rights and leases associated with the Copperwood project.

4.5 Environmental Liabilities

Environmental work performed by CRI identified potential localized surface water impacts resulting from the surface rock piles from the 1950's exploration shaft excavation; some of this excavated material was also used in historic road and culvert construction on the property. As part of the permitting process CRI proposed mitigation in the form of removing this material from the rock pile site, roads and culverts and storing it in the planned Copperwood Tailings Disposal Facility. No other known environmental liabilities exist on the Copperwood Project property.

4.6 Permitting

The MDEQ is responsible for enforcing state laws for protecting natural resources. Michigan's environmental regulations are compiled under the Natural Resources and Environmental Protection Act, Act 451 of the Public Acts 1994, as amended (NREPA). Mining of nonferrous metals is regulated under Part 632 of NREPA.

4.6.1 Exploration

The drilling, operating, plugging, and site restoration of test wells (drill holes) are regulated under Part 625, Mineral Wells of NREPA. In addition, test wells must meet the requirements of other Parts of the NREPA to prevent damage to water, air, soil, wetlands, and other environmental values. In most areas of the state, Part 625 requires a permit for a test well that penetrates 50 feet (15 m) or more into bedrock or below the deepest fresh water aquifer. However, a permit is not required for test wells where the bedrock is Precambrian in age, although these wells must meet all other requirements of Part 625. A test well must be plugged promptly after abandonment, following procedures specified by the MDEQ. A well is considered abandoned if it is inactive for one year, unless an extension is granted by the MDEQ based on the owner showing a good reason to keep the well open. Wells must be plugged in a manner that seals off and confines any fluids in the formations penetrated by the well, and prevents any surface water or other materials from entering the well. Removal of overburden and extraction of limited amounts of materials for the purpose of exploration to the extent necessary to determine the location, quantity, or quality of a mineral deposit on land that does not become a part of a mining operation within two years must be graded and revegetated.

All drilling at the Copperwood Project is in Precambrian bedrock and therefore no permits for drilling are required.

4.6.2 Development

Mining of nonferrous metals is regulated under Part 632 of NREPA.

Part 632 covers all aspects of nonferrous metal mining including transportation, storage, treatment, and disposal of ore, waste rock, and other materials. A permit application under Part 632 must include an environmental impact assessment that describes baseline conditions, expected impacts to the mined area and surrounding affected areas, and alternatives. An application must also include a detailed plan for mining and reclamation that would minimize impacts of the proposed operation, and a contingency plan for dealing with any accidents or failures.

Part 632 provides extensive opportunities for public input, including a public meeting on an application and a public hearing on a proposed permit decision. A permit can be granted only if the applicant demonstrates that the mining operation will not pollute, impair, or destroy the air, water, or other natural resources or the public trust in those resources in accordance with the Michigan Environmental Protection Act. Upon completion of mining, the mine site and associated lands must be reclaimed to achieve a self-sustaining ecosystem that does not require perpetual care. Post-closure monitoring of water quality must be continued for at least 20 years, subject to modification after public review. Part 632 requires a mining company to maintain financial assurance throughout the mining operation and the post-closure monitoring period. The financial assurance must cover the cost for the MDEQ to conduct any necessary reclamation and remediation measures and must be updated at least every three years. Funding to cover the costs for the MDEQ to administer the law comes from permit fees and from annual operating fees based on mass of material mined.

CRI obtained the following permits from the MDEQ:

- April 30, 2012 – Part 632 Mining Permit for Copperwood Project, Upper Peninsula, Michigan, USA;
- November 13, 2012 - National Pollutant Discharge Elimination System permits for treated sanitary and process wastewaters related to the proposed Copperwood copper mine, Upper Peninsula, Michigan, USA;
- July 17, 2012 – Air Quality Division Permit to Install 180-11;
- February 22, 2013 - Wetlands Part 303 and the Inlands Lakes and Streams Part 301 permits for the proposed Copperwood copper mine;
- June 24, 2013 – Part 315 Dam Safety Permit.

Highland is currently considering the amendment of some permits in relation to the ongoing feasibility study.

4.7 Socio-Economics

The State of Michigan, and in particular the Upper Peninsula, has a long mining history, primarily for copper and iron. The large-scale underground White Pine copper mine in Ontonagon County began operation in 1953 and ended in 1996. Exploration programs and mining operations in Michigan are governed by modern mining and environmental laws. The workforce of the western Upper Peninsula of Michigan is currently experiencing high unemployment levels. Many experienced miners and locally-owned firms also exist in the region with necessary mining support capabilities. The Copperwood Project has received local and Michigan State bi-partisan support.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

The Copperwood Project property is located approximately 22.5 km by road to the north of the town of Wakefield in Gogebic County, Michigan, and is also located approximately 40 km by road from the town of Ironwood, also in Gogebic County. Wakefield and Ironwood have populations of 2,300 and 6,800, respectively.

The main access to the Copperwood Project property is by way of the paved north-south County Road 519, which branches off State Highway M-28 just east of Wakefield. The project property is transected by a series of dirt roads and drill trails allowing access for exploration activities.

During inclement weather, four-wheel drive vehicles are required for accessing the project property. Future mining activities at the Copperwood Project will require an upgrade of the paved County Road 519 to an all-season level and an upgrade of the dirt road from County Road 519 to the Copperwood site. Site access is shown in Figure 5.1, and Figure 5.2.

5.2 Climate

The Copperwood Project property is situated immediately south of the Lake Superior shoreline where the local climate consists of four seasons typical of mid-latitude temperate climates. The maximum mean monthly temperature in the summer months is approximately 18°C and in the winter months is about −12°C. The annual precipitation is approximately 890 millimetres of rain equivalent (rain and snow) with the greatest monthly precipitation of about 100 mm and least monthly precipitation of about 30 mm of rain equivalent. Mean annual total snowfall is approximately 4.5 m with the maximum monthly mean snow depth of about 0.6 m. Wind at the Copperwood site is predominantly from the east-southeast and west-northwest directions with peak gusts of about 60 kilometres per hour. Weather measurements are from a local meteorological station operating at the Copperwood Project property and from the Ironwood, Michigan meteorological station.

Figure 5.1: Project Location and Infrastructure

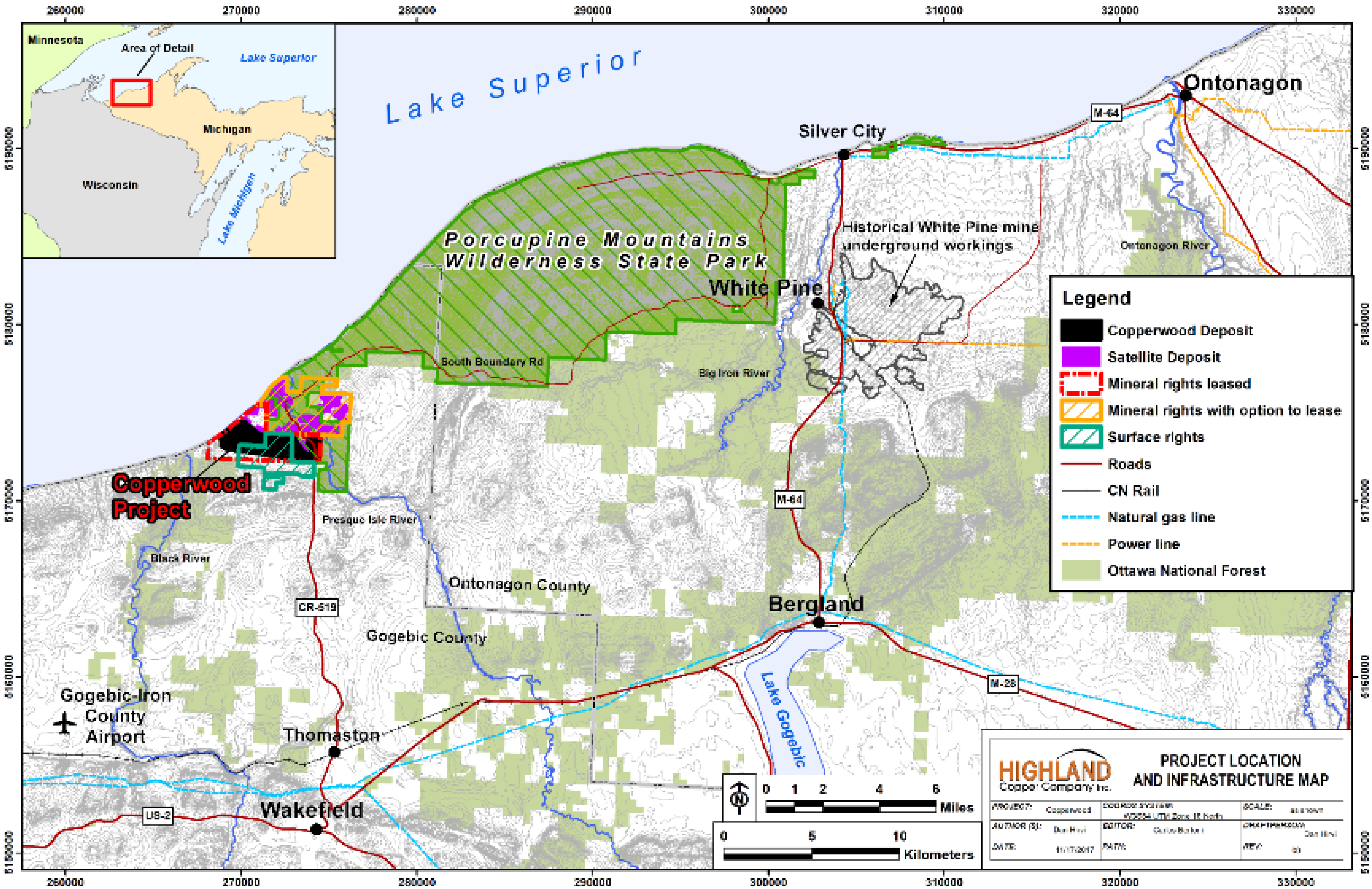
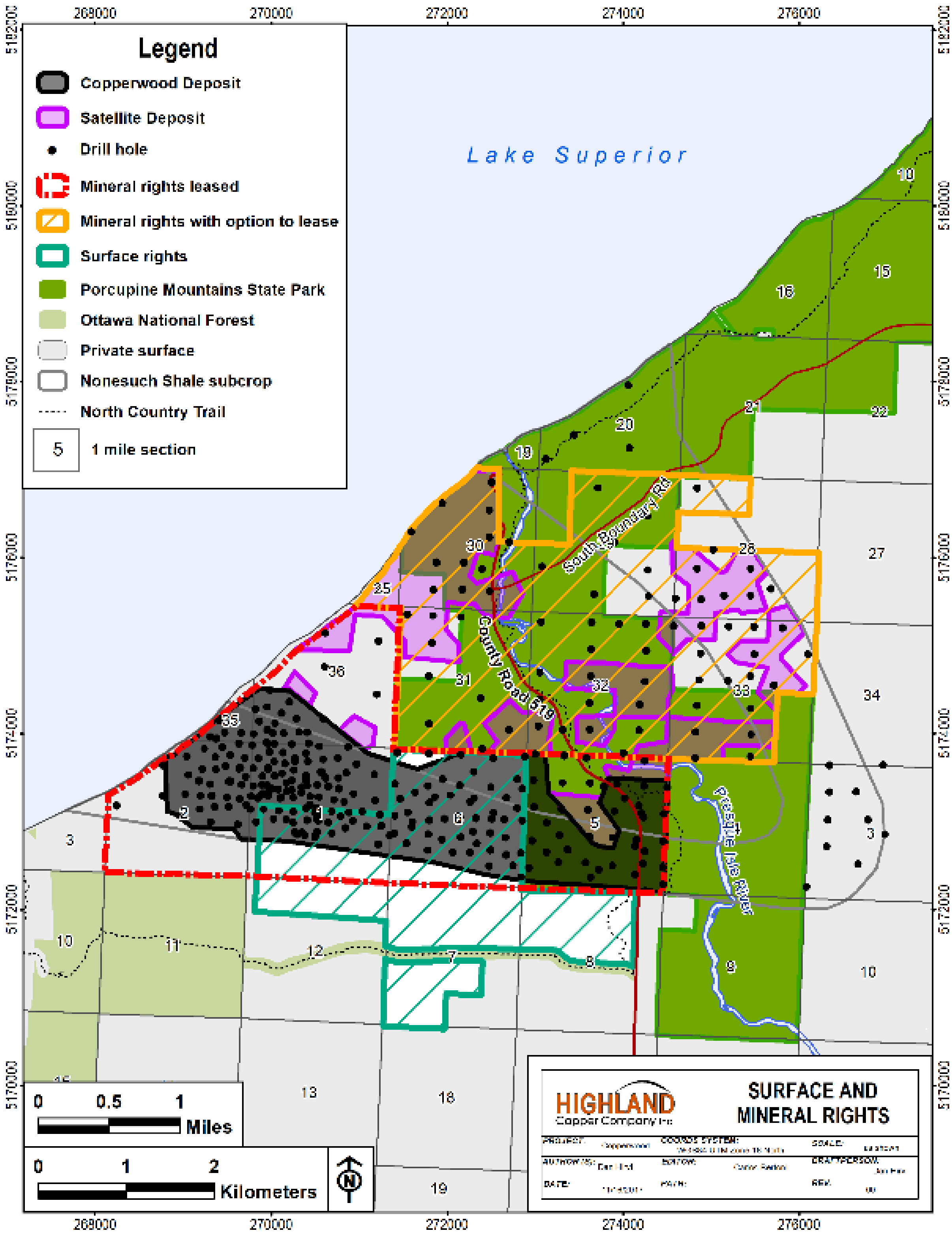


Figure 5.2: Project Location with Lease Information and Drill Hole Location



5.3 Local Resources

A Canadian National Railway Company rail line is located at Thomaston about 18 km south from the Copperwood site via County Road 519. There was an existing loading station at Thomaston, which was used for timber. Additionally, there is an old railway spur bed that passes immediately adjacent to the property; laying tracks along this bed would provide rail access right to the Copperwood Project site. Access by way of air travel is accomplished through the Gogebic-Iron County Airport located 6 km north of Ironwood.

The workforce for any current and future mining activity could be sourced from a combination of the local area after training as appropriate or from external areas. Unemployment is high in Gogebic County; both skilled and unskilled labour forces are available for work.

5.4 Infrastructure

Operation can be conducted year-round and will not be affected by the climate. Infrastructure including access, power and water is available in the region to support the CRI operation.

There is an 88 KV power line located 18 km from the Copperwood Project; however, this is a unique voltage that may be obsolete before long. Xcel Energy owns the nearest transmission lines, which are located approximately 32 km south of the property. Onsite power generation is also an option. A major natural gas pipeline is approximately 16 km south of the property.

There are no aquifers beneath the surface of the property. Potable and process water for any planned mining operation could be obtained from Wakefield through the Gogebic Range Water Authority. Discussions between Orvana and the Gogebic Range Water Authority have begun and are still underway. The well field south of the mine site may also be viable. Current site communications comprise cell phone service available via a repeater tower at Indianhead ski area.

The only infrastructure on the Copperwood Project property is a network of dirt roads, logging roads and drill trails. The main dirt roads are in good condition.

The Copperwood Project property is of sufficient extent for all needed surface infrastructure including a processing facility, maintenance, surface equipment storage, fuel storage, explosives storage, administrative offices, water treatment plant, and, storage for waste rock, top soil and snow.

5.5 Physiography

The land surface at the Copperwood Project property slopes northwest toward the Lake Superior shoreline. The ground surface elevation along the southern edge of the site is approximately 288 m amsl as compared to the approximate elevation of 198 m amsl at the top of the bluff along the Lake Superior shoreline. Mean elevation of the Lake Superior shoreline is approximately 184 m amsl. The topographic contours across the area are generally parallel to the Lake Superior shoreline with the ground surface sloping at a rate of approximately 19 m per km to the northwest. The gently undulating planar surface is transected by small intermittent streams that flow northwest towards Lake Superior. The larger of these streams form steep-walled valleys in glacial deposits that are 3 to 5 m deep in the upper reaches and as much as 12 m deep nearing Lake Superior.

Vegetation at the Copperwood Project is characterized by immature mixed deciduous forest. Wetlands occur onsite in the base of drainage channels and stream corridors that direct surface runoff. Wetlands are also established in depressions or small isolated basins on gently sloping plateaus between the drainage channels and stream corridors. Commercial logging and hunting cabins are the current land uses within, and in direct vicinity of, the Copperwood Project.

6 HISTORY

6.1 Exploration History

Exploration history is well documented by Golder Associates in the March 2014 NI 43-101 technical report; it is repeated here as referenced. The history of exploration completed in the Copperwood area is summarized in Table 6.1.

Table 6.1: Summary of Copperwood Exploration Activity

Company	Activity	Year
U.S. Geological Survey	Economic geology publication demonstrates potential of Western Syncline.	1954
USMR	Leased 1,552 ha in Western Syncline area (Cox, 2003).	1956
USMR	Drilled 26 holes focused on margin of Western Syncline and discovered Copperwood.	1956
USMR	Drilled 135 holes throughout the Western Syncline.	1958
AMAX	Sank 71 m vertical exploration shaft and advanced 635 m of exploration drifts, including three small stopes.	1957-1958
BCR	Drilled 23 holes in the Satellite properties. BCR terminated leases in the early 1960's.	1959
AMAX	Internal engineering and economic study that ended activities by USMR.	1959
AMAX	Engineering and economic review concluded deposit was mineable.	1974
AMAX	Terminated Western Syncline leases.	1983
Orvana	Leased 712 ha at Copperwood and options 1,559 ha in Western Syncline.	2008
Orvana	Began environmental studies with five drill holes intersecting copper mineralization.	2008
Orvana	Drilled 82 holes.	2009
Orvana	Leased 229 ha covering Section 6.	2010
Orvana	Drilled 38 holes. Completed NI 43-101 compliant Mineral Resource estimate.	2010
Orvana	Completed NI 43-101 compliant Mineral Resource estimate.	2011
Orvana	Completed NI 43-101 compliant Prefeasibility Study.	2011
Orvana	Completed NI 43-101 compliant Feasibility Study.	2012
Orvana	Mining Permit Approved by Michigan Department of Environmental Quality.	2012
Orvana	Drilled 21 holes for metallurgical and geotechnical studies.	2013
Highland Copper	Drilled 36 holes and 13 wedges for resource estimate, metallurgical and geotechnical studies.	2017

Archaeological evidence suggests that native copper was first extracted by natives on the Keweenaw Peninsula about 7,000 years ago. From 1610 to 1845, the presence of Lake Superior copper attracted early European and American interest. From 1845 to 1968, the mines of the Keweenaw Peninsula produced approximately 5 Mt of refined copper from 380 Mt of ore hosted by tops of sub-aerial lava flows, interflow clastic sedimentary beds and cross vein systems. Native copper represented over 99% of the metallic minerals in the mined ore bodies of the Keweenaw Peninsula. Copper mineralization in the base of the Nonesuch Formation was first recognized in the 1850s in the White Pine area about 30 km northeast of Copperwood (Ensign et al., 1968). From 1915 to 1921, native copper was economically extracted from the base of the Nonesuch Formation.

Subsequent exploration led to the discovery and the 1953 opening by Copper Range Company of the White Pine Mine. The construction of the White Pine Mine, mill, smelter, refinery and power plant was financed by the U.S. Government. Approximately 2 Mt of copper and 128 million grams of silver, with a mean grade of 1.14 wt.% copper and 7 g/t silver, were produced from 1954 until its closure in 1996. Chalcocite accounted for 85% to 90% of the copper with the remainder as native copper.

From about 1948 to 1954 geologists Walter White and James Wright of the U.S. Geological Survey conducted a major study of the Nonesuch Formation at the White Pine Mine and surrounding area. In a paper summarizing their work (White and Wright, 1954), the Western Syncline is clearly shown. Although there is no comment on copper mineralization in the Western Syncline, they concluded, "*The environment favorable for deposition of sediments similar to those at White Pine therefore existed over an area many times larger than that of the White Pine copper deposit itself*." This publication led to the leasing of the Western Syncline area by the USMR.

In 1956, USMR secured an option from KLA and Sage (timber companies who had retained the mineral rights after selling the surface rights) to lease mineral rights over and proximal to the Western Syncline. USMR drilled a total of 161 vertical holes between August 1956 and November 1958. The first 26 holes were drilled to define the margin of the syncline and to sample the base of the Nonesuch Formation. One hundred thirty-five holes were then completed at 660 or 330 m spacing. Forty-two of these holes, the deepest of which reached 337 m, were drilled within the area of the Copperwood leased mineral rights. This drilling led to the discovery of the Copperwood deposit.

An underground exploration program was initiated by AMAX in July 1958. A vertical exploration shaft was sunk 71 m through 28 m of glacial overburden, 39 m of the Nonesuch Formation and 4 m of the Copper Harbour Formation sandstones. Exploration drifts were driven along strike 373 m to the east and 262 m to the west, and three small stopes were driven up-dip to assess rock mechanic characteristics and the nature of the mineralized zone. The exploration shaft was refilled from the surface upon completion.

During a proposed merger of the Copper Range Company, the operator of the White Pine Mine and AMAX in 1974, an independent consultant completed an engineering study and review of existing data. An independent historical, estimate for the Western Syncline Deposit was completed in 1974. The U.S. Government disallowed the proposed merger and in 1983, due to corporate financial issues, AMAX terminated the Western Syncline mineral lease agreements.

No further work was conducted on the Copperwood Project between 1983 and 2008.

Beginning in 2008, Orvana implemented a series of exploration drilling programs at Copperwood (2008, 2009, 2010 and 2011) culminating in 126 drill holes (17,480 total metres of drilling). Additionally, Orvana commissioned several independent technical reports for the Copperwood and Satellite Deposit areas in 2010 and 2011.

In 2013, Orvana drilled 21 drill holes to collect samples for metallurgical and geotechnical studies (2,781 total metres of drilling); 11 holes were drilled primarily for metallurgical purposes and seven holes were drilled primarily for geotechnical purposes with one hole drilled for both metallurgical and geotechnical purposes.

Details of the Orvana exploration, drilling, sampling and analytical programs are expanded upon in Sections 9, Sections 10 and Sections 11 of this Technical Report.

In 2017, the Highland carried out a drilling program comprising of 33 HQ-diameter and three PQ-diameter drill holes for a total of 6,784 meters of core. The 2017 drill program was designed to upgrade the Mineral Resources at the eastern section of the deposit, obtain metallurgical samples and carry out geotechnical studies to refine the mining plan.

6.2 Production History

The Copperwood Project property has not had any historical or current production. The vertical shaft, exploration drifts and stopes developed by AMAX in 1958 were purely for exploration purposes.

6.3 Environmental History

In September 2008, Orvana contracted STS to conduct the base line studies for an EIA covering the Copperwood Project area. STS was subsequently purchased by AECOM and the environmental studies were continued with AECOM.

In January 2009, the EIA’s initial phase of surface and subsurface water sampling was completed. This is the first step in the two-year long process of developing a seasonal and long-term characterization of the site. In completing this phase of the assessment, 20 holes (totaling 1,239 m) were drilled, packer-tested, and completed as groundwater monitoring wells. These drill holes encountered between 21 to 33 m of fine-grained, unconsolidated glacial sediments overlying the bedrock. Fourteen drill holes were completed in bedrock above the copper-bearing interval and six holes intersected the copper-bearing interval. Also, 14 shallow water monitoring wells were completed.

A meteorological and air-quality monitoring station was installed on the Copperwood Project site and data collection commenced on December 18, 2008.

Other studies required as part of the EIA, including studies of the site's ecosystem, habitat features and terrestrial and aquatic flora and fauna, have also commenced.

An environmental geochemical examination was completed on eight reject samples of mineralization, hanging wall, and footwall rocks from three historic drill holes. Interpretation of the geochemical test results by Geochimica, Inc. indicates that Copperwood rocks are unlikely to be acid generating and, consequently, may be characterized as non-reactive under Michigan mining laws. In addition, the rock pile created by the extraction of copper-bearing rock from the underground exploration activity in the 1950s was recently trenched and sampled. This rock pile has been subjected to approximately 50 years of wet, oxidizing conditions. Based on visual observations, the rocks appear to be non-reactive.

6.4 Historical Resources

As discussed previously, a number of historical resource estimates for the Copperwood deposit have been issued:

- USMR – Covering larger area that included the Copperwood Project area, prepared in 1959.
- AMAX – Covering larger area that included the Copperwood Project area, prepared in 1974.
- Orvana (AMEC) – Copperwood area, published April 2010, effective date of April 30, 2010.
- Orvana (AMEC) – Satellite Deposits, published January 2011, effective date of January 24, 2011.
- Orvana (Marston) – Copperwood areas, published March 2011, effective date of January 25, 2011.
- Highland (GMSI) – Copperwood Deposit, published June 25, 2015, effective date of April 15, 2015.

The USMR and AMAX estimates predated the introduction of NI 43-101 (2001) guidelines, while the 2010, 2011 and 2015 estimates were prepared in accordance with NI 43-101 guidelines in place at the time of preparation.

6.4.1 USMR and AMAX Historical Resource Estimates

An internal engineering and economic study of the entire Western Syncline (or Presque Isle syncline) was completed in 1959 by USMR. The study reported an estimated mineral resource of 136.9 Mt at 1.07 wt.% copper at a 1 wt.% copper cut-off in some areas and a copper cut-off of 0.8 wt.% in others. The USMR mineral resource estimate also included mineralization in the "upper shale unit", or Upper Copper Bearing Sequence (UCBS). This mineralization was not included in the later historical resource estimates. The Copperwood portion of this historical resource estimate was 23.8 Mt at 1.46 wt.% copper. USMR planned to mine the deposit by applying a room-and-pillar mining method. The USMR study concluded it would be necessary to extract barren siltstone hanging wall to reach a stable back. This resulted in excessive dilution and unfavorable economics.

During a proposed merger of the Copper Range Company, the operator of the White Pine mine, and AMAX in 1974, an independent consultant (J. Parker, 1974) completed an engineering study and review of existing data and concluded that the back could be controlled by using resin bolts, which had been recently employed at the White Pine mine. By controlling the back, the problem of excessive dilution would be eliminated, and the economics of mining the Western Syncline Deposit were deemed favorable. An independent historical, non-compliant Mineral Resource estimate for the Western Syncline Deposit was completed in 1974 that included Mineral Resources of 92.3 Mt at 1.27 wt.% copper at a 0.9 wt.% Cu t-off and a minimum mining height of 1.83 m using the same raw data as used by USMR. The Copperwood portion of this historical resource estimate was 21.9 Mt at 1.68 wt.% copper.

USMR and AMAX historical Mineral Resource estimates for the Copperwood portion of the Western Syncline are summarized in Table 6.2.

Table 6.2: USMR & AMAX Historical Resource Estimates for Copperwood

Historical Resource	Tonnage (Mt)	Copper Grade (wt.%)	Copper Cutoff (wt.%)	Minimum Thickness (m)
1959 USMR Engineering and Economic Study	23.8	1.46	1.0	2.6
1974 Independent Consultant Engineering and Economic Review	21.9	1.68	1.0	2.0

Note: The historical estimate cited herein has no equivalent category under CIM Definition Standards (2005). These estimates are of unknown quality and should not be relied upon.

6.4.2 Orvana – AMEC Historical Resource Estimates

In 2008, Orvana leased the Copperwood Project area from KLA and Sage and initiated an Environmental Impact Assessment as required by Michigan's Nonferrous Metallic Mining Regulations. In the fall of 2008, groundwater monitoring wells were completed. Five of these water monitoring holes intersected the mineralized zone of the Copperwood deposit. In 2009, Orvana completed 82 exploration drill holes. On March 22, 2010, Orvana announced an NI 43-101 compliant resource estimate for the Copperwood deposit. This was followed by an NI 43-101 compliant resource estimate for the Section 6 and Satellite Properties in January 2011. Both of these were completed by AMEC. The AMEC historical resource estimates are summarized in Table 6.3.

Table 6.3: AMEC Historical Resource Estimates for Copperwood

Historical Resource Estimates	Tonnage (Mt)	Copper Grade (wt.%)	Copper Cutoff (wt.%)	Minimum Thickness (m)
2010 AMEC Copperwood "Main" Domino				
Measured	7.79	2.56	1	1.66
Indicated	2.48	2.39	1	1.22
Measured and Indicated	10.27	2.52	1	1.53
Inferred	1.30	2.29	1	0.95
2010 AMEC Copperwood "Main" Upper Layer				
Measured	6.35	1.15	1	1.35
Indicated	2.85	1.07	1	1.39
Measured and Indicated	9.20	1.13	1	1.36
Inferred	1.97	0.96	1	1.43
2010 AMEC Copperwood "Main" Combined Domino and Upper				
Measured	14.15	1.93	1	3.01
Indicated	5.33	1.69	1	2.60
Measured and Indicated	19.47	1.86	1	2.89
Inferred	3.27	1.49	1	2.38
2011 AMEC Section 6 area				
Indicated	8.41	1.42	1	1.89
Inferred	0.46	1.29	1	1.54

6.4.3 Orvana – Marston Historical Resource Estimate

In March 2011, Marston completed an update to the Copperwood Main and Section 6 resource estimates. The model used in the resource estimate update was built by Peter DuBois, PE, in Marston's St. Louis office under the supervision of Michael B. Ward, CPG, Senior Geological Consultant, for Marston. The Mineral Resource estimates were completed using Ventyx (formerly Mincom) Stratmodel and Block Model software.

Marston adhered to the Canadian Institute of Mining Metallurgy and Petroleum (CIM) definitions of resources and reserves as referenced in NI 43-101. Mineral Resources were confined by the software to the appropriate stratigraphic units. Mineral Reserves were not estimated as part of the 2011 Marston technical report as a preliminary feasibility study had not been completed. The Marston 2011 historical Mineral Resource estimates are summarized in Table 6.4 (the “Main”, “Bridge” and “Section 6” areas are equivalent to the Copperwood Deposit in this report).

Table 6.4: Marston 2011 Historical Mineral Resource Estimate Presented by Area

Copperwood “Main”			
Historical Resource Category	**Tonnage (Mt)**	**Copper Grade (wt.%)**	**Silver Grade (g/t)**
Measured	17.0	1.84	5.75
Indicated	3.6	1.62	4.57
Measured and Indicated	20.7	1.80	5.54
Inferred	2.6	1.06	2.02

“Bridge” area (between “Main” and Section 6)			
Historical Resource Category	**Tonnage (Mt)**	**Copper Grade (wt.%)**	**Silver Grade (g/t)**
Measured	0.6	1.1	1.63
Indicated	0.2	1.1	1.84
Measured and Indicated	0.8	1.1	1.67
Inferred	0.0	-	-

Section 6 area			
Historical Resource Category	**Tonnage (Mt)**	**Copper Grade (wt.%)**	**Silver Grade (g/t)**
Measured	5.6	1.38	1.96
Indicated	3.0	1.24	1.17
Measured and Indicated	8.6	1.34	1.69
Inferred	0.1	1.35	1.53

Total (Copperwood "Main, Bridge and Section 6" Combined)			
Historical Resource Category	**Tonnage (Mt)**	**Copper Grade (wt.%)**	**Silver Grade (g/t)**
Measured and Indicated	30.1	1.65	4.34
Inferred	2.9	1.07	2.01

6.4.4 Highland – GMSI Resource Estimate

In April 2015, GMSI completed an update to the Copperwood Main and Section 6 resource estimates. Réjean Sirois, Eng., built the model used in the resource estimate update at GMSI's Brossard Office, Quebec, Canada. GMSI adhered to the Canadian Institute of Mining Metallurgy and Petroleum (CIM) definitions of resources and reserves as referenced in NI 43-101.

The estimate was conducted in a block model limited by a single mineralized domain, interpreted as the Lower Copper Bearing Sequence. Hanging wall and footwall surfaces of the LCBS were modelled and merged to create the mineralization solid. The footwall surface was adjusted beforehand to keep a minimum thickness of 2.2 m throughout the deposit, acting as the minimum mining height. Uncapped raw assays were composited into zone composites (one composite per drill hole) with a minimum thickness of 2.2 m. Block sizes of 10 m by 10 m horizontally, with a 2.5 m height were used in the block model. A uniform bulk density of 2.7 g/cm^3 was used for all rock sequences in the model. Copper and silver grades were estimated using the Ordinary Kriging interpolation method in three successive passes, using ellipse ranges of 175 m, 250 m, and 350 m.

To define resource categories, GMSI outlined groups of globally similar interpolation passes. Measured Mineral Resources thus constituted the bulk of the mineral resources in the Copperwood Deposit (as defined in the report) area and include blocks interpolated generally in the first pass. Indicated Mineral Resources were located at the periphery of the measured category where blocks are generally interpolated in the second pass and are limited to the Copperwood Deposit. All other interpolated blocks were categorized in the Inferred Mineral Resource category, including all blocks in the Satellite Deposits. A summary of Mineral Resource estimates is presented in Table 6.5.

Table 6.5: Mineral Resource Estimate - Copperwood Project 1.0% Cu Cut-off Grade – April 15, 2015

Deposits	Resource Category	Tonnage (Mt)	Copper Grade (%)	Silver Grade (g/t)	Copper Contained (M lbs)	Silver Contained (M oz)
Copperwood	Measured	22.5	1.73	5.08	861	3.7
	Indicated	6.6	1.37	2.56	200	0.5
	M + I	29.1	1.65	4.51	1,061	4.2
	Inferred	1.9	1.24	2.37	52	0.1
Satellite	Inferred	38.6	1.23	2.09	1,050	2.6

Notes on Mineral Resources:

1) Mineral Resources are reported using a copper price of 3.00$/lb and a silver price of 20$/oz.
2) A payable rate of 96.5% for copper and 90% for silver was assumed.
3) The Copperwood feasibility study reported metallurgical testing with recovery of 86% for copper and 50% for silver.
4) Cut-off grade of 1.0% copper was used.
5) Operating costs are estimated at 49$/t of ore including ore transportation to a plant at the White Pine site.
6) An NSR sliding scale royalty is applicable and equivalent to 3.0% at $3.00/lb.
7) Measured, Indicated and Inferred Mineral Resources have a drill hole spacing of 175 m, 250 m and 350 m, respectively.
8) No mining dilution and mining loss were considered for the Mineral Resources.
9) Rock bulk densities are based on rock types, % copper and average of specific gravity measurements.
10) Classification of Mineral Resources conforms to CIM definitions.
11) The qualified person for the estimate is Mr. Réjean Sirois, Eng., Vice President Geology and Resources for GMSI. The estimate has an effective date of April 15, 2015.
12) Mineral resources that are not mineral reserves do not have demonstrated economic viability. Environmental, permitting, legal, title, taxation, sociopolitical, marketing, or other relevant issues may materially affect the estimate of mineral resources.
13) The quantity and grade of reported inferred resources in this estimation are uncertain in nature and there has been insufficient exploration to define these inferred resources as indicated or measured mineral resources.

7 GEOLOGICAL SETTING AND MINERALIZATION

Geological descriptions for the Copperwood Project area are based on several authors including Cannon et al., 1989; Elmore, 1984; Elmore et al., 1989; Hieshima and Pratt, 1991; Davis and Paces, 1990; Bornhorst et al., 1988; Cannon, 1992; Bornhorst, 1997; Cannon, 1994; Swenson et al., 2004; White, 1968; Stoiber and Davidson, 1959; Bornhorst and Robinson, 2004; Catacosinos, 2001; Bornhorst and Lankton, 2009; and, Bornhorst and Williams, 2013.

7.1 Regional Geology

The Copperwood Project area is situated along the southeast flank of the 2,200 km long Mesoproterozoic midcontinent rift system of North America within the Keweenaw Copper province as shown in Figure 7.1. The rocks of this rift system consist of a package of volcanic and clastic sedimentary rocks that are up to 30 km thick called the Keweenawan Supergroup. They are only exposed in the Lake Superior area. The rocks range from about 1.15 Ga to 1.03 Ga in age and include active rift-phase rocks of the Bergland Group and the post rift clastic sedimentary rocks of the Oronto and Bayfield Groups. These groups are shown in the stratigraphic column in Figure 7.2.

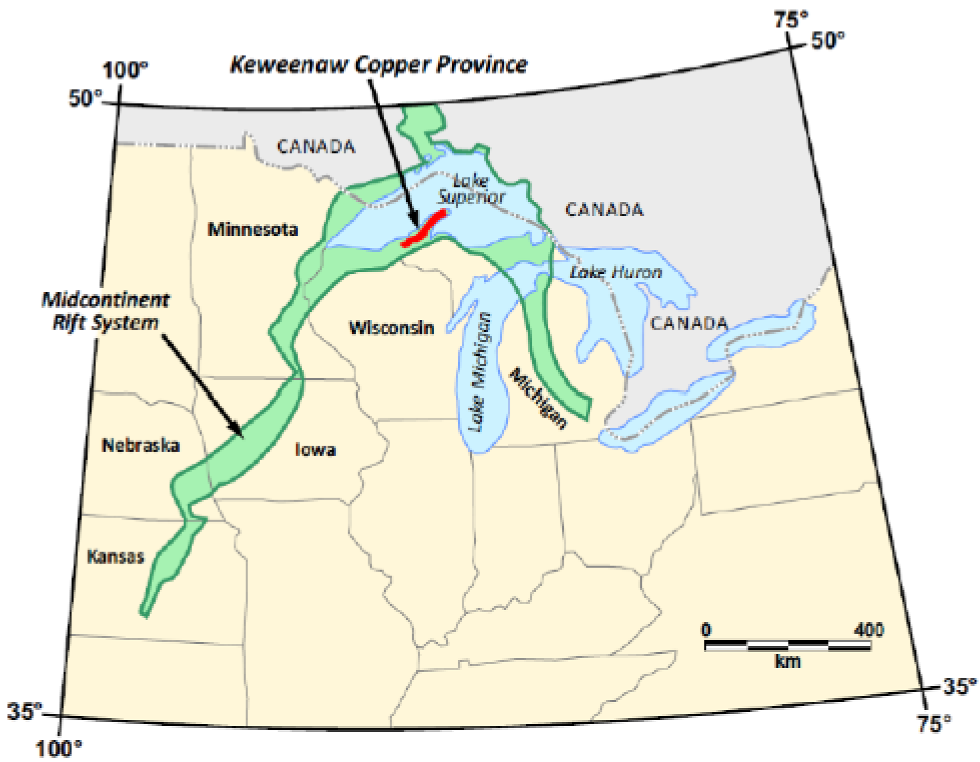
The Bergland Group consists of tholeiitic flood basalts with minor interbedded red conglomerate and sandstone of the Portage Lake Lava Series. This sequence hosts native copper deposits that yielded five million tonnes of the metal between 1845 and 1969. A significant amount of silver was produced as a byproduct. In the Copperwood area, the Porcupine Mountain volcanic rocks lie at the top of the Bergland Group. The lowest exposed portion of the Bergland Group lies along the Keweenaw fault as shown in Figure 7.3.

Following the active rifting phase, the basin continued to subside. Clastic sedimentary rocks of the Oronto and Bayfield Groups were deposited. The Oronto Group directly overlies the Bergland Group. It is subdivided into three formations: the Copper Harbor Formation, the Nonesuch Formation and the Freda Formation. The Nonesuch Formation hosts the mineralization at both the Copperwood Project area and the White Pine mine, as shown in Figure 7.3.

The Copper Harbor Formation is composed of red-brown conglomerates and sandstones with lesser siltstone and these sedimentary rocks were fluvial deposits in coalescing alluvial fans. They are upward and basinward-fining.

The Nonesuch Formation interfingers with and conformably overlies the Copper Harbor Formation. This unit consists of a package of lacustrine and fluvial black-to-gray-to-green-red siltstone and shale with minor carbonate laminates, and sandstone lenses that is up to 300 m thick. Black to dark-gray shale, deposited in anoxic lacustrine conditions favorable for the preservation of organic carbon and pyrite, are common in the lower 30 m of the formation. The Nonesuch Formation is thought to have been deposited in a marine environment.

Figure 7.1: Location of the Midcontinent Rift System



The Freda Formation is gradational with and conformably overlies the Nonesuch Formation. It consists of red-brown fine to very-fine sandstone, siltstone and mudstone, deposited by shallow meandering rivers, resulting in fining-upward sequences on a scale of meters.

The last developmental phase of the midcontinent rift system, from 1.07 Ga to 1.05 Ga, was characterized by a partial inversion of the original graben-bounding normal faults into major reverse faults, accompanied by the deposition of mature clastic sedimentary rocks of the Bayfield Group. This event was likely caused by continental collision along the Grenville Front to the east. The present-day dip of Keweenawan Supergroup strata is a result of syn-depositional sagging and tilting related to faults and folds associated with this compression event. Figure 7.3 shows the Keweenaw fault separating the older Bergland and

Oronto Group rocks to the northwest that have been thrust over the younger Jacobsville sandstone of the Bayfield Group to the southeast.

Figure 7.2: Stratigraphic Column of Regional Geology

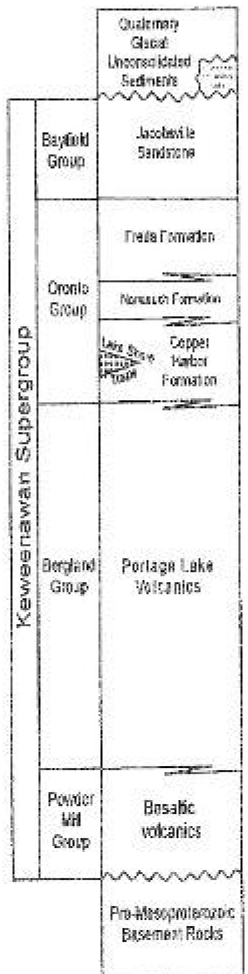
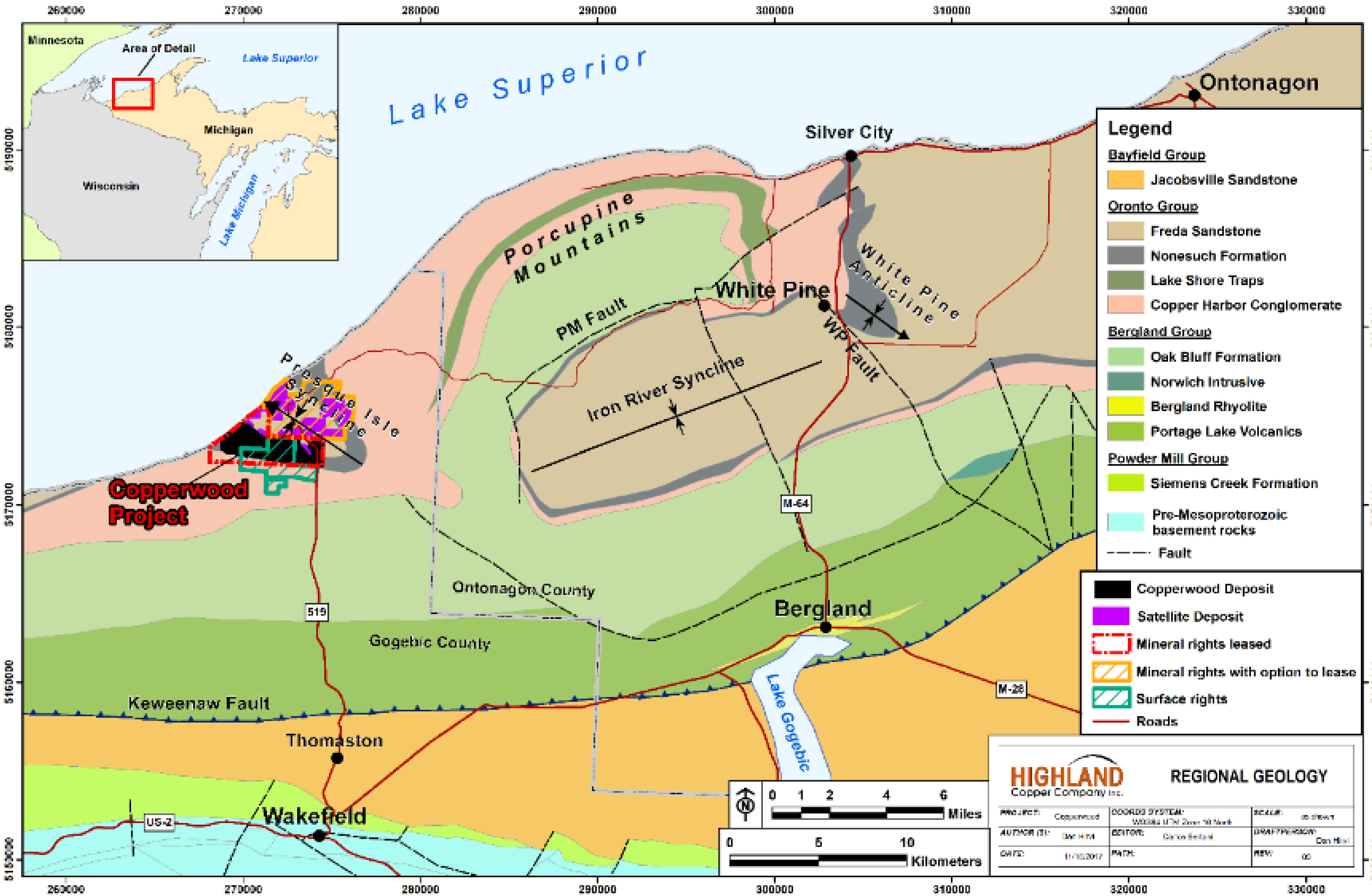


Figure 7.3: Regional Geology and Project Location



Evidence of pervasive alteration by metamorphic fluid is shown in the rift-phase volcanic rocks. These metamorphic fluids moved through a network of faults and fractures developed during late rift compression and are likely responsible for deposition of native copper in the volcanic-dominated strata of the Keweenaw Peninsula rocks in the base of the Nonesuch shale.

Multiple kilometers of bedrock were eroded following the late rift compression event. As a result, the copper deposits were exposed. These Precambrian copper deposits were likely subjected to a long period of downward percolating ground waters followed by marine submergence during the Phanerozoic. The rift rocks were subsequently buried by Phanerozoic sedimentary rocks beginning in the late Cambrian and ending in the middle Jurassic. Deposition of the Phanerozoic rocks was followed by another period of erosion and non-deposition from the middle Jurassic to the Pleistocene. The Phanerozoic rocks were removed by erosion from Precambrian rocks of the western Upper Peninsula by Pleistocene continental glaciers beginning about two million years ago.

The last retreating glaciers left behind unconsolidated gravels, sands and muds deposited in glacial, glaciofluvial and glacial lacustrine cover about 10,000 years ago.

7.2 Project Area Geology

Clastic sediments of the Oronto Group, including the Copper Harbor, Nonesuch and Freda Formations, underlay the entire Copperwood Project Area. Mineralization is hosted at the base of the Nonesuch shale on the limbs of the northwest-plunging Presque Isle Syncline as shown in Figure 7.3, (also known as Western Syncline). A complete stratigraphic section up to about 220 m thick of the Nonesuch Formation occurs in the northern part of the Copperwood Project mineral lease area. Moving to the south, the upper contact is missing due to erosion. The Nonesuch disappears where the basal contact subcrops nears the southern boundary of the mineral lease.

The lowest part of the stratigraphy at the Copperwood Project is the Copper Harbor Formation. Although the unit is normally characterized by a conglomerate facies, the upper portion of the unit intersected by drilling at Copperwood consists mostly of red-brown sandstone. At the contact with the Nonesuch Formation, there is a thin, red-brown siltstone, ranging from about 10 cm up to 0.5 m in thickness. Regionally, the Copper Harbor Formation is up to 2,000 m thick, but the unit is thinner at Copperwood because of the proximity to the Porcupine volcanic center which was a topographic high at the time of deposition of the Copper Harbor Formation conglomerates and sandstones.

The Nonesuch Formation marks a dramatic change from the oxidized red-colored Copper Harbor Formation to a gray- to black-colored fine-grained clastic sedimentary section. The change to a more reducing depositional environment played an important role in the location of the mineralized horizons. The basal portion of the Nonesuch Formation is termed the Lower Copper Bearing Sequence (LCBS). The LCBS is a group of subunits of the Nonesuch Formation that host the bulk of the copper and silver mineralization at Copperwood. The Upper Copper Bearing Shale (UCBS) is a second group of subunits that contain copper mineralization at Copperwood, higher in the stratigraphy. Above the UCBS, the Nonesuch Formation consists of shale, mudstone and siltstone with almost no mineralization.

7.2.1 Lower Copper Bearing Sequence

The LCBS at the Copperwood Project is subdivided into the Domino, Red Massive and Gray Laminated subunits. This horizon directly overlies the red sandstone and siltstone of the Copper Harbor Formation, as shown in Figure 7.4.

The Domino subunit, the principal copper host at Copperwood, lies immediately above the Copper Harbor Formation and is characterized by laminated dark gray to black shale and siltstone. A mineralized sample of the Domino subunit is shown in Figure 7.5. Red-brown layers are present throughout in varying frequency. There are occasionally very fine-grained gray sandstone beds with thickness of a few centimeters within the upper half of Domino. A thin, typically less than 0.1 m thick zone of brecciated shale/siltstone is often, but not always, present at or near the base. The Domino ranges in thickness from 0.0 to 2.3 m and has a mean thickness of 1.6 m.

Figure 7.4: Copperwood Deposit Stratigraphy

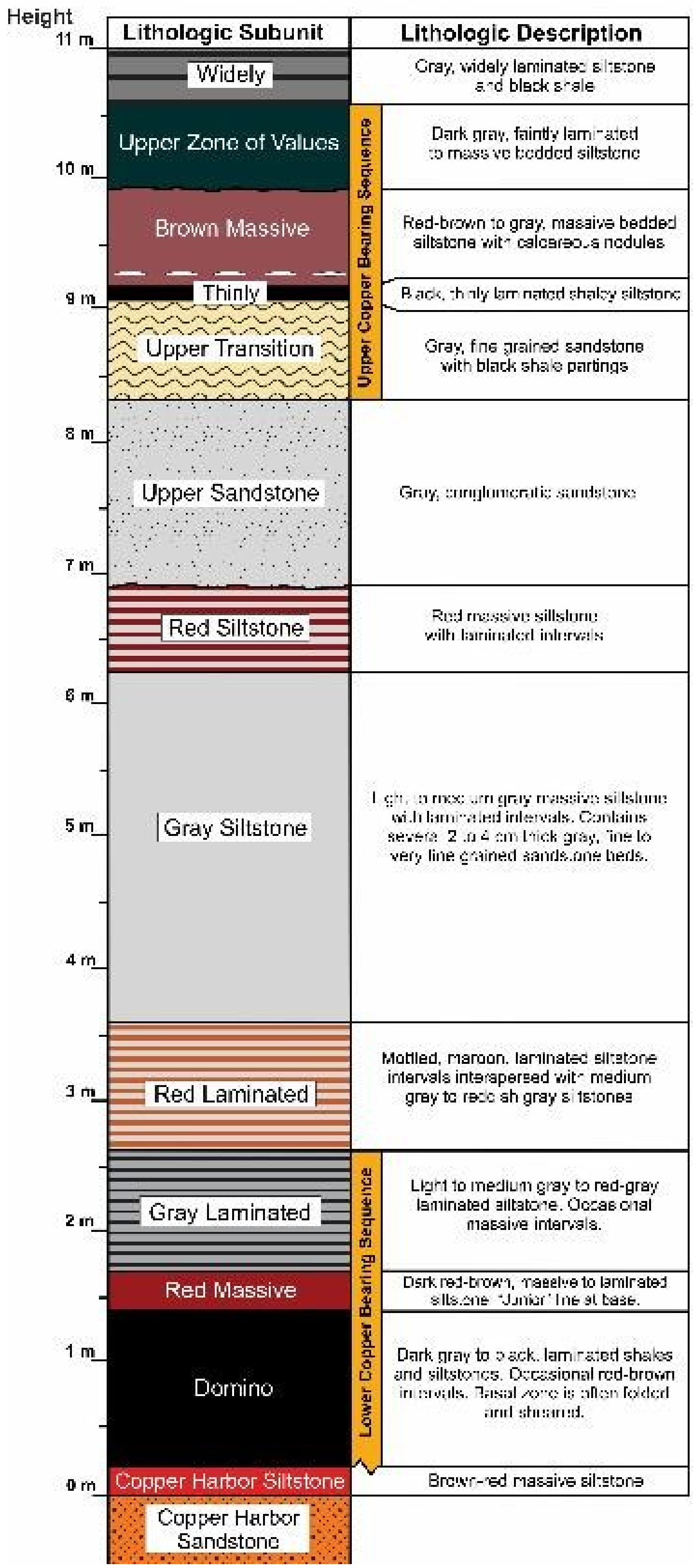
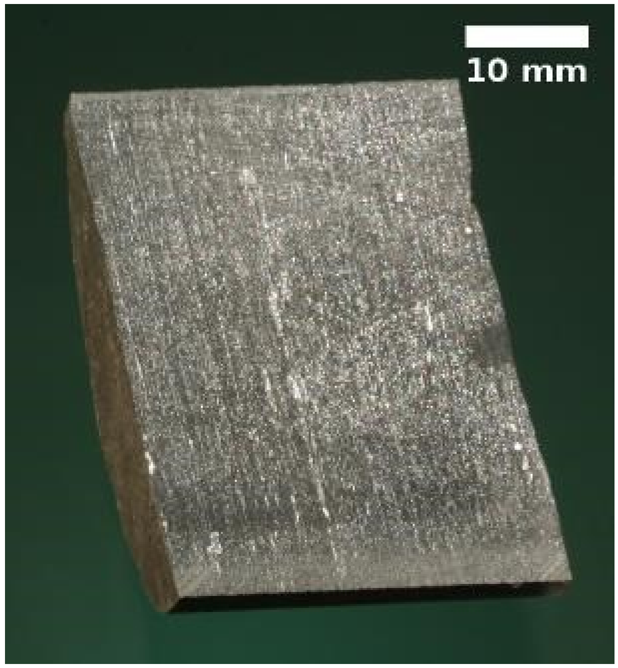


Figure 7.5: Mineralized Domino Subunit Drill Core Sample



The Red Massive subunit overlains the Domino consisting of massive dark red-brown siltstone with beds of fine-grained sandstone. The contact with the Domino is sharp and easily recognized in drill core as an abrupt change from the dark-gray or black color of Domino to the red-brown of Red Massive. Towards the top of the Red Massive, the color changes from red-brown to reddish-gray. The upper contact is placed where the color changes from reddish gray to gray. This upward color change typically occurs over a thickness of a few centimeters. The Red Massive is weakly mineralized and has a mean thickness of 0.3 m and ranges from 0.0 to 1.2 m thick.

The Gray Laminated subunit contact with the underlying Red Massive is gradational. This subunit consists of light to medium-gray to reddish-gray, laminated to locally massive siltstone. Brownish layers are occasionally present in parts of the Gray Laminated interval. A 10 to 50 cm thick zone of calcareous nodules in gray siltstone occurs in all holes near the base of Gray Laminated. The upper contact is placed where the color changes from dominantly gray to mixed maroon and gray. The transition zone is typically on the order of 0.1 m thick. The Gray Laminated is mineralized and has a mean thickness of 1.0 m and ranges from 0.0 to 2.6 m thick.

The LCBS is overlain by the following subunits: Red Laminated, Gray Siltstone, Red Siltstone and Upper Sandstone. These subunits are not mineralized except the Red Laminated where copper-rich mineralization occurs in the lower 0.3 m of the subunit.

The Red Laminated subunit overlies the Gray Laminated. This subunit is characterized by laminated siltstone with a bimodal color distribution of maroon to red-brown and gray. Typical Red Laminated has mottled or wavy maroon intervals interspersed with medium gray to reddish gray siltstone. The Red Laminated sub-unit has a mean thickness of 1.4 m and ranges from 0.0 to 3.1 m thick.

The Gray Siltstone and Red Siltstone subunits overlie the Red Laminated. The Gray Siltstone consists of a laminated, light and dark gray siltstone. The Red Siltstone is a red-gray to red-brown siltstone.

Most minerals in the siltstone-dominated lithologies of the sequence are too fine-grained to be identified in drill core using only the aid of a hand lens. An exception is calcite, which fills thin single millimeter-scale healed fractures that cut across bedding typically at high angles. At least a few calcite healed fractures are found in the sequence of every hole. The non-sulfide mineralogy of the sequence is consistent with low-temperature and low-pressure metamorphism.

This sequence of rocks is overlain by the Upper Sandstone subunit of the Nonesuch Formation. The contact is sharp. The Upper Sandstone consists of generally massive gray siltstones and sandstones, with minor gray conglomeratic, white sandstone and red-brown siltstone lenses.

7.2.2 Upper Copper Bearing Sequence

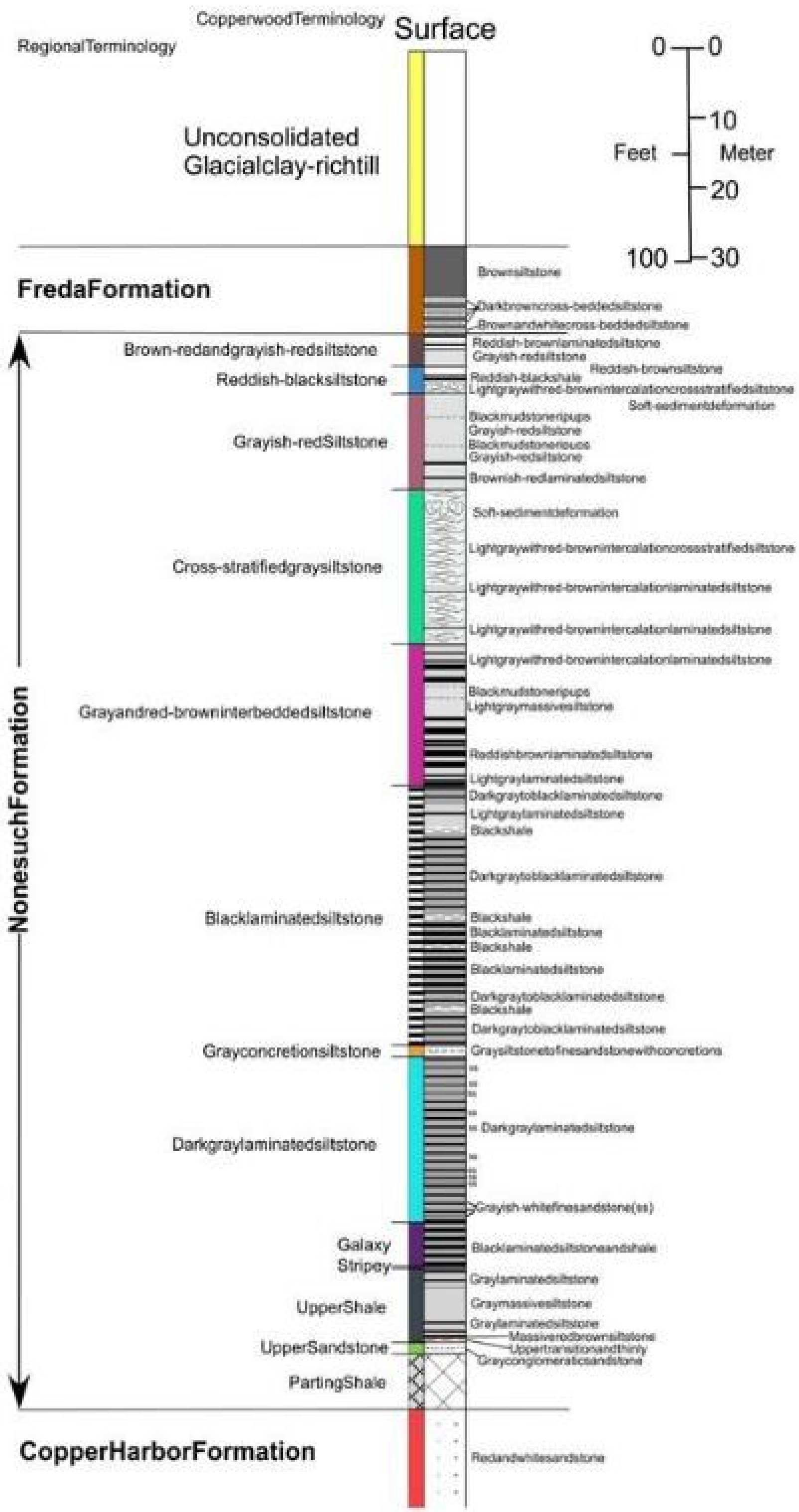
The Upper Copper Bearing Sequence (UCBS), which lies on the Upper Sandstone subunit, is comprised of the following subunits: Upper Transition, Thinly, Brown Massive and Upper Zone of Values.

The Upper Transition subunit is composed of finely interbedded coarse grey siltstone with dark grey shaley siltstone and is approximately 0.6 to 1.2 m thick. It is overlain with a sharp contact by the Thinly subunit, composed of thin, black laminated shale, typically 6 to 10 cm thick. There is a gradational contact to the Brown Massive subunit, composed of massive, brownish red siltstone 0.6 to 1.6 m thick and contains oval shaped calcareous nodules 2 cm thick. The uppermost subunit of the UCBS is the Upper Zone of Values, composed of faintly laminated, greenish black shaley siltstone 0.1 to 1.0 m thick, and is less distinct than at White Pine. The bottom contact is very gradational with splotchy shale partings.

7.2.3 Nonesuch Undivided and Freda Formations

Above the UCBS, subunits of the Nonesuch Formation have not been formally named. They include a series of siltstone and shale horizons shown in Figure 7.6. Their color varies from light to dark gray and black with lesser amounts of reddish brown, oxidized zones. There are variable amounts of calcareous material occurring as disseminations, blebs and veinlets. The Freda Formation at Copperwood consists mainly of reddish brown to brown siltstone and fine sandstone.

Figure 7.6: Stratigraphic Column of the Project Area Geology



7.2.4 Structure

All the units on the southwestern limb of the Presque Isle Syncline dip gently to the north and vary from 12° in the south near the interface with overburden to 8° in the north near the synclinal axis. The lower contact of the Nonesuch Formation subcrops beneath 20 to 35 m of unconsolidated glacial sediments and is approximately 275 m beneath the bedrock surface about 1.3 km to the north.

Figure 7.8 through Figure 7.11 present a series of cross sections within the Copperwood Project area. The cross sections show the constant gentle dip of the LCBS across an east-west distance of 1,220 m. Figure 7.12 presents a longitudinal view of the Copperwood Deposit.

Highland has delineated a low angle reverse fault that dips 23 degrees to the north-northwest in the western, thicker part of the Copperwood Deposit, as shown in Figure 7.7.A The average vertical displacement is 4.8 (up to 8 m), and the maximum along-fault, up-dip displacement of the Domino unit is 25 meters. The fault plane was modeled from eleven Highland drill holes in total. Orvana drill hole CW-09-82 and Highland drill hole CW-17-186 are only two drill holes that intersected a repetition of the LCBS in the Deposit.

A basin-wide basal gouge exists near the bottom of the Domino and the contact of the Copper Harbor Formation. It usually occurs within the Domino a few centimeters from the bottom contact with the Copper Harbor Siltstone. It is comprised of a weaker, deformed shale/siltstone and its contacts are sharp and parallel to laminae. The basal gouge was identified in 177 drill holes within the Deposit and has a median thickness of 5.1 cm and an average thickness of 7.1 cm, as shown in Figure 7.7. The stiffness of the gouge is variably soft, moist (clay-like) to hard, dry (striated) and is sometimes healed.

Figure 7.7: Thrust Fault and Basal Gouge Thickness

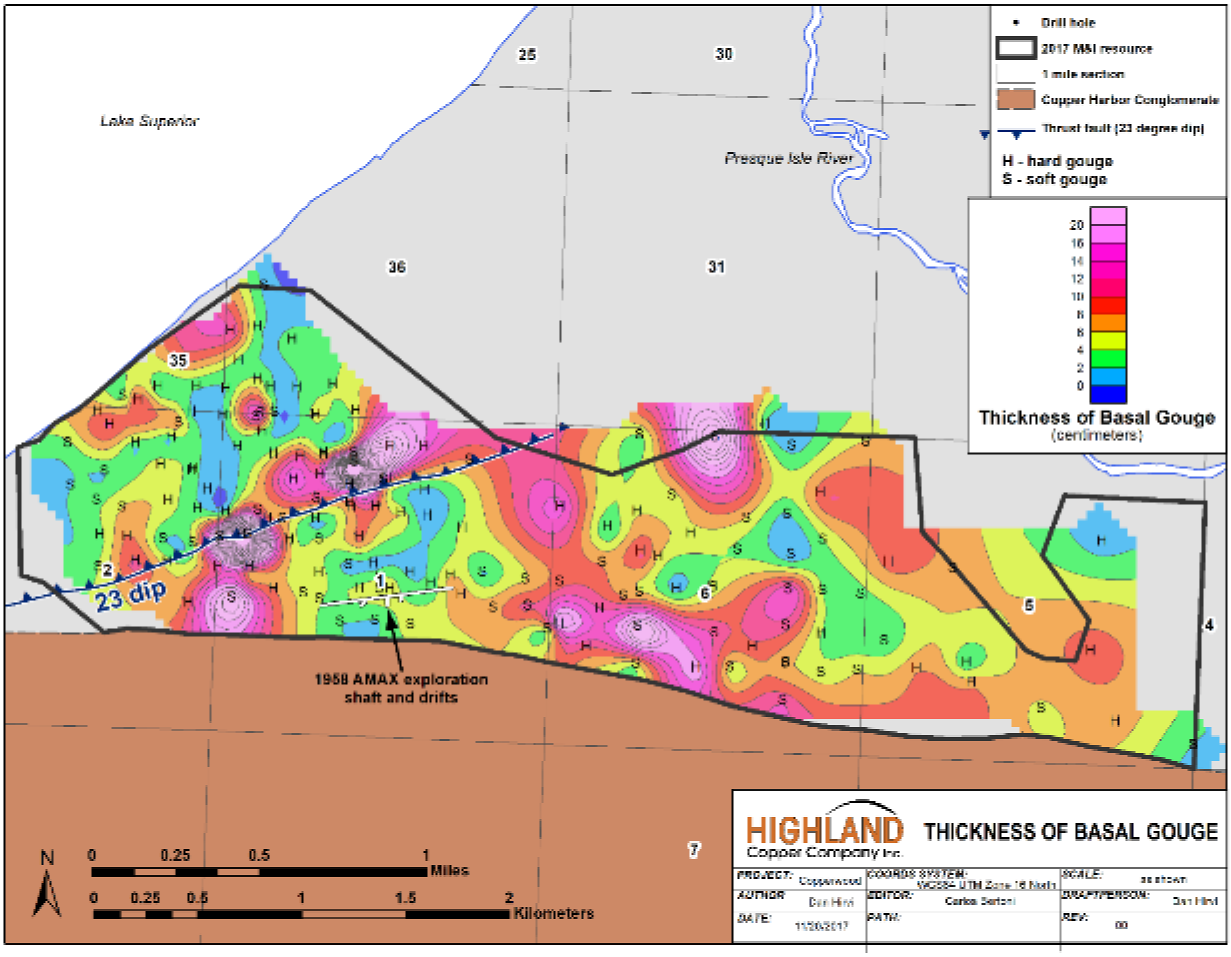


Figure 7.8: Cross Section Showing the LCBS – South West-North East Fence Diagram – Western Copperwood Deposit

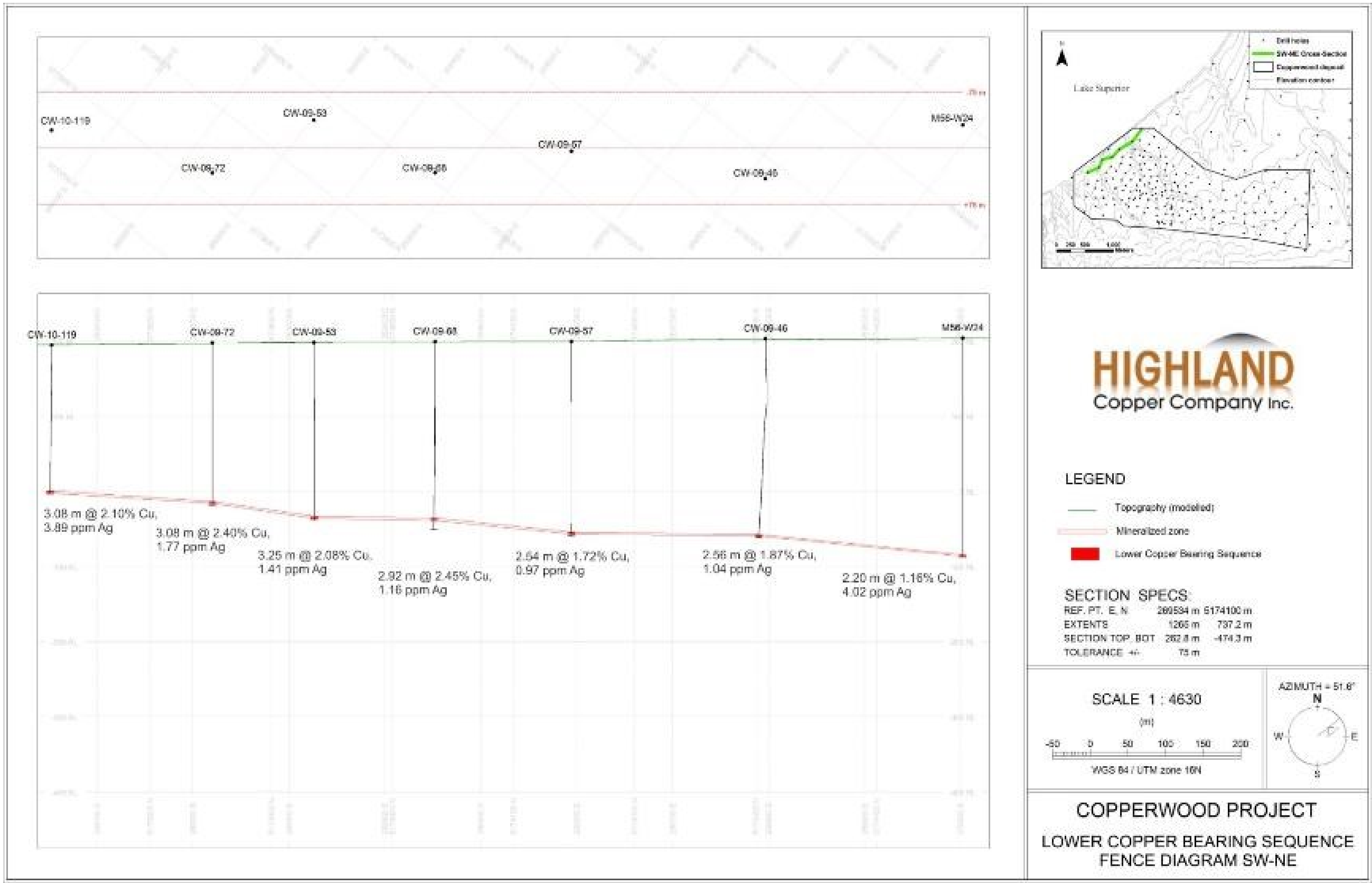


Figure 7.9: Cross Section Showing the LCBS – South-North Fence Diagram – Western Copperwood Deposit

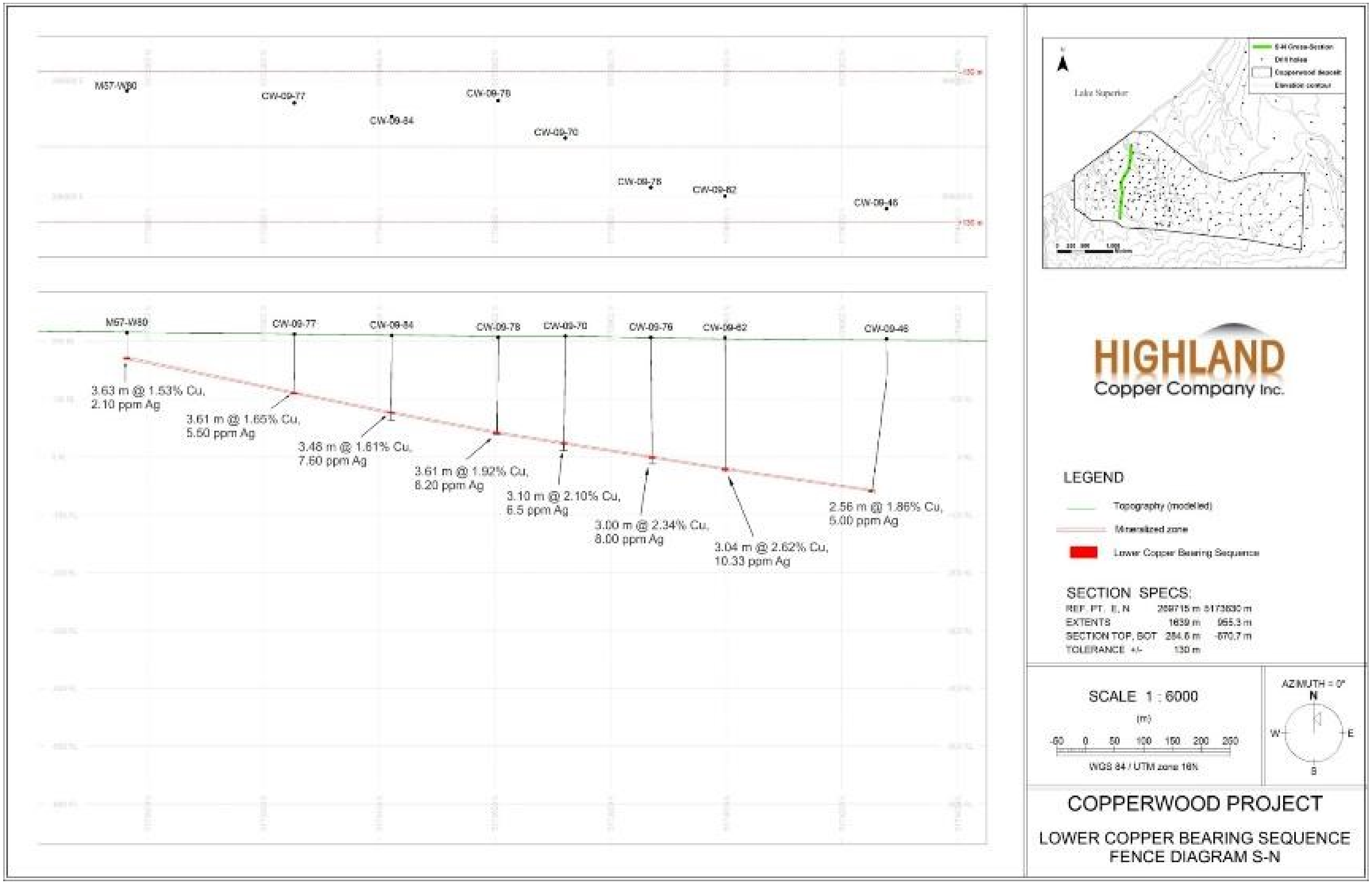


Figure 7.10: Cross Section Showing the LCBS – South-North Fence Diagram – Central Copperwood Deposit

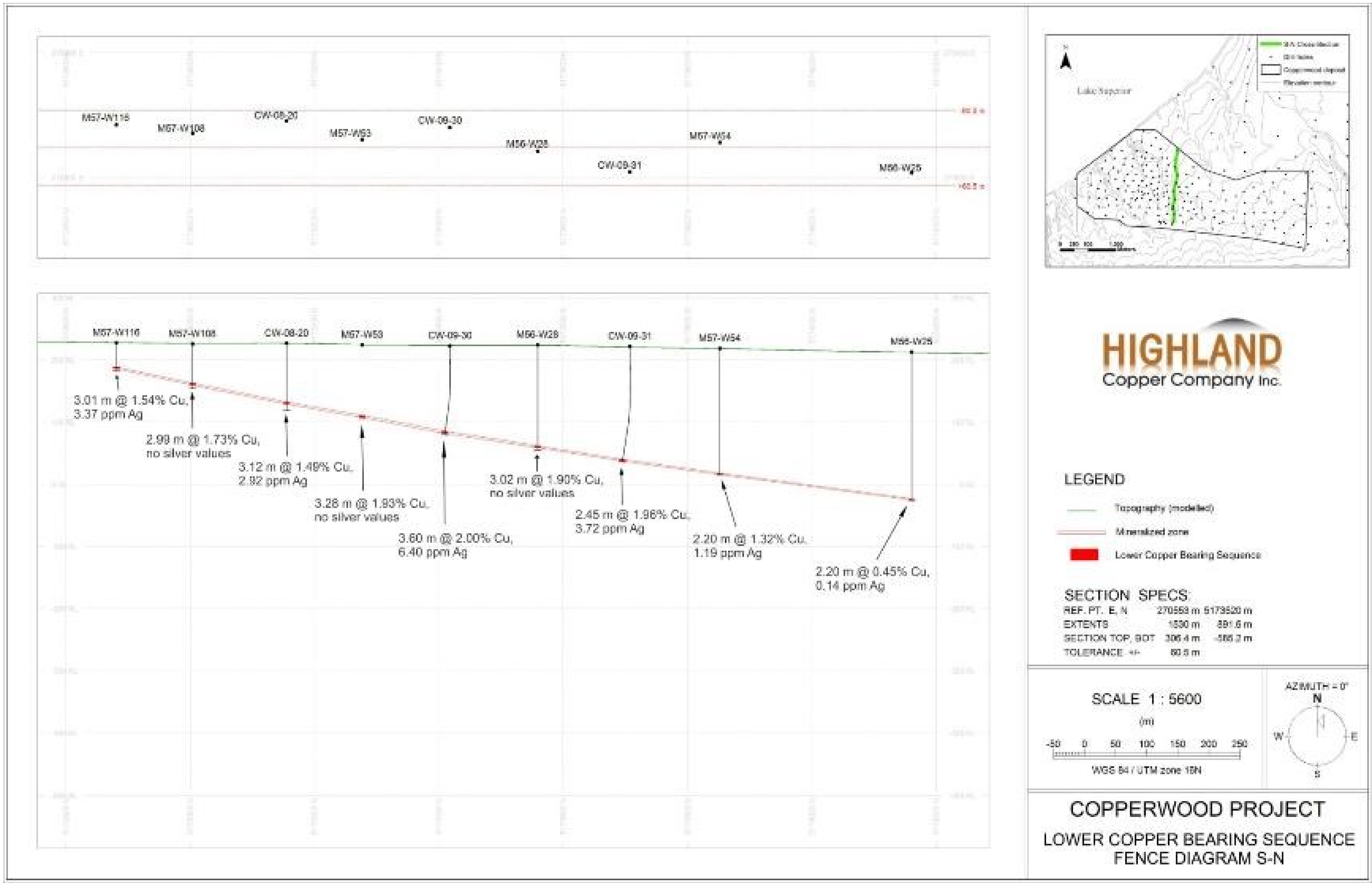


Figure 7.11: Cross Section Showing the LCBS – South-North Fence Diagram – East Copperwood and Satellite Deposits

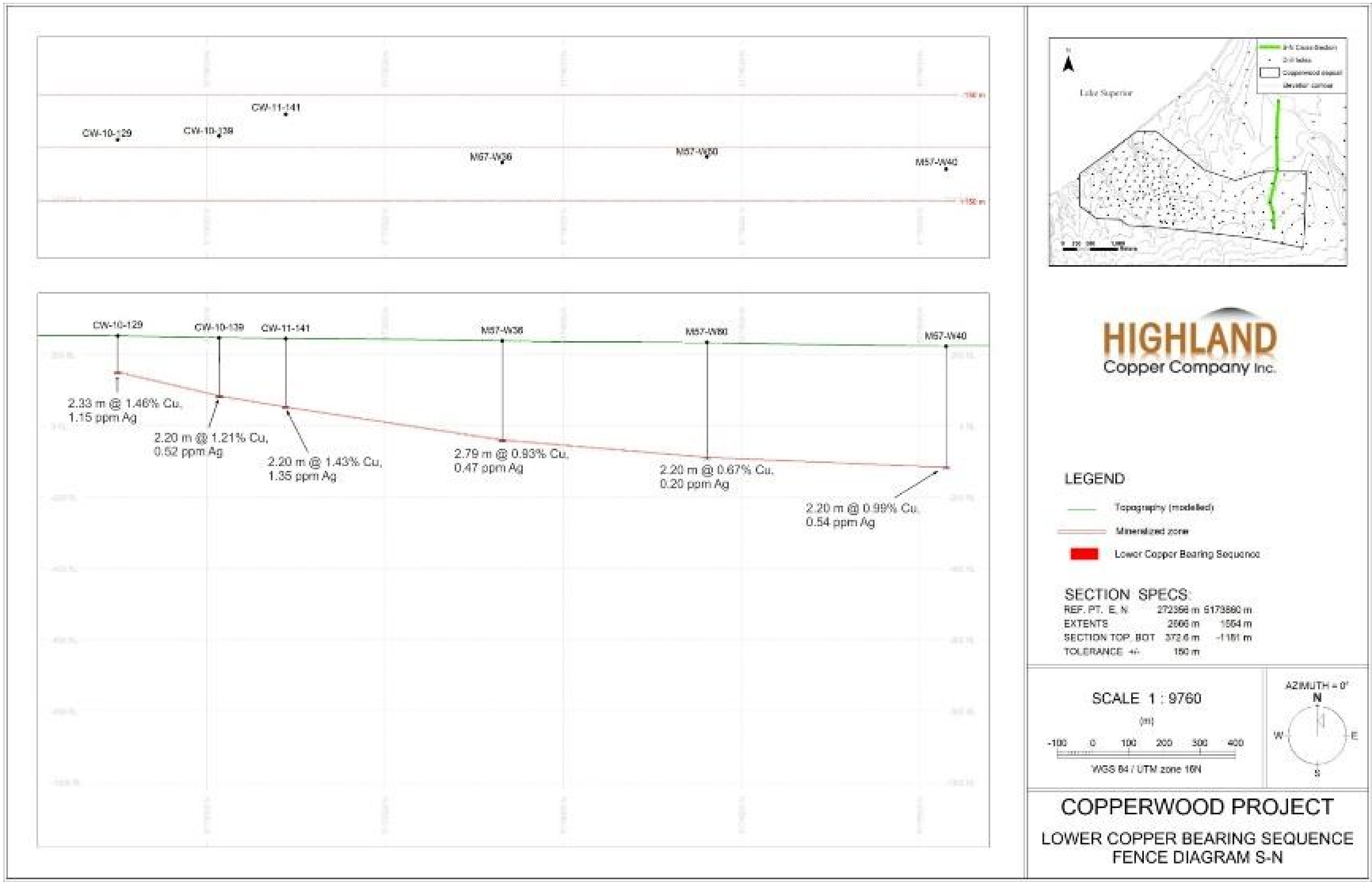
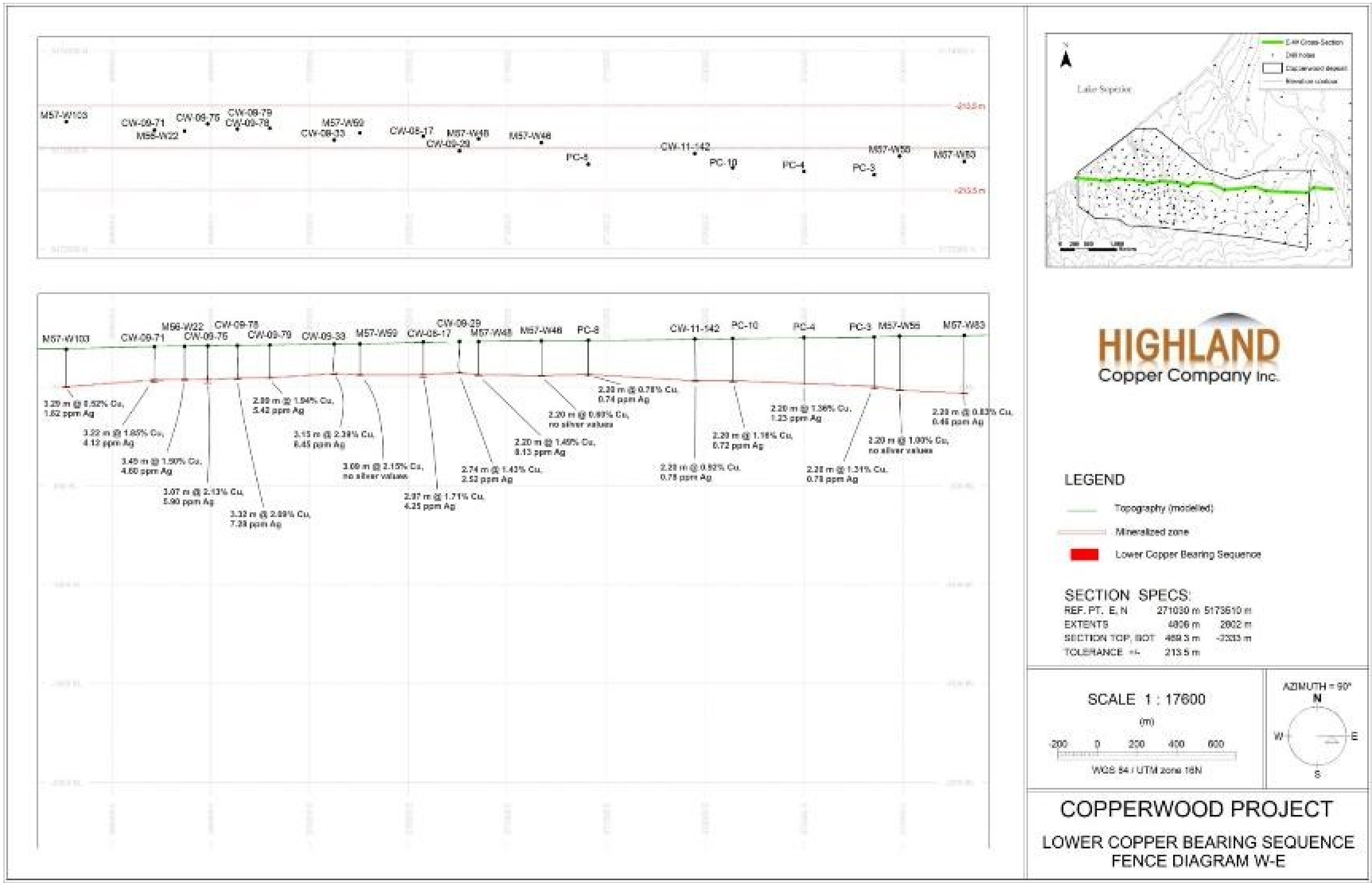


Figure 7.12: Longitudinal Section Showing the LCBS – West-East Fence Diagram – Copperwood and Satellite Deposits



7.3 Mineralization

The Copperwood and Satellite Deposits are situated on the limbs of the Presque Isle Syncline within the Nonesuch Formation. The Nonesuch Formation contains two mineralized sequences, one located at the base and called Lower Copper Bearing Sequence (LCBS), and a stratigraphically higher one called Upper Copper Bearing Sequence (UCBS), separated by poorly mineralized sediments from 0.5 to 6.0 m thick.

The Domino is the main mineralized subunit, averaging 1.6 m in thickness, but thinning to about 0.5 m on the eastern edge of the Copperwood Deposit. Copper assays at Copperwood are remarkably consistent within individual units with mean copper grades of 2.58 wt.%, 0.39 wt.%, and 1.32 wt.% for the Domino, Red Massive and Gray Laminated subunits, respectively. The Red Laminated demonstrates a localized 1% increase in copper grades occurring at the base of the unit adjacent to the Gray Laminated. Silver is also present, with mean grades of 5.5 g/t.

Chalcocite is the only observed copper sulfide-bearing mineral at Copperwood, occurring principally as disseminations within shale and siltstone. Individual disseminated grains of chalcocite are most commonly very fine-grained, approximately 5 to 50 microns (μ) in diameter. Chalcocite occurs as free grains and as complex grains where it appears to have replaced pyrite grains, as evidenced by remnant patchy domains of an iron oxide mineral (probably hematite). In the highest-grade samples, located in the top 0.3 m of Domino subunit, chalcocite occurs as layers that are parallel to laminations in the rock. These layers are usually less than 2 mm thick. Occasionally, ovoids of chalcocite occur that are up to 3 mm in their long axis. They possibly result from the replacement of organic carbon.

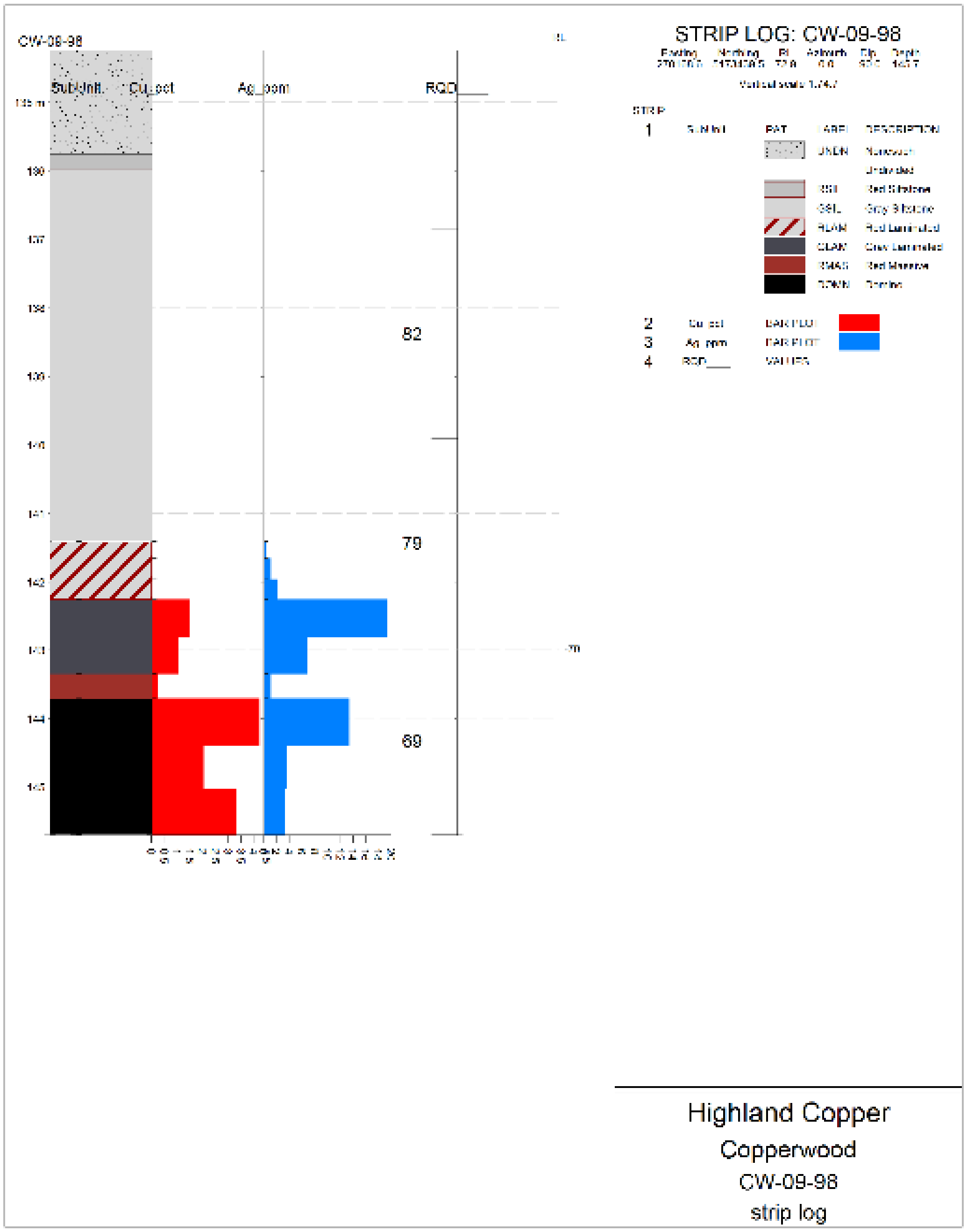
There is an overall negative correlation with the degree of oxidation of the host rock within the LCBS and the abundance of chalcocite within the LCBS. The dark-gray to gray colored Domino subunit has the highest copper grades; the medium to light-gray-colored Gray Laminated has medium copper grades; and, the red-brown colored Red Massive has distinctly the lowest copper grades.

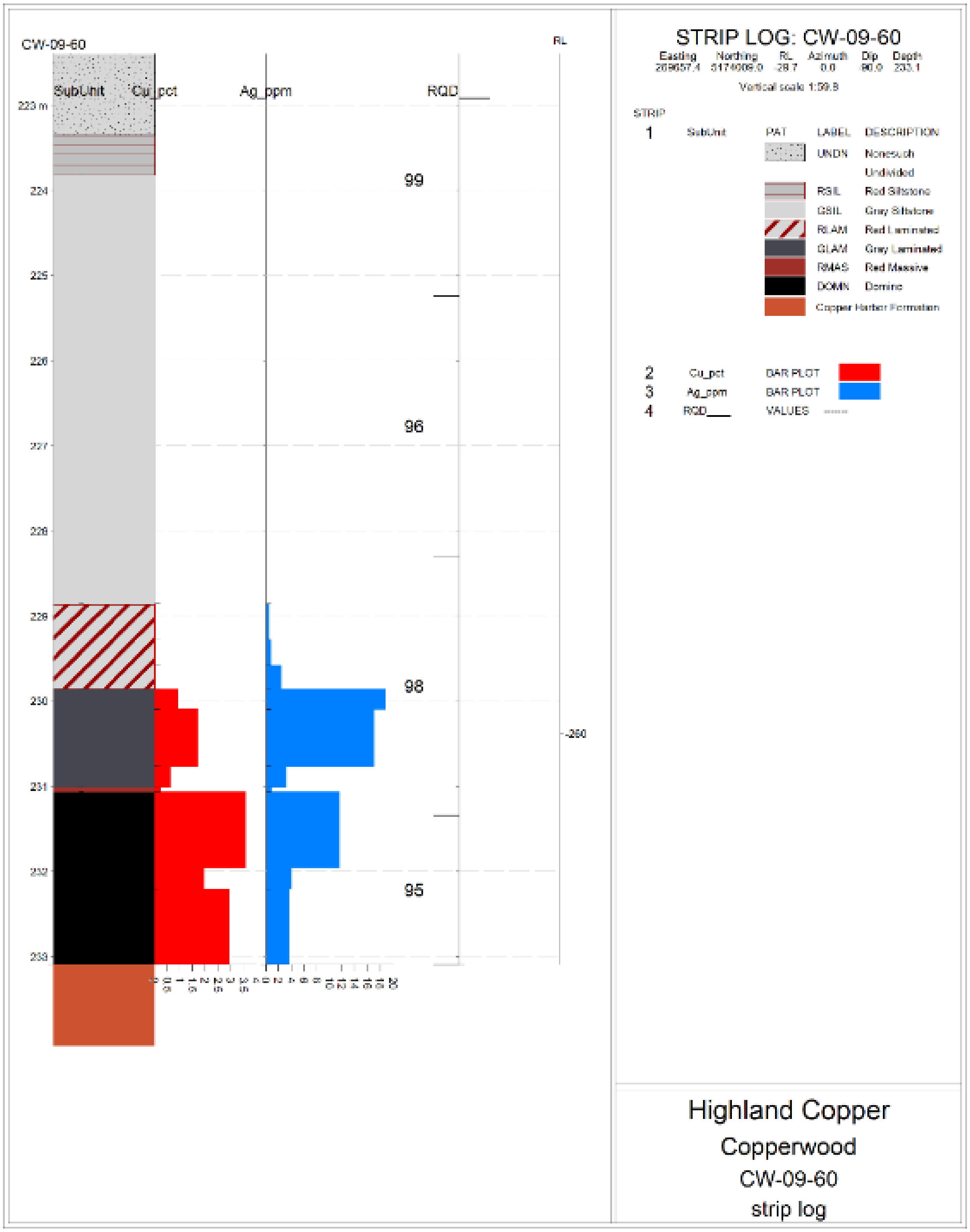
Grade profiles for each of the LCBS units show that there is a natural break in the grade profile, at approximately 1 wt.% copper. The 1 wt.% copper grade is a natural cut-off and is extensively used in Zambian and other African sediment-hosted copper deposits, where most intercepts grade a few tenths of a percent copper above or below the mineralized interval and well over 1 wt.% copper inside the mineralized interval.

The UCBS hosts the same style of chalcocite mineralization as the LCBS, but contains trace to no chalcocite mineralization the western, thicker part of the Deposit. The copper grade gradually increases towards the center of the Western Syncline and Section 6 contains an UCBS grade of 0.5 to 0.8 wt.% copper. The UCBS becomes more mineralized in Section 5 and has a copper grade greater than 1.0 wt.% in the eastern half of the section where the thickness of the UCBS ranges from 2.5 to 3.2 m. Here the copper grades are greater than 1.5 wt.%, 3.0 wt.%, 0.3 wt.%, and 0.9 wt.% for the Upper Transition, Thinly, Brown Massive, and Upper Zone of Values subunits, respectively. The Upper Transition and Thinly units are of economic interest, and were the focus of the resource estimate.

Although the average grades of silver in the Domino and Grey Laminated are of low economic importance (4-6 g Ag/t), the spatial distribution of silver grades are highly variable. A sub-population of higher-grade silver assays (up to 108 g Ag/t) are present in the Domino to the north of the Copperwood Deposit, located within the keel of the syncline. The vertical distribution of copper and silver grades within the LCBS are shown in Figure 7.13.

Figure 7.13: Strip Log Showing Typical Distribution of Copper (top) and Silver (bottom) in the LCBS




CW-09-60
SubUnit
Cu_pct
Ag_ppm
RQD___
RL
223 m
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STRIP LOG: CW-09-60
Easting Northing RL Azimuth Dip Depth
Vertical scale 1:59.8
STRIP
1 SubUnit PAT LABEL DESCRIPTION
UNDN Nonesuch Undivided
RSIL Red Siltstone
GSIL Gray Siltstone
RLAM Red Laminated
GLAM Gray Laminated
RMAS Red Massive
DOMN Domino
Copper Harbor Formation
2 Cu_pct BAR PLOT
3 Ag_ppm BAR PLOT
4 RQD___ VALUES
Highland Copper
Copperwood
CW-09-60
strip log

7.4 Comparison to White Pine Deposit

The White Pine deposit is located about 30 km northeast of the Copperwood Project. The White Pine mine operated from 1952 to 1995, producing over two million metric tonnes of copper. The White Pine and Copperwood Deposits are both considered stratiform copper deposits hosted by shale and siltstone. Geologically, the sites encompass the same overall stratigraphic position at the base of the Nonesuch Formation. The chalcocite mineralization is interpreted to have the same origin and the two deposits mirror each other on either side of the Porcupine Mountains volcanic structure.

The similarities and differences between White Pine and Copperwood are described and commented below. A comparison of the stratigraphy of the base of the Nonesuch Formation at the Copperwood and the White Pine North areas is depicted in Figure 7.14.The White Pine North stratigraphy was developed by Highland based on its 2014 drilling of the deposit.

The Lower Copper Bearing Sequence at Copperwood is the partial equivalent of the Parting Shale sequence at White Pine. The term “Parting Shale” describes a mining configuration, not a stratigraphic sequence and includes three non-mineralized subunits. While the LCBS is typically twice as thick at Copperwood, the thickness of the mineralized horizons is about the same, 2.5 m thick at both sites. The most significant difference is that the Domino subunit at Copperwood is much thicker, averaging 1.6 m, compared to 0.6 m at White Pine. Since the Domino is the highest-grade subunit, the average copper grade at Copperwood is higher than White Pine.

Another difference between the two sites is the potential mining configurations. Both sites have two mineralized sequences: the Parting Shale and Upper Shale at white Pine, and the LCBS and the UCBS at Copperwood. Much of the mining at White Pine included a configuration called the Full Column, which included all of the Parting Shale, the Upper Sandstone and the basal two subunits of the Upper Shale. The Upper Sandstone contains little or no mineralization, but at White Pine the dilution from this zone is compensated for by the very high grade mineralization of the overlying Upper Transition and Thinly subunits. At Copperwood, the thickness of non-copper-bearing units between the two mineralized sequences is much greater and the use of a Full Column-equivalent configuration needs to be investigated.

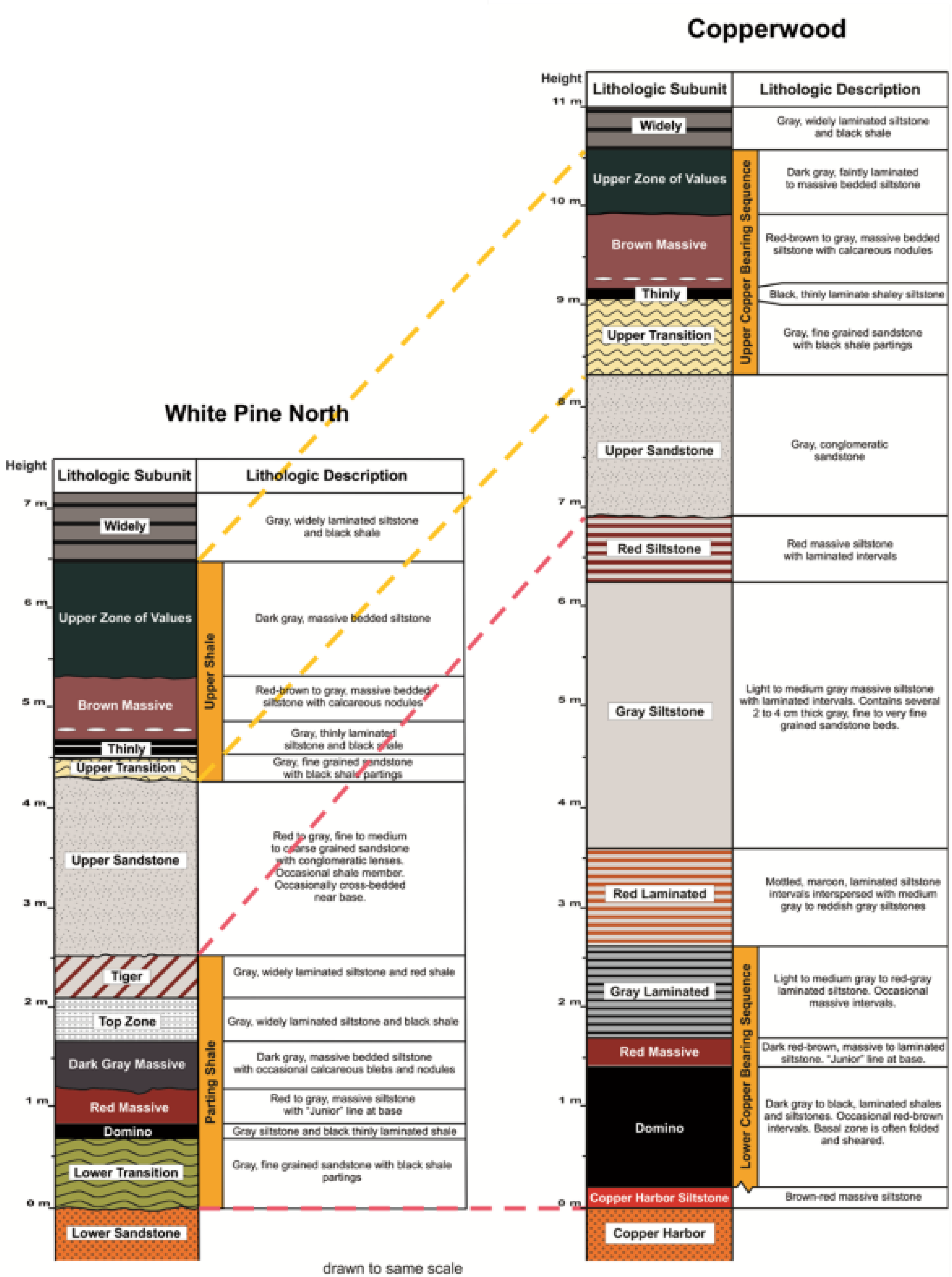
Structurally, there are significant differences between Copperwood and White Pine. The White Pine Deposit straddles an anticline and a right-lateral strike-slip fault. Both the southwest and northwest domains of the White Pine Deposit contain strike-slip and thrust faults. These faults are interpreted as being generated during the regional late rift compressional event. In contrast, the Copperwood deposit is structurally located on a simple dipping plane, appears to be less faulted. Only one significant thrust fault has been identified at Copperwood.

The mineralization type differs slightly between Copperwood and White Pine. The copper bearing mineral at Copperwood is essentially fine-grained chalcocite. In contrast, the White Pine Deposit has two distinct types of mineralization; about 80% to 85% of the copper occurs as chalcocite and the rest as native copper.

At White Pine, most of the native copper occurs as disseminations and coatings along fractures. Some of the native copper occurs as sheets and veinlets along fault zones. There does not appear to be a similar style of mineralization at Copperwood.

The copper grades are very consistent within individual units averaging 2.58 wt.%, 0.39 wt.% and 1.32 wt.% for the Domino, Red Massive, and Gray Laminated, respectively, in the Copperwood Deposit. A similar pattern of relatively consistent grades occurs at White Pine with the stratigraphic equivalent subunits, the Domino, Red Massive and Dark Gray Massive.

Figure 7.14: Comparison of Copperwood and White Pine North Stratigraphy



8 DEPOSIT TYPES

The following descriptions and conclusions related to sediment-hosted copper deposits have taken in considerations the work by several authors, including Gustafson and Williams, 1981; Kirkham, 1989; Lindsey et al., 1995; Cox et al., 2003; and Hitzman et al., 2005.

The Copperwood Project consists of sediment-hosted stratiform copper deposits. Such deposits consist of copper and copper-iron sulfide minerals hosted by siliciclastic rocks in which a relatively thin (typically less than 3 m thick) copper-bearing zone is mostly conformable with stratification of the host sedimentary rocks. Copper occurs as disseminations and veins.

Sediment-hosteddeposits have been grouped on the basis of the reductant into three subtypes: reduced facies, red-bed copper and Revett Copper. They can also be classified based on basinal setting into two subtypes: Kupferschiefer and red-bed. The reduced facies and Kupferschiefer subtypes are similar. Examples of the reduced facies or Kupferschiefer subtypes include most of the deposits within the Central African Copperbelt (such as Nkana, Nchanga, Mufulira, Tenke–Fungurume and Kolwezi), the Kupferschiefer (Germany/Poland), Redstone (Canada) and White Pine (USA).

The following are common features of the reduced facies or Kupferschiefer subtype sediment hosted copper deposits as summarized by Cox et al., 2003 and Hitzman et al., 2005.

Geological setting: Intracratonic rift with coarse-grained sub-aerial sediments overlain by fine-grained sediments or restricted marine setting/basin margin followed by widespread euxinic marine deposits; near paleo-equator; partly evaporitic on the flanks of basement highs; footwall sediments highly permeable; and, host ranging in age from early Proterozoic to late Tertiary, but predominate in late Mesoproterozoic to late Neoproterozoic.

Host Rocks: Marine or lacustrine; thin-bedded to finely-laminated green, black or gray shale, thinly laminated tidal/sabkha facies or reefoid carbonate rocks, and dolomitic shales; common organic carbon and finely disseminated pyrite; tend to have large lateral extent; and, during transgression over oxidized sequences of hematite-bearing sandstones, siltstones, and conglomerates (red-beds).

Mineralization: Chalcocite and other Cu_2S-CuS minerals + bornite are diagnostic; typical minerals hematite–chalcocite–bornite–chalcopyrite–pyrite; may be zoned with chalcocite-bornite central, chalcopyrite-pyrite medial, galena-sphalerite peripheral; finely disseminated; copper sulfides replace framboidal or colloform pyrite; and, carbon-rich materials in favorable host rocks but usually consumed by redox reactions during copper mineralization processes.

Alteration: Diagenetic alteration minerals in host rocks and underlying red-beds (albite, potassic feldspar, chlorite, quartz, carbonate minerals, dolomitization, etc.); and, bleaching of red sediments to greenish gray or light gray where in contact with reducing fluids.

Timing of mineralization: Textures and fabrics indicate that all were precipitated after host-rock deposition; exact timing variable; and, may take place early to very late in the diagenetic history or in the post-diagenetic history.

Mineralization controls: Basin-scale fluid flow system in highly permeable footwall red-bed sediments; giant deposits form from multiple stages or long-term progressive fluid flow; copper is mobilized from footwall red-beds by oxidizing low-temperature brines and metal carried as chloride complexes; mineralizing fluid focusing by marginal basin faults, stratigraphic pinch-outs or anticlinal traps; copper mineralization in lowermost reduced beds overlying red-beds; and, pyritic black shale/siltstone and algal mats, perhaps hydrocarbon fluids, provide source of biogenic sulfur and reducing environment for precipitation of copper.

Global-scale Grade-Tonnage Model: Median reduced facies deposit has 33 Mt and 2.33 wt.% copper.

The Copperwood Project Deposits are interpreted as being classic examples of a reduced-facies sediment-hosted copper type, formed during early diagenesis. Syn-sedimentary faults may have provided important conduits for cupriferous brines flowing from underlying red beds of the Copper Harbor conglomerate into the reduced silt and shale of the Nonesuch Formation, where main-stage copper sulfides and native copper were precipitated.

9 EXPLORATION

9.1 Exploration History

All exploration activities undertaken on the Copperwood project were performed by previous owners, namely Orvana, AMAX and USMR, and Highland.

A summary of historical exploration activities conducted on the Copperwood Project is presented in chapter six of this technical report. The following sections focus primarily on the exploration programs implemented by Orvana between 2008 and 2013 and Highland.

9.2 Orvana Exploration Programs

Beginning in 2008, Orvana implemented a series of exploration drilling programs at Copperwood (2008, 2009, 2010, 2011 and 2013). Additionally, Orvana commissioned several independent technical reports for the Copperwood and Satellite Deposits in 2010 and 2011.

Orvana completed a major resampling and surveying program for Section 6 and the Satellite Deposits. During late 2010, Orvana drilled an additional 23 diamond drill holes in the Project area and 15 new holes in Section 6. The resampling program involved the collection of archived core, rejects and pulps from 87 historic drill holes, which included all but one of the legacy drill holes in Section 6 (drill hole PC-13).

Orvana contracted Coleman Engineering Co. of Ironwood, Michigan, to survey historic drill collars in the Satellite Deposits area. They were able to locate and survey 111 drill hole collars, and coordinates were estimated for an additional 56 drill holes based on the presence of sumps or other evidence was observed, but no monuments were found.

9.3 Highland Exploration Program

In 2017, Highland carried out a drilling program comprising of 33 HQ-diameter, three PQ-diameter drill holes and an additional 13 wedges for a total of 6,784 meters of core. The drilling provided 527 samples for copper and silver assaying and 607 kg taken for metallurgical testing. The 2017 drill program was designed to upgrade the Inferred Mineral Resources at the eastern section of the deposit (as per the 2015-resource estimate), obtain metallurgical samples and carry out geotechnical studies to refine the mining plan. Nineteen holes were acoustic televiewed by DGI Geoscience (www.dgigeoscience.com) for an improved understanding of the rock’s in situ geotechnical characteristics.

9.4 Airborne Geophysical Studies

There are no known surface geophysical exploration programs for the Copperwood Project. Delineation of mineralization has primarily been completed through drilling from surface and limited underground channel sampling.

9.5 Geochemical Surveys

There are no known surface geochemical exploration programs for the Copperwood Project. Delineation of mineralization primarily has been completed through drilling from surface and limited underground channel sampling.

10 DRILLING

10.1 Drilling History

Before 2017, all drilling activities undertaken on the Copperwood Project were performed by previous owners, namely Orvana, AMAX and USMR.

The Historical drilling on the Copperwood Project property and surrounding leases was completed in two different phases. USMR and BCM drilled 184 core holes in 1956 and 1958. BCM drilled 23 holes in Section 6 in 1959. USMR drilled an additional 119 drill holes in the Satellite Deposits between 1956 and 1958. The core diameter for these holes was between 3.01 cm (AX size core) and 4.20 cm (BX size core). The longest hole reached a depth of 354 m. The second phase of drilling at Copperwood commenced in 2008, with Orvana drilling five holes for environmental purposes. These drill holes intersected significant copper mineralization. Orvana subsequently completed 82 drill holes in 2009. Orvana commissioned an NI 43-101 compliant resource estimate from AMEC and followed up on this during 2010 with 24 additional core holes for 2,801 m in order to firm up the resource, to collect metallurgical and geotechnical data and to investigate a suspected fault. Another 15 holes, totaling 1,250 m, were cored in Section 6 during 2010 to verify copper mineralization in area. In 2013, Orvana drilled 21 drill holes for collecting metallurgical and geotechnical studies; of which 13 holes were drilled primarily for metallurgical purposes and seven holes were drilled primarily for geotechnical purposes with one hole drilled for both metallurgical and geotechnical purposes.

The 2017 drilling program began in February 2017 and finished in August 2017. The drilling program contains 36 diamond drill holes and 13 wedges located at the “Main”, Section 5 and Section 6 areas. Only 17 drill holes were assayed for copper, silver and multi-elements. The remainder of the holes were used for metallurgical and geotechnical test work.

Table 10.1 summarizes the completed drill holes.

Table 10.1: Drilling Statistics by Company and Exploration Campaign

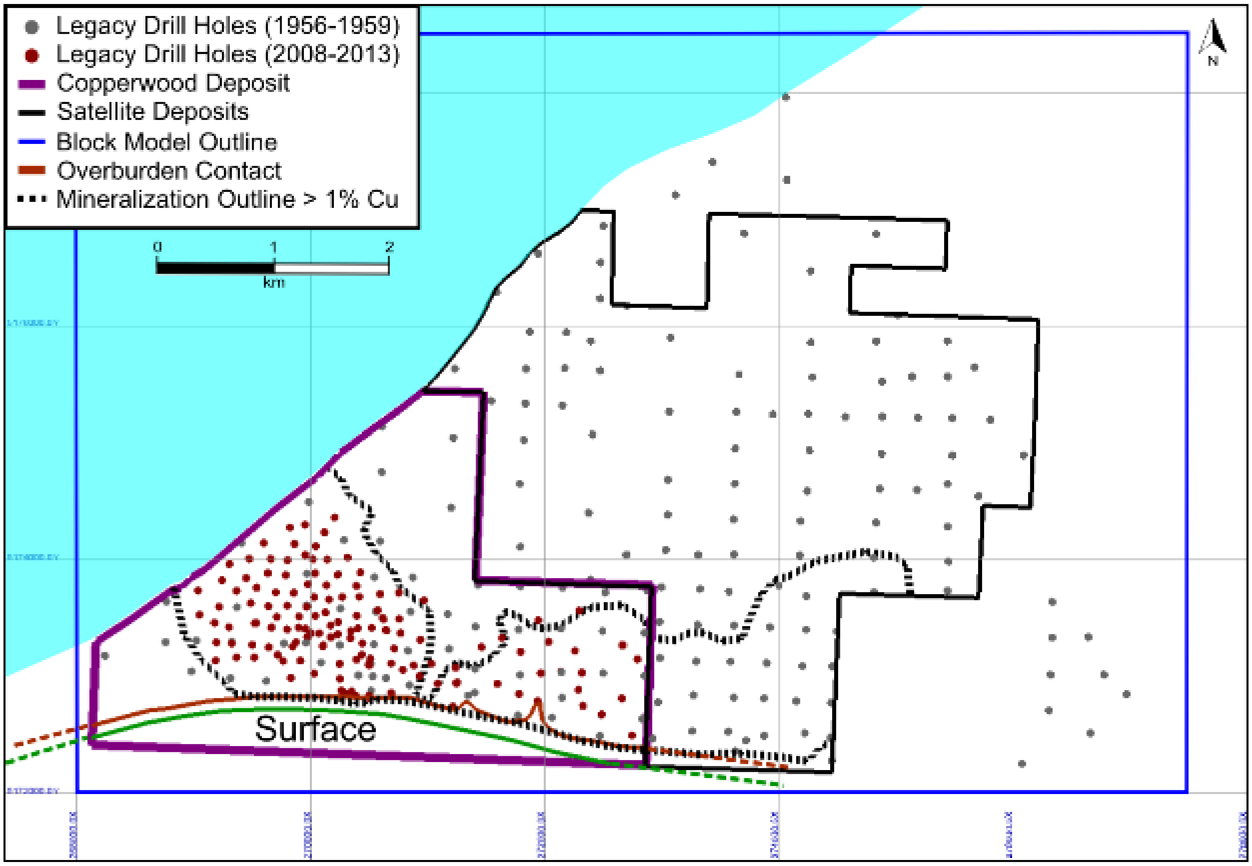
Company	Period	Core Size	Drill Hole Count	Length (m)	% of Total Drilling
USMR	1956 to 1958	BX & AX	161	34,050	51%
BMC	1959	BX & AX	23	3,998	6%
Orvana	2008	NQ	6	744	1%
Orvana	2009	NQ	82	12,858	19%
Orvana	2010	NQ	33	4,274	6%
Orvana	2011	NQ	4	776	1%
Orvana	2013	HQ	21	2,814	4%
Highland	2017	HQ & PQ	36*	6,784	10%
All Programs	1956 to 2017	BX, AX NQ & HQ	366	66,298	100%

**36 drill holes and an additional 13 wedges*

Most of the drilling was done on the southwestern limb of the Presque Isle Syncline, where the LCBS dips to the north at 10º to 15º. Most of the drilling has been vertical; therefore, intercepts are slightly greater than true widths.

Figure 10.1 shows the location of the legacy drill holes.

Figure 10.1: Plan View of the Historical Drilling



10.2 Drilling Procedures

The 2017 drilling was performed by Idea Drilling (www.ideadrilling.com), a company based in Virginia, Minnesota, which used a Marooka CT 14 track-mounted rig, metric HQ rods and all the usual ancillary drilling equipment (Figure 10.2). All drill holes were cased to bedrock to limit and prevent contact with groundwater and were cemented from bottom to top, as per State of Michigan NREPA Part 625. All equipment and vehicles were cleaned to limit the potential for introduction of exotic and invasive plants. All drill cuttings and sump water from Section 5 were disposed off-site, in sumps dug within the company property in Section 6.

Figure 10.2: Winter Drilling at the Section 5 Area

10.2.1 Collar Surveys

Coleman Engineering Company from Ironwood, MI, using a combination of conventional survey, RTK GPS and static GPS methods, surveyed the collar coordinates. The static GPS field data was submitted to OPUS for determining coordinates and elevations and used a Trimble S7 robotic total station or a Sokkia GRX2 GPS unit. The RTK GPS survey used a Topcon Hyper V GPS unit. All data was reduced to WGS 84 UTM Zone 16 coordinates in meters. The elevations were also converted to meters in NAVD 88, Geoid 12A. Ronald K. Jacobson, professional surveyor P.S. # 46671, signed the survey work.

10.2.2 Down-Hole Surveys

The downhole surveys were measured by IDEA Drilling with a DeviShot magnetic downhole survey tool. A reading was taken at the pull of every three-meter drill rod. The geologists on site analysed the surveys and made sure that the data downloaded correctly and indicated which surveys to reject due to casing interference.

10.2.3 Core Logging

A Highland geologist was on site to field log and preserve the mineralized zones within approximately 15 m from the bottom of the LCBS. While on site, the geologist marked natural fractures with a blue lumber crayon and made sure that the driller helper was marking mechanical breaks with a yellow lumber crayon while boxing the core. Core recovery and the boxing of the drill core was supervised before every hole was abandoned.

Detailed geotechnical and lithologic logging of the entire drill core was completed from the glacial overburden to the end of coring in the Copper Harbor Sandstone by geologists Daniel Hirvi, Eric Shepeck and Stacy Saari. Logging was completed in a secure building in White Pine, Michigan on Microsoft Excel spreadsheets using laptops (Figure 10.4). Spreadsheet templates were designed with pull-down menus to ensure that data entry was error free.

Logging was performed with a precision of 5 mm after depths were marked every meter by the geotechnical logger. Geotechnical logging was completed before lithologic logging and sampling to ensure that driller depths were correct throughout the entire core length. Geotechnical logging was completed in intervals between drill runs, between the contacts of the UCBS and the LCBS, and never exceeded three meters. Each interval was logged for depth, total core recovery, solid core recovery, RQD, fracture count, mechanical break count, vein count, vein type, vein thickness, weathering, joint set number, and weathering. Following each geotechnical interval, every discontinuity was logged for depth, discontinuity type, alpha angle (angle to core axis), mating, planarity, roughness, weathering, infill character, infill thickness, and infill hardness.

Lithologic logging recorded bedding type, dominant grain size, percent black shale, bedding angle to core axis, and a lithologic description for each unit. Metallic mineralization style and quantity was also estimated for the UCBS and LCBS using a hand lens and handheld XRF device (Olympus Innov-X Delta Professional, model “DS-4000”).

Each drill hole was photographed entirely one box at a time after logging and samples were marked. Boxes containing remaining core cut from assay sampling and wrapped core for metallurgy were re-photographed for sample documentation (Figure 10.5).

Highland performed routine point load testing on the entire length of core (Figure 10.6), with a greater emphasis on the bottom 19 units, for a total of 5,430 tests. The Itasca Consulting Group prescribed the point load testing methodology. If possible, ten tests were performed in both the axial and diametral directions per subunit below the “Dark Grey Laminated Siltstone” unit. A Bemek Rock tester portable field unit with a 12.4 kip capacity was borrowed from Michigan Technological University under the supervision of Dr. Stanley Vitton.

10.2.4 Core Storage

Core from the Orvana 2008 to 2013 and Highland’s 2017 drilling programs is stored in covered core boxes organized on core racks inside a locked facility, the former mall in White Pine, Michigan.

10.3 Sampling Method and Approach

Core samples from seventeen drill holes were sent for assay form the LCBS, UCBS, and subunits in between. Quarters from HQ size core was sent for assay, half core was kept for metallurgical testing, and the remaining quarter core was kept for reference. Sample intervals were picked between lithologic contacts and never exceeded 0.5 m in the LCBS or the UCBS, but samples up to 1.0 m were taken in the Upper Sandstone, Red Siltstone, Grey Siltstone, and Copper Harbor Sandstone units. Typically, samples 0.25 m long were taken as a first sample outside of both the UCBS and LCBS contacts. Assay intervals were marked with a red crayon and were separated by plastic chocks after cutting. The beginning of each sample interval was marked with unique sample ID from a hand-written sample tag booklet that was later entered into a Microsoft Excel spreadsheet. Core was then sawed in half and then cut into quarters (Figure 10.3).

For sampling consistency, the core cutter/sampler always took the core remaining in the left hand after cutting and placed it into the sample bag and the remaining quarter core was returned to the box for reference. A geologist supervised the cutting and re-boxed half core for metallurgy in separate boxes labelled with the sample intervals.

Whole core metallurgical drill holes were logged, shrink wrapped, and photographed for documentation (Figure 10.8). All core including and in between the UCBS and LCBS were shrink wrapped to at least 0.5 m from the contacts.

A representative sample from each subunit conforming to an assay interval was chosen for density determination (Figure 10.7). The general location within each subunit was noted, e.g., upper, middle, lower, or entire to ensure a good distribution of measurements. If a sample contained more than one piece, then each piece was numbered starting with the top sample as “1”.

Figure 10.3: Core Saw Station at White Pine site

Figure 10.4: Core Logging at White Pine site

Figure 10.5: Core Photography Setup at White Pine site

Figure 10.6: Point Load Testing (Bemek Rock tester)

Figure 10.7: Specific Gravity Station

Figure 10.8: Wrapped Metallurgical Core Samples from Wedge

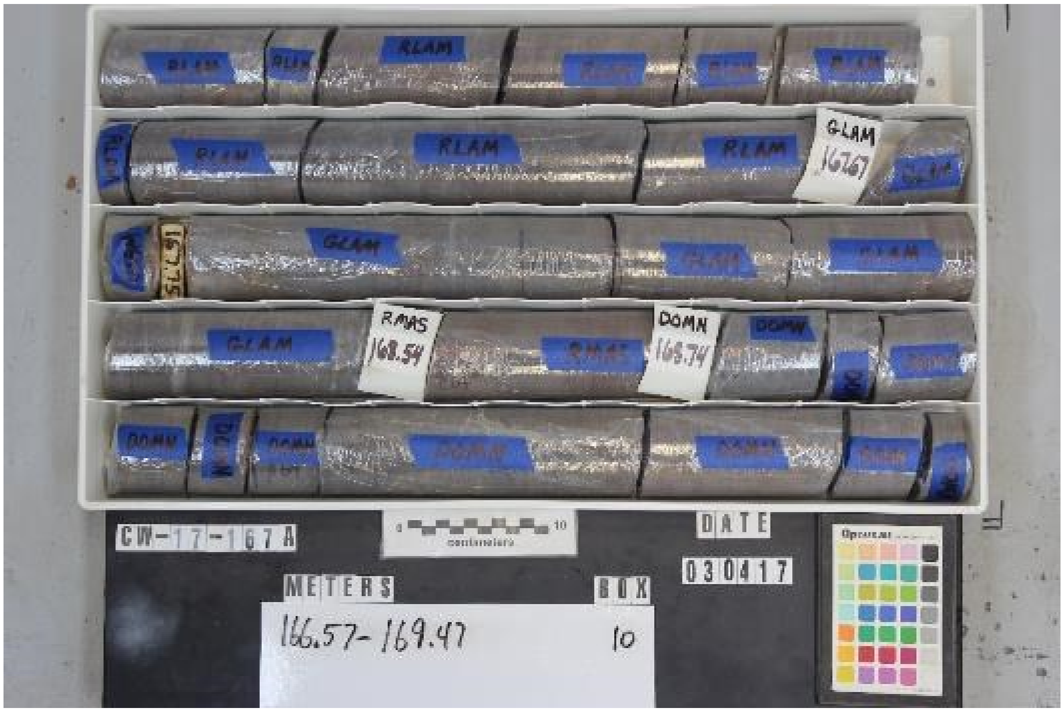


Figure 10.9: Top of LCBS Showing Marked Intervals for Assay Sampling

Figure 10.10: Bottom of UCBS Showing Marked Intervals for Assay Sampling

Core recovery and the boxing of the drill core was supervised by a geologist before every hole was abandoned. An overall average recovery from the 2017 drilling was 99% including the LCBS.

Highland collected 57 specific gravity measurements of which 49 were completed in-house using the water immersion method and eight were performed at the Actlabs laboratory in Thunder Bay, Ontario.

Table 10.2: Specific Gravity Summary for the LCBS

Statistical Element	Domino	Red Massive	Gray Laminated	Red Laminated
Mean	2.7	2.7	2.72	2.72
Standard Deviation	0.04	0.02	0.02	0.02
Minimum	2.63	2.65	2.68	2.68
Maximum	2.79	2.75	2.76	2.75
Coefficient of Variation	0.013	0.007	0.007	0.006
Count	76	37	91	25

Table 10.3: Specific Gravity Summary for the UCBS

Statistical Element	Upper Transition	Thinly	Brown Massive	Upper Zone of Values
Mean	2.73	2.71	2.69	2.7
Standard Deviation	0.02	0.05	0.01	0.04
Minimum	2.7	2.68	2.67	2.68
Maximum	2.76	2.79	2.7	2.79
Coefficient of Variation	0.008	0.017	0.005	0.016
Count	6	5	5	6

11 SAMPLE PREPARATION, ANALYSES AND SECURITY

The drill hole sample data was recorded by the site geologists on standard logging templates using standard codes. The sample data was emailed directly by the geologists to the Highland independent database manager, GDAT Solutions (www.gdatsolutions.com). The analytical results and certificates were emailed directly by the analytical laboratory to GDAT Solutions. The sample and analytical data is stored in the SQL based relational database management system acQuire designed for exploration and mining data. An in-house QAQC on import analysis was carried out for each set of analytical results in order to spot and stop potential QAQC issues in a timely manner.

11.1 Sample Preparation and Reduction

11.1.1 Analysis

The mass of each sample was recorded prior to crushing. The entire sample was crushed to 80% passing 2 mm, with the jaw crusher cleaned and inspected before use and after each sample. For samples below 2 kg, the entire sample was then pulverized to 95% passing 150 mesh. For samples above 2 kg a split of 1 to 2 kilograms is pulverized. After each sample, the equipment is cleaned with pulverizing sand and visually inspected for discoloration. All remaining pulps were saved and returned to Highland for storage. Lab equipment used was a TM or Boyd Crusher, TM or LM Pulverizer, Jones Riffle Splitter, and an Agilent 735 ICP optical emission spectrometer.

All 2017 drilling program samples submitted by Highland Copper were analyzed at the Actlabs analytical laboratory in Thunder Bay, Ontario. The samples were analysed for Ag and Cu with 4-Acid ICP-OES (method code 8) and for 36 elements (Ag, Al, As, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, Hg, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, S, Sb, Sc, Sr, Te, Ti, Tl, U, V, W, Y, Zn, & Zr) including Ag and Cu with ICP Total Digestion (method code 1F2). The 4-Acid ICP-OES analysis is the higher ranked analysis for silver and copper and to be used for silver and copper. The lower detection limits for the 4-Acid ICP-OES are 0.001% for copper and 3 g/t for silver.

Due to the relatively high lower-detection limit of the ICP-OES 4-Acid digest method for silver (3 g/t) and poor resolution (1 g/t), the Total Digest assays (with a lower detection rate of 0.3 g Ag/t) for silver were used in the resource estimation. GMSI found that the Total Digest silver analyses were on average 17% lower than the 4-Acid analyses. Therefore, the resource estimate will use the more conservative method (Total Digest) for silver, which is of low economic importance anyway.

11.1.2 Quality Control

Highland Copper implemented a QAQC program for its 2017 analytical sampling including core sampling duplicates, certified standards (CRM) and coarse blanks collected and inserted according to the company sampling and assay quality procedures. In addition, the laboratory routinely inserts crushing stage duplicates, analytical stage pulp split duplicates and internal laboratory standards and blanks. The company and internal laboratory QAQC samples included in the 2017 drilling program are outlined in Table 11.1.

Table 11.1: Overview of QAQC Sampling

QAQC Sample Type	No of Samples	% of Sampling
Certified coarse blank	55	10.5
CRM - OREAS 162	12	2.3
CRM - OREAS 97	14	2.7
CRM - OREAS 930	9	1.7
CRM Total	35	6.7
Sampling stage core duplicate	17	3.2
Crushing stage duplicate	10	1.9
Laboratory internal standard - Cu ICP-OES (%)	98	18.6
Laboratory internal standard - Ag ICP-OES (g/t)	79	15
Laboratory internal blank - Cu ICP-OES (%) and Ag ICP-OES (g/t)	18	3.4
Laboratory pulp split duplicate - Cu ICP-OES (%) and Ag ICP-	29	5.5

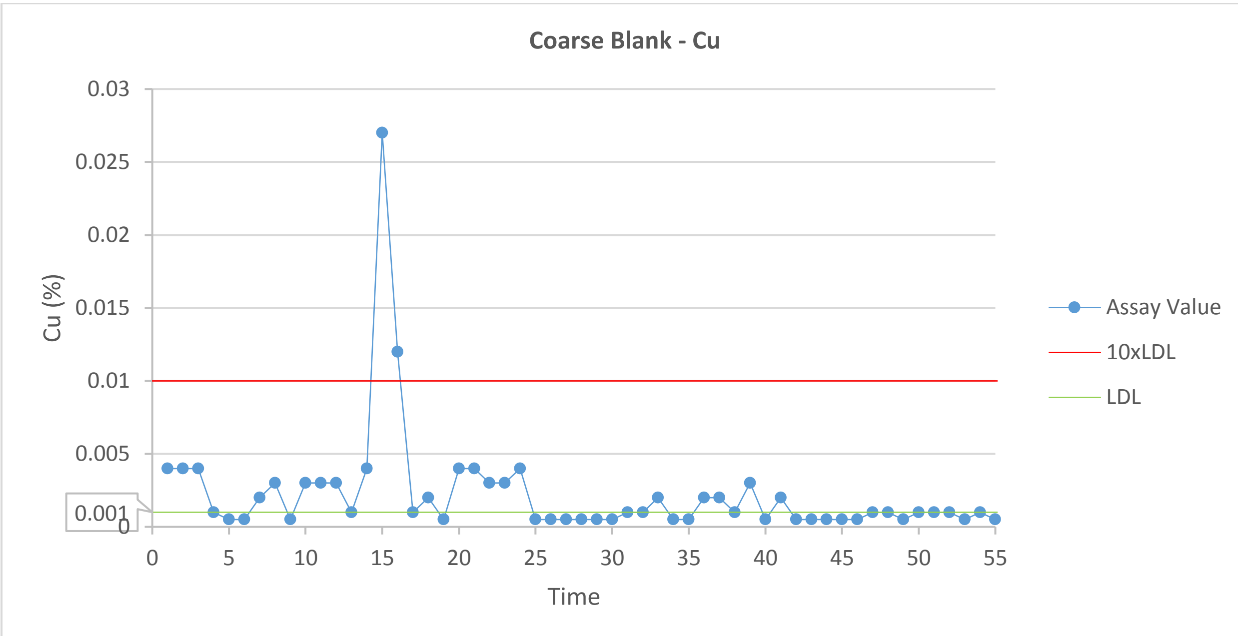
A geologist regularly inserted two standard CRM's, three coarse blanks, and one core duplicate for each drill hole. CRMs with a high Cu wt.%, medium Cu wt.%, and low Cu wt.% were inserted in a high grade, medium grade, and low-grade interval, respectively. Coarse blanks were inserted between high-grade intervals. A quarter core from the same assay interval was taken for a coarse duplicate.

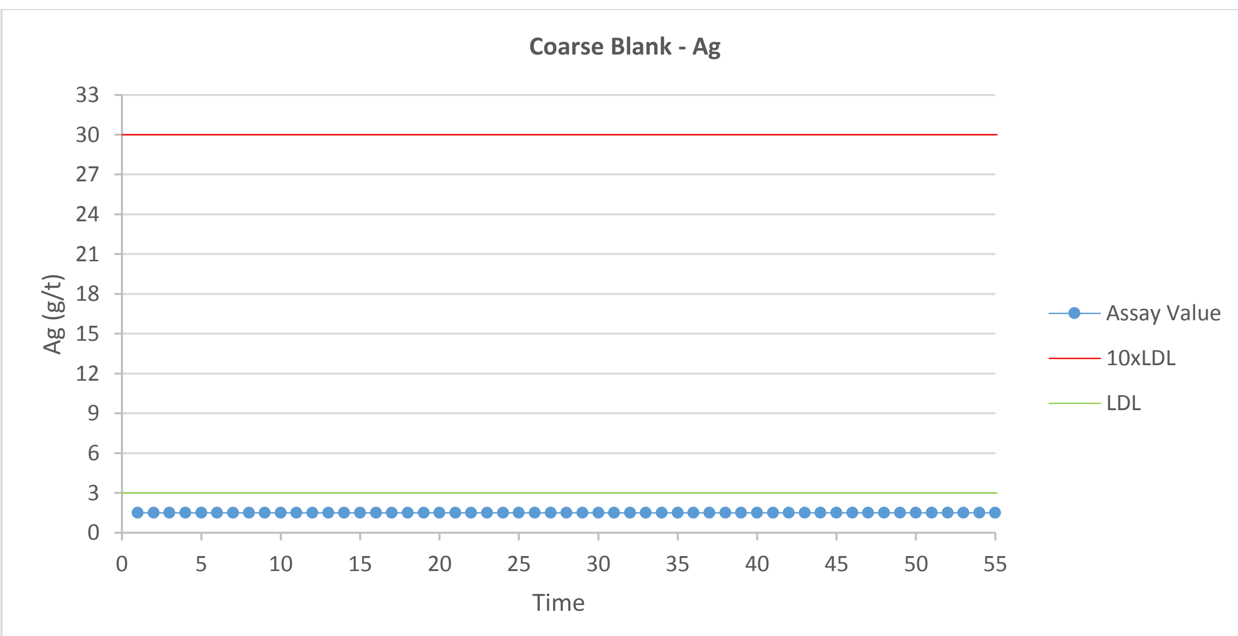
11.1.3 Blanks and Assessment of Contamination

Highland inserted the certified coarse blank 1/2" Mesh Silica Blank by ASL Analytical solutions into the sample stream as part of the 2017 drilling program QAQC at a 10.5% rate. A total of 55 course blanks were used during 2017 analytical assaying.

Less than 4% (2 samples) of the course blanks show greater values than 0.01% Cu (10 x lower detection limit). Both blanks fall after a previous sample with high grade Cu (>3% Cu). The two blanks failing the QAQC and the surrounding primary samples were re-analysed. The results for both the failing blanks and the surrounding primary samples are very similar to original analysis. The original failed blank result is 0.027% Cu (Figure 11.1) and the re-analysis result is 0.029% Cu. 100% of the course blank silver assay values were under the detection limit 3 ppm Ag. With the exception of the one-time Cu contamination the course blanks show no contamination for copper and silver.

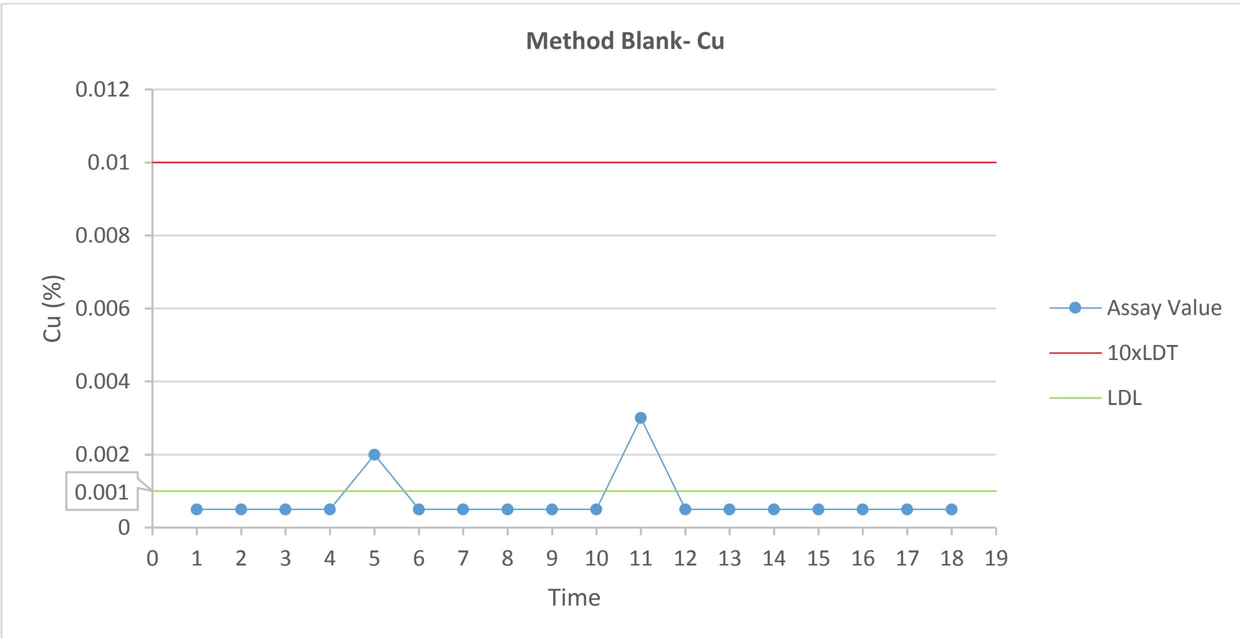
Figure 11.1: Highland-inserted Blank Material Analytical Results (Coarse CRM) for Cu (top) and Ag (bottom)

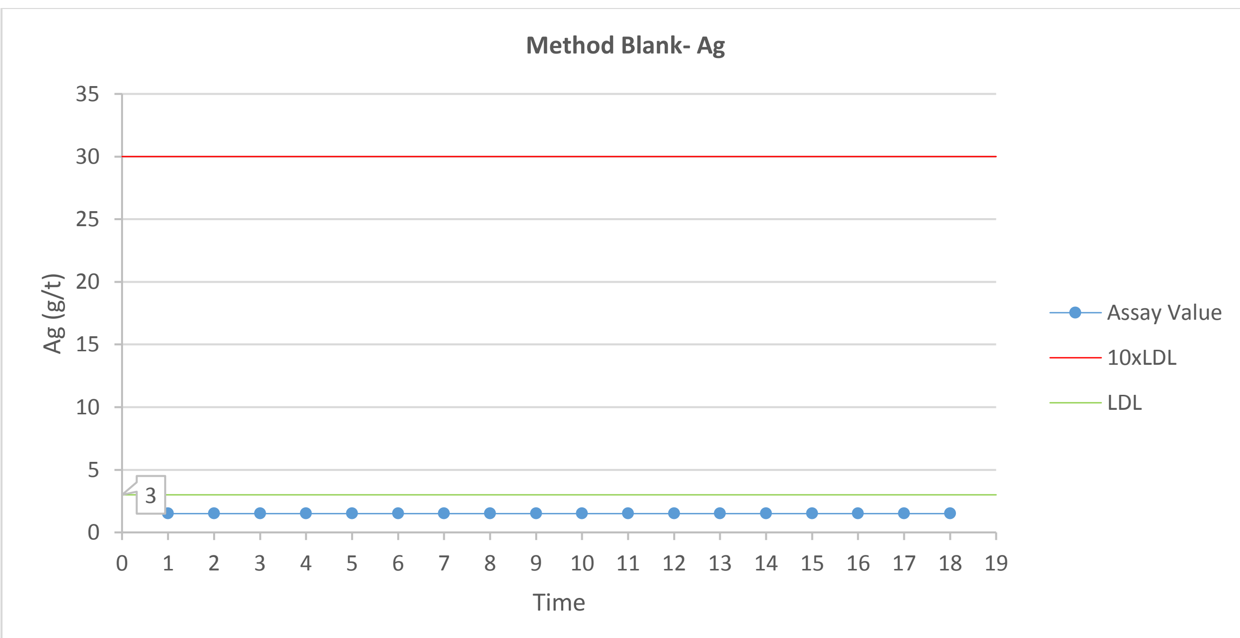




The internal laboratory blank “Method Blank” was inserted by Actlabs at a 3.4% rate. The internal laboratory blanks performance is good with all 18 blanks both for copper and silver ICP-OES having values less than 10 x lower detection limit.

Figure 11.2: Internal Laboratory Blank Material Analytical Results for Copper and Silver





11.1.4 Duplicate Sample Performance

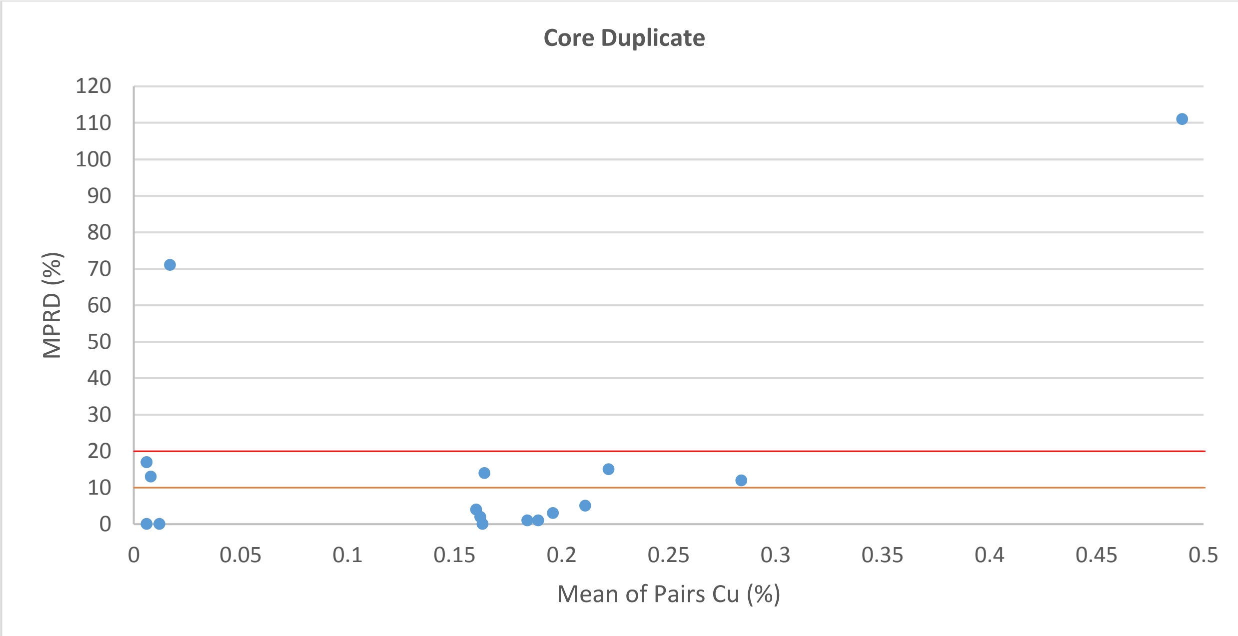
The duplicate samples included in the 2017 drilling program consist of sampling stage core duplicates, crushing stage duplicates and analytical stage pulp split duplicates. The core duplicates were sampled and inserted by the geologists on site. The crushing stage duplicates were collected in the preparation laboratory after jaw crushing and the analytical stage duplicates are split in the analytical laboratory. Core duplicates were inserted at a 3.2% rate, crush duplicates at a 1.9% rate and split duplicates at a 5.5% rate.

The core duplicates performance is considered to be acceptable reflecting good overall precision and negligible sampling and analytical error (field and laboratory). Two copper core duplicates out of 17 core duplicates have a mean pair relative difference greater than 20% and possibly highlight variability characteristics of the ore deposit. Two silver core duplicates also have a mean pair relative difference greater than 20% and one of the silver duplicates coincident with one of the two deviating copper core duplicates. All the crush duplicate silver values for the primary sample or the check sample or both are under 10 x lower detection limit. For copper four core duplicates have values less than 10 x lower detection limit.

The crush duplicates performance is considered to be acceptable reflecting good overall laboratory precision and negligible preparation and analytical error. All 17 copper crush duplicates have a mean pair relative difference less than 10% while one silver crush duplicate is marginally over 20%. Again, all the crush duplicate silver values for the primary sample or the check sample or both are under 10 x lower detection limit. For copper crush duplicates all values are above 10 x lower detection limit.

The analytical pulp split duplicates performance is considered to be acceptable reflecting good analytical precision exclusive of dominant sampling errors. All 29 copper analytical pulp split duplicates have a mean pair relative difference less than 10% and one silver analytical pulp split duplicate is over 20%. Again, all the crush duplicate silver values for the primary sample or the check sample or both are under 10 x lower detection limit. For copper analytical pulp split duplicates, all except one have values above 10 x lower detection limit.

Figure 11.3: Core Duplicate Performance for Cu (top) and Ag (bottom)



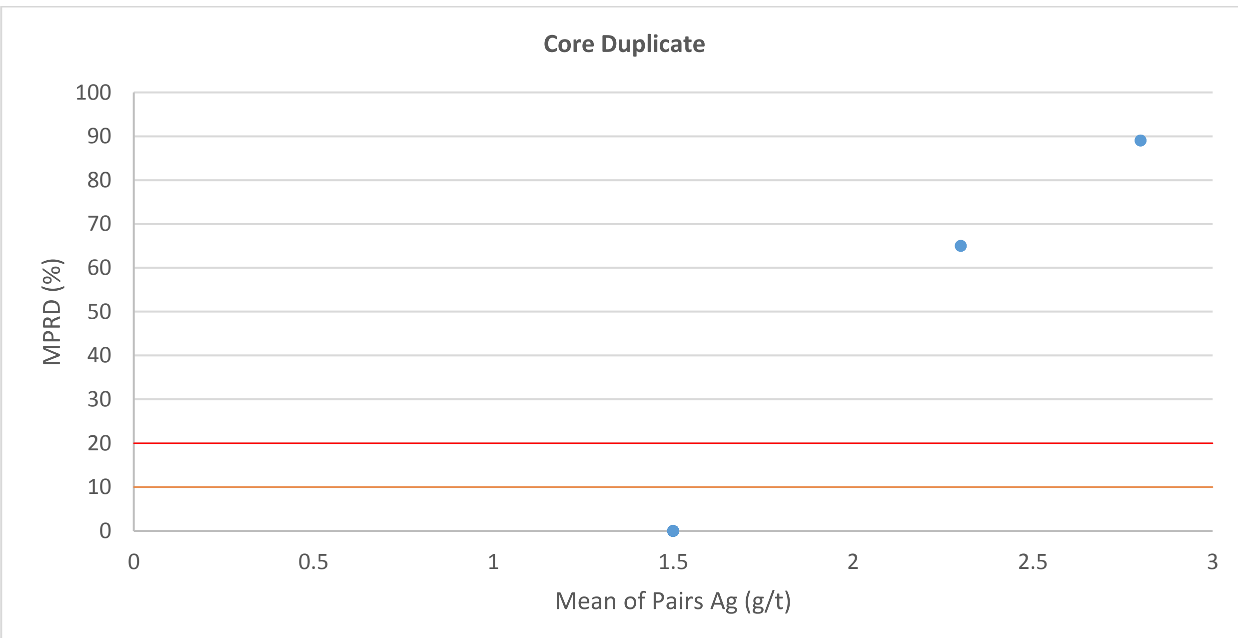
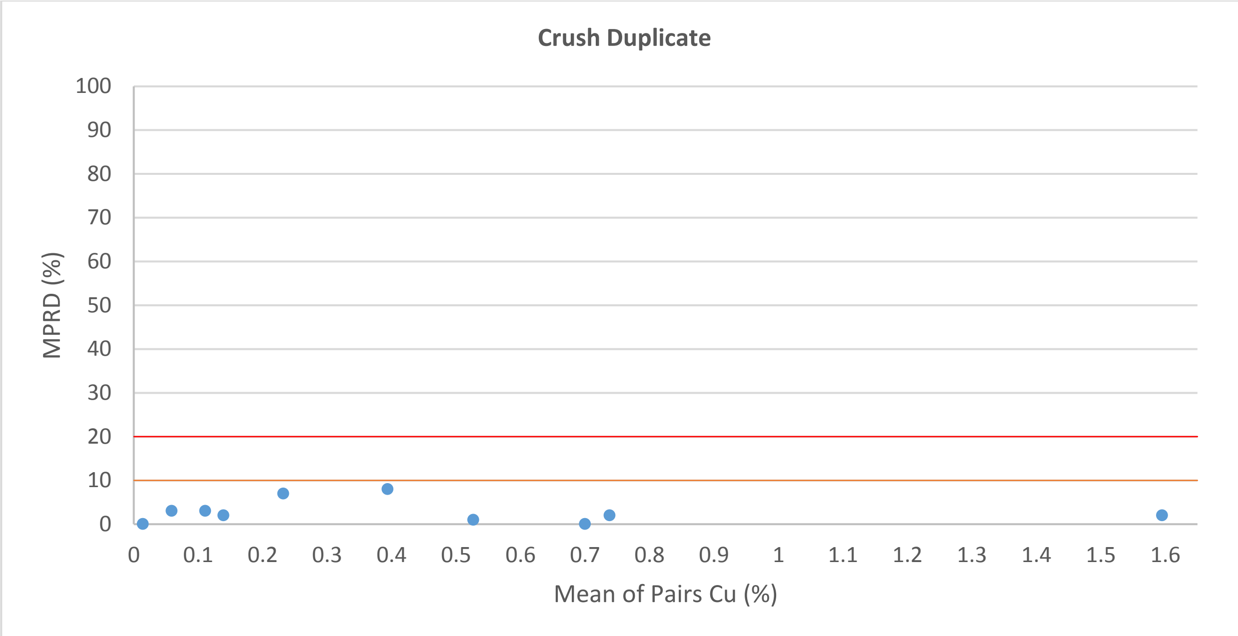


Figure 11.4: Crush Duplicate Performance for Cu (top) and Ag (bottom)



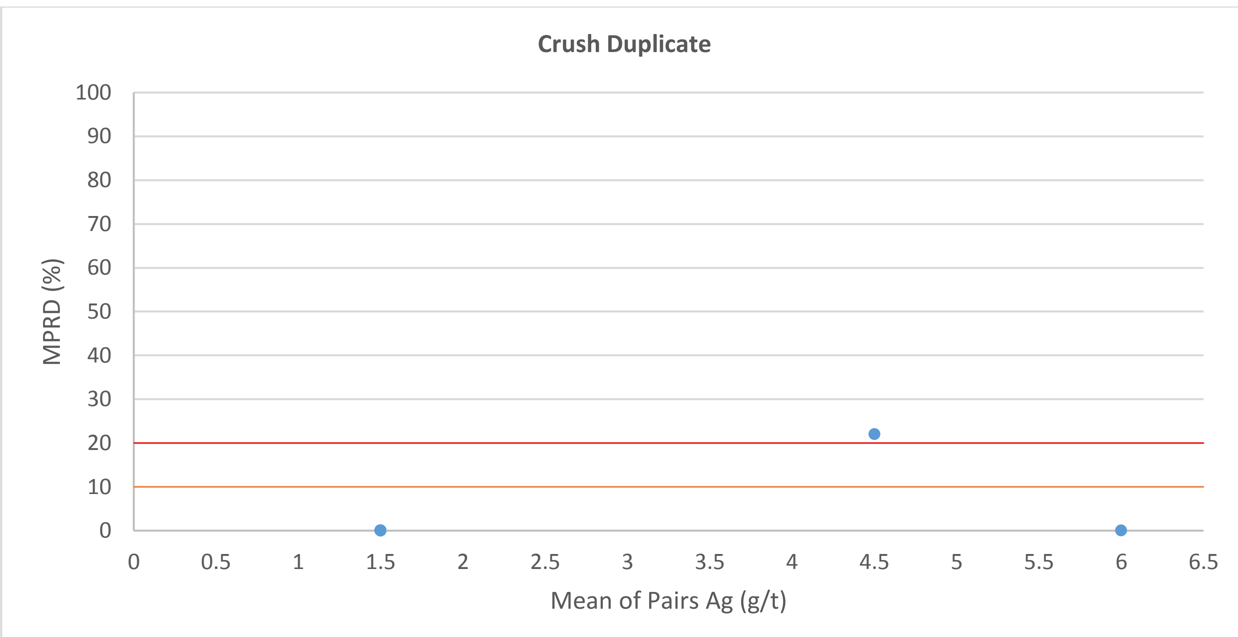
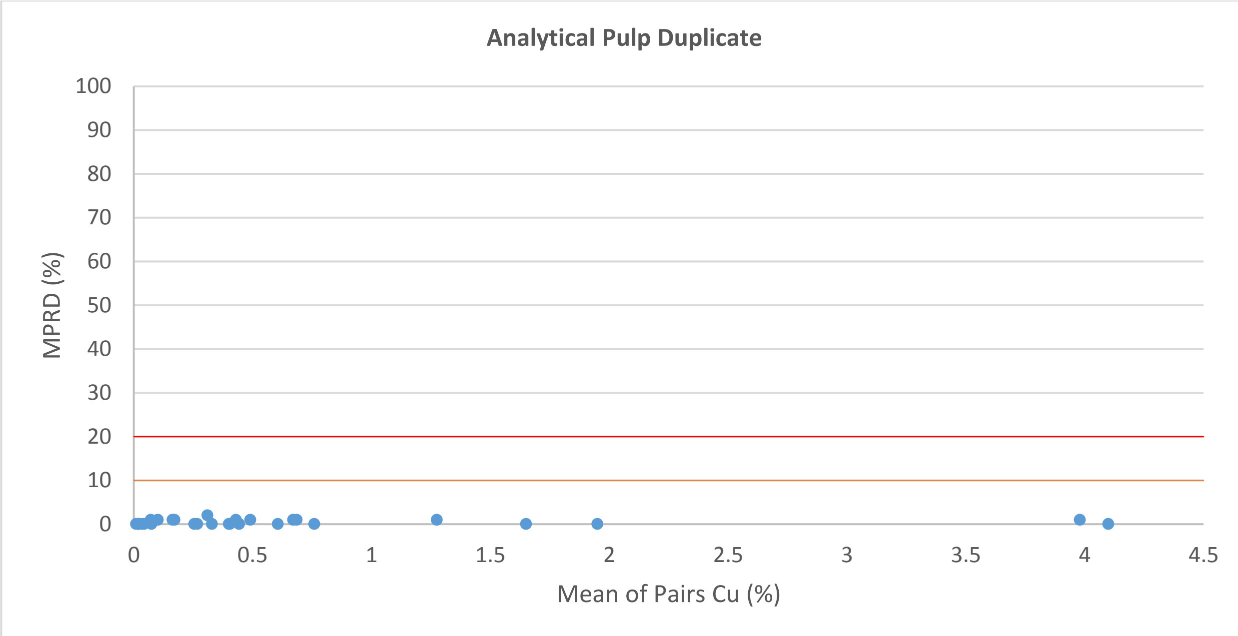
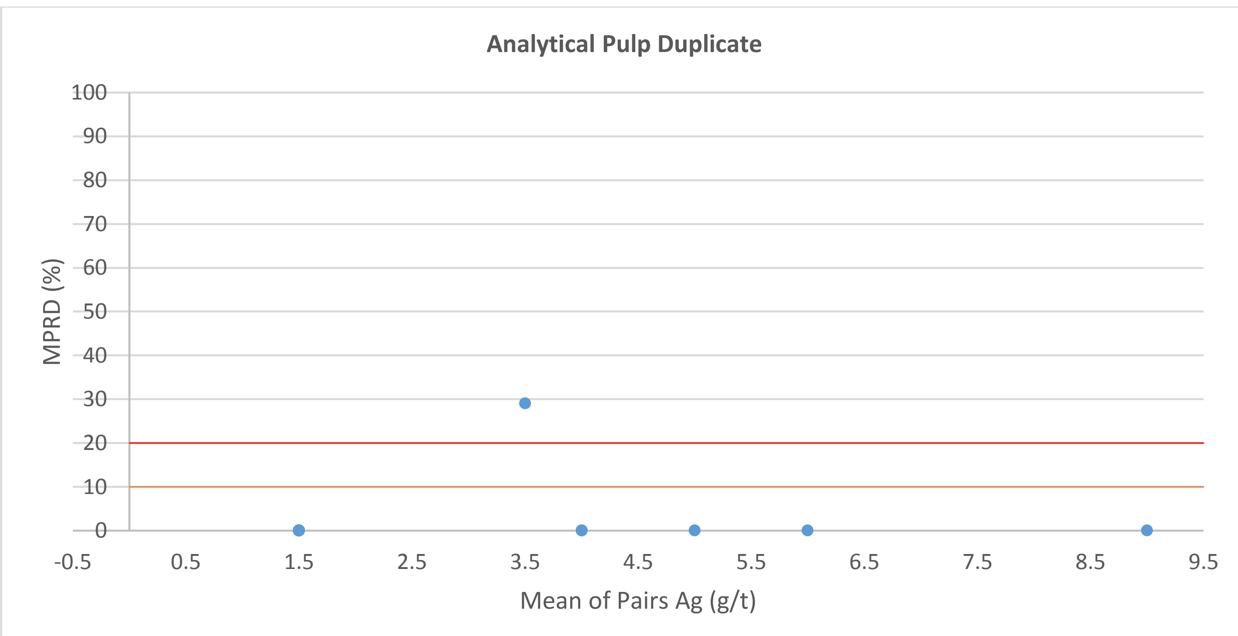


Figure 11.5: Analytical Pulp Performance for Cu (top) and Ag (bottom)





11.2 Performance of Standards

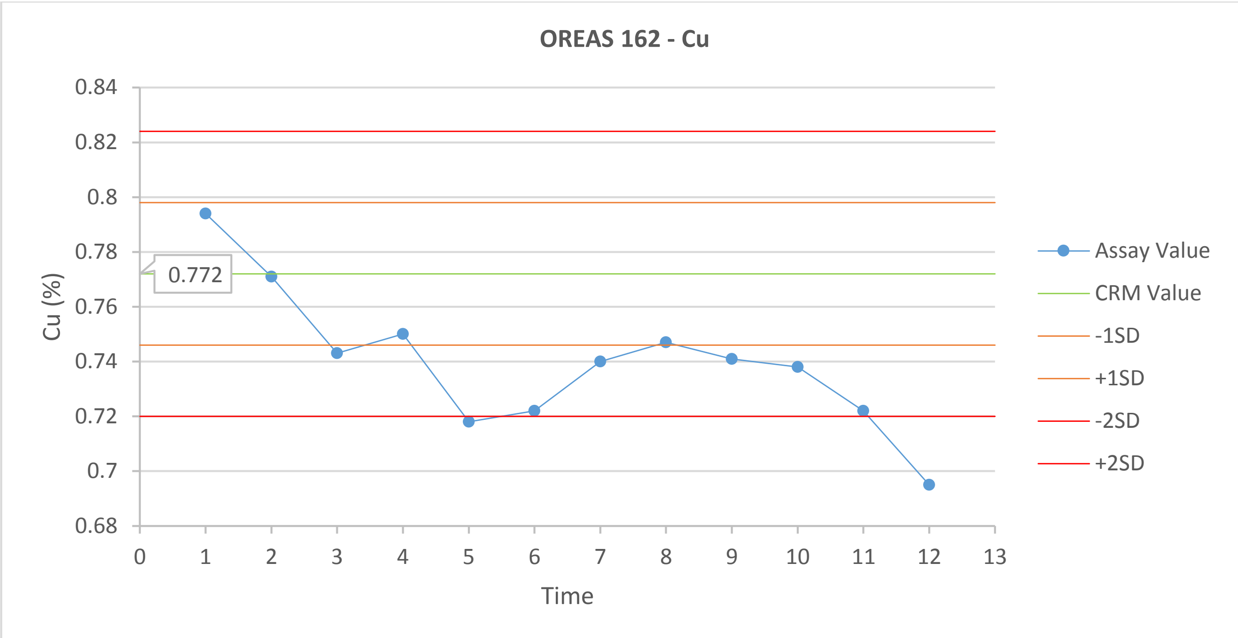
Throughout the analysis of 2017 drilling program standards were inserted at a 6.7% rate. A total of 35 standards were used during the 2017 analytical assaying. Three different standards OREAS 162, OREAS 97 and OREAS 930 were used with expected certified values of 0.772% Cu, 2.52% Cu, 6.31% Cu and

3.5 g Ag/t, 9 g Ag/t and 19.6 g Ag/t respectively. The standards are from Ore Research and Exploration Pty Ltd. (OREAS), an independent provider of commercial analytical standards from Australia.

The overall standard performance is acceptable. Three standards out of 35 have analytical values greater than ±2 standard deviations from the certified value for copper and one of these have an analytical value greater than ±2 standard deviations from the certified value for silver. One of the copper standards fail only marginally with an analytical value of 0.718% copper. The lower acceptance limit for the standard is 0.720% Cu and the standard was considered to pass the QAQC.

The two standards with analytical values greater than ±2 standard deviations from certified values along with the surrounding primary samples were re-analysed. The standard consisting of the certified reference material OREAS 162 fails for copper while the standard consisting of the certified reference material OREAS 97 fails for both copper and silver. Again, the original and re-analysis results both for the failing standards and the surrounding primary samples are very similar and the original analysis was accepted. The original analytical value for the standard OREAS 162 is 0.695% Cu and the re-analysis result is 0.729% Cu. The original analytical values for the standard OREAS 97 is 3.98% Cu and 14 g Ag/t and the re-analysis result is 3.97% Cu and 13 g Ag/t respectively.

Figure 11.6: Performance of Control Reference Material OREAS 162 for Cu (top) and Ag (bottom)



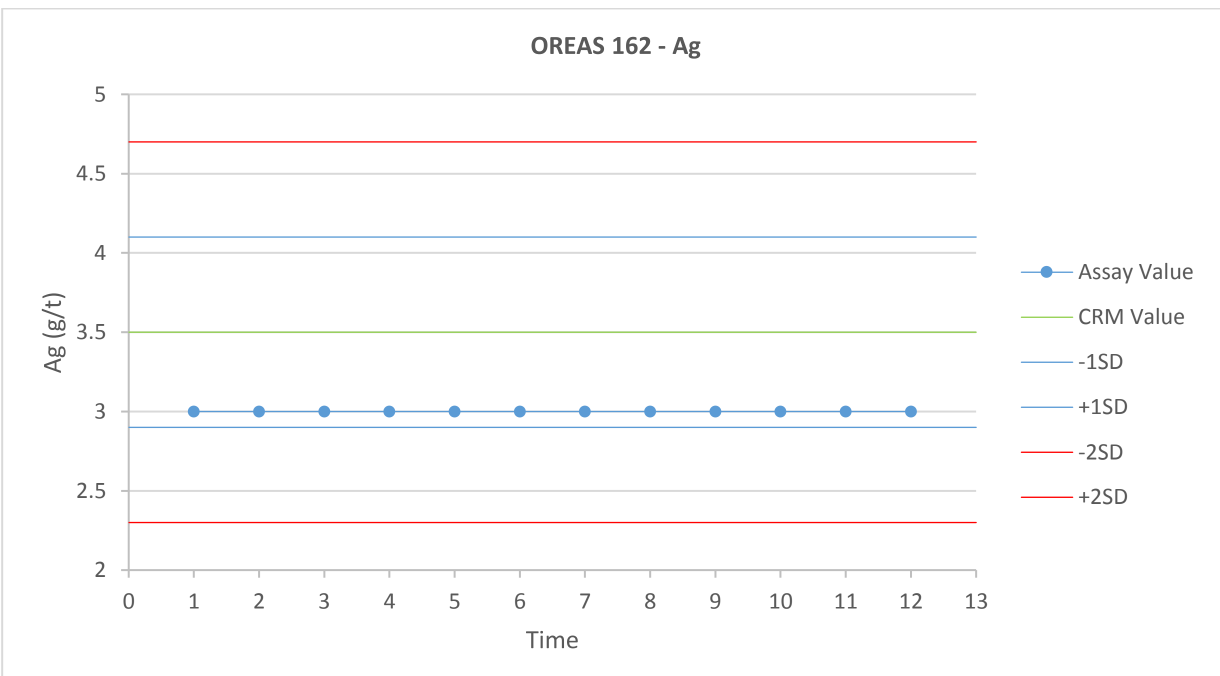
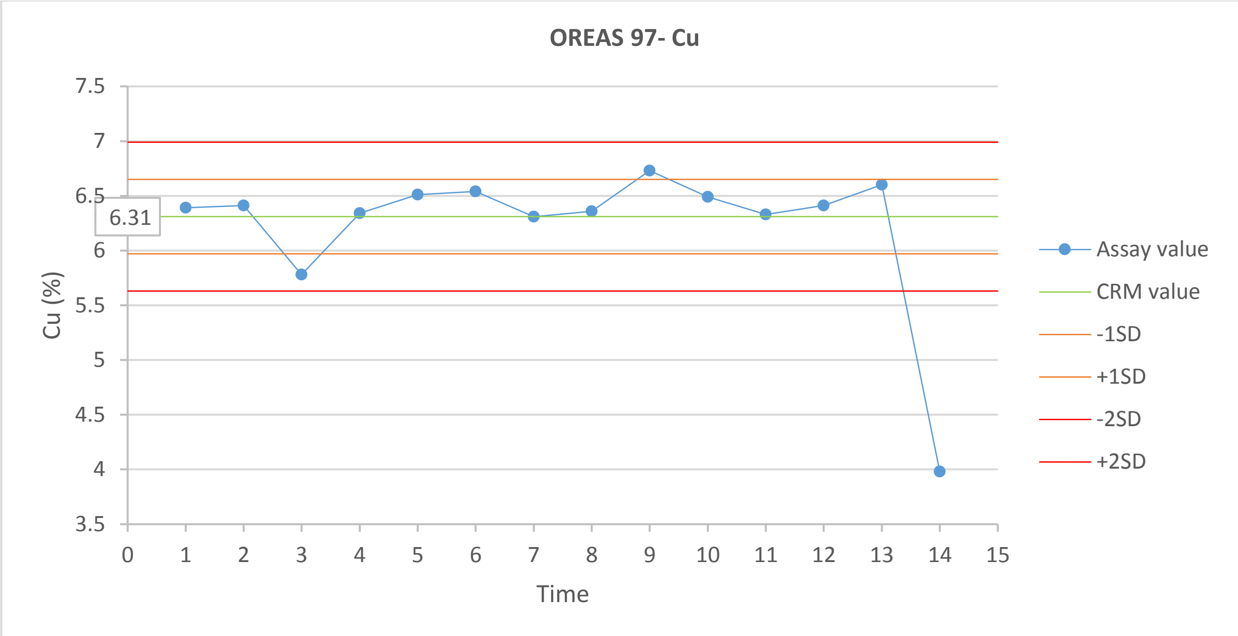


Figure 11.7: Performance of Control Reference Material OREAS 97 for Cu (top) and Ag (bottom)



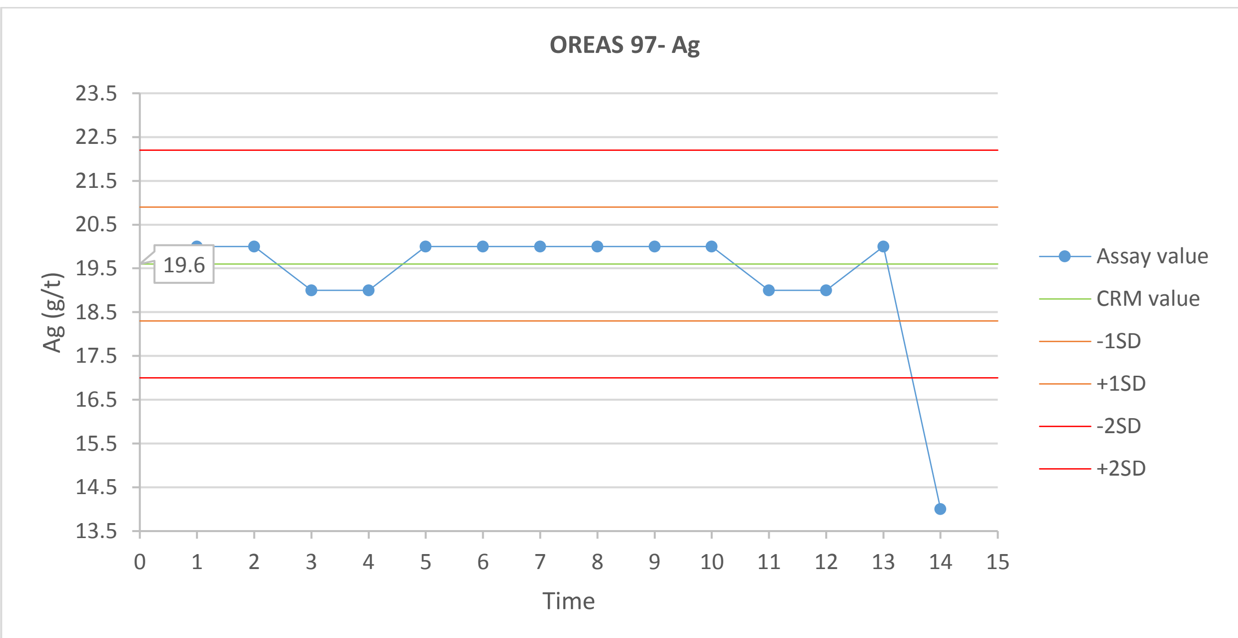
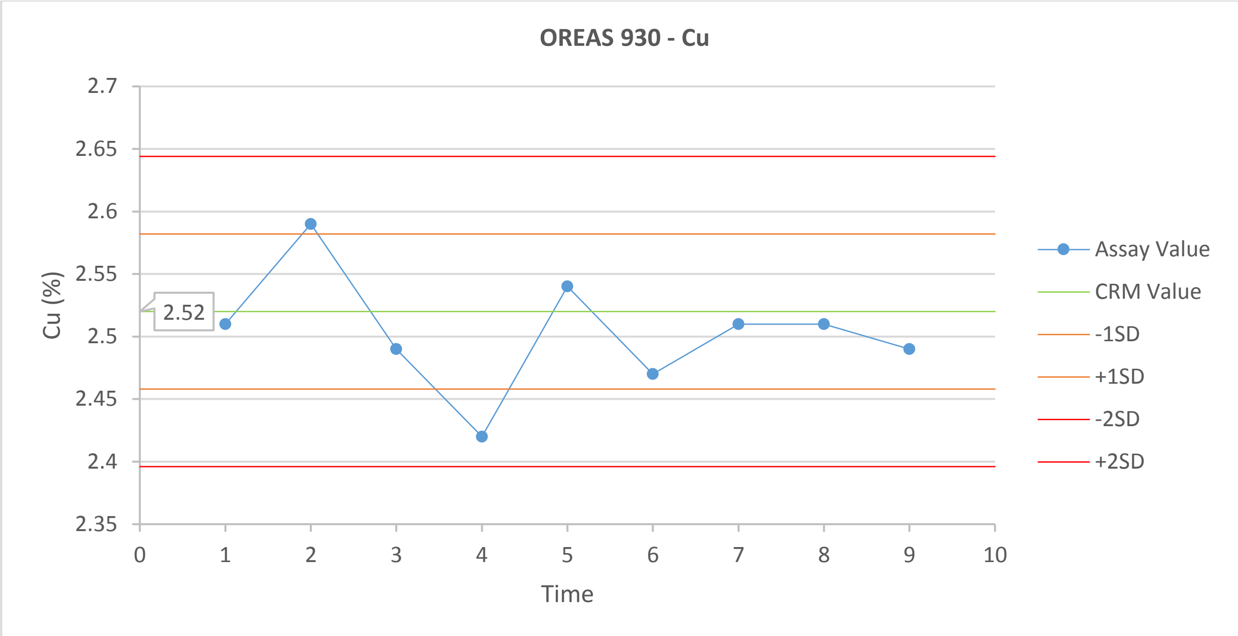
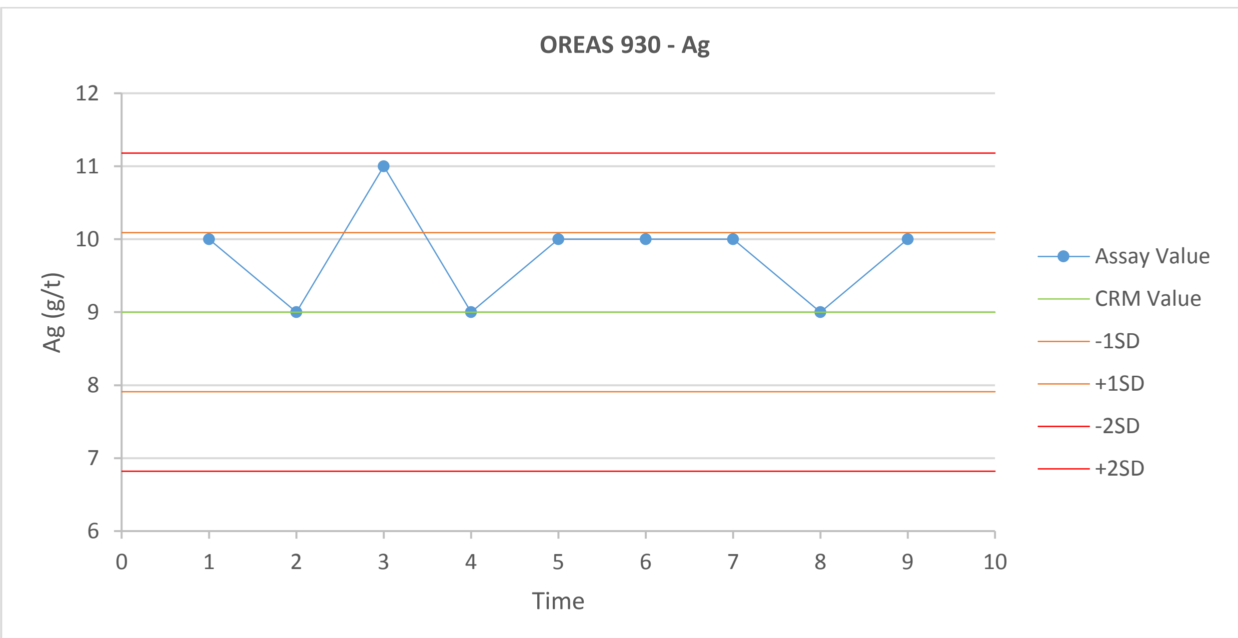


Figure 11.8: Performance of Control Reference Material OREAS 930 for Cu (top) and Ag (bottom)

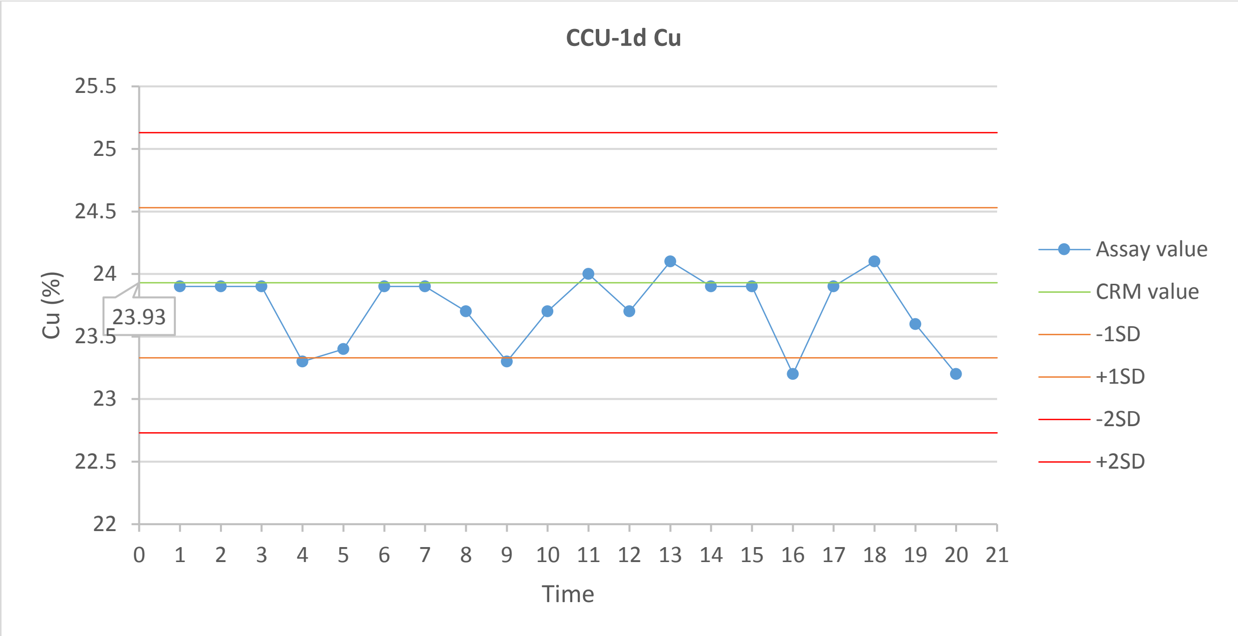




Four different internal laboratory standards were inserted by the Actlabs at a 18.6% rate for Cu ICP-OES and at a 15% rate for Ag ICP-OES. The certified standards include CCU-1d, CZN-4 and MP-1b from Natural Resources Canada and OREAS 14P from Ore Research and Exploration Pty Ltd. All four standards where analysed for copper and three of the standards excluding OREAS 14P were analysed for silver. The certified expected values for the standards are: CCU-1d 23.93% Cu and 120.7 g Ag/t, CZN-4 0.403% Cu and 51.4 g Ag/t, MP-1b 3.069% Cu and 47 g Ag/t, OREAS 14P 0.997% Cu.

The internal laboratory standards performance is good, all the copper standard except one having values within ±2 standard deviations from the certified value. Initially, two copper standards failed significantly for the standard CZN-4 and the laboratory was questioned. The laboratory stated a reporting error and a new certificate was issued excluding the two failing standards. The silver internal laboratory standards are within ±2 standard deviations from the certified value with the exception of two standards. The two silver standards are, however, within the laboratory's own acceptance limits.

Figure 11.9: Performance of Control Reference Material CCU-1D for Cu (top) and Ag (bottom)



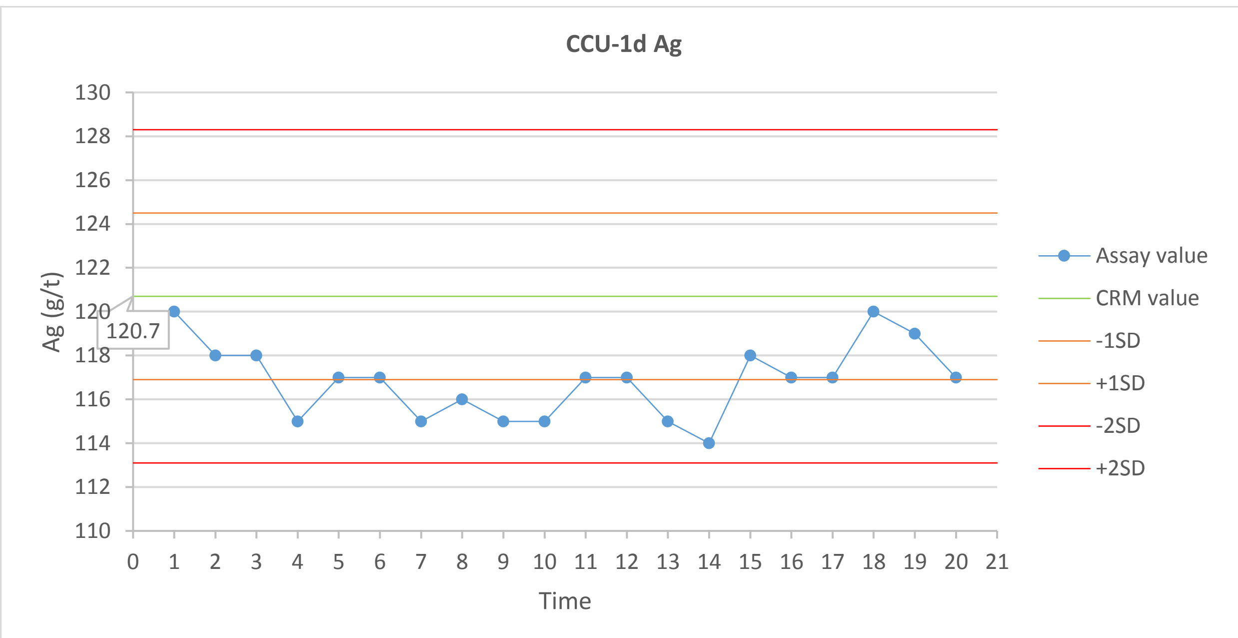
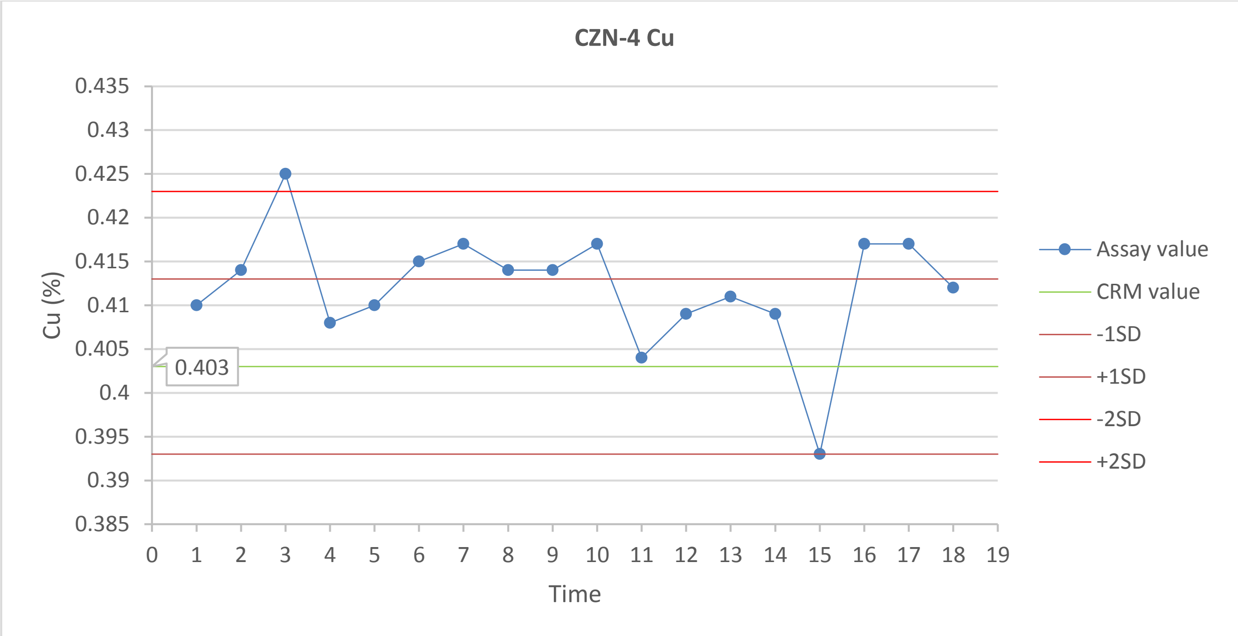


Figure 11.10: Performance of Control Reference Material CZN-4 for Cu (top) and Ag (bottom)



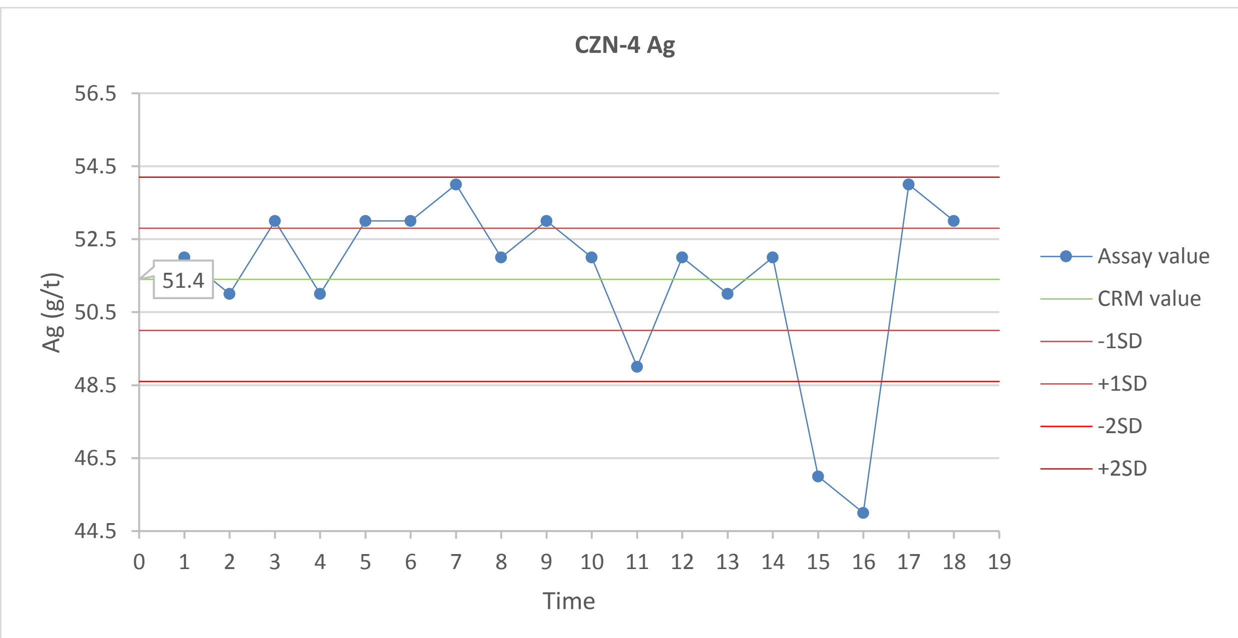
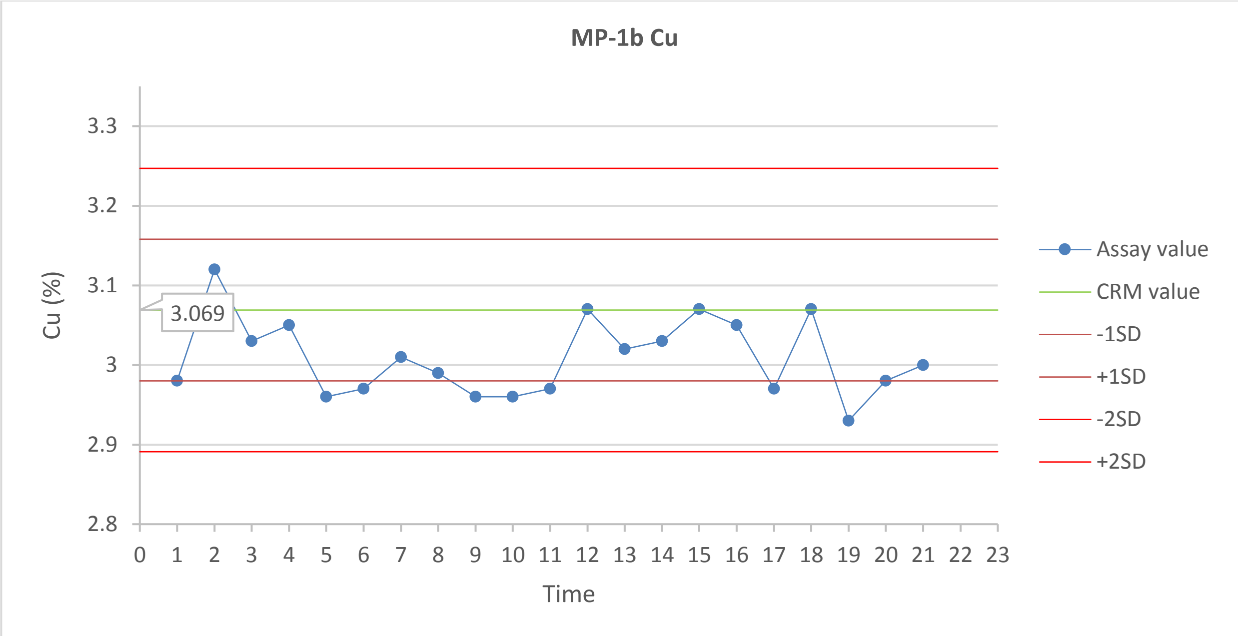


Figure 11.11: Performance of Control Reference Material MP-1b for Cu (top) and Ag (bottom)



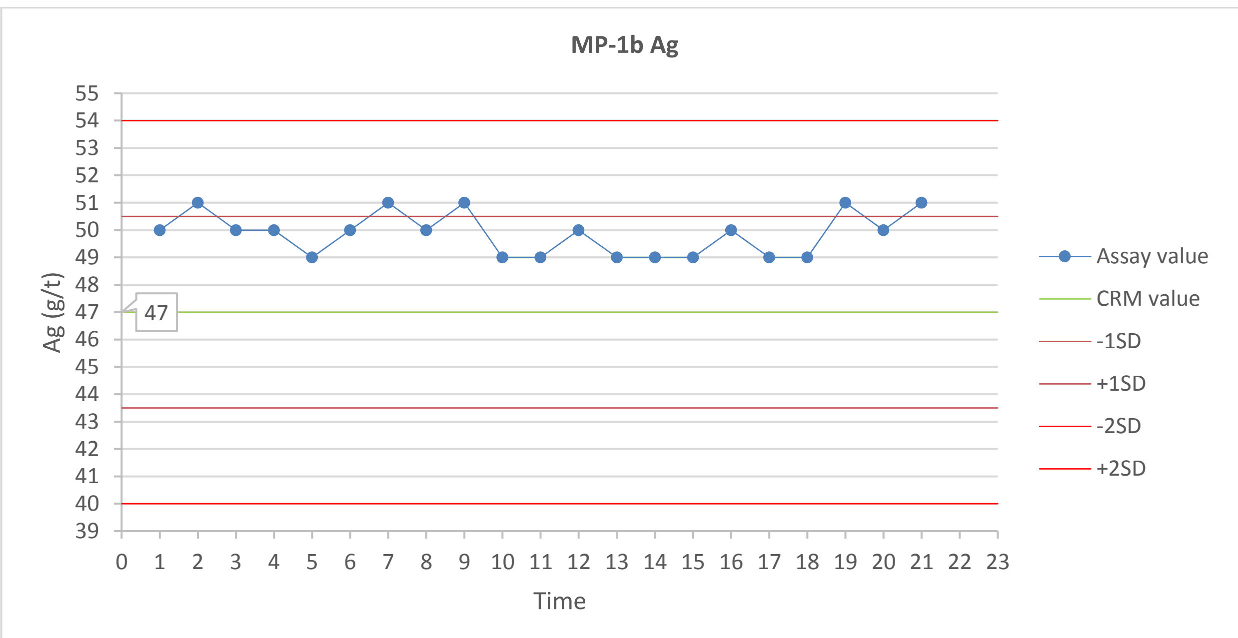
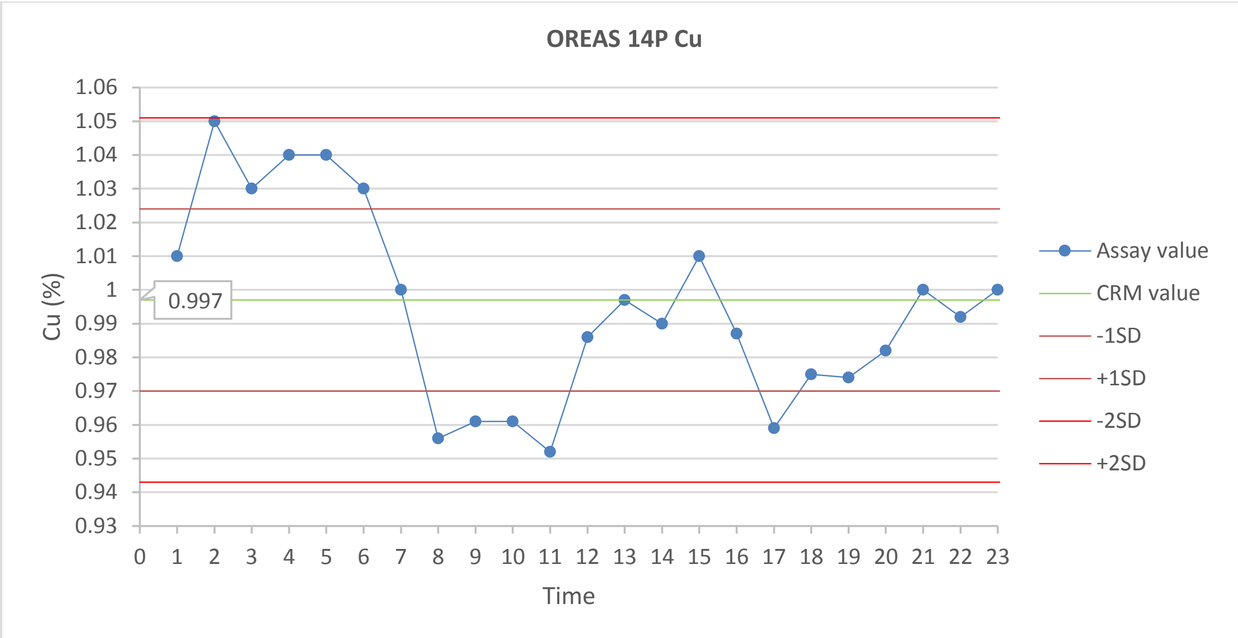


Figure 11.12: Performance of Control Reference Material 14P for Cu



11.3 Density Procedures

In-house bulk density was determined per lithologic unit by measuring specific gravity by the water immersion method on whole core. Quarter core was sent to Actlabs for bulk density determination using the wax immersion method following the American Society for Testing and Materials (ASTM) Designation C914-09. In-house samples were dried in a drying oven at 110° C for 12 to 24 hours and measured on Ohaus Scout Pro SP6001 scale with a 0.1 gram precision. The scale was checked so that it was completely level and calibrated with a 5 kg and 1 kg weight before measurements were taken. The specific gravity of the drill core had to be multiplied by the density of water to yield density. The water temperature was recorded for each measurement and a water temperature/density correction was programmed for each sample. Each measured mass was at least four significant digits and the final bulk density was reported to 0.01 gm/cc.

11.4 Security

Highland maintained sample chain of custody protocols on every step of sample handling, from the drilling site to the delivery of assay results to the database manager.

11.5 Conclusions

The quality control and quality assurance procedures meet or exceed industry standards for the 2017 drilling program. The performance of inserted blanks and standards indicate that the sample preparation and the lab accuracy have been of good quality. Sample duplicate results were reasonable for copper values indicating a reasonable level of precision from the contracted laboratory.

In the 2015 NI 43-101 report on the Copperwood Deposit, GMSI concluded that the QA/QC and security protocols established by Orvana and the quality of the results support resource and future reserve estimation. For further details on historical sampling practices, refer to the NI 43-101 report released by GMSI in 2015.

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12 DATA VERIFICATION

12.1 Database

Drill hole information for the 2017 drilling program at the Copperwood project was provided to GMSI by Highland in the form of Microsoft Excel spreadsheets in CSV format. Data was provided in three separate tranches, on June 16th, July 4th, and October 3rd, 2017. GMSI imported the files into the original MS Access database used in the 2015 resource estimate, using the Geovia® GEMS software. The following drill hole information was imported in the GEMS database:

- Collar information: Hole ID, X, Y and Z coordinates of collar (UTM), length;
- Down-hole survey: Hole ID, down-hole depth, dip, azimuth;
- Assay: Hole ID, depth from and to, Cu values in %, Ag values in ppm;
- Geology: Hole ID, depth from and to, lithology unit.

A total of 305 diamond drill holes with assay information were available for grade estimation, and a further 67 drill holes contained lithology information which was used to build the geological model (Table 12.1). The database was reviewed and corrected if necessary prior to final formatting for resource evaluation. The following activities were performed during database validation:

- Validate total hole lengths and final sample depth data;
- Verify for overlapping and missing intervals;
- Check drill hole survey data for out of range or suspect down-hole deviations;
- Visual check of spatial distribution of drill holes and trenches;
- Validate lithology codes.

Table 12.1: Drill Holes Available in the Database for Resource Estimation

BC-10-113	CW-09-52	CW-09-94	CW-13-148	CW-17-180	M56-W26	M57-W135	M57-W45	M57-W87
BC-10-117	CW-09-53	CW-09-95	CW-13-149	CW-17-180A	M56-W28	M57-W136	M57-W46	M57-W88
BC-10-118	CW-09-54	CW-09-96	CW-13-150	CW-17-181	M56-W2A	M57-W137	M57-W47	M57-W89
CW-08-09	CW-09-55	CW-09-97	CW-13-151	CW-17-181A	M56-W3	M57-W138	M57-W48	M57-W90
CW-08-11	CW-09-56	CW-09-98	CW-13-152	CW-17-182	M56-W4A	M57-W139	M57-W49	M57-W91
CW-08-13	CW-09-57	CW-09-99	CW-13-153	CW-17-183	M56-W5	M57-W140	M57-W50	M57-W92
CW-08-16	CW-09-58	CW-10-103	CW-13-154	CW-17-185	M56-W6	M57-W141	M57-W51	M57-W93
CW-08-17	CW-09-59	CW-10-104	CW-13-155	CW-17-186	M56-W7	M57-W142	M57-W52	M57-W94
CW-08-20	CW-09-60	CW-10-105	CW-13-156	CW-17-187	M56-W8	M57-W143	M57-W53	M57-W95
CW-09-100	CW-09-61	CW-10-106	CW-13-157	CW-17-188	M57-W100	M57-W144	M57-W54	M57-W96
CW-09-101	CW-09-62	CW-10-107	CW-13-158A	CW-17-189	M57-W101	M57-W145	M57-W55	M57-W97
CW-09-102	CW-09-63	CW-10-108	CW-13-159	CW-17-189A	M57-W102	M57-W146	M57-W56	M57-W98
CW-09-21	CW-09-64	CW-10-109	CW-13-160	CW-17-190	M57-W103	M57-W147	M57-W57	M57-W99
CW-09-22	CW-09-65	CW-10-110	CW-13-161	CW-17-190A	M57-W104	M57-W148	M57-W58	PC-1
CW-09-23	CW-09-66	CW-10-111	CW-13-BC-01	CW-17-191	M57-W105	M57-W149	M57-W59	PC-10
CW-09-24	CW-09-67	CW-10-112	CW-13-BC-02	CW-17-191A	M57-W106	M57-W150	M57-W60	PC-11
CW-09-25	CW-09-68	CW-10-114	CW-13-BC-03	CW-17-192	M57-W107	M57-W151	M57-W61	PC-12
CW-09-26	CW-09-69	CW-10-115	CW-13-BC-04	CW-17-192A	M57-W108	M57-W152	M57-W62	PC-13
CW-09-27	CW-09-70	CW-10-116	CW-17-162	CW-17-193	M57-W109	M57-W153	M57-W63	PC-14
CW-09-28	CW-09-71	CW-10-119	CW-17-163	CW-17-194	M57-W110	M57-W154	M57-W64	PC-15
CW-09-29	CW-09-72	CW-10-121	CW-17-164	CW-17-194A	M57-W111	M57-W155	M57-W65	PC-16
CW-09-30	CW-09-73	CW-10-122	CW-17-165	CW-17-195	M57-W112	M57-W156	M57-W66	PC-17
CW-09-31	CW-09-74	CW-10-123	CW-17-165A	CW-17-196	M57-W113	M57-W157	M57-W67	PC-18
CW-09-32	CW-09-75	CW-10-125	CW-17-166	CW-17-197	M57-W114	M57-W158	M57-W68	PC-19
CW-09-33	CW-09-76	CW-10-126	CW-17-167	M56-W09	M57-W115	M57-W159	M57-W69	PC-2
CW-09-34	CW-09-77	CW-10-127	CW-17-167A	M56-W1	M57-W116	M57-W27	M57-W70	PC-20
CW-09-35A	CW-09-78	CW-10-128	CW-17-168	M56-W10	M57-W117	M57-W29	M57-W71	PC-21
CW-09-36	CW-09-79	CW-10-129	CW-17-169	M56-W11	M57-W118	M57-W30	M57-W72	PC-22
CW-09-37	CW-09-80	CW-10-130	CW-17-170	M56-W12A	M57-W119	M57-W31	M57-W73	PC-23
CW-09-38	CW-09-81	CW-10-131	CW-17-171	M56-W13	M57-W120	M57-W32	M57-W74	PC-3
CW-09-39	CW-09-82	CW-10-132	CW-17-171A	M56-W14	M57-W121	M57-W33	M57-W75	PC-4
CW-09-41	CW-09-83	CW-10-133	CW-17-172	M56-W16	M57-W123	M57-W34	M57-W76	PC-5
CW-09-42	CW-09-84	CW-10-136	CW-17-172A	M56-W17	M57-W124	M57-W35	M57-W77	PC-6
CW-09-43	CW-09-85	CW-10-137	CW-17-173	M56-W18	M57-W125	M57-W36	M57-W78	PC-7
CW-09-44	CW-09-86	CW-10-138	CW-17-174	M56-W19	M57-W126	M57-W37	M57-W79	PC-8
CW-09-45	CW-09-87	CW-10-139	CW-17-175	M56-W2	M57-W127	M57-W38	M57-W80	PC-9
CW-09-46	CW-09-88	CW-11-140	CW-17-176	M56-W20	M57-W128	M57-W39	M57-W81	
CW-09-47	CW-09-89	CW-11-141	CW-17-177	M56-W21	M57-W130	M57-W40	M57-W82	
CW-09-48	CW-09-90	CW-11-142	CW-17-178	M56-W22	M57-W131	M57-W41	M57-W83	
CW-09-49	CW-09-91	CW-11-143	CW-17-179	M56-W23	M57-W132	M57-W42	M57-W84	
CW-09-50	CW-09-92	CW-13-146	CW-17-179A	M56-W24	M57-W133	M57-W43	M57-W85	
CW-09-51	CW-09-93	CW-13-147	CW-17-179B	M56-W25	M57-W134	M57-W44	M57-W86	

12.2 GMSI Data Verification

The majority of this Section 12 is sourced from the NI 43-101 report by GMSI on the Copperwood Project from June 2015, which outlines the data verification procedures undertaken on historical data. Regarding the data collected in 2017, drill hole locations were visited and drill core was viewed during the site visit.

GMSI performed data verification checks of the drill logs, assay certificates, down-hole surveys, and additional information sources on site at Highland's White Pine office in April 2015.

The following validation checks were made for the copper and silver assays:

- Approximately 50% of the assay database (2,671 assays) was checked against the original laboratory certificates for possible typographical errors, wrong sample numbers or duplicates. Minor errors were found in less than 0.5% of the database investigated and were corrected accordingly;
- Five random laboratory certificates were also directly sent to GMSI from Actlabs to compare with Highland's certificates. No error was found;
- Assay validation results in a very good confidence in the assay database.

The following validation checks were made for the lithology information:

- Approximately 20% of the drill holes were randomly selected to compare the database with the original paper logs. Some 76 drill holes were selected this way with good overall representation of the Copperwood Project (Table 12.2);
- Lithological information of beds and From/To intervals was validated;
- No error was found; GMSI has a very good confidence in the lithological information.

These other validation checks were made:

- Validation of the down-hole survey of 40 drill holes randomly selected. Comparison between the original survey files and the survey database showed only minor errors, for less than 1% of the database;
- Validation of the drill hole collar survey: check of the survey certificate from U.P. Engineers & Architects, Inc. The certificates details on the conversion process from Copper Range Company local coordinates system (in feet) to UTM Zone 16T (in meters) and on the surveyed drill holes;

- Validation of QA/QC, density, metallurgical and logging procedures with Highland's professional staff. All information pertaining to the aforementioned procedures are rigorously recorded in procedure manuals easily accessible to Highland's personnel.

Table 12.2: Drill Holes Randomly Selected from the Database for Lithology Validation

CW-09-101	CW-09-62	CW-10-105	M56-W19	M57-W117	M57-W151	M57-W65	PC-19
CW-09-24	CW-09-63	CW-10-108	M56-W2	M57-W120	M57-W153	M57-W66	PC-21
CW-09-25	CW-09-71	CW-10-110	M56-W20	M57-W124	M57-W155	M57-W74	PC-23
CW-09-37	CW-09-77	CW-10-121	M56-W25	M57-W126	M57-W158	M57-W82	PC-3
CW-09-41	CW-09-81	CW-10-138	M56-W26	M57-W128	M57-W159	M57-W87	PC-5
CW-09-46	CW-09-82	CW-13-148	M56-W6	M57-W130	M57-W27	M57-W89	PC-7
CW-09-49	CW-09-85	CW-13-149	M57-W100	M57-W131	M57-W36	M57-W93	
CW-09-53	CW-09-89	CW-13-151	M57-W107	M57-W133	M57-W43	M57-W96	
CW-09-54	CW-09-92	CW-13-BC-04	M57-W113	M57-W135	M57-W49	PC-1	
CW-09-60	CW-09-95	M56-W12A	M57-W116	M57-W150	M57-W54	PC-12	

12.3 Drill Hole Collar Location

GMSI personnel visited numerous drill collars from the 2017 drilling campaign during the site visit between the 6th and 9th of November. Drill collars were chosen at random.

In Section 6, drill collars were identified by a concrete base with the name of the drill hole engraved onto it. Due to stringent rehabilitation requirements on Section 5, drill collars were characterised by a single stake with the name of the drill hole. All drill hole locations visited were easily identifiable. Examples are shown in Figure 12.1 and Figure 12.2.

Figure 12.1: Drill Hole Collar Example in Section 6 - CW17-195

Figure 12.2: Drill Hole Collar Example from Section 5 - CW-17-184

12.4 QA/QC Validation

GMSI reviewed the results of the QAQC from the 2017 drilling campaign (as discussed in Section 11), and found them to be within acceptable limits.

12.5 Conclusions

Overall, GMSI is comfortable that the data, analyses, QAQC and geological interpretation presented in the previous historical reports was performed in a professional manner using industry best practices. GMSI believes that all data is reliable for use in the statement of Mineral Resources presented in this technical report.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

Metallurgical testing is ongoing as part of the 2018 feasibility study, and will be reported when complete.

14 MINERAL RESOURCE ESTIMATES

G Mining Services Inc. (GMSI) prepared a mineral resource estimate for the Copperwood Project based on data provided up to and including October 3rd, 2017. Resource estimation methodologies, results and validations are presented in this Section 14 of the Technical Report.

The resource estimate was prepared in accordance with CIM Standards on Mineral Resources and Reserves (adopted May 10, 2014) and is reported in accordance with NI 43-101. Classification, or assigning a level of confidence to Mineral Resources, has been undertaken with strict adherence to CIM Standards on Mineral Resources and Reserves. In the opinion of GMSI, the resource evaluation reported herein is a reasonable representation of the global mineral resources found in the Copperwood Project at the current level and spacing of sampling.

The mineral estimate was prepared under the supervision of Mr. Réjean Sirois, Eng. GMSI, Vice President Geology and Resources, an independent "qualified person" as defined in NI 43-101. Geovia GEMS™ and Leapfrog Geo™ software was used to facilitate the resource estimation process.

The mineral resource estimates include inferred mineral resources that are normally considered too speculative geologically to have economic considerations applied to them that would enable them to be categorized as mineral reserves. There is also no certainty that these inferred mineral resources will be converted to the indicated and measured categories through further drilling, or into mineral reserves, once economic considerations are applied.

14.1 Data

Raw data incorporated into this Technical Report consist of all diamond drilling data obtained from the Copperwood Project between 1956 and October 3rd, 2017. This includes the database used for the 2015 Mineral Resources, and all additional diamond drilling data collected in 2017 (48 drill holes with lithology logging, of which 15 contained assays). Holes included in the database comprise those from the following series: M56, M57, PC and CW-08 to CW-17. GMSI has reviewed the database to verify the historical resources initially published by Highland, and is satisfied that the integrity of the drilling database is of a high standard and can be used for resource estimation.

14.1.1 Drill Hole Spacing

The legacy drill holes from the Copperwood Project were drilled between 1956 and 1959, and between 2008 and 2013 by three different companies. These drill holes are summarised in Table 14.1, and were produced using the drill hole database collar table. The drill hole spacing of the Copperwood Deposit is variable between 100 m to 150 m for the western area and Section 6, and from 150 to 300 m in Section 5. Drilling density in the Satellite Deposits is also irregular, from 300 m to 700 m. The large majority of drill holes are vertical or near-vertical, and increasing length heading northwards depending on the mineralized horizon depth. Figure 14.1 illustrates the grid spacing for the Copperwood Project.

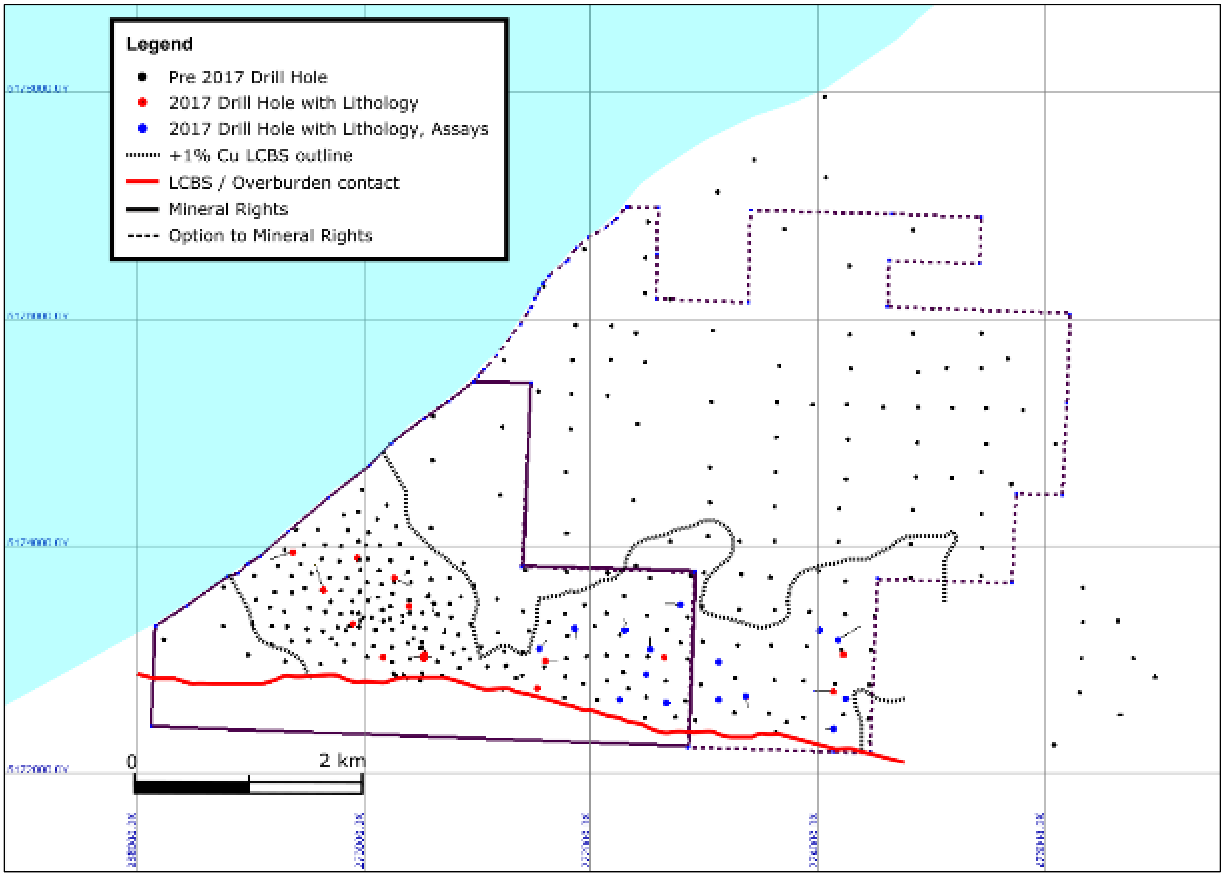
The final drill spacing is judged adequate to develop a reasonable model of the mineralization distribution, and to quantify its volume and quality with a high level of confidence.

Table 14.1: Legacy Drill Holes by Company

Company	Years of Drilling	Drill Hole Series	# Holes	Length (m)
US Metal Refining	1956-1957	M56, M57	161	34,050
Bear Creek Mining	1959	PC	23	3,998
Orvana US	2008-2010, 2013	CW-08, CW-09, CW-10, CW-13, BC	146	21,466
Highland Copper	2017	CW-17	36*	6,784
		Total	366	66,298

**36 drill holes with an additional 13 wedges*

Figure 14.1: Drill Status Plan as of October 3rd, 2017



14.1.2 Data Conditioning

GMSI made some adjustments to the database to facilitate surface generation in Leapfrog Geo™ software, where the consistency of logging of the stratigraphic column is integral to produce and accurate geological model.

It was noted that there was often a single sample directly above the LCBS (logged as Red Laminated unit) containing grades greater than 1% Cu. These samples would be excluded from the LCBS in the current state (the samples are around 30 cm in length, and are present in 39 historical drill holes. These sample likely reflect a change in logging procedure, as they mostly pertain to drill holes with a prefix CW-09. In addition, the boundary between the Grey Laminated and Red Laminated is transitional, and it not easily distinguished.

GMSI subsequently recoded these samples into the Grey Laminated unit to ensure they were captured in the resource estimate.

In addition, it was noted that the Domino and Red Massive were grouped for laboratory analysis for 42 of the drill holes in the database (yet logged separately in the lithology table). GMSI will include these samples in the compositing process described in Section 14.3.3.

Lastly, minor changes were made to the top of the LCBS in nine drill holes to account for grouped logging codes in historical logging. The new logging code “LTRA” (found at the base of the Domino in the 2017 logging data) was recoded to the Domino (23), as it represents a mineralised transition zone between the Domino and the underlying Copper Harbour siltstone/sandstone.

14.2 Modelling Approach

Numerous 2D and 3D modelling elements such as topography, structure and lithology surfaces and/or solids were generated for this resource estimate. The surfaces were created using the 3D geological modelling software Leapfrog Geo™ and then imported into Geovia GEMS™ (version 6.7.4).

GMSI applied the following approach for building the geological block model:

1) Model the thrust fault identified in July 2017 to produce two fault blocks within the model;

2) Model the individual Lower Copper Bearing Sequence (LCBS) units using the lithology codes provided by Highland (Domino, Red Massive and Grey Laminated units);

3) Model hanging wall and footwall dilution zones using a 0.5 m “skin” above and below the LCBS, to ensure accurate representation of dilution grades;

4) Model the Upper Copper Bearing Sequence (UCBS) using a 1% Cu cut-off to define a continuous unit, whilst applying a minimum thickness of 2.2 m (considered the minimum mining height at the time of modelling). The UCBS is defined geologically as the Upper Transition Shale and the Thinly units which present grades greater than 1% Cu in general.

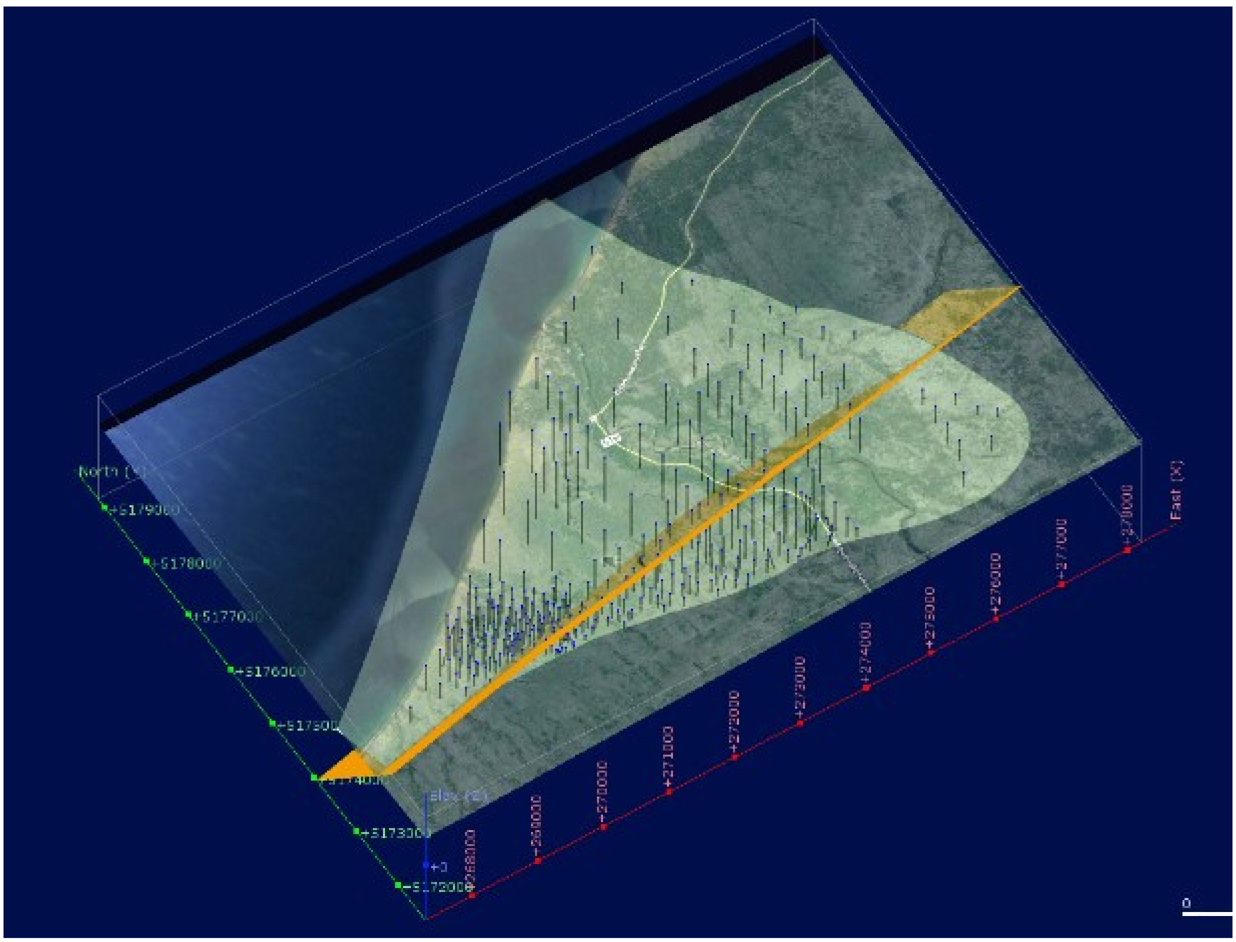
As the lithology units within the LCBS have a strong control on copper grade, no additional lower grade cut-off was applied during modelling of the LCBS. The constraints applied by modelling each unit are considered sufficient to accurately represent mineralisation boundaries.

The UCBS is not consistently logged as individual stratigraphic units (often logged as “undefined”) in the lithology table, so it was not possible to apply the same approach as the LCBS. Alternatively, GMSI applied the mining lower cut-off considered at the time of modelling (1% Cu) to define a coherent unit of mineralisation. A minimum thickness of 2.2 m was applied during the interpretation to ensure a diluted grade was represented in the block model.

14.2.1 <u>Structural Model</u>

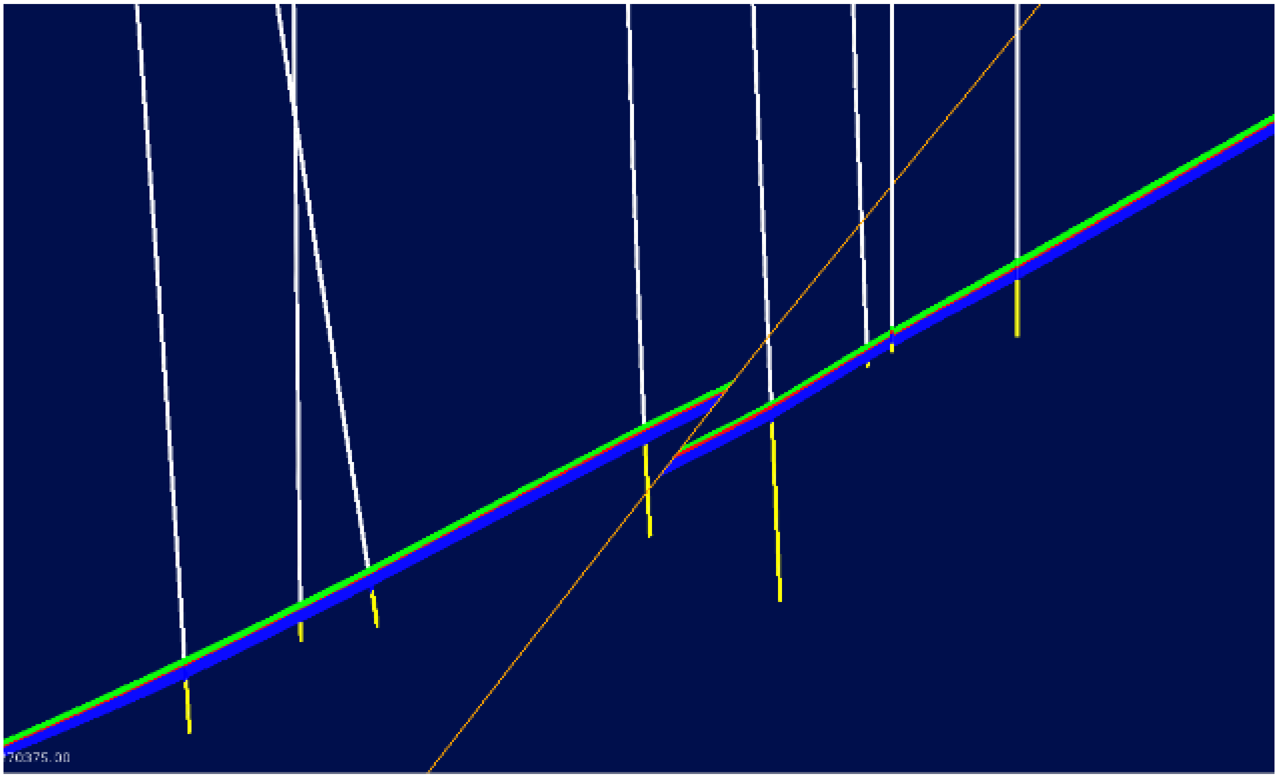
During the 2017 drilling program, a repetition of the LCBS was intersected in CW-17-186 which prompted a review of structural data with the main zone of the Copperwood deposit. The review delineated a thrust fault within the extents of 269,500 mE – 271,000 mE, and was based off drill core observations from 11 drill holes. The thrust fault strikes around 80° azimuth, with a dip of 20° – 25° to the NNW. GMSI was provided with pierce points of the thrust fault identified within drill core, which were used to construct a 3D plane in Leapfrog Geo™ (Figure 14.2).

Figure 14.2: Orthogonal View (looking NE) Showing the Thrust Fault in Yellow



Although the thrust fault is shown to the extents of the block model, displacement of lithological units is only permitted between 269,500 mE and 271,000 mE. Vertical displacement of lithological units is usually less than 5 m, however is up to 8 m in places (Figure 14.3).

Figure 14.3: Section 270375 mE showing displacement of the UCBS (vertical exaggeration x 3)



14.2.2 Lithology Model - LCBS

Three lithology subunits were coded into the LCBS model: Domino (23), Red Massive (24) and Grey Laminated (25), as shown in Figure 14.4. The overall average of the combined sequence was 2.66 m as stated in the Table 14.2. As mentioned in Section 14.2, the UCBS was modelled with a minimum thickness of 2.2 m applied, which is not exceeded as the UCBS is usually between 0.75 m and 1.5 m thick.

The small separation distance (often < 5 m) between the metallurgical wedge drill holes and their respective parent drill holes caused issues during wireframe construction. This was mainly due to suspected small inaccuracies of the distance of the wedge down-hole, which caused unrealistically steep dips of the geological contacts over short distances. As the metallurgical wedge drill holes provided little additional information from a mineral resource perspective, lithology information from these holes were ignored (the parent drill hole information was retained).

Figure 14.4: Modelling of the Stratigraphy and Associated Rock Codes

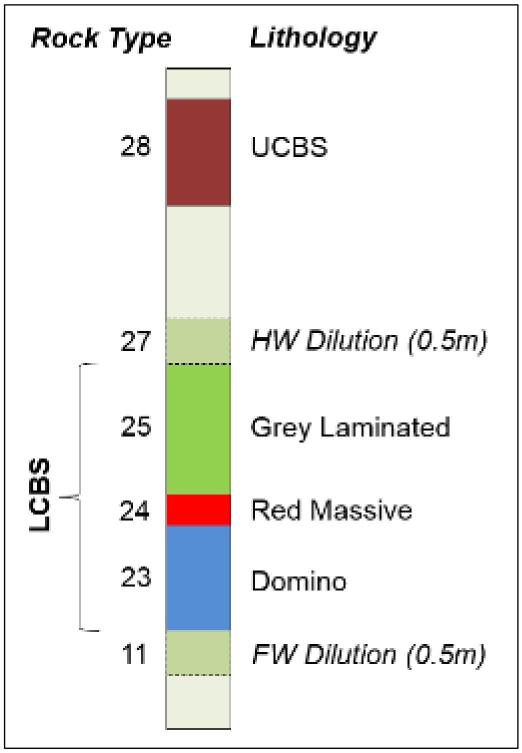


Table 14.2: Average Vertical Thicknesses of the LCBS Units

Lithology (Code)	Average Thickness (m)
Gray Laminated (25)	1.21
Red Massive (24)	0.36
Domino (23)	1.09
LCBS (2345)	2.66

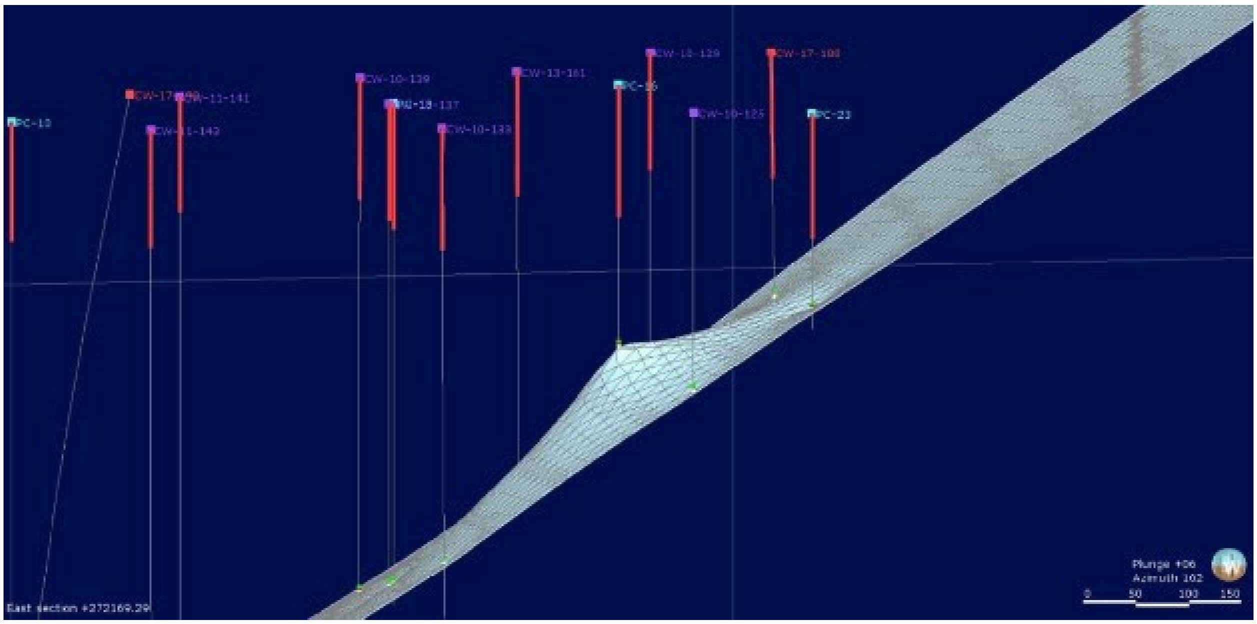
In addition, two 0.5 m thick zones of dilution were also coded as the hanging wall (27) and the footwall (11) of the LCBS to ensure accurate representation of dilution grades within the block model.

No minimum thickness was applied during modelling of the LCBS, as GMSI will apply a post-processing dilution algorithm to the block model to account for area where the LCBS is less than the minimum mining thickness.

Lastly, a single historical drill hole (PC-16) was noted to be inconsistent with the LCBS interpretation, causing a geologically unrealistic "cone" effect in the lithology wireframes (Figure 14.5). The intersection in

PC-16 is 10-12 m higher than anticipated. Follow-up drilling in 2017 (CW-17-188) near this drill hole confirmed the depth of the LCBS as per the surrounding drilling. Representatives of Highland Copper revisited the original logs, downhole logging and down hole survey data, however no error was found. Despite this, it is the opinion of GMSI that PC-16 requires further confirmation, so for this study the drill hole collar was adjusted to bring PC-16 in line with the geological interpretation.

Figure 14.5: Drill Holes PC-16 and Subsequent Diversion of the LCBS Interpretation



14.2.3 <u>Weathering Wireframes</u>

No oxidation or weathering of the Copperwood orebody is observed in drill core due to erosion and deposition of glacial sediments. Glacial sediments have an average thickness of 29 m, and lie unconformably above fresh rock.

The base of overburden surface was modelled using the overburden code “OVB” in the database to produce an upper limit to the interpretation of the LCBS and UCBS.

14.2.4 <u>Topography Surface</u>

A triangulated surface was created from a combination of drill collars and topographic contours, and was coded into the block model as a topography.

14.3 Statistical Analysis

14.3.1 Statistics of the Raw Assays

Length-weighted group-wise statistics of the copper and silver raw assays were computed using the geostatistical software R for the entire drilling database. The statistics were studied by lithology groups: Domino (23), Red Massive (24), Gray Laminated (25) and the UCBS (28). Table 14.3 and

Table 14.4 respectively present the results of the study for the copper and silver raw assay grades.

The Domino unit hosts the highest copper and silver grades with grade averages of 2.19% Cu and 5.28 g Ag/t. The coefficient of variation in this unit is relatively low. The Red Massive is the thinnest unit with an average thickness of 0.36 m and presents the highest coefficient of variation (1.02) of all three separate units due to higher grade variability. The Grey Laminated is lower grade than the Domino, and shows a low coefficient of variation indicating grade is very continuous in nature.

The statistics of the UCBS are impacted by the 2.2 m minimum thickness which includes many low-grade samples into the unit, and presents an average grade of 0.59% Cu. Without applying a minimum thickness of 2.2 m, at a 1% Cu cut-off the UCBS is thinner (between 0.75 m and 1.5 m), and grades between 1.5 and 2% Cu.

Table 14.3: Length-weighted Statistics of the Copper Raw-Assays

Lithology (Code)	# of Assays	Copper Raw Assays (% Cu)					CoV
		Min	Max	Average	Median	Standard Deviation	
UCBS (28)	869	0.001	1.84	0.59	0.30	0.81	1.17
Gray Laminated (25)	899	0.014	6.36	1.11	1.08	0.68	0.61
Red Massive (24)	303	0.004	2.13	0.30	0.21	0.29	1.01
Domino (23)	656	0.003	7.30	2.19	2.05	1.28	0.60

Table 14.4: Length-weighted Statistics of the Silver Raw-Assays

Lithology (Code)	# of Assays	Silver Raw Assays (g Ag/t)					CoV
		Min	Max	Average	Median	Standard Deviation	
UCBS (28)	616	0.1	240.0	4.07	1.50	12.65	2.64
Gray Laminated (25)	678	0.1	42.0	4.34	2.10	6.07	1.35
Red Massive (24)	236	0.1	12.3	1.29	0.90	1.61	1.21
Domino (23)	540	0.1	108.3	5.28	2.90	11.77	2.03

Cumulative probability plots presented in Figure 14.6 and Figure 14.7 were generated for raw assays of copper and silver for the individual units of the LCBS, and the UCBS. GMSI considers there to be no outliers present in the populations of assays regarding Cu %. The Domino unit shows a natural break in the data at around 1% Cu, which likely represents the natural cut-off of mineralisation.

There appears to be several outliers present in the raw assays for silver (Figure 14.7). These will be investigated further after compositing.

Figure 14.6: Overlaid Cumulative Probability Graphs of Cu % Raw Assays for units of the LCBS (left) and the UCBS (right)

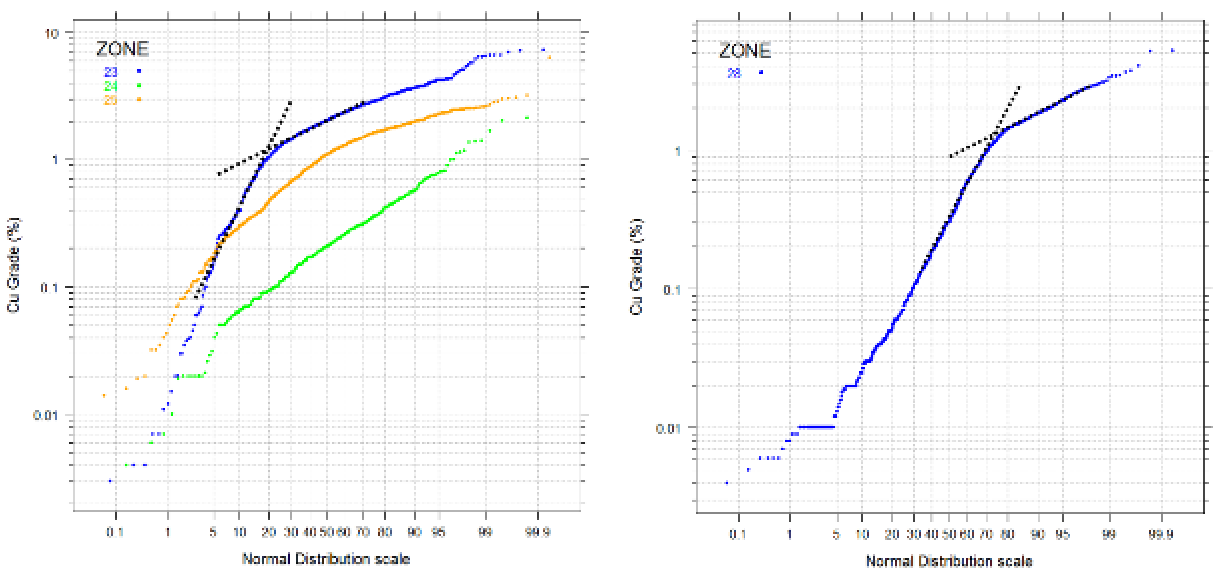
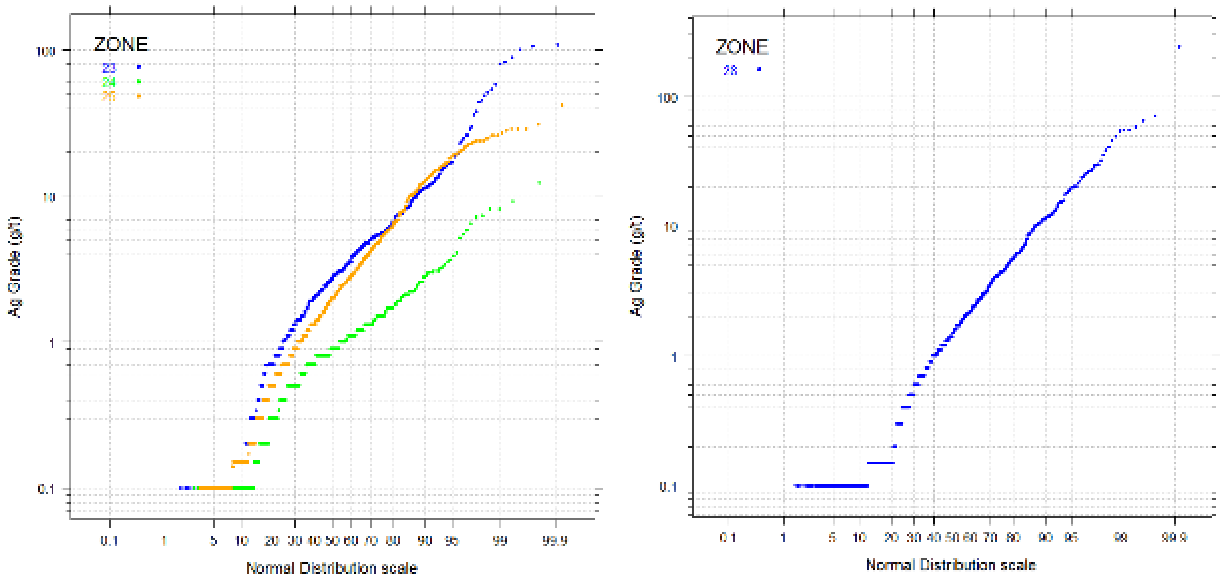


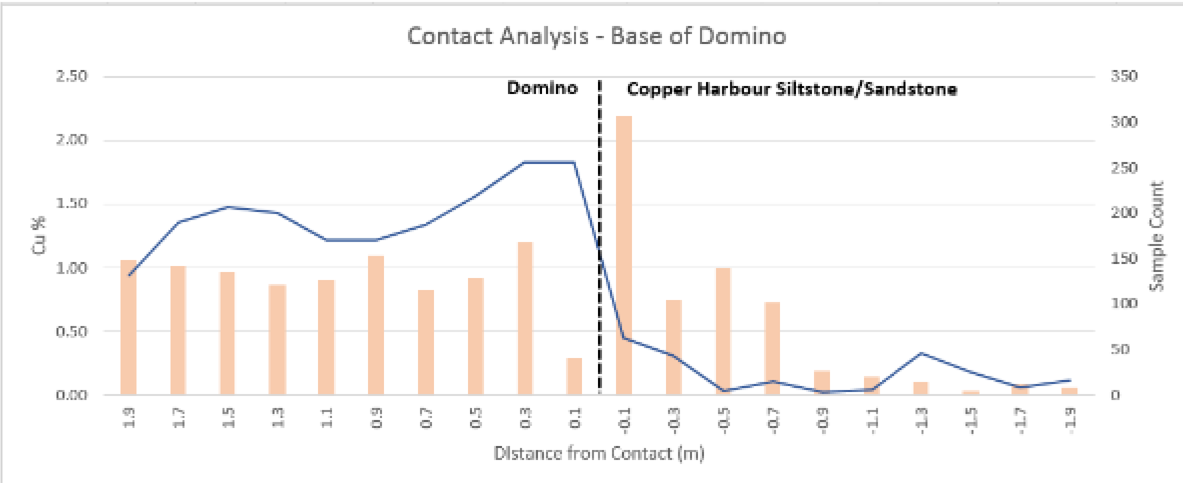
Figure 14.7: Overlaid Cumulative Probability Graphs of Ag g/t Raw Assays for units of the LCBS (left) and the UCBS (right)

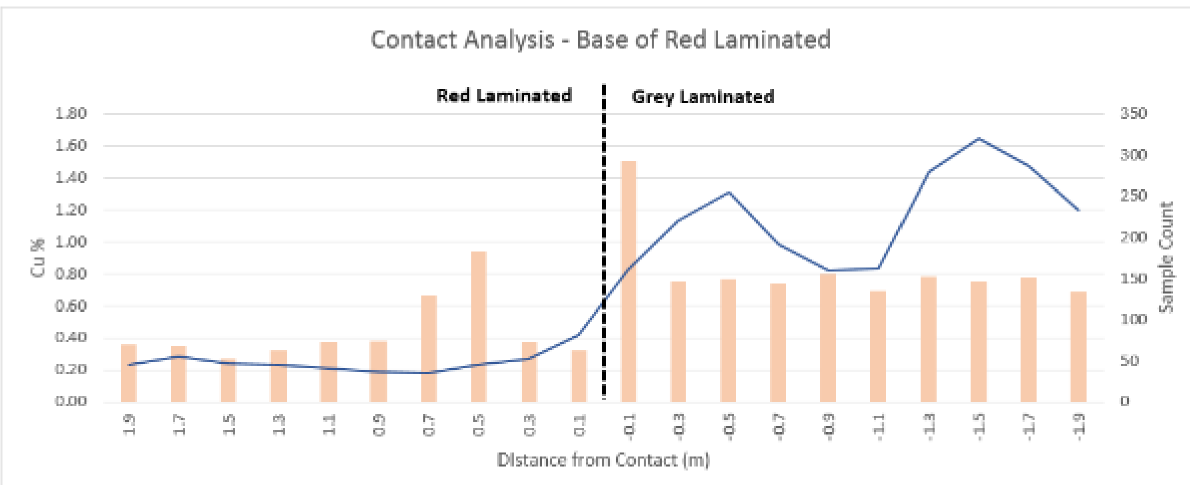


14.3.2 <u>Contact Analysis</u>

To assist in choosing an appropriate estimation methodology, it can be advantageous to determine the nature of the contacts between the individual sub-units of the LCBS (to determine if contacts are sharp or transitional, and to what extent). To quantify this, average grades were calculated as a function of distance from the basal contact of a given subunit (average grades calculated at 20 cm increments away from the boundary). These slopes of these grades can then be examined to see how they behave moving away from a given contact. The key results are presented in Figure 14.8. Positive distances reflect upward distances above the contact, and negative distances reflect downwards distances beneath the contact. The orange bar reflects the number of samples used to calculate the averages, and the blue line represents the average grade.

Figure 14.8: Contact Analysis Plots of the Basal Contact of the Domino (upper image) and Basal Contact of the Red Laminated (lower image). Blue line represents the average Grade; orange bar reflects the number of samples





The contact between the Domino unit and the Copper Harbour Siltstone/Sandstone (footwall unit) is sharp, and reflects a significant drop in grade (from > 1.5% Cu to < 0.5% Cu over a short distance). This implies that a hard boundary must be applied, where composites cannot be shared during estimation between these units. Conversely, the upper boundary of the LCBS (the base of Red Laminated) is a transitional boundary, where over a distance of 1 m the grade gradually reduces from 1.2% Cu to 0.2% Cu. Although the geological boundary between the Red Laminated and Grey Laminated units is not sharp in drill core, grade distributions imply that mineralisation continues into the Red Laminated unit. For this reason, certain samples pertaining to the Red Laminated were recoded in the database to Grey Laminated (Section 14.1.2), and that the hanging wall unit is estimated to accurately represent the grade of mining dilution.

14.3.3 Compositing

Drill holes intervals were flagged in in Leapfrog GEO™, using the constructed wireframes for the LCBS and UCBS. Visual checks were made to ensure that all drill holes were flagged accurately. These intervals were subsequently imported into GEMS as a downhole interval table (LF_INT_FINAL) to use during the compositing process.

The uncapped raw assays were composited down-hole inside each of the LCBS units (rock codes 23, 24, and 25), the UCBS (rock code 28), and the hanging wall and foot wall dilution (rock codes 11 and 27) using the aforementioned drill hole interval table (LF_INT_FINAL). For each drill hole, a single length-weighted composite was calculated within each rock code (i.e. composites are limited by geological boundaries).

Statistical checks were undertaken to ensure that that the composites were an accurate representation of the raw assays (i.e. length-weighted statistics should be more or less equal for each unit).

14.3.4 Statistics of the Composites

Length-weighted group-wise statistical analysis was undertaken to describe the characteristics of the composites within the zone of mineralization. Table 14.5 and Table 14.16 present the statistics calculated from the copper and silver composites.

A total of 288 composites with an average thickness of 2.79 m were used for the resource estimation. The low coefficient of variation of copper composites (0.40) indicates that the grades are closely distributed around the mean of 1.35% Cu.

Table 14.5: Statistics of the Copper Composites

Lithology (Code)	# of Composites	Copper Composites (% Cu)					CoV
		Min	Max	Average	Median	Standard Deviation	
UCBS (28)	162	0.002	1.74	0.71	0.70	0.34	0.49
Gray Laminated (25)	305	0.060	2.49	1.13	1.20	0.39	0.34
Red Massive (24)	305	0.004	2.13	0.35	0.25	0.32	0.91
Domino (23)	307	0.004	3.88	2.18	2.15	0.41	0.60

Table 14.6: Statistics of the Silver Composites

Lithology (Code)	# of Composites	Silver Composites (g Ag/t)					CoV
		Min	Max	Average	Median	Standard Deviation	
UCBS (28)	111	0.2	32.24	4.33	3.60	4.00	0.94
Gray Laminated (25)	242	0.1	20.94	4.40	2.40	4.79	1.04
Red Massive (24)	243	0.1	12.30	1.33	1.00	1.50	1.11
Domino (23)	242	0.1	108.34	5.22	3.11	12.16	2.12

Cumulative probability plots presented in Figure 14.9 and Figure 14.10 were generated for raw assays of copper and silver for the individual units of the LCBS, and the UCBS. GMSI considers there to be no outliers present in the populations of assays regarding Cu %.

Figure 14.9: Overlaid Cumulative Probability Graphs of Cu % Composites for units of the LCBS (left) and the UCBS (right)

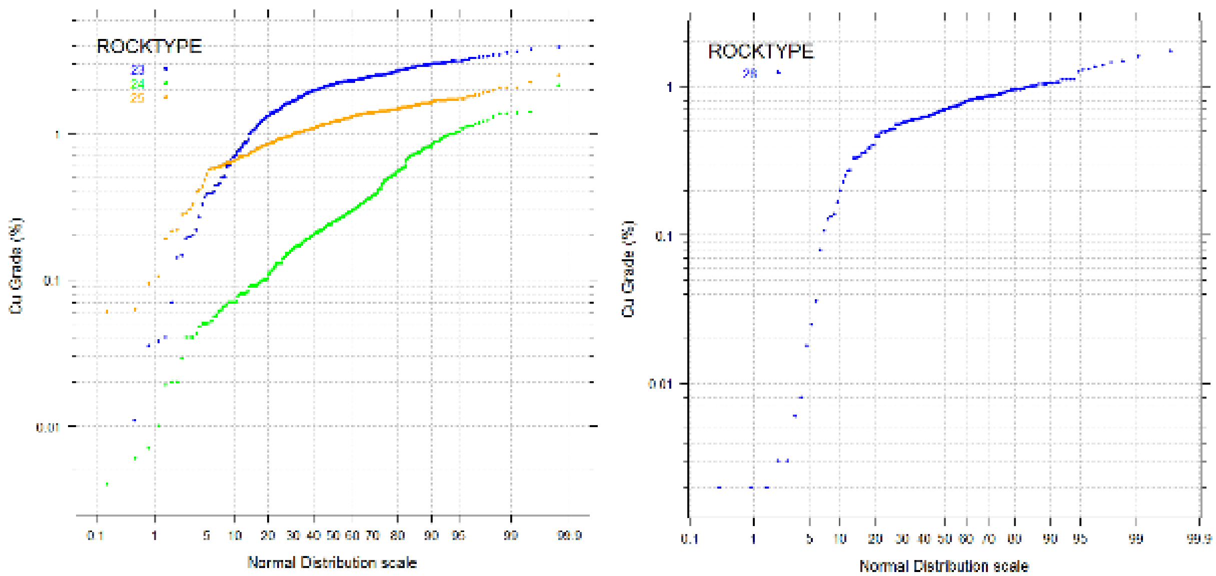
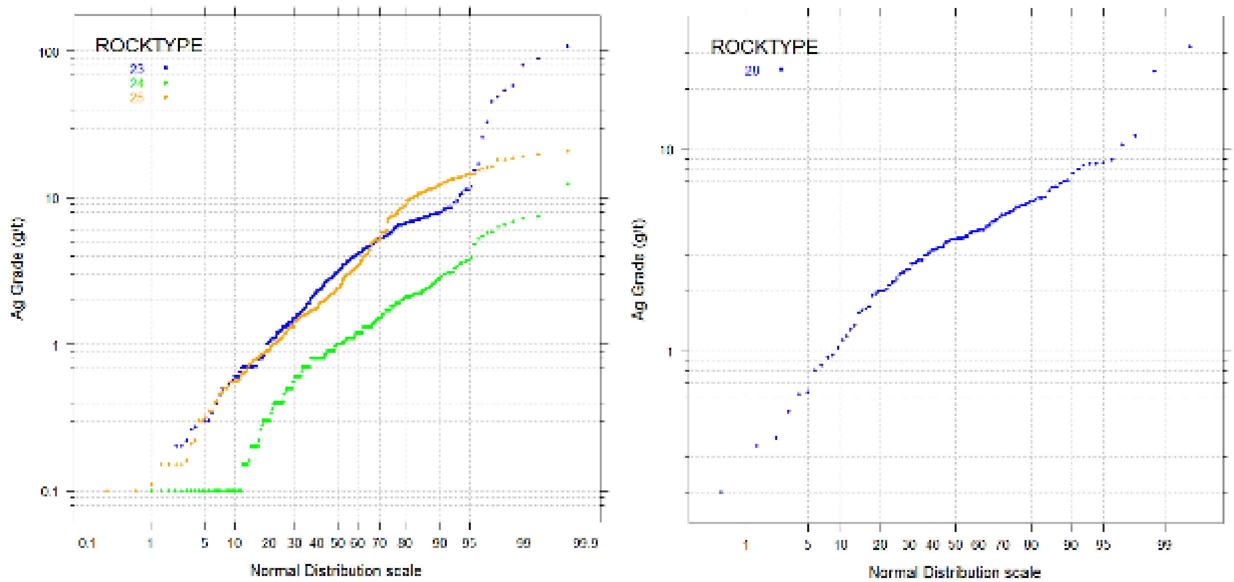


Figure 14.10 Overlaid Cumulative Probability Graphs of Ag g/t Composites for units of the LCBS (left) and the UCBS (right)

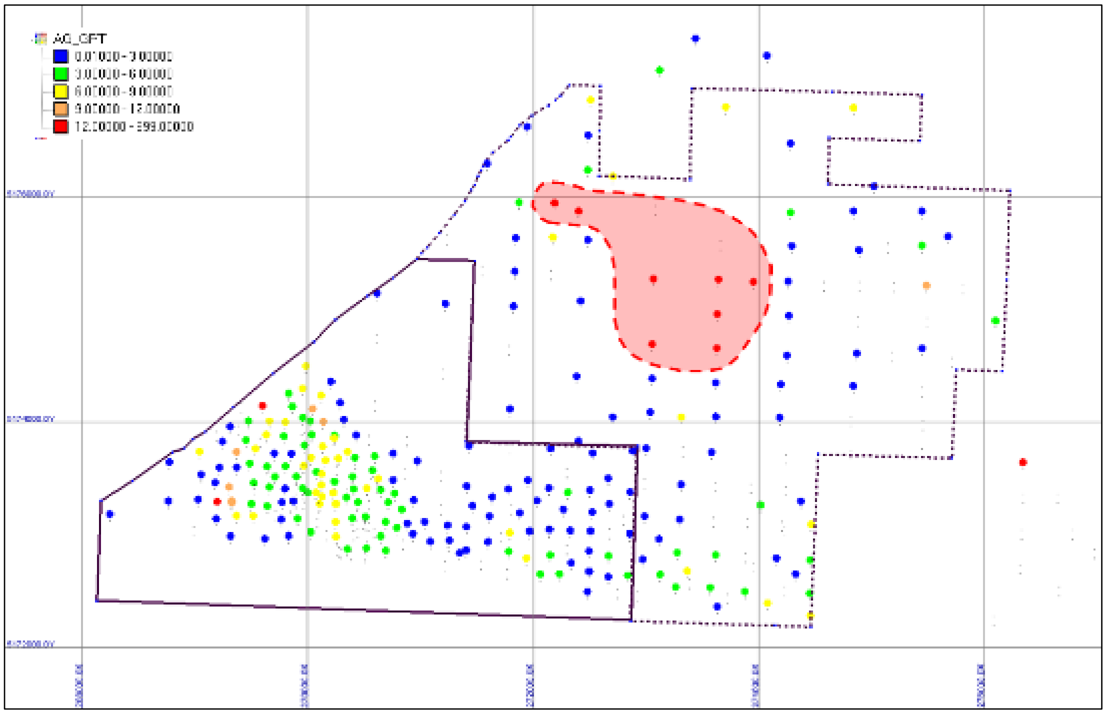


The outliers (> 10 g Ag/t) of the Domino unit were further examined to investigate their spatial distribution, and their potential impact on the estimation of the Copperwood deposit. Figure 14.11 shows that the outliers are spatially limited to a zone in the northern extents of the sparsely drilled satellite deposits, and appear as a continuous zone of high-grade silver mineralisation. As they represent a natural sub-population within the data confined to a limited aerial extent, GMSI has not applied any grade capping of silver composites within the Domino.

No significant silver outliers were identified in the Red Massive (24) or Grey Laminated (25) units, and two potential outliers in the UCBS are located on the extremities of the lease boundaries, where extrapolation will be limited.

As a result of this review, no grade capping was applied to either copper or silver composites for this resource estimate.

Figure 14.11: Composites from the Domino Unit Colored by Ag with Leasing Outlines. Note the sub-population in the northern area (within the sparse drilling)



14.4 Bulk Density Data

The database includes 316 samples of specific gravity measurement taken in the drill holes throughout the Copperwood Deposit. Table 14.7 and Table 14.18 present the statistics of the measurements by year of sample collection for the LCBS, and by subunit within the LCBS and UCBS. The average density observed was 2.71 g/cm^3 for the LCBS. The range of the density data is minimal, where the minimum and maximum values were respectively 2.62 g/cm^3 and 2.79 g/cm^3. Due to the low variability observed in the density data, no study was undertaken to quantify the relationship between density and Cu %. Table 14.9 summarizes the values of density utilized in the resource estimation.

Table 14.7: Statistics of the Specific Gravity Measurements Presented by Year of Collection for the LCBS

Year	# of Measurements	Specific Gravity Measurement (g/cm^3)				
		Min	Max	Average	Median	Standard Deviation
1956-1957	25	2.70	2.74	2.72	2.73	0.014
2009-2011	171	2.62	2.79	2.71	2.70	0.029
2017	16	2.62	2.75	2.69	2.70	0.033
All Years	212	2.62	2.79	2.71	2.71	0.028

Table 14.8: Statistics of the Specific Gravity Measurements Presented by Lithology

Lithology	# of Measurements	Specific Gravity Measurement (g/cm^3)				
		Min	Max	Average	Median	Standard Deviation
Domino	76	2.63	2.79	2.70	2.70	0.036
Red Massive	37	2.65	2.75	2.70	2.70	0.019
Grey Laminated	99	2.62	2.76	2.72	2.72	0.021
UCBS*	47	2.56	2.79	2.69	2.70	0.051

**Determined from all density samples within the UCBS solid wireframe (2.2m minimum width)*

Table 14.9: Specific Gravity Averages Used in the Resource Estimation

Lithology	Specific Gravity (g/cm^3)
Air	0.00
Overburden	2.20
Domino	2.70
Red Massive	2.70
Grey Laminated	2.72
UCBS	2.69

14.5 Variography

Grade variography was generated in preparation for the estimation of copper and silver grades using the Ordinary Kriging interpolation method. The variography was undertaken on the composites for each unit of the LCBS and the UCBS. Geovia GEMS™ was used to perform the variographic analysis.

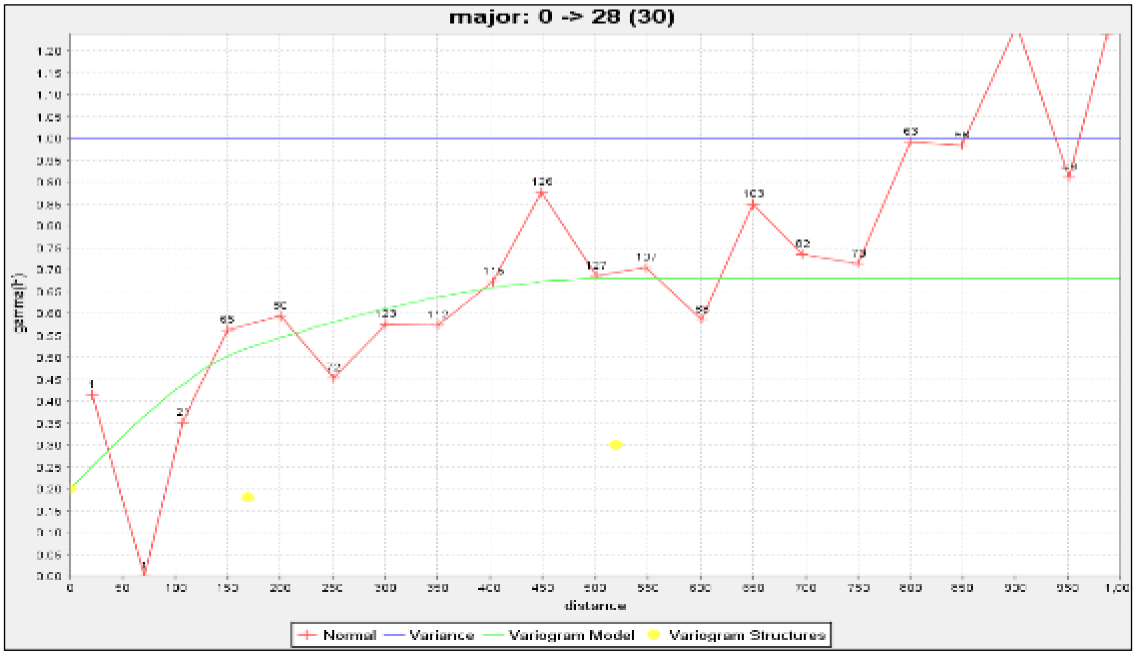
A series of variograms was generated from the composites of each unit every 5 degrees azimuth and 5 degrees dip increments. The spread angle was set to 30 degrees, with a bandwidth of 250 m. A lag distance of 50 m was applied. Only composites selected between 268000 mE and 275000 mE, and 5172000 mN and 5174500 mN were selected to produce the variograms (Main Zone, Section 5 and Section 6). The manually-fitted variogram models included a nugget effect and two spherical structures. The variography study highlighted a near horizontally isotropic distribution of copper and a low nugget effect on copper and silver grades. The results of the models for copper and silver are tabulated in Table 14.10.

Table 14.10: Variogram Models for the Copper and Silver Composites of Zone

Element	Rock Codes	Nugget	Ranges of Influence (m)								Rotation		
			1st Structure				2nd Structure				Azi	Dip	Azi Int.
			X	Y	Z	Sill	X	Y	Z	Sill			
Cu	23	0.026	350	268	60	0.028	600	459	100	0.200	150	5	240
	24	0.024	175	132	60	0.031	500	378	100	0.027	118	0	208
	25	0.032	170	104	60	0.029	520	318	100	0.048	28	-5	118
	28	0.036	250	204	60	0.025	575	470	100	0.036	118	0	208
Ag	23	1.01	260	210	60	1.70	630	500	100	4.19	150	5	240
	24	0.36	250	150	60	0.36	600	340	100	0.6	140	5	230
	25	3.25	550	363	60	1.30	740	489	100	10.85	150	5	240
	28	3.11	400	314	60	2.24	550	432	100	5.59	118	0	208

Figure 14.12 shows an example of a relative semi-variogram for Cu % for the principal direction (X), with the spherical model overlain in yellow. The range of 500 m corresponds to the maximum distance of grade continuity between pairs of composites for this subunit.

Figure 14.12: Variogram Model Cu % for the Grey Laminated subunit of the LCBS



14.6 Block Modelling

A single block model was constructed for the Copperwood Project, including both the Copperwood Deposit and the Satellite Deposits. The block model covers an area large enough to manage underground developments. The block model was set in the Geovia GEMS™ 6.7.4 database environment.

The drilling pattern, the anticipated “room & pillar” mining scenario and minimum mining height considerations guided the choice of block dimension and orientation. The block model parameters for the Copperwood Project are summarized in Table 14.11.

Table 14.11: Block Model Parameters - Copperwood Project

Block Model Name	Orientation	Origin	Number of Columns, Rows, Levels	Block Size (m)	Rotation[1]
CW_22mAp2015	East	268,000	480	20	0°
	North	5,172,000	330	20	
	Elevation	320	270	2.5	

Note: For a positive value, the direction of rotation is counter clockwise around the elevation axis

The rock type model, or domain coding, relied on the wireframe constraints presented in Section 14.2.2. A "percentage" type block model was adopted, where a single block can contain numerous rock codes, with their proportions expressed as percentages of the block. This methodology was adopted due to the thin nature of the subunits of the LCBS, and the large spatial extent of the deposit (10 km x 6 km), which minimises the size of the block model whilst retaining a high level of precision. Sub-blocking was not applied.

Table 14.12 describes the coding and the associated domain used in the mapping of the Lower Copper Bearing Sequence (LCBS: Gray Laminated, Red Massive and Domino beds) in the block model. All densities associated to hard rock are set to a uniform 2.7 g/cm^3. Overburden blocks were assigned a density of 2.2 g/cm^3.

Table 14.12: Rock Codes Used in the Rock Type Model

Rock Code	Description	Specific Gravity
5	Air	0.00
9	Overburden	2.20
0	Host Rock	2.69
11	Foot wall dilution	2.63
23	Domino subunit	2.70
24	Red Massive subunit	2.70
25	Grey Laminated subunit	2.72
27	Hanging wall dilution	2.71
28	UCBS	2.69

Additionally, a series of attributes needed during the block modelling development were incorporated into the block model project. Table 14.13 presents the list of attributes found in the block model project FOR_ENG in the CW_Oct2017 folder.

Table 14.13: List of Attributes Found in the Block Model

Folder Name	Model Name	Description
CW_Oct2017	Rock_##	Individual Rock Coding (11, 23, 24, 25, 27, 28)
	Density_WA	Specific gravity
	Perc_##	Percent attributes (11, 23, 24, 25, 27, 28)
	Cu_##	OK Cu % (11, 23, 24, 25, 27, 28)
	Ag_##	OK Ag ppm (11, 23, 24, 25, 27, 28)
	Pass_##	Interpolation pass (11, 23, 24, 25, 27, 28)
	CATEG_Oct17	Resource category
	Rock_LCBS	LCBS Rock Code 232425 (blocks pertaining to 23, 24, or 25)
	Perc_LCBS	LCBS percentage (blocks pertaining to 23, 24, or 25)
	Cu_LCBS	LCBS Weighted Average Cu % (undiluted)
	Ag_LCBS	LCBS Weighted Average Cu % (undiluted)
	Thick_LCBS	LCBS Thickness (undiluted)
	Cu_Dil	LCBS Diluted Cu %
	Ag_Dil	LCBS Diluted Ag ppm
	Thick_LCBS_Dil	LCBS Diluted Thickness
	Perc_Dil	LCBS Diluted Percentage

14.7 Grade Estimation Methodology

The final interpolation technique selected for the Copperwood Project is the Ordinary Kriging (OK) method.

Grade estimates were generated using the drill hole composites (one per drill hole, per rock code). The boundaries of each domain were considered as hard boundaries through each interpolation step. Only composites pertaining to a given domain were used to estimate that domain. Geovia® GEMS 6.7.4 software was used for the estimate.

The sample search approach used to estimate copper and silver for all units of the LCBS (23, 24, 25) and the UCBS (28) for the Copperwood Project is summarized below:

First Pass: A minimum of 2 and a maximum of 10 composites within the search ellipse ranges.

Second Pass: A minimum of 2 and a maximum of 10 composites within the search ellipse ranges. Only blocks which were not estimated during the first pass could be estimated during the second pass.

Third Pass: A minimum of 1 and a maximum of 10 composites within the search ellipse ranges. Only blocks which were not estimated during the first and second pass could be estimated during the third pass.

For the foot wall and hanging wall dilution domains, Inverse Distance Square (ID^2) interpolation method was used (applying the same passes and search ellipses for the estimation of Cu and Ag).

It was judged unnecessary to apply restriction on search ellipse ranges for high grade composites, based on the high-grade sub-populations identified in Section 14.3.4. The various profiles for interpolation and search ellipses utilized in the estimation of the resource are tabulated in Table 14.14 and Table 14.15.

Table 14.14: Interpolation Profile Settings for Resource Estimation - Copperwood Project

Profile Name	Element Estimated	Pass	Sample			Ellipses Name	Semi-Variogram Name
			Min	Max	Max per Hole		
CU_11_1	Cu	1	2	10	1	CU_175	-
CU_11_2	Cu	2	2	10	1	CU_250	-
CU_11_3	Cu	3	1	10	1	CU_350	-
CU_23_1	Cu	1	2	10	1	CU_175	CU_23
CU_23_2	Cu	2	2	10	1	CU_250	CU_23
CU_23_3	Cu	3	1	10	1	CU_350	CU_23
CU_24_1	Cu	1	2	10	1	CU_175	CU_24
CU_24_2	Cu	2	2	10	1	CU_250	CU_24
CU_24_3	Cu	3	1	10	1	CU_350	CU_24
CU_25_1	Cu	1	2	10	1	CU_175	CU_25
CU_25_2	Cu	2	2	10	1	CU_250	CU_25
CU_25_3	Cu	3	1	10	1	CU_350	CU_25
CU_27_1	Cu	1	2	10	1	CU_175	-
CU_27_2	Cu	2	2	10	1	CU_250	-
CU_27_3	Cu	3	1	10	1	CU_350	-
CU_28_1	Cu	1	2	10	1	CU_175	CU_28
CU_28_2	Cu	2	2	10	1	CU_250	CU_28
CU_28_3	Cu	3	1	10	1	CU_350	CU_28
AG_11_1	Ag	1	2	10	1	AG_175	-
AG_11_2	Ag	2	2	10	1	AG_250	-
AG_11_3	Ag	3	1	10	1	AG_350	-
AG_23_1	Ag	1	2	10	1	AG_175	AG_23
AG_23_2	Ag	2	2	10	1	AG_250	AG_23
AG_23_3	Ag	3	1	10	1	AG_350	AG_23
AG_24_1	Ag	1	2	10	1	AG_175	AG_24
AG_24_2	Ag	2	2	10	1	AG_250	AG_24
AG_24_3	Ag	3	1	10	1	AG_350	AG_24
AG_25_1	Ag	1	2	10	1	AG_175	AG_25
AG_25_2	Ag	2	2	10	1	AG_250	AG_25
AG_25_3	Ag	3	1	10	1	AG_350	AG_25
AG_27_1	Ag	1	2	10	1	AG_175	-
AG_27_2	Ag	2	2	10	1	AG_250	-
AG_27_3	Ag	3	1	10	1	AG_350	-
AG_28_1	Ag	1	2	10	1	AG_175	AG_28
AG_28_2	Ag	2	2	10	1	AG_250	AG_28
AG_28_3	Ag	3	1	10	1	AG_350	AG_28

Table 14.15: Sample Search Ellipsoid Settings for Resource Estimation - Copperwood Project

Rock Code	Element	Pass	Ellipse Profile Name	Anisotropy Range (m)			Rotation		
				X	Y	Z	Z	X	Z
2345	Cu	1	CU_175	175	175	75	0	-10	0
		2	CU_250	250	250	100			
		3	CU_350	350	350	100			
	Ag	1	AG_175	175	175	75			
		2	AG_250	250	250	100			
		3	AG_350	350	350	150			

14.8 Classification and Resource Reporting

The CIM Definition Standards on Mineral Resources and Mineral Reserves, prepared by the CIM Standing Committee on Resource Definition and adopted by the CIM council on May 10, 2014, provide standards for the classification of Mineral Resources and Mineral Reserves estimates into various categories. The category to which a resource or reserve estimate is assigned depends on the level of confidence in the geological information available on the mineral deposit, the quality and quantity of data available, the level of detail of the technical and economic information which has been generated about the deposit and the interpretation of that data and information. Under CIM Definition Standards:

An *“Inferred Mineral Resource”* is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological or grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes.

An “*Indicated Mineral Resource*” is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics can be estimated with a level of confidence sufficient to allow appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough for geological and grade continuity to be reasonably assumed.

A “*Measured Mineral Resource*” is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough to confirm both geological and grade continuity.

In addition, the classification of interpolated blocks in undertaken by considering the following criteria:

- Quality and reliability of drilling and sampling data;
- Distance between sample points (drilling density);
- Confidence in the geological interpretation;
- Continuity of the geologic structures and the continuity of the grade within these structures;
- Variogram models and their related ranges (first and second structures);
- Statistics of the data population;
- Quality of assay data.

The resources were classified according to the above-mentioned criteria which also directed the choice of the search parameters for each interpolation pass during the block estimation.

While strongly based on interpolation passes described above, resource categories were not defined solely on this basis. To delineate Measured, Indicated and Inferred Mineral Resources, GMSI outlined groups of globally similar interpolation passes. Figure 14.13 shows how the resource categories are outlined around interpolation passes for the Copperwood Deposit.

Measured Mineral Resources are limited to the blocks located inside the “Measured Outline”. Measured Mineral Resources include blocks generally interpolated in the first pass. No Measured Resources are estimated in the Satellite Deposits.

Indicated Mineral Resources are limited to the blocks located at the periphery of the measured category blocks and inside of the “Indicated Outline”. Indicated Mineral Resources are generally interpolated in the second pass. No Indicated Resources are estimated in the Satellite Deposits.

Inferred Mineral Resources are all the blocks not included in the Measured or Indicated Mineral Resources, but included inside the "Inferred Outline". All interpolated blocks inside the Satellite Deposits outline are categorized as inferred.

Figure 14.13: Interpolation Passes – Copperwood Deposit

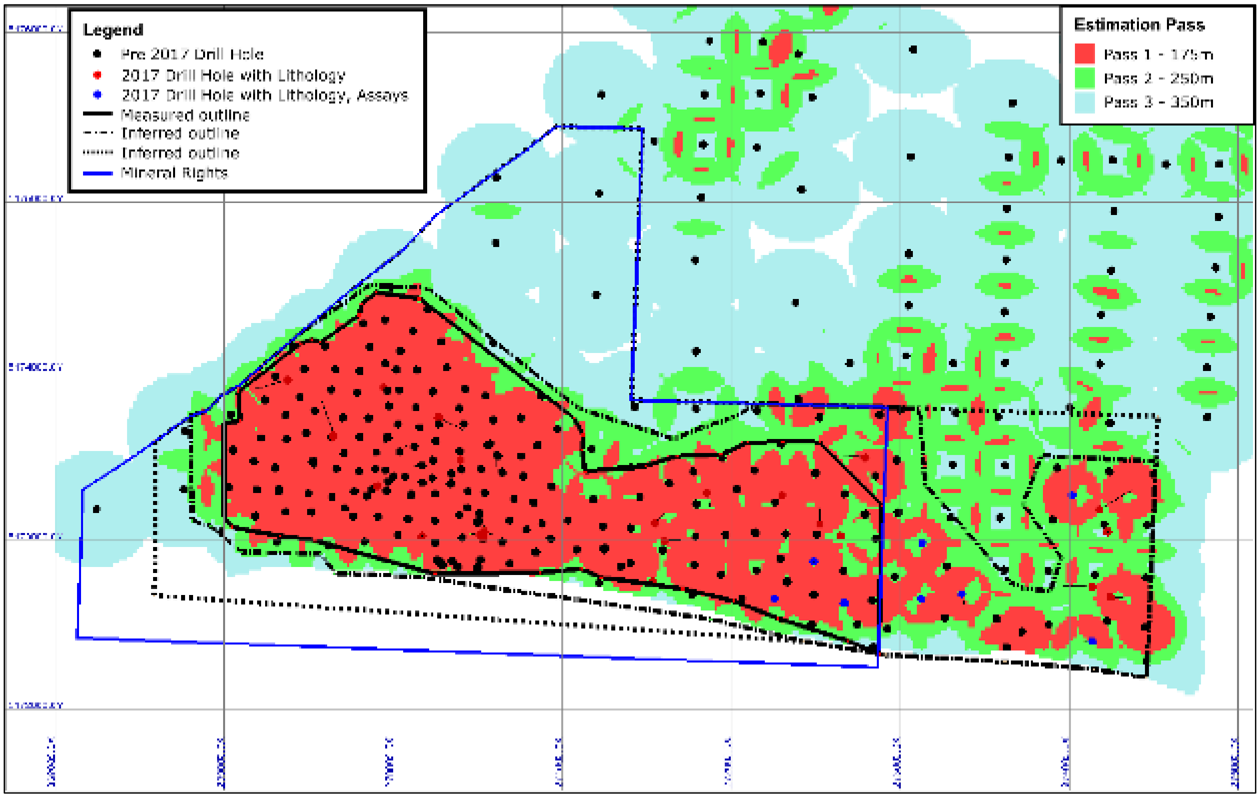


Figure 14.14 shows the new resource categories applied by GMSI for the 2017 resource update, compared to Figure 14.15 which shows the resource categories from the 2015 feasibility study. Measured resources constitute essentially the bulk of the mineral resources in the Copperwood Deposit, where the drilling density is the highest. Indicated resources surround the latter category and are mostly present in the eastern half of the Copperwood Deposit (Section 5 and 6) where the drill spacing is sparser. Inferred resources constitute 100% of the mineral resources found in the Satellite Deposits. Most of the inferred mineral resources of the Copperwood Deposit are of copper grading between 0.5 and 1.0% Cu.

Figure 14.14: Resource Categories - Copperwood Project - 2017

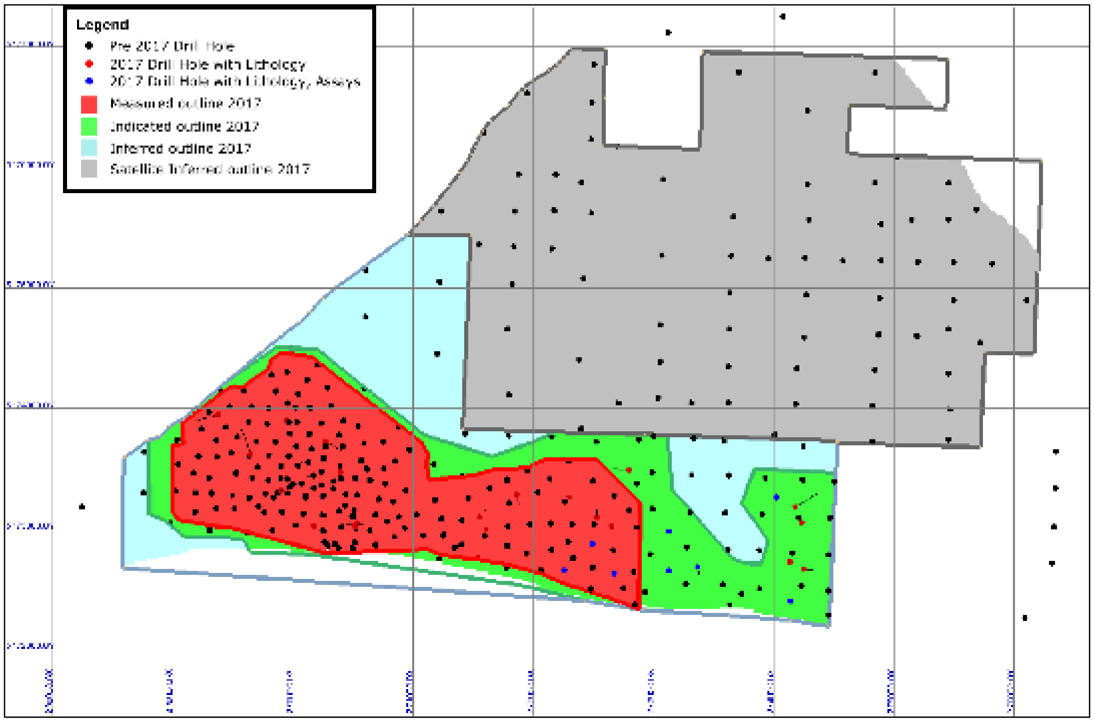
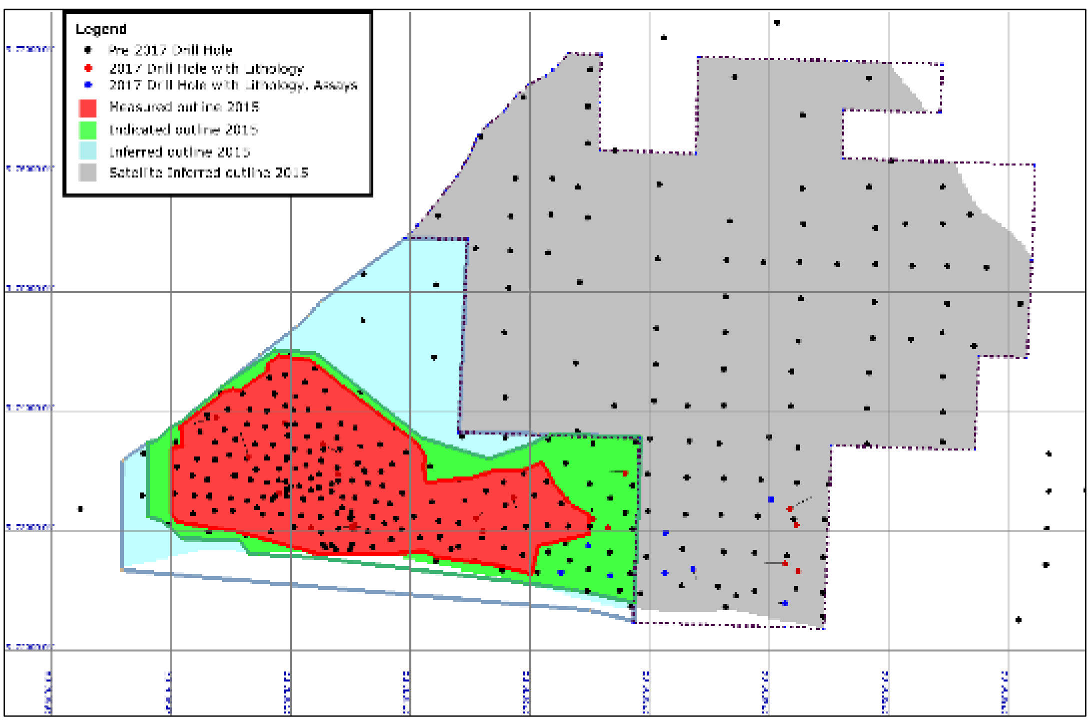


Figure 14.15: Resource Categories - Copperwood Project - 2015



14.9 Grade Estimation Validation

Validation was completed on the Copperwood Project block model. The validation process included visual checks, statistical validation of the model, local validation by swath plots and an assessment of grade smoothing (conditional bias).

14.9.1 Visual Validation

The visual checks consisted of 2D plan views of the block model (for each rock code), the relevant lithology wireframes, and the drill hole composites. In addition, the slicing was performed vertically on 100 m intervals oriented North-South. Various attributes (rock type, percent attribute, density, Cu and Ag grades) throughout the strike length of the deposit were reviewed. The LCBS and associated percent attribute are well represented in their proper attribute model. The Ordinary Kriging based copper and silver resource estimate was found to be a good visual representation of the drill hole composites.

14.9.2 Statistical Validation

A statistical comparison between composites used in the interpolation and block grades was performed to evaluate if samples used in the estimation are well represented in the block model. Statistics were calculated for the key zones of mineralisation (Main zone, Section 5 and Section 6), defined by all blocks and composites between 268000 mE – 275000 mE, and 5172000 mN – 5174500 mN. Declustering of composites is necessary due to the variable sample spacing, therefore weightings were calculated for each composite and applied during the compilation of descriptive statistics.

Table 14.16 and Table 14.17 present the comparison between the composite grades and block grades for copper and silver.

Table 14.16: Comparative Statistics for Cu % Between Composites and Blocks Grouped by Rock Code

Domain	No. of Composites	Composites (Cu %)		Coeff. of Variation Composites	Number of Blocks	Blocks (Cu %)		Coeff. of Variation Blocks	Reduction in variance	No. of blocks for each composite
		Mean	Median			Mean	Median			
23	216	2.24	2.33	0.29	63,479	2.33	2.29	0.29	12%	294
24	215	0.37	0.30	0.80	59,219	0.34	0.29	0.68	49%	275
25	215	1.21	1.27	0.32	65,502	1.18	1.23	0.28	28%	305
28	76	0.77	0.74	0.48	53,205	0.69	0.70	0.56	-	700

Table 14.17: Comparative Statistics for Ag (g/t) Between Composites and Blocks Grouped by Rock Code

Domain	No. of Composites	Composites (Ag g/t)		Coeff. of Variation Composites	Number of Blocks	Blocks (Ag g/t)		Coeff. of Variation Blocks	Reduction in variance	No. of blocks for each composite
		Mean	Median			Mean	Median			
23	182	3.82	3.51	0.85	62,077	4.36	3.18	0.87	19%	341
24	183	1.40	1.10	0.82	58,268	1.40	1.18	0.69	40%	318
25	182	4.78	3.34	0.91	64,419	3.63	2.05	1.00	50%	354
28	54	2.86	2.82	0.46	48,036	2.78	2.91	0.39	30%	890

In general, the reconciliation of grade between the composites and blocks is good (less than 10% difference in mean grades). Silver grade reconciliation for rock code 25 (Grey Laminated) are adversely affected by a localised area of higher composite grades, hence the blocks appears under-estimated in the comparative statistics.

14.9.3 Quantile: Quantile Plots

In addition to descriptive statistics, Q:Q plots were generated to assess the ***distribution*** of copper and silver grades of composites against blocks on a domain by domain basis. These plots are useful in assessing the degree of smoothing (conditional bias) observed during the grade estimation process, and can identify any significant over/under estimation of grades.

Regarding copper grades, the Q:Q plots show minimal smoothing of copper grade, which is also supported by the small reduction in variance observed between the composite and block statistics shown in Table 14.16. For silver, an under-estimation was observed in the Grey Laminated (as highlighted by the comparative statistics), however due to the economic value silver in the Copperwood deposit, this was not investigated further.

Figure 14.16: Quantile:Quantile plots of Cu % distributions for the Domino (23) and Grey Laminated (25) subunits of the LCBS.

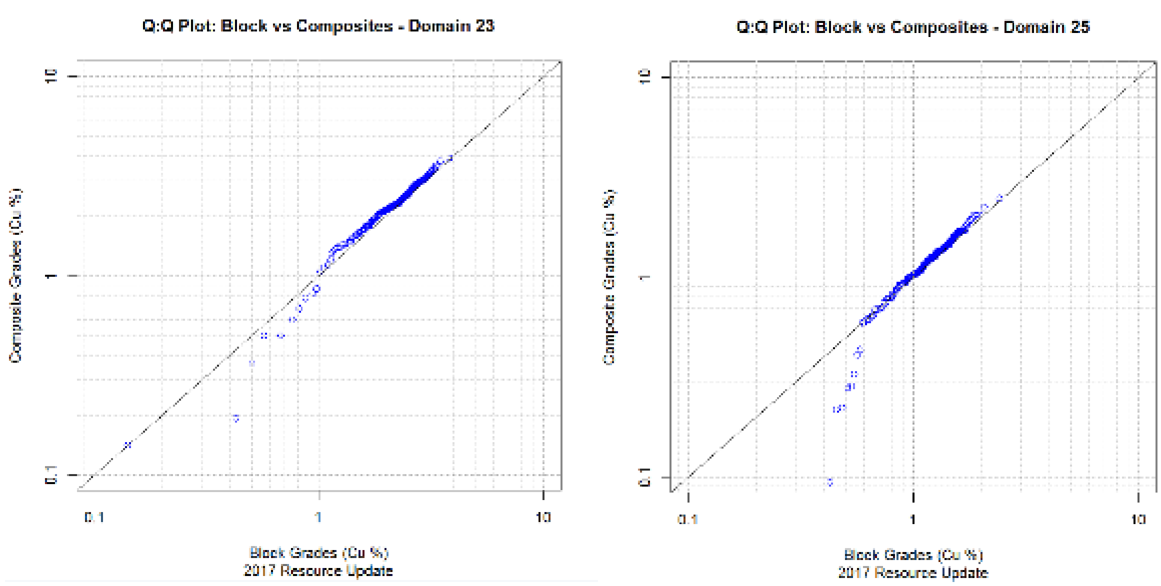
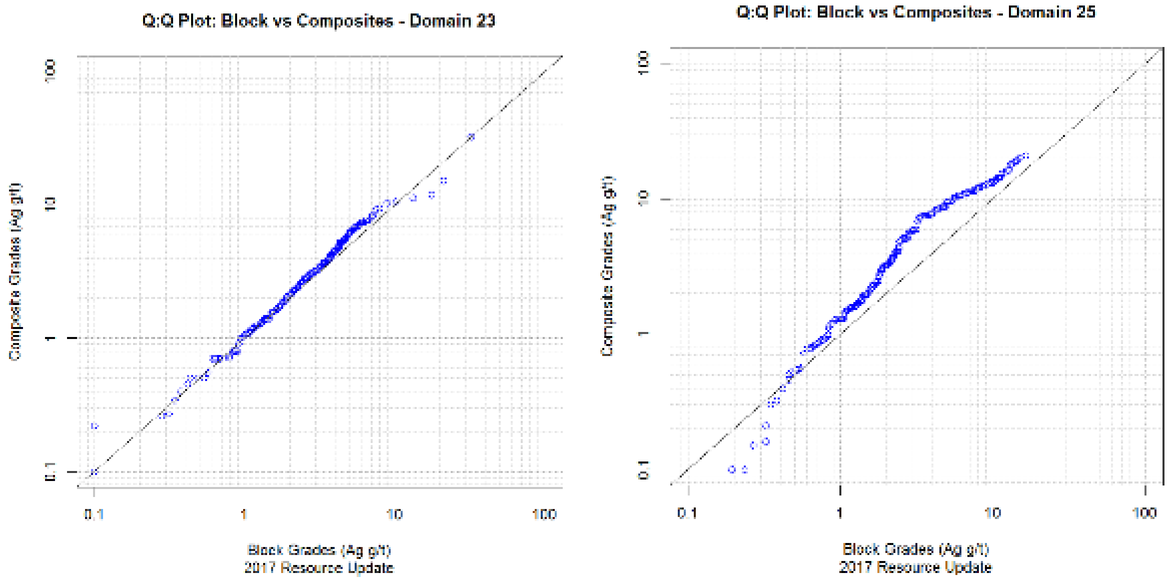


Figure 14.17: Quantile:Quantile plots of Ag g/t distributions for the Domino (23) and Grey Laminated (25) subunits of the LCBS



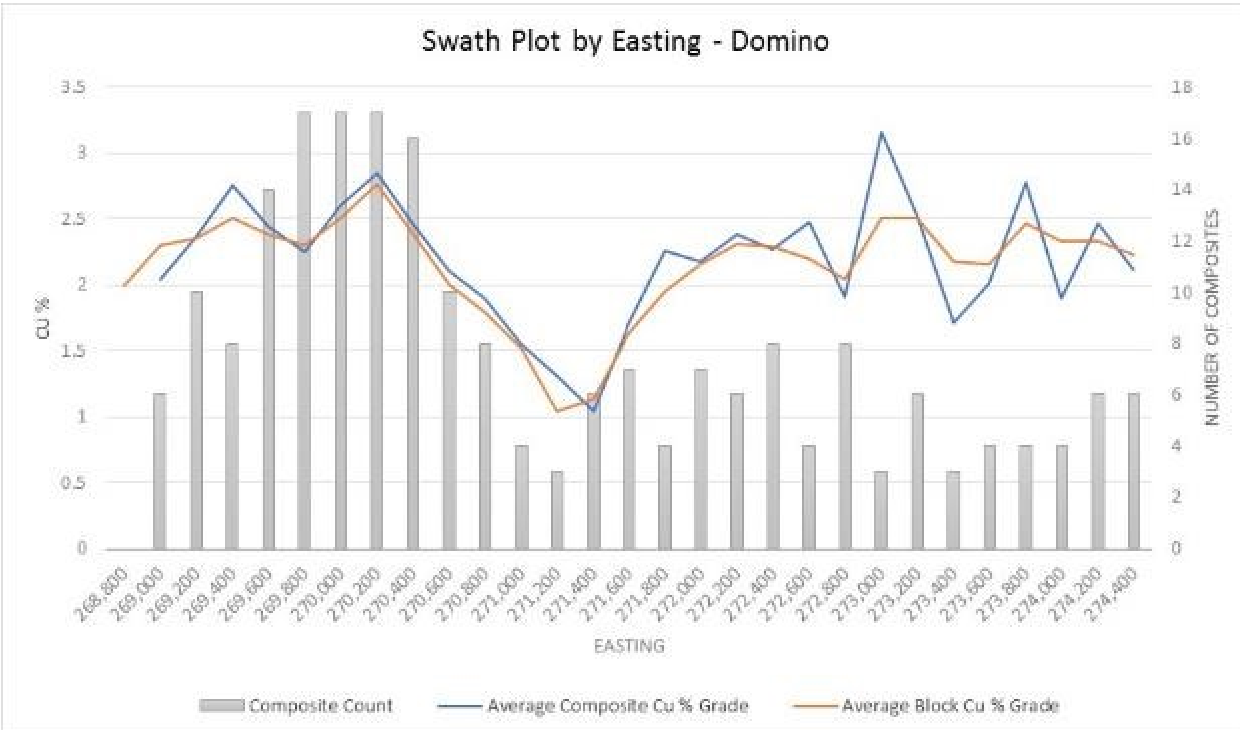
14.9.4 Local Statistical Validation - Swath Plots

The swath plot method is considered a local validation, which works as a visual mean to compare estimated block grades against composite grades within a 3D moving window. It is used to identify possible bias in the interpolation (i.e. over/under estimation of grades).

Swath plots were generated for all subunits of the LCBS and the UCBS at increments of 200 m (Easting) for both Cu % and g Ag/t. Peaks and lows in estimated grades should generally follow peaks and lows in composite (or point) grades in well informed areas of the block model, whereas less informed areas can occasionally show some discrepancies between the grades.

Figure 14.18 illustrates an example swath plot for the Domino subunit of the LCBS by Easting. Peaks and lows in copper content match peaks and lows in composite grades; no bias was found in the resource estimate in this regard. For all other rock codes, no significant bias was observed.

Figure 14.18: Swath Plot of Cu % for the Domino (23) by Easting



14.9.5 Discussion on Block Model Validation

Overall, the Copperwood block model is a good representation of composite copper and silver grades used in the estimation. Global statistical validations show the degree of smoothing is minimal, and no significant over/under-estimation of copper grades has occurred. Local statistical validations show good local correlation of block and composite gold grades, and no excessive extrapolation of grades was observed.

14.10 Global Resources

For the purposes of Mineral Resource Reporting, a weighted-average copper and silver grade was calculated for the LCBS, using the grades and percentages estimated individually in each subunit (Domino, Red Massive and Grey Laminated).

14.10.1 Grade Dilution

At the time of writing, the minimum mining height of the underground workings remains unknown, and is highly dependant on the geotechnical behavior of the deposit during mining operations. The current range is between 1.8 m and 2.2 m minimum mining height, as provided by GMSI underground mining engineers.

Therefore, to ensure that Mineral Resources are reported in line with RPEE (Reasonable Prospects for Economic Extraction) as stipulated by the CIM guidelines for Mineral Resource Reporting, GMSI applied the following procedure for grade dilution within the LCBS using a minimum mining height of 2 metres.

Vertical thickness of the LCBS (Domino, Red Massive and Grey Laminated combined) was calculated and coded into each block within the LCBS unit. For blocks where the LCBS thickness was less than 2 m, the block grades for Cu and Ag were diluted using the grades estimated in the hanging wall (27), and the block percentages adjusted accordingly.

The copper grade distribution within the LCBS and the UCBS are presented in Figure 14.19 and Figure 14.20 respectively. The higher-grade copper resources are located in the western Measured Resource, with grades ranging from 1.5% to 2.5% Cu, and the eastern Indicated and Inferred resource (Section 5) where grades are generally 1.5% to 2.0% Cu.

Figure 14.19: Copper Grade Distribution in the LCBS with Mineral Resource Classification

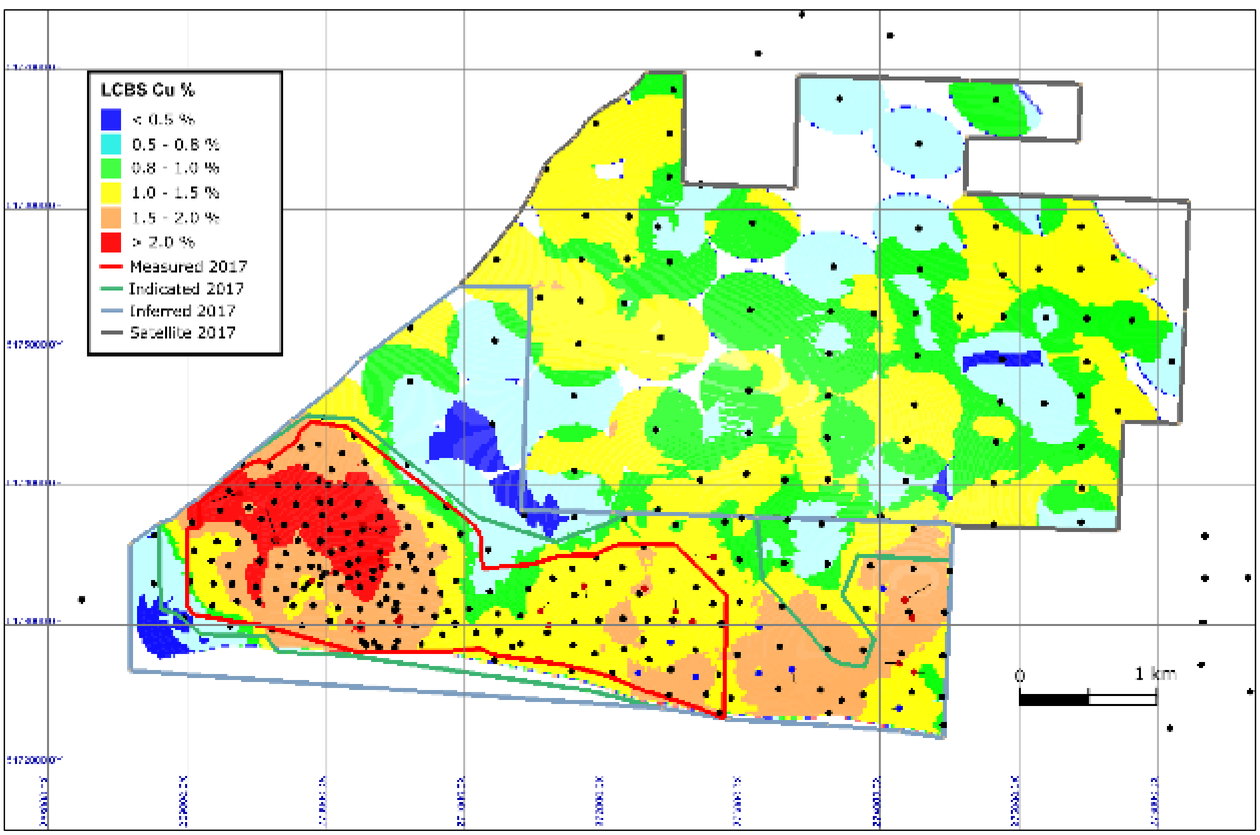
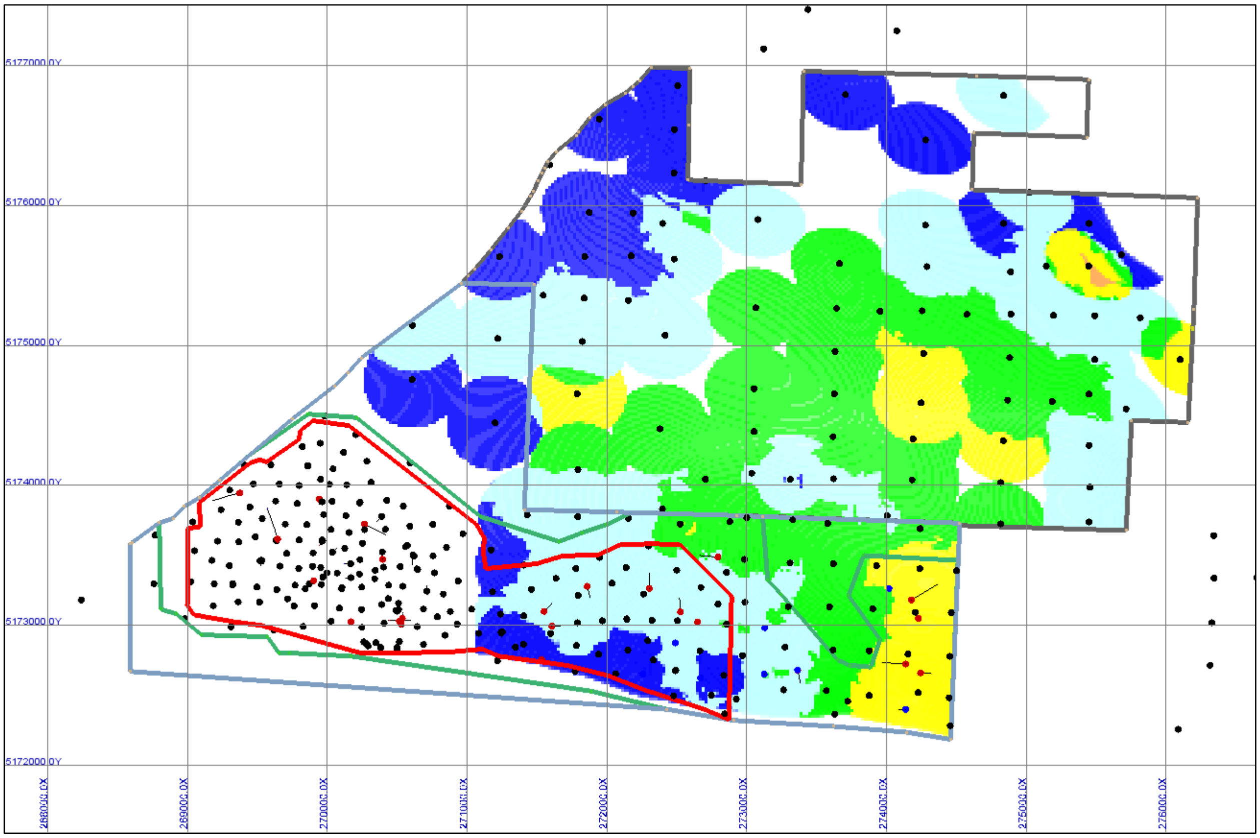


Figure 14.20: Copper Grade Distribution in the UCBS with Mineral Resource Classification



Due to the minimum width of 2.2 meters applied to the interpretation of the UCBS, only the far eastern portion of Indicated Resources is above a grade of 1% copper. The UCBS is not sampled or logged above the Main Zone of the Copperwood deposit.

14.10.2 <u>Constrained Underground Mineral Resources Sensitivity - LCBS</u>

Table 14.18, Table 14.19 and Table 14.20 summarize the sensitivity of the constrained underground mineral resources of the LCBS for the Copperwood and Satellite Deposits for a series of selected cut-offs. The sensitivity analysis is using cut-off grades between 0.8% and 2.0% Cu. For the Copperwood deposit, minimal tonnage (3.5 Mt) is gained when using a cut-off grade of 0.8% instead of 1.0% Cu. On the contrary, in the satellite deposits, a significant proportion (27.6 Mt) for the LCBS grades between 0.8% and 1.0% Cu.

Figure 14.21 and Figure 14.22 illustrate grade-tonnage curves for the Measured & Indicated resources, and Inferred for the LCBS of the Copperwood Deposit. Figure 14.23 illustrates grade-tonnage curves for the Inferred resources for the LCBS of the Satellite Deposits.

Table 14.18: LCBS Constrained Mineral Resource Sensitivity – Measured and Indicated

Cut-off Grade (% Cu)	Copperwood Deposit - Measured & Indicated				
	Tonnage (Mt)	Grade Cu (%)	Copper Contained (Mlbs)	Grade Ag (g/t)	Silver Contained (Moz)
2.0%	6.8	2.34	350	6.32	1.4
1.5%	22.1	1.90	926	4.96	3.5
1.0%	38.4	1.63	1,383	4.02	5.0
0.8%	41.9	1.57	1,452	3.83	5.2

Table 14.19: LCBS Constrained Mineral Resource Sensitivity - Inferred

Cut-off Grade (% Cu)	Copperwood Deposit - Inferred				
	Tonnage (Mt)	Grade Cu (%)	Copper Contained (Mlbs)	Grade Ag (g/t)	Silver Contained (Moz)
2.0%	0.1	2.17	3	2.70	0.0
1.5%	1.4	1.67	52	2.49	0.1
1.0%	4.6	1.36	138	1.69	0.3
0.8%	7.2	1.19	188	1.31	0.3

Table 14.20: LCBS Constrained Mineral Resource Sensitivity – Satellite Inferred

Cut-off Grade (% Cu)	Satellite Deposit - Inferred				
	Tonnage (Mt)	Grade Cu (%)	Copper Contained (Mlbs)	Grade Ag (g/t)	Silver Contained (Moz)
2.0%	0.6	2.19	28	3.06	0.1
1.5%	2.6	1.79	102	3.13	0.3
1.0%	33.2	1.21	885	2.37	2.5
0.8%	60.8	1.07	1,435	2.64	5.2

Figure 14.21: Grade-Tonnage Curve of Measured + Indicated Resources for the LCBS at the Copperwood Deposit

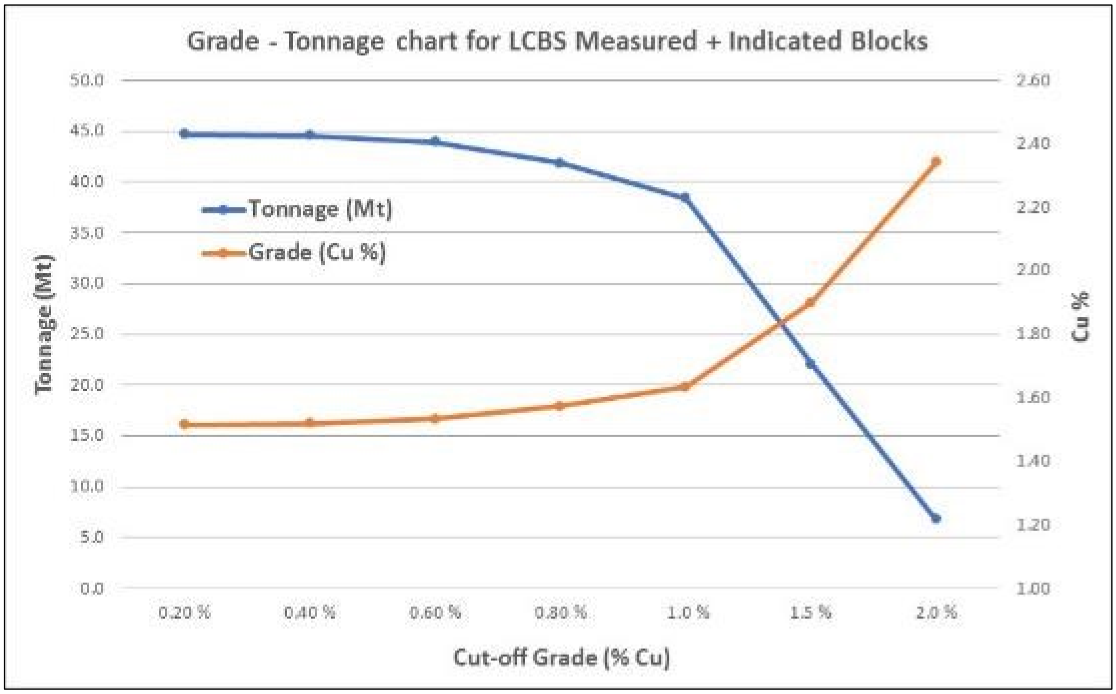


Figure 14.22: Grade-Tonnage Curve of Inferred Resources for the LCBS at the Copperwood Deposit

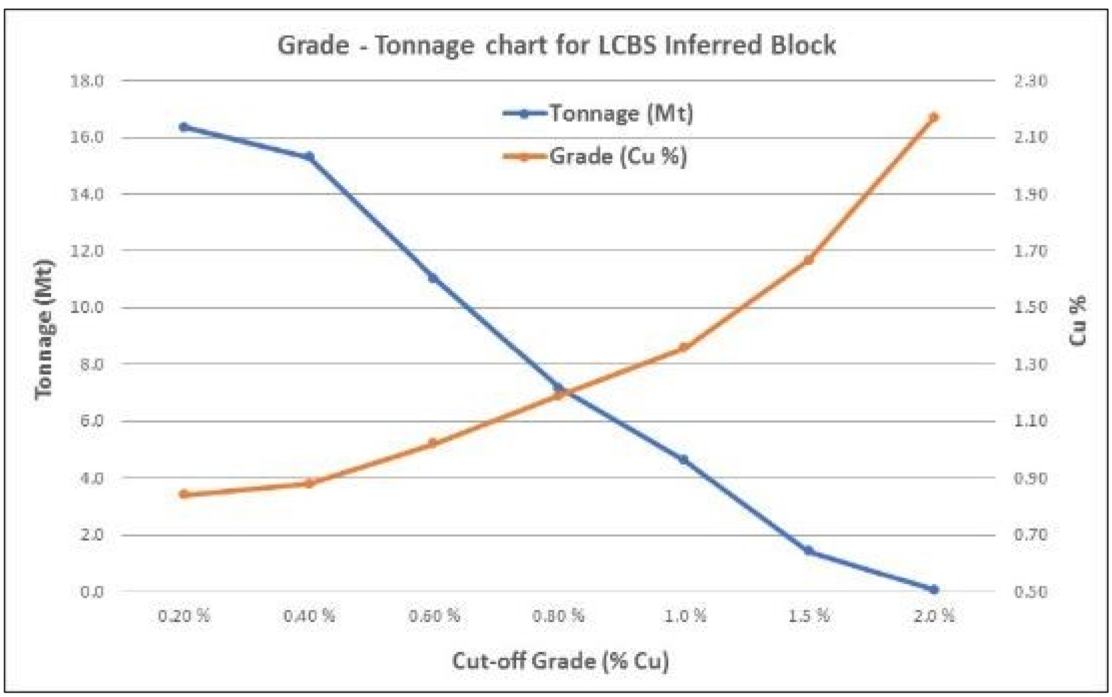
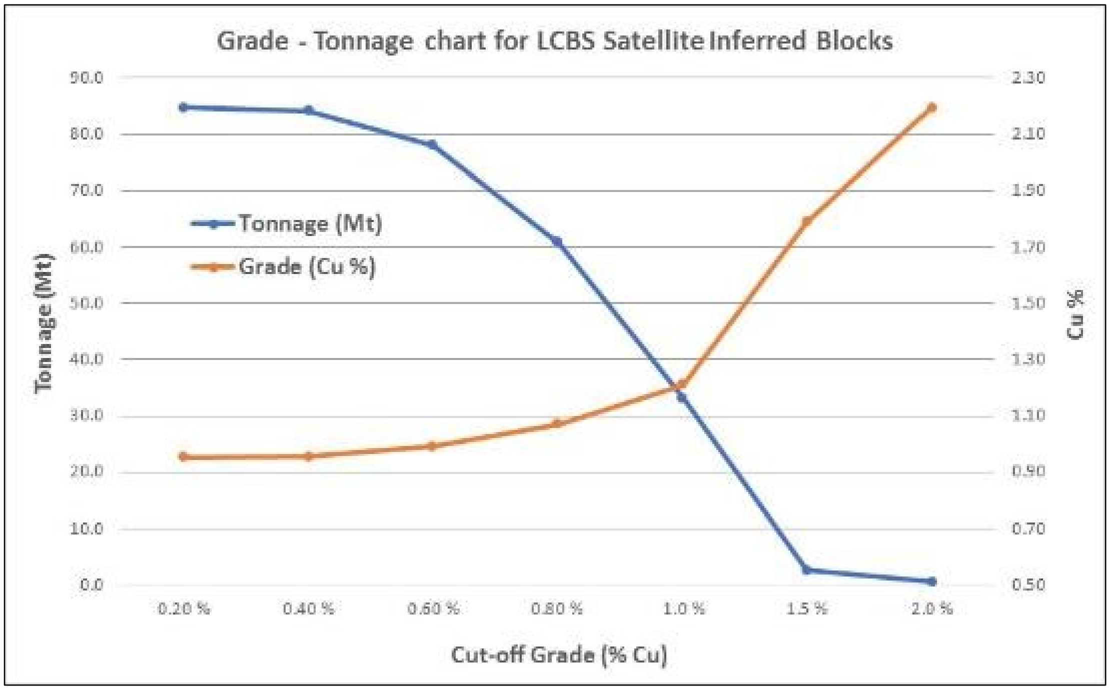


Figure 14.23: Grade-Tonnage Curve of Inferred Resources for the LCBS at the Satellite Deposits



14.10.3 Constrained Underground Mineral Resources Sensitivity – UCBS

Table 14.21, Table 14.22 and Table 14.23 summarize the sensitivity of the constrained underground mineral resources of the LCBS for the Copperwood and Satellite Deposits for a series of selected cut-offs. The sensitivity analysis is using cut-off grades between 0.8% and 2.0% Cu. As seen in the satellite deposits, a significant proportion (22.8 Mt) for the UCBS grades between 0.8% and 1.0% Cu.

Figure 14.24 and Figure 14.25 illustrate grade-tonnage curves for the Measured & Indicated resources, and Inferred for the LCBS of the Copperwood Deposit. Figure 14.26 illustrates grade-tonnage curves for the Inferred resources for the LCBS of the Satellite Deposits

Table 14.21: UCBS Constrained Mineral Resource Sensitivity – Measured and Indicated

Cut-off Grade (% Cu)	Copperwood Deposit - Measured & Indicated				
	Tonnage (Mt)	Grade Cu (%)	Copper Contained (Mlbs)	Grade Ag (g/t)	Silver Contained (Moz)
2.0%	-	-	-	-	-
1.5%	-	-	-	-	-
1.0%	4.1	1.19	107	3.33	0.4
0.8%	7.0	1.06	164	3.23	0.7

Table 14.22: UCBS Constrained Mineral Resource Sensitivity - Inferred

Cut-off Grade (% Cu)	Copperwood Deposit - Inferred				
	Tonnage (Mt)	Grade Cu (%)	Copper Contained (Mlbs)	Grade Ag (g/t)	Silver Contained (Moz)
2.0%	-	-	-	-	-
1.5%	-	-	-	-	-
1.0%	0.3	1.05	8	3.23	0.0
0.8%	4.2	0.89	82	2.17	0.3

Table 14.23: UCBS Constrained Mineral Resource Sensitivity – Satellite Inferred

Cut-off Grade (% Cu)	Satellite Deposit - Inferred				
	Tonnage (Mt)	Grade Cu (%)	Copper Contained (Mlbs)	Grade Ag (g/t)	Silver Contained (Moz)
2.0%	-	-	-	-	-
1.5%	0.1	1.73	5	3.40	0.0
1.0%	6.1	1.15	155	4.75	0.9
0.8%	29.0	0.95	605	5.27	4.9

Figure 14.24: Grade-Tonnage Curve of Measured + Indicated Resources for the UCBS at the Copperwood Deposit

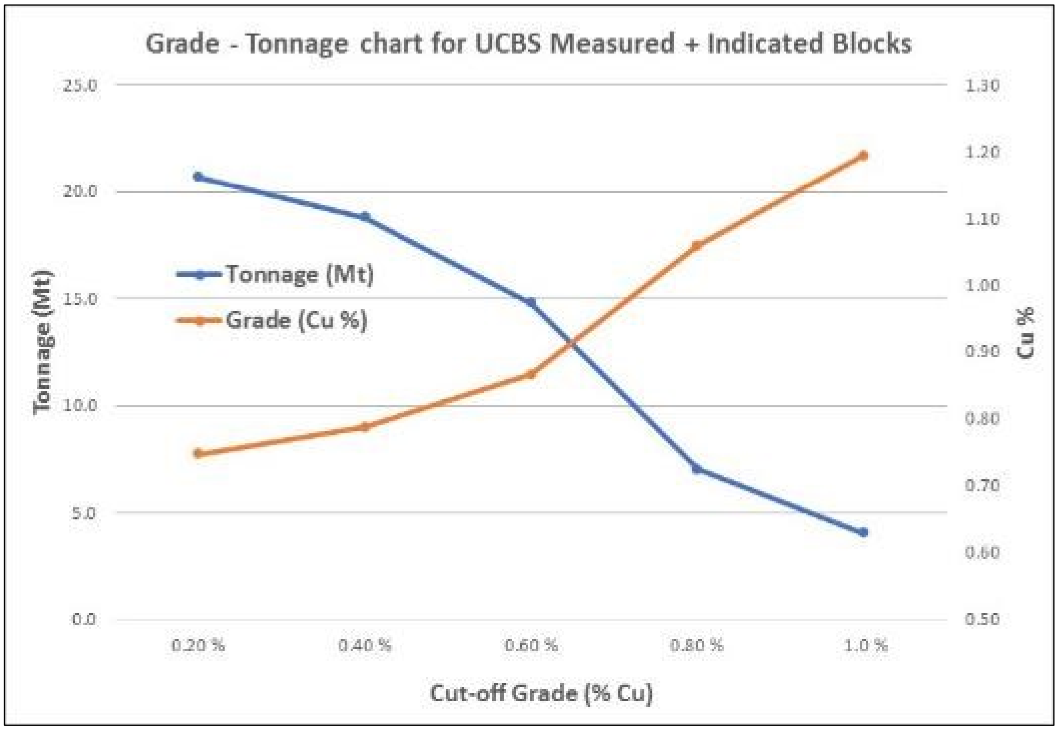


Figure 14.25: Grade-Tonnage Curve of Inferred Resources for the UCBS at the Copperwood Deposit

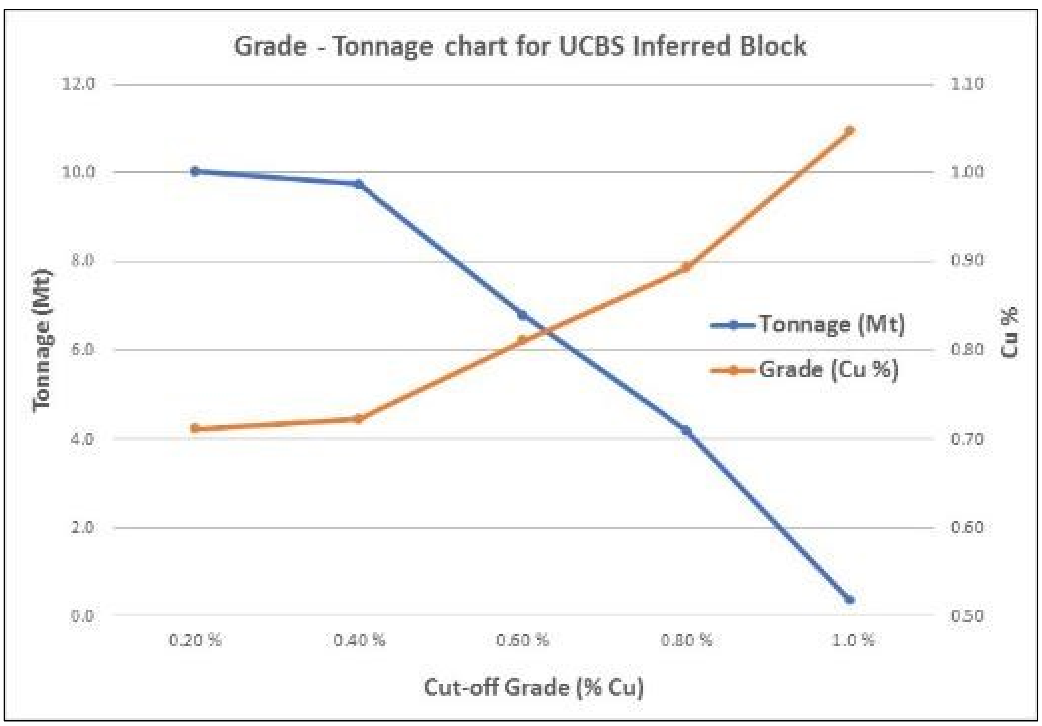
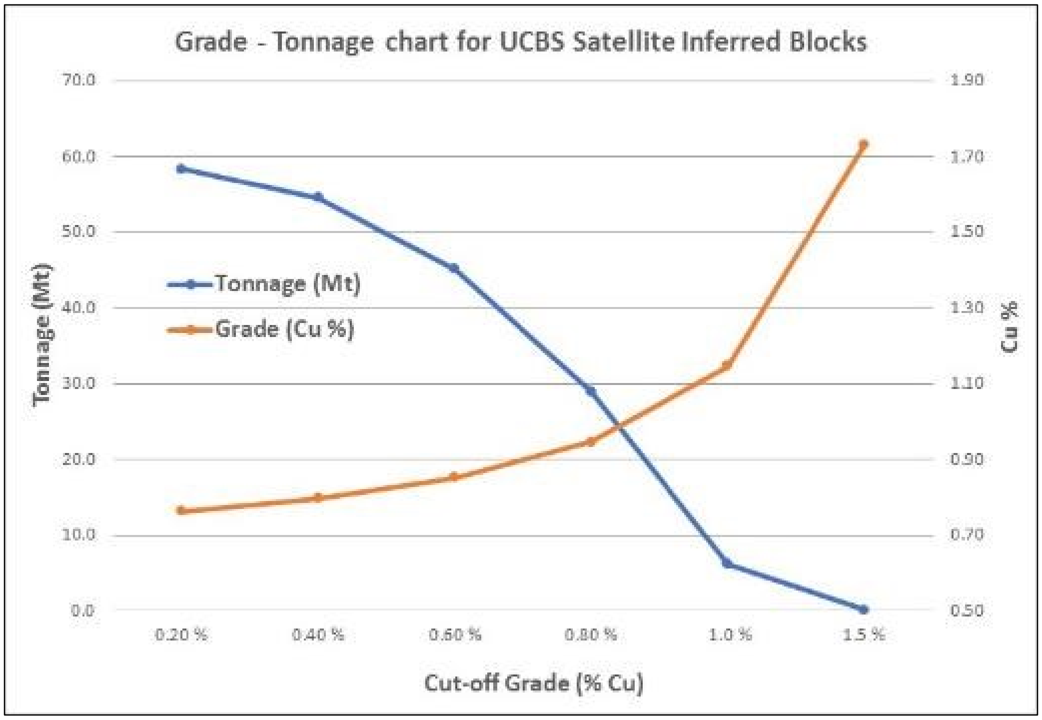


Figure 14.26: Grade-Tonnage Curve of Inferred Resources for the UCBS at the Satellite Deposits



14.11 Underground Constrained Resources

To establish a mineral resource estimate, an underground Room & Pillar (R&P) mining scenario is judged to be the most adapted to the geometry and dip of the LCBS, as well as to the tonnage of the deposits. To assess reasonable prospects of economic extraction by underground mining, GMSI considered several parameters such as concentrate prices, process recoveries, operating costs and mining costs to evaluate a copper cut-off grade. All blocks below this cut-off grade were removed from the constrained mineral resources.

At this stage of the project, all ore blocks classified in the measured, indicated and inferred categories were utilized in the optimization process.

14.11.1 Underground Optimization Parameters

The following conceptual mining parameters were used to calculate block values:

- An NSR sliding scale royalty is applicable and equivalent to 3% at $3.00/lb;
- No mining loss and no mining dilution was considered at this stage of the Technical Report;

- Mineral Resources are reported using a copper price of 3.00$/lb and a silver price of 18$/oz;
- The Copperwood feasibility study by Orvana reported metallurgical testing with recovery of 86% for copper and 50% for silver;
- A payable rate of 96.5% for copper and 90% for silver was assumed;
- A cut-off grade of 1.0% Cu was used;
- Operating costs are based on a processing plant located at the Copperwood site.

14.11.2 Underground Mineral Resource Estimate

Copperwood Deposit total underground R&P Measured & Indicated Mineral Resources are reported at 42.5 million tonnes grading an average 1.59% Cu and 3.9 g/t silver containing 1.5 billion pounds of copper and 5.4 million ounces of silver using a cut-off grade of 1.0% Cu for the LCBS and UCBS combined. Inferred Mineral Resources are reported at 4.9 million tonnes grading an average 1.34% copper and 1.78 g/t silver containing 146 million pounds of copper and 0.3 million ounces of silver using a cut-off grade of 1.0% Cu.

The Satellite Deposits total underground R&P Inferred Mineral Resources are reported at 39.3 million tonnes grading 1.20% copper and 2.74 g/t silver containing 1.04 billion pounds of copper and 3.4 million ounces of silver using a cut-off grade of 1.0% Cu for the LCBS and UCBS combined.

Table 14.24 reports mineral resources for an underground R&P mining scenario for the Copperwood and Satellite Deposits by resource categories. All parameters used in the calculations are presented in the table’s notes.

Table 14.24: Mineral Resource Estimate - Copperwood Project
1.0% Cu Cut-off Grade – October 18, 2017

Deposits	Resource Category	Tonnage (Mt)	Copper Grade (%)	Silver Grade (g/t)	Copper Contained (M lbs)	Silver Contained (M oz)
LCBS	Measured	26.8	1.69	4.59	1,000	4.0
	Indicated	11.6	1.50	2.68	383	1.0
	M + I	38.4	1.63	4.02	1,383	5.0
	Inferred	4.6	1.36	1.69	138	0.3
UCBS	Measured	-	-	-	-	-
	Indicated	4.1	1.19	3.33	107	0.4
	M + I	4.1	1.19	3.33	107	0.4
	Inferred	0.3	1.05	3.23	8	0.0
Satellite LCBS	Inferred	33.2	1.21	2.37	885	2.5
Satellite UCBS	Inferred	6.1	1.15	4.75	155	0.9

Notes on Mineral Resources:

1) Mineral Resources are reported using a copper price of 3.00$/lb and a silver price of 18$/oz
2) A payable rate of 96.5% for copper and 90% for silver was assumed
3) The Copperwood feasibility study reported metallurgical testing with recovery of 86% for copper and 50% for silver
4) Cut-off grade of 1.0% copper was used, based on an underground “room and pillar” mining scenario
5) Operating costs are based on a processing plant located at the Copperwood site.
6) An NSR sliding scale royalty is applicable and equivalent to 3.0% at $3.00/lb
7) Measured, Indicated and Inferred Mineral Resources have a drill hole spacing of 175 m, 250 m and 350 m, respectively
8) No mining dilution and mining loss were considered for the Mineral Resources
9) Rock bulk densities are based on rock types.
10) Classification of Mineral Resources conforms to CIM definitions
11) The qualified person for the estimate is Mr. Réjean Sirois, eng., Vice President Geology and Resources for GMSI. The estimate has an effective date of October 18, 2017
12) Mineral resources that are not mineral reserves do not have demonstrated economic viability. The estimate of mineral resources may be materially affected by environmental, permitting, legal, title, taxation, sociopolitical, marketing, or other relevant issues.
13) LCBS : Lower Copper Bearing Sequence
14) UCBS : Upper Copper Bearing Sequence

The quantity and grade of reported inferred resources in this estimation are uncertain in nature and there has been insufficient exploration to define these inferred resources as indicated or measured mineral resources.

15 MINERAL RESERVE ESTIMATES

There are no current ore reserves for the Copperwood Project reported in this technical report.

16 MINING METHODS

Not applicable to this technical report.

17 RECOVERY METHODS

Not applicable to this technical report.

18 PROJECT INFRASTRUCTURE

Not applicable to this technical report.

19 MARKET STUDIES AND CONTRACTS

Not applicable to this technical report.

20 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

Not applicable to this technical report. Please refer to Section 4, for details on historic studies and permitting status.

21 CAPITAL AND OPERATING COSTS

Not applicable to this technical report.

22 ECONOMIC ANALYSIS

Not applicable to this technical report.

23 ADJACENT PROPERTIES

There are no other mineral exploration or development projects adjacent to the Copperwood Project area.

24 OTHER RELEVANT DATA AND INFORMATION

There is no other information relevant to this technical report.

25 INTERPRETATION AND CONCLUSIONS

GMSI has prepared a mineral resource estimate update for the Copperwood Project based off the original drilling database used in 2015, with additional drilling data collected in 2017. The resource estimate was prepared in accordance with CIM Standards on Mineral Resources and Reserves (adopted May 10, 2014) and is reported in accordance with the NI 43-101. The mineral estimate was prepared by Mr. Réjean Sirois, Eng. GMSI, Vice President Geology and Resources, an independent “qualified person” as defined in NI 43-101. Geovia GEMS™ and Leapfrog GEO™ software was used to facilitate the resource estimation process.

In the process of completing the Mineral Resource estimate of the Copperwood Project, GMSI came to the following conclusions:

GMSI conducted meetings on the Copperwood Project in 2014, 2015 and 2017, and has reviewed the available data used in the Mineral Resource estimate, including drill logs, assay certificates, down-hole surveys, and additional supporting information sources. GMSI concludes that the drill hole database could be used with confidence in the Mineral Resource estimate.

The Mineral Resource estimate is based on a database comprising 6,025 assays derived from 305 diamond drill holes (plus a further 67 drill holes with lithology information only) totaling 66,715 meters, drilled by four companies between 1956 and 2017.

The resources were estimated for each unit of the Lower Copper Bearing Sequence (Domino, Red Massive and Grey Laminated), and the UCBS was modelled as a single unit with a minimum thickness of 2.2 m.

The statistical analyses of the copper and silver assays revealed that the use of grade capping was not necessary.

The uncapped raw assays were composited to produce a single composite per unit, per drill hole. The statistical analyses of the copper and silver composites revealed that the use of grade capping was not necessary.

The variography study based on the zone composites highlighted a near horizontally isotropic distribution of copper and a low nugget effect on copper and silver grades. The semi-variogram models indicated ranges of between 350 m and 500 m, corresponding to the maximum distance of grade continuity between pairs of composites.

The block size dimension (20 m x 20 m x 2.5 m) was based on the drilling pattern, the anticipated room & pillar mining scenario, the complexity of modelling each geological unit, and the minimum mining height of 2.2 m.

The resources were interpolated using the Ordinary Kriging method. Three cumulative passes defined by different degrees of confidence in geological and grade continuity were utilized for block grade estimation.

The resources were classified in Measured, Indicated and Inferred Mineral Resources mostly based on the interpolation passes, but also by delineating groups of blocks of similar interpolation pass.

The model was validated using many global and local validation methods, including descriptive statistics, swath plots, Q:Q plots and visual methods.

The grade-tonnage curves for the measured and indicates resources for the Copperwood Deposit do not show a significant degree of sensitivity to cut-off grades unlike the Satellite Deposits which tend to show a rapid increase in copper content with decreasing cut-offs grades (between 0.8% and 1.0% Cu).

An underground room & pillar mining scenario is judged to be the most adapted to the geometry and dip of the LCBS, as well as to the tonnage of the deposits.

The following conceptual mining parameters were used to calculate block values: 1) An NSR sliding scale royalty equivalent to 3% at $3.00/lb, 2) No mining loss/dilution, 3) Copper price of 3.00$/lb and a silver price of 18$/oz, 4) Recovery of 86% for copper and 50% for silver, 5) A payable rate of 96.5% for copper and 90% for silver, 6) A cut-off grade of 1.0% Cu and 7) Operating costs based on an operating plant at Copperwood.

Copperwood Deposit total Measured & Indicated Mineral Resources are reported at 42.5 million tonnes grading an average 1.59% Cu and 3.9 g/t silver containing 1.5 billion pounds of copper and 5.4 million ounces of silver, using a cut-off grade of 1.0% Cu. Inferred Mineral Resources are reported at 4.9 million tonnes grading an average 1.34% copper and 1.78 g/t silver containing 146 million pounds of copper and 0.3 million ounces of silver.

The Satellite Deposits total Inferred Mineral Resources are reported at 39.3 million tonnes grading 1.20% copper and 2.74 g/t silver containing 1.04 billion pounds of copper and 3.4 million ounces of silver.

The changes observed between the 2015 and 2017 Mineral Resources can be attributed to the upgrade of Section 5 into the Indicated category (previously Satellite Inferred in 2015), and the addition of the UCBS in Section 5.

Mineral resources that are not mineral reserves do not have demonstrated economic viability. The estimate of mineral resources may be materially affected by environmental, permitting, legal, title, taxation, socio- political, marketing, or other relevant issues.

GMSI concludes that the resource evaluation reported in the present Technical Report is a reasonable representation of the global mineral resources found in the Copperwood Project at the current level of sampling.

In GMSI's opinion, there is a good potential to convert inferred mineral resources to the indicated category in the Section 5 area with infill drilling. Furthermore, GMSI believes that there are no significant risks or uncertainties associated with the Project's mineral resource estimate or its potential economic viability.

26 RECOMMENDATIONS

GMSI recommends that further work is undertaken to compliment the ongoing feasibility study, focusing on further upgrades of Inferred resources into the Indicated category, and structural geology studies. The following work is recommended for the Copperwood Project:

- Infill resource drilling at Copperwood Deposit (Section 5 area) to upgrade current Inferred Mineral Resources to Indicated category;
- Consider undertaking a structural review of the Copperwood Deposit, to confirm and refine the current interpretation of the thrust fault (T1) which displaces the LCBS and UCBS in the western portion of the deposit;
- Consider exploring the area east of Section 5, where the UCBS and LCBS converge and the grade of the UCBS improves dramatically. There is no drilling for 1.8 km eastwards of Section 5, and provides an opportunity to mine both the LCBS and UCBS as a single unit (as seen at White Pine). This has the potential to add significant tonnage to the Copperwood Deposit, and the life of the mine;
- Undertake test work to determine the regional principle stress directions from down-hole hydraulic fracturing, to aid in mine designs.

Recommendations from 2015 included metallurgical and geotechnical drilling, which has been undertaken as part of the ongoing Feasibility Study.

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