XANADU MINES

NI 43-101 Preliminary Economic Assessment Technical Report

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NI 43-101 Preliminary Economic Assessment Technical Report

Please find attached for release to the market, Xanadu Mines Ltd's *National Instrument 43-101 Preliminary Economic Assessment Technical Report* in relation to Xanadu's Kharmagtai Copper-Gold Project, South Gobi, Mongolia.

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About Xanadu Mines Ltd:

Xanadu is an ASX and TSX listed Exploration company operating in Mongolia. We give investors exposure to globally significant, large-scale copper-gold discoveries and low-cost inventory growth. Xanadu maintains a portfolio of exploration projects and remains one of the few junior explorers on the ASX or TSX who control a globally significant copper-gold deposit in our flagship Kharmagtai project. For information on Xanadu visit: www.xanadumines.com.

This Announcement was authorised for release by Xanadu's Executive Chairman and Managing Director.

National Instrument 43-101 Preliminary Economic Assessment Technical Report

Kharmagtai Copper-Gold Project, South Gobi, Mongolia
Xanadu Mines Ltd

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Effective Date of Technical Report: 4 April 2022

SRK Consulting (Australasia) Pty Ltd ▪ XML005 ▪ June 2022

National Instrument 43-101 Preliminary Economic Assessment Technical Report

Kharmagtai Copper-Gold Project, South Gobi, Mongolia

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Cover Image(s):
Xanadu exploration drill rig, South Gobi

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Useful Definitions

This list contains definitions of symbols, units, abbreviations, and terminology that may be unfamiliar to the reader.

%	percentage
2018 MRE	2018 Mineral Resource estimate
2019 CSA	2019 CSA – Global Pty Ltd' Scoping Study
2022 MRE	2022 Mineral Resource estimates
2021 MCS	2021 Mining Concept Study
2022 SS	2022 Scoping Study
AFX	AFX Commodities Pty Ltd
Ag	silver
AGC	Asia Gold Corporation, a subsidiary of Ivanhoe Mines Mongolia Inc.
AIG	Australian Institute of Geoscientists
As	arsenic
ASD	analytical spectral data
ASX	Australian Securities Exchange
Au	gold
Ausenco	Ausenco Services Pty Ltd
AusIMM	Australasian Institute of Mining and Metallurgy
BAC	base acquisition cost
CAOB	Central Asian Orogenic Belt
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
Company	Xanadu Mines Limited, (ASX:XAM) and (TSX:XAM)
CRD	Country Rock Diorite
CRP	Country Rock Porphyry
CSA	CSA Global Pty Ltd – Mining Industry Consultants
CSAMT	controlled source audiomagnetotellurics
Cu	copper
CuEq	Copper Equivalent
CuEqRec	Copper Equivalent Recovered
C-veins	chalcopyrite veins
DCF	discounted cashflow
Eq	Equivalent
ESG	environmental, social and governance
EV	Enterprise Value
Fe	iron
g/t	grams per tonne
ICPMS	inductively coupled plasma mass-spectrometry
IER	Independent Expert Report
IMMI	Ivanhoe Mines Mongolia Inc.
IP	induced polarisation

IRR	internal rate of return
ITR	Independent Technical Review
JICA	Japan International Cooperation Agency
JORC Code (2012)	*Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves* (2012 Edition)
KIC	Kharmagtai Igneous Complex
km	kilometres
km^2	square kilometres
koz	thousand ounces
kt	Kilotonnes
ktpa	Kilotonnes per annum
LOM	Life of Mine
M	million
m	metres
Ma	million years ago
Mineral Resources	Mineral Resources – as defined by the JORC Code (2012)
ML	Mining Licence
Mlb	million pounds
MMAJ	Metal Mining Agency of Japan
Mo	molybdenum
MRAM	Mineral Resources Authority of Mongolia
MRE	Mineral Resource estimate
Mt	million tonnes
Mtpa	million tonnes per annum
MTR	Metal Transaction Ratio
MW	megawatts
NI 43-101	Canadian National Instrument 43-101
Noble	Noble Resources International Pte Ltd
NPV	net present value
OK	Ordinary Kriging
Oyut Ulaan	Oyut Ulaan LLC
Pb	lead
PFS	Pre-feasibility Study
PPM	parts per million
QGX	Quincunx
RC	reverse circulation
RL	reduced level
RQD	Rock Quality Designation
S&P	S&P Global Market Intelligence (formerly SNL)
SAG	semi-autogenous grind
SGC	Spiers Geological Consultants Pty Ltd

SME	Society for Mining, Metallurgy and Exploration
Spiers	Spiers Geological Consultants Pty Ltd
SRK	SRK Consulting (Australasia) Pty Ltd
t	tonnes
TBX	tourmaline breccia
the Projects	Kharmagtai and Red Mountain Projects
TMS	Tilyard Metallurgical Services
TSF	tailings storage facility
US$	United States dollars
VALMIN Code (2015)	*Australasian Code for the Public Reporting of the Technical Assessments and Valuations of Mineral Assets (2015 Edition)*
VAT	value added tax
Xanadu	Xanadu Mines Ltd (ASX:XAM) and (TSX:XAM)
XRD	x-ray diffraction
Zn	zinc

1 Executive Summary

1.1 Purpose of this PEA Technical Report and terms of reference

In April 2022, Xanadu Mines Ltd (Xanadu or the Company) completed a Scoping Study of the Kharmagtai copper-gold project. Xanadu has commissioned SRK Consulting (Australasia) Pty Ltd (SRK) to prepare an NI 43-101 Technical Report and Preliminary Economic Assessment for the Kharmagtai Copper-Gold Project (Kharmagtai Project or Project), located in the Omnogovi Province of southern Mongolia.

This Preliminary Economic Assessment (PEA) was carried out for the purpose of determining the preliminary criteria under which the Kharmagtai Copper-Gold Project may be considered potentially economic so that a development program can be planned. This report was produced for Public Reporting under Canadian National Instrument (NI) 43-101 in Canada (NI 43-101, 2014).

The PEA on the Kharmagtai Copper-Gold Project was commissioned by Xanadu with the purpose of defining and quantifying the technical merits of the project and for determining the conditions under which the Kharmagtai Copper-Gold Project should be progressed to the Pre-feasibility Study (PFS) stage for Public Reporting of Mineral Reserves.

This PEA was prepared in accordance with:

- disclosure and reporting requirements of the Toronto Stock Exchange (TSX)
- Canadian National Instrument 43-101, 'Standards of Disclosure for Mineral Projects', Form 43-101F1 and Companion Policy 43-101CP (NI 43-101, 2014)
- Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards (CIM, 2014).

The Project is conceived as a large-scale open pit, mined for copper and gold by conventional drill and blast, dug by face shovel configured excavators loading haul trucks. The ore will be fed to a large process plant comprised a conventional semi-autogenous grind (SAG) mill, pebble crusher and ball mill (SABC) comminution circuit followed by gravity gold recovery and flotation to produce doré and a copper-gold concentrate on site. Both the gold doré and concentrate will be sold into the international market.

The major components of this PEA comprise: Mineral Resource modelling, preliminary mine design, metallurgical testwork, preliminary process design and process plant cost estimation, and preliminary economic analysis. This work tested the merits of proceeding towards a PFS and determined criteria to be evaluated in such a study.

1.2 Summary of authorship, QPs and experts relied upon

This PEA was based on the specialist consultant studies summarised in Section 3 of this report and information from studies conducted on behalf of Xanadu, by independent specialist consultants.

The Qualified Person(s) (QPs) identified as the person responsible for this PEA Technical Report supervised and approved the work of other experts as referred to in NI 43-101 Item 3. These other experts, and their individual reports, together with the Sections to which their work applies, are identified in the Table 3-2 of this report.

1.3 Summary of property description, ownership and royalties

The Kharmagtai Copper-Gold Project is located within the Omnogovi Province of southern Mongolia, approximately 420 km southeast of Ulaanbaatar and 120 km north of Oyu Tolgoi porphyry copper-gold project.

The Kharmagtai Project is covered by a Mining Licence (MV-017387) which is approximately 66.5 km^2, was granted on 27 September 2013 and is valid for 30 years. Xanadu has a 76.5% beneficial interest in the Project.

Mongolia imposes an official royalty or 17% on copper sold, shipped for sale or used. This study has assumed the royalty rate will be negotiated to 5% in line with similar rates negotiated by other operating projects in Mongolia. Gold as bullion is sold to the Bank of Mongolia and attracts a 2.5% royalty. In addition, an incremental surtax royalty is imposed on the total sales value of copper and gold, with the amount varying depending on its market price and the degree of processing.

1.4 Summary of geology and mineralisation

Kharmagtai is located within the Central Asian Fold Belt which extends over 5,000 km from northern China to the Urals in Russia. Contained within this orogenic belt is the southern Mongolian fold system, in which Kharmagtai is hosted. The southern Mongolian fold system comprises a zone of arc-continent collision that was active from the Silurian to Early Carboniferous along the southern margin of the Siberian Craton.

The Kharmagtai District is characterised by an extensive sequence of Devonian to Carboniferous volcanoclastic ash siltstone and sandstone units intruded by the lower to upper Carboniferous rocks which are referred to as the Kharmagtai Intrusive Complex (KIC). The volcano-sedimentary units dip gently to the south-southeast in the southern portions of the district and gently to the north-northwest in the north, ascribing an open antiform geometry.

Near surface, the KIC describes an ovoid body some 6 km by 3 km in dimensions elongated in an east-northeast orientation. North-south extension during the Permian has opened broad shallow basins resulting in approximately 60% of the Kharmagtai district being covered by 2 to 54 m of conglomerates, siltstones, and mudstones.

The KIC was emplaced in a predominantly compressional to weakly- transpressional (sinistral) deformational framework during the main orogenic stages of the Middle Paleozoic Gurvansaikhan Belt. The mineral system geometry and its internal features indicate a clear structural control dominated by WNW striking reverse faults, producing a ‘pop-out’ or positive flower structure.

The alteration observed at Kharmagtai fits broadly into the porphyry alteration model with potassic alteration associated with mineralised intrusive suites surrounded by a phyllic alteration halo and finally a broad propylitic wash.

The potassic alteration is exhibited as replacement of mafic phenocrysts by raggy biotite and less commonly reddening of silicates to K-feldspar. Phyllic alteration occurs as moderate to strong replacement of feldspars by white mica, addition of disseminated pyrite and less commonly quartz. The propylitic alteration is most common and forms as chlorite-epidote replacement of mafic and silicates alike.

The principal minerals of economic interest in all Kharmagtai deposits are chalcopyrite, bornite and gold, which occur primarily as infill within the veins and breccia cements, as well as minor chalcocite and gold frequently intergrown with chalcopyrite and bornite.

There are three main styles of mineralisation at Kharmagtai:

- porphyry stockwork mineralisation
- tourmaline breccia mineralisation
- epithermal mineralisation.

Mineralised zones at Stockwork Hill, White Hill, Copper Hill and Zaraa are associated with paragenetically early-stage quartz veins that were intensely developed in and around quartz diorite intrusive rocks. The vein systems manifest as both sheeted vein arrays and stockwork zones, demonstrating clear structural and temporal controls on vein domain morphology.

Late-stage sulphide only veins (chalcopyrite ± pyrite ± bornite) overprint the quartz-sulphide vein assemblages and are commonly associated with higher Cu-Au grades. At the deposit-scale, sulphide mineralisation is zoned from a bornite-rich core outward to chalcopyrite-rich and then outer pyritic haloes, with gold grades closely associated with chalcopyrite and bornite abundance. There appears to be multiple copper events with an early system producing a broad halo of copper bearing quartz veining which has been overprinted by later stage chalcopyrite veins (C-veins).

At Kharmagtai the sulphide species zonation is broadly consistent with the literature, although bornite mineralisation is only recently being drilled in the lower portions of Stockwork Hill and to date the other five deposits have limited bornite. This strongly suggests the drilled portions of the deposits are only the tops of the system and the greater part of the system is yet to be drilled.

Copper to gold ratios of the porphyry stockwork mineralisation average 1% Cu to 1 g/t Au in the early stockwork, 1% Cu to 2 g/t Au in the higher-grade C-vein upgrade and 1% Cu to 3 g/t Au in the bornite zone.

Tourmaline breccia (TBX) mineralisation occurs throughout the lease. However, the only mineralised tourmaline breccia of potentially economically significant size occurs at Stockwork Hill. The tourmaline breccia body at Stockwork Hill crosscuts the earlier porphyry mineralisation. The breccia is variably mineralised with a larger body of weakly mineralised breccia containing lozenges of much higher grade at the margins of the breccia. Three different models for formation of the TBX were postulated and each has implications for resource definition and exploration.

Copper to gold ratios within the tourmaline breccia average 1% Cu to 0.5 g/t Au although the silver content of the TBX is generally higher than the stockwork mineralisation.

The final stage of mineralisation at Kharmagtai consists of carbonate base metal veins which form within late-stage structures cutting all rock types and mineralisation styles. These commonly occur as 0.1 to 2 m wide veins containing calcite-quartz-siderite-pyrite-chalcopyrite-galena and sphalerite. Veins often grade to 50–100 g/t Au, although vein widths and continuity currently preclude economic interest. The chemical signature (Au-Cu-Ag-Pb-Zn-As) of the epithermal veins are useful fault markers and allow mapping of specific structures between disparate drill holes.

1.5 Summary of exploration

A significant amount of exploration work has been conducted by Xanadu since the acquisition of the Project in late 2014. Initially, work was directed towards data compilation and review, re-logging previously drilled holes and surface validation via mapping. Historical geophysics was re-processed using modern geophysical processing methods.

Preliminary drill programs in early 2015 were focused on extending known mineralisation at Stockwork Hill targeting the tourmaline breccia system, previously thought to be barren and diluting stockwork mineralisation. This led to the discovery of the high-grade tourmaline breccia system at Stockwork Hill.

In 2016 exploration turned to the basin east of the three then known deposits. A program of pattern geochemistry was conducted by drilling rotary mud through the barren cover and 6 m of diamond core into the top of basement rocks. This allowed for the main features of porphyry systems to be mapped and logged under the basin and for whole rock geochemistry to be conducted. This program led to the discovery of Golden Eagle and Zephyr.

Previous workers, Ivanhoe Mines Mongolia Inc. (IMMI) conducted a significant amount of rock chipping across the Kharmagtai lease with 3,158 samples collected across the Kharmagtai lease and assayed for seven elements (Au, Cu, Ag, As, Pb, Zn, Mo). Additional f was conducted by Xanadu with 187 samples collected and assayed for the same element suite used by the drilling.

In 2016 a program of whole rock geochemistry was conducted in conjunction with the top of basement whole rock drilling to allow a complete geochemical map of the Kharmagtai lease to be generated. Samples were submitted for 61 elements and gold by fire assay. The objective of the whole rock geochemical work was to use the pathfinder elements footprint model to assist in further identifying additional targets.

In 2017 a re-log of drill core at Kharmagtai was conducted. This assisted in building 3D geological models of the deposits and exploration under cover. A program of short wavelength infrared data collection for mineralogical analysis was conducted on all previous drilling using TerraSpec™ to assist in mapping the porphyry related alteration systems at Kharmagtai. This work led to the discovery of the Zaraa deposit in late 2017.

Exploration has continued with additional drilling targeting extensions to existing deposits and new zones of mineralisation, geophysics (controlled source audio-frequency magnetotellurics, CSAMT) and continued data collection from previous drilling. In 2018-19 the high-grade bornite zone was discovered at Stockwork Hill via a combination of 3D geological interpretations based on this new data and detailed structural reviews of the deposit. In 2020 two GeoTek ‘Boxscans’ were installed at Kharmagtai to re-image all the previously drilled and new drill core collecting high resolution imagery, laser scans, magnetic susceptibility, and other data. Machine learning algorithms are currently being developed to automatically log the core.

1.6 Summary of sampling and assaying validation

Historical drilling data from 1996 through to 2018 has been conducted by a range of companies including, but not limited to, QGX Ltd (QGX) during 1996 to 1997, IMMI during 2002 to 2007 and Asia Gold Corp. (AGC) from 2007 through to 2012. The more recent drilling from 2014 through to the close off of database in October 2021 has been undertaken by Xanadu. Pre-Xanadu data utilised in this investigation are historical in nature with trenching/drilling, sampling and assaying processes undertaken by a number of different entities and by a range of representatives within each entity over time. The continuity of processes and procedures has been assumed in this instance.

Spiers Geological Consultants Pty Ltd (SGC) conducted an analysis of the quality assurance/quality control (QA/QC) outcomes to establish confidence in the data. Xanadu remains responsible for the integrity and appropriateness of the trench/drilling data until such time as the entire investigation from first principles can be undertaken including a site visit to be scheduled once the COVID restrictions on travel are eased.

Xanadu has adopted similar protocols and procedures for sample preparation, analyses and security as those historically used by IMMI and AGC as described in the following subsections.

1.7 Summary of the Mineral Resource estimate

The Mineral Resources for the near surface oxide and deeper transitional to fresh mineralisation were estimated using Ordinary Kriging (OK) with sectional interpretations. Geometry modelling and data/search criteria were optimised to align parallel to the strike and orthogonal to the dip (and plunge where applicable) of the mineralisation and were supported by data and variogram analysis of each individual ore domain.

The domain strategy is predicated upon, and in line with, the prevailing project context adopted by Xanadu in accordance with the status of project development and the scoping level internal investigation.

SGC reported, as at 28 February 2022, the Kharmagtai resources for the open pit at a 0.2% copper equivalent recovered (CuEqRec) cut-off grade to contain an estimated Indicated Resource of 379 Mt at 0.4% CuEqRec for 1.0 Mt of copper and an estimated Inferred Resource of 374 Mt at 0.3% CuEqRec for 760 kt of copper.

In addition, SGC reported as at 28 February 2022 the Kharmagtai resources for potential underground development at a 0.3% CuEqRec cut-off grade are estimated to include an Indicated Resource of 76 Mt at 0.5% CuEqRec for 250 kt of copper below nominated elevations by project area and an Inferred Resource of 290 Mt at 0.4% CuEqRec for 920 kt of copper below nominated elevations by project area.

Deposit grades are estimated into parent blocks with dimensions of 20.0 m (east) by 20.0 m (north) by 10.0 m (elevation). The resource extends down from the topographic surface locally (at or near 1,355 mRL) in the White Hill project area and extends to a maximum depth of -229 mRL at the deepest block centroid in the Zaraa project area.

The OK estimation approach was chosen to interpolate copper, gold, molybdenum, and sulphur grades into a block model, although only copper and gold grades were used in the CuEqRec calculation. Dry bulk density values, as noted in the datasets provided by Xanadu to SGC, were globally estimated separately by project area for each primary domain and assigned to the model.

The Mineral Resources are classified as Indicated and Inferred Resources in-line with data provided by Xanadu in relation to the project development status, selection of available data utilised, status of geological and mineralisation continuity as defined by geometry models and metallurgical considerations.

A summary of the resource estimate is presented in Table 1-1 and Table 1-2.

Figure 1-1 and Figure 1-2 show examples of the resources on grade tonnage curves for Stockwork Hill and White Hill at a range of cut-off grades for both the potential open pit and underground Mineral Resources by project area. The range of cut-off grades noted in the grade tonnage curve were provided by Xanadu as being consistent with the various ranges of likely economic scenarios.

Table 1-1: Kharmagtai – Mineral Resource estimates (open pit) reported as at 28 February 2022

Deposit	Classification	Tonnes	Grades			Contained metal			
			CuEqRec (%)	Cu (%)	Au (g/t)	CuEqRec (Mlbs)	CuEqRec (kt)	Cu (kt)	Au (koz)
SH	Indicated	158	0.4	0.3	0.3	1,534	700	460	1,500
WH		188	0.3	0.2	0.2	1,424	650	460	1,100
CH		17	0.5	0.4	0.4	200	90	60	200
ZA		9	0.3	0.1	0.2	51	20	10	100
GE		3	0.3	0.1	0.4	25	10	-	-
ZE		4	0.3	0.2	0.2	26	10	10	-
Total Indicated		**379**	**0.4**	**0.3**	**0.2**	**3,260**	**1,480**	**1,000**	**3,000**
SH	Inferred	52	0.3	0.2	0.2	343	160	100	300
WH		211	0.3	0.2	0.1	1,418	640	490	1,000
CH		3	0.3	0.2	0.1	20	10	10	-
ZA		13	0.2	0.1	0.2	73	30	20	100
GE		51	0.3	0.1	0.3	325	150	70	500
ZE		44	0.3	0.1	0.3	271	120	70	400
Total Inferred		**374**	**0.3**	**0.2**	**0.2**	**2,450**	**1,110**	**760**	**2,300**

Notes:

– At a **CuEqRec 0.2% cut-off grade for the potential open pit resources** – reported to the topographic surface and inside the 0.1% CuEq reporting solid provided by Xanadu.
– CuEq accounts for Au value and CuEqkt must not be totalled to Au ounces.
– Figures may not sum due to rounding.
– Significant figures do not imply an added level of precision.
– Resource constrained by 0.1% CuEqRec reporting solid in-line with geological analysis by Xanadu.
– Resource constrained by open cut above nominated mRL level by deposit as follows SH>=720 mRL, WH>=915 mRL, CH>=1,100 mRL, ZA>=920 mRL, ZE>=945 mRL and GE>=845 mRL.
– CuEqRec equation (CuEqRec=Cu+Au*0.60049*0.86667) where Au at US$1,400/oz and Cu at US$3.4/lb was employed according to Xanadu's direction.
– Au recovery is relative with Cu rec=90% and Au rec=78% (rel Au rec=78/90=86.6667% with number according to Xanadu's direction.

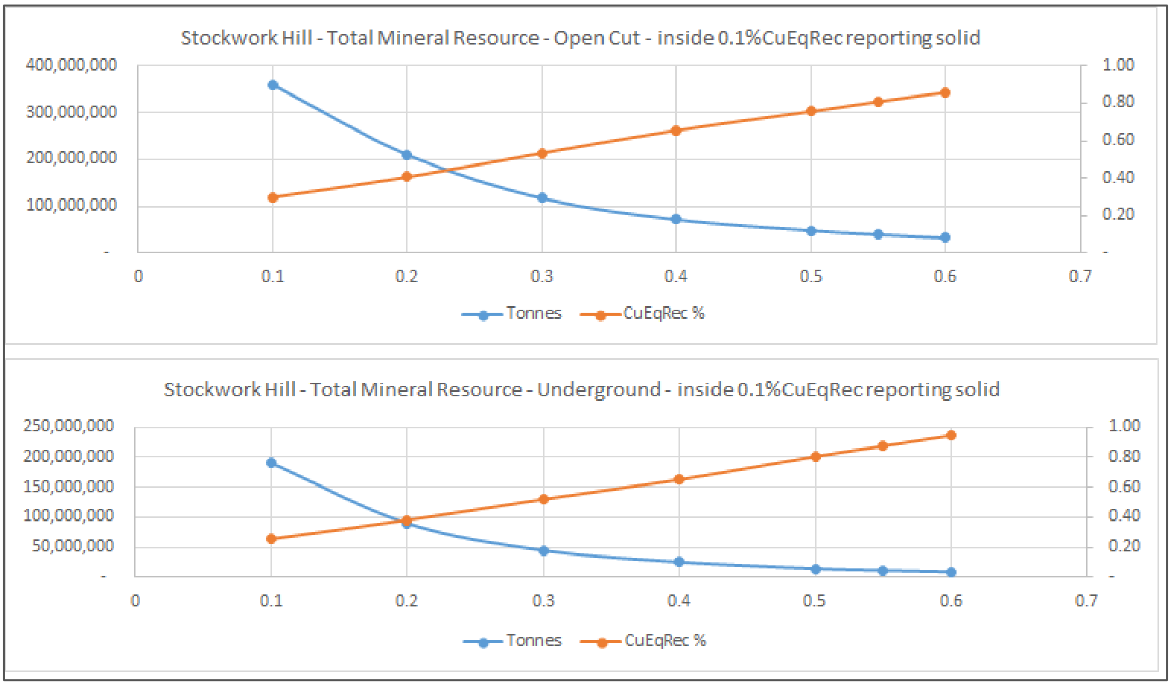
Table 1-2: Kharmagtai – Mineral Resource estimates (underground) reported as at 28 February 2022

Deposit	Classification	Tonnes	Grades			Contained metal			
			CuEqRec (%)	Cu (%)	Au (g/t)	CuEqRec (Mlbs)	CuEqRec (kt)	Cu (kt)	Au (koz)
SH	Indicated	25	0.6	0.4	0.5	323	150	90	400
WH		21	0.4	0.4	0.2	199	90	70	100
CH		3	0.4	0.3	0.2	24	10	10	–
ZA		27	0.5	0.3	0.3	272	120	80	200
GE		–	–	–	–	–	–	–	–
ZE		–	–	–	–	–	–	–	–
Total Indicated		**76**	**0.5**	**0.3**	**0.3**	**818**	**370**	**250**	**700**
SH	Inferred	21	0.4	0.3	0.3	197	90	60	200
WH		138	0.4	0.3	0.1	1,266	570	470	600
CH		2	0.3	0.3	0.2	12	10	–	–
ZA		129	0.4	0.3	0.2	1,214	550	390	1,000
GE		–	–	–	–	–	–	–	–
ZE		–	–	–	–	–	–	–	–
Total Inferred		**290**	**0.4**	**0.3**	**0.2**	**2,690**	**1,220**	**920**	**1,800**

Notes:
– At a **CuEqRec 0.3% cut-off grade for the underground resources** – reported to the topographic surface and inside the 0.1% CuEq reporting solid provided by Xanadu.
– CuEq accounts for Au value and CuEqkt must not be totalled to Au ounces.
– Figures may not sum due to rounding.
– Significant figures do not imply an added level of precision.
– Resource constrained by 0.1% CuEqRec reporting solid in-line with geological analysis by Xanadu.
– Resource constrained by open cut above nominated mRL level by deposit as follows SH>=720 mRL, WH>=915 mRL, CH>=1,100 mRL, ZA>=920 mRL, ZE>=945 mRL and GE>=845 mRL, the remnant forms the underground resource/s.
– CuEqRec equation (CuEqRec=Cu+Au*0.60049*0.86667) where Au at US$1,400/oz and Cu at US$3.4/lb was employed according to Xanadu's direction.
– Au recovery is relative with Cu rec=90% and Au rec=78% (rel Au rec=78/90=86.6667% with number according to Xanadu's direction.

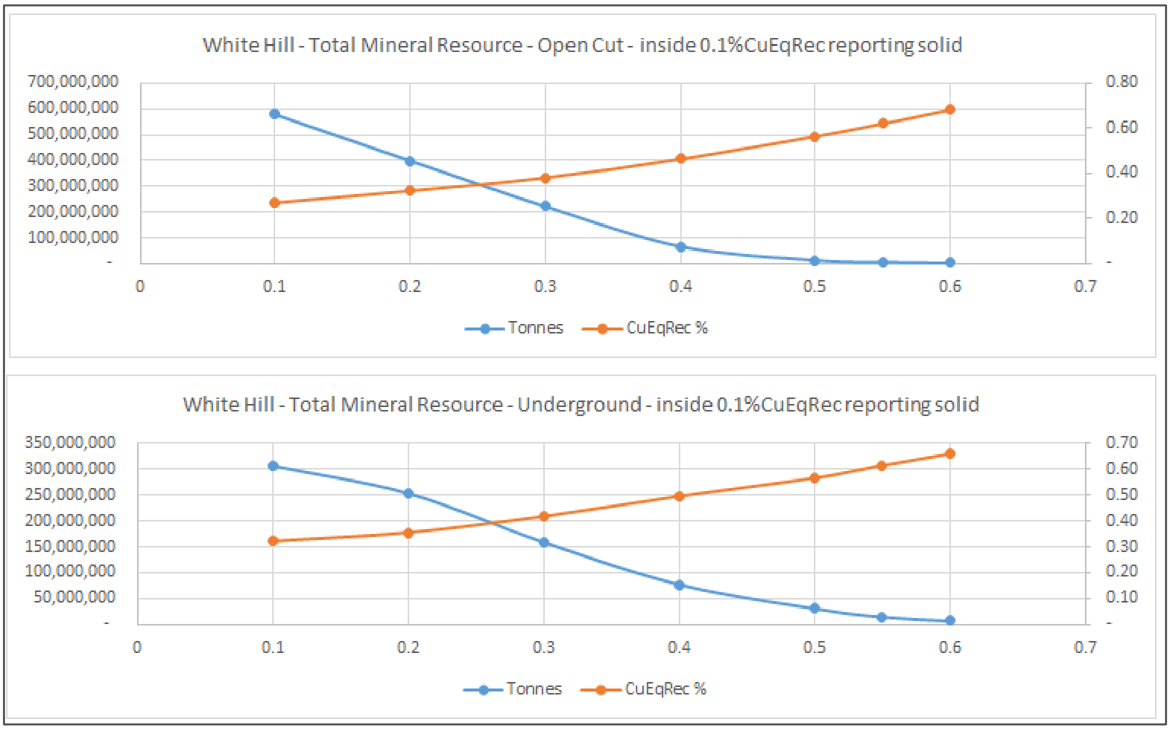
The above updated estimates take into account updated long term metal prices, foreign exchange and cost assumptions, and mining and metallurgy performance to inform cut-off grades and physical mining parameters used in the estimates (where applicable) provided by Xanadu.

Figure 1-1: Kharmagtai open pit and underground grade-tonnage curve – Stockwork Hill Project Area and type



The drill spacing is variable in each deposit but is typically on a predominantly 40 m east-west line spacing, 40 m north-south hole spacing grid pattern over the near surface mineralisation with infill on some key sections down to 20 m east-west line spacing with further infill and alternative scissor drill holes and orientation to target zones of interest as defined by Xanadu.

Figure 1-2: Kharmagtai open pit and underground grade-tonnage curve – White Hill Project Area and type



A number of considerations and assumptions were employed during the generation of the updated resource models, which include, but are not limited to the following:

1. Assumed and interpreted primary domain controls developed by Xanadu in consultation with P. Dunham (geological consultant). Structural controls were included in the interpretation and subsequently resulted in domain controls over the estimation data in line with the above consultation between parties and with consideration to eventual economic extraction and the project development phase.
2. The estimates are designated constrained from the point of view of lithological and structural modelling and are reported within confining solids provided by Xanadu at 0.1% CuEq (geological background).
3. Deposit (local) orientation analysis was completed in Australia, with the aforementioned parties selecting the dominant mineralised orientations to be employed in the estimation passes.
4. Density data (collected from project inception through to close of database at or near 30 October 2021) and the subsequent density matrix constructed (and updated) was employed to define the density variability. Density was then modelled as an attribute of the model for all project areas. In areas of the block model where estimates were available, but density data was absent or scarce, average density values were employed by area, oxidation state and primary domain coding to establish complete representation of density to grade blocks.
5. Topographic surfaces and related survey data (including but not limited to grade solids 800 ppm CuEq, 1,500 ppm CuEq, 4,000 ppm CuEq and related lithological solids as well as fault blocks, constraining solids and boundary solids) were supplied by Xanadu and remain the responsibility of Xanadu.

During the preparation of the 2022 MRE, as part of the due diligence process, SGC reviewed the available QA/QC information provided by Xanadu representatives. The associated QA/QC analysis which is detailed in the 2022 MRE report are excerpts from the work by Xanadu which were reviewed and verified by SGC. At this time, SGC takes the content of those sections at face value and has no further comment.

In addition, the following sections of the 2022 MRE reports were also furnished by Xanadu and were taken at face value by SGC. Those sections include (but are not limited to), Property Description and Location, Geology, QA/QC and Sampling/Drilling together with all aspects pertaining to metallurgy.

SGC takes responsibility for the estimates in conjunction with a Competent Person nominated by Xanadu taking responsibility for drilling, sampling, data quality, geological interpretation, structural context, and all items relating to mining and metallurgical assumptions and outcomes.

SGC has accepted in good faith the data provided by Xanadu in consideration of the Kharmagtai Project and has not conducted any independent checks into the quality control or quality assurance of the field sampling and drilling or laboratory analysis at this time.

At the time of writing this report and estimating the resources upon which the report is based SGC has not been able to visit the site in Mongolia due to COVID-19 travelling restrictions in order to satisfy visual and associated checks first-hand as is accepted as best practice. It is anticipated that an SGC representative will visit the site in question at the first available opportunity as travel bans are lifted, in order to satisfy guidelines for the Reporting of Mineral Resource.

1.8 Summary of metallurgical testwork

The ore processing testwork undertaken between 2008 and 2019 is described in the NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022 (the 2021-22 MRE) and was reviewed by Tilyard Mining Services in 2019 and East Riding Mining Services in 2022.

Three programs of sulphide flotation metallurgy were conducted for the Stockwork Hill, Copper Hill and White Hill Deposits at the Kharmagtai Project. No sulphide metallurgical work has been conducted as yet for the Zaraa, Golden Eagle or Zephyr Deposits.

In 2008, Turquoise Hill Resources Ltd (Turquoise Hill) sent five samples from Kharmagtai for sulphide flotation metallurgical testing as a part of a larger program for Oyu Tolgoi. In 2016 Xanadu sent a single sample of the newly discovered high-grade tourmaline breccia mineralisation for flotation and grindability testing. In 2018–19 Xanadu sent nine composite samples for sulphide float metallurgy and comminution testing.

In aggregate, this sulphide flotation work has demonstrated that the sulphide ore responds well to conventional copper/gold flotation techniques to produce a concentrate free of deleterious elements.

In 2018–19 a single program of copper oxide leach and transitional flotation test work was conducted for the Stockwork Hill, Copper Hill and White Hill deposits. Six samples of oxide to transitional material were run for rougher flotation and bottle roll leaching. This work suggested that the oxide to transitional material responds poorly to flotation without the addition of sulphidising agents.

Two programs were conducted focused on gold recoveries from oxide material from Stockwork Hill, Copper Hill, and Golden Eagle. Samples were run for gravity separation with leaching of the tails and column leach tests. This work suggested gravity separation and leaching of tails may be viable, with moderately high cyanide consumption due to copper oxides in the tails. The column leach work returned mixed recoveries suggesting heap leaching may not be viable for this material.

All testwork and reviews conducted on data indicate that Kharmagtai mineralisation is amenable to copper recovery by large-tonnage conventional sulphide flotation and gold recovery by gravity and the Mineral Resource can be estimated on this basis.

The 2022 MRE utilises a constant copper recovery of 90% and gold recovery of 77.5% in the CuEqRec equation in response to direction by Xanadu, on the basis of independent metallurgical analysis of in-situ head grade and copper speciation.

1.9 Summary of proposed mining, recovery, and conceptual process plant

The Kharmagtai Copper-Gold Project PEA is based on the following:

- the 2022 MRE
- projected annual production ranges from 30–70 ktpa copper and 60–200 kozpa gold

- conventional, low technical complexity open pit and process plant
- a location in sparsely populated, flat terrain, with nearby established rail, power and water infrastructure.

The Project is envisaged as mining copper and gold mill feed by conventional open pit methodology; drill, blast, load and haul, assumed as an owner-operator mining model.

Estimated initial capital expenditure of approximately US$694 M for; open pit development, process plant, tailings storage facility (TSF) and infrastructure, with a subsequent US$1,883 M for mine, plant, TSF, infrastructure expansion, sustaining and closure.

Operating cost (mining, processing, G&A and corporate) for Stage 1 is US$13.30/t ore and US$11.03/t ore for Stage 2. The Life of Mine (LOM) average operating cost is US$11.24/t ore.

There are established roads, rail, power and water infrastructure, and a well-educated population and access to required skills. Mining is an important part of the Mongolian economy.

The potential upside opportunities include:

- Processing oxide ore which is currently assumed to be waste.
- The application of new technology such as in-pit crushing and conveying, beneficiation, ore sorting, coarse particle separation and flotation, and electric mining equipment.
- Operating cost savings could extend mine life.
- Exploration upside with mineralisation open in all directions, potential to grow the Mineral Resource and extend higher-grade zones.
- Potential for future bulk underground mining of deeper ores.

Based on the results of the PEA, advancement to PFS is recommended.

1.10 Summary of environmental studies, permitting and social impact

Mongolian certified environmental impact assessment consultant Eco Trade LLC undertook a preliminary baseline environmental survey of the Kharmagtai area in 2003. This was submitted in 2011 as part of the Mining Licence application. The Mining Licence was granted in 2013.

The conclusion of the preliminary baseline environmental survey provided by the authority stated that a Detailed Environmental Impact Assessment (DEIA) is required for implementing the Kharmagtai Copper-Gold Project.

Xanadu engaged O2 Mining to undertake a review of the preliminary baseline environmental survey in 2019. O2 Mining identified several supplementary studies to be undertaken that will be included in the PFS environmental and social base line assessments. In summary, the project has a relatively low environmental, social and governance (ESG) risk due to the sparse population, flat terrain, permitting and approvals process established and achievable.

1.11 Summary of the Preliminary Economic Analysis

The study base case processed 15 Mtpa for the first seven years and then expanded to 30 Mtpa. Over the 30-year life of mine (LOM), the Kharmagtai Project produces an estimated 1.5 Mt of Cu and 3.3 Moz of Au at average rates of 50 kt Cu and 110 koz Au/annum.

The project initial capital cost was estimated to be US$694 M with an additional US$1,189 M for project expansion and sustaining capital. The operating cost for the initial 15 Mtpa operation was estimated at US$13.30/t ore, reduced to US$11.24/t ore LOM including the expansion to process 30 Mtpa.

The project was assessed using prices of US$4.00/lb copper and US$1,700/oz gold at an 8% real discount rate to generate a net present value (NPV) of US$629 M in real terms and an internal rate of return (IRR) of 20%, after tax. The initial capital payback is 4 years after the commencement of operations.

The project value is most sensitive to copper prices followed by the operating costs, gold price and least sensitive to capital costs. Breakeven scenarios showed that to reduce the NPV to zero, the copper price would need to be reduced by 31% to US$2.76/lb, the operating cost increased by 42% to US$15.95/t ore, the gold price reduced by 64% to US$614/oz or the capital increased by 88% to US$3,357 M over the entire project life.

1.12 Summary of the Qualified Person conclusions and recommendations

No Mineral Reserve under CIM Definition Standards (2014), or Ore Reserves under the JORC Code (2012), were defined for the Kharmagtai Copper-Gold Project at this PEA level of study.

The positive result of this PEA is such that it is likely that the Kharmagtai Copper-Gold Project will continue to progress towards development of a large open pit mine and process plant, and ongoing drilling and assessment, while meeting all required permits and approvals, to add significant value.

The positive results of the PEA of the Kharmagtai Copper-Gold Project have also confirmed that progression of the Project to the PFS stage is warranted.

2 Introduction

2.1 Company profile

Xanadu is an Australian Securities Exchange (ASX) listed (ASX:XAM) and Canadian listed (TSX:XAM) company engaged in the exploration and development of various mineral projects in Mongolia. The company primarily explores for copper and gold deposits. Its flagship project is the Kharmagtai copper-gold project located in Omnogovi Province to the southeast of Ulaanbaatar. Xanadu has a 76.5% beneficial interest the Kharmagtai project.

The company also holds a 100% interest in the Red Mountain copper-gold project located in the Dornogovi Province of southern Mongolia.

Xanadu has a strategic partnership with Zijin Mining Group Co., Ltd to progress the Kharmagtai copper-gold project through its next phase of project evaluation and decision on future development. The company was incorporated in 2005 and is headquartered in Sydney, Australia.

2.2 Scope of work

This report was prepared by SRK Consulting (Australasia) Pty Ltd (SRK) at the request of Xanadu Mines Limited (Xanadu). The purpose of this report is to provide Xanadu with a NI 43-101 compliant Technical Report and Preliminary Economic Assessment on the Kharmagtai Copper-Gold Project in Mongolia.

This Preliminary Economic Assessment (PEA) was carried out for the purpose of determining the preliminary criteria under which the Kharmagtai Copper-Gold Project in Omnogovi Province Mongolia may be considered potentially economic so that a development program can be planned. This report is produced for Public Reporting under Canadian National Instrument (NI) 43-101 in Canada (NI 43-101, 2014).

This PEA study is preliminary in nature. It includes Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the conclusions of this preliminary economic assessment will be realised.

The PEA on the Kharmagtai Copper-Gold Project was commissioned by Xanadu with the purpose of defining and quantifying the technical merits of the project and for determining the conditions under which the Project should be progressed to the PFS stage for Public Reporting of Mineral Reserves.

This PEA was prepared in accordance with:

- disclosure and reporting requirements of the Toronto Stock Exchange (TSX)
- Canadian National Instrument 43-101, 'Standards of Disclosure for Mineral Projects', Form 43-101F1 and Companion Policy 43-101CP (NI 43-101, 2014)
- CIM Definition Standards (CIM, 2014).

2.3 Kharmagtai Copper-Gold Project PEA concept

The Kharmagtai Copper-Gold Project (Kharmagtai Project or Project) is situated in the South Gobi region of Mongolia approximately 420 km southeast of the capital, Ulaanbaatar.

The Project is conceived as a large-scale open pit, mined for copper and gold by conventional drill and blast, dug by face shovel configured excavators feeding haul trucks. Mill feed will be treated in a large process plant comprised a conventional semi-autogenous grind (SAG) mill, pebble crusher and ball mill (SABC) comminution circuit followed by gravity gold recovery and flotation to produce doré and a copper-gold concentrate. A gold doré and concentrate will be produced on site for sale into the international market.

The Kharmagtai Copper-Gold Project will operate in a safe, responsible and technically efficient way to add benefits to all stakeholders including Mongolia, the owners, shareholders, employees, and local communities.

2.4 Personal inspection

During the study period, two site visits were undertaken by Mr Andrew Stewart from 7–10 March 2022 and from 21–26 March 2022.

The personal inspection required travel to Ulaanbaatar in Mongolia and a 9 hour drive south via a mixture of sealed and unsealed roads to the Kharmagtai exploration camp in the South Gobi Desert. Inspections included physical visits to completed drill sites, the core shed, active core scanning equipment, and potential locations for process plant, stockpiles and tailings storage, and nearby infrastructure such as water, power and rail that has recently been built by the Government of Mongolia to accelerate development of mining in the South Gobi. Meetings were held with the geology, safety and operations teams on site, some of which was translated from English into Mongolian for the junior staff. This included discussion of the drill results, data, ongoing core scan databases, the modelling of mineralisation in Resource, the mine designs and processing plans and characteristics in the Scoping Study / PEA. Also discussed were permitting requirements and community and government relation strategies as the project moves forward to the next stage of development

The Authors consider Mr Stewart’s 2022 site visits current under Section 6.2 of NI 43-101.

2.5 Statement of independence

SRK is an independent consulting company contracted by Xanadu to prepare this PEA report under the supervision of the QP. Neither SRK, nor the authors of this report, have or have had previously, any material interest in Xanadu or the mineral properties in which Xanadu has an interest. SRK’s relationship with Xanadu is solely one of professional association between client and independent consultant.

This report is prepared in return for professional fees based upon agreed commercial rates and the payment of these fees is not contingent on the results of this report. No member or employee of SRK is, or is intended to be, a director, officer or other direct employee of SRK.

In the preparation of this Technical Report, SRK has used information provided by Xanadu and other experts. SRK has not verified this information or made due enquiry of all material issues that are required in order to comply with NI 43-101 requirements.

There is no ongoing consultancy agreement between SRK and Xanadu regarding SRK conducting further work for Xanadu as this project progresses to the PFS and Feasibility Study (FS) stages.

The positive result of this PEA is such that it is likely that the Kharmagtai Copper-Gold Project will continue to progress towards development of a large open pit mine and process plant, and ongoing drilling and assessment, while meeting all required permits and approvals, to add significant value to the South Gobi region of Mongolia.

2.6 Risks and forward-looking statements

The business of mining and mineral exploration, development and production by its nature has significant operational risks. The business depends upon, amongst other things, successful prospecting programs and competent management. Profitability and asset values can be affected by unforeseen changes in operating circumstances and by technical issues.

Factors such as political and industrial disruption, currency fluctuation and interest rates could have an impact on the proposed project's future operations, and potential revenue streams can also be affected by these factors. The majority of these factors are, and will be, beyond the control of Xanadu or any other operating entity.

This Technical Report contains forward-looking statements. These forward-looking statements are based on the opinions and estimates of Xanadu, and other specialist consultants at the date the statements were made. The statements are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those anticipated in the forward-looking statements. Factors that could cause such differences include changes in world copper and gold markets, equity markets, costs and supply of materials relevant to the projects, and changes to regulations affecting them.

Although Xanadu believes the expectations reflected in its forward-looking statements to be reasonable, Xanadu does not guarantee future results, levels of activity, performance or achievements.

2.7 Use of the term 'ore' in this PEA

The Canadian National Instrument Companion Policy 43-101 (Section 2.3) indicates that in the context of Mineral Resource estimates, the term 'ore' implies technical feasibility and economic viability that should only be attributed to 'Mineral Reserves'. In compliance with Section 2.3 of the Companion Policy, the term ore is not used in the Mineral Resource context of this PEA.

The term ore is used in the mining and processing sections of this PEA in a generic way to describe the 'mineable' part of the Mineral Resource estimate that will be extracted from the mine and fed to the process plant. Where appropriate this is referred to as the 'mineable resource' since no Mineral Reserve was estimated yet. To do so will require investigation and application of all relevant Modifying Factors as defined in CIM (2014).

This PEA study is preliminary in nature. It includes Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the conclusions of this preliminary economic assessment will be realised.

2.8 Cautionary Statement for Australian Stock Exchange (ASX) Investors

The Study attached to this Announcement has been undertaken to assess viability of developing the Kharmagtai Copper-Gold Project by constructing an open cut mine and processing facility to produce copper concentrate for export. It is a preliminary technical and economic study of the potential viability of the Kharmagtai Project. It is based on low level technical and economic assessments that are not sufficient to support the estimation of ore reserves. Further exploration and evaluation work and appropriate studies are required before Xanadu will be in a position to estimate any ore reserves or to provide any assurance of an economic development case.

The Study is based on the material assumptions set out in the attached Scoping Study. These include assumptions about the availability of funding. While Xanadu considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by the Study will be achieved.

To achieve the range of outcomes indicated in the Study, funding of in the order of US$700 million will likely be required. Investors should note that there is no certainty that Xanadu will be able to raise that amount of funding when needed. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of Xanadu's existing shares. It is also possible that Xanadu could pursue other 'value realisation' strategies such as a sale, partial sale or joint venture of the Project. If it does, this could materially reduce Xanadu's proportionate ownership of the Project.

Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Study.

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

The Study is based on the December 2021 Mineral Resource Estimate, is based on low-level technical and economic assessments, and is insufficient to support estimation of Ore Reserves or to provide assurance of an economic development case at this stage, or to provide certainty that the conclusions of the Study will be realised.

The Study has been completed to a level of accuracy of +/-35% in line with industry standard accuracy for this stage of development.

The Company has reasonable grounds for disclosing a Production Target, given that in the first seven years of production, 100% of the mill feed is scheduled from the Indicated Resource category, which exceeds the economic payback period for the Project by three years. Approximately 58% of the Life of Mine Production Target is in the Indicated Mineral Resource category, and 42% is in the Inferred Mineral Resource category. There is a lower level of geological confidence associated with Inferred Mineral Resources, and while the Company considers all the material assumptions in this Study to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated will be achieved.

The Mineral Resources underpinning the production target in the Study have been prepared by a Competent Person in accordance with the requirements of Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code (2012)). The Competent Person's Statement is found in the Geology and Resources section of the Study. For full details of the Mineral Resource Estimate, please refer to Xanadu's ASX/TSX Announcement dated 25 February 2022. Xanadu confirms that it is not aware of any new information or data that materially affects the information included in that release. All material assumptions and technical parameters underpinning the estimates in that Announcement continue to apply and have not materially changed.

Note that unless otherwise stated, all currency in this Announcement is US dollars.

3 Reliance on other experts

3.1 Sources of information relied upon

This report was prepared by SRK on behalf of Xanadu under the supervision of the Qualified Person (QP) listed in Table 3-2, as a PEA for Public Reporting. SRK has not provided any opinion or made any conclusions and recommendations. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the QP.

The QP has relied on information, conclusions, opinions, and estimates contained herein are based on:

- information available to the QP at the time of preparation of this report
- assumptions, conditions, and qualifications discussed in this report
- data, reports, and other information supplied by Xanadu and other third parties, as documented and referenced in this PEA study report.

For the purpose of this report, the QP has relied on ownership information and other local knowledge provided by Xanadu.

In preparing this report, SRK has not researched property title or mineral rights for the Kharmagtai Project and expresses no opinion as to the ownership status of the property.

Except for the purposes legislated under Canadian or other securities laws, any use of this report by any third party is at that party's sole risk.

The major components of this PEA comprise: resource modelling, preliminary mine design, metallurgical testwork, preliminary process design and process plant cost estimation, and preliminary economic analysis. This work tested the merits of proceeding towards a PFS and determined criteria to be evaluated in such a study.

Key sources used in the compilation of this PEA report include:

- Kharmagtai Project Scoping Study, by Xanadu Mines Limited, 6 April 2022
- NI 43-101 Technical Report entitled *Mineral Resource Estimate, Kharmagtai Project Omnogovi Province Mongolia*, by Spiers Geological Consultants Pty Ltd for Xanadu Mines Limited, 28 February 2022 (Spiers, 2022)
- Kharmagtai Project Mining Concept Study, by Xanadu Mines Limited, March 2021
- Open Pit Scoping Study Kharmagtai Project, Mongolia, CSA Global Pty Ltd, 1 May 2019
- NI 43-101 Technical Report entitled *Kharmagtai Copper-Gold Project Mineral Resource Update, Mongolia*, CSA Global Pty Ltd, 14 December 2018.

This PEA is based on the specialist consultant studies summarised in Table 3-1 and information from studies conducted on behalf of Xanadu, by independent specialist consultants.

Table 3-1: Scoping Study components for the PEA study

PEA Component	Specialist	Consulting Company
Environment	-	Eco Trade LLC
Financial Modelling	Rod Watkins	Resource Consulting Network
Mineral Resource	Robert Spiers	Spiers Geological Consultants Pty Ltd
Metallurgical Testwork	Andrew Goulsbra	East Riding Mining Services
Geotechnical Engineering	William Sarunic	Red Rock Geotechnical
Open pit mining optimisation	Gerald Whittle	Whittle Consulting
Open pit mining equipment selection & cost estimation	Paul Tooth	Integrity Mining Services
Process engineering and cost estimation	-	Ausenco
Study Manager	Jonathon Lew	Corporate Technical Consulting
Surface Infrastructure	Julien Lawrence	O2 Mining Services

Source: Xanadu Mines Ltd, Kharmagtai Project Scoping Study, April 2022

3.2 QPs

The Qualified Person(s) (QPs) identified as the authors responsible for this PEA Technical Report supervised and approved the work completed by other experts as referred to in NI 43-101 Item 3 and in Table 3-1. The QPs are identified in Table 3-2.

Table 3-2: Qualified Persons and experts contributing to the PEA

Company	PEA Component	Name	Role
Xanadu Mines Ltd.	PEA Technical Report	Andrew Stewart	QP
Spiers Geological Consultants Pty Ltd	Geology and Mineral Resource	Robert Spiers	QP

Source: Xanadu Mines Ltd, Kharmagtai Project Scoping Study, April 2022

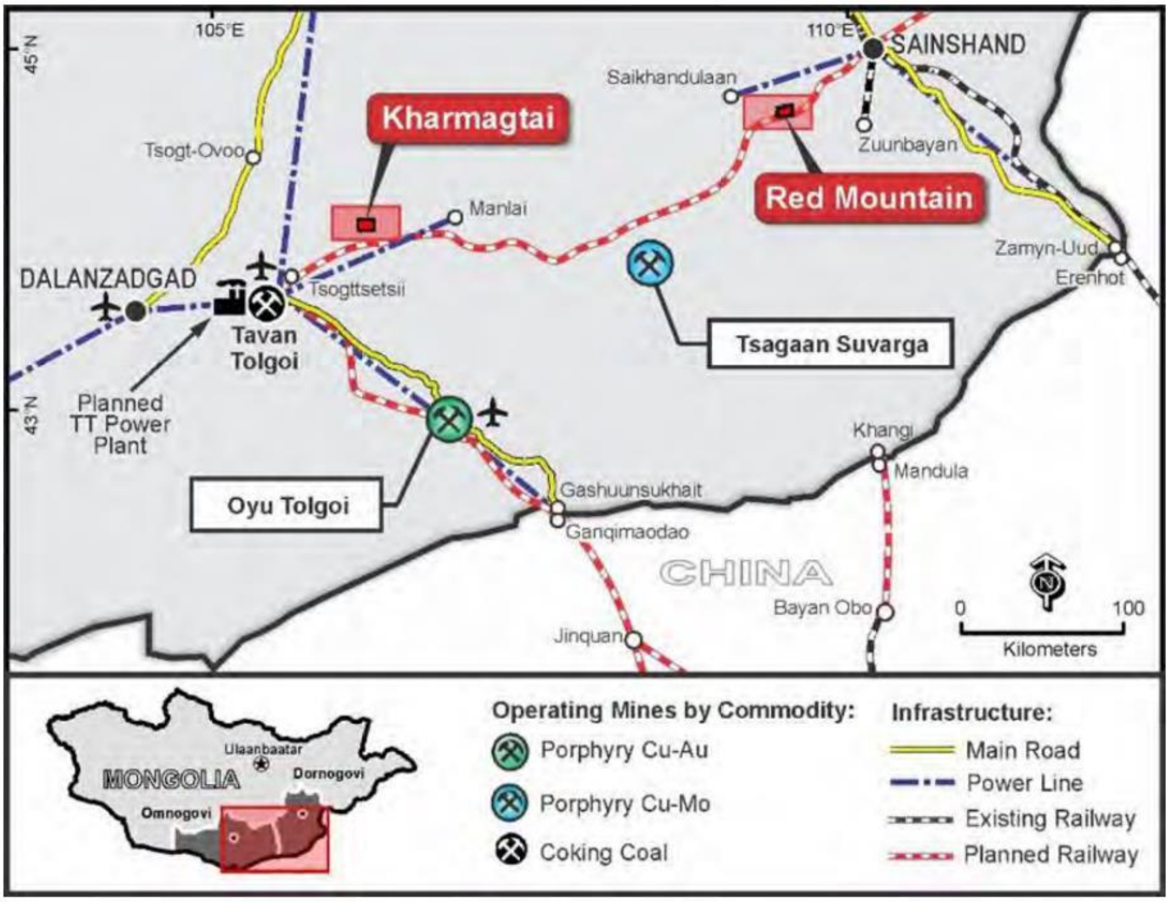
SRK personnel involved in preparing this PEA under the supervision of the QP included: Shaun Barry, Alex Thin, James Carpenter, and Steve Gemell.

4 Property description and location

4.1 Location of tenement

The Kharmagtai Copper-Gold Project is situated in the South Gobi region of Mongolia. It is located 420 km southeast of the capital, Ulaanbaatar and 120 km northwest of the Oyu Tolgoi copper-gold deposit (Figure 4-1).

Figure 4-1: Location of the Kharmagtai Project



Source: Xanadu, Mineral Resource Estimate, 28 February 2022

4.2 Tenement description

The area and geographic coordinates for the Kharmagtai permit are summarised in Table 4-1. The lease covers approximately 66.5 km^2.

Table 4-1: Coordinates of the Kharmagtai Project Mining Lease

Point	Longitude East (WGS-84)	Latitude North (WGS-84)
A	106° 14’ 31.36”	44° 00’ 39.46”
B	106° 07’ 5.36”	44° 00’ 39.45”
C	106° 07’ 5.36”	44° 04’ 16.46”
D	106° 14’ 31.36”	44° 04’ 16.46”

4.3 Mineral tenure and property ownership

Xanadu’s tenure at Kharmagtai is secured through a granted Mining Licence (MV-01738) held by Oyut Ulaan LLC (Oyut Ulaan). Xanadu’s interest is secured through a 90% interest in the joint venture company, Mongol Metals LLC, which in turn holds a 90% interest in Oyut Ulan, thereby entitling Xanadu to a 76.5% participating and controlling interest in the Kharmagtai Project. The remaining 10% interest in Oyut Ulan is held by private company QGX, which is registered in Canada.

The tenure status is summarised in Table 4-2.

Table 4-2: Tenure status

Project Name	Licence No.	Sub-Status	Company Holder	Effective Title Held	Expiry Date	Area (km²)
Kharmagtai	MV-017387	Granted	Oyut Ulaan LLC	76.5%	27/09/2043	66.51

Source: Xanadu Mining Limited; Minter Ellison, Mongolian Legal Opinion, 16 July 2018

In early 2014, 90% of the Kharmagtai project was acquired by Mongol Metals LLC from Turquoise Hill. Xanadu was granted the right to earn up to 85% of Mongol Metals LLC by expenditure on the Property.

At the date of this report, Xanadu had met all expenditure necessary to own 85% of Mongol Metals, equal to a 76.5% beneficial interest in the whole project.

4.4 Property rights and obligation

Rights and obligations for mineral tenure are governed by the new Minerals Law of Mongolia introduced in 2006. Several amendments to the legislation were subsequently enacted, including some key changes in 2014.

MLs are granted for a period of 30 years, extendable twice for 20 years each time. A mining license holder has the right to conduct mining activities throughout the license area and to construct structures within the license area that are related to its mining activities. All such activities must be conducted in compliance with the 2006 Minerals Law and relevant Mongolian laws pertaining to health and safety, environment protection and reclamation.

Upon the expiration of a mining license, the license and the rights under such license revert to the Government of Mongolia. In the case of all minerals other than coal and common construction minerals (e.g., sand and gravel), annual license fees of US$15.00 are payable per hectare of the relevant mining license area. A mining license is subject to cancellation if applicable license fees are not paid on time or other requirements under the 2006 Minerals Law or other relevant laws are not satisfied.

To receive a mining license, an exploration license holder must submit an application to the Mineral Resources Authority of Mongolia (MRAM) together with, among other documents, an environmental impact assessment and a resource report. Holders of mining licenses must also prepare environmental protection and reclamation plans and satisfy various reporting and security deposit requirements. Obligations of a ML require submitting a Feasibility Study on the development of the deposit prepared by an accredited technical expert within one year of obtaining the mining license; ensuring that feasibility studies include detailed information on the transportation of mining products, development of infrastructure, and funds required for mine restoration and closure work.

4.5 Royalties and encumbrances

Mongolian regulatory rights and obligations including any associated state royalties and taxes. Mongolia imposes a 17% royalty on all minerals other than coal that are sold, shipped for sale or used. This study has assumed the royalty rate will be negotiated to 5% in line with similar rates negotiated by other operating projects in Mongolia. Gold as bullion is sold to the Bank of Mongolia and is charged a 2.5% royalty.

While several companies have negotiated lower royalty levels, Xanadu has not yet negotiated any reduction in Mongolian state royalties for the Kharmagtai Project.

In addition, an incremental surtax royalty is imposed on the total sales value of 23 minerals, with the amount varying depending on the mineral, its market price and the degree of processing. Surtax rates for copper and gold are shown in Table 4-3.

Table 4-3: Mongolian Government surtax royalty for copper and gold

Metal	Future market price (US$)	Surtax Royalty rates (%)		
		Ore	Concentrate	Product
Copper (t)	0-5,000	0	0	0
	5,000-6,000	22	11	1
	6,000-7,000	24	12	2
	7,000-8,000	26	13	3
	8,000-9,000	28	14	4
	9,000 and above	30	15	5
Gold (oz)	0-900			0
	900-1,000			1
	1,000-1,100			2
	1,000-1,200			3
	1,200-1,300			4
	1,300 and above			5

SRK is not aware of any third party royalties or payment obligations.

4.6 Environmental liabilities

The Qualified Persons signing this report are not aware of any specific environmental liabilities on the property. Further information regarding the scoping of the Environmental Impact Assessment is provided in Section 20.0.

4.7 Permits

The QPs signing this report were advised that Xanadu has all required permits to conduct the proposed work on the property.

Xanadu has secured the Kharmagtai Mining License, which is renewable, for an initial period of 30 years.

It covers an area of 66.51 km^2 in the South Gobi Region of Mongolia. Mongolian certified environmental impact assessment consultant Eco Trade LLC undertook a preliminary baseline environmental survey of the Kharmagtai area in 2003 and prepared the Mongolian Detailed Environmental Impact Assessment (DEIA) in 2011 as part of the Mining Licence application. The Mining Licence was granted in 2013.

The QP is not aware of any specific environmental liabilities on the property. Xanadu has all required permits to conduct the proposed work on the property. The report author is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform on-going work programs on the property

4.8 Other factors

The Qualified Persons signing this report are not aware of any other significant factors or risks that may affect access, title, or the right or ability to perform ongoing work programs on the property.

5 Accessibility, climate, local resources, infrastructure and physiography

5.1 Accessibility and infrastructure

The Project is accessed via sealed roads from Ulaanbaatar to Tsogt Ovoo and 60 km of unsealed roads from Tsogt Ovoo to Kharmagtai. It requires 6 hours of travel time, with the last 1.5 hours on approximately 60 km of unsealed roads.

The soum (sub-province) centre of Tsogt Tsetsii is situated approximately 60 km southwest of the Project area and is serviced by daily flights from Ulaanbaatar requiring 45 minutes travel time.

Sainshand is an industrial city located approximately 350 km to the east of the Project on the main line of the trans-Mongolian railway, which connects to Ulaanbaatar and on to Siberia going north, and to Beijing via the border crossing at Zamin-Uud going south. A highway also connects Sainshand with Ulaanbaatar and Zamin Uud.

A semi-permanent exploration camp has been established by the Company at Kharmagtai and is located immediately outside of the southwestern corner of the ML. The exploration camp comprises modified sea containers and includes core processing, office, messing and accommodation facilities.

5.2 Physiography and vegetation

Kharmagtai projects are located within the Gobi Desert. The topography of the area is characterised by gravel covered plains with low hills, which range in elevation from 1,050 m to 1,360 m above sea level.

Vegetation is sparse with low shrubs and grassy plains.

5.3 Climate

The area is classified as having a ‘cold desert’ climate. The region generally experiences arid continental climatic conditions, with temperatures varying between +30°C and -30°C and average rainfall around 194 mm. Most rainfall occurs within the summer months from May to September. Due to low humidity and high winds, snow accumulation in winter is limited to isolated drifts, with generally very shallow snow cover away from these drifts interfering very little with exploration activities.

The Qualified Person believes that the climate of the Project area presents no risk to the development of the Project. Exploration activities such as diamond drilling may be conducted year-round; however, some other ground exploration activities may be seasonally specific. Mine operations in the region can operate year-round with supporting infrastructure.

6 History

6.1 Exploration and discovery

Historical exploration activities and Property ownership is summarised in Table 6-1 and described in further detail below.

Between 1960 and 1975, several geological surveys and mineral exploration programs were conducted in the Kharmagtai district with the cooperation of former Soviet Union and Eastern European geological groups (Shabalovski et al., 1976; Shabalovski et al., 1978). This work included regional geological mapping, geochemistry, ground magnetics, induced polarisation (IP) (chargeability and resistivity) and airborne magnetic/radiometric surveys (Goldenberg et al., 1978; Shmelyov et al., 1983). Outcropping copper mineralisation was noted in the Kharmagtai area in 1979, and tourmaline gold mineralisation was subsequently identified at Ovoot Khyar in 1980. Recognition of porphyry-style mineralisation sparked an extensive exploration program, which involved excavation of numerous trenches and drilling of 17 shallow, widely spaced vertical diamond drill holes (Sharkhuu 1980). This exploration work resulted in a preliminary 'Russian standard' Resource estimate (Table 6-1). Gold assays during these programs were by atomic absorption spectrometer and are not considered to be reliable.

Between 1991 and 1995, the Japan International Cooperation Agency (JICA) and Metal Mining Agency of Japan (MMAJ) commenced mineral exploration in the South Gobi region at the request of the Mineral Authority of Mongolia (JICA, 1995). This exploration included regional reconnaissance, airborne magnetic and radiometric surveys, and based on this work Kharmagtai was re-identified as an area of porphyry related alteration and mineralisation.

Exploration by QGX (previously Quincunx) at Kharmagtai during 1995 and 1996 included the collection of approximately 181 rock-chip samples and 475 soil samples. Rock-chip samples from mineralised stockwork at Stockwork Hill returned anomalous results for gold greater than 1 g/t Au (Atkinson et al., 1998b). Based on encouraging results a further 2,980 soil samples were taken as part of a grid-based soil survey and the Ovoot Khyar area was identified as a priority target. In late 1996 a total of 240 line-km of ground magnetic data was collected, and 64 trenches (14.7 km total length) excavated (Roscoe and MacCormack, 1997). Exploration continued in 1997 with detailed geological mapping, trenching (2,411 m) and geophysics focused on shallow replacement-style gold mineralisation at Ovoot Khyar (OV3). This resulted in the drilling of five shallow holes (1,060 m) which intersected narrow intervals of near surface low-grade gold mineralisation (up to 0.83 g/t Au) hosted in phyllic altered sedimentary rock (Atkinson, 1998). This highlighted the potential for replacement-style gold mineralisation typically found in the peripheral zones of porphyry copper deposits.

Following the intersection of low-grade gold mineralisation at Ovoot Khyar in 1998, exploration by QGX moved to the previously identified porphyry copper prospects at Stockwork Hill (formerly known as KH1) and White Hill (formerly known as KH2). Detailed IP surveys were completed and six drill holes (859 m total) targeted shallow porphyry stockwork mineralisation at Stockwork Hill. Drilling confirmed the presence of porphyry-related alteration and mineralisation with the best results of 43 m grading 1.89 g/t Au, 0.58% Cu (KH97-01).

IMMI geologists visited Kharmagtai several times between 1997 and 2001 (Kirwin, 1997). However, it was not until 2002 that IMMI made a decision to earn into the property based on encouraging geology and widespread porphyry-related alteration. Between 2002 and 2006, IMMI collected 2,960 rock chip samples, excavated 119 trenches (65,636 m), and drilled 208 RC holes (27,747 m) and 172 diamond drill holes (54,269 m). Diamond drilling focused on testing and defining the Stockwork Hill, Copper Hill, White Hill, Chun, Burged and OV3 prospects. Geological mapping, stream sediment and soil sample surveys, gradient array IP (289 km), ground magnetics (589 km^2), ground gravity (39 km^2) and aerial magnetics and aerial gravity (259 km^2) surveys were also conducted during this period. Drilling delineated multiple mineralised intercepts at Stockwork Hill, Copper Hill and White Hill (see Section 6.2 and Table 6-2). These resources were predominately near the surface and mineralisation remained open both at depth and along strike at Stockwork Hill and White Hill.

Between 2007 and 2011, Asia Gold Corp. (a subsidiary of Ivanhoe Mines) assumed control of exploration at Kharmagtai and focused on deep copper mineralisation associated with late-stage tourmaline breccia previously recognised in deeper drill holes drilled by IMMI. Fifteen diamond drill holes totalling 5,170.6 m were drilled at Kharmagtai during 2007 to test deeply seated geophysical anomalies. A detailed 3D IP survey was completed in 2011, and 19 diamond holes totalling 15,345.3 m targeted deep geophysical anomalies associated with tourmaline breccia mineralisation under the Stockwork Hill and White Hill deposits. All holes intersected broad low-grade mineralisation indicating the tourmaline breccias were part of a major copper system with significant exploration potential.

Table 6-1: Summary of historical exploration

Period	Description of work	References
1960–1975	Joint Mongolian Eastern Block Exploration: ▪ Regional geological mapping, geochemistry, ground magnetics, IP (chargeability and resistivity) and airborne magnetic/radiometric surveys ▪ Diamond drill 17 vertical drill holes ▪ Historical Russian standard Resource estimate of 193 Mt @ 0.25% Cu*	Goldenberg et al., 1978 Shabalovski et al., 1976 Shabalovski et al., 1978 Sharkhuu, 1980 Shmelyov et al., 1983
1991–1995	JICA and MMAJ: ▪ Regional reconnaissance, airborne magnetic and radiometric surveys ▪ Kharmagtai re-identified as an area of porphyry related alteration and mineralisation	JICA, 1995
1998	QGX (Quincunx): ▪ Regional geological mapping, geochemistry (1,500 rock-chip and 4,000 soil samples), trenching (19 km), geophysics (240 km) ▪ Diamond drilling of five shallow holes (1,060 m) – sediment-hosted Au mineralisation at Ovoot Khyar discovered ▪ Diamond drill 19 shallow widely spaced holes – define widespread porphyry alteration and mineralisation Kharmagati	Atkinson, 1997 Atkinson, 1998 Atkinson & Setterfield, 1998 Atkinson et al., 1998a Atkinson et al., 1998b Roscoe & MacCormack, 1997
2001–2006	IMMI: ▪ Detailed geological mapping, geochemistry (2,960 rock-chip), 119 trenches (66 km). Geophysics included gradient array IP (289 km^2), ground magnetics (589 km^2), ground gravity (39 km^2) and aerial magnetics and aerial gravity ▪ Drilled 208 RC (27,747 m) and 172 diamond drill holes (54,269 m). Drilling focused on testing and defining the Stockwork Hill, Copper Hill, White Hill, Chun, Burged and OV3 prospects ▪ Historical Combined resource at Stockwork Hill, Copper Hill and White Hill of 174 Mt at 0.50% CuEq*	Kirwin, 1997 Kirwin et al., 2003 Wolfe, 2004 Wolfe & Wilson, 2004 Wolfe, R., 2006a Wolfe, R., 2006b Wolfe, R., 2007

Period	Description of work	References
2007–2012	Asia Gold (AGC, a subsidiary of IMMI): ▪ Deep diamond drilling (5,170.60) m testing deeply seated geophysical anomalies ▪ A detailed 3D IP survey was completed was completed in 2011 and 19 diamond holes (15,345.30 m)	Orssich, C., 2012

Notes: *The Mineral Resource estimates noted in this table are 'historical' in nature and not in compliance with NI 43-101. A Qualified Person has not done the work necessary to verify the historical estimates as current estimates under NI 43-101 and as such they should not be relied upon. The Authors are not treating the historical estimates as current Mineral Resources; they are presented for informational purposes only.

6.2 Historical Mineral Resource estimates

Mineral Resources for the Kharmagtai Project were previously reported in 2015 and 2018 and are presented in Table 6-2, Table 6-3 and Table 6-4. The QP has not done sufficient work to classify the historical estimates in Tables 6-2, 6-3 and 6-4 as current mineral resources or mineral reserves and Xanadu is not treating the historical estimates as current mineral resources or mineral reserves.

The April 2015 mineral resource were estimated using Ordinary Kriging and reported above 0.3% CuEq cut-off for open pit mining and above 0.5% CuEq cut-off for underground mining, which also include high-grade core reported above 0.6% CuEq for both open pit and underground mining methods.

Table 6-2: Historical Mineral Resource Statement, Kharmagtai Cu-Au Project (Total Resources and high grade core), Mongolia, Mining Associates, April 2015

Mining method	Cut off (CuEq%)	Classification	Tonnage (Mt)	Cu (%)	Au (g/t)	CuEq (%)	Cu metal (kt)	Au metal (koz)
Open cut	0.3	Indicated	23	0.41	0.55	0.8	94	401
		Inferred	107	0.27	0.25	0.4	289	833
Under-ground	0.5	Indicated	24	0.43	0.47	0.7	103	359
		Inferred	51	0.42	0.36	0.6	214	591
Total open cut and underground		Indicated	46	0.42	0.51	0.7	198	759
		Inferred	157	0.32	0.28	0.5	503	1,424
High grade zones(included in the Total Mineral Resources)								
Open cut, high grade core	0.6	Indicated	9	0.52	0.87	1.1	5	249
		Inferred	1	0.38	0.82	0.9	0	34
Underground, high grade core		Indicated	20	0.46	0.57	0.8	9	368
		Inferred	26	0.46	0.50	0.8	12	418
Total open cut and underground		Indicated	29	0.48	0.66	0.9	14	616
		Inferred	27	0.46	0.52	0.8	12	452

Source: NI 43-101 Technical Report on the Kharmagtai Copper-Gold Project Mineral Resource Update, Mongolia. 1 October 2018

Notes:
– The high grade zones reported are included in the Total Mineral Resources
– All figures rounded to reflect the relative accuracy of the estimates. Mineral resources are not mineral reserves and have not demonstrated economic viability.
– Open pit mineral resources reported at a cut-off grade of 0.3% of CuEq for Total MR and 0.6% CuEq for High Grade core.
– Underground mineral resources reported at a cut-off grade of 0.5% of CuEq for Total MR and 0.6% CuEq for High Grade core.
– CuEq calculated using the following formula: CuEq=Cu (%)+Au (g/t)*0.6378, based on a copper price of $2.60/lb, and a gold price of $1,300/oz, with assumed recoveries of 90% for copper and 70.85% for gold.

The October 2018 mineral resource were estimated using Ordinary Kriging into estimation domain wireframes generated by Xanadu geologists and reported above 0.3% CuEq cut-off for open pit mining and above 0.5% CuEq cut-off for underground mining. The open pit mineral resources were reported within the limits of the ultimate pit shell.

Table 6-3: Kharmagtai open pit Mineral Resources as at 1 October 2018

Deposit	Classifi-cation	Tonnes (Mt)	CuEq (%)	Cu (%)	Au (G/t)	CuEq metal (kt)	Cu metal (kt)	Au metal (koz)
Tsagaan Sudal	Indicated	45.2	0.42	0.30	0.23	189	135	340
Altan Tolgoi		74.4	0.59	0.38	0.41	441	286	972
Zesen Uul		9.7	0.76	0.48	0.54	73	47	167
Total Indicated		**129.3**	**0.54**	**0.36**	**0.36**	**703**	**468**	**1,479**
Tsagaan Sudal	Inferred	412.8	0.40	0.31	0.17	1,653	1,299	2,227
Altan Tolgoi		55.4	0.47	0.30	0.34	263	167	601
Zesen Uul		0.7	0.39	0.31	0.16	3	2	4
Total Inferred		**468.9**	**0.41**	**0.31**	**0.19**	**1,919**	**1,468**	**2,832**

Source: NI 43-101 Technical Report on the Kharmagtai Copper-Gold Project Mineral Resource Update, Mongolia. 1 October 2018

Notes:
– The historical Mineral Resources were classified according to CIM Definition Standards for Mineral Resources and Mineral Reserves (10 May 2014).
– Mineral Resources for open pit mining were estimated within the limits of an ultimate pit shell.
– A cut-off grade of 0.3% CuEq has been applied for open pit mineral resources.
– Dry bulk density values of 2.65 t/m^3 for oxide zones; 2.76, 2.74, 2.73 and 2.71 t/m3 for country rocks, 2.78, 2.80, 2.77, 2.81 and 2.76 t/m^3 for porphyries and 2.76 t/m^3 for andesite dyke were used for the model cells.
– CuEq – copper equivalent was calculated using conversion factor 0.62097 for gold. Metal prices were 3.1 $/lb for copper and 1,320 $/oz for gold, recoveries – 70% for gold and 85% for copper (82.35% relative gold to copper recovery), copper equivalent formula applied: CuEq = Cu + Au * 0.62097 * 0.8235.
– Rows and columns may not add up exactly due to rounding,

Table 6-4: Kharmagtai underground Mineral Resources as at 1 October 2018

Deposit	Classifi-cation	Tonnes (Mt)	CuEq (%)	Cu (%)	Au (G/t)	CuEq metal (kt)	Cu metal (kt)	Au metal (koz)
Altan Tolgoi	Indicated	1.2	0.68	0.45	0.46	8	5	18
Zesen Uul		0.3	0.63	0.46	0.33	1	1	2
Total Indicated		**1.5**	**0.67**	**0.45**	**0.44**	**10**	**7**	**21**
Tsagaan Sudal	Inferred	3.5	0.56	0.46	0.19	19	16	21
Altan Tolgoi		4.8	0.68	0.43	0.49	33	21	77
Total Inferred		**8.3**	**0.63**	**0.44**	**0.37**	**52**	**37**	**98**

Source: NI 43-101 Technical Report on the Kharmagtai Copper-Gold Project Mineral Resource Update, Mongolia. 1 October 2018

Notes:
– The historical Mineral Resources were classified according to CIM Definition Standards for Mineral Resources and Mineral Reserves (10 May 2014).
– Mineral Resources for underground mining were estimated outside the limits of ultimate pit shell.
– A cut –off grade of 0.5% CuEq has been applied for underground mineral resources.
– Dry bulk density values of 2.65 t/m^3 for oxide zones; 2.76, 2.74, 2.73 and 2.71 t/m3 for country rocks, 2.78, 2.80, 2.77, 2.81 and 2.76 t/m^3 for porphyries and 2.76 t/m^3 for andesite dyke were used for the model cells.
– CuEq – copper equivalent was calculated using conversion factor 0.62097 for gold. Metal prices were 3.1 $/lb for copper and 1,320 $/oz for gold, recoveries – 70% for gold and 85% for copper (82.35% relative gold to copper recovery), copper equivalent formula applied: CuEq = Cu + Au * 0.62097 * 0.8235.
– Rows and columns may not add up exactly due to rounding,

6.3 Historical production

No commercial production has been undertaken on the site.

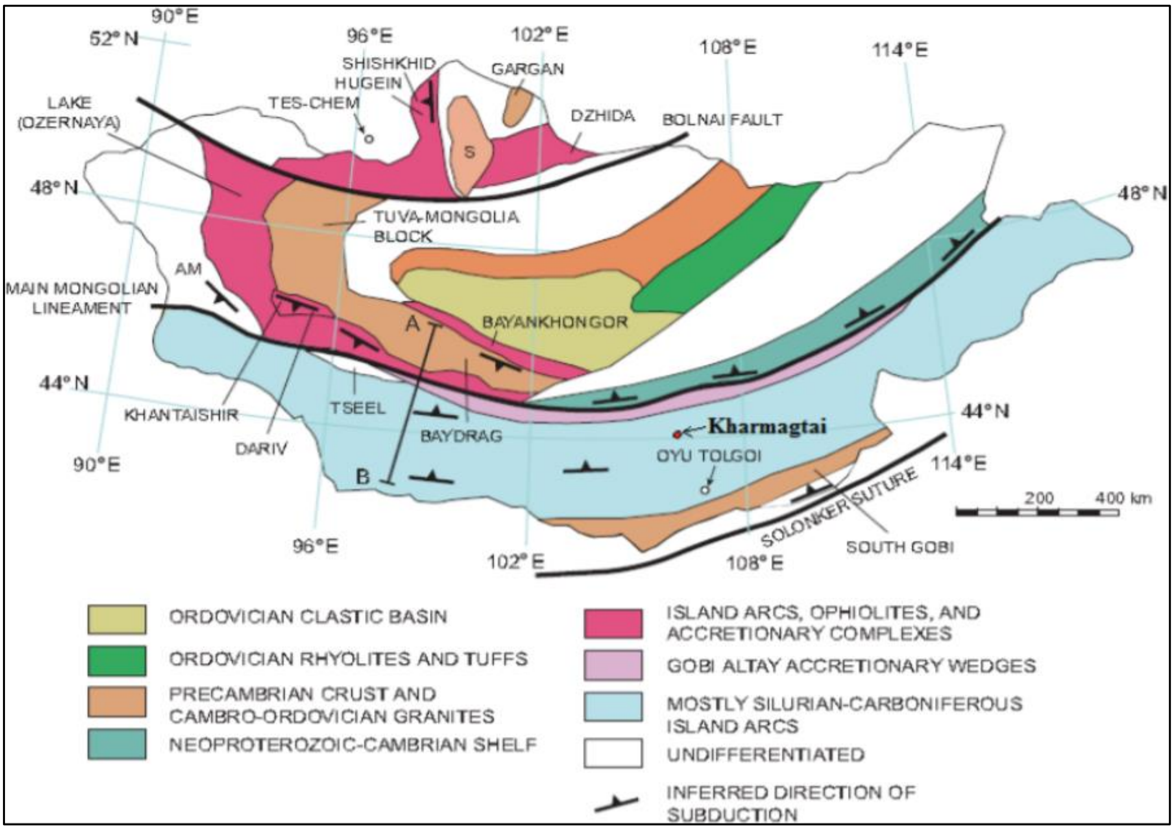
7 Geological setting and mineralisation

7.1 Tectonic setting

The tectonics of Mongolia is interpreted as a series of fault-bounded accreted terranes (Badarch et al., 2002). Kharmagtai lies within the Gurvansaikhan terrane, which forms an arcuate belt 600 km long and up to 200 km wide through southern Mongolia (Figure 7-1).

Kharmagtai is located within the Central Asian Fold Belt (CAFB), one of the largest orogenic belts in the world, extending for over 5,000 km from northern China to the Urals in Russia. Contained within this orogenic belt is the southern Mongolian fold system (Ruzhentsev and Pospelov, 1992), which comprises a zone of arc-continent collision that was active during several episodes from the Silurian to Early Carboniferous along the southern margin of the Siberian Craton forming the southern Mongolian geological terranes.

Figure 7-1: Major terranes and terrane-bounding structures of Mongolia



Source: AMC, 2012

Amalgamation of Mongolian terranes was followed by uplift and thrusting that unroofed the magmatic arcs. Late Carboniferous to early Triassic age continental sediments were deposited in thrust-controlled foreland basins (Edel et al., 2014). Extensive intracontinental rifting and subsidence with associated metamorphic core complex development occurred during the late Jurassic to early Cretaceous (Webb et al, 1999), forming syn-rift basins with up to 2 km of sediments, controlled by movement on northeast-southwest faults. These cover rocks preserved earlier formed porphyry deposits from further erosion, and alluvial plain and aeolian red bed deposition continued into the late Cretaceous.

The current geometry and distribution of volcanic belts in southern Mongolia is attributed to post-accretion disruption and dislocation by transpressional faulting related to the Himalayan collision (Cunningham, 2010).

7.2 Regional geology

The Kharmagtai District is characterised by an extensive sequence of Devonian to Carboniferous volcanoclastic ash siltstone and sandstone units intruded by the lower to upper Carboniferous rocks of an intrusive nature which are referred to as the Kharmagtai Intrusive Complex (the KIC).

The volcano-sedimentary units dip gently to the south-southeast in the southern portions of the district and gently to the north-northwest in the north, ascribing an open antiform geometry likely induced by the intrusion of the Kharmagtai Intrusive Complex and rotation during brittle faulting.

The Kharmagtai Project lies within the Altai and Transbaikal-Mongolian Neoproterozoic to Paleozoic orogenic belts, which consist of accreted terrains of island arc, back arc, ophiolites, accretionary wedges and cratonic fragments between the Siberian Craton to the north, the North China Craton to the southeast, the Tarim Craton to the Southwest, and the East European Craton to the west, (Yakubchuk, 2005). The Transbaikal-Mongolian orogenic belts are thought to have been part of the circum-Pacific orogenic belt, detached from the Siberian craton in the Ordovician, resulting in strike-slip duplication, (Sengor, 1993).

7.3 Host rocks

The Kharmagtai Project is hosted within the Gurvansayhan island arc terrane of the southern Mongolian orogenic belt, consisting of volcanic and sedimentary rocks ranging from Ordovician to Carboniferous in age. (Badarch, 2005).

During the Ordovician to Silurian, the area resided within an oceanic setting with mature sedimentation from a continental source or the eroded roots of an arc to the north. The Devonian to Carboniferous periods were dominated by island arc volcanism. The Paleo-Asian Ocean continued to close resulting in arc collision during the Carboniferous, (Lamb, 2001) and were consolidated by late Carboniferous to Permian continental granitic plutons suggesting that amalgamation took place not later than the Carboniferous time, (Yakubchuk, 2005).

Near surface, the Kharmagtai Intrusive Complex describes an ovoid body some 6 km by 3 km in dimensions elongated in an east-northeast orientation. North-south extension during the Permian has opened broad shallow basins resulting in approximately 60% of the Kharmagtai district being covered by 2 to 54 m of conglomerates, siltstones, and mudstones.

Significant advances were made in the understanding of the intrusive history at Kharmagtai based on contribution from Legrasso, 2016 to 2017 (internal company documentation). Previously, intrusive rock types at Kharmagtai were lumped into a series of ‘monzodiorite’ and ‘quartz-monzodiorite’ buckets, despite quartz being invisible in hand specimen resulting in rock naming being arbitrary and dependant on the individual logger which in turn made constructing a 3D geological model challenging.

During 2016, Legrasso undertook an extensive review of the Kharmagtai core focusing on overprinting relationships, mineralisation and alteration and defined a series of intrusive phases with clear features for loggers to use in categorising the different rock types at Kharmagtai (Figure 7-2). Following this, a complete re-log of the Kharmagtai core library (+150 km) was conducted with continual oversight on calibrating individual geologist during the re-log.

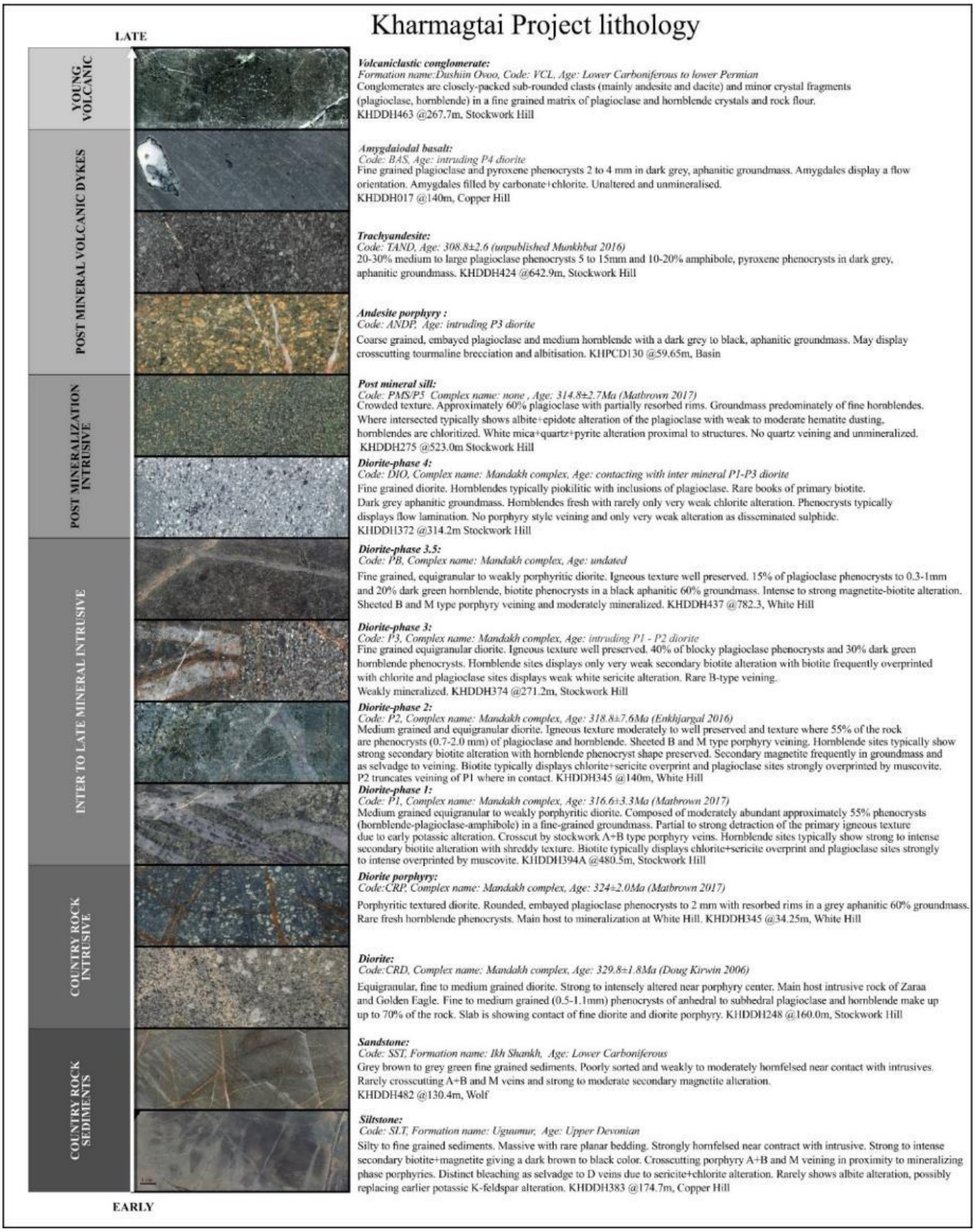
7.3.1 Intrusive phases

The re-definition by Legrasso and associated consolidation of logged units broadly resulted in the definition of a chronology of intrusive phases.

The first intrusive phases at Kharmagtai are label Country Rock Porphyry (CRP) and Country Rock Diorite (CRD). These form the main body of intrusive rock. The first two phases of mineralised intrusive are labelled P1 and P2 displaying the closest links to mineralisation with intense b-veining and texturally destructive alteration. Overprinting these sequences is P3, an orange to red more felsic monzodiorite with weak to moderate b-veining and finally P4, a pale grey, very weakly altered and mineralised monzodiorite as noted in Figure 7-2.

A series of narrow sills and dykes form late in the intrusive sequence as noted in Figure 7-2. These units (PMS1 to 4, ANDP, TAND and BAS) intrude into pre-existing structures which juxtapose and offset mineralisation. These dykes create an excellent opportunity to link structures between drill holes as many have clearly visible features distinct to specific dykes (stretched vesicles, trachytic phenocrysts and amygdaloids). These dykes have allowed a more complete understanding of the structural framework for Kharmagtai.

Figure 7-2: Chrono-lithostratigraphy of the Kharmagtai Project



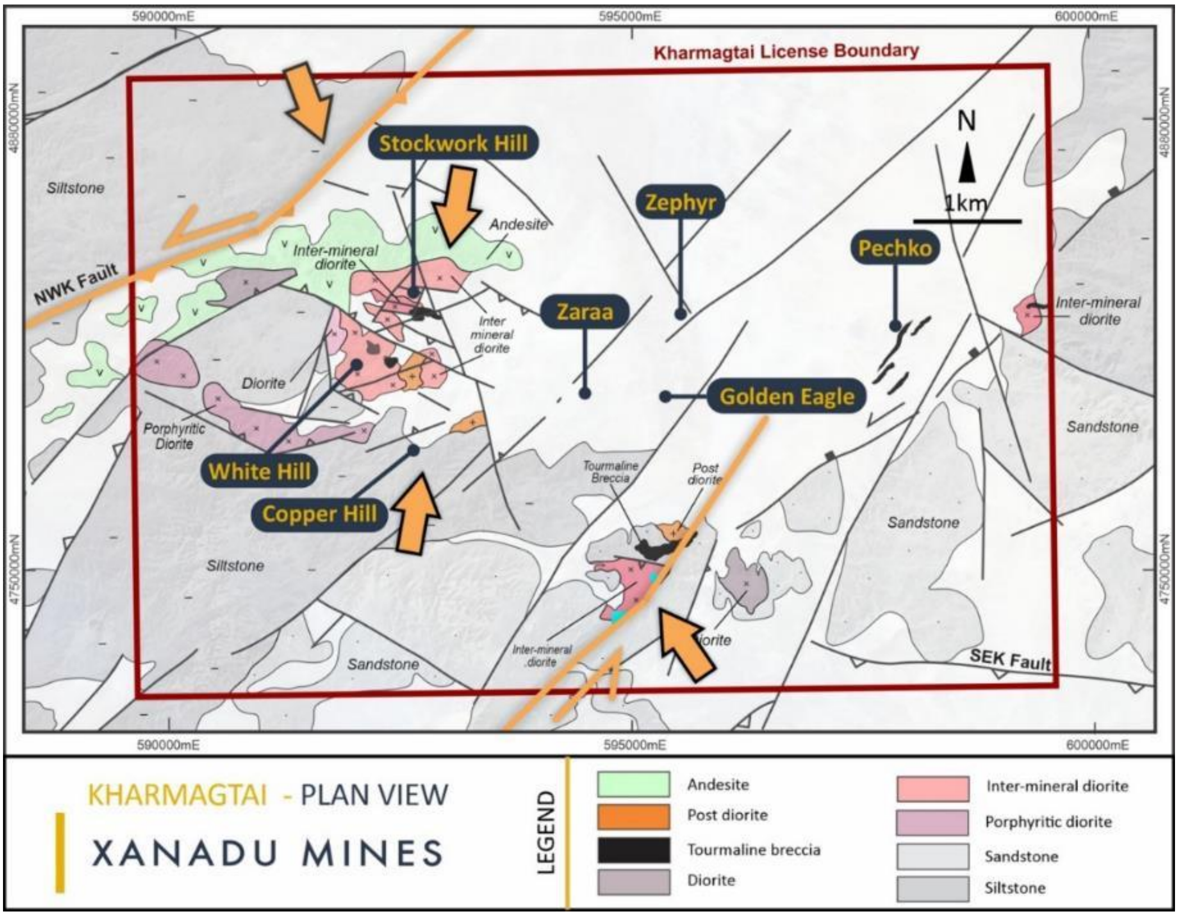
7.3.2 Structure

As a result of detailed structural investigations (Oliver, 2016 to 2018) it was observed that the Kharmagtai Intrusive Complex was emplaced in a predominantly compressional to weakly-transpressional (sinistral) deformational framework during the main orogenic stages of the Middle Paleozoic Gurvansaikhan Belt. The mineral system geometry and its internal features indicate a clear structural control dominated by WNW striking reverse faults, producing a 'pop-out' or positive flower structure.

Emplacement of the KIC was probably facilitated by vertical extension and dilation during shortening, rather than during transtension. However, magma generation may plausibly have commenced with transtension, reflected in a broader N-S array of the more felsic porphyry host rocks.

Oscillation between N-S shortening (with vertical extension) and E-W extension within the KIC was a 'transfer' response to cycles of NW-SE shortening and sinistral strike-slip movement on the regional faults (Figure 7-3).

Figure 7-3: District scale structural framework for emplacement of the Kharmagtai Intrusive Complex



Source: Xanadu data, drafted by Naran Judger, 2021.

Fault oscillations in turn are a likely reflection of somewhat oblique convergence relative to the orientation of these regional faults. These oscillations explain most of the intrusion and mineralisation stages emplacement relating to porphyry stockwork and TBX.

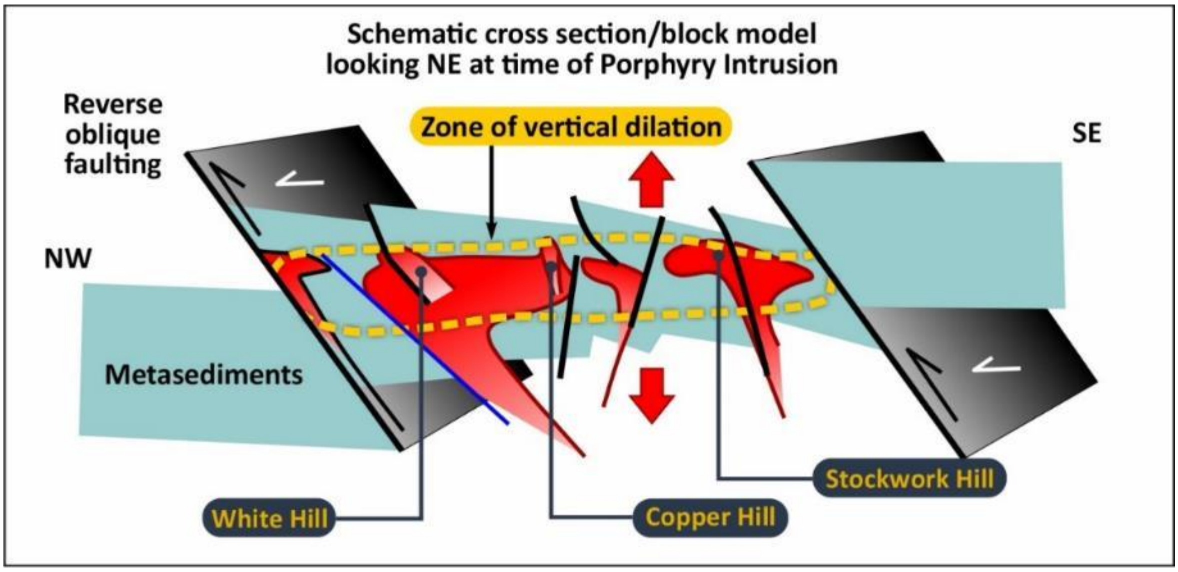
The TBX mineralisation at Stockwork Hill developed by active reverse faulting within a dilatant fault-bend (striking WNW, dipping steeply south), periodically fed by boron-rich magmas, and showing breccia texture variations related to position within the breccia chamber.

Later faulting, again reverse but now including a set of ~ N-S striking faults (and some reactivation on older ones) offset the main Cu-Au mineralisation and introduced an epithermal gold-carbonate-base metal (CBM) suite (Figure 7-4).

Truncation of the eastern edge of the Stockwork Hill TBX mineralisation occurred along one or more of these faults, moving the hanging wall up and northeast, and dropping the footwall block down and south relative to the eastern edge.

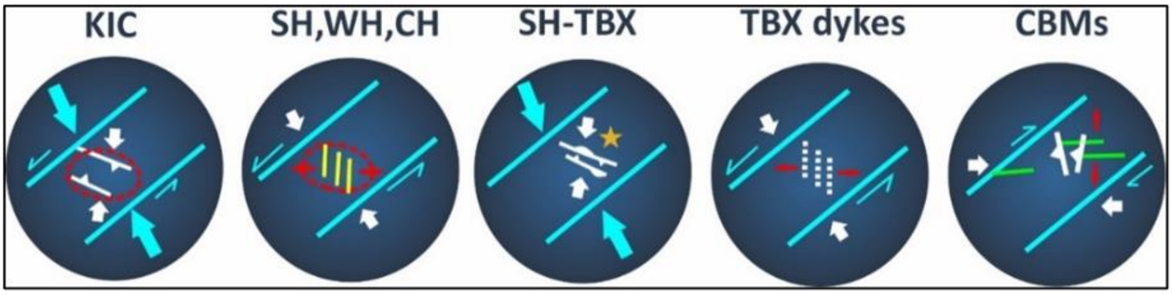
Although the later faulting suggests a significant change in the deformation regime, this epithermal stage was linked to the final porphyry/TBX stages, as suggested by the spatial distribution of epithermal products and the presence of tourmaline and breccia pipes in telescoped alteration around epithermal conduits.

Figure 7-4: Schematic showing structural framework for emplacement of Stockwork Hill, White Hill and Copper Hill



As noted, oscillation between N-S shortening and E-W extension has created the framework for emplacement of the KIC, porphyry mineralisation at Stockwork Hill, White Hill and Copper Hill, the tourmaline breccia mineralisation and later dykes and carbonate base mental veins, Figure 7-5.

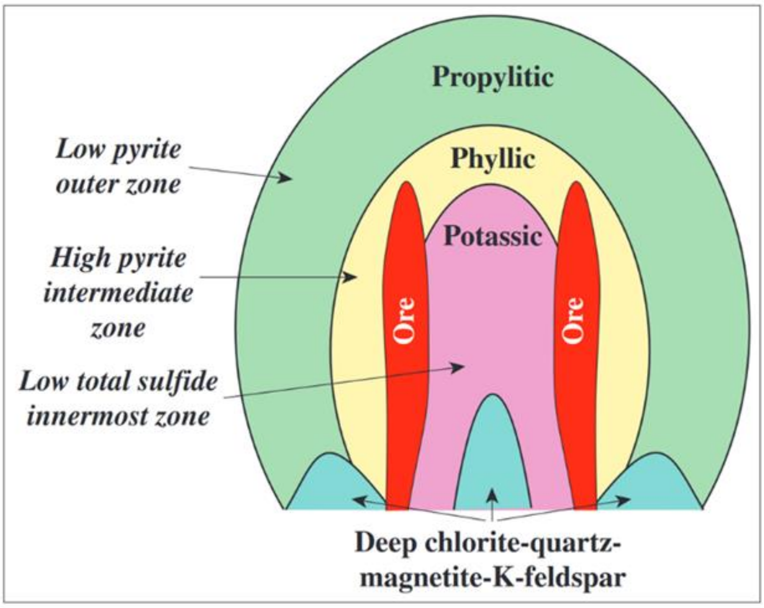
Figure 7-5: The structural framework for formation of mineralisation at Kharmagtai



7.3.3 Alteration

The alteration observed at Kharmagtai fits broadly into the porphyry alteration model with potassic alteration associated with mineralised intrusive suites surrounded by a phyllic alteration halo and finally a broad propylitic wash, Figure 7-6.

Figure 7-6: Classic porphyry alteration model adapted from Gilbert and Lowell 1970.



The multiple generations of faulting have juxtaposed these patterns mixing distal and proximal alteration zones making mapping these patterns difficult.

The potassic alteration is exhibited as replacement of mafic phenocrysts by raggy biotite and less commonly reddening of silicates to K-feldspar. Phyllic alteration occurs as moderate to strong replacement of feldspars by white mica, addition of disseminated pyrite and less commonly quartz. The propylitic alteration is most common and forms as chlorite-epidote replacement of mafic and silicates alike. More detail is given on the alteration of each deposit in the deposit geology section of this report.

7.4 Mineralisation

There are three main styles of mineralisation at Kharmagtai:

- porphyry stockwork mineralisation
- tourmaline breccia mineralisation
- epithermal mineralisation.

Mineralisation at Kharmagtai is directly related to typical porphyry-style vein and hydrothermal breccia assemblages. These assemblages demonstrate both spatial zonation and temporal overprinting relationships commonly associated with porphyry Cu-Au systems, with multiple overprinting phases of intrusions and mineralisation ('telescoping' characteristics).

All mineralisation occurrences across the Kharmagtai Project area demonstrate some (if not all) of the aforementioned mineralisation characteristics.

The principal minerals of economic interest in all Kharmagtai deposits are chalcopyrite, bornite and gold, which occur primarily as infill within the veins and breccia cements, as well as minor chalcocite and gold is frequently intergrown with chalcopyrite and bornite.

Mineralised zones at Stockwork Hill, White Hill, Copper Hill and Zaraa are associated with paragenetically early-stage quartz veins that were intensely developed in and around quartz diorite intrusive rocks. The vein systems manifest as both sheeted vein arrays and stockwork zones, demonstrating clear structural and temporal controls on vein domain morphology.

Late-stage sulphide only veins (chalcopyrite ± pyrite ± bornite) overprint the quartz-sulphide vein assemblages and are commonly associated with higher Cu-Au grades. Visual overprinting relationships indicate that these sulphide-only veins both predate and are locally synchronous with the late-stage tourmaline and sulphide-rich hydrothermal breccias. At the deposit-scale, sulphide mineralisation is zoned from a bornite-rich core outward to chalcopyrite-rich and then outer pyritic haloes, with gold grades closely associated with chalcopyrite and bornite abundance.

7.4.1 Porphyry stockwork mineralisation

The porphyry deposit model is well understood. While each deposit is different in detail, most follow the typical porphyry theme whereby the copper sulphides are broadly associated with sheeted to stockwork quartz, pyrite, chalcopyrite and bornite veins which are surrounded by disseminated pyrite.

At Kharmagtai this pattern stands, although as the mineralisation is structurally controlled many of the deposits form as sheeted veining within wall rock rather than wrapping around a causative intrusive. There are discussions amongst the geology group at Xanadu whether any causative intrusive has been drilled to date, which has significant implications for the potential scale of the project.

In the standard porphyry model the bulk of copper mineralisation occurs early in the intrusive history and copper input wanes over time. At Kharmagtai there appears to be multiple copper events with an early system producing a broad halo of copper bearing quartz veining which has been overprinted by later stage chalcopyrite veins (c-veins). Examples of this are the Southern Stockwork Zone at Stockwork Hill and the Copper Hill deposit, where high-grade copper and gold occurs as earlier b-veins have been re-opened and crosscut by chalcopyrite-only veining.

Sulphide species zonation within porphyry deposits is also well understood. In the standard model the core of a deposit is bornite mineralisation, grading outwards/upwards to chalcopyrite mineralisation with a broad halo of barren pyrite. This pattern presumably represents a down temperature chemical process and a relative lack of copper versus sulphur and iron in the system.

At Kharmagtai the zonation is broadly consistent with the accepted sulphide species zonation, although bornite mineralisation is only recently being drilled in the lower portions of Stockwork Hill and to date the other five deposits have very limited bornite. This strongly suggests the drilled portions of the deposits are only the tops of the system and the greater part of the system is yet to be drilled.

Copper to gold ratios of the porphyry stockwork mineralisation average 1% Cu to 1 g/t Au in the early stockwork, 1% Cu to 2 g/t Au in the higher-grade C-vein upgrade and 1% Cu to 3 g/t Au in the bornite zone.

7.4.2 Tourmaline breccia mineralisation

Tourmaline breccia (TBX) mineralisation occurs throughout the lease. However, the only mineralised tourmaline breccia of potentially economically significant size occurs at Stockwork Hill. The tourmaline breccia body at Stockwork Hill crosscuts the earlier porphyry mineralisation. The breccia is variably mineralised with a larger body of weakly mineralised breccia containing lozenges of much higher grade at the margins of the breccia. Three different models for formation of the TBX were postulated and each has implications for resource definition and exploration.

As noted in works by Kirwin, 2020, the TBX has formed as an elongated breccia pipe. Internal variations in fragment size and matrix type within this pipe occur with larger slabby fragments on the ends of the lobe and fine rock flour within the matrix in the core. The model implies mineralisation will be focused around the larger slabby fragments due to increased porosity and less within the core (Figure 7-7). The aforementioned implied mineralisation geometry is based on observations from numerous mineralised and unmineralized tourmaline breccias from throughout the world.

Works completed by Cooke, 2018 over the Kharmagtai Project have invoked a conceptual model closer to the Los Bronces Deposit in Chile within which multiple breccias occur within a cluster appearing to create a suitable host rock for later mineralisation.

Oliver, 2015 has postulated the TBX formed as classic dilatant cavity and related collapse in a bent reverse faulted regime. The investigations undertaken by Oliver, 2015 are based on several weeks of detailed geological logging and mapping at Kharmagtai wrapped around the structural framework provided by Woodcock and Mort (2008) (Figure 7-8).

Both Kirwin's and Oliver's models provide a mechanism to explain the location of higher-grade tourmaline breccia mineralisation at Stockwork Hill, although the current dataset cannot falsify either.

Investigations which are currently underway are anticipated to provide sufficiently consistent data to define the 3D distribution of breccia facies and contribute to understanding the TBX origin. Exploration strategies for TBX style mineralisation would differ significantly depending on the model used to frame drill hole targeting.

Copper to gold ratios within the tourmaline breccia average 1% Cu to 0.5 g/t Au although the silver content of the TBX is generally higher than the stockwork mineralisation.

Figure 7-7: Slide from Kirwin's Frieberg Student Chapter conference, August 2020

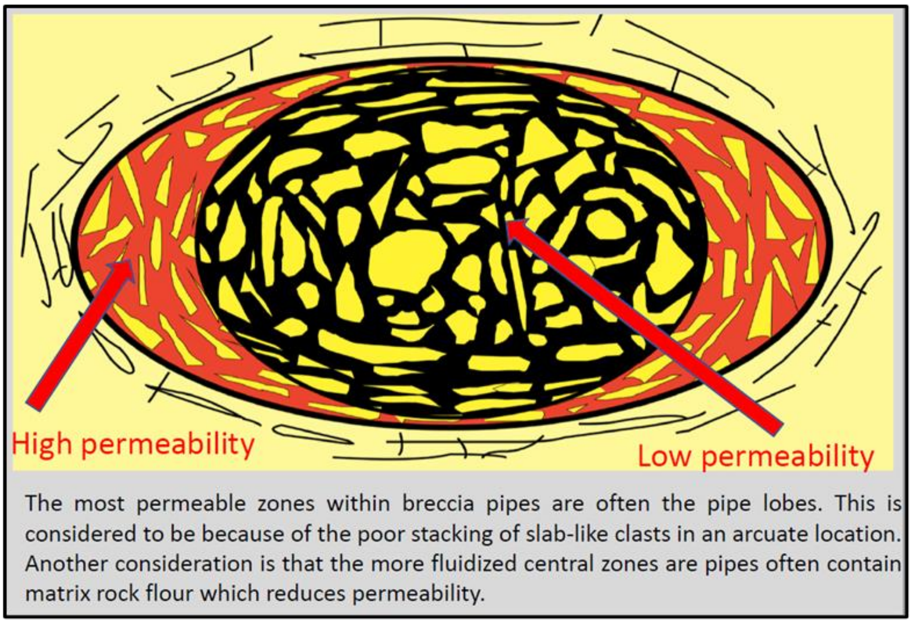
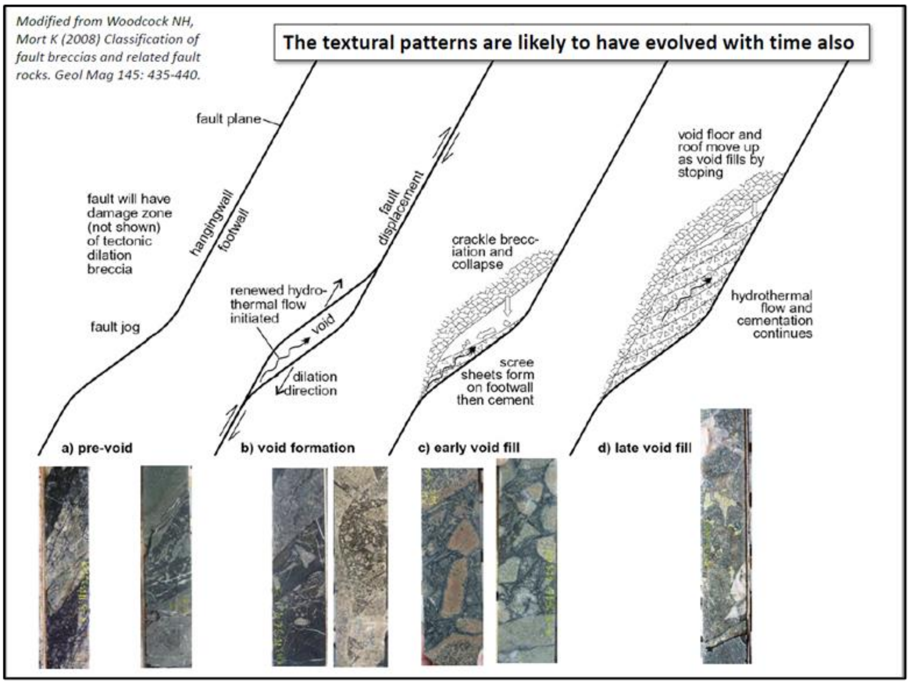


Figure 7-8: Oliver's model of TBX formation (from November 2015 field report)



7.4.3 Epithermal (carbonate base metal vein) mineralisation

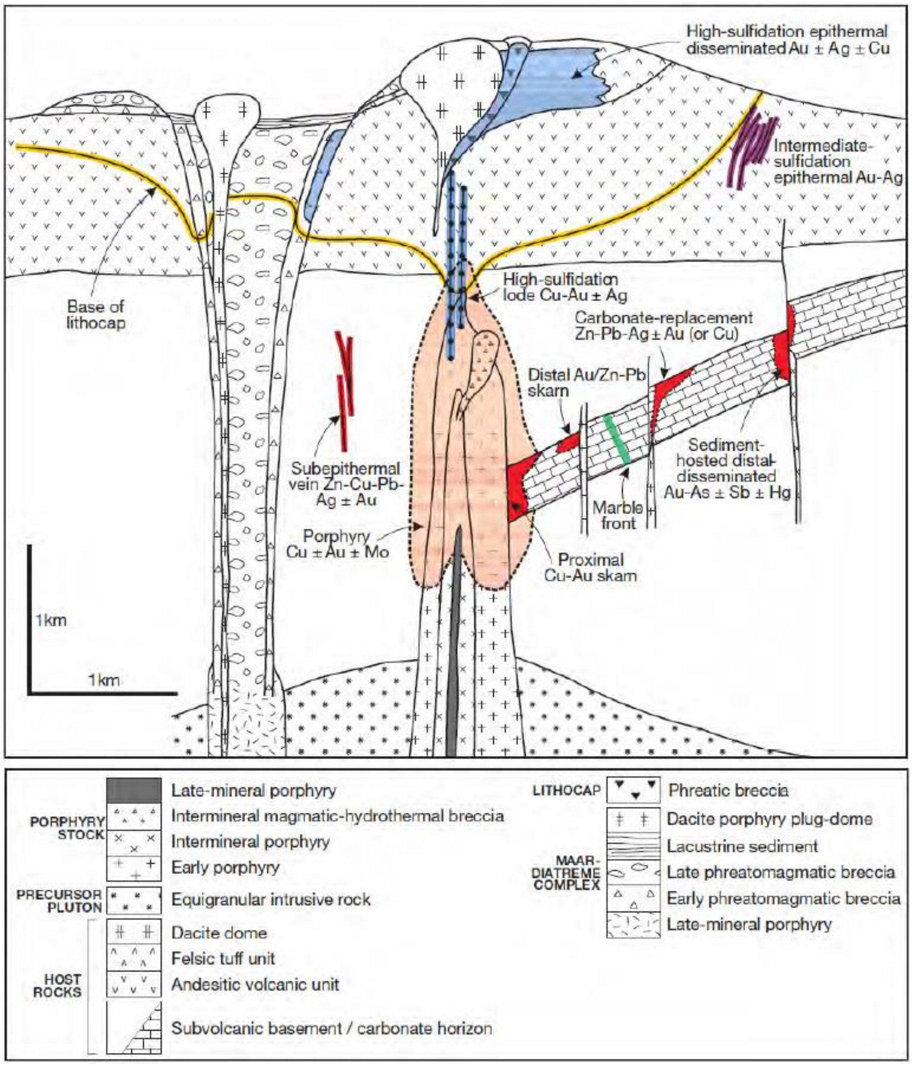
The final stage of mineralisation at Kharmagtai consists of carbonate base metal veins which form within late-stage structures cutting all rock types and mineralisation styles. These commonly occur as 10 cm to 2 m wide veins containing calcite-quartz-siderite-pyrite-chalcopyrite-galena and sphalerite.

Within the vein system, veins often run to 50–100 g/t Au, although vein widths and continuity currently preclude economic interest. The chemical signature (Au-Cu-Ag-Pb-Zn-As) of the epithermal veins are useful fault markers and allow mapping of specific structures between disparate drill holes.

8 Deposit types

Mineralisation at Kharmagtai is classified as porphyry style. Porphyry copper-gold deposits are formed from magmatic hydrothermal fluids typically associated with felsic to intermediate intrusive stocks that have deposited metals as sulphides, both within the intrusive and the intruded host rocks. Quartz stockwork veins are typically associated with sulphides occurring both within the quartz veinlets and disseminated throughout wall rock. Typical alteration patterns consist of potassic altered cores, grading outward to propylitic altered margins and grading upward to overprinted phyllic alteration. Porphyry deposits are typically large tonnage deposits ranging from low to high grade and are generally mined by large scale open pit or underground bulk mining methods. Richard Sillitoe's Economic Geology review paper entitled 'Porphyry Copper Systems' (Sillitoe, 2010) provides an excellent summary overview of the porphyry Cu magmatic-hydrothermal mineral system. The following porphyry mineral system summary diagram (Figure 8-1) is reproduced from Sillitoe 2010.

Figure 8-1: Schematic anatomy of a telescoped porphyry Cu mineral system



Source: Sillitoe, 2010

9 Exploration

9.1 Summary of relevant work

A significant amount of exploration work has been conducted by Xanadu since the acquisition of the Kharmagtai Project in late 2014. Initially, work was directed towards data compilation and review, re-logging previously drilled holes and surface validation via mapping. Historical geophysics was re-processed using modern geophysical processing methods.

Preliminary drill programs in early 2015 were focused on extending known mineralisation at Stockwork Hill targeting the tourmaline breccia system, previously thought to be barren and diluting stockwork mineralisation. This led to the discovery of the high-grade tourmaline breccia system at Stockwork Hill. A maiden JORC Mineral Resource estimate was released in 2015.

In 2016 exploration turned to the basin east of the three existing deposits. A program of pattern geochemistry was conducted by drilling rotary mud through the barren cover and 6 m of diamond core into the top of basement rocks. This allowed for the main features of porphyry systems to be mapped and logged under the basin and for whole rock geochemistry to be conducted. This program led to the immediate discovery of Golden Eagle and Zephyr and the identification of many new geochemical targets.

In 2017 a full re-log of all drill core at Kharmagtai was conducted using the Anaconda Logging Method. This assisted in building 3D geological models of the deposits and exploration under cover. At the same time a program of ASD data collection was conducted on all previous drilling using ‘TerraSpec’ to assist in mapping the porphyry related alteration systems at Kharmagtai. This work led to the discovery of the Zaraa deposit in late 2017.

In 2018 the entire Kharmagtai lease was remapped using the Anaconda Mapping method, focusing on the visible features of porphyry systems (vein densities, feldspar and mafic mineral alteration etc.).

Exploration has continued with additional drilling targeting extensions to existing deposits and new zones of mineralisation, geophysics (CSAMT) and continued data collection from previous drilling. In 2018-19 the high-grade bornite zone was discovered at Stockwork Hill via a combination of 3D geological interpretations based off this new data and detailed structural reviews of the deposit. In 2020 two GeoTek ‘Boxscans’ were installed at Kharmagtai to re-image all the previously drilled and new drill core collecting high resolution imagery, laser scans, magnetic susceptibility, and other data. Machine learning algorithms are currently being developed to automatically log the core for lithology, alteration, sulphide abundance, vein types and abundance and rock property data. This is being conducted to allow highly accurate 3D geological, geochemical, geophysical and rock property models to be built to assist the study phases at Kharmagtai.

9.2 Data compilation and drill hole locations

All drill holes at Kharmagtai were relogged using the Anaconda Logging Method, standardising the logging outputs. This work was conducted by a small group of geologists being supervised by a highly experienced senior geologist who calibrated the loggers daily ensuring inter geologist variability was reduced. Some drill holes were logged multiple times to standardise lithological and alteration logging between holes and loggers.

All drill holes at Kharmagtai were re-surveyed/located by a professional Mongolian Surveyor via differential global positioning system (DGPS).

9.3 Trenching

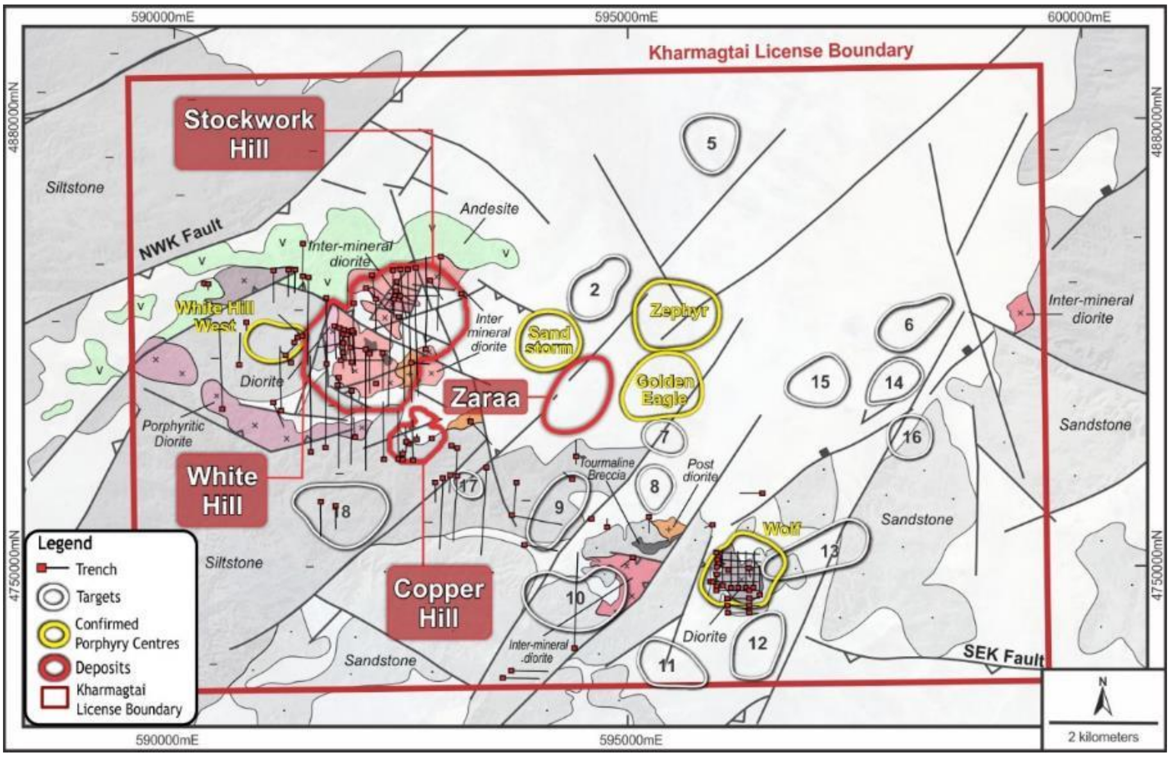
Trenching is a common exploration technique in Mongolia where shallow alluvium covers outcrops. A significant amount of trenching was conducted at Kharmagtai by previous explorers (Figure 9-1). This trenching is mostly focused on the three first discovered deposits.

Trenching was conducted by Xanadu at White Hill and Stockwork Hill where strong visible oxide copper was seen at surface when only limited drilling had been completed. Seventeen trenches totalling 5,618 m were excavated. Each trench segment was excavated, sampled, logged and backfilled in the same day due to safety and environmental concerns.

All trenches were surveyed using a DGPS, logged for lithology, alteration and structure by a certified geologist. Sampling was conducted by laying a plastics sheet on the trench floor and channel sampling using hammer and chisel into a halved piece of large gauge PVC pipe to reduce contamination. Samples were collected from approximately 10 cm above the toe of the trench and consisted of 2 m intervals.

While chip channel sampling is less precise (in terms of sample support) than drill core, in the opinion of the Qualified Person, the strict sampling protocols employed, coupled with all trench samples being taken from oxide material, 2 m sample intervals, and the distributed nature of porphyry copper-gold oxide domain mineralisation, in combination with significant spatially coincident drill hole data, provides sufficient sample support to justify the inclusion of the trench sample data into the oxide component of the MRE.

Figure 9-1: Trench locations over summary geology



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx
Note: XAM data, drafted by Naran Judger, 2021

9.4 Geophysical surveying

A large amount of detailed geophysical work was conducted by IMMI and AGC. This work has been re-processed by Xanadu using modern geophysical processing. The previous geophysics includes 25 m spaced ground magnetics, ground gravity, airborne gravity, gradient array IP and 3D MIMDAS IP.

Xanadu contracted Fathom Geoscience to reprocess this data and produce 3D geophysical inversions constrained by geology. In 2015 an additional 1,200 line-km of ground magnetics was conducted by Xanadu, infilling previous surveys. The entire Kharmagtai lease was covered with 100 m gravity in 2016 for 2,225 gravity stations.

In 2017 the 3D inversions we're reprocessed by Barry de Wet to produce highly detailed 3D magnetic and gravity models. These were combined into self-organising maps (SOMs) to help constrain the geophysical properties of known mineralisation and search for similar properties in un-explored areas.

In 2020 a large scale CSAMT survey was conducted to image the regional scale structures across the lease. This survey consisted of 60.5-line km of CSAMT (19 lines and 603 stations). Receiver spacings were set at 100 m to allow a high-resolution product and a depth of investigation to 1,000 m.

Each deposit at Kharmagtai displays a different geophysical characteristic. The Stockworks zones at Copper Hill, White Hill, Golden Eagle and Stockwork Hill are magnetic features in the regional dataset, however, Zaraa and Zephyr fall on the flanks of magnetic features. The tourmaline breccia zone at Stockwork Hill is a zone of magnetic destruction. White Hill, particularly the western edge of White Hill has a strong IP chargeability response, however, other deposits do not show a strong or consistent IP response. Zaraa has a large halo of IP chargeability, however, the mineralised zone does not.

9.5 Geochemistry

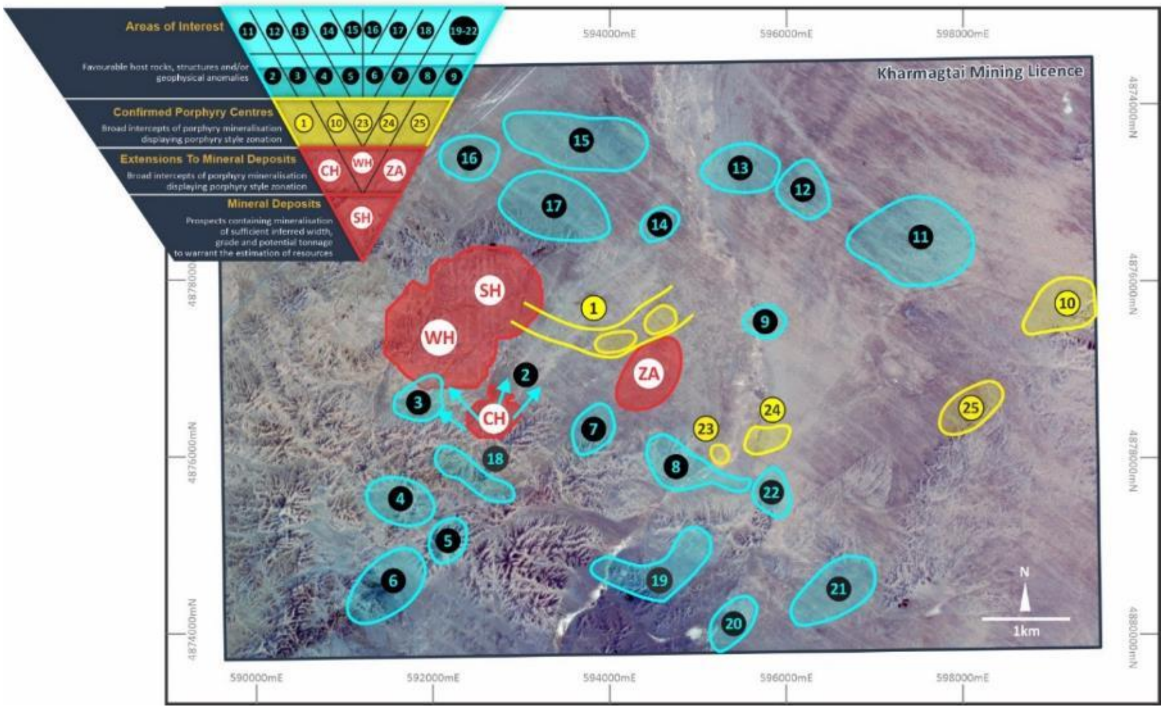
Previous workers (IMMI) conducted a significant amount of rock chipping across the Kharmagtai lease with 3,158 samples collected and assayed for seven elements (Au, Cu, Ag, As, Pb, Zn, Mo). Additional rock chipping was conducted by Xanadu with 187 samples collected and assayed for the same element suite used by the drilling.

In 2016 a program of whole rock geochemistry was conducted in conjunction with the top-of-basement whole rock drilling to allow a complete geochemical map of the Kharmagtai lease to be generated. Samples were submitted for four-acid ICPMS analysis for 61 elements and major elements via XRD and gold by fire assay. The objective of the whole rock geochemical work was to use the pathfinder elements footprint model developed by Cohen (2011) and reported by Halley et al. (2015).

9.6 Targeting

Targeting methodologies focus on using the outputs of the Anaconda Logging and Mapping combined with geochemistry supported finally by geophysics. The current target locations and ranking can be seen in Figure 9-2.

Figure 9-2: Target and deposit locations



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Note: XAM data, drafted by Naran Judger, 2021.

10 Drilling

At the time of writing this report and due to COVID restriction limitations, SGC was not able to undertake the conventional site and laboratory investigations which are regarded best practice, and as such, all aspects pertaining to data, sampling and assaying are taken at face value as supplied by Xanadu to SGC.

10.1 Grid convention

The project coordinates are in the Universal Transverse Mercator projection (UTM), Zone 48 North, World Geodetic System 84 (WGS84) datum.

All data were supplied by Xanadu in the form of UTM_48N grid convention with drilling sites located using non specified DGPS methods.

10.2 Drill hole data

A summary showing database drilling details for Kharmagtai and associated areas is presented in Table 10-1. The assay file was subsequently composited to 4 m composites as deemed appropriate by Xanadu for use in geometry modelling and subsequent resource estimation.

The drilling database contains historical data from July 1996 through to the present (October 2021). The close-off of the database was staggered based on delivery of final drill hole data and on the basis on the completion of each area interpretation phase. The final data/s were supplied to SGC on 27 October 2021. It is understood by SGC that drilling continued beyond the close-off of the database as noted above, these data/s will be incorporated in the next iteration.

It should be noted that although the database contains data spanning as far back as 1996, some of the historical data was deemed by the investigation team to be unfit for use in the estimation phase of the work.

In total there are 1,522 records in the collar file which cover a range of sampling methods.

Table 10-1: Collar file data by method (Kharmagtai and associated) – closed-off database October 2021

Method	Count	Sum (m)	Average (m)	Description
DDH	481	212,840.71	442.5	Diamond Drilling
Hydro	1	80	80.0	Hydraulic Drilling
PCD	664	26,136.6	39.36	Percussion Drilling – nonspecific
RC	228	38,773.7	170.06	Reverse Circulation
RCDH	24	6,662.85	277.62	Reverse Circulation with Diamond Tail
TR	123	45,392.65	369.05	Surface Trenching
NO RECORD	1	154.1	154.1	No record

The assay file contains 138,450 records as at 27 October 2021 and assay results generally cover a full suite of 34 elements (for Xanadu) as follows Au_PPM, Cu_PPM, Mo_PPM, Ag_PPM, Al_PPM, Ba_PPM, Be_PPM, Bi_PPM, Ca_PPM, Cd_PPM, Co_PPM, Cr_PPM, K_PPM, La_PPM, Li_PPM, Mg_PPM, Mn_PPM, Na_PPM, Ni_PPM, P_PERCENT, V_PPM, Sb_PPM, Sc_PPM, Sn_PPM, Sr_PPM, Ti_PPM, As_PPM, Pb_PPM, Zn_PPM, W_PPM, Y_PPM, Fe_PERCENT, Zr_PPM and S_PPM.

The survey file contains 10,923 records as at 27 October 2021, with numerous measurements down hole at regular intervals which vary from hole to hole, generally at or near every 30 m down hole.

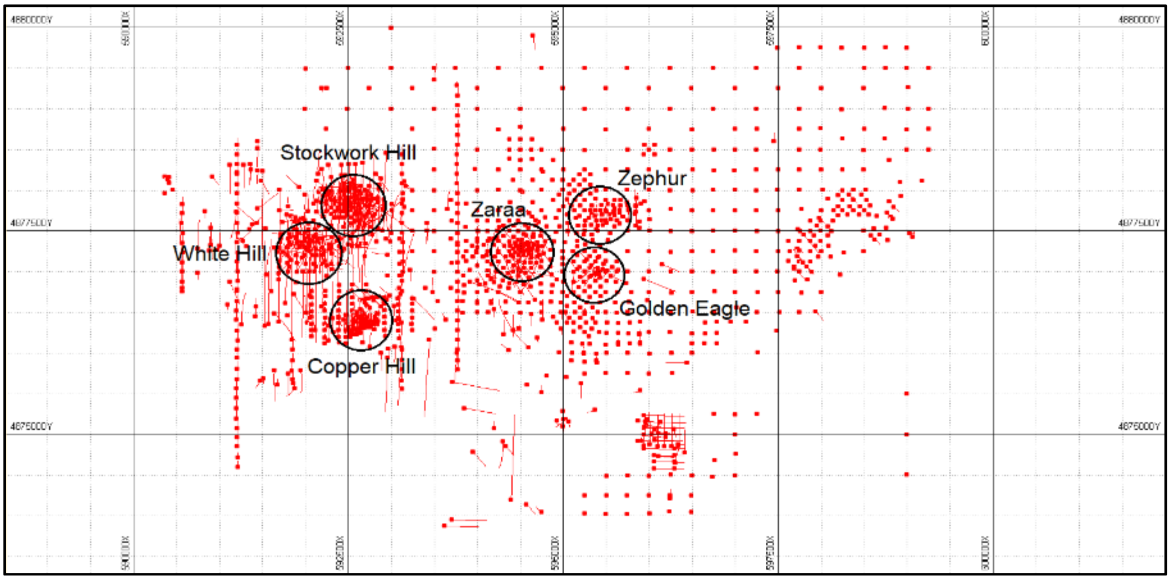
The lithology file contains 49,040 records as at 27 October 2021 with intervals being logged at geological intervals and samples broadly speaking (for DDH drill holes) at 2 m sample intervals.

10.3 Drill hole spacing

At Kharmagtai, drilling was completed on approximately 40 m section spacing and holes spaced approximately 40 m apart along sections, although many holes are drilled off section and at a range of azimuths. In some areas where the mineralisation is of particular interest and in-line with the historical approach to delineation a number of sections are drilled down to 20 m on sections.

The drill spacing (Figure 10-1) is considered appropriate at this stage of development to appropriately define the geometry and extent of the larger to medium scale continuity and smaller scale local variability of the mineralisation for the purpose of estimating of Cu, Au, Mo and S given the understanding of the local project geology, structure and confining formations.

Figure 10-1: Plan of drill collars at the Kharmagtai deposit



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report - Feb28-2022.docx

Note: XAM data, drafted by Robert Spiers, 2021.

As can be seen in Figure 10-1, the bulk of the drilling has been focussed over three main zones, Stockwork Hill, White Hill and Copper Hill. In addition, significant drilling has also been undertaken over other important mineral occurrences of Zaraa, Zephyr and Golden Eagle project areas.

It is understood by SGC that drilling is ongoing over the Kharmagtai project scheduled for completion first quarter of 2022 in-line with company strategy.

SGC recommends further drill testing be undertaken to define more clearly the limits, geometry and style of the short scale mineralisation continuity present in all project areas with particular emphasis on the ore zones which contribute most significantly to the resource and for which structural complexity is significant such as Stockwork Hill TBX zones on the north-eastern flank of the Mid Area.

10.4 Collar and down-hole surveys

Down-hole surveys are conducted at regular interval and are recorded by Gyro (no specific information is present in the database as to what form of Gyro is being employed).

All survey records within the survey file pertaining to historical drilling are taken at face value. SGC has not undertaken any validation with respect to the survey data and are not aware of the extent to which Xanadu have taken steps to account for the accuracy of the survey database.

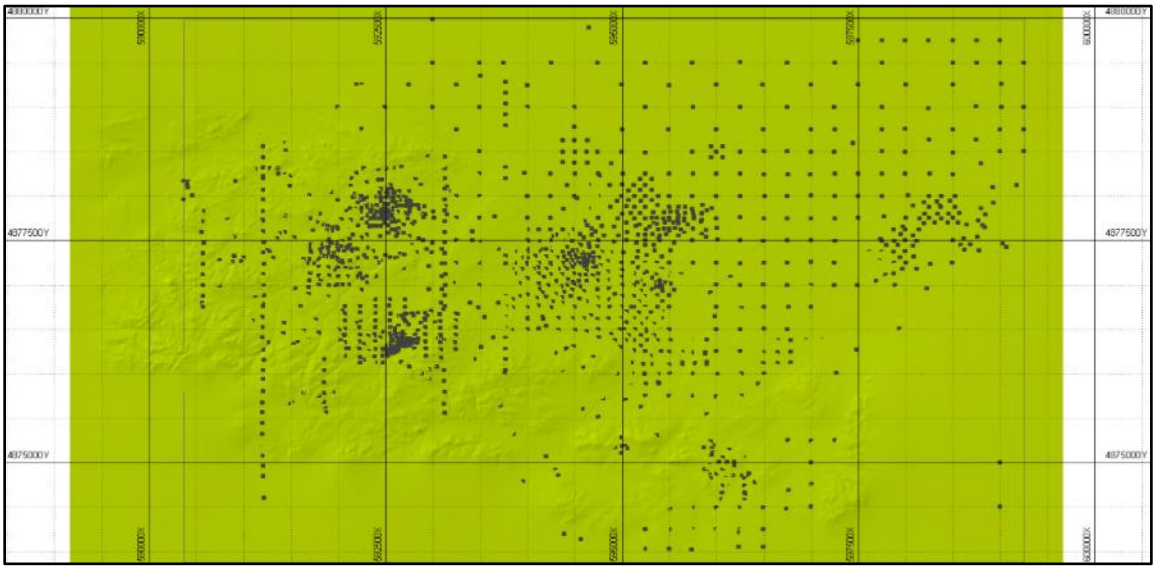
The recent infill drilling was combined with the historical dataset and the combined survey dataset now consists of 10,923 records.

10.5 Topography

Xanadu provided SGC with a topographic surface, a base of oxidation surface and a top of fresh rock surface, Figure 10-2 illustrates the topographic surface as of 2021. The project topography is based on 1 m contours from satellite imagery acquired in 2020 with an accuracy of ± 0.1 m.

To the best of SGC’s knowledge the topographic surface was produced by an Airborne Laser Scanning (LiDAR) survey was carried out over the Kharmagtai and adjacent areas as seen in Figure 10-2. SGC is not aware of the details of the processing and production of the aforementioned surfaces and as such take the surfaces at face value from Xanadu.

Figure 10-2: Topographic surface for the Kharmagtai deposit

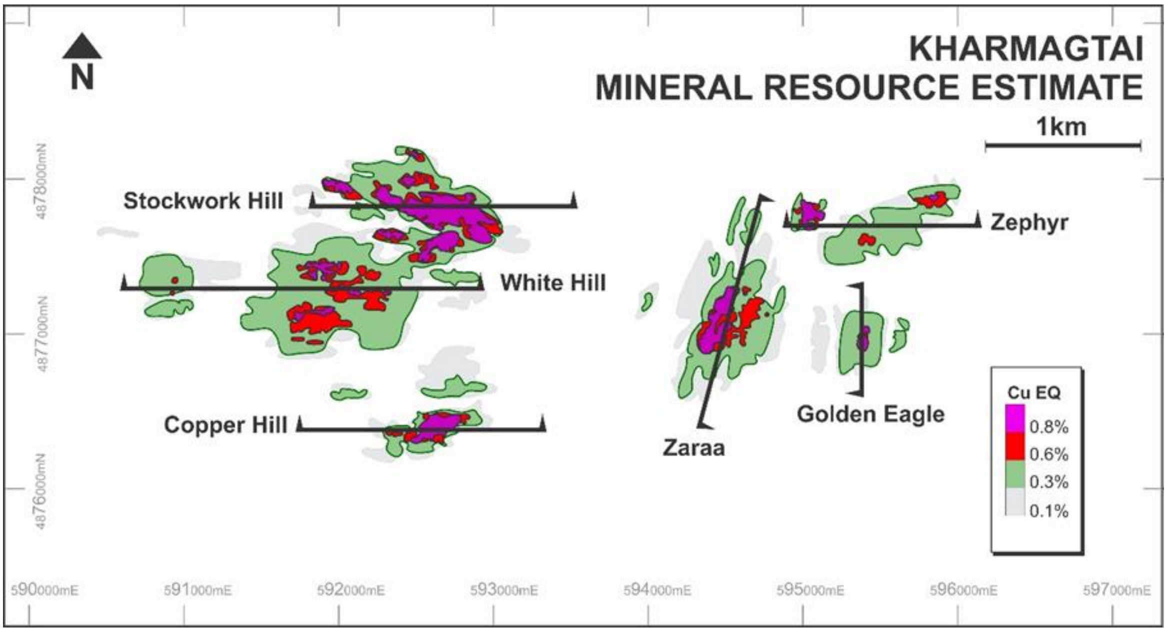


Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx
Note: Xanadu data, drafted by Robert Speirs, 2021

10.6 Sampling method and approach

There are six discrete deposits within the updated MRE with differing data densities (Figure 10-3), these will be discussed separately below.

Figure 10-3: Plan view of the Kharmagtai district, displaying the Mineral Resource estimate, where legend CuEq=CuEqRec

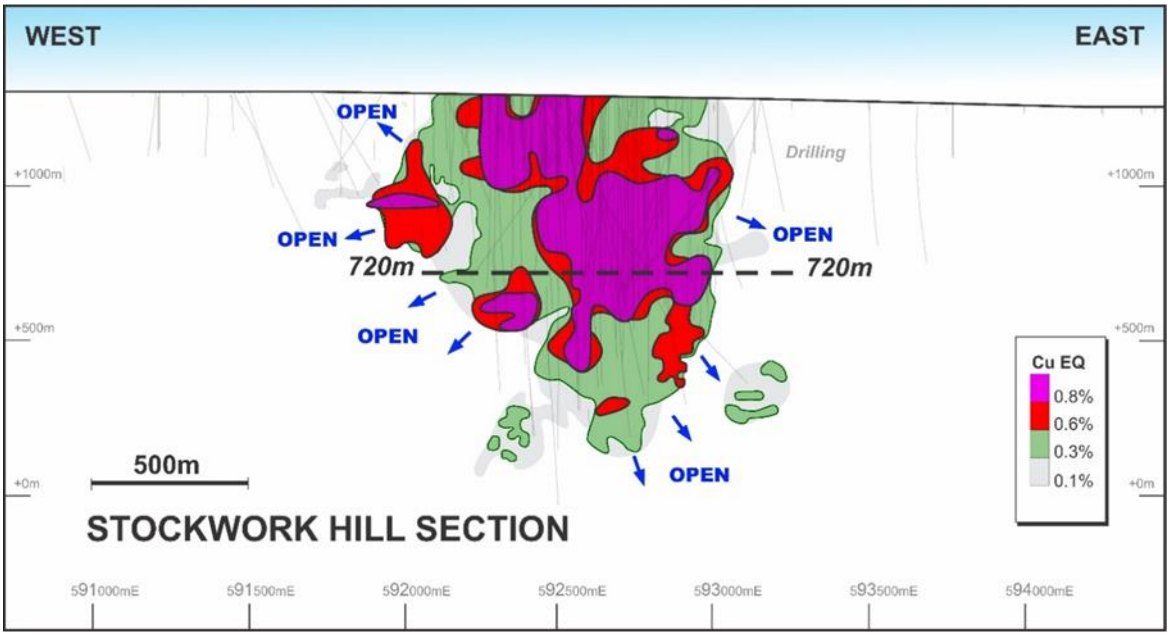


Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx
Notes: Xanadu data, drafted by Naran Judger, 2021

10.6.1 Stockwork Hill

The Stockwork Hill deposit describes broadly east-west trending, vertical tabular body of mineralisation above 0.1% CuEq that is 1,075 m long (at surface), 380 m wide and is drilled to 1,125 m from surface (Figure 10-4).

Figure 10-4: Long section of the Stockwork Hill deposit, displaying the Mineral Resource estimate extents in relation to drilling, where legend CuEq=CuEqRec



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx
Note: Xanadu data, drafted by Naran Judger, 2021.

The drilling metres and sample numbers for drilling at Stockwork Hill are detailed in Table 10-2.

Table 10-2: Drilling statistics for Stockwork Hill

Drilling type	Metres drilling	Number of Assays/Samples
Diamond	99,443.46	46,040 samples
RC	4,491.00	2,221 samples
Rotary Mud	120.20	18 samples
Trenching	10,468.90	3,013 samples
Total	**114,523.56**	**51,292 samples**

Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report - Feb28-2022.docx

Stockwork Hill has been the focus of most of the drilling of all deposits at Kharmagtai with ~100 km of diamond drilling and 46,000 samples assayed. Drill spacings within the mineralised zone average ~50 m. Drill directions range from south to north for most of the early IMMI drilling, to variable drill orientations during Xanadu drilling. Variable orientations were used to help understand structural features.

The drill hole dips are generally steep (60 to 70 degrees) which introduces a potential sample bias by drilling at a low to moderate angle to the mineralised body. Steep orientations were used as the drilling equipment is not capable of drilling at a low angle to the mineralised body and drill hole deviations increase at low angles.

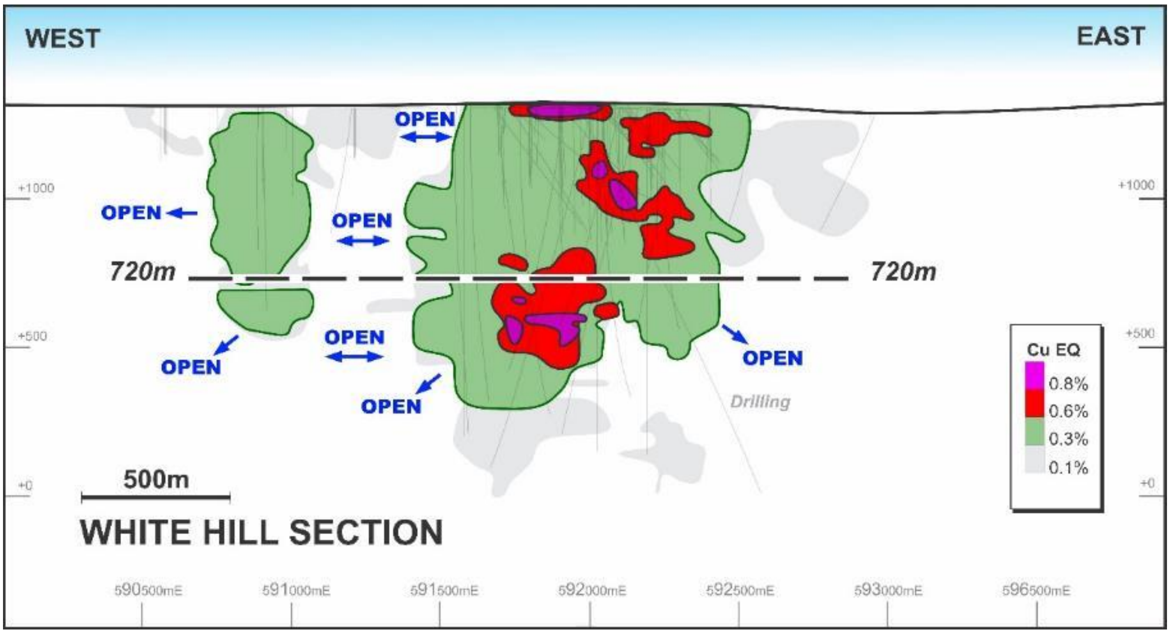
Sample intervals are nominally 2 m composites. Prior to 2016 sampling was conducted on regular 2 m intervals with no regard to geology. In 2016 the sampling protocol was changed to sample to geological/lithological boundaries. Samples start or finish at lithological contacts. Sampling remains nominally at 2 m but for narrower geological features can be brought down to 30cm.

Lithologies and geological controls to mineralisation are described in detail in section 14 of this report.

10.6.2 White Hill

The White Hill Deposit describes a body of mineralisation above 0.1% CuEq that is 1,000 m long (at surface), 800 m wide and is drilled to 1,000 m from surface (Figure 10-5). There is a separate body of mineralisation to the west (350 m x 250 m x 600 m) that with drilling could be joined to the main body of mineralisation.

Figure 10-5: Long section of the White Hill deposit, displaying the Mineral Resource estimate extents in relation to drilling, where legend CuEq=CuEqRec



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx
Notes: Xanadu data, drafted by Naran Judger, 2021.

White Hill drilling statistics are detailed in Table 10-3.

Table 10-3: Drilling statistics for White Hill

Drilling type	Metres drilling	Number of Assays/Samples
Diamond	39,183.81	16,450 samples
RC	9,995.30	5,006 samples
Rotary Mud	33.00	6 samples
Trenching	14,389.10	5,301 samples
Total	**63,601.21**	**26,763 samples**

Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Drill spacings within the mineralised zone at 1,200 mRL (80 m from surface) average ~50 m. This spacing broadens to ~75 m at 900 mRL (400 m from surface) and to greater than 150 m below 700 mRL (600 m from surface). Drill directions range from south to north and east to west for most of the early IMMI. Post 2015 drilling is generally directed from the south to the north. Variable orientations were used to help understand structural features. Drill dips are generally shallower than Stockwork Hill (55 to 65 degrees) which introduces less of a potential sample bias by drilling at a low to moderate angle to the mineralised body. Shallow orientations were used by IMMI as the drill rig type was capable of shallower angles (Longyear, LM40's). Steep orientations were used by Xanadu as the drilling equipment (UDR style rigs) are not capable of drilling at a low angle to the mineralised body and drill hole deviations increase at low angles.

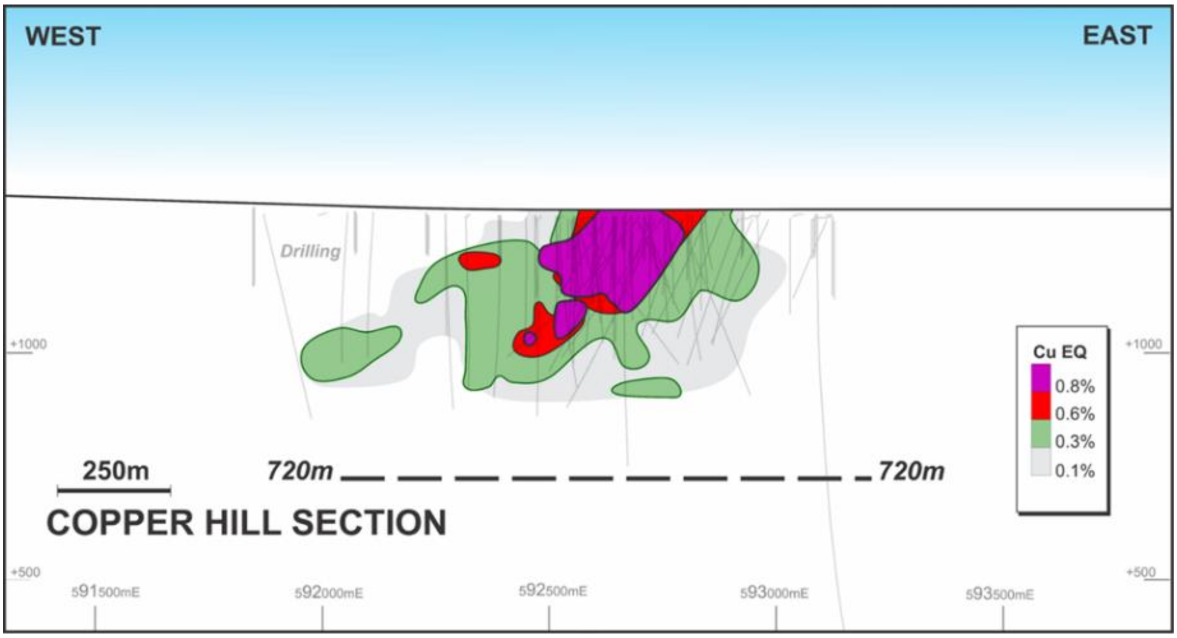
Sample intervals are nominally 2 m composites. Prior to 2016 sampling was conducted on regular 2 m intervals with no regard to geology. In 2016 the sampling protocol was changed to sample to geological/lithological boundaries. Samples start or finish at lithological contacts. Sampling remains nominally at 2 m but for narrower geological features can be brought down to 30 cm.

Lithologies and geological controls to mineralisation are described in detail in section 14 of this report.

10.6.3 Copper Hill

Copper Hill is a smaller, but higher-grade zone of mineralisation describing a plunging flattened cigar shaped body (Figure 10-6). This body plunges at ~50 degrees towards 240 degrees. The plunge length of Copper Hill is approximately 600 m long and is 150 m by 200 m in cross section.

Figure 10-6: Long section of the Copper Hill deposit, displaying the Mineral Resource estimate extents in relation to drilling, where legend CuEq=CuEqRec



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx
Note: Xanadu data, drafted by Naran Judger, 2021.

The drilling statistics for Copper Hill are detailed in Table 10-4.

Table 10-4: Drilling statistics for Copper Hill

Drilling type	Metres drilling	Number of Assays/Samples
Diamond	23,648.71	11,258 samples
RC	8,527.00	4,227 samples
PCD	18.00	3 samples
Trenching	4,555.00	1,430 samples
Total	**36,748.71**	**16,918 samples**

Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report - Feb28-2022.docx
Notes: Rotary mud samples are diamond drilling samples taken from the base of a rotary mud collar.

Drill spacings within the mineralised zone at Copper Hill average ~25 m. Drill are dominantly from south to north. Post 2015 drilling variable. Variable orientations were used to help understand structural features. Drill dips are generally shallower than Stockwork Hill (55 to 65 degrees) which introduces less of a potential sample bias by drilling at a low to moderate angle to the mineralised body.

Shallow drilling orientations were used by IMMI due to the drill rig type being capable of shallower angles (Longyear, LM40's) Steep orientations were used by Xanadu as the drilling equipment (UDR style rigs) are not capable of drilling at a low angle to the mineralised body and drill hole deviations increase at low angles.

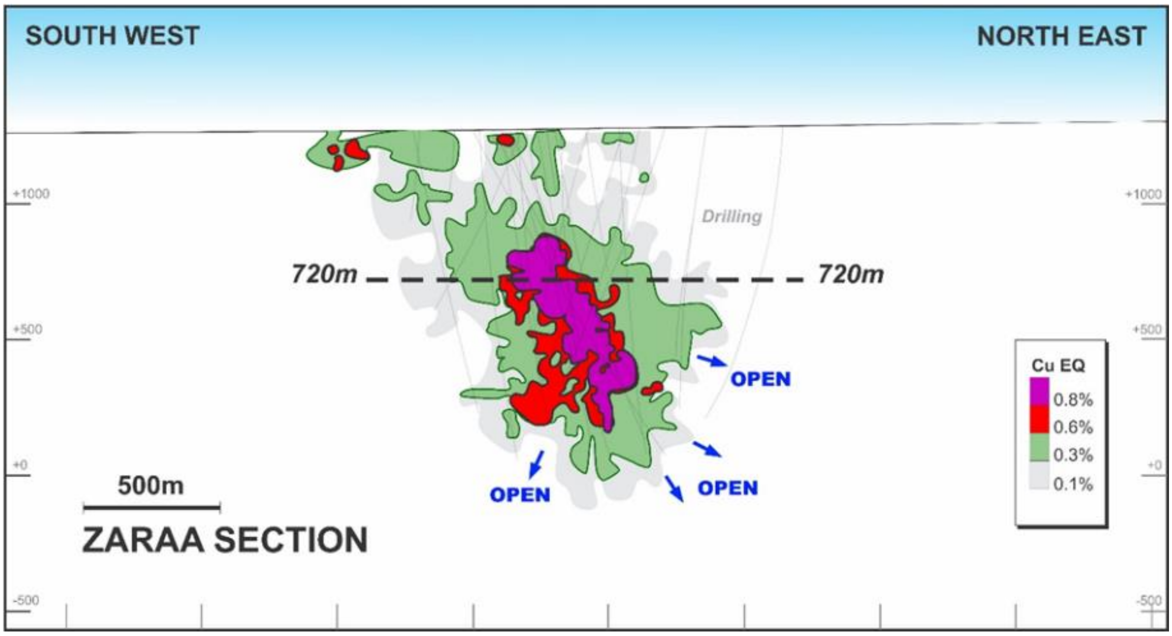
Sample intervals are nominally 2 m composites. Prior to 2016 sampling was conducted on regular 2 m intervals with no regard to geology. In 2016 the sampling protocol was changed to sample to geological/lithological boundaries. Samples start or finish at lithological contacts. Sampling remains nominally at 2 m but for narrower geological features can be brought down to 30 cm.

Lithologies and geological controls to mineralisation are described in detail in section 14 of this report.

10.6.4 Zaraa

Zaraa describes a broadly tabular body of mineralisation that strikes NNE-SSW and plunges at approximately 58 degrees. The dimensions of mineralisation above 0.1% CuEq is ~1,000 m along strike, 600 m across strike and 1,000 m down plunge (Figure 10-7).

Figure 10-7: Long section of the Zaraa deposit, displaying the Mineral Resource estimate extents in relation to drilling, where legend CuEq=CuEqRec



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Notes: Xanadu data, drafted by Naran Judger, 2021.

Drilling statistics for Zaraa and detailed in Table 10-5.

Table 10-5: Drilling statistics for Zaraa

Drilling type	Metres drilling	Number of Assays/Samples
Diamond	32,273.56	15,840 samples
RC	6,705.65	3,103 samples
PCD	5,432.50	856 samples
Trenching	1,638.00	597 samples
Total	**46,049.71**	**20,396 samples**

Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx
Notes: Rotary mud samples are diamond drilling samples taken from the base of a rotary mud collar

Zaraa is a more recent discovery and as the top of the main body of mineralisation is several hundred metres below surface drill spacings are generally broader. Drilling has been directed from all angles and scissor holes employed to assist in determining the true orientation of the mineralised body. As such the drill spacings vary depending on RL.

The top of basement sampling above Zaraa is drilled to 50 m spacings. At the 900 mRL (400 m from surface) the top of the higher-grade portion of Zaraa drill spacings are ~100 m. In the core of the high-grade portion of Zaraa at 700 mRL drill spacings average 75 m. The deeper portions of Zaraa, drill spacings average 100 m.

Variable orientations were used to help understand structural features and determine the orientation of the mineralisation.

The drill hole dips are generally steeper (60 to 70 degrees) which introduces a potential sample bias by drilling at a low to moderate angle to the mineralised body. Steep orientations were used as the drilling equipment (UDR style rigs) are not capable of drilling at a low angle to the mineralised body and drill hole deviations increase at low angles.

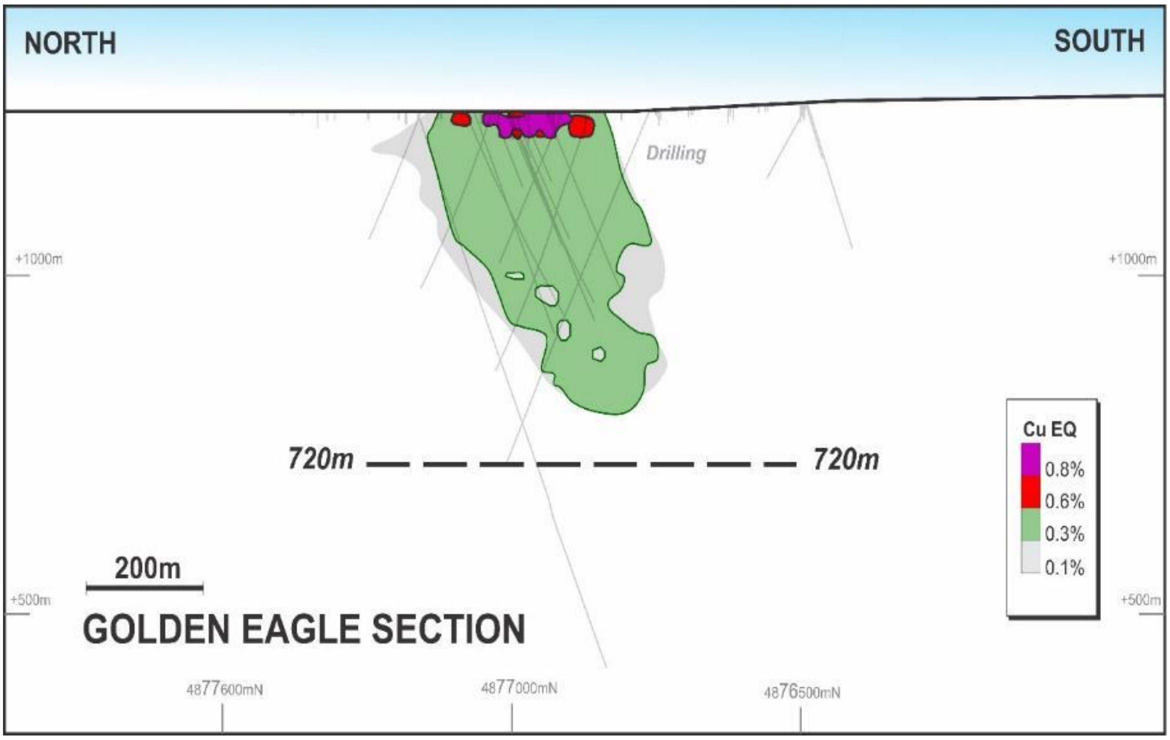
Sample intervals are nominally 2 m composites constrained to geological/lithological boundaries. Samples start or finish at lithological contacts. Sampling remains nominally at 2 m but for narrower geological features can be brought down to 30 cm.

Lithologies and geological controls to mineralisation are described in detail in section 14 of this report.

10.6.5 Golden Eagle

The Golden Eagle Deposit describes a body of mineralisation above 0.1% Cu of 300 m long by 300 m wide drilled to a depth of 450 m (Figure 10-8).

Figure 10-8: Long section of the Golden Eagle deposit, displaying the Mineral Resource estimate extents in relation to drilling, where legend CuEq=CuEqRec



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx
Notes: Xanadu data, drafted by Naran Judger, 2021.

The drilling statistics for Golden eagle are detailed in Table 10-6.

Table 10-6: Drilling statistics for Golden Eagle

Drilling type	Metres drilling	Number of Assays/Samples
Diamond	5,871.0	4,875 samples
RC	1,325.5	1,230 samples
PCD	2,689.6	593 samples
Trenching	0	0 samples
Total	**9,886.1**	**6,698 samples**

Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx
Notes: Rotary mud samples are diamond drilling samples taken from the base of a rotary mud collar

Drill spacings at Golden Eagle are dependent on depth. The initial top of basement drilling which discovered the deposit are drilled at approximately 25 m spacings over the higher-grade gold portion of the deposit. Spacings broaden to 50 m spacings at 1,100 mRL and +100 m below 1,000 mRL. Drill orientations are generally from northwest to southwest and after modelling appear to be parallel to the main trend of mineralisation which has potential to introduce a bias in sampling and geological modelling as discussed in sections 8, 9 and 10 of this document.

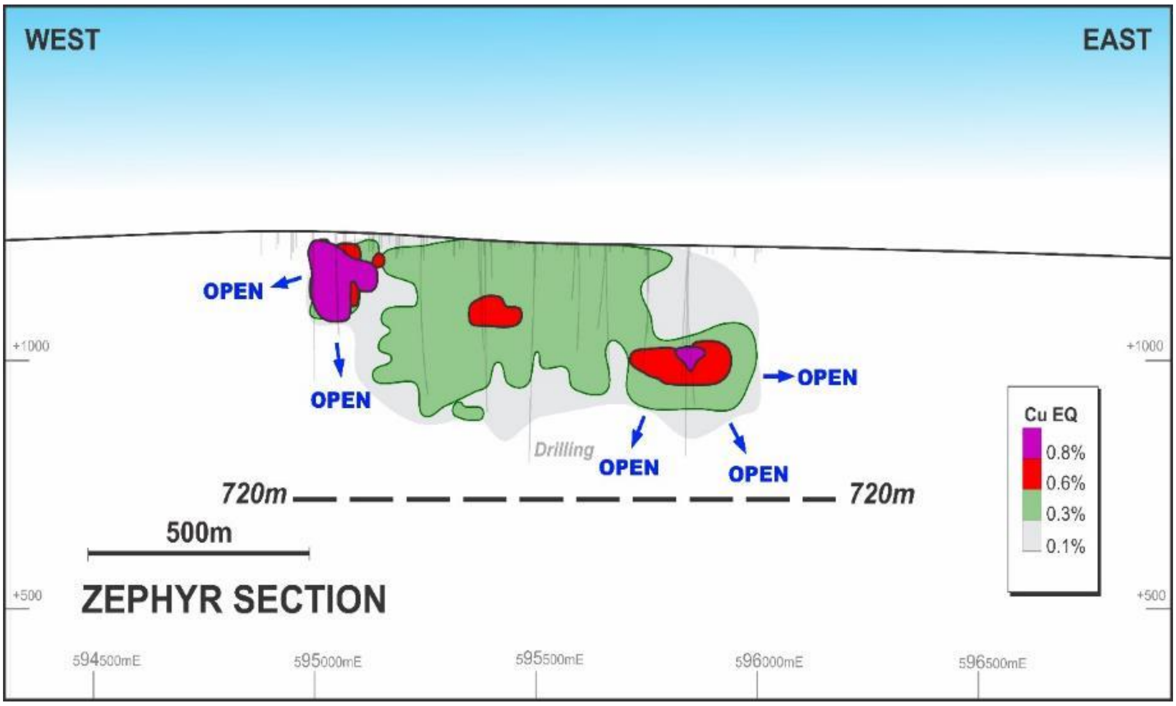
Sample intervals are nominally 2 m composites constrained to geological/lithological boundaries. Samples start or finish at lithological contacts. Sampling remains nominally at 2 m but for narrower geological features can be brought down to 30 cm.

Lithologies and geological controls to mineralisation are described in detail in section 14 of this report.

10.6.6 Zephyr

The Zephyr deposit describes a broadly tabular body that strikes approximately 1,000 m to the west-northwest, is 250 m wide and plunges 400 m approximately 60 degrees to the south (Figure 10-9).

Figure 10-9: Long section of the Zephyr deposit, displaying the Mineral Resource estimate extents in relation to drilling, where legend CuEq=CuEqRec



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx
Note: Xanadu data, drafted by Naran Judger, 2021.

The drilling statistics for Zephyr are detailed in Table 10-7.

Table 10-7: Drilling Statistics for Golden Eagle

Drilling type	Metres drilling	Number of Assays/Samples
Diamond	4,538.0	2,146 samples
RC	1,460.6	617 samples
PCD	3,277.2	304 samples
Trenching	0	0 samples
Total	**9,275.8**	**3,067 samples**

Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx
Notes: Rotary mud samples are diamond drilling samples taken from the base of a rotary mud collar.

Drill spacings at Zephyr are dependent on depth. The initial top of basement drilling which discovered the deposit are drilled at approximately 50 m spacings. Spacings broaden to 100 m at 1,100 mRL. Drill orientations are generally from south to north and cross the mineralisation at a high angle.

Sample intervals are nominally 2 m composites constrained to geological/lithological boundaries. Samples start or finish at lithological contacts. Sampling remains nominally at 2 m but for narrower geological features can be brought down to 30 cm.

Lithologies and geological controls to mineralisation are described in detail in section 14 of this report.

ALS and SGS are independent accredited laboratories operating in Ulaanbaatar, Mongolia. Their relationship to Xanadu is a simple commercial relationship providing sample analysis.

10.7 Diamond drilling procedures

The majority of drilling on the property is diamond coring, with supplementary RC drilling. Both diamond and RC drilling data were used (in conjunction with trench assays) to complete the 2018 Mineral Resource estimate (2018 MRE) update. Diamond coring utilised mainly HQ diameter (63.5 mm core diameter) equipment with triple tubing used historically to increase core recovery. NQ (47.6 mm core diameter) equipment was used for deeper portions of drill holes. HQ coring was also used to sample bedrock at the bottom of rotary percussion drill holes.

All diamond core drilled by Xanadu has been oriented using the ‘Reflex Ace’ orientation tool.

10.8 Core recovery

Core recovery is measured at the core logging area by geology staff where the following measurements are recorded:

- block interval
- drill run (m)
- measured length (m)
- calculated recovery (%).

Recovery measurements were collected during all core programs and recorded in the master Geobank database. Diamond drill core recoveries are assessed using the standard industry practice which involves; removing the core from core trays; reassembling multiple core runs in a v-rail; measuring core lengths with a tape measure, assessing recovery against core block depth measurements and recording any measured core loss for each core run.

Diamond core recoveries average 97% through mineralisation.

Overall, core quality is good, with minimal core loss. Where there is localised faulting and or fracturing, core recoveries decrease; however, this is a very small percentage of the mineralised intersections.

RC recoveries are currently measured by Xanadu using whole weight of each 1 m intercept measured before splitting; however, it is not clear that this procedure has been followed for all historical RC drilling at Kharmagtai.

Analysis of recovery results vs grade shows no significant trends that might indicate sampling bias introduced by variable recovery in fault/fracture zones.

10.9 Reverse circulation drilling

10.9.1 RC sampling procedures

Reverse circulation (RC) drilling methods were used by IMMI for regional reconnaissance purposes, and more recently by Xanadu for preliminary target testing. RC drilling used a 4.375-inch (11.11 cm) face sampling bit. Some of Xanadu's RC holes encountered excessive water ingress that prevented a dry sample from being collected. In these cases, the hole was continued to planned depth using HQ diamond coring.

11 Sampling preparation, analyses and security

Historical drilling data from 1996 through to 2018 has been conducted by a range of companies including, but not limited to, QGX during 1996 to 1997, IMMI during 2002 to 2007 and AGC during 2007 through to 2012. The more recent drilling from 2014 through to the close off-of database in October 2021 has been undertaken by Xanadu. Pre-Xanadu data utilised in this investigation are historical in nature with trenching/drilling, sampling and assaying processes undertaken by a number of different entities and by a range of representatives within each entity over time. The continuity of processes and procedures has been assumed in this instance.

SGC conducted an analysis of the QA/QC outcomes to establish confidence in the data. The integrity and appropriateness of the trench/drilling data will remain the responsibility of Xanadu until such a time as the entire investigation from first principles can be undertaken including a site visit to be scheduled once the COVID restrictions on travel are eased and upon request by Xanadu.

Xanadu has adopted similar protocols and procedures for sample preparation, analyses and security as those historically used by IMMI and AGC as described in the following subsections.

11.1 Onsite sample preparation – diamond core

Diamond core sample preparation procedure is as follows:

- The uncovered core boxes are transferred from the logging area to the cutting shed.
- Long pieces of core are broken into smaller segments with a hammer.
- Core is cut with a diamond saw. The orientation of the cut line is controlled using a standard rotation from the core orientation line, ensuring uniformity of core splitting wherever the core has been successfully oriented. The rock saw is regularly flushed with fresh water.
- Both halves of the core are returned to the box in their original orientation.
- The uncovered core boxes are transferred from the cutting shed to the adjacent sampling area. Standard 2 m sample intervals are defined and subsequently checked by geologists, with sample intervals locally modified to honour geological contacts. The minimum allowed sample length is 30 cm.
- Sample tags are attached (stapled) to the plastic core trays for every sample interval, and sample intervals are marked on both the core and the core box with permanent marker; sample tags are stapled to the box at the end of each 2 m sample interval, sample numbers are pre-determined and account for the insertion of QA/QC samples (core field duplicates, certified reference materials (CRMs), blanks).
- Samples are individually bagged. Each sample is routinely identified with inner tags and outside marked numbers. Samples are regularly transferred to a sample preparation facility in Ulaanbaatar.
- The unsampled half of the core is retained in the core box, in its original orientation, as a permanent record. It is transferred to the on-site core storage area.

Prior to 2015, barren dykes that extend more than 10 m along the core length are generally not sampled. Post 2015, all core drilled is sampled.

The Xanadu reverse circulation drill holes are sampled on 2 m intervals and subsamples taken using a 25:75 riffle splitter at the drill rig. RC samples are uniform 2 m samples formed from the combination of two quarter-split 1 m samples and are not sampled to geological boundaries.

11.2 Onsite sample preparation – RC

Xanadu RC drill holes are sampled on 2 m intervals and subsamples taken using a 25:75 riffle splitter at the drill rig. RC samples are uniform 2 m samples formed from the combination of two quarter-split 1 m samples and are not sampled to geological boundaries.

11.3 Sample analyses

Until recently, routine sample preparation and analyses of IMMI, AGC and Xanadu samples were carried out by SGS Mongolia LLC (SGS Mongolia), which operates an independent sample preparation and analytical laboratory in Ulaanbaatar.

Between 2002 and June 2016, three sample preparation facilities were used. During 2002 and 2003, samples were prepared at SGS Mongolia LLC (SGS Mongolia), which operates an independent sample preparation facility at Manlai. The preparation facility was installed in 2002 as a dedicated facility for Ivanhoe's Kharmagtai Project during its exploration and resource definition stages. Although the facility mostly dealt with samples from the property, it also prepared some samples from other IMMI projects in Mongolia. From 2004 to June 2016, samples were sent to SGS Mongolia facilities at Oyu Tolgoi (IMMI and AGC samples) and Ulaanbaatar (Xanadu samples).

Since June 2016, Xanadu has sent samples to ALS Mongolia LLC for analysis. ALS Mongolia LLC (ALS Mongolia) operates an independent sample preparation and analytical laboratory in Ulaanbaatar.

Sample comminution/preparation and analysis protocols have varied slightly over time with different laboratories. These variations are minor and are highly unlikely to impart any bias to assay results. Prior to June 2016 samples were prepared by SGS Mongolia in line with the following protocols:

- drying
- pre-preparation weighing
- crushed to 75% passing 3.35 mm
- split to 500 g
- pulverised to >85% passing 200 mesh (75 microns)
- split to 150 g.

Prior to 2014, Cu, Ag, Pb, Zn, As and Mo were routinely determined using a three-acid-digestion of a 0.3 g subsample followed by an AAS finish (AAS21R) at SGS Mongolia. Samples were digested with nitric, hydrochloric and perchloric acids to dryness before leaching with hydrochloric acid to dissolve soluble salts and made to 15 ml volume with distilled water. The lower detection limit (LDL) for copper using this technique was 2 ppm. Where copper was over-range (>1% Cu), it was analysed by a second analytical technique (AAS22S), which has a higher upper detection limit

(UDL) of 5% copper. The gold analysis method prior to 2014 was essentially from the same as that used between 2014 and 2016 as described below.

Between 2014 and 2016, all samples were routinely assayed by for gold and a four-acid ICP-AES multi-element suite of 34 elements including copper, silver, lead, zinc, arsenic and molybdenum. The SGS assay suite and detection limits are presented in Table 11-1.

- Gold was determined at SGS using a 30 g fire assay fusion, cupelled to obtain a bead, and digested with aqua regia, followed by an atomic absorption spectroscopy (AAS) finish, with an LDL of 0.01 ppm Au.
- Multi-element analysis (SGS code ICP40B) used a four-acid digest (perchloric, nitric, hydrofluoric and hydrochloric acids) with the resulting solution analysed by ICP-AES. The digest used is able to dissolve most minerals in a sample and the analytical technique is considered 'near-total'.

Copper reporting above the UDL of 1% for four-acid ICP-AES was re-analysed using an 'ore grade' assay procedure (SGS AAS43B/40C). The sample was dissolved in aqua regia, diluted with de-ionised water and analysed using either ICP-AES, or AAS.

Table 11-1: Summary of analytical techniques

Method	Element	Detection limit	Element	Detection limit
FAA303	Au	0.01–1,000 ppm		
ICP40B	Ag	2–50 ppm	Mo	2–10,000 ppm
	Al	0.3–15 %	Na	0.01–15 %
	As	5–10,000 ppm	Ni	2–10,000 ppm
	Ba	5–10,000 ppm	P	0.01–15 %
	Be	0.5–2,500 ppm	Pb	2–10,000 ppm
	Bi	5–10,000 ppm	S	0.01–15 %
	Ca	0.01–15 %	Sb	5–10,000 ppm
	Cd	1–10,000 ppm	Sc	0.5–10,000 ppm
	Co	1–10,000 ppm	Sn	10–10,000 ppm
	Cr	10–10,000 ppm	Sr	5–5,000 ppm
	Cu	2–10,000 ppm	Ti	0.01–15 %
	Fe	0.1–15 %	V	2–10,000 ppm
	K	0.01–15 %	W	10–10,000 ppm
	La	1–10,000 ppm	Y	1–10,000 ppm
	Li	1–10,000 ppm	Zn	5–10,000 ppm
	Mg	0.02–15 %	Zr	3–10,000 ppm
	Mn	5–10,000 ppm		
AAS43B	Cu	0.01–40%	Fe	0.1–100%
AAS40C	Cu	0.001–2%		

Source: SGS Mongolia, 2014 to June 2016

Since June 2016, all samples were prepared by ALS Mongolia in line with the following protocols:

- drying (66°C)
- pre-preparation weighing

- entire sample crushed to 90% passing 3.54 mm
- split to 500 g
- pulverised to >90% passing 200 mesh (75 microns)
- split to 150 g sample pulp.

All samples were routinely assayed by for gold and a four-acid ICP-AES multi-element suite of 34 elements including copper, silver, lead, zinc, arsenic and molybdenum. The ALS assay suite and detection limits are presented in Table 11-2.

- Gold was determined at SGS using a 25 g fire assay fusion, cupelled to obtain a bead, and digested with Aqua Regia, followed by an atomic absorption spectroscopy (AAS) finish, with a lower detection (LDL) of 0.01 ppm Au.
- Multi-element analysis (ALS code ME-ICP61) used a four-acid digest (perchloric, nitric, hydrofluoric and hydrochloric acids) with the resulting solution analysed by ICP-AES. The digest used is able to dissolve most minerals in a sample and the analytical technique is considered “near-total”.

Copper reporting above the UDL of 1% for four-acid ICP-AES was re-analysed using an ‘ore grade’ assay procedure (ALS ME-OG46). The sample was dissolved in aqua regia, diluted with de-ionised water and analysed using either ICP-AES, or AAS.

Table 11-2: Summary of analytical techniques

Method	Element	Detection limit	Element	Detection limit
Au-AA26	Au	0.01–1,000 ppm		
ME-ICP61	Ag	0.5–100 ppm	Mo	1–10,000 ppm
	Al	0.01–50 %	Na	0.01–10 %
	As	5–10,000 ppm	Ni	1–10,000 ppm
	Ba	10–10,000 ppm	P	10–10,000 ppm
	Be	0.5–1,000 ppm	Pb	2–10,000 ppm
	Bi	2–10,000 ppm	S	0.01–10 %
	Ca	0.01–50 %	Sb	5–10,000 ppm
	Cd	0.5–500 ppm	Sc	1–10,000 ppm
	Co	1–10,000 ppm	Sr	1–10,000 ppm
	Cr	1–10,000 ppm	Th	20–10,000 ppm
	Cu	1–10,000 ppm	Ti	0.01–10%
	Fe	0.01–50 %	Tl	10–10,000 ppm
	K	0.01–10 %	U	10–10,000 ppm
	La	10–10,000 ppm	V	1–10,000 ppm
	Mg	0.01–50 %	W	10–10,000 ppm
	Mn	5–100,000 ppm	Zn	2–10,000 ppm
	Mn	5–10,000 ppm		
Cu-OG62	Cu	0.01–40%		

Source: ALS Mongolia, post June 2016

11.4 Sample security

After sampling, bagged samples are store on site within locked containers. Samples are dispatched using secure Xanadu vehicles to the assay laboratory in Ulaanbaatar. Consignments are signed for at the laboratory and a confirmation of receipt email is sent to Xanadu. Samples are store at the laboratory for analysis and returned pulps are stored in a secured site.

11.5 Laboratory independence and certification

Both SGS Mongolia and ALS Mongolia LLC are independent laboratories located in Ulaanbaatar, Mongolia. Laboratories are accredited by the Mongolian Agency for Standardization and Metrology to ISO 17025 standards. For further details into the laboratory quality assurance and quality control please refer to section 12 of this report.

11.6 Database structure

A rolling close-off of the dataset by project area was adopted so as to incorporate as much up-to-the-minute data into the estimates whilst drilling, sampling and assaying continued into late 2021. The data handover commenced with the Zaraa project area on or near 23 July 2021 and consisted of the following files in Table 11-3 that presents the lithology, survey datum, assay (with and without XRF), collar, SG (bulk density), survey, oxidation surface data (BOCO – base of complete oxidation, BOX – base of oxidation (partial) and TOP – top of fresh rock) file together. SGC loaded and validated all files into its preferred software for pre-processing ahead of estimation.

Table 11-3: Zaraa closed off database files as of 23 July 2021

Name	Date modified	Type	Size
KH_ALM_LITHOLOGY.csv	6/07/2021 7:49 PM	CSV File	36,111 KB
KH_ASD.csv	28/06/2021 2:50 PM	CSV File	17,145 KB
KH_ASSAY without XRF.csv	5/07/2021 7:43 PM	CSV File	49,034 KB
KH_ASSAY.csv	5/07/2021 7:40 PM	CSV File	51,622 KB
KH_COLLAR.csv	3/07/2021 6:49 PM	CSV File	258 KB
KH_SG.csv	29/06/2021 4:16 PM	CSV File	925 KB
KH_STRUCTURE.csv	10/06/2021 11:43 AM	CSV File	855 KB
KH_SURVEY.csv	5/07/2021 7:14 PM	CSV File	555 KB
KH_WX_HOR.csv	7/07/2021 11:26 AM	CSV File	132 KB
KH_WX_HOR_BOCO.csv	7/07/2021 11:26 AM	CSV File	24 KB
KH_WX_HOR_BOX.csv	7/07/2021 11:27 AM	CSV File	23 KB
KH_WX_HOR_TOP.csv	7/07/2021 11:26 AM	CSV File	74 KB

The data handover continued project area by project area until all areas' databases were closed off by 7 October 2021. Table 11-4 through to Table 11-8 present the data made available to SGC as of the close of the database for project areas Zephyr, Golden Eagle, Copper Hill, White Hill and Stockwork Hill.

Table 11-4: Zephyr closed off database files as of 7 October 2021

Name	Date modified	Type	Size
Zephyr_ASD.csv	20/09/2021 1:03 PM	CSV File	517 KB
Zephyr_ASSAY.csv	20/09/2021 1:02 PM	CSV File	1,390 KB
Zephyr_COLLAR.csv	20/09/2021 1:01 PM	CSV File	18 KB
Zephyr_LITHOLOGY.csv	20/09/2021 1:02 PM	CSV File	872 KB
Zephyr_RQD.csv	30/09/2021 11:00 AM	CSV File	176 KB
Zephyr_SG.csv	30/09/2021 10:59 AM	CSV File	27 KB
Zephyr_Structure.csv	30/09/2021 11:03 AM	CSV File	19 KB
Zephyr_SURVEY.csv	20/09/2021 1:01 PM	CSV File	18 KB

Table 11-5: Golden Eagle closed off database files as of 7 October 2021

Name	Date modified	Type	Size
GE_ASD.csv	20/09/2021 1:09 PM	CSV File	498 KB
GE_ASSAY.csv	20/09/2021 1:08 PM	CSV File	1,645 KB
GE_COLLAR.csv	20/09/2021 1:04 PM	CSV File	18 KB
GE_LITHOLOGY.csv	20/09/2021 1:05 PM	CSV File	1,036 KB
GE_RQD.csv	30/09/2021 11:01 AM	CSV File	183 KB
GE_SG.csv	30/09/2021 10:58 AM	CSV File	34 KB
GE_Structure.csv	30/09/2021 11:02 AM	CSV File	66 KB
GE_SURVEY.csv	20/09/2021 1:04 PM	CSV File	19 KB

Table 11-6: Copper Hill closed off database files as of 7 October 2021

Name	Date modified	Type	Size
CH_ASD.csv	8/09/2021 2:56 PM	CSV File	946 KB
CH_ASSAY.csv	8/09/2021 2:56 PM	CSV File	6,084 KB
CH_COLLAR.csv	8/09/2021 2:53 PM	CSV File	28 KB
CH_LITHOLOGY.csv	8/09/2021 2:56 PM	CSV File	4,491 KB
CH_RQD.csv	30/09/2021 11:01 AM	CSV File	375 KB
CH_SG.csv	30/09/2021 10:58 AM	CSV File	130 KB
CH_Structure.csv	30/09/2021 11:02 AM	CSV File	51 KB
CH_SURVEY.csv	8/09/2021 2:53 PM	CSV File	53 KB

Table 11-7: White Hill closed off database files as of 7 October 2021

Name	Date modified	Type	Size
WH_ASD.csv	8/09/2021 2:49 PM	CSV File	4,125 KB
WH_ASSAY.csv	8/09/2021 2:48 PM	CSV File	10,381 KB
WH_COLLAR.csv	8/09/2021 2:45 PM	CSV File	28 KB
WH_LITHOLOGY.csv	8/09/2021 2:48 PM	CSV File	7,098 KB
WH_RQD.csv	30/09/2021 11:01 AM	CSV File	623 KB
WH_SG.csv	30/09/2021 10:59 AM	CSV File	147 KB
WH_Structure.csv	30/09/2021 11:03 AM	CSV File	246 KB
WH_SURVEY.csv	8/09/2021 2:45 PM	CSV File	99 KB

Table 11-8: Stockwork Hill closed off database files as of 7 October 2021

Name	Date modified	Type	Size
SH_ASD.csv	22/09/2021 4:11 PM	CSV File	7,392 KB
SH_ASSAY.csv	7/10/2021 12:01 PM	CSV File	19,620 KB
SH_COLLAR.csv	1/10/2021 6:45 PM	CSV File	41 KB
SH_LITHOLOGY.csv	6/10/2021 7:55 PM	CSV File	13,843 KB
SH_RQD.csv	30/09/2021 11:01 AM	CSV File	1,436 KB
SH_SG.csv	30/09/2021 10:57 AM	CSV File	391 KB
SH_Structure.csv	30/09/2021 11:02 AM	CSV File	307 KB
SH_SURVEY.csv	6/10/2021 6:19 PM	CSV File	214 KB

The database structure was standardised overall project areas. Table 11-9 through to Table 11-13 illustrate the standardised structure as at 7 October 2021.

Table 11-9: Closed off database Collar file standardised structure as of 7 October 2021 – all project areas

	FIELD NAME	TYPE	WIDTH<256	DECIMALS
1	SITE_ID	C	50	
2	EASTING	N	50	5
3	NORTHING	N	50	5
4	HEIGHT	N	50	5
5	END_DEPTH	N	50	5
6	PROJECT	C	50	
7	PROSPECT	C	50	
8	SITE_TYPE	C	50	
9	START_DEPTH	N	50	5
10	COORDSYS	C	50	
11	SURVEY_TYPE	C	50	
12	SURVEY_METHOD	C	50	
13	DATE_STARTED	C	50	
14	DATE_COMPLETED	C	50	
15	COMPANY	C	50	
16	YEAR_DRILLED	N	50	5
17	AREA_CODE	N	50	5

Table 11-10: Closed off database Survey file standardised structure as of 7 October 2021 – all project areas

	FIELD NAME	TYPE	WIDTH<256	DECIMALS
1	SITE_ID	C	50	
2	DEPTH	N	50	5
3	INCLINATION	N	50	5
4	INCLINATION_AMEND	N	50	5
5	AZIMUTH	N	50	5
6	CODE	N	50	5

Table 11-11: Closed off database Density file standardised structure as of 7 October 2021 – all project areas

	FIELD NAME	TYPE	WIDTH<256	DECIMALS
1	east	N	25	5
2	north	N	25	5
3	rl	N	25	5
4	PROJECT	C	25	
5	SITE_ID	C	25	
6	DEPTH_FROM	N	25	5
7	DEPTH_TO	N	25	5
8	INTERVAL	N	25	5
9	WET_WEIGHT	N	25	5
10	DRY_WEIGHT	N	25	5
11	VOLUME	N	25	5
12	SG	N	25	5
13	SG_CUTOUTLIERS	N	25	5
14	COMMENTS	C	25	
15	CODE	N	25	0
16	OXIDATION_CODE	N	25	0
17	LITH_CODE	C	25	

Table 11-12: Closed off database Lithology file standardised structure as of 7 October 2021 – all project areas

	FIELD NAME	TYPE	WIDTH<256	DECIMALS
1	SITE_ID	C	55	
2	DEPTH_FROM	N	55	5
3	DEPTH_TO	N	55	5
4	PROJECT	C	55	
5	RECOVERY_KG	N	55	5
6	MOISTURE	C	55	
7	LITH	C	55	
8	LITH2	C	55	
9	COLOUR	C	55	
10	COLOUR_MUNSEL	C	55	
11	GRAINSIZE	C	55	
12	WEATHERING	N	55	5
13	PHENOCRYST_RATIO	N	55	5
14	GROUNDMASS_RATIO	N	55	5
15	PHASE	C	55	
16	EARLY_ALT_ZONE	C	55	
17	EARLY_ALT_ZONE_INT	N	55	5
18	LATE_ALT_ZONE	C	55	
19	LATE_ALT_ZONE_INT	N	55	5
20	MAF_BIOTITE_INT	N	55	5
21	MAF_MAGNETITE_INT	N	55	5
22	MAF_CHL_AFT_BIO_INT	N	55	5
23	MAF_SER_SIL_INT	N	55	5
24	MAF_SER_CLY_INT	N	55	5
25	MAF_CHLORITE_INT	N	55	5
26	MAF_TOURMALINE_INT	N	55	5
27	FSP_KFELDSPAR_INT	N	55	5
28	FSP_HEM_DUST_ALB_INT	N	55	5
29	FSP_SER_SIL_INT	N	55	5
30	FSP_SER_CLY_INT	N	55	5
31	FSP_EPIDOTE_INT	N	55	5
32	Fe_Ox_HEMATITE	N	55	5
33	Fe_Ox_JAROSITE	N	55	5
34	Fe_Ox_GEOTHITE	N	55	5

Table 11-12 cont.,

35	Fe_Ox_INT	N	55	5
36	Cu_Ox_TENORITE	N	55	5
37	Cu_Ox_CHRYSOCOLLA	N	55	5
38	Cu_Ox_MALACHITE	N	55	5
39	SULF_TOTAL_PCT	N	55	5
40	SULF_DISSEMINATED_PCT	N	55	5
41	SULF_VEINING_PCT	N	55	5
42	SULF_MATRIX_PCT	N	55	5
43	SULF_CPY_RATIO	N	55	5
44	SULF_PY_RATIO	N	55	5
45	SULF_CHALCOSITE_PCT	N	55	5
46	SULF_BORNITE_PCT	N	55	5
47	SULF_CHALCOPYRITE_PCT	N	55	5
48	SULF_CPY_PCT_VEIN	N	55	5
49	SULF_CPY_PCT_DISS	N	55	5
50	SULF_CPY_PCT_MATRIX	N	55	5
51	SULF_PYRITE_PCT	N	55	5
52	SULF_PY_PCT_VEIN	N	55	5
53	SULF_PY_PCT_DISS	N	55	5
54	SULF_PY_PCT_MATRIX	N	55	5
55	SULF_MOLYBDENUM_PCT	N	55	5
56	SULF_COPPER_OXIDE_PCT	N	55	5
57	SULF_CPY_PY_RATIO	N	55	5
58	SULF_Cu_Est	N	55	5
59	VN_UST_VOL_PCT	N	55	5
60	VN_UST_AVG_THICK_CM	N	55	5
61	VN_UST_SPACING_CM	N	55	5
62	VN_M_VOL_PCT	N	55	5
63	VN_M_AVG_THICK_CM	N	55	5
64	VN_M_SPACING_CM	N	55	5
65	VN_AB_VOL_PCT	N	55	5

Table 11-12 cont.,

66	VN_AB_AVG_THICK_CM	N	55	5
67	VN_AB_SPACING_CM	N	55	5
68	VN_C_VOL_PCT	N	55	5
69	VN_C_AVG_THICK_CM	N	55	5
70	VN_C_SPACING_CM	N	55	5
71	VN_D_VOL_PCT	N	55	5
72	VN_D_AVG_THICK_CM	N	55	5
73	VN_D_SPACING_CM	N	55	5
74	VN_CARB_VOL_PCT	N	55	5
75	VN_CARB_AVG_THICK_CM	N	55	5
76	VN_CARB_SPACING_CM	N	55	5
77	VN_ABC_VOL_PCT	N	55	5
78	BX_TOTAL_PCT	N	55	5
79	BX_TOURMALINE_PCT	N	55	5
80	BX_CHLORITE_PCT	N	55	5
81	BX_EPIDOTE_PCT	N	55	5
82	BX_CAR_ANH_PCT	N	55	5
83	BX_SILICA_PCT	N	55	5
84	BX_ANH_GYPSUM_PCT	N	55	5
85	STR_DEPTH	N	55	5
86	STR_TYPE	C	55	
87	STR_DIP	N	55	5
88	STR_DIP_DIRECTION	N	55	5
89	DATE_LOGGED	C	55	
90	LOGGED_BY	C	55	
91	COMMENTS	C	55	
92	PROSPECT	C	55	
93	W_BOCO	N	55	5
94	W_BOX	N	55	5
95	BBS	C	55	
96	Fifty50_1	C	55	
97	TAND	C	55	
98	LIthModel	C	55	
99	Golden_Eagle_Lithology	C	55	
100	Copper_Hill_Lithology	C	55	
101	SH_GM	C	55	
102	changed	N	55	5
103	CODE	N	55	5

Table 11-13: Closed off database Assay file standardised structure as of 7 October 2021 – all project areas

	FIELD NAME	TYPE	WIDTH<256	DECIMALS
1	SITE_ID	C	55	
2	DEPTH_FROM	N	55	5
3	DEPTH_TO	N	55	5
4	PROJECT	C	55	
5	SAMPLE_ID	C	55	
6	Au_PPM	N	55	5
7	Cu_PPM	N	55	5
8	Mo_PPM	F		5
9	Ag_PPM	F		5
10	Al_PPM	F		5
11	Ba_PPM	F		5
12	Be_PPM	F		5
13	Bi_PPM	F		5
14	Ca_PPM	F		5
15	Cd_PPM	F		5
16	Co_PPM	F		5
17	Cr_PPM	F		5
18	K_PPM	F		5
19	La_PPM	F		5
20	Li_PPM	F		5
21	Mg_PPM	F		5
22	Mn_PPM	F		5
23	Na_PPM	F		5
24	Ni_PPM	F		5
25	P_PERCENT	F		5
26	V_PPM	F		5
27	Sb_PPM	F		5
28	Sc_PPM	F		5
29	Sn_PPM	F		5
30	Sr_PPM	F		5
31	Ti_PPM	F		5
32	As_PPM	F		5
33	Pb_PPM	F		5
34	Zn_PPM	F		5
35	W_PPM	F		5

Table 11-13 cont.,

36	Y_PPM	F		5
37	Fe_PERCENT	F		5
38	Zr_PPM	F		5
39	S_PPM	F		5
40	Ga_PPM	F		5
41	Th_PPM	F		5
42	Tl_PPM	F		5
43	U_PPM	F		5
44	Ce_PPM	F		5
45	Cs_PPM	F		5
46	Dy_PPM	F		5
47	Er_PPM	F		5
48	Eu_PPM	F		5
49	Gd_PPM	F		5
50	Hf_PPM	F		5
51	Ho_PPM	F		5
52	Lu_PPM	F		5
53	Nb_PPM	F		5
54	Nd_PPM	F		5
55	Pr_PPM	F		5
56	Rb_PPM	F		5
57	Sm_PPM	F		5
58	Ta_PPM	F		5
59	Tb_PPM	F		5
60	Tm_PPM	F		5
61	Yb_PPM	F		5
62	Hg_PPM	F		5
63	In_PPM	F		5
64	Re_PPM	F		5
65	Se_PPM	F		5
66	Te_PPM	F		5
67	SiO2_PERCENT	F		5
68	Al2O3_PERCENT	F		5

Table 11-13 cont.,

69	Fe2O3_PERCENT	F		5
70	CaO_PERCENT	F		5
71	MgO_PERCENT	F		5
72	Na2O_PERCENT	F		5
73	K2O_PERCENT	F		5
74	Cr2O3_PERCENT	F		5
75	TiO2_PERCENT	F		5
76	MnO_PERCENT	F		5
77	P2O5_PERCENT	F		5
78	SrO_PERCENT	F		5
79	BaO_PERCENT	F		5
80	LOI_PERCENT	F		5
81	C_PERCENT	F		5
82	Cu_Zn	F		5
83	Cu_S	F		5
84	Au_Cu	F		5
85	Na_K	F		5
86	V_Cr	F		5
87	Ti_Cr	F		5
88	Ti_V	F		5
89	Al_Cr	F		5
90	Cu_Mo	F		5
91	Au_Mo	F		5
92	eCu	F		5
93	PROSPECT	C	55	
94	COMPANY	C	55	
95	SSq_Cu	F		5
96	CODE	F		5
97	Cu_code	N	25	0
98	Mo_code	N	25	0
99	Cu_Mo_code	N	25	0

All aspects pertaining to the database construction, integrity, chain of custody, archiving and management and control are the responsibility of Xanadu. At the time of writing the report a site visit had not been conducted by SGC due to COVID restrictions. SGC plans to complete a site visit at the first possible opportunity to assess project sensitive data at the source.

11.7 Bulk density data validation

A comprehensive database of density measurements supplied to SGC by the Xanadu geologists incorporates both historical and recent data.

During this round of estimation density was modelled as an attribute of the model utilising the local informing data assigned block by block. In instances where element estimates are available but density estimates are absent (due to a lack of available local data), averaged density values by project areas and oxidation state were employed through the analysis of the informing dataset.

Due to COVID-19 restrictions SGC was not able to complete a site visit and cannot comment further on the process of delivery of density data and as such these data remain the responsibility of Xanadu. SGC takes the data provided at face value at this time.

As at 27 October 2021, the density dataset contains 14,058 bulk density measurements from the 2021 compilation. As is industry best practice and in accordance with the standard operating procedures for bulk density as employed at the Kharmagtai site, density sampling is ongoing.

An assessment of outliers was completed by SGC in consultation with Xanadu. Outliers were resolved to be replaced during the assessment of the bulk density dataset on an area-by-area basis which saw the minimum/maximum value set as follows:

- Stockwork Hill and White Hill: Minimum density of 1.297 gm/cc and a maximum value of 3.789 gm/cc.
- Copper Hill: Minimum density of 2.115 gm/cc and a maximum value of 3.773 gm/cc.
- Golden Eagle: Minimum density of 2.22 gm/cc and a maximum value of 4.507 gm/cc.
- Zephyr: Minimum density of 2.22 gm/cc and a maximum value of 4.507gm/cc.
- Zaraa: Minimum density of 1.991 gm/cc and a maximum value of 3.406 gm/cc.

SGC recommends that further work be undertaken to further refine the density variability on an area-by-area basis prior to leading into mining studies.

11.8 Summary

The sampling preparation, security, and analytical procedures for the Kharmagtai drilling program demonstrate that the data used for the Mineral Resource estimate is appropriate at the Preliminary Economic Assessment level of study.

12 Data verification

12.1 QA/QC discussion of historical and recent 2021 infill drilling control sample outcomes

SGC undertook a review of a representative section of the QA/QC data as well as a review of the QA/QC procedures conducted by the site personnel and the following section is a summary of observations.

12.2 Quality assurance and quality control programs

QA concerns the establishment of measurement systems and procedures to provide adequate confidence that quality is adhered to. QC is one aspect of QA and refers to the use of control checks of the measurements to ensure the systems are working as planned.

The QC terms commonly used to discuss geochemical data are:

- Precision: How close the assay result is to that of a repeat or duplicate of the same sample, i.e., the reproducibility of assay results. Assessed by insertion of duplicate samples at various stages of subsampling, from initial sample split (field duplicate) to final assay pulp (pulp duplicate).
- Accuracy: How close the assay result is to the expected result (of a CRM). Assessed by the insertion of CRMs within sample batches, for which the laboratory does not know the expected grade.
- Bias: The amount by which the analysis varies from the correct result. Also assessed using CRM.
- Contamination: Accidental inclusion of target elements into a sample, which can occur at any sampling stage. Assessed by the insertion of "blank" material into a sample batch that is known to contain very low, levels of target elements.

QA/QC procedures and protocols are well described in reports supplied by Xanadu. SGC reviewed the reports (SOPS) and summarises them in this section of the report.

According to historical reports provided by Xanadu to SGC, Xanadu implemented QA/QC protocols for all drill hole sampling undertaken since acquiring the Kharmagtai Project in 2014 (according to earlier reviews by Mining Associates 2015).

Prior to 2014, IMMI and AGC used similar QA/QC protocols for drill hole sampling. IMMI's QA/QC program was reviewed by AMC (2012) and reported in accordance with NI 43-101 technical reporting standards.

QA/QC protocols have evolved at Kharmagtai during the various phases of exploration. A summary of the QA/QC protocols applicable to different drill hole series included in the resource estimate is outlined in Table 12-1.

The QA/QC protocols adopted by Xanadu are very similar to those used by IMMI and AGC from 2011 onwards, although no pulp or coarse reject duplicates were used. Prior to 2011, the majority of drill hole samples were monitored using CRMs and blanks, with field duplicates inserted from 2004 onwards.

12.3 Quality control program

Xanadu implemented QA/QC protocols for all drill hole sampling undertaken since acquiring the Property in 2014. Prior to this, IMMI and AGC used similar QA/QC protocols for drill sampling.

QA/QC protocols evolved at Kharmagtai during the various phases of exploration. A summary of the QA/QC protocols applicable to different drill holes included in the resource estimate are outlined in (Table 12-1).

In addition to Xanadu's QA/QC, SGS Mongolia and ALS Mongolia both conduct their own internal QA/QC consisting of CRM testing, duplicate assaying and repeats along with the primary sample analysis. In addition to this Xanadu undertook a third-party laboratory analysis of selected 2021 drilling samples the results of which are presented later in this section of the report.

Table 12-1: Historical QAQC protocols by drillhole series

Drill hole series	Date range	Company	QA/QC protocols
KHDDH001 to KHDDH003	Early 2002	IMMI	No QC samples used
KHDDH004 to KHDDH261	Mid-2002 to 2004	IMMI	CRMs and blanks used in non-uniform sized batches
KHDDH262 to KHDDH317	2004 to mid-2007	IMMI	Two CRMs, one blank and one field duplicate used in batches of 40 samples
KHDDH318 to KHDDH335 (and KHDDH313A), metallurgical holes	2011-2012	AGC	Two CRMs, two blanks, one core duplicate, one pulp duplicate and one reject duplicate inserted randomly in batches
KHDDH336 to KHDDH385	2014 to mid-2016	Xanadu	Two CRMs, two blanks and one field duplicate inserted randomly in batches of 45 samples and sent to SGS laboratory
KHDDH386 onwards	mid-2016 to present	Xanadu	Two CRMs, two blanks and one field duplicate inserted randomly in batches of 45 samples and sent to ALS laboratory

Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Table 12-2 shows a summary of historical QC sample insertion for the main drilling samples. Xanadu have adopted the same insertion rate protocol as is noted in the historical works by CSA Global Pty Ltd (CSA). Upon review of the available information SGC believes that the insertion rate of CRMs, blanks and field duplicates are adequate and in accordance with industry standard practices for exploration projects.

Table 12-2: QC sample insertion summary

	QGX (1997 to 1998)	IMMI (2002 to 2007)	AGC (2011 to 2012)	Xanadu SGS (2014 to mid-2016)	Xanadu ALS (mid-2016 to present
Number of routine samples	3,754	216,99	3,947	16,992	35,080
Number of CRM		776	223	851	1,574
CRM insertion rate		3.6%	5.6%	5.0%	4.5%
Number of blanks		692	219	809	1,381
Blanks insertion rate		3.2%	5.5%	809	3.9%
Number of field duplicates		378	101	391	728
Field duplicate insertion rate		1.7%	2.5%	2.3%	2.1%

Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report - Feb28-2022.docx

12.3.1 Historical use of blanks

Blanks were inserted routinely in all sample batches for all drilling since mid-2002 (KHDDH004). Blank material was sourced locally from outcrops of Khanbogd Mountain granite and coarse crushed to 1 cm particle size.

Monitoring of blanks by IMMI and Xanadu initially defined a failure as results more than five to 10 times the lower detection limit for the element analytical method were revealed. Subsequently various failures over the period from June 2002 to June 2004 were related mostly to sampling errors caused by switches with CRMs rather than systematic contamination. According to the investigation by CSA as reported in their 2018 report, these errors were corrected using stored data and the database utilised by Xanadu is considered correct. According to CSA at that time, there has been no indication of systematic assaying errors due to contamination.

SGC has subsequently reviewed the available data analysis provided by Xanadu including charts and related documents and considers that the results are adequate to support the integrity of the Mineral Resource estimate.

12.3.2 Historical use of pulp duplicates

Pulp duplicates were utilised by IMMI in 2011 and were assessed using scatter plots, ranked scatter plots (Q-Q plots) and relative percentage difference (RPD) plots by AMC (AMC, 2012). AMC (2012) found that more than 98% of gold samples and 92% of copper samples reported an RPD value less than 10% and at that time the results were considered adequate to support the integrity of the Mineral Resource estimate by Xanadu and AMC.

12.3.3 Use of field duplicates

Field duplicates for drill core samples were included as part of QA/QC protocols since 2011 and continue to be utilised today. Duplicates were created by splitting routine half-core samples using a diamond saw and submitting each resulting quarter-core sample under separate sample numbers.

SGC has reviewed the current Xanadu analysis of the field duplicate data provided by Xanadu from both historical and recent drilling samples, including scatterplots and relative percent difference plots. Scatter plots show generally tight distribution (R2 >0.8) about regression lines with slopes more than 0.95. Field duplicate data for Cu shows higher precision than for Au, reflecting more homogenous distribution of copper minerals compared to gold (particularly at Stockwork Hill).

Analysis of RPD plots shows that for gold 80% of duplicate pairs have a relative difference less than 30%, and for copper 80% of duplicate pairs have a relative difference less than 20–25%. Results for IMMI/AGC data and Xanadu data are very similar, although Xanadu Cu analyses show more scatter at high grades (>5,000 ppm) compared with IMMI/AGC. The results reported are considered adequate by SGC to support their use in the estimation of the Mineral Resource estimates presented in the 2022 MRE report.

12.3.4 Use of certified reference materials

Certified reference materials (CRMs) – or standards – were inserted routinely in sample batches for all drilling after mid-2002. CRMs were sourced from two main commercial suppliers: Ore Research & Exploration in Australia (OREAS) and CDN Resource Laboratories Ltd in Canada (CDN). OREAS CRMs were derived from homogenised porphyry Cu-Au ore material with included Cu-Mo concentrate. CDN CRMs were derived by mixing and homogenising barren granitic material with Cu-Au concentrate. In addition to commercially supplied CRMs, IMMI used a number of internally produced CRMs from 2002 to 2003. The exact nature and source of these CRMs is unknown. Details of CRMs used throughout the history of drilling at Kharmagtai are shown in Table 12-3.

CRM analyses were routinely monitored on receipt of laboratory results, and IMMI/AGC and Xanadu defined CRM failures as follows in accordance with international standard practices:

- If 1 sample in 1,000 exceeds 3 standard deviations from the mean accepted value as defined by the CRM certificate, then it is considered as a process out of control and requires attention/action.
- If 2 CRMs fall between 2 standard deviations and 3 standard deviations on the same side of the mean value, then this suggests a trend is emerging which could be considered as a bias which warrants close attention over the following sample analysis. If the trend continues then the preceding batches require attention/action.

As reported by Wilson in 2005, any batch of samples with a CRM failure were routinely re-assayed until it passed. IMMI and Xanadu included a protocol whereby a geological override was applied for barren batches or marginal failures with low impacts (Wilson, 2005). SGC confirmed with Xanadu that this course of action continues to present.

In earlier investigations by Mining Associates and CSA, CRM control charts for IMMI/AGC and Xanadu drilling were reviewed which at the time of the investigation noted that multiple CRM failures in the earliest stages of QC monitoring from 2002 to 2004 could all be traced to CRM handling errors, where the one CRM was recorded in the database, but a different CRM or blank was inserted in the assay batch. SGC take this earlier analysis at face value.

In general, the performance control charts demonstrate acceptable levels of accuracy in the analytical procedures being used, with the majority of assays falling within ±2 standard deviations of the certified means. In many cases a slight positive or negative bias is apparent when comparing analyses to the certified values.

Taking into account earlier commentary surrounding the performance of CRMs in conjunction with the recent review of data and works completed by Xanadu, SGC does not consider the data exhibits a consistent bias and as such deem that the assayed results lie within acceptable limits. In SGC's opinion, the results of CRM analyses provide confidence in the assay data and are adequate to support their use in a Mineral Resource estimate in accordance with international best practices.

Table 12-3: Summary of CRMs used at the Kharmagtai Project

CRM code	Au (ppm)	Cu (%)	Usage period	Source
OREAS 501b	0.248	0.26	XAM (2014–2017)	OREAS
OREAS 501c	0.221	0.276	XAM (2017–2021)	OREAS
OREAS 503b	0.695	0.531	XAM (2014–2017)	OREAS
OREAS 503c	0.698	0.538	XAM (2017–2021)	OREAS
OREAS 504b	1.61	1.11	XAM (2014–2017)	OREAS
OREAS 50P	0.727	0.691	XAM (2014–2017)	OREAS
OREAS 51P	0.43	0.728	IMMI (2003–2007)	OREAS
OREAS 52P	0.183	0.387	IMMI (2003–2007)	OREAS
OREAS 53P	0.38	0.413	IMMI (2003–2007)	OREAS
CGS-6	0.26	0.318	AGC (2011)	CDN
CGS-21	0.99	1.3	AGC (2011)	CDN
CGS-22	0.64	0.725	AGC (2011)	CDN
CGS-23	0.218	0.182	AGC (2011)	CDN
CGS-24	0.487	0.486	AGC (2011)	CDN
CGS-25	2.4	2.19	AGC (2011)	CDN
STD3	1.269	1.29	IMMI (2002–2003)	IMMI internal
STD5	0.099	0.811	IMMI (2002–2003)	IMMI internal
STD6	0.203	0.254	IMMI (2002–2003)	IMMI internal
STD7	0.499	0.508	IMMI (2002–2003)	IMMI internal
STD8	2.211	0.869	IMMI (2002–2003)	IMMI internal
STD9	3.308	0.953	IMMI (2002–2003)	IMMI internal
STD10	0.215	0.853	IMMI (2002–2003)	IMMI internal

Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

12.4 Discussion on sampling, quality assurance/quality control program

As noted in earlier works by CSA, the sampling preparation, security, and analytical procedures used by Xanadu, and historically by IMMI/AGC, are consistent with generally accepted industry best practices and are therefore adequate for the purpose of Mineral Resource estimation.

The application of total digest multi-element geochemistry and SWIR spectral mineralogy provides additional rigour to geological models and exceeds current industry standards.

A report prepared by AMC (AMC, 2012) provided a comprehensive review of QA/QC for sampling by IMMI up to the end of 2011. SGC has reviewed this report and the historic QC results and concur with the conclusion reached by AMC that the historical assay data are considered to have sufficient accuracy and precision to support a Mineral Resource estimate. Additional drilling undertaken since the end of 2011 has been monitored by similar QA/QC protocols. To date no on-site validation has been possible by SGC due to COVID travel restrictions. It is envisaged that at the first possible opportunity SGC representatives will visit site in Mongolia once travel bans are lifted and the COVID state has stabilised internationally.

The general level of diligence and supervision of sample preparation and analytical QC carried out by IMMI/AGC and Xanadu was in accordance with the site-defined standard operating procedures (SOPs). The frequency of insertion of CRM, blanks and pulp duplicates is considered by SGC to be of sufficient standard to assure quality of assay data. The SOP for Sample Handling (including QA/QC) addresses all industry best practice fail criteria for assay batches used by IMMI/AGC and Xanadu and are considered by SGC to be appropriate.

12.5 Standard reference material

SGC was provided with the analysis undertaken by site personnel for Stockwork Hill and looked at a range of standard reference material performance charts for the key elements (Cu, Au and As).

Historically a broad range of SRM’s were used which cover appropriate grade ranges for each element (dominantly Cu and Au).

A general observation on the use of the various standard reference material by Xanadu is that Xanadu have tended to use standards at or lower than the lower cut-off for Cu and Au. Some higher-grade standards were employed, however on average lower grade standards dominate.

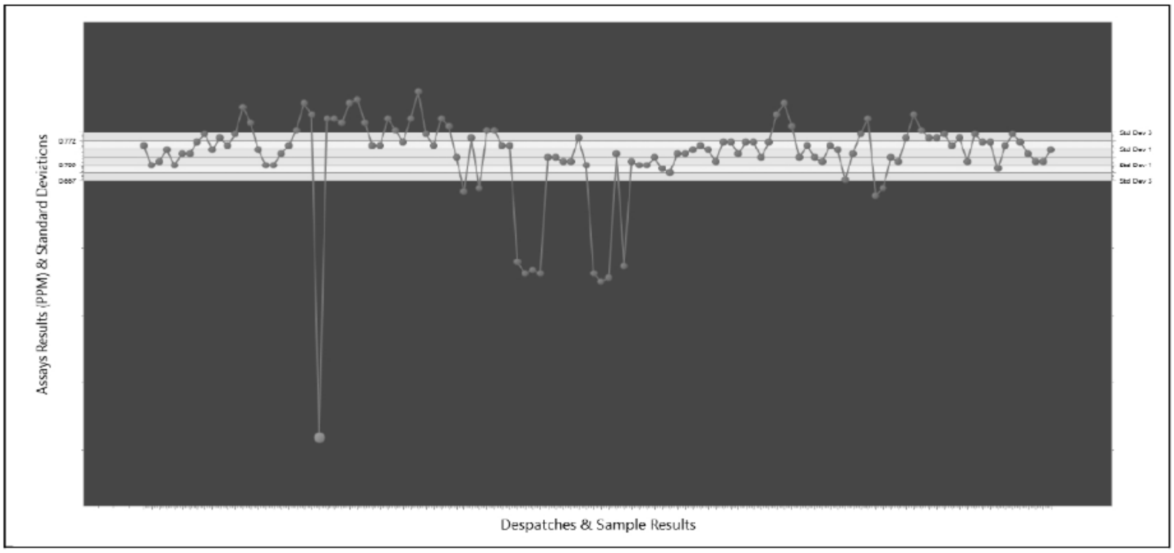
SGC undertook a review of the existing QA/QC protocols and outcomes completed by Xanadu which included assessments of a range of standard control samples over a range of time, performance of blank control material and laboratory and field duplicate analysis.

12.6 Standard control charts by Xanadu

A broad range of standard reference material has been used during the various drilling programs over the Kharmagtai project from 2003 through to 2021.

The following control charts (Figure 12-1 through to Figure 12-15) show a cross section review of the dataset by SGC (with associated commentary).

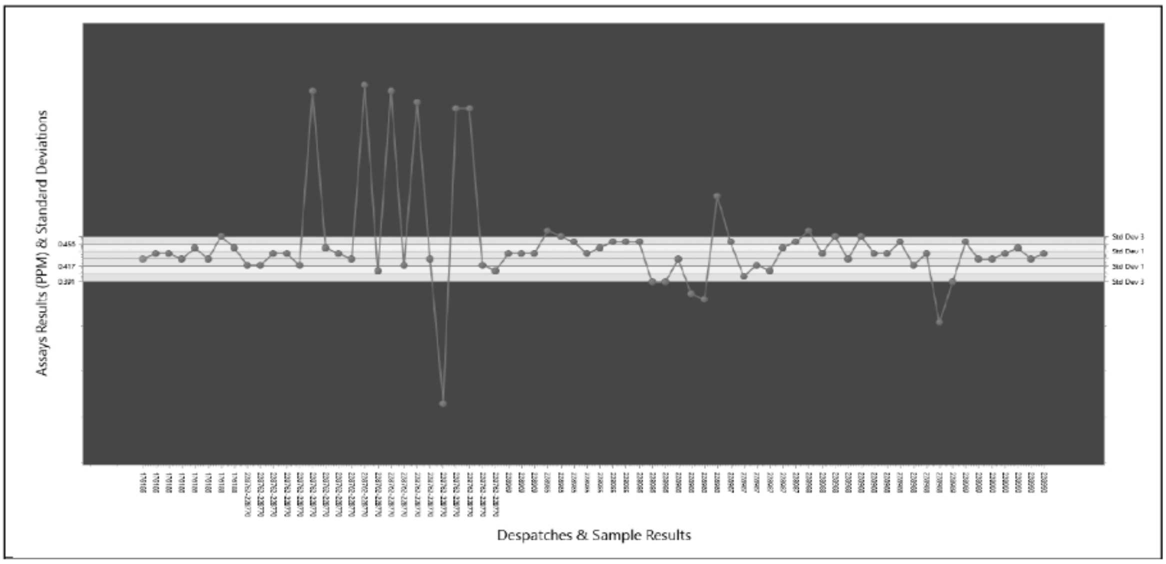
Figure 12-1: Analysis by XAM for standard 50p for A, 2003



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Standard 50p (mean expected value of 0.73 g/t Au) from 2003 illustrating many samples falling outside of 3SD from the mean expected value of the standard. 34 out of 120 samples (28.3%) analysed are at or below the expected value, 86 out of 120 samples (71.7%) analysed are at or above the expected value which indicates a trend toward higher-than-expected determinations on average. In addition, 25 samples analysed are out of control high and 13 low.

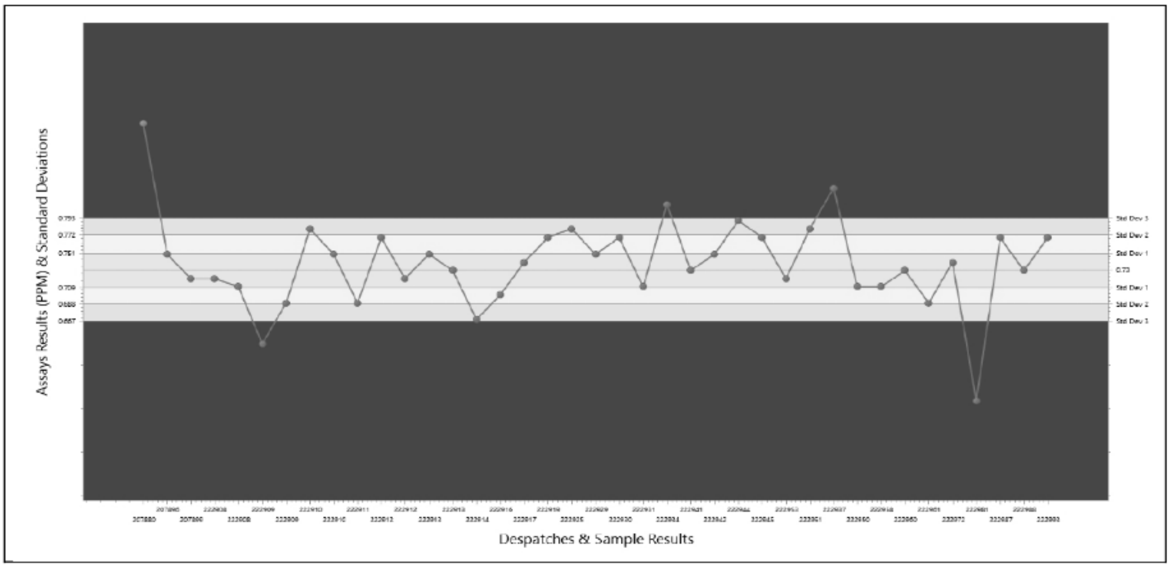
Figure 12-2: Analysis by XAM for standard 51p for Au, 2003



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Standard 51p (mean expected value of 0.43 g/t Au) from 2003 illustrating many samples falling outside of 3SD from the mean expected value of the standard. 18 out of 70 samples (25.7%) analysed are at or below the expected value, 52 out of 70 samples (74.3%) analysed are at or above the expected value which indicates a trend toward higher-than-expected determinations on average. In addition, 13 samples analysed are out of control high and 7 low.

Figure 12-3: Analysis by XAM for standard 50p for Au, 2004



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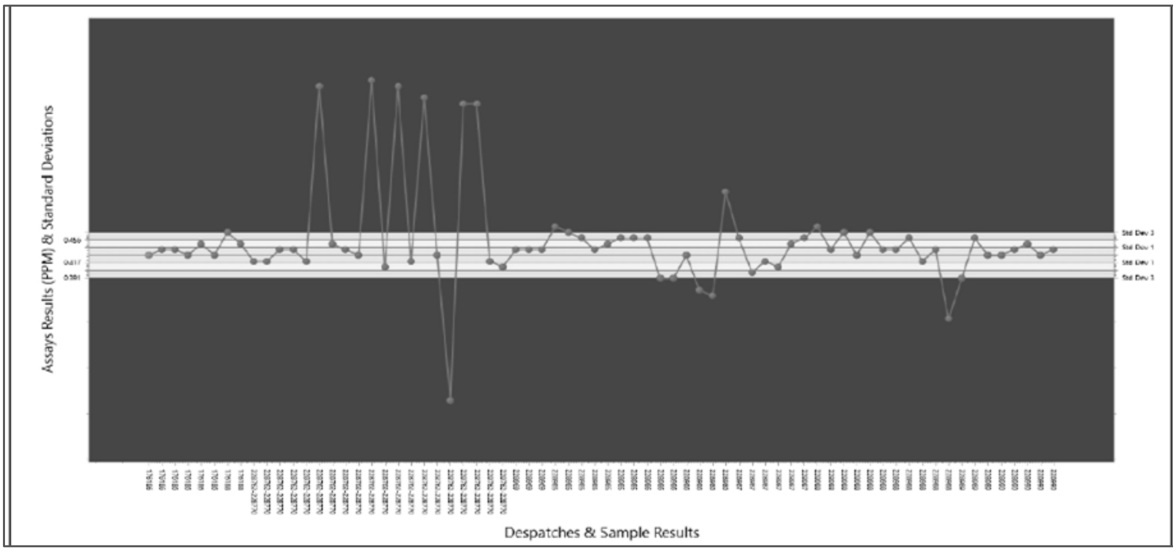
Standard 50p (mean expected value of 0.73 g/t Au) from 2004 illustrating only 5 samples falling outside of 3SD from the mean expected value of the standard. 15 out of 39 samples (38.5%) analysed are at or below the expected value, 24 out of 39 samples (61.5%) analysed are at or above the expected value which indicates a trend toward higher-than-expected determinations on average. 3 samples analysed are out of control high and 2 low.

Figure 12-4: Analysis by XAM for standard 51p for Au, 2004



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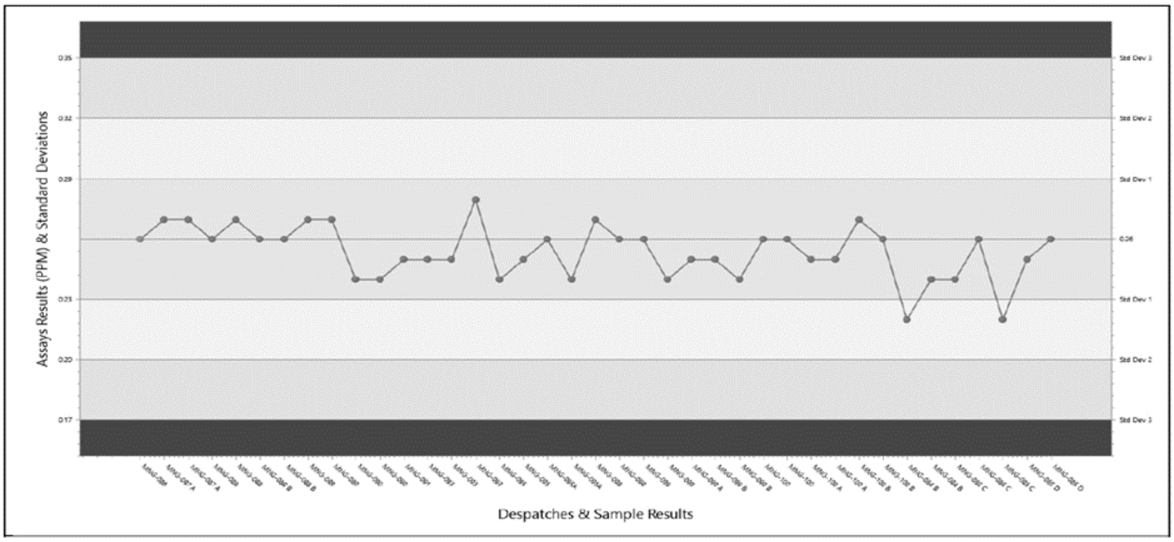
Standard 51p (mean expected value of 0.43 g/t Au) from 2004 illustrating few samples falling outside of 3SD from the mean expected value of the standard. 4 out of 19 samples (21.0%) analysed are at or below the expected value, 15 out of 19 samples (79.0%) analysed are at or above the expected value which indicates a trend toward higher-than-expected determinations on average. In addition, 5 samples analysed are out of control high and 1 low.

Figure 12-5: Analysis by XAM for standard CDN-CGS-6 for Au, 2011



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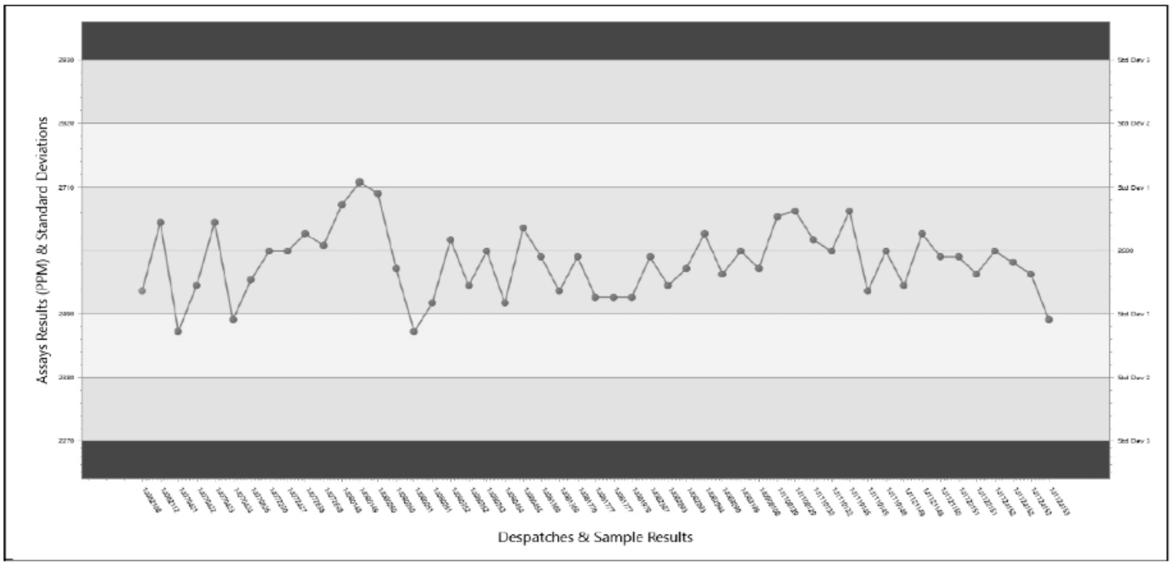
Standard SGS CDN-CGS-6 Au (mean expected value of 0.26 g/t Au) from 2011 illustrating no samples falling outside of 3SD from the mean expected value of the standard and only 2 samples returning values between 1 and 2SD. This standard shows a tendency towards lower outcomes than expected values.

Figure 12-6: Analysis by XAM for standard 501b for Cu, 2014



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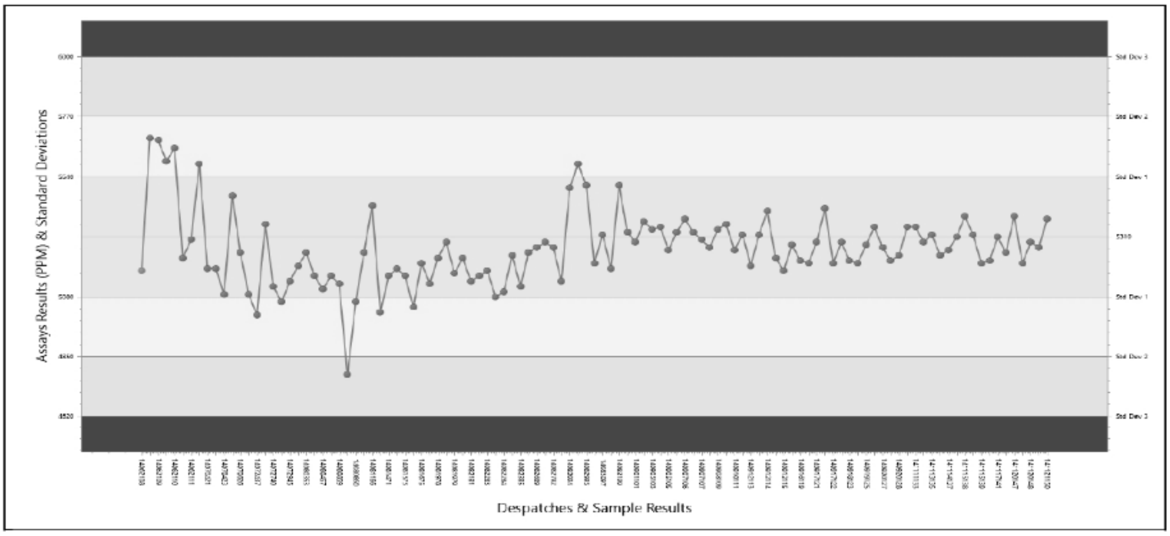
Standard SGS 501b Cu (mean expected value of 2,600 ppm Cu) from 2014 illustrating no samples falling outside of 3SD from the mean expected value of the standard. 29 out of 51 samples (56.9%) analysed are at or below the expected value, 21 out of 51 samples (43.1%) analysed are at or above the expected value which does not indicate a significant trend in either direction.

Figure 12-7: Analysis by XAM for standard 503b for Cu, 2014



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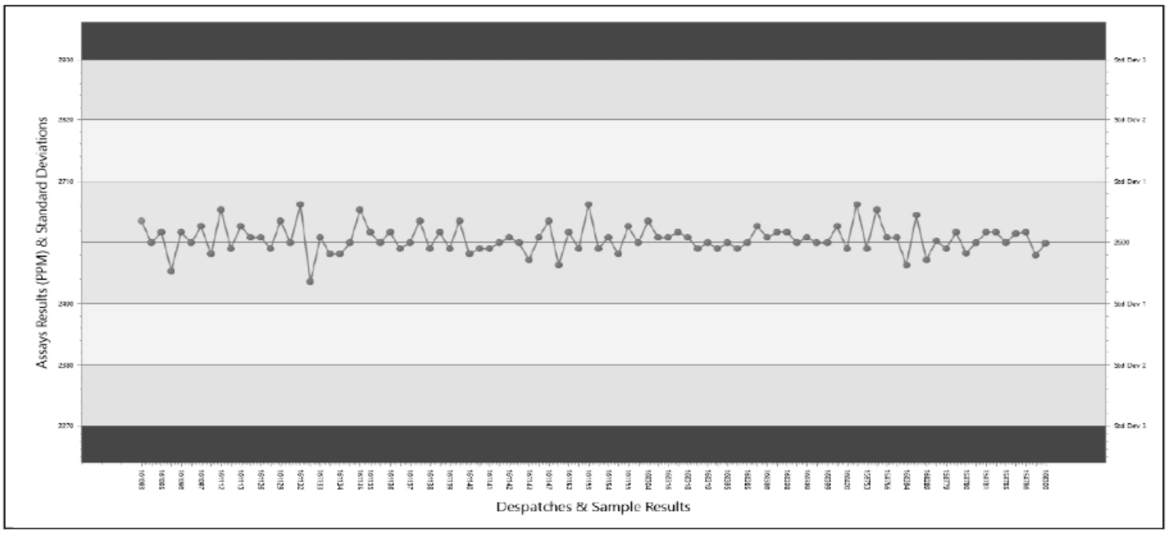
Standard SGS 503b Cu (mean expected value of 5,310 ppm Cu) from 2014 illustrating no samples falling outside of 3SD from the mean expected value of the standard. 75 out of 111 samples (67.6%) analysed are at or below the expected value, 25 out of 111 samples (32.4%) analysed are at or above the expected value which indicate a moderate trend toward lower-than-expected values.

Figure 12-8: Analysis by XAM for standard 501b for Cu, 2015



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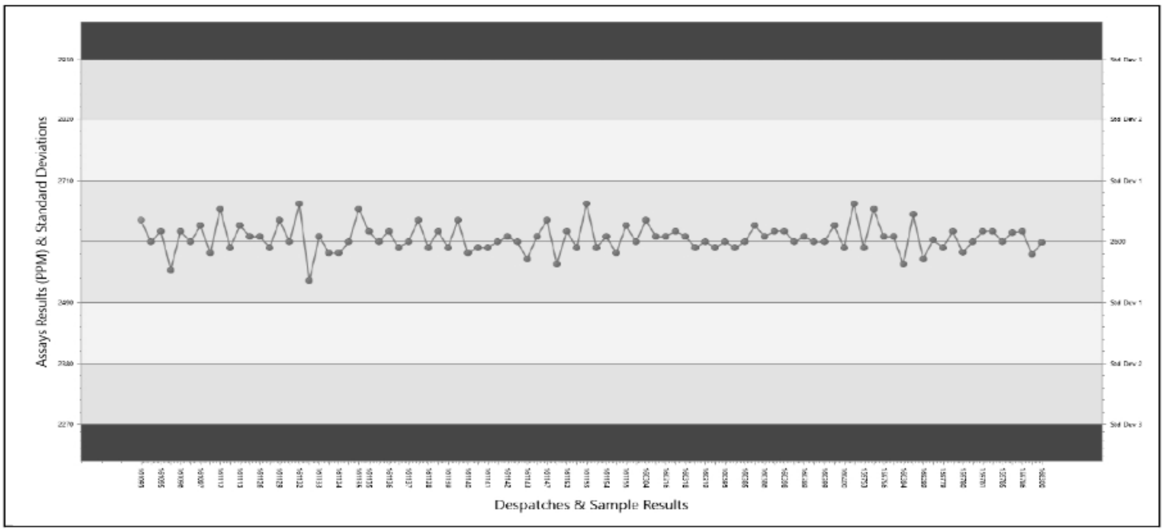
Standard SGS 501b Cu (mean expected value of 2,600 ppm Cu) from 2015 illustrating no samples falling outside of 3SD from the mean expected value of the standard and a very tight distribution of outcomes around the mean expected values. Twenty-nine out of 92 samples (31.5%) analysed are at or marginally below the expected value, 63 out of 92 samples (68.5%) analysed are at or marginally above the expected value which does not indicate a significant trend for expected values.

Figure 12-9: Analysis by XAM for standard 503b for Au, 2015



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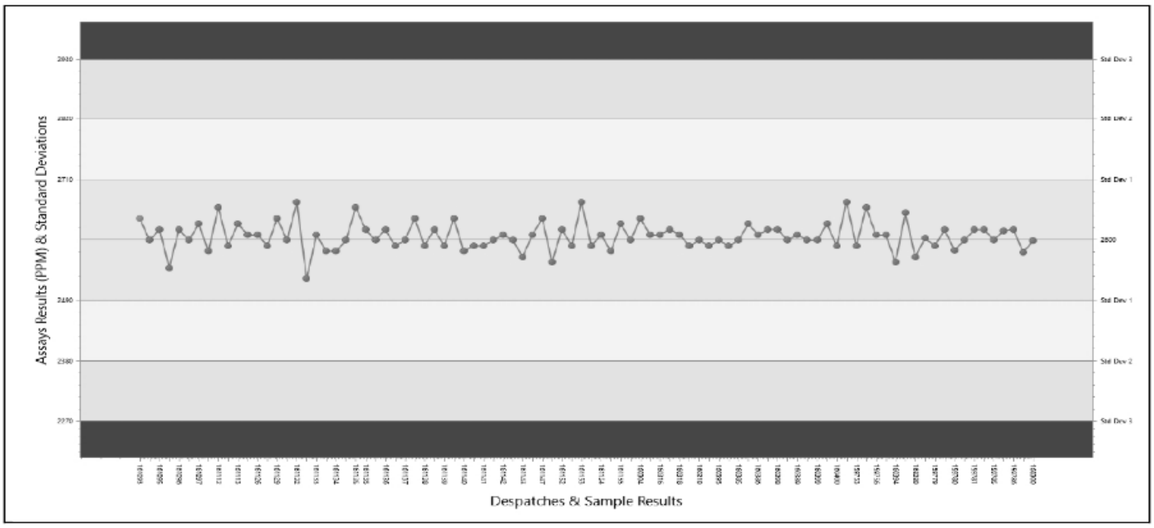
Standard SGS 503b Au (mean expected value of 0.695 g/t Au) from 2015 illustrating no samples falling outside of 3SD from the mean expected value of the standard and a very tight distribution of outcomes around the mean expected values. Fifteen out of 59 samples (25.4%) analysed are at or marginally below the expected value, 44 out of 59 samples (74.6%) analysed are at or marginally above the expected value which indicates a weak trend toward higher-than-expected values.

Figure 12-10: Analysis by XAM for standard 504b for Cu, 2016



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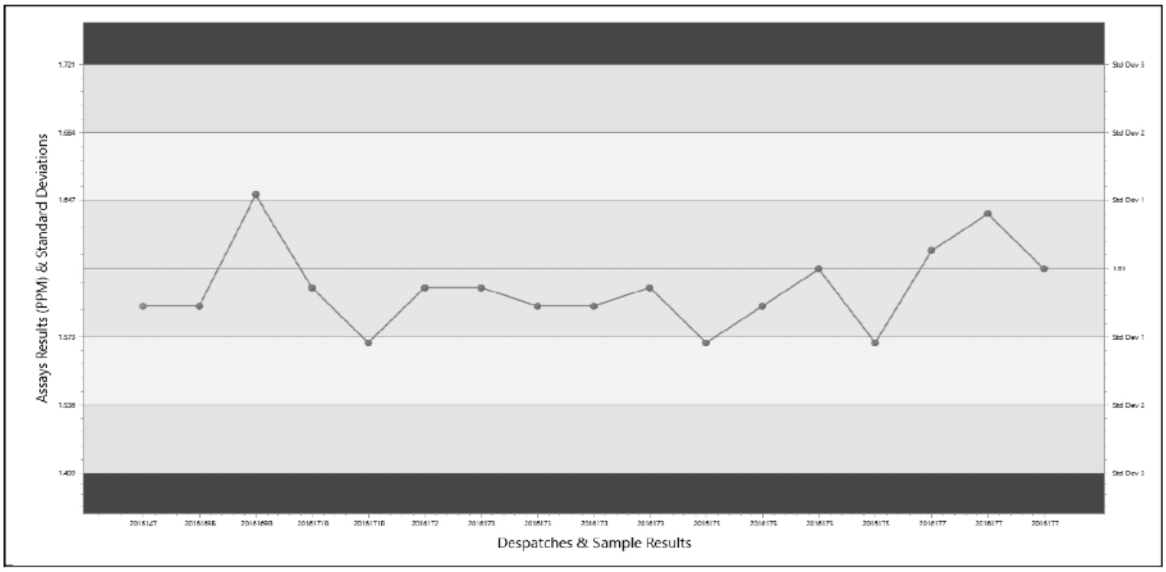
Standard SGS 504b Cu (mean expected value of 1.11% Cu) from 2016 illustrating no samples falling outside of 3SD from the mean expected value of the standard and a very tight distribution of outcomes around the mean expected values. Two out of 17 samples (11.8%) analysed are at or marginally below the expected value, 15 out of 17 samples (88.2%) analysed are at or marginally above the expected value which does not indicate any trend for expected values.

Figure 12-11: Analysis by XAM for standard 504b for Au, 2016



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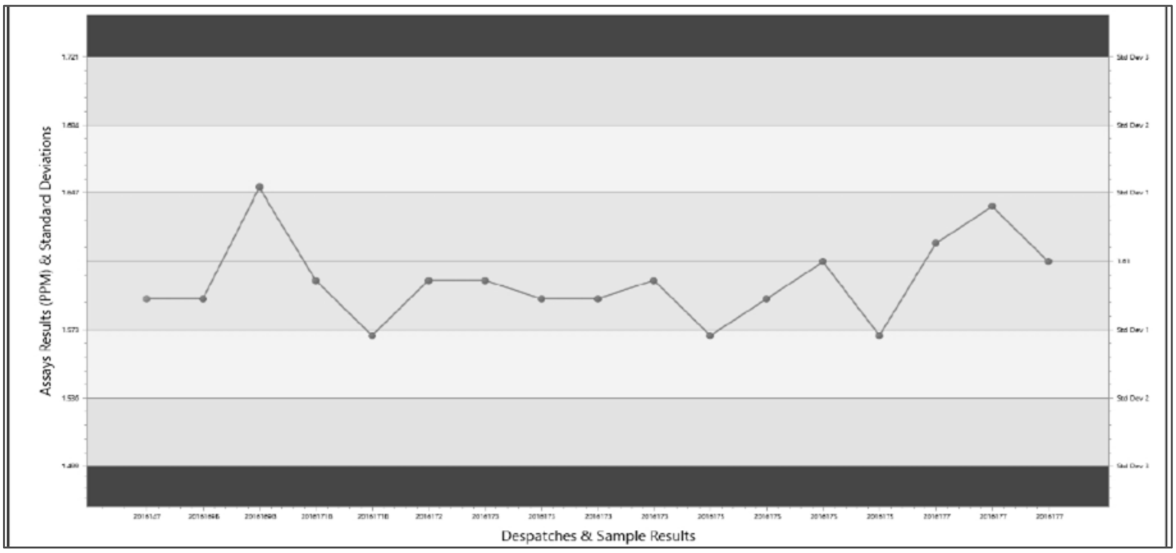
Standard SGS 504b Au (mean expected value of 1.61 g/t Au) from 2016 illustrating no samples falling outside of 3SD from the mean expected value of the standard and a very tight distribution of outcomes around the mean expected values. Twelve out of 17 samples (70.6%) analysed are at or marginally below the expected value, 5 out of 17 samples (29.4%) analysed are at or marginally above the expected value which indicates a weak trend toward lower-than-expected values.

Figure 12-12: Analysis by XAM for standard 503b for Cu, 2019



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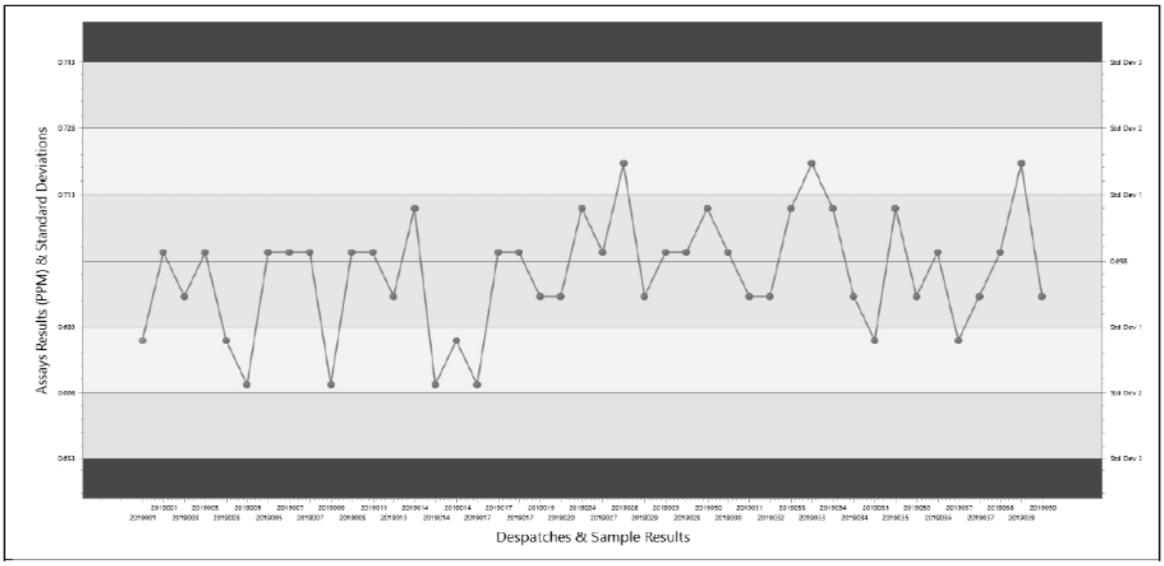
Standard SGS 503b Cu (mean expected value of 5,380 ppm Cu) from 2019 illustrating no samples falling outside of 3SD from the mean expected value of the standard and a very tight distribution of outcomes around the mean expected values. Twenty-seven out of 44 samples (61.4%) analysed are at or marginally below the expected value, 17 out of 44 samples (38.6%) analysed are at or marginally above the expected value which does not indicate a significant trend for expected values.

Figure 12-13: Analysis by XAM for standard 503b for Au, 2019



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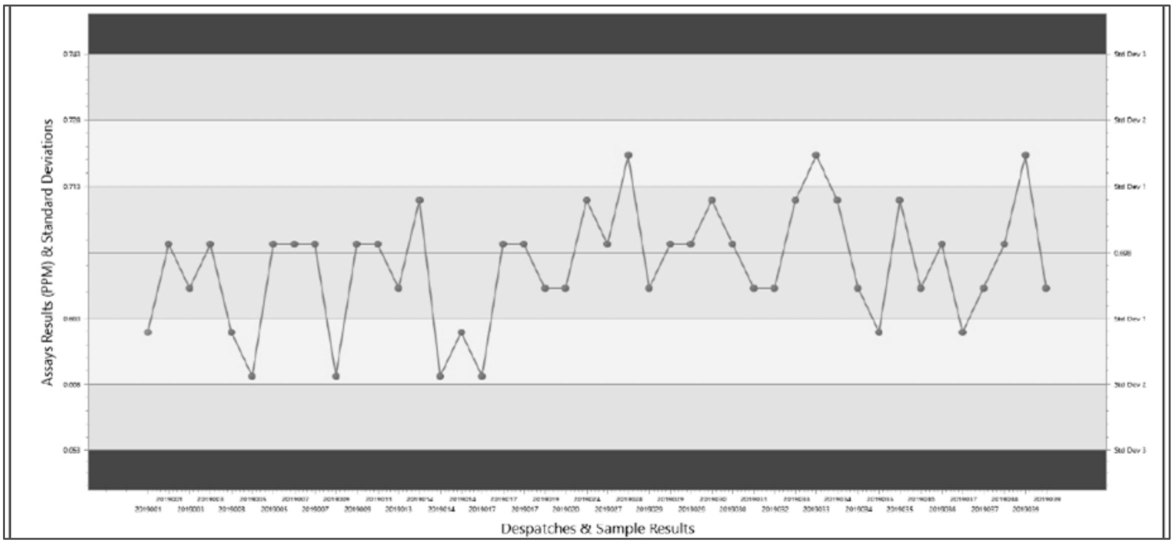
Standard SGS 503b Au (mean expected value of 0.695 g/t Au) from 2019 illustrating no samples falling outside of 3SD from the mean expected value of the standard and a moderately tight distribution of outcomes around the mean expected values. Twenty out of 44 samples (45.5%) analysed are at or marginally below the expected value, 24 out of 44 samples (54.5%) analysed are at or marginally above the expected value which does not indicate a significant trend for expected values.

Figure 12-14: Analysis by XAM for standard 503c for Cu, 2020



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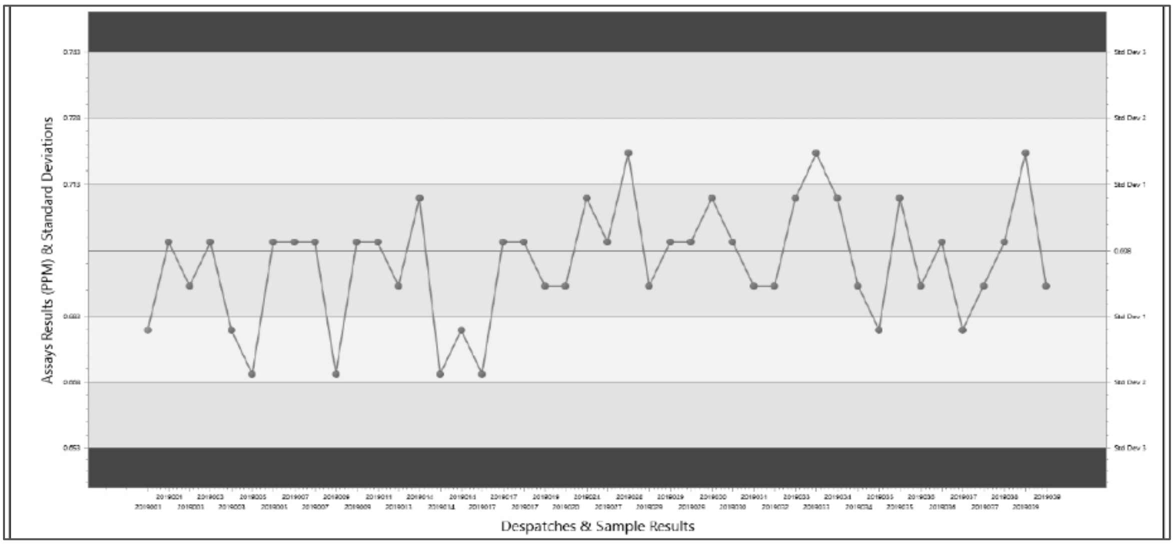
Standard SGS 2020 Field ALS 503c Cu (mean expected value of 5,380 ppm Cu) from 2020 illustrating no samples falling outside of 3SD from the mean expected value of the standard and a very tight distribution of outcomes around the mean expected values. Nineteen out of 33 samples (57.6%) analysed are at or marginally below the expected value, 14 out of 33 samples (46.4%) analysed are at or marginally above the expected value which does not indicate a significant trend for expected values.

Figure 12-15: Analysis by XAM for standard 503c for Au, 2020



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Standard SGS 503c Au (mean expected value of 0.698 g/t Au) from 2020 illustrating no samples falling outside of 3SD from the mean expected value of the standard and a scattered distribution of outcomes around the mean expected values. Twelve out of 32 samples (37.5%) analysed are at or marginally below the expected value, 20 out of 32 samples (62.5%) analysed are at or marginally above the expected value which does not indicate a significant trend for expected values but does see Many samples outcomes moving into 2 and 3SD from the mean both high and low.

12.7 Standard control charts by Xanadu – summary and comments

There are five key observations made by SGC during the review of standard reference material outcomes; which are:

1. On average, the outcomes for both Cu and Au across the board are generally in control with a number of instances of out-of-control results which tended to be in the earlier years 2003 through to 2007.
2. When gold values departed from the expected, they were marginally higher than the expected mean with some earlier examples showing a stronger trend toward higher outcomes.
3. When copper values departed from the expected, they were only marginally lower than the expected mean with some earlier examples showing a slightly stronger trend toward lower outcomes.

4. The reports provided from the laboratories show fewer decimals than are expressed in the expected values which can result in rounding effects which may marginally move outcomes one way or another depending on the grade of the expected values. At the higher grade this presents little to no impact, at the lower grade this is more pronounced but still only weakly significant and not material.
5. Over the range of years presented, there is a tendency to preferentially use lower grade standards at or near the mean grade of the deposit for both Au and Cu. SGC saw fewer references to high grade standards having been used.

The above noted items are all worthy of continued observation and continual improvement.

12.8 Blank analysis

To date, SGC has not been furnished with any historical data pertaining to the performance of blank material either as stand-alone samples or within the sample stream analysis. It is understood by SGC that Xanadu and earlier owners did insert blanks into the sample stream.

A review of the recent umpire laboratory results of blank analysis by SGS and ALS revealed the following:

1. Copper values were routinely returned at very low levels at or near the expected values (defined by Xanadu as 'low' across all multi-element data for the use of barren granitic material from the Khanbogd Mountain granite) for drill holes KHDDH347 and KHDDH421 respectively (Figure 12-14, Figure 12-16 and Figure 12-17).
2. Gold values were routinely returned at very low levels at or near the expected levels (defined by Xanadu as 'low' across all multi-element data for the use of barren granitic material from the Khanbogd Mountain granite) for drill holes KHDDH347 and KHDDH421 respectively, however many gold readings show no records (Table 12-5, Figure 12-18 and Figure 12-19).

In SGC's view it is not satisfactory to use barren material without knowing the confidence interval and what the material elements assay rather than just stating 'low'. Further clarification is recommended by SGC on this matter.

Table 12-4: KHDDH347 Cu and Au umpire outcomes by ALS – Kharmagtai Project

Site ID	Sample ID	Depth from	Depth to	QC type	Standard ID	Parent sample ID	Au g/t	Expected Au g/t	Cu ppm	Expected Cu ppm
KHDDH347	RE55777			Blank	KH-BLANK			<0.01	40	low
KHDDH347	RE55785			Blank	KH-BLANK			<0.01	4	low
KHDDH347	RE55799			Standard	503b		0.67	<0.01	5,470	low
KHDDH347	RE55809			Blank	KH-BLANK		0.01	<0.01	66	low
KHDDH347	RE55815			Standard	505		0.56	<0.01	3,190	low
KHDDH347	RE55844			Standard	503b		0.69	<0.01	5,250	low
KHDDH347	RE55854			Blank	KH-BLANK			<0.01	36	low
KHDDH347	RE55860			Blank	KH-BLANK			<0.01	6	low
KHDDH347	RE55867			Blank	KH-BLANK		0.01	<0.01	160	low
KHDDH347	RE55889			Standard	503b		0.69	<0.01	5,290	low
KHDDH347	RE55899			Blank	KH-BLANK		0.01	<0.01	99	low
KHDDH347	RE55905			Standard	504b		1.55	<0.01	11,150	low
KHDDH347	RE55912			Blank	KH-BLANK			<0.01	80	low
KHDDH347	RE55934			Standard	504b			<0.01	11,050	low
KHDDH347	RE55950			Standard	503c		0.69	<0.01	5,490	low
KHDDH347	RE55957			Blank	KH-BLANK			<0.01	43	low
KHDDH347	RE55979			Blank	KH-BLANK			<0.01	7	low
KHDDH347	RE55989			Blank	KH-BLANK			<0.01	21	low
KHDDH347	RE55995			Blank	KH-BLANK			<0.01	10	low
KHDDH347	RE56002			Blank	KH-BLANK			<0.01	32	low
KHDDH347	RE56034			Standard	505		0.55	<0.01	3,150	low
KHDDH347	XD55875	384	386	Check		XD55874	0.12	<0.01	5,680	low
KHDDH347	XD55920	452	454	Check		XD55914	0.37	<0.01	3,190	low
KHDDH347	XD55965	532	534	Check		XD55964	1.54	<0.01	9,830	low
KHDDH347	XD56010	612	614	Check		XD56009	1.04	<0.01	5,990	low

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Figure 12-16: Performance chart of KHDDH347 Au umpire outcomes by ALS

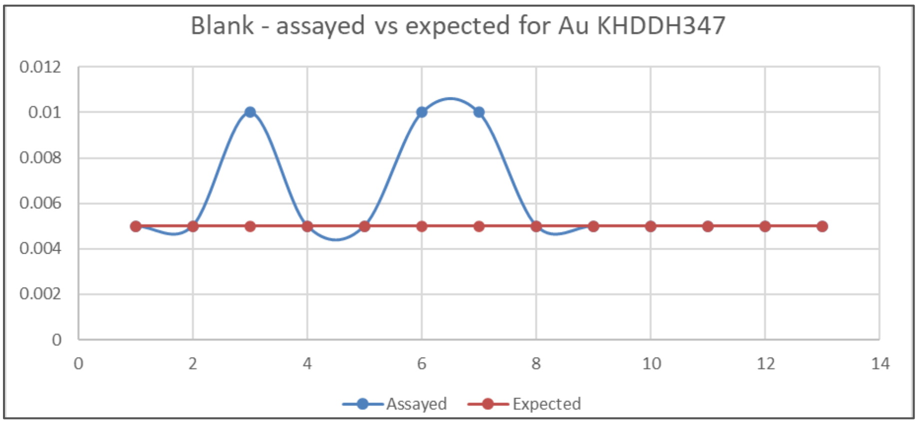

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Figure 12-17: Performance chart of KHDDH347 Cu umpire outcomes by ALS

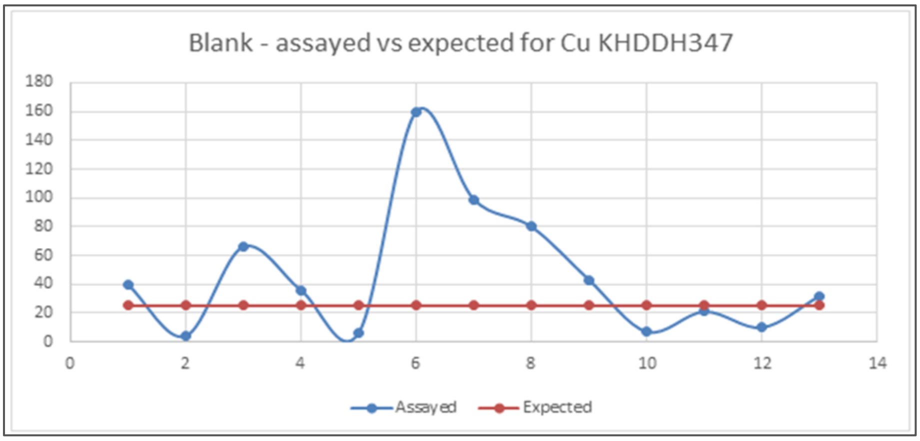

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Table 12-5: KHDDH421 Cu and Au umpire outcomes by SGS – Kharmagtai Project

Site ID	Sample ID	Depth from	Depth to	QC type	Standard ID	Parent sample ID	Au g/t	Expected Au g/t	Cu ppm	Expected Cu ppm
KHDDH421	RE102509			Blank	KH-BLANK			<0.01	1.7	low
KHDDH421	RE102519			Blank	KH-BLANK			<0.01	2.1	low
KHDDH421	RE102549			Blank	KH-BLANK			<0.01	1.7	low
KHDDH421	RE102559			Standard	504b		1.61	<0.01	11,100	low
KHDDH421	RE102569			Blank	KH-BLANK			<0.01	2.2	low
KHDDH421	RE102579			Blank	KH-BLANK			<0.01	1.7	low
KHDDH421	RE102599			Standard	505		0.55	<0.01	3,300	low
KHDDH421	RE102619			Blank	KH-BLANK			<0.01	1.2	low
KHDDH421	RE102629			Blank	KH-BLANK			<0.01	1.4	low
KHDDH421	RE102649			Standard	503c		0.69	<0.01	5,280	low
KHDDH421	RE102659			Blank	KH-BLANK			<0.01	1.3	low
KHDDH421	RE102669			Standard	501b		0.25	<0.01	2,590	low
KHDDH421	RE102679			Blank	KH-BLANK			<0.01	1.2	low
KHDDH421	XD102529	52	54	Check		XD102528	0.64	<0.01	7,170	low
KHDDH421	XD102589	160	162	Check		XD102588	0.4	<0.01	2,320	low
KHDDH421	XD102639	250	252	Check		XD102638	1.6	<0.01	2,780	low

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Figure 12-18: Performance chart of KHDDH421 Au umpire outcomes by SGS

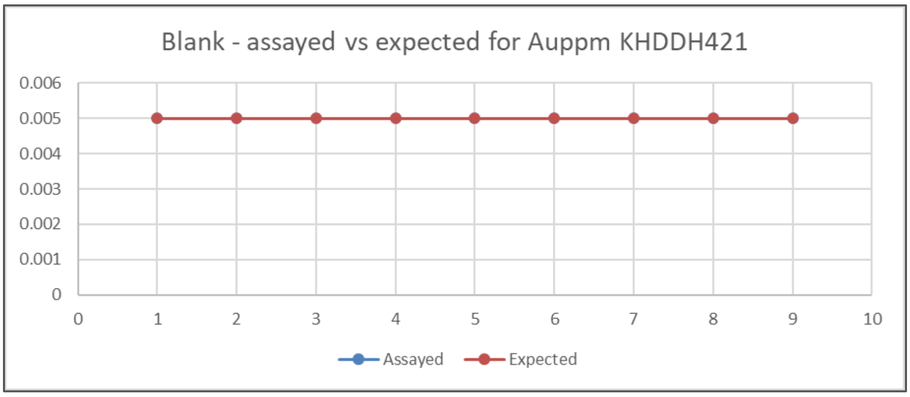

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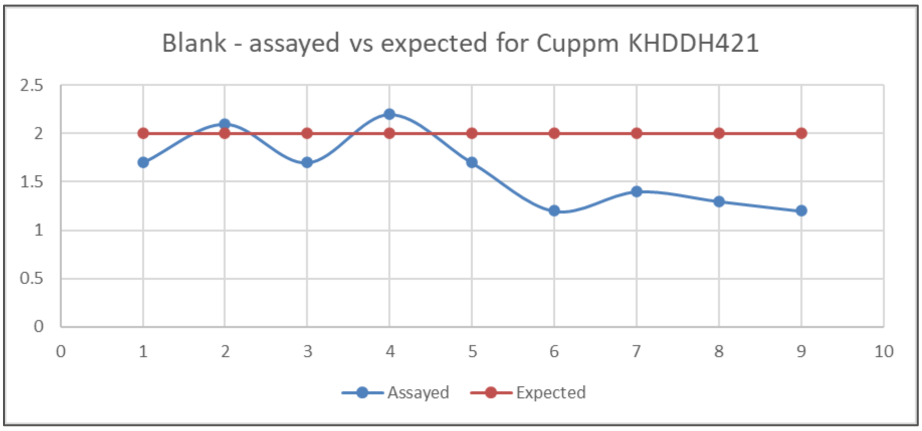
Figure 12-19: Performance chart of KHDDH421 Cu umpire outcomes by SGS



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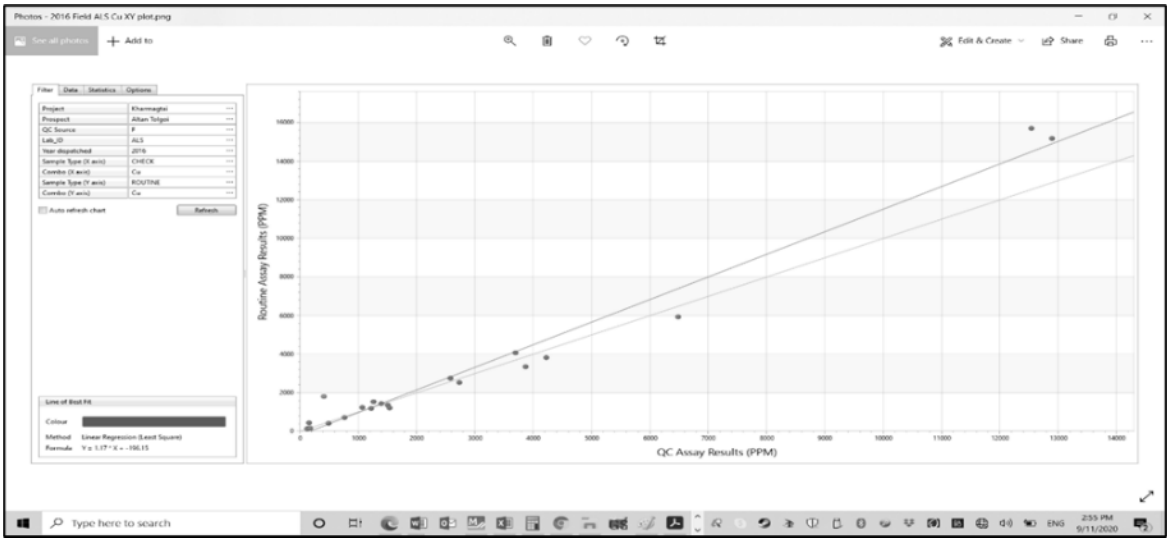
12.9 Field and laboratory duplicate analysis

This section of the report tables the field and laboratory duplicate analysis undertaken by Xanadu and reviewed by SGC (Figure 12-20 through to Figure 12-26).

Figure 12-20: Field Duplicate Cu analysis – ALS 2016



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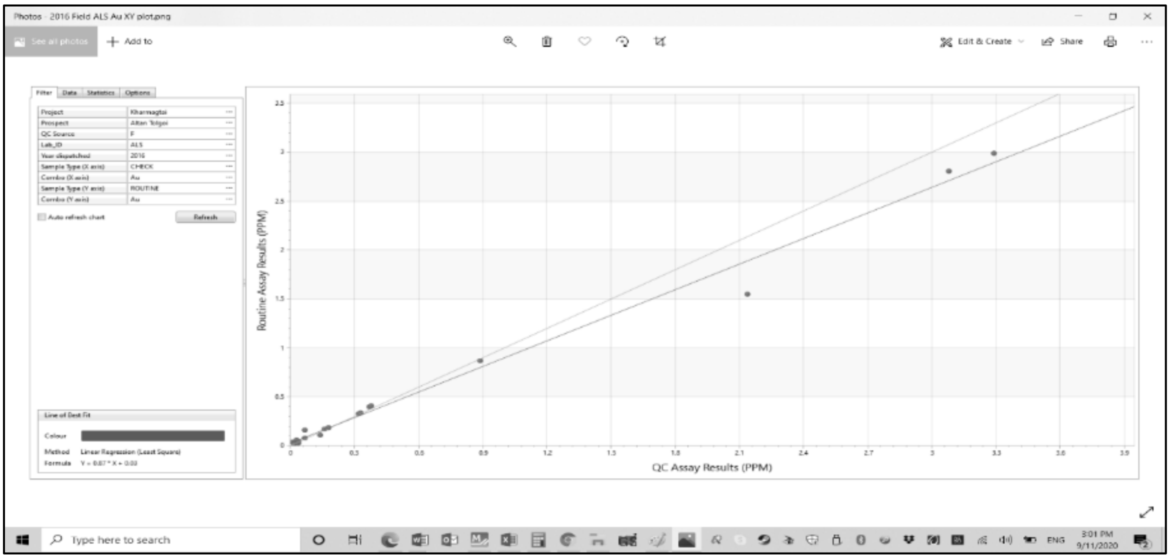
The 2016 ALS Cu values shows a strong correlation with the slope of regression at 1.17. This population is clearly marginally influenced by two high-end members and one outlier near the lower cut-off for Cu ~0.38%.

Figure 12-21: Field Duplicate Au analysis – ALS 2016



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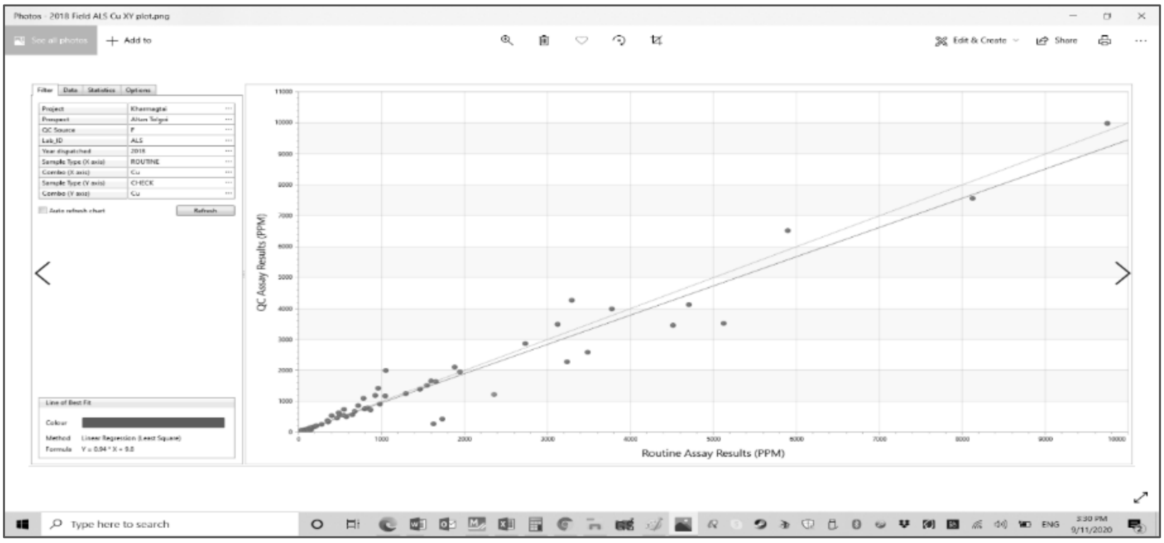
The 2016 ALS Au values shows a strong correlation with the slope of regression at 0.87. This population is marginally influenced by the lower end of the population presenting higher duplicate values than the original values.

Figure 12-22: Field Duplicate Cu analysis – ALS 2018



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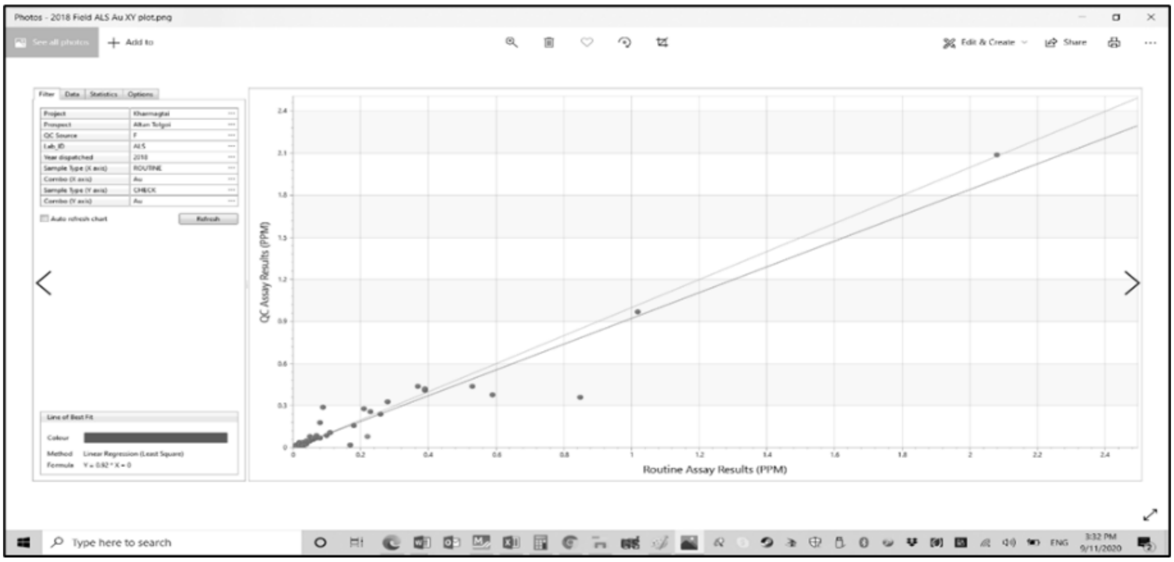
The 2018 ALS Cu values shows a strong correlation with the slope of regression at 0.94. This population is marginally influenced by the tendency for a spread around the upper end of the population with the original samples assaying higher than the duplicate samples.

Figure 12-23: Field Duplicate Au analysis – ALS 2018



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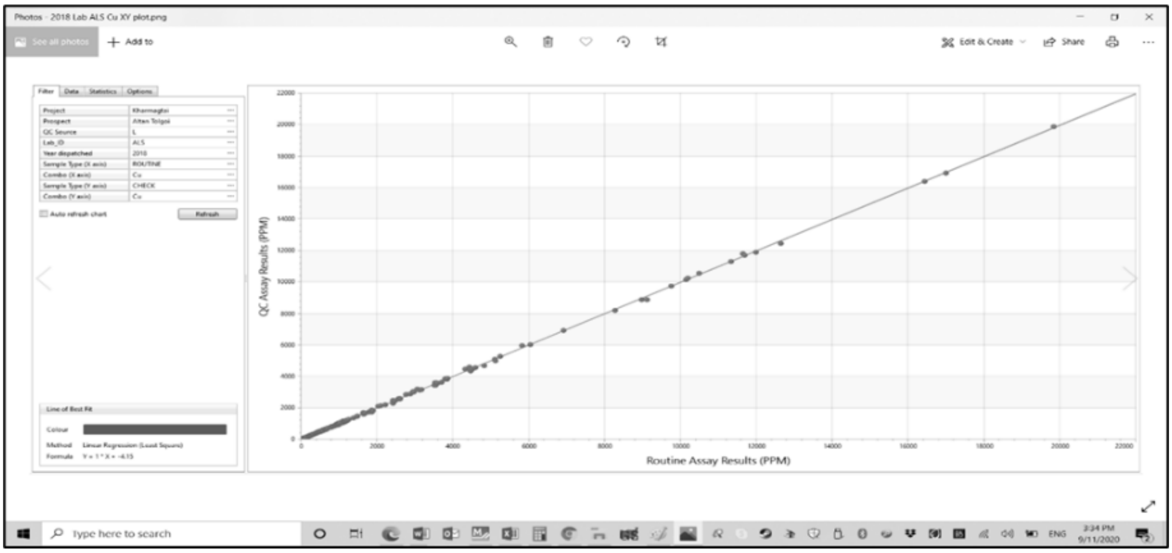
As per the above Cu analysis the 2018 ALS Au values shows a strong correlation with the slope of regression at 0.92. This population is marginally influenced by the tendency for a spread around the upper end of the population with the original samples assaying higher than the duplicate samples.

Figure 12-24: Laboratory Duplicate slope of regression Cu analysis – ALS 2018



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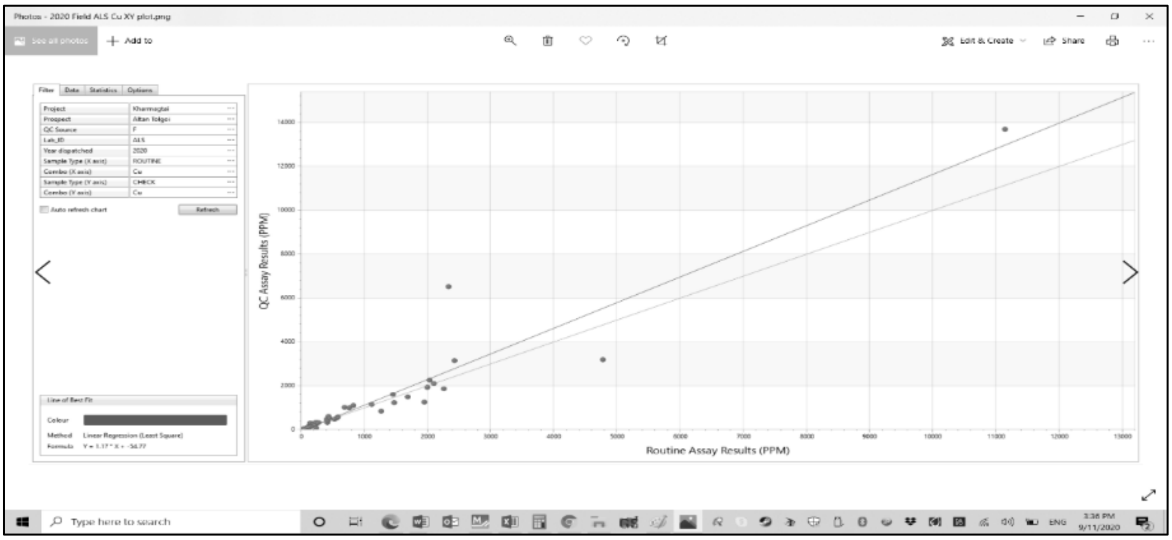
Laboratory duplicate analysis shows a perfect correlation with the R2 (Slope of regression) equal to 1.00. There is no influence from either high-end members or outliers on the population.

Figure 12-25: Field Duplicate Cu analysis – ALS 2020



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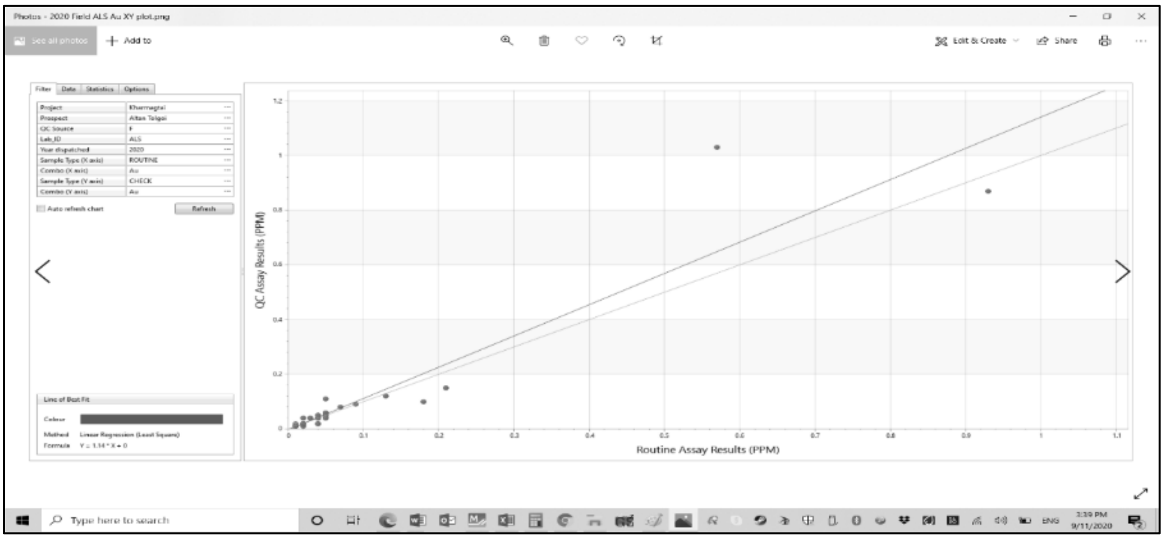
Analysis of Cu for field duplicates for 2020 again shows a strong correlation with the slope of regression being 1.17 and like earlier examples the 2020 duplicate data for Cu shows higher duplicate values than original values which are affected by high-end members and outliers alike.

Figure 12-26: Field Duplicate Au analysis – ALS 2020



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For the 2020 duplicate analysis for Au the same result is obtained as for Cu with the slope of regression being 1.14 and the second determinations being higher. This dataset is strongly affected by skewed high-end members.

12.10 Duplicate analysis by Xanadu and the laboratory – summary and comments

Overall, the outcomes for the duplicate analysis by both Xanadu and the preferred laboratories are good to very good with the slope of regression nearing 1.00 in all cases observed by SGC (reviewed a 10% cross section of the total data).

With the above noted, there are a number of high-end members which do influence the outcomes. When this is taken into consideration in conjunction with the standard outcomes and the observed lack of higher-grade standards across the board, some further investigation is warranted to ensure that:

1. The higher-grade population of the deposit is being accurately represented.
2. Where outliers of high grades are encountered for Cu and Au (but perhaps more for Au due to observation from standard analysis) that they are routinely reviewed again with a second or third split from the remaining coarse rejects.

Overall, the data handling and procedures undertaken by Xanadu are to industry standards in respect of QA/QC.

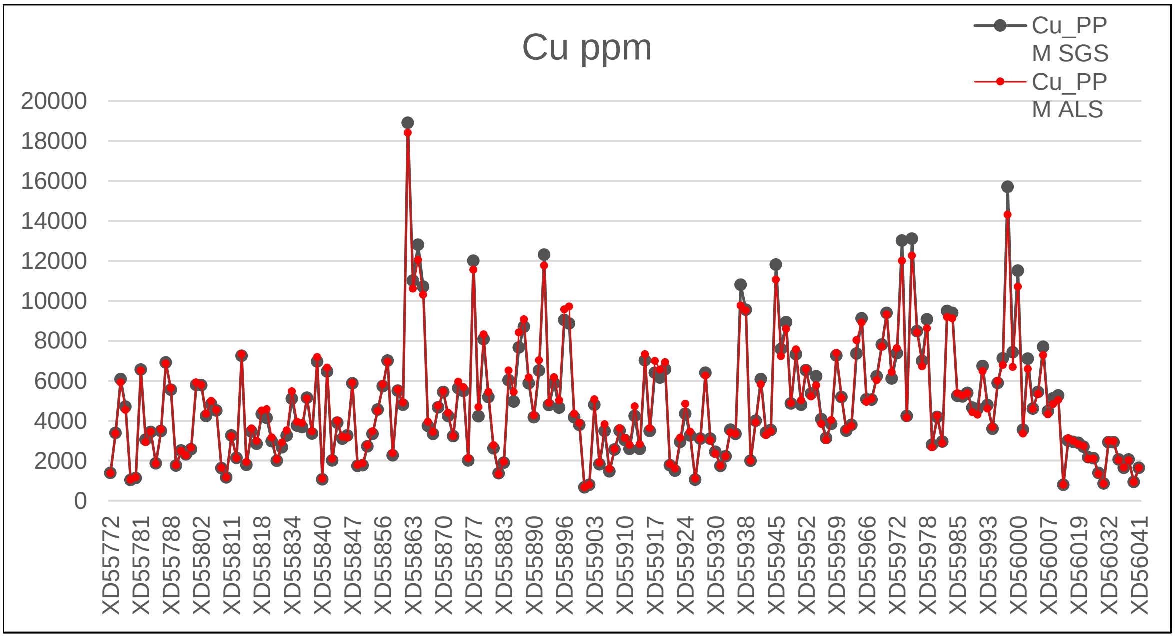
12.11 Third party laboratory analysis of selected Xanadu samples – 2021

Two drill holes (KHDDH347 by ALS and KHDDH421 by SGS) were submitted for analysis at both SGS and ALS. As can be seen in the following (Figure 12-27 through to Figure 12-30), the outcomes for the multi element data were in very close agreement across the entire populations.

In respect to the analysis of KHDDH347, it is clear from the comparative plot (Figure 12-27) and the regression plot (Figure 12-28) for Cu that the R2 is at 0.99 which is a very strong correlation. The minor differences which are observed of a slightly higher overall trend associated with the SGS outcomes are driven by a number of high-end members above 10,000 ppm. SGS assays higher in KHDDH347 according to the trend line by ~5%.

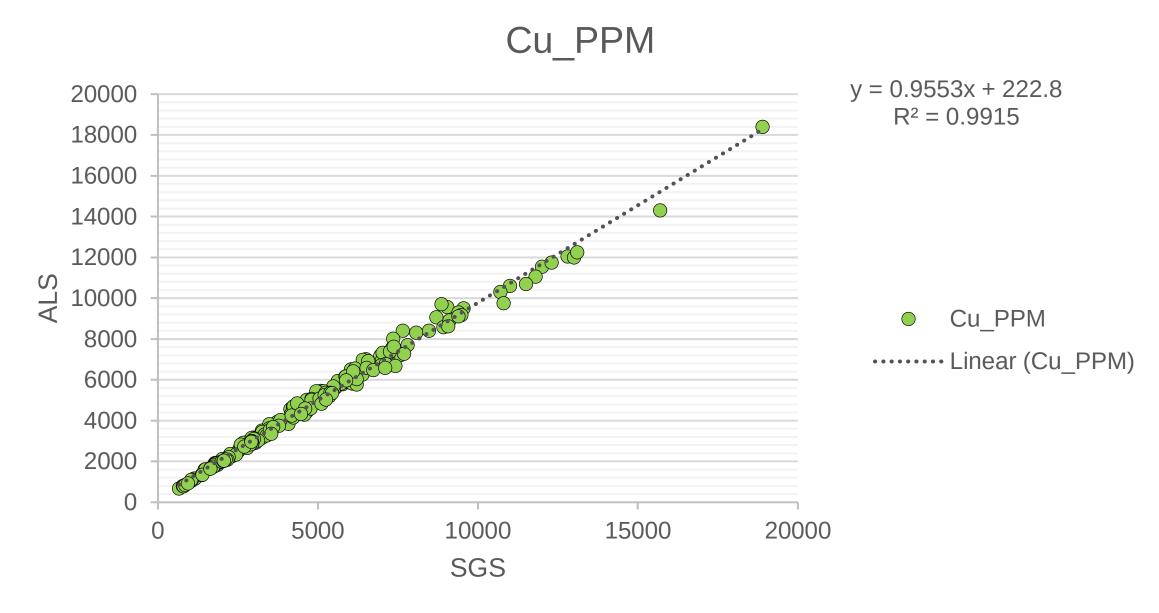
In respect to the analysis of KHDDH421, it is as per KHDDH347 clear from the regression plot of Cu that the R2 is at 0.99 which is a very strong correlation. The minor differences which are observed of a slightly higher overall trend associated with the SGS outcomes are again driven by a number of high-end members above 23,000 ppm. ALS assays higher in KHDDH421 according to the trend line by ~1%.

Figure 12-27: KHDDH347 Down drill-hole comparative line plot for Cu – ALS vs SGS



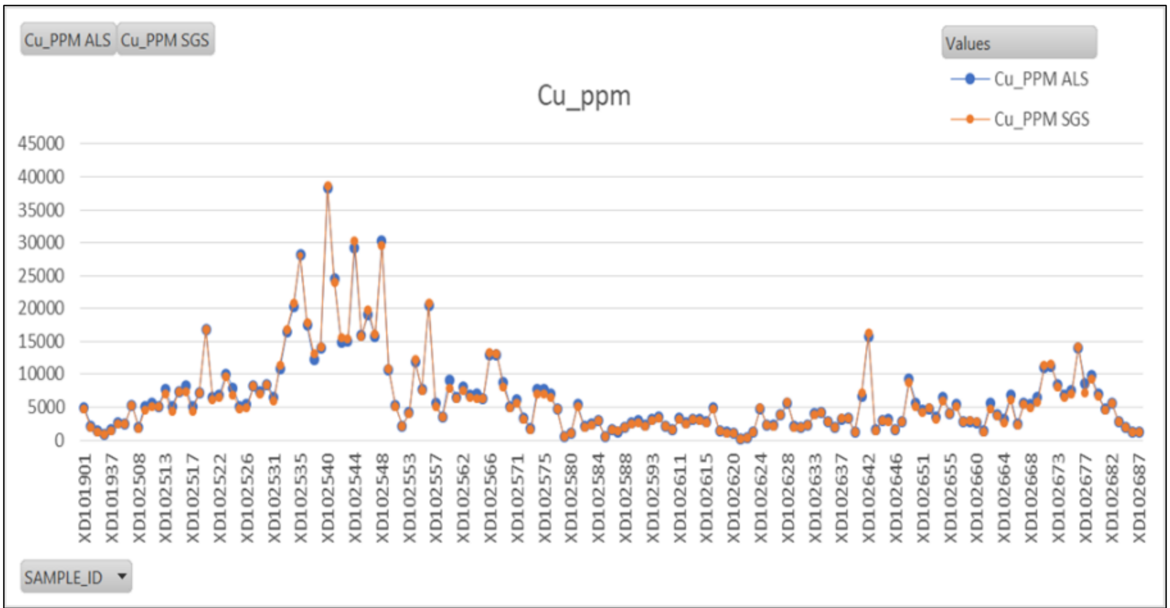
Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Figure 12-28: KHDDH347 Down drill-hole comparative regression plot for Cu – ALS vs SGS



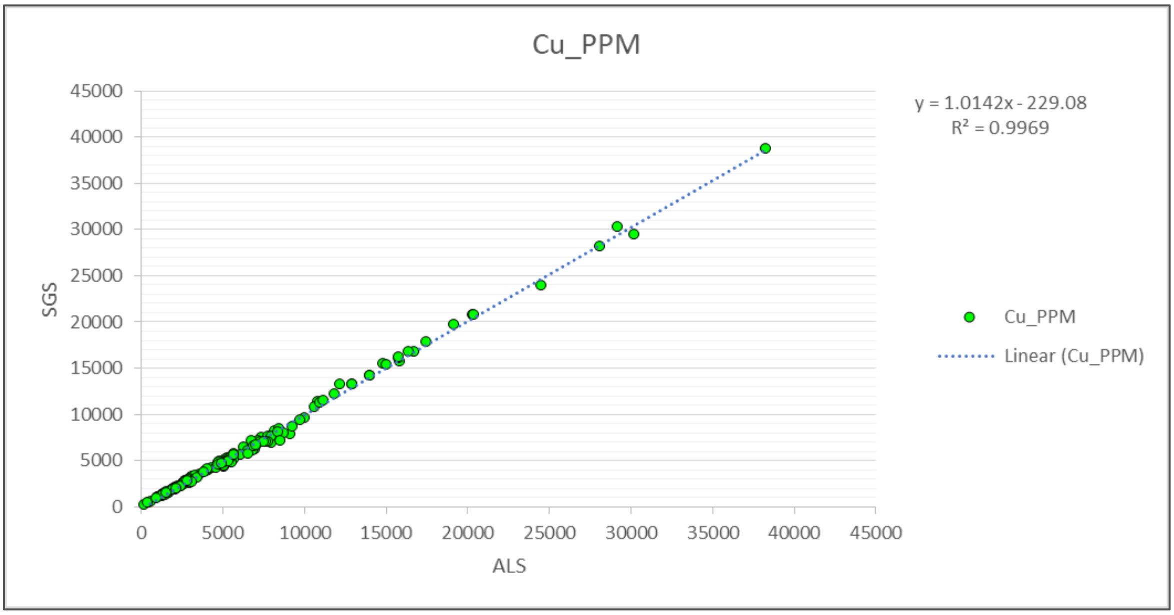
Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Figure 12-29: KHDDH421 Down drill-hole comparative line plot for Cu – ALS vs SGS



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Figure 12-30: KHDDH421 Down drill-hole comparative regression plot for Cu – ALS vs SGS



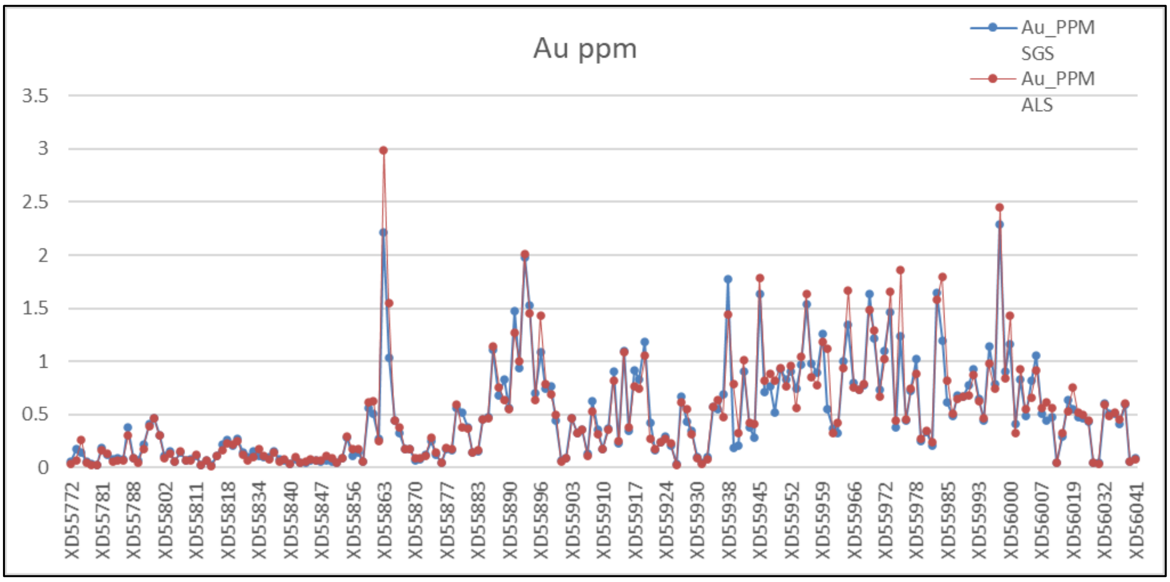
Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

As can be seen in Figure 12-31 to Figure 12-34, for gold in drill hole KHDDH347 and KHDDH421, the regression plot figures show strong correlation across both drill holes and within the populations with R2 being 0.93 and 0.98 respectively.

The slightly lower correlations are a result of one high-end member in the KHDDH347 population, as well as a number of outliers associated with the grade range between 1.25 g/t Au through to the upper limit of the population at or near 2.5 g/t Au. For KHDDH421, the correlation is reduced only by two high-end members. ALS is higher by 4% and 12% respectively for the two drill holes KHDDH347 and KHDDH421 respectively for gold which is approaching a material difference in drill hole KHDDH421.

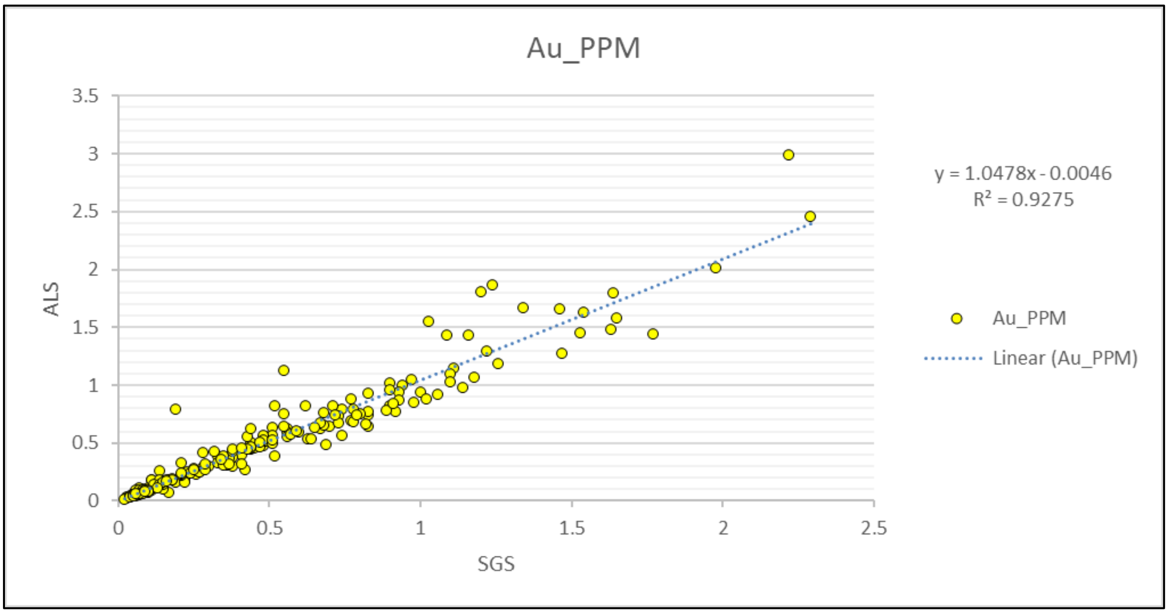
To better understand the KHDDH421 outcomes, it is recommended that further analysis of the outliers/high-end members be completed to assess if the remainder of the population correlations improve.

Figure 12-31: KHDDH347 Down drill-hole comparative line plot for Au – ALS vs SGS



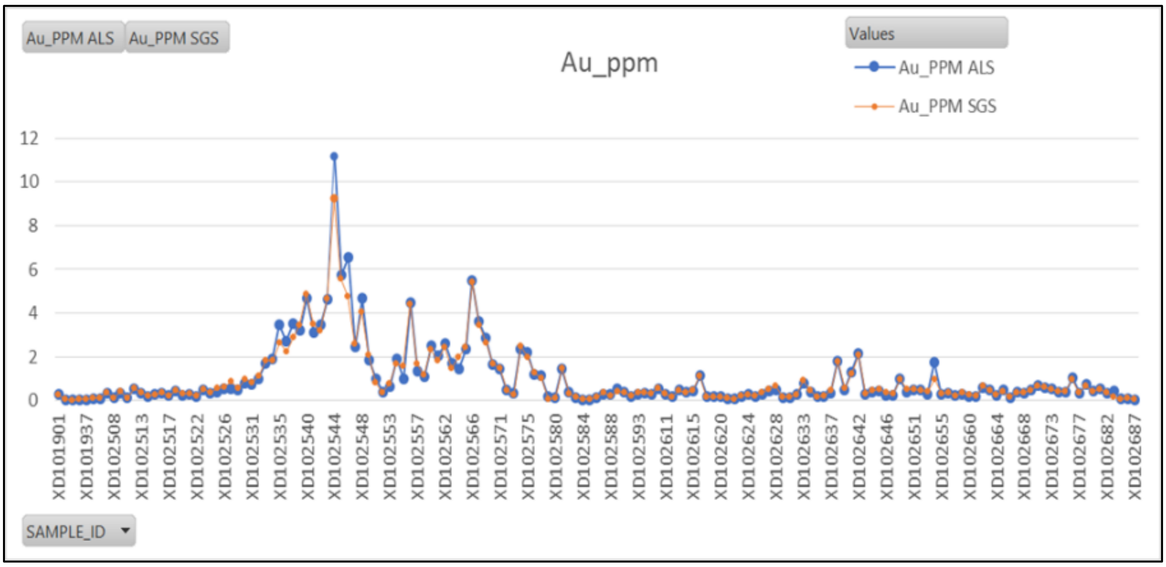
Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Figure 12-32: KHDDH347 Down drill-hole comparative regression plot for Au – ALS vs SGS



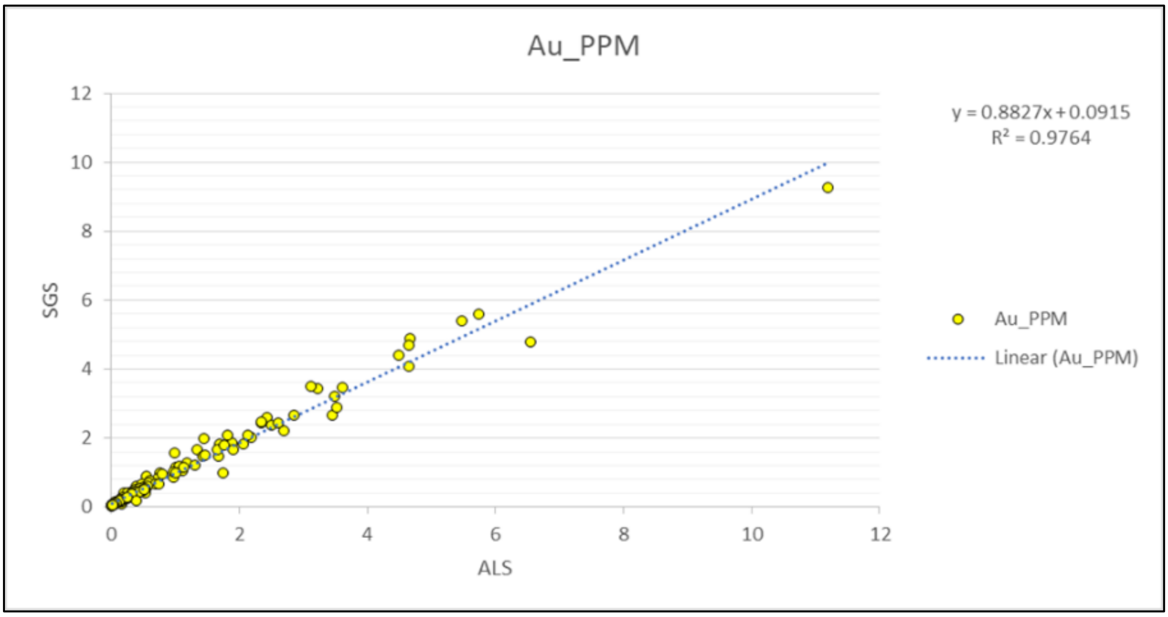
Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Figure 12-33: KHDDH421 Down drill-hole comparative line plot for Au – ALS vs SGS



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Figure 12-34: KHDDH421 Down drill-hole comparative regression plot for Au – ALS vs SGS

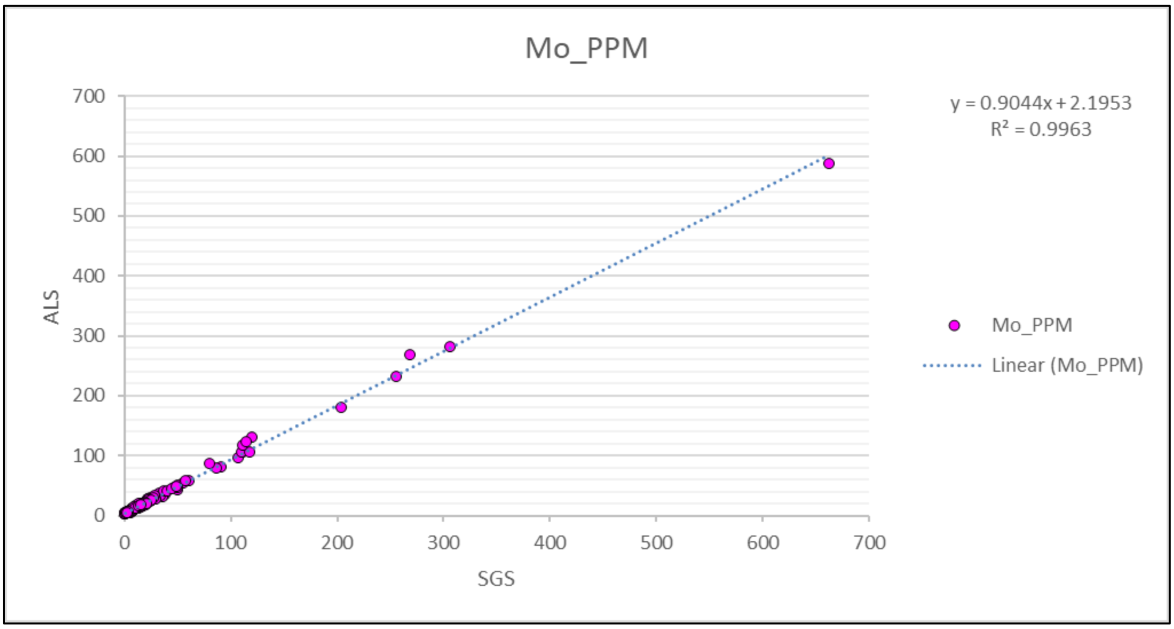


Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

As can be seen in Figure 12-35 and Figure 12-36, for Mo the slope of regression plot for ASL versus SGS displays a very strong correlation with the R2 at 0.996 for KHDDH347. For drill hole KHDDH421 the analysis is not as strong but still consistently high at 0.92 with the trend being driven by two high-end members.

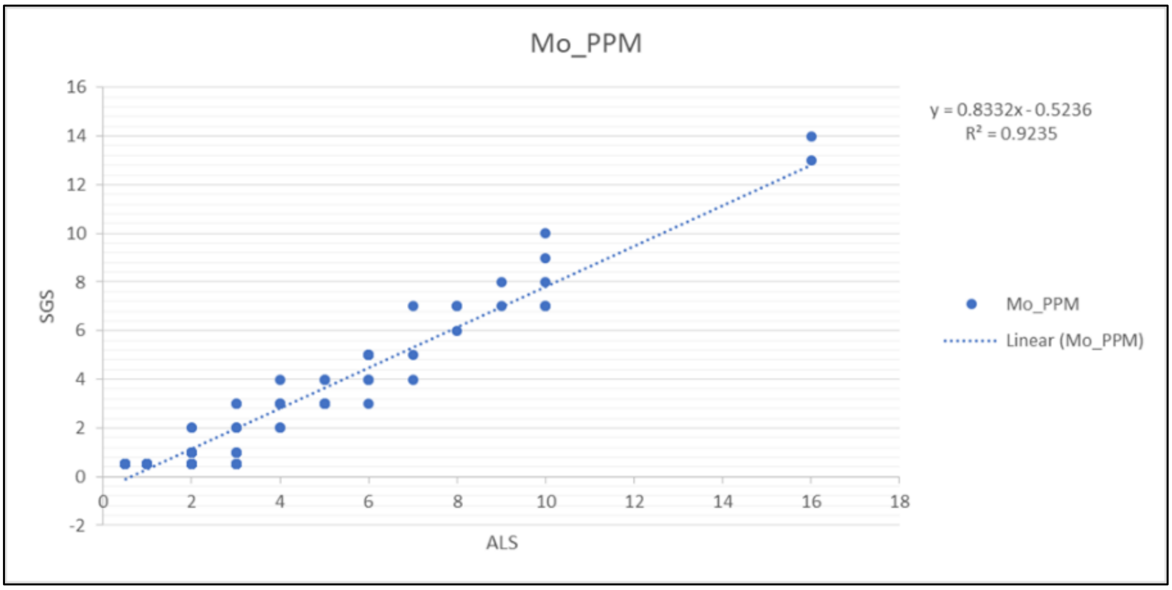
That noted, the two populations are influenced by a single high-end member in KHDDH347 and two high-end members in KHDDH421. The resolution of these samples will improve the outcomes to within a higher level.

Figure 12-35: KHDDH347 Down drill-hole comparative line plot for Mo – ALS vs SGS



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Figure 12-36: KHDDH421 Down drill-hole comparative line plot for Mo – ALS vs SGS



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Overall, the correlations between the two datasets are strong to very strong, with deviation due largely to higher end members in both datasets. It is recommended by SGC that further attention be given the high-end members of each population in order to better understand the cause of the differences and the impact of their removal.

13 Mineral processing and metallurgical testing

13.1 Introduction

The ore processing testwork undertaken between 2008 and 2019 is described in the NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022 and was reviewed by Tilyard Mining Services in 2019 and East Riding Mining Services in 2022.

Three programs of sulphide flotation metallurgy were conducted for the Stockwork Hill, Copper Hill and White Hill Deposits at the Kharmagtai Project. No sulphide metallurgical work has been conducted as yet for the Zaraa, Golden Eagle or Zephyr Deposits.

In 2008, Turquoise Hill sent five samples from Kharmagtai for sulphide flotation metallurgical testing as a part of a larger program for Oyu Tolgoi. In 2016 Xanadu sent a single sample of the newly discovered high-grade tourmaline breccia mineralisation for flotation and grindability testing. In 2018–19, Xanadu sent nine composite samples for sulphide flotation metallurgy and comminution testing.

In aggregate, this sulphide flotation work has demonstrated that the sulphide mineralized material responds well to conventional copper/gold flotation techniques to produce a concentrate free of deleterious elements.

In 2018–19, a single program of copper oxide leach and transitional flotation test work was conducted for the Stockwork Hill, Copper Hill and White Hill deposits. Six samples of oxide to transitional material were run for rougher flotation and bottle roll leaching. This work suggested that the oxide to transitional material responds poorly to flotation without the addition of sulphidising agents.

Two programs were conducted focused on gold recoveries from oxide material from Stockwork Hill, Copper Hill, and Golden Eagle. Samples were run for gravity separation with leaching of the tails and column leach tests. This work suggested gravity separation and leaching of tails may be viable, with moderately high cyanide consumption due to copper oxides in the tails. The column leach work returned mixed recoveries and high cyanide consumption suggesting heap leaching may not be viable for this material.

Details for these programs are described below.

All testwork and reviews conducted on data indicate that Kharmagtai mineralisation is amenable to copper recovery by large tonnage conventional sulphide flotation and gold recovery by gravity, and the Mineral Resource can be estimated on this basis.

The 2022 MRE utilises a constant copper recovery of 90% and gold recovery of 77.5% in the CuEqRec equation in response to direction by Xanadu on the basis of independent metallurgical analysis of in-situ head grade and copper speciation. At the time of writing this report, the QPs “are not aware of any potential factors which may materially impact the Mineral Resource estimates”.

13.2 Turquoise Hill metallurgy (2008)

Preliminary metallurgical work was conducted on Kharmagtai samples as a part of a larger program for Oyu Tolgoi in 2008. Five composite samples were collected from Kharmagtai and run for flotation and grindability using the Oyu Tolgoi flowsheet.

13.2.1 Sample selection

Samples were selected from Stockwork Hill (n=3), White Hill (n=1) and Copper Hill (n=1) (Table 13-1). Sample selection for this program was deemed as being problematic as samples were selected without consideration of oxide or sulphide domains. Sample number AT002 was selected from the Southern Stockwork Zone and contained approximately 20% of the sample from the oxide zone. Sample number AT003 was selected from the Northern Stockwork Zone and +50% of the sample had come from the oxide zone. The Copper Hill Sample (number ZU001) also contained approximately 20% of material from the oxide zone. In addition to the mixed sulphide domains, the average head grade of 1.2% Cu is considered to be substantially higher than the average grade of the deposit.

Table 13-1: 2008 metallurgical samples from Kharmagtai

Sample ID	Deposit	% Cu	g/t Au	% Fe	% S	% Cuox	g/t F	Mass (kg)
AT001	Stockwork Hill	0.53	1.62	7.55	3.17	0.062	525	17.2
AT002	Stockwork Hill	1.58	2.15	6.05	1.92	0.025	415	28.5
AT003	Stockwork Hill	0.57	0.46	4.48	0.42	0.329	585	15.4
TS001	White Hill	0.25	0.24	0.25	1.94	0.01	368	16.8
ZU001	Copper Hill	1.4	2.18	7.45	1.52	0.152	225	20.7

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.2.2 Mineralogy

Modal mineralogy was run for each sample (Table 13-2) after grinding to ~80% passing 150 microns. The dominant copper mineral was chalcopyrite with a moderate amount of bornite in sample AT003 from Stockwork Hill. Pyrite is the dominant sulphide in all but AT003. At this grind size approximately 50% of the sulphide was liberated from gangue and these results suggest no significant improvements would be achieved with finer grind sizes.

Table 13-2: Modal mineralogy from 2008 samples

Sample ID	Chalcopyrite	Bornite	Chalcocite	Pyrite	Gangue	Grind, microns
AT001	1.5	<0.1	<0.1	8.5	90	140
AT002	1.7	<0.1	<0.1	4.6	94	148
AT003	0.7	0.6	<0.1	0.7	98	120
TS001	0.7	<0.1	<0.1	2.6	97	159
ZU001	3.7	0.1	0.2	0.9	95	167

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.2.3 Grindability

Grindability work was done via estimates, rather than measured, due to sample size limitations and suggested the samples are medium to hard (Table 13-3).

Table 13-3: Grindability estimates

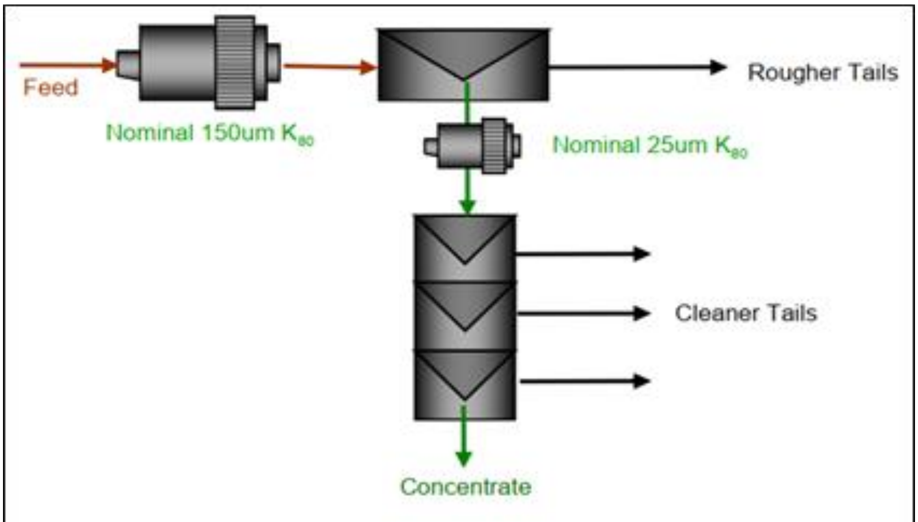
Sample ID	BWi (kWh/t)
AT001	14.6
AT002	18.9
AT003	22.4
TS001	25.0
ZU001	26.0

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.2.4 Flotation

Flotation work included rougher and cleaner tests with no locked cycle testing. Test conditions are found in Figure 13-1.

Figure 13-1: Schematic of cleaner test conditions



NOMINAL CLEANER TEST CONDITIONS

Stage	size –m K_{80}	Regents - g/t			pH
		Lime	3418A	MIBC	
Grind	132 - 166	-	10	-	7.8 - 9.4
Rougher	-	-	0 - 18	8 - 45	7.8 - 9.4
Regrind	10 - 60	200 - 500	-	-	8.3 - 10.5
Cleaners	-	50 - 400	0 - 15	45 - 90	10.5 - 10.8

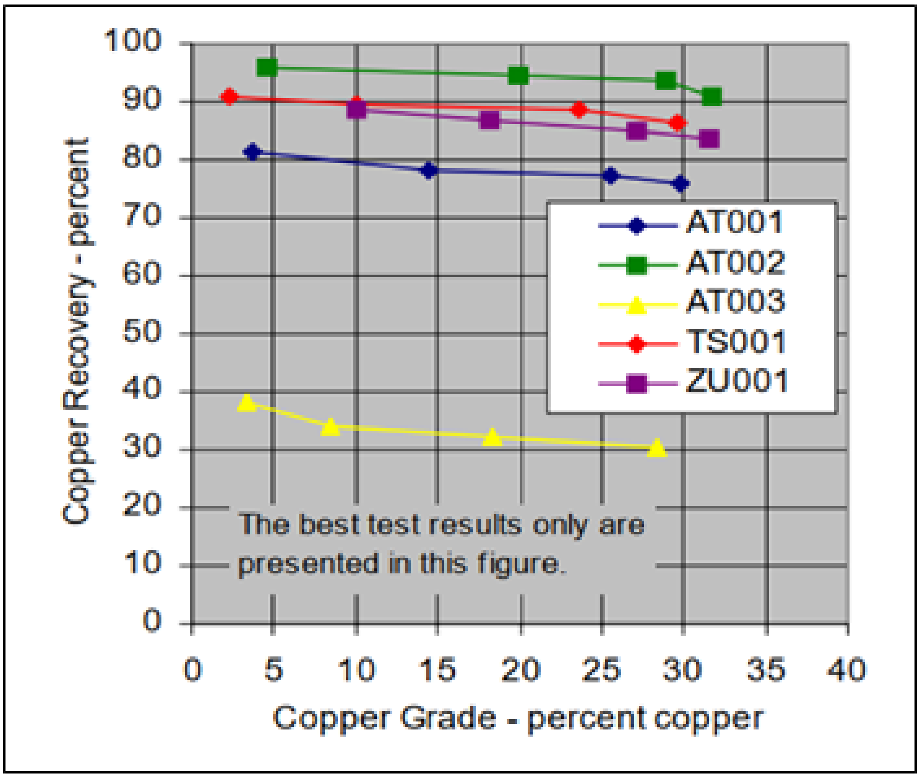
Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

The selective copper sulphide collector used was Aerophine 3418A and flotation frother used was MIBC (Methyl Iso Butyl Carbinol). Moderate pyrite flotation was achieved via adjustment of the pH using lime. No significant optimisations were conducted. Samples were run through open rougher and cleaner test with none of the intermediate products recycled.

As noted above, despite the samples containing mixed oxidation states, a saleable grade (~30% Cu) concentrate was produced with recoveries of between 75% and 90% except AT003 which returned a 30% recovery (Figure 13-2 and Table 13-4).

The concentrates produced were generally free of deleterious elements except for some elevated levels of As and Bi.

Figure 13-2: Grade vs recovery flotation testwork



Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

Table 13-4: Summary of payable and deleterious elements in copper concentrates

Element	Unit	Composite							
		AT001	AT002	TS001	ZU001	Met001	Met002	Met003	Met004
Copper	%	26.4	23.9	19.3	31.0	17.4	18.2	28.7	22.4
Gold	g/t	63.1	86.3	18.7	43.5	8.3	101.5	55.9	8.4
Molybdenum	%	–	–	–	–	1.1	0.36	0.14	1.70
Silver	g/t	76	72	28	105	24	42	68	56
Antimony	g/t	144	410	218	94	188	200	160	122
Arsenic	g/t	264	199	160	101	77	62	18	18
Bismuth	g/t	**480**	**474**	**470**	**468**	**390**	**376**	**434**	**418**

Element	Unit	Composite							
		AT001	AT002	TS001	ZU001	Met001	Met002	Met003	Met004
Cadmium	g/t	14	<10	<10	<10	10	14	18	10
Cobalt	g/t	52	54	104	40	98	60	62	36
Fluorine	g/t	83	102	111	44	**1430**	**770**	**770**	**452**
Iron	%	29.1	28.7	30.4	25.9	26.4	29.0	28.0	28.9
Lead	%	0.04	0.04	0.03	0.04	0.10	0.11	0.55	0.05
Mercury	g/t	0.6	0.3	4.7	<.1	0.3	0.1	0.1	0.1
Nickel	g/t	102	96	128	80	64	60	406	72
Phosphorus	g/t	69	114	90	47	412	162	49	78
Selenium	g/t	110	152	87	193	109	147	274	112
Sulphur	%	34.6	33.1	39.6	31.3	27.6	31.3	33.5	33.4
Zinc	%	0.46	0.07	0.05	0.03	0.09	0.14	0.12	0.11
Silica	%	2.15	5.55	7.46	4.61	14.8	13.8	4.25	9.58
Aluminum Oxide	%	0.64	1.10	1.72	1.19	4.14	3.53	1.11	2.21
Calcium Oxide	%	0.50	0.91	0.39	0.19	0.70	0.37	1.35	0.96
Magnesium Oxide	%	0.21	0.34	0.25	0.32	1.19	0.56	0.44	0.20
Manganese Oxide	g/t	0.02	0.03	0.01	0.02	0.05	0.02	0.01	0.01

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

Notes: Copper, iron, sulphur molybdenum and gold are calculated values

13.3 Xanadu flotation testwork (2016)

In 2016 a single sample of high-grade tourmaline breccia from Stockwork Hill was sent for flotation and grindability testing to Core Research Laboratory (Queensland, Australia) after the discovery of this mineralized material type.

13.3.1 Sample Selection

This sample is only considered representative of the high-grade tourmaline breccia (4.2% Cu) which is significantly higher grade than the average resource grade. The composite had the following chemical characteristics (Table 13-5).

Table 13-5: Tourmaline breccia float sample assays and copper speciation

Sample ID	Au (g/t)	Ag (g/t)	% Fe	% S	% Cu CN	% Cu HAS	%CN RES
AT001	1.86	14.1	7.77	7.2	0.076	0.082	4.21

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.3.2 Grindability

Grindability work was conducted using a screen size of 150 microns. The Bond Work Index (BWI) for this test returned a value of 18.9 kWh/t which parallels the earlier estimates.

13.3.3 Flotation

Rougher flotation work was conducted using three grind sizes (80% passing 125 µm, 150 µm and 180 µm, Table 13-6) using similar reagents to the 2008 testwork. Rougher recoveries were high (over 93%) across three grind sizes with good recoveries in the coarser grind range. Concentrate grades ranges between 17.5% and 18.9% Cu.

Table 13-6: Kharmagtai flotation sighter tests – June 2016

	Feed grade	Recovery to Rougher concentrate	Concentrate grade
FT1-125 µm grind			
Cu	4.07	95.3	18.9
Au	1.83	93.4	8.33
Ag	12.7	86.7	53.7
FT2-150 µm grind			
Cu	3.99	94.8	18.2
Au	1.62	95.1	7.37
Ag	11.4	89.6	48.9
FT3-180 µm grind			
Cu	4.13	93.6	17.5
Au	1.69	95.4	7.28
Ag	11.6	89.9	47.2

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022Xanada Flotation Testwork (2018-2019)

In 2018–19 a series of composite samples were sent for flotation and comminution testwork to SGS in Vancouver, Canada.

13.3.4 Sample selection

Nine composites were selected based on geometallurgical models built for Copper Hill, White Hill and Stockwork Hill by Warren Potma of CSA. CSA used the porphyry alteration domaining process described by Scott Halley (Halley et al., 2005) to define potassic, sericite and albite-chlorite alteration domains from four acid digest multielement assay data and short wave infra-red data acquired via Terraspec. Samples were selected from these alteration domains as multi-hole composites separated by deposit, rock type and alteration type. The composite details are listed in Table 13-7 and composite characterisation is listed in Table 13-8.

Three master composites were built from a selection of variability composites. The Master Composite Recipe can be found in Table 13-9.

Table 13-7: 2018 sample selections

Hole ID	From	To	Sample ID	Met Composite	Received Weight	Total	Comp Name
KHDDH024	472	474	MD026776	TS_Potassic_Dio	4.00	36.80	Comp 1
KHDDH430	254	256	XD120324	TS_Potassic_Dio	3.95		
KHDDH430	262	264	XD120329	TS_Potassic_Dio	4.30		
KHDDH430	272	274	XD120334	TS_Potassic_Dio	3.70		
KHDDH430	472	474	XD120463	TS_Potassic_Dio	4.10		
KHDDH430	474	476	XD120465	TS_Potassic_Dio	4.05		
KHDDH437	480.3	481.3	XD122462	TS_Potassic_Dio	1.90		
KHDDH437	496	498	XD122472	TS_Potassic_Dio	4.05		
KHDDH437	590.3	592	XD122725	TS_Potassic_Dio	3.10		
KHDDH437	638	639.9	XD122753	TS_Potassic_Dio	3.65		
KHDDH024	332	334	MD026705	TS_Potassic_Slt	2.25	38.35	Comp 2
KHDDH024	392	394	MD026735	TS_Potassic_Slt	4.10		
KHDDH437	534	536	XD122494	TS_Potassic_Slt	3.90		
KHDDH437	550	552	XD122703	TS_Potassic_Slt	3.90		
KHDDH437	558	560	XD122707	TS_Potassic_Slt	3.65		
KHDDH450	640	642	XD126963	TS_Potassic_Slt	4.10		
KHDDH450	644	646	XD126965	TS_Potassic_Slt	3.90		
KHDDH450	648	650	XD126968	TS_Potassic_Slt	4.25		
KHDDH450	660	662	XD126974	TS_Potassic_Slt	4.20		
KHDDH450	680	682	XD126985	TS_Potassic_Slt	4.10		
KHDDH430	68	70	XD120221	TS_Ser-Chl	4.40	49.45	Comp 3
KHDDH430	82	84	XD120229	TS_Ser-Chl	3.95		
KHDDH430	156	158	XD120270	TS_Ser-Chl	3.85		
KHDDH437	74	76	XD122028	TS_Ser-Chl	4.15		
KHDDH437	940	942	XD123725	TS_Ser-Chl	2.05		
KHDDH450	92	94	XD125747	TS_Ser-Chl	6.70		
KHDDH450	252	254	XD125840	TS_Ser-Chl	7.50		
KHDDH450	258	260	XD125843	TS_Ser-Chl	6.25		
KHDDH450	364	366	XD126806	TS_Ser-Chl	5.90		
KHDDH450	382	384	XD126816	TS_Ser-Chl	4.70		
KHDDH430	188	190	XD120288	TS_Alb	3.80	53.15	Comp 4
KHDDH430	198	200	XD120293	TS_Alb	3.80		
KHDDH430	218	220	XD120304	TS_Alb	4.35		
KHDDH437	92	94	XD122038	TS_Alb	4.05		
KHDDH437	190	192	XD122097	TS_Alb	3.90		
KHDDH444	400	402	XD124753	TS_Alb	4.10		
KHDDH450	73	75	XD125736	TS_Alb	7.65		
KHDDH450	110	112	XD125758	TS_Alb	7.10		
KHDDH450	216	218	XD125820	TS_Alb	7.95		
KHDDH450	218	220	XD125822	TS_Alb	6.45		

Hole ID	From	To	Sample ID	Met Composite	Received Weight	Total	Comp Name
KHDDH383	102	104	XD76360	ZU_Ser-Chl	2.85	34.35	Comp 5
KHDDH421	210	212	XD102616	ZU_Ser-Chl	3.80		
KHDDH421	240	242	XD102633	ZU_Ser-Chl	4.05		
KHDDH421	242	244	XD102634	ZU_Ser-Chl	3.65		
KHDDH421	370	372	XD101915	ZU_Ser-Chl	3.55		
KHDDH434	86	88	XD121247	ZU_Ser-Chl	4.00		
KHDDH434	126.6	128	XD121274	ZU_Ser-Chl	3.05		
KHDDH434	128	130	XD121275	ZU_Ser-Chl	3.75		
KHDDH434	182	184	XD121405	ZU_Ser-Chl	3.90		
KHDDH434	187.3	188	XD121409	ZU_Ser-Chl	1.75		
KHDDH117	184	186	XD58660	ZU_Alb	3.80	38.80	Comp 6
KHDDH117	186	188	XD58661	ZU_Alb	3.95		
KHDDH117	202	204	XD58670	ZU_Alb	4.05		
KHDDH421	252	254	XD102640	ZU_Alb	3.60		
KHDDH434	114	116	XD121264	ZU_Alb	3.60		
KHDDH434	152	154	XD121288	ZU_Alb	4.20		
KHDDH434	176	178	XD121401	ZU_Alb	3.90		
KHDDH434	232	234	XD121435	ZU_Alb	4.15		
KHDDH434	252	254	XD121447	ZU_Alb	3.80		
KHDDH434	268	270	XD121458	ZU_Alb	3.75		
KHDDH338	72	74	XD54154	AT_Ser-Chl	3.85	51.30	Comp 7
KHDDH341	70	72	XD54757	AT_Ser-Chl	3.65		
KHDDH341	92	94	XD54770	AT_Ser-Chl	3.75		
KHDDH359	246	248	XD60465	AT_Ser-Chl	3.95		
KHDDH394	84	86	XD83265	AT_Ser-Chl	7.35		
KHDDH394	88	90	XD83267	AT_Ser-Chl	7.15		
KHDDH394	160	162	XD83307	AT_Ser-Chl	7.05		
KHDDH394	170	172	XD83313	AT_Ser-Chl	7.50		
KHDDH415	26	28	XD109065	AT_Ser-Chl	3.15		
KHDDH415	158	160	XD109138	AT_Ser-Chl	3.90		
KHDDH338	144	146	XD54194	AT_Alb	3.25	39.95	Comp 8
KHDDH338	160	162	XD54203	AT_Alb	4.70		
KHDDH338	172	174	XD54210	AT_Alb	3.75		
KHDDH341	52	54	XD54747	AT_Alb	3.55		
KHDDH394	350	352	XD83413	AT_Alb	7.05		
KHDDH394	572	574	XD83735	AT_Alb	2.75		
KHDDH394	638	640	XD83772	AT_Alb	3.75		
KHDDH394	650	652	XD83778	AT_Alb	3.80		
KHDDH394	684	686	XD83797	AT_Alb	4.15		
KHDDH394	710	712	XD83812	AT_Alb	3.20		
KHDDH338	236	238	XD54246	AT_TBX	3.50	49.30	Comp 9

Hole ID	From	To	Sample ID	Met Composite	Received Weight	Total	Comp Name
KHDDH338	264	266	XD54261	AT_TBX	3.95		
KHDDH338	272	274	XD54266	AT_TBX	3.65		
KHDDH394	250	252	XD83357	AT_TBX	7.80		
KHDDH394	254	256	XD83359	AT_TBX	8.45		
KHDDH415	206	208	XD109205	AT_TBX	4.40		
KHDDH415	216	218	XD109211	AT_TBX	4.85		
KHDDH415	218	220	XD109212	AT_TBX	4.20		
KHDDH415	242	244	XD109225	AT_TBX	4.00		
KHDDH415	274	276	XD109242	AT_TBX	4.50		

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

Table 13-8: Head characterisation summary

Sample	Au Ave g/t	Ag g/t	Cu %	Fe %	S %
Comp 1	0.16	0.70	0.31	6.10	3.02
Comp 2	0.12	0.60	0.31	3.70	1.42
Comp 3	0.33	0.80	0.32	7.04	2.41
Comp 4	0.18	0.50	0.24	5.22	0.93
Comp 5	0.40	3.20	0.45	7.06	2.85
Comp 6	0.60	2.10	0.36	6.35	0.86
Comp 7	0.57	1.30	0.28	8.07	3.86
Comp 8	0.50	0.90	0.28	5.98	0.97
Comp 9 (TBX MC)	0.50	1.00	0.27	7.37	2.27
Alb MC	0.42	1.30	0.29	5.89	0.93
Ser Chl MC	0.42	2.20	0.35	7.44	3.03

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

Table 13-9: Master composite recipe

Master Composite	Weight (kg)
Alb Master Composite	51.0
TS_Alb (Comp 4)	17.0
Zu_Alb (Comp 6)	17.0
AT_Alb (Comp 8)	17.0
Ser_Chl Master Composite	51.0
TS_Ser_Chl (Comp 3)	17.0
Zu_Ser_Chl (Comp 5)	17.0
AT_Ser_Chl (Comp 7)	17.0
TBX Master Composite	41.3
AT_TBX (Comp 9)	41.3

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.3.5 Mineralogy

Modal mineralogy was conducted on all variability samples using QEMSCAN. Chalcopyrite was the main copper-bearing sulphide, with pyrite also present along with other sulphide minerals. Quartz was the dominant non-sulphide mineral. Copper deportment shows chalcopyrite as the main copper-bearing mineral followed by bornite with trace chalcocite/covellite and enargite (Table 13-10).

Table 13-10: Modal analysis of variability samples

Mineral Mass (wt%)	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6	Comp 7	Comp 8	Comp 9
Pyrite	5.29	2.47	4.59	1.44	4.72	1.18	6.02	1.13	4.09
Chalcopyrite	1.15	0.99	1.01	0.90	1.56	0.93	1.11	0.85	0.83
Other Sulphides	0.02	0.02	0.02	0.00	0.05	0.00	0.00	0.00	0.00
Quartz	26.2	27.4	33.4	25.8	35.9	25.0	32.8	21.1	26.4
Plagioclase	18.5	22.3	8.09	31.8	8.18	27.1	4.29	33.6	17.9
K-Feldspar	7.87	12.6	1.30	5.19	0.96	3.71	0.94	2.11	0.63
Sericite/ Muscovite	18.0	13.2	23.6	10.3	15.2	12.2	16.6	6.82	14.6
Biotite	3.39	3.67	0.77	1.29	1.25	0.45	1.51	0.46	1.15
Amphibole	0.30	0.32	0.39	0.43	0.36	2.28	0.67	0.68	0.65
Epidote Group	0.12	0.12	0.60	0.51	0.40	1.21	2.83	5.84	3.10
Chlorite	8.21	8.59	11.6	11.4	19.9	15.5	23.4	17.6	19.0
Clays	2.36	1.87	5.90	2.69	1.86	2.26	1.73	1.72	2.31
Other Silicates	0.05	0.19	0.11	0.20	0.11	0.52	0.53	0.97	0.53
Oxides	3.75	1.94	3.07	4.93	1.86	4.88	1.92	3.95	3.10
Carbonates	3.70	3.77	4.95	2.52	7.06	2.16	4.71	2.37	4.98
Apatite	0.49	0.38	0.37	0.46	0.32	0.44	0.76	0.50	0.55
Other	0.62	0.26	0.15	0.11	0.23	0.16	0.21	0.37	0.21
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.3.6 Grindability

Comminution testing was conducted on the three master composites by Bond Ball Mill Grindability testing (BWI). The samples were categorised as hard to very hard with a ball mill work index of 17.3 to 19.8 kWh/t (Table 13-11).

Table 13-11: BWI Summary

Sample Name	Mesh of Grind	F80 (um)	P80 (um)	Gram per Revolution	Work Index (kWh/t)	Hardness Percentile	Feed passing (%)	Bulk Density (kg/m^3)
Alb Master Composite	100	2,497	118	1.11	19.8	91.6	7.6	1842.0
Ser Chl Master Composite	100	2,482	113	1.30	16.9	76.1	8.8	1860.4
TBX Master Composite	100	2,583	113	1.25	17.3	78.8	7.6	1842.7

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.3.7 Flotation testwork

The variability composites were run for baseline rougher and cleaner flotation work using previously established conditions. These tests resulted in final copper recoveries in the range of 79.6 to 89.2% with grades in the range of 22 to 32.4%. Copper stage recoveries from the rougher to the final concentrate were in the range of 93.4 to 96.6%, with good upgradability on all composites.

Final gold recoveries to the copper concentrate ranged between 51.3 to 74.1% with grades ranging between 8.1 to 45.3 g/t. Gold stage recoveries from the rougher to the final cleaner concentrate ranged between 63.2 to 89.6% (Table 13-12).

Optimisation testing was conducted on Master Composites Alb, Ser Chl, and TBX (Comp 9) focusing on primary grind and regrind size, collector type and dosage, flotation time, and other variables. The optimized Alb Master Composite test returned copper recovery of 87.0% (95.0% stage recovery) with a grade of 28.7% and a final gold recovery of 75.8% (88.0% stage recovery) with a grade of 35.4 g/t.

The optimised Ser Chl Master composite test yielded a final copper recovery of 82.7% (88.9% staged) with a grade of 29.5% and a final gold recovery of 57.9% (64.7% stage recovery) with a grade of 25.3 g/t. The optimised TBX Master Composite test yielded a final copper recovery of 84.4% (89.8% stage recovery) with a grade of 27.3% and a final gold recovery of 70.7% (82.4% stage recovery) with a grade of 43.5 g/t.

Locked cycle testing was conducted on Master Composites Alb and Ser Chl based on optimised batch cleaner conditions.

The Alb Master Composite test returned a final copper recovery of 89.7% at a grade of 25.6% and final gold recovery of 78.7% at a grade of 30.0 g/t. The Ser Chl Master Composite test returned a final copper recovery of 89.3% at a grade of 24.8% and final gold recovery of 60.8% at a grade of 24.8 g/t. The final flowsheet used is depicted in Figure 13-3.

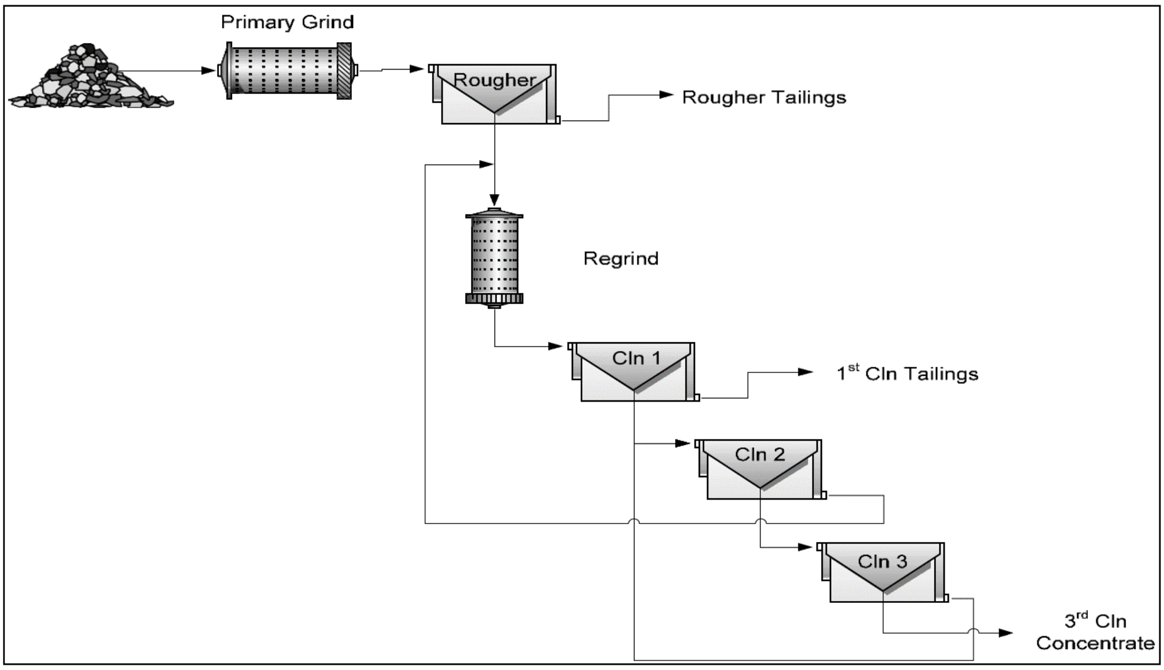
Table 13-12: Variability baseline cleaner flotation summary

Test	Product	Wt (%)	Assay				Distribution				Stage distribution			
			Cu %	Fe %	Au %	S %	Cu %	Fe %	Au %	S %	Cu %	Fe %	Au %	S %
Comp 1-CF1	3rd cleaner con	1.0	25.4	31.6	8.94	36.0	83.2	5.5	51.3	13.5	93.7	15.1	78.1	17.0
	2nd cleaner con	1.3	20.3	31.0	7.32	35.0	85.7	6.9	54.1	16.8	96.5	19.0	82.3	21.3
	1st cleaner con	2.2	12.5	26.3	4.61	28.7	87.0	9.7	56.5	22.9	98.0	26.7	86.0	29.0
	Rougher con	11.5	2.45	33.2	0.54	5.10	88.8	36.3	65.7	78.9	100.0	100.0	100.0	100.0
	Rougher tail	88.5	0.04	4.30	0.07	0.66	11.2	63.7	34.3	21.1	-	-	-	-
	Head (calc)	**100.0**	**0.32**	**5.98**	**0.18**	**2.77**	**100.00**	**100.0**	**100.0**	**100.0**	**-**	**-**	**-**	**-**
Comp 2-CF1	3rd cleaner con	0.8	30.3	29.7	8.06	33.2	81.0	6.7	55.7	20.9	95.0	21.4	72.1	25.2
	2nd cleaner con	0.9	28.3	29.0	7.43	32.3	82.2	7.1	55.7	22.0	96.3	22.7	72.1	26.6
	1st cleaner con	1.3	20.0	23.6	5.40	25.5	83.3	8.2	58.1	25.0	97.6	26.5	75.3	30.2
	Rougher con	9.2	2.88	27.6	0.30	2.47	85.3	31.2	77.3	82.8	100.0	100.0	100.0	100.0
	Rougher tail	90.8	0.05	2.79	0.03	0.25	14.7	68.8	22.7	17.2	-	-	-	-
	Head (calc)	**100.0**	**0.31**	**3.68**	**0.12**	**1.32**	**100.0**	**100.0**	**100.0**	**100.0**	**-**	**-**	**-**	**-**
Comp 3-CF1	3rd cleaner con	1.1	23.3	32.1	16.6	36.6	80.7	5.1	61.8	17.3	93.4	16.5	73.6	19.5
	2nd cleaner con	1.4	19.4	32.0	14.2	36.2	82.9	6.3	65.1	21.1	95.9	20.3	77.6	23.8
	1st cleaner con	2.1	13.2	28.2	9.87	30.7	83.9	8.2	67.4	26.6	97.1	26.6	80.3	30.0
	Rougher con	11.2	2.52	43.9	0.44	2.38	86.4	30.9	83.9	88.9	100.0	100.0	100.0	100.0
	Rougher tail	88.8	0.05	5.53	0.06	0.30	13.6	69.1	16.1	11.1	-	-	-	-
	Head (calc)	**100.0**	**0.33**	**7.11**	**0.30**	**2.39**	**100.0**	**100.0**	**100.0**	**100.0**	**-**	**-**	**-**	**-**
Comp 4-CF1	3rd cleaner con	0.7	27.6	30.9	17.3	34.5	81.1	4.0	70.7	26.0	95.9	21.5	81.7	29.2
	2nd cleaner con	0.8	23.6	29.7	15.1	33.0	82.2	4.5	73.4	29.4	97.2	24.4	84.7	33.0
	1st cleaner con	1.3	14.7	22.9	9.61	24.0	82.7	5.7	75.4	34.7	98.0	30.6	87.1	39.0
	Rougher con	7.9	2.54	55.9	0.29	1.27	84.6	18.5	86.6	89.1	100.0	100.0	100.0	100.0
	Rougher tail	92.1	0.04	4.83	0.03	0.11	15.4	81.5	13.4	10.9	-	-	-	-
	Head (calc)	**100.0**	**0.24**	**5.45**	**0.17**	**0.93**	**100.0**	**100.0**	**100.0**	**100.0**	**-**	**-**	**-**	**-**
Comp 5-CF1	3rd cleaner con	1.3	28.6	29.9	19.3	33.2	87.0	5.4	59.3	16.2	94.6	16.4	71.6	19.6
	2nd cleaner con	1.7	23.2	29.4	16.3	32.2	89.1	6.7	63.0	19.8	96.8	20.3	76.0	23.9
	1st cleaner con	2.8	14.3	25.8	10.5	26.8	90.3	9.7	66.7	27.1	98.1	29.3	80.5	32.8
	Rougher con	12.3	3.29	40.2	0.61	3.86	92.0	33.0	82.8	82.7	100.0	100.0	100.0	100.0
	Rougher tail	87.7	0.04	5.62	0.09	0.54	8.0	67.0	17.2	17.3	-	-	-	-
	Head (calc)	**100.0**	**0.44**	**7.36**	**0.43**	**2.74**	**100.0**	**100.0**	**100.0**	**100.0**	**-**	**-**	**-**	**-**
Comp 6-CF1	3rd cleaner con	1.0	32.4	30.4	45.3	33.3	89.2	4.7	74.1	40.3	96.6	27.4	89.6	46.5
	2nd cleaner con	1.2	27.2	27.8	38.8	29.8	90.6	5.2	76.7	43.5	98.0	30.3	92.7	50.2
	1st cleaner con	2.0	16.5	20.8	23.7	20.1	91.2	6.4	77.9	48.9	98.7	37.7	94.2	56.4
	Rougher con	9.3	3.59	57.7	1.13	1.18	92.4	17.1	82.7	86.7	100.0	100.0	100.0	100.0
	Rougher tail	90.7	0.03	5.88	0.12	0.12	7.6	82.9	17.3	13.3	-	-	-	-
	Head (calc)	**100.0**	**0.36**	**6.43**	**0.60**	**0.82**	**100.0**	**100.0**	**100.0**	**100.0**	**-**	**-**	**-**	**-**

Test	Product	Wt (%)	Assay				Distribution				Stage distribution			
			Cu %	Fe %	Au %	S %	Cu %	Fe %	Au %	S %	Cu %	Fe %	Au %	S %
Comp 7-CF1	3rd cleaner con	1.0	24.1	32.5	25.2	35.4	85.7	4.1	54.4	9.6	94.4	10.3	63.2	11.0
	2nd cleaner con	1.4	18.3	31.1	19.8	33.8	87.7	5.3	57.6	12.4	96.5	13.3	66.9	14.2
	1st cleaner con	2.5	9.89	26.4	11.2	27.5	88.6	8.4	61.1	18.8	97.5	21.1	71.0	21.6
	Rougher con	13.3	1.94	36.5	0.49	3.59	90.8	39.6	86.1	87.2	100.0	100.0	100.0	100.0
	Rougher tail	86.7	0.03	5.59	0.08	0.55	9.2	60.4	13.9	12.8	-	-	-	-
	Head (calc)	**100.0**	**0.28**	**8.03**	**0.47**	**3.72**	**100.0**	**100.0**	**100.0**	**100.0**	**-**	**-**	**-**	**-**
Comp 8-CF1	3rd cleaner con	0.8	29.8	29.9	34.7	32.7	79.6	3.9	69.6	27.2	94.9	23.2	86.3	34.5
	2nd cleaner con	1.0	23.8	27.2	27.9	28.8	81.7	4.5	71.8	30.8	97.5	27.1	89.1	39.0
	1st cleaner con	1.6	14.7	21.1	17.4	20.5	82.4	5.7	73.1	35.8	98.3	34.5	90.7	45.3
	Rougher con	7.5	3.22	66.4	0.99	2.60	83.9	16.6	80.6	78.9	100.0	100.0	100.0	100.0
	Rougher tail	92.5	0.05	5.36	0.08	0.21	16.1	83.4	19.4	21.1	-	-	-	-
	Head (calc)	**100.0**	**0.29**	**5.94**	**0.38**	**0.92**	**100.0**	**100.0**	**100.0**	**100.0**	**-**	**-**	**-**	**-**
Comp 9-CF1	3rd cleaner con	1.0	22.0	32.5	32.7	36.5	85.2	4.5	70.0	16.1	94.5	14.7	83.6	18.3
	2nd cleaner con	1.5	15.7	30.2	23.6	33.3	87.3	6.0	72.3	21.0	96.9	19.7	86.4	23.8
	1st cleaner con	2.6	8.98	24.6	13.7	25.2	88.3	8.6	74.1	28.2	98.0	28.4	88.6	32.0
	Rougher con	12.4	1.93	42.0	0.63	2.25	90.1	30.3	83.7	88.1	100.0	100.0	100.0	100.0
	Rougher tail	87.6	0.03	5.97	0.09	0.32	9.9	69.7	16.3	11.9	-	-	-	-
	Head (calc)	**100.0**	**0.27**	**7.50**	**0.48**	**2.35**	**100.0**	**100.0**	**100.0**	**100.0**	**-**	**-**	**-**	**-**

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

Figure 13-3: Process flowsheet



Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

The main differences between the 2008 and 2019 flotation tests revolves around head grade of samples. In the 2008 work the average Cu grade was 0.62% Cu versus 0.31% Cu in 2019. The gold grades in 2008 averaged 1.2 g/t Au versus 0.39 g/t Au in 2019. The grades of the 2019 samples are considered to be closer to the average mineralized material grade.

Despite this significant difference in grade between 2008 and 2019 tests due to sample selection, the 2019 work produced saleable concentrates with little to no decrease in recoveries.

13.4 Gold deportment studies (2018)

In 2018, twelve samples were selected from the sulphide zones within Stockwork Hill, Copper Hill and Stockwork Hill. These samples were sent for thin section preparation, petrography and scanning electron microprobe work to Sarah Mulling at the University of Western Australia (UWA) (Table 13-3).

Table 13-13: Samples selected for gold deportment studies

Drill Hole	Depth (m)	Cu (%)	Au (ppm)	Ag (ppm)
AT-346	413.5	4.58	3.8	13.0
AT-394A	456.8	0.51	2.4	1.3
AT-419	622.5	0.38	1.4	2.0
AT-419	681.9	1.36	3.2	1.6
ZU-383	76.2	1.7	3.4	17.0
ZU-383	138.4	0.73	2.6	8.0
ZU-416	115.7	1.42	4.4	6.5
TS-340	219.65	1.19	1.3	3.0
TS-345	332.6	0.79	1.5	2.0
TS-430	766.5	0.7	0.27	2.0
AB-395	84.8	0.93	4.5	1.1
AB-398	133.8	0.52	2.76	2.3

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

Chalcopyrite was the dominant copper sulphide observed. Bornite was observed in many samples, but as small inclusions within magnetite or as small flame structures within chalcopyrite. Chalcopyrite sometimes occurs as fine fractures within magnetite or as small inclusions within pyrite (potential losses in recovery).

Gold occurs as electrum (>20 wt% Ag) in grains that range between 1 µm to 70 µm. Most electrum grains are enclosed in chalcopyrite and pyrite, although some occur as intergrowths with gangue (potential losses in float only process).

13.5 Oxide testwork (2018–2020)

Between 2018 and 2020 three rounds of oxide testwork were conducted at Kharmagtai, as discussed below.

13.6 Copper oxide-transition testwork (Blue Coast Metallurgy, BC)

In late 2018 samples of oxide to transitional material were selected for flotation test work conducted at Blue Coast Metallurgy, British Columbia, Canada.

13.6.1 Sample selection

Six samples of oxide to transitional material were collected from Stockwork Hill, White Hill and Copper Hill. Samples ranged in head grade from 0.28% Cu to 0.38% Cu and 0.07 g/t Au to 0.25 g/t Au. Sample details are presented in Table 13-14 and sample compositions in Table 13-15.

Table 13-14: Sample details

Composite	Sample ID	Comp ID	Additional Identifiers	Tared Mass (kg)
KH_WH_01	MD066630	White Hill (Oxide)	Barrel 1	3.7
	XD121788			6.4
	MD064646			3.54
	XD1200093			2.45
	MD064783			3.67
	XD130372			2.88
	MD005495			2.78
	MD82008			1.87
	MD067130			1.56
			Total Mass	**28.86**
KH_CH_02	MD020587	Copper Hill (Oxide Transition)	Barrel 2	3.02
	MD023748			1.92
	MD003629			3.63
	MD004619			3.08
	MD004625			1.22
	MD023847			4.46
	MD020316			6.13
	MD004863			3.31
	XD71353			2.9
	MD020242			3.04
			Total Mass	**32.69**
KH_SH_02	MD067797	Stockwork Hill (Oxide Transition)	Barrel 3	3.33
	MD004521			3.83
	MD068912			3.11
	MD069208			2.36
	XD129209			3.71
	MD068911			3.81
	XD54943			3.44
	XD103204			2.93
	XD73786			6.87
	MD008534			4.7
			Total Mass	**38.08**

Composite	Sample ID	Comp ID	Additional Identifiers	Tared Mass (kg)
KH_SH_01	XD54938	Stockwork Hill (Oxide)	Barrel 4	2.76
	XD56270			3.55
	XD113246			5.93
	MD78508			3.61
	XD60332			4.2
	XD54719			2.36
	MD069201			1.88
	XD101971			2.32
	MD070735			2.72
			Total Mass	**29.33**
KH_CH_01	MD022182	Copper Hill (Oxide)	Barrel 5	1.9
	MD020312			6.41
	XD54869			3.09
	XD71361			2.76
	XD109159			2.3
	XD121205			5.16
	XD53002			3.19
	XD102503			2.85
	XD53011			3.58
			Total Mass	**31.23**
KH_WH_02	XD130376	White Hill (Oxide Transition)	Barrel 6	3.81
	XD130038			3.19
	XD80512			1.91
	XD130044			3.28
	XD80761			2.17
	XD80520			2.02
	XD80533			1.63
	XD80757			2.32
	XD79355			2.4
	XD120181			3.73
			Total Mass	**26.45**

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

Table 13-15: Composite head assays

Composite ID	Cu (%)	Fe (%)	Au (g/t)	Ag (g/t)	Stot (%)
KH_CH_01	0.28	5.66	0.07	0.63	0.01
KH_CH_02	0.38	5.07	0.25	2.10	0.05
KH_SH_01	0.29	4.28	0.17	0.57	0.01
KH_SH_02	0.34	5.41	0.17	0.87	0.03
KH_WH_01	0.28	5.87	0.17	0.85	0.01
KH_WH_02	0.30	5.64	0.15	0.67	0.05

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.6.2 Mineralogy

Mineralogy was conducted on all samples via semi-quantitative x-ray diffraction (XRD). The gangue minerals were quartz (31 to 36%) and albite (23 to 34%). Sulphide abundances were low, with pyrite dominating in two samples. No copper sulphides were detected due to the high lower detection limit of XRD (Table 13-16).

Table 13-16: Summary of XRD Results

Mineral	CH_01 M190021	CH_02 M190022	SH_01 M190023	SH_02 M190024	WH_01 M190025	WH_02 M190026
Quartz	34.2	33.9	31.3	35.0	35.7	33.8
Albite	24.1	33.8	24.9	24.2	22.6	23.3
Oligoclase	17.8	0.0	0.0	0.0	0.0	0.0
Orthoclase	7.0	14.7	10.8	10.9	14.8	14.1
Clinochlore	2.1	10.6	12.6	12.7	10.4	12.0
Kaolinite	0.3	0.3	0.4	0.4	0.4	0.7
Vermiculite	0.5	0.2	0.3	0.4	0.3	0.4
Actinolite	6.7	0.0	0.0	0.0	0.0	0.0
Pyrite	0.0	0.0	0.0	0.2	0.0	0.9
Micas	7.3	5.0	16.1	13.4	14.1	13.2
Calcite	0.0	1.6	3.6	2.7	1.6	1.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.6.3 Flotation testwork

Bench scale rougher flotation was conducted using a conventional sulphide flotation flowsheet without sulphidising agents and with similar reagents to the previous flotation work.

Rougher flotation work returned poor recoveries; 21.3% to 35.8% Cu and 51.3% to 64.5% Au with concentrate grades averaging 1% Cu (Table 13-17). Flotation is considered to not be a viable process for this material without sulphidising agents.

Table 13-17: Flotation test F-1 to F-6 summary of results

Test ID	Composite	Copper Rougher Concs 1-4				
		Mass Pull (%)	Cu Grade (%)	Au Grade (%)	Cu Rec. (%)	Au Rec. (%)
F-1	KH_CH_02	8.0	1.12	1.24	24.5	51.3
F-2	KH_SH_02	16.5	0.44	0.51	21.3	52.1
F-3	KH_WH_02	21.7	0.43	0.43	32.6	55.6
F-4	KH_CH_02	12.5	1.04	1.12	35.5	64.5
F-5	KH_SH_02	17.1	0.49	0.63	25.1	56.0
F-6	KH_WH_02	23.6	0.44	0.38	35.8	54.2

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.6.4 Diagnostic leach work

Diagnostic tests were conducted on all six composites (Table 55). Results indicate that 30 to 54% of the copper in the samples were present as copper oxides and 15% as secondary copper sulphides and bornite and 33 to 62% as chalcopyrite.

This work contrasts with the rougher flotation work and suggests that any floatable sulphide must be extremely fine grained and not amenable to flotation at the coarse grind sizes used.

Furthermore, the data presented in Table 13-18 also suggests leaching will only yield recoveries of 40-50% with potential increases with the addition of ferric sulphate.

Table 13-18: Summary of diagnostic copper leach results

Test ID	Comp ID	Total copper		4-Acid (%)	Diagnostic leach		
		Blue Coast (%)	Au Tec Aqua Regia (%)		Acid soluble Cu (%)	Cyanide soluble (Cu %)	Others (%)
1	KH_CH_01	0.28	0.27	0.25	33.9	6.2	60.0
5	KH_CH_02	0.38	0.38	0.36	52.9	14.5	32.6
9	KH_SH_01	0.29	0.30	0.29	45.4	4.6	50.0
13	KH_SH_02	0.34	0.33	0.31	53.5	3.8	42.8
17	KH_WH_01	0.28	0.28	0.26	30.2	8.2	61.7
21	KH_WH_02	0.30	0.30	0.26	41.7	10.8	47.5

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.6.5 Bottle roll leach tests

Bottle roll leach test work supported the above with recoveries ranging between 40 and 61% Cu. Testwork was halted as the data suggested limited opportunities for increases in recoveries with finer grinding and agitated leaching at production scales.

A summary of the diagnostic leach versus bottle roll results can be found in Table 13-19.

Table 13-19: Diagnostic leach vs bottle roll test results

Comp ID	Acid+NaCN Diag.leach recovery (%)	Acid+Ferric Bottle roll recovery (%)
KH_CH_01	40.0	48.9
KH_CH_02	67.4	63.5
KH_SH_01	50.0	45.7
KH_SH_02	57.2	49.2
KH_WH_01	38.3	40.1
KH_WH_02	52.5	55.8

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.7 Oxide gold test work (MAK Laboratory Ulaanbaatar)

Three composite samples of oxide were sent to MAK laboratory in Ulaanbaatar for grindability and gravity separation with leaching of tails.

13.7.1 Sample Selection

Samples were selected from Copper Hill, Stockwork Hill and Golden Eagle with gold grades ranging between 1.92 g/t to 3.14 g/t Au, see Table 13-20.

Table 13-20: Oxide gold testwork sample details

Fraction size (mm)	SHOX-01		CHOX-02		GEOX-03	
	Yield (%)	Au (ppm)	Yield (%)	Au (ppm)	Yield (%)	Au (ppm)
-50+25	25.49	1.97	43.72	2.77	37.18	2.31
-25+12.5	32.95	3.76	29.49	2.36	31.99	1.90
-12.5+6.3	17.60	3.12	12.21	2.73	13.21	1.80
-6.3+1	17.56	2.61	9.89	2.67	12.05	1.50
-1+0	6.40	2.79	4.69	5.62	5.57	2.57
Total	**100.00**	**2.93**	**100.00**	**2.77**	**100.00**	**2.03**
Composite		**3.14**		**2.65**		**1.92**

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.7.2 Grindability

Bond Work Index tests returned hard mineralized material (14 to 17 kWh/t) and low to medium abrasiveness (0.07 to 0.45) (Table 13-21 and Table 13-22).

Table 13-21: Comminution testwork

Parameter	Composite		
	SHOX-01	CHOX-02	GEOX-03
Feed F_{80}, mic	1709.05	1884.55	1750.11
Product P_{80}, mic	125.05	130.20	115.16
Grinding, g/rev	1.83	1.44	1.50
Bond Work index, kW·h/t	14.50	17.71	16.00
Hardness classification	**Hard**	**Hard**	**Hard**

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

Table 13-22: Abrasion indices

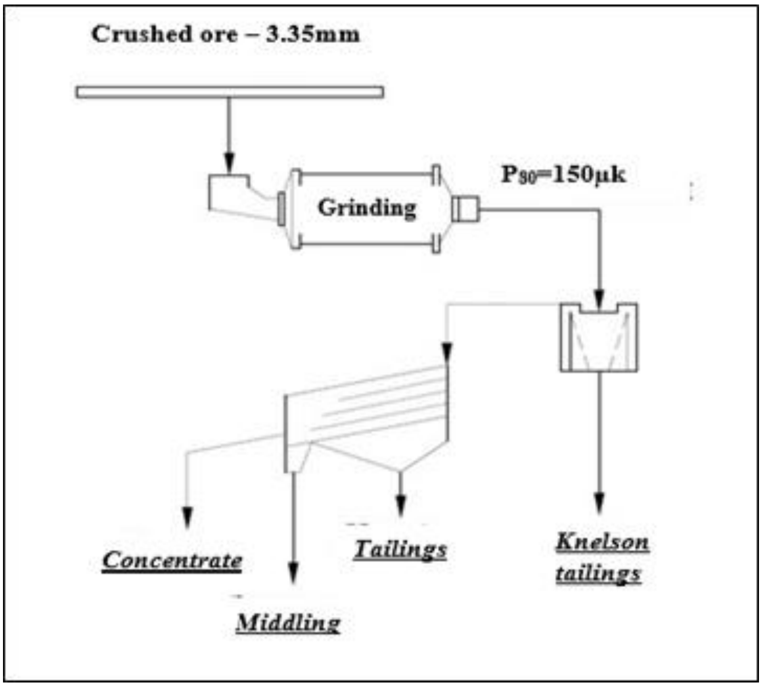
Parameter	Composite		
	SHOX-01	CHOX-02	GEOX-03
Bond Abrasion index	0.0725	0.3644	0.4549
Mineralized material type	**Not abrasive**	**Slightly abrasive**	**Medium abrasive**

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.7.3 Gravity separation testwork

Gravity testwork via Knelson concentrator (Figure 13-4) returned recoveries of 13 to 40% with a gravity concentrate ranging between 77 g/t to 109 g/t Au. (Table 13-23).

Figure 13-4: Gravity testwork flowsheet



Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

Table 13-23: Gravity recovery

Product	SHOX-01			CHOX-02			GEOX-03		
	Yield (%)	Au grade (g/t)	Au recovery (%)	Yield (%)	Au grade (g/t)	Au recovery (%)	Yield (%)	Au grade (g/t)	Au recovery (%)
Concentrate/ Concentrationtable	0.26	115.50	9.76	1.08	77.72	33.73	0.65	109.70	27.99
Middling/ Concentrationtable	0.07	34.31	0.81	0.33	27.79	3.71	0.10	30.71	1.20
Tailings/ Concentrationtable	1.36	5.48	2.47	1.58	4.67	2.96	1.27	8.80	4.34
Tailings/Knelson	98.31	2.67	86.96	97.01	1.53	59.59	97.98	1.74	66.47
Total	**100.0**	**3.02**	**100.0**	**100.0**	**2.49**	**100.0**	**100.0**	**2.56**	**100.0**
Concentrate/ Knelson	1.69	23.31	13.04	2.99	33.62	40.41	2.02	42.57	33.53

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.7.4 Bottle roll leach testwork

Leaching on the gravity tails returned recoveries of 46% to 96% to give a combined recovery of 67% to 97% Au. Cyanide consumptions were high, due to the presence of cyanide soluble copper. (Table 13-24 and Table 13-25).

Table 13-24: Cyanide leaching results

Composite	P_{80} (μk)	Duration (hours)	Head grade (Au g/t)	Tailings Au grade (g/t)	Au recovery		KCN consumption (kg/t)	Cu (pregnant solution) (g/t)
					(%)	g/t		
SHOX-01	150	48	2.38	0.44	81.51	1.94	1.89	728.90
	100		2.26	0.38	83.19	1.88	1.85	752.30
	70		2.15	0.53	75.35	1.62	1.90	750.20
CHOX-02	150		1.31	0.75	42.75	0.56	2.10	747.10
	100		1.31	0.75	42.75	0.56	2.11	781.90
	70		1.26	0.68	46.03	0.58	2.08	794.20
GEOX-03	150		2.12	0.12	94.34	2.00	0.85	96.88
	100		1.65	0.09	94.55	1.56	0.41	120.60
	70		1.62	0.06	96.30	1.56	0.41	126.50

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

Table 13-25: Combined gravity and leach results

Composite	Gravity concentrate Aurecovery (%)	P_{80} mic	Leaching Au recovery (%)		Total recovery (%)
			Actual	Primary	
SHOX-01	13.04	150	81.51	70.88	83.92
		100	83.19	72.33	85.38
		70	75.35	65.52	78.56
CHOX-02	40.41	150	42.75	25.48	65.88
		100	42.75	25.48	65.88
		70	46.03	27.43	67.84
GEOX-03	33.53	150	94.34	62.71	96.24
		100	94.55	62.84	96.37
		70	96.30	64.01	97.54

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.8 2020 Oxide gold heap leach testwork

13.8.1 Sample election

In 2019–20, the same samples used in the MAK lab oxide test work were run for column leach test work at MAK lab in Ulaanbaatar. Assays and the degree of oxidation of the copper species are shown in Table 13-26.

Table 13-26: Assays and degree of oxidation

Sample	Au (g/t)	Ag (g/t)	Cu total (%)	Cu oxide (%)	Oxidation degree (%)
SHOX-01	3.14	2.13	0.98	0.51	52
CHOX-02	2.65	8.76	1.86	0.33	17.7
GEOX-03	1.92	1.65	0.2	0.04	20

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.8.2 Column leach testwork

Samples were run using close cycle column leaching. 80 kg of each sample was crushed to -50 mm, loaded into columns and leached with cyanide for 60 days.

Gold recoveries were mixed and ranged from 14 to 60% Au (Table 13-27). The modest gold recoveries, combined with the relatively high cyanide consumptions led to the conclusion that heap leaching was not a viable gold recovery method.

Table 13-27: Integrated results of column leaching testwork

Parameters	Unit	SHOX-01	CHOX-02	GEOX-03
Head Au grade/assay	g/t	3.14	2.65	1.92
Head Au grade/calculation	g/t	2.99	2.59	2.02
Au recovery	%	60.58	13.83	47.99
Au recovery	g/t	1.81	0.37	0.99
Solid remainder’s Au grade	g/t	1.18	2.23	1.05
Head Ag grade/assay	g/t	2.13	9.72	1.25
Head Ag grade/calculation	g/t	1.93	7.89	1.51
Ag recovery	%	5.26	2.77	17.55
Ag recovery	g/t	0.10	0.22	0.27
Solid remainder’s Ag grade	g/t	1.83	7.67	1.25
NaCN consumption	kg/t	1.68	2.65	0.62

Source: Spiers, R. NI 43-101 report: MRE, Kharmagtai Project, Omnogovi Province, Mongolia, 28 February 2022

13.9 Design criteria development

The comminution and metallurgical testwork has provided preliminary information about the physical characteristics and metallurgical response of the Kharmagtai mineralised material.

The processing route option assessed is to process the sulphide mineralisation comprised a conventional SABC mill comminution circuit followed by gravity gold recovery and flotation to produce doré and a copper-gold concentrate.

The process design criteria were developed based on the available testwork and modification to the 2019 CSA initial design.

Design criteria, assumptions and predictions are discussed in Section 17 in further detail.

14 Mineral Resource estimates

14.1 Resource estimation modelling

The interpretation foundation was completed by Xanadu representative M. Brown and Xanadu-engaged independent consultant P. Dunham prior to estimation.

The first point of contact in the foundation interpretation was for the Stockwork Hill data which was to assess the domain strategy in relation to the informing data to gain a further understanding of the controls over the mineralisation and to understand the local and regional spatial distribution (geometry) of the mineralisation.

Discussions with Xanadu and subsequent sectional review/s highlighted the very strong relationship between grade, lithology and structure. However, as in many porphyry systems, mineralisation is typically diffusive, decreasing from the higher-grade core (either presumed causative intrusive phase or most receptive host/structure) into the surrounding country rock that may result in complex geology/grade relationships. In addition, the presence of tourmaline breccia plays a potential roll in the localisation of mineralisation adjacent to dominant structural fabric.

14.1.1 Introduction

There are six known porphyry deposits at Kharmagtai and numerous Exploration Targets where the key features of a porphyry system were identified. The geology of the six deposits modelled in the 2022 MRE are described below.

The advances in understanding of intrusive phases, structural framework, and alteration systems at Kharmagtai combined with significant advances in modelling capacities afforded by Leapfrog software has allowed detailed 3D geological and geometallurgical models to be constructed.

The following process was used to build the geological framework for the 2021 resource estimate:

1. Composite copper and gold grades to consistent 10 m intervals.
2. Define grade cut-offs using changes in slope of histograms and cumulative log plots.
3. Create raw grade shells at these intervals using implicit numeric modelling (e.g., 800, 1,500 and 4,000 ppm Cu).
4. Define the main geological features of consistent or continuous grade populations and highlight areas of rapid grade truncations indicating possible significant faulting or cross-cutting relationships.
5. Develop major dividing structures in detail using grade, lithology, and structural information. Compare against other available datasets including project geophysics results.
6. For each compartment/fault block:
    a. Group the main lithologies into ‘like units’.
    b. Build geological volumes for each unit including country rock hosts and each intrusive ‘phase’ honouring the interpreted emplacement sequence.
    c. Re-build the grade shells within each compartment using information from the geological shapes to constrain the grade volumes to the major structural compartments.

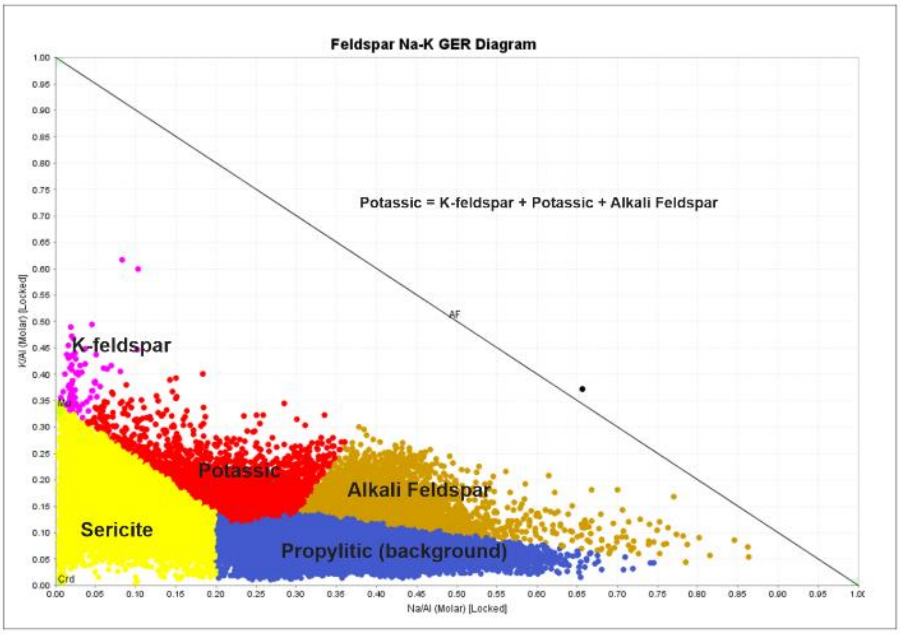
7. Once each compartment was built, re-assess in context with each other and refined so that the models made geological sense. Ensure the compiled geological framework contains the key controls to the observed grade distributions wherever possible.

The geometallurgical models being built for metallurgical sample selection post-2022 MRE were developed using both alteration zones, sulphide species and oxidation state. The objective is to overlap lithology, alteration, oxidation state and sulphide species for each deposit and select samples from each deposit based on these overlapping domains. The geometallurgical models were not used in the estimation of the 2021 Mineral Resource.

The following methodology has been used to define broad alteration domains for each deposit:

1. Composite Al, K and Na to 10 m intervals.
2. Use Scott Halley's alteration Al/K/Na charts Halley et.al. 2005 to categorise into the following alteration groups for both raw and composite values (Figure 14-1):
    a. Sericite.
    b. Potassic (K-feldspar + Potassic + Alkali Feldspar).
    c. Propylitic (background albite-chlorite-epidote).
3. Compile ASD raw data and group mineralogy using Scott Halley's grouping methodology.
4. Import the alteration groups and ASD groupings into Leapfrog.
5. Create interval selections in leapfrog to group 'like areas' into the three main alteration types. Sericite takes preference as the presence of sericite is likely to have the strongest influence on metallurgical performance.
6. Build implicit geological models using these categories.
7. Fault these models using the structural frameworks defined by the geological domaining.
8. Review and edit these models to ensure a geologically sensible product that honours the geology models.

Figure 14-1: Halley alteration classification scheme (adjusted for Kharmagtai)

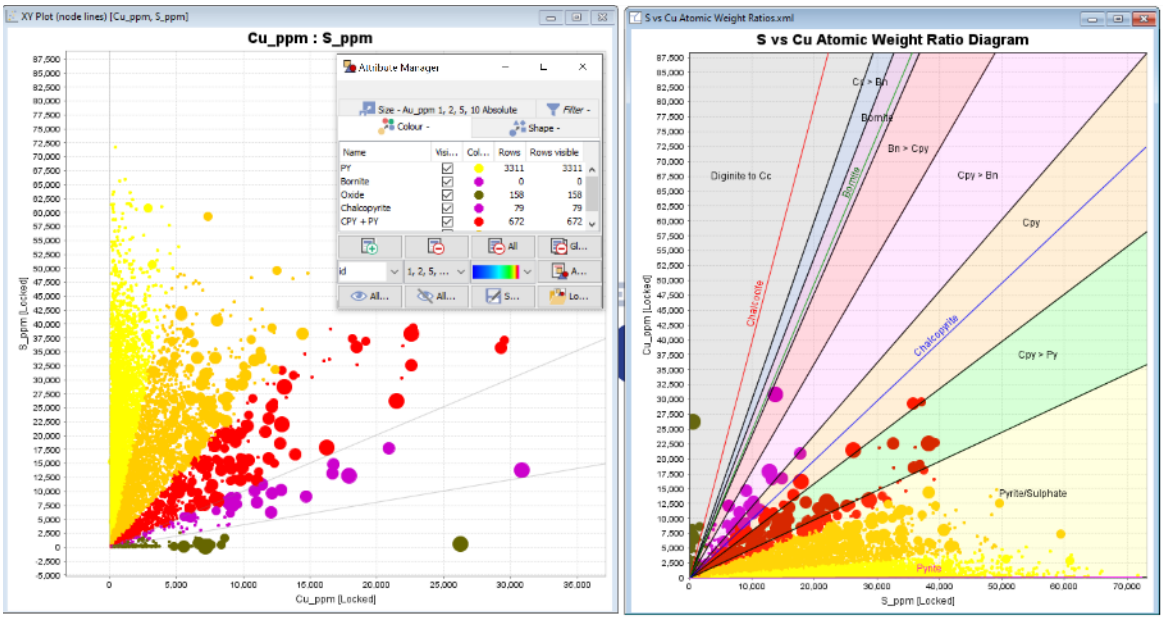


Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

The following methodology has been used to define the sulphide species for each deposit:

1. Composite Cu and Au values to 10 m.
2. Plot both raw and composited Cu and S in ioGAS on x y charts and use the following molecular weight ratios to define domains (Figure 14-2):
   a. <0.05 = pyrite.
   b. Between 0.05 and 0.2 = Pyrite plus chalcopyrite.
   c. Between 0.2 and 0.5 = Chalcopyrite plus pyrite.
   d. Between 0.5 and 1.2 = Chalcopyrite plus bornite.
   e. Above 1.2 = Bornite.
   f. Oxide selected based on low S and spatially from 3D review of geological model oxide boundaries.
3. Review these in 3D in Leapfrog and define domains using an interval selection.
4. Build implicit models of these domains.
5. Fault these domains using the structural models defined during the geological modelling process.
6. Review and edit these models to produce a geologically sensible product.

Figure 14-2: Sulphide species categorisation scheme for Kharmagtai



Source: 03.05 2022 Xanadu Kharmagtai SGC NI 43-101 Technical Report – Feb28-2022.docx

Notes: Yellow = pyrite only, Orange = pyrite + chalcopyrite, Red = chalcopyrite + pyrite, Pink = Bornite + Chalcopyrite, Brown = Oxide

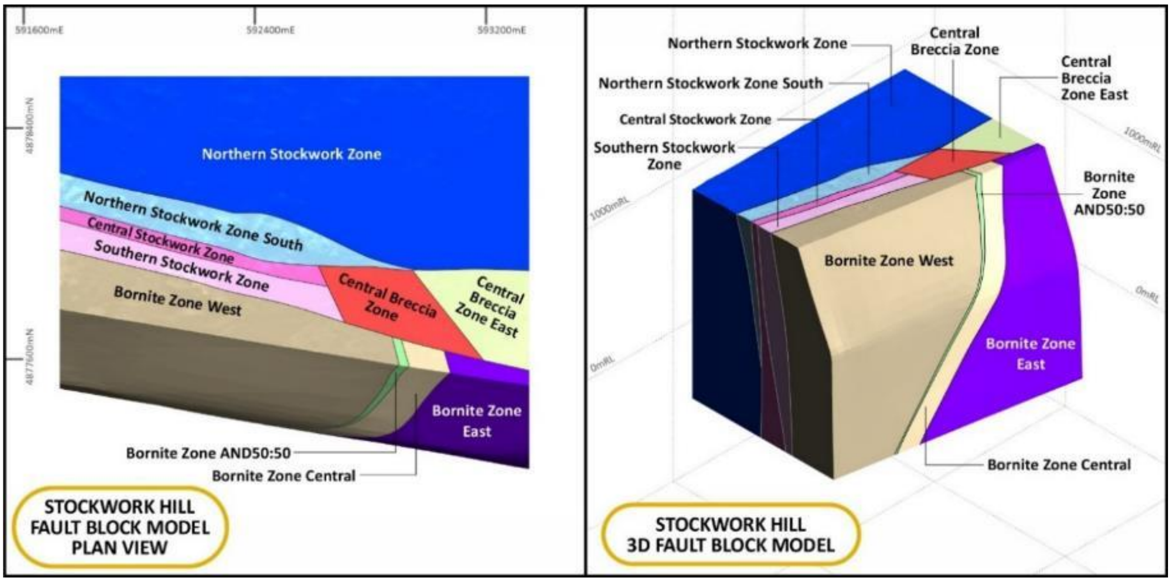
Separating the oxide versus sulphide mineralisation is a difficult process as the boundary between domains is transitional and does not form a single narrow surface. The nature of this boundary is not well understood at Kharmagtai and might differ significantly from other parts of the world due to the nature of weathering processes in the Gobi Desert. It is not uncommon to find sulphide at surface and shallow weathering profiles due to the low rainfall and extremely low temperatures for up to 6 months of the year (0 to -50ºC).

Direct geological logging cannot be used due to intra geologist variations in defining a gradational boundary. For the 2021 resource models a simple sulphur exclusion boundary was selected based on a statistical review of the data combined with a review of the data in 3D. The logged top of fresh rock roughly corresponded with a sharp drop in sulphur content at approximately 2,000 ppm sulphur. Interval selections were made of oxidised rock based on these criteria then validated through detailed review of the core photography. Small zones of sulphide/transitional material were included in the oxide zone and some internal variability will be seen due to these inclusions. However, this provides a single, uniform surface to divide oxide and sulphide. More detail will be given in the deposit geology sections below.

14.2 Stockwork Hill Mineral Resource modelling

Stockwork Hill is the most complex of the deposits at Kharmagtai and the resource domaining effort has resulted in ten discrete fault blocks of mineralisation. These fault blocks are defined by different mineralisation styles and copper and gold populations (Figure 14-3). The rationale for each domain and the methodology used to define them are described below.

Figure 14-3: The ten modelled fault blocks within the Stockwork Hill deposit geological domain models



14.2.1 Lithologies

Host lithologies have a strong control on copper and gold distribution throughout Stockwork Hill (Figure 14-4, Figure 14-5 and Table 14-1). The new (post-2017) logging has sixteen separate lithological units in the primary lithology field. These units were grouped for the purposes of this model into seven blocks based on rock composition, texture and overprinting relationships. The SH_GM field in the lithology data file records this grouping.

Figure 14-4: Copper and gold box plots (log-scale) for the grouped lithological domains at Stockwork Hill based on 10 m composite data

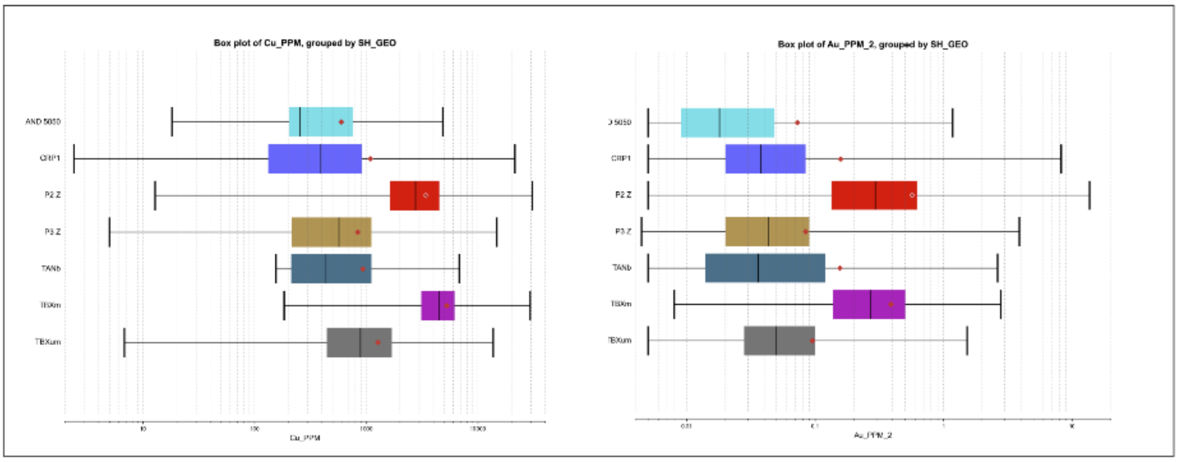


Figure 14-5: Plan view of modelled P2 vs copper grade in drill holes

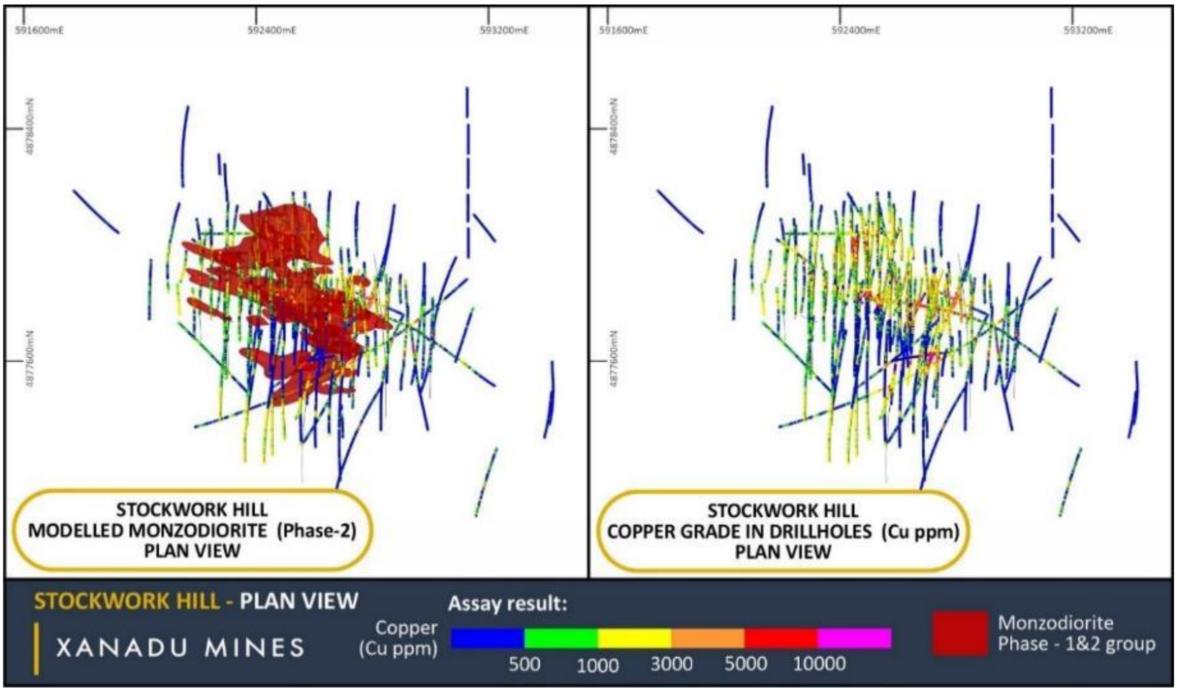


Table 14-1: Statistics (length weighted) for Cu % and Au g/t (raw data) grouped lithologies at Stockwork Hill

	Name	Count	Length	Mean	SD	CV	Variance	Minimum	Lower quartile	Median	Upper quartile	Maximum
Gold ppm	Total	47462	87716	0.20	0.63	3.17	0.40	0.0030	0.02	0.05	0.15	63.5
	AND 5050	331	591	0.06	0.30	5.11	0.09	0.0050	0.01	0.01	0.04	4.96
	CRP1	4678	8858	0.16	0.60	3.81	0.36	0.0050	0.01	0.03	0.08	17.2
	P2 Z	8921	15942	0.57	1.20	2.09	1.44	0.0030	0.1	0.26	0.6	63.5
	P3 Z	17044	31741	0.08	0.30	3.64	0.09	0.0030	0.01	0.03	0.08	18.05
	TANb	408	703	0.11	0.31	2.85	0.09	0.0050	0.005	0.02	0.07	3.18
	TBXm	2926	5592	0.39	0.58	1.47	0.33	0.0050	0.09	0.21	0.47	13.5
	TBXum	9698	18040	0.09	0.18	1.93	0.03	0.0030	0.02	0.04	0.09	3.694
	*Inactive	3456	6248	0.05	0.09	1.78	0.01	0.0050	0.02	0.03	0.06	4.91
Copper Percent	Total	47461	87715	0.17	0.27	1.60	0.07	0.0001	0.0249	0.0774	0.206	14.85
	AND 5050	331	591	0.05	0.07	1.33	0.00	0.0005	0.0202	0.0208	0.051	0.563
	CRP1	4678	8858	0.11	0.23	2.12	0.05	0.0001	0.0117	0.0351	0.0887	3.45
	P2 Z	8919	15938	0.34	0.35	1.02	0.12	0.0004	0.131	0.257	0.454	14.85
	P3 Z	17044	31741	0.08	0.11	1.39	0.01	0.0001	0.017	0.0477	0.103	3.11
	TANb	408	703	0.07	0.10	1.50	0.01	0.0014	0.0198	0.0221	0.0693	0.71
	TBXm	2926	5592	0.53	0.53	0.99	0.28	0.0052	0.236	0.4	0.638	5.82
	TBXum	9696	18037	0.13	0.16	1.29	0.03	0.0001	0.0325	0.0734	0.164	3.1
	*Inactive	3459	6254	0.08	0.10	1.17	0.01	0.0004	0.0102	0.0425	0.137	1.61

Source: Xanadu data, drafted by Naran Judger, 2021

14.2.2 Mineralisation

There are three main styles of mineralisation at Stockwork Hill that have formed under different geological processes at different times and therefore will have different geostatistical characteristics. These are:

1. stockwork mineralisation
2. tourmaline breccia mineralisation
3. bornite mineralisation.

Stockwork mineralisation is characterised by quartz, chalcopyrite, pyrite veins (B-veins) and associated disseminated chalcopyrite, overprinted by a chalcopyrite only vein set (C-veins). Zones of stockwork mineralisation commonly have a strong structural control resulting in elongate sheets of mineralisation with typical anisotropy ratios of 5 to 3:2:1 (L:H:W). There are two main zones of stockwork mineralisation: the Northern Stockwork Zone and the Southern Stockwork Zone.

Tourmaline breccia mineralisation is characterised by massive chalcopyrite and/or pyrite infill to tourmaline breccias which overprint the stockwork mineralisation. The main tourmaline breccia body forms a large (500 m by 600 m by 200 m) vertical sheet-like body. Mineralisation within this sheet is variable. The majority of the breccia is low to moderate grade (TBXum) but several very high-grade zones exist. These were modelled separately (TBXm) and were modelled in the resource as distinct populations.

Bornite mineralisation is characterised by disseminated, veined and breccia infill bornite and chalcopyrite within a discrete zone called the Bornite Zone.

Texturally, tourmaline breccia mineralisation is significantly different to stockwork and bornite mineralisation and as such has been modelled as a separate lithological unit.

14.2.3 Oxide versus sulphide mineralisation

The oxide to sulphide surface was modelled using the criteria explained above. Stockwork Hill is unusual at Kharmagtai relative to the other deposits as this surface seems to have minimal influence on copper and gold grades and there appears little movement of copper and gold in the oxide domain.

14.2.4 Structure

The structural framework for the Stockwork Hill deposit is complex. There are four main elements that may overlap/enhance each other (or not) and should be considered separately, depending on the required output (resource estimation, geological model, exploration targeting and mine planning).

Structural trend which represents the general structural fabric controlling the orientation of the intrusions and mineralised zones.

'Dividers' – contacts between lithologies, structural breaks or late barren units reflected in 'step changes' between populations of grade data in the dataset.

True large-scale structures that truncate and/or offset mineralisation, across which new bodies of mineralisation may be found.

The rock property characteristics of the deposit, zones of fractured rock that will be important for geotechnical evaluation when developing a mine plan.

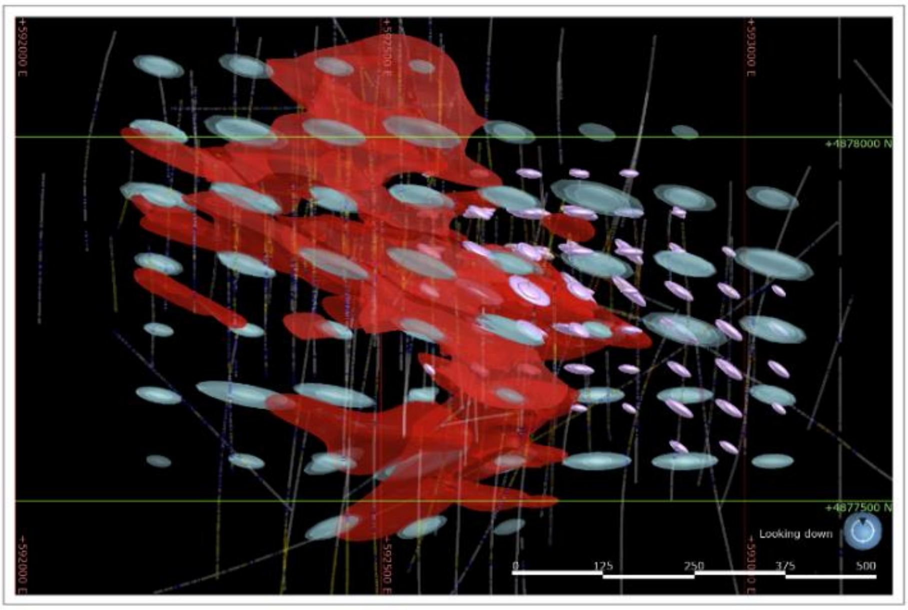
An example of how these features interact is the relationship between large-scale structures and rock properties. Some large-scale structures were healed and despite having had many hundreds of metres of displacement do not represent significant zones of fractured rock. The fault breccias within these structures were annealed by later intrusive units and/or alteration and the rock is again moderately competent. For mine planning these structures may not have a significant impact. In exploration and resource definition these structures are of critical importance.

14.2.5 Structural trend

Two structural trends were applied to the model (Figure 14-6). The grey disc trend is a universal trend used for intrusive rocks built from contact and grade distribution specific to each fault block in the deposit. Five individual trends were used with equal weightings, the trend is strongest along the disc orientation and has a range of 100 m.

A second trend (pink) was created for the TBX units built from an interpretation of the overprinting TBX mineralisation.

Figure 14-6: Structural trends applied to the domain model



14.2.6 Dividers

Nine dividers were defined using natural breaks in mineralisation identified during the modelling process. Numerous other internal dividers were identified but not modelled if there was insufficient separation between populations of data or the locations were ambiguous. Not all dividers are faults, some represent barren zones between natural populations of grade data and others represent contacts between key units.

There are two main east-west dividers that separate the three main blocks of mineralisation at Stockwork Hill. The Bornite Divide separates the bornite zone in the south from the rest of the model and the CBX_NSZ Divie separates the northern block of mineralisation called the Northern Stockwork Zone (Figure 14-7).

Bornite Divider

The Bornite Divider forms the main east-west trending dividing line between the bornite zone in the south and the bulk of Stockwork Hill (Figure 14-8). This divider takes advantage of the broadly east west TAND dyke structure in the shallower portions of the deposit and a zone of barren tourmaline breccias in the lower portion of the deposit.

CBX_NSZ Divider

The CBX_NSZ Divider forms the main east-west trending dividing line between the central portion of tourmaline breccia and stockwork mineralisation and the Northern Stockwork Zone (Figure 14-3). This feature represents an amalgamation of several anastomosing fault splays.

Bornite zone internal dividers

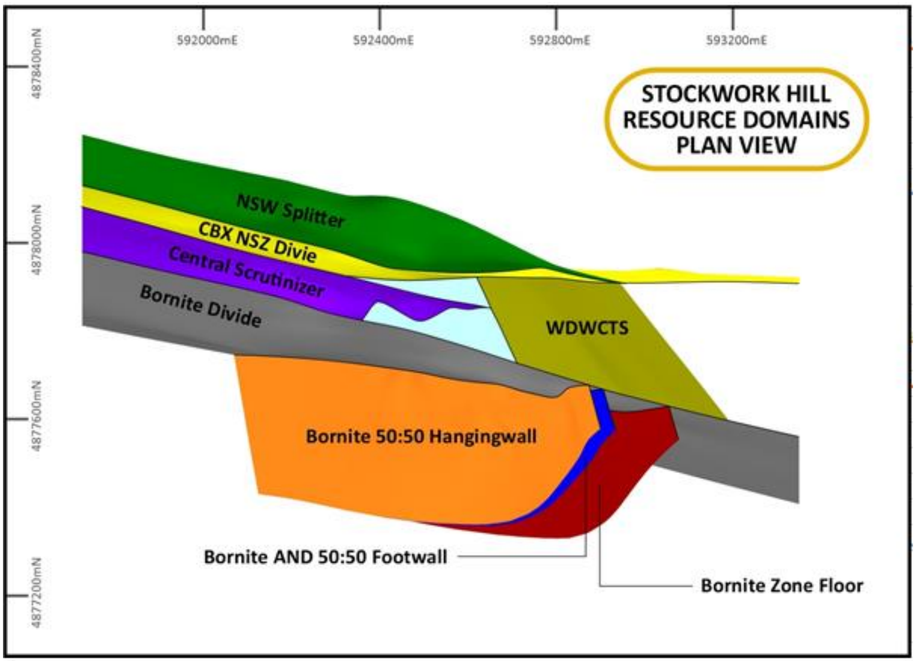
There are three internal dividers within the bornite zone. These separate four discrete fault blocks (Figure 14-3 and Figure 14-8).

The AND50:50 footwall and hanging wall dividers represent the footwall and hanging wall to the AND50:50 fault. This is a barren andesite dyke that fills a key structure in the bornite zone. The fault appears to have a throw of approximately 250 m, west block up and 50 m west block north.

The bornite floor represents a parallel fault which terminates the high grade bornite zone (central bornite zone) to the east. There appears to be a similar offset of 250 m west block up and 50–100 m west block north across this structure which opens opportunities for additional zones of bornite mineralisation below the bornite floor.

An additional divider could were chosen roughly 300 m vertically above the AND50:50 fault block. This divider was not used as it created unnecessary additional fault blocks (and estimation domains) that did not add value to the modelling effort.

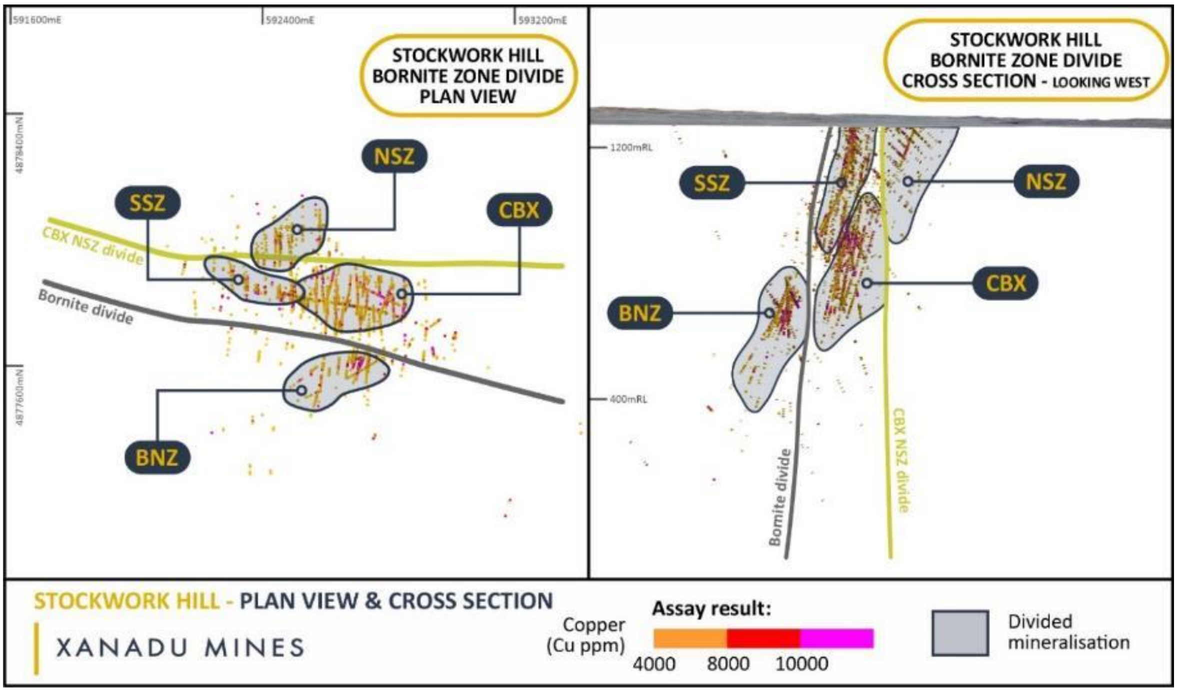
Figure 14-7: Dividers/structures used to segment the resource domains



Source: Xanadu data, drafted by Naran Judger, 2021

Note: Plan view, surfaces dip steep to south or steep to west.

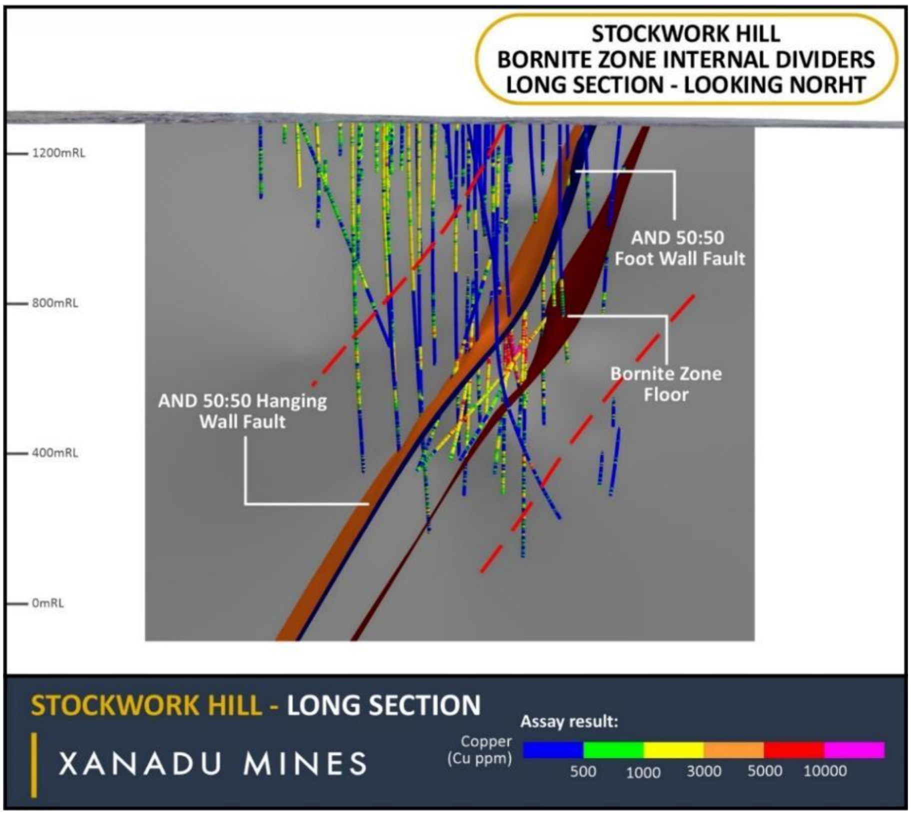
Figure 14-8: Bornite divider and CBX_NSZ divider



Source: Xanadu data, drafted by Naran Judger, 2021.

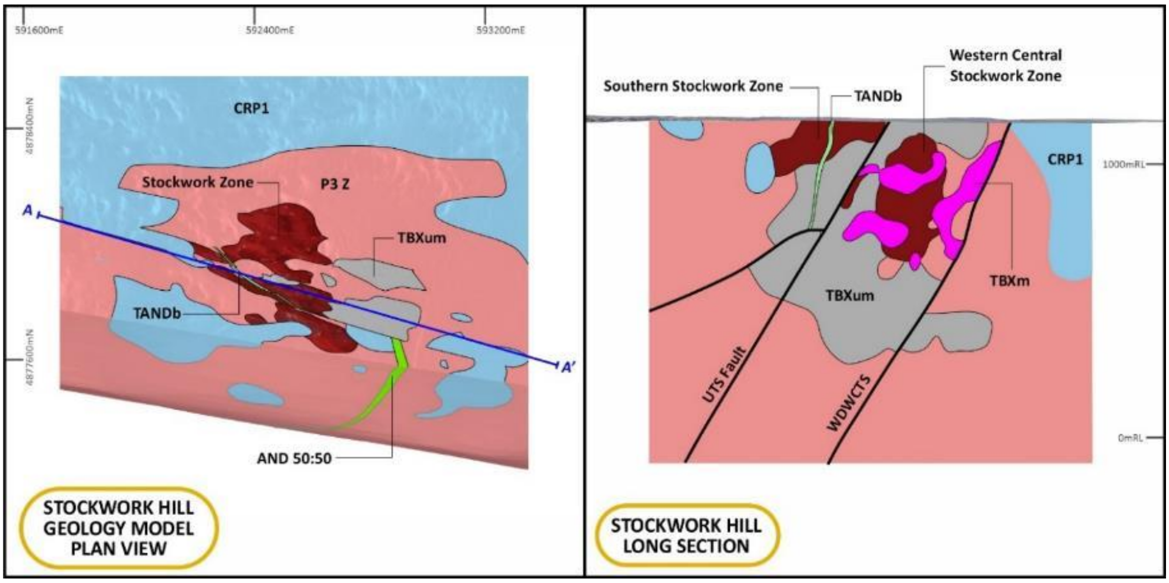
Note: Left: Plan view showing bornite divide and Divide and copper assays above 4,000 ppm Cu. Right: Cross section (looking towards 264 degrees) showing bornite divide and Divide and Cu assays above 4,000 ppm Cu.

Figure 14-9: Long section though the bornite zone showing the main dividers and drill hole assays (Cu ppm)



Source: Xanada data, drafted by Naran Judger, 2021

Figure 14-10: Plan view and long section through the central breccia zone showing the UTS and WDWCTS faults



Source: Xanadu data, drafted by Naran Judger, 2021

Central zone internal dividers

The central zone can be split into east and west domains using the UTS divider (Figure 14-3 and Figure 14-10). The UTS is a discrete zone of shearing and faulting that forms an eastern boundary to the Southern Stockwork Zone and separates this from the mineralised tourmaline breccias to the west. The UTS has a similar orientation to the AND50:50 fault and may represent the northern extensions of this structure across the bornite divider. The apparent offset on the UTS is similar to the AND50:50 structures with west block up by around 250 m.

The WDWCTS structure terminates tourmaline breccia mineralisation in the west. There are small hints of TBXm on the western side of this that suggest a similar fault movement to the UTS.

To the west of the UTS fault lies the main Southern Stockwork Zone, the highest grade stockwork zone at Stockwork Hill. The Western Central Zone is split by an east-west trending internal divider called the Central Scrutiniser. This structure divides the highest-grade portion of the Southern Stockwork Zone from a mixed zone of moderate to low grade stockwork and TBXum (Central Stockwork Zone).

The Central Scrutiniser extends across the UTS and into the Central Breccia Zone but was terminated on the UTS for the purposes of this model as it plays little reliable role in changing the grade populations within the Central Breccia Zone. This reduced the number of fault blocks and additional complications.

Northern Stockwork Zone internal dividers

There is a single internal divider in the Northern Stockwork Zone that separates two lobes of stockwork with a low grade to barren zone between. This divider is likely a splay off the Central Scrutiniser (Figure 14-3).

14.2.7 Rock properties

Density

The specific gravity data for Stockwork Hill describes a mostly normal population (Figure 14-11 and Figure 14-12) with a mean of 2.74 g/cm^3. There may exist multiple overlapping populations of data (double peak), presumably relating to the addition of sulphide. The higher and lower sample values are being reviewed for accuracy.

Figure 14-11: Specific gravity data for Stockwork Hill

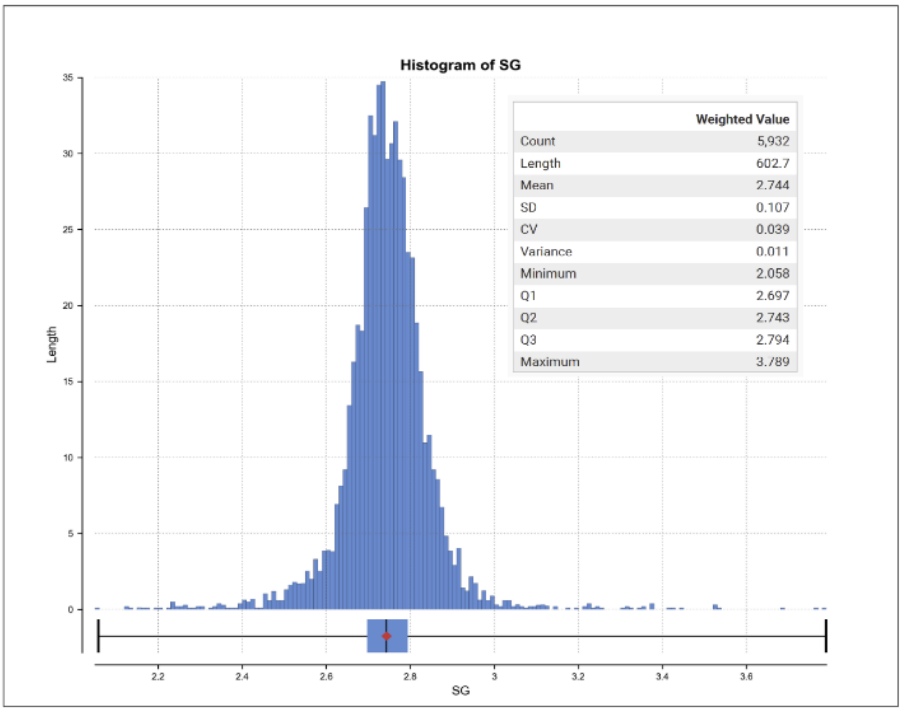
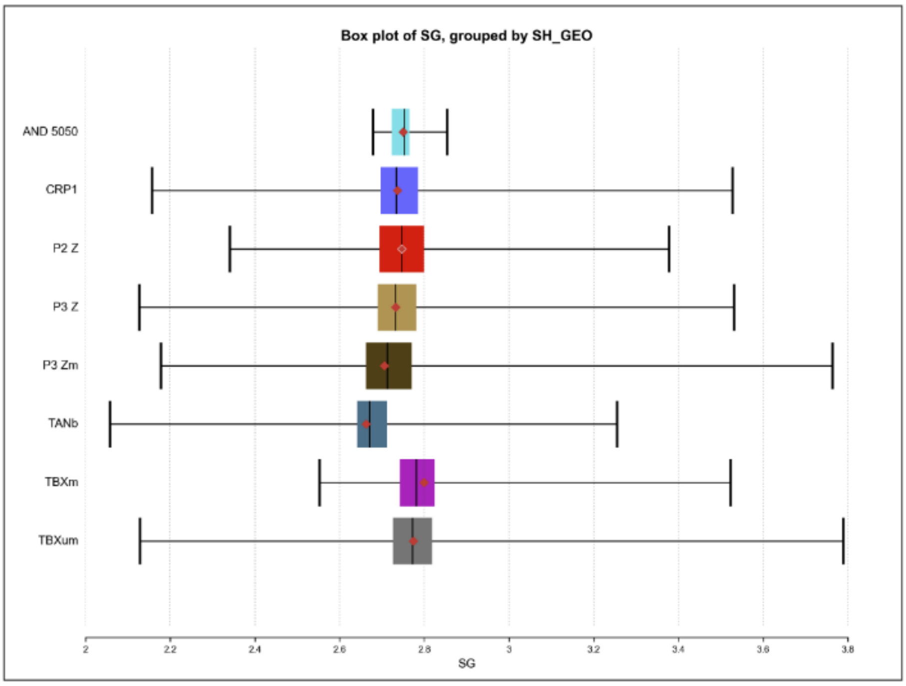


Figure 14-12: Lithology versus specific gravity box plots for Stockwork Hill



14.2.8 Context for estimations – Stockwork Hill

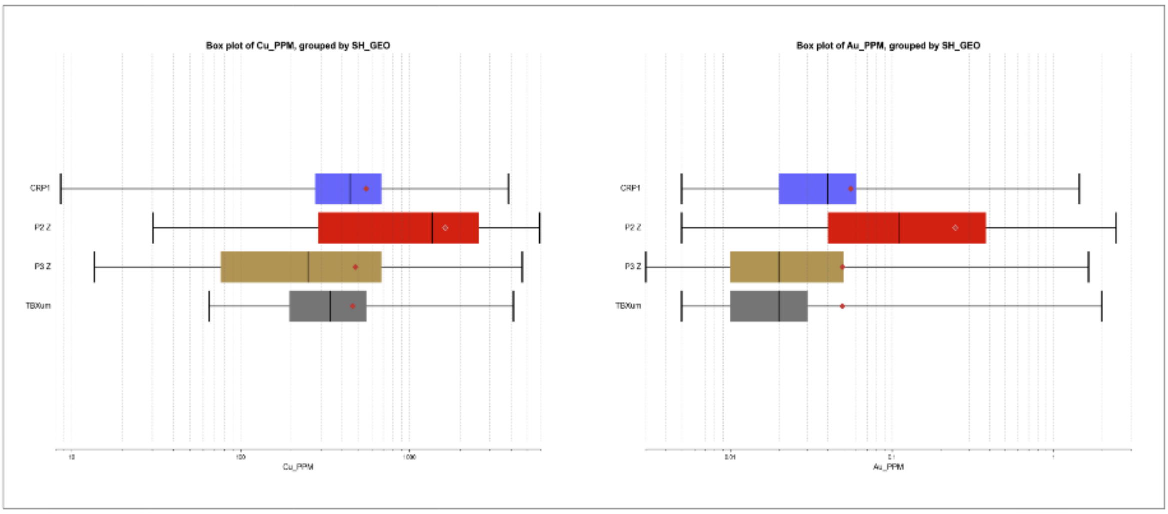
The below is a summary of the modelled geological features of each fault block, the observed grade associations, and their potential use for Resource estimation.

Bornite West

In general, this zone is low grade. Bound by the model boundary in the south, the Bornite divider in the North and AND50:50 in the east. The main modelled lithologies are P2, CRP1, TBXum and P3 as background. Grade shells were generated for Cu 800 ppm (outer limit of significant mineralisation) and 1,500 ppm. Box plots show that while P2 is generally higher grade than the other lithologies there is significant overlap (Figure 14-13).

As Cu grade extends outside P2 in places and P2 extends outside grade in others, the 800 ppm Cu and 1,500 ppm Cu shells should be evaluated as estimation domains as P2 cannot be used to define the limits of grade. Modelled lithologies do not appear to constrain Cu and Au grade distributions.

Figure 14-13: Box plots for lithology vs Cu and Au, Bornite Zone West



Bornite Zone AND50:50

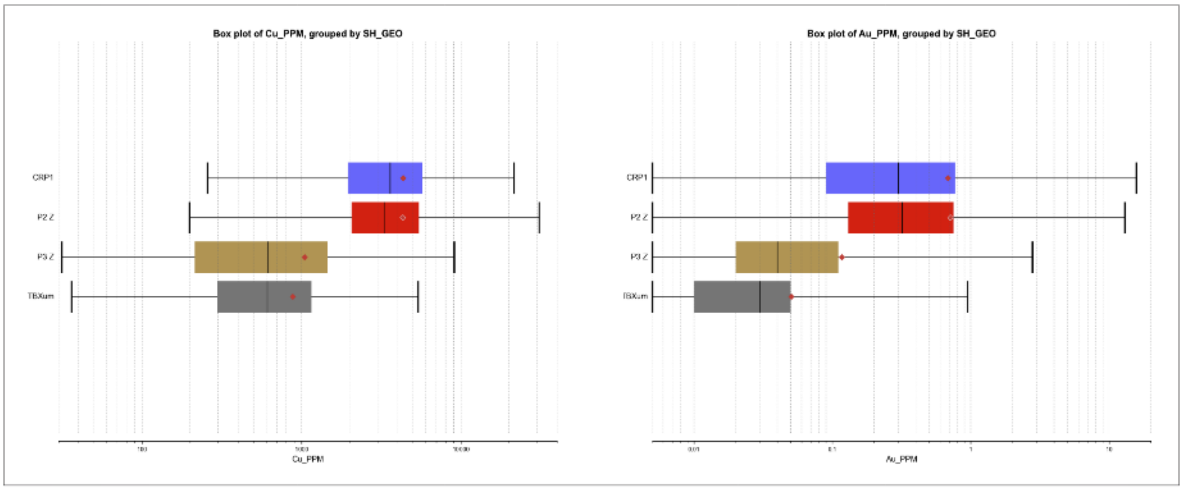
The AND50:50 should be considered a barren zone and treated as such. The assay population within this domain is low to very low grade and high-end members should be removed and/or modified to minimise skewness within this domain.

Bornite Central

Bound by the model boundary in the south, the Bornite divider in the north, the AND50:50 in the west and bornite floor in the east. The main modelled lithologies are P2, CRP1, TBXum and P3 as background. Grade shells were generated for 800, 1,500 and 4,000 ppm Cu and 1% veining. The highest grades sit on the contact between the P2 and CRP.

As seen in the box plots below (Figure 14-14), CRP1 has similar grade to P2 indicating mineralisation extends significantly across the intrusive/host contact. Modelled lithologies do not appear to constrain Cu and Au grade distributions. Accordingly, consideration should be given to the 1% vein shape (high grade zone) and 800 ppm (outer limit of significant mineralisation) as estimations domains. The Cu 1,500 ppm shell may be required dependent on geostatistical assessments.

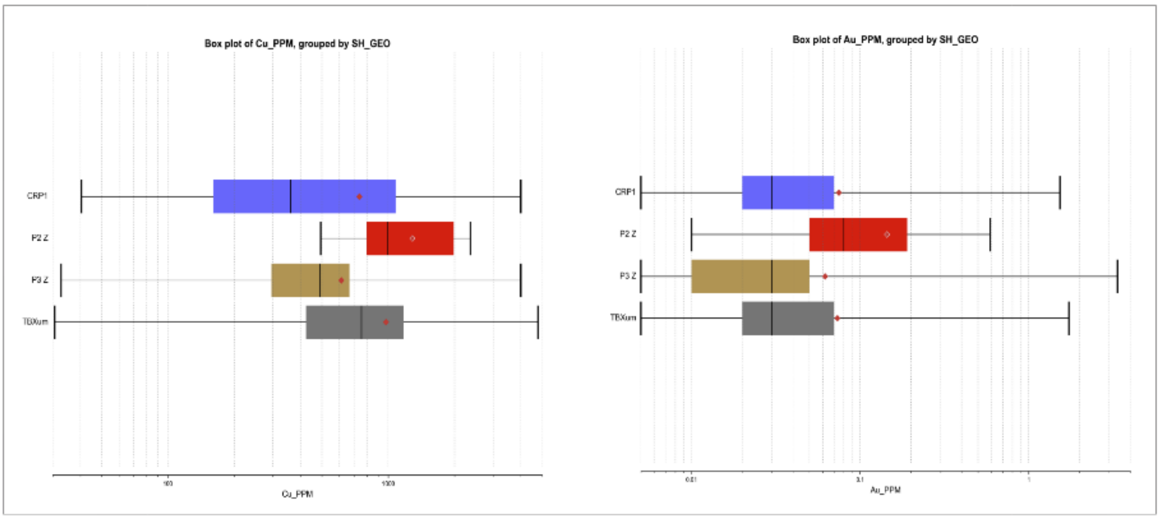
Figure 14-14: Box plots for lithology vs Cu and Au, Bornite Zone Central



Bornite Zone East

In general, this zone is lower grade. Bound by the model boundary in the south, the Bornite divider in the north, the AND50:50 in the west and bornite floor in the east. The main modelled lithologies are P2, CRP1, TBXum and P3 as background. Grade shells were generated for 800 and 1,500 ppm Cu. Box plots show that while P2 is generally higher grade than the other lithologies there is significant overlap (Figure 14-15). As modelled lithologies do not appear to constrain Cu and Au grade distributions, it is suggested that the 800 ppm Cu domain is evaluated as an estimation domain. P2 cannot be used to define the limits of grade. Grade extends outside P2 in places and P2 extends outside Cu grade shells in others.

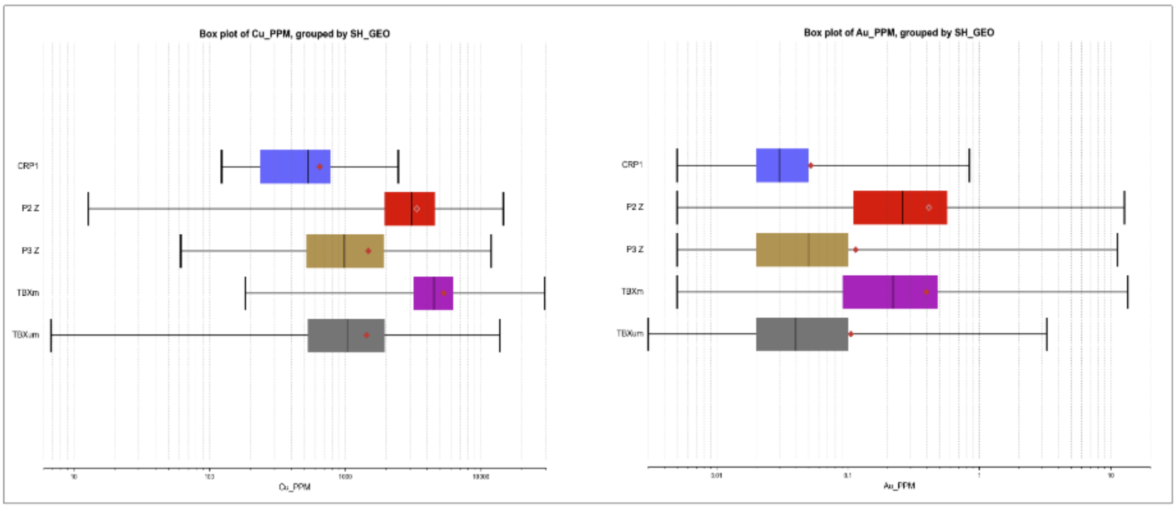
Figure 14-15: Box plots for lithology vs Cu and Au, Bornite Zone East



Central Breccia Zone (CBX)

Bound by the Bornite divider in the south, CBX-NSZ_Divie in the north, UTS in the west and WDWCTS in the east. The main modelled lithologies are P2, CRP1, TBXum, TBXm and P3 as background. Grade shells were generated for 800, 1,500 and 4,000 ppm Cu. Box plots show that P2 and TBXm are the main grade contributors (Figure 14-16). A simple estimation was run on these domains separately showing the P2 is behaving like P2 in other areas of Stockwork Hill with a 'diffusive' grade transition, but the TBXm has very patchy and variable grade and needs to be treated with caution. Suggested estimation domains are P2, TBXm and Cu 800 ppm shell outside these lithologies.

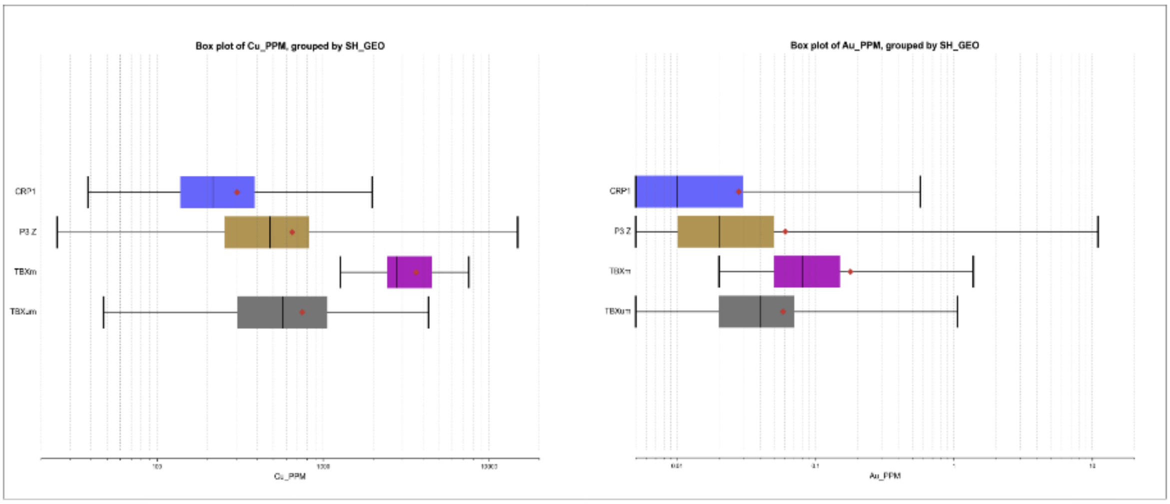
Figure 14-16: Box plots for lithology vs Cu and Au, CBX



Central Breccia Zone East

Bound by the Bornite divide in the south, CBX-NSZ_Divie in the north, WDWCTS in the west and the model boundary in the east. The main modelled lithologies are CRP1, TBXum, TBXm and P3 as background. Grade shells were generated for 800 and 1,500 ppm Cu. Box plots show TBXm is the main grade contributor (Figure 14-17). Suggested estimation domains are the same as CBX (sans P2).

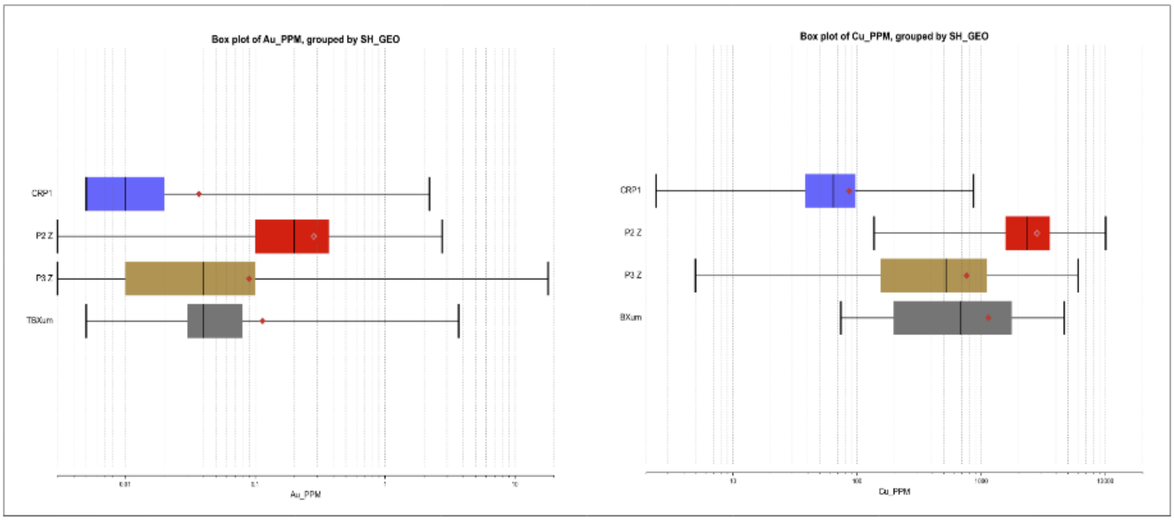
Figure 14-17: Box plots for lithology versus Cu and Gold, CBX East



Northern Stockwork Zone South

Bound by the CBX_NSZ_Divie in the south, model boundary in the north, model boundary in the east and west and has one internal divider NSWSplitter. The main modelled lithologies are P2, CRP1, TBXum, and P3 as background. Grade shells were generated for 800, 1,500 ppm Cu. Box plots show P2 is the main grade contributor (Figure 14-18). Suggested estimation domains are P2 and Cu 800 ppm within all other lithologies.

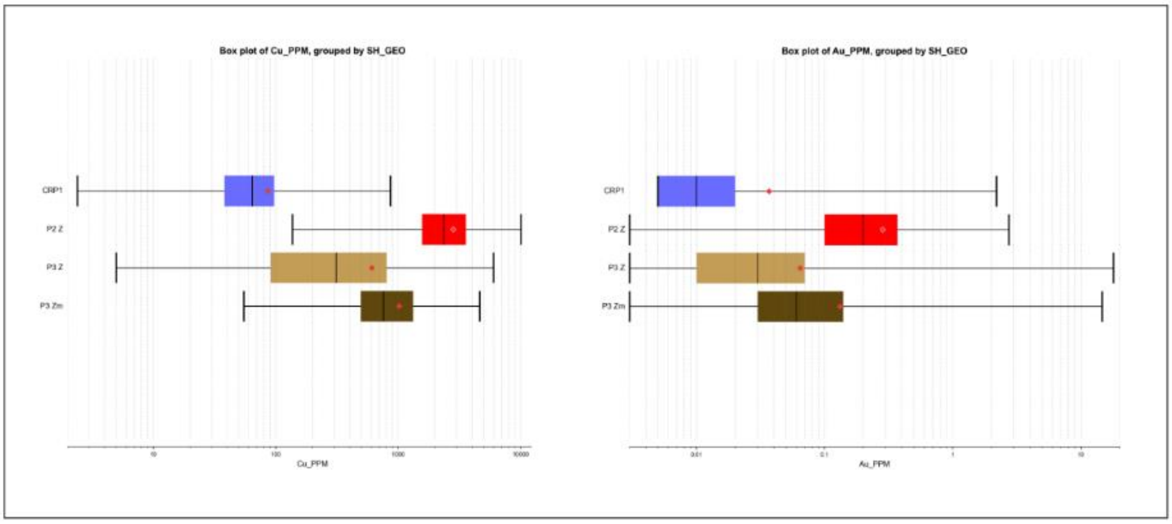
Figure 14-18: Box plots for lithology versus Cu and Au, Northern Stockwork Zone South



Northern Stockwork Zone

Bounded by the CBX_NSZ_Divie in the south and the model boundary in the north, east and west with one internal divider NSWSplitter. The main modelled lithologies are P2, CRP1, P3m and P3 as background. During the estimation process the modeller noticed two distinct populations within P3 and these were separated for the estimation process into P3 and P3m. P3m represents a halo of mineralisation around the P2 domain. Grade shells were generated for 800, 1,500 ppm Cu. Box plots show P2 is the main grade contributor (Figure 14-19). Suggested estimation domains are P2 and 800 within all other lithologies although P3m may be required as well.

Figure 14-19: Box plots for lithology vs Cu and Au, Northern Stockwork Zone and Northern Stockwork Zone South

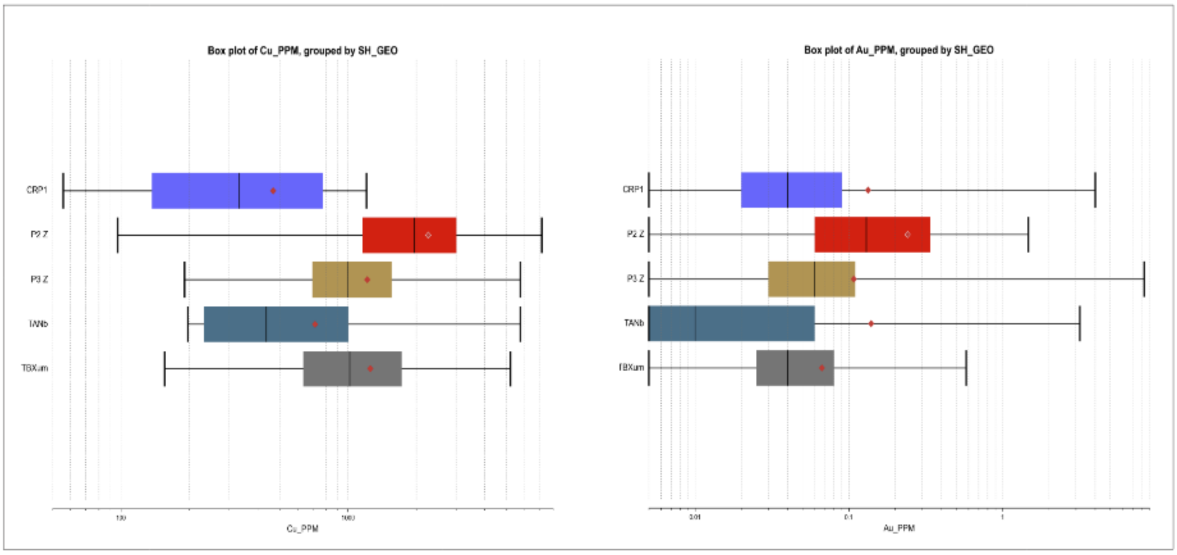


Central Stockwork Zone

Bounded by the central scrutiniser in the south, CBX-NSZ_Divie in the north, UTS in the east and model boundary in the west. The main modelled lithologies are P2, CRP1, TBXum, TAND and P3 as background. Grade shells were generated for 800, 1,500 ppm Cu. Box plots show P2 is the main grade contributor but overlaps with P3.

TAND should be set to background grade (Figure 14-20). Suggested estimation domains are P2 and 800 within all other lithologies.

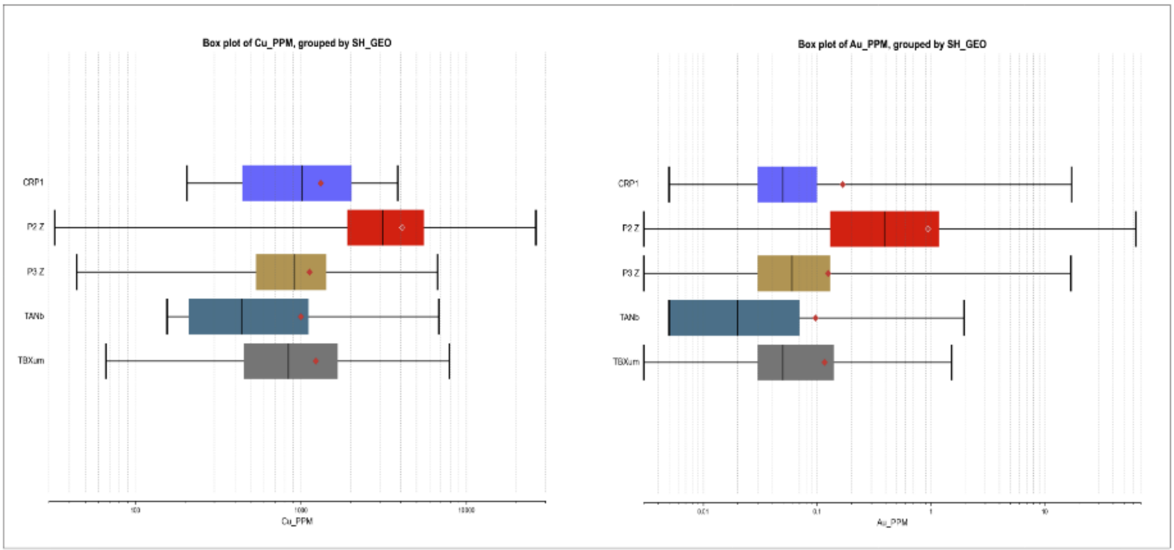
Figure 14-20: Box plots for lithology versus Cu and Au, Central Stockwork Zone



Southern Stockwork Zone

Bounded by the Bornite Divide in the south, Central Scrutiniser in the north, UTS in the east and model boundary in the west. The main modelled lithologies are P2, CRP1, TBXum, TAND and P3 as background. Grade shells were generated for 800, 1,500 and 4,000 ppm Cu. Box plots show P2 is the main grade contributor. TAND should be set to background grade (Figure 14-21). Suggested estimation domains are P2 and 800 within all other lithologies.

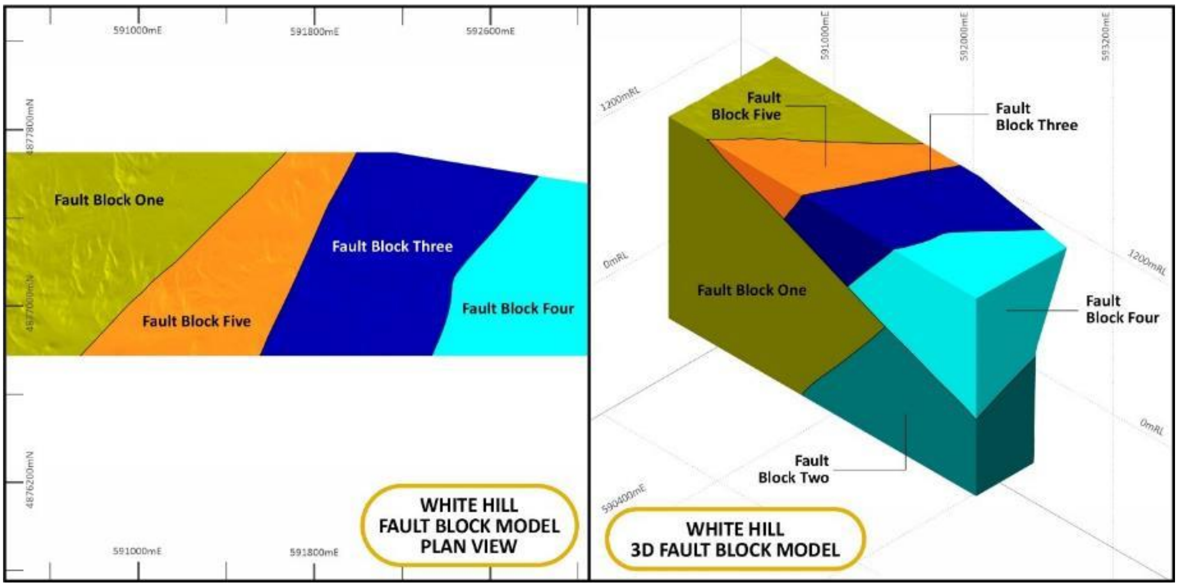
Figure 14-21: Box plots for lithology versus Cu and Au, Southern Stockwork Zone



14.3 White Hill Mineral Resource modelling

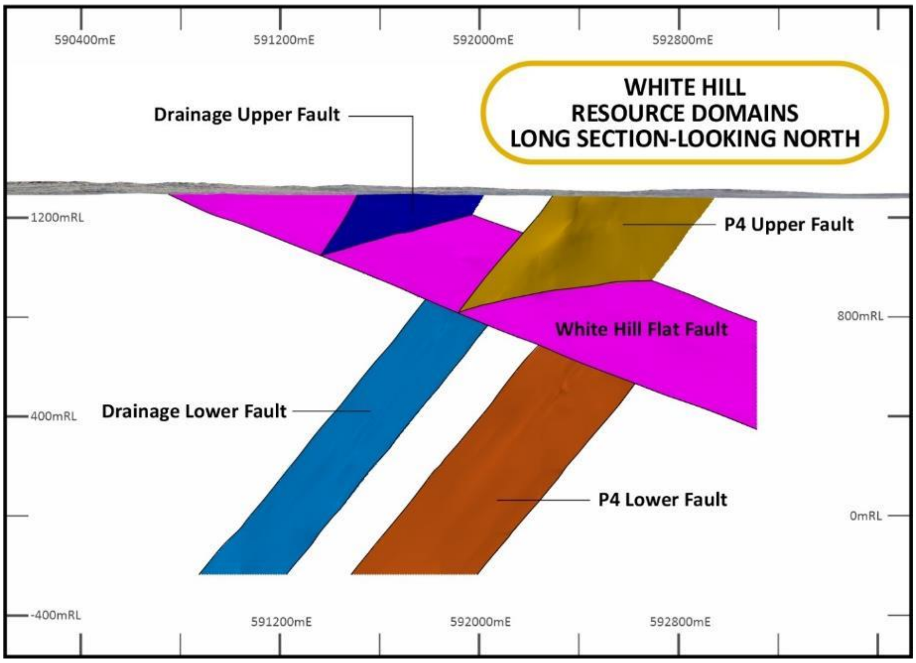
The White Hill deposit is the largest deposit at Kharmagtai, but potentially the simplest. The geological framework modelling resulted in five discrete fault blocks of mineralisation (Figure 14-22 and Figure 14-23). These fault blocks are defined by discrete copper and gold populations separated by key structures or lithological contacts. This rationale for each domain and the methodology used to define them is described below.

Figure 14-22: White Hill Resource domain fault blocks



Source: Xanadu data, drafted by Naran Judger, 2021

Figure 14-23: White Hill domain faults



Source: Xanadu data, drafted by Naran Judger, 2021

Lithologies

Host lithologies have a strong control on copper and gold distribution throughout White Hill (Figure 14-24 and Table 14-2). The new (post-2017) logging lithologies were grouped for the purposes of this modelling into six groups based on rock composition, texture and overprinting relationships. The P2 and PB1 phases appear to be the main control on copper and gold mineralisation with a halo of mineralisation within the CRP_1 and P3 Z phases where they contact P2 and PB1. The P4 phase is mostly barren.

Figure 14-24: Box plot for raw Cu ppm and Au ppm data against group lithology (log scale)

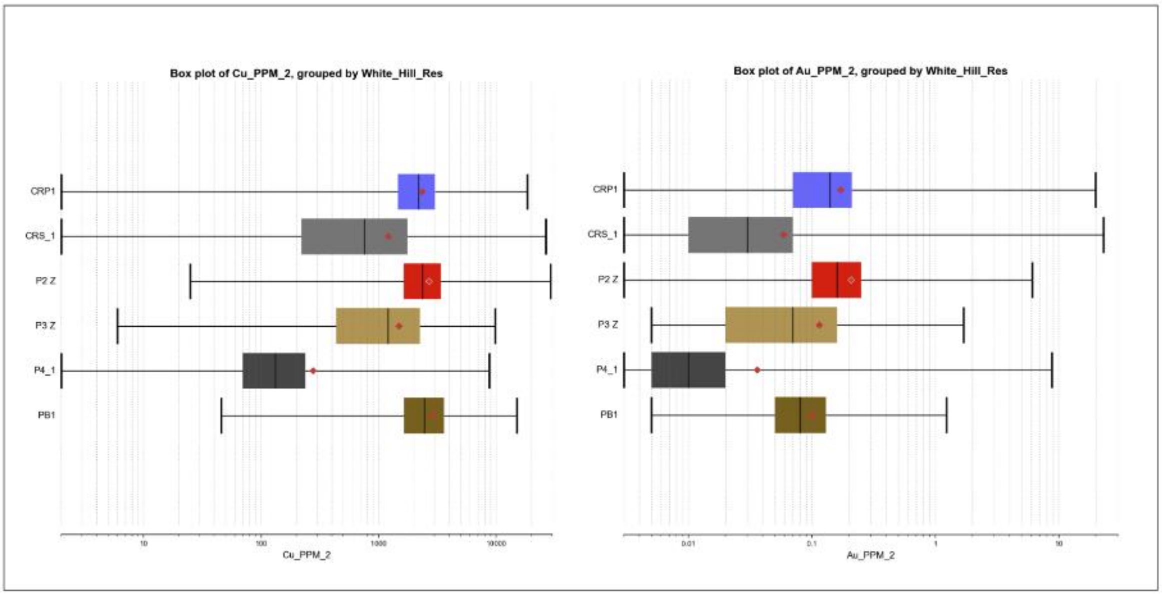


Table 14-2: Table of statistics (length weighted) for raw assay data for White Hill

Name		Count	Length	Mean	Standard deviation	Coefficient of variation	Variance	Minimum	Lower quartile	Median	Upper quartile	Maximum
Au_PPM		33118	54311	0.12	0.27	2.16	0.0716	0.003	0.02	0.08	0.17	23
	CRP1	13621	21053	0.17	0.29	1.69	0.0831	0.003	0.07	0.14	0.21	19.9
	CRS_1	7410	13074	0.06	0.30	5.06	0.0891	0.003	0.01	0.03	0.07	23
	P2 Z	4271	6624	0.21	0.23	1.12	0.0548	0.003	0.1	0.16	0.25	6.1
	P3 Z	2143	3406	0.12	0.14	1.17	0.0183	0.005	0.02	0.07	0.16	1.69
	P4_1	1508	2685	0.04	0.25	7.03	0.0641	0.003	0.005	0.01	0.02	8.8
	PB1	865	1552	0.10	0.09	0.87	0.0079	0.005	0.05	0.08	0.13	1.23
	*Inactive	3300	5917	0.05	0.17	3.09	0.0281	0.003	0.01	0.02	0.04	3.967
Cu_PPM		32481	52148	1828.50	1616.35	0.88	2612572	2	499	1620	2670	29000
	CRP1	13328	20122	2341.60	1353.05	0.58	1830747	2	1460	2192	3020	18400
	CRS_1	7260	12546	1214.23	1366.28	1.13	1866721	2	221	757	1760	26500
	P2 Z	4271	6624	2693.67	1696.89	0.63	2879442	25	1640	2370	3380	29000
	P3 Z	2142	3402	1494.44	1294.99	0.87	1676996	6	436	1200	2250	9800
	P4_1	1457	2534	277.63	543.98	1.96	295916	2	70	133	238	8740
	PB1	865	1552	2860.55	1875.24	0.66	3516524	46	1650	2460	3620	15050
	*Inactive	3158	5368	918.77	1803.54	1.96	3252747	6	104	248	959	20000

14.3.2 Oxide versus sulphide mineralisation

The oxide to sulphide surface was modelled using the criteria explained in the above sections. White Hill has a strong and shallow apparent enrichment in oxide in the north-western portion of the deposit. As such, separate oxide domains will be needed for variography at White Hill.

14.3.3 Structure

There are three key structures at White Hill that impact the geological domaining (Figure 14-23). A flat lying, east dipping structure (White Hill Flat Fault) separates a shallow grade population from a deeper population and offsets two steeper structures with the upper block displaced up-dip to the west. A steep, west dipping structure (P4 Fault) in the eastern portion of the deposit separates the barren P4 intrusive from the mineralised portion of the deposit. A second steep west dipping structure (Drainage Fault) separates grade populations above the Flat Fault but appears to have less impact below the Flat Fault. This may be due to a paucity of drilling data in the area of the Drainage Fault below the Flat Fault.

Structural trend

Two different structural trends were applied. A global trend of 65 degrees dip towards 195 degrees dip azimuth with an ellipsoid ratio of 5:5:1 has been applied to P2, P3 and P4 intrusive units. A global trend of 75 degrees dip towards 184 degrees dip azimuth with an ellipsoid ratio of 3:2:1 has been applied to the PB intrusive unit. No trend has been applied to the CRP and CRS units.

Dividers

Four dividers were defined using natural breaks in mineralisation identified during the modelling process (Figure 14-23). These have been discussed in the structure section above.

14.3.4 Rock properties

Density

The specific gravity data for White Hill describes a mostly normal population (Figure 14-25 and Figure 14-26) with a mean of 2.72 g/cm^3. There may exist multiple overlapping populations of data (double peak) presumably relating to the addition of sulphide. The higher and lower sample values are being reviewed for accuracy.

Figure 14-25: Specific gravity data for White Hill

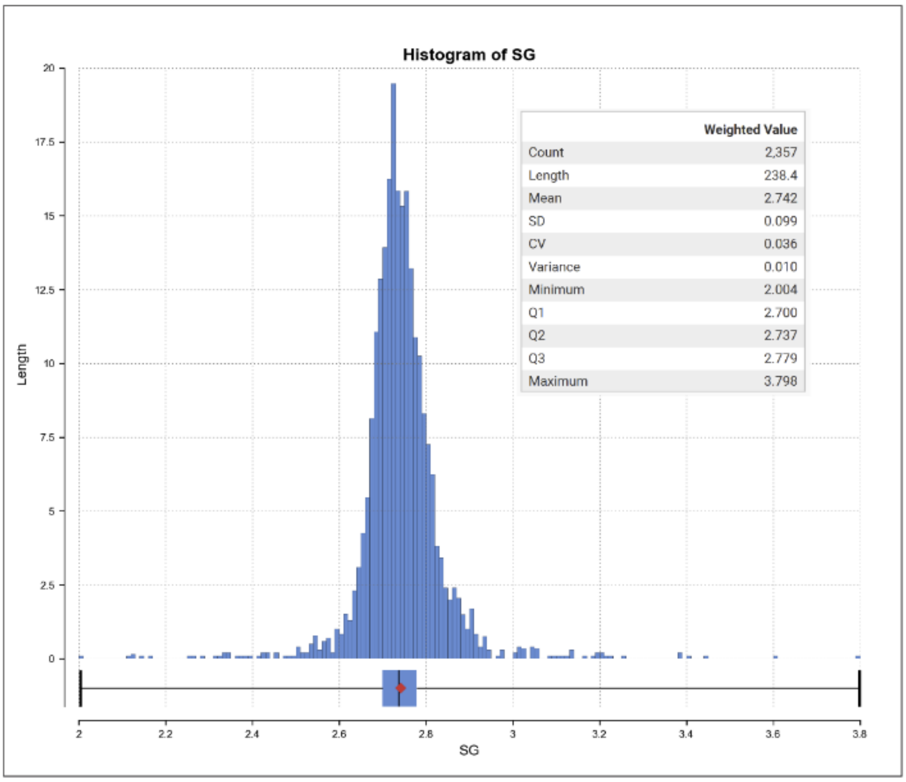
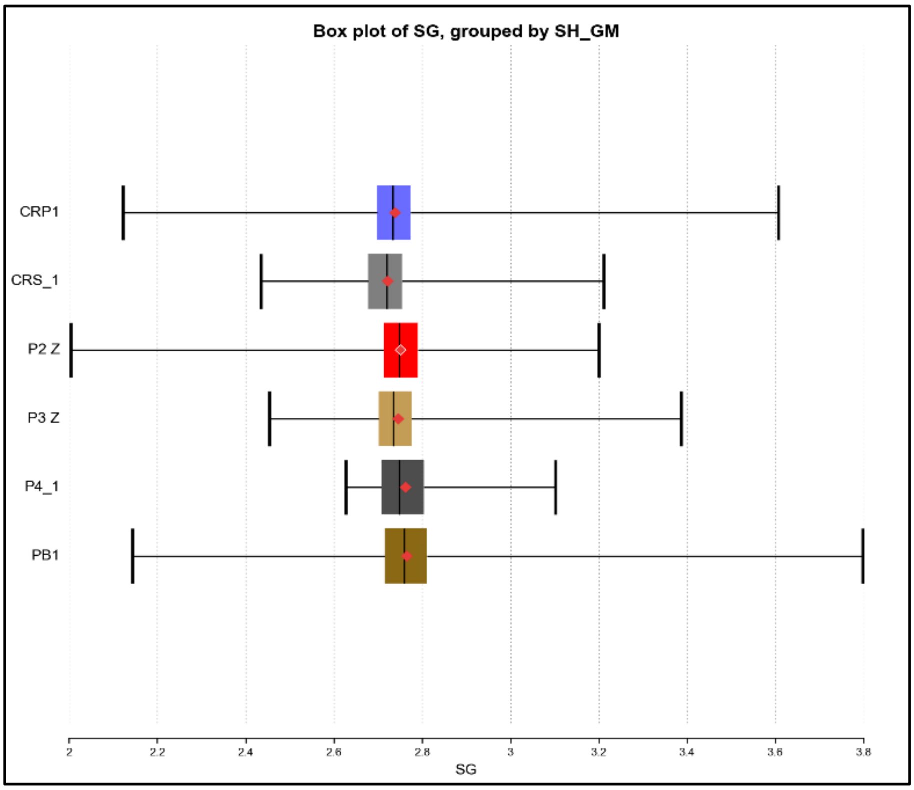


Figure 14-26: Lithology box plot for White Hill specific gravity data



14.3.5 Context for estimations – White Hill

The below is a summary of the geological modelled features of each fault block, the observed grade associations and their potential use for resource estimation.

Fault block one

Bound by the model boundary in the north, south and west and by the Flat Fault and P4 Fault in the east. The main modelled lithologies are P2, P3, P4, PB, CRP and CRS. Grade shells were generated for Au 0.1g/t (oxide and sulphide separately), Cu at 800 ppm, 1,500 ppm and 4,000 ppm (oxide and sulphide separately). There is little variability of lithological control of grade between fault blocks in White Hill. Accordingly, it is suggested that the 800 ppm Cu and 1,500 ppm Cu shells are evaluated as estimation domains as P2 cannot be used to define the limits of grade. Grade extends outside P2 in places and P2 extends outside grade in others.

Fault block two

Bound by the model boundary in the north, south and east and by the Flat Fault and P4 Fault in the west. The only modelled lithology is P4, modelled as background to fill the entire fault block. No grade shells were modelled for Fault Block 2 as this is designated as a barren domain.

Fault block three

Bound by the model boundary in the north and south by the Flat Fault below, P4 Fault in the east and Drainage Fault in the west. The main modelled lithologies are P2, P3, P4, PB and CRP. Grade shells were generated for Au 0.1 g/t (oxide and sulphide separately), Cu at 800 ppm, 1,500 ppm and 4,000 ppm (oxide and sulphide separately). There is little variability of lithological control of grade between fault blocks in White Hill. Again, it is suggested that the 800 ppm Cu and 1,500 ppm Cu grades shells are evaluated as estimation domains as P2 cannot be used to define the limits of grade. Grade extends somewhat outside P2 in places and P2 extends outside grade in others.

Fault block four

Bound by the model boundary in the north, south and east and by the Flat Fault and P4 Fault in the west. The only modelled lithology is P4, modelled as background to fill the entire fault block. No grade shells were modelled for Fault Block Four as this is designated as a barren domain.

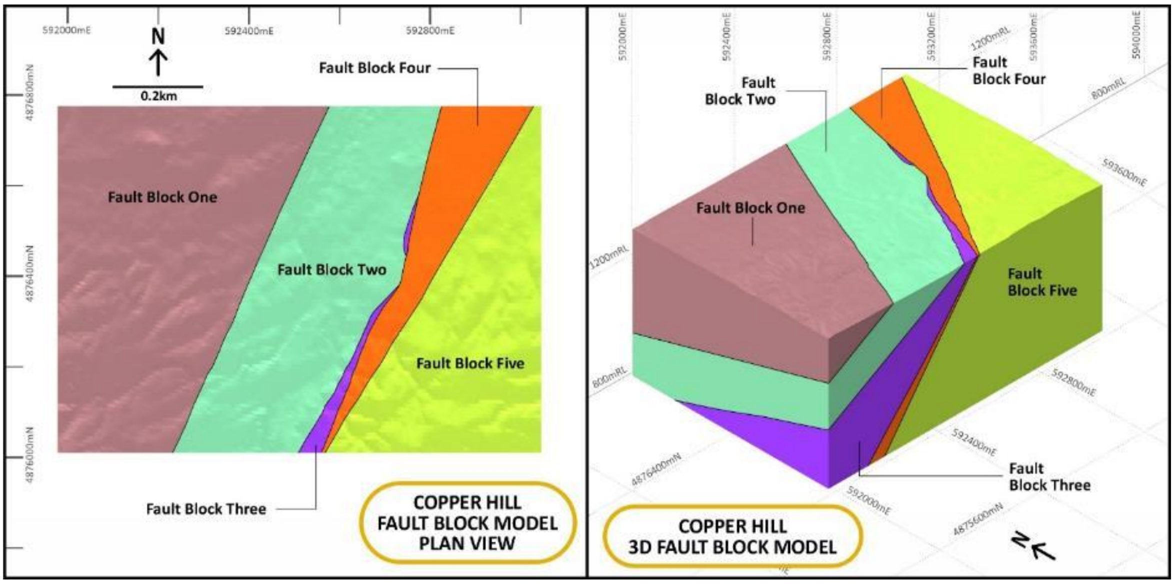
Fault block five

Bound by the model boundary in the north and south by the Flat Fault below and Drainage Fault in the east. The main modelled lithologies are P3, CRP and CRS. Grade shells were generated for Au 0.1 g/t (oxide and sulphide separately), Cu at 800 ppm and 1,500 ppm (oxide and sulphide separately). There is little variability of lithological control to grade between fault blocks in White Hill. It is suggested that the 800 ppm Cu and 1,500 ppm Cu shells are evaluated as estimation domains.

14.4 Copper Hill Mineral Resource modelling

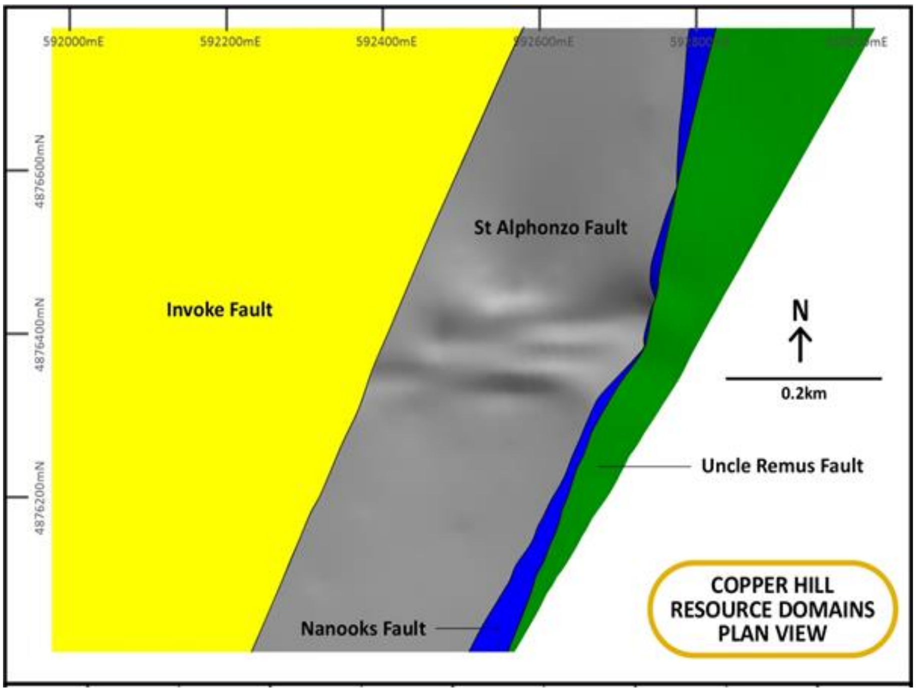
The Copper Hill Deposit is a smaller, discrete body of higher-grade porphyry mineralisation 2 km south of Stockwork Hill. The geological framework modelling resulted in five separate fault blocks of mineralisation. These fault blocks are defined by copper and gold populations of that differ separated by key structures or lithological boundaries (Figure 14-27, Figure 14-28 and Figure 14-29). This rationale for each domain and the methodology used to define them is described below.

Figure 14-27: Fault block diagram for Copper Hill



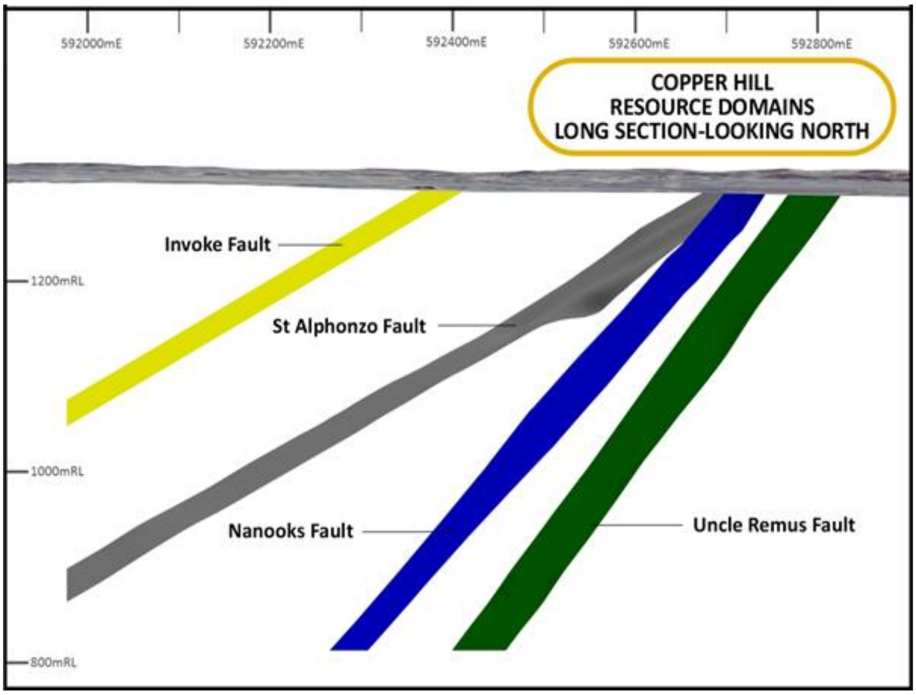
Source: Xanadu data, drafted by Naran Judger, 2021

Figure 14-28: Copper Hill domain faults – plan view



Source: Xanadu data, drafted by Naran Judger, 2021

Figure 14-29: Copper Hill domain faults – sectional view



Source: Xanadu data, drafted by Naran Judger, 2021

14.4.1 Lithologies

Host lithologies have a strong control on copper and gold distribution throughout Copper Hill (Figure 14-30 and Table 14-3). The new (post-2017) logging lithologies were grouped for the purposes of this modelling into three groups based on rock composition, texture and overprinting relationships. The SH_GM field in the lithology data file details these groupings. The P2 phase appears to be the main control on copper and gold mineralisation with a halo of mineralisation within the P3 phase where is contacts P2. The background rock at Copper Hill is Country Rock Siltstone (CRS).

There is an obvious structural control on mineralisation which is described in the structure section below.

Figure 14-30: Box plot for raw Cu ppm and Au ppm data against group lithology (log scale) for Copper Hill

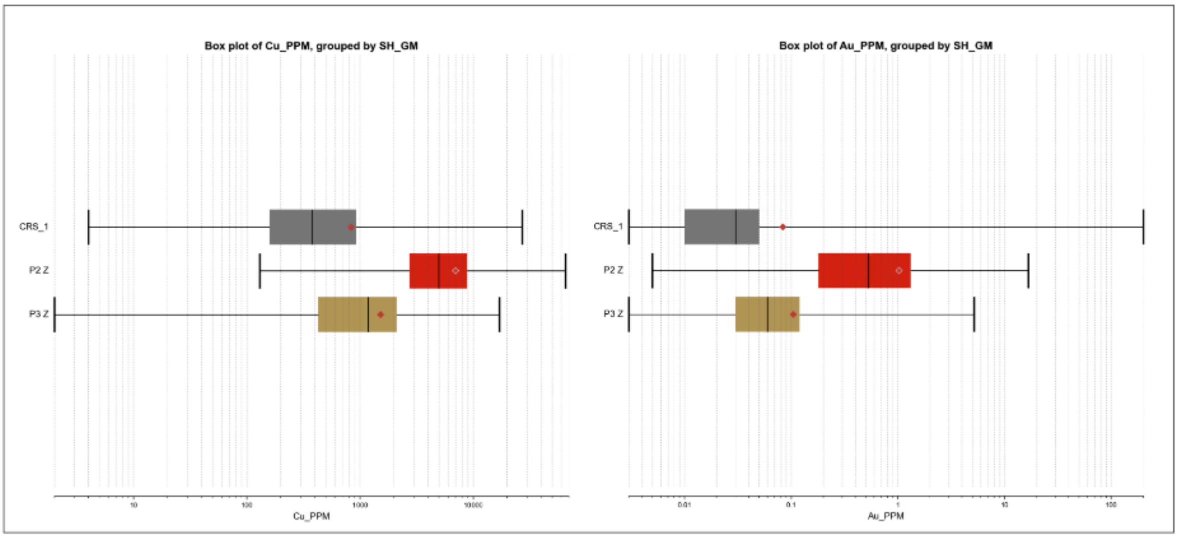


Table 14-3: Table of statistics (length weighted) for raw assay data – Copper Hill

Name		Count	Length	Mean	Standard deviation	Coefficient of variation	Variance	Minimum	Lower quartile	Median	Upper quartile	Maximum
Au_PPM		19162	32556.46	0.16	1.64	10.34	2.70	0.003	0.02	0.03	0.07	199.5
	CRS_1	8403	14310.14	0.08	2.37	28.21	5.59	0.003	0.01	0.03	0.05	199.5
	P2 Z	1910	2928.13	1.03	1.34	1.30	1.80	0.005	0.18	0.53	1.32	16.75
	P3 Z	3290	5447.09	0.10	0.18	1.75	0.03	0.003	0.03	0.06	0.12	5.2
Cu_PPM		19111	32319.66	1442.20	3011.70	2.09	9070314.75	1	159	509	1490	65500
	CRS_1	8403	14310.14	839.51	1371.02	1.63	1879694.01	4	159	377	920	27200
	P2 Z	1910	2928.13	6993.52	7022.33	1.00	49313155.09	130	2740	4980	8860	65500
	P3 Z	3290	5447.09	1522.53	1496.85	0.98	2240549.97	2	429	1180	2110	17040

14.4.2 Oxide versus sulphide mineralisation

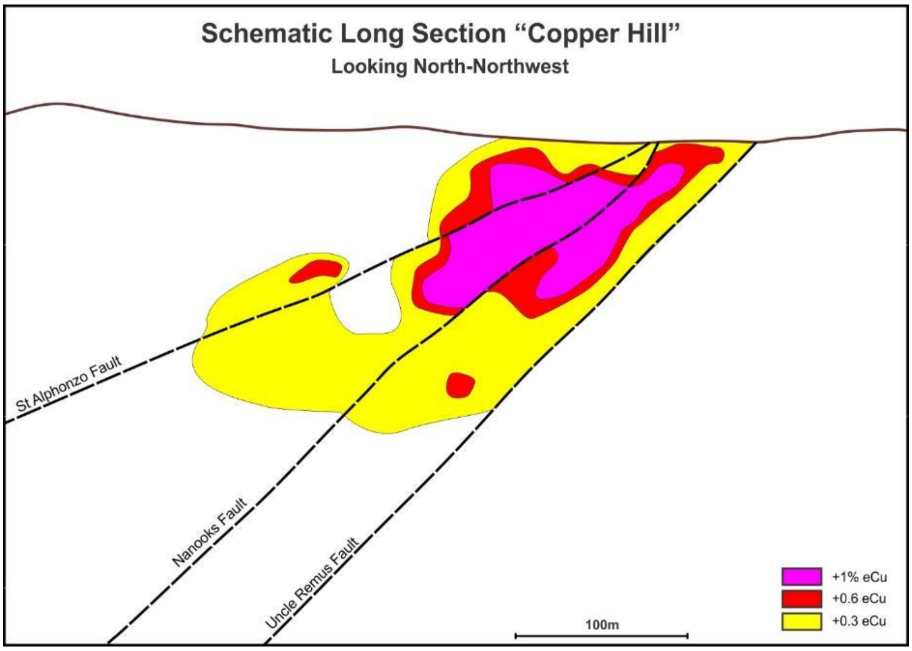
The oxide to sulphide surface was modelled using the criteria explained in the above sections. There appears no significant change in the grade distribution for copper across the oxide-sulphide surface. Gold generally follows the same pattern, however, there are several high gold values (+100 g/t Au) in the shallow drilling that should be isolated or excluded from the resource to ensure a realistic output.

14.4.3 Structure

Detailed structural work has been completed at Copper Hill. The deposit is relatively small, well-drilled and a structural review of the deposit might provide an opportunity to understand the relationship between structure and mineralisation at Kharmagtai.

There are four key structures at Copper Hill that impact the geological domaining (Figure 14-29). Three of these structures interact with the mineralisation and require discussion (Figure 14-31). These structures are moderately dipping (northwest) features with multiple apparent movement senses.

Figure 14-31: Schematic long section through Copper Hill showing grade distribution and fault locations



Source: Xanadu data, drafted by Naran Judger, 2021

Uncle Remus Fault

The Uncle Remus Fault forms the basal fault to the Copper Hill Deposit. Mineralisation terminates against this structure (Figure 14-31). The Uncle Remus Fault forms a 10–20 m wide zone of highly fractured hornfelsed siltstone. Significant work has been conducted attempting to understand the offset of the Uncle Remus Fault, but the true offset is yet to be understood. This aspect is critical as Copper Hill is the highest-grade deposit at Kharmagtai and the faulted offset to the deposit could represent a significant target.

Nanooks Fault

Nanooks Fault lies roughly parallel to and 60 m above the Uncle Remus Fault. There are three observations that link Nanooks fault to the mineralising event at Copper Hill:

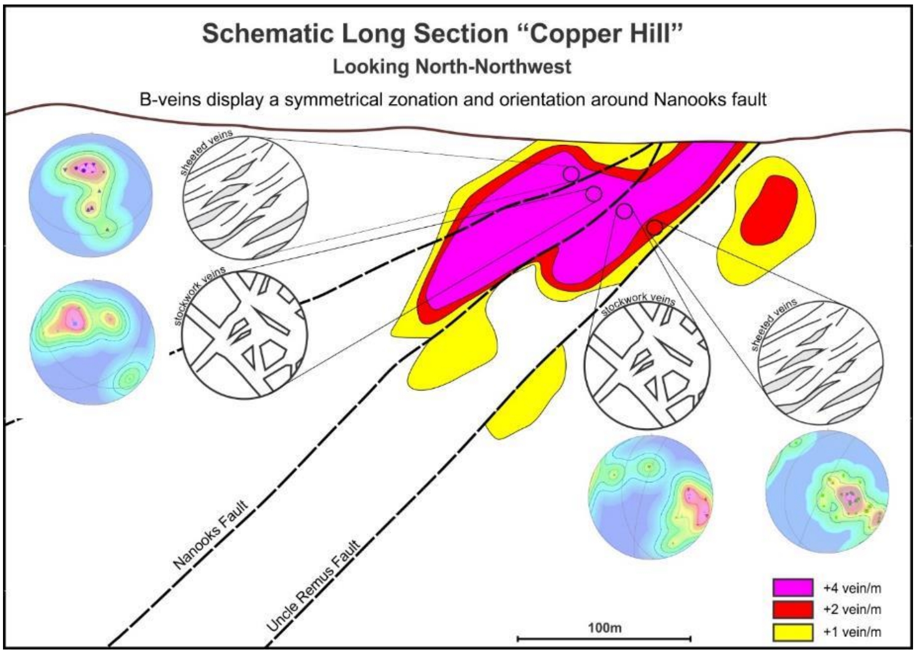
1. The highest-grade mineralisation at Copper Hill straddles Nanooks Fault (Figure 14-32).
2. Mineralised porphyry veining is zoned symmetrically around Nanooks Fault (Figure 14-32 and Figure 14-33).
3. Orientation of B veining is zoned symmetrically around Nanooks Fault (Figure 14-32).

Vein kinematics and shear sense indicators suggest Nanooks Fault was active as a reverse fault during mineralisation and connected to sheets veins and stockworks and is plausibly the main feeder fault allowing access of deeper-seated porphyry fluids.

Saint Alphonso's Fault

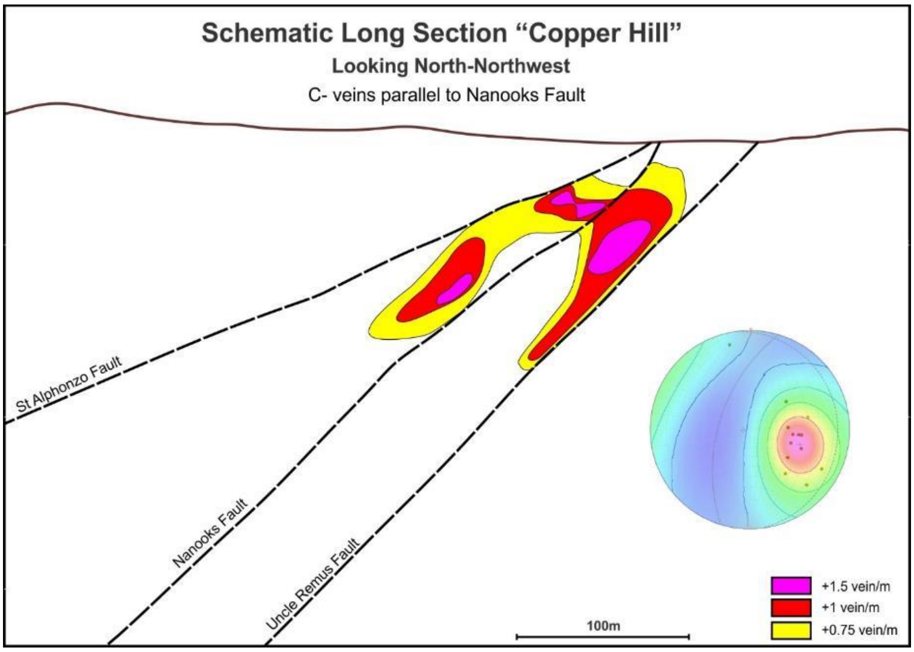
The Saint Alphonso's Fault lies approximately 100 m above Nanooks Fault (Figure 14-32). St Alphono's Fault is shallower and may represent a splay off Nanooks Fault.

Figure 14-32: Schematic long section through Copper Hill showing B vein density and vein orientation symmetry around Nanooks Fault



Source: Xanadu data, drafted by Naran Judger, 2021

Figure 14-33: Schematic long section through Copper Hill showing C vein density and vein orientations



Source: Xanada data, drafted by Naran Judger, 2021

14.4.4 Structural trend

A single structural trend has been applied to the P2 intrusive unit at Copper Hill. This trend dips at 55 degrees towards 176 degrees with a pitch of 90 degrees. The trend is strongest long the centre line and dissipates over 100 m distance.

14.4.5 Dividers

Four dividers were defined using natural breaks in mineralisation identified during the modelling process (Figure 14-29). Three of these have been discussed in the structure section above. The fourth and final structure (Invoke Fault) was applied due to an obvious offset in the surface geology and solved several geological and grade modelling issues by terminating weak mineralisation.

14.4.6 Rock properties

Density

The specific gravity data for Copper Hill describes a slightly skewed normal population (Figure 14-34 and Figure 14-35) with a mean of 2.74 g/cm³. There may exist multiple overlapping populations of data (double peak and small peaks on the higher density flank) presumably relating to the addition of sulphide. The higher and lower sample values are being reviewed for accuracy.

Figure 14-34: Specific gravity data for Copper Hill

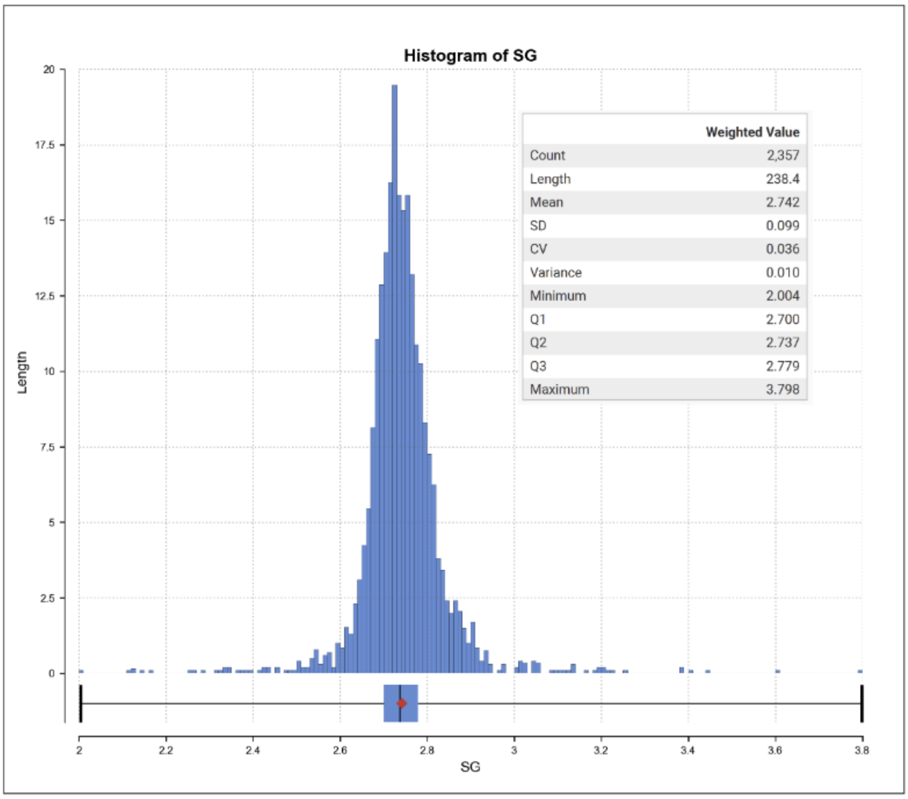
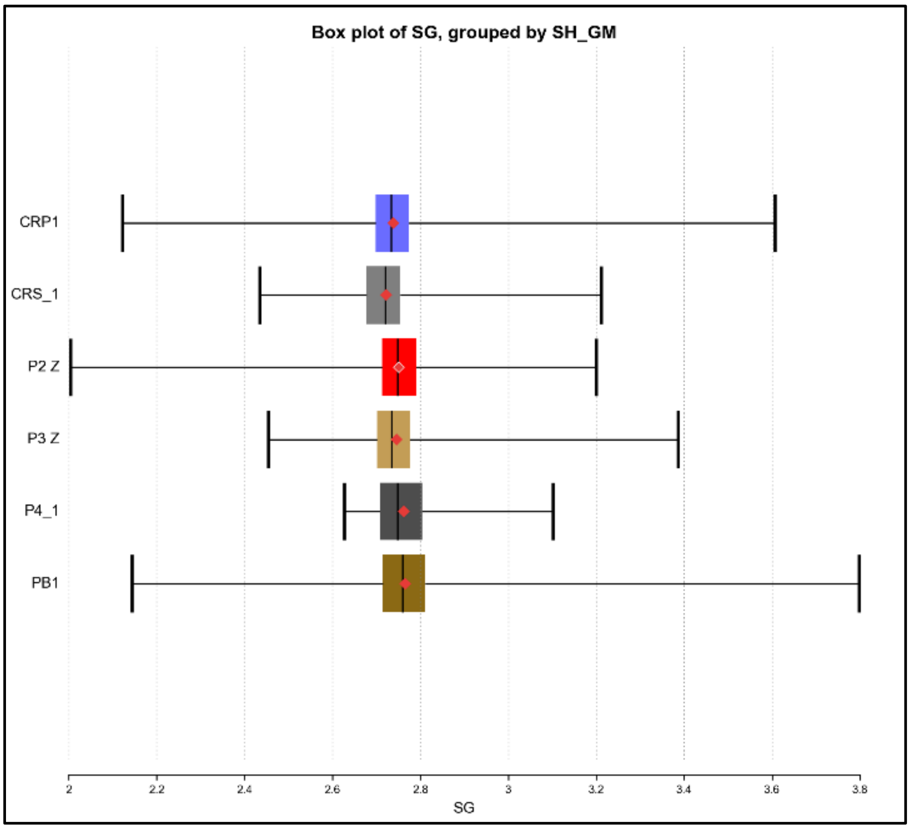


Figure 14-35: Lithology box plot for Copper Hill specific gravity data



14.4.7 Context for estimations – Copper Hill

The below is a summary of the geological modelled features of each fault block, the observed grade associations and their potential use for resource estimation.

Fault Block One

Bound by the model boundary in the north, south and west and by the Invoke Fault in the east. The main modelled lithologies are P3 and CRS. This fault block should be modelled as background grade.

Fault Block Two

Bound by the model boundary in the north and south and by Invoke Fault in the west and St Alphonso's in the east. The main modelled lithologies are CRS, P3 and P2. Grade shells were generated separately for oxide and sulphide. For copper grade shells were generated at 1,000 ppm and 2,000 ppm intervals, however as the relationship between P2 and mineralisation is strong it is recommended that the P2 unit be evaluated as the estimation domain.

Fault Block Three

Bound by the model boundary in the north and south and by St Alphonso's Fault in the west and Nanooks Fault in the east. The main modelled lithologies are P2, P3 and CRS. Grade shells were generated separately for oxide and sulphide. For copper grade shells were generated at 1,000 ppm and 2,000 ppm intervals, however as the relationship between P2 and mineralisation is strong it is recommended that the P2 unit be evaluated as the estimation domain.

Fault Block Four

Bound by the model boundary in the north and south, Nanooks Fault in the west and Uncle Remus Fault in the east. The main modelled lithologies are P2, P3 and CRS. Grade shells were generated separately for oxide and sulphide. For copper grade shells were generated at 1,000 ppm and 2,000 ppm intervals, however as the relationship between P2 and mineralisation is strong it is recommended that the P2 unit be evaluated as the estimation domain.

Fault Block Five

Bound by the model boundary in the north, south and east, Uncle Remus Fault in the west. The main modelled lithologies are P2, P3 and CRS. Grade shells were generated separately for oxide and sulphide. For copper grade shells were generated at 1,000 ppm and 2,000 ppm intervals, however as the relationship between P2 and mineralisation is strong it is recommended that the P2 unit be evaluated as the estimation domain.

14.5 Zaraa Mineral Resource modelling

The Zaraa deposit lies 2 km east of White Hill, beneath 27 m of shallow cover. Zaraa was a blind discovery made in 2017 using the standard porphyry vein model and the porphyry geochemical footprint model. Three historic drill holes were relogged and assayed and these gave vectors from which the discovery drill hole was targeted. The 2022 MRE adds Zaraa to the Kharmagtai Global Resource.

14.5.1 Lithologies

There is a strong correlation between individual lithological groups and mineralisation at Zaraa. Logging has defined six key lithologies. The intrusive Phases (P1, P2) correlate well with the mineralisation (Figure 14-36 and Table 14-4). The P3, CRP (Country Rock Porphyry) and CRS (Country Rock Siltstone) all form host rocks to the mineralisation. Red Dog Dyke is a late phase and is barren. The cover sequence was modelled separately and trimmed to topography. The cover sequence should be excluded from the models or assigned background grade.

Figure 14-36: Box plot for raw Cu ppm and Au ppm data against group lithology (log scale) for Zaraa

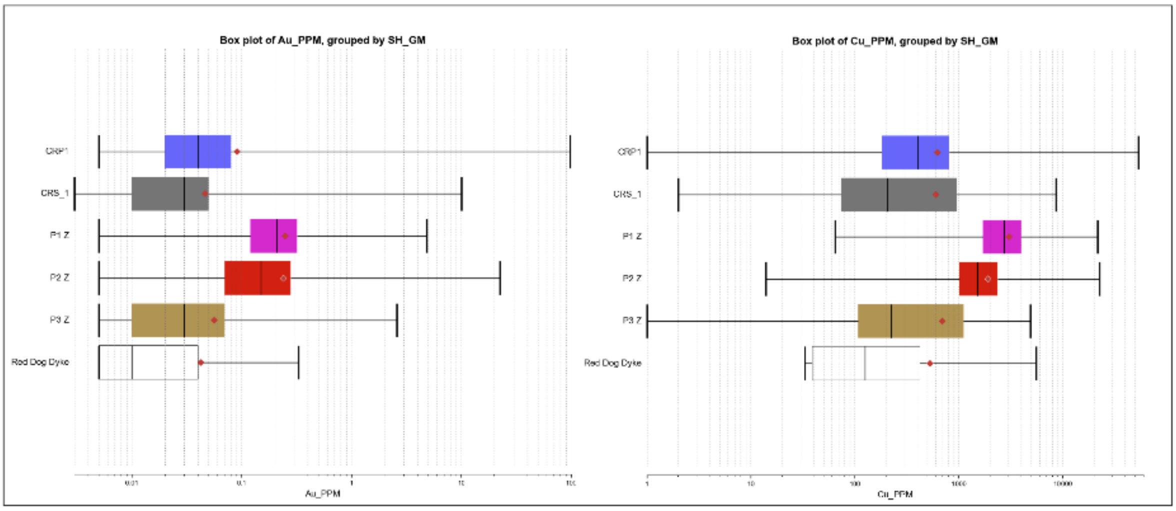


Table 14-4: Table of statistics (length weighted) for raw assay data for Zaraa

	Lithology	Count	Length	Mean	Standard deviation	Coefficient of variation	Variance	Minimum	Lower quartile	Median	Upper quartile	Maximum
Au_PPM		24409	44552.86	0.11	0.73	6.64	0.54	0.003	0.02	0.05	0.108	98.5
	CRP1	11989	21725.31	0.09	0.98	10.80	0.97	0.005	0.02	0.04	0.08	98.5
	CRS_1	3676	7042.35	0.05	0.17	3.64	0.03	0.003	0.01	0.03	0.05	10.05
	P1 Z	985	1833.80	0.25	0.25	1.01	0.06	0.005	0.12	0.21	0.32	4.83
	P2 Z	4404	7637.05	0.24	0.46	1.94	0.22	0.005	0.07	0.15	0.28	22.6
	P3 Z	1644	3118.30	0.06	0.09	1.69	0.01	0.005	0.01	0.03	0.07	2.59
	Red Dog Dyke	74	100.40	0.04	0.07	1.75	0.01	0.005	0.005	0.01	0.04	0.33
Cu_PPM		24274	44093.86	918.25	1242.93	1.35	1544864.22	1	159	485	1240	53800
	CRP1	11995	21737.31	622.33	889.74	1.43	791632.50	1	182	404	814	53800
	CRS_1	3592	6784.25	601.38	799.45	1.33	639119.45	2	74	206	957	8660
	P1 Z	985	1833.80	3049.37	2044.20	0.67	4178762.92	65	1710	2730	3960	21800
	P2 Z	4404	7637.05	1909.03	1449.71	0.76	2101646.99	14	1020	1510	2380	22700
	P3 Z	1644	3118.30	695.60	889.00	1.28	790325.22	1	108	222	1110	4900
	Red Dog Dyke	74	100.40	528.15	1044.55	1.98	1091082.30	33	39	126	424	5550

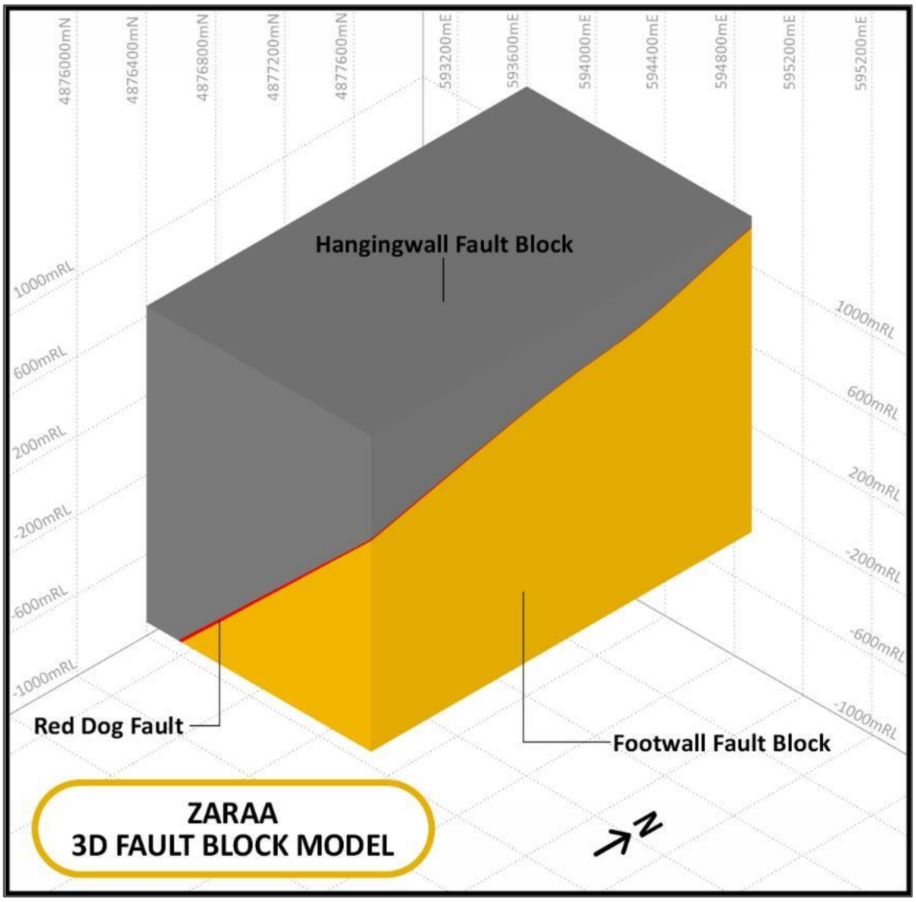
14.5.2 Oxide versus sulphide mineralisation

The modelled body of mineralisation at Zaraa does not interact with the oxide sulphide surface and this aspect has not been accounted for in this resource estimate.

14.5.3 Structure

There is one observed structural feature that interacts with the mineralisation at Zaraa. The Red Dog Dyke is a low angle west dipping structure cross cutting the deposit (Figure 14-37). The Red Dog fault has been filled with a distinctive, brick red andesite unit which simplifies mapping the structure in drill core. There is an apparent normal, top block down (to the northwest) offset of 45 m on the Red Dog fault relative to the mineralised intrusive units.

Figure 14-37: Fault block Model for the Zaraa Deposit



Source: Xanadu data, drafted by Naran Judger, 2021

14.5.4 Structural trend

A single structural trend has been applied to the P1 and P2 intrusive units at Zaraa. This trend dips at 80 degrees towards 290 degrees with a pitch of 86 degrees with ellipsoid ratios of 3:3:1. This trend was determined using a 3D analysis of both the lithological units and grade.

14.5.5 Dividers

A single divider (Red Dog Fault) has been defined using natural breaks in mineralisation identified during the modelling process (Figure 14-37). As the fault has volume (approximately 10 m thick) its hanging wall and footwall are also defined as dividers allow it to be domained out separately and its barren volume excluded from the estimations.

14.5.6 Rock properties

Density

The specific gravity data for Zaraa describes a slightly skewed normal population (Figure 14-38 and Figure 14-39) with a mean of 2.73 g/cm^3. There may exist multiple overlapping populations of data (double peak and small peaks on the higher density flank) presumably relating to the addition of sulphide. The higher and lower sample values are being reviewed for accuracy.

Figure 14-38: Specific gravity data for Zaraa

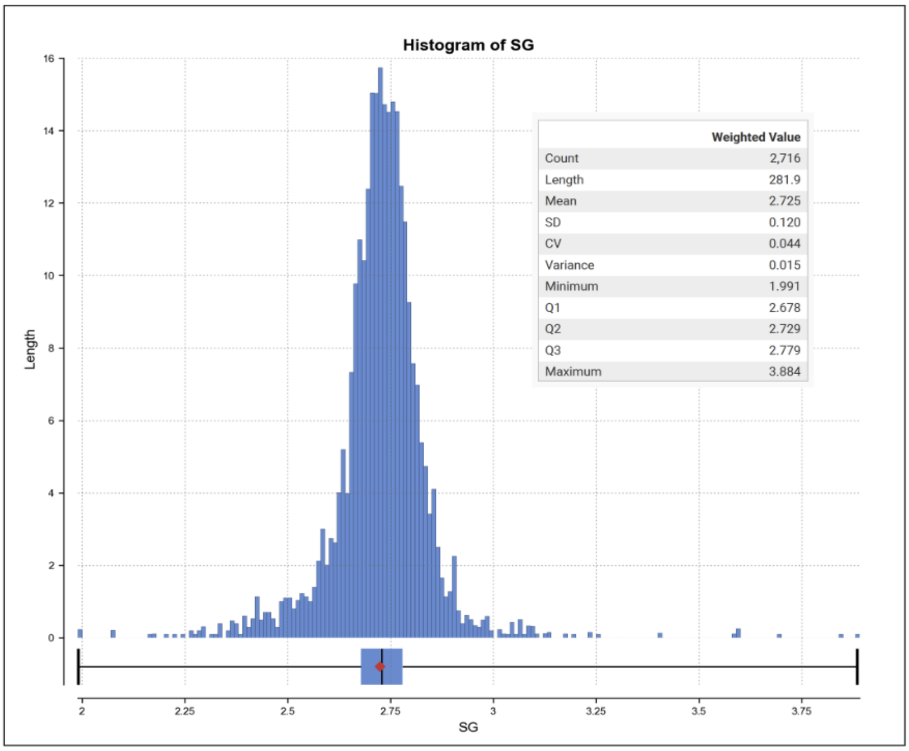
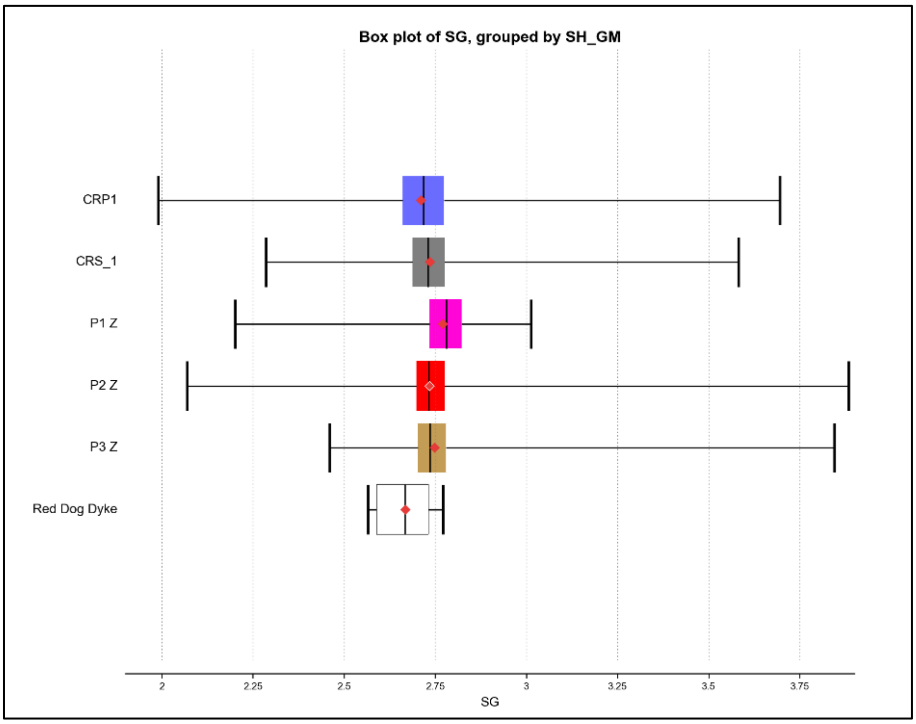


Figure 14-39: Lithology box plot for Zaraa specific gravity data



14.5.7 Context for estimations – Zaraa

The below is a summary of the geological modelled features of each fault block, the observed grade associations and their potential use for resource estimation.

Hangingwall Fault Block

Bound by the model boundary in the north, south, east and west and by the Red Dog Fault at depth. The main modelled lithologies are P1, P2, P3, CRP and CRS. Multiple grade shells were produced (800 ppm, 1,000 ppm and 2,000 ppm Cu and 0.1 ppm Au) but it is suggested that the P1 and P2 lithological volumes are evaluated as estimation domains due to their strong correlation with grade.

Red Dog Fault Block

Bound by the hangingwall and footwall fault blocks, The Red Dog Fault is barren and should be assigned background grade in the estimation.

Footwall Fault Block

Bound by the model boundary in the north, south, east and west and by the Red Dog Fault above. The main modelled lithologies are P1, P2, P3, CRP and CRS. Multiple grade shells were produced (800 ppm, 1,000 ppm and 2,000 ppm Cu and 0.1 ppm Au) but it is suggested that the P1 and P2 lithological volumes are evaluated as estimation domains due to their strong correlation with grade.

14.6 Golden Eagle Mineral Resource modelling

The Golden Eagle deposit was discovered in 2016 during the top of basement geochemical drilling program. Top of basement drill holes returned high-density porphyry b-veins and significant gold results. The deposit lies below 22 m of cover.

14.6.1 Lithologies

The Golden Eagle deposit geology appears to be simple with only two modelled lithologies, Country Rock Porphry (CRP) as host rock and the main mineralised intrusive phase P2 (Figure 14-40 and Table 14-5). Initial models were built using separate P1 and P2 volumes to evaluate if different grade populations are present. As the drill direction is broadly parallel to the boundaries of these intrusive units there are few contacts within the drill holes between the units. Contacts fall between drill holes. Placing a boundary between P1 and P2 was difficult and obtaining Boolean volumes of realistic shapes impossible. P1 and P2 were combined into a single intrusive unit. Small pods/inclusions of this unit created by narrow one drill hole intercepts were removed in the SE and N fault blocks for simplicity. The cover sequence has been modelled separately and trimmed to topography. The cover sequence should be assigned a background grade value.

Figure 14-40: Box plot for raw Cu ppm and Au ppm data against group lithology (log scale) for Golden Eagle

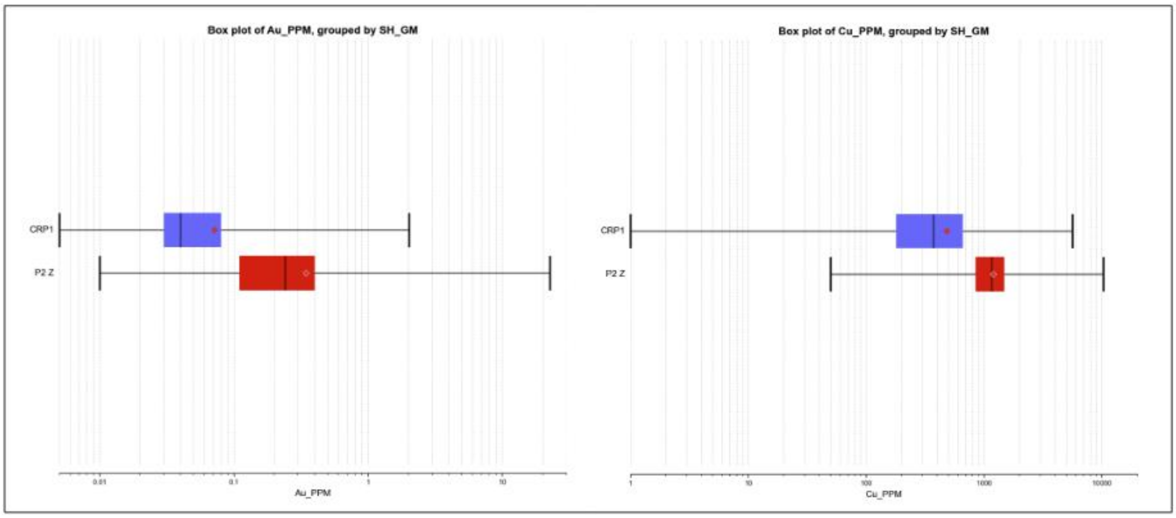


Table 14-5: Table of statistics (length weighted) for raw assay data for Golden Eagle

	Lithology	Count	Length	Mean	Standard deviation	Coefficient of variation	Variance	Minimum	Lower quartile	Median	Upper quartile	Maximum
Au_PPM		4606	6859.70	0.20	0.45	2.23	0.20	0.005	0.04	0.08	0.25	22.6
	CRP1	1795	2860.35	0.07	0.12	1.60	0.01	0.005	0.03	0.04	0.08	2.02
	P2 Z	2366	3333.55	0.35	0.60	1.74	0.36	0.01	0.11	0.24	0.4	22.6
Cu_PPM		4606	6859.70	809.29	642.15	0.79	412358.62	1	282	710	1200	10300
	CRP1	1795	2860.35	482.70	442.12	0.92	195474.00	1	179	373	661	5630
	P2 Z	2366	3333.55	1206.03	589.80	0.49	347869.72	50	848	1160	1480	10300

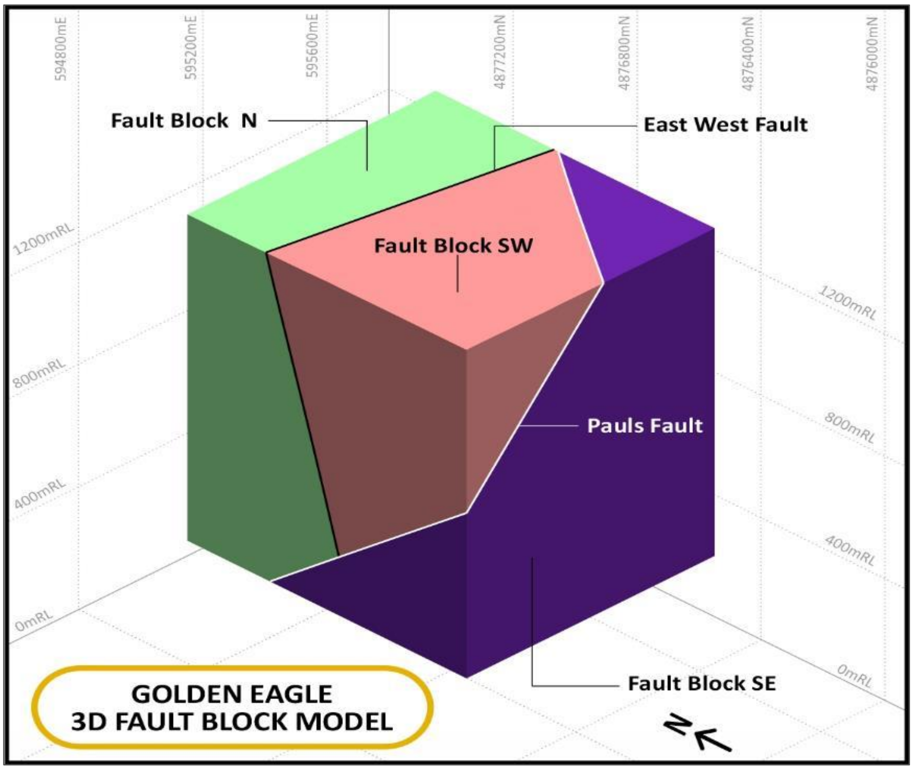
14.6.2 Oxide versus sulphide mineralisation

The oxide to sulphide surface was modelled using the criteria explained in the above sections. Small kernels of fresh rock were included in the oxide domain to ensure a realistic and simple oxide to fresh domain boundary. Mineralisation volumes were modelled separately for gold and copper and separately for oxide and sulphide. There is a strong control on gold grade across the oxide surface with gold appearing to be enriched in the oxide domain. Copper appears to be depleted in the oxide zone.

14.6.3 Structure

Two main faults were identified during the modelling process defining three fault blocks. The Pauls Fault and the East West Fault (Figure 14-41). Pauls Fault was identified based on grade and lithological terminations. Offsets in magnetics indicate this is a large offset structure. This feature could be used as a hard boundary in the estimation process. The East West Fault was identified based on lithological terminations and apparent grade offsets. Magnetics confirms this fault terminates against Pauls Fault, so it interpreted to be older. Grade appears to 'leak' across this fault in places so may be pre-mineralisation and considered a soft boundary for estimation purposes.

Figure 14-41: Fault block model for Golden Eagle



Source: Xanadu data, drafted by Naran Judger, 2021

14.6.4 Rock properties

Density

The specific gravity data for Golden Eagle describes a slightly skewed normal population (Figure 14-42 and Figure 14-43) with a mean of 2.73 g/cm^3. There appear to be multiple overlapping populations of data (double peak and small peaks on the higher density flank) presumably relating to the addition of sulphide. The higher and lower sample values are being reviewed for accuracy.

Figure 14-42: Specific gravity data for Golden Eagle

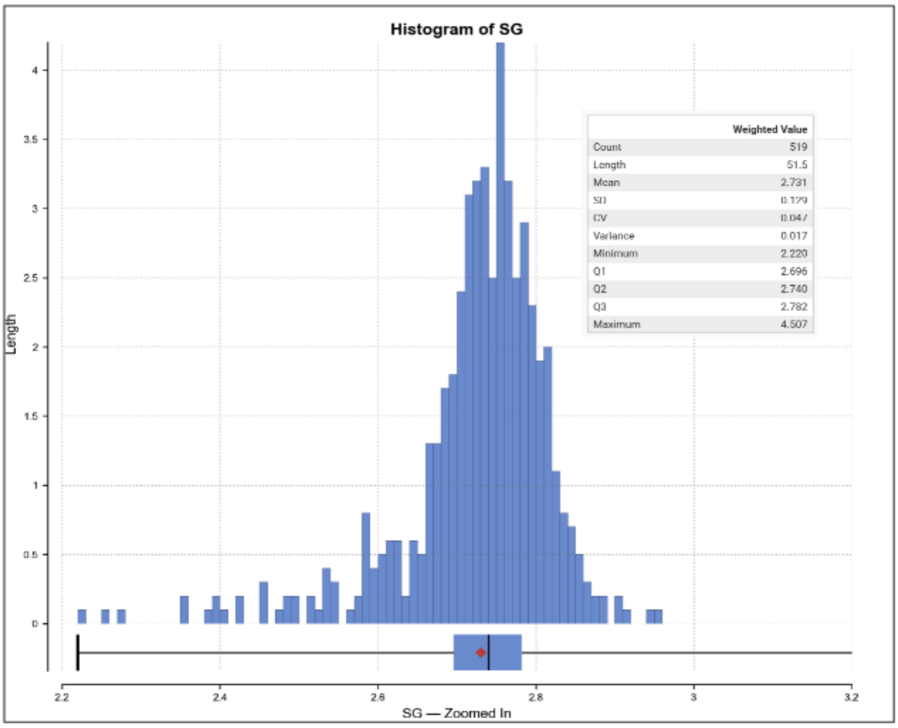
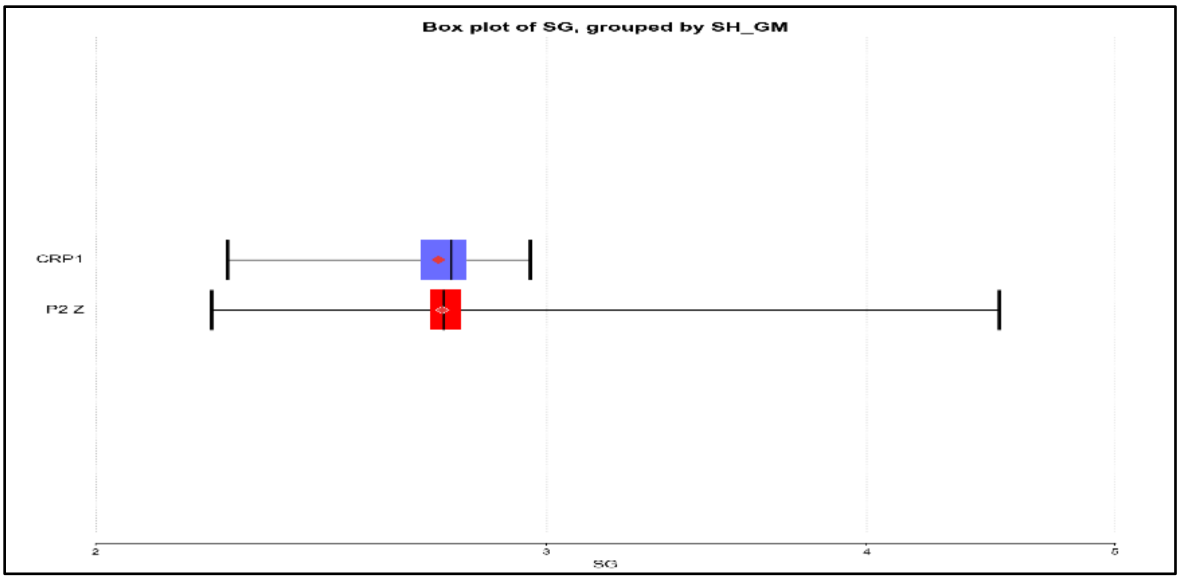


Figure 14-43: Lithology box plot for Golden Eagle specific gravity data



14.6.5 Context for estimations – Golden Eagle

The below is a summary of the geological modelled features of each fault block, the observed grade associations and their potential use for resource estimation.

Fault Block North

Bound by the model boundary in the north and west, by the East West Fault in the north and Pauls Fault in the east. Mineralisation correlated directly with the P2 Domain. Mineralisation shells were modelled separately for gold and copper and separately for oxide and sulphide. Au was modelled on a 0.08 ppm Au cut-off based on a statistical review of the Au population.

There appears a weak inflection point at this value. Cu was modelled on a 1,000 ppm Cu cut-off based on a statistical review of the GE Cu population. There appears to be an inflection point at this value.

Fault Block Southwest

Bound by the model boundary in the west and south and Pauls Fault in the northwest. Mineralisation is correlated directly with the P2 Domain. Mineralisation shells were modelled separately for gold and copper and separately for oxide and sulphide. Au was modelled on a 0.08 ppm Au cut-off based on a statistical review of the Au population. There appears a weak inflection point at this value. Cu was modelled on a 1,000 ppm Cu cut-off based on a statistical review of the GE Cu population. There appears to be an inflection point at this value.

Fault Block Southeast

Bound by the model boundary in the east and south and Pauls Fault in the northwest. This fault should be designated a background grade value as mineralisation terminates against Paul's Fault.

14.7 Zephyr Mineral Resource modelling

The Zephyr Deposit was discovered in 2016 during the top of basement geochemical drilling program. Top of basement drill holes returned porphyry b-veins and significant copper and gold results. The deposit lies below 20 m of shallow cover.

14.7.1 Lithologies

The Zephyr Deposit geology appears to be relatively simple with three main lithologies modelled P2, P3 and Country Rock Porphyry (CRP). The cover units were modelled separately, trimmed to topography and should be excluded from the estimation. There is a strong correlation between mineralisation and the P2 intrusive (Figure 14-44 and Table 14-6).

Figure 14-44: Box plot for raw Cu ppm and Au ppm data against group lithology (log scale) for Zephyr

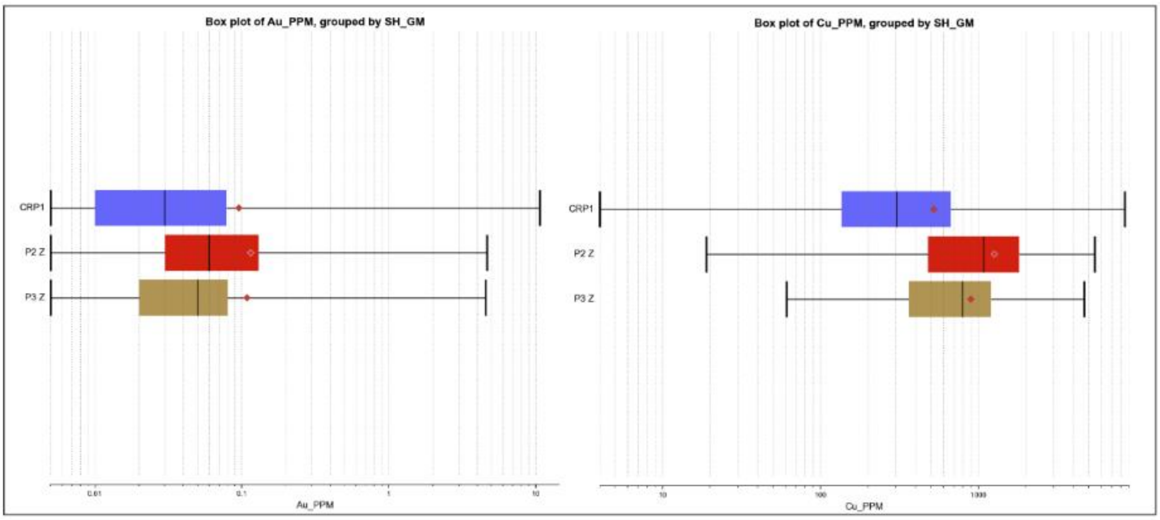


Table 14-6: Table of statistics (length weighted) for raw assay data for Zephyr

	Lithology	Count	Length	Mean	Standard deviation	Coefficient of variation	Variance	Minimum	Lower quartile	Median	Upper quartile	Maximum
Au_PPM		3262	5946.4	0.1002	0.325745	3.249341644	0.1061099	0.005	0.02	0.04	0.09	10.7
	CRP1	1731	3231.1	0.0957	0.397978	4.15997173	0.1583862	0.005	0.01	0.03	0.079	10.7
	P2 Z	1104	2009.7	0.1151	0.174424	1.515951227	0.0304237	0.005	0.03	0.06	0.13	4.69
	P3 Z	294	425.3	0.1088	0.363568	3.342454075	0.1321813	0.005	0.02	0.05	0.08	4.57
Cu_PPM		3268	5958.4	789.8	845.1944	1.070141619	714353.63	4	183	482	1130	8450
	CRP1	1734	3237.1	521.76	648.8268	1.243536324	420976.17	4	136	303	668	8450
	P2 Z	1107	2015.7	1263.9	957.2498	0.757354738	916327.21	19	481	1080	1820	5460
	P3 Z	294	425.3	898.41	695.4465	0.774085784	483645.78	61	363	793	1200	4690

14.7.2 Oxide versus sulphide mineralisation

The oxide to sulphide surface was modelled using the criteria explained in the above sections. Copper and gold grade shells were separated at this surface.

Structure

There is a single structure impacting the lithological and grade models for Zephyr (the Zephyr Fault). This structure was identified via lithological and grade 'breaks' and supported by the project scale magnetics. The offset and movements sense on this structure is not yet defined as there appears to be multiple movement events.

14.7.3 Rock properties

Density

The specific gravity data for Zephyr describes a slightly skewed normal population (Figure 14-45 and Figure 14-46) with a mean of 2.72 g/cm^3. There appear to be multiple overlapping populations of data (double peak and small peaks on the higher density flank) presumably relating to the addition of sulphide. The higher and lower sample values are being reviewed for accuracy.

Figure 14-45: Specific gravity data for Zephyr

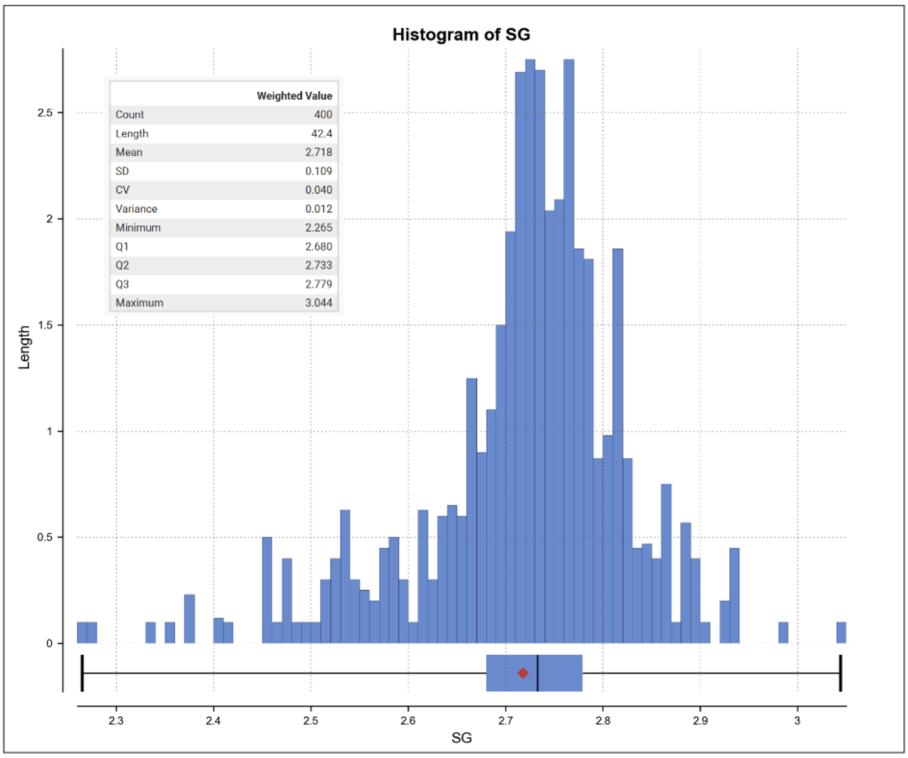
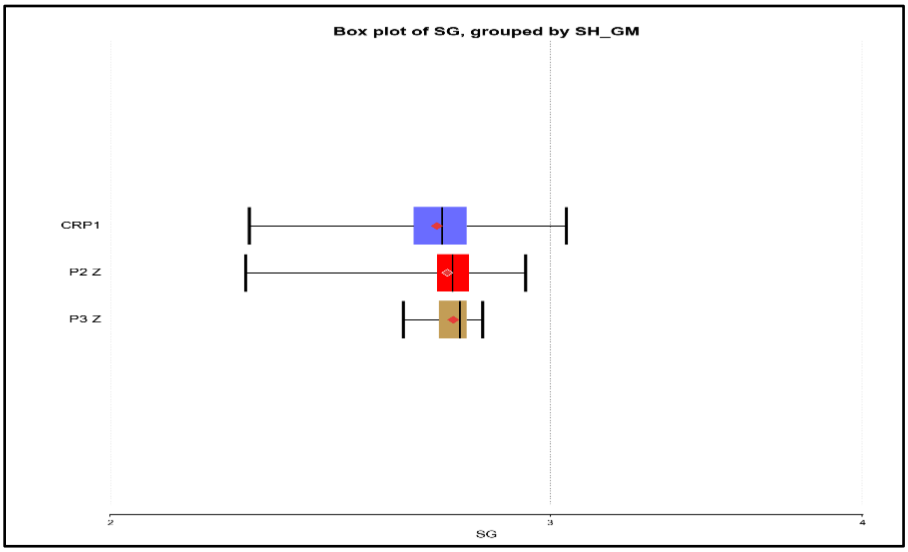


Figure 14-46: Lithology box plot for Zephyr specific gravity data



14.7.4 Context for estimations – Zephyr

The below is a summary of the key features of each fault block relevant to the estimations.

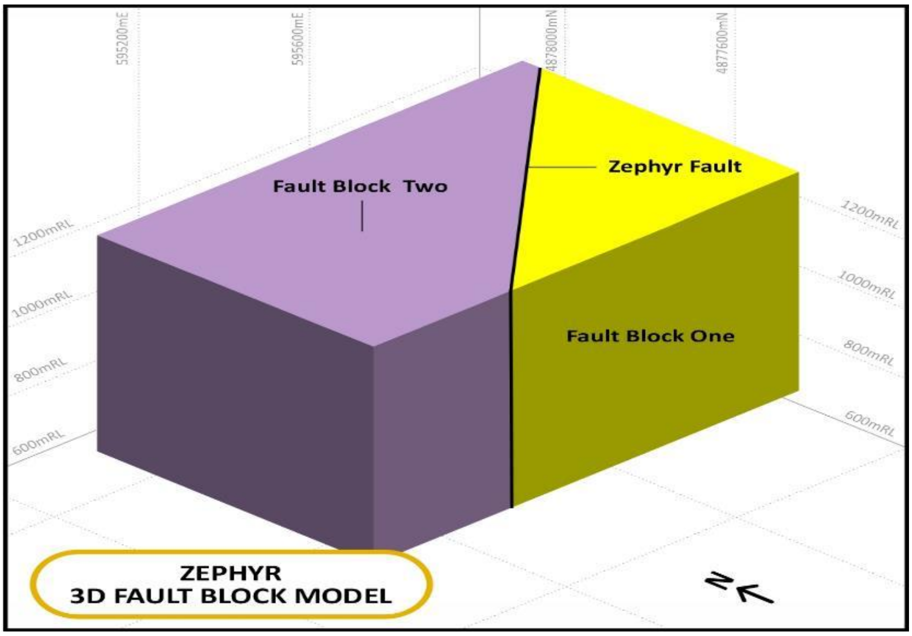
Fault Block One

Bound by the model boundary in the east and south and by the Zephyr Fault in the West. Mineralisation correlated directly with the P2 Domain. Mineralisation shells were modelled separately for gold and copper and separately for oxide and sulphide. Copper grade shells were modelled at 800 ppm Cu and Gold at 0.1 ppm Au. The suggested estimation domain is the P2 intrusive volume.

Fault Block Two

Bound by the model boundary in the west and north and by the Zephyr Fault in the East, Figure 14-47. Mineralisation correlated directly with the P2 volume. Mineralisation shells were modelled separately for gold and copper and separately for oxide and sulphide.

Figure 14-47: The Zephyr fault block model



Copper grade shells were modelled at 800 ppm Cu and Gold at 0.1 ppm Au. The suggested estimation domain is the P2 intrusive.

14.7.5 Context for estimations – Zephyr

The below is a summary of the key features of each fault block relevant to the estimations.

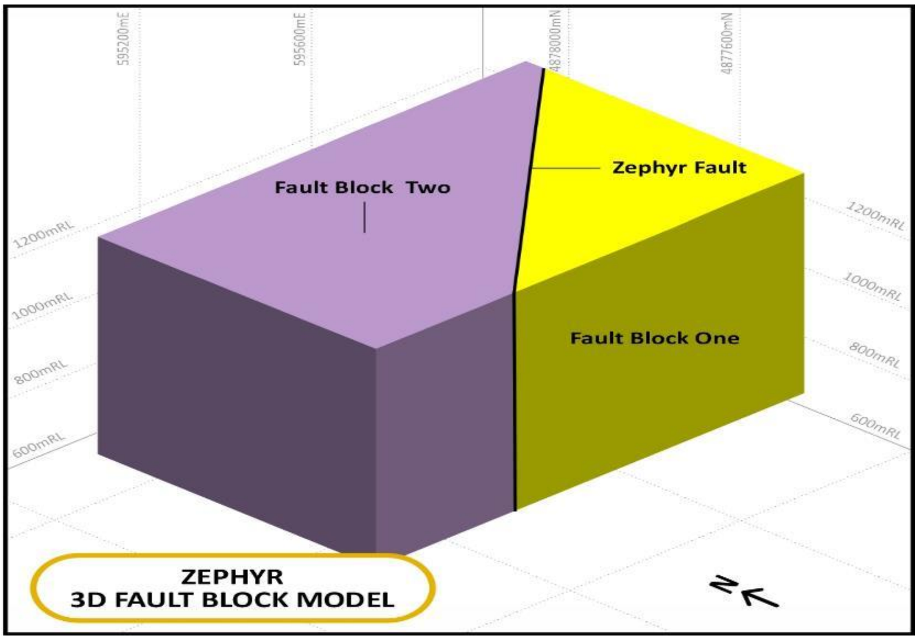
Fault Block One

Bound by the model boundary in the east and south and by the Zephyr Fault in the West. Mineralisation correlated directly with the P2 Domain. Mineralisation shells were modelled separately for gold and copper and separately for oxide and sulphide. Copper grade shells were modelled at 800 ppm Cu and Gold at 0.1 ppm Au. The suggested estimation domain is the P2 intrusive volume.

Fault Block Two

Bound by the model boundary in the west and north and by the Zephyr Fault in the east, Figure 14-48. Mineralisation correlated directly with the P2 volume. Mineralisation shells were modelled separately for gold and copper and separately for oxide and sulphide.

Figure 14-48: The Zephyr fault block model



Copper grade shells were modelled at 800 ppm Cu and Gold at 0.1 ppm Au. The suggested estimation domain is the P2 intrusive.

14.8 Geological context and informing data

Taking into consideration the geological context provided by Xanadu, SGC assessed each project area on a section-by-section basis to ensure the geological models honour the informing data.

Figure 14-49 illustrates a typical representation of the mineralised distribution (in this instance over Stockwork Hill) capturing the foundation phase geological context as defined by Xanadu with fault blocks (noted in grey linework on section) and combined grade shells at 800, 1,400 and 5,000 ppm CuEqRec represented (noted in magenta linework on section).

Figure 14-49: Foundation phase of interpretation - Stockwork Hill sectional view 592,660 mE – looking East with CuEqRec% on LHS

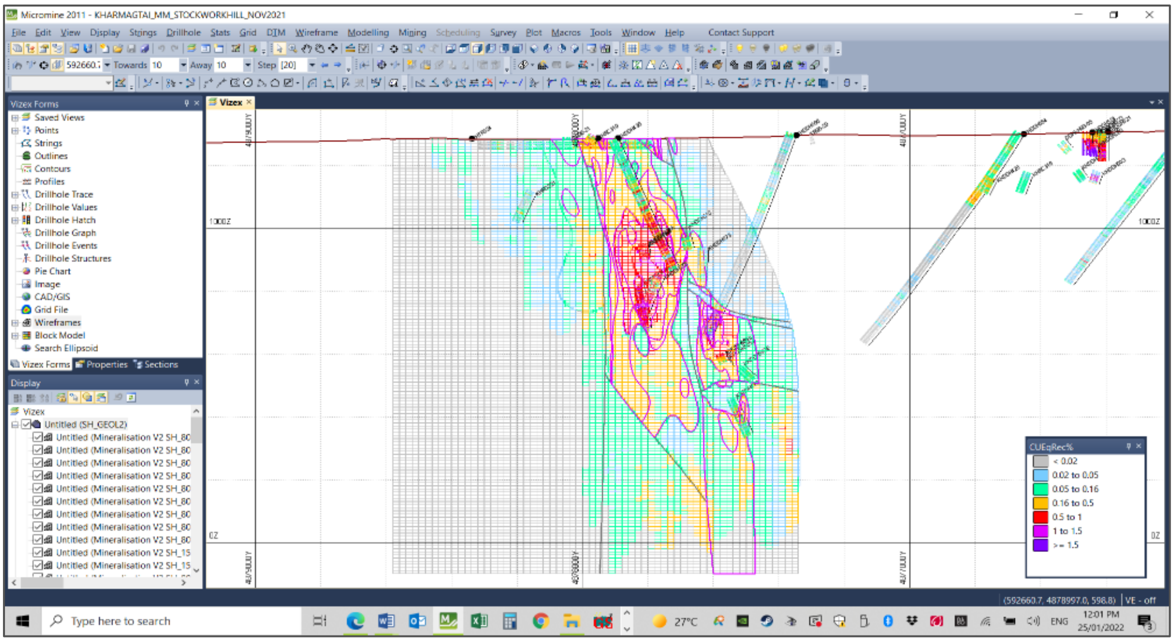


Figure 14-49 shows the various intrusive domains, cut by tourmaline breccias, and again cut by intersecting structures to produce a complex interaction of associated primary domains.

Most of the structural control and the effects of the intrusive phases were incorporated (P2, P3 and P4 phases) into the global estimation interpretation at the request of Xanadu and XAM representatives. A similar theme was employed across all Kharmagtai Project areas, Stockwork Hill, White Hill, Copper Hill, Zaraa, Golden Eagle and Zephyr.

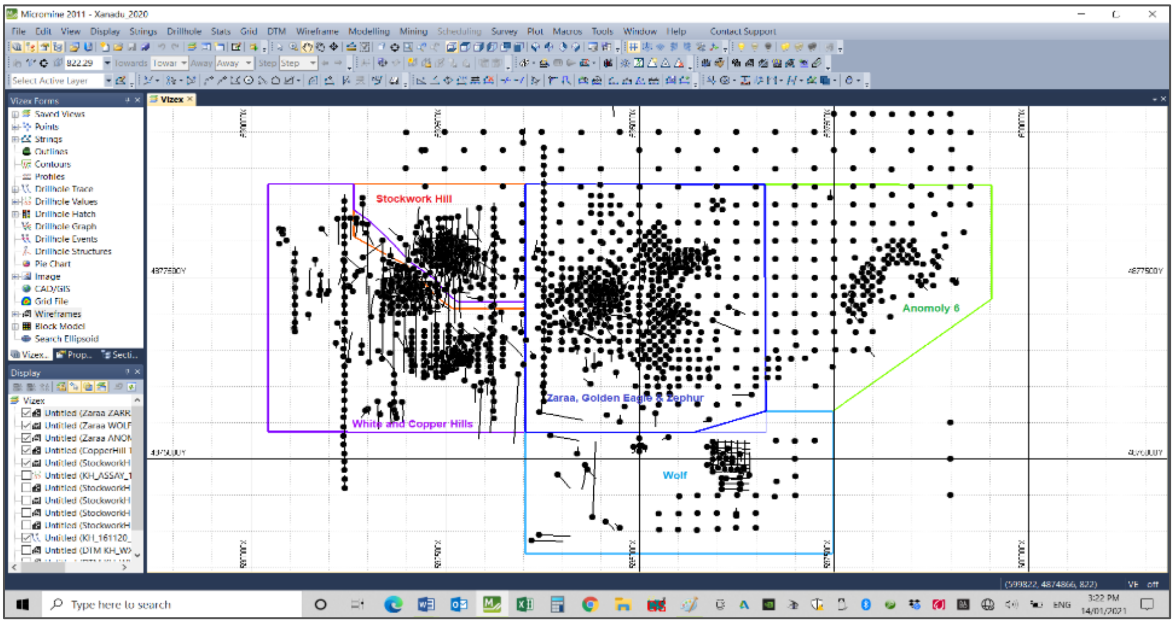
The regional mineral occurrences known locally as Wolf and Anomaly 6 were not addressed during this estimation investigation; as deemed appropriate by Xanadu and supported by SGC. The project was sub-divided into project quadrants within which were the individual project areas referred to above and as noted in Figure 14-50.

All strings were then tidied up to ensure that overlaps and gaps were eliminated ahead of solid modelling. This phase of the process was a collaboration between Xanadu and P. Dunham and was undertaken by Xanadu over the 3-month period during August 2021 through to October 2021 ahead of resource modelling.

A domain strings and subsequent solid model (for quadrants and sectors) and interpretation was constructed in leapfrog by M. Brown and was based on earlier discussions and export to SGC for incorporation into Micromine software for data coding.

SGC recommends that grade definition be ongoing as more drilling is completed and during the next round of interpretation to further capture the inherent variability and mixed populations which may continue to exist within the project area sectors and broader quadrants to better confine the estimates within the primary domains and to minimise the smoothing of grades from high to low grade samples which is inherent of the global estimation approach employed.

Figure 14-50: Kharmagtai project area quadrants



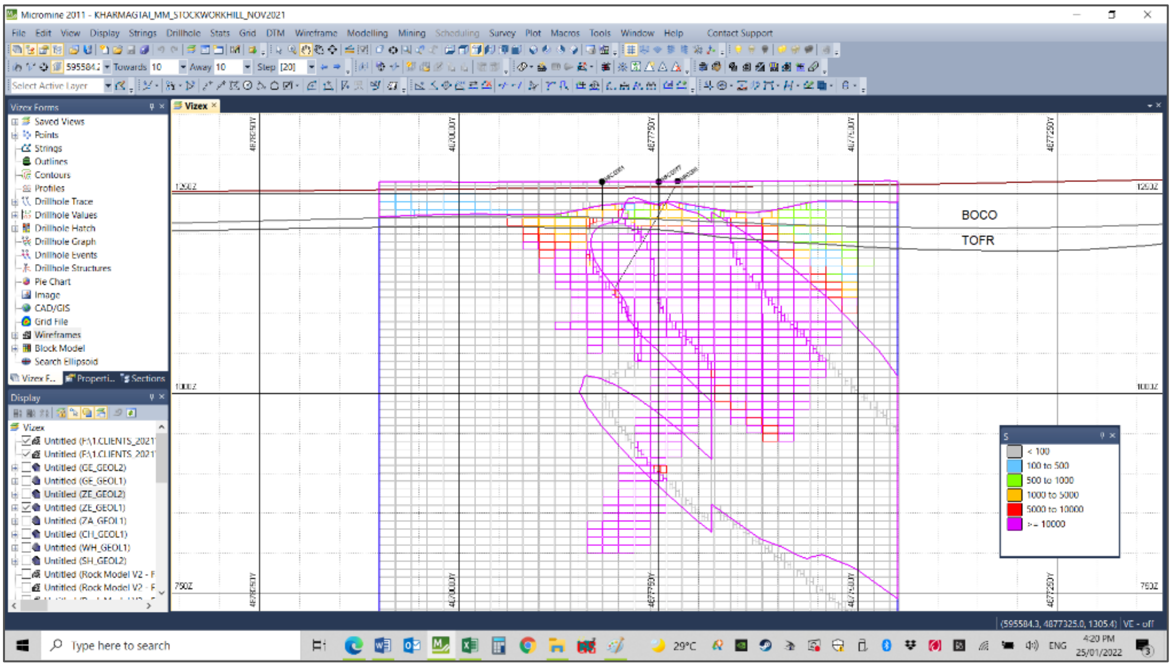
14.9 Oxidation intensity and profiles

Xanadu provided SGC with oxidation surface depicting the base of complete oxidation and the top of fresh rock as illustrated in Figure 14-51 below (example from Zephyr illustrating depleted sulphur above the BOCO surface).

The oxidation surfaces were used to code the final block model for oxidation state whereby oxide=1 above the base of complete oxidation, transition=2 below the base of complete oxidation and above the top of fresh rock and fresh=3 below the top of fresh rock. In some instances, elements were confined by the base of oxidation in conjunction with the domain solids (where appropriate and defined in the multi element data review).

Over the Golden Eagle project area, where molybdenum was noted in the multi-element data to be depleted above the base of oxidation, the oxidation surface served to further constrain the estimates. Oxidation was not modelled independently as an attribute of the resource model.

Figure 14-51: Zephyr – oxidation surfaces (BOCO)



14.10 Treatment of un-sampled intervals

The assay data file was composited to 4 m with end of drill hole samples retained where they were no less than 2 m. Compositing was conducted prior to geological and domain coding. Missing data for the Kharmagtai datasets were addressed prior to modelling.

Substitutions were applied prior to compositing to the primary assay data for each of the multi-elements in question (Au, Cu, Mo and S), in general (unless otherwise stipulated) included replacing < values with half lower detection limit (HLDL) values, 0.00 values with -99 (inside mineralized material domains), Au <0.005 ppm with 0.005 ppm Au, Mo <0.25 ppm with 0.25 ppm Mo, S <25 ppm with 25 ppm S and <5 ppm Cu with 5 ppm Cu. Details of the data substitutions are presented in Table 14-7 by project area.

Table 14-7: Data substitutions

Project area	Element	No. of data	Substitution
Zaraa	Cu	N/A	replace <1 ppm with HLDL 0.5 ppm
	Au	N/A	replace missing data inside of mineralized material domains with -99
		N/A	replace <0.01 ppm with HLDL 0.005 ppm
	Mo	N/A	replace missing data outside of mineralized material domains with -99
		N/A	replace <0.5 ppm with HLDH 0.25 ppm
	S	N/A	replace missing data outside of mineralized material domains with -99
		N/A	replace <5.0 with HLDH 2.5

Project area	Element	No. of data	Substitution
Zephyr	Cu	N/A	replace missing with 0.000 ppm
	Au	2	replace <0.01 ppm with 0.005 ppm
	Mo	1	replace <0.5 ppm with 0.25 ppm
	S	N/A	replace missing with 0.000 ppm
Copper Hill	Cu	N/A	replace missing data inside of mineralized material domains with -99
	Au	N/A	replace missing data inside of mineralized material domains with -99
		N/A	replace <0.001 ppm with 0.0005 ppm
	Mo	N/A	replace missing data inside of mineralized material domains with -99
		N/A	replace <0.05 ppm with 0.025 ppm
	S	N/A	replace missing data inside of mineralized material domains with -99
Golden Eagle	Cu	N/A	replace missing data inside of mineralized material domains with -99
	Au	N/A	replace missing data inside of mineralized material domains with -99
	Mo	N/A	replace missing data inside of mineralized material domains with -99
	S	N/A	replace missing data inside of mineralized material domains with -99
White Hill	Cu	N/A	replace missing data inside of mineralized material domains with -99
	Au	N/A	replace missing data inside of mineralized material domains with -99
	Mo	N/A	replace missing data inside of mineralized material domains with -99
	S	N/A	replace missing data inside of mineralized material domains with -99
Stockwork Hill	Cu	N/A	replace missing data inside of mineralized material domains with -99
	Au	N/A	replace missing data inside of mineralized material domains with -99
	Mo	N/A	replace missing data inside of mineralized material domains with -99
	S	N/A	replace missing data inside of mineralized material domains with -99

In instances where missing samples are observed to fall inside of primary mineralized material domains, but sampling was not conducted in the field, then all are replaced with -99 for modelling on advice from Xanadu and on the assumption that the interval could have contained potential mineralisation which was not visually identifiable.

14.11 Spatial continuity analysis

Many resource estimation methods use a measure of spatial continuity to estimate the grade of blocks in a resource model. In some methods, the measure is implicit; for example, a polygonal method assumes that the grade is perfectly continuous from the sample to its surrounding polygon boundary.

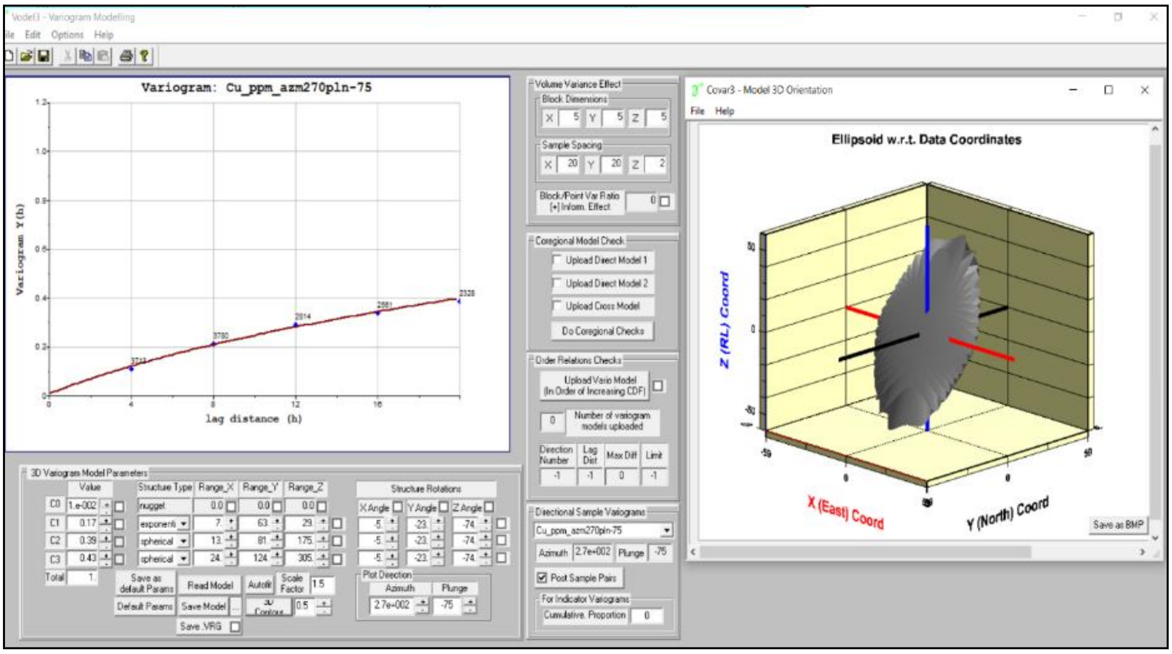
Geostatistical methods like Ordinary Kriging and Indicator Kriging are among those methods for which the continuity measure is explicit and is customised to the data set being studied.

Geostatistics provide several measures for describing spatial continuity: the variogram, the covariance, the correlogram and many others. All are valid descriptions but not all provide a basis for constructing kriging models of mineralisation. Whatever the method of description used, it is common to use the term variogram in a generic sense to describe contour plots and directional plots of spatial continuity measures.

The various parameters of the variogram model, such as the nugget effect and ranges in different directions, describe properties of the statistical continuity of metal grades. For example, a variogram with high nugget may indicate that there is a high level of error in the sample grades being used to construct the variograms or that there is a high degree of variability in the grade over very short distances in the mineralisation. A different range in one direction compared to another is likely to be indicating that grade is more continuous in one direction than another. Practitioners must inherently understand the data upon which assumptions are levelled to undertake successful data preparation and subsequent estimation.

For the Kharmagtai Project spatial analysis variograms were calculated in GS3 using directions which follow the trigonometric convention; with east being 0° and north being 90°. As seen in Figure 14-52, which provides a screen shot of a typical ellipsoidal representation (with respect to data coordinates) of the 3D orientation associated with the variogram model for the Kharmagtai Project.

Figure 14-52: Stockwork Hill primary domain 1 for copper



All experimental variogram details utilised in the construction of the resource estimates for Kharmagtai Project areas are summarised in Appendix 1 of the originally reported NI 43-101 report titled *Mineral Resource Estimation Kharmagtai Project Omnogovi Province, Mongolia* available on Canada's System for Electronic Document Analysis and Retrieval (SEDAR). Variogram models were completed for copper, gold, molybdenum, sulphur and density for all primary and sub-domains (as deemed appropriate by SGC in-line with the informing data).

14.12 Resource estimation methodology

The Kharmagtai resource models were estimated by Ordinary Kriging (OK) using GS3 software and are post processed in Micromine software. An internal process review was also conducted by SGC, and no third-party modelling was undertaken at this time.

Data searches were aligned consistent with the strike, dip and plunge (where appropriate) of the mineralisation and consistent with the domain modelling and geometry modelling.

According to Xanadu's interpretation the host of the mineralisation exhibit geometries which are consistent with those geometries defined by the spatial analysis of grade (in this instance copper, gold, molybdenum and sulphur).

A number of fields were estimated during the course of the recent investigation which included (but is not limited to and in no particular order of priority), and the model structure is as follows in Table 14-8.

Table 14-8: Model structure and estimated elements – Kharmagtai

Field Name	Field Type	Field Width	Field Decimal Places
east	R	4	3
_east	R	4	0
north	R	4	3
_north	R	4	0
rl	R	4	3
_rl	R	4	0
Cu_ppm	R	4	3
Au_ppm	R	4	3
Mo_ppm	R	4	3
S_ppm	R	4	3
ResCat	R	4	0
SG	R	4	0
pdom	R	25	0
Oxidation	R	4	3
Cu_%	R	4	3
CuEqRec	R	4	3
Inside_0p1_rpt_solid	R	4	0
Area	C	4	3

A nominal composite length of 4 m down hole was used for inputs which was settled upon during consultation with Xanadu and Xanadus preferred Geological Consultant (P Dunham). The 4 m composite is two times larger than the dominant sampling interval spacing of 2 m in the informing data and as such a larger composite was not considered appropriate or consistent with the local short-range variability inherent in the informing dataset.

Several iterations of the modelling process were undertaken to assess the sensitivity of estimates to estimation parameters. Post processing, model validation and reporting were undertaken in Micromine software.

To provide some context to the modelling approach selected by SGC for the Kharmagtai Project, in deposits where the coefficient of variation (CV) in samples is low to moderate (0 to 2.5), Ordinary Kriging (OK) is one method that may be used to provide reliable estimates. If the CV is moderate to high (above 2.5) indicating a more skewed distribution and data has the tendency toward a higher degree of spread, then non-linear modelling methodologies which account for the skewness are implemented such as Multiple Indicator Kriging (MIK) or simulation.

A number of the primary and secondary domains provided by Xanadu exhibited CVs which were at or near 2.5, indicating that further resolution of the domain solids was required to capture the potential mixed populations and reduce the inherent skewness. See Appendix 3 of the originally reported NI 43-101 report titled *Mineral Resource Estimation Kharmagtai Project Omnogovi Province, Mongolia*, available on SEDAR, for details of coefficients of variation by project area.

The estimation error is inversely related to the size of the volume being estimated. To take the extreme case, the estimate of the average grade of a deposit generated from a weighted average grade of the entire sample data set is much more reliable than the estimate of the average grade of a small block of material within the deposit generated from a local neighbourhood of data, (Isaaks, E.H. & Srivastava, R.M., 1989).

The estimation has been performed using Ordinary Kriging (OK) at this time in line with, and supported by, the geological modelling and population statistical analysis.

In future as further resolution of confining solids is achieved (in accordance with statistical analysis) and population are further defined, iteration of the model may employ alternative linear/non-linear modelling methodologies for the potential resource estimates with data composites and block sizes chosen that are compatible with the available sample data and potential future mining considerations.

Following is a general summary of the methodology used:

1. Attributes were compiled for CuEqRec%, Cu%, Au ppm, Mo ppm and S% as well as density across all domain objects.
2. The data was provided by Xanadu to SGC (and taken in good faith) in the UTM_48N grid projection for modelling.
3. The three-dimensional solids and interpretation were compiled by Xanadu in conjunction with geological Consultant P. Dunham in Leapfrog and third-party software. Subsequent domaining was undertaken on section and in plan drawing on evolved geological, lithological, structural and oxidation constraints.

4. Recent interpretations provided by Xanadu's representatives have sought to capture considerable additional detail in the geological framework model which are reflected in the estimation approach. This resulted in material changes to the interpretation and subsequent solid model.
5. Datasets are composited to a 4 m composite for domain coding.
6. Statistical distribution analysis was completed, and high-grade end members and outliers were analysed. Top cut analysis of the primary data was reviewed. Data substitutions were undertaken, and dataset was coded by domain objects for further detailed statistical analysis.
7. Statistical analysis was undertaken utilising univariate and conditional statistics (where appropriate) to provide guidance to the population distributions both globally and locally within estimation domains and domain boundary conditions were analysed.
8. Where appropriate data was transformed and experimental variograms of the variables were modelled.
9. Ordinary kriging of the variables was performed in the UTM_48N grid. Block dimensions were selected in line with data density and modelling methodology and with previous modelling in mind.
10. Search and data criteria were assessed and implemented, in line with modelling strategy.
11. Models were constructed and iterations undertaken to assess modelling sensitivities to data and search criteria.
12. The block estimates were validated against the informing data to ensure that they were consistent with the original data in a three-dimensional sense and within the search neighbourhood via data analysis.
13. The block estimates were exported to Micromine, and where appropriate, a topographic surface was applied as were other surfaces and solids which may have acted upon the estimates. Each area model was then compiled into a global model where all fields were cleaned, and missing data assigned as well as coding for primary and secondary domain and calculation of CuEq and CuEqRec completed.
14. Final densities were assigned where necessary and model validation completed ahead of final reports preparation.

14.13 Modelling parameters

The details of the model grid framework and search parameters used to construct the current resource models are shown in Table 14-9 through to Table 14-14.

Search radii were selected on the basis of the local dominant data spacing and generally reflected an incremental value equivalent to the dominant drill hole spacing in the central portion of the deposit and are consistent with the first structure ranges defined by the geometry modelling.

Extended search and estimation passes were employed within a number of primary and secondary domains as deemed appropriate by the Qualified Person in-line with first and second structure ranges in cases where estimation domains were highly constrained and local data availability was constricted. For details concerning all estimation search and data criteria please refer to Appendices 1, 2 and 3 of the originally reported NI 43-101 report titled *Mineral Resource Estimation Kharmagtai Project Omnogovi Province, Mongolia*, available on SEDAR, as well as details presented in Table 14-9 through to Table 14-14.

Data criteria employed took into account the clustering of the local data and the geometry and continuity of local grade in-line with geometry modelling as noted in this report with details of geometry model attributes compiled in Appendices 1, 2 and 3 of the originally reported NI 43-101 report titled *Mineral Resource Estimation Kharmagtai Project Omnogovi Province, Mongolia*, available on SEDAR, as well as Table 14-9 through to Table 14-14.

Estimation iteration was completed over all project areas before final estimation passes to ascertain the effects (if any) of the search and data criteria on model outcomes. Modelling sensitivity to modelling search and data criteria was observed to have minimal impact on the outcomes of the estimates both locally and globally.

Table 14-9: Kharmagtai Model framework and criteria – Stockwork Hill Mineral Resource estimates

Field Name	Minimum centroid	Maximum centroid
EAST	591,726.00	593,350.00
NORTH	4,877,222.00	4,878,578.00
RL	-45	1,325
_EAST	4	20
_NORTH	4	20
_RL	2	10
Parent cell dimension	x=20 y=20 and z=10	
Search radius Z	First pass 55 (extended pass 75)	
Search radius Y	First pass 75 (extended pass 95)	
Search radius X	First pass 10 (extended pass 20)	
Expansion Factor	1	
Discretisation	5x5x2	
Data Criteria		
Minimum Data	12	
Minimum Octants	4	
Maximum Data	32	
Search rotations are applied according to mineralized material domain geometry		

Table 14-10: Kharmagtai Model framework and criteria – White Hill Mineral Resource estimates

Field Name	Minimum centroid	Maximum centroid
EAST	590,402.00	593,050.00
NORTH	4,876,778.00	4,877,698.00
RL	-49	1,327
_EAST	4	20
_NORTH	4	20
_RL	2	10
Parent cell dimension	x=20 y=20 and z=10	
Search radius Z	First pass 55 (extended pass 75)	
Search radius Y	First pass 75 (extended pass 95)	
Search radius X	First pass 10 (extended pass 20)	
Expansion Factor	1	
Discretisation	5x5x2	
Data Criteria		
Minimum Data	12	
Minimum Octants	4	
Maximum Data	32	
Search rotations are applied according to mineralized material domain geometry		

Table 14-11: Kharmagtai Model framework and criteria – Copper Hill Mineral Resource estimates

Field Name	Minimum centroid	Maximum centroid
EAST	591,978.00	593,046.00
NORTH	4,876,010.00	4,876,774.00
RL	813	1,322
_EAST	4	20
_NORTH	4	20
_RL	2	10
Parent cell dimension	x=20 y=20 and z=10	
Search radius Z	First pass 55 (extended pass 75)	
Search radius Y	First pass 75 (extended pass 95)	
Search radius X	First pass 10 (extended pass 20)	
Expansion Factor	1	
Discretisation	5x5x2	
Data Criteria		
Minimum Data	12	
Minimum Octants	4	
Maximum Data	32	
Search rotations are applied according to mineralized material domain geometry		

Table 14-12: Kharmagtai Model framework and criteria – Zaraa Mineral Resource estimates

Field Name	Minimum centroid	Maximum centroid
EAST	593,702.00	594,998.00
NORTH	4,876,002.00	4,877,898.00
RL	-229	1,351
_EAST	4	20
_NORTH	4	20
_RL	2	10
Parent cell dimension	x=20 y=20 and z=10	
Search radius Z	First pass 55 (extended pass 75)	
Search radius Y	First pass 75 (extended pass 95)	
Search radius X	First pass 10 (extended pass 20)	
Expansion Factor	1	
Discretisation	5x5x2	
Data Criteria		
Minimum Data	12	
Minimum Octants	4	
Maximum Data	32	
Search rotations are applied according to mineralized material domain geometry		

Table 14-13: Kharmagtai Model framework and criteria – Zephyr Mineral Resource estimates

Field Name	Minimum centroid	Maximum centroid
EAST	595,002.00	595,998.00
NORTH	4,877,450.00	4,878,098.00
RL	639	1,355
_EAST	4	20
_NORTH	4	20
_RL	2	10
Parent cell dimension	x=20 y=20 and z=10	
Search radius Z	First pass 55 (extended pass 75)	
Search radius Y	First pass 75 (extended pass 95)	
Search radius X	First pass 10 (extended pass 20)	
Expansion Factor	1	
Discretisation	5x5x2	
Data Criteria		
Minimum Data	12	
Minimum Octants	4	
Maximum Data	32	
Search rotations are applied according to mineralized material domain geometry		

Table 14-14: Kharmagtai Model framework and criteria – Golden Eagle Mineral Resource estimates

Field Name	Minimum centroid	Maximum centroid
EAST	595,002.00	595,798.00
NORTH	4,876,550.00	4,877,450.00
RL	205	1,345
_EAST	4	20
_NORTH	4	20
_RL	2	10
Parent cell dimension	x=20 y=20 and z=10	
Search radius Z	First pass 55 (extended pass 75)	
Search radius Y	First pass 75 (extended pass 95)	
Search radius X	First pass 10 (extended pass 20)	
Expansion Factor	1	
Discretisation	5x5x2	
Data Criteria		
Minimum Data	12	
Minimum Octants	4	
Maximum Data	32	
Search rotations are applied according to mineralized material domain geometry		

For details of estimation domain search rotations see Appendix 2 of the originally reported NI 43-101 report titled *Mineral Resource Estimation Kharmagtai Project Omnogovi Province, Mongolia* available on SEDAR. For Kharmagtai, the resource has been estimated between block centroids of 590,402.00 mE – 595,998.00 mE and 487,6002.00 mN – 487,8578.00 mN and between the current ground surface at or near 1,355.00 mRL (at its peak near Zephyr) down to the deepest block at -229 mRL associated with the Zaraa project area.

For Kharmagtai a number of domains required some degree of high-end member manipulation in order for the high CV's to be reduced to an acceptable level for ordinary kriging. On average the CV's across most domains were low to moderate and required no attention across the main elements of Cu%, Au ppm, Mo ppm and S% as noted in Table 14-15 below.

The use of top-cuts has an immaterial impact on the MRE as no Cu samples were cut, only 17 Au samples reduced, four Mo samples and no S% samples.

The following Table 14-15 through to Table 14-20 detail the extent of high-end member and outlier treatment ahead of modelling by project area. For relationship between geological domains, primary domains and variogram analysis by primary domain please see header variogram name details in Appendix 1 of the originally reported NI 43-101 report titled *Mineral Resource Estimation Kharmagtai Project Omnogovi Province, Mongolia* available on SEDAR.

Table 14-15: Kharmagtai data manipulation – modification of high-end members – Stockwork Hill

Project Area	Elements	Hole Id	from	to	Project	Sample No	Original value	Cut value	Domain code
Stockwork Hill	Cu	N/A	N/A	N/A	Kharmagtai	N/A	N/A	N/A	N/A
	Au	KHDDH316	144	148	Kharmagtai	MD105917	0.9575	0.5	83
		KHDDH565	1424	1428	Kharmagtai	XD159311	1.25804	0.75	17
		KHDDH565	1428	1432	Kharmagtai	XD159314	1.47796	0.75	17
		KHDDH461A	416	420	Kharmagtai	XD112067	2.1076	0.75	17
		KHRC194	68	72	Kharmagtai	MD61010	1.29	1.1	73
		KHDDH559B	32	36	Kharmagtai	XD154342	2.04519	1.75	72
		KHDDH527	84	88	Kharmagtai	XD140661	2.16159	1	66
		KHDDH394A	816	820	Kharmagtai	XD84445	5.20706	2.5	552
		KHDDH360	124	128	Kharmagtai	XD57755	7.7677	1.75	93
	Mo	N/A	N/A	N/A	Kharmagtai	N/A	N/A	N/A	N/A
	S	N/A	N/A	N/A	Kharmagtai	N/A	N/A	N/A	N/A

Table 14-16: Kharmagtai data manipulation – modification of high-end members – White Hill

Project Area	Elements	Hole Id	from	to	Project	Sample No	Original value	Cut value	pdom
White Hill	Cu	N/A	N/A	N/A	Kharmagtai	N/A	N/A	N/A	N/A
	Au	N/A	N/A	N/A	Kharmagtai	N/A	N/A	N/A	N/A
	Mo	KHRC317	224	228	Kharmagtai	XD112277	1443.5	1000	44
	S	N/A	N/A	N/A	Kharmagtai	N/A	N/A	N/A	N/A

Table 14-17: Kharmagtai data manipulation – modification of high-end members – Copper Hill

Project Area	Elements	Hole Id	from	to	Project	Sample No	Original value	Cut value	pdom
Copper Hill	Cu	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Au	KHDDH008	4	8	Kharmagtai		49.9475	2.9475	N/A
		KHDDH008	8	12	Kharmagtai	MD023658	49.975	2.9475	N/A
	Mo	KHRC317	220	224	Kharmagtai	XD112273	798.75	561.64063	N/A
		KHRC317	224	228	Kharmagtai	XD112276	805.75	561.64063	N/A
	S	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 14-18: Kharmagtai data manipulation – modification of high-end members – Zaraa

Project Area	Elements	Hole Id	from	to	Project	Sample No	Original value	Cut value	pdom
Zaraa	Cu	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Au	KHPCD478	24	28	Kharmagtai	XD115173	9.44	5.635	N/A
		KHDDH335	196	200	Kharmagtai	25890	12.43375	5.635	N/A
		KHDDH335	200	204	Kharmagtai	25892	37.0625	5.635	N/A
	Mo	KHDDH469	604	608	Kharmagtai	XD116566	1044.0249	296.67499	N/A
	S	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 14-19: Kharmagtai data manipulation – modification of high-end members – Zephyr

Project Area	Elements	Hole Id	from	to	Project	Sample No	Original value	Cut value	pdom
Zephyr	Cu	N/A	N/A	N/A	Kharmagtai	N/A	N/A	N/A	N/A
	Au	KHDDH454	300	304	Kharmagtai	XD127183	4.2072	2.60651	4
		KHDDH305	56	60	Kharmagtai	MD103285	5.635	2.60651	4
	Mo	N/A	N/A	N/A	Kharmagtai	N/A	N/A	N/A	N/A
	S	N/A	N/A	N/A	Kharmagtai	N/A	N/A	N/A	N/A

Table 14-20: Kharmagtai data manipulation – modification of high-end members – Golden Eagle

Project Area	Elements	Hole Id	from	to	Project	Sample No	Original value	Cut value	pdom
Golden Eagle	Cu	N/A	N/A	N/A	Kharmagtai	N/A	N/A	N/A	N/A
	Au	N/A	N/A	N/A	Kharmagtai	N/A	N/A	N/A	N/A
	Mo	N/A	N/A	N/A	Kharmagtai	N/A	N/A	N/A	N/A
	S	N/A	N/A	N/A	Kharmagtai	N/A	N/A	N/A	N/A

Spatial models (variograms) were used to establish the short scale continuity, structures ranges and over-all attribute continuity of the mineralisation and associated attributes.

Variogram models which represent the local spatial grade distributions were produced and employed during estimation in accordance with the geological domains defined in the foundation interpretation. For details of variogram models for each domain please see Appendix 1 of the originally reported NI 43-101 report titled *Mineral Resource Estimation Kharmagtai Project Omnogovi Province, Mongolia* available on SEDAR . The resource has been trimmed to the available topographic surface supplied by Xanadu and is believed by SGC to be a fair depiction of the known ground surface at the time of the investigation.

The resource models were built using GS3M software employing an octant search with the first pass using a minimum of 4 octants. The octant search constraint approach is classically employed as a declustering function to ensure that the local search neighbourhood is not unduly impacted by local clustered drilling data.

In conjunction with the octant search, a declustering function was run on the input data to provide a declustered weights file for additional review of the sensitivity of the informing data to local spatial distribution.

The first pass estimation employed a minimum of 12 data across 4 octants and a maximum of 32 data. The second pass engaged an expansion factor of 1 whereby the search radius was expanded by 100% and the data criteria remained the same at 12 data across 4 octants and a maximum of 32 data. The third as pass used the same conditions established during the second pass in respect of search radius but with a halving of the data criteria to a minimum of 6 data in a minimum of 2 octants and a maximum of 32 data.

The resources are reported at a series of cut-off grades as requested by Xanadu representatives from 0.1% CuEqRec through to 1.0 g/t CuEqRec at 0.1% Cu intervals. For detailed breakdown of grade tonnage curves and associated data by project area please refer to Appendix 9 of the originally reported NI 43-101 report titled *Mineral Resource Estimation Kharmagtai Project Omnogovi Province, Mongolia* available on SEDAR.

14.14 Resource classification

Blocks in the individual Project area resource models were classified as Measured, Indicated or Inferred confidence category based primarily on the number and location of data used to estimate the grade of each block. Estimation was conducted in line with the modelling orientations provided by Xanadu and Xanadu's consulting geologist defined during the foundation interpretation phase of the investigation.

Secondary considerations include other modelling inputs such as but not limited to the confidence in the geological model continuity and constraints, oxidation profile development, structural modelling data and density modelling. Also, all the aforementioned attributes were considered within the context of the overall interpretation (primary, secondary and tertiary domains) defined by Xanadu and took into account aspects of project evolution on an area-by-area basis. At the time of writing this report no Measured resource estimates were achieved.

In line with GS3 software, resource classification is firstly defined on the basis of the data criteria by model pass. The principal search radii in the easting, northing and vertical directions for the ordinary kriged (OK) model in the first pass were 55 mE, 75 mN and 10 mRL respectively.

Minimum data were set at 12 with a minimum number of octants set to 4 with a maximum data of 32. Estimation took place in three primary passes using an octant search with minimum data and maximum points per octant to define the data that is utilised.

At the current level of detail all estimates are classified as either Indicated or Inferred according to the CIM Definition Standards, 2014 for the Reporting of Mineral Resources and Mineral Reserves.

It is envisaged that with further economic viability analysis and detailed core investigation, additional mineralogical analysis and improved understanding of the deposit's geological and structural setting a higher level of confidence will be obtained in future resource estimates.

Figure 14-53 through to Figure 14-58 illustrate a selection of typical sections through Stockwork Hill, Copper Hill and White Hill, Zaraa, Zephyr and Golden Eagle project areas respectively showing the resource classification.

As seen in Figure 14-53 through to Figure 14-58, blocks are colour coded for resource classification Indicated (green) and Inferred (light blue). The remaining coloured blocks which contain two shades of grey are not classified at this time. The light grey blocks could represent exploration potential estimates and are colour coded separately to the background blocks (dark grey) which are not estimated for internal scoping purposes only at the time of writing this report.

Figure 14-53: Stockwork Hill north looking section 4,877,800 mN – block model displaying block resource classification

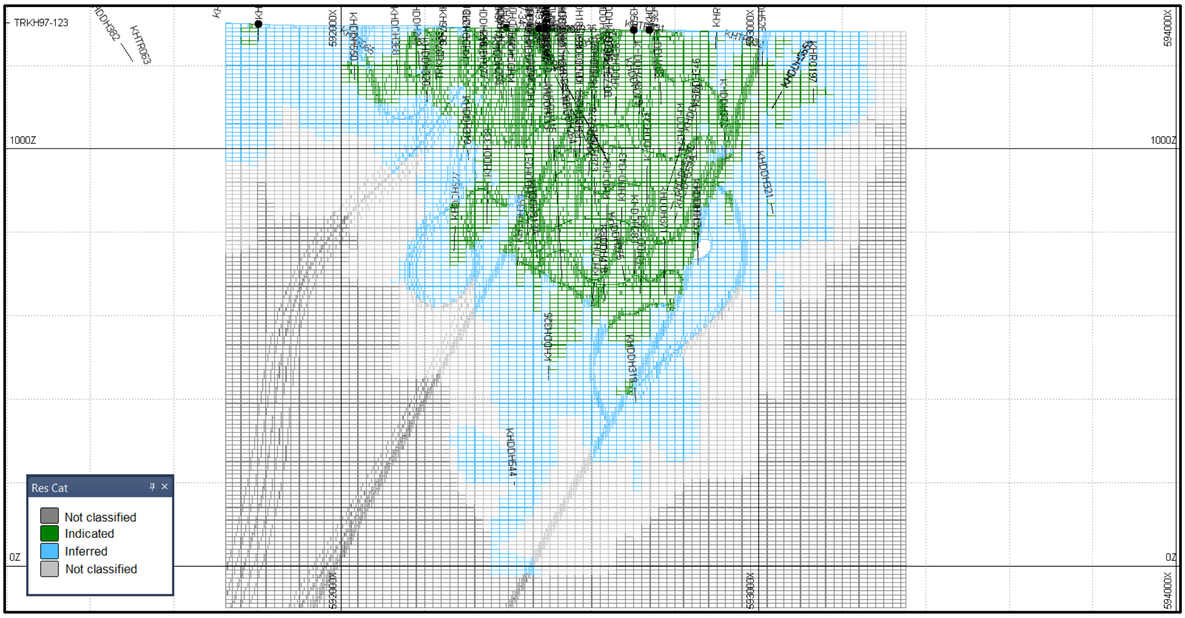


Figure 14-54: Copper Hill north looking section 4,876,350 mN – block model displaying block resource classification

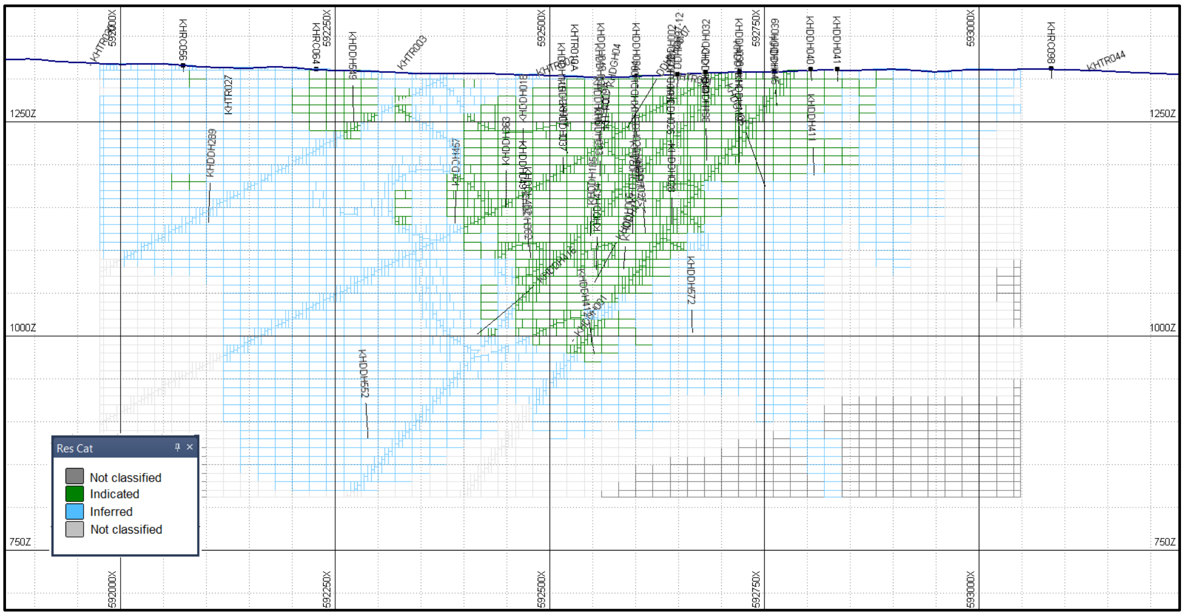


Figure 14-55: White Hill north looking section 4,877,050 mN – block model displaying block resource classification

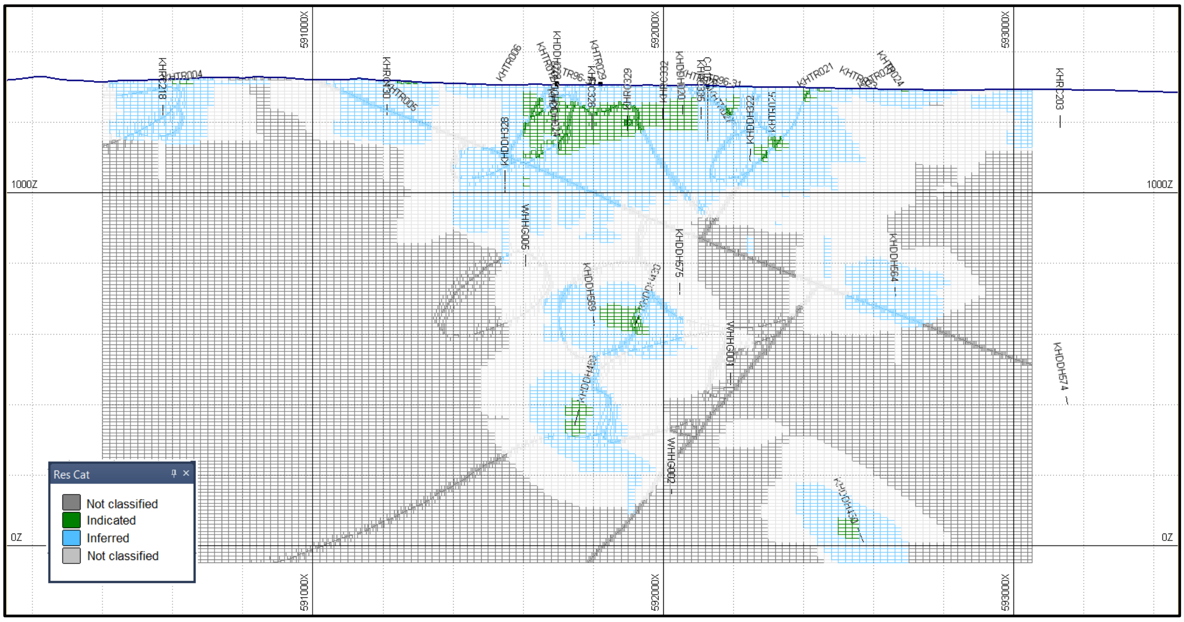


Figure 14-56: Zaraa north looking section 4,877,800 mN – block model displaying block resource classification

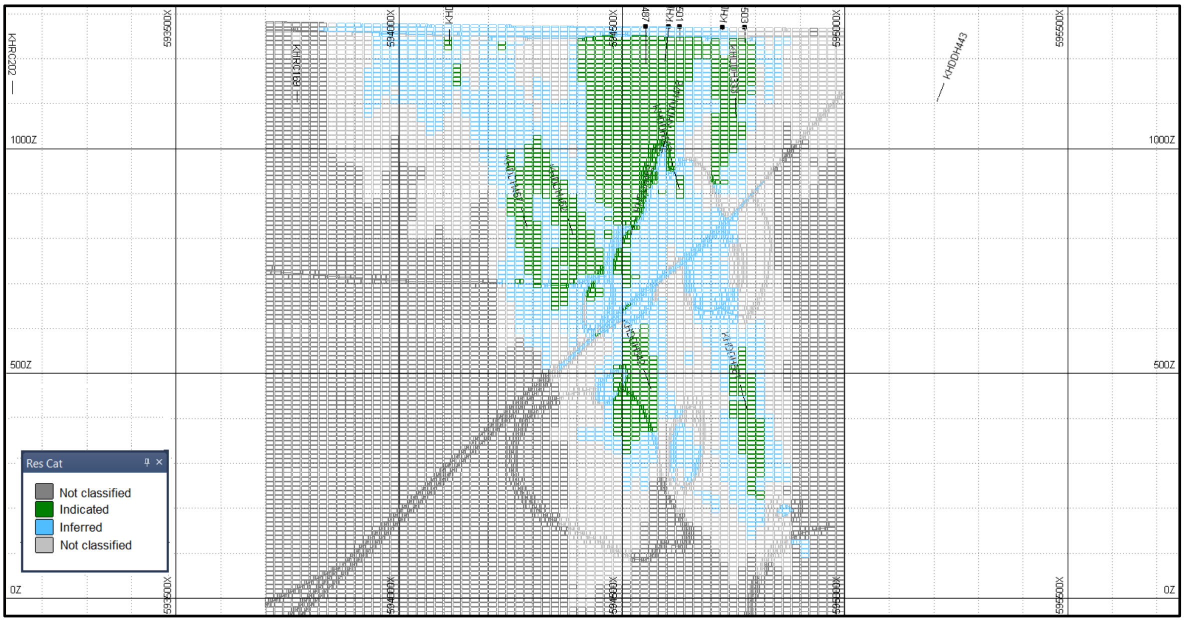


Figure 14-57: Zephyr north looking section 4,877,760 mN – block model displaying block resource classification.

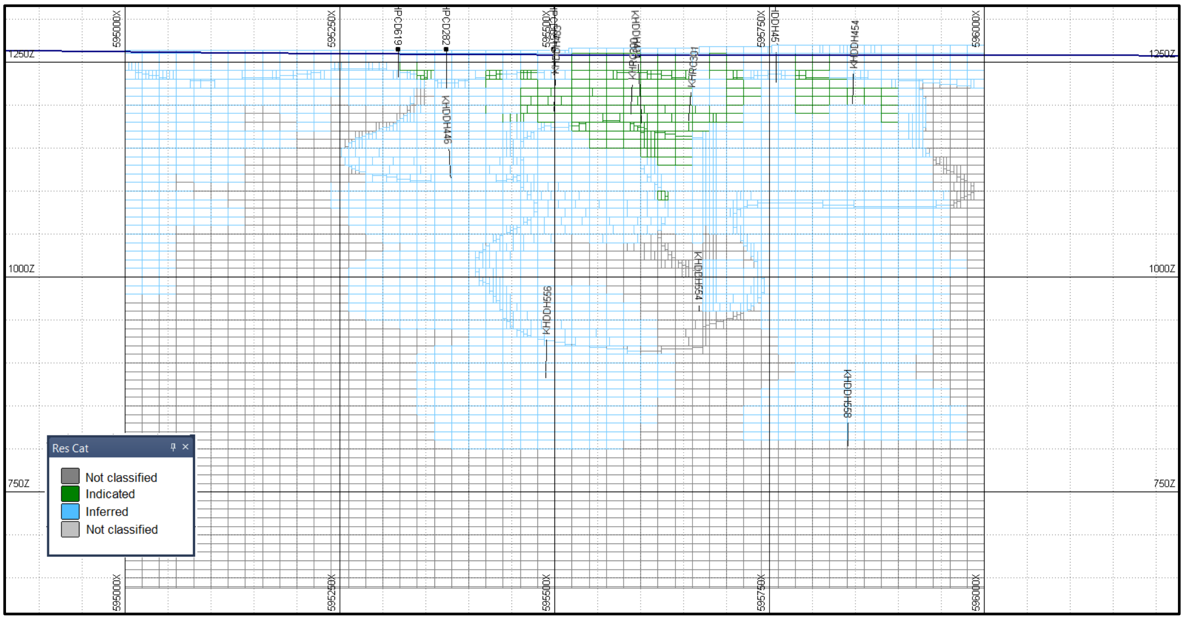
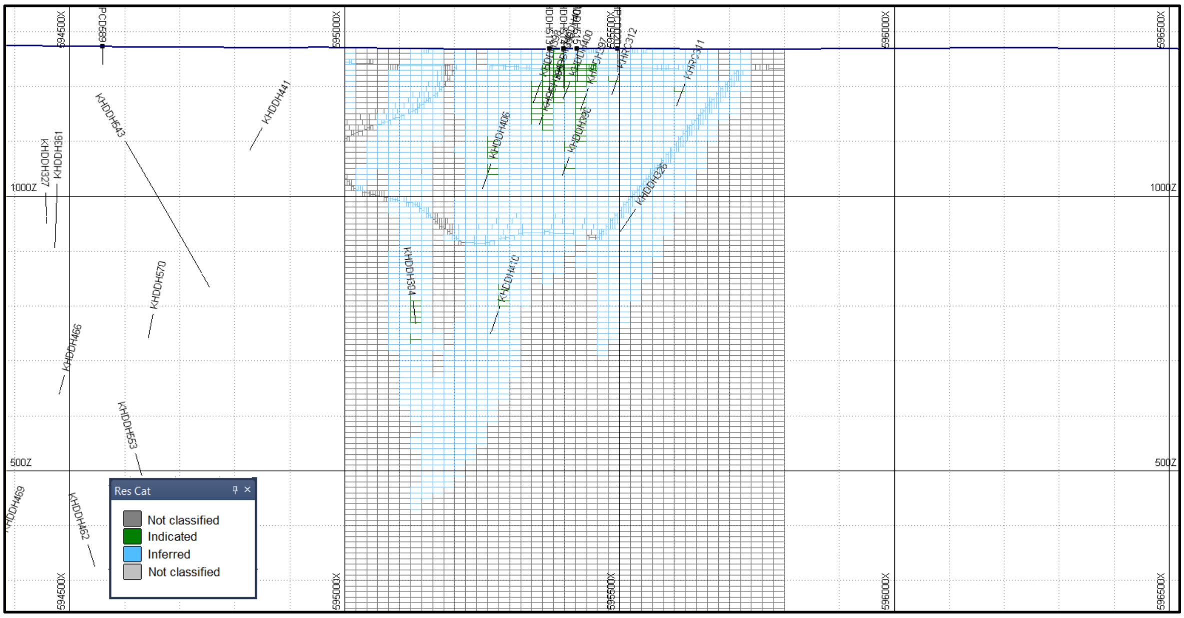


Figure 14-58: Golden Eagle north looking section 4,876,980 mN – block model displaying block resource classification



14.15 Resource estimates

The resource estimates were constructed from the inclusion of all sampling data which has been verified as exhibiting adequate standard to be employed during estimation, this includes all resource drill hole information available as of 27 October 2021 for the Kharmagtai Project – closed-off database with the exception of the following conditions:

1. White Hill and Stockwork Hill – cut all drill hole data equal to or older than 1997 on advice from Xanadu due to difficulties in assessing the adequacy of field and laboratory practice over this period.
2. White Hill and Stockwork Hill – utilise surface trenches data where available with the exception of 1997 and pre-1997 data. Where trench samples are not sampled substitute 0.00 values for every element on advice from Xanadu representatives that no mineralisation is present supported by geological observations.
3. Zaraa – no trench data was present in the domain coding and estimation datasets due to basin sediment coverage over the entire Zaraa project area. All pre 1997 data was cut from the dataset for Zaraa on advice from Xanadu due to difficulties in assessing the adequacy of field and laboratory practice over this period.
4. Zephyr – no trench data was present in the domain coding and estimation datasets. All pre-1997 data was cut from the dataset for Zephyr on advice from Xanadu due to difficulties in assessing the adequacy of field and laboratory practice over this period.
5. Copper Hill – no trench data was used in the domain coding or estimation. All pre-1997 data was cut from the dataset for Copper Hill on advice from Xanadu due to difficulties in assessing the adequacy of field and laboratory practice over this period.
6. Golden Eagle – no trench data was used in the domain coding or estimation. All pre-1997 data was cut from the dataset for Golden Eagle on advice from Xanadu due to difficulties in assessing the adequacy of field and laboratory practice over this period.

The Mineral Resource Estimation numbers noted earlier in this report in Table 1-1 and Table 1-2 (represented here in Table 14-21 and Table 14-22 with complete decimal places as per the raw data) may not sum due to rounding and significant figures do not imply an added level of precision or accuracy of estimates.

The location, quantity and distribution of the current data are sufficient to allow the classification of Measured, Indicated, Inferred and Exploration Potential Resources on the basis of the available data and modelling constraints applied by the competent persons involved in the estimation process and associated inputs.

For the potential near surface mineralisation where OK modelling methodology was employed, resource estimates are reported above an economic CuEqRec cut-off grade defined by economic criteria provided by Xanadu analysis and engineering studies, with open pit resources being reported at a 0.2% CuEqRec cut-off grade and underground resources being reported at a 0.3% CuEqRec cut-off grade.

The 2022 MRE is based on mining of open pits by conventional large tonnage, drill-blast load-haul operations delivering to conventional sulphide flotation and gravity recovery processing. Underground mining is based on bulk methods (block cave/sub-level cave) delivering to the similar recovery circuit. There are no known current risks that could materially affect the potential development of the Mineral Resource.

The range/s presented do not in any way suggest the range of potential economic environments. Economic factors implemented during the consideration of economic cut-off grades were supplied by and are the responsibility of Xanadu. For a detailed breakdown of the Mineral Resource at incremental cut-off grades by project area please refer to Appendix 9 of the originally reported NI 43-101 report titled *Mineral Resource Estimation Kharmagtai Project Omnogovi Province, Mongolia* available on SEDAR.

Summary results are presented in the following section of this report. The estimates tabled below need to be taken in context and as such the following further clarification is provided by SGC in line with the scope of works.

The 2020-2021 geological investigations are predicated on geology logs by site and remotely based geologists which incorporate an evolving understanding of the overall geological and structural regime.

The detailed geology/lithology logs provided by Xanadu representatives and the resulting interpretation upon which the block model estimated are deemed adequate and are classified accordingly. Further definition drilling is recommended and understood by SGC to be ongoing to infill and close of mineralised internal trends.

Table 14-21: Kharmagtai - Mineral Resource estimates reported as at 28 February 2022, CuEqRec 0.2% cut-off grade

Deposit	Tonnes (t)	Grades			Contained metal			
		CuEqRec (%)	Cu (%)	Au (g/t)	CuEqRec (lbs)	CuEqRec (t)	Cu (t)	Au (Oz)
Indicated								
SH	158,003,674	0.4	0.3	0.3	1,534,289,817	695,943	460,328	1,455,553
WH	188,139,015	0.3	0.2	0.2	1,424,484,220	646,136	464,466	1,122,295
CH	16,715,813	0.5	0.4	0.4	200,284,471	90,848	59,160	195,623
ZA	8,798,057	0.3	0.1	0.2	51,400,387	23,315	13,021	63,927
GE	3,319,760	0.3	0.1	0.4	24,955,676	11,320	4,396	42,773
ZE	4,097,916	0.3	0.2	0.2	25,928,574	11,761	7,212	27,931
Total Indicated	**379,074,235**	**0.4**	**0.3**	**0.2**	**3,261,343,146**	**1,479,322**	**1,008,584**	**2,908,103**
Inferred								
SH	51,852,366	0.3	0.2	0.2	343,024,309	155,593	101,164	336,269
WH	211,045,705	0.3	0.2	0.1	1,418,335,195	643,347	486,126	971,244
CH	2,793,700	0.3	0.2	0.1	19,966,580	9,057	6,898	13,293
ZA	13,368,144	0.2	0.1	0.2	72,500,324	32,886	19,116	84,240
GE	50,975,258	0.3	0.1	0.3	324,781,303	147,318	66,778	499,862
ZE	44,185,407	0.3	0.1	0.3	270,805,451	122,835	65,394	355,148
Total Inferred	**374,220,580**	**0.3**	**0.2**	**0.2**	**2,449,413,163**	**1,111,036**	**745,477**	**2,260,056**

Notes:
– At a **CuEqRec 0.2% cut-off grade** for the potential open pit resources – reported to the topographic surface and inside the 0.1% CuEq reporting solid provided by Xanadu.
– CuEqRec accounts for Au value and CuEqRecKt must not be totalled to Au ounces.
– Figures may not sum due to rounding.
– Significant figures do not imply an added level of precision.
– Resource constrained by 0.1% CuEqRec reporting solid in-line with geological analysis by Xanadu.
– Resource constrained by open cut above nominated mRL level by deposit as follows SH>=720 mRL, WH>=915 mRL, CH>=1,100 mRL, ZA>=920 mRL, ZE>=945 mRL and GE>=845 mRL, the remnant resource within the reporting solids forms the basis of the underground resources.
– CuEqRec equation (CuEqRec=Cu+Au*0.60049*0.86667) where Au at US$1,400/oz and Cu at US$3.4/lb was employed according to Xanadus' (Xanadu) direction.
– Au recovery is relative with Cu rec=90% and Au rec=78% (rel Au rec=78/90=86.6667% with number according to Xanadus' (Xanadu) direction.

Table 14-22: Kharmagtai - Mineral Resource estimates reported as at 28 February 2022, CuEqRec 0.3% cut-off grade

Deposit	Tonnes (t)	Grades			Contained metal			
		CuEqRec (%)	Cu (%)	Au (g/t)	CuEqRec (lbs)	CuEqRec (t)	Cu (t)	Au (Oz)
Indicated								
SH	24,653,854	0.6	0.4	0.5	323,005,324	146,513	87,918	361,975
WH	20,788,755	0.4	0.4	0.2	198,633,946	90,099	73,050	105,322
CH	2,636,536	0.4	0.3	0.2	24,410,468	11,072	8,091	18,394
ZA	26,761,354	0.5	0.3	0.3	271,983,620	123,370	84,566	239,190
GE	-	-	-	-	-	-	-	-
ZE	-	-	-	-	-	-	-	-
Total Indicated	**74,840,499**	**0.5**	**0.3**	**0.3**	**818,033,358**	**371,054**	**253,625**	**724,882**
Inferred								
SH	20,644,947	0.4	0.3	0.3	197,035,801	89,374	56,373	203,877
WH	138,192,930	0.4	0.3	0.1	1,266,238,566	574,357	470,626	640,814
CH	1,578,876	0.3	0.3	0.2	12,040,711	5,462	4,187	7,868
ZA	128,709,056	0.4	0.3	0.2	1,214,469,516	550,875	387,414	1,013,832
GE	38,414	0.3	0.1	0.3	270,239	123	54	424
ZE	361,120	0.4	0.1	0.6	2,993,458	1,358	246	6,885
Total Inferred	**289,525,344**	**0.4**	**0.3**	**0.2**	**2,693,048,290**	**1,221,548**	**918,900**	**1,873,700**

Notes:
– At a **CuEqRec 0.3% cut-off grade** for the underground resources – reported to the topographic surface and inside the -0.1% CuEq reporting solid provided by Xanadu.
– CuEqRec accounts for Au value and CuEqRecKt must not be totalled to Au ounces.
– Figures may not sum due to rounding.
– Significant figures do not imply an added level of precision.
– Resource constrained by 0.1% CuEqRec reporting solid in-line with geological analysis by Xanadu.
– Resource constrained by open cut above nominated mRL level by deposit as follows SH>=720 mRL, WH>=915 mRL, CH>=1,100 mRL, ZA>=920 mRL, ZE>=945 mRL and GE>=845 mRL, the remnant resource within the reporting solids forms the basis of the underground resources.
– CuEqRec equation (CuEqRec=Cu+Au*0.60049*0.86667) where Au at US$1,400/oz and Cu at US$3.4/lb was employed according to Xanadus' (Xanadu) direction.
– Au recovery is relative with Cu rec=90% and Au rec=78% (rel Au rec=78/90=86.6667% with number according to Xanadus' (Xanadu) direction.

14.16 Model validation – Kharmagtai sections

The following figures present an example of the resource and inform data by project area. For details of the full range of cross sections looking east across all project areas (grade only) please refer to Appendix 8 of the originally reported NI 43-101 report titled *Mineral Resource Estimation Kharmagtai Project Omnogovi Province, Mongolia* available on SEDAR.

Figure 14-59 through to Figure 14-64 displays a selection of the block model estimates for CuEqRec% looking East in a north south section projection displaying drill hole traces. Copper Equivalent recovered % is displayed on the left-hand side (LHS) of the trace and topographic surface represented (Brown section line is the topographic surface and the magenta linework captures the grade and/or lithological/intrusion related domains interpreted by Xanadu (as deemed appropriate on a project area by area basis) and the grey linework is the interpreted and measure fault trends.

Model validation was conducted by way of visual on-screen review of the informing data against the block model grades on section and in plan. SGC considers that the block models honour the point data locally and maintain a low degree of smoothing of grades across the model extent for the OK modelling approaches given the detailed and evolved structural, lithological and grade shell domaining provided by Xanadu.

Figure 14-59: Kharmagtai Stockwork Hill – resource model sectional view 592,700 mE displaying block model CuEqRec% looking east

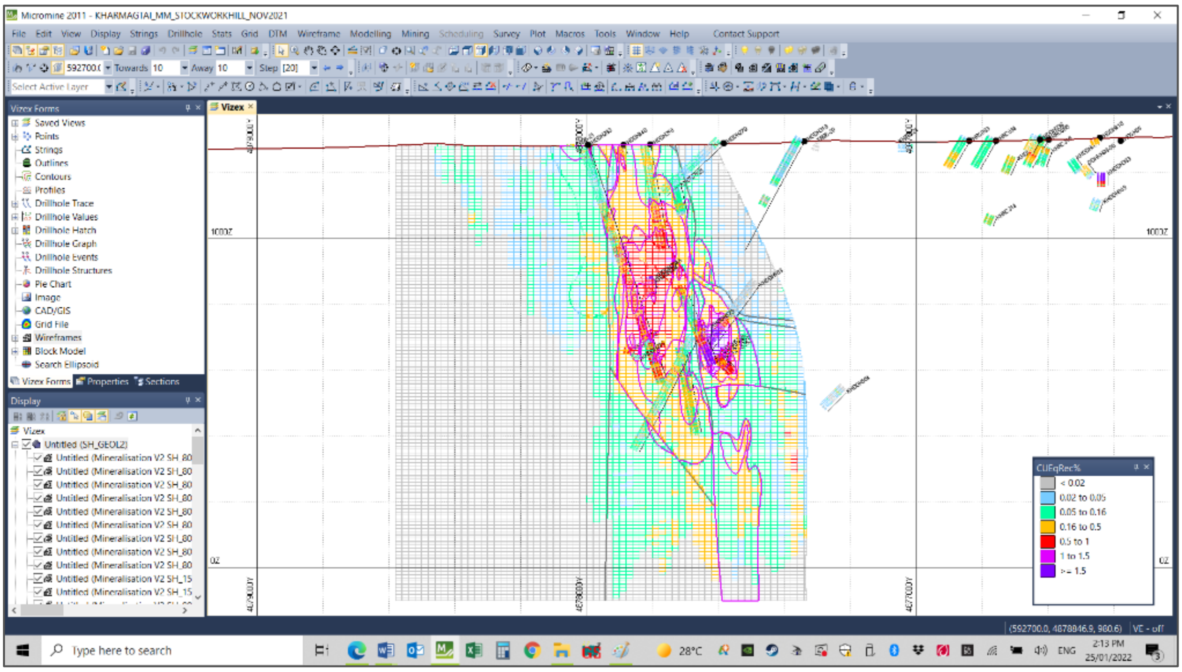


Figure 14-60: Kharmagtai Copper Hill – resource model sectional view 592,560 mE displaying block model CuEqRec% looking east

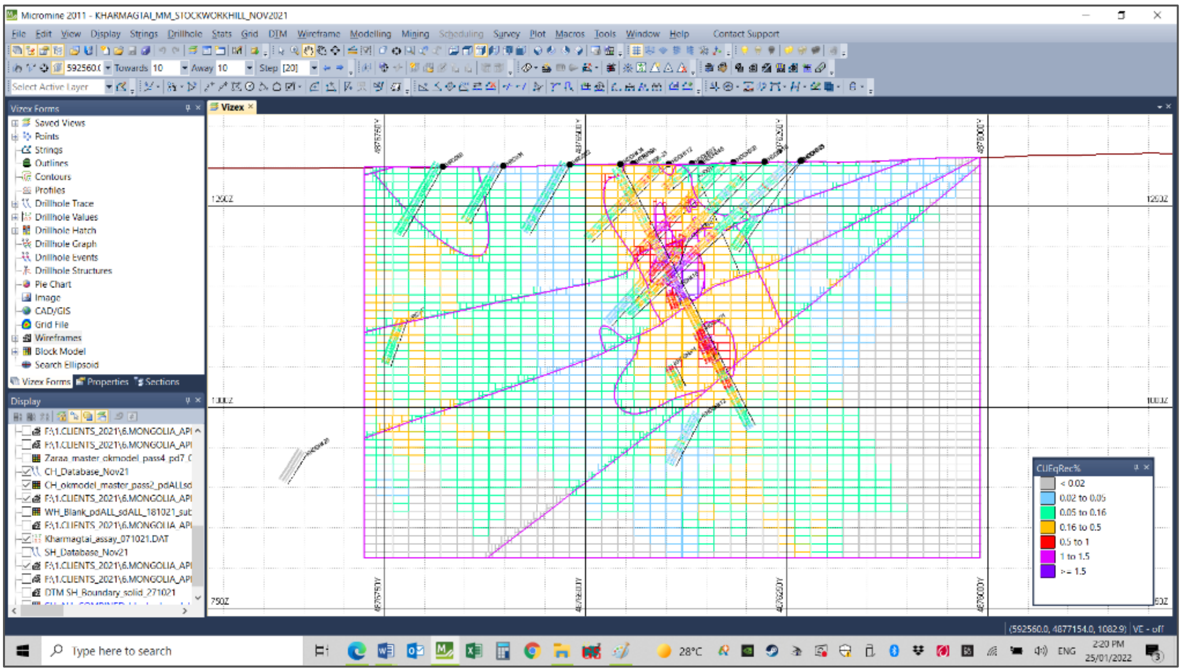


Figure 14-61: Kharmagtai White Hill – resource model sectional view 592,100 mE displaying block model CuEqRec% looking east

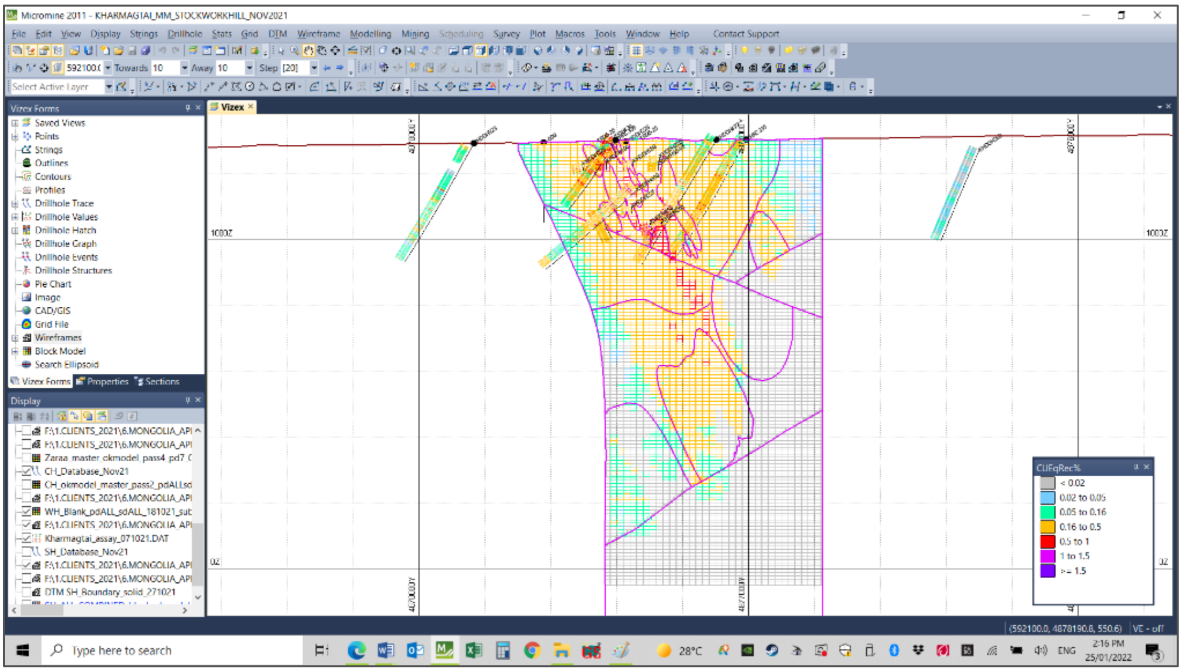


Figure 14-62: Kharmagtai Zaraa – resource model sectional view 594,460 mE displaying block model CuEqRec% looking east

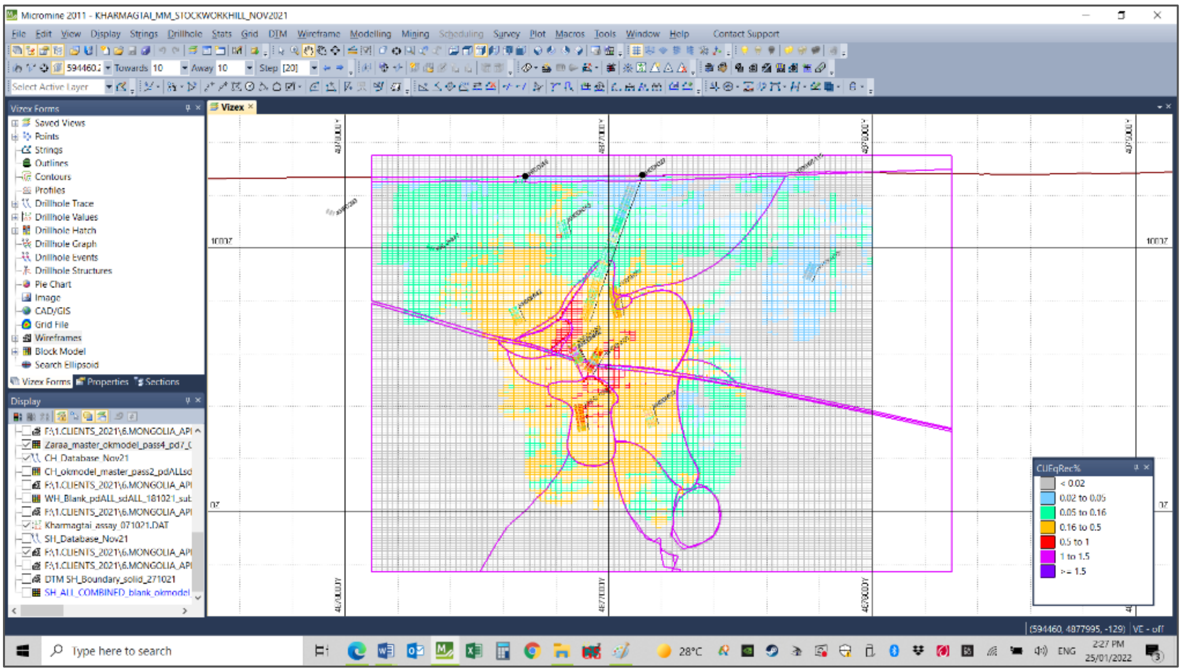


Figure 14-63: Kharmagtai Zephyr – resource model sectional view 595,390 mE displaying block model CuEqRec% looking east

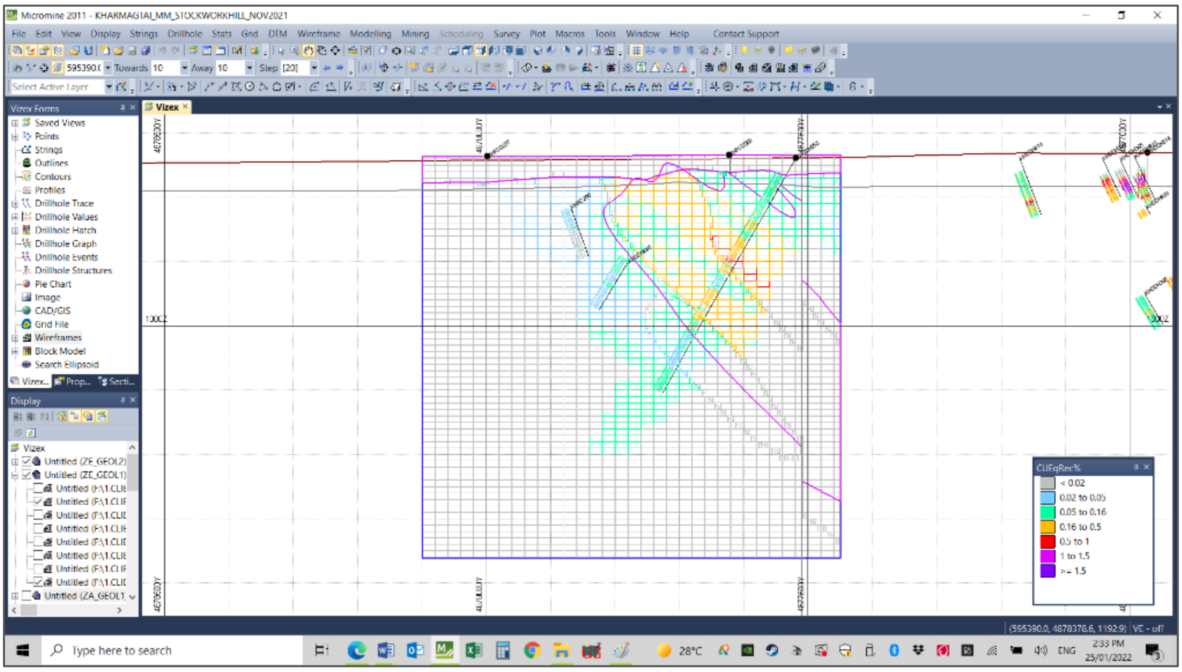
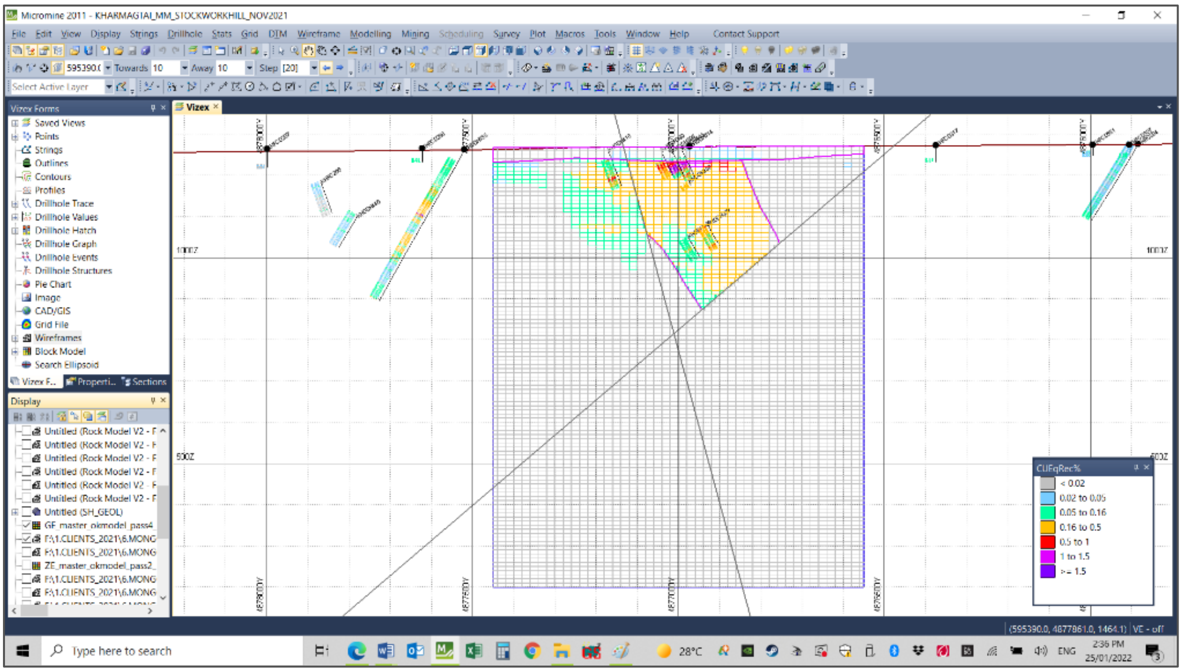


Figure 14-64: Kharmagtai Golden Eagle – resource model sectional view 595,390 mE displaying block model CuEqRec% looking east



14.17 Model validation – check estimates

An internal desk top process review was completed by SGC and established that no fundamental flaws were present which would materially impact the resource estimates or the data upon which the estimates are predicated.

At the time of writing the report, to the best of SGC's knowledge, no third party estimates were completed or requested by Xanadu.

Modelling sensitivity analysis of the input data constraints and modelling criteria were conducted by SGC and found that within the modelling domains defined by Xanadu the estimates were not unduly sensitive to modelling attributes. This indicates to SGC that the geological models produced by Xanadu appropriately define individual populations which were subsequently also supported by the geometry models produced by SGC.

Furthermore, the population statistics were found to be heterogeneous across domains with no notable drift locally within domains and with minimal to no impact from population outliers (on informing data used in estimates – post data preparation).

14.18 Independent review of the Mineral Resource estimate

There has been no independent review of the Mineral Resource estimate.

14.19 Model comparisons – 2018 MRE to 2022 MRE

In comparison to the earlier estimates by CSA (Warren Potma, MSc, MAIG, MAusIMM, Principal Geologist) in 2018, the recent 2022 MRE estimation (which includes resource classification to Indicated and Inferred level of confidence) has resulted in an overall shift in tonnage allocation to a dominantly Indicated resource status from Inferred and Exploration Potential in earlier iterations.

A direct comparison between the reported 2018 MRE resource and 2022 MRE resource is not straightforward due to the fact that CSA reported the estimates at different cut-off grades, inside optimised pits which were based on different economic criteria and using different cost and recovery structures for the formulation of the CuEqRec equation.

Further complicating the comparison is the fact that the 2022 MRE estimates were reported inside a 0.1% CuEqRec reporting solid, thus eliminating peripheral resource from the 2021 estimates that may have been incorporated in the 2018 estimates. The following section breaks down the differences step by step to finally present a comparison within the CSA mega pit and at CSA reporting cut-off grades (It should be noted that whilst the pits shells noted in the 2018 MRE public release point toward the economic case having been used, this is not the case, the mega pit was used in the reporting of the resource.)

As can be seen in Table 14-23 and Table 14-24 which presents 2018 MRE versus 2022 MRE outcomes inside the 2018 MRE mega pit (for Stockwork Hill, White Hill and Copper Hill only, as this data was the only data available for the CSA estimates. Zaraa, Zephyr and Golden Eagle are all addition resource in the SGC 2021 estimates which are not discussed herein) and at 0.2% CuEqRec for open pit and 0.3% CuEqRec for underground.

Note the QP has not done sufficient work to classify the historical estimates in Table 14-23 and Table 14-24 as current mineral resources or mineral reserves and Xanadu is not treating the historical estimate as current mineral resources or mineral reserves.

Table 14-23: Kharmagtai – CSA to SGC open pit estimates comparison inside 2018 MRE mega pit and at CSA cut-off grades

2018 MRE Resource								
Deposit	Tonnes (t)	Grades			Contained metal			
		CuEqRec (%)	Cu (%)	Au (g/t)	CuEqRec (lbs)	CuEqRec (t)	Cu (t)	Au (oz)
Indicated								
SH	74,400,000	0.59	0.38	0.41	438,960	282,720	980,726	74,400,000
WH	45,200,000	0.42	0.30	0.23	189,840	135,600	334,239	45,200,000
CH	9,700,000	0.76	0.48	0.54	73,720	46,560	168,405	9,700,000
Total Indicated	**129,300,000**	**0.54**	**0.36**	**0.36**	**702,520**	**464,880**	**1,483,370**	**129,300,000**
Inferred								
SH	55,400,000	0.47	0.30	0.34	260,380	166,200	605,591	55,400,000
WH	412,800,000	0.40	0.31	0.17	1,651,200	1,279,680	2,256,209	412,800,000
CH	700,000	0.39	0.31	0.16	2,730	2,170	3,601	700,000
Total Inferred	**468,900,000**	**0.41**	**0.31**	**0.19**	**1,914,310**	**1,448,050**	**2,865,401**	**468,900,000**

2022 MRE Resource								
Deposit	Tonnes (t)	Grades			Contained metal			
		CuEqRec (%)	Cu (%)	Au (g/t)	CuEqRec (lbs)	CuEqRec (%)	Cu (%)	Au (oz)
Indicated								
SH	111,412,633	0.57	0.36	0.39	631,063	405,252	1,395,009	111,412,633
WH	140,386,990	0.39	0.28	0.21	553,196	399,609	948,837	140,386,990
CH	10,007,374	0.75	0.47	0.55	75,283	46,810	175,994	10,007,374
Total Indicated	**261,806,997**	**0.48**	**0.33**	**0.30**	**1,259,542**	**851,672**	**2,519,840**	**261,806,997**
Inferred								
SH	14,176,182	0.42	0.27	0.29	60,138	38,633	132,854	14,176,182
WH	197,139,333	0.40	0.31	0.16	785,960	620,384	1,022,918	197,139,333
CH	1,187,120	0.41	0.29	0.21	4,809	3,501	8,091	1,187,120
Total Inferred	**212,502,636**	**0.40**	**0.31**	**0.17**	**850,907**	**662,518**	**1,163,863**	**212,502,636**
Comparison of 2022 MRE to 2018 MRE inside CSA mega pit								
Indicated								
SH	50%	-4%	-4%	-5%	44%	43%	42%	50%
WH	211%	-6%	-5%	-9%	191%	195%	184%	211%
CH	3%	-1%	-3%	1%	2%	1%	5%	3%
Total Indicated	**102%**	**-11%**	**-10%**	**-16%**	**79%**	**83%**	**70%**	**102%**
Inferred								
SH	-74%	-10%	-9%	-14%	-77%	-77%	-78%	-74%
WH	-52%	0%	2%	-5%	-52%	-52%	-55%	-52%
CH	70%	4%	-5%	33%	76%	61%	125%	70%
Total Inferred	**-55%**	**-2%**	**1%**	**-10%**	**-56%**	**-54%**	**-59%**	**-55%**

Note: CuEqRec formulas not consistent.

As can be seen in Table 14-23 above, the comparison of the 2018 MRE open cut estimates to 2022 MRE open pit estimates inside the 2018 MRE mega pit and at CSA cut-off grades of 0.2% CuEqRec reveal many differences.

There is a notable shift of resource classification toward Indicated during the 2021 estimation due to significant infill drilling and highly developed geological and structural re-interpretation by project area with an 83% increase in indicated contained Cu t and a 70% increase in Indicated contained Au ounces in the 2022 MRE estimates. At the same time the Inferred estimates have declined overall in the SGC 2021 estimates as resources are shifted into the higher classification with a 54% decrease in Inferred Cu t and a 59% decrease in Au ounces in the SGC estimates.

Table 14-24: Kharmagtai – CSA to SGC underground estimates comparison inside CSA 2018 mega pit and at CSA cut-off grades

Deposit	Tonnes (t)	Grades			Contained metal			
		CuEqRec (%)	Cu (%)	Au (g/t)	CuEqRec (lbs)	CuEqRec (t)	Cu (t)	Au (Oz)
2018 MRE Resource								
Indicated								
SH	1,200,000	0.68	0.45	0.46	8,160	5,400	17,747	1,200,000
WH	-	-	-	-	-	-	-	-
CH	200,000	0.63	0.46	0.33	1,260	920	2,122	200,000
Total Indicated	**1,400,000**	**0.67**	**0.45**	**0.44**	**9,420**	**6,320**	**19,869**	**1,400,000**
Inferred								
SH	4,800,000	0.68	0.43	0.49	32,640	20,640	75,618	4,800,000
WH	3,500,000	0.56	0.46	0.19	19,600	16,100	21,380	3,500,000
CH	-	-	-	-	-	-	-	-
Total Inferred	**8,300,000**	**0.63**	**0.44**	**0.36**	**52,240**	**36,740**	**96,999**	**8,300,000**
2022 MRE Resource								
Indicated								
SH	4,613,414	0.8	0.5	0.6	37,473	23,151	88,482	4,613,414
WH	500,393	0.6	0.5	0.2	2,783	2,327	2,818	500,393
CH	516,853	0.6	0.4	0.4	3,229	2,226	6,198	516,853
Total Indicated	**5,630,660**	**0.77**	**0.49**	**0.54**	**43,485**	**27,703**	**97,498**	**5,630,660**
Inferred								
SH	6,859,713	0.7	0.3	0.6	44,892	23,218	133,895	6,859,713
WH	3,695,022	0.6	0.5	0.2	20,674	16,952	22,996	3,695,022
CH	50,619	0.6	0.4	0.4	319	220	614	50,619
Total Inferred	**10,605,354**	**0.62**	**0.38**	**0.46**	**65,885**	**40,390**	**157,504**	**10,605,354**
Comparison of 2022 MRE to 2018 MRE inside CSA mega pit								
Indicated								
SH	284%	19%	12%	30%	359%	329%	399%	284%
WH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CH	158%	-1%	-6%	13%	156%	142%	192%	158%
Total Indicated	302%	15%	9%	22%	362%	338%	391%	302%
Inferred								
SH	43%	-4%	-21%	24%	38%	12%	77%	43%
WH	6%	0%	0%	2%	5%	5%	8%	6%
CH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Inferred	28%	-1%	-14%	27%	26%	10%	62%	28%

Note: CuEqRec formulas not matching.

As can be seen in Table 14-24 above, the comparison of the CSA 2018 underground estimates to SGC 2021 underground estimates outside the CSA 2018 mega pit and at CSA cut-off grades of 0.3% CuEqRec again reveal many differences.

There is a notable shift of resource classification toward more material in both Indicated and Inferred resources during the 2021 estimation due to significant infill drilling and highly developed geological and structural re-interpretation by project area. There is a 338% increase in Indicated contained Cu tonnes and a 391% increase in Indicated contained Au ounces in the SGC 2021 estimates. At the same time the Inferred estimates have increased overall in the SGC 2021 estimates as resources are added due to further drilling with a 10% increase in Inferred Cu tonnes and a 62% increase in Au ounces in the SGC estimates.

In relation to the cost structures and recovery factors used by 2018 MRE the following was employed:

- CuEqRec equation (CuEqRec=Cu+Au*0.62097*0.8235) where Au at US$1320/oz and Cu at US$3.1/lb was employed according to Xanadus' (Xanadu) direction.
- Au recovery is relative with Cu rec=85% and Au rec=70% (rel Au rec=70/85=82.35% with number according to Xanadu’s direction.

In relation to the cost structures and recovery factors used by SGC 2021 the following was employed:

- CuEqRec equation (CuEqRec=Cu+Au*0.60049*0.86667) where Au at US$1400/oz and Cu at US$3.4/lb was employed according to Xanadu’s direction.
- Au recovery is relative with Cu rec=90% and Au rec=78% (rel Au rec=78/90=86.667% with number according to Xanadu’s direction.

The differences observed above contribute to an overall 1.8% difference due to cost and recovery.

Broadly speaking the two estimates are quite different in the approach to domaining, with the CSA estimates incorporating significant complexity including intrusive domains and sub-domains, vein percentage sub-domains and breccia domains for each project area. The current 2021 estimates incorporate structural and lithological domains and grade domains to minimise the presence of mixed local grade populations and constrain the estimation.

Secondarily, the CSA approach to the use of the geometry modelling outputs was significantly different to that of SGC. In the first pass CSA used the long range multiplied by 0.333 for search radii, in the second pass CSA used the long range multiplied by 0.667 for search radii and in the third pass CSA used the long range multiplied by 1 for the search radii. In addition, CSA continued to model all cells in the model using ever expanding ranges (search radii) until all cells in the model received estimates.

CSA also controlled the estimates by the use of a minimum number of drill holes which could populate estimates. In the first three passes that minimum was only 2, in subsequent passes it was reduced to 1. Due to the broadly spaced nature of the local drilling over all project areas, it is likely that estimates only referenced data from 2 drill holes or less in the local search neighbourhood. By contrast, SGC applied an octant search which allowed a minimum data as opposed to a minimum hole to be utilised in the estimates. Given the broad spaced drilling this would allow more local data to be referenced from more holes which would potentially result in a more locally and globally reliable estimate where homogeneity is observed.

In addition, the complex domaining by CSA would have preserved higher grade end members across all project areas and in turn increase the grade of the overall estimates. This coupled with the expanded search radii has resulted in more tonnes at a higher grade than would be anticipated and then has been estimated into the 2021 SGC estimates. By contrast, the search ranges employed by SGC were significantly shorter and akin to the first structure range of the variogram models across all project areas as opposed to the use of long ranges as the default in the CSA model. In the first pass SGC used an expansion factor of 1 on the first and second passes. SGC conducted a secondary pass to estimate Exploration potential estimates which employed a factor of 1.5 multiplier to the first structure range of the variograms which is generally still less than or equal to the CSA long ranges employed. The Exploration potential estimates are not included in this resource and were undertaken for scoping purposes only.

It is strongly recommended by SGC that significant efforts and time be put into continually resolving the geological and structure story for the deposit as more drilling is completed in order that the domain models continue to evolve in the next pass. It is envisaged by SGC that by including the ongoing appropriate level of detail into the domain strategy that there is opportunity for realistic grade to be built back into the final modelling pass and that this should be viewed as an opportunity to the project particularly as the project is on the lower grade end of the projects spectrum when compared to other similar deposits.

15 Mineral Reserve estimate

No Mineral Reserve under the CIM Definition Standards (2014), or Ore Reserve under the JORC Code (2012), was defined for the Kharmagtai Copper-Gold Project at this PEA level of study.

16 Mining methods

16.1 Introduction

Mining has not yet commenced at Kharmagtai. The current mine design and costing assessment is based on the geological and Mineral Resource block model prepared by Xanadu as discussed in Section 14. The Indicated and Inferred Mineral Resources are included in the assessment.

The Mineral Resource estimates were defined within the 0.1% CuEqRec shapes around each deposit. Open pit and underground Mineral Resource estimates were specified separately, based on location within the 0.1% CuEqRec shell above or below 720 mRL, approximately 600 m below surface. The open pit Mineral Resources were defined as material within the 0.1% CuEqRec shell located above 720 mRL with a grade >0.2% CuEqRec, and the underground Mineral Resources were material within the shell located below 720 mRL >0.3% CuEqRec.

16.2 Mining methodology

The operation is configured as an open pit mine to achieve the highest value, lowest cost, lowest complexity, and most rapid development option.

Mine planning is based on 10 m benches consistent with the current Mineral Resource block models. Optimisation of the Selective Mining Unit (SMU) including bench height will be addressed in the PFS. Grade control would be undertaken from sampling of blasthole cuttings assayed in the on-site laboratory.

Mining operations would be conventional drill, blast, load and haul, and assumed as an owner-operator model. The proposed primary mining fleet comprises 550 t diesel hydraulic shovels loading 220 t capacity haul trucks and is a well-proven, flexible and efficient match suited to the planned scale of operations. Supplemental primary loading capacity and stockpile reclaim would be provided by 20 m^3 capacity wheel loaders.

The mining fleet requirements were estimated from the mining production schedule material movements from the open pits and stockpile reclaim. The initial major mining equipment required is shown on Table 16-1 in addition to the fleet required at maximum production.

Table 16-1: Mining fleet

Equipment	Initial No.	Peak No.
Drills - CAT MD6310	3	6
Hydraulic Excavator – Cat 6060	2	5
Wheel Loaders - KOM WA1200	1	2
Haul Trucks - KOM 830E	8	31
Track Dozers - CAT D10	4	9
Tyred Dozers - CAT 834	2	4
Water Trucks - CAT 775	2	5
Graders - CAT 14M	2	5
Small Excavator - KOM PC850	1	2
Service Trucks	1	2

Additional allowances are made for minor ancillary equipment (5% of major equipment cost) and 1.5 light and medium vehicles for each unit of major equipment. Equipment fleet additions and replacements were calculated annually based on the production schedules and assumed equipment lives.

For this assessment, no additional estimate was made for mining dilution and loss due to the gradational nature of the deposit. It was assumed that with this style of mineralisation the geological model incorporates some level of dilution.

16.3 Mine design criteria

16.3.1 Introduction

The objective of the mine design (mining optimisation/schedule) study is to demonstrate a potentially viable mining sequence based on open pit mining of the sulphide mineralisation. The oxide mineralisation is treated as waste but could potentially be processed at a later stage.

The approach taken was to define the economic sulphide open pit shells based on the study assumptions, select practical open pit phases (cut-backs) and then schedule the material in the phases for a range of mining and ore processing capacities to identify an optimal set of mining and ore processing rates, with dynamic cut-off between what is processed immediately and what is stockpiled for processing later in the mine life. This assessment was based on open pit shells (not mine designs) and considered all the Indicated and Inferred Mineral Resources. Processing of Inferred Resources was prohibited until after a conservative 7 year pay-back period to demonstrate that the project viability was not dependent on processing Inferred Resources.

The sulphide mill feed processing rates assessed were based on 15 Mtpa process train modules providing total throughput of 15 Mtpa, 30 Mtpa and 15 Mtpa increasing to 30 Mtpa after the payback period. This report assesses the latter case only.

After the production schedules were determined, an appropriate mining fleet was selected, the mining operating costs were re-estimated based on the mining fleet and a preliminary truck-hour model and then the mining schedules re-optimised ready for financial analysis.

16.3.2 Optimisation assumptions

In 2018 Xanadu commissioned CSA to undertake a Scoping Study based on the 2018 MRE; the CSA Global Study (2019 CSA). The mining operating costs for the initial 2022 optimisations were based on the 2019 CSA costs with 10% contingency added and haulage costs estimated for Golden Eagle, Zephyr and Zaraa not considered in 2019 CSA.

Table 16-2 summarises the mining operating costs for initial optimisation based on 2019 CSA.

Table 16-2: Mining operating costs for initial optimisation based on 2019 CSA

Area	Deposit	Sulphide	Waste	Deposit	Sulphide	Waste
Drilling	Stockwork Hill	0.14	0.14	Copper Hill	0.14	0.14
Blasting		0.29	0.29		0.29	0.29
Loading		0.21	0.21		0.21	0.21
Hauling		0.31	0.47		0.45	0.38
Support Equipment		0.25	0.28		0.28	0.26
Contingency		0.12	0.14		0.14	0.13
Total ($/t mined)		**1.32**	**1.53**		**1.51**	**1.41**
Drilling	White Hill	0.14	0.14	Golden Eagle	0.14	0.14
Blasting		0.29	0.29		0.29	0.29
Loading		0.21	0.21		0.21	0.21
Hauling		0.33	0.50		0.57	0.45
Support Equipment		0.26	0.30		0.26	0.30
Contingency		0.12	0.14		0.15	0.14
Total ($/t mined)		**1.35**	**1.58**		**1.62**	**1.53**
Drilling	Zaraa	0.14	0.14	Zephyr	0.14	0.14
Blasting		0.29	0.29		0.29	0.29
Loading		0.21	0.21		0.21	0.21
Hauling		0.57	0.45		0.57	0.45
Support Equipment		0.26	0.30		0.26	0.30
Contingency		0.15	0.14		0.15	0.14
Total ($/t mined)		**1.62**	**1.53**		**1.62**	**1.53**

In addition to the operating costs in Table 16-2, a mining fixed cost based on the mining rate was estimated for mine management based on the estimates from the 2019 CSA report. For 38Mtpa it is US$8.6M per annum or US$9.2 M per annum for 48Mtpa.

A minimum mining width of 80 m and the maximum rate of vertical advance in each open pit of 100 m/annum were applied. Where low grade material was stockpiled for later processing, a stockpile reclaim cost of $0.50/t was used, with an associated fixed mine management cost of US$4.6 M per annum.

The ore processing operating costs were used from 2019 CSA with a 10% contingency added (Table 16-3).

Table 16-3: Processing operating costs used for pit optimisation

Parameter	Units	15 Mt plant	30 Mt plant
Labour (period cost)	US$ fixed	5,670,000	8,590,000
Power	US$/t	1.27	1.27
Reagents	US$/t	0.44	0.44
Grinding media & liners	US$/t	2.55	2.55
Plant maintenance	US$/t	0.37	0.37
Other consumables	US$/t	0.10	0.10
TSF	US$/t	0.20	0.20
Gravity gold plant	US$/t	0.05	0.05
Gold room	US$/oz	13.86	13.86
Contingency	%	10	10

The applied metal prices and realisation charges are shown on Table 16-4.

Table 16-4: Metal prices and realisation charges used for the mining optimisation

Parameter	Units	Value
Copper price	US$/lb	3.50
Gold price	US$/oz	1,700
Copper recovery	%	90
Gold recovery	%	77.5
Concentrate grade (wet)	%	25
Concentrate moisture	%	8
Concentrate transit loss	%	0.5
Concentrate treatment	US$/dry t	85.00
Copper refining charge	US$/lb	0.085
Copper payable	%	96.5
Copper deduction	%	1
Gold refining	US$/oz	4.50
Gold payable	%	96
Gold deduction	g/dry t	1

16.3.3 Open pit optimisation

Xanadu engaged Whittle Consulting Pty Ltd (Whittle) to perform the pit optimisations with Dassault Systèmes Geovia Whittle™ software to determine the inventories to be mined and to develop open pit phasing strategies.

The six Mineral Resource block models were merged because the open pit shells for several of the deposits overlapped as mining progressed (radially and with depth).

The sub-block model was re-blocked into a 20 m x 20 m x 10 m framework retaining the sub-block data as individual parcels.

Allowance for haul roads was made by using overall slope angles that were flatter than the prescribed maximum slope angle for each domain (Table 16-6).

A minimum mining width of 80 m was respected, and the intermediate open pit shells selected for phases adjusted as required.

Mining variable costs differed by deposit, depth and destination due to varying haul distances. Processing variable cost and recovery were applied equally to all material processed. All fixed/period costs were applied to processing tonnes as the ore processing plant is the primary bottleneck in the operation.

Phase selection and skin analysis were performed on the deposits both individually and in combination.

The Stockwork Hill and White Hill phases overlapped, with the common areas treated as a set of wedges to be mined when either of the deposit's phases required, depending on which phase was scheduled first.

The process generates a set of nested open pit shells by varying the 'Revenue Factor': (i.e., metal price assumption). Separated sets of nested open pit shells were prepared to select the Stockwork Hill and White Hill starter open pits and pushbacks while a combined (all-areas) run was used to select the final open pit for the Stockwork Hill – White Hill 'super' open pit and the open pits for White Hill West, Copper Hill, Golden Eagle and Zephyr. The open pit shells were used as the basis for the cut-backs and adjusted manually for the 80 m minimum mining width. Graphs showing tonnages of ore and waste for each revenue factor and the shells selected for cut-backs and the ultimate open pits are shown in Figure 16-1, Figure 16-2 and Figure 16-3.

Figure 16-1: Stockwork Hill open pit shells by revenue factor with intermediate phases and approximate final pit highlighted

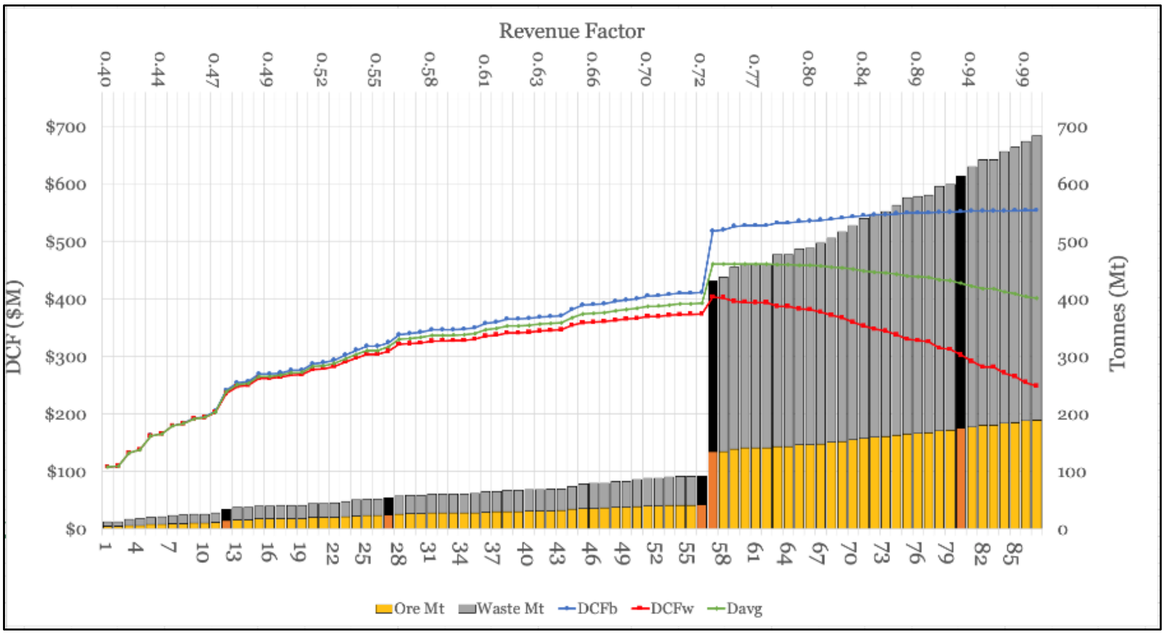


Figure 16-2: White Hill open pit shells by revenue factor with intermediate phases and final pit highlighted

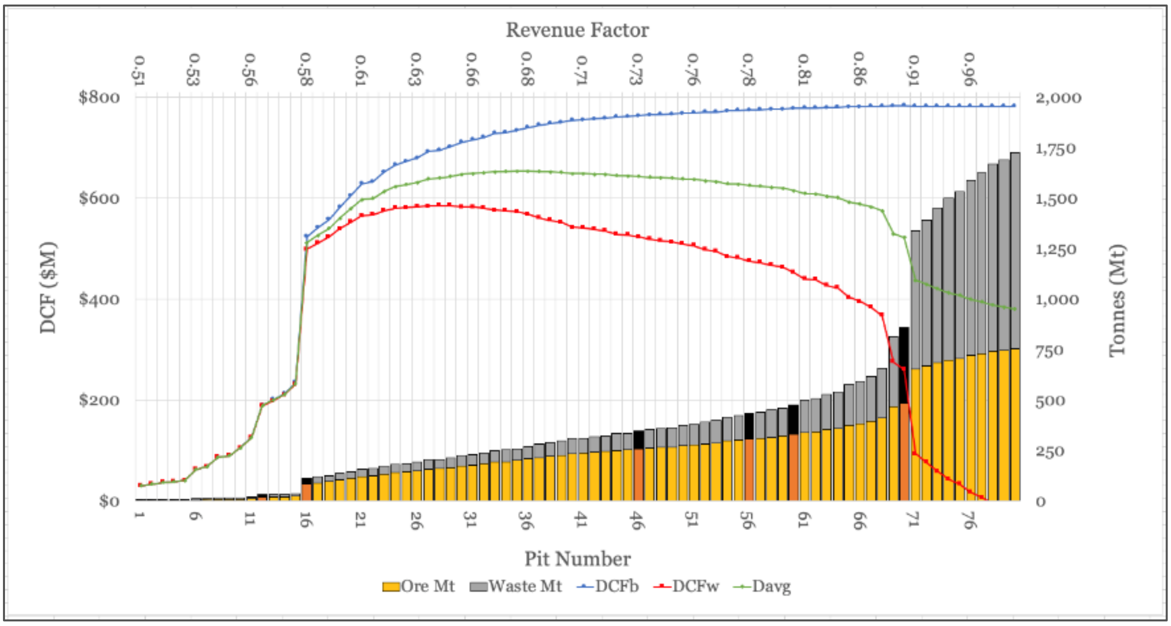
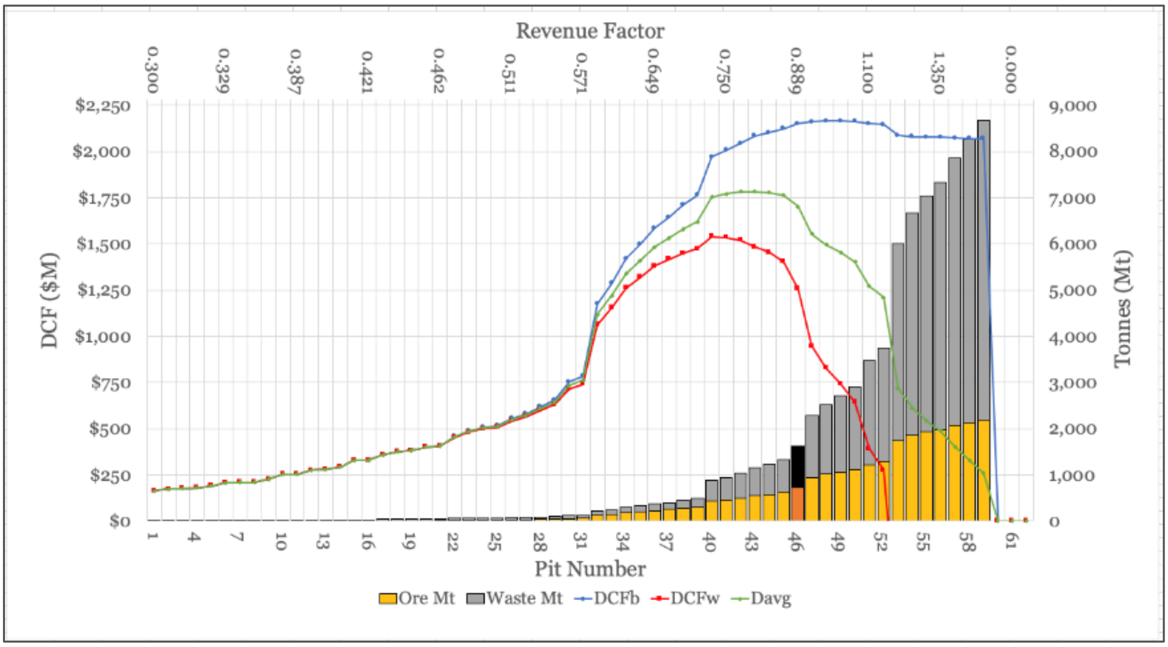


Figure 16-3: Combined Stockwork Hill and White Hill pit shells by revenue factor with the selected shell for final pit highlighted



The result was a total of 16 phases plus 13 wedges across the 5 deposits as shown on Figure 16-4 and Figure 16-5.

Figure 16-4: Intermediate phases and final pits

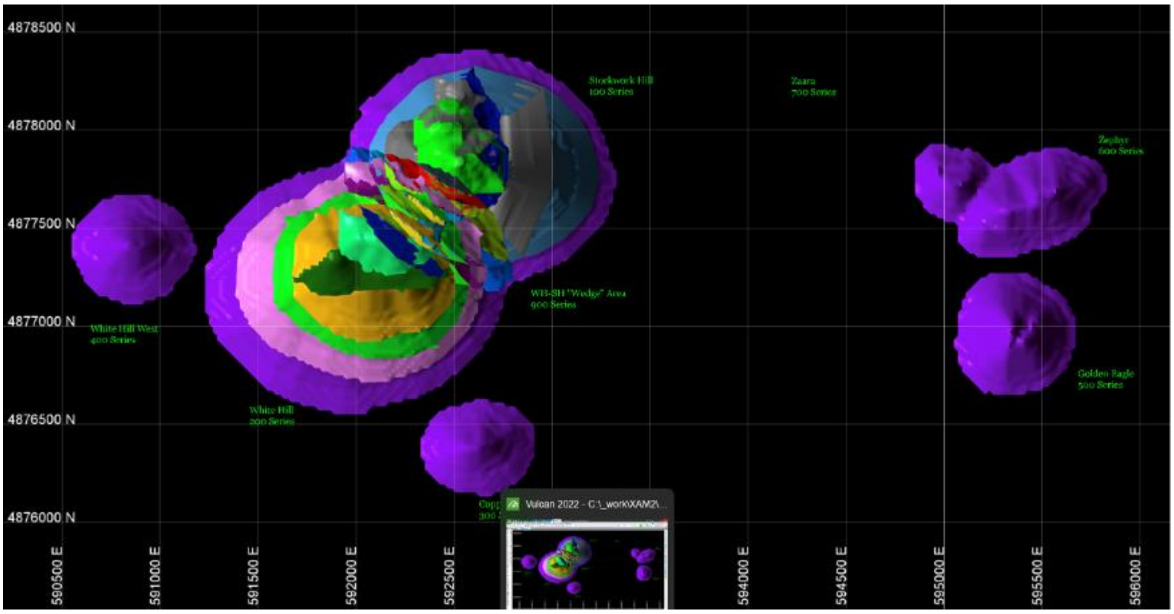
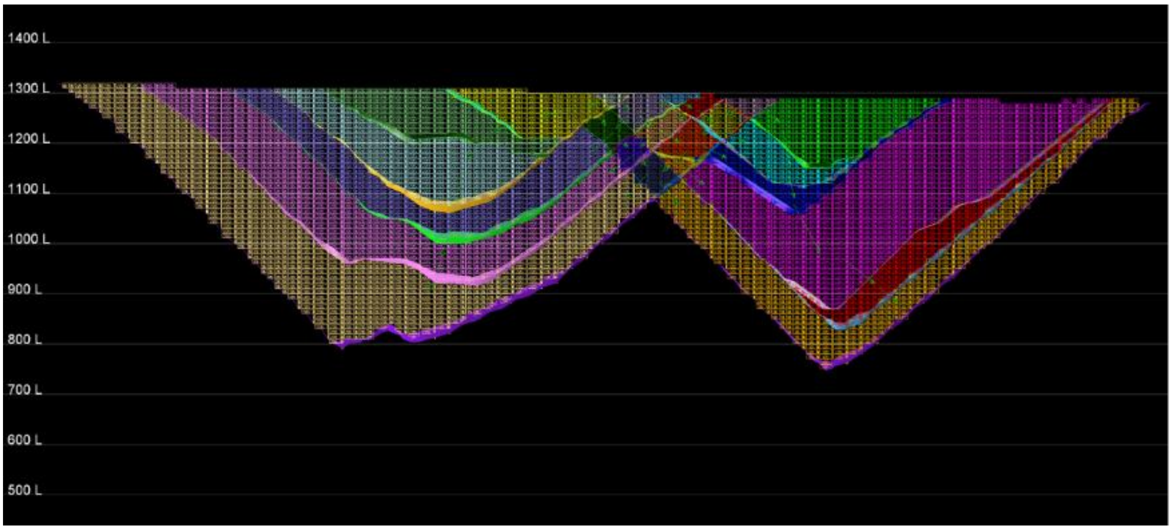


Figure 16-5: Cross section of Stockwork Hill-White Hill 'super' open pit showing phases and wedges



The final open pit depths were 610 m for White Hill, 570 m for Stockwork Hill, 250 m for Golden Eagle, 220 m for Zephyr and 210 m for Copper Hill.

An economic open pit could not be defined for the Zaraa deposit based on the study assumptions.

16.3.4 Mine scheduling

The resulting phases (or cut-backs) were scheduled by year using Whittle's proprietary Prober E™ software for a variety of scenarios. Blocks on each bench of each open pit phase were consolidated into 'bins' by Mineral Resource category (Indicated, Inferred), rock type (oxide, sulphide) and by a range of copper equivalent grades in steps of 0.1% up to 1.5%. Each Prober-

E[TM] run determines the multi-mine mining sequence and rate, elevated cut-off to the plant by 'bin' varying over time, and stockpiling of lower grade material for processing later, to maximise net present value (NPV) using the study assumptions and constraints.

The ore processing capacity was set at 12 Mtpa for the first year (80% of installed capacity), then 15 Mtpa for the next 6 years and then ramping up to 30 Mtpa (Figure 16-1 to Figure 16-3).

The schedules were constrained to only process Indicated Mineral Resources during the first 7 years of production to demonstrate that project viability was not dependent on processing Inferred Mineral Resources.

Initial production schedules were prepared to determine the mining capacity required to ensure the ore processing plant capacity was fully utilised. The mining fleet required to deliver the required mining capacity was then selected; in this case 550 t excavators and 220 t trucks were selected.

A preliminary truck-hour model was then prepared based on the 220 t trucks to update the haulage distances and speed for each block of material in the pits to the plant, waste dump or stockpile (Figure 16-11). The mining operating costs were then updated based on the new mining fleet. The production schedules were then re-optimised based on the updated mining operating costs and haulage costs to provide the final schedules.

The materials contained within each phase and scheduled to be processed are shown on Table 16-5.

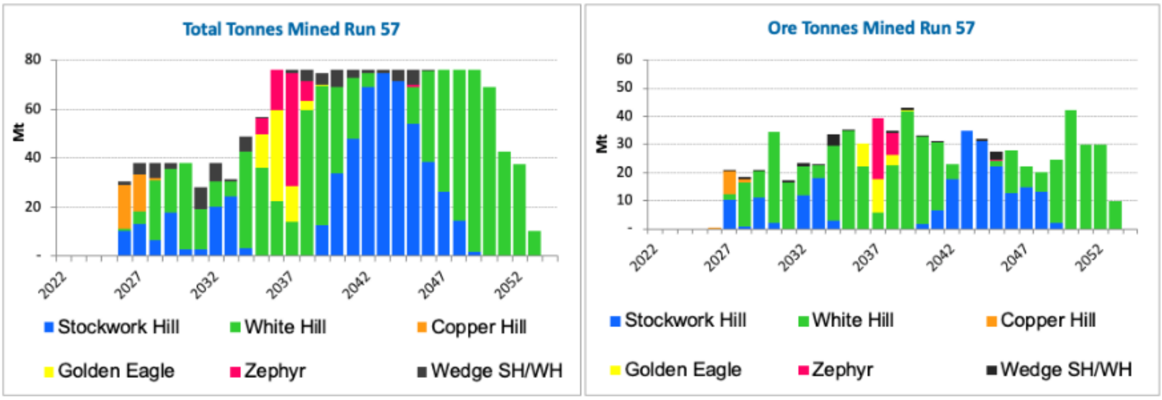
Table 16-5: Material scheduled by open pit phase

Deposit/Phase	Ore (Mt)	Cu (%)	Au (g/t)	Waste (Mt)	Total (Mt)	Strip Ratio
Stockwork Hill 1	10.4	0.25	0.34	14.2	24.6	1.4
Stockwork Hill 2	13.8	0.21	0.31	12.8	26.6	0.9
Stockwork Hill 3	33.1	0.18	0.21	27.4	60.5	0.8
Stockwork Hill 4	57.5	0.21	0.15	102.7	160.2	1.8
Stockwork Hill 5	45.8	0.29	0.21	98.6	144.4	2.2
Stockwork Hill 6	60.2	0.19	0.20	123.0	183.2	2.0
Stockwork Hill total	**220.8**	**0.22**	**0.21**	**378.7**	**599.5**	**1.7**
White Hill 1	6.2	0.29	0.22	3.9	10.2	0.6
White Hill 2	22.0	0.25	0.20	13.6	35.6	0.6
White Hill 3	64.0	0.24	0.19	11.7	75.7	0.2
White Hill 4	94.5	0.23	0.16	20.4	115.0	0.2
White Hill 5	126.5	0.21	0.13	65.8	192.3	0.5
White Hill 6	144.7	0.21	0.11	204.2	348.9	1.4
White Hill Satellite	21.3	0.16	0.11	27.2	48.6	1.3
White Hill total	**479.2**	**0.22**	**0.14**	**347**	**826.2**	**0.7**
Golden Eagle	24.6	0.13	0.34	45.9	70.5	1.9
Copper Hill	9.4	0.42	0.49	25.0	34.3	2.7
Zephyr	30.1	0.13	0.24	47.5	77.6	1.6
Grand total	**764**	**0.21**	**0.18**	**844.1**	**1608.1**	**1.1**

The mining schedule optimisation determined the sequence and rate that the open pit phases will be mined, considering strip ratio, grades, recovery, mining and plant capacity, to maximise NPV. The outcome involves a one-year pre-strip and a mining capacity of 38 Mtpa for the first eight years, then ramping up to 76 Mtpa (Figure 16-6).

Figure 16-6 shows the anticipated annual total tonnes mined by open pit and the ore tonnes processed by deposit.

Figure 16-6: Mining schedule by open pits and phases



The schedule involves stockpiling lower grade ore to process later in the mine life. Figure 16-7 shows the annual proportions of direct feed and stockpile reclaim processed and the size of the stockpile by year. The maximum balance of material stockpiled was 100 Mt.

Figure 16-7: Ore processing rate, stockpile reclaim processing and stockpile balance by year

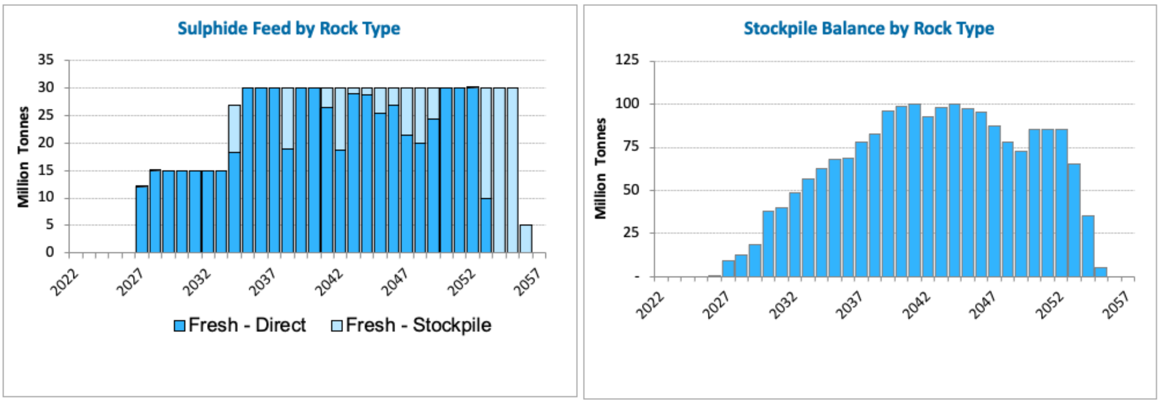


Figure 16-8 shows the Mineral Resource classification of the material processed by year. Inferred Mineral Resource material was not permitted to be processed in the first 7 years.

Figure 16-8: Production schedule Mineral Resource classification

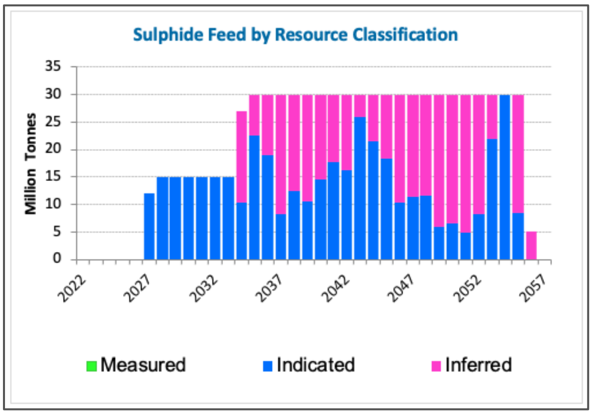


Figure 16-9 and Figure 16-10 show the anticipated annual copper and gold grades and metal production.

Figure 16-9: Annual Copper production and grade

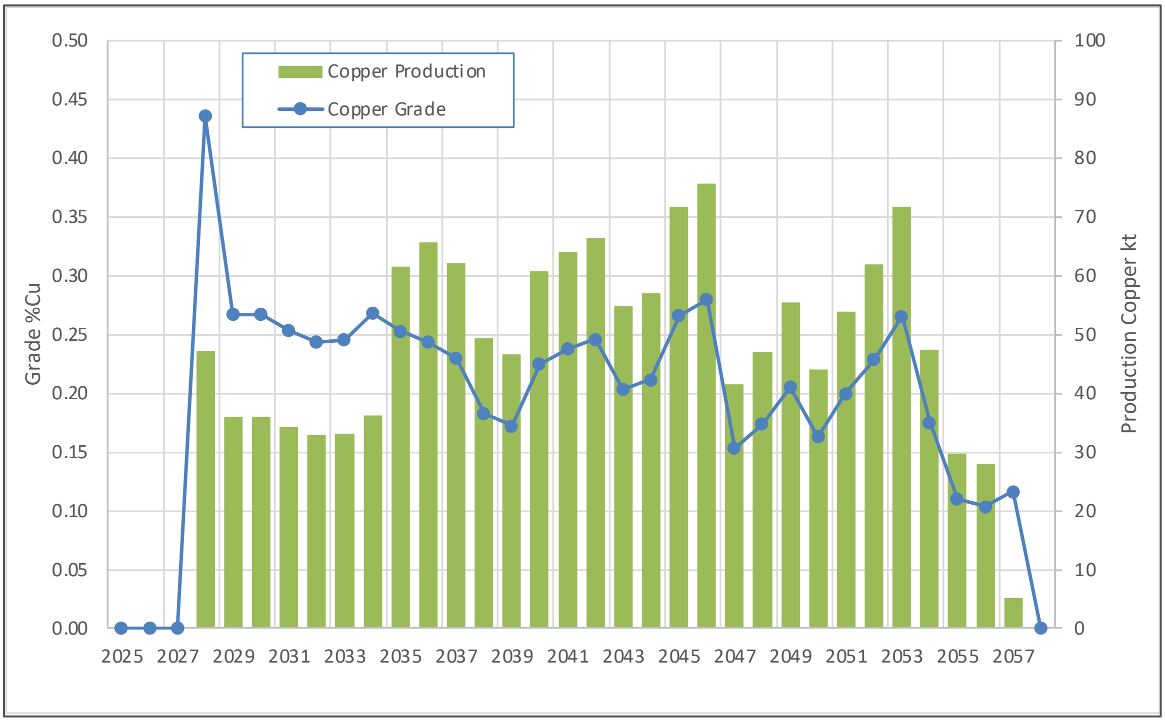
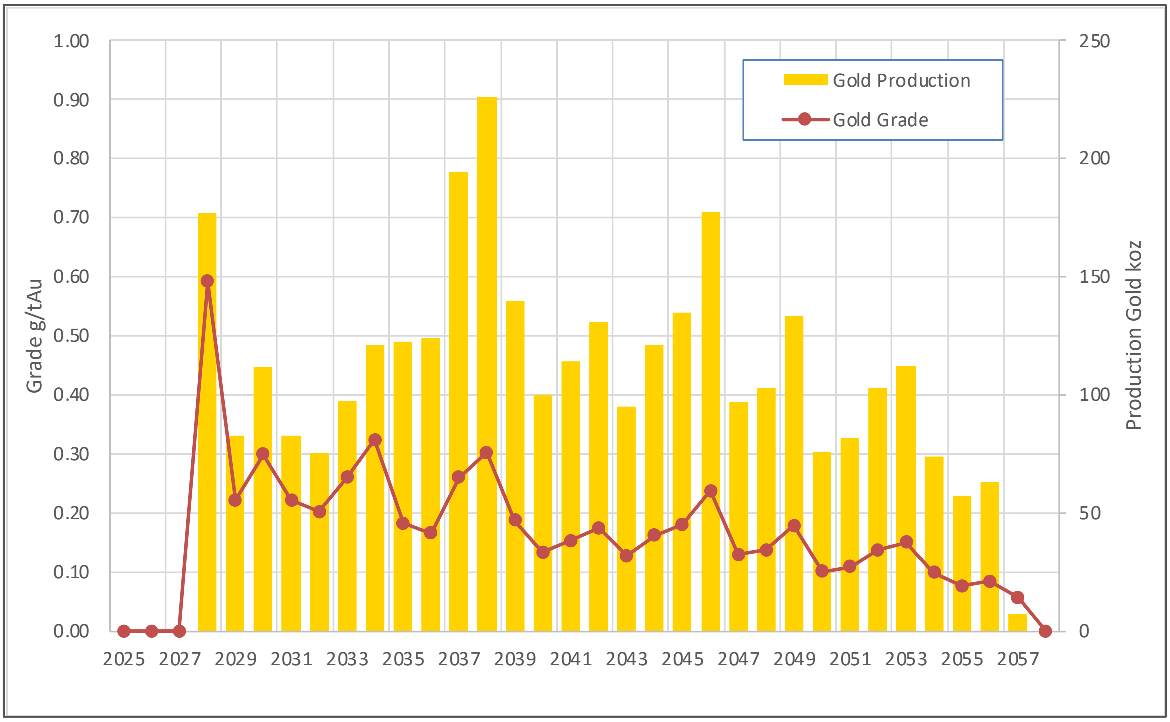


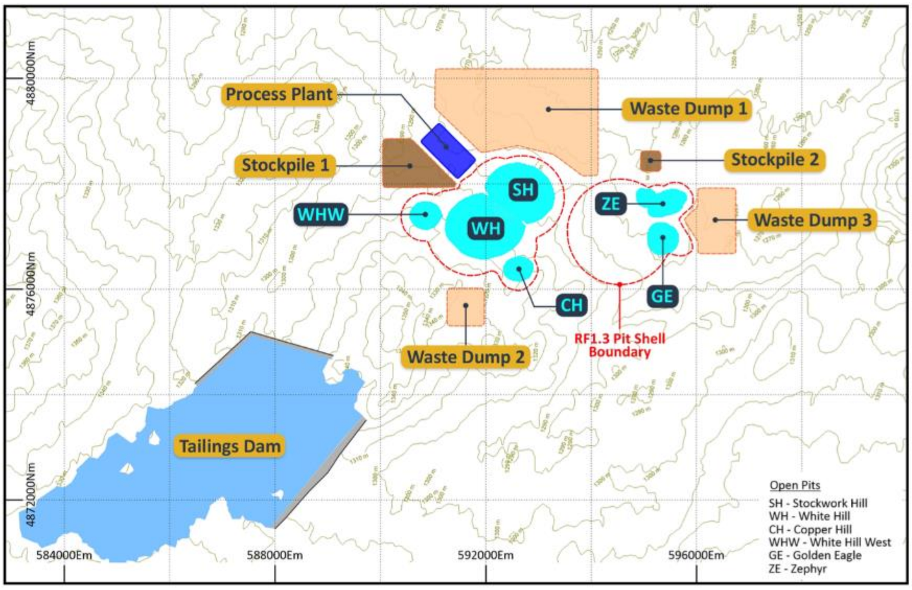
Figure 16-10: Annual Gold production and grade



Over the 30-year mine life the Project processes 764 Mt to produce 1.5 Mt of copper and 3.3 Moz of gold at average rates of 50 kt copper and 110 koz gold.

Figure 16-11 shows the open pit locations with respect to the process plant, stockpiles, tailings storage facility (TSF) and waste rock dumps used for the mining optimisation study.

Figure 16-11: Site layout



16.3.5 Further open pit investigations and testing

The PEA uses outputs from the preceding disciplines to determine the likely economic open pit size and mineable inventory with an optimisation study. The effectiveness of the optimisation study to provide the best value production schedules is dependent on the level of orebody knowledge available.

The PFS mining aspects will essentially be an iteration of the PEA with enhanced orebody knowledge and design parameters:

- additional drilling and Mineral Resource estimate update focussed on better definition of high-grade areas and increasing confidence of most areas to Indicated Mineral Resource status
- updated open pit slope assumptions
- assignment of metallurgical recoveries and throughputs by ore type and grade
- reassessment of open pit mining fleet requirements based on the project scale
- workforce assessment to enable appropriate infrastructure to be costed
- revision of the operating costs to reflect the final project scale and configuration
- advance mine designs from open pit shells to optimised designs.

The suggested work program is recommended in Section 26.

16.4 Geotechnical investigations

Red Rock Geotechnical (RRG) was engaged to analyse the diamond drilling core logging data for each deposit, assess the rock masses and provide indicative open pit slope angles for the open pit shell optimisations. The data assessed were from 187 km of diamond drilling across the six deposits and included lithology, weathering, rock-quality designation (RQD), and oriented structures.

RRG estimated the geotechnical quality of the rock masses at the six deposits using the Rock Mass Rating methodology as published by Bieniawski in 1989 known as RMR89. RRG estimated the RMR89 for each drill run and then averaged them over 5 m intervals downhole for each deposit.

Summary plots were prepared for each deposit showing RMR89, RQD, Recovery % and data count averaged for each 5 m interval downhole. Example plots for Stockwork Hill and White Hill are shown on Figure 16-12.

RRG estimated the effect of weathering on the rock mass extends down to about 50 m down hole, a transition zone to about 95 m down hole and then fresh rock.

RRG utilised the RMR89 data for each deposit to develop preliminary slope design parameters. Two methods were adopted, these include the Mining Rock Mass Rating (MRMR) slope design chart as developed by Haines and Terbrugge (1991)[1] with MRMR derived from RMR89 using the relationship determined by Duran and Douglas (2000)[2] as follows:

$$GSI = 0.78 \times MRMR + 25.22$$

The second method adopted is that developed by Douglas (2002)[3] as part of his PhD thesis which updates and augments the data set used by Haines and Terbrugge as well as presenting suggested slope angle versus slope height for various rock mass qualities based on the Geological Strength Index (GSI). Note that GSI is equal to RMR89 minus 5.

RRG considers that the Douglas assessment (i.e. Slope height versus slope angle assessment using GSI for Wet (moderate pressures) rock mass) is the most appropriate for use as the basis for slope design. Additionally, as a majority of the estimated rock mass GSI's are greater than 40, then slope stability is likely to be controlled by structure, both small scale (i.e. jointing) and large scale (i.e. faults and shears), as such defect orientations, obtained from the logging of orientated drill core or via Acoustic and Optical Televiewer (down hole geophysical methods) is critical for future investigations.

The slope angles RRG suggested for the open pit optimisations are shown on Table 16-6.

For the pit optimisation the RRG slope angles were generally flattened by three degrees in the oxide, four degrees in the transition and five degrees in the fresh rock zone to account for the impact of ramps in the overall slope angles. The optimisation angles used were 35 degrees in oxide, 40 degrees in transition and 45 degrees in fresh rock.

[1] Haines, A. and Terbrugge, P., 1991: Preliminary Estimation of Rock Slope stability using rock mass classification systems. *Proceedings 7th International Society Rock Mechanics, (Herausgeber ed.) Aachen Vol 2 pp. 887-892*.

[2] Duran, A. and Douglas, K. 2000: Experience with empirical rock slope design. *GeoEng2000: An International Conference on Geotechnical and Geological Engineering, 19-24 Nov. Melbourne* Australia, 2, pp. 41, Technomic Publishing Pennsylvania.

[3] Douglas, K. 2000: *Shear Strength of Rock Masses*. PhD Thesis University of New South Wales.

Figure 16-12: Down hole geotechnical data for Stockwork Hill and White Hill

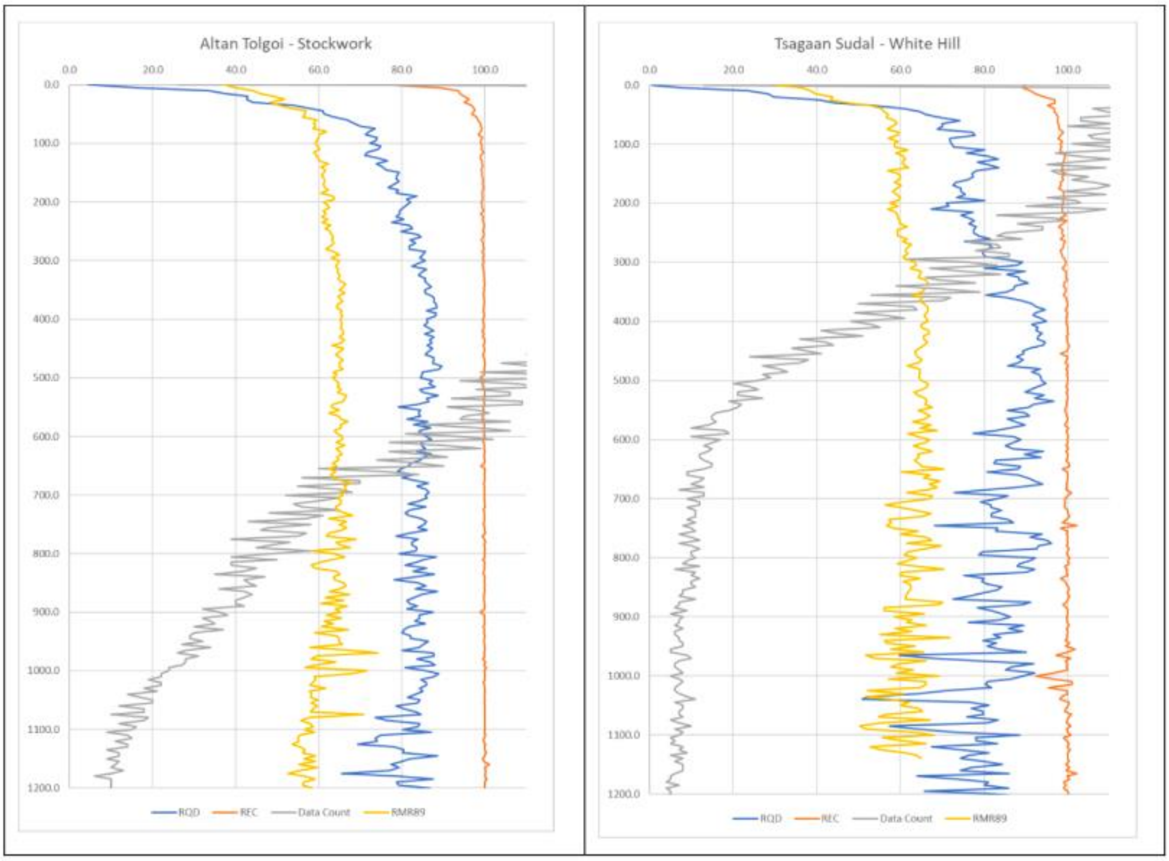


Table 16-6: RRG open pit slope angles

Deposit	Depth Range (m)	Slope height (m)	Slope Angle (º)
White Hill	0 - 50	50	42
	50 - 100	50	46
	>100	150	50
Stockwork Hill	0 - 50	50	44
	50 - 100	50	46
	>100	150	50
Copper Hill	0 - 50	50	38
	50 - 100	50	46
	>100	150	50
Golden Eagle	0 - 50	50	34
	50 - 100	50	46
	>100	150	50
Zephyr	0 - 50	50	30
	50 - 100	50	46
	>100	150	47
Zaraa	0 - 50	50	34
	50 - 100	50	46
	>100	150	50

16.4.1 Further open pit geotechnical investigations and testing

Following the Scoping Study compilation and interpretation of all geotechnical data from the diamond drill holes the PFS assessment entails data acquisition from drill holes oriented for the geotechnical assessment of the proposed mining areas. These data, along with the PFS hydrogeological assessment, are to be used for a detailed assessment and modelling of local conditions to inform the mine design. Assessments and geotechnical design parameters should also be prepared for key infrastructure.

The suggested work program is recommended in Section 26.

16.5 Hydrogeological investigation

Only limited supporting studies have been completed for the hydrogeological information relating to the open pit and slope stability, however these are sufficient to inform a PEA. Hydrogeological studies associated with the open pit and slope stability will need to be advanced as the project proceeds to a higher level of study and is listed as a recommendation for future work programs as part of the PFS.

Additional hydrogeological related geotechnical assessment should provide a comprehensive understanding of the groundwater and surface water regime to identify any potential material impacts on the mining, i.e., assess potential groundwater impacts on open pit slope stability.

17 Recovery methods

17.1 Design philosophy

The ore processing option assessed to process the sulphide mineralisation comprised a conventional SABC mill comminution circuit followed by gravity gold recovery and flotation to produce doré and a copper-gold concentrate.

The ore processing testwork undertaken between 2008 and 2019 is described in the NI 43-101 Technical Report entitled Mineral Resource Estimate, Kharmagtai Project Omnogovi Province Mongolia, and was reviewed by Tilyard Mining Services in 2019 and East Riding Mining Services in 2022. The ore processing assumptions for this PEA were drawn from the conclusions and recommendations of these reviews.

Plant throughput was based on two options to process sulphide ore for a single line 15 Mtpa plant and a dual line 30 Mtpa plant. This study treated the oxide mineralisation as waste.

17.2 Sulphide ore processing

17.2.1 Throughput rates

The Kharmagtai primary ore is hard with Bond Work Indices as high as 26 kWh/t. The comminution data is limited, but the average appears to be around 18 kWh/t. The Cadia Hill mine in central west NSW, Australia, was considered a reasonable reference case for processing of Kharmagtai ore. Cadia Hill ore had a Bond Work Index of 17 kWh/t and achieved a throughput rate of 17 Mtpa at 180 µm through a single-train SABC circuit incorporating a 20 MW, 40' SAG mill. As the limited data suggest the Kharmagtai primary ore is harder than Cadia Hill ore, the maximum throughput rate through a single train SABC circuit was set at 15 Mtpa by Xanadu.

17.2.2 Recoveries

In 2019 CSA nominated an ore processing plant that comprised generic crushing, SABC comminution, rougher flotation, cleaner flotation with final thickening and filtration circuits to produce a copper-gold concentrate for sale.

The copper and gold recoveries and concentrate grades were estimated from testwork undertaken in 2008 and are shown on Table 17-1.

Table 17-1: 2019 CSA ore processing recovery assumptions

	Recoveries		Concentrate Grades	
	Cu (%)	Au (%)	Cu (%)	Au (g/t)
Stockwork Hill	90.9	76.0	26.0	66.0
White Hill	85.7	69.1	22.5	18.5
Copper Hill	90.9	76.0	26.0	66.0

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

The weighted average recoveries for all material scheduled to be processed in 2019 CSA were 86.5% Cu and 70.8% Au.

Xanadu undertook additional metallurgical testwork in 2019 on nine variability composites selected based on alteration type (potassic, sericite, albite-chlorite and tourmaline breccia) from individual deposits and two master composites made up of material from three deposits (Stockwork Hill, White Hill and Copper Hill). This work was reviewed by Tilyard (2019) who recommended the recoveries by alteration type shown on Table 17-2 based on a 25% Cu concentrate.

Table 17-2: Metallurgical recoveries by alteration type

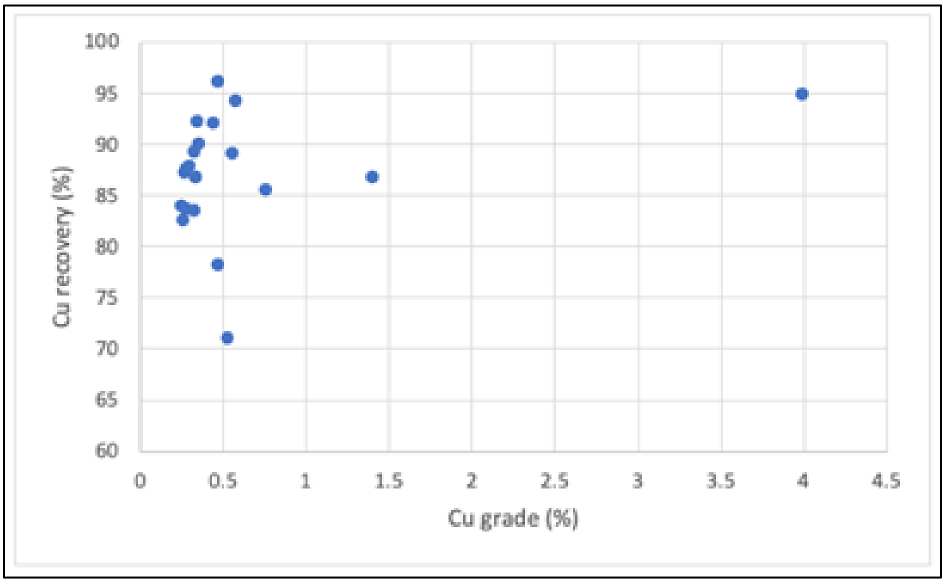
Alteration Type	Recovery	
	Cu (%)	Au (%)
Albite	90	79
Sericite - chlorite	89	61
Tourmaline breccia	87	72

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

The latest geological interpretation has cast doubt on the validity of the representivity and classification of the 2019 metallurgical samples tested. Hence varying recoveries by lithology with the current data set is not considered valid.

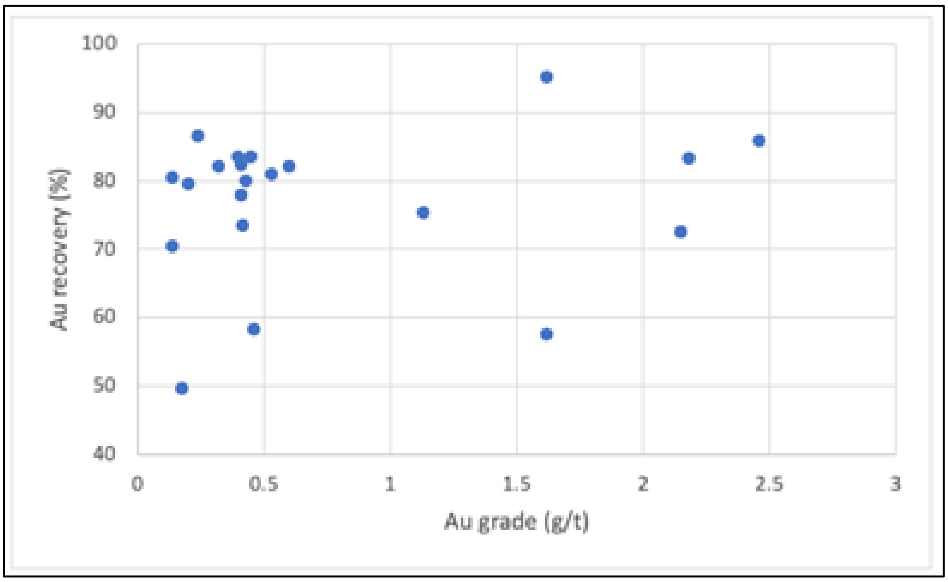
The relationships between head grade and recovery for copper and gold are shown on Figure 17-1 and Figure 17-2 for the rougher flotation tests deemed comparable from the 2009, 2016 and 2019 testwork. A total of 21 test results were used.

Figure 17-1: Metallurgical samples copper recovery vs head grade



Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

Figure 17-2: Metallurgical samples gold recovery vs head grade



Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

Based on these data, there does not appear to be a clear relationship between recovery and head grade for gold or copper.

So, without a clear relationship between grade and recovery or a valid lithology/recovery relationship, for this study all results were given equal weighting and the average recoveries were used.

Table 17-3 shows the averages of all flotation batch tests and the average of the locked-cycle testwork. These recoveries reflect a concentrate grade of 20-25% Cu.

Table 17-3: Average copper and gold recoveries

	Cu Rec (%)	Au Rec (%)	Number of samples
Arithmetical Average of All tests	84.6	65.4	21
Average of Locked Cycle Tests	89.5	69.75	3

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

The locked cycle testwork is considered the most reliable predictor of performance as they were undertaken with the optimum flotation conditions and recycled some of the cleaner product streams. Hence, for the purposes of this Scoping Study and based on the testwork undertaken and the 2019 CSA process, recoveries of 89.5% Cu and 70% Au at a 25% copper concentrate are considered reasonable.

The flowsheet used in the testwork mirrors the Oyu Tolgoi flowsheet. However, additional testwork has also demonstrated that a portion of the gold at Kharmagtai is gravity recoverable. A rule-of-thumb estimate from Australian porphyry operations is that a gravity circuit can add 5% to the gold recovery.

Gold is often slow to float and may benefit from different flotation parameters than fast-floating copper. Testwork that extended the rougher flotation time by 30% gave an additional 2.5% gold recovery in testwork. The addition of a scavenging circuit after the roughers should achieve this additional recovery as well as a slight improvement in copper recovery of 0.5%.

Hence the copper and gold recoveries used for this study were 90% for Cu and 77.5% for Au.

17.2.3 Process

The ore process flowsheet for this study was similar to the 2019 CSA design, but with the addition of a gravity circuit to recover free gold and a scavenger circuit after the roughers and cleaner scavenger cells to improve the recovery. Ausenco was engaged to undertake a conceptual engineering and cost study based on Kharmagtai process design criteria and to provide a flowsheet, layout (Figure 17-3) and capital cost estimates (Section 21). Ausenco used an operating reference plant as the project template. The design was based on a standard copper/gold porphyry flowsheet and uses industry standard, well-proven technology.

The processing is described as follows and illustrated on Figure 17-3 and Figure 17-4.

Primary Crushing

The primary crusher is a 60 x 110 gyratory crusher with a 750 kW motor capable of taking direct tipped feed. The primary crusher discharges onto a crushed ore stockpile with 20 hours live capacity. Both the primary crusher and the crushed ore stockpile will be covered to protect them from the weather.

Grinding

The grinding circuit will comprise a 40’ x 20’ SAG mill with a 20 MW motor, two MP1000 recycle crushers and one 27’ x 46’ 20 MW ball mill operating in closed circuit. The grinding circuit will be housed in an insulated, heated shed. (Note that Ausenco specified two ball mills, which this study replaced with a single larger ball mill to simplify the design).

Flotation

The flotation circuit will contain two stages of flash flotation. Coarse gold will be recovered from the flash flotation concentrate and smelted to produce gold doré. The remainder of the flash float concentrate will report to the final concentrate. The flotation circuit will consist of roughers and rougher scavengers, regrind mills, cleaners and cleaner scavengers. The flotation circuit will be housed in an insulated, heated shed. The final tails will be thickened and pumped to the tailings storage facility.

Tailings

CSA 2019 designed a tailings stotage facility (TSF) 4.6 km southwest of the plant site (Figure 20). The unlined TSF design comprised a series of saddle dams between the hills constructed in two lifts with a capacity of 190 Mm^3, sufficient for approximately 305 Mt of tailings or around 10 years of this proposed operation.

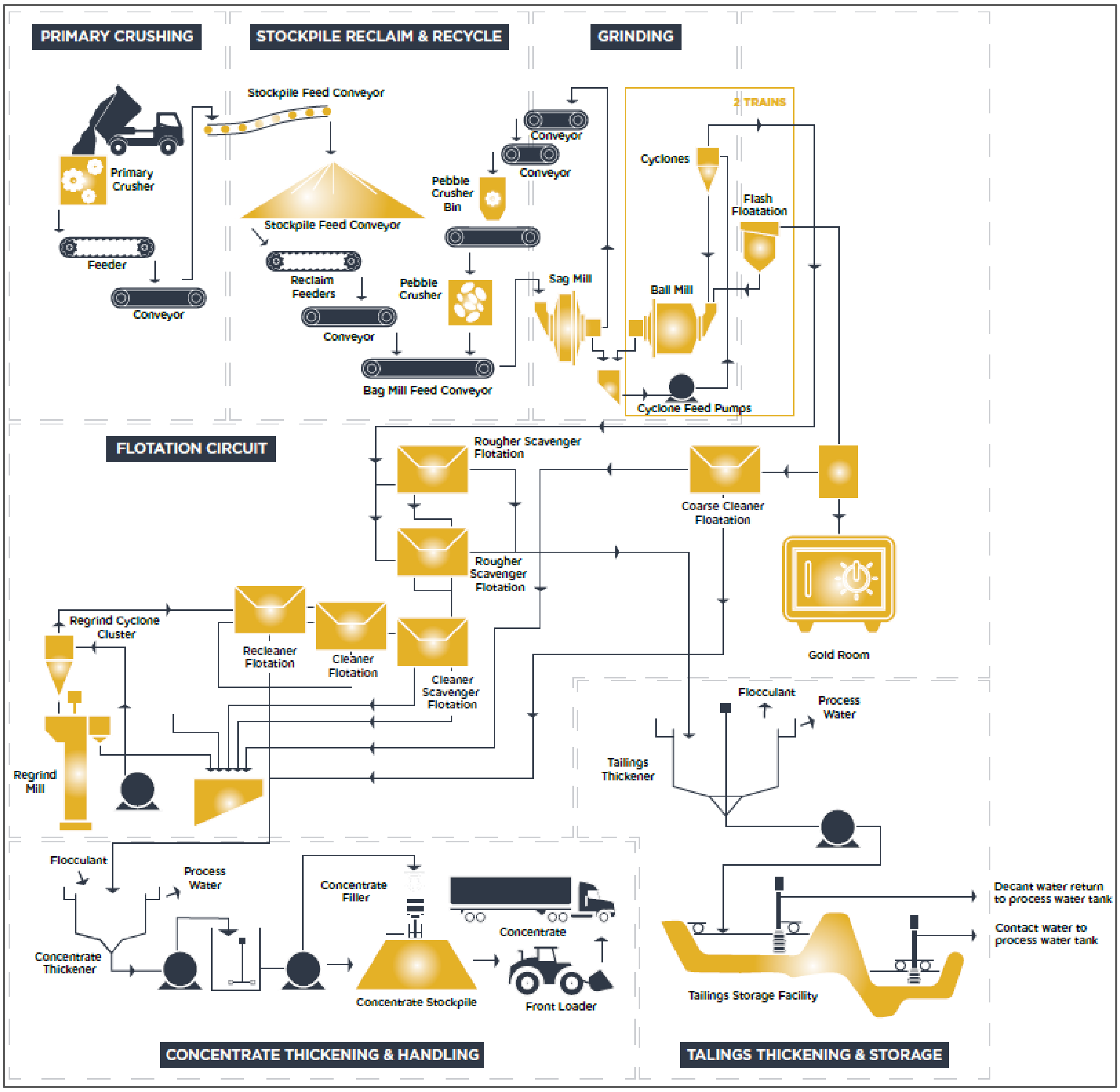
This study accounted for storage of tailings additional to the initial 305 Mt with a pro rata tonnage cost and also added an additional $25 M allowance to the TSF initial capital cost for a redesigned lined TSF if required.

The final tailing storage solution for the life of mine would be addressed in the PFS.

Concentrate handling

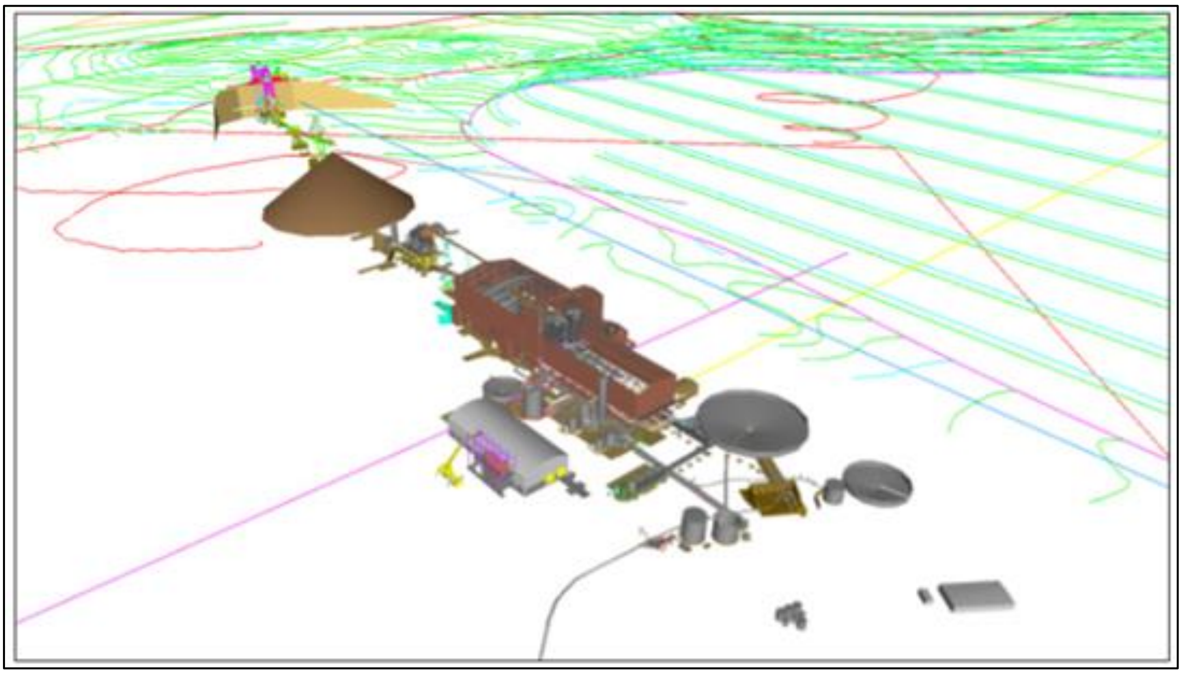
The flotation concentrate will be thickened, filtered and placed into containers. The containers will be trucked to a rail-siding located nearby and transported to smelters by rail.

Figure 17-3: Ore processing flowsheet



Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

Figure 17-4: Process plant layout



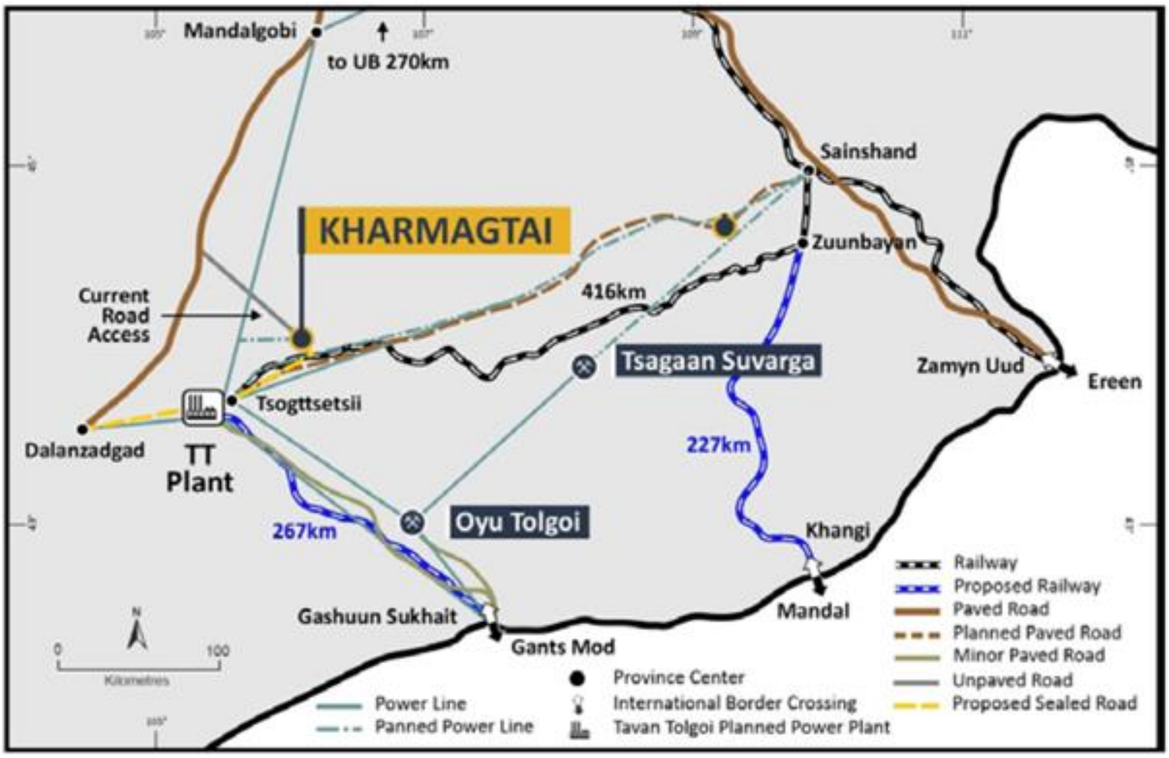
Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

18 Project infrastructure

18.1 Introduction

Kharmagtai is currently well located with respect to existing infrastructure (Figure 18-1). Road access to site entails a 6-hour drive from Ulaanbaatar on a sealed road followed by a 1.5-hour drive for the last 60 km on an unsealed road. Approximately 10 km south of Kharmagtai is a rail line that connects Tavan Tolgoi to the Trans-Siberian rail, a sealed road from Tsogttsetsii along the rail corridor and a 35 kV power line. The Mongolian Government is currently facilitating construction of the 450 MW Tavan Tolgoi power station immediately southwest of Tsogttsetsii.

Figure 18-1: Regional infrastructure



The relatively flat terrain around Kharmagtai provides flexibility in locating the infrastructure around the open pits and potential tailings storage location identified by 2019 CSA. These, along with the assumed plant, waste dump and stockpile locations are shown on Figure 17-4.

The construction plan envisages an initial year of early works to establish the site infrastructure sufficient to support full scale construction of the ore processing facility and remaining infrastructure.

The site infrastructure requirements were assessed and costed by O2 Mining with a few items carried over from 2019 CSA detailed in Section 21. The infrastructure in the ore processing area was assessed and costed by Ausenco.

The project envisages establishing administrative centres in Tsogttsetsii and the regional capital of Dalanzadgad. Most of the workforce would be engaged locally and accommodation would be provided on site for all employees. Commutes would be largely by bus from the regional centres, supplemented with limited specialist expertise from Ulaanbaatar.

The site facilities would include an accommodation village likely sited near the main access road within 5 km of the operation, an industrial area comprising the mine workshops/warehouse, administration building, mine dry change house and a mess, the ore processing plant with workshop/warehouse and the laboratory, the tailings storage facility and a water supply bore field.

18.2 Power

The site power requirements are estimated to be 55 MW for the initial 15 Mtpa operation and 110 MW for the expanded 30 Mtpa operation. Site construction power, estimated at 5MW, would initially be from diesel generators and could then be accessed from the existing 35 kV line approximately 10 km south of site and then from the 110 kV line approximately 40 km west of site (Figure 18-1).

The largest power consumer on site is the ore processing facility. The Ausenco estimate includes allowances for the high voltage (HV) switchyard and transformers and there are separate allowances for distribution within the ore processing area and around the site.

18.3 Water supply

The raw water supply is planned to be sourced from a water resource 8 km from Kharmagtai, defined as part of the Kharmagtai Mining License application. The initial water requirement would be approximately 15 GL/annum, rising to 30GL/annum after the plant expansion. The water would be pumped to site via a pipeline, with raw water used for ore processing and water purification plants to provide potable water. Water purification plants were specified in the ore processing plant, mine office area and at the accommodation village.

An alternative water supply is a fully developed but underutilised bore field 40 km from site developed for the Tavan Tolgoi power station. Both bore fields access deep aquifers of non-potable water designated for industrial use. Alternative water sources will be assessed in the PFS based on their environmental, social, sustainability and technical performance.

18.4 Roads

Allowances have been made for a site access road, pit access roads, roads in the ore processing area and tailings storage facility access road.

18.5 Railway

The Mongolian Government recently completed a 416 km rail line from Tavan Tolgoi to Zuunbayan which connects to the Trans-Siberian railway (Figure 18-1). Kharmagtai is located approximately 10 km north of the new railway and there is an existing rail siding within 15 km of site. The copper-gold concentrate would be placed into containers at the plant site and trucked to the siding to be railed to smelters.

18.6 Construction camp

The exploration camp currently on site has accommodation for 120 people. Accommodation for the early-works and full-scale construction workforces would be provided initially with a temporary construction camp and then with the permanent site accommodation. The construction camp would have a capacity for of 500 persons and operate on a 24/7 basis. The study assumes that the construction camp would use temporary diesel power until the mains power lines are installed. The grey/black water from the construction camps would be processed through the permanent wastewater treatment facility planned for the site.

18.7 Permanent Camp

The accommodation village, containing both the temporary construction camp and permanent facilities, would likely be located near the main access road within reasonable proximity to the mine site. The permanent accommodation village would be built for rostered staff and have an initial capacity of 555 personnel (15 Mtpa operation), increasing to 948 personnel for the mine expansion (30 Mtpa operation).

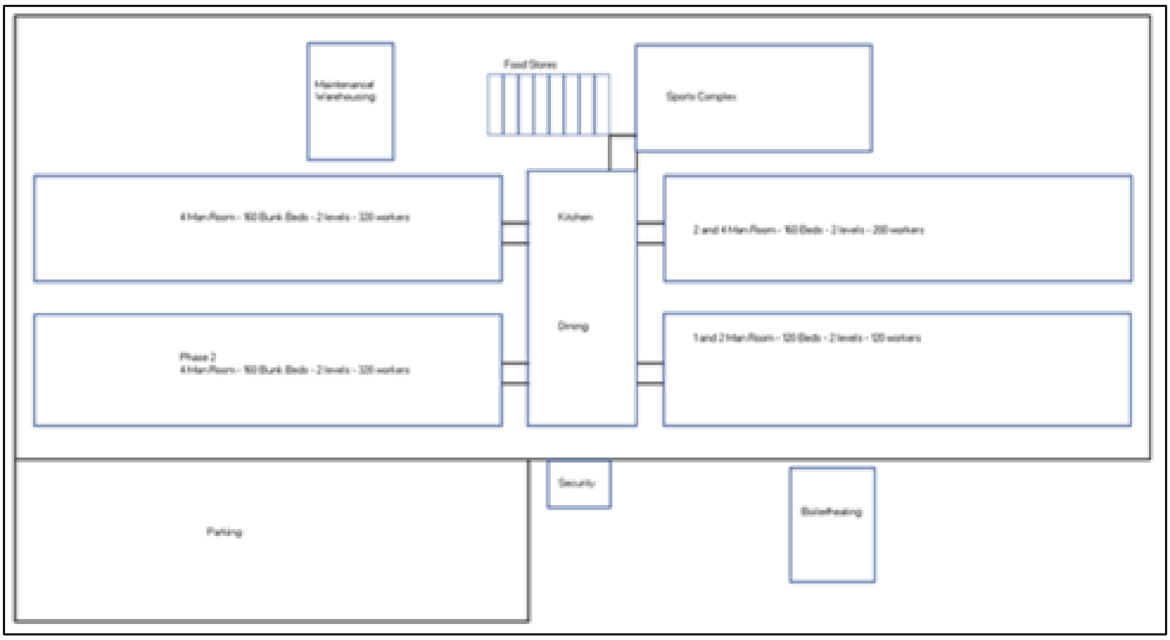
The village design includes:

- dining and kitchen facilities
- accommodation rooms
- laundry and ablution facilities
- offices
- recreation room
- indoor multi-gym
- service facility building
- dry, reefer and chiller storages
- guest gers
- heating, potable water and grey water treatment.

The accommodation village would include all services, equipment and reticulation for mobile phone and data, TV and video entertainment to each room. Communications are expected to be provided by third party telecommunications providers allowing 4G data access to all site-based personnel.

A conceptual layout is shown on Figure 18-2.

Figure 18-2: Permanent accommodation facility



Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

During the construction phase the permanent camp could be reconfigured for 640 persons and then refurbished and adjusted for operations.

18.8 Mine office building

The mine administration building would be a two-storey 40 x 20 m prefabricated modular style building sufficient for up to 150 staff and would include the following facilities:

- reception area
- pre-start and operational briefing rooms
- meeting rooms
- training rooms
- War room – stand up room
- offices and storage for senior leadership
- open office space for general teams
- emergency response room
- storage and filing room
- lunch area
- tea and coffee facilities
- printing facilities on each floor.

This building would be constructed in the early works period to provide office facilities for the construction staff and then office facilities for the site professional staff during operations.

18.9 Messing and ablution facilities

The messing facility would be located close to the mine office building, processing plant facilities and other facilities within an industrial complex. Separate crib and ablution facilities may be located within the heavy equipment workshop and warehouse facilities located at the mine, some distance from the industrial complex. Three meals per shift would be provided, requiring four dining periods within a 24-hour period. Dining capacity is for 100–120 persons per sitting. Staggered mealtimes would enable the facility to provide for all site personnel. Take away lunch packs would be available for select workers who are not able to return to the crib facilities for their meal breaks. Ablutions would be provided in all buildings and located strategically within the industrial park and where parking areas exist for heavy equipment. Both male and female facilities should be available with disabled access. The messing and ablution facilities would be combined with the mine dry for capital efficiency.

18.10 Sewage and grey water treatment

The main sewage disposal system and grey water treatment plant would comprise a buried gravity collection system from the facilities within the industrial area. Sewerage and grey water from the mine area would be pumped from septic tanks located nearby the mine facilities and trucked to the sewage treatment plant for further treatment. The facility is planned for capacity for the entire site. The village has its own separate facility included in the estimate.

The industrial site would be landscaped to permit gravity sewage collection throughout. The sewage treatment plant would be a pre-packaged Rotating Biological Contactor. The plant would be modular and manufactured offsite and containerised for simple connection to the collection system on site. Once treated, the sewage treatment plant effluent would be discharged into the environment in accordance with the requirements of the Environmental Impact Assessment.

18.11 Surface water management

Drainage channels would be installed around the industrial area to manage precipitation run-off. Drains and dam would be established to channel water away from the open pits, dump toes and other infrastructure areas. Any water pumped from the pits would be stored in dams and used for dust suppression. Sediment control dams would be established to collect any run-off from the waste dumps and stockpiles.

18.12 Communications and IT

The isolated nature of the Project site and the anticipated amount of data and communications for the Project means a fibre optic cable would have to be installed to provide a reliable communication. This would provide a site wide network with the following main elements:

- public mobile phone cell at the camp
- private LTE network over the entire project area
- bore field telemetry system
- CCTV system
- access control system

- corporate local area network
- corporate IT infrastructure
- fibre-optic cabling
- camp entertainment system
- communications masts/towers
- communications shelters
- communications power systems
- private microwave radio.

The study allowed for connection to a fibre optic cable within 20 km of site. This should be further assessed in the PFS.

18.13 Security

A gatehouse would be built at the site entrance for access control. This building will house security guards and a visitor waiting room. A lifting gate controlled by the security guards will give access to vehicular traffic.

The site would be fenced for stock control around the key site infrastructure including the mining areas, and process plant. In addition, a high security fence would be installed around the gold room.

18.14 Mine dry

The mine dry would be located near the mine office building and crib facilities and would provide space for workers to change into their work clothes on arrival, store any personal items not required during the workday, and shower and change back into civilian clothing at the end of the workday. The mine dry can accommodate 100 persons at one time, assuming staggered shift start and finish times for crews from the mine, administration and processing plant. A laundry facility is also included in the mine dry.

18.15 Heavy equipment workshop and warehouse

The heavy equipment workshop would be a steel portal frame style building with sandwich panel cladding on the walls and the roof. The workshop would require five maintenance bays initially to cater for up to twenty 220 t capacity dump trucks and other heavy mining equipment such as water trucks, fuel trucks, track dozers, wheel dozers, motor graders, and front-end loaders. On expansion, an additional five bays would be built back-to-back, taking the total to ten bays and resulting in a final building 120 m long and 36 m wide.

Heavy equipment parking would be located adjacent to the workshop but separated from active traffic with suitable bunding.

The mine and general warehouse facility would be connected to the heavy equipment workshop. The height of this building would be substantially less than the Heavy equipment workshop, designed at 5 m. The total footprint required for covered warehousing is approximately 2,800 m^2.

Racking would be provided for most of the covered storage, with special storage areas for hazardous materials. A security fenced compound would be coupled with the covered warehouse to provide for further storage of larger items that do not need covered storage.

Pick up and drop off bays and areas would be situated by the warehouse to allow for collection and delivery. Sufficient parking would be allowed for adjacent to the warehouse entrance, separated from active traffic with bunding.

18.16 Fuel storage facility

Design of the fuel storage facility for the main fuel farm has been based on a 14-day holding capacity. A large quantity of fuel storage is available from one of the vendors nearby the project. It is believed this supply provides adequate supply shortage risk coverage for the site.

It is estimated 20 Ml of fuel would be consumed per annum in the initial phase (15 Mtpa) and this would increase to 48 Ml when ramped up to 30 Mtpa. This would require regular diesel loads to be supplied to the main facility and then dispatched to satellite facilities used to load fuel trucks capable of servicing the mobile equipment operating in those areas. The fuel storage facilities to be located at the site should be owned and operated by the fuel supply company.

18.17 Explosive magazine

Magazine and detonator storage is currently available offsite in Tsogttsetsii with sufficient capacity to service the Project. These facilities are owned by private explosives supply and blasting service companies who intend to expand their operations to support the expansion of the mines in the region. Allowances have been made for preparation of the earthworks for the magazine, however no further allowance is made for explosives storage at the site. Such facilities would be designed, owned, constructed, and operated by third parties.

18.18 Waste and stockpile storage facilities

The Scoping Study conceptual mine layout shown on Figure 17-4 was developed primarily to determine haulage distances for the schedule optimisation. As the terrain is relatively flat there are few limitations on the dump locations apart from economics. However, other considerations may be identified in the PFS such as environmental, archaeological or ARD management.

A small waste dump and stockpile are located adjacent to the Zephyr and Golden Eagle pits, a waste dump sited adjacent to the Copper Hill pit and the main waste dump is located north of Stockwork Hill. The main low-grade stockpile is located adjacent to the process plant. These dumps were placed inside the Mining Lease and outside the conceptual revenue factor 1.3 pit shells. The large circular RF1.3 shell between Stockwork Hill and Golden Eagle is over the Zaraa deposit. This area should be kept clear of permanent infrastructure so as to not impede potential mining of this deposit in the future.

As this case does not consider processing oxide material, no allowance was made for a separate oxide stockpile. The site layout will be refined in the PFS. The suggested work program is recommended in Section 26.

19 Market studies and contracts

19.1 Market study

Xanadu engaged AFX Commodities Pty Ltd (AFX) to assess the marketability of the copper-gold concentrate from the project and to advise on the economic parameters associated with the sale of the concentrate.

The available data on concentrate chemistry are shown on Table 19-1.

Table 19-1: Concentrate assays

Sym	Element	Unit	AT001	AT002	TS001	ZU001	Met001	Met002	Met003	Met004	Avg
Cu	Copper	%	26.4	23.9	19.3	31.0	17.4	18.2	28.7	22.4	**23.4**
Au	Gold	g/t	63.1	86.3	18.7	43.5	8.3	101.5	55.9	8.4	**48.2**
Ag	Silver	g/t	76	72	28	105	24	42	68	58	**59**
Al_2O_3	Aluminium Oxide	%	0.64	1.10	1.72	1.19	4.14	3.53	1.11	2.21	**1.96**
Sb	Antimony	ppm	144	410	218	94	188	200	160	122	**192**
As	Arsenic	ppm	264	199	160	101	77	62	18	18	**112**
Bi	Bismuth	ppm	430	474	470	468	390	376	434	418	**433**
Cd	Cadmium	ppm	14	<10	<10	<10	10	14	18	10	**13**
CaO	Calcium Oxide	%	0.50	0.91	0.39	0.19	0.70	0.37	1.35	0.96	**0.67**
Co	Cobalt	ppm	52	54	104	40	98	60	62	36	**63**
F	Fluorine	ppm	83	102	111	44	1430	770	770	452	**470**
Fe	Iron	%	29.1	28.7	30.4	25.9	26.4	29.0	28.0	28.9	**28.3**
Pb	Lead	%	0.04	0.04	0.03	0.04	0.1	0.11	0.55	0.05	**0.12**
MgO	Magnesium Oxide	%	0.21	0.34	0.25	0.32	1.19	0.56	0.44	0.2	**0.44**
MnO	Manganese Oxide	ppm	0.02	0.03	0.01	0.02	0.05	0.02	0.01	0.01	**0.02**
Hg	Mercury	ppm	0.6	0.3	4.7	<1	0.3	0.1	0.1	0.1	**0.9**
Mo	Molybdenum	%	-	-	-	-	1.1	0.36	0.14	1.7	**0.8**
Ni	Nickel	ppm	102	96	128	80	64	60	406	72	**126**
P	Phosphurus	ppm	69	114	90	47	412	162	49	78	**128**
Se	Selenium	ppm	110	152	87	193	109	147	274	112	**148**
Si	Silica	%	2.15	5.55	7.46	4.61	14.8	13.8	4.25	9.58	**7.78**
S	Sulphur	%	34.5	33.1	39.6	31.3	27.6	31.3	33.5	33.4	**33.0**
Zn	Zinc	%	0.46	0.07	0.05	0.03	0.09	0.14	0.12	0.13	**0.14**

AFX advised that the Kharmagtai concentrate was expected to be readily saleable, and that China was the most likely market. Based on available concentrate assays, the concentrate quality would be suitable to all major Chinese smelters. Penalties could be assumed from time to time on fluorine and bismuth but would not be onerous or have a material impact on marketability.

The potential for a molybdenum by-product will be investigated in the PFS.

The economic parameters could be expected to be:

- Benchmark treatment and refining charges, currently $85/dmt and 8.5c/lb Cu.
- Payable rates of 96.5% for Cu with a 1.0 unit deduction.
- Payable rate of 96% for Au with concentrate grade >10 g/t.
- Refining charge of $4.50/oz Au.

19.2 Gold Doré

No internationally recognised commercial refineries are operating in Mongolia.

Gold produced by license holders must be assayed and registered by the State Assaying Agency, which is a special gold laboratory of Mongolian Agency for Standardization and Metrology. Mine production is recorded at the State Assaying Agency. This laboratory smelts the delivered material to a gold doré. The lab returns the gold to the miner and informs MRAM about the amount of gold assayed.

In 2002, article 3.3 of the Treasury Law was amended to provide legal grounds for domestic, precious metal refining. After making amendments to the Minerals Law in 2006 and passing some regulations the Bank of Mongolia (BoM) is still the main gold buyer but no longer the sole trader.

The BoM prepares a tender for the refining of doré gold and selects the best offer. Every working day the BoM announces the gold buying price in MNT per gram of gold, which is based on the London Gold Fix.

19.3 Marketing contract

On 31 December 2013, Xanadu, through it is wholly owned subsidiary Oyut Ulaan, entered into a Marketing Agreement with Noble Resources International Pte Ltd (Noble). The agreement appoints Noble as the marketing agent for a portion of the Kharmagtai Project’s production in return for a marketing fee. The agreement also provides Noble with the first right of refusal for all other copper projects.

The relevant terms in relation to the valuation of the Agreement are summarised in Table 19-2.

On 5 April 2021, Noble assigned this agreement to Tailai (HK) Company Limited (Tailai), a Related Corporate Body.

This contract is consistent with industry standards.

Table 19-2: Relevant terms of the Marketing Agreement between Xanadu and Noble

Item	Clause	Interpretation
Project Owner	Recitals	Oyut Ulaan (OU)
Marketing Agent	Recitals	Noble Resources International
Quantity	Clause 1	30% of product produced in each contract year
Other Production	Clause 1	The proportion of annual product produced from the Project over which Noble has no marketing rights
Term	Clause 2	20 years from the production commencement date, the permanent cessation of commercial production or terminated in accordance with Clause 7.
Termination	Clause 7	A party may terminate by written notice if the other party is in breach or suffers an insolvency event. OU may also terminate for convenience at any time and must pay Noble an Early Termination Payment as estimated by an Expert
Assignment	Clause 11	Noble may assign to any Related Body Corporate to Noble with prior written consent. OU may transfer any interest in the Project to a third party or grant any person a security interest in respect of the Project subject to executing a deed of covenant.
Marketing Fee	Clause 4	Subject to the terms and conditions of this Agreement during the Payment Period OU will pay Noble a marketing fee equal to: ▪ US$10.00/dmt for the initial 35,000 dmt of Product in each Contract Year ▪ US$8.00/dmt for the next 30,000 dmt of Product in each Contract Year ▪ US$7.00/dmt for all subsequent amounts of the Product in each Contract Year, whose sale is procured by Noble as OU's agent under this Agreement.
Tax	Clause 16	OU must make all payments to be made by it under this Agreement without any Tax Deduction, unless such Tax Deduction is required by law. If required by law, OU must pay an additional amount together with the payment so that, after making any Tax Deduction, Noble receives an amount equal to the payment which would have been due.

Source: Marketing Agreement between Xanadu and Noble

Notes: This table does not summarise the whole agreement. It only summarises the relevant terms of the agreement with respect to the valuation of the Agreement. SRK is not qualified to give legal comment on this agreement.

19.4 Contracts required for development

Prior to construction and commissioning the Kharmagtai project will require a number of material contracts for mining, smelting and refining, transportation, handling and sales. As of the date of this report, none of these contracts are in place with the exception of the marketing agency contract noted in Section 19.3. These future contacts will be established during and after the next stage of study, consistent with industry standards.

20 Environmental studies, permitting and social or community impact

20.1 Environmental studies

Mongolian certified environmental impact assessment consultant Eco Trade LLC undertook a preliminary baseline environmental survey of the Kharmagtai area in 2003. This was submitted in 2011 as part of the Mining Licence application. The Mining Licence was granted in 2013.

All mining projects are required to have an impact assessment on environment and receive approval for an environmental protection plan and environmental mentoring program prior to implementation of the project. The conclusion of the preliminary baseline environmental survey provided by the authority stated that a Detailed Environmental Impact Assessment (DEIA) is required for implementing the Kharmagtai Copper-Gold Project, which was completed in 2012.

Xanadu engaged O2 Mining to undertake a review of the approved DEIA in 2019. O2 Mining identified the following supplementary studies to be undertaken:

- update climate monitoring data set
- baseline analyses of surface water chemistry
- baseline analyses of soil chemistry
- biodiversity offset studies for forest, flora and fauna
- ARD studies of waste rock
- Risk Assessment to be updated with risks associated with chemicals used on site
- mine closure plan
- further consultation with local communities and authorities to better inform the socio-economic impact assessment
- intangible cultural heritage study
- develop a cultural heritage ‘chance finding’ procedure.

These supplementary studies will be included in the PFS environmental and social base line assessments.

20.2 Permitting

The permitting pathway is clearly defined in Mongolia and includes the following key stages.

Stage 1 Studies & Assessments: 18 months

- Baseline Studies, as noted in the previous section
- Mongolia Feasibility Study (FS) Preparation
- Mongolia Environmental Impact Statement (EIS) Preparation

Stage 2 Study Approvals: 6 months

- Mongolia FS Approval
- Mongolia EIS Approval

Stage 3 Permitting and Agreements: 12 months

- Mongolia Permitting
- Mongolia Strategic Project Review
- Mongolia Investment Agreement

20.3 Waste Management

Waste management is addressed in the permitting process as described in section 20.1, through updated baseline studies, EIS and detailed permitting stages.

Further discussion of waste and stockpile storage plans at a PEA stage of development are described in section 18.18.

20.4 Water Requirements and Management

Water management is addressed in the permitting process as described in section 20.1, through updated baseline studies, IS and detailed permitting stages.

Further discussion of water usage and supply at a PEA stage of development is described in section 18.3.

20.5 Tailings Disposal

Tailings disposal is addressed in the permitting process as described in section 20.1, through updated baseline studies, EIS and detailed permitting stages.

Further discussion of tailings disposal at a PEA stage of development is described in section 17.2.3.

20.6 Local Communities

The South Gobi is one of the least populated regions of the world, and Kharmagtai project is located approximately 100km from the closest community of Tsogttsetsii, as shown on the map in section 18.1. A small number of nomadic herders also live in the same region as the project. Xanadu maintains strong relationships with these stakeholders and provides support to education, health and economic development. Community relations and engagement are described in greater detail in Xanadu’s Sustainability Report, which available on the Xanadu website.

From a permitting perspective, local community impact is addressed as described in section 20.1, through updated baseline studies, EIS and detailed permitting stages.

21 Capital and operating costs

21.1 Capital cost estimate

Capital costs were generated from new sources for this study with only minimal costs carried over from 2019 CSA. Mine establishment and sustaining costs have been estimated by Integrity Mining Services. The process plant and associated plant infrastructure costs were provided by Ausenco with adjustments made to eliminate scope overlaps with other consultants. O2 Mining provided general site infrastructure costs including buildings, workshops, accommodation and site heating requirements. Each consultant has provided advice on appropriate levels of EPCM and contingency for their respective scope areas. The major Project cost areas are described in the following sections.

21.1.1 Mining

The initial mine establishment cost is US$104 M with additional added throughout the mine life as the pits deepen and the haul duration increases. Mine fleet replacements are also included over the mine life.

21.1.2 Process

Ausenco was commissioned by Xanadu to provide a scoping study level engineering and cost estimate for the concentrator, with a nominal accuracy of +/-35%. The design criteria were set by Xanadu for both a single (15 Mtpa) and dual (30 Mtpa) train plants.

Process plant capital costs for a 15 Mt single line SAG and ball mill circuit including a gravity gold recovery circuit were based on Ausenco's benchmark costs for an operating plant. Adjustments made to Ausenco's original estimate were the removal of scope areas estimated by others and adjustment to the ball milling circuit to allow for a single ball mill in place of the original twin mill design. Ausenco provided two plant estimates; one using international sourced equipment and international EPCM providers utilising local construction contractors with expatriate management and supervision, the second using Chinese sourced equipment and Chinese/Mongolian EPCM providers with local construction contractors and no expatriate supervision. These two estimates for the 15 Mtpa plant resulted in an international delivery capital cost estimate at $644M and a Chinese estimate at $491M, both costs including indirect costs and contingency. Xanadu elected to adopt the Chinese execution and supply estimate for this study due to the physical proximity of the project to China and the strong potential for a Chinese strategic partner in its development.

Plant sustaining costs were based on 1% of the process plant direct cost and allocated on a per tonne basis to allow for ramp up and down throughout the schedule. Tailings dam development was based on the 2019 CSA design and costs for a 305 Mt facility and extrapolated on a $/t basis to allow for the increased storage required for the current case. An allowance of $25 M was added to the initial capital cost for a redesigned lined TSF to be detailed in the PFS.

21.1.3 Infrastructure

Infrastructure area capital costs are a combination of new estimates provided by O2 Mining, a Mongolian-based engineering house, and the 2019 CSA estimates. The power line to site is based on current construction data provided by Xanadu Ulaanbaatar staff.

21.1.4 Indirect and contingencies

Indirect costs and contingency were applied to the direct costs using the factors in the following Table 21-1. EPCM factors for the process plant were derived by the study team and were not provided by Ausenco. Capital to establish the construction facility was provided by O2 Mining, and operating cost of the facility was estimated by Ausenco.

Closure costs are a study allowance only at this stage.

Table 21-1: Indirect and contingency capital costs

Indirect Costs	Initial 15 Mt	Expansion 30 Mt	Source
EPCM - Mining	5%	5%	Study team
EPCM - Process Plant	20%	10%	Study team
EPCM - Infrastructure	10%	10%	O2 Mining
Construction Facilities - Plant	US$10 M	US$10 M	Ausenco
Commissioning - Plant	5%	5%	Ausenco
Construction Cranes	2.6%	2.6%	Ausenco
Construction Facilities - Infra	US$5 M	US$3 M	O2 Mining
Commissioning - Infra	US$0.2	$0	O2 Mining
Other Indirects	US$2 M	US$1 M	O2 Mining
Closure Costs		US$90 M	allowance
Contingency			
Mining	15%	15%	Study team
Process Plant	20%	20%	Ausenco
Infrastructure	15%	15%	O2 Mining

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

21.1.5 Summary of capital costs

The overall capital costs comprising initial, deferred and sustaining are summarised in Table 21-2.

Table 21-2: Summary of initial and deferred capital cost

Capital Expenditure	US$ M
Mining	104
Process Plant	289
Tailings	42
Site Infrastructure	32
Indirects	110
Contingency	84
Owners Costs	
Drilling & Evaluation	5
Studies	19
General Owners Team	10
Total Initial Capital	**694**

Capital Expenditure	US$ M
Mine Expansion	72
Mine Sustaining	300
Plant & Infra Expansion	287
Plant Sustaining	147
Tailings Sustaining	137
Indirects	73
Contingency	83
Closure	90
Total Deferred/Sustaining	**1,189**
Total Capital Expenditure	**1,883**

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

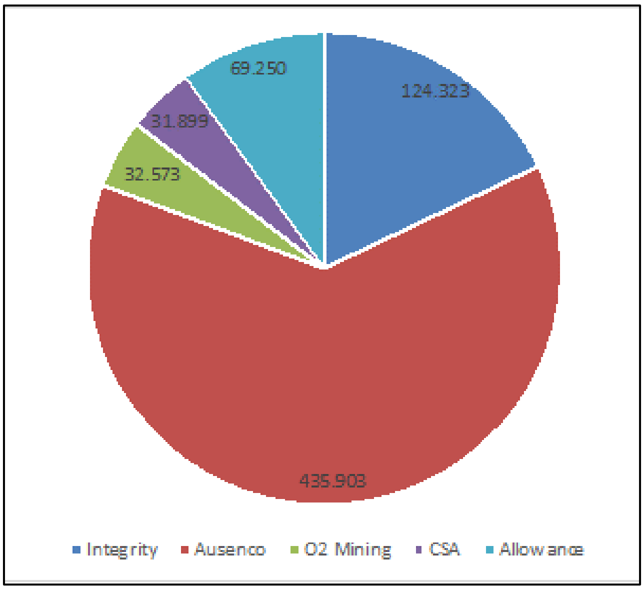
Table 21-3 and Figure 21-1 show the initial capital by estimate source consultant or internal study team allowance. The majority of the initial capital estimate were provided by Ausenco for the process plant followed by Integrity Mining for the initial mining fleet. Indirects and contingency allowances are included in these values.

Table 21-3: Estimate sources

Estimate Sources	US$ M
Integrity Mining	124
Ausenco	436
O2 Mining	33
2019 CSA	32
Allowances	69
Total Initial Capital	694

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

Figure 21-1: Estimate sources



Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

21.2 Operating cost estimate

21.2.1 Introduction

Operating costs have been based on data from Integrity Mining for mining related costs, 2019 CSA for the process plant and study team benchmark data for site general and administration costs and corporate overhead. The following sections list the primary results for each main project activity along with consolidated average life of mine unit costs.

21.2.2 Mining

The mining operating costs used in the financial evaluation were developed from first principles by Integrity Mining without contingency added (Table 21-4).

Table 21-4: Mining operating costs

Mining operating costs	Unit	Rate
Drilling	$/drilled	0.15
Blasting	$/blasted	0.30
Loading	$/tmm	0.24
Hauling	$/Uhour	370
Mine Services	$/tmm	0.33
Mine Management		
40 Mt Mining Rate	US$M/annum	12.3
85 Mt Mining Rate	US$M/annum	17.4
Stockpile Reclaim	US$M/annum	4.6

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

Note that the mine optimisation process used different rates than the table above, based on the 2019 CSA Study costs plus 10% contingency.

21.2.3 Processing

Process plant input cost assumptions are shown in Table 21-5. These factors were previously derived by 2019 CSA and have been reviewed and confirmed as appropriate for this plant design. The power tariff of $47/MWh was also benchmarked and confirmed as appropriate by O2 Mining using their extensive and current Mongolian database. The same unit rates are used for both plant scales of a single line 15 Mtpa plant and a dual line 30 Mtpa plant with only an adjustment to the labour cost.

Table 21-5: Operating costs for processing

Processing operating cost	Units	15 Mtpa (single line)	30 Mtpa (dual line)
Labour	US$M/annum	5.7	8.6
Power			
Consumption	kWh/t	27.10	27.10
Power Unit Cost	US$/MWh	47.00	47.00
Reagents			
Lime	US$/t	0.06	0.06
MIBC	US$/t	0.26	0.26
Aerophine 3418A	US$/t	0.08	0.08
Flocculant	US$/t	0.04	0.04
Grinding Media & Liners			
Grinding Ball	US$/t	1.42	1.42
Crusher Liners	US$/t	0.07	0.07
Grinding Mill Liners	US$/t	1.06	1.06
Plant Maintenance	US$/t	0.37	0.37
Other Consumables			
Safety Equipment	US$/t	0.02	0.02
Assay Lab	US$/t	0.01	0.01
Piping	US$/t	0.06	0.06
Lubricants	US$/t	0.01	0.01
Tailings	US$/t	0.20	0.20
Gravity Gold Plant			
Gravity Plant	US$/t	0.05	0.05
Gold Room	US$/oz	13.86	13.86

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

21.2.4 General and administration, regional office and corporate overheads

Site general and administration (G&A) covers all non-mining and process costs including labour messing and accommodation, building heating costs, water supply costs, site administration and management functions. Xanadu intends to operate a regional office for community relations and any administration functions that are not required at the mine site. People in this office would live in the town and work a normal five day per week roster.

The Ulaanbaatar head office function would cover company management, sales and marketing along with legal, accounting and business compliance functions.

The rates used in the study are based on benchmarks taken from similar sized operations in developing countries with a similar operating structure. These rates are not based on detailed estimates at this stage.

Table 21-6: G & A and corporate overheads operating costs

General & Administration	Unit	15 Mt Plant	30 Mt Plant
Site General & Admin	US$M/annum fixed	19.3	29.2
Regional Office	US$M/annum fixed	3.3	3.3
Corporate Overheads			
Ulaanbaatar Head Office	US$M/annum fixed	9.8	9.8

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

21.2.5 Summary of operating costs

A summary of the overall project operating costs is shown in Table 21-7 and are expressed as a cost per tonne of ore processed. Mining costs are shown in three formats, cost of material ex pit which excludes stockpile rehandle tonnes, costs including stockpile rehandle tonnes and a cost per tonne of ore processed.

Operating cost contingency allowances have been excluded from the financial analysis.

Table 21-7: Summary of operating unit cost

Operating Unit Costs	Units	Initial 5 years	Expansion 25 years	Average LOM
Mining excl stockpile reclaim	US$/tmm	1.86	2.13	2.09
Mining	US$/tmm	1.86	1.92	1.91
Mining	US$/t ore	5.43	4.30	4.40
Processing	US$/t ore	5.42	5.30	5.31
General & Administration	US$/t ore	1.70	1.08	1.14
Corporate Overheads	US$/t ore	0.75	0.35	0.39
Total Operating Unit Costs	**US$/t ore**	**13.30**	**11.03**	**11.24**

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

22 Economic analysis

The results of the economic analysis represent forward-looking information as defined under Canadian securities law. The results depend on inputs that are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here. Factors that could cause such differences include, but are not limited to: changes in commodity prices, costs and supply of materials relevant to the mining industry, the actual extent of the mineral resources compared to those that were estimated, actual mining and metallurgical recoveries that may be achieved, technological change in the mining, processing and waste disposal, changes in government and changes in regulations affecting the ability to permit and operate a mining operation. Forward-looking information in this analysis includes statements regarding future mining and mineral processing plans, rates and amounts of metal production, tax and royalty terms, smelter and refinery terms, the ability to finance the project, and metal price forecasts.

This PEA study is preliminary in nature. It includes Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the conclusions of this preliminary economic assessment will be realised. As such, Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

22.1 Principal assumptions

The economic modelling of the production schedules has used the evaluation inputs and assumptions for financial, marketing and production parameters as shown in Table 22-1, Table 22-2 and Table 22-3.

Table 22-1: Economic analysis financial inputs

Financial Inputs	Value
NPV Discount Rate	8% real
Mongolian Company Tax	25%
Tax Depreciation Method	10-year straight line
Customs Duty	5% rate applied to 50% of expenditure
Mongolian VAT	10% rate applied to 75% of expenditure
VAT Recovered	100% after export sales begin

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

Table 22-2: Economic analysis marketing inputs

Marketing Inputs	Copper	Gold	Common
Metal Price	US$4.00/lb	US$1,700/oz	
Treatment Charge			US$85/t conc
Refining Charge	US$0.085/lb	US$4.50/oz	
Payable	96.5%	96.0%	
Metal Deduction	1% unit	1 g/t dry	
Concentrate Grade			25%
Concentrate Moisture			8%
Concentrate Freight			US$50/t wet
Royalty Rates	5% in conc	5% Au in conc 2.5% Au bullion	

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

Table 22-3: Economic analysis production inputs

Production Inputs	Value
Early Construction Work	2025
Mine Pre-stripping Start	2027
Process Production Start	2028
Production Ramp-up Yr 1	80%
Cu Recovery to Concentrate	90%
Au Recovery to Concentrate	47.5%
Au Recovery to Bullion	30% (gravity)

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

The derivation for concentrate treatment charges and process recoveries are described in section 19.3 of this report. All evaluation results are presented in US$ real terms on an after-tax basis.

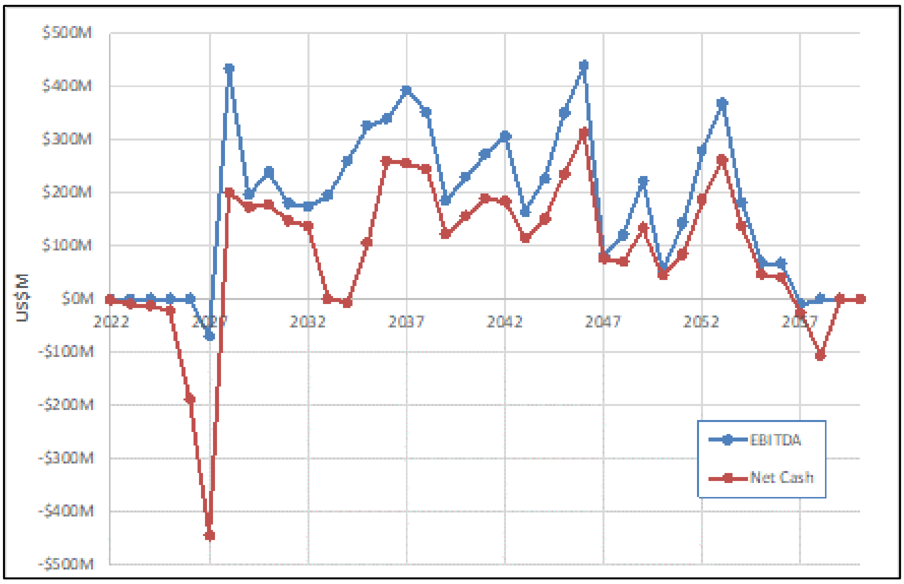
The study assumes the Mongolian royalties can be negotiated down to 5% for copper concentrate as was achieved for the Oyu Tolgoi project.

22.2 Cashflow forecasts

Project annual cashflow and EBITDA are shown in Figure 22-1. The average EBITDA is $226 M while the net cashflow averages $114 M. Note the low net cashflow result in 2032 and 2033 which corresponds with the process plant expansion construction expenditure.

The results of the economic analysis under this section of the Report are based on Mineral Resources and not Mineral Reserves. The reader should be aware that Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

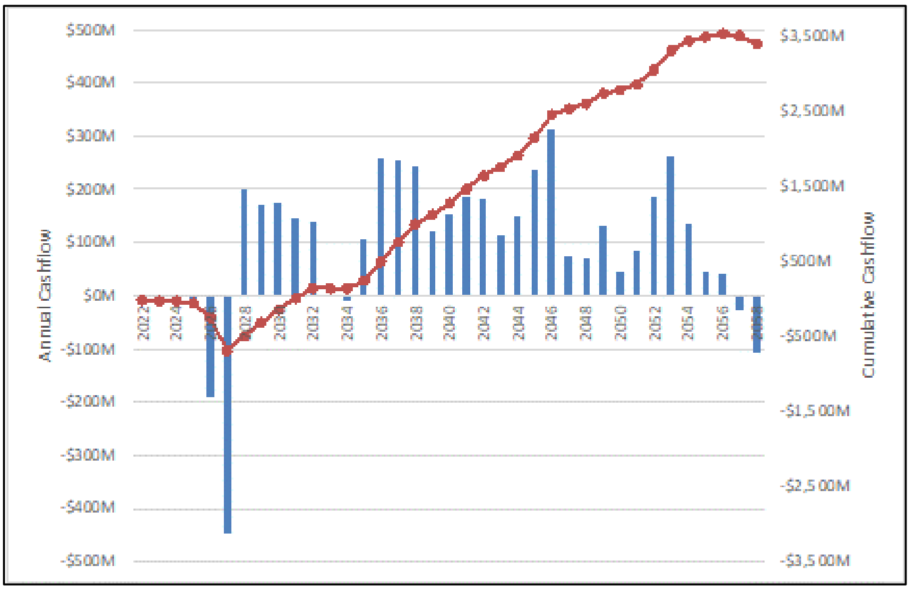
Figure 22-1: EBITDA and net cashflow



Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

The Project cumulative cashflow is shown in Figure 22-2. The negative cashflows at the end of the Project life are associated with closure activities. Final cumulative net cash is $3,148 M.

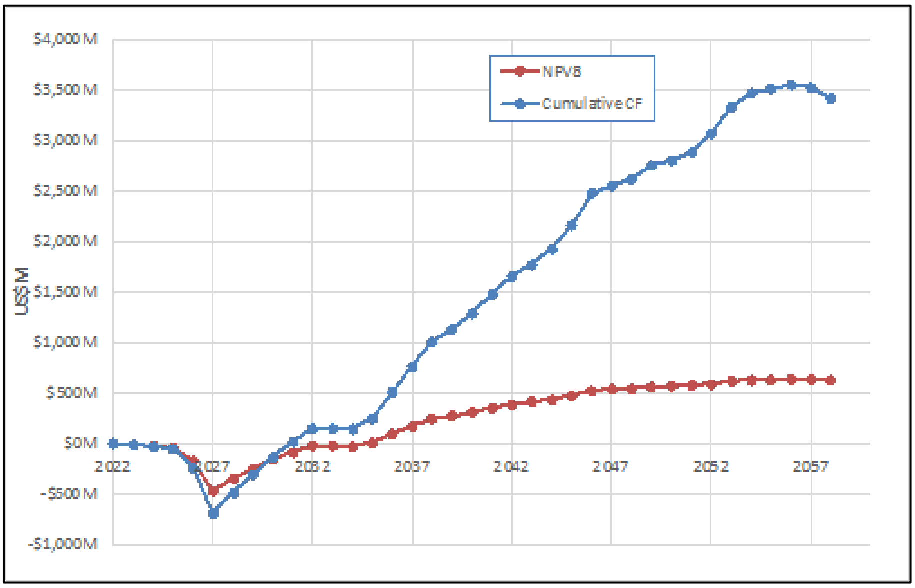
Figure 22-2: Cumulative net cashflow



Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

Finally, cumulative cashflow and NPV generation are shown together in Figure 22-3.

Figure 22-3: Net cashflow & NPV generation



Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

22.3 Evaluation results

The Project evaluation results are shown in Table 22-4 including total net revenue, EBITDA, net cashflow, NPV at 8% discount rate, internal rate of return and capital payback period.

In summary, the Project generates an NPV of $629 M and an IRR of 20% for the base case. The initial capital payback is 4 years after the commencement of operations. In the low case the NPV and IRR are $405 M and 16%, respectively. While for the high case the NPV and IRR are $850 M and 25%, respectively.

The results of the economic analysis under this section of the Report are based on Mineral Resources and not Mineral Reserves. The reader should be aware that Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

Table 22-4: Financial evaluation results

Project Financial Summary	Unit	Low Case	Base Case	High Case
Net Revenue	US$ M	15,200	16,124	17,100
EBITDA	US$ M	5,880	6,766	7,660
Net Cashflow	US$ M	2,590	3,418	4,240
NPV (8% discount)	US$ M	405	629	850
IRR	%	16%	20%	25%
Capital Payback Period	year	7	4	4

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

The Project all in sustaining cost (AISC) is shown in Table 22-5 with an initial net unit cost of $1.02/lb which increases over time to a final average life of mine result of $1.87/lb. These costs would position the project initially in the first quartile and overall in the third quartile of copper producers. The increase in unit cost over time is related to the gradual decline in copper grades and reduction in the gold credit again due to declining gold grades.

Table 22-5: All in sustaining cost

All in Sustaining Cost ($/lb)	Initial 5 Years	Expansion 25 Years	Average LOM
Mining	1.00	1.09	1.08
Processing	0.99	1.35	1.31
General & Admin	0.31	0.28	0.28
Corporate Overhead	0.14	0.09	0.09
Sustaining Capital	0.09	0.20	0.18
Site Costs	2.53	3.00	2.94
Concentrate Transport	0.10	0.10	0.10
TC/RC	0.25	0.25	0.25
Royalties	0.27	0.24	0.25
Total Unit Operating Cost	3.15	3.60	3.54
Au Credits	-2.13	-1.61	-1.67
Net Unit Costs	1.02	1.99	1.87

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

22.4 Taxation and royalties

A summary of expected royalty and taxation payments to the Mongolian Government is shown in Table 22-6 and graphically in Figure 22-4. Royalty rates and taxation rates are listed in Table 22-1 and Table 21-2 previously. The VAT calculation assumes that VAT is paid and refunded against project export earnings. Given that export earnings or net revenue is always greater than the VAT paid each year, then 100% of VAT payments would be refunded. The only VAT payments not eligible for a refund would be the initial project construction expenditure prior to the commencement of commercial operations. Annual average values shown in Table 22-6 are a simple total value divided by the project life of 30 years.

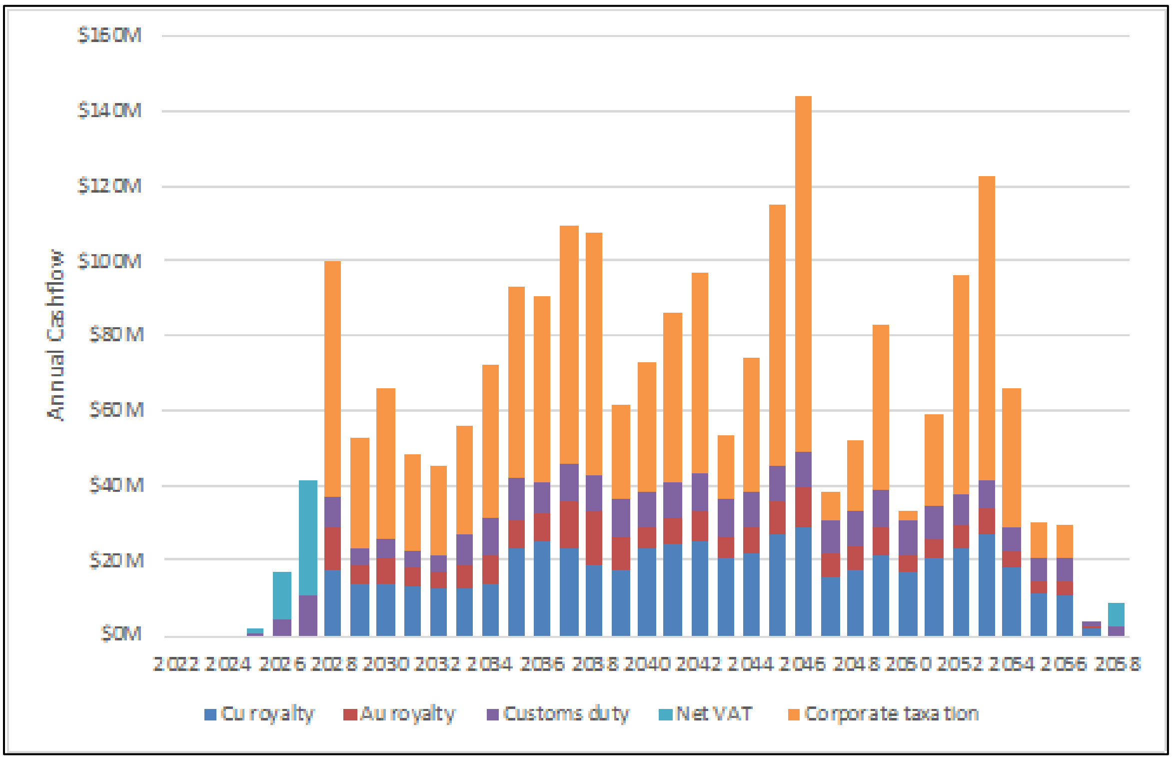
The results of the economic analysis under this section of the Report are based on Mineral Resources and not Mineral Reserves. The reader should be aware that Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

Table 22-6: Government cashflow

Mongolian Government Cashflow	Annual Ave US$ M	LOM Total US$ M
Cu Royalty	18.7	562
Au Royalty	6.8	205
Customs Duty	8.7	261
Net VAT	1.7	52.5
Corporate Taxation	38.3	1,150
Total Government Cashflow	74.4	2,231

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

Figure 22-4: Government cashflow



Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

22.5 Sensitivity analysis

Sensitivity results are shown in Table 22-7, Figure 22-5 and Figure 22-6 for a variation in copper price, operating costs, gold price and capital costs of +-20%. Results for both NPV and IRR are shown. The Project is most sensitive to copper prices followed by operating costs, gold price and least sensitive to capital costs. Throughout a range of +-20%, the Project values remain positive.

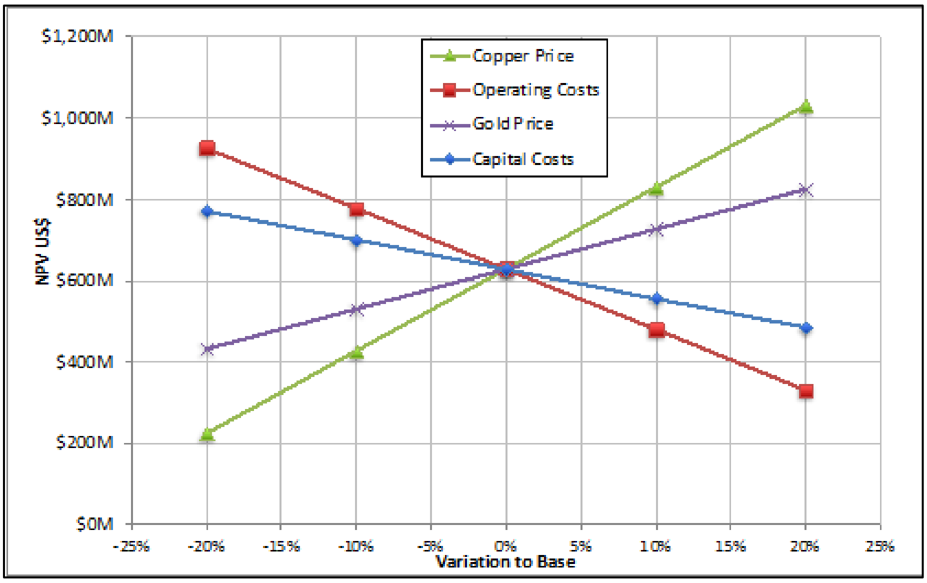
The results of the economic analysis under this section of the Report are based on Mineral Resources and not Mineral Reserves. The reader should be aware that Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

Table 22-7: Sensitivities

Copper Price	-20%	-5%	Base	10%	20%
NPV US$ M	$225	$427	$629	$831	$1,032
IRR %	13.3%	17.0%	20.3%	23.4%	26.2%
Operating Costs	-20%	-10%	Base	10%	20%
NPV US$ M	$926	$778	$629	$481	$331
IRR %	24.5%	22.5%	20.3%	18.0%	15.5%
Gold Price	-20%	-10%	Base	10%	20%
NPV US$ M	$433	$531	$629	$727	$826
IRR %	16.8%	18.6%	20.3%	22.0%	23.7%
Capital Cost	-20%	-10%	Base	10%	20%
NPV US$ M	$773	$701	$629	$558	$486
IRR %	26.1%	22.9%	20.3%	18.1%	16.2%

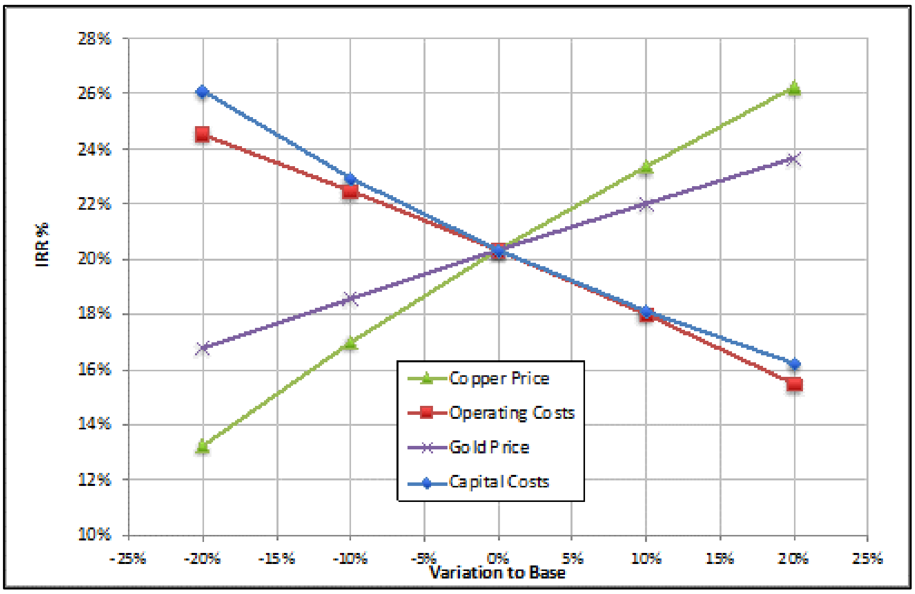
Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

Figure 22-5: NPV sensitivities



Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

Figure 22-6: IRR sensitivities



Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

Breakeven scenarios are shown in Table 22-8 where each variable is changed individually to yield a zero NPV. To reduce the value to zero, the copper price would need to be reduced by 31% to $2.76/lb, the operating costs increased by 42% to $15.95/t ore, the gold price reduced by 64% to $614/oz or the capital increased by 88% to $3,357 M over the entire Project life.

Table 22-8: Breakeven scenarios

Breakeven Sensitivity	% Change	Value
Copper Price	-31%	$2.76/lb
Operating Costs	+42%	$15.95/t
Gold Price	-64%	$614/oz
Capital Costs	+88%	$3,357 M

Source: Xanadu Mines Limited, Kharmagtai Project Scoping Study, 6 April 2022

23 Adjacent properties

Two major third party owned mining projects are situated within 150 km of the Kharmagtai Project: Erdenes-Tavantolgoi JSC's Tavan Tolgoi coking/thermal coal mine (located 65 km to the southwest) and Turquoise Hill's Oyu Tolgoi copper-gold mine (125 km to the south-southeast).

24 Other relevant data and information

The Qualified Persons signing this PEA report are not aware of any omissions or other relevant data and consider the explanations provided are not misleading.

25 Interpretation and conclusions

25.1 Mineral Resource

The continuity of mineralisation over the Kharmagtai deposit demonstrated by the historical drilling has defined considerable mineralised continuity. Recent infill and expansion drilling has produced data of a sufficiently high standard allowing the estimation of a reliable Mineral Resource for the project and has at this time allowed much of the deposit to be classified as Indicated and Inferred Estimates according to the NI 43-101 guidance notes for the reporting of Mineral Resources and Ore Reserves.

The current resource classification represents a significant improvement when compared to the earlier public released resource estimate classification in the 2018 MRE report and marks a prominent development milestone for Xanadu moving into more advanced Scoping Studies going forward.

The sectional interpretation and subsequent domain solid model provided by Xanadu in the 2021 investigation has evolved considerably when compared to the earlier iteration by SGC for internal purposes (2020) and even by comparison to the much earlier public release works by CSA in 2018.

Details pertaining to mineralogy, intrusive timing, veining types and intensity and cross cutting relationships, multi-element geochemistry, alteration and structural framework were incorporated during this round of domaining and subsequent estimation resulting in a complex and sophisticated domain strategy in-line with Xanadu’s direction and the advanced nature of the project development.

SGC further considers that in relation to the currently available drilling coverage:

- Significant upside exists to extend and upgrade the Mineral Resources across the Kharmagtai Project with potential to increase tonnages and upgrade classifications with additional drill density at depth. The existing Resources are also amenable to infill and extension drilling nearer to surface, particularly if a lower cut-off grade can be justified.

Numerous other priority exploration targets across the tenement would also benefit significantly from additional exploration, infill and extension drilling to a level that can potentially support the estimation of additional Resources on over other mineralised centres proximal to the existing Resources at Stockwork Hill, Copper Hill, Zaraa and White Hill.

25.2 Mining and processing

This PEA study is preliminary in nature. It includes Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the conclusions of this PEA will be realised.

The Kharmagtai Project Scoping Study was initiated to demonstrate a potentially viable mine configuration for the Kharmagtai Project of sufficient interest to support advancement to a PFS.

Based on a reasonable set of cost and revenue assumptions and a conventional low risk mining and processing operation, the mining optimisation study demonstrated a production schedule to process at 15 Mtpa until payback (7 years) of the initial capital and then add a second processing train to process at 30 Mtpa for the remainder of the mine life totalling some 30 years. The total inventory processed would be some 764 Mt grading 0.21% copper and 0.18 g/t gold to produce 1.47 Mt copper and 3.3 Moz gold at average rates of 50 ktpa copper and 110 kozpa gold.

Reputable consultants with relevant expertise were engaged to estimate the Project capital cost and operating costs to a typical Scoping Study accuracy of ±35%. The study comprised preliminary assessments of the full range of study disciplines and described a viable development option to warrant advancement to the PFS stage.

The initial capital cost was estimated at US$694 M with an additional US$1,188 M of expansion and sustaining capital over the mine life. The project has an IRR of 20%, a payback period of 4 years and an NPV at 8% of US$629 M in real terms after tax. The Project value is relatively insensitive to capital costs and most sensitive to revenue. However, the Project value remains positive through a range of ±20%.

There remains significant opportunities to improve the project by processing of oxide mineralisation, currently mined as waste and extending mine life by lowering operating costs and/or realising the exploration potential.

The PFS is the major data acquisition phase with drilling programs to collect data and samples to support the Mineral Resource estimation, geotechnical engineering, geometallurgy, process design, waste rock, TSF and environmental studies.

The PFS should assess a range of development options typically costed to ±20 to 25% to identify the single development option to assess in the FS.

Critical path tasks to complete the PFS would be the inputs to the mining optimisation study including the MRE, geotechnical and hydrological study inputs to the mine design parameters and ore processing recoveries for sulphide and oxide mineralisation. Critical path items to project development are likely environmental, social, permitting and approvals. These areas would need to be carefully managed during the PFS.

26 Recommendations

Based on the results of this PEA, advancement to Pre-Feasibility Study (PFS) is recommended. The PFS will include trade-off studies to select a single, go-forward option and to reduce the levels of uncertainty in the project, to enable a Financial Investment Decision (FID), engineering and construction. The PFS will consider but not be limited to the following technical studies.

26.1 Geology and Resource definition

Approximately 30,000 m of resource drilling are estimated to bring the Kharmagtai mining zones to a fully indicated classification.

In addition, SGC believes that further effort should be focused upon the validation of project sensitive information at or as close to source as possible to fully confirm the veracity of all data sets. Conclusions drawn from the project review are discussed below:

- Whilst the domain models have significantly evolved during this round of investigation and estimation, it is proposed by SGC that the geological databases/logs will continue to require further refinement and review to ensure that consistency in logging is achieved in relation to the key constraining attributes of the dataset, including but not limited to; structural, geological, veining and intrusive phases as well as geotechnical to ensure that the domain solid modelling captures the inherent local variability and continuity of the associated ore zones.
- During the production of the 2021 estimates by SGC, structural controls were incorporated into the final domain strategy, and it is understood by SGC that Xanadu is working on further detailed follow-up work in relation to structural complexity which is ear marked to be incorporated into the next round of estimation.
- Density measurements and the subsequent density database must be reviewed by lithology and oxidation state and compared to the historical informing dataset to ensure all outliers are accounted for and that values are within logical ranges for the known host units on a continuing basis.
- During the recent re-estimation by SGC, comparative geometry modelling primarily for copper and gold values within the mineralised domains was undertaken as a means of assessing the sensitivities of structure ranges and nugget to an alternative geometry modelling methodology. The geometry modelling highlighted the presences of a number of mixed populations within primary domains which were addressed by Xanadu once raised by SGC. To this end, it is recommended by SGC that continued vigilance be the standard during domaining stages to identify all sub-populations where applicable.
- Some ore domains displayed insufficient data to undertake adequate variogram modelling. In those circumstances a representative variogram model was used which appropriately reflected the ore domain orientation and habit. This was particularly prevalent in zones which suffered a lacked sufficient drilling such as some portions of the Zaraa deposit at depth and at the margins of both Copper Hill and White Hill.
- The variogram models produced by SGC for the individual project areas (and sectors within the project areas) according to the defined domain strategy by Xanadu exhibit structure ranges which are notionally shorter across all variogram directions when compared to the earlier 2018 MRE variogram models, this was particularly the case at the second and third structure ranges.

- For the Mineral Resource further effort should be focused upon the validation of project sensitive information at or as close to source as possible to fully confirm the veracity of all data sets.

26.2 Mining

- update the open pit optimisation study and select the final open pit shapes, mining sequence, production schedules
- optimise mining selectivity with trade-off analysis considering mining rate, cost and productivity and estimate mining recovery and dilution
- select the preferred mining method and production rates
- develop preliminary practical mine designs for each cut-back accounting for access ramps, minimum mining widths, bench heights and geotechnical design criteria
- prepare preliminary drill and blast designs, method and costs
- identify waste dump and stockpile locations and design consistent with the production schedule
- design preliminary mine surface infrastructure layout including roads, water management facilities, workshops, fuel storage, explosives handling and offices
- assess opportunities to reduce operating costs such as mining fleet electrification and in-pit crushing and conveying
- select mining equipment fleet
- assess workforce requirements
- consider potential future underground mining in surface layout design.

26.3 Geotechnical

- design and implement the geotechnical drilling program and data collection regime to support the proposed mine designs and integrated with the hydrogeological data requirements
- in collaboration with the geological team, prepare a site structural model to support development of the geotechnical pit design parameters
- ensure sufficient data are collected and laboratory testwork undertaken to characterise the rock mass and groundwater conditions to develop the preliminary geotechnical model
- develop design parameters for the mine design
- undertake studies to provide design parameters for the key site infrastructure such as waste dumps, TSF, roads, buildings and the ore processing plant sites.

26.4 Metallurgy & Processing

- In collaboration with the geological team, prepare a geometallurgical domain model to support the development of process plant design parameters
- Design and implement the metallurgical test program to evaluate all key geometallurgical domains and to support the proposed process plant design and flow sheet

- Ensure sufficient data are collected and laboratory testwork undertaken to characterise the grind, hardness, flotation, leach and other chemical and physical processing characteristics within each key domain
- Undertake testwork to define concentrate product characteristics from the proposed plant design
- Develop design parameters for the process plant
- Develop input requirements for the process plan including water, power and chemicals
- Undertake studies to provide design parameters for all key process plant components including but not limited to crush & grind, flotation, leach.

26.5 Engineering and infrastructure

The infrastructure to support the mining and processing operation should be identified and preliminary engineering designs prepared.

Suggested work program:

- Identify the required infrastructure and prepare a preliminary site layout
- Prepare preliminary designs for the site access road
- Prepare preliminary designs for the site water supply, treatment system reticulation and disposal facilities
- Preliminary analysis of the site transport requirements (road, rail and air) including personnel and goods during construction and operation
- Preliminary study on the transport of the copper-gold concentrate and bullion
- Assess the amount and type of waste to be disposed of from site, the waste disposal options and costs
- Describe the project support infrastructure including warehouses, workshops, fire systems, security, power substations and water supply etc
- Preliminary assessment of the site power and energy requirements and options for supply and delivery
- Preliminary assessment of site power and energy reticulation infrastructure
- Preliminary design of site accommodation, security and medical facilities.

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Certificate of Qualified Person

This certificate applies to the technical report prepared for Xanadu Mines Limited (Xanadu) entitled National Instrument 43-101 Preliminary Economic Assessment Technical Report on the Kharmagtai Copper-Gold Project signed on 12th of June 2022 (the 'Technical Report') and effective 4th of April 2022.

I Andrew Stewart confirm that I am the Competent Person (and Qualified Person in relation to the CIM Definition Standards, 2014) for the Report and:

- I am full time employee of Xanadu Mines Ltd and have been so since 2015. I currently hold the position of Vice President Exploration situated at Xanadu main office: Level 6, 22 Pit Street Sydney, NSW, 2000
- I graduated with a Bachelor of Science (Hons) from Macquarie University and a PhD from the Centre of Ore Deposits and Exploration Studies at the University of Tasmania. I have worked as a geologist for 22 years since graduating from university and have worked continuously in the mining industry for 22 years.
- I am a Member of the Australasian Institute of Geoscientists and a Member of the Society of Exploration Geologists.
- I am a Competent Person as defined by the JORC Code, 2012 Edition, having more than five years' experience that is relevant to the style of mineralisation and type of deposit described in the Report, and to the activity for which I am accepting responsibility.
- I have read the definition of a Qualified Person set out in the National Instrument 43-101 – Standards Disclosure for Mineral Projects (NI 43-101) and certify that, by reason of my education, affiliation with a professional association, and past relevant work experience, I fulfil the requirements to be a Qualified Person for the purpose of NI 43-101.
- I am responsible for preparing the technical report titled National Instrument 43-101 Preliminary Economic Assessment Technical Report, Kharmagtai Copper-Gold Project, dated 12th of June 2022 (the Technical Report). I am responsible for the overall project management and all sections of this report. Input has been received from independent professional companies.
- I visited the site on multiple occasions, most recently in both March and June 2022.
- As an employee of Xanadu Mines, I am not considered independent as set out in the National Instrument 43-101.
- I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclosure which makes the Technical Report misleading.
- I have read the National Instrument 43-101 and Form 43-101F and the Technical Report has been prepared in compliance with that instrument and form
- I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report

Dated this 20th of June 2022.

[Dr. Andrew Stewart, BSc Hons Geology, PhD Geology]

[Australian Institute of Geoscientists, Members Number: 4878; Society of Exploration Geologists, Member Number: 76121]

Certificate of Qualified Person

This certificate applies to the technical report prepared for Xanadu Mines Limited (Xanadu) entitled National Instrument 43-101 Preliminary Economic Assessment Technical Report on the Kharmagtai Copper-Gold Project signed on 12th of June 2022 (the 'Technical Report') and effective 4th of April 2022.

I Robert Huon Spiers confirm that I am the Competent Person (and Qualified Person in relation to the CIM Definition Standards, 2014) for the Report and:

- I am a full-time employee of Spiers Geological Consultants and was engaged by Xanadu Mines to prepare the documentation for Mineral Resource Estimates for the Kharmagtai Projects on which the Report is based, for the period ended as of 28th of February 2022. The place from which I conduct my business is Level 6, 22 Pit Street Sydney, NSW, 2000.
- I graduated with a Bachelor of Science (Hons) with a double Major Geology and Geophysics at La Trobe University in Melbourne, Australia. I have worked as a geologist for a total of 31 years since graduating, and worked continuously in the mining industry for 31 years.
- I have read and understood the requirements of the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012 Edition).
- I have read and understood the requirements of the 2014 Edition of the CIM Definition Standards for Mineral Resources and Mineral Reserves (CIM, 2014 Edition).
- I am a Competent Person as defined by the JORC Code, 2012 Edition, having five years' experience that is relevant to the style of mineralisation and type of deposit described in the Report, and to the activity for which I am accepting responsibility.
- I am a Qualified Person(s) as defined by the CIM Definition Standards in that I am able to face peers and demonstrate competence and relevant experience in the commodity, type of deposit and situation under consideration. If doubt exists, the person must either seek or obtain opinions from other colleagues or demonstrate that he or she has obtained assistance from experts in areas where he or she lacked the necessary expertise.
- I am a Member of the Australian Institute of Geoscientists.
- I am responsible for preparing the geological sections of the technical report titled National Instrument 43-101 Preliminary Economic Assessment Technical Report, Kharmagtai Copper-Gold Project and dated 12th of June 2022 (the Technical Report). Those include Sections 1, 6, 7, 8, 9, 10, 11, 12, 14, 24 - 27 of this report, which are largely unchanged from the previous NI43-101 dated February 28, 2022. Input has been received from independent professional companies.
- I have not visited the site due to COVID travel restrictions during the period the geology and resource component of this report was completed. A future visit is being planned in conjunction with Xanadu Mines Ltd.
- I currently hold 750,000 shares of Xanadu Mines Ltd. While this is not considered a material holding, it means that I do not qualify as independent of the issuer as defined in the National Instrument 43-101.
- I verify that the Report is based on and fairly and accurately reflects in the form and context in which it appears, the information in my supporting documentation relating to Exploration Targets, Exploration Results, Mineral Resources and/or Ore Reserves.
- I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report

Date this 20th of June 2022.

[Robert Spiers, BSc Hons Double Major Geology and Geophysics]
[Australian Institute of Geoscientists, Members Number: 3021]