NI 43-101 TECHNICAL REPORT AND PREFEASIBILITY STUDY, SAN MATÍAS COPPER-GOLD-SILVER PROJECT, COLOMBIA

PREPARED FOR: CORDOBA MINERALS CORP.

TECHNICAL REPORT EFFECTIVE DATE: JANUARY 11, 2022

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NI 43-101 TECHNICAL REPORT AND PREFEASIBILITY STUDY

SAN MATÍAS COPPER-GOLD-SILVER PROJECT COLOMBIA

Prepared for:

Cordoba Minerals Corp.

Project # 21008-01

Technical Report Effective Date: January 11, 2022

Alacran Deposit Mineral Resource Effective Date: August 3, 2021

Alacran Deposit Mineral Reserves Effective Date: October 31, 2021

Satellite Deposit Mineral Resource Effective Date: July 24, 2019

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Satellite Deposit Mineral Resource Effective Date: July 24, 2019

PREPARED AND SIGNED BY

The undersigned prepared this Technical Report, titled NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Colombia, and dated January 11, 2022. The format and content of this Technical Report conforms to National Instrument 43-101 of the Canadian Securities Administrators.

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REVISION HISTORY

REV. NO	ISSUE DATE	PREPARED BY	REVIEWED BY	APPROVED BY	DESCRIPTION OF REVISION
2.1	November 2, 2021	Nordmin	Client		Initial review
4.8	November 11, 2021	Nordmin	Client		Subsequent review
5.3	December 15, 2021	Nordmin	QPs		Review
5.4	January 4, 2022	Nordmin	QPs	QPs	Final

FORWARD-LOOKING STATEMENT

This document includes certain “forward-looking” information and "forward-looking statements" within the meaning of applicable securities legislation, together, forward-looking statements. All statements, other than statements of historical facts constitute forward-looking statements. Forward-looking statements estimates and statements that describe the Company's future plans, objectives or goals, including words to the effect that the Company or management expects a stated condition or result to occur. Forward-looking statements may be identified by such terms as "believes", "anticipates", "expects", "estimates", "may", "will", "could", "would", "if", "yet", "potential", "undetermined", "objective", "plan" or similar expressions. Since forward-looking statements are based on assumptions and estimates and address future events and conditions, by their very nature, they involve inherent risk, and uncertainties. Although these statements are based on information currently available to the authors of this Technical Report and the Company, the authors provide no assurance that actual results will meet the expectations set forth herein. Risks, uncertainties, and other factors, known and unknown, involved with forward-looking statements could cause actual events, results, performance, prospects, and opportunities to differ materially from those expressed or implied by such forward-looking statements. Forward-looking statements in this Technical Report include, but are not limited to, the Company's objectives, goals, future plans, statements, exploration results, potential mineralization, estimation of Mineral Resources, exploration, and mine development plans, the timing of the commencement of operations and estimates of market conditions. Furthermore, forward-looking statements include disclosure regarding the economics and project parameters presented in the PEA, including, without limitation, IRR, all-in sustaining costs, NPV, and other costs, and economic information, possible events, conditions, or financial performance that is based on assumptions about future economic conditions and courses of action; the timing and costs of future development and exploration activities on the Company's projects; success of development and exploration activities; permitting time lines and requirements; time lines for further studies; planned exploration and development of properties and the results thereof; and planned expenditures and budgets and the execution thereof. Factors that could cause actual results to differ materially from such forward-looking statements include, but are not limited to the failure to identify Mineral Resources, failure to convert estimated Mineral Resources to reserves, the inability to complete a feasibility study which recommends a production decision, the preliminary nature of the PFS and the metallurgical test results, geotechnical challenges, delays in obtaining or failures to obtain required governmental, environmental, or other project approvals, political risks, inability to fulfill the duty to accommodate Indigenous Peoples, uncertainties relating to epidemics, pandemics and other public health crises, including COVID-19 or similar such viruses, uncertainties relating to the availability and costs of financing needed in the future, changes in equity markets, inflation, changes in foreign currency exchange rates, fluctuations in commodity prices, delays in the development of projects, capital and operating costs varying significantly from estimates and the other risks involved in the mineral exploration and development industry, and those risks set out in the Company's public documents filed on the System for Electronic Document Analysis and Retrieval ("SEDAR"). Although the authors believes that the assumptions and factors used in preparing the forward-looking statements in this Technical Report are reasonable, undue reliance should not be placed on such forward-looking statements, which only apply as of the date of this Technical Report, and no assurance can be given that such events will occur in the disclosed time frames or at all. The authors disclaim any intention or obligation to update or revise any forward-looking statements, whether as a result of new information, future events, or otherwise, other than as required by applicable law.

CAUTIONARY NOTE TO US READERS REGARDING ESTIMATES OF MEASURED, INDICATED AND INFERRED RESOURCES

This Technical Report uses the terms "Measured" and "Indicated" Mineral Resources and "Inferred" Mineral Resources. The Company advises United States ("US") investors that, while these terms are recognized by the US Securities and Exchange Commission (SEC) under Regulation S-K subpart 1300, there are differences between the definitions ascribed to such terms under Regulation S-K subpart 1300 and the Canadian Institute of Mining (CIM) Standards.

The estimation of "Measured" and "Indicated" Mineral Resources involves greater uncertainty as to their existence and economic feasibility than the estimation of proven and probable reserves. The estimation of "Inferred" resources involves far greater uncertainty as to their existence and economic viability than the estimation of other categories of resources. It cannot be assumed that all or any part of a "Measured," "Indicated," or "Inferred" Mineral Resource will ever be upgraded to a higher category.

Under Canadian rules, estimates of "Inferred Mineral Resources" may not form the basis of feasibility studies, prefeasibility studies, or other economic studies, except in prescribed cases, such as in a preliminary economic assessment under certain circumstances. Under SEC rules, estimates of "Inferred Mineral Resources" may not be considered when assessing the economic viability of a mining project, and may not be converted to a Mineral Reserve. Under US standards, mineralization may not be classified as a "Mineral Reserve" unless the determination has been made that the mineralization could be economically and legally produced or extracted at the time the reserve determination is made. US investors are cautioned not to assume that any part or all of a "Measured," "Indicated," or "Inferred" Mineral Resource exists or is economically or legally mineable. Information concerning descriptions of mineralization and resources contained herein may not be comparable to information made public by US companies subject to the reporting and disclosure requirements under the SEC's Regulation S-K subpart 1300.

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1 SUMMARY

Nordmin Engineering Ltd. ("Nordmin"), Intera Geoscience & Engineering Solutions ("Intera"), Blue Coast Metallurgy & Research ("Blue Coast"), Stantec Consulting Chile Ltda ("Stantec") and Knight Piésold Ltd. ("Knight Piésold") (collectively referred to as "the Consultants") were retained by Cordoba Minerals Corp. ("Cordoba" or "the Company") to prepare a Canadian National Instrument 43-101 ("NI 43-101") Technical Report ("Technical Report") for the Prefeasibility Study ("PFS") for the Alacran deposit within the San Matías Copper-Gold-Silver Project ("the Project") located within Cordoba's San Matías exploration area in Colombia, South America.

1.1 Principal Outcomes

1.1.1 Economic Analysis

An engineering economic model was prepared for the Project to estimate annual cash flows and assess sensitivities to certain economic parameters. The economic results of this Technical Report are based upon the services performed by:

- Nordmin for geology, resource, reserve, open pit mining, processing, and surface infrastructure, water treatment facility ("WTF").
- Knight Piésold Ltd. for waste management facility and water management, geotechnical for site infrastructure.
- Stantec for open pit geotechnical.
- INTERA for hydrogeology, geochemistry, and environmental, and permitting.

The Alacran Mine includes an approximate two year construction period, two years of mining pre-production period, followed by 13 years of production supplying a mill feed rate of 22,000 t/d, and ten years of post-production mine closure. The project is planned to utilize an owner-operated scenario.

The Alacran Mine includes an open pit mine and associated infrastructure, surface infrastructure to support the mine operations (i.e., maintenance and office facilities), water management features, run of mine stockpiling areas, processing facility, waste and tailings management facility, and camp facility.

The Alacran Mine indicates an after-tax cash flow of 873.4$M, after-tax Net Present Value ("NPV") (8%) of 415.1$M, and after-tax IRR of 25.4%. The Project is most sensitive to commodity prices. On a pre-tax basis, the project has a pre-tax cash flow of 1,387.6 M$, a pre-tax NPV (8%) of 734.9 M$, and a pre-tax IRR of 36.1%.

Table 1-1 summarizes the economics for the described base case.

Table 1-1: Summary of Economic Analysis Results

Item	Value	Units
Financial Analysis		
Copper ("Cu") Price Assumption	3.60	US$/lb
Gold ("Au") Price Assumption	1,650	US$/oz
Silver ("Ag') Price Assumption	21	US$/oz
Pre-Tax NPV 8%	734.9	$M
Pre-Tax IRR	36.1%	%
Pre-Tax Payback	2.2	years

Item	Value	Units
After-Tax NPV 8%	415.1	$M
After-Tax IRR	25.4%	%
After-Tax Payback	2.9	years
Pre-Tax Unlevered Free Cash Flow	1387.6	$M
After-Tax Unlevered Free Cash Flow	873.4	$M
Life of Mine (“LOM”) Income and Financial Transaction Tax (FTT)	514.2	$M
Production Data		
Life of Mine	13	Years
Processing Rate	22,000 8.03	Tpd Mtpa
Blending of Saprolite Material	10	%
Recovered Cu	848.6	Mlbs
Average Cu Recovery	92.5	%
Recovered Au	0.68	Moz
Average Au Recovery	78.1	%
Recovered Ag	4.7	Moz
Average Ag Recovery	62.9	%
Pre-production Mined Tonnage	16.1	Mt
Total Mined Tonnage (including pre-production) from Open Pit Mining	211.8	Mt
Total Milled Tonnage from Open Pit Mining	101.2	Mt
Overall Mined Strip Ratio	1.1	waste:ore
Average Annual Cu Production	68,786	klbs
Average Annual Au Production	55	koz
Average Annual Ag Production	386	koz
Average LOM Mine Grade	0.41 0.26 2.30	% Cu g/t Au g/t Ag
Capital Costs		
Initial Capital, Direct Cost Estimate	321.3	$M
Initial Capital, Indirect Costs, and Contingency	111.9	$M
Other Costs and Working Capital	0.0	$M
Total Initial Capital Costs	434.9	$M
LOM Sustaining Capital	78.8	$M

Item	Value	Units
LOM Sustaining Capital, Indirect Costs, and Contingency	9.6	$M
Total LOM Sustaining Capital	88.4	$M
Reclamation	67.7	$M
LOM Total Capital	591.0	$M
LOM Operating Costs		
Open Pit (“OP”) Mining (per tonne OP mined)	2.05	$/t
Processing (per tonne milled)	8.28	$/t
Tailings, Water Management (per tonne milled)	0.45	$/t
Site Support Costs (per tonne milled)	1.40	$/t
Refining, Treatment, and Transport Costs (per tonne milled)	4.30	$/t
Royalties Costs (per tonne milled)	2.57	$/t
Total Operating Cost (per tonne milled)	20.97	$/t
Operating Cash Cost per lb Cu payable [1]	2.59	$/lb
All-In Sustaining Cost per lb Cu payable (net by-product credits) [1]	1.38	$/lb

Source: Nordmin, 2021. [1] Refers to "Non IFRS Financial Measures."

1.1.2 Mineral Resources

The Mineral Resources for Alacran were classified using the 2014 CIM Definition Standards and have an effective date of August 3, 2021. The Alacran deposit hosts 105.6 million tonnes of Indicated Resources grading 0.44% Cu, 0.27 g/t Au and 2.52 g/t Ag and 2.6 million tonnes of Inferred Resources grading 0.20% Cu, 0.17 g/t Au, and 0.86 g/t Ag at an NSR cut-off of $1.78/tonne for saprolite and $8.85/tonne for transition and fresh material. Total Indicated Resources contain 1,028 million pounds of Cu, 921,957 ounces of Au, and 8,545,652 ounces of Ag. Total Inferred Resources contain 11 million pounds of Cu, 14,531 ounces of Au, and 72,308 ounces of Ag.

The Mineral Resources were classified for the Satellite deposits using the 2014 CIM Definition Standards and have an effective date of July 24, 2019. The Satellite deposits host 16.3 million tons of Indicated Resources grading 0.29% Cu, 0.32 g/t Au, and 1.07 g/t Ag (0.64% CuEq) at an NSR cut-off of $13.75/tonne. Total Indicated Resources contain 51,300 tonnes of Cu, 170,600 ounces of Au, and 562,800 ounces of Ag. Total Inferred Resources contain 5,200 tonnes of Cu, 20,200 ounces of Au, and 71,700 ounces of Ag (Table 1-2).

Table 1-2: San Matías Copper-Gold-Silver Project 2021 Mineral Resource Estimate

Classification	Tonnage (Mt)	NSR ($)	CuEq Grade (%)	Cu Grade (%)	Au Grade (g/t)	Ag Grade (g/t)	Contained Cu (tonnes)	Contained Cu (Mlb)	Contained Au (oz)	Contained Ag (oz)
Indicated Resources										
Alacran	105.6	8.85	n/a	0.44	0.27	2.52	466,719	1,028.9	921,957	8,545,652
Montiel East	4.3	-	0.7	0.46	0.35	1.53	19,800	43.7	48,800	211,200
Montiel West	4.6	-	0.52	0.24	0.49	1.32	11,200	24.8	72,600	195,800
Costa Azul	7.4	-	0.4	0.24	0.21	0.65	20,300	44.8	49,200	155,800
Total Indicated	121.9	-	0.64	0.42	0.28	2.33	518,019	1,142.2	1,092,557	9,108,452
Inferred Resources										
Alacran	2.6	8.85	n/a	0.20	0.17	0.86	5,228	11.5	14,531	72,308
Montiel East	1.8	-	0.34	0.25	0.15	0.88	4,400	9.6	8,500	50,300
Montiel West	0.6	-	0.39	0.07	0.54	0.96	400	1	11,100	19,000
Costa Azul	0.1	-	0.39	0.29	0.16	0.6	400	0.8	600	2,400
Total Inferred	5.1	-	0.39	0.204	0.206	0.874	10,428	22.9	34,731	144,008

Source: Nordmin, 2021

Notes on Mineral Resources

1. The Mineral Resources in this estimate were independently prepared by Glen Kuntz, P.Geo. of Nordmin Engineering Ltd and the Mineral Resources were prepared in accordance with NI 43-101 and the CIM Definition Standards for Mineral Resources and Mineral Reserves (2014) and the CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (2019). Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. This estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, taxation, sociopolitical, marketing, or other relevant issues.
2. Verification included multiple site visits to inspect drilling, logging, density measurement procedures and sampling procedures, and a review of the control sample results used to assess laboratory assay quality. In addition, a random selection of the drill hole database results was compared with original records.
3. The Mineral Resources in this estimate for the Alacran deposit used Datamine Studio RM™ Software to create the block models and Geovia's Surpac™ and Whittle™ software to constrain the resources and create a conceptual OP shell for the deposit. Assumptions used to prepare the conceptual pit for the Alacran deposit include:

- Metal prices of $3.25/lb Cu, $1,600.00/oz Au, and $20.00/oz Ag;
- Operating cost inputs include:
  a. Mining cost of $1.73/t for saprolite and $2.30/t for transition and fresh rock for the overall LOM
  b. Processing costs of $1.78/t for saprolite and $8.85/tonne fresh and transition rock. This includes assumptions for milling, G&A, and tailings.
- 98.0% mining recovery, 2.0% dilution and 41°-48° pit slope in fresh and transitional rock, and 36.5° in weathered saprolite.
- Freight costs of $30.00t concentrate from the mine to port and $82.00t concentrate port to a smelter.
- Treatment costs of $85.00/t dry concentrate, payable metal factors of 95.0% for Cu, 96.5% for Au, and 90.0% for Ag.
- Refining charges of $0.085/lb Cu, $5.00/oz Au, and $0.30/oz Ag.
- An NSR cut-off of $1.78/t for saprolite and $8.85/t for transition and fresh rock has been applied to Alacran. The NSR value was calculated using preliminary production and processing parameters and commodity metal prices as follows:
  - NSR_Cu = Cu_% * MiningRec_% * MillCuRec_% * 51.53/% Cu (On Site Value)
  - NSR_Au = Au_g/t * MiningRec_% * MillAuRec_% * 46.55_$/g (On Site Value)
  - NSR_Ag = Ag_g/t * MiningRec_% * MillAgRec_% * 0.54_$/g (On Site Value)
  - NSR = NSR_Cu + NSR_Au + NSR_Ag

4. The Mineral Resources in this estimate for the Satellite deposits used Datamine Studio 3™ software to create the block models and Datamine NPV Scheduler™ to constrain resources and create conceptual OP shells using Indicated and Inferred mineralized material (oxide and sulphide). Assumptions used to prepare the conceptual pits for the Satellite deposits include:

- Metal prices of $3.10/lb Cu, $1,400/oz Au, and $17.75/oz Ag;
- An NSR cut-off of $13.75/tonne has been applied. This equates to approximately 0.22% CuEq as calculated in the Satellite deposit block models.
- Operating cost inputs include:
  - Mining cost of $2.43/t mined for the first five years and $1.69/t thereafter
  - Processing cost of $8.63/t milled for the first five years and $7.50/t thereafter
  - G&A costs of $2.56/t milled for the first five years and $1.32/t thereafter

- 97.0% mining recovery, 4.0% dilution, and 45° pit slope in fresh and transitional rock and 32.5° in weathered saprolite
- Variable process recoveries of 50.0% to 90.0% for Cu, 72.0% to 77.5% for Au, and 40.0% to 70.0% for Ag depending on the domain (saprolite, transition, or fresh sulphide) and Cu grade.
- Freight costs of $100.00/t concentrate, and treatment costs of $90.00/t dry concentrate, payable metal factors of 95.5% for Cu and 96.5% for Au and 90.0% for Ag. Refining charges of $0.090/lb Cu, $5.00/oz Au and $0.30/oz Ag.
- Cu equivalency has been used for the three Satellite pits and was calculated using: CuEq % = Cu % + (Au Factor x Au Grade g/t + Ag Factor x Ag Grade g/t) x 100.
    - Au Factor = (Au Recovery % x Au Price $/oz / 31.1035 g/oz) / (Cu Recovery % x Cu Price $/lb x 2204.62 lb/t).
    - Ag Factor = (Ag Recovery % x Ag Price $/oz / 31.1035 g/oz) / (Cu Recovery % x Cu Price $/lb x 2204.62 lb/t).
    - Variable process recoveries of 50.0% to 90.0% for Cu, 72.0% to 77.5% for Au and 40.0% to 70.0% for Ag depending on the domain (saprolite, transition, or fresh sulphide) and Cu grade.

5. The Mineral Resources for Alacran were classified using the 2014 Standards for Mineral Resources and Mineral Reserves and the 2019 CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines and have an effective date of August 3, 2021.
6. The Mineral Resources were classified for the Satellite deposits using the 2014 Standards for Mineral Resources and Mineral Reserves and the 2019 CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines and have an effective date of July 24, 2019.
    - The 2019 Mineral Resource Estimate for the Alacran deposit is no longer considered to be current and is not to be relied upon for the Alacran Mineral Resource Estimate.
7. All references to the 2019 Mineral Resource Estimate are reported in the Technical Report titled "NI 43-101 Technical Report and Preliminary Economic Assessment, San Matías Copper-Gold-Silver Project, Colombia". The Technical Report has an effective date of July 29, 2019.
    - Changes have not been made to the Mineral Resource Estimates for the Satellite deposits (Montiel East, Montiel West, and Costa Azul).
8. Totals may not sum due to rounding.

1.1.3 Mineral Reserves

The Mineral Reserve Estimate for the Alacran deposit is based on the resource block model estimated by Nordmin. The block model contained both Indicated and Inferred Mineral Resources; however, only Indicated Mineral Resources were used. Inferred Mineral Resources in the block model were not included in the Probable Mineral Reserve and remain classified as waste; Inferred Mineral Resources do not meet the standards required for inclusion in Mineral Reserves.

Mineral Reserves for the Alacran deposit incorporate appropriate mining dilution and mining recovery estimations for the OP mining method.

The reference point at which Mineral Reserves are defined is the point where the ore is delivered to the processing facility, including Run of mine (ROM) stockpiles.

Following the detailed design of the final pit and a LOM scheduling with the cut-off grade, the 2021 Mineral Reserve Estimate for the Project includes 102.1 million tonnes of Probable Reserve grading 0.41% Cu, 0.26 g/t Au, and 2.30 g/t Ag at a $1.78 NSR cut-off for saprolite material and $8.85 NSR cut-off for transition and fresh material.

Table 1-3 presents the reserves inside the design pit.

Table 1-3: Mineral Reserve Estimate

Category		NSR Value Cut-off Grade	Tonnage (t)	Diluted Cu Grade (%)	Diluted Au Grade (g/t)	Diluted Ag Grade (g/t)
Probable Mineral Reserve	Saprolite	1.78 $/t	10,135,000		0.21	
Probable Mineral Reserve	Transition	8.85 $/t	2,011,000	0.62	0.22	3.11
Probable Mineral Reserve	Fresh	8.85 $/t	89,954,000	0.45	0.27	2.54
Probable Mineral Reserve	Fresh + Transition	8.85 $/t	91,165,000	0.45	0.27	2.56
Probable Mineral Reserve	Overall Total		102,100,000	0.41	0.26	2.30

Source: Nordmin, 2021

Notes on Mineral Reserves

1. The independent and Qualified Person for the Mineral Reserve Estimate, as defined by NI 43-101, is Joanne Robinson, P.Eng. of Nordmin Engineering Ltd.
2. The effective date of the Mineral Reserves estimate is October 31, 2021.
3. The Mineral Reserve Estimate is based on metallurgical recovery algorithms that result in an overall recovery of 92.5% of Cu in the fresh and transition material, 78.1% Au in fresh, transition and saprolite, and 62.9% Ag in the fresh and transition material.
4. Cu and Ag are not planned to be recovered from saprolite material.
5. Metal prices are set at 3.25 $/lb Cu, 1,600 $/oz Au, 20 $/oz Ag.
6. The Mineral Reserve Estimate incorporates mining dilution and mining loss assumptions through regularization of block size and a mining recovery factor of 98%.

1.2 Property Description and Ownership

The Project is located in the jurisdiction of the Municipality of Puerto Libertador, Department of Córdoba, 390 km northwest of Bogotá, the capital of Colombia, 160 km north of Medellín, the capital of the Department of Antioquia and the second largest city in Colombia, and 112 km south of Montería, the capital of the Department of Córdoba. The Project hosts the Alacran, Montiel East, Montiel West, and Costa Azul deposits on various mining titles.

The Alacran deposit is centred at approximately 7°44’16” N, 75°44’02” W.

The Montiel East deposit is centred at approximately 7°45’03” N, 75°42’49” W.

The Montiel West deposit is centred at approximately 7°45’04” N, 75°43’16” W.

The Costa Azul deposit is centred at approximately 7°43’38” N, 75°43’10” W.

1.3 Accessibility, Climate, Local Resources, Infrastructure and Physiography

The Project is assessable via a 70 km paved road from the city of Caucasia to Puerto Libertador and then via a 21 km partially unsurfaced road to the exploration camp. The Project core shack is accessible from camp via a 5 km unsurfaced road. Caucasia is easily accessible by road or by regularly scheduled flights from Medellín.

The Project is in the northern foothills of the Western Cordillera and the southern side of the Caribbean lowlands. Altitudes in the Property area are between about 100 m and 350 m above mean sea level. The climate allows for mineral exploration and drilling year-round. The physiography of the Project area is favourable for OP mining with sufficient room for a processing plant, waste management storage, ore stockpiles, and other mine infrastructure. The district is expected to be able to supply the basic workforce for any future mining operation. Cordoba will need to acquire additional surface rights to support a mining operation.

1.4 History

Initial exploration on the Property was carried out by Dual Resources Inc ("Dual Resources"). between 1987-1989 and included pits, trenches, rock sampling, underground sampling, geological mapping, and a ground magnetic survey, followed by fifteen diamond drill holes totalling 2,584.2 m. A concession agreement was granted in 2009 to Sociedad Ordinaria de Minas Omni S.O.M. ("OMNI") and was subsequently optioned to Ashmont Resources Corp. ("Ashmont") in 2010. Ashmont carried out geological mapping, underground mapping, and sampling, a ground magnetic survey, and 52 diamond drill holes totalling 13,429.45 m. Cordoba acquired the Property and completed three diamond drill holes in 2015, 41 diamond drill holes in 2016, 40 diamond drill holes in 2017, three diamond drill holes in 2019, one diamond drill hole in 2020 and six diamond drill holes in 2021.

Au is mined illegally by small scale/artisanal miners at the Project by the Asociación de Mineros de Alacran (Alacran Miners Association), but there has been no industrial scale mining production within the Property.

1.5 Geological Setting, Mineralization, and Deposit Types

The Project is located in an accreted oceanic terrane of the Western Cordillera, described as the Calima Terrane by Restrepo & Toussaint (1988). The host rocks likely belong to the Upper Cretaceous Cañasgordas Group, which is subdivided into the Barroso Formation of basalts, and the Penderisco Formation of turbidites, chert, and limestone. The Project area comprises three primary lithological domains: intrusive rocks (including porphyries) in the Alacran, Montiel East, and Costa Azul deposits; volcanic rocks in the Montiel West deposit; and volcaniclastic rocks in the Alacran deposit. Volcaniclastic rocks are also present in the Alacran Norte and Willian Prospect areas. The volcanics and volcaniclastics likely belong to the early Cretaceous-age Barroso formation.

The Alacran deposit Cu-Au-Ag mineralization is hosted by a west-dipping Cretaceous succession comprising mafic volcanic rocks overlain by a calcareous volcaniclastic sequence and capped by pre- to syn-mineral, sill-like diorite, and felsic sub-volcanic bodies. The sequence is approximately 550 m thick, and the diorites are about 200 m thick. Cu-Au-Ag mineralization occurs throughout the volcaniclastic package at Alacran, except within the lower mafic units. It is most strongly developed in the calcareous volcaniclastic sequence. Several different deposit models have been proposed for the Alacran deposit, including Volcanogenic Massive Sulphide ("VMS"), Skarn, Carbonate Replacement Deposit ("CRD"), and Iron Oxide Copper-Gold ("IOCG"). To better understand the Alacran deposit formation, thesis-based research was completed with the Mineral Deposit Research Unit ("MDRU") at the University of British Columbia ("UBC"), in partnership with the Company. The thesis results (Manco, 2020) in combination with previous work suggest a hybrid model between IOCG-style and a CRD that is associated with a porphyry source can best explain the Alacran deposit mineralization.

The Montiel East porphyry is located near the San Matías Village 2.5 km northeast Alacran deposit in the eastern side of the San Pedro River Lineament. The shallow parts of the Montiel East deposit display surface dimensions of approximately 100 m x 70 m and a vertical extent of 100 m. Montiel East deposit is porphyry Cu-Au-Ag mineralization associated with a series of tonalite porphyry stocks and sills that intrude basaltic andesitic volcanic rocks and host a strong stockwork of quartz-magnetite-chalcopyrite-bornite veins. Based on cross-cutting relationships, alteration assemblages, and compositions, four different phases have been identified within the Montiel East porphyry suite, three of which are hornblende porphyries and one of which is a quartz feldspar porphyry.

The Montiel West deposit is located approximately 2 km northeast of the Alacran deposit in the eastern margin of the San Pedro River Lineament, and less than 1 km west of the Montiel East deposit. Diamond drill holes intersected high-density zones of both sheeted and multi-directional quartz-magnetite-chalcopyrite-bornite veining that are hosted in mafic and intermediate volcanic rocks, but no intrusive rocks. This style of wall rock Cu-Au-Ag mineralization is interpreted to be porphyry-related, as seen at both the Montiel East and Costa Azul prospects. The veinlets are generally narrower than those observed at Montiel East, possibly suggesting that there is no direct relationship between the two prospects. Alteration appears to be sodic-calcic, defined by albite, actinolite, and possible diopside.

The Costa Azul porphyry deposit is located approximately 2 km southeast of the Alacran deposit in the eastern side of the San Pedro River Lineament. The Costa Azul porphyry is a shallow dipping, holocrystalline, Cretaceous porphyry diorite intrusion dominated by phenocrysts, euhedral plagioclase and anhedral to subhedral hornblende, intergrown with primary magnetite, and biotite.

Porphyry-style Cu-Au-Ag mineralization is associated with sheeted quartz-magnetite-chalcopyrite-pyrite-bornite veinlets within an altered diorite porphyry. This porphyry has not been described in the same detail as Montiel East porphyry; however, the intrusive phases are equivalent to the Montiel East (i.e., Hornblende Porphyry, Hornblende Porphyry Late) and the veining paragenesis is similar to the veins observed at Montiel East.

The Montiel East, Montiel West, and Costa Azul deposits can all be broadly classified as Cu-Au porphyry systems as defined by Sillitoe (2000). Cu-Au porphyries are typically associated with I-type magnetite-series intrusive rocks and typically contain significant hydrothermal magnetite, indicating the host intrusions are highly oxidized and sulphur-poor members of this series of magmas. The porphyry stocks in these types of rocks span a range of compositions from diorites, quartz diorite, and tonalite through to quartz monzonite, monzonite, and syenite. The porphyry deposits of the Project area are of low-potassium, calc-alkaline dioritic, and tonalitic composition.

1.6 Exploration and Drilling

Cordoba completed 1:2,000 scale geological mapping, rock channel sampling, a 74-line km 100.0 m spaced ground magnetic survey, and a 50.0 m x 100.0 m spaced soil survey that identified a 1,300.0 m by 800.0 m wide Cu and Au soil anomaly within the Project area.

Cordoba carried out a 5,700-line km helicopter-borne magnetic and radiometric survey and a 1,293-line km induced polarization survey over the Project area.

Diamond drilling at the Alacran deposit consists of 40,609.6 m in 189 HQ and NQ diameter holes completed between 1987 and 2021. Cordoba drilled 94 HQ/NQ diameter diamond drill holes between 2015 and 2021. Dual Resources drilled 15 NQ diameter diamond drill holes in 1987, and 52 HQ diameter diamond drill holes were drilled by Ashmont in 2011-2012. The drill hole database used for this Mineral

Resource Estimate has increased by ten drill holes (+5%) and 623 samples (+2%) as compared to the Mineral Resource Estimate completed by Nordmin with an effective date of July 3, 2019. This is a result of the inclusion of historic drill holes completed by previous operator Dual Resources ("SJ" drill holes) that were later twinned by Ashmont and Cordoba. A twin hole analysis was completed by Nordmin in 2019 of the historical Dual Resources/Ashmont diamond drilling versus the more recent Cordoba drilling was completed. This exercise compared the drill hole collar locations, downhole surveys, logging (lithology, alteration and mineralization), sampling, and assaying between the two groups to determine if the historical holes had valid information and would not be introducing a bias within the geological model or Resource Estimate. Nordmin determined that no bias would be introduced by including the SJ holes and therefore, the sampling and analytical results of these holes are considered reliable and suitable to be included in the Mineral Resource Estimation.

At the Costa Azul deposit, Cordoba completed a total of 4,995.9 m of drilling in 118 holes, including 3,305.0 m of small diameter reverse circulation drilling in 112 holes and 1,690.9 m of diamond drilling in six holes between 2014 and 2017. At the Montiel East deposit, Cordoba completed 11,056.7 m of drilling in 78 holes, including 1,681.0 m in 48 reverse circulation ("RC") holes and 9,375.7 m in 30 diamond drill holes between 2013 and 2017. At the Montiel West deposit, Cordoba completed 4,055.9 m in 93 holes including 2,032.0 m in 85 RC holes and 2,023.9 m in eight diamond drill holes between 2013 and 2017.

Unless specifically stated, >97% of the RC and diamond drill holes completed within these four deposits have been used to support the current Mineral Resource Estimate.

There are several areas that provide opportunities for potential resource expansion within each of the current resource deposits along with the Alacran Norte and Willian prospects.

1.7 Sample Preparation, Analyses, and Security

Ashmont and Cordoba drill core samples were prepared by ALS Minerals in Medellín, Colombia and analyzed for Au by fire assay and for Cu and 32 other elements by four-acid digestion Inductively Coupled Plasma Atomic Emission Spectrometry ("ICP-AES") methods at ALS Minerals labs in Chile, Peru, and Canada. The assaying was monitored using standards, blanks, duplicates, and check samples inserted into the sample stream by Ashmont and Cordoba personnel. The sample preparation routine of Dual Resources is unknown; however, they did collect field and laboratory duplicates for their "SJ" holes, which were later twinned by Ashmont and Cordoba and fully support the mineralization geometry and associated Cu, Au, and Ag grades as determined by the estimation process.

1.8 Data Verification

The QP completed multiple site visits and data validation checks between 2019 and 2021 to review surface geology, artisanal miner workings, drill core geology, geological procedures, chain of custody of drill core, sample pulps, and for the collection of independent samples for metal verification. Data verification included a survey spot check of drill collars, a spot check comparison of Cu, Au and Ag assays from the drill hole database against original assay records (lab certificates), spot check of drill core lithologies recorded in the database versus the core located in the core storage shed and a review of quality assurance ("QA")/quality control ("QC") performance of the drill programs. There are no material concerns with the geological or analytical procedures used or the quality of the result data. Nordmin considers the resource database reliable and appropriate to support a Mineral Resource and Mineral Reserve Estimate.

1.9 Mineral Processing and Recovery Methods

1.9.1 Mineral Processing

The process plant was designed using conventional and proven technology. It is designed for a throughput of 22,000 metric tonnes per day ("mtpd") at an availability of 92% per annum, equating to an annual feed of 8,030,000 metric tonnes. The beneficiation plan will operate a planned 360 days per year and produce a Cu-Au-Ag concentrate to be sold in the open market.

ROM feed from the adjacent OP will be hauled to a primary crusher facility consisting of a gyratory crusher before being conveyed to a 25,000-tonne surface stockpile prior to the mill facility. The comminution circuit consists of a semi autogenous grinding ("SAG") mill with a pebble crusher, and a ball mill operating in a closed circuit with a hydrocyclone cluster. Cyclone overflow of 200 microns ("µm") will report flow to a four-stage flotation circuit including a roughing stage, primary, secondary, and tertiary cleaning. Mechanical flotation tank cells will be utilized for all stages other than tertiary cleaning, wherein a column cell will be employed. A regrind stage will treat rougher float products to a P_{80} of 45 µm prior to primary cleaning.

Two stages of gravity concentration will be placed to produce a dedicated Au rich concentrate. The concentrate can be handled and stored separately from the primary beneficiation product, if it is advantageous to market as such. One unit will be fed from a partial stream of ball mill hydrocyclone underflow, and the smaller unit will be fed from the product of the 1st cleaner.

Grindability and flotation test work was conducted by Blue Coast Research and SGS Canada in Burnaby, BC. This included 71 batch flotation tests and three locked cycle flotation tests. The results of which were used to derive the preliminary process flow sheet and pro-forma mass balance of the facility. Process design parameters were established to define the equipment required for production and storage of concentrate adjacent to the OP facilities. Various major equipment vendors have been consulted with to vet preliminary equipment selections. Preliminary circuit configuration has been built based on the learnings from test work and configured within a notional process plant model to mitigate operational risk associated with the process. Subsequently, information from the resultant processing plant model as well as vendor budget pricing contribute to the overall capital and operating cost estimates.

1.9.2 Recovery Methods

The Alacran deposit consists of three principal zones of economically treatable material dictated by the degree of exposure to atmospheric weathering, namely the fresh, transition, and saprolite zones.

The tested fresh samples were moderately hard. They are expected to be mildly resistant, but amenable to SAG milling. No high pressure grinding rolls ("HPGR") testing was conducted. Saprolite was very soft and based on power needs in laboratory grinding, appear to need a small fraction of the grinding power of fresh samples. Transition material hardness levels should be in between those of the fresh and saprolite materials.

The fresh zone contains Cu almost exclusively in the form of chalcopyrite. This chalcopyrite is relatively coarse and is adequately liberated for good rougher recoveries at a primary grind of 80% passing 200 µm, while cleaning was effective following a regrind to 80% passing 39 µm. This chalcopyrite floats very well in rougher and cleaner flotation, with only a small dose of xanthate collector.

Au is present mostly as free and liberated metal, which commonly caused nugget issues in balancing of tests. It tended to float well.

Pyrite is also present in the fresh zone, with the LOM average ratio of pyrite to chalcopyrite being 2.5:1. Pyrite dilution in the Cu concentrate can for the most part be controlled by raising the pH in roughing to approximately 10.5 and especially in cleaning to approximately 11.5, using lime. This treatment approach is very typical for such deposits. Typically, about 97% of the pyrite is rejected from the Cu concentrate.

Non sulphide gangue is a mix of quartz and chlorite with minor clays, feldspar, and carbonates. Some of this gangue has a propensity to float, so a gangue depressant is employed to control this. Several gangue depressants are effective at this, but in this study calgon was adopted as standard. This was effective, but final concentrate grades were still quite low by industry standards, mostly as a consequence of residual flotation of liberated non sulphides.

Three samples of transition material were examined and tested. They were all different from each other, however they tended to comprise a blend of recoverable Cu in the form of chalcopyrite and chalcocite, and non recoverable Cu, presumably hosted in non sulphides. Au is minimally affected by weathering and so usually floated reasonably well from the transition samples.

The saprolite zone contains Cu mineralization hosted by non sulphide minerals, mostly kaolinite, and other clays as well as chlorite. This is not economically recoverable by froth flotation. Substantial Au is also present, and this is recoverable by flotation and/or gravity concentration. Some of the saprolite will contain sufficient Au to warrant processing.

Ag floats quite well from the fresh materials but like Cu, floats poorly from saprolite.

The reader should be aware that all the flotation testing was conducted on a small number of metallurgical drill holes, less than would be typical of a Prefeasibility Study on a project of this size. Further, many of the master composites were relatively low grade and comprised of material sourced mostly from the periphery of the Alacran deposit. However, all the presently known rock types are believed to have been represented in the metallurgical program, while the lack of testing of material from the centre of the Alacran deposit may represent a risk to the metallurgical forecast.

1.9.3 Mineral Resource Estimate

The Mineral Resource Estimate for the Project conforms to industry best practices and is reported using the May 10, 2014, Standards for Mineral Resources and Mineral Reserves and the 2019 CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (2019). Technical and economic parameters and assumptions applied to the Mineral Resource Estimate are based on an OP mining method and milling and flotation concentration processing method. Areas of uncertainty that may materially impact the Mineral Resource Estimate include:

- Changes to long term metal price assumptions;
- Changes to the input values for mining, processing, and G&A costs to constrain the estimate;
- Changes to local interpretations of mineralization geometry and continuity of mineralized zones;
- Changes to the density values applied to the mineralized zones;
- Changes to metallurgical recovery assumptions;
- Changes in assumptions of marketability of the final product;
- Variations in geotechnical, hydrogeological and mining assumptions;
- Changes to assumptions with an existing agreement or new agreements; and
- Changes to environmental, permitting, and social licence assumptions.

The 2021 Mineral Resource Estimate for the Project includes 121.9 million tonnes of Indicated Resources grading 0.42% Cu, 0.28 g/t Au, and 2.33 g/t Ag and 5.1 million tonnes of Inferred Resources grading 0.20% Cu, 0.20 g/t Au, and 0.87 g/t Ag at a $1.78 NSR cut-off for saprolite material and $8.85 NSR cut-off for transition and fresh material (Table 14-36).

Only the Alacran deposit was updated during the 2021 Mineral Resource Estimate, therefore only the updates to the Indicated and Inferred Resources for the Alacran deposit with be compared to the 2019

Mineral Resource Estimate. The 2019 Mineral Resource Estimate has a reporting cut-off grade of 0.22% CuEq, when compared to the 2021 Mineral Resource Estimate at a cut-off grade of $1.78 NSR for saprolite material and $8.85 NSR cut-off for transition and fresh material, the 2021 Mineral Resource Estimate increased Indicated tonnage by 7.3% at the Alacran deposit. The Satellite deposits were not affected by updates during the 2021 Mineral Resource Estimate and remained the same (Table 14-42 to Table 14-44).

The change from the use of CuEq for cut-off to NSR was made due to the absence of recoveries for Cu and Ag within saprolite material. At the Alacran deposit, Indicated contained Cu remained the same, contained Au increased by 16.2%, and contained Ag increased by 2.5%. The Satellite deposits were not affected by 2021 updates and therefore remained unchanged from the 2019 Mineral Resource Report (Table 14-41). The Alacran deposit Inferred Resources contained Cu decreased by 26.3%, contained Au increased by 33.9%, and contained Ag decreased by 36.3%. The decrease in Cu and Ag contained tonnage can be attributed to the lack of recovery for Cu and Ag within saprolite material.

There is potential for an increase in the estimate if mineralization that is currently classified as Inferred can be upgraded to a higher-confidence Mineral Resource category. Additionally, additional increases may occur if any categorized or uncategorized mineralization within the various deposits is upgraded.

1.10 Mining and Mineral Reserve

Conventional OP mining methods will be used to extract a portion of the Alacran deposit. This method was selected considering the Alacran deposit's size, shape, orientation, and proximity to the surface. Drilling, blasting, loading, and hauling will be used to mine the OP material within the designed pit to meet the mine production schedule.

OP mining will include conventional drilling and blasting with a combination of a backhoe type excavator and front end loader type excavator loading broken rock into haul trucks, which will haul the material from the bench to the crusher, ROM stockpile, or waste dumps depending on the material type. Ancillary equipment includes dozers, graders, and various maintenance, support, service, and utility vehicles.

During pre-production, the mineralized material (above cut-off grade) will be hauled to designated stockpiles. The higher grade mill feed material will be hauled to a stockpile near the ROM pad located near the primary crusher. The saprolite material and lower grade mill feed will be hauled and stockpiled in a stockpile located south of the mill and crusher areas.

During production, higher grade mill feed material will be hauled directly to the primary crusher and either direct tipped into the crusher or stockpiled temporarily on the ROM pad. For the first three years of production, lower grade mill feed material (8.85 ≥ NSR < 16.85) will continue to be stockpiled for later rehandling and processing. In the fourth and fifth year of production, mill feed material with NSR ≥ 14.85 (Bin 7 and Bin 8) will be hauled directly to the crusher, while stockpiling material with 8.85 ≥ NSR < 14.85. After the fifth year of production, all fresh material with NSR ≥ 8.85 will be directed to the crusher as it is mined.

1.10.1 Mineral Reserve Estimate

The Mineral Reserve Estimate for the Project conforms to industry best practices and is reported using the May 10, 2014, Standards for Mineral Resources and Mineral Reserves and the 2019 CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (2019).

Mineral Reserves are based on the engineering and economic analysis described in Sections 16 to Section 22 of this Technical Report. Changes in the following factors and assumptions may affect the Mineral Reserve Estimate:

Factors that may affect the Mineral Reserve

- Metal prices
- Interpretations of mineralization geometry and continuity of mineralization zones
- Kriging assumptions
- Geomechanical and hydrogeological assumptions
- Ability of the mining operation to meet the annual production rate
- Operating cost assumptions
- Process plant recoveries
- Mining loss and dilution
- Ability to meet and maintain permitting and environmental licence conditions
- Historical mining depletion

Nordmin prepared a Mineral Reserve Estimate for the Project using a combination of Geovia's Whittle 4.7.4, Geovia's Surpac 2021 and Datamine software packages for estimating the economic pit limit for the OP and block model interrogation.

The Mineral Reserve Estimate for the Alacran deposit is based on the resource block model estimated by Nordmin and described in Section 14. The block model contained both Indicated and Inferred Mineral Resources, however only Indicated Mineral Resources were used. Inferred Mineral Resources in the block model were not included in the Probable Mineral Reserve and remain classified as waste; Inferred Mineral Resources do not meet the standards required for inclusion in Mineral Reserves.

Mineral Reserves for the Alacran deposit incorporate appropriate mining dilution and mining recovery estimations for the OP mining method.

The reference point at which Mineral Reserves are defined, is the point where the ore is delivered to the processing facility, including ROM stockpiles.

The 2021 Mineral Reserve Estimate for the Project includes 102.1 million tonnes of Probable Reserve grading 0.41% Cu, 0.26 g/t Au, and 2.30 g/t Ag at a $1.78 NSR cut-off for saprolite material and $8.85 NSR cut-off for transition and fresh material (Table 14-36).

1.11 Infrastructure

The main infrastructure components include mine and process plant supporting infrastructure, site accommodation facilities, a waste management facility ("WMF"), external and internal access roads, power supply and distribution, freshwater supply and distribution, and a WTF.

The Project is accessible by travelling on a paved two-lane highway to Puerto Libertador and then by driving approximately 21 km from Puerto Libertador on a hard-packed, gravel road. The main access road between La Rica and the planned security gate of the site is of a lower quality, being only wide enough for one vehicle, with sharp turns and abrupt grade changes. This road is 6 km long and is the intended haul road for concentrate. The entirety of this road will need to be upgraded and widened to allow two-way traffic and transport trucks.

The majority of the earthworks will be realized in the preparation of the mine infrastructure and concentrator plant infrastructure pad. Additional smaller pads will be built up for the water storage tanks and for the primary crusher dumping station. Laydown areas, stockpiles, and waste dumps will be constructed as the mining operation expands. In total, approximately 10,000 m^2 of general buildings (not including the camp) have been provided. These ancillary infrastructure buildings will be pre-engineered steel structures founded on piled foundations. The site accommodations will be a trailer type construction with central kitchen and dining hall buildings.

Electrical power to the Project is expected to be supplied via a new 35 km long, 110 kilovolt ("kV") powerline connecting to the Cerro Matoso substation which is owned and operated by Interconexión

Eléctrica ("ISA"). The site primary power distribution will operate nominally at 13.8 kV which is supplied by two 30/50 megavolt-ampere ("MVA"), 110kV/13.8kV power transformers. A site wide overhead line distribution has been planned for construction which will feed the north side and south side infrastructure from two separate 13.8 kV overhead line feeders. The north power line distribution will supply power to the camp, WTF, water collection, and pumping stations. The south power line will provide power to the OP, WMF, and south side water collection and treatment.

Freshwater will be supplied by a 2,700 m^3 fresh/fire water head tank which will be located adjacent to the process water head tank. Supply to this tank will be from the mill influent metals and total suspended solids ("TSS") removal plant, which will draw from the San Juan River. The fresh/fire water tank will be equipped with a standpipe for freshwater process suctions which will ensure that the tank is always holding at least 90 minutes supply of fire water

Two separate modular WTFs will be required for the mill influent (supply) and the mill effluent (discharge) systems. The mill influent system will draw from the San Juan River and process water at a design rate of 4.2 m^3/hr for use throughout the mill. The effluent system will draw water from the WMF to treat the tailings water prior to being released back into the environment. The effluent plant is designed for a flow rate of 700 m^3/hr. Both plants will be located adjacent to the saddle dam that divides the WMF and water management pond ("WMP").

A potable water treatment system will also be fed from the discharge of the mill influent metals and TSS removal plant. This system will be located within the mill influent treatment plant area. Potable water will be treated, stored, and distributed to the various buildings on site, with each building having its own pressurized reservoir tank for distribution.

1.12 Water Management

The WMP will be primarily used to store water from the WMF, contact water from operations (including inflows to the OP) and provide the required reclaim water to the mill.

The primary objectives for the site water management strategy include:

- Maintain a small supernatant pond (water transfer pond) within the WMF basin by transferring run-off and supernatant to the WMP on an ongoing basis via the water transfer system.
- Maximize reclaim of supernatant water and run-off from the WMP to the mill and minimize freshwater requirements from the San Pedro River.
- Treat and discharge excess supernatant water, mine water (pit inflow), and run-off to the environment, as required during the mine life, via the water treatment and discharge system.
- Collect and manage run-off via surface water management measures.
- Provide temporary containment of the Environmental Design Flood ("EDF") within the WMF and WMP basins during operations.
- Provide temporary storage and conveyance of the Inflow Design Flood ("IDF") via spillways from the WMF and WMP.

Process water will be sourced from the WMP, via a pump on a barge collecting clear water, which is conveyed to the concentrator plant via a pipeline. Water to supply the buildings, as well as for the fire suppression distribution system will be provided by the water treatment facility ("WTF").

1.13 Waste Management Facility

The extracted material from the OP will use conventional crushing, flotation, re-grinding, and gravity concentration. Thickened potentially acid generating ("PAG") tailings will be delivered to the WMF at a design solids content of approximately 63% by mass. PAG and Uncertain waste rock from OP development will be hauled to the WMF. The PAG and Uncertain waste rock excavated from initial OP development will be used for a portion of Stage 1 embankment construction, and the remainder will be placed within the WMF basin and covered with tailings during ongoing mining operations. Saprolite and non-potentially acid generating ("NPAG") waste rock from OP mine development will be primarily used to construct the WMF embankments and downstream buttresses. Additional saprolite and weathered bedrock (transition zone) material not needed for embankment construction will be placed and compacted in a waste stockpile adjacent to the downstream slope of the WMF Main Embankment.

The WMF will consist of a valley type impoundment to provide permanent storage for the PAG tailings and PAG/Uncertain waste rock. Waste storage capacity will be developed by constructing embankments around the perimeter of the valley and using the natural topography to form a valley type impoundment. The Main and Northeast Embankments will be raised using the downstream construction method and the South Embankment will be raised using the centreline construction method. The South Embankment will be a divider embankment that will establish the WMP in the southern portion of the valley.

1.14 Environmental Studies, Permitting, and Social or Community Impact

1.14.1 Baseline Environmental Conditions

In general, groundwater, and surface water quality are good, except for the drainages impacted by approximately 40 years of tailings disposal into the streams that drain the Alacrán community. Surface water in these drainages shows clear evidence of acid drainage and metal leaching. Elevated sulphate concentrations in Quebrada Valdez were observed 5 km downstream of the village.

Groundwater is relatively shallow (<5 m below ground surface) in the alluvial valleys. Due to the high rainfall, abundant springs appear during the rainy season. Groundwater appears to be unconfined. Aquifer characteristics of the rock in the vicinity of the proposed pit indicate that they are poor aquifers with low capacity for groundwater movement. The potential role of geologic structures to convey groundwater to the pit is still to be determined.

Abundant surface water is available for the mine from the nearby San Pedro River and Quebrada San Juan. The planned makeup volume is (4.2 m^3/hour) is much lower than the average flows in these two water bodies.

Static geochemical characterization of soils, waste rock and tailings indicate that the tailings are PAG. Approximately 40% of the waste rock will be PAG or have uncertain acid generation potential. The calcareous and mafic volcanoclastics make up most of the PAG or Uncertain rock. the felsic volcanoclastics, intrusive rock, and the saprolite are not acid generating. The chemistry of the tailings and surface water in Quebrada Valdez clearly shows that ore and tailings have acid generation potential. Lab and field kinetic tests performed to date indicate that onset of acid generation will take several months.

Baseline monitoring of air quality, vibrations, noise, and soils produced results concomitant with small, rural, and dispersed communities with dirt roads and a love of loud music.

The local ecosystem is characterized as warm, humid forest, located in the foothills where the coastal plains transition to mountain. Most of the project area has been cleared of the original vegetation for cattle grazing and agriculture.

Archaeological evidence of indigenous communities spanning a period from the second to 16th centuries of the common era was found in five locations in the footprint of the proposed mine infrastructure. The artifacts recovered were limited to ceramic fragments and lithic elements, including axes, metates, manos, and flakes.

1.14.2 Social and Community

The area around the Project is sparsely inhabited. There are five small communities within 5 km of the Project, including the Alacrán community located within the footprint of the proposed pit. The Alacrán community is the largest local population centre (700 persons) and the population within a 5 km radius is approximately 1,700. The local population subsists on mining, small scale agriculture, ranching and small businesses that support the local community (bars and stores).

Surveys of the local community show largely favourable opinions in most of the respondents to the development of future mining activities. During the spring and summer of 2021, drilling activities were curtailed due to occasional road blockades and denial of access. Issues with the local community appear to have been largely resolved through a negotiated accord and social outreach programs.

1.14.3 Waste Rock Management

NPAG waste rock will be used to construct the WMF embankments. PAG waste rock and thickened PAG tailings will be strategically co-disposed in the WMF to maximize storage volume. Covering PAG waste rock with low permeability tailings has the advantage of effectively sealing previous lifts of waste rock and tailings from oxygen diffusion and advection of water, which will greatly minimize the potential for acid rock drainage ("ARD").

The Stage 1 WMF basin will be cleared and grubbed, then nominally compacted to reduce the permeability of the underlying saprolite/residual soil (foundation soil) and reduce potential seepage through the WMF foundation. Laboratory tests of reworked saprolite show that it has the hydraulic conductivity of compacted clay or silt (1.5E-7 cm/sec). Monitoring wells downgradient of the WMF will be used to monitor for potential leakage from the WMF and can be used as pump back wells if leakage occurs.

1.14.4 Closure

At closure, most of the mine infrastructure will be removed, with the possible exception of some of the buildings, which might be turned over to the community as part of the sustainability program. The WMF will be capped with saprolite and a growth medium. The OP dewatering infrastructure will be decommissioned, and the wells will be left in place to monitor groundwater quantity and quality. Surface water from Quebrada Palestina and the WMF will be directed into the OP. The OP is expected to fill to an elevation of approximately 118 above mean sea level ("amsl") over a period of eight years due to groundwater inflow, precipitation, and surface run-off. OP overflow will be directed from an engineered spillway into a lined ditch and into the San Pedro River. During decommissioning, the WTF will stay in operation to treat and discharge water from the WMP and will then be relocated to an area east of the OP in case the overflow from the pit does not meet discharge standards.

1.14.5 Regulations and Permitting

The regulatory requirements for new mine are well defined, with the principal agencies being the national mining authority ("ANM") and the national environmental agency ("ANLA"). Regulatory requirements for an Environmental Impact Assessment ("EIA") are subject to refinement as Colombia is experiencing a surge in mining activity. The time frame for review and approval of an EIA is not defined and can take anywhere between 6 and 24 months.

1.15 Market Studies and Contracts

Market studies for Cu, Au and Ag have been completed by a third party concentrate trading advisory, and marketing specialist company, who were contracted by the Company to prepare a market study to support the PFS.

Marketing studies and product price assumptions are based on research and forecasts for the following products:

- The long term Consensus Cu Pricing 2021-2024 of 3.60 per pound.
- The long term Consensus Au Pricing 2021-2024 of $1,650 per ounce.
- The long term Consensus Silver Pricing 2021-2024 of $21.0 per ounce.

The Company is planning on shipping its concentrate through one of the main Colombia ports such as Tolú or Cartagena. The port will be finalized during contract/feasibility studies.

The Company is considering selling its concentrate through all avenues, which include entering into long term contracts with offtakers; direct with smelters or through metal traders.

The Company has no current contracts for project development, mining, concentrating, smelting, refining, transportation, handling, sales, and hedging, forward sales contracts, or arrangements.

However, based upon preliminary assay data the Project's concentrate can be regarded as a clean, high Cu, with solid Au-Ag credits. Such material is likely to be in demand from smelters in Japan, China, elsewhere in Asia, and Europe. The Au and Ag content is also likely to make the Project's concentrate attractive to traders for blending purposes. The clean quality combined with the combination of freight, Au, and Ag payable makes Japanese smelters likely to achieve the best netback.

1.16 Capital and Operating Costs

The capital cost estimate was prepared by Nordmin with an expected accuracy range of +/-25% weighted average accuracy of actual costs. Base pricing is in Q3 2021 US dollars, with no allowances for inflation or escalation beyond that time. The estimate includes direct and indirect costs, (such as engineering, procurement, construction and start up of facilities) as well as owners costs and contingency associated with mine and process facilities and on site and off site infrastructure. Total LOM capital costs, including initial, sustaining and reclamation costs, are US$ 591 million. The initial capital estimate is US$ 433 million.

The operating cost estimate was prepared by Nordmin with an expected accuracy range of +/-25% weighted average accuracy of actual costs. Base pricing is in Q3 2021 US dollars, with no allowances for inflation or escalation beyond that time. The LOM operating costs are estimated to be 1,686 million. LOM Cu C1 cash costs are expected to average US$ 1.18/lb net of credits, and US$ 2.59/lb including royalties but before precious metals credits. Total on site operating costs, including royalties, are expected to average of US$ 20.97/t processed.

1.17 Economic Analysis

An engineering economic model was prepared for the Project to estimate annual cash flows and assess sensitivities to certain economic parameters. The economic results of this Technical Report are based upon the services performed by:

- Nordmin Engineering Ltd. for the geology, resource, reserve, OP mining, processing, and surface infrastructure, WTF.
- Knight Piésold Ltd. for the WMF, water management and the geotechnical analysis for site infrastructure.
- Stantec for the OP geotechnical.
- INTERA for the hydrogeology, geochemistry, and environmental, and permitting.

The proposed Project includes an approximate two year construction period, two years of mining pre-production period, followed by 13 years of production supplying a mill feed rate of 22,000 t/d, and ten years of post-production mine closure. The Project is planned to utilize an owner-operated scenario.

The Project includes an OP mine and associated infrastructure, surface infrastructure to support the mine operations (i.e., maintenance and office facilities), water management features, ROM stockpiling areas, processing facility, waste and tailings management facility, and camp facility.

The Project indicates an after-tax cash flow of 873.4$M, after-tax NPV (8%) of 415.1$M, and after-tax IRR of 25.4%. The Project is most sensitive to commodity prices. On a pre-tax basis, the Project has a pre-tax cash flow of 1,387.6 M$, a pre-tax NPV (8%) of 734.9 M$, and a pre-tax IRR of 36.1%.

1.18 Recommendations

The recommendations focus on drilling activities, environmental baseline programs, metallurgical test work, and field work to support infrastructure, water management, and waste management designs and prepare an FS and an EIA study. The recommendations are estimated to require a total budget of US$ 36.45 million. Table 1-4 outlines the cost to complete the FS, and Table 1-5 summarizes the cost to complete the EIA study.

Table 1-4: Feasibility Budget Recommendations

Item	Cost (US$)
Drilling approximately 40,000 m	12,030,000
Engineering and Engineering Studies	12,000,000
Other Contractor Costs	4,500,000
Project Team – Support for Project Director	700,000
Contingency (15%)	4,380,000
Total	**33,610,000**

Source: Nordmin, 2021

Table 1-5: EIA Budget Recommendations

Item	Cost (US$)
EIA Study work	2,500,000
Contingency (15%)	375,000
Total	**2,875,000**

Source: Nordmin, 2021

2 INTRODUCTION

2.1 Terms of Reference

This Technical Report for the Project was prepared as a NI 43-101 Technical Report, Mineral Resource Estimate, and Prefeasibility Study for the Company by Nordmin.

The Alacran deposit Mineral Resources are considered effective as of August 3, 2021, the Satellite deposits Mineral Resources are considered effective as of July 24, 2019, the Mineral Reserves are considered effective as of October 31, 2021, and the Technical Report is effective as of January 11, 2022. This Technical Report supersedes all prior technical reports, Mineral Resource Estimates, and economic studies prepared for the Project. As of the date of this Technical Report, the Company anticipates using these Mineral Resources for future drill targeting and Mineral Resource upgrades.

The Company is a Vancouver-based minerals exploration and development company trading on the TSX Venture Exchange under the symbol CDB and in the US on the OTCQB Exchange with the ticker CDBMF. The corporate office is located at:

Suite 606-999 Canada Place
Vancouver, British Columbia, Canada V6C 3E1

The quality of information, conclusions, and estimate contained herein are consistent with the level of effort involved in Nordmin's services, based on i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications outlined in this Technical Report.

The user of this document should ensure that this is the most recent Technical Report for the San Matías Copper-Gold-Silver Project, as it is not valid if a new Technical Report has been issued.

This Technical Report provides a Mineral Resource, and a classification of the Mineral Resource prepared in accordance with the CIM, Metallurgy, and Petroleum Standards on Mineral Resources and Reserves: Definitions and Guidelines, May 10, 2014 (CIM, 2014) and the CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (November 2019; 2019 CIM Best Practice Guidelines).

2.2 Qualified Persons

The Consultants preparing this Technical Report are specialists in the fields of geology, exploration, OP mining, waste management, water management, environmental, infrastructure development, mineral processing, metallurgical testing, and Mineral Resource, and Mineral Reserve estimation, and classification.

The Consultants nor any associates employed in the preparation of this Technical Report are insiders, associates, affiliates, or has any beneficial interest in the Company. The results of this Technical Report are not dependent upon any prior agreements concerning the conclusions to be reached, nor are there any undisclosed understandings concerning any future business dealings between the Company and the Consultants. The Consultants are being paid a fee for the work in accordance with reasonable professional consulting practices.

This Technical Report was prepared by the QPs listed in Table 2-1, and their responsibilities for each section are indicated. These individuals, by virtue of their education, experience, and professional association, are considered a QP as defined in the NI 43-101 standard, for this Technical Report, and are a member in good standing of a relevant professional institution. QP Certificates of the Authors are provided in Appendix A of this Technical Report.

Table 2-1: QP – Section Responsibility

Section and Title	Qualified Person	Company
1: Summary	All	All
2: Introduction	All	All
3: Reliance on Other Experts	Glen Kuntz	Nordmin
4: Property Description and Location	Glen Kuntz	Nordmin
5: Accessibility, Climate, Local Resources, Infrastructure, and Physiography	Patrick Williamson	INTERA
6: History	Glen Kuntz	Nordmin
7: Geological Setting and Mineralization	Glen Kuntz	Nordmin
8: Deposit Types	Glen Kuntz	Nordmin
9: Exploration	Glen Kuntz	Nordmin
10: Drilling	Glen Kuntz	Nordmin
11: Sample Preparation, Analyses, and Security	Glen Kuntz	Nordmin
12: Data Verification	Glen Kuntz	Nordmin
13: Mineral Processing and Metallurgical Testing	Chris Martin	Blue Coast
14: Mineral Resource Estimate	Glen Kuntz	Nordmin
15: Mineral Reserve Estimate	Joanne Robinson/Peter Cepuritis	Nordmin/Stantec
16: Mining Methods	Joanne Robinson	Nordmin
17: Recovery Methods	Kurt Boyko	Nordmin
18: Project Infrastructure	Steve Pumphrey, Kurt Boyko, Harold Harkonen & Wilson Muir	Nordmin/Knight Piésold
19: Market Studies and Contracts	Glen Kuntz	Nordmin
20: Environmental Studies, Permitting, and Social, or Community Impact	Patrick Williamson	INTERA
21: Capital and Operating Costs	Joanne Robinson, Steve Pumphrey, Kurt Boyko, Harold Harkonen & Wilson Muir	Nordmin
22: Economic Analysis	Joanne Robinson	Nordmin
23: Adjacent Properties	Glen Kuntz	Nordmin
24: Other Relevant Data and Information	Glen Kuntz	Nordmin
25: Interpretation and Conclusions	All	All
26: Recommendations	All	All
27: References	All	All
28: Glossary	Glen Kuntz	Nordmin

The following summarizes the dates of QP site visits to the Project:

- Glen Kuntz, P.Geo., completed a site visit from January 18 to January 21, 2021, and September 20 to September 21, 2021.
- Kurt Boyko, P.Eng., completed a site visit from September 20 to September 21, 2021.
- Joanne Robinson, P.Eng., completed a site visit from September 20 to September 21, 2021.
- Patrick Williamson, P.G., completed a site visit from September 20 to September 21, 2021.
- Wilson Muir, P.Eng., completed a site visit from September 20 to September 21, 2021.

2.3 Effective Dates

The effective date of the Alacran deposit Mineral Resource Estimate is August 3, 2021.

The effective date of the Satellite deposit Mineral Resource Estimate is July 24, 2019.

The effective date of the Alacran deposit Mineral Reserve is October 31, 2021.

The effective date of the Technical Report is January 11, 2022.

2.4 Information Sources and References

This Technical Report has been prepared by independent Consultants who are QP's under NI 43-101 and prepared in accordance with NI 43-101, Form 43-101F1, and Companion Policy 43-101CP. Subject to the conditions and limitations set forth herein, the independent Consultants believe that the qualifications, assumptions, and information used by them are reliable, and efforts have been made to confirm this to the extent practicable. However, none of the Consultants involved in this study can guarantee the accuracy of all information in this Technical Report.

This Technical Report is based, in part, on internal Company technical reports and maps, published government reports, company letters and memoranda, and public information as listed in Section 27. Several sections from reports authored by other Consultants have been directly quoted or summarized in this Technical Report and are so indicated where appropriate.

A draft copy of this Technical Report has been reviewed for factual errors by the Company.

Any statements and opinions expressed in this document are given in good faith and in the belief that such statements and opinions are not false and misleading at the date of this Technical Report.

The authors of this Technical Report have taken all steps in their professional judgment to verify and confirm the accuracy of the information contained in this Technical Report and other than with respect to this matters set forth in Section 3 hereof, do not disclaim any responsibility for this Technical Report.

2.5 Previous Reporting

The Alacran deposit Mineral Resource Estimate (effective date of August 3, 2021) discussed herein (Section 14.9) supersedes historical and past Alacran deposit Mineral Resource Estimate presented in this section.

The Mineral Resource Estimate for the Satellite deposits (Montiel East, Montiel West, and Costa Azul) discussed herein have not changed from the 2019 Mineral Resource Estimate reported in the Technical Report titled "NI 43-101 Technical Report and Preliminary Economic Assessment, San Matías Copper-Gold-Silver Project, Colombia". The Technical Report has an effective date of July 29, 2019.

The following historical information is relevant to provide context but is not current and should not be relied upon. The QPs responsible for the preparation of this Technical Report have not done sufficient work to classify the historical estimate as current Mineral Resources or Mineral Reserves, and the Company is not treating any historical estimates as Mineral Resource Estimates.

2.5.1 Previous Technical Reports

- Kuntz, G. of Nordmin Engineering Ltd. et al, 2019: NI 43-101 Technical Report and Preliminary Economic Assessment, San Matías Copper-Gold-Silver Project, Colombia, effective date 29 July 2019
- Kuntz, G. of Nordmin Engineering Ltd., 2019: NI 43-101 Technical Report and Resource Estimate, San Matías Copper-Gold-Silver Project, Colombia, effective date 3 July 2019
- Kulla, G., and Oshust, P. of AMEC Foster Wheeler, 2018: NI 43-101 Technical Report on the Alacran Project Department of Córdoba, Colombia: a Technical Report prepared for Cordoba Minerals, effective date 10 April 2018
- Redwood, S.D., 2014. NI 43-101 Technical Report for the San Matías Porphyry Copper-Gold project, Department of Cordoba, Republic of Colombia, effective date 30 November 2013.

2.5.2 Previous Mineral Resource Estimates

- Kuntz, G. of Nordmin Engineering Ltd. et al, 2019: NI 43-101 Technical Report and Preliminary Economic Assessment, San Matías Copper-Gold-Silver Project, Colombia, effective date 29 July 2019
- Kuntz, G. of Nordmin Engineering Ltd., 2019: NI 43-101 Technical Report and Resource Estimate, San Matías Copper-Gold-Silver Project, Colombia, effective date 3 July 2019
- Taylor, I., Redwood, S. of Mining Associates Pty Ltd., 2017: Independent Technical Report and Resource Estimate on the Alacran Copper Gold Deposit: a Technical Report prepared for Cordoba Minerals, effective date 27 October 2017
- Vargas, H., 2014 Sociedad Minera El Alacrán Colombia, El Alacrán Copper and Gold Project Executive Summary, 16 September 2014.
- Mosher, G., 2011: Technical Report on the El Alacrán Copper-Gold Property, Colombia: a Technical Report prepared for Ashmont Resources Corp, 20 February 2011 (not published)

2.5.3 Previous Mineral Reserve Estimates

There are no previous Mineral Reserve estimates calculated for the Project.

2.6 Acknowledgements

Nordmin would like to thank and acknowledge the following people who have contributed to the preparation of this Technical Report and the underlying studies under the supervision of the QPs:

Nordmin Personnel

Christian Ballard, P.Geo, Senior Geologist, John McKenzie, Senior Geologist, Annika Van Kessel, G.I.T., Sirena Jacobsen, Geological Technician, Glen Brown, Technical Design Specialist, Brett Stewart, Technical Design Specialist, Ben Belluz, P. Eng., Andrew Olesen, EIT, Cody Vander Zwagg, P. Eng., and Anthony Picton, Designer.

Cordoba Personnel

Sarah Armstrong-Montoya, President and CEO, Mark Gibson, COO, David Garratt, CFO, Oscar Pinilla, Project Manager, Exploration, Juan Diego Benitez Correa, (former) Environmental Director, Alexandra Milena Ortiz Ramirez, Title Director, Adriana Velez, Geo Database Director, Mr. Gibson Pierce, Director, and Dr. Peng Huaisheng, Director.

Cordoba Consultants

Frank Palkovitz, Responsible Mining Solutions Corporation, Art Ratte, Technical Advisor for mineral processing, David Osachoff, OM&C Ltd, Ingeniería De Rocas y Suelos (IRYS), Servicios Hidrogeologicos Integrals SAS (SHI), Dynamica Engineering and Environmental, and Ecoquima.

2.7 Units of Measure

Unless otherwise noted, the following measurement units, formats, and systems are used throughout this Technical Report.

- Measurement Units: all references to measurement units use the System International (SI, or metric) for measurement. The primary linear distance unit, unless otherwise noted, are metres (m).
- General Orientation: all references to orientation and coordinates in this Technical Report are presented as Universal Transverse Mercator ("UTM") in metres, unless otherwise noted.
- Currencies outlined in the Technical Report are stated in US dollars ("US$") unless otherwise noted.

The symbols and abbreviations used in this Technical Report are outlined in Section 28.

3 RELIANCE ON OTHER EXPERTS

Nordmin and the Consultants have assumed and relied on the fact that all the information and existing technical documents listed in the References, Section 27 of this Technical Report, are accurate, and complete in all material aspects. The authors of this Technical Report have taken all steps in their professional judgment to verify and confirm the accuracy of the information contained these documents and do not disclaim any responsibility for this Technical Report. However, the authors cannot guarantee its accuracy and completeness. We reserve the right, but will not be obligated, to revise the Technical Report and conclusions if additional information becomes known after the date of this Technical Report.

Nordmin

Nordmin and Mr. Glen Kuntz, P.Geo. and QP relied on the following experts to complete his sections of this Technical Report. Mr. Kuntz has reviewed the data supplied by other experts and in his professional judgment, has taken appropriate steps to ensure that the work, information, and advice from the noted experts below are sound for the purpose of this Technical Report.

Mineral Tenure, Surface Rights, Property Agreements, and Royalties

Copies of the tenure documents, operating licences, permits, and work contracts were reviewed by Nordmin; independent verification of land title and tenure reported in Section 4 was not performed. Nordmin did not independently verify the legality of any underlying agreement(s) that may exist concerning the licenses or other agreement(s) between third parties but has instead relied on the Company to have conducted the proper legal due diligence.

Environmental, Permitting, and Liability Issues

The QP has fully relied upon the Company and SHI concerning the Project environmental, socioeconomic, and permitting matters relevant to the Technical Report.

Tax Matters

The QP has fully relied upon the Company for the tax impact of the economic model, including calculation of federal and provincial income taxes, provincial mining taxes, and available tax attributes that are applicable to the Project.

4 PROPERTY DESCRIPTION AND LOCATION

4.1 Location

The Project hosts the Alacran, Montiel East, Montiel West and Costa Azul deposits across various mining titles. The Project is located in the jurisdiction of the Municipality of Puerto Libertador, Department of Córdoba, 390 km northwest of Bogotá, the capital of Colombia, 160 km north of Medellín, the capital of the Department of Antioquia and the second largest city in Colombia, and 112 km south of Montería, the capital of the Department of Córdoba (Figure 4-1). Table 4-1 presents the coordinates of the Alacran, Montiel East, Montiel West and Costa Azul deposits.

Table 4-1: Coordinates Alacran, Montiel East, Montiel West and Costa Azul deposits

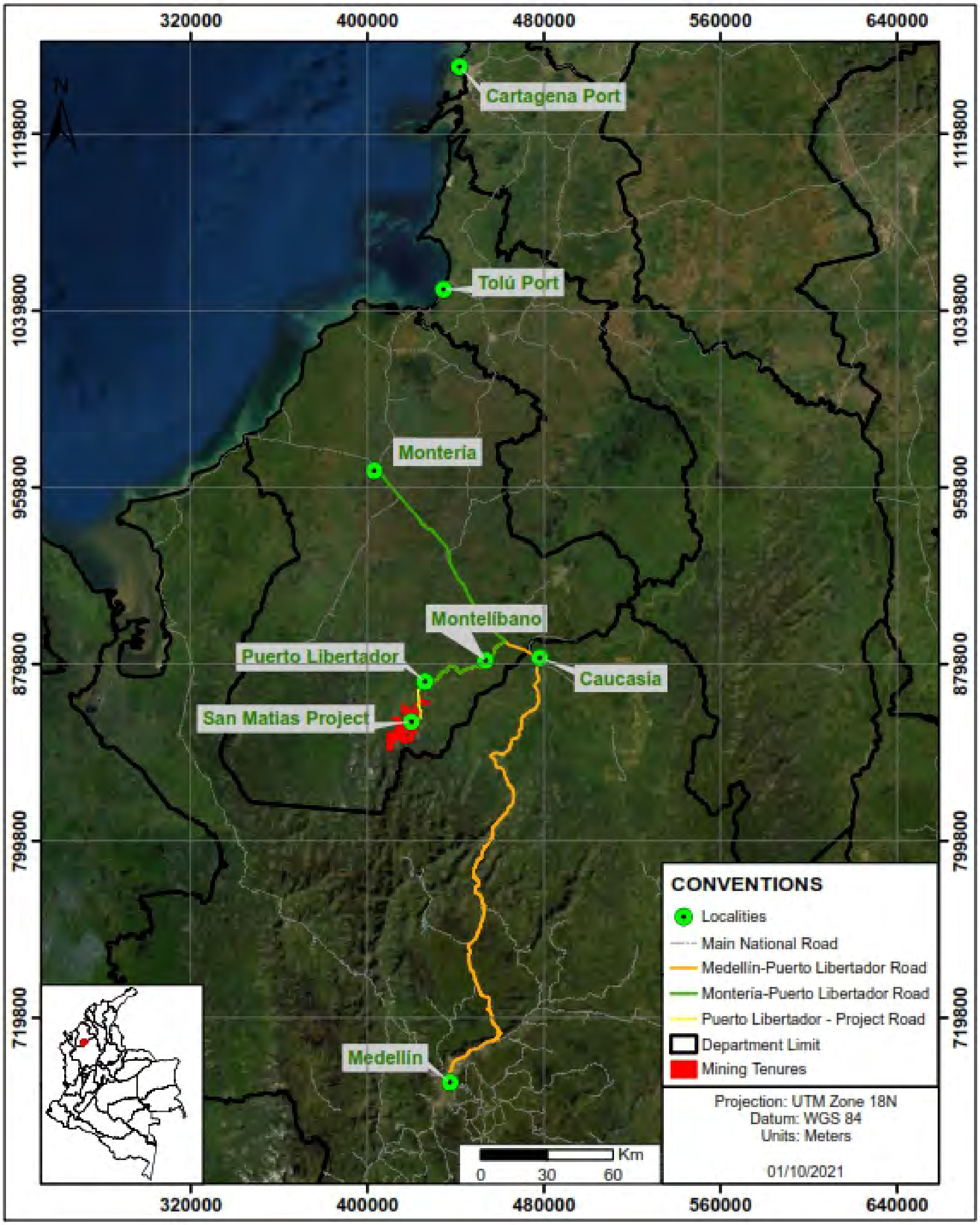
III-08021 (Alacrán)	
North Coordinate	East Coordinate
1.348.349,800	1.149.165,500
1.348.149,800	1.149.164,900
1.346.050,000	1.149.164,700
1.346.050,075	1.148.904,000
1.346.050,200	1.148.903,800
1.346.050,400	1.147.947,900
1.346.050,000	1.147.947,500
1.346.050,140	1.147.464,900
1.346.749,900	1.147.465,000
1.348.349,700	1.147.464,700

LEQ-15161 (Montiel West)	
North Coordinate	East Coordinate
1.349.999,9980	1.149.852,8990
1.349.300,0010	1.149.852,7130
1.348.389,6100	1.149.852,4590
1.348.388,4000	1.149.681,1990
1.345.807,3520	1.149.699,3940
1.346.062,5300	1.149.164,7360
1.348.349,7500	1.149.166,0000
1.348.472,4000	1.148.989,7010
1.349.799,9990	1.148.978,4450
1.349.799,9990	1.147.300,0020
1.349.999,9980	1.147.300,0000
Exclusion	
North Coordinate	East Coordinate
1.349.299,9980	1.149.714,9990
1.348.488,6000	1.149.715,0010
1.348.489,5990	1.149.852,4010
1.349.300,0000	1.149.852,5980

JJ9-08091 (Montiel East)	
North Coordinate	East Coordinate
1.350.000,177	1.146.000,003
1.350.000,399	1.148.999,868
1.351.188,272	1.149.000,462
1.350.977,997	1.148.816,972
1.350.982,951	1.148.810,937
1.350.977,926	1.148.806,971
1.352.612,410	1.146.927,611
1.352.200,928	1.146.570,575
1.352.205,886	1.146.564,540
1.352.200,857	1.146.560,578
1.352.688,262	1.145.999,999
1.353.434,7030	1.146.000,0040
1.350.984,0000	1.148.817,9210
1.352.344,9040	1.150.000,0280
1.351.000,0010	1.150.000,0290
1.350.999,6240	1.152.999,9970
1.349.362,8370	1.153.000,0070
1.349.000,0000	1.152.999,9000
1.349.000,0000	1.153.000,0030
1.347.999,8480	1.152.999,6310

LEB-08491 (Montiel West)	
North Coordinate	East Coordinate
1.348.389,6090	1.149.852,4580
1.348.349,6000	1.149.852,4470
1.348.349,6340	1.150.000,0020
1.348.349,8290	1.150.800,3460
1.348.350,2920	1.150.800,3470
1.348.349,9890	1.151.465,2890
1.348.000,0210	1.151.465,7570
1.347.999,8480	1.152.999,6310
1.346.021,3000	1.153.000,0080
1.344.904,9560	1.153.000,0030
1.344.500,1120	1.152.749,0640
1.344.500,0330	1.150.689,4380
1.344.545,1980	1.150.677,0010
1.344.563,9980	1.149.945,9000
1.345.707,6010	1.149.908,4010
1.345.734,2150	1.149.852,6410
1.345.626,8940	1.149.852,6350
1.345.646,4360	1.149.710,3440
1.345.642,5910	1.149.700,5580

Source: Mining National Register, 2021, coordinate system Magna Sirgas Colombia West Zone (point [.] for thousands, and a comma [,] for decimals)



Source: Cordoba, 2021

Figure 4-1: Location of the Project, Department of Córdoba, Colombia, in relation to infrastructure in the region

4.2 Mineral Rights in Colombia

4.2.1 Mineral Title

The Colombian Constitution provides that the sole owner of the subsurface and all non-renewable natural resources in the territory is the Republic of Colombia[1]. The exploitation of any non-renewable natural resource present in the subsurface originates the payment of a royalty to the Republic of Colombia, together with any other considerations that may be agreed upon for each title, concession or license.

The concession or licensing of any rights to undertake the exploration and exploitation of non-renewable resources are determined by statutes enacted by the Congress of the Republic Colombian Congress. With respect to any mineral interest, the Colombian Code of Mines sets out the terms subject to which the Sovereign concedes or licenses the investing party the undertaking of mining activities.

The main regulation in force is the Colombian mining code (Law 685) of 2001 established the legal framework for the concession of mineral exploration and exploitation. A concession agreement includes exploration; exploitation; construction and assembly; mineral processing and transportation; and closure of a specific ore body and mining operation. Concession agreements are granted for a maximum period of 30 years, renewable for another 30 years.

The Colombian State may confer 'mining titles' which are concession agreements that grant an exclusive and temporary right to explore and exploit minerals in a specific area set out by the agreement. Concession agreements are awarded by the ANM on a 'first come, first served' basis, and shall be duly registered in the National Mining Registry ("RNM") to become fully enforceable.

Holders of mining titles are not vested with property of the minerals 'in situ,' but with the ability to i) explore and determine the presence, quantity and quality of minerals within the contracted area; ii) extract and become the rightful owner of the minerals therein; and iii) obtain mining easements over the land of third parties to efficiently undertake the mining activity.

Mining titles are divided into three different phases:

i. Exploration

- The licensee shall undertake a technical exploration in order to determine the existence, location, quality and quantity of minerals in the contracted area, and the feasibility of exploiting and extracting the resources.
  Exploration could be conducted within three years as from the registration of the concession agreement in the ANM. The licensee is entitled to request up to four extensions of two years each. Throughout this phase the licensee shall annually i) pay a surface fee in consideration for the contracted area[2], and ii) obtain an environmental mining insurance policy to cover any breach to the mining or environmental obligations or the mandatory early termination of the concession by the ANM[3].
- Before the end of the exploration period, the licensee shall present, for the approval of the corresponding authority, i) the exploitation working plan ("PTO") in accordance with Article 78 of the

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[1] Without prejudice to the rights and entitlements acquired under prior statutes.

[2] Surface payment fees depend on the extension of the contracted area and the year the concession is at. The longest a licensee has had the mining title and the larger the contracted area is, the higher the annual surface payment will be.

[3] The value of the environmental mining policy shall be equivalent to 5% of the foreseen investment for said year of exploration.

Mining Code (last updated in 2021) describing the resource, site conditions and mining plan. The requirements for the PTO are specified in the Terms of Reference for generation of a PTO (ANM, 2018), and ii) the Environmental Impact Assessment ("EIA") that demonstrates the environmental feasibility of the PTO.

ii. Construction and mining assembly

- The licensee shall prepare and build all facilities and infrastructure necessary for the exploitation of the title in accordance with the PTO previously approved.
- Construction and mining assembly shall be conducted within three years as of the termination of the exploration phase. The licensee is entitled to request a one-year extension.
- To initiate this phase, the titleholder shall have an environmental license which is granted by the environmental authority based on the EIA presented by the licensee.
- Throughout this phase the licensee shall annually i) pay a surface fee[4], and ii) obtain an environmental mining insurance policy to cover any breach to the mining or environmental obligations or the mandatory early termination of the concession by the ANM[5].

iii. Exploitation

- The licensee shall undertake the activities for the extraction and collection of the minerals in the surface or subsurface of the contracted area.
- The exploitation of the mining title shall be conducted within the term of the concession agreement (up to 30 years) deducted by the time spent on the exploration and construction phases. Before the exploitation term ends, the licensee is entitled to request the renewal of the concession agreement for up to 30 years more.
- Throughout this phase the licensee shall i) obtain an environmental mining insurance policy to cover any breach to the mining or environmental obligations or the mandatory early termination of the concession by the ANM,6; and ii) pay a royalty to the Colombian Government over the main or secondary resources extracted from the area licensed for the exploitation under the concession agreement.

The obligations under the concession agreement may be temporarily suspended at the request of the licensee, whenever there is a situation of force majeure. The mining authority shall approve the suspension and may request at any time that the licensee demonstrates the continuity of the force majeure situation. Obligations regarding the payment of the surface fee are waived during the suspension, but not the obligation to obtain and pay the environmental mining insurance policy.

4.2.2 Environmental Regulations in Colombia

The Colombian Constitution considers the environment a collective right and sets out the main features for its preservation, protection and treatment by the Colombian citizens and authorities.

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[4] The amount of the surface payment fees will that of the last fee paid in the exploration phase.

[5] The value of the environmental mining policy shall be equivalent to 5% of the foreseen investment for said year of construction and assembly.

[6] The value of the environmental mining policy shall be equivalent to 10% of the result obtained from multiplying the estimated annual production volume for the price annually fixed by the National Government for the corresponding mineral at the pit.

Projects that might have an impact on the environment, as determined by the statutes, require the prior authorization from the maximum environmental authority. Pursuant to the Colombian Mining Code, a mining project is divided into three phases, each of which shall meet different requirements.

The most important environmental requirement regarding the construction, and mining assembly and the exploitation of a mining title is an environmental license. This license shall be granted by the environmental license agency or by the local or regional authority, based on the EIA that is prepared and filed by the titleholder.

As part of the protection of the environment, Colombian laws have identified areas subject to special protection, such as forests, natural parks or areas occupied by minority groups, among others, in which it is not allowed to undertake any mining activity, or there are special requirements to do so.

4.2.3 Legal Access and Surface Rights in Colombia

The award of a concession agreement does not grant the licensee property rights on the surface of the area of the title either.

Mining is deemed, by law, as a public interest activity and, therefore, mining titleholders have the ability to request the expropriation of land and the imposition of easements on land owned by third parties to the extent such area is required to undertake mining activities over the mining title efficiently.

The perfection of mining easements over third-party lands shall include a direct agreement of the involved parties regarding economic compensation and shall be made by public deed. Otherwise, it shall be preceded by a judicial proceeding. Recent opinions have held that such judicial proceeding is governed by act 1274 of 2009, which contemplates the petroleum industry easement judicial proceeding and appraisal.

4.2.4 Water Rights in Colombia

The holder of a mining title shall obtain, before initiating exploration activities, a i) superficial water concession permit when the exploration of the mining title is expected to require the usage of public water resources or its channels, and ii) an underground water concession permit when the exploration of the mining title is expected to require the usage of public underground water resources.

4.3 Cordoba Mineral Rights

4.3.1 San Matías Copper-Gold-Silver Project Mineral Title

The subsidiaries of Cordoba[7], MCSAS (a Colombian subsidiary of Cordoba), Recursos de Colombia S.A.S. ("RCSAS") (a Colombian subsidiary of Cordoba) and ECSAS (the operator of the mining title), are simplified stock corporations formed in accordance with the laws of the Republic of Colombia. ECSAS has the corporate power to conduct and undertake advisory, consultancy and work supervision in the mining and energy industries; while MCSAS has the corporate power to own and hold mining titles, and conduct the exploration, development and exploitation of mines in the Republic of Colombia.

As of the date of this Technical Report, MCSAS is the sole owner of record of 22 mining titles located in the departments of Córdoba and Caldas in the Republic of Colombia, including those for the Montiel East, Montiel West and the Costa Azul deposits.

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[7] Approximately 63.0% of Cordoba's issued and outstanding shares are owned by Ivanhoe Electric Inc. ("IVNE") formerly held by IVNE affiliate, High Power Exploration Inc.

Cobre Minerals S.A.S. ("CM Company") is the sole holder of record of mining title for the Alacran deposit (mining title III-08021) located in the municipality of Puerto Libertador, Córdoba. ECSAS is the operator of the Alacran Project.

The Alacran deposit is located within the Project area in the mining concession described in Table 4-2 and shown in Figure 4-2 and Figure 4-3.

Table 4-2: Project Title Concessions

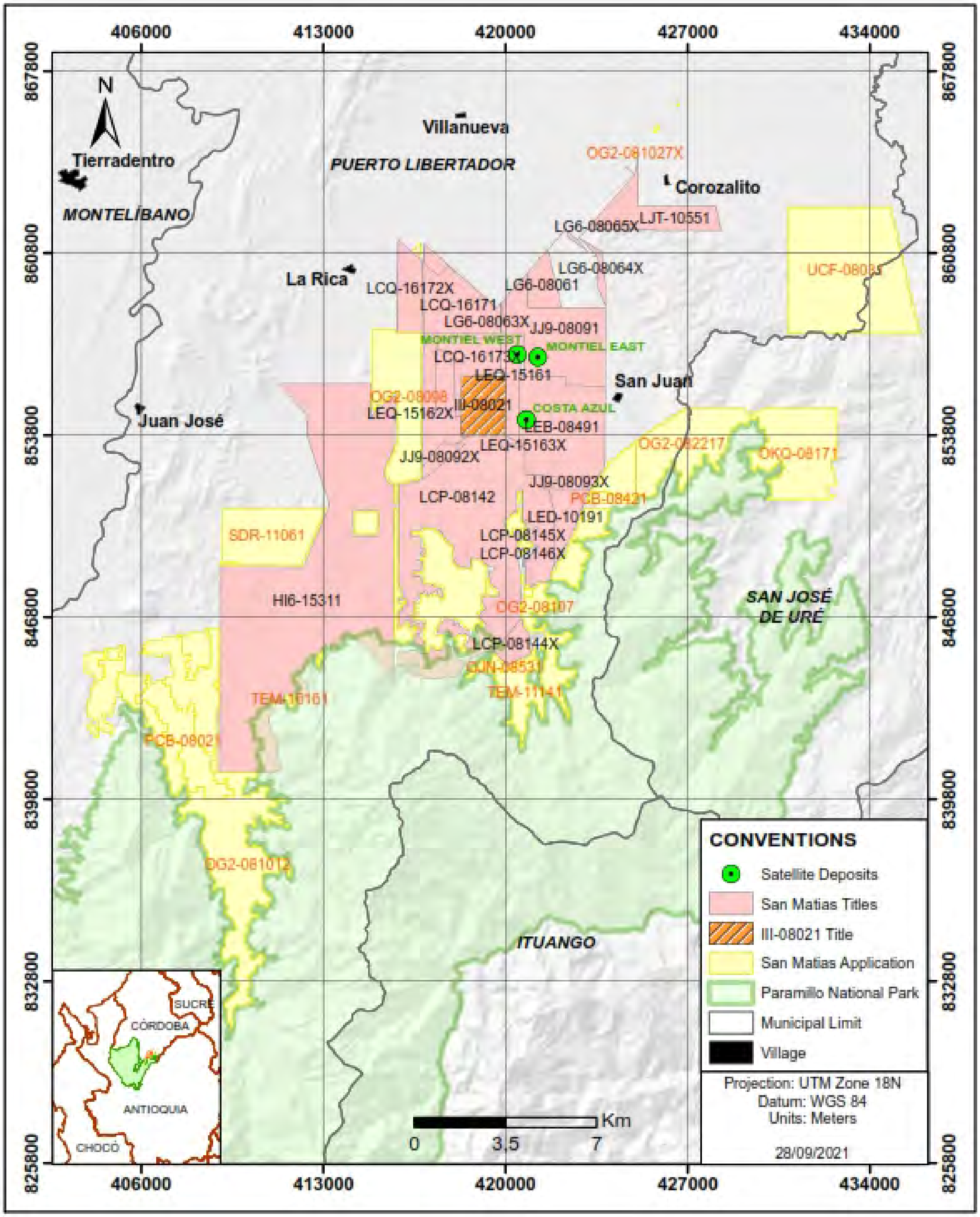
RMN Number	Holder of Record	Date of Registration	Term	Area (Ha) Area (m^2)	2018 Fees (Surface Fee + Insurance Policy)	Payment Up to Date	Suspension of Obligations
III-08021	Cobre Minerals S.A.S. (ECSAS is the operator of the mining title)	July 1, 2009	June 30, 2039	390 Ha. 9220 m^2	$ 22.031.756	Yes	Suspended from May 24, 2019, to May 23,2020 and extended to November 23, 2020
HI6-15311	MCSAS	May 2, 2008	May 2, 2088	5418 Ha. 634 m^2	$ 23.560.750	Yes	Suspended to March 1, 2022
JJ9-08091	MCSAS	November 19, 2012	November 18, 2042	1282 Ha. 500 m^2	$ 28.397.667	Yes	Suspended to February 6, 2021, pending suspension[8]
JJ9-08092X	MCSAS	November 19, 2012	November 18, 2042	80 Ha. 4440 m^2	$ 694.764	Yes	Suspended to April 24, 2021, pending suspension
JJ9-08093X	MCSAS	November 19, 2012	November 18, 2042	97 Ha. 7375 m^2	$ 789.968	Yes	Suspended to April 22, 2021, pending suspension
LCP-08142	MCSAS	February 2, 2015	February 8, 2045	3063 Ha. 2763 m^2	$ 4.101.994	Yes	Suspended to March 20, 2022
LCP-08143X	MCSAS	January 30,2015	January 29,2045	748 m^2	$ 715.229	Yes	Suspended to January 8, 2022
LCP-08144X	MCSAS	February 2, 2015	February 1, 2045	138 Ha. 4300 m^2	$ 1.173.512	Yes	Suspended to January 8, 2022
LCP-08145X	MCSAS	January 30,2015	January 29, 2045	794 m^2	$ 1.029.662	Yes	Suspended to January 8, 2022

[8] Pending refers to items awaiting resolution by the ANM

RMN Number	Holder of Record	Date of Registration	Term	Area (Ha) Area (m²)	2018 Fees (Surface Fee + Insurance Policy)	Payment Up to Date	Suspension of Obligations
LCP-08146X	MCSAS	January 30,2015	January 29, 2045	434 m^2	$ 1.029.662	Yes	Suspended to January 8, 2022
LCQ-16171	MCSAS	February 17, 2015	February 16, 2045	583 Ha. 4209 m^2	$ 2.115.351	Yes	Suspended to January 8, 2022
LCQ-16172X	MCSAS	May 14, 2014	May 13, 2044	305 Ha. 5961 m^2	$ 1.033.853	Yes	Suspended to December 26, 2021
LCQ-16173X	MCSAS	May 14, 2014	May 13, 2044	329 Ha. 3295 m^2	$ 6.767.004	Yes	Suspended to January 7, 2021, pending suspension
LEB-08491	MCSAS	January 25,2015	January 24,2045	1184 Ha. 1577 m^2	$ 29.292.392	Yes	Suspended to March 20, 2021, pending suspension
LED-10191	MCSAS	May 24, 2012	May 25, 2042	233 Ha. 6383 m^2	$ 2.147.754	Yes	Suspended to January 30, 2022
LEQ-15161	MCSAS	October 17, 2012	October 16, 2042	290 Ha. 7373 m^2	$ 24.503.334	Yes	Suspended to March 20, 2022
LEQ-15162X	MCSAS	May 10, 2013	May 9, 2043	368 Ha. 1684 m^2	$ 1.101.145	Yes	Suspended to December 13, 2020, pending suspension
LEQ-15163X	MCSAS	May 10, 2013	May 9, 2043	4 Ha. 8100 m^2	$ 729.921	Yes	Suspended to December 22, 2021,
LG6-08061	MCSAS	April 4, 2012	April 3, 2042	196 Ha. 9485 m^2	$ 11.645.319	Yes	Suspended to January 30, 2022
LG6-08063X	MCSAS	June 5, 2015	June 4, 2045	2 Ha. 8653 m^2	$ 6.639.811	Yes	Suspended to December 5, 2021,
LG6-08064X	MCSAS	May 14, 2012	May 13, 2042	55 Ha. 6082 m^2	$ 7.665.348	Yes	Suspended to January 29, 2021 pending suspension

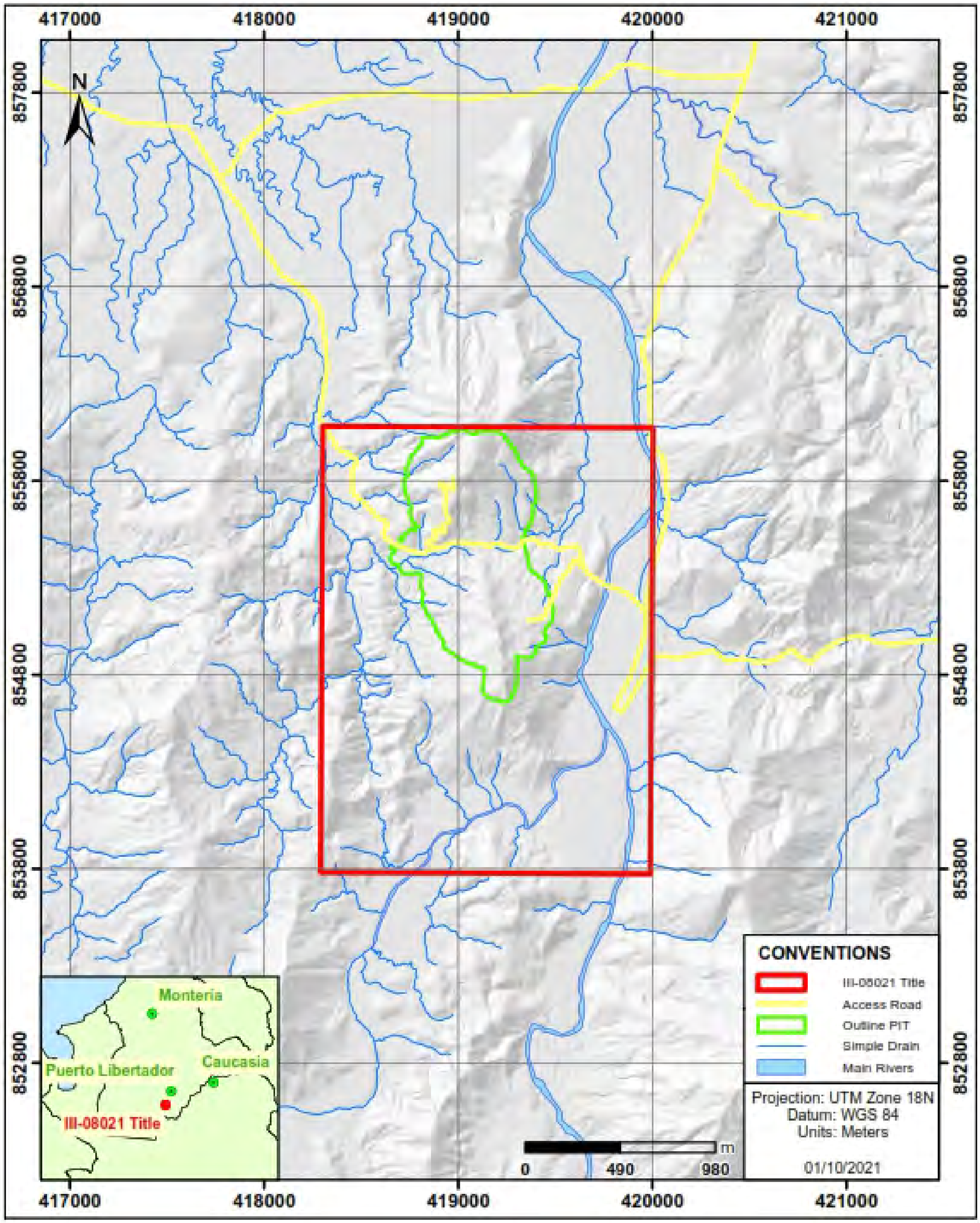
RMN Number	Holder of Record	Date of Registration	Term	Area (Ha) Area (m^2)	2018 Fees (Surface Fee + Insurance Policy)	Payment Up to Date	Suspension of Obligations
LG6-08065X	MCSAS	May 14, 2014	May 13, 2044	47 Ha. 1920 m^2	$ 454.012	Yes	Suspended to January 30, 2022
LJT-10551	MCSAS	January 25, 2012	January 24, 2042	483 Ha. 8637 m^2	$ 907.927	Yes	Suspended to January 30, 2022

Source: Cordoba, 2021



Source: Cordoba, 2021

Figure 4-2: Map of the Project concession agreements



Source: Cordoba, 2021

Figure 4-3: Map of the Alacran concession agreement, on which the Alacran deposit is located, within the Project area.

4.3.2 Mining Title Agreements

There are two agreements related to mining titles:

i. the option agreement executed on February 27, 2016, entered into by Cordoba; MCSAS; ECSAS (together with Cordoba and MCSAS (the “Cordoba Parties”); OMNI; Compañía Minera Alacran S.A.S. (“CMA”)[9]; CMH Colombia S.A.S. (“CMH”); and CM Company, (together with OMNI, CMA and CMH [the “OMNI Parties”]) in connection with the San Matías Property (as partially amended and restated in writing by the ‘*Otrosí Nº 1*’ dated October 10, 2016, the ‘*Otrosí Nº 2*’ dated August 11, 2017, the ‘*Otrosí Nº 3*’ dated January 23, 2018, the ‘*Otrosí Nº 4*’ dated February 21, 2019, and the ‘*Otrosí Nº 5*’ dated May 20, 2019, the “Option Agreement”).

ii. the future transfer promise agreement executed on May 19, 2016, entered into by Activos Mineros de Colombia S.A.S. (“Activos Mineros”) and MCSAS in connection with Mining Title PCB-08021 (the “Future Transfer Promise Agreement”).

4.3.2.1 The Option Agreement

On October 20, 2015, the Cordoba Parties submitted a letter of intent to CMA and OMNI regarding the execution of the Option Agreement with respect to the Property, which CMA and OMNI accepted.

On February 27, 2016, the Cordoba Parties and the OMNI Parties executed the Option Agreement. The Option Agreement has been subject to five amendments. Pursuant the Option Agreement (as it has been modified from time to time), the OMNI Parties have granted the Cordoba Parties the exclusive and irrevocable first option to acquire 100% of the issued and outstanding shares of CM Company. CM Company is the current titleholder of Mining Title III-08021, which hosts the Alacran deposit. For the execution of the Option by one or all of the Cordoba Parties, the sixteen conditions in Table 4-2 must be satisfied.

[9] 50.1% of OMNI issued, and outstanding shares are owned by HPX. 50.1% of CMH issued and outstanding shares are owned by HPX.

Table 4-3: Conditions of the Property February 27, 2016, Option Agreement

Condition	Status
First Option Advance Payment disbursement ($250,000).	Completed
Commencement by the Operator of a drilling program of minimum 3,000.0 m.	Completed
Second Option Advance Payment disbursement ($250,000).	Completed
Third Option Advance Payment disbursement ($250,000).	Completed
Filing of an extension request for the exploration stage with the ANM by MCSAS.	Completed
Fourth Option Advance Payment disbursement ($1,000,000).	Completed
Issuance of the Cordoba Option Warrant Certificate.	Completed
Completion by the Operator of minimum 8,000.0 m of drilling in the Mining Title.	Completed
Good standing of the Mining Title.	Ongoing
$10,000 monthly payments by the Cordoba Parties to the OMNI Parties for their corporate expenses.	Completed
Delivery of Technical Report NI 43-101 by the Cordoba Parties to the OMNI Parties (the "Technical Report Delivery").	Completed
Completion by the Operator of the additional minimum drilling programs established in the extension requests for the exploration stage.	Completed
Written notice by the Cordoba Parties containing their decision whether or not to exercise the Option in June 2020 on the earlier of (i) 5 business days following receipt of the final Preliminary Economic Assessment Report by Nordmin; or (ii) 30 August 2019. (Written notice deemed as a letter of intent on the obligation of the Fifth Option Advance Payment disbursement which shall be guaranteed by the constitution of corporate guaranties by the Cordoba Parties on or before the date of the written notice).	Completed
Filing by MCSAS of the PTO (works plan) for the Mining Title with the ANM.	Completed
Filing by MCSAS of the EIA for the Mining Title with the ANM.	Pending
Fifth Option Advance Payment disbursement ($13,000,000).	Completed

Source: Cordoba, 2021

Under the Option Agreement, the Cordoba Parties shall conduct, on their account and at their sole risk, the mining activities for the Project.

Schedule C of the Option Agreement contains the royalty agreement dated as of April 5, 2016, entered into by the Cordoba Parties and CMH, pursuant to which the Cordoba Parties have granted CMH a 2% NSR royalty.

4.3.2.2 The Future Transfer Promise Agreement

Activos Mineros is the applicant of the proposal for Concession Agreement PCB-08021 before the ANM, for the technical exploration and economic exploitation of 'precious metals and their concentrates,' in the municipality of Puerto Libertador, Córdoba.

On May 19, 2016, Activos Mineros and MCSAS executed the Future Transfer Promise Agreement. Pursuant to this agreement, once Activos Mineros becomes the holder of record of the mining title PCB-08021, it shall transfer all rights and obligations resulting from the PCB-08021 mining title to MCSAS[10].

4.3.3 Environmental Permitting Considerations

For the current exploration phase of the Mining Titles, environmental licenses are not required. The environmental license is necessary for the titleholder to initiate the construction and assembly phase and is granted by the environmental authority upon the review and assessment of the EIA filed by the titleholder.

MCSAS is currently preparing the EIA for the Project. Table 4-3 outlines the environmental permits in force for the Mining Titles.

Table 4-4: Environmental Permits by Mining Title

Title	Permit	Current Status
Alacran	Gathering Permit for Environmental Impact Study-EIA	Granted by Resolution 2-7034 of February 10, 2020. The permit is valid for two years.
Costa Azul	Cutting down wood and forest use	Desisting request filed on December 3, 2018, is approved on November 29, 2019, by Resolution 345.
	Mining – Environmental Guidelines for exploration	Submitted on May 29, 2013.
	Waste Management Plan	Submitted on February 2, 2021.
	Hazardous Waste Management Plan	Updated and submitted on September 22, 2021.
Montiel West	Waste Management Plan	Submitted on August 31, 2021.
	Hazardous Waste Management Plan	Updated and submitted November 6, 2020.
	Mining – Environmental Guidelines for exploration	Submitted on August 26, 2013.
Montiel East	Waste Permit.	Extended by Resolution 2-6875 of December 20, 2019.
	Hazardous Waste Management Plan.	Submitted on March 29, 2021.

Source: Cordoba, 2021

[10] MCSAS filed an administrative request in connection to the areas covered by concession agreement proposals PCB-08021; OG2- 08107 and NGN-10251 on March 18, 2015. Decision from the ANM is still pending.

4.3.4 Legal Access and Surface Rights Considerations

Between 2016 and 2017 MCSAS entered into six agreements regarding the purchase of properties located within the municipality Puerto Libertador in Córdoba. Furthermore, MCSAS has entered into at least 60 and land access rights agreements regarding properties in the municipality of Puerto Libertador, Córdoba.

Part of the land in the area in which the Mining Titles are located is either owned by the Republic of Colombia and qualified as a vacant or '*baldío*' property or not recorded in the land ownership registry and therefore deemed as '*baldío*' property.

Properties deemed as '*baldíos*' are not subject to be acquired by MCSAS or any other person by direct purchase to the occupants of the land. The ownership of '*baldío*' properties may only be transferred by the direct and official allocation by the Republic of Colombia, subject to legal regulations and restrictions¸ and specific administrative and judicial procedures that allow it for the Company´s purposes and the project development.

4.3.5 Water Rights Considerations

For the exploration phase, in which all of the Mining Titles are, the concession permits related to water are only required if the titleholder expects to use water resources. The vestment permit is required for the proper disposal of liquid resources during the exploration phase.

The permits held by the Mining Titles are outlined in Table 4-5.

Table 4-5: Water Resource Permits by Mining Title

Title	Permit	Current Status
Alacran	Surface Water Concession.	The permit is currently on extension process for 5 years more. The request was submitted on August 3, 2021
	Discharge wastewater permit.	
Costa Azul	Surface Water Concession.	They were extended for 5 years by Resolution 2-7317 of September 10, 2020
	Discharge wastewater permit.	
Montiel West	Surface Water Concession.	They were extended for 5 years by Resolution 2-6918 of December 30, 2019
	Discharge wastewater permit.	
Montiel East	Surface Water Concession.	They were extended for 5 years by Resolution 2-6875 of December 20, 2019

Source: Cordoba, 2021

4.3.6 Social License Considerations

The Colombian Ministry of Internal Affairs certified the presence of the indigenous group '*Cabildo Indígena San Pedro*' within the contracted area of the Project. Under Colombian regulations, minority groups such as the '*Cabildo Indígena San Pedro*,' shall be consulted in connection with mining activities that might affect them prior to the perfection of the environmental license.

There is ongoing complaint filed by the "Asociación de Mineros El Alacrán" ("ASOMINAL") against OMNI and the Ministry of Mines and Energy, in which ASOMINAL requested the annulment of the Mining Concession Contract III-08021. The case is moving to the evidentiary stage, and the Tribunal will schedule a date for continuing with the preliminary hearing, in which it will decide on the evidence requested by the parties, and it will schedule a date for holding the trial. Cordoba believes the request for annulment has no legal basis, and the Company has high or probable probabilities of success.

4.3.7 Royalties

Once the concession enters into the exploitation phase it will be subject to Colombian corporate taxes and mining royalties on metals production. The corporate income tax rate in Colombia is 30% from 2022 onwards. Colombian mining royalties are 4% of all revenues received from Au and Ag exploitation and 5% of all revenue from Cu exploitation. The mining royalties are deductible for income tax purposes. A 2% royalty on the net income for production is payable to OMNI.

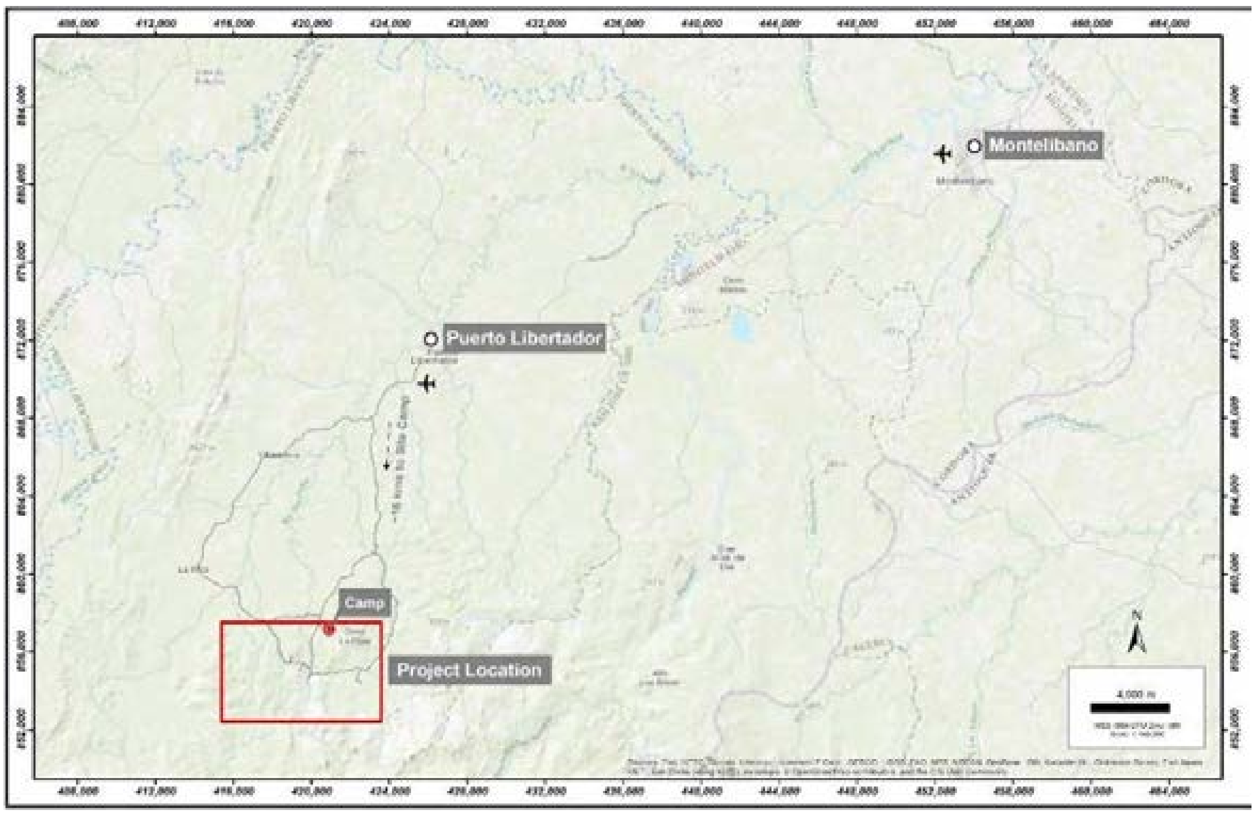
4.4 Comments on Section 4

- MCSAS, RCSAS and ECSAS have the corporate power to carry out exploration and exploitation activities in Colombia.
- MCSAS is the holder of record of 23 mining titles located in the territory of Colombia pursuant to mining concession agreements executed with the ANM (the "Minerales Mining Titles").
- CM Company is the sole holder of record of Alacran Mining Title III-08021. Pursuant to the Option Agreement, the Cordoba Parties are entitled to the exclusive and irrevocable first option to acquire 100% of the issued and outstanding shares of CM Company and thus, become indirect sole beneficiaries of Mining Title III-08021, subject to the satisfaction of the conditions set forth in the Option Agreement (described in section 4.3.2.1 herein).
- Each of the Minerales Mining Titles held by MCSAS, as of the date of the legal opinion:
  - vests in its holder of record a right to explore, and, subject to the satisfaction of its terms and conditions, exploit the permitted mines according to each mining title;
  - is currently in force;
  - is registered in the national mining registry of the ANM;
  - has no registration of breach, termination, mandatory early termination or any other record that would deem the mining titles unenforceable; and
  - has no security interest recorded in the Colombian 'security interests' registration system.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

The Project is located in the Municipality of Puerto Libertador, Department of Córdoba, 390 km northwest of Bogotá and 160 km north of Medellín (Figure 5-1). The nearest major town is Puerto Libertador, which has a population of approximately 55,600. There are daily scheduled flights from Medellín to the cities of Montería, the capital of the Department of Córdoba, 160 km northwest of Puerto Libertador and Caucasia, 70 km from Puerto Libertador. The Project exploration camp is accessible from the city of Puerto Libertador via a 21 km partially paved road. Vehicle access across the Project is limited to four-wheel drive vehicles due to rough terrain, stream crossing, and abundant rain.



Source: Cordoba, 2019

Figure 5-1: Project location and area infrastructure

5.2 Climate

The climate is humid and warm, with range of average monthly temperatures between 24.5 ° C and 27° C. The average annual rainfall is approximately 2,850 mm/yr, predominantly falling between April, and November. Estimates for rainfall intensity versus return interval, as well as the Probable Maximum Precipitation event ("PMP") were calculated using data from thirteen stations within a 75 km radius of the Project (Figure 5-2). Calculation of site-specific climate values were performed using several methods due to the varying periods of record, incomplete datasets, and significant variations in the elevations of the stations.

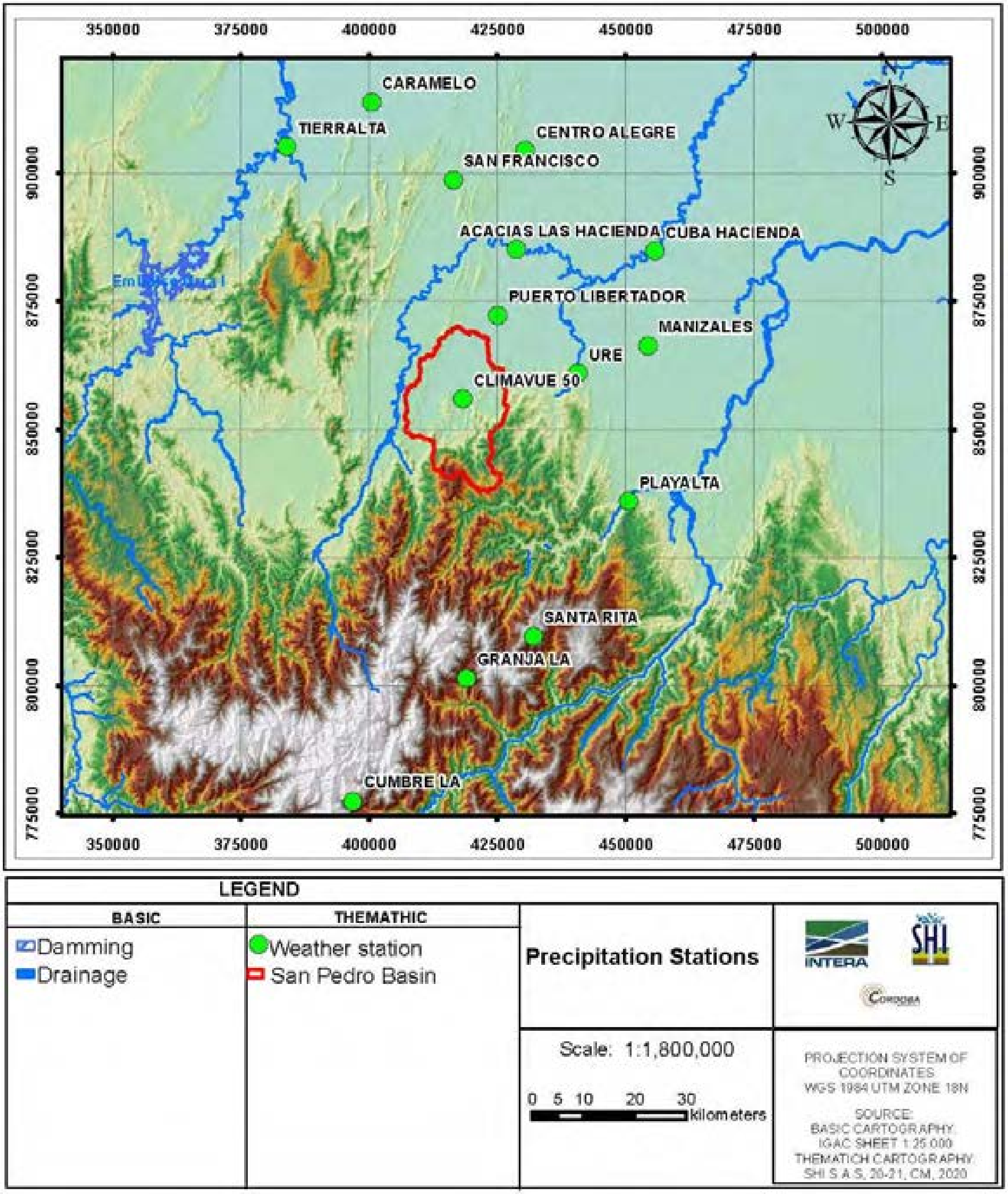
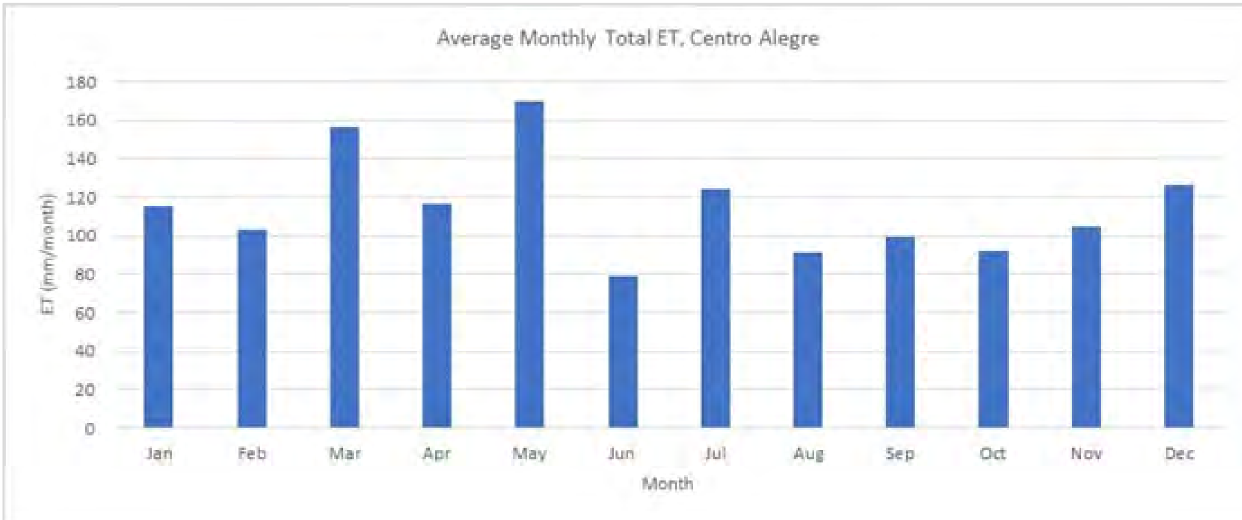


Figure 5-2: Location of the climate stations

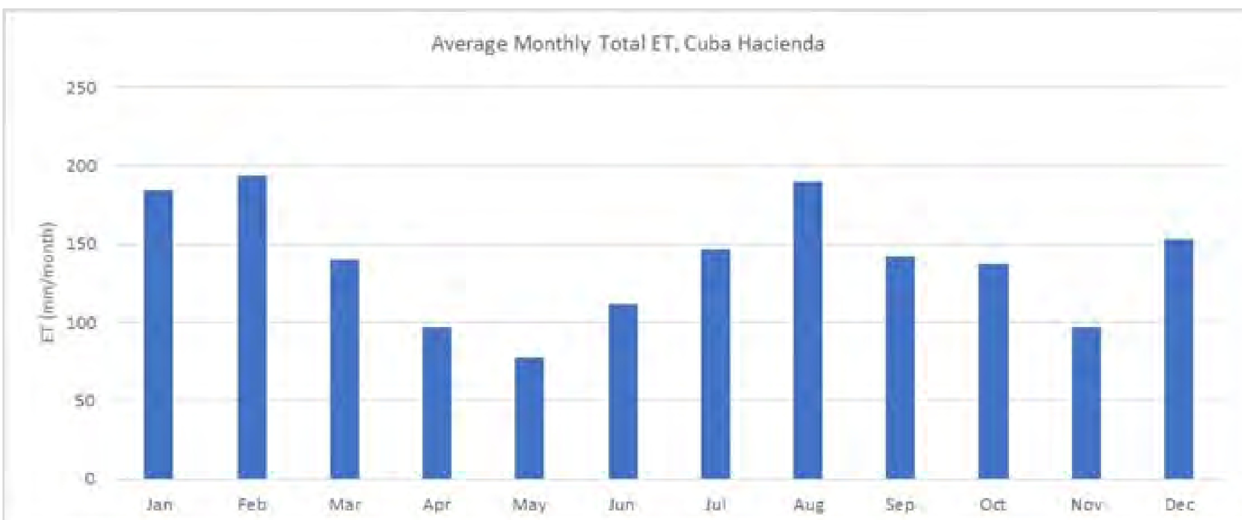
5.2.1 Evapotranspiration

Evapotranspiration ("ET") estimates were derived using the Tucs method and available climatological data from the Hacienda Cuba and Centro Alegre stations. Average ET varies from 78 mm per month in May at the Hacienda Cuba station to a maximum of 193.7 mm per month in February at the Hacienda Cuba station. ET is highest during the drier months. Total average ET ranges from 170 mm to 193.7 mm per month for the Hacienda Cuba and Centro Alegre stations. The average monthly variability for ET for the Centro Alegre and Hacienda Cuba stations is shown in Figure 5-3 and Figure 5-4, respectively.



Source: INTERA, 2021

Figure 5-3: Average monthly total ET, Centro Alegre

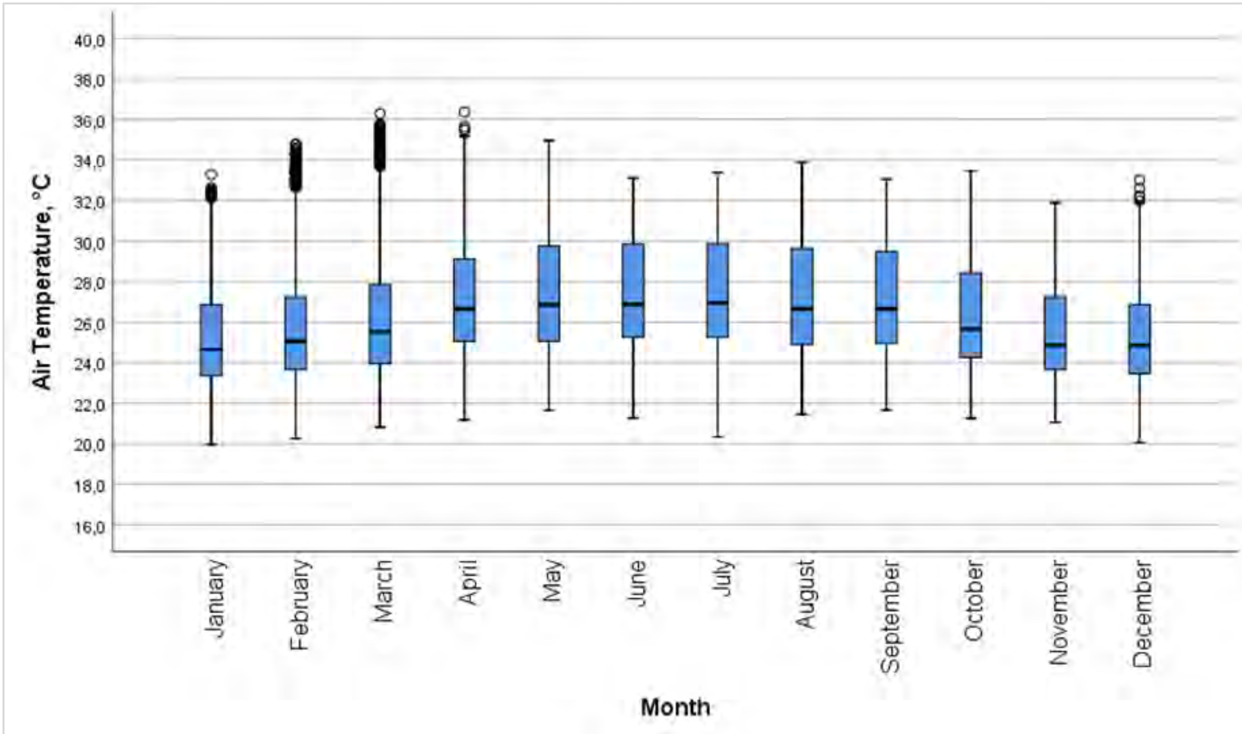


Source: INTERA, 2021

Figure 5-4: Average monthly total ET, Hacienda Cuba

5.2.2 Temperature

The temperature at the Project is temperate to hot, with a narrow range of average daily temperature range of 20° C to 34° C in the winter and 20° C to 36° C in the summer, with average daily temperatures between 25.5° C and 27° C (Figure 5-5).



Source: Ecoquimsa, 2021

Figure 5-5: Statistical summary of monthly temperatures

5.2.3 Precipitation

A comprehensive climatological analysis was employed to analyze the precipitation data in the vicinity of the mine. Data from a total of thirteen precipitation stations were analyzed and used for the estimate of design storm depths and PMP for the mine. An in-depth statistical analysis of the rainfall records illustrated that the Ure station is the best analog for the rainfall at the mine due to its close proximity to the mine and the length and completeness of the record.

The Ure meteorological stations is located 25 km ENE of the Project and has a precipitation record from November 1, 1973, through September 30, 2018. The station at Puerto Libertador, 17 km NEN of the Project spans May 1, 1986, through December 31, 2019 (Table 5-1). Both the Ure and Puerto Libertador stations are close to the mine area, and overall, the Ure station contains the most complete precipitation record. For the evaluation of the Ure precipitation data, data gaps in the Ure record were filled with data from the nearby Manizales station, which was the closest station to Ure with available data.

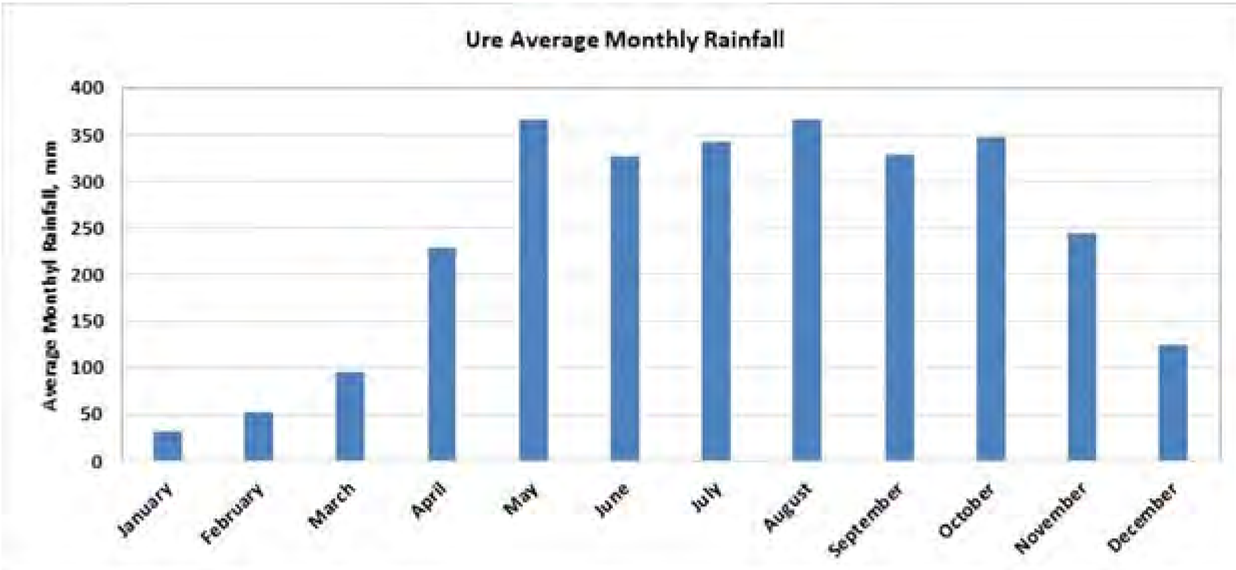
Table 5-1: Location of the Ure and Puerto Libertador Meteorological Stations

Location	Easting* [m]	Northing* [m]	Altitude (metres above sea level)	First Recorded Measurement
2501006-URE	440,645.0	860904.9	200	11/1/1973
25010010-PUERTO LIBERTADOR	425043.0	872229.0	55	5/1/1986

* Coordinate system: WGS84/UTM Zone 18 North

Annual precipitation at Ure ranges from 1,600 mm to 4,012 mm per year, with an average of 2,851 mm/year.

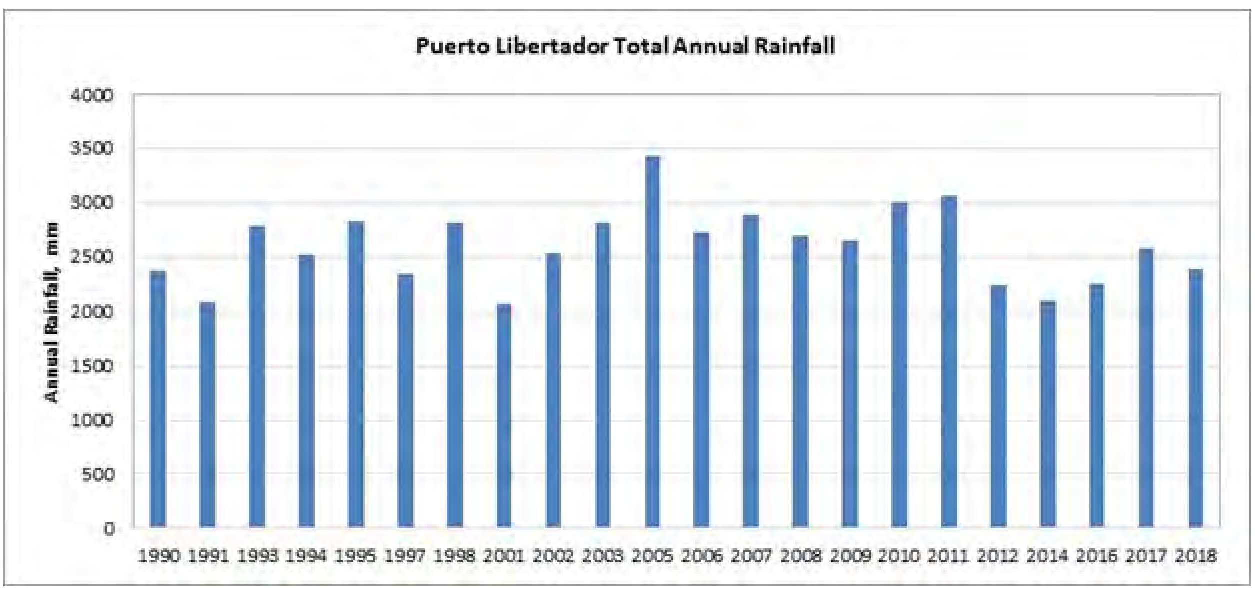
Rainfall occurs in two well defined seasons, with a dry season from December to March or April and a rainy season from May to November. January tends to be the driest month of the year and May the wettest. Typically, the rainy season has two peaks in May and October, with slightly drier months in between (Figure 5-6).



Source: INTERA, 2021

Figure 5-6: Ure Station, average rainfall by month

The Puerto Libertador station contains 22 years of complete rainfall records between 1990 and 2018 (Figure 5-7). As shown, average rainfall is slightly higher at this location, which averages 2,598 mm/year.



Source: INTERA, 2021

Figure 5-7: Puerto Libertador total annual rainfall

The calculated annual average precipitation for the Project is 2,838 mm/yr.

5.2.4 Wind

Winds at the Project are generally out of the northeast or south (Figure 5-8). Wind speeds are generally low with approximately 50% of winds occurring at 0.5 m/s to 2.1 m/s. The maximum wind speeds are approximately 5.7 m/s.

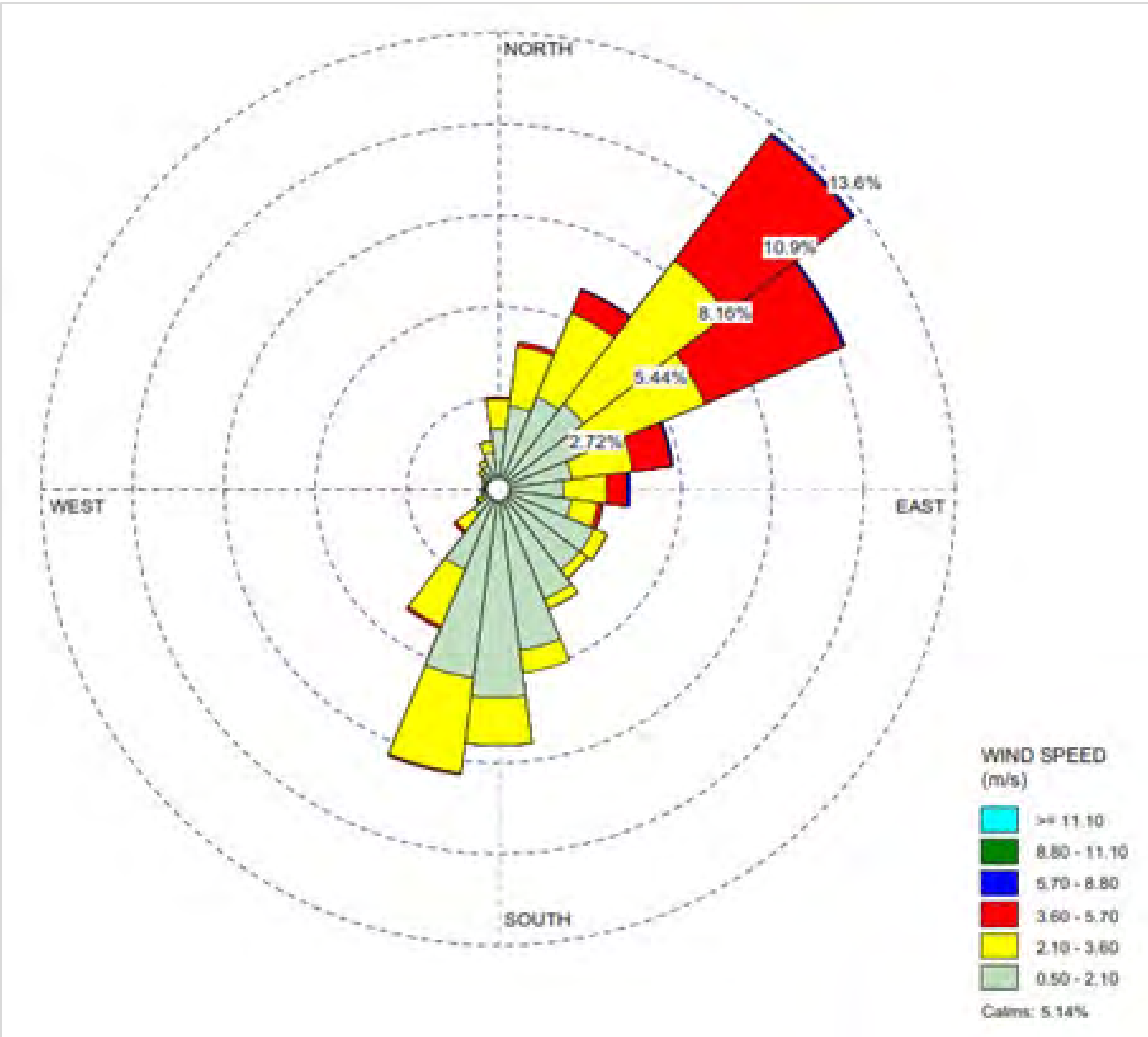


Figure 5-8: Wind rose plot for the Project

5.3 Physiography

The Project is located in the geomorphic transition from the southeastern edge of the Caribbean lowlands and the northern foothills of the north south trending Western Cordillera. Elevations in the Property area range between about 100 m and 350 m above mean sea level.

The vegetative cover across the Project consists of small patches of the original "humid forest" surrounded by areas that have been cleared for agriculture and grazing. Cleared areas that are no longer in use are rapidly overgrown by secondary growth. Land use is mainly for agriculture, cattle grazing, and mining.

The Project is situated in the Upper San Jorge River basin and lies between the north-flowing San Pedro River to the east and the north-flowing San Jorge River to the west. These are part of the Magdalena River system, which drains into the Atlantic Ocean. The principal surface water body in the vicinity of the Project is the San Pedro River immediately east of the planned pit. The surface drainage in the vicinity of the Project is principally to the north and northwest. The two streams that drain from the saddle between the two hills that form the Alacran deposit have been severely impacted by discharge of sediments (tailings) from artisanal mining operations.

The Paramillo National Park is situated in the forested mountains to the southeast of the Project.

5.4 Local Resources and Infrastructure

There is a small field camp, including core shack, offices, dorm building, and dining hall located in Vereda San Matías, near the village of San Juan Viejo. San Juan and El Alacrán provide general labour to support the Project's exploration activities. Hotel accommodation and field supplies are available in the towns of Puerto Libertador and Montelíbano.

There is an airstrip at Puerto Libertador that can be used by helicopters, and an airstrip at Montelíbano, and Caucasia that supports light aircraft and helicopters.

The Project is about 220 km due east of the Pacific Ocean and 115 km due east of the Gulf of Uraba on the Caribbean Sea. The nearest ports are at Tolú (273 km by road) and Cartagena (360 km by road) on the Atlantic Ocean. The city of Caucasia is situated on the navigable Cauca River, part of the Magdalena River system which enters the Atlantic Ocean at Barranquilla. The nearest railway is at Medellín, 170 km to the south.

The national electricity grid supplies the towns of Puerto Libertador and Montelíbano and the Cerro Matoso OP nickel mine owned by South 32. The national gas grid also supplies the Cerro Matoso mine. A major thermal power station was recently completed near Puerto Libertador and uses locally mined sub-bituminous coal.

5.5 Comments on Section 5

The climate at the Project allows for mineral exploration and drilling year-round. The regional district is expected to be able to supply a basic workforce for any future mining operation. The physiography of the Project area is favourable for OP mining with sufficient room for a processing plant, waste rock dumps, tailings storage, and other mine infrastructure. Cordoba would need to acquire additional surface rights to support a mining operation if one were to proceed.

6 HISTORY

Exploration was carried out on the Alacran deposit by Dual Resources, a Canadian junior mineral exploration company, in 1987-1989 in conjunction with the Colombian consulting company Geotec Ltd. Exploration is described in reports by Vargas (1998, 2001, 2002, 2014) and Shaw (2002). The Dual Resources exploration programs included pit, trenches, rock sampling, underground sampling, geological mapping, and a ground magnetic survey, followed by fifteen diamond drill holes totalling 2,584.0 m in length (holes SJ 1 to SJ 19). Dual Resources held the mineral title until 1994. The Alacran area was staked in 1995 by Sociedad Ordinaria de Minas Santa Gertdis and Sociedad Minera Alacran S.O.M., both private Colombian companies. No significant exploration work was carried out between 1995 and 2009. A Concession Agreement was granted in 2009 to OMNI and was optioned in 2010 to Ashmont, a private mineral exploration company based in Vancouver. Ashmont carried out geological mapping at 1:2,000 scale, underground mapping, and sampling, a ground magnetic survey, and two programs of diamond drilling. Ashmont earned a 90% interest in the Concession Agreement which it held through Ashmont Omni S.A.S., ownership of which reverted to OMNI on termination of the option, and it was renamed Compañía Minera Alacran S.A.S. in 2014.

6.1 Historical Mineral Resource Estimates

Two Mineral Resource Estimates were prepared for the Alacran deposit before Cordoba acquired the Project. Tetra Tech Wardrop prepared a Resource Estimate in 2012 based on the Dual Resources data and the first phase of 2011-12 drilling by Ashmont (Mosher, 2011); another estimate was completed for Ashmont in 2014 (Vargas, 2014). Neither of these was publicly disclosed by the previous operators.

Mining Associates Pty Ltd. prepared the first publicly disclosed Resource Estimate for the project, for the Alacran deposit, following the NI 43-101 Technical Report format, for Cordoba in 2017, titled *Independent Technical Report, and Resource Estimate on the Alacran Copper Gold Deposit*, with an effective date of October 27, 2017.

AMEC Foster Wheeler (now Wood Plc) prepared a NI 43-101 Technical Report titled NI 43-101 Technical Report on the Alacran Project, providing a Mineral Resource update for the Alacran deposit for Cordoba, effective April 10, 2018.

Nordmin Engineering Ltd. prepared the first publicly disclosed Resource Estimate for the project following the NI 43-101 Technical Report format, for Cordoba in 2019, titled *NI 43-101 Technical Report and Resource Estimate, San Matías Copper-Gold-Silver Project, Colombia*, with an effective date of July 3, 2019.

6.2 Production

There has been no industrial scale mining production within the Project area. Au is mined illegally near the Alacran deposit by the Asociación de Mineros de Alacran (Alacran Miners Association). Approximately 80 "artisanal" miners work in approximately 30 shallow pits and adits and process material in numerous small stamp mills and small ball mills. Tailings from the artisanal ore processing are dumped in the nearby drainages (Quebrada La Hoga Mina to the west and Quebrada La Hoga Conis Alvies to the east). Although the artisanal miners have no legal mining rights, Cordoba has a good relationship with the miners and has made an agreement such that they are allowed to keep mining until such time that construction of a mine begins.

7 GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

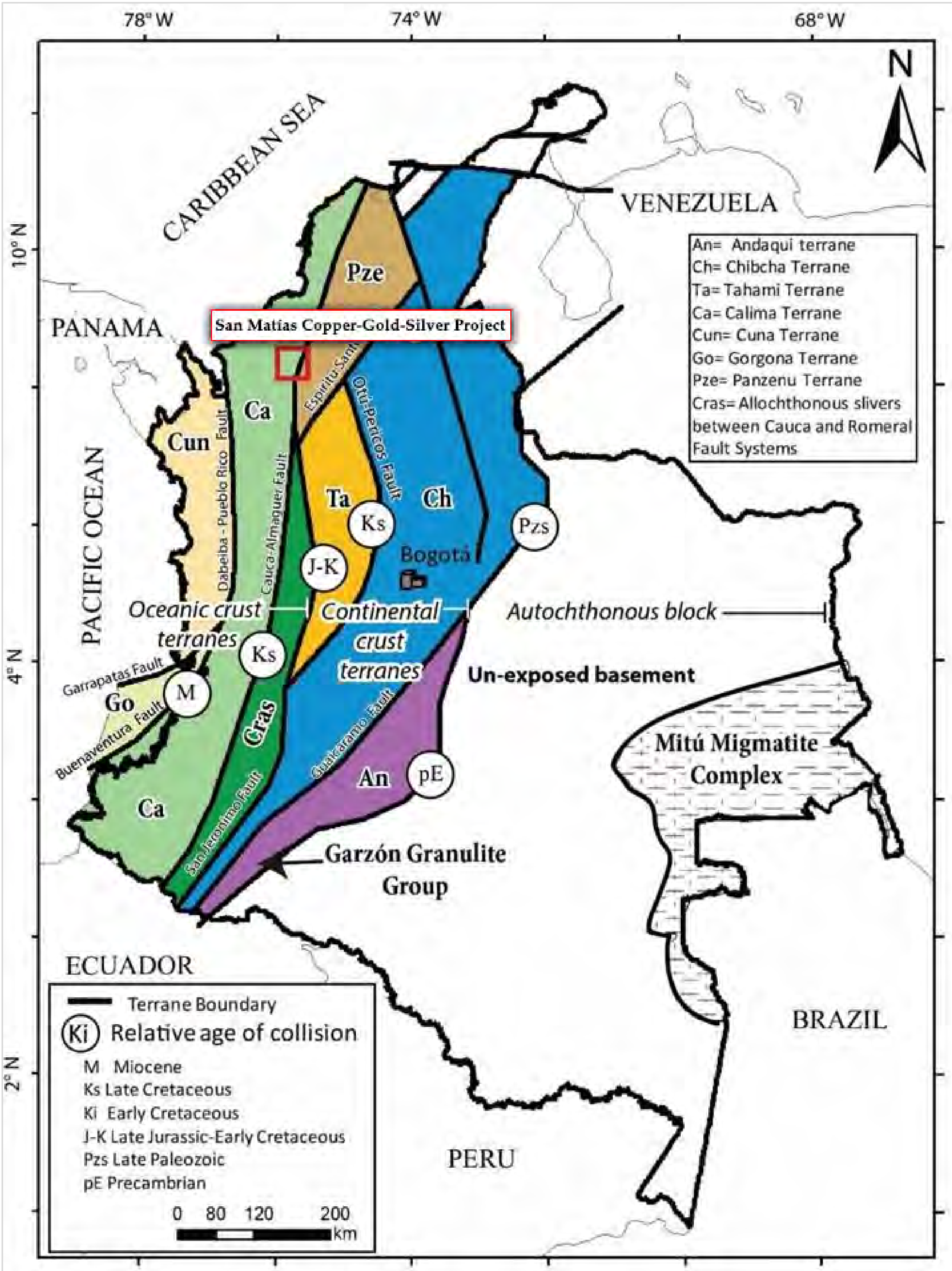
The Project is located in an accreted oceanic terrane of the Western Cordillera, described as the Calima Terrane by Restrepo & Toussaint (1988) (Figure 7-1). The host rocks likely belong to the Upper Cretaceous Cañasgordas Group, which is subdivided into the Barroso Formation of basalts, and the Penderisco Formation of turbidites, chert, and limestone. The Barroso Formation has been dated using fossil records from the interbedded sedimentary rocks, where the youngest records have been established between the Campanian and Maastrichtian (Moreno and Pardo, 2003).

The basalts and pelagic sediments formed on the ocean floor and are interpreted to be fragments of an oceanic plateau called the Caribbean Large Igneous Province, which were transported from the west (Kennan & Pindell, 2009). The age of the plateau basalts is approximately 90 Ma (Turonian; Kennan & Pindell, 2009). On the eastern side, the oceanic terranes are separated from Paleozoic Cajamarca Group schists in the Central Cordillera or Tahami Terrane (Restrepo et al., 1988). This fault has large-scale right-lateral movement, and its trace is marked by isolated outcrops of peridotite interpreted to be ophiolites, such as that which hosts the Cerro Matoso nickel laterite deposit, 25 km northeast of the Project (Gleeson et al., 2004). The age of the accretion is suggested to be between 75-73 Ma (Villagómez, 2010; Spikings et al., 2015), and Paleocene-Lower Eocene, Cediel et al., 2003; Cardona et al., 2012).

The Cajamarca and Cañasgordas Groups are overlain unconformably by Cenozoic age sediments in the northern part of the Project area. The sediments are accretionary prisms of Paleocene to Oligocene age forming the San Jacinto Fold Belt, and accretionary prisms of Oligocene to Pliocene age forming the Sinú Fold Belt to the west, as well as extensive quaternary sediments (Cediel & Cáceres, 2000).

Recent Re-Os dating obtained for the porphyry intrusion at Montiel East and molybdenite in the mineralization at Alacran yielded Laramide Age: 76.8 ± 0.3 Ma and 73.3 ± 1.5 Ma, respectively (Manco et al., 2019). This suggests Late Cretaceous magmatism associated with the district mineralizing events. These mineralizing ages are the first record of its type along the Western Cordillera of Colombia, being markedly younger to the Cretaceous magmatism developed along the Calima Terrane, i.e., the Buga Batholith (92-90 Ma) and Jejenes Stock (ca. 85 Ma) (Leal-Mejía, 2011; Leal-Mejía, 2019).

These new ages would suggest the existence of a metal-endowed, Late Cretaceous metallogenic belt in this part of Colombia. The mineralization events developed along the Calima Terrane may have occurred pre- or syn-accretion of the oceanic terrane to the NW continental margin (Manco et al., 2018 a).



Source: Cordoba, 2019

Figure 7-1: Regional tectonic setting of the San Matías Copper-Gold-Silver Project

7.2 Local Geology

The Project area comprises three primary lithological domains: intrusive rocks (including porphyries) in the Alacran, Montiel East, and Costa Azul deposits, volcanic rocks in the Montiel West deposit, and volcaniclastic rocks in the Alacran deposit. Volcaniclastic rocks are also present in the Alacran Norte and Willian Prospect areas. The volcanics and volcaniclastics likely belong to the early Cretaceous-age Barroso formation (Figure 7-2).

7.2.1 Intrusive Rocks

Magmatism in the San Matías District (“SMD”) is interpreted to be part of the pre-accretionary magmatic arc development in the Calima Terrane (Manco et al., 2018 a). The majority of the mapped intrusive rocks outcrop along the eastern side of the San Pedro River Lineament. Mineralogically, the intrusive and porphyry rocks can be divided into three groups: 1) Tonalite-Granodiorite, 2) Tonalite-Quartz Diorite, and 3) Diorite-Quartz Diorite.

7.2.1.1 Tonalites-Granodiorites

This group includes the Montiel East porphyry, the Costa Azul porphyry and the La Jagua Tonalite (Figure 7-2) which are comprised of holocrystalline and porphyritic rocks dominated by medium-grained euhedral plagioclase and anhedral to subhedral hornblende that is intergrown with primary biotite and magnetite. Quartz occurs either as fine-grained, anhedral phenocrysts, or as very fine-grained granoblastic aggregates in the porphyry groundmass. Major oxide geochemistry indicates a high degree of fractionation in these intrusions (Manco et al., 2019). A U-lead (“Pb”) age of 74.4 ± 1.2 Ma was obtained for the La Jagua Tonalite (Manco et al., 2019), which is slightly older than the Montiel East porphyry ages of 72.3 ± 1.8 Ma to 70.0 ± 2.0 Ma (Leal-Mejía and Hart, 2017) and 73.4 ± 1.9 Ma to 72.4 ± 4.3 Ma (Manco et al., 2019).

7.2.1.2 Quartz Diorite-Tonalites

These include the San Jorge, Costa Rica, Betesta, Bucaramanga and the Mina Escondida intrusions (Figure 7-2) and comprises holocrystalline, sub-hypidiomorphic rocks composed of medium-grained euhedral, plagioclase, subhedral, fine-grained, anhedral quartz, and anhedral biotite. Primary magnetite occurs as very fine-grained, subhedral, disseminated aggregates. Major oxide geochemistry indicates low fractionation conditions of the magma relative to the Tonalite-Granodiorite group (Manco et al., 2018 a). The San Jorge Intrusion yielded a U-Pb age of 74.47 ± 0.74 Ma, whereas the Betesta Intrusion was 72.9 ± 1.2 Ma (Manco et al., 2019). These ages are consistent and within the error of the ages obtained for the Tonalite-Granodiorite group.

7.2.1.3 Diorite-Quartz Diorite

This group includes the Alto San Pedro Diorite and the small units that outcrop along the western margin of the Betesta Quartz Diorite (Figure 7-2). Petrographically, the Alto San Pedro Diorite comprises holocrystalline, hypidiomorphic rocks, composed of medium-grained euhedral plagioclase and two stages of clinopyroxene. Primary quartz occurs as fine-grained, anhedral intergrowth with plagioclase. Primary magnetite occurs as fine-grained, subhedral disseminations, and plagioclase inclusions. This unit has not been dated using U-Pb in zircon due to its mafic composition with an inherent low abundance of zircons.

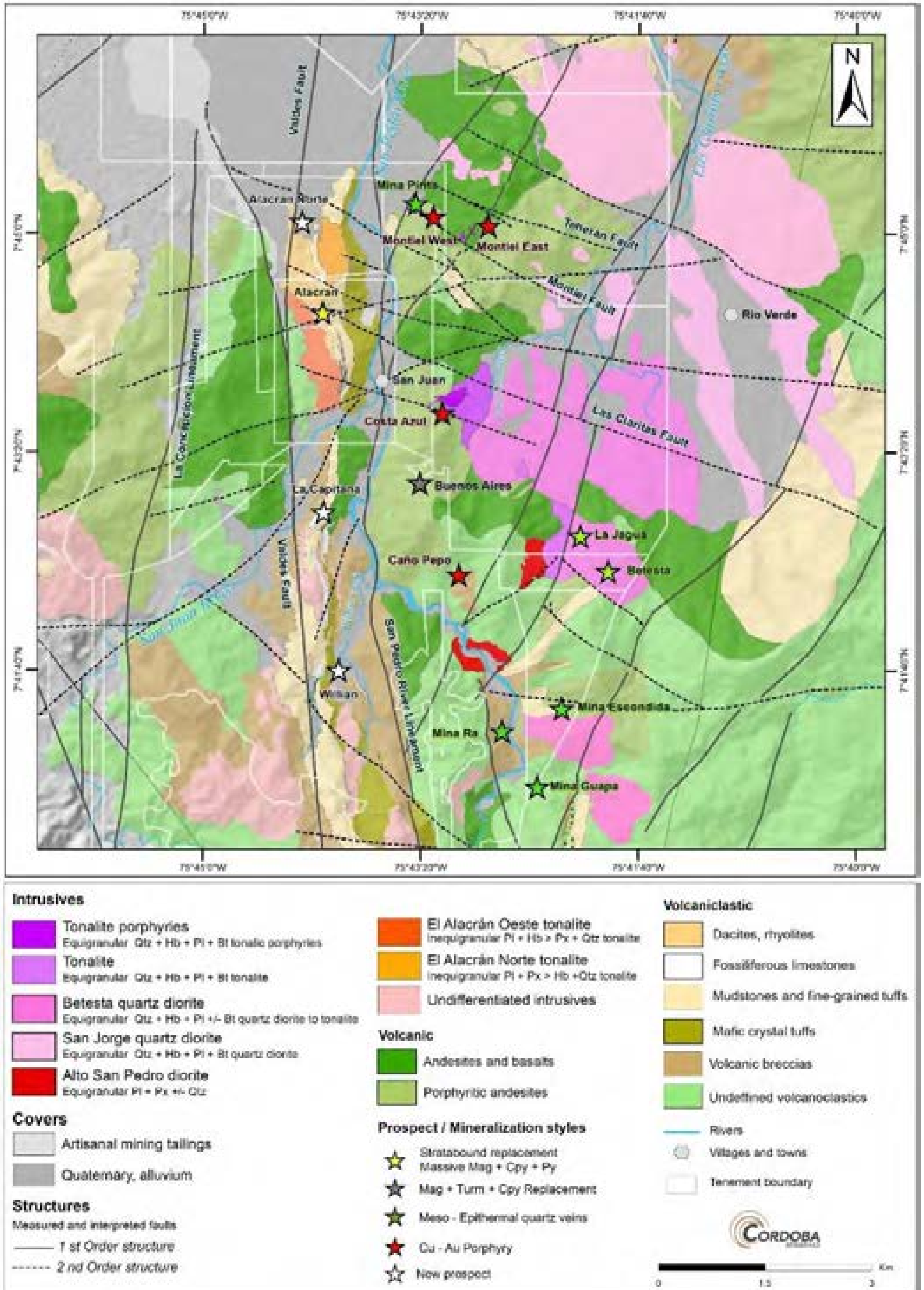
7.2.2 Volcanic Rocks

The volcanic rocks correspond to aphyric andesite and basalt with variations to andesite porphyry, composed mostly of phenocrysts of plagioclase and augite.

7.2.3 Volcanoclastic Rocks

1. The volcaniclastic sequence present within the Project can be divided into four groups:
2. Coarse-grained member: volcanic agglomerate and volcanic breccia and lithic tuff with size fragments than can surpass 5.0 mm in length.
3. Medium-grained member: (>1.0 mm) volcaniclastics dominated by crystal tuffs.
4. Fine-grained sedimentary member: coarse to fine laminated siltstone and mudstone with interlayering of fine tuff and fine lithic tuff. The rocks in this member are interlayered with fossiliferous marlstone and muddy limestone.
5. Acid volcanic rocks: rhyolite and dacite volcanic breccia that varies to medium and fine dacite tuff. This member possesses visible quartz and potassic feldspar groundmass.

Detailed geology of the four mineralized areas that are the subject of the Resource Estimate for the Project is described in Sections 7.3 through to Section 7.6. The geology of other exploration prospects in the region is described in Section 7.7.



Source: Cordoba, 2019

Figure 7-2: Geology of the San Matías Copper-Gold-Silver Project and surrounding district, with the Alacran, and Satellite deposits highlighted. These are shown within the context of the suspect terranes of Colombia model (Modified from Restrepo and Toussaint, 1988; Ordóñez-Carmona and Pimentel 2002). Figure by Manco et al., 2019.

7.3 Alacran Deposit Geology

The Alacran deposit Cu-Au-Ag mineralization is hosted by a west-dipping Cretaceous succession comprising mafic volcanic rocks overlain by a calcareous volcaniclastic sequence and capped by pre- to syn-mineral, sill-like diorite, and felsic sub-volcanic bodies. The sequence is approximately 550 m thick, and the diorites are about 200 m thick. The Alacran surface geology, as shown in Figure 7-3, was interpreted by Cordoba geologists based on core logging, lithogeochemistry, soil geochemistry, and outcrop mapping. Faults have been surface-mapped as well as inferred from ground magnetics and apparent displacements in the three dimensional (3D) geological model constructed using Leapfrog® software.

Cu-Au-Ag mineralization occurs throughout the volcaniclastic package at Alacran, except within the lower mafic units. It is most strongly developed in the calcareous volcaniclastic sequence (referred to as Unit 2).

7.3.1 Lithostratigraphy

Lithological units in the Alacran deposit area can be broadly divided into three main stratigraphic units, from bottom to top: Unit 3 (Mafic Volcaniclastics), Unit 2 (Calcareous Volcaniclastics), and Unit 1 (Felsic Volcaniclastics). A schematic cross section A-A' as shown in Figure 7-4 (A) illustrates the distribution of these lithofacies recognized in the Alacran deposit and shows the stratigraphic column Figure 7-4 (B). Lithology codes are included in parenthesis.

Unit 3: Mafic Volcaniclastic Rock Sequence

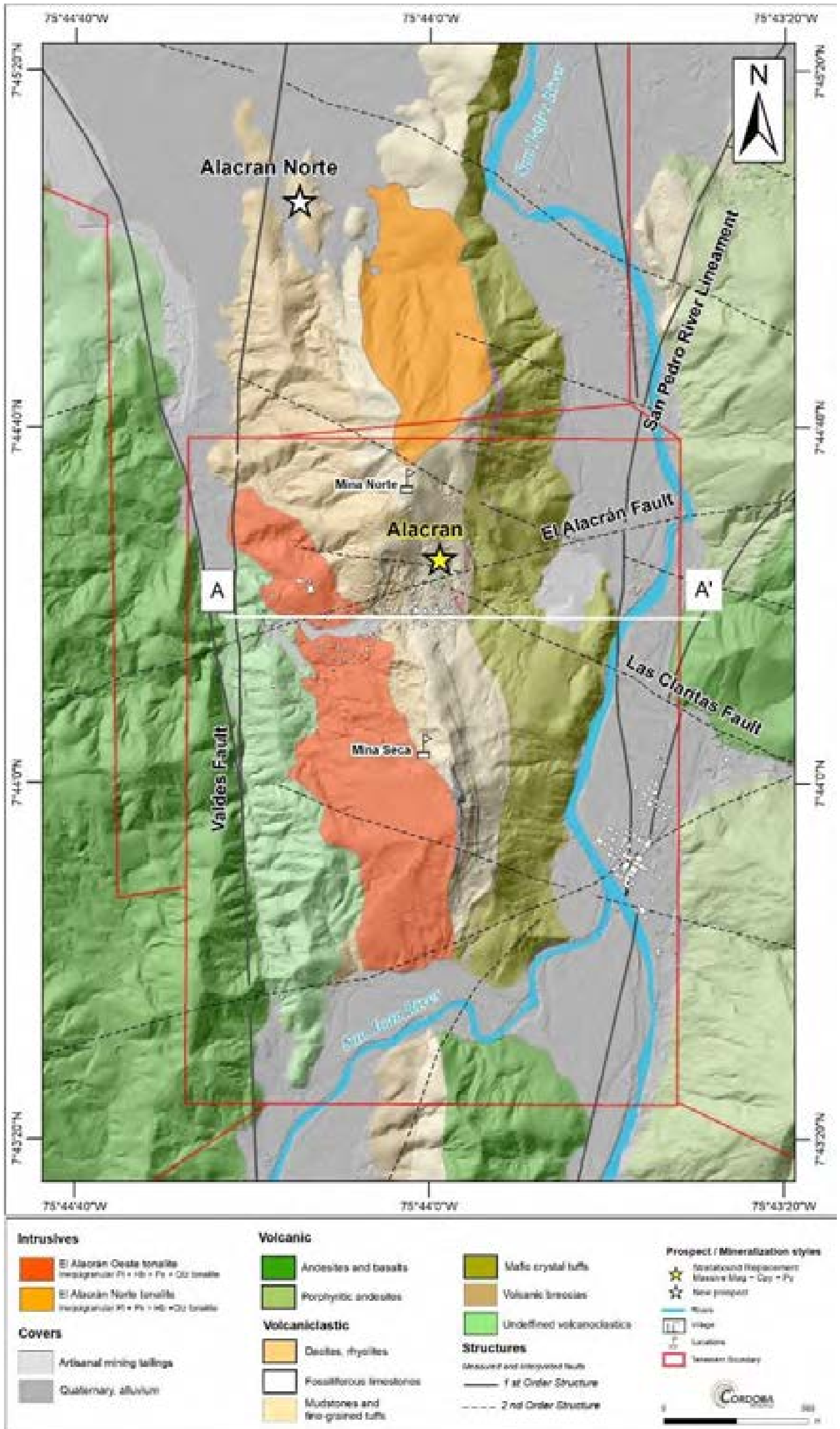
This unit comprises coherent mafic lavas interlayered with mafic to intermediate volcaniclastic rocks. Locally, remnants of vitroclastic, and lesser epiclastic silty tuffaceous material are observed. This unit exceeds 300 m in thickness and is the oldest part of the Alacran stratigraphy that has been delineated by drilling (Figure 7-4). Unit 3 outcrops along the San Pedro River margins and typically displays gradational depositional contacts with Unit 2. Based on textural, composition, geometry and volcanic structure criteria (McPhie et al., 1993), three major lithofacies can be delineated within this unit: mafic tuffs; amygdaloidal tuff, and interbedded lithic and fine-grained tuffs (refer to Table 7-1 for detailed descriptions of each lithofacies).

Unit 2: Calcareous Volcanoclastic Rock Sequence

This unit outcrops >800.0 m N-S along the strike extent of the Alacran deposit sequence and ranges from 160 to 208 m in thickness (Figure 7-4). This unit exhibits gradational contacts to Unit 3 and is overlain and locally intruded by rocks of Unit 1. Unit 2 hosts the bulk of the mineralization at the Alacran deposit. Based on texture, composition, geometry and volcanic structure (McPhie et al., 1993), at least five different volcanic lithofacies are defined in this unit: laminated limestone lithofacies, massive fossiliferous limestone lithofacies; lithic tuff lithofacies; fiamme tuff lithofacies; and fine to coarse crystal tuff lithofacies (refer to Table 7-1 for detailed descriptions of each lithofacies).

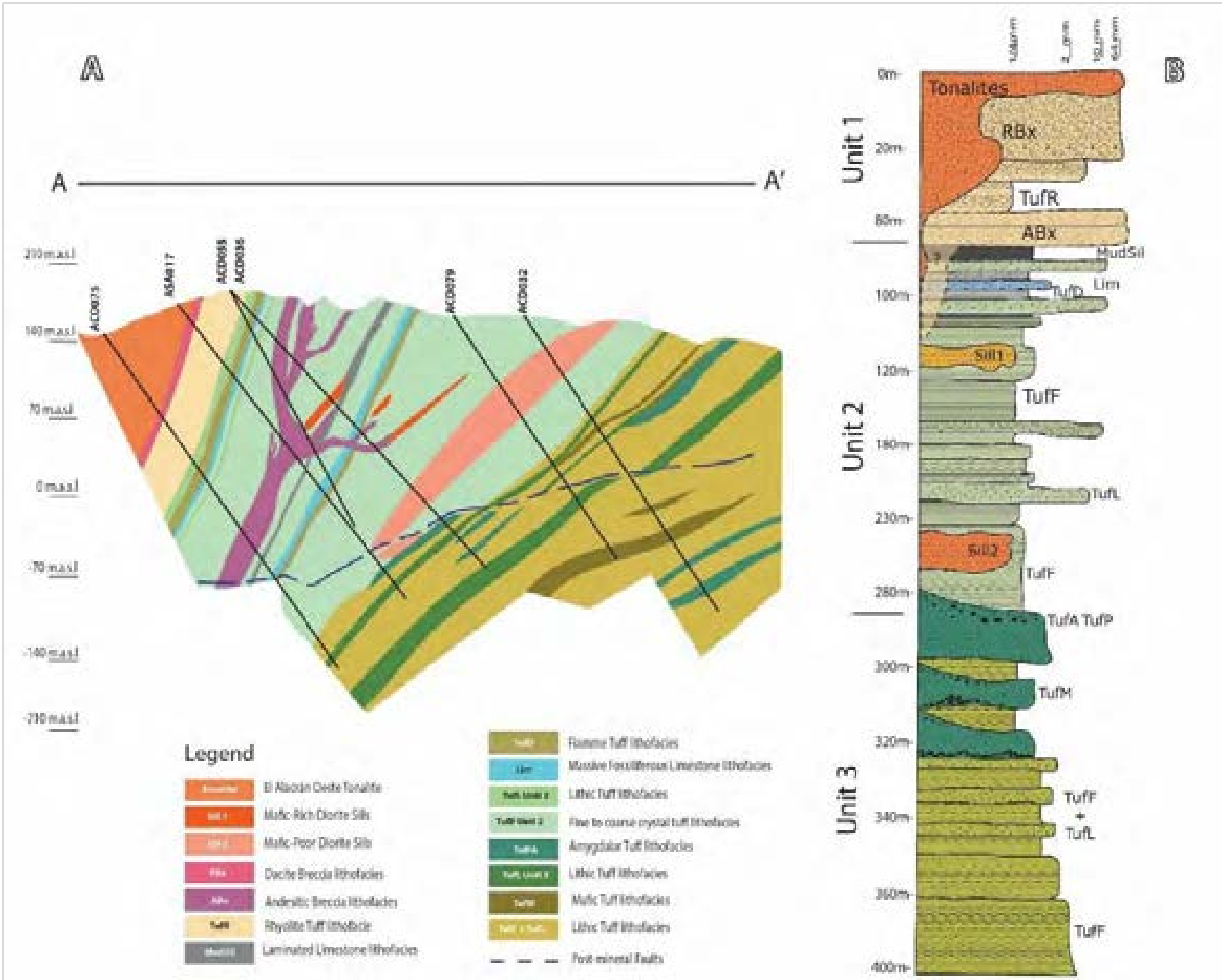
Unit 1: Felsic Volcaniclastic Rock Sequence

Unit 1 extends >1,500 m N-S along strike in the Alacran deposit sequence and ranges from 120 m thick in the north to few metres in the south where it is completely obliterated by the Alacran Oeste Tonalite (Figure 7-3). Unit 1 comprises andesitic to rhyolitic breccia tuffs grouped into three dominant lithofacies: an andesitic breccia; a rhyolite tuff and a dacite breccia. Detailed descriptions of each lithofacies are contained in Table 7-1.



Source: Cordoba, 2019

Figure 7-3: Alacran deposit geology map



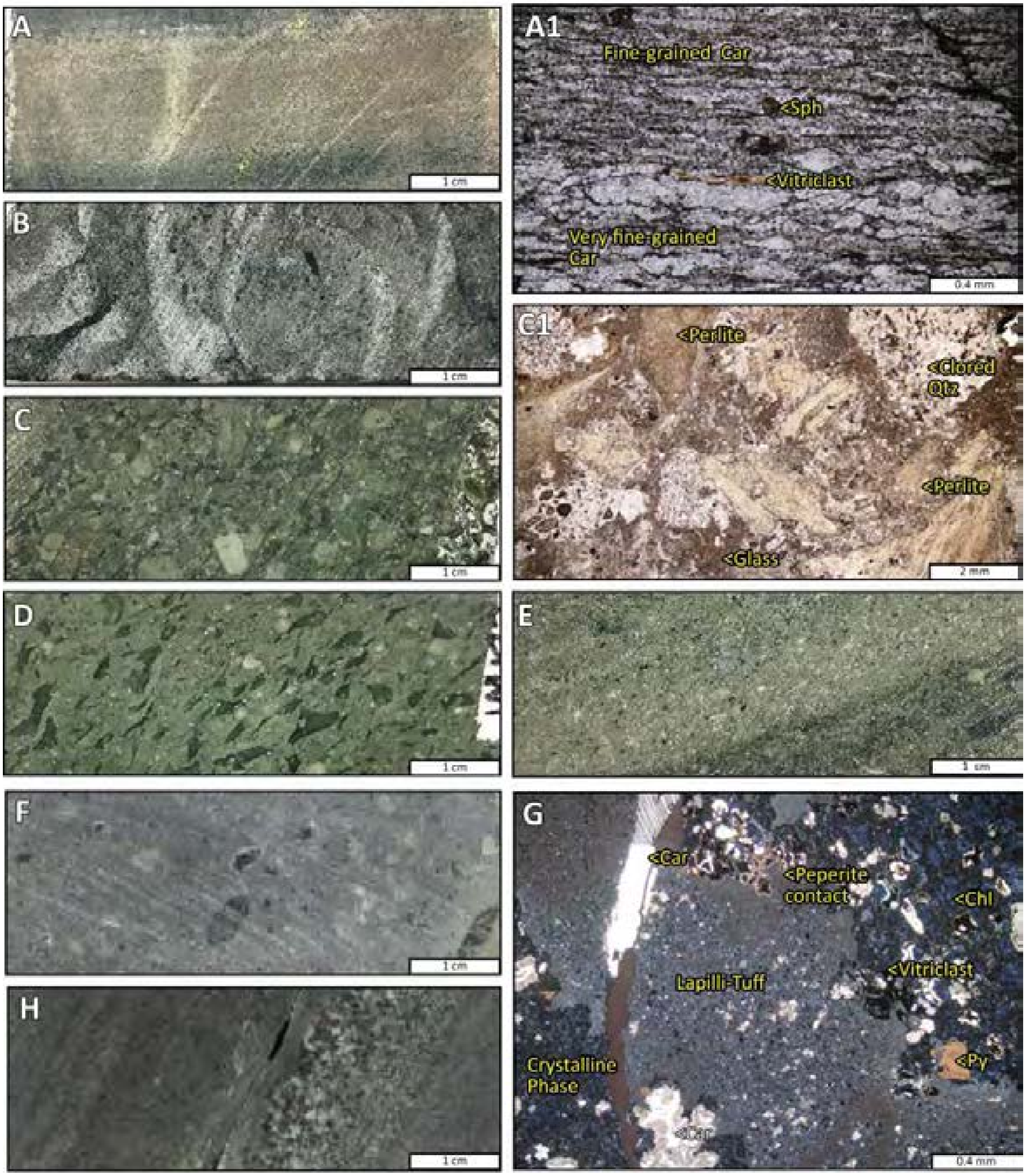
Source: Cordoba, 2019

Figure 7-4: Alacran lithostratigraphic column and cross section (Manco et al. (2018b)).
The location of the east west section A-A1 is denoted on Figure 7-3.

Table 7-1: Detailed Descriptions of Alacran Deposit Lithofacies

Sequence	Sequence Thickness (m)	Lithofacies	Code	Lithofacies Thickness (m)	Description	Occurrence	Comment
Felsic Volcaniclastic (Unit 1)	**>1500 m**	Dacite Breccia	RBx	12 - 28m	Dacitic to rhyolitic intrusion breccia with aplite and stockwork porphyritic clasts set in a rhyodacite groundmass.	This lithofacies extends up to 450 m N-S and occurs in the northwestern part of the deposit.	A possible volcanic depositional settings that include a lava dome or cryptodome (Manco et al., 2018b).
		Rhyolite Tuff	TufR	13 - 38m	Flow-banded monomictic rhyolite to andesite breccias with a matrix composed of plagioclase, K-feldspar and quartz.	This lithofacies extends from near surface to greater than 200 m depth downhole.	Constitutes the bulk of the Unit 1 rocks and shows evidence of an intrusion/emplacement in the volcaniclastic Unit 2.
		Andesitic Breccia	ABx	3 - 40 m	Clast-supported intrusive breccia bimodal groundmass from glassy to crystalline and plagioclase, potassium feldspar and quartz phenocrysts	This lithofacies outcrops in a 350 m N-S, preferentially in the central part of the deposit.	This breccia displays near-vertical, locally discordant contacts producing pipe-like shaped bodies.
Calcareous Volcaniclastic (Unit 2)	**>800 m**	Laminated Limestone	Mudsil	10 - 35m	Well-sorted chemical limestone with laminations of euhedral carbonate with primary granoblastic textures. interlayers within the carbonate sequence	This lithofacies is continue along the sequence and reach 35 m in the southern margin of the deposit.	This lithofacies is preferentially replaced by magnetite stage of the deposit
		Massive Fossiliferous Limestone	Lim	5 - 8m	This lithofacies comprises a series of discontinuous, non-graded, bioclasts-bearing limy mudstones packages (Marlstones)	Located approximately 80 - 100 m below the contact between Unit 1 and Unit 2 and are relatively continuous in the sequence.	The easy recognition and continuity of this lithofacies is used as a stratigraphic marker of Unit 2.
		Fiamme Tuff	TufD	5 - 20m	Partailly welded tuff with a matrix composed of recrystallized glass and juvenile volcanic clasts.	This lithofacies occur and discontinues packages in the upper and middle Unit 2	The easy recognition and restricted stratigraphic location allow using this lithofacies as a Unit 2 marker
		Lithic Tuff	TufL	5 - 16m	Poorly sorted, monomictic breccias composed of quartz and plagioclase groundmass with glassy shards with incipient welding evidence.	This unit occurs preferentially in the upper Unit 2	This lithofacie is interbedded with fossiliferous mudstones
		Fine to Coarse Crystal Tuff	TufF+TufC	1 - 50m	Coarse- to fine-laminated tuff packages composed of coherent volcanic material	This lithofacies lower contact conformably overlies Unit 3 and corresponds to the largest lithofacies in Unit 2.	The lack of relictic pyroxenes in this lithofacies is a mapping criterion used by the geologist to differentiate it form Unit 3 tuffs
Mafic Volcaniclastic (Unit 3)	**>300 m**	Amygdaloidal Tuff	TufA + TufP	8 - 25m	Coherent amygdaloidal andesitic lavas with fine-grained, phaneritic plagioclase-rich groundmass that created some peperite textures in contact with ash tuffs (TufP)	Occurs as Interbedded with fine-grained volcaniclastics in the top of Unit 3	This lithofacies is considered a distinctive geological marker in Unit 3.
		Mafic Tuff	TufM	8 - 16m	Coherent plagioclase-rich, porphyritic andesitic to basaltic lavas plagioclase and hornblende phenocrysts set within a groundmass (80%)	Occur preferentially in the lower part of Unit 3.	This lithofacies is considered a distinctive geological marker in Unit 3.
		Interbedded Lithic Tuff	TufL+TufF	40 - 60m	Interbedded succession of poorly sorted lithic tuffs and fine-grained laminated tuffs with banded hypocrystalline layers of plagioclase and augite	This lithofacies is the deepest units delineated by drilling	This lithofacies is the bulk rocks in Unit 3

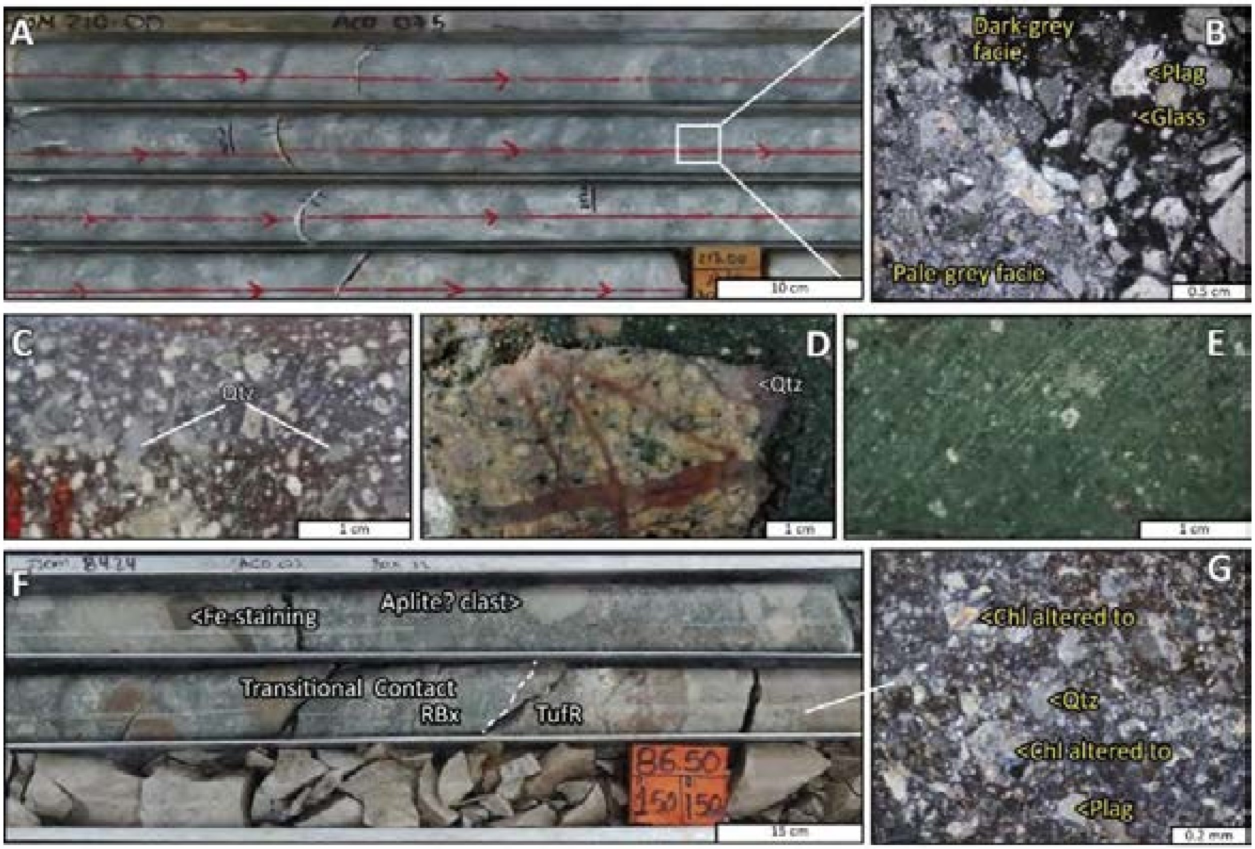
Source: Cordoba, 2010



Source: Manco et al., 2018b

Figure 7-5: Alacran deposit Unit 3 and Unit 2 highlights

Alacran deposit volcaniclastic lithofacies from Unit 2 and Unit 3 (Manco et al., 2019). A. Core-scale sample of laminated limestone lithofacies. A1. Microphotograph 10X under crossed Nicolls of A. B. Core-scale sample of the marlstone lithofacies with carbonate-replaced bivalves. C. Core-scale sample of the lithic tuff lithofacies. C1. Microphotograph 2X of A, showing breccia texture. Note composition of clasts is dominated by vitroclasts and recrystallized quartz. D. Core-scale sample of fiamme tuff lithofacies. E. Core-scale sample of the fine-grained to coarse-grained tuff lithofacies F. Core-scale sample of coherent lavas with amygdaloidal facies. G. Microphotograph 10X with crossed Nicolls of peperites in the contact of the amygdaloidal facies. H. Banded interbedding of fine-grained tuff and lithic tuffs. *Abbreviations:* Sph: Sphalerite, Qtz: Quartz, Car: Carbonate, Py: Pyrite, Chl: Chlorite.



Source: Manco et al., 2019

Figure 7-6: Alacran deposit Unit 1 highlights

Alacran deposit volcaniclastic lithofacies from Unit 1 (Manco et al., 2019). **A.** Photo of drill core of andesite breccia (drill hole ACD075 @ 210 – 213 m). **B.** Detail of A. Microphotograph 10X with crossed Nicolls, showing coherent facies composition of andesite breccia. Note the glassy groundmass in the dark-grey facies. **C.** Drill core sample of quartz rich porphyritic facies associated with the dacite intrusive breccia lithofacies. **D.** Quartz stockwork in porphyry clast embedded in a quartz rich groundmass volcanic/magmatic? breccia from the rhyolite tuff lithofacies. **E.** Detail of the rhyolite tuff lithofacies. **F.** Photo of drill core from the dacite breccia in transitional contact with rhyolite tuff (drill hole ACD003 @ 84.2 – 86.5 m). **G.** Microphotograph 10X with crossed Nicolls of photo F, showing a fine-grained breccia texture composed of quartz, plagioclase, and K-feldspar. *Abbreviations:* Plag: Plagioclase, Qtz: Quartz, Car: Carbonate, Py: Pyrite, Chl: Chlorite.

7.3.2 Intrusions

Intrusions are recognized at Alacran by their hypabyssal igneous textures in core and surface mapping, and chemically by their high Al/Ti (>25), low Nb/Al (< 4), low Zr/Al & Cr/Al ratios, and they display other geochemical features consistent with intermediate igneous rocks. Petrographic and modal analysis, along with the geochemical characterization of the intrusions show two different end-member magmatic sources:

Alacran Oeste Tonalite

This tonalite occurs in the western portion of the Alacran deposit where it intrudes the metasedimentary-volcaniclastic succession in a broadly north south zone up to 2 km long (Figure 7-3). The eastern contacts of these diorites generally dip moderately to steeply west, broadly concordant with the stratigraphy, but locally discordant (Figure 7-4 (A)). The rock displays a weak to medium-intensity hydrothermal alteration that includes silicification (11%), chloritization (15%) after mafic minerals, and sericite-carbonate (approximately 2%) after plagioclase. This unit is non mineralized but displays very fine-grained (< 0.04 mm) disseminated pyrite (Figure 7-7).

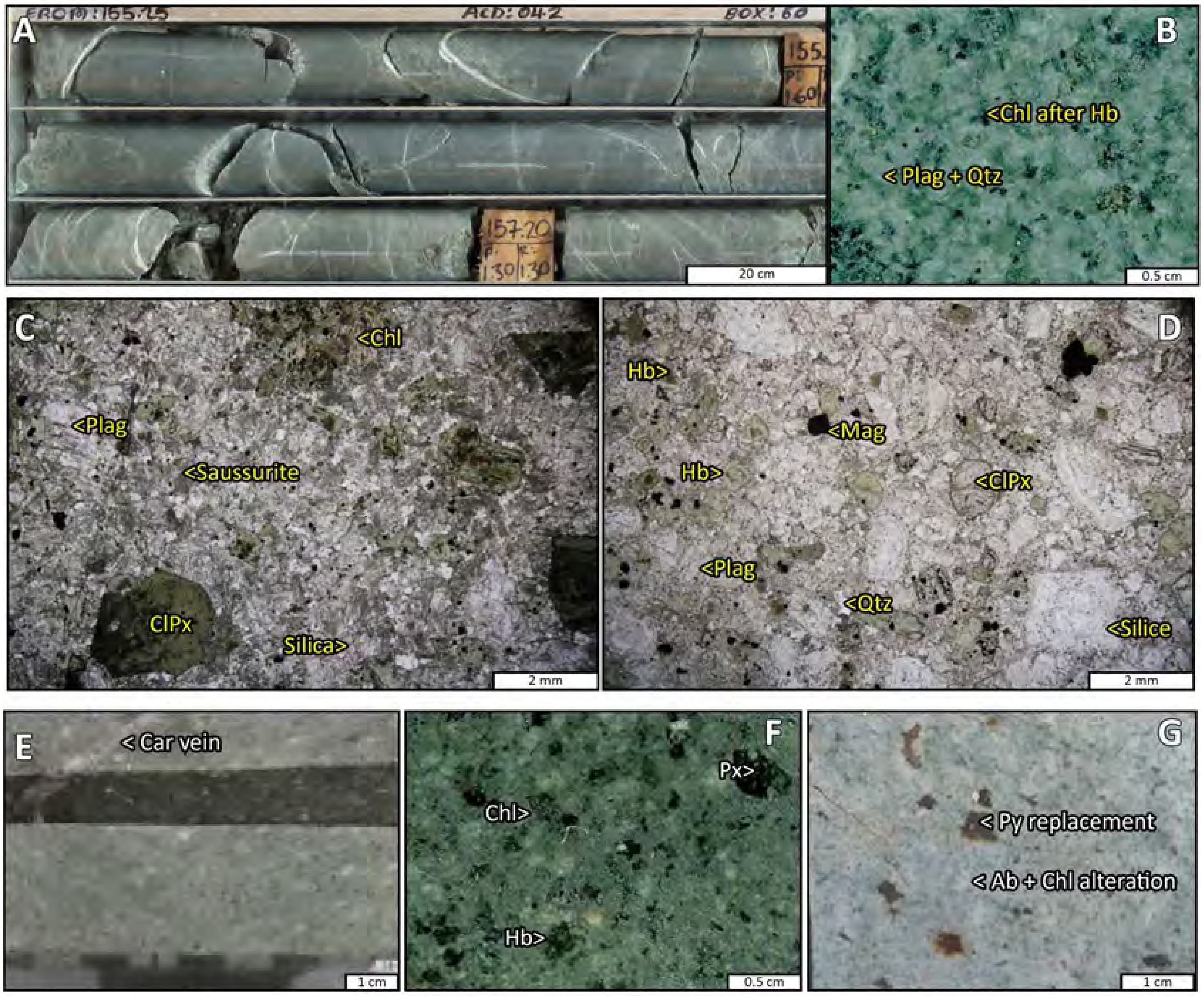
Alacran Norte Tonalite

The Alacran Norte Tonalite occurs in the northernmost part of the Alacran deposit, where it intrudes, and is possibly faulted against, the volcaniclastic sequence (Figure 7-3). This unit constitutes the topographic high observed in the northern Alacran deposit (Mina Norte Hill). Field relationships suggest this unit is post-mineral to the Alacran mineralization. It is generally fresh, locally silicified (18%) and its mafic minerals are altered to fine to very fine-grained (approximately 0.12 mm) chlorite (4%). This unit is non mineralized and contains traces of pyrite (approximately 0.5%) after the mafic mineralogy (Figure 7-7).

7.3.3 Sills

The Alacran deposit succession is intruded by up to five andesitic sills that can be grouped according to alteration and mineralogy into Sill 1 and Sill 2. Sill 1 comprises mafic-rich diorite sills that concordantly intrude the Unit 2 volcaniclastic sequence along a >1 km N-S contact and occurs within the first 10 m depth below the contact between Unit 1 and 2 (Figure 7-4 (A)). Sill 1 ranges from 5 m to 10 m in thickness and are fine to medium-grained holocrystalline rocks with porphyritic texture, and rock groundmass that is dominated by plagioclase and mafic minerals. Phenocrysts comprise medium-grained plagioclase, pyroxene and hornblende (Figure 7-7). Sill 1 displays variable hydrothermal alteration intensity from weak to pervasive. When pervasively altered, this unit presents a calc-sodic assemblage (albite + chlorite + epidote + carbonate ± actinolite) that selectively replaces the mafic mineralogy.

Sill 2 comprises a discontinuous N-S oriented intrusion that is divided into two segments: a northern segment that extends 380 m northwards; and a southern segment that extends 300 m southwards until it merges with a sill within the Sill 1 rock type: denoted as Sill1b. These segments are separated by approximately 300 m. Sill 2 is 10 m to 33 m wide and intrudes concordantly and locally discordantly the lower stratigraphy of Unit 2 (Figure 7-4). Sill 2 is a fine-grained, holocrystalline, strongly altered, mafic-poor, porphyritic diorite rock (Figure 7-7) with approximately 70 % groundmass. Relict phenocrysts are fine-grained euhedral to subhedral plagioclase. Intense sodic-calcic alteration is a distinct feature of this unit and comprises fine-grained albite chlorite and quartz with traces of titanite and anhedral apatite. Mineralization occurs as fine-grained (<0.1 mm) traces of anhedral pyrite accompanying chlorite (Figure 7-7).



Source: Manco et al., 2018b

Figure 7-7: Alacran deposit intrusions

Alacran deposit intrusions. **A.** Photo of drill core from the Alacran Oeste Tonalite (drill hole ACD042 @ 152.2–157.7 m). **B.** Detailed of photo A. **C.** Photo of drill core from the Alacran Norte Tonalite (drill hole ACD039 @ 58.2–60.7 m). **D.** Detailed of photo C. **E.** Microphotograph 4X with parallel Nicolls of the Alacran Oeste Tonalite. **F.** Microphotograph 4X, with parallel Nicolls of the Alacran Norte Tonalite. **G.** Drill core photo of the Sill 1 a unit. *Abbreviation:* Pl: Plagioclase, Chl: Chlorite, Qtz: Quartz, ClPx: Clinopyroxene, Px:Pyroxene, Hb: Hornblende, Car: Carbonate, Ab:Albite, Py:Pyrite. Figure by Manco et al. (2018b).

7.3.4 Alacran Deposit Mineral Paragenesis

Petrographic work and core logging have led to the categorization of five alteration assemblages within the Alacran deposit: Group I) Calc-Silicate Magnetite, Group II) V-Mica-Carbonate Base Metal ("CBM"); Group III) Illite-CBM, Group IV) Barren Calc-Silicate Group V) Calcite-Zeolite (Figure 7-8).

The Group I through Group III stages represent the most significant stages of hydrothermal alteration and mineralization. Mineralization is distinguished on the basis of structural and textural overprinting relations, from oldest to youngest:

i. Magnetite Stage: Group I: Early Calc-Silicate;

ii. Sulphide Stage: Group II: V-Mica – CBM; and Group III: Illite – CBM; and

iii. Late epithermal overprint: CBM style auriferous veining.

7.3.4.1 Magnetite Stage

Group I: Calc-Silicate

Group I alteration is characterized by a magnetite – quartz – apatite ± Fe-rich chlorite ± carbonate (± pyrite) ± epidote assemblage that is primarily replacement and breccia infill. As replacement, this assemblage extends almost 1 km on/along the contact between the andesite breccia and the laminated limestone lithofacies; which represents the boundary between Units 1 and 2 of Alacran stratigraphy. It preferentially replaces the laminate limestones, with replacement zones range from 20 m to 30 m thick and are only present in the southern part of the Alacran deposit.

As breccia infill, this assemblage is dominated by mushketovite (bladed magnetite) with pyrite/chalcopyrite present and occurs dominantly along the andesite breccia footwall contact at the base of Unit 1, and within the laminated limestone lithofacies of Unit 2.

The largest magnetite-quartz rich zones (where not overprinted by iron ("Fe")-rich sulphides) occur in the western portion of the Alacran deposit in the south-central area. These zones strike approximately N-S and dip moderately to steeply west and are broadly concordant with the layered volcaniclastic succession and external contacts of the Alacran Oeste Tonalite intrusion around which the main magnetite-rich bodies are clustered. Individual magnetite-rich bodies may persist along several hundred metres of strike length and the western magnetite-rich zones over strike lengths of around 700 m (between 854900 N and 855600 N) over a depth range in excess of 200 m. Except where veined and partially replaced by sulphides, the magnetite-rich bodies are Cu and S poor.

The mineralogy of the Group I assemblage is consistent with formation from relatively high temperature (probably magmatic) fluids in intrusion-proximal situations. To the north and the southeast of the Alacran deposit, Fe-enrichment (>10% Fe) is evident in the volcaniclastic package but rarely in the underlying mafic rocks and also locally overprints intrusions. Zones of Fe-enrichment are broadly concordant with layering but locally broaden over strike and dip extents of 50 m to 100 m.

7.3.4.2 Sulphide Stage

Hypogene Cu-Au mineralization takes the form of lenticular zones with broadly north south strikes that dip moderately to the west, broadly concordant with host stratigraphy and intrusive contacts. The Cu-Au zones, however, locally broaden in vertical and horizontal around steep N-S surfaces and these, along with high grade sub-zones, plunge at a relatively shallowly orientation. Cu-Au zones are largely restricted to the main volcaniclastic package, although drilling has intersected mineralization in the upper part of the mafic package in northern and central Alacran.

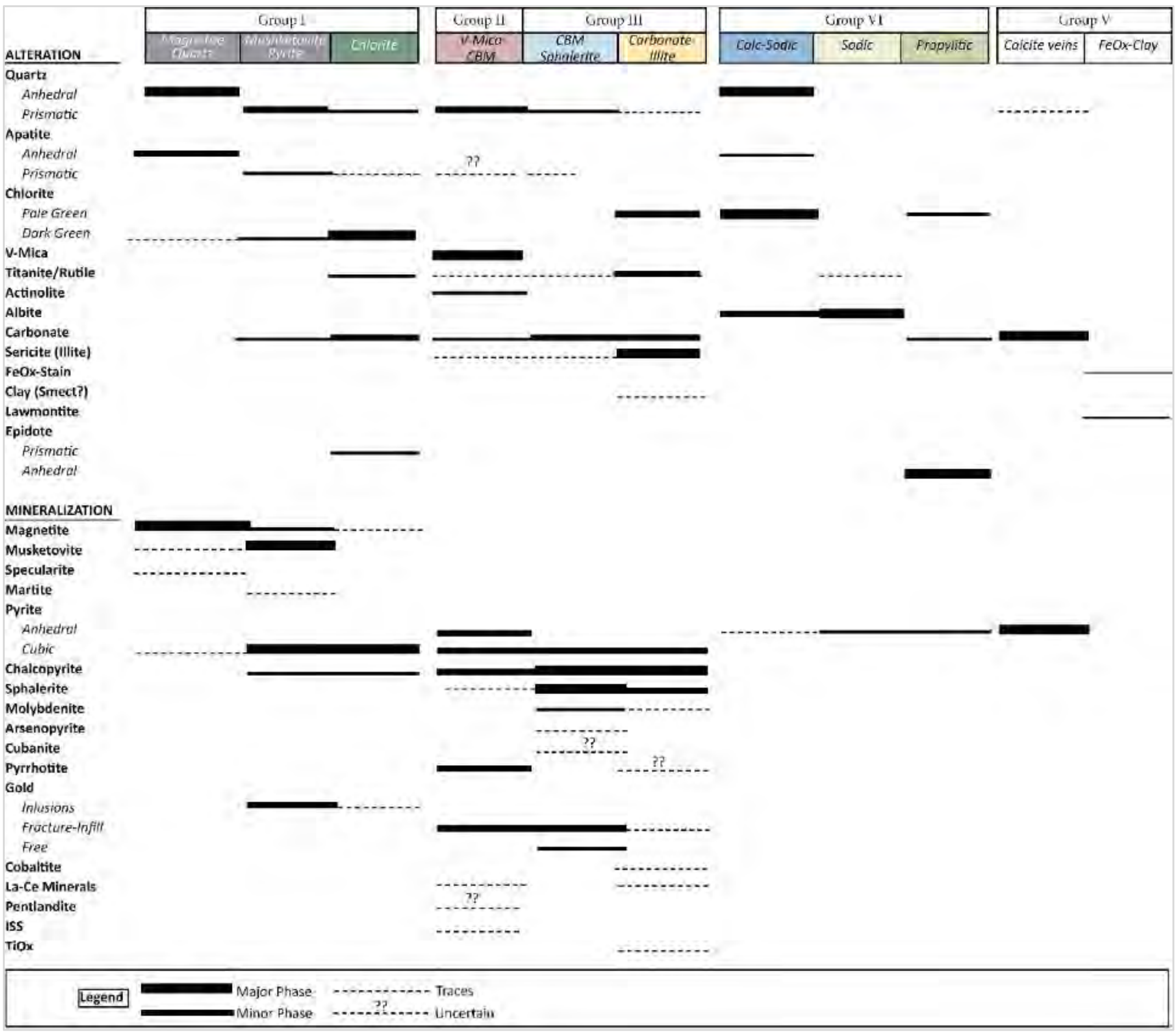
Sulphide precipitation in the Alacran deposit is associated with discrete alteration assemblages from Group II: V-Mica – CBM and Group III: Illite – CBM Stage.

Group II: V-Mica –CBM

The V-Mica assemblage is restricted to the central and northern part of the Alacran deposit and occurs in the andesite breccia footwall. This alteration assemblage exhibits transitional mineralogy from high temperature (apatite + actinolite + quartz + pyrrhotite) to lower temperature (sphalerite ± sericite) and may represent a significant change in the redox conditions during the incursion of a different mineralizing fluid (Manco et al., 2019).

Group III: Illite – CBM

The illite – CBM assemblage dominates the northern and central part of the Alacran deposit and preferentially occurs in the felsic to intermediate lithofacies associated with Unit 1 (i.e., rhyolite tuff, dacite intrusive breccia, and andesite tuff). Alteration intensity varies from pervasive in the shallowest part of the andesite breccias and decreases to trace amounts at deeper levels (>150 m depth) of the breccia. The alteration assemblage comprises medium-grained (< 1.5 mm), anhedral carbonate (< 35%) accompanied by very fine grained (< 0.1 mm) sericite (< 25%) and anhedral, Mg-rich chlorite. Short wavelength infrared analysis on sericite of this assemblage displays a marked absorbance feature at 1900 nm indicating a low crystallinity phase consistent with an illite composition with variations to paragonitic and lesser to phengite (Manco et al., 2018c).



Source: Manco et al., 2018b

Figure 7-8: Mineral paragenesis table for the Alacran deposit

Note: The Mineral Paragenesis table includes eleven mineral paragenetic associations grouped into five major groups. The bars indicate the proportion of the observed mineralogy varying from major, minor, trace, and uncertain distribution.

Cu-Au mineralization comprises veins and dissemination of chalcopyrite-pyrite ± pyrrhotite with quartz and carbonate and locally forms massive sulphides, and apatite is common. Au correlates with Cu and molybdenum (“Mo”), Nickel (“Ni”), cobalt (“Co”), chromium (“Cr”), phosphorous (“P”) and the light rare earth elements are typically enriched in the sulphide-mineralized zones.

Macroscopic and petrographic observations show that Cu-Au sulphide mineralization partially to completely replaces magnetite stage alteration. Pyrrhotite dominates early Cu-Au mineralization and may be intergrown with or partially replace actinolite. The pyritic assemblage commonly overprints pyrrhotite, and much of the chalcopyrite apparently formed at this stage, associated with chlorite-carbonate ± sericite alteration. This alteration is magnesian and sodic-calcic, apparently phyllic (sericitic) alteration in its later stages.

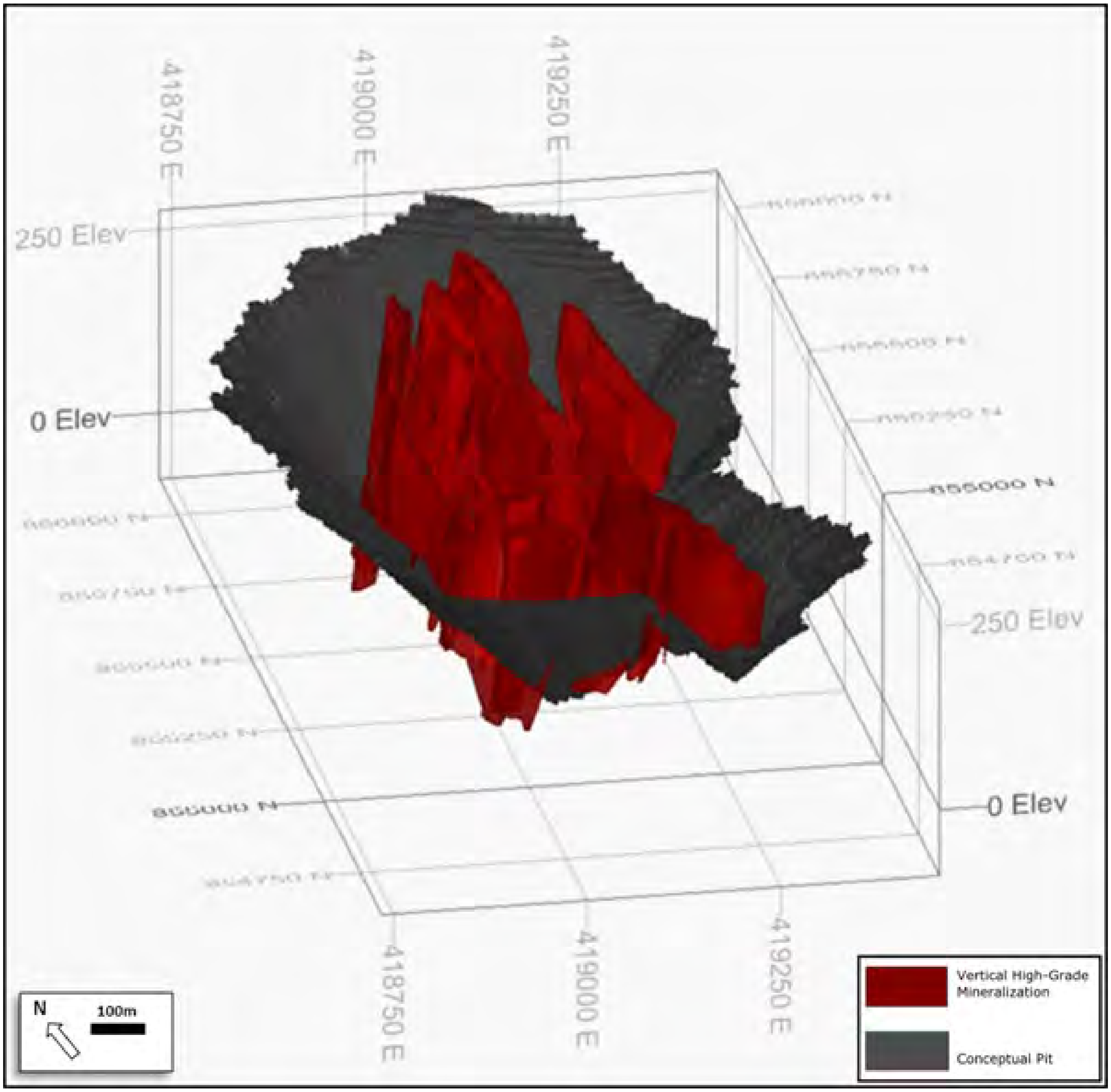
In the south west of the Alacran deposit, Cu-Au mineralization generally exhibits high Au/Cu ratios and high grade Au (>5 g/t Au) intercepts. These Au-rich zones commonly occur in and around the magnetite-rich bodies, and the main sulphide is pyrrhotite, partially overprinted by pyrite.

Re-Os age dating of molybdenite yielded a model age of 75.8 ± 0.4 and 73.3 ± 1.5 Ma (Leal-Mejía and Hart, 2017; Manco et al., 2018d).

7.3.4.3 Late Epithermal Overprint: CBM Style Auriferous Veining

The CBM mineral assemblage (Calcite + Sphalerite + Chalcopyrite) represents a long-lived formation either as replacement, associated with the Group III alteration assemblage or as late-veins that overprint the Cu-Au mineralization. In the northern half of the Alacran deposit sphalerite-rich, pyrite-carbonate-quartz veins are more widely distributed than in the southern half. These veins are generally auriferous and may carry high grade Au, i.e., 14 g/t Au over 3.0 m (ACD-009) and 4,440 g/t Au over 0.9 m (ACD-036) that is sometimes visible at the macroscopic scale. The CBM veins may be somewhat discordant to this mineralization, and their orientation pattern is not yet confidently established. These veins are cut by later Ni-Co-antimony (“Sb”)-rich arsenopyrite-carbonate-Au veins.

This late-stage CBM assemblage has been explicitly modelled into wireframes, referred to as vertical mineralization, as seen in Figure 7-9 and incorporated into the Resource modelling.



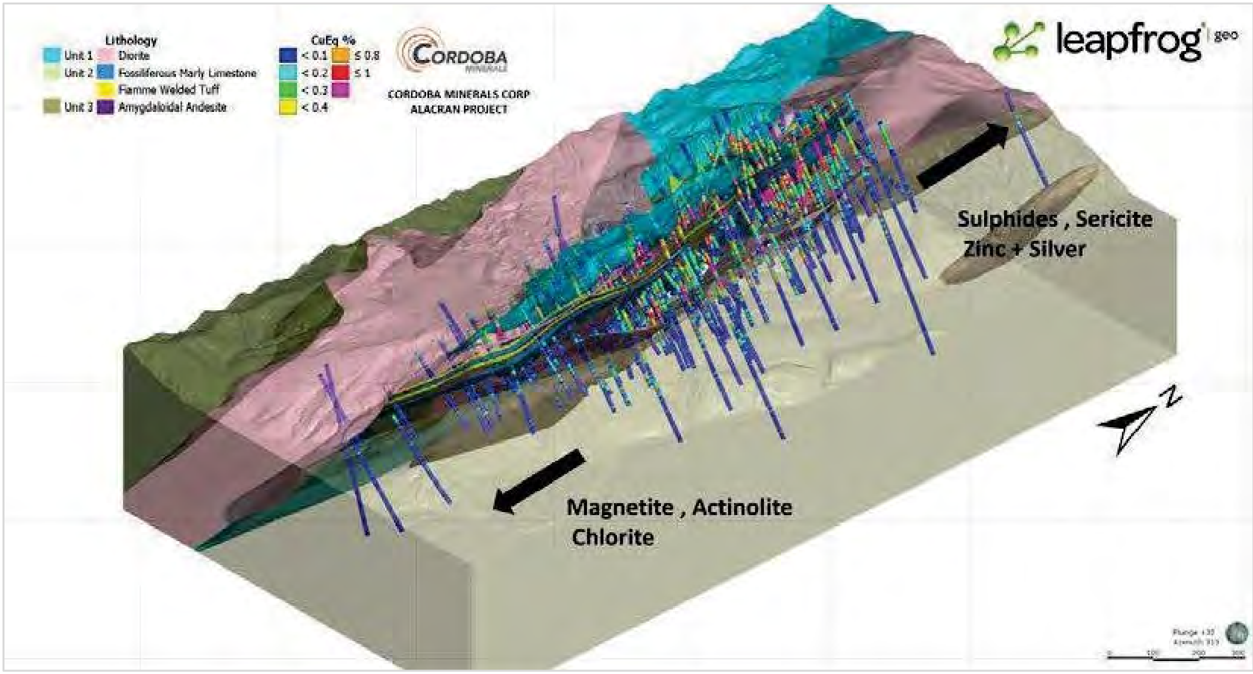
Source: Nordmin, 2019

Figure 7-9: Alacran deposit high grade Au CBM mineralization within the conceptual OP

7.3.5 Alacran Deposit Geological Model

A geological model was developed for the Alacran deposit in Leapfrog® 3D by Cordoba geologists (Figure 7-10). With successive drill campaigns and core re-logging exercises, the geological model has been further refined.

The geological model illustrates the three volcano-sedimentary packages (from hanging wall to footwall): Unit 1, Unit 2, and Unit 3, and the late diorite intrusions. In addition, several marker units identified during core re-logging exercises were modelled: the massive fossiliferous limestone and fiamme tuffs of Unit 2, and the amygdaloidal tuffs of Unit 3.

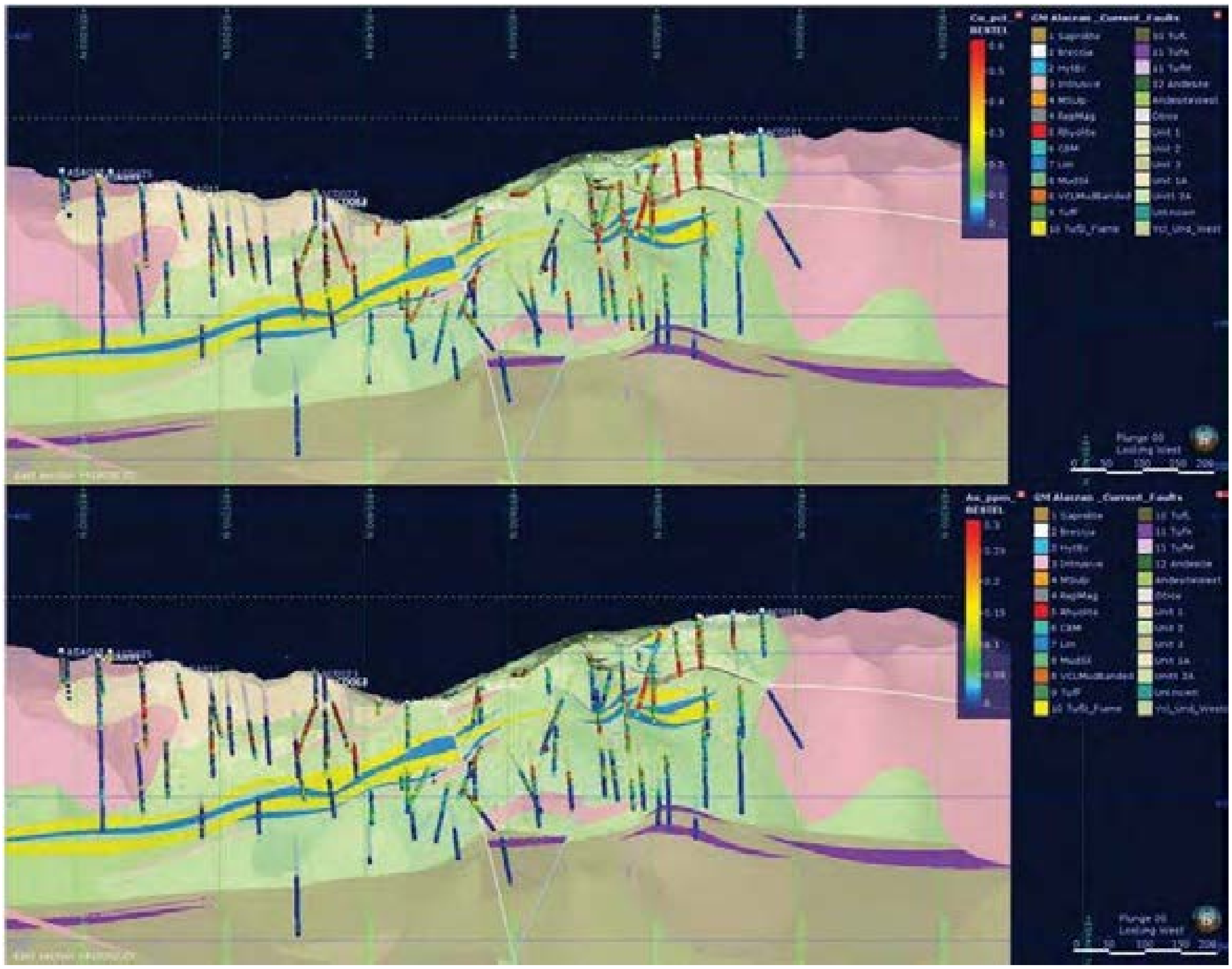


Source: Cordoba, 2018

Figure 7-10: Alacran 3D geological and grade model

There is evidence of many structural offsets of marker horizons, that range from minor to significant on a deposit scale and three major faults (discussed further in Section 7.3.6) were modelled. The cross section in Figure 7-11 shows the Unit 2 marker horizons and the offsets observed.

The CBM veins intersected by drilling and associated with high grade Au mineralization have been added to the geological model and Resource Estimate, based on structural analysis work completed by Nordmin. The structural analysis is described in detail in Section 7.3.6.



Source: Cordoba, 2018 Leapfrog® Model. Cu in %, Au in ppb

Figure 7-11: Alacran long section 419,050 looking East showing modelled geological units, observed structural offsets along with Cu and Au values in drill core.

7.3.6 Alacran Deposit Structures and Structural Model

The Cretaceous succession of the Alacran deposit is situated on the moderately dipping western limb of a faulted, regional anticlinal zone with N-S to NNW strike trending axial surfaces. Mesoscopic folds, observed in outcrop and drill core, are responsible for local changes in dip, are shallowly plunging, and are interpreted to represent parasitic folds syn-kinematic with the regional post-Cretaceous deformation. This deformation was of relatively low strain and produced a steep, weak cleavage in the Cretaceous sediments. As noted above, intrusive activity is inferred to postdate this regional deformation.

Cenozoic successions to the north and west of Alacran generally dip shallowly and are folded along N-S to NNE axes. These successions are faulted against, or unconformably overly, the Cretaceous succession, and are believed to have been eroded from the Alacran area.

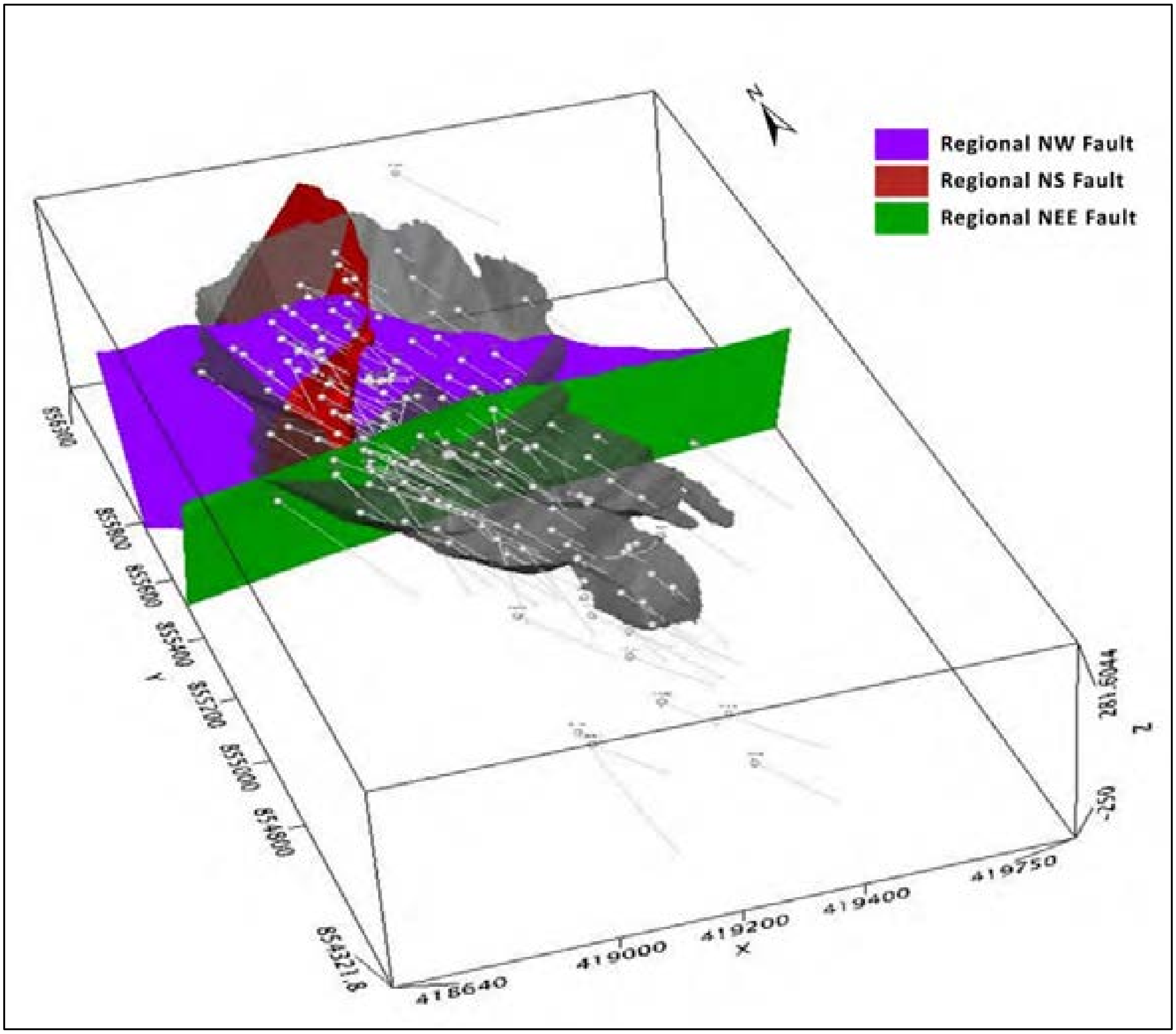
The Alacran deposit displays three dominant structure sets that have been identified by Cordoba geologists from mapping their topographic expressions, interpreting both ground magnetics, and aeromagnetic data, mapping visually in drill core and by a detailed structural analysis of core data. These three main dominant structures (Figure 7-12) are:

- NW fault set: dipping approximately 50°-75° W and striking NNW, parallel to the host rock bedding (which includes a subordinated antithetic system (striking NW, dipping 10°-30° northeast)). This set may be linked with the N-S to NNE striking faults of the Valdés and Rio San Pedro System (Figure 7-2) and has been interpreted as the oldest set, which does not have significant control on local mineralization.
- NEE fault set: striking at 060°and dipping 50°-60° SE, this set is possibly related to the east west system of faults. The El Alacrán Fault is the most prominent fault in the NEE set (Figure 7-13) and shows a listric geometry with a dip decreasing from 60° to < 10° with depth. This fault did not produce a significate offset of the Alacran deposit sequence; however, small (< 50.0 m) dextral offsets have been mapped along some artisanal tunnels (Mosher, 2011).
- N-S Fault set: Striking N-S and sub-vertically dipping, and these structures are the primary control for the high grade Au carbonate base mineralization

In drill core, the NW and NEE set of structures show evidence of post-mineral deformation indicated by extensive (<30 m thick) attrition breccias that include intensely fractured and gridding rocks lacking syn-tectonic alteration or mineralization. However, at a deposit scale, the andesite breccias appear to be preferentially developed when the NW structures intercept the NEE structures.

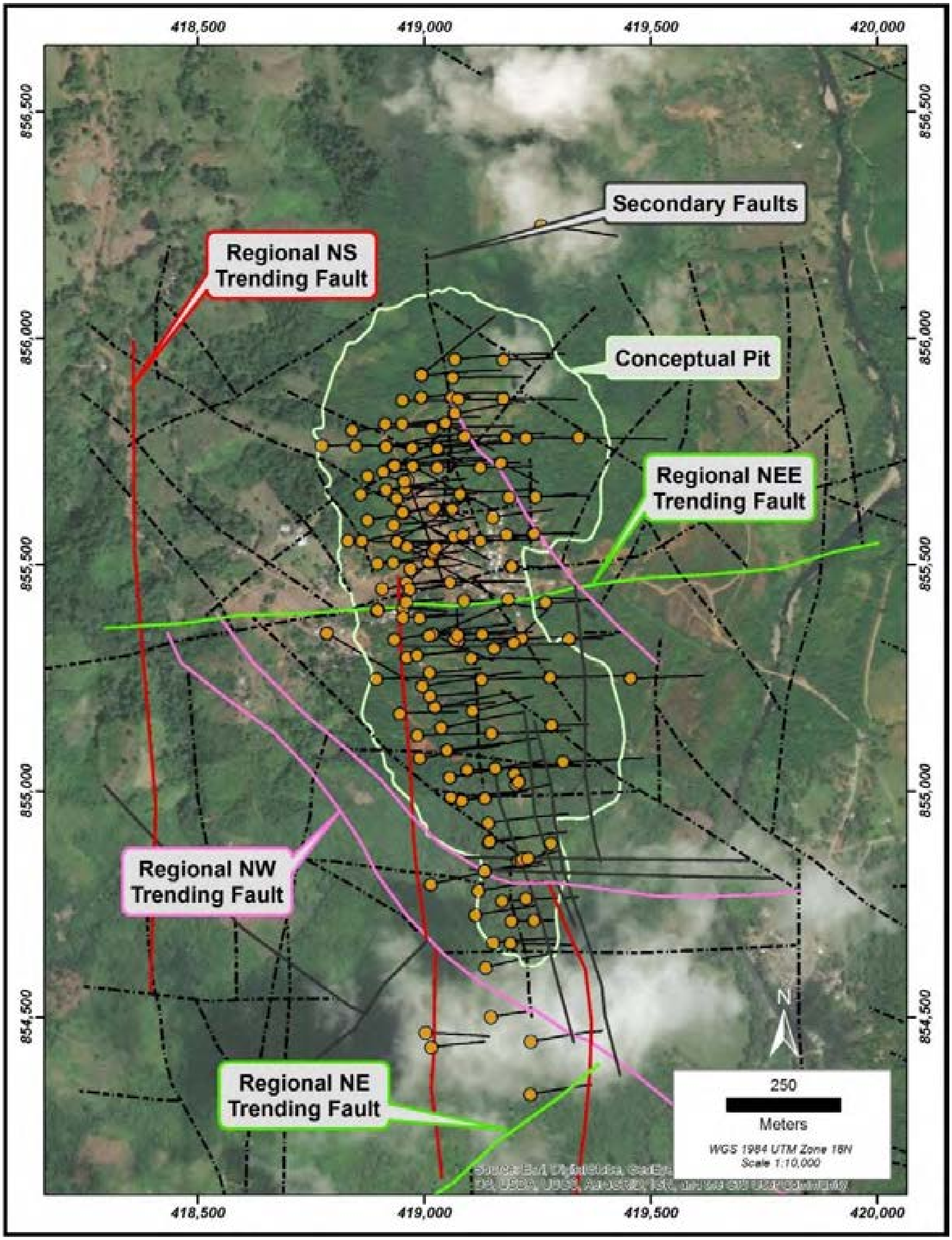
The most prominent structure at Alacran is the NEE fault, which traverses across the middle of the Alacran deposit.

In order to further refine the Alacran structural interpretation and build a structural model, Nordmin examined the data associated with the structural features previously identified by Cordoba, including geographic information system ("GIS") data, surface fault mapping, downhole structural core measurements, and 3D modelled three fault planes created previously by Cordoba. Nordmin confirmed the presence and orientations of the three major fault sets (the NW, NEE and NS sets) (Figure 7-13) and identified multiple N-S structures that control the high grade Au mineralization within the Alacran deposit.



Source: Nordmin, 2019

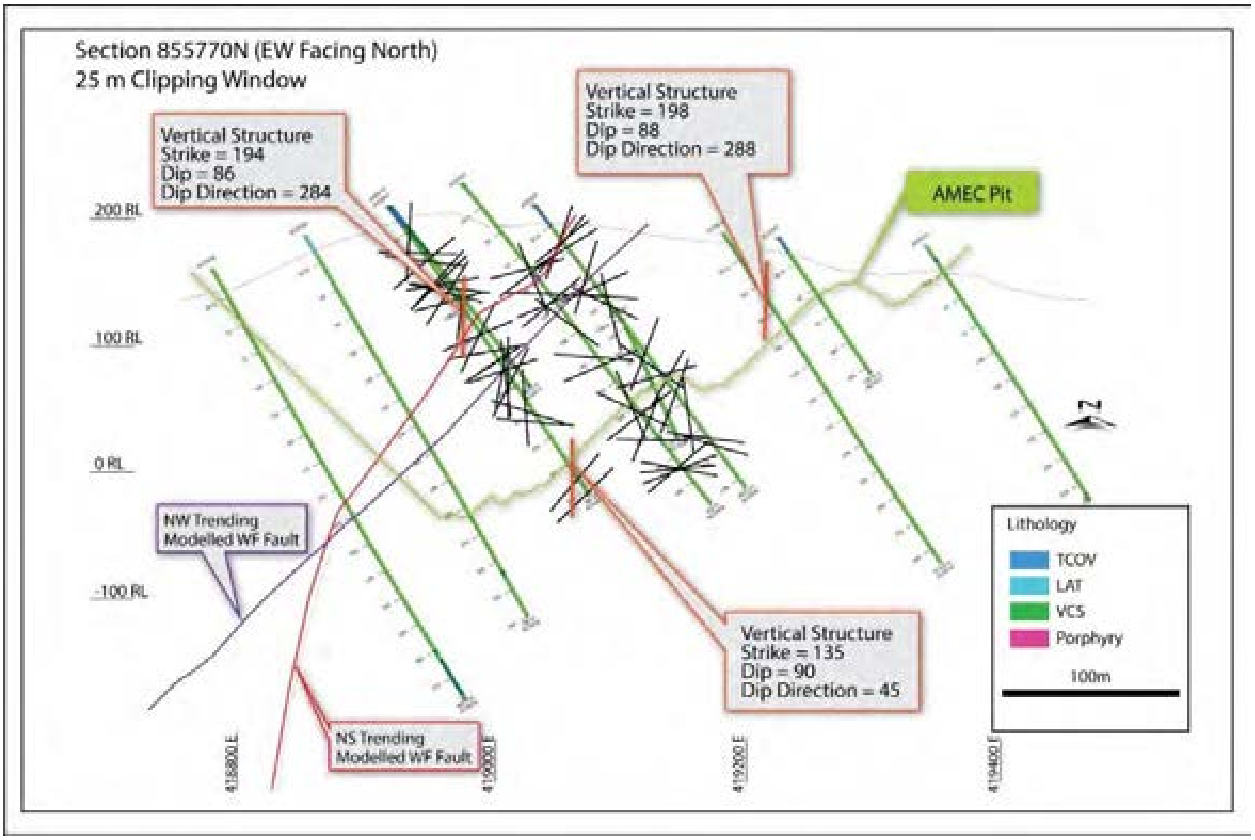
Figure 7-12: Plan map with previously developed faults



Source: Nordmin, 2019

Figure 7-13: Plan map with surface structural GIS data as interpreted by Cordoba and Nordmin.

Nordmin analyzed oriented core structural data (and collection procedures) and validated this data by examining core in conjunction with drill logs. The downhole strike and dip measurements were analyzed for the three main structural orientations in a plan view and a cross-sectional view (Figure 7-14) in order to confirm previously identified structures and identify new ones of significance.

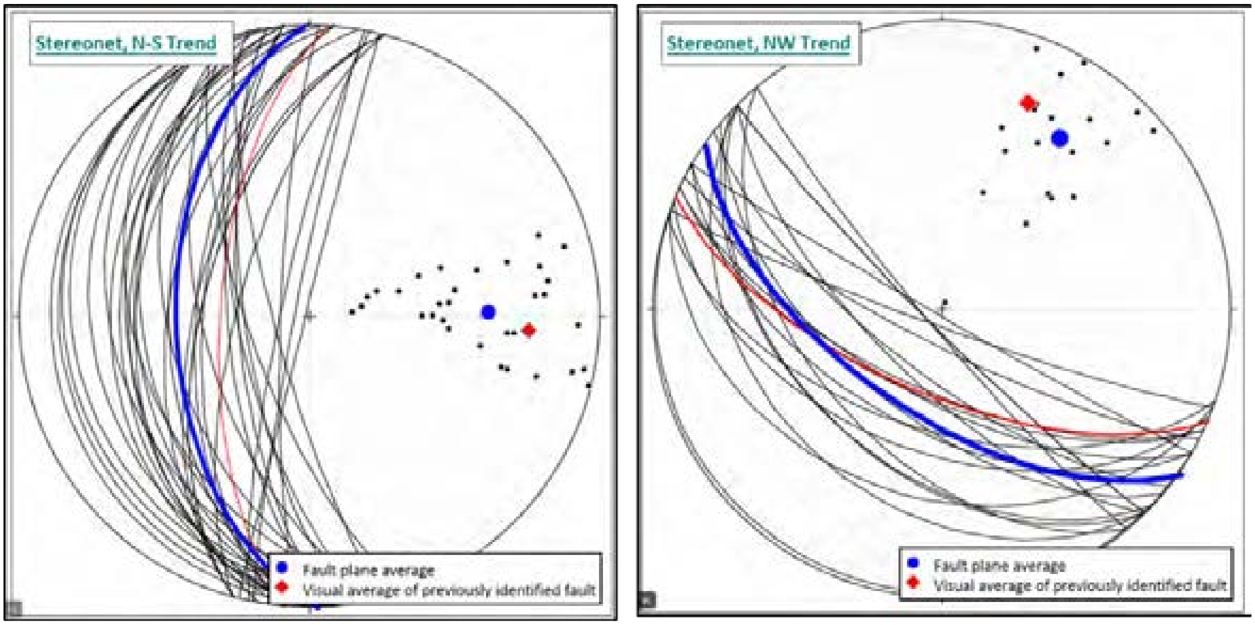


Source: Nordmin, 2019

Figure 7-14: Alacran cross section displaying drill holes and structural measurements

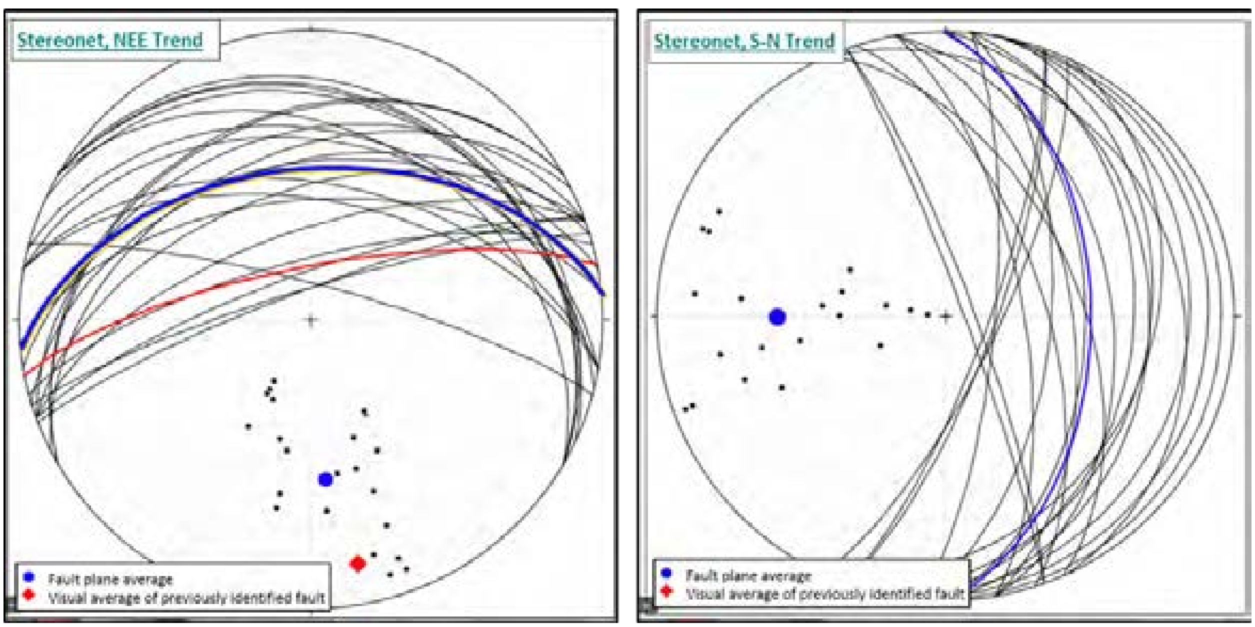
Trends in the data were identified, and a stereonet analysis was undertaken, which illustrated four main structural cluster subsets. Three subsets matched the previously identified trends (NW, NEE and NS) and a new trend, referred to as the S-N trend, was identified (Figure 7-15 and Figure 7-16).

Three dimensional structures were then developed explicitly along sections using all available data. When mineralization was examined alongside the structural data, the S-N and NW structures were interpreted as the oldest structures and did not have a significant impact on mineralization, and the N-S, and NEE trending structures did appear to control mineralization. The S-N trend proved difficult to discern from the NW trend, and it was determined that more data was required for further analysis.



Source: Nordmin, 2019

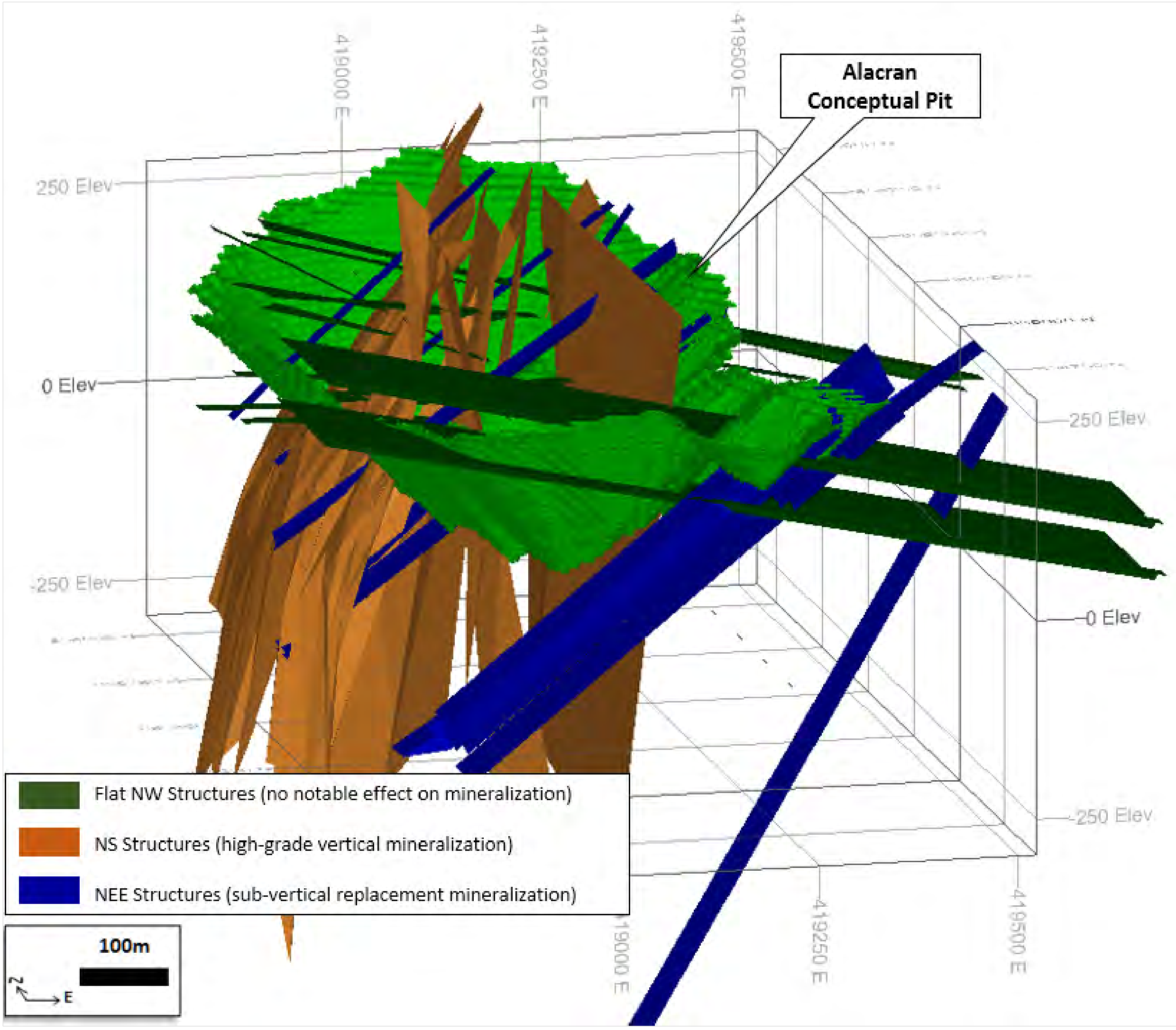
Figure 7-15: Stereonets showing the N-S and NW fault trend clusters



Source: Nordmin, 2019

Figure 7-16: Stereonets showing the NEE and S-N fault trend clusters

Figure 7-17 and Figure 7-18 illustrate the validated three main Alacran fault trends N-S, NEE, and NW faults, in relation to the conceptual OP.



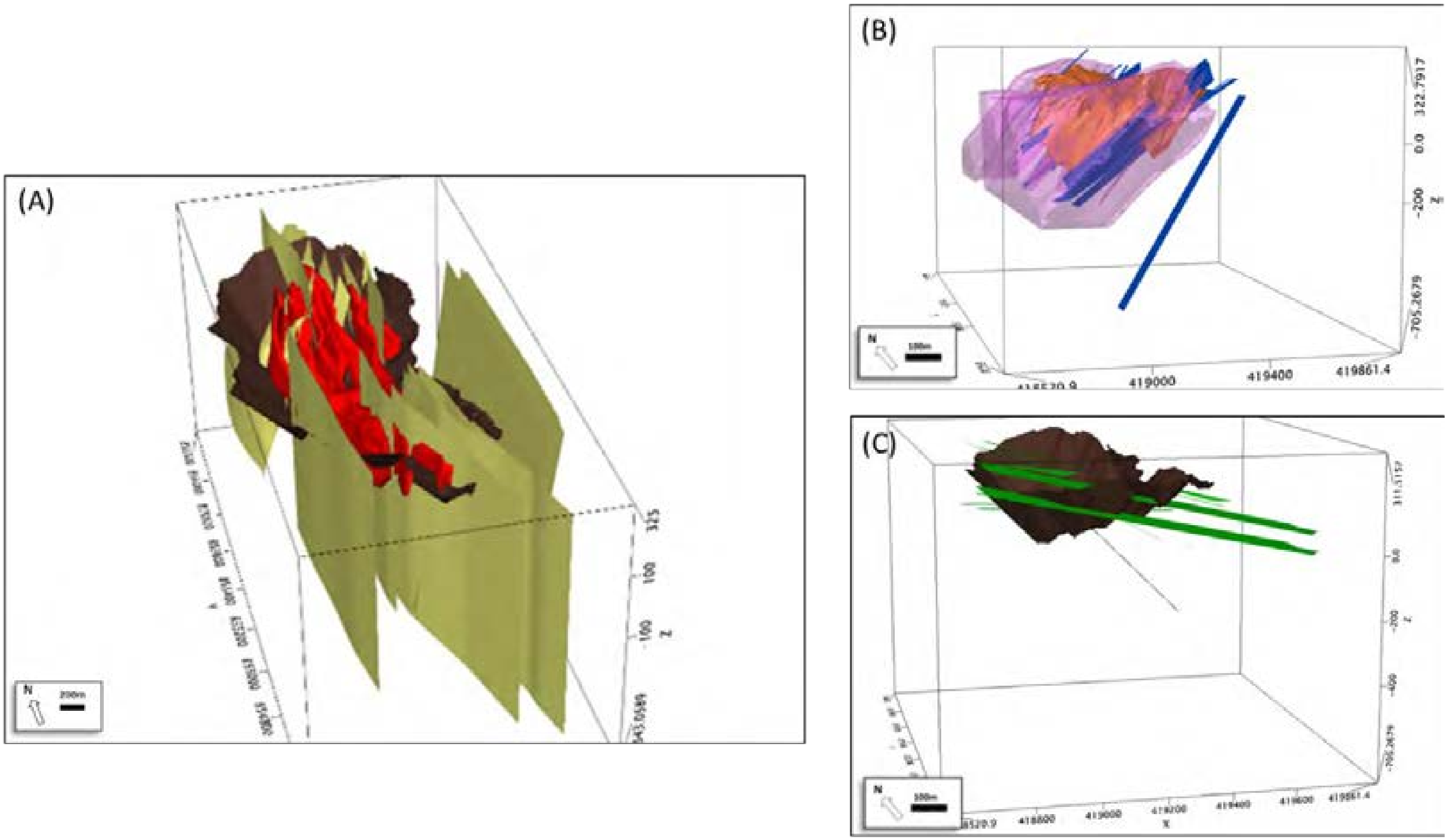
Source: Nordmin, 2019

Figure 7-17: Alacran conceptual OP with N-S, NEE, and NW structure trend

Yellow = N-S structures, high grade vertical mineralization structures

Blue = NEE structures, sub-vertical replacement mineralization

Green = Flat NW structures. No notable effect on mineralization



Source: Nordmin, 2019

Figure 7-18: (A) Alacran N-S vertical structures in yellow, high grade mineralization structures in red. (B) Alacran NEE sub-vertical structures in blue, sub-vertical replacement mineralization structures in orange (C) Alacran NW flat structures in blue

7.4 Montiel East Deposit

The Montiel East porphyry is located near the San Matías Village 2.5 km northeast Alacran deposit in the eastern side of the San Pedro River Lineament (Figure 7-2). The shallow parts of the Montiel East deposit display surface dimensions of approximately 100 m x 70 m and a vertical extent of 100 m. The Montiel East deposit is porphyry Cu-Au mineralization associated with a series of tonalite porphyry stocks and sills that intrude basaltic andesitic volcanic rocks and host a strong stockwork of quartz-magnetite-chalcopyrite-bornite veins. Based on cross-cutting relationships, alteration assemblages, and compositions, four different phases have been identified within the Montiel East porphyry suite, three of which are hornblende porphyries and one of which is a quartz feldspar porphyry (Figure 7-17).

Major oxide geochemistry from samples of Montiel E phases show SiO_2 = 61.8 – 73.8%, Al_2O_3 = 13.6 – 16.6%, CaO = 2.06 – 6.83%, MgO = 0.8 – 3.04%, and TiO_2 = 0.1 – 0.32%, Indicating the higher fractionation degree observed in the San Matías Copper-Gold-Silver Project intrusions (Manco et al., 2018 a).

Hornblende Porphyry: There are three phases of hornblende porphyry at Montiel East: an early, inter-mineral, and a late phase. Alteration and mineralization vary within each phase. In general, the hornblende porphyritic rocks are characterized by a groundmass formed by very fine-grained (< 0.05 mm) quartz (30%) with phenocrysts of fine to medium-grained (< 2.0 mm) plagioclase (40%), hornblende (5%), and fine-grained (< 0.1 mm) biotite (2.5%). Individual LA-ICP-MS analyses yielded Pb/U ages between 68.5 ± 7.5 and 78.0 ± 10.0 Ma with a weighted average yielded a U-Pb age of 72.4 ± 4.3 Ma (Manco et al., 2019).

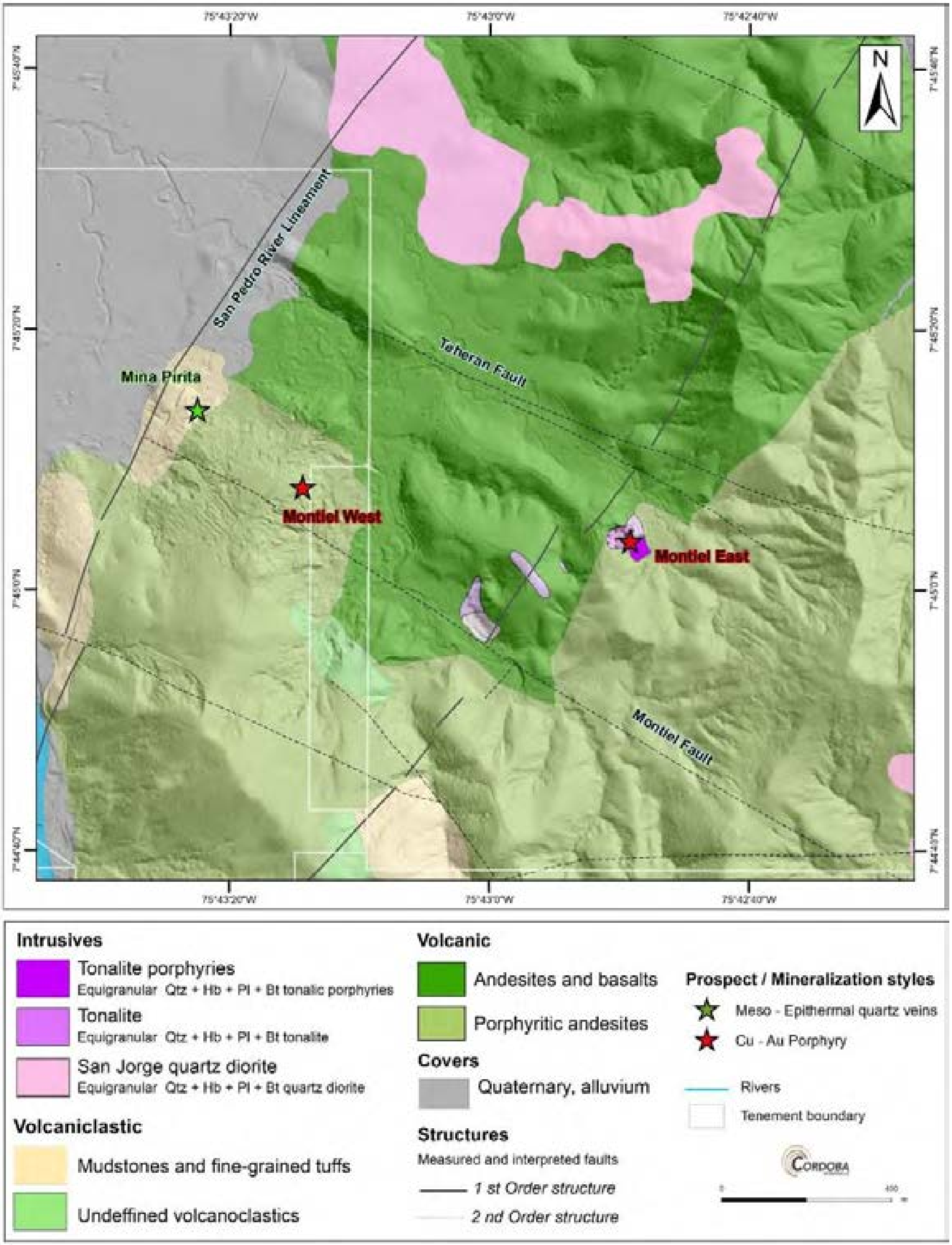
In the early phases, alteration manifests as fine-grained (0.2 mm to 0.4 mm) hydrothermal biotite in selective replacements and veinlets, and traces of fine-grained actinolite occur as alteration after hornblende (Manco et al., 2018b). Three major vein sets have been identified: Late-magmatic quartz veins (A-type veins); magnetite + chalcopyrite + bornite quartz veins (B-type veins), and chalcopyrite-only veinlets (C-type veins). The porphyry, as well as the volcanic rock within approximately 10.0 m of the contact, is characterized by an intense A-type quartz vein stockwork (Figure 7-20), with >40% of the rock comprising vein quartz and individual veins locally exceeding 1 m wide.

In the inter-mineral phase is a low grade phase with variable amounts of fine-grained (< 1.0 mm) chalcopyrite, pyrite, and pyrrhotite. This phase is recognized by a marked secondary biotite alteration with retrograde chlorite and pyrrhotite disseminations.

The late phase, which is low grade to barren, is a tonalitic phase with propylitic alteration and pyrite. Alteration is dominated by the occurrence of very fine-grained (<0.1 mm) sericite (15%), chlorite (4%) and traces of actinolite. Mineralization occurs mostly as 2.0 mm-width veinlets of pyrite, chlorite, epidote, sericite, and carbonate.

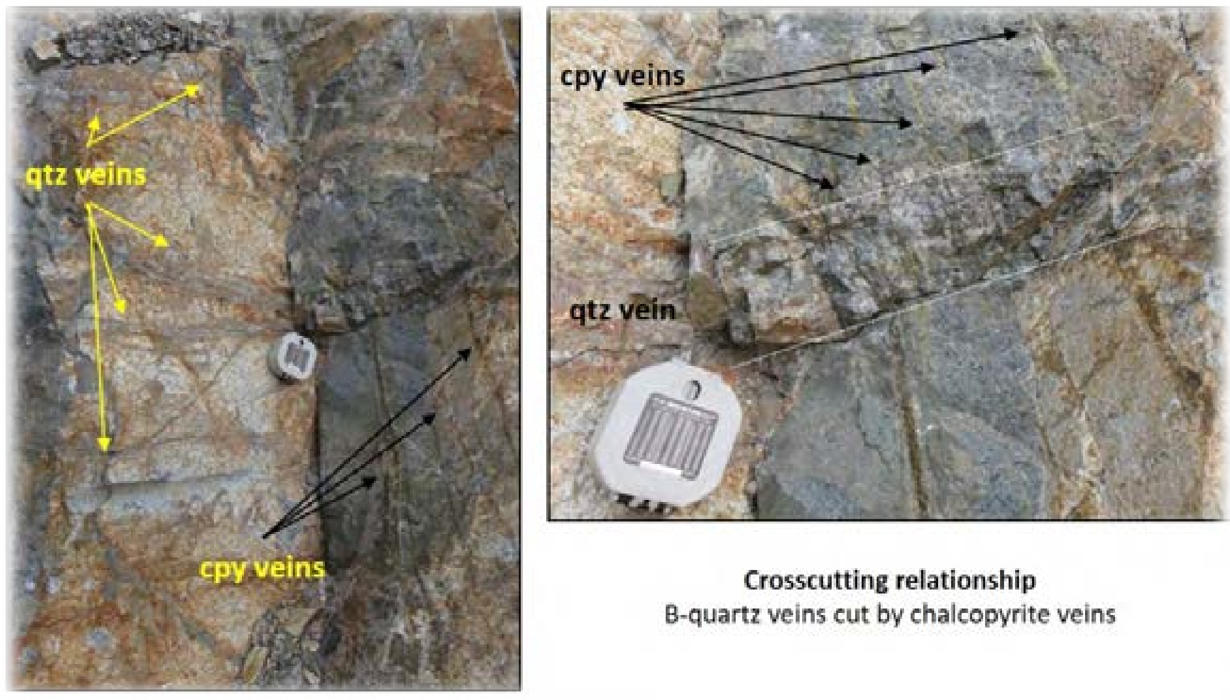
Quartz Feldspar Porphyry: This phase occurs as an intermineral-late phase as evidenced by the low grade mineralization and clear cross-cutting relationships observed in relation to the early hornblende porphyry phase. The Quartz Feldspar porphyry is an inequigranular medium-grained (0.5 mm to 2.0 mm) leucocratic rock composed of anhedral K-feldspar (14%), euhedral plagioclase (10%), and fine-grained (< 1.0 mm) quartz (40%) (Manco et al., 2018 a). Alteration intensity is relatively low to moderate and is characterized by the occurrence of silicification (16%), chlorite (3%) and sericite + clay and carbonate (3%). Mineralization is dominated by chalcopyrite and pyrite that occurs in interstices infill accompanied by actinolite and chlorite, respectively.

LA-ICP-MS analyses yielded Pb/U ages between 66.0 ± 13 and 79.3 ± 7.3 Ma with an obtained weighted average of 73.4 ± 1.9 Ma (Manco et al., 2019).



Source: Cordoba, 2019

Figure 7-19: Montiel East and Montiel West geology map



Source: Cordoba, 2019

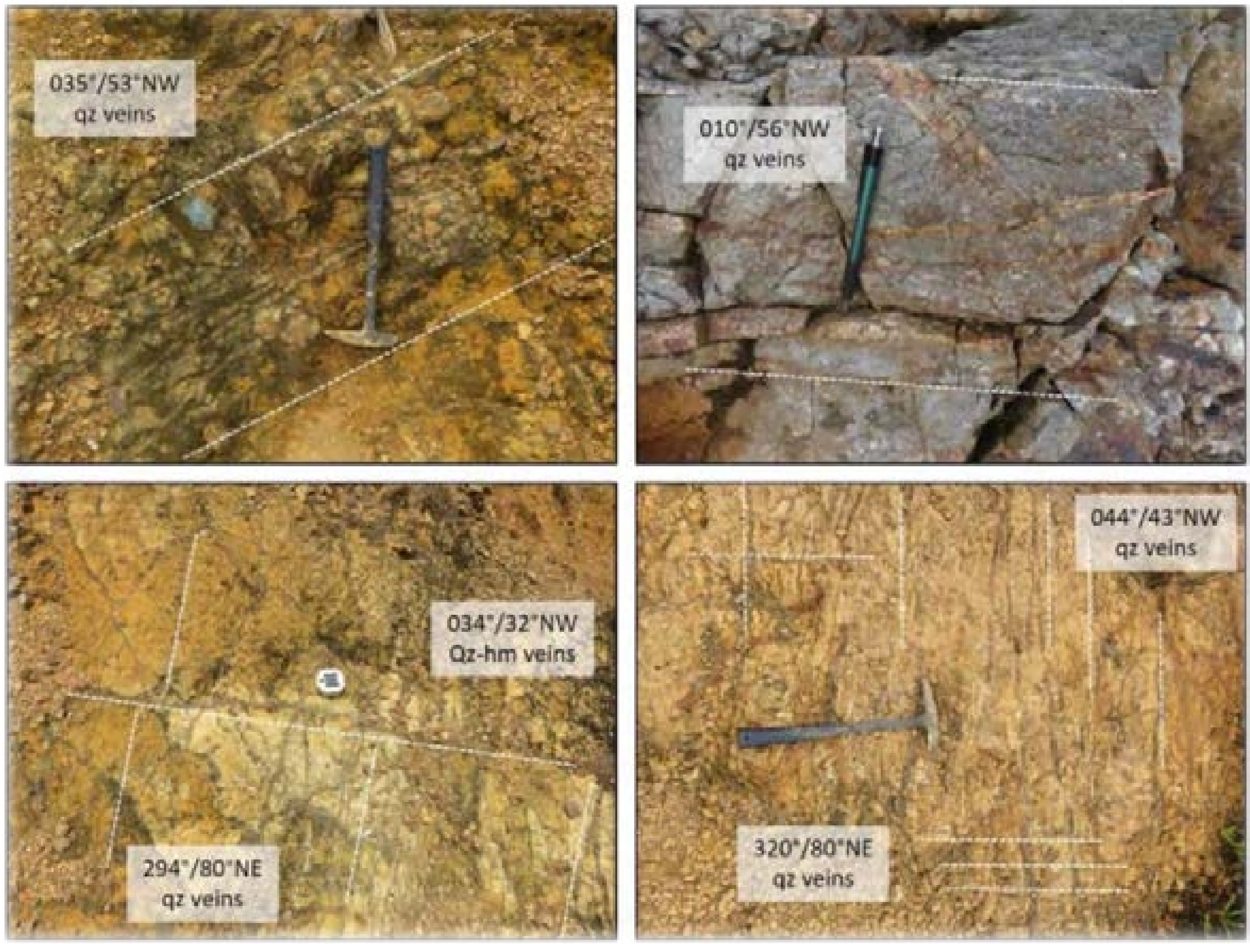
Figure 7-20: Vein density and cross-cutting relationships in the Montiel East deposit

7.5 Montiel West Deposit

The Montiel West deposit is located approximately 2 km northeast of the Alacran deposit in the eastern margin of the San Pedro River Lineament, and less than 1 km west of the Montiel East deposit (Figure 7-2). Diamond drill holes intersected high-density zones of both sheeted and multi-directional quartz-magnetite-chalcopyrite-bornite veining that are hosted in mafic and intermediate volcanic rocks, but no intrusive rocks. This style of wall rock Cu-Au mineralization is interpreted to be porphyry-related, as seen at both the Montiel East and Costa Azul prospects. The veinlets are generally narrower than those observed at Montiel East, possibly suggesting that there is no direct relationship between the two prospects. Alteration appears to be sodic-calcic, defined by albite, actinolite, and possible diopside.

Three sets of quartz veins have been identified (Figure 7-21):

- a NS-striking, W-dipping set, which is the most prominent set and shows the highest vein density for a width of 100 metres;
- a NE-striking, NW-dipping sheeted set that occurs in the western area of the Montiel West deposit; and,
- a NW-striking, NE-dipping set that sometimes contains hematite.



Source: Cordoba, 2019

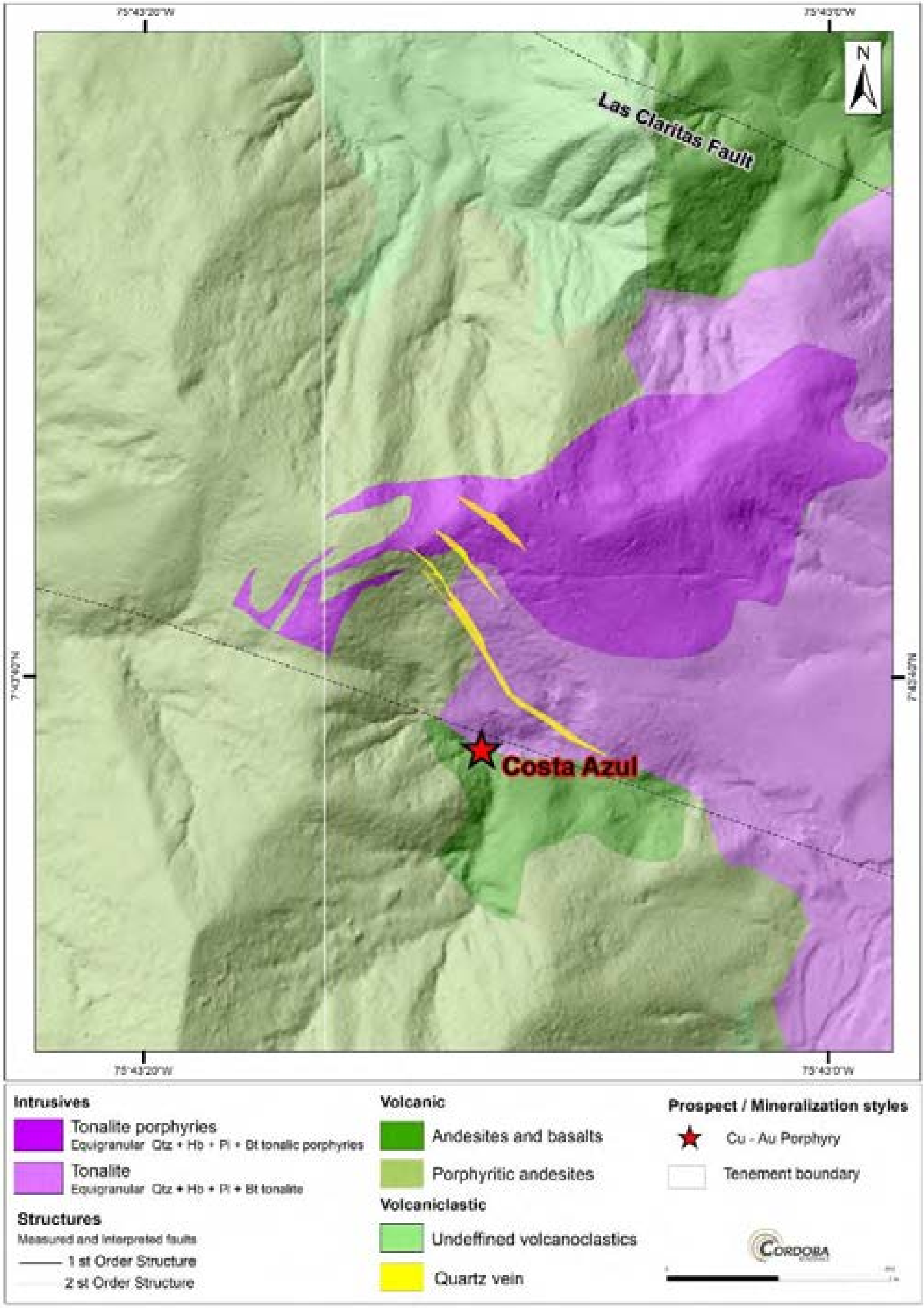
Figure 7-21: Variability in intensity and orientation of quartz veins sets identified at the Montiel West deposit.

7.6 Costa Azul Deposit

The Costa Azul porphyry deposit is located approximately 2 km southeast of the Alacran deposit in the eastern side of the San Pedro River Lineament (Figure 7-2). The Costa Azul porphyry is a shallow dipping, holocrystalline, Cretaceous porphyry diorite intrusion dominated by phenocrysts (approximately 70%) comprising medium-grained (< 2.0 mm), euhedral plagioclase (21%) and anhedral to subhedral hornblende (6%), intergrown with primary magnetite, and biotite. Quartz (27%) occurs either as fine-grained (<.5 mm), anhedral phenocrysts or as very fine-grained (< 0.05 mm) groundmass.

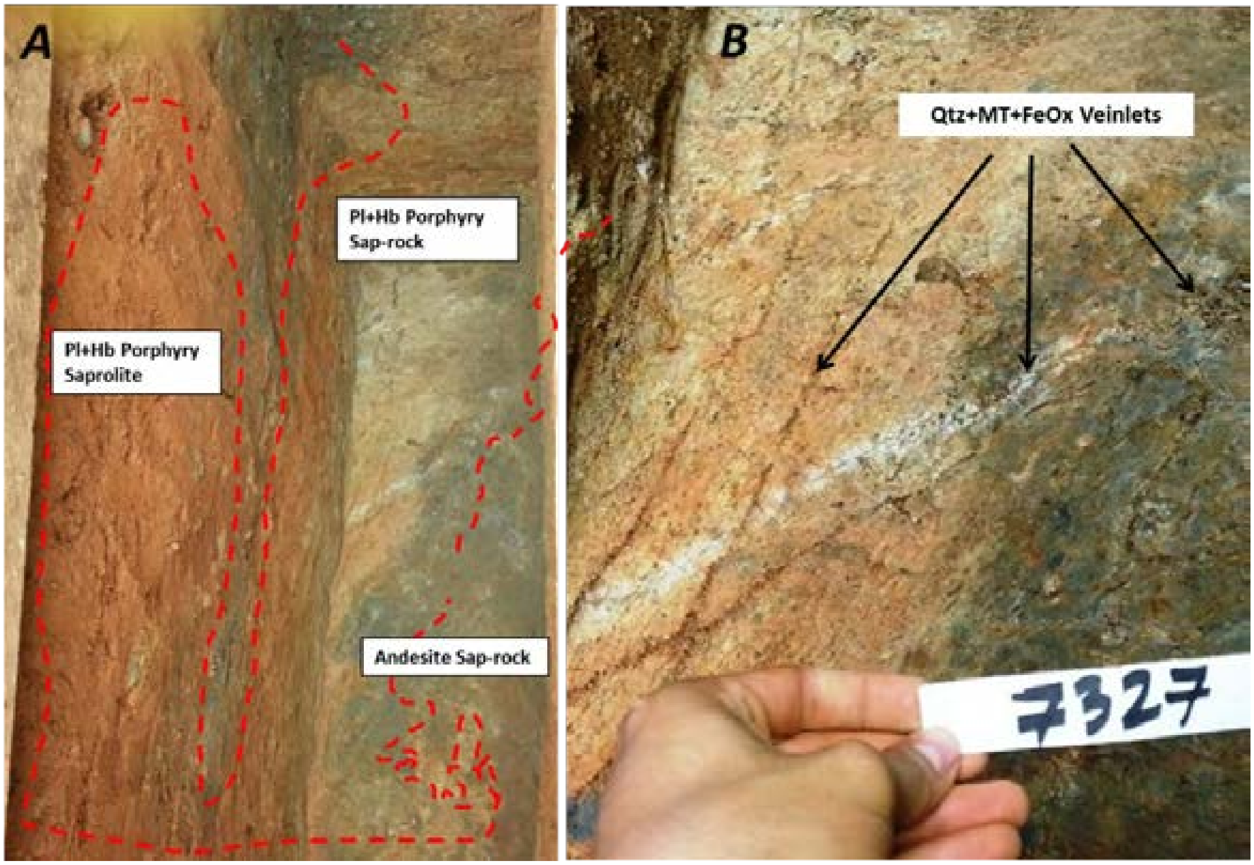
Hydrothermal alteration intensity is low to moderate and consists of silicification (29%), chlorite (3%), and traces of actinolite. Mineralization here is porphyry-style Cu-Au associated with sheeted quartz-magnetite-chalcopyrite-pyrite-bornite veinlets within altered diorite porphyry and unmineralized, mafic volcanic footwall rocks (Figure 7-22). This porphyry has not been described in the same detail as Montiel East porphyry. However, it shows intrusive phases equivalent to the ones described at Montiel East (i.e., Hornblende Porphyry, Hornblende Porphyry Late). Veining paragenesis is similar to the veins observed at Montiel East. Chalcopyrite is the dominant sulphide and occurs in two different stages. 1) Very fine- to fine-grained (< 0.3 mm) anhedral aggregates intergrown with bornite ± pyrite in quartz rich B-type veins; and 2) as 0.2 mm-wide chalcopyrite-rich veinlets that crosscut the B-type veins (Figure 7-23).

Re-Os age dating of molybdenite yielded a model age of 76.6 ± 0.3 Ma, which is interpreted as the age of mineralization for the porphyry system and suggests a clear temporal, and likely genetic relationship with the Montiel East deposit.



Source: Cordoba, 2019

Figure 7-22: Costa Azul geology map



Source: Cordoba, 2019

Figure 7-23: Samples of rock from the Costa Azul deposit showing A. Plagioclase-hornblende porphyry saprolite ("SAP") and andesitic saprolite rock in drill core; and B. outcrop with quartz + magnetite + Fe oxide veinlets.

7.7 Geological Satellite Deposit Models

Preliminary geological models were constructed for each of the Costa Azul, Montiel East, and Montiel West deposits in order to constrain grade for the Resource Estimate by lithology. Lithologies were based primarily on surface mapping and lithology from drilling. Lithologies in the models are based on ten rock groups, including:

- Andesite Porphyry
- Andesite Basalt
- Hornblende Porphyry
- Hornblende Porphyry (Late)
- Porphyritic Andesite
- Quartz Feldspar Porphyry
- Quartz Veining
- Volcaniclastics (Undifferentiated)
- Volcanic Sediments (Mud)

<u>Costa Azul</u>

The Costa Azul deposit is predominantly located within the porphyritic andesite and hornblende porphyry lithological units, and lesser within the hornblende porphyry (late) and quartz veining lithological units.

Montiel East

The Montiel East deposits are located predominantly within the andesite basalt and porphyritic andesite lithological units, and lesser within the alluvium, hornblende porphyry, hornblende porphyry (late), quartz feldspar porphyry, and volcaniclastics (undifferentiated) lithological units.

Montiel West

The Montiel West deposits are located predominantly within the andesite porphyry and porphyritic andesite lithological units, and lesser within the andesite basalt, volcaniclastic sediments (mud) units.

8 DEPOSIT TYPES

8.1 Alacran Deposit Genetic Model

The Alacran deposit is located in the SMD in the Northern Western Cordillera of Colombia and is associated with a Late Cretaceous pre-accretional island arc environment of the Calima Terrane. The Alacran deposit comprises a replacement style of mineralization that trends northerly for about 1 km and has a vertical extent of >200 m. Ore is primarily hosted within a calcareous volcanoclastic sequence (Unit 2), which was intruded by a series of andesitic sills and tonalites (i.e., the Alacran Oeste Tonalite). The Alacran deposit contains total resources of 82.15 Mt of 0.73-0.49% CuEq which represents approximately 87% of the total Mineral Resources of the SMD (94.9 Mt@ 0.71% Eq. Cu, Cordoba Minerals Corp., 2019b). The genesis and evolution of the Alacran deposit had not been properly established, thus making it challenging to explore for similar deposits in the SMD.

Several different deposit models have been proposed for the Alacran deposit, including VMS, Skarn, CRD, and IOCG. To understand the Alacran deposit formation, thesis-based research was completed with the MDRU at the UBC, in partnership with the Company. This research further developed the Alacran deposit model through a combination of alteration-mineralization and host rock geochronology, Pb and S isotope and Electron Microprobe Analysis ("EMPA") in magnetite.

The thesis (Manco, 2020) presents the results of petrographic, geochronologic (U-Pb, Ar-Ar, Re-Os), and isotopic (Pb, S) characterization of the Alacran deposit ores and related representative units and prospects of the SMD. The hydrothermal alteration assemblages of the Alacran deposit are zoned from early high temperature calc-silicate alteration to a subsequent calc-potassic, sericitic, and CBM alteration. The mineral paragenesis indicates at least three different Au precipitation events: 1) associated with pyrite – mushketovite in the calc-silicate alteration; 2) precipitation of Au electrum with chalcopyrite, traces of the pyrrhotite and molybdenite in the calc-potassic and sericitic alteration; and 3) as visible grains in the carbonate base metal-related alteration. The mineral paragenesis, Ar-Ar dates, Pb and S isotopic composition (i.e., heavy $\delta^{34}S$ approximately 11‰) from the Alacran deposit can be explained by two different magmatic fluids with a marked interaction with seawater. The magmatic fluids might have been sourced from the Alacran Oeste Tonalite and a concealed intrusion (Px2) that is possibly associated with the Montiel East porphyry event (approximately 68-70 Ma).

The IOCG model is supported by Sillitoe (2018) who suggested that the abundance of hydrothermal apatite, the distinctive Cu-Au-Mo geochemical signature, the abundance of mushketovite (magnetite pseudomorphs after specular hematite) found in the Alacran deposit are common features associated with IOCGs, especially to deposits in the Chilean Belt (i.e., Candelaria). In addition, the lack of abundant quartz and the presence of coarsely crystalline calcite in the late Zn-Cu veins is a characteristic texture in late and/or distal parts of IOCG deposits.

Evidence that argues against the IOCG model, among others, is the presence of sericite and pyrite that is quite uncommon in IOCG systems. When reported, these alteration minerals are formed in the Cu-poor hydrolytic stage (Hitzman et al., 1992). In the Alacran deposit, the main Cu deposition occurs within the sulphide stage that is associated with the sericite + chlorite + carbonate from the Group II and Group III alteration assemblages (see Section 7.3.4).

Similarly, when revising the tectonic setting of the area (Manco et al., 2019) the most accepted tectonic environment for the Project area consists of a pre-accretional, intra-oceanic island arc setting. This tectonic setting is not favourable for the formation of IOCGs deposits, which is interpreted to be formed in intra-continental to cratonic settings (Haywood, 2008; Groves et al., 2010).

Finally, the Cu deposition in the Alacran deposit indicates that there is a temporal relationship (approximately 73 Ma) with the magmatism and Cu-Au porphyry occurrences of the Project (i.e., Montiel East porphyry). Additionally, the recent delineation of the dacite intrusive breccia, which bears stockwork-porphyry clasts (Figure 7-6 (D)) in the Alacran deposit (Unit 1), suggests a spatial, and possibly genetic relationship with the tonalitic porphyry intrusions of the district.

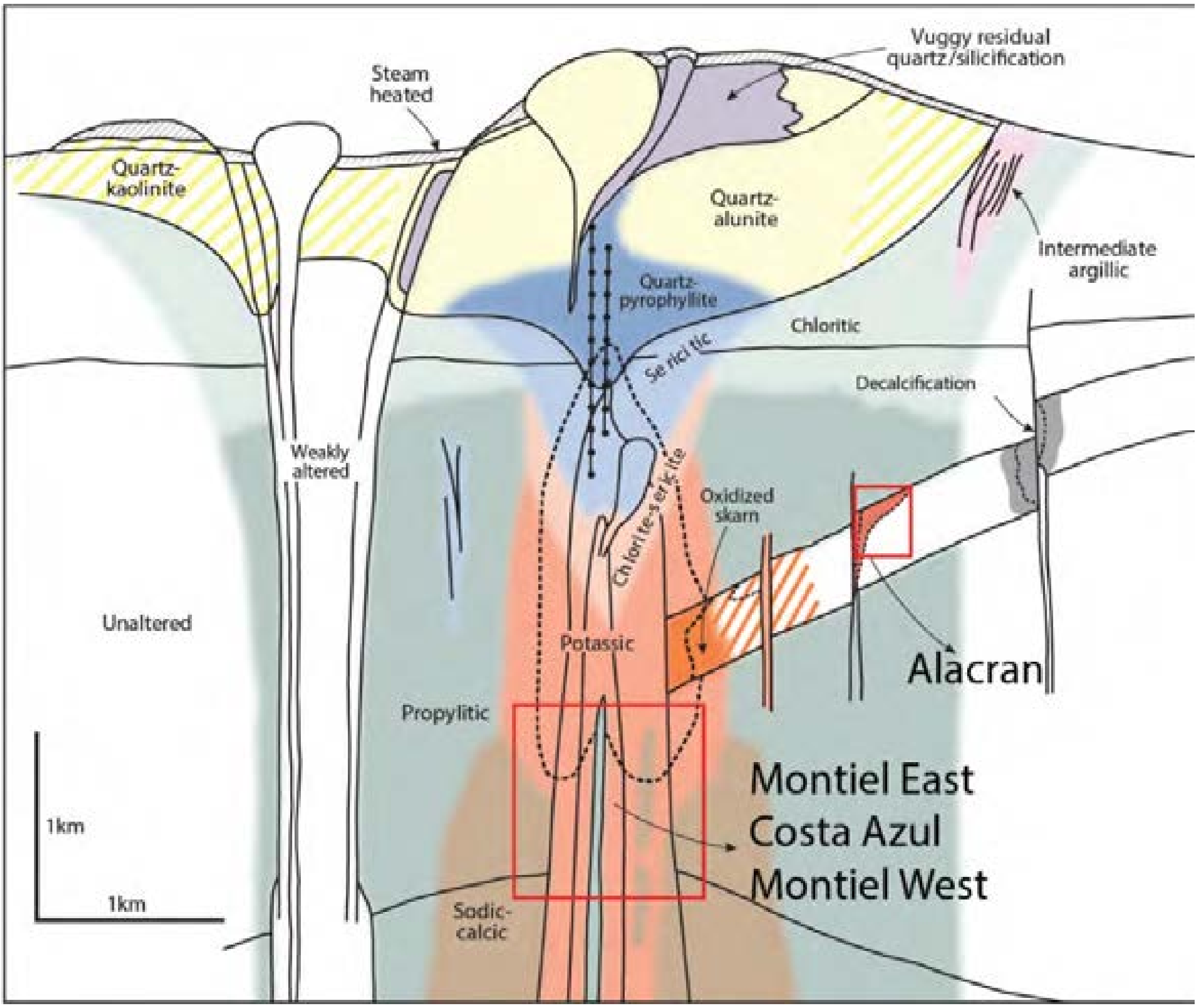
The 2020 thesis results in combination with previous work suggest a hybrid model between IOCG-style and a CRD that is associated with a porphyry source can best explain the Alacran deposit mineralization.

8.2 Satellite Deposits Genetic Models

The Montiel East, Montiel West, and Costa Azul deposits can all be broadly classified as Cu-Au porphyry systems as defined by Sillitoe (2000). Cu-Au porphyries are typically associated with I-type magnetite-series intrusive rocks and typically contain significant hydrothermal magnetite, indicating the host intrusions are highly oxidized and sulphur-poor members of this series of magmas. The porphyry stocks in these types of rocks span a range of compositions from diorites, quartz diorite, and tonalite through to quartz monzonite, monzonite, and syenite. The porphyry deposits of the Project area are of low-potassium, calc-alkaline dioritic, and tonalitic composition.

Mineralization in the San Matías porphyry deposits is associated with a quartz-sulphide (chalcopyrite+pyrite±bornite) stockwork typically within hydrothermal biotite (potassic) altered rocks. The occasional presence of albite-actinolite (sodic-calcic) alteration assemblages, as well as the relative lack of sericitic alteration assemblages, has led some workers to interpret that the Montiel porphyries are eroded to deep levels. Counter to this argument, however, are observations by Lowder and Dow (1978) and Carlile and Kirkegaard (1985) who note that some Indonesian Au-rich porphyry deposits are characterized by hybrid sodic-calcic and potassic assemblages. At the Costa Azul porphyry, no such sodic-calcic assemblages have been observed.

There is little debate as to whether the Montiel and Costa Azul deposits are indeed Cu-Au porphyries; however, the debate continues about the erosional level of these systems, as well as the degree and attitude of post-mineral faulting and tilting (Figure 8-1).



Source: Cordoba, 2019

Figure 8-1: Generalized alteration-mineralization zoning pattern for telescoped porphyry Cu deposits (modified from Sillitoe, 2010). Red boxes highlight the position of the San Matías Porphyry occurrences (Montiel East, Montiel West, and Costa Azul deposits) relative to the CRD (Alacran deposit).

9 DRILLING

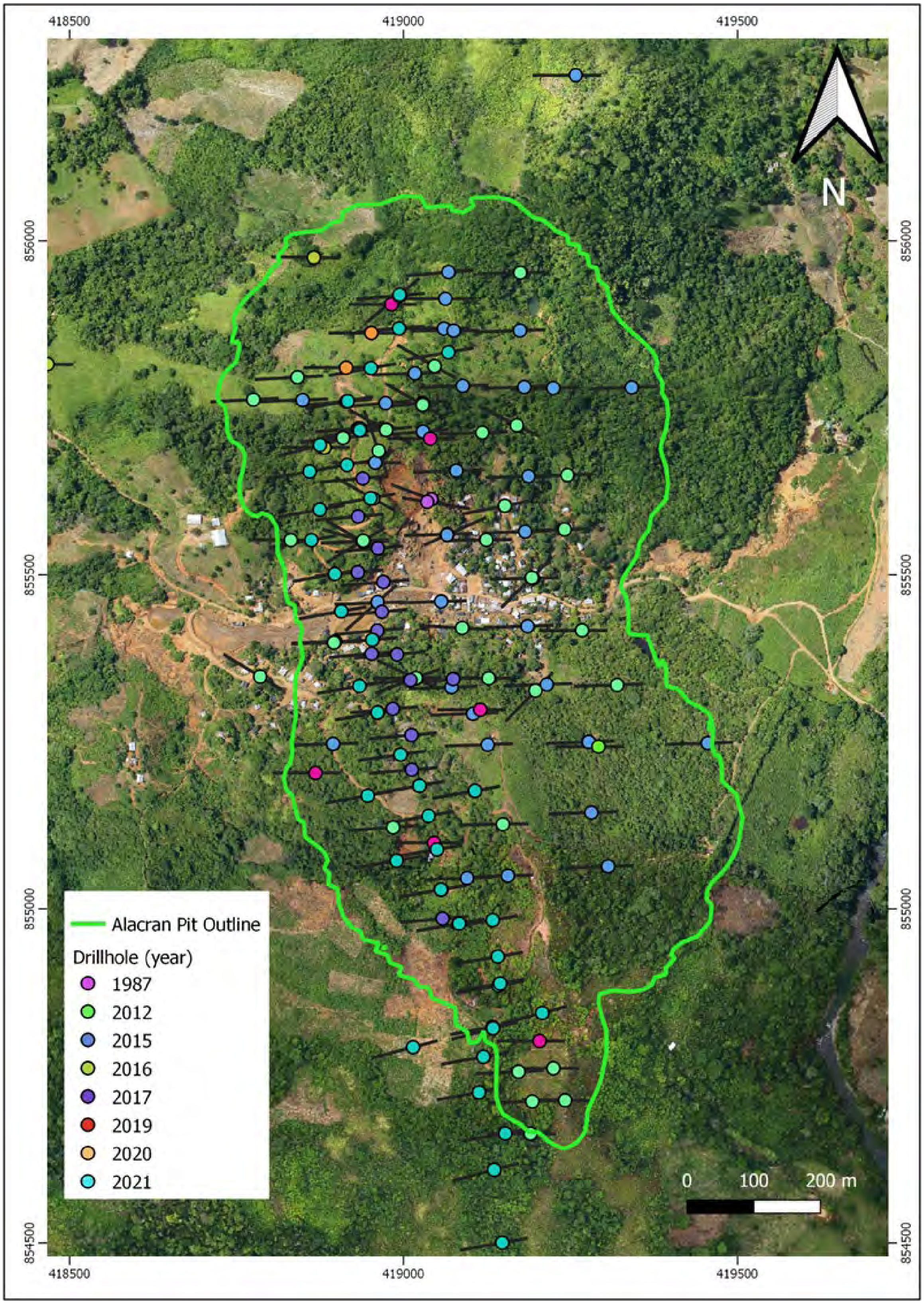
9.1 Alacran Deposit

Diamond drilling at the Alacran deposit consists of 40,609.6 m of core from 189 PQ, HQ, and NQ diameter drill holes completed between 1987 and 2021. Table 10-1 provides a summary of the drill campaigns by year and operator. Figure 10-1 shows drill collar locations by drill campaign for each deposit.

Table 9-1: Alacran Drill Hole Summary

Year	Operator	Hole Prefix	Number of Holes	Hole Diameter	Total Length (m)
Unknown	Alluvial miners	Multiple	27	Unknown	624.3
1987	Dual Resources	SJ	15	NQ	2,584.2
2011-2012	Ashmont	ASA	52	HQ	13,459.7
2015	Cordoba	ACD	3	HQ	877.9
2016	Cordoba	ACD	41	HQ/NQ	11,804.8
2017	Cordoba	ACD	40	HQ/NQ	9,737.5
2019	Cordoba	ACD	3	HQ	1,060.2
2020	Cordoba	ACD	1	PQ	97.6
2021	Cordoba	ACD	6	PQ	725.4
Total			**189**		**40,609.6**

Source: Cordoba, 2021



Source: Nordmin, 2021

Figure 10-1: Plan view of Alacran deposit diamond drill holes with hole collar coloured by drill campaign

9.1.1 Dual Resources Drilling

Holes completed by Dual Resources were drilled on 20 m to 45 m centres generally at an azimuth of 085° and a dip of -50°. The collar locations were originally reported in Bogota West Prime Geodetic System coordinates and later translated or resurveyed in WGS 84 UTM Zone 18 N coordinates. The documentation describing Dual's collar survey method is not available.

Dual Resources holes were not surveyed downhole, and archived drill core is not available.

9.1.2 Ashmont Drilling

Holes completed by Ashmont were generally drilled on 50 m centres at azimuths ranging from 050° to 085°, and dips ranging from -45° to -80°. Most holes were drilled at an azimuth of 080° and a dip of 50°. The collar locations were originally reported in Bogota West Prime Geodetic System coordinates and later resurveyed in WGS 84 UTM Zone 18 N coordinates using differential Global Positioning System ("GPS") methods.

The downhole survey method used is unknown, but the data suggests that a single shot magnetic tool was used. The Ashmont holes have from one to eight downhole survey points per hole, spaced at approximately 50 m intervals.

Drill core was photographed prior to sampling, then was logged geologically, and geotechnically. The core was measured for recovery and rock quality designation ("RQD") and marked for sampling on 1.0 m intervals. The lithological and mineralization contacts were ignored when marking up samples. The data collection was recorded on paper forms and observations were subsequently transferred to a Microsoft Excel™ database.

9.1.3 Cordoba Drilling

Cordoba generally performed infill drilling on 50.0 m centres at azimuths ranging from 045° to 245° and dips ranging from -45° to -85°. Most of the holes were drilled at an azimuth of 080° and dip of -50° to -60°. The collar locations were surveyed in WGS 84 UTM Zone 18 N coordinates using differential GPS methods.

A north-seeking gyroscopic tool was used for most downhole surveys. A Reflex EZ-Trac multi-shot magnetic tool was used for four holes. The Cordoba holes have between 24 and 147 downhole survey measurements per hole, depending on hole depth, typically spaced at 3.0 m intervals.

Once the core arrived at the core handling facility, the core boxes were cleaned, fully labelled, photographed, and logged for geotechnical, and geological data. Logs were completed initially on paper and later directly into an on-line acQuire™ database. Sample intervals were marked with a nominal length of 1.0 m, ignoring lithological, or mineralization contacts.

For the 2020 and 2021 campaigns, geotechnical, hydrogeological, and condemnation drilling was also performed in addition to regular diamond drilling. The hole prefix for exploration/definition drilling was ACD, for condemnation was CON, for hydrogeological was HDH and HYD, and for geotechnical was DH and BH (Table 10-2).

Table 9-2: Geotechnical, Hydrogeological, and Condemnation Drilling, 2020 to 2021

Year	Operator	Hole Prefix	Hole Type	Number of Holes	Total Length (m)
2020	Cordoba	CON	Condemnation	8	900.0
		DH	Geotechnical	12	278.2
		HDH	Hydrogeological	17	260.0
2021	Cordoba	CON	Condemnation	1	215.1
		DH	Geotechnical	43	2,195.1
		HDH	Hydrogeological	17	508.1
Total				**98**	**4,356.5**

Source: Nordmin, 2021

9.1.4 Core Recovery

The current Alacran database has core recovery measurements for 93 Cordoba diamond drill holes and two Ashmont holes. Core recovery for Cordoba holes is generally high at 95%, and similar high core recovery was observed for Ashmont drill holes inspected during the QP site visit. Core recovery is summarized in Figure 10-2 and Table 10-2.

Source: Nordmin, 2019

Figure 10-2: Drill hole ACD081, displaying core recovery

Table 9-3 Summary of Alacran Deposit Core Recovery

	Recovery %
Median	100
Average	95
Mode	100
SD	14
2SD	28
Min	0
Max	100
Count	17,150

Source: Nordmin, 2021

9.2 Satellite Deposits

The drilling located within the Montiel East, Montiel West, and Costa Azul deposits consisted of both diamond drill and RC drilling completed by Cordoba between August 2013 and May 2017.

9.2.1 Montiel East

Between 2013 and 2017, Cordoba completed 11,056.7 m of drilling in 78 holes, including 1,681 m in 48 RC holes and 9,376 m in 30 diamond drill holes with dips ranging from -42° to -90 (Table 10-4). Azimuths were highly variable, and most of the dips were at -90°. The collar locations were surveyed in WGS 84 UTM Zone 18 N coordinates using differential GPS methods.

Table 9-4: Montiel East Drill Hole Summary

Year	Operator	Hole Prefix	Number of Holes	Hole Diameter	Total Length (m)
2013	Cordoba	SMDDH	4	HQ	575.4
2014	Cordoba	SMDDH	10	HQ	2,971.8
		MERAB	48	RC	1,681.0
2016	Cordoba	SMDDH	15	HQ/NQ	5,243.0
2017	Cordoba	SMDDH	1	PQ/HQ/NQ	585.5
	Total		78		11,056.7

Source: Cordoba, 2019

9.2.2 Montiel West

Between 2013 and 2017, Cordoba completed 4,055.9 m in 93 holes including 2,032 m in 85 RC holes and 2,024 m in eight diamond drill holes with dips ranging from -40° to -90 (Table 10-5). Most of the azimuths were at 000° and 180°, and many of the dips were at -50° and -90°. The collar locations were surveyed in WGS 84 UTM Zone 18 N coordinates using differential GPS methods.

Table 9-5: Montiel West Drill Hole Summary

Year	Operator	Hole Prefix	Number of Holes	Hole Diameter	Total Length (m)
2014	Cordoba	MWDDH	6	HQ	1,706.4
		MWRAB	86	RC	2,032.0
2017	Cordoba	MWDDH	1	HQ	317.5
	Total		93		4,055.9

Source: Nordmin, 2019

9.2.3 Costa Azul

Between 2014 and 2017, Cordoba completed a total of 4,995.9 m of drilling in 118 holes, including 3,305 m of RC drilling in 112 holes and 1,691 m of diamond drilling in six holes with dips ranging from -45° to
-90 (Table 10-6). Most of the azimuths were at 000°, 180°, and 270°, with many dips at -50°. The collar locations were surveyed in WGS 84 UTM Zone 18 N coordinates using differential GPS methods.

Table 9-6: Costa Azul Drill Hole Summary

Year	Operator	Hole Prefix	Number of Holes	Hole Diameter	Total Length (m)
2014	Cordoba	CARAB, CADDH	116	RC	4,186.7
2017	Cordoba	CADDH	2	HQ/NQ	809.2
	Total		118		4,995.9

Source: Cordoba, 2019

9.3 Core Logging

The Cordoba geological logging included recording lithology, alteration, mineralization, oxidation, structure, and magnetic susceptibility. In 2017, most of the Ashmont holes were relogged by Cordoba geologists to align with Cordoba logging methodology and terminology. The current Alacran database has 35 unique lithology types in eight lithological units. The alteration database has eighteen unique alteration codes. Chlorite, biotite, albite, silica, and sericite are the most common logged alteration types. There are eighteen unique minerals recorded in the current database, pyrite, and chalcopyrite being the most common.

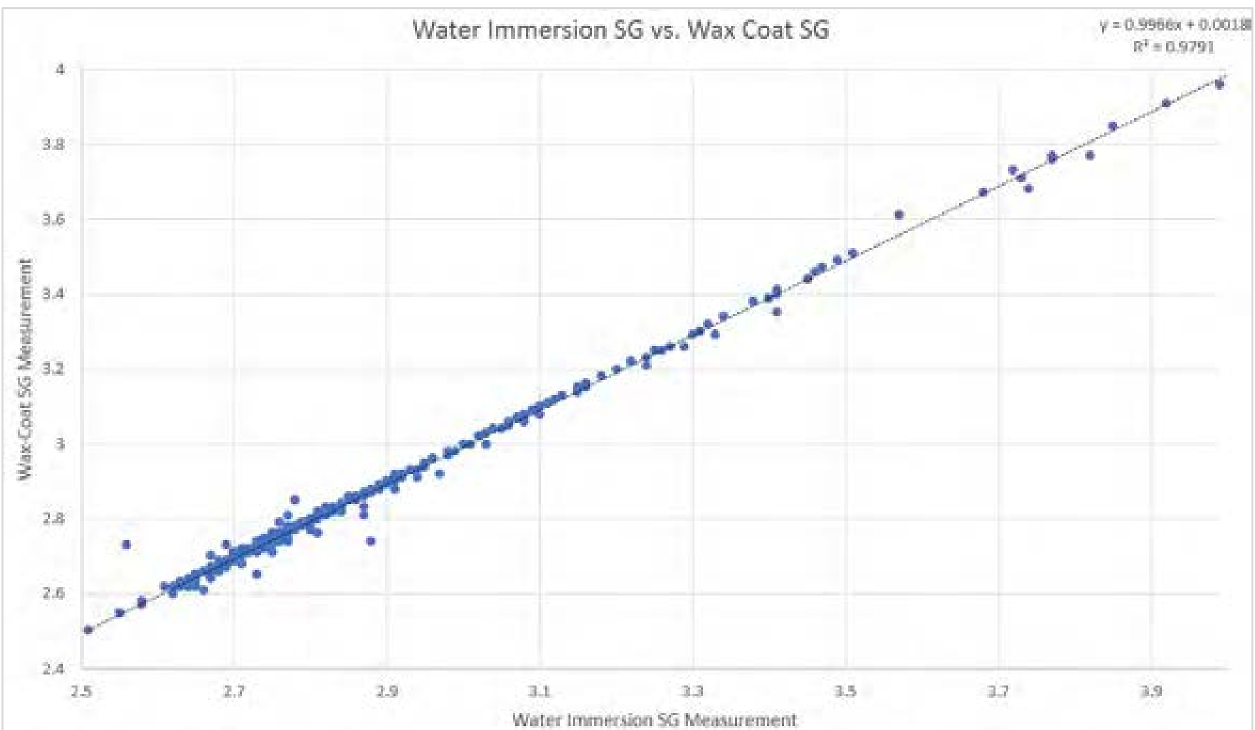
9.4 Specific Gravity

Cordoba has collected 13,424 water immersion SG measurements from 95 drill holes within the Alacran and satellite deposits including 87 Ashmont (ASA prefix) and Cordoba (ACD prefix) drill holes. In addition, Cordoba analyzed 497 SG check samples by wax coat water immersion methods and 229 SG check samples by pycnometer method. The water immersion measurements were made by Cordoba personnel at the site. The wax coat water immersion and pycnometer measurements were made at commercial laboratories. The measurements were made using 10.0 cm to 15.0 cm lengths of half-diameter NQ and HQ sized core.

The measurements were taken from NQ, and HQ sized using the weight in air versus the weight in water method (Archimedes), by applying the following formula:

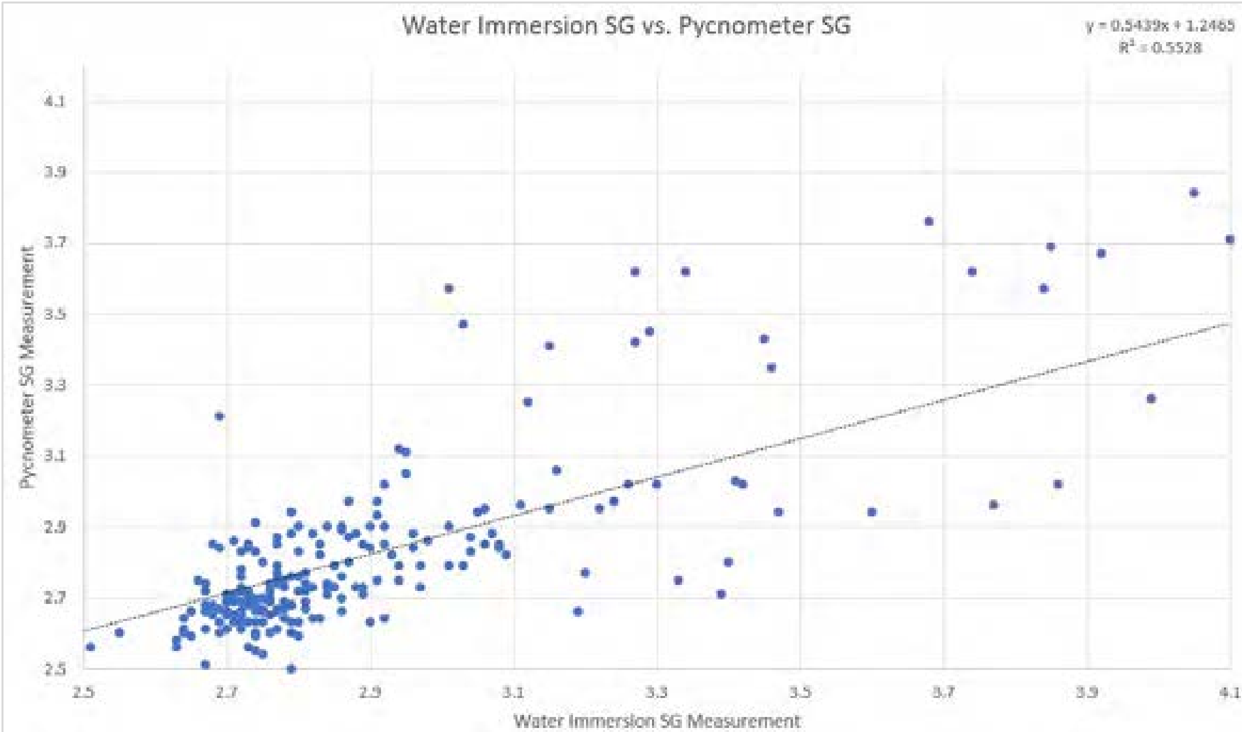
$$\text{Specific Gravity} = \frac{\text{Weight in Air}}{(\text{Weight in Air} - \text{Weight in Water})}$$

The wax coat water immersion measurements average 0.32% higher than the water immersion measurements, while the pycnometer measurements average 3.39% below the water immersion measurements. A large scatter is evident between water immersion and pycnometer measurements. Overall minimal bias is thus demonstrated in the uncoated water immersion measurements. This, in addition to a large number of water immersion SG measurements, leads to a high degree of confidence in the SG measurements. The accuracy analyses of the wax coat versus water immersion and pycnometer versus water immersion SG methods can be found in Figure 10-3 and Figure 10-4.



Source: Nordmin, 2021

Figure 10-3: Wax Coat SG measurement accuracy analysis



Source: Nordmin, 2021

Figure 10-4: Pycnometer SG measurement accuracy analysis

9.4.1 Alacran SG Data

In 2012 and between December 2015 and July 2021, there were 18,449 total SG measurements taken from 87 Ashmont and Cordoba drilled holes, including 17,406 water immersion, 807 wax coat, and 236 pycnometer (Table 10-7).

Nordmin determined that lithology was the appropriate indicator of SG, and nine lithology sets were developed from drill logging, each with a weighted average SG assigned.

For block modelling purposes, a set of nine lithological groups was created, each with a set weighted average SG, found in Table 10-7. Further information regarding block modelling SG can be found in Section 14.5.4.

Table 9-7: Alacran Lithological SG Groups

Unit	SG	Lithologies
All units not otherwise listed below	2.806	All not listed below
Unit 1	2.750	Dio, RBx, TufR
INT	2.720	Intrusive
TUFA	2.757	Tuff A
Unit 3	2.800	TufA, TufM, TufP, TufL, TufF
TUFD	2.803	Tuff D

Unit	SG	Lithologies
Unit 2, 2 A	2.830	TufL, TufD, MudSil, Sill_1/2, VBx, TufL, TufF
LIM	2.910	Limestone
High Grade ("HG") Vertical Mineralization	2.926	All blocks within the HG vertical mineralization wireframes

Source: Nordmin, 2021. Refer to Table 7-1 for lithological code descriptions

9.4.2 Costa Azul SG Data

In the drilling database for Costa Azul, a total of 394 water immersion SG samples exist from three drill holes (Table 10-8).

Table 9-8: Costa Azul Weighted Average

Unit	SG
Weighted Average of all rock types	2.788

Source: Nordmin, 2019

9.4.3 Montiel East SG Data

In the drilling database for Montiel East, a total of 812 water immersion SG samples exist from four drill holes Table 10-9.

Table 9-9: Montiel East Weighted Average

Unit	SG
Quartz Feldspar Porphyry	2.746
Weighted Average of all other rock types	2.782

Source: Nordmin, 2019

9.4.4 Montiel West SG Data

In the drilling database for Montiel West, a total of 154 water immersion SG samples exist from one drill hole, as well as five wax coat water immersion and five pycnometer SG measurements (Table 10-10).

Table 9-10: Montiel West Weighted Average

Unit	SG
Andesite Porphyry	2.883
Weighted Average of all other rock types	2.732

Source: Nordmin, 2019

9.5 Comments on Section 10

In the opinion of the QP, the quantity, and quality of the lithological, collar, downhole survey, and SG data collected in the exploration programs are sufficient to support the Mineral Resource Estimate.

- Core and RC logging completed by Cordoba and previous operators meet industry standards for exploration on replacement and porphyry deposits;

- Collar surveys and downhole surveys were performed using industry standard instrumentation;
- Recovery data from core drilling programs was of good quantity and acceptable;
- Drill hole orientations are appropriate for the mineralized style. Drill trace orientations are shown in example cross sections in Section 14.6; and
- Drill hole intercepts demonstrate that sampling is representative for the various mineralized low and HG domains.
- No other factors were identified with the data collected from the drill programs that could significantly affect the Mineral Resource Estimate.

10 EXPLORATION

Cordoba has historically had three exploration objectives:

1. Discovery of additional porphyry deposits in addition to those seen at Montiel and Costa Azul.
2. Discovery of additional replacement style deposits in the receptive stratigraphy that hosts the Alacran deposit.
3. Discovery of additional high grade CBM veins similar to those seen at Alacran.

The potential of each of these is discussed in Section 9.5.

To support these objectives. the Company conducted several exploration programs between 2012 and 2019, consisting of geological mapping, geochemical sampling, geophysical surveys, and drilling.

10.1 Topography

Cordoba acquired high resolution ALOS PALSAR satellite radar imagery for the Project area and carried out a LIDAR survey of the Alacran deposit area to generate a high resolution digital elevation model and topographic contour map.

10.2 Geological Mapping

Geological mapping in the Project area has been undertaken on all of the deposits that are the subject of the Mineral Resource Estimate (i.e., Alacran, Montiel East, Montiel West, and Costa Azul) and the prospects (i.e., Willian and Alacran Norte) at a scale of 1: 2,000. Geological interpretation of the mapped outcrops was supported by soil geochemistry, ground, and airborne magnetic survey information and diamond drill core.

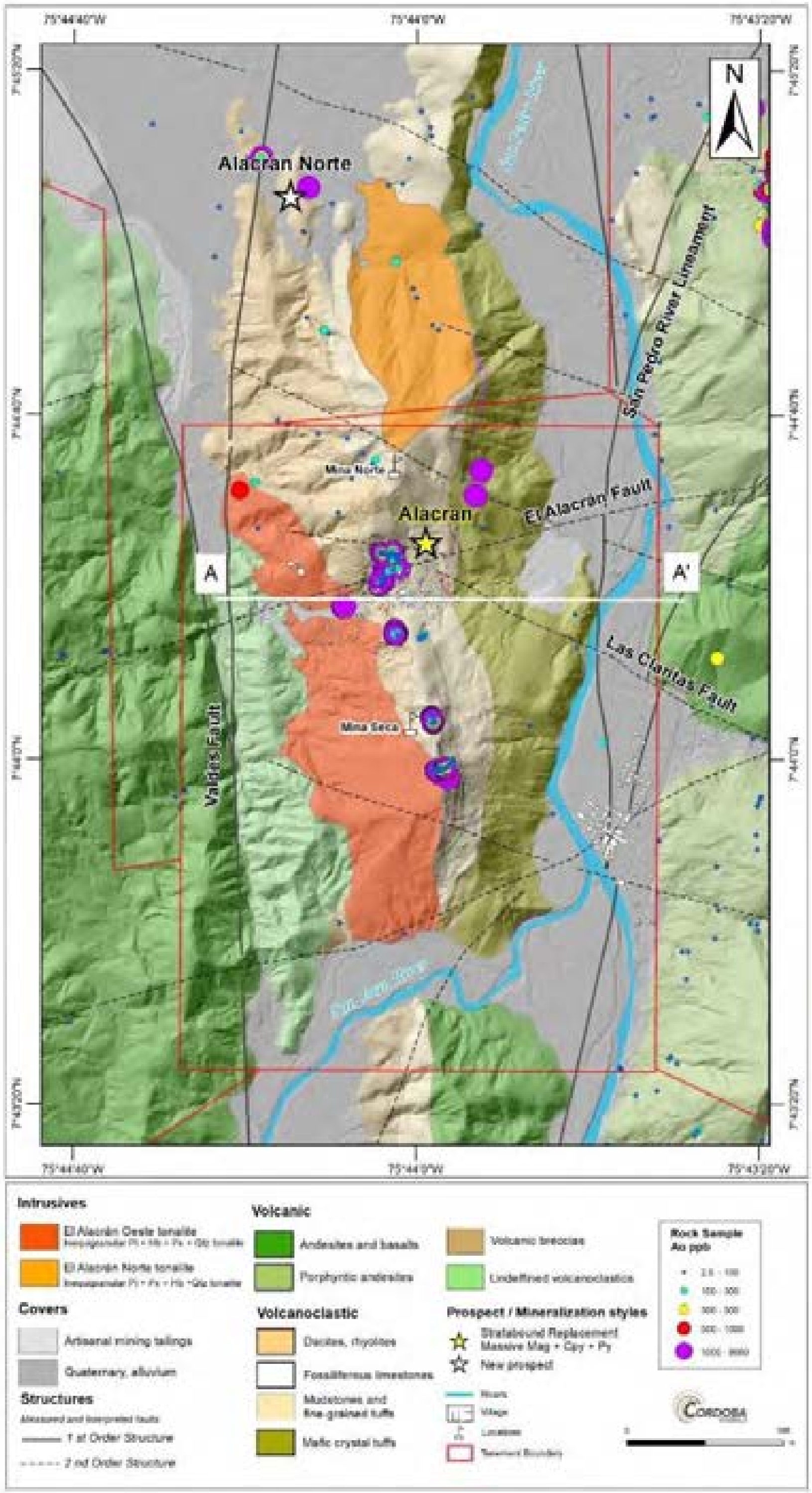
10.3 Geochemical Sampling

10.3.1 Rock Geochemistry

Several rock samplings campaigns have been carried out by Cordoba over many regions within the Project area, focusing on sampling subcrop, outcrop and channel sampling in areas such as artisanal mines and workings, in order to characterize the chemistry of known mineralization and alteration. Once profiles for known mineralization and alteration were established, the information could then be used to link anomalous areas identified by soil samples to possible sources within the Project area. A total of 4,661 trench samples and 9,627 rock samples on outcrops and tunnels have been collected and assayed by Cordoba.

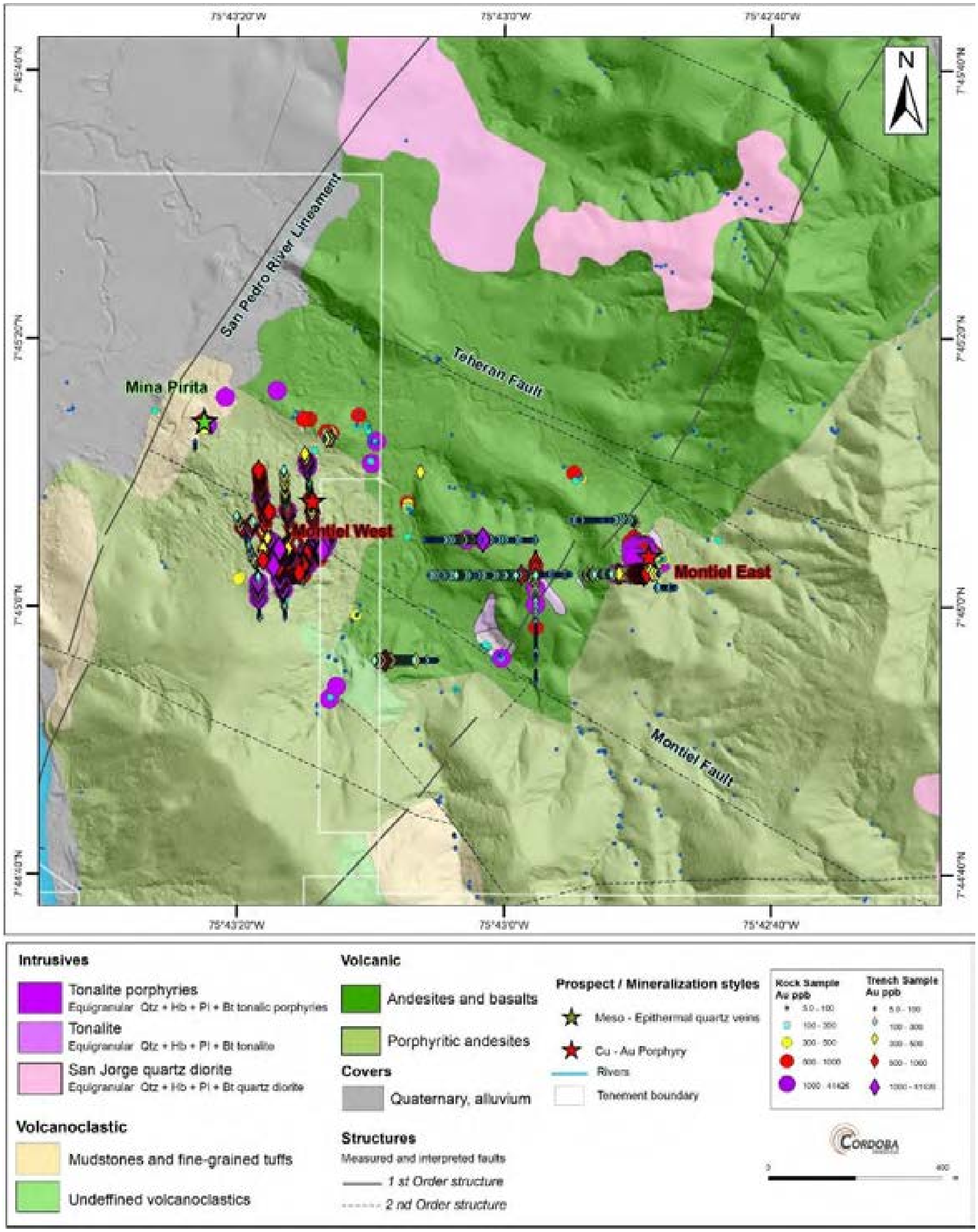
As part of Cordoba's QA/QC protocol for rock sampling, samples collected were put into plastic bags, labelled, sealed, and stored securely on site at Alacran prior to shipment to a laboratory. Upon arrival at the laboratory, samples were prepared by weighing, oven drying and then crushing to 70% to less than 2 mm and sieved to 75 µm. Certified Reference Materials ("CRM") from ORE Analytical Solutions Ltd. were inserted at regular intervals in the analytical routine. Standards (Minerals 501-501b, Oreas 502-502b, 503b) and blanks (Oreas 22c, 23 a, 25c and raw samples of the company) were also inserted in the routine. Samples were analyzed at one of three laboratories over the years: ACME in Medellín, SGS Colombia S.A. ("SGS") and ALS Global ("ALS").

Multiple element analysis was performed primarily by Inductively Coupled Plasma-Mass Spectrometry ("ICP-MS"); Samples were analyzed for the complete package of elements that includes Au-AA24 (fire assay), ME-MS41 (Aqua Regia with ICP-MS Finish), ME-MS61 (four-acid digestion with ICP-MS Finish), ICP-MS on limits (as needed). Depending on how high element values are in the sample, specific analyses are requested for minerals such as Au-OG62 (total Au) and Cu-OG62 (total Cu). Figure 9-1, Figure 9-2 and Figure 9-3 illustrate Au results in the four main deposits.



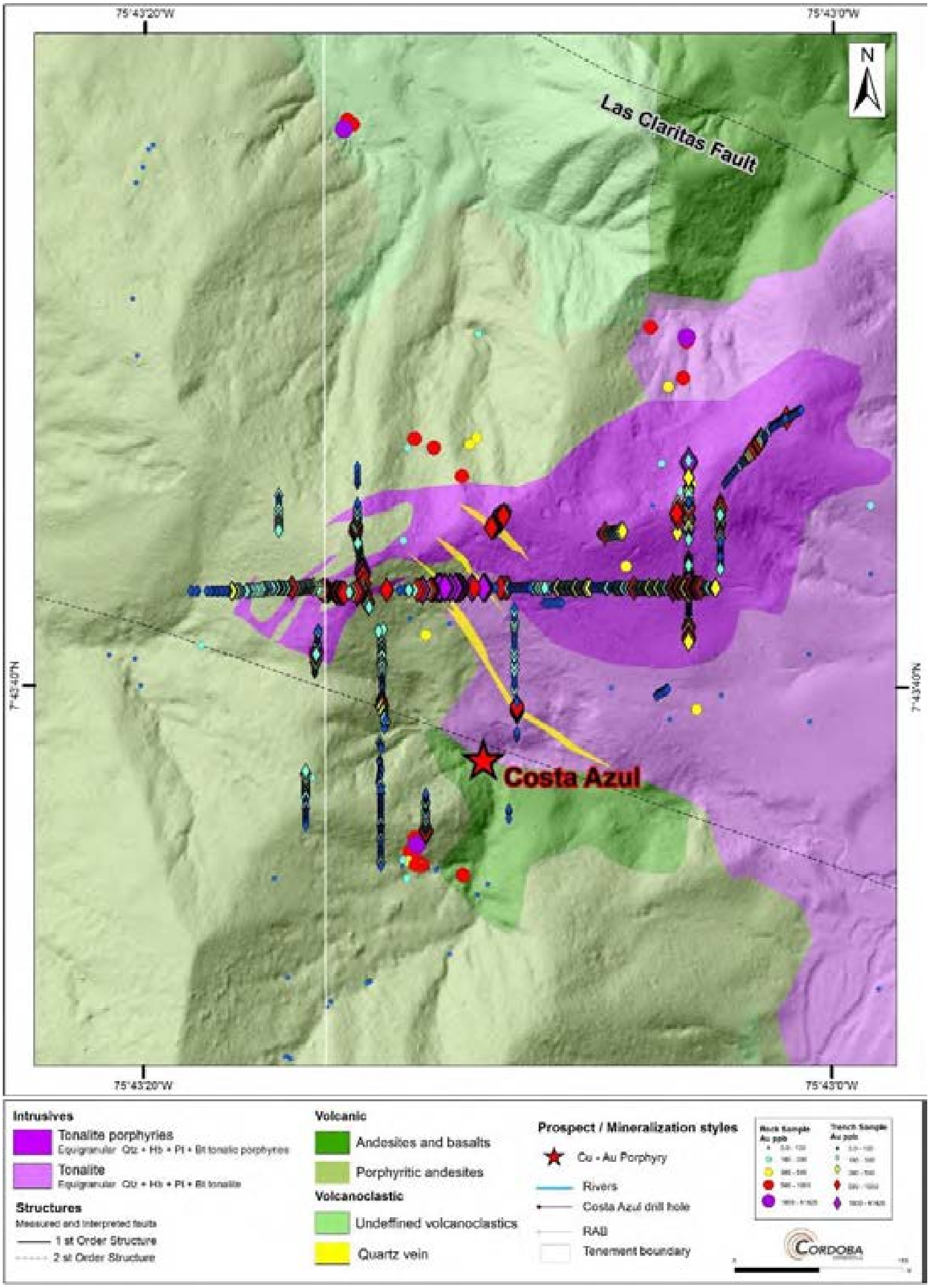
Source: Cordoba, 2019

Figure 9-1: Au results in surface rock samples at Alacran, with surface geology



Source: Cordoba, 2019

Figure 9-2: Au results in surface rock samples at Montiel West and Montiel East, with surface geology



Source: Cordoba, 2019

Figure 9-3: Au results in surface rock samples at Costa Azul, with surface geology

10.3.2 Soil Geochemistry

Cordoba carried out a number of stream and soil sampling programs between 2013 and 2019 over many areas of the Project, covering approximately 60 km^2 along a 14 km long N-S trend and up to 6 km in width in an E-W direction. Sampling density varied from reconnaissance-level spacing of 500 m x 100 m to follow-up detailed sampling with 25 m x 25 m spacing. Follow-up sampling programs sampled a range of materials including the “B” horizon (1.0 m to 1.5 m depth below the surface), the soil “C” horizon and near surface saprolite.

At Alacran, the majority of sampling was completed on 100 m x 50 m centres with lines oriented N-S and E-W. At the Montiel East, Montiel West, and Costa Azul deposits, samples were collected every 50 m in E-W lines, with a later infill survey performed along the mountain ridges at 2.05 m spacing. Samples were taken of the soil “B” horizon with an auger at an average depth of 1.0 m to 1.5 m. A total of 7,425 stream and soil samples have been collected throughout the Project area to date. The most recent sampling campaign was in the Willian area in March 2019.

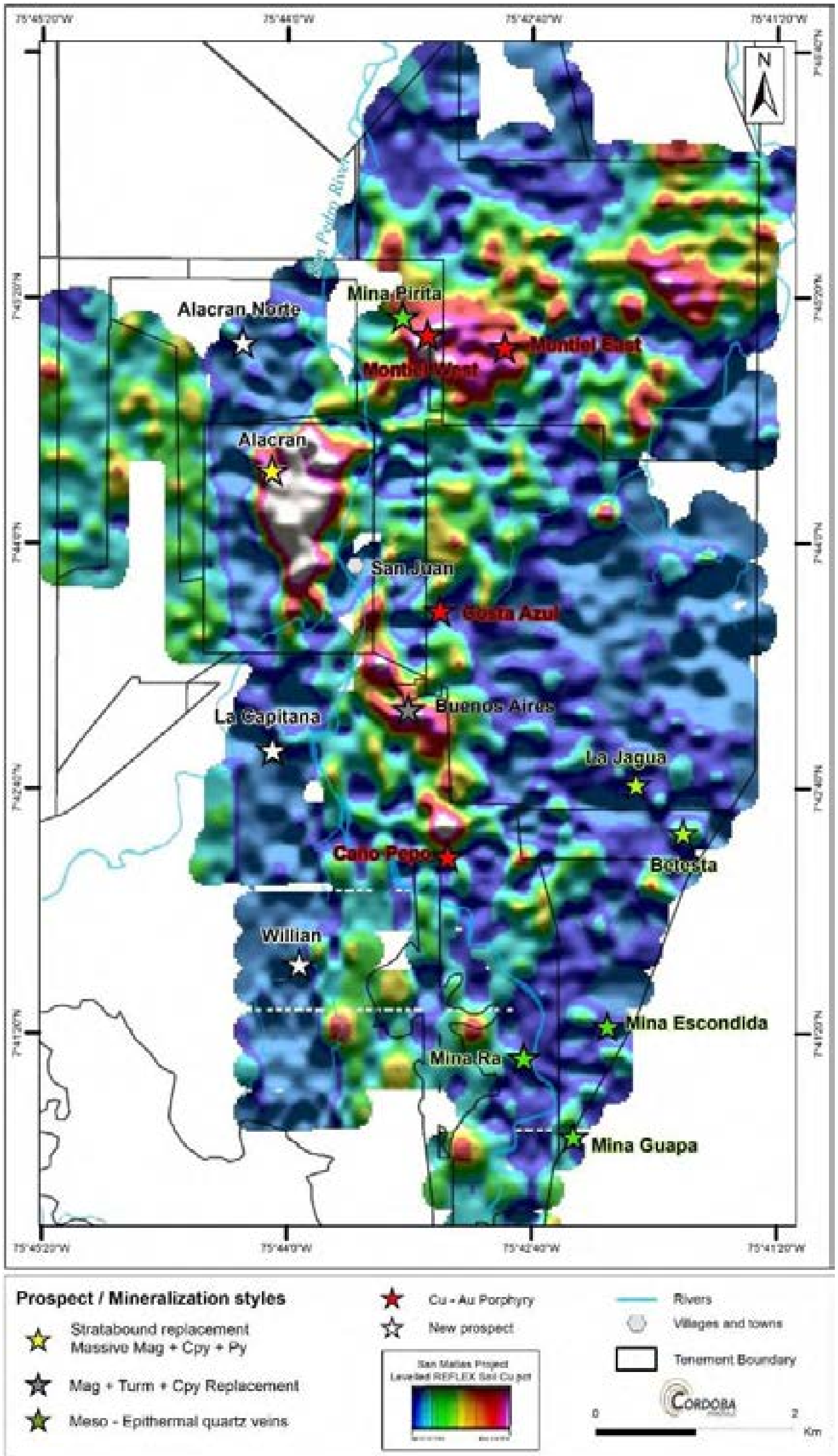
Soil samples were collected in plastic bags, labelled and sealed (samples were not sieved). CRMs (Ores 501 – 501b, Oreas 502 – 502b and 503b) from ORE Analytical Solutions Ltd., blank (Oreas 22c, 23a and 25c) and Company-provided blanks (quartz, feldspar, hornblende and chlorite) were inserted at regular intervals in the analytical routine, following Cordoba’s QA/QC protocol. Samples were stored in a secured area at the site before being shipped to one of three laboratories: ACME Medellín, SGS Colombia S.A., or ALS Global. Upon receipt at the laboratory, samples are catalogued, weighed, oven-dried at < 60°C/140°F, and subsequently crushed and sieved to less than 180 µm (-80 mesh).

For chemical analysis, the complete package of elements is analyzed including method Au-AA24 (atomic absorption spectrometry with fire assay), ME-MS41 (Aqua Regia with ICP-MS Finish), ME-MS61 (Four-Acid Digestion with ICP-MS Finish), and ICP-MS over limits (as required). If samples were highly anomalous for Au or Cu, then they were analyzed by Au-OG62 (total Au using ore grade elements and four-acid digestion) and Cu-OG62 (total Cu) methods. Unfortunately, both aqua regia, and four-acid were used for digestion, resulting in “unleveled” data due to partial or total digestion of the various elements.

In 2016, the Company had Reflex North America Ltd., of Vancouver, British Columbia, Canada, undertake a detailed analysis of the soil geochemical data. Soil data was levelled in order to remove the bias resulting from the aqua regia versus four-acid digestion and element plots of the levelled data were created in order to characterize the chemistry of known mineralized areas and to identify new anomalous areas. Ratios for immobile elements were also analyzed in order to show the effect of lithology on Cu, Mo, and Zn, and alteration trends. Results show highly anomalous areas around the Project for Cu (Figure 9-4) and Au (Figure 9-5) including for the four resource deposits in Cu (Figure 9-6) and Au (Figure 9-7).

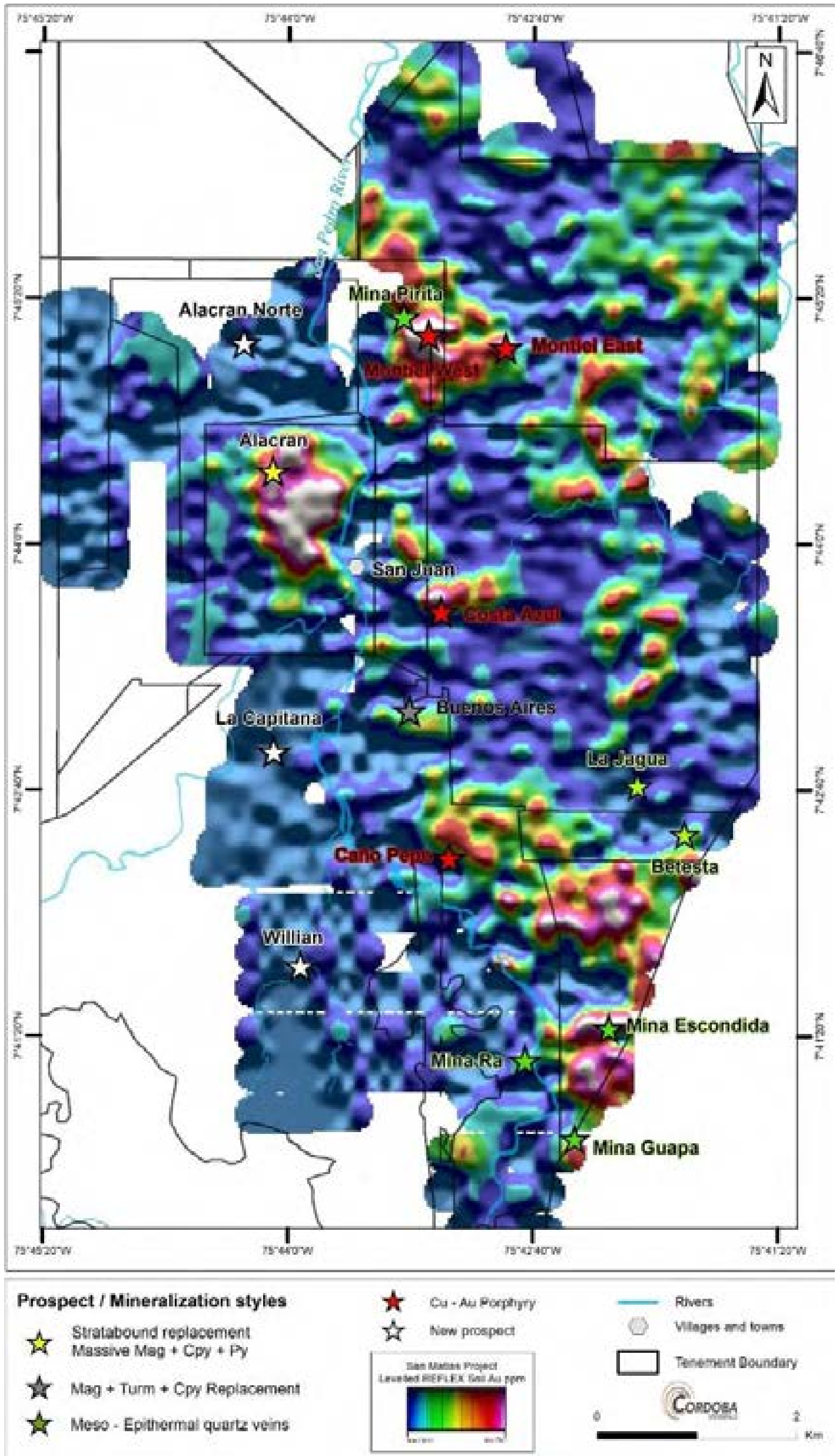
Surface geological mapping, combined with soil, and rock geochemical results, characterize known mineralization at the four resource deposits.

Both the Alacran and the Montiel deposits show consistent, broad highly anomalous soil geochemistry for Cu and Au, while Costal Azul is characterized by a small highly anomalous Au, and broad weak Cu anomaly. Work in 2018 and 2019 showed anomalous areas and favourable lithology for mineralization for at least 2 km north and 7 km south of the Alacran deposit. Soil geochemical results also highlighted a 1,300 m by 800 metre, N-S elongated Cu soil anomaly and Au anomaly on the eastern side of the Alacran deposit at a depth of 1.0 m to 1.5 m below surface.



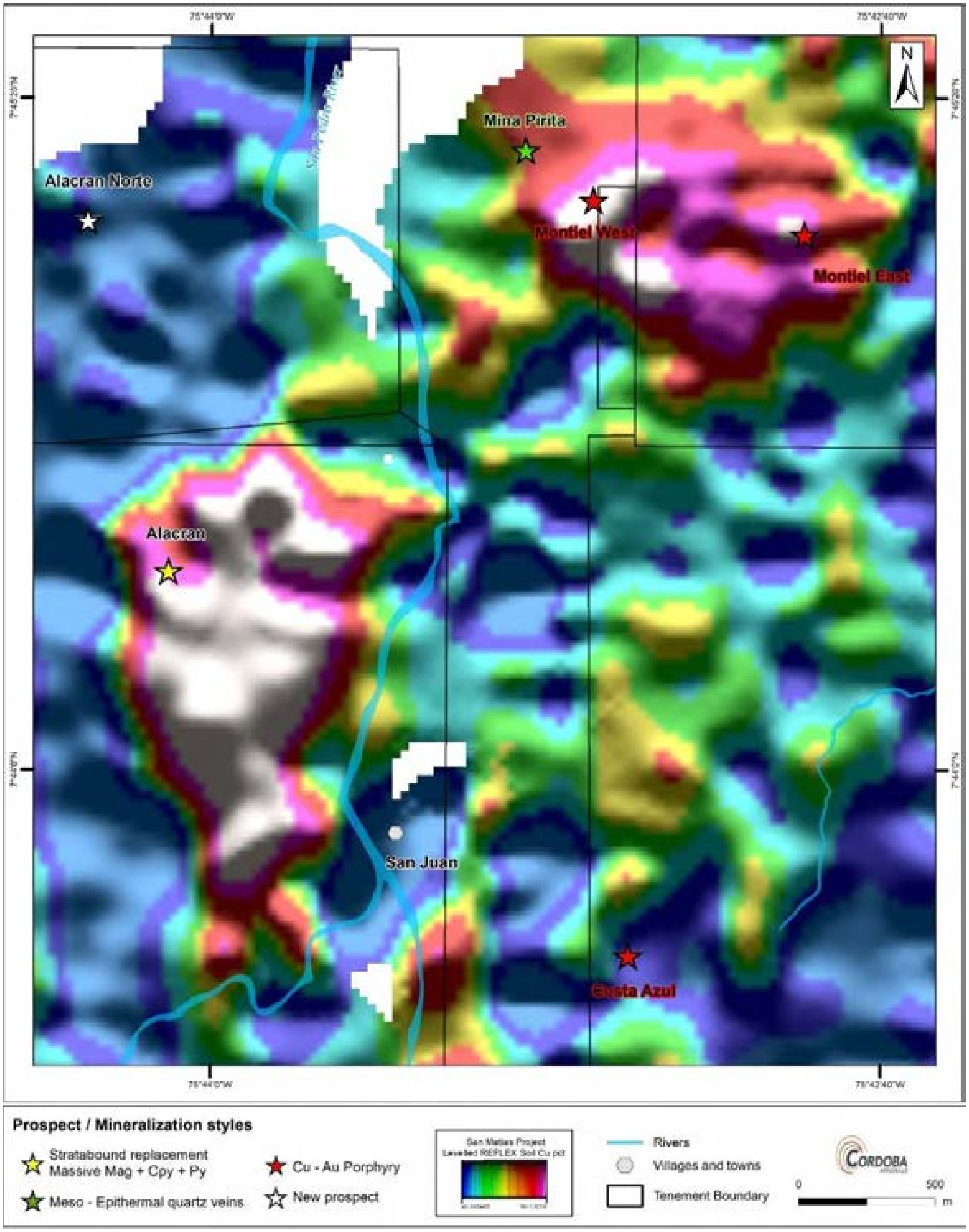
Source: Cordoba, 2019

Figure 9-4: San Matías Copper-Gold-Silver Project Cu in soils.



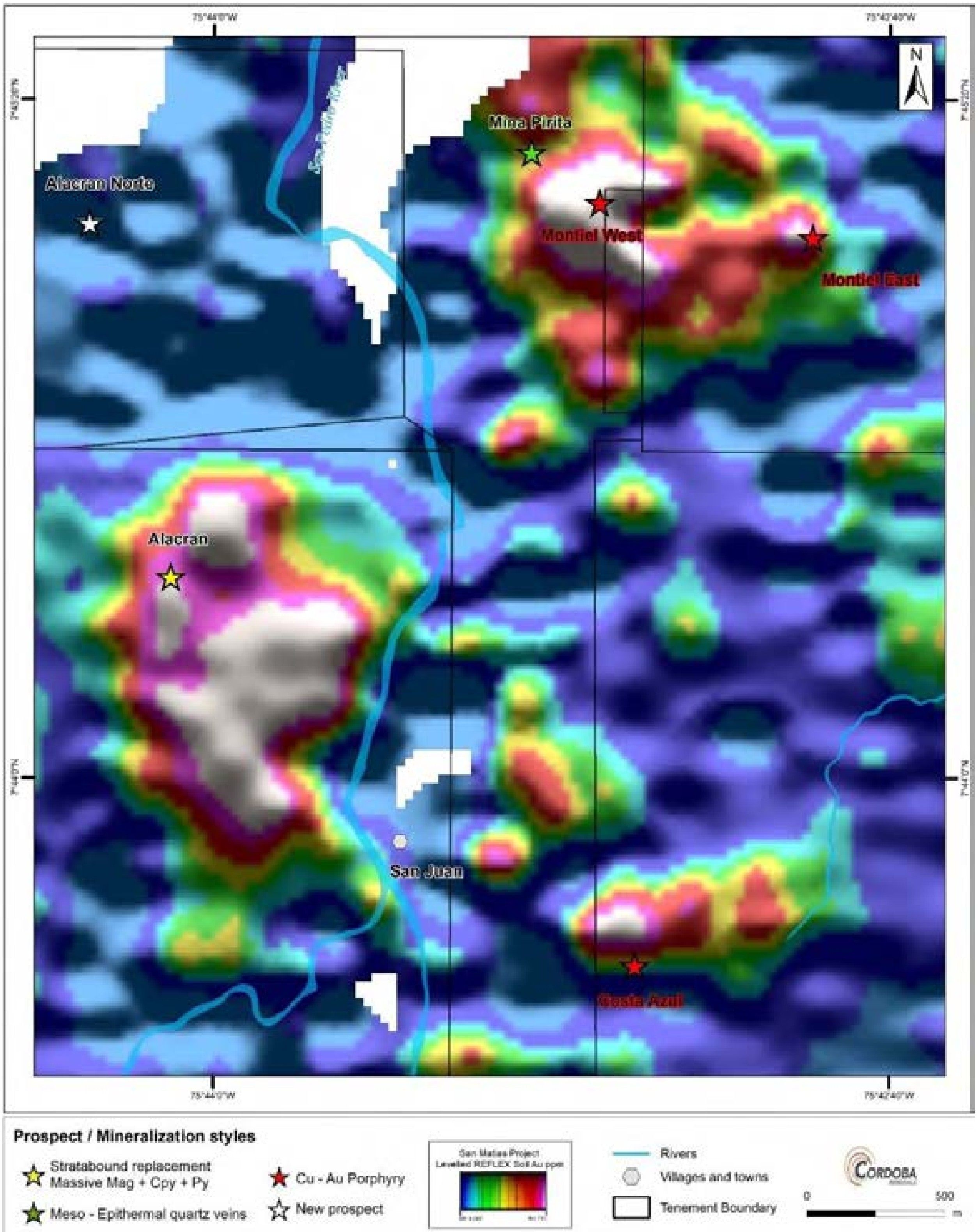
Source: Cordoba, 2019

Figure 9-5: San Matías Copper-Gold-Silver Project Au in soils



Source: Cordoba, 2019

Figure 9-6: Cu in soils at the Alacran, Montiel East, Montiel West, and Costa Azul deposits



Source: Cordoba, 2019

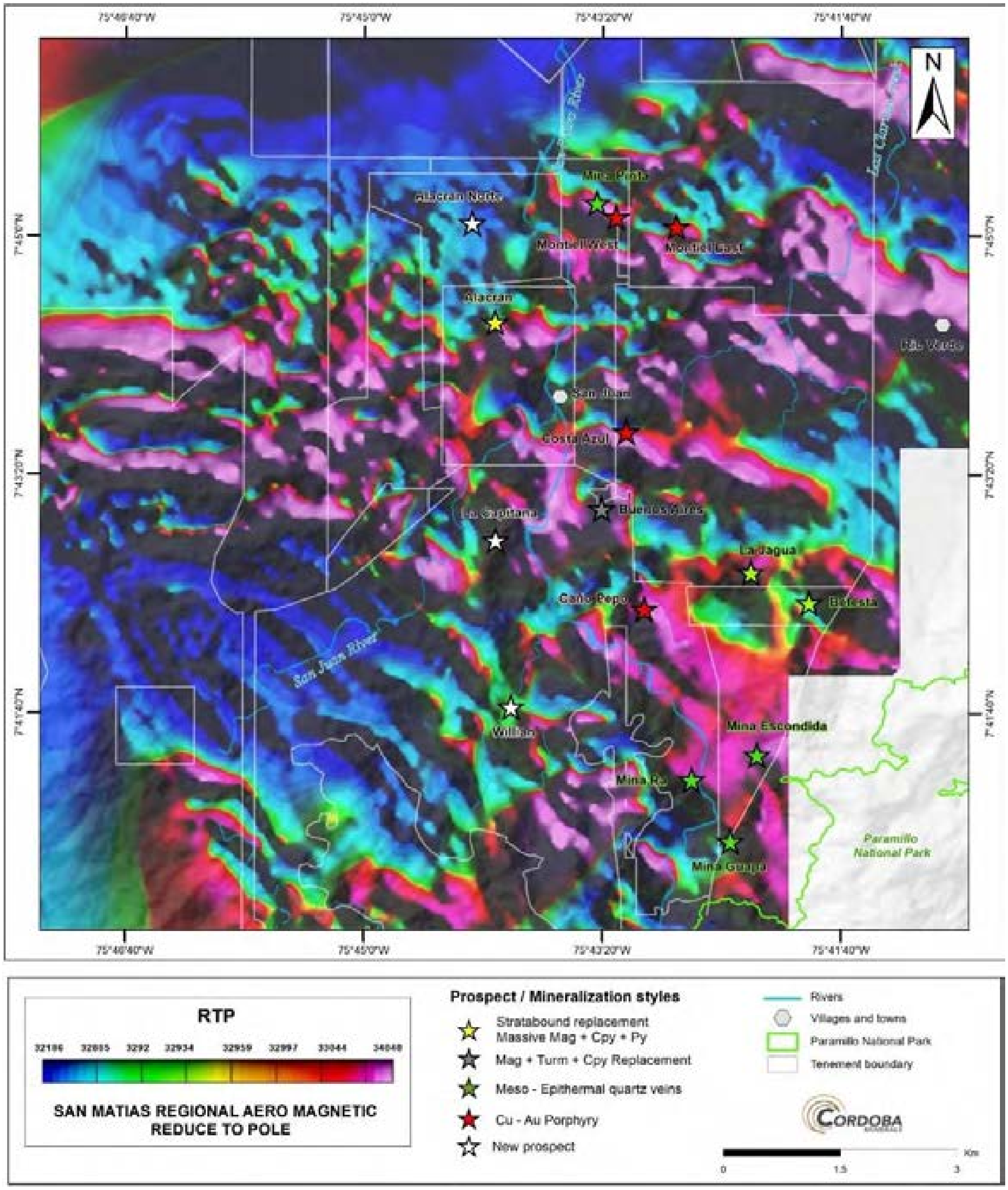
Figure 9-7: Au in soils at the Alacran, Montiel East, Montiel West, and Costa Azul deposits

10.4 Geophysics

10.4.1 Helicopter Magnetic and Radiometric Surveys

Helicopter-borne magnetic and radiometric surveys were carried out over the Project area in 2011 and 2012. Both surveys were performed by MPX Geophysics Ltd., Canada ("MPX") and are described in internal reports (MPX 2011 and 2012). The 2011 survey was 1,310 line km survey over 216 km^2 with a terrain clearance of 70 m. Flight lines were oriented E-W at 200 m spaced intervals with N-S tie lines every 2,000 m. The 2012 survey was 4,408.6 line km survey over an area of 785 km^2 with a terrain clearance of 30 m. Flight lines were oriented E-W and spaced 200 m apart, with N-S tie lines every 2,000 m.

Along the Montiel East, Montiel West, and East Alacran deposit areas, the magnetic data was acquired on 100 m spaced lines with tie lines spaced at 1,000 m. Figure 9-8 illustrates the reduced to pole ("RTP") merged data for the complete survey area. The regional survey shows regional magnetic domains and larger crustal structures.



Source: Cordoba, 2019. Map datum is WGS84.

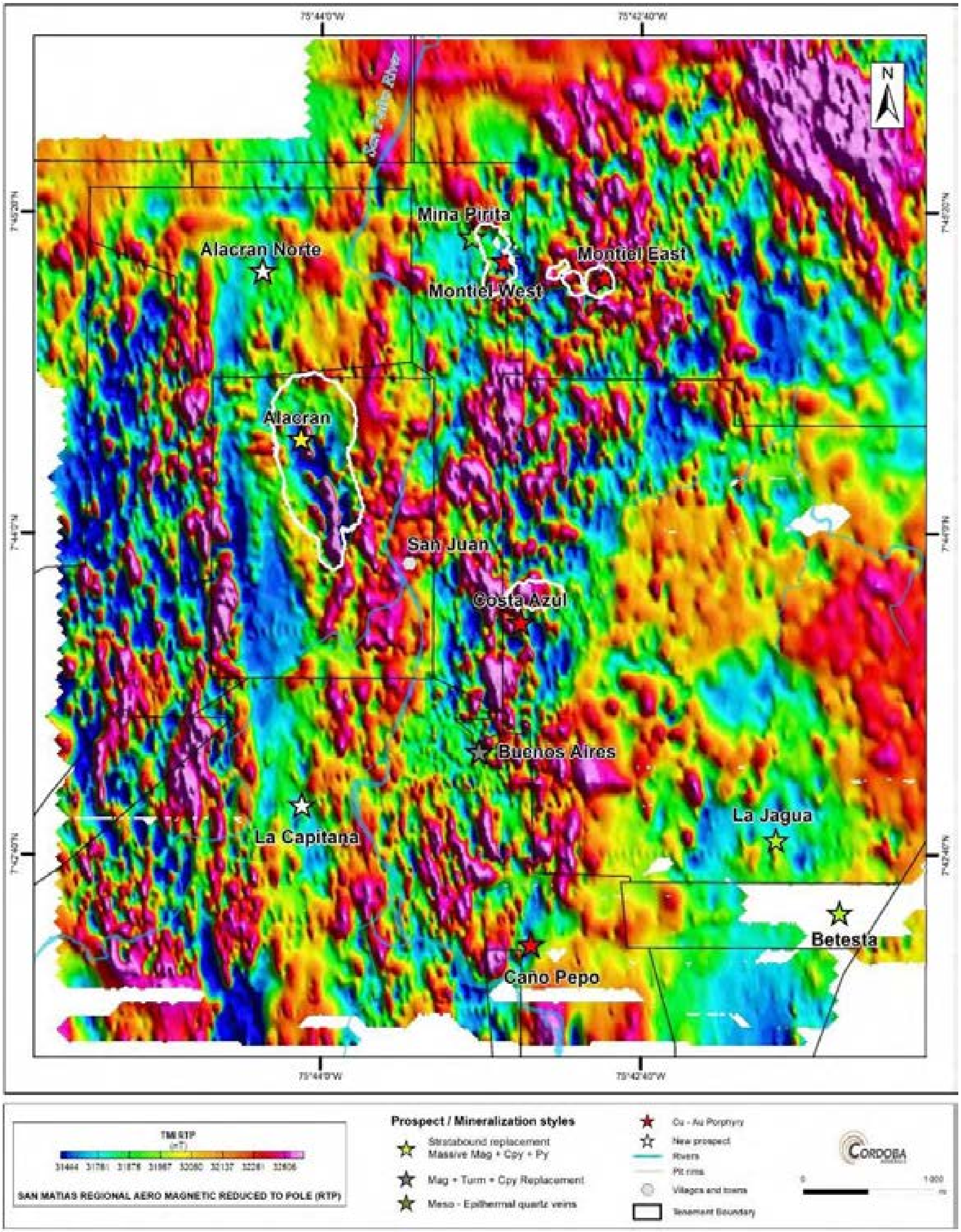
Figure 9-8: San Matías RTP aeromagnetic data for the San Matías Copper-Gold-Silver Project district

10.4.2 Ground Magnetic Surveys

Ground magnetic surveys were carried out over the Project area in 2011 and 2016. The 2011 survey was performed by Mibex S.A.S. Colombia and was carried out on 100.0 m E-W lines with readings taken on 10.0 m intervals.

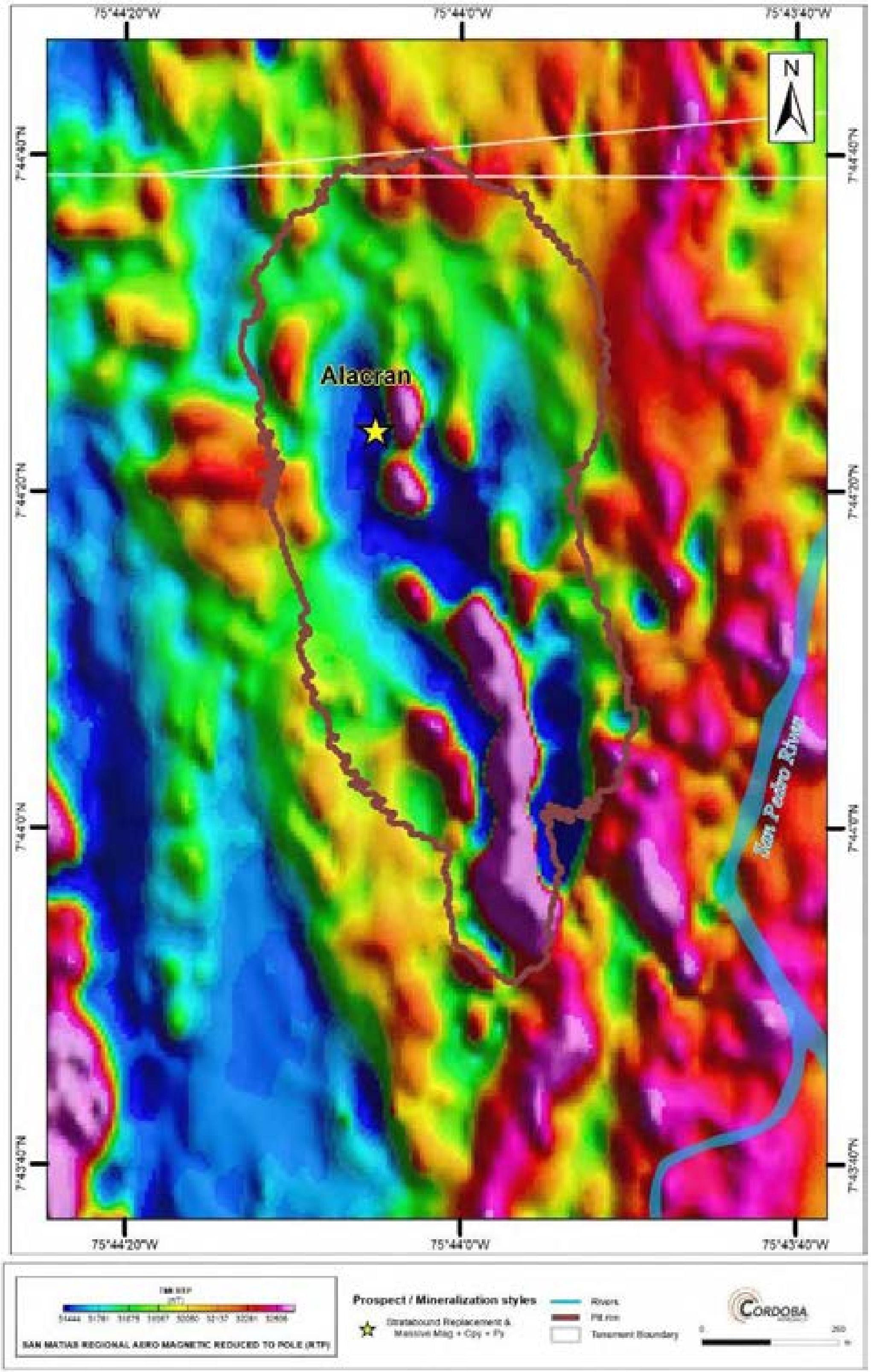
The 2016 survey was carried out by Cordoba field personnel. This survey was completed on 47 E-W lines of 1,680.0 m length spaced at 50.0 m, with readings every five seconds. Completed merged data for the two surveys is shown as RTP data for the entire Project (Figure 9-9), the Alacran deposit (Figure 9-10), the Montiel East and Montiel West deposits (Figure 9-11) and the Costa Azul deposit (Figure 9-12).

In the ground magnetic data, the Alacran body is shown as a strong remanently magnetized anomaly, and its signature is distinctive within the area covered by the survey. The ground magnetic data has assisted in further defining prominent structural features identified in the aeromagnetic survey data. The Satellite deposits Costa Azul, Montiel East, and Montiel West do not have a significant magnetic signature; however, they are associated with broader zones of elevated magnetic response.



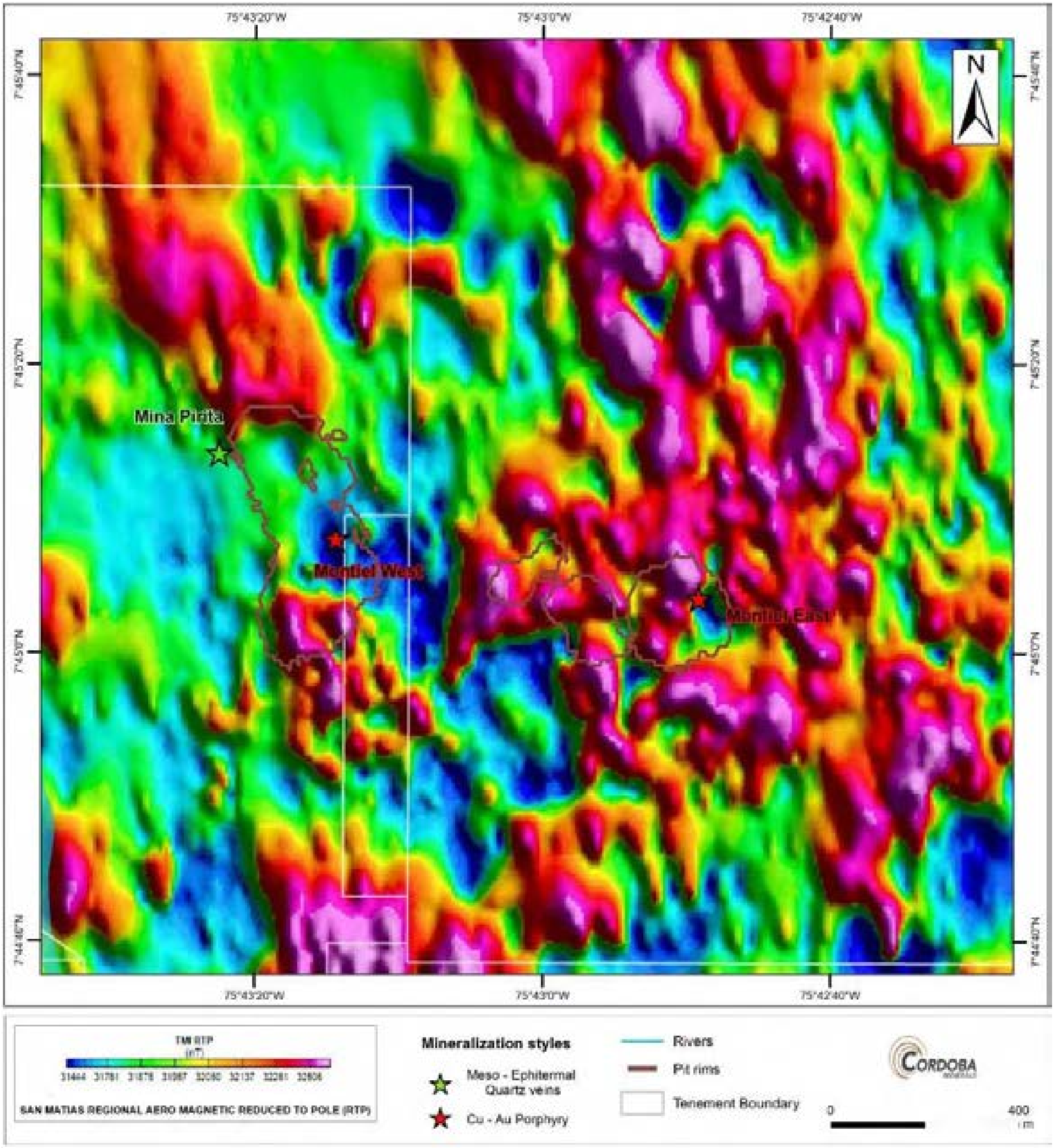
Source: Cordoba, 2019

Figure 9-9: San Matías Copper-Gold-Silver Project total magnetic intensity-RTP ground magnetic data



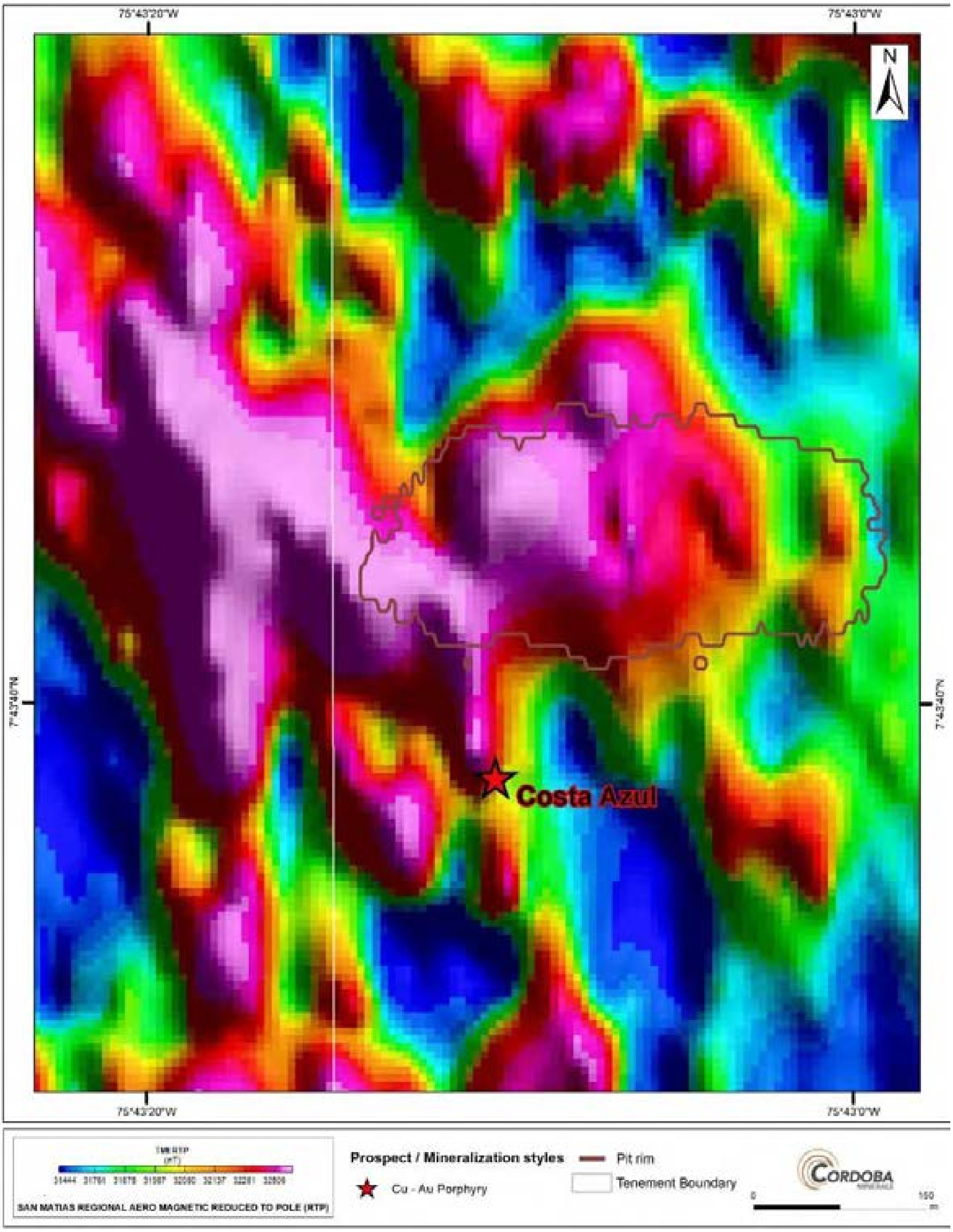
Source: Cordoba, 2019

Figure 9-10: Alacran deposit total magnetic intensity-RTP ground magnetic data ground magnetic survey data.



Source: Cordoba, 2019

Figure 9-11: Montiel West and Montiel East total magnetic intensity-RTP ground magnetic data



Source: Nordmin, 2019

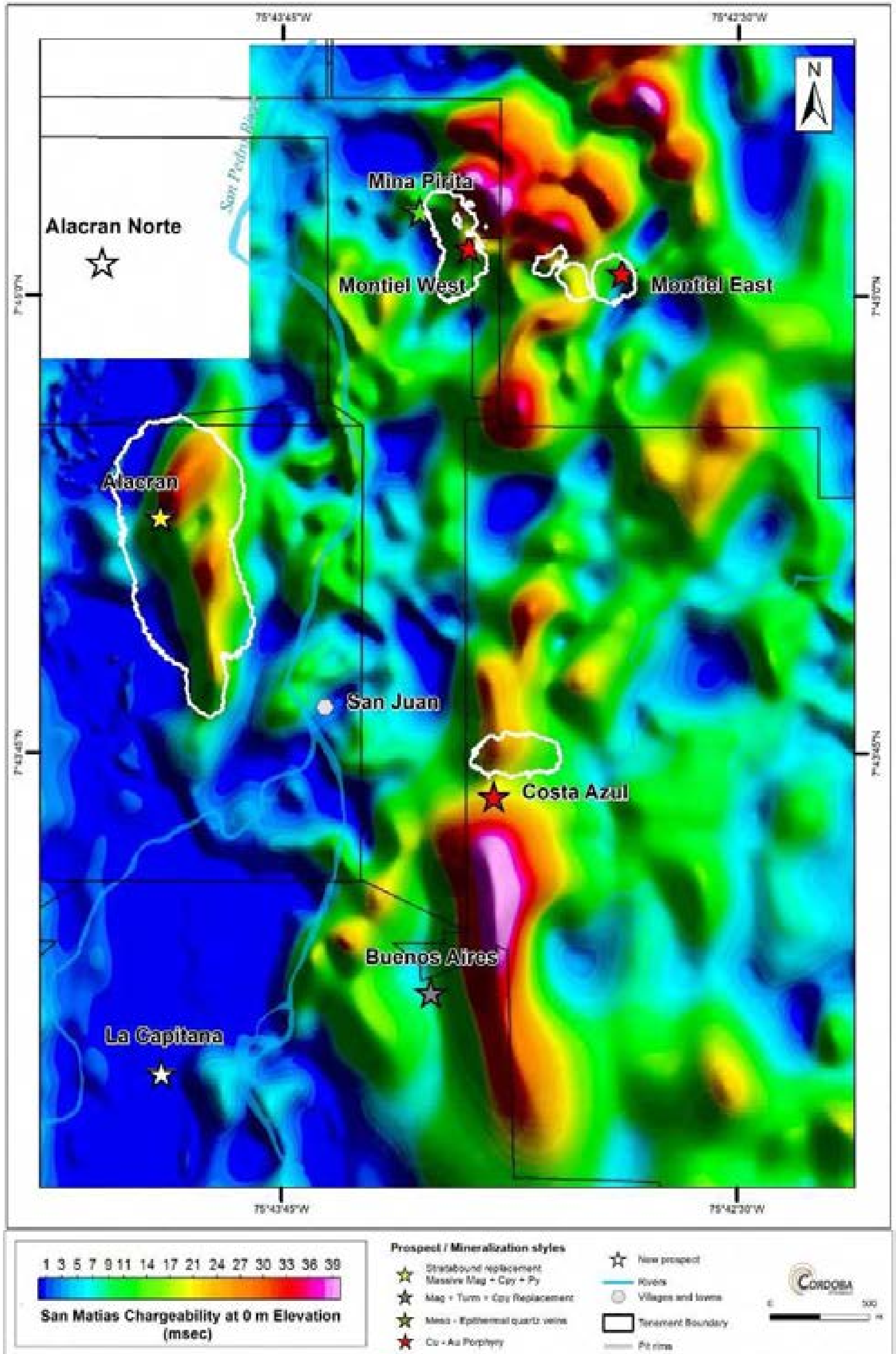
Figure 9-12: Costa Azul total magnetic intensity-RTP ground magnetic data

10.4.3 Typhoon Induced Polarization and Electromagnetic Survey

Two phases of induced polarization ("IP") and a trial time domain electromagnetic ("TDEM") survey were carried out over the Project in 2016 using the Typhoon™ system, owned and operated by Cordoba's major-shareholder Ivanhoe Electric Inc. ("IVNE"). Phase 1 of the survey covered an area of approximately 7.5 km^2 (370.4-line km), and Phase 2 covered an area of 16.4 km^2 (923.0-line km). A perpendicular pole-dipole ("PPD") survey design was deployed, with long transmitter wires, widely spaced transmitter electrode poles, and overlapping arrays of receiver electrodes. Receiver lines were separated by 100.0 m with receiver stations at 100.0 m intervals. S.J. Geophysics Ltd., from Vancouver, B.C., Canada, was responsible for data acquisition using their Volterra data acquisition system. Final data was inverted with 3D code to create 3D conductivity and chargeability models, generated by Computational Geosciences Inc. of Vancouver, B.C., Canada, using the UBC's Inversion software.

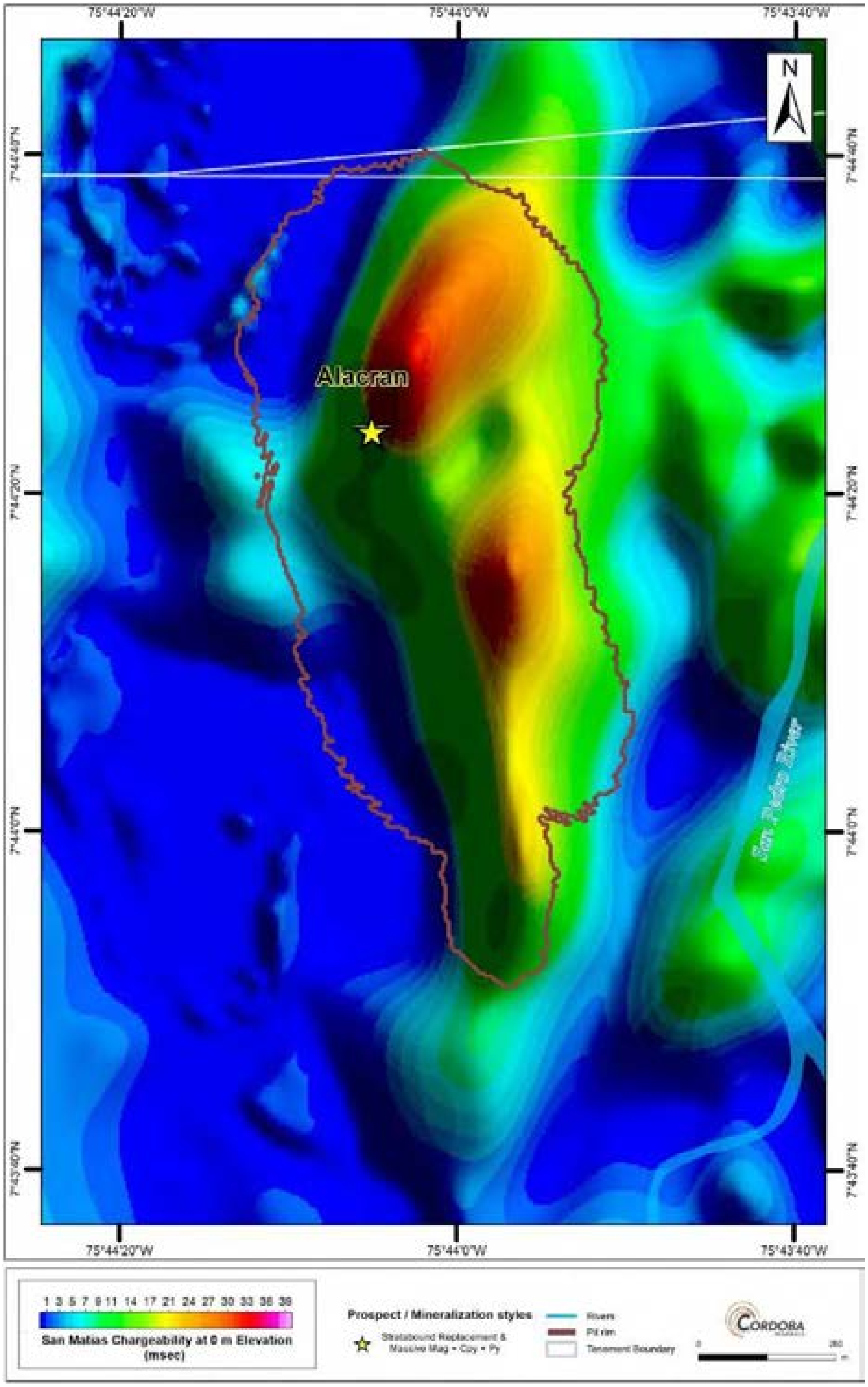
The survey successfully highlighted numerous zones of high chargeability and led to an expanded drilling campaign. In particular, a chargeability high, and resistivity low was observed over the Alacran deposit, coincident with mineralized zones. Figure 9-13 shows the chargeability results for the entire region over which the Typhoon surveys were completed. Figure 9-14, Figure 9-15 and Figure 9-16 illustrate chargeability results for the individual deposits.

At the end of Phase 1, a small, 8.05-line km, TDEM test survey was carried out over the Alacran deposit to determine if TDEM was a suitable exploration tool to detect the sulphide mineralization. Results indicated that the sulphides at Alacran are not connected enough to be a good EM target for the system used. However, there may be other electromagnetic receivers that would be sensitive enough to detect it.



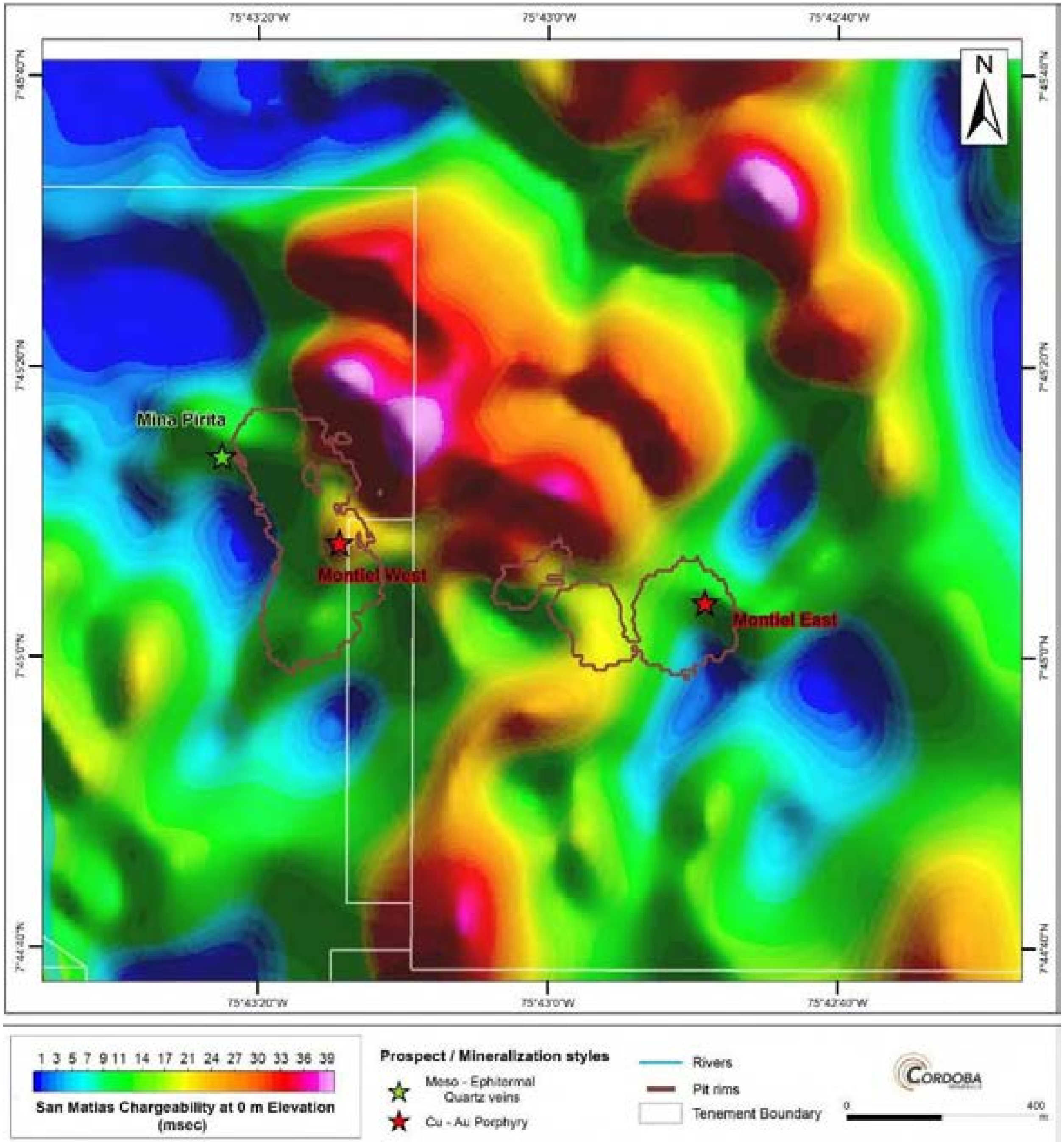
Source: Cordoba, 2019. Map datum is WGS84.

Figure 9-13: Merged chargeability results for the two Typhoon surveys at the San Matías Copper-Gold-Silver Project, shown at 0 m elevation (approximately 200.0 m depth)



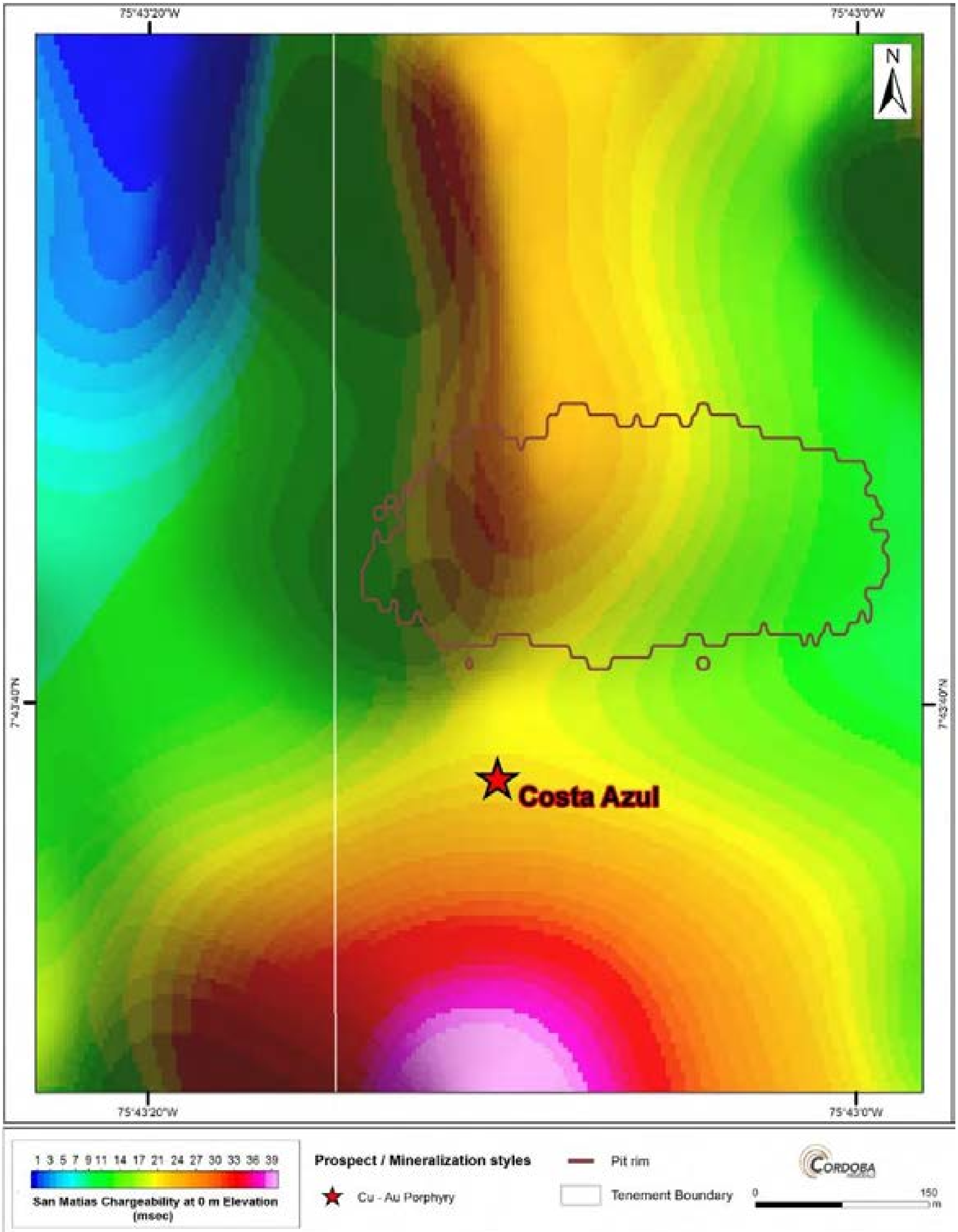
Source: Cordoba, 2019

Figure 9-14: Chargeability results for the Alacran deposit shown at 0 m elevation (approximately 200.0 m depth)



Source: Cordoba, 2019

Figure 9-15: Chargeability results for the Montiel area at 0 m elevation (approximately 200.0 m depth)



Source: Cordoba. 2019

Figure 9-16: Chargeability results for the Costa Azul area shown at 0 m elevation (approximately 200.0 m depth)

10.5 Exploration Potential

10.5.1 Resource Deposits

There are several areas across the Project that provide opportunities for further discoveries, and within the resource deposits, expansion of mineralization is possible. These are detailed in the following subsections.

10.5.1.1 Alacran Deposit

Identification of an IOCG/CRD source: mineralized stockwork and potassically-altered IOCG/CRD fragments within breccias (Figure 9-17) have been observed in Unit 1 and are a clear indication of an IOCG/CRD source. This source is thought to be genetically related and be the source of the replacement style Cu and high grade Au mineralization. This IOCG/CRD source may lie at depth or more likely at depth along strike either to the north or south of the Alacran deposit. The N-S striking Valdés Fault and the San Pedro Lineament bounding the west and east sides of Alacran respectively, probably rule out an IOCG/CRD source west or east of the Alacran deposit.

Source: Cordoba, 2019

Figure 9-17: IOCG/CRD clast with A-type veins in dacite breccia in Alacran deposit drill core hole ASA-046

Potential for extensions of the Alacran deposit:

- Down dip to the west: in the hanging wall diorite sill, small patches of weakly disseminated bornite and native Cu associated with chlorite alteration have been observed in drill core. This may –indicate that this sill is late mineral, rather than post-mineral and may be genetically related to the mineralizing IOCG/CRD system; however, the Valdés Fault would be the ultimate limit of the down dip potential.
- To the east: the potential for down-dropped blocks containing receptive stratigraphy and possibly additional high grade vertical domains has not been well constrained between the eastern limit of known drilling and the San Pedro River Lineament.
- To the south: there is limited potential to identify blind mineralized horizons below post-mineral faulting, but these horizons are generally waning in thickness and grade to the south, so the potential is limited. The La Capitana target, an area with a large Zn-Mo-Pb soil anomaly in a region with similar stratigraphy as Alacran, may represent potential in the southern area of the Project.
- To the north: the mineralized body abuts the northern diorite sill: there is some possibility that the mineralization could continue farther north either in the hanging wall or footwall of the sill. Any northward extension would be subsurface and, hence, difficult to detect without additional step-out drilling.
- Potential to better constrain and high grade domains:
- Extremely high grade Au (>4,000 g/t Au) in CBM veins has been observed in drill samples; however, the control of these extremely high grade pods within the vertical high grade domains is unclear.
- A detailed structural review of the presumably brittle structures that control the location of these extremely high grade "pods" may result in a model, which can predictably locate, and drill these pods. If successful, a statistically significant high grade coarse Au domain may result with tight spaced infill drilling.

10.5.1.2 Montiel East

- Potential fault offset mineralization from the main body is possible. The Tehran fault is a clear late mineral fault that has active fault scarps and surface deformation observed in the topography. This fault may well have offset mineralization, the quantity, and location of this is unclear and was the subject of several drill hole tests.
- The most successful test of this theory was SMDDH032 which was collared W of the pit and drilled to the NNE, cutting the fault at 357 m which graded over 2% CuEq over 4 m before entering a broad domain of weakly mineralized material running approximately 0.15% CuEq in excess of 100 m. The material on the north side of this fault was better mineralized than the rocks on the south side of this fault, as seen along the drill trace: the background Cu, Au, and Mo values are more than double in the former than in the latter. This intersection and observation were not followed up with additional drilling, and it may be marginal to a porphyry centre or indeed another portion of the Montiel East body.

10.5.1.3 Montiel West

- Montiel West was long thought to be a sub-horizontal slice of mineralized stockwork in host andesites and basalts. This theory was based on the shape of the mineralized body and the sharp boundary seen in outcrop between mineralized stockwork and unmineralized andesite. In actual fact, while the thrust theory is still possible, it has not been completely confirmed in outcrop that the mineralization terminates at a thrust fault boundary.

- The intrusion which created these porphyry stockwork causing fluids has not yet been located. A careful review of drill core, geophysics, and geochemistry is needed in this area to vector toward the source porphyry.
- The Mina Pirita vein is very close to the Montiel West stockwork, and although their relationship is unclear, it is thought that they are related to the same mineralizing source. MWDDH008 drilled in (2017) may have intersected this vein and modelling the geometry and mineralogy of these veins may provide a vector toward the mineralizing source.

10.5.1.4 Costa Azul

- This body is broadly conformable to the dip slope to the east, and all deeper drill holes through this roughly planar body terminate in weakly to unmineralized intrusive and “tight” basaltic volcanics.
- The potential for the Costa Azul porphyry to be a tilted body with a source stock downslope to the east remains untested.
- Soil geochemical evidence suggests an alignment of Cu and Au geochemistry along the ridge running NE away from the western margins of Costa Azul, indicating that there may be other untested bodies along this lineament.
- The western-most drill holes were collared adjacent to a steep slope that marks the western edge of the Costa Azul deposit. All these holes were mineralized, and the mineralization appears open save for topography “daylighting.” There is potential for more mineralization downslope to the west, or at the base of the hill to the west which is untested by drilling.

10.5.2 Regional Prospects

10.5.2.1 Alacran Norte Prospect

The Alacran Norte prospect is located 500 m north of the Alacran deposit (Figure 7-2). Surface features noted here provide evidence of a possible northerly extension of Alacran deposit-like lithology and mineralization. These features include the occurrence of hydrothermal breccias with strong oxidation (Figure 9-18), the intrusive rocks, sericite and malachite (Cu-carbonate) occurrence. The observation of visible Au in pan concentrates provides further encouragement for a northerly extension of the Alacran deposit ores.

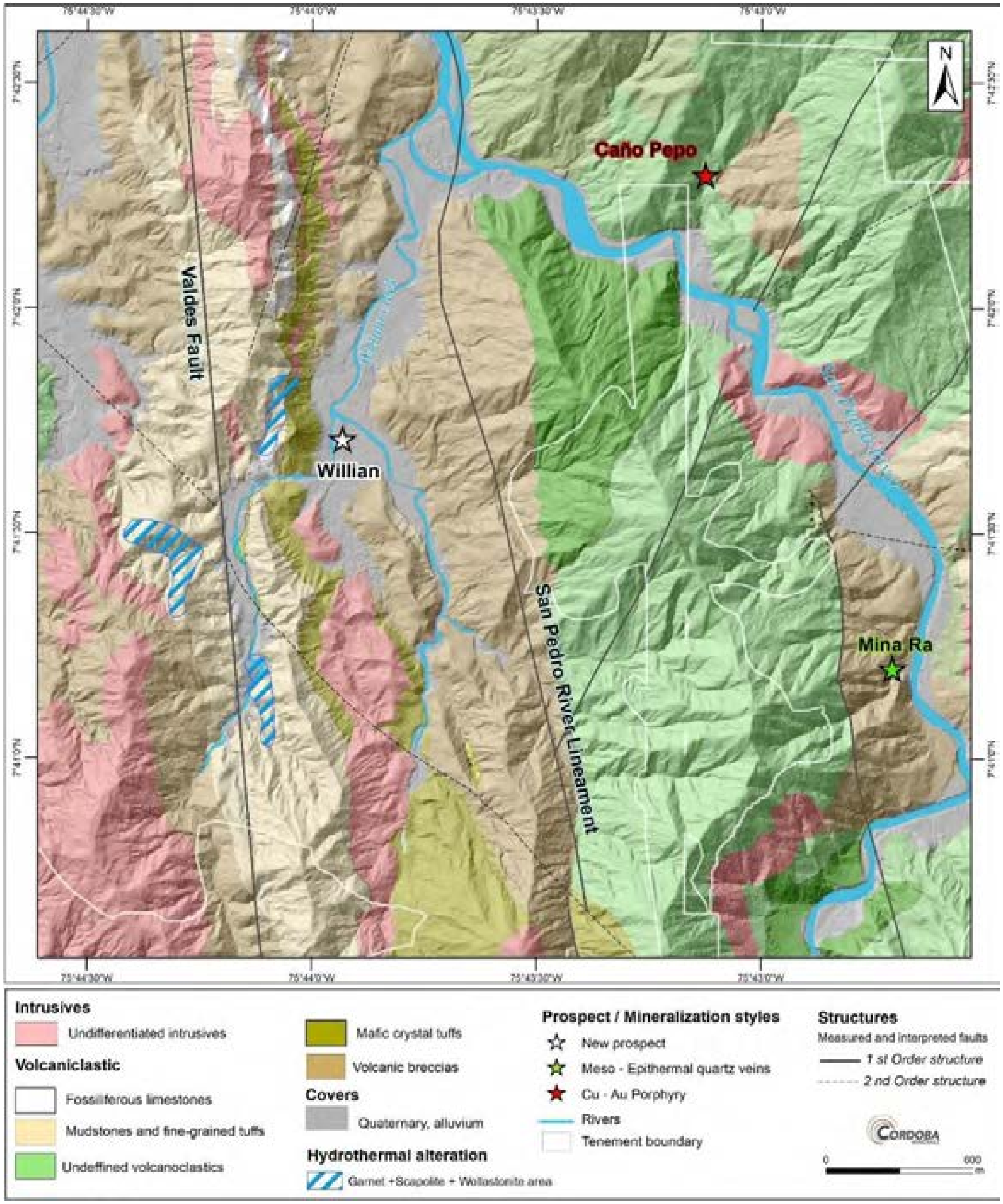
Source: Cordoba, 2019

Figure 9-18: Hydrothermal breccias with strong oxidation at El Alacrán Norte

10.5.2.2 Willian Prospect

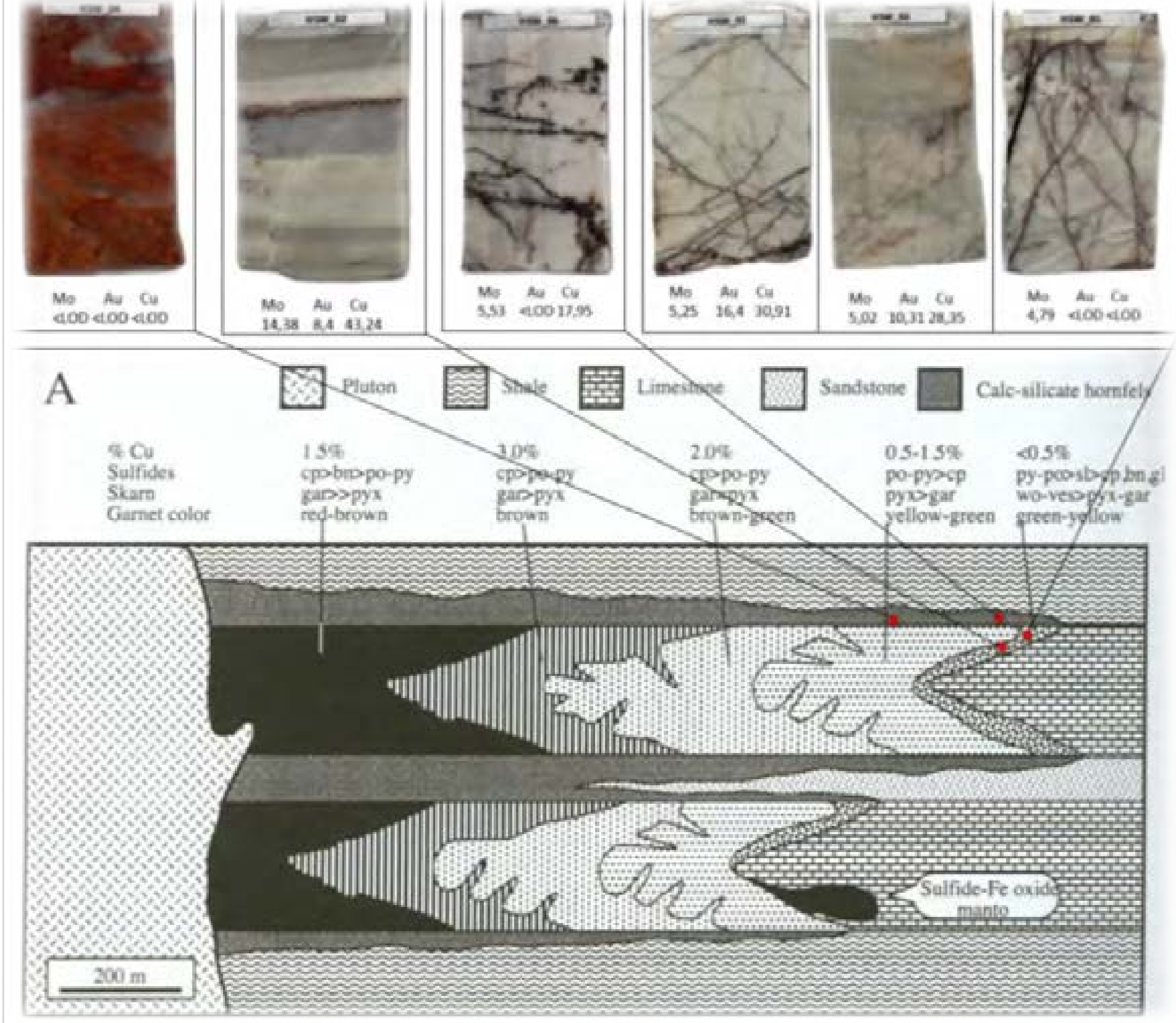
The Willian Prospect is located 4 km south of the Alacran deposit and has recently been recognized as a prospective area for polymetallic mineralization (Figure 9-19). Mapping and petrographic analysis of rocks in the area have confirmed the presence of garnet, wollastonite, and scapolite alteration, which are recognized as distal metasomatic alteration products associated with skarn deposits (Meinert et al., 2005). These alteration products provide a good vector to explore for skarn-hosted mineralization. Recognition of alteration mineralogy such as this are associated with Cu grades up to 2.00 % in outcrop and 8.95 % in float and indicate the potential for a Cu-rich skarn system developed in the carbonate-rich sediments and volcaniclastic units hosted in the same stratigraphy that which hosts the Alacran deposit (Figure 9-20). The presence of metasomatic alteration would also suggest proximity to an intrusive body that might host porphyry Cu-Au mineralization, which has not yet been recognized here.

Further work in this region would include further soil sampling, ground magnetics, a Typhoon™ IP survey, and trenching and or scout drilling (i.e., RAB drilling).



Source: Cordoba, 2019

Figure 9-19: Willian geology map



Source: MINERLAB, 2018

Figure 9-20: Schematic diagram with the zonation of Cu skarn and the hypothetical location of samples with the Willian Prospect (Modified from Meinert et al. 2005).

11 SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 Assay Sample Preparation and Analysis

11.1.1 Dual Resources Drilling

No formal documented processes were found with respect to sample preparation and analysis for work completed by Dual Resources.

11.1.2 Ashmont Drilling

Drill core, as sampled by Ashmont under the supervision of Luis Oviedo, P. Geo., of South American Management SA of Santiago Chile ("SAMSA"), was split with a mechanical splitter, with one half of the core placed in a pre-marked plastic sample bag, and the other half returned to the core box. Core pieces were weighed prior to sampling, and the bagged samples were weighed after splitting to ensure that the splits approximated half the core. Sample bags were sealed to ensure sample integrity.

All samples were prepared by ALS Minerals in Medellín, Colombia. ALS Minerals is a laboratory certified to International Standards ISO/IEC 17025:2005 and ISO 9001:2015. The samples were dried, crushed to 70% passing 2.0 mm, riffle split, and a 250 g split pulverized to 85% passing 75 µm.

Samples were analyzed at ALS Minerals laboratories in Chile, Peru, and Canada. Au was analyzed by fire assay on a 50 g aliquot with an Atomic Absorption Spectroscopy ("AAS") finish (method Au-AA24). Samples above the upper limit of detection of 10.0 ppm were reanalyzed by fire assay on a 50 g aliquot with a gravimetric finish (method ME-GRA22). Multi-elements were analyzed by four-acid digestion of a 0.25 g sample with ICP-AES finish for 33 elements (method ME-ICP61). Samples above the upper detection limit of 10,000 ppm Cu were reanalyzed by four-acid digestion with ICP-AES finish (method Cu-OG62).

11.1.3 Cordoba Drilling

Drill core sampled by Cordoba was numbered using consecutive sample numbers, with a sample label stuck to the core box labelled with hole number and the sample interval. The core was cut lengthwise by a diamond saw along a cut line marked by a geologist (Figure 11-1). One half of the sample was placed in a plastic sample bag, double-bagged, labelled and sealed with a cable tie, and the other half returned to the core box for reference. Fabric bags, also sealed by cable tie, were used to hold about four samples each for transportation (Figure 11-1).

Source: Nordmin, 2019

Figure 11-1: Left: Core sample cut shack at the Alacran deposit. Right: Sample selection.

All samples were prepared by ALS Minerals in Medellín, Colombia. The samples were dried, crushed to 70% passing 2.0 mm riffle split, and a 1 kg split pulverized to 85% passing 75 µm.

Samples were analyzed at the ALS laboratory in El Callao, Lima, Peru. Au was analyzed by fire assay on a 50 g aliquot with an AAS finish (method Au-AA24). Samples above the upper limit of detection of 10.0 ppm were reanalyzed by fire assay on a 50 g aliquot with a gravimetric finish (method Au-GRA22). Multi-elements were analyzed by four-acid digestion of a 0.25 g sample with ICP finish for 48 elements (method ME-MS61, ME-OG62). Samples with grades above the 2,000 ppm Cu were reanalyzed by four-acid digestion with ICP-AES finish (method Cu-OG62). Samples above the upper limit of detection for Ag (100 ppm), Zn (10,000 ppm) and S (10.0%) were reanalyzed by four-acid digestion with ICP-AES finish (methods Ag-OG62, Zn-OG62, S-OG62).

11.2 Quality Assurance/Quality Control Programs

QC measures were set in place to ensure the reliability and trustworthiness of exploration data. These measures include written field procedures and independent verifications of aspects such as drilling, surveying, sampling, and assaying, data management, and database integrity. Appropriate documentation of quality control measures and regular analysis of QC data are essential as a safeguard for project data and form the basis for the QA program implemented during exploration.

Analytical QC measures involve internal and external laboratory procedures implemented to monitor the precision and accuracy of the sample preparation and assay data. They are also important to identify potential sample sequencing errors and to monitor for contamination of samples.

Sampling and analytical QA/QC protocols typically involve taking duplicate samples and inserting quality control samples (CRM and blanks) to monitor the reliability of the assay results throughout the drill program. Umpire check assays are typically performed to evaluate the primary lab for bias and involve re-assaying a set proportion of sample rejects and pulps at a secondary umpire laboratory.

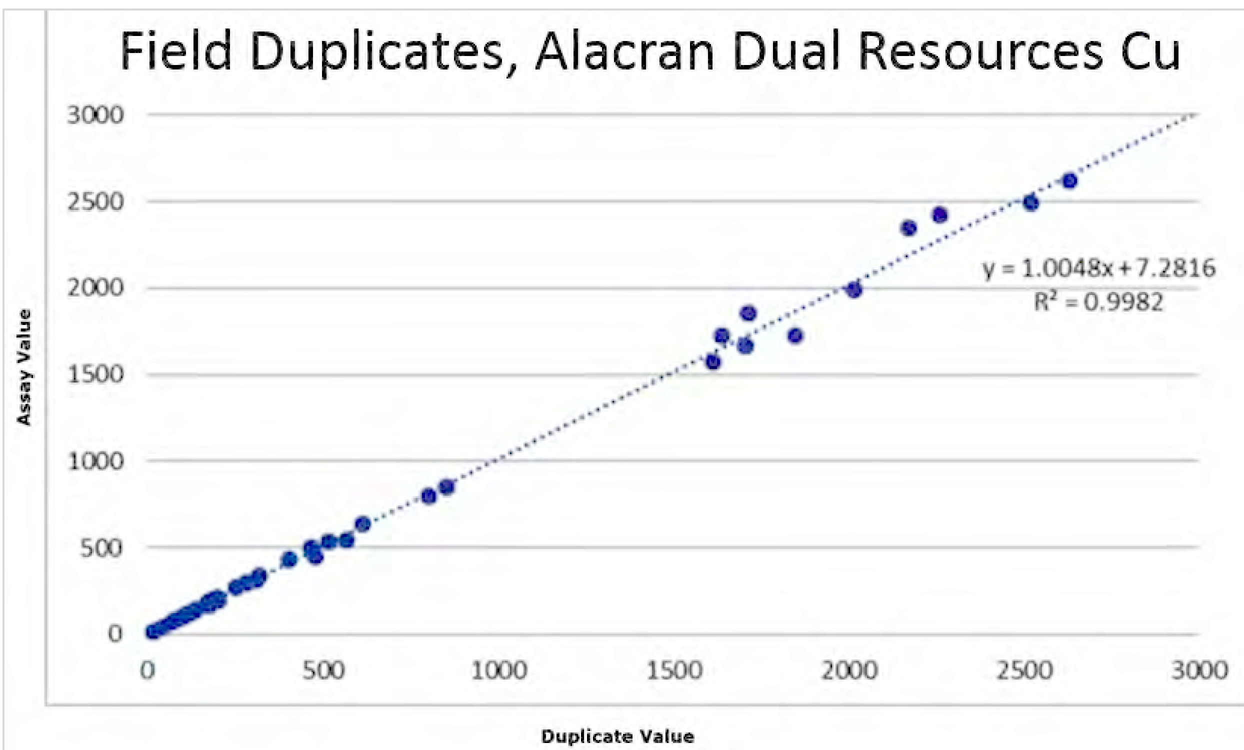
11.2.1 Dual Resources

Dual Resources used field and laboratory duplicates as the basis of their QA/QC program. The SJ drill holes that this QA/QC program accompanies were later twinned by Ashmont and Cordoba. Further detailed analysis of twin hole assay data between the SJ holes and the twin holes was undertaken by Nordmin and is described in Section 12.1.4.

Data collected by Dual Resources has been deemed reliable and of high quality and can be included in the Mineral Resource Estimate.

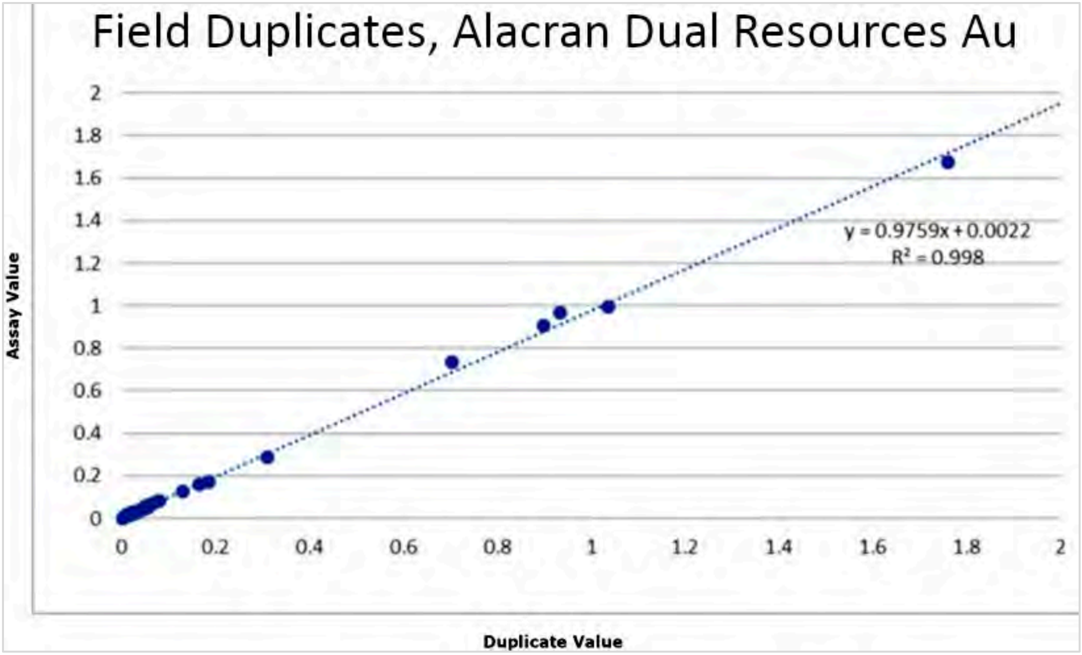
Field and Laboratory Duplicates

Dual Resources submitted 37 core and pulp duplicates and eleven laboratory Au duplicates and six laboratory Cu duplicates as part of their QA/QC process. The Cu and Au field duplicates demonstrate good agreement (Figure 11-2 and Figure 11-3).



Source: Nordmin, 2021

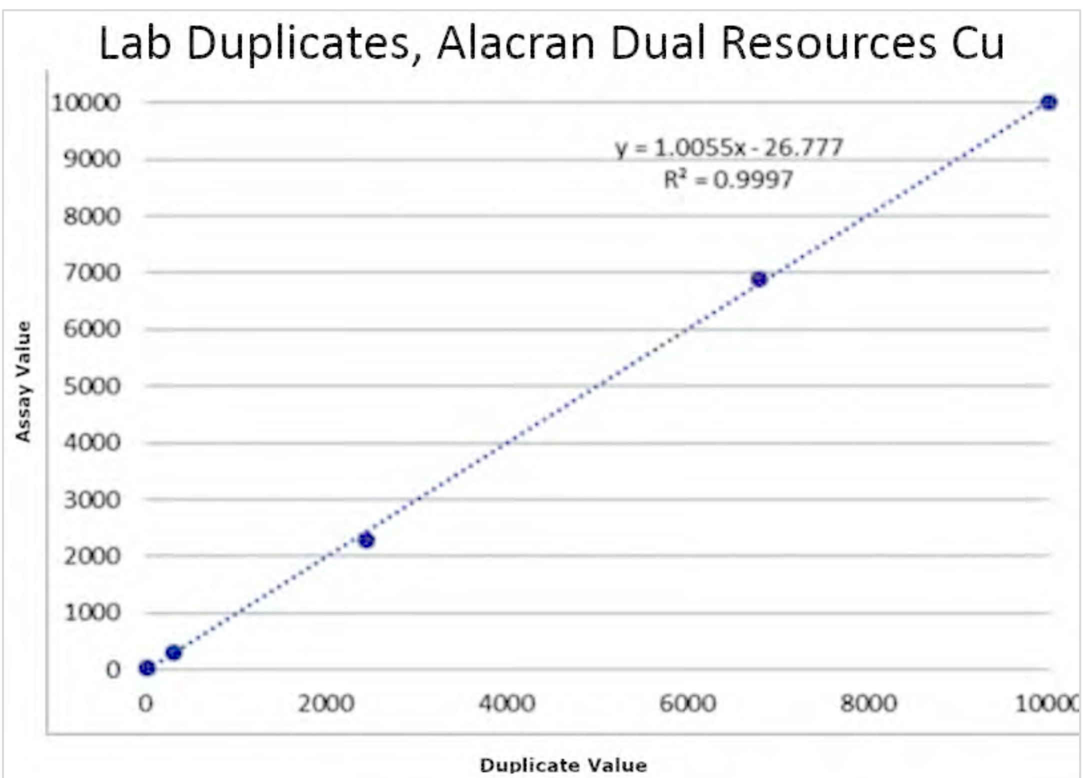
Figure 11-2: Field duplicates for Cu (ppm) by Dual Resources for the Alacran deposit



Source: Nordmin, 2021

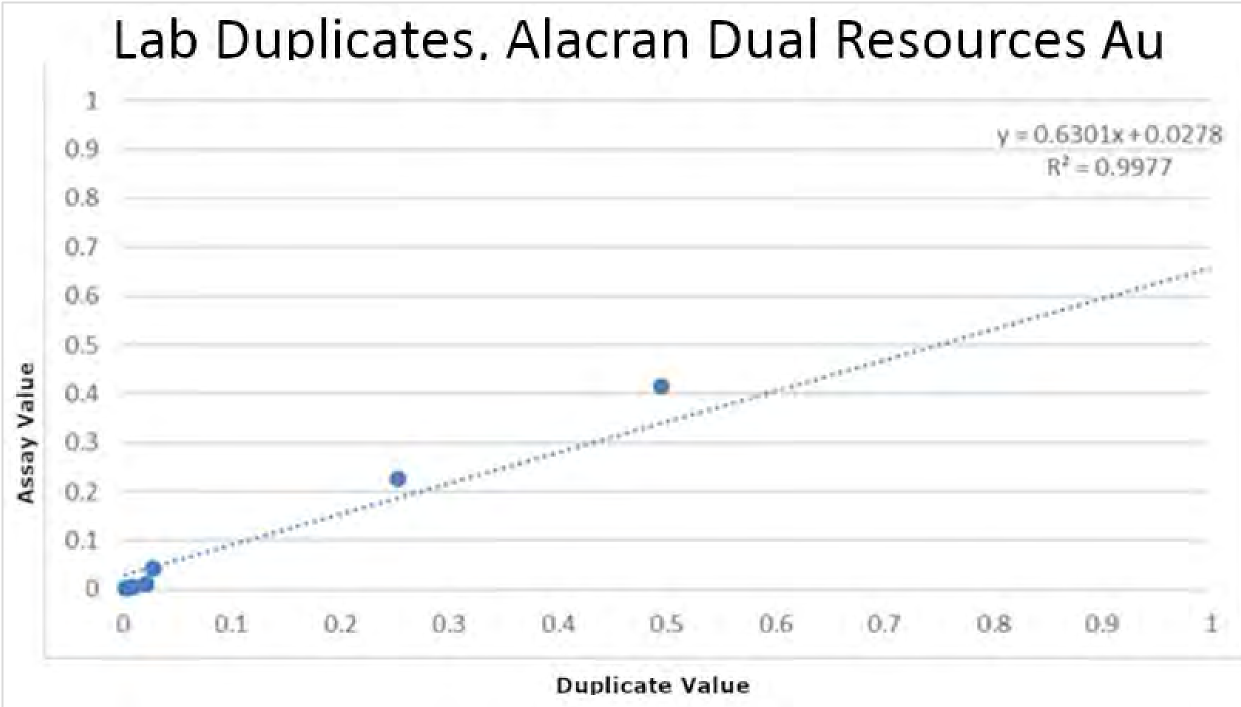
Figure 11-3: Field duplicates for Au (g/t) by Dual Resources for the Alacran deposit

Coarse reject and pulp duplicate pair for both Au and Cu results show good agreement (Figure 11-4 and Figure 11-5).



Source: Nordmin, 2021

Figure 11-4: Lab duplicates (coarse reject and pulp) for Cu (ppm) by Dual Resources for the Alacran deposit



Source: Nordmin, 2021

Figure 11-5: Lab duplicates (coarse reject and pulp) for Au (g/t) by Dual Resources for the Alacran deposit

11.2.2 Ashmont

Ashmont used blanks and duplicates as the basis of their QA/QC program. Three standards, approximating the low, medium, and HG portions of the anticipated grade spectrum were used. Ashmont inserted one of three certified standard reference materials for every 13 samples, one coarse blank or fine blank every 50 samples, one half-core duplicate for every 40 samples, one coarse reject duplicate, or pulp duplicate every 20 samples. The Company also analyzed duplicates at a second laboratory, ACME Analytical Laboratories Colombia S.A.S ("ACME"). Documentation summarizing the Ashmont QA/QC monitoring procedures and responses to failures has not been located. Data collected by Ashmont has been deemed reliable and of high quality and can be included in the Mineral Resource Estimate.

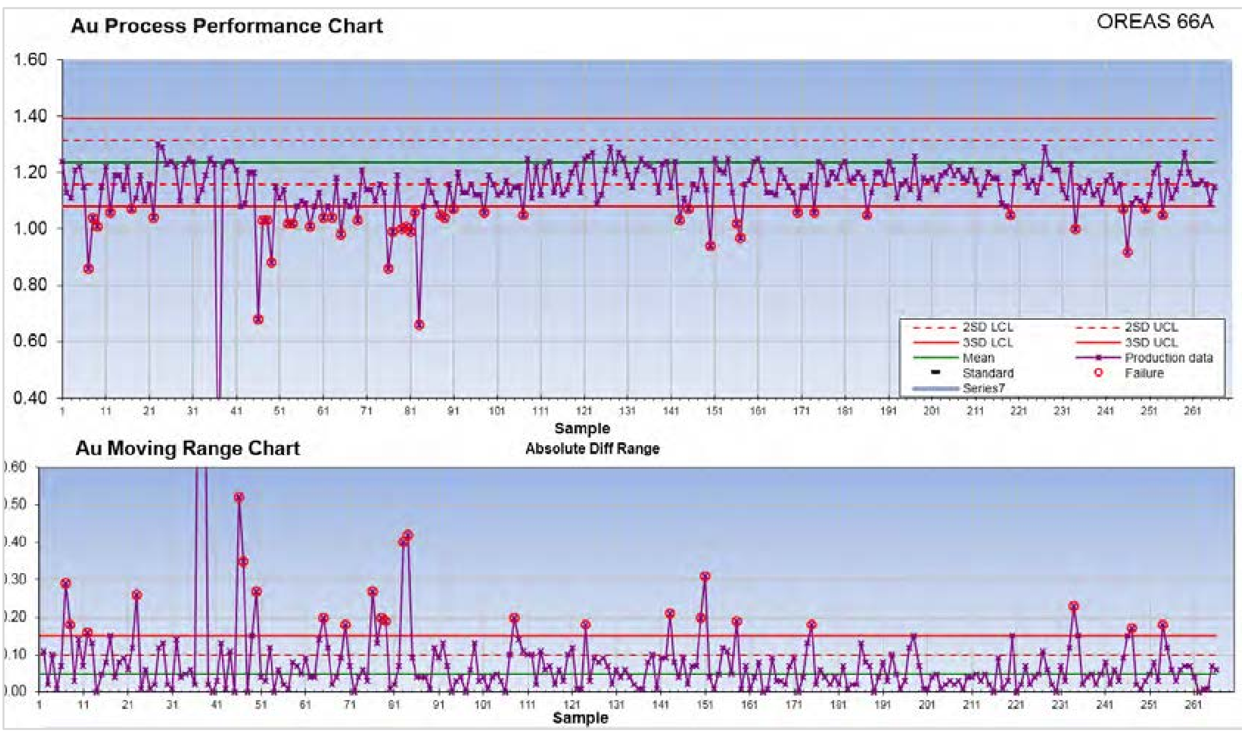
Standards

Ashmont submitted 799 CRMs with an insertion rate of 6% as part of its QA/QC process. The review of CRM results identified nineteen sample swaps or laboratory failures for Au results and two failures for Cu results that have been incorrectly identified as members of a different population. It is unknown how Ashmont resolved the observed failures. An apparent low Au bias indicated for Oreas 66 a (Figure 11-6). Oreas 502 largely fell within the range of mean +/- two standard deviations, although the Au analyses appear to have a slightly low bias (Figure 11-7). This bias has not been confirmed but may result in a slight underprediction of Au grades in grade estimation. CRM results are summarized in Table 11-1.

Table 11-1: Alacran Ashmont CRM Result Summary

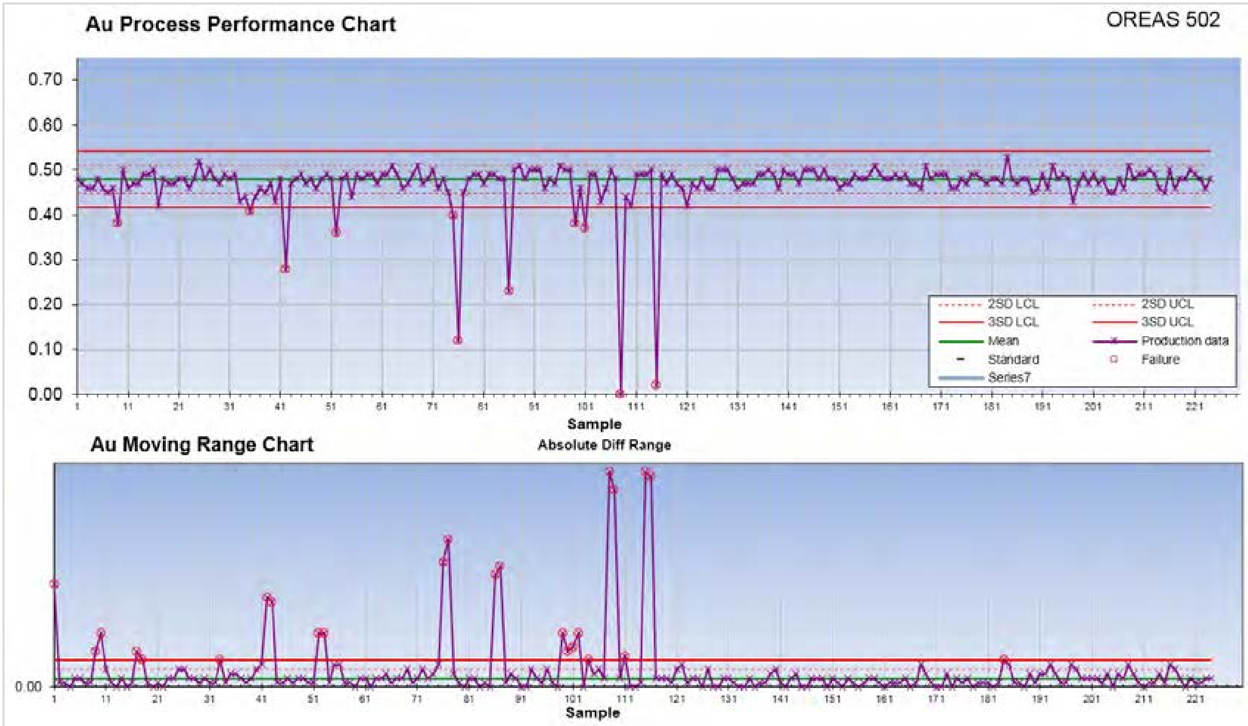
Standard	Count	Best Value Au (g/t)	Mean AuAA24 (g/t)	Mean AuGRA22 (g/t)	Bias (%)	Best Value Cu (ppm)	Mean Cu MEMS61 (ppm)	Bias (%)
Oreas 502	267	0.491	0.479		-2.5	7,550	7,535	-0.2
Oreas 66 a	266	1.237	1.152		-6.8	120	125	4.2
Oreas 12 a	266	11.79		11.877	0.7			

Source: Cordoba, 2021



Source: Nordmin, 2021

Figure 11-6: Alacran deposit Ashmont standard OREAS 66A Au (g/t)



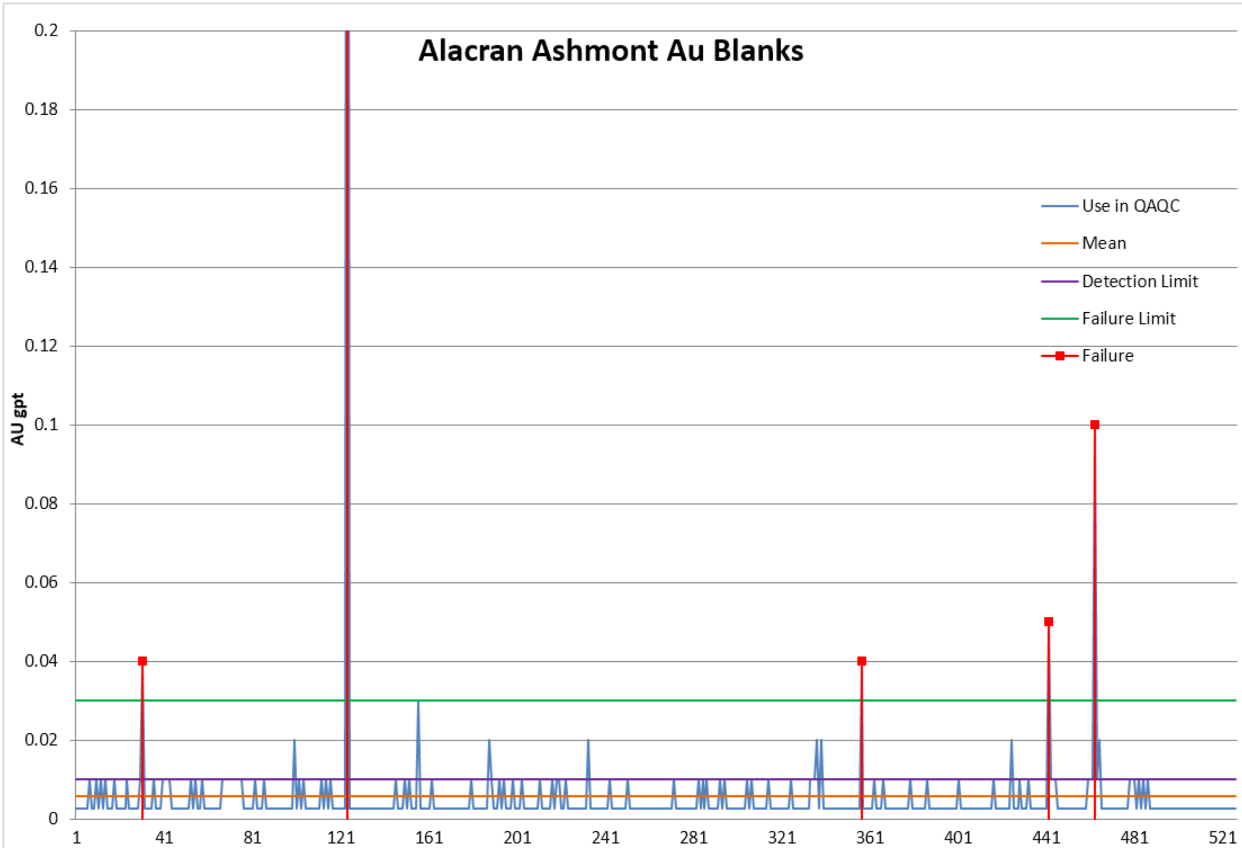
Source: Nordmin, 2021

Figure 11-7: Alacran deposit Ashmont standard OREAS 502 Au (g/t)

<u>Blanks</u>

Ashmont submitted 529 coarse blanks at an insertion rate of 4% as part of its program QA/QC process. Blanks, obtained from cement construction blocks, were submitted with the samples to monitor cross-sample contamination.

Although the blanks contain measurable quantities of Au and Cu, there was no obvious correlation between the blank values and those of the immediately preceding samples. An overall 5% failure rate was observed (Figure 11-8).

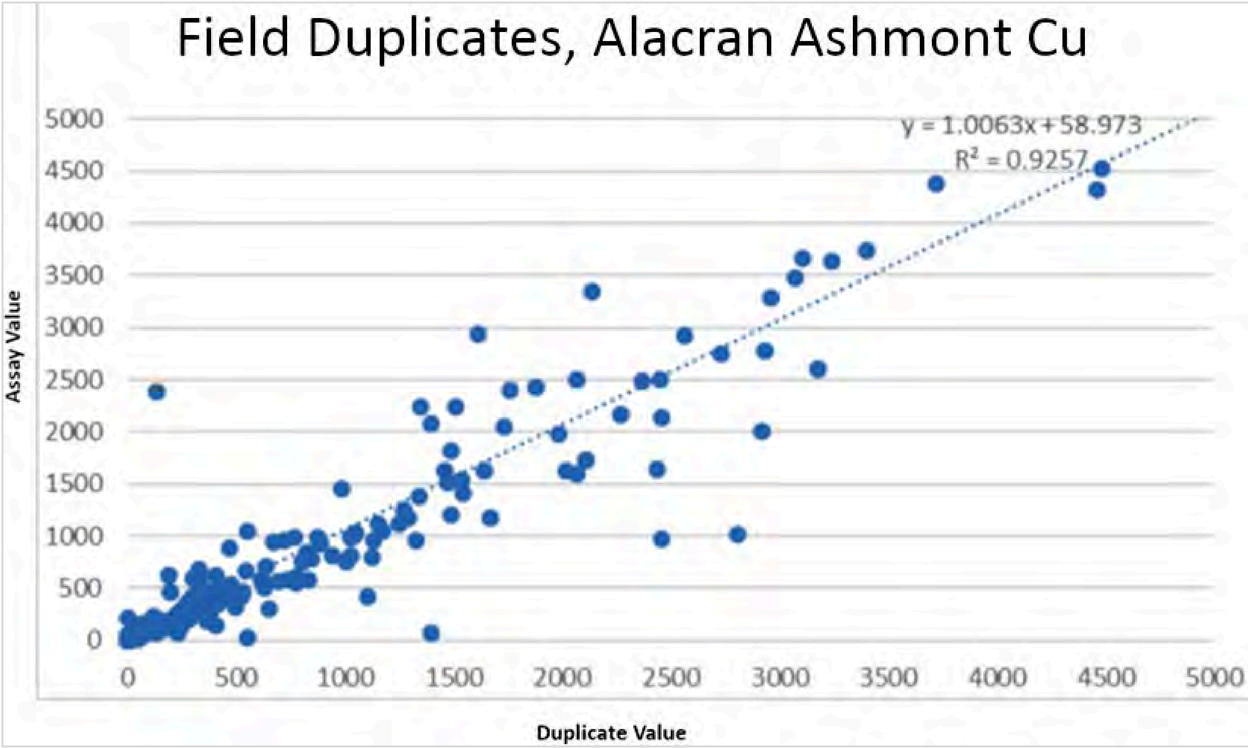


Source: Nordmin, 2021

Figure 11-8: Ashmont coarse blanks, Au (g/t) results for the Alacran deposit

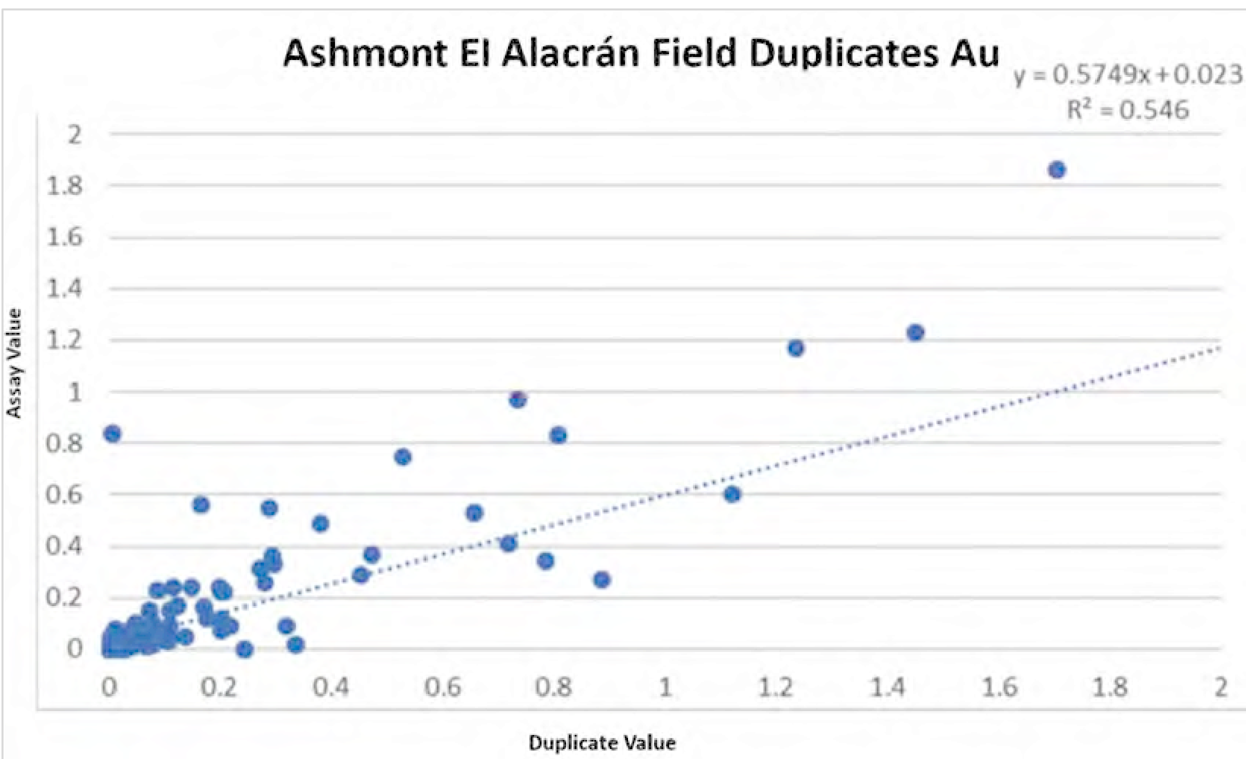
Field and Laboratory Duplicates

Ashmont submitted 265 core and pulp duplicates and 568 laboratory Au duplicates and 750 laboratory Cu duplicates as part of their QA/QC process. The Cu field duplicates demonstrate good agreement while the Au results show high variability for Au results (Figure 11-9 and Figure 11-10). Coarse reject and pulp duplicate pair for both Au and Cu results show good agreement (Figure 11-11 and Figure 11-12).



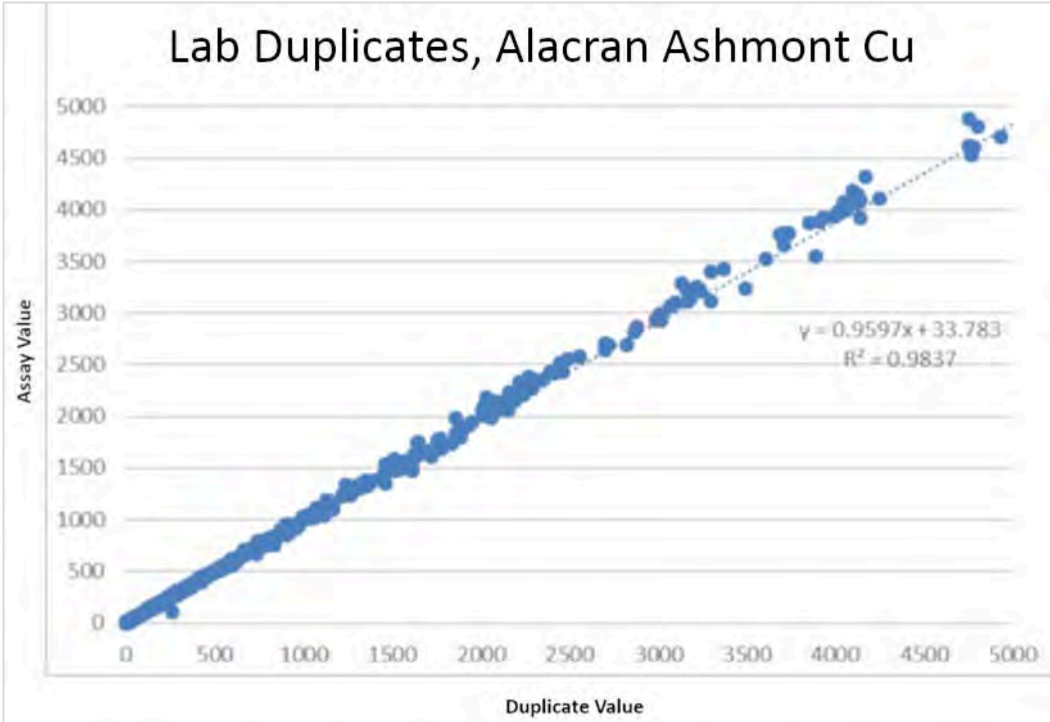
Source: Nordmin, 2021

Figure 11-9: Field duplicates for Cu (ppm) by Ashmont for the Alacran deposit



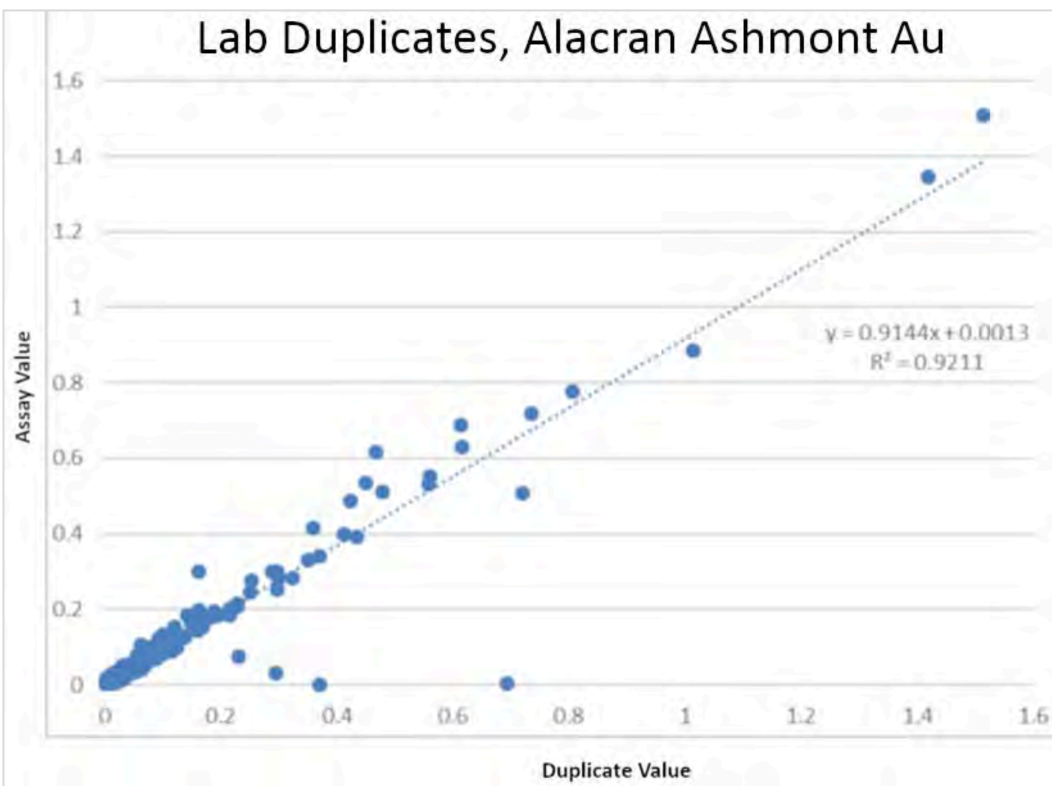
Source: Nordmin, 2021

Figure 11-10: Field duplicates for Au (g/t) by Ashmont for the Alacran deposit



Source: Nordmin, 2021

Figure 11-11: Lab duplicates (coarse reject and pulp) for Cu (ppm) by Ashmont for the Alacran deposit

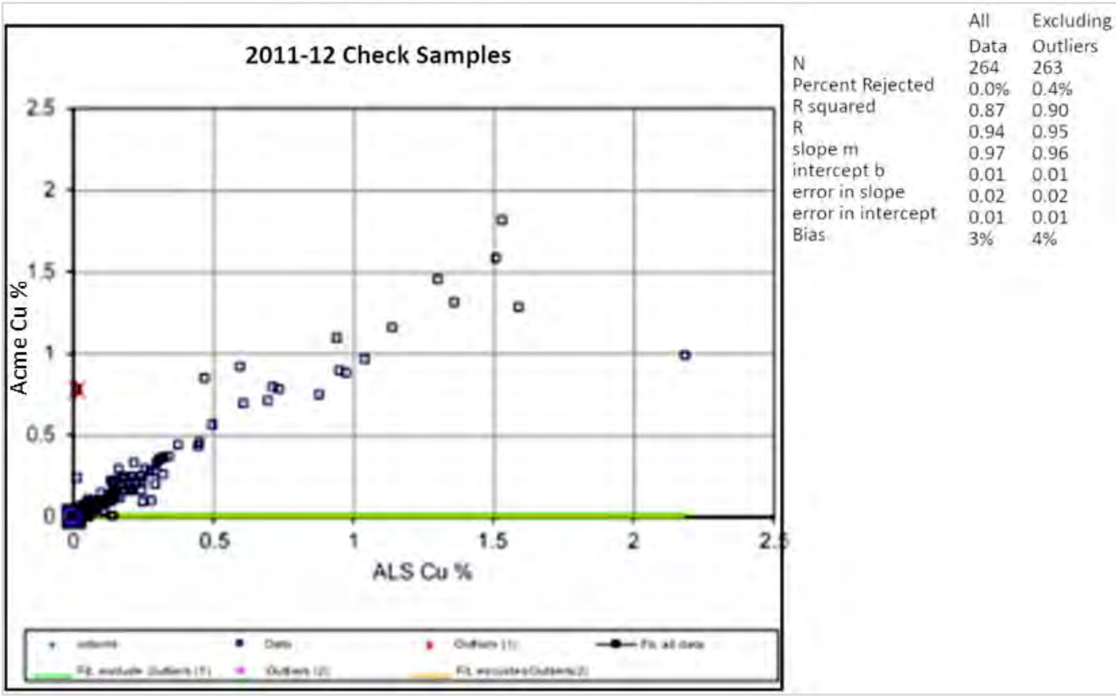


Source: Nordmin, 2021

Figure 11-12: Lab duplicates (coarse reject and pulp) for Au (g/t) by Ashmont for the Alacran deposit

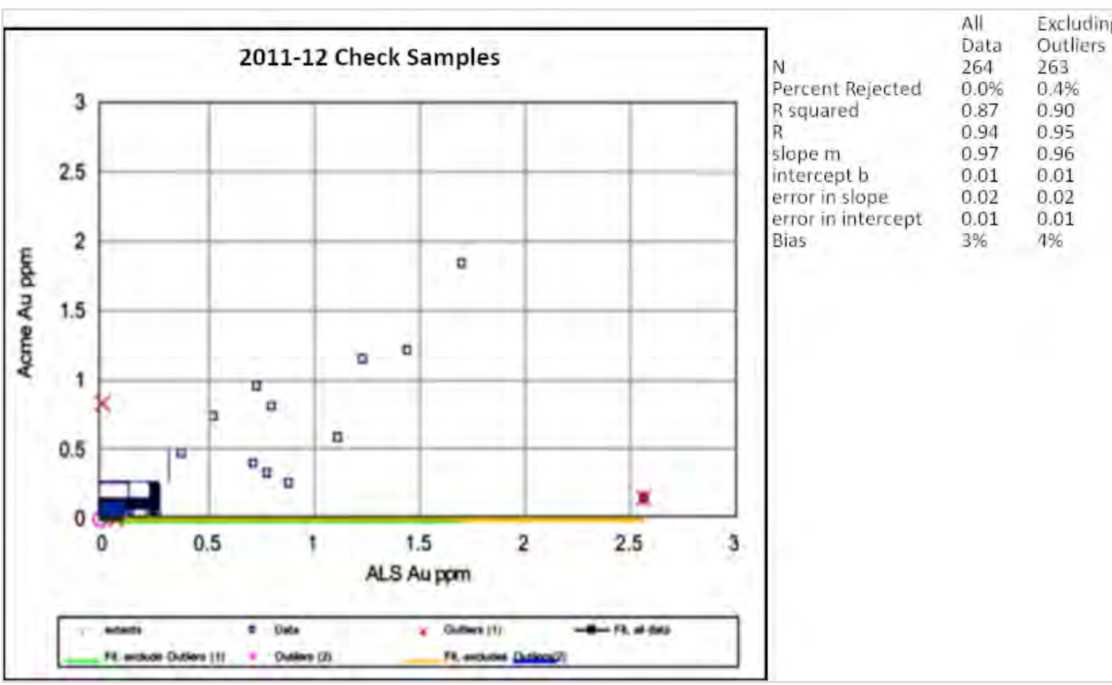
Checks

Ashmont submitted 264 pulp samples to ACME Laboratories for secondary analysis. The Au and Cu results show good correlation and no significant bias after excluding a few outliers (Figure 11-13 and Figure 11-14.



Source: Nordmin, 2021

Figure 11-13: Check samples for Cu (%) for the Alacran deposit by Ashmont



Source: Nordmin, 2021

Figure 11-14: Check samples for Au (ppm) for the Alacran deposit by Ashmont

There is no QA/QC information for drill holes ASA042 to ASA051. There is no record of any re-assaying related to identified failures or any CRM checks for Cu-OG62 results. Cu-OG62 results are generally greater than 1% Cu and represent approximately 3% of Ashmont assay results.

11.2.3 Cordoba

Cordoba inserted one of six CRMs, one coarse blank, and one field duplicate in every batch of 25 samples. During the 2020 and 2021 sampling programs no field duplicates were sent to the lab as the remaining core halves were utilized for metallurgical testing.

11.2.3.1 Alacran Deposit

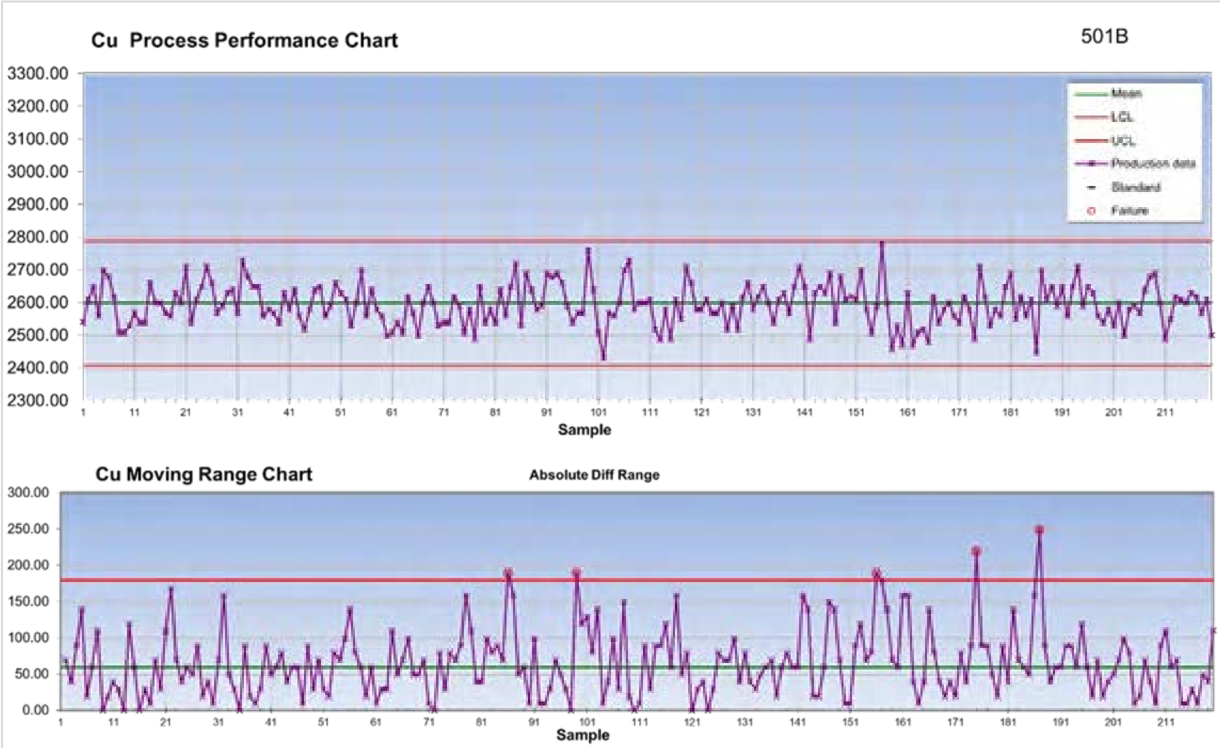
Standards

Cordoba submitted 702 CRMs between 2016 and 2021 as part of their QA/QC process. One of the CRM's, OREAS 904, does not contain enough data points to make reliable charts as it was only used in 2021 a total of six times (Table 11-2). The CRM results are summarized in Table 11-2, Figure 11-15, Figure 11-16, Figure 11-17 and Figure 11-18.

Table 11-2: Cordoba Alacran CRM Result Summary

Standard	Count	Best Value Au (g/t)	Mean Au (g/t)	Certified Value Au (g/t)	Bias (%)	1 Standard Deviation (95%)	Best Value Cu (%)	Mean Cu (%)	Certified Value Cu (%)	Bias (%)	1 Standard Deviation (95%)
501b	220	0.248	0.243	0.248	2.02	0.01	0.260	0.259	0.260	0.38	0.011
502b	136	0.494	0.480	0.494	2.83	0.015	0.773	0.763	0.773	1.29	0.020
503b	167	0.695	0.683	0.695	1.73	0.021	0.531	0.524	0.531	1.32	0.023
504b	87	1.610	1.581	1.61	1.80	0.037	1.11	1.0	1.11	9.91	0.042
CDN-CM-35	86	0.320	0.319	0.324	1.54	0.032	0.243	0.245	0.243	-0.82	0.012
OREAS 904	6	0.044	0.047	.045	-4.44	0.004	0.612	0.615	0.612	-0.49	0.021

Source: Cordoba, 2021. The -9.9% bias for 504b Cu-ME-MS is superseded by Cu-OG62 results.



Source: Nordmin, 2021

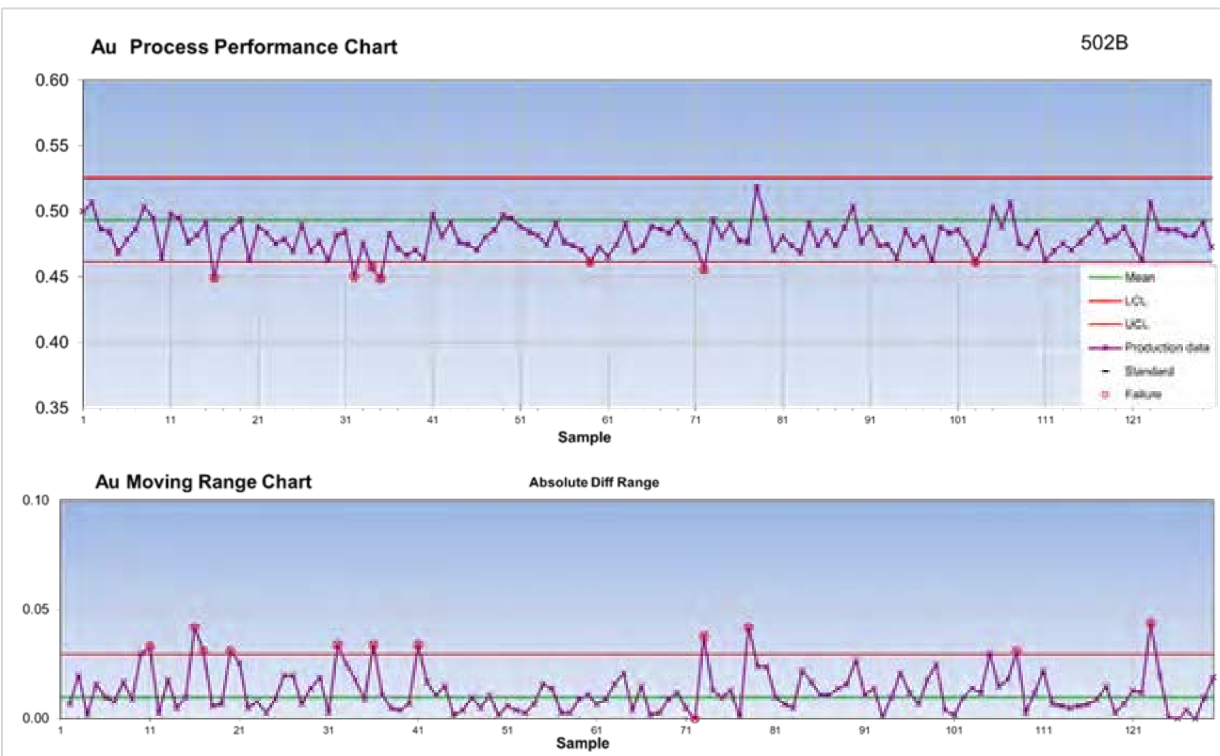
Figure 11-15: Alacran deposit Cordoba standard 501B Cu (ppm)

Source: Nordmin, 2021

Figure 11-16: Alacran deposit Cordoba standard 501B Au (g/t)

Source: Nordmin, 2021

Figure 11-17: Alacran deposit Cordoba standard 502B Cu (ppm)

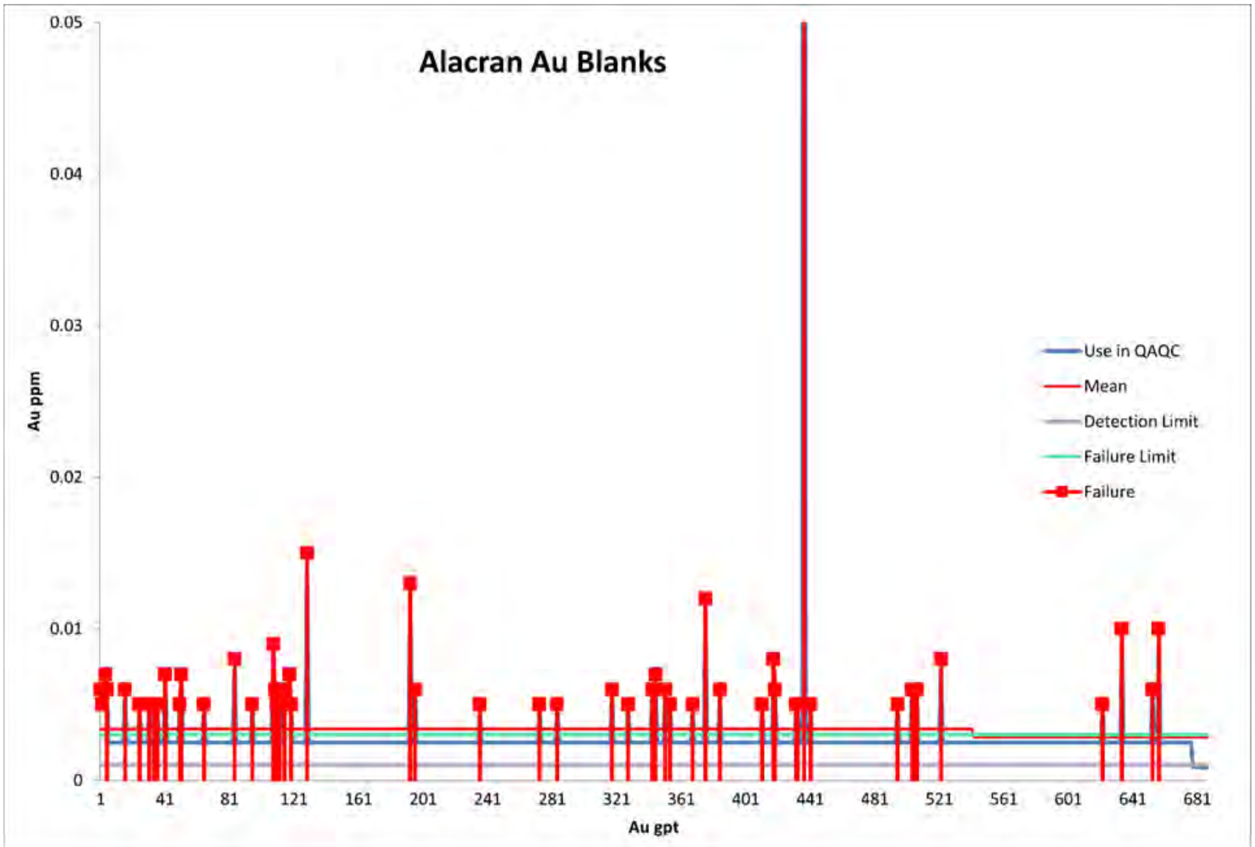


Source: Nordmin, 2021

Figure 11-18: Alacran deposit Cordoba standard 502B Au (g/t)

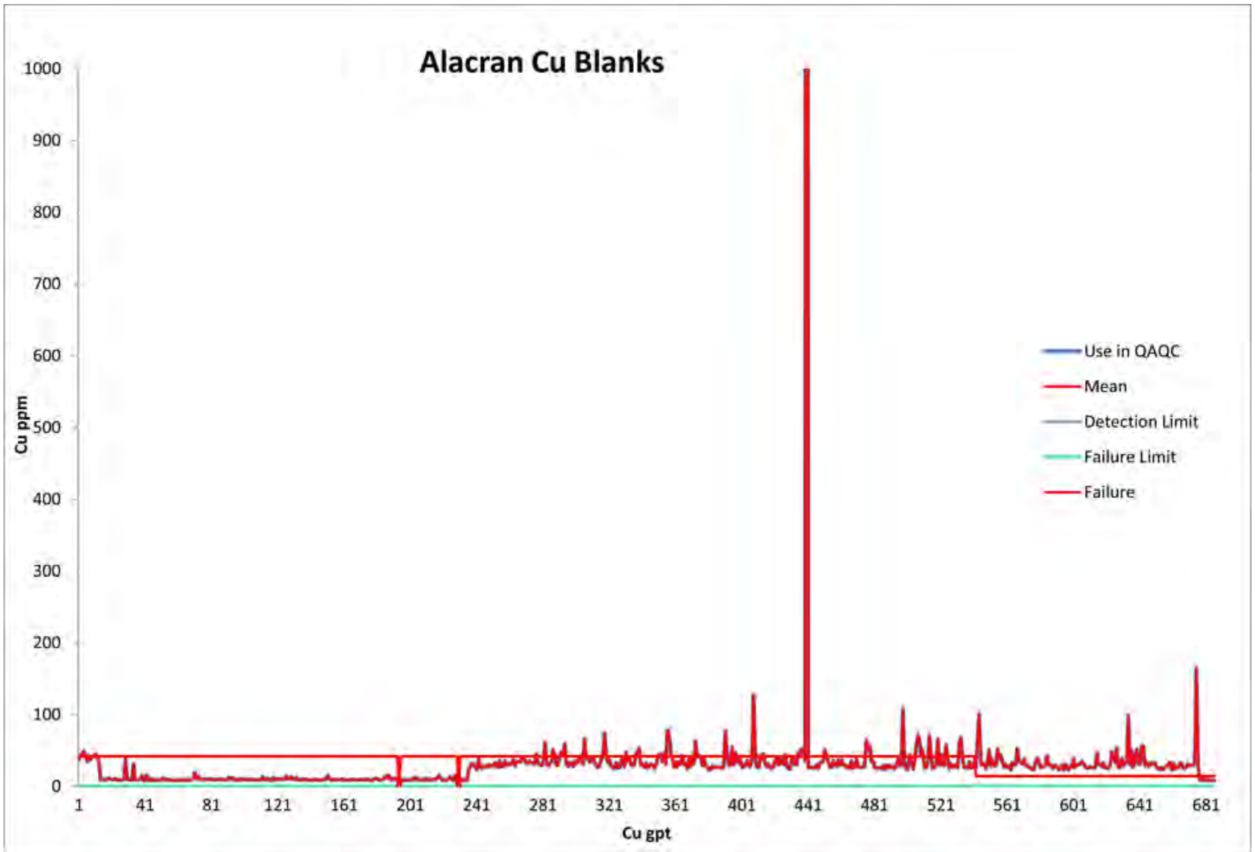
Blanks

Cordoba submitted 421 coarse blanks between 2016 and 2021 as part of its QA/QC process. No significant carryover is evident (Figure 11-19 and Figure 11-20); however, they do demonstrate that the coarse blank is not sufficiently devoid of Cu relative to the ME-MS-61 lower detection limit. This does not impact the current assessment.



Source: Nordmin, 2021

Figure 11-19: Cordoba coarse blanks, Au (g/t) results for the Alacran deposit



Source: Nordmin, 2021

Figure 11-20: Cordoba coarse blanks, Cu (ppm) results for the Alacran deposit

Field and Laboratory Duplicates

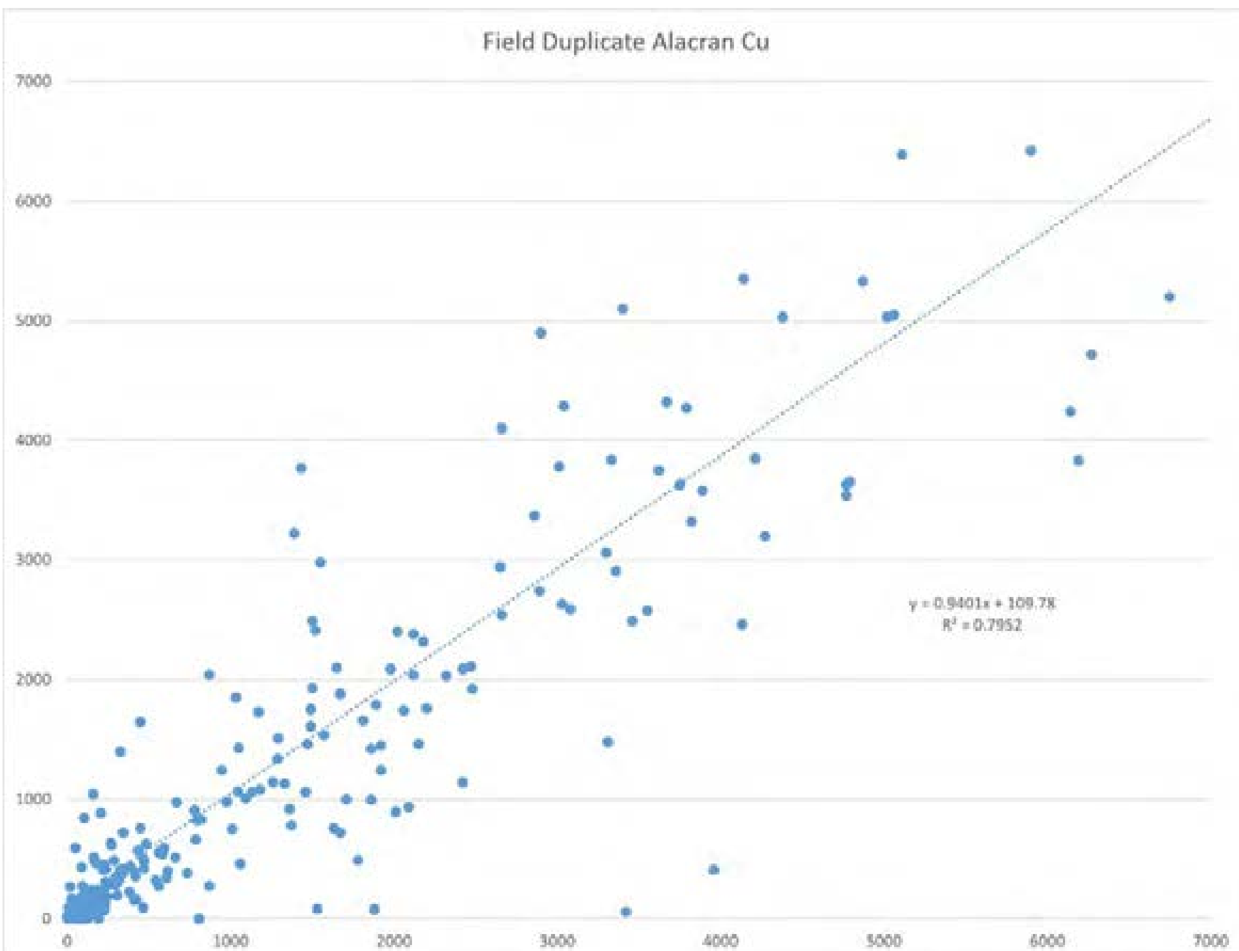
Cordoba submitted 332 core and pulp duplicates, along with 177 laboratory Au duplicates and 194 laboratory Cu duplicates as part of their QA/QC process. No field duplicates were sent for the 2020 drilling program as the material was used for metallurgical testing. An additional fourteen core and pulp duplicates were sent for Au and Cu from the 2019 and 2021 drilling programs. Field duplicate pair results show high variability for Cu and much less for Au (Figure 11-21 and Figure 11-22). Coarse reject and pulp duplicate pairs for both Au and Cu results show low variability for Cu and higher variability for Au (Figure 11-23 and Figure 11-24). During the 2020 and 2021 drill programs no duplicates were sent as the remainder of the drill core was used for metallurgical testing.

The variability in the field duplicates may be attributable to the natural variability of mineralization but can also be a result of poor sampling practice. In a review in 2016, Mr. Sketchley observed a serious water shortage issue that resulted in a thick, muddy coating on some cut core and a potential for significant contamination. The importance of adequate flushing was pointed out to the operator, and the issue was rectified.

Mr. Sketchley (2016) examined the precision issue by comparing fire assay methods and initiating screen metallic assays and concluded that the significant amount of scatter present above 0.2 g/t Au indicates the presence of coarse Au. The scatter is more pronounced for 30 g fire assay compared to 50 g. When values above 1 g/t are excluded, a reverse effect tends to be exhibited. In a follow-up investigation by Mr.

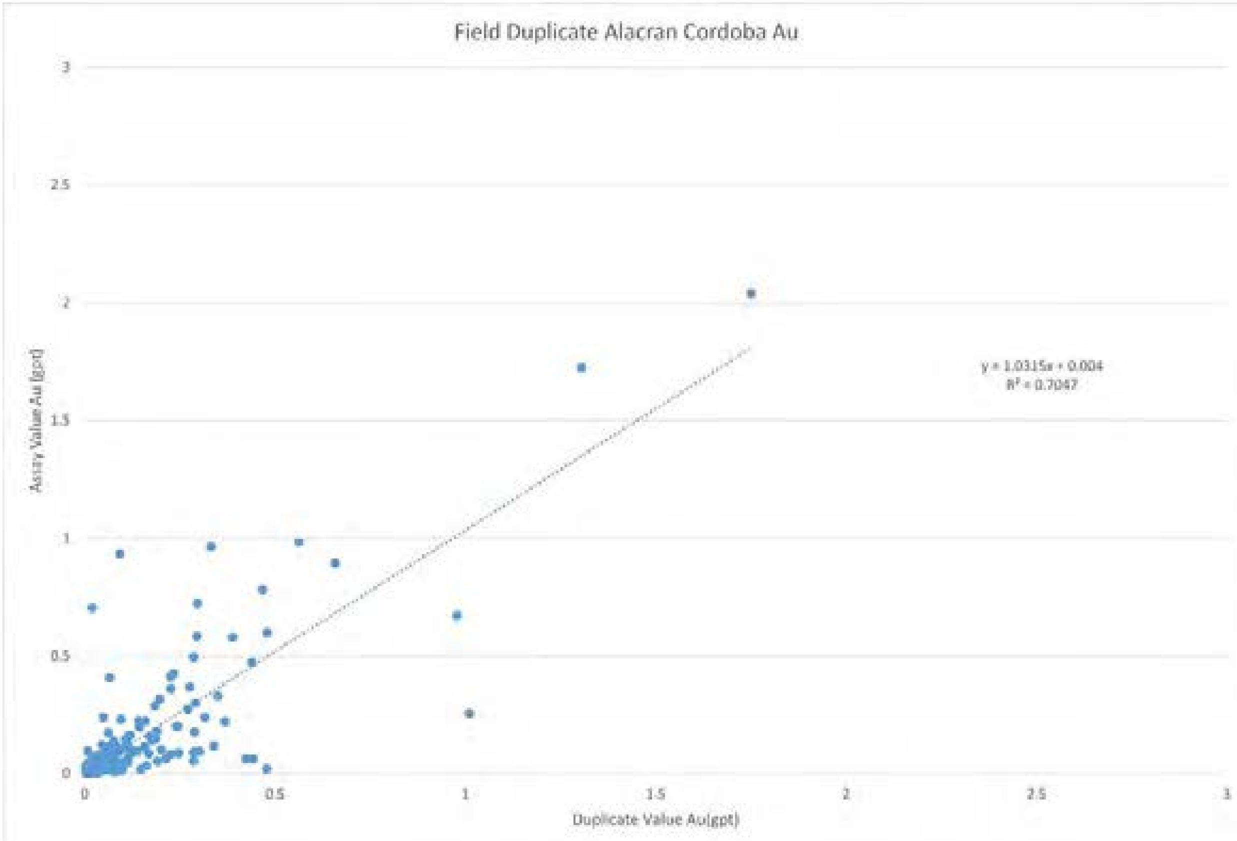
Sketchley in 2018, the heterogeneity of Au was evaluated by conducting Au grain size fraction analyses on a material known to exhibit coarse Au heterogeneity issues. He concluded that two groups of Au grain sizes are present in the test samples: finer than about 105 µm (140 mesh), and coarser than 105 µm (140 mesh). They roughly correspond to non liberation and liberation of Au during the routine pulverizing procedure in a laboratory. Mr. Sketchley recommended that in order to maintain the desired level of reproducibility the grade and size of analytical samples containing coarse Au must be greater than specified thresholds to ensure at least twenty Au particles per analytical sample. Samples with coarse Au lower than specified thresholds would be expected to exhibit a nugget effect, which could be overcome by doing pre-concentration such as screen metallic assays.

Cordoba reviewed core for fifteen field duplicate pairs in an effort to determine a source of variability and conclude the variations in the results of duplicates are due mostly to the heterogeneity of the Alacran deposit. Second and infrequent is a matter of bad sampling such as ignoring geological contacts in areas of high fracturing. Only one case does not seem to have a geological explanation for the disparate results.



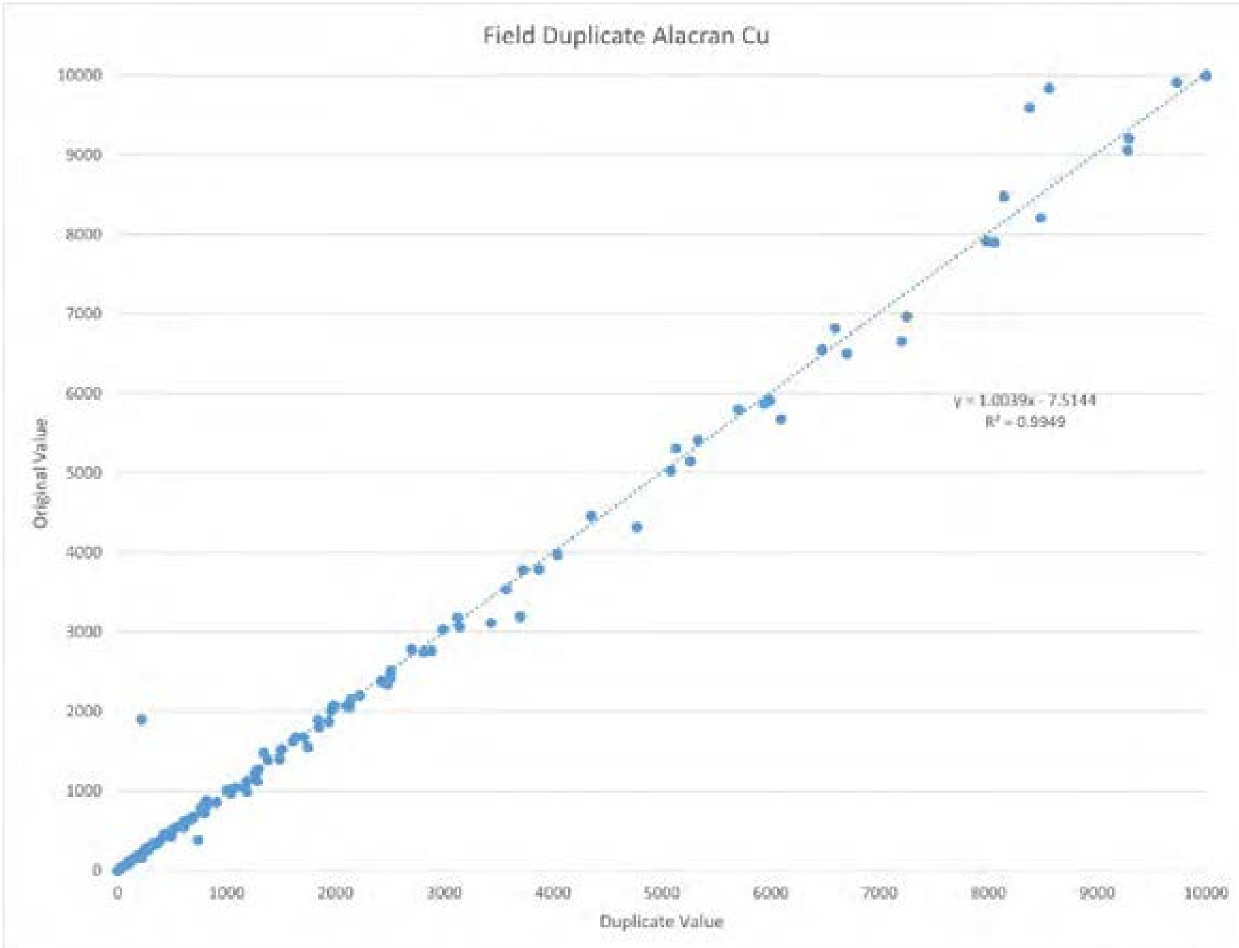
Source: Nordmin, 2021

Figure 11-21: Field duplicates for Cu (ppm) by Cordoba for the Alacran deposit



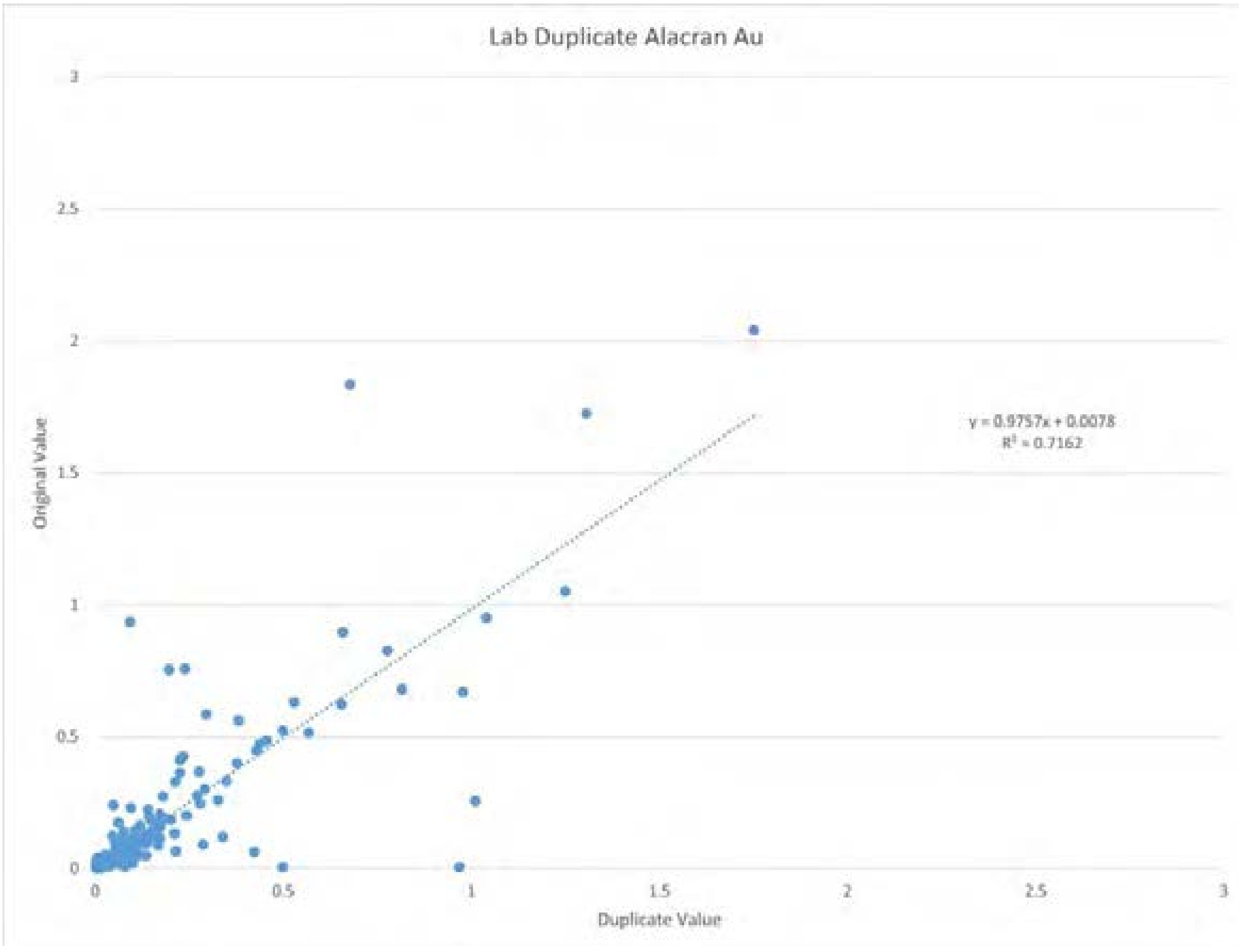
Source: Nordmin, 2021

Figure 11-22: Field duplicates for Au (g/t) by Cordoba for the Alacran deposit



Source: Nordmin, 2021

Figure 11-23: Lab duplicates (coarse reject and pulp) for Cu (ppm) by Cordoba for the Alacran deposit



Source: Nordmin, 2021

Figure 11-24: Lab duplicates (coarse reject and pulp) for Au (g/t) by Cordoba for the Alacran deposit

Checks

Check samples were not submitted during the 2020 and 2021 drill programs.

11.2.3.2 Satellite Deposits

Standards

Cordoba submitted 641 standards between 2016 and 2018 as part of their QA/QC process for the three Satellite deposits (Costa Azul, Montiel East, and Montiel West). The combined CRM results are summarized in Table 11-3, Figure 11-25, Figure 11-26, Figure 11-27 and Figure 11-28. No significant biases are evident.

Table 11-3: Cordoba Satellite Deposits CRM Result Summary

Standard	Count	Best Value Au (g/t)	Mean Au (g/t)	Bias (%)	Certified Value Au (%)	Standard Deviation Moving Average (%)	Best Value Cu (ppm)	Mean Cu (ppm)	Bias (%)	Certified Value Cu (%)	Standard Deviation Moving Average (%)
501b	165	0.248	0.242	-2.4	2.5	2.1	2,600	2,586	-0.1	2.6	2.4
502b	28	0.494	0.470	-4.8	3.1	2.1	7,730	7,794	-0.1	3.1	3.4
503b	34	0.695	0.670	-3.6	2.4	1.8	-	-	-	-	-
504b	41	1.61	1.520	5.5	3.8	2.2	11,100	11,098	-0.1	1.6	0.9
CDN-CM-35	118	0.320	0.319	-0.3	6.4	5.9	2,430	2,452	-1.0	2.8	3.0

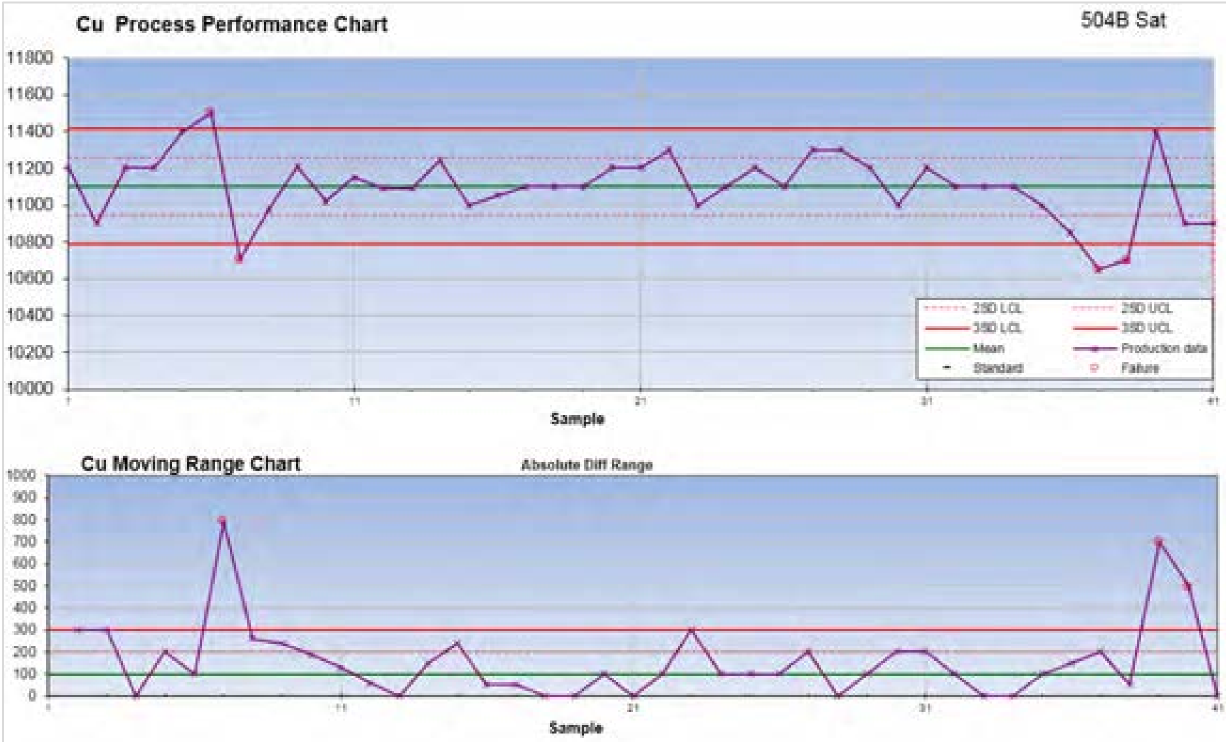
Source: Cordoba, 2019. No data was available for 503B Cu.

Source: Nordmin, 2021

Figure 11-25: Satellite deposits, Cordoba standard 501B Cu (ppm)

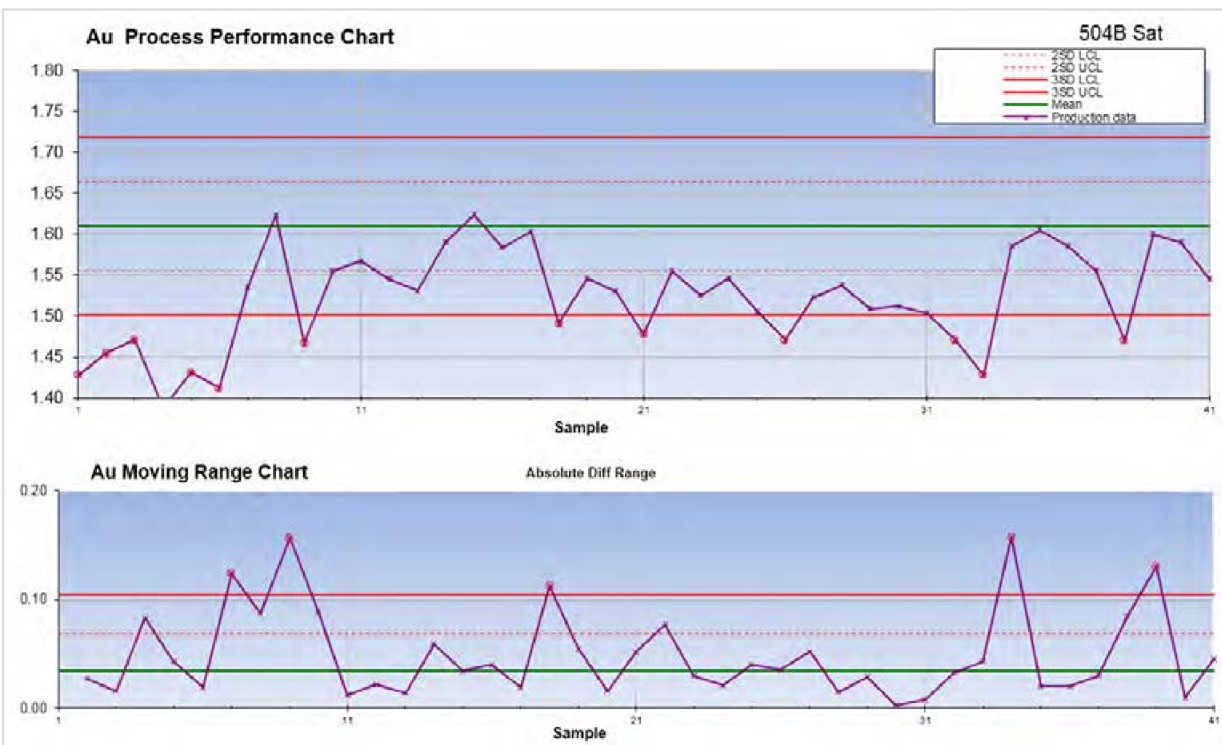
Source: Nordmin, 2021

Figure 11-26: Satellite deposits, Cordoba standard 501B Au (g/t)



Source: Nordmin, 2021

Figure 11-27: Satellite deposits, Cordoba standard 504B Cu (ppm)

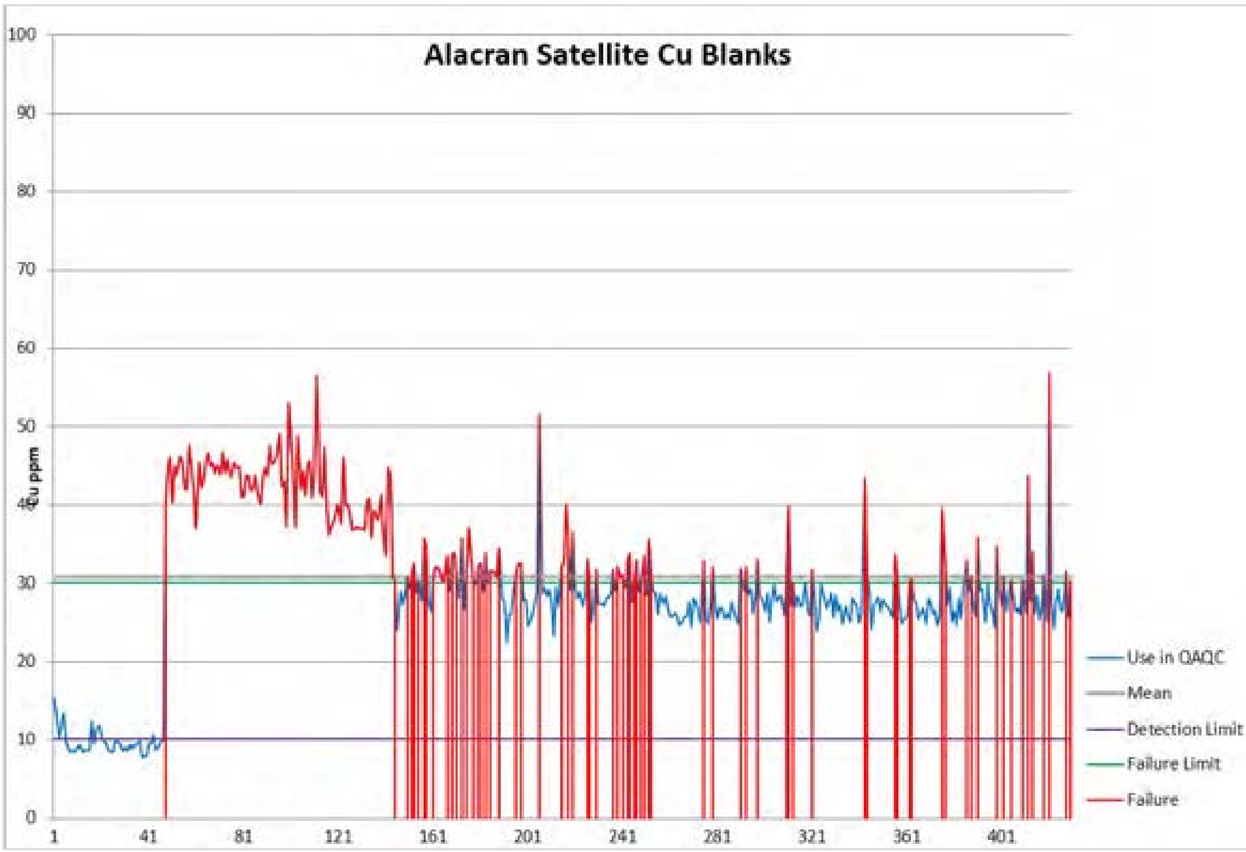


Source: Nordmin, 2021

Figure 11-28: Satellite deposits, Cordoba standard 504B Au (g/t)

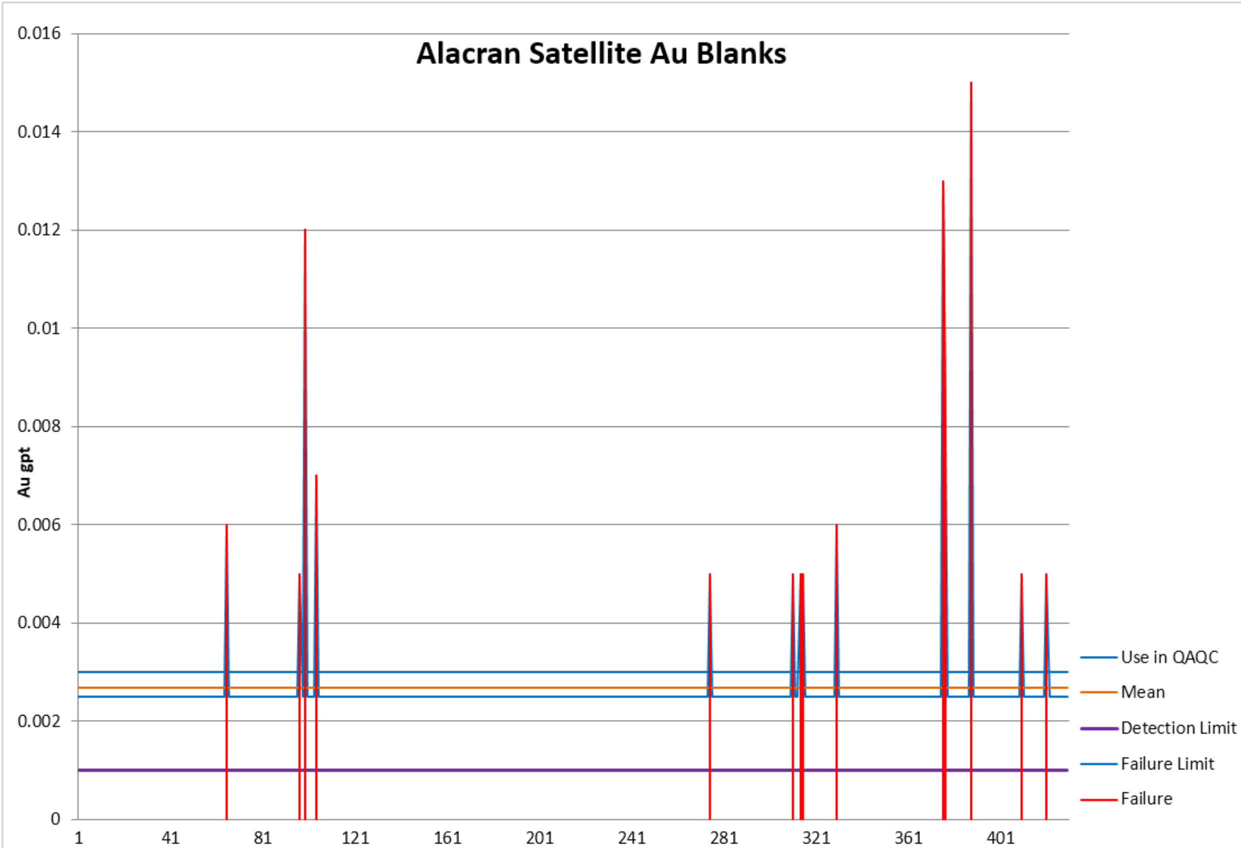
Blanks

Cordoba submitted 443 coarse blanks between 2014 and 2017 as part of its QA/QC process for its three Satellite deposits (Costa Azul, Montiel East, and Montiel West). No significant carryover is evident (Figure 11-30 and Figure 11-29); however, they do demonstrate that the coarse blank is not sufficiently devoid of Cu relative to the ME-MS 61 lower detection limit. This does not impact the current assessment.



Source: Nordmin, 2021

Figure 11-29: Cordoba coarse blanks, Cu (ppm) results for the Satellite deposits

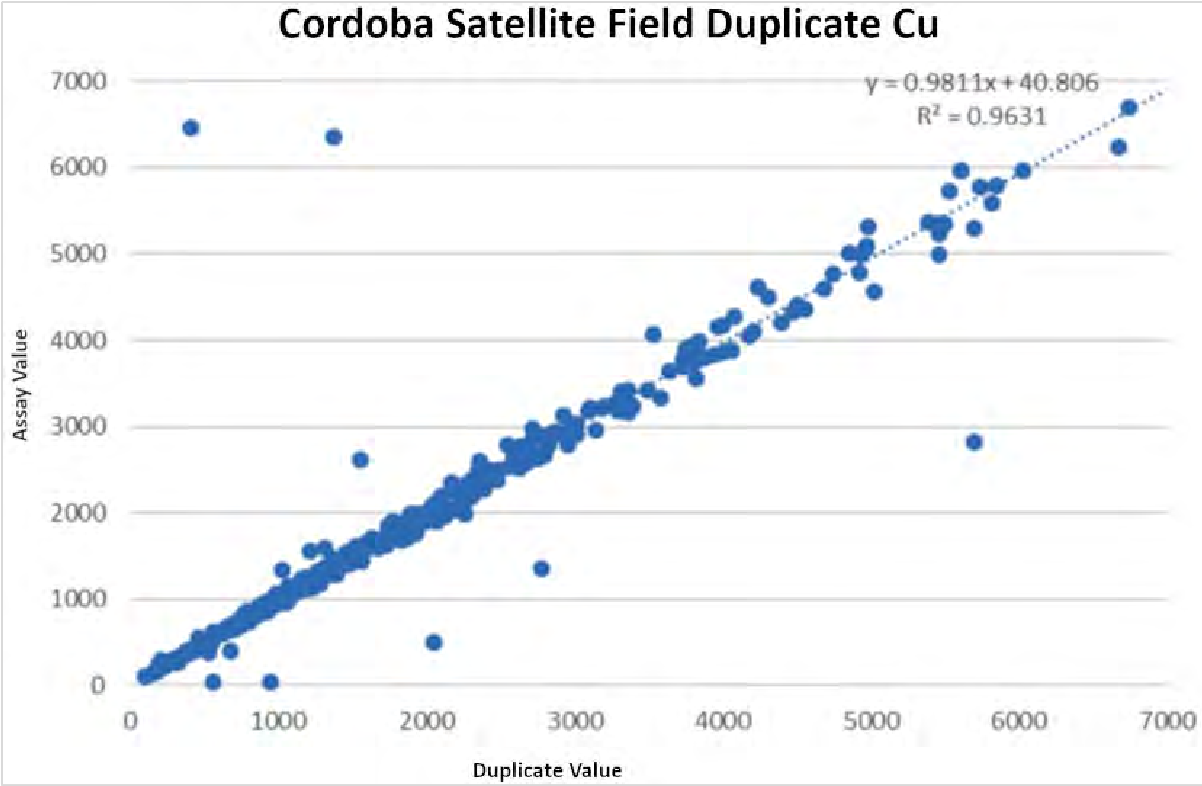


Source: Nordmin, 2021

Figure 11-30: Cordoba coarse blanks, Au (g/t) results for the Satellite deposits

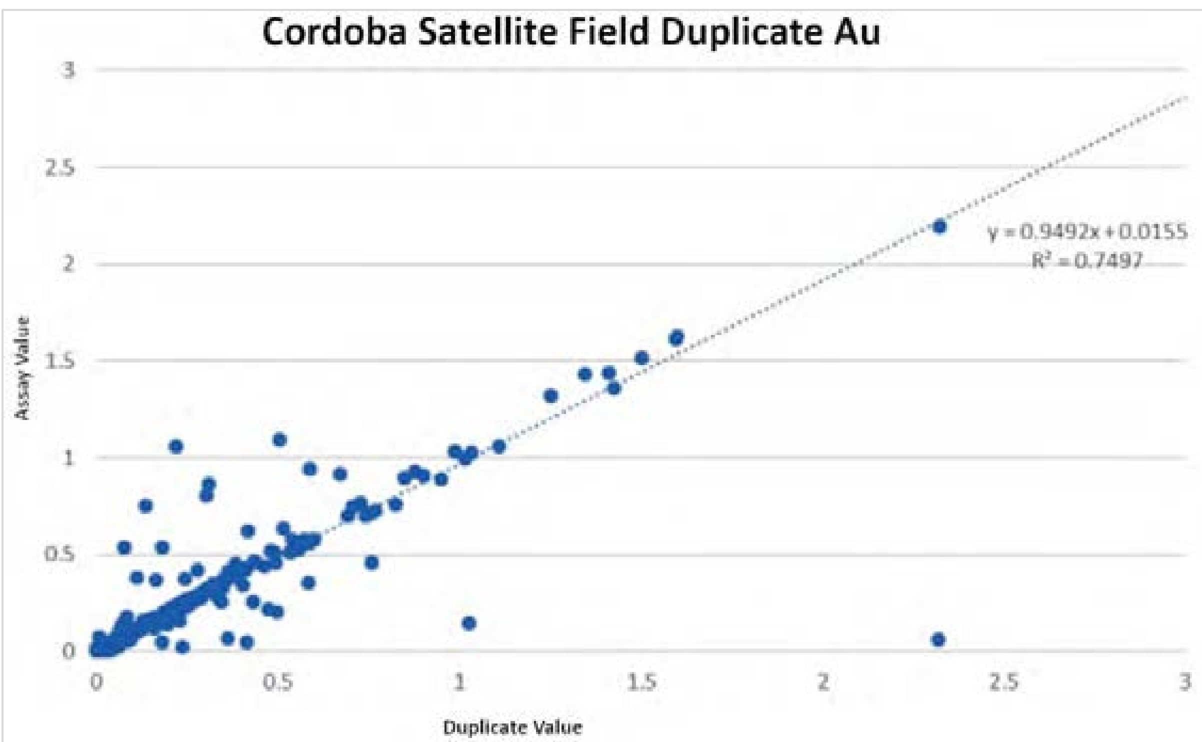
Field and Laboratory Duplicates

Cordoba submitted 719 Au/Cu core and pulp duplicates, along with 167 laboratory Au duplicates and 232 laboratory Cu duplicates as part of their QA/QC process for its three Satellite deposits (Costa Azul, Montiel East, and Montiel West). Field duplicate pair results show low variability for Cu and higher for Au (Figure 11-31 and Figure 11-32), while coarse reject and pulp duplicate pair for both Au and Cu results show low variability for Cu and Au (Figure 11-33 and Figure 11-34).



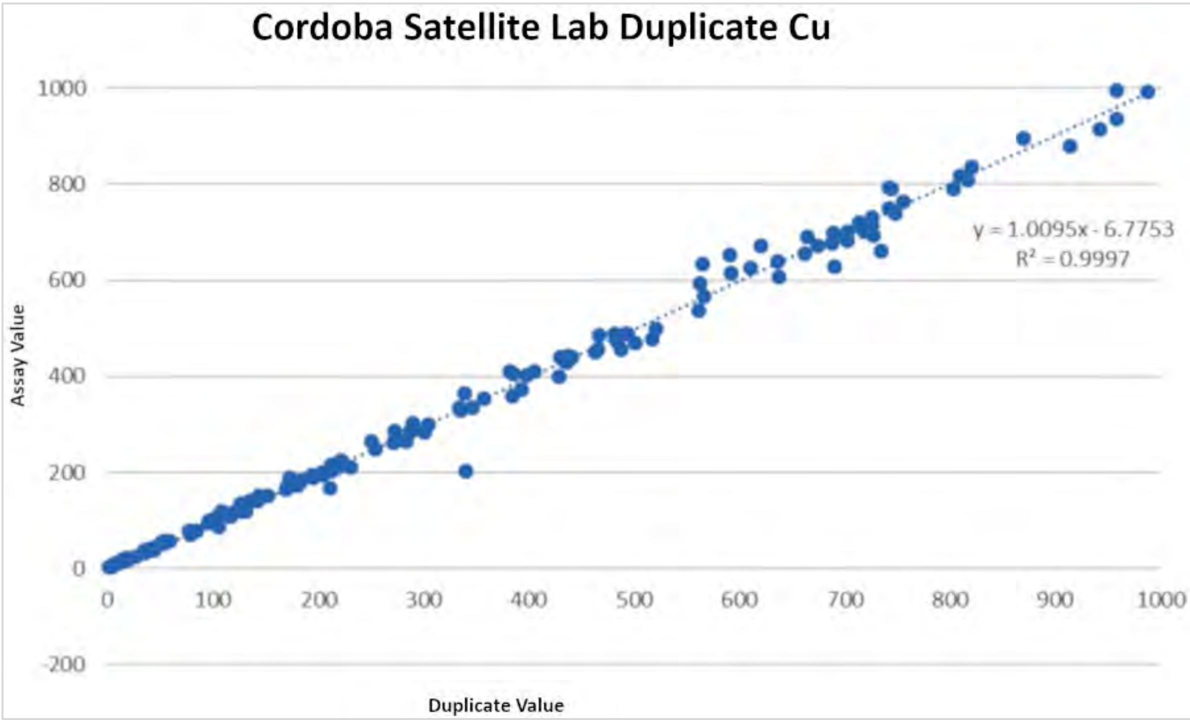
Source: Nordmin, 2021

Figure 11-31: Field duplicates, for Cu (ppm) by Cordoba for the Satellite deposits



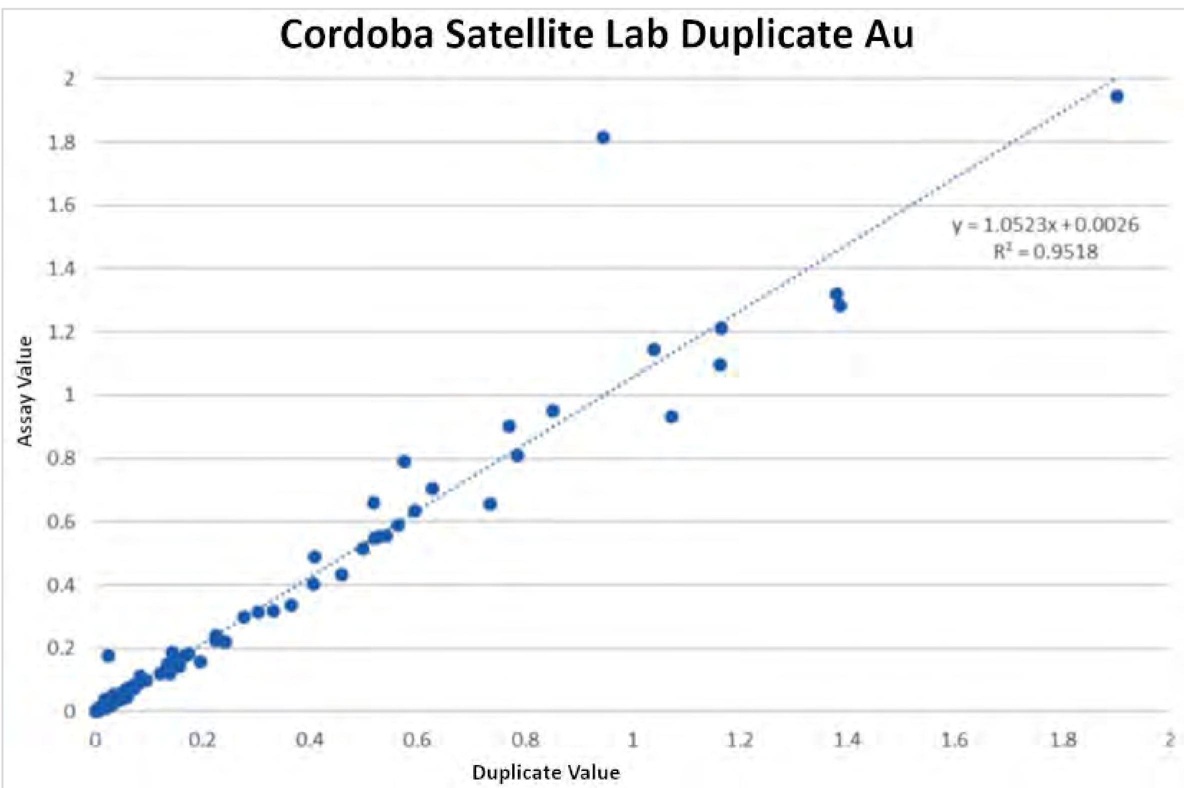
Source: Nordmin, 2021

Figure 11-32: Field duplicates, for Au (g/t) by Cordoba for the Satellite deposits



Source: Nordmin, 2021

Figure 11-33: Lab duplicates (coarse reject and pulp), for Cu (ppm) by Cordoba for the Satellite deposits



Source: Nordmin, 2021

Figure 11-34: Lab duplicates (coarse reject and pulp), for Au (g/t) by Cordoba for the Satellite deposits

11.3 Sample Security

11.3.1 Dual Resource

No formal documented processes were found with respect to sample security.

11.3.2 Ashmont

The Ashmont drill core was stored in metal core boxes by Ashmont in a store in Montería and was transported to Cordoba' secure core store and core logging shack at Alacran when it acquired the Project. The sample rejects and pulps were stored by Ashmont in a store in Puerto Libertador and were likewise transferred to the core storage by Cordoba.

11.3.3 Cordoba

Drill core from each run was placed in metal core boxes by the drillers. Core boxes were taken from the rig to the core shack by company vehicle. Samples were securely stored in the core shack at Alacran were then transported by courier to the laboratory in Medellín. All remaining core is stored at Cordoba's secure core logging facility.

11.4 Qualified Person's Opinion on the Adequacy of Sample Preparation, Security, and Analytical Procedures.

Nordmin has been supplied with all raw QA/QC data and has reviewed and completed an independent check of the results for all Cordoba, Ashmont, and Dual Resources sampling programs. It is Nordmin's opinion that the sample preparation, security, and analytical procedures used by all parties are consistent with standard industry practices and that the data is suitable for the 2019 Mineral Resource Estimate. Nordmin identified several further recommendations to Cordoba to ensure the continuation of a robust QA/QC program but has noted that there are no material concerns with the geological or analytical procedures used or the quality of the resulting data.

12 DATA VERIFICATION

Nordmin completed several data validation checks by the QP to review surface geology, artisanal miner workings, drill core geology, geological procedures, chain of custody of drill core, sample pulps, and for the collection of independent samples for metal verification. Data verification included a survey spot check of drill collars, a spot check comparison of Cu, Au and Ag assays from the drill hole database against original assay records (lab certificates), spot check of drill core lithologies recorded in the database versus the core located in the core storage shed and a review of QA/QC performance of the drill programs. The QP has also completed additional data analysis and validation, as outlined in Section 11.

12.1 Qualified Person Site Visit 2019

A site visit to the Project was carried out April 8 to April 10, 2019, by Glen Kuntz, P.Geo., QP for Mineral Resources. Activities during the site visit included:

- Review of the geological and geographical setting of the Project;
- Review and inspection of the site geology, mineralization and structural controls on mineralization;
- Review of the drilling, logging, sampling, analytical and QA/QC procedures;
- Review of the chain of custody of samples from the field to assay lab;
- Review of the drill logs, drill core, storage facilities and independent assay verification on selected core samples;
- Confirmation of some drill hole collar locations;
- Review of the artisanal operations that are dedicated to the recovery of Au;
- Assessment of logistical aspects, potential OP locations, potential waste dumps and other surface infrastructure practicalities relating to the Property;
- Review of the structural measurements recorded within the drill logs and how these measurements are utilized within the 3D structural model; and
- Validation of a portion of the drill hole database.

The Cordoba geologists completed the geological mapping, core logging, and sampling associated with the 2015 to 2019 drill programs. Therefore, Nordmin relied on Cordoba's database to review the core logging procedures, collection of samples, and the chain of custody associated with the drilling programs. Cordoba provided Nordmin with excerpts from the drill database (acQuire^{TM}) for the Project and electronic copies of the original logging and assay reports.

Cordoba employs a rigorous QA/QC protocol including the routine insertion of field duplicates, laboratory pulp duplicates, blanks, and certified reference standards. Nordmin was provided with an excerpt from the database for review.

The collection and use of the structural information were reliable, and representative of the structure features being drilled. This was found to be consistent with industry standards and in accordance with Cordoba's internal procedural documentation.

No significant issues were identified during the site visit. Nordmin was accompanied by Cordoba geologists who have been involved with the Project since 2011

- The geological data collection procedures and the chain of custody were found to be consistent with industry standards and in accordance with Cordoba's internal procedural documentation; and
- Nordmin was able to verify the quality of geological and sampling information and develop an interpretation of Cu, Au, and Ag grade distributions appropriate to use in the Mineral Resource model.

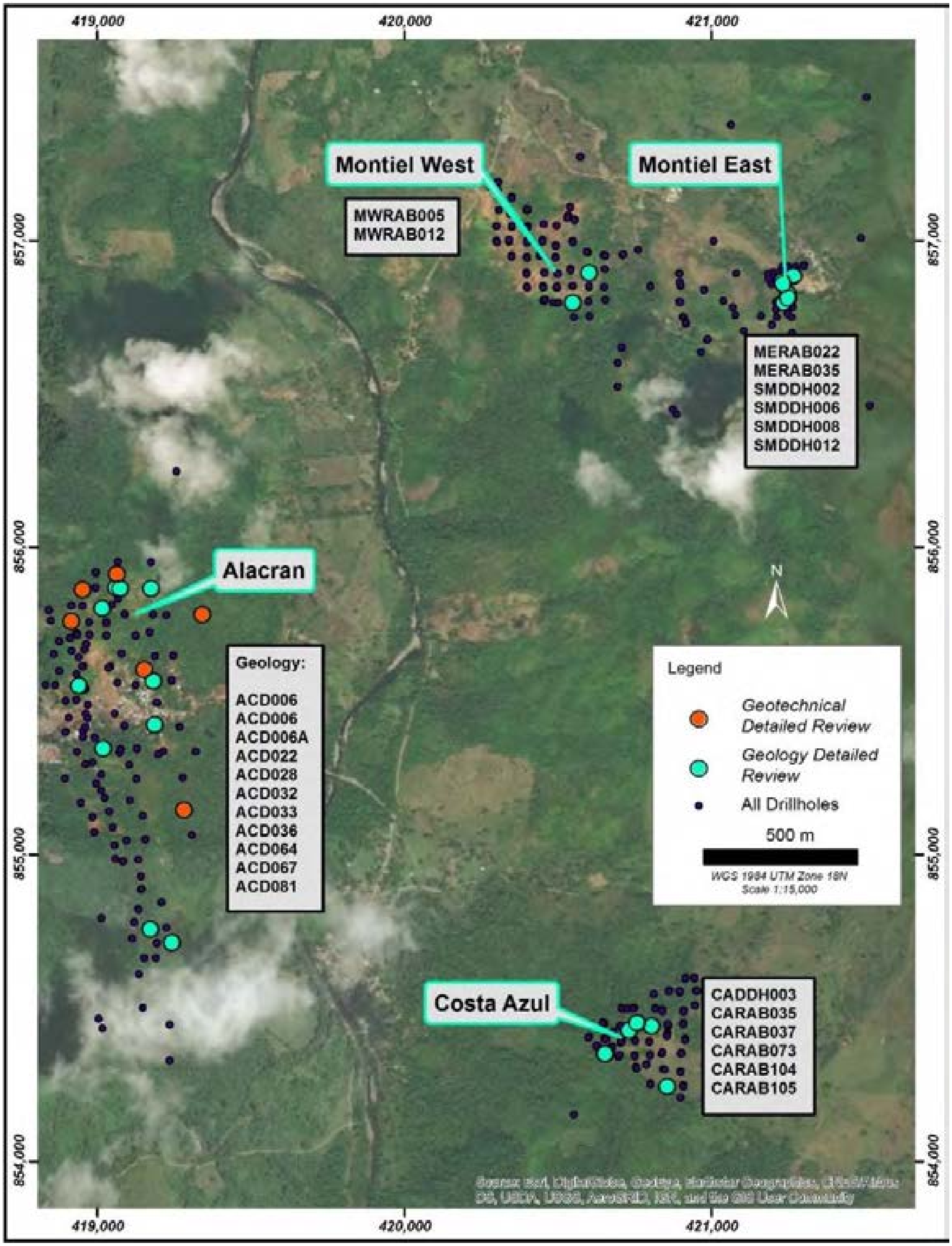
12.1.1 Field Collar Validation

The QP confirmed the collar locations of twenty Alacran, ten Costa Azul, and eight Montiel East, and Montiel West drill holes used within the Resource Estimate. The QP collected the collar locations using a Garmin GPSMAP 62 handheld GPS unit versus the differential GPS (sub-centimetre accuracy) used in the Cordoba database. Approximately 13% of the collar locations were checked in Alacran, approximately 7% in Costa Azul and approximately 5% in Montiel East/ Montiel West. The RC collar locations within the Satellite deposits had a fair number of the collars removed. However, the drill pad was still visible for many of these collars. All of the collar locations except for two RC holes within the Costa Azul deposit are within the acceptable error limit of the GPS unit (Table 12-1, Figure 12-1 and Figure 12-2).

Table 12-1: Field Check Comparing DDH Collar Coordinates Using a Handheld GPS Versus Database Coordinates

DATABASE				ORIGINAL COLLAR				VERIFICATION		
PROJECT	BHID	EASTING	NORTHING	PROJECT	BHID	EASTING	NORTHING	BHID	XCOLLAR	YCOLLAR
Alacran North	ACD001	418914	855760	Alacran North	ACD001	418913	855764	ACD001	-1	4
Alacran North	ACD004	418973	855757	Alacran North	ACD004	418975	855763	ACD004	2	6
Alacran North	ACD007	418974	855718	Alacran North	ACD007	418976	855722	ACD007	2	4
Alacran North	ACD022	419017	855802	Alacran North	ACD022	419019	855804	ACD022	2	2
Alacran South	ACD025	419095	855046	Alacran South	ACD025	419092	855049	ACD025	-3	3
Alacran North	ACD047	419046	855813	Alacran North	ACD047	419049	855816	ACD047	3	3
Alacran North	ACD058	418963	855686	Alacran North	ACD058	418964	855689	ACD058	1	3
Alacran South	ACD066	419224	854762	Alacran South	ACD066	419224	854767	ACD066	0	5
Alacran South	ACD067	419242	854714	Alacran South	ACD067	419241	854719	ACD067	-1	5
Alacran South	ACD073	418984	855122	Alacran South	ACD073	418985	855127	ACD073	1	5
Alacran South	ACD081	419172	854756	Alacran South	ACD081	419168	854761	ACD081	-4	5
Alacran South	ASA011	419037	855139	Alacran South	ASA011	419034	855144	ASA011	-3	5
Alacran South	ASA014	418916	855760	Alacran South	ASA14	418916	855764	ASA14	0	4
Alacran South	ASA016	418951	855810	Alacran South	ASA16	418952	855814	ASA16	1	4
Alacran South	ASA019	418994	855869	Alacran South	ASA19	418993	855870	ASA19	-1	1
Alacran South	ASA021	418993	855869	Alacran South	ASA21	418993	855870	ASA21	0	1
Alacran North	ASA022	419141	854929	Alacran North	ASA022	419141	854928	ASA022	0	-1
Alacran North	ASA028	419113	854725	Alacran North	ASA028	419112	854729	ASA028	-1	4
Alacran North	ASA045	419133	854983	Alacran North	ASA045	419131	854986	ASA045	-2	3
Alacran North	ASA027	419120	854779	Alacran North	ASA027	419128	854782	ASA027	9	3
Costa Azul	CADDH001	420707	854442	Costa Azul	CADDH001	420704	854442	CADDH001	-3	0
Costa Azul	CADDH002	420705	854440	Costa Azul	CADDH002	420704	854442	CADDH002	-1	2
Costa Azul	CADDH003	420730	854428	Costa Azul	CADDH003	420730	854428	CADDH003	0	0
Costa Azul	CADDH005	420856	854420	Costa Azul	CADDH005	420857	854425	CADDH005	1	5
Costa Azul	CARAB021	420838	854355	Costa Azul	CARAB021	420822	854334	CARB021	-16	-21
Costa Azul	CARAB022	420838	854352	Costa Azul	CARAB022	420822	854334	CARB022	-16	-18
Costa Azul	CARAB039	420908	854493	Costa Azul	CARAB039	420901	854486	CARB039	-7	-7
Costa Azul	CARAB040	420908	854490	Costa Azul	CARAB040	420901	854486	CARB040	-7	-4
Costa Azul	CARAB048	420946	854510	Costa Azul	CARAB048	420945	854486	CARB048	-1	-24
Costa Azul	CARAB049	420946	854507	Costa Azul	CARAB049	420945	854486	CARB049	-1	-21
Montiel East	MWRAB007	420547	856852	Montiel East	MWRAB007	420547	856847	MWDDH007	0	-5
Montiel East	MWRAB008	420547	856852	Montiel East	MWRAB008	420547	856847	MWDDH008	0	-5
Montiel West	SMDDH011	420800	856850	Montiel West	SMDDH011	420810	856845	SMDDH011	10	-5
Montiel West	SMDDH015	420915	856731	Montiel West	SMDDH015	420916	856733	SMDDH015	1	2
Montiel West	SMDDH016	420915	856736	Montiel West	SMDDH016	420917	856739	SMDDH016	2	3
Montiel West	SMDDH016-W	420916	856731	Montiel West	SMDDH016W	420917	856739	SMDDH016W	1	8
Montiel West	SMDDH025	421006	856999	Montiel West	SMDDH025	421006	857001	SMDDH025	0	2
Montiel West	SMDDH032	421080	856892	Montiel West	SMDDH032	421081	856896	SMDDH032	1	4

Source: Nordmin, 2019



Source: Nordmin, 2019

Figure 12-1: Map of Alacran deposit and the three Satellite deposits with validated drill hole collars

Source: Nordmin, 2019

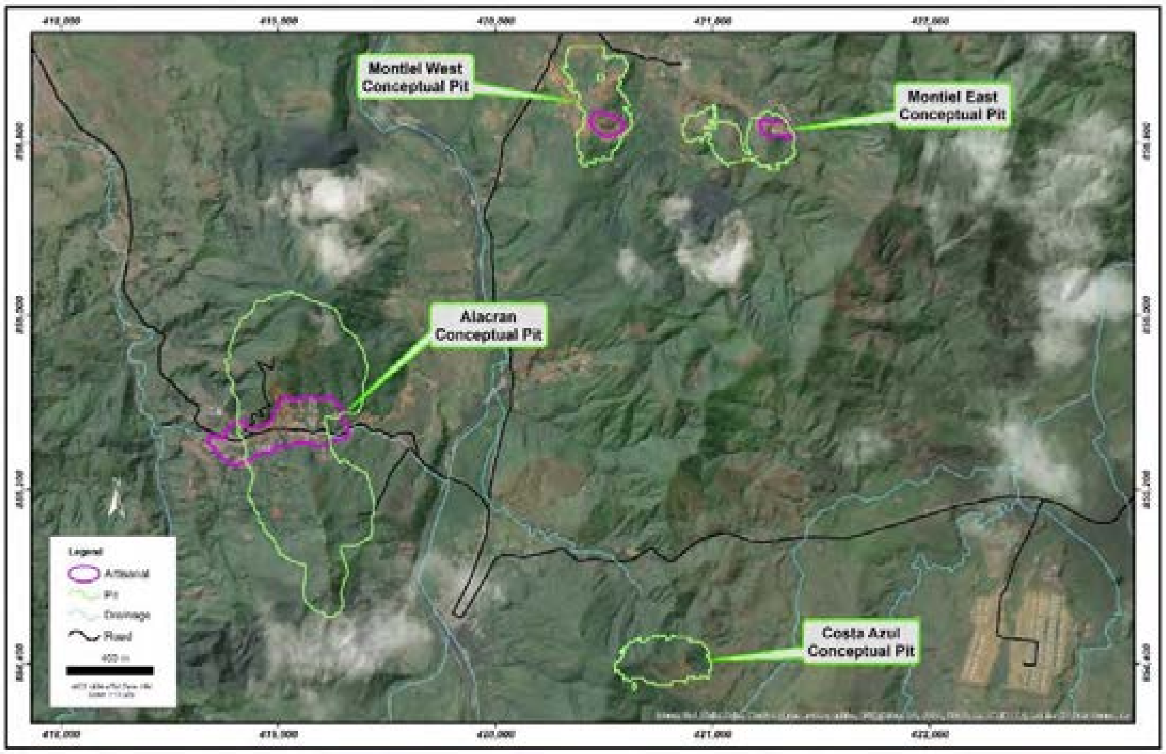
Figure 12-2: Examples of core hole validation for diamond drill core and RC drilling

12.1.2 Review of Local Artisanal Operations

Nordmin reviewed six artisanal operations while on site (Figure 12-3). Most were dedicated to the recovery of Au, and Nordmin observed one operation that had Cu-rich mineralization been set aside for the recovery of Cu but, unlike the Au-only recovery operations, the Au recovery plant was not in operation.

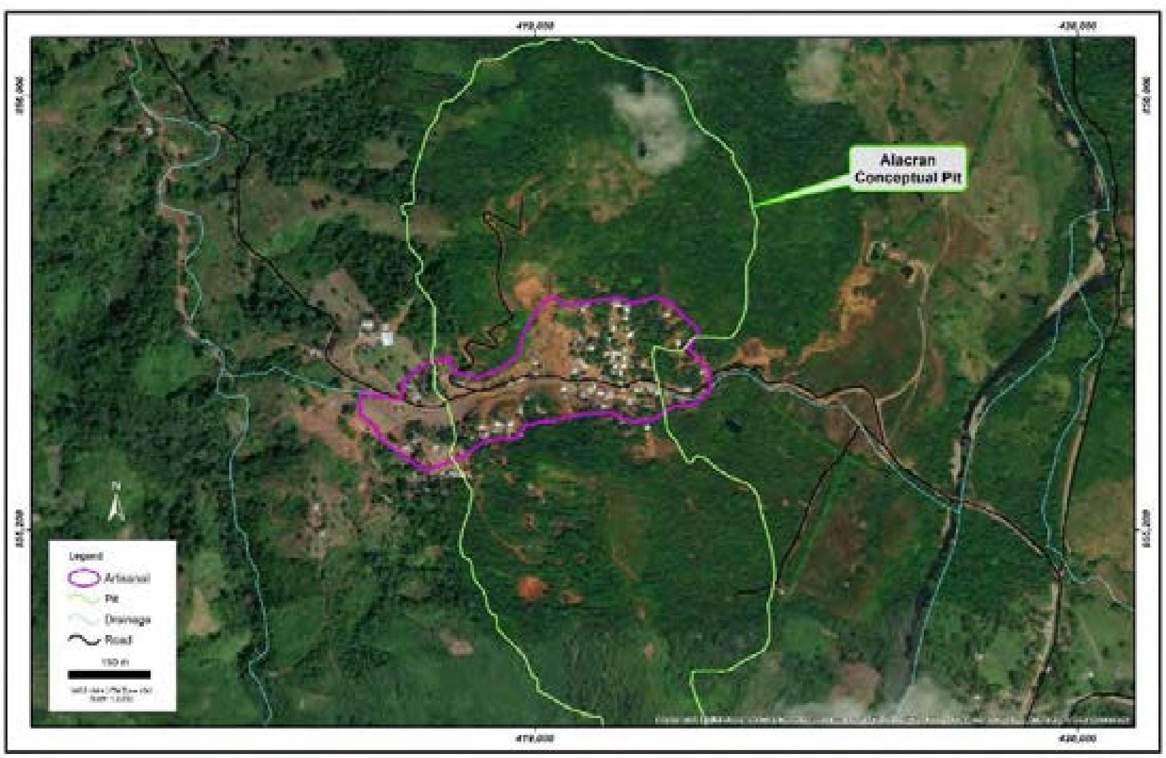
Figure 12-3: (A) Artisanal mining operations and (B) Artisanal mining portal

Nordmin observed the local artisanal operations focused on mining the HG Au structures in the Project area (Figure 12-4 and Figure 12-5).



Source: Nordmin, 2019

Figure 12-4: Overview of the Project area artisanal mining operations



Source: Nordmin, 2019

Figure 12-5: Plan view of Alacran deposit artisanal mining operations

12.1.3 Core Logging, Sampling, and Storage Facilities

Cordoba drill holes were logged, photographed, and sampled on site at the core logging facility. Most of the core is stored on site, and the samples pulps and coarse rejects are archived in secure storage facilities off site (Figure 12-6).

Source: Nordmin, 2019

Figure 12-6: (A) Core logging and sampling facility at the Alacran camp, and (B) Core storage facility at the Alacran camp

12.1.4 Independent Sampling

The QP selected intervals from 24 Alacran holes (both Cordoba and Ashmont drilled holes), four Costa Azul, and ten holes from Montiel East and Montiel West. A total of 38 sample pulps plus six control samples (two CRM standards and four blanks) were collected. Nordmin elected to choose a variety of grade ranges from various drill holes between the deposits (Table 12-2).

Table 12-2: Drill Program Intervals Selected for Verification Sampling

Hole ID	Sample From (m)	Sample To (m)	Old Sample ID	New Sample ID
ACD027	180.00	182.00	ALA03745	ALA12201
ACD002	245.18	246.00	41319	ALA12206
ACD004	21.00	22.00	41712	ALA12208
ACD006A	223.00	224.00	42599	ALA12204
ACD008	119.00	120.00	43131	ALA12203
ACD015	131.00	132.00	ALA00155	ALA12205
ACD023	302.00	303.00	ALA03077	ALA12207
ACD027	8.00	10.00	ALA03643	ALA12202
ACD030	192.00	194.00	ALA04320	ALA12210
ACD032	54.00	56.00	ALA04614	ALA12222
ACD034	214.00	216.00	ALA5050	ALA12225
ACD044	120.00	122.00	ALA06584	ALA12209
ACD052	118.00	118.50	ALA07762	ALA12220
ACD055	188.00	190.00	ALA07672	ALA12223
ACD062	146.00	148.00	ALA9197	ALA12221
ACD070	197.85	199.40	ALA10340	ALA12211
ACD070	253.00	255.00	ALA10718	ALA12212
ASA019	67.00	68.00	31352	ALA12241
ASA019	71.00	72.00	31356	ALA12242
ASA022	204.00	205.00	32496	ALA12250
ASA024	148.00	149.00	33103	ALA12251
ASA024	231.00	232.00	33202	ALA12253
ASA026	136.00	137.00	33723	ALA12244
ASA026	141.00	142.00	33729	ALA12247
ASA027	125.00	126.00	33948	ALA12239
ASA027	102.00	103.00	33919	ALA12240
ASA034	80.00	81.00	35635	ALA12243

Hole ID	Sample From (m)	Sample To (m)	Old Sample ID	New Sample ID
ASA038	138.00	139.00	36974	ALA12238
ASA038	140.00	141.00	36976	ALA12245
ASA038	162.00	163.00	37004	ALA12246
ASA041	78.00	79.00	37813	ALA12249
ASA041	88.00	89.00	37826	ALA12252
CADDH001	37.00	38.00	101184	ALA12231
CADDH002	81.50	82.50	101393	ALA12237
CADDH004	22.50	24.20	101839	ALA12234
CADDH006	15.00	17.00	SMA05707	ALA12233
MWDDH001	22.40	23.20	102002	ALA12227
MWDDH001	6.00	7.10	101985	ALA12226
MWDDH005	86.00	88.00	SMA05480	ALA12232
MWDDH008	24.00	26.00	SMA06416	ALA12218
SMDDH001	52.00	52.40	100070	ALA12235
SMDDH002	28.80	29.55	100123	ALA12213
SMDDH002	81.20	81.95	100193	ALA12214
SMDDH003	136.00	137.20	100666	ALA12215
SMDDH008	58.00	59.10	102717	ALA12216
SMDDH008	80.60	81.50	102741	ALA12217
SMDDH008	331.80	333.00	103002	ALA12219
SMDDH015	89.00	90.00	SMA00105	ALA12229
SMDDH018	64.00	66.00	SMA00768	ALA12230
SMDDH019	66.00	68.00	SMA01557	ALA12228

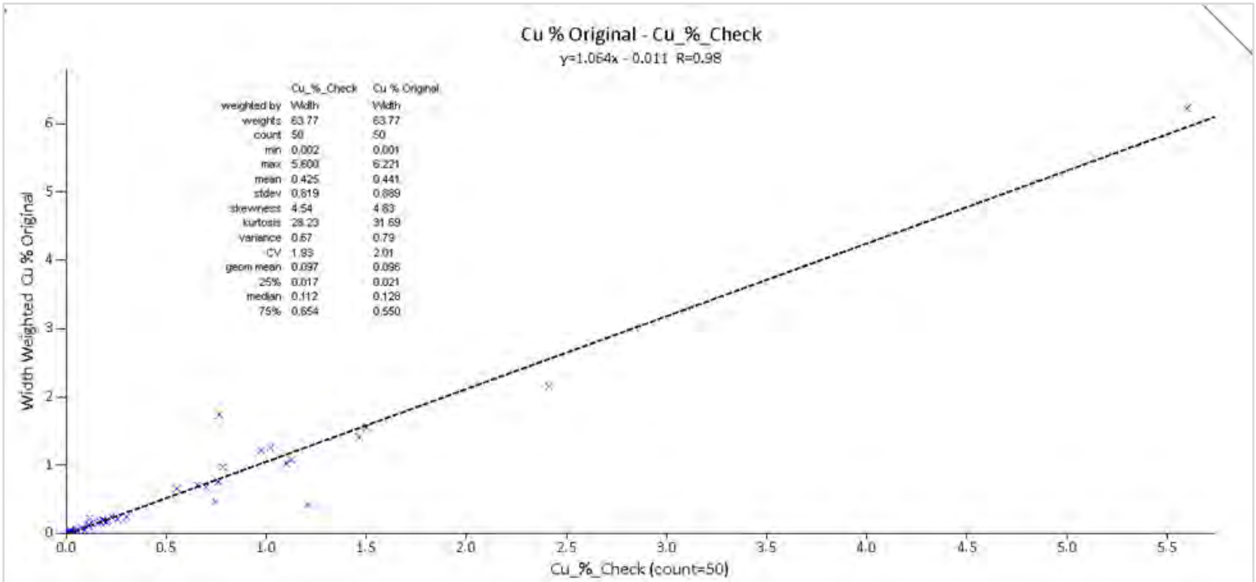
Source: Nordmin, 2019

Pulp samples selected by Nordmin for verification analysis were individually placed into plastic sample bags which were then packaged together and shipped to the ALS Laboratory in Colombia for analysis using Cordoba's analytical procedures (Figure 12-7).

Source: Nordmin, 2019

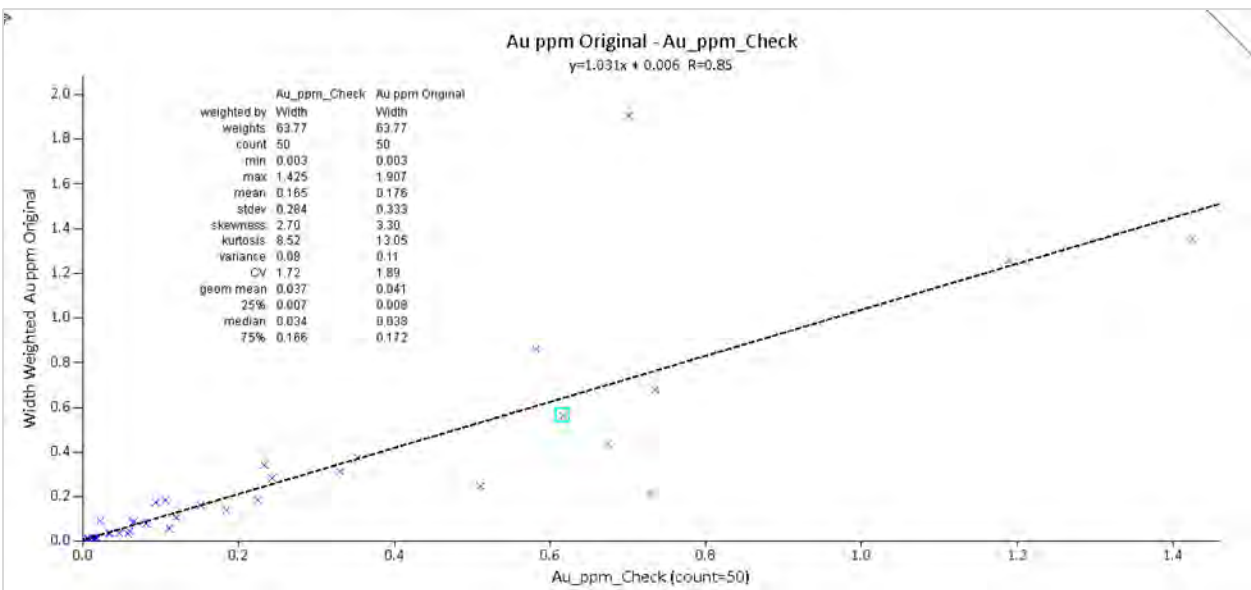
Figure 12-7: Nordmin verification samples

The Nordmin assay results were compared to the Cordoba database and summarized in the scatter plots for Cu and Au (Figure 12-8 and Figure 12-9). Despite some sample variance, most assays compared within reasonable tolerances for the deposit types and no material bias was evident.



Source: Nordmin, 2019

Figure 12-8: Scatter plot comparison of Cu (%) verification samples



Source: Nordmin, 2019

Figure 12-9: Scatter plot comparison of Au (ppm) verification samples

12.2 Qualified Persons Site Visits 2021

A site visit was carried out June 8 to June 9, 2021, by Glen Kuntz P.Geo. QP for Mineral Resources and for a second time during September 20 to September 21, 2021, by Glen Kuntz, P.Geo., QP for Mineral Resources, and Joanne Robinson, P.Eng., QP for Mineral Reserves. Activities during the site visit included:

- Review of the geological and geographical setting of the Project;
- Review and inspection of the site geology, mineralization and structural controls on mineralization;
- Review of the drill logs, drill core, storage facilities and independent assay verification on selected core samples;
- Review of geotechnical information and studies;
- Confirmation of some drill hole collar locations;
- Review of the artisanal operations that are dedicated to the recovery of Au;
- Assessment of logistical aspects, potential OP locations, potential waste dumps and other surface infrastructure practicalities relating to the Property;
- Validation of a portion of the drill hole database.

The Cordoba geologists completed the geological mapping, core logging, and sampling associated with the 2020-2021 drill program. Therefore, Nordmin relied on Cordoba's database to review the core logging procedures, collection of samples, and chain of custody associated with the drilling programs. Cordoba provided Nordmin with excerpts from the drill database (MX Deposits™) for the Project and electronic copies of the original logging and assay reports.

Cordoba employs a rigorous QA/QC protocol including the routine insertion of field duplicates, laboratory pulp duplicates, blanks, and certified reference standards. Nordmin was provided with an excerpt from the database for review.

The collection and use of the structural information were reliable, and representative of the structure features being drilled. This was found to be consistent with industry standards and in accordance with Cordoba's internal procedural documentation.

No significant issues were identified during each site visit. Nordmin was accompanied by Cordoba geologists who have been involved with the Project since 2011.

- The geological data collection procedures and the chain of custody were found to be consistent with industry standards and in accordance with Cordoba's internal procedural documentation; and
- Nordmin was able to verify the quality of geological and sampling information and develop an interpretation of Cu, Au, and Ag grade distributions appropriate to use in the Mineral Resource and Mineral Reserve model.

12.2.1 Field Collar Validation

The QP confirmed the collar locations of an additional five Alacran deposit drill holes used within the Resource Estimate. The QP collected the collar locations using a Garmin eTrex handheld GPS unit versus the differential GPS (sub-centimetre accuracy) used in the Cordoba database. Approximately 17% of the collar locations were checked in the Alacran deposit between the 2019 and 2021 site visits. The collar locations that were checked during the 2021 site visits can be viewed in

Table 12-3.

Table 12-3: Field Check Comparing Handheld GPS Collar Coordinates Versus the Database Collar Coordinates from the 2021 Site Visit

BHID	Original Collar Coordinates			Checked Collar Coordinates		
	X Collar	Y Collar	Z collar	X Collar	Y Collar	Z Collar
ACD086	419040	855704	218.65	419040	855704	223
ACD088	418982	855905	218.02	418982	855905	218
ACD091	419203.8	854802.4	261.28	419203	854802	260
ACD092	419045.5	855099.1	184.20	419045	855099	182
DH082	419150	855163	229.57	418151	855159	227

Source: Nordmin, 2021

12.2.2 Independent Sampling

The QP selected intervals from four Alacran deposit holes. A total of twenty sample pulps plus three control samples (1 CRM standard and two blanks) were collected. Nordmin elected to choose a variety of grade ranges from various drill holes between the deposits (Table 12-4).

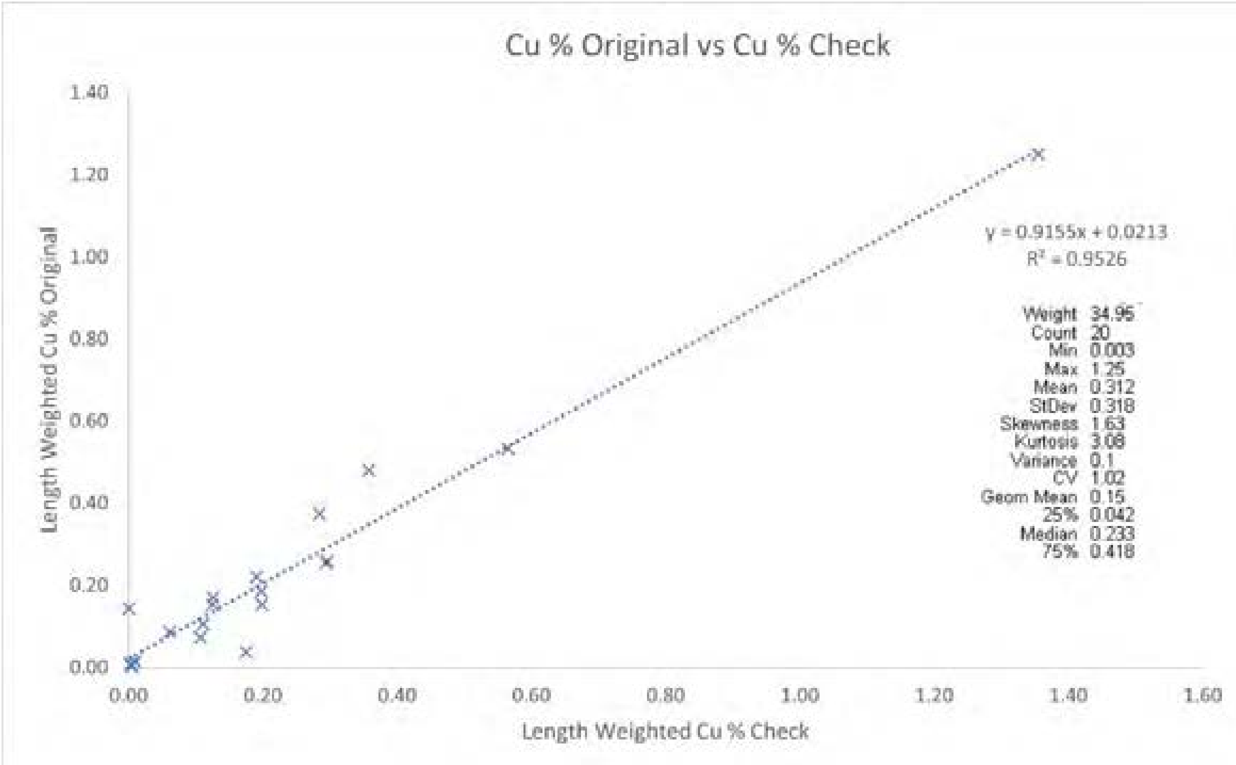
Table 12-4: Drill Program Intervals Selected for Verification Sampling

Hole ID	Sample From (m)	Sample To (m)	Old Sample ID	New Sample ID
ACD092	84	86	ALA11807	ALA13527
ACD092	86	88	ALA11808	ALA13528
ACD092	88	90	ALA11809	ALA13529
ACD092	90	92	ALA11810	ALA13530
ACD092	92	94	ALA11811	ALA13531
ACD092	94	96	ALA11812	ALA13532
ACD086	57.2	59.2	ALA12172	ALA13533
ACD086	59.2	60.7	ALA12173	ALA13534
ACD086	60.7	61.7	ALA12174	ALA13535
ACD086	61.7	63.4	ALA12175	ALA13536
ACD086	63.4	65	ALA12176	ALA13537
ACD091	53.5	55.5	ALA11959	ALA13538
ACD091	55.5	57	ALA11960	ALA13539
ACD091	57	59	ALA11961	ALA13540
ACD091	59	61	ALA11962	ALA13541
ACD091	61	63	ALA11963	ALA13542
ACD088	59.85	61	ALA12023	ALA13543
ACD088	61	62	ALA12024	ALA13544
ACD088	62	63.5	ALA12026	ALA13546
ACD088	65.1	67.1	ALA12028	ALA13547

Source: Nordmin, 2021

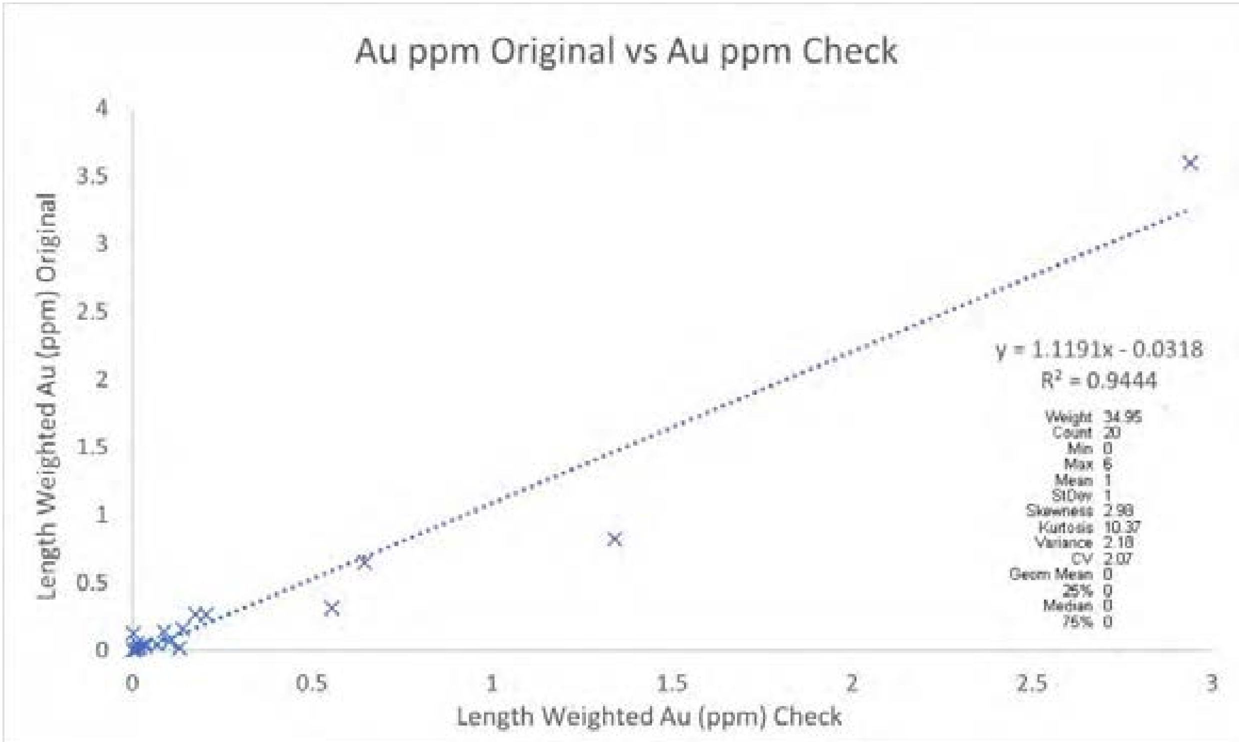
Pulp samples selected by Nordmin for verification analysis were individually placed into plastic sample bags which were then packaged together and shipped to the ALS Laboratory in Colombia for analysis using Cordoba's analytical procedures.

The Nordmin assay results were compared to the Cordoba database and summarized in the scatter plots for Cu and Au (Figure 12-10 and Figure 12-11). Despite some sample variance, most assays compared within reasonable tolerances for the IOCG/CRD deposit type, and no material bias was evident.



Source: Nordmin, 2021

Figure 12-10 Scatter plot comparison of Cu (%) verification samples



Source: Nordmin, 2021

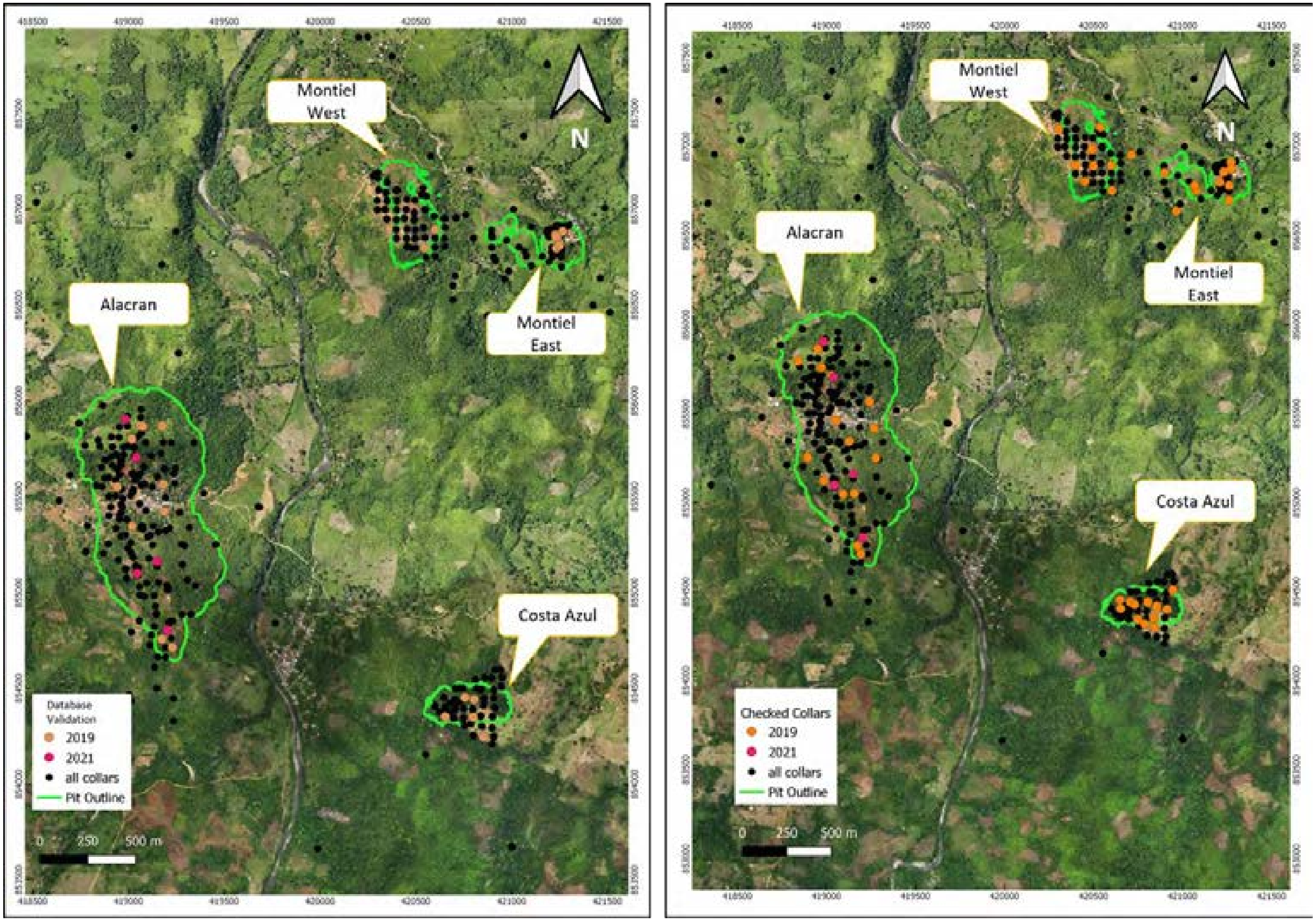
Figure 12-11 Scatter plot comparison of Au (ppm) verification samples

12.3 Database Validation

The QP completed a spot check verification on the following deposits:

- Alacran deposit – 11 (6%) of the lithologies, 6 (4%) of the geotechnical measurements, 2,699 (9%) of the assays.
- Satellite deposits – 14 (5%) of the lithologies, 2,458 (20%) of the assays.

A summary of the data validation is outlined in Figure 12-12. The geology was validated for lithological units from Cordoba's Leapfrog® lithological model. The geological contacts aligned with the core contacts and are acceptable for use.



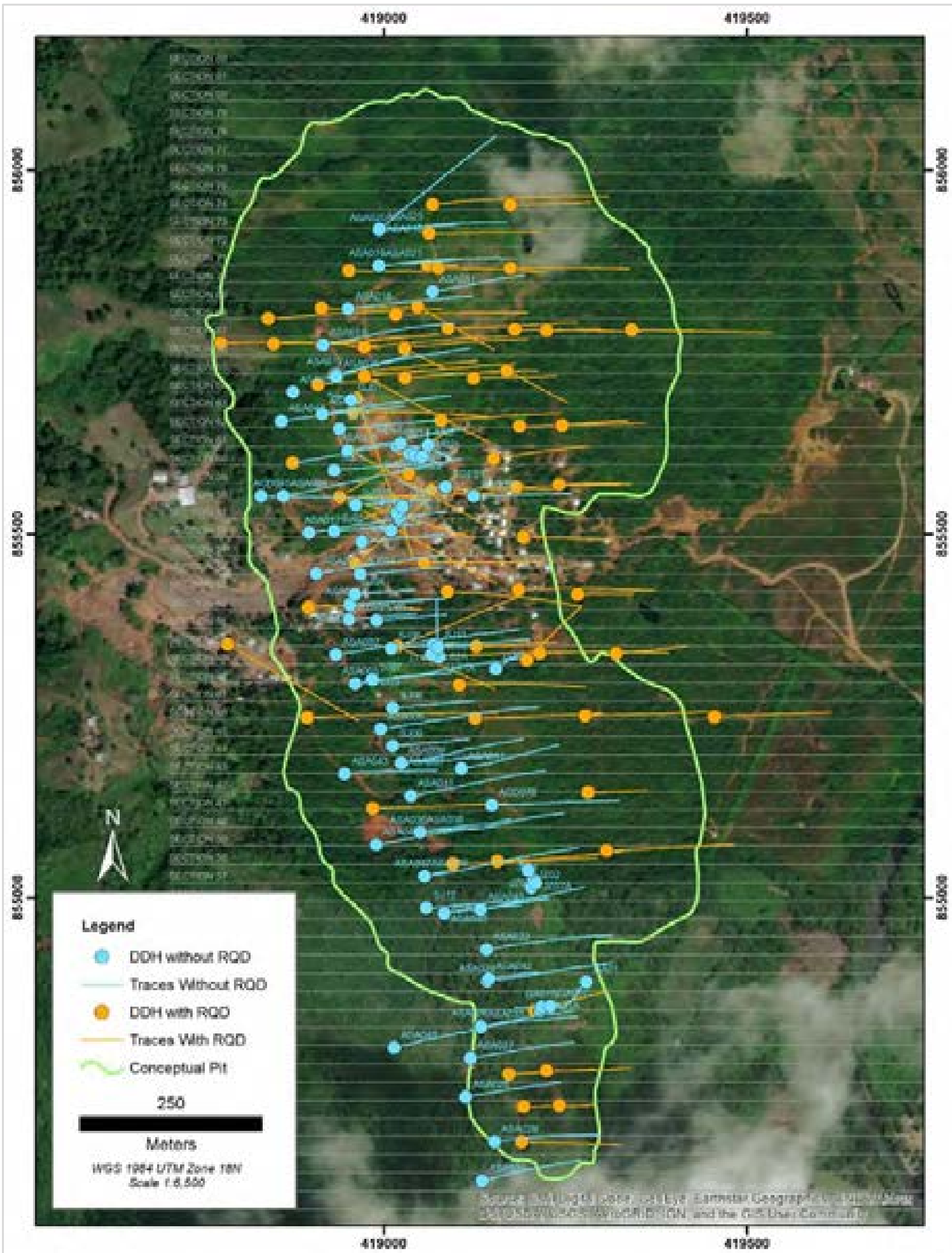
Source: Nordmin, 2021

Figure 12-12: Validated drill holes from 2019 and 2021 site visits

12.4 Geotechnical Review

In 2019, in conjunction with the structural model, Nordmin completed a geotechnical review of the Alacran deposit and Satellite deposits. The review involved validating the geotechnical RQD data, reviewing core photos, and re-logging specific sections of drill core. Nordmin used this information to determine if the structural information can be used to support various potential pit slopes angles for the 2019 PEA. Further geotechnical work has been completed and is outlined in Section 15.3.

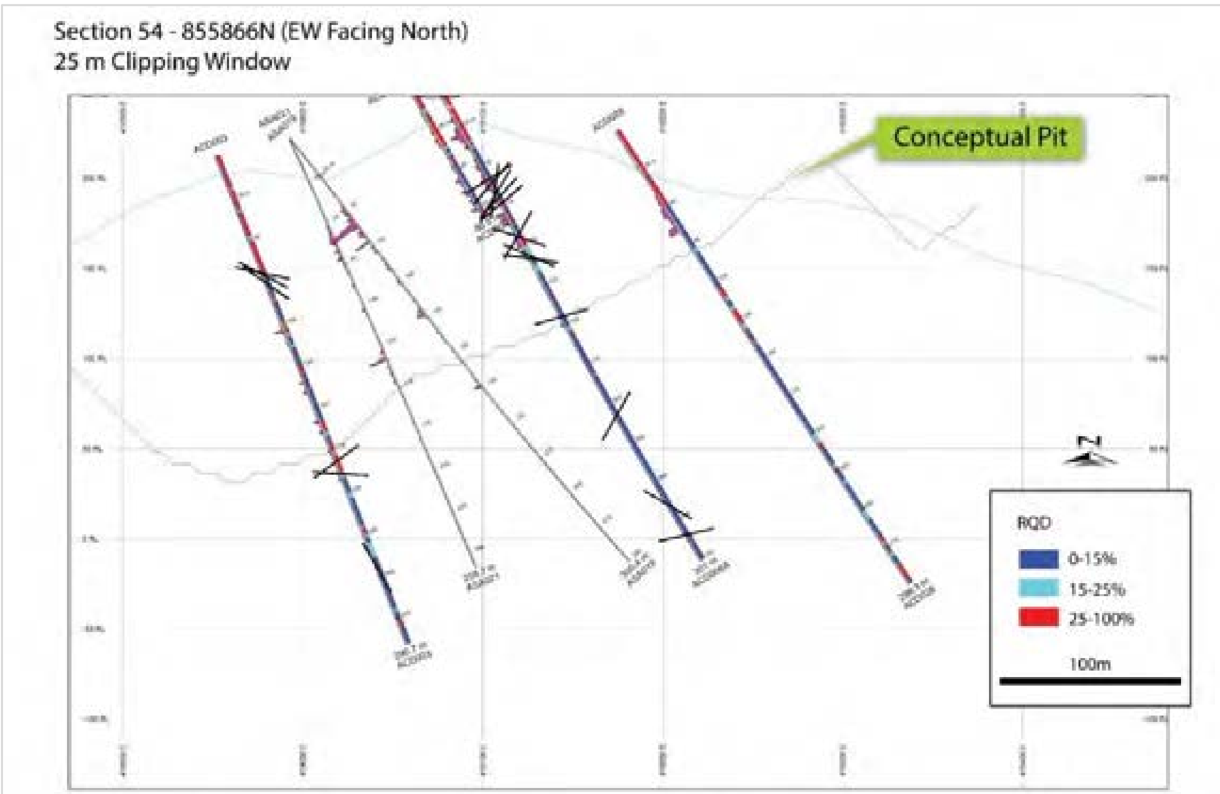
The Cordoba geological team collected various geotechnical RQD information across the majority of the Alacran deposit (Figure 12-13); however, less data was captured for the Satellite deposits.



Source: Nordmin, 2019

Figure 12-13: Plan map of Alacran deposit drill holes with recorded RQD data

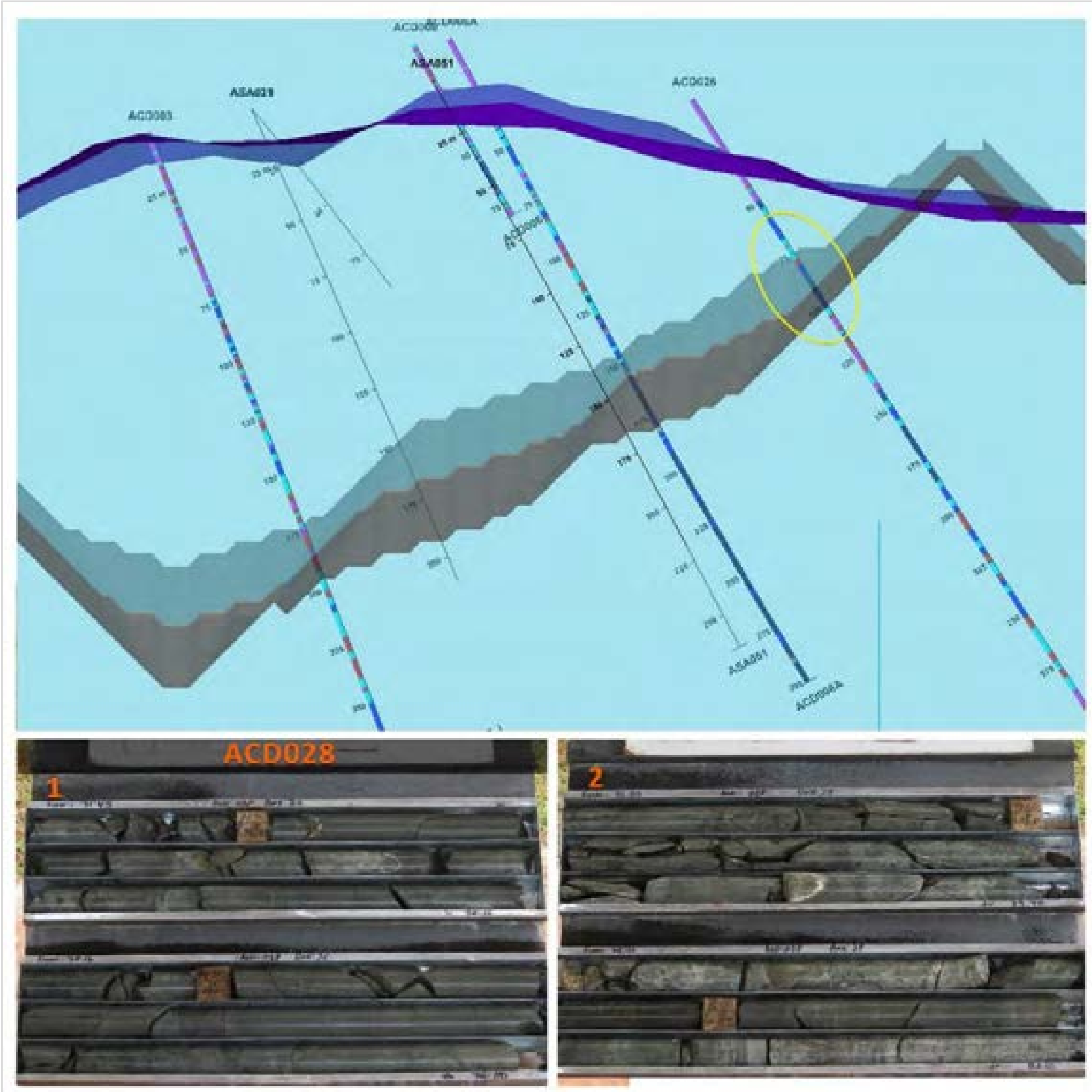
Figure 12-14 is a section outlining the typical level of geotechnical data that was collected for each drill hole. The cross section demonstrates the different strength of the rock depending on whether it occurs in the saprolite or fresh rock and the orientation of the corresponding fault(s) that are intersected by the drilling. The Alacran deposit hosts shallow, moderate, and vertical structures throughout. The colour red indicated that the rock has a low rock strength, whereas the light blue indicates that the rock is of medium strength and the dark blue that the rock is relatively strong. The saprolite layer that is within the top 10.0 m to 15.0 m of the Alacran deposit has a relatively poor rock strength. The rock strength tends to improve with depth below the surface of the Alacran deposit.



Source: Nordmin, 2019

Figure 12-14: Cross section within the Alacran deposit conceptual OP outlining typical RQD and fault measurements downhole

Figure 12-15 is an example from drill hole ACD028 of the RQD measurements that are in proximal distance to the conceptual OP wall.



Source: Nordmin, 2019

Figure 12-15: Cross section E=855,865 m with hole ACD028 RQD measurements and associated core photos

12.5 Review of Cordoba QA/QC

Cordoba has a robust QA/QC process in place, as previously described in Section 11. The Cordoba geologists actively monitor the assay results throughout the drill programs and summarize the QA/QC results in weekly/monthly reports. A number of failures for standard and blank reference materials were documented, resulting in re-assay of entire sample batches. Most of the CRMs performed as expected within tolerances of two to three standard deviations of the mean grade. Nordmin is satisfied that the QA/QC process is performing as designed to ensure the quality of the assay data.

12.6 QP's Opinion

Upon completion of the data verification process, it is the QP's opinion that the geological data collection and QA/QC procedures used by Cordoba and Ashmont are consistent with standard industry practices and that the geological database is of suitable quality to support the Mineral Resource.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Introduction and Summary

Data used for the Prefeasibility Study has largely been produced in 2021 by Blue Coast Research in Parksville, BC, Canada, with mineralogical work done by Actlabs in Ancaster, Ontario and SGS Canada in Lakefield, Ontario. Earlier metallurgical test work programs had been completed on the Alacran deposit, by Minpro of Santiago, Chile ("Minpro") in 2012 and SGS Canada in 2019. This work also included samples from the Satellite deposits of Montiel East, Montiel West, and Costa Azul. The work on the Satellite deposits is not included in the PFS, for more information the reader is referred to the PEA (2019). The metallurgy on the Alacran deposit has been advanced significantly since then so the reader should use caution in interpreting the earlier work on samples from the Alacran deposit.

Grindability work has been conducted by Blue Coast Research and SGS Canada in Burnaby, BC. The program included 77 batch flotation tests and three locked cycle flotation tests.

Samples of fresh (primary) material, as well as transition, and saprolite materials have been tested. Metallurgical drilling proved to be challenging for a variety of reasons and this limited the breadth of samples made available for metallurgical testing. This has had two effects:

1. Representativity has been limited, especially of the higher grade materials sourced from the centre of the Alacran deposit, and
2. With the limited options available, the ability to tune the variability sample suite to reflect expected head grades has been limited, so samples have tended to be relatively Cu-poor and sulphur (pyrite) rich. Such samples could be more challenging to process than would be expected in practice.

The selected flowsheet for the fresh feed, employs a relatively coarse primary grind and a conventional Cu/Au flotation scheme. Au is recovered by both gravity concentration and flotation. In fact, the presence of coarse Au made Au balancing in many tests challenging. Payable Ag is also recovered in the flowsheet.

The use of gangue depressants is the only aspect of the flowsheet that might be deemed atypical of Cu/Au ore processing, though this too is not particularly unusual.

The test work has led to the creation of head grade/recovery algorithms by principal material type. These are described later in this section.

13.2 Sample Collection

The fresh samples used for comminution, flotation and gravity testing for the Prefeasibility Study are shown below (Figure 13-1). Testing for the PFS was conducted on sample from holes ACD085, ACD086, ACD088, ACD090, and ACD092. A more extensive drill program for metallurgical samples was planned for the PFS, but, owing in part to the COVID-19 pandemic and some other local factors this was not fully completed.

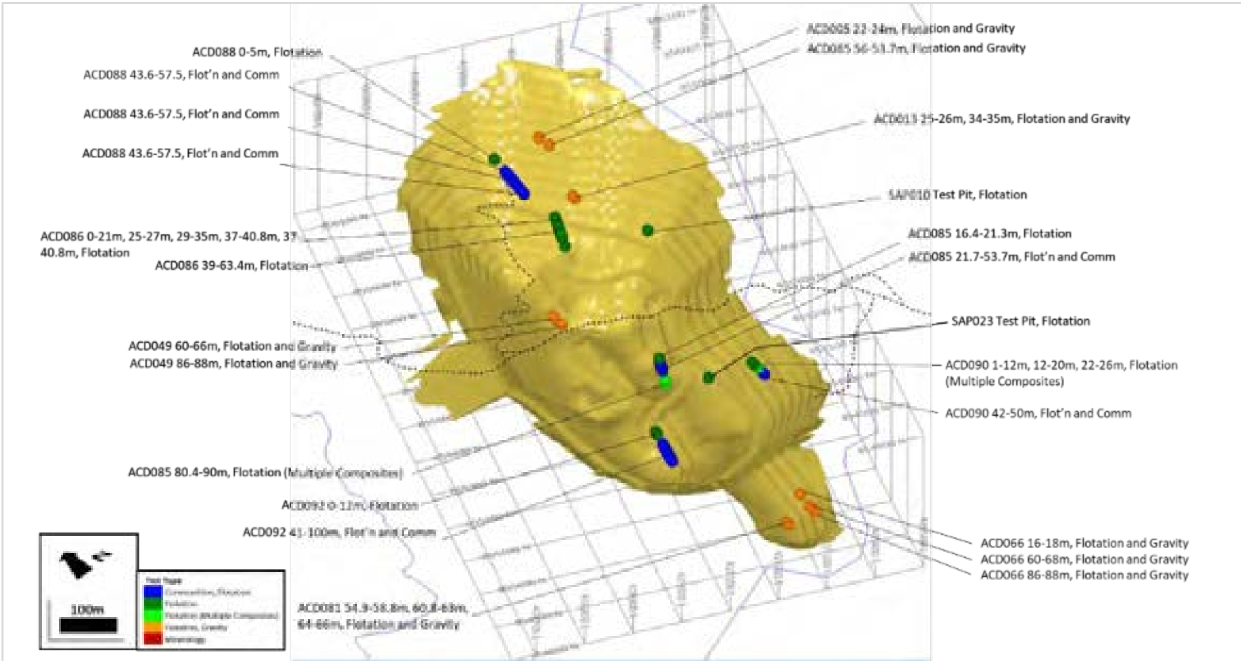


Figure 13-1: Location of source drill holes of the fresh, transition, and saprolite metallurgical samples

With such a limited suite of available material, essentially all the material from these holes assaying above cut-off grade (and some below cut-off) was used. This did not allow for fine-tuning of sample selection to match expected Cu and sulphur grades, or the expected distribution of other key rock type factors expected to drive flotation performance. Compared with the resource averages, Cu grades in tested composites tended to be low, and sulphur grades were high (reflecting an abundance of pyrite), while Au grades varied widely.

Samples of saprolite material, sourced from 29 test pits, excavated to a depth of up to 5 m from the surface, were also shipped to Blue Coast Research for testing. Saprolite samples tested in the program included SAP010 and SAP023, as well as core intercepting saprolite from the drill holes listed earlier.

13.3 Grindability Testing

Six samples were submitted for SAG mill comminution ("SMC") testwork, yielding an average SAG Axb (hardness grindability parameter) of 31.3 and DWI of 9.22. This places the Alacran deposit in the "moderately resistant" category for SAG milling, however comminution experts working with the project concluded that, based on this data, the material would be suitable for SAG milling. Accordingly, no HPGR testing was conducted for the Prefeasibility Study.

Seven samples and three composites have to date been subjected to bond ball mill work index testing. One test was run at a closing screen size of 180 µm; the remainder were run at 150 µm. The average bond ball mill work index from these tests is 17.4 kWh/tonne, and the 80% percentile is 20.4 kWh/tonne.

The comminution testing summary is presented in Table 13-1.

Table 13-1: Comminution Testing Summary[11]

Comminution	Ai	SAG Axb	SAG DWI	Bond Ball (kWh/tonne)	Bond CSS
SGS Lakefield ACD 001,016,027,037,041,069*		29.4	9.75	16.8	180
ACD 086 106.3-120 m	0.086	33.9	8.30	14.2	150
ACD 088 43.6-57.5		35.0	8.31	21.1	150
ACD 088 57.5-103.7		28.5	9.89	20.2	150
ACD 088 103.7-126		31.1	8.91	16.3	150
ACD 088 183-198	0.048	29.8	9.20	21.4	150
PTO Fresh #1		-	-	15.2	150
PTO Fresh #2		-	-	18.9	150
ACD 085 21.7-53.7		-	-	14.4	150
ACD 090 42-50		-	-	15.8	150
Average fresh	0.066	31.3	9.09	17.4	
80th percentile		29.4	9.75	20.4	

Source: Blue Coast Research, SGS*

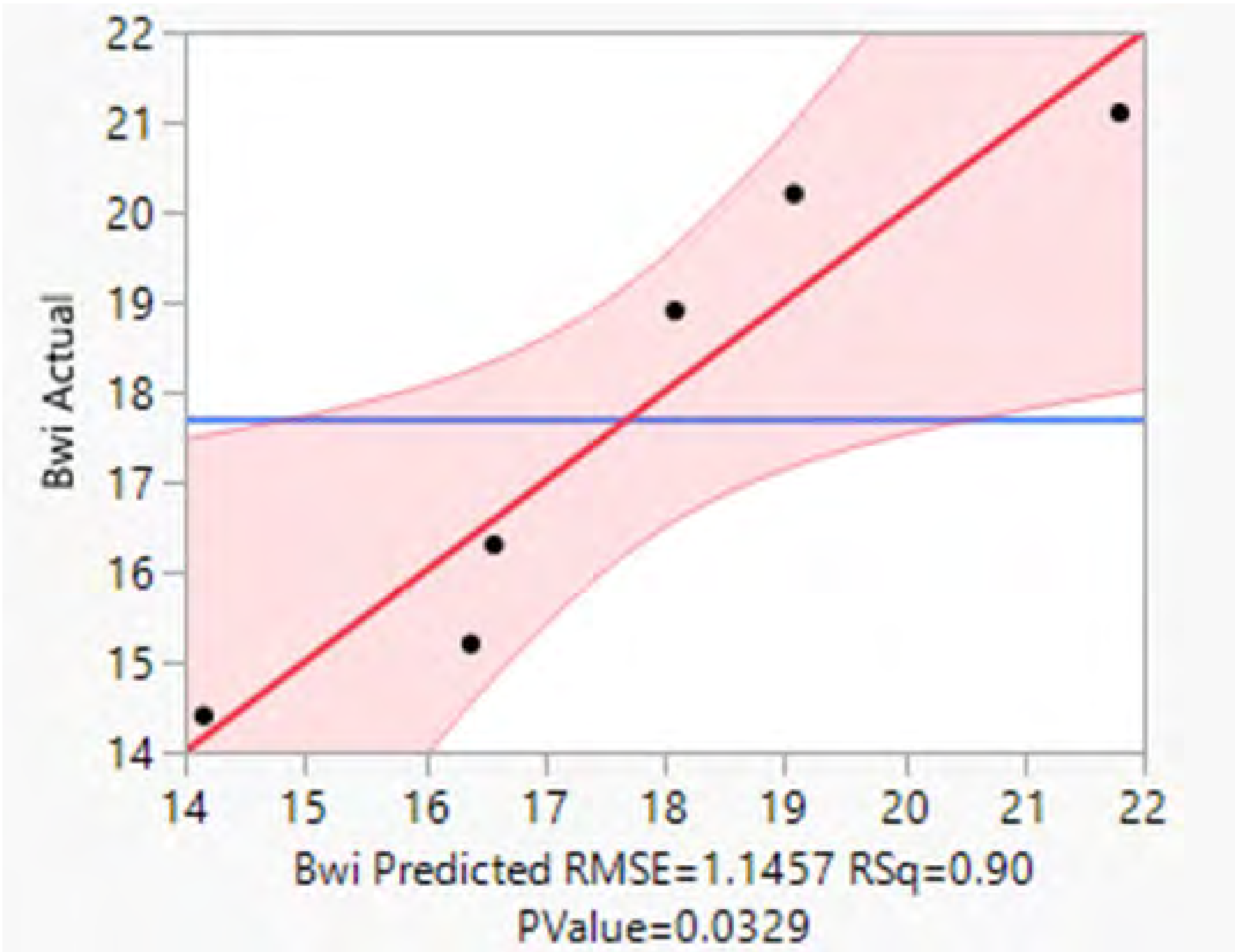
Two abrasion tests were conducted as part of the program, averaging 0.066 g.

As the drill core was too small, no crusher work index tests were run.

No grindability tests were run on saprolite material. However, in the grinding of six samples, this material ground to product size in, on average, 3.4 minutes versus 20 minutes for composites of fresh samples. Power requirements for grinding therefore appear to be roughly 15% to 20% of that of the fresh material.

An objective of the grindability testing program has been to introduce some foundations to support a future geometallurgical model for the Feasibility Study, as such work has commenced linking mineralogical and geochemical factors to metallurgy. The datasets were too small for definitive work so this has not been reported on to any significance here, except to demonstrate the process is underway. As an example, a multivariate regression analysis investigating the mineralogical factors behind hardness (ball mill work index) indicated that hardness is driven by quartz content and (inversely) by Fe oxides and hydroxide content. The reader should be cautioned however that this analysis was based on just six data points (Figure 13-2).

[11] The reader should note that the mill sizing calculations have been made prior to the availability of all the data in this data. Accordingly, the data described herein, and the process design criteria show slight differences.



Term	Estimate	Std Error	t Ratio
Intercept	13.59	1.77	7.7
Fe Oxide/hydroxide	-0.31	0.07	-4.8
Quartz	0.21	0.06	3.3

Figure 13-2: Multivariate analysis of key mineralogical factors behind bond ball mill work index

13.4 Mineralogy

The average modal mineralogy from analyses of sixteen fresh[12], three transition and five saprolite samples is presented in Table 13-2. Quartz and chlorite are the dominant minerals in all three zones, though there are some differences between the zones.

Host rock mineralization is dominated by quartz and chlorite. Iron oxides (mostly hematite and goethite) are enriched in the transition and saprolite zones. Clays are present in all zones, mostly kaolinite, which is usually not a major factor in flotation.

Sulphide Cu mineralization in the fresh samples comprised entirely chalcopyrite, however this shifted to (on average) closer to an equal mass split of chalcopyrite and chalcocite in the transition zone, with the

[12] In this report "Fresh" refers to the level of in-situ weathering of the rock, and not the degree of aging of the respective sample.

majority of the sulphide Cu in the form of chalcocite. Sulphide Cu mineralization essentially disappeared in the highly weathered saprolite zone, and therefore no floatable Cu was present.

Table 13-2: Mineral Modal Abundances in Fresh, Transition, and Saprolite Materials from Alacran

	Fresh (16 samples)	Transition (3 samples)	Saprolite (5 samples)
Chalcocite	0.0	0.6	0.0
Sphalerite	0.0	0.0	0.0
Chalcopyrite	1.1	0.8	0.0
Pyrite	5.9	4.2	0.0
Molybdenite	0.0	0.0	0.0
Fe Oxi/Hydroxi	3.7	23.8	13.6
Mn-Cu oxide low Al	0.0	0.0	0.1
Ilmenite	0.4	0.3	1.1
Titanite	0.1	0.0	0.0
Quartz	25.7	35.8	29.6
Feldspar	10.9	1.0	4.3
Amphibole	0.5	0.1	1.3
Epidote	0.1	0.4	1.3
Phlogop./Biotite	1.1	0.4	0.0
Muscovite	7.4	1.0	4.0
Chlorite	30.7	26.8	34.2
Si-Al Clays	5.6	1.8	9.8
Serpentine	0.0	0.1	0.0
Apatite	0.6	0.3	0.0
Calcite	4.8	0.5	0.0
Dolomite	0.6	1.6	0.2
Others	0.5	0.6	0.4

The mineralogy of Cu hosted in the transition zone varies widely, with some being predominantly present as chalcopyrite, some as secondary Cu minerals and some in non sulphide form. Cu recoveries from the transition zone can be expected to vary widely as a result.

Four saprolite samples studied by SGS (Lakefield) were shown (Figure 13-3) to host Cu in both kaolinite and chlorite with only very minor amounts in chalcopyrite and other sulphides. This means only minimal amounts of Cu in the saprolite would likely be floatable.

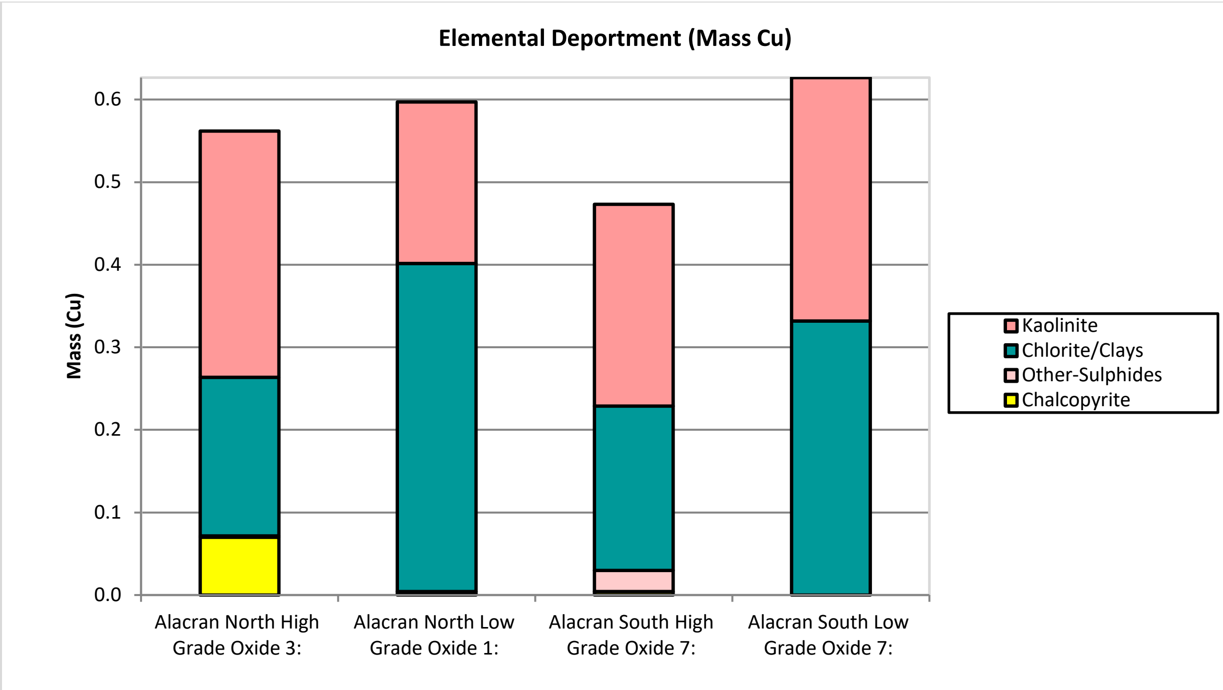


Figure 13-3: Cu deportment in saprolite samples from the Alacran deposit

The total sulphide suite in the fresh material comprises pyrite and chalcopyrite. Based on projected sulphur and Cu assays from the PEA, and assuming all sulphur, and Cu are hosted in these two sulphides, the LOM mass ratio of pyrite to chalcopyrite is about 2.5:1. This compares with 5.1:1 in the samples tested in the mineralogy program, with some samples well over 10:1 (Figure 13-4). The reader is advised to keep this in mind in interpreting the flotation section of this report, as pyrite rejection was sometimes problematic and may have more reflected the pyrite-rich bias in the samples rather than systemic problems with the metallurgy.

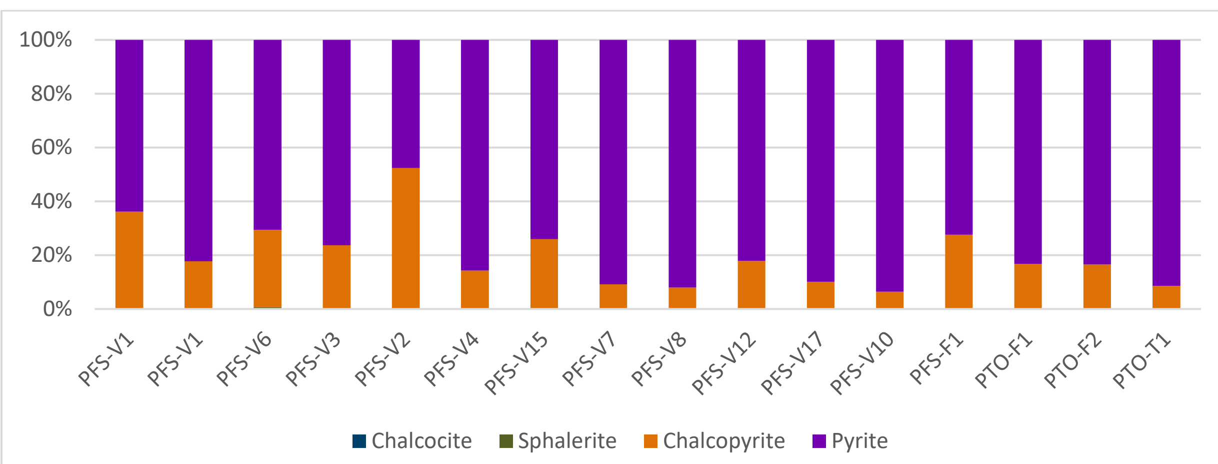


Figure 13-4: Modal mix of sulphides in the Alacran deposit fresh samples

Chalcopyrite in the fresh zone is moderately coarse-grained, and accordingly is released at a relative coarse grind size. Three composites were studied for chalcopyrite liberation by size, providing some insights into the incremental growth in chalcopyrite liberation with successive reduction in host particle size (Figure 13-5).

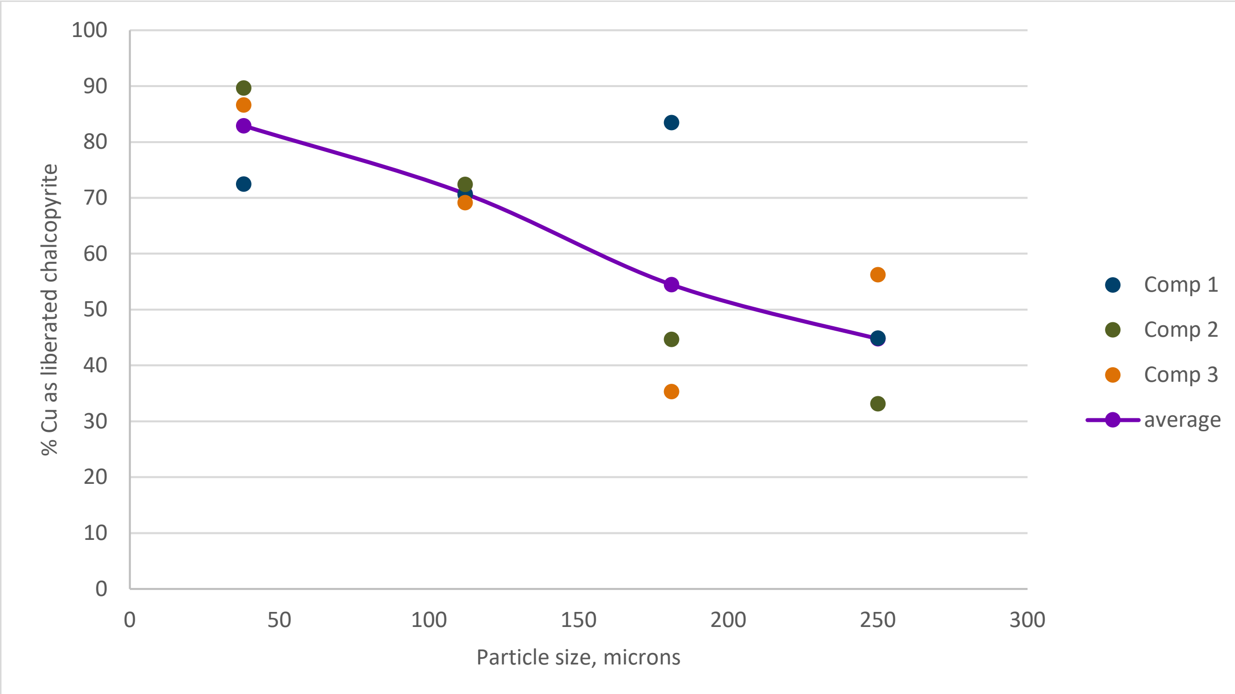


Figure 13-5: Chalcopyrite liberation as a function of host particle size

No Au mineralogical work was conducted as part of the Prefeasibility Study. However, the gravity work conducted on both saprolite, and fresh samples provides some insight into the nature of the Au in the Alacran deposit. This is described in Section 13.5.

13.5 Gravity Recovery

The active use of gravity concentration by the artisanal miners on site provides clues into to the coarseness and gravity recoverability of some of the Au, and this was shown further by constant challenges in metal balancing in flotation tests in the gravity recovery program.

Five Knelson Concentrator tests were run, to provide some further insights into the potential for recovering Au by gravity.

One test, a full Extended Gravity Recoverable Gold (EGRG) test, was run on saprolite material. This proved quite difficult to run given the slimy nature of the saprolite, and this may have led to an under-estimate of Au gravity recoverability.

However, the test still recovered 55% of the Au at a grind of 80% passing 75 µm, with 31% essentially being recoverable without any grinding at all. The Au recovery at the 200 µm primary grind size was estimated at 45%. Although the Au was quite easily liberated, relatively little was very coarse. Three quarters of the Au reporting to the gravity concentrate comprised free particles finer than 75 µm.

The other four tests, all basic gravity recoverable gold (GRG) tests were run on fresh material and yielded recoveries in the range of 29% to 53% (Table 13-3).

Table 13-3: Knelson GRG Gold Recoveries from Fresh Zone Samples

Source of sample	Au head grade, g/t	Au conc grade, g/t	Au Recovery, %
ACD064 77-97 m	0.89	98.1	53.2
ACD006A 57-76 m	0.29	37.7	52.0
ACD070 199.5-216.2 m	0.29	20.9	29.3
ACD070 216-240 m	0.15	12.1	32.3

13.6 Flotation

13.6.1 Fresh Mineralization

Some 77 batch flotation tests were conducted on samples from the Alacran deposit. Roughly 42 of these comprised a flowsheet development exercise and for product generation for downstream studies, while the other 35 tests were used to investigate variability in Cu, Au and Ag recovery as well as the effect of blending different material types (saprolite with fresh/transition material).

The Alacran deposit chalcopyrite floats readily and quite consistently. Initial tests were on a relatively low grade master composite assaying 0.31% Cu. The first tests used collector doses employed in previous programs and floated both the pyrite and chalcopyrite, so collector (potassium amyl xanthate) doses in rougher flotation were progressively scaled back to 2 g/t in subsequent tests. This still recovered more than 96% of the Cu as well as 90% of the Au to the rougher concentrate from this starting composite. Raising the pH to 10.5 in roughing and 11.5 in cleaning successfully removed up to 98% of the pyrite with Cu recovery in batch testing dropping to 80-85% (Figure 13-6).

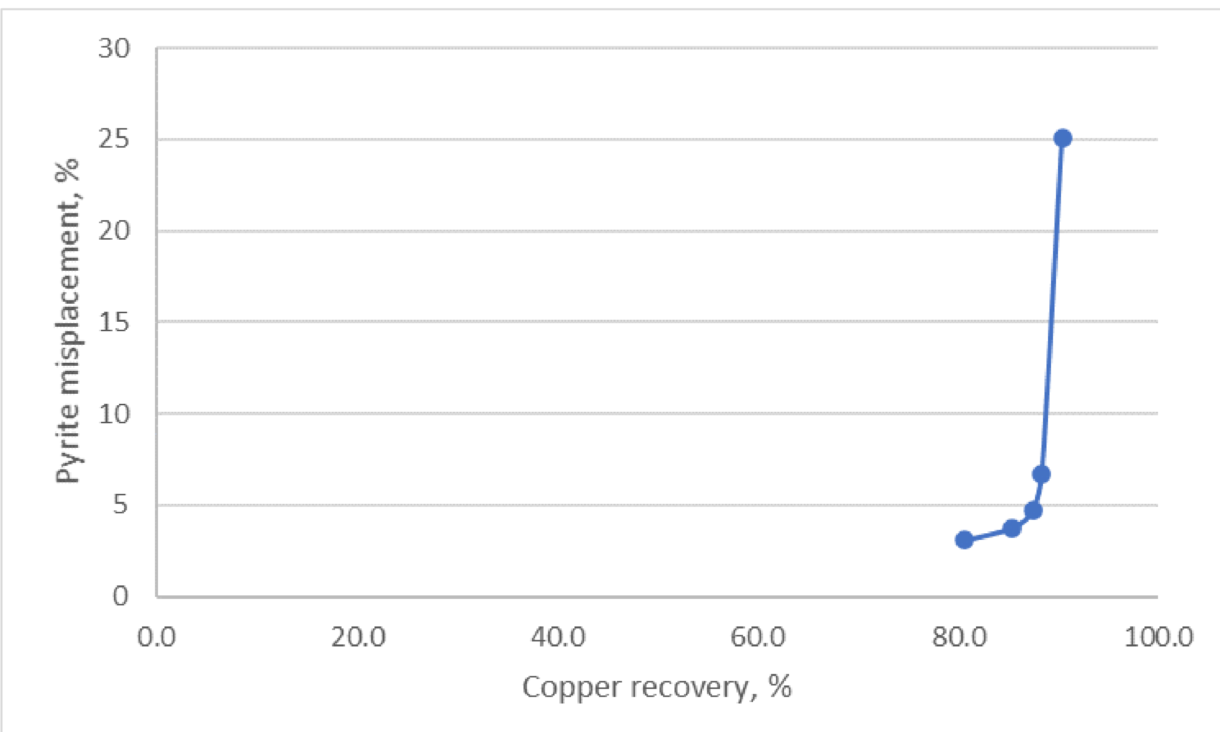


Figure 13-6: Selectivity of chalcopyrite flotation against pyrite

This left a concentrate containing a small amount of pyrite, but also significant non sulphide gangue. Mineralogical analysis as well as size by size studies showed the chalcopyrite and the gangue to be liberated, so finer re-grinding was deemed unnecessary for concentrate upgrading (Figure 13-7).

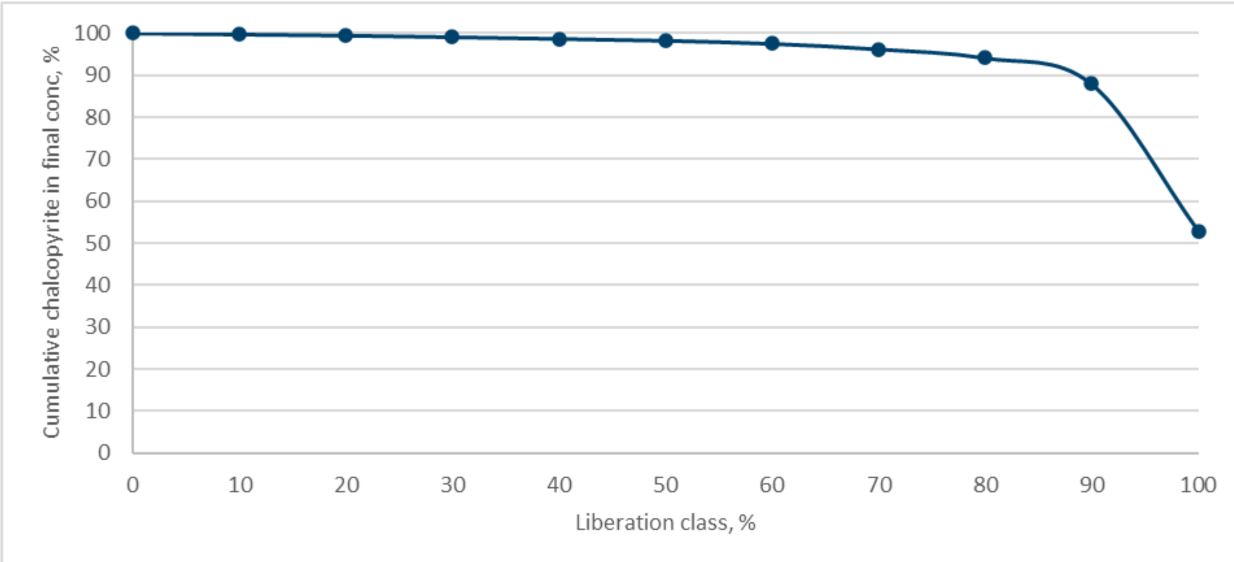


Figure 13-7: Liberation of chalcopyrite in Test F37 concentrate

The floatable gangue, analyzed in a Cu cleaner #3 concentrate, comprised much the same mix of minerals as in the feed suggesting it is not a specific mineral that is floating, rather some surface coating of a clay-type material that is rendering some of the gangue mineralization floatable. It is unclear what is causing this – perhaps smearing in grinding, but more likely the clay occurs as interstitial minerals between gangue particles, which on grinding break along the weak clay-rich boundaries leaving clay-coated gangue particles.

The problematic gangue flotation led to the evaluation of candidate polymeric chemistries, aimed at silicate gangue rejection. Several gangue depressants were tested, and many proved capable of controlling the gangue but a calgon stage added through the flowsheet, appeared to be most consistent, and often the most potent candidate (Table 13-4).

Table 13-4: Composition of Copper Concentrates Floated with Different Depressants

	Chalcopyrite	Pyrite	Gangue
None, no regrind	48.0	12.4	39.7
None, with regrind	52.1	9.6	38.3
Calgon, with regrind	76.2	5.2	18.6
Sodium alginate, with regrind	64.7	3.8	31.5
PE 26, with regrind	71.3	4.7	24.0
Depramin 347, with regrind	60.8	6.7	32.5

The gangue, however, was not fully removed and more work will be needed to more systematically evaluate the reagent options, as well as dosage, pH strategies, and flotation times.

Sixteen different samples and composites of fresh material, comprising different rock types, and alteration groups, were subjected to flotation using the chosen flowsheet. The head assays and rougher recoveries are provided in Table 13-5. Cu floated consistently well to the rougher concentrate, averaging 95% recovery from the sixteen samples. Au floated less well, though, with the lowest recoveries observed from those samples with very low Au head grades. Weighted for Au content in the samples, the average rougher Au recovery was 88%. Not all tests were balanced for Ag. Of those that were balanced for Ag, the Ag recovery was 66%.

Table 13-5: Rougher Flotation from sixteen Fresh Variability Samples and Composites

Comp #	Weathering	Rock Unit	Alteration Group	Reconstituted head assays				Rougher Recovery		
				Cu, %	Au, g/t	Ag, g/t	S, %	Cu %	Au, %	Ag, %
PFS-V5	Fresh	2	2	0.58	0.29	2.23	2.6	96	93	85
PFS-V6	Fresh	2	2	0.59	0.26	3.74	3.2	95	82	84
PFS-V1	Fresh	2	2	0.15	0.62	1.23	1.82	95	98	46
PFS-V2	Fresh	2	3	0.21	0.22	1.8	0.9	98	85	56
PFS-V3	Fresh	2	3	0.15	0.14	0.65	0.9	92	93	45
PFS-V4	Fresh	2	3	0.52	1.65	2.22	5.1	88	92	84
PFS-V7	Fresh	Intrusive	3	0.26	0.09	2.7	4.6	95	77	42
PFS-V8	Fresh	Intrusive	3	0.41	0.11	5.77	7.62	97	51	60
PFS-V12	Trans/Fresh	Intrusive	3	0.4	0.21	1.41	3	98	74	73
PFS-V15	Trans/Fresh	Intrusive	3	0.45	0.22	-	3.2	98	86	-
PTO-F2	Fresh	Mix	Mix	0.32	0.4	1.45	3.3	90	91	76
PTO-F1	Fresh	Mix	Mix	0.36	0.61	-	2.8	96	80	-
PFS-F1	Fresh	Mix	Mix	0.91	0.79	17.63	4.4	95	93	64
PFS-V10	Fresh	Mix	Mix	0.15	0.05	-	2.36	90	67	-
PFS-F2	Fresh	Mix	Mix	0.48	0.52	-	3.5	96	95	-
PFS-V17	Trans/Fresh	Mix	Mix	0.4	0.16	3.12	6.9	95	39	73
Average				**0.4**	**0.4**		**3.51**	**95**	**81**	**66**
Average, weighted for head assay								**95**	**88**	

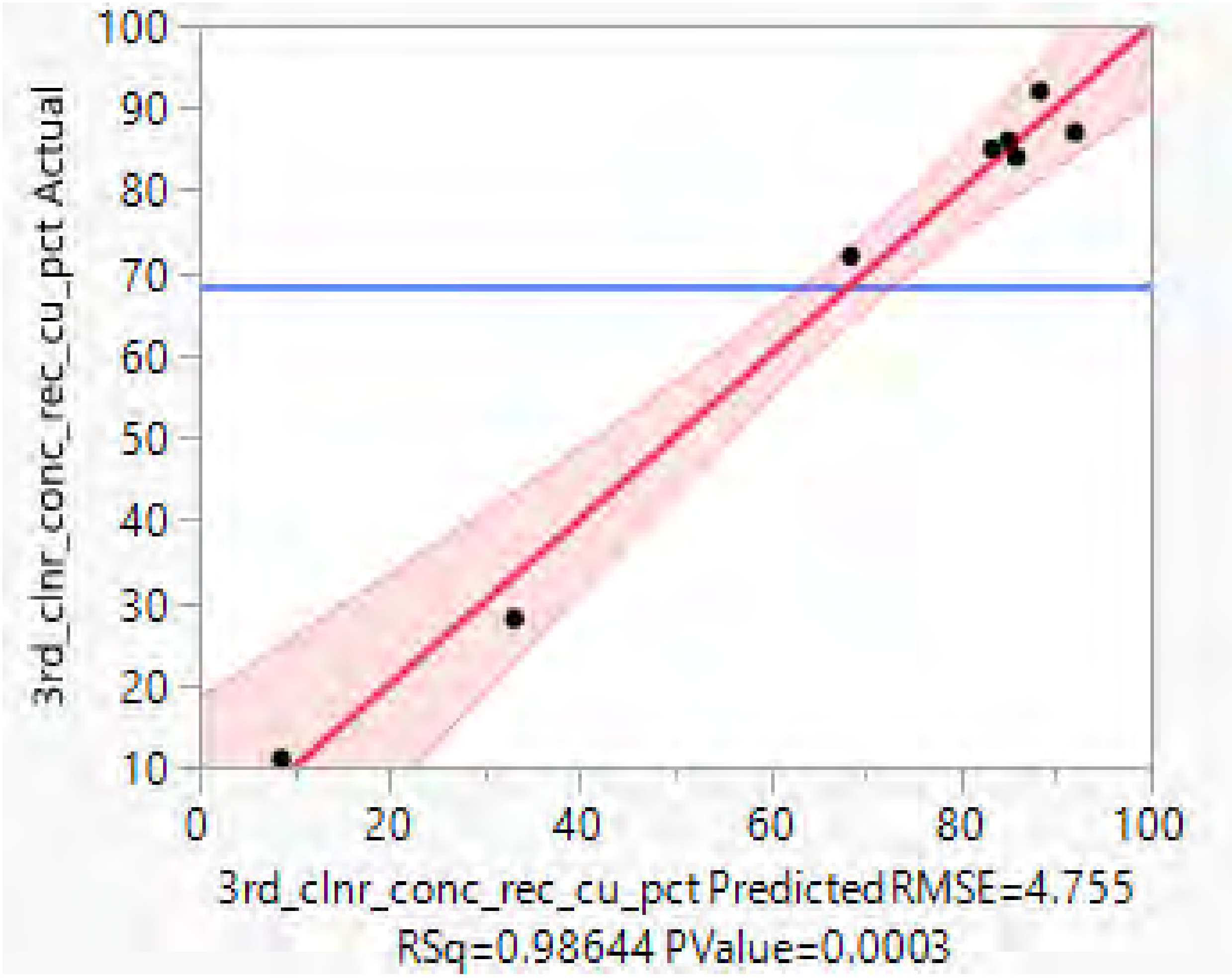
Batch cleaner flotation performance was less consistent, especially to the third cleaner concentrate. Recoveries of Cu and Au, weighted for head grades, averaged 89% and 77% to the second cleaner concentrate respectively, and 83% and 67% to the third cleaner concentrate (Table 13-6).

As noted earlier, the reader should be aware that sample availability for this study was limited, so sample head grades were often low, often close to, or below the likely cut-off. Further, the samples tended to be rich in sulphur, so the ratio of pyrite to chalcopyrite was unfavourable from a cleaner flotation perspective. This was likely a factor in the low concentrate grade achieved in some samples and probably reduces the mean final concentrate grade several points compared with what will be achieved at an industrial scale. The average second cleaner concentrate grade was 17% Cu, while the third cleaner concentrate averaged 23% Cu.

Table 13-6: Cleaner Flotation from sixteen Variability Samples

Comp #	2nd Cleaner Conc						3rd Cleaner Conc					
	Conc grade			Recovery, %			Conc grade			Recovery, %		
	Cu, %	Au g/t	Ag g/t	Cu, %	Au, %	Ag, %	Cu, %	Au g/t	Ag g/t	Cu, %	Au, %	Ag, %
PFS-V5	16	17	42	88	74	69	22	7	59	87	55	60
PFS-V6	18	6	82	85	64	62	28	8	121	71	52	50
PFS-V1	10	25	13	83	89	32	20	48	22	45	84	27
PFS-V2	21	17	52	96	83	47	25	18	59	85	65	40
PFS-V3	11	9	34	81	74	34	20	17	48	45	41	25
PFS-V4	8	34	26	92	85	68	13	47	41	88	74	66
PFS-V7	17	4	45	82	61	21	26	7	65	72	54	17
PFS-V8	19	2	123	83	30	38	23	2	144	80	23	36
PFS-V12	23	9	50	96	71	59	31	9	59	92	52	50
PFS-V15	24	7	-	90	56	-	29	8	-	87	49	-
PTO- F2	17	13	54	87	52	62	20	-	63	85	39	60
PTO- F1	19	27	-	86	72	-	19	34	-	86	77	-
PFS- F1	22	27	256	92	86	54	25	27	270	92	77	52
PFS-V10	19	6	-	75	69	-	23	7	-	72	66	-
PFS-F2	16	16	-	91	85	-	18	29	-	84	75	-
PFS-V17	13	4	64	91	63	56	21	4	93	84	44	49
Average	**17**	**14**		**87**	**70**		**23**	**19**	**86**	**78**	**58**	**44**
Average, weighted for head assay				**89**	**77**					**83**	**67**	

Multivariate analysis linking mineralogy to Cu recovery pointed to chalcopyrite, pyrite and muscovite being the primary mineral drivers, and provides an early pointer behind the likely mineralogical drivers behind flotation recovery (Figure 13-8).



Term	Estimate	Std Error	t Ratio
Intercept	0.089	4.42	0.02
Chalcopyrite	13.13	2.7	4.86
Pyrite	3.07	0.69	4.46
Muscovite	7.51	0.64	11.77

Figure 13-8: Multivariate analysis of key mineralogical factors behind Cu batch cleaner recovery

13.6.2 Transition Mineralization

Several samples tagged as "transition" were shipped to the laboratory and prepared as transition testing samples and composites. The first transition composite proved to float well, and mineralogical analysis revealed it to be more characteristic of fresh material than transition.

Three subsequent samples that could be described mineralogically or metallurgically by the content of Cu as secondary or non sulphide mineralization, were tested. One sample was from the magnetite zone. Results are provided in Table 13-7.

Table 13-7: Flotation of Transition Samples

Comp #	Recon head assays		Rougher recovery			3rd cleaner conc grade			3rd cleaner recovery, %		
	Cu, %	Au g/t	Cu %	Au, %	Ag, %	Cu, %	Au g/t	Ag g/t	Cu, %	Au, %	Ag, %
PFS-V14	0.37	0.77	31	73	49	6	72	163	11	49	16
PFS-V16	1.67	0.23	53	60	43	43	22	260	28	23	18
PFS-V9	0.8	0.19	82	78	n/a	21	4	n/a	66	52	n/a
Average	**0.95**	**0.4**	**55**	**70**	**46**	**23**	**33**	**212**	**35**	**41**	**17**

These results show that metallurgy varies widely within the transition zone, with Cu recoveries ranging from 11% to 66% to the third cleaner concentrate. Au recoveries are more consistent. Forecasting metallurgical recoveries for transition material will be challenging, likely requiring some in-depth geometallurgical work. Given the limited size of the transition zone this may be hard to justify.

13.6.3 Saprolite

Parts of the saprolite zone contain both Cu and Au, however there was consistently little or no recovery of Cu to a flotation concentrate following application of the standard flotation scheme. Rougher flotation results from testwork are provided in Table 13-8. Cu recoveries equate to mass pull rates to concentrate for all but two tests, suggesting no true selective flotation of Cu.

Table 13-8: Copper and Gold Recovery by Rougher Flotation of Saprolite Samples

		Recon head assays			Rougher Recovery	
Comp #	Source interval	Cu%	Au, g/t	S%	Cu %	Au, %
PFS-V13	ACD086 29-35 m	0.36	0.3	0.05	11	60
PFS-V30	ACD092 9 – 12 m	0.06	0.35	0.04	5	61
PFS-V31	ACD086 0 – 21 m	0.13	0.73	0.07	13	52
PFS-V32	ACD088 0 – 5 m	0.18	0.25	0.02	7	44
PFS-V33	SAP 23 (Test Pit)	0.22	0.19	0.02	5	39
PFS-V34	ACD090 16 – 18 m	0.26	0.11	0.01	3	50
PFS-V35	ACD086 25-27 m	0.29	0.12	0.04	3	44
PFS-V36	SAP 10 (Test Pit)	0.5	1.52	0.04	5	89
Average		**0.25**	**0.45**	**0.04**	**7**	**55**

Au, however, floated quite well with recoveries varying from 39% to 75%, linked loosely to head grade. Cleaner flotation was conducted on several samples but in many cases after a single stage of cleaning there was not enough material to hold a froth together, with concentrate masses dropping to less than a gram. Grades and recoveries to the first cleaner concentrate are provided in Table 13-9. They show reasonably consistent partial Au flotation and essentially no Cu flotation.

Table 13-9: Saprolite Cleaner Flotation

Comp #	Flotation	Concentrate grade		First Cleaner Recovery, %	
		Cu, %	Au g/t	Cu, %	Au, %
PFS-V13	ACD086 29-35 m	0.5	33.9	0.6	56
PFS-V30	ACD092 9 – 12 m	0.2	26.1	1.7	75
PFS-V31	ACD086 0 – 21 m	0.2	34.7	0.9	42
PFS-V32	ACD088 0 – 5 m	0.4	25.1	0.5	25
PFS-V33	SAP 23 (Test Pit)	0.3	9.9	1.0	40
PFS-V34	ACD090 16 – 18 m	0.3	35.8	0.3	54
PFS-V35	ACD086 25-27 m	0.3	19.7	0.2	37
PFS-V36	SAP 10 (Test Pit)	0.3	11.9	1.3	11
Average		**0.3**	**24.6**	**0.8**	**43**

While the Cu content in the saprolite holds no commercial value owing to its poor metallurgy, Au from the saprolite material floats quite well, and is also well recovered by gravity concentration. Ag behaved in a similar way to Cu, with essentially no selective flotation.

Blends of saprolite and fresh feed were tested to evaluate if saprolite could be processed with fresh material without compromising the metallurgy of either component. Blending of saprolite with fresh material was tested in two series of tests.

In a first suite of blending tests, blending saprolite and fresh material as a 50:50 blend, yielded excellent cleaner performance, showing mass pull and metal recovery rates that matched those predicted from tests on the individual fresh and saprolite samples (Figure 13-9). In fact, this blend test yielded a Cu concentrate assaying 31% Cu – one of the highest-grade concentrates floated in the project to date.

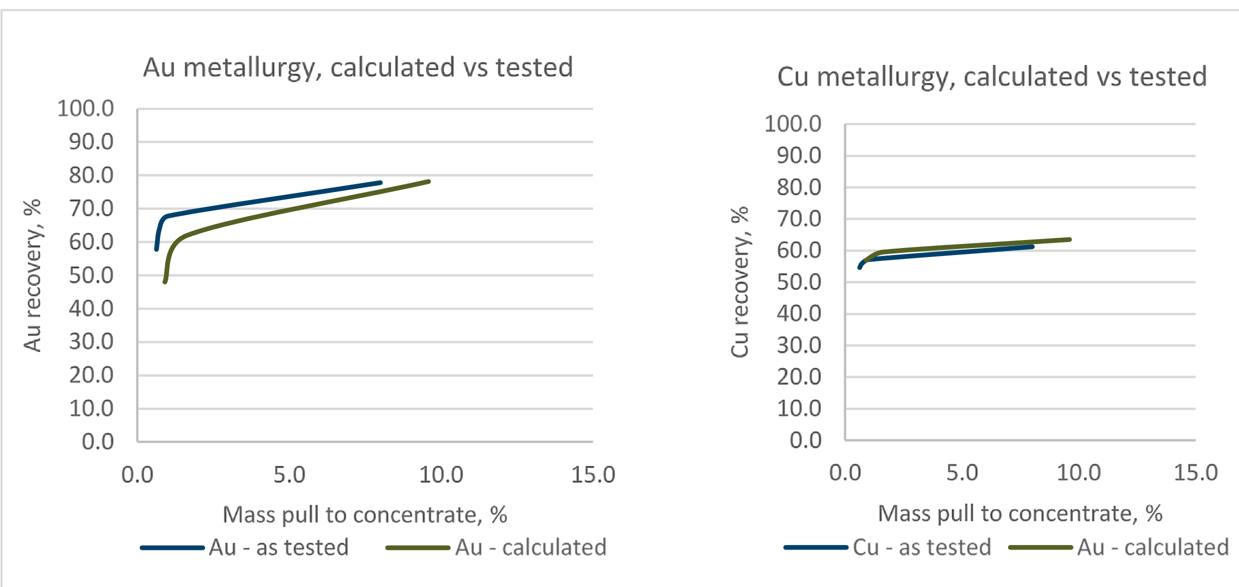


Figure 13-9: Calculated vs actual recoveries from blending of fresh and saprolite samples

These saprolite and fresh samples were taken from the same hole relatively close to each other, and perhaps represent an optimistic scenario for blending.

So, a second suite of tests were run, this time using near surface saprolite material from one of the test pits. This material, SAP 10, had shown itself to be particularly challenging to handle and so would more likely impact Cu flotation than most.

SAP 10 was blended with a very low Au fresh sample at 10:90 and 25:75 ratios. Selecting an Au-poor fresh sample provides good visibility to Au flotation from the saprolite sample, thereby answering the question of whether saprolite-hosted Au floats well when blended with fresh feed. Both Au and Cu metallurgy was monitored, with a focus on metal recovery.

As-tested metal losses to tails are compared with weighted data from tests on the individual samples. Losses of both Cu and Au to tails as achieved vs as expected are provided in Figure 13-10.

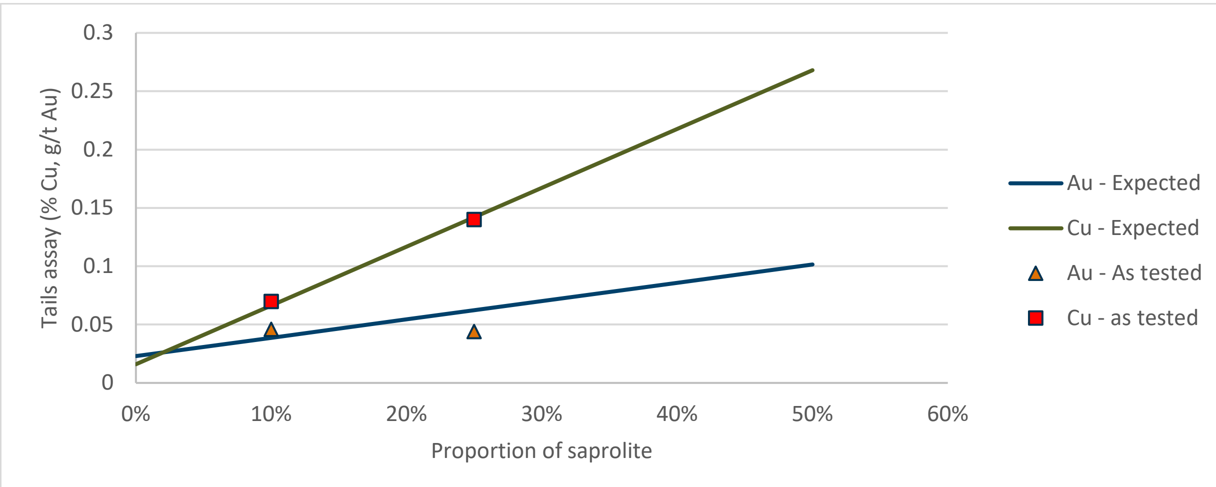


Figure 13-10: Expected vs tested effects of proportion of saprolite on rougher flotation of blends of fresh and saprolite material

The results match well, showing the saprolite-hosted Au floats at least as well as expected from the blend.

Cu recoveries to the first cleaner also matched those expected from the individual tests. The saprolite float was only taken to first cleaner so no comparison could be made to higher levels of cleaning (Table 13-10).

Table 13-10: Copper Recoveries from Flotation of Blended Feed: Expected vs Achieved

	10% blend		25% blend	
	Expected	Achieved	Expected	Achieved
Rougher	72.2	71.6	51.8	53.3
1st cleaner	77.8	78.8	59.8	59.6

Unlike in the first blend test work, the flotation test work containing the fresh and SAP 10 material yielded higher mass pull rates, diluting the final concentrate. This shows that blending saprolite and fresh feed will not always yield excellent grade concentrates. In this case the Cu grade was in the order of 15%. While this is low, but not so low that manipulating the gangue depressant doses may not address the problem.

Accordingly, it was concluded that saprolite and fresh material could most likely be blended and treated together.

13.7 Locked Cycle Testing

Two locked cycle tests were conducted on the PFS Fresh #2 composite comprising material from the fresh zone. The batch test on this composite that preceded the locked cycle test yielded a concentrate assaying 20% Cu at 88% Cu (and Au) recovery.

The projected closed circuit performance from the locked cycle test is shown in Table 13-11.

Table 13-11: PFS Fresh #2 Composite, LCT-1 Metallurgical Balance

		Grade				Distribution, %			
	Mass %	Cu (%)	Au (g/t)	Ag (g/t)	S (%)	Cu	Au	Ag	S
Final Concentrate	2.1	19.8	17.1	156.4	25	93.5	85.7	44.7	15.8
Cleaner Tail	8.2	0.07	0.21	3.7	5.8	1.4	4.2	4.2	14.4
Rougher Tail	89.7	0.03	0.05	4.2	2.6	5.2	10.1	51.1	69.8
Feed	100	0.45	0.42	7.4	3.3	100	100	100	100

The locked cycle test ran fairly well, however, the final concentrate was under-pulled in the third cleaner, so the test never fully stabilized with Cu accumulating in the third cleaner tail. This had the consequence of slightly reducing overall Cu recovery. Au metallurgical stability again proved challenging due to nugget issues.

A second locked cycle test was then run allowing for more mass to be pulled to final concentrate. This unloaded the third cleaner tail circulating load so better stabilizing the test. It yielded a small drop in concentrate grade, while increasing the Cu recovery to over 95%. Au recovery was 84.6%, and Ag 73.7% (Table 13-12).

Table 13-12: PFS Fresh #2 Composite: LCT-2

		Grade				Distribution, %			
	Mass %	Cu (%)	Au (g/t)	Ag (g/t)	S (%)	Cu	Au	Ag	S
Final Concentrate	2.4	18.8	23.0	158.2	23.8	95.3	84.6	73.7	17.0
Cleaner Tail	8.1	0.08	0.18	3.2	4.5	1.4	2.2	5.1	10.8
Rougher Tail	89.5	0.02	0.10	1.2	2.7	3.3	13.1	21.3	72.2
Feed	100	0.47	0.65	5.2	3.4	100.0	100.0	100.0	100.0

A third locked cycle test was run on a separate composite. In cycles 3-5 this yielded 93.8% Cu recovery to a concentrate assaying 19.1% Cu. The Au recovery was 78.8% and the Ag recovery 70.3% (Table 13-13).

Table 13-13: PFS Fresh #3 Composite: LCT-3

		Grade				% Distribution			
	Mass %	Cu (%)	Au (g/t)	Ag (g/t)	S (%)	Cu	Au	Ag	S
Final Concentrate	1.80	19.1	17.4	76.6	27.2	93.8	78.8	70.3	13.0
Cleaner Tail	7.52	0.08	0.16	2.2	8.4	1.6	3.0	8.2	16.8
Rougher Tail	90.7	0.02	0.08	0.47	2.9	4.5	18.2	21.5	70.2
Feed	100.0	0.37	0.40	2.0	3.8	100.0	100.0	100.0	100.0

13.8 Standard Locked Cycle Test Reagent Suite

On average, the reagent doses in Table 13-14 were used in the cycles of the locked cycle tests used to create the metallurgical balances.

Table 13-14: Average Reagent Dose in Final Cycles from Locked Cycle Tests

	Reagents (g/tonne)			
	Lime	**Calgon**	**Potassium amyl xanthate**	**Methyl Isobutyl Carbinol (MIBC) Frother**
Primary Grind	564	0	0	0
Rougher 1 feed	69	0	1.2	8
Rougher 2 feed	38	0	1.2	8
Regrind feed	300	20	0	0
Cleaner 1 feed	27	23	1.5	0
Cleaner 2 feed	53	27	1.5	0
Cleaner 3 feed	33	27	1.3	0
Feed	**1,084**	**97**	**6.7**	**16**

13.9 Concentrate Quality

The concentrate assays in Table 13-15 were obtained from a sample of concentrates produced through the metallurgical program.

Table 13-15: Multi-element Analysis of Copper Concentrate

all 4AD ICP, except *FA and otherwise noted											
Element	**Units**		**Element**	**Units**		**Element**	**Units**		**Element**	**Units**	
Ag	ppm	57	Cu	%	18.4	Na	%	1.03	Sr	ppm	17
Al	%	1.96	Fe	%	34.2	Nb	ppm	<10	Ta	ppm	11
As	ppm	44	Ga	ppm	25	Ni	ppm	45	Te	ppm	34
Au*	ppm	18.5	Ge	ppm	<20	P	%	<0.002	Ti	%	0.16
Ba	ppm	94	Hf	ppm	<20	Pb	ppm	21	Tl	ppm	<2
Be	ppm	0.3	In	ppm	<20	Rb	ppm	<20	V	ppm	213
Bi	ppm	<2	K	%	0.28	Re	ppm	<20	W	ppm	37
Ca	%	1.55	Li	ppm	11	S	%	22.8	Zn	ppm	1,678
Cd	ppm	11.4	Mg	%	0.46	Sb	ppm	19	Zr	ppm	186
Co	ppm	120	Mn	ppm	352	Se	ppm	<10			
Cr	ppm	22	Mo	ppm	21.5	Sn	ppm	<10			
Cl (INAA)	%	<0.01	F (ISE)	%	0.07	Hg (1 G)	ppb	315			

13.10 Metallurgical Forecast Algorithms for the Financial Model[13]

For the sake of the metallurgical forecast, the mineralization has been classified into three categories, namely saprolite, fresh, and transition.

[13] The reader should note that the forecast algorithms used for mine planning pre-dated the availability of locked cycle data and so may be somewhat different from those described in this section.

13.10.1 Saprolite

Only Au is recovered from saprolitic material. Based on the currently available data, Au recovery to rougher concentrate is linked to Au head grade, the test data being shown as orange points in Figure 13-11.

No locked cycle test data are available on saprolite flotation, so the trend in Au metallurgy as observed when converting from rougher recovery to final locked cycle recovery in fresh sample tested, has been used as a guide for saprolite. These tests recovered 97% of the Au in the rougher concentrate to final concentrate, but to add a measure of conservatism to the projection for saprolite a cleaner stage recovery factor of 0.95 has been applied.

A logarithmic algorithm has been used to describe the relationship between Au head grade and recovery where test data provide coverage, while the recovery is capped (fixed) for high head grades and penalized for head grades below the minimum tested.

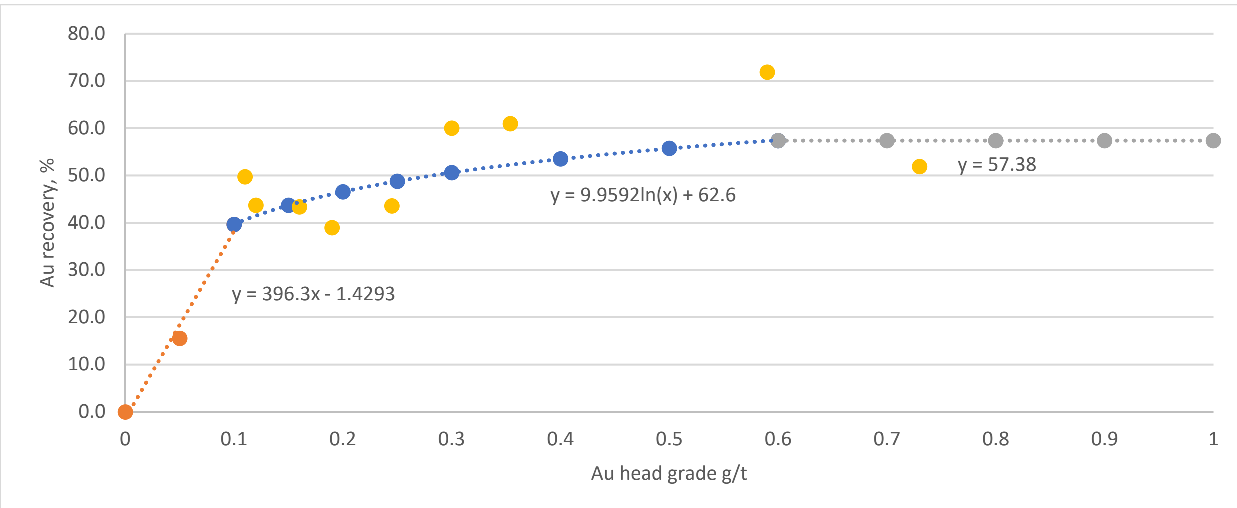


Figure 13-11: Saprolite Au head grade vs rougher recovery: variability test data and met projections

The associated algorithms are provided in Table 13-16.

Table 13-16: Saprolite Metallurgical Forecast Algorithms

Grade Range		Au Recoveries
<0.1	g/t Au	Recovery = 396.3 x Au feed grade, g/t – 1.4293
0.1-0.6	g/t Au	Recovery = 9.9592 x Natural logarithm (“LN”) (Au feed grade, g/t) +62.6
>0.6	g/t Au	Recovery = 57.38%

Cu and Ag recoveries are both assumed to be zero.

13.10.2 Fresh

Rougher flotation Cu, Au, and Ag recoveries are plotted against head grade from the variability study on fresh samples, using orange-coloured points in the figures below.

The average cleaner stage recovery in the three locked cycle tests for Cu was 98.5%, for Au 97.0%, and for Ag 92.7%. These factors were used to convert algorithms created to describe rougher recovery, to recovery to final concentrate.

In each case for the data ranges covered by testing, a logarithmic curve was found to best describe the metal recovery as a function of head grade, with Cu and Ag recoveries being linked to Cu head grade, and Au recovery linked to Au head grade.

Outside of the tested ranges, recoveries were capped (fixed) at grades above the range and penalized using linear relationships for grades below the tested range. These are shown for Cu in Figure 13-12 and Table 13-17, for Au in Figure 13-13 and Table 13-18 and for Ag in Figure 13-14 and Table 13-19.

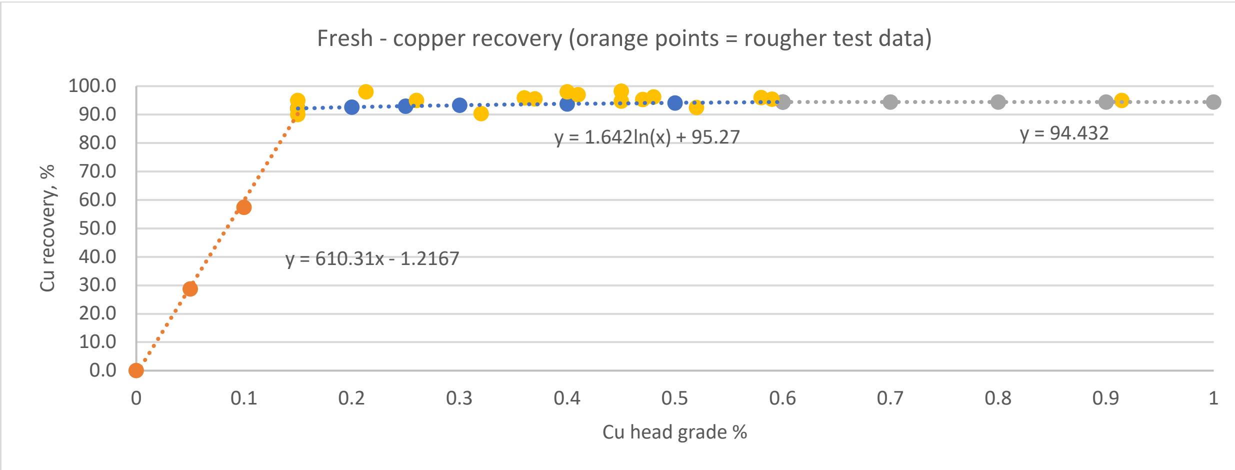


Figure 13-12: Fresh: Cu metallurgical forecasting recovery algorithms

Table 13-17: Fresh Feed: Copper Recovery Algorithms

Grade Range		Recovery Algorithms
<0.15	% Cu	recovery, % = 610.3 x Cu grade, % – 1.2167
0.15-0.6	% Cu	recovery, % = 1.642 x LN (Cu grade, %) + 95.27
>0.6	% Cu	recovery = 94.43%

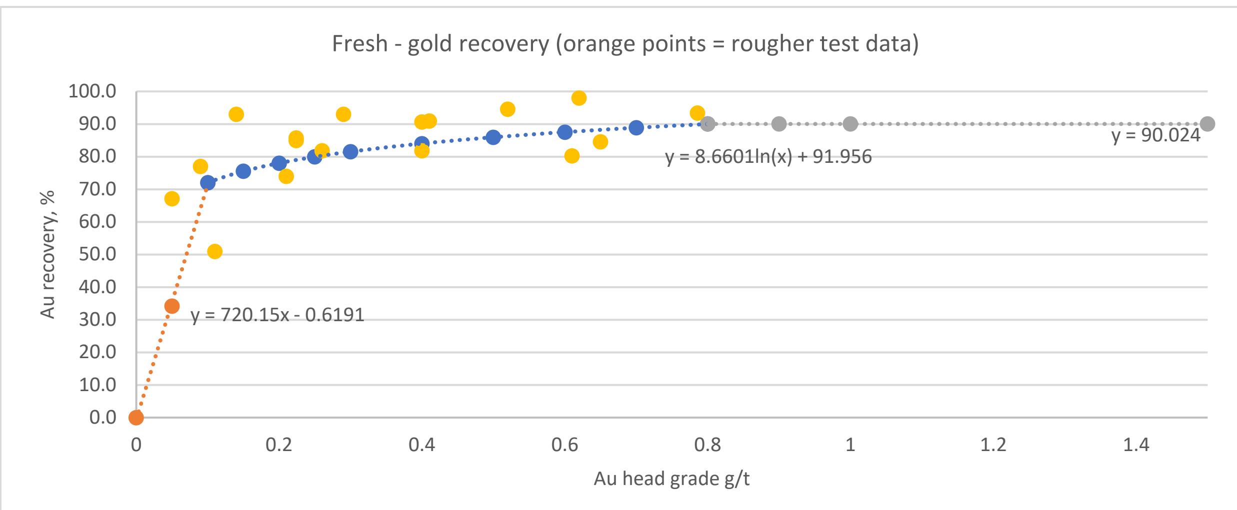


Figure 13-13: Fresh: Au metallurgical forecasting recovery algorithms

Table 13-18: Fresh Feed, Gold Recovery Algorithms

Grade Range		Recovery Algorithms
<0.1	g/t Au	recovery, % = 720.15 x Au grade, g/t – 0.619
0.1-0.8	g/t Au	recovery, % = 8.66*LN (Au grade, g/t) + 91.956
>0.8	g/t Au	recovery = 90.02%

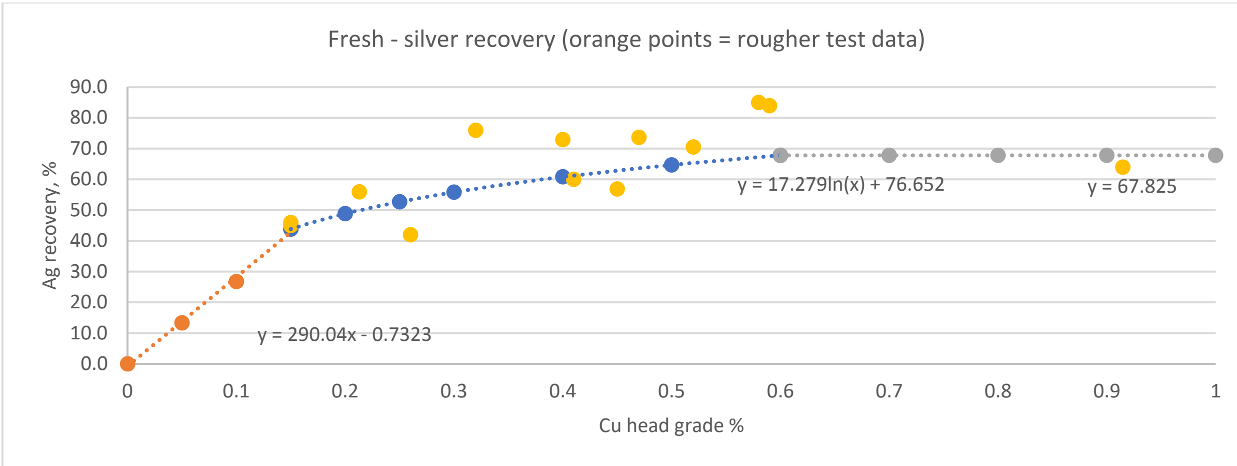


Figure 13-14: Fresh: Ag metallurgical forecasting recovery algorithms

Table 13-19: Fresh Feed, Silver Recovery Algorithms

Grade Range		Recovery Algorithms
<0.15	%Cu	recovery, % = 290.04 x Cu grade, % - 0.732
0.15-0.6	%Cu	recovery, % = 17.279*LN (Cu grade, %) + 76.652
>0.6	%Cu	recovery = 67.83%

13.10.3 Transition

Forecasting recoveries for transition material is challenging, for Cu, and Ag in particular, as the Cu mineralization is a mix of zero-recovery oxide-hosted mineralization, stronger-floating secondary sulphide mineralization (chalcocite) and very strong-floating primary sulphide mineralization (chalcopyrite). As no diagnostic test has yet been developed for the project to speciate the Cu in different samples, recoveries become essentially impossible to estimate from present geochemical data. A diagnostic leach needs to be developed to allow for estimation of the Cu recovery for transition material – if the tonnage of transition material justifies this effort.

Without this, for the sake of the PFS, it has been assumed that recoveries from transition material would be mid way between those achieved from saprolite material and from fresh material. The recovery algorithms used for transition material are presented in Table 13-20.

Table 13-20: Metallurgical Forecasting Recovery Algorithms for Transition Material

Grade Range		Recovery Algorithms
Cu		
<0.15	%Cu	recovery, % = 305.2 x Cu grade, % - 0.6084
0.15-0.6	%Cu	recovery, % = 10.821 x LN (Cu grade, %) + 47.64
>0.6	%Cu	recovery = 47.22%
Au		
<0.1	g/t Au	recovery, % = 558.23 x Au grade, g/t - 0.619
0.1-0.8	g/t Au	recovery, % = 8.855*LN (Au grade, g/t) + 76.54
>0.8	g/t Au	recovery = 73.70%
Ag		
<0.15	%Cu	recovery, % = 145.02 x Cu grade, % - 0.366
0.15-0.6	%Cu	recovery, % = 8.640*LN (Cu grade, %) + 38.33
>0.6	%Cu	recovery = 33.91%

13.10.4 Forecasted Concentrate Grade

All flotation algorithms have been created on the assumption that the concentrate grade will be 20% Cu.

14 MINERAL RESOURCE ESTIMATES

14.1 Introduction

The Mineral Resources have been classified according to CIM (CIM, 2014). Accordingly, the resources have been classified as Measured, Indicated, or Inferred.

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

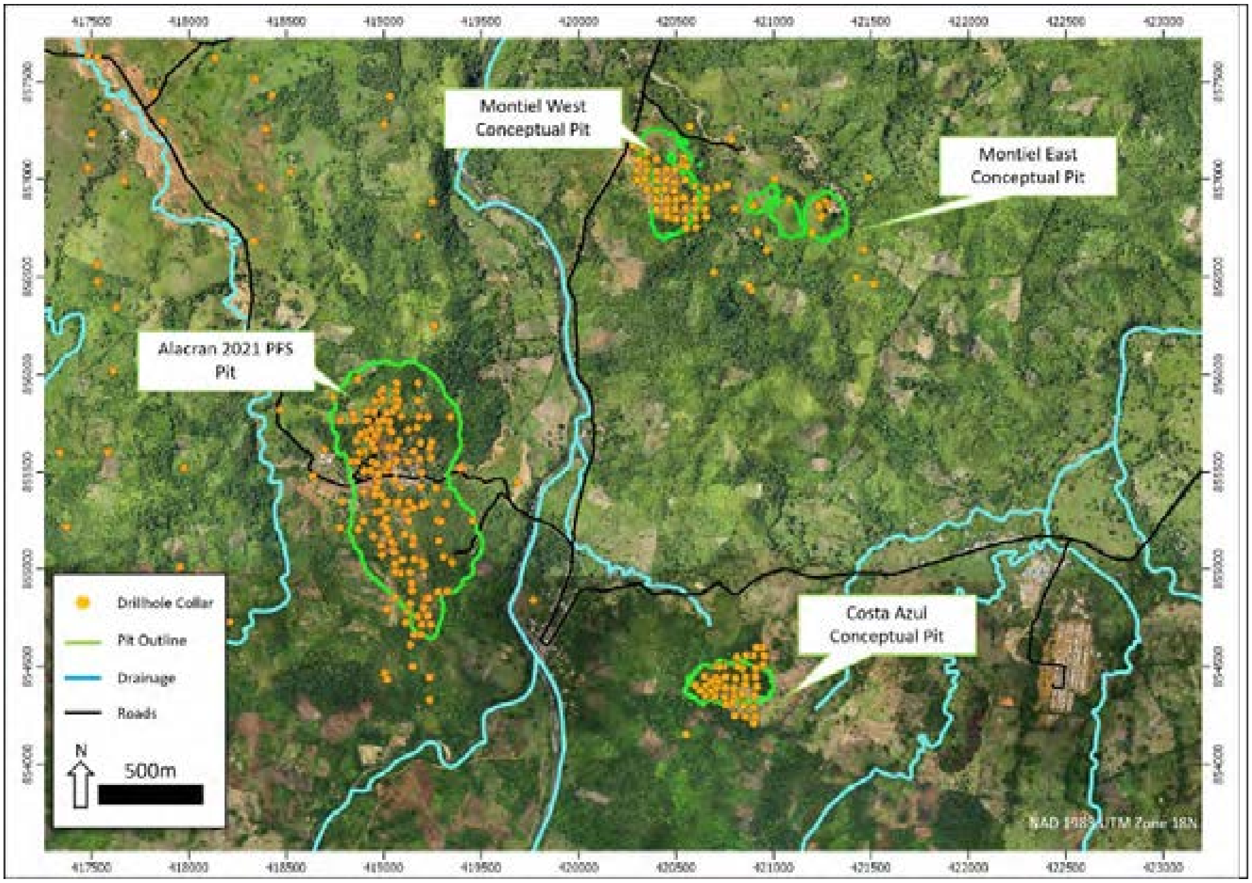
An **Inferred Mineral Resource** is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Mineral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

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

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

14.2 Drill Hole Database

The work on the Mineral Resource Estimate for the PFS included a detailed geological re-examination of the structural controls to HG Au veins within the Alacran deposit (Nordmin, 2021). It also includes the three porphyry Cu-Au-Ag Satellite deposits at Montiel East, Montiel West, and Costa Azul (Figure 14-1).

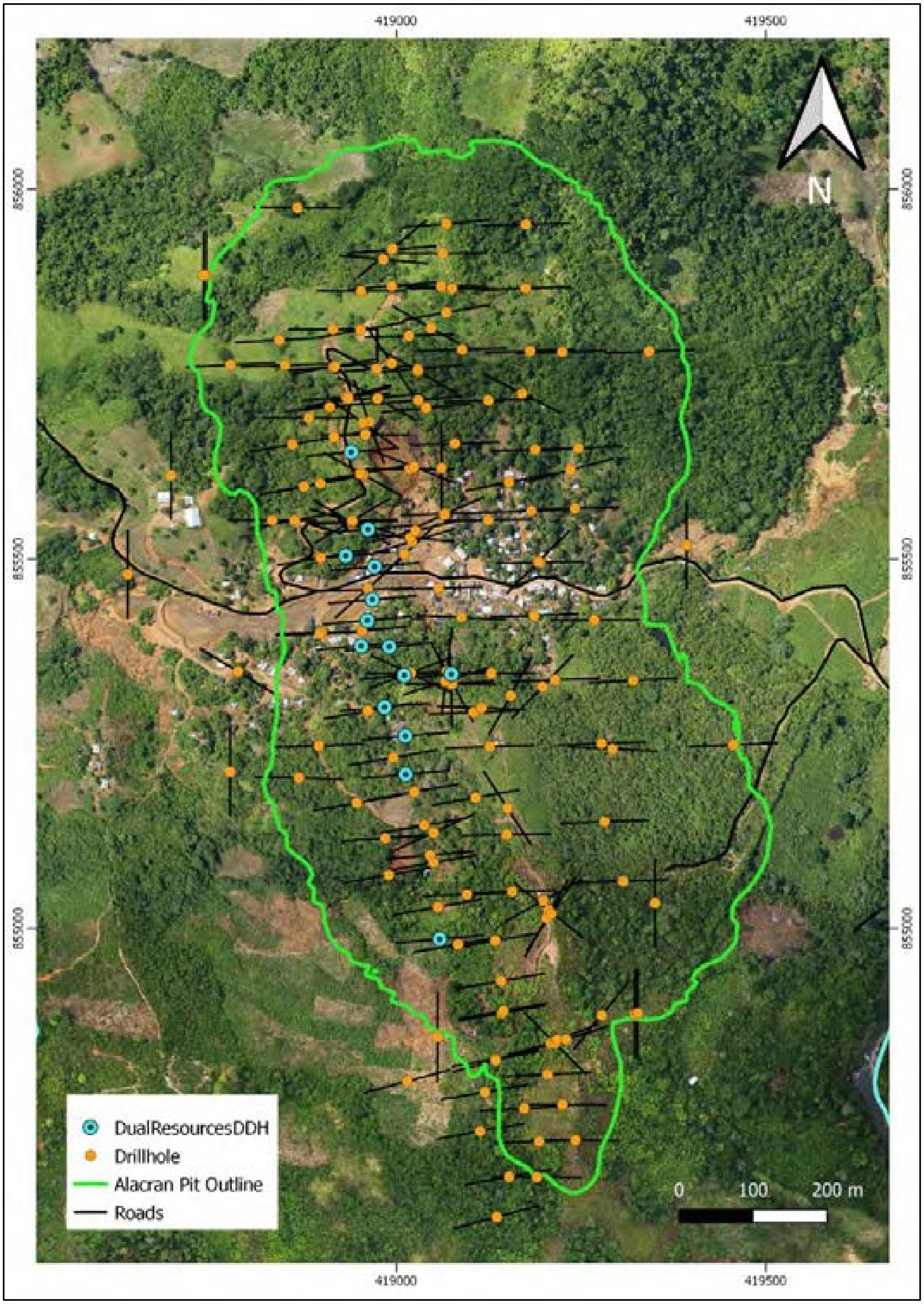


Source: Nordmin, 2021

Figure 14-1: The Project area showing the location of the Alacran deposit and the Satellite deposits (Montiel East, Montiel West, and Costa Azul)

Alacran

The 2021 PFS Mineral Resource Estimate for Alacran is based on the geological and structural data from 178 diamond drill holes, totalling 39,086.0 metres and 30,086 samples, as well as 29 surface saprolite test pits totalling 30.5 m and 35 samples. This work was completed by Cordoba and the previous operators between 2012 and 2021. Assay data is available for all of the completed drillholes. Drill hole locations and the OP outline can be viewed in Figure 14-2. Historic drill hole locations are highlighted in blue, these were re-incorporated into the Resource Estimate after completing a twin drill hole analysis and QA/QC.



Source: Nordmin, 2021

Figure 14-2: Plan map of the Alacran deposit with the drill holes plotted. Note that historical drill holes (blue) were added into the updated Mineral Resource Estimate after completing twin drill hole analysis and QA/QC.

Costa Azul

The Mineral Resource Estimate is based on geology and assay data from 118 holes consisting of 4,996 metres completed between April 2014 and March 2017. These 118 holes were comprised of six diamond core and 112 RC holes. A total of 2,275 assays were used, comprised of 1,193 diamond core assays and 1,082 RC drill hole assays.

Montiel East

The drill hole database for this Mineral Resource Estimate is based on geology and assay data from 78 holes consisting of 11,056.0 metres completed between August 2013 and March 2017. These 78 holes were comprised of 30 diamond core and 48 RC holes. A total of 6,946 assays were used, comprised of 6,406 diamond core assays and 540 RC drill hole assays.

Montiel West

The drill hole database for this Mineral Resource Estimate is based on geology and assay data from 93 holes consisting of 4,056.0 metres completed between February 2014 and May 2017. These 93 holes were comprised of eight diamond core and 85 RC holes. A total of 1,746 assays were used, comprised of 1,104 diamond core assays and 639 RC assays.

14.3 Geological Domaining

Nordmin examined and modelled the lithological and geochemical correlations between rock types, and mineralization, and included a detailed geological examination of the structural controls to HG Au veins within the Alacran deposit.

The saprolite layer was updated in 2021 using contact points from all available diamond drilling and test pits; typically, the saprolite layer extends up to 35 m below surface. The transition layer was also updated using all available diamond drilling, and typically extends up to 20 m below the saprolite layer although it is variable locally. These updates resulted in greatly improved accuracy in both layers and led to a reduction in saprolite and transition volumes. Much of this reduced volume was reflected in the "fresh" rock below the two layers.

Nordmin, applying the approach of a large mineable area, created HG and low grade domains and associated zones (wireframes) within each domain based on drill hole intersection and grade, including relevant geological data, and structure. In areas of less defined or scattered mineralization, areas were combined to avoid irregular wireframes. Where wireframes merge or diverge, multiple sections along strike were reviewed to determine if the breaks in mineralization were consistent or just localized patches of low grade mineralization. If a break in the mineralization occurred only over a small strike length or vertically, the break would be consolidated within the surrounding mineralization. In areas where breaks in mineralization are consistent over multiple sections, wireframes merged, or diverged accordingly. To avoid overly complex wireframes that merge and frequently diverge with irregular local deviations, as well as areas that could not be extended or replicated, some mineralization was disregarded.

Wireframes were initially created on 25 m sections and then adjusted on plan views to edit and smooth each wireframe where required. When not cut-off by drilling, the wireframes terminate at plunge and depth due to lack of drilling. No wireframe overlapping exists within a given domain, but wireframes of different HG domains do locally overlap. Due to contrasts in the physical characteristics between the different mineral phases, Nordmin elected to create hard boundaries to separate the HG mineralization from the low grade mineralization for each zone within each domain (Figure 14-3). This approach has the advantage of being able to interpret the mineralization in context with the deposit geology and associated geochemistry using explicit modelling. It is Nordmin's opinion that the explicit modelling approach minimizes risks compared to using implicit modelling for Resource Estimation within this deposit.

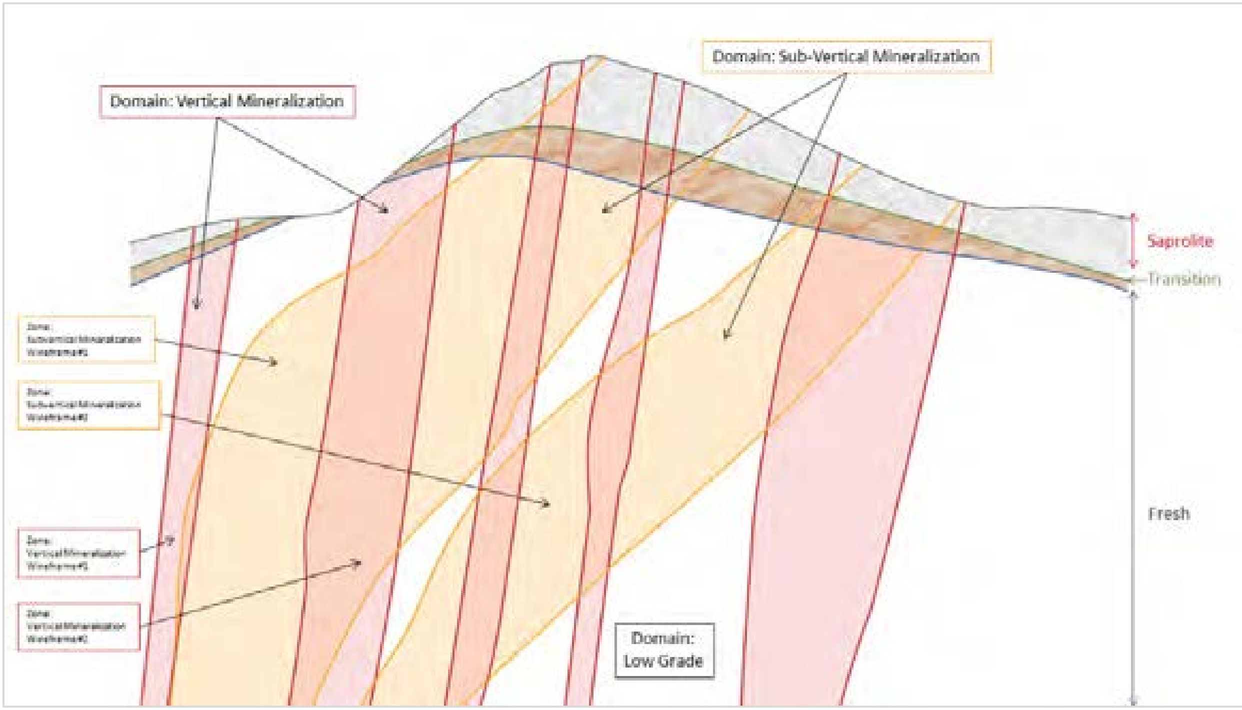
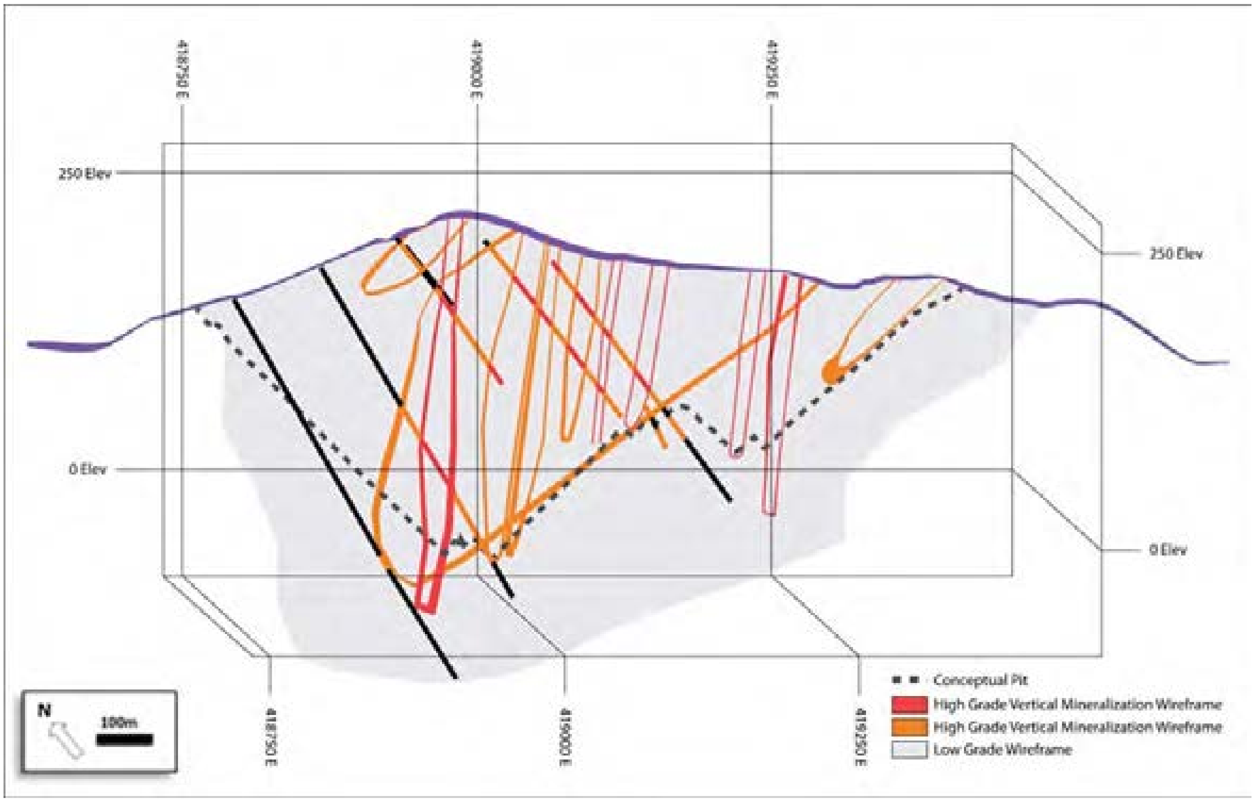


Figure 14-3: Representation of the geological domaining of the Alacran deposit

All wireframes were clipped to topography. Wireframes were then further divided into saprolite, transition, and fresh. Assays within each zone wireframe were identified, coded, and isolated (Figure 14-4).



Source: Nordmin, 2021

Figure 14-4 Wireframes for HG vertical mineralization at the Alacran deposit in red, sub-vertical stratabound mineralization in orange, low grade mineralization in black with flagged drill holes displaying the same colours

Alacran

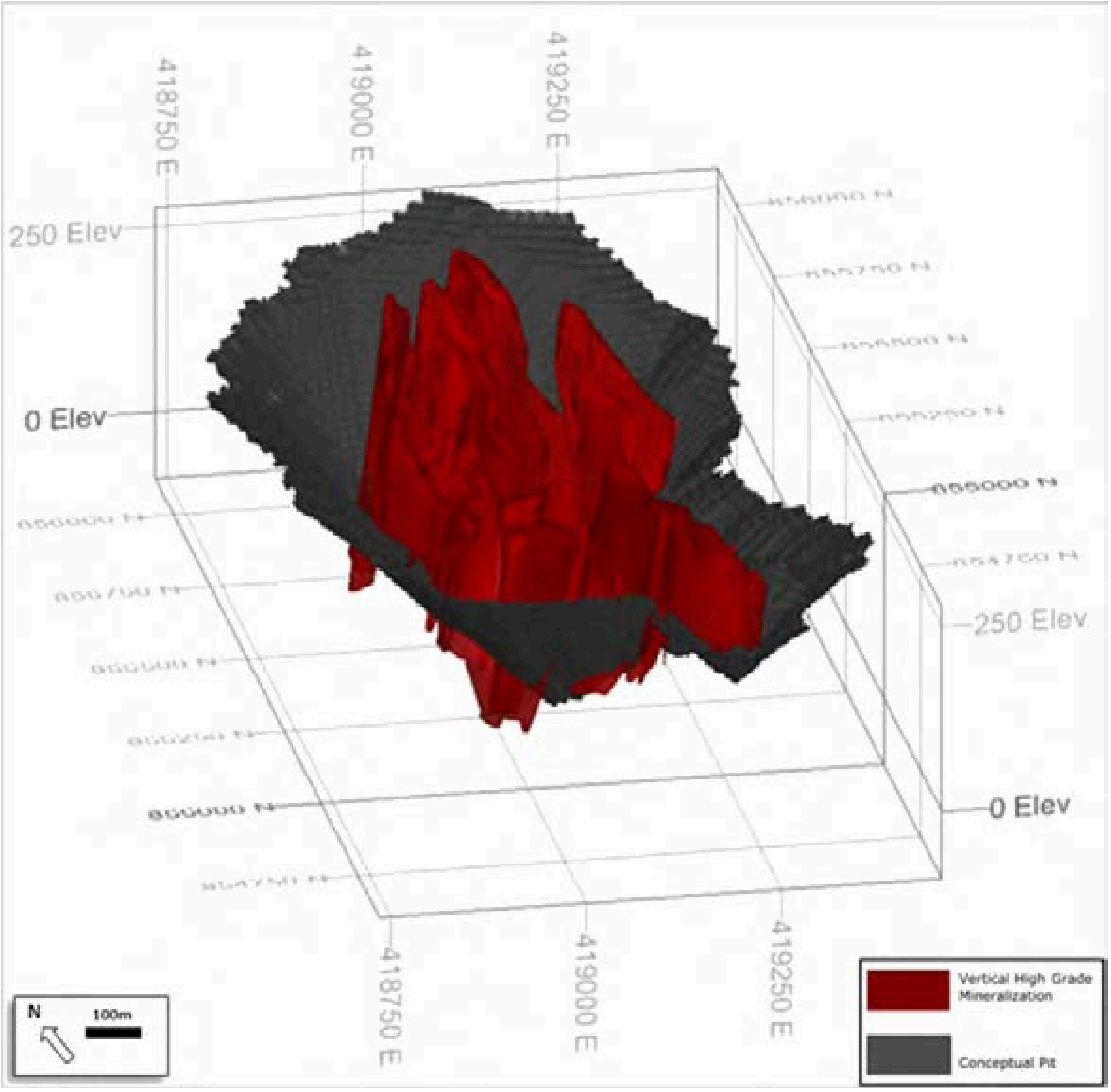
Two major mineralization domains and one encompassing low grade domain were identified and explicitly modelled.

1. Vertical Mineralization

   Wireframes were modelled using the following:

   - A cut-off grade of 1 ppm Au;
   - Structural model: Structural trends were observed while developing the model; the wireframes tightly followed the structural trends where measurements were available; and
   - Geology model and lithological boundaries: wireframes were permitted to follow lithological boundaries and trends where appropriate.

Vertical mineralization wireframes as modelled is shown in Figure 14-5.



Source: Nordmin, 2021

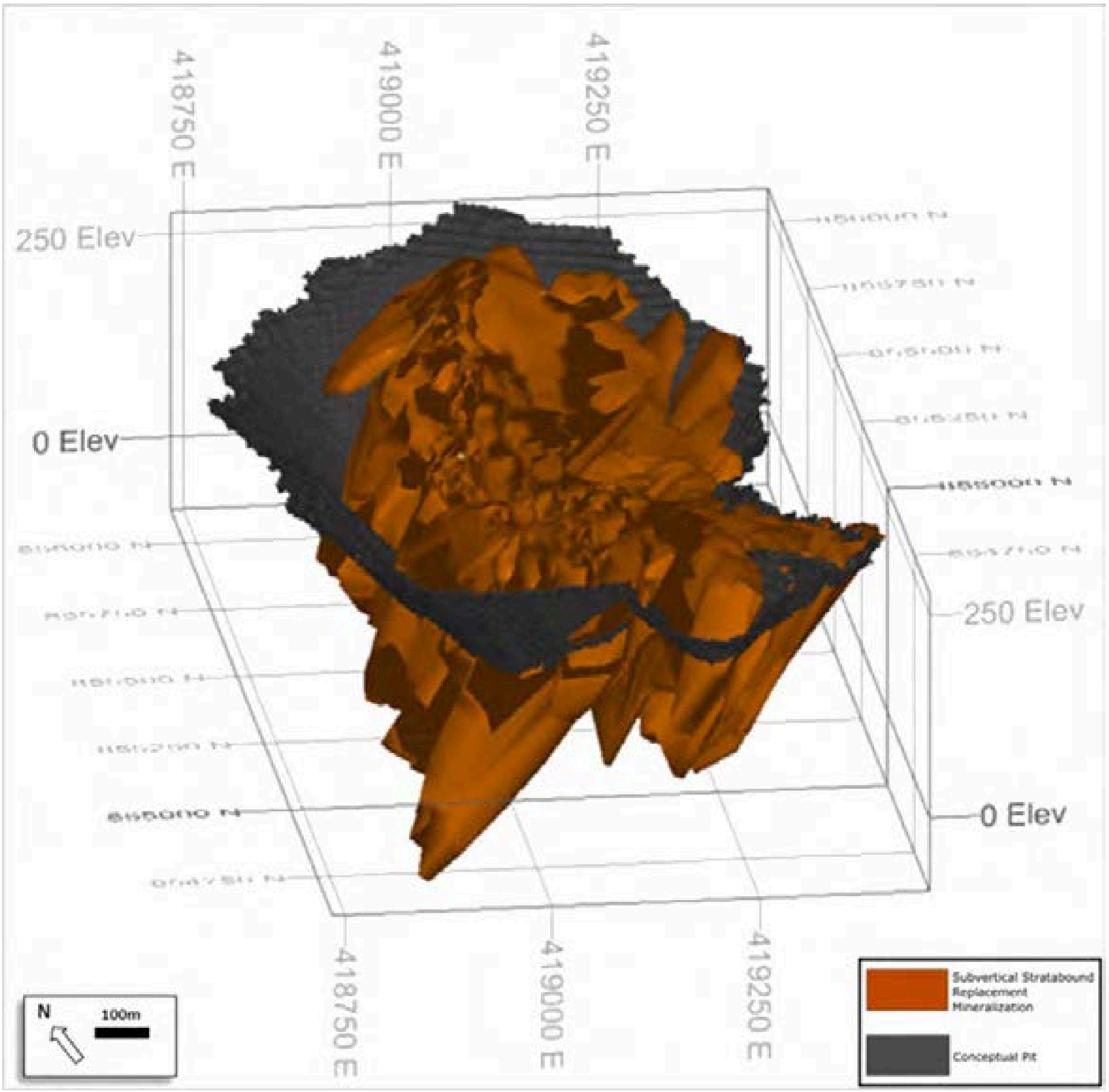
Figure 14-5: Vertical HG mineralization wireframes with conceptual OP

2. Sub-vertical Stratabound Mineralization

   Wireframes were modelled using the following:

   - A cut-off grade of 0.25% Cu;
   - Structural model: structural trends were observed while developing the model; the wireframes tightly followed the structural trends where measurements were available; and
   - Geology Model and lithological boundaries: wireframes were permitted to follow lithological boundaries and trends where appropriate.

   Sub-vertical stratabound mineralization wireframes as modelled is shown in Figure 14-6.



Source: Nordmin, 2021

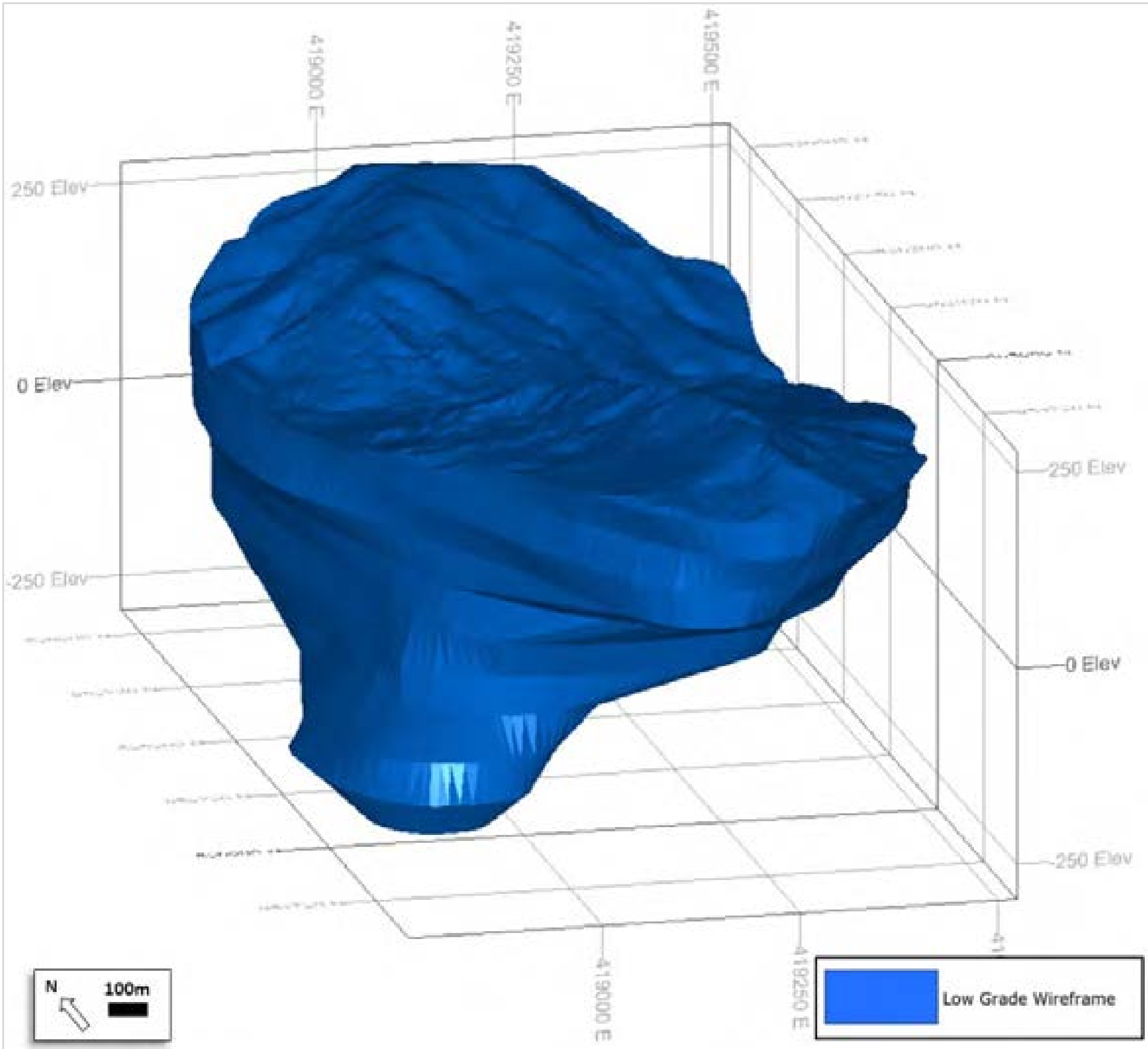
Figure 14-6: Sub-vertical stratabound mineralization wireframes with conceptual OP

3. Low Grade Mineralization

   An encompassing low grade mineralization wireframe was modelled using the following:

   - Structural model: structural trends were observed while developing the model; the vertical mineralization wireframes tightly followed the structural trends where measurements were available; and
   - Geology model and lithological boundaries: vertical mineralization wireframes were permitted to follow lithological boundaries and trends where appropriate.

   Low grade wireframes as modelled are demonstrated Figure 14-7.

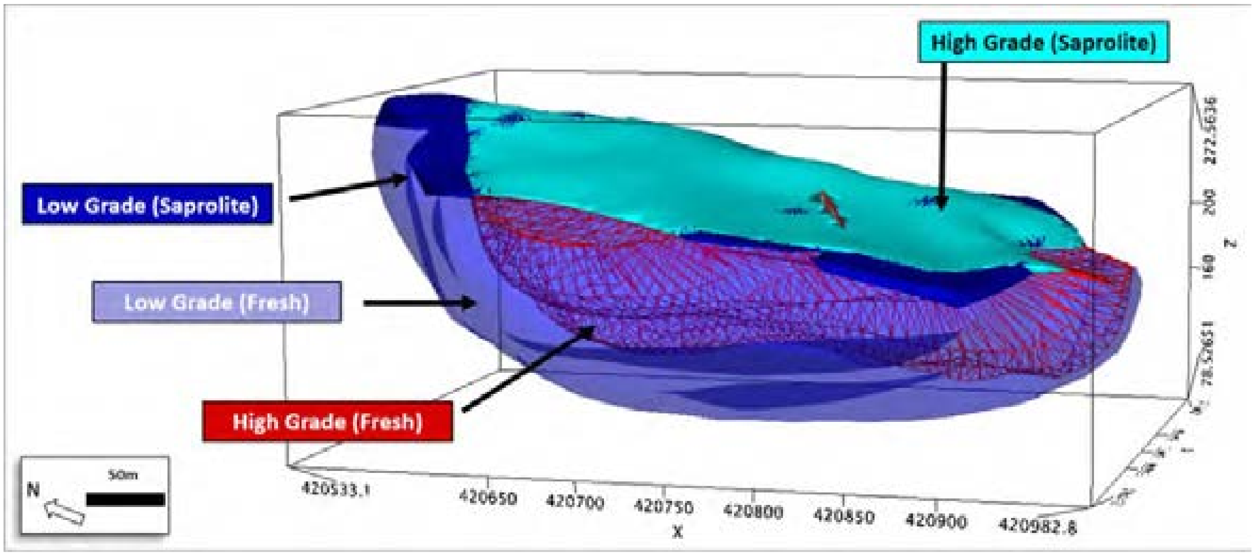


Source: Nordmin, 2021

Figure 14-7: Alacran deposit low grade wireframe

Costa Azul

Two HG wireframes and an encompassing low grade shell were explicitly modelled, as shown in Figure 14-8.

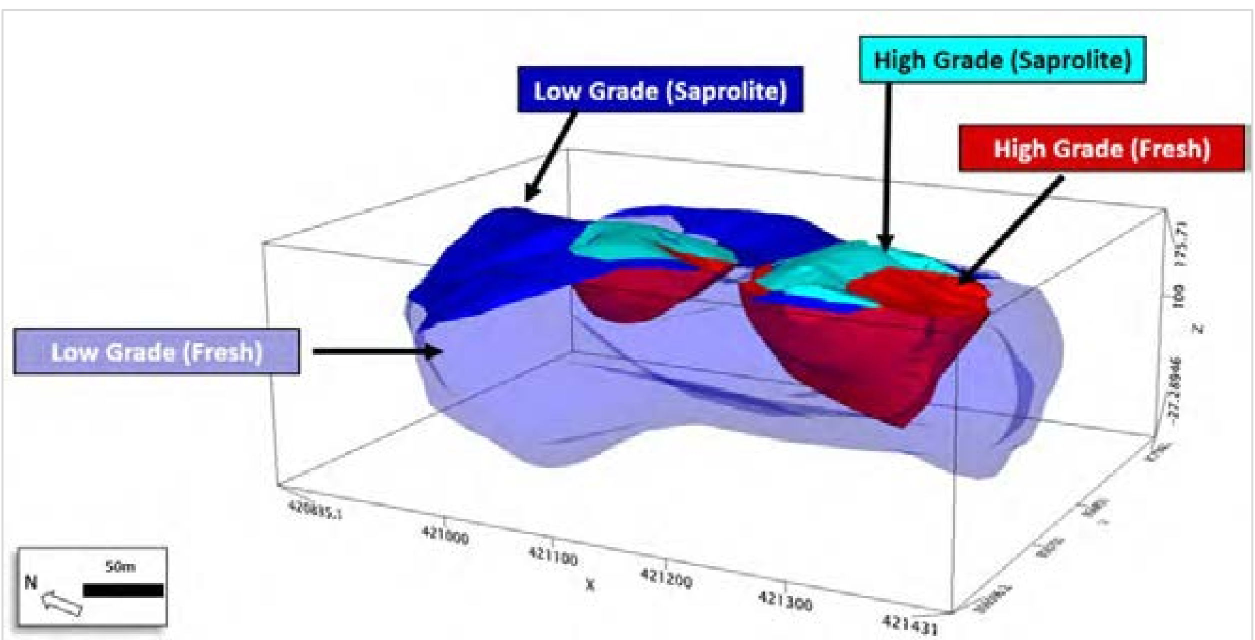


Source: Nordmin, 2019

Figure 14-8: Costa Azul domain model

Montiel East

The models include two HG wireframes and an encompassing low grade shell, as shown in Figure 14-9.

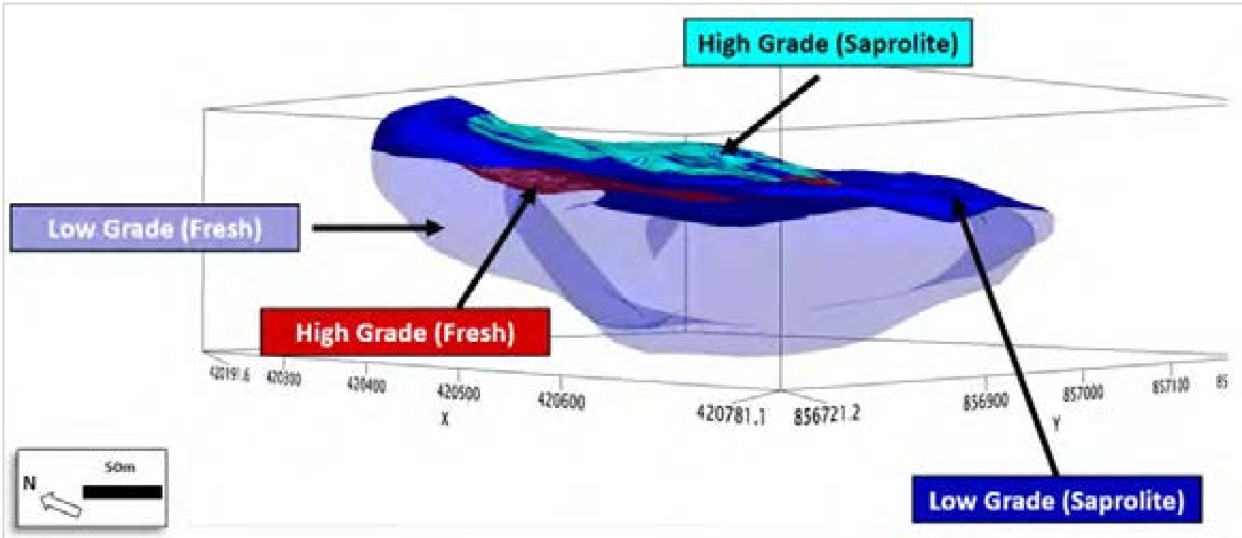


Source: Nordmin, 2019

Figure 14-9: Montiel East domain model

Montiel West

The models include one HG wireframe and an encompassing low grade shell, as seen in Figure 14-10.



Source: Nordmin, 2019

Figure 14-10: Montiel West domain model

14.4 Exploratory Data Analysis

The exploratory data analysis was conducted on raw drill hole data to determine the nature of the Cu, Au, and Ag distribution, correlation of grades within individual rock units, and the identification of HG outlier samples. Nordmin used a combination of descriptive statistics, histograms, probability plots, and XY scatter plots to analyze the grade population data. The findings of the exploratory data analysis were used to help define modelling procedures and parameters used in the Mineral Resource Estimate.

Descriptive statistics were used to analyze the grade distribution of each sample population, determine the presence of outliers, and identify correlations between grade and rock types for each mineral zone. Diamond drill core and RC chips were analyzed as separate populations for the three Satellite deposits (Costa Azul, Montiel East, and Montiel West).

Table 14-1 provides a summary of the descriptive statistics for the raw sample populations captured from within each mineral zone.

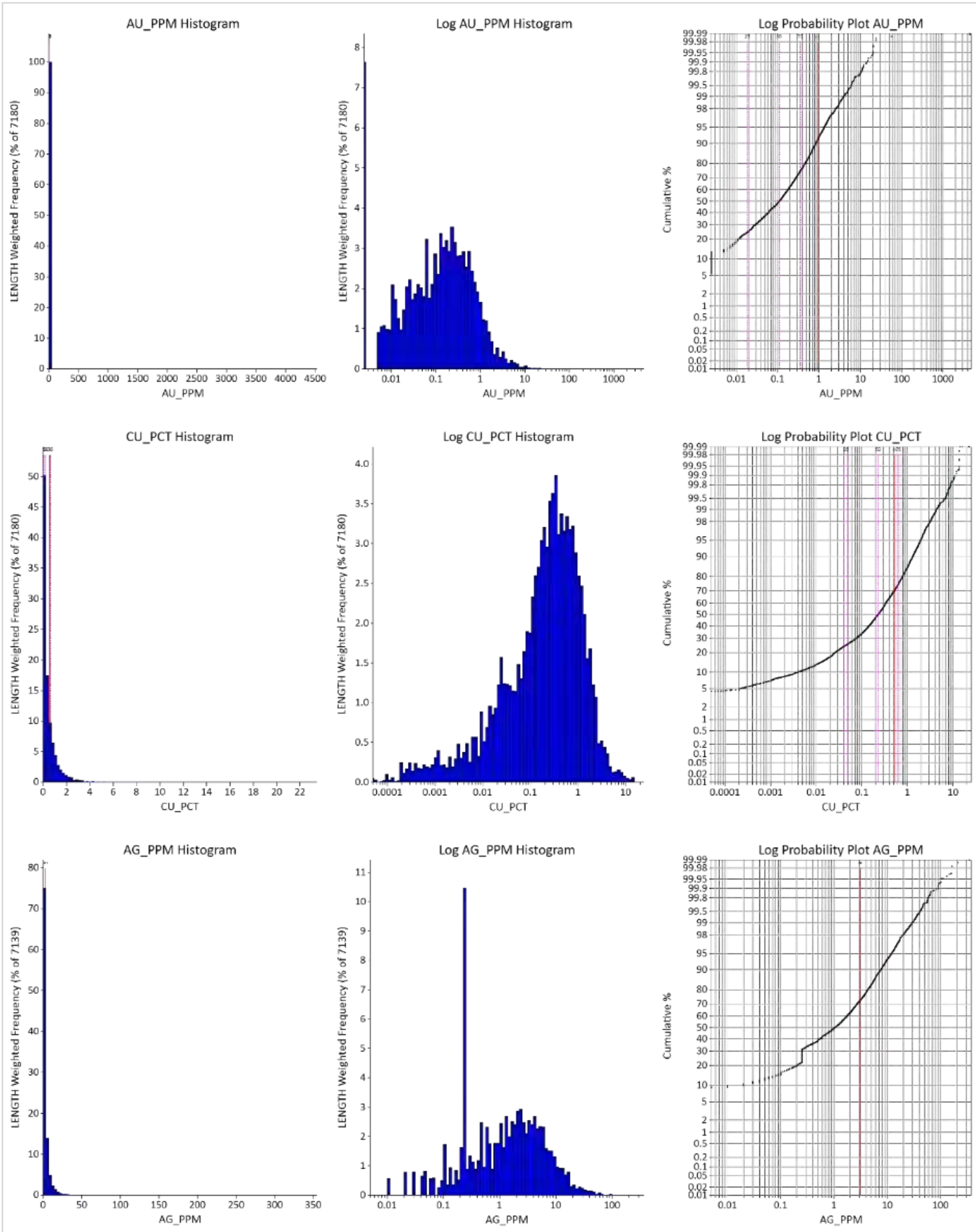
Table 14-1: Summary of Data Available by Zone

Deposit	Domain	Zone	Number of Drill Holes	Number of Samples
Alacran	HG Vertical Mineralization	1	36	673
		2	43	689
		5	88	4,515
		6	25	544
		9	4	43
		Total		6,464
	Sub-vertical Stratabound Replacement Mineralization	1	133	8,726
		3	11	155
		5	7	107
		6	13	186
		7	11	151
		Total		9,325
	Low grade Mineralization		153	12,271
Costa Azul	HG Mineralization		92	2,940
	Low grade Mineralization		13	386
Montiel East	HG Mineralization	1	3	102
		2	32	1,744
	Low grade Mineralization		64	2,736
Montiel West	HG Mineralization		44	944
	Low grade Mineralization		68	1,646

Source: Nordmin, 2021

Alacran

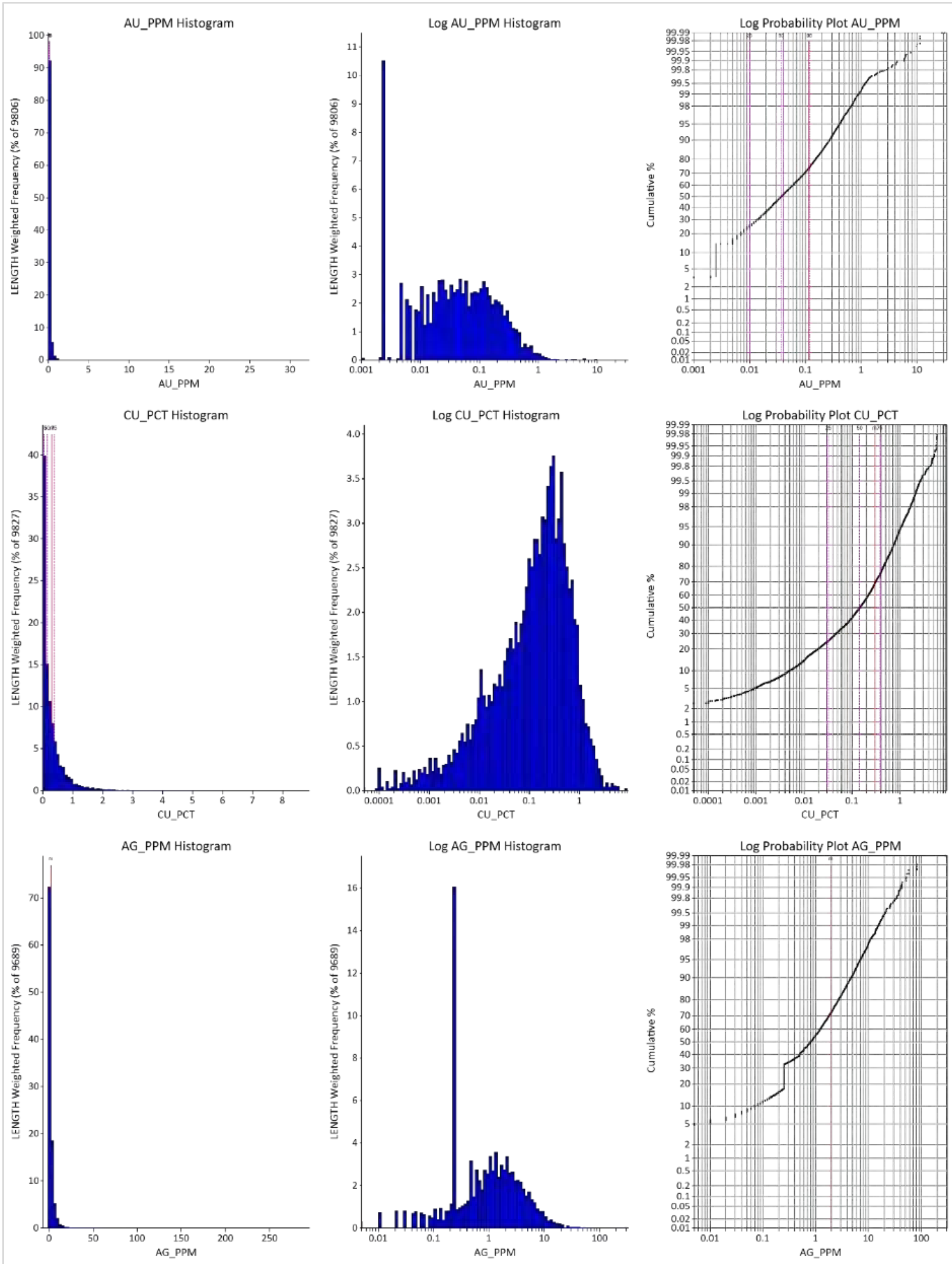
Figure 14-11 provides the Cu, Au, and Ag data analysis for the Alacran HG vertical mineralization domain. One population exists for all sample types.



Source: Nordmin, 2021

Figure 14-11: Alacran deposit HG vertical mineralization domain data analysis for Cu, Au, and Ag

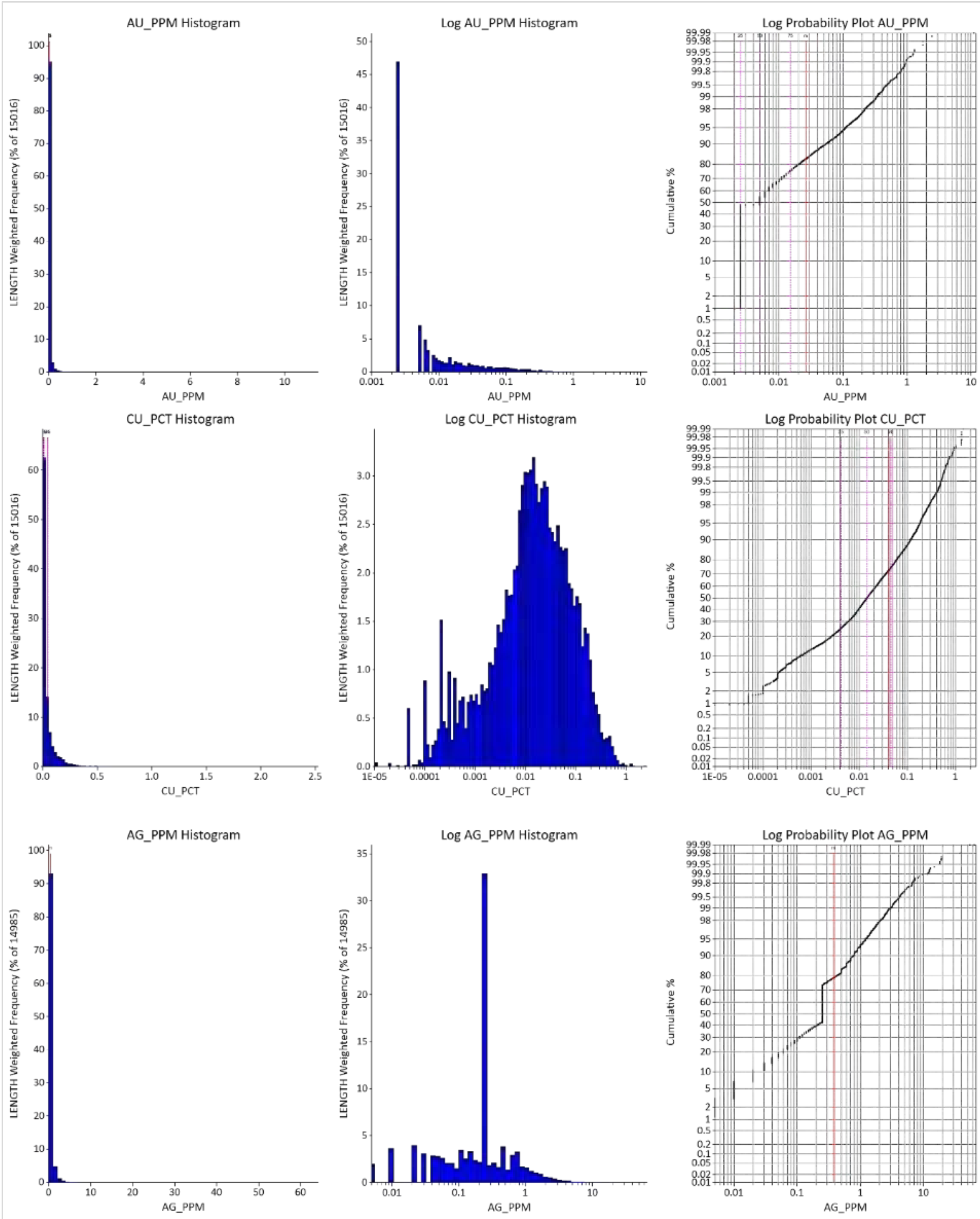
Figure 14-12 provides the Cu, Au, and Ag data analysis for the Alacran deposit sub-vertical stratabound replacement mineralization domain. One population exists for all sample types



Source: Nordmin, 2021

Figure 14-12: Alacran deposit sub-vertical stratabound replacement domain data analysis for Cu, Au, and Ag

Figure 14-13 provides the Cu, Au, and Ag data analysis for the Alacran low grade mineralization domain. One population exists for all sample types.

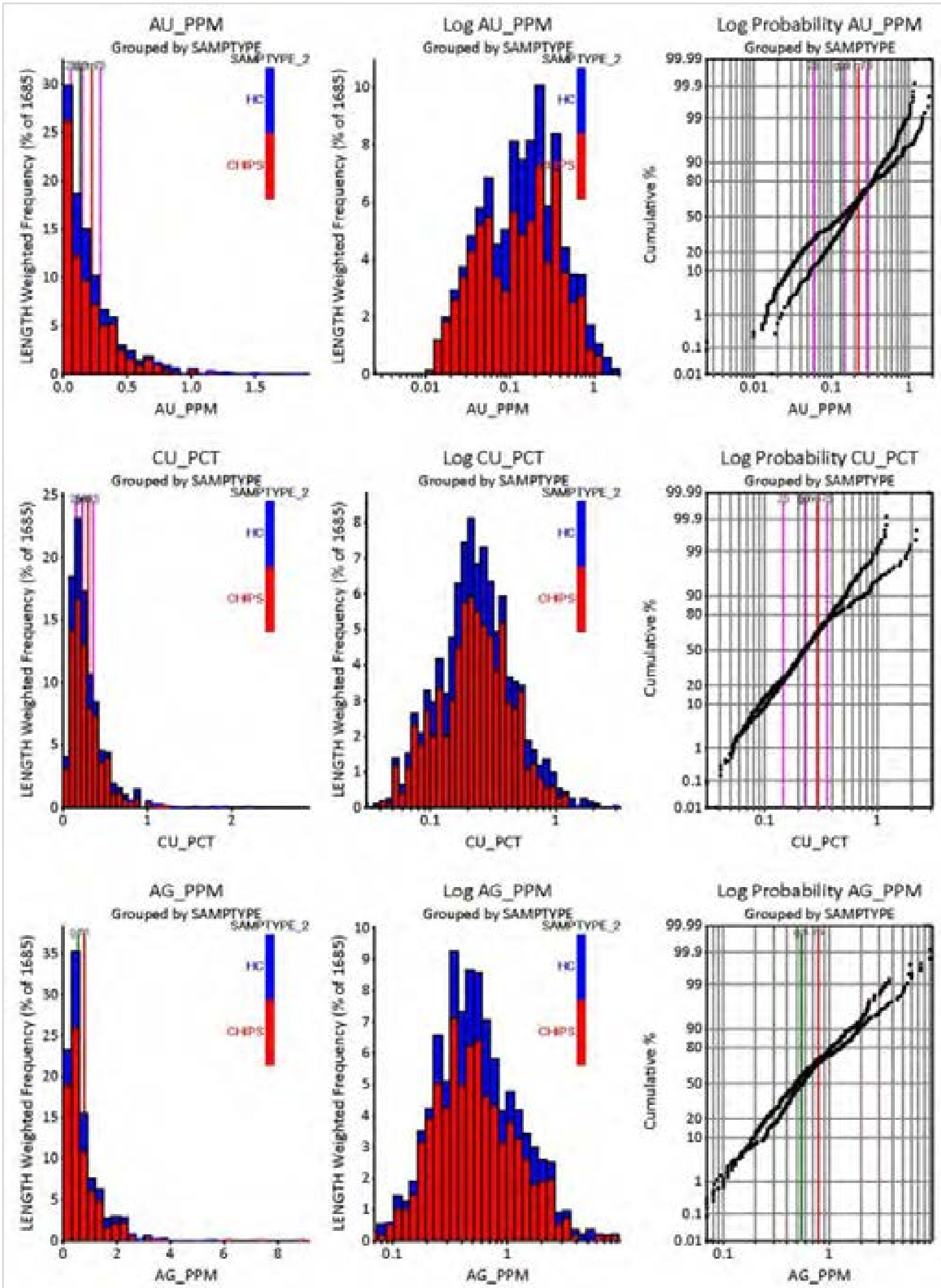


Source: Nordmin, 2021

Figure 14-13: Alacran deposit low grade mineralization domain analysis for Cu, Au, and Ag

Costa Azul

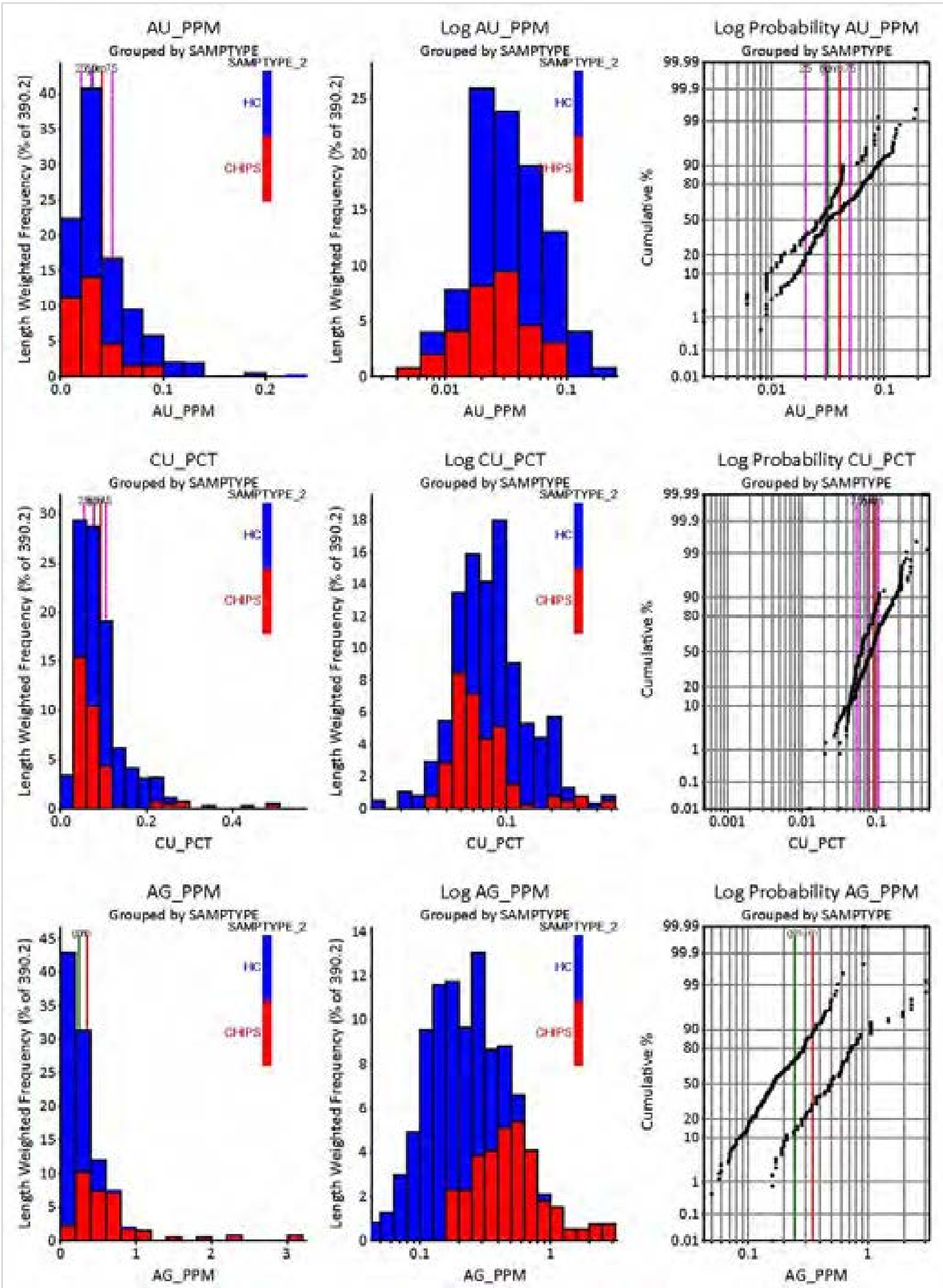
Figure 14-14 provides the Cu, Au, and Ag data analysis for the Costa Azul HG mineralization domain. Two sample types were analyzed separately in individual populations, including diamond drill core, and RC.



Source: Nordmin, 2019

Figure 14-14: Costa Azul HG mineralization domain analysis for Cu, Au, and Ag

Figure 14-6 provides the Cu, Au, and Ag data analysis for the Costa Azul low grade mineralization domain. Two sample types were analyzed separately in individual populations, including diamond drill core, and RC.

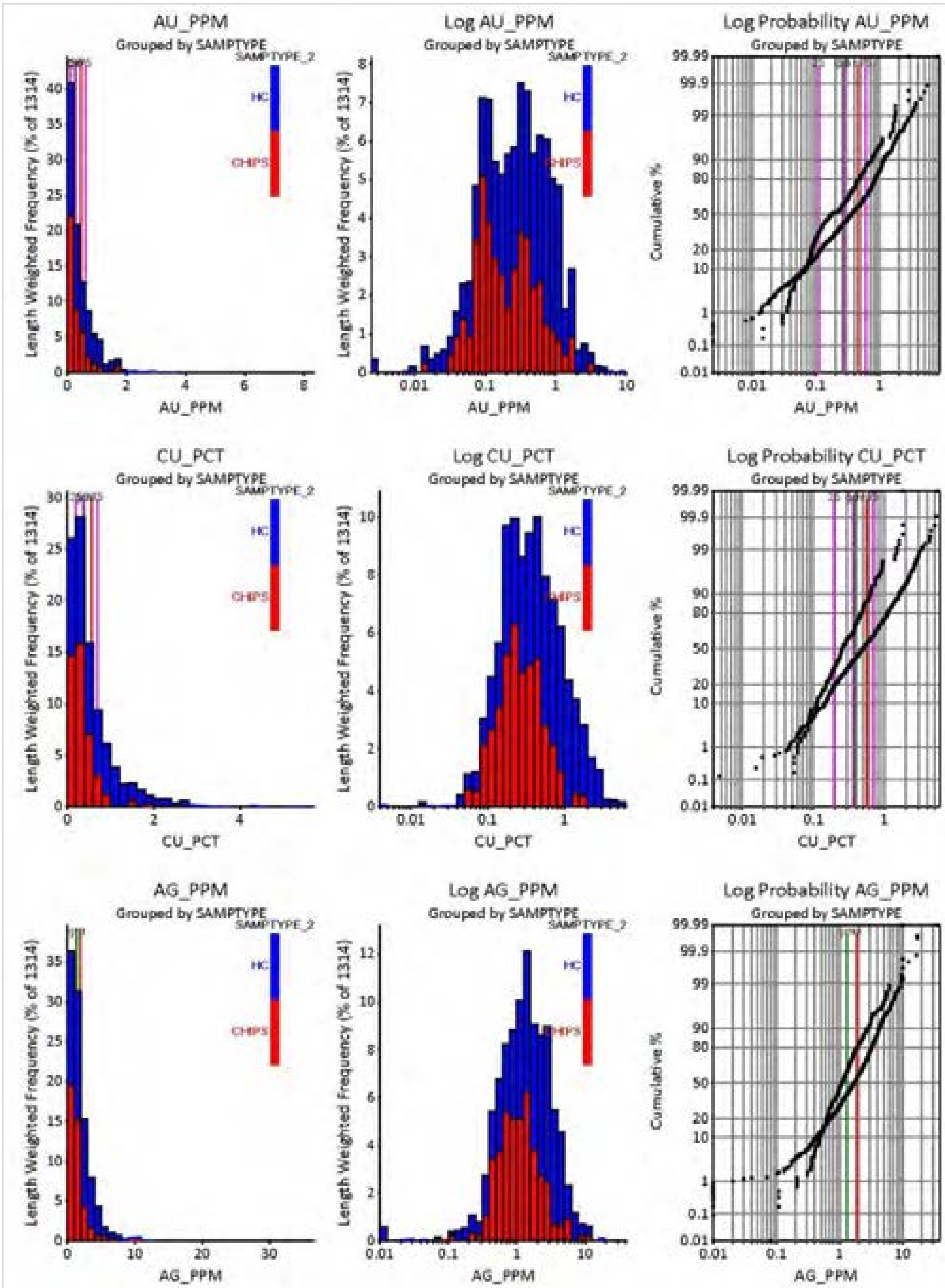


Source: Nordmin, 2019

Figure 14-15: Costa Azul low grade mineralization domain analysis for Cu, Au, and Ag

Montiel East

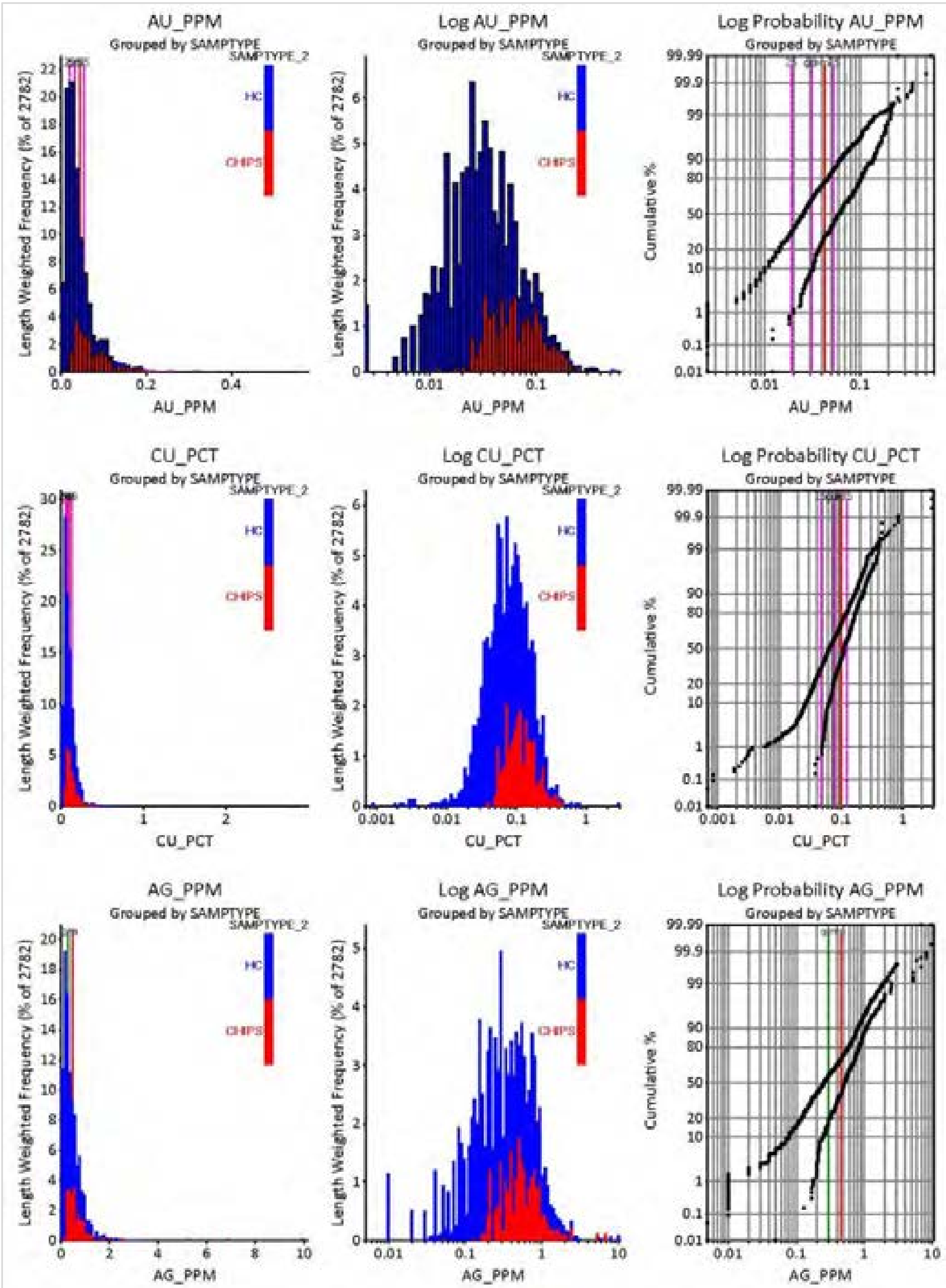
Figure 14-16 provides the Cu, Au, and Ag data analysis for the Montiel East HG mineralization domain. Two sample types were analyzed separately in individual populations, including diamond drill core, and RC.



Source: Nordmin, 2019

Figure 14-16: Montiel East HG mineralization domain analysis for Cu, Au, and Ag

Figure 14-17 provides the Cu, Au, and Ag data analysis for the Montiel East low grade mineralization domain. Two sample types were analyzed separately in individual populations, including diamond drill core, and RC.

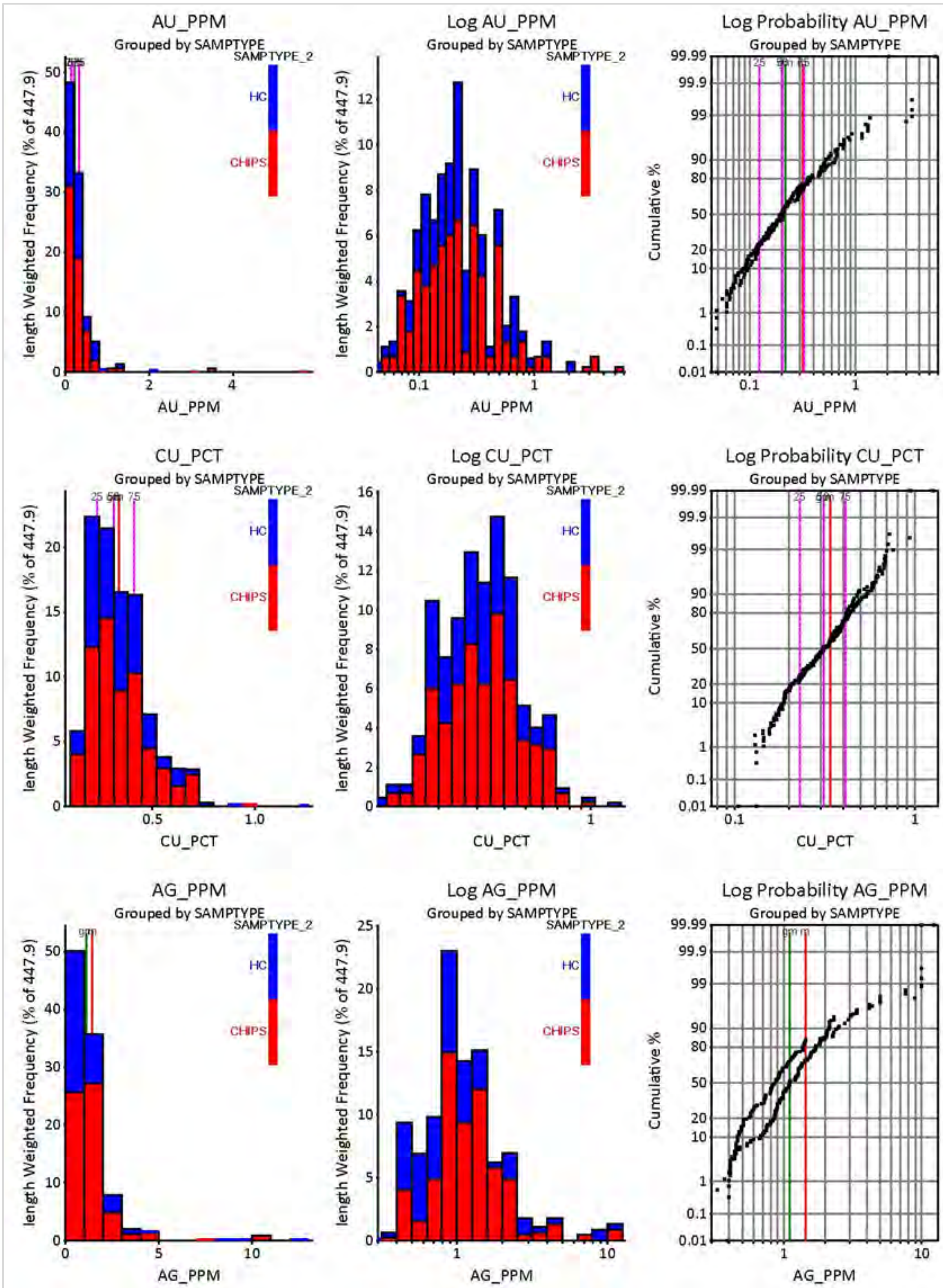


Source: Nordmin, 2019

Figure 14-17: Montiel East low grade mineralization domain analysis for Cu, Au, and Ag

Montiel West

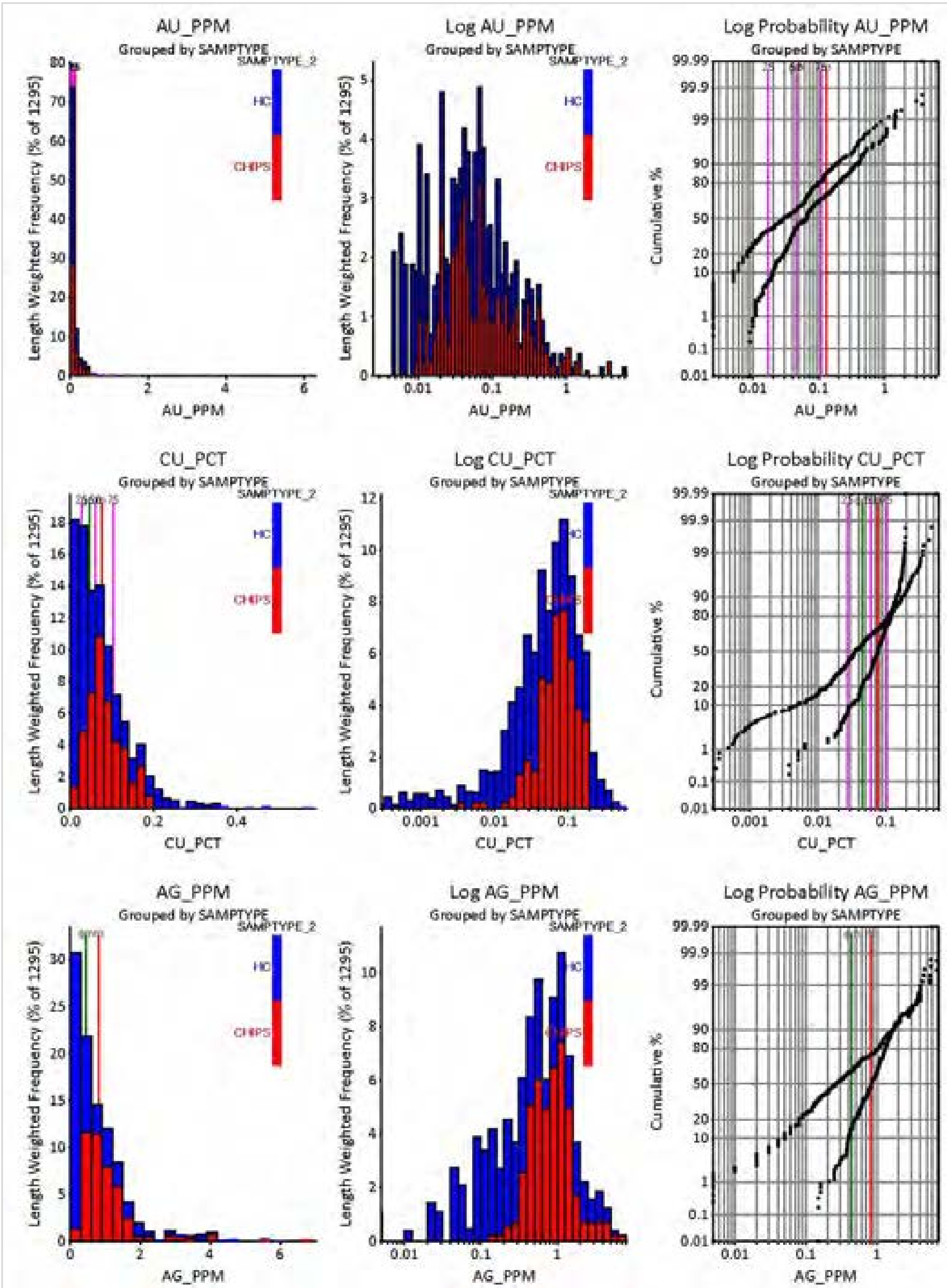
Figure 14-18 provides the Cu, Au, and Ag data analysis for the Montiel West HG mineralization domain. Two sample types were analyzed separately in individual populations, including diamond drill core, and RC.



Source: Nordmin, 2019

Figure 14-18: Montiel West HG mineralization domain analysis for Cu, Au, and Ag

Figure 14-19 provides the Cu, Au, and Ag data analysis for the Montiel West low grade mineralization domain. Two sample types were analyzed separately in individual populations, including diamond drill core, and RC.



Source: Nordmin, 2019

Figure 14-19: Montiel West low grade mineralization domain analysis for Cu, Au, and Ag

14.5 Data Preparation

Prior to grade estimation, the data was prepared in the following manner:

- All drill hole samples that intersected a wireframe within each domain were assigned a set of integer codes representative of the domain and wireframe number
- HG outlier samples in each domain were top-cut to a maximum value

14.5.1 Non Assayed Sample Intervals

Table 14-2, Table 14-3, Table 14-4, and Table 14-5 summarize the drill holes used in the resource models for all four deposits. Where non assayed intervals exist for non payable fields, minimum detection values were substituted to remove bias from the block model.

Alacran

Table 14-2: Summary of Alacran Drilling Database

Number of Drill Holes	153
Number of Survey Records	9,043
Number of Lithology Records	6,536

Field	Count	Count at Minimum Detection	% of Minimum Detection
Au (ppm)	28,009	8,554	30.5%
Cu (%)	27,981	1,344	4.8%
Ag (ppm)	27,788	2,456	8.8%

Source: Nordmin, 2021

Costa Azul

Table 14-3: Summary of Costa Azul Drilling Database

Number of Drill Holes	118
Number of Survey Records	676
Number of Lithology Records	3,427

Field	Count	Count at Minimum Detection	Total Assay Count	% Minimum Detection
Au (ppm)	2,276	125	2,276	5.49%
Cu (%)	2,276	0	2,276	0.00%
Ag (ppm)	2,276	6	2,276	0.26%

Source: Nordmin, 2019

Montiel East

Table 14-4: Summary of Montiel East Drilling Database

Number of Drill Holes	78
Number of Survey Records	2,535
Number of Lithology Records	2,328

Field	Count	Count at Minimum Detection	Total Assay Count	% Minimum Detection
Au (ppm)	6,946	734	6,946	10.57%
Cu (%)	6,946	0	6,946	0.00%
Ag (ppm)	6,946	29	6,946	0.42%

Source: Nordmin, 2019

Montiel West

Table 14-5: Summary of Montiel West Drilling Database

Number of Drill Holes	93
Number of Survey Records	622
Number of Lithology Records	2,192

Field	Count	Count at Minimum Detection	Total Assay Count	% Minimum Detection
Au (ppm)	1,743	121	1,743	6.94%
Cu (%)	1,743	0	1,743	0.00%
Ag (ppm)	1,743	12	1,743	0.69%

Source: Nordmin, 2019

14.5.2 Outlier Analysis and Capping

Grade outliers are HG assay values that are much higher than the general population of samples and have the potential to bias (inflate) the quantity of metal estimated in a block model. Geostatistical analysis using XY scatter plots, cumulative probability plots, and decile analysis was used by Nordmin to analyze the raw drill hole assay data for each domain to determine appropriate grade capping. Statistical analysis was performed by the X10 Geo software package.

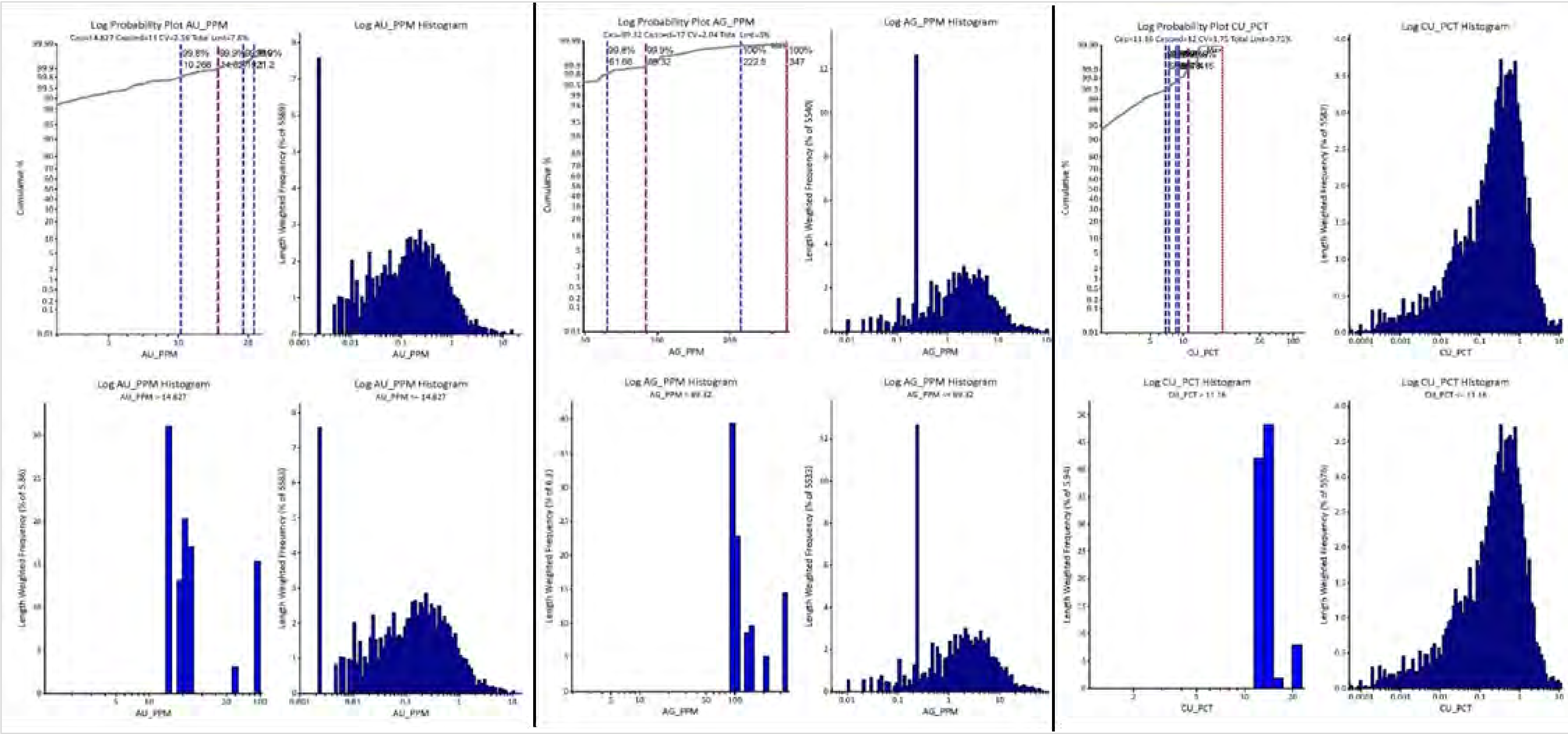
Alacran

The samples were analyzed separately depending on whether they occurred in saprolite, transition, or fresh rock (Table 14-6).

Table 14-6 Alacran Deposit Grade Capping Values

Domain	Zone	Rock Type	Au g/t Cap	Cu % Cap		Ag g/t Cap
Low Grade			Saprolite	1.2	No Cap	10.0
			Transition	No Cap	No Cap	12.0
			Fresh	1.5	2.0	15.0
Vertical Structures	1	Saprolite	6.0	No cap		No Cap
		Transition	No Cap	3.0		No Cap
		Fresh	No Cap	No Cap		25.0
	2	Saprolite	No Cap	No Cap		No Cap
		Transition	No Cap	No Cap		No Cap
		Fresh	No Cap	No Cap		No Cap
	5	Saprolite	No Cap	4.0		50.0
		Transition	No Cap	10.0		No Cap
		Fresh	32.0	16.0		120.0
	6	Saprolite	No Cap	No Cap		No Cap
		Transition	No Cap	No Cap		No Cap
		Fresh	10.0	No Cap		No Cap
	9	Saprolite	No Cap	No Cap		No Cap
		Transition	n/a	n/a		n/a
		Fresh	No Cap	No Cap		No Cap
Sub-vertical Structures	1	Saprolite	No Cap	No Cap		No Cap
		Transition	3.0	12.0		64.0
		Fresh	8.0	No Cap		64.0
	2	Saprolite	n/a	n/a		n/a
		Transition	n/a	n/a		n/a
		Fresh	No Cap	No Cap		No Cap
	3	Saprolite	No Cap	No Cap		No Cap
		Transition	No Cap	No Cap		No Cap
		Fresh	No Cap	No Cap		No Cap
	5	Saprolite	4.0	No Cap		No Cap
		Transition	No Cap	No Cap		No Cap
		Fresh	No Cap	No Cap		No Cap
	6	Saprolite	No Cap	No Cap		No Cap
		Transition	No Cap	No Cap		No Cap
		Fresh	No Cap	No Cap		5.0
	7	Saprolite	n/a	n/a		n/a
		Transition	n/a	n/a		n/a
		Fresh	No cap	No cap		35.0

Figure 14-20 provides the decile capping analysis for the Alacran deposit HG vertical mineralization, fresh domain for Cu, Au, and Ag.



Source: Nordmin, 2021

Figure 14-20: Decile capping analysis for Alacran HG vertical mineralization, fresh domain for Cu, Au, and Ag (1)

Due to the nature of the mineralization, it was prudent to apply capping to Au, Ag, and Cu for each individual zone.

After capping, the resulting change to the overall mean grades is insignificant at the Alacran deposit. Cap values were applied as per Table 14-6. Table 14-7 describes the theoretical metal loss due to capping values.

Table 14-7 Alacran Theoretical Metal Loss

Domain	Zone	Saprolite/ Fresh	Field	Number of Samples	Number of Capped Samples	Min	Max	Uncapped Average	Capped Average	Capped Value	Theoretical Metal Loss (%)
HG Vertical Mineralization	1	Saprolite	Au (ppm)	203	1	0	7.77	0.195	0.195	0.195	1.8
			Cu (%)	203	0	0	1.555	0.206	0.206	0.206	0
			Ag (ppm)	203	0	0	8.2	0.858	0.858	0.858	0
		Transition	Au (ppm)	59	0	0	0.754	0.09	0.09	0.09	0
			Cu (%)	59	1	0	4.78	0.465	0.465	0.465	10
			Ag (ppm)	59	0	0	5.7	1.218	1.218	1.218	0
		Fresh	Au (ppm)	709	0	0	5	0.148	0.148	0.148	0
			Cu (%)	709	0	0	6.92	0.319	0.319	0.319	0
			Ag (ppm)	709	25	0	103	2.07	2.07	2.07	11
	2	Saprolite	Au (ppm)	48	0	0.003	2.47	0.32	0.32	0.32	0
			Cu (%)	48	0	0.053	2.34	0.235	0.235	0.235	0
			Ag (ppm)	48	0	0.1	38.4	2.24	2.24	2.24	0
		Transition	Au (ppm)	14	0	0.025	1.325	0.378	0.378	0.378	0
			Cu (%)	14	0	0.037	2.12	0.76	0.76	0.76	0
			Ag (ppm)	14	0	0.03	10	3.9	3.9	3.9	0
		Fresh	Au (ppm)	1,788	0	0	7.22	0.293	0.293	0.293	0
			Cu (%)	1,788	0	0	8.31	0.491	0.491	0.491	0

Domain	Zone	Saprolite/ Fresh	Field	Number of Samples	Number of Capped Samples	Min	Max	Uncapped Average	Capped Average	Capped Value	Theoretical Metal Loss (%)
			Ag (ppm)	1,788	0	0	35.8	2.28	2.28	2.28	0
	5	Saprolite	Au (ppm)	345	0	0	4.97	0.222	0.222	0.222	0
			Cu (%)	345	1	0	5.96	0.221	0.213	4	3.6
			Ag (ppm)	345	1	0	165	2.31	2.01	50	14
		Transition	Au (ppm)	116	0	0.025	1.325	0.299	0.299	0.299	0
			Cu (%)	116	1	0.037	2.12	0.683	0.643	10	5.8
			Ag (ppm)	116	0	0.03	10	3.902	3.902	3.902	0
		Fresh	Au (ppm)	7,785	4	0	4,440	1.364	0.436	32	68
			Cu (%)	7,785	2	0	22.9	0.563	0.562	16	0.1
			Ag (ppm)	7,744	7	0	347	3.38	3.32	120	1.8
	6	Saprolite	Au (ppm)	43	0	0.003	5.32	0.498	0.498	0.498	0
			Cu (%)	43	0	0.055	2.01	0.483	0.483	0.483	0
			Ag (ppm)	43	0	0.17	21.3	3.057	3.057	3.057	0
		Transition	Au (ppm)	19	0	0.005	0.629	0.24	0.24	0.24	0
			Cu (%)	19	0	0.055	2.2	0.805	0.805	0.805	0
			Ag (ppm)	19	0	0.46	17.45	5.31	5.31	5.31	0
		Fresh	Au (ppm)	843	6	0.003	12.1	0.353	0.346	10	2.1

Domain	Zone	Saprolite/ Fresh	Field	Number of Samples	Number of Capped Samples	Min	Max	Uncapped Average	Capped Average	Capped Value	Theoretical Metal Loss (%)
			Cu (%)	843	0	0	13.65	0.785	0.785	0.785	0
			Ag (ppm)	843	0	0.01	36.8	4.78	4.78	4.78	0
	9	Saprolite	Au (ppm)	8	0	0.02	0.918	0.538	0.538	0.538	0
			Cu (%)	8	0	0.07	0.129	0.092	0.092	0.092	0
			Ag (ppm)	8	0	0.06	0.43	0.247	0.247	0.247	0
		Transition	Au (ppm)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
			Cu (%)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
			Ag (ppm)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		Fresh	Au (ppm)	59	0	0.003	0.558	0.12	0.12	0.12	0
			Cu (%)	59	0	0.02	1.915	0.349	0.349	0.349	0
			Ag (ppm)	59	0	0.22	16.8	2.489	2.489	2.489	0
Sub-vertical Stratabound Replacement Mineralization	1	Saprolite	Au (ppm)	563	0	0	3.25	0.126	0.126	0.126	0
			Cu (%)	563	0	0	1.22	0.208	0.208	0.208	0
			Ag (ppm)	563	0	0	25.3	1.36	1.36	1.36	0
		Transition	Au (ppm)	385	3	0	6.83	0.106	0.09	3	11
			Cu (%)	385	1	0	21.8	0.493	0.468	12	5.1
			Ag (ppm)	385	1	0	129	2.34	2.173	64	7.1

Domain	Zone	Saprolite/ Fresh	Field	Number of Samples	Number of Capped Samples	Min	Max	Uncapped Average	Capped Average	Capped Value	Theoretical Metal Loss (%)
		Fresh	Au (ppm)	15,227	7	0	31.6	0.115	0.111	8	3.6
			Cu (%)	15,227	0	0	8.72	0.297	0.297	0.297	0
			Ag (ppm)	15,112	5	0	289	1.96	1.91	64	2.4
	2	Fresh	Au (ppm)	30	0	0.003	0.045	0.024	0.024	0.024	0
			Cu (%)	30	0	0.001	1.62	0.497	0.497	0.497	0
			Ag (ppm)	30	0	0.02	9.31	2.818	2.818	2.818	0
	3	Saprolite	Au (ppm)	38	0	0	2.37	0.143	0.143	0.143	0
			Cu (%)	38	0	0.036	0.496	0.204	0.204	0.204	0
			Ag (ppm)	38	0	0.25	11.5	1.218	1.218	1.218	0
		Transition	Au (ppm)	8	0	0.008	0.118	0.0537	0.0537	0.0537	0
			Cu (%)	8	0	0.001	0.495	0.157	0.157	0.157	0
			Ag (ppm)	8	0	0.01	2.2	0.69	0.69	0.69	0
		Fresh	Au (ppm)	125	0	0.001	1.76	0.108	0.108	0.108	0
			Cu (%)	123	0	0	0.696	0.108	0.108	0.108	0
			Ag (ppm)	123	0	0.01	2.7	0.608	0.608	0.608	0
	5	Saprolite	Au (ppm)	69	2	0	9.95	0.177	0.12	4	32
			Cu (%)	69	0	0	0.59	0.034	0.034	0.034	0

Domain	Zone	Saprolite/ Fresh	Field	Number of Samples	Number of Capped Samples	Min	Max	Uncapped Average	Capped Average	Capped Value	Theoretical Metal Loss (%)
			Ag (ppm)	69	0	0	0.4	0.155	0.155	0.155	0
		Transition	Au (ppm)	20	0	0	0.436	0.026	0.026	0.026	0
			Cu (%)	20	0	0	0.52	0.054	0.054	0.054	0
			Ag (ppm)	20	0	0	0.5	0.257	0.257	0.257	0
		Fresh	Au (ppm)	50	0	0	0.467	0.045	0.045	0.045	0
			Cu (%)	50	0	0	0.74	0.082	0.082	0.082	0
			Ag (ppm)	50	0	0	0.8	0.26	0.26	0.26	0
	6	Saprolite	Au (ppm)	82	0	0.003	0.169	0.025	0.025	0.025	0
			Cu (%)	82	0	0.008	0.986	0.32	0.32	0.32	0
			Ag (ppm)	82	0	0.08	7.8	1.514	1.514	1.514	0
		Transition	Au (ppm)	56	0	0.003	0.083	0.0106	0.0106	0.0106	0
			Cu (%)	56	0	0.004	1.36	0.272	0.272	0.272	0
			Ag (ppm)	56	0	0.04	11.3	1.55	1.55	1.55	0
		Fresh	Au (ppm)	56	0	0.003	0.163	0.0173	0.0173	0.0173	0
			Cu (%)	56	0	0	0.97	0.075	0.075	0.075	0
			Ag (ppm)	56	0	0.02	8.4	0.525	0.525	0.525	0
	7	Fresh	Au (ppm)	369	0	0.003	5.88	0.17	0.17	0.17	0

Domain	Zone	Saprolite/ Fresh	Field	Number of Samples	Number of Capped Samples	Min	Max	Uncapped Average	Capped Average	Capped Value	Theoretical Metal Loss (%)
			Cu (%)	369	0	0	5.8	0.456	0.456	0.456	0
			Ag (ppm)	369	5	0.01	42.1	2.48	2.4	32	0
Low grade		Saprolite	Au (ppm)	928	1	0	1.76	0.07	0.073	0.073	1.2
			Cu (%)	928	0	0	1.44	0.102	0.102	0.102	0.102
			Ag (ppm)	921	4	0	53.8	0.893	0.787	0.787	10
		Transition	Au (ppm)	412	0	0	1.045	0.04	0.040	0.04	0.04
			Cu (%)	412	0	0	0.614	0.056	0.056	0.056	0.056
			Ag (ppm)	410	1	0	14.8	0.494	0.488	0.488	12
		Fresh	Au (ppm)	21,212	8	0	11.15	0.022	0.02	0.02	1.5
			Cu (%)	21,212	3	0	2.48	0.038	0.038	0.038	2
			Ag (ppm)	21,189	11	0	63	0.332	0.326	0.326	15

Costa Azul

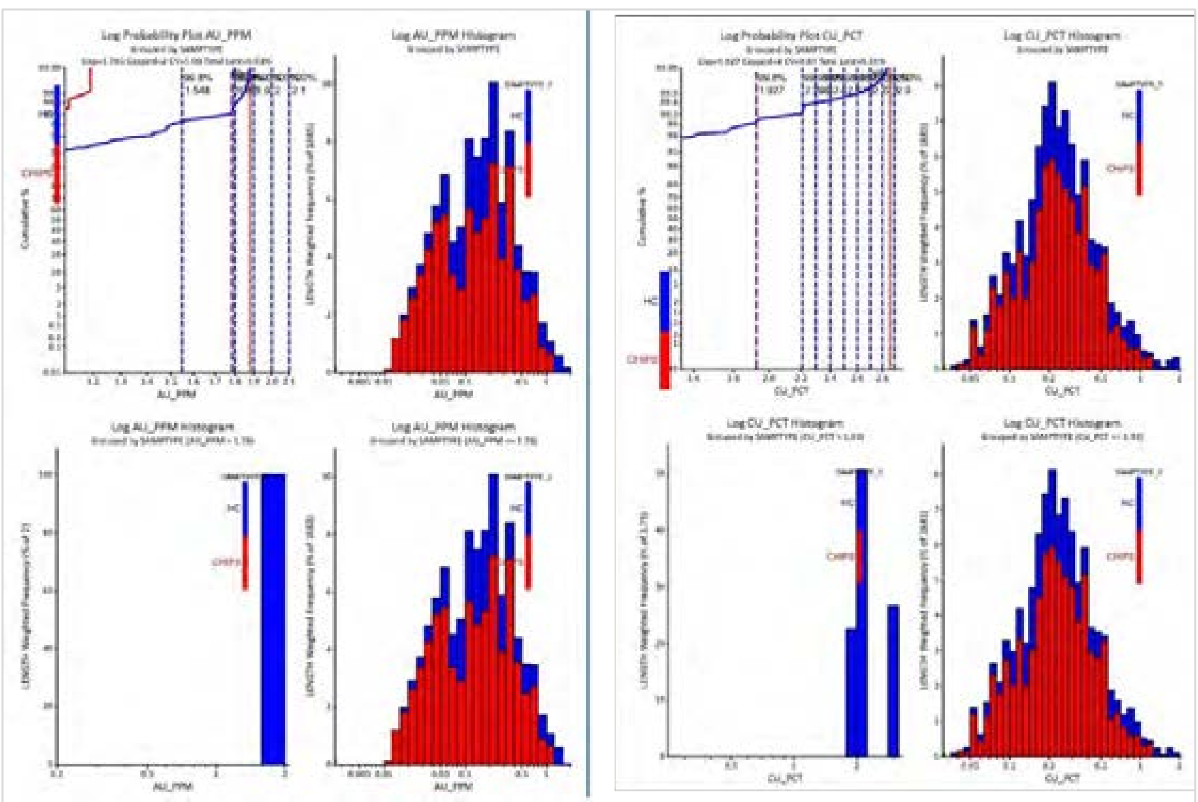
Four sample populations were created for independent analysis; diamond drill core and RC sample types were each divided for saprolite or fresh rock (Table 14-8).

Table 14-8: Costa Azul Grade Capping Values

Domain	Sample Type	Sap/Fresh	Au (ppm)	Cu (%)	Ag (ppm)
High grade	Core	Saprolite	0.91	0.63	7
High grade	RC	Saprolite	1.02	0.78	7
High grade	Core	Fresh	1.78	1.90	5
High grade	RC	Fresh	1.00	1.00	5
Low grade	Core	Saprolite	0.39	0.23	No Cap
Low grade	RC	Saprolite	0.95	0.47	No Cap
Low grade	Core	Fresh	0.42	0.42	No Cap
Low grade	RC	Fresh	0.47	0.42	No Cap

Source: Nordmin, 2019

Figure 14-21 provides the decile capping analysis for the Costa Azul HG mineralization, fresh domain for Cu, and Au.



Source: Nordmin, 2019

Figure 14-21: Decile capping analysis for Costa Azul HG mineralization, fresh for Cu, and Au

Montiel East

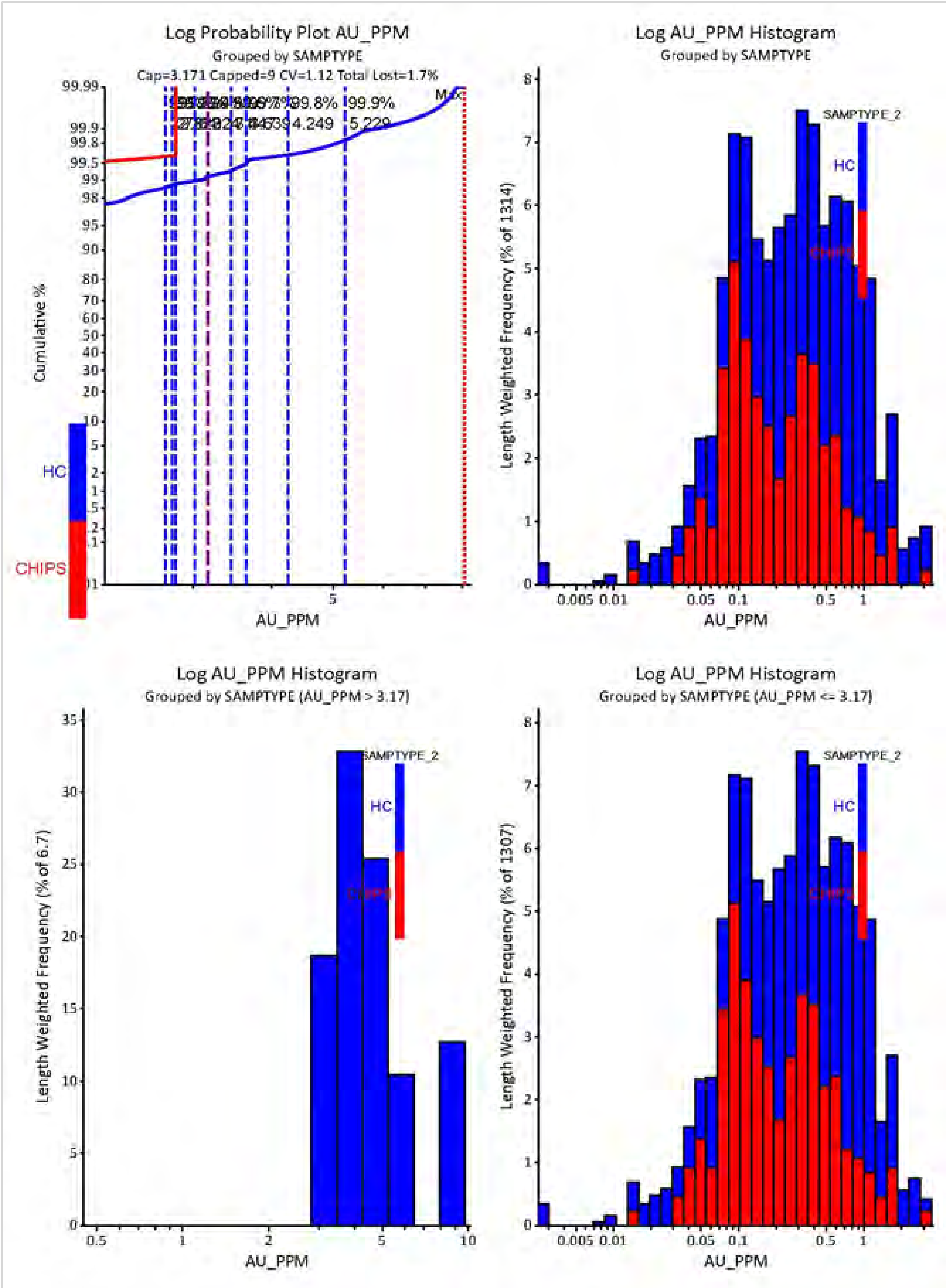
Four sample populations were created for independent analysis; diamond drill core and RC sample types were each divided for saprolite or fresh rock (Table 14-9).

Table 14-9: Montiel East Grade Capping Values

Domain	Sample Type	Sap/Fresh	Au (ppm)	Cu (%)	Ag (ppm)
High grade	Core	Saprolite	0.35	1.50	20
High grade	RC	Saprolite	0.22	1.00	20
High grade	Core	Fresh	3.18	3.40	10
High grade	RC	Fresh	1.75	1.55	10
Low grade	Core	Saprolite	0.50	0.60	15
Low grade	RC	Saprolite	0.22	0.50	15
Low grade	Core	Fresh	0.35	2.00	4
Low grade	RC	Fresh	0.22	0.50	4

Source: Nordmin, 2019

Figure 14-22 provides the decile capping analysis for the Montiel East HG mineralization, fresh domain for Au.



Source: Nordmin, 2019

Figure 14-22: Decile capping analysis for Montiel East HG mineralization, fresh domain for Au

Montiel West

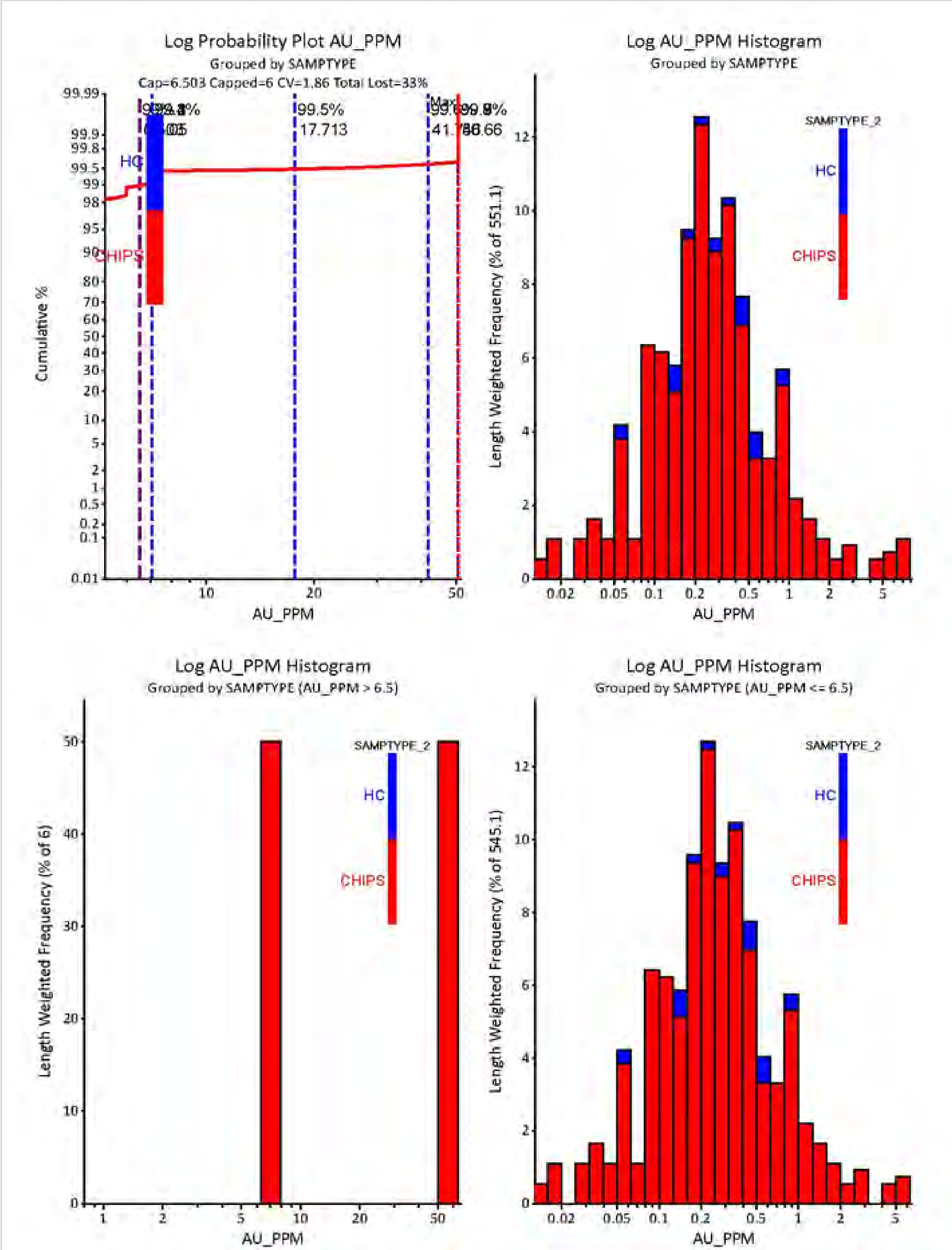
Four sample populations were created for independent analysis; diamond drill core and RC drill hole sample types were each divided for saprolite or fresh rock (Table 14-10).

Table 14-10: Montiel West Grade Capping Values

Domain	Sample Type	Sap/Fresh	Au (ppm)	Cu (%)	Ag (ppm)
High grade	Core	Saprolite	0.98	1.19	No Cap
High grade	RC	Saprolite	6.12	1.12	No Cap
High grade	Core	Fresh	1.17	1.10	10
High grade	RC	Fresh	3.26	0.71	10
Low grade	Core	Saprolite	0.34	0.103	10
Low grade	RC	Saprolite	1.78	0.39	10
Low grade	Core	Fresh	1.40	0.80	6
Low grade	RC	Fresh	3.58	0.68	6

Source: Nordmin, 2019

Figure 14-23 provides the decile capping analysis for the Montiel West HG mineralization, fresh domain for Cu, and Au, for individual diamond drill core and RC sample types.



Source: Nordmin, 2019

Figure 14-23: Montiel West decile capping analysis for HG mineralization, saprolite for Au

After capping, the resulting change to the overall mean grades is insignificant in each of the Costa Azul, Montiel East, and Montiel West deposits. Cap values were applied as per Table 14-11, Table 14-12 and Table 14-13.

Table 14-11: Costa Azul Theoretical Metal Loss

Domain	Saprolite/ Fresh	Field	Type	Number of Samples	Number of Uncapped Samples	Number of Capped Samples	Uncapped Average	Capped Average	Capped Value	Capped Certified Value	Theoretical Metal Loss (%)
High grade	Saprolite	Cu (%)	Core	58	57	1	0.28	0.28	0.63	0.47	0.12
			RC	439	434	5	0.29	0.29	0.78	0.53	0.40
		Au (ppm)	Core	58	57	1	0.35	0.35	0.91	0.64	0.12
			RC	439	436	3	0.26	0.26	1.02	0.85	0.43
	Fresh	Cu (%)	Core	178	174	4	0.53	0.52	1.90	0.87	1.60
			RC	198	194	4	0.41	0.41	1.00	0.48	0.54
		Au (ppm)	Core	178	176	2	0.44	0.44	1.78	0.91	0.14
			RC	198	196	2	0.34	0.33	1.00	0.68	0.14
Low grade	Saprolite	Cu (%)	Core	18	17	1	0.19	0.19	0.23	0.13	0.02
			RC	713	707	6	0.18	0.18	0.47	0.48	1.20
		Au (ppm)	Core	18	17	1	0.12	0.11	0.39	0.67	2.40
			RC	713	707	6	0.14	0.14	0.95	1.13	0.24
	Fresh	Cu (%)	Core	213	210	3	0.17	0.17	0.42	0.47	0.21
			RC	809	801	8	0.17	0.17	0.42	0.54	0.18
		Au (ppm)	Core	213	210	3	0.17	0.17	0.42	0.46	0.21
			RC	809	807	2	0.23	0.17	0.47	0.52	0.01

Source: Nordmin, 2019

Table 14-12: Montiel East Theoretical Metal Loss

Domain	Saprolite/ Fresh	Field	Type	Number of Samples	Number of Uncapped Samples	Number of Capped Samples	Uncapped Average	Capped Average	Capped Value	Capped Certified Value	Theoretical Metal Loss (%)
High grade	Saprolite	Au (ppm)	Core	153	151	2	0.37	0.37	0.50	1.46	3.40
			RC	59	58	1	0.30	0.30	0.22	0.85	0.26
		Cu (%)	Core	153	151	2	0.42	0.42	0.60	0.74	2.00
			RC	59	58	1	0.32	0.30	0.50	0.85	0.11
	Fresh	Au (ppm)	Core	791	782	9	0.61	0.61	0.35	1.10	2.30
			RC	153	152	1	0.37	0.37	0.22	1.11	2.00
		Cu (%)	Core	791	782	9	0.80	0.80	2.00	0.93	1.50
			RC	153	151	2	0.38	0.38	0.50	0.74	0.52
Low grade	Saprolite	Au (ppm)	Core	1,374	1,371	3	0.04	0.04	1.00	1.31	0.48
			RC	436	436	0	0.08	0.08	2.70	0.58	0.00
		Cu (%)	Core	1,374	1,369	5	0.09	0.09	1.50	0.04	0.29
			RC	436	433	3	0.13	0.13	1.00	0.08	0.64
	Fresh	Au (ppm)	Core	297	297	0	0.03	0.36	3.18	1.08	0.00
			RC	137	137	0	0.10	0.10	1.75	0.50	0.00
		Cu (%)	Core	297	295	2	0.12	0.12	3.40	0.36	3.50
			RC	137	137	0	0.19	0.19	1.55	0.10	0.00

Source: Nordmin, 2019

Table 14-13: Montiel West Theoretical Metal Loss

Domain	Saprolite/ Fresh	Field	Type	Number of Samples	Number of Uncapped Samples	Number of Capped Samples	Uncapped Average	Capped Average	Capped Value	Capped Certified Value	Theoretical Metal Loss (%)
High grade	Saprolite	Au (ppm)	Core	9	8	1	0.53	0.53	0.98	0.52	0.02
			RC	191	189	2	0.76	0.76	6.12	4.94	0.31
		Cu (%)	Core	9	8	1	0.53	0.53	1.19	0.64	0.88
			RC	191	189	2	0.39	0.39	1.12	0.64	0.16
	Fresh	Au (ppm)	Core	41	40	1	0.31	0.31	1.17	0.83	1.50
			RC	94	92	2	0.36	0.36	3.26	1.66	6.60
		Cu (%)	Core	41	40	1	0.44	0.44	1.10	0.41	0.87
			RC	94	92	2	0.36	0.36	0.71	0.39	0.69
Low grade	Saprolite	Au (ppm)	Core	14	13	1	0.10	0.10	0.34	1.12	1.80
			RC	522	521	1	0.18	0.18	1.78	3.25	0.20
		Cu (%)	Core	14	14	0	0.07	0.10	0.103	0.36	0.00
			RC	522	519	3	0.11	0.11	0.39	0.65	0.18
	Fresh	Au (ppm)	Core	487	484	3	0.12	0.12	1.40	1.89	2.80
			RC	839	835	4	0.22	0.22	3.58	1.95	1.30
		Cu (%)	Core	487	485	2	0.13	0.13	0.80	1.15	0.88
			RC	839	835	4	0.17	0.17	0.68	0.90	0.25

Source: Nordmin, 2019

14.5.3 Compositing

Compositing of samples is a technique used to give each sample a relatively equal length to reduce the potential for bias due to uneven sample lengths. It prevents the potential loss of sample data and reduces the potential for grade bias due to the possible creation of short and potentially HG composites that are generally formed along the zone contacts when using a fixed length.

The raw sample data was found to have a relatively narrow range of sample lengths. Samples captured within all zones were composited to 2.5 m regular intervals based on the observed modal distribution of sample lengths, which supports both 5.0 m x 5.0 m x 5.0 m and 5.0 m x 10.0 m x 5.0 m block models. An option to use a variable composite length was chosen to allow for backstitching shorter composites that are located along the edges of the deposit. All composite samples were generated within each mineral zone with no overlaps along boundaries. The composite samples were validated statistically to ensure there was no loss of data or change to the mean grade of each sample population (Table 14-15, Table 14-15).

Table 14-14 Composite Analysis for Alacran

Deposit	Domain	Type	Zone	Class	Number of Composites	Cu	Au	Ag
Alacran	High grade	Vertical Mineralization	1	Saprolite	78	78	78	78
				Transition	16	16	16	16
				Fresh	190	190	190	190
			2	Saprolite	36	36	36	36
				Transition	7	7	7	7
				Fresh	400	400	400	400
			5	Saprolite	144	144	144	144
				Transition	54	54	54	54
				Fresh	1,749	1,749	1,749	1,733
			6	Saprolite	20	20	20	20
				Transition	8	8	8	8
				Fresh	238	238	238	238
			9	Saprolite	4	4	4	4
				Transition	n/a	n/a	n/a	n/a
				Fresh	18	18	18	18
	High grade	Sub-vertical Stratabound Mineralization	1	Saprolite	343	343	343	343
				Transition	147	147	147	147
				Fresh	3,945	3,945	3,945	3,898

Deposit	Domain	Type	Zone	Class	Number of Composites	Cu	Au	Ag
			3	Saprolite	15	15	15	15
				Transition	3	3	3	3
				Fresh	47	47	47	47
			5	Saprolite	14	14	14	14
				Transition	5	5	5	5
				Fresh	11	11	11	11
			6	Saprolite	34	34	34	34
				Transition	21	21	21	21
				Fresh	21	21	21	21
			7	Saprolite	n/a	n/a	n/a	n/a
				Transition	n/a	n/a	n/a	n/a
				Fresh	80	80	80	80
	Low grade			Saprolite	486	486	486	483
				Transition	167	167	167	166
				Fresh	5,571	5,571	5,571	5,559

Source: Nordmin, 2021

Table 14-15: Composite Analysis for Costa Azul, Montiel East, and Montiel West

Deposit	Domain	Class	Number of Composites	Cu	Au	Ag
Costa Azul	High grade	Saprolite	517	517	517	517
		Fresh	674	674	674	674
	Low grade	Saprolite	17	17	17	17
		Fresh	155	155	155	155
Montiel East	High grade	Saprolite	150	150	150	150
		Fresh	528	528	528	528
	Low grade	Saprolite	111	111	111	111
		Fresh	1,161	1,161	1,161	1,161
Montiel West	High grade	Saprolite	223	223	223	223
		Fresh	182	182	182	182
	Low grade	Saprolite	226	226	226	226
		Fresh	551	551	551	551

Source: Nordmin, 2019

14.5.4 Specific Gravity

A total of 18,449 SG measurements for all four deposits were provided from on site drill measurements. Measurements were taken from NQ, and HQ sized using the weight in air versus the weight in water method (Archimedes), by applying the following formula:

$$Specific\ Gravity = \frac{Weight\ in\ Air}{(Weight\ in\ Air - Weight\ in\ Water)}$$

Nordmin determined that the required amount and distribution of SG measurements did not exist for direct estimation of the entire block model. Lithology was determined to be the appropriate indicator of SG, and nine lithology sets were developed from drill logging, each with a weighted average SG assigned.

Alacran

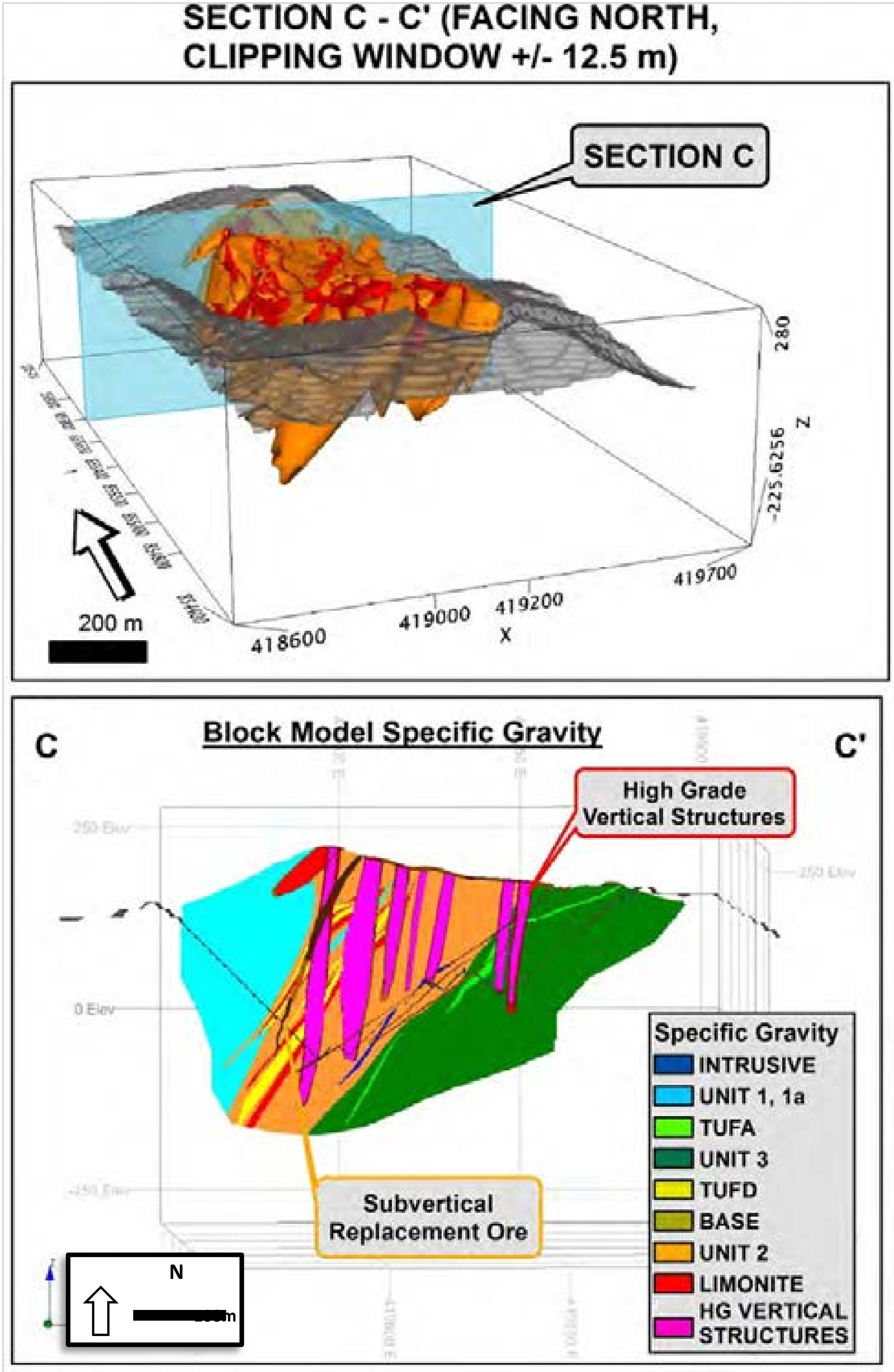
In 2012 and between December 2015 and November 2017, there were 12,211 measurements taken from 87 Ashmont and Cordoba drilled holes. A set of nine lithological groups was created, each with a set weighted average SG. Wireframes for each of the SG groups were successively applied to the block model in a specific order provided in Table 14-16.

Table 14-16: Alacran Lithological Group SG, from First Applied to Last Applied

Unit	SG	Lithologies
All units not otherwise listed below	2.806	All not listed below
Unit 1	2.750	Dio, RBx, TufR
INT	2.720	Intrusive
TUFA	2.757	Tuff A
Unit 3	2.800	TufA, TufM, TufP, TufL, TufF
TUFD	2.803	Tuff D
Unit 2, 2 A	2.830	TufL, TufD, MudSil, Sill_1/2, VBx, TufL, TufF
LIM	2.910	Limestone
HG Vertical Mineralization	2.926	All blocks within the HG vertical mineralization wireframes

Source: Nordmin, 2021. See Table 7-1 for lithological codes.

Figure 14-24 demonstrates the SG distribution for Alacran across a vertical section.



Source: Nordmin, 2021

Figure 14-24: Alacran, Section C demonstrating SG distribution across a vertical section

Costa Azul

An SG analysis determined that SG measurements were sparse and relatively consistent throughout, and a weighted average SG=2.788 was applied to all blocks.

Table 14-17: Costa Azul Weighted Average

Unit	SG
Weighted Average of all rock types	2.788

Source: Nordmin, 2019

Montiel East

During analysis, one lithological unit was outside the deviation of the weighted average; two SG groups were applied to the block model.

Table 14-18: Montiel East Weighted Average

Unit	SG
Quartz Feldspar Porphyry	2.746
Weighted Average of all other rock types	2.782

Source: Nordmin, 2019

Montiel West

Measurements for Montiel West were only taken from one drill hole. During analysis, one lithological unit was significantly outside the deviation of the weighted average; two SG groups were applied to the block model.

Table 14-19: Montiel West Weighted Average

Unit	SG
Andesite Porphyry	2.883
Weighted Average of all other rock types	2.732

Source: Nordmin, 2019

14.6 Block Model Resource Estimation

14.6.1 Block Model Strategy and Analysis

A series of upfront test modelling was completed to define an estimation methodology to meet the following criteria:

- Representative of the deposit geology and structural model;
- Accounts for the variability of grade, orientation, and continuity of mineralization;
- Controls the smoothing (grade spreading) of grades and influence of outliers between HG and low grade areas within the deposit;
- Accounts for most of the mineralization for the deposit; and
- Robust and repeatable within the mineral domains.

Multiple test scenarios were evaluated for each deposit to determine the optimum processes and parameters to use to achieve the stated criteria. Each scenario was based on NN, ID2, and OK interpolation methods.

Alacran

Nine test runs and one final run was completed, and then two more additional runs were completed only to update the NSR calculations.

Costa Azul

Nine test runs and one final run was completed, and then one more additional run was completed only to update the CuEq formula.

Montiel East

Two test runs and one final run was completed, and then one more additional run was completed only to update the CuEq formula.

Montiel West

Two test runs and one final run was completed, and then one more additional run was completed only to update the CuEq formula.

All test scenarios were evaluated based on global statistical comparisons, visual comparisons of composite samples versus block grades, and the assessment of overall smoothing. Based on results of the testing, it was determined that that the final Mineral Resource Estimation methodology would constrain the mineralization by using hard wireframe boundaries to control the spread of HG and low grade mineralization and would use OK interpolation method to achieve the criteria listed in Section 14.5.1.

14.6.2 Assessment of Spatial Grade Continuity

Datamine and SAGE 2001 were used to determine the geostatistical relationship of the deposits. Independent variography was performed on the composite data for each zone (Cu, Au, and Ag in saprolite, and fresh portions of HG vertical mineralization, sub-vertical replacement mineralization, and low grade mineralization). Experimental grade variograms were calculated from the capped/composited sample Cu, Au, and Ag data to determine the approximate search ellipse dimensions and orientations.

The analyses considered the following:

- Downhole variograms were created and modelled to define the nugget effect;
- Experimental pairwise-relative correlogram variograms were calculated to determine directional variograms for the strike and down dip orientations;
- Variograms were modelled using an exponential with practical range;
- Directional variograms were modelled using the nugget defined in the downhole variography, and the ranges for the along strike, perpendicular to strike and down dip directions; and
- Variograms outputs were re-oriented to reflect the orientation of the mineralization.

Pairwise correlograms for all domains were generated.

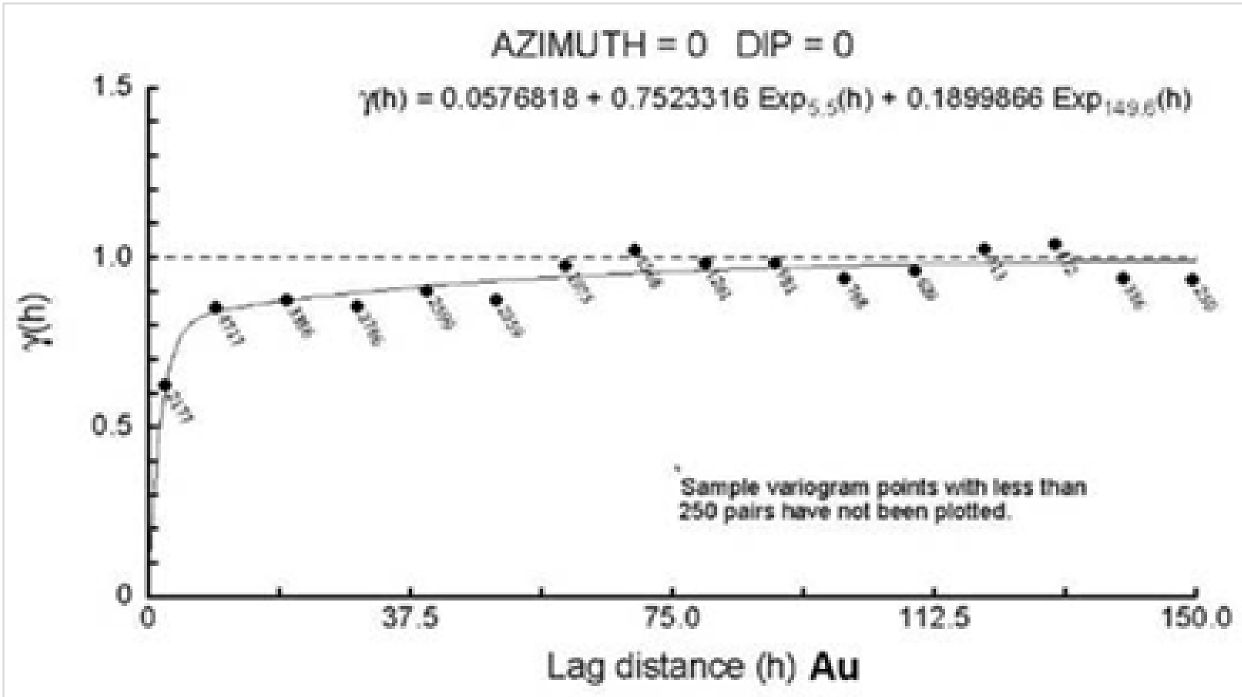
Alacran

A set of structure variogram models were fitted to the experimental variogram data for blocks within the vertical mineralization wireframes, sub-vertical mineralization wireframes, and low grade wireframes for Cu, Au, and Ag. The Alacran variography parameters are provided in Table 14-20 and Figure 14-25 through Figure 14-29 display the pairwise correlogram variography models for Alacran.

Table 14-20: Alacran Search Variography Parameters

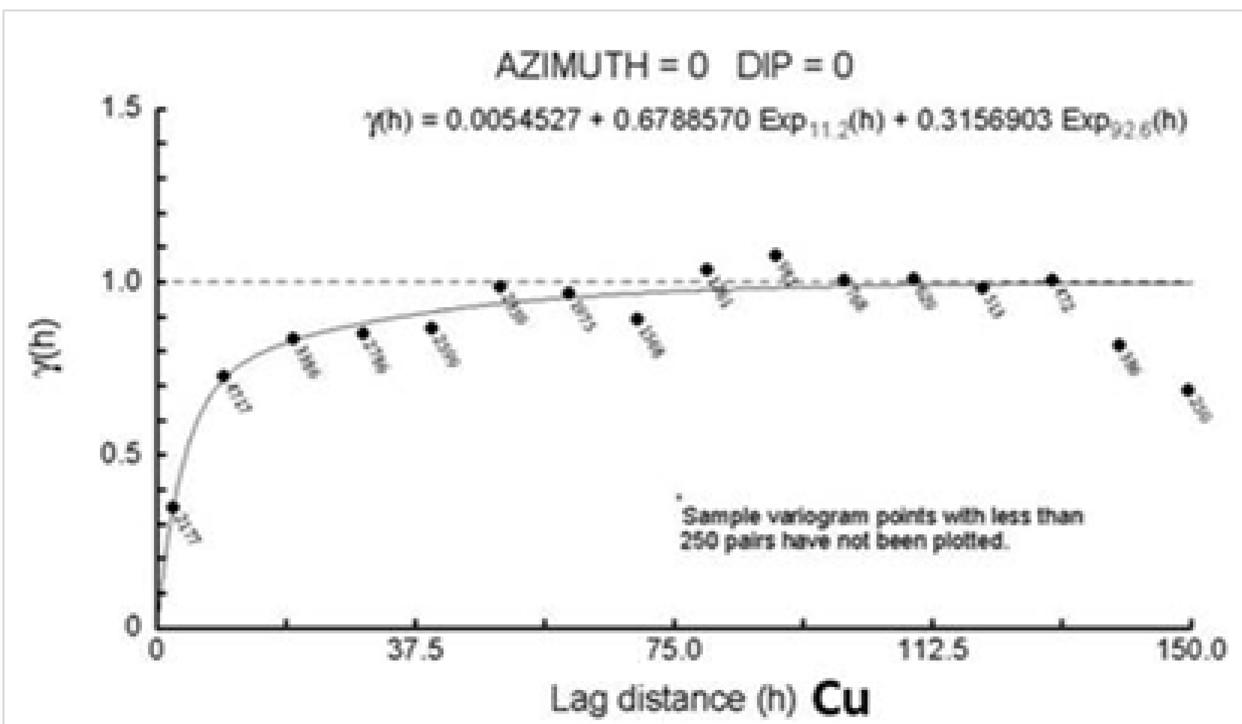
		Rotation Angles				Structure 1			Structure 2		
Type	**Field**	**1**	**2**	**3**	**Axes**	**Range 1**	**Range 2**	**Range 3**	**Range 1**	**Range 2**	**Range 3**
HG Vertical Mineralization	Au	-47	-9	30	Z-Y-Z	4.5	28	46	39	92	23.6
	Cu	13	53	-11	Z-Y-Z	7.5	5.3	16	77	211	119
	Ag	12	52	-14	Z-Y-Z	7.5	6.1	21.8	78	684	115
HG Sub-vertical Mineralization	Au	-20	-90	-38	Z-Y-Z	2.2	8	18.9	35	66	23
	Cu	-55	-70	-2	Z-Y-Z	6	9.9	38.6	86	185	28
	Ag	-28	30	14	Z-Y-Z	12.4	7.2	15.4	323	143	91
Low Grade	Au	-20	-90	-38	Z-Y-Z	2.2	8	18.9	35	66	23
	Cu	-55	-70	-2	Z-Y-Z	6	9.9	38.6	86	185	28
	Ag	-28	30	14	Z-Y-Z	12.4	7.2	15.4	323	143	91

Source: Nordmin, 2021



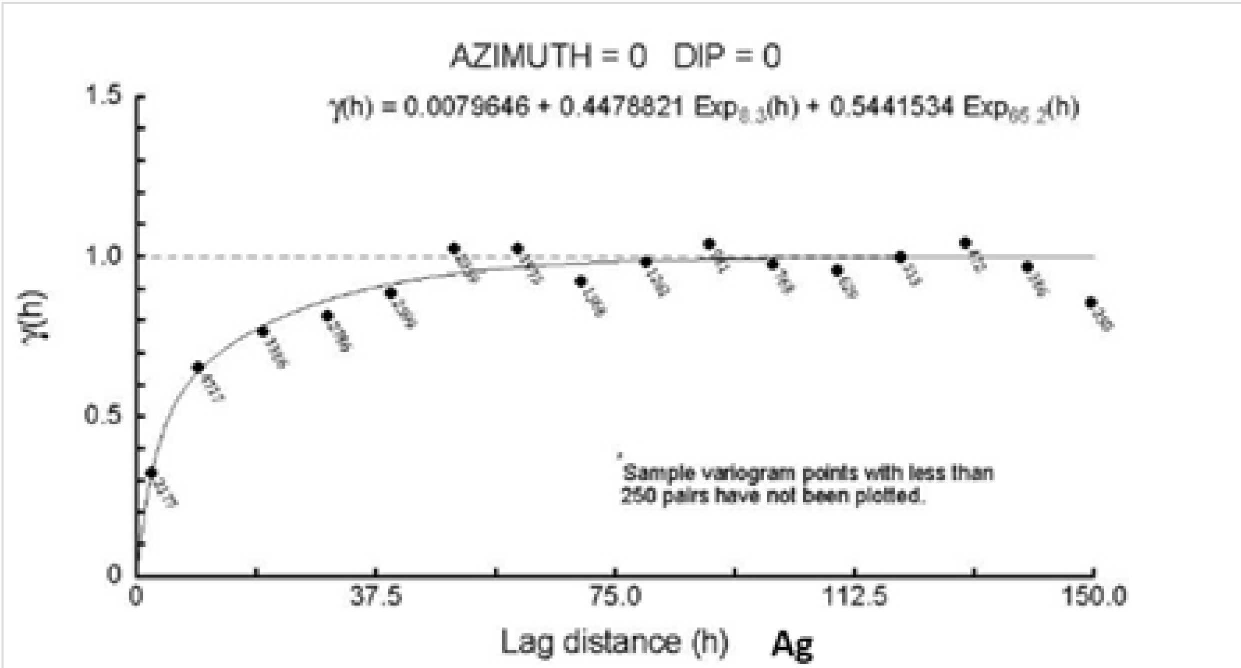
Source: Nordmin, 2021

Figure 14-25: Downhole variogram for Au for Alacran HG vertical mineralization



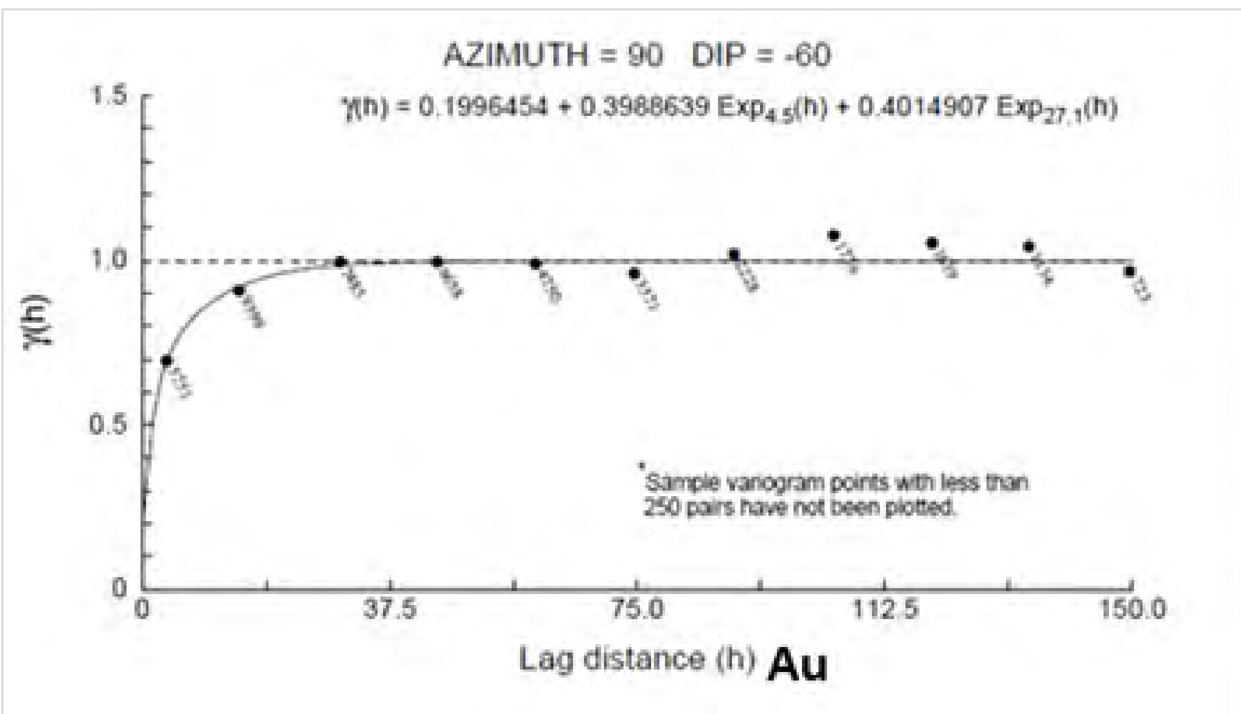
Source: Nordmin, 2021

Figure 14-26: Downhole variogram for Cu for Alacran HG vertical mineralization



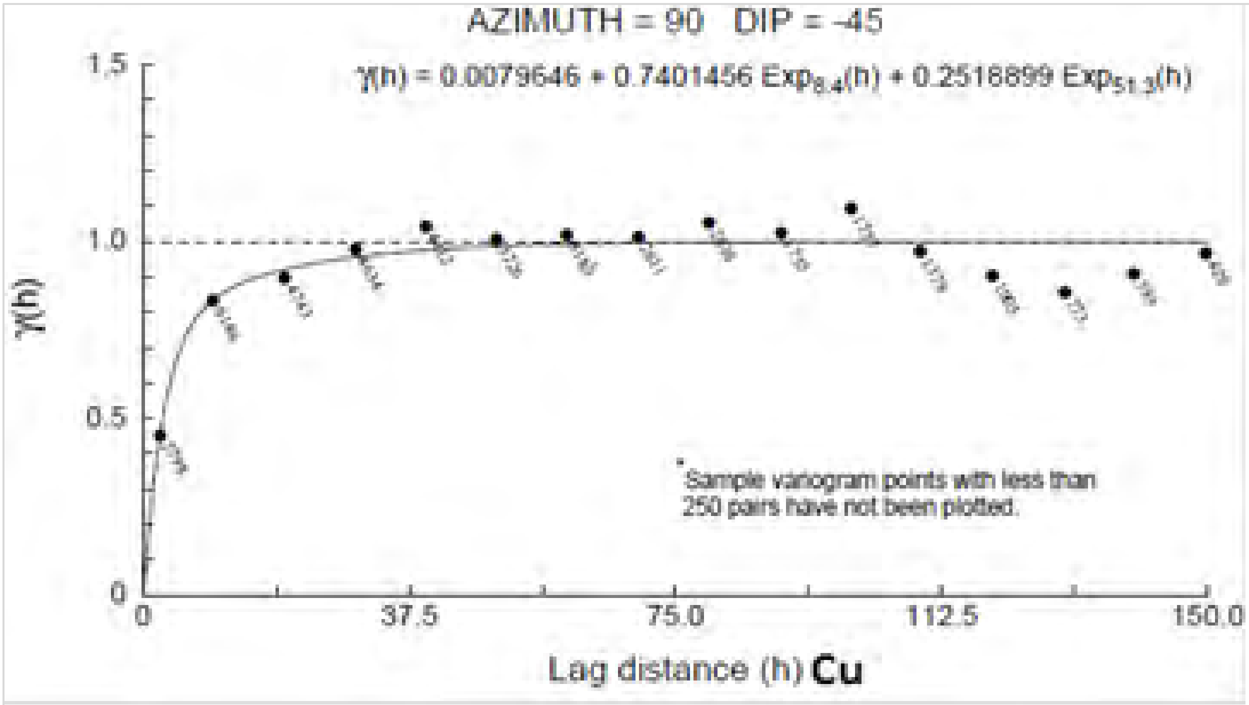
Source: Nordmin, 2021

Figure 14-27: Downhole variogram for Ag for Alacran HG vertical mineralization



Source: Nordmin, 2021

Figure 14-28: Downhole variogram for Au for Alacran sub-vertical mineralization



Source: Nordmin, 2021

Figure 14-29: Downhole variogram for Cu for Alacran sub-vertical mineralization

Costa Azul

A set of structure variogram models were fitted to the experimental variogram data for blocks within the HG and low grade wireframes for Cu, Au, and Ag. Table 14-21 provides the Costa Azul variography parameters.

Table 14-21: Costa Azul Search Parameters and Rotation Angles

		Rotation Angle				Structure 1			Structure 2		
Domain	**Field**	**1**	**2**	**3**	**Axes**	**Range 1**	**Range 2**	**Range 3**	**Range 1**	**Range 2**	**Range 3**
HG and Low grade	Au	48	-39	-41	Z-Y-Z	31	74	150	80	34	160
	Cu	-12	54	81	Z-Y-Z	63.9	22.1	246.9	26.3	44.4	379
	Ag	48	-39	-41	Z-Y-Z	31	74	150	80	34	160

Source: Nordmin, 2019

Montiel East

A set of structure variogram models were fitted to the experimental variogram data for blocks within the HG and low grade wireframes for Cu, Au, and Ag. Table 14-22 provides the Montiel East variography parameters.

Table 14-22: Montiel East Search Parameters and Rotation Angles

		Rotation Angles				Structure 1			Structure 2		
Type	**Field**	**1**	**2**	**3**	**Axes**	**Range 1**	**Range 2**	**Range 3**	**Range 1**	**Range 2**	**Range 3**
HG and Low grade	Au	-53	-49	31	Z-Y-Z	7.5	7.3	15.8	104	52	113
	Cu	-47	-51	22	Z-Y-Z	22.1	42.4	87.7	22.4	198	26.6
	Ag	-53	-49	31	Z-Y-Z	7.5	7.3	15.8	112.3	52	68.4

Source: Nordmin, 2019

Montiel West

A set of structure variogram models were fitted to the experimental variogram data for blocks within the HG and low grade wireframes for Cu, Au, and Ag. Table 14-23 provides the Montiel West variography parameters.

Table 14-23: Montiel West Search Parameters and Rotation Angles

		Rotation Angles				Structure 1			Structure 2		
Type	**Field**	**1**	**2**	**3**	**Axes**	**Range 1**	**Range 2**	**Range 3**	**Range 1**	**Range 2**	**Range 3**
HG and Low grade	Au	-56	-13	36	Z-Y-Z	3.7	13.7	30.7	104.6	548	58.7
	Cu	48	-38	-42	Z-Y-Z	18.2	49.7	40.9	19.9	314.3	55.3
	Ag	-56	-13	36	Z-Y-Z	3.7	13.7	30.7	104.6	548	58.7

Source: Nordmin, 2019

14.6.3 Block Model Definition

Block model shape and size is typically a function of the geometry of the deposit, the density of sample data, drill hole spacing, and the selected mining unit ("SMU"). On this basis, the following parent block sizes were selected:

- Alacran: 5.0 m x 5.0 m x 5.0 m (N-S x E-W x Elevation)
- Satellite deposits: 5.0 m x 10.0 m x 5.0 m (N-S x E-W x Elevation)

All mineral zone volumes were filled with blocks using the parameters described in Table 14-24. Block volumes were compared to the mineral zone volumes to confirm there were no errors during the process. Block volumes for all zones were found to be within reasonable tolerance limits for all mineral zone volumes. Sub-blocking was allowed to maintain the geological interpretation and accommodate the HG and low grade zones (wireframes), the lithological SG, and the category application. Sub-blocking has been allowed to the following minimums:

- Alacran: 5.0 m x 5.0 m x 5.0 m sub-blocked three-fold to 0.625 m x 0.625 m in the N-S and E-W directions with a variable elevation.
- Costa Azul: 5.0 m x 10.0 m x 5.0 m sub-blocked three-fold to 0.625 m x 1.25 m in the N-S and E-W directions with a variable elevation.
- Montiel East: 5.0 m x 10.0 m x 5.0 m sub-blocked three-fold to 0.625 m x 1.25 m in the N-S and E-W directions with a variable elevation.
- Montiel West: 5.0 m x 10.0 m x 5.0 m sub-blocked three-fold to 0.625 m x 1.25 m in the N-S and E-W directions with a variable elevation.

The block models were not rotated but were clipped to topography. The Resource Estimation was conducted using Datamine Studio RM™ version 1.5.47.0 within the UTM grid (NAD83 Zone 18 N).

Table 14-24: Block Model Origin Summary

Item	Minimum (m)	Maximum (m)	Block Size (m)	Number of Blocks	Minimum Sub-Block (m)
Easting	418,600	419,700	5.0	220	0.625
Northing	854,400	856,4000	5.0	400	0.625
Elevation	-400	400	5.0	160	Variable
Deposit	**Item**	**Origin (m)**	**Block Dimension (m)**	**Number of Blocks**	**Minimum Sub-block (m)**
Costa Azul	Easting	420,400	5.0	140	0.625
	Northing	854,050	10.0	110	1.25
	Elevation	0	5.0	80	Variable
Montiel East	Easting	420,100	5.0	300	0.625
	Northing	856,500	10.0	160	1.25
	Elevation	-400	5.0	140	Variable
Montiel West	Easting	420,100	5.0	300	0.625
	Northing	856,500	10.0	160	1.25
	Elevation	-400	5.0	140	Variable

Source: Nordmin, 2021

14.6.4 Interpolation Method

The block models for all deposits were generated using NN, ID2, and OK interpolation methods to complete global comparisons and validation purposes. The OK method was used for the Mineral Resource Estimate. This method is a spatial estimation method where the error in variance is minimized through the kriging variance, and it was selected over ID2 and NN to control the smoothing of grades better and attribute more weight to samples located in the main orientation of the low grade and HG domains.

14.6.5 Search Strategy

Zonal controls were used to constrain the grade estimates to within each low and HG wireframe. These controls prevented the samples from individual domain wireframes from influencing the block grades of one another, acting as a "hard boundary" between the zones. For instance, the composites identified within HG vertical mineralization Zone 1 were used to estimate Zone 1 only, and all other composites were ignored during the estimation of Zone 1.

Search orientations were estimated into the block model based on the shape of the modelled mineral domains. A total of three nested searches were performed on all zones. The search distances were based upon the variogram ranges outlined in Section 14.6.2. The search radius of the first search for the low grade and HG Cu, Au, and Ag was based upon the first structure of the variogram, the second search being two times the first structure and the third search on the maximum of the second structure within the variogram. Search strategies for each domain used an elliptical search with a minimum of three samples and a maximum of eight samples from a minimum of two holes in the first, second, and third passes. Un-estimated blocks were left as absent and not reported in the Mineral Resource Estimate.

Alacran

Composite controls for Alacran are summarized in Table 14-25.

Table 14-25: Alacran Search Parameters

			Search Rotation (°)				Search Distances (m)				First Pass			Second, Third Pass	
Mineralization Domain	Field	Material	1	2	3	Axes	1	2	3	2nd Factor	3rd Factor	Min Cmp	Max Cmp	Min Cmp	Max Cmp
HG Vertical Mineralization	Au	Saprolite, Transition, Fresh	354	83	0	Z-Y-Z	25	50	25	2	12	3	8	3	8
	Cu	Saprolite, Transition, Fresh	354	83	0	Z-Y-Z	40	100	50	2	12	3	8	3	8
	Ag	HG Vertical	354	83	0	Z-Y-Z	50	75	50	2	12	3	8	3	8
Sub-vertical Replacement Mineralization	Au	Saprolite	349	63	0	Z-Y-Z	100	70	45	2	12	3	8	3	8
		Transition, Fresh	349	63	0	Z-Y-Z	25	50	25	2	12	3	8	3	8
	Cu	Saprolite, Transition, Fresh	349	63	0	Z-Y-Z	45	100	50	2	12	3	8	3	8
	Ag	Saprolite	349	63	0	Z-Y-Z	50	75	50	2	12	3	8	3	8
		Transition, Fresh	349	63	0	Z-Y-Z	25	50	25	2	12	3	8	3	8
Low grade	Au	Saprolite, Transition, Fresh	259	63	0	Z-Y-Z	90	200	30	2	10	3	8	3	8
	Cu	Saprolite, Transition, Fresh	259	63	0	Z-Y-Z	90	200	30	2	10	3	8	3	8
	Ag	Saprolite, Transition, Fresh	259	63	0	Z-Y-Z	90	200	30	2	10	3	8	3	8

Source: Nordmin, 2021

Costa Azul

Composite controls for Costa Azul are summarized in Table 14-26.

Table 14-26: Costa Azul Search Parameters

			Search Rotation (°)				Search Distances (m)					1st, 2nd Pass		3rd Pass	
Domain	Material	Field	1	2	3	Axes	1	2	3	2nd Factor	3rd Factor	Min Cmp	Max Cmp	Min Cmp	Max Cmp
High grade	Saprolite	Au	-12	54	81	Z-Y-Z	15	35	50	2	15	3	8	2	8
		Cu	-12	54	81	Z-Y-Z	30	10	50	2	15	3	8	2	8
		Ag	-12	54	81	Z-Y-Z	15	35	50	2	15	3	8	2	8
	Fresh	Au	-12	54	81	Z-Y-Z	15	35	50	2	8	3	8	2	8
		Cu	-12	54	81	Z-Y-Z	30	10	30	2	8	3	8	2	8
		Ag	-12	54	81	Z-Y-Z	15	35	50	2	8	3	8	2	8
Low grade	Saprolite	Au	-12	54	81	Z-Y-Z	15	35	50	2	15	3	8	2	8
		Cu	-12	54	81	Z-Y-Z	30	10	50	2	15	3	8	2	8
		Ag	-12	54	81	Z-Y-Z	15	35	50	2	15	3	8	2	8
	Fresh	Au	-12	54	81	Z-Y-Z	15	35	50	2	8	3	8	2	8
		Cu	-12	54	81	Z-Y-Z	30	10	30	2	8	3	8	2	8
		Ag	-12	54	81	Z-Y-Z	15	35	50	2	8	3	8	2	8

Source: Nordmin, 2021

Montiel East

Composite controls for Montiel East are summarized in Table 14-27.

Table 14-27: Montiel East Search Parameters

			Search Rotation (°)				Search Distances (m)					1st, 2nd, 3rd Pass	
Domain	Material	Field	1	2	3	Axes	1	2	3	2nd Factor	3rd Factor	Min Cmp	Max Cmp
High grade	Saprolite	Au	-53	-49	31	Z-Y-Z	15	15	30	20	18	3	8
		Cu	5	69	24	Z-Y-Z	10	25	25	20	18	3	8
		Ag	-53	-49	31	Z-Y-Z	15	15	30	20	18	3	8
	Fresh	Au	-53	-49	31	Z-Y-Z	15	15	30	20	18	3	8
		Cu	-47	-51	22	Z-Y-Z	30	10	20	20	18	3	8
		Ag	-53	-49	31	Z-Y-Z	15	15	30	20	18	3	8
Low grade	Saprolite	Au	-47	-51	22	Z-Y-Z	15	5	10	20	20	3	8
		Cu	-47	-51	22	Z-Y-Z	15	5	10	20	20	3	8
		Ag	-47	-51	22	Z-Y-Z	15	5	10	20	20	3	8

Source: Nordmin, 2019

Montiel West

Composite controls for Montiel West are summarized in Table 14-28.

Table 14-28: Montiel West Search Parameters

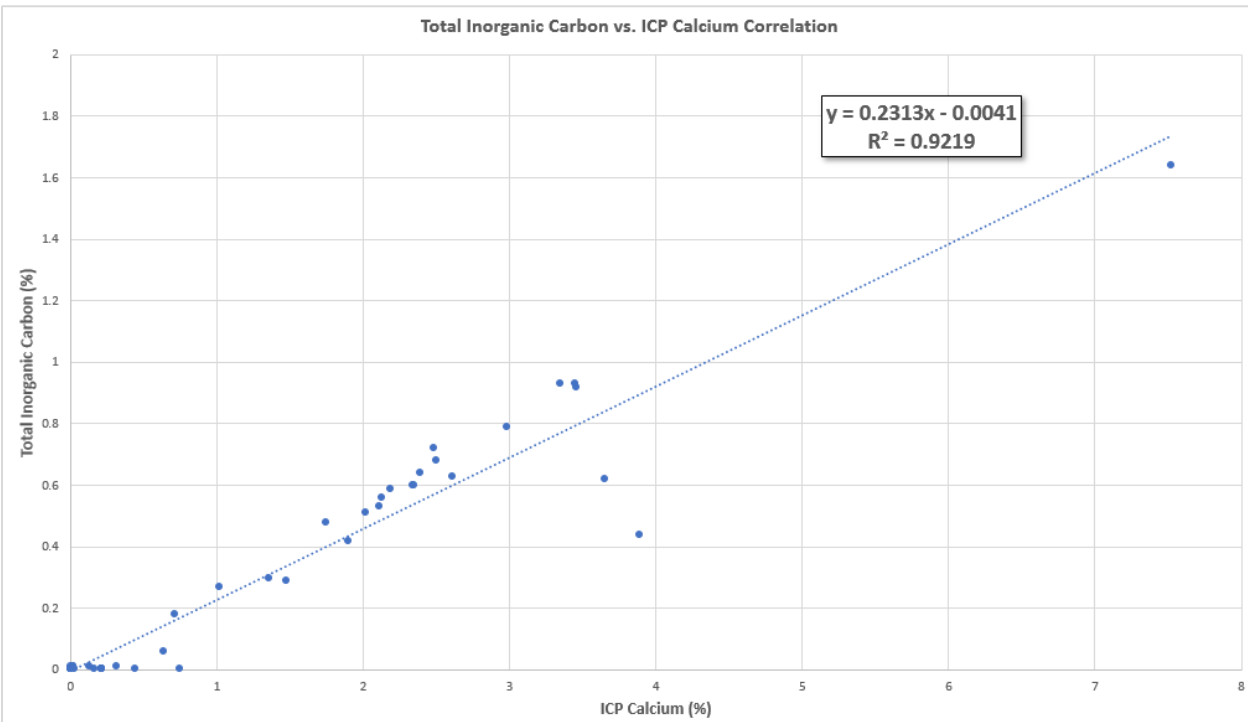
			Search Rotation (°)				Search Distances (m)					1st, 2nd, 3rd Pass	
Domain	Material	Field	1	2	3	Axes	1	2	3	2nd Factor	3rd Factor	Min Cmp	Max Cmp
High grade	Saprolite	Au	-29	-32	5	Z-Y-Z	20	10	10	2	20	3	8
		Cu	48	-38	-42	Z-Y-Z	20	10	10	2	20	3	8
		Ag	-29	-32	5	Z-Y-Z	10	15	10	2	20	3	8
	Fresh	Au	-29	-32	5	Z-Y-Z	20	10	10	2	15	3	8
		Cu	48	-38	-42	Z-Y-Z	20	10	10	2	15	3	8
		Ag	-29	-32	5	Z-Y-Z	10	15	10	2	15	3	8
Low grade	All	Au	-29	-32	5	Z-Y-Z	10	15	10	2	15	3	8
		Cu	48	-38	-42	Z-Y-Z	10	15	10	2	15	3	8
		Ag	-29	-32	5	Z-Y-Z	10	15	10	2	15	3	8

Source: Nordmin, 2019

14.6.6 Acid Generation

A total of 52 waste rock samples were sent to an analytical laboratory for acid base accounting ("ABA") testing. ABA testing is used to evaluate a rock's potential to create acidic or basic leachate. ABA test results are expressed as acid generating potential ("AP") and acid neutralizing potential ("NP"). A statistical analysis of the test results demonstrated a very strong relationship of Net Potential Ratio ("NPR"), the ratio of NP to AP, to total calcium, and sulphide sulphur. The assayed calcium and sulphur values were merged with the ABA results and a strong statistical linear regression was calculated for both. The total inorganic carbon versus ICP calcium linear regression formula utilized and shown in Figure 14-30 was:

*Total Inorganic Carbon (%) = (0.2313 * Calcium (%)) - 0.0041,* R^2*=0.9219*

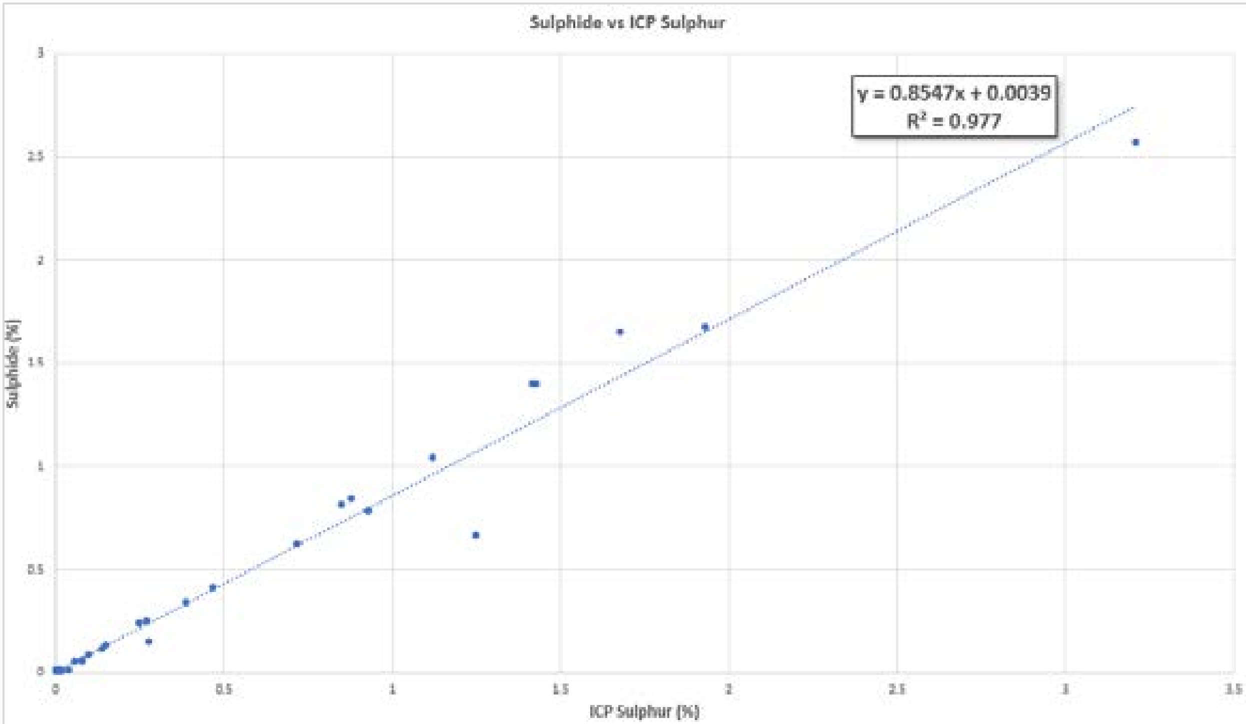


Source: Nordmin, 2021

Figure 14-30: Total Inorganic Carbon versus ICP Calcium Linear Regression

The sulphide sulphur vs ICP sulphur linear regression formula utilized and shown in Figure 14-31 was:

*Sulphide Sulphur (%) = (0.8547 * ICP Sulphur (%)) + 0.0039, R2=0.977*



Source: Nordmin, 2021

Figure 14-31: Sulphide versus ICP sulphur linear regression

These linear regression formulas were then applied to the block model using the OK estimation for the calcium and sulphur values to populate the block model with calculated total inorganic carbon and sulphide sulphur values.

In order to leverage the assayed calcium and sulphur values against the ABA results, the calcium, and sulphur values need to be converted to NP and AP values respectively. This was achieved through the following equations:

*Modified NP = (19.56 * Estimated Calcium Value (%)) + 2.8589*

*Sulphide = (0.8545 * Estimated Sulphur Value (%)) + 0.0041*

*AP = 31.25 * Sulphide (from above)*

These values were then used to calculate the modified net neutralization potential ("Modified NP") and the acid generation potential, which were then used to calculate NPR for each block:

For sulphur values greater than or equal to 0.1%:

NPR = NP/AP

And then classified as follows:

NPR less than 1: PAG

NPR between 1 and 3: Uncertain

NPR greater than 3: NPAG

Where the block sulphur value was less than 0.1%, a classification of NPAG was applied. Totals for mined waste rock categorized as “NPAG” or “PAG” can be viewed in Table 14-29.

Table 14-29: NPAG, PAG totals for Pit Design Results, Pit Contents

Acid Generation Class	Rock Type	Tonnes
Not Potentially Acid Generating	Saprolite	21,479,000
Not Potentially Acid Generating	Fresh	47,589,000
Not Potentially Acid Generating	Transition	4,898,000
Not Potentially Acid Generating	**SUBTOTAL**	**73,966,000**
Potentially Acid Generating	Fresh	8,107,000
Potentially Acid Generating	Transition	1,638,000
Potentially Acid Generating	**SUBTOTAL**	**9,745,000**
Uncertain	Fresh	24,917,000
Uncertain	Transition	481,000
Uncertain	**SUBTOTAL**	**25,398,000**
TOTAL		**109,109,000**

Source: Nordmin, 2021

14.6.7 Net Smelter Return

NSR was used for estimating the Alacran deposit. It was calculated for each block using the appropriate Cu, Au, and Ag recovery values. The following formula was applied for each block in the block model:

A 98% dilution was applied to estimated Cu, Au, and Ag grades.

- *NSR_Cu = Cu_% * MiningRec_% * MillCuRec_% * 51.53/% Cu (On Site Value)*
- *NSR_Au = Au_g/t * MiningRec_% * MillAuRec_% * 46.55_$/g (On Site Value)*
- *NSR_Ag = Ag_g/t * MiningRec_% * MillAgRec_% * 0.54_$/g (On Site Value)*
- *NSR = NSR_Cu + NSR_Au + NSR_Ag*

14.6.8 Equivalency

Cu equivalency (“CuEq”) was used for estimating the Satellite deposits (Costa Azul, Montiel East, and Montiel West). Metal prices reported here only apply to the Satellite deposits. It was calculated for each block using the appropriate Cu, Au, and Ag recovery values. The following formula was applied for each block in each block model:

CuEq % = [Cu grade + (Au factor × Au grade) + (Ag factor × Ag grade)] × 100

Where:

$$\text{Au Factor} = \frac{(\text{Au Recovery \%} \times \text{Au price per oz} \div 31.1035)}{(\text{Cu Recovery \%} \times \text{Cu price per lb} \times 2{,}204.62)}$$

$$\text{Ag Factor} = \frac{(\text{Ag Recovery \%} \times \text{Ag price per oz} \div 31.1035)}{(\text{Cu Recovery \%} \times \text{Cu price per lb} \times 2{,}204.62)}$$

And:

Au Price = $1,400/oz

Cu Price = $3.25/lb

Ag Price = $17.75/oz

14.6.9 Recovery Approach

Metallurgical testing was performed by Minpro in 2012, where preliminary flotation test work was completed on 84 one metre long quarter core samples from 23 holes distributed across the length of Alacran. The 2012 metallurgical testing was almost exclusively in fresh rock.

In 2019, Cordoba completed metallurgical testing on the following, focusing mainly on saprolite, and transitional rock. Tests included:

- Comminution Testing: 25.3 kg of coarse rejects for Alacran
- Saprolite/Transition Flotation Testing: 46.8 kg of coarse rejects for all four deposits
- Saprolite Heap Leach Testing: 17.7 kg of coarse rejects for all four deposits
- Gravity Testing: 11.2 kg of HG samples from within the HG vertical mineralization wireframes for Alacran

Metallurgical testing in 2021 was performed by Blue Coast. Testing consisted of 182 samples from twenty drill holes within the Alacran deposit only. This metallurgical testing focused mainly on transition and fresh rock with some samples in saprolite and transition. This included:

- Comminution Testing
- Flotation Testing
- Gravity Testing
- Mineralogy

Recoveries were independently considered for Au, Cu and Ag for saprolite, transition, and fresh material. Subsequently, Cu, Au, and Ag recoveries were calculated for each block in the model. For the Alacran deposit and the Satellite deposits, separate recoveries were considered for each of the three elements in saprolite, transition, and fresh (Table 14-30, Table 14-31 and Figure 14-31).

Table 14-30: Recoveries for the Alacran Deposit

Rock Type	Magnetite	Element	Grade Range	Recovery %
Saprolite	All	Cu	Any	0.0
		Au	0.0 to <1.52 g/t	$[14.196 \times log_{10}(Au\ g/t\ OK)] + 71.652$
			≥ 1.52 g/t	77.6
		Ag	Any	0.0
Transition	All	Cu	≤ 0.1%	0.0
			> 0.1%	23.0
		Au	< 0.1 g/t	0.0
			≥ 0.1 g/t	44.0
		Ag	≤ 0.65 g/t	0.0
			> 0.65 g/t	23.0
Fresh	Non-Magnetite	Cu	≤ 0.9%	$[5.681 \times log_{10}(Cu\ \%\ OK)] + 93.156$
			> 0.9%	92.55
		Au	≤ 1.65 g/t	$[9.3298 \times log_{10}(Au\ g/t\ OK)] + 81.883$
			> 1.65	86.56
		Ag	≤ 0.65 g/t	0.0
			> 0.65 g/t	50.0
	Magnetite	Cu	< 0.1%	0.0
			≥ 0.1%	67.0
		Au	< 0.1 g/t	0.0
			≥ 0.1 g/t	50.0
		Ag	< 0.65 g/t	0.0
			≥ 0.65 g/t	50.0

Source: Nordmin, 2021

Table 14-31: Recoveries for the Costa Azul, Montiel East, and Montiel West Deposits

			Recovery		
Domain		Qualifier	Au	Cu	Ag
Costa Azul					
Saprolite	HG and Low grade	-	76.0%	55.0%	45.0%
Fresh	HG and Low grade	Cu ≥0.4%	77.5%	90.0%	70.0%
		Cu <0.4%	77.5%	75.0%	70.0%
Montiel East					
Saprolite	HG and Low grade		72.0%	50.0%	40.0%
Fresh	HG and Low grade	Cu ≥0.4%	77.5%	90.0%	70.0%
		Cu <0.4%	77.5%	75.0%	70.0%
Montiel West					
Saprolite	HG and Low grade		72.0%	50.0%	40.0%
Fresh	HG and Low grade	Cu ≥0.4%	77.5%	90.0%	70.0%
		Cu <0.4%	77.5%	75.0%	70.0%

Source: Nordmin, 2019

14.6.10 Estimation Parameters for Non Payables

Non payable elements were estimated using the inverse distance squared interpolation method and included Al, Sb, As, Cd, Cr, Fe, Pb, Ni, S, Th, Ti, W, U, Zn.

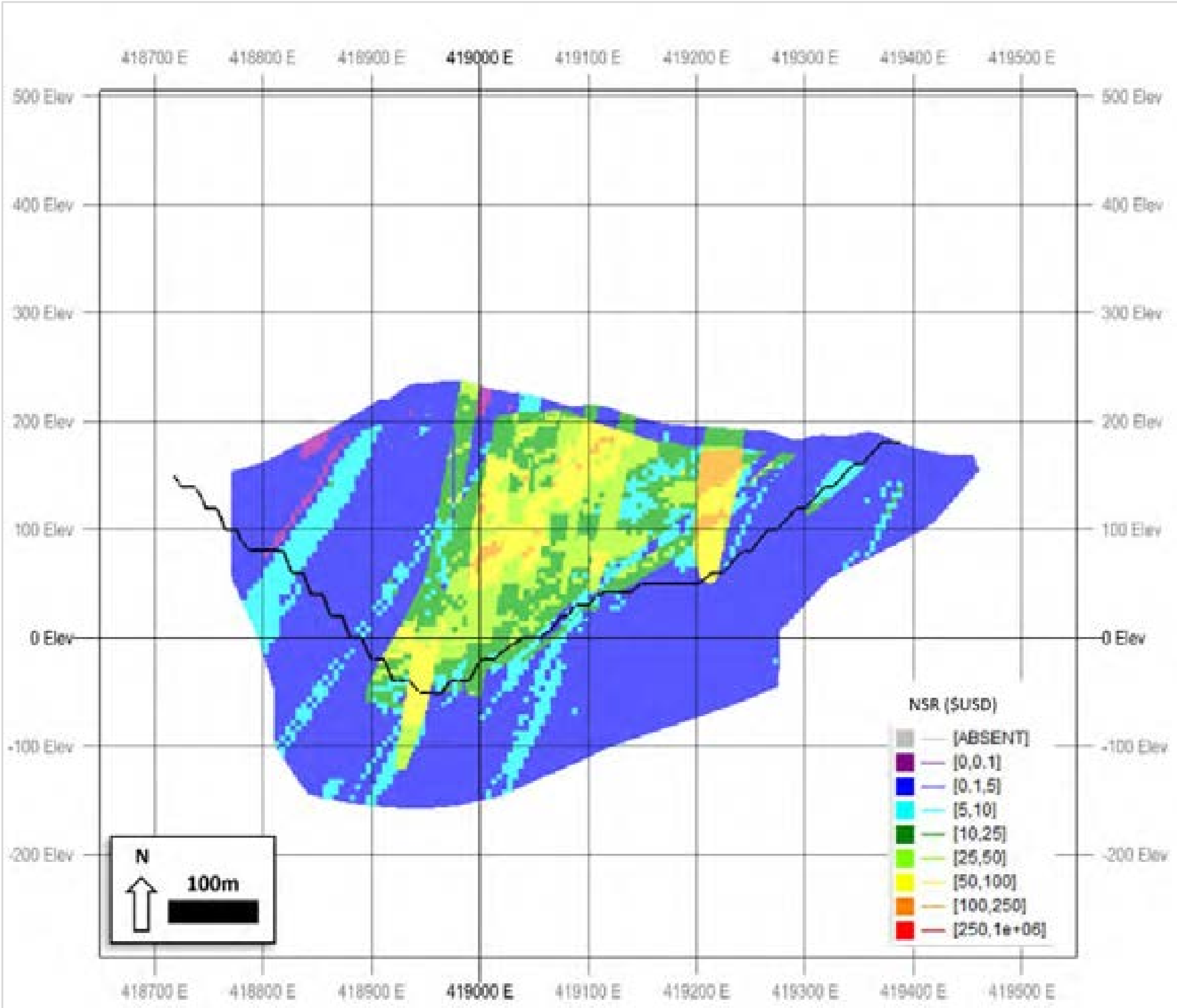
14.7 Block Model Validation

The block model validation process included visual comparisons between block estimates and composite grades in plan and section, local versus global estimations (NN, ID2, OK) and swath plots. Block estimates were visually compared to the drill hole composite data in all domains and corresponding zones to ensure agreement. No material grade bias issues were identified, the block grades were identified, and the block grades compared well to the composite data.

14.7.1 Visual Comparison

The validation of the interpolated block model was assessed by using visual assessments and validation plots of block grades versus capped assay grades and composites. The review demonstrated a good comparison between local block estimates and nearby samples, without excessive smoothing in the block model (Figure 14-32, Figure 14-33 and Figure 14-34).

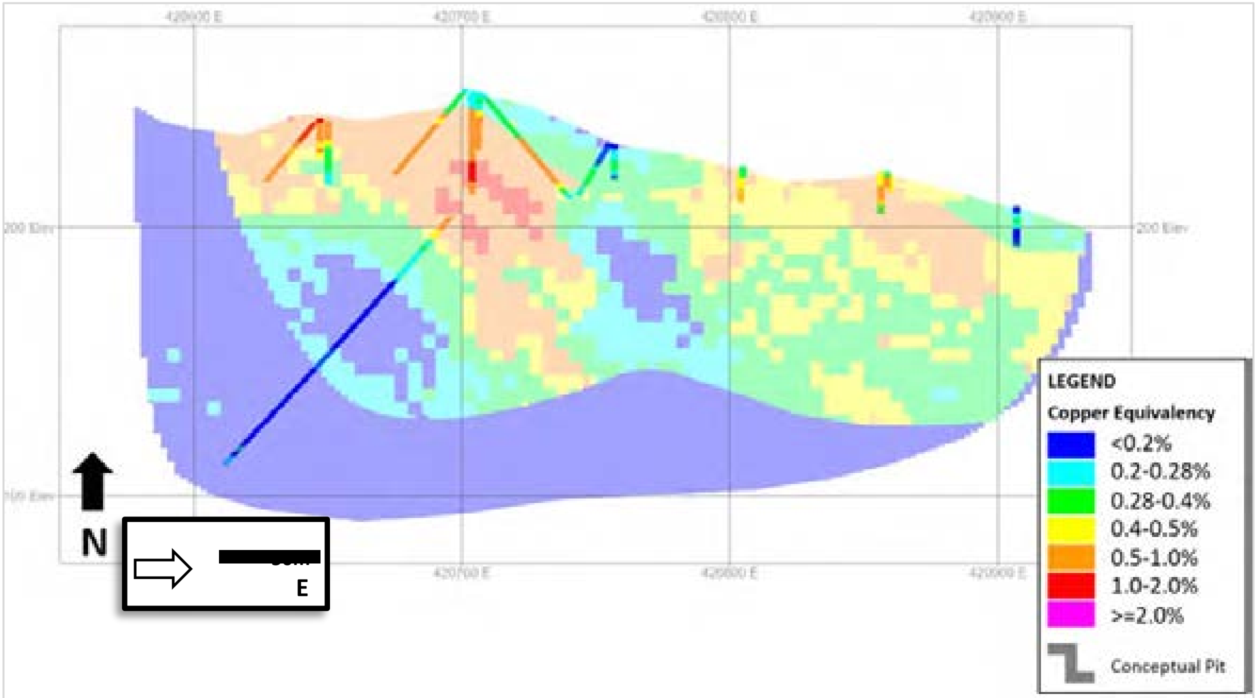
Alacran



Source: Nordmin, 2021

Figure 14-32: Alacran horizontal section, Northing = 855,800 m with block model and composite drill holes displaying NSR.

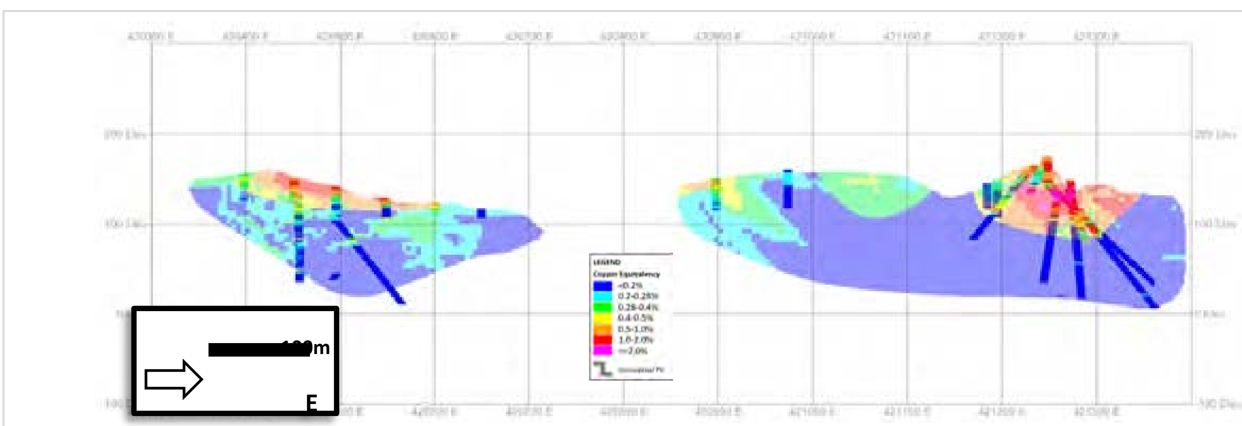
Costa Azul



Source: Nordmin, 2019

Figure 14-33: Costa Azul horizontal section, Northing = 854,350 m with block model and composite drill holes displaying CuEq %

Montiel East and Montiel West



Source: Nordmin, 2019

Figure 14-34: Montiel East and Montiel West horizontal section, Northing = 856,850 m with block model and composite drill holes displaying CuEq %

14.7.2 Interpolation Comparison

Global statistical comparisons between the composite samples, NN estimates, ID2 estimates, and OK for various cut-off grades were compared to assess global bias, where the NN model estimates represent de-clustered composite data. Clustering of the drill hole data can result in differences between the global means of the composites and NN estimates. Similar global means of the NN, ID2, and OK estimates indicate there is no apparent global grade bias in the model. The results summarized in Table 14-32 indicates that no material grade bias was found in the block model.

The OK method was used as the reporting estimation interpolation method, while NN, and ID2 were also calculated for validation purposes, as described in Section 14.5.4. Table 14-33 and compare Alacran ID2 versus OK estimated grades for the conceptual pit-contained Cu, Au, and Ag.

Table 14-32: Comparison Mean Estimated Grade Versus Cut-off Grade

Category	Rock Type	Cut-off NSR ($USD)	Au (ppm)				Cu (%)				Ag (ppm)			
			NN	ID2	ID3	OK	NN	ID2	ID3	OK	NN	ID2	ID3	OK
Alacran														
Indicated	SAP	1.78	0.22	0.23	0.23	0.22	0.26	0.27	0.27	0.27	1.67	1.80	1.67	1.69
	TRANS	8.85	0.20	0.20	0.21	0.22	0.65	0.63	0.63	0.65	3.30	3.32	3.20	3.16
	FRESH	8.85	0.26	0.26	0.27	0.28	0.46	0.44	0.44	0.45	2.59	2.56	2.50	2.50
Inferred	SAP	1.78	0.16	0.16	0.19	0.16	0.18	0.19	0.19	0.20	0.78	0.93	0.86	0.89
	TRANS	8.85	0.10	0.10	0.20	0.49	0.49	0.31	0.29	0.27	1.61	1.14	1.10	1.01
	FRESH	8.85	0.20	0.18	0.18	0.27	0.27	0.29	0.30	0.34	1.19	1.13	1.16	1.13

Category	Cut-off NSR ($USD)	Au (ppm)			Cu (%)			Ag (ppm)		
		NN	ID	OK	NN	ID	OK	NN	ID	OK
Costa Azul										
Indicated	0.2	0.16	0.17	0.17	0.24	0.24	0.24	0.60	0.60	0.62
	0.3	0.21	0.21	0.22	0.28	0.28	0.29	0.66	0.65	0.67
	0.4	0.26	0.26	0.27	0.34	0.33	0.35	0.80	0.78	0.80
Inferred	0.2	0.11	0.13	0.13	0.25	0.23	0.23	0.59	0.55	0.50
	0.3	0.13	0.15	0.16	0.28	0.25	0.26	0.62	0.59	0.55
	0.4	0.13	0.16	0.17	0.36	0.31	0.33	0.61	0.68	0.62
Montiel East										
Indicated	0.2	0.27	0.28	0.29	0.37	0.37	0.39	1.25	1.30	1.32
	0.3	0.34	0.35	0.37	0.46	0.46	0.48	1.48	1.50	1.57
	0.4	0.43	0.44	0.46	0.55	0.55	0.59	1.75	1.76	1.84
Inferred	0.2	0.09	0.10	0.11	0.18	0.18	0.20	0.66	0.72	0.77
	0.3	0.12	0.13	0.15	0.23	0.23	0.25	0.83	0.83	0.93
	0.4	0.15	0.15	0.21	0.33	0.26	0.31	1.12	0.94	1.12
Montiel West										
Indicated	0.2	0.30	0.28	0.30	0.15	0.14	0.15	1.22	1.16	1.15
	0.3	0.44	0.40	0.47	0.22	0.21	0.22	1.32	1.20	1.26
	0.4	0.55	0.52	0.60	0.29	0.28	0.29	1.49	1.32	1.38
Inferred	0.2	0.41	0.37	0.36	0.05	0.06	0.07	0.75	0.80	0.85
	0.3	0.49	0.41	0.50	0.05	0.06	0.07	0.81	0.80	0.93
	0.4	0.54	0.46	0.67	0.06	0.06	0.07	0.96	0.78	1.05

Source: Nordmin, 2021

Table 14-33: Alacran ID and OK Estimation Details for Conceptual Pit-Contained Metals

Category	Rock Type	NSR Cut-Off ($USD)	Au ID2 ppm	Au OK ppm	Cu ID2 %	Cu OK %	Ag ID2 ppm	Ag OK ppm
Indicated	Saprolite	1.5	0.21	0.21	0.26	0.25	1.60	1.59
		1.78	0.22	0.22	0.27	0.26	1.67	1.67
		2	0.23	0.23	0.28	0.27	1.71	1.72
	Transition	8	0.19	0.20	0.60	0.60	2.99	3.06
		8.85	0.20	0.22	0.63	0.65	3.20	3.30
		9.5	0.21	0.23	0.66	0.68	3.35	3.48
	Fresh	8	0.26	0.27	0.43	0.44	2.44	2.53
		8.85	0.26	0.28	0.44	0.46	2.50	2.59
		9.5	0.27	0.28	0.45	0.47	2.54	2.64
Inferred	Saprolite	1.5	0.15	0.14	0.18	0.17	0.83	0.76
		1.78	0.16	0.16	0.19	0.18	0.86	0.78
		2	0.16	0.17	0.19	0.18	0.86	0.77
	Transition	8	0.10	0.12	0.36	0.45	1.30	1.52
		8.85	0.10	0.14	0.31	0.49	1.10	1.61
		9.5	0.11	0.16	0.30	0.51	1.12	1.70
	Fresh	8	0.19	0.22	0.27	0.25	1.09	1.10
		8.85	0.20	0.24	0.29	0.27	1.16	1.19
		9.5	0.22	0.28	0.29	0.29	1.21	1.26

Source: Nordmin, 2021

Table 14-34: Alacran ID Versus OK Differences for NSR Cut-offs

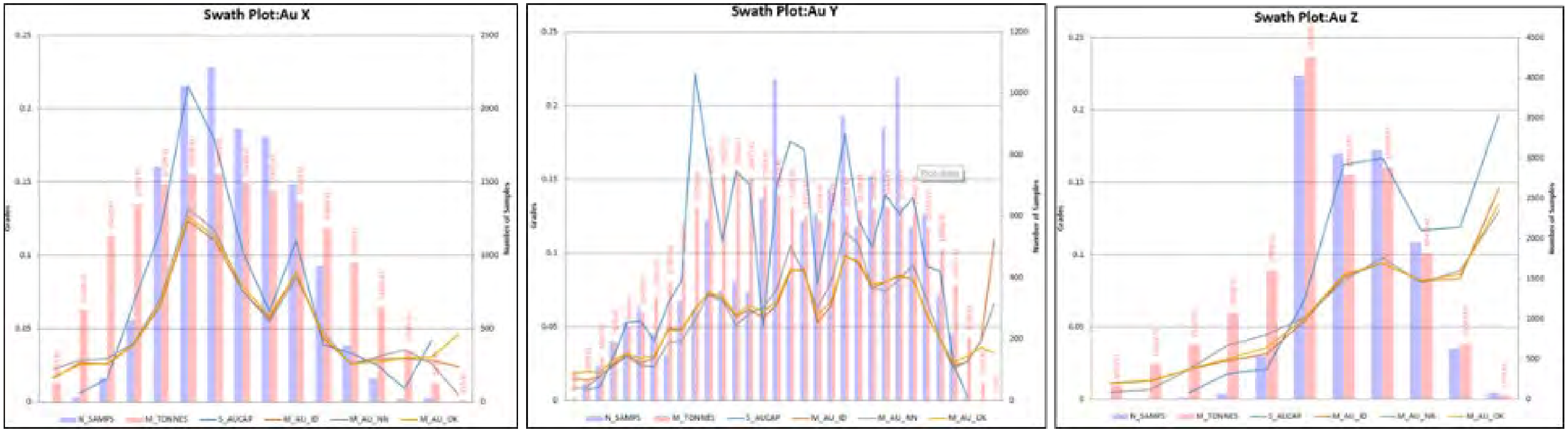
Category	Rock Type	NSR ($) Cut-Off	Au Chg	Cu Chg	Ag Chg
			OK vs ID2	OK vs ID2	OK vs ID2
INDICATED	Sap	1.5	0.002	-0.01	0.002
		1.78	0.003	-0.01	0.003
		2	0.003	-0.01	0.003
	Trans + Fresh	8	0.025	0.04	0.141
		8.85	0.029	0.04	0.16
		9.5	0.031	0.04	0.171
INFERRED	Sap	1.5	0.033	0.02	-0.031
		1.78	0.037	0.02	-0.042
		2	0.039	0.02	-0.057
	Trans + Fresh	8	0.045	0.19	0.554
		8.85	0.042	0.26	0.607
		9.5	0.049	0.3	0.697

Source: Nordmin, 2021

14.7.3 Swath Plots

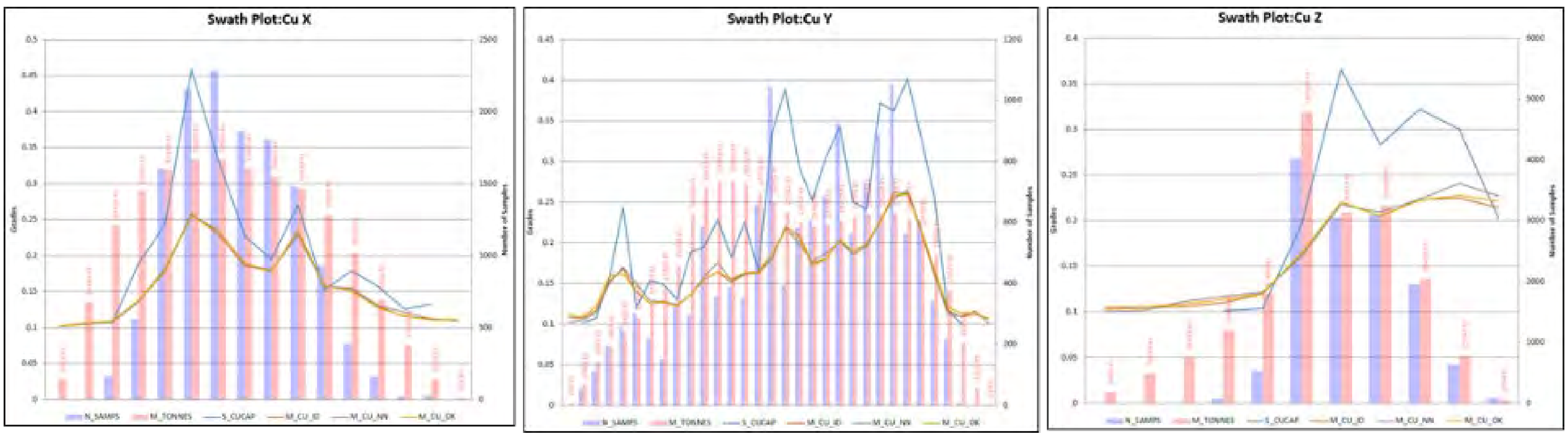
A series of swath plots were generated for Cu, Au, and Ag from slices throughout each domain. They compare the block model grades for NN, ID2, and OK to the drill hole composite grades to evaluate any potential local grade bias. Review of the swath plots did not identify bias in the model that is material to the 2021 Mineral Resource Estimate, as there was a strong overall correlation between the block model grade and the capped composites used in the 2021 Mineral Resource Estimate (Figure 14-36 and Figure 14-37Figure 14-38).

Alacran



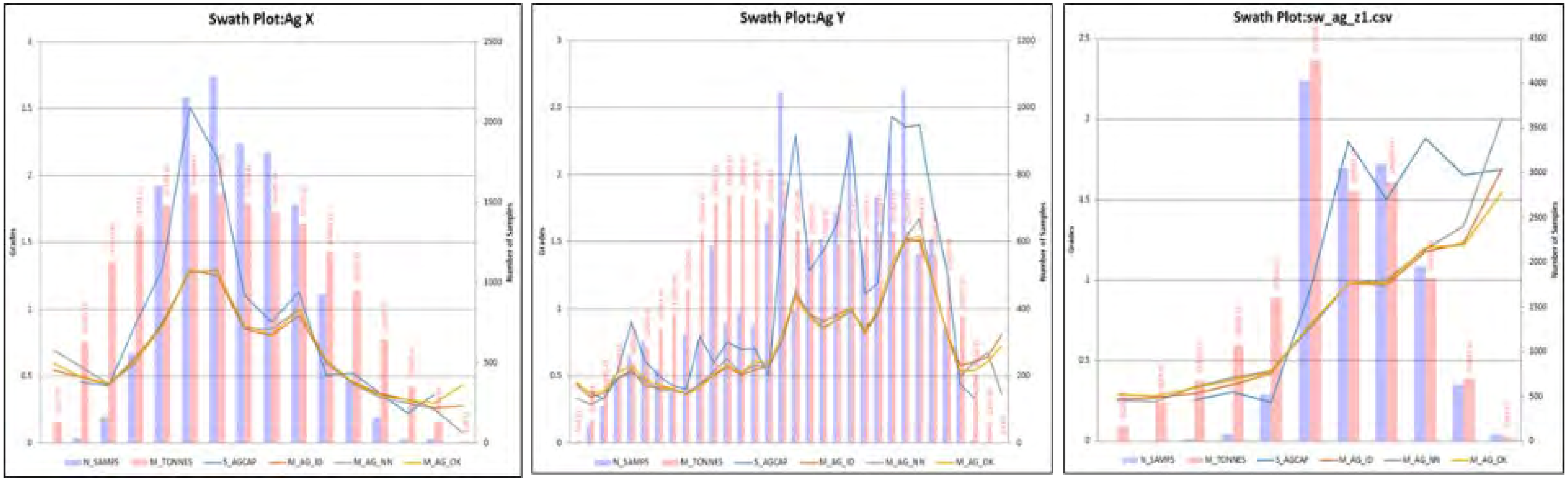
Source: Nordmin, 2021

Figure 14-35: Alacran swath plots for Au with composite grades



Source: Nordmin, 2021

Figure 14-36: Alacran swath plots for Cu with composite grades



Source: Nordmin, 2021

Figure 14-37: Alacran swath plots for Ag with composite grades

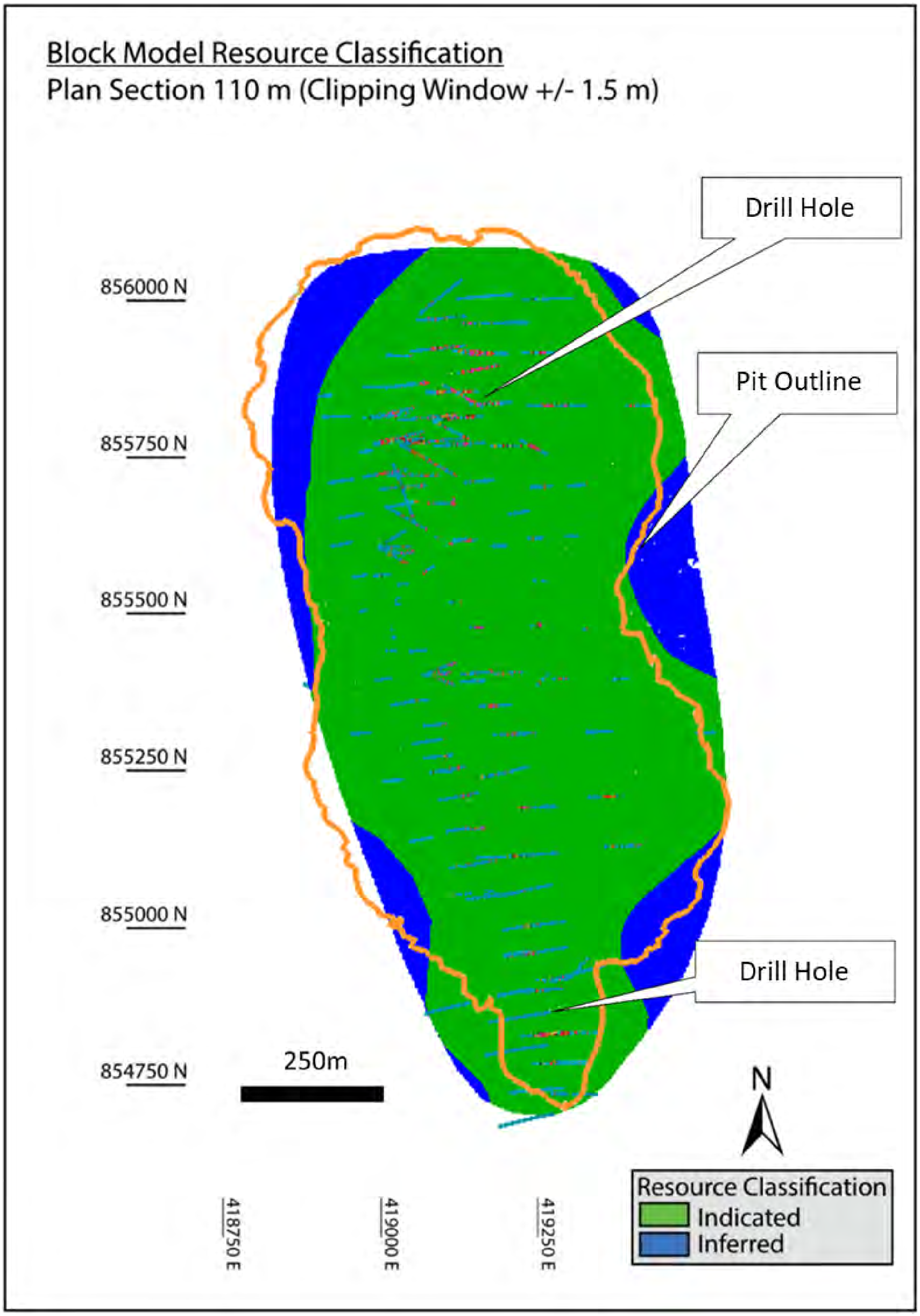
14.8 Mineral Resource Classification

The Mineral Resource Estimate was classified in accordance with CIM Definition Standards for Mineral Resources and Mineral Reserves (May 2014). Mineral Resource classifications were assigned to broad regions of the block model based on the Qualified Person's confidence and judgment related to geological understanding, continuity of mineralization in conjunction with data quality, spatial continuity based on variography, estimation pass, data density, and block model representativeness.

Classification (Indicated and Inferred) was applied to all four block models based on a drill spacing review for each deposit in vertical and plan section view.

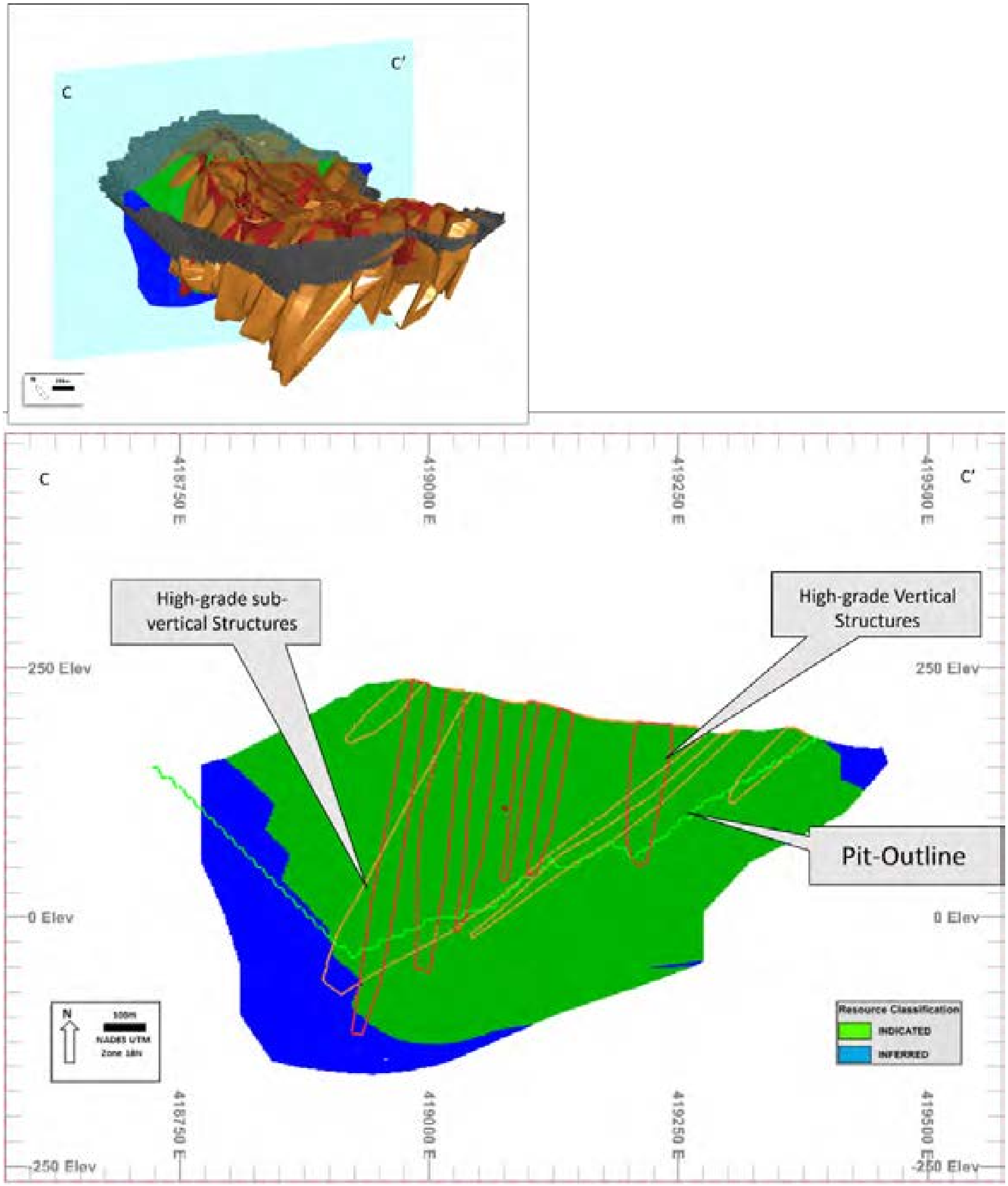
Alacran

Nordmin determined that the appropriate drill spacing for the purpose of the Indicated resource category was approximately 50 m and between 50 m and 150 m for the Inferred resource category (Figure 14-38 and Figure 14-39).



Source: Nordmin, 2021

Figure 14-38: Alacran plan view showing drill holes and classification



Source: Nordmin, 2021

Figure 14-39: Alacran cross section showing HG vertical and sub-vertical mineralization wireframes, and resource classification

Costa Azul

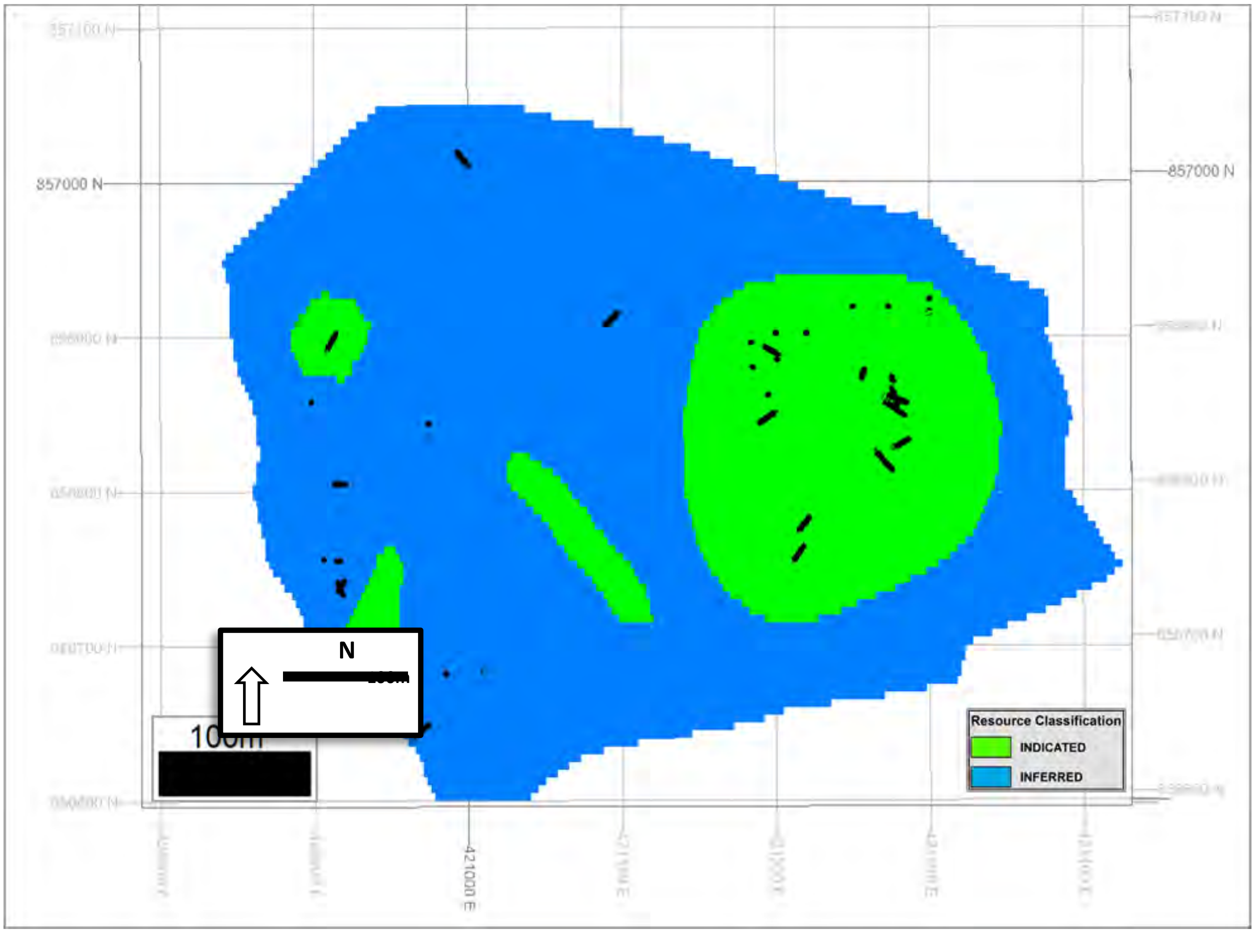
Drill spacing for each Satellite deposit was analyzed, and it was determined that all three were similar in nature. Nordmin determined that the appropriate drill spacing for the purpose of the Indicated category was 50 m and between 50 m and 150 m for the Inferred category (Figure 14-40).

Source: Nordmin, 2019

Figure 14-40: Costa Azul plan view showing composites and classification

Montiel East

Drill spacing for each Satellite deposit was analyzed, and it was determined that all three were similar in nature. Nordmin determined that the appropriate drill spacing for the purpose of the Indicated category was 50 m and between 50 m and 150 m for the Inferred category (Figure 14-41).

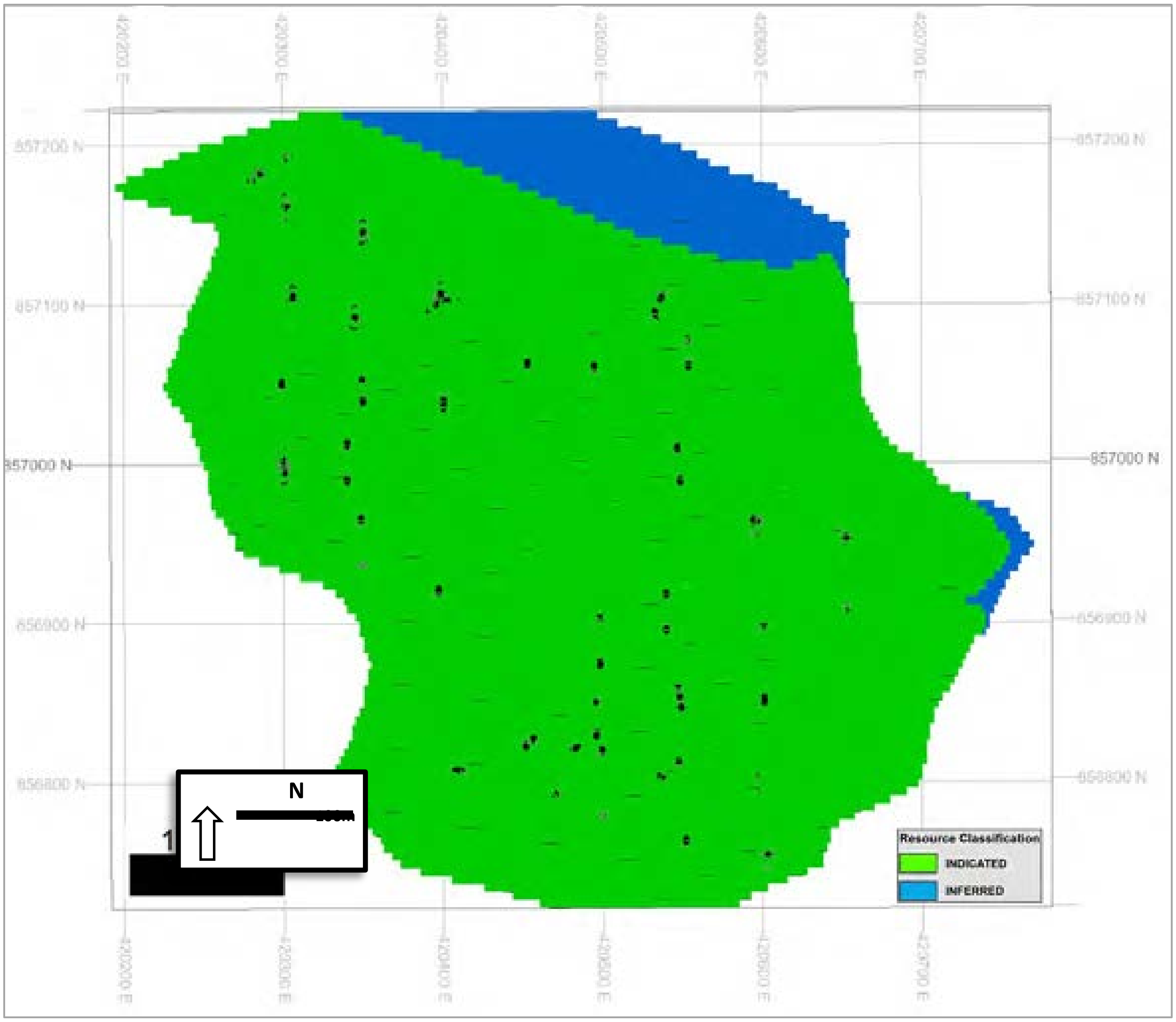


Source: Nordmin, 2019

Figure 14-41: Montiel East plan view showing composites and classification

Montiel West

Drill spacing for each Satellite deposit was analyzed, and it was determined that all three were similar in nature. Nordmin determined that the appropriate drill spacing for the purpose of the Indicated category was 50.0 m and between 50.0 m and 150.0 m for the Inferred category (Figure 14-42).



Source: Nordmin, 2019

Figure 14-42: Montiel West plan view showing composites and classification

14.9 Reasonable Prospects of Eventual Economic Extraction

To demonstrate reasonable prospects for eventual economic extraction, Nordmin created the Mineral Resource using:

- Datamine Studio RM™ software to create the block models for Alacran and the Satellite deposits.
- Geovia's Surpac™ 2021 and Geovia's Whittle™ 4.7.4 software packages were used for estimating the economic pit limit for the OP and model interrogation for Alacran.
- Datamine NPV Scheduler™ to constrain the resources and create conceptual OP shells for the Satellite deposits using Indicated and Inferred mineralized material (oxide and sulphide).

The deposits were assumed to be developed as a long-life operation consisting of a conventional truck and shovel OP operation to mine a total of 102Mt, initially mining 22,000 t/day to produce a Cu-Au-Ag concentrate. The assumed processing costs are based on a sulphide concentrate being produced using flotation methods to recover Cu, Au, and Ag.

The input parameter assumptions are provided in Table 14-35.

Table 14-35: Input Parameter Assumptions ($ = USD)

Parameter	Value	Units
Cu Price	3.25	$/lb
Au Price	1,600.00	$/oz
Ag Price	20.00	$/oz
Mining Cost, Saprolite	1.73	$/t mined
Mining Cost, Transition & Fresh	2.30	$/t mine
Processing Cost, Saprolite	0.70	$/t milled
Processing Cost, Transition & Fresh	7.02	$/t milled
G&A Cost	1.25	$/t milled
Tailings and Operating Costs	0.58	$/t milled
Mining Recovery	98.0	%
Mining Dilution, Saprolite	2.0	%
Max Pit Slope, Saprolite	36.5	degree
Max Pit Slope, Transition & Fresh	41-48	degree
Variable Process Recoveries Cu	92.5	%
Variable Process Recoveries Au	78.1	%
Variable Process Recoveries Ag	62.9	%
Freight Costs: Mine to Port	30.00	$/wet metric tonnes (“wmt”)
Freight Costs: Port to Smelter	82.00	$/wmt
Treatment Costs, Concentrate	85.00	$/dry metric tonnes (“dmt”)
Payable Metal Factors Cu	95.5	%
Payable Metal Factors Au	96.5	%
Payable Metal Factors Ag	90.0	%
Refining Charges Cu	0.09	$/lb
Refining Charges Au	5.00	$/oz
Refining Charges Ag	0.30	$/oz

Source: Nordmin, 2021

The input parameters were based on:

- Metal prices net selling cost, including concentrate refining.
- For Costa Azul, Montiel East, and Montiel West, metallurgical recoveries are based upon initial preliminary metallurgical studies for saprolite and fresh rock. Variable process recoveries of 50.0% to 90.0% for Cu, 72.0% to 77.5% for Au and 40.0% to 70.0% for Ag were used depending on the domain (saprolite, transition, or fresh).
- Variable process recoveries of 47.22% to 92.5% for Cu, 57.38% to 90.02% for Au, and 33.91% to 67.83% for Ag were used for the Alacran deposit. There was no recovery for Ag or Cu within the saprolite material (Table 14-30).
- For Alacran, an NSR value was calculated using the following formulas:
  - NSR = Commodity * Mining Recovery% * Milling Recovery% * (On Site Value)
  - Cu On Site Value: NSR Cu = Cu% * Mining Recovery% * Milling Cu Recovery% * $51.53/%Cu
  - Au On Site Value: NSR Au = Au g/t * Mining Recovery% * Milling Au Recovery% * $46.55/g
  - Ag On Site Value: NSR Ag = Ag g/t * Mining Recovery% * Milling Ag Recovery% * $0.54/g
- An NSR cut-off of $1.78/t for saprolite material and $8.85/t for transition and fresh rock materials has been applied for the Alacran deposit estimation
- For the Satellite deposits, CuEq has been calculated using: CuEq % = Cu % + (Au Factor x Au Grade g/t + Ag Factor x Ag Grade g/t) x 100.
  - Au Factor = (Au Recovery % x Au Price ($/oz) / 31.1035 g/oz) / (Cu Recovery % x Cu Price $/lb x 2204.62 lb/t).
  - Ag Factor = (Ag Recovery % x Ag Price ($/oz) / 31.1035 g/oz) / (Cu Recovery % x Cu Price $/lb x 2204.62 lb/t).

14.10 Mineral Resource Estimate

The average ratio of waste to total in pit mineralization at a cut-off of 0.22% CuEq for all three Satellite pits is approximately 0.92:1. Although the conceptual pit shells capture much of the material classified with an Inferred or Indicated level of confidence, there is mineralized material that falls outside of the conceptual pit shells. Additional core drilling will be required to support the potential estimation of Mineral Resources from this material. The average ratio of waste to total in pit mineralization for Alacran is approximately 1.1:1.

The Mineral Resources for Alacran were classified using the 2014 Standards for Mineral Resources and Mineral Reserves and the 2019 CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines and have an effective date of August 3, 2021. The Alacran deposit hosts 105.6 million tonnes of Indicated Resources grading 0.44% Cu, 0.27 g/t Au and 2.52 g/t Ag and 2.6 million tonnes of Inferred Resources grading 0.20% Cu, 0.17 g/t Au, and 0.86 g/t Ag at an NSR cut-off of $1.78/tonne for saprolite and $8.85/tonne for transition and fresh material. Total Indicated Resources contain 1,028 million pounds of Cu, 921,957 ounces of Au, and 8,545,652 ounces of Ag. Total Inferred Resources contain 11 million pounds of Cu, 14,531 ounces of Au, and 72,308 ounces of Ag.

The Mineral Resources were classified for the Satellite deposits using the 2014 Standards for Mineral Resources and Mineral Reserves and the 2019 CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines and have an effective date of July 24, 2019. The Satellite deposits host 16.3 million tons of Indicated Resources grading 0.29% Cu, 0.32 g/t Au, and 1.07 g/t Ag (0.64% CuEq) at an NSR cut-off of $13.75/tonne. Total Indicated Resources contain 51,300 tonnes of Cu, 170,600 ounces of Au, and 562,800 ounces of Ag. Total Inferred Resources contain 5,200 tonnes of Cu, 20,200 ounces of Au, and 71,700 ounces of Ag (Table 14-36).

Table 14-36: San Matías Copper-Gold-Silver Project 2021 Mineral Resource Estimate

Classification	Tonnage (Mt)	NSR ($)	CuEq Grade (%)	Cu Grade (%)	Au Grade (g/t)	Ag Grade (g/t)	Contained Cu (tonnes)	Contained Cu (Mlb)	Contained Au (oz)	Contained Ag (oz)
Indicated Resources										
Alacran	105.6	8.85	n/a	0.44	0.27	2.52	466,719	1,028.9	921,957	8,545,652
Montiel East	4.3	-	0.7	0.46	0.35	1.53	19,800	43.7	48,800	211,200
Montiel West	4.6	-	0.52	0.24	0.49	1.32	11,200	24.8	72,600	195,800
Costa Azul	7.4	-	0.4	0.24	0.21	0.65	20,300	44.8	49,200	155,800
Total Indicated	121.9	-	0.64	0.42	0.28	2.33	518,019	1,142.2	1,092,557	9,108,452
Inferred Resources										
Alacran	2.6	8.85	n/a	0.20	0.17	0.86	5,228	11.5	14,531	72,308
Montiel East	1.8	-	0.34	0.25	0.15	0.88	4,400	9.6	8,500	50,300
Montiel West	0.6	-	0.39	0.07	0.54	0.96	400	1	11,100	19,000
Costa Azul	0.1	-	0.39	0.29	0.16	0.6	400	0.8	600	2,400
Total Inferred	5.1	-	0.39	0.204	0.206	0.874	10,428	22.9	34,731	144,008

Source: Nordmin, 2021

Notes on Mineral Resources

1. The Mineral Resources in this estimate were independently prepared by Glen Kuntz, P.Geo. of Nordmin Engineering Ltd and the Mineral Resources were prepared in accordance with NI 43-101 and the CIM Definition Standards for Mineral Resources and Mineral Reserves (2014) and the CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (2019). Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. This estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, taxation, sociopolitical, marketing, or other relevant issues.
2. Verification included multiple site visits to inspect drilling, logging, density measurement procedures and sampling procedures, and a review of the control sample results used to assess laboratory assay quality. In addition, a random selection of the drill hole database results was compared with original records.
3. The Mineral Resources in this estimate for the Alacran deposit used Datamine Studio RM™ Software to create the block models and Geovia's Surpac™ and Whittle™ software to constrain the resources and create a conceptual OP shell for the deposit. Assumptions used to prepare the conceptual pit for the Alacran deposit include:

   - Metal prices of $3.25/lb Cu, $1,600.00/oz Au, and $20.00/oz Ag;
   - Operating cost inputs include:

     c. Mining cost of $1.73/t for saprolite and $2.30/t for transition and fresh rock for the overall LOM
     d. Processing costs of $1.78/t for saprolite and $8.85/tonne fresh and transition rock. This includes assumptions for milling, G&A, and tailings.

   - 98.0% mining recovery, 2.0% dilution and 41°-48° pit slope in fresh and transitional rock, and 36.5° in weathered saprolite.
   - Freight costs of $30.00t concentrate from the mine to port and $82.00t concentrate port to a smelter.
   - Treatment costs of $85.00/t dry concentrate, payable metal factors of 95.0% for Cu, 96.5% for Au, and 90.0% for Ag.
   - Refining charges of $0.085/lb Cu, $5.00/oz Au, and $0.30/oz Ag.
   - An NSR cut-off of $1.78/t for saprolite and $8.85/t for transition and fresh rock has been applied to Alacran. The NSR value was calculated using preliminary production and processing parameters and commodity metal prices as follows:

     - NSR_Cu = Cu_% * MiningRec_% * MillCuRec_% * 51.53/% Cu (On Site Value)
     - NSR_Au = Au_g/t * MiningRec_% * MillAuRec_% * 46.55_$/g (On Site Value)
     - NSR_Ag = Ag_g/t * MiningRec_% * MillAgRec_% * 0.54_$/g (On Site Value)
     - NSR = NSR_Cu + NSR_Au + NSR_Ag

4. The Mineral Resources in this estimate for the Satellite deposits used Datamine Studio 3™ software to create the block models and Datamine NPV Scheduler™ to constrain resources and create conceptual OP shells using Indicated and Inferred mineralized material (oxide and sulphide). Assumptions used to prepare the conceptual pits for the Satellite deposits include:

   - Metal prices of $3.10/lb Cu, $1,400/oz Au, and $17.75/oz Ag;
   - An NSR cut-off of $13.75/tonne has been applied. This equates to approximately 0.22% CuEq as calculated in the Satellite Deposit block models.
   - Operating cost inputs include:

     - Mining cost of $2.43/t mined for the first five years and $1.69/t thereafter
     - Processing cost of $8.63/t milled for the first five years and $7.50/t thereafter
     - G&A costs of $2.56/t milled for the first five years and $1.32/t thereafter

- 97.0% mining recovery, 4.0% dilution, and 45° pit slope in fresh and transitional rock and 32.5° in weathered saprolite.
- Variable process recoveries of 50.0% to 90.0% for Cu, 72.0% to 77.5% for Au, and 40.0% to 70.0%for Ag depending on the domain (saprolite, transition, or fresh sulphide) and Cu grade.
- Freight costs of $100.00/t concentrate, and treatment costs of $90.00/t dry concentrate, payable metal factors of 95.5% for Cu and 96.5% for Au and 90.0% for Ag. Refining charges of $0.090/lb Cu, $5.00/oz Au and $0.30/oz Ag.
- Cu equivalency has been used for the three Satellite pits and was calculated using: CuEq % = Cu % + (Au Factor x Au Grade g/t + Ag Factor x Ag Grade g/t) x 100.
    - Au Factor = (Au Recovery % x Au Price $/oz / 31.1035 g/oz) / (Cu Recovery % x Cu Price $/lb x 2204.62 lb/t).
    - Ag Factor = (Ag Recovery % x Ag Price $/oz / 31.1035 g/oz) / (Cu Recovery % x Cu Price $/lb x 2204.62 lb/t).
    - Variable process recoveries of 50.0% to 90.0% for Cu, 72.0% to 77.5% for Au and 40.0% to 70.0% for Ag depending on the domain (saprolite, transition, or fresh sulphide) and Cu grade.

5. The Mineral Resources for Alacran were classified using the 2014 Standards for Mineral Resources and Mineral Reserves and the 2019 CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines and have an effective date of August 3, 2021.
6. The Mineral Resources were classified for the Satellite deposits using the 2014 Standards for Mineral Resources and Mineral Reserves and the 2019 CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines and have an effective date of July 24, 2019.
    - The 2019 Mineral Resource Estimate for the Alacran deposit is no longer considered to be current and is not to be relied upon for the Alacran Mineral Resource Estimate.
7. All references to the 2019 Mineral Resource Estimate are reported in the Technical Report titled “NI 43-101 Technical Report and Preliminary Economic Assessment, San Matías Copper-Gold-Silver Project, Colombia”. The Technical Report has an effective date of July 29, 2019.
    - Changes have not been made to the Mineral Resource Estimates for the Satellite deposits (Montiel East, Montiel West, and Costa Azul).
8. Totals may not sum due to rounding.

14.11 Mineral Resource Sensitivity to Reporting Cut-off

The sensitivity of the updated Alacran Mineral Resource Estimate to an NSR cut-off is summarized in Table 14-37. Indicated and Inferred Mineral Resources have been calculated at various NSR cut-off grades to demonstrate the variability of tonnage and grades. The NSR cut-off of $1.78 for saprolite and $8.85 for transition and fresh rock is representative of the 2021 PFS Mineral Resource (Section 14.9).

Table 14-37: Alacran Sensitivities, $1.78 NSR Cut-off for Saprolite and $8.85 NSR Cut-off for transition and fresh Materials

	Rock Type	Cut-off NSR ($USD)	Tonnes	NSR2021	Cu (%)	Au (g/t)	Ag (g/t)	Cu (t)	Au (oz)	Ag (oz)
Indicated	Saprolite	1.63	11,178,743	4.73	0.26	0.21	1.62	28,774	76,743	581,678
		1.68	10,999,001	4.79	0.26	0.22	1.63	28,479	76,203	575,015
		1.78	10,438,482	4.95	0.26	0.22	1.67	27,542	74,457	559,463
		1.85	10,144,197	5.04	0.27	0.23	1.69	27,000	73,507	549,868
		1.9	9,954,110	5.10	0.27	0.23	1.70	26,668	72,877	543,131
		8.85	1,141,034	13.53	0.54	0.53	4.08	6,116	19,290	149,592
	Transition	8.7	2,402,117	21.45	0.64	0.22	3.26	15,443	16,939	251,754
		8.75	2,376,214	21.59	0.65	0.22	3.28	15,356	16,882	250,647
		8.8	2,360,059	21.68	0.65	0.22	3.29	15,300	16,848	249,865
		8.85	2,347,909	21.75	0.65	0.22	3.30	15,258	16,824	249,276
		8.9	2,334,069	21.82	0.65	0.22	3.31	15,219	16,786	248,548
		8.95	2,309,516	21.96	0.66	0.23	3.33	15,135	16,729	247,580
		9	2,279,484	22.13	0.66	0.23	3.36	15,030	16,659	246,444
	Fresh	8.7	93,478,697	31.88	0.45	0.28	2.58	424,816	832,392	7,757,189
		8.75	93,258,894	31.93	0.46	0.28	2.58	424,516	831,829	7,750,223
		8.8	93,045,212	31.99	0.46	0.28	2.59	424,228	831,260	7,743,686
		8.85	92,820,474	32.04	0.46	0.28	2.59	423,920	830,676	7,736,913
		8.9	92,597,681	32.10	0.46	0.28	2.60	423,607	830,129	7,730,105
		8.95	92,383,743	32.15	0.46	0.28	2.60	423,307	829,563	7,723,470
		9	92,174,797	32.21	0.46	0.28	2.60	423,025	828,996	7,717,215
Inferred	Saprolite	1.63	2,588,097	3.01	0.17	0.15	0.80	4,510	12,452	66,228
		1.68	2,481,670	3.06	0.18	0.15	0.79	4,378	12,131	62,690
		1.78	2,194,446	3.24	0.18	0.16	0.78	3,984	11,236	55,307
		1.85	2,112,975	3.29	0.18	0.16	0.79	3,849	10,975	53,405
		1.9	2,093,743	3.31	0.18	0.16	0.79	3,824	10,911	52,888

	Rock Type	Cut-off NSR ($USD)	Tonnes	NSR2021	Cu (%)	Au (g/t)	Ag (g/t)	Cu (t)	Au (oz)	Ag (oz)
		8.85	12,395	10.98	0.16	0.44	1.39	20	176	555
	Transition	8.7	35,013	14.40	0.48	0.14	1.58	169	157	1,780
		8.75	34,836	14.43	0.48	0.14	1.58	169	157	1,773
		8.8	34,494	14.49	0.49	0.14	1.59	167	156	1,759
		8.85	33,431	14.67	0.49	0.14	1.61	163	154	1,728
		8.9	33,239	14.70	0.49	0.14	1.61	162	154	1,720
		8.95	32,830	14.77	0.49	0.15	1.62	161	153	1,708
		9	32,782	14.78	0.49	0.15	1.62	161	153	1,706
	Fresh	8.7	414,869	22.05	0.27	0.24	1.17	1,101	3,169	15,563
		8.75	410,080	22.21	0.27	0.24	1.17	1,094	3,159	15,471
		8.8	403,533	22.42	0.27	0.24	1.18	1,085	3,147	15,334
		8.85	400,256	22.53	0.27	0.24	1.19	1,080	3,140	15,273
		8.9	392,974	22.79	0.27	0.25	1.20	1,069	3,129	15,123
		8.95	387,617	22.98	0.27	0.25	1.20	1,061	3,120	15,014
		9	381,771	23.19	0.28	0.25	1.21	1,052	3,109	14,895

Source: Nordmin, 2021

The sensitivity of the Costa Azul Resource Estimate to a CuEq cut-off grade is summarized in Table 14-38. Indicated and Inferred Mineral Resources have been calculated at various CuEq cut-off grades to demonstrate the variability of tonnage and grades. There is no change to the CuEq cut-offs of 0.22% and 0.30% reported in the 2019 Mineral Resource Estimate.

Table 14-38: Costa Azul Sensitivities, 0.02% CuEq Cut-off at 0.10-0.40%, Revenue Factor = 80%

			Grades				Contained Metal		
Classification	CuEq Cut-off	Tonnage	CuEq	Cu	Au	Ag	Cu	Au	Ag
	(%)	(t)	(%)	(%)	(g/t)	(g/t)	(t)	(oz)	(oz)
Indicated	0.10	8,429,377	0.389	0.256	0.189	0.62	21,568	51,265	169,365
	0.12	8,343,294	0.392	0.258	0.191	0.63	21,499	51,146	168,534

			Grades				Contained Metal		
Classification	CuEq Cut-off	Tonnage	CuEq	Cu	Au	Ag	Cu	Au	Ag
	(%)	(t)	(%)	(%)	(g/t)	(g/t)	(t)	(oz)	(oz)
	0.14	8,239,073	0.395	0.260	0.192	0.63	21,403	50,972	167,170
	0.16	8,125,865	0.399	0.262	0.194	0.63	21,284	50,757	165,601
	0.18	7,952,270	0.404	0.265	0.197	0.64	21,081	50,385	162,924
	0.20	7,775,706	0.408	0.268	0.200	0.64	20,848	49,945	160,252
	0.22	7,510,878	0.415	0.272	0.204	0.65	20,463	49,212	156,241
	0.24	7,219,967	0.423	0.277	0.208	0.65	19,999	48,344	151,509
	0.26	6,887,567	0.431	0.282	0.213	0.66	19,433	47,205	145,974
	0.28	6,553,928	0.439	0.287	0.218	0.67	18,824	45,928	140,370
	0.30	6,118,872	0.450	0.294	0.224	0.67	17,991	44,038	132,729
	0.32	5,632,663	0.462	0.302	0.230	0.69	16,998	41,728	124,544
	0.34	5,026,831	0.478	0.312	0.239	0.71	15,690	38,583	114,476
	0.36	4,392,504	0.497	0.324	0.248	0.73	14,251	35,054	103,552
	0.38	3,803,358	0.516	0.338	0.258	0.77	12,837	31,590	93,704
	0.40	3,230,688	0.539	0.353	0.269	0.80	11,398	27,971	83,070
Inferred	0.10	118,497	0.397	0.290	0.157	0.60	344	598	2,296
	0.12	118,459	0.397	0.290	0.157	0.60	344	597	2,296
	0.14	118,459	0.397	0.290	0.157	0.60	344	597	2,296
	0.16	118,454	0.397	0.290	0.157	0.60	344	597	2,296
	0.18	116,840	0.400	0.293	0.158	0.60	342	594	2,269
	0.20	115,646	0.402	0.294	0.159	0.60	340	592	2,226
	0.22	115,646	0.402	0.294	0.159	0.60	340	592	2,226
	0.24	114,842	0.404	0.295	0.160	0.60	339	591	2,213
	0.26	113,875	0.405	0.296	0.160	0.60	338	586	2,199
	0.28	113,139	0.406	0.297	0.160	0.60	336	583	2,188
	0.30	110,573	0.409	0.300	0.160	0.60	331	570	2,131

			Grades				Contained Metal		
Classification	CuEq Cut-off	Tonnage	CuEq	Cu	Au	Ag	Cu	Au	Ag
	(%)	(t)	(%)	(%)	(g/t)	(g/t)	(t)	(oz)	(oz)
	0.32	102,882	0.416	0.307	0.160	0.60	316	529	1,973
	0.34	95,138	0.423	0.316	0.159	0.58	300	485	1,779
	0.36	85,519	0.431	0.324	0.158	0.57	277	434	1,577
	0.38	67,355	0.448	0.341	0.158	0.56	230	342	1,206
	0.40	61,512	0.453	0.347	0.158	0.56	213	312	1,110

Source: Nordmin, 2019

The sensitivity of the Montiel East Resource Estimate to a CuEq cut-off grade is summarized in Table 14-39. Indicated and Inferred Mineral Resources have been calculated at various CuEq cut-off grades to demonstrate the variability of tonnage and grades. There is no change to the CuEq cut-offs of 0.22% and 0.30% reported in the 2019 Mineral Resource Estimate.

Table 14-39: Montiel East Sensitivities, 0.02% CuEq Cut-off at 0.10-0.40%, Revenue Factor = 80%

			Grades				Contained Metal		
Classification	CuEq Cut-off	Tonnage	CuEq	Cu	Au	Ag	Cu	Au	Ag
	(%)	(t)	(%)	(%)	(g/t)	(g/t)	(t)	(oz)	(oz)
Indicated	0.10	4,986,744	0.615	0.413	0.315	1.39	20,609	50,563	223,020
	0.12	4,916,514	0.622	0.418	0.319	1.41	20,556	50,450	222,204
	0.14	4,810,414	0.633	0.425	0.325	1.43	20,463	50,244	220,661
	0.16	4,680,912	0.646	0.434	0.332	1.45	20,333	49,963	218,587
	0.18	4,529,829	0.662	0.445	0.341	1.48	20,160	49,598	215,743
	0.20	4,419,047	0.674	0.453	0.347	1.50	20,025	49,281	213,249
	0.22	4,328,176	0.684	0.460	0.352	1.52	19,899	49,015	211,396
	0.24	4,181,309	0.699	0.470	0.361	1.55	19,666	48,571	208,151
	0.26	4,017,373	0.718	0.483	0.372	1.58	19,384	48,019	204,217
	0.28	3,853,888	0.737	0.495	0.383	1.61	19,082	47,413	199,811
	0.30	3,661,883	0.760	0.511	0.396	1.65	18,700	46,626	194,195
	0.32	3,479,206	0.784	0.526	0.410	1.69	18,308	45,863	189,022

			Grades				Contained Metal		
Classification	CuEq Cut-off	Tonnage	CuEq	Cu	Au	Ag	Cu	Au	Ag
	(%)	(t)	(%)	(%)	(g/t)	(g/t)	(t)	(oz)	(oz)
	0.34	3,273,689	0.812	0.545	0.426	1.73	17,849	44,884	182,440
	0.36	3,066,909	0.843	0.566	0.444	1.78	17,362	43,816	175,941
	0.38	2,922,578	0.867	0.582	0.458	1.83	17,002	43,034	171,584
	0.40	2,766,343	0.894	0.600	0.473	1.87	16,606	42,077	166,488
Inferred	0.10	2,222,368	0.326	0.221	0.138	0.79	4,902	9,857	56,384
	0.12	2,216,026	0.326	0.221	0.138	0.79	4,897	9,848	56,280
	0.14	2,205,827	0.327	0.222	0.139	0.79	4,888	9,831	56,109
	0.16	2,165,255	0.331	0.224	0.140	0.80	4,846	9,745	55,399
	0.18	2,089,215	0.336	0.228	0.142	0.81	4,761	9,567	54,175
	0.20	2,002,312	0.343	0.232	0.145	0.82	4,652	9,346	52,887
	0.22	1,906,130	0.349	0.237	0.148	0.84	4,525	9,066	51,458
	0.24	1,813,121	0.356	0.242	0.150	0.86	4,389	8,768	50,040
	0.26	1,714,147	0.362	0.246	0.153	0.88	4,223	8,447	48,544
	0.28	1,588,805	0.369	0.251	0.157	0.90	3,989	8,027	46,222
	0.30	1,421,690	0.378	0.258	0.162	0.94	3,661	7,393	42,933
	0.32	1,231,764	0.389	0.266	0.167	0.97	3,271	6,597	38,575
	0.34	1,047,238	0.399	0.273	0.171	1.00	2,857	5,772	33,632
	0.36	784,018	0.416	0.284	0.178	1.04	2,230	4,483	26,231
	0.38	567,129	0.433	0.296	0.186	1.08	1,680	3,387	19,710
	0.40	324,458	0.466	0.317	0.199	1.13	1,027	2,074	11,792

Source: Nordmin, 2019

The sensitivity of the Montiel West Resource Estimate to a CuEq cut-off grade is summarized in Table 14-40. Indicated and Inferred Mineral Resources have been calculated at various CuEq cut-off grades to demonstrate the variability of tonnage and grades. There is no change to the CuEq cut-off of 0.22% and 0.30% reported in the 2019 Mineral Resource Estimate.

Table 14-40: Montiel West Sensitivities, 0.02% CuEq Cut-off at 0.10-0.40%, Revenue Factor = 80%

			Grades				Contained Metal		
Classification	CuEq Cut-off	Tonnage	CuEq	Cu	Au	Ag	Cu	Au	Ag
	(%)	(t)	(%)	(%)	(g/t)	(g/t)	(t)	(oz)	(oz)
Indicated	0.10	5,498,044	0.554	0.220	0.429	1.25	12,091	75,852	220,783
	0.12	5,425,664	0.560	0.222	0.434	1.25	12,043	75,717	218,817
	0.14	5,348,295	0.566	0.224	0.439	1.26	11,989	75,524	216,601
	0.16	5,207,307	0.577	0.228	0.449	1.27	11,878	75,111	212,313
	0.18	5,078,990	0.588	0.232	0.457	1.27	11,768	74,673	208,033
	0.20	4,917,963	0.601	0.236	0.468	1.28	11,624	74,025	202,760
	0.22	4,738,484	0.615	0.242	0.481	1.29	11,452	73,233	197,022
	0.24	4,535,700	0.633	0.248	0.495	1.30	11,237	72,234	189,369
	0.26	4,357,491	0.648	0.253	0.508	1.30	11,042	71,207	182,532
	0.28	4,202,102	0.662	0.259	0.519	1.31	10,879	70,159	177,167
	0.30	4,039,220	0.677	0.265	0.531	1.32	10,699	68,993	171,508
	0.32	3,818,992	0.698	0.273	0.549	1.33	10,425	67,385	163,599
	0.34	3,574,435	0.724	0.283	0.570	1.35	10,100	65,469	154,632
	0.36	3,385,218	0.745	0.291	0.586	1.37	9,852	63,746	148,582
	0.38	3,211,119	0.765	0.298	0.602	1.38	9,582	62,179	142,815
	0.40	3,057,773	0.784	0.305	0.617	1.40	9,340	60,673	137,477
Inferred	0.10	632,732	0.447	0.071	0.542	0.93	446	11,016	18,868
	0.12	632,665	0.447	0.071	0.542	0.93	446	11,016	18,867
	0.14	632,522	0.447	0.071	0.542	0.93	446	11,015	18,864
	0.16	631,743	0.448	0.071	0.542	0.93	446	11,011	18,850
	0.18	629,723	0.448	0.071	0.543	0.93	445	10,999	18,812
	0.20	627,605	0.449	0.071	0.544	0.93	444	10,983	18,777
	0.22	624,532	0.450	0.071	0.546	0.93	443	10,958	18,718
	0.24	616,978	0.453	0.071	0.549	0.94	439	10,891	18,574

			Grades				Contained Metal		
Classification	CuEq Cut-off	Tonnage	CuEq	Cu	Au	Ag	Cu	Au	Ag
	(%)	(t)	(%)	(%)	(g/t)	(g/t)	(t)	(oz)	(oz)
	0.26	608,708	0.456	0.071	0.553	0.94	435	10,813	18,404
	0.28	595,408	0.460	0.072	0.558	0.95	427	10,679	18,118
	0.30	574,596	0.466	0.072	0.566	0.96	414	10,448	17,657
	0.32	531,519	0.479	0.073	0.581	0.97	386	9,936	16,567
	0.34	477,971	0.495	0.073	0.602	0.99	351	9,253	15,143
	0.36	397,117	0.525	0.074	0.639	1.02	296	8,156	12,980
	0.38	342,391	0.549	0.074	0.676	1.05	253	7,444	11,556
	0.40	279,395	0.585	0.072	0.736	1.10	201	6,609	9,906

Source: Nordmin, 2019

14.12 Comparison with the Previous Resource Estimate

The 2021 Mineral Resource Estimate for the Project includes 121.9 million tonnes of Indicated Resources grading 0.42% Cu, 0.28 g/t Au, and 2.33 g/t Ag and 5.1 million tonnes of Inferred Resources grading 0.20% Cu, 0.20 g/t Au, and 0.87 g/t Ag at a $1.78 NSR cut-off for saprolite material and $8.85 NSR cut-off for transition and fresh material (Table 14-36).

Only the Alacran deposit was updated during the 2021 Mineral Resource Estimate, therefore only the updates to the Indicated and Inferred Resources for the Alacran deposit with be compared to the 2019 Mineral Resource Estimate. The 2019 Mineral Resource Estimate has a reporting cut-off grade of 0.22% CuEq, when compared to the 2021 Mineral Resource Estimate at a cut-off grade of $1.78 NSR for saprolite material and $8.85 NSR cut-off for transition and fresh material, the 2021 Mineral Resource Estimate increased Indicated tonnage by 7.3% at the Alacran deposit. The Satellite deposits were not affected by updates during the 2021 Mineral Resource Estimate and remained the same (Table 14-42 to Table 14-44).

The change from the use of CuEq for cut-off to NSR was made due to the absence of recoveries for Cu and Ag within saprolite material. At the Alacran deposit, Indicated contained Cu remained the same, contained Au increased by 16.2%, and contained Ag increased by 2.5%. The Satellite deposits were not affected by 2021 updates and therefore remained unchanged from the 2019 Mineral Resource Report (Table 14-41). The Alacran deposit Inferred Resources contained Cu decreased by 26.3%, contained Au increased by 33.9%, and contained Ag decreased by 36.3%. The decrease in Cu and Ag contained tonnage can be attributed to the lack of recovery for Cu and Ag within saprolite material. Figure 14-43 shows the 2021 Mineral Resource Estimate and updated OP design.

Table 14-41: Alacran 2019 Mineral Resource Estimate (NSR cut-off $13.75/tonne or CuEq cut-off 0.22%) and 2021 Mineral Resource Estimate (NSR cut-off of $1.78/tonne for Saprolite and $8.85/tonne for Transition And Fresh Material).

				Grades				Contained Metal		
	CuEq	NSR	Tonnage	CuEq	Cu	Au	Ag	Cu	Au	Ag
Classification	Cut-off (%)	Cut-off ($/t)	(Mt)	%	%	g/t	g/t	(t)	(oz)	(oz)
2019 Alacran Mineral Resource Indicated	0.22	n/a	97.9	0.65	0.47	0.25	2.64	466,900	772,300	8,324,400
2021 Alacran Mineral Resource Indicated	n/a	8.85	105.6	-	0.44	0.27	2.52	466,719	921,957	8,545,652
2019 Alacran Mineral Resource Inferred	0.22	n/a	2.2	0.41	0.32	0.13	1.59	7,100	9,600	113,600
2021 Alacran Mineral Resource Inferred	n/a	8.85	2.6	-	0.20	0.17	0.86	5,228	14,530	72,308

Source: Nordmin, 2021

Table 14-42: Costa Azul 2019 Mineral Resource Estimate (NSR cut-off $13.75/tonne or CuEq cut-off 0.22%)

				Grades				Contained Metal		
	CuEq	NSR	Tonnage	CuEq	Cu	Au	Ag	Cu	Au	Ag
Classification	Cut-off (%)	Cut-off ($/t)	(Mt)	%	%	g/t	g/t	(t)	(oz)	(oz)
2019 Costa Azul Mineral Resource Indicated	n/a	13.75	7.4	0.40	0.27	0.21	0.65	20,300	49,200	155,800
2019 Costa Azul Mineral Resource Inferred	n/a	13.75	0.1	0.39	0.29	0.16	0.6	400	600	2,400

Source: Nordmin, 2019

Table 14-43: Montiel East 2019 Mineral Resource Estimate (NSR cut-off $13.75/tonne or CuEq cut-off 0.22%)

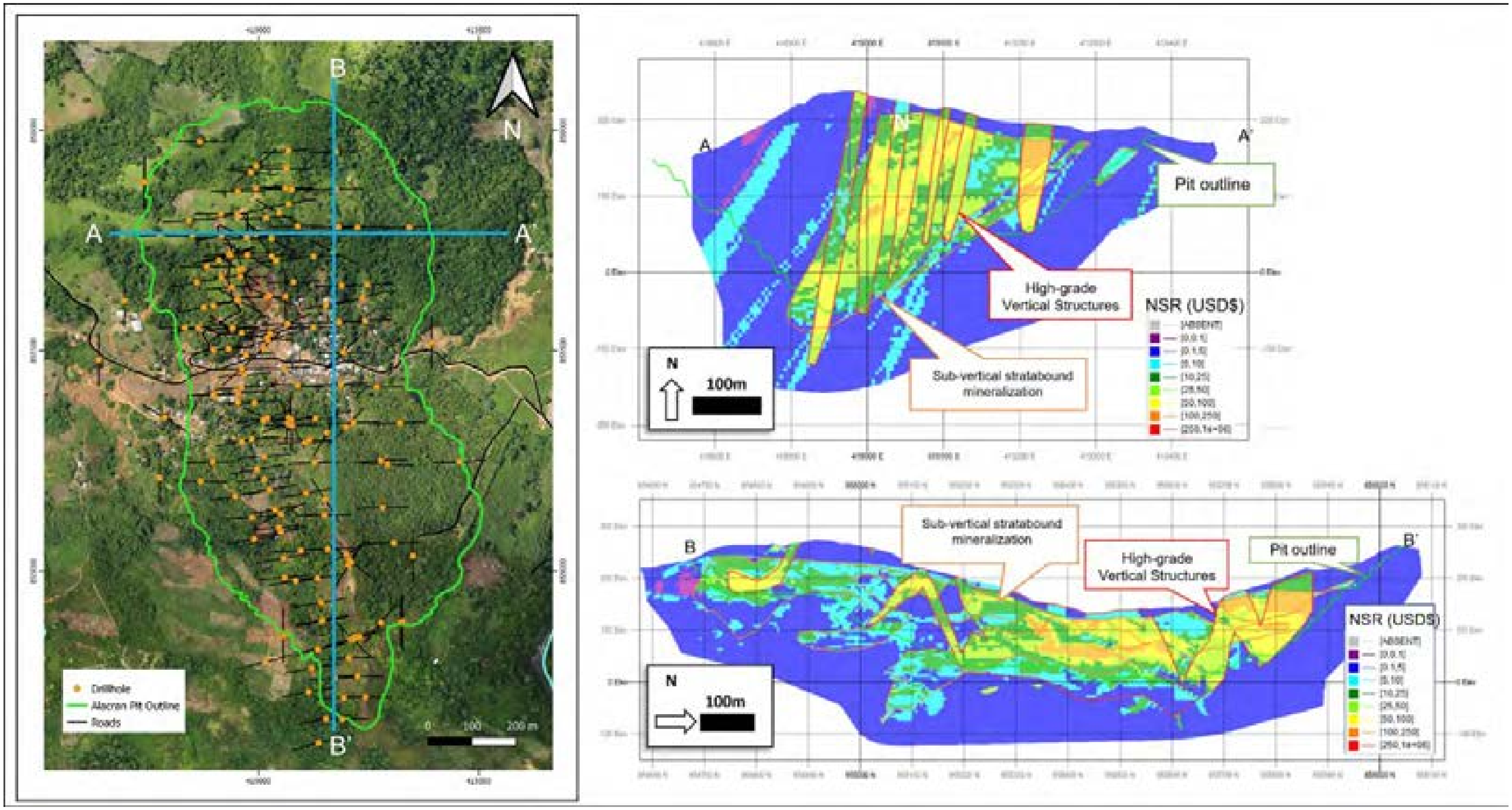
Classification	CuEq Cut-off (%)	NSR Cut-off ($/t)	Tonnage (Mt)	Grades CuEq %	Cu %	Au g/t	Ag g/t	Contained Metal Cu (t)	Au (oz)	Ag (oz)
2019 Montiel East Mineral Resource Indicated	n/a	13.75	4.3	0.70	0.46	0.35	1.53	19,800	48,800	211,200
2019 Montiel East Mineral Resource Inferred	n/a	13.75	1.8	0.34	0.25	0.15	0.88	4,400	8,500	50,300

Source: Nordmin, 2019

Table 14-44: Montiel West 2019 Mineral Resource Estimate (NSR cut-off $13.75/tonne or CuEq cut-off 0.22%)

Classification	CuEq Cut-off (%)	NSR Cut-off ($/t)	Tonnage (Mt)	Grades CuEq %	Cu %	Au g/t	Ag g/t	Contained Metal Cu (t)	Au (oz)	Ag (oz)
July 2019 Montiel West PEA Mineral Resource Indicated	n/a	13.75	4.6	0.52	0.24	0.49	1.32	11,200	72,600	195,800
July 2019 Montiel West PEA Mineral Resource Inferred	n/a	13.75	0.6	0.39	0.07	0.54	0.93	400	11,100	19,000

Source: Nordmin, 2019



Source: Nordmin, 2021

Figure 14-43: 2021 PFS Alacran OP design and Mineral Resource Estimate.

14.13 Factors That May Affect the Mineral Resources

Areas of uncertainty that may materially impact the Mineral Resource Estimates include:

- changes to long term metal price assumptions;
- changes to the input values for mining, processing, and G&A costs to constrain the estimate;
- changes to local interpretations of mineralization geometry and continuity of mineralized zones;
- changes to the density values applied to the mineralized zones;
- changes to metallurgical recovery assumptions;
- changes in assumptions of marketability of the final product;
- variations in geotechnical, hydrogeological and mining assumptions;
- changes to assumptions with an existing agreement or new agreements;
- changes to environmental, permitting, and social licence assumptions; and
- Logistics of securing and moving adequate services, labour, and supplies could be affected by epidemics, pandemics and other public health crises, including COVID-19, or similar such viruses.

14.14 Comments on Section 14

The QP is not aware of any environmental, legal, title, taxation, socioeconomic, marketing, political or other relevant factors that would materially affect the estimation of Mineral Resources that are not discussed in this Report.

The QP is of the opinion that Mineral Resources were estimated using industry-accepted practices and conform to the 2014 CIM Definition Standards. Technical and economic parameters and assumptions applied to the Mineral Resource Estimates are based on an OP mining method and milling and flotation concentration processing method.

Further metallurgical testing pertaining to the blending of the saprolite/fresh rock, final concentrate makeup, final doré production, and any corresponding processing requirements for the Satellite deposits, is required. There is limited information from the current test work with respect to metallurgical variability within each of the Satellite deposits. As such, various concentrate marketing and/or secondary processing options should be evaluated once the recommended metallurgical test work is available to assess metallurgical characteristics.

15 MINERAL RESERVE ESTIMATES

15.1 Introduction

NI 43-101 defines the terms "Mineral Reserve", "probable mineral reserve" and "proven mineral reserve" have the meanings ascribed to those terms by the Canadian Institute of Mining, Metallurgy, and Petroleum, as the CIM Definition Standards on Mineral Resources and Mineral Reserves (May 2014) and the CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (2019).

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

Modifying Factors are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social, and governmental factors.

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

A **Proven Mineral Reserve** is the economically mineable part of a Measured Mineral Resource. A Proven Mineral Reserve implies a high degree of confidence in the modifying factors. Application of the Proven Mineral Reserve category implies that the Qualified Person has the highest degree of confidence in the estimate with the consequent expectation in the minds of the readers of the report. The term should be restricted to that part of the deposit where production planning is taking place and for which any variation in the estimate would not significantly affect potential economic viability.

15.2 Mineral Reserve Estimate

Mineral Reserves are based on the engineering and economic analysis described in Sections 16 to Section 22 of this Technical Report. Changes in the following factors and assumptions may affect the Mineral Reserve Estimate:

- Metal prices
- Interpretations of mineralization geometry and continuity of mineralization zones
- Kriging assumptions
- Geomechanical and hydrogeological assumptions
- Ability of the mining operation to meet the annual production rate
- Operating cost assumptions
- Process plant recoveries
- Mining loss and dilution
- Ability to meet and maintain permitting and environmental licence conditions
- Historical mining depletion

Nordmin prepared a Mineral Reserve Estimate for the Project using a combination of Geovia's Whittle 4.7.4, Geovia's Surpac 2021 and Datamine software packages for estimating the economic pit limit for the OP and block model interrogation.

The Mineral Reserve Estimate for the Alacran deposit is based on the resource block model estimated by Nordmin and described in Section 14. The block model contained both Indicated and Inferred Mineral

Resources, however only Indicated Mineral Resources were used. Inferred Mineral Resources in the block model were not included in the Probable Mineral Reserve and remain classified as waste; Inferred Mineral Resources do not meet the standards required for inclusion in Mineral Reserves.

Mineral Reserves for the Alacran deposit incorporate appropriate mining dilution and mining recovery estimations for the OP mining method.

The reference point at which Mineral Reserves are defined, is the point where the ore is delivered to the processing facility, including ROM stockpiles.

The following subsections outline the procedures used to estimate the Mineral Reserves. Following the detailed design of the final pit and a LOM scheduling with the cut-off grade, a total of 102.1 Mt of diluted ore exists inside the mine design. The detailed pit design is discussed in the following sections, while the production plan is discussed in Section 16.

Table 15-1 presents the reserves inside the design pit.

Table 15-1: Mineral Reserve Estimate

Category		NSR Value Cut-off Grade	Tonnage (t)	Diluted Cu Grade (%)	Diluted Au Grade (g/t)	Diluted Ag Grade (g/t)
Probable Mineral Reserve	Saprolite	1.78 $/t	10,135,000		0.21	
Probable Mineral Reserve	Transition	8.85 $/t	2,011,000	0.62	0.22	3.11
Probable Mineral Reserve	Fresh	8.85 $/t	89,954,000	0.45	0.27	2.54
Probable Mineral Reserve	Fresh + Transition	8.85 $/t	91,165,000	0.45	0.27	2.56
Probable Mineral Reserve	Overall Total		102,100,000	0.41	0.26	2.30

Source: Nordmin, 2021

Notes:

- The independent and Qualified Person for the Mineral Reserve Estimate, as defined by NI 43-101, is Joanne Robinson, P.Eng. of Nordmin Engineering Ltd.
- The effective date of the Mineral Reserves estimate is October 31, 2021.
- The Mineral Reserve Estimate is based metallurgical recovery algorithms, that result in an overall recovery of 92.5% of Cu in the fresh and transition material, 78.1% Au in fresh, transition and saprolite, and 62.9% Ag in the fresh and transition material.
- Cu and Ag are not planned to be recovered from saprolite material.
- Metal prices are set at 3.25 $/lb Cu, 1,600 $/oz Au, 20 $/oz Ag.

- The Mineral Reserve Estimate incorporates mining dilution and mining loss assumptions through regularization of block size and a mining recovery factor of 98%.

15.3 OP Mine Design

Conventional OP mining methods will be used to extract a portion of the Alacran deposit. This method was selected considering the Alacran deposit's size, shape, orientation, and proximity to the surface. Drilling, blasting, loading, and hauling will be used to mine the OP material within the designed pit to meet the mine production schedule.

The following sub-section details the aspects of the pit design.

15.3.1 Pit Limit Analysis

Economic pit limits were determined using Geovia's Whittle™ 4.7 software that uses the Lerchs-Grossmann algorithm. The Lerchs-Grossmann algorithm progressively identifies economic blocks, taking into account waste stripping, that results in a highest possible total value mined within the OP shell, subject to the specified pit slope constraints.

The pit limit analysis was evaluated on the Alacran deposit, using the Indicated Mineral Resources from the saprolite, transitional, and fresh material types.

15.3.1.1 Input Parameters

A 3D geological block model and other economic and operational variables were used as inputs into the Lerchs-Grossmann program. These variables include overall pit slope angle, mining costs, processing costs, selling costs, metal prices, and other variables listed in Table 15-2. Although these parameters are not necessarily final, a reasonable degree of accuracy is required since the analysis is an iterative process.

The economic parameters used at the time of the pit limit analysis may not necessarily conform to those stated in the economic model.

Table 15-2 Pit Limit Analysis Parameters

Parameter	Value
Currency Used for Evaluation	US$
Block Size	5 m x 5m x 5m
Overall Slope Angle	Rock: Varied by Sector – Range 41° – 48° Saprolite: 36.5°
Mining Cost	1.73 $/$t_{mined}$ saprolite 2.30 $/$t_{mined}$ Rock + 0.02 $/t per 10 m for depths below 120 m
Process Cost includes assumptions for Milling, G&A, tailings	8.85 $/$t_{processed}$ Fresh & Transition 1.78 $/$t_{processed}$ saprolite
Selling Cost includes transportation, refining, and royalty, % payable	0.91 $/lb Cu 152.11 $/oz Au 3.35 $/oz Ag

Parameter	Value
Metal Price	3.25 $/lb Cu 1,600 $/oz Au 20 $/oz Ag
Process Recovery	Based on Recovery Curve Algorithms
Mining Loss & Dilution	Included within Regularized Block Model Mining Loss = Mining Dilution 98% Diluted grade (MiningRec_%)
Resources Used for Pit Shell Generation	Indicated
Pit Shell Selection	Revenue Factor ("RF") 1.00 for Resource Pit Shell RF 0.87 for Mine Planning

Source: Nordmin, 2021

15.3.1.1.1 Resource Block Model

From the grade category block model created for the Mineral Resource, a recovery, and NSR attribute was populated using the grades from the Indicated Resources. The recovery attributes for each metal (Cu, Au, Ag) was calculated according to the algorithms described in Section 15.3.1.1.4. The NSR value was calculated using preliminary production and processing parameters and commodity metal prices, as follows:

Cu On Site Value

NSR_Cu = Cu_% * MiningRec_% * MillCuRec_% * 51.53/% Cu (On Site Value)

Au On Site Value

NSR_Au = Au_g/t * MiningRec_% * MillAuRec_% * 46.55_$/g (On Site Value)

Ag On Site Value

NSR_Ag = Ag_g/t * MiningRec_% * MillAgRec_% * 0.54_$/g (On Site Value)

NSR = NSR_Cu + NSR_Au + NSR_Ag

Where:

- MiningRec_% = 98%
- Mill Recoveries | MillCuRec_%, MillAuRec_%, and MillAg_Rec% were calculated in the Block Model using the algorithms described in Section 15.3.1.1.4.
- On Site Value calculations are described in Section 15.3.1.1.5.

15.3.1.1.2 Mine Dilution and Mine Loss

Mining Dilution was added to the mining block model to model for mixing of waste into potential mill feed ("PMF") blocks due to blast mixing, mining selectivity, and/or truck box carry-back activities.

The Mineral Resource model was created using subblocks, smaller than the parent blocks, as a means of improving the resolution of the model at geological boundaries. This technique is designed to maximize the resolution of the in situ boundaries of the mineralization in the Mineral Resource model.

For mine planning, it was decided to reblock the sub-block models to blocks of regular size which matched the half mining bench height. This reblocking process is known as regularization. Ideally, the regularization would reblock the model to a block size that represents the mining selectivity.

The regularization process creates blocks that cut across the mineralized-waste boundaries, thus adding dilution to the PMF material. This also drives some of the regularized blocks below the cut-off grade and these become mining loss.

Mining dilution and mining loss were modelled by regularizing the geological subcelled model to a regular 5 m x 5 m x 5 m block size.

The Cu, Au, and Ag grade attributes were additionally factored by 2% (98% mining recovery). Table 15-3 summarizes the comparison of the Indicated Mineral Resource within the pit design with the subcelled Mineral Resource model and with the regularized block model.

Table 15-3: Comparison Regularized Block Model with Subcelled Block Model

	NSR Cut-off Value ($/t)	SUBCELLED MODEL				REGULARIZED MODEL			
		Tonnes (t)	Cu (%)	Au (g/t)	Ag (g/t)	Tonnes (t)	Cu (%)	Au (g/t)	Ag (g/t)
SAPROLITE	1.78	9,948,965		0.22		10,134,948		0.21	
TRANSITION	8.85	2,067,488	0.71	0.24	3.58	2,010,686	0.62	0.22	3.11
FRESH	8.85	89,148,602	0.47	0.28	2.63	89,993,223	0.45	0.27	2.54
TOTAL		101,165,055	0.42	0.28	2.39	102,138,857	0.41	0.26	2.30

Source: Nordmin, 2021

The resulting impact from regularizing the block model is a 1% increase in overall tonnage and an approximately 3% decrease in Cu metal, Au metal, and Ag metal quantities.

15.3.1.1.3 Operating Costs

The operating costs are preliminary and are used for pit limit optimization, reserve estimate, and mine planning purposes. Detailed operating costs are developed based on a detailed mine design and plan and discussed in Section 21. The preliminary process costs were based on the estimate provided in Table 15-4.

Table 15-4: Preliminary Process Cost Estimate

Process Cost Item	Units	Value
Milling Operating Costs Saprolite	US$/t Milled	0.70
Milling Operating Costs Transition & Fresh	US$/t Milled	7.02
Tailings Operating Costs	US$/t Milled	0.58
G&A Costs	US$/t Milled	1.25
Saprolite Rehandle Cost	US$/t Milled	0.50
Total Processing – Transition & Fresh (including Milling, G&A, tailings)	**US$/t Milled**	**8.85**
Total Processing – Saprolite (including Milling, rehandle, tailings)	**US$/t Milled**	**1.78**

Source: Nordmin, 2021

15.3.1.1.4 Metallurgical Recovery

The assumptions for the metallurgical recoveries are based on the preliminary grade-recovery curve developed by Blue Coast. The algorithm equations are provided in Section 13.10.

15.3.1.1.5 Selling Costs

Table 15-5, Table 15-6, Table 15-7, and Table 15-8 provide the calculations for the selling costs.

Table 15-5 Selling Cost Assumptions

Selling Cost Item	Units	Value
Cu Concentrate Grade	%	20.0
Concentrate Moisture	%	8.0
Concentrate Freight Charges		
Mine to Port	$/wmt	30.00
Port to Smelter Including Port Handling Charges	$/wmt	82.00
Treatment Charge	$/dmt	85.00
Refining Charges		
Cu	US$/lb	0.085
Au	US$/oz	5.00
Ag	US$/oz	0.30
Payable		
Cu	%	95.0
Au	%	96.5
Ag	%	90.0
Royalty		
Contractual Royalty – All Metal Revenue Note 1	%	2.0
Government Cu	%	5.0
Government Au	%	4.0
Government Ag	%	4.0

Source: Nordmin, 2021

Table 15-6 Selling Cost Calculations, Copper

Selling Cost Item	Units	Value
Cu Price	US$/lb	3.25
Payable Cu	%	95.0
Payable Cu Price	US$/lb	3.09
Payable Cu Price	US$/lb	3.09
Refining Charge	US$/lb	0.085
Cu Price After Refining Charge	US$/lb	3.00
	US$/t	6,619.37
Cu Concentrate Grade	%	20.0
Dry Concentrate Value Before Treatment and Freight	$/dmt	1,323.87
Treatment Charge	$/dmt	85.00
Dry Concentrate Value After Treatment Charge	$/dmt	1,238.87
Concentrate Moisture	%	8.0
Wet Concentrate Value Before Freight	$/wmt	1,147.11
Freight Charge: Mine to Port	$/wmt	30.00
Freight Charge: Port to Smelter	$/wmt	82.00
Wet Concentrate On Site Value	$/wmt	1,035.11
Dry Concentrate On Site Value	$/dmt	1,117.91
Government Royalty	$/dmt	66.19
Contractual Royalty	$/dmt	21.03
Dry Concentrate On Site Value after Royalties	$/dmt	1,030.69
Cu On Site Value	$/t	5,153.43
	US$/lb	2.34
Net Difference Between Cu Price and Cu On Site Value	**US$/lb**	**0.91**

Source: Nordmin, 2021

Table 15-7 Selling Costs Calculations, Gold

Selling Cost Item	Units	Value
Au Price	US$/oz	1,600.00
Payable Au	%	96.5%
Payable Au Price	US$/oz	1,544.00
Payable Au Price	US$/oz	1,544.00
Refining Charge	US$/oz	5.00
Au Price After Refining Charge	US$/oz	1,539.00
Government Royalty	US$/oz	61.56
Contractual Royalty	US$/oz	29.55
Au On Site Value	US$/oz US$/g	1,447.89 46.5507
Net Difference Between Au Price and Au On Site Value	**US$/oz**	**152.11**

Source: Nordmin, 2021

Table 15-8 Selling Costs Calculations, Silver

Selling Cost Item	Units	Value
Ag Price	US$/oz	20.00
Payable Ag	%	90.0
Payable Ag Price	US$/oz	18.00
Payable Ag Price	US$/oz	18.00
Refining Charge	US$/oz	0.30
Ag Price After Refining Charge	US$/oz	17.70
Government Royalty	US$/oz	0.71
Contractual Royalty	US$/oz	0.34
Ag On Site Value	US$/oz US$/g	16.65 0.53538
Net Difference between Ag Price and Ag On Site Value	**US$/oz**	**3.35**

Source: Nordmin, 2021

15.3.1.1.6 Cut-off Grade

To classify the material contained within the OP limits as material for processing or material for waste, the milling cut-off grade is used. This break-even cut-off grade is calculated to cover the costs of processing, G&A costs, and selling costs using the economic and technical parameters listed in Table 15-5. Mineral Resource material contained within the pit and above the cut-off grade is classified as PMF, while resource material below the cut-off grade is classified as waste.

The cut-off grade for the Alacran deposit is represented by the NSR value.

The cut-off grade has been estimated to be 8.85 $/t NSR for fresh and transition material and 1.78 $/t NSR for the saprolite material.

15.3.1.1.7 Boundary Constraints

The Alacran concession boundary was used as a physical boundary constraint for the pit limit analysis.

15.3.1.2 Pit Limit Analysis Results

The pit limit analysis process results in a series of nested pit shells, each corresponding to a RF. The revenue factor scales the metal price only, and no costs are factored by the RF. The RF 1 corresponds to a Cu price of 3.25 $/lb, Au price of 1,600 $/oz, and Ag price of 20 $/oz. Table 15-9 summarizes the Lersch Grossman nested pit shell results for the Alacran deposit at a selection of revenue factors.

Table 15-9 Low Grade ("LG") Nested Pit Shell Results

RF	Pit Shell Label	Total Rock (Mt)	Waste (Mt)	PMF (Mt)	Strip Ratio	Cu Grade (%)	Au Grade (g/t)	Ag Grade (g/t)
0.30	11	0.3	0.2	0.1	1.4	0.53	1.50	2.60
0.40	21	10.8	6.2	4.7	1.3	0.99	0.62	6.52
0.50	31	77.6	48.0	29.6	1.6	0.71	0.44	4.07
0.60	41	108.3	60.1	48.1	1.3	0.61	0.36	3.44
0.70	51	145.1	77.9	67.2	1.2	0.53	0.32	2.99
0.80	61	188.3	102.8	85.5	1.2	0.48	0.29	2.73
0.90	71	203.4	107.8	95.6	1.1	0.45	0.28	2.59
1.00	81	212.3	108.8	103.5	1.1	0.43	0.27	2.49
1.50	82	249.3	122.0	127.4	1.0	0.38	0.24	2.22

Source: Nordmin, 2021

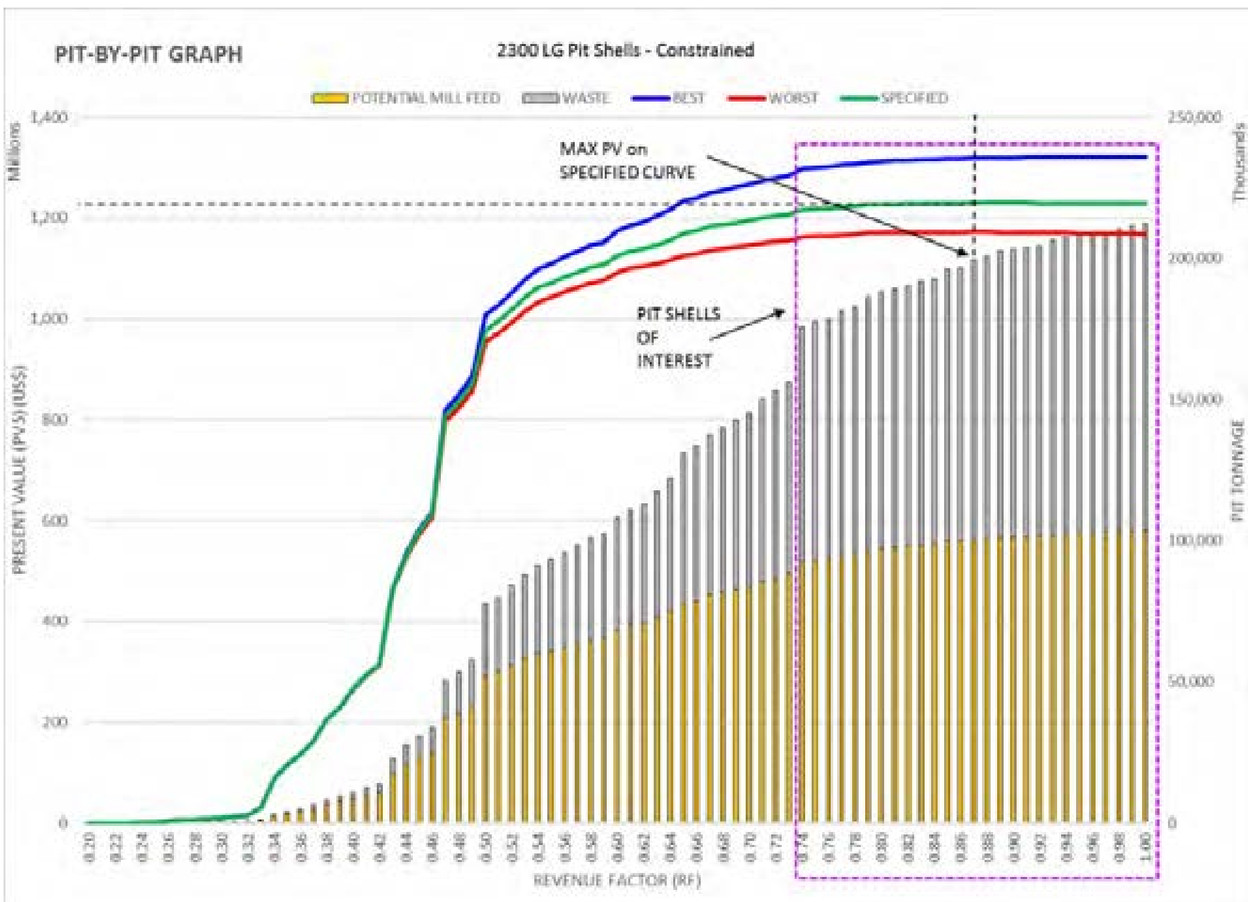
15.3.1.3 Pit Optimization Methodology

The nested pit shell generation step does not take into consideration the time value of money. This factor is considered during the schedule optimization step of the analysis.

A basic schedule is applied to the nested pit shells to produce a 'pit-by-pit' graph. An objective of the pit-by-pit graph is to illustrate the impact of scheduling on the pit shells and to provide guidance on selection of an optimum pit shell to use as a guide in the detailed pit design. The optimum pit limit is chosen by estimating the pit size where an incremental increase in pit size does not significantly increase the pit resource and where the economic return starts to decline.

Figure 15-1 illustrates the pit-by-pit graph generated for the Alacran deposit for the base case. Three schedules represented are:

1. The **Best Case** schedule consists of mining out nested Pit Shell 1, the smallest pit, and then mining out each subsequent pit shell from the top down, before starting the next pit shell. This schedule is seldom feasible because the pushbacks are usually too narrow. Its usefulness lies in setting an upper limit to the achievable present value ("PV").
2. The **Worst Case** schedule consists of mining each bench completely before starting on the next bench. This schedule's usefulness lies in setting a lower limit to the PV. If, as is sometimes the case, Worst Case, and Best Case schedules differ by only a few percent then, for that pit, mining sequence is relatively unimportant from an economic point of view.
3. If, as is usually the case, the difference between worst, and Best Case is significant, a more realistic mining schedule can be approximated, between the two extremes, by specifying a sequence of pit outlines to push back to, this is the **Specified Case**. Chosen pushbacks should satisfy mining constraints and produce a PV curve that is as close as possible to the Best Case PV curve.



Source: Nordmin, 2021

Figure 15-1: Pit optimization results, pit-by-pit graph

Note: The PV (PV5) shown on Figure 15-1 is used only as a guide in pit shell selection.

In choosing an optimum pit, it is important to understand the level of risk the Alacran pit is willing to accept. By accepting more risk, the pit size can increase, thereby increasing mining tonnages at the possibility that the NPV of the Alacran pit could suffer.

The pit shells selected to use as a guide for the detailed pit design is pit shell with RF 0.87, which was the pit shell with the maximum PV on the specified curve in Figure 15-1, and the RF 1.00 pit shell.

15.3.2 OP Design

The objective of the detailed pit design is to follow the outline of the selected pit shell while incorporating bench designs, minimum mining widths, and haulage ramps. Figure 15-2 and Table 15-10 summarizes the slope design sectors and the slope design recommendations. Table 15-11 summarizes the slope design assumptions applied, while Table 15-12 summarizes the haul ramp design assumptions. Optimization of pit design, ramp locations, pit exits, and interaction of pit walls with historical mine openings should be considered in the next level of study.

15.3.2.1 Pit Slope Stability Considerations

The Company commissioned Stantec Consulting Chile Ltda. to develop a PFS level geotechnical study for OP mining for the Alacran deposit, as well as manage the relevant PFS level geotechnical sampling and testing program for surface infrastructure.

Stantec undertook kinematic and limit equilibrium stability analysis to evaluate bench scale, inter-ramp, and overall slope stability of proposed pit slopes in order to generate design recommendations.

The main findings and recommendations developed by the study are presented below.

15.3.2.1.1 Geotechnical Data

Geotechnical data for geotechnical studies at the Alacran deposit were taken primarily from a specifically designed and executed geotechnical site investigation. The planned investigations consisted of six HQ3 oriented diamond drill holes. Unfortunately, due to site access issues, only four holes were drilled. The existing exploration diamond drilling database was used to supplement data in the areas of the planned holes that were not executed. It is considered that the quantity types and distribution of geotechnical data is sufficient for the development of OP geotechnical studies to PFS level.

Based on the geotechnical site investigations and existing geological model and database, a geotechnical model for the OP was developed. The model is based principally on geology (major identified geological units), weathering/alteration and major structures.

Intact rock strength for each geotechnical domain was ascertained from a variety of sources including field index strength, point load tests, and geomechanics laboratory testing. Various discrepancies between known relationships between unconfirmed compressive strength (“UCS”) and other measures such as Young’s modulus, tensile strength, and point load index tests, suggests that laboratory unconfined compressive strength values are biased to the lower side.

15.3.2.1.2 Groundwater

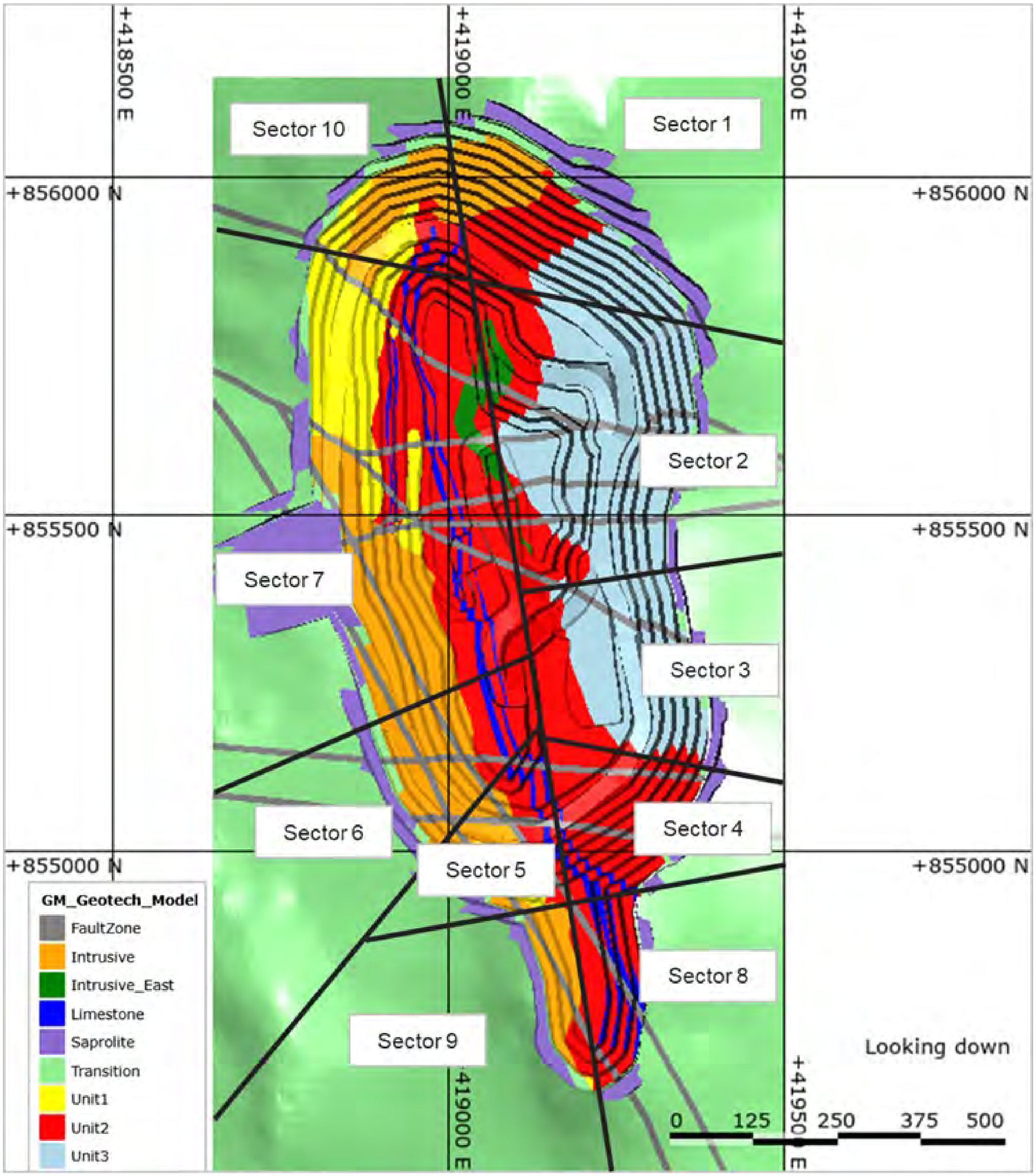
The current groundwater model suggests that the water table is very close to the topographical surface, especially at lower altitudes and in local valleys/gullies. The current PFS level local groundwater model in the OP area is based on sparse data and has impacted on generating a reliable water table for slope stability analyses. For the limit equilibrium studies, estimated water tables were generated for each analysis section based on the assumption of mostly to fully drained slopes.

15.3.2.1.3 Stability Analysis

Stability analysis for slope design purposes were undertaken utilizing both kinematic and limit equilibrium analyses.

Structural data from the recent geotechnical site investigations was used to undertake bench scale kinematic stability and limit equilibrium analyses. As planned holes for the east wall have yet to be drilled, the existing geological structure database was used for the east wall. However, the existing structural data set is strongly biased to unfavourably oriented structures. This has led to lower recommended bench face angles for the east wall, and hence, lower inter-ramp slope angles.

The design sectors for the kinematic and kinematic analyses are shown in Figure 15-2.



Source: Stantec, 2021

Figure 15-2: Geotechnical design sectors

15.3.2.1.4 Slope Design Parameters

Based on the kinematic and limit equilibrium slope stability analyses, the slope design parameters in Table 15-10 were recommended.

Table 15-10: Recommended Pit Slope Design, Maximum

Design Sectors	Bench Scale					IRA•	
	Berm With Berm			Failure		No. Benches	Toe-Toe (°)
	BFA •	Width (m)	Height (m)	Type	POF		
1	70	8.5	20	Wedge	23.0%	10	51.7
2	65	7	20	Planar	21.0%	5	50.8
3	65	7	20	Planar	21.0%	4	50.8
4	65	7	20	Wedge	33.5%	5	50.8
5	65	7	20	Wedge	20.5%	8	50.8
6	65	7	20	Wedge	152%	9	50.8
7	80	8.5	20	Wedge	19.3%	10	59.0
8	80	8.5	20	Wedge	21.3%	3	59.0
9	80	8.5	20	Planar	18.1%	3	59.0
10	75	8.5	20	Wedge	19.1%	3	55.3

Source: Stantec, 2021

The above recommended design parameters are based on maximum bench face angles ("BFA") for the various design sectors in fresh and transition rock. In order to regularize the design and improve mine operations (drill and blast considerations and shovel operations), bench face angles greater than 70° (i.e., 75° – 80° shown in Table 15-10) were reduced to 70° while maintaining the recommended bench width of 8.5 m.

Table 15-11 summarizes the design angles used in the pit design.

Table 15-11: Mine Design Slope Angles

Design Sector	Bench Face Angle (°)	Berm Width (m)	Bench Height (m)	Ira (°)
1	70	8.5	20	52
2	65	7	20	51
3	65	7	20	51
4	65	7	20	51
5	65	7	20	51
6	65	7	20	51
7	70	8.5	20	52
8	70	8.5	20	52
9	70	8.5	20	52
10	70	8.5	20	52

Source: Nordmin, 2021

A geotechnical berm of 25 m width was incorporated when slope heights were greater than 120 m.

Bench designs for saprolite material in the PFS mine design were completed on double bench heights, similar to the remaining pit design. The slope angle for saprolite was approximately 36 degrees.

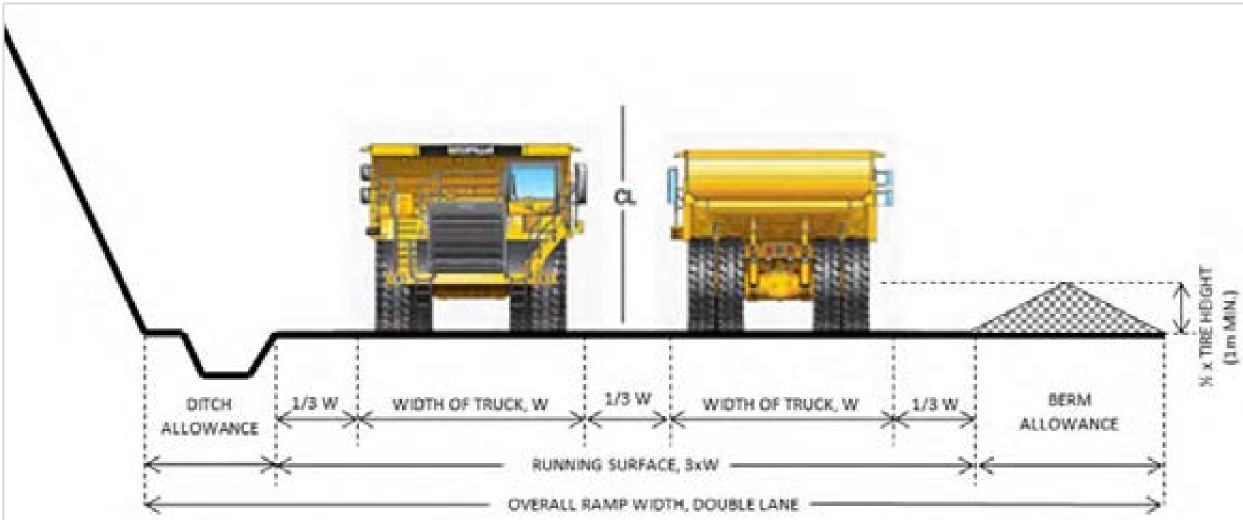
15.3.2.1.5 Haul Ramp Design

Nordmin based the haul ramp design on the largest truck planned for the Alacran pit; a 90 tonne truck. Table 15-12 summarizes the calculations for the haul ramp width. Table 15-13 illustrates a typical haul ramp profile.

Table 15-12: Ultimate Pit Design Assumptions – Haul Ramp Design

Item	Units	Value
Haul Truck Parameters		
Example Model		CAT 777
Payload (T, Heaped 2:1)	Tonne	90
Operating Width, W	m	6.1
Width Factor (of Truck Width)		
Double Lane		3x
Single Lane		2x
Running Surface Width		
Double Lane	m	18.3
Single Lane	m	12.2
Safety Berm Parameters		
Tire Type		27.00R49
Tire Overall Diameter	m	2.6
Factor (of Tire Size)		0.5
Berm Height (Calculated)	m	1.3
Berm Height (Minimum)	m	1.0
Slope	degrees	37
Road Berm Allowance	m	3.5
Road Drainage Ditch Parameters		
Road Drainage Allowance	m	2.5
Total Ramp Width		
Double Lane	m	25.0
Single Lane	m	18.0
Other Ramp Design Parameters		
Ramp Gradient	%	10

Source: Nordmin, 2021



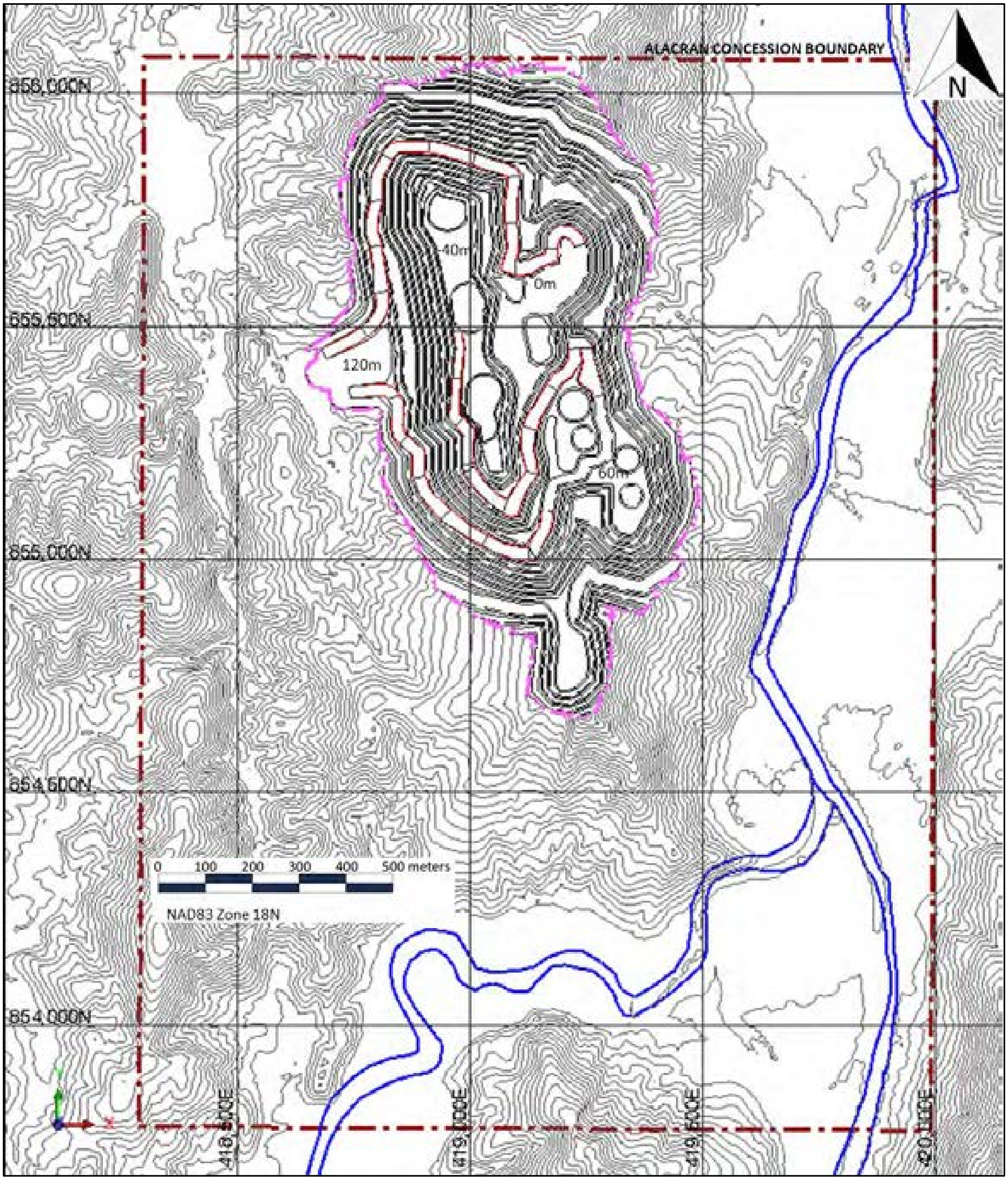
Source: Nordmin, 2021

Figure 15-3: Schematic of haul ramp geometry

Access to the final two bench levels has been designed with single lane access.

15.3.3 Pit Design Results

A pit design was created using the pit limit analysis pit shell as a guide, the slope design parameters described in previous section, and the Alacran concession boundary as a constraint. Figure 15-4 illustrates the pit design.



Source: Nordmin, 2021

Figure 15-4: Ultimate Pit design, Alacran pit

The pit entrance is on the west side at 120 m elevation. Two ramp accesses were incorporated to access the pushbacks on the north and on the south. Table 15-3 summarizes the planned material quantities. Table 15-4 summarizes the approximate dimensions of the ultimate pit design.

Table 15-13: Ultimate Pit Design Results, Pit Contents

Rock Category			Tonnes (T)	Cu (%)	Au (g/t)	Ag (g/t)
MILL FEED MINED						
	SAPROLITE		10,135,000		0.214	
	TRANSITION		2,011,000	0.620	0.225	3.115
	FRESH		89,954,000	0.449	0.272	2.544
	TOTAL	TOTAL	102,100,000	0.41	0.26	2.30
WASTE MINED						
	NPAG	SAPROLITE	21,612,000			
	NPAG	FRESH	48,036,000			
	NPAG	TRANSITION	4,899,000			
	NPAG	SUBTOTAL	74,548,000			
	PAG	FRESH	8,101,000			
	PAG	TRANSITION	1,638,000			
	PAG	SUBTOTAL	9,739,000			
	UNCERTAIN	FRESH	24,917,000			
	UNCERTAIN	TRANSITION	481,000			
	UNCERTAIN	SUBTOTAL	25,398,000			
	TOTAL	TOTAL	109,685,000			
	STRIP RATIO		1.1			

Source: Stantec, 2021

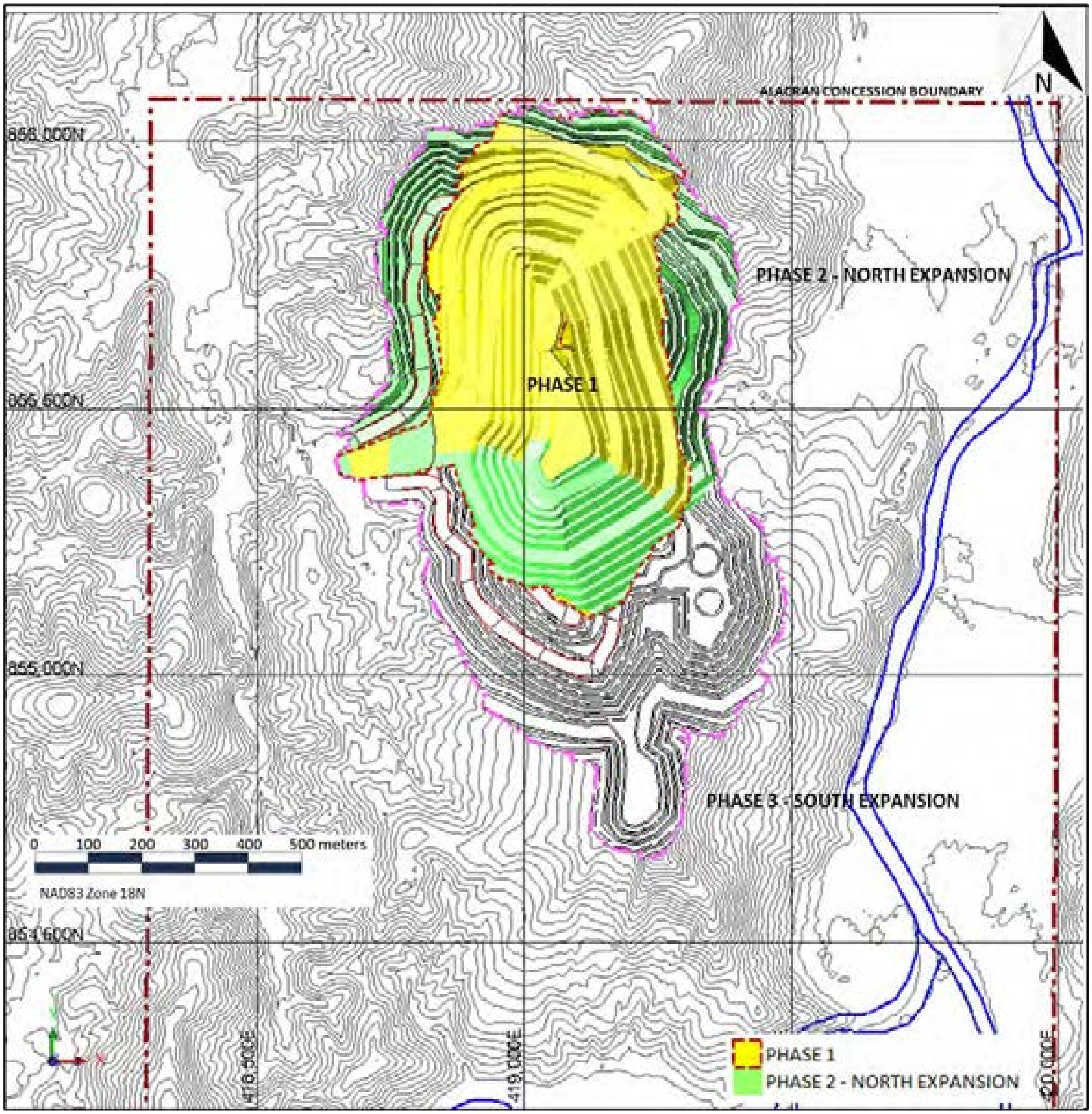
Table 15-14: Ultimate Pit Design Results, Pit Dimensions

Item	Unit	Alacran pit
Length	m	1,425
Width	m	710
Depth	m	approximately 270 m Elev to -40 m Elev 310

Source: Nordmin, 2021

As part of the planning and scheduling process, the intermediate pits leading to ultimate pit limits are determined to see how the pit will evolve over time. In the pit limit analysis using Whittle software, a number of nested pit shells are generated which use varying commodity prices, from a low to a high value. This generated a number of pit shells of increasing size and decreasing average unit value per tonne of ore contained within each pit shell. A smaller RF nested pit shell, pit shell 28, was used as an approximate reference to represent the initial phasing.

The OP mine plan for the PFS assumed three phases – the initial pit, the north expansion, and the south expansion. Figure 15-5 illustrates the phase designs for the Alacran pit.

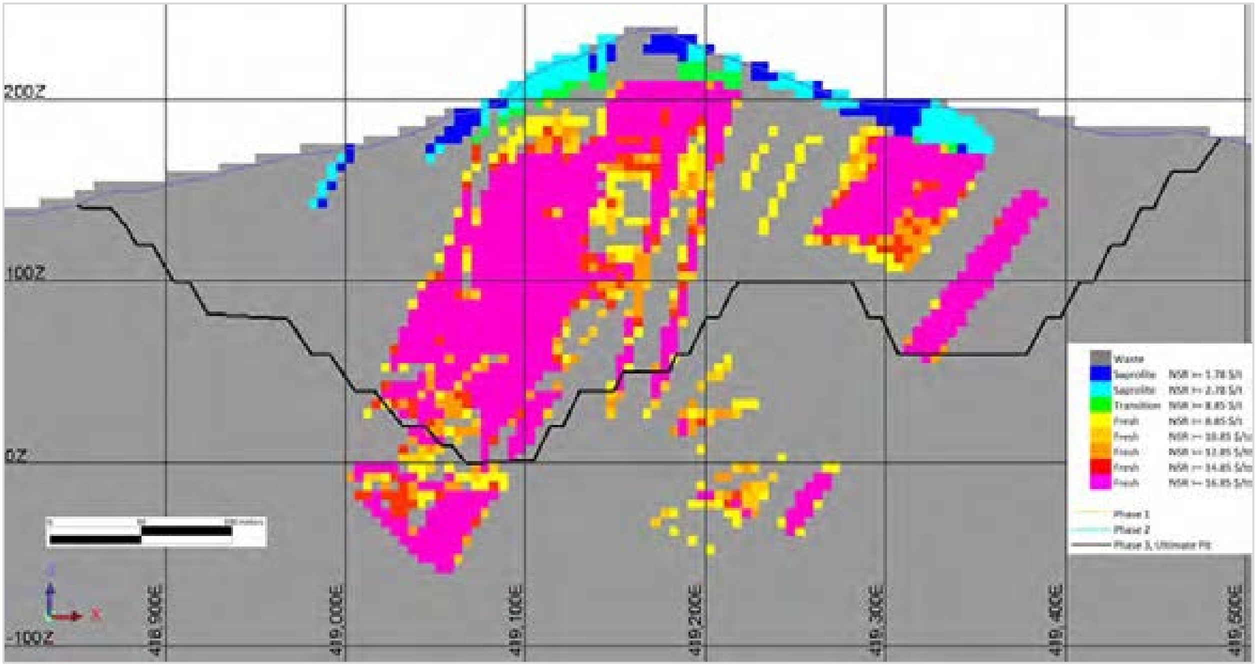


Source: Nordmin, 2021

Figure 15-5: Phase design

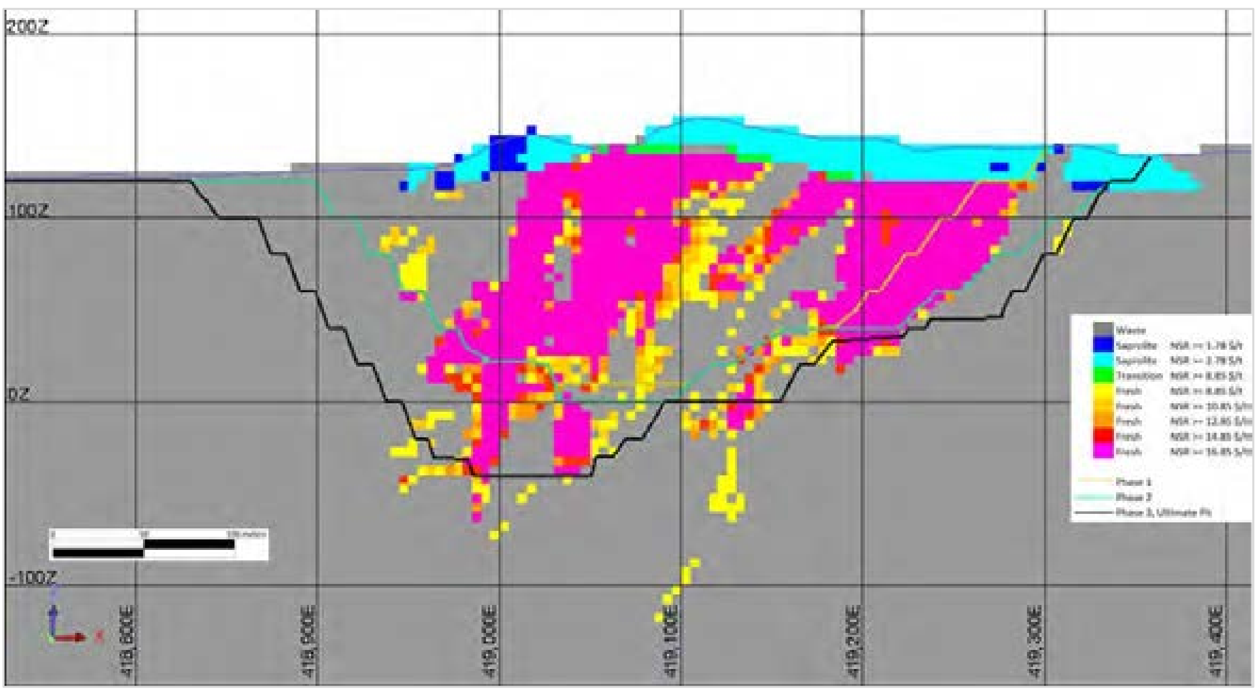
The following figures, Figure 15-6 through Figure 15-9 illustrate various sections through the ultimate pit showing the PFS level pit design, phases, and the Probable Reserve material (within the pit design limits) by rock type and grade bin.

Figure 15-10 illustrates a plan view section of the Probable Mineral Reserve at the 120 m elevation, while Figures 15-11, 15-12, and 15-13 illustrate cross section views of the Probable Mineral Reserve.



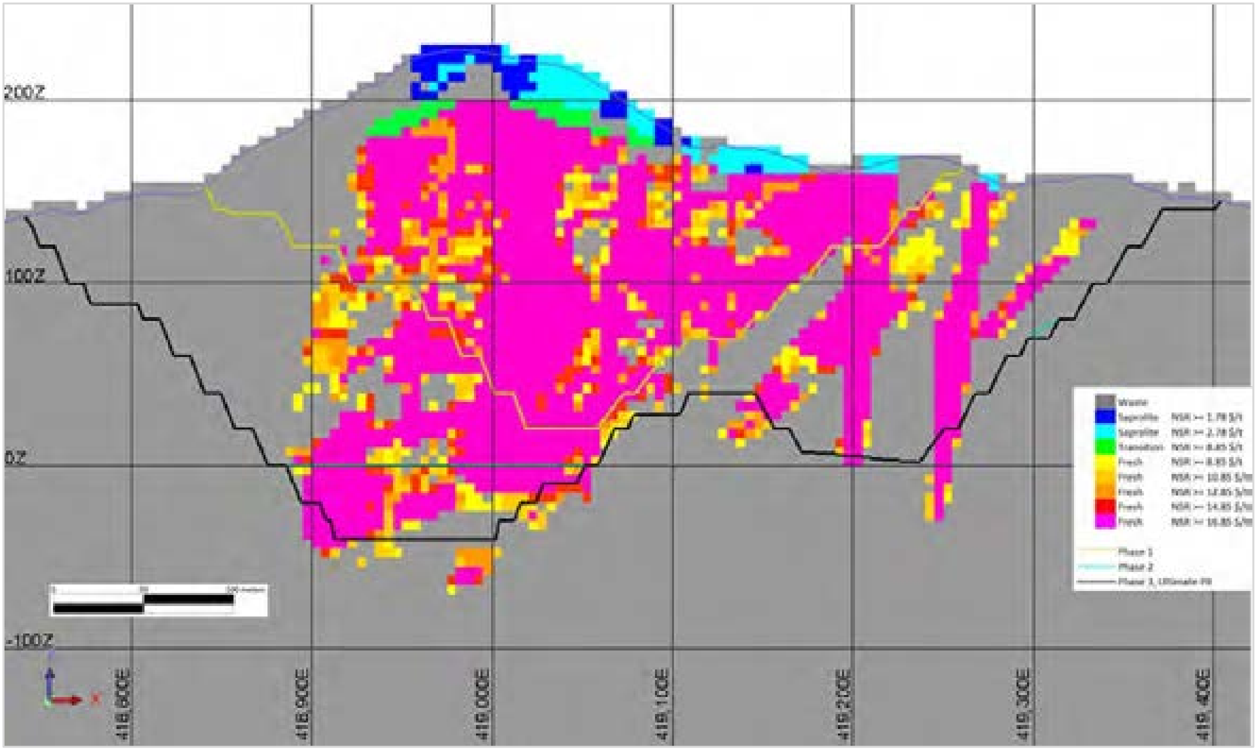
Source: Nordmin, 2021

Figure 15-6: Cross section 855100 N (looking North)



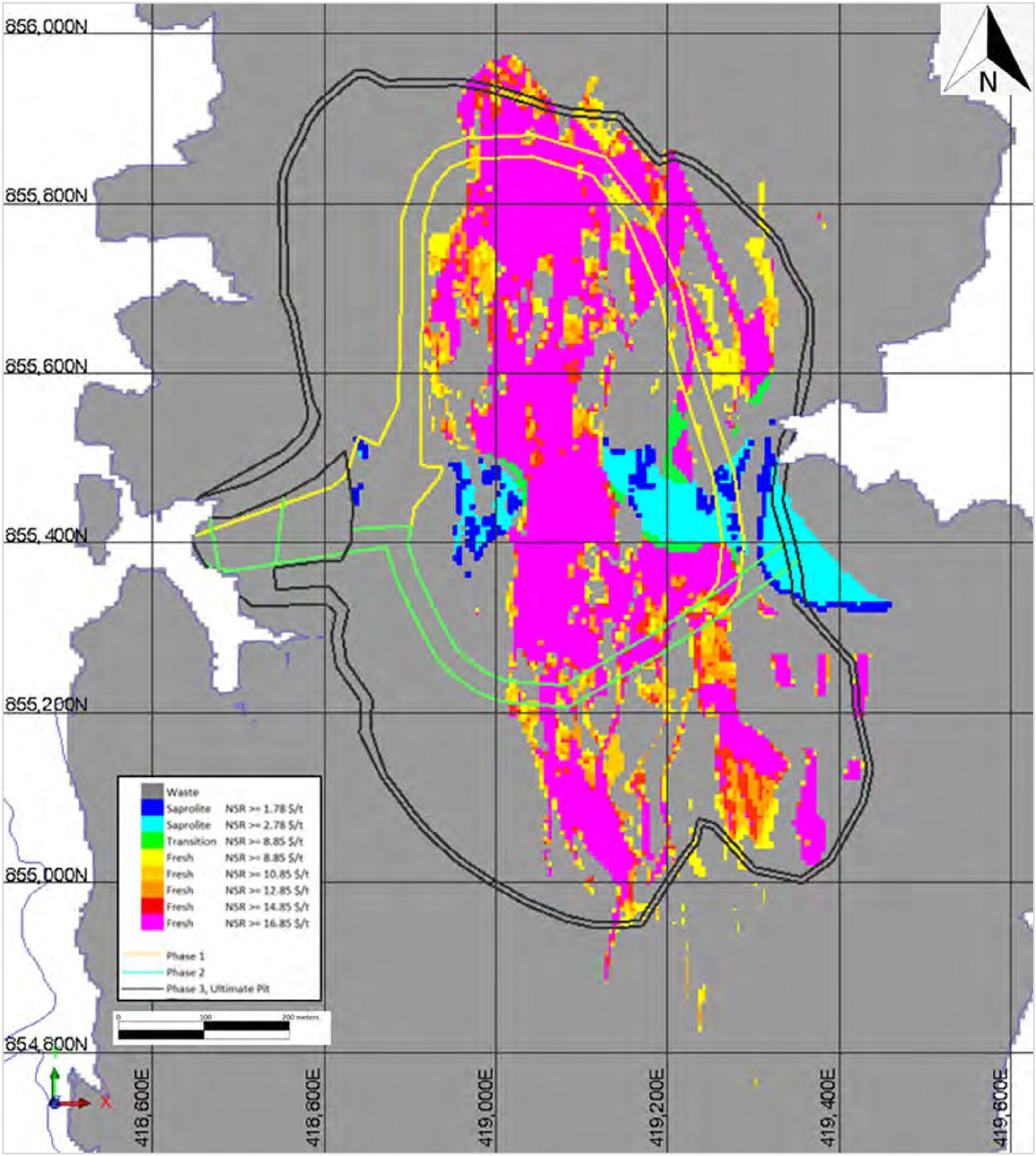
Source: Nordmin, 2021

Figure 15-7: Cross section 855400N (looking North)



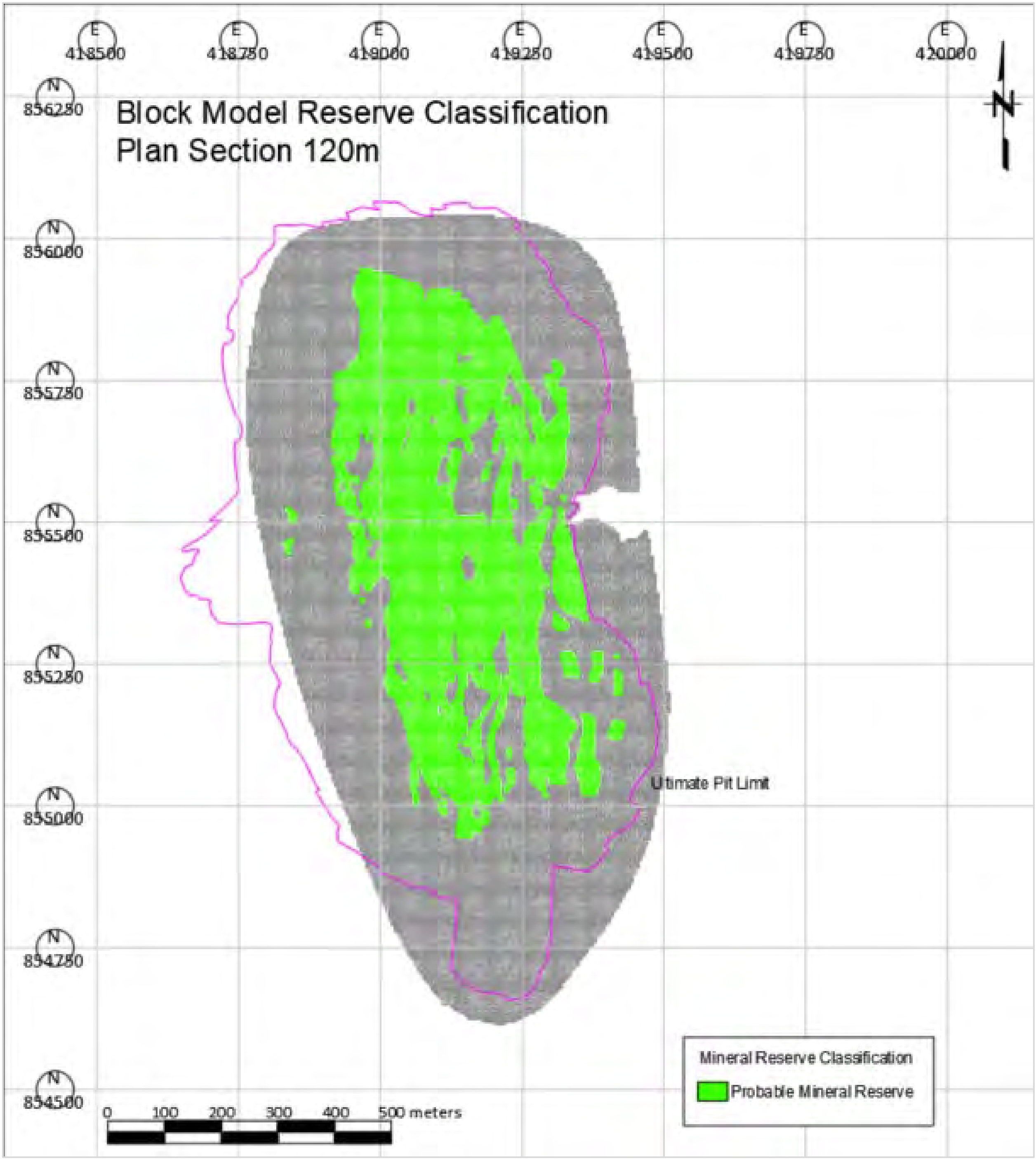
Source: Nordmin, 2021

Figure 15-8: Cross section 855700N (looking North)



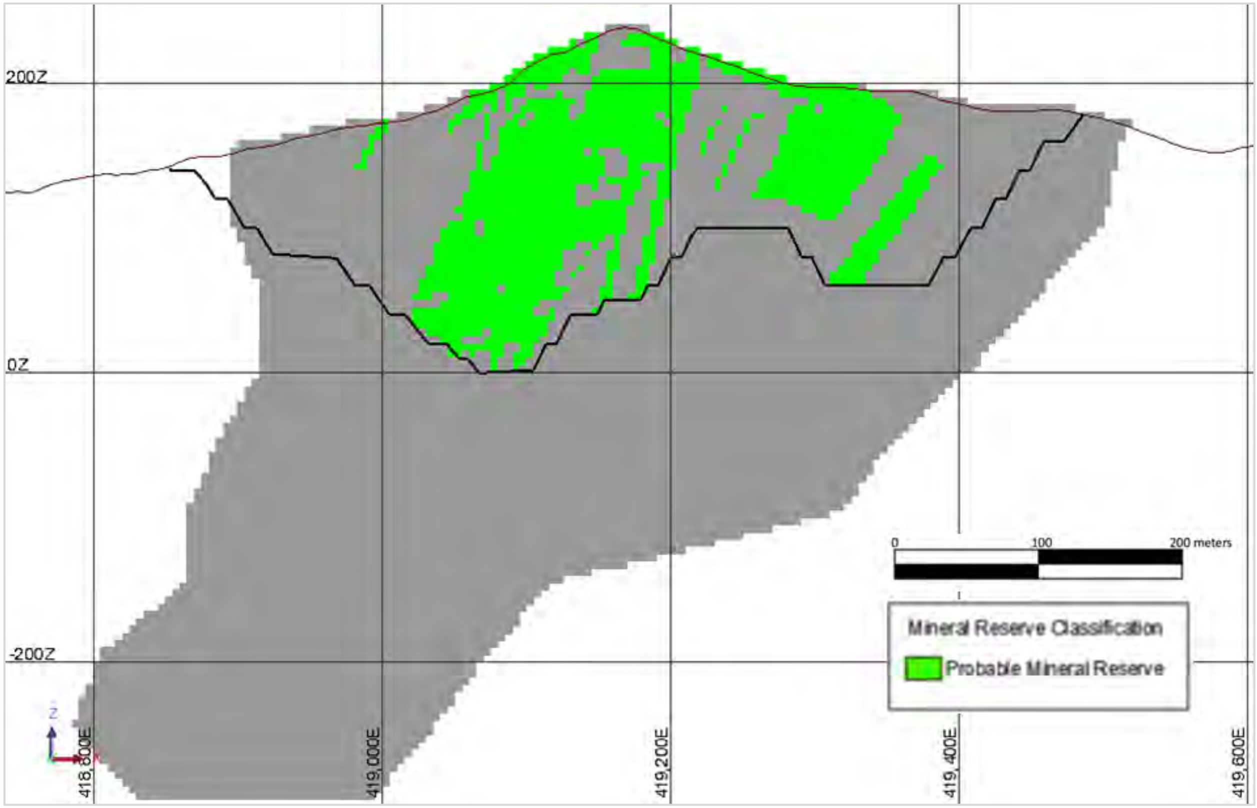
Source: Nordmin, 2021

Figure 15-9: Plan view 120 m elevation



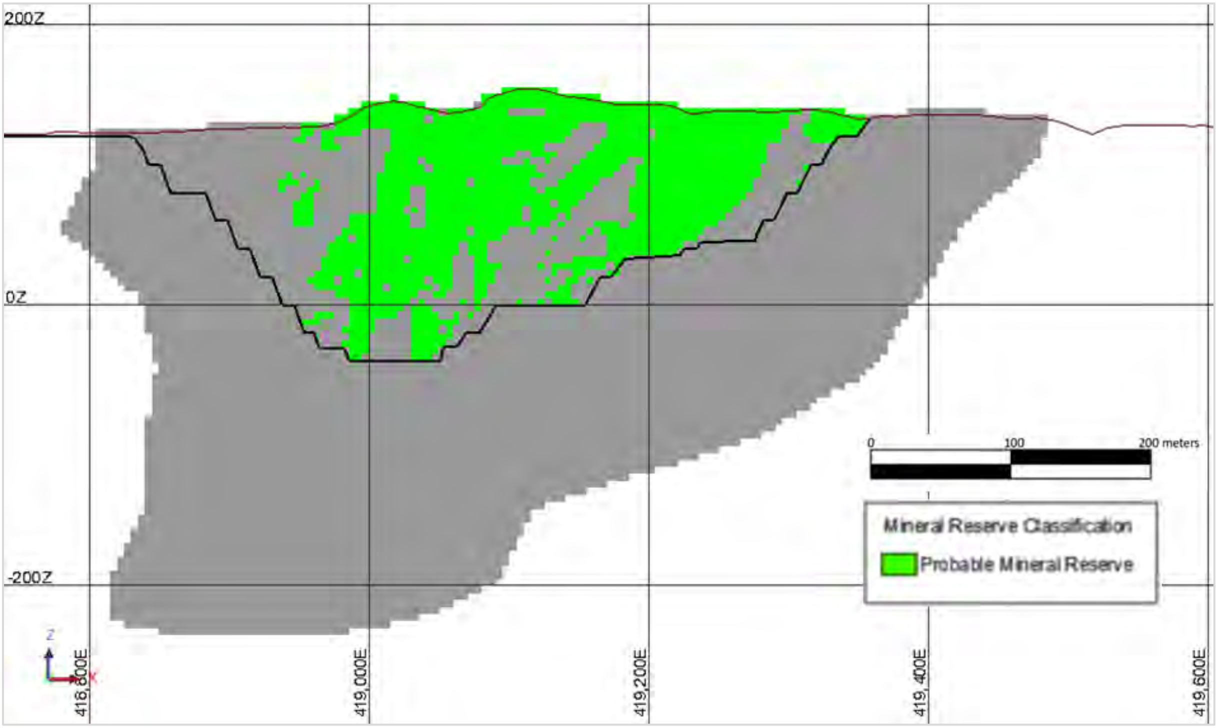
Source: Nordmin, 2021

Figure 15-10: Mineral Reserve Classification, Plan view 120 m elevation



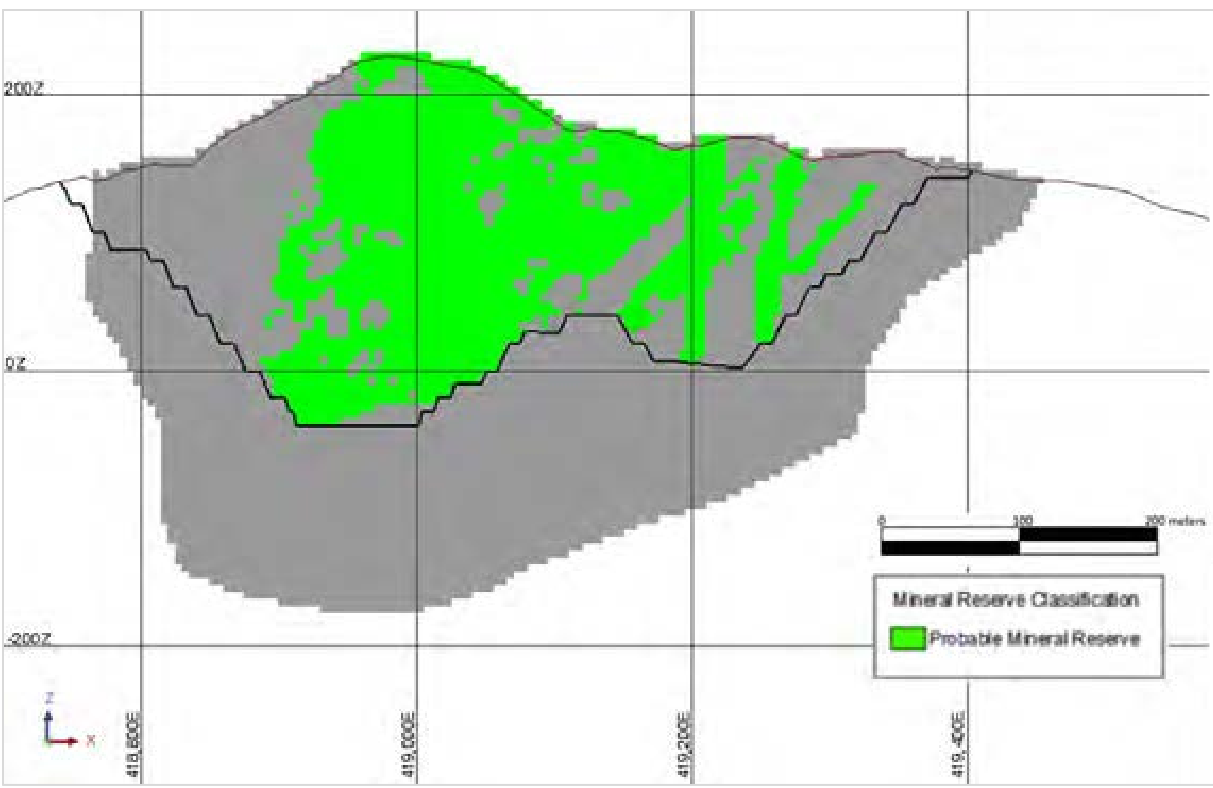
Source: Nordmin, 2021

Figure 15-11: Mineral Reserve Classification, Section view 855100 N (looking North)



Source: Nordmin, 2021

Figure 15-12: Mineral Reserve Classification, Section view 855400 N (looking North)



Source: Nordmin, 2021

Figure 15-13: Mineral Reserve Classification, Section view 855700 N (looking North)

16 MINING METHODS

16.1 OP Mining

OP mining was considered a viable option for the study given that the mineralization is on or near surface.

OP mining will include conventional drilling and blasting with a combination of a backhoe type excavator and front end loader type excavator loading broken rock into haul trucks, which will haul the material from the bench to the crusher, ROM stockpile, or WMF depending on the material type. Ancillary equipment includes dozers, graders, and various maintenance, support, service, and utility vehicles.

This Technical Report considers an owner operator scenario.

16.2 Material Types and Movements

16.2.1 Planned Mill Feed Material

Table 16-1 tabulates the planned mill feed material within the PFS mine design.

Table 16-1: Planned Mill Feed Material

Mill Feed Rock Type and Grade Bin		Mined Quantity (tonnes)	Cu Grade (%)	Au Grade (g/t)	AG Grade (g/t)	NSR Value	SG
SAPROLITE	BIN 1 NSR ≥ 1.78	2,914,000		0.12		2.24	2.33
SAPROLITE	BIN 2 NSR ≥ 2.78	7,221,000		0.25		5.87	2.36
SAPROLITE	**SUBTOTAL**	**10,135,000**		**0.21**		**4.83**	
TRANSITION	BIN3 NSR ≥ 8.85	2,011,000	0.62	0.22	3.12	21.55	2.81
TRANSITION	**SUBTOTAL**	**2,011,000**	**0.62**	**0.22**	**3.12**	**21.55**	
FRESH	BIN4 NSR ≥ 8.85	7,107,000	0.16	0.09	1.10	9.82	2.83
FRESH	BIN5 NSR ≥ 10.85	6,611,000	0.19	0.11	1.24	11.84	2.83
FRESH	BIN6 NSR ≥ 12.85	6,359,000	0.21	0.12	1.35	13.84	2.84
FRESH	BIN7 NSR ≥ 14.85	6,088,000	0.24	0.14	1.47	15.84	2.84
FRESH	BIN8 NSR ≥ 16.85	63,789,000	0.55	0.34	3.06	40.39	2.86
FRESH	**SUBTOTAL**	**89,954,000**	**0.45**	**0.27**	**2.54**	**32.34**	
TOTAL	**TOTAL**	**102,100,000**	**0.41**	**0.26**	**2.30**	**29.40**	

Source: Nordmin, 2021

During pre-production, the mineralized material (above cut-off grade) will be hauled to designated stockpiles. The higher grade mill feed material will be hauled to a stockpile near the ROM pad located near the primary crusher. The saprolite material and lower grade mill feed will be hauled and stockpiled in a stockpile located south of the mill and crusher areas.

During production, higher grade mill feed material will be hauled directly to the primary crusher and either direct tipped into the crusher or stockpiled temporarily on the ROM pad. For the first three years of production, lower grade mill feed material (8.85 ≥ NSR < 16.85) will continue to be stockpiled for later rehandling and processing. In the fourth and fifth year of production, mill feed material with NSR ≥ 14.85 (Bin 7 and Bin 8) will be hauled directly to the crusher, while stockpiling material with 8.85 ≥ NSR < 14.85. After the fifth year of production, all fresh material with NSR ≥ 8.85 will be directed to the crusher as it is mined.

16.2.2 Planned Waste Rock

The waste generated from the OP includes waste rock, and waste saprolite. Table 16-2 tabulates the planned waste rock material within the PFS mine design.

Table 16-2: Planned Waste Rock Material

Waste Rock Type		Mined Quantity (tonnes)
NPAG	SAPROLITE	21,612,000
NPAG	FRESH	48,036,000
NPAG	TRANSITION	4,899,000
NPAG	**SUBTOTAL**	**74,548,000**
PAG	SAPROLITE	
PAG	FRESH	8,101,000
PAG	TRANSITION	1,638,000
PAG	**SUBTOTAL**	**9,739,000**
UNCERTAIN	SAPROLITE	
UNCERTAIN	FRESH	24,917,000
UNCERTAIN	TRANSITION	481,000
UNCERTAIN	**SUBTOTAL**	**25,398,000**
TOTAL	**TOTAL**	**109,685,000**

Source: Nordmin, 2021

The waste rock generated from the pit has been planned as follows:

- NPAG fresh rock will be directed to the WMF embankment.
- NPAG transition rock will be directed to the WMF embankment.
- NPAG saprolite will be directed to the WMF embankment or the saprolite stockpile area (Section 16.4.6).
- PAG fresh and transition rock will be directed to the WMF and co-disposed with the thickened tailings.
- Uncertain fresh and transition rock will be directed to the WMF and co-disposed with the thickened tailings.
- Other uses for suitable waste rock include haul road and pad preparation and maintenance.

Additional details on the WMF are discussed in Section 18.12.

16.3 LOM Production Schedule

The production schedule was produced using Geovia's Surpac 2021 software for generating tonnage reports by phase by bench and Excel for scheduling. A mine production schedule was developed with the main objective of delivering 22,000 t/d of material to the processing facility. This includes 20,000 t/d of fresh and transition economic material and 10% or 2,000 t/d of economic saprolite. Other considerations for the schedule included the following:

- Bringing forward higher value material where possible, that is mining at an elevated cut-off grade for the first five years of production period and stockpiling lower grade material for later processing.
- Economic saprolite material would be blended in at 10% ratio.
- Year 1 of production takes into account an approximate 6 month mill ramp up period

The LOM schedule is based on the same parameters as described in the pit limit analysis.

Table 16-3 presents a summary of the material movement for the OP LOM schedule, on an annual basis.

Table 16-4 presents a summary of the material movement from the OP LOM schedule, on an annual basis, by destination.

Table 16-5 presents a summary of the stockpile material movement for the OP LOM schedule, on an annual basis.

Table 16-3: Life of Mine Schedule, Annual Basis

					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
			UNITS	LOM TOTAL	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14
MINED MATERIAL																				
POTENTIAL MILL FEED																				
MINED TONNAGE	**TOTAL**	**NSR**	**kt**	102,100	2,133	5,432	8,558	9,097	9,550	9,286	9,115	8,002	7,749	7,671	6,165	5,800	6,917	5,383	1,242	0
PMF	SAPROLITE 1	≥ 1.78		2,914	317	362	436	360	105	49	0	216	181	579	309	1	0	0	0	
PMF	SAPROLITE 2	≥ 2.78		7,221	1,239	996	1,220	1,506	205	87	0	361	268	664	674	0	0	0	0	
PMF	TRANSITION	≥ 8.85		2,011	131	656	501	255	15	7	0	81	110	229	25	1	0	0	0	
PMF	FRESH 1	≥ 8.85		7,107	4	99	401	527	714	651	653	490	626	743	625	494	605	364	111	
PMF	FRESH 2	≥ 10.85		6,611	6	106	395	508	611	563	601	507	635	738	496	412	533	413	87	
PMF	FRESH 3	≥ 12.85		6,359	4	157	370	455	592	480	560	470	584	652	490	466	571	388	119	
PMF	FRESH 4	≥ 14.85		6,088	18	150	347	407	550	450	497	457	521	595	517	512	544	416	106	
PMF	FRESH 5	≥ 16.85		63,789	414	2,906	4,888	5,080	6,757	6,999	6,803	5,419	4,824	3,471	3,030	3,915	4,665	3,802	819	
MINED GRADE																				
SAPROLITE 1		≥ 1.78																		
Cu			%																	
Au			g/t	**0.12**	0.12	0.12	0.12	0.12	0.12	0.12		0.12	0.12	0.12	0.12	0.12				
Ag			g/t																	
SAPROLITE 2		≥ 2.78																		
Cu			%																	
Au			g/t	**0.25**	0.31	0.28	0.26	0.26	0.22	0.16		0.30	0.21	0.18	0.17					
Ag			g/t																	
TRANSITION		≥ 8.85																		
Cu			%	**0.62**	1.16	0.69	0.64	0.47	0.39	0.37		0.37	0.42	0.45	0.39	0.30				
Au			g/t	**0.22**	0.35	0.19	0.30	0.24	0.21	0.09		0.13	0.15	0.15	0.13	0.26				
Ag			g/t	**3.12**	7.53	3.62	2.89	2.89	2.33	2.29		1.93	1.41	1.41	1.36	0.99				
FRESH 1		≥ 8.85																		
Cu			%	**0.16**	0.20	0.20	0.18	0.17	0.18	0.17	0.17	0.16	0.16	0.15	0.14	0.15	0.16	0.16	0.16	
Au			g/t	**0.09**	0.09	0.05	0.06	0.07	0.07	0.08	0.08	0.09	0.09	0.12	0.13	0.13	0.10	0.10	0.10	
Ag			g/t	**1.10**	1.12	1.59	1.73	1.29	1.23	1.08	1.18	1.25	1.61	0.75	0.58	0.66	0.96	1.10	0.92	
FRESH 2		≥ 10.85																		
Cu			%	**0.19**	0.23	0.23	0.21	0.20	0.20	0.20	0.19	0.19	0.18	0.16	0.16	0.17	0.19	0.17	0.15	
Au			g/t	**0.11**	0.08	0.07	0.08	0.09	0.08	0.09	0.10	0.10	0.10	0.14	0.15	0.14	0.11	0.12	0.16	
Ag			g/t	**1.24**	0.99	1.63	1.79	1.47	1.47	1.28	1.36	1.42	1.63	0.83	0.65	0.78	0.99	1.16	1.01	
FRESH 3		≥ 12.85																		
Cu			%	**0.21**	0.27	0.25	0.24	0.23	0.23	0.23	0.22	0.22	0.21	0.19	0.19	0.19	0.22	0.20	0.14	
Au			g/t	**0.12**	0.08	0.07	0.08	0.10	0.10	0.10	0.11	0.11	0.12	0.15	0.16	0.16	0.12	0.14	0.22	
Ag			g/t	**1.35**	1.15	1.81	2.01	1.63	1.61	1.52	1.48	1.51	1.64	0.92	0.73	0.91	1.11	1.29	1.11	
FRESH 4		≥ 14.85																		
Cu			%	**0.24**	0.29	0.29	0.27	0.25	0.26	0.26	0.25	0.25	0.24	0.22	0.20	0.22	0.24	0.23	0.18	
Au			g/t	**0.14**	0.08	0.08	0.09	0.12	0.11	0.11	0.11	0.12	0.13	0.17	0.20	0.17	0.13	0.15	0.21	
Ag			g/t	**1.47**	1.01	1.82	2.08	1.86	1.82	1.62	1.63	1.62	1.73	1.03	0.76	1.11	1.30	1.41	1.17	

Table continues…..

				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		UNITS	**LOM TOTAL**	**Year -2**	**Year -1**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**	**Year 11**	**Year 12**	**Year 13**	**Year 14**
MINED MATERIAL																			
FRESH 5	≥ 16.85																		
Cu		%	**0.55**	0.91	0.65	0.62	0.56	0.68	0.65	0.63	0.63	0.48	0.42	0.33	0.34	0.45	0.41	0.43	
Au		g/t	**0.34**	0.29	0.22	0.30	0.33	0.34	0.32	0.29	0.27	0.27	0.24	0.58	0.58	0.46	0.28	0.30	
Ag		g/t	**3.06**	4.57	4.57	3.94	3.57	4.05	3.59	3.15	3.17	2.91	1.88	1.28	1.63	2.31	2.18	2.18	
Contained Metal @ ROM																			
Cu		tonnes	**415,939**	5,361	24,797	37,007	33,671	51,404	50,363	47,543	38,526	28,299	20,324	13,615	16,637	25,704	18,536	4,152	0
Au		oz	**869,618**	18,982	36,346	66,766	74,648	83,824	78,175	69,923	58,707	53,386	46,728	72,069	82,457	76,804	40,463	10,341	0
Ag		oz	**7,558,605**	93,626	531,856	757,197	700,466	1,000,710	900,592	793,246	646,475	581,897	296,792	172,358	257,574	424,777	329,298	71,740	0
WASTE MATERIAL																			
MINED TONNAGE	**TOTAL**	**kt**	**109,685**	**3,531**	**4,995**	**5,288**	**8,976**	**9,257**	**8,273**	**8,204**	**7,854**	**6,604**	**9,899**	**12,703**	**11,160**	**8,889**	**3,514**	**537**	**0**
NPAG	FRESH	kt	**48,036**	56	861	2,186	2,135	4,234	5,297	5,895	3,952	3,651	2,159	2,773	6,098	5,899	2,486	353	0
NPAG	TRANSITON	kt	**4,899**	242	761	527	1,139	364	201	12	114	176	281	932	150	0	0	0	0
NPAG	SAPROLITE	kt	**21,612**	2,801	2,257	1,433	3,230	1,981	512	0	2,023	832	3,111	3,131	301	0	0	0	0
PAG	FRESH	kt	**8,101**	98	350	346	736	455	314	435	336	385	842	1,745	1,228	515	264	50	0
PAG	TRANSITION	kt	**1,638**	224	493	156	250	13	0	0	99	20	247	137	0	0	0	0	0
PAG	SAPROLITE	kt	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UNCERTAIN	FRESH	kt	**24,917**	111	261	589	1,395	2,075	1,940	1,862	1,326	1,539	3,186	3,904	3,357	2,476	764	133	0
UNCERTAIN	TRANSITION	kt	**481**	0	11	51	92	135	9	0	3	0	72	82	26	0	0	0	0
UNCERTAIN	SAPROLITE	kt	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MANUAL	ADJUSTMENT	kt	**0**	0	0	0	0	0	0	0	0	0	0	0	0	-750	750	0	0
TOTAL MINED MATERIAL		kt	**211,785**	**5,664**	**10,427**	**13,846**	**18,073**	**18,807**	**17,559**	**17,319**	**15,856**	**14,353**	**17,569**	**18,869**	**16,961**	**15,806**	**8,897**	**1,778**	**0**
OTHER MATERIAL MOVEMENTS																			
Stockpile Rehandle – Fresh PMF		Kt	**13,954**	0	0	1,400	1,965	164	0	0	0	0	872	2,118	1,500	383	1,917	3,634	0
Stockpile Rehandle – Saprolite PMF		Kt	**7,221**	0	0	243	370	625	681	730	514	594	296	487	729	730	730	490	0
	TOTAL	Kt	**21,175**	**0**	**0**	**1,643**	**2,336**	**789**	**681**	**730**	**514**	**594**	**1,168**	**2,605**	**2,230**	**1,113**	**2,647**	**4,125**	**0**

Source: Nordmin, 2021

Table 16-4: Summary of Material Movement from the OP, on an Annual Basis, by Destination

			PRE-PRODUCTION		PRODUCTION PERIOD													
	UNITS	LoM	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14
		TOTAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MATERIAL MOVEMENT BY DESTINATION																		
WMF FACILITY																		
PAG - WASTE ROCK	kt	35,137.0	432.7	1,115.2	1,141.9	2,472.3	2,678.4	2,263.1	2,296.8	1,764.2	1,944.3	4,347.1	5,868.0	4,611.0	2,990.7	1,027.3	183.9	0.0
	k cu.m.	16,731.9	206.1	531.1	543.8	1,177.3	1,275.4	1,077.7	1,093.7	840.1	925.8	2,070.1	2,794.3	2,195.7	1,424.1	489.2	87.6	0.0
	cumulative volume		*206.1*	*737.1*	*1,280.9*	*2,458.2*	*3,733.6*	*4,811.3*	*5,905.0*	*6,745.1*	*7,671.0*	*9,741.0*	*12,535.3*	*14,731.0*	*16,155.1*	*16,644.3*	*16,731.9*	*16,731.9*
THICKENED TAILINGS	kt	101,164.3	0.0	0.0	7,467.9	8,030.0	8,030.0	8,030.0	8,030.1	8,030.0	8,030.0	8,030.0	8,030.0	8,030.0	8,030.0	8,030.0	5,366.3	0.0
	k cu.m.	59,508.4	0.0	0.0	4,392.9	4,723.5	4,723.5	4,723.5	4,723.6	4,723.5	4,723.5	4,723.5	4,723.5	4,723.5	4,723.5	4,723.5	3,156.6	0.0
	cumulative volume		*0.0*	*0.0*	*4,392.9*	*9,116.4*	*13,839.9*	*18,563.5*	*23,287.1*	*28,010.6*	*32,734.1*	*37,457.7*	*42,181.2*	*46,904.7*	*51,628.2*	*56,351.8*	*59,508.4*	*59,508.4*
TOTAL	**kt**	**136,301.3**	**432.7**	**1,115.2**	**8,609.8**	**10,502.3**	**10,708.4**	**10,293.1**	**10,326.9**	**9,794.2**	**9,974.3**	**12,377.1**	**13,898.0**	**12,641.0**	**11,020.7**	**9,057.3**	**5,550.1**	**0.0**
	k cu.m.	**76,240.3**	**206.1**	**531.1**	**4,936.7**	**5,900.8**	**5,999.0**	**5,801.2**	**5,817.3**	**5,563.6**	**5,649.4**	**6,793.6**	**7,517.8**	**6,919.2**	**6,147.7**	**5,212.7**	**3,244.2**	**0.0**
	cumulative volume		***206.1***	***737.1***	***5,673.8***	***11,574.6***	***17,573.6***	***23,374.8***	***29,192.1***	***34,755.7***	***40,405.1***	***47,198.7***	***54,716.5***	***61,635.7***	***67,783.4***	***72,996.1***	***76,240.3***	***76,240.3***
WMF EMBANKMENT																		
NAG - SAPROLITE	kt	21,612.3	2,800.7	2,256.9	1,432.6	3,229.8	1,981.0	511.6	0.3	2,023.3	832.5	3,111.2	3,131.0	301.4	0.0	0.0	0.0	0.0
	k cu.m.	12,713.1	1,647.4	1,327.6	842.7	1,899.9	1,165.3	300.9	0.2	1,190.2	489.7	1,830.1	1,841.8	177.3	0.0	0.0	0.0	0.0
	cumulative volume		*1,647.4*	*2,975.0*	*3,817.7*	*5,717.6*	*6,882.9*	*7,183.8*	*7,184.0*	*8,374.2*	*8,863.9*	*10,694.1*	*12,535.8*	*12,713.1*	*12,713.1*	*12,713.1*	*12,713.1*	*12,713.1*
NAG - TRANSITION	kt	4,899.4	241.7	761.1	527.4	1,139.0	363.6	201.1	12.4	113.8	176.2	281.1	931.7	150.4	0.0	0.0	0.0	0.0
	k cu.m.	2,721.9	134.3	422.8	293.0	632.8	202.0	111.7	6.9	63.2	97.9	156.1	517.6	83.5	0.0	0.0	0.0	0.0
	cumulative volume		*134.3*	*557.1*	*850.1*	*1,482.9*	*1,684.9*	*1,796.6*	*1,803.5*	*1,866.7*	*1,964.6*	*2,120.7*	*2,638.3*	*2,721.9*	*2,721.9*	*2,721.9*	*2,721.9*	*2,721.9*
NAG - FRESH	kt	48,035.9	55.9	861.4	2,186.2	2,135.3	4,234.4	5,297.3	5,894.9	3,952.4	3,650.9	2,159.2	2,772.7	6,097.7	5,898.7	2,486.2	352.9	0.0
	k cu.m.	22,874.3	26.6	410.2	1,041.0	1,016.8	2,016.4	2,522.5	2,807.1	1,882.1	1,738.5	1,028.2	1,320.3	2,903.7	2,808.9	1,183.9	168.0	0.0
	cumulative volume		*26.6*	*436.8*	*1,477.8*	*2,494.6*	*4,511.0*	*7,033.5*	*9,840.6*	*11,722.7*	*13,461.2*	*14,489.4*	*15,809.8*	*18,713.4*	*21,522.3*	*22,706.2*	*22,874.3*	*22,874.3*
TOTAL	**kt**	**74,547.6**	**3,098.3**	**3,879.3**	**4,146.2**	**6,504.0**	**6,579.0**	**6,010.0**	**5,907.6**	**6,089.6**	**4,659.5**	**5,551.6**	**6,835.3**	**6,549.5**	**6,648.7**	**1,736.2**	**352.9**	**0.0**
	k cu.m.	**38,309.2**	**1,808.3**	**2,160.6**	**2,176.7**	**3,549.4**	**3,383.7**	**2,935.2**	**2,814.2**	**3,135.5**	**2,326.1**	**3,014.5**	**3,679.7**	**3,164.5**	**2,808.9**	**1,183.9**	**168.0**	**0.0**
	cumulative volume		***1,808.3***	***3,968.9***	***6,145.6***	***9,695.1***	***13,078.8***	***16,013.9***	***18,828.1***	***21,963.6***	***24,289.7***	***27,304.2***	***30,983.9***	***34,148.4***	***36,957.3***	***38,141.2***	***38,309.2***	***38,309.2***

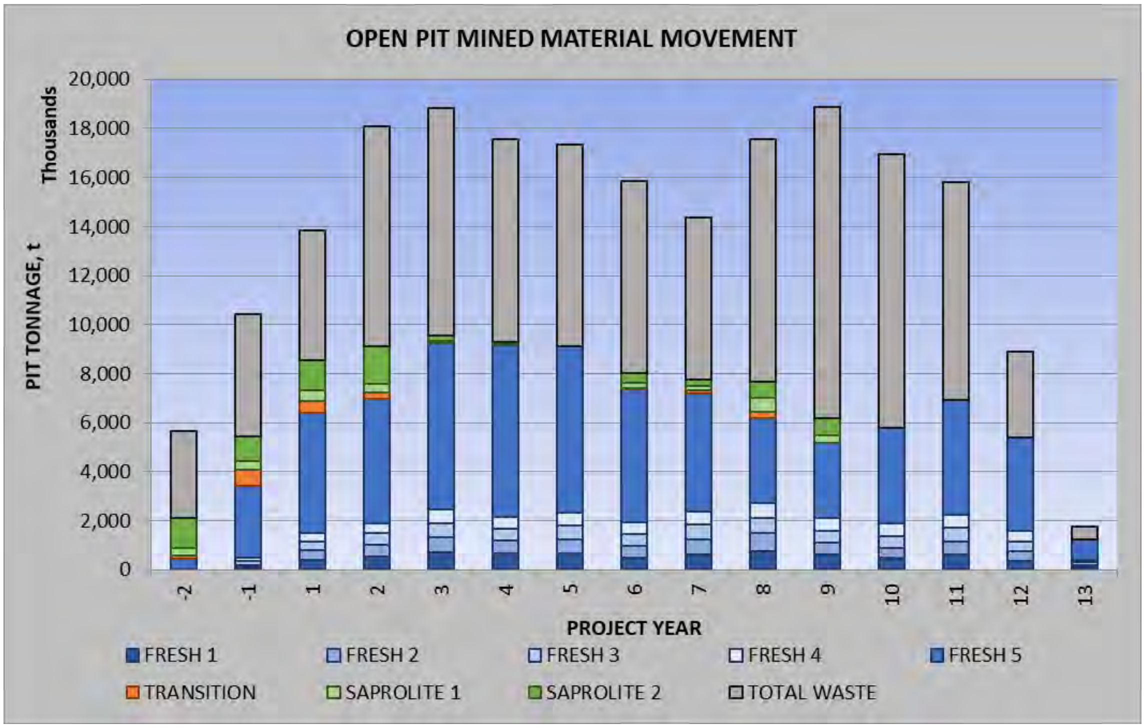
Source: Nordmin, 2021

Table 16-5: Summary of Stockpiling from OP, on an Annual Basis

	UNITS	LoM	PRE-PRODUCTION		PRODUCTION PERIOD													
		TOTAL	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
STOCKPILING																		
SAPROLITE																		
INTO STOCKPILE	kt	8,156.8	1,556.0	1,358.3	1,219.8	1,506.5	205.0	86.8	0.0	361.1	313.6	809.0	740.7	0.0	0.0	0.0	0.0	0.0
	k cu.m.	4,798.1	915.3	799.0	717.5	886.2	120.6	51.1	0.0	212.4	184.4	475.9	435.7	0.0	0.0	0.0	0.0	0.0
	cumulative volume		*915.3*	*1,714.3*	*2,431.8*	*3,318.0*	*3,438.6*	*3,489.6*	*3,489.6*	*3,702.1*	*3,886.5*	*4,362.4*	*4,798.1*	*4,798.1*	*4,798.1*	*4,798.1*	*4,798.1*	*4,798.1*
OUT OF STOCKPILE	kt	7,221.1	0.0	0.0	243.3	370.4	625.5	680.7	730.0	514.1	594.1	295.9	487.4	729.4	730.0	730.0	490.3	0.0
	k cu.m.	8,156.8	1,556.0	1,358.3	1,219.8	1,506.5	205.0	86.8	0.0	361.1	313.6	809.0	740.7	0.0	0.0	0.0	0.0	0.0
	cumulative volume		*1,556.0*	*2,914.3*	*4,134.1*	*5,640.6*	*5,845.6*	*5,932.4*	*5,932.4*	*6,293.5*	*6,607.1*	*7,416.1*	*8,156.8*	*8,156.8*	*8,156.8*	*8,156.8*	*8,156.8*	*8,156.8*
BALANCE	kt		1,556.0	2,914.3	3,890.9	5,027.0	4,606.5	4,012.6	3,282.6	3,129.6	2,849.0	3,362.1	3,615.4	2,886.0	2,156.0	1,426.0	935.7	935.7
	k cu.m.		915.3	1,714.3	2,288.8	2,957.1	2,709.7	2,360.4	1,930.9	1,840.9	1,675.9	1,977.7	2,126.7	1,697.7	1,268.3	838.8	550.4	550.4
HG FRESH																		
INTO STOCKPILE	kt	3,319.5	413.8	2,905.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	k cu.m.	1,580.7	197.1	1,383.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	cumulative volume		*197.1*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*
OUT OF STOCKPILE	kt	3,319.5	0.0	0.0	1,400.2	1,919.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	k cu.m.	1,580.7	0.0	0.0	666.8	914.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	cumulative volume		*0.0*	*0.0*	*666.8*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*	*1,580.7*
BALANCE	kt		413.8	3,319.5	1,919.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	k cu.m.		197.1	1,580.7	914.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LG FRESH + TRANSITION																		
INTO STOCKPILE	kt	10,634.6	162.9	1,168.0	1,513.7	1,896.3	2,104.0	1,849.7	1,815.0	125.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	k cu.m.	5,126.5	88.0	608.2	720.8	903.0	1,001.9	880.8	864.3	59.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	cumulative volume		*88.0*	*696.2*	*1,417.0*	*2,320.0*	*3,321.9*	*4,202.7*	*5,067.0*	*5,126.5*	*5,126.5*	*5,126.5*	*5,126.5*	*5,126.5*	*5,126.5*	*5,126.5*	*5,126.5*	*5,126.5*
OUT OF STOCKPILE	kt	10,634.6	0.0	0.0	0.0	46.1	163.9	0.0	0.0	0.0	0.0	872.3	2,118.1	1,500.1	382.9	1,916.8	3,634.3	0.0
	k cu.m.	5,126.5	0.0	0.0	0.0	25.6	80.7	0.0	0.0	0.0	0.0	429.2	1,042.2	723.1	182.3	912.8	1,730.6	0.0
	cumulative volume		*0.0*	*0.0*	*0.0*	*25.6*	*106.3*	*106.3*	*106.3*	*106.3*	*106.3*	*535.5*	*1,577.7*	*2,300.8*	*2,483.1*	*3,395.9*	*5,126.5*	*5,126.5*
BALANCE	kt		162.9	1,330.9	2,844.6	4,694.8	6,634.9	8,484.6	10,299.6	10,424.6	10,424.6	9,552.3	7,434.2	5,934.1	5,551.2	3,634.3	0.0	0.0
	k cu.m.		77.6	633.8	1,354.6	2,235.6	3,159.5	4,040.3	4,904.6	4,964.1	4,964.1	4,548.7	3,540.1	2,825.7	2,643.4	1,730.6	0.0	0.0

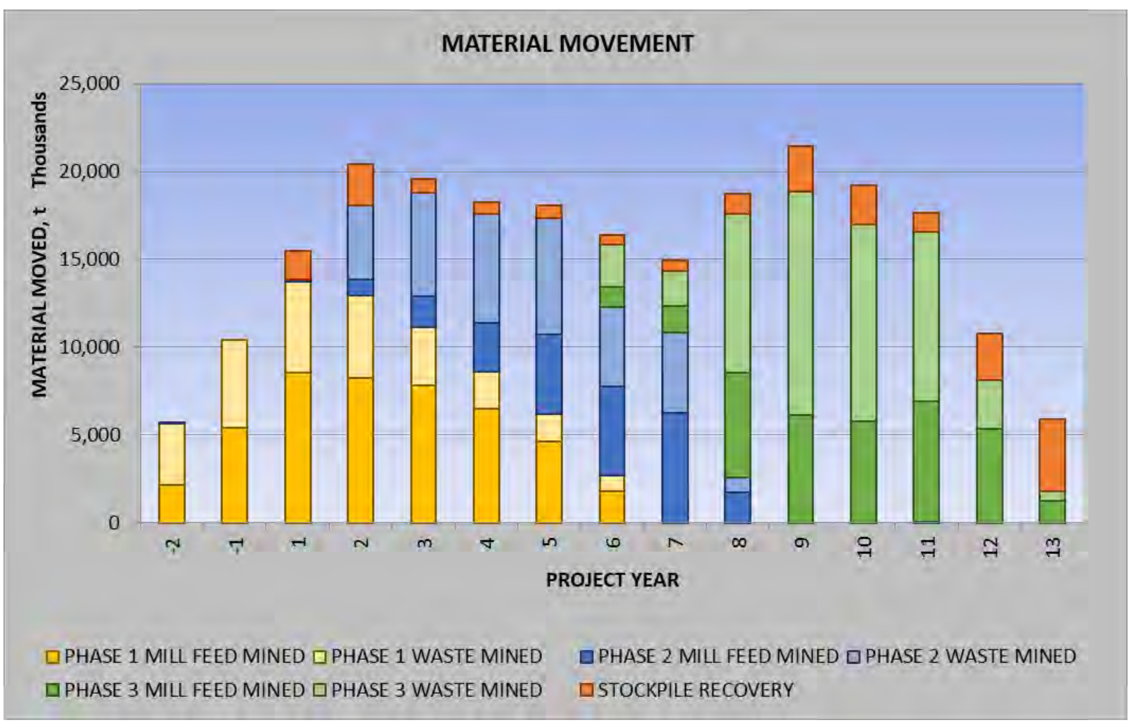
Source: Nordmin, 2021

The various aspects of the LOM scheduled on an annual basis are depicted in Figure 16-1 through Figure 16-6.



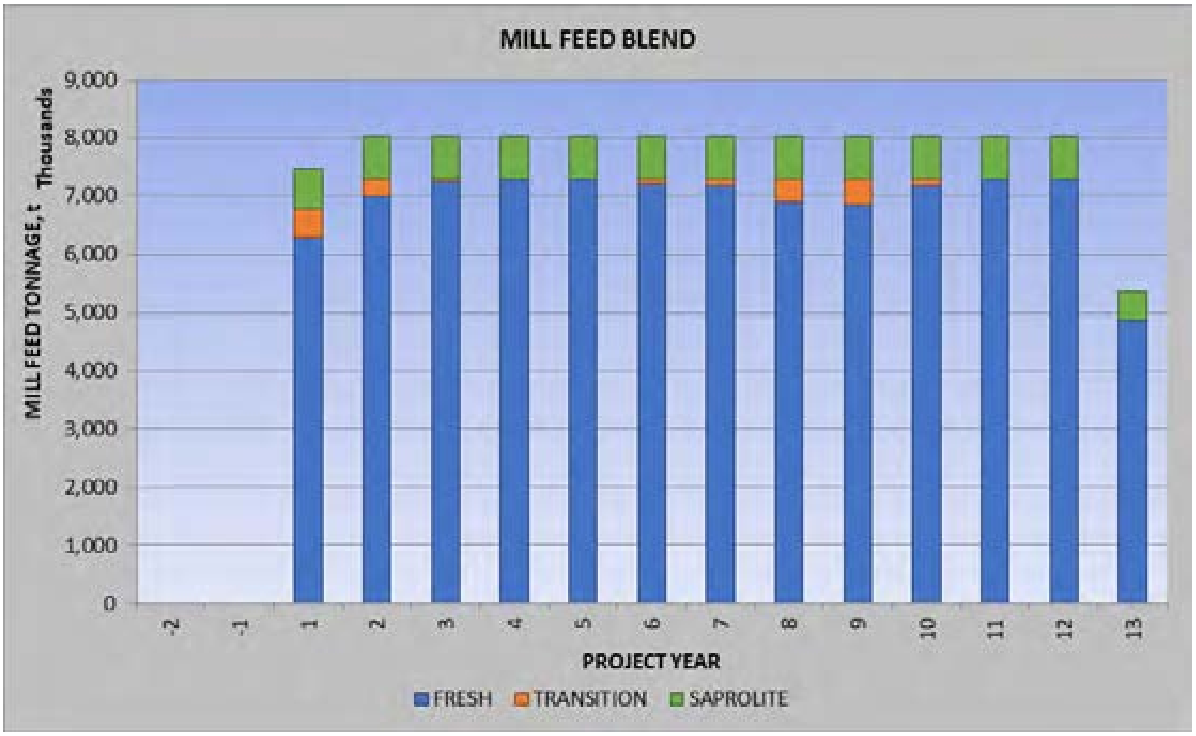
Source: Nordmin, 2021

Figure 16-1: OP mine plan, OP material movement



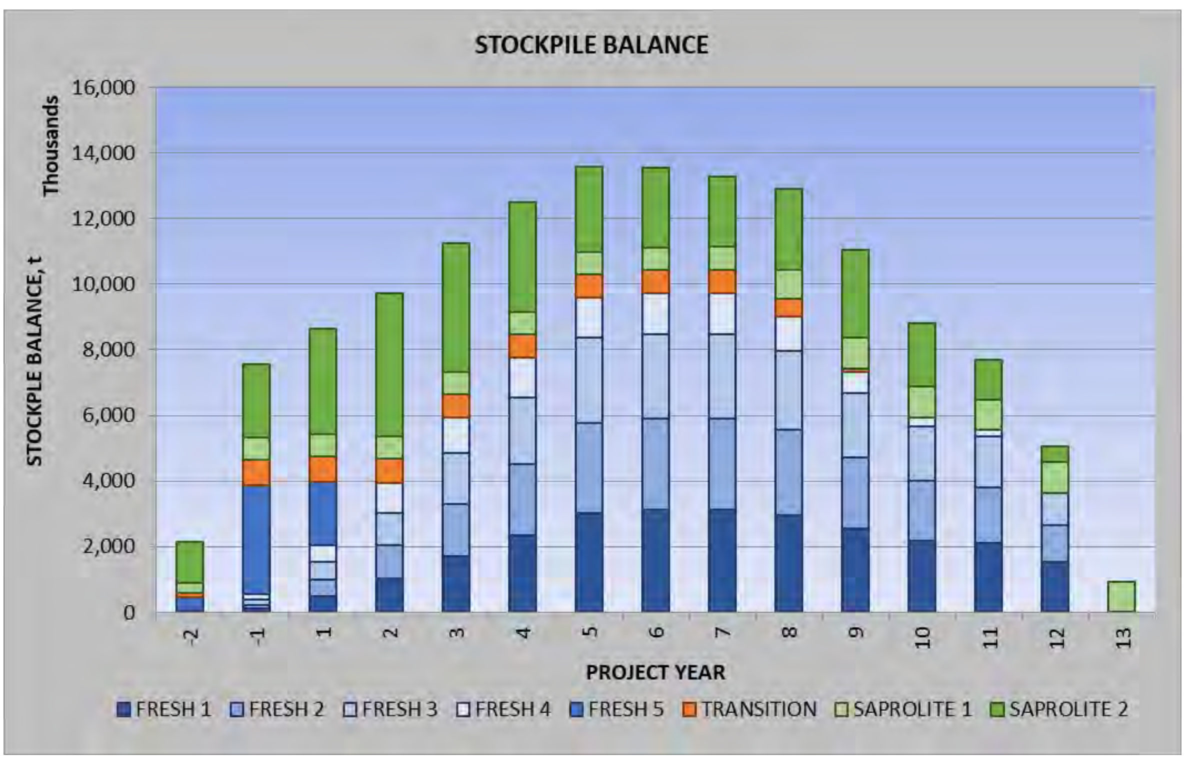
Source: Nordmin, 2021

Figure 16-2: OP mine plan, OP material movement, including stockpile rehandle



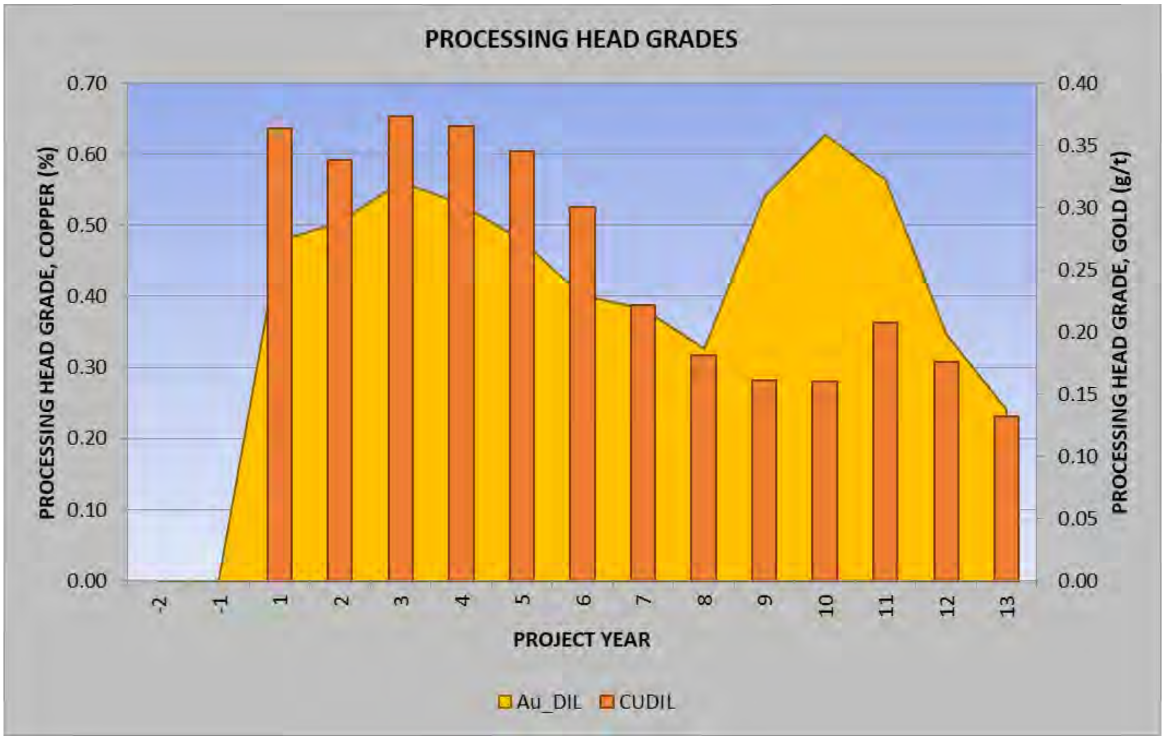
Source: Nordmin, 2021

Figure 16-3: OP mine plan, mill feed blend



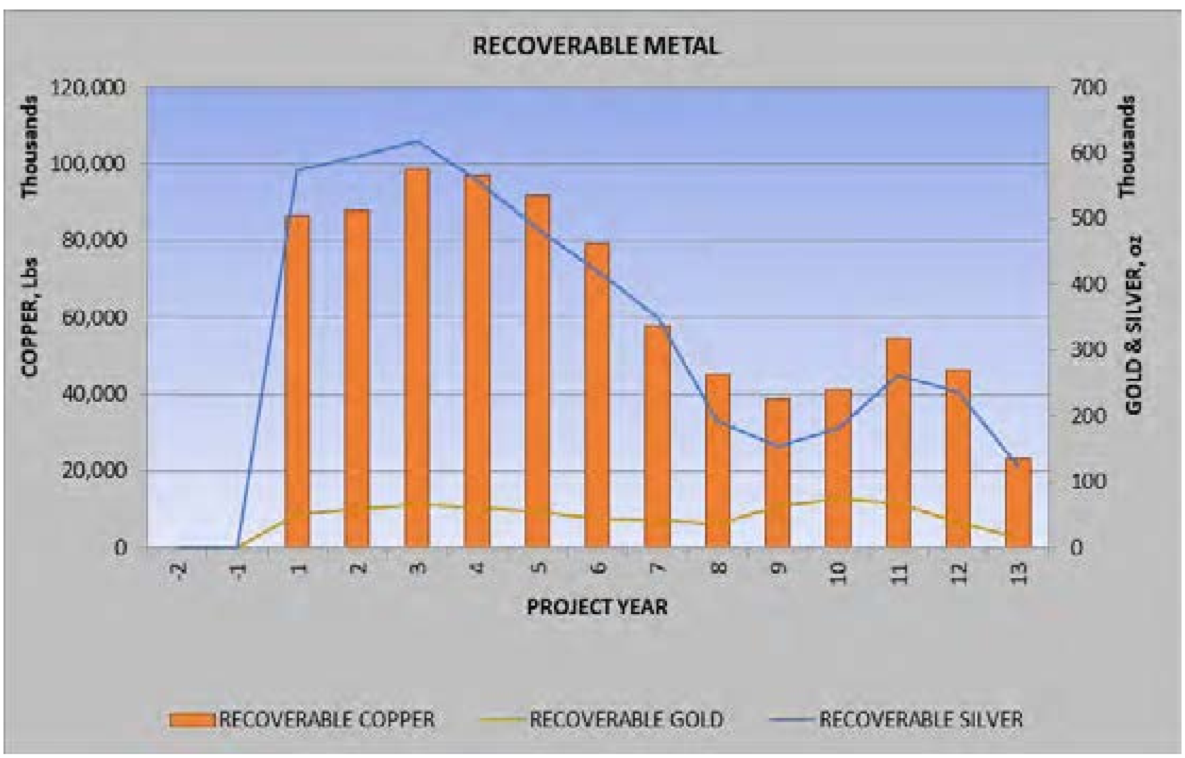
Source: Nordmin, 2021

Figure 16-4: OP mine plan, stockpile balance



Source: Nordmin, 2021

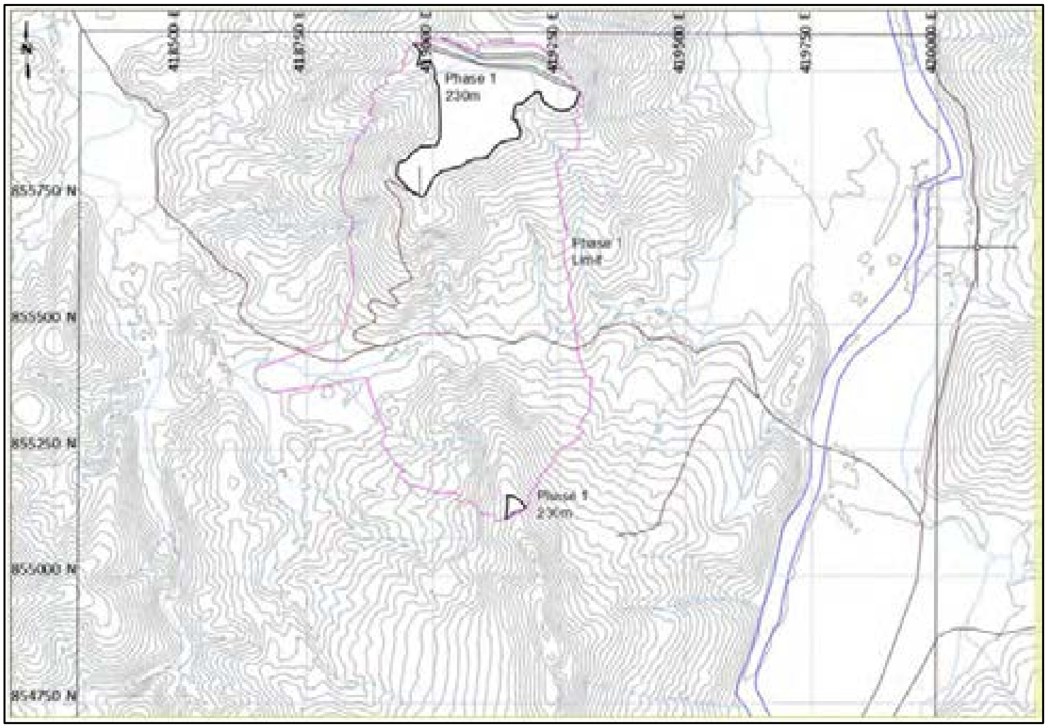
Figure 16-5: OP mine plan, processing head grade



Source: Nordmin, 2021

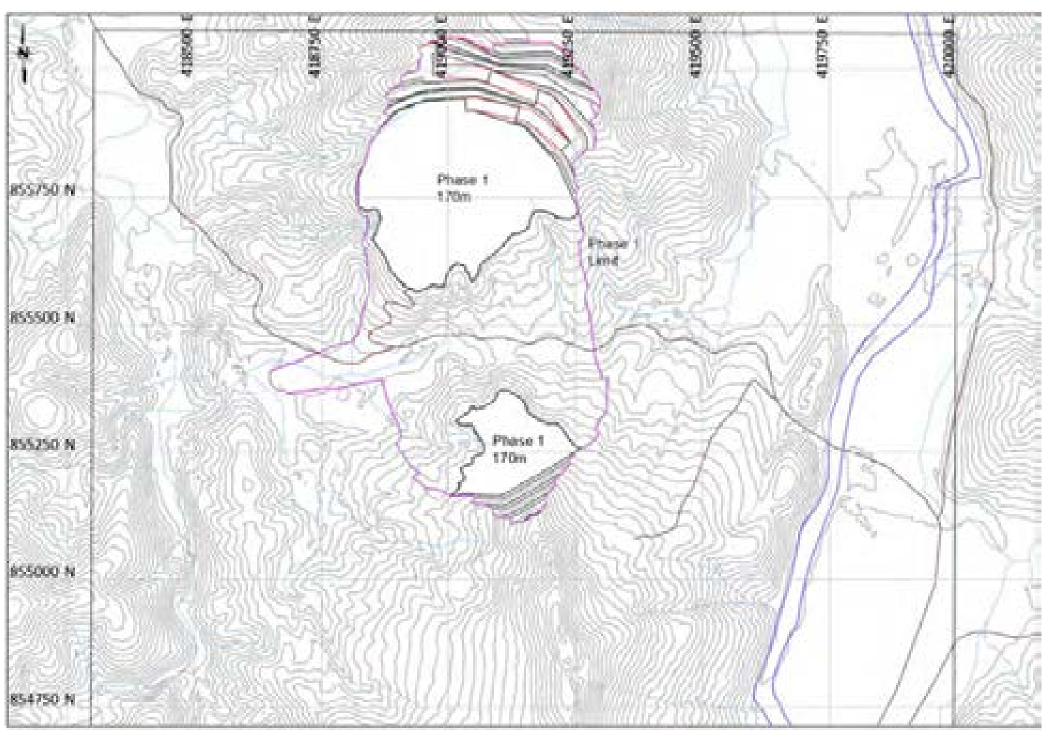
Figure 16-6: OP mine plan, recovered metal

Figure 16-7 through Figure 16-17 depict the progression of the OP, on an annual basis for select years.



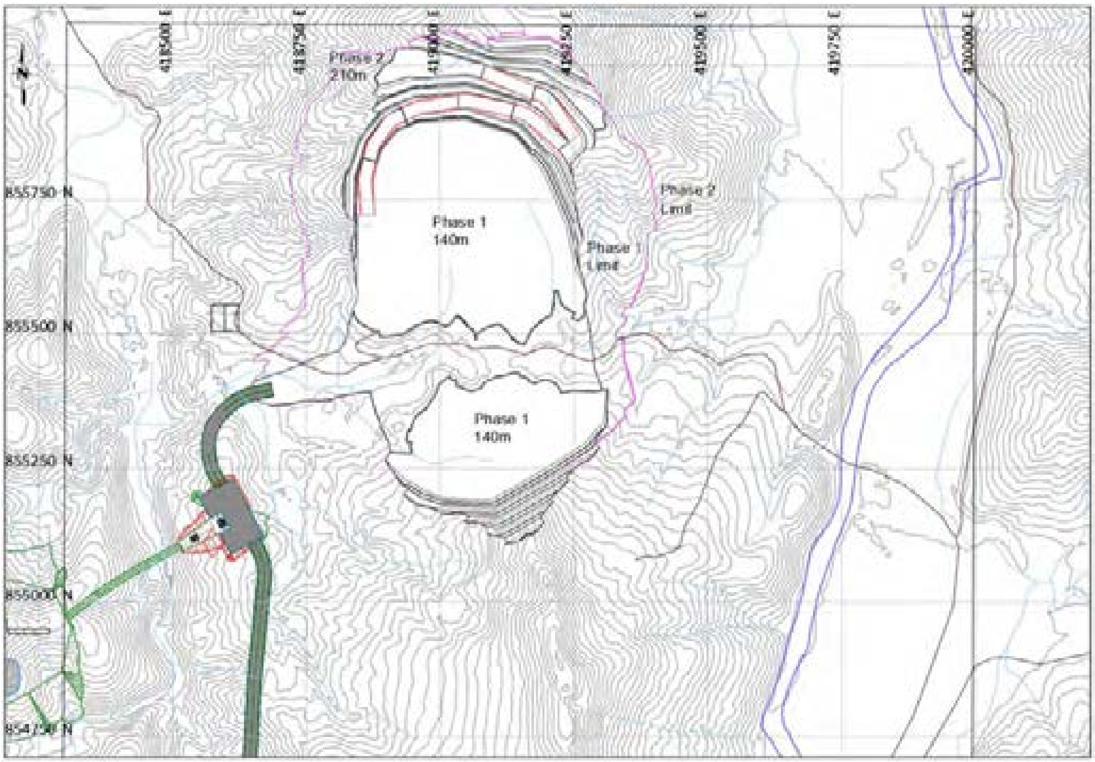
Source: Nordmin, 2021

Figure 16-7: Pit progression, Year -2 pre-production



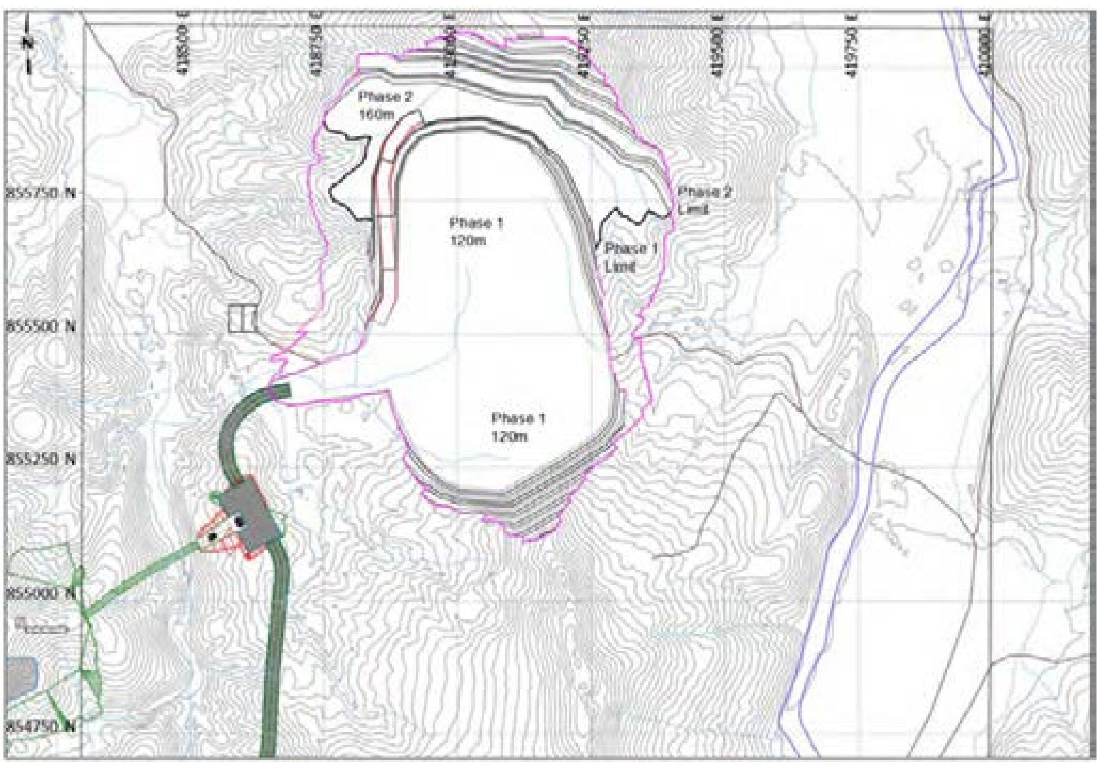
Source: Nordmin, 2021

Figure 16-8: Pit progression, Year -1 pre-production



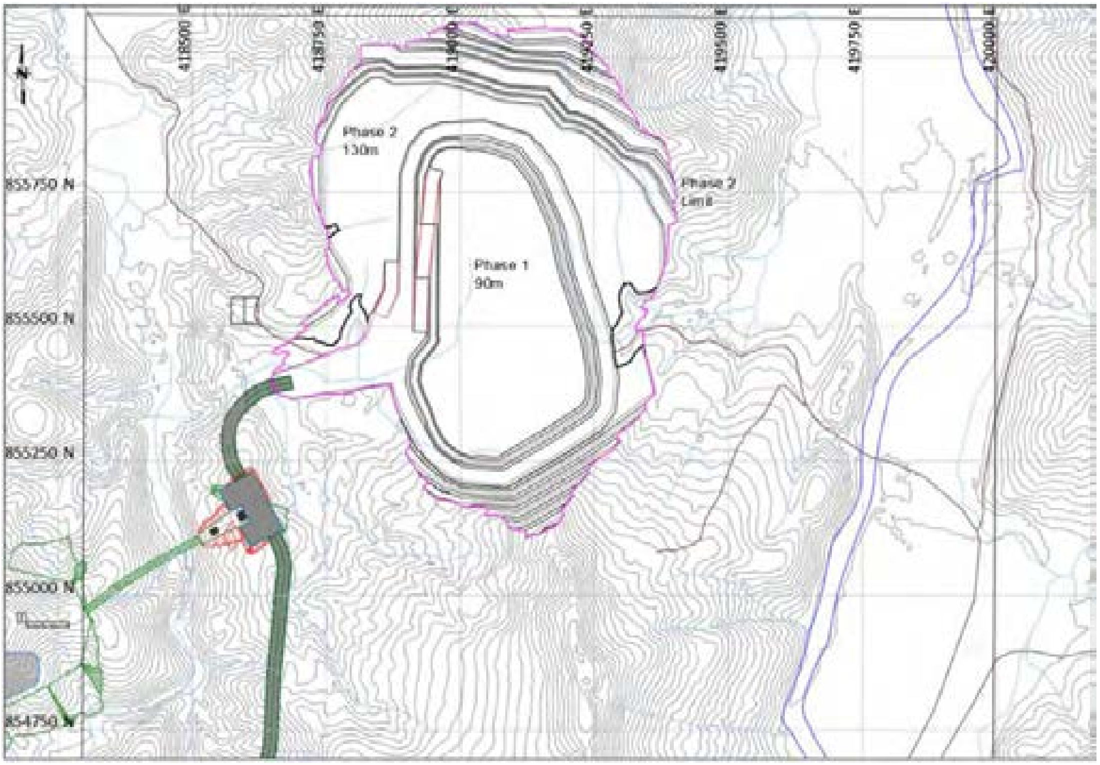
Source: Nordmin, 2021

Figure 16-9: Pit progression, Year 1 production



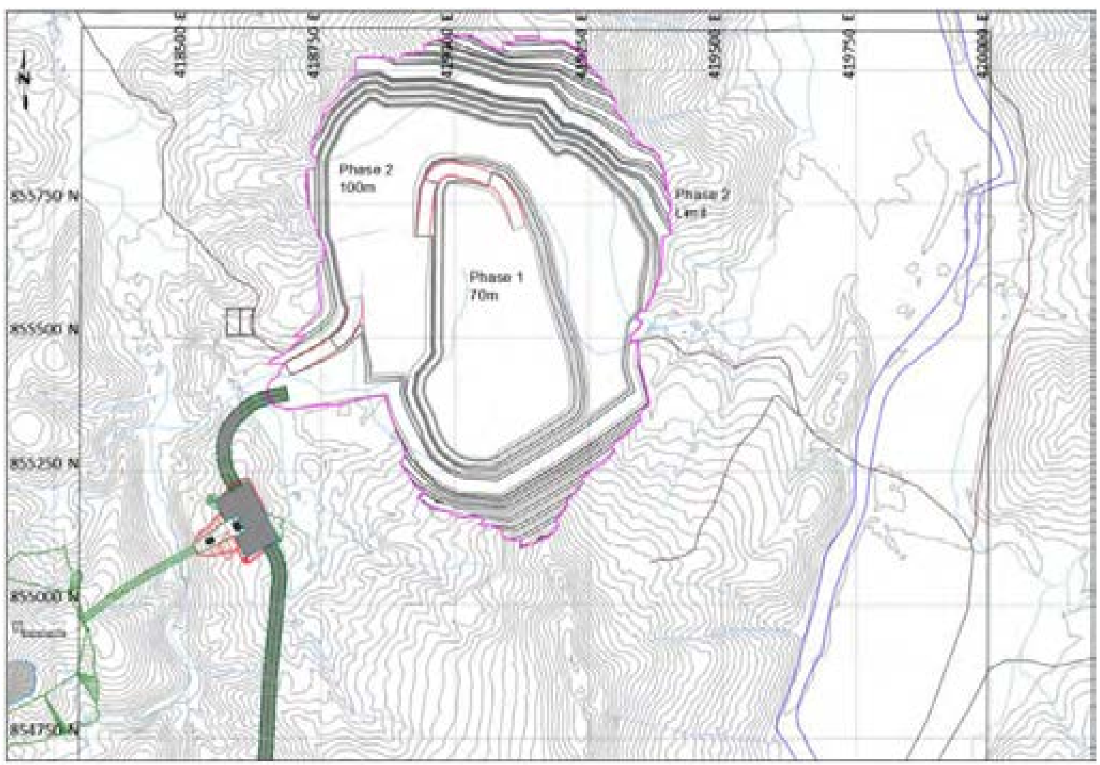
Source: Nordmin, 2021

Figure 16-10: Pit progression, Year 2 production



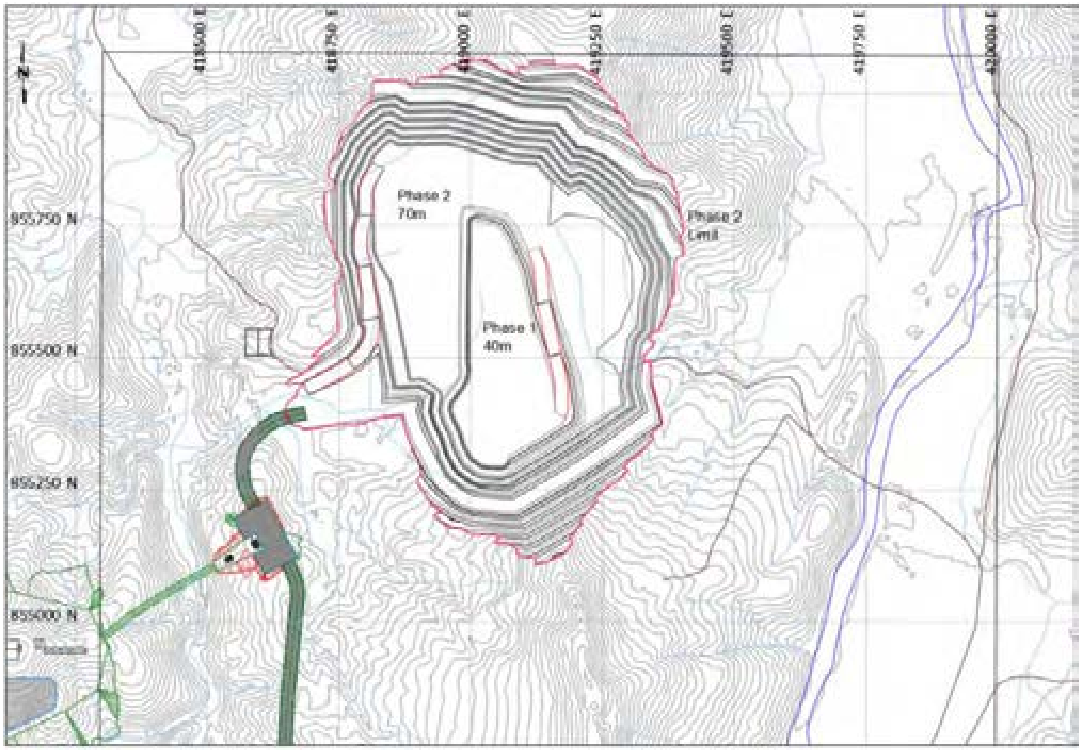
Source: Nordmin, 2021

Figure 16-11: Pit progression, Year 3 production



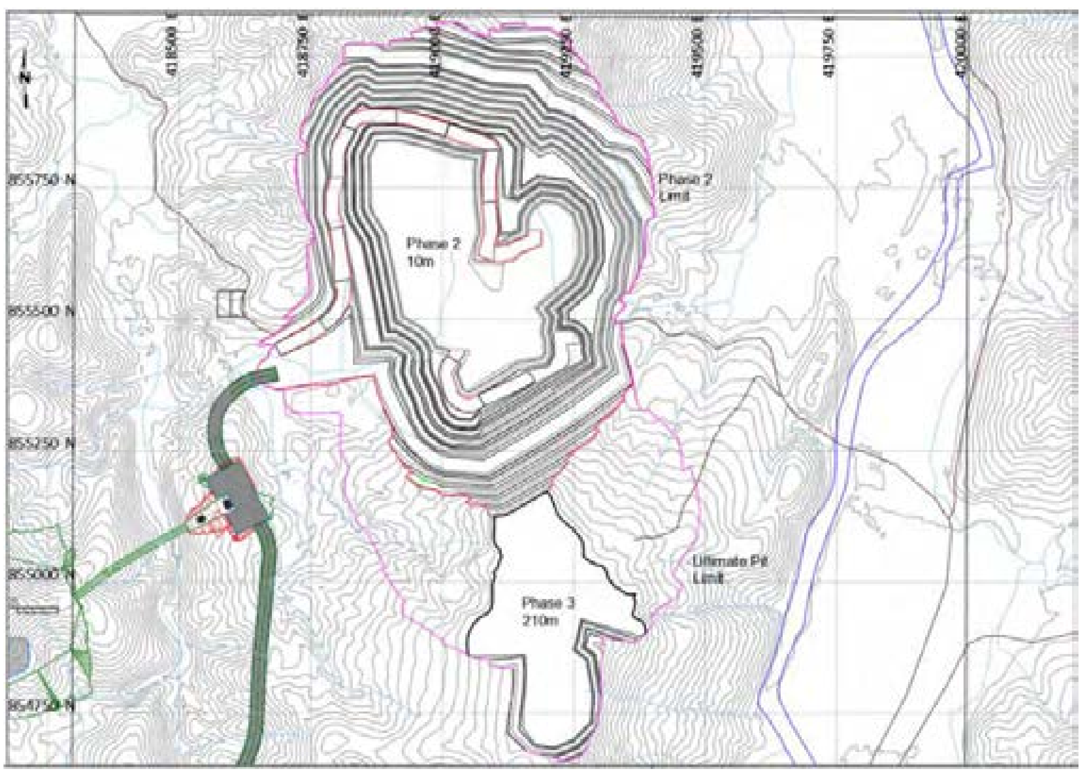
Source: Nordmin, 2021

Figure 16-12: Pit progression, Year 4 production



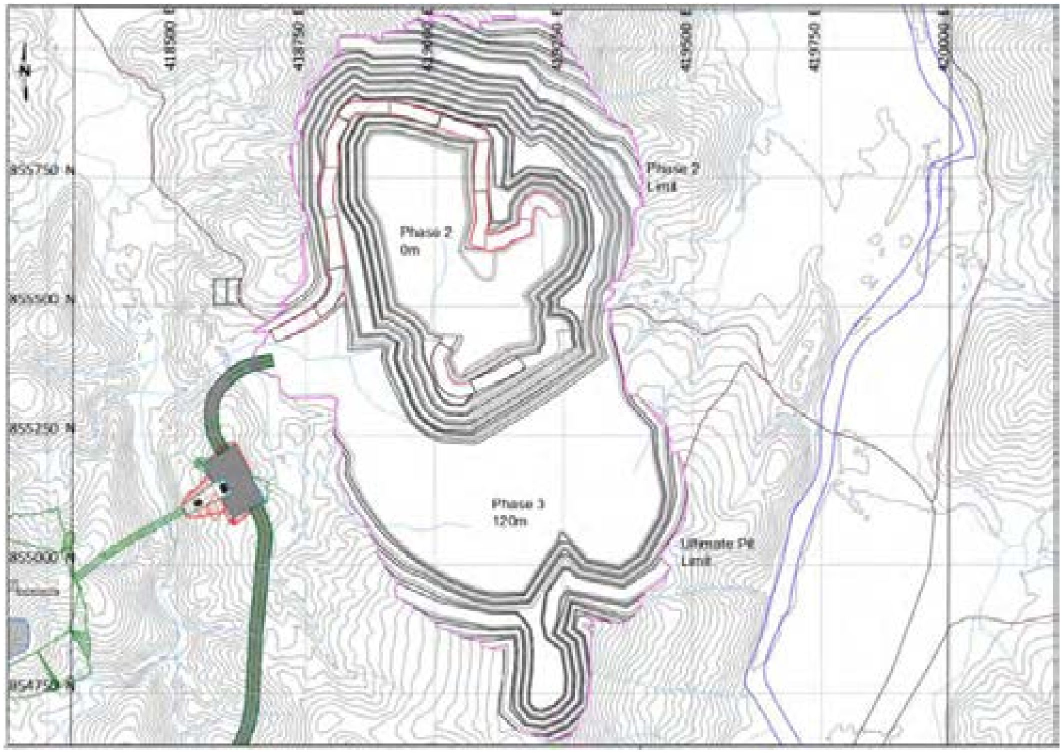
Source: Nordmin, 2021

Figure 16-13: Pit progression, Year 5 production



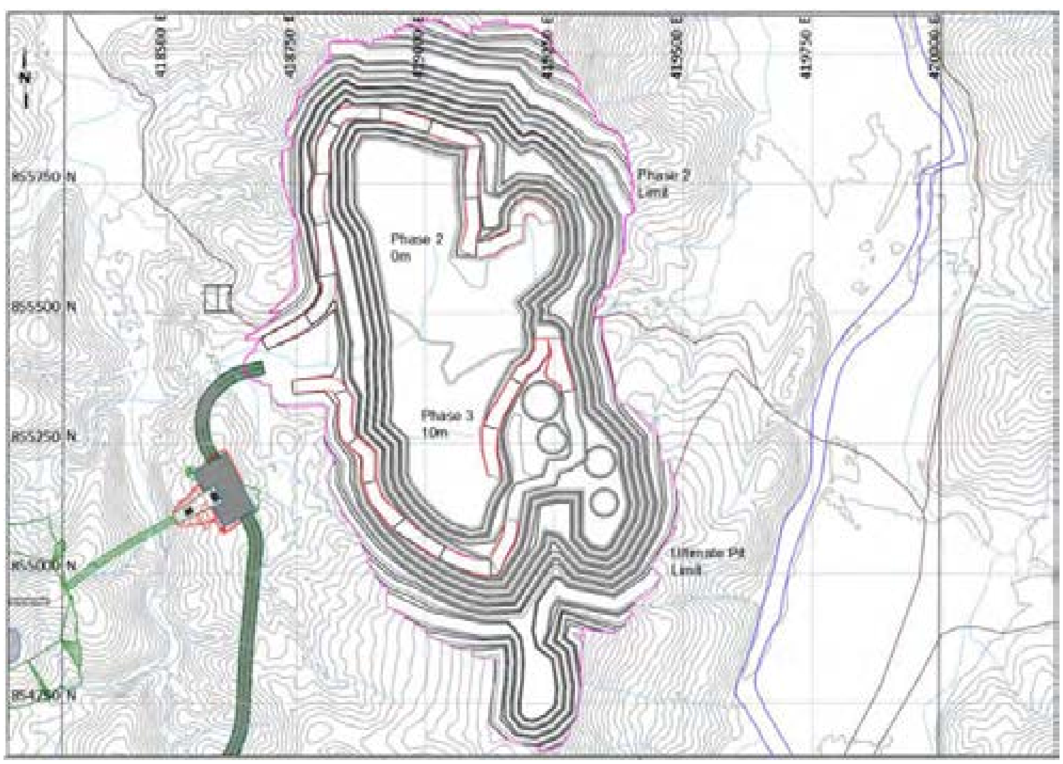
Source: Nordmin, 2021

Figure 16-14: Pit progression, Year 7 production



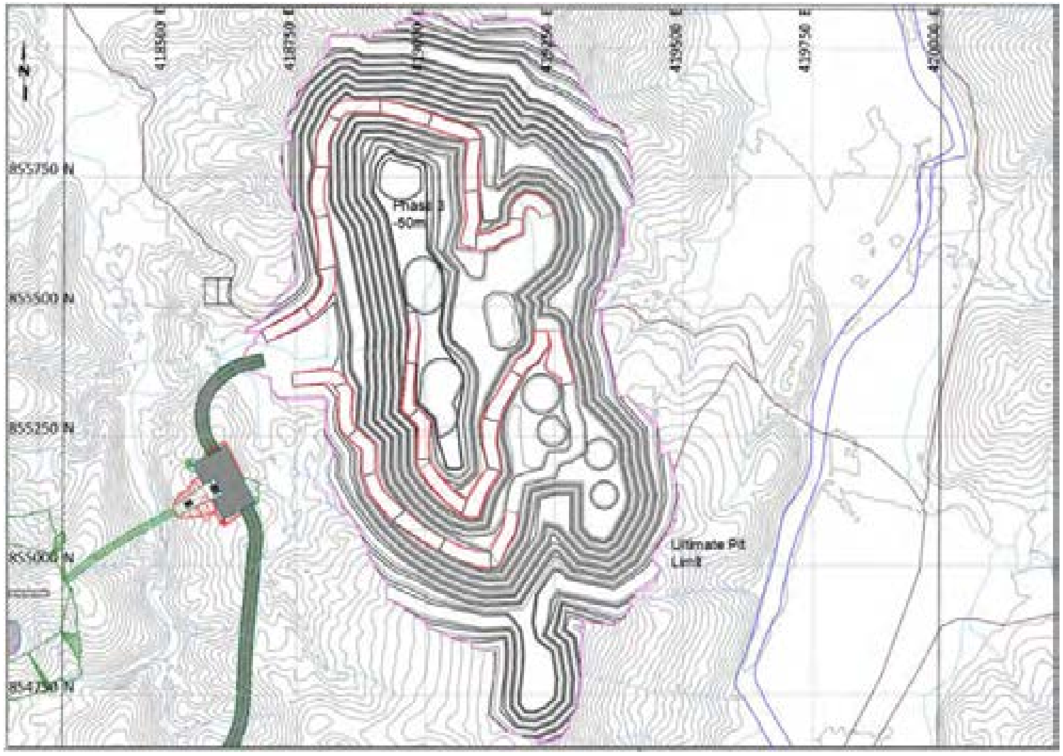
Source: Nordmin, 2021

Figure 16-15: Pit progression, Year 9 production



Source: Nordmin, 2021

Figure 16-16: Pit progression, Year 11 production



Source: Nordmin, 2021

Figure 16-17: Pit progression, Year 13 production

16.4 Mining Operation

This section includes indicative parameters for drilling, blasting, loading, and hauling. The objective of equipment selection for this level of study is to produce an estimate of costs suitable for a PFS level study and not necessarily to design an optimized equipment fleet.

16.4.1 Annual Hours

Table 16-6 presents the assumptions used in estimating the annual equipment production hours.

Table 16-6: Estimation of Annual Production Hours

	Units	Drill	Load	Haul
Calendar Days	days	365	365	365
Calendar Hours	Hours	24	24	24
Total Time (TH)	Hours	8,760	8,760	8,760
Mechanical Availability	%	85	85	85
Available Time	Hours	7,446	7,446	7,446
Operator Standby (i.e., Weather Delays)	Days	15	15	15
	Hours	360	360	360
Utilized Time (UT)	Hours	7,086	7,086	7,086
Operating Delay Hours	hours	1,521	1,521	1,521
Shifts per Day		2	2	2
Shift Start/Shutdown	mins/shift	20.0	20.0	20.0
Lunch Break	mins/shift	60.0	60.0	60.0
Miscellaneous Breaks	mins/shift	30.0	30.0	30.0
Blasting & Moves	mins/shift	10.0	10.0	10.0
Equipment Inspection	mins/shift	5.0	5.0	5.0
Production Hours (PT)	Hours	5,565	5,565	5,565
Efficiency Factor	%	85	90	98
Valuable Production Time (VPT)	Hours	4,730	5,009	5,454
Availability	%	85	85	85
Utilization	%	75	75	75
Effective Utilization	%	64	64	64

Source: Nordmin, 2021

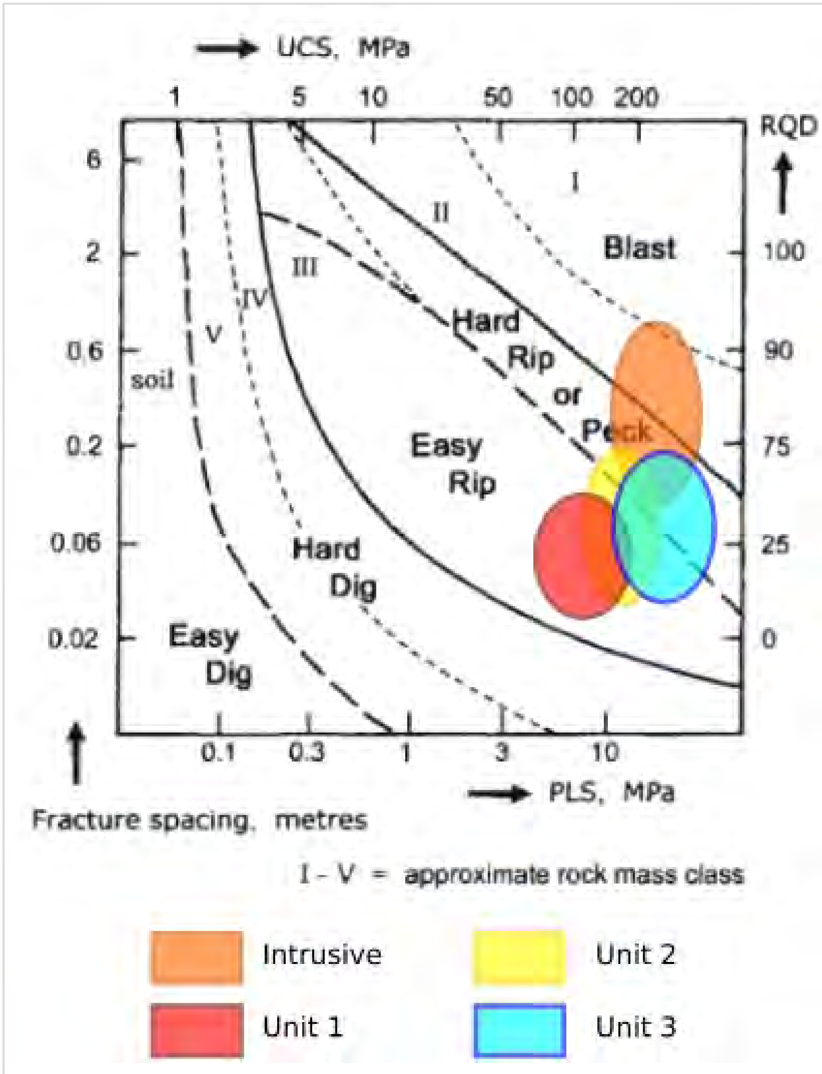
16.4.2 Drilling and Blasting

The optimum excavation method is related to rock strength and fracture density.

- Direct excavation: possible in fractured rock of mass class V and in all soils; using face shovel, backhoe, clam-shell grab, or dragline.
- Ripping: needed to break up slightly stronger rock, roughly class IV, using tractor/dozer mounted ripper, or breaking with boom-mounted hydraulic pick (pecker).

- Blasting: generally required in stronger, less fractured rock. Class III rock is loosened in the ground by undercharged blasting, massive rock of moderate, or high strength, class I, or II, needs to be fractured normally by blasting.

Most rock mass of the Alacran deposit is class II to III. Although ripping is possible, it is considered that blast to loosen and some minor blast to fracture will be required at Alacran, as shown in Figure 16-18 (Waltham, 2009).



Source: Waltham, 2009

Figure 16-18: Suggested guide for ease of excavation

16.4.2.1 Drilling

Drilling may be performed on 10 m benches and excavated on two five metre “flitches” for ore control if needed. Table 16-7 provides the blasthole productivity for a 10 m drill bench.

Two drill rigs will be required to meet the drilling targets for the 7.3 Mtpa of mill feed material scenario. A down the hole (“DTH”) drilling rig such as the EPIROC ATLAS DM45 140 mm to 225 mm rotary or CAT MD6250 152 mm to 250 mm rotary is envisaged.

It is the assumption that saprolite material will not required drilling and blasting and will be ripped and free digging.

Table 16-7: Blasthole Drill Productivity

Blasthole Drill Productivity	Units	Saprolite	Rock
Hole Diameter	mm		225
Bench Height	m		10
Bank Density	t/m^3*		2.86
Burden	m		7.0
Spacing	m		8.10
Drill Hole Length	m		12.10
Rock Mass per Hole	t/hole		1,622
Drilling Rate (overall)	m/h**		23

Source: Nordmin, 2021 * t/m^3 = tonnes per cubic metre **m/h = metres per hour

16.4.2.2 Blasting

It is recommended that the blasting services be provided by a specialist blasting services provider.

It is recommended to use booster sensitive bulk emulsion explosives and electronic detonators. An emulsion explosive is a suitable product for wet blasting application in open cut mines.

Typical blasting parameters are set out in Table 16-8.

Table 16-8: Blasting Parameters for Production Blast Holes

Description	Unit	Saprolite	Rock
Explosive density	g /cm^3*		1.20
Powder Factor	kg /t		0.21
Stemming Length	m		4.9
Blasthole Length	m		12.1
Explosive Length	m		7.2
Explosive Weight	Kg/hole		343.4

Source: Nordmin, 2021 *g/cm^3 = grams per cubic centimetre **kg= kilogram

For the purposes of estimating the requirements it has been assumed that the saprolite material will be free digging.

For blasting in rock, double priming of the blastholes has been accounted for since the explosive length is greater than 6 m.

It is estimated that, during production, approximately 1.9 M kg to 3.7 M kg of emulsion explosive product would be required for blasting every year. Assuming a working period of 365 days per year, the blasting operations will require between about 5,200 kg and 10,200 kg of explosives per day and a blast would occur every two days. The drilling and blasting plan will be optimized during further studies.

16.4.2.2.1 Wall Control Blasting

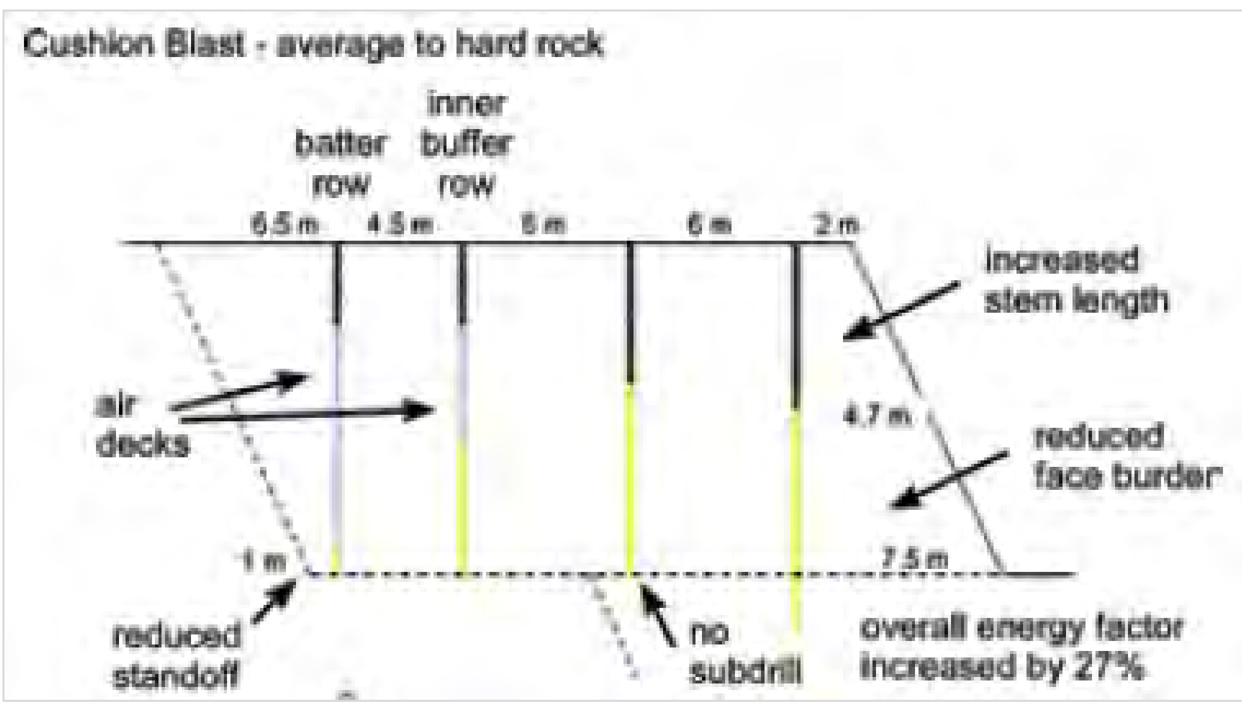
Controlled blasting strategies are recommended to ensure that the walls are not damaged by blasting and are not significantly compromised by short term production requirements.

There are several techniques that can be used to reduce blast-induced slope damage. In the subsequent stages of the project, blast engineering must be developed in such a way as to define the design and implementation practices that optimize production at the Alacran OP, while limiting damage to final pit slopes.

Initially, it is estimated that the design should be developed based on cushion blasting (Figure 16-19) which should best be adapted according to the characteristics of the design of the Alacran OP and rock mass properties.

It is recommended that some pre-splitting will be better suited to stronger more massive rock, such as the intrusive on the western wall, to control damage to final pit slopes:

- Cushion blasts are recommended for the majority of final walls. These are typically three to five rows wide and shot to a free face with a consistent burden. In adverse geology, extra rows may have to be added to the blast to protect the slope from damage caused by the production blast
- In stronger and more massive units, such as the intrusive on the western wall, pre-splitting is also recommended.



Source: Stantec, 2021

Figure 16-19: Typical cushion blast design

16.4.2.2.2 Blasting Infrastructure

The blasting infrastructure will include one magazine to be used to store packaged explosives and a second magazine to store electronic detonators and related products.

An explosive manufacturing site was not envisioned. The explosive supplier or specialist blasting service provider would drive the bulk explosives delivery trucks on the blasting bench and load the explosives into the boreholes.

16.4.3 Loading and Hauling

A backhoe type hydraulic excavator was envisioned for the production loading. A 12.0 m^3 bucket capacity was assumed when estimating the loading fleet requirements. A front end loader type of excavator was envisioned for the Project for stockpiling handling and back-up loading. A 11.0 m^3 bucket capacity was assumed when estimating the loading fleet requirements.

Loading fleet numbers have been estimated on first principles based on the operating hours required to achieve the production schedule, calculated by cycle times, and estimates of the equipment's rated capacities and productivities. The loading unit productivity assumptions are listed in Table 16-9.

Table 16-9: Loading Productivity Calculations

Description	Unit	Saprolite	Saprolite	Rock	Rock
Material Type	m^3	Ore	Waste	Ore	Waste
Excavator Type		Backhoe	Front End Loader (FEL)	Backhoe	FEL
Bucket Capacity	m^3	12	11	12	11
Bucket Fill Factor	%	75	80	80	90
Dry Density	t/bcm*	2.83	2.83	2.86	2.86
Moisture	%	5	5	5	5
Swell Factor	%	40	40	40	40
Tonnes/Pass	wmt	19.2	18.7	20.6	21.3
Haul Truck		ADT	ADT	RDT	RDT
	wmt	55	55	90.7	90.7
Passes		3.0	3.0	4.0	5.0
First Bucket Cycle Time	sec	35	30	30	30
Subsequent Bucket Cycle Time	sec	35	35	35	35
Truck Spot Time	sec	30	30	30	30
Total Load Time	sec	135	130	165	200
Productivity					
Maximum Theoretical	dry t/hr (VPT)	1,455	1,478	1,765	1,820
Truck Availability to Shovel	%	83	83	83	83
Production Adjusted	dry t/hr (PT)	1,213	1,231	1,471	1,517
Utilization	%	75	75	75	75
Production Adjusted	dry t/hr (UT)	910	924	1,103	1,138

Source: Nordmin, 2021 * bcm = bank cubic metre

Two types of haul trucks are envisioned for the Project. A 90 t rigid frame haul truck (“RDT”), example model includes CAT777, and a 55 t articulated dump truck (“ADT”), example model includes Volvo A60. Haul truck fleet numbers have been estimated on first principles based on the operating hours required to achieve the production schedule, calculated cycle times, and estimates of the equipment’s rated capacities and productivities. A limited number of typical haul profiles specific to the detailed pit design were estimated. Table 16-10 provides the average annual cycle times and Table 16-11 provides the average annual cycle metres estimated for the Project.

Other assumptions for the haul cycles include:

- 3% rolling resistance
- 3.25 min for loading time, including spot time
- 1.25 min for dumping time, including spot time
- 20 m deceleration length at starting point and destination point
- 40 km/hr maximum average speed

Table 16-10: Estimated Haul Cycles from Bench to Pit Exit (min), by Material Type

Column Label		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Year Label		**-2**	**-2**	**-1**	**-1**	**1**	**1**	**2**	**2**	**3**	**3**	**4**	**4**	**5**	**5**	**6**	**6**	**7**	**7**	**8**	**8**	**9**	**9**	**10**	**10**	**11**	**11**	**12**	**12**	**13**
PHASE 1		**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**29**
SAP1 – PIT EXIT	min	11.4	10.4	9.4	8.4	7.5	6.7	6.1	5.6	6.3																				
SAP2 – PIT EXIT	min	11.4	10.4	9.3	8.4	7.5	6.6	6.1	5.6	5.9																				
TRANS – PIT EXIT	min	11.1	10.4	9.3	8.3	7.6	6.7	6.1	5.6	6.1	7.9																			
FRESH1 – PIT EXIT	min		10.3	9.3	8.2	7.5	6.6	6.1	5.5	6.6	8.1	9.4	10.3	11.4	12.8	14.5														
FRESH2 – PIT EXIT	min		10.5	9.2	8.2	7.5	6.6	6.1	5.5	6.5	8.1	9.4	10.3	11.4	12.7	14.5														
FRESH3 – PIT EXIT	min	11.1	10.4	9.2	8.3	7.5	6.6	6.1	5.5	6.5	8.1	9.3	10.3	11.4	12.8	14.5														
FRESH4 – PIT EXIT	min	11.1	10.4	9.3	8.3	7.5	6.6	6.1	5.5	6.6	8.2	9.3	10.2	11.4	12.8	14.5														
FRESH5 – PIT EXIT	min	11.1	10.3	9.3	8.3	7.5	6.7	6.1	5.5	6.5	8.2	9.4	10.2	11.4	12.8	14.4														
SAP – WST – PIT EXIT	min	11.6	10.4	9.4	8.3	7.6	6.6	6.1	5.5	6.3	7.9																			
TRANS – WST – PIT EXIT	min	11.2	10.5	9.3	8.4	7.6	6.7	6.1	5.5	6.5	7.9																			
NPAG – WST – PIT EXIT	min	11.1	10.4	9.2	8.3	7.5	6.6	6.1	5.5	6.5	8.1	9.3	10.3	11.4	12.8	14.5														
PHASE 2																														
SAP1 – PIT EXIT	min							8.9	8.1	7.2	6.7	6.1	7.0																	
SAP2 – PIT EXIT	min							8.7	8.1	7.3	6.6	5.9	7.0																	
TRANS – PIT EXIT	min							9.3	7.8	6.8	6.3	5.9																		
FRESH1 – PIT EXIT	min							9.2	7.8	7.5	6.6	6.3	7.3	8.1	9.5	10.4	11.8	13.7	15.7	17.6										
FRESH2 – PIT EXIT	min								7.8	7.5	6.6	6.4	7.4	8.1	9.4	10.5	11.8	13.7	15.8	17.6										
FRESH3 – PIT EXIT	min								7.7	7.5	6.6	6.5	7.4	8.1	9.4	10.5	11.8	13.6	15.8	17.6										
FRESH4 – PIT EXIT	min								7.7	7.5	6.7	6.4	7.4	8.1	9.5	10.4	11.8	13.6	15.9	17.6										
FRESH5 – PIT EXIT	min								7.7	7.5	6.6	6.4	7.4	8.1	9.5	10.5	11.7	13.7	15.9	17.6										
SAP – WST – PIT EXIT	min							9.4	7.9	7.5	6.7	6.1	7.0	7.7																
TRANS – WST – PIT EXIT	min							9.4	7.9	7.6	6.6	6.4	7.1	7.7																
NPAG – WST – PIT EXIT	min							9.3	7.8	7.4	6.6	6.3	7.4	8.1	9.4	10.4	11.7	13.6	15.8	17.6										
PHASE 3																														
SAP1 – PIT EXIT	min															10.6	9.8	9.2	8.8	7.9	6.9	6.2	5.7	6.4						
SAP2 – PIT EXIT	min															10.7	9.8	9.2	8.8	7.9	6.9	6.1	5.7							
TRANS – PIT EXIT	min															10.5	9.9	9.2	8.8	8.0	6.8	6.3	5.8	6.4						
FRESH1 – PIT EXIT	min															10.3	9.7	9.2	8.8	7.9	6.8	6.2	5.8	6.7	8.3	10.6	13.8	16.9	18.6	19.8
FRESH2 – PIT EXIT	min															10.3	9.7	9.2	8.8	8.0	6.9	6.2	5.8	6.7	8.4	10.5	13.9	16.9	18.6	19.9
FRESH3 – PIT EXIT	min															10.2	9.8	9.2	8.8	7.9	6.9	6.2	5.8	6.7	8.4	10.5	13.8	16.9	18.7	19.9
FRESH4 – PIT EXIT	min															10.2	9.8	9.2	8.8	7.9	6.8	6.1	5.8	6.7	8.4	10.4	13.9	16.9	18.6	19.9
FRESH5 – PIT EXIT	min															10.3	9.8	9.2	8.8	7.9	6.8	6.1	5.8	6.8	8.4	10.4	13.6	17.0	18.6	19.9
SAP – WST – PIT EXIT	min															10.5	9.9	9.2	8.8	7.9	6.8	6.2	5.7	6.4						
TRANS – WST – PIT EXIT	min															10.5	9.9	9.2	8.8	8.0	6.8	6.1	5.7	6.4						
NPAG – WST – PIT EXIT	min															10.2	9.7	9.2	8.8	7.9	6.8	6.1	5.8	6.8	8.4	10.4	13.5	16.7	18.6	19.9

Source: Nordmin, 2021

Table 16-11: Estimated Haul Cycles from Bench to Pit Exit (m), by Material Type

Column Label		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Year Label		-2	-2	-1	-1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13
PHASE 1		**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**29**
SAP1 – PIT EXIT	m	1,553	1,394	1,213	1,033	887	720	658	560	647																				
SAP2 – PIT EXIT	m	1,554	1,402	1,201	1,028	891	712	658	562	608																				
TRANS – PIT EXIT	m	1,495	1,395	1,203	1,026	901	722	659	562	621	871																			
FRESH1 – PIT EXIT	m		1,392	1,199	1,007	888	710	658	559	686	902	1,036	1,088	1,182	1,327	1,490														
FRESH2 – PIT EXIT	m		1,412	1,188	1,012	889	712	658	559	684	902	1,036	1,085	1,184	1,325	1,492														
FRESH3 – PIT EXIT	m	1,494	1,395	1,179	1,013	897	708	658	559	685	903	1,033	1,086	1,182	1,329	1,490														
FRESH4 – PIT EXIT	m	1,494	1,399	1,189	1,015	894	704	658	560	687	909	1,035	1,082	1,182	1,329	1,491														
FRESH5 – PIT EXIT	m	1,494	1,389	1,190	1,019	893	714	658	558	685	912	1,036	1,084	1,181	1,328	1,487														
SAP – WST – PIT EXIT	m	1,580	1,399	1,212	1,024	899	709	658	558	658	871																			
TRANS – WST – PIT EXIT	m	1,518	1,414	1,194	1,029	898	715	659	558	674	871																			
NPAG – WST – PIT EXIT	m	1,494	1,397	1,186	1,022	893	712	658	559	683	905	1,034	1,085	1,183	1,328	1,489														
PHASE 2																														
SAP1 – PIT EXIT	m							1,221	1,053	933	821	652	785																	
SAP2 – PIT EXIT	m							1,180	1,058	943	805	630	785																	
TRANS – PIT EXIT	m							1,312	1,005	857	725	630																		
FRESH1 – PIT EXIT	m							1,288	1,004	983	800	688	798	811	912	1,003	1,137	1,342	1,575	1,744										
FRESH2 – PIT EXIT	m								1,003	982	801	699	801	811	909	1,003	1,138	1,337	1,577	1,744										
FRESH3 – PIT EXIT	m								993	982	812	707	800	810	908	1,004	1,136	1,331	1,586	1,744										
FRESH4 – PIT EXIT	m								998	980	819	706	802	810	914	1,000	1,138	1,330	1,591	1,744										
FRESH5 – PIT EXIT	m								996	987	808	706	801	810	913	1,004	1,128	1,340	1,589	1,744										
SAP – WST – PIT EXIT	m							1,304	1,029	978	827	656	785	817																
TRANS – WST – PIT EXIT	m							1,309	1,021	1,001	805	695	790	817																
NPAG – WST – PIT EXIT	m							1,292	1,011	974	807	690	800	811	907	1,002	1,128	1,330	1,577	1,744										
PHASE 3																														
SAP1 – PIT EXIT	m															1,500	1,348	1,222	1,130	941	747	629	570	632						
SAP2 – PIT EXIT	m															1,516	1,350	1,222	1,130	958	743	617	570							
TRANS – PIT EXIT	m															1,474	1,368	1,219	1,130	972	736	649	575	632						
FRESH1 – PIT EXIT	m															1,436	1,327	1,221	1,130	960	739	628	575	640	740	943	1,297	1,616	1,825	1,932
FRESH2 – PIT EXIT	m															1,431	1,326	1,220	1,130	967	742	627	575	640	744	936	1,314	1,618	1,824	1,934
FRESH3 – PIT EXIT	m															1,425	1,338	1,219	1,130	960	743	628	575	640	745	933	1,303	1,617	1,828	1,935
FRESH4 – PIT EXIT	m															1,423	1,341	1,220	1,130	952	738	626	576	639	748	928	1,313	1,614	1,824	1,934
FRESH5 – PIT EXIT	m															1,432	1,347	1,222	1,130	948	739	623	575	641	751	932	1,279	1,624	1,821	1,933
SAP – WST – PIT EXIT	m															1,482	1,356	1,222	1,130	954	735	628	573	633						
TRANS – WST – PIT EXIT	m															1,468	1,365	1,219	1,130	968	740	622	572	632						
NPAG – WST – PIT EXIT	m															1,416	1,327	1,221	1,130	954	740	623	575	642	749	930	1,270	1,606	1,817	1,934

Source: Nordmin, 2021

For the additional haulage from the pit exit to the destination, a number of centroids were selected to represent dump locations.

- Distance from the pit exit to the ROM was estimated at 345 m with 3.8 min cycle time
- Distance from the ROM to stockpiling area was estimated at an additional 1,340 m with 9.9 min cycle time
- Distance from pit exit to WMF varied between 2,270 m and 2,812 m with 10.3 min to 12.4 min cycle time
- Distance from pit exit to the WMF embankment varied between 515 m at the South Embankment to 3,295 m along the Main Embankment with cycle times varying between 3.4 min and 15.3 min.

Table 16-12 summarizes the overall cycle times estimate by destination.

Table 16-12: Average Haul Cycle Times

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Year		**-2**	**-2**	**-1**	**-1**	**1**	**1**	**2**	**2**	**3**	**3**	**4**	**4**	**5**	**5**	**6**	**6**	**7**	**7**	**8**	**8**	**9**	**9**	**10**	**10**	**11**	**11**	**12**	**12**	**13**	**13**
AVERAGE CYCLE TIMES		**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**
ROM – FRESH, TRANSITION	min	14.86	14.17	13.05	12.06	11.32	10.43	9.98	9.63	10.43	11.67	12.38	13.10	13.55	14.95	15.98	14.63	16.91	18.47	16.44	10.63	9.96	9.56	10.48	12.16	14.26	17.59	20.69	22.42	23.68	0.00
ROM – SAPROLITE	min	15.21	14.18	13.13	12.17	11.30	10.45	10.13	9.85	10.34	10.44	9.77	10.82	0.00	0.00	14.46	13.63	13.01	12.55	11.69	10.66	9.92	9.53	10.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAG – FRESH – WMF	min	21.39	20.71	19.55	18.64	17.85	16.89	17.61	17.55	17.89	18.40	18.62	19.77	20.49	22.18	23.45	22.36	24.60	25.93	22.25	19.25	18.54	18.19	19.21	20.81	22.85	25.94	29.16	30.97	32.31	12.42
PAG – TRANS – WMF	min	21.51	20.84	19.60	18.69	17.87	16.77	18.93	18.45	18.33	17.67	17.22	17.98	10.85	10.85	21.30	22.34	21.63	21.18	20.41	19.25	18.54	18.15	18.84	12.42	12.42	12.42	12.42	12.42	12.42	12.42
NPAG – SAP – EMBANKMENT	min	21.53	20.33	19.80	18.77	18.63	17.38	19.05	17.99	18.44	17.91	17.28	18.22	18.94	15.28	19.41	18.76	18.11	24.04	23.20	22.08	21.44	21.02	21.72	15.28	15.28	15.28	15.28	15.28	15.28	15.28
NPAG – TRANS – EMBANKMENT	min	21.12	20.44	19.71	18.80	18.74	17.32	19.55	18.43	18.42	18.07	17.56	18.32	18.94	15.28	19.34	18.81	18.10	24.04	23.27	22.11	21.40	21.01	21.69	15.28	15.28	15.28	15.28	15.28	15.28	15.28
NPAG – FRESH – EMBANKMENT	min	20.99	20.31	19.66	18.75	18.72	17.83	17.64	17.43	18.31	18.44	18.20	18.98	19.51	24.97	19.99	20.05	22.25	30.00	27.50	22.11	21.40	21.04	22.07	23.67	25.71	28.80	32.02	33.83	35.16	15.28
ADDITIONAL TO STOCKPILE	min	6.69	6.69	6.69	6.69	6.69	6.69	6.69	6.69	6.69	6.69	6.69	6.69	0.00	0.00	6.69	6.69	6.69	6.69	6.69	6.69	6.69	6.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FROM STOCKPILE	min	0.00	0.00	0.00	0.00	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94

Source: Nordmin, 2021

16.4.4 Major Mobile Mining Equipment

The mining equipment cost inputs for the operating cost estimate are based on the mining fleet being operated by the owner.

Equipment selection, sizing, and fleet requirements were based on expected typical operating conditions, haulage profiles, production cycle times, mechanical availability, utilization, and operator efficiency. To determine the number of units for each equipment type (drills, shovels, trucks, etc.), annual operating hours were calculated and compared to the available annual equipment hours.

Mobile support equipment such as a front end loader, dozer, grader, water, and fuel truck were matched with the major mining units.

A mine equipment fleet typical for this size of operation is listed in Table 16-13.

Table 16-13: Major Mobile Mine Equipment for OP

Item	Example Model	Quantity
Load and Haul		
12.0 m^3 Backhoe Excavator	Komatsu PC3000	2
11.0 m^3 Back-up and Stockpile FEL	Caterpillar 992	1
90 t RDT	Caterpillar 777	Up to 10
55 t ADT	Volvo A60	Up to 5
Drilling		
225 mm Rotary Drill		2
Support		
Track Dozer	Caterpillar D9	Up to 4
Wheel Dozer	Caterpillar 834	1
Grader	Caterpillar 16 M	2

Source: Nordmin, 2021

Table 16-14 summarizes the annual major equipment numbers operating, purchased, and replaced.

Table 16-14: List of Major Mine Equipment Purchase, Replacement

Open Pit Equipment Category	Assumed Life Hours		YR -2	YR -1	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	YR 7	YR 8	YR 9	YR 10	YR 11	YR 12	YR 13
OPEN PIT MINING AREA REPLACEMENTS																	
PRIMARY DRILL	55,000	# of Units	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1
		# of Units New	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced															
FRONT END LOADER	45,000	# of Units	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
		# of Units New	0		1												
		# of Units Replaced/Overhauled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HYDRAULIC EXCAVATOR	60,000	# of Units	1	1	2	2	2	2	2	2	2	2	2	1	1	1	1
		# of Units New	1														
		# of Units Replaced/Overhauled															
90 t TRUCK	60,000	# of Units	2	5	7	8	9	10	10	9	10	10	10	10	10	10	5
		# of Units New	2	3	2	1	1	1	0	0	0	0	0	0	0	0	0
		# of Units Replaced/Overhauled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ARTICULATED TRUCK	45,000	# of Units	5	5	3	5	3	2	3	3	3	4	3	4	4	3	1
		# of Units New	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced/Overhauled	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
TRACKED DOZER	45,000	# of Units	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4
		# of Units New	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced/Overhauled	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0
WHEEL DOZER	45,000	# of Units	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		# of Units New	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced/Overhauled	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
GRADER	35,000	# of Units	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1
		# of Units New	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		# of Units Replaced/Overhauled	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0

Source: Nordmin, 2021

16.4.5 Ancillary Service and Support Equipment

The primary pit operations will be supported by additional equipment including track dozers with ripper attachments, road graders, water truck, utility loaders and excavators, and maintenance service vehicles (Table 16-15).

Table 16-15: Estimated List of Ancillary Mine Equipment

Ancillary Equipment	No. of Units
Blast Crew Truck	1
Blaster's Truck	1
Skid Steer / Stemming Loader	1
Air Trac – Secondary Drill	1
Loader – Medium	1
Water Truck	1
Utility Excavator	2
Utility Loader	1
Maintenance Field & Service Trucks	3
Fuel/Lube Truck	1
Float Truck	1
Flatbed Truck	1
Crane	1
Tire Handler	1
Forklift	1
Light Vehicles	7
Crew Buses	1
Mine Rescue Truck	1
Light Vehicles	15
Portable Light Towers	10
Dewatering Pumps	3
Auxiliary Pumps	2

Source: Nordmin, 2021

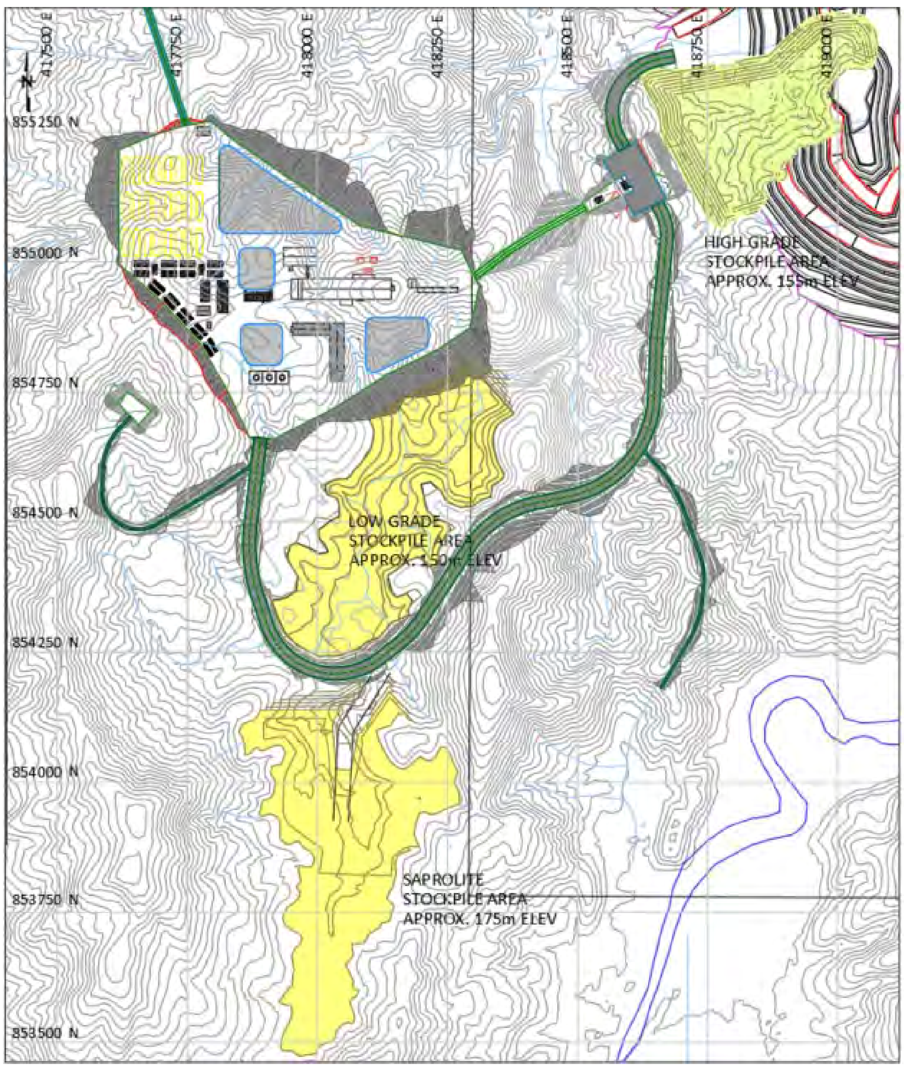
16.4.6 Surface Stockpiles

It is envisaged that the rock will be loaded directly into the processing plant crusher hopper but there will be a need for a ROM stockpile to allow for stoppages and possibly some blending. A small FEL, such as a CAT 988, has been allowed for.

A CAT 992 is also envisioned to provide back-up and to handle the rehandle from the expected lower grade and saprolite stockpiles.

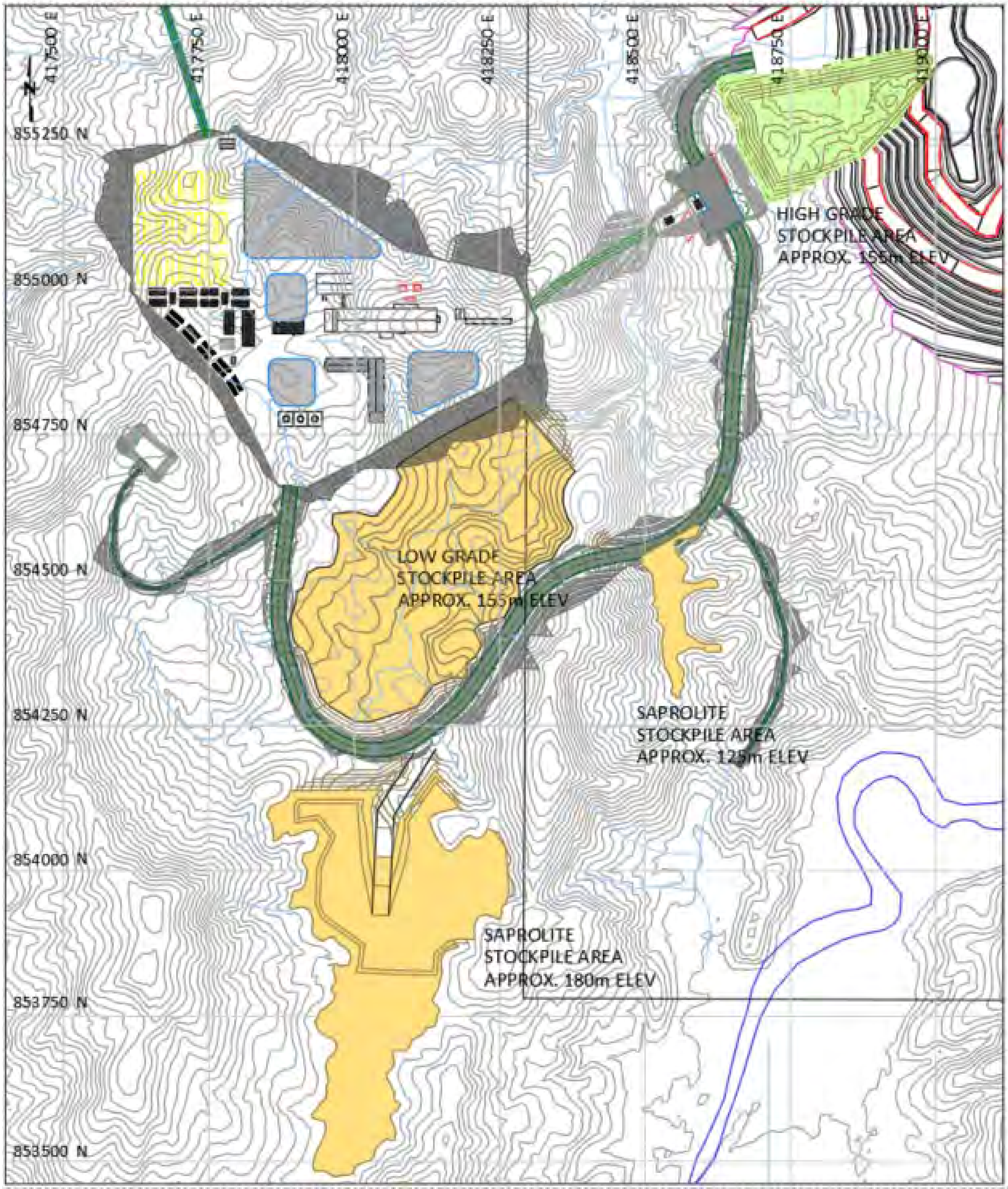
Table 16-6 depicts the stockpile movements by year (on 6-month intervals). The peak storage requirements for the HG material is approximately 1.58 M m^3 at Year -1, LG material is approximately 4.96 M m^3 at Year 6 of production, while the peak storage requirements for the economic saprolite material is approximately 2.96 M m^3 at Year 2 of production. The estimated progression of the surface stockpiles is conceptually illustrated in Figure 16-20 through Figure 16-28.

The stockpile areas will be prepared with a compacted saprolite base, from saprolite waste material mined during pre-production. The stockpile areas will be graded to trenches so that run-off can be collected and treated accordingly.



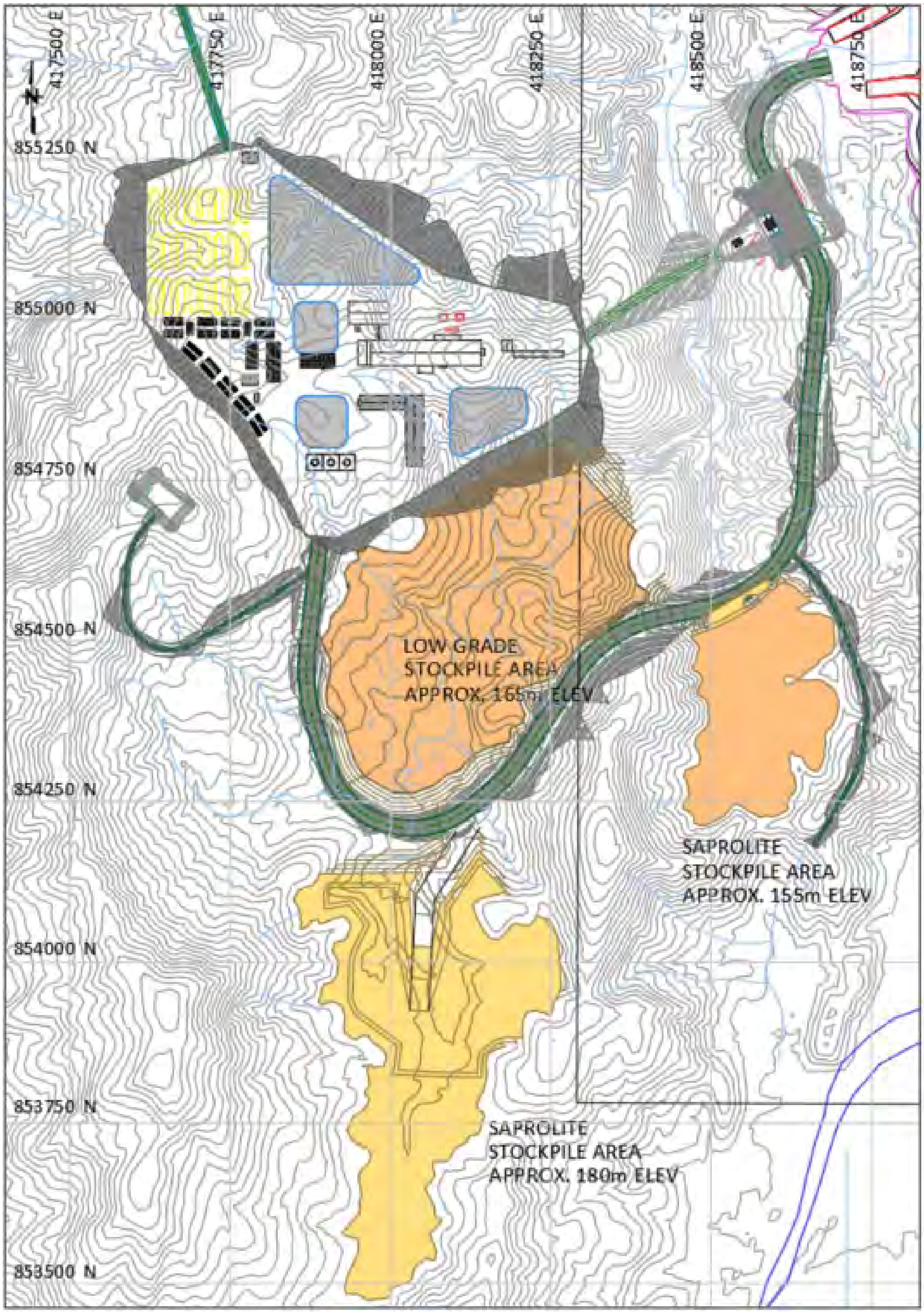
Source: Nordmin, 2021

Figure 16-20: Stockpile Progression, Year -1



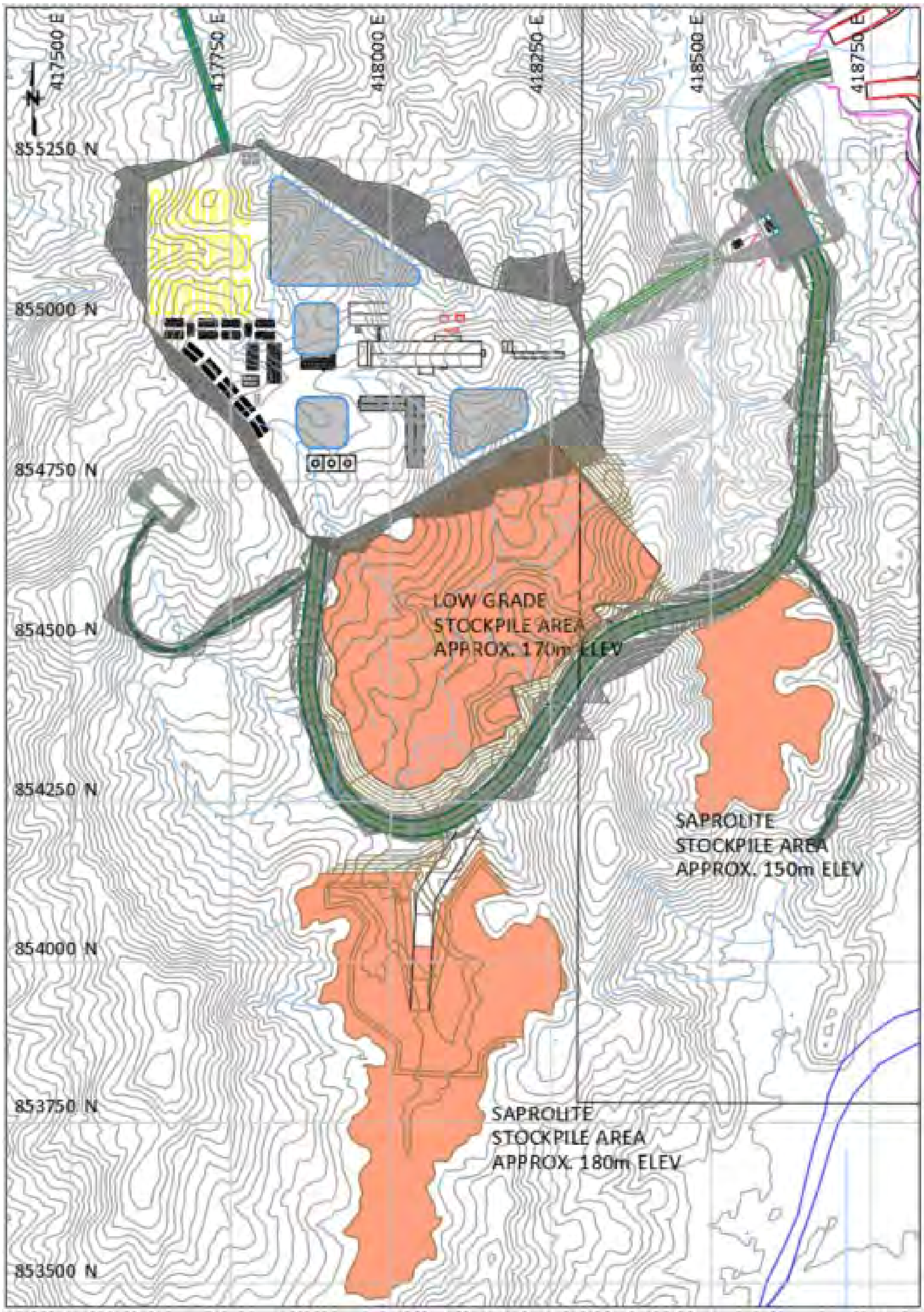
Source: Nordmin, 2021

Figure 16-21: Stockpile progression, Year 1



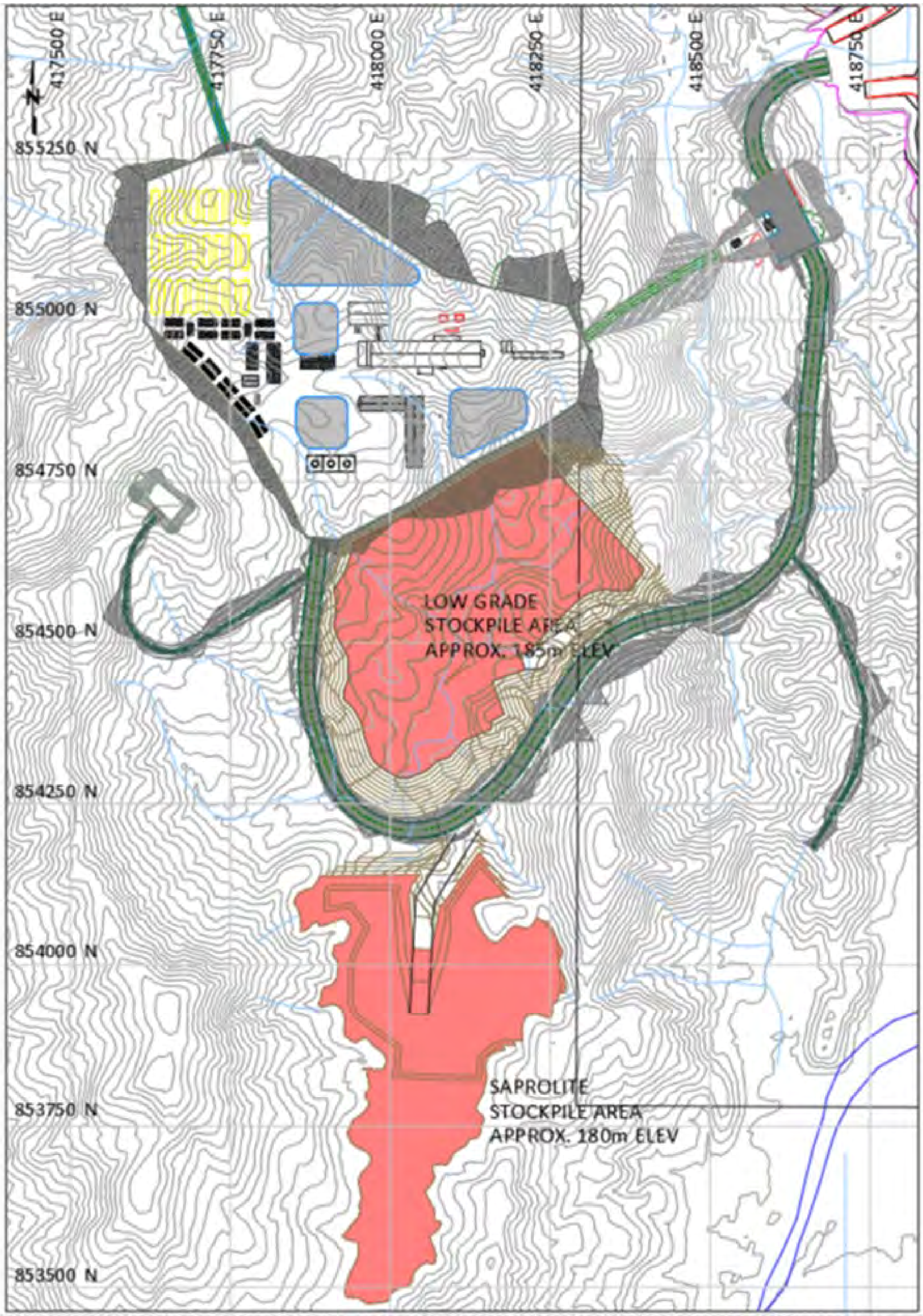
Source: Nordmin, 2021

Figure 16-22: Stockpile progression, Year 2



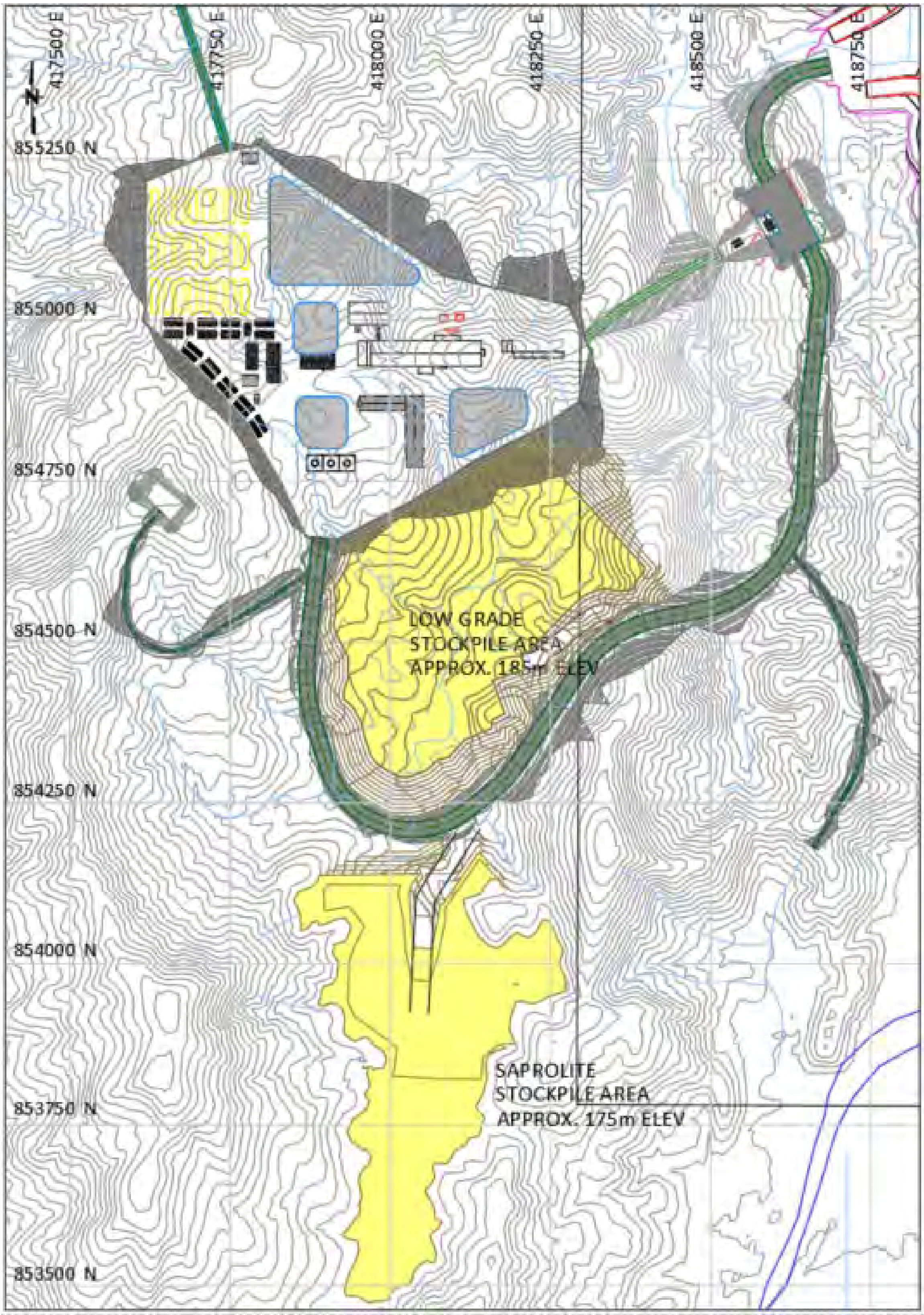
Source: Nordmin, 2021

Figure 16-23: Stockpile progression, Year 3



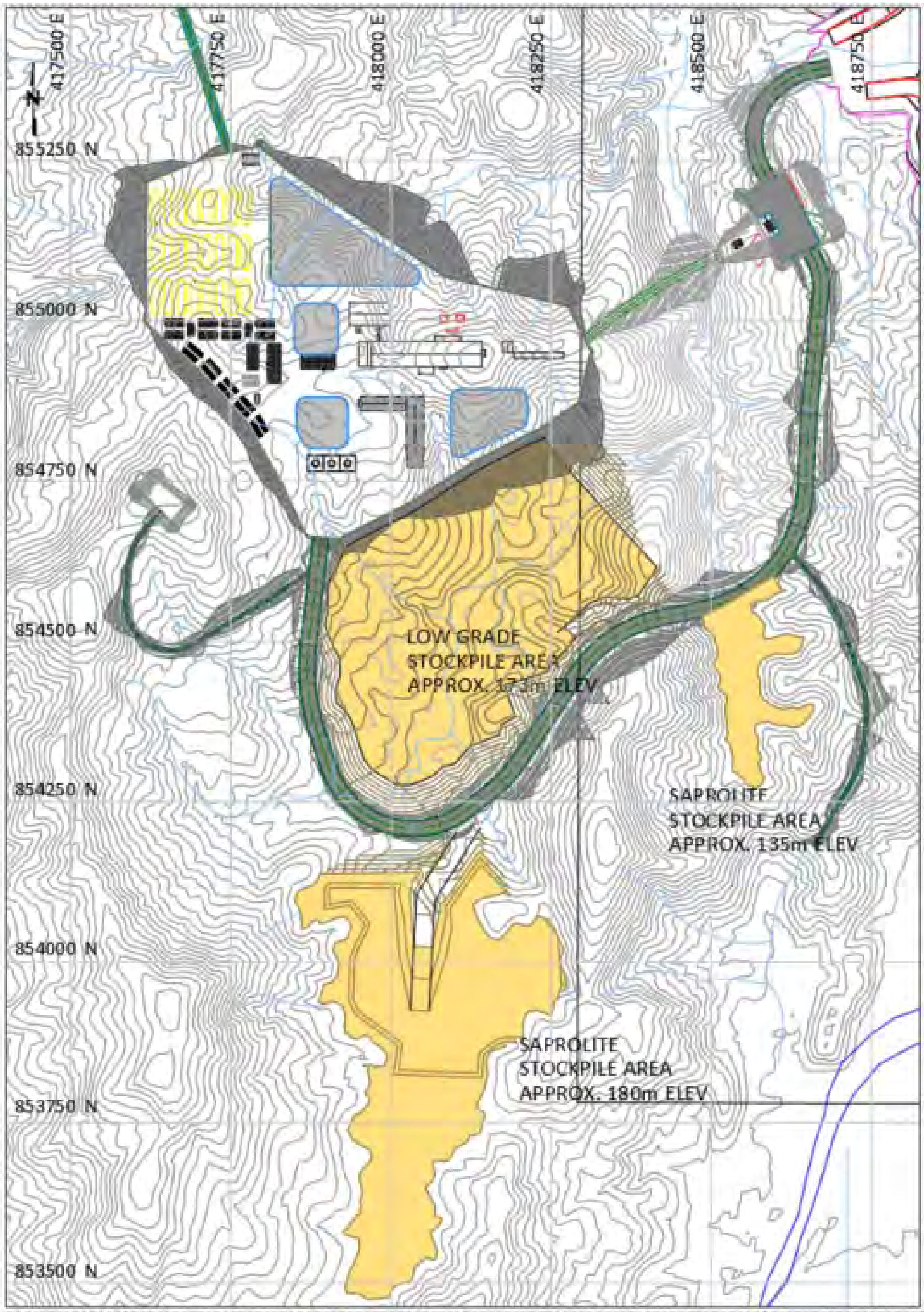
Source: Nordmin, 2021

Figure 16-24: Stockpile progression, Year 5



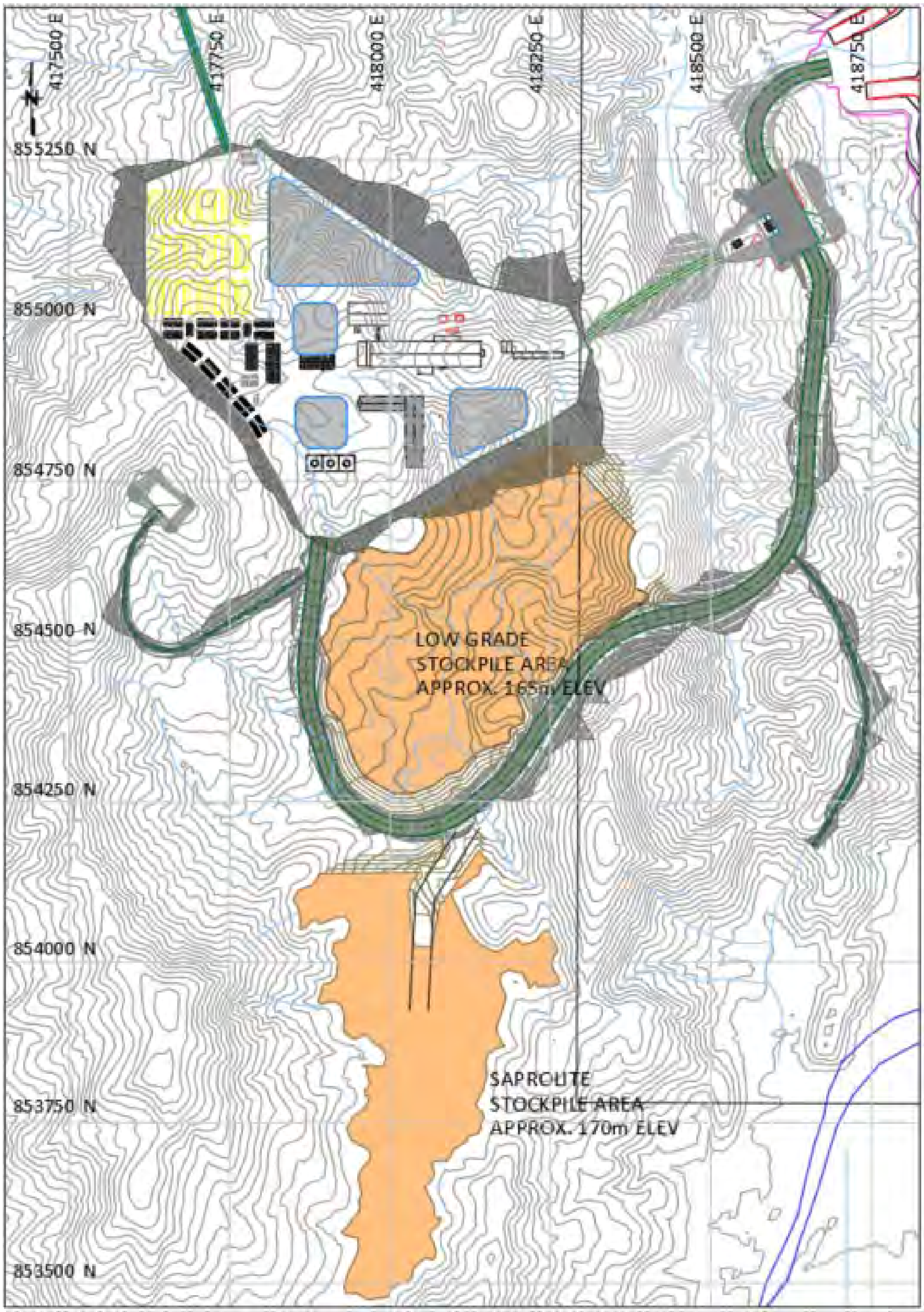
Source: Nordmin, 2021

Figure 16-25: Stockpile progression, Year 7



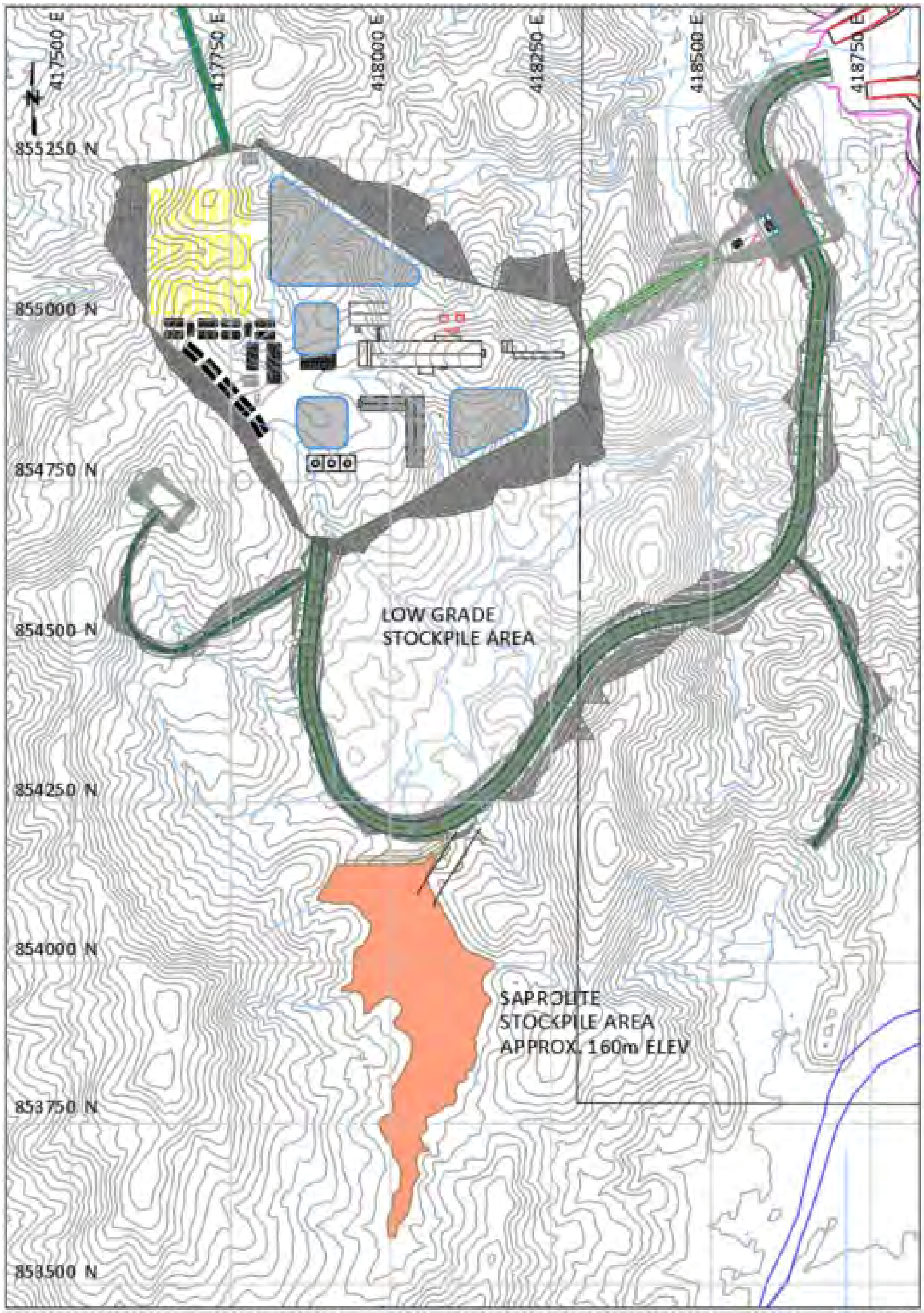
Source: Nordmin, 2021

Figure 16-26: Stockpile progression, Year 9



Source: Nordmin, 2021

Figure 16-27: Stockpile progression, Year 11



Source: Nordmin, 2021

Figure 16-28: Stockpile progression, Year 13

16.4.7 Mine Services

16.4.7.1 Pit Dewatering

The progressive development of the OP will result in increasing water infiltration from precipitation and groundwater inflows. As the pit deepens and increases in footprint, it will be necessary to control water inflow through a combination of dewatering systems such as dewatering wells around the pit, diversion ditches, sumps, pipelines, and pumps. The objective of the pit water management program is to minimize the inflow of groundwater and surface runoff to the pit, but there will be a significant amount of rainfall that will have to be managed due to the annual precipitation rate of 2,800 mm/year.

An allowance has been included in the OP capital and operating costs for in pit dewatering through in pit sumps.

Dewatering inside the pit will be minimal for the first four years as the pit will daylight out of the hillside so that surface runoff will be collected in external ditching. Once a pit is developed that does not daylight, two to three diesel powered pumps with associated pipelines will be installed at the bottom of the pit for in pit dewatering by sumps. Water will be pumped a short distance out of the pit area to local external ditching.

For moving water out of the Alacran OP and to the nearest transfer station, 1000-hp horizontal centrifugal dewatering pump assemblies has been allowed for. In the first five years, two pumps are used, and these are increased to three in the sixth year. Smaller pump units are also used to help feed the 1000-hp horizontal centrifugal dewatering pump assemblies in the Alacran pit.

Perimeter dewatering wells are proposed for the project and are discussed in Section 20.

16.4.7.2 Dust Suppression

A CAT777 truck modified with a water tank is suggested to be used for dust suppression. Water required for dust allaying purposes on the haul roads, at the loading areas, and the waste dumps will be obtained from water from the OP.

Water refilling stations / goosenecks will be situated at the sump in the OP and on surface at a take off point from the pit dewatering pipeline. Supplementary water will be obtained from the surface water control ponds / tanks situated near the processing plant.

16.5 Labour Requirements

The labour cost inputs for the operating cost estimate are based on the skilled and unskilled labour being supplied by the owner.

A combination of rotation schedules is envisioned. The majority of operations and maintenance crews were assumed to be 12 hours per day, seven days per week. The administrative positions are planned as eight hours per day, five days per week. The personnel estimate for the OP mining area has been grouped into the following general categories:

- Mine Management
- Mine Supervision
- Mine Operations
- Mine Maintenance
- Mine Technical Services

Table 16-16 lists the proposed labour requirements for the OP operations and maintenance at peak years. Table 16-17 illustrates the proposed labour for the OP by year.

Table 16-16: Proposed Labour for OP Operations, Peak Years

Department	# Persons
MINING DEPARTMENT	**238**
DRILL & BLAST	23
Drill Operators	8
Drill Helpers	4
Blaster	8
Blast Helper	3
LOADING	8
Shovel Operator	8
HAULING	52
Haul Truck Driver – 90 T	36
Haul Truck Driver – ADT	16
DOZING & GRADING	28
Track Dozer	16
Wheel Dozer	4
Grader	8
SUPPORT	48
Loader Operators	8
Backhoe Operators	2
Water Truck	4
Air Trac Operator	2
Utility Labour	2
Dispatcher	4
Crusher – Roadbed	3
Conveyor – Short	1
Tool Crib Attendant	4
Warehouse Attendant	4

Department	# Persons
MINING DEPARTMENT	**238**
Warehouse Staff	6
Pit Labourer	8
MAINTENANCE	48
Light Duty Mechanic	10
Tire Technician	8
Lube Truck Driver	4
Heavy Duty Mechanic	12
Millwright	2
Electrician	4
Maintenance Superintendent	1
Maintenance Supervisor	4
Maintenance Planner	1
Crane Operator	1
Mine Maintenance Admin	1
MINE SUPERVISION	14
Mine Manager	1
Mine Superintendent	1
General Foreman	1
Blast Supervisor	1
Mine Supervisor	8
Mine Admin	1
Training Supervisor	1
MINE ENGINEERING	10
Chief Engineer	1
Senior Mine Engineer	1
Mine Planning Engineer	2
Surveyor	2

Department	# Persons
MINING DEPARTMENT	**238**
Mine Technician	2
Survey Assistant	2
MINE GEOLOGY	7
Chief Geologist	1
Senior Geologist	1
Geologist	2
Geology Technician	3

Source: Nordmin, 2021

Table 16-17: OP Operations Labour Estimate by Year

	Year - 2	Year - 1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
MINE DEPARTMENT	**156**	**192**	**226**	**238**	**238**	**238**	**238**	**238**	**238**	**238**	**234**	**234**	**234**	**195**	**102**
MINE MANAGEMENT	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MINE MANAGER	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MINE SUPERVISION	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**
Mine Superintendent	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
General Foreman	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Blast Supervisor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mine Supervisor	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Mine Admin	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Training Supervisor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MINE OPERATIONS	**95**	**129**	**147**	**159**	**159**	**159**	**159**	**159**	**159**	**159**	**155**	**155**	**155**	**121**	**52**
Drill Operators	4	4	8	8	8	8	8	8	8	8	8	8	8	4	
Drill Helpers	2	2	4	4	4	4	4	4	4	4	4	4	4	2	
Blaster	8	8	8	8	8	8	8	8	8	8	8	8	4	4	
Blast Helper	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
Shovel Operator	4	4	4	8	8	8	8	8	8	8	4	4	4	4	
Haul Truck Driver	28	36	40	52	52	52	52	52	52	56	52	52	56	28	8
Track Dozer	8	12	16	16	16	16	16	16	16	16	16	16	16	16	8
Wheel Dozer	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Grader	4	8	8	8	8	8	8	8	8	8	8	8	8	8	4
Loader Operators	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
Backhoe Operators	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Water Truck	2	4	4	4	4	4	4	4	4	4	4	4	4	4	
Air Trac Operator	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Utility Labour	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Dispatcher	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Crusher – Roadbed	2	3	3	3	3	3	3	3	3		3	3	3	3	3
Conveyor – Short	1	1	1	1	1	1	1	1	1		1	1	1	1	1
Tool Crib Attendant	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Warehouse Attendant	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Warehouse Staff	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6

	Year - 2	Year - 1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Pit Labourer	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8
MINE MAINTENANCE	**30**	**32**	**48**	**48**	**48**	**48**	**48**	**48**	**48**	**48**	**48**	**48**	**48**	**43**	**19**
Light Duty Mechanic	5	5	10	10	10	10	10	10	10	10	10	10	10	5	2
Tire Technician	4	4	8	8	8	8	8	8	8	8	8	8	8	8	2
Lube Truck Driver	2	2	4	4	4	4	4	4	4	4	4	4	4	4	2
Heavy Duty Mechanic	10	12	12	12	12	12	12	12	12	12	12	12	12	12	4
Millwright	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1
Electrician	2	2	4	4	4	4	4	4	4	4	4	4	4	4	2
Maintenance Superintendent	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maintenance Supervisor	2	2	4	4	4	4	4	4	4	4	4	4	4	4	2
Maintenance Planner	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Crane Operator	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mine Maintenance Admin	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MINE TECHNICAL SERVICES	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**
Chief Engineer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Senior Mine Engineer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mine Planning Engineer	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Surveyor	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mine Technician	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Survey Assistant	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Chief Geologist	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Senior Geologist	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Geologist	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Geology Technician	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Source: Nordmin, 2021

16.6 Consumable Estimates for OP Mining Area

Table 16-18 provides a general summary of the major consumables that were estimated as part of the OP mining cost estimate.

Table 16-18: Quantities of Main Consumables from the OP

Activity	Units	LOM Total	YR-2	YR-1	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	YR11	YR12	YR13
BLASTING																	
Explosive Quantity																	
Emulsion	kg	38,852,270	290,280	1,472,127	2,322,862	2,804,668	3,563,494	3,645,489	3,732,355	2,861,870	2,819,218	2,856,067	3,186,502	3,590,416	3,406,379	1,917,292	383,252
ESTIMATED FUEL																	
Drilling	L	6,477,000	131,000	292,000	410,000	522,000	582,000	562,000	563,000	483,000	450,000	516,000	560,000	546,000	513,000	289,000	58,000
Loading	L	18,086,000	691,000	1,042,000	1,456,000	1,939,000	1,546,000	1,277,000	1,168,000	1,317,000	1,132,000	1,533,000	1,579,000	996,000	948,000	906,000	556,000
Hauling	L	47,600,000	1,197,000	2,253,000	2,571,000	3,390,000	3,553,000	3,581,000	3,736,000	3,423,000	3,673,000	4,006,000	4,073,000	3,861,000	4,159,000	3,034,000	1,090,000
Dozer/Grader	L	20,134,000	691,000	1,173,000	1,346,000	1,474,000	1,474,000	1,474,000	1,474,000	1,474,000	1,474,000	1,474,000	1,474,000	1,474,000	1,474,000	1,474,000	710,000
Support Equipment	L	38,457,000	1,028,000	1,576,000	2,127,000	2,127,000	2,677,000	2,677,000	2,677,000	3,118,000	3,118,000	3,118,000	3,118,000	3,118,000	3,118,000	3,118,000	1,742,000
General Vehicles	L	1,638,500	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	56,500
TOTAL	**L**	132,392,500	3,851,000	6,449,000	8,023,000	9,565,000	9,945,000	9,684,000	9,731,000	9,928,000	9,960,000	10,760,000	10,917,000	10,108,000	10,325,000	8,934,000	4,212,500

Source: Nordmin, 2021

17 RECOVERY METHODS

17.1 Summary

Section 13 of this Technical Report provides a summary of the metallurgical test work to date. Industrial process design for the Prefeasibility Study was developed based on metallurgical test work produced in 2021 by Blue Coast Research in Parksville, BC, Canada, with mineralogical work done by Actlabs in Ancaster Ontario and SGS Canada in Lakefield Ontario.

Grindability and flotation test work was conducted by Blue Coast Research and SGS Canada in Burnaby, BC. This included 71 batch flotation tests and three locked cycle flotation tests. The results of which were used to derive the preliminary process flow sheet and pro-forma mass balance of the facility. Process design parameters were established to define the equipment required for production and storage of concentrate adjacent to the OP facilities. Various major equipment vendors have been consulted with to vet preliminary equipment selections. Preliminary circuit configuration has been built based on the learnings from test work and configured within a notional process plant model to mitigate operational risk associated with the process. Subsequently, information from the resultant processing plant model as well as vendor budget pricing contribute to the overall capital and operating cost estimates presented in Section 21.

The process plant was designed using conventional and proven technology. It is designed for a throughput of 22,000 metric tonnes per day ("mtpd") at an availability of 92% per annum, equating to an annual feed of 8,030,000 metric tonnes. The beneficiation plan will operate a planned 365 days per year and produce a Cu-Au-Ag concentrate to be sold in the open market.

ROM feed from the adjacent OP will be hauled to a primary crusher facility consisting of a gyratory crusher before being conveyed to a 25,000-tonne surface stockpile prior to the mill facility. On average, 20,000mptd of fresh/transition ore will be blended with 2,000 mtpd of saprolite prior to the primary crusher by mine operations on a day to day basis. The comminution circuit consists of a SAG mill closed-in with a pebble crusher, and a ball mill operating in a closed circuit with a hydrocyclone cluster. Cyclone overflow of P_{80} of 200 µm will report to a four-stage flotation circuit including a roughing stage, primary, secondary, and tertiary cleaning. Mechanical flotation tank cells will be utilized for all stages other than tertiary cleaning, wherein a column cell will be employed. A regrind stage will treat rougher float product to a P_{80} of 45 µm prior to primary cleaning.

Two stages of gravity concentration will be utilized to produce a dedicated Au rich concentrate. The concentrate can be handled and stored separately from the primary beneficiation product, if it is advantageous to market as such. One unit will be fed from a partial stream of ball mill hydrocyclone underflow, and the smaller unit will be fed from the 1st cleaner tailings.

17.2 Process Description

All throughput and mass balance calculations used as the basis of design were based on the average production mill feed of 22,000 mtpd of ore. The key process design criteria used for plant design is provided in Table 17-1. An overall simplified flowsheet is presented in Figure 17-1, followed by a surface infrastructure layout in Figure 17-2.

Table 17-1: Key Process Design Criteria Used for Plant Design (based on Fresh/Transition ore)

Parameter	Value	Unit
Plant Capacity	22,000	mt/d
SG	2.84	t/m^3
Moisture	3	%
ROM Granulometry F80	303	mm
Crushing Work Index (Cwi)	13.6	kWh/ton
Abrasion Index (Ai)	0.066	g
JK Parameter Axb (85th Percentile)	29.4	
SAG Mill Work Index (85th Percentile)	9.75	kWh/ton
Ball Mill Work Index (85th Percentile)	20.4	kWh/ton
Primary Crushing Utilization to match Concentrator throughput	50	%
Grinding Operating Hours	24	h/d
Primary Crusher size	Superior 5475 MK-III	gyratory
Primary Crusher Installed Power	560	kW
SAG Mill Dimensions	10.4 m dia. x 5.2m effective grinding length (EGL)	
SAG Mill Installed Power	12.5, with variable frequency drive (VFD)	MW
Pebble Crusher Type		Cone
Pebble Crusher Installed Power	671	kW
Ball Mill Dimensions	7.3 m dia. x 10.7m EGL	
Ball Mill Installed Power	11.4	MW
Ball Mill Circulating Load	250	%
Hydrocyclone Overflow Density	34	% w/w
Primary Grind Size	200	µm
Rougher Flotation Cell Type		Mechanical Tank Cell
Rougher Flotation Residence Time	15	min
Regrind Mill Type		Vertimill

Parameter	Value	Unit
Regrind Mill Installed Power	746	kW
Regrind Mill Grind Size (P_{80})	45	µm
First Cleaner Flotation Cell Type		Mechanical Tank Cell
First Cleaner Flotation Residence Time	14	min
Second Cleaner Flotation Cell Type		Mechanical Tank Cell
Second Cleaner Flotation Residence Time	25	min
Third Cleaner Flotation Cell Type		Column Cell
Third Cleaner Flotation Residence Time	40	min
Final Concentrate Mass Pull	2.4	%
Concentrate Filter Type		Multi-plate Pressure
Concentrate Moisture	8	%
Tailings Thickener Type		High Compression
Tailings Thickener Underflow Density	63	% w/w

Source: Nordmin, 2021

The concentrator will operate on a 24 hours per day basis, 7 days per week, and 365 days per year which equates to a planned plant overall utilization of 92.0%.

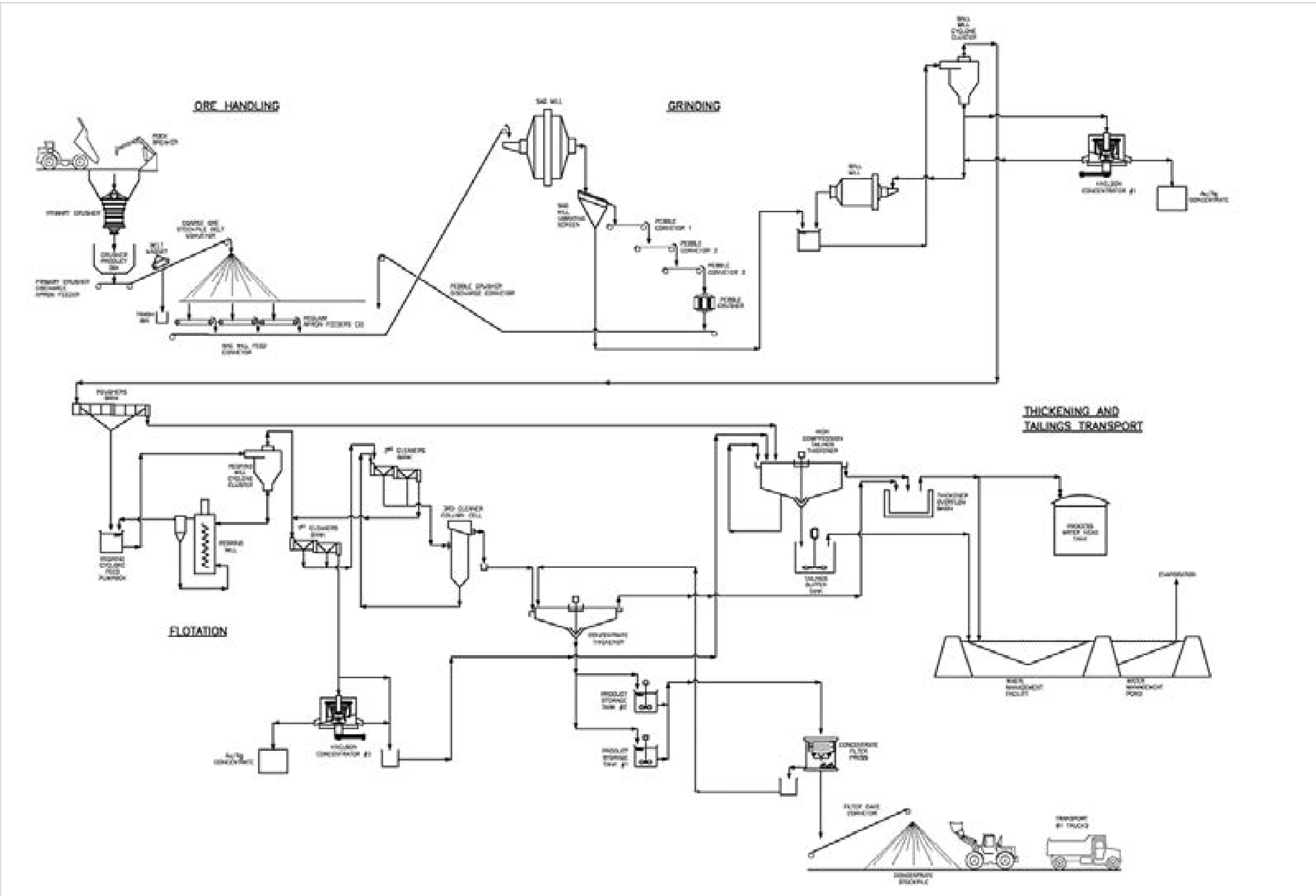


Figure 17-1: Simplified overall process flow diagram

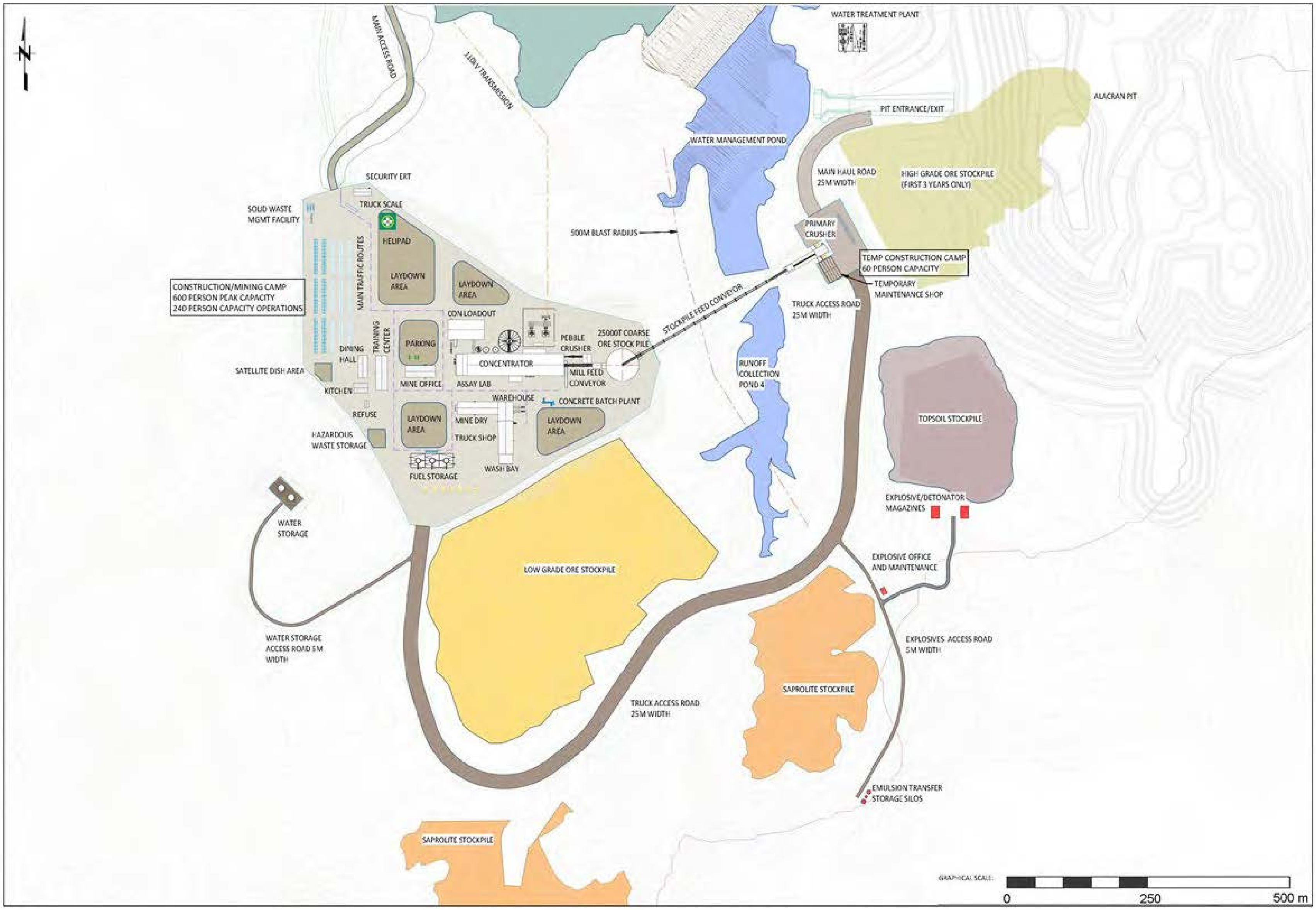


Figure 17-2: Surface infrastructure layout

17.3 Primary Crushing

17.3.1 Purpose

The crushing circuit is designed to reduce ROM ore with a moisture content of maximum 5% and a F_{80} of 300 mm to feed the mill comminution circuit at a P_{80} of 150 mm. The primary crusher facility is depicted in Figure 17-3.

Figure 17-3: Primary crusher facility

17.3.2 Description

ROM ore is transported by truck from the OP and dumped directly onto the spider of the primary gyratory crusher, where it is reduced to a P_{80} size of 150 mm. The back-in arrangement of the primary crusher facility will accept ore from two haul trucks (777 Cat) at once. ROM ore top size will be controlled by blast fragmentation to below 600 mm minus, thereby avoiding the use of a grizzly section prior to the primary. A Superior 5475 MK-III crusher has been selected for the service, that can pass a maximum lump size of 1,370 mm. A remote-operated rock breaker will be installed at the dump point to reduce oversize material.

A product bin is located at the primary crusher outlet, crushed ore drops into an ore bin which is fitted with a discharge apron feeder which feeds a loadout conveyor.

A belt magnet is located on the loadout conveyor to remove tramp ferrous material entrained in the ore before it leaves the crusher building complex. Nominal size of the troughed loadout belt is 1.37 m wide x 525 m long, and it will report to the course ore stockpile. A belt weigh scale on the loadout conveyor tracks the production rate of the crushing plant.

A baghouse collects dust at the ore transfer points within the primary crusher building, which once collected, will report to the tail end of the loadout conveyor. A sump pit is provided to collect wash-up residue and is designed to be emptied periodically by vacuum truck.

17.4 Coarse Ore Stockpile

17.4.1 Purpose

The coarse ore stockpile (Figure 17-4) is designed to provide storage of ore prior to the concentrator, and capacitance between the crushing circuit and the concentrator to allow for maintenance of the crushing circuit without interrupting mill feed.

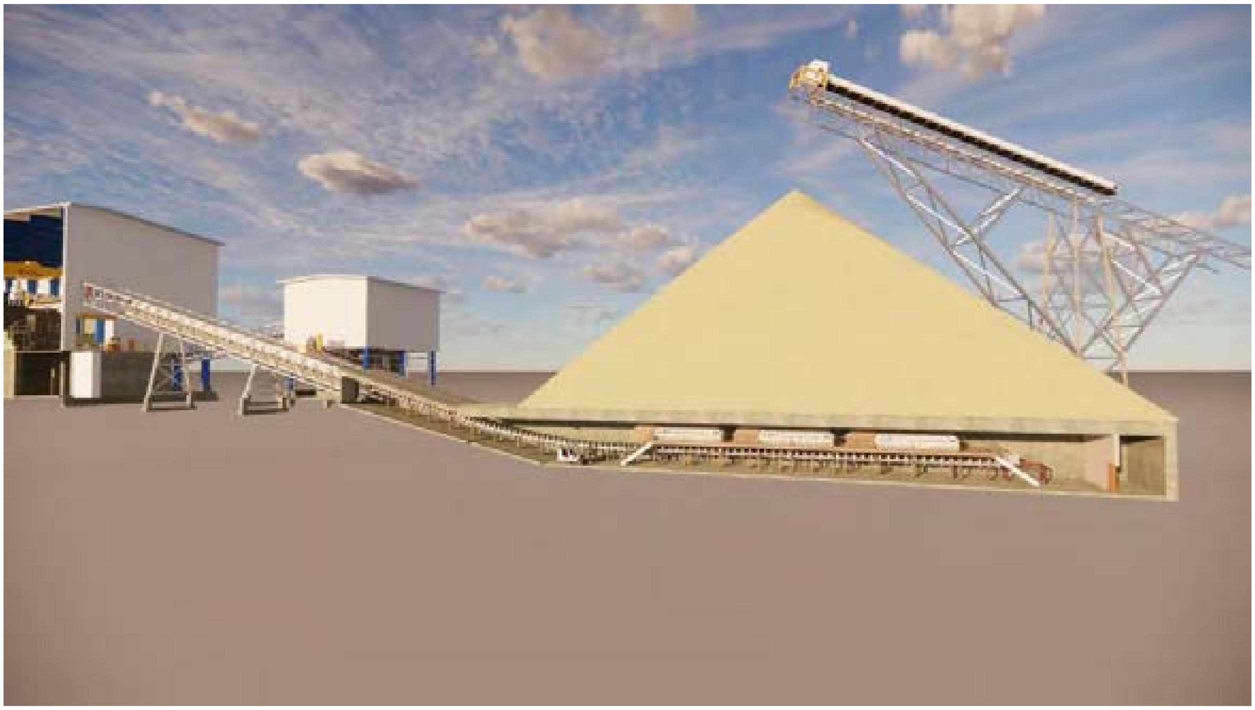


Figure 17-4: Course Ore Storage

17.4.2 Description

Ore discharged from the primary crusher circuit is fed to the coarse ore stockpile via the crusher circuit loadout conveyor. Dimensions of the coarse ore stockpile are approximately 59 m diameter x 22 m high, at an angle of repose of 37 degrees which corresponds to a design storage capacity of 25,000 tonnes. Excess crushed material can be broadcast away from conical stockpile via dozer, to provide adequate storage capacity for routine scheduled maintenance of the primary crushing facility without interrupting feed to the mill.

Three apron feeders (two running, one spare) will be located within a concrete reclaim tunnel will be utilized to control the outlet flow from storage pile to feed the SAG mill feed conveyor. Feedrate control to the SAG mill will be accomplished via VFD control of the apron feeders, and VFD control of the SAG mill feed conveyor. Dimensions of the troughed feed conveyor will be 1.07 m wide x 98 m long. The reclaim tunnel will be large enough to accommodate a track loader for ore clean up and will have two means of egress. Emergency egress will be located at the tail end of the SAG mill feed conveyor and will consist of a culvert of suitable size to provide access and utilidor path out to a surface walk-in enclosure to house a motor control centre. All conveyor transfer points will be provided with either dust collection or water sprays to minimize the generation of dust.

17.5 Comminution

17.5.1 Purpose

The grinding circuit will consist of a conventional SABC arrangement and has been designed to produce feed slurry fine enough for effective flotation (Figure 17-5). Design parameters for the circuit include an F_{80} of 150 mm and a ball mill closed-in with hydrocyclones. A hydrocyclone overflow P_{80} of 200 µm will report to the roughing circuit for the first stage of flotation.

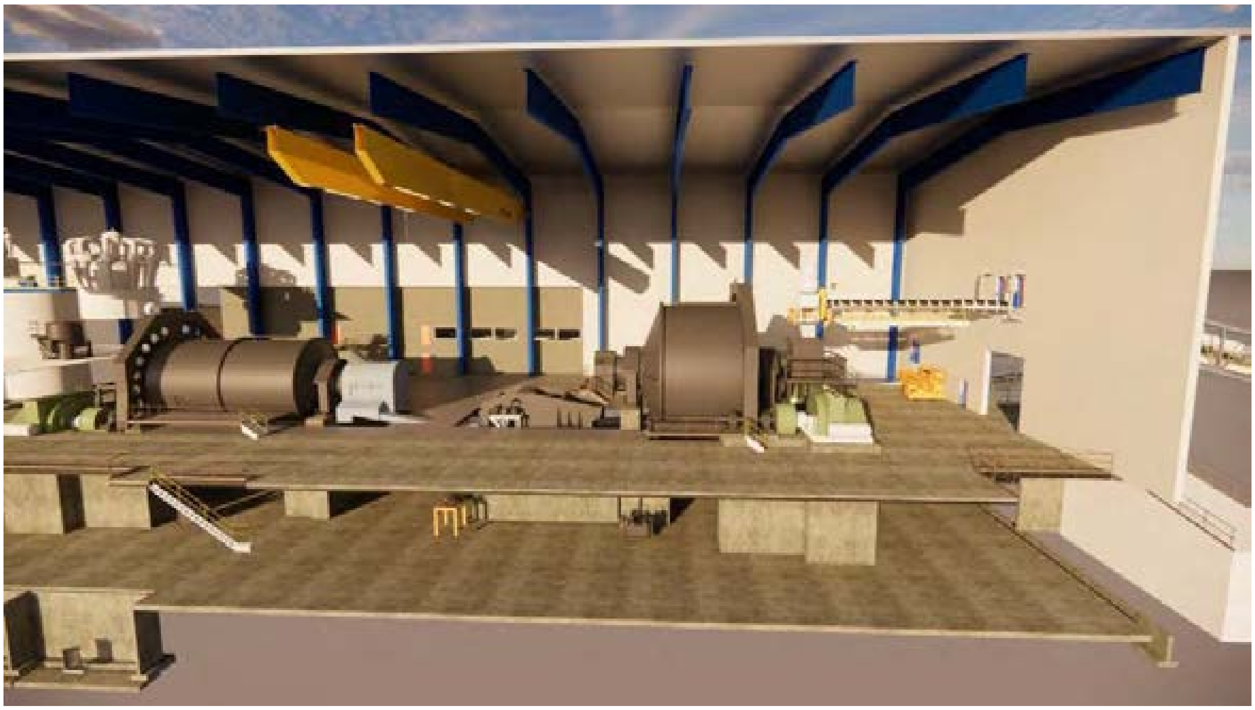


Figure 17-5: Comminution

17.6 Grinding

17.6.1 Description

The grinding circuit is designed to produce feed slurry fine enough for effective flotation. Primary grinding will be achieved with a SAG mill. The SAG mill slurry will discharge through a double deck vibrating screen where the pebbles will be screened and oversized recycled to a pebble crusher. SAG mill dimensions will be 10.4 m dia. x 5.2 m EGL, with a total installed power of 12.5 MW which will be through a dual pinion drive and VFD.

The pebble crusher will reduce the SAG mill pebbles to a P_{80} of 14 mm will be accomplished with an HP900 cone crusher with a closed side setting of 15 mm. The pebble crusher is rated for a nominal 275 mtph throughput, however, is capable of a throughput of 367 mpth to handle process upsets. Product of the pebble crusher will be returned to the inlet chute of the SAG mill via conveyors. A secondary ball mill will work in concert to produce a particle size of P_{80} = 200 µm for feed to a hydrocyclone unit prior to rougher flotation.

SAG mill discharge screen undersize will report to the common mill pumpbox to be pumped to the hydrocyclone. The ball mill will be fed by the cyclone underflow and will discharge into the pumpbox. A trunnion magnet will be fitted on the ball mill discharge to separate ball scats and slivers for disposal. Ball mill dimensions will be 7.3 m dia. x 10.7 m EGL, with a total installed power of 11.4 MW which will be through a dual pinion drive and soft-start arrangement.

A gravity concentrator will also be fit to the cyclone underflow, to process approximately 30% of the underflow through the unit. A dedicated Au-Ag concentrate will be available to be produced from this point in the circuit and will report to a separable and secure concentrate bagging system. This concentrate may be marketed separately or can be recombined with the aggregate concentrate product depending on market conditions and take off agreements. Process water will be added to the grinding circuit to achieve a pulp density of 34% w/w feeding the hydrocyclones.

17.7 Flotation Circuit

17.7.1 Purpose

The flotation circuit is designed to concentrate target metals from the ROM ore and consolidate the flotation products in the product stock tank ("PST") prior to dewatering and storage (Figure 17-6). The equipment selected for the rougher, first, and second cleaner stages are conventional mechanical tank cells. The third cleaning stage will utilize column cell technology.

Figure 17-6: Flotation

17.7.2 Roughers

The rougher flotation circuit consists of six 200 m^3 mechanical tank cells in series, equipped with 187 kW agitators. Feed will report to the roughers at a grind P_{80} of 200 µm, via hydrocyclone overflow with an increased pH of 10.5 using lime. An additional reagent introduced prior to the roughers is sodium hexameta-phosphate ("calgon"). Reagent addition to the rougher cells proper will consist of MIBC (to cell #1 & 2) and potassium amyl xanthate ("PAX") (to cells #2 & 5). Total residence time within the roughing network will be 15 minutes, provided by the total 1,200 m^3 of stage capacity. Rougher float products will report to a single regrind stage closed-in with hydrocyclones. Re-grinding will be accomplished with a 746 kW Vertimill (VTM1000) with a P_{80} of 45 µm prior to overflowing to the 1st cleaners feed box.

17.7.3 1st Cleaners

The 1st cleaners flotation circuit consists of six 100 m^3 mechanical tank cells in series, equipped with 93 kW agitators. Feed will report to the first cleaning stage from the regrind hydroclyclone overflow at a grind P_{80} of 45 µm, with an increased pH to 11.5 using lime (to cells #1 & 3). Additional reagents introduced to the first cleaners will consist of calgon (to cells #1, 2, & 3) and PAX (to cells #1, 2, & 3). First cleaners float products will report forward to second stage of cleaning. First cleaner sink products will be pumped through a Knelson gravity concentrator. The dedicated Au-Ag concentrate will be available to be combined with the concentrate produced at the first stage of gravity concentrations and will report to a separable and secure concentrate bagging system. This concentrate may be marketed separately or can be recombined with the aggregate concentrate product depending on market conditions and take off agreements.

17.7.4 2nd Cleaners

The 2nd cleaners flotation circuit consists of three 30 m^3 mechanical tank cells in series, equipped with 45 kW agitators. Feed will report to the second cleaning stage from the 1st cleaners concentrate. There are no additional reagents introduced to the second cleaners based on the PFS test work, however, prior the next stage of study it is recommended to review whether there is merit for additional gangue suppression prior to the final cleaning stage. Total residence time within the 2nd cleaner stage will be 25 minutes, provided by the 90 m^3 of total stage capacity.

17.7.5 3rd Cleaner

The 3rd cleaner flotation circuit consists of a single 120 m^3 column cell. Feed will report to the third cleaning stage from the 2nd cleaner concentrate. There are no additional reagents introduced to the third cleaner based on the PFS test work, however, prior the next stage of study it is recommended to review whether there is merit for additional gangue suppression at the final cleaning stage. Total residence time within the 3rd cleaner stage will be 40 minutes, provided by the 120 m^3 of stage capacity.

17.8 Concentrate Thickening, Dewatering, and Storage

17.8.1 Purpose

The concentrate thickening and dewatering circuit is designed to dewater and filter a combined concentrate feed, in preparation for storage on site. The concentrate thickening/storage facility is depicted in Figure 17-7.

Figure 17-7: Concentrate thickening/storage

17.8.2 Description

Final concentrate from the 3rd cleaner concentrate are fed to a 11 m diameter high-rate concentrate thickener, where the feed slurry at 24% w/w is mixed with anionic flocculant and thickened to a target solids concentration of 63% w/w.

Thickened concentrate is pumped to a concentrate pressure filter, where the solids content is further increased to a target of 91% solids w/w.

Discharge from the pressure filter is conveyed in an enclosed stockpile for bulk storage prior to being transported off site via dump truck for storage at a port facility prior to being loaded to ocean vessels for shipping to market. The bulk storage facility on site is sized to stage 2,200 m^3 of concentrate and is of dimension 33 m wide x 60 m long (1980 m^2). The bulk storage facility located near the chosen port facility is sized to stage 7,750 m^3 of concentrate and is of dimension 36 m wide x 90 m long (3,240 m^2).

Thickener overflow and filter filtrate are collected and recycled back to the process.

17.8.3 Tailings Thickening and Reticulation

Rougher tails and tails from the 1st cleaners will be pumped to a high-compression tailings thickener where the density will be increased to a target of 63% density. Flocculent will be added to the thickener at a feed rate sufficient to obtain target clarity for the thickener overflow water. Thickener underflow will be pumped to an intermediate buffer tank prior to being discharged to the WMF. Thickener overflow will join the concentrate thickener overflow to report back to the process water storage tank.

17.8.4 Process Control

The general approach to automation and control for the concentrator plant will be one with a moderate level of complexity with remote monitoring and control from a central control room but offering the option of local control. Instrumentation will be provided within the plant to measure and control key process parameters to minimize operator intervention in standard start up functions and to provide key monitoring and control to minimize process excursions and maintain steady state operations. The process control system ("PCS") will be a programmable logic controller ("PLC") based system. The PCS will control the process interlocks and control loops for non packaged equipment. Control loop set-point changes for non packaged equipment will be made at the operator interface terminals ("OIT"). Vendor supplied packages will use vendor standard control systems and will generally have limited interface with the PCS such that control and set-point changes may have to be done locally. General equipment fault alarms for each vendor package will be monitored by the PCS and displayed on the OIT.

17.9 Reagents

Reagents will be stored dry, when possible, on site prior to being prepared and stored in a separate area adjacent to the concentrator facility for distribution to the process. Lime, calgon, PAX, and flocculent will be received and blended into solution. MIBC will be received in liquid form and stored in a dedicated tank and delivery facility. Reagents will be prepared using a dedicated fresh process water supply to avoid cross-contamination and other unfavourable effects. Table 17-2 outlines the required reagents and volumes.

Table 17-2: Required Reagents

Reagents	g/tonne	kg/yr
Lime	1,125	8,910,983
Calgon	80	633,670
PAX	6	47,525
MIBC	32	253,467
Flocculant	40	316,835

17.10 Assay and Metallurgical Laboratory

The assay and metallurgical laboratory facilities will include all necessary equipment to filter, dry, and pulverize mine, and concentrator samples to prepare them for assay; to perform all digestions and analytical procedures required for tracking concentrator feed head grades (using mine samples); and to perform all digestions and analytical procedures required for tracking the day to day metallurgical performance of the concentrator facility (using grinding and flotation composite samples collected within the mill).

Analytical instruments required to provide all routine assays for the mine, concentrator, and environmental department will include:

- Sample Prep
  - o Grieve drying shelf ovens
  - o Riffle work station
  - o Jaw crusher
  - o Pulverizer
  - o Balance scale
  - o Associated accessories and gear

- Microbalance Room
  - Micro balance
- Weighing Areas
  - Various electronic balances
  - Associated accessories and gear
- Fire Assay Lab
  - MAS Furnaces
  - Bench top muffle furnace
  - Associated accessories and gear
- Wet Chemistry Lab
  - Centrifuge
  - pH metre
  - Benchtop ISE/pH/mV/ORP.Temp analyzer
  - Orbital Shaker
  - Auto Dilutor
  - Associated accessories and gear
- Environmental Lab
  - UV-VIS spectrophotometer
  - Electronic balance
  - Portable, ISE/pH/mV/ORP/Temp analyzer
  - Associated accessories and gear
- Instrument Room
  - Surface carbon analyzer
  - Microwave Plasma Atomic Emission Spectrometer

17.11 Water Supply

Process water will be supplied to a 2,700 m^3 process water head tank from multiple sources and will be located 55 m above the concentrator plant ground floor. The primary source of process water will be the concentrate thickener and tailings thickener overflow water, which reports to a common overflow basin before being pumped to the storage tank. The secondary water source will be from the mill effluent metals and TSS removal plant, as necessary, to maintain a sufficient water level in the storage tank.

Influent to the mill effluent metals and TSS removal plant will be delivered from pumps mounted on the process water reclaim barge located within the WMP. After treatment, the excess water will be discharged to the San Pedro River.

Process water will primarily be used for the following processes:

- grinding circuit
- launder and column water
- fire water for emergency use
- concentrate filter wash water

Freshwater will be supplied by a 2,700 m^3 fresh/fire water head tank which will be located adjacent to the process water head tank. Supply to this tank will be from the mill influent metals and TSS removal plant, which will draw from the San Juan River. The fresh/fire water tank will be equipped with a standpipe for freshwater process suctions which will ensure that the tank is always holding at least 90 minutes supply of fire water.

Freshwater will primarily be used for the following processes:

- gland water for slurry pumps
- fire water
- cooling water for mill lubrication systems
- reagent preparation

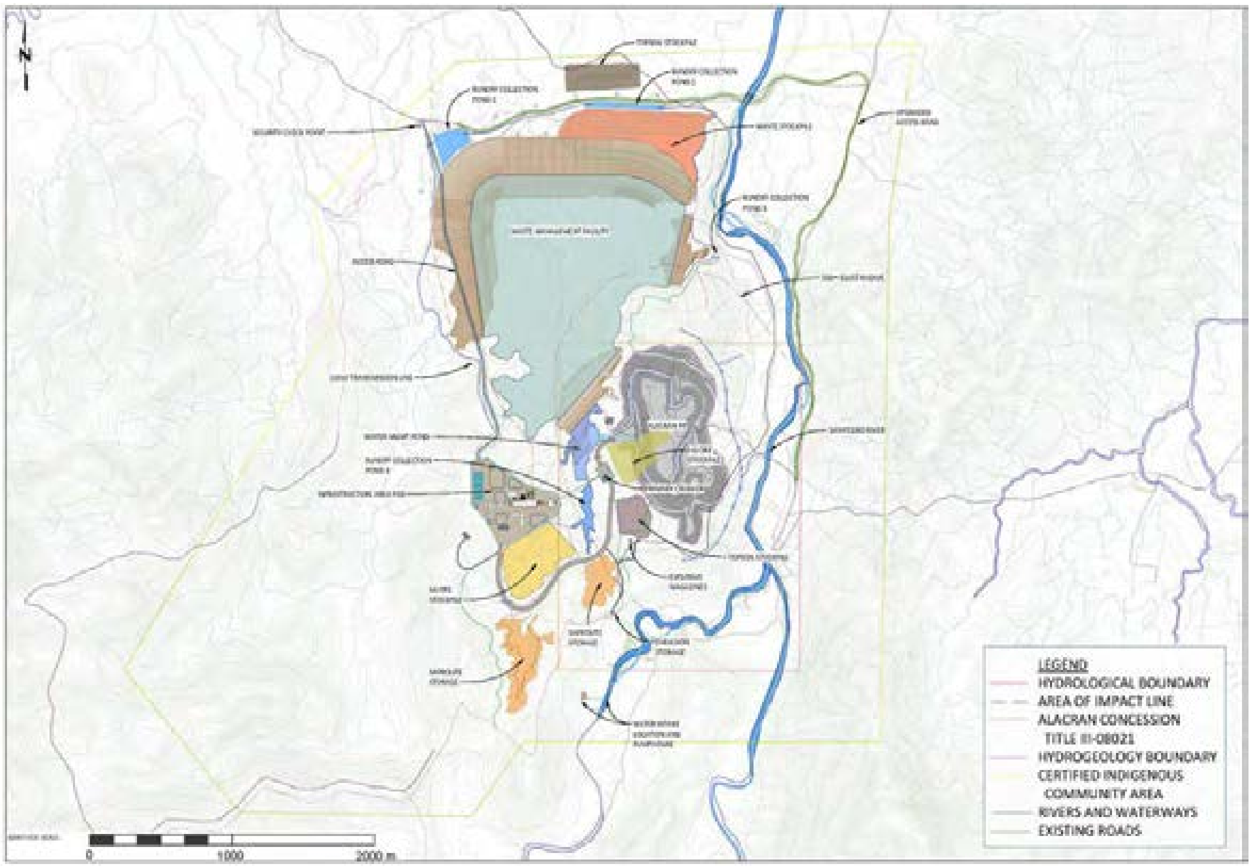
Two separate modular treatment plants will be required for the mill influent (supply) described above and the mill effluent (discharge) systems. The mill influent system will draw from the San Juan River and process water at a design rate of 4.2 m^3/hr for use throughout the mill as described above. The effluent system will draw water from the WMF to treat the tailings water prior to being released back into the environment. The effluent plant is designed for a flow rate of 700 m3/hr. Both plants will be located adjacent to the saddle dam that divides the WMF and WMP. The influent of both treatment plants will be treated by a combination of chemical and mechanical means to adjust the pH and remove any metals and suspended solids. The treatment plants will have their own common reagent storage and make-down systems, which will consist of H_2SO_4, NaOH, NaHS, coagulant, and flocculant. The mill influent WTF will utilize a ballasted flocculation clarifier prior to a series of multi-media filters, while the mill effluent treatment plant will utilize three ballasted flocculation clarifiers prior to a series of multi-media filters.

A potable water treatment system will also be fed from the discharge of the mill influent metals and TSS removal plant, which will consist of a reverse osmosis unit followed by an ultraviolet light train. Additionally, the system will include antiscalant and clean in place (“CIP”) chemical reagents. This system will be located within the mill influent treatment plant area. Potable water will be treated, stored, and distributed to the various buildings on site, with each building having its own pressurized reservoir tank for distribution.

18 PROJECT INFRASTRUCTURE

18.1 Introduction

The main Project infrastructure components include mine and process plant supporting infrastructure, site accommodation facilities, a WMF, external, and internal access roads, power supply and distribution, freshwater supply, and distribution, and WTF. The infrastructure is to be situated within the locations shown in Figure 18-1. It should be noted that the figure shows the maximum extents of the pit and various stockpiles and not a specific phase of the Project.



Source: Nordmin, 2021

Figure 18-1: Site conceptual general arrangement

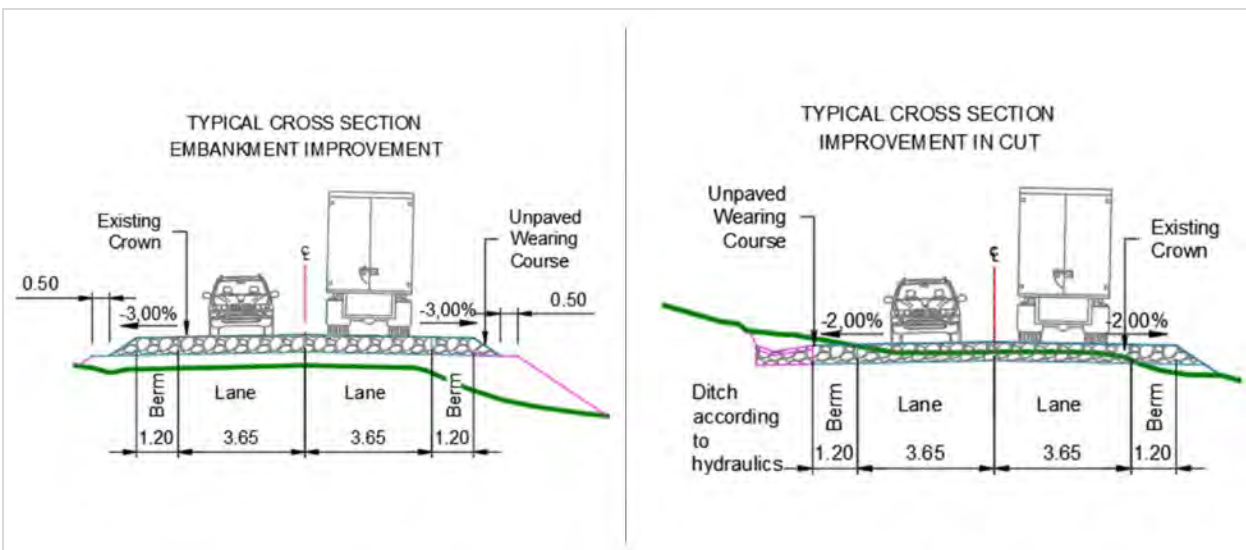
18.2 Project Logistics

The Property is accessible by travelling to Puerto Libertador and then by driving approximately 21 km from Puerto Libertador on a hard-packed, gravel road. The paving of the road past Puerto Libertador is on going, and the planned extent is unknown. The main access road between La Rica and the planned security gate of the Project site is of a lower quality, being only wide enough for one vehicle and with sharp turns and abrupt grade changes. This road is 6 km long and is the intended haul road for concentrate. For cost estimation purposes it has been assumed that the entirety of the road will need to be upgraded and widened to allow two-way traffic and transport trucks. The state of the current road is shown in Figure 18-2.

IRYS has prepared a prefeasibility level design of this road upgrade including a detailed geological and hydrological survey. The proposed road is approximately 7.15 km long through flat to slightly undulating terrain characteristic of alluvial plains. Cross sections of IRYS's road design are shown in Figure 18-3. The stationing begins at 0+000 km, located at the junction in La Rica. Three bridges along the road will be upgraded.

Source: IRYS, 2021

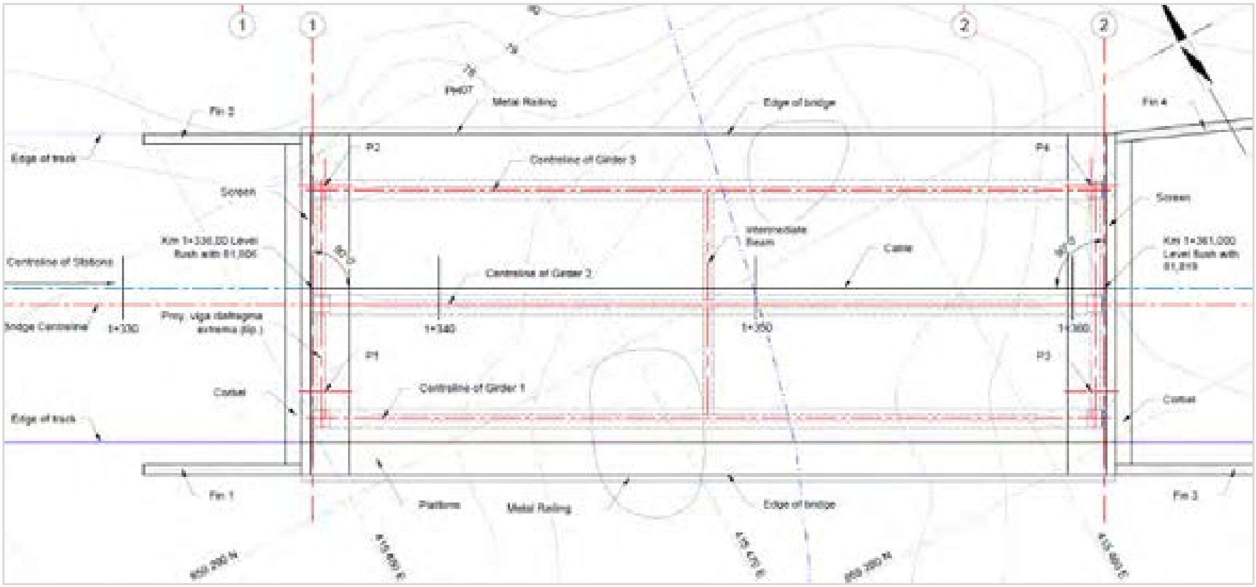
Figure 18-2: Existing topography along La Rica Road



Source: IRYS, 2021

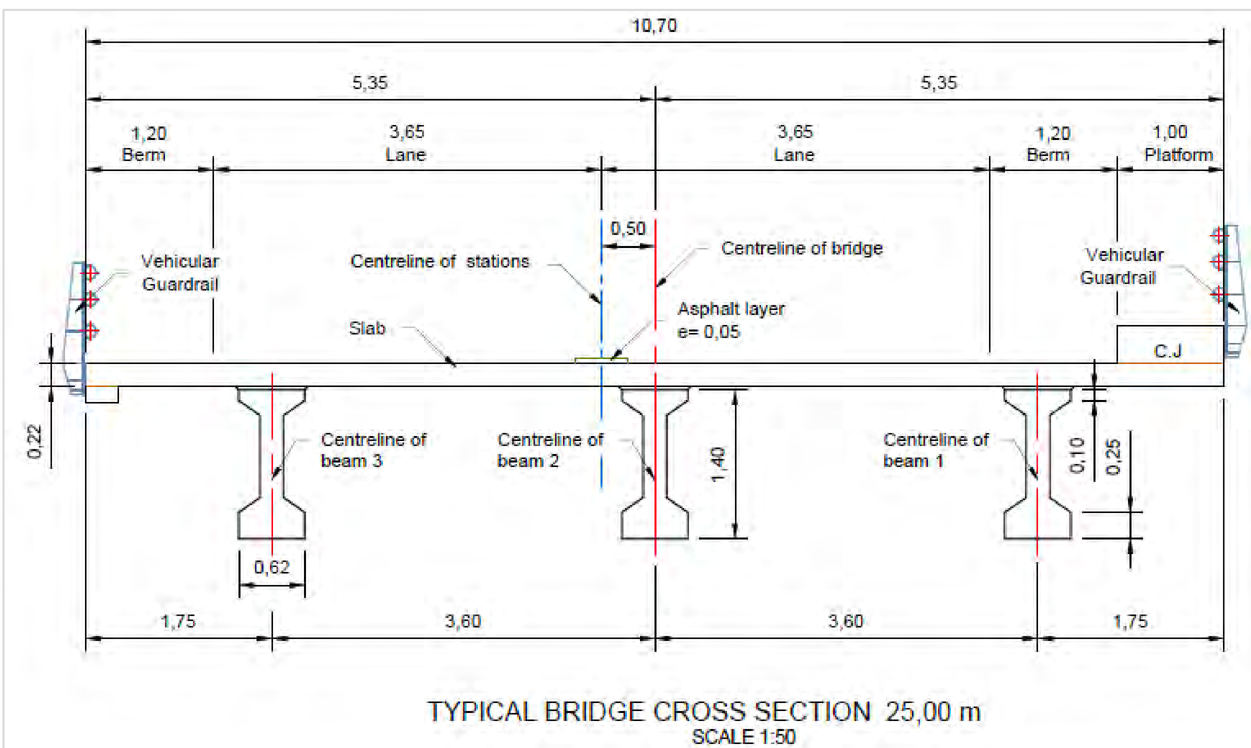
Figure 18-3: IRYS road design

El Salado bridge is located at approximately 1+200 km. The current bridge is constructed of four reinforced concrete beams, a reinforced concrete deck, and two reinforced concrete abutments. The new bridge will be built of three reinforced concrete beams having a depth of 1.4 m and a span of 25 m. The bridge will be built beside the existing bridge, allowing lighter traffic to continue to use the existing infrastructure. The total width of the bridge is 10.7 m allowing for, two 3.65 m lanes, two 1.2 m shoulders and a single, one metre walking platform. A plan view of this bridge is shown in Figure 18-4 and a typical cross section is shown in Figure 18-5.



Source: IRYS, 2021

Figure 18-4: El Salado bridge conceptual design



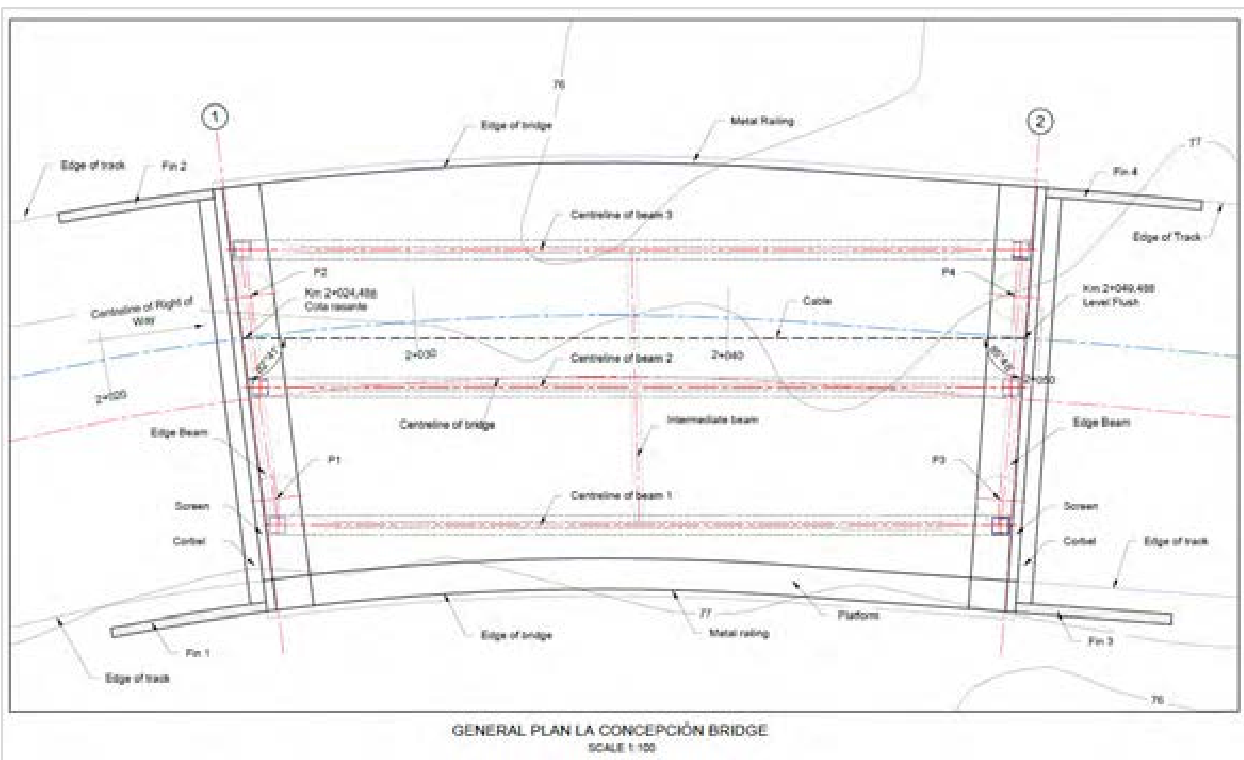
Source: IRYS, 2021

Figure 18-5: El Salado bridge cross section

The La Conception bridge is located at 1+900 km. The existing bridge is constructed of wood. The new bridge will be of a similar size and construction to El Salado bridge with the exception that the width is 13.6 m to allow for a 6.55 m lane. The existing conception bridge is shown in Figure 18-6. A plan view of the proposed bridge design is shown in Figure 18-7 and a typical cross section is shown in Figure 18-8.

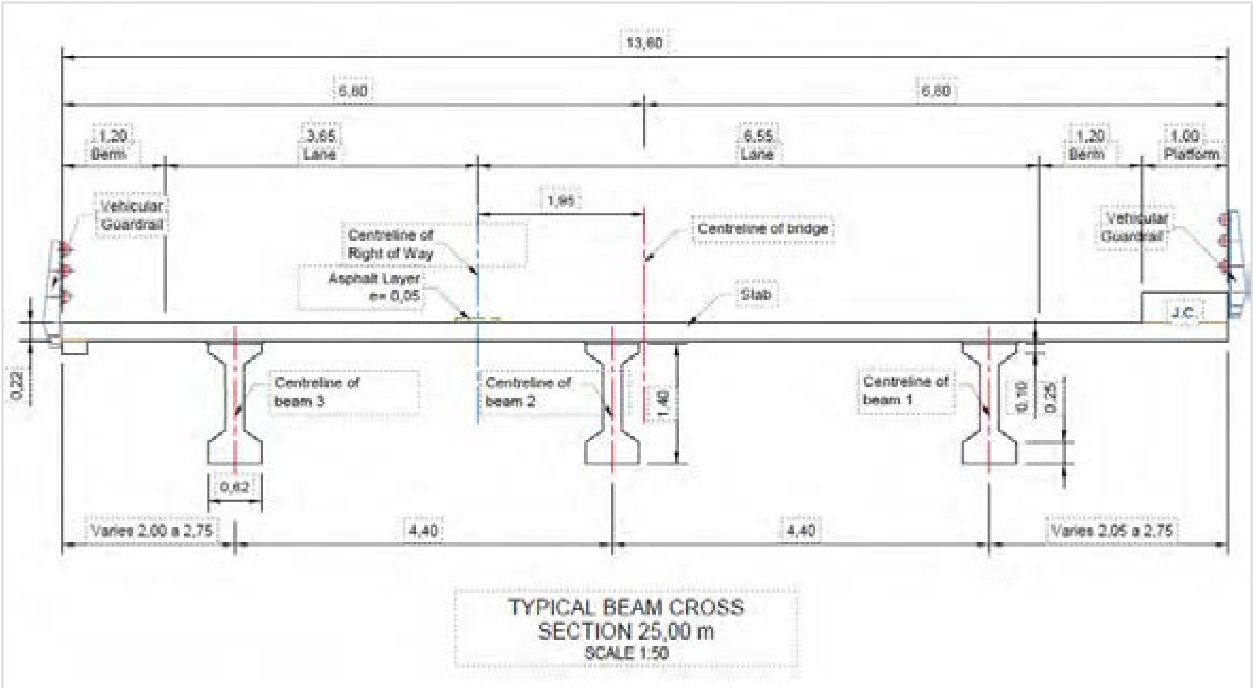
Source: IRYS, 2021

Figure 18-6 : Existing La Conception bridge



Source: IRYS, 2021

Figure 18-7: La Conception bridge plan view

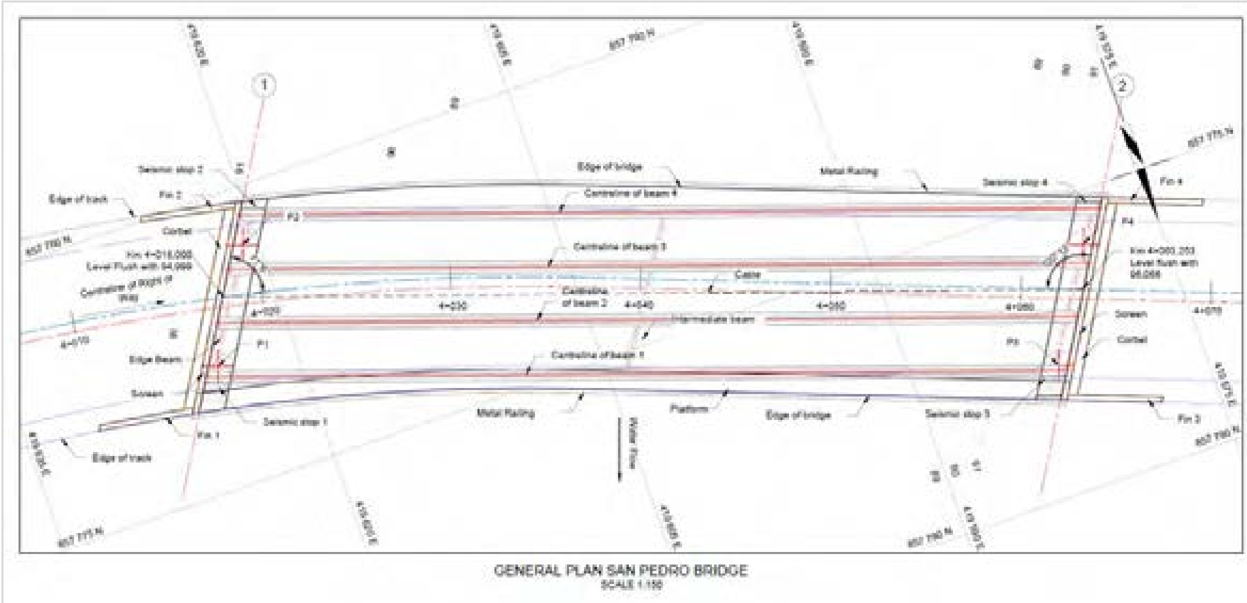


Source: IRYS, 2021

Figure 18-8 : La Conception bridge cross section

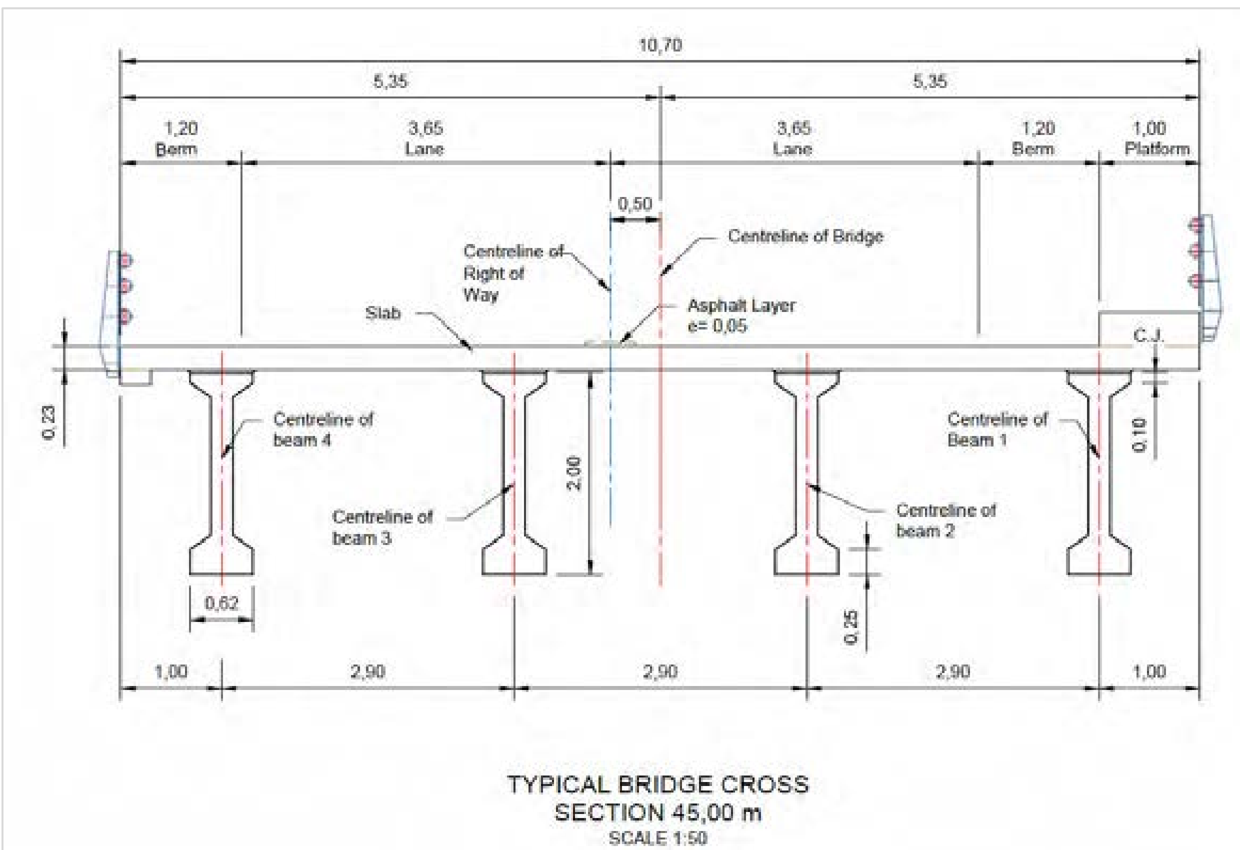
The Valdés bridge will be located at 4+300 km. There is currently no existing bridge here. The bridge to be constructed will be similar to El Salado bridge.

A road exists on the east side to access the mine site via San Juan Viejo and San Matías. IRYS has prepared a prefeasibility level design of this road including a detailed geological and hydrological survey, with 6.1 km of total road to be upgraded. The proposed right of way crosses both plains and hills or elongated hills. This roadway crosses the San Pedro River and will require a bridge with a 45 m span to cross. A plan view of the bridge is shown in Figure 18-9 and a typical cross section is shown Figure 18-10. Figure 18-11 shows the existing road.



Source: IRYS, 2021

Figure 18-9: San Pedro bridge plan view



Source: IRYS, 2021

Figure 18-10: San Pedro bridge cross section

Source: IRYS, 2021

Figure 18-11: Existing road east of San Pedro River

The proposed bridge will be built of reinforced concrete and consist of four beams with a depth of two metres, supported on two buttresses with a deck with of 10.7 m similar to El Salado bridge on the La Rica Road. A jarillón (a type of earthen or concrete embankment) is planned to be constructed to aid in the controlling of flood waters.

The road network is maintained by the local governments and would be used to transport personnel, materials, consumables, and concentrate to the port for export. A helipad will be provided on site to allow for helicopter service. A local airstrip is present just south of Puerto Libertador, 18 km from the Project site. Airports also exist in Montelíbano and Caucasia, which are a respective 64 km and 109 km from the Project site entrance to the airport terminal. Ports are located at Tolú and Cartagena: Tolú is approximately 273 km away from the Project site by road, and Cartagena is 418 km away (Figure 4-1).

Accommodations will need to be provided for employees who cannot be hired from local communities.

18.3 Port Facilities

A preliminary analysis was conducted of the ports that could be used for the Project resulting in the Company proposing to export the ore concentrate through the Port of Tolú (Figure 18-12), which is the closest port with the capacity to handle bulk concentrates for export. The Port of Tolú is located on the Colombian Atlantic Coast, in the department of Sucre, southwest of the city of Santiago de Tolú, Kilometre 4 on the national highway "Troncal del Caribe", between Santiago de Tolú, and Coveñas. Tolú is approximately 273 km from the Mining Concession Contract III-08021, accessible through various roads.

The Port of Tolú, located in the Gulf of Morrosquillo and managed by Compas, has become another gateway for Colombian foreign trade, after the National Tax and Customs Directorate (“DIAN”) authorized the operation of the terminal as a public warehouse and of international logistical support. The complex offers a covered conveyor belt for direct loading of coal and other minerals to ships, complying with environmental regulations. Additionally, the complex offers facilities for livestock and agricultural exports. It has an expansion area of more than 300,000 m^2.

Figure 18-12: Port of Tolú Facilities

The Cu-Au-Ag concentrate will be shipped to smelters in Asia, India, or Europe. A new storage facility will be required at the Port of Tolú to house the concentrate material before being loaded onto ships. In front of the port facilities, there is an area available to support a covered warehouse with a capacity to store 7,500 m^3 or 15,000 metric tonnes of concentrate (Figure 18-13). There will also be a truck scale and an area for washing trucks and for the control of the corresponding safety and environmental regulations (Figure 18-14 and Figure 18-15).

Source: Image from Google Earth

Figure 18-13: Port of Tolu, proposed storage facility location

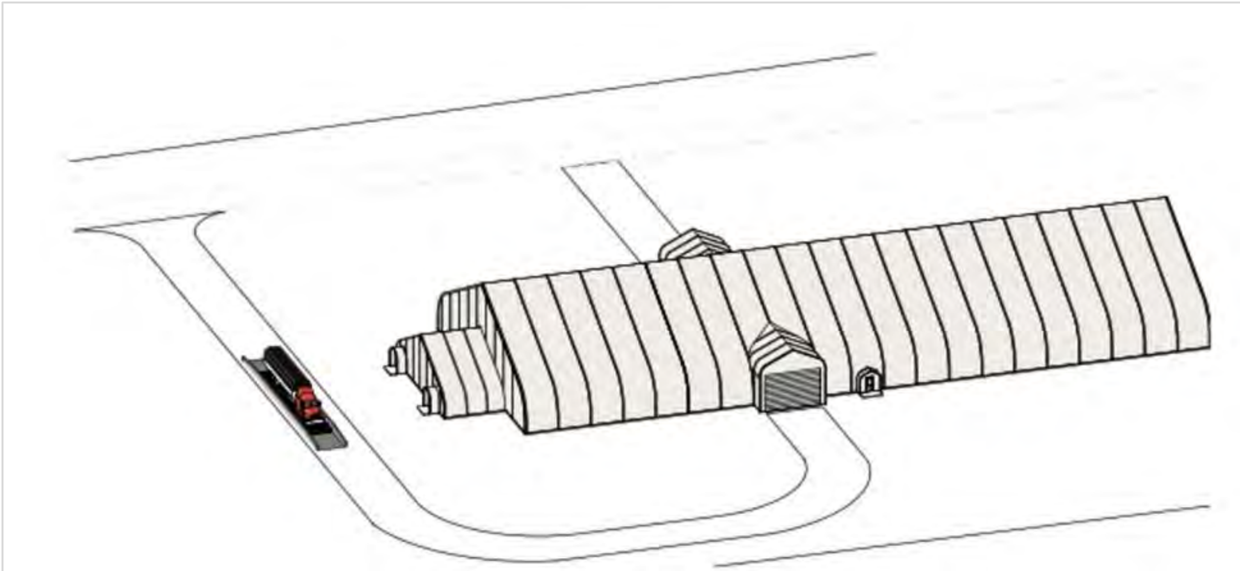


Figure 18-14: Design of the proposed facilities in the Port of Tolú (A)

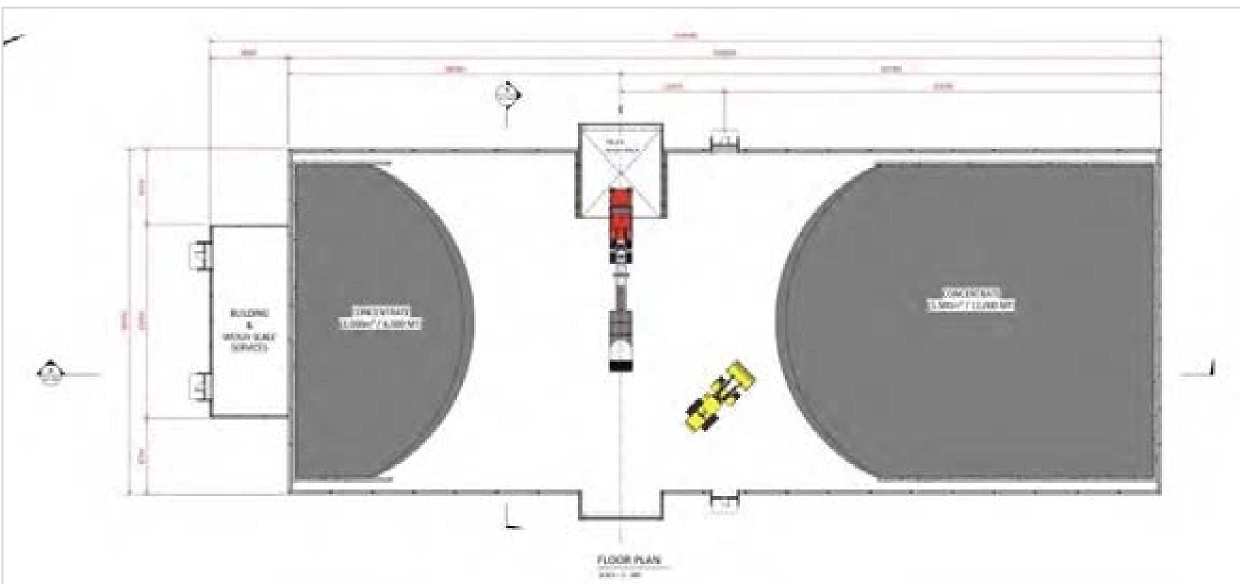
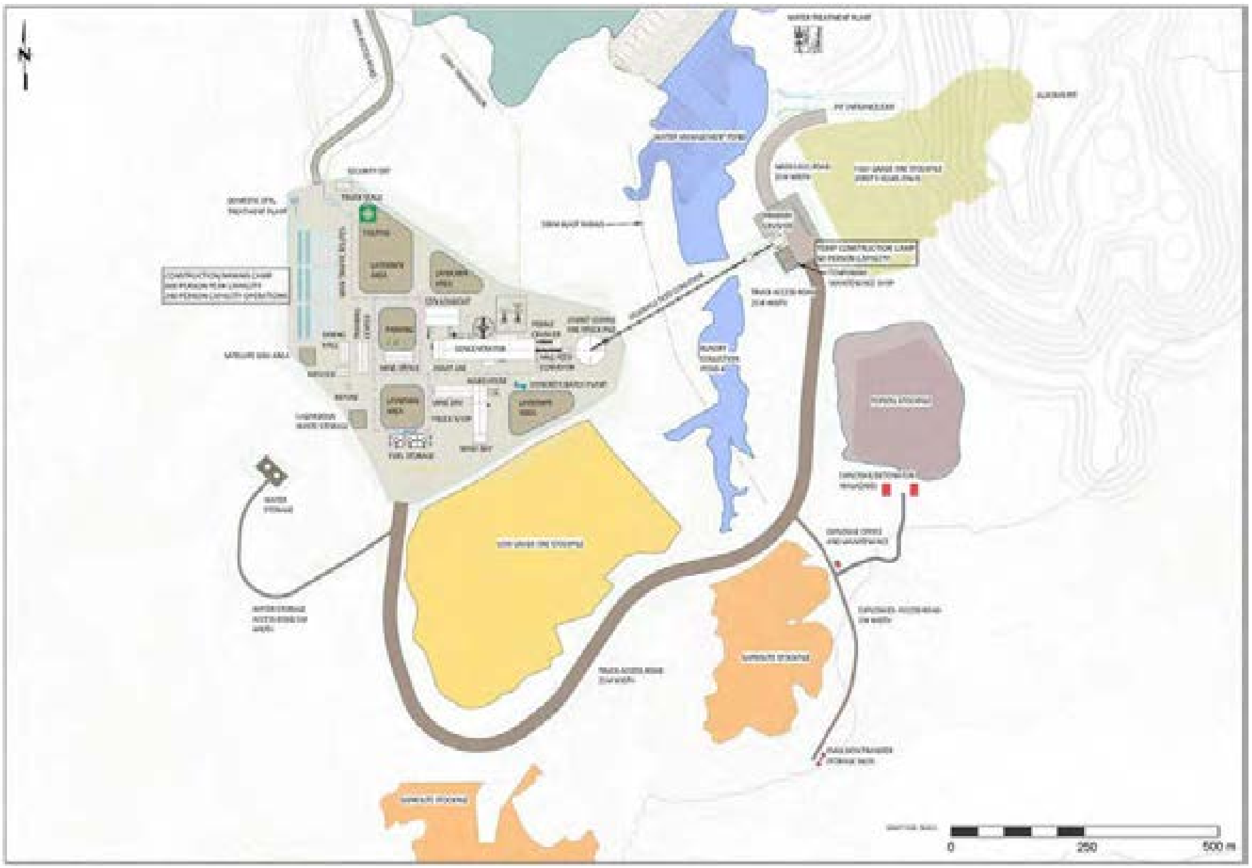


Figure 18-15: Design of the proposed facilities in the Port of Tolú (B)

Port selection should be reviewed during more detailed studies once the final concentrate specification is finalized.

18.4 Infrastructure On Site

The final locations of infrastructure at the mining site will be determined following further geotechnical studies and a thorough land survey. At the current level of study, preliminary locations have been selected. An overall site plan is shown in Figure 18-1 and a more detailed view of the infrastructure area shown in Figure 18-6. These are the locations of buildings and other infrastructure based on information gathered from a site visit and geographic data including existing roads and watersheds.



Source: Nordmin, 2021

Figure 18-16 Site facility conceptual general arrangement

The Alacran pit is located to the east of the infrastructure area and is accessed by a 25 m wide haul road. The Alacran pit description and resources are discussed in detail in Sections 14 through 16.

The concentrator plant is located just over 700 m from the Alacran pit, the concentrator plant consists of a primary gyratory crusher, grinding bay, and flotation bay. The plant has been designed for a throughput of 22,000 mtpd at an availability of 92%. The concentrator plant process and equipment are discussed in detail in Section 17. The ancillary buildings are located to the south and west of the concentrator plant. These buildings are relatively close together on an elevated area of the Property near both the main pit and the WMF. A stockpile located to the northeast of the concentrator plant stores saprolite and a smaller stockpile to the south holds fresh material to supply the concentrator plant during the rainy season when mining may be slower.

A WMF is proposed to be constructed within the valley west of the Alacran pit, as described in Section 18.12.

When accessing site from the La Rica Road, personnel will report in at the security/Emergency Response Transport ("ERT") building. An outpost at the start of the access road will also be provided for an additional security presence on the north side of the WMF area. The ERT building will also house a two-vehicle garage for the site emergency response team. The nearby laydown area has a portion reserved for a helipad in the case of a medical evacuation, or for helicopter arrivals to the site.

The construction and operations camps are positioned on the very west of the infrastructure area pad, with capacity for 600, and 240 workers respectively. The camp will be temporary trailer type facilities and will share a central kitchen and dining hall. Once construction of the mine is complete the surplus trailers will be removed from site. To the east of the camp is the training centre and the mine office. The training centre consists of classrooms, offices, and a 600 m^2 hall for mass assemblies. The hall may also double as an overflow dining area during peak construction occupancy of the camp. To the east of the training centre are the mine offices that will provide office and cubicle space for a total of 67 of the mines accounting, administration, safety, and environment personnel. The assay lab is situated in the same building as the concentrator plant. The labs will consist of two floors containing both the assay lab and metallurgical ("MET") lab. This building will also serve as the concentrator plant shop where maintenance activities can be performed, and the area will be serviced by a five tonne bridge crane. North of the concentrator plant is the concentrate loadout building which will house the concentrate stockpile ready for shipment to the port. The concentrate stockpile is fed by a covered conveyor belt directly from the concentrator plant, this building has been designed to store 2,200 m^3 of concentrate.

The truck shop, warehouse, engineering offices, and mine dry are combined into a single L-shaped building to the south of the concentrator plant. The truck shop houses three vehicle repair bays and is serviced by a 35 tonne bridge crane. Enough clearance has been provided to allow servicing of a CAT 777 D rock truck. Space for a welding fabrication area has also been provided for miscellaneous maintenance requirements. A covered area for the truck wash was provided at the south end of the building. The connecting mine engineering office contains office space, and cubicles for the mine's engineers, geologists, and technical managers, based on the projected workforce planning 37 workspaces have been provided. The mine dry contains a total of 500 lockers for the surface mine workers. The dry building includes gendered locker rooms, showers, and laundry rooms.

South of the mine office is the fuel storage area. Separate tanks and containment areas have been provided for diesel, unleaded, and aviation fuels. Throughout site are three laydown areas for staging equipment and material. A total of 40,000 m^2 of laydown area has been provided. An area near the south east laydown has been reserved for hazardous waste storage, this will be used to stage waste such as oil barrels, soil, or materials contaminated with fuel and chemical containers before being removed from site.

18.5 Buildings and Facilities

The PFS general mine and process surface facilities assumptions include the following:

- Security/ERT
- Training Centre
- Mine Office
- Mine Dry
- Engineering Office
- Truck Shop
- Truck Wash
- Concentrate Loadout
- Assay Lab
- Concentrator Plant
- Fuel Storage
- Explosive magazine storage
- Generation Plant
- Substation
- Power Distribution
- Helipad

- Operations Camp
- Construction Camp
- Concrete Batch Plant
- Water Treatment Facility
- Meteorological Monitoring Station

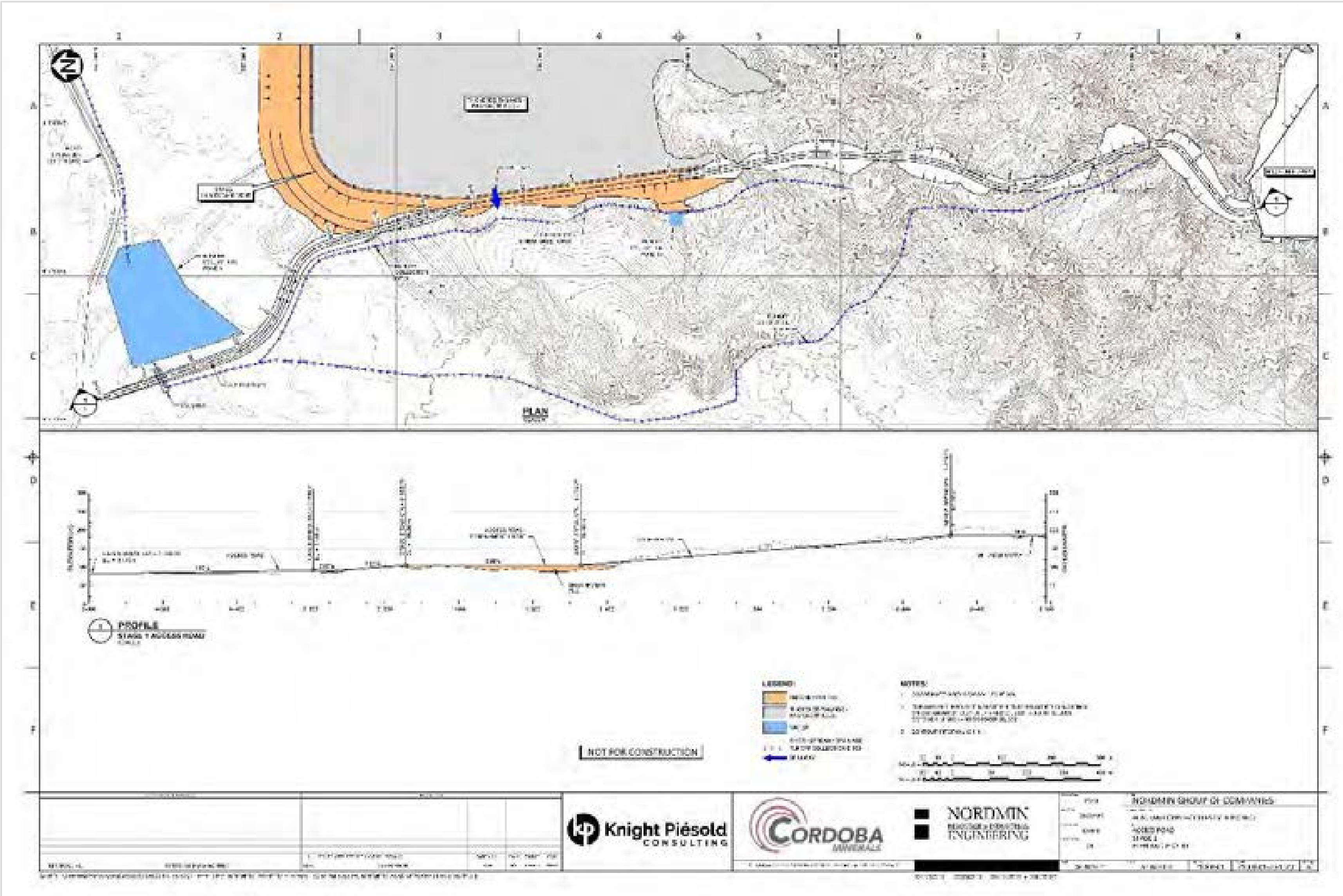
In total, approximately 10,000 m^2 of general buildings (not including the camp) have been accounted for in the capital cost estimate.

The main operational and support buildings are located on an elevated pad 700 m northwest of the main Alacran pit. The concentrator plant is the building closest to the pits with the primary crusher station between the concentrator plant and the road. The majority of the infrastructure buildings are intended to be pre-engineered steel structures. Preliminary geotechnical results from site indicate the soil in the infrastructure area is made up of relatively soft clays. At the time of this Technical Report, geotechnical recommendations advise that most of the buildings and heavy equipment are to be supported by steel piles driven to refusal. Preliminary designs indicate that all buildings except for the mine office and training centre will require these steel piles. Due to the remote nature of the site a temporary concrete batch plant has also been provided for construction. This batch plant will be capable of producing 50 m^3/hr, which will ensure concrete production can keep up with the largest pours during the site construction.

18.6 Road Network

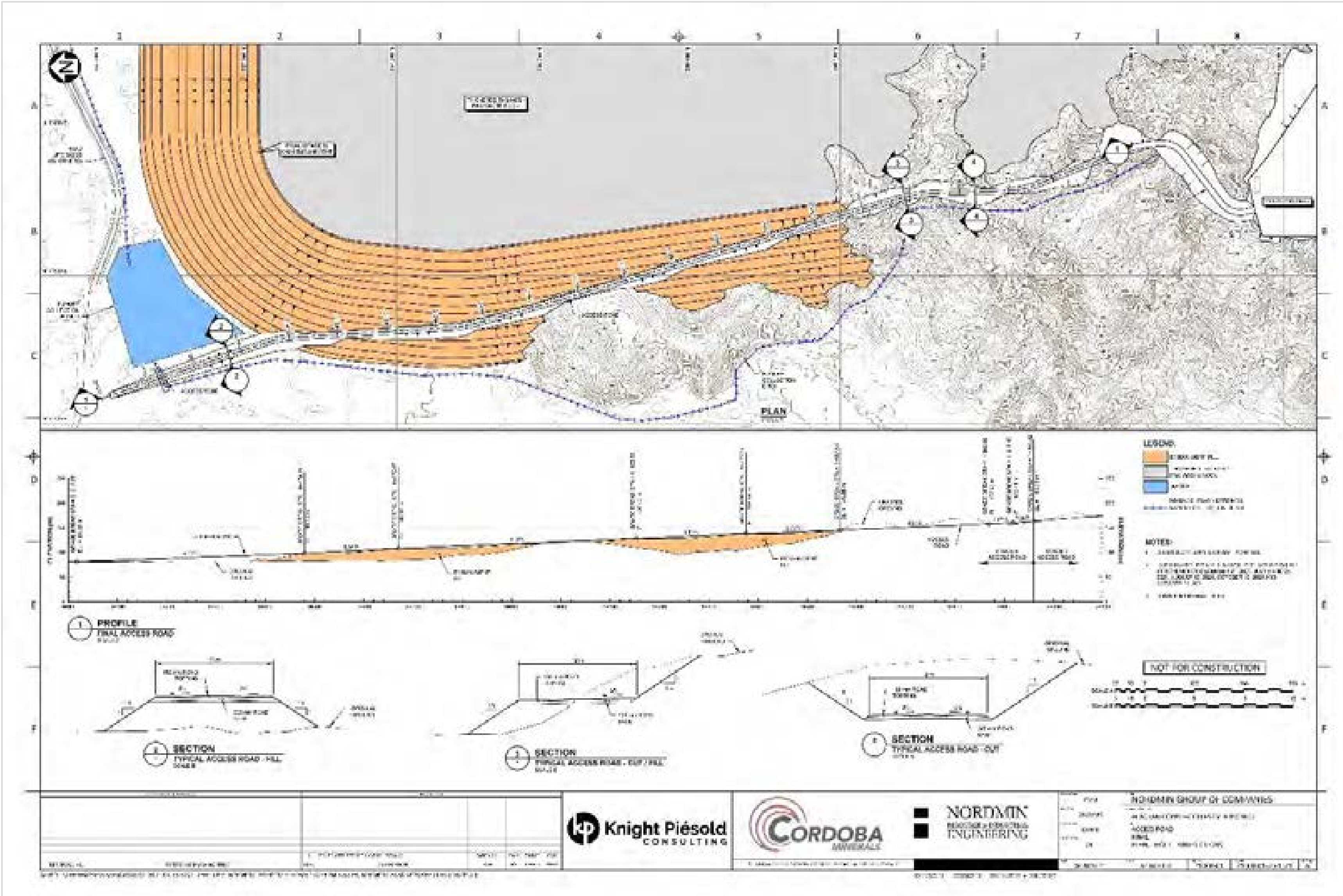
18.6.1 Site Access Road

The site access road will be located on the western edge of the Quebrada Valdez valley and will be incorporated into the main WMF embankment to optimize construction requirements and minimize site disturbance. Figure 18-17 and Figure 18-18 show the alignment of the access road as the WMF is constructed and expanded.



Source: KP, 2021

Figure 18-17: Access road Stage 1 plan and profile



Source: KP, 2021

Figure 18-18: Access road final plan, profile, and sections

The Stage 1 access road will be constructed during Years -2 and -1 of the mine plan and will be approximately 2.5 km long. The access road will be modified as the Main Embankment is raised throughout the mine life. A significant reroute for the access road occurs at Stage 4 of the WMF layout, this will be the final road route for the LOM. The final access road will be approximately 2.4 km long.
The typical cross section of the road at all stages is summarized as follows:

- Road width of 12 m. Ditches will be excavated along the sides of the road, where applicable, to convey run-off to the run-off collection ponds
- Crossfall or crown of 2% to allow run-off to shed from the road surface
- 300 mm thick road base and 150 mm thick road topping to support vehicle traffic

18.6.2 Haulage Roads

Haulage roads on site will be built to withstand frequent, heavy mine traffic. Like the Alacran pit and conceptual waste dump, they will be wide enough to accommodate two trucks passing each other, being 25 m, and have grades no greater than 10%.

Service roads other than those used by haulage trucks will be approximately 5 m wide and less resistant to heavy loads. The exception to this is the conveyor access road which will be 10 m wide. This conveyor access road is parallel to the conveyor from the primary crusher to the ore stockpile on the east side of the concentrator plant.

The main haul road connects the south side of the mine infrastructure and concentrator plant to the south side of the graded pad of the primary crusher. A road to access the site water tanks connects on the east side, at approximately 0+050 km along the right of way leaving from the mine infrastructure area. A proposed stockpile for saprolite is on the south side of this haul road at approximately 1+100 km. An access road to the explosive storage area connects on the south side of the road at approximately 1+270 km. The explosive storage access road passes the explosive office and maintenance area before branching north and south to the explosive/detonator magazine storage and the emulsion transfer storage silos, respectively. The only other haul road on site connects the primary crusher pad to the OP.

18.7 Waste Rock Storage

Waste rock that is likely to generate acid will be stored within the WMF. Waste rock classified as NPAG will be used in the construction of roads, earthworks, and the WMF. Further details for waste rock can be found in Section 16.2.2 and 18.12.

18.8 Power Supply and Distribution

18.8.1 Project Power Requirements

Based on benchmarking, the average forecast of overall Project peak power demand is approximately 41 megawatts (“MW”), taking into consideration the total site wide power requirements for the process plant, tailings, and general infrastructure plus an allowance. Annual energy consumption of approximately 200,000 megawatt hours (“MWh”). Actual requirements will be determined as part of future detailed studies.

18.8.2 Supply and Distribution

Electrical power to the Project is expected to be supplied via a new 35 km long, 110 kV powerline connecting to the Cerro Matoso substation which is owned and operated by ISA.

The site primary power distribution will operate nominally at 13.8 kV which is supplied by two 30/50 MVA, 110kV/13.8kV step down transformers connected to a “main-tie-main” switchgear lineup installed in a prefabricated electrical building. The switchgear lineup and two transformers provide redundancy to the primary power distribution in case some equipment is required to be taken offline for maintenance or repair for any extended length of time. A 110 kV circuit breaker and motorized disconnect switches will be installed ahead of the two main transformers.

A site wide overhead line distribution has been planned for construction which will feed the north side and south side infrastructure from two separate 13.8 kV overhead line feeders. The north power line distribution will supply power to the camp, WTF, water collection, and pumping stations. The south power line will provide power to the OP, waste storage, WMF, and south side water collection & treatment.

13.8 kV to 4.16 kV and 600 V distribution step down transformers will be installed in strategic locations to service the site loads. These transformers, interconnected with suitably rated switchgear and motor control equipment, will service the individual loads.

Smaller, suitable rated pole mounted transformers will be used to service remote loads along the 13.8 kV pole line routes.

The electrical systems (13.8 kV, 4.16 kV, and 600 V) will each be resistance grounded to meet standard safety and mine electrical code requirements.

18.8.3 Back-up Electrical Power

Back-up power for critical infrastructure at the mine site will be provided from a 1,500 kW diesel powered generator set. The generator will be directly connected to the 13.8 kV distribution bus and interlocked with the incoming supply from the main step down transformers.

18.9 Services and Utilities

18.9.1 Fuel

The PFS assumes that fuel supply will be contracted out and delivered by road transport. Fuel storage tanks and the Project gas station are planned to be located close to the mine services facilities area. A total of 378,000 litres of fuel would be stored.

18.9.2 Water

Process water will be sourced from the WMF, via a pump on a barge collecting clear water, which is conveyed to the concentrator plant via a pipeline.

Water to supply the buildings, as well as for the fire suppression distribution system will be provided by the WTF. Used water and sewage are handled by a lagoon, to the north, and downhill of all buildings.

18.9.3 Domestic Effluent Treatment Plant

Wastewater from the camps and other on site facilities will be piped underground to an effluent treatment facility. The effluent treatment facility will be located at the northwest limit of the infrastructure pad area. The effluent treatment facility will collect and subsequently treat sewage and grey water generated by the camps and other infrastructure buildings. The effluent treatment facility will consist of one buried 79,000 L balance tank feeding three buried BioDisc BM units which will allow for initial solids settlement, two stage biological treatment, followed by a final settlement stage resulting in a clear effluent meeting local environmental standards, to be appropriately discharged to the environment.

18.9.4 Security

The security/ERT building is a 30 m x12 m pre-engineered steel structure that will serve as the primary checkpoint for entering site from the La Rica Road. This structure will have offices for security guards and a security system for monitoring personnel coming to and leaving site. This building will also house a two-vehicle garage and storage area for the site emergency response team. This building will act as a base of operations for these first responders to assist with medical emergencies throughout site. This building will be continuously occupied by both security and ERT personnel.

A security outpost will also be located at the start of the access road north of the WMF. This checkpoint will be a security presence for any vehicles that travel the road to site. This building will be a prefabricated wood or light gauge steel shed.

Perimeter fencing will be built as required.

18.9.5 Communications

Cellular service is currently available at the site, as is Wi-Fi, and will be extended to the office and concentrator plant areas. Telecommunication and internet lines will be installed for use in the office areas, construction, and operations camps, control rooms, and security. A site wide telephone system will be provided for internal and external calls, site emergency response, and site paging, and announcements. Ultra high frequency (“UHF”) radio will be used in the pits and WMF, with a base station at the security building. An area of the infrastructure pit has been reserved for satellite dishes to facilitate any required incoming data.

18.10 Site Preparation and Earthworks

The Project is located north of the Western Cordillera and is considered mountainous terrain. Preliminary earthwork estimates show significant cut and fill quantities for both the roads and built up areas due to the undulating topography. The site is sparsely forested, with most areas consisting of grassy fields. Tree cover exists for approximately 60% of the land to be cleared. All organic material cleared will be stockpiled for mine close-out and reclamation efforts. Any granular pad material required can be quarried from the fresh rock material in the Alacran pit area. Further study will be required to ensure that the material to be quarried will not generate acid.

Saprolite is expected to be found across the majority of the site and has been assumed to be machine rippable. The majority of the earthworks will be realized in the preparation of the mine infrastructure and concentrator plant infrastructure pad. Additional smaller pads will be built up for the water storage tanks and for the primary crusher dumping station. Below the primary crusher dumping station another graded area will be developed for the ore feed to the conveyor belt. Finally, an area will be cleared for the explosive storage magazine and emulsion tank.

18.11 Water Management

The water management strategy for the project includes for the management of contact water from the site within the WMP, OP and WMF. KP developed the water management strategy in conjunction with Nordmin as part of the overall site water management plan. The WMP will be primarily used to store water from the WMF, contact water from operations, and inflows from the OP. The water stored in the WMP will be used to provide the required reclaim water to the mill.

The primary water management objectives for the site water management strategy include:

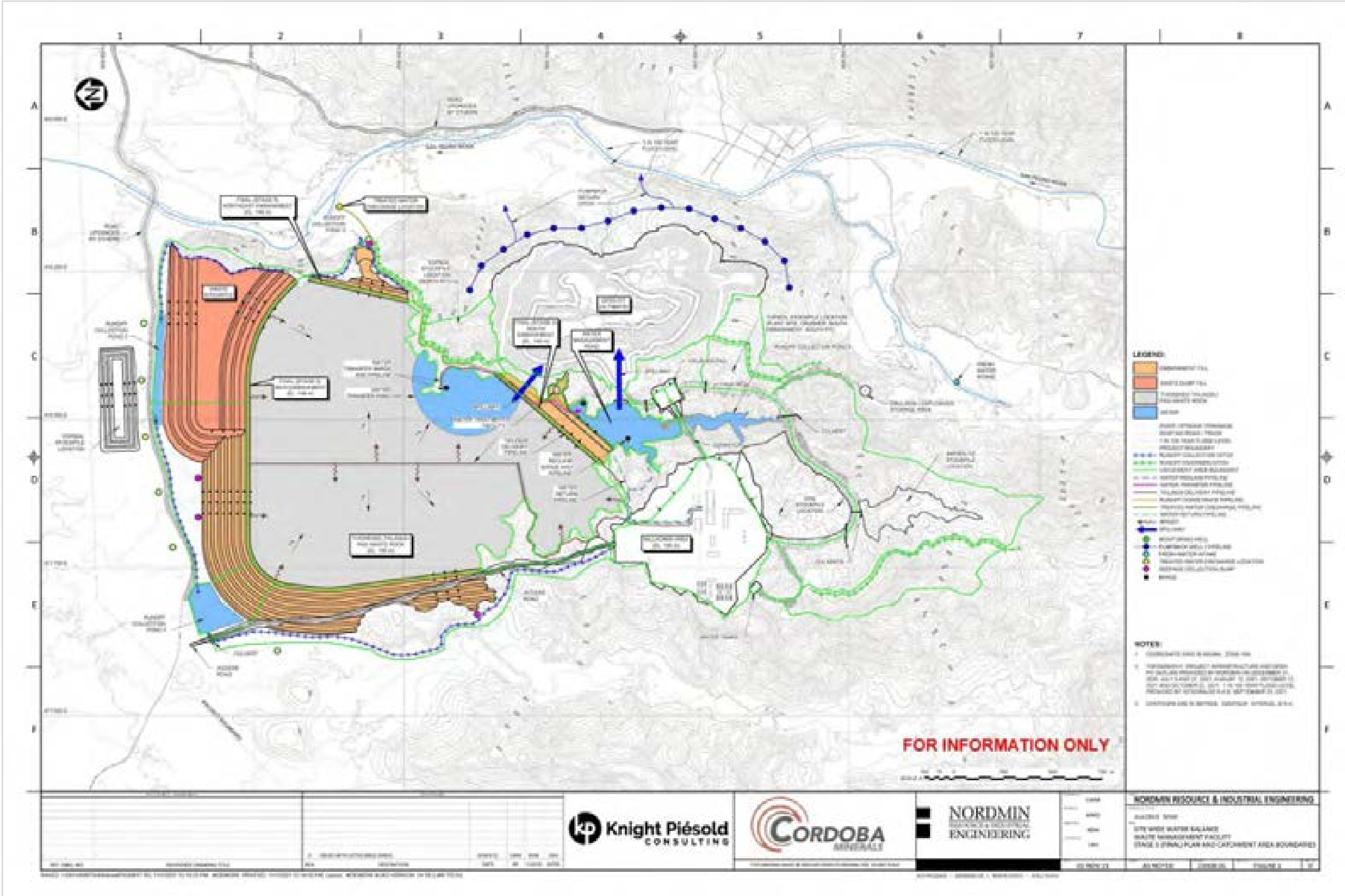
- Maintain a small supernatant pond (water transfer pond) within the WMF basin by transferring run-off and supernatant to the WMP on an ongoing basis via the water transfer system.

- Maximize reclaim of supernatant water and run-off from the WMP to the mill and minimize freshwater requirements from the San Pedro River.
- Minimize the groundwater inflow to the pit and volume of contact water that requires treatment.
- Treat and discharge excess supernatant water, mine water (OP inflow), and run-off to the environment, as required during the mine life, via the water treatment and discharge system.
- Collect and manage run-off via surface water management measures.
- Provide temporary containment of the EDF within the WMF and WMP basins during operations.
- Provide temporary storage and conveyance of the IDF via spillways from the WMF and WMP.

Pumps and pipelines will be installed for water transfer to the WMP, water reclaim to the mill, and water discharge from the WTF. The site water balance, water management strategy, and stormwater management measures are summarized below.

18.11.1 Site Wide Water Balance

The site wide water balance was prepared to confirm that adequate reclaim water would be available for the mill and estimate the required water discharge rates from the site. The final site arrangement and catchment areas that surface water run-off will be managed from are illustrated in plan on Figure 18-19.



Source: KP, 2021

Figure 18-19: Site wide water balance, WMF Stage 5 (final) plan and catchment area boundaries

The key input parameters and assumptions for the site wide water balance are summarized as follows:

- Years Modelled – The water balance was developed to estimate flows throughout the mine life including Year 2 through Year 15 (two years of construction, 12.25 years of operations, and 2.75 years of closure). Years -1, 4, 10, and 14 were selected as key years to illustrate the water balance results and provide a range of outputs during construction, varying operating conditions, and closure.
- Hydrological Conditions – Conceptual level analyses, prior to completing the water balance, showed that the Alacran Mine will operate under an annual surplus
- Hydrological Information – Monthly precipitation and evaporation data were developed by KP based on daily precipitation and evaporation data provided by INTERA Inc. Run-off coefficients for various site areas were estimated by KP.
- Surface Water Management (WMF) – Run-off collection ponds 1 through 3 located along the WMF toe will provide temporary water storage for sediment management prior to the release of water to the environment. Pond 1 will collect run-off from the access road and nearby embankments and includes the collection of run-off from temporary pond 1A, which will be removed during later operations. An oil/grease separator will also be installed in Pond 1 to remove any oil and grease prior to the release of water to the environment. Ponds 2 and 3 will collect run-off from the nearby embankments and discharge the collected water directly to the environment.
- Surface Water Management (Operational Areas) – Run-off collection Pond 4 will collect surface water from ore stockpiles upslope of the key infrastructure, and the run-off from this stockpile is expected to be acidic with elevated metals concentrations. Water collected in Pond 4 will be pumped to the WMP for reuse in the process or transferred to the WTF for treatment and discharge.
- The final settled dry density for the deposited tailings was estimated to be 1.7 t/m^3 based on laboratory testing results (KP, 2021a) and the assumption that the tailings will fill a portion of the PAG and Uncertain waste rock voids during operations.
- The operational pond volume in the WMF basin will be minimized throughout operations by pumping supernatant and run-off to the WMP.
- The WMP was sized to have a maximum operating pond volume of approximately 560,000 m^3. This value was selected based on the mill throughput rate and the available space to locate the WMP. The minimum operating pond volume was set to 250,000 m^3 to maintain adequate water depth for the water reclaim and water treatment barges and to allow the water treatment rate to be relatively constant over time.
- WMF Seepage – Seepage estimates for the Main, Northeast, and South Embankments were developed by KP (2021b) for the Stage 1 and Stage 5 operating conditions. Seepage from the Main and Northeast Embankments will be routed to sumps via drains and pumped back to the WMF. It has been assumed that all seepage from the South Embankment will report to the OP and transferred to the WMP via the OP dewatering system. The following assumptions were used to estimate the seepage rates for the evaluated years in the water balance model:
    - Seepage rates for Years 4 and 10 were estimated from the Stage 1 and Stage 5 seepage rates based on the projected filling level in the WMF. The increase in seepage over time was assumed to be linear to estimate the seepage rates at Year 4 and year 10.
    - At closure, seepage from the WMF will be equal to the Stage 5 seepage results. This is a conservative assumption given that the water pond in the WMF will be removed at closure.
    - OP – Seepage estimates into the OP from the WMF were estimated by KP (2021b). KP also estimated the run-off entering the OP. Seepage estimates into the OP from the surrounding topography, including leakage estimates for the WMP and Pond 4 were provided by INTERA (2021b).

- Mill and Camp – Flow rates for the mill and camp were provided by Nordmin
- WTF – Sewage outflow estimates were provided by Nordmin. KP estimated the water treatment rates based on the estimated water discharge requirements from the water balance. The maximum water treatment rate was set at a constant value and cycled between the WMP operating volumes. The results were aggregated over the model reporting periods (monthly and annually) to determine the typical water treatment rates. The WMP volume was allowed to fluctuate to provide surge capacity during wetter operating conditions.

18.11.2 Water Management Overview

Run-off from outside of the WMF footprint will be diverted and discharged to the environment. Water collected within the WMF, Pond 4, and the OP will be pumped to the WMP. Water in the WMP will be pumped to the mill for reuse as process water during milling or conveyed to the WTF for treatment and discharge. Most of the treated water will be discharged to the environment. Freshwater required for the mill will be pumped from the WTF to the mill.

The main water management components include:

- Collection ditches, diversion ditches, and the four run-off collection ponds around the perimeter of the WMF and WMP
- WMF
- WMP
- OP
- Mill
- Camp
- WTF
- Freshwater makeup from the San Pedro River
- Flows for use under unusual conditions (additional freshwater and water used for fire suppression)

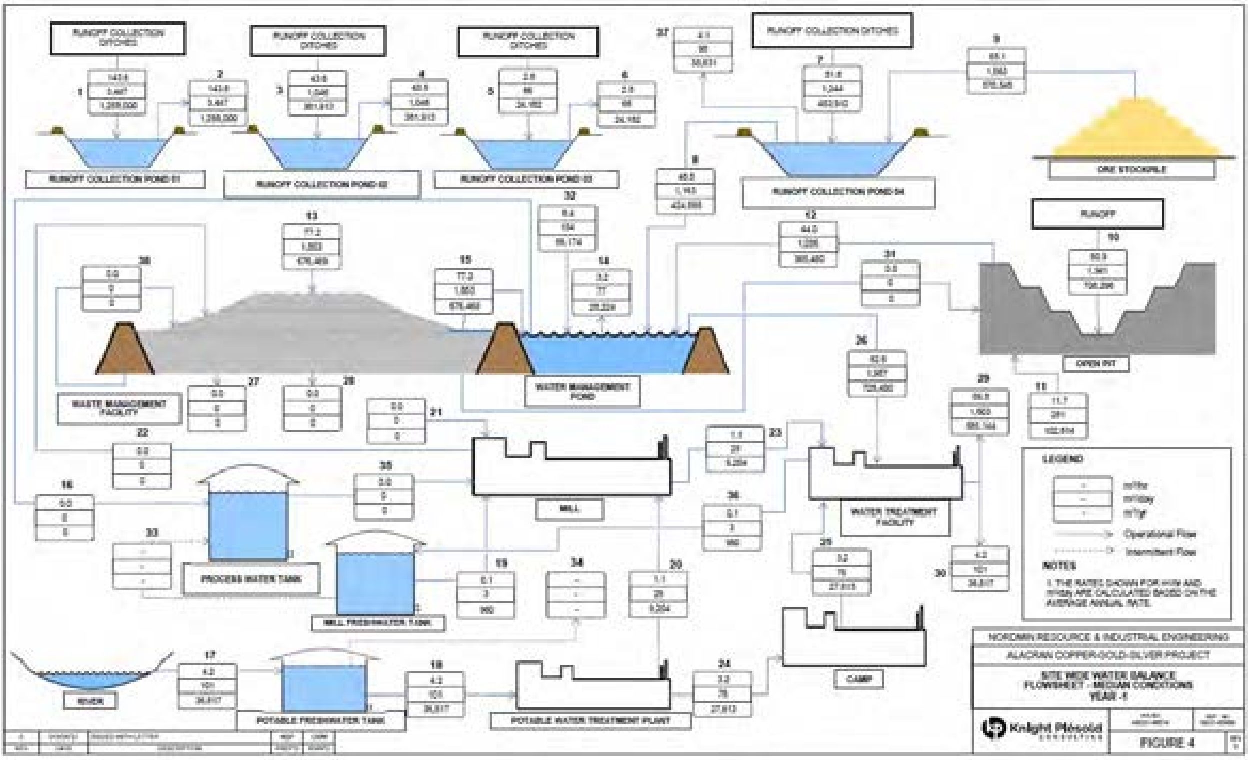
The flows included in the water balance model are listed in Table 18-1 and flow paths are illustrated on Figure 18-20 and Figure 18-21, including estimated discharge rates to the environment.

Table 18-1: Flow Identifiers

Flow Number	Description
1	Runoff to Runoff Collection Pond 1
2	Runoff Collection Pond 1 Discharge to Environment
3	Runoff to Runoff Collection Pond 2
4	Runoff Collection Pond 2 Discharge to Environment
5	Runoff to Runoff Collection Pond 3
6	Runoff Collection Pond 3 Discharge to Environment
7	Runoff to Runoff Collection Pond 4 (Undisturbed Catchment Area)
8	Runoff Collection Pond 4 Discharge to WMP
9	Runoff to Collection Pond 4 (Ore Stockpile)
10	Runoff to Open Pit
11	Groundwater Seepage to Open Pit

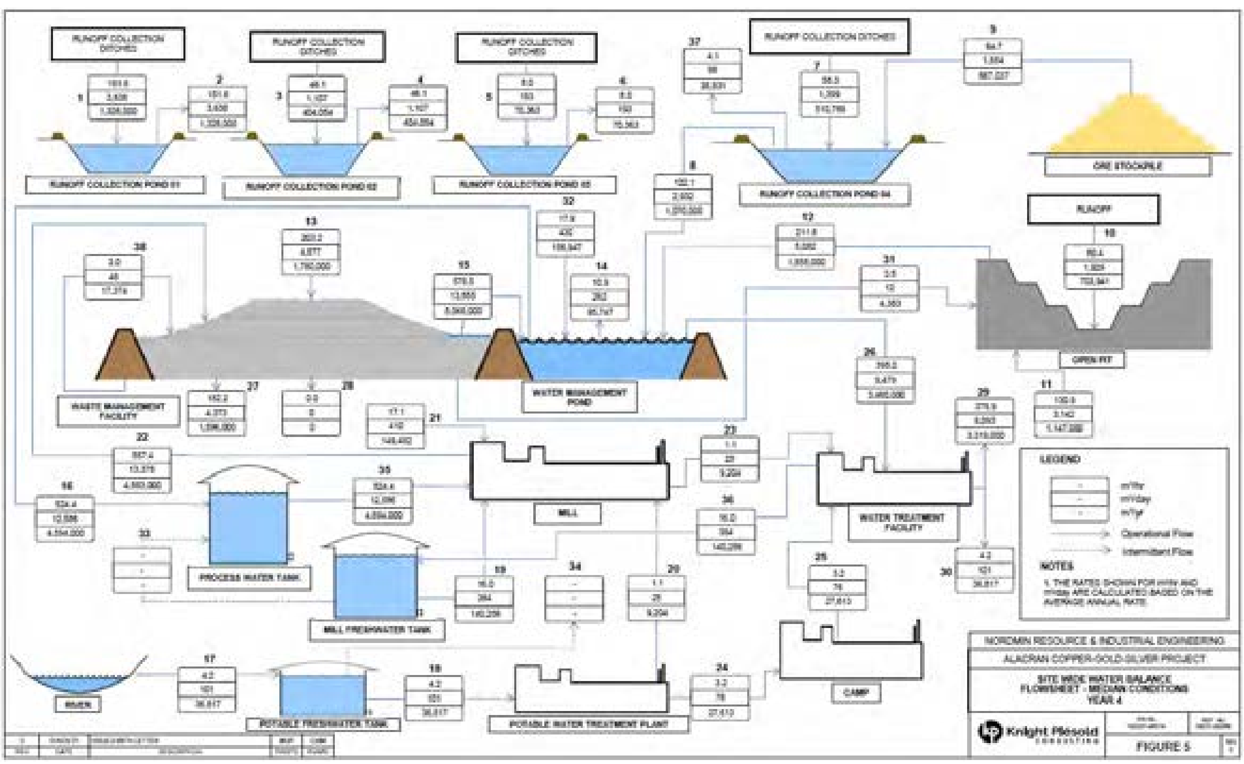
Flow Number	Description
12	Pit Dewatering to Water Management Pond
13	WMF Direct Precipitation
14	WMP Evaporation
15	Water Transfer from WMF to WMP
16	Reclaim Water from WMP to Mill, via the Process Water Tank
17	Freshwater to Freshwater Tank, via the San Pedro River
18	Freshwater to Potable Water Treatment Plant
19	Freshwater to Mill, via the Mill Freshwater Tank
20	Potable Water to Mill
21	Water in Ore
22	Tailings Slurry Water to WMF
23	Mill Sewage to Water Treatment Facility
24	Potable Water to Camp
25	Camp Sewage to Water Treatment Facility
26	Contact Water to Water Treatment Facility
27	Water Retained in Voids
28	WMF Seepage from Main/Northeast Embankments
29	Treated Contact Water Discharged to Environment
30	Treated Sewage Discharged to Environment
31	WMF Seepage to Open Pit, from South Embankment
32	WMP Direct Precipitation
33	Freshwater to Process Water Tank
34	Water for Fire Suppression
35	Water Transfer to Mill, via the Process Water Tank
36	Treated Water to Mill Freshwater Tank
37	Runoff Collection Pond 4 Evaporation
38	Captured Seepage from the WMF Main and Northeast Embankments – Returned to WMF Basin

Source: KP, 2021



Source: KP, 2021

Figure 18-20: Year -1



Source: KP, 2021

Figure 18-21: Year 4

18.11.3 Surface Water Management

Surface water management measures outside of the WMF and WMP footprints were laid out and sized to manage surface water during initial construction, and throughout operations. The measures include collection ditches, diversion ditches, and run-off collection ponds. Pumps and pipelines were sized to convey run-off collected in the ponds either to larger ponds, the environment, or to the WMP.

The design criteria, analyses completed, and details for the surface water management measures are presented below.

18.11.3.1 Design Criteria

The design criteria for the surface water management measures are as follows:

- Storm Events: The specified storm events for the various structures are listed below. Rainfall depths for the various storms were provided by INTERA (INTERA, 2021c).
  - The 1 in 50 year, 24-hour duration storm event (185 mm of rainfall) was selected to size the run-off collection and diversion ditches based on the 12.3 year mine life and industry best practices.
  - The run-off collection ponds were sized to temporarily contain run-off from the 1 in 10 year, 24-hour duration storm event (163 mm of rainfall) based on accepted guidelines in Canada (BCMOE, 2015).
  - The IDF for the run-off collection ponds was specified as the flood resulting from the 1 in 200 year, 24-hour duration storm event (209 mm of rainfall) based on accepted guidelines in Canada (BCMOE, 2015).
- Catchment Areas: Catchment areas were estimated based on the available topographical survey information and the proposed layout. Development of the surface water management measures was based on dividing the area into two main types of catchment areas (undisturbed and disturbed catchment areas). The two main types of catchment areas are described as follows:
  - Undisturbed catchment areas within (or adjacent to) the project footprint that will not be disturbed by the mining operations. Where feasible, run-off from the undisturbed catchment areas will be diverted around mine infrastructure and discharged directly to the environment.
  - Disturbed catchment areas within the project footprint that are disturbed by mining activities. The run-off from these areas may require treatment prior to discharge (settling of suspended solids, removal of oil/grease, or removal of dissolved metals). Run-off from the disturbed catchment areas will be conveyed by collection ditches, or the natural topography, and temporarily stored in run-off collection ponds or the WMP. Disturbed areas include the OP, ore stockpiles, haul/access roads, mill, waste stockpiles, and the WMF embankments.
- Curve Numbers: A soil conservation service (“SCS”) run-off curve number (“CN”) was assigned to each catchment area. The selection of each CN was based on the available land use information, past experience with similar projects, soil conditions encountered during the site investigation programs, and input provided by INTERA (INTERA, 2021 d). A high CN indicates high potential for run-off from catchment areas, while a low CN indicates low potential for run-off. The CNs used for the site are provided in Table 18-2.

Table 18-2: SCS CNs for the Site

Area	Curve Number	Source
Active Tailings Beach	98	KP Estimate
Inactive Tailings Beach	95	KP Estimate
PAG Waste Rock	98	KP Estimate
Supernatant Pond	99	INTERA, 2021 d
Cleared Area	73	INTERA, 2021 d
Embankment Fill	77	KP Estimate
Access Road	98	KP Estimate
Disturbed Area/Mill	76	KP Estimate

Source: KP, 2021

- Time of Concentration: Time of concentration ("Tc") values were applied to each catchment area to estimate the time required for run-off to flow from the furthest point in a catchment area to the associated receiving water management structure. Tc values were estimated based on soil cover, land slope, and hydraulic length (i.e., run-off flow path length).
- Storm Type: An SCS Type III rainfall distribution was used in the analysis to reflect potential hurricane or tropical storm conditions.
- Freeboard:
    - Collection/Diversion Ditches: 0.3 m.
    - Run-off Collection Ponds: Wet freeboard of 0.7 m above spillway inverts for conveyance of the IDF to the downstream environment and a dry freeboard of 0.3 m for potential wave setup and run up.

18.11.3.2 Design Methodology

The locations and layouts for the surface water management measures were based on the infrastructure locations during construction and throughout operations. The following methodologies were used to size the surface water management measures:

- Stormwater modelling was carried out to estimate the run-off volumes/peak run-off flows for the collection/diversion ditches, run-off collection ponds, and WMP. The modelling was completed using HydroCAD® (HydroCAD, 2015), which is a commercial software program.
- Run-off volumes resulting from the 1 in 10 year, 24-hour duration storm event were used to estimate the required storage capacity of each pond.
- Peak flows from the IDF were used to determine the wet freeboard requirements for each basin, based on the peak flow depth from routing the flood through the ponds and spillways. Typical details for the spillways were also estimated using the peak flows and flow depths.
- Manning's equation was used to estimate the collection/diversion ditch and spillway dimensions and armouring requirements (riprap).

18.11.3.3 Collection/Diversion Ditches

Six collection ditches and three diversion ditches will be constructed in Year -2 and -1 of the mine plan (initial construction or Stage 1) to collect and divert run-off during construction and into the operational period. The number of required collection ditches will change during operations, as summarized below.

- Stage 2: Three collection ditches along the Stage 1 access road will be removed as the WMF embankment is expanded in the downstream direction and as the access road is re-aligned. The outer collection ditch will continue to collect run-off from the access road.
- Stage 4: Two collection ditches will be installed downstream of the Northeast Embankment.

The minimum ditch slope in the direction of flow is approximately 0.5%. Ditches will be excavated with 2H:1 V side slopes and varying base widths and depths. Ditches running parallel to natural slopes will likely be constructed using a cut and fill construction methodology with a low height berm forming one side of the ditch. These berms will have a crest width of 2 m and 2H:1 V side slopes. Erosion protection (where required) will consist of riprap overlying non woven geotextile. Additional riprap will be placed along ditch sections during operations if noticeable erosion is observed. The base width, excavation depth/berm heights and armouring requirements for each ditch/berm will vary based on the estimated peak inflow and existing ground conditions. Ditches in flatter areas will be excavated. The base width and excavation depth will vary based on the estimated inflow. The excavated ditches will have 2H:1 V side slopes.

18.11.3.4 Run-off Collection Ponds

Five run-off collection ponds (Ponds 1, 1 A, 2, 3, and 4) will be constructed to manage run-off during construction and operations and minimize sediment reporting to the environment. The main components of each pond include the basin (retention capacity for run-off), pumps, and pipelines to transfer clarified water to larger ponds, the environment, or to the WMP, and spillways to safely convey run-off resulting from extreme precipitation events through and away from the ponds. The pond sizing includes for temporary storage of run-off to allow a portion of the suspended solids to settle out prior to water being discharged or pumped to the WMP.

The number and locations of the required run-off collection ponds will change during operations, as summarized below:

- Stages 2 through 4: Ponds 1 A and 3 will be relocated as the Main and Northeast Embankments are raised.
- Stage 5: Pond 1 A will be removed as the Main Embankment is raised. Following removal of the pond, run-off from this area will report to the collection ditch along the downstream toe of the Main Embankment.

Specific requirements for the ponds are outlined below:

- Pond 1 will have an oil/grit separator installed to remove any oil or excess grit present in the run-off from the access road.
- Pond 1 A will be equipped with a pump and pipeline to convey run-off collected in the pond to a nearby ditch. The ditch will drain to Pond 1.
- Water collected in the interim locations for Pond 3 will be pumped to a nearby ditch, which will report to Pond 2.
- Water from Pond 4 will be discharged into the WMP due to the potential presence of dissolved metals in the run-off from ore stockpiles further upstream in the catchment.
  Typical run-off collection pond details are described below.
- Each pond has a sediment storage depth allowance of approximately 0.5 m above the pond floor. The ponds will be cleaned periodically to maintain the sediment storage allowance.

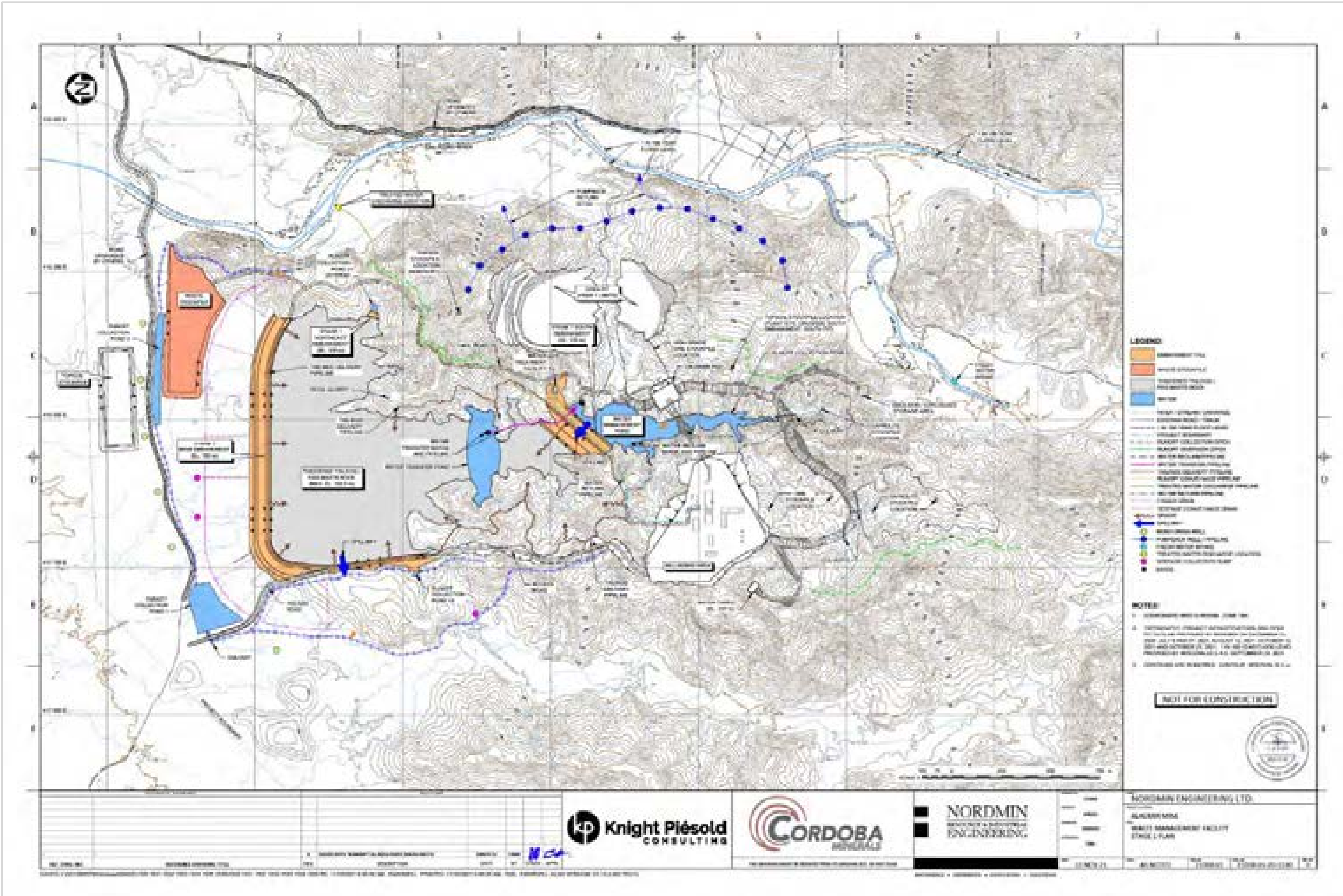
- Each pond excavation will be lined with a 0.3 m thick layer of saprolite to reduce seepage from the ponds.
- Containment for interim Ponds 1 A and 3 will be provided by the natural topography at each pond location. A pump and pipeline will be installed in each pond to convey run-off to a nearby collection ditch.
- Ponds 1 and 2 and final Pond 3 will be constructed with cut and fill construction methodology. A portion of each basin will be excavated into the original ground and the remainder of the basin formed by constructing perimeter berms using saprolite. Each berm will be approximately 1 m high with a crest width of 6 m and 2.5H:1 V upstream and downstream slopes. The excavation slopes will also be 2.5H:1 V.
- Pond 4 will be located upstream of the WMP. The basin will be established by constructing an embankment across the valley (supporting the crushed ore conveyor) to provide containment. The conveyor embankment will be constructed with 1.5H:1 V upstream and downstream slopes.
- Water collected in each pond will be removed once sufficient settling of TSS has occurred, which is estimated to be within hours following a rainfall event (up to and including the 1 in 10 year, 24 hour duration event). A floating pump and HDPE pipeline will be installed in each pond to convey the collected water to other ditches or ponds, or to the environment.
- Ponds 1, 2, 3 (final), and 4 will include spillways to convey flows resulting from storm events greater than the 1 in 10 year, 24-hour duration storm event, and up to and including the IDF (1 in 200 year, 24 hour duration storm event), to the downstream environment or to the WMP. The peak flows estimated from HydroCAD® were used in the Manning’s equation to estimate the required spillway width, depth, and erosion protection requirements. It was conservatively assumed that each pond was filled to the spillway inlet elevation at the onset of the storm event. The spillways will be trapezoidal in section and lined with riprap overlying non woven geotextile.

18.11.4 WMF and WMP Stormwater Management

Stormwater management measures for the WMF and WMP were developed to manage run-off from storm events throughout operations (Stages 1 through 5) and closure. The design analyses were completed to confirm the following:

- Storage requirements to temporarily store EDF run-off volumes and establish maximum pond levels in the WMF and WMP during operations.
- Peak IDF flows to size spillways and manage the IDF.

The WMF spillways for Stages 1 through 4 will be located on the west side of the Main Embankment, as shown in plan on Figure 18-22. Run-off conveyed by these spillways will be released to the Quebrada La Concepcion Valley, west of the WMF.

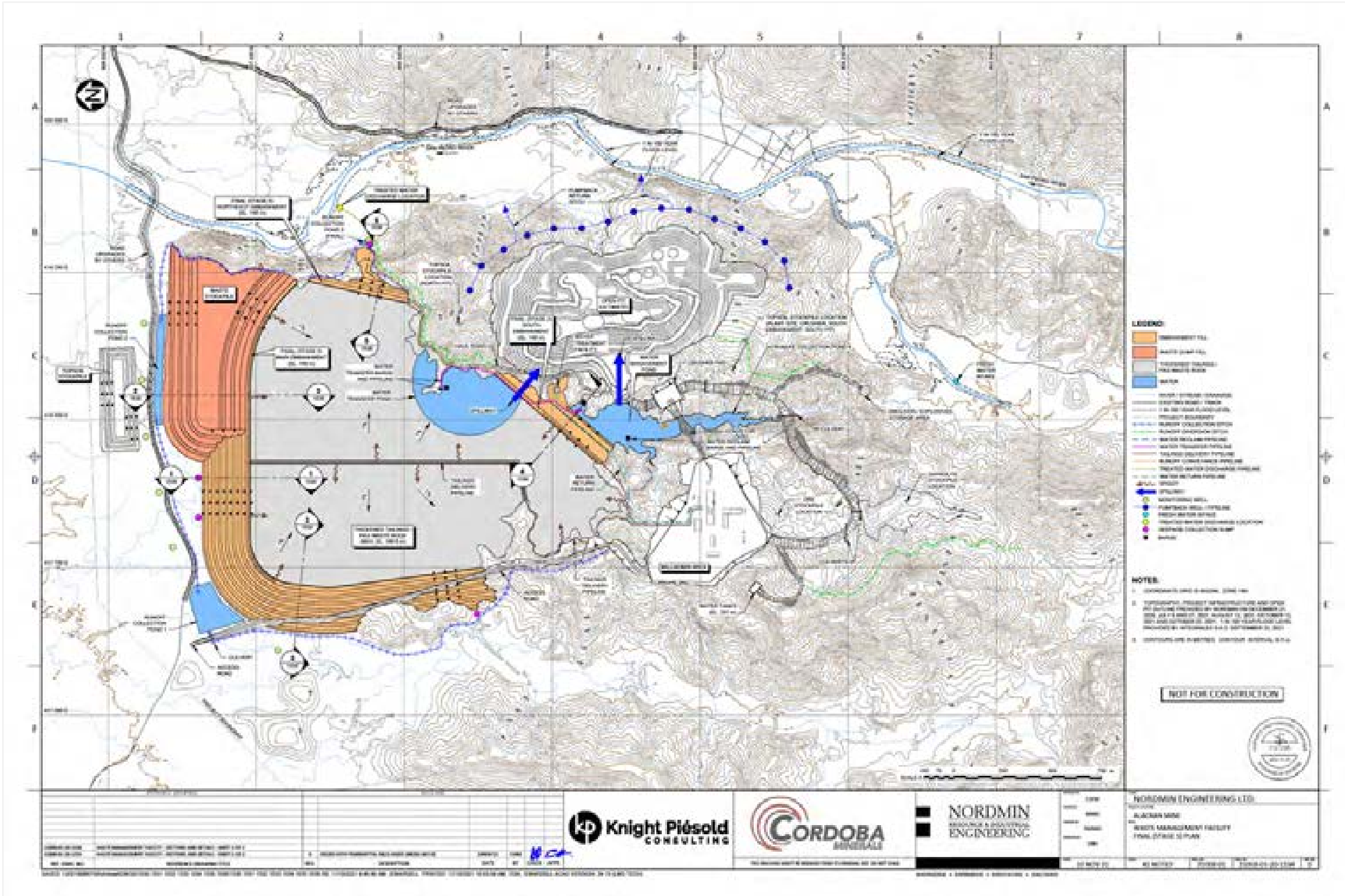


Source: KP, 2021

Figure 18-22: WMF Stage 1 plan

The WMF spillway for Stage 5 will be located on the South Embankment and was sized to suit closure conditions, as this spillway will remain at closure. Run-off conveyed by this spillway will report to the OP.

The Stage 1 WMP spillway will convey storm flows from the WMP basin to the WMF basin by constructing a swale in the Stage 1 South Embankment. The Stage 2 through Stage 5 (final) WMP spillway will convey storm flows from the WMP spillway to the OP as illustrated in plan and section on Figure 18-23.



Source: KP, 2021

Figure 18-23: WMF Stage 5 plan

The WMP spillway into the OP was sized to suit closure conditions, as this spillway will remain at closure.

The design criteria, analyses completed, and details of the WMF and WMP stormwater management measures are described below.

18.11.4.1 Design Criteria

The key design criteria utilized for the WMF and WMP include:

- Environmental Design Storms (Temporary Storage)
  - The WMF has been sized to temporarily contain run-off generated from the EDF, which was selected as the 1 in 200 year, 24-hour storm event (CDA, 2019). The estimated rainfall depth for this event is 209 mm of rainfall (INTERA, 2021c).
  - The WMP has been sized to temporarily contain the run-off resulting from the 1 in 10 year, 24-hour duration storm event, similar to the run-off collection ponds (BCMOE, 2015). The estimated rainfall depth for this event is 163 mm of rainfall (INTERA, 2021c).
- IDF Events (Temporary Storage and Discharge)
  - The IDF for the WMF during operations was selected as the flood that is ⅔ between the 1 in 1,000 year flood and the probable maximum flood (CDA, 2019). The IDF for the WMF at closure was defined as the probable maximum flood (CDA, 2019). The estimated rainfall depth for the 1 in 1,000 year, 24 hour duration storm event is 228 mm. The estimated rainfall depth for the PMP storm event (which would result in the probable maximum flood is 258 mm (INTERA, 2021c).
  - The IDF for the WMP during operations was selected as the flood that is ⅔ between the 1 in 1,000 year flood and the probable maximum flood. The IDF for the WMP at closure was defined as the probable maximum flood (CDA, 2019). Since the WMP spillway will be installed for operations and will remain in place during closure, the two operating and closure scenarios were evaluated to determine which would result in the larger peak flow event for sizing the spillway. Scenario 1 included a lower storm depth and larger catchment area along the east side of the WMP due to limited OP development at the start of operations. Scenario 2 included a larger storm depth and a smaller catchment area along the east side of the WMP due to full OP development. The results from this assessment confirmed that the peak inflow to the WMP was greatest for Scenario 1.
- Freeboard
  - WMF: Wet freeboard allowance of 0.5 m above the spillway invert for conveyance of the IDF to the downstream environment (based on analysis above) and a dry freeboard of 1.0 m for potential wave setup and run up
  - WMP: Wet freeboard allowance of 0.7 m above the spillway invert for conveyance of the IDF to the downstream environment (based on analysis above) and a dry freeboard of 0.3 m for potential wave setup and run up

18.11.4.2 Design Methodology

The run-off volumes and peak flows into the WMF and WMP basins resulting from the EDF and IDF were estimated using HydroCAD® (HydroCAD, 2015). The estimated run-off volumes from the EDF were used to determine the maximum operating levels within the WMF and WMP during operations. The peak flows from the IDF were used to determine the wet freeboard requirements within each basin based on the peak flow depth while routing the flood through the spillways during operations and closure. Details for each of the spillways were developed using results from the hydraulic analyses completed in HydroCAD®. The analyses assumed that the diversion ditches would fail during the IDF events, as the ditches were sized for a smaller 1 in 50 year, 24-hour storm event. Manning's equation was used to estimate the spillway channel dimensions and armouring requirements.

18.11.4.3 Results – WMF

The results from the stormwater analysis for the Stage 1 WMF are summarized below.

- The EDF run-off volume was estimated to be approximately 470,000 m^3 during operations. The EDF run-off will be temporarily stored in the WMF basin and gradually conveyed to the WMP via the water transfer system.
- The peak IDF inflow was estimated to be about 83 m^3/s and the design outflow from the spillway was approximately 10 m^3/s. The spillway details are as follows:
  - The inlet and channel over the embankment will be 1.5 m deep, with a 20 m base width and 6H:1 V side slopes. The channel over the embankment will be sloped at 1% in the direction of flow. The maximum flow depth through the inlet was estimated to be 0.3 m.
  - Riprap with a D_{50} of 0.15 m will be placed over non woven geotextile installed over the spillway inlet base and side slopes, as well as the spillway channel on the embankment crest.
  - The spillway channel downstream of the WMF will be excavated into natural ground with similar characteristics as the channel over the WMF embankment and a minimum required channel depth of 0.6 m (based on a maximum flow depth estimated to be 0.3 m).

The results from the stormwater analyses for the WMF at Stage 5 and at closure are summarized below.

- The peak IDF inflow was estimated to be approximately 93 m^3/s and the design outflow through the spillway was estimated to be about 3 m^3/s. The final WMF spillway was sized for the Stage 5 conditions, as opposed to closure, based on the following:
  - Placement of a cover and vegetation on the WMF surface at closure would result in a reduction in the CN value and therefore decrease the peak IDF flow as compared to the estimated peak flow during Stage 5 operations.
  - Establishment of a mounded cover that sheds water over the entire WMF perimeter would reduce the catchment area reporting to the spillway and therefore the peak IDF flow.
- The Stage 5 spillway details are as follows:
  - The inlet and channel over the embankment will be 1.5 m deep, with a 20 m base width and 6H:1 V side slopes. The channel over the embankment will be sloped at 1% in the direction of flow. The maximum flow depth through the inlet was estimated to be less than 0.2 m.
  - Riprap with a D_{50} of 0.15 m will be placed over non woven geotextile installed over the spillway inlet base and side slopes, as well as the spillway channel over the embankment crest.
  - The spillway channel downstream of the WMF will have an initial steeper section and subsequent flatter section that outlets into the OP. The steep section will have a slope in the direction of flow of approximately 15%, a minimum channel depth of 0.5 m (based on a flow depth of 0.1 m), a 10 m wide base, and 2H:1 V side slopes. This portion of the spillway channel will be armoured with coarser riprap (D_{50} of 0.2 m) to minimize potential erosion. The flatter section will have a slope in the direction of flow of approximately 1%, a minimum channel depth of 0.5 m (based on a flow depth of 0.2 m), a 10 m wide base and 2H:1 V side slopes (except where vehicle access is required - in this case the side slopes will be 6H:1 V).

The Stage 2 through 4 spillway sizes were estimated based on the Stage 1 and 5 spillways.

18.11.4.4 Results – WMP

The maximum WMP crest will be at El. 121 m with the spillway invert at El. 120 m to maintain freeboard requirements.

The results from the stormwater analyses for the WMP are summarized below.

- The EDF volume was estimated to be approximately 155,000 m^3 during operations. The EDF volume will be temporarily stored in the WMP basin and will be reclaimed to the mill for use as process water or transferred to the WTF for treatment and discharge. The maximum operating level for the WMP will be El. 119 m to allow for storage of the EDF volume below the spillway invert.
- The IDF inflow was estimated to peak at about 38 m^3/s, while the peak outflow was estimated to be approximately 32 m^3/s. The estimated outflow was used to size the spillways, which will consist of the following:
    - The Stage 1 (interim) spillway will be a swale excavated through the Stage 1 South Embankment to convey flows to the WMF basin. The Stage 1 South Embankment will be constructed to crest El. 125 m and the swale will be 5 m deep to maintain the invert at El. 120 m. The swale will have a base width of 8 m and 4H:1 V side slopes to allow the passage of small vehicle traffic.
    - The final spillway will be constructed during Stage 2 operations and will remain in place during closure. The spillway inlet and channel over the embankment crest will be 1.0 m deep with a 38 m base width and 6H:1 V side slopes. The channel on the embankment crest will be sloped at 0.5% in the direction of flow.
    - Riprap with a D_{50} of 0.15 m will be placed over non woven geotextile installed along the spillway inlet base and side slopes, as well as the spillway channel on the embankment crest.
    - The spillway channel downstream of the WMP will be formed by building out the downstream WMP embankment slope to establish flatter based slope (sloped in direction of flow at 2%). At the downstream toe of embankment, a channel will be excavated to the OP (slope in the direction of flow of 0.5%). The entire channel will be a minimum of 1.0 m deep (based on a maximum flow depth of 0.7 m), with a 20 m wide base and 6H:1 V side slopes. The channel will be armoured with riprap (D_{50} of 0.15 m) overlying non woven geotextile (where required) to minimize erosion.

18.12 Waste Management Facility

18.12.1 Overview

The extracted material from the OP will use conventional crushing, flotation, re-grinding, and gravity concentration. Thickened PAG tailings will be delivered to the WMF at a design solids content of approximately 63% by mass. PAG and Uncertain waste rock from OP development will be hauled to the WMF. The PAG and Uncertain waste rock excavated from initial OP development will be used for a portion of Stage 1 embankment construction, and the remainder will be placed within the WMF basin and covered with tailings during ongoing mining operations. Saprolite and NPAG waste rock from OP mine development will be primarily used to construct the WMF embankments and downstream buttresses. Additional saprolite and weathered bedrock (transition zone) material not needed for embankment construction will be placed and compacted in a waste stockpile adjacent to the downstream slope of the WMF Main Embankment.

The WMF will consist of a valley type impoundment to provide permanent storage for the PAG tailings and PAG/Uncertain waste rock. Waste storage capacity will be developed by constructing embankments around the perimeter of the valley and using the natural topography to form a valley type impoundment. The Main and Northeast Embankments will be raised using the downstream construction method and the South Embankment will be raised using the centreline construction method. The South Embankment will be a divider embankment that will establish the WMP in the southern portion of the valley.

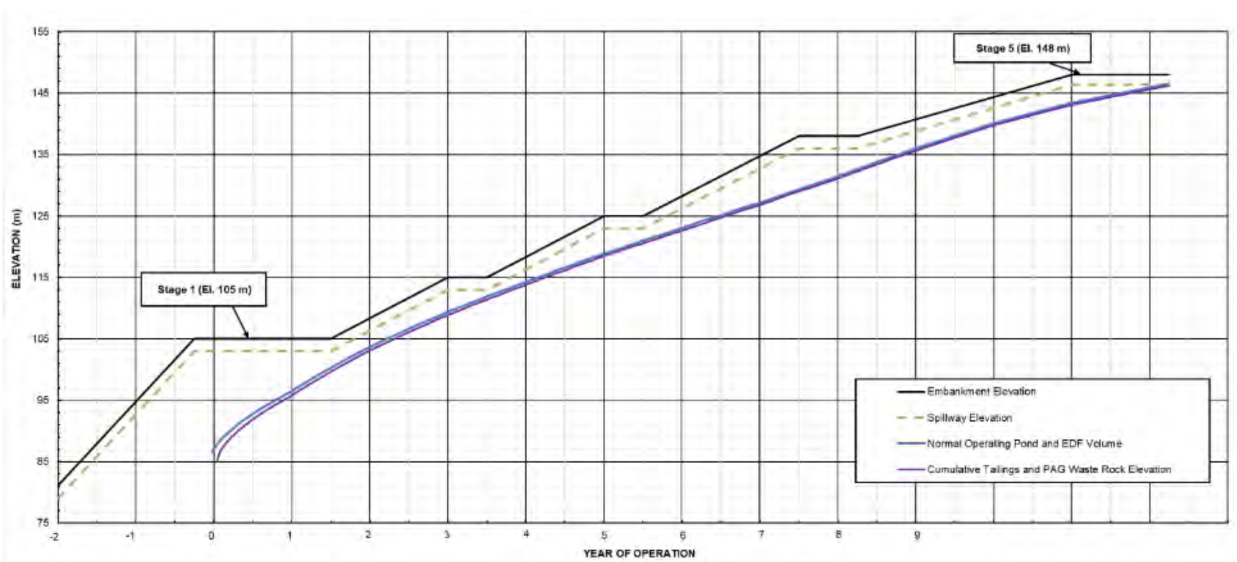
Stage 1 construction will be completed during Year -2 and Year -1 of the mine plan. Raising of the embankments (Stages 2, 3, 4, and 5) will be completed over the mine life. The WMF embankment staging plans, cross sections, and key design features are summarized below.

18.12.2 Filling Schedule and Embankment Staging

The capacity of the WMF is based on the following:

- Mill throughput data provided by Nordmin
- Local topography
- WMF basin filling characteristics
- Estimated final average settled dry density of the tailings (1.7 t/m^3)
- Supernatant pond volume in the WMF basin
- Temporary storage of run-off generated from storm events, up to, and including the EDF
- Provision of overtopping protection for wave setup and run up
- Passage of the IDF over the spillway

The filling schedule and proposed embankment construction schedule is illustrated on Figure 18-24. The schedule illustrates the five stages of construction from Year -2 through to the end of mine operations.



Source: KP, 2021

Figure 18-24: WMF filing schedule

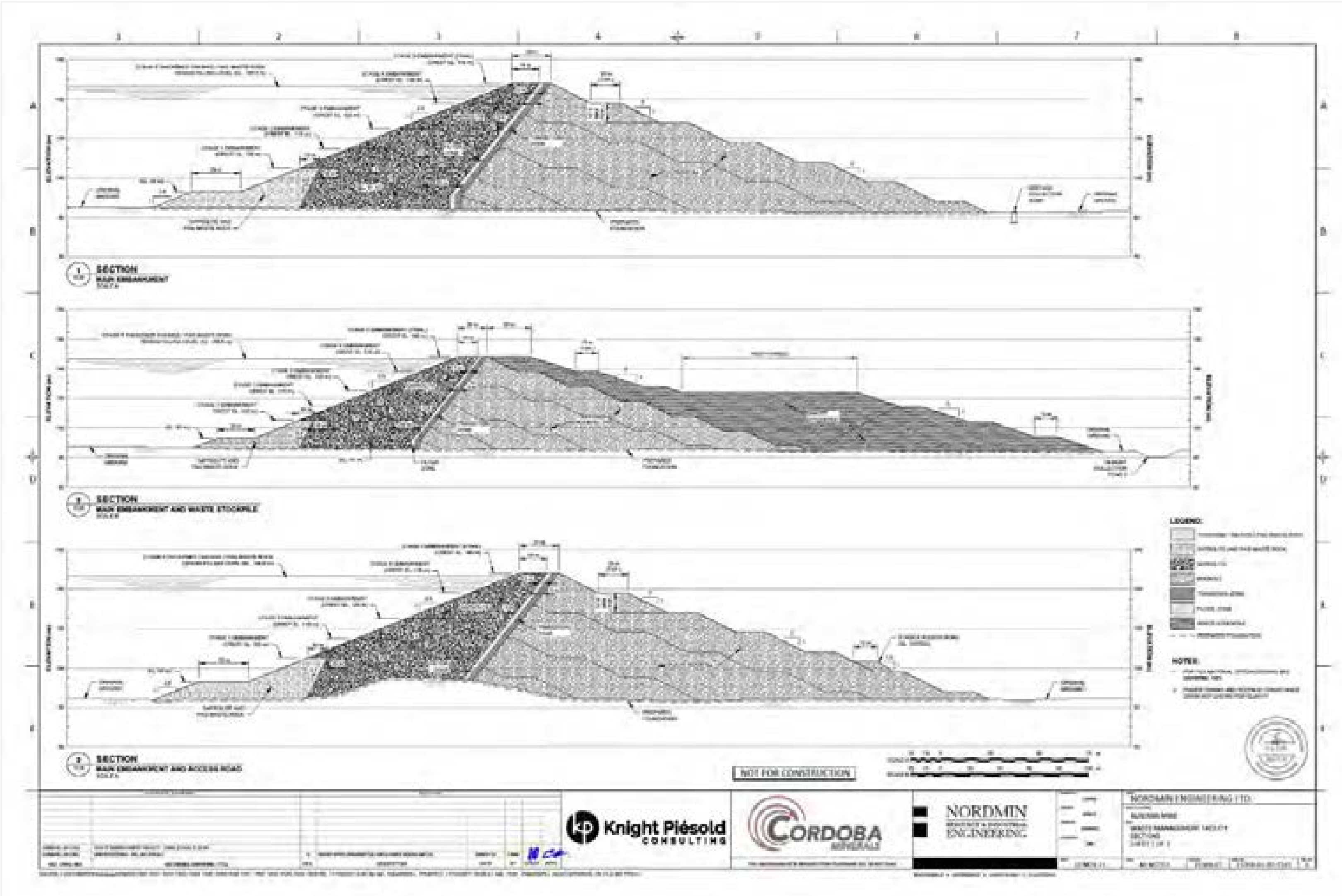
18.12.3 Embankment Cross Section

Saprolite, residual soil, and weathered bedrock, along with isolated areas of alluvium are typically present below the WMF embankments and within the WMF basin. The Main, South, and Northeast Embankment foundations will be cleared, grubbed, and stripped of topsoil, unsuitable materials, and isolated areas of alluvium to expose stiff saprolite or residual soil prior to embankment construction. The Stage 1 basin will be cleared and grubbed, then nominally compacted to reduce the permeability of the underlying saprolite/residual soil (foundation soil) and reduce potential seepage through the WMF foundation. The topsoil, unsuitable materials, and alluvium will be stored downstream of the WMF in two stockpiles; one for topsoil and one for unsuitable materials and alluvium.

The embankment cross sections developed for the WMF are as follows:

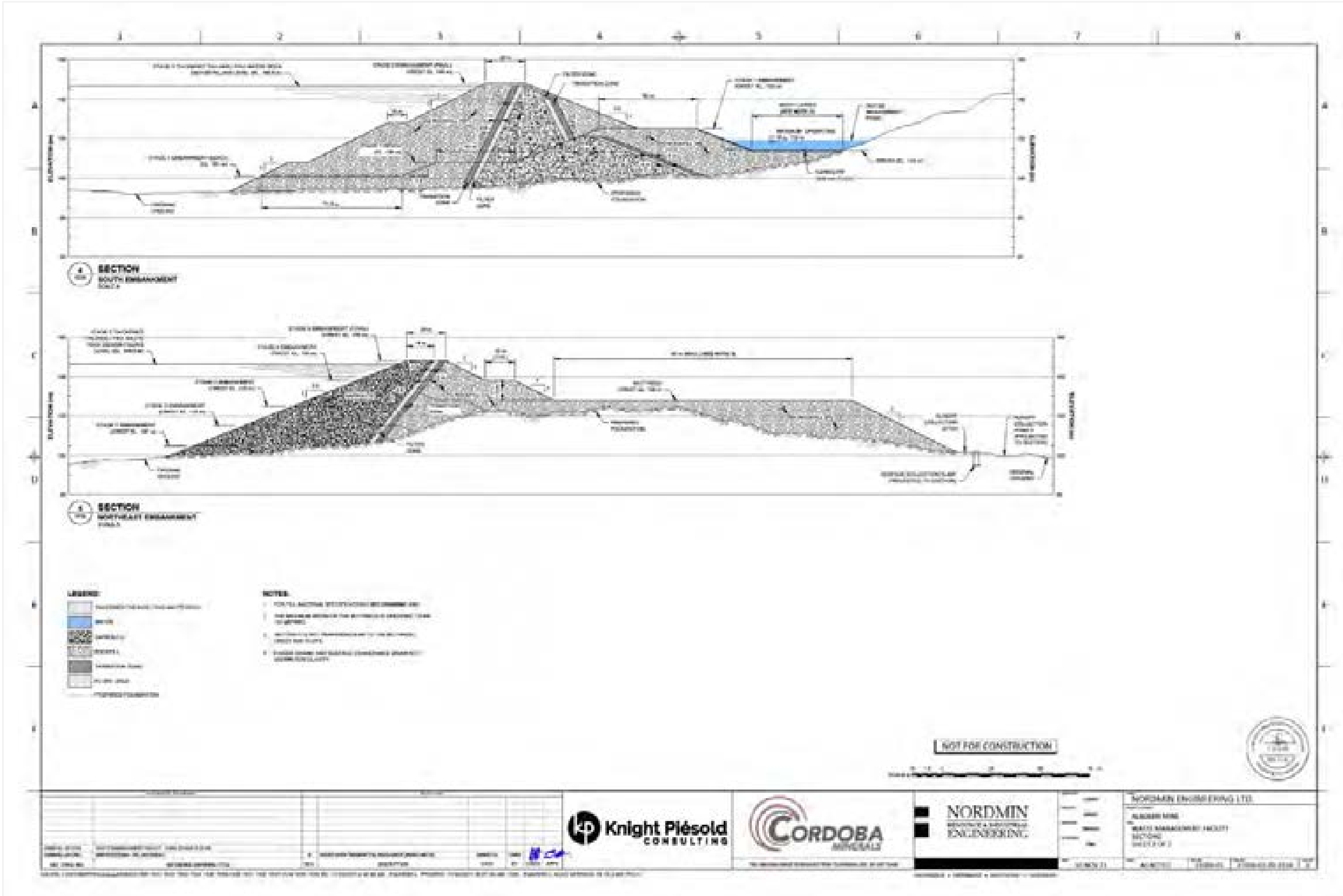
- The Main and Northeast Embankments will be initially constructed during Stage 1 and raised using the downstream construction method during Stages 2 through 5
- The South Embankment will be initially constructed during Stage 1 and raised to the final elevation using the centreline construction method during Stage 2

Embankment fill will comprise waste materials from OP development. Processing will be required to meet the material specifications for the filter and transition zones. The Stage 1 and Stage 5 general arrangements are provided in plan on Figure 18-22 and Figure 18-23, respectively. Typical cross sections for the embankments are provided on Figure 18-25 and Figure 18-26.



Source: KP, 2021

Figure 18-25: WMF sections (1 of 2)



Source: KP, 2021

Figure 18-26: WMF sections (2 of 2)

18.12.3.1 Main Embankment

The Stage 1 Main Embankment will be approximately 22 m in height at the tallest section with the embankment crest constructed to El. 105 m. The upstream slope will be 2.5H:1 V with a 25 m wide, 8 m high buttress to satisfy slope stability requirements. The downstream slope will be 3H:1 V with a 20 m wide, 7 m high buttress to satisfy slope stability requirements. The crest width will be 20 m. Fill zones from upstream to downstream are summarized below:

- Saprolite and PAG Waste Rock – Alternating layers of PAG waste rock and saprolite will be placed and compacted to encapsulate the PAG waste rock and minimize the potential for the onset of ARD conditions. The minimum width of this zone will be 10 m.
- Saprolite Fill – The saprolite fill will be placed and compacted to provide a low permeability zone and reduce seepage through the WMF fill. The minimum width of this zone will be 10 m.
- Filter Zone – The filter zone will be 3 m wide and placed to maintain filter relationships with the saprolite fill and provide drainage within the embankment fill
- Transition Zone – The transition zone will be 3 m wide and placed to maintain filter relationships with the upstream filter zone and the downstream rockfill and provide drainage within the embankment fill.
- Rockfill – The rockfill will consist of NPAG waste rock and will form the downstream shell zone of the embankment

The Stage 5 Main Embankment will be approximately 66 m in height at the tallest embankment section with the embankment crest constructed to El. 148 m. The upstream slope will be 2.5H:1 V and the crest width will be 20 m. The overall downstream slope will be 3.5H:1 V with mid slope benches (10 m tall, 15 m wide and 2H:1 V slopes). Fill zones from upstream to downstream are summarized below:

- Saprolite Fill – The saprolite fill will be placed and compacted to provide a low permeability zone and reduce seepage through the WMF fill. The minimum width of this zone will be 14 m.
- Filter Zone – The filter zone will be 3 m wide and placed to maintain filter relationships with the saprolite and provide drainage within the embankment fill
- Transition Zone – The transition zone will be 3 m wide and placed to maintain filter relationships with the upstream filter zone and the downstream rockfill and provide drainage within the embankment fill
- Rockfill – The rockfill will consist of NPAG waste rock and will form the downstream shell zone of the embankment

18.12.3.2 Northeast Embankment

The Northeast Embankment will be located in a saddle between two hills. The lowest elevation of the saddle is at El. 125 m. The Stage 1 and 2 embankments will be constructed upstream of the saddle to provide a platform for embankment raising. The Stage 2 embankment will be approximately 17 m in height at the tallest section. The upstream slope will be 2.5H:1 V, the downstream slope will be 2H:1 V, and the crest width will be 20 m. The Stage 1 and 2 Northeast Embankment will be constructed as a homogeneous embankment with saprolite fill.

The Stage 5 Northeast Embankment will be approximately 50 m in height at the tallest embankment section with the embankment crest constructed to El. 148 m. The upstream slope will be 2.5H:1 V and the crest width will be 20 m. The overall downstream slope will be 3.5H:1 V with mid slope benches (10 m tall, 15 m wide and 2H:1 V slopes). The downstream slope will also have a 95 m wide, 18 m high buttress to satisfy slope stability requirements. The fill zones from upstream to downstream will be the same as the Main Embankment cross section.

18.12.3.3 South Embankment

The Stage 1 South Embankment will be approximately 27 m in height at the tallest section. The embankment will be constructed to crest El. 125 m (Stage 3 crest elevation) with a 50 m wide crest to provide a corridor for the Stage 1 tailings delivery pipeline and to provide access to the Main and Northeast Embankments for small vehicles. The upstream slope will vary from 2.5H:1 V to 2H:1 V with two benches at El. 108 m and El. 101 m, respectively, to satisfy slope stability requirements. The downstream slope will be 2.5H:1 V with a buttress constructed to El. 114 m with a maximum length of 131 m to satisfy slope stability requirements. The fill zones are summarized below:

- Rockfill – The rockfill will consist of NPAG waste rock and will form the upstream and downstream shell zones of the embankment
- Saprolite Fill – The saprolite fill will be placed to construct the central portion of the embankment and provide a low permeability zone to reduce seepage through the WMF fill. The minimum width of this zone will be 6 m.
- Filter Zone – The 3 m to 4 m wide filter zone will be placed upstream and downstream of the saprolite to maintain filter relationships and provide drainage within the embankment fill
- Transition Zone – The 3 m to 4 m wide transition zone will be placed upstream and downstream of the filter zone to maintain filter relationships with the adjacent filter zone and rockfill and provide drainage within the embankment fill

The final South Embankment will be approximately 52 m in height at the tallest embankment section with the embankment crest constructed to El. 148 m. The embankment will be constructed to Stage 5 final elevation during Stage 2 construction to accommodate the tailings delivery pipeline. The Stage 5 embankment has the same cross section as the Stage 1 embankment.

The upstream slope will be 2H:1 V with two 10 m wide benches to optimize construction requirements and the crest width will be 20 m. The downstream slope will be 2.5H:1 V and will extend down to the Stage 1 crest at El. 125 m.

18.12.4 Stability

The WMF is required to be stable under the anticipated loading conditions during construction, operations, and closure. The amount of potential deformation that may occur under these loading conditions cannot result in loss of containment or the uncontrolled release of liquid or solids from the WMF. The following seismic criteria were adopted for the analyses based on previous seismicity assessments (KP, 2020) and current guidelines (CDA, 2019):

- Main Embankment – The estimated ground acceleration generated during the 1 in 2,475 year earthquake to reflect closure conditions. The Peak Ground Acceleration (PGA) for the design earthquake was estimated to be 0.43 g.
- Northeast and South Embankments – The estimated ground acceleration generated during the 1 in 10,000 year earthquake, or the Maximum Credible Earthquake (MCE), to reflect closure conditions. The PGA for the design earthquake was estimated to be 0.59 g.

The required Factor of Safety (FoS) against slope instability as per CDA (2019) guidelines are summarized as follows:

- Static Stability
    - 1.3 immediately following construction (undrained or total stress conditions) and prior to filling (upstream and downstream slopes)

- 1.5 during operations and at closure (drained or effective stress conditions, downstream slope only)
- 1.2 to 1.3 following full or rapid drawdown (upstream slope)

- Pseudo-Static (Seismic) Stability – 1.0 (upstream and downstream slopes)
- Post-Earthquake (Residual Strengths) Stability – 1.2 (upstream and downstream slopes)

Stability analyses for static, pseudo-static and post-earthquake loading during normal operating conditions wee completed using SLOPE/W©, a two dimensional limit equilibrium stability analysis software package (Geo Slope, 2021). The stability models incorporated the proposed embankment configurations, estimated strengths of the tailings, fill and foundation materials, projected tailings level, projected water levels, and projected phreatic surfaces estimated from the seepage analyses. The stability cases analyzed are summarized below.

- Static Stability: Static stability analyses were completed by modelling the fill and foundation materials at peak strengths. The short term case (immediately following construction) assumed that the foundation soils would experience excess pore pressures due to embankment loading. The long term case assumed full pore pressure dissipation in the foundation soils.
- Pseudo-Static (Seismic) Stability: The sensitivity of the upstream and downstream embankment stability to seismic loading was evaluated by applying a seismic coefficient to the long term stability analyses (i.e., at the maximum tailings filling level and full strength gain development in the foundation soils). The horizontal seismic coefficients were based on the PGA estimates under post closure conditions. The horizontal seismic coefficients were estimated based on acceptable deformation limits selected for each embankment geometry and published methods (Makdisi and Seed; 1978). Acceptable displacement limits were selected to maintain the function of each embankment, as summarized below.
    - Main Embankment: A horizontal seismic coefficient of 0.09 g was selected based on the occurrence of the 1 in 2,475-year event with no more than 1.0 m of displacement
    - Northeast Embankment: A horizontal seismic coefficient of 0.09 g was selected based on the occurrence of the 1 in 10,000-year event with no more than 1.0 m of displacement
    - South Embankment: A horizontal seismic coefficient of 0.06 g was selected based on the occurrence of the 1 in 10,000-year event with no more than 2.0 m of displacement
- Post-Earthquake Stability: Post-earthquake analyses were completed to evaluate the downstream slopes with residual strengths for the foundation soils and assuming long term loading conditions (i.e., full strength gain development in the foundation soils). Liquefied strengths were assigned to the tailings. A 20% strength reduction was applied to estimate the cyclic softening that could occur in the residual soil/saprolite foundation following a significant seismic event, as per typical recommendations by Makdisi and Seed (1978). The saprolite fill was modelled at peak strength for the post-earthquake case, as this material is not expected to cyclic soften following a seismic event. This is based on the material being reworked and compacted during fill placement.

The full or partial rapid drawdown case along the upstream slope was not evaluated for this assessment based on the following:

- The operational water pond on the WMF surface will be minimized throughout operations by the ongoing conveyance of water to the WMP
- The estimated inflow run-off volume from the EDF (1 in 200-year, 24 hour duration storm event) is estimated to be approximately 500,000 m^3 and represents an average depth of approximately 0.05 m on the impoundment surface. This depth is judged to be minimal and would not significantly saturate the upstream portion of the embankment fill.

Four representative embankment sections for the WMF embankments were selected as critical sections to evaluate embankment stability and confirm the estimated FoS against slope instability. Buttresses have been included in the embankment geometry to enhance embankment stability and achieve the minimum FoS objectives, as illustrated in section on Figure 18-25 and Figure 18-26.

18.12.5 Seepage

Potential seepage through the Main, Northeast, and South Embankments was evaluated using SEEP/W, a finite element software package, to estimate the unit seepage rate through a representative two dimensional cross section (Geo Slope, 2021). The permeability estimates for the various modelled zones are summarized below.

- The permeability of the tailings was estimated based on consolidation and permeability testwork (KP, 2021a)
- The permeabilities of the of the saprolite and PAG waste rock zone and rockfill were estimated based on typical values (Freeze and Cherry, 1979)
- The permeabilities of the saprolite fill and foundation soil were based on permeability testwork (KP, 2021c)
- The permeability of the filter and transition zones were estimated based on typical values (Freeze and Cherry, 1979) and were represented as rockfill in the models
- The permeability of the rockfill was estimated based on typical values (Freeze and Cherry, 1979)
- The permeability for the weathered bedrock was estimated based on typical values for fractured igneous rock (Freeze and Cherry, 1979) and is consistent with rock mass rating ("RMR") and RQD data from the 2021 Site Investigations (KP, 2021c), RQD data from the OP area (Stantec, 2021), and hydraulic conductivity and porosity values used by INTERA for volcaniclastic material (P. Williamson, personal communication, October 14, 2021).
- The estimated bedrock permeability used in the seepage model is consistent with regional hydraulic conductivity estimates provided by INTERA (P. Williamson, personal communication, October 14, 2021).

The Stage 1 and 5 seepage sections were modelled with the phreatic surface at the maximum tailings elevation for each stage. This is a conservative assumption as the model assumes that no tailings beach is present. Additional models were run to assess the sensitivity of hydraulic conductivity on the results and to estimate a range of possible seepage values.

The results of the seepage modelling are summarized as follows:

- Main Embankment: The estimated seepage during Stage 1 ranges from approximately 30 m^3/day to 150 m^3/day for the evaluated base case values and sensitivity values, respectively. The estimated seepage at the end of Stage 5 ranges from just over 100 m^3/day to almost 1,400 m^3/day. The seepage will be captured in the seepage collection system that will be installed within the Main Embankment foundation. The analysis indicates that the seepage values are most sensitive to the hydraulic conductivity of the settled tailings.
- Northeast Embankment: The estimated seepage at the end of Stage 5 ranges from about 10 m^3/day to almost 50 m^3/day. Seepage from the tailings will be captured within the embankment footprint. Similar to the Main Embankment, estimated seepage values are sensitive to the hydraulic conductivity of the tailings. The seepage model with an increased tailings hydraulic conductivity indicates that there is the potential for about 30 m^3/day of seepage to the ground surface upgradient of the San Pedro River and approximately 6 m^3/day of seepage through the lower weathered bedrock.
- South Embankment: The estimated seepage from the tailings at the end of Stage 5 ranges from approximately 35 m^3/day to 395 m^3/day for the evaluated base case values and sensitivity values,

respectively. Seepage from the South Embankment is estimated to ultimately discharge into the OP. These estimates include seepage from the WMF only and do not include seepage from other sources, such as regional groundwater flow or potential leakage from the WMP. Seepage values are sensitive to the hydraulic conductivity of the tailings.

Based on the results of the seepage modelling, the following seepage collection and monitoring measures will be installed during the Stage 1 Main Embankment construction and Stage 3 Northeast Embankment construction:

- Finger drains will be installed at approximate 200 m intervals from the base of the filter zone to the downstream toe of the ultimate Main Embankment footprint. One finger drain will be installed from the base of the filter zone to the downstream toe of the ultimate Northeast Embankment footprint.
- A seepage conveyance drain will be installed along the ultimate downstream toe of the Main Embankment (parallel to the embankment) The finger drains will either directly report to a seepage recycle sump or convey seepage to the seepage conveyance drain. The seepage conveyance drain will also report to a seepage recycle sump. The finger drain within the Northeast Embankment will convey seepage directly to the seepage recycle sump.
- A total of four seepage recycle sumps will be installed including three downstream of the Main Embankment and one downstream of the Northeast Embankment
- Each seepage recycle sump will include a pump and 100 mm dia DR11 HDPE pipeline to transfer the collected seepage back to the WMF basin

The seepage collection system is illustrated on Figure 18-27, including details for the drains and sumps. The finger and seepage conveyance drains will be excavated into the foundation, filled with filter zone material, and wrapped with 12 oz/yd^2 geotextile. The seepage conveyance drain will also have a 100 mm diameter slotted CPT pipe installed in the bottom of the drain.

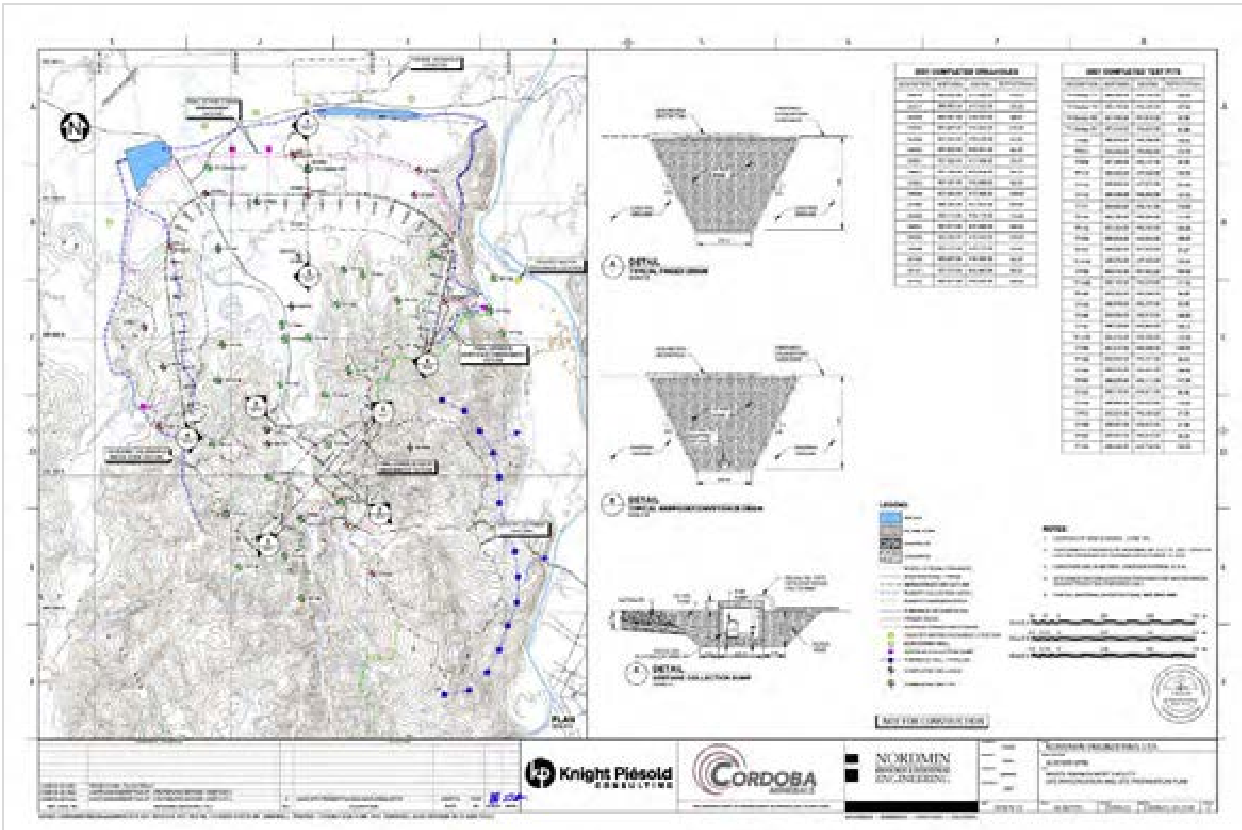


Figure 18-27: WMF site investigation and site preparation plan

18.12.6 Instrumentation

Instrumentation will be installed in the embankment foundations and embankment fill to confirm that the WMF is performing as designed. The instrumentation installed over the life of the WMF will include:

- Fifty-four vibrating wire piezometers ("VWPs") in the embankment foundations and fill to monitor pore pressures in the embankment foundations and potential phreatic surfaces within the embankments. Three planes of VWPs will be installed within the Main Embankment and one plane of VWPs will be installed within the Northeast and South Embankments.
- Nineteen surface movement monuments to monitor potential movement of the embankment crests
- Seven groundwater monitoring wells downstream of the Main and Northeast Embankments, into the weathered bedrock foundation, to monitor the groundwater quality. The monitoring wells will be sized to be upgraded to pumpback wells in the event that water quality does not meet the established criteria and pumpback is warranted.

The instrumentation will provide early warning in the event that the phreatic surface, porewater pressure, or potential movement in the embankment exceeds allowable levels. A trigger action response plan ("TARP") that includes instrumentation trigger levels and response protocols will be defined in later stages of design as part of the operations, maintenance, and surveillance ("OMS") Manual for the WMF. Instrumentation details for the WMF are shown in section on Figure 18-28 and Figure 18-29.

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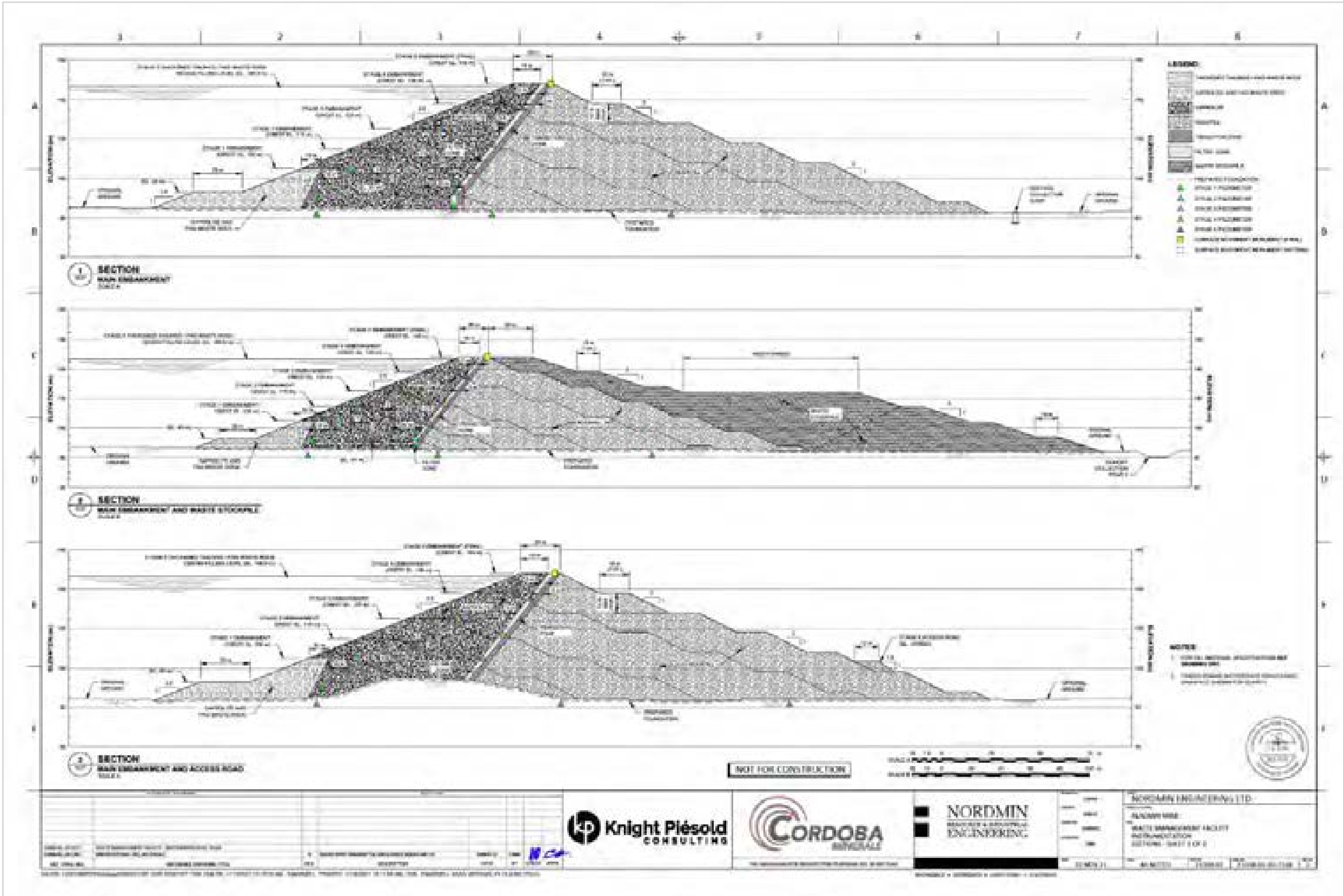
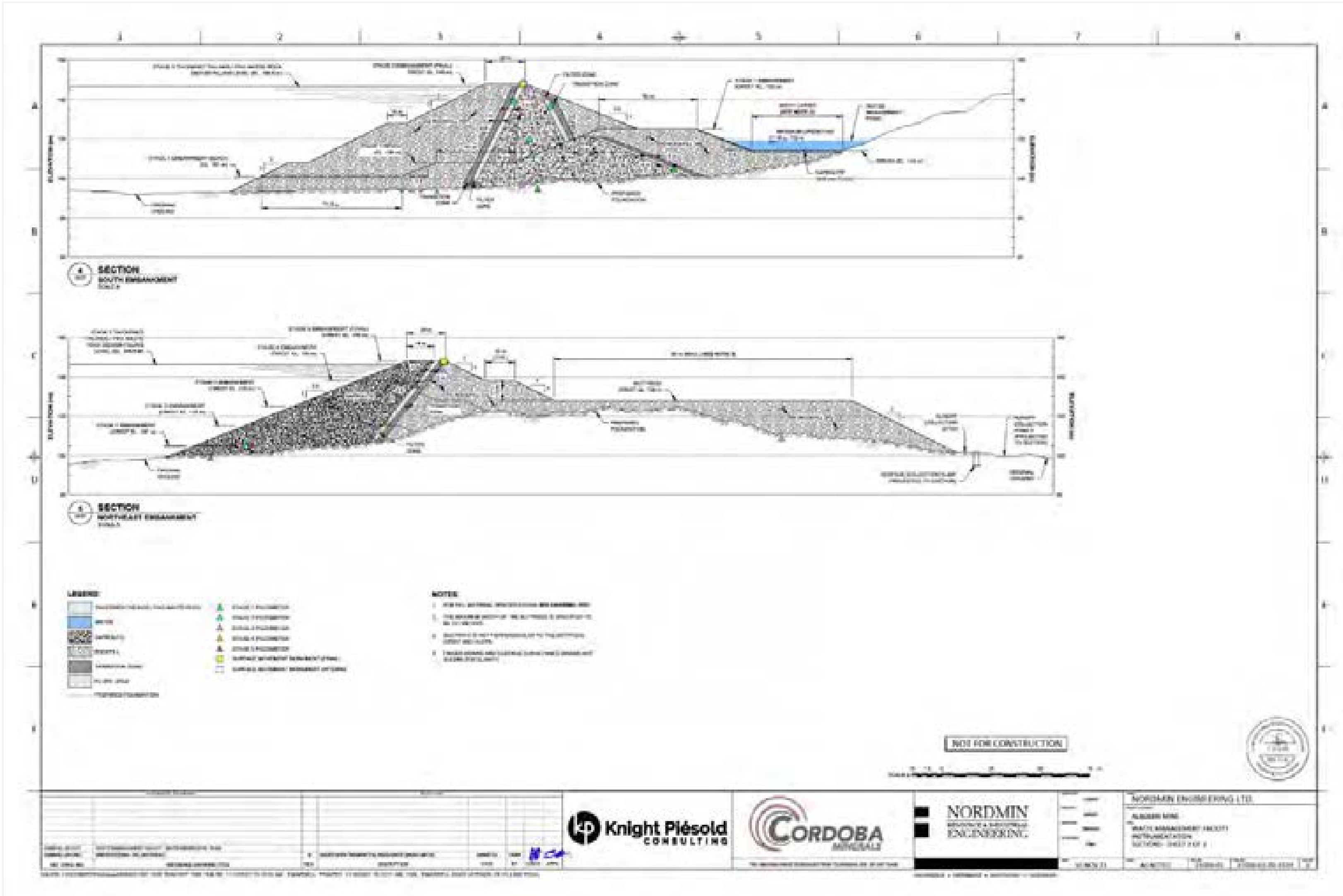


Source: KP, 2021

Figure 18-28: WMF instrumentation sections (1 of 2)



Source: KP, 2021

Figure 18-29: WMF instrumentation sections (2 of 2)

18.12.7 Waste Management

PAG tailings will be conveyed to the WMF from the mill via HDPE pipelines as a homogeneous, non segregated, thickened slurry. The tailings will be deposited sub-aerially from the upstream crest of the perimeter embankments and from strategic locations on natural ground to maintain the WMF supernatant pond near the South Embankment. During later years of the mine life, an access road across the centre of the basin will be constructed with waste rock. Tailings will then be deposited sub-aerially from the centre of the facility to raise the elevation and allow run-off to report to the perimeter of the basin. This approach will prepare the tailings surface for the closure cover.

The deposition plan will include for rotational discharge of tailings in thin layers (approximately 0.3 m) from several discharge locations to develop a dense, low permeability tailings deposit. This deposition strategy will allow the tailings to partially dry and consolidate prior to deposition of the following tailings layer. The deposition strategy will develop a homogeneous, low permeability tailings deposit, reduce foundation seepage, and minimize the potential for the onset of ARD and/or metal leaching ("ML") conditions.

The initial supernatant pond in the WMF basin will be located toward the centre of the valley, close to the South Embankment. The pond will gradually migrate to the south and the final location will be adjacent to the valley slope at the east end of the South Embankment. Supernatant and run-off from the WMF pond will be transferred to the WMP to the greatest practical extent. This approach will keep the pond volume in the WMF basin at a minimum.

PAG and Uncertain waste rock will be co-disposed with the tailings. The waste rock will be strategically placed and spread in the WMF basin throughout the mine life to allow the ingress of tailings to the greatest practical extent. The PAG and Uncertain waste rock will continuously be buried by subsequent tailings deposition to minimize the potential for the onset of ARD and/or ML conditions.

The tailings delivery and waste management strategy are described in the following sections.

18.12.7.1 Tailings Delivery

Tailings generated from the milling process will be conveyed to a thickener to increase the tailings slurry solids content to approximately 63% by mass. Tailings will be pumped from the thickener to a holding tank, passed through a series of centrifugal pumps, and conveyed to the WMF via a pressurized HDPE pipeline. The thickener, holding tank, and pump details have been developed by Nordmin and Mine Paste. KP developed the tailings delivery pipeline alignments and confirmed the pipeline sizing.

The tailings delivery pipeline was selected to be a non insulated ND 500 mm (20") DR 11 HDPE pipeline to deliver the thickened tailings at a flow rate of 855 m^3/hr with a slurry solids content of 63% by weight. The pipeline alignment travels to the north of the mill to a flow control assembly. The flow control assembly will allow tailings to be conveyed to the west or east sides of the WMF basin via the West Tailings Delivery Pipeline or East Tailings Delivery Pipeline.

18.12.7.2 Waste Deposition and Placement

The rate of rise of the tailings and PAG/Uncertain waste rock within the WMF is estimated to be 11 m/yr throughout Year 1 of operations, 6.5 m/yr during Years 2 and 3 of operations, and 4.1 m/yr from Year 4 through Year 12.3 of operations, as shown on Figure 18-24.

Basin filling will be optimized during Stages 1 through 4 (Years 1 through 8) by depositing tailings in approximately 0.3 m thick layers and rotating the deposition fronts around the perimeter of the basin to achieve a tailings beach slope of approximately 1%. Multiple spigots will be used to maintain a low deposition velocity and maintain the homogeneity and non segregating properties of the tailings during deposition. It is expected that some of the tailings will remain on the slopes of the embankments/natural ground due to the low deposition velocity. This approach will increase the exposed surface area of the tailings and will allow the tailings to partially dry and consolidate prior to deposition of the following tailings layer. The previous layer of tailings will be covered with a subsequent layer of tailings in a timely manner to inhibit the ingress of air and minimize the potential for the onset of ARD and/or ML conditions. This deposition method will also minimize the potential for dusting, as the coarser sand particles will be entrained within the finer silt and clay particles.

Tailings deposition will be managed to route the supernatant liberated from the tailings and run-off towards the pond within the southern portion of the basin. This approach will allow for efficient transfer of supernatant and run-off to the WMP.

Prior to placement of PAG and Uncertain waste rock within the WMF basin, a few layers of tailings will be deposited at the defined placement area to develop a low permeability layer approximately 1 m thick immediately above the foundation. The tailings deposition will increase the seepage path and reduce potential seepage from the waste rock placement area within the WMF basin. PAG and Uncertain waste rock will be strategically placed within the WMF basin following the initial tailings deposition and during ongoing tailings deposition. The tailings will partially fill the waste rock voids and increase the dry density of the stored materials. This tailings deposition and waste rock placement strategy is illustrated on Figure 18-30 and Figure 18-31.

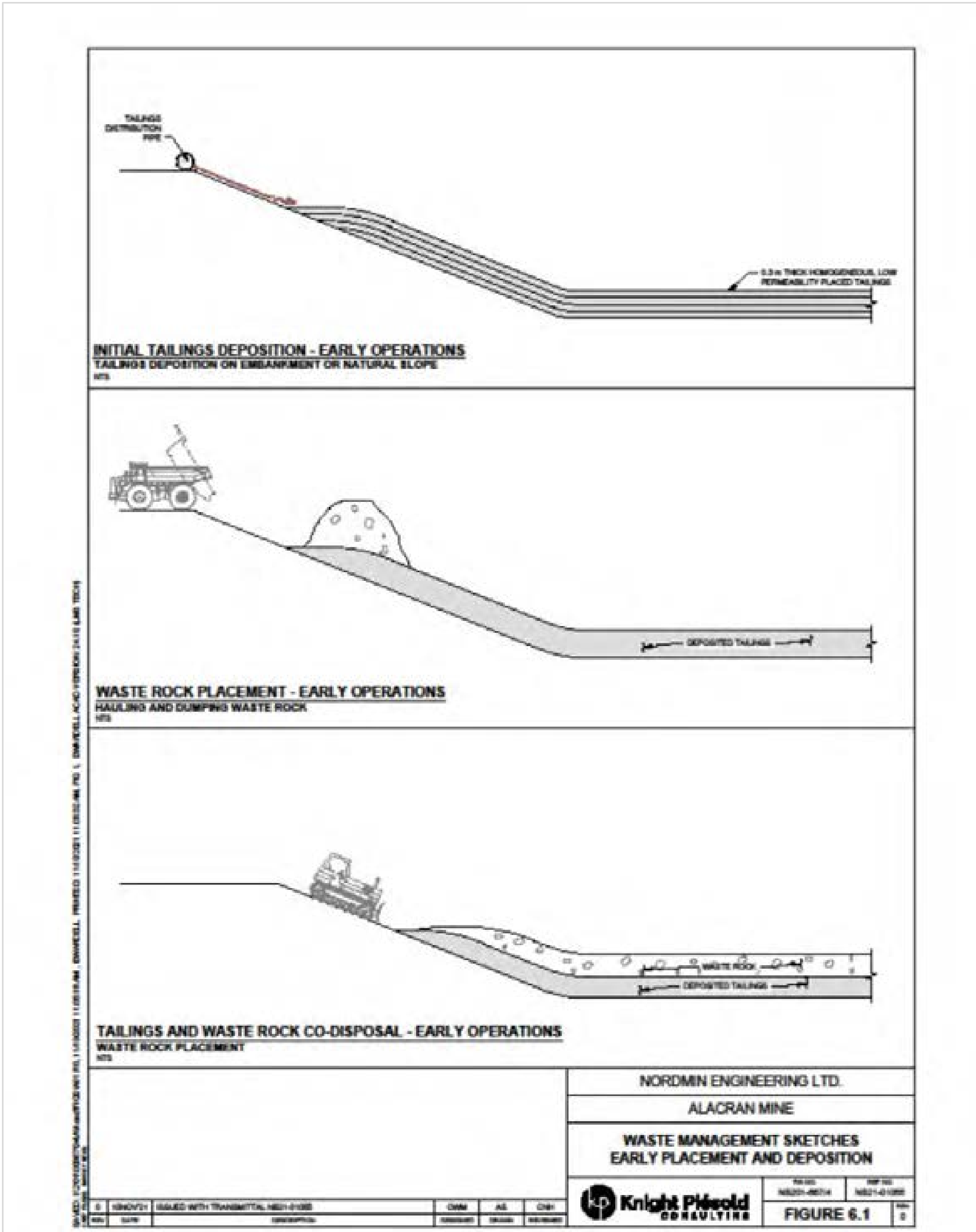


Figure 18-30: Waste management sketches, early placement, and deposition

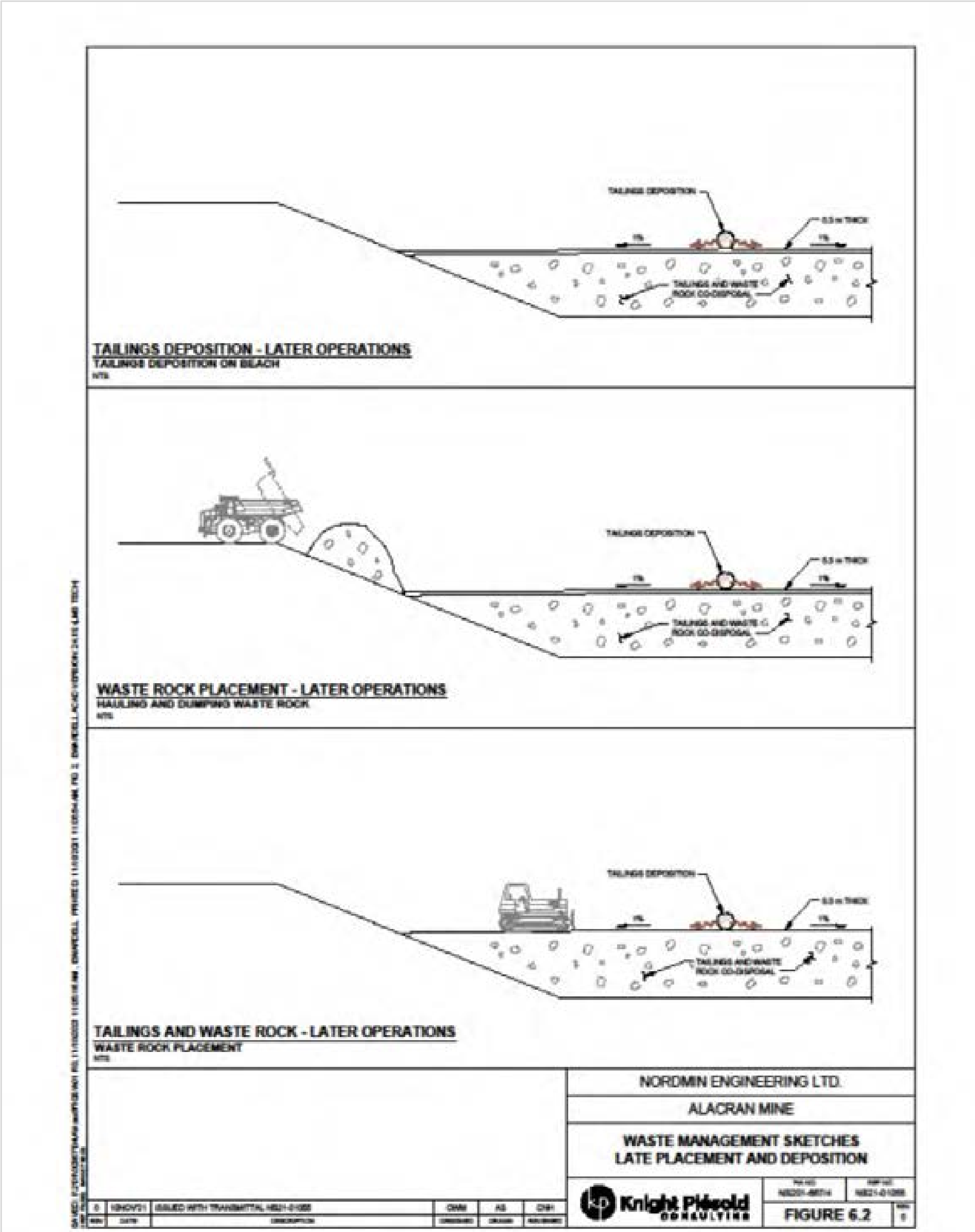


Figure 18-31: Waste management sketches, late placement, and deposition

The basin filling strategy will change during Stage 5 operations (Years 9 through 12.3). An access road will be constructed towards the centre of the tailings surface with waste rock and the East Tailings Delivery Pipeline will be relocated onto the road. The majority of tailings deposition will then occur from both sides of the road to raise the tailings elevation along the central portion of the basin. Tailings will also be strategically deposited from the Main and South Embankment crests to maintain the water pond adjacent to the South Embankment and maintain tailings beaches with approximate 1% slopes. PAG and Uncertain waste rock will continue to be strategically placed within the WMF basin during tailings deposition.

The access road will be re-constructed periodically until the tailings within the central portion of the impoundment are higher than the tailings along the perimeter of the impoundment. The tailings pipeline will be relocated in tandem with road re-construction. It is envisioned that the access road will be maintained by grading the tailings surface with a dozer once the tailings in the central portion of the impoundment are higher than the tailings along the perimeter of the impoundment. The final waste surface will be graded at 1%. This tailings deposition and waste rock placement strategy is illustrated Figure 18-31. The overall placement and deposition strategy at the WMF will create a dense, low permeability waste deposit.

18.13 Comments on Section 18

The PFS design assumes conventional infrastructure and conceptual infrastructure locations. This includes the construction of a new Project access road from the La Rica community as the current access road would require significant upgrading to support truck traffic. The amount of engineering completed is consistent with the level of detail required for this study. As more detailed information becomes available the designs described above are subject to change.

19 MARKET STUDIES AND CONTRACTS

19.1 Market Studies

The information summarized in this section is derived from David Osachoff of OM&C Ltd, a third party concentrate trading advisory, and marketing specialist company, who were contracted by the Company to prepare a market study to support the PFS.

19.2 Copper Market Overview

19.2.1 Copper's Role Historically and in Today's Market

Archaeological evidence shows that Cu was one of the first metals used by humans and was used at least 10,000 years ago for items such as coins and ornaments in western Asia. Over time, discoveries were made that Cu when alloyed with tin, produces bronze, and led to the Bronze Age, c. 2,500 BC.

During the Middle Ages, Cu and bronze works flourished in China, India, and Japan.

The discoveries and inventions relating to electricity and magnetism of the late 18th and early 19th centuries and the products manufactured from Cu, helped launch the Industrial Revolution and propel Cu into a new era.

Today, innovative applications for Cu are still being developed as evidenced by the development of the Cu computer chip by the semi conductor industry.

Cu and Cu-based alloys are used in a variety of applications that are necessary for a reasonable standard of living. Its continued production and use are essential for society's development. Cu is an important contributor to the national economies of mature, newly developed, and developing countries. Mining, processing, recycling, and the transformation of metal into a multitude of products creates jobs and generates wealth. These activities contribute to building and maintaining a country's infrastructure and create trade and investment opportunities.

19.2.2 Global Refined Consumption and Production

World usage of refined Cu has more than tripled in the last 50 years thanks to expanding sectors such as electrical and electronic products, building construction, industrial machinery and equipment, transportation equipment, and consumer, and general products. Because of its properties, Cu has become a major industrial metal, ranking third after Fe, and aluminum in terms of quantities consumed.

As noted in the International Copper Study Group ("ICSG") 2020 Copper Factbook, since 1900 when world production was less than 500 thousand tonnes Cu world mine production has grown by 3.2% per annum to 20.5 million tonnes in 2019. In fact, more than 97% of all Cu ever mined and smelted has been extracted since 1900.

Global demand for Cu is expected to grow at 1.3% compound annual growth rate ("CAGR") over the next five years. In the short term, the Cu market balance is expected to turn into a surplus, though in order to reach the future demand, more investments are needed in expansions and new projects.

Although Cu demand scenarios differ among analysts, there is a general agreement that the major driver for increased Cu demand will come from infrastructure investments associated with energy transitions.

The International Energy Agency ("IEA") recently published a comprehensive report titled "The Role of Critical Materials in Clean Energy Transitions". The IEA notes that the shift to clean energy naturally involves burning less fuel but building more equipment. Since 2010 the average amount of minerals needed for a new unit of power generation capacity has increased by 50%, with an onshore wind facility requiring nine times more Mineral Resources than a gas-fired plant of the same capacity. Clean energy rollout requires significant electrical network expansion. The IEA estimates an annual average grid expansion and replacement of approximately 3,600 thousand km by 2040. This translates to 7,613 kt of Cu demand in 2040. The IEA also predicts Cu demand from renewables will increase 108% to 1,289 kt Cu by 2040, 94% of which will come from solar photovoltaic and wind. The report details a tripling of solar photovoltaic deployment by 2040, driven by growth in emerging economies, which equates to the addition of just under 645 kilotonnes per annum ("ktpa") of Cu demand from this energy type by the end of 2040 (Figure 19-1).

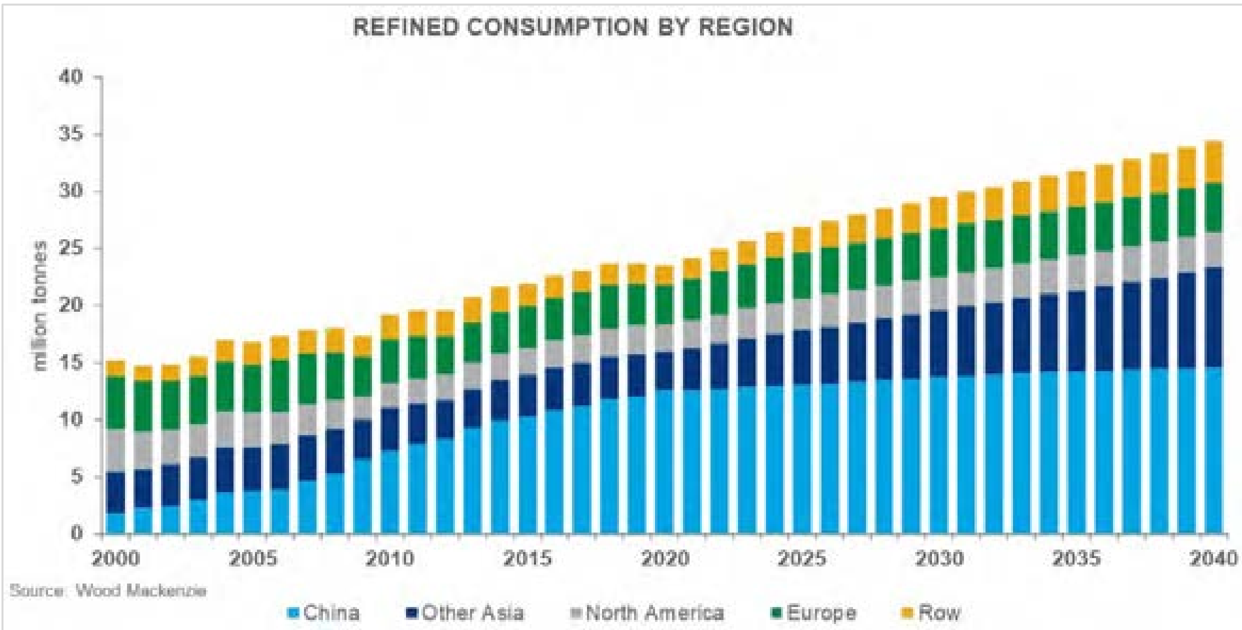


Figure 19-1: Global Cu demand 2000 – 2040

With the development of froth flotation, late in the 19th century, Cu mining on a larger scale developed for recovering Cu from sulphide ores and provided feedstock for the pyrometallurgical smelting process. Beginning in the mid 1980s a new technology, commonly known as the leach-solvent extraction-electrowinning process ("SX/EW process") was widely adopted to primarily process oxide ores. This new Cu technology utilizes smelter acid to produce Cu from oxidized ores and led to further expansion of Cu supply/production.

Figure 19-2 provides the World Cu mine production during the years 1900 to 2019 (thousand metric tonnes Cu).

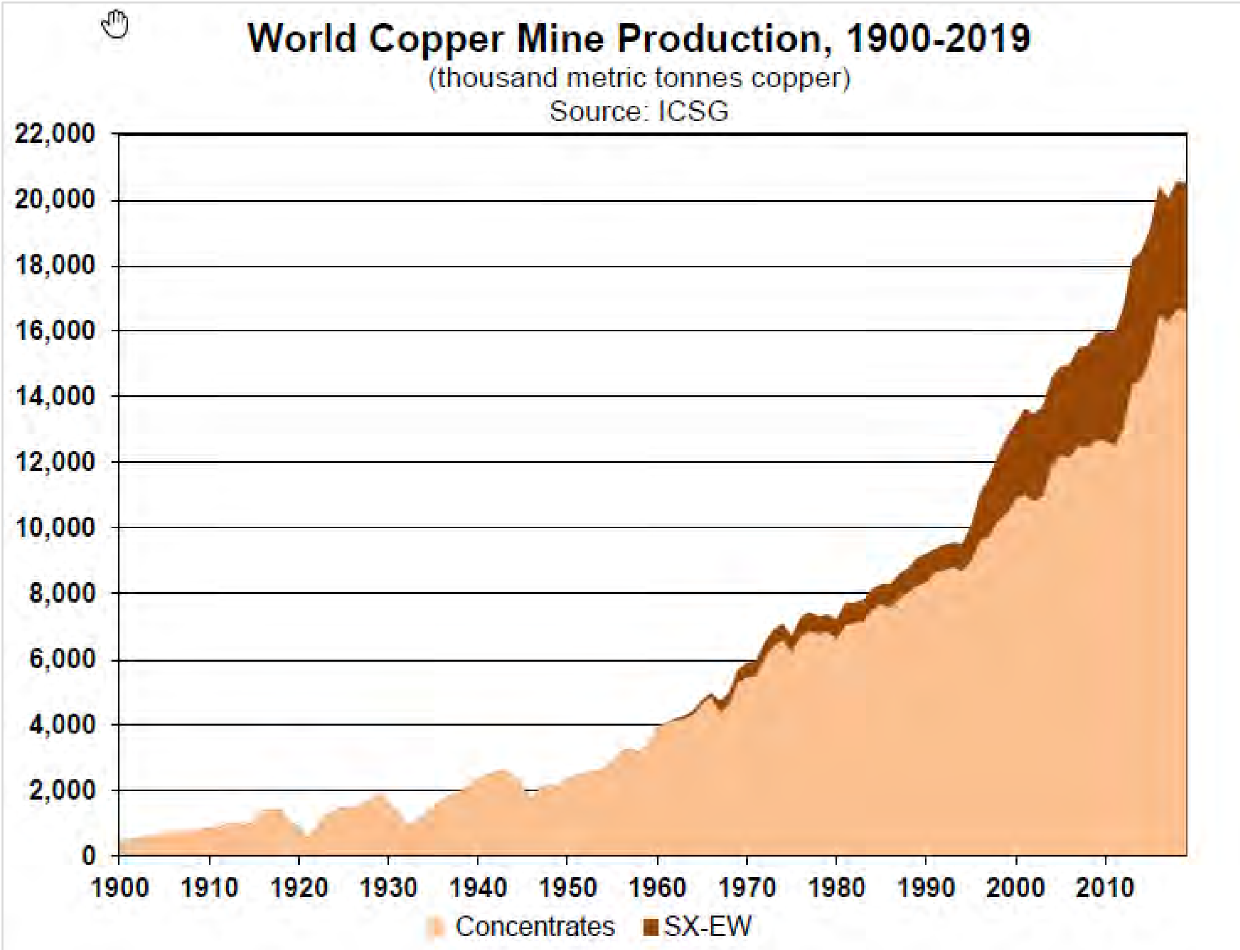


Figure 19-2: World Cu mine production, 1900 – 2019 (thousand metric tonnes Cu)

19.2.3 Copper Prices

Cu prices, in theory, correlate to the supply, and demand of refined Cu. However, economic policy, geo-political events, wars, black swan events like the COVID-19 pandemic and the development of financial derivatives and associated market speculation has contributed to the volatility in prices. While the recent price has reached a historic high in nominal terms, this is not the case in real terms.

19.2.3.1 Historic Copper Prices

The Cu price is dynamic. The graph in Figure 19-3 provides some explanation of the variability of the price over the last century and while history does not necessarily provide the answer to the future Cu price it can provide prognosticators with various factors to monitor to fine tune their forecasts of the forward Cu price.

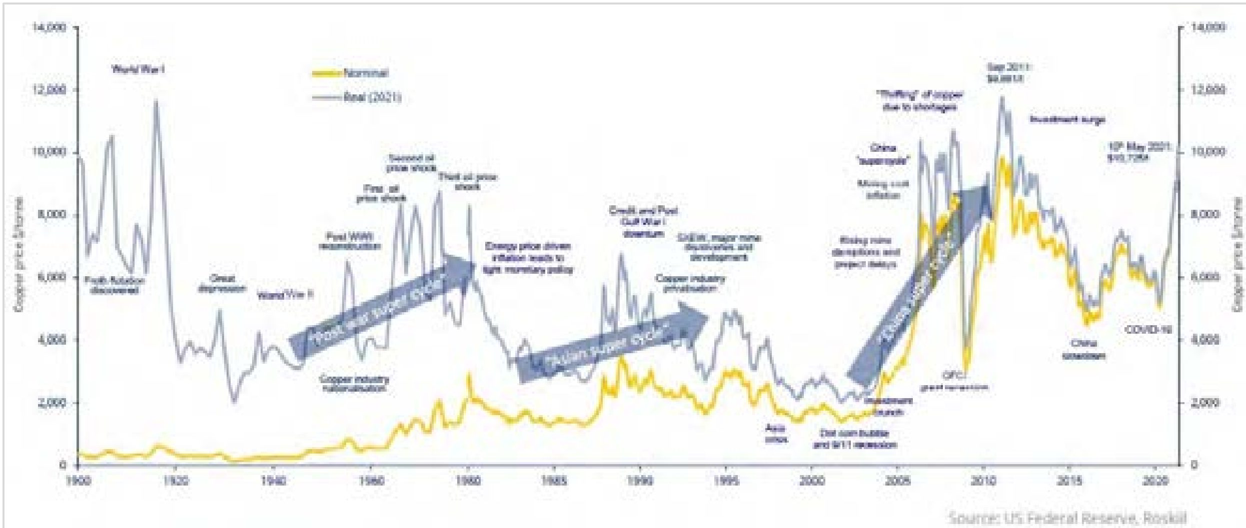


Figure 19-3: A century of Cu prices

19.2.3.2 Copper Price Forecast

There will always be differing views of what the future holds in terms of price based on analysis and assumptions. With a number of significant mining operations due to come on-line in the next one to two years, many analysts are forecasting a decline in prices from the current highs (Table 19-1).

Table 19-1: Consensus Copper Pricing 2021-2024

Copper
(US$/lb)

November 30, 2021

Date	Firm	2021	2022	2023	2024	LT
19-Nov-21	CIBC	$4.46	$4.75	$3.75	$3.55	$3.30
19-Nov-21	Deutsche Bank	$4.22	$4.28	$3.74	$3.77	$3.63
15-Nov-21	BAML	$4.24	$4.48	$4.31	$4.04	$3.09
15-Nov-21	BMO	$4.09	$3.48	$3.01	$3.35	$3.25
15-Nov-21	Canaccord	$4.19	$4.25	$4.00	$4.25	$3.30
15-Nov-21	Credit Suisse	$4.25	$3.40	$3.20	$3.30	$3.50
15-Nov-21	Desjardins	$4.32	$4.73	$4.10	$4.10	$4.10
15-Nov-21	Morgan Stanley	$4.16	-	-	-	$2.82
15-Nov-21	Raymond James	$4.16	$3.75	$3.50	$3.50	$3.50
15-Nov-21	Scotia	$4.15	$4.25	$4.25	$4.50	$3.25
14-Nov-21	National Bank	$4.21	$4.30	$3.75	$3.75	$3.30
13-Nov-21	Jefferies	$4.13	$4.50	$5.50	$6.00	$3.25
12-Nov-21	Societe Generale	$4.20	$3.63	$4.31	$4.99	-
10-Nov-21	Eight Capital	$4.37	$3.75	$3.50	$3.50	$3.50
09-Nov-21	RBC	$4.12	$3.75	$3.50	$3.50	$3.50
08-Nov-21	Paradigm	$4.21	$4.00	$4.00	$3.50	$3.50
05-Nov-21	HSBC	$4.16	$3.95	$3.60	$3.50	$3.00
05-Nov-21	JP Morgan	$4.14	$3.83	$3.27	-	$3.30
04-Nov-21	Haywood	$4.19	$4.15	$4.15	$4.15	$4.15
03-Nov-21	Stifel	$4.20	$3.75	$3.75	$3.75	$3.75
22-Oct-21	Cormark	$4.05	$3.75	$3.50	$3.50	$3.50
20-Oct-21	TD	$4.22	$4.00	$3.50	$3.35	$3.50
08-Oct-21	Barclays	$4.15	$3.55	$2.85	-	$3.00
07-Oct-21	Berenberg	$4.14	$3.94	$3.86	$3.86	$3.22
06-Oct-21	BNP Paribas	$4.17	$4.08	$4.04	-	$3.63
05-Oct-21	UBS	$4.12	$3.50	$3.30	$3.30	$3.00
Average		**$4.19**	**$3.99**	**$3.77**	**$3.86**	**$3.39**

Source: CIBC Mining Markets

Beyond 2024, the supply demand gap is expected to widen leading to higher Cu prices (Figure 19-4).

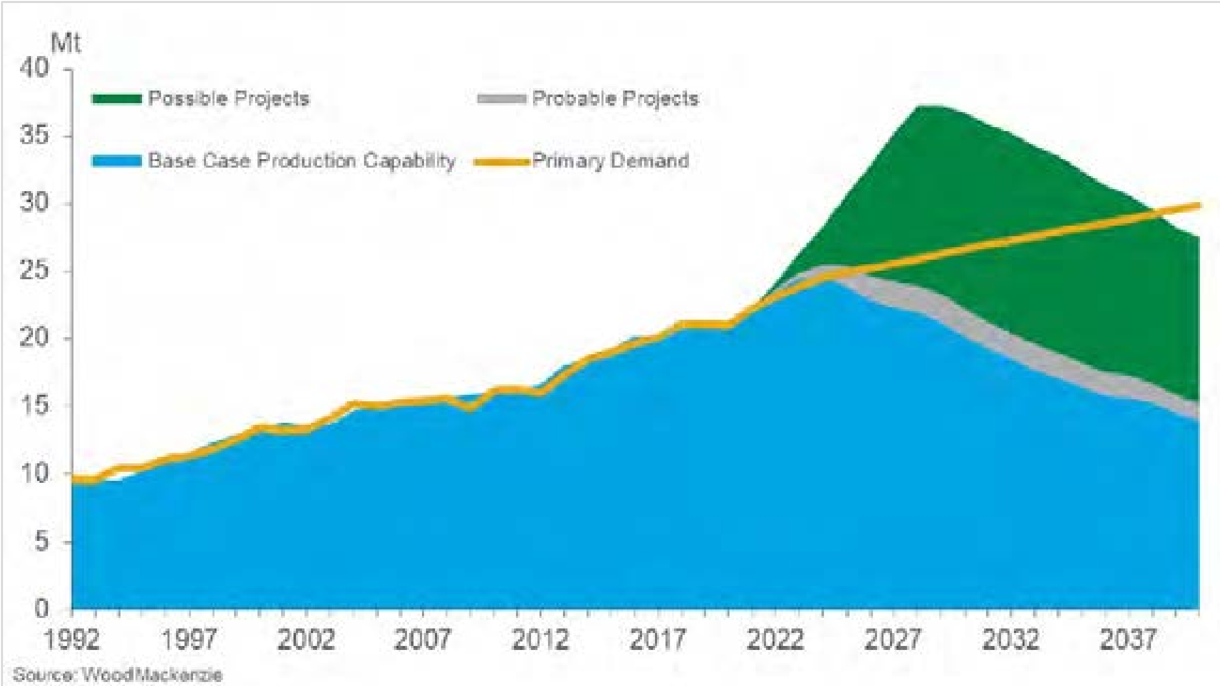


Figure 19-4: Mine supply demand gap to 2040

The longer term Cu price is currently assessed at around $3.39 per pound which currently is considered similar to the incentive price for new production to be brought to market.

19.2.4 Precious Metal Price Forecast

Precious metals, Ag and Au, prices tend to correlate with interest rates and strength or weakness in the USA dollar (Table 19-2 and Table 19-3).

Table 19-2: Consensus Silver Pricing 2021-2024

November 2, 2021

Silver *(US$/oz)*

Date	Firm	2021	2022	2023	2024	LT
29-Oct-21	Deutsche Bank	$25.60	$23.30	$22.40	$22.00	$20.00
27-Oct-21	CIBC	$26.80	$31.00	$28.00	$25.00	$20.00
25-Oct-21	BMO	$25.06	$24.88	$24.25	$23.00	$19.30
25-Oct-21	Canaccord	$25.40	$22.72	$22.89	$23.32	$23.55
25-Oct-21	Desjardins	$25.10	$23.25	$24.25	$24.25	$24.25
25-Oct-21	Stifel	$25.10	$25.50	$24.00	$24.00	$24.00
25-Oct-21	Morgan Stanley	$25.10	-	-	-	$20.00
25-Oct-21	BAML	$25.83	$29.39	$30.93	$28.96	$26.98
25-Oct-21	Jefferies	$26.40	$28.00	$25.00	$22.50	$20.00
24-Oct-21	National Bank	$25.49	$25.00	$24.00	$22.00	$19.00
22-Oct-21	Cormark	$25.80	$24.00	$24.00	$24.00	$24.00
19-Oct-21	RBC	$25.11	$24.00	$22.50	$20.00	$18.75
18-Oct-21	Scotia	$25.06	$25.00	$23.00	$20.00	$20.00
15-Oct-21	Haywood	$24.72	$23.75	$22.50	$22.50	$22.50
15-Oct-21	TD	$25.06	$24.00	$22.50	$22.50	$20.00
13-Oct-21	Raymond James	$25.13	$23.00	$23.00	$22.50	$22.50
08-Oct-21	Barclays	$25.20	$22.50	$20.20	-	$17.50
08-Oct-21	Eight Capital	$24.96	$27.50	$28.00	$25.00	-
07-Oct-21	Credit Suisse	$25.73	$20.00	$18.00	$18.37	$16.50
05-Oct-21	UBS	$25.00	$21.60	$19.50	$17.30	$17.00
04-Oct-21	JP Morgan	$24.85	$17.63	$16.90	-	$25.00
15-Sep-21	HSBC	$27.50	$26.80	$26.00	-	$24.00
07-Aug-21	Berenberg	$26.38	$26.00	$24.00	$22.00	$17.50
05-Aug-21	BNP Paribas	$26.29	$26.00	$25.00	-	-
Average		**$25.53**	**$24.56**	**$23.51**	**$22.59**	**$21.02**

Source: CIBC Mining Markets

Table 19-3: Consensus Gold Pricing 2021-2024

November 2, 2021

Gold *(US$/oz)*

Date	Firm	2021	2022	2023	2024	LT
29-Oct-21	Deutsche Bank	$1,777	$1,550	$1,659	$1,698	$1,550
27-Oct-21	CIBC	$1,874	$2,100	$2,000	$1,800	$1,650
25-Oct-21	BMO	$1,781	$1,656	$1,663	$1,675	$1,400
25-Oct-21	Canaccord	$1,798	$1,766	$1,780	$1,819	$1,860
25-Oct-21	Desjardins	$1,794	$1,775	$1,725	$1,725	$1,725
25-Oct-21	H.C. Wainwright	$1,900	$1,900	$1,900	$1,900	$1,900
25-Oct-21	Stifel	$1,788	$1,800	$1,750	$1,750	$1,750
25-Oct-21	JP Morgan	$1,791	$1,768	$1,768	$1,776	$1,600
25-Oct-21	Morgan Stanley	$1,782	-	-	-	$1,155
25-Oct-21	BAML	$1,803	$1,829	$1,856	$1,821	$1,785
24-Oct-21	National Bank	$1,803	$1,810	$1,700	$1,590	$1,475
23-Oct-21	Jefferies	$1,853	$2,000	$1,800	$1,750	$1,500
22-Oct-21	Cormark	$1,800	$1,800	$1,800	$1,800	$1,800
19-Oct-21	RBC	$1,791	$1,696	$1,650	$1,600	$1,500
19-Oct-21	M Partners	$1,797	$1,800	-	-	$1,800
19-Oct-21	Paradigm	$1,800	$1,750	-	-	-
18-Oct-21	Scotia	$1,799	$1,850	$1,700	$1,500	$1,500
17-Oct-21	HSBC	$1,770	$1,740	$1,715	$1,742	$1,600
15-Oct-21	Haywood	$1,815	$1,900	$1,800	$1,800	$1,800
15-Oct-21	TD	$1,807	$1,850	$1,750	$1,650	$1,500
15-Oct-21	Eight Capital	$1,836	$1,975	$2,000	$2,000	$1,700
13-Oct-21	Raymond James	$1,788	$1,725	$1,700	$1,600	$1,600
08-Oct-21	Barclays	$1,788	$1,700	$1,588	$1,450	$1,350
08-Oct-21	Cantor	$1,791	$1,800	$1,800	-	$1,800
07-Oct-21	Credit Suisse	$1,890	$2,100	$1,800	$1,783	$1,400
06-Oct-21	BNP Paribas	$1,800	$1,800	$1,750	-	$1,600

Date	Firm	2021	2022	2023	2024	LT
05-Oct-21	UBS	$1,780	$1,675	$1,550	$1,500	$1,300
24-Sep-21	Berenberg	$1,806	$1,750	$1,650	$1,500	$1,400
14-Sep-21	Laurentian	$1,750	$1,750	$1,750	-	$1,750
08-Sep-21	Societe Generale	$1,925	$1,750	-	-	-
Average		**$1,809**	**$1,806**	**$1,754**	**$1,706**	**$1,598**

Source: CIBC Mining Markets

A longer term price of about $21.00 per ounce for Ag and about $1,650.00 per ounce for Au are considered reasonable among most analysts.

19.3 Copper Concentrate Market

The primary raw material for Cu smelters is Cu concentrate produced by mines processing Cu bearing sulphide ores. These concentrates are processed by Cu smelters. Historically, Japan, and Europe were centres of demand for concentrates, but the epicentre has now shifted to China. Other markets still play an important role, especially when the burden of freight is added to sales. In Asia and outside of China, key smelters exist in Japan, Korea, India, Indonesia, and the Philippines.

Cu smelters can be classified as integrated or custom. Integrated smelters, as the name suggests, process concentrates from their own mine(s) to anodes and (usually) cathodes. Custom smelters process concentrates from non related entities (also called custom mines). Smelters which were once fully integrated will now purchase third party concentrates. Also, many smelting entities have taken equity positions in mines, thus securing long term feed from “captured” sources.

Global Cu-in-concentrate production in 2020 is estimated by Wood Mackenzie to have been about 17 million tonnes. The custom share of the market to have been about 10 million tonnes in 2020 (on a Cu contained basis).

Miners can also sell concentrates to traders. Traders will then (generally) on-sell the concentrates to smelters. A development since the early 2000s has been the establishment of blending facilities. Whereas a smelter may purchase several qualities and blend on site, traders will blend concentrates at their own facilities and then on-sell the blended material to smelters.

Traders play an important role in the market as they add liquidity. They can also assume risk. Through the blending of concentrates, they can take complex material (with high levels of deleterious elements) and blend to a quality acceptable to smelters. Traders, from time to time, also finance mines through a variety of mechanisms ranging from debt to advance and pre-payments. Traders may now account for approximately 45% of the custom/traded market.

19.3.1 Copper Concentrate Supply

Cu concentrate supply is set to expand with newly completed projects ramping up (Cobre de Panama, Spence and Kamoa) and committed projects set to come on within the next two years (Quellaveco, Quebrada Blanco 2, Carrapateena, and brownfield expansions at Codelco mines in Chile).

Additionally, there are probable mines that are in various stages of assessment as Mining Intelligence [14] provides in their assessment of the ten most probable Cu mines (Table 19-4).

Table 19-4: Mining Intelligence Ten Most Probable Cu Mines

	Property	Country	Owner (s)	Development Status	Geology	Contained Copper (t)	Grade (%)
1.	Kamoa - Kakula	Dem. Republic of the Congo	Ivanhoe Mines/Zijin Mining Group	Construction	Sediment Hosted	37,927,792	2.74
2.	Pebble	United States	Northern Dynasty Minerals	Preliminary Economic Assessment	Porphyry, Supergene Copper	26,047,959	0.40
3.	Udokan	Russia	Udokan Copper	Construction	Sediment Hosted	18,469,997	1.01
4.	Reko Diq	Pakistan	Antofagasta/Barrick Gold	Feasibility	Porphyry, Supergene Copper	14,240,215	0.48
5.	Tampakan	Philippines	Sagittarius	Feasibility	Porphyry	12,566,992	0.55
6.	Resolution	United States	Rio Tinto/BHP	Feasibility	Porphyry	10,176,000	1.92
7.	Cascabel	Ecuador	SolGold/Cornerstone Capital	Prefeasibility	Porphyry	9,837,581	0.37
8.	Taca Taca	Argentina	First Quantum Minerals	Advanced Exploration	Porphyry	9,478,002	0.43
9.	Frieda River	Papua New Guinea	Guangdong Rising/Pala	Feasibility	Epithermal, Porphyry	9,425,532	0.50
10.	El Pachon	Argentina	Glencore	Advanced Exploration	Porphyry	8,742,385	0.55

Source: miningintelligence.com

There are other smaller sized projects that are also being evaluated.

While a concentrate surplus could occur in the next couple of years this is likely to be offset by declining head grades and thus production at existing mines.

Global Cu supply over the next four to five years is expected to increase but decline thereafter. Table 19-5 outlines the forecast for global supply by region. Latin America, including Colombia, is expected to be the major source of supply.

Table 19-5: Regional Copper Mine Production – kt Cu Contained

	2020	2021	2022	2023	2024	2025	2030	2040	CAGR 2020 to 2025	Change 2020 to 2040 kt	CAGR 2020 to 2040
Africa	2594	2811	3137	3300	3348	3205	2838	1658	4.3%	-936	-2.2%
Asia (excl. China)	1148	1423	1533	1597	1662	1676	1787	1128	7.9%	-20	-0.1%
China	1767	1871	2031	2089	2110	2122	2112	1604	3.7%	-163	-0.5%
Europe	1084	1056	1148	1148	1157	1128	934	459	0.8%	-625	-4.2%
Latin America and the Caribbean	8531	9006	9395	9901	9964	9425	7457	5288	2.0%	-3243	-2.4%
Middle East	413	419	437	447	446	438	395	366	1.2%	-47	-0.6%
North America	2584	2724	2843	2862	2828	2772	2159	1383	1.4%	-1201	-3.1%
Oceania	937	999	979	965	929	914	566	358	-0.5%	-579	-4.7%
Russia and the Caspian	1833	1778	1937	2094	2142	2172	1929	1600	3.4%	-233	-0.7%
Global Total	**20892**	**22088**	**23440**	**24402**	**24586**	**23852**	**20177**	**13844**	**2.7%**	**-7048**	**-2.0%**
change y-o-y	-0.2%	5.7%	6.1%	4.1%	0.8%	-3.0%					

Source: Wood Mackenzie, 2021

[14] https://www.miningintelligence.com/ a division of Glacier Resource Innovation Group

19.3.2 Copper Concentrate Demand

Cu concentrate demand is a function of Cu smelter capacity and operating rates. Wood Mackenzie projects smelter production capability to reach 21.96 Mt in 2021, representing an 8.8% increase from 2020. However, supply disruptions of Cu concentrate are likely to restrict actual smelter production to only 20.63 Mt. Smelter output capability growth is expected to grow with new capacity being built in China and another new smelter expected in India. Global smelter production capability is forecast to grow by an average of 0.9% p.a. through to 2040 (Table 19-6). A total of 4.1 Mt of additional smelter production capability is expected over the period, with over 60% coming from China.

Table 19-6: Copper Smelter Capability (kt Cu)

	2020	2021	2022	2023	2024	2025	2030	2040	CAGR 2020 to 2025	Change 2020 to 2040 kt	CAGR 2020 to 2040
Africa	1547	1782	1954	2001	2035	2056	2055	1960	5.9%	413	1.2%
Asia (excl. China)	2973	3217	3334	3309	3334	3309	3321	3321	2.2%	348	0.6%
China	8347	9172	9962	10242	10287	10827	10877	10877	5.3%	2530	1.3%
Europe	2597	2644	2664	2719	2789	2789	2799	2799	1.4%	201	0.4%
Latin America and the Caribbean	1717	1907	1928	2016	2016	2016	2016	2016	3.3%	299	0.8%
Middle East	270	270	270	270	270	270	270	270	0.0%	0	0.0%
North America	781	1030	1116	1116	1116	1116	1116	1086	7.4%	305	1.7%
Oceania	408	403	438	473	478	483	233	233	3.5%	-175	-2.8%
Russia and the Caspian	1546	1536	1576	1656	1731	1736	1736	1736	2.3%	190	0.6%
Global Total	**20186**	**21960**	**23242**	**23801**	**24055**	**24601**	**24422**	**24297**	**4.0%**	**4111**	**0.9%**
change y-o-y	2.7%	8.8%	5.8%	2.4%	1.1%	2.3%					

Source: Wood Mackenzie, 2021

19.3.3 Copper Concentrate Forecast

As noted earlier, Cu concentrate production is forecast to increase as a result of increased smelter demand and higher Cu prices. From the end of 2020 through 2023 concentrate production is expected to increase by about 2.8 million tonnes of Cu contained or about 10 million tonnes of concentrate (Table 19-7). Beyond 2024, unless the probable projects can be put into production the demand will outstrip supply leading to lower smelter utilization rates, lower treatment, and refining charges, and higher Cu prices.

Table 19-7: Copper Concentrate Production (kt Cu)

Contained metal basis	2016	2017	2018	2019	2020	2021	2022	2023
Conc. production/capability (incl Probables)	16405	16451	17245	17362	17365	18612	20087	21227
Add/(Less) market & other adjustments	0	0	0	0	0	-724	-1000	-1060
Less Direct use of concentrate	-11	-15	-20	-22	-20	-18	-16	-16
Concentrate available for world smelters	16393	16436	17226	17341	17346	17870	19071	20151
Concentrate stock change	**240**	**-26**	**-48**	**31**	**-296**	**50**	**100**	**200**
Smelter usage	16153	16462	17274	17310	17642	17820	18971	19951
Smelter concentrate usage capacity	19413	19779	21655	22146	22373	22574	23312	23940
Concs smelted as % of smelter capacity	**83.2%**	**83.2%**	**79.8%**	**78.2%**	**78.9%**	**78.9%**	**81.4%**	**83.3%**
Concentrate stock days	**46**	**44**	**40**	**39**	**34**	**35**	**35**	**37**
Concentrates smelted	16153	16462	17274	17310	17642	17820	18971	19951
Less processing losses	-517	-517	-590	-603	-597	-577	-612	-640
Smelter production from concentrates	15636	15945	16684	16706	17045	17243	18359	19311
Add Secondaries (incl re-smelted blister)	2910	3117	2869	2952	3133	3300	3420	3489
World smelter production	18546	19061	19554	19659	20177	20543	21779	22800

Source: Wood Mackenzie, 2021

19.3.4 Treatment & Refining Charges

Treatment charges and refining charges are effectively the cost to the smelter of processing the concentrate to anodes then refining the anodes to 99.999% Cu cathodes. These charges are the main revenue stream for the smelter. China is the leading importer of Cu concentrate and has the greatest capacity for smelting and refining. As a result, China will usually set the marginal cost for smelting and refining in negotiations with a major concentrate supplier.

Treatment charges reflect the supply demand balance of Cu concentrate in the market. Refining anodes to cathodes is more of a fixed cost process, primarily the cost of energy. However, since the 1980s the market has accepted the refining charge be derived from the treatment charge as a result of some contracts being based on a “combined” treatment and refining charge on a cents per pound charge.

Most mines and smelters are unwilling to agree to fixed treatment charges and refining charges for the tenor of a long term supply contract. Instead, they agree annually, to recognize changes in the market. These annual agreements are referenced as ‘Benchmark’ settlements, and contracts with non major mines and smelters tend to reference these benchmark terms as the basis for annual settlement.

Historic benchmark terms over the last ten years are provided in Table 19-8.

Table 19-8: Historic Benchmark Terms, 2012 – 2021

Year	Treatment Charges $/dmt	Refining Charges ¢/PP Cu
2012	63.50	6.35
2013	70.00	7.00
2014	92.00	9.20
2015	107.00	10.70
2016	97.35	9.74
2017	92.50	9.25
2018	82.25	8.23
2019	80.80	8.08
2020	62.00	6.20
2021	59.50	5.95
Average	**80.69**	**8.069**

Source: CRU, 2021

Spot market treatment and refining terms are reflective of current market conditions. Smelters will purchase concentrates at spot terms to cover any shortfalls in supply or if spot terms are higher than benchmark terms, purchase concentrates to increase inventory and recognize higher revenues.

Spot terms between mines and traders and traders and smelters compared to benchmark terms are provided in Figure 19-5.

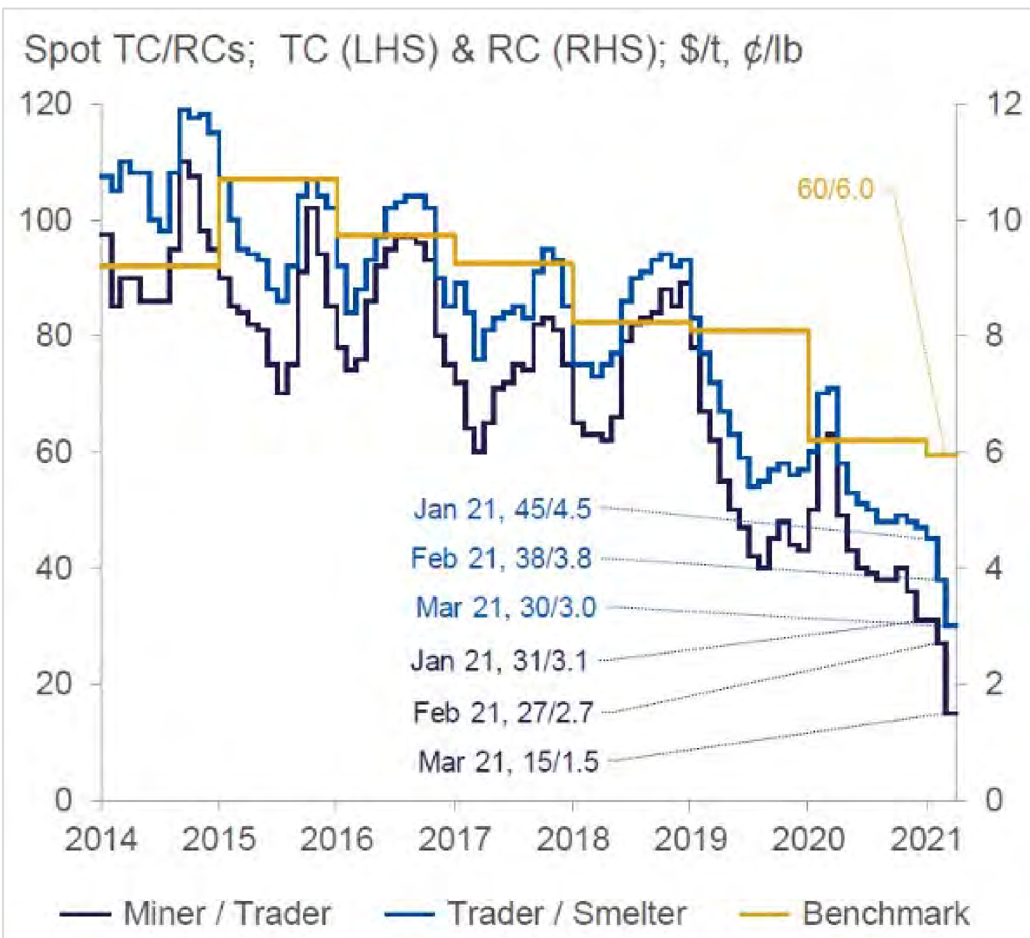


Figure 19-5: : Treatment & Refining Charges 2014 – 2021

Treatment charges/refining charges levels, over the next decade, are likely to average treatment charges $85 and refining charges $0.085. which is slightly higher than the trailing 10-year average of benchmark terms of treatment charges $80.69 and refining charges $0.08069.

19.3.4.1 Payable Metals

Pyrometallurgical technology used to process Cu concentrate is relatively efficient in extracting the Cu from the concentrate but not perfect. A modern well run smelter can likely achieve 98.5% Cu recovery.

Generally accepted as industry standard terms, Cu is usually paid for at 96.5% of the full and final assayed quantity, subject to a minimum deduction of one unit of Cu; above 30% Cu content will normally be paid for at 96.65% and above 35% Cu content will be paid for at 96.75%.

For lower grades of Cu content, payables will depend on market conditions, i.e., when the market is in short supply terms will be better than when the market is in surplus. Lower grade Cu is not preferred by most smelters, certainly those producing Cu cathodes, but there are exceptions; blister manufacturers, subject to fixed high costs for their sale of blister, benefit from a lower Cu content as their income is derived mainly from the treatment charge; high Au (>10 g per dmt) concentrates may be attractive to smelters which are capable of high precious metals ("PM") recovery such as the smelters located in Japan, Korea, and northern Europe, allowing them to be more tolerant of a lower grade Cu.

Minimum deductions for Cu content in concentrate can be expected as provided in Table 19-9.

Table 19-9: Minimum Deductions For Copper Content in Concentrate

Cu %	Minimum Deduction Units
> 28.5	0
25.0 – 28.5	1
22.0 – 25.0	1.1
20.0 – 22.0	1.2
17.5 – 20.0	1.3
15.0 – 17.5	1.4

Source: OM&CL, 2021

The market for material much lower than 15% Cu is spotty.

19.3.4.2 Precious Metals

For PM payments two main formulaic methodologies are used to determine the payable contained Au and Ag quantities, the determination made (usually) on where the material is delivered; referred to as Asian style payables, or European style payables. China, Korea, Japan, and all deliveries outside of Europe are usually subject to Asian style payables; deliveries to Aurubis (Germany or Bulgaria), Boliden (Sweden or Finland), Freeport Atlantic (Spain), and RTB Bor (Serbia) are subject to European style payables.

Asian Style

Ag is paid for at 90% of the full and final assayed quantity of Ag content per dmt, provided that the Ag content is above a minimum of 30 g per dmt. Below this threshold no Ag would normally be payable.

The price paid for Ag content is usually based on the Ag 'Fix' made once a day in London, by the London Bullion Market Association ("LBMA") averaged over the quotational period and as published in the major trade journals such as Metal Bulletin, Platts, Reuters, and Bloomberg.

Au is normally payable on a percentage scale, of the full and final assayed quantity, provided that Au content is above a minimum of 1 g per dmt. The scale can vary from deal to deal but is typified below.

The price paid for Au content is usually the average of the daily a.m. and p.m. Au 'Fix' of the LBMA, averaged over the quotational period, and published in major trade journals such as Metal Bulletin, Platts, Reuters, and Bloomberg.

An example of a scale for high PM Cu concentrate:

- 0-1 g then no Au payable
- 1-3 g then 90% of Au content will be payable
- 3-5 g 95% of Au content will be payable
- 5-10 g 96% of Au content will be payable
- 10-15 g 96.5% of Au content will be payable
- 15-20 g 96.75% of Au content will be payable
- 20-50 g 97.5% of Au content will be payable
- 50 g+ between 97.75% and 98% payable depending on tightness of market for treatment charges/ refining charges

European Style

Ag is payable at the full and final assayed quantity of Ag less a deduction of 30 g. Any content below 30 g therefore would not be payable. In higher Ag content concentrates, there is often a deduction of 50 g made rather than the 30 g. The price paid for the Ag would usually be the Ag 'fix' made once a day in London by the LBMA, averaged over the quotational period, as published in the major trade journals such as Metal Bulletin, Platts, Reuters, and Bloomberg.

Au is payable at the full and final assayed quantity of Au less a deduction of 1 g.

In concentrate containing less than 1 g per dmt there would be no payment. The price payable for Au is usually the average of the daily a.m. and p.m. Au fix of the LBMA, averaged over the quotational period, as published in major trade journals such as Metal Bulletin, Platts, Reuters, and Bloomberg.

19.3.4.3 Deleterious Penalties

Cu concentrates can sometimes contain a high level of deleterious elements known as complex Cu concentrates. This term is more generally applied to any Cu concentrate that exceeds the allowable levels of deleterious elements for import into China. Concentrates exceeding statutory limits for arsenic, fluorine, mercury, Pb, or cadmium can be seized or directed to be re-exported. If below the statutory limit but above a prescribed threshold a penalty can be applied.

19.4 Marketing Strategy Considerations

19.4.1 Concentrate Quality

Concentrate quality will determine which smelters will have interest. Cu smelters generally prefer higher Cu content as compared to lower grade Cu content as this maximizes Cu production. The exception is that high Au and Ag content is attractive to smelters with high PM recoveries, allowing for increased revenue from 'free' units; increasingly attractive at higher Au prices. Important to the smelter is consistency in quality.

19.4.2 Concentrate Quantity

The mine's annual production profile will dictate the number of sales agreements it will enter into. While a single sales agreement with a single smelter is possible it adds risk to the mine should the smelter face a force majeure event. Project financing may also have conditions as to what proportion of production will have to be with a smelter as opposed to a trader. If the production quantity is expected to be variable the mine may not commit all of the production under term contracts and look to sell some production on a spot basis as production above that committed under term contracts becomes available. Typically, approximately 60% to 70% of production is sold under term contracts with smelters and the balance to traders under term and spot contracts. Consistency in production makes it easier to schedule deliveries which counterparties look for in entering into sales contracts.

19.4.3 Offtakers; Direct with Smelters or Through Traders

There are a number of smelters that should be considered as potential counterparties.

The Tier 1 smelters provided in Table 19-10 are considered more capable of taking lower Cu content but with good PM recovery.

Table 19-10: Major Smelting/Refining Complexes Excluding China and India

Company	Location	Country
Aurubis	Pirdop	Bulgaria
	Hamburg	Germany
Boliden	Rönnskär	Sweden
	Harjavalta	Finland
Freeport Atlantic	Huelva	Spain
Glencore	The Horne Smelter	Canada
	PASAR	Philippines
JX-NMMC Mitsui	Saganoseki	Japan
	Hibi	
Mitsubishi	Naoshima	Japan
	Gresik	
Sumitomo	Toyo	Japan
Dowa	Furukawa Onahama	Japan
LS Nikko	Onsan	South Korea

Source: International Copper Study Group, 2020

Tier 2 smelters with lesser capability to process low Cu with medium to high Au concentrate are provided in Table 19-11.

Table 19-11: Major Smelters/Refiners in China and India

Company	Location	Country
Birla Copper	Dahej	India
Vedanta	Tuticorin (currently closed)	India
XGC	Yanggu	China
Tongling	Sumitomo	China
Jiangxi Cooper	Guixi	China
China Gold	Zhongyuang	China
DYS	Donying	China
Humon	Muping	China

Source: International Copper Study Group, 2020

There are numerous traders that are well established and trade concentrates internationally (Table 19-12).

Table 19-12: Established International Concentrate Traders

Name of Trader		
IXM Metals	Trafigura	Glencore International Ag
MRI Trading Ag	Gerald Metals	Hartree Partners
Transamine Trading S.A.	Ocean Partners	Traxys
Freepoint	Sumitomo Corp	Mitsubishi Corp
Mitsui & Co	LG International	Bluequest

Source: International Copper Study Group, 2020

19.4.3.1 Pros and Cons

Smelters provide some offtake stability but can still declare force majeure if they incur operational problems with their plant. They are less likely to provide flexibility in terms and tend to have standard “benchmark terms” in their sales agreements.

Traders, on the other hand, provide liquidity, and more flexibility in negotiating contract terms. Often, they will offer lower treatment charges/refining charges in exchange for quotational flexibility. Many will provide project financing in exchange for an offtake agreement. Traders are less likely to declare force majeure as they have multiple smelter contracts to place the concentrates.

19.4.3.2 Selection Process

The selection process is evaluating the NSR each counterparty provides along with the risk each counterparty brings with any financing arrangements they can provide.

19.4.4 Marketing Administration Considerations

In order to simplify administration, avoiding customers who make payments with Letters of Credit is advisable.

19.5 Weighing Sampling Moisture Determination

Weighing and sampling is an important aspect for all concentrate deliveries, but it is especially relevant for a high Au content material; even small weight losses can prove expensive. It is important that a thorough sampling process is agreed at discharge port or smelter in advance of any shipments being made. This is particularly true for a heterogeneous material such as the concentrate, where small variances in distribution or sampling method can be gamed by a buyer to exploit a bias in sampling methodology. The seller must arrange for the services of an independent surveyor to ensure the weighing and sampling is done in accordance with the sales agreement which should be based on established ISO protocols. Similarly, it is imperative that weighing, and sampling be undertaken at the loadport for monitoring for possible weight loss and proof of quality and quantity for insurance purposes as well as provisional invoicing. This will be of vital importance as metallurgical balance differences between load and discharge will give clues as to the competency and application of Weighing Sampling Moisture Determination ("WSMD") at discharge and allow for remedial measures to be taken to enforce Cordoba's rights at discharge. Sloppy WSMD will create doubt and allow bias to pass unrecognized. Small differences here will make a large difference to the value of the material.

In order to provide accurate and consistent results in determining payable contents of minerals, industry standards have been established in terms of weighing, sampling, and moisture determination. The following ISO standards apply to WSMD:

- ISO 12743: 2021 Sampling Procedures
- ISO 13292:2006 Checking for Bias in Sampling
- ISO 12744:2006 Checking for Precision in Sampling
- ISO 10251:2006 Moisture Determination
- ISO 11790:2017 Inspection of Mechanical Sampling
- ISO/TR 15855;2001 Testing of Static Scales
- ISO 9599:2015 Determination of Hygroscopic Moisture of Analysis Samples

These standards should be incorporated into the operational protocols under the responsibility of the Office of the Chief Metallurgist.

19.5.1 Metal Balance Protocol

It is important to be able to determine if payable metal losses are occurring during processing and/or logistics and take corrective measures to mitigate any identified losses. The Office of the Chief Metallurgist should develop appropriate protocols to determine if and where losses may be occurring.

19.5.2 International Maritime Organization ("IMO") Regulations; Flow Moisture Point and Transportable Moisture Limits

The primary aim of the International Maritime Solid Bulk Cargoes Code ("IMSBC Code") is to facilitate the safe stowage and shipment of solid bulk cargoes by providing information on the dangers associated with the shipment of certain types of solid bulk cargoes and instructions on the procedures to be adopted when the shipment of solid bulk cargoes is contemplated.

Before any material can be loaded on a vessel the Flow Moisture Point ("FMP") and Transportable Moisture Limit ("TML") must be determined not more than seven days prior to the start of loading the vessel. Excessive moisture can lead to liquefaction of the cargo in the vessel's hold that can lead to capsizing of the vessel in heavy seas. It is therefore a requirement that that dewatering/filtering of the concentrate at the mine be designed, taking into the particle grind sizing, any clay content, and use of any reagents that would tend to hold moisture. Additionally, all storage facilities, both at the mine, and port prevent any ingress of moisture. This is also applicable while the concentrate is in transit to the port from the mine. ISO 12742:2020 is the applicable ISO standard.

19.5.3 IMO: Marpol Annex V

Vessel cargo holds require cleaning after discharging the contents of the hold. This includes washing the hold to avoid contamination of the next cargo to be loaded. Management of the wash water is the primary purpose of the Marpol Annex V regulations. It is a requirement that concentrates be analyzed to determine if they are harmful to the marine environment ("HME") as residues from the hold cleaning would end up in the wash water and if discharged into the marine environment could result in harm to the marine environment. This is a lengthy process and can be costly but must be done prior to the concentrates being exported. Further regulations are being introduced to determine if the concentrate is corrosive.

19.6 Assaying

It is usual that an international supervisor be employed by the mine to oversee the undertaking of the sampling process, ensuring it follows the ISO standards. During such sampling, the surveyor will sign off on the samples taken, seal the sample packets, and distribute the samples in accordance with the contract. Usually, samples are sent to an international laboratory in Europe for assaying of the main components, Cu, Ag, and Au, and any penalty elements. Alternatively, if the mine has a well equipped lab, including fire assaying capabilities, with qualified technicians, it may elect to do the party assay analysis itself. It usually takes three to four weeks from the time the samples are received by the respective parties for analysis, on a lot by lot basis, to be completed, and ready for exchange. Once exchanged, the buyer's assays are compared to the mine's results, and if the difference between the two is greater than the agreed contractual differences allowable ("splitting limits"), either party may elect to have those lots exceeding the splitting limits be sent to an independent laboratory, of which a list of laboratories are usually specified in the contract and often appointed as required on a rotational basis. The reserve set of samples or the respective lots requiring umpire analysis will be dispatched to a neutral lab (i.e., one not already used by the seller or buyer) and subjected to a more rigorous assaying process (more replicates) to determine the final umpire result. If the differences are marginally above the splitting limits, the parties may mutually agree to split the differences without going to umpire.

The result of this umpire assay is then used to compare against both original assay submissions by the mine and the buyer. The party that had originally the closest assay to the umpire is then used to set the final assay result for that lot, usually the median of the umpire and the closest original assay, but this will depend on contractual wording.

There is a benefit for the mine to undertake all assaying at its own lab but does require increased spending for equipment and qualified personnel.

19.6.1 ISO Standards

There are more than one ISO standards for determining the content of payable metals. Accordingly, it is recommended that both the buyer and seller use the same standards. Applicable ISO standards are:

- ISO 10469:2006 or ISO 10258:2018 for Cu
- ISO 10378:2016 for Ag and Au

19.6.2 Splitting Limits

When assays for payable metals have been exchanged between buyer and seller and the resultant differences are greater than the contractual splitting limits either of the parties may elect to have samples re-assayed by an independent laboratory to determine the final content. Below are generally accepted splitting limits for Cu concentrate payable elements and possible minor elements that may incur penalties.

- Cu 0.15 g
- Au 0.5 g
- Au 15 g
- As 300 ppm
- Sb 100 ppm
- Hg 5 ppm
- MgO + Al_2O_3 0.1%
- F 50 ppm
- Cd 100 ppm

19.6.3 Umpire Selection

The majority of labs certified to undertake umpire assay analysis are located in the UK or Europe. Typically, a list of agreed umpire laboratories will be specified in the sales agreement. Any laboratories being considered for analysis should be ISO 17025:2017, ISO 9001:2015 and ISO 17020:2012 accredited. The following is a list of the most commonly used umpire laboratories:

- Alex Stewart International Corporation (“ASIC”)
- SGS
- Bureau Veritas/Inspectorate (“BV”)
- ALS
- Intertek
- Alfred H Knight (“AHK”)
- Bachelet Laboratories

19.7 Logistics

19.7.1 Mine Storage

Mine storage of filtered concentrate should be sized to prevent any bottleneck in logistics. It should provide overhead coverage to prevent any moisture being re-introduced to the filtered product. Ideally, building space will permit loading of trucks within the structure, whatever the type of haulage equipment being employed. A static scale should be in place and positioned to allow a mobile loader move concentrate from the stockpile to the trailer/container without any obstacles to be manoeuvred around. Practically, the truck and trailer would be parked on the scale to record the empty tare weight and then a digital readout, viewable by the loader operator, would indicate the amount loaded so the maximum weight is loaded without exceeding the maximum weight allowed. Weighing needs to be recorded and entered into a weigh billing system. The floor space should be sufficient to provide segregation of material into two piles with storage capacity of the main pile being sufficient to hold two weeks of production. Additionally, samples should be taken from each loader bucket (using a sample spear) and packaged in an air-tight container with truck details and delivered to the mine lab for processing and analysis of moisture content and Cu content.

19.7.2 Mine to Port

The Port of Tolú is the closest port capable of handling bulk concentrates for export. Cartagena and Barranquilla could be an option as well but are further away adding costs. Tolú is approximately 273 km from the mine over various classes of road and highway.

19.7.2.1 Carriage Options

The use of enclosed containers has been used effectively elsewhere and provides the additional benefit of security of the contents and eliminates dusting. In the event of an accident, spillage, if any, is minimized. There are a number of truck configurations that could be used but the analysis on what configuration to use is lowest cost basis that provides the best security and least impact on the communities the route passes through. Options include:

- Conventional dump trucks
- Super dump trucks (larger capacity with more axles)
- Tractor units with large capacity dump trailer
- Tractor units with live bottom belt discharging
- Tractor units with side dump trailers
- Tractor units with closed containers on lightweight chassis
- The necessary measures will be taken so that the concentrate transport trucks generate the least possible impact on the communities, such as noise, frequency, or dust. These trucks will have the following features, offered by the companies providing the transportation services, in order to avoid spills and security issues during the trip.:
- Trailer with surveillance system (security cameras)
- Automatic Tarp System with tarp seal
- Load Capacity: 34 tons/trip
- The proposed truck design for the ore concentrate transportation from the Project to the port is the 3S3 type (Figure 19-6).
-

Figure 19-6: 3S3-type, three-axle Truck Tractor with three-axle semi trailer

19.7.2.2 Security Considerations

Assuming a concentrate containing 21% Cu and 10 g/dmt Au, a 25 wmt (@9% moisture) cargo would have an approximate value of $58,000. Accumulating a single tonne of concentrate would have more value than the average wage earned by an individual in a month in Colombia. Accordingly, individuals, or cartels could look to the concentrate as a source of revenue. Therefore, security precautions need to be in place at the mine, during transit to the port and while in storage at the port.

19.7.3 Port Facilities

The port facilities are a key component in the supply chain. It provides storage of the concentrate while being accumulated for export and provides a safe berth for bulk transport vessels being chartered and has the capability to load these vessels.

19.7.3.1 Receiving

The port facility should have specified hours of when trucks from the mine can arrive at the facility for unloading. Security measures should be in place to record the truck number and driver. The truck should be weighed on a static scale and the weight recorded for comparison to the mine departure weight. Seal numbers should be inspected for any tampering and that they match the numbers when applied. The truck or container should then be unloaded and checked that all the contents have been emptied. In the case of containers, the empty container(s) should be placed back on the chassis for return to the mine.

19.7.3.2 Warehousing

The port complex offers a covered conveyor belt for direct loading of coal and other minerals to ships, complying with environmental regulations. It has an expansion area of more than 300,000 m^2.

The Cu-Au-Ag concentrate will be shipped to smelters in Asia, India, or Europe. A new storage facility will be required at the Port of Tolú to house the concentrate material before being loaded onto ships. In front of the port facilities, there is an area available to support a covered warehouse with a capacity to store 7,500 m^3 of concentrate. There will also be a scale and an area for washing trucks and for the control of the corresponding safety and environmental regulations.

19.7.3.3 Export Vessel Loading

The port operator would be responsible for loading the berthed vessel by using front end loaders or other reclaiming equipment and moving the concentrate to the covered belt conveyor system that goes out to the vessel. The operator should ensure the belt is cleaned before and after each loading and that any wash water be contained for environmental reasons.

19.7.3.3.1 Contractual Loading Rates

The higher the guaranteed load rate the lower the ocean freight rate. Ideally the load rate should be a minimum of 8,000 wmt per 24 hour period.

19.7.4 Product Security

19.7.4.1 Mine to Port

To ensure the highest level of security the container lids should be put in place with multiple numbered seals put in place on each locking position. The number of each seal should be recorded. Trucks ideally would be equipped with GPS tracking units that can be monitored remotely. In addition, onboard cameras should record activity around the tractor and the trailer unit.

19.7.4.2 Port

The port should have a security protocol that documents movements of people and equipment in and out of the facilities. This would also be the case for the specific warehouse being used to store the concentrate. Security cameras should be continuously operating with mine personnel able to access the video footage remotely. On the arrival of each truck the security seals should be inspected to see if any tampering has occurred, or the seals possibly replaced.

19.7.4.3 Ocean Transport

Product, once in the vessel hold is secure and under the management of the vessel's Captain for security. The main risk of loss is through leaking hatch covers. Holds should be inspected prior to loading to ensure they are clean and not subject to contamination. Once loaded, the cargo should be trimmed to limit movement of the cargo within the hold while in transit. Once trimming is completed and the hatch covers put in place, they should be checked that they are watertight.

19.7.5 Delivery Terms

Cu concentrates are usually sold to smelters or traders on a bulk basis for delivery CIF FO, i.e., cost, insurance and freight, free out. This means the seller is responsible for loading the vessel, paying for the insurance to cover 110% value of the cargo and arranging and paying for the freight to the named destination provided by the buyer. Free out denotes that costs for discharge are for the buyer's account.

While insurance is arranged and paid for by the seller, in case of a claim, the seller must claim on the insurance policy.

There are instances where the parties agree that the buyer arranges the freight and insurance themselves; referred to as a Free on Board (FOB) delivery. However, this means the seller reimburses the buyer for the freight and insurance at market rates. In agreeing FOB terms, the seller loses control of the vessel and so is not recommended.

19.7.5.1 Incoterms 2020

The Incoterms® are a set of individual rules issued by the International Chamber of Commerce (ICC) which define the responsibilities of Sellers and Buyers for the sale of goods in international transactions. Of primary importance is that each Incoterms rule clarifies the tasks, costs and risks to be borne by Buyers and Sellers in these transactions.

19.7.6 Export Vessel Chartering

With the obligation to deliver cargoes to a destination, the seller is responsible for arranging marine transportation. Normally, the arrangement is for the use of one or more holds to accommodate the tonnage being shipped. The process of chartering a vessel is facilitated by a shipbroker who can broadcast the requirements in terms of quantity of tonnes to be shipped, timing of arrival at the loadport, suitability of vessel in terms of vessel's age, deadweight tonnage, draft, length overall ("LOA") that meet both loadport and disport restrictions. Shipowners who have open space on a vessel that meets the charterer's requirements will respond to the shipbroker. The shipbroker can then vet the responses and the vessel being offered for compliance and advise the charterer of the offers and negotiate terms with the selected shipowner and secure the vessel with a legally binding contract referred to as the Charter Party.

19.7.6.1 Brokerage

In addition to finding suitable vessels and vetting them and the shipowner, negotiate the freight terms, and prepare a Charter Party, the shipbroker will provide updates on the vessels itinerary, convey communications between the charterer and shipowner, assist in preparing laytime calculations and generally provide the charterer with relative marine market intelligence and advice. For these services the shipbroker is normally compensated by the shipowner through the freight rate in the amount of 1.25% of the gross freight rate.

19.7.6.2 Spot or Term Chartering

The mine, as charterer, can elect to charter vessels on a shipment by shipment basis or enter into a Contract of Affreightment ("COA"), covering a prescribed number of shipments over a specified period of time at a fixed freight rate. The latter may be beneficial if shipments are scheduled to be made to a specific destination or region on a regular basis.

19.7.7 Risk Management

19.7.7.1 Insurance Requirements

The mine will need insurance coverage for the concentrate from the time it is filtered and put into storage until the time it is loaded on a vessel. This insurance policy may be a rider on the overall mine insurance policy to cover loss due to theft or by accident while in transit to the port and for any costs for environmental damage and clean up. This would be in addition to any insurance coverage requirements the truck haulage company may have.

A second insurance policy referred to as Marine Cargo Insurance, will contractually be required on a shipment by shipment basis. The policy will cover 110% of the cargo value and is endorsed to the buyer once the cargo is loaded on the vessel. It is the responsibility of the buyer to make any claims, but the seller is obliged to provide any documentation the underwriters may have in assessing the claim.

19.7.7.2 Counterparty Risk

Counterparty risk is usually assessed in terms of "performance" risk or "financial" risk. Each potential customer's risk profile should be evaluated to minimize the mine's risk exposure.

19.7.8 Sales Agreements

It is common that a new project will be developed using a mix of equity, bank financing (possibly backed by Export Credit Agreement guarantees) and equipment manufacturing financing. A necessary requirement of most bank financings is that the majority of sales (usually 60% to 70%) are committed directly to smelters for a period longer than the tenor of the loan. Such long term benchmark contracts are common in the Cu concentrates business. The balance is often sold to traders on a spot or term basis.

19.7.8.1 Agreement Negotiations and Vetting

Cu concentrates will differ one to another; each will have its own unique elemental footprint. Contributing to the footprint will be other elements (aside from Cu) in mineral form, predominantly Fe, and sulphur, non payable metals such as Pb, zinc, Ni, Co, and antimony, and to a lesser degree insolubles such as alumina, magnesia, carbon, and silica. The remaining few percent will consist of 'minor' elements, some of which are highly desirous such as Au and Ag PM platinum and palladium (Platinum Group Metals or "PGM"), and others which can often adversely affect the smelting and refining process or are ecologically harmful; these latter two sets of elements are collectively referred to as deleterious elements. Such minor (in weight) elements, however, can significantly affect the value of the concentrate; in the case of PMs and PGMs by increasing the value and in the case of deleterious elements by decreasing the value.

Because chalcopyrite derived concentrates form the majority of global output from mines, most Cu smelters are designed to process a Cu concentrate with approximately 29% Cu, 30% Fe and 30% sulphur. Due to the need for higher capacity utilization, to allow for economic production, third party smelters often treat additional lower grade concentrate. The average feed grade, therefore, is somewhere between 24% to 26% Cu content.

Smelters therefore source from a variety of mines to optimize the level of 'major' elements, Cu, Fe and sulphur and to dilute the 'minor' primarily deleterious elements (but also silica, magnesia and alumina) for an optimal raw material feed to the furnace. The deleterious elements are kept to a minimum so that downstream operations are not impacted with removal costs and slower recoveries of payable metals such as Au and Ag.

Cu smelter purchase teams are therefore keenly interested in low deleterious content concentrate, as by carefully combining 'clean' with higher revenue deleterious concentrate, a smelter may maximize economic gains while meeting plant engineer's requirements and environmental emission standards. Therefore, before any negotiations with smelters can begin, the smelters will need to receive a sample of the concentrate to be produced so they can evaluate it in their existing feed mix to assess the value of this concentrate compared to others being offered and decide which provides the most value to them. If the evaluation meets their requirements negotiations can begin.

Once a few smelters have indicated interest in the concentrate the mine can evaluate them for operational performance and reliability as well as for financial performance and credit worthiness. From this and logistics costs a NSR can be calculated to determine a ranking of preference as a contract partner.

19.8 Commodity Price Projections

Project economics were estimated based on long term metal prices of US$ 3.60/lb Cu, US$ 1,650/oz Au and US$ 21.00/oz Ag, which was established by the Company in conjunction with consensus forecasts from various financial institutions.

The QP notes that the Company's pricing used in the cash flow analysis is reasonably aligned with various long term forward-looking financial instructions.

19.9 Contracts

The Company has no current contracts for project development, mining, concentrating, smelting, refining, transportation, handling, sales, and hedging, forward sales contracts, or arrangements.

19.10 Comments on Section 19

The demand for Cu is expected to grow and new Cu projects are needed to meet the increased demand and offset declining production from existing mature mines.

Colombian authorities indicate they would like to expand their mining production and diversify their mining to include more base metals like Cu.

The Company should prepare a presentation on the project, once the project is approved, that can be provided to parties (smelters and traders) that may have interest in purchasing concentrate from the mine.

Once logistics costs, including land transport, port handling and ocean freight costs are determined a NSR model should be prepared to narrow down prospective concentrate purchasers. With this and the project presentation the Company should look to meet with the prospective buyers to confirm interest and ultimately enter into Letters of Intent. This may include project financing in addition to just purchasing concentrates.

Currently, the Company has no commercial sales agreements or logistic service agreements in place.

20 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL, OR COMMUNITY IMPACT

The following section summarizes publicly available information as well as information developed during the baseline studies on the current environmental and social/community conditions and potential impacts that might be caused by construction and operation of the Alacran OP mine. This section also provides a summary of the regulatory context for baseline investigations. The regulatory requirements for exploration and mine development are summarized in Section 4. The section concludes with a summary of risks and potential impacts, as well as the additional work planned to extend the information provided in this section to a Feasibility Study level.

As required by the policies for a NI 43-101 study for Disclosure of Mineral Projects, Patrick Williamson, the QP for this Section, performed a site visit of the Alacran deposit in November 2017 and a second visit in September 2021 to evaluate environmental and social aspects of the Project.

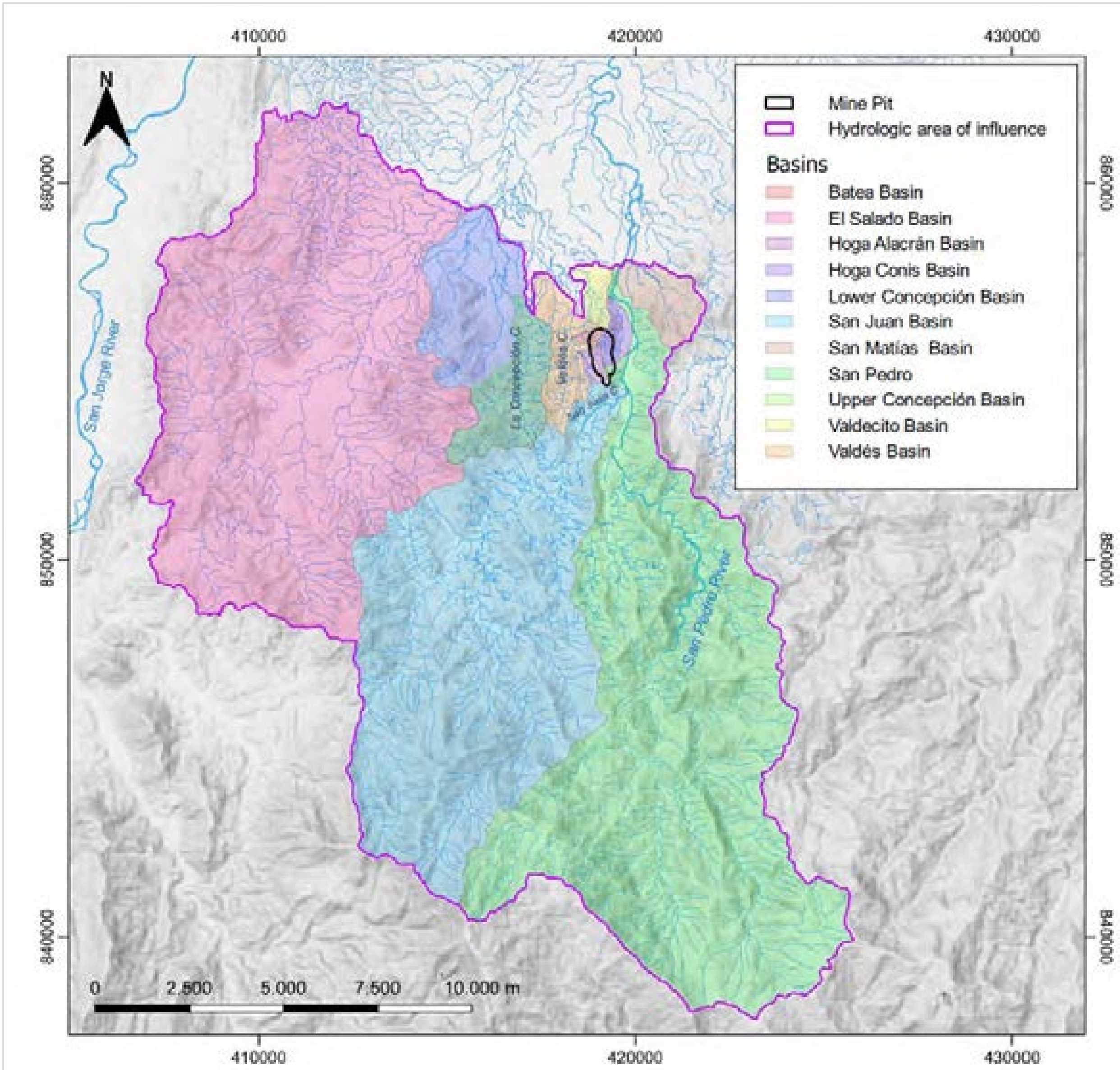
20.1 Environmental Setting

The Project is in an area which has hosted mineral exploration and mining projects for several decades. Previous mineral activities on the Property are comprised of exploration activities and artisanal mining.

The area around the Project is sparsely inhabited, including five small communities within 5 km of the project, and the Alacrán community located within the footprint of the Alacran Mine. The Alacrán community is the largest local population centre (1,200 persons) and the population within a 5 km radius is approximately 1,900. The local population subsists on mining, small scale agriculture, ranching and small businesses that support the local community (bars and stores). Most of the original forest has been cleared for grazing and agriculture. The degree of deforestation decreases 5 to 7 km south of the Project as the terrain climbs into the Western Cordillera.

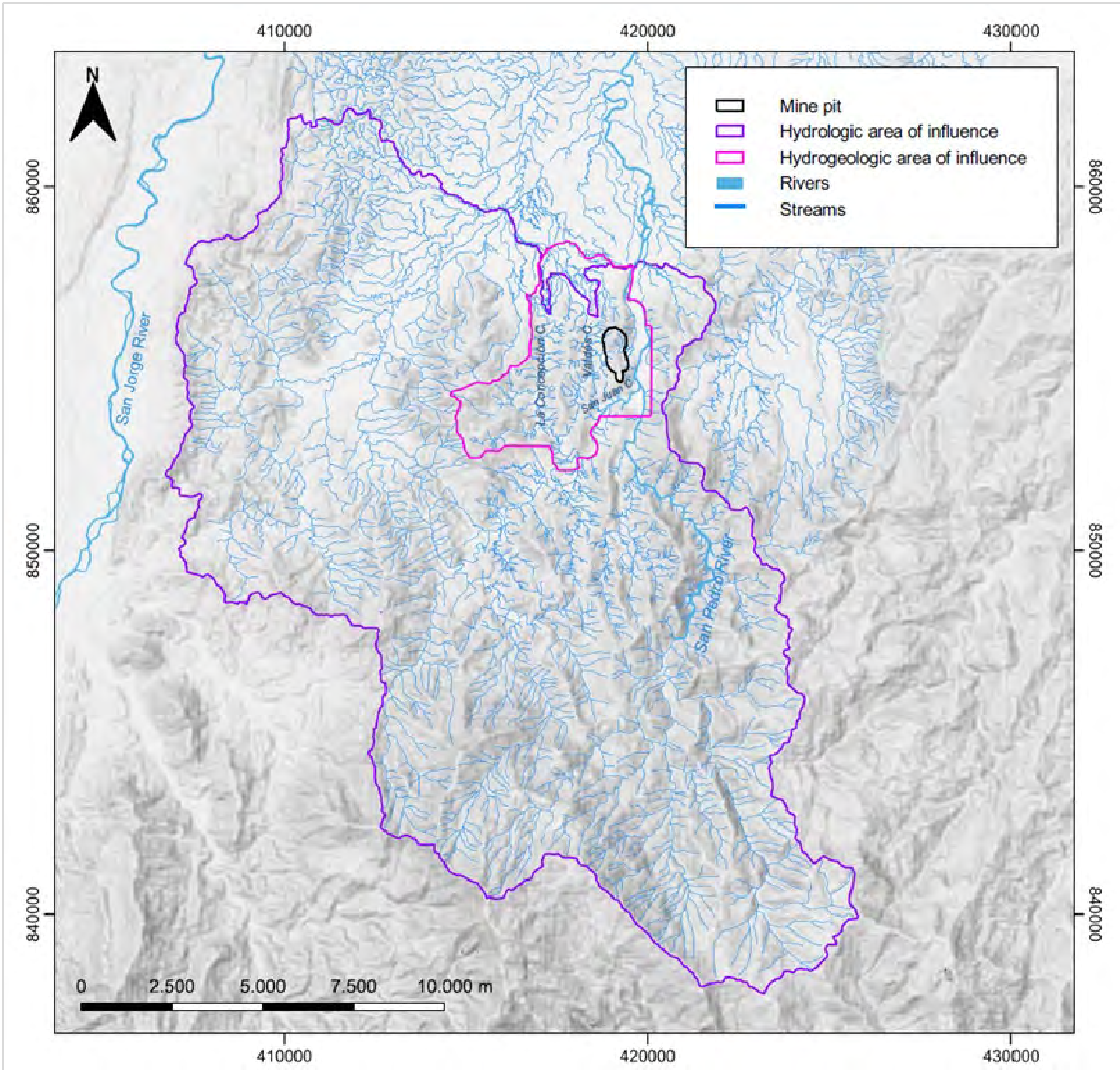
Illegal mining of the Alacran and Montiel deposits have resulted in extensive localized erosion in Cerro Norte and Cerro Montiel Este.

The surface drainage pattern is principally to the north and northwest in the vicinity of the OP mine (Figure 20-1). The principal surface water body is the San Pedro River immediately east of the planned pit (Figure 20-2). The two streams that drain from the saddle between the two hills that form the Alacran deposit (Quebrada La Hoga Mina to the west and Quebrada La Hoga Conis Alvies to the east) have been used for decades as uncontrolled tailings dumps by illegal mining operations.



Source: INTERA, 2021

Figure 20-1: Regional surface drainage in the vicinity of the OP mine



Source: INTERA, 2021

Figure 20-2: Local surface drainage in the vicinity of the OP mine

Discharge of mine process water and tailings into the local streams has resulted in extensive contamination of Quebrada La Hoga Mina, Quebrada Valdez, and Quebrada La Hoga Conis Alvies. Discharge of tailings into Quebrada Valdez over a period of approximately 40 years has significantly affected the flow and depth of the stream, resulting in an extensive braided stream as the sediment load greatly exceeds the carrying capacity. The streams originating in Alacrán are effectively sterile, with no fish, macroinvertebrates, or vegetation. This includes Quebrada La Hoga Conis Alvies to the San Pedro River and Quebrada Valdez as far as the junction with Quebradra Concepcion.

20.2 Baseline Studies

A baseline monitoring program was initiated in 2020 to inform the EIA, PTO, PFS, and ultimately the FS for the Project. The baseline studies were focused on the Alacran deposit and did not include the Satellite deposits discussed in previous sections of this Technical Report. The baseline monitoring program was designed to inform the requirements of the Terms of Reference ("TR") for the PTO and EIA; corporate social responsibility requirements; NI 43-101 Technical Reports; and best practices for international mining. The spatial and temporal extent of each baseline monitoring program was determined based on a delineation of the respective "area of influence" for each medium, pursuant to the requirements of the ANLA and ANM TRs. The area of influence of a specific medium (air, surface water, groundwater) is defined in the TRs as the biotic, abiotic, or socioeconomic medium-specific area that might impacted by the development and operation of the mine.

Baseline studies were started in 2020 and generated data on the following topics:

- Biological studies to identify significant habitat/ features, endangered species, and/or other biological factors requiring consideration during project planning.
- Hydrologic characterization including water quality, stream flows, identification of springs and seeps, and water and water resources uses/impacts.
- Hydrogeology including groundwater levels, groundwater sampling for chemistry/quality and evaluation of aquifer characteristics.
- Geochemical characterization of excavated material (tailings, overburden and waste rock), soils, tailings, and potentially reactive surfaces (mine pit wall at closure);
- Characterization and mapping of soil types and distributions.
- Archaeological sites and areas of cultural significance.
- Environmental/ecosystem impacts and health.
- Atmospheric environment (air quality, noise).
- Vibrations.
- Socioeconomics and demographics.
- Community issues and social management.

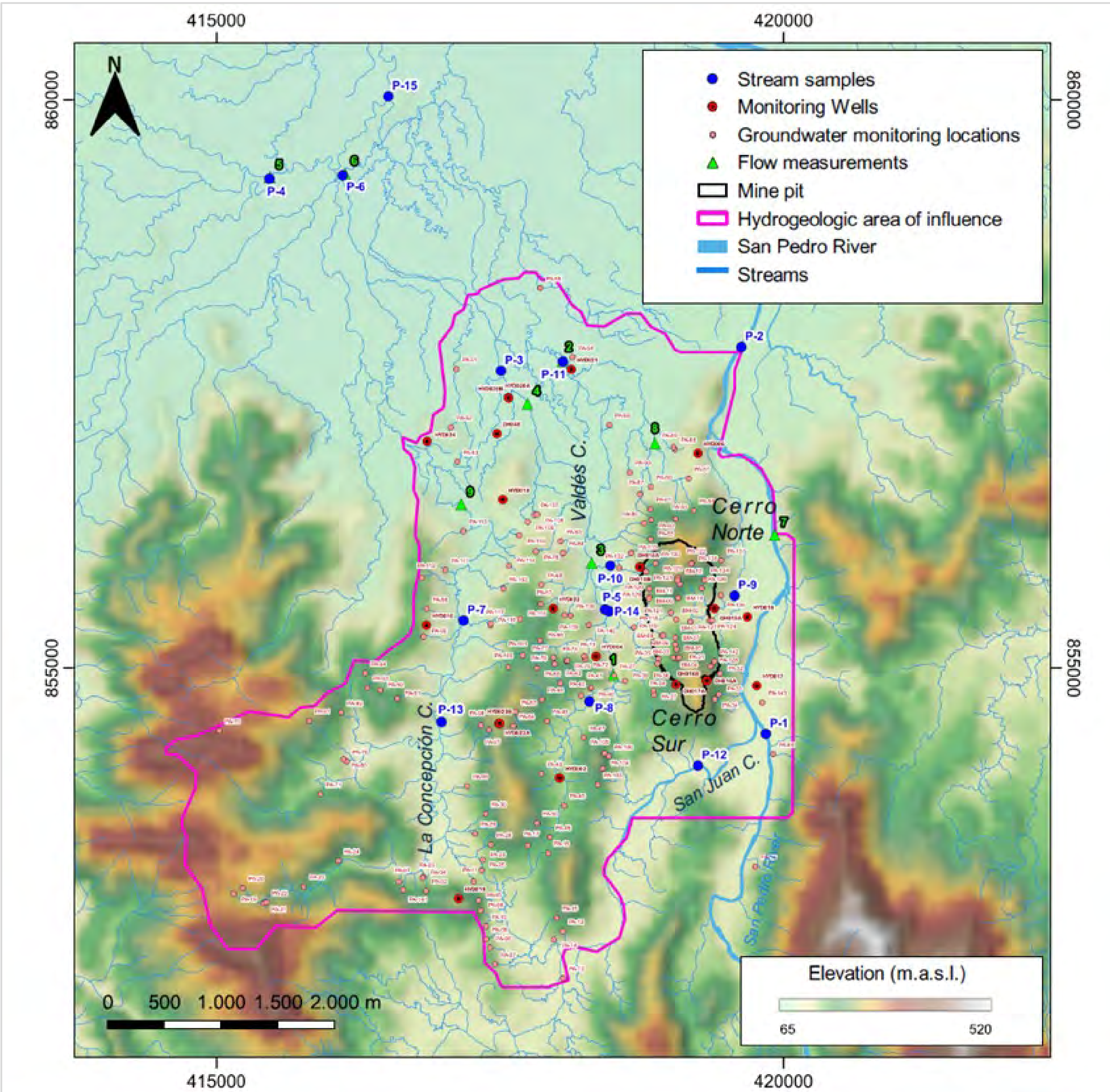
In addition to the baseline studies, the environmental aspects and potential impacts of the Alacran Mine plans and mining operations were evaluated, including:

- Climate calculations (precipitation, temperature, evapotranspiration, design storms, stream/river max flows).
- Closure and reclamation.
- Waste rock and tailings management.
- Mine water management.
- Stormwater management and treatment.
- Discharges of treated process water and contact water.
- Management of domestic wastewater.
- Identification of valued environmental components (biophysical and socio-cultural).
- Identification of environmental impacts by illegal mining prior to exploration and industrial and impacts that might occur due to planned industrial mining activities.
- Potential impacts.

20.2.1 Hydrology

The hydrology of the Project site was evaluated within the area of influence for surface water flow, water quality, and sediment chemistry. Data collection locations are shown in Figure 20-3 as well as the hydrologic and hydrogeologic areas of influence. The ongoing baseline hydrology characterization program includes:

- Sampling and chemical analysis of surface water and sediments chemistry at fifteen locations.
- Survey of water users and uses.
- Stream flow measurements at 22 locations.



Source: INTERA, 2021

Figure 20-3: Data collection locations for hydrology and hydrogeology

The main surface water feature is the San Pedro River, which flows north to south along the east side of the OP. On the west side, several smaller streams drain the OP (Quebrada La Hoga Mina) and mine infrastructure areas (Quebrada Palestina) before merging into Quebrada Valdez and ultimately discharging into the San Pedro River approximately 10 km north of the Project. On the east side of the OP area, the village of Alacrán is drained by Quebrada La Hoga Conis Avlies, which discharges into the San Pedro River 1 km north of the Alacrán community.

Flows in the surface streams vary by season. For the baseline period, Quebrada Valdez has an average flow of 0.25 m^3/s. Based on long term gauging data and statistical analysis of basin run-off, the annual average flows in the San Pedro River at the site is 9 m^3/s but can rise to 50 m^3/s after a strong storm. Minimum flow was calculated to be 2 m^3/s at a 2.3 year return period.

Water usage around the Alacran Mine area includes diversions for domestic use and illegal mining. The illegal miners store process water in “jagueyes”, small, unlined ponds with earthen banks frequently composed of tailings. Field pH measurements of water ponded in jaueyes were frequently acidic. Surface diversions for irrigation and deep groundwater wells were not observed.

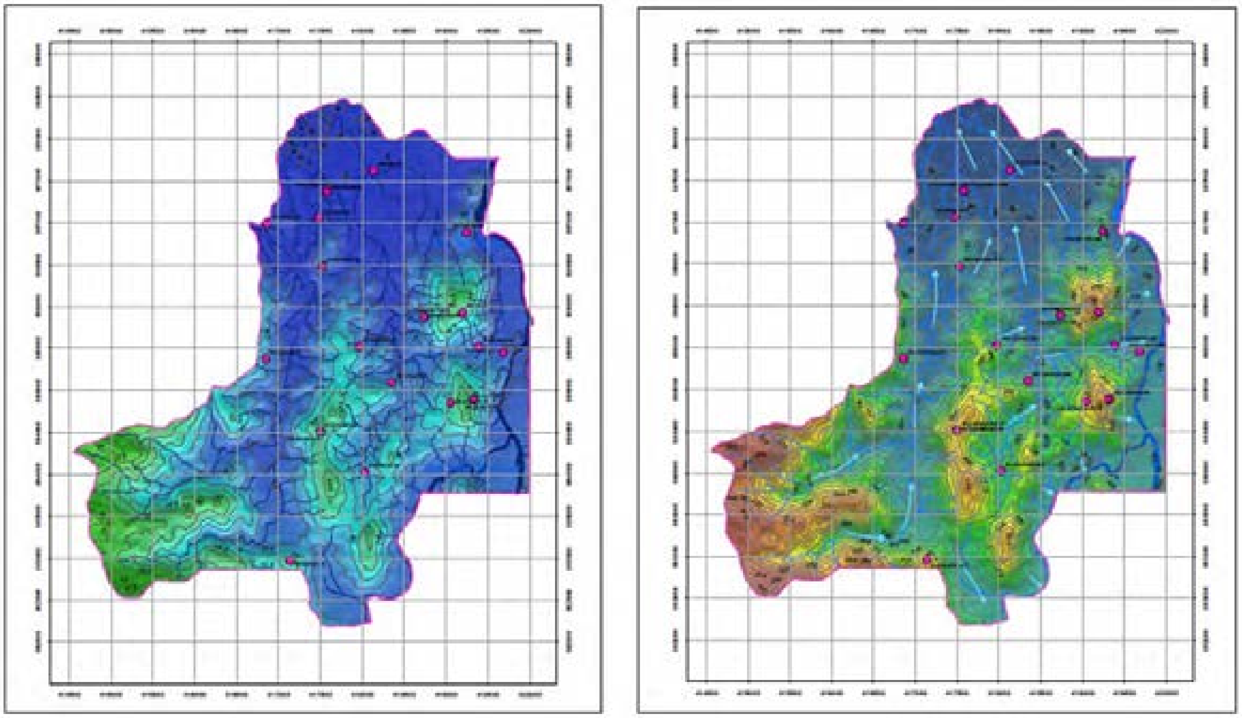
Surface water was generally classified as calcium/magnesium-carbonate. Surface water and stream sediments within and downstream of the community of Alacrán show extensive contamination due to illegal mining, with elevated concentrations of sulphate, suspended solids, metals, phosphorus, oil, and grease, coliform, and acidity, with low pH, and alkalinity. Contamination from illegal mining extends east in Quebrada La Hoga Conis Avlies to the San Pedro River. West of the village of Alacrán, Quebrada La Hoga Mina, and Quebrada Valdez display heavy sediment loading that extends at least 2 km. Concentrations of several regulated metals (Cu, Cr, Fe) in the impacted streams exceed regulatory standard 0631. Elevated sulphate concentrations from illegal mining appears to extend at least 5 km downstream of Alacrán in Quebrada Valdez. The San Pedro River also receives discharge from multiple locations on the east bank downstream of San Juan Viejo from illegal mining operations processing ore from the Montiel deposits. Water quality in the San Pedro River upstream of San Juan Viejo, in Quebrada San Juan, and Quebrada Concepcion was good.

20.2.2 Hydrogeology

The baseline groundwater characterization program included:

- Installation of 20 2-inch piezometers and two 4-inch test wells.
- Water level measurements and determination of groundwater flow directions
- Aquifer characterization using a range of hydraulic tests (packer, slug, injection, and pumping).
- A survey of springs and seeps during both the wet and dry seasons, and their uses.
- Infiltration tests.
- Groundwater sampling (metals, isotopes, major ions, physiochemical parameters) from eight monitoring wells, seven springs, and three tunnels.

Figure 20-4 illustrates the depth to groundwater, which is strongly affected by topography and the groundwater elevations and directions of groundwater flow within the groundwater area of influence.



Source: INTERA, 2021

Figure 20-4: Depth to groundwater (m below ground surface) and groundwater elevations (m above mean sea level), September 2021

The findings of the baseline hydrogeology program were:

- Groundwater quality is generally good. Based on major ion chemistry, the water is classified calcium/magnesium carbonate type. Groundwater quality has been impacted in the vicinity of the village of Alacran, based on the elevated sulphate concentrations in mine tunnel drainage and piezometer HYD-016A.
- The spring and seep survey identified 143 discharges of groundwater with the hydrogeologic area of influence during the wet season, of which fourteen were still flowing during the dry season within the pit footprint.
- Groundwater elevations and directions of flow follow topography. Depth to groundwater varies from 5 m below ground surface in the valley bottoms and alluvial plain of the San Pedro River to approximately 30 m below ground surface on the hills within the OP footprint. The direction of groundwater flow is down slope from the hills and then parallel to surface water.
- A total of 42 hydraulic conductivity measurements were obtained from aquifer testing at the site. Measured hydraulic conductivities in rock range from 0.0006 m/d to 0.2 m/d with a geometric mean of 0.01 m/d. The valley alluvium/colluvium had conductivity of 0.1 m/d to 56 m/day.
- Results of the aquifer tests indicate that hydraulic conductivities are consistent, with approximately 70% of the values falling between 0.01 m/d and 0.5 m/d (1.16 E-5 to 6 E-4 cm/s).

20.2.2.1 Conceptual Groundwater Model

Data from the hydrogeology program was integrated into a conceptual groundwater model to evaluate the predevelopment groundwater flow regime and inform the numerical groundwater models that will be developed to evaluate the long term behaviour and impacts to groundwater by mine development, operation, and closure. For the area in the vicinity of the Alacran Mine, six hydrostratigraphic units ("HSU") associated with the different geological formations and quaternary deposits were defined. These have been differentiated according to their principal lithological, geomorphological, and hydraulic characteristics, with supporting information from water chemistries and groundwater levels. The HSUs and their characteristics are summarized in Table 20-1.

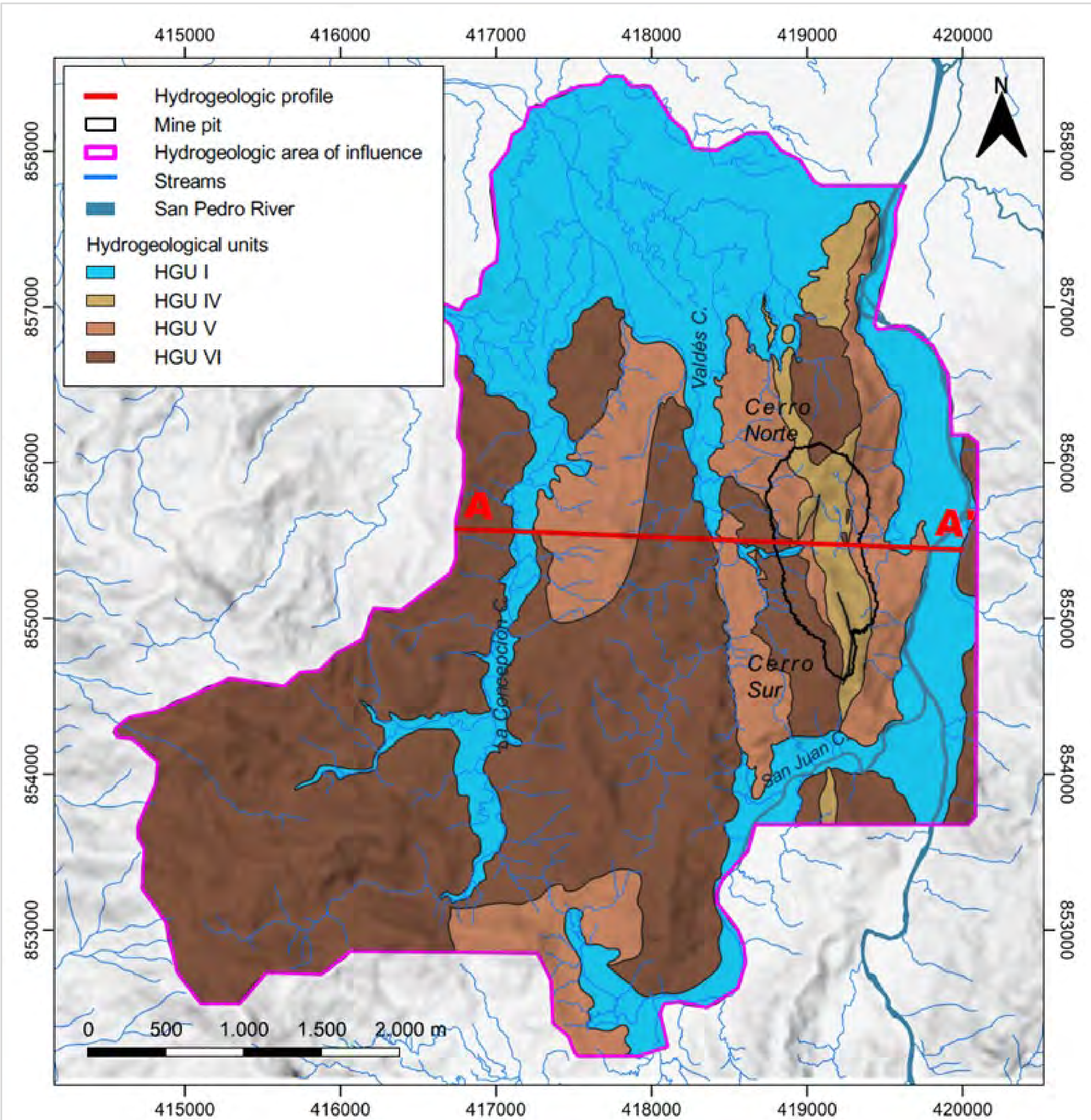
Table 20-1: Summary of Hydrostratigraphic Units

Hydrostratigraphic Unit	General Unit	Lithology	Hydraulic Conductivity (K) [m/d]	Type of Porosity	Total Estimated Porosity (%)	Transmissivity [m^2/day]	Thickness (m)	Type of Unit
UH-I	**Sed – Alluvial Terrace**	Unconsolidated sediments (colluvial-alluvial deposits; mixture of sand, clay, silt, and conglomerate)	4E-01 to 56 (average7)	Primary	25-50	49 (based on average thickness)	0.15 – 20	Unconfined Aquifer
UH-II	**S – Residual soils and Qdv slope deposits**	Residual soils and Qdv slope deposit (Clay-sand/silty, blocks approximately < 1 m)	9E-01 to 18.5 (average 4)	Primary and secondary	35-50	20.5 (based on average thickness)	0.25-10	Poor aquifer
UH-III	**Sp – Saprolites/Transition**	Saprolites and weathered bedrock (clay-sand)	8.9E-03 to 4.1E-01 (average 2.6E-01)	Primary and secondary	0.25-50	1.3E-06 to 1E-05	0.9-42.6	Aquitard
UH-IV	**Vc – El Alacrán U2**	Volcanoclastic sequence: calcareous-andesitic (Tuffs; breccias; fossiliferous mudstone; marlstone; crystalline calcite)	1.5E-02 to 1.38 (average 4.0E-01)	Secondary	0.1 to 0.2	5.8E-05 to 5.6E-04	160 – 280	Aquitard
UH-V	**Vc – Tob-Bx**	Mafic volcanoclastic sequence (Tuffs and breccias)	1.7E-02 to 2.9E-01 (average 2.0E-01)	Secondary	0 to 2.5	1.8 to 2.4 (in screened intervals)	120 to>300?	Aquitard
	Vc – El Alacrán U3	Mafic volcanoclastic sequence (Lithic tuffs, tuffs, and lavas with agglomerates, sandstones, and siltstones)						
	Vc – El Alacrán U1	Felsic volcanoclastic sequence (Tuffs, breccias, and lava flows)						

Hydrostratigraphic Unit	General Unit	Lithology	Hydraulic Conductivity (K) [m/d]	Type of Porosity	Total Estimated Porosity (%)	Transmissivity [m²/day]	Thickness (m)	Type of Unit
	Vc – El Alacrán U1	Felsic volcanoclastic sequence						
		(Tuffs and volcanic breccias, lava flows)						
UH-VI	**In – Ton N Alacrán**	Tonalite	5.5E-04 a 2.0E-01 (average 6.0E-02)	Secondary	0 to 2.9	6.9E-07 to 3.6E-04	Undefined	Aquitard
	In – Ton W Alacrán	Tonalite						
	In – Ton-Dior	Tonalite – Diorite						
	Vl – And-Bas	Basalt – Andesite						
	Vl – And Porfiri	Basalt						

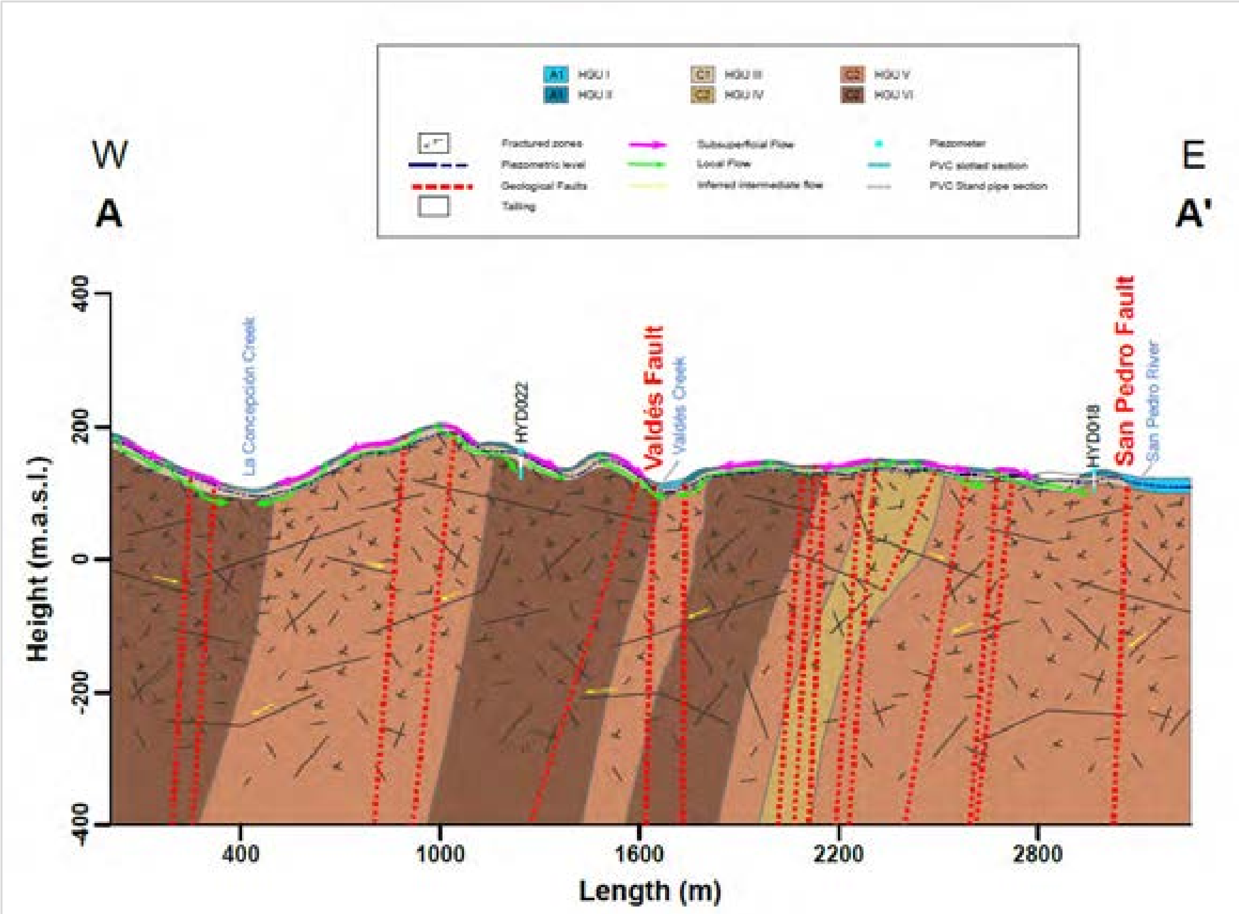
Source: INTERA, 2021

Figure 20-5 shows the surface outcrops of the HSUs and the location of a hydrogeologic cross section (Figure 20-6) across the OP. HSU I (recent alluvium, colluvium, and alluvial terrace deposits) is the primary aquifer unit in the study area. HSU I occurs along the San Pedro River and valley floors and has varying thickness up to about 20 m. Residual soils and slope deposits (HSU II) cover the majority of the site where HSU I does not occur. These units overly the bedrock units classified as HSU III through HSU VI, which include the various volcanic, volcano-clastic, and sedimentary sequences described in Section 7 as well as the saprolite and saprolite rock transition zones in the uppermost bedrock intervals.



Source: INTERA, 2021

Figure 20-5: Surface outcrops of HSUs and location of cross sections A-A'



Source: INTERA, 2021

Figure 20-6: Conceptual hydrogeologic cross section A-A'

Hydraulic conductivity values for HSU I and HSU II range from 0.4 m/d to 56 m/d with average values of 7 m/d and 4 m/d, respectively. HSU I is considered an unconfined aquifer and is capable of supplying water to production wells. HSU II can transmit groundwater but is not very productive and is therefore considered a poor aquifer with limited productivity.

Hydraulic conductivity values for the bedrock units range from about 0.0006 m/d to 0.3 m/d. The average hydraulic conductivity for HSU VI (0.06 m/d) is about an order of magnitude lower than that for the other bedrock units (0.2 m/d to 0.4 m/d). Hydraulic testing indicates that the bedrock and saprolite units are generally capable of storing and transmitting water; however, these units are not considered to be sufficiently productive to be considered aquifers. Flows from at least some of these units have been identified at existing mine shaft openings, however, and these formations will need to be considered as active hydrogeologic units that will drain into the OP during excavation, most likely via geologic structures as opposed to their primary porosity.

20.2.2.2 Groundwater Conditions and Flow Paths

The aquifer conditions within HSU I and HSU II is unconfined. These units are generally considered to be in direct hydraulic communication with the underlying saprolite and bedrock units. The aquifer conditions within the saprolite and bedrock units are also considered to be unconfined, though there is likely some localized confinement and/or perching of groundwater within those units. Water level data indicate that flow is controlled by topography, with groundwater flowing from areas of higher elevation to lower elevations (Figure 20-4). Water quality parameters for the various HSUs are fairly consistent, which suggests that they are a single heterogenous groundwater system with relatively low residence times for groundwater at the site.

Borehole data indicate that the bedrock is extensively fractured to a depth of 350 m below ground surface, with fracturing decreasing below that depth (Figure 20-6). There are three fracture systems within the pit that might exert some degree of control on groundwater flow. The bedrock units tend to have low to moderate primary porosities, which indicates that the overall hydrogeologic system is best characterized as a dual-porosity system with groundwater occurrence and flow in both fractures and in the primary matrix porosity. Topography provides the primary controls on flow within the bedrock units, with fracture patterns, and HSU occurrence providing secondary controls on fluid flow patterns.

The overall hydrogeologic system is under unconfined conditions; therefore, storage parameters for the study area will be controlled by specific yields (i.e., effective porosities) of the alluvium and bedrock formations. Only three reliable dimensionless storativity values were derived from the hydraulic testing at the site. The reliable measured values (0.0017, 0.0064, and 0.24) are consistent with an unconfined hydrogeologic system, and the lower two values are consistent with an unconfined system dominated by storage in fractures rather than in the primary porosity.

20.2.2.3 Boundary Conditions

Climate for the region is considered tropical and isothermal, with average net rainfall (i.e., precipitation minus estimated evapotranspiration) of about 0.00312 m/d (3.12 mm/d, or 114 cm/yr). Recharge to the aquifer within the study area is therefore dominated by areal infiltration of precipitation at higher elevations, with some lateral flows from outside of the area of influence. Recharge rates are expected to be about 5% of net precipitation.

Discharge from the groundwater occurs as localized discharge to tributaries and primary discharge to the San Pedro River. The San Pedro River represents the main boundary condition in the aquifer due to its proximity to the OP, and it is expected to provide a considerable amount of control on groundwater flows into the OP and overall flow patterns within the area of influence.

Other local lateral boundaries in the system might include the major north south and east west trending fault systems.

Based on the results of preliminary transient groundwater model, groundwater inflow towards the OP will gradually increase as the pit is broadened and deepened, with a maximum estimated inflow of 750,000 m^3 per day in year 12. Approximately 10% this flow is expected to originate from the river when the pit goes below the elevation of the river (105 m below m.s.l) and the direction of groundwater gradient and direction of flow reverses. Potential groundwater flow from the river to the OP via structures may be a significant pathway. Additional hydrogeologic testing and numerical modelling will be performed to determine the volume of flow and groundwater management strategies. As discussed in Section 18, the volume of contact water will be minimized by intercepting groundwater flow to the OP using wells.

20.2.3 Air Quality

The baseline study of air quality was performed by Ecoquimsa in accordance with the requirements of Decree 1076 of 2015 of the Minambiente. Concentrations of 2.5- µm and 10- µm particulate matter (PM2.5 and PM10) were measured in six locations around the OP during the dry and wet seasons of 2020 and 2021 (Villanueva, La Rica Las Brisas, San Juan Viejo, San Juan Nuevo, and La Concepcion). In general, the concentrations of PM10 were 2 to 5 times higher than concentrations of PM2.5 and concentrations of both sizes were higher during the dry season. The first quartile concentrations of PM10 exceeded the regulatory limit of 75 µg/m^3 during the dry season in Villanueva, La Rica, and San Juan Viejo. The elevated particle concentrations during the dry season are attributed to unpaved roads, areas devoid of vegetation, wind, and low humidity. Average concentrations of PM2.5 were below the standard of 37 µg/m^3 during both sampling periods.

20.2.4 Noise

The baseline evaluation of environmental noise was performed at ten stations around the OP in accordance with the methodology provided in Resolution 0627 of 2006, which establishes the maximum allowable limit 55 decibels for a rural area during daytime hours and 45 decibels at night. The temporal distribution of environmental noise ranged from 50 dB and 70 dB during the day and night. The noise levels varied by community, the proximity to roads, and some domestic, and commercial activities; no industrial activities are recorded in the study area. At all locations the background noise levels exceeded the regulatory limits. The community of San Juan Viejo was the noisiest of the ten locations, especially on Sundays. Elevated baselines sound levels are attributed to vehicular traffic (mostly motorcycles), nocturnal fauna (mainly insects and domestic animals) and the routine activities of the inhabitants of the populated centres. The high noise levels in San Juan Viejo on the weekends are due to increased activity at bars and discos.

20.2.5 Vibration

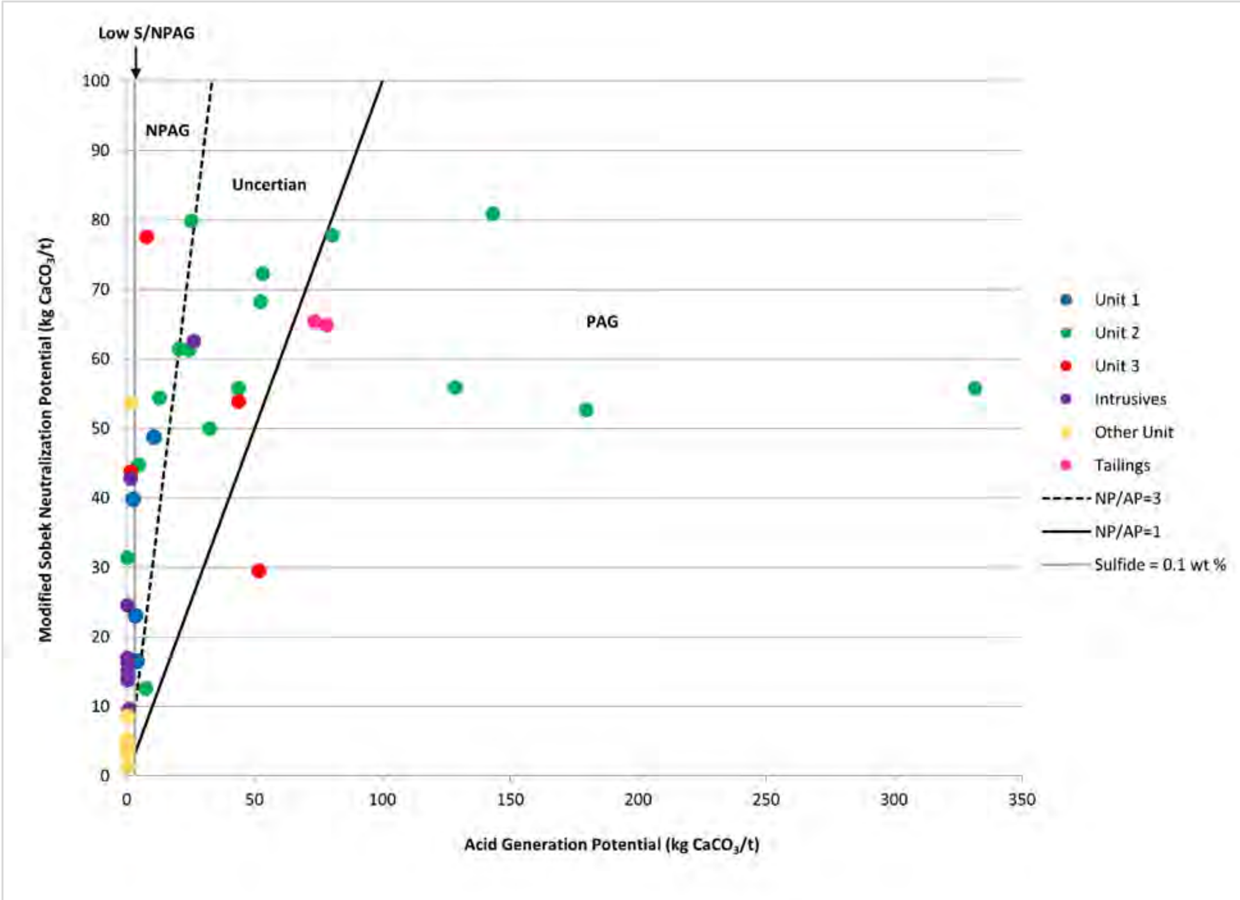
In the absence of a Colombian regulation and methodology for baseline vibrations studies, the DIN 4150-2 (DIN, 1999) standard was employed for the evaluation of human exposure to structural vibration and DIN 4150-3 (DIN,2016) for the evaluation of the effects of vibrations on structures designed primarily for static loading.

The baseline vibration study around the OP was performed at ten stations that provided information on the vibration exposure of inhabitants and infrastructure. In general, the monitored locations do not present significant levels of vibration.

20.2.6 Geochemistry

A preliminary baseline geochemical evaluation was performed to determine the potential for ARD and ML of waste rock and tailings that would be generated by mining operations in the open pit as well as soils that will ultimately underlie the mine infrastructure. Sample selection for waste rock was based on a site-specific conceptual geochemical model, the range of waste rock lithologies expected during mining and potentially reactive surfaces in the final pit walls. In addition, two samples of soils in the infrastructure area were also analyzed. A total of 52 samples were collected from cores and test pits. Two tailings samples were collected from a composite sample generated by the pilot program metallurgical analysis.

Samples analysis including ABA, net acid generation, mineralogy, total elemental analysis and shake flask extraction ("SFE") as specified in the ANLA TRs and in accordance with industry best practices. Static results for AP and NP indicate that most of the waste rock will be NPAG" (Figure 20-7) including all the intrusive rock and saprolite. Unit 3 has uncertain ARD potential (NP/AP between 1 and 3), while Unit 2 was mostly uncertain and PAG ((NP/AP < 1). Table 20-2 lists the volumes of waste rock by lithology. The lithologies most likely to produce ARD and ML (Units 2 and 3) make up approximately 43% of the waste rock. Static results for the tailings samples indicate that they will be acid generating.



Source: INTERA, 2021

Figure 20-7: NP versus AP for waste rock lithologies

Table 20-2: Summary of Waste Rock Volumes and Tonnes by Lithology

Unit	Volume	Tonnes
Intrusive	10,772,664	28,988,231
Limestone	602,186	1,730,304
TUFA	199,787	552,344
TUFD	866,922	2,446,462
Unit 1	6,561,150	17,839,215
Unit 1a	2,411,919	6,607,960
Unit 2	1,943,310	5,439,219
Unit 2 a	9,352,322	26,222,790
Unit 3	4,550,674	12,631,177
TOTAL	**37,260,935**	**102,457,703**

Across sample types, the most abundant elements generated during leaching tests were calcium, magnesium, potassium, silicon, sodium, and sulphur, results consistent with incipient sulphide oxidation and gangue mineral dissolution. Elevated concentrations of Cu, sulphur, arsenic, molybdenum, and Cu exist in a minority of rock samples but the potential to leach these elements is small.

Laboratory humidity cell tests are in progress on ten waste rock and one tailings sample to determine their long term leaching characteristics. Ten large-scale (barrel) tests are in progress at the site using composites of each major waste rock lithology to evaluate leachate chemistry under site-specific climatic conditions. Additional sample collection and analysis will be performed during the FS to increase the confidence in the PFS results.

20.2.7 Soils

The baseline characterization of soil types across the project was performed by Dynamica Ingeniería y Ambiente S.A.S. in 2020 and 2021. The Project contains the following four soil types:

- MVEa – a soil mixture of colluvium and alluvium which occurs in the San Juan and San Pedro River alluvial valleys.
- MVDd1 – a saprolitic soil found in the north and south hills of the Alacran deposit, derived from the in situ weathering of the underlying igneous and metasedimentary rocks.
- MVDe1 – a saprolitic soil located in the drainage valley of Quebrada Valdez also derived from the underlying igneous and metasedimentary rock.
- RVNa – alluvium located in the lower reach of the Quebrada Valdez. Much of this material is tailings.

The saprolitic soils are classified as relatively thin entisols and inceptisols with poor soil profile development, high clay content, and poor drainage characteristics. Soil pHs ranged from 4.7 to 7 standard units ("su"). A soil pH less than 5.5 su is considered strongly acidic.

20.2.8 Ecosystems and Biota

Ecological and biological baseline studies were performed between 2018 and 2021 by Dynamica Ingeniería y Ambiente S.A.S. The ecosystem evaluation is based on biomes, which represent large naturally occurring communities of flora and fauna occupying a specific climate. The biome classification and delineation schema are based on the Colombian National Information System ("SIAC") delineations and definitions (2021).

The biological area of influence of the Project is in the Sinú – San Jorge district of the Chocó-Magdalena province. The Magdalena province is characterized as a humid region located in the foothills of the mountain ranges, with flora, and fauna common to warm humid forests. For ecosystem classification, the area of influence encompasses the Magadalena – Caribe biotic community (Helobiome) within the Magdalena y Caribe humid tropical zonobiome of the larger humid tropical forest biome. The Magdalena y Caribe helobiome is characterized by valleys, plains, and foothills, with poor to very poor drainage; whereas the larger zonobiome incorporate plains, foothills, and hills that have a warm humid climate and poorly developed drainage.

Preliminary survey results identified 70 species of trees, which is considered low for this biome and is attributed to the fact that almost the Project area has been cleared of the original vegetation for agricultural, livestock, and mining activities. In addition, the more valuable/useful trees have largely been harvested for use by local communities.

The evaluation of fauna identified representative specimens for the region, including *Puma concolor* (Puma), *Aotus griseimembra* (Gray-bellied night monkey) and *Chauna chavarrí* (Northern or Black-necked screamer). All of these species are threatened to some degree and will be subject to special management in the area of influence. Twenty species of fish were recorded during the baseline studies. Two of the fish species, *Leporinus muyscorum*, and *Prochilodus magdalenae*, will be monitored to determine their status and conservation once the mining operation begins.

Macro invertebrate surveys identified healthy populations normal to the area in Rio San Pedro Arriba, Quebrada Palestina, and Quebrada Concepcion.

The streams downstream of the village Alacrán are effectively sterile, with no fish, macroinvertebrates, or vegetation. This includes Quebrada La Hoga Conis Alvies to the San Pedro River, Quebrada La Hoga Mina, and Quebrada Valdez from the confluence with Quebrada La Hoga Mina all the way to the confluence with Quebradra Concepcion. Where the slope of Quebrada Valdez decreases, sediment loading has produced a wide braided stream bed that supports very little vegetation.

Within the biological area of influence, social surveys were conducted to determine terrestrial and aquatic ecosystem usage by the local population. Approximately 20% of those surveyed make use of small lots of second growth forest, which total 171 Ha. Wood from the forest is used mostly for cooking, with a monthly extraction rate of approximately 32 tonnes.

20.2.9 Social

The Alacran deposit is located in a rural and sparsely populated portion of department of Cordoba. The Alacran Mine's area of influence overlaps with six villages (veredas) in the San Juan district of the Municipality of Puerto Libertador, Córdoba. The Alacrán community is located in the centre of the OP and has an estimated population of 1,200 inhabitants. The other five communities (San Matías, San Juan Nuevo/Viejo, Parcelas – La Concepcion, Los Olivos and Valdez) have an estimated population of 1,900 inhabitants. The community of San Pedro includes an Indigenous Council of the Zenú ethnic group that are native to the region. These communities for the most part subsist on illegal mining activities, small scale agriculture, and raising fish, poultry, pigs, and cattle. Water supplies for the local communities includes surface water from the Quebradas Valdez and Concepcion (70 households), shallow hand dug groundwater wells (55 households), or a central water source (San Juan Viejo).

Baseline monitoring of the social aspects of the Project was performed in accordance with ANM TR for the development of social management plans. The Social Management Plan ("PGS") is a systematic and comprehensive management instrument that consolidates the programs, projects and activities carried out by a mining concessionaire to mitigate and address the social risks/impacts generated by the development of the mining project. The PGS must also discuss the opportunities and benefits that will be generated by the Project. The Project environmental licence is an input to the PGS.

Currently, 56% of the Company's employees at the Project are from neighbouring villages, employed as labourers, kitchen staff and maintenance/cleaning.

Surveys of the local community show largely favourable opinions in most of the respondents to the development of future mining activities. During the spring and summer of 2021, drilling activities were curtailed due to occasional road blockades and denial of access. Issues with the local community appear to have been largely resolved through a negotiated accord and social outreach programs

20.2.10 Archaeology

The first phase of the archaeology baseline evaluation for the Alacran deposit was carried out in the summer of 2021 in accordance with resolution 550 of May 07, 2021, by the Colombian institute of Anthropology and History ("ICANH"). The survey identified five archaeological sites from which cultural artifacts were recovered, specifically 391 ceramic fragments associated with the Momil, Tierralta, Betancí, and Panaguá cultures, spanning a period from the second to 16th centuries of the common era. In addition, 26 lithic elements were recovered, including axes, metates, manos, and flakes (Arqueonorte S.A.S., 2021).

The archaeological sites were all located within the proposed mine infrastructure footprint (two in the WMF, two in the process area and one in the proposed pond 4).

20.3 Mine Waste Management and Monitoring

20.3.1 Mine Waste Management

Based on the mineralogy of the orebody, process methodology, mine plan and analytical testing, INTERA anticipates that the tailings and approximately 40% of the waste rock and all the tailings will be acid generating and will require appropriate management during operations and post closure. Waste rock and thickened tailings will be stored in the WMF. The NPAG waste rock from overburn stripping will be used for the construction of the WMF embankments. The base of the WMF will consist of grubbed and reworked saprolite to provide a low permeability geologic liner. A constant head hydraulic conductivity test of compacted saprolite at 23% to 26% moist content and 99.8% compaction produced a hydraulic conductivity of 0.0001 m/day (1.51E-7 cm/sec). This value is equivalent to a compacted clay or silt. An initial lift of thickened tailings two to six metres thick will be deposited on top of the engineered layer of saprolite. Based on a grain size analysis, the calculated hydraulic conductivity of the tailings would be approximately 0.78 m/day (0.009 cm/sec). Thickened tailings on top of compacted saprolite will function as low permeability liner to minimize vertical migration of decantant during tailings consolidation and possible tailings oxidation products. Monitoring will be performed in a line of wells downgradient of the WMF to evaluate groundwater chemistry. In the unlikely case that tailings solutions are detected in groundwater, the wells will be used to collect impacted groundwater and send it to the WTF.

PAG waste rock will be placed in the WMF in layers sandwiched between layers of thickened tailings (i.e., co-deposition or co-disposal). The layers of waste rock and thickened tailings will be placed in lifts so that thickened tailings subsequently poured on top of them will fill the interstitial voids. This method has been used with great success at the Caraiba mine in Brazil since 2008 and Neves Corvo in Portugal.

Additional metallurgical, geochemical and physical characterization will be performed to:

- Inform water quality models for estimating potential run-off chemistry.
- Determine the seismic stability of the mixed waste.
- Calculate the vertical permeability of the mixed tailings and waste rock.

20.3.2 General Water Management

Make up water for the operation will be provided principally through a combination of groundwater from interception wells installed to minimize the entry of groundwater the pit (after year 2), precipitation in the infrastructure area, reclaim water from the WMF and surface or groundwater sources from alluvium at the junction of the San Pedro River and Quebrada San Juan.

Precipitation falling in undeveloped parts of the mine will be directed into diversion ditches and conveyed to streams. Treated contact water and treated sewerage from the camp will be discharged into Quebrada Valdez. Treated water from the processing circuit will be discharged to the San Pedro River. Surface run-off that does not come into contact with the mine infrastructure (non contact water) will be conveyed south to Quebrada Valdez, north to Quebrada San Juan or east to the San Pedro River.

Groundwater from the interception wells around the OP will not have come into contact with potential sources of contamination and will either be pumped to the river or used as makeup water for the processing circuit. As required by the TRs for the EIA, flow, and water quality will be modelled at the discharge locations for treated water.

20.3.3 Environmental Management Program

The planned environmental management programs will include the following elements:

- Protection of flora and fauna
- Air and noise monitoring
- Waste rock and tailings geochemistry monitoring
- Surface and groundwater monitoring (including discharge locations)
- Permit reporting and compliance

Based on mining operations of similar throughput and mineralogy, the Company is contemplating a staff of eight full time environmental specialists as well as contractors to support the following environmental and social programs.

20.3.3.1 Flora and Fauna

Prior to mine construction, a detailed flora, and fauna protection plan will be developed and implemented. For fauna, protection methods will include removal of terrestrial vertebrates in the operational areas either by means of repellent, or rescue, and relocation. Fish will also be relocated to other streams outside the impacted area. During mine operation, animal crossing will be installed with signage to alert vehicle traffic and avoid collisions with animals.

Plant species of ecological interest, such as orchids, and bromeliads, will be removed to a plant nursery for reforestation of the Project during closure. The nursery will also raise native plants that will stabilize the soil during restoration. Vegetation harvested during construction will either be composted for later use as growth medium during closure or used on site as construction material.

Riparian areas and drainages affected by construction of water infrastructure and other civil works will be remediated to reduce the generation of sediments and erosion in stream channels.

Monitoring plans will be developed to protect vulnerable species. A mine wildlife team will mitigate effects of the Project on wildlife. Wildlife mitigation efforts will include lighting selection and design.

20.3.3.2 Air and Noise Monitoring

Noise control for mining operations will be taken into consideration in the design of the mine machinery and mine infrastructure. Noise monitoring programs will be developed and implemented to comply with applicable regulatory limits and industrial criteria to minimize impacts to workers, communities, and wildlife. Noise monitoring will be performed during construction, operation, and removal of mine infrastructure at closure. The program will include both attended (mobile spot measurements) and continuous unattended monitoring.

20.3.3.3 Waste Rock, Tailings, and Ore Geochemistry

Additional samples of waste rock lithologies, overburden, ore and tailings will be collected to inform the FS and EIA, and over the life of the mine to refine the site-specific conceptual geochemical model, the mine waste handling procedures and closure plans. Run-off from the mine pit walls will be modelled to determine the long term geochemical behaviour of the pit during operation and closure.

20.3.3.4 Surface and Groundwater

Surface and groundwater monitoring will continue at the current locations. Additional monitoring locations will be installed as piezometers are mined out, downgradient of the WMF, within the ore body and around the pit to monitor groundwater levels. Groundwater will be monitored semi annually. Surface water and discharge locations will be monitored quarterly, or more frequently if required by the environmental licence.

20.3.3.5 Permit Reporting and Compliance

Permit compliance monitoring and reporting will be performed by the environmental staff in accordance with the requirements of the mining permit and other regulations.

20.4 Project Permitting Requirements

The following section describes the regulatory framework for environmental and social aspects of the mine development and operation. National regulations related to exploration and mining were dispersed among a wide range of decrees, laws, and resolutions until 2015 when most of the applicable regulations were consolidated into decree 1076. The permitting requirements and history for the mining related aspects of the Project are summarized in Section 4. Table 20-3 provides a summary of the applicable regulations.

Table 20-3: Summary of Permits

Legal Permit or Document Required	Project Stage			Approving Entity	Legal Standard
	Construction	Exploitation	Closure and Abandonment		
Closure and abandonment	X	X	X	ANLA/CVS	Decree 2811/1974, Law 99/1993, Decree 1076/2015
Mine permit	X	X	X	ANM	Law 685 of 2001
Environmental permit	X	X	X	ANLA	Resolution 1503 of 2010, Decree 1076/2015
Water discharge permit	X	X	X	ANLA/CVS	Decree 2811/1974, Law 99/1993, Decree 1076/2016, Resolution 1514 of 2012, and Resolution 0631 de 2015
Forest harvesting permit	X	X		ANLA/CVS	Decree 2811/1974, Law 99/1993, Decree 1076/2015
Lifting of the ban	X				Resolution 0213/1977, Decree 1076/2015, Resolution 1912/2017 and Article 125 of Decree 2106/2019
Channel occupation permit	X			ANLA/CVS	Decree 2811/1974, Law 99/1993, Decree 1076/2015
Permit for the Collection of Specimens of Fauna and Flora for the Preparation of Environmental Studies	X	X	X	ANLA/CVS	Decree 2811/1974, Law 99/1993, Decree 1076/2015
Air emissions permit	X	X	X	ANLA/CVS	Decree 2811/1974, Law 99/1993, Decree 1076/2015 and Resolution 2254/2017
Archaeological Management Plan	X	X		Colombian Institute of Anthropology and History (ICANH)	Law 99/1993, Decree 833/2002, Law 1185/2008, Decree 763/2009 Decree 1080/2015 and Decree 138/2019
Protocolization Act of the Prior Consultation Process with the Indigenous Communities of the Mining Project Area	X	X	X	Ministry of Interior	ILO Convention 169, Law 21/1991 and Presidential Directive No. 08 of 2020
* * only required to file the environmental licence application					

Source: Cordoba, 2021

20.4.1 General Mining Authority

The Colombian Ministry of Mines and Energy (MME), formerly the Mines, and Petroleum Ministry, is the national mining authority that regulates mining activities. Article 334 of the 1991 Constitution stipulates that it is the state's responsibility to manage the "use, production, operation, exploitation, and distribution of minerals obtained from the soil and subsoil". With a few exceptions, Mineral Resources can only be exploited via permits from the relevant authorities, which may include the MME, ANM, ANLA or the regional government agencies (known as Corporaciones).

20.4.2 Environmental Authority

The legal framework for environmental regulation is based on Law 99 (1993) which created the national Environmental Ministry. In 2011 Decree 3570 modified its objectives and structure and changed the name to Environment and Sustainable Development Ministry. The Ministry is responsible for the management and regulation of the nation's environment and renewable natural resources.

The national environmental permitting agency (ANLA) was created in 2011 by Decree 3533. The ANLA is responsible for the development of environmental regulations and procedures for all activities and projects that require environmental licenses. The ANLA also reviews and grants environmental licences and permits and enforces environmental regulations.

Article 33 of the same Law created the regional environmental authorities with the responsibility to manage the environment and renewable natural resources. The environmental authority for the Project is the ANLA, as the department of Cordoba has no regional environmental authority

20.4.3 Environmental Regulations and Impact Assessment

Colombian laws regulating mining activities differentiate between the requirements for exploration activities and those for construction, exploitation, and closure of a mine. During exploration, a concession holder is not required to obtain an environmental licence, but work must be conducted in accordance with the environmental guidelines issued by the MME.

For construction and exploitation operations, the concession holder must perform an extensive baseline investigation of environmental, social and economic conditions and summarize them in an EIA. The scope of activities and required information are defined in the TRs for the EIA (ANLA, 2016). The Company is currently undertaking a baseline characterization of surface water, groundwater, air, soil, flora, and fauna, climate, geochemistry of mine waste and reactive surfaces, and socioeconomic conditions. As specified in the ANLA TRs, industry best practices, and guidelines, impacts associated with the biotic, abiotic, and socioeconomic components which the activity may generate, or cause have been identified, as well as the different measures which have been established to address these impacts.

Colombian regulations stipulated that Non Governmental Organizations ("NGOs") and the local communities must be allowed to participate in the administrative procedures for an environmental licence. The community involvement program for the environmental permit must include opportunities for all neighboring communities and indigenous groups to be adequately informed and participate in community meetings regarding the mine project.

20.4.4 Water Permits and Quality

The Colombian regulation governing water quality and discharge permits is based on Decree 2811 of 1974 (national code for renewable natural resources and protection of the environment) which was subsequently updated and modified by:

- Decree 1541 of 1978 detailing rules for water use, including use prioritization, discharges, hydraulic structures, steam course protection, fees, and sanctions.,
- Decree 1594 of 1984 establishing water quality standards, water treatment methods, and discharge criteria
- Decree 3930 of 2010 to clarify water uses and characterization, and
- Resolution 0631 of 2015 which establish the maximum permissible limits for discharges to surface water.

These regulations were aggregated in 2015 in Decree 1076. Water rights for mining activities and other uses in the Project area are granted by means of a water concession granted by the Corporacion Autonoma Regional de los Valles del Sinú y del San Jorge ("CVS") which is independent of the mining concession or land ownership. The project currently holds permits for water use and discharge for exploration activities as well as a permit for the monitoring wells. The water rights related to mining activities are included in the environmental licences are normally granted for five years. The terms and conditions under which a water concession is granted may depend, amongst others, on the amount of water available in the specific region, the possible environmental impact of the concession, water demand, the minimum ecological flow, and, and prior authorized uses of the water.

20.4.5 Air Quality

Title 5 of Decree 1076 of 2015 and Resolution 2254 of 2017 provide the main regulations for air quality. Decrees 1076 details the general principles and rules for the atmospheric protection while resolution 2254 lists emission standards. The list of regulated emission sources include:

- Controlled open burnings in rural zones.
- Discharges of fumes, gases, vapours, dust or particles through stacks or chimneys.
- Fugitive emissions or dispersion of contaminants by OP mining.
- Solid, liquid, and gas waste incineration.
- Processes or activities that produce toxic emissions.
- Operation of boilers or incinerators.

The regulated parameters include contaminant gases, particulate matter, metal fumes, and organic compounds.

20.4.6 Noise

Decree 1076 of 2015 consolidates the regulations for ambient noise.

20.4.7 Fauna and Flora

The regulations for the protection of fauna and flora are regulated by Decree 2811 of 1974 and 1791 of 1996 (for extraction of forest products) and the compensation for biodiversity loss is regulated by Resolution 1517 of 2012, which were subsequently incorporated into Decree 1076 of 2015. Other regulations regarding protection of species include Convention on Biological Diversity of 1992 and the Convention on International Trade of Threatened Wild Fauna and Flora Species ("CITES")

of 1973. Endangered species are protected by environmental and criminal law.

20.4.8 Riparian Areas and Drainages

Decree 2811 of 1974 regarding riparian and water channel protection, prohibits the alteration of perennial water courses except under very specific terms: Alteration of stream channels is regulated by the CVS. Alteration of stream channels requires a "change of use" permit from the CVS.

Discharges of treated water to streams and rivers is regulated under the TRs for an EIA. Flow and water quality must be characterized (baseline) and potential impacts modeled.

20.4.9 Cultural Heritage and Archaeology

Cultural and natural heritage protection in Colombia was first regulated by Law 163 in 1959 (Table 20-3). Laws and regulations governing cultural heritage were consolidated in Decree 1080 of 2015, which was subsequently modified and updated by Decree 138 of 2019.

20.4.10 Permitting

Exploration and baseline investigation activities at the Alacran deposit are currently authorized under several permits which are summarized in Table 20-3. These include the following permits and the issuing agency:

- Surface water extraction and disposal in Quebrada Valdez during exploration – CVS (2019)
- Monitoring well installation and testing – CVS (2021)
- Collection of flora and fauna samples – (ANLA/CVS 2020)

During construction, channel occupancy permits will be required for the WMF, the process plant site, and the stream gauges that will be installed around the site. Likewise, a Forest Exploitation Permit will be needed for areas of proposed surface disturbance with trees (Diameter at Breast Height [“DBH”] more than 10 cm).

These facilities are subject to the environmental licensing process described above and will require the submittal of a comprehensive mine design plan (the PTO), hydraulic, hydrogeological investigation reports, geotechnical reports on stability, and an EIA. This s requires a baseline characterization program to generate the quantity and quality of data required to meet the specifications of the TRs for an EIA and to evaluate potential impacts. Data generation for the EIA is already well advanced.

The final EIA report will include applications for all the environmental permits that will be required for the construction and operation of the project. Once the EIA is officially delivered to the ANLA, the review process can take anywhere from six to 24 months to complete, depending on the complexity of the project and the quality of the information provided. An incomplete application might be immediately rejected.

20.4.11 Performance and Reclamation Bonding

Under the Colombian Mining Code (Ley 685 of 2010) there are several mechanisms by which a mining concession can be terminated, including: renunciation, mutual agreement, expiration of the contract, the concession holder’s death (if the assignees do not ask to be substituted within two years). In all cases, the concession holder must meet their environmental obligations at the time the termination.

The Mining Code requires the concession holder to obtain insurance policies from a company with a Colombian branch office to guarantee compliance with the mining and environmental obligations during each phase of mine life. The policy must be approved by the relevant authority, maintained during the LOM and remain in effect for three years after the termination of the concession contract. The value of the policy is calculated as follows:

- For the exploration phase, the value of the policy must be 5% of the planned annual exploration expenditures.
- During construction, the insured value must be 5% of the planned annual investment for construction.
- During mine operation, the insured value must be 10% of the value of the estimated annual production multiplied by the “mine mouth” commodity value established annually by the government

20.5 Social or Community Related Requirements

The PGS for the mining phase will be developed based on identified impacts and the required social management measures, presented in the EIA, and implemented when the environmental licence is granted. The objective, at that time, will be to have a general PGS for the company and specific objectives and measures for each community or village.

The PGS for the exploration stage of the Project is designed to build and maintain the Company's relationship with the communities and other stakeholders, based on international best practices and national guidelines. Social outreach by the Company has focused on the development of a participatory PGS to monitor the well-being and development of communities; address social risk to the project and establish good community relations practices within the framework of current regulations. This has included involvement of the community to obtain entry permits/ agreements with property owners during exploration and baseline studies.

The objectives of the PGS are:

- Management of social risk to prevent, mitigate, or eliminate the negative social impacts of the project.
- Opportunity management to enhance the benefits of the project.
- Social investment to support local and regional development.

20.5.1 Social Investment

As of the date of this Technical Report, approximately $850,000 has been invested in social programs and support for the communities within the area of influence as well as neighbouring communities. Social investment in 2021 benefited 1,034 families and approximately 3,136 individuals, and included:

- Community support projects, including health care, roads, school, and athletic facility improvements, materiel for community sewers, capital for pig farming, a playground, support for community sports, community pots, among others.
- Workshops to strengthen the Community Action Boards for the local government and leadership bodies.
- Salary replacement to 118 miners from the village of Mina El Alacrán village for basic living expenses when exploration operations were carried out in their operating area.
- Support for training in first aid, environmental management, dressmaking, and food handling for the community, as well as cacao farming.
- Formalization of two small scale mines in Pirita and Buenos Aires, which will allow 23 families to mine legally, safely, and without affecting the environment.

A prior consultation process is being developed with the indigenous community of the Cabildo San Pedro to guarantee their rights of participation in accordance with Law 21 of 1991. Currently, the negotiations have produced full agreement on the impacts and management measures with the community. The agreement was formalized in October 2021.

The social, political and legal strategy for the resettlement and relocation of the communities within the mine operating area is underway and will be implemented in accordance with international and national guidelines. The Company is outlining its social responsibilities for the development of the Project as well as the competent entities to lead this process with the communities that subsist on illegal mining activities in the area. A retraining program will be implemented for illegal miners. For those who wish to continue small scale mining, the Company will provide support for the formalization of their activities in accordance with Decree 933 (2013).

The relocation program will also include identification of economic alternatives, training, and opportunities for entrepreneurships, and formal businesses for the people who must be relocated. This resettlement and relocation process is identified as social risk for the Project.

The PGS for the construction and mining phases stage will be refined when the socioeconomic characterization of all the communities and villages in the area of influence is complete. This will include the identification of potential socioeconomic and cultural impacts, management measures for the impacts, and additional information that will be generated during EIA. As required by the ANM TRs for the preparation of a PGS, the PGS is a component of the environmental licence and the two must align.

20.5.2 Community Relations

Cordoba Minerals is working with the local communities, so they understand the phases and development of the project as well as benefits for the communities, such as better living conditions through numerous programs that include employment, education, health, and infrastructure. In general, the communities are in favour of the project due to the potential economic benefits, in particular, employment. Public consultations between the Company and the communities are ongoing and will continue to be developed as part of the various project licence requirements by authorities, to ensure appropriate participation by the communities.

The Company is also working with the national authorities to establish a road map for the simultaneous development of the project and the communities which also minimizes associated risks (such as not obtaining the social licence for the Alacran community). This includes relocation programs, employment, legalization for illegal miners and upskilling/training in other areas such as agriculture. Associated risks are considered manageable given the support of communities for the project.

Development of the mine will require the relocation of some communities as well as some dispersed households. A community communication and outreach process is planned for the affected and neighbouring communities to hire local labour. An alliance has been initiated with public entities to support the development of rural entrepreneurship. The objective of these social programs is to develop sustainable sources of income and employment that will continue after mine closure. Employees who developed skills by working at the mine can relocate to other companies that carry out mining activities in the region. The foregoing is an expectation shared between Cordoba, the communities, and inhabitants of the region who, for the most part, are in favour of the development of the mine to boost the local economy and effect a positive transformation of the territory.

Construction and operation of the mine will create approximately 472 jobs, respectively, covering the range of jobs inherent to a medium sized mining operation. Of these, 200 to 300 will be jobs that can be filled by members of the local community (haulage, grading, support, site services, camp/community support and maintenance).

20.5.3 Artisanal and Small Scale Mining Operations

"Colombia's mining sector is characterized by widespread informality. A recent census revealed that 72% of all mining operations in Colombia are classed as 'artisanal and small scale mining' ("ASM"), and 63% are 'informal', lacking a legal mining concession or title. Large-scale mining ("LSM") comprises only one per cent of operations. Over 340,000 Colombians depend directly on ASM and medium-scale mining ("MSM") for their income. This informality deprives the state of important financial resources, while the current poor conditions (environmental, social, health, and safety, labour, technical and trading) prevent the sector from delivering on important social objectives, such as generating formal employment and improving quality of life in mining communities" (Echavarria, 2014).

Illegal artisanal mining occurs in two locations within the hydrologic area of influence, including the Alacrán community, and across the San Pedro River. In the Alacrán community, the local miners extract ore by hand in tunnels hand dug tunnels that follow the mineralized veins. Ore is brough to the village on horseback or motorcycle cargo tricycles. The ore is crushed in 3 or 4 hammer stamp mills, milled in small ball mills (about the size of a 35 gallon drum) and the Au is separated out gravimetrically and then amalgamated with mercury. The tailings produced from ore processing are washed into Quebrada La Hoga Mina and Quebrada La Hoga Conis Avlies. Sediment laden process water from illegal mining of the East Montiel deposit is discharged into the San Pedro River at two or three locations east of the planned OP. The mining community of Alacran has been active for at least four decades. Many of the miners belong to a local association, the "Asociación de Mineros Artesanales El Alacrán".

20.6 Mine Closure, Remediation, and Reclamation

Reclamation and closure of mining operations is regulated by Article 2.2.2.3.9.2 of Decree 1076 (2015), which specifies that the concession holder must undertake the necessary environmental measures for the reclamation and closure of the mining operation. The operator must submit a detailed closure plan at least 3 months prior to the start of closure activities.

Decree 2820 of 2010 specifies that the concession holder must submit a plan for dismantling and abandonment of the Alacran Mine. The ANLA TRs for the EIA require a description and cost estimate of the proposed closure measure for closure and post closure activities, including geotechnical stability, seismic stability, saturated stability (rise in groundwater).

Progressive reclamation and closure will be undertaken, however, without posing impediments on day to day operations of the site. Final closure of the mine site will be undertaken following completion of all mining operations.

The draft reclamation and closure plan for the WMF is based on the following general objectives:

- Implementation of progressive reclamation activities during mine operations, where possible.
- Decommissioning and appropriate disposal or salvage of most WMF infrastructure components upon cessation of operations. There will be some infrastructure items that will be operated and/or maintained into the closure period.
- Rehabilitation of the WMF upon cessation of operations to allow for future land use as guided by local regulators.
- Long term physical stability of the WMF embankments to protect public health, safety, and the environment.
- Long term chemical stability of the tailings, stored waste rock, and embankment materials.
- Creation of a final landform that is compatible with the surrounding landscape.

Prior to closure, tailings will be selectively deposited in the centre of the WMF basin to establish final tailings slopes of approximate 1% toward the perimeter embankments and closure spillway to facilitate construction of the final closure cover. Settling ponds, interception ditches, riprap, mulch, and filter fabric may be used to avoid an influx of sediment into the surrounding watersheds. It has been assumed that monitoring, maintenance, and minimal operations will take place for a period of five years upon cessation of operations (Active Closure). The WMF and associated infrastructure would then move into the Passive Closure phase with no constant presence from the Company.

The key closure items are briefly summarized below.

- The WMF outer embankment slopes will be progressively reclaimed during the last few years of operations. This work will include grading to promote drainage to the edges of the embankments, placement of a growth medium, and planting of grass, and legumes on the slopes.

- The Stage 5 spillway from the WMF into the OP will be designed to meet closure objectives and will become the closure spillway upon cessation of mining activities.
- All PAG waste rock will be buried under tailings prior to final closure. The final tailings surface will be covered with an approximate 1 m thick layer of saprolite and graded toward the closure spillway. A growth medium will then be applied, and grass, and legumes will be planted on the graded surface. Once the vegetation is established, the reclaimed surface could be used for graze land by local farmers/ranchers.
- All tailings delivery and distribution pipework will be dismantled and decommissioned
- The diversion/collection ditches, run-off collection Ponds 1 through 3, the access road, and all internal haul roads will be decommissioned, and the disturbed areas will be rehabilitated.
- The WMP will be operated until the water quality meets Colombian discharge limits (assumed to be one year). The WMP will then be drawn down and decommissioned by removing the water management barges/pipelines. The causeway supporting the conveyor will be removed to combine the WMP and run-off collection Pond 4 into one basin. The spillway from the WMP to the OP will be kept allowing water to drain from the lake to the OP once the lake reaches the elevation of the spillway invert. The lake will be stocked with local fish species to support recreational fishing and provide a potential food source for the local population.
- The OP will gradually fill over a period of approximately eight years with groundwater, water conveyed from the rehabilitated WMF surface, water conveyed from the WMP lake, and run-off from the surrounding catchments. The water treatment barge from the WMP will be relocated to the OP and the WTF will be moved to the east of the pit. An outlet structure will also be constructed along the east wall of the pit at the lowest elevation (approximate elevation of 118 m at the centre of the saddle) to convey flows from the pit to the San Pedro River. Water in the OP will be treated and discharged to the San Pedro River until the water quality meets the Colombian water quality targets (assumed to be four years). Once the water quality is acceptable, the outlet structure will be commissioned, and the water will naturally flow from the pit to the river.
- Monitoring for physical and chemical stability, including surface movement monuments, VWPs, and monitoring wells, will be continued for an assumed period of five years.

The plan currently assumes monitoring of physical stability of earthen structures twice annually for three years and then annually for three years if no movement is detected.

20.6.1 Reclamation and Closure Costs

The current estimated cost for mine closure activities is approximately 30 M USD. An insurance bond for closure costs will be obtained from Marsh, at a cost of approximately 1.5% annually of the closure cost. The amount of the bond is expected to decrease over time as reclamation work is performed. The cost and bonding company will be evaluated in more detail for the FS.

Details regarding reclamation and closure costs are available in Section 21.5.7.

20.7 Summary of Existing and Potential Impacts

20.7.1 Existing Mining Impacts

Informal and illegal artisanal mining of the highest-grade veins and processing in the village of Alacran using basic technology (stamp mills, small ball mils and mercury amalgamation) and disposal of the mining residues in the stream beds, has resulted in extensive surface water and stream sediment in the Quebrada Valdez and Quebrada La Hoga Conis Avlies.

20.7.1.1 Noise

Mining operations are expected to produce an increase in noise during construction, mining, and some demolition. Elevated noise levels have the potential to impact works, surrounding communities, and wildlife. Sources of noise will include mining, blasting, crushing, and grinding, as well as truck, and vehicle traffic required for mine production, for which engineering and management measures (equipment selection, mining methods, sound walls and equipment maintenance) will be developed to mitigate potential noise impacts.

20.7.1.2 Archaeology

Several of the areas identified with medium or high archaeological significance will be impacted by overburden removal and mine construction. A second phase of the archaeology program is planned in these areas to carry out the required excavation and documentation of the archaeological sites to safeguard the cultural heritage (Arquenorte, 2021).

20.7.1.3 Ecosystems

Local ecosystems have already been impacted by deforestation of much of the original forest and disposal of mine tailings in the stream drainages. Disposal of tailings in Quebrada La Hoga Mina have effectively sterilized the water and sediments of Quebrada Valdez. The proposed plan to remove tailings from streams for either storage in the WMF or reprocessing for their Cu, Au, and Ag content should help restore the stream ecosystems by removing the sources of chronic ecotoxicity.

Development and operation of the mine will further affect the local ecosystems within the infrastructure area. Affected areas will be restored at closure. To maintain the integrating of the engineering cover on the WMF, only grasses will be permitted to grow in this area.

20.7.1.4 Air Quality

Air quality will be impacted during mining by dust from the pit, the processing pit, and hauling operations. The mine will also have emissions from combustion engines. Standard engineering practices (road design, dust suppression, equipment selection and maintenance) will be implemented to minimize air quality impacts.

20.7.1.5 Stream Contamination

The mining operations will have a positive impact on stream quality and sediment. The current mine plan calls for removal of the tailings deposited in the Quebrada La Hoga Mina, Quebrada La Hoga Conis Avlies, and Quebrada Valdez. Tailings within the footprint of the pit, the WMF, and possibly further downstream of the WMF will be removed, as they are a long term source of contamination and might present a preferential flow path for drainage under the WMF.

20.7.1.6 Social and Community

Construction and operation of the mine will have a strong and largely positive impact on the local communities. While some of the illegal miners might resent their loss of independence, the inhabitants of the region are, for the most part, in favour of the development of the mine to boost the local economy and effect a positive transformation of the territory. The communities around the mine will benefit from higher paying jobs, job expenses, and the benefits of employment in the formal economy (social security, worker protection, medical coverage, etc.). Plans for community sustainability will be refined for the FS with the objective of developing a self-sustaining economy when the mine ceases operations. Associated social risks are considered manageable given the support of communities for the project.

20.7.1.7 Water Quality and Availability

Mine operations will require approximately 4.2 m^3/hr of make up water. This is only a small portion of the flow in Quebrada San Juan and the San Pedro River. Dewatering of the pit is expected to have minimal impact on the river flow, even at low stages, and the water will be returned to the river close the point of impact. Diversion of water from the headwaters of Quebrada Valdez during the mine operation may result in a decrease of flow, but water quality will likely improve as the oxidation of illegally dumped tailings will cease. Water flow and quality modelling will be performed during the FS to quantify the impact.

Water quality at closure may be impacted by the oxidation of sulphides in reactive surfaces of the pit washing into the pit lake. Results of ongoing geochemical tests will be integrated into a geochemical and mass balance model to calculate discharge water quality. If required, the water will be treated to discharge standards until such time as the chemistry of the pit lake stabilizes below discharge concentrations. Preliminary geochemical results and the high degree of dilution indicate that discharge from the pit most likely will not create an environmental impact.

20.8 Comments on Section 20

Mitigation measures to avoid, reduce or compensate for potential effects will need to be developed and supported by comprehensive environmental and social baseline investigations and engineering studies. The PFS has made certain assumptions as to the timelines needed to complete prior consultation and collect the necessary wet season/dry season baseline data to allow the EIA report to be completed and lodged with the relevant regulatory authorities. There is a risk that these timeline assumptions are aggressive, and the schedule may need to be refined during the EIA application process.

21 CAPITAL AND OPERATING COSTS

21.1 Basis of Estimate

The capital cost estimate was prepared by Nordmin with an expected accuracy range of +/-25% weighted average accuracy of actual costs. Base pricing is in Q3 2021 US dollars, with no allowances for inflation or escalation beyond that time.

The estimate includes direct and indirect costs, (such as engineering, procurement, construction and start up of facilities) as well as owners costs and contingency associated with mine and process facilities and on site and off site infrastructure. The following areas are included in the estimate:

- mine (OP development, equipment fleet, and support infrastructure and services);
- process plant (Cu, Au, and Ag concentrates, conventional 22,000 t/d SABC circuit and flotation plant with support infrastructure and services);
- WMF;
- on site infrastructure (water treatment and distribution, electrical substation, and distribution, shops, and other general facilities); and
- off site infrastructures (water and power supply and new external access).

Prefeasibility level of engineering work, being in the range of 10-12% of total engineering tasks for the Project was carried out to support the estimate. The estimate was based on the following project-specific information:

- preliminary conceptual mine, process plant and WMF design criteria;
- conceptual process flowsheets;
- preliminary major mechanical equipment list for process plant and mining equipment fleet;
- general site layout;
- conceptual electrical supply trade off study;
- preliminary conceptual mine plan and WMF designs;
- process plant general mechanical arrangement; and
- earthworks quantities calculated from preliminary 3D models.

Factored, end product units and physical dimensions methods were used to estimate costs based on historical data from similar projects or facilities. Local contacts provided quotes for major cost items and labour productivity rates. The ratio or factored estimating method was used in estimating the cost of process plant components or areas where the cost of the specialized process equipment made up a significant portion of the total component or area cost. Nordmin used historical data available from similar projects; the end product units estimating method was used to relate the end product units (capacity units) of a plant component to construction costs. This allows an estimate to be prepared relatively quickly, knowing only the end product unit capacity of the proposed component.

The following assumptions were considered:

- all equipment and materials will be new;
- the main equipment will be purchased and manufactured in appropriate sizes to be transported by the existing main roads from Medellín or from ocean port facilities to the Project site;

- the execution work will be continuous without interruptions or stoppages;
- concrete will be produced at the construction site;
- contractors will be contracted under unit price contracts; and
- the project will be executed through an Engineering, Procurement, and Construction Management (“EPCM”) contract.

The following are excluded from the capital cost estimate:

- finance costs and interests during construction;
- costs due to fluctuations in exchange rates;
- changes in the design criteria;
- changes in scope or accelerated schedule;
- changes in Colombian legislation;
- site mitigation (identification and removal of contaminated soils – oil, fuel spilled, heavy metals, pesticides, etc.);
- other than specified obligations and taxes;
- provisions for force majeure;
- wrap-up insurance; and
- reschedule to recover delays due to:
  - change in scope;
  - force majeure;
  - notice to proceed with construction;
  - labour conflicts;
  - non availability of qualified and other labour;
  - lack of geotechnical and environmental definitions; and
  - different soil conditions.

The project includes a two year pre-production construction period, followed by 13 years of production supplying a mill feed rate of 22,000 t/d, and one year of post-production for mine closure.

21.2 Labour Assumptions

The construction labour and equipment costs were included in the factors that were used in the estimation to account for installation costs or in the unit costs when applied.

21.3 Material Costs

All materials required for facilities construction are included in the capital cost estimate. Material costs include freight to the site. Material costs related to the processing plant such as concrete, structural steel, piping and fittings, and electrical cable were included within the installation factors applied to the mechanical equipment costs.

Material cost related to the processing plant platform, WMF and planned access roads were determined by material-take off quantities from sketches/drawings and installation unit costs. All earthworks quantities were assumed to be neat in place, with no allowance for swell, waste, or compaction of materials. Industry standard allowances for swell and compaction were incorporated into the unit rate.

21.4 Contingency

The contingency was established deterministically applying the following percentage factors associated with a PFS level capital estimate:

- 10% for OP mine equipment
- 15% for the mine, on site preparation, haul roads, and supporting infrastructure direct costs
- 20% on the process plant, on site and off site infrastructure direct costs, and on the indirect, and Owner's costs
- 15% on the WMF

21.5 Capital Costs

The total estimated capital cost for the Project is approximately US$ 591.0 million (Table 21-1). The initial capital of approximately US$ 434.9 million covers Years -2, which is the start of pre-production activity through to the start of production.

The capital costs are broken down into the following two timeframes:

- Initial capital costs: Include the design, procurement, construction and management for the Project start up production rate of 22,000 t/d.
- Sustaining capital costs: include the progression of the WMF and the expansion of the mining mobile fleet to meet the production plan. Sustaining capital also includes an estimate of planned recouperation costs from some construction capital items.

Table 21-1: Capital Costs Summary

Capital Costs Summary	Initial Capital Cost (US$ 000)	Sustaining Capital Cost (US$ 000)	Total LOM Capital Cost (US$ 000)
Mining, Pre-Production Mining	33,701		33,701
Mining, OP Mobile Equipment	25,613	51,340	76,953
Processing Plant	133,071		133,071
WMF, Water Management Structures	29,585	28,749	58,334
Infrastructure and Other	82,907	-1,271	81,636
Other	5,445		5,445
Other Off Site	11,000		11,000
Contingency/EPCM/Owner's Team	111,930	9,601	121,531
Total Initial Capital	**433,253**		
Sustaining Capital		**88,419**	
Reclamation and Closure Costs	1,623	67,675	69,298
Total LOM Capital Costs	**434,875**	**156,094**	**590,969**

Source: Nordmin, 2021

21.5.1 Initial Capital Costs

The initial capital supports the design, procurement, construction and management for the Project production rate of 22,000 t/d. The initial capital costs are captured in four main categories: mining, processing plant, WMF, infrastructure, other, and contingency/EPCM /owner’s team (Table 21-2).

Table 21-2: Initial Capital Costs

Initial Capital Costs	TOTAL (US$ 000)	Y -2 (US$ 000)	Y -1 (US$ 000)
Mining, Pre-Production Mining	33,701	12,864	20,836
Mining, OP Mobile Equipment	25,613	20,223	5,390
Processing Plant	133,071	66,536	66,536
WMF, Water Management Structures	29,585	11,393	18,192
Infrastructure and Other	82,907	43,082	39,825
Other	5,445	750	4,695
Other Off Site	11,000	11,000	0
Contingency/EPCM/Owner's Team	111,930	55,194	56,736
Subtotal Initial Capital	433,253	221,042	212,211
Closure Costs and Bond Costs	1,623	811	811
Total Initial Capital	434,875	221,853	213,022

Source: Nordmin, 2021

21.5.2 Mining Capital Costs

It is expected that the major equipment of the OP mobile mining fleet will be acquired through leasing arrangements. Mine capital equipment costs, and leasing costs were obtained from EMG Consultants and their database for Global Pricing. Other minor equipment pricing and costs were acquired from either internal project database of similar projects and/or the Mine and Mill Equipment Costs an Estimators Guide (InfoMine, 2017), with an escalation percentage of 2% per year was applied to bring costs to PV.

Table 21-3: OP Mining Capital Costs

OP Mining Capital Costs	LOM Cost (US$ 000)	Pre-Production (US$ 000)	Production (US$ 000)
Pre-production Mining	32,703	32,703	
Mobile Equipment Purchase – New	11,597	9,403	2,194
Mobile Equipment Purchase – Replacement	18,730	0	18,730
Mobile Equipment Leasing	40,009	10,307	29,702
Other Equipment	6,389	5,903	486
Clearing and Grubbing, Pit, and Stockpile Areas	1,226	998	228
Subtotal OP Mining Capital Costs	**110,653**	**59,314**	**51,340**
Contingency 10%	11,065	5,931	5,134
Total Estimate	**121,719**	**65,245**	**56,474**

Source: Nordmin, 2021

The leasing estimate is based on a 20% down payment and the remaining amount over 84 months. The major mobile production equipment (drill, hydraulic excavators, front end loader, dozer, grader) were planned to be leased. Equipment purchases total $11.6M of which $9.4M is incurred in the pre-production period. This cost includes the support equipment (i.e., pick-up trucks, maintenance vehicles, utility vehicles, pumps, tower lights, etc.). Other equipment includes allowances for major equipment initial spare parts, mine shop tools, mine dispatch system, and mine technical services equipment.

The cost of pre-production mining is $32.7 M. This includes all mining operations during approximately 22 months of pre-production, such as drilling, blasting, loading and hauling of all saprolite and rock material, and all other auxiliary mining work. Some labour costs for management and technical staff are categorized under the Owner’s Cost during the pre-production period.

21.5.3 Processing Capital Costs

The processing capital costs account for the capital costs associated with the process plant, including site preparation in the Project area and the infrastructure support services.

The process plant and associated infrastructure costs were based on a major mechanical equipment list and budgetary quotations obtained for equipment based on the prefeasibility level of design and from Nordmin’s internal database.

The site preparation and surface water management costs are associated with earthworks in the process plant area that have been estimated from site layout drawings and unit costs sourced from local contractors.

Installation costs were accounted for by applying a benchmark factor of 25% on the equipment costs. Processing plant general, ore handling and crushing, grinding, and classification, flotation, re-grinding and Cu concentrate filtration were determined based on installed mechanical equipment costs using the benchmark distribution factors in Table 21-4. The installed mechanical equipment cost accounts for approximately 40% of the total process plant direct cost.

Table 12-4 shows a break down of the estimated processing plant direct capital costs.

Table 21-4: Process Plant Direct Capital Estimate

Processing Plant Area Costs	Cost (US$ 000)
Concentrator Plant	126,195
Concentrator Loadout and Storage	4,891
Reagent Building	1,985
Subtotal Process Plant Area Cost	**133,071**
Contingency	24,792
Total Estimate	**157,863**

Source: Nordmin, 2021

21.5.4 Waste Management Facility Capital Costs

Table 21-5 shows a break down of the estimated thickened tailings equipment capital costs. These costs were estimated based on conceptual plans and Nordmin's internal database. The estimate is in the -30%/+40% range.

Table 21-5: Thickened Tailings Capital Costs

Thickened Tailings Capital Costs	Cost (US$ 000)
Total Mechanical Equipment	5,100
Allowance for Installation	816
Directs	3,833
Indirects	1,583
Escalation	275.8
Subtotal	**11,608**
Contingency	2,322
Total Estimate	**13,930**

Source: Nordmin, 2021

Table 21-6 summarizes the WMF and water management structures capital cost estimate, broken into pre-production phase, and production phase. The WMF costs were estimated based on quantities obtained from the conceptual layouts. Unit rates were obtained from Knight Piésold's internal database.

Table 21-6: WMF and Water Management Structures Capital Costs

WMF Capital Costs	LOM Total (US$ 000)	Pre-Production Cost (US$ 000)	Production Cost (US$ 000)
WMF Embankment Earthworks	33,687	8,439	25,247
Pipelines	5,696	4,097	1,599
Access Roads	3,493	2,303	1,190
Water Management Structures	3,850	3,138	712
Subtotal	**46,726**	**17,977**	**28,749**
Contingency (15%)	7,015	2,698	4,317
Total Estimate	**53,741**	**20,675**	**33,066**

Source: Nordmin, 2021

21.5.5 Infrastructure Capital Costs

The total estimated capital cost for site infrastructure is approximately US$275.5 million, including $59.6M of contingency (described in Table 21-7). All infrastructure required for the initial capital period is listed in Table 21-7.

The costs associated with the site electrical substation and on site distribution were estimated based on conceptual system design and benchmarked costs for the major components. The power supply cost includes costs associated with the new 35 km transmission line from the Cerromatoso transmission substation to the proposed on site electrical substation. These costs were estimated based on sketched routes, benchmark costs sourced from Nordmin's internal database and unit rates provided by local sources.

The general facilities cost accounts for the costs associated with items such as the administration office, training centre, truck shop, engineering offices, and warehouse. These costs were developed based on general arrangement drawings and layouts. Preliminary engineering was completed to estimate concrete and steel quantities for these buildings, costing, and unit rates were provided by local sources from historical projects. Site preparation and road construction cut and fill quantities were calculated using Autodesk Civil 3D. Earthworks unit rates and productivities were established from local contractors as well as historical information from similar projects.

The water supply cost accounts for the costs associated with the freshwater catchment system, storage pond, pipeline, and freshwater storage tanks in the Project area. These costs were estimated based on conceptual system design and a combination of unit and benchmark costs for the major components sourced from both Nordmin and Knight Piésold's internal databases.

Table 21-7: Infrastructure Capital Costs

Infrastructure Capital Costs	Cost (US$ 000)
General Mine Site Development	22,518
General Facilities: Training Centre, Administration Building, Truck Shop, Engineering Office, Warehouse, Mine Dry, Security/ERT	17,344
Fuel Storage	2,609
Powder and Explosives Storage	50
Water Treatment Plant	8,008
Concentrator Plant, Assay Lab, and Core Storage	136,651
Substation & Electrical Infrastructure	14,242
OP Infrastructure	60
On Site Services	1,028
Camp	8,647
Concrete Batch Plant	1,200
Port Facilities	3,620
Subtotal Capital Estimate	**215,978**
Contingency/EPCM/Owner's Team	59,574
Total Capital	**275,553**

Source: Nordmin, 2021

21.5.6 Other Capital Costs

The total estimated capital cost for other capital is approximately US$ 7.4 million. All items required for the initial capital period is listed below in Table 21-8.

In Colombia, there is a compensation requirement for projects that consume water from natural sources. Decree 2099 of 2016 – Article 2.2.9.3.1.1 indicates that “Any project that requires an environmental licence and that involves in its execution the use of water taken directly from natural sources for any activity, must allocate no less than 1% of the total investment for recovery, conservation, preservation, and surveillance of the hydrographic basin that feeds the respective water source.”

Table 21-8: Other Capital Costs

Other Capital Costs	LOM Cost (US$ 000)	Pre-Production Cost (US$ 000)	Production Cost (US$ 000)
Technology Allowance	825	825	
General & Administrative Area Vehicles	1,060	1,060	
Compensation for Water Consumption	3,310	3,310	
Perimeter Dewatering Wells	1,000	250	750
Subtotal Other Capital	**6,195**	**5,445**	**750**
Contingency (20%)	1,239	1,089	150
Total Estimate	**7,434**	**6,534**	**900**

Source: Nordmin, 2021

The off site capital costs listed in Table 21-9 cover expenditures related to social costs, permitting, land purchase.

Table 21-9: Off site Capital Costs

Off site Capital Costs	Cost (US$ 000)
EIA, Permits	3,500
Relocation	5,500
Land Purchases	2,000
Subtotal Off site Capital	**11,000**
Contingency (20%)	2,200
Total Estimate	**13,200**

Source: Nordmin, 2021

21.5.7 Closure Costs

Closure costs of US$ 69.3 million have been estimated for the PFS. This includes US$ 48.4 million in closure costs (including contingency), offset by an estimated US$ 1.7 million in salvage costs (including contingency), plus US$ 15.2 million in reclamation performance bond costs. These closure costs are scheduled to take effect toward the end of production in Year 13 and over a 12 year period. The reclamation bond costs are scheduled from start of disturbance and additional details are described in Section 22. Table 21-10 summarizes the costs included in the closure estimate.

Table 21-10: Closure Costs

Closure Costs	Cost (US$ 000)
Earthworks	14,514
Removal Pipelines and Appurtenances	246
Run-off Collection Ponds and Run-off Collection/Diversion Ditches	323
OP Inlet and Outlet Channel To San Pedro River	100
Monitoring (Active)	700
Monitoring (Passive)	250
Demolition	17,824
Salvage	- 1,657
Water Treatment	16,134
Subtotal Closure	**48,435**
Contingency (15-20%)	5,652
Total Estimate	**54,087**
Reclamation Bond Costs	15,211
Total Estimate	**69,298**

Source: Nordmin, 2021

21.5.8 Indirect Capital Costs

The indirect capital cost covers for administration and overhead, EPCM, and other construction indirects estimated during the pre-production phase.

Indirect capital costs are summarized in Table 21-11.

Table 21-11: Indirect Capital Estimate for Capital Costs

Item	Indirect Capital (US$ 000)
Administration & Overhead	20,422
EPCM, Construction Indirects	28,903
Subtotal Indirect Capital Estimate	**49,326**
Contingency (15%)	7,399
Total Estimate	**56,725**

21.5.9 Contingency

A provision of $59.1 M is included in the initial capital for contingency, based on the level of development stage of the Project. Table 21-12 summarizes the contingency added to the cost estimate.

In order to meet the budgeted costs established for the Project in this estimate, it is expected that sufficiently developed engineering, adequate project management, realistic construction schedule, and appropriate controls will be implemented.

Table 21-12: Contingency for Capital Costs

Area	Contingency (US$ 000)
Mining	5,931
Infrastructure and Concentrator Plant	40,965
Thickened Tailings and WMF	5,020
Other Capital Expenditure (“CapEx”)	1,089
Other CapEx – Off site	2,200
Indirects	7,399
Total Contingency on Initial CapEx	**62,604**

21.5.10 Sustaining Capital Costs

Sustaining capital costs applied to the mining division are costs incurred in leasing and/or purchasing new OP mobile mining equipment after the pre-production period and for purchasing new mobile equipment as replacement units are required. The clearing and grubbing of the Phase 3 mining area is also categorized as sustaining capital. Sustaining capital items also includes the WMF embankment progression and staged perimeter dewatering wells. The resulting sustaining capital costs are outlined in Table 21-13.

Table 21-13: Sustaining Capital Costs

Sustaining Capital Costs	LOM Cost (US$ 000)
Mine Mobile Equipment Purchase Costs	2,194
Mine Mobile Equipment Replacement Purchase Costs	18,730
Mine Mobile Equipment Leasing Costs	29,702
Mine Other Equipment Costs	486
Clearing & Grubbing Pit and Stockpile Areas	228
Subtotal Mining Sustaining Capital Estimate	**51,340**
Thickened Tailings, WMF, Water Management	28,749
Other	(1,271)
Subtotal Sustaining Capital	**78,818**
Contingency	9,601
Subtotal Sustaining Capital	**88,419**
Reclamation and Closure Costs (includes contingency)	67,675
Total Sustaining Capital	**156,094**

Source: Nordmin, 2021

It is estimated that some infrastructure costs can be recouped after the construction period. It is estimated that approximately 75% or 900k US$ could be recovered from the resale of the Concrete Batch Plant components and approximately 1,121 k US$ could be recovered from selling the extraneous trailers from the construction camp. These recuperated costs are included above (under Other) and in the cashflow model in Years 1 and 2 of production as credits to the Project.

21.5.11 Capital Cost Summary

The capital cost estimate is presented in Table 21-1. Capital costs include the direct costs for project execution, as well as the indirect costs associated with design, construction, and commissioning.

Indirect project capital costs include EPCM, third party consultants, construction facilities, and services, equipment freight, and vendor support. Percentage factors were based on Nordmin's experience with similar projects that were used to determine indirect project costs, based on the project direct costs.

21.6 Operating Costs

21.6.1 Basis of Estimate

The operating cost estimate was prepared by Nordmin with an expected accuracy range of +/-25% weighted average accuracy of actual costs. Base pricing is in Q3 2021 US dollars, with no allowances for inflation or escalation beyond that time. LOM Cu C1 cash costs are expected to average US$ 1.18/lb net of credits, and US$ 2.59/lb including royalties but before PM credits. Total on site operating costs, including royalties, are expected to average of US$ 20.97/t processed.

There is a breakdown of the LOM unit costs in Table 21-14.

Table 21-14: LOM Operating Costs Summary

LOM Operating Costs Summary	Cost (US$000)	US$/t Mined	US$/t Processed	US$/lb Cu Payable
OP Mining (excludes pre-production, includes stockpile rehandle)	401,461	2.05	3.97	0.49
Processing	837,163		8.28	1.02
Tailings, WMF, Water Management	45,773		0.45	0.06
G&A	141,611		1.40	0.17
Contractual Royalties	69,480		0.69	0.08
Government Royalties	190,433		1.88	0.23
Total On site	1,685,922		16.67	2.06
Cu Treatment, Refining, and Other Off Site	435,390		4.30	0.53
Total Before By-Product Credits	2,121,312		20.97	2.59
By-Product Credits				(1.41)
Total LOM Net of By-Product Credits				1.18

Source: Nordmin, 2021

21.6.2 Mining Operating Costs

Mine operating costs were developed by Nordmin and based on the mine plan, equipment requirements, and workforce requirements. The basis of the operating costs is owner-operated mining with leased equipment. The objective of this strategy was to decrease initial capital costs. The mine operating costs include all the supplies, parts, and labour costs associated with mine supervision, operation, and equipment maintenance.

Nordmin estimated the required mining equipment fleets, required production operating hours, and workforce to arrive at an estimate of the mining costs. The estimated mining operating costs were developed from first principles. The mining operating costs are presented in the following categories:

- drilling;
- blasting;
- loading;
- hauling;
- dozing and grading; and
- support and maintenance equipment/workforce (other mine operations, support equipment operations, maintenance workforce, etc.)

A maintenance parts cost was allocated to each category that requires equipment maintenance. The operating costs are defined as starting in Year -2 and includes pre-production operations.

Employee classifications, wages and burden benefits are based on information provided by Cordoba The costs for maintenance supplies and materials were based on estimates presented in the EMG Consultants Database of Global Pricing, Nordmin's internal project database of similar projects, and *Mine and Mill Equipment Costs an Estimators Guide* (InfoMine, 2017). An escalation percentage of 2% per year was applied to bring costs to PV.

It was assumed that the Project would not incur duties on imported equipment and supplies.

The mining operating cost estimates include the following parameters:

- diesel fuel cost of US$ 0.50/L (delivered to site);
- average mining bench height of 10 m;
- average drilling penetration rate of 23 m/hour;
- blasting powder factor of 0.21 kg/t (kg explosives per tonne of rock) for fresh and transition type material;
- 100% use of bulk emulsion explosives for blasting;
- average bulk emulsion cost of $2.42/kg (at the site);
- equipment utilization of 5,454 operating hours per year for hauling units, 5,009 hours for 11.0-12.0 m^3 loading units, and 4,730 hours for drilling units; and
- 10% of plant economic material feed re-handled in saprolite stockpile for blending; rehandle of HG and LG material from stockpile;

The estimated mining operating costs for LOM is US$ 436.6 million resulting in a LOM unit rate of US$ 2.06/t mined. This includes $401.5M occurring during the production period and $35.1M occurring during the pre-production period. The LOM material mined totals 211.8 million tonnes, comprising of 102.1 million tonnes of economic material and 109.7 million tonnes of waste. The mined tonnage during pre-production is 16.1 million tonnes and 195.7 million tonnes over the production period. There is a breakdown of the production phase LOM unit costs in Table 21-15.

Table 21-15: LOM Mining Operating Costs Summary

LOM Mining Operating Costs	US$/t Mined	LOM Cost (US$ 000)
Drilling	0.08	16,033
Blasting	0.49	95,388
Loading	0.14	27,950
Hauling	0.49	96,476
Dozing & Grading	0.20	38,654
Support	0.24	47,873
Labour	0.31	60,866
General	0.09	18,222
Total LOM Mining Operating	**2.05**	**401,461**

Source: Nordmin, 2021

Table 21-16 summarizes the major equipment hourly cost estimates. The hourly cost rates reflect equipment parts, consumables (including tire wear), fuel consumption, maintenance repair, and overhaul part. The rate does not include operator labour or maintenance labour.

Table 21-16: OP Mining Major Equipment Hourly Rates

Major Equipment	Hourly Cost Estimate (US$/hr)
Drill	204
Loading – Hydraulic Excavator	293
Loading – Front End Loader	148
Hauling – RDT, 90 t	129
Hauling – ADT, 55 t	103
Track Dozer – ex D9	110
Wheel Dozer	102
Grader, ex 16 M	98

Source: Nordmin, 2021

21.6.1 Process Operating Costs

The process operating cost estimate accounts for the operating and maintenance costs associated with the 22,000 t/d process plant operation, supporting services infrastructure. Process plant operating costs were estimated using the following cost categories: power, labour, reagents, mill maintenance, grinding media, liners, and other costs. There is breakdown of processing operating costs by category in Table 21-17.

In general, the process operating cost estimate is based on the following preliminary documentation: conceptual process flowsheet, conceptual mass balance, mechanical equipment list, list of reagents and consumables, and a referential staffing plan.

Reagent consumptions were estimated based on the results of previous metallurgical test work. However, due to the lack of test work information, these reagent usages were estimated based on benchmarks from similar polymetallic processing plants in combination with preliminary consumption rates observed within the metallurgical test program.

Equipment consumables were estimated using comminution parameters generated through initial test work for the SAG and Ball mill liners and grinding media. These correlations use limited information available for abrasion index at this time, to establish consumption rates expressed in g/kWh.

The consumables and reagents costs were sourced from budgetary quotations and Nordmin's internal databases.

General consumables for the process plant (personnel protective equipment, a metallurgical laboratory, chemical laboratories, maintenance, office supplies and others) were estimated using a factor.

The unit cost for LOM processing operating is estimated at US$ 8.91/t for fresh ore processed and US$1.93/t for saprolite processed as shown in Table 21-17. For periods when saprolite is blended into the mill feed at the rate of 2,000 tpd with 20,000 tpd of fresh ore, the process operating cost will be reduced to an approximate average of US$8.28/t.

Table 21-17: Processing Operating Costs by Category – Fresh Ore

Processing Operating Costs by Category	US$/t Processed	Annual Cost (US$ 000)
Electric Power	4.24	30,950
Reagents	0.87	6,354
Grinding Media	1.68	12,253
Mill Liners	0.66	4,800
Mill Maintenance	0.52	4,105
General / Other Costs	0.22	1,584
Labour	0.72	5,153
Total Processing Operating by Category	8.91	65,200

Source: Nordmin, 2021

The marginal cost of milling, conveying, and pumping the saprolite is estimated at US$ 1.93/t and shown in Table 21-18.

Table 21-18: Saprolite Processing Operating Costs by Category

Saprolite Processing Operating Costs by Category	US$/t Processed
Grinding Energy	1.06
Reagents	0.87
Total Saprolite Processing Operating	1.93

Source: Nordmin, 2021

21.6.2 Power Operating Costs

Power consumption was estimated based on the power requirements by the major and secondary processing plant equipment and adjusted using benchmark factors to account for auxiliary and minor equipment power demand. Assumptions include:

- 90% average equipment efficiency;
- 75% correction factor;
- crushing circuit operations of 16 h/d;
- other process circuit operations of 24 h/d; and
- 92% annual availability.

The current energy cost per kilowatt-hour is US$ 0.12 and has been used as the basis for the PFS.

21.6.3 Waste Management Facility

Table 21-19 summarizes the LOM operating costs for the WMF facility, that has not been accounted for in mining or processing. The labour includes the position assumptions listed in Table 21-20.

Table 21-19: WMF Operating Cost Estimate

Operating Costs by Category	$/t Processed	LOM Cost ($000)
WMF Operational Costs	0.24	24,462
Pumping Costs	0.05	4,956
Embankment – Place and compact waste material	0.24	10,383
Contingency	0.06	5,970
Total Operating by Category	**0.45**	**45,773**

Source: Nordmin, 2021

Table 21-20 WMF Labour Assumptions

Department	# Persons
WMF	**12**
Supervision	**3**
Shift Supervisor	2
Senior Supervisor	1
Operations	**8**
Operators	8
Technical	**1**
Tailing/Waste Engineer	1

Source: Nordmin, 2021

21.6.4 General and Administrative Operating Costs

The total expenditure for LOM G&A is estimated at $153.2 million. $11.6 million occurs during the pre-production period and is captured in the Owner's costs in the Indirect capital. The following tabulates the G&A during the production period. The G&A includes management labour costs, site services labour costs, vehicle costs, office supplies, personnel protection equipment, environmental monitoring, and compliance, licences, and permits, safety, and first aid equipment, security supplies, consultants, communications equipment, software, legal fees, travel, training, community assistance, and maintenance for all buildings and equipment not directly related to mining or processing.

There is a breakdown of the G&A unit costs Table 21-21. Table 21-22 tabulates the labour assumptions for the G&A cost centre.

Table 21-21: G&A Cost Summary

G&A Costs	$/t Processed	LOM Cost ($000)
Labour		38,804
Services, Supplies, etc.		34,417
Vehicles		4,005
Perimeter Dewatering Wells		2,327
Camp		35,839
Water Treatment		26,218
Total LOM G&A	1.40	141,611

Source: Nordmin, 2021

Table 21-22: General & Administrative Area Labour Estimate

	# Persons
GENERAL & ADMINISTRATIVE AREA	**86**
Environmental Department	**6**
WMF Superintendent	1
Environmental Supervisor	2
Environmental Technicians	3
Site Services	**24**
Site Services Superintendent	2
IT Specialist	2
IT Support	2
Safety Coordinator	4
First Aid Attendant	2
General Services/Carpenter	6
Janitor/Sanitation	6
Security / Camp / Community	**41**
Security Officer	24
Driver	9
Community Coordinator	1
Community Coordinator Team	3
Nurse	4
General Management	**15**
General Manager	1
Administrative Assistant	1
Engineering Superintendent	1
Senior Controller	2
Payroll Clerk	4
HR Superintendent	1
HR Coordinator	2
Safety Superintendent	2
Security Superintendent	1

Source: Nordmin, 2021

21.6.5 Other Operating Costs

The total expenditure for LOM royalties is estimated $260 million, resulting in a unit rate of $2.57/t processed. Contractual royalties consist of 2% of all metal revenue with deductions for concentrate transportation costs, concentrate refinement costs, and government royalties. Colombian government royalties consist of 5% of Cu metal revenue, 4% Au metal revenue, and 4% Ag metal revenue.

There is a breakdown of the royalties' unit costs in Table 21-23.

Table 21-23: Royalties Cost Summary

Royalties Costs	$/t Processed	Cost ($000)
Total LOM Contractual Royalties	0.69	69,480
Total LOM Government Royalties	1.88	190,433
Total LOM Royalties	**2.57**	**259,913**

Source: Nordmin, 2021

The total expenditure for LOM off site operating costs is estimated at $435.4 million resulting in a unit rate of $4.30/t processed. Refining, treatment, and freight charges are described in Section 19.

There is a breakdown of the off site operating unit costs in Table 21-24.

Table 21-24: Off Site Operating Costs

Off Site Operating Costs	$/t Processed	Cost ($000)
Mine to Port		62,354
Port to Smelter		145,492
Port Handling		31,177
Concentrate Freight Charges	**2.36**	**239,022**
Refining Charges	0.61	61,653
Treatment Charges	1.33	134,715
Concentrate Treatment Charges	**1.94**	**196,368**
Total Off site Operating	**4.30**	**435,390**

Source: Nordmin, 2021

21.6.6 Labour Costs

Labour costs were estimated based on a preliminary staffing plan estimate for the operation and maintenance of the process plant based on Nordmin's experience with similar projects. The estimate accounts for management, plant operators, and supervisors, as well as laboratory, and plant maintenance personnel.

Operating personnel of the plant will work under a rotation system of 12 hours per shift, two shifts per day. Labour costs were sourced from Cordoba internal database. These labour costs include basic salaries as well as bonuses and personnel health insurance costs required by law.

The PFS includes employment for about 475 personnel at peak levels during operations. Table 21-25 summarizes the peak labour counts.

Table 21-25: Overall Project Site Operations Labour Summary

Area	Peak Number	
OP Mining	238	May vary year to year depending on equipment operating needs
WMF	12	
Processing	139	
General & Administrative	86	
Estimated Total	475	

Source: Nordmin, 2021

22 ECONOMIC ANALYSIS

22.1 Introduction

An engineering economic model was prepared for the Project to estimate annual cash flows and assess sensitivities to certain economic parameters. The economic results of this Technical Report are based upon the services performed by:

- Nordmin Engineering Ltd. for the geology, resource, reserve, OP mining, processing, and surface infrastructure, WTF.
- Knight Piésold Ltd. for the WMF and water management, geotechnical for site infrastructure
- Stantec for the OP geotechnical.
- INTERA for the hydrogeology, geochemistry, and environmental, and permitting

The project includes an approximate two year construction period, two years of mining pre-production period, followed by 13 years of production supplying a mill feed rate of 22,000 t/d, and ten years of post-production mine closure. The project is planned to utilize an owner-operated scenario.

The project includes an OP mine and associated infrastructure, surface infrastructure to support the mine operations (i.e., maintenance and office facilities), water management features, ROM stockpiling areas, processing facility, waste and tailings management facility, and camp facility.

The project indicates an after-tax cash flow of 873.4$M, after-tax NPV (8%) of 415.1$M, and after-tax IRR of 25.4%. The project is most sensitive to commodity prices. On a pre-tax basis, the project has a pre-tax cash flow of 1,387.5 M$, a pre-tax NPV (8%) of 734.9 M$, and a pre-tax IRR of 36.1%.

Table 22-1 summarizes the economics for the described base case.

Table 22-1: Summary of Economic Analysis Results

Item	Value	Units
Financial Analysis		
Cu Price Assumption	3.60	US$/lb
Au Price Assumption	1,650	US$/oz
Ag Price Assumption	21	US$/oz
Pre-Tax NPV 8%	734.9	$M
Pre-Tax IRR	36.1	%
Pre-Tax Payback	2.2	years
After-Tax NPV 8%	415.1	$M
After-Tax IRR	25.4	%
After-Tax Payback	2.9	years
Pre-Tax Unlevered Free Cash Flow	1,387.6	$M
After-Tax Unlevered Free Cash Flow	873.4	$M
LOM Income and FTT Taxes	514.2	$M

Item	Value	Units
Production Data		
Life of Mine	13	Years
Processing Rate	22,000 8.03	Tpd Mtpa
Blending of Saprolite Material	10	%
Recovered Cu	848.6	Mlbs
Average Cu Recovery	92.5	%
Recovered Au	0.68	Moz
Average Au Recovery	78.1	%
Recovered Ag	4.7	Moz
Average Ag Recovery	62.9	%
Pre-production Mined Tonnage	16.1	Mt
Total Mined Tonnage (including pre-production) from OP Mining	211.8	Mt
Total Milled Tonnage from OP Mining	101.2	Mt
Overall Mined Strip Ratio	1.1	waste:ore
Average Annual Cu Production	68,786	klbs
Average Annual Au Production	55	koz
Average Annual Ag Production	386	koz
Average LOM Mined Grade	0.41 0.26 2.30	% Cu g/t Au g/t Ag
Capital Costs		
Initial Capital, Direct Cost Estimate	322.9	$M
Initial Capital, Indirect Costs, and Contingency	111.9	$M
Other Costs and Working Capital	0	$M
Total Initial Capital Costs	434.9	$M
LOM Sustaining Capital	78.8	$M
LOM Sustaining Capital, Indirect Costs, and Contingency	9.6	$M
Total LOM Sustaining Capital	88.4	$M

Item	Value	Units
Reclamation and Closure Costs	67.7	$M
LOM Total Capital	591.0	$M
LOM Operating Costs		
Open Pit Mining (per tonne OP mined)	2.05	$/t
Processing (per tonne milled)	8.28	$/t
Tailings, Water Management (per tonne milled)	0.45	$/t
Site Support Costs (per tonne milled)	1.40	$/t
Refining, Treatment, and Transport Costs (per tonne milled)	4.30	$/t
Royalties Costs (per tonne milled)	2.57	$/t
Total Operating Cost (per tonne milled)	20.97	$/t
Operating Cash Cost per lb Cu payable [1]	2.59	$/lb
All-In Sustaining Cost per lb Cu payable (net by-product credits) [1]	1.38	$/lb

Source: Nordmin, 2021. [1] refers to "Non IFRS Financial Measures"

22.2 Cautionary Statements

The results of the economic analysis are based on forward-looking information that is 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.

All forward-looking statements in this Technical Report are necessarily based on opinions and estimates made as of the date such statements are made and are subject to important risk factors and uncertainties, many of which cannot be controlled or predicted. Material assumptions regarding forward-looking statements are discussed in this Technical Report, where applicable. In addition to, and subject to, such specific assumptions discussed in more detail elsewhere in this Technical Report, the forward-looking statements in this Technical Report are subject to the following assumptions:

- There being no signification disruptions affecting the development and operation of the Project;
- The availability of certain consumables and services and the prices for power and other key supplies being approximately consistent with assumptions in the Technical Report;
- Labour and materials cost being approximately consistent with assumptions in the Technical Report;
- The timelines for prior consultation and wet season/dry season baseline data collection being generally consistent with PFS assumptions, and permitting and arrangements with stakeholders being consistent with current expectations as outlined in the Technical Report;
- All environmental approvals, required permits, licences and authorizations will be obtained from the relevant governments and other relevant stakeholders;
- Certain tax rates, including the allocation of certain tax attributes, being applicable to the Project;
- The availability of financing for Cordoba’s planned development activities;
- The timelines for exploration and development activities on the Project;
- Assumptions made in Mineral Resource and Mineral Reserve Estimate, including, but not limited to, geological interpretation, grades, commodity price assumptions, extraction, and mining recovery

rates, geotechnical, hydrological, and hydrogeological assumptions, capital and operating cost estimates, and general marketing, political, business, and economic conditions.

The production schedules and financial analysis annualized cash flow table are presented with conceptual years shown. Years shown in these tables are for illustrative purposes only. If additional mining, technical, and engineering studies are conducted, these may alter the project assumptions as discussed in this Technical Report and any result in changes to the calendar timelines presented.

A cash flow projection has been generated from the LOM plan production schedule and capital and operating cost estimates and is summarized in Table 22-6. The associated process recoveries, metal prices, operating costs, refining, and transportation charges, royalties, and capital expenditures (pre-production and sustaining) were also taken into account. All costs are presented in Q3 2021 US dollars, with no allowances for inflation or escalation beyond that time.

22.3 Methodology Used

The financial analysis was carried out using a discounted cash flow ("DCF") methodology. Net annual cash flows were estimated projecting yearly cash inflows (or revenues) and subtracting projected yearly cash outflows (such as capital and operating costs, royalties, and taxes). These annual cash flows were discounted back to of the first year of capital expenditure and totalled to determine the NPV of the Project at selected discount rates. A discount rate of 8% was used as the base discounting rate.

In addition, the IRR expressed as the discount rate that yields an NPV of zero, and the payback period, expressed as the estimated time from the start of production until all initial capital expenditures have been recovered, were also estimated.

Sensitivities to variations in commodity prices, initial capital costs, sustaining capital costs, and operating costs were carried out to identify potential impacts on NPV and IRR.

For discounting purposes, cash flows are assumed to occur at the end of each period. Revenue is recognized at the time of production.

22.4 Principal Assumptions

The cash flow estimate includes only revenue, costs, taxes, and other factors applicable to the Project. Corporate obligations, financing costs, sunk costs, and taxes at the corporate level are excluded.

The model was prepared from mining schedules estimated on an annual basis. The cash flow model was based on the following:

- All costs are reported in US dollars (US$) and referenced as '$', unless otherwise stated.
- 100% equity basis.
- No cost escalation beyond 2021.
- No provision for effects of inflation.
- Constant 2021 dollar analysis.
- The economic analysis consists of the technical assumptions outlined in the previous sections, together with the economic assumptions and estimated capital and operating costs described in Section 21.
- Exploration costs are deemed outside of the Project.
- Any additional Project study costs have not been included in the analysis.
- Reclamation costs and requirements for a reclamation performance bond have been included in the economic analysis. It has been assumed that the reclamation performance bond would be secured by a surety bond product or similar insurance instrument with an annual financing cost of approximately 1.5% of bond value.

- Annual gross revenue is determined by applying estimated metal prices with payable metal assumption to the annual recovered metal estimated for each operating year.
- Salvage value has been included in the closure estimate.
- As discussed in Section 19, a constant commodity pricing was used in the economic analysis. Other parameters, as discussed in Section 19 include:
    - Cu concentrate grade of 20%
    - Treatment charge assumption of 70$/t
    - Cu payable 96.5%
    - Au payable 96.5%
    - Ag payable 75%
    - Cu refining charge of 0.07$/lbs payable
    - Au refining charge of 5$/oz
    - Ag refining charge of 0.30$/oz
    - Freight costs include 30$/t concentrate for mine to port, 70$/t concentrate for port to smelter, and 15$/t concentrate for port handling.

22.5 Taxation and Royalties

22.5.1 Taxation

The Project has been evaluated on an after-tax basis. It must be noted that there are many potential complex factors that affect the taxation of a mining project. The taxes, depletion, and depreciation calculations in the PFS economic analysis are simplified and are intended only to give a general indication of the potential tax implications; like the rest of the PFS economics, they are only preliminary.

The tax calculations in the financial model are based on the current tax laws, most notably Colombian Law 2155, enacted on September 14, 2021, that increased the corporate tax rate to 35% as of January 1, 2022.

Tax deductions are used to adjust the Project's gross income to determine taxable income. The following items are applied to the tax model as deductions:

- Operating costs.
- Tax depreciation.
- Historical capitalized exploration and evaluation expenditures totalling approximately 76.5 billion Colombian pesos.
- 50% of the financial transactions tax paid in the same tax year.

The tax depreciation is used to amortize the cost of capital assets as expenses over their useful life and reduce the taxable income reported in a period.

Table 22-2 presents the categories of capital assets and the various treatment of the total capital costs of each within the financial model.

Table 22-2: Tax Depreciation of Capital Assets

Sector	Asset Value (US$ M)	Usable Life	Depreciation Method
Initial Capital	402.9	LOM	The higher of units of production and an accelerated annual depreciation limit of 13.75%
Sustaining Capital	21.7	Remainder of LOM at time of expenditure	The higher of units of production and an accelerated annual depreciation limit of 13.75%
Tailings Embankment	53.7	Remainder of LOM at time of expenditure	Straight-line 2.22%

Source: Nordmin, 2021

Table 22-3 presents the basis of calculation for the various Colombian taxes, as well as the total tax paid by the Project within each category.

Table 22-3: Estimated LOM Taxes Payable in Colombia

Tax Category	Tax Rate (%)	Estimated Total Tax Paid (US$ M)
Corporate Income Tax (CIT)	35%	505.1
Financial Transactions Tax (FTT)	0.4%	9.1
Total Estimated Taxes		**514.2**

Source: Nordmin, 2021

22.5.2 Royalties

Contractual royalties consist of 2% of all metal revenue with deductions for concentrate transportation costs, concentrate refinement costs, and government royalties. Colombian government royalties consist of 5% of Cu metal revenue, 4% Au metal revenue, and 4% Ag metal revenue.

22.6 Economic Results

The results are derived from the LOM schedule presented in Section16, the recovery method discussed in Section 17, and capital, and operating costs presented in Section 21.

Table 22-4, 22-5, and 22-6 summarizes the cost inputs for the economic analysis.

The estimate of initial capital costs is $434.9 million including pre-production mining, indirect, and contingency assumptions, as outlined in Table 22-4 (note that columns may not sum exactly due to rounding). A contingency of $62.6 million has been included in the estimate of initial capital costs, which amounts to 20% of direct initial capital costs.

Table 22-4: Initial Capital Cost Estimate

Cost Item / Description	Pre-Production Period (US$ 000)	Production Period (US$ 000)	Post-Production Period (US$ 000)
OP Mining (including Pre-production mining)	59,314	51,340	
Process Plant	133,071		
Tailings, WMF, Water Management	29,585	28,749	
Site Development, Power, Electrical	82,907	(1,271)	
Other Site Capital	5,445		
Other Off Site Capital	11,000		
Closure Cost and Closure Bond Costs	1,623		67,675
Subtotal Estimate	**322,945**	**78,818**	**67,675**
Indirect CapEx	49,326		
Contingency	62,604	9,601	incl
Total Estimate	**434,875**	**88,419**	**67,675**

Source: Nordmin, 2021

The sustaining capital, including rehabilitation, and closure costs, is estimated at $156.1 million over the life of the mine.

The Operating Costs, detailed in Table 22-5, are estimated at $20.97/t of material processed.

Table 22-5: Operating Cost Estimate

Cost Item / Description	Total $ M	$/t mined	$/t milled	$/lb Cu payable
OP Mining (excluding pre-production mining)	401.5	2.05	3.97	0.49
Processing	837.2		8.28	1.02
Tailings, WMF, Water Management	45.8		0.45	0.06
General and Administration	141.6		1.40	0.17
Royalties	259.9		2.57	0.31
Total Operating Costs	1,685.9		20.97	2.06

Source: Nordmin, 2021

Figure 22-1 shows the cash flow model results. The cash flow is presented in Table 22-6.

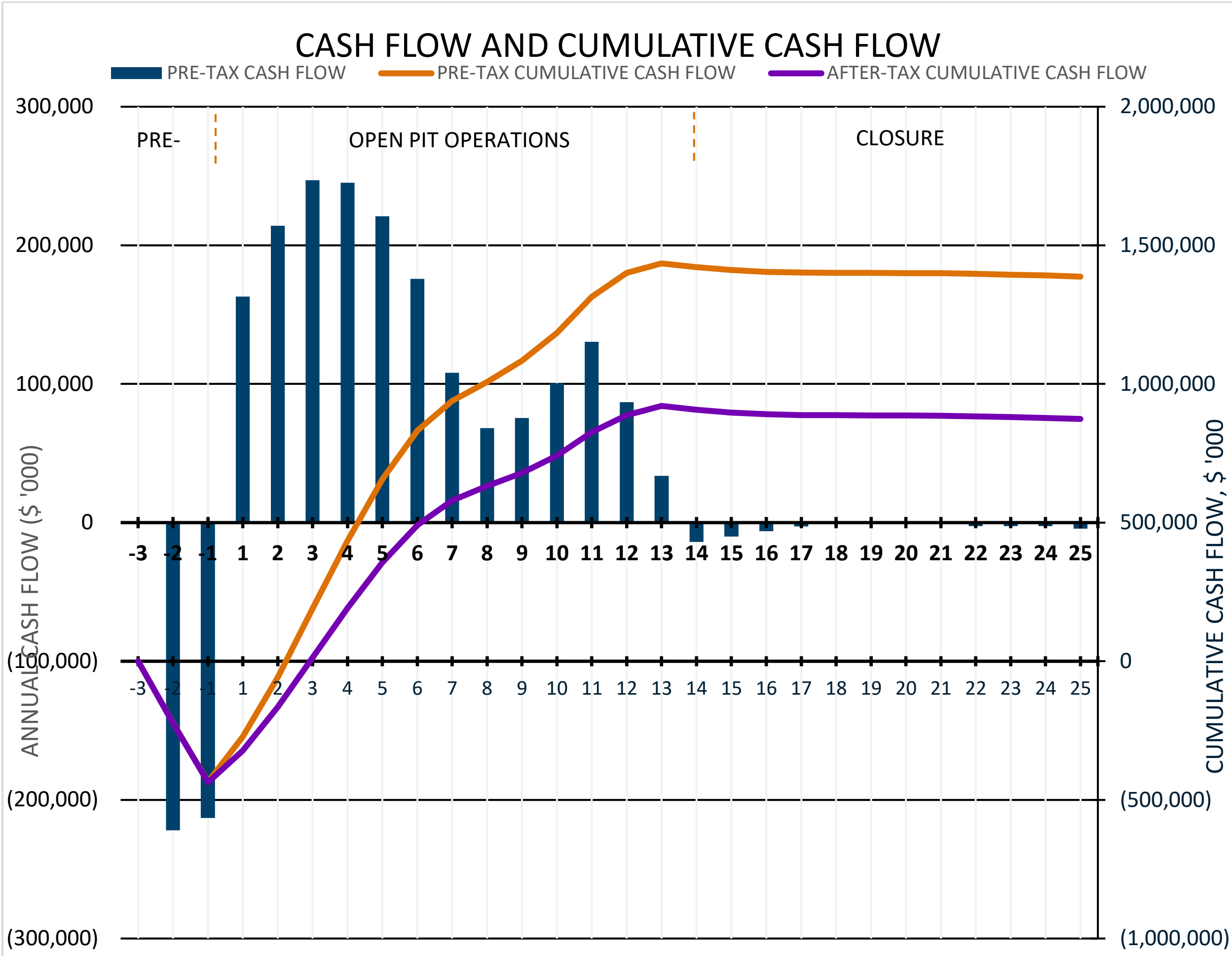


Figure 22-1: Cash flow model results

Table 22-6: Cash Flow Model

	LOM		PRE-PRODUCTION		PRODUCTION													CLOSURE											
	Total	Units	YR-2	YR-1	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	YR11	YR12	YR13	YR14	YR15	YR16	YR17	YR18	YR19	YR20	YR21	YR22	YR23	YR24	YR25
Mill feed production tonnage	101.2	M t	0	0	7.47	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	5.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered Copper Production	848.6	Mlbs	0.00	0.00	86.42	88.05	98.88	97.06	91.73	79.22	57.90	45.15	38.74	41.22	54.75	46.31	23.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered Gold Production	0.68	Moz	0.00	0.00	0.05	0.06	0.07	0.06	0.06	0.05	0.04	0.04	0.06	0.08	0.07	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered Silver Production	4.75	Moz	0.00	0.00	0.57	0.59	0.62	0.56	0.48	0.42	0.35	0.19	0.16	0.18	0.26	0.24	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Assumptions																													
Copper Price	3.60	US$/oz	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
Gold Price	1,650		1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650
Silver Price	21.00		21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
Gross Revenue	4,099.8	M US$	0.0	0.0	390.5	408.6	458.5	444.7	413.9	353.9	274.8	216.5	237.9	265.8	301.0	225.6	108.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Selling Costs	435.4	M US$	0.0	0.0	44.3	45.1	50.7	49.7	47.0	40.6	29.7	23.2	20.0	21.3	28.2	23.8	11.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operating Costs	1,685.9	M US$	0.0	0.0	128.9	139.6	144.5	143.1	142.0	135.7	131.1	128.6	130.7	132.0	134.4	122.0	73.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sustaining Capital Costs (incl. Contingency)	88.4	M US$	0.0	0.0	10.3	6.8	9.0	7.8	7.5	8.8	15.3	3.5	6.7	7.0	3.3	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital Costs (incl. Contingency)	433.3	M US$	221.0	212.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reclamation & Closure Costs (incl. Contingency)	69.3	M US$	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1.7	23.0	10.0	6.1	2.7	0.6	0.6	0.6	0.6	2.6	2.6	2.5	4.3
Other Costs	0.0	M US$																											
Working Capital	0.0	M US$	0.0	0.0	(43.2)	(1.9)	(6.5)	1.9	4.3	7.8	10.1	7.8	(4.1)	(4.2)	(4.0)	10.3	12.5	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Taxes	514.2	M US$	0.9	0.9	48.8	56.4	69.9	65.9	56.6	41.3	19.0	15.9	28.8	37.4	46.1	25.9	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cash flow results																													
Pre-tax cash flow	1,387.6	M US$	(221.9)	(213.0)	163.1	214.2	247.0	245.2	220.9	175.9	108.0	68.2	75.5	100.5	130.4	86.9	33.8	(14.0)	(10.0)	(6.1)	(2.7)	(0.6)	(0.6)	(0.6)	(0.6)	(2.6)	(2.6)	(2.5)	(4.3)
Cumulative Pre-Tax Cash Flow		M US$	(221.9)	(434.9)	(271.8)	(57.6)	189.4	434.6	655.6	831.4	939.4	1,007.7	1,083.2	1,183.7	1,314.0	1,401.0	1,434.8	1,420.8	1,410.7	1,404.6	1,401.9	1,401.3	1,400.7	1,400.1	1,399.5	1,396.9	1,394.4	1,391.9	1,387.6
After-tax cash flow	873.4	M US$	(222.7)	(213.9)	114.3	157.8	177.1	179.3	164.3	134.6	89.0	52.4	46.8	63.1	84.3	61.1	33.5	(14.1)	(10.1)	(6.2)	(2.7)	(0.6)	(0.6)	(0.6)	(0.6)	(2.6)	(2.6)	(2.5)	(4.3)
Cumulative After-Tax Cash Flow		M US$	(222.7)	(436.6)	(322.3)	(164.5)	12.6	191.9	356.2	490.7	579.8	632.1	678.9	742.0	826.3	887.3	920.8	906.7	896.7	890.5	887.8	887.2	886.6	886.0	885.4	882.8	880.2	877.7	873.4

Source: Nordmin, 2021

The economic modelling resulted in an estimated LOM all-in sustaining cost ("AISC") net of by-product credits of $1.38/lb Cu payable. A breakdown of AISC/lb Cu payable is shown in Table 22-7.

Table 22-7: Project AISC ($/lb Cu Payable)

Project AISC ($/lb Cu payable)	LOM
Operating Costs On Site	
Mining	0.49
Processing	1.02
Tailings, WMF, Water Management	0.06
G&A	0.17
Contractual Royalties	0.08
Government Royalties	0.22
Total Operating Costs On Site	**2.02**
Operating Costs Off Site	
Refining	0.08
Treatment	0.16
Freight/Transport	0.29
Total Operating Costs Off Site	**0.53**
Subtotal Operating Costs (On Site + Off Site)	**2.59**
Sustaining and Closure Costs	
Sustaining Capital	0.11
Reclamation and Remediation	0.08
Total Sustaining and Closure Costs	**0.19**
Total Before By-product Credits	**2.78**
By-product Credits	-1.41
Total AISC ($/lb Cu payable)	**1.38**

Source: Nordmin, 2021

Table 22.8 summarizes the economic indicators, both pre-tax, and after-tax, for the estimated cash flow model.

Table 22-8: Economic Indicators, Pre-Tax, and After-Tax

Economic Indicators	Units	Pre-Tax	After-Tax
Payback Period *(from start of production)*	Years	2.2	2.9
Internal Rate of Return, IRR	%	36.1%	25.4%
NPV @ 5%	$M	931.8	554.1
NPV @ 7%	$M	795.5	457.9
NPV @ 8%	$M	734.9	415.1
NPV @ 10%	$M	626.7	338.4

Source: Nordmin, 2021

22.7 Sensitivity Analysis

To assess the Project value drivers, sensitivity analyses were performed for the NPV and IRR considering variations in metal prices, initial capital, sustaining capital, and operating costs on the after-tax NPV 8% and on IRR.

The metal price sensitivity on an after-tax basis is presented in Table 22-9. Sensitivities to changes in other parameters are shown in Table 22-10, on an after-tax basis.

The Project’s after-tax NPV was most sensitive to the factors impacting revenue, that is, commodity pricing.

Table 22-9: After-Tax Valuation Sensitivities to Metal Prices

Description		Unit							
% Variation		%	-20%	-10%	0%	+10%	+20%	+30%	Spot[4]
Metal Price		Cu US$/lb	2.88	3.24	3.6	3.96	4.32	4.68	4.28
		Au US$/oz	1,320	1,485	1,650	1,815	1,980	2,145	1,778
		Ag US$/oz	16.80	18.90	21	23.10	25.20	27.30	21.93
Discount Rate	5%	$M	195.6	374.9	554.1	733.4	912.6	1,091.9	836.6
	7%	$M	141.3	299.6	457.9	616.2	774.5	932.8	707.8
	8%	$M	116.8	265.9	415.1	564.2	713.3	862.4	650.7
	10%	$M	72.6	205.5	338.4	471.3	604.3	737.2	548.8
IRR			14.0%	20.1%	25.4%	30.1%	34.4%	38.5%	32.7%
Payback Period[2]		years	4.0	3.4	2.9	2.6	2.3	2.1	2.4

Source: Nordmin, 2021

Table 22-10: After-Tax Valuation Sensitivity to Certain Parameters

Factor		20%	10%	0%	-10%	-20%
Operating Cost	$M	1,971.1	1,828.5	1,685.9	1,543.3	1,400.7
	IRR	21.9%	23.7%	25.4%	26.9%	28.5%
	NPV8% ($M)	308.5	361.8	415.1	468.4	521.7
	Payback (yrs)[2]	3.2	3.0	2.9	2.8	2.7
Initial Capital Cost	$M	521.5	478.2	434.9	391.5	348.2
	IRR	20.9%	22.9%	25.4%	28.2%	31.5%
	NPV8% ($M)	351.5	383.3	415.1	446.8	478.6
	Payback (yrs)[2]	3.3	3.1	2.9	2.7	2.5
Sustaining Capital Cost[3]	$M	187.7	171.9	156.1	140.3	124.5
	IRR	25.0%	25.2%	25.4%	25.5%	25.7%
	NPV8% ($M)	402.3	408.7	415.1	421.4	427.8
	Payback (yrs)[2]	3.0	2.9	2.9	2.9	2.9

Source: Nordmin, 2021

Notes for Table 22-9 and Table 22-10:

1. Non IFRS Financial Measures
2. Payback is defined as achieving cumulative positive free cashflow after all cash costs and capital costs, including sustaining capital costs, and is counted from the start of production.
3. Closure and Bond Costs are included in this category.
4. Spot Cu, Au, Ag price are as of December 14, 2021, based on the website thestockmarketwatch.com/metal/prices.aspx.

22.8 Comments on Section 22

Under the assumptions in this Technical Report, and based on the available data, the Project shows positive economics. Using an 8% discount rate, the Project has an after-tax NPV of US$ 415.1 million, an IRR of 25.4% and a payback period of 2.9 years. There is potential for the Project if the metal price assumptions increase from the assumptions used in the Technical Report or the contained Mineral Resources increase within the Project.

23 ADJACENT PROPERTIES

In the areas closest to the Mining Concession Contract III-08021, there are other mining titles, which are in the exploration stage for similar minerals, and whose owner is the company Minerales Cordoba S.A.S. To the west, the mining title borders with the LEQ-15162X Concession Contracts, to the north, and west with the LCQ – 16173X Contract, to the east with the LEQ-15161 Contract and to the south with the LCP-08142 Contract.

In addition, there are other mining titles in the area, granted for certain minerals, denominated as follows: "Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates", which are also in the exploration stage.

Table 23-1 indicates the main characteristics of the mining titles adjacent to the mining project and illustrated in Figure 23-1.

In the area, there are four Formalization Subcontracts, by virtue of which, traditional mines undergoing the formalization process are located; these correspond to the Pyrite Mine (Mina Pirita) in the Subcontract LEQ-15161-001 and the Tehran Mine (Mina Teherán) in the Subcontract JJ9-08091-001, exploitations located less than 1,500 m to the NE of the Mining Concession Contract III-08021. To the south, the Buenos Aires Mine (Mina Buenos Aires) and the Raa Mine (Mina Raa) are located, corresponding to the Formalization Subcontracts LCP-08142-002 and LCP-08142-001 respectively, located to the SE of the Mining Contract at distances of between 600 m and 4,400 m.

The area has been historically prospective, and several types of mineral deposits have been identified, among them, epithermal deposits as in the case of the Pyrite Mine; Porphyry-type Cu and Au deposits, and potential skarn-type deposits in the William sector (to the S-SE of Mining Contract III-08021), in addition to the type of deposit proposed for this mining project, which is associated with an IOCG deposit.

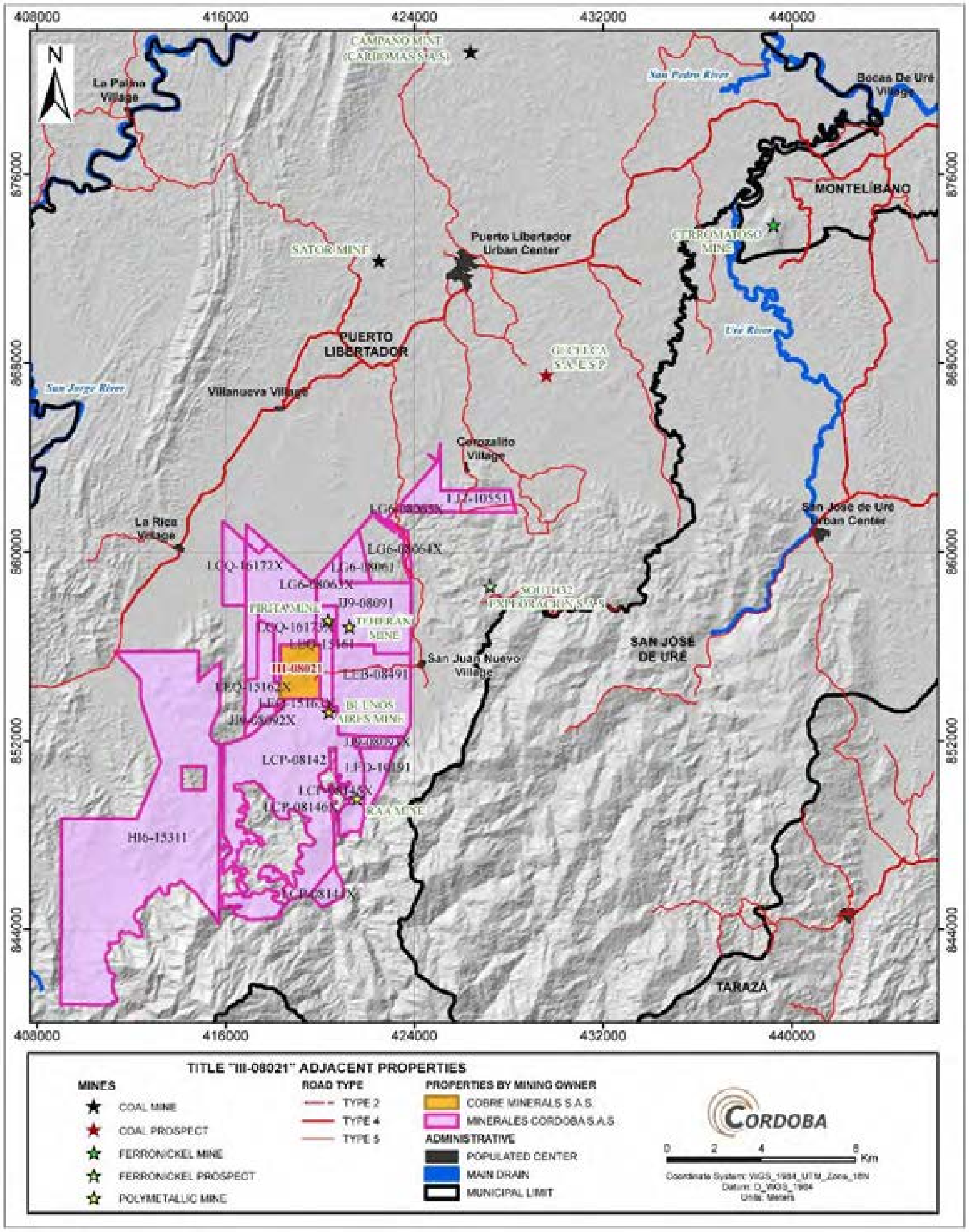
In the area, there are also the Ferroniquel mining operations of the Cerromatoso company, as well as coal operations of the Sator, Carbomas, and Geocosta Ltda. companies, and the projection of the Gecelca Mine, which proposes the construction of a new thermoelectric plant in the Municipality of Puerto Libertador.

Table 23-1: Mining Properties Adjacent to the Mining Title III-08021

Mining Title	Area (Ha)	Mining Registration Date	Holder	Stage	Minerals
LEQ-15162X	368.28	2013-05-10	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
JJ9-08093X	97.76	2012-11-19	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
LG6-08064X	55.62	2012-05-14	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.

Mining Title	Area (Ha)	Mining Registration Date	Holder	Stage	Minerals
LEQ-15163X	4.81	2013-05-10	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
LG6-08065X	47.20	2014-05-14	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
LCQ-16171	583.60	2015-02-17	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
LG6-08063X	2.87	2015-05-06	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
LG6-08061	197.00	2012-04-04	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
JJ9-08092X	80.47	2012-11-19	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
LCQ-16173X	329.43	2014-05-14	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
LEQ-15161	290.82	2012-10-17	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates.
LEB-08491	1,184.44	2012-01-25	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
JJ9-08091	1,282.37	2012-11-19	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
HI6-15311	5,420.19	2008-05-02	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.

Mining Title	Area (Ha)	Mining Registration Date	Holder	Stage	Minerals
LED-10191	233.69	2012-05-24	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
LCQ-16172X	305.70	2014-05-14	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
LJT-10551	483.95	2012-01-25	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
LCP-08144X	138.47	2015-02-02	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
LCP-08142	3,064.16	2015-02-02	Minerales Cordoba S.A.S	Exploration	Other Concessional Minerals/Copper Minerals and their Concentrates/Silver Minerals and their Concentrates/Gold Minerals and their Concentrates/Platinum Minerals and their Concentrates.
L853005	35,521.23	1999-08-02	Cerro Matoso S.A.	Exploration	Nickel ores and their Concentrates
JDF-16002X	3,366.14	2008-06-18	Gecelca S.A. E.S.P.	Exploitation	Anthracite, coal, metallurgical coal, thermal coal
FKG-107	1,105.75	2005-08-31	Geocosta Ltda.	Exploitation	Anthracite, coal, metallurgical coal, thermal coal
FIN-104	1,368.31	2005-08-11	Carbones del Sinú S.A.; Geocosta Ltda.	Exploitation	Anthracite, coal, metallurgical coal, thermal coal
GD4-121	442.84	2007-03-01	Sator S.A.S.	Exploitation	Thermal coal
4676	10,000.02	1990-06-05	Sator S.A.S.	Exploitation	Thermal coal
HBA-122	4,344.50	2012-12-10	South32 Exploration S.A.S.	Exploration	Nickel ores and their Concentrates
GI9-159	1,593.92	2010-05-05	South32 Exploration S.A.S.	Exploration	Nickel ores and their Concentrates



Source: Cordoba, 2021

Figure 23-1: Mining properties adjacent to the mining title III-08021

24 OTHER RELEVANT DATA AND INFORMATION

24.1 Implementation Plan

The key objectives are to:

- Deliver on time and on budget.
- Ensure alignment with environmental compliance.
- Ensure the safety of all stakeholders.
- Ensure compliance with all applicable laws and regulations, at the municipal, departmental, and national levels.
- Ensure positive economic impacts for Colombia, including the use of local businesses wherever feasible, the employment of local residents and tax benefits for local governments.
- Maintain a high level of engagement and communication with all stakeholders.
- Meet design parameter objectives, throughput, quality, and operating budget objectives.

24.2 Cost Objectives

Table 22-4 and Table 22-5 present the cost by the main category of work. The cost objective is to reach 100% of production capacity within the initial cost of US$ 434 million and Total LOM cost of US$591 million. Numbers are rounded to the nearest thousand.

24.3 Schedule Objectives

The scheduling objective is to deliver a fully constructed and commissioned mining facility as per the following timeline.

- The timeline is based on achieving ramp up to 100% of production capacity within first year of operation.
- The timeline is linked to both the mining related activities and the surface operations in both sequencing and duration. The construction of the main plant buildings and supporting infrastructure is the critical path.

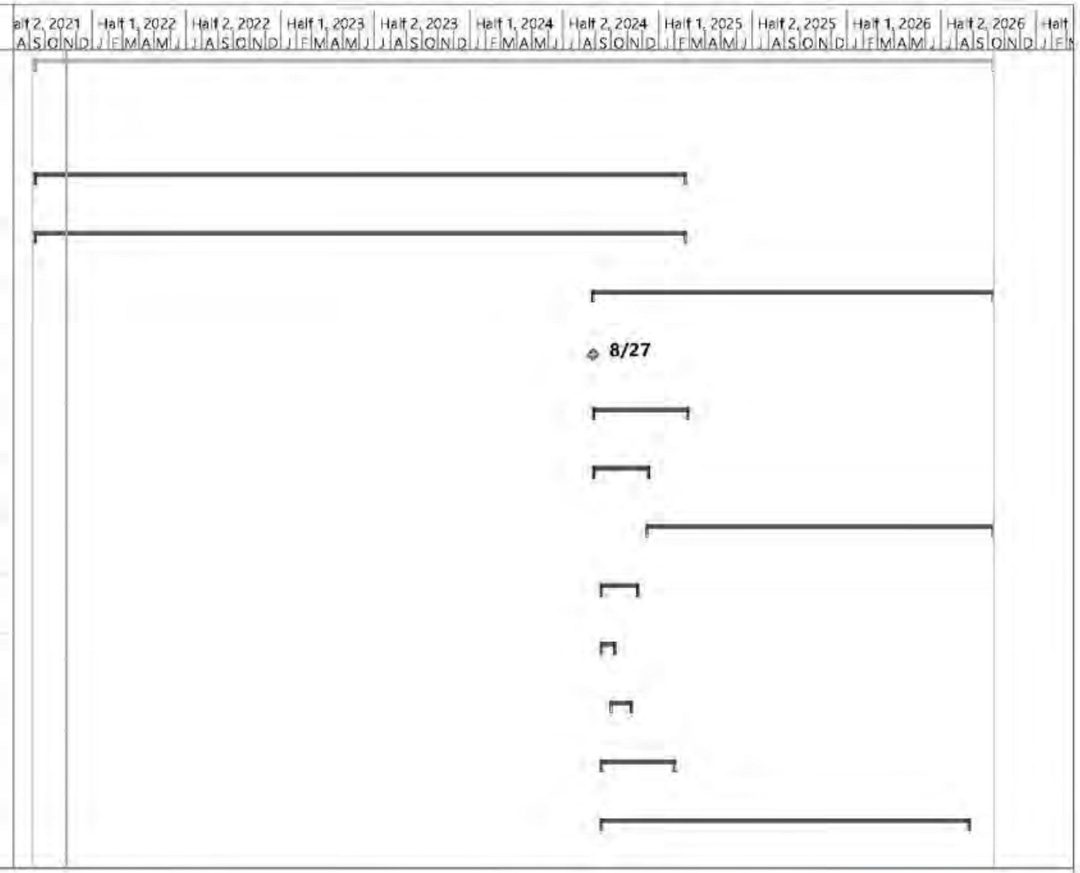
24.4 Construction Management and Schedule

Construction management functions will be performed by EPCM contractors, including planning, organizing, and resolving issues involving the site contractors. Ensuring that contractors' work is performed according to the Company’s safety, quality, schedule, and cost requirements. Additionally, the EPCM contractors are required to provide the facilities and services, including security, to support the sub-contractors. This practice will ensure that quality standards are maintained and will improve the use of shared resources and equipment. The primary functions include planning and coordination, contractor management, quality assurance, resolving design engineering issues, quantity measurement, and materials management.

Table 24-1 provides the construction schedule and Figure 24-1 illustrated the workforce headcount for the Alacran Mine, prepared by Nordmin in conjunction with the Company.

Table 24-1: Construction Schedule

ID	Task Name	Duration	Start	Finish
0	**Cordoba Construction Schedule - Early Camp Construction Option 9-16-2021**	**265 wks?**	**9/13/2021**	**10/10/2026**
1	**Cordoba Engineering**	**180 wks?**	**9/13/2021**	**2/22/2025**
2	**Engineering**	**180 wks?**	**9/13/2021**	**2/22/2025**
14	**Cordoba Construction**	**111 wks**	**8/26/2024**	**10/10/2026**
15	PROJECT START/KICK-OFF	0.2 wks	8/26/2024	8/27/2024
16	**LaRica Road**	**26.4 wks**	**8/27/2024**	**2/27/2025**
20	**Access Road 1,017,071 m3**	**15.4 wks**	**8/27/2024**	**12/12/2024**
25	**Tails Pond Embankment**	**96 wks**	**12/9/2024**	**10/10/2026**
28	**Construction Camp**	**10 wks**	**9/12/2024**	**11/21/2024**
31	**Primary Crusher Station Level Pad (Pit/Site Laydow**	**3.6 wks**	**9/12/2024**	**10/8/2024**
35	**Temporary Camp at the Primary Crusher Pad**	**6 wks**	**9/30/2024**	**11/9/2024**
38	**Mine Site Civil Works, Grading, Perimeter Security**	**20.4 wks**	**9/12/2024**	**2/1/2025**
43	**Open Pit Civil works.**	**101.6 wks**	**9/12/2024**	**8/25/2026**



Project: Cordoba Const
Date: 11/12/2021

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Path Predecessor Milestone Task | Path Predecessor Summary Task | Path Predecessor Normal Task | Path Driving Predecessor Milestone Task | Path Driving Predecessor Summary Task | Path Driving Predecessor Normal Task | Critical | Critical Split | Progress | Manual Progress

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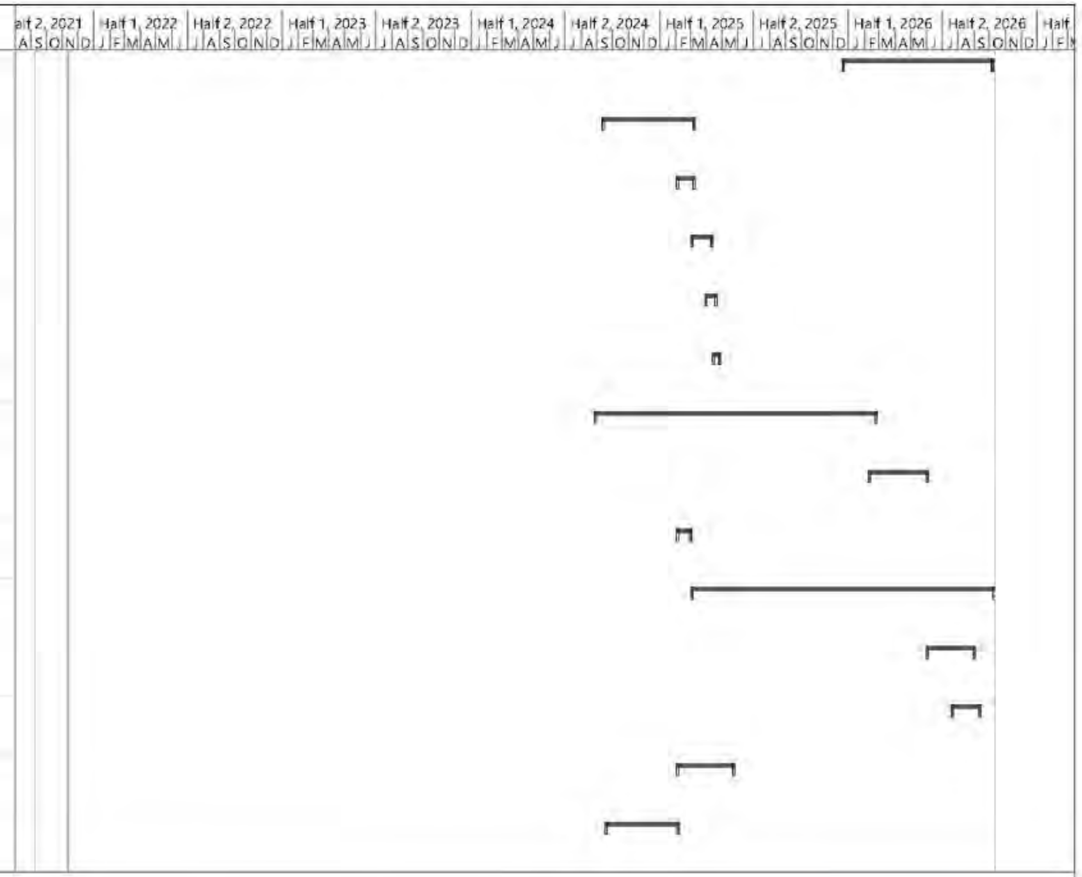
ID	Task Name	Duration	Start	Finish
46	**Tailing Delivery System**	**41.4 wks**	**12/22/2025**	**10/7/2026**
51	**Surface Water Management**	**25.2 wks**	**9/12/2024**	**3/7/2025**
56	**Services layout/Installation**	**5 wks**	**2/3/2025**	**3/8/2025**
60	**Security/ERT Building and Parking**	**6 wks**	**3/3/2025**	**4/12/2025**
63	**Heli-pad**	**3 wks**	**3/31/2025**	**4/19/2025**
66	**Fuel Storage - Aviation**	**2 wks**	**4/14/2025**	**4/26/2025**
68	**Power Main Line**	**78 wks**	**8/27/2024**	**2/24/2026**
73	**Site Power Distribution**	**16 wks**	**2/10/2026**	**6/2/2026**
75	**Batch Plant**	**4 wks**	**2/3/2025**	**3/1/2025**
78	**Concentrator Plant**	**84 wks**	**3/3/2025**	**10/10/2026**
84	**Concentrate Loadout and Storage**	**13.1 wks**	**6/1/2026**	**9/1/2026**
87	**Reagent Building**	**8 wks**	**7/20/2026**	**9/12/2026**
90	**Main Substation**	**16 wks**	**2/3/2025**	**5/24/2025**
94	**Water Treatment**	**20 wks**	**9/18/2024**	**2/5/2025**



Project: Cordoba Const
Date: 11/12/2021

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Path Predecessor Milestone Task | Path Predecessor Summary Task | Path Predecessor Normal Task | Path Driving Predecessor Milestone Task | Path Driving Predecessor Summary Task | Path Driving Predecessor Normal Task | Critical | Critical Split | Progress | Manual Progress

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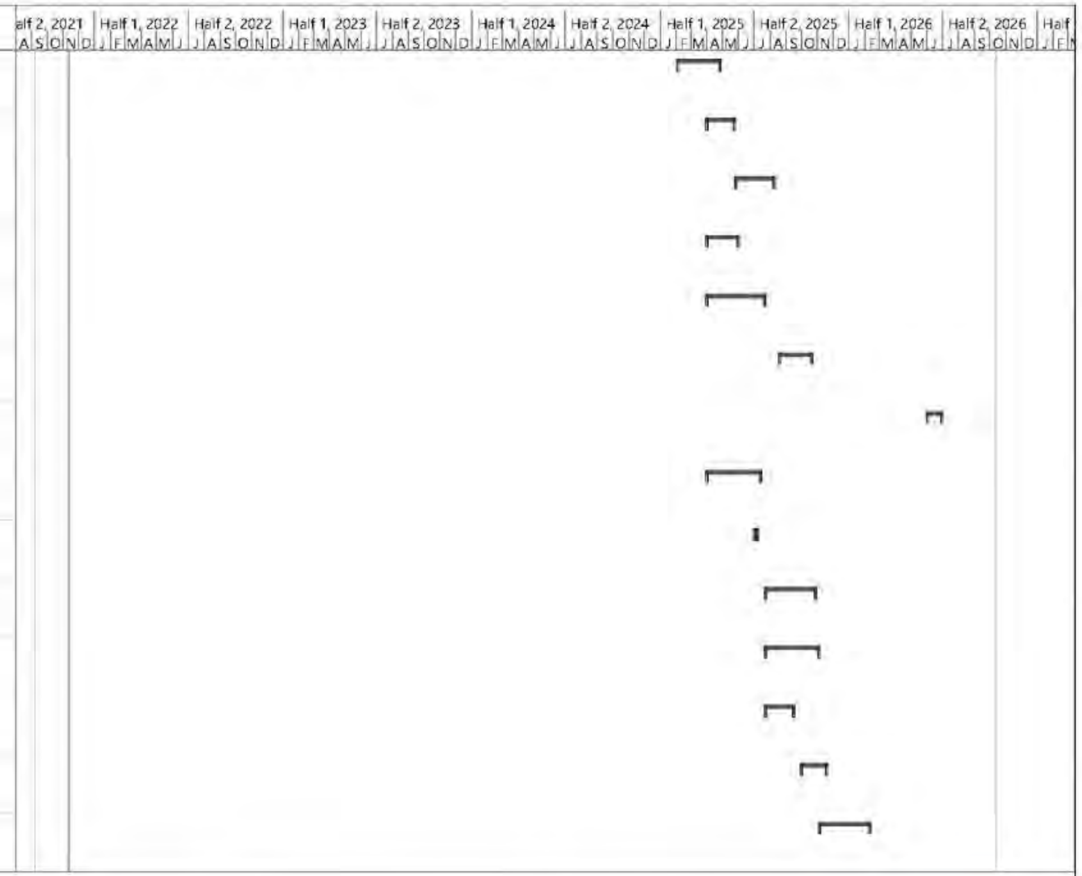
ID	Task Name	Duration	Start	Finish
101	**Truck Shop Building**	**12 wks**	**2/3/2025**	**4/26/2025**
105	**Fuel Storage - Diesel**	**8 wks**	**3/31/2025**	**5/24/2025**
108	**Fuel Storage - Unleaded**	**11 wks**	**5/26/2025**	**8/9/2025**
110	**Truck Wash**	**9 wks**	**3/31/2025**	**5/31/2025**
113	**Warehouse Building**	**16.2 wks**	**3/31/2025**	**7/22/2025**
118	**Mine Dry Building**	**9 wks**	**8/19/2025**	**10/21/2025**
122	**Open Pit Mine Infrastructure**	**4 wks**	**6/2/2026**	**6/30/2026**
124	**Primary Crusher**	**15.2 wks**	**3/31/2025**	**7/15/2025**
129	**Explosive Storage**	**1 wk**	**7/1/2025**	**7/8/2025**
131	**Operations Camp**	**14 wks**	**7/22/2025**	**10/28/2025**
134	**Administration Office Building**	**15 wks**	**7/22/2025**	**11/4/2025**
138	**Assay Lab and Core Storage**	**8 wks**	**7/22/2025**	**9/16/2025**
142	**Mine Engineering Office Building**	**7.2 wks**	**9/30/2025**	**11/19/2025**
146	**Training Center Building**	**14 wks**	**11/5/2025**	**2/11/2026**



Project: Cordoba Const
Date: 11/12/2021

Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task
Milestone	Duration-only	Deadline	Critical
Summary	Manual Summary Rollup	Path Predecessor Milestone Task	Critical Split
Project Summary	Manual Summary	Path Predecessor Summary Task	Progress
Inactive Task	Start-only	Path Predecessor Normal Task	Manual Progress
Inactive Milestone	Finish-only	Path Driving Predecessor Milestone Task	

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ID	Task Name	Duration	Start	Finish
150	**On Site Communication**	**3 wks**	**10/7/2025**	**10/28/2025**
152	**Port Facilities**	**16 wks**	**6/1/2026**	**9/19/2026**
155	Production Commences - Construction Complete	0 wks	10/3/2026	10/3/2026

Project: Cordoba Const
Date: 11/12/2021

Task; Split; Milestone; Summary; Project Summary; Inactive Task; Inactive Milestone; Inactive Summary; Manual Task; Duration-only; Manual Summary Rollup; Manual Summary; Start-only; Finish-only; External Tasks; External Milestone; Deadline; Path Predecessor Milestone Task; Path Predecessor Summary Task; Path Predecessor Normal Task; Path Driving Predecessor Milestone Task; Path Driving Predecessor Summary Task; Path Driving Predecessor Normal Task; Critical; Critical Split; Progress; Manual Progress

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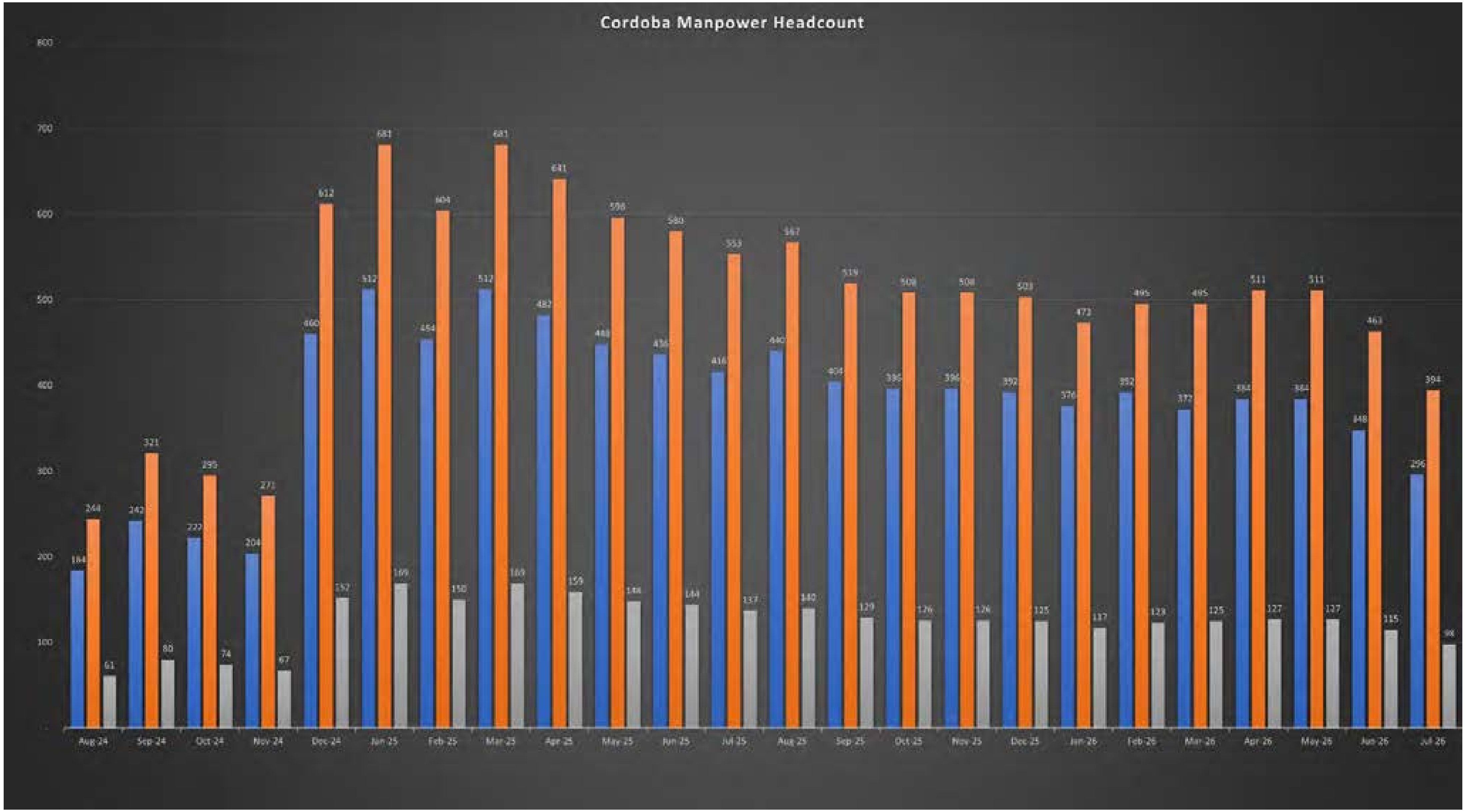
Source: Nordmin, 2021



Source: Nordmin, 2021

Figure 24-1: Construction workforce headcount

The construction schedule has been developed based on the following key assumptions.

Assumption #1

- Weather during construction will not interfere with the construction work.
- Weather will not be so severe that work will have to stop for long durations (more than 10%).

Assumption #2

- An available trained and qualified workforce.
- Workforce will perform and meet the productivity targets required.
- On-the-job training will be at a minimum.
- Area production rates will be provided by local sources.

Assumption #3

- All equipment requirements to execute the construction work will be available and fill the required equipment needs to work in multiple areas.
- Use of D-11 Cats or equivalent for excavation.

Assumption #4

- Equipment availability will be based at 90+%, and available parts readily available for repairs and maintenance for the duration of the construction.

Assumption #5

- All required permitting has been completed prior to starting of the construction preventing any unnecessary delays to start up.

Assumption #6

- Concrete batch plant will be constructed on site and concrete will be readily available for use.
- All materials for mixing concrete to design specs are also available.
- Plant will be capable of providing a minimum of 50 yards of concrete per hour.

Assumption #7

- All predesigned fabricated buildings and all parts are delivered to the site prior to the starting of construction of the building as scheduled.

Assumption #8

- There will be no local interference with the start up that may create unnecessary delays.

Assumption #9

- On site crushing operations will provide the required engineered fill materials for pre-construction foundation preparation, road finishing materials for the site and access roads.
- Sand and aggregate to be produced from cut materials. The materials from the area will be suitable for such purposes.

Assumption #10

- Productivity levels are at 100% performance.
- Percent performance rate will be factored in upon completion of draft and agreed upon by all parties.
- Multiple crews will be working at the same time during construction works.

Assumption # 11

- A temporary accommodations camp and equipment laydown area will be established at the location of the primary crusher as soon as the site road reaches the pad area. This will provide accommodations for the ground stripping and grading crews for the mill site and pit.

Assumption #12

- The main accommodations camp will be located at the junction of the La Rica Road and the mine access road. There is a flat area at that location that will accept the camp facilities with a minimum of groundwork. This will help take the camp construction off the critical path.

Assumption #13

- The mill/concentrator construction is the critical task. Any delays in the commencement of construction or any materials or procurement delays during construction will directly affect the scheduled end date.

Assumption #14

- The construction camp will be adequate for housing up to 500 people at any given time. This will include bathing, sleeping, and food requirements.

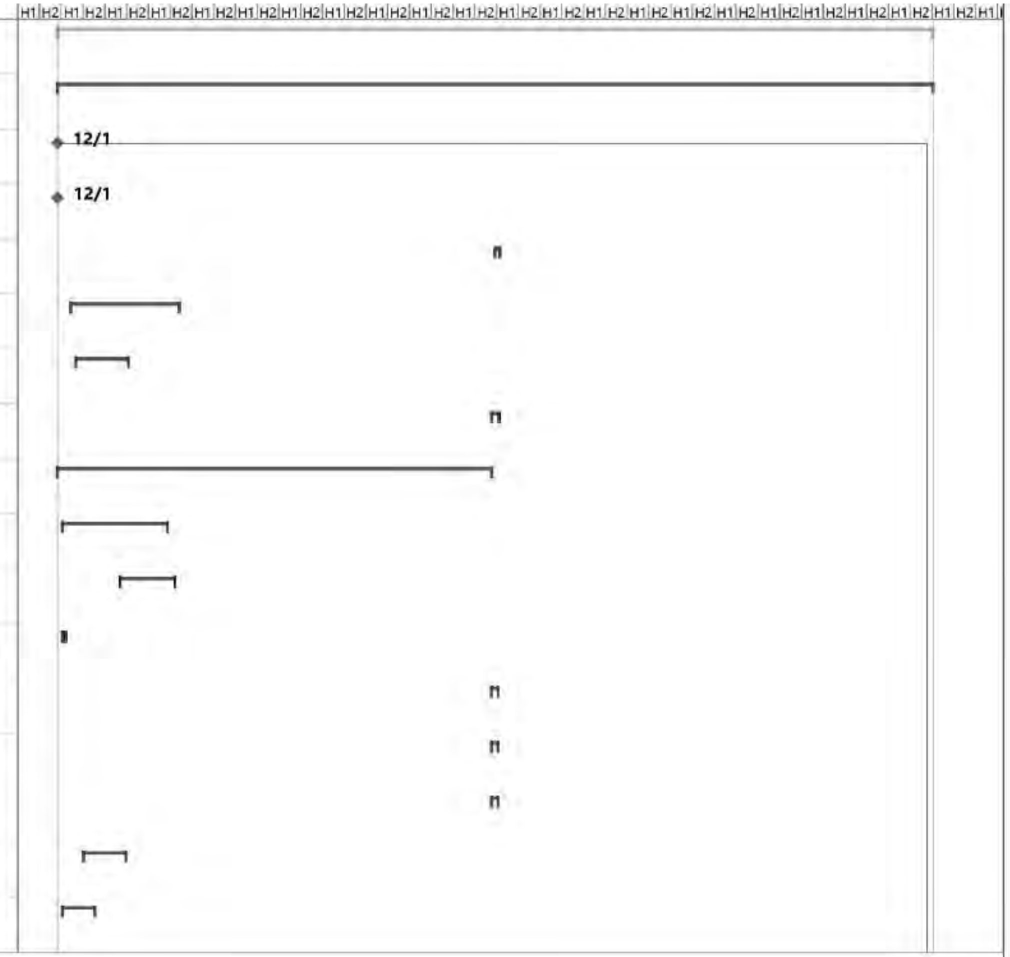
24.5 Closure Schedule

The closure schedule assumes that 95% of reclamation work will be completed first year starting after all mining materials have been processed. The details associated with mine closure are outlined in Section 20.6.

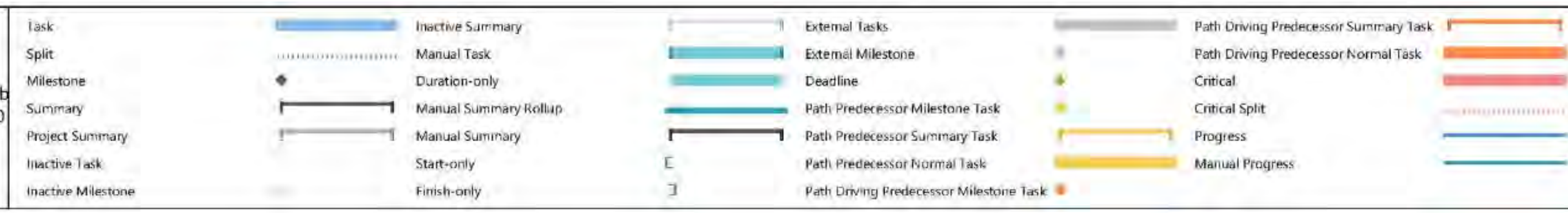
Table 24-1 provides the closure schedule for the Alacran Mine, prepared by Nordmin in conjunction with the Company.

Table 24-2: Closure Schedule

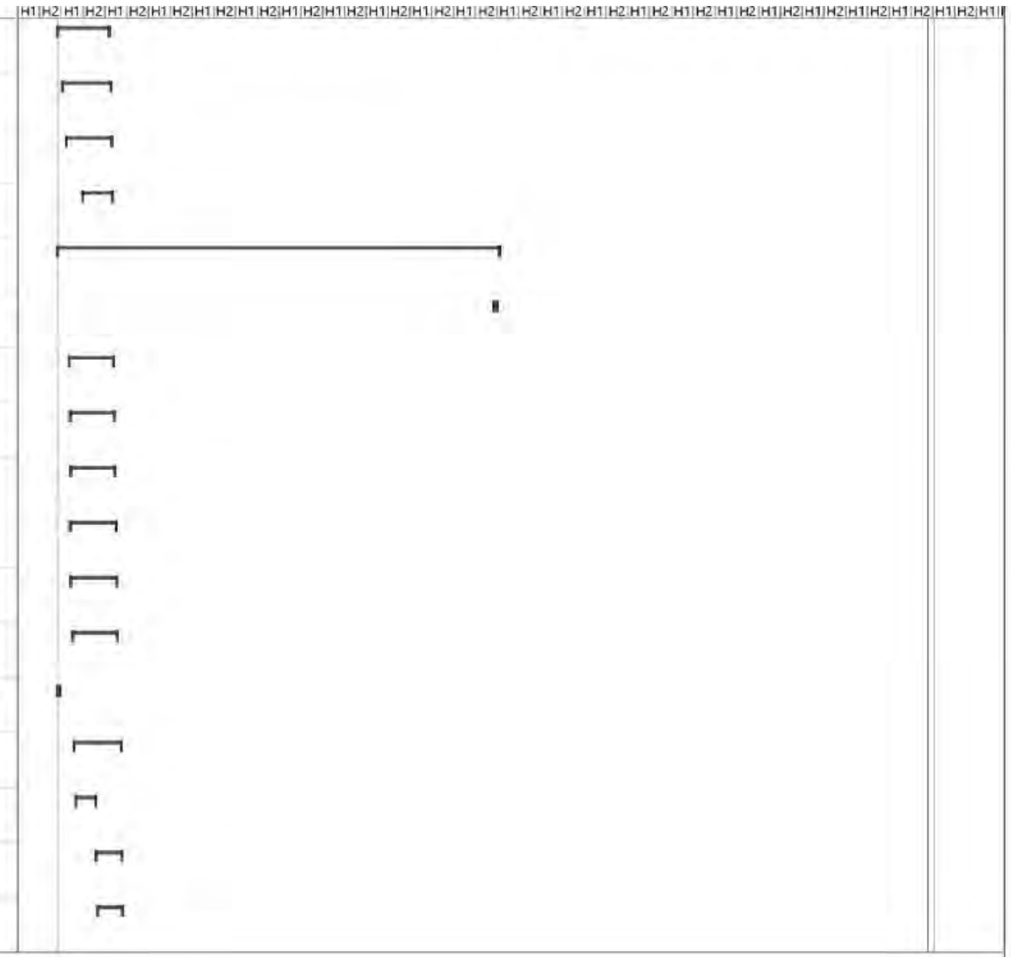
ID	Mode	Task Name	Duration	Start	Finish
0		**Cordoba Closure Schedule**	**1049 wks**	**12/1/2039**	**1/8/2060**
1		**Cordoba Closure Schedule**	**1049 wks**	12/1/2039	**1/8/2060**
2		**PROJECT START/KICK-OFF**	0 wks	12/1/2039	12/1/2039
3		**La Rica Road**	**0 wks**	12/1/2039	**12/1/2039**
5		**Access Road**	6 wks	12/16/2049	1/27/2050
9		**Tails Pond Embankment**	**130 wks**	**3/22/2040**	**9/18/2042**
13		**Primary Crusher Station Level Pad (Pit/Site Laydow**	**63 wks**	**5/3/2040**	**7/18/2041**
21		**Perimeter Security**	**9 wks**	**11/18/2049**	**1/20/2050**
26		**Open Pit Civil Works**	**520 wks**	**12/1/2039**	**11/18/2049**
33		**Tailing Delivery System**	**126 wks**	**1/12/2040**	**6/12/2042**
38		**Surface Water Management**	**66 wks**	**5/9/2041**	**8/14/2042**
44		**Services Layout/Installation**	**4 wks**	**1/12/2040**	**2/9/2040**
47		**Security/ERT Building and Parking**	**8 wks**	**11/18/2049**	**1/13/2050**
52		**Heli-Pad**	**8 wks**	**11/18/2049**	**1/13/2050**
56		**Fuel Storage - Aviation**	**8 wks**	**11/18/2049**	**1/13/2050**
60		**Power Main Line**	**51 wks**	**7/5/2040**	**6/27/2041**
64		**Site Power Distribution**	**39 wks**	**1/12/2040**	**10/11/2040**



Project: Cordob
Date: 11/11/20



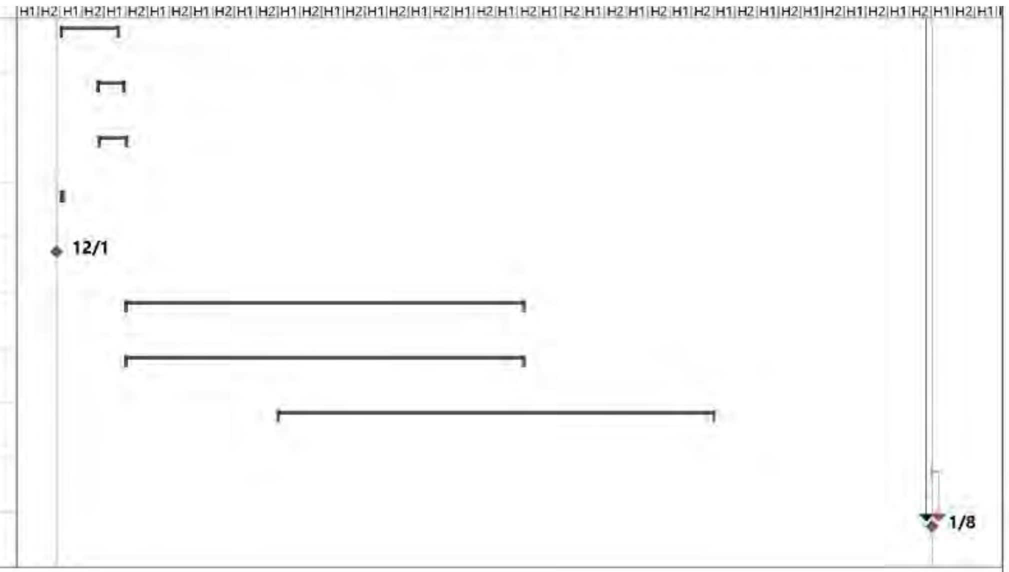
	Mode	Task Name	Duration	Start	Finish
68		**Concentrator Plant**	**62 wks**	**12/1/2039**	**2/7/2041**
74		**Concentrate Loadout and Storage**	**58 wks**	**1/12/2040**	**2/21/2041**
79		**Reagent Building**	**55 wks**	**2/9/2040**	**2/28/2041**
84		**Main Substation**	**36 wks**	**6/28/2040**	**3/7/2041**
89		**Water Treatment**	**529 wks**	**12/1/2039**	**1/20/2050**
96		**Remaining Balance of Operational Camp**	**4 wks**	**12/2/2049**	**12/30/2049**
101		**Truck Shop Building**	**53 wks**	**3/8/2040**	**3/14/2041**
106		**Fuel Storage - Diesel**	**53 wks**	**3/15/2040**	**3/21/2041**
111		**Fuel Storage - Unleaded**	**53 wks**	**3/22/2040**	**3/28/2041**
115		**Truck Wash**	**55 wks**	**3/15/2040**	**4/4/2041**
120		**Warehouse Building**	**55 wks**	**3/22/2040**	**4/11/2041**
125		**Mine Dry Building**	**54 wks**	**4/5/2040**	**4/18/2041**
130		**Open Pit Mine Infrastructure**	**3 wks**	**12/1/2039**	**12/22/2039**
132		**Primary Crusher**	**56 wks**	**4/19/2040**	**5/16/2041**
137		**Explosive Storage**	**24 wks**	**5/3/2040**	**10/18/2040**
140		**Operations Camp**	**31 wks**	**10/18/2040**	**5/23/2041**
145		**Administration Office Building**	**30 wks**	**11/1/2040**	**5/30/2041**



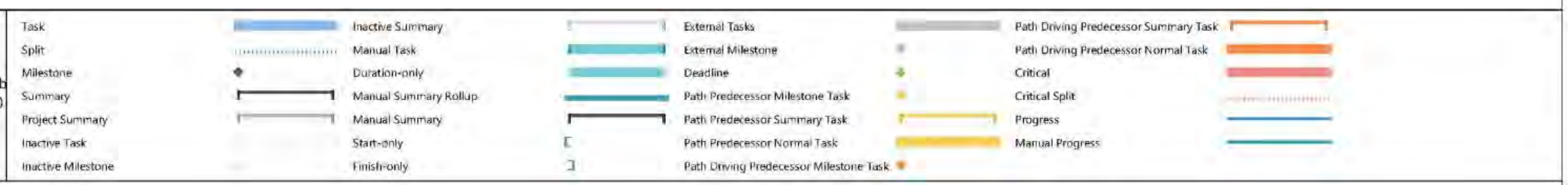
Project: Cordob
Date: 11/11/20

Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task
Milestone	Duration-only	Deadline	Critical
Summary	Manual Summary Rollup	Path Predecessor Milestone Task	Critical Split
Project Summary	Manual Summary	Path Predecessor Summary Task	Progress
Inactive Task	Start-only	Path Predecessor Normal Task	Manual Progress
Inactive Milestone	Finish-only	Path Driving Predecessor Milestone Task	

		Mode				
150			**Assay Lab and Core Storage**	**68 wks**	**1/12/2040**	**5/2/2041**
155			**Mine Engineering Office Building**	**31 wks**	**11/15/2040**	**6/20/2041**
160			**Training Center Building**	**33 wks**	**11/22/2040**	**7/11/2041**
165			**On Site Communication**	**2 wks**	**1/12/2040**	**1/26/2040**
167			**Port Facilities**	**0 wks**	**12/1/2039**	**12/1/2039**
169			**Reclamation Monitoring**	**477 wks**	**7/4/2041**	**8/25/2050**
171			**Inspection**	**477 wks**	**7/4/2041**	**8/25/2050**
174			**Dam Safety and Open Pit Reviews**	**522.8 wks**	**1/2/2045**	**1/8/2055**
178			Final Relinquishment Report	1 wk	1/1/2060	1/8/2060
179			**Reclamation Complete**	0 wks	1/8/2060	1/8/2060



Project: Cordob
Date: 11/11/20



Source: Nordmin, 2021

The closure schedule has been developed based on the following assumptions:

Assumption #1

- That 95% of reclamation work will be completed first year starting after all mining materials have been processed.
- Weather will not be so severe that work will have to stop for any long durations. (10%).

Assumption #2

- That area will have the available trained and qualified workforce.
- Workforce will perform and meet the productivity targets required.
- Crews will be doing specific tasks.
- Each crew will move from one building to the next for assigned tasks.

Assumption #3

- All Equipment requirements to execute the construction work will be available and fill the required equipment needs to work in multiple areas.
- Use of D-11 Cats or equivalent for removal of all foundation works.
- Underground concrete structures that are not easily removed will remain.

Assumption #4

- Equipment availability will be based at 80+%, available parts may have issues with availability due to remoteness of the project.

Assumption #5

- All reclamation plans will be approved and agreed upon prior to work starting.

Assumption #6

- Concrete batch plant will be removed/Pre-operation phase/ production phase of the project.

Assumption #7

- Water management system will be left in place for an additional 10 year to monitor water and site.
- After 10-year monitoring has been completed Water treatment plant will be Salvaged and area reclaimed and access road to plant will be reclaimed and seeded.

Assumption #8

- Security and ERT will be maintained up through the duration of water treatment monitoring.
- Security and ERT will be salvaged and reclaimed upon the completion of the Water Treatment phase and duration.

Assumption #9

- All predesigned fabricated buildings and all parts will be salvaged and sold for potential cash savings.

Assumption #10

- Mechanical components from mill, crushing, conveying, and buildings will be salvaged and sold for cost savings.

Assumption #11

- Tailing pond reclamation will be on going through out the last few years of operations phase of the project.

- Tailing pond will have final area reclaimed upon completion of operations.

Assumption #12

- Concrete foundation materials will be hauled and placed in tailings area covered and reclaimed.

Assumption #13

- Production offices and camp will stay operational during reclamation period for use of management and personal.
- Reduced camp and offices will remain operational during water treatment period during Reclamation. All non required buildings will be salvaged and reclaimed.

Assumption #14

- Security and Medical personnel will stay in operation during the reclamation period and will be reclaimed upon the completion of the water treatment phase of work.

Assumption #15

- After reclamation and re-seeding has been completed in the distinct phases of work. Vegetation monitoring will be done Annually to ensure proper growth is sustained throughout the Water monitoring 10-year period.

Assumption #16

- Dam and Pit inspection and monitoring will be done every 5 years from closure to 2060 approx. 20-year period.
- Dam Safety and OP Inspection, Chemical, Physical, and Biological Monitoring will be done on a yearly annual bases during the Water monitory period.

Assumption #17

- LaRica Roadway will be retained and turned over to the local jurisdictions.

Assumption #18

- Temporary power supply will be maintained during Water monitoring period by Power Generator system.
- Main line power feed from High voltage grid will be salvage. power line, transmission route will be reclaimed.

24.6 Opportunity and Risk Assessment

Nordmin completed a risk analysis in conjunction with INTERA, Knight Piésold, and the Company at the project level.

Nordmin provided each QP with a semi quantitative risk matrix where the likelihoods and consequences were assigned numbered levels that were multiplied to generate a numerical description of risk ratings. The values assigned to the likelihoods and consequences were not related to their actual magnitude, but to the numerical value derived for risk (Figure 24-2). This approach provided for a standardized grouping and generation of indicated risk ratings. Each QP worked independently and reported back to Nordmin their findings which were then compiled. This compilation was discussed as a group during a workshop on September 23, 2021, in Medellín, Colombia and subsequently summarized, including possible mitigation strategies (Appendix B).

Likelihood x Consequence Matrix

Likelihood	Consequence	Negligible	Minor	Moderate	Major	Severe
	Score	*1*	*2*	*3*	*4*	*5*
Rare	*1*	1	2	3	4	5
Unlikely	*2*	2	4	6	8	10
Possible	*3*	3	6	9	12	15
Likely	*4*	4	8	12	16	20
Almost Certain	*5*	5	10	15	20	25

Low
Medium
High
Very High

Source: Nordmin, 2021

Figure 24-2: Likelihood and consequence matrix

24.6.1 Risks

The risk analysis defined 112 risks and their associated potential mitigation strategies (Appendix B).

- Sixty-five risks were considered a pre-response consequence of moderate, major, or severe, and a likelihood of likely or almost certain.
- If the action plan is initiated, the post response consequence for these high-risk items reduces to three risks.
- Thirty-seven risks were considered a pre-response consequence of minor or moderate and a likelihood of unlikely or possible.
- If the action plan is initiated, the post response consequence for these moderate risk items remains the same.

The major group of risks identified and have an action planned assigned in Appendix B are the following:

Camp

- Delays due to lack of accommodation capacity and timely services at camp, resulting in a delay of construction and operations, which can be mitigated with early contracts and secured resources.

Compliance

- Improper interactions with government officials resulting in increased corruption risk, which can be mitigated with internal controls, training, enforcement.

Engineering and Construction

- Construction – Road upgrades not completed on time, causing overall project delays, and increased cost. Potential mitigation strategies include identifying long lead items and contractor(s) and enforcing the schedule.
- Health and Safety – Lack of antidote in case of snake, alacran, wasp, or other insect bites, causing overall project delays, and increased cost. Potential mitigation strategies include awareness training,

personal protective equipment ("PPE"), operational procedures, EpiPens, first aid kits and potentially a defibrillator (depending upon legal review).

- Mine Waste – OP overflow to San Pedro River and/or Q. Valdez River would negatively impact safety, health, environment, community, and the Company's reputation. Potential mitigation strategies include a complete geochemical pit model, monitoring the water at closure, and implementing a plan to reduce the impact by water as part of the FS.
- Permits – Obtaining approval for thickened tails storage (versus conventional), causing overall project delays, and increased cost. To potentially mitigate this risk, the Company can complete a trade off study to demonstrate the differences between each approach and select the best option. Provide education and examples of the various sites that have approved the comingling of thickened tails.
- Processing – There are risks associated with (1) frozen charge in the milling circuit resulting from a power outage, (2) equipment operator or control system error in reagent make-down building which results in excessive chemical concentration or gaseous spill to the environment (3) failure of the tanks, clarifiers, pumps, piping reticulation etc. outside of plant area proper which is protected by sloped floors/containment, (4) excessive content of saprolite into crushing circuit and (5) overflow from the flotation circuit resulting from a power outage/network leak. These risks negatively impact safety, health, environment, community, production and the reputation of the Company but can potentially be mitigated with the installation of engineering controls, engagement controls, alarms, lined emergency event pond, operating standards, complete operational procedures, block crusher, and adherence to the blending approach.
- Water Treatment – Unforeseen cost for discharge water treatment causing overall project delays and increased cost. Potential mitigation strategies include water volume optimization and reduction.
- Weather – Delays caused by river floods during the construction phase, delays in earthworks due to heavy rain season extension and life risk due to electrical storms and lightning, causing overall project delays, and increased cost. Potential mitigation strategies include ensuring the design can handle the intake, warning systems, and associated operational procedures.

External

- Operational – Delays and human risk caused by malaria and dengue at the site, causing overall project delays, and increased cost. To potentially mitigate this risk, the Company can implement government spraying programs, PPE, bug spray, nets, and the recommended medical protection(s).
- Ore Prices – The project is exposed to commodity pricing on the world markets, and likely the greatest sensitivity is to commodity pricing, which is both a production and financial risk to the Company. This risk can potentially be mitigated by ensuring tight capital and operating spending controls to alleviate some of the sensitivity to commodity pricing. Still, under an extended period of depressed metal markets, the Project would be marginal to uneconomical. The Company may also employ hedging strategies to mitigate some of the risks.
- Social – Terrorism, civil unrest, local blockades, etc., causing an interruption of operations; however, the Company may potentially mitigate this risk by engaging a larger social team and augmenting communications. Additionally, the Company may want to investigate installing and utilizing a dirt airstrip.
- Infrastructure – Delays caused by lack of solid waste disposal capacity. No sanitary landfill is available in the nearby towns, causing overall project delays, and increased cost. To potentially mitigate this risk, the Company can outsource to a third party, a community project, or utilize an incinerator.

Infrastructure

- Power – Overall project delays and increased cost caused by unreliable timing of constructing the main power line to the site. Additionally, there may be delays, and increased costs associated with obtaining the necessary power supply before commissioning. To potentially mitigate this risk, the Company can continue studying and exploring alternative options such as a local gas plant versus a power line. Additional exploration activities could include investigating a gas line connecting Cerro Matoso to the Project site, liquefied natural gas ("LNG") trucks versus the right of way gas/power line, LNG as a bridging option.

Mine Operations

- Mine Waste – Regulators require the Company to remediate sediment contamination in Q. Valdez River and Q. La Hoga River. To facilitate this, the Company can collect samples in the field along the rivers, characterize the soils within the WMF, and either dig the material and treat it in plant or dig and store the material within the WMF. The Company would conduct a cost benefit analysis to determine which option is better, cleaning, or treatment in the plant.
- Logistics – Concerns with long lead times required for the purchase/lease of the major mobile equipment causing delays in the schedule. To potentially mitigate these delays, the Company can investigate the timing to start the equipment, secure the payment/delivery schedule, and lock in a portion of the fleet during the FS stage.
- Mining Dilution and Mining Recovery – Excess dilution or poor ore mining recovery due to improper mining methods, poor drilling, and blasting practices, poor follow-up from the geology department/assay lab, and inefficient shovel operators all contribute to the production and financial consequences. To potentially mitigate these consequences, the Company can conduct (1) a detailed trade off study to determine the optimal selective mining unit required to address mining selectivity, ore-loss and dilution and associated shovel versus backhoe application, ore controls are required, using autonomous equipment (2) a detailed trade off study to determine the optimal selective mining unit required to address mining selectivity, ore-loss and dilution and associated shovel versus backhoe application, and (3) the Company can implement ore tracking technology.
- OP Design and Planning – Mining at elevated cut-off value and stockpiling material for later rehandling and processing through the mill can cause a potential reduction in recovery within the stockpile. To mitigate this, the Company can line the stockpile and line Pond 4. If the water does not meet discharge levels, then the water will be transferred to a WMP through the treatment plant.

24.6.2 Opportunities

Opportunities recognized during the analysis included:

Resource/Reserve Expansion Potential

- The centre of the Alacran deposit has significant HG Cu, Au, and Ag areas that are currently being mined by the illegal surface miners. A significant infill definition drill program has been planned for the FS which will be used to determine if the Alacran deposit orebody can be expanded.
- The Alacran deposit higher grade areas would potentially increase the overall head grade and recovered metal within second half of the production schedule.
- The current Satellite deposits are not included within the current mine plan. These Mineral Resources could be converted into Mineral Reserves at a later stage which will increase overall mine life.

Mine Operations

- Optimizing the Alacran deposit mine plan based upon current market conditions. At present, the mine plan is utilizing long term metal prices rather than current market conditions. There are existing areas within the centre of the Alacran deposit that have relatively high concentrations of Cu, Au, and Ag that may be further expanded once the infill drilling has been completed.
- After completion of additional diamond drilling there could be a reason to increase the depth of the OP, if geotechnical factors allow.

Plant Infrastructure

- Currently, the WTF has assumed that 100% of the supernatant and contact water will need to be treated prior to being released. Ongoing ARD, hydrogeology and hydrology baseline studies are ongoing and initial results have indicated that a WTF may or may not be required. As such further testing will be required.
- Currently, the Project assumes requiring make up water from the river and from dewatering wells. Further trade off studies are required to determine if any make up water will be required from the river.
- The PFS assumes that the electrical power to the Project is expected to be supplied via a new 35 km long, 110 kV powerline connecting to the Cerro Matoso substation which is owned and operated by ISA. Further trade off studies is being planned between a local LNG plant versus grid power.
- Further metallurgical testing is required with respect to energy used to grind, potentially improving overall concentrate grade and further variability testing. Collectively, these items have the potential to positively impact CapEx/operating expenditures ("OpEx") costs.

25 INTERPRETATION AND CONCLUSIONS

25.1 Introduction

The QP's note the following interpretations and conclusions in their respective areas of expertise, based on the review of data available for this Technical Report.

25.2 Mineral Tenure, Surface Rights, Royalties, and Agreements

The legal opinion and additional information provided by Cordoba personnel support the following:

Cordoba has three subsidiary companies (ECSAS, MCSAS, and RCSAS) in Colombia. MCSAS holds an ownership interest in the Project:

- RCSAS, MCSAS and ECSAS have the corporate power to carry out exploration and exploitation activities in Colombia;
- MCSAS is the holder of 23 mining titles located in the territory of Colombia pursuant to mining concession agreements executed with the ANM (the "Minerales Mining Titles").
- CM Company is the sole holder of record of Alacran Mining Title III-08021. Pursuant to the Option Agreement, the Cordoba Parties are entitled to the exclusive and irrevocable first option to acquire 100% of the issued and outstanding shares of CM Company and thus, become indirect sole beneficiaries of Mining Title III-08021, subject to the satisfaction of the conditions set forth in the Option Agreement (described in section 4.3.2.1 herein).

Each of the mining titles held by MCSAS, as of the date of the legal opinion:

- vests in its holder of record a right to explore, and, subject to the satisfaction of its terms and conditions, exploit the permitted mines according to each mining title;
- is currently in force;
- is registered in the national mining registry of the ANM;
- has no registration of breach, termination, mandatory early termination or any other record that would deem the mining titles unenforceable; and
- has no security interest recorded in the Colombian 'security interests' registration system.

25.2.1 Mining Title Agreements

There are two agreements related to mining titles; the Option Agreement and the Future Transfer Promise Agreement:

- the option agreement executed on February 27, 2016, entered into by the Cordoba Parties and the OMNI Parties in connection with the San Matías Property Option Agreement.
- the Future Transfer Promise Agreement executed on May 19, 2016, entered into by Activos Mineros and MCSAS in connection with Mining Title PCB-08021.

25.2.2 Environmental Permitting Considerations

Environmental licences are not required for the current exploration phase of the mining titles. The environmental licence is necessary for the titleholder to initiate the construction and assembly phase and is granted by the environmental authority upon the review and assessment of the EIA filed by the titleholder. MCSAS is currently preparing the EIA for the Project.

25.2.3 Social License Considerations

The Colombian Ministry of Internal Affairs certified the presence of the indigenous group '*Cabildo Indígena San Pedro*' within the contracted area of the Project. Under Colombian regulations, minority groups such as the '*Cabildo Indígena San Pedro*,' shall be consulted in connection with mining activities that might affect them prior to the perfection of the environmental license.

There is ongoing complaint filed by ASOMINAL against OMNI and the Ministry of Mines and Energy, in which ASOMINAL requested the annulment of the Mining Concession Contract III-08021. The case is moving to the evidentiary stage, and the Tribunal will schedule a date for continuing with the preliminary hearing, in which it will decide on the evidence requested by the parties, and it will schedule a date for holding the trial. Cordoba believes the request for annulment has no legal basis, and the Company has high or probable probabilities of success.

25.2.4 Water Rights Considerations

For the exploration phase, in which all of the mining titles are, the concession permits related to water are only required if the titleholder expects to use water resources. A permit has been obtained for exploration. A permit will be obtained for surface water use as part of the EIA. Water withdrawals for make-up water are expected to be minimal (< 5 m^3/hr).

The vestment permit is required for the proper disposal of liquid resources during the exploration phase.

25.2.5 Royalties

Once the concession enters into the exploitation phase it will be subject to Colombian corporate taxes and mining royalties on metals production. The corporate income tax rate in Colombia is 35% from 2022 onwards. Colombian mining royalties are 4% of all revenues received from Au and Ag exploitation and 5% of all revenue from Cu exploitation. The mining royalties are deductible for income tax purposes. A 2% royalty on the net income for production is payable to OMNI.

25.2.6 Conclusion

The Company advised that there are no other significant legal factors and risks that may affect access, title, right, and ability to perform work on the Project.

25.3 Exploration, Drilling, and Analytical Data Collection in Support of Mineral Resource Estimation

The exploration programs completed by Cordoba and previous operators are appropriate for the deposit styles. The programs have delineated the Alacran, Costa Azul, Montiel East, and Montiel West deposits, as well as a number of exploration targets. Geophysical interpretations and regional surface exploration indicate the potential to discover further targets that warrant further investigation.

The quantity and quality of the lithological, collar and downhole survey data collected in the various exploration programs by various operators are sufficient to support the Mineral Resource Estimate. The collected sampling is representative of the Cu, Au, and Ag grades in the deposit, reflecting areas of higher, and lower grades. The analytical laboratories used for legacy and current assaying are well known in the industry, produce reliable data, are properly accredited, and widely used within the industry.

Nordmin is not aware of any drilling, sampling, or recovery factors that could materially impact the accuracy and reliability of the results. In Nordmin's opinion, the drilling, core handling, logging, and sampling procedures meet, or exceed industry standards, and are adequate for the purpose of Mineral Resource Estimation.

Nordmin considers the QA/QC protocols in place for the Project to be acceptable and in line with standard industry practice. Based on the data validation and the results of the standard, blank, and duplicate analyses, Nordmin is of the opinion that the assay and bulk density databases are of sufficient quality for Mineral Resource Estimation for the Project.

No limitations were placed on Nordmin's data verification process. Nordmin considers the resource database reliable and appropriate to support a Mineral Resource Estimate.

25.4 Geology and Mineral Resource

Drilling by Cordoba and its predecessors has led to the discovery of multiple Cu-Au-Ag deposits within the Property. The deposits have been delineated using surface mapping/sampling, RC, and diamond drilling, collar, and downhole survey methods, and sampling and laboratory analysis methods accompanied by appropriate QC and monitoring.

Mineralized models were constructed for the four deposits (Alacran, Costa Azul, Montiel East, and Montiel West) based on all available drilling and mapping data collected to date. As summarized in Section 14, block modelling was completed in Datamine using explicitly modelled geological and mineralized domains, HG vertical structure mineralization, sub-vertical stratabound replacement mineralization, and LG mineralization). Structural and mineralization trends were used in the interpretation and for selection of modelling parameters. The final block model was developed by estimating and combining block models for each domain, and the final block model has been fully validated with no material bias identified.

Mineral Resources were classified into Indicated and Inferred Resource categories based on geological and grade continuity as well as drill hole spacing.

Further infill drilling within the Alacran deposit has the potential to increase the overall contained metal further. Some of the deposits are open to supporting resource expansion potential based on additional definition diamond drilling.

The geological understanding of the setting (lithologies and structural) and alteration controls on mineralization is sufficient to support the estimation of Mineral Resources.

25.4.1 Mineral Resource Estimate

The Mineral Resource Estimate for the Project conforms to industry best practices and is reported using the May 10, 2014, Standards for Mineral Resources and Mineral Reserves and the 2019 CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (2019). Technical and economic parameters and assumptions applied to the Mineral Resource Estimate are based on an OP mining method and milling and flotation concentration processing method. Areas of uncertainty that may materially impact the Mineral Resource Estimate include:

- Changes to long term metal price assumptions;
- Changes to the input values for mining, processing, and G&A costs to constrain the estimate;
- Changes to local interpretations of mineralization geometry and continuity of mineralized zones;
- Changes to the density values applied to the mineralized zones;
- Changes to metallurgical recovery assumptions;
- Changes in assumptions of marketability of the final product;
- Variations in geotechnical, hydrogeological and mining assumptions;
- Changes to assumptions with an existing agreement or new agreements;
- Changes to environmental, permitting, and social licence assumptions; and
- Logistics of securing and moving adequate services, labour, and supplies could be affected by epidemics, pandemics and other public health crises, including COVID-19, or similar such viruses.

The 2021 Mineral Resource Estimate for the Project includes 121.9 million tonnes of Indicated Resources grading 0.42% Cu, 0.28 g/t Au, and 2.33 g/t Ag and 5.1 million tonnes of Inferred Resources grading 0.20% Cu, 0.20 g/t Au, and 0.87 g/t Ag at a $1.78 NSR cut-off for saprolite material and $8.85 NSR cut-off for transition and fresh material (Table 14-36).

Only the Alacran deposit was updated during the 2021 Mineral Resource Estimate, therefore only the updates to the Indicated and Inferred Resources for the Alacran deposit with be compared to the 2019 Mineral Resource Estimate. The 2019 Mineral Resource Estimate has a reporting cut-off grade of 0.22% CuEq, when compared to the 2021 Mineral Resource Estimate at a cut-off grade of $1.78 NSR for saprolite material and $8.85 NSR cut-off for transition and fresh material, the 2021 Mineral Resource Estimate increased Indicated tonnage by 7.3% at the Alacran deposit. The Satellite deposits were not affected by updates during the 2021 Mineral Resource Estimate and remained the same (Table 14-42 to Table 14-44).

The change from the use of CuEq for cut-off to NSR was made due to the absence of recoveries for Cu and Ag within saprolite material. At the Alacran deposit, Indicated contained Cu remained the same, contained Au increased by 16.2%, and contained Ag increased by 2.5%. The Satellite deposits were not affected by 2021 updates and therefore remained unchanged from the 2019 Mineral Resource Report (Table 14-41). The Alacran deposit Inferred Resources contained Cu decreased by 26.3%, contained Au increased by 33.9%, and contained Ag decreased by 36.3%. The decrease in Cu and Ag contained tonnage can be attributed to the lack of recovery for Cu and Ag within saprolite material.

There is potential for an increase in the estimate if mineralization that is currently classified as Inferred can be upgraded to a higher-confidence Mineral Resource category. Additionally, additional increases may occur if any categorized or uncategorized mineralization within the various deposits is upgraded.

25.5 Mining and Mineral Reserve Estimate

Conventional OP mining methods will be used to extract a portion of the Alacran deposit. This method was selected considering the Alacran deposit's size, shape, orientation, and proximity to the surface. Drilling, blasting, loading, and hauling will be used to mine the OP material within the designed pit to meet the mine production schedule.

OP mining will include conventional drilling and blasting with a combination of a backhoe type excavator and front end loader type excavator loading broken rock into haul trucks, which will haul the material from the bench to the crusher, ROM stockpile, or waste dumps depending on the material type. Ancillary equipment includes dozers, graders, and various maintenance, support, service, and utility vehicles.

During pre-production, the mineralized material (above cut-off grade) will be hauled to designated stockpiles. The higher grade mill feed material will be hauled to a stockpile near the ROM pad located near the primary crusher. The saprolite material and lower grade mill feed will be hauled and stockpiled in a stockpile located south of the mill and crusher areas.

During production, higher grade mill feed material will be hauled directly to the primary crusher and either direct tipped into the crusher or stockpiled temporarily on the ROM pad. For the first three years of production, lower grade mill feed material (8.85 ≥ NSR < 16.85) will continue to be stockpiled for later rehandling and processing. In the fourth and fifth year of production, mill feed material with NSR ≥ 14.85 (Bin 7 and Bin 8) will be hauled directly to the crusher, while stockpiling material with 8.85 ≥ NSR < 14.85. After the fifth year of production, all fresh material with NSR ≥ 8.85 will be directed to the crusher as it is mined.

25.5.1 Mineral Reserve Estimate

The Mineral Reserve Estimate for the Project conforms to industry best practices and is reported using the May 10, 2014, Standards for Mineral Resources and Mineral Reserves and the 2019 CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (2019).

Mineral Reserves are based on the engineering and economic analysis described in Sections 16 to Section 22 of this Technical Report. Changes in the following factors and assumptions may affect the Mineral Reserve Estimate:

Factors that may affect the Mineral Reserve

- Metal prices
- Interpretations of mineralization geometry and continuity of mineralization zones
- Kriging assumptions
- Geomechanical and hydrogeological assumptions
- Ability of the mining operation to meet the annual production rate
- Operating cost assumptions
- Process plant recoveries
- Mining loss and dilution
- Ability to meet and maintain permitting and environmental licence conditions
- Historical mining depletion

Nordmin prepared a Mineral Reserve Estimate for the Project using a combination of Geovia's Whittle 4.7.4, Geovia's Surpac 2021 and Datamine software packages for estimating the economic pit limit for the OP and block model interrogation.

The Mineral Reserve Estimate for the Alacran deposit is based on the resource block model estimated by Nordmin and described in Section 14. The block model contained both Indicated and Inferred Mineral Resources, however only Indicated Mineral Resources were used. Inferred Mineral Resources in the block model were not included in the Probable Mineral Reserve and remain classified as waste; Inferred Mineral Resources do not meet the standards required for inclusion in Mineral Reserves.

Mineral Reserves for the Alacran deposit incorporate appropriate mining dilution and mining recovery estimations for the OP mining method.

The reference point at which Mineral Reserves are defined, is the point where the ore is delivered to the processing facility, including ROM stockpiles.

The 2021 Mineral Reserve Estimate for the Project includes 102.1 million tonnes of Probable Reserve grading 0.41% Cu, 0.26 g/t Au, and 2.30 g/t Ag at a $1.78 NSR cut-off for saprolite material and $8.85 NSR cut-off for transition and fresh material (Table 15-1).

25.6 Mineral Processing and Recovery Methods

25.6.1 Mineral Processing

Review and consideration of previous preliminary testwork completed in 2012 by Minpro and 2019 by SGS proved to be good context for the design of the prefeasibility level metallurgical testwork program completed by Blue Coast Metallurgy and Testwork.

Relevant prefeasibility level metallurgical testwork was performed on a master composite that was composed of mineralization classified into three categories, namely fresh ore, transition ore, and saprolite. Advancement of the metallurgical performance based on this master composite, that better represents the mining approach over LOM, is a significant improvement over previous work. As such, the representativity and suitability of the derived testwork data has resulted in the development of an efficient and conventional comminution and flotation circuit for the processing plant. Design criteria and subsequent equipment selection was validated by industry experts and specialized equipment vendors to the point where there is a high degree of confidence in the selected technology and process equipment carried for the processing plant and supporting surface infrastructure reflected in the project financial modelling.

A conventional SABC comminution circuit followed by a standard Cu/Au sulphide flotation circuit complete with a regrind stage was proven to produce good quality Cu and Au concentrates.

25.6.2 Recovery Methods

The Alacran deposit consists of three principal zones of economically treatable material dictated by the degree of exposure to atmospheric weathering, namely the fresh, transition, and saprolite zones.

The tested fresh samples were moderately hard. They are expected to be mildly resistant, but amenable to SAG milling. No HPGR testing was conducted. Saprolite was very soft and based on power needs in laboratory grinding, appear to need a small fraction of the grinding power of fresh samples. Transition material hardness levels should be in between those of the fresh and saprolite materials.

The fresh zone contains Cu almost exclusively in the form of chalcopyrite. This chalcopyrite is relatively coarse and is adequately liberated for good rougher recoveries at a primary grind of 80% passing 200 µm, while cleaning was effective following a regrind to 80% passing 39 µm. This chalcopyrite floats very well in rougher and cleaner flotation, with only a small dose of xanthate collector.

Au is present mostly as free and liberated metal, which commonly caused nugget issues in balancing of tests. It tended to float well.

Pyrite is also present in the fresh zone, with the LOM average ratio of pyrite to chalcopyrite being 2.5:1. Pyrite dilution in the Cu concentrate can for the most part be controlled by raising the pH in roughing to approximately 10.5 and especially in cleaning to approximately 11.5, using lime. This treatment approach is very typical for such deposits. Typically, in this project, about 97% of the pyrite is rejected from the Cu concentrate.

Non sulphide gangue is a mix of quartz and chlorite with minor clays, feldspar, and carbonates. Some of this gangue has a propensity to float, so a gangue depressant is employed to control this. Several gangue depressants are effective at this, but in this study calgon was adopted as standard. This was effective, but final concentrate grades were still quite low by industry standards, mostly as a consequence of residual flotation of liberated non sulphides.

Three samples of transition material were examined and tested. They were all different from each other, however they tended to comprise a blend of recoverable Cu in the form of chalcopyrite and chalcocite, and non recoverable Cu, presumably hosted in non sulphides. Au is minimally affected by weathering and so usually floated reasonably well from the transition samples.

The saprolite zone contains Cu mineralization hosted by non sulphide minerals, mostly kaolinite, and other clays as well as chlorite. This is not economically recoverable by froth flotation. Substantial Au is also present, and this is recoverable by flotation and/or gravity concentration. Some of the saprolite will contain sufficient Au to warrant processing.

Ag floats quite well from the fresh materials but like Cu, floats poorly from saprolite.

The reader should be aware that all the flotation testing was conducted on a small number of metallurgical drill holes, less than would be typical of a Prefeasibility Study on a project of this size. Further, many of the master composites were relatively LG and comprised of material sourced mostly from the periphery of the Alacran deposit. However, all the presently known rock types are believed to have been represented in the metallurgical program, while the lack of testing of material from the centre of the Alacran deposit may represent a risk to the metallurgical forecast.

25.7 Infrastructure

The main Project infrastructure components include mine and process plant supporting infrastructure, site accommodation facilities, a WMF, external and internal access roads, power supply and distribution, freshwater supply and distribution, and a WTF.

The Project is accessible by travelling on a paved two-lane highway to Puerto Libertador and then by driving approximately 21 km from Puerto Libertador on a hard-packed, gravel road. The main access road between La Rica and the planned security gate of the project site is of a lower quality, being only wide enough for one vehicle and with sharp turns and abrupt grade changes. This road is 6 km long and is the intended haul road for concentrate. The entirety of this road will need to be upgraded and widened to allow two-way traffic and transport trucks.

The majority of the earthworks will be realized in the preparation of the mine infrastructure and concentrator plant infrastructure pad. Additional smaller pads will be built up for the water storage tanks and for the primary crusher dumping station. Laydown areas, stockpiles, and waste dumps will be constructed as the mining operation expands. In total, approximately 10,000 m^2 of general buildings (not including the camp) have been provided. These ancillary infrastructure buildings will be pre-engineered steel structures founded on piled foundations. The site accommodations will be a trailer type construction with central kitchen and dining hall buildings.

Electrical power to the Project is expected to be supplied via a new 35 km long, 110 kV powerline connecting to the Cerro Matoso substation which is owned and operated by ISA. The site primary power distribution will operate nominally at 13.8 kV which is supplied by two 30/50 MVA, 110kV/13.8kV power transformers. A site wide overhead line distribution has been planned for construction which will feed the north side and south side infrastructure from two separate 13.8 kV overhead line feeders. The north power line distribution will supply power to the camp, WTF, water collection, and pumping stations. The south power line will provide power to the OP, waste storage, WMF, and south side water collection & treatment.

Freshwater will be supplied to a 2,700 m^3 fresh/fire water head tank which will be located adjacent to the process water head tank. Supply to this tank will be from the mill influent metals and TSS removal plant, which will draw from the San Juan River. The fresh/fire water tank will be equipped with a standpipe for freshwater process suctions which will ensure that the tank is always holding at least 90 minutes supply of fire water

Two separate modular WTFs will be required for the mill influent (supply) and the mill effluent (discharge) systems. The mill influent system will draw from the San Juan River and process water at a design rate of 4.2 m^3/hr for use throughout the mill. The effluent system will draw water from the WMF to treat the tailings water prior to being released back into the environment. The effluent plant is designed for a flow rate of 700 m^3/hr. Both plants will be located adjacent to the saddle dam that divides the WMF and WMP.

A potable water treatment system will also be fed from the discharge of the mill influent metals and TSS removal plant. This system will be located within the mill influent treatment plant area. Potable water will be treated, stored, and distributed to the various buildings on site, with each building having its own pressurized reservoir tank for distribution.

25.8 Water Management

The WMP will be primarily used to store water from the WMF, contact water from operations, and inflows from the OP. The water stored in the WMP will be used to provide the required reclaim water to the mill.

The primary water management objectives for the site water management strategy include:

- Maintain a small supernatant pond (water transfer pond) within the WMF basin by transferring run-off and supernatant to the WMP on an ongoing basis via the water transfer system.
- Maximize reclaim of supernatant water and run-off from the WMP to the mill and minimize freshwater requirements from the San Pedro River.
- Treat and discharge excess supernatant water, mine water (OP inflow), and run-off to the environment, as required during the mine life, via the water treatment, and discharge system.
- Collect and manage run-off via surface water management measures.
- Provide temporary containment of the EDF within the WMF and WMP basins during operations.
- Provide temporary storage and conveyance of the IDF via spillways from the WMF and WMP.

Process water will be sourced from the WMF, via a pump on a barge collecting clear water, and conveyed to the concentrator plant via a pipeline. Water to supply the buildings, as well as for the fire suppression distribution system will be provided by the WTF.

25.9 Waste Management Facility

The extracted material from the OP will use conventional crushing, flotation, re-grinding, and gravity concentration. Thickened PAG tailings will be delivered to the WMF at a design solids content of approximately 63% by mass. PAG and Uncertain waste rock from OP development will be hauled to the WMF. The PAG and Uncertain waste rock excavated from initial OP development will be used for a portion of Stage 1 embankment construction, and the remainder will be placed within the WMF basin and covered with tailings during ongoing mining operations. Saprolite and NPAG waste rock from OP mine development will be primarily used to construct the WMF embankments and downstream buttresses. Additional saprolite and weathered bedrock (transition zone) material not needed for embankment construction will be placed and compacted in a waste stockpile adjacent to the downstream slope of the WMF Main Embankment.

The WMF will consist of a valley type impoundment to provide permanent storage for the PAG tailings and PAG/Uncertain waste rock. Waste storage capacity will be developed by constructing embankments around the perimeter of the valley and using the natural topography to form a valley type impoundment. The Main and Northeast Embankments will be raised using the downstream construction method and the South Embankment will be raised using the centreline construction method. The South Embankment will be a divider embankment that will establish the WMP in the southern portion of the valley.

25.10 Market Studies and Contracts

Market studies for Cu, Au and Ag have been completed by a third party concentrate trading advisory, and marketing specialist company, who were contracted by the Company to prepare a market study to support the PFS.

Marketing studies and product price assumptions are based on research and forecasts for the following products:

- The long term Consensus Cu Pricing 2021-2024 of $3.60 per pound
- The long term Consensus Au Pricing 2021-2024 of $1,650 per ounce
- The long term Consensus Ag Pricing 2021-2024 of $21.0 per ounce

The Company is planning on shipping its concentrate through one of the main Colombia ports such as Tolú or Cartagena. The port will be finalized during contract/feasibility studies.

Cordoba is considering selling its concentrate through all avenues, which include entering into long term contracts with offtakers; direct with smelters or through metal traders.

The Company has no current contracts for project development, mining, concentrating, smelting, refining, transportation, handling, sales, and hedging, forward sales contracts, or arrangements.

25.11 Environmental Studies, Permitting, and Social, or Community Impact

25.11.1 Baseline Environmental Conditions

In general, groundwater, and surface water quality are good, except for the drainages impacted by approximately 40 years of tailings disposal into the streams that drain the Alacrán community. Surface water in these drainages shows clear evidence of ARD and ML. Elevated sulphate concentrations in Quebrada Valdez was observed 5 km downstream of the village.

Groundwater is relatively shallow (<5 m below ground surface) in the alluvial valleys. Due to the high rainfall, abundant springs appear during the rainy season. Groundwater appears to be unconfined. Aquifer characteristics of the rock in the vicinity of the proposed pit indicate that they are poor aquifers with low capacity for groundwater movement. The potential role of geologic structures to convey groundwater to the pit is still to be determined.

Abundant surface water is available for the mine from the nearby San Pedro River and Quebrada San Juan. The planned makeup volume is (4.2 m3/hour) is much lower than the average flows in these two water bodies.

Static geochemical characterization of soils, waste rock and tailings indicate that the tailings are PAG. Approximately 40% of the waste rock will be PAG or have uncertain acid generation potential. Units 2 and 3 make up most of the PAG or Uncertain rock. Unit 1, intrusive rock, and the saprolite are not acid generating. The chemistry of the tailings and surface water in Quebrada Valdez clearly shows that ore has acid generation potential. Lab and field kinetic tests performed to date indicate that onset of acid generation will take several months

Baseline monitoring of air quality, vibrations, noise, and soils produced results concomitant with small, rural, and dispersed communities with dirt roads and a love of loud music.

The local ecosystem is characterized as warm, humid forest, located in the foothills where the coastal plains transition to mountain. Most of the project area has been cleared of the original vegetation for cattle grazing and agriculture.

Archaeological evidence of indigenous communities spanning a period from the second to 16th centuries of the common era was found in five locations in the footprint of the proposed mine infrastructure. The artifacts recovered were limited to ceramic fragments and lithic elements, including axes, metates, manos, and flakes.

25.11.2 Social and Community

The area around the Project is sparsely inhabited, including five small communities within 5 km of the project, and the Alacrán community located within the footprint of the proposed pit. The Alacrán community is the largest local population centre (1,200 persons) and the population within a 5 km radius is approximately 1,900. The local population subsists on mining, small scale agriculture, ranching and small businesses that support the local community (bars and stores).

Surveys of the local community show largely favourable opinions in most of the respondents to the development of future mining activities. During the spring and summer of 2021, drilling activities were curtailed due to occasional road blockades and denial of access. Issues with the local community appear to have been largely resolved through a negotiated accord and social outreach programs.

25.11.3 Waste Rock Management

Waste rock and thickened tailings will be co-disposed in the WMF, using alternating layers to maximize storage volume. Covering waste rock with low permeability tailings has the advantage of effectively sealing previous lifts of waste rock and tailings from oxygen diffusion and advection of water, which will greatly minimize the potential for ARD.

The Stage 1 WMF basin will be cleared and grubbed, then nominally compacted to reduce the permeability of the underlying saprolite/residual soil (foundation soil) and reduce potential seepage through the WMF foundation. Laboratory tests of reworked saprolite show that it has the hydraulic conductivity of compacted clay or silt (1.5E-7 cm/sec). Monitoring wells downgradient of the WMF will be used to monitor for potential leakage from the WMF and can be used as pump back wells if leakage occurs.

25.11.4 Closure

At closure, most of the mine infrastructure will be removed, with the possible exception of some of the buildings, which might be turned over to the community as part of the sustainability program. The WMF will be capped with saprolite and a growth medium. The OP dewatering infrastructure will be decommissioned, and the wells will be left in place to monitor groundwater quantity and quality. Surface water from Quebrada Palestina and the WMF will be directed into the OP. The OP is expected to fill to an elevation of approximately 118 amsl over a period of eight years due to groundwater inflow, precipitation, and surface run-off. OP overflow will be directed from an engineered spillway into a lined ditch and into the San Pedro River. During decommissioning, the WTF will stay in operation to treat and discharge water from the WMP and will then be relocated to an area east of the OP in case the overflow from the pit does not meet discharge standards.

25.11.5 Regulations and Permitting

The regulatory requirements for new mine are well defined, with the principal agencies being the national mining authority (ANM) and the national environmental agency (ANLA). Regulatory requirements for an EIA are subject to refinement as Colombia experience is a surge in mining activity. The time frame for review and approval of an EIA is not defined and can take anywhere between 6 months and 24 months.

25.12 Capital and Operating Costs

The capital cost estimate was prepared by Nordmin with an expected accuracy range of +/-25% weighted average accuracy of actual costs. Base pricing is in Q3 2021 US dollars, with no allowances for inflation or escalation beyond that time. The estimate includes direct and indirect costs, (such as engineering, procurement, construction and start up of facilities) as well as owners costs and contingency associated with mine and process facilities and on site and off site infrastructure. Total LOM capital costs, including initial, sustaining and reclamation costs, are US$ 591.0 million. The initial capital estimate is US$ 434.9 million.

The operating cost estimate was prepared by Nordmin with an expected accuracy range of +/-25% weighted average accuracy of actual costs. Base pricing is in Q3 2021 US dollars, with no allowances for inflation or escalation beyond that time. The LOM operating costs are estimated to be 1,686 million. LOM AISC (operating costs on site and off site, sustaining capital, and reclamation and closure) are expected to average US$ 1.38/lb net of credits, and US$ 2.78/lb before precious metal credits. Total on site operating costs, including royalties, are expected to average of US$ 20.97/t processed.

25.13 Economic Analysis

An engineering economic model was prepared for the Project to estimate annual cash flows and assess sensitivities to certain economic parameters. The economic results of this Technical Report are based upon the services performed by:

- Nordmin for the geology, resource, reserve, OP mining, processing, and surface infrastructure, WTF.
- Knight Piésold Ltd. for the WMF and water management, geotechnical for site infrastructure.
- Stantec for the OP geotechnical.
- INTERA for the hydrogeology, geochemistry, and environmental, and permitting.

The proposed Alacran Mine includes an approximate two year construction period, two years of mining pre-production period, followed by 13 years of production supplying a mill feed rate of 22,000 t/d, and ten years of post-production mine closure. The project is planned to utilize an owner-operated scenario.

The Project includes an OP mine and associated infrastructure, surface infrastructure to support the mine operations (i.e., maintenance and office facilities), water management features, ROM stockpiling areas, processing facility, waste and tailings management facility, and camp facility.

The Alacran Mine indicates an after-tax cash flow of 873.4$M, after-tax NPV (8%) of 415.1$M, and after-tax IRR of 25.4%. The project is most sensitive to commodity prices. On a pre-tax basis, the project has a pre-tax cash flow of 1,388 M$, a pre-tax NPV (8%) of 734.9 M$, and a pre-tax IRR of 36.1%.

26 RECOMMENDATIONS

26.1 Recommended Work Programs

26.1.1 Geology and Mineral Resources

Nordmin recommends extensive (approximately 40,000 m) consisting of infill, metallurgical, geotechnical, and hydrogeological drilling.

- Infill drilling: Primary focused on the first 5 years of the mine plan to improve Mineral Resource confidence and increase confidence of the higher grade Cu, Au, and Ag mineralization within the centre of the proposed OP.
- Upon completion of the drill program, the Mineral Resource model should be updated to reflect the changes from the drilling
- Further specific gravity testing of the saprolite material

26.1.2 Mineral Reserves

26.1.2.1 Geotechnical

For the PFS OP Geotechnical Study (Stantec) recommends, six specific geotechnical holes were planned to understand rock mass conditions for the OP design. Of the six holes only four were completely executed. Importantly, two (2) holes for the east wall were not completed and, at the time of the PFS, represented a level of uncertainty for east wall slope design, however, this was partially mitigated by use of information and further point load testing of resource holes in the zone of the pit, to adequately complete PFS level engineering.

It is strongly recommended that the remaining two uncompleted PFS holes are drilled in this part of the pit, along with additional specific FS holes. In summary, a drill program of 1,758 m should be accounted for FS OP Geotechnical site investigations.

All holes are to be drilled with HQ3 (triple tube), oriented cores with Reflex ACTIII or similar digital core orienting system. All holes are to be wireline surveyed with ATV/OTV (acoustic/optical televiewer) at hole completion. Consideration for Lugeon tests in contract, as such drilling/hydrogeological field company should have all necessary equipment to perform Lugeon testing, including packers, manifolds, appropriate pumps, etc.

Geotechnical Data Collection

Data acquisition for geotechnical site investigations will require a dedicated team of engineering geologists for duration of the program. The investigation team should consist of at least one supervising geologist and sufficient geologists and field assistants to supervise drilling, core orientations, core extraction, split removal, orientation line mark-up, depth mark-up, core placement in core boxes, photography, logging, and sampling, supervision of Lugeon, and other pumping tests, move/transport core boxes, sample selection, packaging, and dispatch. Geotechnical core logging can be undertaken using the same format as the PFS studies. It is highly recommended that Cordoba contract an external Supervision QA/QC service for the FS geotechnical site investigation (similar to what was undertaken for the PFS).

26.1.3 Mineral Processing and Recovery

The following course of action is recommended in advancing the metallurgical database to feasibility level:

Prior to embarking on feasibility testing, a program of process optimization is recommended. This program would, for example, include:

- Evaluation of ore-sorting technologies with the aim of rejecting as much of the hard, power-intensive gangue from the mill feed upstream from grinding, and
- Seeking better rejection of the floatable gangue. This is a somewhat atypical of normal Cu flotation flowsheet development so may require a little more time than normal to execute, hence the recommendation to start the work ahead of feasibility testing.
- Establishment of standard geomet flotation (and perhaps gravity) testing procedures designed to produce good quality Cu, Ag, and Au metallurgical balances.

A specific metallurgical drilling program is required to provide sufficient quantity of sample material that represents and reflects the resource inventory at the Feasibility Study level. The sample program should be designed to reflect relevant project geology, mining, and metallurgical matters in order to best emulate the ore feed most likely to be processed within the process plant. Variability sample material is of particular importance during the next stage of study, in order to optimize the performance of the process plant across variable conditions expected, especially relative to potential higher grades zones. The master composite sample should be designed to provide this spatial variability data as well as represent the LOM ore feed.

A further metallurgical program including further comminution, flotation, filtration, and thickening testwork is required to be performed based on the FS master composite in order to advance the process design criteria and process plant design that has been executed to the PFS level. It is fully expected that the process design established at the PFS level of study can be expanded upon and detailed to the level required for FS. After which, the capital and operating cost estimates can be further refined to a +/-15% level of accuracy, commensurate with the requirements for an FS.

The future required metallurgical testwork has been established and is included in the estimated budget for the FS.

Review and consideration of previous preliminary testwork completed in 2012 by Minpro and 2019 by SGS proved to be good context for the design of the prefeasibility level metallurgical testwork program completed by Blue Coast Metallurgy and Testwork.

Relevant prefeasibility level metallurgical testwork was performed on a master composite that was composed of mineralization classified into three categories, namely fresh ore, transition ore, and saprolite. Advancement of the metallurgical performance based on this master composite, that better represents the mining approach over LOM, is a significant improvement over previous work. As such, the representativity and suitability of the derived testwork data has resulted in the development of an efficient and conventional comminution and flotation circuit for the processing plant. Design criteria and subsequent equipment selection was validated by industry experts and specialized equipment vendors to the point where there is a high degree of confidence in the selected technology and process equipment carried for the processing plant and supporting surface infrastructure reflected in the project financial modelling.

A conventional SABC comminution circuit followed by a standard Cu/Au sulphide flotation circuit complete with a regrind stage was proven to produce good quality Cu and Au concentrates.

26.1.4 Infrastructure

This Technical Report is supported by engineering consistent with the detail required for this present level of study. At the next stage of study, the follow areas are recommended to be investigated further:

- It is recommended that a detailed geotechnical field investigation study be conducted to support the project facilities locations and infrastructure design. Drilling should be completed specifically in the proposed building areas to support foundation recommendations and analysis. Once the geotechnical data is available, trade off studies should be conducted to the optimized foundation system for the ancillary buildings and equipment foundations.
- The geotechnical investigation should include:
  - foundations recommendation for shallow footings and deep piles;
  - recommendations for slab on grade design;
  - seismic site classification;
  - complete foundation recommendations prepared to meet local codes and best practices;
  - trade off study for drilled caissons vs driven steel piles;
  - optimization of the infrastructure pad design and
  - depth to competent bed rock.
- Discussion with local populations for closure plan and the use of infrastructure after mine closure.
- Finalization of the right of way for the 110 kV transmission line corridor from Cerro Matoso to the mine site.
- Completion of further trade off/detail on establishing which Port shall be used for project, and establishing the commercial terms for stevedoring, storage, representation, etc.

26.1.5 Waste Management

The following recommendations are provided to support future, more detailed levels of study:

- Additional site investigations, in situ testing, and laboratory testing to confirm the following:
  - The extent of the coarse alluvium under the Main Embankment footprint.
  - The contact between the residual soil/saprolite and the coarse alluvium downstream of the Northeast Embankment.
  - Groundwater levels below the Main, Northeast, and South Embankments.
  - The strength, permeability, and consolidation characteristics of the residual soil and saprolite below the Main, Northeast, and South Embankments.
  - The thickness, strength, and permeability of the weathered bedrock below the Main, Northeast, and South Embankments.
  - The permeability of the bedrock below the Main, Northeast, and South Embankments.
  - The extent of faulting within the South Embankment foundation.
- Three dimensional seepage modelling to further assess potential seepage associated with the complex topography and stratigraphy, faulting within the WMF embankment foundations, and the potential for seepage to flow in several directions from the WMF (i.e., north, east, south, and west).
- A detailed seismicity assessment, along with deformation analyses, to assess the sensitivity of the WMF embankments to seismic loading.
- Consolidation modelling to assess the sensitivity of the WMF embankments to pore pressure conditions in the foundation and to refine the embankment raising plan.
- A review of the basin filling and embankment construction schedule to estimate the maximum elevation difference between the embankment crest and the tailings at different points in time. This assessment will confirm the maximum loading conditions for evaluating upstream slope stability.
- Stability assessments for waste stockpiles.

- A review of the hydrometeorological data and extreme storm event estimates to refine the stormwater management measures.

26.1.6 Environmental Programs

Additional environmental data are required to provide the level of detail required for the FS and EIA. The recommended work is summarized below.

- Continuation of the monitoring program to develop a longer baseline (water levels, groundwater quality, surface water flow, and quality).
- A second round of geochemical characterization of geologic materials, which will include sample collection and analysis of waste rock, tailings, soil/rock under the proposed mine infrastructure and ore that will be stockpiled during mine construction.
- Evaluation of the chemistry and extent of tailings from illegal mining in Quebrada Valdez, Quebrada La Hoga Mina, and Quebrada La Hoga Conis Avlies to inform remedial planning.
- Continuation of the kinetic geochemical analyses (humidity cells and barrel tests) to refine the waste rock management plan and pit lake mixing model.
- Installation and testing of five wells to evaluate aquifer characteristics and inform the numerical groundwater model.
- Installation of VWPs within the planned pit to refine the conceptual hydrogeologic model.
- Installation of automatic gauging stations in streams that might be affected by mining operations.
- Groundwater numerical modelling in support of the design of the pit dewatering system and to evaluate the impact of long term dewatering on groundwater levels and stream/river flows around the mine.
- Flow and water quality modelling of the discharge locations for treated process water, treated contact water and pit overflow (at closure).
- OP lake chemical modelling to inform the discharge water quality model and closure planning.

26.2 Recommendation Budget

The recommendations focus on drilling activities, environmental baseline programs, metallurgical test work, and field work to support infrastructure, water management, and waste management designs and prepare an FS and an EIA study. The recommendations are estimated to require a total budget of US$ 36.45 million. Table 26-1 outlines the cost to complete the FS and Table 26-2 outlines the cost to complete the EIA study.

Table 26-1: Feasibility Budget Recommendations

Item	Cost (US$)
Drilling approximately 40,000 m	12,030,000
Engineering and Engineering Studies	12,000,000
Other Contractor Costs	4,500,000
Project Team – Support for Project Director	700,000
Contingency (15%)	4,380,000
Total	**33,610,000**

Source: Nordmin, 2021

Table 26-2: EIA Budget Recommendations

Item	Cost (US$)
EIA Study work	2,500,000
Contingency (15%)	375,000
Total	**2,875,000**

Source: Nordmin, 2021

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28 DEFINITIONS AND ABBREVIATIONS

28.1 Definition of Terms

Table 28-1 summarizes the general mining terms potentially used in this Technical Report.

Table 28-1: Definition of Terms

Term	Definition
Alluvium	Soil or sediment transported and deposited by flowing water.
Assay	The chemical analysis of mineral samples to determine the metal content.
Berm	A horizontal shelf or ledge built into a sloping wall of an OP or quarry for protection under level.
Bench	A ledge which forms a single level of operation where ore and waste are excavated.
Capital Expenditure	All other expenditures not classified as operating costs.
Composite	Combining more than one sample result to give an average result over a larger distance.
Concentrate	A metal-rich product resulting from a mineral enrichment process such as gravity concentration or flotation, in which most of the desired mineral has been separated from the waste material in the ore.
Crushing	The initial process of reducing the ore particle size to render it more amenable for further processing.
Cut-Off Grade	The grade of mineralized rock, which determines as to whether or not it is economical to recover its gold content by further concentration.
Dilution	Waste, which is unavoidably mined with ore.
Dip	The angle of inclination of a geological feature/rock from the horizontal.
Fault	The surface of a fracture along which movement has occurred.
Footwall	The underlying side of an orebody or stope.
Gangue	Non valuable components of the ore.
Grade	The measure of the concentration of gold within the mineralized rock.
Hanging wall	The overlying side of an orebody or slope.
Hydrocyclone	A process whereby material is graded according to size by exploiting centrifugal forces of particulate materials.
Igneous	Primary crystalline rock formed by the solidification of magma.
Kriging	An interpolation method of assigning values from samples to blocks that minimize the estimation error.

Term	Definition
Lithological	Geological description pertaining to different rock types.
Life of Mine	The length of time a mine is or could be in production.
Milling	A general term used to describe the process in which the ore is crushed and ground and subjected to physical or chemical treatment to extract the valuable metals to a concentrate or finished product.
Mineral/Mining Lease	A lease area for which mineral rights are held.
Ongoing Capital	Capital estimates of a routine nature, which is necessary for sustaining operations.
Pit Limit	The maximum vertical and lateral extent which may be excavated economically in an OP mine.
Pit Slope	The angle from the horizontal which the wall of an OP stands as measured from crest to toe.
Run of Mine	A term used loosely to describe ore of average grade.
Sedimentary	Pertaining to rocks formed by the accumulation of sediments, formed by the erosion of other rocks.
Sill	A thin, tabular, horizontal to the sub-horizontal body of igneous rock formed by the injection of magma into planar zones of weakness.
Smelting	A high temperature pyrometallurgical operation conducted in a furnace, in which the valuable metal is collected to a molten matte or dolt phase and separated from the gangue components that accumulate in a less dense molten slag phase.
Stratigraphy	The study of stratified rocks in terms of time and space.
Strike	The direction of the line formed by the intersection of strata surfaces with the horizontal plane, always perpendicular to the dip direction.
Stripping	The removal of overburden.
Strip Ratio	The ratio of a unit of waste material removed per similar unit of ore material removed.
Sulphide	A sulphur-bearing mineral.
Tailings	Finely ground waste rock from which valuable minerals or metals have been extracted.
Thickening	The process of concentrating solid particles in suspension.
Toe	The base of a bank bench or a slope.

Term	Definition
Total Expenditure	All expenditures, including those of an operating and capital nature.
Variogram	A statistical representation of the characteristics (usually grade).
Waste Dump	A place where waste materials are piled.

28.2 Abbreviations and Acronyms

The following abbreviations and acronyms have been used in this Technical Report.

Table 28-2: Abbreviations and Acronyms

Abbreviation	Unit or Term
%	percent
%w/w	percent mass fraction for percent mass
<	less than
>	greater than
°	degree (degrees)
°C	degrees Celsius
µm	micrometre or micron
A	ampere
AA	atomic absorption
AAS	atomic absorption spectroscopy
ABA	acid base accounting
ACME	ACME Analytical Laboratories Colombia S.A.S
ADT	articulated dump truck
Ag	silver
AHK	Alfred H Knight
AISC	all-in sustaining cost
Al	aluminum
AMEC	AMEC Foster Wheeler (now Wood Plc)
amsl	above mean sea level
ANLA	National Environmental Licensing Agency
ANM	National Mining Agency
AP	acid generating potential
ARD	acid rock drainage
ASM	artisanal and small scale mining
ASOMINAL	Asociación de Mineros El Alacrán
Au	gold
CapEx	capital expenditure
Car	carbonate
CBM	carbonate base metal
Chl	chlorite

Abbreviation	Unit or Term
CIBC	Canadian Imperial Bank of Commerce
CIM	Canadian Institute of Mining, Metallurgy, and Petroleum
cm	centimetre
CM Company	Cobre Minerals S.A.S.
cm^2	square centimetre
cm^3	cubic centimetre
CMA	Compañía Minera Alacran S.A.S.
CMH	CMH Colombia S.A.S.
CN	curve number
COP	Colombian Pesos
CRD	carbonate replacement deposit
CREE	income tax for equality
CRM	certified reference material
Cu	copper
CuEq	copper equivalent
CVS	Corporacion Autonoma Regional de los Valles del Sinú y del San Jorge
DCF	discounted cash flow
DDH	diamond drill hole
DH	drill hole
DIAN	National Tax and Customs Directorate
DWI	drop-weight index
dmt	dry metric tonnes
ECSAS	the operator of the Mining Title III-08021
EDF	environmental design flood
EDS	environmental design storm
EGL	effective grinding length
EGRG	extended gravity recoverable gold
EIA	environmental impact assessment
EM	electromagnetics
EMPA	electron microprobe analysis
ENE	East North East
EPCM	Engineering, Procurement, and Construction Management
ERT	emergency response transport
ET	evapotranspiration
FA	fire assay
Fe	iron
FEL	Front end loader
FOB	free on board
FoS	factor of safety
FS	Feasibility Study

Abbreviation	Unit or Term
ft	foot (feet)
ft^2	square foot (feet)
ft^3	cubic foot (feet)
g	gram
G&A	general and administrative
g/cm^3	grams per cubic centimetre
g/L	gram per litre
g/t	grams per tonne
Ga	giga-annum (1 billion years)
gal	gallon
GEL	global environmental licence
GIS	geographic information system
GMF	financial transactions tax
g-mol	gram-mole
GPS	global positioning system
GRG	gravity recoverable gold
ha	hectare (10,000 m^2)
HDPE	high-density polyethylene
HG	high grade
Hp	horsepower
HPGR	high pressure grinding rolls
HSU	hydrostratigraphic units
ICP	inductively coupled plasma-mass
ICP-AES	inductively coupled plasma atomic emission spectrometry
ID2	inverse distance squared
IDF	inflow design flood
IEA	International Energy Agency
INTERA	INTERA Inc.
IOCG	iron oxide copper-gold
IRR	internal rate of return
ISA	Interconexión Eléctrica
kdmt	thousand dry metric tonnes
kg	kilogram
kg/m^2	kilogram per square metre
kg/m^3	kilogram per cubic metre
km	kilometre
km^2	square kilometre
kt	thousand tonnes
ktpa	kilotonnes per annum
kV	kilovolt

Abbreviation	Unit or Term
L	litre
L/s	litres per second
lb	pound
LBMA	London Bullion Market Association
LG	low grade
LIDAR	light detection and ranging
LN	natural logarithm
LNG	liquefied natural gas
LOM	life of mine
m	metre
M	million
m^2	square metre
m^3	cubic metre
Ma	mega-annum (1 million years)
MCE	maximum credible earthquake
MCSAS	a Colombian subsidiary of Cordoba
MDRU	mineral deposit research unit
mg/L	milligrams/litre
MIBC	methyl isobutyl carbinol
ML	metal leaching
mm	millimetre
mm^2	square millimetre
mm^3	cubic millimetre
MME	Ministry of Mines and Energy
Modified NP	modified net neutralization potential
Moz	million troy ounces
MPX	MPX Geophysics Ltd., Canada
MT	metric tonnes
Mt	million tonnes
Mtpa	million tonnes per annum
mtpd	metric tonnes per day
mtph	metric tonnes per hour
MVA	mega volt amp
MW	megawatt
MWh	megawatt hour
NEE	North East
NEN	North East North
Ni	nickel
NI 43-101	Canadian National Instrument 43-101
NN	nearest neighbour

Abbreviation	Unit or Term
NNE	North East
NNW	North West
NP	neutralizing potential
NPAG	non-potentially acid generating
NPR	net potential ratio
NPV	net present value
NS	North South
NSR	net smelter return
NW	North West
OK	ordinary kriging
OMNI	Sociedad Ordinaria de Minas Omni
OMS	operations, maintenance, and surveillance
OP	open pit
OpEx	operating expenditures
opt	ounce per tonne
OTC	over the counter
oz	troy ounce
PAG	potentially acid generating
PAX	potassium amyl xanthate
Pb	lead
PCS	process control system
PEA	Preliminary Economic Assessment
PFS	Prefeasibility Study
PGA	peak ground acceleration
PGM	platinum group metals
PGS	social management plan
Plag	plagioclase
PM	precious metal
PMF	potential mill feed
PMP	probable maximum precipitation
ppb	parts per billion
ppm	parts per million
PTO	exploitation working plan
PV	present value
Py	pyrite
QA/QC	quality assurance/quality control
QC	quality control
QP	Qualified Person
Qtz	quartz
RAB	rotary air blast

Abbreviation	Unit or Term
RC	reverse circulation
RCSAS	Recursos de Colombia S.A.S.
RDT	rigid frame haul truck
RF	revenue factor
RMR	rock mass rating
ROM	run of mine
RQD	rock quality description
RTP	reduced to pole
S	sulphur
SABC	semi autogenous ball mill comminution
SAG	semi autogenous grinding
Sb	antimony
SCS	Soil Conservation Service
SEC	Securities and Exchange Commission
sec	second
SG	specific gravity
SI	System International
SIAC	Colombian National Information System
SMC	SAG mill comminution
SMD	San Matías District
SMU	selected mining unit
Sph	sphalerite
su	standard units
SWIR	short wavelength infrared analysis
t	tonne (metric ton) (2,204.6 pounds)
t/d	tonnes per day
t/h	tonnes per hour
TARP	trigger action response plan
TDEM	time domain electromagnetics
Th	thorium
Ti	titanium
TR	Terms of Reference
TSS	total suspended solids
U	uranium
UBC	University of British Columbia
UHF	ultra high frequency
US	United States
UTM	Universal Transverse Mercator
VFD	variable frequency drive
VMS	volcanogenic massive sulphide

Abbreviation	Unit or Term
VWP	vibrating wire piezometers
W	tungsten
WMF	waste management facility
WMP	water management pond
WSMD	weighing sampling moisture determination
WTF	water treatment facility
y	year
Zn	zinc

APPENDIX A: Certificates of Qualified Persons

Knight Piésold
CONSULTING

CERTIFICATE OF QUALIFIED PERSON

I, Wilson Muir, P.Eng., of North Bay, Ontario do hereby certify:

1. I am a Senior Engineer with Knight Piésold Ltd. with a business address at 1650 Main Street West, North Bay, Ontario.
2. This certificate applies to the technical report titled "NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Colombia" with an Effective Date of January 11, 2022 (the "Technical Report").
3. I am a graduate of the University of British Columbia, 1994, with a Bachelor of Applied Science in Geological Engineering.
4. I am a member in good standing of the Professional Engineers of Ontario and registered as a Professional Engineer, license number 100060272.
5. My relevant experience includes 29 years of experience as a consulting engineer in the field of geotechnical engineering. I am a "Qualified Person" for the purposes of Canadian National Instrument 43-101 ("NI 43-101" or the "Instrument").
6. My most recent personal inspection of San Matías Copper-Gold-Silver Project ("the Project"), located in Colombia, South America, was September 20 to September 21, 2021. The Project is within the jurisdiction of the Municipality of Puerto Libertador, Department of Córdoba, 390 km northwest of Bogotá, 160 km north of Medellín, and 112 km south of Montería.
7. I am responsible for Sections 18.11 and 18.12 and portions of Sections 1, 21, 25 and 26 (the "Relevant Sections") summarized within the Technical Report.
8. I am independent of Cordoba Minerals Corp., as defined by Section 1.5 of the Instrument.
9. I have read the NI 43-101 reporting requirements and the portions of the Technical Report, for which I am responsible, have been prepared in accordance with the Instrument and Form 43-101F1.
10. As of the date of this certificate, to the best of my knowledge, information, and belief, the Sections of the Technical Report that I am responsible for contain all scientific and technical information relating to the Project that is required to be disclosed to make the Technical Report not misleading.
11. I have previous involvement with the Project that is the subject of the Technical Report, as I was a QP for the technical report titled "NI 43-101 Technical Report and Preliminary Economic Assessment, San Matías Copper-Gold-Silver Project, Colombia" with an Effective Date of July 29, 2019.

Signed and dated this 11th day of January 2022, at North Bay, Ontario.

LICENSED PROFESSIONAL ENGINEER
C.W. MUIR
2022-01-11
PROVINCE OF ONTARIO

Wilson Muir, P.Eng., Senior Engineer, Knight Piésold Ltd.

Knight Piésold Ltd. | 1650 Main Street West | North Bay, Ontario | Canada, P1B 8G5
T +1 705 476 2165 | E northbay@knightpiesold.com | www.knightpiesold.com

CERTIFICATE OF QUALIFIED PERSON

I, Kurt Boyko, P. Eng., of Thunder Bay, Ontario do hereby certify:

1. I am the Consulting Specialist – Mechanical Systems with Nordmin Engineering Ltd. with a business address at 160 Logan Ave., Thunder Bay, Ontario.
2. This certificate applies to the technical report titled "NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Colombia" with an Effective Date of January 11, 2022 (the "Technical Report").
3. I am a graduate of Lakehead University, 1994, with a Bachelor of Engineering Degree, Mechanical.
4. I am a member in good standing of the Professional Engineers of Ontario and registered as a Professional Engineer, license number 90418484.
5. My relevant experience includes 29 years of experience of design and operation of industrial processing plants, including materials handling and pumping design, machine design, mine dewatering plans, and ventilation systems. I am a "Qualified Person" for the purposes of Canadian National Instrument 43-101 ("NI 43-101" or the "Instrument").
6. I have inspected the site of San Matías Copper-Gold-Silver Project ("the Project"), located in Colombia, South America, on September 20 to September 21, 2021. The Project is within the jurisdiction of the Municipality of Puerto Libertador, Department of Córdoba, 390 km northwest of Bogotá, 160 km north of Medellín, and 112 km south of Montería.
7. I am responsible for Section 17 and portions of Sections 1,18,21,25 and 26 (the "Relevant Sections") summarized within the Technical Report.
8. I am independent of Cordoba Minerals Corp., as defined by Section 1.5 of the Instrument.
9. I have read the NI 43-101 reporting requirements and the Relevant Sections of the Technical Report, for which I am responsible, have been prepared in accordance with the Instrument and Form 43-101F1.
10. As of the date of this certificate, to the best of my knowledge, information, and belief, the Relevant Sections of the Technical Report that I am responsible for, contain all scientific and technical information relating to the Project that is required to be disclosed to make the Technical Report not misleading.
11. I have previous involvement with the Project that is the subject of the Technical Report, as I was a QP for the technical report titled "NI 43-101 Technical Report and Preliminary Economic Assessment, San Matías Copper-Gold-Silver Project, Colombia" with an Effective Date of July 29, 2019.

Signed and dated this 11th day of January 2022, at Thunder Bay, Ontario.

____

Kurt Boyko, P.Eng.
Consulting Specialist – Mechanical Systems
Nordmin Engineering Ltd.

Stantec Consultoria Chile Ltd
Av. Apoquindo 4775, Piso 2
Las Condes – Santiago
Chile

CERTIFICATE OF QUALIFIED PERSON

I, Peter Cepuritis, MAusIMM (CP), of Las Condes, Santiago, Chile do hereby certify:

1. I am the Consulting Specialist – Geotechnical (Mining) sub-contracted to Stantec Consultoría Chile Ltda., with a business address at Av. Apoquindo 4775, Piso 2, Las Condes, Santiago, Chile.
2. This certificate applies to the Technical Report titled "NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Colombia" with an effective date of January 11th, 2022 (the "Technical Report").
3. I am a graduate of the RMIT University, 1990 with a Bachelor of Applied Science in Applied Geology, and I have a Master of Engineering Science in Mining Geomechanics from Curtin University, 1998, and a PhD in Geomechanics from Curtin University, 2011.
4. I am a member in good standing of the Australasian Institute of Mining and Metallurgy and registered as a Chartered Professional Geotechnical (Mining), Membership No. 109802.
5. My relevant experience includes 30 years of experience in geotechnical site investigations, geotechnical studies and mining operations, and assistance in mineral reserve estimations. I am a "Qualified Person" for the purposes of Canadian National Instrument 43-101 – Standards of Disclosure for Mineral Projects ("NI 43-101" or the "Instrument").
6. I am responsible for parts of Section 15 and their related portions of Sections 1, 25 and 26.
7. I am independent of Cordoba Minerals Corp., as defined by Section 1.5 of the Instrument.
8. I have read the NI 43-101 and the entirety of the Technical Report, for which I am responsible, has been prepared in compliance with the Instrument and Form 43-101F1.
9. As of the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Sections of the Technical Report that I am responsible for, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
10. I have no prior involvement with the San Matías Copper-Gold-Silver Project.

Signed and dated this 11th day of January 2022, at Santiago, Chile.
"Signed and sealed""

Peter Cepuritis, MAusIMM (CP).
Consulting Specialist – Geotechnical
Stantec Consultoria Chile Ltda.

NORDMIN
RESOURCE & INDUSTRIAL
ENGINEERING

CERTIFICATE OF QUALIFIED PERSON

I, Harold Harkonen, P. Eng., of Thunder Bay, Ontario do hereby certify:

1. I am the Consulting Specialist – Power Systems with Nordmin Engineering Ltd. with a business address at 160 Logan Ave., Thunder Bay, Ontario.
2. This certificate applies to the Technical Report titled "NI 43-101 Technical Report and Prefeasibility Study for the San Matías Copper-Gold-Silver Project, Colombia" with an effective date of January 11, 2022 (the "Technical Report").
3. I am a graduate of Lakehead University, 1989 with a Bachelor of Engineering.
4. I am a member in good standing of the Professional Engineers Ontario and registered as a Professional Engineer, license number 90299520.
5. My relevant experience includes 30 years of experience in design and engineering of mining and industrial infrastructure.
6. I am a "Qualified Person" for the purposes of Canadian National Instrument 43-101 – Standards of Disclosure for Mineral Projects ("NI 43-101" or the "Instrument").
7. I have not visited the San Matias Copper-Gold-Silver Project situated within the jurisdiction of the Municipality of Puerto Libertador, Department of Córdoba, 390 km northwest of Bogotá, 160 km north of Medellín, and 112 km south of Montería.
8. I am responsible for Section 18.8 and its related portion of Sections 1, 2, 21, 25 and 26.
9. I am independent of Cordoba Minerals Corp., as defined by Section 1.5 of the Instrument.
10. I have read the NI 43-101 and the Sections of the Technical Report, for which I am responsible, have been prepared in compliance with the Instrument and Form 43-101F1.
11. As of the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Sections of the Technical Report that I am responsible for, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
12. I have previous involvement with the Project that is the subject of the Technical Report, as I was a QP for the technical report titled "NI 43-101 Technical Report and Preliminary Economic Assessment, San Matías Copper-Gold-Silver Project, Colombia" with an Effective Date of July 29, 2019.

Signed and dated this 11th day of January, 2022, at Thunder Bay, Ontario.

LICENSED PROFESSIONAL ENGINEER
H. E. HARKONEN
11-Jan-2022
PROVINCE OF ONTARIO

____

Harold Harkonen, P. Eng.
Consulting Specialist – Power Systems
Nordmin Engineering Ltd.

NORDMIN
RESOURCE & INDUSTRIAL
ENGINEERING

CERTIFICATE OF QUALIFIED PERSON

I, Glen Kuntz, P. Geo., of Thunder Bay, Ontario do hereby certify:

1. I am the Consulting Specialist – Geology/Mining with Nordmin Engineering Ltd. with a business address at 160 Logan Ave., Thunder Bay, Ontario.
2. This certificate applies to the technical report titled "NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Colombia" with an Effective Date of January 11, 2022 (the "Technical Report").
3. I am a graduate of the University of Manitoba, 1991, with a Bachelor of Science in Geology.
4. I am a member in good standing of the Association of Professional Geoscientist of Ontario and registered as a Professional Geoscientist, license number 0475.
5. My relevant experience includes 30 years of experience in exploration, operations and resource estimations. I am a "Qualified Person" for the purposes of Canadian National Instrument 43-101 ("NI 43-101" or the "Instrument").
6. My most recent personal inspection of San Matías Copper-Gold-Silver Project ("the Project"), located in Colombia, South America, was January 18 to January 21, 2021, and September 20 to September 21, 2021. The Project is within the jurisdiction of the Municipality of Puerto Libertador, Department of Córdoba, 390 km northwest of Bogotá, 160 km north of Medellín, and 112 km south of Montería.
7. I am responsible for Sections 2 through 4, 6 through 12, 14, 19, 23, 24 and 27 and portions of Sections 1, 25 and 26 (the "Relevant Sections") summarized within the Technical Report.
8. I am independent of Cordoba Minerals Corp., as defined by Section 1.5 of the Instrument.
9. I have read the NI 43-101 reporting requirements and the Relevant Sections of the Technical Report, for which I am responsible, have been prepared in accordance with the Instrument and Form 43-101F1.
10. As of the date of this certificate, to the best of my knowledge, information, and belief, the Relevant Sections of the Technical Report that I am responsible for, contain all scientific and technical information relating to the Project that is required to be disclosed to make the Technical Report not misleading.
11. I have previous involvement with the Project that is the subject of the Technical Report, as I was a QP for the technical report titled "NI 43-101 Technical Report and Preliminary Economic Assessment, San Matías Copper-Gold-Silver Project, Colombia" with an Effective Date of July 29, 2019.

Signed and dated this 11th day of January 2022, at Thunder Bay, Ontario.

PROFESSIONAL GEOSCIENTISTS
GLEN N. KUNTZ
PRACTISING MEMBER
0475
ONTARIO

Glen Kuntz, P.Geo.
Consulting Specialist – Geology/Mining
Nordmin Engineering Ltd.

CERTIFICATE OF QUALIFIED PERSON

I, Christopher Martin, C.Eng., of Nanoose Bay, British Columbia do hereby certify:

1. I am the Principal Metallurgist with Blue Coast Metallurgy Ltd. with a business address at 2020 Herring Gull Way, Parksville, BC, V9P 1R2.
2. This certificate applies to the technical report titled "NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Colombia" with an Effective Date of January 11, 2022 (the "Technical Report").
3. I am a graduate of Camborne School of Mines, Redruth, UK with a Batchelor of Science (Honours) degree in Mineral Processing and of McGill University, Montreal, Canada with a Master of Engineering degree in Metallurgical Engineering.
4. I am a member in good standing of the British Institute of Materials, Minerals and Mining, license number and a Chartered Engineer, Licence number 46116.
5. My relevant experience includes 35 years of experience in mineral processing flowsheet design and milling operations. I am a "Qualified Person" for the purposes of Canadian National Instrument 43-101 ("NI 43-101" or the "Instrument").
6. I have not been to the site of the San Matías Copper-Gold-Silver Project ("the Project"), located in Colombia, South America.
7. I am responsible for Sections 13, and portions of Sections 1, 21, 25 and 26 (the "Relevant Sections") summarized within the Technical Report.
8. I am independent of Cordoba Minerals Corp., as defined by Section 1.5 of the Instrument.
9. I have read the NI 43-101 reporting requirements and the Relevant Sections of the Technical Report, for which I am responsible, have been prepared in accordance with the Instrument and Form 43-101F1.
10. As of the date of this certificate, to the best of my knowledge, information, and belief, the Relevant Sections of the Technical Report that I am responsible for, contain all scientific and technical information relating to the Project that is required to be disclosed to make the Technical Report not misleading.
11. I have had no involvement with the Project prior to this study.

Signed and dated this 11th day of January 2022, at Nanoose Bay, British Columbia.

____

Christopher Martin, C.Eng.
Principal Metallurgist
Blue Coast Metallurgy Ltd.

NORDMIN
RESOURCE & INDUSTRIAL
ENGINEERING

CERTIFICATE OF QUALIFIED PERSON

I, Joanne Robinson, P.Eng., of Toronto, Ontario do hereby certify:

1. I am a Senior Mining Engineer with Nordmin Engineering Ltd. with a business address at 160 Logan Ave., Thunder Bay ON, P7A 6R1.
2. This certificate applies to the Technical Report titled "NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Colombia" with an effective date of January 11, 2022 (the "Technical Report").
3. I am a graduate of Queen's University with a Bachelor of Science in Mining Engineering. I am a member in good standing of the Association of Professional Engineers of Ontario (PEO), License Number 100049603. I have been working as a mining engineer from 1997 to 2000 and 2004 to present.
4. My relevant experience includes 7 years working at various Canadian open pit operations in progressively senior roles doing production engineering, mine design, and mine planning; over 3 years with an open pit mine development project focusing on the pit optimization, mine design, mine planning, cost estimation, and project management; and over 9 years in mine consulting completing the open pit mine design, optimization, planning, mine cost estimation, and cash flow model analyses for a number of technical studies.
5. I am a "Qualified Person" for the purposes of Canadian National Instrument 43-101 – Standards of Disclosure for Mineral Projects ("NI 43-101" or the "Instrument").
6. I have visited the Property on September 20-21, 2021.
7. I am responsible for Sections 15, 16, 22 and their related portion of Sections 1, 2, 3, 21, 25 and 26.
8. I am independent of Cordoba Minerals Corp., as defined by Section 1.5 of the Instrument.
9. I have read the NI 43-101 and the entirety of the Technical Report, for which I am responsible, has been prepared in compliance with the Instrument and Form 43-101F1.
10. As of the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Sections of the Technical Report that I am responsible for, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
11. I have no prior involvement with the Project.

Signed and dated this 11th day of January 2022, at Toronto, Ontario.

LICENSED PROFESSIONAL ENGINEER
J.P. ROBINSON
100049603
11/01/22
PROVINCE OF ONTARIO

Joanne Robinson, P.Eng.
Senior Mine Engineer, Open Pit
Nordmin Engineering Ltd.

NORDMIN
RESOURCE & INDUSTRIAL
ENGINEERING

CERTIFICATE OF QUALIFIED PERSON

I, Steven Pumphrey, P. Eng., of Thunder Bay, Ontario do hereby certify:

1. I am the Consulting Engineer – Civil / Structural with Nordmin Engineering Ltd. with a business address at 160 Logan Ave., Thunder Bay, Ontario.
2. This certificate applies to the Technical Report titled "NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Columbia" with an Effective Date of January 11, 2022 (the "Technical Report").
3. I am a graduate of Lakehead University, 2006 with a Bachelor of Engineering.
4. I am a member in good standing of the Professional Engineers Ontario and registered as a Professional Engineer, license number 100120156.
5. My relevant experience includes 15 years of experience in design and engineering of mining and industrial infrastructure. I am a "Qualified Person" for the purposes of Canadian National Instrument 43-101 – Standards of Disclosure for Mineral Projects ("NI 43-101" or the "Instrument").
6. I have not visited the San Matías Copper-Gold-Silver Project ("the Project"), located in Colombia, South America.
7. I am responsible for Sections 18.1 through 18.6, 18.8, 18.9, 18.10 and 18.13, and their related portion of Sections 1, 2, 21, 25 and 26.
8. I am independent of Cordoba Minerals Corp., as defined by Section 1.5 of the Instrument.
9. I have read the NI 43-101 and the Sections of the Technical Report, for which I am responsible, have been prepared in compliance with the Instrument and Form 43-101F1.
10. As of the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Sections of the Technical Report that I am responsible for, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
11. I have no prior involvement with the Project that is the subject of the Technical Report.

Signed and dated this 11th day of January 2022, at Thunder Bay, Ontario.

LICENSED PROFESSIONAL ENGINEER
S. J. PUMPHREY
100120156
01/11/22
PROVINCE OF ONTARIO

Steven Pumphrey, P. Eng.
Consulting Engineer – Civil / Structural
Nordmin Engineering Ltd.

CERTIFICATE OF QUALIFIED PERSON

I, Patrick Williamson, P. Geo., of Boulder, Colorado do hereby certify:

1. I am Principal Hydrogeochemist with INTERA Inc., with a Corporate business address of 9600 Great Hills Trail, Suite 300W, Austin, TX
2. This certificate applies to the technical report titled "NI 43-101 Technical Report and Prefeasibility Study, San Matías Copper-Gold-Silver Project, Colombia" with an Effective Date of January 11, 2022 (the "Technical Report").
3. I am a graduate of the Colorado College, with a Bachelor of Science in Geology and the University of Colorado (Boulder) with a Masters in Geology.
4. I am Registered Professional Geologist, CA license number 5496, in good standing with the California State Board of Registration for Geologists and Geophysicists.
5. I am a Qualified Person (QP 1359) in good standing with the Mining and Metallurgical Society of America.
6. My relevant experience includes 33 years of consulting in the hydrogeology, hydrology and geochemistry of rock/water interaction for a range of environmental and mining projects. My focus has been exclusively in the mining sector since 2005, mostly in Latin America.
7. My most recent personal inspection of San Matías Copper-Gold-Silver Project ("the Project"), located in Colombia, South America, was September 20 to September 21, 2021. I also visited the project in November 2017, prior to my involvement with the Project. The Project is within the jurisdiction of the Municipality of Puerto Libertador, Department of Córdoba, 390 km northwest of Bogotá, 160 km north of Medellín, and 112 km south of Montería.
8. I am responsible for Sections 5 and 20, and portions of Sections 1, 25 and 26 (the "Relevant Sections") summarized within the Technical Report.
9. I am independent of Cordoba Minerals Corp., as defined by Section 1.5 of the Instrument.
10. I have read the NI 43-101 reporting requirements and the Relevant Sections of the Technical Report, for which I am responsible, have been prepared in accordance with the Instrument and Form 43-101F1.
11. As of the date of this certificate, to the best of my knowledge, information, and belief, the Relevant Sections of the Technical Report that I am responsible for, contain all scientific and technical information relating to the Project that is required to be disclosed to make the Technical Report not misleading.
12. I had no previous involvement with the Project that is the subject of the Technical Report.

Signed and dated this 11th day of January 2022, at Boulder, Colorado.

ORGANIZED APRIL 1908 INCORPORATED DECEMBER
Patrick Williamson
1359QP
Mining & Metallurgical
Society of America

Patrick Williamson, PG, QP
Principal Hydrogeochemist
INTERA Inc.

APPENDIX B: Risk Register

Project Phase:	**Prefeasibility Report/PTO/EIA**	**Project Manager: Glen Kuntz**	**Issue Date: 07/23/2021**	
		Project Sponsor:		
		Project Risk Manager: Glen Kuntz	**Revision: 004**	

Primary Source	Secondary Source	Risk Owner or Delegator	Headline Label	Risk or Opportunity	Root Cause and Risk Description	Risk Classification	Probable Consequence Description	Primary Consequence Category	Secondary Consequence Category	Pre-Response Consequence Level	Pre-Response Likelihood Level	Pre-Response Risk Rating	Strategies to Process Risk	Risk Response - Action Plan	Post-Response Consequence Level	Post-Response Likelihood Level	Post-Response Risk Rating
Power	Engineering & Construction	Mining	Infrastructure	Risk	Power Line Alternative: environmental approval delays	Threat		Production	Organizational Effectiveness	Severe	Almost Certain	25	Explore	Submit connection study, collection of lidar along proposed route, define optimal route (multiple options), geotech site investigations	Major	Likely	16
Administrative	Engineering & Construction	Owner	Project financing	Risk	As with all resource development projects there is an inherent risk that the project will not be able to raise the necessary capital to fund any new construction.	Threat	Overall project delays and increased cost	Reputation	Financial/ Costs	Severe	Almost Certain	25	Explore	Marketing, strategic relationships with partners	Severe	Possible	15
Compliance	Political	Owner	Compliance	Risk	Improper interactions with Government Officials resulting on increased corruption risk	Threat	Reputational damage at company and group level	Reputation	Financial/ Costs	Severe	Likely	20	Improve	Internal controls, training, enforcement	Severe	Possible	15
Operational	Metallurgy/Processing	Plant Operations	Plant Operations	Risk	Variability of the ore, recovery or concentrate specifications	Threat	Lower recovery than expected affecting project returns	Financial/ Costs	Reputation	Severe	Likely	20	Mitigate	Campaign to ore sort technology, refine ore variability, look at emerging technologies	Severe	Possible	15
Power	Operations	Plant Operations	Infrastructure	Risk	Delay on obtaining the required power supply before commissioning	Threat	Overall project delays and increased cost	Financial/ Costs	Production	Major	Almost Certain	20	Explore	Alternative options need to be explored, (local gas plant vs power line). Exploring gas line to connect from Cerro Matoso to site, lng trucks vs right of way gas/power line, lng is a bridging option	Major	Possible	12
Logistics	Engineering & Construction	Owner	Mine Operations	Risk	Investigate concerns with long lead times required for the purchase/lease of the major mobile equipment.	Threat	Delays in schedule	Financial/ Costs	Production	Severe	Likely	20	Mitigate	Timing to start the equipment, secure payment/delivery schedule, locking in a portion of the fleet during FS	Major	Possible	12
Operational	Safety, Health, Environment & Community	Owner	External	Risk	Delays and human risk caused by malaria and dengue at site	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community		Severe	Likely	20	Prevent	Government spraying programs, PPE, bug spray, nets, proper medical protection	Major	Possible	12
Weather	Construction	Owner	Engineering & Construction	Risk	Delays caused by river floods during construction phase	Threat	Overall project delays and increased cost	Financial/ Costs		Major	Almost Certain	20	Accept	Ensure design can handle intake, warning systems, operational procedures	Major	Possible	12
Weather	Construction	Owner	Engineering & Construction	Risk	Delays in earthworks due to heavy rains season extension	Threat	Overall project delays and increased cost	Financial/ Costs		Major	Almost Certain	20	Accept	Ensure design can handle intake, warning systems, operational procedures	Major	Possible	12
Weather	Safety, Health, Environment & Community	Owner	Engineering & Construction	Risk	Life risk due to electrical storms and lightning	Threat	Overall project delays and increased cost	Financial/ Costs	Safety, Health, Environment & Community	Major	Almost Certain	20	Accept	Advanced warning of storms, operational procedures	Major	Possible	12
Processing	Health & Safety	Plant Operations	Engineering & Construction	Risk	Frozen charge in milling circuit resulting from power outage	Threat		Safety, Health, Environment & Community	Production	Major	Almost Certain	20	Mitigate	Install engineering control and complete operational procedure	Moderate	Likely	12
Ore Prices	Market	Owner	External	Risk	Commodity pricing: — This Project is exposed to commodity pricing on the world markets, and likely shows its greatest sensitivity to commodity pricing.	Threat		Financial/ Costs	Production	Major	Almost Certain	20	Mitigate	Tight control on Capital and Operating spending will alleviate some of the sensitivity to commodity pricing, but under an extended period of depressed metal markets, the Project would be marginal to uneconomical. Hedging strategies	Moderate	Likely	12
Permits	Environment	Owner	Safety, Health, Environment & Community	Risk	Delay in approval of EIA. 1.Evaluation process and approval of ESIA might take longer than expected 2. ANLA decision influenced by Political Campaign / Environmentalists in Public Hearing 3. Elections?	Threat	1. Delay in construction start up 2. Quality of execution works 3. Revisit project execution schedule 4. Project stoppage	Reputation	Financial	Severe	Likely	20	Mitigate	Ensure all sections structured with all supporting data, sampling over a 3-4 year period	Major	Possible	12
Social	Safety, Health, Environment & Community	Owner	Safety, Health, Environment & Community	Risk	Social unrest restarts/increases in the country - as happened in the last months	Threat		Safety, Health, Environment & Community	Financial/ Costs	Major	Likely	16	Accept	Monitor, evaluate, communicate with authorities	Major	Possible	12
Processing		Plant Operations	Engineering & Construction	Risk	Excessive content of Saprolite into crushing circuit	Threat		Production	Safety, Health, Environment & Community	Major	Likely	16	Mitigate	Block crusher, blending approach has to be adhered	Moderate	Likely	12
Geochemistry	Permit	Owner	Engineering & Construction	Risk	ANLA does not accept our correlation between the ABA data and the assay data. We would not have enough data and could not generate more in the short correction period.	Threat		Safety, Health, Environment & Community	Financial/ Costs	Major	Possible	12	Accept	Approach is documented with references/support data. Show data to authorities and allow authorities to view other mine data.	Major	Possible	12
Compliance	Political	Owner	Compliance	Risk	Bribes or corruption involving government officials or their affiliates/agents	Threat	fines, significant reputational damages at a corporate, personal and shareholder level	Financial/ Costs	Reputation	Severe	Possible	15	Improve	Internal controls, training, enforcement	Severe	Unlikely	10
Mine Design	Hydrology	Mining	Safety, Health, Environment & Community	Risk	High levels of water infiltrating into the pit	Threat	Resulting in flooding of pit, pit wall instability, loss of production, potential health and safety hazard	Safety, Health, Environment & Community	Production	Severe	Possible	15	Mitigate	Mitigated by perimeter dewatering wells, sufficient in pit sumps, ditching around pit, horizontal drains,	Severe	Unlikely	10
Open Pit Design and Planning		Mining	Mine Operations	Risk	Mining at Elevated Cut-off Value and stockpiling material for later rehandling and processing through the mill	Threat	Potential reduction in recovery within stockpile	Production	Financial/ Costs	Moderate	Almost Certain	15	Mitigate	Line the stock pile and line pond #4, if water does not meet discharge levels then water will be transferred to WMP through treatment plant	Minor	Almost Certain	10
Permits	Access	Owner	Safety, Health, Environment & Community	Risk	Fail to get environmental license on time. Detail engineering level may be required to apply for this licence	Threat	Overall project delays and increased cost	Organizational Effectiveness	Financial/ Costs	Severe	Possible	15	Mitigate	Submit proper tested chapters as per Colombia guidelines and terms of reference	Severe	Unlikely	10
Permits	Environment	Owner	Safety, Health, Environment & Community	Risk	Rejection or additional conditions by the ANLA. ANLA rejection of critical aspects such as deposits, waste water permits or others, or additional conditions required (i.e. resettlement, coexistent or social) may lead to overall project delays and increased cost.	Threat	Overall project delays and increased cost	Organizational Effectiveness	Financial	Severe	Possible	15	Mitigate	Respond to ANLAs conditions/changes to documentation, possible of legal response,	Severe	Unlikely	10
Permits	Access	Owner	Safety, Health, Environment & Community	Risk	Additional environmental license may be required prior to roads upgrade due to path changes	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community	Financial/ Costs	Severe	Possible	15	Mitigate	Previa consultation, relations with mayor, detour may cause delays to new road for it requires a environmental license	Severe	Unlikely	10
Permits	Environment	Owner	Engineering & Construction	Risk	The area selected for the TMF is suitable. However, there could be ANLA acceptance issues to build the facility due to a	Threat	1. Inability to use land 2. Project delay 3. Financial impacts - Unbudgeted costs 4. Site selection studies to be undertaken	Reputation	Financial	Severe	Possible	15	Mitigate	Completing trade off study, have appropriate location and tailings technology	Severe	Unlikely	10
Social	Safety, Health, Environment & Community	Community	Safety, Health, Environment & Community	Risk	Delays caused by communities or illegal miners (roads blocking); logistical delays and difficulties to access site.	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community	Financial/ Costs	Severe	Almost Certain	25	Mitigate	Cordoba to development plan to move the community and execute the plan	Moderate	Possible	9
Social	Safety, Health, Environment & Community	Community	Safety, Health, Environment & Community	Risk	Delays due to local population resistance to relocation and lack of government support	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community	Financial/ Costs	Severe	Almost Certain	25	Mitigate	Cordoba in conjunction with Government Support to develop a plan to move the community and execute the plan	Moderate	Possible	9
Permits	Environment	Owner	Engineering & Construction	Risk	Thickened tails approval (vs Conventional)	Threat	Overall project delays and increased cost	Financial/ Costs	Production	Severe	Almost Certain	25	Explore	Complete trade off study to demonstrate the differences between an approach, and choose the best approach, KP to share the draft options assessment document and then compile and finalise. Education of various sites that have approved comingling of thickened tails	Moderate	Possible	9
Geology	Mine Design	Mining	Resources & Reserves	Risk	Current mine plan is based upon 100% of indicated resources, with no Measured material	Threat	Grade throughput is significantly reduced	Production	Financial/ Costs	Severe	Almost Certain	25	Explore	Infill drilling is required and update of estimation	Moderate	Possible	9
Geology	Plant	Plant Operations	Plant Operations	Risk	Lack of detailed drilling to determine geochemical variations within the deposit	Threat	Development of production activity stopped	Production	Financial/ Costs	Severe	Almost Certain	25	Explore	Infill drilling is required and update of estimation, geochemical characterization, metallurgical drilling/testing	Moderate	Possible	9
Mine Waste	Environment	Owner	Mine Operations	Risk	Regulators require CM to remediate sediment contamination in Q. Valdez and Q. La Hoga	Threat		Financial/ Costs	Financial	Severe	Almost Certain	25	Improve	Collect samples in field along river, characterize the soils within the WMF, option 1 is to dig material and treat in plant or option 2 is to dig and store within WMF, cost benefit analysis to determine cleaning or plant	Moderate	Possible	9
Geology	Resource Estimation	Geology	Resources & Reserves	Risk	Infill drilling in the centre of the deposit creates grades that are less than the estimated model	Threat	Grade throughput is significantly reduced	Production	Financial/ Costs	Severe	Likely	20	Explore	Infill drilling is required and update of estimation	Moderate	Possible	9
Health & Safety	Safety, Health, Environment & Community	Owner	Safety, Health, Environment & Community	Risk	Lack of appropriate medical attention nearby the project in case of serious accident	Threat		Safety, Health, Environment & Community	Financial/ Costs	Severe	Likely	20	Mitigate	Construction have a paramedic facility on site, share medical support with Cerro Matoso. Find construction statistics with respect to frequency	Moderate	Possible	9

Primary Source	Secondary Source	Risk Owner or Delegator	Headline Label	Risk or Opportunity	Root Cause and Risk Description	Risk Classification	Probable Consequence Description	Primary Consequence Category	Secondary Consequence Category	Pre-Response Consequence Level	Pre-Response Likelihood Level	Pre-Response Risk Rating	Strategies to Process Risk	Risk Response - Action Plan	Post-Response Consequence Level	Post-Response Likelihood Level	Post-Response Risk Rating
Processing	Health & Safety	Plant Operations	Engineering & Construction	Risk	Equipment operator error or control system error in reagent make-down building which results in excessive chemical concentration or gaseous spill to environment. Failure of tanks, clarifiers, pumps, piping reticulation etc. outside of plant area proper which is protected by sloped floors/containment	Threat		Safety, Health, Environment & Community	Reputation	Severe	Likely	20	Mitigate	Installation of engagement controls, alarms, operating standards, procedures	Moderate	Possible	9
Mining dilution and mining recovery	Mining Method	Mining	Mine Operations	Risk	Excess dilution or poor ore mining recovery due to improper mining methods.	Threat		Production	Financial/ Costs	Severe	Likely	20	Mitigate	Conduct a detailed trade-off study to determine the optimal selective mining unit required to address mining selectivity, ore-loss and dilution and associated shovel versus backhoe application, ore controls are required, using autonomous equipment. Ore tracking technology	Moderate	Possible	9
Mining dilution and mining recovery	Mining Method	Mining	Mine Operations	Risk	Poor drilling and blasting practices, poor follow-up from the geology department/assay lab, and inefficient shovel operators	Threat	Can lead to both excess waste material being sent to the mill and ore being sent to the waste stockpile.	Production	Financial/ Costs	Severe	Likely	20	Mitigate	Conduct a detailed trade-off study to determine the optimal selective mining unit required to address mining selectivity, ore-loss and dilution and associated shovel versus backhoe application. Ore tracking technology	Moderate	Possible	9
Health & Safety	Procurement	Owner	Engineering & Construction	Risk	Lack of antidote in case of snake, Alacran or wasp bite, little critters	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community	Financial/ Costs	Severe	Likely	20	Prevent	Awareness, PPE, operational procedures, EpiPens, first aid kits, defibrillator (depending upon legal review)	Moderate	Possible	9
Health & Safety		Owner	Safety, Health, Environment & Community	Risk	Collision of light or medium equipment on public roads. Traffic accidents during concentrate transportation. 1. Conditions of the road: Narrow roads, sharp curves, hollows, among others. 2. Pedestrian and Bicycle Precaution 3. Imprudence of drivers - third parties 4. Neglect or distraction, overconfidence 5. Fatigue 6. Mechanical Vehicle Faults 7. Inexperienced driver 8. Adverse Climate Conditions or Natural Disaster 9. Lack of visibility 10. Third-party incidents on the road 11. Violation of traffic regulations 12. Driving under the influence of alcohol and drugs 13. Speeding 14. Presence of animals on the road	Threat	1.Serious Injuries (Deaths, Multiple Injuries) 2. Damage to equipment 3. Environmental damage, and injuries to workers or the community.	Safety, Health, Environment & Community	Production	Severe	Likely	20	Mitigate	Training, procedures, good operational equipment, equipment check lists	Moderate	Possible	9
Power	Engineering & Construction	Mining	Infrastructure	Risk	Power Line Alternative: government approval delays	Threat	Overall project delays and increased cost	Production	Organizational Effectiveness	Major	Likely	16	Mitigate	Engage with power distribution companies and look at ways to mitigate	Moderate	Possible	9
Power	Engineering & Construction	Mining	Infrastructure	Risk	Power Line Alternative: delays in completion of necessary infrastructure at Cerro Matoso substation	Threat	Overall project delays and increased cost	Production	Organizational Effectiveness	Major	Likely	16	Mitigate	Engage with power distribution companies and look at ways to mitigate	Moderate	Possible	9
Social	Security	Owner	External	Risk	Terrorism, civil unrest, local blockades, etc.	Threat	Interruption of operation	Production	Reputation	Moderate	Almost Certain	15	Mitigate	Larger social team, communications. Investigate dirt airstrip	Moderate	Possible	9
Mine Waste		Owner	Engineering & Construction	Risk	Pit overflow to San Pedro and/or Q. Valdez	Threat		Safety, Health, Environment & Community	Reputation	Moderate	Almost Certain	15	Accept	During FS study complete geochemical pit modelling, monitor the water at closure, implement an plan to reduce impact by water	Moderate	Possible	9
Operational	Metallurgy/Processing	Plant Operations	Plant Operations	Risk	Recovery Poor	Threat	1. Financial losses 2. Reputational damage	Financial/ Costs	Reputation	Severe	Possible	15	Mitigate	Utilizing engineering controls advanced control technology, mine plan blending, testwork to support met program	Moderate	Possible	9
Water Treatment	Operations	Owner	Engineering & Construction	Risk	Unforeseen cost for discharge water treatment	Threat	Overall project delays and increased cost	Financial/ Costs	Safety, Health, Environment & Community	Moderate	Almost Certain	15	Mitigate	Water optimization, reduction	Moderate	Possible	9
Geotechnical Characterization	Mine Design	Mining	Engineering & Construction	Risk	Lack of Geotech drilling and numerous faults will result in a shallowing of the pit walls, increasing strip and lowering revenue	Threat	Overall project delays and increased cost	Production	Financial/ Costs	Major	Possible	12	Mitigate	Complete further geotech drilling and analysis	Moderate	Possible	9
Hydrogeology	Mine Design	Mining	Engineering & Construction	Risk	Lack of hydrogeology holes to estimate/monitor water flow with the open pit	Threat	Overall project delays and increased cost	Production	Financial/ Costs	Major	Possible	12	Mitigate	Complete hydro drilling and analysis	Moderate	Possible	9
Camp	Engineering & Construction	Owner	Camp	Risk	Delays due to lack of accommodation capacity and services at camp on time	Threat	Delay in Construction and Operations	Financial/ Costs	Production	Moderate	Likely	12	Mitigate	Early contracts and secure resources,	Moderate	Possible	9
COVID	Supply Chain	Owner	Supply	Risk	Transportation fees and times had increased due to covid	Threat	Overall project delays and increased cost	Financial/ Costs	Production	Moderate	Likely	12	Explore	Secure options on long lead time items	Moderate	Possible	9
COVID	Procurement	Procurement	Supply	Risk	Delivery times increased due to Covid	Threat	Delay to production	Financial/ Costs	Production	Moderate	Likely	12	Explore	Secure options on long lead time items	Moderate	Possible	9
Construction		Owner	Engineering & Construction	Risk	Road upgrade not complete on time	Threat	Overall project delays and increased cost	Financial/ Costs	Reputation	Moderate	Likely	12	Mitigate	Long lead item, identify contractor, enforcing schedule	Moderate	Possible	9
Security	Safety, Health, Environment & Community	Owner	Engineering & Construction	Risk	Delays and human life risks caused by guerrilla activity. Illegal armed groups could blackmail the company to allow the construction	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community	Financial/ Costs	Major	Possible	12	Mitigate	Contractor selection, security protocols, monitoring,	Moderate	Possible	9
Hydrogeology	Permit	Owner	Engineering & Construction	Risk	Little data on the seeps and springs in the pit area for a wet summer season. In Colombia the springs are protected and the pit would have an irrecoverable impact. This is related to the community resettlement plan. There are currently some locals that claim they are using water from springs. While the locals are still there, they can make claims to be affected by the loss of these water points. The fewer water permanent springs inside the pit, the fewer opportunities for the environmental authority to imposed restrictions or request compensation.	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community	Safety, Health, Environment & Community	Moderate	Possible	9	Explore	Continue to monitor flow, locations and users	Moderate	Possible	9
Mine Pit	Mine Closure	Owner	Safety, Health, Environment & Community	Risk	Acidic conditions at/after closure requiring treatment	Threat		Financial/ Costs	Safety, Health, Environment & Community	Moderate	Possible	9	Accept	Continue the kinetic tests to determine results	Moderate	Possible	9
Environmental	Operations	Plant Operations	Safety, Health, Environment & Community	Risk	Excessive dry hydrological conditions resulting in much greater use of fresh water for process	Threat	Interruption of operation	Safety, Health, Environment & Community	Production	Moderate	Possible	9	Mitigate	Draw additional water from San Pedro. Increase solids content of the tailings, complete worst case water balance (KP will complete 95% and 5%), water use for concrete, truck wash,	Moderate	Possible	9
Tailings	Safety, Health, Environment & Community	Plant Operations	Mine Operations	Risk	Lining: use saprolite as lining instead of HDPE? Is it safe? Would be approved by regulators in Colombia? Does it follow the GLOBAL INDUSTRY STANDARD ON TAILINGS MANAGEMENT? This standard is enforced by the International Council on Mining and Metals (ICMM) - which is led by the CEOs of 27 mining and metals companies.	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community	Production	Severe	Possible	15	Explore	Field test of compacted saprolite compression, water placement and sand cone to estimate density	Major	Unlikely	8
Operational	Metallurgy/Processing	Plant Operations	Plant Operations	Risk	Quality of concentrate Inability to sell product Lower product value	Threat	1. Financial losses 2. Reputational damage	Financial/ Costs	Reputation	Severe	Possible	15	Mitigate	Insert daily sampling programs/monitoring of your process flow. Sample trucks carrying concentrate,	Major	Unlikely	8
Processing	Health & Safety	Plant Operations	Engineering & Construction	Risk	Fire involving dry reagents and/or production of toxic smoke (i.e.. belt conveyors)	Threat		Safety, Health, Environment & Community	Financial/ Costs	Severe	Possible	15	Mitigate	Engineered solutions for fire detection, evacuation and shut down of equipment	Major	Unlikely	8
Geotechnical	Engineering & Construction	Mining	Mine Operations	Risk	Ultimate detailed open pit design should be assessed for slope stability	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community	Production	Major	Possible	12	Explore	Geotech drilling, televiewer	Major	Unlikely	8
Tailings	Safety, Health, Environment & Community	Plant Operations	Mine Operations	Risk	Use of co-disposal vs separate waste form tailings	Threat	Overall project delays and increased cost	Financial/ Costs	Production	Major	Possible	12	Explore	Insitu testing, education of mining companies using this approach (Brazil, Canada, etc.), chronical technology as it has improved since Cerro Matoso, GARD guidelines	Major	Unlikely	8
Power	Engineering & Construction	Mining	Infrastructure	Risk	Natural Gas Alternative: excessive accumulation of gas in confined space of generation facility	Threat	Low O2 levels	Safety, Health, Environment & Community	Reputation	Major	Possible	12	Mitigate	Engineering controls and instrumentation to monitor, tie into advanced controls (HVAC) to dilute issues	Major	Unlikely	8
Environmental	Social	Mining	Safety, Health, Environment & Community	Risk	Delays with archeological. Burial site find (high archeological potential).	Threat	Delays with the archeology resulting in overall project delays	Organizational Effectiveness	Financial	Minor	Almost Certain	10	Explore	We have the locations, in operations we pause operation and recover the site	Minor	Likely	8

Primary Source	Secondary Source	Risk Owner or Delegator	Headline Label	Risk or Opportunity	Root Cause and Risk Description	Risk Classification	Probable Consequence Description	Primary Consequence Category	Secondary Consequence Category	Pre-Response Consequence Level	Pre-Response Likelihood Level	Pre-Response Risk Rating	Strategies to Process Risk	Risk Response - Action Plan	Post-Response Consequence Level	Post-Response Likelihood Level	Post-Response Risk Rating
Communications	Operations	Owner	Infrastructure	Risk	1. Inadequate sizing 2. Vandalism / Sabotage 3. Problems with maintenance of refrigeration equipment 4. Equipment damage 5. Operator training 6. Construction activities damage infrastructure and equipment	Threat	1. Interruption of operation 2. Equipment damage 3. Data loss 4. Economic losses 5. Low performance of services 6. Affecting the quality of IT service 7. Selection of equipment - Integrity - reputable suppliers	Production	Financial/ Costs	Severe	Unlikely	10	Mitigate	Ongoing training, ensure proper protocols are in place,	Major	Unlikely	8
Operational	Mine Design	Mining	Mine Operations	Risk	Tons processed Tons per day / per hour Product size Production does not meet financial requirements	Threat	1. Financial losses 2. Rework of material	Financial/ Costs	Production	Severe	Unlikely	10	Mitigate	Follow through on the planning/mine scheduling, communication with operations	Major	Unlikely	8
Mine Pit	Water	Owner	Engineering & Construction	Risk	How much volume can be intersected – number of wells, CAPEX and OPEX	Threat	Underestimate of water inflow, increased cost	Production	Financial/ Costs	Moderate	Possible	9	Explore	Install test wells, finalise numerical model, complete geochemistry testing on the contact water,	Minor	Likely	8
Social & Sustainability Development		Owner	Strategic Issues	Risk	Inadequate community relationships.	Threat	1. Community stopping construction material supply. 2. With limited housing stock and the likelihood of localised inflation, the risk of burgeoning informal settlements close to the mine. 3. The significant increase of job-seekers and service providers will place additional burden on existing social and physical infrastructure. 4. The significant increase of job-seekers and service providers will place additional burden on existing social and physical infrastructure.	Production	Reputation	Major	Unlikely	8	Mitigate	Ongoing monitoring social engagement	Major	Unlikely	8
Construction	Borrow site availability	Mining	Safety, Health, Environment & Community	Risk	Slope wall stability in the event of excess overburden *saprolite*	Threat		Safety, Health, Environment & Community	Production	Severe	Possible	15	Mitigate	Geotech stability assessment of borrow pit, execution plan and hazard assessment, restrict movement within area. Might be minimized by access road construction and pre-strip	Moderate	Unlikely	6
Construction	Ground Stability	Mining	Safety, Health, Environment & Community	Risk	Ground stability adjacent to foundation excavations during rain event prior to backfill	Threat		Safety, Health, Environment & Community	Safety, Health, Environment & Community	Severe	Possible	15	Mitigate	Geotech stability assessment required to monitor situation	Moderate	Unlikely	6
Infrastructure	Safety, Health, Environment & Community	Owner	External	Risk	Delays caused by lack of solid waste disposal capacity. No sanitary landfill available in the nearby towns.	Threat	Overall project delays and increased cost	Financial/ Costs	Safety, Health, Environment & Community	Moderate	Almost Certain	15	Explore	Outsource to third party, community project, incinerator	Minor	Possible	6
Geology	Mine Design	Mining	Engineering & Construction	Risk	The complexity of the orebody could lead to increasing mining dilution, unplanned dilution which impact grade, throughput and operating costs	Threat	Reducing head grade	Production	Financial/ Costs	Major	Possible	12	Explore	Infill drilling along with mineralization modelling, comparisons on re-blocking to determine if dilution is adequate	Moderate	Unlikely	6
Construction	Ground Preparation	Owner	Safety, Health, Environment & Community	Risk	Grubbing (excess erosion & sedimentation during clearing and grubbing)	Threat		Safety, Health, Environment & Community	Financial/ Costs	Major	Possible	12	Mitigate	Engage civil contractors to PTO submission, get feedback on approach. Adherence to construction schedule and time it will take to complete	Moderate	Unlikely	6
COVID	Safety, Health, Environment & Community	Owner	Safety, Health, Environment & Community	Risk	New and more contagious variant	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community	Financial/ Costs	Moderate	Likely	12	Mitigate	Mitigate with vaccination and emergency protocols	Minor	Possible	6
Water Treatment	Operations	Owner	Engineering & Construction	Risk	If plant is sized improperly and further water treatment is required for not managing contact and non contact water properly	Threat	Overall project delays and increased cost	Financial/ Costs	Safety, Health, Environment & Community	Major	Possible	12	Explore	Get more data, modularize the build to accommodate further water management	Moderate	Unlikely	6
Legal		Owner	Compliance	Risk	PTO amendments	Threat	Overall project delays and increased cost	Production	Financial/ Costs	Minor	Almost Certain	10	Mitigate	Making amendments and distribute	Minor	Possible	6
Geochemistry			Engineering & Construction	Risk	Management plans based on only static results.	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community	Financial/ Costs	Moderate	Possible	9	Explore	Kinetic test results, barrel test results monitoring/analysis, results may adjust amount of water to be treated and cost to treat, testing for tailings and waste rock to simulate	Minor	Possible	6
Hydrology		Environment	Infrastructure	Risk	Uncertainty in rainfall design estimates since there is no available rain data at the mine site and rainfall was spatially translated from other sites using appropriate statistical methods. Risks of extreme precipitation events with return periods less frequent than 1 in 10,000 years.	Threat		Production	Safety, Health, Environment & Community	Moderate	Possible	9	Accept	Overdesign the spillway, purchase additional graders for road management, review error bars precipitation analysis	Moderate	Unlikely	6
Hydrology		Environment	Infrastructure	Risk	Uncertainty in surface flow model calibration due to limited available water quality data.	Threat		Safety, Health, Environment & Community	Safety, Health, Environment & Community	Moderate	Possible	9	Accept	Quantify how streams react in large precipitation events.	Moderate	Unlikely	6
Human Resources		Owner	Human Resources	Risk	Poor project performance - Delivery based on poor skilled persons brought in by contractors	Threat	1. Additional cost incurred 2. Schedule delays 3. Loss of trained workers to other mines	Financial/ Costs	Organizational Effectiveness	Moderate	Possible	9	Share	Training, contractual	Moderate	Unlikely	6
Operational	Social	Owner	External	Risk	Any NGO that could oppose the project, e.g. to protect the environment or illegal miner or native people (Indians), LOCALS, ETC.	Threat	Reputational damage, community and government pressures and overall project delays	Reputation	Financial	Moderate	Possible	9	Mitigate	Social engagement	Moderate	Unlikely	6
Power	Engineering & Construction	Mining	Infrastructure	Risk	Natural Gas Alternative: LNG storage tank rupture	Threat		Safety, Health, Environment & Community	Reputation	Moderate	Possible	9	Mitigate	Engineering controls and instrumentation to monitor	Minor	Possible	6
Legal		Owner	Strategic Issues	Risk	Legal challenges to our license to operate resulting in operations' temporary or permanent shutdown (i.e., mining titles and environmental license through tutelas and class actions).	Threat	1. Fines 2. Penalties 3. Reputational losses	Financial/ Costs	Reputation	Major	Unlikely	8	Mitigate	Ongoing legal engagement to ensure title is not compromised	Moderate	Unlikely	6
Environmental			Safety, Health, Environment & Community	Risk	Environmental incident affecting water, fauna or flora	Threat	Fines, significant reputational damages at a corporate and shareholder level	Reputation	Financial	Minor	Likely	8	Mitigate	Operational procedures for personnel and equipment	Minor	Possible	6
Permits	Access	Owner	Safety, Health, Environment & Community	Risk	Project canceled of delayed due to fail in applying for PTO and EIS on time	Threat	Overall project delays and increased cost	Organizational Effectiveness		Major	Unlikely	8	Mitigate	Continue to work on chapters to Colombia guidelines, may have to pay a fine if not successful	Moderate	Unlikely	6
Hydrology	Environment	Owner	Safety, Health, Environment & Community	Risk	Changes to natural sub-watershed boundaries due to mine construction altering recharge/discharge/flow	Threat		Safety, Health, Environment & Community	Production	Minor	Possible	6	Accept	Monitor and model minimum groundwater/surface water, potentially increase ditch size	Minor	Possible	6
Construction	Operations	Mining	Mine Operations	Risk	Delays in WMF construction causing delay in start up and/or encroachments on freeboard provisions,	Threat	Overall project delays and increased cost	Financial/ Costs	Production	Severe	Unlikely	10	Prevent	Have enough equipment and excavation plan is in sync with mine plan, volumes available, use of saprolite in construction, pass the IDF,	Severe	Rare	5
Geotechnical	Ground Stability	Plant Operations	Engineering & Construction	Risk	Northeast Embankment failure due to soft foundations, earthquake, or piping. Tailings and/or process water may reach the San Pedro River	Threat	Financial losses, fines, penalties, significant reputational damage at a corporate and shareholder level	Safety, Health, Environment & Community	Financial/ Costs	Severe	Rare	5	Mitigate	Understand geotech conditions, ensure design is sound, fit for purpose and embankment construction have good material control. Complete additional excavation to remove saprolite in the foundation	Severe	Rare	5
Power	Engineering & Construction	Mining	Infrastructure	Risk	Natural Gas Alternative: is gas is able to be trucked to site reliably?	Threat		Production	Organizational Effectiveness	Severe	Almost Certain	25	Share	Upgrade the road based upon IRYS PFS study	Minor	Unlikely	4
Infrastructure	Operations	Owner	Infrastructure	Risk	Pit close to crusher. Any change of an expansion that would require crusher relocation?	Threat		Financial/ Costs	Production	Severe	Possible	15	Explore	Drilling sterilization and exploration holes	Minor	Unlikely	4
Logistics		Mining	Logistics	Risk	Insufficient storage for concentrate at the plant or port	Threat	1. Financial impact 2. Social impact -traffic	Financial/ Costs	Safety, Health, Environment & Community	Major	Possible	12	Mitigate	Mitigate in the design and contractional	Minor	Unlikely	4
Communications				Risk	Delays caused by poor available communications at site (cell phone and internet coverage)	Threat	Overall project delays and increased cost	Financial/ Costs	Production	Moderate	Likely	12	Mitigate	Investigating sat providers or terrestrial tower	Minor	Unlikely	4
Geology	Resource Estimation	Geology	Resources & Reserves	Risk	Local miners remove significant portions of the metals before the mining operation begins	Threat	Grade throughput is significantly reduced	Production	Financial/ Costs	Minor	Almost Certain	10	Accept	Move community and secure site	Minor	Unlikely	4
Mine Pit	Water	Owner	Engineering & Construction	Risk	Water chemistry from pit vs. treatment method/cost	Threat	Overall project delays and increased cost	Financial/ Costs	Financial/ Costs	Moderate	Possible	9	Explore	Kinetic test results, barrel test results monitoring/analysis, results may adjust amount of water to be treated and cost to treat	Minor	Unlikely	4

Primary Source	Secondary Source	Risk Owner or Delegator	Headline Label	Risk or Opportunity	Root Cause and Risk Description	Risk Classification	Probable Consequence Description	Primary Consequence Category	Secondary Consequence Category	Pre-Response Consequence Level	Pre-Response Likelihood Level	Pre-Response Risk Rating	Strategies to Process Risk	Risk Response - Action Plan	Post-Response Consequence Level	Post-Response Likelihood Level	Post-Response Risk Rating
Human Resources		Owner	Human Resources	Risk	Recruitment / Selection Not having persons available for construction and operational need. 1. Local labour does not have the required skill sets for the project and operations 2. ESIA requirement to employ 100% local labour	Threat	1. Slow ramp up of operation 2. Additional cost 3. Breach of legal requirements 4. Social unrest 5. Reputational damage 6. HSE impacts	Financial/ Costs	Organizational Effectiveness	Moderate	Possible	9	Mitigate	Work with SENA to establish training requirements, in region	Minor	Unlikely	4
Hydrology	Permit			Risk	Channel occupation analysis: to date there is no information for the request for channel occupation permits of the infrastructure	Threat		Production	Safety, Health, Environment & Community	Moderate	Possible	9	Explore	Communicate and engage water resource management plan with CVS	Minor	Unlikely	4
Hydrogeology	Permit		Engineering & Construction	Risk	Numerical groundwater model with insufficient details about the evolution of the pit area.	Threat		Production	Safety, Health, Environment & Community	Moderate	Possible	9	Mitigate	Currently developing transient water flow/management,	Minor	Unlikely	4
Legal		Owner	Infrastructure	Risk	Delay to obtaining land access or purchasing land may delay project schedule.	Threat	1. Start-up delayed. 2. Financial impacts 3. Legal liabilities 4. Reputation damage	Production	Organizational Effectiveness	Moderate	Possible	9	Mitigate	Determine who is effected with proper valuations and either buy land or negotiate with government on easements	Minor	Unlikely	4
Environmental	Mine Closure	Environment	Safety, Health, Environment & Community	Risk	Onset of ARD/ML during operations	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community	Financial/ Costs	Major	Unlikely	8	Explore	Field testing and lab testing, cover tailings, place tailings in the TMF, testing downstream	Major	Rare	4
Mine Waste		Owner	Mine Operations	Risk	Implementation of mine waste storage does not fully fill voids in waste rock with tailings, allowing formation and storage of acid and metal leaching, as well as increased storage volume requirements.	Threat	Overall project delays and increased cost	Financial/ Costs	Safety, Health, Environment & Community	Major	Unlikely	8	Explore	Document the process(KP - deliver by Oct 15), collect more data	Minor	Unlikely	4
Hydrogeology	Water	Owner	Engineering & Construction	Risk	Uncertainty in surface flow model calibration due to limited available water quality data.	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community	Safety, Health, Environment & Community	Minor	Possible	6	Explore	Stream gauges have been installed and will improve our understanding to determine if changes are expected. Use for flood model predictions	Minor	Unlikely	4
Hydrology				Risk	Modeling of discharges. The modeling of discharges is a required EIA activity that has field activities and laboratory analysis.	Threat		Safety, Health, Environment & Community	Safety, Health, Environment & Community	Moderate	Unlikely	6	Explore	Perform the required modelling,	Minor	Unlikely	4
Hydrotechnical	Water Management	Plant Operations	Plant Operations	Risk	Extreme storm event overtops the Main embankment	Threat	Financial losses, fines, penalties, significant reputational damage at a corporate and shareholder level	Safety, Health, Environment & Community	Financial/ Costs	Severe	Rare	5	Mitigate	Overdesign the spillway based upon limited hydrological data, during operations that the freeboard provisions are adhered to at all times	Major	Rare	4
Tailings	Construction	Plant Operations	Infrastructure	Risk	Settled dry density estimate. If the target density of 1.7 cannot be achieved, additional embankment construction would be required. Potential decreases in dry density include less infiltration of tailings solids into waste rock voids, not obtaining the thickened tailings solids content targets, and too large of a water pond on the surface of the WMF basin.	Threat	Overall project delays and increased cost	Financial/ Costs	Production	Minor	Unlikely	4	Explore	Benchmark, field testing, testing vertical conductivity, leach tests, solids content has to be monitored, spigots need to be monitored,	Minor	Unlikely	4
Geotechnical	Ground Stability	Plant Operations	Engineering & Construction	Risk	Main Embankment failure due to soft foundations, earthquake, or piping	Threat	Financial losses, fines, penalties, significant reputational damage at a corporate and shareholder level	Safety, Health, Environment & Community	Financial/ Costs	Major	Rare	4	Mitigate	Understand geotech conditions, ensure design is sound, fit for purpose and embankment construction have good material control.	Major	Rare	4
Geotechnical	Ground Stability	Plant Operations	Engineering & Construction	Risk	South Embankment failure due to soft foundations, earthquake, or piping. Tailings and/or process water may enter the open pit	Threat	Resulting in flooding of pit, pit wall instability, loss of production, potential health and safety hazard	Safety, Health, Environment & Community	Financial/ Costs	Major	Rare	4	Mitigate	Understand geotech conditions, ensure design is sound, fit for purpose and embankment construction have good material control.	Major	Rare	4
Hydrotechnical	Water Management	Environment	Safety, Health, Environment & Community	Risk	Erosion of natural and constructed drainages/collection ponds during an extreme storm event	Threat	Fines, Penalties, and reputational losses	Safety, Health, Environment & Community	Reputation	Minor	Unlikely	4	Mitigate	Maintenance and inspections of ponds and ditches, overdesign infrastructure	Minor	Unlikely	4
Hydrotechnical	Engineering & Construction	Hydrotechnical	Access	Risk	Failure of access road	Threat	Interruption of operation	Safety, Health, Environment & Community	Financial/ Costs	Minor	Unlikely	4	Mitigate	Design of culverts, maintenance	Minor	Unlikely	4
Hydrology	Environment	Owner	Safety, Health, Environment & Community	Risk	The census of uses and users of water must be completed for the area of influence since, linked to uses and users, and conflicts with water uses must be determined.	Threat		Safety, Health, Environment & Community	Production	Minor	Unlikely	4	Accept	Interpret data and identify spring users	Minor	Unlikely	4
Compliance	Human Resources	Human Resources	Compliance	Risk	Breaches of employees or third parties privacy rights due to inadequate data privacy/data protection practices	Threat	Legal contingency fines and reputational damage	Financial/ Costs	Reputation	Minor	Unlikely	4	Accept	Monitor and continue to instill standards and enforcement	Minor	Unlikely	4
Processing	Health & Safety	Plant Operations	Engineering & Construction	Risk	Overflow from flotation circuit resulting from power outage / network leak	Threat		Safety, Health, Environment & Community	Production	Moderate	Likely	12	Mitigate	Engineering controls, lined emergency event pond,	Negligible	Possible	3
Environmental	Engineering & Construction	Plant Operations	Safety, Health, Environment & Community	Risk	Ruptured tailings delivery or water reclaim/discharge pipeline on embankments causing concentrated erosion and potential release to environment	Threat	Fines, Penalties, and reputational losses	Safety, Health, Environment & Community	Production	Moderate	Unlikely	6	Prevent	Ensure tailings discharge line is within the tailings facility, proper inspections are ongoing, and procedures are in place	Moderate	Rare	3
Hydrotechnical	Water Management	Environment	Safety, Health, Environment & Community	Risk	Geological hazards from extreme storm event affecting access and erosion of embankments	Threat	Interruption of operation	Safety, Health, Environment & Community	Production	Moderate	Unlikely	6	Mitigate	Inspect surrounding slopes, stabilise as needed.	Minor	Rare	2
Hydrogeology	Permit	Owner	Safety, Health, Environment & Community	Risk	Submit the EIA without the complete (12 sample) isotope data set. It is possible that the EIA evaluator might request the 12 samples (and not the 8 as currently scheduled) despite our letter of finding from the ANLA.	Threat		Safety, Health, Environment & Community	Financial/ Costs	Minor	Possible	6	Mitigate	Continue to monitor we have rush additional samples	Negligible	Unlikely	2
Hydrotechnical	Water Management	Plant Operations	Plant Operations	Risk	Extreme storm event overtops the South embankment	Threat	Resulting in flooding of pit, pit wall instability, loss of production, potential health and safety hazard	Safety, Health, Environment & Community	Financial/ Costs	Moderate	Rare	3	Mitigate	move equipment and people to higher elevation to prevent equipment loss. overdesign the spillway based upon limited hydrological data, during operations that the freeboard provisions are adhered to at all times	Minor	Rare	2
Environmental	Engineering & Construction	Engineering & Construction	Environment	Risk	Excessive seepage under embankment and through weathered bedrock layer	Threat	Fines, Penalties, and reputational losses	Safety, Health, Environment & Community	Financial/ Costs	Minor	Rare	2	Accept	Install monitoring/pump back wells downstream,	Minor	Rare	2
Hydrology		Mining	Safety, Health, Environment & Community	Risk	The mining plan must define exact points and volumes of water to be extracted to proceed with the water concession process.	Threat		Safety, Health, Environment & Community	Safety, Health, Environment & Community	Moderate	Likely	12	Mitigate	Finalise the output locations for all streams/rivers.	Negligible	Rare	1
Environmental	Water Management	Plant Operations	Infrastructure	Risk	Water reclaim, water transfer, and/or water treatment system failure, causing increased water levels in WMF and WMP ponds	Threat	Interruption of operation	Production	Financial/ Costs	Negligible	Rare	1	Mitigate	100% standby pumps on barge, adequate spare parts, pipelines properly inspected. During emergency, water could be temporarily pumped to pit	Negligible	Rare	1
Mine Pit	Water	Owner	Engineering & Construction	Risk	How much water will flow into pit and need to be treated	Threat	Overall project delays and increased cost	Safety, Health, Environment & Community	Financial/ Costs	Moderate	Possible	9					0
Hydrology				Risk	Uncertainty in modeling results due to limited available historical streamflow for model calibration (for surface water models).	Threat		Safety, Health, Environment & Community	Safety, Health, Environment & Community	Minor	Possible	6					0
Legal		Owner	Strategic Issues	Risk	Litigation against Alacran people	Threat	1. Reputation losses 2. Financial impact 3. Project delays 4. Rework 5. Legal liability 6. Project stoppage	Reputation	Production			0					0