Southern Copper

and

Grupo México MINERÍA

El Arco Project
Mexico
Technical Report Summary

Report prepared for:

Southern Copper Corporation

Report prepared by:

Wood Group USA, Inc.

wood.

Report current as at:

December 31, 2021.

Date and Signature Page

This technical report summary (the Report), entitled "El Arco Project, Mexico, Technical Report Summary" is current as at December 31, 2021. The Report was prepared by Wood Group USA, Inc. (Wood), acting as a Qualified Person Firm.

Dated: February 24, 2022.

"signed"

Wood Group USA, Inc.

10876 S River Front Pkwy #250

South Jordan, UT 84095

USA.

CONTENTS

TABLES

FIGURES

1 EXECUTIVE SUMMARY

1.1 Introduction

This technical report summary (the Report) was prepared for Southern Copper Corporation (Southern Copper) by Wood Group USA, Inc. (Wood, acting as the QP Firm) on the El Arco Project (the Project), located in the Baja California, Mexico.

1.2 Terms of Reference

The Report was prepared to be attached as an exhibit to support mineral property disclosure, including mineral resource and mineral reserve estimates, for the El Arco Project in Southern Copper's Form 10-K for the year ending December 31, 2021.

Mineral resources and mineral reserves are reported for the El Arco deposit. This is a development stage property.

Unless otherwise indicated, all financial values are reported in United States (US) currency (US$) including all operating costs, capital costs, cash flows, taxes, revenues, expenses, and overhead distributions. Unless otherwise indicated, the metric system is used in this Report. Mineral resources and mineral reserves are reported using the definitions in Regulation S–K 1300 (SK1300), under Item 1300. The Report uses US English.

1.3 Property Setting

The El Arco deposit is located near the village of El Arco in Baja California, Mexico, which lies near the center of the Baja California Peninsula in the municipalities of San Quintin, Baja California and Mulegé, Baja California Sur, México.

Route 1 is the only paved highway connecting the northern and southern parts of the Baja Peninsula. El Arco located between the towns of Santa Rosalía and Guerrero Negro at km 189. The El Arco site is accessed by taking Highway 1 approximately 30 km south of the town of Guerrero Negro to the intersection with the highway MX 18, and following MX 18 42 km east to the Project site. Highway 1 is paved and in good condition and Highway 18 was originally paved but currently all pavement is gone, leaving a gravel roadbed. The current route of MX18 passes directly through the area of the proposed open pit, and the highway will need to be realigned to allow open pit mining.

The nearest port is Santa Rosalía on the Sea of Cortez, 240 km by road southeast of El Arco. Southern Copper plans to construct a port at El Barril, located 70 km northeast of the proposed mine site.

The climate is dry with an average yearly rainfall of <120 mm. Exploration is conducted year-round. Mining is planned to operate year-round.

The site is currently a greenfields site with limited infrastructure that is only suitable to support exploration-level activities. The past-producing El Arco underground mine, related infrastructure and former town site are located on the southern edge of the current deposit.

1.4 Mineral Tenure, Surface Rights, Water Rights, Royalties and Agreements

Southern Copper holds 11 mining concessions, covering 72,133 ha.

Surfaces rights in the deposit area are held by a combination of agrarian cooperatives (ejido) and private owners. Between 2010–2015, Southern Copper acquired 22,174.29 ha of surface rights from the Confederación Nacional Campesina ejido. Negotiations are underway to acquire 15,000 ha of surface rights from the Costeño ejido. Southern Copper indicated to Wood that there are sufficient surface rights envisaged for their life-of-mine (LOM) plan.

Project water is planned to be sourced from a desalination plant, to be constructed at El Barril.

In 2013, the Mexican Federal government introduced a mining royalty, effective January 1, 2014, based on 7.5% of taxable earnings before interest and depreciation. In addition, precious metal mining companies must pay a 0.5% royalty on revenues from gold, silver, and platinum.

1.5 Geology and Mineralization

The El Arco deposit is considered to be an example of a porphyry copper deposit.

The Alisitos arc is an approximately 300 × 30 km oceanic arc terrane that accreted to the western edge of the Peninsular Ranges batholith within the North American Cordillera. A chain of granitic batholithic intrusions intrude the Alisitos Formation, and El Arco, the oldest known porphyry deposit in this chain, is located at the extreme southern end of the chain.

In the El Arco area basement consists of serpentinite, with blocks of peridotite, pyroxenite and amphibolite that are tectonically overlain by diorites, gabbros, and rocks interpreted to be pillow lavas. These units are overlain by metavolcanic agglomerates, metagraywackes, meta-andesite flows and breccias, and thinly-bedded marble. Andesite flows in the upper part of this sequence host granodiorite porphyry intrusions that generated the El Arco deposit. Barren diabase dikes cut the andesite and granodiorite porphyry. All lithologies have been subject to greenschist facies metamorphism, characterized by development of chlorite–epidote–calcite–quartz.

The mineralization at El Arco measures approximately 1,500 x 1,500 m, with a minimum thickness of more than 300 m. Mineralization has been drill tested to a depth of approximately 600 m, and remains open at depth. The mineralization at El Arco occurs in three sub-horizontal zones:

- The oxide zone at the top of the surface has a blanket shape, approximately parallel with the surface topography, with an average thickness of 40 m. Oxide minerals include chrysocolla, malachite, dioptase, argillaceous goethite, copper wad, cuprite and neotocite
- Underlying the oxide zone is a transition zone that contains a mixture of both secondary and primary iron and copper oxides and sulfides. The zone varies in thickness from 0–18 m with an average thickness of 9 m
- The primary or sulfide zone is lenticular in shape, fingering out at its extremities with a greater horizontal than vertical dimension. The upper limit of this zone coincides with the present water table. The lower limit remains open, as the deepest drill hole ended in mineralization. Sulfides include pyrite, chalcopyrite, bornite, molybdenite, galena and sphalerite. Copper mineralization occurs in two forms: fracture filling (± 60%) and dissemination as discrete grains (± 40%). The gold content is of economic importance.

1.6 History

Southern Copper has had an interest in the Project area since 1969. Prior to Southern Copper's interest, the Project area had been mined for placer gold deposits, and gold–copper mineralization via underground mining methods.

Work conducted by Southern Copper included reverse circulation (RC) and core drilling, petrographic studies, underground development to provide sufficient material for metallurgical testwork, pilot plant testing, mineral resource and mineral reserve estimation, collection of environmental baseline data, and internal mining studies.

1.7 Exploration, Drilling, and Sampling

1.7.1 Exploration

Exploration has included geological mapping, induced polarization and resistivity/chargeability geophysical surveys, excavation of exploration shafts and limited drifting, and bulk sampling from the drifts for metallurgical testwork. Initial stage exploration data have been superseded by drill data on the deposit area.

1.7.2 Drilling

Bulk channel sampling from underground mine development, consisting of two shafts and drifts, was used to obtain bulk material for metallurgical and pilot plant testing on oxide and sulfide ores in the andesite and granodiorite rocks.

The current drill database for the Project consists of 364 core and RC/rotary percussion drill holes (133,877 m). All of the core drill holes are used in support of mineral resource estimation. RC drilling does not support estimation due to a lack of documentation.

Drill holes completed prior to 2015 were logged on paper, with data capture including lithology, mineralization, and alteration intensity. Logging during the 2015–2016 drill campaign used Excel workbooks, and recorded geological descriptions, alteration, and mineralization intensity, graphic strip logs and rock quality designation (RQD) logging. Core recoveries were generally good, ranging from 88.9% in oxidized granodiorite to 94.9% in sulfidic andesite.

Collar surveys from the 1970–2016 drill campaigns were performed by the Southern Copper geological team in collaboration with surveyors. Formal survey certificates have not been located so Wood was not able to verify the digital data against the original hard copy. However, some historical reports were found with matching collars that allowed verification of a few holes and provide confidence that the other collar locations are correct. Most drill holes at El Arco are drilled vertically; however, several holes were collared at -50^{o} in 1994 with a small number of holes collared at -45 to -79^{o} in other years.

Downhole survey data were collected since the earliest campaign. Downhole survey methods included Sperry Sun, Tropari and Reflex magnetic surveys for the 2015 drill program; however, methods for individual drill holes and drill campaigns are not known. Typically, surveys were taken at 50 m intervals. Downhole surveys deviate to the southwest in all of the drill holes measured. A number of the drill holes exhibit extreme deviations. If the drill hole trajectories are steeper than indicated from these survey data, there is a risk that the mineral resource estimate may not be in the 3D space as currently estimated.

1.7.3 Sampling

The shafts were sampled along the two walls, and the drifts were sampled along the two walls and the back. All samples were taken as channel samples, split, and sent for assaying at Southern Copper's laboratory. The core sampling procedure was based on the geological description of the core, samples did not have standard lengths, but were restricted to no longer than 3.05 m (10 ft core-barrel) and no shorter than 0.50 m.

Density data were collected during every drill program beginning in 1970, and there are currently about 51,400 determinations available based on water immersion methods. Due to the very compact nature of the rock at El Arco, samples were not sealed with wax prior to weighing in water. To ensure that no error has been caused by this procedure, Grupo México re-measured the density for a representative number of samples from each rock and ore type using wax-sealed samples.

Assay and sample preparation laboratories, where known, include the Southern Copper laboratories at Nacozari, San Luis, Laboratorio Geoquimico San Luis Potosi and an on-site preparation/assay facility at El Arco, none of which were independent. Accreditations were not recorded in the Project database. The majority of the assay and sample preparation data comes from these laboratories. Independent primary or check laboratories include the ALS laboratory in Hermosillo (ALS Hermosillo; no accreditations recorded in database), and Actlabs Zacatecas-Mexico laboratory (Actlabs; now Bureau Veritas; held ISO 9001 accreditation).

During the principal drilling programs, El Arco had an on-site sample preparation and assaying facility. However, later samples were crushed and pulverized in Hermosillo. Four pulverized pulp samples were prepared, one was sent to Southern Copper's laboratory in San Luis Potosi, two were sent to commercial laboratories and one was kept at El Arco. There are no reliable records discussing sample preparation and analysis performed at the Laboratorio Geoquimico San Luis Potosi in 2015 campaign or from the older campaigns.

For the 2015 campaign, sample preparation was completed by Actlabs in Cananea, Sonora; however, the procedures are not recorded.

Analytical methods included:

- Drill holes 1–241: each sample in the oxide and transition zones was analyzed for total copper and acid soluble copper; gold, silver, and molybdenum were assayed in 15 m intervals
- Drill holes 242–261: total copper, acid soluble copper, gold, silver, and molybdenum in the oxide and transition zone, and for total copper, gold, silver and molybdenum in the sulfide zone
- All remaining drill holes: total copper, gold, silver and molybdenum. Oxide and transitional material was assayed for acid soluble copper as well.

For drill holes 1–241, the assay data represent a 15 m composite interval. For the remaining drill holes, each assay represents the individual interval.

With the exception of check assays, there is no evidence of prior independent quality assurance–quality control (QA/QC) programs for the El Arco analyses. Wood requested that Southern Copper perform a re-assay program on selected core and pulp samples at Bureau Veritas.

Data are currently stored in a series of Excel files. There is no formal digital database that provides database integrity, version control, and data quality assurance or that provides a source for verified data to support geological modeling and resource estimation for the Project.

1.8 Data Verification

Wood audited the database and found a small number of discrepancies, which were corrected. Several risks were identified with respect to data management.

The re-assay program samples were selected to include samples across the deposit and from each drill campaign. The focus was on copper, molybdenum, gold, and silver grades, and the intent was to use the same analytical method for each element as was originally used. Results for total copper and acid-soluble copper showed that the legacy laboratories were not biased relative the ALS Hermosillo. Molybdenum showed a conditional bias at higher grades that is not considered to be material. Gold and silver showed larger biases that could result in underestimation of gold and silver grades. Wood considers the uncertainties around gold and silver grades to be a factor that limits mineral resource classification to indicated at best.

1.9 Metallurgical Testwork

Metallurgical tests have been performed at bench-scale (laboratory level) and at pilot-scale, on oxide and sulfide mineralization. Independent laboratories used as testwork facilities included Metcon Research, Inc., Svedala Grinding Division, Polysius AG, and M3 Engineering.

Southern Copper facilities, under the supervision of Earl Rau from the Colorado School of Mines Research Institute, and then under the direction of Dr. Roshan Bhappu from Mountain States R&D International, also performed selected tests.

Testwork prior to 2009 included run-of-mine dump leaching, leach testing and pilot plant sulfide testing, column leaching, tests on the applicability of solvent extraction and electrowinning (SX/EW) of copper, sulfide ore testing with sea water, crushing and grinding tests, evaluation of flotation performance with fresh water versus reclaim water, and flotation tests for molybdenum recovery to a bulk copper-molybdenum concentrate.

More recent testwork, from 2009 onward, included flotation tests with high-pressure grind–roll (HPGR) mill product, and flotation tests for molybdenum recovery.

Results of Southern Copper's sulfide material testwork indicated that copper recovery would be about 86%, and a copper concentrate grade of 25% Cu could be produced. A slight (0.6%) additional recovery for HPGR crushing was demonstrated in the testwork, but was not included in the recovery estimates that support the proposed LOM plan. Southern Copper estimated an overall oxide circuit recovery of 80% copper recovery. The sulfide circuit copper recovery is estimated at 86%, and the gold recovered to the sulfide concentrate will be 55.7%. Silver recovered to the sulfide concentrate is estimated to be 50.2% based on Mountain States flotation studies. Based on the results obtained by Southern Copper, the molybdenum recovery was estimated at 57% producing a 56% Mo grade in the concentrate. There is a risk that low average head grades could result in variable molybdenum recoveries.

Samples selected for metallurgical testing were representative of the various styles of mineralization within the different deposit areas. Samples were selected from a range of locations within the deposit zones. Sufficient samples were taken and tests were performed using sufficient sample mass for the respective tests completed.

An analysis of the concentrate produced during the 1996 pilot trials indicated a high-quality copper concentrate with very minor amounts of deleterious elements. Arsenic in particular was not detected in the analysis.

1.10 Mineral Resource Estimates

1.10.1 Estimation Methodology

Exploratory data analysis was completed on the assay and density data using box, contact, and scatter plots.

A Leapfrog lithological model was built that included five lithological units: a 2014 LiDAR topographic surface; an andesite wireframe, a conglomerate wireframe, a granodiorite and quartz wireframe, and wireframes representing narrow post-mineralization mafic dikes. Four additional wireframes, for oxidation state (oxide, transition or mixed, and sulfide or primary) and conglomerate were constructed. Wireframes of two faults were built.

Wood constructed grade shells in Leapfrog Edge to constrain grade estimation. The thresholds were chosen to remove the low-grade tail in the copper distribution (at approximately 0.1% Cu), and the multi-modal low-grade populations in gold, silver, and molybdenum (thresholds at 0.05 g/t Au, 1.2 g/t Ag and 0.006% Mo respectively).

Density was estimated using one pass per zone and inverse-distance to the second power (ID2) interpolation, with the ore types as estimation constraints.

Grades were not capped. Outlier restriction was used to control possible over-projection of high grades into predominantly low-grade or poorly-drilled areas. The thresholds were selected by reviewing the locations of the high-grade assays and composites for each estimation domain.

Composites were generated using 7.5 m intervals. Correlograms were constructed for copper, silver, gold, and molybdenum on the 7.5 m composites within the copper grade shell. A downhole correlogram was first used to estimate the nugget effect for each metal.

A block size of 25 x 25 x 15 m with no sub-blocking was used as the parent block size. A partial value was coded to the blocks to represent the percentage of the block falling within the post-mineral dike wireframe. An ordinary kriging (OK) interpolator was used to independently estimate grades for mineralization and unmineralized dikes. Blocks were estimated in three passes. The dimensions of the search ellipse for each pass were taken from the copper variogram, whereas the search ellipse orientations were taken from the anisotropy directions displayed by the variogram model. Non-estimated total copper blocks were assigned to the mean of the total copper by a nearest neighbor (NN) estimation method. The final grades were estimated by diluting the mineralized grades with the dike grades using the dike partial value sub-blocking.

The approach for estimating acid-soluble copper was slightly different. The ore-type contacts were considered as hard boundaries for estimation. Only composites within the oxide material were used to estimate blocks falling within the oxide wireframe. The estimation was done using one pass at the longer range used for the copper estimation (total copper pass 3) and more flexible estimation parameters. The blocks where acid soluble copper was not estimated during the OK interpolation were assigned the mean value of acid soluble copper estimated using the NN method.

Model validation included visual inspection, review of OK grade and NN model summary statistics, swath plots, and a change of support selectivity check. No material issues were noted with the estimate.

Drill hole spacing studies were used as a guide for mineral resource classification together with assay data quality and confidence in geological models. Based on the assay data quality and uncertainty in the volume of the unmineralized dikes, Wood decided to use drill hole spacings of 100 x 100 m for indicated and 50 x 50 m for measured category mineral resources respectively. Inferred category mineral resources were classified within 200 m of the closest drill hole. Review of the drill hole spacing for measured showed that the blocks meeting that distance criteria did not form a continuous volume; therefore, the mineral resource classification was limited to the indicated and inferred categories. No measured mineral resources are reported for El Arco.

Wood constrained the mineral resource estimate within a conceptual pit shell using a Lerchs–Grossman algorithm. Commodity prices used in resource estimation are based on long-term analyst and bank forecasts, supplemented with research by Wood's internal specialists. The estimated timeframe used for the price forecasts is the 35-year LOM that supports the mineral reserve estimates. The estimate is reported using a net smelter return (NSR) cut-off. The marginal NSR cut-off values were $1.15/t for potentially leachable material and $6.89/t for potential mill feed material.

1.10.2 Mineral Resource Statement

Mineral resources are reported using the mineral resource definitions set out in SK1300, and are reported exclusive of those mineral resources converted to mineral reserves. The reference point for the estimate is in situ. The indicated mineral resource estimates for the El Arco Project are provided in Table 1-1. The inferred mineral resource estimates are included in Table 1-2. Wood is the QP Firm responsible for the estimate.

Table 1-1: Indicated Mineral Resource Statement

Process Type	Tonnes (Mt)	Copper Grade (%)	Molybdenum Grade (%)	Gold Grade (g/t	Silver Grade (g/t	Contained Copper (Mlb)	Contained Molybdenum (Mlb)	Contained Gold (Moz)	Contained Silver (Moz)
Mill	826.62	0.41	0.008	0.12	1.6	7,544.91	146.48	3.23	41.88
Leach	51.32	0.30	—	—	—	335.25	—	—	—
Total	***877.95***	***0.41***	—	—	—	***7,880.16***	***146.48***	***3.23***	***41.88***

Table 1-2: Inferred Mineral Resource Statement

Process Type	Tonnes (Mt)	Copper Grade (%)	Molybdenum Grade (%)	Gold Grade (g/t	Silver Grade (g/t	Contained Copper (Mlb)	Contained Molybdenum (Mlb)	Contained Gold (Moz)	Contained Silver (Moz)
Mill	2,344.89	0.37	0.006	0.11	1.5	19,352.33	298.15	8.05	110.89
Leach	63.78	0.25	—	—	—	350.94	—	—	—
Total	***2,408.66***	***0.37***	—	—	—	***19,703,27***	***298.15***	***8.05***	***110.89***

Notes to Accompany Mineral Resource Tables

1. Mineral resources are reported in situ and are current as at December 31, 2021. Mineral resources are reported exclusive of mineral reserves. Mineral resources that are not mineral reserves do not have demonstrated economic viability. Wood is the QP Firm responsible for the estimate.
2. Mineral resources are reported within a conceptual pit shell that is based on copper and molybdenum values only. The pit shell uses the following input parameters: metal prices of US$3.80/lb Cu and US$10.35/lb Mo; variable net smelter return cut-offs; mining recovery of 100%; metallurgical recoveries of 86% Cu, and 55% Mo for material sent to the mill facility, and recovery of 80% Cu (Total copper) for material sent to the heap leach pad; total mining costs (base, incremental and sustaining) of US$1.206/t mined; total mill process costs (base, sustaining, tailings, G&A and molybdenum plant) of US$7.80/t milled, total leaching costs (operating and SX/EW) of US$1.60/t leached; miscellaneous costs (closure, payments) of US$0.10/t processed; copper refining cost of US$0.09/lb, copper smelting cost of US$90/t concentrate, copper transport costs of US$107.69/t concentrate, molybdenum transport costs of US$73.67/t concentrate, and molybdenum refining/treatment cost of 12.50% (of molybdenum price). Mineral resources are constrained within a wireframe constructed at a 0.1% total copper cut-off grade.
3. Gold and silver are not used in the pit optimization. The gold and silver metallurgical recoveries for material that will be sent to the mill facility are forecast at 55.7% Au, and 50.2% Ag, respectively. Molybdenum, gold and silver are not expected to be recovered from the leach process.
4. Numbers in the table have been rounded. Totals may not sum due to rounding.

Areas of uncertainty that may materially impact all of the mineral resource estimates include: changes to long-term metal prices and exchange rate assumptions; changes in local interpretations of mineralization geometry such as presence of unrecognized mineralization off-shoots; faults, dikes and other structures; and continuity of mineralized zones; changes to geological and grade shape, and geological and grade continuity assumptions; changes to metallurgical recovery assumptions; changes to the input assumptions used to derive the conceptual open pit shell that is used to constrain the estimates; changes to the forecast dilution and mining recovery assumptions; changes to the cut-off values applied to the estimates; variations in geotechnical (including seismicity), hydrogeological and mining method assumptions; and changes to environmental, permitting and social license assumptions.

There is uncertainty on the grade estimates due to weaknesses in the structural, alteration and current lithology models. The weaknesses in the geological models were a contributor to the decision to downgrade blocks with potential for Measured classification based on drill hole spacing metrics. Improvement to geological models will require a significant drill core relogging effort with quantitative tools including lithogeochemistry and bulk mineralogical analysis to standardize lithological and alteration units. Improved geological models will also benefit rock quality modeling and geotechnical recommendations for pit designs.

The volume of post-mineralization dikes is poorly constrained by vertical drill holes. The risk is that the volume of the dikes is greater than assumed in the model, therefore the diluted grades may be lower than those modelled. Any infill drilling should include inclined holes to provide better intersections with sub-vertical structures and lithological contacts such as the post-mineralization dikes.

The uncertainty on molybdenum, silver and gold grades is a contributor to the decision to downgrade blocks with potential for measured classification based on drill hole spacing metrics. Any future infill drilling sampling and assaying or reassaying of existing samples to upgrade confidence in indicated mineral resources should use a rigorous QA/QC program to provide data quality assurance for the by-product metals.

Pachycereus schottii var. monstruoso "garambullo" (garambullo monstruoso), a rare tree cactus, occurs within the area of the mineral resource estimate. For the purposes of mineral resource estimation, Wood has assumed that the Valle de los Cirios Flora and Fauna Protection Area Management Plan can be amended to allow mining activities and species removal, and that the translocation of this species to new habitat is feasible. If this is not the case, the conceptual pit constraining the mineral resource estimate would need to be modified to remove the habitat area, and would result in a smaller tonnage and contained metal estimate.

1.11 Mineral Reserve Estimates

1.11.1 Estimation Methodology

Mineral reserves were converted from indicated mineral resources. Inferred mineral resources were set to waste. The mine plan assumes conventional open pit mining methods.

The surface topography was provided by Southern Copper. The block models were coded with a variable that represented the different geotechnical zones within the deposit, which corresponded to an overall slope angle; these ranged from a minimum of 31º to a maximum of 42º.

Pit optimization was performed using the Lerchs–Grossmann algorithm implemented in Hexagon MinePlan software. The optimization was based on copper and molybdenum only. Nested pit shells were run from revenue factors ranging from 0.2 to 1.2. The revenue factor 1.0 pit shell was selected as the guide for the final pit design. The break-even pit shell used a copper price of US$3.45/lb, which equates to a copper price at US$3.80/lb and a revenue factor 0.908 pit.

Metallurgical recoveries were assumed to be 86% Cu and 57% Mo for material sent to the mill facility, and a recovery of 80% Cu was used for material sent to the heap leach pad.

The base mining cost of US$1.189/t included operating, general, and indirect costs. An incremental haulage cost of US$0.017/t was applied for each bench below a mining reference elevation of 270 (bench # 42).

Processing costs for sulfide material totaled an estimated US$7.80/t milled, and included base, sustaining, tailings, G&A and molybdenum plant costs. The total leaching costs (operating and SX/EW) were estimated at US$1.60/t leached.

Other costs included a provision for miscellaneous costs (closure, payments) of US$0.10/t processed. In addition, a copper refining cost of US$0.09/lb, copper smelting cost of US$90/t concentrate, copper transport costs of US$107.69/t concentrate, molybdenum transport costs of US$73.67/t concentrate, and molybdenum refining/treatment cost of 12.50% (of molybdenum price) were used in optimization. An allowance of $0.07/t processed was made for closure costs for the mineral reserve cut-off.

Ore versus waste determinations were made using an NSR value, based on the economic parameters used in the pit optimizations, and the metal grades estimated in the resource block model.

1.11.2 Mineral Reserve Statement

Mineral reserves are reported using the mineral reserve definitions set out in SK1300. The reference point for the estimate is delivery to the process plant. Mineral reserves are summarized in Table 1-3. Wood is the QP Firm responsible for the estimate. The estimates are current as of December 31, 2021.

Factors that may affect the mineral reserve estimates include: changes to long-term metal price assumptions; changes to exchange rate assumptions; changes to metallurgical recovery assumptions; changes to the input assumptions used to design the optimized open pit shell; changes to operating and capital cost assumptions used, including changes to input cost assumptions such as consumables, labour costs, royalty and taxation rates, and changes to designs for infrastructure, mining and waste management; variations in geotechnical, mining, dilution and processing recovery assumptions; including changes to designs as a result of changes to geotechnical, hydrogeological, and engineering data used; changes to the NSR cut-off criteria used to constrain the open pit estimates; changes to the assumed permitting and regulatory environment under which the mine plan was developed; ability to maintain mining permits and/or surface rights; and the ability to maintain social and environmental license to operate.

1.12 Mining Methods

Conventional open pit mining methods using drill-and-blast techniques and truck-and-shovel operations will be used.

The rock quality at El Arco can be classified as Good to Excellent, and the intact rock strength is generally classified as Strong Rock. Very little information is available in regard to the rock fabric and major structures which cross the proposed open pit. The majority of the exploration core holes deviated consistently to the southwest due to subsurface structural conditions. This suggests that there is a pervasive structural fabric throughout the rock mass that is currently poorly characterized.

Table 1-3: Probable Mineral Reserve Statement

	Tonnage (Mt)	Copper Grade (Cu %)	Molybdenum Grade (Mo %)	Gold Grade (Au g/t)	Silver Grade (Ag g/t)	Contained Copper (Mlbs)	Contained Molybdenum (Mlbs)	Contained Gold (Moz)	Contained Silver (Moz)
Sulfide mill	1,229.54	0.40	0.006	0.14	1.8	10,822.09	166.70	5.58	70.46
Oxide leach	140.52	0.27	—	—	—	846.27	—	—	—
Total	***1,370.06***	***0.39***	**—**	**—**	**—**	***11,668.36***	***166.70***	***5.58***	***70.46***

Notes to Accompany Mineral Reserves Table:

1. The estimates are current as of December, 31, 2021. Wood is the QP Firm responsible for the estimate.
2. The point of reference for the mineral reserves is the point of delivery to the processing facility.
3. Mineral reserves are constrained within an optimized pit shell based on copper and molybdenum only. The following parameters were used in estimation: assumption of open pit mining methods; assumption of heap leach and concentrate processing; copper price of US$3.30/lb, molybdenum price of US$9.00/lb; variable net smelter return cut-offs; mining recovery of 100%; metallurgical recoveries of 86% Cu, and 55% Mo for material sent to the mill facility, and recovery of 80% Cu (Total copper) for material sent to the heap leach pad; total mining costs (base, incremental and sustaining) of US$1.206/t mined; total mill process costs (base, sustaining, tailings, G&A and molybdenum plant) of US$7.80/t milled, total leaching costs (operating and SX/EW) of US$1.60/t leached; miscellaneous costs (closure, payments) of US$0.10/t processed; copper refining cost of US$0.09/lb, copper smelting cost of US$90/t concentrate, copper transport costs of US$107.69/t concentrate, molybdenum transport costs of US$73.67/t concentrate, and molybdenum refining/treatment cost of 12.50% (of molybdenum price).
4. Gold and silver are not used in the pit optimization. The gold and silver metallurgical recoveries for material that will be sent to the mill facility are forecast at 55.7% Au, and 50.2% Ag, respectively. Molybdenum, gold and silver are not expected to be recovered from the leach process.
5. Numbers have been rounded. Totals may not sum due to rounding.

Four pit sectors were selected based on structure and proposed pit geometry. The slope performance database of similar copper porphyry deposits suggests that inter-ramp slope angles of 36–46º, and overall slope angles of 37–42º, are a reasonable range of slope angles for the pre-feasibility-level design until additional data are collected and evaluated.

The mapped potentiometric water level surface measurements average from 20–45 m below ground surface. Saltwater intrusion is considered as low risk based upon the elevation of the phreatic surface, depth of proposed pit and distance to either coast, Pacific, or Sea of Cortez. The groundwater seepage into the El Arco open pit is estimated to be 1,900 m^3/day. If hydraulic conductivity values are increased by a factor of two over those used above, the predicted inflow into the open pit becomes 3,300 m^3/day while a reduction in the assumed hydraulic conductivity by a factor of two results in computed inflow rate of 1,100 m^3/day.

A total of eight phase designs are envisaged within the constrained ultimate pit shell. There will be two waste rock storage facilities, located to the east and south of the planned open pit. A temporary stockpile will be used for oxide material in the early mine life, and sulfide material will be temporarily stockpiled once sulfide material is encountered.

The mine plan assumes:

- 100,000 t/d mill sulfide material throughput or 36.5 Mt/a
- 27.7 Mt to the concentrator for first production year (based on McNulty Curve)
- 35 kt/a of copper cathode production (recovered) from oxide material
- Maximum crushing and agglomeration capacity at leach of 15.6 Mt/a
- Stockpiling for mill and leach
- Mill feed using a minimum of two phases
- Leaching facilities constructed in pre-production years -3 to -1. Pre-production stripping occurs in year -1. Concentration facilities constructed in years -2 to 1. Oxide leaching operation starts in year 1. Sulfide concentration starts in year 2
- Maximum of 10 benches per year sinking rate
- Operations will run 365 d/a, 24 h/d.

The total material movement was kept within 72 Mt for the first 18 years and gradually ramped up, reaching a maximum of about 76.5 Mt in the later years of the mine life. Phases will be progressively mined from Phase 1 to Phase 8 with a peak mining rate of 200 kt/d.

It is assumed that blasting services will be contracted out. Grade control will use a fleet of rotary blast-hole drills. Blast patterns are envisaged at 7 x 9 m spacing in ore and waste.

Open pit mining will be undertaken using a conventional truck-and-shovel fleet. It was assumed that construction of the tailings storage facility (TSF) will be done by the Owner. A tailings specialist will be contracted for the first six months of the TSF construction period in which Southern Copper personnel will be trained and continue with the construction of the TSF.

1.13 Recovery Methods

The process designs are based on existing technologies and proven equipment.

Two process routes are envisaged:

- Oxide SX/EW plant: designed to treat oxide ores from a heap leach pad to extract copper and produce copper cathodes
- Sulfide concentrator: designed to treat sulfide material and produce a separate copper concentrate and separate molybdenum concentrate.

The oxide ore will be available to be placed on a permanent leach pad with collected pregnant leach solution (PLS) reporting to a SX/EW plant designed to produce 35,000 t/a of copper cathode. The proposed flowsheet includes crushing, conveying and agglomeration, static heap leaching, and SX/EW. The crushing and agglomerating hourly design throughput for primary crushing was 2,578 t/hr and the balance of the circuit was 2,230 t/hr. Southern Copper has operational experience in Mexico with permanent leach pads.

The process concentrator facilities were designed to treat a nominal rate of 100,000 t/d of copper sulfide ore and included crushing, grinding, flotation, thickening and filtration. The copper–gold–silver concentrate will be sent off site and sold to third party smelters, while the molybdenum concentrate will be bagged and loaded onto trucks for shipment to market. Southern Copper has other large copper operations in Mexico and Peru that use conventional crushing, and the company has experience in operating this type of plant. The use of conventional crushing is a well-known technology, has high overall availability, and has manageable maintenance.

Southern Copper have assumed that power will be obtained from a private power provider. The average power load for the leach pads, the SX/EW plant and the concentrator will be approximately 230 MW. Grinding and classification is forecast to represent around 76.4% of the total consumed power. Emergency diesel generators will be located near each major facility.

The El Arco water requirements will be supplied from a sea water desalination plant, proposed to be located at El Barril port. Fresh water will be required to replace what is trapped in concentrates, sent to the TSF, and losses due to evaporation. The operation will use fresh water pumped from the desalination plant at the coast as the make-up supply.

Consumables used in the oxide SX/EW plant will include sulfuric acid, extractant, diluent, cobalt sulfate and diatomaceous earth. The concentrator will require liners, grinding media, flotation reagents, MIBC frother, flocculant, sodium hydrosulfide, fuel oil, and lime.

1.14 Infrastructure

The site is currently a greenfields site, with the only infrastructure being the exploration camp.

The proposed major mine components are in areas that do not present major geotechnical hazards such as river washes and flooding, rockfalls, landslides or visible or known active faults. The current TSF location is planned for an area that will allow expansion, if necessary.

Planned on-site infrastructure includes an open pit mine, two waste rock storage facilities (WRSFs), mill complex and oxide fine crushing facilities, temporary ore stockpile, heap leach facility, TSF, administration office, change house/safety building, lunch room and construction laydown area, administration building, truck shop and warehouse, main 230 kV electrical substation and a water storage dam and reservoir. Proposed off-site infrastructure includes a desalination plant, water pipeline from the desalination plant to the water storage reservoir, an accommodations facility/townsite, to be located 5 km north of Guerrero Negro, and a port site at El Barril.

A new Owner-operated port will be constructed near El Barril 70 km to the northeast, on the Gulf of Cortez and will require an access road from the plant site at El Arco to the port. All supplies will be transported through Guerrero Negro via La Ensenada or Tijuana. A second route is from the port of Guaymas through the port of El Barril. Concentrate in containers will be shipped daily by motorized barge to the port of Guaymas, Sonora, directly across the Gulf of Cortez, where Southern Copper has a concentrate shipping and storage facility. Fuel oil, reagents and other supplies will be barged in on a daily basis.

The accommodations camp/townsite is planned to have accommodations for about 1,200 personnel. An allowance, based on construction man hours, has been made for a contractor's camp for construction. This is assumed to be located in proximity to the planned mine site.

Southern Copper have assumed that power will be obtained from a private power provider. The assumed cost for this provision is US$91 MW/hr. The cost assumption is supported by two internal studies completed by Southern Copper. The average mine site power load is expected to be around 230 MW. Offsite power for the desalination plant, water pumping and town site is estimated at about 20 MW, so the total average load required for operations is approximately 250 MW.

The majority of the Project water requirements will be supplied from a sea water desalination plant that will be located at El Barril. The desalination plant capacity is estimated to deliver approximately 80,000 m^3/day, using sea water reverse osmosis technology. Water will be pumped to the El Arco site via pipeline.

1.15 Market Studies

1.15.1 Markets

The El Arco Project is expected to produce copper–gold–silver and molybdenum concentrates, and copper cathodes.

Southern Copper provided Wood with an overview of the copper market as sourced from third-party experts, Wood Mackenzie, which was dated June, 2021. The report provided information on the copper market out to 2040, and covered information such as copper price forecasts, scenario modelling, demand in detail, and supply in detail. These data together with Southern Copper's internal experience with selling similar concentrates from their current producing mines, support that there is a reasonable basis to assume that the key products will be saleable at the assumed commodity pricing for the LOM plan.

Southern Copper employs a corporate strategy that is in line with the company's marketing experience, and experience with obtaining long-term contracts with strategic business partners in the Asian and European markets, as well as annual contracts with other active market participants. Depending on concentrate quality, the company's concentrates are primarily sold onto the Asian or European markets. Cathode copper is sold onto the Asian, European, Brazilian and/or North American markets. Similar end-markets are expected to be the purchasers of concentrates and cathodes produced from the El Arco Project.

Southern Copper currently produces molybdenum from its mining operations in Mexico and has established links to buyers of the concentrate.

1.15.2 Commodity Pricing

To establish the copper price forecasts Wood used a combination of information derived from 22 financial institutions, from pricing used in technical reports filed with Canadian regulatory authorities over the previous 12-month period, from pricing reported by major mining companies in public filings such as annual reports in the previous 12-month period, spot pricing, and three-year trailing average pricing. Wood considers that a long-term price forecast of US$3.30/lb Cu is reasonable.

It is in accordance with industry-accepted practice to use higher metal prices for the mineral resource estimates than the pricing used for mineral reserves. The copper price forecast of US$3.30/lb was increased by 15% to provide the mineral resource estimate copper price estimate of US$3.80/lb.

Wood reviewed the Southern Copper internal long term forecast price for molybdenum of US$9.00/lb, and concluded that it is reasonable and conservative compared to what others have recently been using in the industry. The Southern Copper molybdenum price forecast of US$9.00/lb was increased by 15% to US$10.35/lb for the input to the constraining pit shell and NSR cut-off used in the mineral resource estimate.

Mineral reserves and mineral resources were constrained within pit shells that used inputs from copper and molybdenum only, with no gold or silver contribution to the NSR value or constraining pit shells. The economic analysis however, did include contributions from gold and silver. Gold and silver long term pricing was provided by Wood. To establish the gold and silver forecasts Wood uses a combination of information derived from 22 financial institutions, from pricing used in technical reports filed with Canadian securities regulatory authorities over the previous 12 month period, from pricing reported by major mining companies in public filings such as annual reports in the previous 12-month period, spot pricing, and three-year trailing average pricing. Wood considers that a long-term price forecast of US$1,600/oz is reasonable for gold and US$20.70/oz is reasonable for silver.

The pricing used in this Report is as follows:

- Mineral resources:
  - Copper: US$3.80/lb
  - Molybdenum: US$10.35/lb
- Mineral reserves:
  - Copper: US$3.30/lb

  - Molybdenum: US$9.00/lb
- Cashflows:
  - Copper: US$3.30/lb
  - Molybdenum: US$9.00/lb
  - Gold: US$1,600/oz
  - Silver: US$20.70/oz.

The assumed exchange rate for costs and cashflow analysis purposes was US$1.00 = MXN$22.00. This exchange rate was provided by Southern Copper.

1.15.3 Contracts

No contracts are in place for sale of any of the proposed copper or molybdenum concentrate or copper cathode production. Southern Copper expects that any sales terms will be in line with contracts that Southern Copper has for its existing Mexican operations.

Southern Copper expects that terms contained within any gold and silver sales contracts that could be entered into would be typical of, and consistent with, standard industry practices, and be similar to contracts for the supply of gold and silver elsewhere in the world. No contracts are currently in place for any proposed gold or silver production.

No contracts are currently in place for any services. When concluded, such contracts would be negotiated and renewed as needed. Contract terms are expected to be typical of similar mining-related contracts that Southern Copper has previously entered into in Mexico.

1.16 Environmental, Permitting and Social Considerations

The proposed mine site is located within the Valle de los Cirios Flora and Fauna Protection Area. A set of preservation 45 polygons or subzones were established within the Valle de los Cirios Flora and Fauna Protection Area. Each of the subzones have differing levels of allowed activity within the subzone, based on whether the subzone must receive greater protection and care to maintain the original natural conditions as it contains particularly relevant or fragile ecosystems. Some subzones do not allow for mining exploration or exploitation activities.

The El Vizcaino Biosphere Reserve extends across Baja California on the southern side of the state boundary, and is approximately 1 km south of the planned mine site area.

Historically there has been mining in the El Arco area since the late 1800s. El Arco and Calmallí were the larger mining operations but there were several other smaller mines near El Arco.

1.16.1 Environmental Studies and Monitoring

An environmental impact assessment was prepared in 2008 by Corporación Ambiental de México S.A., which included baseline climate, geomorphology, soil, flora, fauna and social surveys. Wood has assumed, as no construction activities have commenced, and there are no current mining activities, that the baseline data collected in 2008 has not changed significantly over time. An update of the baseline studies was underway at the Report date.

Three species of flora were identified that are considered species at risk under NOM-059-ECOL-2001. A population of garambullo monstruoso occurs within a portion of the mineral resource estimate area, and a second population is adjacent the planned leach pad and temporary ore stockpile areas.

Some endemic fauna were identified within the Project area.

An Environmental Management Plan (EMP) will be developed that will define the activities required to comply with the legal provisions and those responsible for performing them, as well as establishing the compliance indicators, the frequency for their measurement, the reporting formats and the guidelines for their safekeeping. It will also consider procedures for environmental emergencies.

1.16.2 Protected Areas

The Valle de los Cirios Flora and Fauna Protection Area has an official Management Plan that recognizes mining as a historical activity within the protection area, and envisages that mining activities could potentially be undertaken in the special exploitation subzone where the El Arco Project is located. The Management Plan may be amended

A strategy is proposed that contemplates two parallel sequences:

- Obtain authorization in terms of environmental impact;
- Obtain approval to modify the Valle de Los Cirios Flora and Fauna Protection Area Management Plan (the Management Plan).

1.16.3 Closure and Reclamation Considerations

No specific closure or reclamation requirements exist in Mexico. M3 estimated a closure cost in 2009, which included facilities such as the proposed heap leach operation, WRSFs and TSF, but did not include the closure costs for the planned open pit. Wood reviewed the M3 estimates, and made provision for additional elements within the closure estimate. With the additional assumptions included, Wood estimates that the closure cost would be approximately $125 M. Some of the closure costs can be allocated during active mining including concurrent grading of parts of the heap leach facility, TSF and WRSFs.

1.16.4 Permitting

Southern Copper's Environmental Management identified a list of 17 key permit requirements for mine construction, seven permits that must be in place prior to operations commencing, and two additional permits that must be granted for operations. Additional permits will be required to support construction and operation of the proposed desalination plants.

Permitting within the Valle de los Cirios Flora and Fauna Protection Area is subject to the provisions of the Baja California State Ecological Ordinance Program (2014) that defines the ecological regulation criteria for the preservation, protection, restoration and sustainable use of natural resources applicable to different areas of the State. It provides for mining activity under certain restrictions in some areas of the State's territory, including the El Arco Project. Exploration, exploitation and beneficiation of minerals and supporting works and activities in protected natural areas under the jurisdiction of the Federation must undergo an environmental impact assessment, which is the procedure by which the Ministry of Environment and Natural Resources (SEMARNAT) establishes conditions for performance of work and activities that may cause ecological imbalance or exceed the limits and conditions established in the applicable provisions to protect the environment and preserve and restore ecosystems, in order to avoid or minimize their negative effects on the environment.

A permitting strategy is proposed that contemplates two parallel sequences:

- Obtain authorization in terms of environmental impact
- Obtain approval to modify the Valle de Los Cirios Flora and Fauna Protection Area Management Plan.

1.16.5 Social Considerations, Plans, Negotiations and Agreements

Southern Copper developed a socio-economic baseline with information collected from 2010–2021 for two municipalities:

- Ensenada (Baja California province)
- Mulegé (Guerrero Negro and El Vizcaíno, Baja California Sur province).

The Project covers two ejidos, Costeño and Confederación Nacional Campesina.

There is an Indigenous presence (Cochimis population) in Guerrero Negro, and Southern Copper has undertaken, through different participatory mechanisms, to ensure their active participation in social programs of the community development model.

The community development model includes three key fundamentals: good neighbours, economic and human development.

Southern Copper created two community committees as a citizen participation structure that encourages a social relationship between communities and Southern Copper:

- Unidos Villa Morelos, established 28 February, 2019
- Guerrero Negro, established 20 February, 2020.

Casa Grande is a local Southern Copper office in Guerrero Negro that was established to provide information about the Project and clarify any questions and concerns that the local communities may have.

The Community Care Service was established to receive and serve all the concerns, suggestions, complaints, special cases or contingency reports that arise from the community in relation to the El Arco Project.

1.17 Capital Cost Estimates

Capital costs are reported using the criteria set out in SK1300, and have a pre-feasibility accuracy level of ±25%, and a contingency allocation of ≤15%.

A mining study was completed in 2009, which assumed a 100,000 t/d of sulfide material production rate and oxide operation with a nominal production capacity of 35,000 t/a of cathodes. The estimate was based on capital cost estimate prices obtained in 2008. In 2011, the 2009 study was used as a basis for an updated capital cost estimate. There were no more recent studies available to Wood. The cost estimates used in this Report are supported by 2009 quotes escalated to Q2 2021 as well as recent quotes for major mining equipment obtained for other Southern Copper projects.

The capital cost estimate totals US$4,325.7 M, consisting of US$3,537.1 M in initial capital and US$788.6 M in sustaining capital. A summary of the initial capital cost estimate is provided in Table 1-4.

1.18 Operating Cost Estimates

Operating costs are reported using the criteria set out in SK1300, and have a pre-feasibility accuracy level of ±25%, with no contingency applied.

Mine operating costs are forecast to average US$1.80/t mined over the LOM. Operating costs incorporated operational life, average availabilities, and efficiencies for the major mine equipment fleet. Other costs considered included drilling, personnel, explosives and consumables, and maintenance costs.

The estimated mill operating cost for El Arco is US$0.75/lb Cu recovered equivalent to US$5.69/t processed. Oxide material will be processed to obtain cathodes using a SX/EW plant. The estimated operating cost for the cathode production is US$0.58/lb Cu or the equivalent of US$2.80/t ore processed.

The total estimated annual G&A operating costs is US$25.0 M or the equivalent of US$0.70/t of milled ore.

Table 1-5 is a summary of the LOM operating cost estimates, exclusive of value-added taxes.

Table 1-4: Initial Capital Cost Estimate

Area	Cost Estimate (US$ M)
Off-site infrastructure	115.7
Site supporting facilities	32.4
Mining	174.0
Sulfide plant	956.7
Oxide plant	348.5
Indirect costs	1,460.1
Contingency	449.7
Total	3,537.1

Note: numbers have been rounded. Totals may not sum due to rounding.

Table 1-5: LOM Operating Cost Estimate

Description	Total (US$M)	Unit Cost	
Mining	3,953.8	US$/t mined	1.80
Process	7,385.7	US$/t processed	5.39
G&A	861.1	US$ M/a	25.0
Total	***12,200.6***		

Note: Numbers have been rounded. Totals may not sum due to rounding.

1.19 Economic Analysis

1.19.1 Forward-Looking Information Caution

Certain information and statements contained in this section are forward-looking in nature and are subject to known and unknown risks, uncertainties, and other factors, many of which cannot be controlled or predicted and may cause actual results to differ materially from those presented here. Forward-looking statements include, but are not limited to, statements with respect to the economic and study parameters of the El Arco Project; mineral reserves; the cost and timing of any development of the El Arco Project; the proposed mine plan and mining strategy; dilution and extraction recoveries; processing method and rates; mine production rates; projected metallurgical recovery rates; infrastructure requirements; power supply, water and geotechnical assumptions, proposed infrastructure assumptions may change; capital, operating and sustaining cost estimates; concentrates and cathodes marketability and commercial terms; the projected LOM and other expected attributes of the Project; the net present value (NPV), internal rate of return (IRR) and payback period of capital; future metal prices and currency exchange rates; government regulations and permitting timelines; taxes applicable to the Project; estimates of reclamation obligations; requirements for additional capital; environmental and social risks; and general business and economic conditions.

1.19.2 Methodology and Assumptions

The financial analysis was performed using a discounted cash flow (DCF) method. 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).

The financial model that supports the mineral reserve declaration was a standalone model that calculated annual cash flows based on: scheduled ore production; assumed processing recoveries; metal sale prices and MXN/US$ exchange rate; projected operating and capital costs; and estimated taxes.

The financial analysis was based on an after-tax discount rate of 10%. Cash flows were assumed to occur at the end of each calendar year and were discounted to the start of construction. Cash flows were reported based on generic years (e.g., Year -3, Year -2, Year -1, Year 1, Year 2).

Costs projected within the cash flows are based on constant Q2 2021 US dollars.

Revenue was calculated from the recoverable copper, gold, silver and molybdenum estimates, and the long-term copper, gold, silver and molybdenum price forecasts.

The economic analysis was based on 100% equity financing and was reported on a 100% Project ownership basis. The base case economic analysis assumed constant prices with no inflationary adjustments.

Long-term commercial terms and charges to be used in the economic analysis were provided by Southern Copper. These were based on contract terms from Southern Copper's other operations in Mexico. Transport costs were based on estimates provided by Southern Copper.

The taxation modeled within the financial analysis was based on the taxation scheme that was provided and validated by Southern Copper. The tax depreciation was straight line.

1.19.3 Economic Analysis

The El Arco Project is anticipated to generate a pre-tax NPV of US$1,937.9 M at a 10.0% discount rate, an IRR of 17.7% and a payback of 4.9 years.

The financial analysis results show an after-tax NPV of US$474.8 M at a 10.0% discount rate, an IRR of 12.1% and a payback of 6.5 years.

Table 1-6 presents a summary of the economic results.

1.19.4 Sensitivity Analysis

A sensitivity analysis was performed to identify potential impacts on the after-tax NPV and IRR of variations in metal prices, grades, initial capital costs and operating costs.

As shown in Figure 1-1 and Figure 1-2, at a 10% discount rate, the El Arco Project is most sensitive to fluctuations in copper price and grade. It is less sensitive to changes in initial capital cost and operating costs. It is least sensitive to variations in gold price and grade, silver price and grade and molybdenum price and grade.

Gold, silver and molybdenum grade sensitivities were excluded from Figure 1-1 and Figure 1-2 as metal price and grade sensitivity trends are similar for each of these metals.

1.20 Risks and Opportunities

1.20.1 Risks

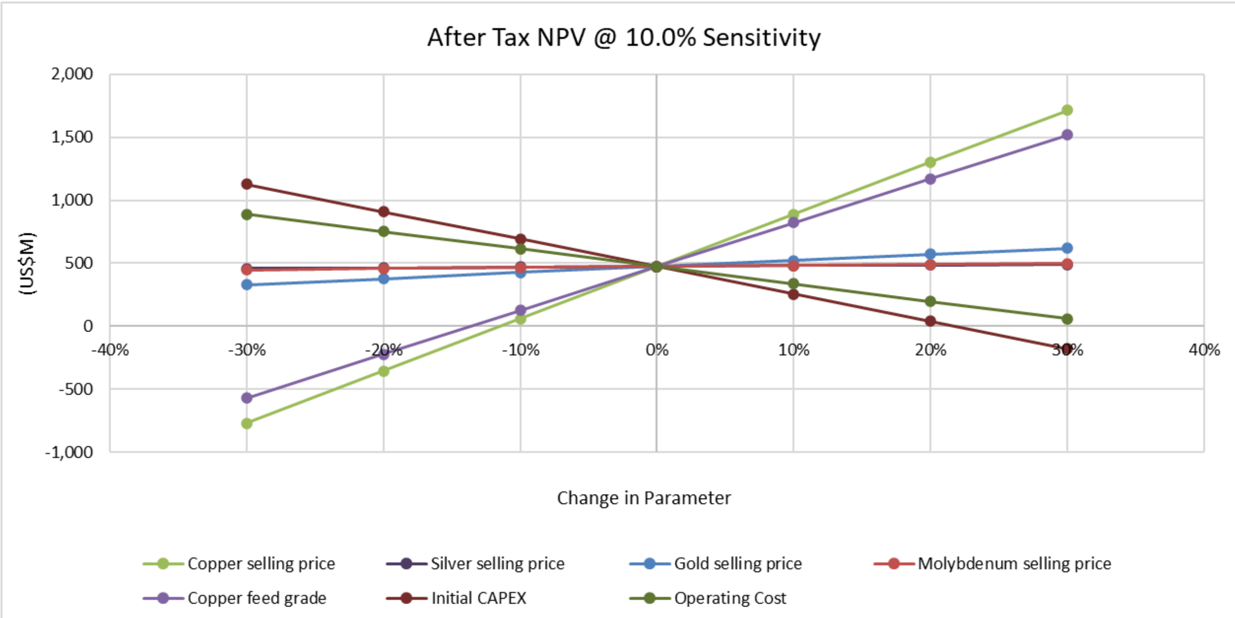
The risks associated with the El Arco site are generally those expected with a proposed large surface mining operation and include social license to operate, the accuracy of the resource model, unexpected geological features that cause geotechnical issues, and/or operational impacts, ability to permit, construct, and operate a desalination plant facility at El Barril port.

Table 1-6: Summary of Economic Results

Description	Units	Value
Mine life	Years	35
Copper payable	Mt	4.3
Gold payable	Moz	2.6
Silver payable	Moz	24.4
Molybdenum payable	Mt	0.04
After-Tax Valuation Indicators		
Undiscounted cash flow	US$M	8,929.8
NPV @ 10.0%	US$M	474.8
Payback period (from start of operations)	years	6.5
IRR	%	12.1
Project capital (initial)	US$M	3,537.1
Sustaining capital	US$M	788.6
Closure cost	US$M	125.0
Mining operating cost	US$M	3,953.8
Process operating cost	US$M	7,385.7
G&A	US$M	861.1

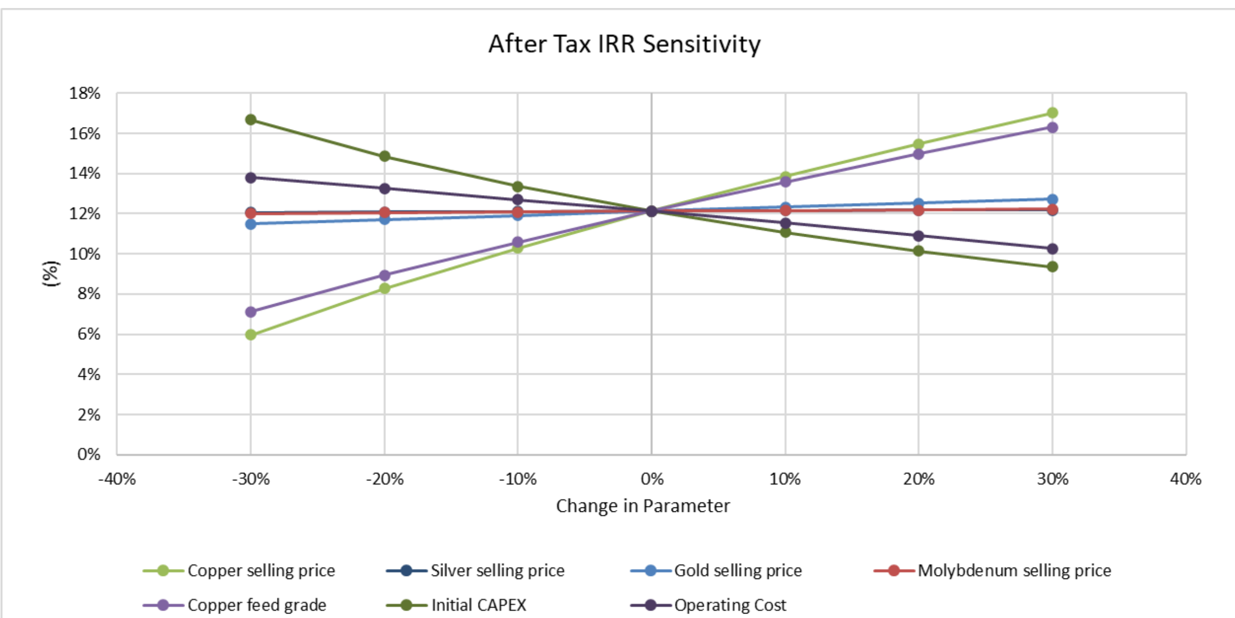
Note: Numbers have been rounded. Totals may not sum due to rounding.

Figure 1-1: After-Tax NPV Sensitivity (10% discount rate)



Note: Figure prepared by Wood, 2021.

Figure 1-2: After-Tax IRR Sensitivity



Note: Figure prepared by Wood, 2021.

Specific risks include:

- The prefeasibility level mine plans and infrastructure have been located to avoid the known colonies of garambullo monstruoso. For the purposes of mineral resource estimates exclusive of mineral reserves, Wood has assumed that the Valle de los Cirios Flora and Fauna Protection Area Management Plan can be amended to allow mining activities and species removal, and that the translocation of this species to new habitat is feasible. If this is not the case, the conceptual pit constraining the mineral resource estimate would need to be modified to avoid the habitat area, and would result in a smaller tonnage and metal estimate
- The mineral reserve estimate excludes areas where known colonies of garambullo monstruoso occur. However, there is a risk that during permitting, exclusion zones to protect the cactus may require larger than envisaged no-mining polygons. This would affect the planned open pit, and could affect infrastructure locations, in particular the leach pad and temporary ore stockpiles. Changes to the pit design and locations would affect the capital cost estimate, the assumed operating cost estimates, and the financial analysis
- Geotechnical and hydrological assumptions used in mine planning are based on testwork. Any changes to the geotechnical and hydrological assumptions could affect mine planning, affect capital cost estimates if any major changes to the mine plan are required due changes in interpretations, affect operating costs due to mitigation measures that may need to be imposed as a result of the interpretational changes, and impact the economic analysis that supports the mineral reserve estimates
- The new Global Industry Standard on Tailings Management (GISTM) provides a set of industry standards to guide design and management of TSFs. Members and non-members of International Council on Mining and Metals (ICMM) are required to be in compliance with the GISTM over the next several years. The TSF design needs to be revisited and be revised as needed to be in full compliance with the recently-published global tailings standard (GISTM, 2020). This may result in changes to the design criteria. Such changes may result in increases to the capital cost estimates, and changes to the operating cost estimates, which could affect the mineral reserve estimates.
- Molybdenum recoveries are based on testwork; however, there is a risk that the low average head grades could result in variable molybdenum recoveries. This could

affect the operating cost estimates, and revenue assumptions in the cashflow analysis;

- The LOM plan assumes that Southern Copper will purchase electric power from a private power provider. The assumed cost for this provision is US$91 MW/hr. The cost assumption is supported by two internal studies completed by Southern Copper, if this is not possible, there is a risk to the mine plan, including the capital cost estimate, the assumed operating cost estimates, and the financial analysis as suitable alternative sites would need to be assessed.
- The LOM plan assumes that fuel can be readily supplied to the El Barril site at a reasonable cost to support operations
- The LOM plan assumes that the accommodations village to support operations can be constructed outside the town of Guerrero Negro.
- Commodity price increases for key consumables such diesel, electricity, tires and chemicals would negatively impact the stated mineral reserves and mineral resources
- Labor cost increases or productivity decreases could also impact the stated mineral reserves and mineral resources, or impact the economic analysis that supports the mineral reserves.

As with any large mining project in Mexico, the El Arco Project is subject to certain risks, including:

- Potential social conflicts based on negative community or regulatory perceptions. These could include unfulfilled expectations, new leadership with new ideas as to how agreements should be concluded, differing ideas of appropriate compensation, or changes in the community boundaries
- Agreements with communities are not respected by certain members of a community and further demands are made for social investment or other considerations not covered by the agreements
- Governmental changes to mining policies and mining regulations
- Non-governmental organizations that promote an anti-mining culture.

1.20.2 Opportunities

Opportunities include:

- Conversion of some or all of the indicated mineral resources currently reported exclusive of mineral reserves to mineral reserves, with appropriate supporting studies;
- There are discontinuous patches of blocks with potential for measured classification based on drill hole spacing metrics that are classified as indicated mineral resources in the 2021 mineral resource estimate. A targeted infill drill program, consisting of 10–20 drill holes could be completed to upgrade confidence in a significant volume of this mineralization to the measured category
- Upgrade of some or all of the inferred mineral resources to higher-confidence categories, such that such better-confidence material could be used in mineral reserve estimation;
- A single drill hole was drilled to a depth of approximately 1,500 m below surface. The drill hole intercepted moderate- to high-grade material (0.3% Cu to 0.6% Cu). Molybdenum grades are higher at the bottom of the mine. Drilling of additional deep drill holes may allow deepening of the pit shell and expansion of the mineralization available for mineral resource estimation
- Higher metal prices than forecast could present upside sales opportunities and potentially an increase in predicted Project economics;
- Based on the relatively high RQD and RMR indicated for the major slope forming rocks, steeper slopes may be achievable. Where structure is not identified as a control to the achievable bench face angle, steeper bench faces, and steeper inter-ramp slopes may be possible. Additionally, it may be possible to double bench in some areas of the pit if pervasive structural controls are not present. There is currently no reliable subsurface structure orientation data that would allow such an assessment.

1.21 Conclusions

Under the assumptions presented in this Report, the El Arco Project has a mine plan that is technically feasible and economically viable. The positive net present value of the Project supports mineral reserves.

1.22 Recommendations

The recommendations cover the discipline areas of geology, geotechnical, mineral resource and mineral reserve estimates, infrastructure and environmental. The total recommended budget estimate to complete the programs is US$11.5–US$13.7 M.

Recommendations include:

- Geology:
  - Completion of a pulp re-assay program, focusing on those areas within the planned open pit where there are no or limited numbers of silver and gold assay data
  - Completion of re-logging of available drill core to provide more robust data for inclusion in the structural, alteration and current lithology models
  - Completion of a 15,000 m drill program, consisting of angle drill holes, oriented to provide better understanding of location, thickness, and orientation of dikes in the geological model
  - Completion of two oriented drill holes to provide structural data to explain the downhole deviations noted in historical drill holes completed in the northeastern quadrant of the deposit
  - Completion of a study to document why the historical drill holes are deviating
- Geotechnical:
  - Completion of detailed geological and structural mapping of existing outcrops
  - Completion of a 6,000 m geotechnical drill program, consisting of oriented core holes, to support pit slope designs. The drill holes should be surveyed using borehole televiewer surveys
  - To the extent possible, hydrogeologic information should be collected from the drill holes by performing packer testing and installing vibrating wire piezometers in the completed holes
  - Revisit and revise TSF designs to be in full compliance with the recently-published global tailings standard
  - Complete a site-specific seismic hazard study

  - Complete subsurface geotechnical investigations for the areas planned for the heap leach facility and TSF.
- Mineral resources and mineral reserves:
  - Once results are available from the recommended geological and geotechnical programs, the mineral resource and mineral reserve estimates should be updated
  - Inclusion of gold and copper in the NSR formulae used to calculate cut-off grades and in pit optimization
- Infrastructure:
  - Trade-off studies to determine optimal locations for desalination plant, accommodations camp, and optimal power supply and fuel sources for the operation.
  - Determine route alignment for highway MX18 deviation; prepare a list of the permits and consultations that must be conducted to allow the highway alignment to be changed
- Environmental:
  - Continue with programs designed to evaluate the potential of translocation and propagation of the garambullo monstruoso
  - Continue discussions with the appropriate regulatory authorities as to the potential for mining within or immediately adjacent to the protected polygons covering garambullo monstruoso communities
  - Complete baseline studies in the areas planned for the proposed desalination plant and power supply options.
  - If the preferred location of the accommodations camp is not Guerrero Negro, baseline studies should be completed over the new area.

2 INTRODUCTION

2.1 Registrant

This technical report summary (the Report) was prepared for Southern Copper Corporation (Southern Copper) by Wood Group USA, Inc. (Wood, acting as the QP Firm) on the El Arco Project (the Project), located in the Baja California, Mexico (Figure 2-1).

2.2 Terms of Reference

2.2.1 Report Purpose

The Report was prepared to be attached as an exhibit to support mineral property disclosure, including mineral resource and mineral reserve estimates, for the El Arco Project in Southern Copper's Form 10-K for the year ending December 31, 2021.

Mineral resources and mineral reserves are reported for the El Arco deposit.

2.2.2 Terms of Reference

Unless otherwise indicated, all financial values are reported in United States (US) currency (US$) including all operating costs, capital costs, cash flows, taxes, revenues, expenses, and overhead distributions.

Unless otherwise indicated, the metric system is used in this report for mineral resources and mineral reserves and associated financials.

Mineral resources and mineral reserves are reported using the definitions in Subpart 229.1300 – Disclosure by Registrants Engaged in Mining Operations in Regulation S–K 1300 (SK1300).

The Report uses US English.

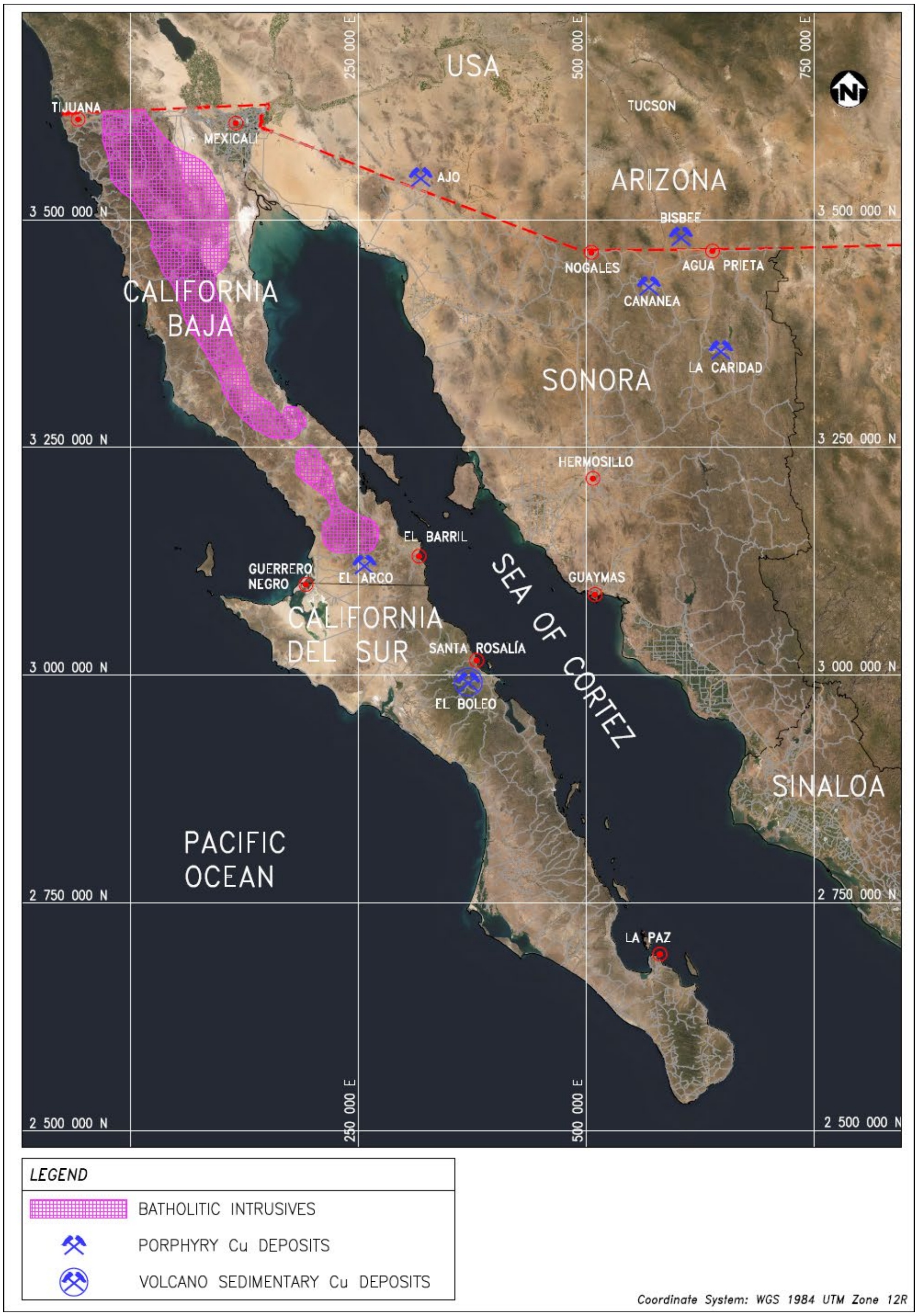
2.3 Qualified Persons

Wood is using the allowance for a third-party firm consisting of mining experts to date and sign the Report.

Wood had appropriate individual Qualified Persons (QPs) prepare the content that is summarized in this Report.

A portion of the information was provided by Southern Copper as the registrant as set forth in Chapter 25. Wood has relied on the registrant for the information specified in Chapter 25.

Figure 2-1: Project Location Plan



Note: Figure prepared by Wood, 2021. Red dashed line is international border.

2.4 Site Visits and Scope of Personal Inspection

Wood QPs and support staff visited the Project site. The scope of inspection by each discipline area is summarized in Table 2-1.

2.5 Report Date

Information in the Report is current as at December 31, 2021.

2.6 Information Sources

The reports and documents listed in Chapter 24 and Chapter 25 of this Report were used to support Report preparation.

2.7 Previous Technical Report Summaries

Southern Copper has not previously filed a technical report summary on the Project.

Table 2-1: Scope of Personal Inspection

Discipline Area	Site Visit Date	Scope of Personal Inspection
Geology/mineral resources	23–24 February, 2021	Discussed the Project history with the Southern Copper geology team. Visited outcrops of the main lithologies and viewed examples of oxide copper mineralization. Examined drill core from four drill holes, including inspections of lithology, alteration, structure, and mineralization in those cores. Visited drill core storage warehouses and checked the condition of drill core from drill campaigns carried out from the 1970s to 2015. Visited the pulp storage warehouse and checked the condition of assay pulps from holes drilled from the 1970s to 2015. Reviewed selected drill hole logs and assay certificates from programs carried out in the 1970s.
Mining engineering/geotechnical/infrastructure	23–24 February, 2021	Reviewed the state of existing site access road. Reviewed the of existing project infrastructure. Viewed the proposed locations of major mine infrastructure components such as tailings storage facility (TSF), waste rock storage facilities (WRSFs), areas for stockpiles. Discussed the potential sources for power and water for the project with Southern Copper staff. Reviewed the potential to source construction materials in the immediate project proximity.
Geotechnical/hydrological	June 22–23, 2021	Inspected proposed locations of the open pit, WRSFs, heap leach pad, temporary ore stockpile, and TSF. Viewed existing drainage and geologic features, landforms, vegetation, and potential interactions between planned facilities. Examined potential material borrow sites. Visited core shed.

3 PROPERTY DESCRIPTION

3.1 Property Location

The El Arco deposit is located near the village of El Arco in Baja California, Mexico, which lies near the center of the Baja California peninsula, on the border of the states of Baja California and Baja California Sur. El Arco is located approximately 70 km northeast of the city of Guerrero Negro, Baja California Sur, which is the closest town to the site.

The Project centroid is at approximately 28° 03′ 24.08″ N; 113° 27′ 35.23″ W.

The center of the El Arco deposit is located at approximately 28° 02′ 02.97″ N; 113° 23′ 46.75″ W.

The past-producing El Arco underground mine, related infrastructure and former town site are located on the southern edge of the current deposit.

3.2 Property and Title in Mexico

Wood has not independently verified the following information which is in the public domain and has sourced the information from official Mexican Government websites.

3.2.1 Mineral Title

In Mexico, mining concessions are granted by the Economy Ministry and are considered exploitation concessions with a 50-year term.

Valid mining concessions can be renewed for an additional 50-year term as long as the mine is active, and the applicant has abided by all appropriate regulations and makes the application within five years prior to the expiration date.

All concessions must be surveyed by a licensed surveyor.

Mining concessions have an annual minimum investment that must be met, an annual mining rights fee to be paid to keep the concessions effective, and compliance with environmental laws. Minimum expenditures, pursuant to Mexican regulations, may be substituted for sales of minerals from the mine for an equivalent amount.

3.2.2 Surface Rights

Surface rights in Mexico are commonly owned either by communities (ejidos) or by private owners. Mexican mining law includes provisions to facilitate purchasing land required for mining activities, installations and development.

3.2.3 Royalties

In 2013, the Mexican Federal government introduced a mining royalty, effective January 1, 2014, based on 7.5% of taxable earnings before interest and depreciation. In addition, precious metal mining companies must pay a 0.5% royalty on revenues from gold, silver, and platinum.

3.2.4 Water Rights

The National Water Law and associated regulations control all water use in Mexico. The Comisión Nacional del Agua (CONAGUA) is the responsible agency. Applications are submitted to this agency indicating the annual water needs for the mine operation and the source of water to be used. CONAGUA grants water concessions based on water availability in the source area.

3.2.5 Fraser Institute Survey

Wood used the 2020 Fraser Institute Annual Survey of Mining Companies report (the 2020 Fraser Institute Survey) as a credible source for the assessment of the overall political risk facing an exploration or mining project in Mexico. Each year, the Fraser Institute sends a questionnaire to selected mining and exploration companies globally. The Fraser Institute survey is an attempt to assess how mineral endowments and public policy factors such as taxation and regulatory uncertainty affect exploration investment.

Wood used the 2020 Fraser Institute survey because it is globally regarded as an independent report-card style assessment to governments on how attractive their policies are from the point of view of an exploration manager or mining company and forms a proxy for the assessment by industry of political risk in specific political jurisdictions from the mining industry's perspective.

Of the 77 jurisdictions surveyed in the 2020 Fraser Institute survey, Mexico ranks 42nd for investment attractiveness, 61st for policy perception and 27th for best practices mineral potential.

3.3 Ownership

The Project is wholly-owned by Southern Copper Corporation, Sucursal del Perú, which is a majority-owned, indirect subsidiary of Grupo Mexico S.A.B de CV. (Grupo Mexico). Mexicana del Arco, S.A. de C.V. (Mexarco), a Grupo Mexico/Southern Copper subsidiary company is the in-country holding company. An ownership organogram is provided in Figure 3-1.

3.4 Mineral Title

Southern Copper holds 11 mining concessions, covering 72,133 ha (Table 3-1). Concession locations are shown in Figure 3-2. Concessions are held in the name of Mexarco.

3.5 Surface Rights

Surfaces rights in the deposit area are held by a combination of agrarian cooperatives (ejido) and private owners.

Between 2010–2015, Southern Copper acquired 22,174.29 ha of surface rights from the Confederación Nacional Campesina ejido. Negotiations are underway to acquire 15,000 ha of surface rights from the Costeño ejido. The surface rights obtained are shown in Table 3-2 and Table 3-3, and shown in Figure 3-3. A usufruct right is a temporary right to use and derive income or benefit from land that is owned by a third party.

Southern Copper indicated to Wood that there are sufficient surface rights envisaged for their life-of-mine (LOM) plan.

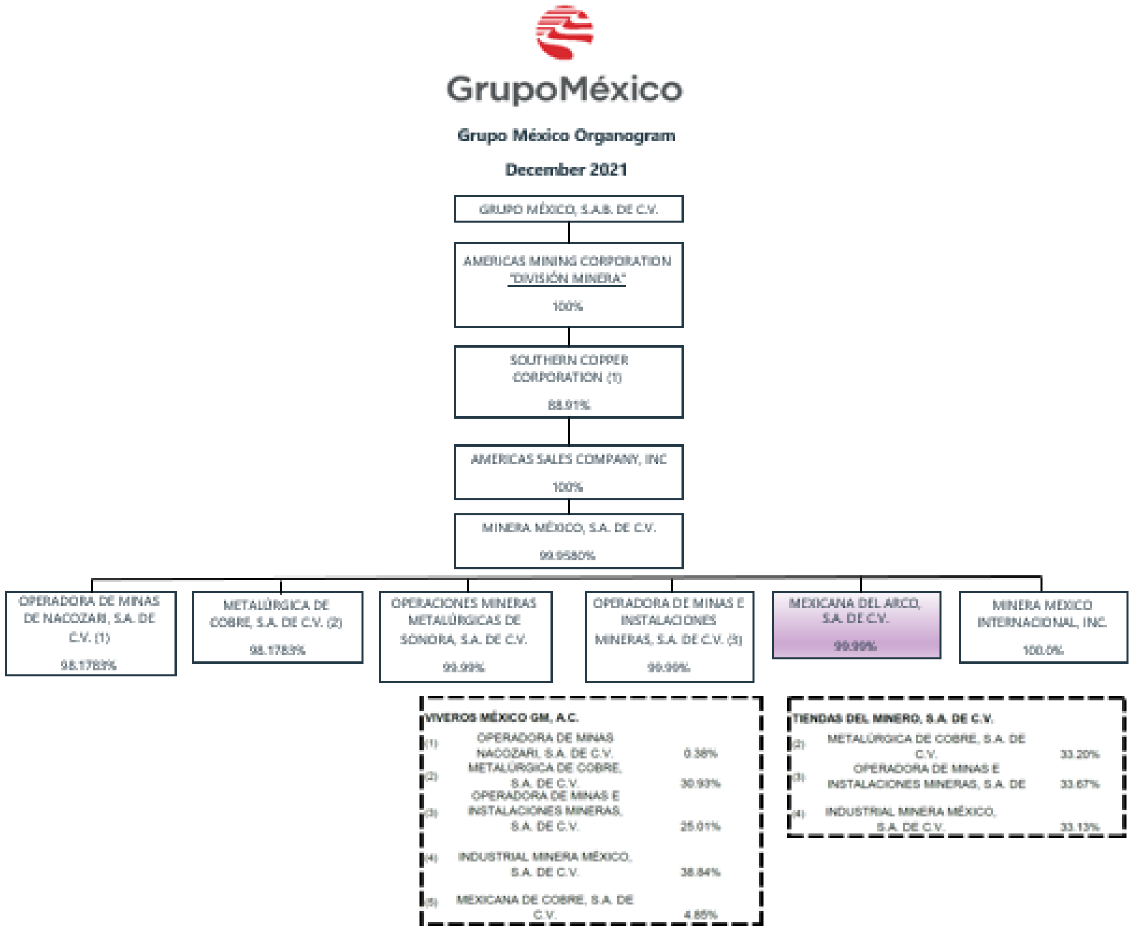
3.6 Water Rights

Project water is planned to be sourced from a desalination plant, to be constructed at the El Barril port site (see Figure 2-1 for locationof El Barril).

3.7 Royalties

A royalty is payable to the Mexican Government (see Chapter 3.2.3).

Figure 3-1: Ownership Organogram



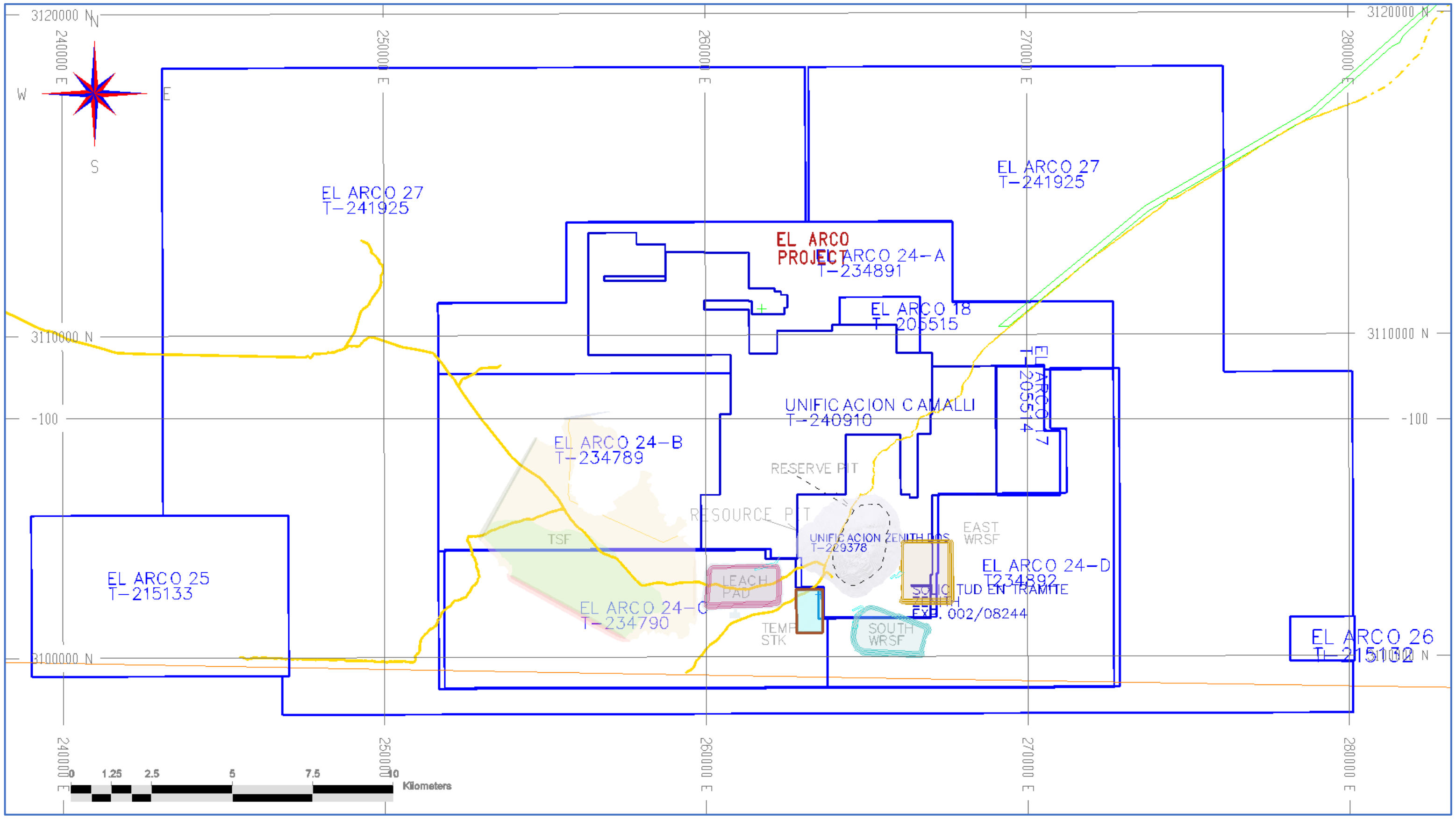
Note: Figure prepared by Southern Copper, 2021.

Table 3-1: Mineral Tenure Table

Concession	Owner	Title	Municipality	State	Grant Date	Area (ha)
El Arco 17	Mexarco	205514	Ensenada	Baja California	17/09/97	698
El Arco 18	Mexarco	205515	Ensenada	Baja California	17/09/97	278
El Arco 26	Mexarco	215132	Ensenada	Baja California	7/2/2002	276
El Arco 25	Mexarco	215133	Ensenada	Baja California	7/2/2002	4,000
Unificacion Zenith Dos	Mexarco	229378	Ensenada	Baja California	12/4/2007	2,752
El Arco 24-B	Mexarco	234789	Ensenada	Baja California	13/08/09	4,759
El Arco 24-C	Mexarco	234790	Ensenada	Baja California	13/08/09	4,988
El Arco 24-A	Mexarco	234891	Ensenada	Baja California	7/9/2009	4,840
El Arco 24-D	Mexarco	234892	Ensenada	Baja California	7/9/2009	4,887
Unificacion Calmalli	Mexarco	240910	Ensenada	Baja California	7/8/2012	4,997
El Arco 27	Mexarco	241925	Ensenada	Baja California	9/4/2013	39,658
						72,133

Note: Mexarco = Mexicana del Arco, S.A. de C.V., a Grupo Mexico/Southern Copper subsidiary. Date format is day/month/year.

Figure 3-2: Mineral Tenure Location Map



Note: Figure prepared by Wood, 2021. SCC = Southern Copper Corporation. Mine infrastructure shown on the figure is proposed.

Table 3-2: Surface Rights

Key	Original Owner	Parcel Number	Owner	State	Municipality	Ejido	Area (m^2)	Area (ha)
1	Gabriel Castro Lara	108	Mexarco	Baja California	San Quintín	El Costeño	30,008,117	3,001
2	Melchor Ávalos Anguiano	109	Mexarco	Baja California	San Quintín	El Costeño	29,197,133	2,920
3	Exiquio Mendoza Peña	123	Mexarco	Baja California	San Quintín	El Costeño	17,210,358	1,721
4	Ejido CNC	210	Mexarco	Baja California	San Quintín	Ejido CNC	59,298,381	5,930
5	Ejido CNC	211	Mexarco	Baja California	San Quintín	Ejido CNC	59,298,381	5,930
6	Ejido CNC	212	Mexarco	Baja California	San Quintín	Ejido CNC	2,821,136	282
7	Camilo Cervantes Soto	53	Mexarco	Baja California	San Quintín	Ejido CNC	84,959	8
8	Ejido CNC	34	Mexarco	Baja California	San Quintín	Ejido CNC	352,920	35
9	Ejido CNC	441	Mexarco	Baja California	San Quintín	El Costeño	10,000,033	1,000
10	Ejido CNC	79	Mexarco	Baja California	San Quintín	El Costeño	19,970,026	1,997
17-A	María de la Luz Gallegos Lara	111	Mexarco	Baja California	San Quintín	El Costeño	31,249,088	3,125
17-B	Manuel Isidro Villavicencio Ceseña	125	Mexarco	Baja California	San Quintín	El Costeño	20,141,338	2,014
11-C	Abelardo Peralta Gallegos	126	Mexarco	Baja California	San Quintín	El Costeño	4,841,619	484
13	Francisco Antonio Cota Ceseña	442	Mexarco	Baja California	San Quintín	El Costeño	3,000,482	300
14	Mariana Meza López	443	Mexarco	Baja California	San Quintín	El Costeño	3,600,093	360
15	María de Jesús Villavicencio Ceseña	444	Mexarco	Baja California	San Quintín	El Costeño	5,000,044	500
16	Juan Luis Villavicencio Ceseña	445	Mexarco	Baja California	San Quintín	El Costeño	5,000,168	500

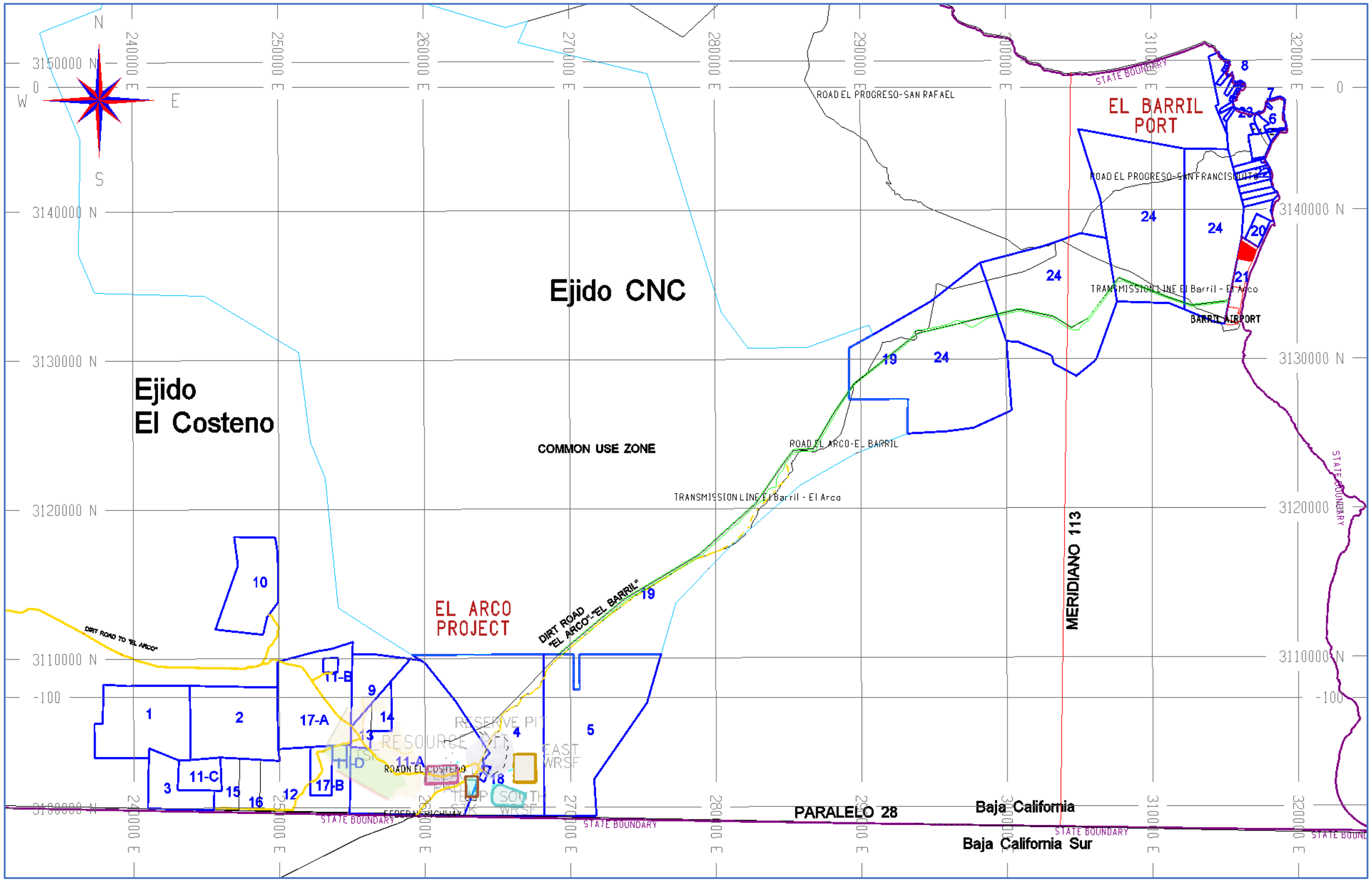
Note: CNC = Confederación Nacional Campesina. Mexarco = Mexicana del Arco, S.A. de C.V., a Grupo Mexico/Southern Copper subsidiary.

Table 3-3: Usufruct Surface Rights

Key	Original Owner	Parcel Number	Owner	State	Municipality	Ejido	Area (m^2)	Area (ha)
11-A	El Costeño	112	Mexarco	Baja California	San Quintín	El Costeño	65,955,234	6,596
11-B	El Costeño	104	Mexarco	Baja California	San Quintín	El Costeño	952,948	95
11-C	El Costeño	124	Mexarco	Baja California	San Quintín	El Costeño	6,143,251	614
11-D	El Costeño	391	Mexarco	Baja California	San Quintín	El Costeño	998,310	100
12	Manuel Isidro Villavicencio Ceseña	125	Mexarco	Baja California	San Quintín	Partner	20,141,338	2,014
13	Francisco Antonio Cota Ceseña	442	Mexarco	Baja California	San Quintín	Partner	3,000,482	300
14	Mariana Mesa Lopez	443	Mexarco	Baja California	San Quintín	Partner	3,600,093	360
15	María de Jesús Villavicencio Ceseña	444	Mexarco	Baja California	San Quintín	Partner	5,000,044	500
16	Juan Luis Villavicencio Ceseña	445	Mexarco	Baja California	San Quintín	Partner	5,000,168	500

Note: Mexarco = Mexicana del Arco, S.A. de C.V., a Grupo Mexico/Southern Copper subsidiary.

Figure 3-3: Surface Rights Location Map



Note: Figure prepared by Southern Copper, 2021. CNC = Confederación Nacional Campesina. Powerline shown is planned.

3.8 Encumbrances

There are currently no encumbrances such as liens, streaming agreements that could affect the LOM plan.

3.9 Permitting

Permitting and permitting conditions are discussed in Chapter 17.5 of this Report.

3.10 Violations and Fines

There are no current material violations or fines, as imposed in the mining regulatory context of the Mine Safety and Health Administration (MSHA) in the United States, that apply to the El Arco Project.

3.11 Significant Factors and Risks That May Affect Access, Title or Work Programs

Pachycereus schottii var. monstruoso "garambullo" (garambullo monstruoso) a rare tree cactus, occurs within the area of the Project. The prefeasibility level mine plans and infrastructure have been located to avoid the known colonies. For the purposes of mineral resource estimates exclusive of mineral reserves, Wood has assumed that the Valle de los Cirios Flora and Fauna Protection Area Management Plan can be amended to allow translocation of this species to new habitat. If this is not the case, the conceptual pit constraining the mineral resource estimate would need to be modified to avoid the habitat area, and would result in a smaller tonnage and metal estimate.

To the extent known to Wood, there are no other significant factors and risks that may affect access, title, or the right or ability to perform work on the Project that are not discussed in this Report.

4 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

4.1 Physiography

The elevation at El Arco is about 300 masl. Elevations increase to more than 1,300 m the north and northeast before dropping off adjacent to the Sea of Cortez.

The El Arco Project is dominated by low rolling hills on the southwestern slope of a low mountain range. It is dissected by various small arroyos (washes), the biggest of which is the El Arco Arroyo that drains to the southwest of the Project area. Drainage is to the south and southwest into the Vizcaino Desert.

Vegetation primarily consists of desert scrub. Within the Valle de los Cirios Flora and Fauna Protection Area, desert habitat is managed and conserved; however, in the vicinity of the historical El Arco mining township, where the Project is situated, there is significant habitat disturbance.

The Project area has no current land use, has no crop records, remains uncultivated, and is uninhabited.

The El Arco Project area could be affected by tectonic activity due to the motion produced from the North American and Pacific plates. The seismic potential in the northern part of the Baja California Peninsula is associated with the extension of the San Andreas and San Jacinto faults. In Northern Baja California, the San Andreas fault continues past California as the Cerro Prieto fault before it veers towards the Gulf of California. Throughout Baja California, these networks of faults are known as the Southern California Shear Zone. The faults that could have the highest impact on the Project area are the San Andreas fault system and the San Benito-Tosco Abreojos fault. These two fault systems have historical maximum magnitudes of 7.8 and 5.3, respectively.

Fault traces that have been mapped within the Project boundaries were subject to a review performed by Wood, and no evidence of fault ruptures within the Project boundaries and vicinity were noted as a result of that review.

4.2 Accessibility

The El Arco deposit is located near the village of El Arco in Baja California, Mexico, which lies near the center of the Baja California Peninsula in the municipalities of San Quintin, Baja California and Mulegé, Baja California Sur, México.

Route 1 is the only paved highway connecting the northern and southern parts of the Bajo Peninsula, located between the towns of Santa Rosalía and Guerrero Negro at km 189. the nearest point of this highway is 40 km west of El Arco.

The nearest port is Santa Rosalía on the Sea of Cortez, 240 km by road southeast of El Arco. Southern Copper plans to construct the El Barril port, which will be located 70 km northeast of the proposed mine site.

The El Arco site is accessed by taking Highway 1 approximately 30 km south of the town of Guerrero Negro to the intersection with the highway MX 18, and following MX 18 42 km east to the project site. Highway 1 is paved and in good condition and Highway 18 was originally paved but currently all of the pavement is gone, leaving a gravel roadbed. Although MX 18 is not well maintained it was in acceptable condition to allow access to site by light vehicle with four-wheel-drive. MX18 is straight and flat from Highway 1 to site and no bridges or overpasses will be required to deliver major equipment to site for construction and operation.

The current route of MX18 passes directly through the area of the proposed open pit, and the highway will need to be realigned to allow open pit mining.

The current exploration camp is accessed by gravel roads. The mid-1990s pilot plant is located just east of the current exploration camp. Access to drill pads was by gravel road.

4.3 Climate

The climate is dry with an average yearly rainfall of <120 mm. Rare Pacific hurricanes can result in short-term intense rainfall events.

Temperatures typically range from a low of 3°C to a high of 41 °C. Winter fogs, coming from the Pacific Ocean, often cover the area at night and early in the morning.

Exploration is conducted year-round. Mining is planned to operate year-round.

4.4 Infrastructure

Infrastructure required to support proposed mining and processing activities (see also discussions in Chapter 13, Chapter 14, and Chapter 15 of this Report). These Report chapters also discuss water sources, electricity, personnel, and supplies.

Current infrastructure at El Arco is limited, and suitable to support exploration-stage activities, consisting of offices, core shack, cafeteria, and rooms for staff and visitor accommodation. A former pilot plant is located approximately 1 km west of the current exploration camp site.

The exploration camp site is located adjacent to the abandoned El Arco town site which includes a school, church, houses, a small military base and mine and plant facilities from the historic El Arco operations. Southern Copper advised Wood that none of the buildings from the old town and mine site are considered to have historical or archeological value, no buildings will need to be relocated or preserved, and the old townsite location will not affect the final limits of the planned El Arco pit.

Currently water is supplied from one of the two explorations shafts excavated to provide metallurgical samples. Water supply for construction and operations will be sourced from a desalination complex to be located at El Barril.

At present, the El Arco site is not connected to any local or national electric grid.

Labor and specialized skills will be brought in from outside Baja California. The closest town to the site is Guerrero Negro, which Southern Copper has assumed will provide some of the required labor with appropriate training.

Supplies supporting exploration-stage activities are typically sourced from La Ensenada, Tijuana via National Highway 1.

5 HISTORY

In 1883, gold placers were discovered in the Calmalli–El Arco district of Baja California. Lode and placer mining for gold has continued sporadically to the present day, although the combined production has not been significant. During World Wars I and II, attention in the district was focused on the oxidized copper minerals associated with the gold, and, although its remote location made production costly, a few small operations were successful. The principal mines in the Calmalli–El Arco district were the Calmalli-Don Carlos mine, developed in the early 1930s for gold and copper, and the El Arco mine, which operated from 1935 to 1940 with small gold bonanzas reported.

In early 1968, the El Arco prospect was submitted to the Southwestern Exploration Division of Asarco, which was at the time conducting a search for porphyry copper deposits with Asarco Mexicana.

The exploration and development history is outlined in Table 5-1.

Table 5-1: Exploration and Development History

Date	Operator	Comment
1883		Gold placers were discovered in the Calmalli–El Arco district
1930s		Calmalli–Don Carlos mined for copper and gold; total production is not known
1935–1940		Gold mining at El Arco; total production is not known
1969	Asarco	RC (rotary percussion) drilling; 15 holes, 1,863 m.
1970–1972		Core drilling; 58 holes, 17,127 m.
1974–1977		Core drilling; 170 holes, 53,256 m. Petrographic studies. Underground development to provide sufficient material for run-of-mine dump leaching tests of granodiorite and andesite.
1980		Core drilling, 9 holes, 3,240 m.
1983		Core drilling, 3 holes, 467 m
1994		Core drilling, 21 holes, 6,309 m
1995–1997		Core drilling, 31 holes, 14,625 m; internal mining studies, metallurgical testwork. Feasibility study co-ordinated by Bechtel Corporation (Bechtel). Underground development to provide sufficient material for leach testing and pilot plant sulfide testing.
1996–1997		RC drilling, 27 holes, 7,050 m, completed for condemnation purposes
1999	Southern Copper	Acquires Asarco
2008		Core drilling, 13 holes, 7,768 m.
2009		Internal mining studies, metallurgical and geotechnical testwork.
2015		Core drilling, 32 holes, 20,172 m.

6 GEOLOGICAL SETTING, MINERALIZATION, AND DEPOSIT

6.1 Deposit Type

The El Arco deposit is considered to be an example of a porphyry copper deposit.

Porphyry deposits range in age from Archean to Recent, but are best preserved from the Cenozoic or Mesozoic, and form in a variety of tectonic settings. Most copper deposits are associated with low-silica, relatively primitive dioritic to granodioritic plutons that fall on the more oxidized, magnetite-series spectrum.

Deposits commonly form irregular, oval, solid or "hollow" cylindrical and inverted cup shapes. Orebodies can occur separately, overlap each other, or be stacked on top of each other. They are characteristically zoned, with barren cores and crudely concentric metal zones that are surrounded by barren pyritic halos with/without peripheral veins, skarns, replacement manto zones and epithermal precious-metal deposits. At the scale of ore deposits, associated structures can result in a variety of mineralization styles, including veins, vein sets, stockworks, fractures, 'crackled zones' and breccia pipes.

The predominant copper minerals in hypogene ore are chalcopyrite and bornite, and copper mineralization may be associated with elevated gold and silver grades.

6.2 Regional Geology

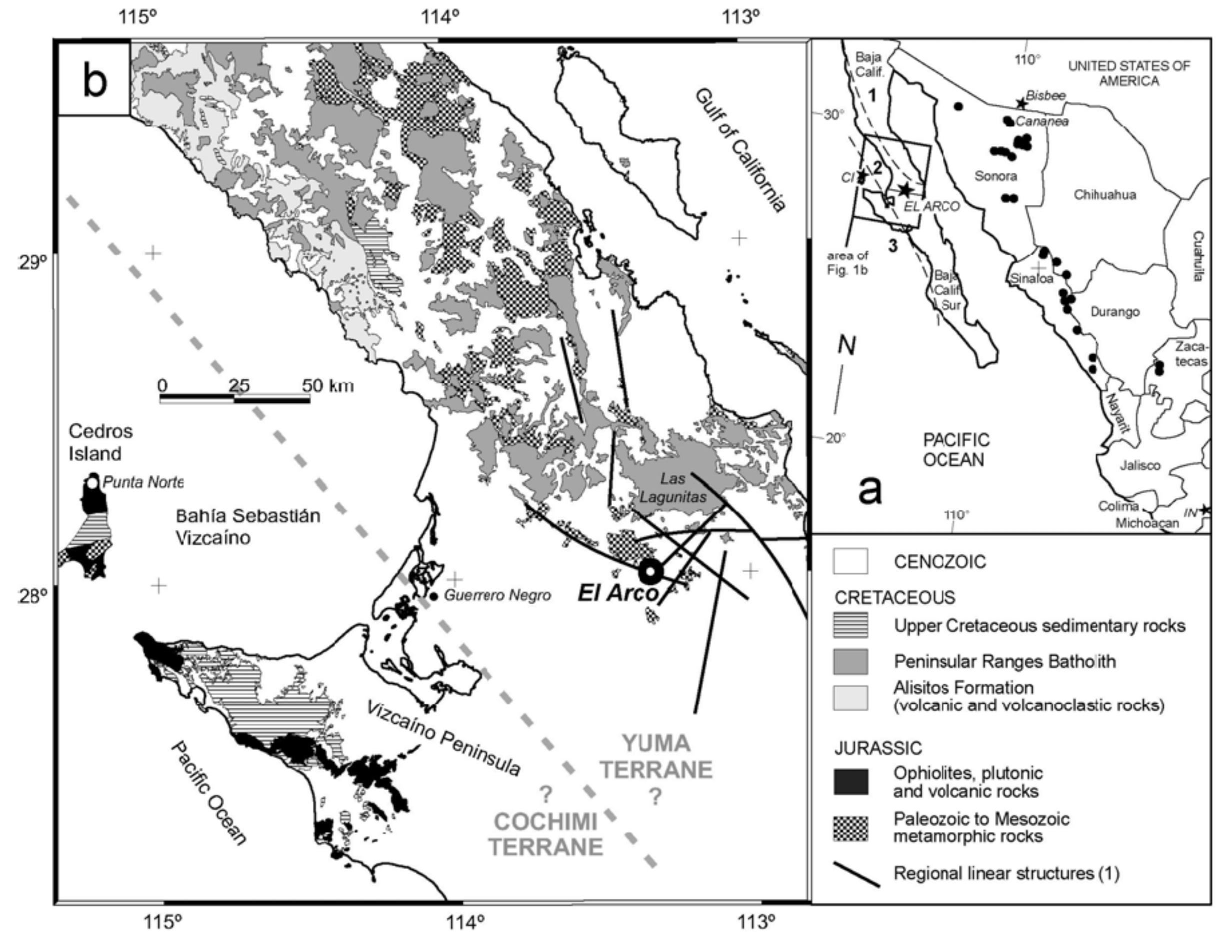
The Pacific margin of western Mexico is part of a mosaic of accreted terranes that comprise the North American Cordillera and circum-Pacific rim (Valencia et al., 2006). The Baja California peninsula is characterized by three major units:

- Pre-batholithic basement: Mesozoic volcanic and volcaniclastic rocks of the Choyal and Alistos Formations; Triassic–Jurassic sandstones, and Paleozoic metasedimentary rocks;
- Peninsular Range batholith;
- Tertiary sedimentary and volcanic rocks.

The Alisitos arc is an approximately 300 × 30 km oceanic arc terrane that accreted to the western wall of the Peninsular Ranges batholith. A chain of granitic batholithic intrusions intrude the Alisitos Formation, and El Arco, the oldest known porphyry deposit in this chain, is located at the extreme southern end of the chain.

A regional geology map is provided in Figure 6-1.

Figure 6-1: Regional Geology Map



Note: Figure from Valencia et al., 2006. a) shows the location of the El Arco deposit compared to other porphyry copper deposits from mainland Mexico and Southern Arizona; b) shows the El Arco deposit, the Pre-Cenozoic and Jurassic rocks on a general map of Baja California.

6.3 Local Geology

6.3.1 Lithologies and Stratigraphy

In the El Arco area, the basement consists of serpentinite, with blocks of peridotite, pyroxenite and amphibolite that are tectonically overlain by diorites, gabbros, and rocks that are interpreted to be pillow lavas. These units are overlain by metavolcanic agglomerates, metagraywackes, meta-andesite flows and breccias, and thin-bedded marble. Andesite flows in the upper part of this sequence host granodiorite porphyry intrusions that generated the El

Arco deposit. Barren diabase dikes cut both the andesite flows and granodiorite porphyry intrusions.

A stratigraphic column is provided in Figure 6-2.

6.3.2 Structure

The El Arco district lies at the intersection of at least two regional structures which trend to the northwest and northeast (refer to Figure 6-1).

6.3.3 Alteration and Metamorphism

All lithologies have been subject to greenschist facies metamorphism, characterized by development of a chlorite–epidote–calcite–quartz mineral assemblage.

6.3.4 Mineralization

To date, the only mineralization identified within the property area is the El Arco deposit, discussed in the following sub-section.

6.4 Property Geology

6.4.1 Deposit Dimensions

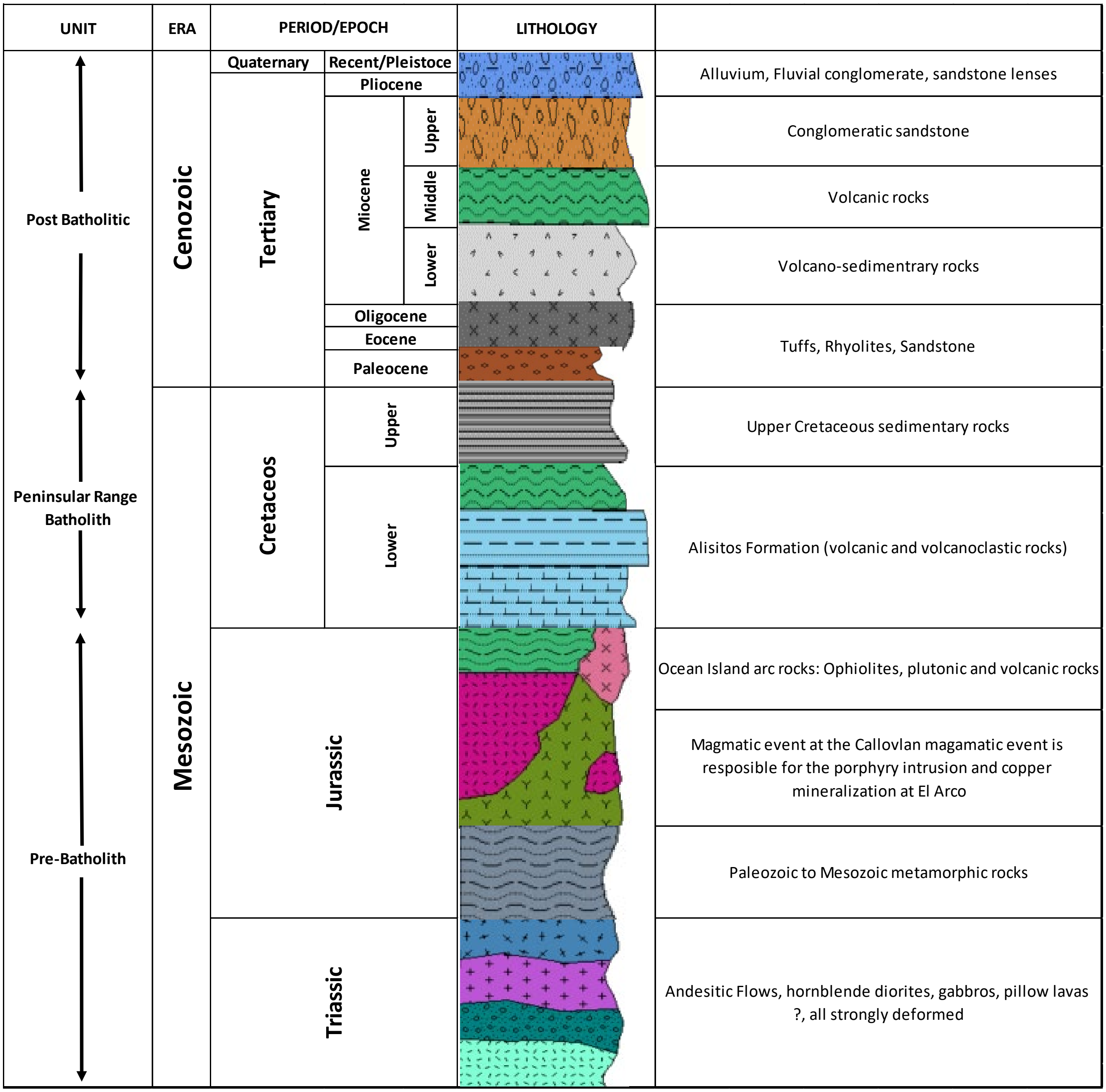
The deposit has a west–northwest to west–southwest strike and dips steeply to the north. Mineralization extends over an approximate 1,500 x 1,500 m area, with a minimum thickness of >300 m. Mineralization has been drill tested to a depth of approximately 600 m, and remains open at depth.

6.4.2 Lithologies

Host rock types include:

- Andesite:
  - Porphyritic
  - Breccia
  - Undifferentiated
- Granodiorite porphyry: coarse feldspar and biotite phenocrysts and feldspar megacrysts with a recrystallized matrix.

Figure 6-2: Stratigraphic Column



Note: Figure prepared by Wood, 2021, after de la Pena (1979) and Valencia et al., (2006).

The copper mineralization is concentrated in a core of potassic alteration in a granodioritic porphyritic stock surrounded by propylitic alteration in andesitic lavas.

A small body of massive quartz within the granodiorite porphyry contains elevated copper, molybdenum and precious metal grades, but the volume of this type of mineralization is limited.

Porphyritic andesite and brecciated porphyritic andesite are locally mineralized with lower grades than those of the granodiorite porphyry and undifferentiated andesite.

Mafic dikes that intruded the deposit are not mineralized, but they are affected by post-ore low-grade metamorphism. Unaltered mafic dikes do not contain significant mineralization and may be largely post- or late-mineral.

A sheet of Quaternary alluvium overlies the west end of the deposit and is not mineralized.

A geological map of the deposit area is included as Figure 6-3, and a plan of the major lithologies and grade shells within the planned pit area is included as Figure 6-4. A simplified geological cross-section through the deposit is provided in Figure 6-5, and the simplified geology showing the copper shell is provided as Figure 6-6, and Figure 6-7 shows the molybdenum shell.

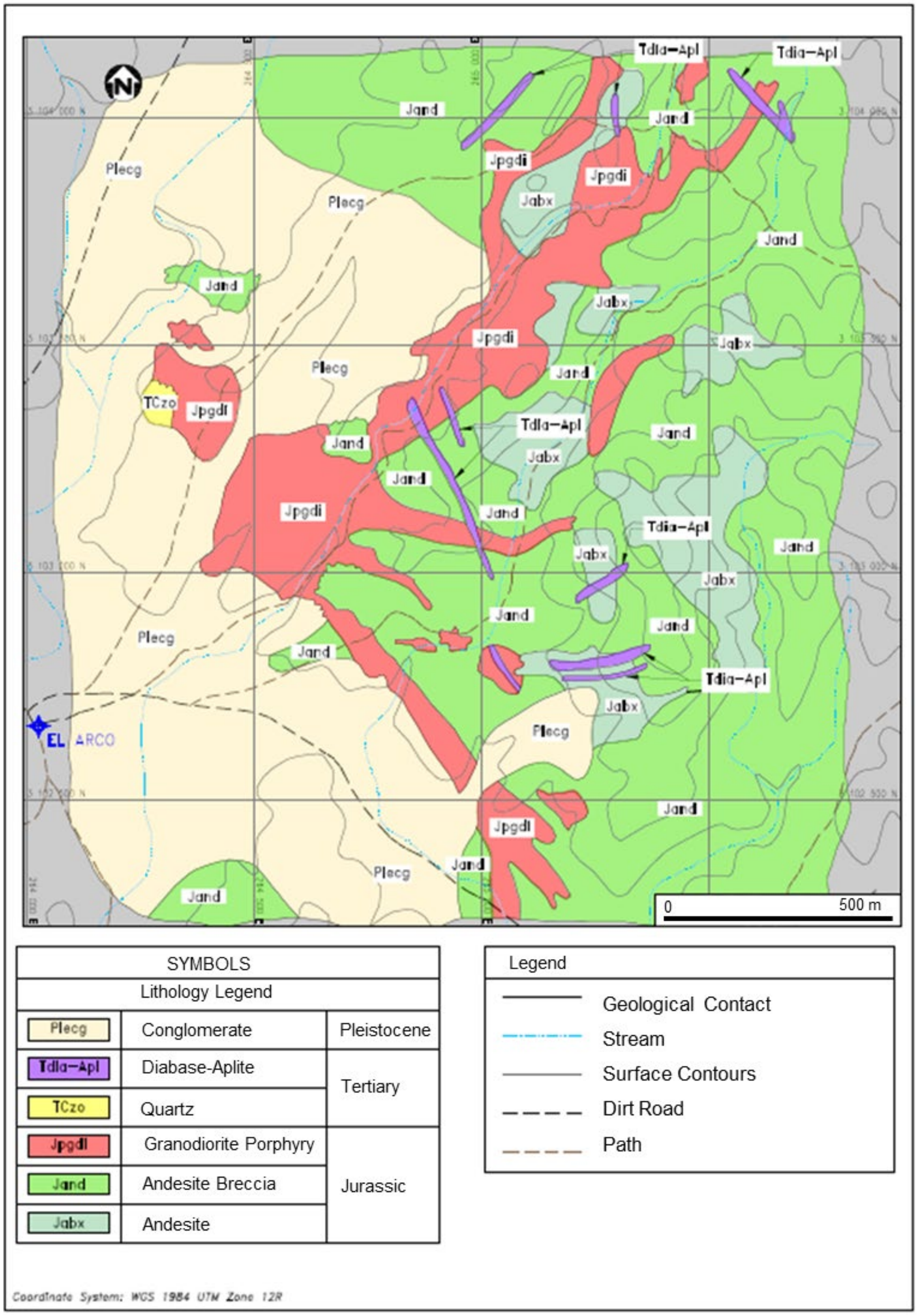
6.4.3 Structure

The main granodiorite porphyry unit is a wedge-shaped body bound by converging, arcuate, west and west–southwest-striking, north-dipping planar features. These features may be formerly vertical contacts of an intrusive body that were likely overturned and broadly folded during obduction of the arc terrane to the continental margin.

The east end of the granodiorite body is an irregular contact with andesite and the continuity and intensity of mineralization is poorer at this end of the deposit. Small fingers of granodiorite extend from the main body of the granodiorite into the andesite beyond north and south bounding structures.

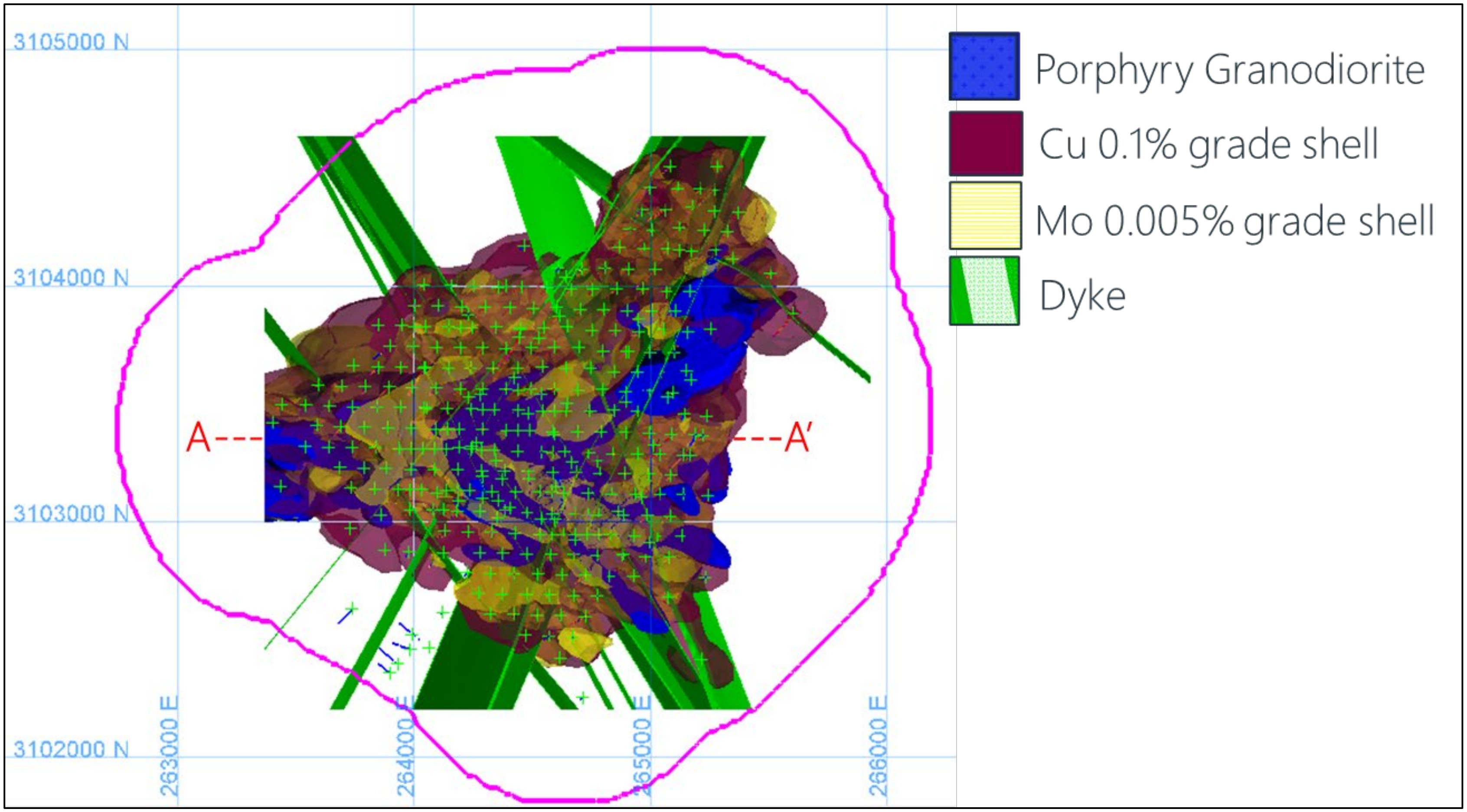
Quebrada El Arco, which has incised into the western portion of the deposit may be following a cross-fault; however, no clear offset in lithological or grade contacts have been noted to date.

Figure 6-3: Deposit Geology Map



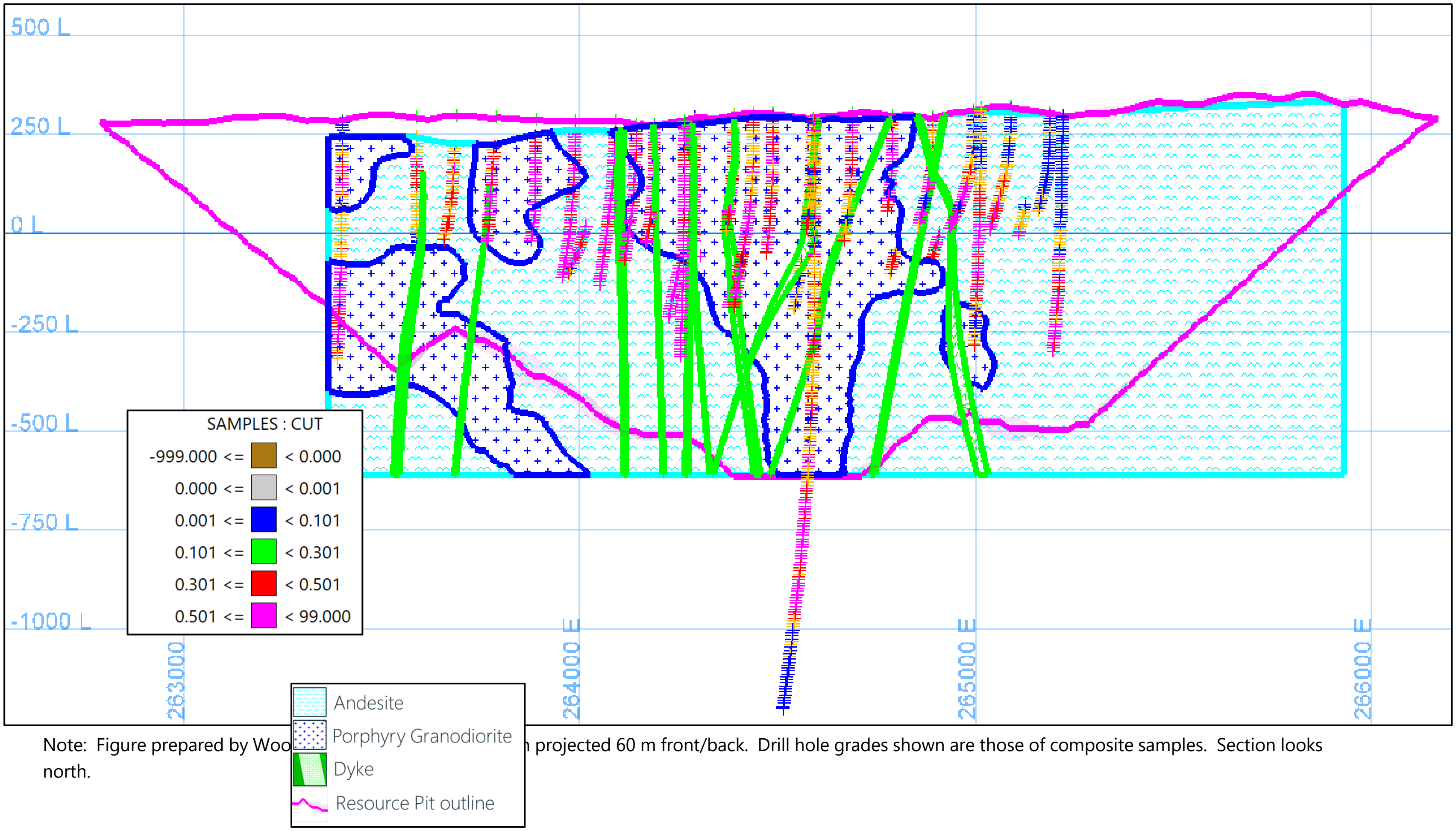
Note: Figure prepared by Wood, 2021

Figure 6-4: Geological Plan View, Showing Major Lithologies and Grade Shells



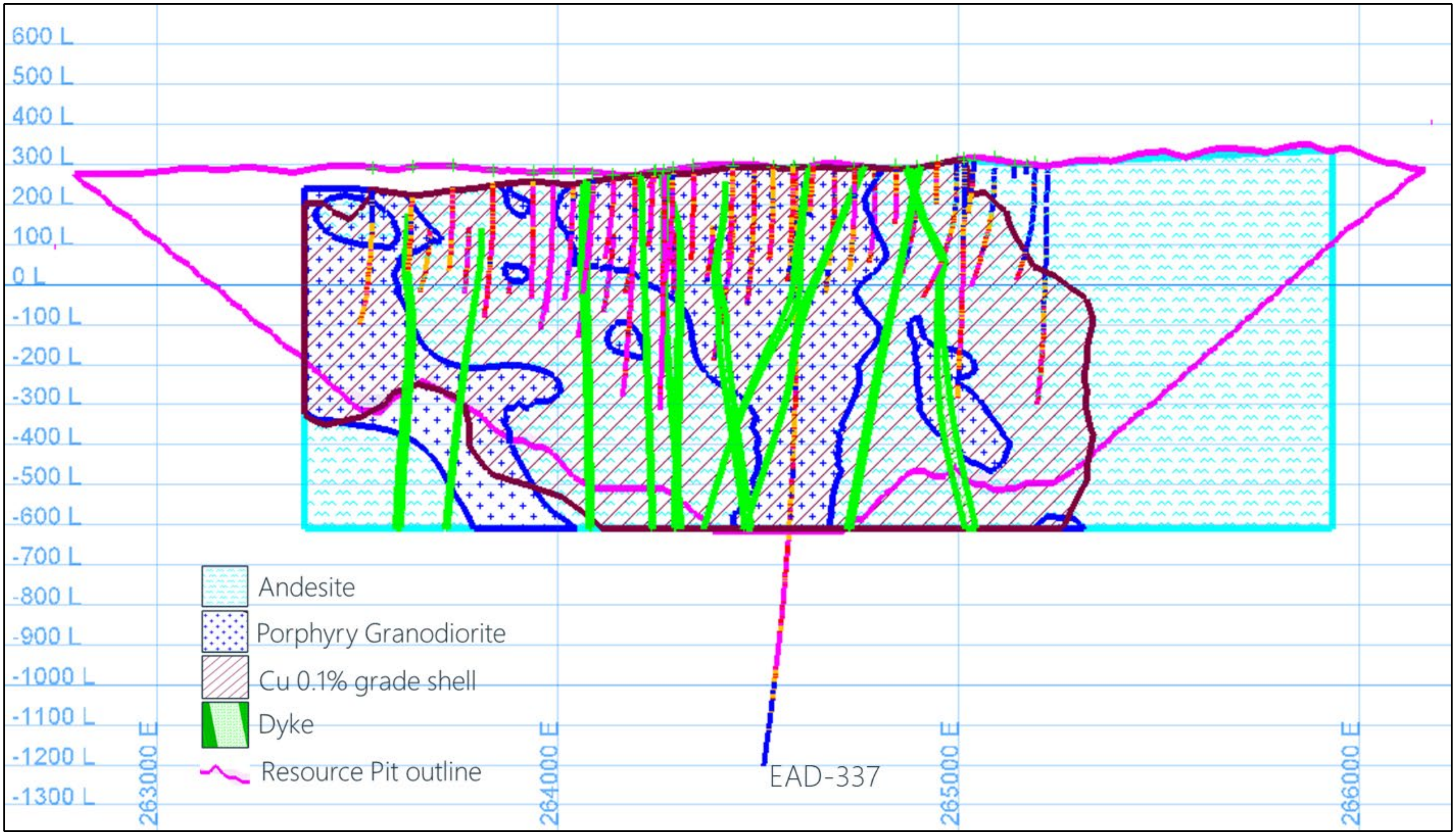
Note: Figure prepared by Wood, 2021.

Figure 6-5: Simplified Geological Cross-Section (N 3103350)



Note: Figure prepared by Woo[...]n projected 60 m front/back. Drill hole grades shown are those of composite samples. Section looks north.

Figure 6-6: Geological Cross-Section Showing Copper Grade Shell (N 3103350)



Note: Figure prepared by Wood, 2021. Drill holes on section projected 60 m front/back. Section looks north.

Figure 6-7: Geological Cross-Section Showing Molybdenum Grade Shell (N 3103350)

Note: Figure prepared by Wood, 2021. Drill holes on section projected 60 m front/back. Section looks north.

6.4.4 Alteration

K-feldspar alteration, consisting of veinlets and replacement of other minerals, occurs in the andesite and is generally associated with quartz and albite. Secondary biotite and anhydrite were not observed at El Arco during Southern Copper's initial studies; however, recent studies indicate that secondary biotite is present.

No well-defined phyllic alteration zone has been identified. The limited quartz–sericite alteration occurs along veinlets and rarely replaces phenocrysts of feldspar and biotite.

Since the metavolcanic rocks were initially metamorphosed to the greenschist facies, it is difficult to clearly define the extent of the hydrothermal alteration.

Propylitic alteration is characterized by epidote, chlorite and calcite, with lesser amounts of titanite (sphene), rutile and probably apatite. The majority of the mineral assemblages occur in veinlets or as complete or partial substitution of other minerals. Calcite is present in all rock types, but is more abundant in the andesite. Other carbonates present are dolomite, siderite, and ankerite.

6.4.5 Mineralization

Copper–gold mineralization at El Arco occurs in three sub-horizontal zones.

The topmost zone is an oxide cap. The oxide zone is approximately parallel with the surface topography, has a blanket shape, and an average thickness of 40 m (Echavarri, 1975). The main copper oxide minerals are chrysocolla, malachite, dioptase, argillaceous goethite, copper wad, cuprite and neotocite. Chrysocolla is by far the most abundant copper mineral in the oxidized zone.

Underlying the oxide zone, and parallel to it, is a transition zone varying in thickness from 0–18 m with an average thickness of 9 m. This zone contains a mixture of both secondary and primary iron and copper oxides and sulfides. Supergene minerals that have been identified are chalcocite, digenite, covellite, native copper and chalcotrichite; however, those minerals contribute little to the value of the deposit.

The primary sulfide zone directly underlies the transition zone and comprises the major portion of the deposit. This zone is lenticular in shape, fingering out at its extremities, with a greater horizontal than vertical dimension. The upper limit of this zone coincides with the present water table. The lower limit is not well defined because exploratory drilling to 600 m bottomed in mineralization grading >0.4% Cu.

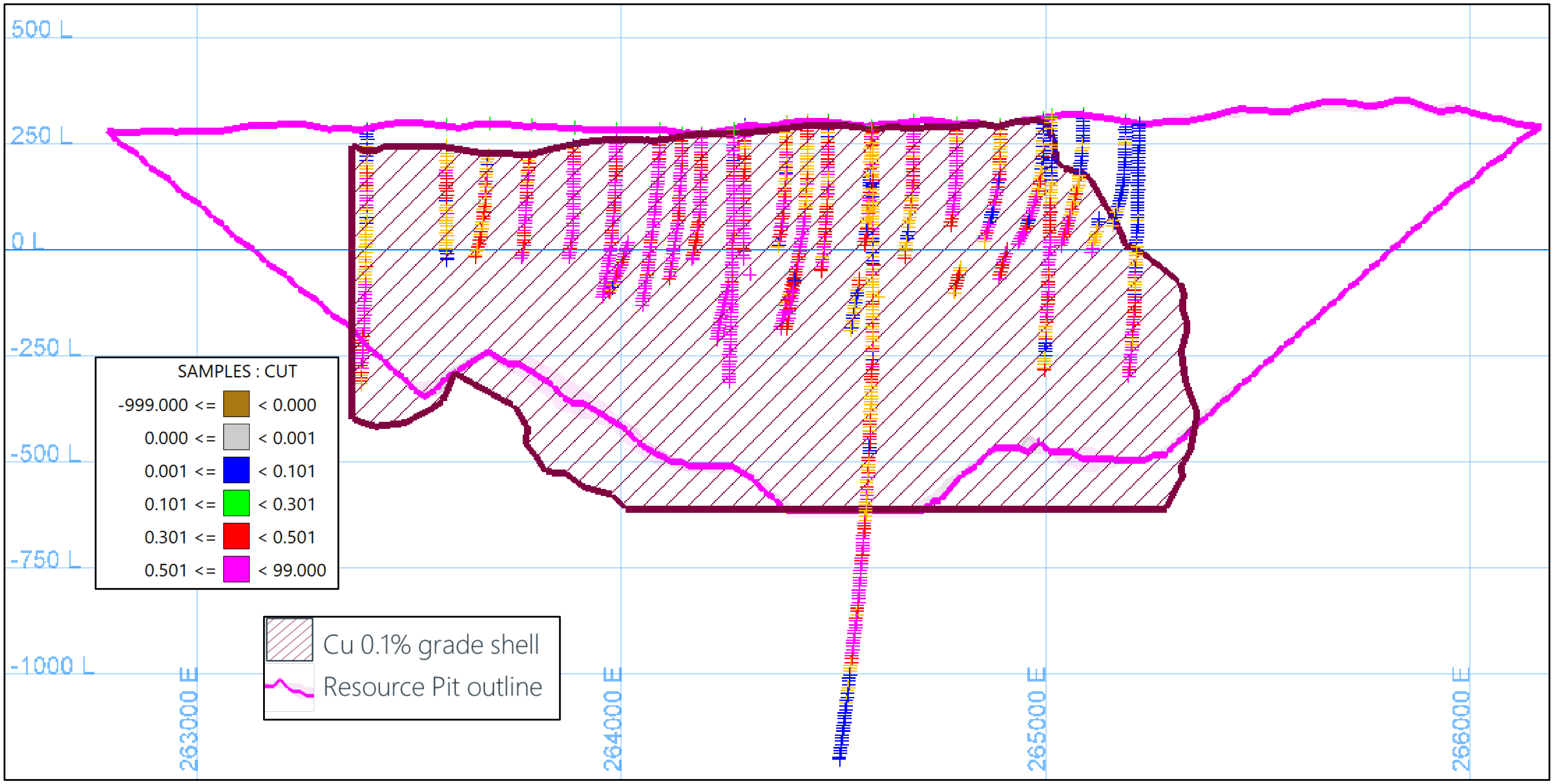
Pyrite and chalcopyrite are the most abundant sulfides in this zone with bornite in lesser amounts. Molybdenite, galena and sphalerite are also present. Gold is of economic importance. Copper mineralization occurs in two forms: fracture filling (± 60%) and dissemination as discrete grains (± 40%). About 60% of the copper grades are in the porphyry with the remaining 40% in the andesite wallrock.

At the center of the deposit the total pyrite content is <1% by weight, increasing toward the periphery where it forms a halo with 3–9% by weight (Echavarri, 1972). This halo roughly corresponds to the zone with the most intense propylitic alteration.

A smaller copper–molybdenum–gold–silver deposit to the north of the main granodiorite body is mainly hosted in andesite and occurs above a deeper apophysis of granodiorite, but this apophysis is not well defined by drilling.

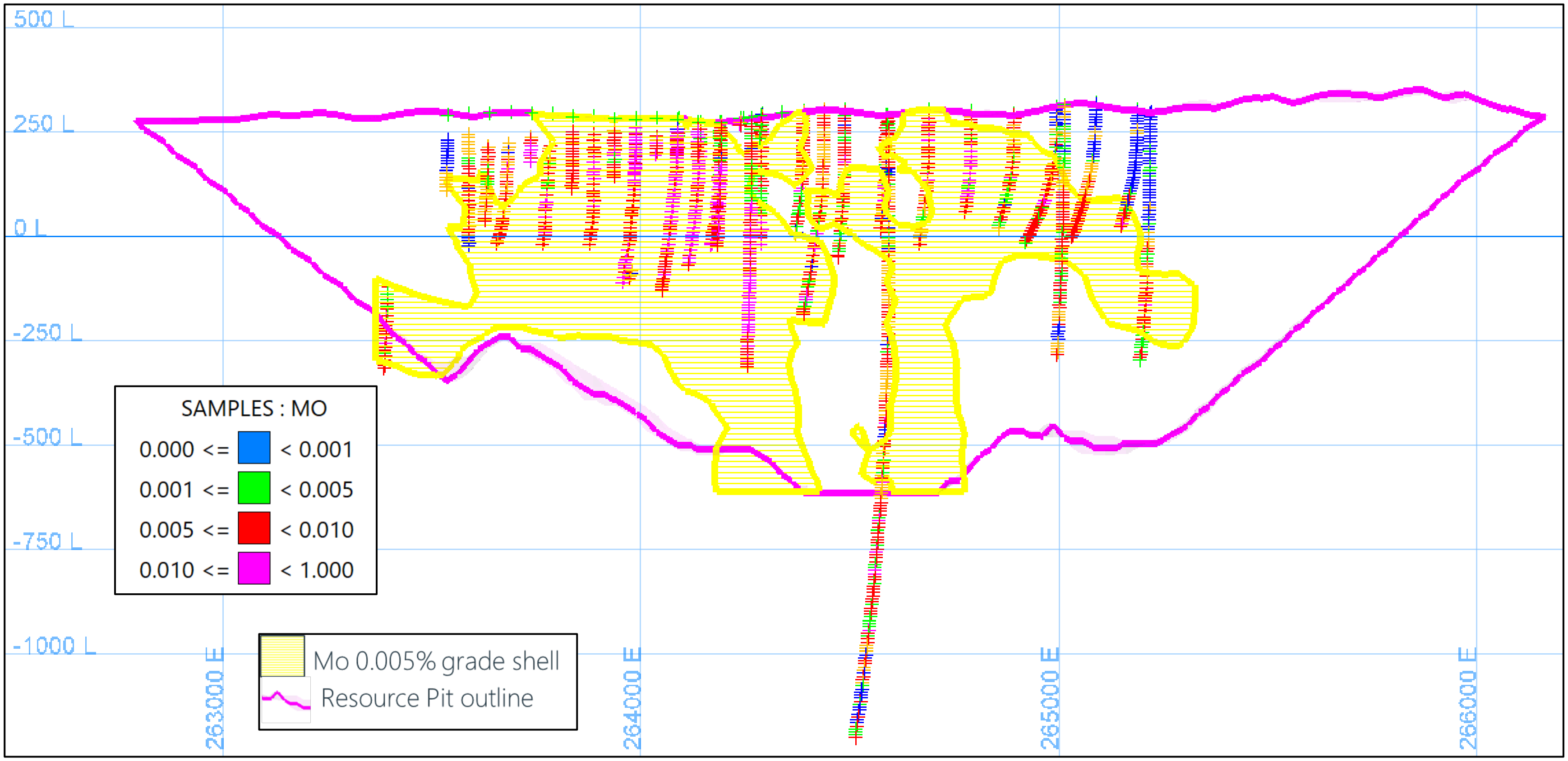
Cross-sections showing the mineralization are provided in Figure 6-8 (copper) and Figure 6-9 (molybdenum).

Figure 6-8: Example Copper Mineralization Cross-Section (N 3103350)



Note: Figure prepared by Wood, 2021. Drill holes on section projected 50 m front/back. Drill hole grades shown are those of composite samples. Section looks north.

Figure 6-9: Example Molybdenum Mineralization Cross-Section (N 3103350)



Note: Figure prepared by Wood, 2021. Drill holes on section projected 50 m front/back. Drill hole grades shown are those of composite samples. Section looks north.

7 EXPLORATION

7.1.1 Grids and Surveys

Collar surveys are reported in the WGS84 – Zone 12R coordinate system.

The topographic survey used for the current mineral resource estimate includes field surveys until October 2011. Survey data were acquired by the geologist in cooperation with surveyors using a LIDAR system.

7.1.2 Geological Mapping

Two geological maps were completed by Southern Copper:

- A local geologic for the deposit area, at a scale of 1:10,000
- A regional geology map at 1:20,000.

7.1.3 Geochemistry

No information was available to Wood as to exploration-stage geochemical sampling.

7.1.4 Geophysics

Early-stage geophysical testwork is poorly documented. Farias Garcia (1978) reported the following.

An induced polarization (IP) survey was run using a three-electrode array at spacings of 100 m. Traverses were run in a north–south direction with an electrode separation of 100 m. High intensity values correlated to pyrite mineralization surrounding the main copper mineralization and an area of mineralized outcrop. Concurrent with the IP survey, a resistivity survey was completed. Resistivity lows correlated with the IP highs, and were generally coincident with the known mineralized area. Both surveys were useful in outlining previously unrecognized areas of disseminated mineralization.

Results from an otherwise undescribed magnetic survey suggested that localized magnetic highs surrounded the copper mineralization. The source was ascribed to the high magnetite content of the andesitic rocks that surround the mineralized intrusive granodiorite. A gravity profile shows a low-density contrast between the granodiorite porphyry and the host rocks. The two surveys were used to determine the sediment thicknesses and the depths to buried topography in the El Arco area ahead of planning of the first drill programs into the deposit area.

7.1.5 Bulk Sampling

Underground mine development was used to obtain bulk material for pilot plant testing on both the oxide and sulfide mineralization in the andesite and granodiorite rocks. This work consisted of sinking two 3 x 2 m shafts. Shaft No. 1 is in andesite and shaft No. 2 is in granodiorite to depths of 75 m and 90 m, respectively. Since both shafts were driven in mineralization at higher-than-average grade, drifting in the oxide and sulfide zones was performed to secure sufficient material of average grade for metallurgical testing. Approximately 2,451 t were extracted during the sinking of the shafts; of this about 80% was oxide and the remainder was sulfide. From the drifts, approximately 1,326 t of oxide mineralization and 1,434 t of sulfide mineralization were produced. To complete the oxide requirement, an additional 6,700 t were obtained from mineralized surface outcrops. Table 7-1 summarizes the material collection for pilot plant metallurgical testing.

The underground development was accomplished in two periods, one between 1974–1975 where enough material was collected for run-of-mine dump leaching tests of granodiorite and andesite, and the other from March 1995 to February 1996 when material for the 1995 leach testing and pilot plant sulfide testing was developed. Figure 7-1 and Figure 7-2 are section and plan views of the underground development.

7.1.6 Other Studies

The limits of the conglomerate, oxide, transition (mix) and sulfide data were classified based on the petrographic and mineralogical studies of 375 thin sections, X-ray and atomic absorption (AA) analysis of representative samples across the El Arco deposit. The study was completed in 1975 by Dr. Ariel Echavarri.

7.1.7 Qualified Person's Interpretation of the Exploration Information

Initial stage exploration data have been superseded by drill data on the deposit area.

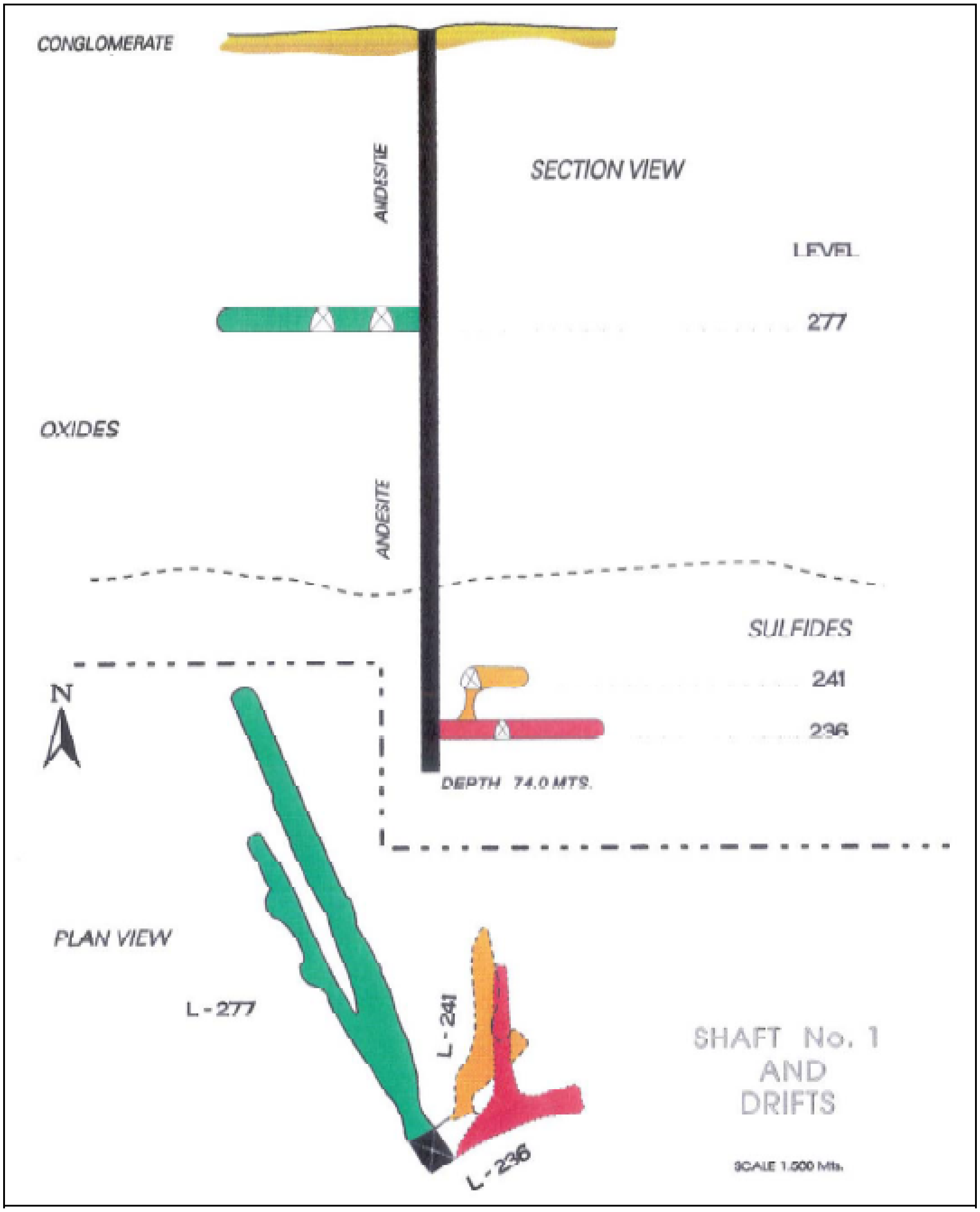
7.1.8 Exploration Potential

The El Arco deposit remains open at depth. There is potential to the west in an area where no drilling had been conducted, due to a lack of surface rights to allow drill programs. Southern Copper has recently obtained surface access rights, and a drill program is planned.

Table 7-1: Summary of Pilot Plant Testwork Sample Sources

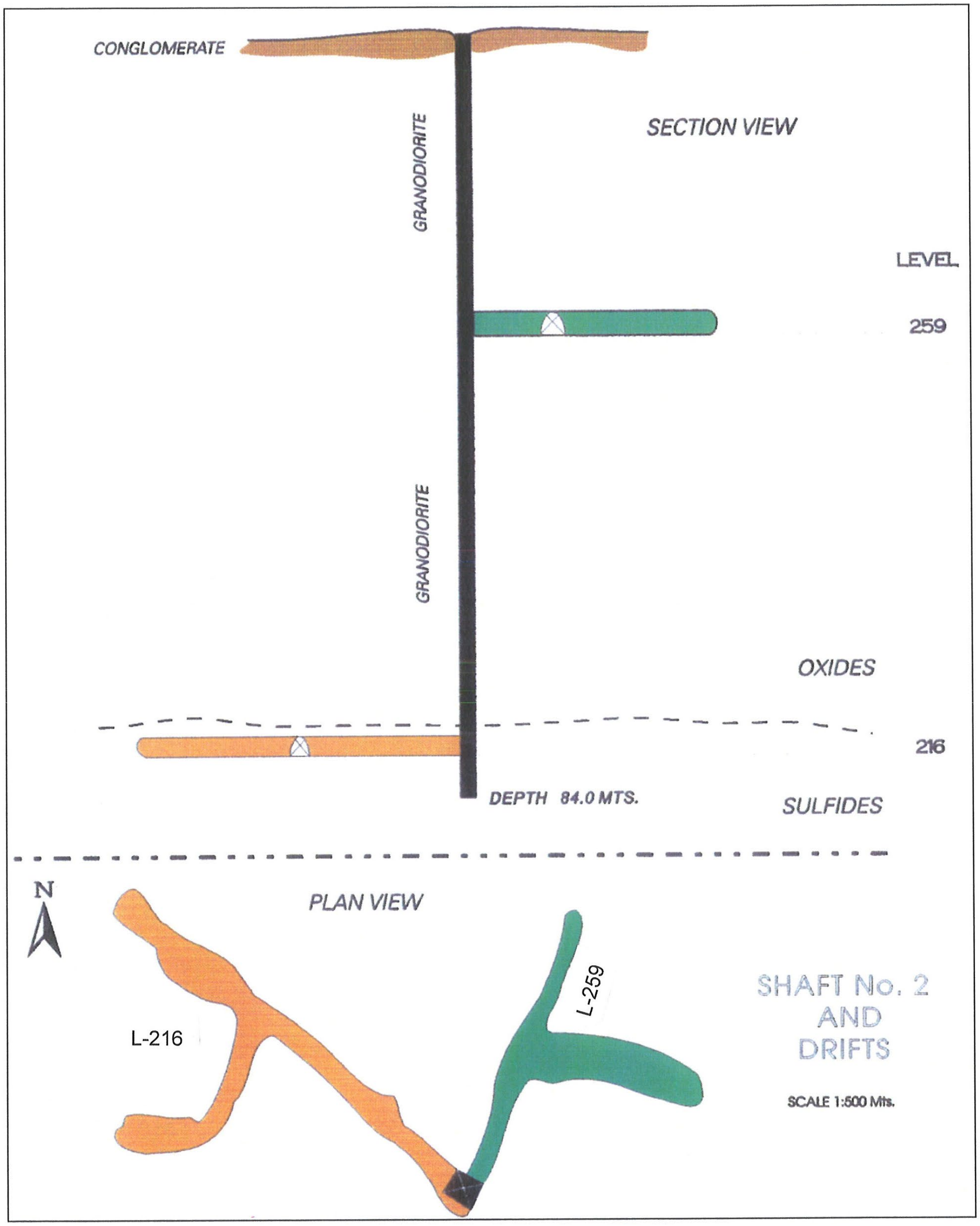
	Rock Type	Oxides (tons)	Sulfides (tons)
Shaft I	Andesite	812	379
Shaft 2	Granodiorite	1,143	117
Surface cut	Andesite	3,500	0
Surface cut	Granodiorite	3,500	0
Drift T-1	Andesite	707	541
Drift T-2	Granodiorite	619	893
Total		***10,281***	***1,930***

Figure 7-1: Shaft No. 1 and Drifts



Note: Figure from M3 (2009)

Figure 7-2: Shaft No. 2 and Drifts



Note: Figure from M3 (2009)

7.2 Drilling

7.2.1 Overview

The current drill database for the Project consists of 364 core and RC/rotary percussion drill holes (133,877 m). A Project drill summary table is provided in Table 7-2.

Core drilling supports the mineral resource estimate. The RC and rotary percussion drilling does not support estimation as there are insufficient records for those drill holes.

No RC drilling is used in estimation. A portion of the RC drilling was condemnation drilling. A total of 27 RC holes, completed in 1996 are located in the peripheral areas of the Project. In addition, RC drilling completed in 1969 was excluded from use in mineral resource estimation because Southern Copper identified sample quality issues.

Drill collar locations are shown on a Project-basis in Figure 7-3 and the collars of those drill holes used in mineral resource estimation are shown in Figure 7-4.

7.2.2 Drill Methods

All of the drill hole information in Grupo México's database that is used in mineral resource estimation was generated by core drilling with diamond tools. Standard wireline drilling methods using Longyear-44 and Longyear-38 drill rigs were used. The majority of the drilling was accomplished with HQ (63.5 mm), NQ (47.6 mm) and BQ (36.4 mm) core diameters, with one period using 150 mm (6 inch) core for metallurgical testwork purposes.

All core holes were drilled vertically, and collared on section lines spaced between 50–100 m apart.

7.2.3 Logging

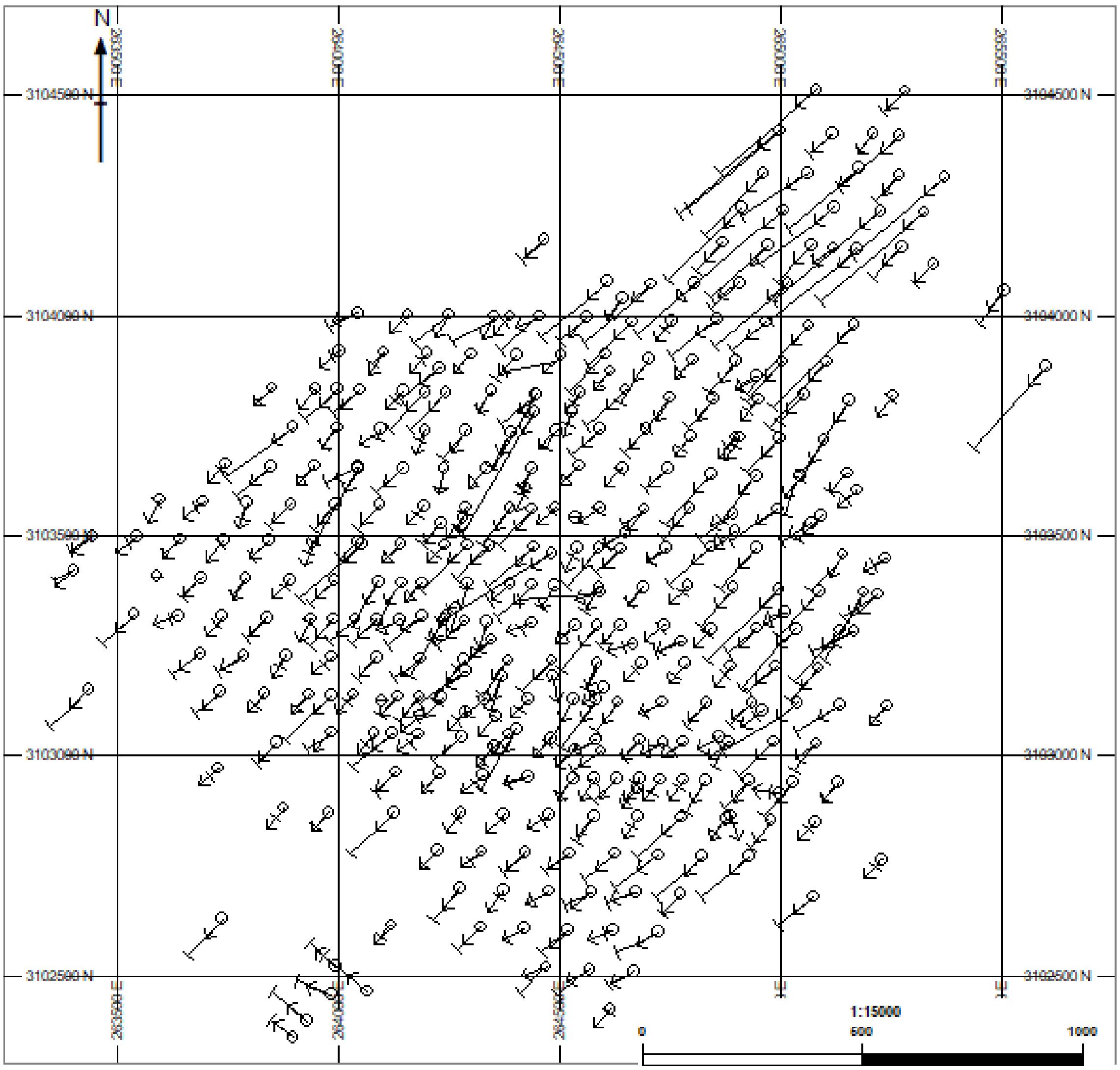
Strip logs and handwritten and typed logs of lithology, mineralization, and alteration intensity are available as original paper logs for holes drilled before 2015. The paper logs are in the process of being scanned by Southern Copper. There is no geotechnical or rock quality designation (RQD) logging for holes drilled from 1970–1996.

Geological descriptions, alteration, and mineralization intensity, graphic strip logs and rock quality logging are available in individual Excel workbooks for each drill hole from the 2015 drill campaign.

Table 7-2: Project Drill Summary Table

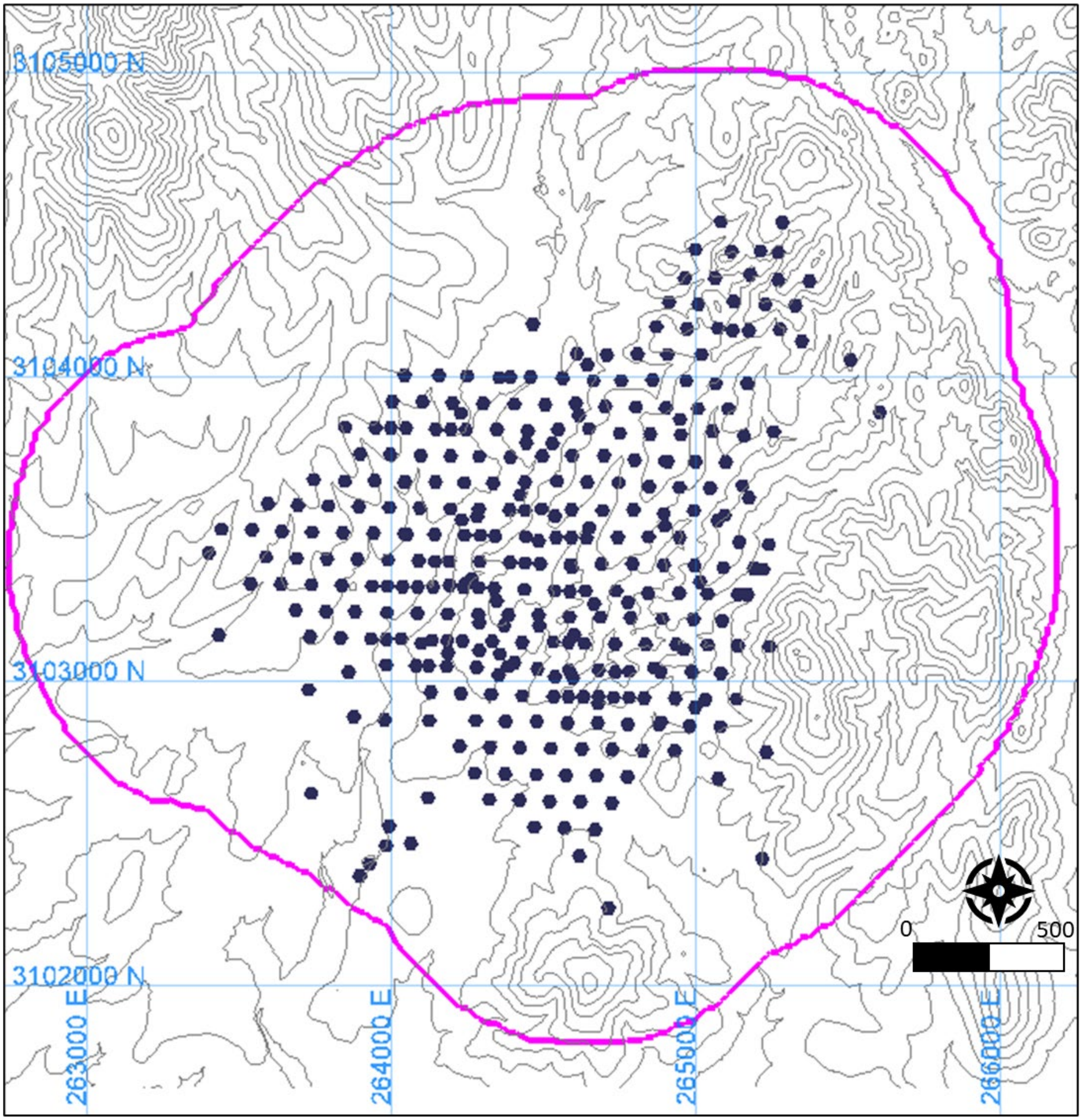
Year(s)	Drill Method	Number of Holes	Total Meters (m)
1969	RC (rotary percussion)	15	1,863
1970–1972	Core	58	17,127
1974–1977	Core	170	53,256
1980	Core	9	3,240
1983	Core	3	467
1994	Core	21	6,309
1995–1997	Core	31	14,625
1996	RC	27	7,050
2008	Core	13	7,768
2015–2016	Core	32	20,172
Total		***364***	***131,877***

Figure 7-3: Property Drill Collar Location Plan



Note: Figure prepared by Wood, 2021.

Figure 7-4: Drill Collar Location Plan for Drilling Supporting Mineral Resource Estimates



Note: Figure prepared by Wood, 2021. Pink line is extent of mineral resource pit shell.

A Leapfrog project folder contains a 3D lithology model built from all drilling completed to the end of 2015.

7.2.4 Recovery

To determine recoveries, the entire samples were weighted and compared to its theoretical 100% percent recovery weight. Southern Copper's database includes density and recoveries for each sample. Average recovery by lithology is:

- Andesite (oxide): 90.2%
- Granodiorite (oxide): 88.9%
- Andesite (sulfide): 94.9%
- Granodiorite (sulfide): 94%.

7.2.5 Collar Surveys

Collar surveys from the 1970–2015 drill campaigns were performed by the Southern Copper geological team in collaboration with surveyors.

Formal survey certificates have not been located so Wood was not able to verify the digital data against the original hard copy. However, some historical reports were found with matching collars that allowed verification of a few holes and provide confidence that the other collar locations are correct.

An adjustment of the historical collar data measurements was made by Southern Copper's surveyor with LiDAR topographic data generated by Geosisa on May 18, 2010.

7.2.6 Down Hole Surveys

Most drill holes at El Arco are drilled vertically; however, several holes were collared at -50° in 1994 with a small number of holes collared at -45 to -79° in other years. Downhole survey data have been collected since the earliest campaign. No original survey logs were found by Wood during the site visit (with the exception of drill hole EAD135, which was cross-checked with the database).

Downhole survey methods included Sperry-Sun and Tropari instruments, with Reflex magnetic surveys for the 2015 drill program; however, methods for individual drill holes and drill campaigns are not known. Typically, surveys were taken at 50 m intervals. There is no indication in the record what, if any, declination corrections were made and what the magnitude of the corrections was.

Downhole surveys deviate to the southwest in all of the drill holes measured. The southwesterly deviation was very regular and can be explained geologically since all deviations tend to go perpendicular to the northwest-striking/northeast-dipping foliation imparted by the regional metamorphism. To assign deviation to the drill holes that were not measured, contour maps of the deviation (strike and dip) were constructed and the unmeasured drill holes were assigned a deviation at 50 m depth depending on their position on the contour maps. Of the 13 holes with collar inclinations of -45° to -79°, only two have downhole surveys in the database and those show deviations similar to the vertical holes.

A number of the drill holes in the northeastern sector of the deposit area consistently exhibit extreme deviations. These deviations are, in Wood's opinion, at the limit of deviation that drill rods can achieve. There may be an issue with the survey data as reported. If so, this would result in samples as shown in the surveys not being in the place projected.

7.2.7 Comment on Material Results and Interpretation

Drill spacing varies from approximately 50 m in isolated, better-drilled deposit areas to about 100 m spacing in the less well drilled portions of the deposit.

The term "true thickness" is not generally applicable to porphyry-style deposits as the entire rock mass is potentially mineralized and there is often no preferred orientation to the mineralization. In areas that display porphyry-style mineralization, in general, most drill holes intersect mineralized zones at an angle, and the drill hole intercept widths reported for those drill holes are typically greater than the true widths of the mineralization at the drill intercept point.

Drilling and surveying were conducted in accordance with industry standard practices at the time the drill data were collected, and provide suitable coverage of the mineralization. The collar and downhole survey methods used provide reliable sample locations. Logging procedures provide consistency in descriptions.

In Wood's opinion, the quantity and quality of existing drilling data are sufficient for resource estimation at El Arco.

There are no material factors, such as sample location and sample recovery, that may impact the accuracy and reliability of drill results.

7.3 Hydrogeology

7.3.1 Sampling Methods and Laboratory Determinations

Groundwater samples were obtained from 15 different sites within the Project area. Field measurements included temperature, electrical conductivity, pH, and total dissolved solids.

A laboratory accredited by the Comisión Nacional del Agua performed chemical analysis on the collected samples to cover the parameters that correspond to the Standard for Potability (NOM 127-SSA1 -1994):

- Cations: sodium; magnesium; potassium; calcium
- Anions: sulfates; bicarbonates; chlorides; nitrates; chloride
- Other parameters of interest: dissolved total solids; calcium hardness; total hardness; total alkalinity; manganese; fluoride; arsenic; steel rod; mercury
- Additional parameters of interest: physical and chemical, bacteriological, heavy metal, pesticide and herbicide, hydrocarbon and radioactive analysis.

Results were used to identify groundwater sources, the dominant geochemical processes, water-rock interaction, water quality, and any evidence of contamination if such existed.

7.3.2 Comment on Results

In general, the water quality is good, with only some catchments near the coast exceeding the limits established for potability. The coastal areas have high concentrations of both sodium and chloride, reflecting a seawater influence.

Future groundwater wells, sampling of groundwater, testing for hydraulic conductivity, and placement of piezometers will fall under strict standard operating procedures and quality assurance (QA/QC) programs that will be developed by Wood.

7.3.3 Groundwater Models

The groundwater system hydrodynamic performance characterized using a model that incorporated the system spatial geometry, definition of the hydrostratigraphic units and quantification and spatial distribution of their hydraulic parameters, distribution of hydraulic loads, recharge and discharge zones and the flow direction scheme.

The components of the groundwater balance equation (geohydrological balance) were identified on the basis of the proposed conceptual model, such as precipitation, natural recharge, runoff, lateral inlets of underground flow, evapotranspiration, and excesses. The geohydrological balance was compared with the hydrometeorological balance and adjusted as needed. The conceptual study estimated 1,900 m^3/day inflow into the pit.

7.3.4 Water Balance

No water balance (or site-specific) models have been developed to date for El Arco.

Deterministic water balance models were used by Wood to validate seepage, process and event pond storage requirements for the heap leach pad and TSF. In addition, these models were used to estimate the make-up water requirements.

Results of the heap leach water balance model indicate that through the 20-year life of the heap leach facility, process solution is anticipated to be contained in the pregnant leach solution (PLS) pond. The arid climate, combined with ore moisture uptake, will result in a net negative solution balance, therefore make-up water will be required to maintain leach pad operations. The average make-up water rate is estimated at 91.4 m^3/hr for Phase 1 operations and will decrease for Phases 2 and 3.

Results of the TSF water balance model indicated that recoverable decant water will be available as the tailings settle and consolidate. This surplus water can be collected from a decant system and pumped back to the process mill for use in operations. During initial operations, Wood estimates that as much as 60,900 m^3/d of decant water will be available for use as make-up water, but during later operations, this will decrease to 16,400 m^3/d.

7.3.5 Mine Hydrogeology

The El Arco deposit is within the area of the Llanos del Berrendo aquifer in the southern portion of the state of Baja California (between 28° 00' and 28° 27' N and 112° 58' to 114° 05' W covering an area of 3,519 km^2). The aquifer consists of upper alluvial deposits and conglomerates that are restricted to stream beds and the coastal plain. Most of the aquifer is Quaternary sands, or Paleogene-Neogene sands and conglomerates. The lower portion of the aquifer is in fractured sandstone and conglomerate. The upper alluvial and aeolian sediments are currently exploited. Basement in the valley consists of compact extrusive igneous rock identified as andesite found at depths to greater than 300 m. Intrusive and metamorphic igneous rocks, due to their poorly permeable or impermeable nature, constitute barriers to the flow of groundwater. Water level data in this aquifer and a number assumptions based on similar lithologies was the basis for the conceptual hydrogeological model and estimate of pit inflow.

7.3.6 Process Hydrogeology

Hydrogeological characterization of the tailings, oxide ore leaching, spent ore and waste rock disposal areas will be required to meet the federal site characterization requirements of NOM-141_SEMARNAT-2003. Upgradient and down gradient monitoring wells and determination of local groundwater quality is mandated. In addition, assessment of groundwater flow directions and determination of foundation hydraulic conductivity are required to support an evaluation of potential groundwater quality impacts associated with future leaching and mine waste disposal operations.

7.3.7 Proposed TSF Area Hydrology

A 2008 study completed by Rafael de la Cruz, was completed to estimate the maximum runoff for use in hydraulic and stormwater design in the area planned for tailings disposal. The study used established precipitation records from meteorological stations and various methods to statistically estimate the maximum expected runoff.

In 2016, Buro Hidrologico conducted multiple hydrological studies for arroyos located within the Project area. These studies, building upon Cruz (2008), delineated basins and sub-basins within the arroyos and estimated maximum runoff for various return periods. Buro Hidrologico (2017) completed a study estimating the hydraulic availability of the Llanos del Berrendo aquifer as well as testing results from 10 exploration wells.

Buro Hidrologico consolidated all previous studies into a more comprehensive summary in 2021.

A recent conceptual groundwater hydrogeologic study was performed by Wood (2021) for a large area encompassing the project site. The objective of the study was to evaluate groundwater occurrence, movement, and quality in the Project area, in relation to the proposed mining area and potential facilities. Information regarding the hydraulic properties of the bedrock, baseline water quality, local well yields, and site water level data were compiled to develop a baseline conceptual hydrogeologic model meeting pre-feasibility level industry standards. An estimated phreatic groundwater surface was estimated to exist at depths ranging from 40–100 m below the existing ground surface.

7.4 Geotechnical

Geotechnical data for the open pit slope evaluation includes reconnaissance level surface observations, outcrop structural mapping, and geomechanical core logging of previously-drilled cores by Wood personnel in 2021. Historical geomechanical core logging data from previously-drilled core holes performed by Southern Copper was also provided. Wood evaluated the available data and provided pit slope design recommendations.

7.4.1 Sampling Methods and Laboratory Determinations

7.4.1.1 Historical Geotechnical Evaluations, Proposed TSF Area

AGRA Earth & Environmental (AGRA) conducted limited field and laboratory investigations of three proposed tailings impoundment locations (West, East and North tailings sites) in support of the 1996 feasibility study (as termed; the study pre-dates the SK1300 definition) co-ordinated by Bechtel. The investigations consisted of seismic refraction surveys, hollow stem auger drilling, NQ core drilling, in-situ permeability test pits and laboratory classification of selected samples. Generalized geological profiles were developed using the information collected during the field investigation. Bechtel (1996) concluded that the west tailings site provided the best advantage for tailings deposition. The west site investigated by AGRA/Bechtel corresponds to the TSF location selected in this Report.

During 2009, Golder Associates (Golder) summarized the laboratory testing results of near-surface materials, focusing on depths accessible for borrow operations (upper 10 m).

Corporación Ambiental de México SA de C.V. and ARCADIS US, Inc. (CAM/Arcadis) on behalf of Mexicana del Arco, SA de C.V. (Mexarco), completed a series of geophysical surveys in 2021. The surveys included 22 vertical electrical soundings, 15 lines for the seismic refraction survey, and 14 lines for the electrical resistivity survey. In addition, 55 soil samples were obtained at various localities in the proposed TSF area and were analyzed by granulometric analysis and X-ray diffraction. Southern Copper provided Wood with only a portion of the geophysical report, and that portion of the report provided did not include detailed discussion of results of the vertical electrical soundings and the seismic refraction survey. The electrical resistivity survey data were used to determine the stratigraphy of the soil lying beneath the ground surface. Seven soil units were discerned from the resistivity values obtained from the survey. The data obtained from the geophysical surveys conducted by CAM/Arcadis were utilized to estimate the minimum key depth required to construct the starter dike in the tailings dam.

7.4.1.2 Wood Geotechnical Evaluations, Proposed Open Pit Area

Wood was provided with rock quality designation (RQD) and estimated intact rock strength data collected by Southern Copper on 35 core holes. Wood noted that a modified procedure was used for measuring RQD in which the maximum length of full core considered was two times the diameter of the core, which is approximately 12 cm for HQ sized core. This procedure used by Southern Copper is likely to result in slightly lower RQD values as compared to the standard procedure in which pieces longer than 10 cm are considered in the calculation of RQD.

Wood performed or supervised geomechanical core logging or supervision of logging and core photography of a total of 6,024.65 linear meters of the core from 14 core holes that were previously drilled and geomechanically logged by Southern Copper personnel in the proposed pit area. The geomechanical core logging performed by Wood supplemented the logging performed by Southern Copper with the parameters required to calculate rock mass rating (RMR) (Bieniawski, 1976). Wood geomechanical logging was performed using a procedure developed by Wood. Material and discontinuity parameters logged were generally based on guidelines provided by ISRM (Brown, 1981). The resulting data were processed to calculate the RMR'76 for each rock type. Intersections of the mafic dike were limited such that RMR'76 was not calculated for the mafic dike. Based on observations of the core and RQD measurements, Wood concluded that the mafic dikes were not distinctly different from the surrounding rock mass and the contacts between the dikes and surrounding rock did not appear to be weaker than the dikes or surrounding rock.

No geomechanical laboratory testing has been performed at El Arco.

7.4.2 Comment on Results

The methods and procedures used to collect the geotechnical data were consistent with industry standards.

Southern Copper is currently in the process of obtaining permits that will support additional geotechnical and hydrological drilling.

8 SAMPLE PREPARATION, ANALYSES, AND SECURITY

8.1 Sampling Methods

8.1.1 Bulk Sampling

Bulk samples were material mined from the shafts and drifts. These materials were identified by oxidation state and stored on the surface until used for metallurgical testing.

The shafts were sampled along the two walls, and the drifts were sampled along the two walls and the back. All samples were taken as channel samples, split, and sent for assaying at Southern Copper's laboratory.

8.1.2 Core

The core sampling procedure was based on the geological description of the core. Samples honored lithological and alteration boundaries and did not have standard lengths, but were restricted to not longer than 3.05 m (10 ft core-barrel) and not shorter than 0.50 m.

Prior to 2015, core was split with a mechanical core splitter (most were hydraulic). During the 2015 drill program, samples were sawn in half.

Wood requested a re-assay program in support of this Report during 2021, using selected available core and pulp samples. Core samples were taken for reassay using the same methods and sample breaks as in the original sampling. Pulp samples selected corresponded to the same core intervals selected for check assays.

8.2 Sample Security Methods

Sample security measures prior to 2015 are not known.

In 2015, sample security from drill point to laboratory relied upon the fact that samples were either always attended to, or stored in a secure area prior to shipment to the external laboratory. Chain-of-custody procedures consisted of completing sample submittal forms to be sent to the laboratory with sample shipments to ensure that all samples were received by the laboratory.

8.3 Density Determinations

Density data were collected during every drill program beginning in 1970, and there are currently about 51,400 determinations available. Laboratories included:

- On-site laboratory operated by Southern Copper from 1970–2000. Little documentation is available. It was not independent. There are no known certifications or accreditations in the Project database
- Southern Copper laboratories at Nacozari and San Luis Potosi were used as check assay laboratories. These were operated by Southern Copper and were not independent. There are no known certifications or accreditations in the Project database
- Bondar Clegg in Vancouver, B.C. was reportedly used for some check assays for samples originally assayed at the on-site laboratory, but no additional information is available. Bondar Clegg was independent. There are no known certifications or accreditations in the Project database

Table 8-1 summarizes the average densities by rock type and oxidation state.

In the database, density sample lengths are assumed to be the same length as the assay sample.

After the core was logged and the samples selected, densities were determined for each sample by weighing a portion in water and air and applying the following formula:

$$d = \frac{Wa}{Wa - Ww}$$

The length of density samples varies with a minimum of 20 cm of intact core, normally taken at the beginning of each assay sample. Due to the very compact nature of the rock at El Arco, samples were not sealed with wax prior to weighing in water. To ensure that no bias was introduced by this procedure, Grupo México re-measured the density for a representative number of samples from each rock and ore type using wax-sealed samples.

No quality control measures were in place for density determinations.

8.4 Analytical and Test Laboratories

Laboratories included:

- On-site laboratory operated by Southern Copper from 1970–2000. Little documentation is available. It was not independent. There are no known certifications or accreditations in the Project database
- Southern Copper laboratories at Nacozari and San Luis Potosi were used as check assay laboratories. These were operated by Southern Copper and were not

independent. There are no known certifications or accreditations in the Project database

- Bondar Clegg in Vancouver, B.C. was reportedly used for some check assays for samples originally assayed at the on-site laboratory, but no additional information is available. Bondar Clegg was independent. There are no known certifications or accreditations in the Project database

Table 8-1: Density Determinations

	Oxide			Sulfide	
	Conglomerate	**Andesite**	**Granodiorite**	**Andesite**	**Granodiorite**
Density (g/cm^3)	2.6	2.69	2.60	2.79	2.69

- In 2000, the ALS laboratory in Hermosillo (ALS Hermosillo) was used as the primary assay laboratory. No accreditations are recorded in the Project database for this laboratory
- The 2015 data used for mineral resource estimation were the data analyzed internally by Southern Copper's Laboratorio Geoquimico San Luis Potosi (San Luis Potosi). This laboratory is not independent and is not accredited
- The 2015 check assay samples were analyzed by Actlabs in Zacatecas, Mexico (Actlabs), which holds an ISO 9001 accreditation by Bureau Veritas. Actlabs is independent of Southern Copper.

8.5 Sample Preparation

During the principal drilling programs, El Arco had an on-site sample preparation and assaying facility. However, later samples were crushed and pulverized in Hermosillo. Four pulverized pulp samples were prepared, one was sent to Southern Copper's laboratory in San Luis Potosi, two were sent to commercial laboratories and one was kept at El Arco.

There are no reliable records discussing sample preparation and analysis performed at the Laboratorio Geoquimico San Luis Potosi in 2015 campaign or from the older campaigns.

For the 2015 campaign, sample preparation was completed by Actlabs in Cananea, Sonora, with analysis at the Laboratorio Geoquimico San Luis Potosi. There is no record of the sample preparation procedures used by Actlabs.

8.6 Analysis

For drill holes EAD1–EAD241, each sample in the oxide and transition zones was analyzed for total copper and acid soluble copper at Southern Copper's laboratory in San Luis Potosi, and for total copper at two external laboratories. Each sample in the primary zone was analyzed for total copper at Southern Copper's San Luis Potosi laboratory. Gold, silver, and molybdenum were assayed in 15 m intervals (composites) at Southern Copper's San Luis Potosi laboratory.

For drill holes EAD242–EAD261, each sample was assayed for total copper, acid soluble copper, gold, silver, and molybdenum in the oxide and transition zone, and for total copper, gold, silver and molybdenum in the sulfide zone.

All other drill holes had total copper, gold, silver and molybdenum assays. Oxide and transitional material was assayed for acid soluble copper as well.

Approximately 5% of the samples were assayed at Nacozari, 16% at Parral, and the remaining 79% were assayed at San Luis Potosi. Due to the complete suite of assay results obtained from the San Luis Potosi laboratory, these data have always been used as the basis for the resource estimate. The total copper assay from this data set is referred to as CuT.

As the rate of drilling on the deposit increased and the numbers of samples sent for assay became large, it was not always possible to wait for the results from the Grupo México geochemical laboratory before proceeding with drilling. A laboratory was established on-site to perform a quick turnaround for CuT assays. In addition, this laboratory was used for samples from the 1990s pilot plant programs.

Chemical analysis for the 2015 campaign included:

- Aqua regia digestion with inductively-coupled plasma (ICP) analysis for a 38-element suite
- Atomic adsorption spectroscopy (AAS)
- 30 g fire assay with AAS finish for gold (detection limit 0.005 ppm Au).

Selected drill core from the 2015 drill campaign were submitted to Actlabs to provide data to correlate geochemical analyses with data collected using CoreScan. Actlabs also used a 38-element ICP method and AAS for gold analysis.

8.7 Quality Assurance and Quality Control

With the exception of check assays, there is no evidence of prior systematic, independent quality assurance/quality control (QA/QC) programs for El Arco analyses. All assaying prior to 2015 was done at an on-site laboratory at El Arco, or other Southern Copper facilities.

For the purpose of maintaining an outside check on the assay results, a split of each assay was sent to another laboratory for analysis of the total copper. Approximately 12% of these outside checks were sent to Geoquimica de México and the rest were sent to assay laboratories at other Grupo México facilities.

Approximately 9% of the samples assayed in the on-site laboratory were check assayed at Bondar Clegg in Vancouver, B.C.

The check assay results were used by Southern Copper and Wood to validate the original analyses. The conclusion was that there is no systematic bias in the copper assays used for the mineral resource estimate.

Southern Copper completed a re-assay program in 2021 at the request of Wood. Those results are discussed in Chapter 9.1.3.

8.8 Assay Representivity

Not all samples that were collected were analyzed for all elements. There are 337 core holes in the database used to estimate mineral resources. Of those, 106 drill holes have <50% of the samples assayed for gold. Twelve holes have no gold assays in the database. Overall, only 68% of the total intervals have gold assays compared to 97.8% for total copper. It is not entirely clear from the record why samples were not assayed for gold. Drill holes EAD-4-EAD-61 (mostly drilled in 1970) and EAD-190-EAD-292 (drilled in the period 1974–1995) were time intervals where most of the drill holes had <50% of the samples assayed for gold so it was not a single drill program where gold assays were lacking. The intervals without gold assays are distributed throughout the deposit with a somewhat higher concentration around the periphery of the deposit, indicating that the non-assay reason was not geographical. The lack of gold assays limits the mineral resource classification for gold.

Acid-soluble copper is reported for only 29.5% of the intervals, but acid-soluble copper assays are restricted to the oxide, supergene, and transition zones so samples with no secondary copper minerals were not routinely assayed for acid-soluble copper.

8.9 Database

There is no formal digital database for the Project.

Data for 261 core holes (80,397.29 m) drilled between 1970–2014 were entered into a MedSystem (now Hexagon) data table, which is not a secure database management program. All information was first loaded manually using Microsoft Excel and printed and checked by Southern Copper personnel. All errors were corrected and the corrected information re-entered. This procedure was repeated three times to create a reasonably error free data table. After this procedure, the data were exported to an ASCII file and imported into MedSystem as a data table.

Collar, survey and assay data for holes drilled in 2015 are housed in several different versions of Excel files named "Base de datos". Geological descriptions, alteration, and mineralization intensity, graphic strip logs and rock quality logging are available in individual Excel spreadsheets for each drill hole from the 2015 drill campaign.

Typically, gold was assayed only when the geologist believed that the sample being submitted for copper analysis would also have anomalous gold values. This was particularly true of drilling in the northeastern quadrant of the deposit. Hence there are numerous drill holes that have missing assays in the data tables.

8.10 Qualified Person's Opinion on Sample Preparation, Security, and Analytical Procedures

In Wood's opinion, the sample preparation procedures, analytical methods, QA/QC protocols, and sample security for the samples used in mineral resource estimation are acceptable for the purposes used.

Approximate 68% of the total intervals have gold assays compared to 97.8% for total copper. Wood considers this to add uncertainty to the gold mineral resource estimate (see discussion in Chapter 9.1.3) that limits the mineral resource classification to indicated mineral resources.

9 DATA VERIFICATION

9.1 Data Verification by Qualified Person

9.1.1 Site Visit

Representatives from Wood visited the El Arco Project, as outlined in Chapter 2.4. Observations from the visit were incorporated into Wood's conclusions as appropriate to the discipline areas in this Report, or incorporated into the recommendations in Chapter 23.

A large volume of drill core is archived in boxes and on racks in warehouses on site. Wood visited the warehouse and confirmed that holes from throughout the Project history were available and well preserved in boxes with hole numbers, down hole intervals and containing half split drill core with meterage blocks marking drill runs and sample tags marking sample intervals.

All assay pulps are archived in boxes in warehouses on site except for the 2015 drill program assay pulps that are stored in Hermosillo. Wood visited the pulp storage warehouse on site and confirmed that pulps from drill holes drilled from the throughout the project history are available in clearly-labelled paper envelopes that are stored in boxes labeled by drill hole.

9.1.2 Database Audit

Wood audited the database and found a small number of discrepancies, which were corrected. Several risks were identified with respect to the data management and suggestions to mitigate those issues are incorporated into the recommendations in Chapter 23; these included:

- Standardize geological codes
- Improve consistency between loggers when core logging
- Improve data validation such that data are properly validated as they are entered into the system
- Appoint a data administrator who will be responsible for data management and data modification after data are in the system.

9.1.3 Re-assay Program

Wood requested a check sampling program on pulp samples from 12 drill holes ("pulp data"; 2,628 samples) and core samples from five drill holes ("core data"; 915 samples) to validate the copper, molybdenum, gold, and silver data supporting mineral resource estimation.

Samples were selected to include spatial representivity of the mineralization and were from each drill campaign. The focus was on copper, molybdenum, gold, and silver grades, and the intent was to use the same analytical method for each element as was originally used. These check samples were sent to Bureau Veritas and included standards and blanks as QA/QC controls. In addition, 1% of the samples re-assayed by Bureau Veritas were sent to ALS Hermosillo.

Wood compared the original assay data from the San Luis Potosi laboratory to the re-assay data from Bureau Veritas (Table 9-1), and noted the following:

- Total copper (CuT): pulp data show no significant bias to about 6% CuT. Only two data pairs contain >6% CuT so meaningful conclusions are not possible. Core data from Bureau Veritas are biased about 10–12% lower than the data from San Luis Potosi. The origin of that bias is uncertain
- Soluble copper (CuS): pulp data show no significant bias below 1% CuS. Only two data pairs have higher CuS concentrations so no meaningful conclusions are possible. Core data show that Bureau Veritas is biased low relative to San Luis Potosi by possibly 25%, but much of that apparent bias is due to different lower detection limits, and many of the results are near lower detection limit. Some oxidation of core may have occurred that could possibly bias the result or oxide minerals on fractures may have abraded off the core and were not sampled. Overall, there is no explanation for the biased core data
- Molybdenum: pulp data from Bureau Veritas are biased about 3% high relative to San Luis Potosi for grades <0.06% Mo. Wood considers this bias to be within acceptable limits. Above 0.006% Mo, there are too few data to quantify the bias. Core data show Bureau Veritas is biased about 7% low relative to San Luis Potosi. Wood considers that bias to be within reasonable limits
- Gold: pulp data show San Luis Potosi biased about 20% low relative to Bureau Veritas for data <1.2 g/t Au. There are too few data >1.2 g/t Au to support meaningful conclusions. Core data <0.6 g/t Au show that San Luis Potosi is biased 6% low relative to Bureau Veritas. Above 0.6 g/t Au, there are too few data to support meaningful conclusions

Table 9-1: Check Assay Results

Sample Type	Element	Unit	Qty.	Minimum	Mean Original	Mean Check BV	Difference (%)	P90 ARD (%)
Core	CuT	%	38	0.1	0.455	0.407	-10.96	37.6
	CuS	%	149	0.01	0.055	0.027	-67.56	149.5
	Au	ppm	117	0.0100	0.150	0.118	-24.50	117.2
	Ag	ppm	143	0.30	1.701	1.241	-31.29	142.9
	Mo	%	133	0.00010	0.004	0.003	-28.02	133.3
Pulp	CuT	%	2,544	0.0008	0.305	0.299	-2.06	22.5
	CuS	%	1,530	0.0005	0.056	0.055	-0.71	85.7
	Au	ppm	1,924	0.0025	0.123	0.112	-9.11	106.6
	Ag	ppm	1,757	0.15	1.816	1.432	-23.61	96.3
	Mo	%	1,846	0.00005	0.006	0.006	-3.75	107.7

Note: Qty = number of samples; BV = best value, P90 ARD = 90th percentile absolute relative difference; CuT = total copper; CuS = soluble copper.

- Silver: pulp data show San Luis Potosi biased about 10% low relative to Bureau Veritas for data <25 g/t Ag. Above 25 g/t Ag there are too few data to support meaningful conclusions. Core data show San Luis Potosi biased about 16% low relative to Bureau Veritas for data <5 g/t Ag. Above 5 g/t, too few data exist to support meaningful conclusions
- Project QC data indicate that the Bureau Veritas check assay data are acceptably accurate and contamination-free
- Laboratory QC data were evaluated and indicate that the check assay data at Bureau Veritas were sufficiently precise to support mineral resource estimation.

Analysis of check assay samples showed ALS Hermosillo results to be closely comparable to those obtained from Bureau Veritas:

- The mean of the copper values from ALS Hermosillo was 2% higher than that of the Bureau Veritas assays
- The difference for each of the acid soluble copper and silver means was 1% lower at ALS Hermosillo than the results from Bureau Veritas
- Insufficient data were available to make a meaningful comparison for gold assays.

The 2021 check sample program:

- Verified that, based on pulp data, legacy total copper, soluble copper, and molybdenum data are sufficiently accurate to support mineral resource estimation
- Found that core data for soluble copper and molybdenum show unexplained biases that may be related to sample storage, sample handling, or sampling. Those biases should be investigated by Southern Copper
- Concluded that gold and silver data from San Luis Potosi are biased by as much as 20% and 10% respectively lower than data from Bureau Veritas. Wood considers the original gold and silver data from San Luis Potosi to still be useable for mineral resource estimation, recognizing that those data may have a low bias. Re-assay of all of the existing samples for gold and silver is recommended.

Wood considers the uncertainties around gold and silver grades to be a factor that limits mineral resource classification to indicated at best.

9.1.4 Peer Review

Wood requested that information, conclusions, and recommendations presented in the body of this Report be peer reviewed by Wood subject matter experts or experts retained by Wood in each discipline area as a further level of data verification.

Peer reviewers reviewed the information in the areas of their expertise as presented in the TRS. This could include checks of numerical data, consistency of presentation of information between the different Report chapters, consistency of interpretation of the data between different discipline areas, checked for data omissions, verified that errors identified during Wood's gap analyses were appropriately addressed or mitigated, and reviewed the appropriateness of the QP's opinions, interpretations, recommendations, and conclusions as summarized by the QP Firm.

9.2 Qualified Person's Opinion on Data Adequacy

Wood considers that a reasonable level of verification has been completed, and that no material issues would have been left unidentified from the programs undertaken.

Wood is of the opinion that the data verification programs for Project data adequately support the geological interpretations, the analytical and database quality, and therefore support the use of the data in mineral resource estimation.

Wood considers the uncertainties around gold and silver grades to be a factor that limits mineral resource classification to indicated at best.

10 MINERAL PROCESSING AND METALLURGICAL TESTING

10.1 Introduction

Metallurgical tests have been carried out at bench-scale (laboratory level) and at pilot-scale, on oxide and sulfide mineralization.

10.2 Test Laboratories

The following laboratories were used for metallurgical testwork:

- Metcon Research, Inc., located in Tucson, Arizona (Metcon; independent)
- Mountain States R&D International of Tucson, Arizona (Mountain States; independent)
- El Arco on-site laboratory by Centro de Investigación Metalurgica de Grupo México, in Parral, Chihuahua (Southern Copper Parral; not independent) under the direction of Earl Rau from the Colorado School of Mines Research Institute (CSMRI), and then under the direction of Dr. Roshan Bhappu from Mountain States,
- Svedala Grinding Division, in York, Pennsylvania (Svedala, now Metso Minerals, independent)
- EIMCO Process Equipment Company (EIMCO, now FLSmidth) conducted testwork at the El Arco on-site laboratory
- M3 Engineering in Tucson, Arizona (M3; independent)
- Polysius AG, a company of Thyssenkrupp Technologies in Germany (Polysius; independent).

There is no international standard of accreditation provided for metallurgical testing laboratories or metallurgical testing techniques.

10.3 Metallurgical Testwork

10.3.1 Copper Oxides

Pilot test heaps of uncrushed oxide ore samples were done at the El Arco site from 1976 to 1977. Tests were run for approximately 300 days on separate andesite and granodiorite heaps, using samples obtained from shafts sunk into the deposit. There was poor penetration of acid into the rock so total copper recovery was below 50%. This result, and average sulfuric acid consumption of nearly 48 kg/t of mineralized material leached, suggested that crushing should be considered to give better copper recovery, a shorter leach cycle and lower acid consumption.

In 1994, column leaching tests with Metcon began, with the goal of evaluating the leaching characteristics of the andesite and the granodiorite. These tests were performed in two stages. The first included 17 columns in an open circuit with material crushed to minus 19 mm, using artificially acidified sea water containing 3 g/L of ferric ion. In the second test stage, two columns were evaluated with a closed system to determine the effect of cured vs. uncured ore and two more columns were run to evaluate leaching with sea water versus fresh water.

In August of 2005, the final phase of the leaching tests was completed. The testing campaign included the leaching of 20 columns to determine and confirm the optimal parameters for an industrial leaching plant facility with solvent extraction and electrowinning (SX/EW) of copper.

These parameters were confirmed by leaching separate 1,000 t heaps of andesite and granodiorite ore. Pregnant leach solution from the heaps was processed in a SX/EW pilot plant. This generated raffinate to continue leaching of the heaps. A commercial refined copper product was produced. The SX plant was fed with a PLS solution at a flow rate of 25 L/min with reverse flow mixers/settlers designed by Bateman E&C Division. The EW plant consisted of two electrolytic cells with 27 anodes and 26 cathodes and rectifiers with a capacity of 1,500 amps.

All tests were validated by Mountain States, except for the leaching tests in pilot heaps with run-of-mine ore.

10.3.2 Copper Sulfides

In 1979 and 1980, copper sulfide mineralization was tested using sea water at the on-site El Arco laboratory by personnel from Southern Copper Parral. The testwork was conducted at both bench-scale and pilot-scale under the direction of Earl Rau from the Colorado School of Mines Research Institute (CSMRI), who was responsible for the specifications, monitoring, and reports of the results of the program.

In 1995–1996, tests were performed at the laboratory level as well as pilot plant tests on the project site at Mountain States. Data from these tests established an average copper recovery of 83.7% with an average 29.5% copper concentrate grade. Average gold recovery ranged between 44.7% and 62.7%. Mineralized samples were sent to Svedala Grinding Division to conduct pilot-scale SAG grinding tests and Bond Work Index confirmation testing. The test results indicated that the sulfide mineralization was amenable to primary SAG and secondary ball mill grinding

Pilot column flotation tests were completed. The results indicated no significant improvement in flotation recoveries, so no further consideration was given to column flotation.

EIMCO conducted thickening and filtration tests on tailings and concentrate at the El Arco on-site laboratory. The results established criteria for concentrate and tailings thickening and demonstrated that effective pressure filtration and washing of the concentrate to reduce chlorides could be performed.

Flotation performance comparing results using fresh water, reclaim water, 50% each fresh and reclaim water, and sea water was tested in the Southern Copper laboratory at Parral in 2008. A summary of resulting copper recoveries and concentrate copper grades are in Table 10-1 These data indicated that use of fresh water is preferable in flotation.

Copper recovery was set at 86% and concentrate copper grade was set at 25% for the 2009 internal study. The average gold recovery was set at 55.7%.

Flotation tests for molybdenum recovery to a bulk copper–molybdenum concentrate are summarized in Table 10-2.

10.3.3 Recent and In Progress Tests

Technological advances in the copper ore processing industry since 2009 led Southern Copper to commission new laboratory tests on copper sulfide ores. Testwork is summarized in the following subsections.

10.3.3.1 High Pressure Grinding Roll–Ball Mill Circuit Sizing

Samples of andesite and granodiorite mineralization were sent to Polysius to establish breakage characteristics and grindability of the samples. The test work was used to develop a basic and an alternative high-pressure grind roll (HPGR)–ball mill flowsheet, and provide equipment design and sizing for the respective options. The recommended flowsheet followed a similar configuration to similar established operations.

Table 10-1: Copper Recoveries and Copper Concentrate Grades

Product	100% Sea Water		100% Fresh Water		100% Reclaim Water		50% Fresh Water/ 50% Reclaim Water	
	Test ARC-046-95		Test ARC-107-08		Test ARC-107-08		Test ARC-109-08	
	Cu%	Recov%	Cu%	Recov%	Cu%	Recov%	Cu%	Recov%
Cu Concentrate	26.00	82.1	27.88	86.6	24.33	88.4	26.72	86.5

Table 10-2: Molybdenum Flotation Recovery

Product	Weight %	Assays (%)			Recovery (%)		
		Cu	Fe	Mo	Cu	Fe	Mo
Heads	100	0.52	3.72	0.0079	100	100	100
Cu–Mo Conc.	1.69	25.72	24.58	0.2080	83.5	11.2	44.5
Final Tail	98.31	0.09	3.37	0.0045	16.5	88.8	55.5

10.3.3.2 Flotation Tests with HPGR–Ball Mill Product

The crushed and milled andesite and granodiorite mineralization from the HPGR–ball mill testwork by Polysius in Germany was sent to Mountain States in Vail, Arizona to conduct locked cycle closed circuit flotation testing.

The testwork followed the M3/Mountain States suggested flowsheet and used the reagent suite as previously used by Southern Copper Parral. The results from the comparison tests between the HPGR and ball mill circuit, and the more conventional crushing and ball mill circuit indicated a copper recovery of 82.7% and 81.4%, with concentrate grades of 27.4% and 31.5% respectively.

In addition, flotation testing was conducted to compare the performance of flotation using fresh and sea water. The copper recovery and grade for sea water was 83.9% and 20.6%, compared to 81.4% and 31.5% for fresh water.

10.3.3.3 Flotation Tests for Molybdenum Recovery

This series of metallurgical tests were performed with mineralized material from the El Arco Project with the purpose of recovering the molybdenum from copper concentrate and likewise ascertaining the suitability of reagents used in the molybdenum flotation circuit.

Scavenger flotation rougher tails to recover a greater quantity of molybdenite with special reagents and re-flotation of the copper–molybdenum was tested. The best results were found with a grind of 70–72% passing 200 mesh. The nine tests performed in this investigation gave results of copper–molybdenum concentrates with copper contents that varied between 24.3–25.7% and a molybdenum content in the range of 0.19–0.23%. Copper recoveries were in the range of 81.9–85.3%, while the molybdenum recoveries were in the range of 44.5–52.9%.

10.4 Recovery Estimates

Results of Southern Copper's sulfide material testwork indicated that the copper recovery would be about 86%, and a copper concentrate grade of 25% could be produced.

A slight (0.6%) additional recovery for HPGR crushing was demonstrated in the testwork, but was not included in the recovery estimates that support the proposed LOM plan.

Southern Copper estimated an overall oxide circuit recovery of 80% copper recovery. The sulfide circuit copper recovery is estimated at 86%, and the gold recovered to the sulfide concentrate will be 55.7%. Silver recovered to the sulfide concentrate is estimated to be 50.2% based on Mountain States flotation studies.

Based on the results obtained by Southern Copper, the molybdenum recovery was estimated at 57%. There is a risk that low average head grades could result in variable molybdenum recoveries.

10.5 Metallurgical Variability

Samples selected for metallurgical testing were representative of the various styles of mineralization within the different deposit areas. Samples were selected from a range of locations within the deposit. Sufficient samples were taken and tests were performed using sufficient sample mass for the respective tests undertaken.

10.6 Deleterious Elements

An analysis of the concentrate produced during the 1996 pilot trials indicated a high-quality copper concentrate with very minor amounts of deleterious elements. Arsenic in particular was not detected in the analysis.

10.7 Qualified Person's Opinion on Data Adequacy

Industry-standard studies were performed as part of process development and initial plant designs. Testwork programs were acceptable for the mineralization type.

Wood reviewed the metallurgical testwork results, and based on these checks, in Wood's opinion, the metallurgical testwork results and recovery forecasts support the estimation of mineral resources and mineral reserves and can be used in the economic analysis.

11 MINERAL RESOURCE ESTIMATES

11.1 Exploratory Data Analysis

Wood completed basic exploratory data analysis on the assay data prior to compositing and supplementary exploratory data analysis on the composite data used for grade estimation. Boxplots by lithology and ore type were also examined. Scatter plots were constructed by element to check for correlations between elements and contact plots were used to examine grades by lithology.

The copper and gold distributions were log-normal with a minor low-grade tail. There were very few outlier values for either element. The molybdenum distribution was log-normal and shows multiple modes below a threshold of approximately 0.006%. Approximately 70% of the assays had grades <0.006% Mo. The silver distribution was log-normal with two modes, a low-grade mode at approximately 1 g/t Ag and a second mode at a grade of approximately 2 g/t Ag.

All elements exhibited little variation in mean grades within mineralized rock types.

Copper results showed little variation in average grade or co-efficient of variation (CV) by ore type; however, the conglomerate had a significantly lower average grade and higher CV. Gold displayed minor enrichment in the oxide and mixed ore types with somewhat higher CV values. Silver showed minor depletion in the oxide ore type. Molybdenum exhibited minor depletion in the conglomerate, oxide and mixed ore types with lower CV values. Acid-soluble copper (CuAS) results showed a significant progressive decrease in grades passing from the oxide to the sulfide ore types. The CV values were relatively constant.

Scatterplots showed that there was very little correlation between the metals and the metals behaved independently. This indicated that separate grade shells were required for each metal.

The contact plots showed that there were gradational changes in grade both within the lithologies and across contacts between lithologies. There were sharp changes in grade across mineralized rock type boundaries in contact with the dikes. Contact plots for CuAS across the ore type boundaries indicated that there were sharp changes in grade across the contacts. Estimation used a mix of hard and soft boundaries, depending on the lithologies. Lithological and ore type contacts were considered as soft boundaries except for the low-grade conglomerate and dikes which were considered as hard boundaries. The gold, silver and molybdenum grade shells were considered as hard boundaries.

Boxplots of the density values by ore type show little variation in the mean. The conglomerate has a mean density which is 5.5% lower than the mean of the combined density measurements from all ore types. There is a difference of between 1.5–2.7% in the means of the oxide, mixed and sulfide ore types.

11.2 Geological Models

A Leapfrog lithological model was built with the following units:

- A 2014 LiDAR topographic surface, used to constrain the top of the resource model
- Andesite wireframes: consists of the andesite porphyrite, brecciated andesite, and andesite lithologies
- Conglomerate wireframe; estimated using a hard boundary
- Combined granodiorite and quartz wireframe. The granodiorite porphyry is bounded by fault structures to the north and south
- Narrow post mineralization mafic dike wireframes.

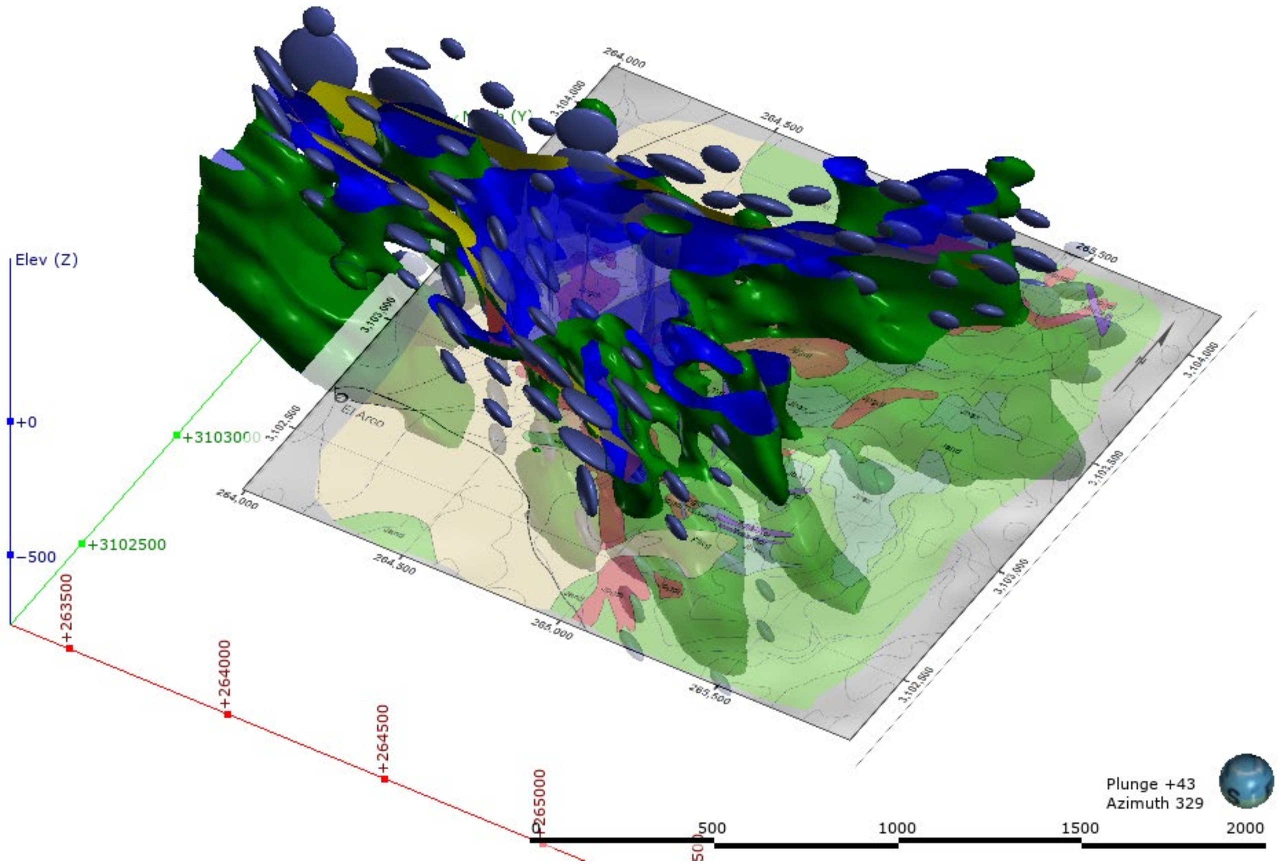
Four additional wireframes, for oxidation state (oxide, transition or mixed, and sulfide or primary) and conglomerate were constructed. The data used to construct the models was a combination of core logging data and results of petrographic and mineralogical studies on a range of thin sections.

Wood attempted to define alteration domains using geochemistry and CoreScan mineralogy (data collected from 2015 drillhole campaign) and to establish potential relationships between CoreScan data and the lithology/alteration logging data. No strong correlations were observed that could be modeled. Wood recommended Southern Copper consider a re-logging program focusing on collecting alteration data.

A 3D structural analysis of drill core logging and assaying indicated that the north and south contacts of the granodiorite porphyry intrusion, and zones of higher-grade copper, molybdenum, gold and silver mineralization follow steeply north-dipping, arc-shaped planar structural features that are interpreted to have been overturned and deformed during accretion and subsequent metamorphism of the arc terrain. Wireframes of the two faults were built.

Wood visually inspected plan and cross sections with drill hole logging data and concluded that there was a good three-dimensional consistency in the lithology and ore-type models, and that the models respected the majority of logged lithology and ore type intervals.

Figure 11-1: Granodiorite Porphyry Model



Note: Figure prepared by Wood, 2021. Disks represent the orientation of structural features in drill holes interpreted to be associated with the north and south faults. Local geological map from Southern Copper as a modeling reference.

11.3 Grade Shells

Wood constructed grade shells in Leapfrog Edge to constrain grade estimation (see also Chapter 11.8.1). The thresholds were chosen to remove the low-grade tail in the copper distribution (at approximately 0.1% Cu), and the multi-modal low-grade populations in gold, silver, and molybdenum (thresholds at 0.05 g/t Au, 1.2 g/t Ag and 0.006% Mo respectively).

11.4 Density Assignment

A total of 16,711 composites have density assignments. Density was estimated using one pass per zone and inverse-distance to the second power (ID2) interpolation, with the ore types as estimation constraints.

Estimation used a discretization of 5, 5, 2. The search ellipse had the same orientation as the copper search ellipse, with dimensions 15% larger than the third pass search ellipse. Estimation used a minimum of three and a maximum of 18 composites with a maximum of three composites per drill hole.

The oxide, mixed and sulfide ore type boundaries were treated as soft boundaries and the conglomerate contact was treated as a hard boundary.

11.5 Grade Capping/Outlier Restrictions

Grades were not capped. Outlier restriction was used to control possible over-projection of high grades into predominantly low-grade or poorly-drilled areas. The thresholds were selected by reviewing the locations of the high-grade assays and composites for each estimation domain.

11.6 Composites

Composites that were 7.5 m long were calculated and broken at the contacts between lithologies to incorporate the sharp decrease in grades across the conglomerate and dike contacts.

The composites were back-flagged with codes from the 0.1% copper, gold, silver, and molybdenum grade shells.

For gold, missing values were assigned the mean gold grade of the composites falling within the 0.1% Cu grade shell.

11.7 Variography

Correlograms were constructed for copper, silver, gold, and molybdenum on the 7.5 m composites within the copper grade shell. A downhole correlogram was used to estimate the nugget effect for each metal. Variogram maps for each metal were used to evaluate anisotropy in grade continuity. Directional correlograms were calculated in the three orthogonal directions of continuity and were fitted with two nested structures, a spherical first structure and a second exponential structure.

11.8 Estimation/interpolation Methods

11.8.1 Estimation

A block size of 25 x 25 x 15 m with no sub-blocking was used as the parent block size. A partial value was coded to the blocks to represent the percentage of the block falling within the post-mineral dike wireframe. The estimation used a discretization of x, y, and z equal to 5, 5, and 2 respectively.

The general approach to estimation for total copper, gold, silver, and molybdenum was to composite the assay data to half the proposed bench height and estimate the grades of the blocks within the 0.1% Cu grade shell.

Grade shells were defined for copper, silver, gold and molybdenum based on the initial exploratory data analysis on the raw and composite data. The grade models were generated using indicator interpolant models in Leapfrog with probability levels between 0.3–0.6 to reduce extreme grade shell shapes.

An ordinary kriging (OK) interpolator was used to independently estimate grades for mineralization within grade shells and unmineralized dikes. Blocks were estimated in three passes:

- Pass 1: all elements required a minimum of seven and maximum of 18 composites, with a maximum number of three composites from a drill hole and maximum number of drill holes used set as six
- Pass 2: all elements required a minimum of seven and maximum of 18 composites, with a maximum number of three composites from a drill hole and maximum number of drill holes used set as six
- Pass 3: all elements except copper required a minimum of one and maximum of 18 composites, with a maximum number of three composites from a drill hole and maximum number of drill holes used set as six. Copper required a minimum of three composites for estimation.

The dimensions of the search ellipse for each pass were taken from the copper variogram using the following distances

- Pass 1: point at which the variogram crosses the 80% range of the total sill: 480 x 344 x 200 m

- Pass 2: point at which the variogram crosses the 90% range of the total sill: 540 x 387 x 225 m
- Pass 3: point at which the variogram crosses the 100% range of the total sill: 600 x 430 x 250 m.

Search ellipse orientations were taken from the anisotropy directions displayed by the variogram model. A restricted number of composites was used to control the grade smoothing inherent in the ordinary kriging estimator. The composite restriction effectively reduced the search ellipse to the nearest six holes (i.e., a search distance of between 100–150 m in plan assuming a drill hole spacing of 100 x 100 m).

Non-estimated total copper blocks were assigned the mean of the total copper by a nearest neighbor (NN) estimation method (mean value = 0.392 TCu).

The final grades were estimated by diluting the mineralized grades with the dike grades using a dike partial value sub-blocking.

11.8.2 Copper Dilution

A copper dilution variable was used to represent the effect on the copper grades of the late-stage dike wireframes. This variable was calculated by factoring the total copper estimated into the dike wireframe that was itself calculated using a global search and ID2 interpolation, and the percentage of the blocks by dike domain variable. The copper dilution variable was coded into the model using a script formula.

11.8.3 Acid-Soluble Copper Estimation

The approach for estimating acid-soluble copper was slightly different. The ore-type contacts were considered as hard boundaries for estimation. Only composites identified as being within the oxide zone were used to estimate blocks falling within the oxide wireframe. The estimation was done using one pass at the longer range used for the copper estimation (total copper pass 3) and more flexible estimation parameters. This resulted in the block estimation using a minimum of three and maximum of eight composites, a maximum of three composites per drill hole, and maximum of a single drill hole.

The blocks where acid soluble copper was not estimated during the OK interpolation were assigned the mean value of acid soluble copper estimated using the NN method.

11.9 Validation

Model validation included visual and geostatistical methods:

- Visual inspection of sections and plans displaying the OK block grade estimates for copper, gold, silver, and molybdenum grades and the composites showed that the block model accurately reflects the input composite data
- Summary statistics were tabulated for the OK grade and NN models. There was <5% difference in the mean grades and therefore there was minimal global bias between the OK and NN models
- A review of the local grade trends was completed by plotting the OK copper, gold, silver and molybdenum grades against NN grades in swaths 50 m in width along the northing, easting, and elevation directions. The copper swath plots showed a trend of decreasing copper grades towards the east, with a sharp increase in the easternmost part of the deposit. The silver and gold swath plots displayed very little grade variation. In contrast, the molybdenum swath plots showed more variability between the two block models. There was no evidence of local bias in the swath plots for copper or gold
- A change of support selectivity check was completed on OK block copper estimates with an approximate 100 x 100 m drill hole spacing. The variance correction factors used in the discrete Gaussian model corrected grade–tonnage curves were calculated using a copper grade correlogram model based on 15 m composites. The results of the change of support check showed that the model selectivity was appropriate between 0.1–0.2% Cu cut-off grades; however, the model was slightly too smooth at cut-offs between 0.2–0.3% Cu.

11.10 Confidence Classification of Mineral Resource Estimate

11.10.1 Mineral Resource Confidence Classification

Drill spacing studies were performed to determine an appropriate initial spacing to support mineral resource confidence classification. These showed that measured and indicated mineral resources would be supported by a maximum spacing of about 100 x 100 m.

These drill hole spacing studies were used as a guide for mineral resource classification together with assay data quality and confidence in geological models. For example, there are a significantly lower number of assay data for gold at El Arco (approximately 30% less) and therefore the confidence in the gold grade estimates is much lower than that for copper. The presence of barren unmineralized dikes lowers the confidence in the geological model.

Based on the assay data quality and uncertainty in the volume of the unmineralized dikes, Wood decided to use drill hole spacings of 100 x 100 m for indicated and 50 x 50 m for measured category mineral resources respectively. Inferred category mineral resources were classified within 200 m of the closest drill hole.

Wood used a smoothing algorithm in SGEMS software to remove isolated blocks of the inferred category within predominantly indicated category and isolated blocks of measured within predominantly indicated category. The total number of measured and indicated blocks changed by <1%.

The final step was to review the spacing between the three closest drill holes. As a result, the target distance for the measured mineral resource classification was revised to 40 m spacing. The blocks meeting that distance criteria did not form a continuous volume; therefore, the mineral resource classification was limited to the indicated and inferred categories.

11.10.2 Uncertainties Considered During Confidence Classification

Following the statistical analysis in Chapter 11.10.1 that classified the mineral resource estimates into the indicated and inferred confidence categories, uncertainties regarding sampling and drilling methods, probable bias in gold and silver data, data processing and handling, geological modelling, and estimation were incorporated into the classifications assigned. Wood considers the uncertainties around gold and silver grades to be a factor that limits mineral resource classification to indicated at best.

The areas with the most uncertainty were assigned to the inferred category, and the areas with fewer uncertainties were classified as indicated.

11.11 Reasonable Prospects of Economic Extraction

11.11.1 Input Assumptions

Wood constrained the mineral resource estimate within a conceptual pit shell using a Lerchs–Grossmann algorithm and the parameters set out in Table 11-1.

Table 11-1: Pit Shell Input Parameters

Parameter	Unit	Mill
Restriction boundary		No
Metal Prices		
Copper	US$/lb	3.80
Molybdenum	US$/lb	10.35
Resource confidence categories		Indicated and inferred
Process Recovery – Mill		
Copper	%	86
Molybdenum	%	57
Process Recovery – Leach		
Copper	%	80
Operating Cost		
Base mining cost – ore, leach, waste	US$/t	1.189
Incremental haul cost per bench	US$/t	0.017
Process Cost – Mill		
Mill operating cost	US$/t	6.13
Mill sustaining cost	US$/t	0.00
Tailing sustaining cost	US$/t	0.00
G&A operating cost	US$/t	0.51
Molybdenum plant operating cost	US$/t	0.25
Process Cost – Leach		
Leach operating cost	US$/t	1.15
SX/EW cost	US$/lb	0.45
Other Costs		
Closure cost	US$/t	0.07
Payments (concession, property, treasury)	US$/t	0.03

Table 11-2: Marginal Cut-off Input Parameters

Parameter	Unit	Mill
Refining and Transportation Costs		
Copper refining	US$/lb	0.09
Copper smelting cost	US$/t con	90.00
Copper transportation cost	US$/t con	107.69
Molybdenum transportation cost	US$/t con	73.67
Molybdenum treatment, refining	% (Mo price)	12.50
Payable Metal		
Copper	%	96.5
Molybdenum	%	100
Deductions		
Copper	%	1.0
Transport Losses		
Copper	%	0.5
Molybdenum	%	0.2
Concentrate Grade		
Copper	%	25
Molybdenum	%	56
Marginal Cut-off		
Copper mill	%	0.107
Copper oxide leach	%	0.033

11.11.2 Commodity Price

Commodity prices used in resource estimation are based on long-term analyst and bank forecasts, supplemented with benchmarking by Wood's internal specialists. An explanation of the derivation of the commodity prices is provided in Chapter 16.2. The estimated timeframe used for the price forecasts is the 35-year LOM that supports the mineral reserve estimates. The break-even pit shell used a copper price of US$3.45/lb, which equates to a copper price at US$3.80/lb and a revenue factor 0.908 pit.

11.11.3 Cut-off

Wood calculated net smelter return (NSR) values for each block based on the smelter terms shown in Table 11-2. The marginal cut-off is determined at the pit rim. Mined material is considered for processing if the mineralization contains a value that is greater than the costs to process it, i.e., is above the marginal cut-off. Mined material with less value than the marginal cut-off at the pit rim is sent to the WRSF. The marginal NSR cut-off values were $1.15/t for potentially leachable material and $6.89/t for potential mill feed material.

Wood considers those blocks within the constraining resource pit shell and above the cut-off applied to have reasonable prospects for economic extraction.

11.11.4 QP Statement

Wood is of the opinion that any issues that arise in relation to relevant technical and economic factors likely to influence the prospect of economic extraction can be resolved with additional work. Porphyry-copper style deposits are a well-known and studied deposit type, and Southern Copper has experience with mining operations that exploit these deposit types.

There is sufficient time in the 35-year timeframe considered for the commodity price forecast for Southern Copper to address any issues that may arise, or perform appropriate additional drilling, testwork and engineering studies to mitigate identified issues with the estimates.

11.12 Mineral Resource Estimate

Mineral resources are reported using the mineral resource definitions set out in SK1300, and are reported exclusive of those mineral resources converted to mineral reserves. The reference point for the estimate is in situ. The indicated mineral resource estimates for the El Arco Project are provided in Table 11-3. The inferred mineral resource estimates are included in Table 11-4. Wood is the QP Firm responsible for the estimate.

Table 11-3: Indicated Mineral Resource Statement

Process Type	Tonnes (Mt)	Copper Grade (%)	Molybdenum Grade (%)	Gold Grade (g/t	Silver Grade (g/t	Contained Copper (Mlb)	Contained Molybdenum (Mlb)	Contained Gold (Moz)	Contained Silver (Moz)
Mill	826.62	0.41	0.008	0.12	1.6	7,544.91	146.48	3.226	41,88
Leach	51.32	0.30	—	—	—	335.25	—	—	—
Total	***877.95***	***0.41***	—	—	—	***7,880.16***	***146.48***	***3.226***	***41,88***

Table 11-4: Inferred Mineral Resource Statement

Process Type	Tonnes (Mt)	Copper Grade (%)	Molybdenum Grade (%)	Gold Grade (g/t	Silver Grade (g/t	Contained Copper (Mlb)	Contained Molybdenum (Mlb)	Contained Gold (Moz)	Contained Silver (Moz)
Mill	2,344.89	0.37	0.006	0.11	1.5	19,352.33	298.15	8.05	110.89
Leach	63.78	0.25	—	—	—	350.94	—	—	—
Total	***2,408.66***	***0.37***	—	—	—	***19,703,27***	***298.15***	***8.05***	***110.89***

Notes to Accompany Mineral Resource Tables

1. Mineral resources are reported in situ and are current as at December 31, 2021. Mineral resources are reported exclusive of mineral reserves. Mineral resources that are not mineral reserves do not have demonstrated economic viability. Wood is the QP Firm responsible for the estimate.
2. Mineral resources are reported within a conceptual pit shell that is based on copper and molybdenum values only. The pit shell uses the following input parameters: metal prices of US$3.80/lb Cu and US$10.35/lb Mo; variable net smelter return cut-offs; mining recovery of 100%; metallurgical recoveries of 86% Cu, and 55% Mo for material sent to the mill facility, and recovery of 80% Cu (Total copper) for material sent to the heap leach pad; total mining costs (base, incremental and sustaining) of US$1.206/t mined; total mill process costs (base, sustaining, tailings, G&A and molybdenum plant) of US$7.80/t milled, total leaching costs (operating and SX/EW) of US$1.60/t leached; miscellaneous costs (closure, payments) of US$0.10/t processed; copper refining cost of US$0.09/lb, copper smelting cost of US$90/t concentrate, copper transport costs of US$107.69/t concentrate, molybdenum transport costs of US$73.67/t concentrate, and molybdenum refining/treatment cost of 12.50% (of molybdenum price). Mineral resources are constrained within a wireframe constructed at a 0.1% total copper cut-off grade.
3. Gold and silver are not used in the pit optimization. The gold and silver metallurgical recoveries for material that will be sent to the mill facility are forecast at 55.7% Au, and 50.2% Ag, respectively. Molybdenum, gold and silver are not expected to be recovered from the leach process.
4. Numbers in the table have been rounded. Totals may not sum due to rounding.

11.13 Uncertainties (Factors) That May Affect the Mineral Resource Estimate

Areas of uncertainty that may materially impact the mineral resource estimates include:

- Changes to long-term metal price and exchange rate assumptions
- Changes in local interpretations of mineralization geometry such as presence of unrecognized mineralization off-shoots; faults, dikes and other structures; and continuity of mineralized zones
- Changes to geological and grade shape, and geological and grade continuity assumptions
- Changes to metallurgical recovery assumptions
- Changes to the input assumptions used to derive the conceptual open pit shell that is used to constrain the estimates
- Changes to the forecast dilution and mining recovery assumptions
- Changes to the cut-off values applied to the estimates
- Variations in geotechnical (including seismicity), hydrogeological and mining method assumptions
- Changes to environmental, permitting and social license assumptions.

Specific factors that may affect the estimates include:

- There is uncertainty with the grade estimates due to weaknesses in the structural, alteration and current lithology models
- The volume of post-mineralization dikes is poorly constrained by vertical drill holes. The risk is that the volume of the dikes is greater than assumed in the model, therefore the diluted grades may be lower than those modelled
- Uncertainty about silver and gold grades
- *Pachycereus schottii var. monstruoso* "garambullo" (garambullo monstruoso), a rare tree cactus, occurs within the area of the mineral resource estimate (see discussion in Chapter 17). For the purposes of mineral resource estimation, Wood has assumed that the Valle de los Cirios Flora and Fauna Protection Area Management Plan can be amended to allow mining activities and species removal, and that the translocation of this species to new habitat is feasible. If this is not the case, the conceptual pit constraining the mineral resource estimate would require

modification to remove the habitat area, and would result in a smaller tonnage and contained metal estimate.

12 MINERAL RESERVE ESTIMATES

12.1 Introduction

Mineral reserves were converted from indicated mineral resources. Inferred mineral resources were set to waste.

The mine plan that supports these mineral reserves is presented in Chapter 13.

12.2 Development of Mining Case

12.2.1 Pit Optimization Overview

The Lerchs-Grossmann pit optimization method in Hexagon MinePlan software was used to determine the economic pit limit based the NSR values computed using a copper price of $3.30/lb and a molybdenum price of $9.00/lb. The input parameters for the NSR calculations are presented in Table 12-1.

A series of pit optimizations at different revenue factors were done for El Arco deposit applying different revenue factors. The revenue factor is a multiplier applied to the base metal price and, subsequently, used in the pit optimization. For example, a revenue factor of 1.0 corresponds to a copper base price of $3.30/lb and a molybdenum price of $9.00/lb at El Arco. A revenue factor of 0.5 multiplies the base metal price of by 0.5 to determine the price used in the optimization and pit shells.

Internal dilution was included as part of the block model. No external dilution or mining loss was included.

Pit optimizations were constrained by a polygon provided by Southern Copper. The polygonal constraint was determined by the permitting authorities and defines an area where the garambullo monstruoso are identified.

A plan view of the ultimate pit shell generated using the NSR at revenue factor 1 is shown in Figure 12-1 along with the constrained polygon. A cross-section of the pit is shown in Figure 12-2.

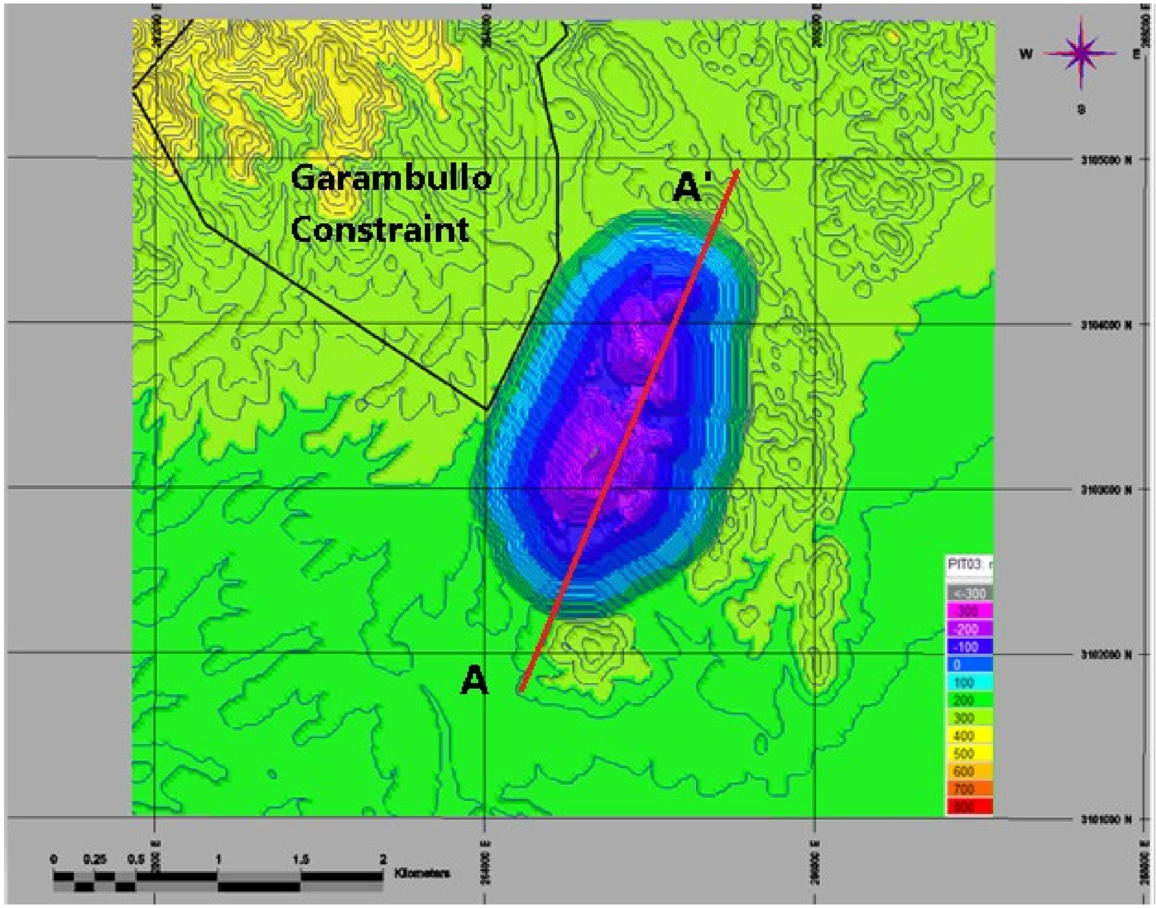
The mineral reserves were reported inside the final pit design as shown in Figure 12-3.

Table 12-1: NSR Calculation Input Parameters Summary

Parameter	Unit	Mill
Restriction boundary		Yes
Metal Prices		
Copper	US$/lb	3.30
Molybdenum	US$/lb	9.00
Resource confidence category		Indicated
Process Recovery – Mill		
Copper	%	86
Molybdenum	%	57
Process Recovery – Leach		
Copper	%	80
Operating Cost		
Base mining cost – ore, leach, waste	US$/t	1.189
Incremental haul cost per bench	US$/t	0.017
Process Cost – Mill		
Mill operating cost	US$/t	6.13
Mill sustaining cost	US$/t	0.10
Tailing sustaining cost	US$/t	0.81
G&A operating cost	US$/t	0.51
Molybdenum plant operating cost	US$/t	0.25
Process Cost – Leach		
Leach operating cost	US$/t	1.15
SX/EW cost	US$/lb Cu	0.45
Other Costs –		
Closure cost	US$/t	0.07
Payments (concession, property, treasury)	US$/t	0.03
Smelting and Refining Terms		
Refining and Transportation Costs		
Copper refining	US $/lb	0.09
Copper smelting cost	US$/t con	90.00
Copper transportation cost	US$/t con	107.69

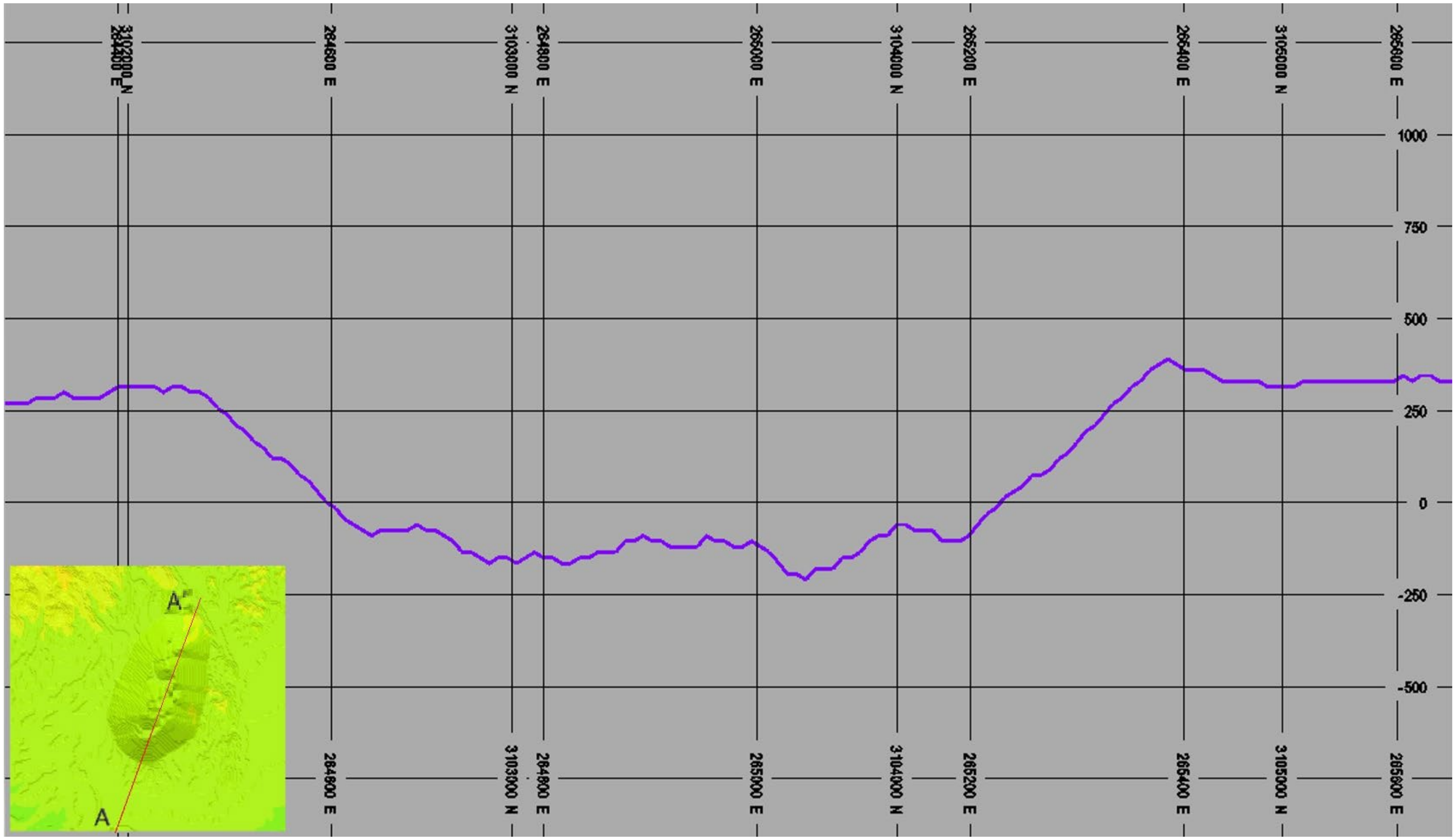
Parameter	Unit	Mill
Molybdenum transportation cost	US$/t con	73.67
Molybdenum treatment, refining	% (Mo Price)	12.50
Payable Metal		
Copper	%	96.5
Molybdenum	%	100
Deductions		
Copper	%	1.0
Transport Losses		
Copper	%	0.5
Molybdenum	%	0.2
Concentrate Grade		
Copper	%	25.0
Molybdenum	%	56.0

Figure 12-1: Ultimate Pit Shell, Plan View



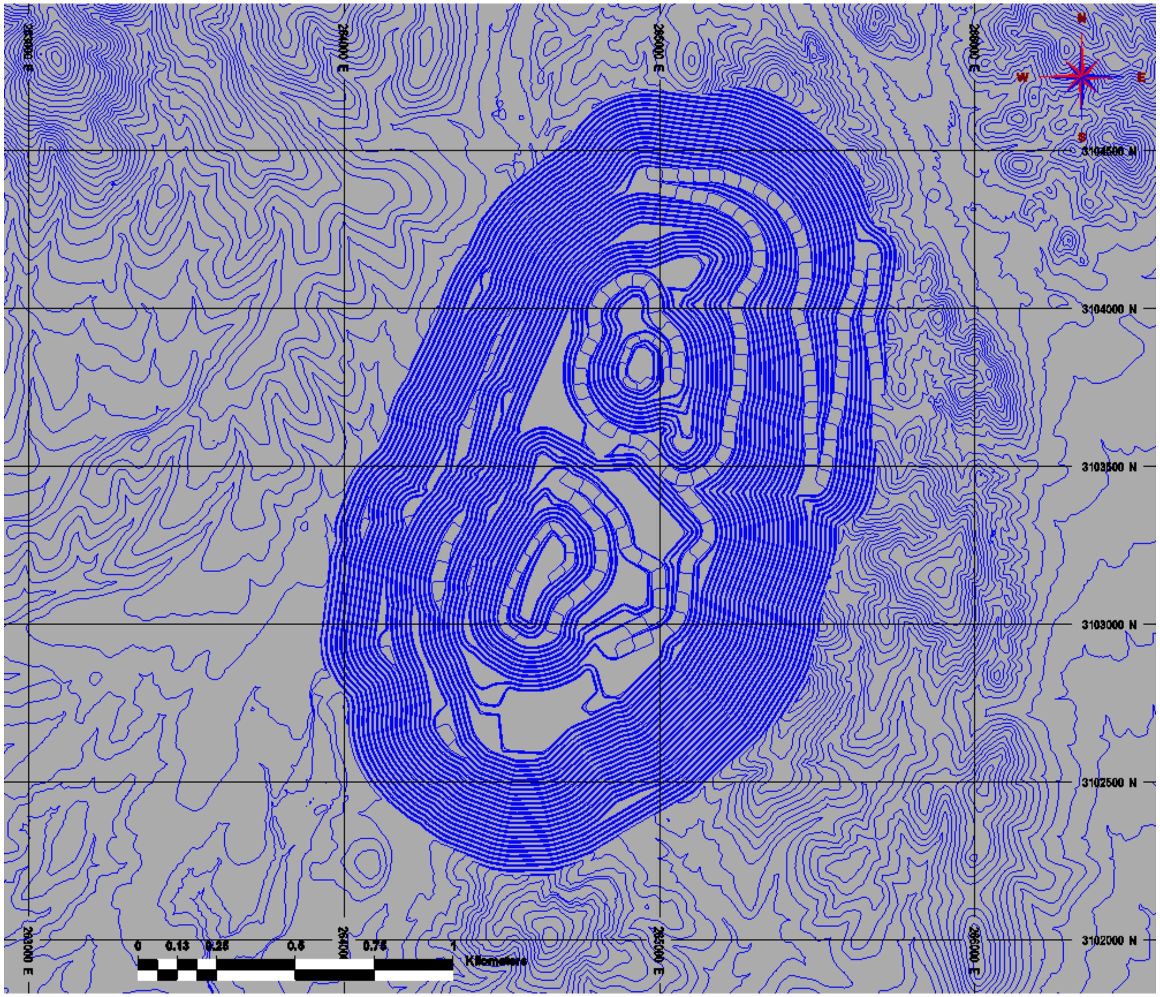
Note: Figure prepared by Wood, 2021. Section line A–A′ is the location of Figure 12-2.

Figure 12-2: Ultimate Pit Shell – Cross-Section AA′



Note: Figure prepared by Wood, 2021. Location of section line is shown in Figure 12-1.

Figure 12-3: Ultimate Pit With Roads



Note: Figure prepared by Wood, 2021.

A sensitivity analysis was also carried out by varying the metal prices at different revenue factors (+10%, -10%, +20%, -20%) corresponding to the base price at revenue factor 1.0. However, following Southern Copper's corporate guidelines, which require that production and metal content should be maximized, the revenue factor 1.0 pit shell was selected to be used as a guide for the final pit design.

12.2.2 Inputs

12.2.2.1 Block Model

The copper and molybdenum grades in Wood's block model incorporated internal dilution based on the percentage of dyke material in the block and the metal grade of the block. No external dilution was assigned. A mining recovery of 100% was assumed.

12.2.2.2 Topography

The surface topography was provided by Southern Copper using the WGS84 coordinate system. This surface was used to code the rock percentage in the block model. Blocks above the surface were given a value of 0, blocks below the surface were given a value of 100, and blocks on the surface were given a value between 0–100.

12.2.2.3 Slope Angles

The slope angles used in the optimization study were recommended by Wood. The overall slope angle varied by lithology, and were assigned using the lithology codes stored in the block model (Table 12-2).

12.2.2.4 Metallurgical Recoveries

Wood recommended a copper recovery of 86% for material sent to the concentrator, and a copper recovery of 80% for material to be sent to the leach pads.

The molybdenum recovery recommendation for material sent to the concentrator was 57%. Molybdenum cannot be recovered via the leach process. These metallurgical recoveries were applied, with the grades, to each block together with the other relevant economic parameters to compute the NSR value for use in the pit optimization.

Table 12-2: Overall Slope Angle by Geotechnical Zone

Lithology	Lithology Code	Overall Slope Angle (º)
Conglomerate	1	31
Dyke	2	42
Quartz	3	42
Porphyry granodiorite	4	42
Andesite breccia	5	42
Aphanitic andesite	6	42
Porphyritic andesite	7	42

The gold and silver recovery recommended for material sent to the concentrator was 55.7% and 50.2% respectively. Gold and silver also cannot be recovered via the leach process and were not used in the pit optimization, the NSR values or cut-off determinations.

12.2.2.5 Mining Costs

A base mining cost of US$1.189/t was used that included operating, general, and indirect costs. In addition, an incremental haulage cost of US$0.017/t was applied for each bench below a mining reference elevation of 270 (bench # 42).

12.2.2.6 Process Costs

A concentration process cost of US$7.80/t was applied to material to be sent to the concentrator, and included operating, supervision, indirect, general and administrative (G&A), and other costs. It also included a concentrator sustaining cost of US$0.10/t and a tailing sustaining cost of US$0.81/t. These costs represented the replacement costs of the concentrator components, and the costs associated with the tailings storage facility (TSF). A leach processing cost of US$1.60/t was applied to the material to be sent to the leach pad, which included crushing and other associated indirect costs.

12.2.2.7 Smelting, Refining and Treatment Costs

Copper smelting operating costs were estimated to be $90//t of concentrate. Coper refining cost is $0.09/lb. Copper concentrate transportation costs were estimated to be $107.69, while molybdenum concentrate transportation cost is$73.67/t of concentrate. These costs included transportation and shipping costs to/from the port.

12.2.2.8 Solvent Extraction and Electrowinning Costs

The SX/EW cost was estimated to be US$0.45/lb of copper cathode, which included reposition costs. In addition, a closure cost of $0.07/t and a consideration of payments to the amount of $0.03/t related to concession lease, property tax and treasury was applied in the pit optimization.

12.2.2.9 Metal Prices

Long-term metal prices of US$3.30/lb for copper and US$9.00/lb for molybdenum were used to estimate mineral reserves and cash flow. The basis for these metal price forecasts is provided in Chapter 16.

12.2.3 Cut-off Assumptions

NSR break-even cut-off values were used to estimate the mineral reserves. The NSRs varied by bench, depending on the copper and molybdenum grade, process destination, and incremental haulage costs. The break-even cut-off value included mining, processing, sustaining, G&A, and other costs charged to the process area. For the leaching process, the internal copper cut-off was 0.049% while the breakeven copper cut-off was 0.057%.

The formulae used to estimate the concentration and leaching NSR cut-off values were:

- CCOV = (BMC + MSC + (IHC * NB)) + (CPC + CSC)
- LCOV = (BMC+ LPC+ (IHC * NB))/(RUC * REC* CF)

Where: CCOV: concentration break-even NSR cut-off value (US$/t conc); LCOV: leaching internal NSR cut-off value (US$/t leach); BMC: base mining cost (US$/t mined); MSC: mining sustaining cost (US$/t mined); IHC: incremental haul cost per bench (US$/t mined); NB: number of benches below mining reference level; CPC: concentration process cost including G&A and other costs (US$/t conc); CSC: concentration sustaining cost (US$/t conc); LPC: leaching process cost (US$/t leach); RUC: revenue unit cost (copper price – SX/EW cost); REC: leaching process recovery; CF: conversion factor based on the units.

12.3 Ore Versus Waste Determinations

An NSR value was estimated using the economic parameters described in Table 12-1, and the metal grades estimated in the resource block model. Any block paying at least the processing cost was considered to be potentially mineable, and any block below the processing cost was considered to be potentially waste. The pit optimization flagged blocks that should be sent to the process facilities.

12.4 Mineral Reserve Statement

Mineral reserves are reported using the mineral reserve definitions set out in SK1300. The reference point for the estimate is delivery to the process plant. Mineral reserves are summarized in Table 12-3. Wood is the QP Firm responsible for the estimate. The estimates are current as of December 31, 2021.

12.5 Uncertainties (Factors) That May Affect the Mineral Reserve Estimate

Factors that may affect the mineral reserve estimates include:

- Changes to long-term copper and molybdenum price assumptions;
- Changes to exchange rate assumptions;
- Changes to metallurgical recovery assumptions;
- Changes to the input assumptions used to design the optimized open pit shell;
- Changes to operating and capital cost assumptions used, including changes to input cost assumptions such as consumables, labour costs, royalty and taxation rates;
- Variations in geotechnical, mining, dilution and processing recovery assumptions; including changes to designs as a result of changes to geotechnical, hydrogeological, and engineering data used;
- Changes to the NSR cut-off criteria used to constrain the open pit estimates;
- Changes to the assumed permitting and regulatory environment under which the mine plan was developed;
- Ability to maintain mining permits and/or surface rights;
- Ability to maintain social and environmental license to operate.

A pit optimization sensitivity analysis was performed by varying the metal price, metallurgical recoveries, mining costs, and process costs. The greatest impact results from changes in metal prices, and metallurgical recoveries, with lesser impacts from changes to the mining and processing costs.

Table 12-3: Probable Mineral Reserve Statement

	Tonnage (Mt)	Copper Grade (Cu %)	Molybdenum Grade (Mo %)	Gold Grade (Au g/t)	Silver Grade (Ag g/t)	Contained Copper (Mlbs)	Contained Molybdenum (Mlbs)	Contained Gold (Moz)	Contained Silver (Moz)
Sulfide mill	1,229.54	0.40	0.006	0.14	1.8	10,822.09	166.70	5.,58	70.46
Oxide leach	140.52	0.27	—	—	—	846.27	—	—	—
Total	***1,370.06***	***0.39***	**—**	**—**	**—**	***11,668.36***	***166,70***	***5.58***	***70.46***

Notes to Accompany Mineral Reserves Table:

1. The estimates are current as of December, 31, 2021. Wood is the QP Firm responsible for the estimate.
2. The point of reference for the mineral reserves is the point of delivery to the processing facility.
3. Mineral reserves are constrained within an optimized pit shell based on copper and molybdenum only. The following parameters were used in estimation: assumption of open pit mining methods; assumption of heap leach and concentrate processing; copper price of US$3.30/lb, molybdenum price of US$9.00/lb; variable net smelter return cut-offs; mining recovery of 100%; metallurgical recoveries of 86% Cu, and 55% Mo for material sent to the mill facility, and recovery of 80% Cu (Total copper) for material sent to the heap leach pad; total mining costs (base, incremental and sustaining) of US$1.206/t mined; total mill process costs (base, sustaining, tailings, G&A and molybdenum plant) of US$7.80/t milled, total leaching costs (operating and SX/EW) of US$1.60/t leached; miscellaneous costs (closure, payments) of US$0.10/t processed; copper refining cost of US$0.09/lb, copper smelting cost of US$90/t concentrate, copper transport costs of US$107.69/t concentrate, molybdenum transport costs of US$73.67/t concentrate, and molybdenum refining/treatment cost of 12.50% (of molybdenum price).
4. Gold and silver are not used in the pit optimization. The gold and silver metallurgical recoveries for material that will be sent to the mill facility are forecast at 55.7% Au, and 50.2% Ag, respectively. Molybdenum, gold and silver are not expected to be recovered from the leach process.
5. Numbers have been rounded. Totals may not sum due to rounding.

13 MINING METHODS

13.1 Introduction

The proposed El Arco operations will use conventional truck-and-shovel open pit mining methods.

13.2 Geotechnical Considerations

The rock quality at El Arco can be classified as Good to Excellent, and the intact rock strength is generally classified as Strong Rock.

Very little information is available in regard to the rock fabric and major structures which cross the proposed open pit. There are limited outcrops in the projected area of the pit. Mintec (2014) note that the majority of the exploration core holes deviated consistently to the southwest due to subsurface structural conditions. This suggests that there is a pervasive structural fabric, possibly foliation in the andesite, throughout the rock mass that is currently poorly characterized. The approximate average plunge at the bottom of the drillholes is 75º. However, in the northeast portion of the pit the drillhole plunge is as low as 45–55º.

Four pit sectors were selected based on structure and proposed pit geometry. Sector 1 is the west wall, which has a maximum height of 580 m and has a dip direction of approximately 111º from true north. Sector 2 is the north wall and has an approximate maximum height of 550 m and a dip direction of 201º. The east wall has a maximum height of 630 m and a dip direction of 291º, and the south wall has an approximate maximum height of 550 m and a dip direction of 21º. Kinematic analyses were performed for each sector using the discontinuity information for planar, wedge and toppling failures. The slope angles were evaluated for the potential for flexural toppling, direct toppling, planar sliding, and wedge sliding.

An acceptance criterion of 80% slope reliability and a limit equilibrium factor of safety of 1.2 under static conditions was selected based on criteria used for similar mine projects (Wesseloo and Read, 2009). A discontinuity friction angle of 32º was assumed based on the observed condition of the joint surfaces. These analyses indicated that achievable bench face angles for Sectors 1, 2, and 3 may be in the low to mid-seventies, and in the low sixties for sector number 4.

Rock mass strength was estimated using the Hoek-Brown failure criterion (Hoek et al. 2002) for the major lithologic units. The results of the limit equilibrium stability analyses indicate acceptable factors of safety against over stressing of the rock mass for inter-ramp slopes of up to 42º overall.

It is highly likely that the final achievable pit slope angles will be similar to other porphyry copper operations, and Wood did a comparison of the proposed slope angles against the pit slope angles used in 22 operating porphyry copper open pits. All of the pit slopes from these pits have had instability issues throughout development. These issues include slope failure due to weak rock mass, slope failures due to kinematic failures (some minor and some major), and slope failures due to instability along existing faults on the single benches scale to overall slope failures which affected operations. The slope performance database of similar copper porphyry deposits suggests that inter-ramp slope angles of 36–46º, and overall slope angles of 37–42º, are a reasonable range of slope angles for the pre-feasibility-level design until additional data are collected and evaluated.

A minimum 63º bench face angle was assumed for all sectors of the pit, which should be readily achievable to industry-standard reliability with a trim blast designed to minimize damage to the final walls. A minimum bench width of 7.5 m was recommended for single 15-m-high benches to catch rockfall. For assumed 7.5 m wide catch benches and 63º bench face angles, the inter-ramp slope angle is 45º. Based on performance data for other copper porphyry deposits, overall slope angles of up to 42º are supported. The predicted exposure of conglomerate is generally 30 m (two benches) or less where exposed in the pit. Based on experience at other mines with similar cemented gravels, inter-ramp slopes of 42º should be achievable in this material. To reduce overall slope angles to the recommended maximum overall slope angle, haul roads or 30-m-wide geotechnical catch benches should be located in the slopes so that uninterrupted inter-ramp slopes do not exceed 200 m.

13.3 Hydrogeological Considerations

The mapped potentiometric surface using Wood's 2021 site visit measurements average from 20–45 m below ground surface.

Saltwater intrusion is considered as low risk based upon the elevation of the phreatic surface, depth of proposed pit and distance to either coast, Pacific, or Sea of Cortez.

To provide a pre-feasibility level estimate of the potential dewatering requirements for the fully-developed El Arco open pit, the steady-state analytical solution for estimating the groundwater inflow rate to a mine pit developed by Marinielli and Niccoli (2000) was used. This solution considers

- The effect of decreased saturated thickness near the pit walls

- Distributed recharge to the water table
- Upward flow through the pit bottom.

For the purpose of the analytical calculations, groundwater inflow into the mine pit was conceptualized as coming from two separate zones:

- Pit walls (Zone 1): steady-state, unconfined , horizontal radial flow (i.e. flow into pit from the pit walls) with uniformly distributed recharge at the water table
- Pit bottom (Zone 2): steady-state flow to circular disk (the pit bottom) of constant and uniform drawdown

The groundwater seepage into the El Arco open pit is estimated to be 1,900 m^3/day. If hydraulic conductivity values are increased by a factor of two over those used above, the predicted inflow into the open pit becomes 3,300 m^3/day while a reduction in the assumed hydraulic conductivity by a factor of two results in computed inflow rate of 1,100 m^3/day.

13.4 Pit Designs

The pit phases were obtained to the limits of the economic ore using a combination of the phasing options in Hexagon's MSEP program and a price sensitivity study.

A total of eight phase designs within the constrained ultimate pit shell (Figure 13-1; Figure 13-2) were generated and subsequently used in the mine plan. The phase design slope parameters were provided in Table 12-2. In addition, design requirements included:

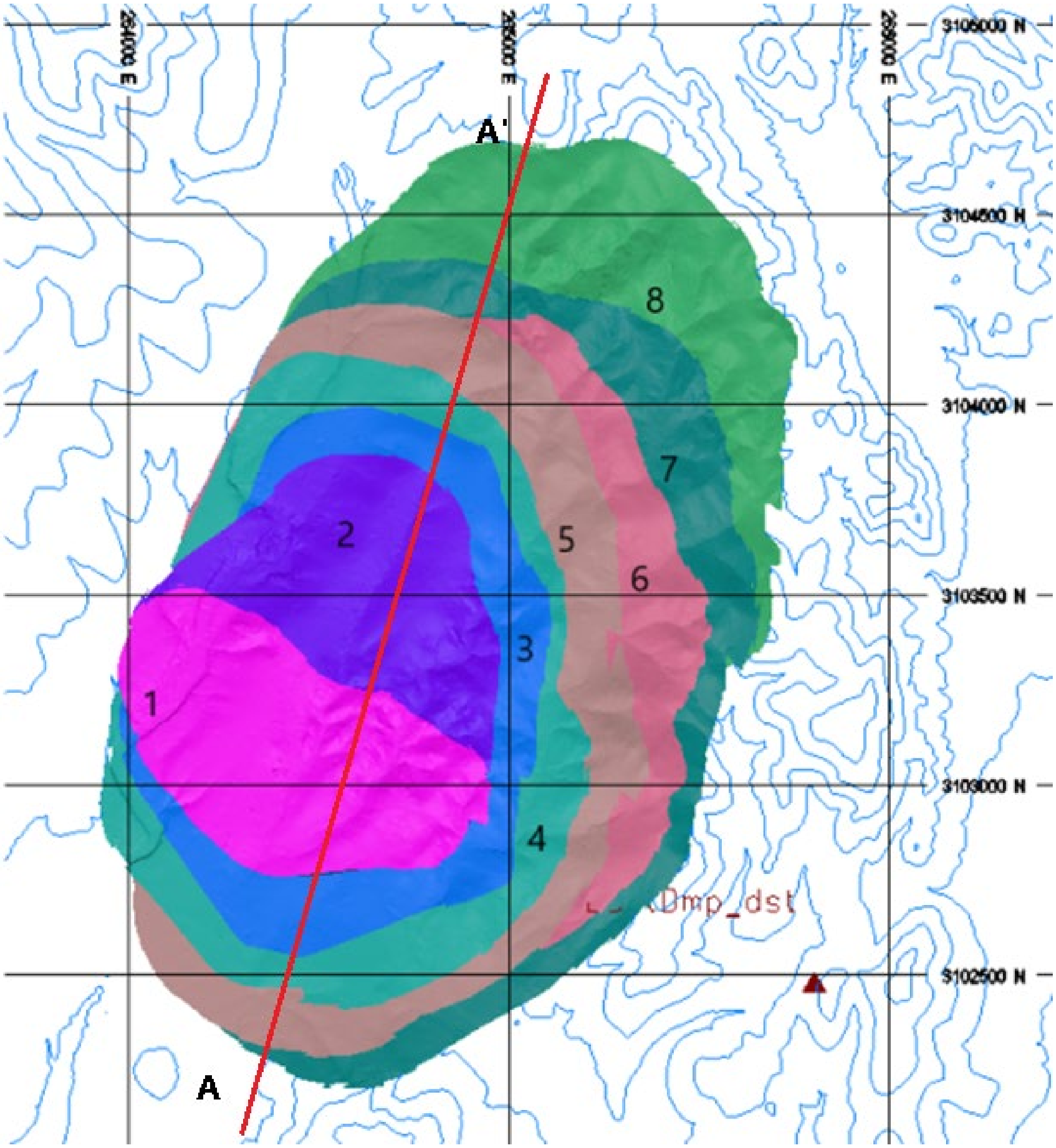
- 15 m bench height with single benching
- Bench face slope angle of 63º
- 40 m haulage ramp width
- Maximum ramp gradient of 8%
- Phase working bench width ±150 m.

The phase designs were sequenced from the central main body of the deposit to the northeast area. The surface roads that were used in haulage profiling for the cycle time generation in production schedule used a maximum ramp gradient of 10%.

13.5 Waste Rock Storage Facilities

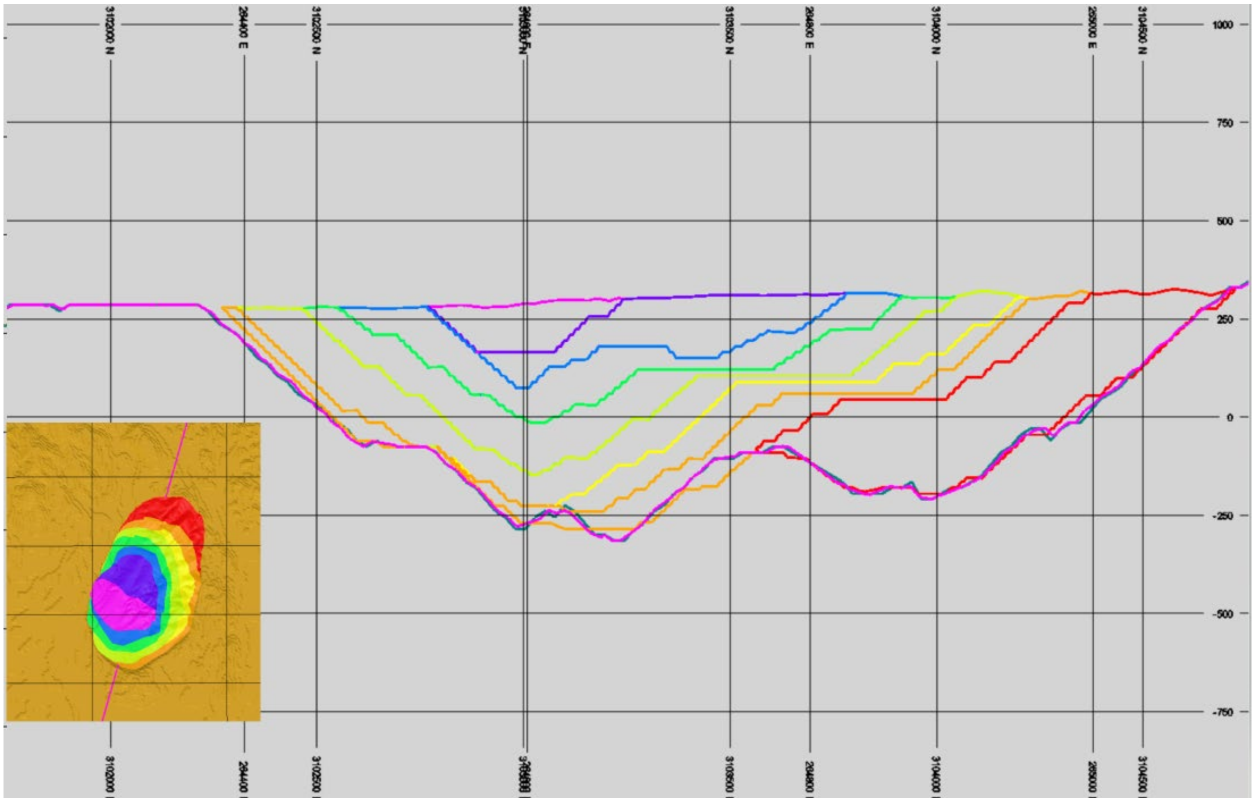
Two WRSFs are envisaged. One will be located east of the pit and the second will be located south of the pit (Figure 13-3). Storage capacities required are summarized in Table 13-1.

Figure 13-1: Life-of-Mine Outline (plan view)



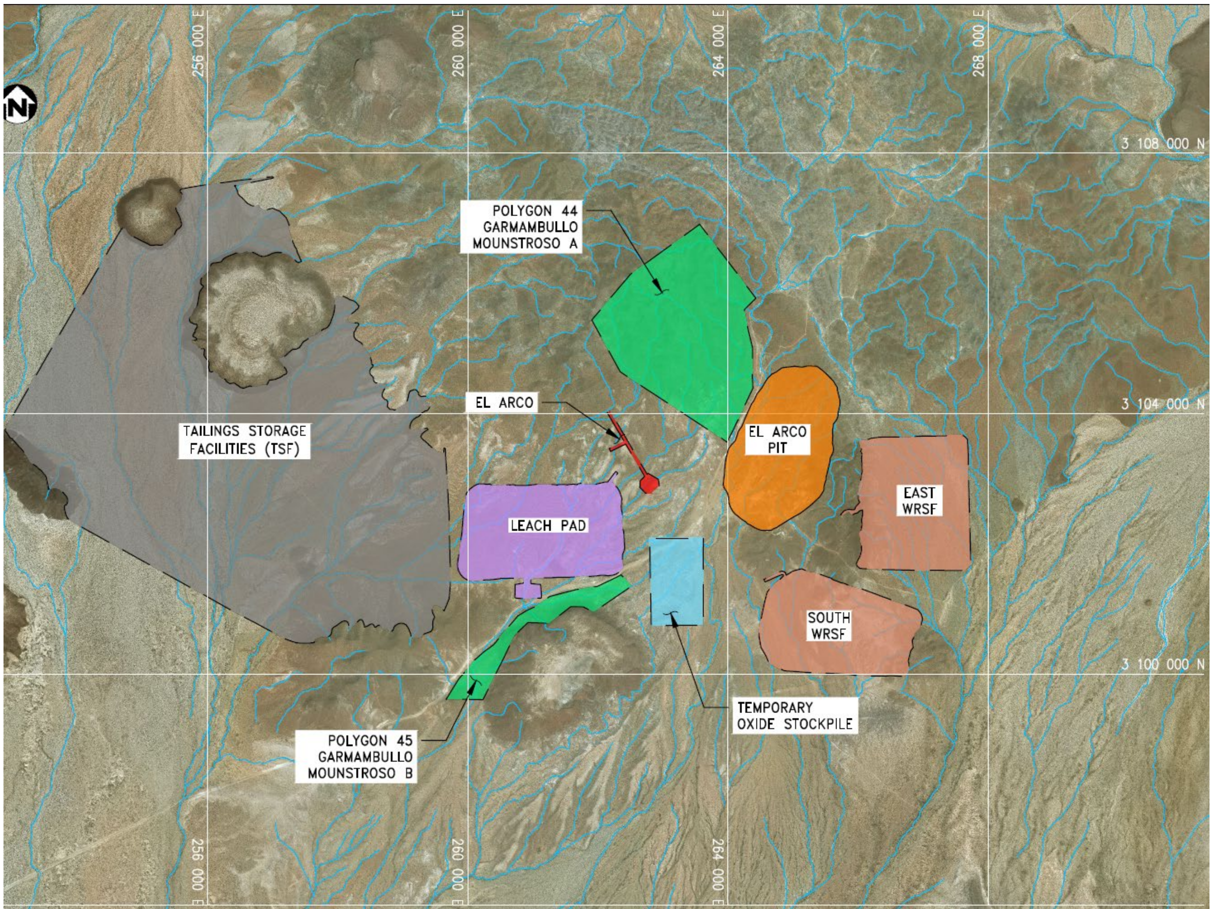
Note: Figure prepared by Wood, 2021. Section line A–A′ shows the location of Figure 13-2.

Figure 13-2: Life-of-Mine Outline (section view)



Note: Figure prepared by Wood, 2021. Location of section is shown on Figure 13-1.

Figure 13-3: WRSF and Temporary Stockpile Location Map



Note: Figure prepared by Wood, 2021.

Table 13-1: WRSF Capacities

Lift Elevation (15 m height)	East WRSF Capacity (Mt)	South WRSF Capacity (Mt)
260	17.9	82.2
275	61.8	86.6
290	87.7	79.8
305	88.3	72.6
320	83.4	65.6
335	75.2	204

Note: Numbers have been rounded.

Wood identified potentially-acid-generating (PAG) material within the waste rock. All transition and sulfide material, which is assumed to be PAG and therefore at risk of metals leaching and acid mine drainage, will be stored in the east WRSF, and non-PAG material, consisting of conglomerate and oxide, will be stored in the south WRSF.

13.6 Stockpiles

A temporary ore stockpile (see proposed location in Figure 13-3) will be used to store oxide ores during the early years of operation. Low-grade sulfide material will also be temporarily stockpiled once mining in sulfide material commences.

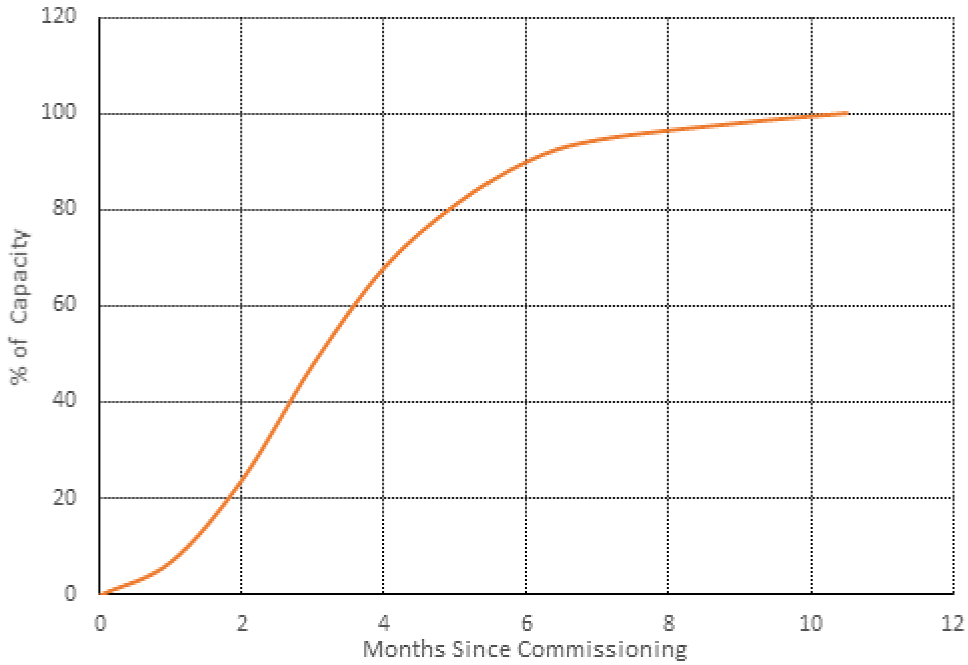
13.7 Production Schedule

Material movement was scheduled on annual period increments based on production requirements and mine operating considerations, using the following major criteria:

- 100,000 t/d mill sulfide material throughput or 36.5 Mt/a
- 27.7 Mt from the concentrator for first production year (based on McNulty Curve)
- 35 kt/a of copper cathode production (recovered) from leached material
- Maximum crushing and agglomeration capacity at leach of 15.6 Mt/a
- Stockpiling for mill and leach
- Mill feed using a minimum of two phases
- Leaching facilities constructed in pre-production years -3 to -1. Pre-production stripping occurs in year -1. Concentration facilities constructed in years -2 to 1. Oxides leaching operation starts in year 1. Sulfides concentration starts in year 2
- Maximum of 10 benches per year sinking rate
- Operations will run 365 d/a, 24 hr/d.

Ramp-up is illustrated in the McNulty curve shown in Figure 13-4.

Figure 13-4: Mill Production Ramp-Up (McNulty curve)



Note: Figure prepared by Wood, 2021.

The plant is expected to achieve full production starting in year 4. Based on the McNulty curve, it was estimated that the plant would reach full production capacity in approximately 11 months (Table 13-2). The leach pad is expected to have a one year construction period and be in full production starting in year 2.

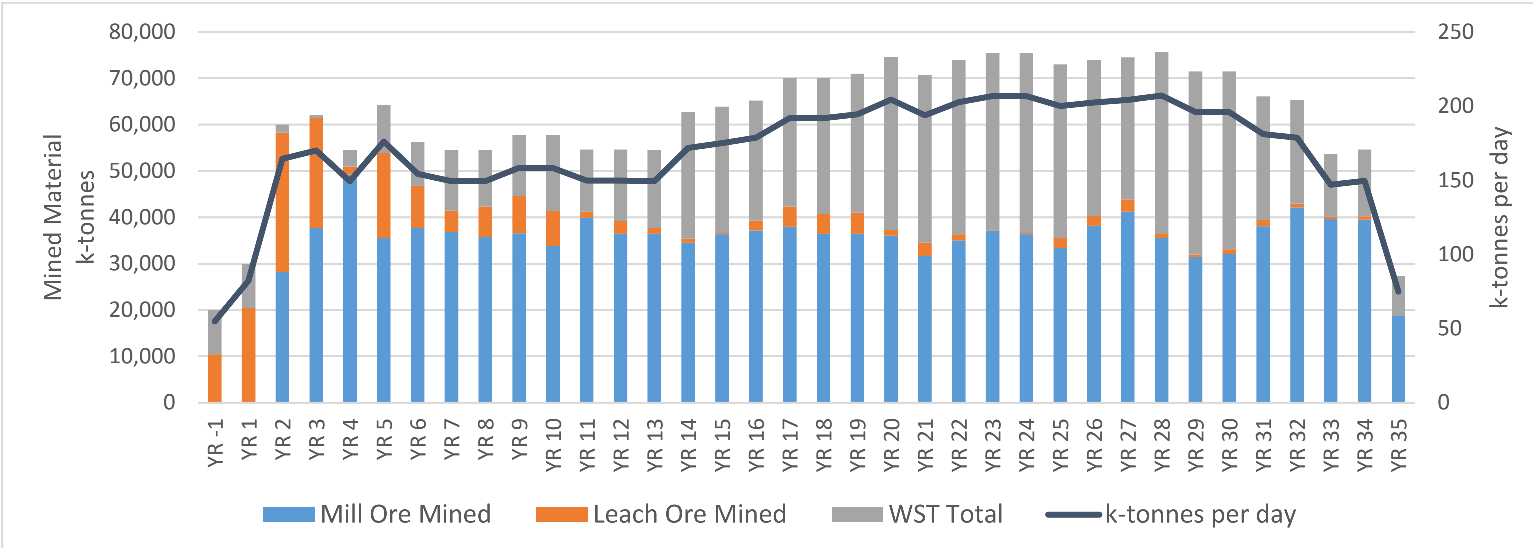
The pit is scheduled to operate for 35 years with two pre-production periods in annual mining increments. Instead of a single period scheduling strategy, a multi-period forward-looking approach, with a moving period window scale range of five years, was used to obtain the phased mining patterns which in turn ensured maximization of the NPV for that period range. The total material movement was kept within 72 Mt for the first nine years, and then was gradually ramped up, reaching a maximum of about 76.5 Mt in the later years of the mine life. Phases are progressively mined from Phase 1 to Phase 8 with peak mining of 200 kt/d.

Figure 13-5 shows the material that will be mined over the life-of-mine (LOM) plan. Figure 13-6 shows the material that will be mined in each pit phase. Figure 13-7 shows the material that will be sent to process, by process method.

Table 13-2: Ramp-Up Assumption

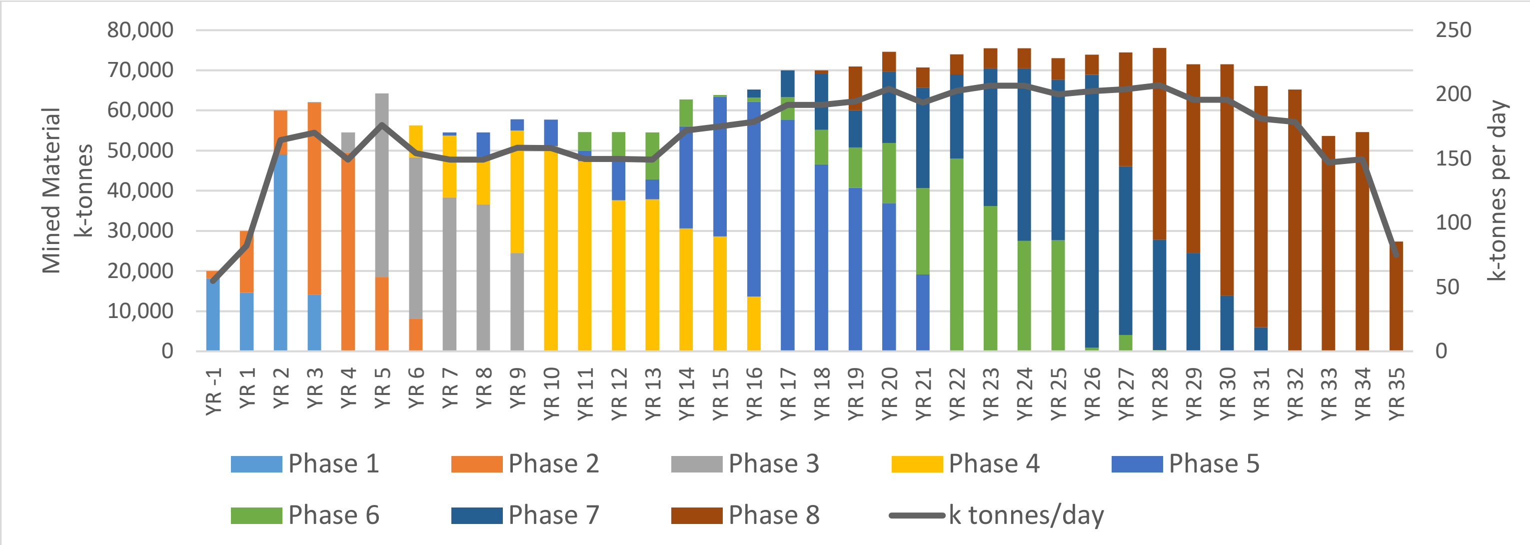
Months	% Capacity
0.0	0.0
1.0	7.0
2.0	24.0
3.0	48.0
4.0	68.0
5.0	81.0
6.0	90.0
7.0	94.5
9.0	98.0
10.5	100.0

Figure 13-5: Material Mined Over Life-Of-Mine



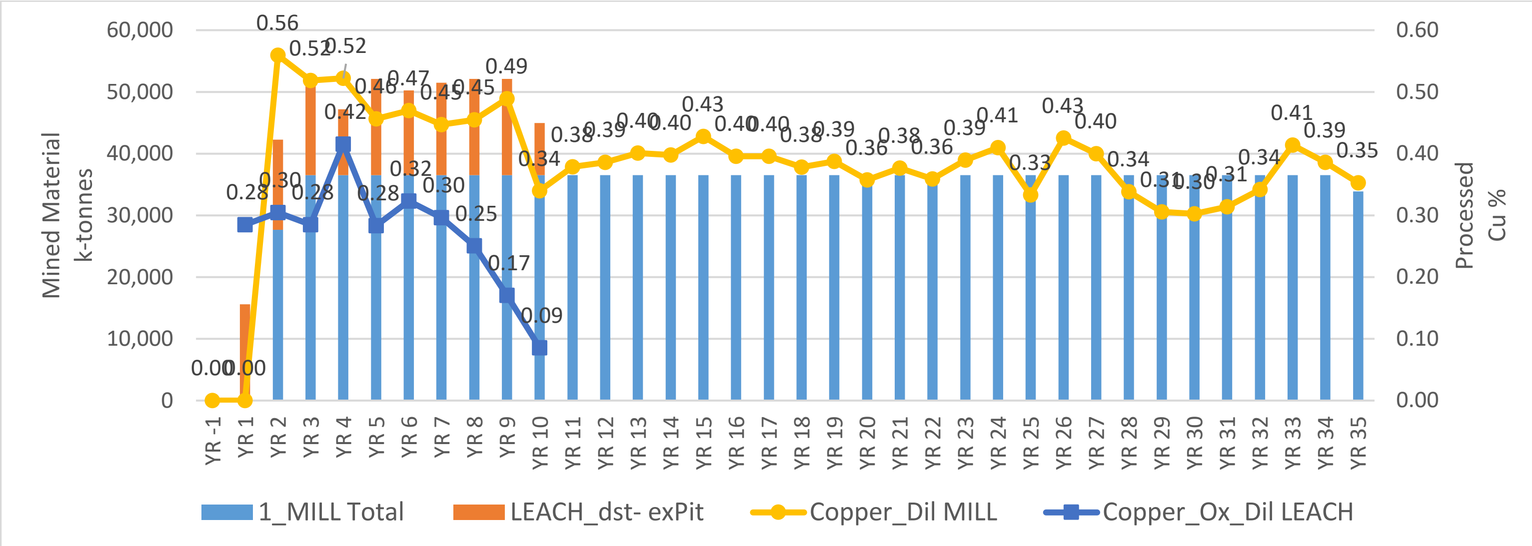
Note: Figure prepared by Wood, 2021. WST = waste.

Figure 13-6: Material Mined by Phase



Note: Figure prepared by Wood, 2021.

Figure 13-7: Processed Material



Note: Figure prepared by Wood, 2021.

13.8 Blasting and Explosives

It is assumed that blasting services will be contracted, and the contractor will be responsible for obtaining and securing explosive agents, loading blast holes, and initiating the blasts.

13.9 Grade Control and Production Monitoring

Grade control will be conducted using a fleet of rotary blast-hole drills. Grade control grids will be dependent on the material type being evaluated (ore/waste), the drill hole diameter, and the pit phase.

Blast patterns are envisaged at 7 x 9 m spacing in ore and waste. The blast-hole diameter will be 279 mm.

13.10 Equipment

Open pit mining will use a conventional truck-and-shovel fleet. Primary loading will be performed by P&H 4100XPC rope shovel. A P&H L-2350 front-end loader will be used for secondary loading. Conventional haul trucks (e.g., Komatsu 930 E-4) will be used for both ore and waste haulage. The equipment list is provided in Table 13-3.

It was assumed that construction of the tailings will be done by the Owner. A tailings specialist will be contracted for the first six months of the tailings construction period in which Southern Copper personnel will be trained and continue with the construction of the tailings. The equipment estimated for the construction of the tailings is summarized in Table 13-4.

13.11 Personnel

Mining personnel will range from 122 to a peak of 308 over the LOM. Technical manpower was estimated to be an average of 47 people. The personnel numbers are expected to start to decline as the pit approaches the final layout to reflect the smaller mining fleet needed to meet the reduced material movement targets for the remaining LOM.

Table 13-3: Main Equipment List

Equipment Type	Number of Units
Primary Equipment	
Atlas Pit Viper 271	3
P&H 4100XPC-AC	2
Letourneau L1850	1
Komatsu 930E	30
Cat 336F excavator	1
Cat D10 dozer	3
Cat 834 RTD	3
Cat 785 water truck	3
Cat 16 grader	2
Cat 24 grader	1
Cat 740 fuel/lube truck	3
Ancillary Equipment	
Truck-mounted 40 t crane	1
80 t rough terrain crane	1
5 t forklift	3
10 t forklift	3
Mechanic service truck	4
Small fuel/lube truck	2
CAT262 skid steer	2
Flatbed truck	3
CAT TL1255 telehandler	2
CAT 450F backhoe/loader	1
Cat H180DS hydraulic hammer/impactor	1
160 t lowboy	1
Compactor	1
Light plant	9
4000 gallon water truck	1
Small dump truck	2
¾ t pickup	6

Equipment Type	Number of Units
1 t pickup	7
Crew bus	6
Slope monitoring stations	2
Mine & geology software	1
Pumps	1
980k cable-reeler	1
Communication system	1

Table 13-4: Tailings Construction Equipment

Equipment Type	Number of Units
CAT 777F truck	5
CAT 992K loader	2
CAT 16M motorgrader	1
CAT 815 compactor	2
Atlas Copco FlexiROC D60	2

14 PROCESSING AND RECOVERY METHODS

14.1 Process Method Selection

The process design was primarily based on metallurgical testwork discussed in Chapter 10. Two process routes are envisaged:

- Oxide leaching, followed by a solvent extraction and electrowinning (SX/EW) plant: designed to treat oxidized ores from a heap leach pad to extract copper and produce copper cathodes
- Concentrator: designed to treat sulfide material and produce a separate copper concentrate and separate molybdenum concentrate. The molybdenum circuit design is conceptual, and was based on analogous process plants. No metallurgical testwork on separating molybdenum from the El Arco copper concentrate was conducted.

Oxide ore will be placed on a permanent leach pad with collected pregnant leach solution (PLS) reporting to a SX/EW plant designed to produce 35,000 t/a of copper cathode. The proposed flowsheet includes crushing, conveying and agglomeration, static heap leaching, and SX/EW. The crushing and agglomerating hourly design throughput for the primary crushing is 2,578 t/hr with a nominal circuit capacity of 2,230 t/hr. Southern Copper has operational experience in Mexico with permanent leach pads.

Sulfide concentrator facilities were designed to treat a nominal rate of 100,000 t/d of copper sulfide ore and included crushing, grinding, flotation, thickening and filtration. Copper concentrate will be sent off site to a smelter and refinery to produce copper cathodes as the final product, while the molybdenum concentrate will be bagged and loaded onto trucks for shipment to market. Southern Copper has other large copper operations in Mexico and Perú that use conventional crushing, and thus has experience in operating this type of plant. The use of conventional crushing is a well-known technology, has high overall availability, and has manageable maintenance.

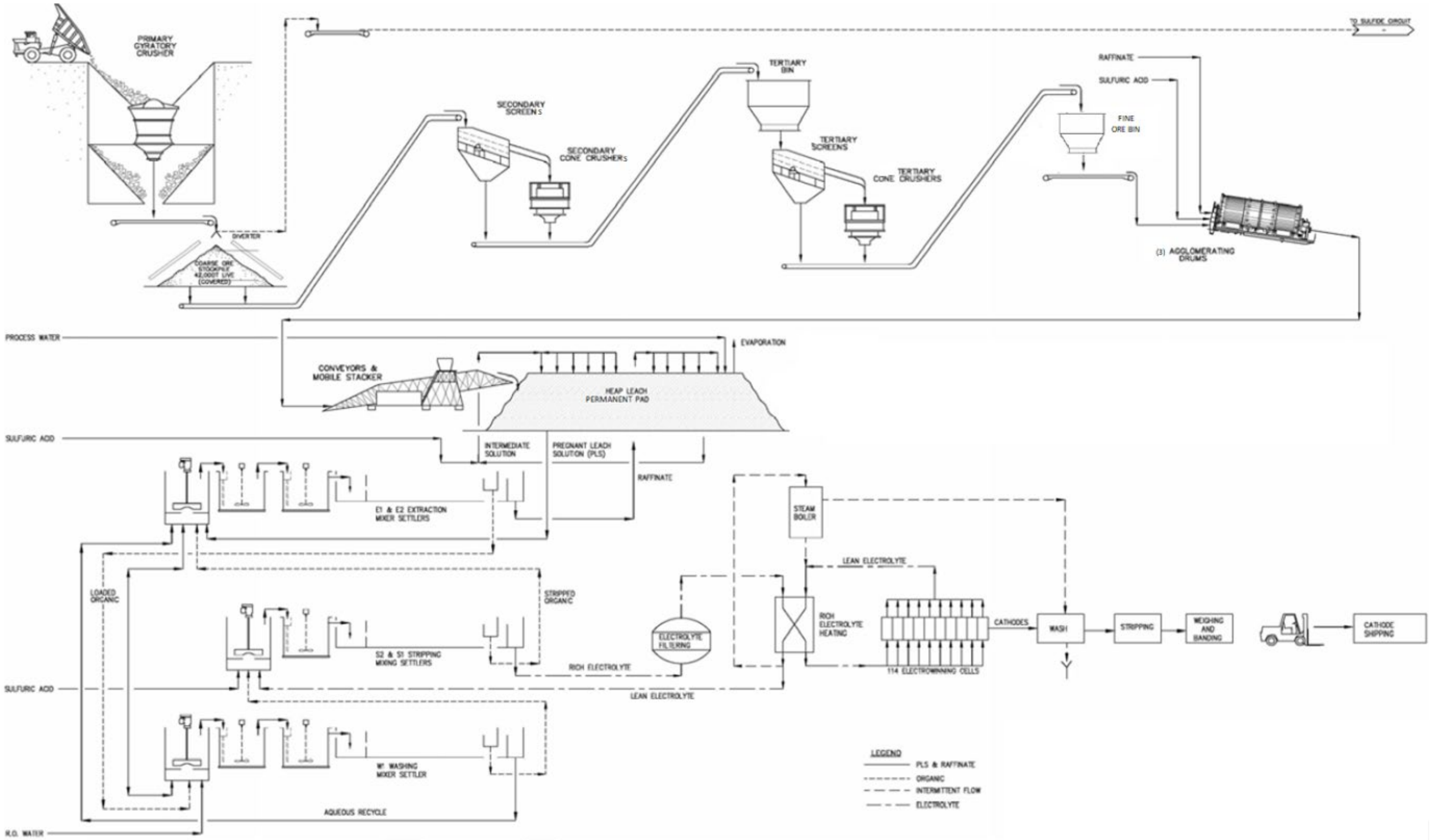
The process designs are based on existing, conventional technologies and proven equipment.

14.2 Flowsheets

The proposed flowsheet for the SX/EW circuit is included as Figure 14-1.

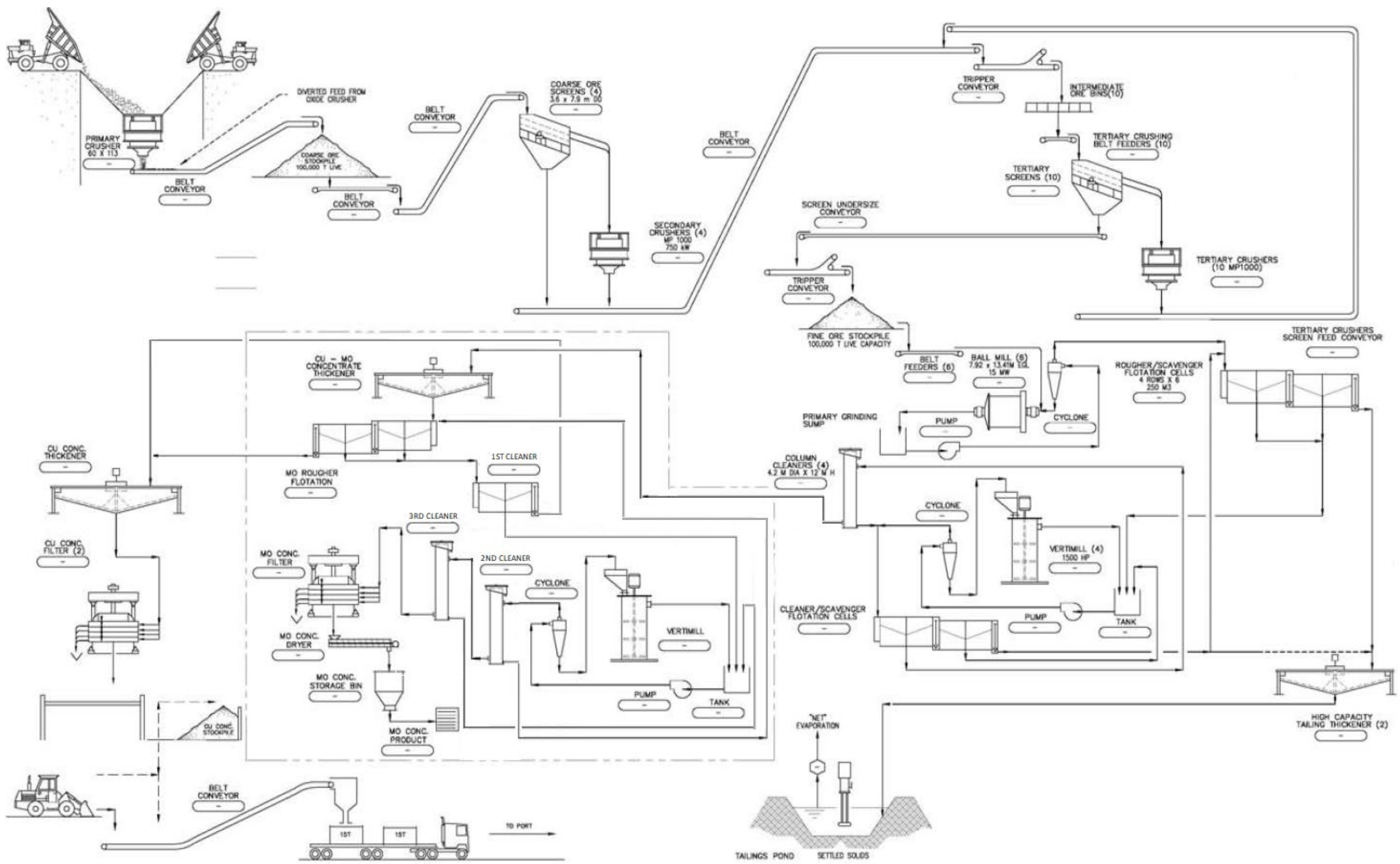
The proposed flowsheet for the El Arco concentrator is presented in Figure 14-2.

Figure 14-1: Proposed Process Flowsheet, Heap Leach and SX/EW



Note: Figure provided by Southern Copper, 2021.

Figure 14-2: Proposed Process Flowsheet, Concentrator



Note: Figure provided by Southern Copper, 2021.

14.3 Leaching, Solvent Extraction and Electrowinning Circuit

14.3.1 Overview

The oxide ore will be treated in a conventional leaching facility consisting of primary, secondary, and tertiary crushing stages, agglomeration, and a permanent leach facility. The resulting PLS will be collected in a retention pond and pumped to an SX–EW plant for further processing.

14.3.2 Crushing, Conveying and Agglomerating

The oxide ore will be hauled by mine trucks from the mine and transferred to the primary oxide crusher. The ore will be discharged directly into the gyratory crusher dump pocket, with a maximum particle size of 1.2 m. The crushing and agglomerating hourly design throughput for primary crushing will be 2,578 t/hr and the balance of the circuit will be 2,230 t/hr. The average throughput the LOM will be 35,000 t/d. Oversize rocks will be size-reduced by a rock breaker installed in this area.

The first crushing stage is a 60–89 gyratory crusher with an open side setting of 165 mm. Product from the gyratory crusher will have a P_{80} of 165 mm and will be reclaimed by an apron feeder that will transfer the material to a conveyor. The conveyor will discharge the coarse crushed ore to a coarse ore stockpile with a live capacity of 42,000 t, and the stockpile will be equipped with three draw points and three apron feeders.

Coarse crushed ore from the stockpile will be conveyed to two 3 x 7.3 m double deck secondary screens with top and bottom deck openings of 90 mm and 38 mm, respectively.

Oversize ore from the secondary screens will be fed to two MP1000 secondary cone crushers with a close side setting of 38 mm. Product from the cone crushers and the secondary screens undersize will be combined on a belt conveyor and transferred to a tertiary crusher feed bin, from where four belt feeders will draw the secondary crushed ore and feed the four 3 x 7.3 m double decked tertiary screens. Each tertiary screen will have top and bottom deck openings of 30 and 19 mm, respectively; and will operate in open circuit with one MP1000 tertiary short cone crusher (four in total). Screens undersize and tertiary crushers discharge, with a P_{80} of 10 mm, will be combined on a belt conveyor and transferred to a fine ore bin that will be 12 m in diameter and 10 m high.

The fine ore bin will feed three parallel 3.7 x 10.7 m agglomeration drums. The ore feeding the drum will be weighed on belt feeders to control the feed rates of raffinate and sulfuric acid used in the agglomeration process resulting in a moisture of 11% in the agglomerate. The agglomerate will be collected on a conveyor that will transport the material to a lateral tripper conveyor and a mobile stacker conveyor for continuous placement in a 12 m per lift static leach pad.

14.3.3 Leaching

At the leach pad, the agglomerate will be deposited and spread, forming layers of 12 m height. The leach pad will be a permanent heap that will be irrigated using drip emitters distributed on the surface of the heap. The irrigation solution will contain sulfuric acid with a nominal flow of 1,200 m^3/hr; this correlates to an application rate of 0.015 m^3/hr-m^2. After an irrigation cycle of 35 days is completed, an upper lift will be prepared on top of the leached layer. An inter-lift liner will isolate the heap lifts and with a system of corrugated perforated pipes on top of the liner to allow the collection of the PLS. The inter-lift liners will be required as the material continues to be acid consuming after the recoverable copper has been leached.

The PLS will be collected from the heap through a network of collecting pipes and sent to collection ponds.

The sulfuric acid consumed in the leaching process will be delivered by trucks with 94% concentration and will be discharged in a sulfuric acid tank situated in a self-contained, bermed area to contain spills.

14.3.4 Solution Management

Leach solution that percolates through the first stage leach zone will be collected in perforated pipes buried in the drainage layer under the ore on leach and flow by gravity to the pregnant leach solution (PLS) pond that will have a 16,070 m^3 capacity. The PLS from the collection pond will be pumped to the SX feed tank.

Leach solution that percolates through the second stage leach zone will be collected in perforated pipes buried in the drainage layer under the ore on leach and flow by gravity to the PLS pond.

Two stormwater collection ponds with a storage capacity of 304,400 m^3 each (total 608,800 m^3) will be located downstream of the PLS pond. The stormwater ponds will complement the PLS collection pond by serving as flood control ponds, especially during high rainfall events.

The facilities will also include a raffinate solution pond of 8,650 m^3 capacity. The raffinate will be received by gravity from the E2 extraction settler and will be pumped from this pond using two vertical turbine pumps online to the leach pad. It will be applied through drip emitters to the second stage leach, i.e., the back half of the ore on leach.

14.3.5 Solvent Extraction

At the SX circuit, the PLS generated in the leaching circuit will be purified and the copper content will be concentrated to obtain a copper-rich electrolyte.

The SX plant design assumes one train of two extraction stages. Each stage (E1 and E2) will consist of a primary, secondary, and tertiary mixer tank with agitators and an extraction settler for phase separation. Due to potentially high levels of chloride in the PLS and physical transfer of chloride to the electrolyte, desalinated water will be used in a single washing stage (W1) to remove entrained chloride from the organic phase ahead of the two-stripping stages (S1 and S2). The washing stage will consist of a primary, secondary, and tertiary mixer tank and an extraction settler, while each stripping stage will consist of a primary and secondary mixer tank and an extraction settler. The high acid content of the lean electrolyte used in the stripping stage will cause the copper in the organic to be “stripped” or transferred from the loaded organic to the aqueous electrolyte. This transfer will enrich the lean electrolyte returned from the EW process.

14.3.6 Electrowinning

Rich electrolyte will be filtered and heated by hot water during start-up, and then by hot lean electrolyte during steady-state operations. Rich electrolyte will be pumped to the EW cells for electrowinning onto stainless steel permanent cathode blanks. Cathodic copper will be harvested on weekly basis and washed in cathode washing tanks. Washed cathodes will be removed from the blanks by processing the blanks through an automatic stripping machine. The resultant copper cathodes will be sampled, weighed, and banded into 2–3 t packages for sale as a final product.

The EW plant design includes the installation of 146 electrolytic cells that will be divided into two banks of 73 cells each. Each cell will contain 60 stainless steel cathodes of 1.00 m^2 of submerged area, and 61 lead–calcium–tin alloy anodes. Spacing between electrodes will be 101.6 mm. A total of 8,760 cathodes and 8,906 anodes will be used throughout the plant.

Electrical power supply to the cells will be provided by two rectifier groups. Each rectifier group will feed one bank of EW cells (73 cells per bank).

The design contemplates an estimated annual copper cathode production of 35,000 t/a.

14.3.7 Tank Farm

This facility will be fed by gravity flow from the SX/EW facilities. The tankage is sized to accommodate drain down of connected electrolyte piping and organic from the settler units.

Fuel for the steam boiler will be supplied from the diesel tank. The steam boiler will heat treated water in a hot water tank through a steam loop, and hot water will be circulated through a second electrolyte heat exchanger when additional heat is required in the electrolyte solution.

A centrifuge system will be installed to process solvent extraction "crud". The crud is a material that forms from an accumulation of solids, organic and aqueous solution at the organic/aqueous interface in the settlers. The centrifuge system will recover organic solution to be reuse at the solvent extraction circuit. Crud will be drained from the settlers through the crud drain header to a crud-holding tank or can be diverted into the crud storage tank. Material in the crud holding tank will be pumped to the crud treatment tank.

Crud will be mixed with diluent and allowed to settle in the decant tank. An organic layer that will separate out in the crud treatment tank will be pumped to the loaded organic tank. Sediment from the crud holding tank will be pumped to a Dioearth mix tank for mixing with diatomaceous earth filter media. Organic centrate will be collected in the recovered organic tank and pumped to the loaded organic tank.

14.4 Concentrator

14.4.1 Overview

The process facilities were designed to treat an average of 100,000 dmt/d of sulfide ore. Process design was based on existing technologies with available and proven equipment. The current design included the operational units of crushing, grinding, flotation, thickening and filtration to obtain a copper concentrate and molybdenum concentrate.

Run-of-mine (ROM) ore to be processed at the concentrator plant will be extracted from the open pits. Ore will be reduced in size by a primary crushing stage and transported with conveyor belts to two additional conventional crushing stages. Fine ore product from the crushing stage will be stockpiled and conveyed to the grinding circuit, with subsequent classification and copper flotation and molybdenum circuits. Copper concentrate produced by froth flotation will be loaded into haul trucks for shipment to market. Molybdenum concentrate will be bagged and loaded onto trucks for shipment to market.

14.4.2 Primary Crushing

ROM ore will be transported in 220 t trucks from the mine to the primary crusher circuit. The ore will be dumped directly into a crusher dump pocket that will feed the gyratory crusher (60" x 113"), with an average capacity of 5,556 t/hr (6,540 t/hr design) and an open side setting (OSS) set to generate a product with a P_{80} of 220 mm. The primary crushed material will be conveyed to a coarse ore stockpile with a 100,000 t live capacity.

A hydraulic-operated rock breaker will be installed in the dump pocket. Primary crushed ore will be withdrawn from the crusher discharge pocket by a variable speed, hydraulic-drive crusher discharge feeder. The crusher discharge feeder will feed the primary crushing discharge conveyor that will be mounted with a scale and discharge into a tripper stacking conveyor that will transport the crushed product to the ore stockpile. The circuit will have installed a metal detector over the primary crushing discharge conveyor, wet-type dust collector systems, bridge crane for maintenance, air compressor and instrument air dryer for operations and maintenance.

14.4.3 Coarse Ore Stockpile

Primary crushed ore will be stockpiled on the ground in a covered, trapezoidal, ore stockpile with a 100,000 t live capacity. Reclaim tunnels will be installed beneath the stockpile.

During primary crusher down time the ore will be moved by bulldozer. Dust generated will be controlled by wet-type dust collector systems installed at the primary crushing area.

14.4.4 Secondary Crushing

Coarse ore will be withdrawn by eight reclaim feeders that will discharge to four secondary crusher conveyor belts that will be installed in parallel. Each conveyor will feed to one of the four secondary crushing lines consisting of a 75 kw, 3.6 x 7.9 m double deck banana screen. Screen oversize material (90 mm top screen and 35mm bottom screen opening) will be fed into four MP-1000 standard 750-kW cone crushers, each producing a material with a P_{80} of 50 mm. The cone crushers discharge and coarse ore screens undersize will discharge to a tertiary crushing feed conveyor for delivery to the tertiary crushing circuit.

The secondary crushing circuit was designed for an average ore flow of 5,556 t/hr (6,540 t/hr design) with the crusher's open side setting (OSS) of 55 mm.

14.4.5 Tertiary Crushing

The tertiary crushing circuit will receive crushed ore from the feed conveyor and will discharge into 10 intermediate ore bins. Ten belt feeders, with a capacity of 743 t/hr each, will draw ore from each intermediate ore bin to feed a 3 x 7.3 m double-deck banana tertiary screen per line (10 in total).

Oversize material from each tertiary screen will be crushed in ten MP 1000 tertiary short head cone crushers, rated at 750 kW each. Undersize product from all tertiary screens will be collected on a 400 m long tripper conveyor belt that will feed the fine ore stockpile of 100,000 t live capacity. Product from the tertiary crushers will be collected on a 300 m long belt conveyor to return the crushed material to the intermediate ore bins.

14.4.6 Grinding

Grinding will be a single comminution stage. Material from the fine ore stockpile will be fed to a total of six ball mills of 7.9 m inside shell diameter x 12.34 m (EGL), rated at 15.7 MW each and operating in parallel. A total of six feeders will discharge the fine material from the fine stockpile to the feeders of each mill. All ball mills will operate in closed circuit with a cluster of hydrocyclones per mill. Underflow with oversized material will return to the ball mills for additional grinding, and the finer overflow material with a P_{80} of 104 µm will be sent by gravity to the flotation circuit.

Each ball mill will discharge into a primary grinding sump and the contents of each sump will be transferred using variable speed horizontal centrifugal slurry pumps to the hydrocyclone clusters. Overflow from all cyclone clusters will be combined and sampled by two two-stage sampler systems for metallurgical control prior to flotation.

Lime slurry will be added to the ball mill feed to adjust the pH of the slurry. Lime slurry can also be added to the primary grinding sumps as required. Fuel oil will also be added to the ball mill feed to aid in molybdenum collection.

The circuit will have installed air compressors, instrument air dryer and air receivers for operation and maintenance. Overhead cranes will be installed for maintenance of the grinding mills and hydrocyclones.

14.4.7 Bulk Copper–Molybdenum Flotation

After cycloning at the grinding circuit, the overflow stream will flow by gravity to a slurry splitter and then to the copper-moly (Cu-Mo) bulk flotation circuit. This circuit will consist of a rougher flotation stage, vertical regrind mills, first cleaner flotation cells, second cleaner flotation cells, third cleaner flotation column cells, and cleaner–scavenger flotation cells.

Cyclone overflow will be diluted to ~28.3% w/w solids and will be fed to the rougher flotation circuit, which will consist of four rows of six 257 m^3 cells each. Rougher concentrates will be pumped and collected in a re-grind sump, while the tailings will flow by gravity to the final tailing circuit. Metallurgical samples will be taken from the final tailings stream.

Copper–molybdenum rougher flotation concentrates will be pumped from the re-grind sump to the re-grind circuit that will consist of four 4.52 m diameter x 14.61 m high vertical mills rated at 1,119 kW each working in parallel. Those vertical mills will operate in closed circuit with two clusters of sixteen 20-inches diameter cyclones each. Rougher concentrate will be re-ground to a P_{80} of 44 µm and the final cyclone overflow will be transferred by gravity to the cleaner conditioner tank, while the underflow will return to the re-grind sump.

The first cleaner flotation stage comprises one row of three 257 m^3 flotation cells. Tailings from the first cleaner stage will flow by gravity to the cleaner–scavenger stage that consists of one row of six 257 m^3 cells. Concentrate from the cleaner-scavenger stage will be pumped to the re-grind sump, while tailings will flow by gravity to rougher flotation splitter box. Concentrate from the first cleaner stage will be pumped to the second cleaner stage that will consist of six 30 m^3 cells. Tailing from this stage will return to the first cleaning stage, while concentrate will flow by gravity to the third cleaner flotation stage. From the third cleaner feed sump, the slurry will be pumped to two parallel feed splitters that will feed the third cleaning stage comprising four 4.27 m diameter x 12 m high column cells.

Copper–molybdenum bulk concentrate from the third cleaner column cells will then be fed to a 25 m diameter copper–molybdenum thickener, where it will be thickened to 60% solids and pumped to the molybdenum flotation plant. Tailings from the third cleaner columns cells will return to the second cleaner flotation circuit.

Two blowers (one operating and one standby) will supply air to the moly cleaner column cells and flotation reagents will be added at several points in the molybdenum flotation circuit. The molybdenum circuit process streams will be sampled for metallurgical control by samplers installed for the tailings from the copper–molybdenum rougher flotation stage and the molybdenum first cleaner flotation stage; and concentrates from the copper–molybdenum rougher flotation stage, the molybdenum first cleaner stage and molybdenum third cleaner column stage.

Flotation reagents will be added at several points in the copper–molybdenum flotation circuit.

14.4.8 Molybdenum Flotation (Conceptual)

The molybdenum flotation circuit design was based on analogue plants. The process will be conventional and consist of a rougher circuit, classifying and regrinding, and a three-stage flotation cleaning circuit.

The copper–molybdenum bulk concentrate will be fed to the rougher flotation circuit that will consist of one row of six 30 m^3 cells. Tails from the rougher stage will flow by gravity to a 25 m diameter copper concentrate thickener. Molybdenum rougher concentrate will be pumped to the first cleaner stage (four 30 m^3 cells) and concentrate from the first cleaner will be fed to the feed sump of the molybdenum concentrate regrind circuit. Tails from the first cleaner will flow to the feed launder of the copper concentrate thickener.

Molybdenum concentrate regrinding will be performed in one 1.52 m diameter x 7.18 m high vertical mill that will be operated in closed circuit with a cluster of 10 in diameter cyclones (one operating, one stand-by). This will generate a cyclone overflow with particles with a P_{80} of 25 µm that will flow by gravity to the molybdenum second cleaner flotation circuit. Hydrocyclone underflow will report back to the regrind mill.

The second cleaner flotation stage will consist of one 1.83 m diameter x 8 m high column cell. Tailings from the second cleaner stage will be pumped to the molybdenum rougher flotation stage, while concentrate will be pumped to the third cleaner flotation stage that will consist of one 0.91 m diameter x 8 m high column cell. The third cleaner concentrate will flow by gravity to the molybdenum concentrate dewatering circuit while tailings will flow by gravity to the sump and then be pumped to the molybdenum concentrate regrind cyclone feed sump.

Two blowers (one operating and one standby) will supply air to the molybdenum cleaner column cells and flotation reagents will be added at several points in the molybdenum flotation circuit. The molybdenum circuit process streams will be sampled for metallurgical control by samplers installed for the tailings from the copper–molybdenum rougher flotation stage and the molybdenum first cleaner flotation stage; and concentrates from the copper–molybdenum rougher flotation stage, the molybdenum first cleaner stage and molybdenum third cleaner column stage.

14.4.9 Copper Concentrate Dewatering

Copper concentrate (copper–molybdenum rougher tailings and molybdenum first cleaner flotation tailings) will be thickened in a 25 m diameter copper concentrate thickener to 69% solids, fed to the splitter box over three 3 x 3 m diameter slurry stock tanks and pumped to three Larox PF 84/96 MI60 pressure filters to produce a concentrate cake with 12% moisture. Filtrate and filter washdown water will be returned to the feed box of the copper concentrate thickener.

Final copper concentrate will be discharged in a conveyor belt, sent to a shuttle conveyor and then discharged in a covered concentrate stockpile. Front-end loaders will reclaim the copper concentrate from the stockpile and discharge it onto highway haulage trucks. A truck scale will be located near the concentrate load-out area.

14.4.10 Molybdenite Concentrate Dewatering

Molybdenum concentrate from the third molybdenum flotation stage will be dewatered by one concentrate filter to produce a concentrate cake with 12% moisture. Filtrate will be pumped to the copper–molybdenum thickener.

Final molybdenum concentrate will be discharged into a Holo-Flite Type hot oil dryer to reduce the moisture from 12% to 2%. The dryer will discharge via screw conveyor to the molybdenite concentrate storage bins. Molybdenum concentrate in the various storage bins will be analyzed for conformity with specification requirements, and be bagged in 2 t lots in super sacks by a packaging system for shipment by truck to the market as a final product. Rejected batches will be returned to the molybdenum flotation circuit.

14.4.11 Tailings Dewatering

All tailings generated in the flotation circuit will be discharged to a tailing's distribution box. From there, the tailings will be distributed to two 100 m diameter tailings thickeners operating in parallel. Overflow water will be recovered in a process water pond for reuse.

The final thickened tailings will contain 60% w/w solids and will be pumped to the TSF.

14.5 Equipment Sizing

A summary of the equipment requirements for the heap leach and SX/EW facility is included in Table 14-1. A summary table that shows the sizing of the key equipment for the concentrator is provided in Table 14-2.

Table 14-1: Key Equipment List, Heap Leach and SX/EW

Area	Description	Units	Value
General design parameters	Plant throughput	t/hr	2,230
	Cathode copper production	t/a	35,000
	Primary crushing, availability	%	75
	Fine crushing, agglomeration and stacking availability	%	80
	Leaching, SX, and EW availability	%	97
	Ore density (in situ)	t/m^3	2.66
	Crushing Bond index	kWh/t	13
	Ore moisture	%	2
	PLS composition (design)		
	Cu	g/L	3.81
	Fe	g/L	3
Crushing, curing, stacking	Primary crusher, gyratory 60–89	kW	750
	Primary crusher OSS (design)	mm	165
	Secondary crusher, MP1000 standard cone, 2 units	kW	750
	Secondary crusher CSS (design)	mm	38
	Tertiary crushers, MP1000 short head cone, 4 units	kW	750
	Tertiary crusher CSS (design)	mm	12
	Agglomeration drums, 3 units	m (dia) x m (L)	3.66 x 10.67
		kW each	149
	Agglomerated ore moisture	%	11
	Leaching copper oxide extraction (design)	%	80
	Leaching heap type		Static
	Heap height	m	12
	Irrigation rate	m^3/m^2-hr	0.015
	Net acid consumption	Kg H_2SO_4/t ore	18
Solvent extraction and tank farm	Mixed tanks for extraction stage	Primary m (W) x m (L)	3.25 x 4
		Secondary & tertiary m (W) x m (L)	4.25 x 4
	Mix tank for washing stage	Primary	3.75 x 4

Area	Description	Units	Value
		m (W) x m (L)	
		Secondary & tertiary m (W) x m (L)	4.75 x 4
	Settlers for extraction, washing and stripping stages	m (W) x m (L) x m (H)	21 x 30 x 1
	SX feed tank	m^3	600
	Electrolyte filters	Units	3
	Electrolyte/electrolyte heat exchangers	Units	2
	PLS feed flow per train (nominal)	m^3/hr	1,200
	Ratio organic/aqueous		1:1
Electrowinning	Polymer concrete electrowinning cells, 146 units	m (L) x m (W) x m (H)	6.1 x 1.22 x 1.52
	Cathodes and anodes per cell	No./No.	60/61
	Overhead crane	t (capacity)	10
	Stripping cathode machine	kW/cathodes/hr	86/240
	Copper in rich electrolyte	g/L	50
	H_2SO_4 in lean electrolyte	g/L	180
	Current density (design)	A/m^2	340
	Current efficiency (design)	%	90
	Cathode harvesting cycle	days	7
	Cathode effective area (per side)	m^2	1
	Copper cathode bundle	t	2–3

Note: CSS = closed side setting, OSS = open side setting.

Table 14-2: Key Equipment List, Concentrator

Description	Quantity	Function
Gyratory crusher, 1,524 mm x 2,870 mm, 750 kW	1	Primary crushing
Cone crushers, MP-1000, 750 kW each	4	Secondary crushing
Short head cone crusher, MP-1000, 750 kW each	10	Tertiary crushing
Ball mills, 7.9 m D x 13.4 m (EGL), 15.7 MW	6	Grinding
Tank cells, 257 m^3	24	Cu–Mo rougher flotation
Vertical mills VTM 1500, 4.52 m D x 14.61 m H, 1,119 kW	4	Cu–Mo rougher con. regrind
Tank cells, 257 m^3	3	1st cleaner flotation
Tank cells, 30 m^3	6	2nd cleaner flotation
Column cells, Ø4.27 m x 12 m H	4	3rd cleaner flotation
Tank cells, 257 m^3	6	Cleaner–scavenger flotation
High-rate thickener, Ø25 m	1	Cu–Mo bulk con. dewatering
Tank cells, 30 m^3	6	Mo rougher
Tank cells, 30 m^3	4	Mo 1st cleaner
Vertical mill VTM 20, 1.52 m D x 7.18 m H, 15 kW	1	Mo 1st cleaner con. regrind
Column cell, Ø1.83 m x 8 m H	1	Mo 2nd cleaner
Column cell, Ø0.91 m x 8 m H	1	Mo 3rd cleaner
High-rate thickener, Ø25 m	1	Cu concentrate thickening
Pressure filter Larox PF 84/96 M60	3	Cu concentrate filtration
Concentrate filter	1	Mo concentrate filtration
Holo-Flite dryer	1	Mo concentrate drying
High rate thickener, Ø100 m	2	Tailings thickening

14.6 Power and Consumables

14.6.1 Power

Southern Copper have assumed that power will be obtained from a private power provider. Power is expected to be delivered at 13.8 kV and will be stepped up from 13.8 kV to 230 kV at the El Barril switch yard. The power from the switch yard will be transmitted via a 230 kV transmission line to the El Arco main substation.

The 230 kV power received at the El Arco main substation will be stepped down to 34.5 kV and distributed to the mine, concentrator, SX/EW plant, water wells and booster stations, planned town site to be located 5 km north of Guerrero Negro, and tailings reclaim water pumps located at the TSF.

In the event of a loss of normal power, the standby power for critical process equipment and ancillary buildings will be provided from emergency diesel generators located near each facility. The average power consumption for the leach pads, the SX/EW plant and the concentrator, and the townsite will be approximately 250 MW.

The concentrator will use power for crushing, ore conveying, grinding, flotation cells and dewatering circuits. The average LOM power consumption rate was estimated to be 1,171,503 MW-hr/a. Grinding and classification is forecast to use around 76.4% of the total consumed power.

The average LOM power consumption for the Leaching facilities and SX/EW plant was estimated at 167.46 MW-hr/a.

14.6.2 Water

The El Arco water requirements will be supplied from a sea water desalination plant, proposed to be located at El Barril, which is east–northeast of the planned El Arco mine site (refer to Figure 2-1 and discussion in Chapter 15.11).

Fresh water will be required to replace what is trapped in concentrates, sent to the TSF with tailings, trapped water in spent-leached ore or "ripios" and losses due to evaporation. The operation will use desalinated fresh water pumped from the desalination plant at the coast as the make-up supply. Average LOM water consumption for the concentrator and leaching plant is estimated at 18.2 Mm^3/a and 1.96 Mm^3/a respectively.

14.6.3 Consumables

Sulfuric acid will be used as the leaching reagent in the dissolution of copper oxides. A total of 207,200 t/a of acid will be required for the heap leach facility. Other reagents such as extractant (78.9 t/a), diluent (546.8 t/a), cobalt sulfate (80.3 t/a) and diatomaceous earth (26.3 t/a) will be required in the Oxide Plant.

At the concentrator plant, liners will be consumed by the crushers and ball mills and steel grinding media will be consumed in the ball and regrind mills. Other major consumables will include flotation reagents such as: collector Aero 5415 and sodium isopropyl xanthate (SIPX), MIBC frother, flocculant, sodium hydrosulfide (NaSH), fuel oil and lime. Most chemicals will be delivered to site in bulk containers, will be stored in large tanks and bags or sacks on pallets, and will be able to support the operation for several days.

14.7 Personnel

A LOM personnel count of 144 is estimated for the heap leach and SX/EW facility operation and related maintenance. The number of personnel required for the concentrator and related maintenance is assumed to total 371.

15 INFRASTRUCTURE

15.1 Introduction

The site is currently a greenfields site with limited infrastructure that is only suitable to support exploration-level activities (see Chapter 4.4).

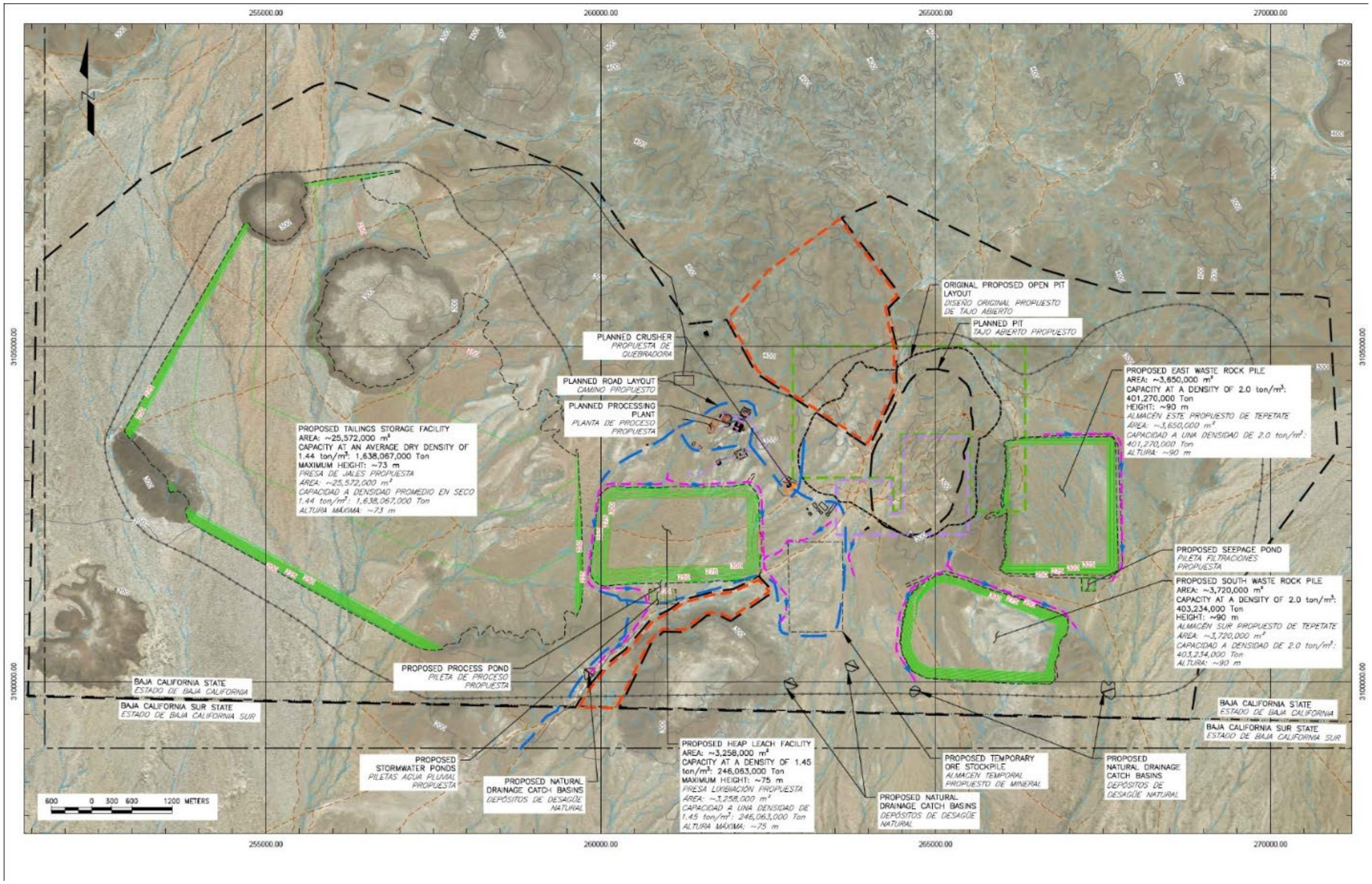
Planned on-site infrastructure includes:

- Open pit mine
- Two WRSFs
- Temporary ore stockpile
- Mill complex and oxide fine crushing facilities
- Coarse ore and intermediate ore stockpiles
- Heap leach pad
- TSF
- Administration office, change house/safety building, lunch room and construction laydown area
- Administration building, truck shop and warehouse
- Main 230 kV electrical substation
- Water storage dam and reservoir

An on-site location infrastructure layout plan is provided in Figure 15-1

The proposed major mine components are in areas that do not present major geotechnical hazards such as river washes and flooding, rockfalls, landslides or visible or known active faults. The current TSF location is planned for an area that will allow expansion, if necessary.

Figure 15-1: On-Site Infrastructure Layout Plan



Note: Figure prepared by Wood, 2021.

Planned off-site infrastructure includes:

- Desalination plant to be located at El Barril
- Water pipeline from the desalination plant to the water storage reservoir
- Accommodation facility/townsite, to be located 5 km north of Guerrero Negro
- Port site at El Barril

Figure 15-2 shows the locations of El Barril and the proposed powerline in relation to the El Arco site.

15.2 Roads and Logistics

15.2.1 Roads

Site access was discussed in Chapter 4.2.

All supplies will be transported through Guerrero Negro via La Ensenada or Tijuana. A second route is from the port of Guaymas through the port of El Barril.

15.2.2 Ports

A new Owner port will be constructed near El Barril 70 km to the northeast, on the Gulf of Cortez and will require an access road from the plant site at El Arco to the port. This is anticipated to be an asphalt-paved, two-lane road with maximum slope of 4%. A new roll-on-roll-off container sea port will be constructed.

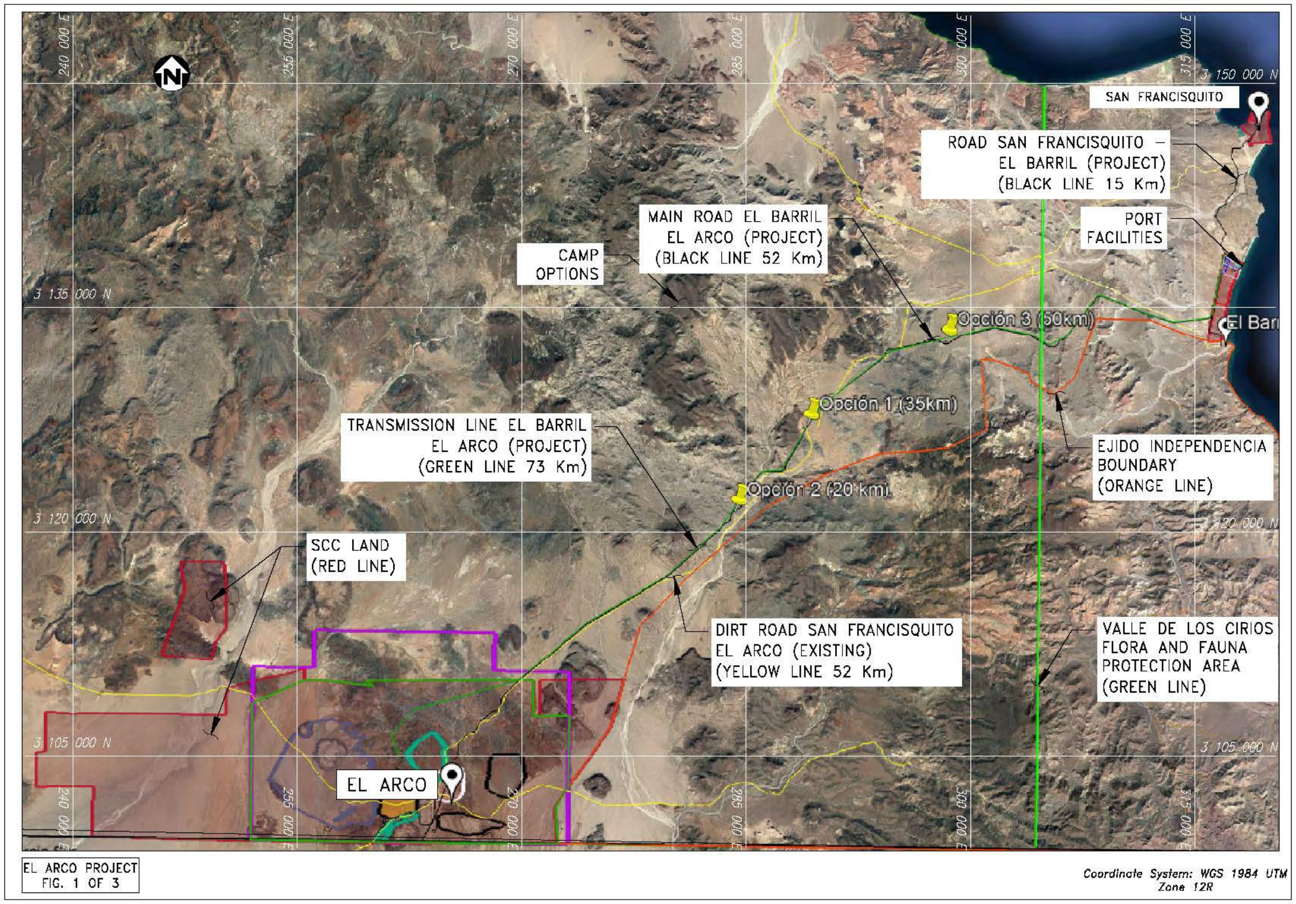
Concentrate in containers will be shipped daily by motorized barge to the port of Guaymas, Sonora, directly across the Gulf of Cortez, where Southern Copper has a concentrate shipping and storage facility.

Fuel oil, reagents and other supplies will be barged in on a daily basis.

15.3 Stockpiles

The only stockpile envisaged in the LOM plan is the temporary ore stockpile. Stockpile designs will be addressed during more detailed studies.

Figure 15-2: Offsite Infrastructure



Note: Figure prepared by Wood, 2021.

15.4 Waste Rock Storage Facilities

Two WRSFs, designated as the East and South WRSFs, are planned (refer to Figure 15-1). The East WRSF is planned to store potentially acid generating (PAG) waste rock and the West WRSF is planned to store non-PAG waste rock. Water management plans for the facilities are outlined in Chapter 15.7.

Both sites are relatively flat and favorable for development from a geotechnical perspective. Stripping of unmineralized material would be required along with vegetation. Southern Copper plans to remove and stockpile topsoil for reclamation.

15.5 Tailings Storage Facilities

As discussed in Chapter 7.4.1.1, a site to the west was selected in 1996 as preferred for the location of the planned TSF.

It was assumed that the TSF would have a maximum storage elevation of 270 m or 3 m below the ultimate embankment crest elevation. The TSF embankment will be the primary structure for the TSF impoundment and will be constructed with earth and rock fill materials generated from the surface mine or borrowed from within the project limits. The design of the embankment includes a starter dam, followed by succession of nine raises to the final crest elevation. The embankment and basin expansions will be constructed concurrently.

The starter embankment will include a dam keyway to be constructed of an upstream shell of low-permeable soils followed by a select fill core, drain material and embankment fill. A chimney drain will be constructed on the downstream side of the keyway. Subsequent phases of TSF construction will consist of raising the starter embankment crest in a centerline fashion. The chimney drain will be raised and in conjunction with the downstream shell that will be constructed of embankment fill.

A tailings seepage collection system will be provided outside the downstream toe of the starter dam. This seepage collection system will collect solution that drains from the tailings, collected via the chimney drain, and convey it to a seepage collection pond outside of the downstream final embankment footprint. One seepage collection pond is planned for construction along each general embankment for the south, west and east embankments. The collected solution will then be pumped into the TSF impoundment for reclaim. Tailings slurry will be pumped using three tailings pumps, via slurry tailings lines into the TSF by spigotting off from the distribution lines located on the embankment crest.

Stability analyses for the embankments were performed for circular and non-circular surfaces using SLIDE 2 software. Static factors of safety exceeded the minimum design acceptance value of 1.5. Pseudo-static analyses exceeded the minimum design acceptance value of 1.0.

Deterministic water balance models were used to validate seepage, process and event pond storage requirements for the TSF. Recoverable decant water will be available as the tailings settle and consolidate. This surplus water can be collected from a decant system and pumped back to the process mill for use in operations. During initial operations, Wood estimates that as much as 60,900 m^3/d of decant water will be available for use as make-up water and will decrease to 16,400 m^3/d.

15.6 Heap Leach Facility

The location of the proposed heap leach facility will be directly south of the planned processing plant and crusher facilities. The heap leach facility will be a permanent pad that will require the use of a temporary ore stockpile during startup operations. The heap leach pad will be constructed in three phases, with each phase being approximately one-third of the total leach pad area. The planned location of the temporary ore stockpile is to the east of the heap leach facility in an area of relatively flat topography.

The base and interlayers of the heap leach facility will be divided into fifteen 500 m wide internal cells by geomembrane-lined divider berms to provide smaller, more manageable solution collection areas. The cells will have an approximate solution collection area of 200,000–250,000 m^2. At the proposed maximum solution pumping rate of 1,403 m^3/hr and the proposed application rate of 15 L/hr/m^2, an area of approximately 93,533 m^2 will be under leach at any given time.

A solution collection system consisting of a network of perforated collection pipes will be installed in each cell.

A lining system will be required for each of the leach pad, process water pond, and stormwater pond.

Stability analyses were performed for circular and non-circular surfaces. Static factors of safety exceeded the minimum design acceptance value of 1.3. Pseudo-static analyses exceeded the minimum design acceptance value of 1.05.

Deterministic water balance models were used to validate process and event pond storage requirements for the heap leach facility. For the 20-year life of the heap leach facility, process solutions are anticipated to be contained in the PLS pond. The arid climate combined with moisture uptake will result in a net negative solution balance, therefore make-up water will be required to maintain leach pad operations. The average make-up water rate is forecast at 91.4 m^3/hr for early operations and will decrease as mining progresses.

15.7 Water Management Structures

Stormwater management will consist of seven permanent stormwater channels, two temporary stormwater channels, and two contact water diversion channels. Hydraulic analyses were completed to inform the appropriate sizing of stormwater channels and erosion protection against a 100-year, 24-hour storm event. Sizing of contact water diversion channels was completed against a 20-year, 24-hour storm event.

Perimeter diversion channels will be used to collect non-impacted runoff from areas up gradient of the footprints of the proposed facilities and convey them to existing drainages or areas where the water will be reclaimed. The surface water diversion channels will convey runoff from north of the facilities to the south, downgradient of the storage areas. The TSF was not designed with any diversion structures upstream of the facility. The TSF design allows upstream runoff to enter the facility, and provides adequate storage capacity within the embankment to contain the probable maximum precipitation storm event below freeboard.

The proposed heap leach facility will require the use of two permanent diversion channels. The proposed temporary ore stockpile will intercept stormwater using two V-ditch channels. The South WRSF will require two permanent diversion channels and the East WRSF will require one diversion channel. All permanent channels will be constructed using 3H:1V slopes.

Two contact water diversion channels will be located on the east and south side of the East WRSF in order to manage stormwater infiltrated through the PAG waste rock material. The contact water diversion channels will collect accumulated runoff which will then be diverted to a seepage pond located South of the East WRSF.

To control sediment generated from surface water flows, detention basins will be located at the discharge points of the main diversion channels. Five proposed drainage catch basins will be located south of the outlet channels to provide flood control through attenuation of stormwater runoff. The detention basins will be used to settle any particulates contained within the runoff.

Two temporary stormwater channels will be constructed during Phase 1 of the heap leach facility. The temporary channels will intercept any runoff within the smaller sub-hydrologic basin areas, and will divert water to the west and east, to the permanent stormwater channels.

15.8 Built Infrastructure

Built infrastructure will include:

- Administration office, change house/safety building, lunch room and construction laydown area
- Mine administration building, the truck shop and warehouse
- Accommodation camp/townsite and contractor camp
- Process plant complex.

15.9 Camps and Accommodation

An accommodation camp/townsite will be constructed north of Guerrero Negro and will have accommodations for about 1,200 personnel.

An allowance, based on construction man hours, has been made for a contractor's camp for construction. This is assumed to be located in proximity to the planned mine site.

15.10 Power and Electrical

Southern Copper have assumed that power will be obtained from a private power provider. The assumed cost for this provision is US$91 MW/hr. The cost assumption is supported by two internal studies completed by Southern Copper:

- Enter into a private power purchase agreement (PPA), and construct a transmission line from the provider to the site:
  - Purchase power from a private power producer in Baja California; or purchase power from the Federal Commission of Electricity (CFE)
  - Transmission line would be from the provider site or the national grid to the Project site
  - The estimated power cost as delivered to the El Arco site was updated in 2021, and was US$79.50 MW-hr, with a capital expenditure of US$264 M
- Construct a natural gas power plant in Mexicali and construct a transmission line from the plant to the site:
  - Supply could be sourced from:
    - El Paso Natural Gas

  - North Baja (Trans Canada)
  - Rosarito Gas Line (Gasoducto Rosarito, IENOVA)
  - The estimated natural gas prices for 2021–2025 were estimated at US$3.2/million British thermal units (MMBtu)
- Transmission line would be approximately 630 km long, from Mexicali to the Project site
- Takes advantage of natural gas supplied to the power plant and could potentially pass on any excess supply to the Baja California grid
- The estimated power cost as delivered to the El Arco site was US$66.50 MW-hr, with a capital expenditure of US$589 M.

Both alternatives would allow for incorporation of alternative energies such as solar, wind or geothermal sources.

Southern Copper has recent experience with installation of a natural gas combined-cycle power plant at the La Caridad mine in Sonora.

For the purposes of the capital cost estimate in Chapter 18 and the financial analysis in Chapter 19, used the study results to estimate a power cost of US$91 MW/hr or US$0.091 kW/hr.

The average mine site load is expected to be around 230 MW. Offsite power for the desalinization plant, water pumping and town site is estimated at about 20 MW. The total average load required for operations is approximately 250 MW.

15.11 Water Supply

The majority of the Project water requirements will be supplied from a sea water desalination plant that will be located at El Barril.

For the purposes of the capital cost estimate, the desalination plant capacity is estimated at approximately 80,000 m^3/day, supplied by a battery of sea water reverse osmosis plants. Three sea water reverse osmosis plants are envisaged, each consisting of a 32,000 m^3/d three-unit desalination plant.

The desalinated water, with <200 ppm total dissolved solids, will be transported using a single 36″ diameter carbon steel pipe lined with a 10 mill-thick epoxy lining that will extend from El Barril port to El Arco. The line capacity will be 3,600 m^3/hr and two booster stations will be required to pump the water over the distance between the desalination plant and the mine site.

16 MARKET STUDIES

16.1 Markets

16.1.1 Copper

Copper futures are exchange-traded contracts on all of the world's major commodity exchanges. Copper is the world's third most widely used metal after iron and aluminum and is primarily consumed in industries such as construction and industrial machinery manufacturing.

The El Arco Project is expected to produce copper concentrates and copper cathodes.

Southern Copper provided Wood with an overview of the copper market as sourced from third-party experts, Wood Mackenzie, which was dated June, 2021. The report provided information on the copper market out to 2040, and covered information such as copper price forecasts, scenario modelling, demand in detail, and supply in detail.

These data support that there is a reasonable basis to assume that the key products will be saleable at the assumed commodity pricing for the LOM plan.

16.1.2 Molybdenum

Molybdenum is mainly used as an alloying agent in stainless steel, and also in the manufacture of aircraft parts and industrial motors. The biggest producers of the metal are: China, United States, Chile, Peru and Mexico. Molybdenum futures are available for trading in The London Metal Exchange (LME). Prices are generally determined by principal-to-principal negotiations between producers, trading houses, and end users.

16.1.3 Gold and Silver

Gold and silver will be sold as contained in the copper concentrate and not as a separate product from the mine.

16.2 Market Strategy

16.2.1 Copper

Southern Copper employs a corporate strategy that is in line with the company's marketing experience, and experience with obtaining long-term contracts with strategic business partners in the Asian and European markets, as well as annual contracts with other active market participants. Depending on concentrate quality, the company's concentrates are primarily sold onto the Asian or European markets. Cathode copper is sold onto the Asian, European, Brazilian and/or North American markets. Similar end-markets are expected to be the purchasers of concentrates and cathodes produced from the El Arco Project.

16.2.2 Molybdenum

Southern Copper currently produces molybdenum from its mining operations in Mexico and has established links to buyers of the concentrate.

16.2.3 Gold and Silver

Credit for gold and silver content in will be part of the contract terms for sale of the copper concentrate and will not be a separate product from the Project.

16.3 Commodity Pricing

To establish the copper price forecasts Wood used a combination of information derived from 22 financial institutions, from pricing used in technical reports filed with Canadian regulatory authorities over the previous 12-month period, from pricing reported by major mining companies in public filings such as annual reports in the previous 12-month period, spot pricing, and three-year trailing average pricing. Wood considers that a long-term price forecast of US$3.30/lb Cu is reasonable.

It is in accordance with industry-accepted practice to use higher metal prices for the mineral resource estimates than the pricing used for mineral reserves. The copper price forecast of US$3.30/lb was increased by 15% to provide the mineral resource estimate copper price estimate of US$3.80/lb.

Wood reviewed the Southern Copper long term forecast price for molybdenum of US$9.00/lb, and concluded that the molybdenum price selected by Southern Copper is reasonable and conservative compared to what others have recently been using in the industry. Wood considers there is a reasonable probability that the realized price of molybdenum will be at or higher than forecast US$9.00/lb over the projected 35 year El Arco Project LOM. The Southern Copper molybdenum price forecast of US$9.00/lb was increased by 15% to US$10.35/lb to provide the input to the mineral resource constraining pit shell and NSR cut-off.

Mineral reserves and mineral resources were constrained by pit shells that used inputs from copper and molybdenum only, with no gold or silver contribution to the NSR value determinations. However, the economic analysis included the contribution from gold and silver. Gold and silver pricing was provided by Wood. To establish the gold and silver forecasts Wood used a combination of information derived from 22 financial institutions, from pricing used in technical reports filed with Canadian regulatory authorities over the previous 12 month period, from pricing reported by major mining companies in public filings such as annual reports in the previous 12-month period, spot pricing, and three-year trailing average pricing. Wood considers that a long-term price forecast of US$1,600/oz is reasonable for gold and US$20.70/oz is reasonable for silver.

The pricing used in this Report is as follows:

- Mineral resources:
  - Copper: US$3.80/lb
  - Molybdenum: US$10.35/lb
- Mineral reserves:
  - Copper: US$3.30/lb
  - Molybdenum: US$9.00/lb
- Cashflows:
  - Copper: US$3.30/lb
  - Molybdenum: US$9.00/lb
  - Gold: US$1,600/oz
  - Silver: US$20.70/oz.

The assumed exchange rate for costs and cashflow analysis purposes was US$1.00 = MXN$22.00. This exchange rate was provided by Southern Copper.

16.4 Contracts

Southern Copper expects that any mine product sales terms will be in line with contracts that Southern Copper has for its existing Mexican operations.

No contracts are currently in place for any services. When concluded, such contracts would be negotiated and renewed as needed. Contract terms are expected to be typical of similar mining-related contracts that Southern Copper has previously entered into in Mexico.

17 ENVIRONMENTAL STUDIES, PERMITTING, AND PLANS, NEGOTIATIONS, OR AGREEMENTS WITH LOCAL INDIVIDUALS OR GROUPS

17.1 Introduction

The proposed mine site is located within the Valle de los Cirios Flora and Fauna Protection Area. The El Vizcaino Biosphere Reserve extends across Baja California on the southern side of the state boundary, and is approximately 1 km south of the planned mine site area (Figure 17-1).

There has been mining in the area since late 1800s. El Arco and Calmallí were the larger mining operations but there were several other smaller mines near El Arco.

17.2 Baseline and Supporting Studies

Southern Copper provided Wood with a copy of an environmental impact assessment that was prepared in 2008 by Corporación Ambiental de México S.A. A baseline study update was underway at the Report date.

Wood has assumed, as no construction activities have commenced, and there are no current mining activities, that the baseline data collected in 2008 has not changed significantly over time.

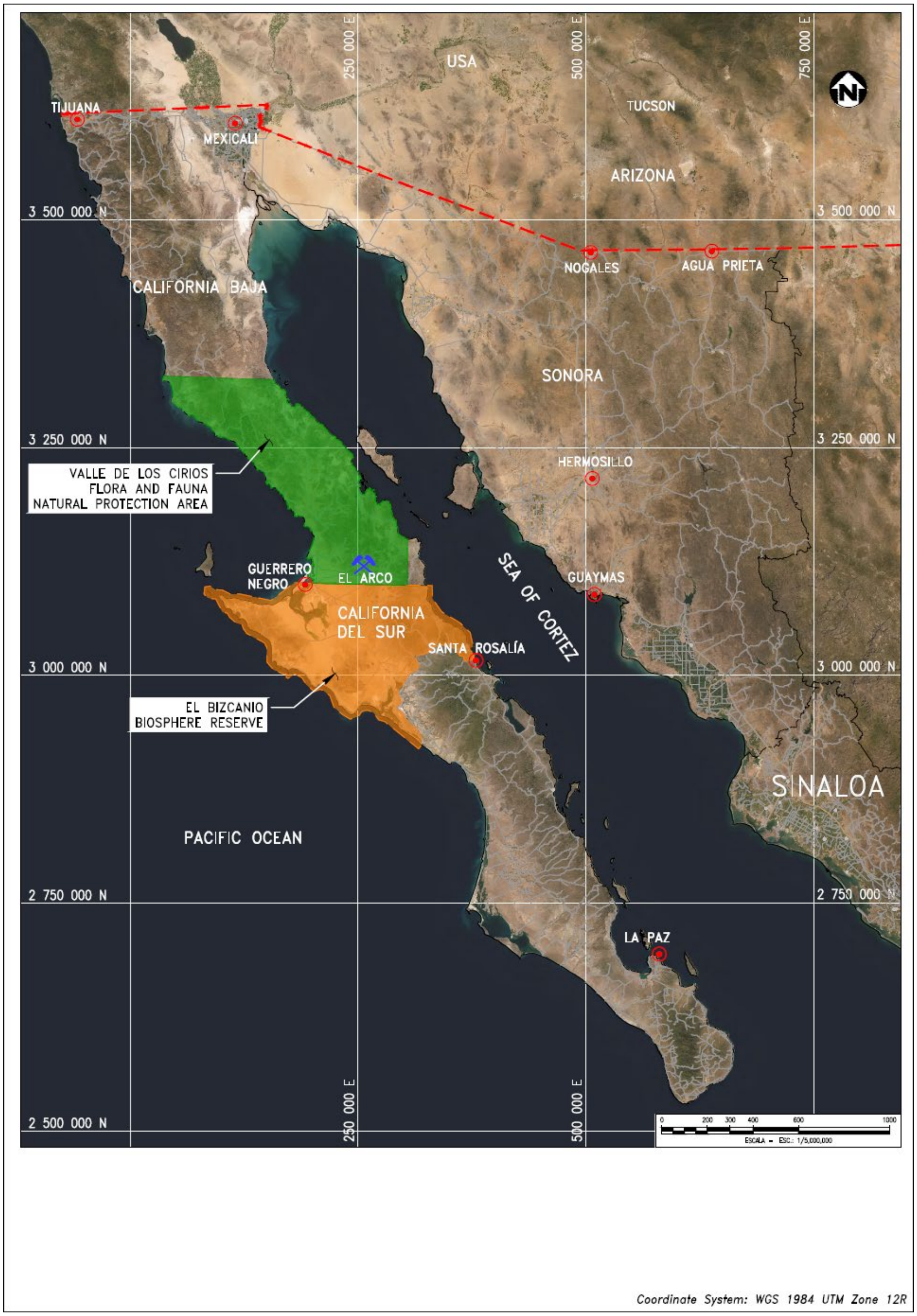
17.2.1 Climate

As noted in Chapter 4.3, the climate is arid. Sudden intense rainfall events can occur in a 24-hour period and will need to be considered when designing facilities, including the TSF. Temperatures have a wide variation between day and night, with high solar radiation rates.

The prevailing wind direction is to the west and south during May–October, and to the west and north from November–April. The spread of particulates and dust will need to be considered, particularly for population centers to the west of the planned operations.

Project design should address both the expected typical climate conditions and extreme rainfall events.

Figure 17-1: Location Plan, Protection Areas and Biosphere Reserves



Note: Figure prepared by Wood, 2021.

17.2.2 Geomorphology

The Project includes wide plains, streams, areas of riverine alluvium, hills, and talus slopes. The main fault directions are northwest–southeast, forming fault blocks that are commonly oriented to the northeast. Elevations range from 200–600 masl.

17.2.3 Soil

Soils have good drainage, but are organic-matter poor, susceptible to erosion, and are not suitable for agriculture.

17.2.4 Vegetation

Baseline studies identified 99 different species, distributed across 31 families and 74 genera. The predominant flora are classified as sarcocaule (fleshy-stemmed) xerophilic (low water requirements) scrub. The survey identified three rare species:

- Threatened: *Ferocactus townsendianus* or "biznaga", a type of cactus
- Under special protection: garambullo monstruoso
- Under special protection: *Mammillaria evermanniana*, a type of pincushion cactus.

The Valle de los Cirios Flora and Fauna Protection Area has 45 subzones or polygons that have differing levels of allowed activity within the subzone, based on whether the subzone must receive greater protection and care to maintain the original natural conditions if the polygon contains particularly relevant or fragile ecosystems. Some subzones do not allow for mining exploration or exploitation activities. Polygon 44 Garambullo monstruoso A (530.56 ha) and Polygon 45 Garambullo monstruoso B (124.72 ha) are located within the Project area as shown in Figure 13-3.

A population of garambullo monstruoso occurs within the area of the mineral resource estimate, and a second population occurs adjacent the proposed site of the leach pad and temporary ore stockpile.

While polygon areas that contain the garambullo monstruoso communities are included in the mineral resource estimates, the mine plan supporting the mineral reserve estimates has excluded the polygon areas that host those communities.

17.2.5 Fauna

In Baja California as a whole, 106 species of herpetofauna (reptiles and amphibians) have been recorded. Fifteen reptile species were identified in the Project area, eight species of which are endemic.

Sixteen mammal species were identified in the Project area. Of these, the following species have been identified as endemic to Mexico: jackrabbit (*Lepus californicus*), deer mouse (*Peromyscus maniculatus*), woodrat (*Neotoma bryanti*) and pocket mouse (*Chaetodipus arenarius*).

A total of 35 bird species were identified. There is one species of endemic bird of the Peninsula, the Cuitlacoche Peninsular (*Toxostoma cinereum*), five semi-endemic species (in Mexico only in the Baja California Peninsula), the Codorniz californiana (*Callipepla californica*), the Toquí Californiano (*Pipilo crissalis*), the Carpintero de pechera ala roja (*Colaptes auratus cafer*), the Perlita californiana (*Polioptila californica*) and the Pinzón purpúreo (*Carpodacus purpureus*). One species is included in the Special Protection category in NOM-059-ECOL-2001, this is the red-black hawk (*Parabuteo unicinctus*).

17.2.6 Social

The social baseline studies are discussed in Chapter 17.7.

17.3 Environmental Considerations/Monitoring Programs

The Environmental Management Plan (EMP) will be part of the Environmental Impact Statement being prepared by Southern Copper. In this sense, the EMP will define the activities required to comply with the legal provisions and those responsible for performing them, as well as establishing the compliance indicators, the frequency for their measurement, the reporting formats and the guidelines for their safekeeping. It will also consider procedures for environmental emergencies.

17.3.1 Actions To Support the Construction Program

The objective of this program is to minimize the impacts generated during construction phase. Emissions into the atmosphere will be from either mobile or fixed sources, and would consist of solid particles (dust), that would be generated during facility construction, road rehabilitation, as well as the formation of dust caused by the passage of vehicles. Although it is considered as a temporary and localized impact, dust resolution will be based on the availability of water in the region. Water would be applied to roads or provide a temporary road coating to minimize dust.

17.3.2 Erosion Protection Program

This program has the objective of publicizing and recognizing the flora that will be rescued from the work site to reduce the environmental disturbance caused by Project development, as well as to establish the appropriate methodologies for flora rescue, transplanting and propagation, giving priority to the species that are classified as at-risk under NOM-059-SEMARNAT-2010. The program will also ensure preservation of representative species of the ecosystem, as well as those that have some potential end-use.

17.3.3 Wildlife Rescue Program

This program is concentrated to a greater extent on slow-moving species, such as reptiles and amphibians (herpetofauna), which are the most vulnerable to any development activity. However, the fauna that has not moved (breeding birds and small mammals), will also be rescued to protect ecosystem integrity.

17.3.4 Rehabilitation Program

This program will employ techniques commonly used in management of woody and arboreal plant species, to ensure that the flora survive and flourish if moved to a new locale.

17.3.5 Acid Mine Drainage and Metals Leaching

A metal leaching/acid rock drainage (ML/ARD) study of ore and waste rock representative of the El Arco open pit was completed. Drill core including a total of 126 waste rock and 67 ore samples were assessed for their potential for acid generation and short-term metal leaching on the basis of lithology and deposit zone (conglomerate, oxidized, transition and sulfide). Based on the results, carbonate neutralization (Carb NP) potential was determined to be a suitable measure of available neutralization potential in the samples.

Acid potential (AP) was assessed on the basis of sulfide content. A neutralization potential ratio (NPR, the ratio of Carb NP/AP) of <3 as specified in Mexican standards (NOM-157-SEMARNAT-2009) was assumed to represent PAG rock. In comparison it is noted that international standards (e.g. MEND, 2009) have a generally lower NPR threshold and identify samples with an NPR <2 as being PAG.

Transition and sulfide zone waste rock exhibited a generally high risk of future ML/ARD; whereas conglomerate and oxidized zone waste rock exhibited a generally low risk of ML/ARD.

Leach ore containing primarily oxidized zone material had a low proportion (<10%) of samples that were interpreted to be PAG and mill ore containing primarily sulfide zone material had a generally high proportion (>80%) of samples that were interpreted to be PAG. Transition zone samples, which were a small sample subset in both the leach ore and mill ore, were mostly identified as PAG.

17.4 Closure and Reclamation Considerations

No specific closure or reclamation requirements exist in Mexico. Wood reviewed the closure assumptions made by M3 (2009) and conducted a check of the cost estimate based on the M3 assumptions.

A store-and-release approach was used for closure of the heap leach pad, WRSFs, and TSF. This will include

- Recontouring slopes to a 3H:1V ratio to allow equipment to still operate. A portion of this work may be able to be completed concurrent with operations
- Covering facilities with an approximately 0.3 m thick layer of earth that is:
  - Capable of supporting vegetation
  - Of sufficient thickness to absorb precipitation during rainy periods
  - Capable of releasing the absorbed moisture through evapotranspiration during dry periods such that the fluids do not accumulate within the piles.
  - The final 0.3 m thick layer of soil on the TSFs will require an equivalent of 1.2 m to be deposited, as M3 assumed that a portion of the layer would sink into the underlying tailings material.

Other assumptions provided in the M3 closure included:

- Buildings and equipment would be removed, and anchor bolts bent over. The building site will be scarified and seeded with native seed. Some native species will be transplanted from storage where available.
- Soil stockpiled during the early construction stages would be used to better support revegetation activities.

In conducting a check of the M3 cost and closure assumptions, Wood including the following assumptions for closure

- Covering building foundations with growth media
- Construction of permanent diversion channels
- Management of drain down solution from the TSF and HLF including construction of evaporation cells
- Miscellaneous facility demolition including pipelines and powerlines
- Water quality monitoring for a period of five years after closure
- Miscellaneous cost including engineering cost and contingencies.

With the additional assumptions included, Wood estimates that the closure cost would be approximately US$125 M. Some of the closure costs can be allocated during active mining including concurrent grading of parts of the heap leach facility, TSF and WRSFs.

17.5 Permitting

Southern Copper's Environmental Management identified the list of permit requirements summarized in Table 17-1 for the mine operations area and in Table 17-2 for the proposed process plant and desalination plant areas.

17.6 Protected Areas

17.6.1 Background

The El Arco Project is within in the Valle de los Cirios Flora and Fauna Protection Area, which was originally decreed as such in 1980 and later recategorized in 2000. The Management Plan for this protected natural area was published in the Official Gazette of the Federation in 2013 (Diario Oficial de La Federación).

The Project is subject to the provisions of the Baja California State Ecological Ordinance Program (2014) that defines the ecological regulation criteria for the preservation, protection, restoration and sustainable use of natural resources applicable to different areas of the State. It provides for mining activity under certain restrictions in some areas of the State's territory, including the El Arco Project.

Table 17-1: Required Construction and Operating Permits And Approvals—Mine Site

Permit/Approval Name	**Approving Authority**
Pre-construction period	
Use change on forest land /construction permit	Municipality of San Quintin
MIA – Environmental Impact Assessment	SEMARNAT
Construction water well	CONAGUA
Surface use change	SEMARNAT
Risk analysis	SEMARNAT
Access road improvement	SEMARNAT
Land for town relocation	Ejido*, Municipality of San Quintin
Town relocation	SEMARNAT
Town access road	SEMARNAT
Transmission line right-of-way	Local Landowners
Power and water transmission lines	CFE, CONAGUA
Sand and gravel borrow pit	CONAGUA
Clay borrow pit	SEMARNAT
Access road right-of-way	Local landowners
Access road construction water supply	CONAGUA
Surface water diversion	CONAGUA
Equipment importation permit	SHCP
Pre-operations period	
Operations water supply	SIDURT
Garbage dump	SIDURT
Camp sewage treatment plant	CONAGUA
Camp water supply	CONAGUA
Air quality permit	SEMARNAT
Explosives permit – mine	SEDENA
Explosives permit – road construction	SEDENA
Operations period	
Closure plan	SEMARNAT
Unique environmental license	SEMARNAT

Table 17-2: Required Construction and Operating Permits And Approvals—Power and Desalination Plants

Permit/Approval Name	Approving Authority
Pre-Construction Period	
Land Use agreement/construction permit	Municipality
MIA – Environmental Impact Asessment	SEMARNAT
Risk analysis	SEMARNAT
Construction water well	CONAGUA
Surface use change	SEMARNAT
Access Road improvement	SEMARNAT
Transmission line right-of-way	Local Landowners
Power and water transmission lines	CFE, CONAGUA
Sand and gravel borrow pit	CONAGUA
Clay borrow pit	SEMARNAT
Access road right-of-way	Local Landowners
Surface water diversion	CONAGUA
Access road construction water supply	CONAGUA
Equipment importation permit	Hacienda
Pre-Operations Period	
Operations water supply	SIDURT
Refuse facility	SIDURT
Camp sewage treatment plant	CONAGUA
Camp water supply	CONAGUA
Air quality permit	SEMARNAT
Explosives permit – road construction	SEDENA
Operations Period	
Closure plan	SEMARNAT
Unique environmental license	SEMARNAT

Note: CFE: Federal Electrical Commission (Comisión Federal de Electricidad); CONAGUA = National Water Commission (Comisión Nacional del Agua); SEDENA = Secretariat of National Defense (Secretaría de la Defensa Nacional); SEMARNAT: Secretariat of Environment and Natural Resources (Secretaría del Medio Ambiente y Recursos Naturales); SHCP = Ministry of Finance and Public Credit (Secretaría de Hacienda y Crédito Público); SIDURT = Secretariat of Infrastructure, Urban Development and Territorial Reorganization (Secretaría de Infraestructura, Desarrollo Urbano y Reordenación Territorial) Baja California.

Article 28 of the General Law of Ecological Balance and Environmental Protection (LGEEPA), requires that exploration, exploitation and beneficiation of minerals and supporting works and activities in protected natural areas under the jurisdiction of the Federation must undergo an environmental impact assessment, which is the procedure by which SEMARNAT establishes conditions for performance of work and activities that may cause ecological imbalance or exceed the limits and conditions established in the applicable provisions to protect the environment and preserve and restore ecosystems, to avoid or minimize their negative effects on the environment.

Any exploration or exploitation activities require prior authorization from the Secretariat.

Regulations promulgated as a result of the General Law of Ecological Balance and Environmental Protection in the matter of protected Natural Areas establish that protected natural areas must have a Management Program (Article 72) that has as its objective the administration of the Protected Natural Area.

The Management Program will contain a description of the physical and biological characteristics of the protected natural area, the actions to be carried out, the sustainable use of natural resources, its link with the National Development Plan, as well as the corresponding sector programs, in accordance with article 66 of the LGEEPA.

Articles 77 and 78 of the Regulation require that the Management Program be reviewed at least every five years in order to evaluate its effectiveness and propose possible modifications. The Management Program may be modified in whole or in part, when it is inadequate for the fulfillment of the objectives of the protected natural area. The Secretariat will request the opinion of the respective Advisory Council for this type of change.

After analysis and opinion of the Advisory Council of the protected natural area in question, the management program may be modified when, among other things, it is technically demonstrated that strategies or actions established in the current program cannot be fulfilled, or the need to adapt the delimitation, extension or location of the subzones indicated in the corresponding declaration.

17.6.2 Permitting Strategy

A strategy is proposed that contemplates two parallel sequences:

- Obtain authorization in terms of environmental impact
- Obtain approval to modify the Valle de Los Cirios Flora and Fauna Protection Area Management Plan (the Management Plan).

17.6.2.1 Environmental Impact Permit

A regional environmental impact statement is required to be submitted. This authorization must be obtained for those projects that intend to develop in sites where, due to their interaction with the different regional environmental components, cumulative, synergistic or residual impacts are anticipated that could cause the destruction, isolation or fragmentation of an ecosystem, according to section IV of article 11 of the LGEEPA Regulations on Environmental Impact Assessment.

The application is expected to be submitted in the course of 2022. In accordance with article 35bis of the LGEEPA, the authority has 60 days from receipt of the environmental impact statement to issue comments, but may request clarifications, rectifications or extensions to the content. Depending on the complexity and size of a work, the Secretariat could extend the evaluation period for an additional 60 days.

17.6.2.2 Valle de los Cirios Flora and Fauna Protection Area Management Plan

The Management Plan recognizes mining as a historical and relevant activity for the region, and also envisages the possibility of performing mining activities in the special exploitation subzone where the El Arco Project is located.

One of the goals is to work together with private companies and the University to carry out studies that will allow the identification of mitigation and compensation measures.

Studies are planned to define the garambullo monstruoso population that is present in the demarcated preservation polygons within the El Arco Project area, with the aims of:

- Determining the conditions that promote endemism
- Development of techniques and procedures for in vitro and tissue reproduction of the cacti, to establish the scientific basis for translocation of existing populations to other sites that meet the conditions that currently exist in the Project area preservation subzones.

The studies will be performed by experts from the Autonomous University of Baja California through the Advisory Council of the protected natural area. Southern Copper and the University will participate with the goal of modifying the Management Plan, delimiting the preservation subzones, while remaining within the environmental regulations.

The studies will also be performed in consultation with, and under the supervision of, the Directorate of the protected natural area.

17.6.2.3 Current Activities

The El Arco environmental team is in the process of updating the EIA and completing a report that includes a garambullo monstruoso census within the Project area, a review of whether relocation of specimens is feasible, and what propagation measures to increase the cactus numbers can be undertaken. The report will also review similar considerations for the other endemic and endangered species within the Project area.

17.7 Social Considerations, Plans, Negotiations and Agreements

17.7.1 Social Baseline

Southern Copper has developed a socio-economic baseline with information collected from 2010–2021 for two municipalities:

- Ensenada (Baja California province)
- Mulegé (Guerrero Negro and El Vizcaíno, Baja California Sur province).

This includes information on socio-demographic, economic, employment, education, health, culture, and services. All social studies were developed in accordance with Southern Copper's corporate procedures, which assure proper methodologies and results.

In addition, Southern Copper completed two assessments (Diagnósticos de valor compartido) collecting data on demographics, education, environmental, health, safety and economic development in the area of their social influence area:

- 2013–2015: 17 interviews and 90 surveys
- 2016–2019: 180 workshops.

There is an Indigenous presence (Cochimis population) in Guerrero Negro, and Southern Copper has attempted, through different participatory mechanisms, to ensure their active participation in social programs of the community development model. One such initiative is the "Rescatando la lengua Cochimí", a project to preserve the Cochimis language. Cochimis descendants have been volunteers in summer activities organized by Southern Copper, have led workshops, and are members of the Community Committee.

The Project covers the ejidos of Costeño and Confederación Nacional Campesina.

The community development model is based on a policy of good neighbors, creating economic and human development. Social baseline data and diagnoses are key to identifying expectations and local needs, to guide project proposals (Proyectos por convocatoria) presented by the population and assessed by community committees.

Southern Copper created two community committees with memorandum of conformation and evidence for their meetings and activities (memoranda, documents, photos):

- Unidos Villa Morelos, established 28 February, 2019
- Guerrero Negro, established 20 February, 2020.

The community committees comprise a voluntary, diverse, and transparent citizen participation structure that encourage a social relationship between communities and Southern Copper, in which opinions are presented, and proposed community projects are analyzed and approved.

Casa Grande is a local Southern Copper office in Guerrero Negro established to provide information about the Project and clarify any questions and concerns. Casa Grande has been open since October 2014 with 3,500 visits per year. There is documentation of such visits (list of participants, photos, and reports).

The Community Care Service was established to receive and serve all the concerns, suggestions, complaints, special cases or contingency reports that arise from the community in relation to the El Arco Project. There is evidence of the ongoing mechanisms 24/7 (photos, flyers, systematization of logs). There were few grievances for the period 2019–2021, and all such issues were attended to and replied to properly. There were six cases from January 2019 to March 2021. Five were received through social teams from Southern Copper and one was lodged via the free phone line.

Other supporting documents related to social management and understanding of social influence area prepared and regularly updated by Southern Copper are:

- 2020 Sustainability Report
- General Policy for Human Rights
- Social risks analysis (based on a matrix of social risks of Southern Copper corporate) and stakeholder mapping.

Stakeholder mapping includes identification of the level of influence and level of impact for villages, institutions, and leaders.

Different communication and participatory mechanisms are used to provide Project information to the general population and stakeholders, such as newsletters, face-to-face meetings, interviews, surveys, home visits, and social networks. Virtual platforms are more relevant since the Covid-19 pandemic.

17.7.2 Community Development Model

Southern Copper has prepared a matrix of positive and negative social impacts of the exploration, mine construction, and mine operations stage, where mitigation measures were included. Such measured included economic and social development activities, communication programs, environmental education, grievance mechanisms, environmental community committee, and a road safety campaign. It is at an early assessment stage, as plans for developing the project are still being finalized.

The community development model includes three key fundamentals: good neighbors, economic and human development. Each key fundamental has programs and activities, that includes in its Social Management Plan, goals and indicators for a proper follow-up. The main programs and examples are presented in Table 17-3.

All activities, programs, projects, and participatory mechanisms framed as part of the community development model will help strengthen relations between Southern Copper and the Project's their social influence area and contribute to obtaining the social license for the Project.

17.7.3 Social Agreements

Southern Copper has executed several projects and programs since 2013 as part of their Social Management Plan. The social strategy was based on the shared value diagnosis and aimed to create capabilities, environmental awareness, healthy lifestyles and educational activities.

From 2014 to 2016, there were 419 activities, more than 5,600 beneficiaries, and engagement with more than 14 institutions.

From 2017 to 2018, there were 163 activities, more than 4,266 beneficiaries and 709 volunteers.

In parallel, Southern Copper has had social engagement with numerous institutions and persons, including researchers, schools, universities, local organizations, non-governmental organizations, among others.

Table 17-3: Programs Envisaged Within Community Development Model

Fundamental for Model	Programs	Examples
Good neighbors	Social participatory diagnosis (two) Humanitarian support (Covid-19) Community Care Service	Delivery of an irrigation system to the Ejido Costeño in 2021. Medical products to prevent Covid-19 spread in the region. Open a free phone line for medical orientation and psychological support (24/7).
Economic development	Forjando futuro program (Forging our future)	Training 27 entrepreneurs in 2020 Program for local providers and program for local employment (not yet executed)
Human development	Casa Grande Projects requested by community initiative (Proyectos por convocatoria)	800 activities to promote environmental care and protection, education, healthy lifestyle. 23 social projects designed and operated by the communities.

17.7.4 Land Negotiations

Southern Copper signed a social agreement with the Ejido Confederación Nacional Campesina in 2009, and acquired 22,174.29 ha between 2010 and 2015. Currently, the company is in negotiations with the Ejido Costeño to acquire 15,000 ha.

According to the regulatory requirements, if the surface rights belong to an ejido, the concessionaire can establish an agreement with the community within the framework of the Agrarian Legislation. This agreement would then be registered in the National Agrarian Registry and in the same way, although without being binding, in the Mining Public Registry (Registro Público de Minería).

17.8 Qualified Person's Opinion on Adequacy of Current Plans to Address Issues

Southern Copper provided Wood with supporting documentation on their studies to recognize the issues that might be of a concern to the local communities and that documentation meets or exceeds what is expected for pre-feasibility-level studies. In addition, Southern Copper established mechanisms for citizen participation and opened communication channels to provide attention and answers for community concerns and address grievances.

Southern Copper provided Wood with supporting information that demonstrates that Southern Copper have a process in place to obtain the "social license" to permit, construct, and operate the El Arco mine. The information provided by Southern Copper on obtaining a social license meets or exceeds that required for a pre-feasibility-level study.

Southern Copper has a community development model based on a policy of good neighbors, economic development, and human development. This model allows Southern Copper to identify expectations, local needs, and social issues, and engage with communities and other stakeholders to provide solutions. Southern Copper provided Wood with information supporting Southern Copper's method to recognize and mitigate social issues that may come up during pre-development, development, mine operating activities and mine closure. Southern Copper's plan is considered to meet or exceed industry-accepted practice.

Southern Copper confirmed to Wood that the company has proper internal controls and follows up on social projects and programs, which supports the process for establishing social communication. Community understanding of the Project has been well advanced by Southern Copper, and the process for implementing social programs is operating as intended.

The El Arco Project is undergoing definition studies, and at this point social risks are considered well-understood and manageable. The Project is in a favorable mining community, steps have been taken by Southern Copper to mitigate surface rights ownership risk for the Project and there are no large communities directly affected by the proposed mine development. The neighboring communities have generally expressed support for the economic development and human development opportunities that the Project offers and will continue to offer.

However, El Arco remains subject to risks that may arise, including:

- Potential social conflicts based on negative perceptions from the communities or authorities (unfulfilled expectations, new leaderships with new ideas of agreements, changes in the community boundaries, among other reasons)
- Unfavourable changes by the government in mining policies and mining regulations
- Organizations lobbying for an anti-mining culture.

18 CAPITAL AND OPERATING COSTS

18.1 Introduction

Capital and operating costs are reported using the criteria set out in S-K1300, and have a pre-feasibility accuracy level of ±25%, and a contingency allocation of ≤15%.

18.2 Capital Cost Estimates

A mining study on the Project was completed by third-party consultants in 2009. Wood completed a gap analysis on that study.

The 2009 mining study assumed a production rate of 100,000 t/d production of sulfide ore, and an oxide operation with nominal production capacity of 35,000 t/a of copper cathodes. The 2009 study was based on capital cost estimate pricing obtained in 2008. In 2011, the 2009 study was used as a basis for an updated capital cost estimate. There were no more recent studies available to Wood. The cost estimates used in this Report are supported by (2009) quotes escalated to Q2 2021 as well as recent quotes for major mining equipment obtained for other Southern Copper projects.

18.2.1 Basis of Estimate

The capital cost estimate includes:

- Mining: assumes an Owner-operated mine; consists of mining equipment, mine development (pre-stripping) and mine facilities including access roads, power supply and distribution, supporting infrastructure (workshops, storage, fuel, offices, change rooms)
- Process plant: consists of sulfide ore crushing, conveying systems, grinding, classification, flotation, regrind, thickening, filtration and dewatering of concentrates, tailings disposal and ancillary services. The oxide plant consists of ore crushing, a static leach pad and a SX/EW plant
- Plant infrastructure: consists of general plant buildings such as: administration building, workshops and storage, laboratory, and other supporting facilities (e.g., change house, control rooms, dining room, first aid, gatehouse, reagents storage, and water treatment plant)
- Off-site infrastructure: consists of the site access road from the plant site to the port of El Barril (about 70 km) and improvements on the Guerrero Negro to El Arco road

(approximately 40 km); a transmission line to the El Barril; water supply consisting of sea water intake, desalination plant, pumping and an approximately 78 km long pipeline, and water storage near site; and camp.

A period of 48 months, starting at the beginning of year -3, was allocated to engineering development, procurement and overall project construction. Year 1 corresponds to the start of cathode copper production. Concentration facilities are assumed to be completed in year 1, with operations starting in year 2.

All capital costs were expressed in Q2 2021 US$ unless otherwise stated. Where costs used in the estimate were provided in currencies other than US$, the following exchange rates were used:

- 2021: 1 US$ = 22 MXN.

No allowances were made for fluctuations in exchange rates.

A rate by manhours approach was used to develop the overall installation cost which formed the basis for all discipline cost adjustments. The overall labour rate was updated from 2011 to Q2 2021 using normalization factors. Indices were calculated based on installation rates from recent projects in Mexico.

Overall material and equipment supply costs were updated from 2011 to 2021 using normalization factors. Indices were calculated based on recent costs from global suppliers. Contractor indirect costs were reported separately.

Costs for the TSF, WRSFs, and the heap leach facility were estimated based on revised material take-offs, using normalized costs from the 2008 quotes.

The water supply pumping system and its components were reviewed due to a change in the location of the desalination plant from that assumed in the 2009 study.

18.2.2 Mining

The cost estimates used in this Report are based on the 2009 and 2011 studies, as applicable, and escalated to second-quarter Q2 2021. The studies are supported by 2009 quotes escalated to current dollars as well as recent quotes for similar equipment for other Southern Copper projects where required, for major capital items. Estimates are provided on a "ready-to-work at the mine site" basis, and included costs for transportation from factory to the proposed mine site including port charges in the country of origin, ocean freight, port charges, customs charges, insurance, land freight, unloading at the mine site, assembly, and commissioning. Starter spares were not included.

The ancillary equipment was divided in two groups:

- Mine maintenance support
- Mine operations support.

The ancillary list also included one replacement front shovel bucket and one replacement truck dump body and rims. Capital costs were based on information sourced from CostMine (2018) and vendor quotations for similar projects located in Northern Mexico.

18.2.3 Process

Major process and infrastructure equipment costs were based on firm quotations obtained by Southern Copper in 2008, normalized to Q2 2021. Bulk material and minor equipment costs were based on the 2009 study, escalated to 2021 using normalization factors.

18.2.4 Construction

Indirect field costs were estimated as follows:

- Mobilization: included at 0.4% of direct costs excluding TSF, WRSF and heap leach facility
- Construction utilities: included at 0.6% of direct costs excluding TSF, WRSF and heap leach facility
- Camp, busing, and meals: included at $5.06 per direct manhour
- Contractor fee: included in direct costs
- Manufacturing, Maquila and Export Services Industries Program (Immex): included at 1.8% of direct costs. Immex is a foreign trade facilitation instrument created by the Mexican government that allows authorized companies to import goods into Mexico on a temporary basis, to be used in the production of final products destined for export or in rendering export-related services.

Engineering, procurement and construction management (EPCM) costs were estimated at 14.09% of total direct costs and are inclusive of management and accounting, engineering, project services, project control, construction management, EPCM fixed fee, and construction trailers. The TSF, WRSF and heap leach facility EPCM costs were estimated separately.

Vendor representative costs were included at 1.0% of the total equipment supply costs.

Capital spare parts were included at 2% of the total equipment supply costs.

First fills were included at 3.05% of the total equipment supply costs.

Freight was calculated at 10% of the total cost of material and equipment supply. Freight costs exclude mining equipment.

18.2.5 Off-Site Construction Costs

The following facilities were considered to be within the Owner's scope and were updated by applying a normalization factor of 1.313:

- Permanent housing
- Communications and computer equipment
- Fuel unloading system
- Power transmission line and power distribution line
- Water plant and water intake system
- Pipeline and water wells
- General port facilities
- Access road from El Arco to El Barril
- Access road from El Arco to the junction with the federal highway.

18.2.6 Owner's Cost

An allowance was included for Owner's costs based on the 2009 study.

18.2.7 Contingency

The overall contingency was allocated at 14.69% of the total Project cost.

18.2.8 Sustaining Capital

Sustaining capital costs were estimated by area and allocated over time using the same basis as the initial capital cost estimate. Sustaining capital costs are summarized in

18.2.9 Capital Cost Estimate Summary

The capital cost estimate totals US$4,325.7 M, consisting of US$3,537.1 M in initial capital and US$788.6 M in sustaining capital. The sustaining capital estimate summary is provided in Table 18-1, and the overall capital cost estimate is included as Table 18-2.

18.3 Operating Cost Estimates

18.3.1 Basis of Estimate

Operating costs were based on the 2009 study, updated using Wood's experience, data from Southern Copper's operating mines in Mexico and Peru, and the proposed mine and process plans.

18.3.2 Mining Costs

Operating costs incorporated operational life, average availabilities, and efficiencies for the major mine equipment fleet. The equipment operating time inputs are vendor estimates and Southern Copper's experience with similar operations, adjusted by Wood to reflect operational considerations for the El Arco Project. To better estimate equipment requirements in the early years, the annual period availability was applied to the primary trucks, shovels, and drills.

Wood used industry drill calculators to estimate instantaneous penetration rates and drill productivity.

Explosives costs were estimated from calculated powder factors and costs provided by Southern Copper, and based on data from their operating open pit mines in Mexico and Peru.

Most of the inputs and main consumable costs were provided by Southern Copper. Blasting accessory costs were based on supplier quotes obtained by Wood for similar projects.

Load-and-haul design criteria were based on the operational parameters from other mines operated by Southern Copper in the region.

Vehicle speeds and diesel consumption were based on grouping roads with similar inclinations into segments.

The mine equipment power consumption was provided by Southern Copper.

Table 18-1: Sustaining Capital Cost Estimate

Component	Cost Estimate (US$ M)
Mining equipment	480.0
Tailings storage facility	106.1
Heap leach facility	100.2
Interlift liner for heap leach facility	102.3
Total	788.6

Note: numbers have been rounded.

Table 18-2: Capital Cost Estimate

Area	Cost Estimate (US$)
Off-site infrastructure	115.7
Site supporting facilities	32.4
Mining	174.0
Sulfide plant	956.7
Oxide plant	348.5
Indirects costs	1,460.1
Contingency	449.7
Total	3,537.1

Note: numbers have been rounded.

Average maintenance parts and repair costs over the equipment life cycle for the major mine equipment were estimated. The maintenance parts and repair cost includes the costs to repair and replace parts, including re-build labor. To simplify the cost model, the main consumable costs such as bucket, bed, undercarriage, and wear parts were included. The replacement cost for truck tires was estimated at US$36,600 with a life of 6,000 hours.

The technical manpower required was estimated based on a typical organizational structure, based on data from other existing operations and Wood's experience.

Salaries were benchmarked by Wood.

Mine operating costs are forecast to average US$1.80/t mined over the LOM.

The total material mined is forecast to be 2,216 Mt. During the initial years of production, mining costs are above the LOM average because of ramp-up inefficiencies. Mining costs in years 2–14 are below the LOM average as full production efficiencies are realized in combination with in-pit haulage segments that remain relatively short due to phasing and the El Arco open pit deepening gradually. As the El Arco pit deepens beyond year 14, the mining costs increase beyond the LOM average cost, primarily because of increased haulage requirements.

18.3.3 Process Costs

Process plant operating costs included the following major areas:

- Concentrator operating and maintenance costs: power, labor, reagents, grinding media and wear parts, maintenance, water, supplies
- SX/EW operating and maintenance costs: power, labor, reagents, sulfuric acid, steel (liners), maintenance, water, supplies

Concentrator costs are estimated at US$207.5 M/a, or an average of US$5.69/t sulfide ore processed. SX/EW operating and maintenance costs are estimated at a LOM total of US$45.3 M/a, averaging US$0.58/lb Cu produced.

18.3.4 General and Administrative

The El Arco open pit mine will operate seven days a week, 24 hours a day with three shifts rotating to fill the proposed mine roster of 14 x 7. The technical and supervision personnel will work in rotations of two shifts. General and administrative labor costs were based on 121 full-time employees including management, medical personnel, human resources, security, finance, procurement and logistics, community relations and environmental, and services. The total estimated annual G&A operating costs were approximately US$25 M/a or US$0.70/t of mill processed ore (Table 18-3).

18.3.5 Operating Cost Estimate Summary

Table 18-4 is a summary of the operating cost estimates, exclusive of value-added taxes.

Table 18-3: Estimated G&A Costs

Area	US$ M/a	US$/t ore
Labor	2.1	0.06
Expenses	22.9	0.63
Total	***25.0***	***0.70***

Note: Numbers have been rounded. Totals may not sum due to rounding

Table 18-4: LOM Operating Cost Estimate

Description	Total (US$M)	Unit Cost	
Mining	3,953.8	US$/t mined	1.80
Process	7,385.7	US$/t processed	5.39
G&A	861.1	US$ M/a	25.0
Total	***12,200.6***		

Note: Numbers have been rounded. Totals may not sum due to rounding.

19 ECONOMIC ANALYSIS

19.1 Forward-looking Information Caution

Certain information and statements contained in this section are forward-looking in nature and are subject to known and unknown risks, uncertainties, and other factors, many of which cannot be controlled or predicted and may cause actual results to differ materially from those presented here. Forward-looking statements include, but are not limited to, statements with respect to the economic and study parameters of the El Arco Project; mineral reserves; the cost and timing of any development of the El Arco Project; the proposed mine plan and mining strategy; dilution and extraction recoveries; processing method and rates; mine production rates; projected metallurgical recovery rates; infrastructure requirements; power supply, water and geotechnical assumptions, proposed infrastructure assumptions may change; capital, operating and sustaining cost estimates; concentrates and cathodes marketability and commercial terms; the projected LOM and other expected attributes of the Project; the net present value (NPV), internal rate of return (IRR) and payback period of capital; future metal prices and currency exchange rates; government regulations and permitting timelines; taxes applicable to the Project; estimates of reclamation obligations; requirements for additional capital; environmental and social risks; and general business and economic conditions.

19.2 Methodology

The financial analysis was performed using a discounted cash flow (DCF) method. 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).

The financial model that supports the mineral reserve declaration was a standalone model that calculated annual cash flows based on: scheduled ore production; assumed processing recoveries; metal sale prices and MXN/US$ exchange rate; projected operating and capital costs; and estimated taxes.

The financial analysis was based on an after-tax discount rate of 10%. Cash flows were assumed to occur at the end of each calendar year and were discounted to the start of construction (beginning of Year -3). Cash flows were reported based on generic years (e.g., Year -2, Year -1, Year 1, Year 2, Year 3).

Costs projected within the cash flows are based on constant Q2 2021 US dollars.

Revenue was calculated from the recoverable metal and the long-term forecasts of metal prices and exchange rates.

The IRR, expressed as the discount rate that yields a NPV of zero, and the payback period, expressed as the estimated time from the start of production until all initial capital expenditures were recovered, were also estimated.

19.3 Input Parameters

The mineral reserves estimate was provided in Chapter 12.5. The projected mine life is 35 years. The metallurgical recovery forecast was provided in Chapter 10.4. Commodity prices were discussed in Chapter 16.2.

Capital costs were summarized in Chapter 18.2. Operating costs were summarized in Chapter 18.3. Capital and operating costs were reported using Q2 2021 US$.

The only royalties are those payable to the Mexican Government. Royalties were summarized in Chapter 3.2.3.

Closure costs are applied as incurred based on the proposed closure schedule described in Chapter 17.7. It was assumed that closure cost accruals are not required, and closure obligations will be satisfied by either a bond or a bank letter of credit.

The working capital allowance assumes 60 days in accounts receivable (including revenue), and 30 days in accounts payable (including concentrate and cathode selling costs and operating costs). Salvage value is assumed to be zero.

The economic analysis is based on 100% equity financing and is reported on a 100% project ownership basis. The base case economic analysis assumes constant prices with no inflationary adjustments.

Metal prices used, and the basis for that pricing is discussed in Chapter 16. The metal prices for the cashflow analysis were:

- Copper price: $3.30/lb
- Gold price: $1,600/oz
- Silver price: $20.70/oz
- Molybdenum price = $9.00/lb.

The forecast exchange rate used is 1.00 USD = 22.00 MXN. The exchange rate forecast was provided by Southern Copper.

19.4 Commercial Terms

Long-term commercial terms and charges were provided by Southern Copper. These are based on contract terms from Southern Copper's other operations in Mexico. Transport costs were based on estimates provided by Southern Copper.

19.4.1 Copper Concentrates

For the purposes of the cashflow analysis, copper concentrates are assumed to be sold into the Asian market, e.g., to China, Japan, Korea, Taiwan, or the Philippines. The following assumptions were applied in the cashflow analysis:

- Pay factors:
  - Pay for 96.5% of copper content, subject to a minimum deduction of 1.0 unit
  - Pay for 90.0% of gold content, subject to a minimum deduction of 1.0 g/dmt
  - Pay for 90.0% of silver content, subject to a minimum deduction of 20.0 g/dmt
- No price participation applicable
- Treatment and refining charges (TC/RCs):
  - TC = US$90.0/dmt
  - Cu RC = US$0.09/lb Cu payable
  - Au RC = US$5.00/oz Au payable
  - Ag RC = US$0.35/oz Ag payable
- A concentrate transport loss of 0.5% (based on benchmark)
- A concentrate moisture of 9.0%
- Transport and freight costs of:
  - Land transport (assuming an approximate distance of 80 km from project site to San Francisquito (next to El Barril)): US$13.50/wet metric tonne (wmt)
  - Port charges (at San Francisquito and Guaymas ports): US$13.58/wmt
  - Ocean freight (from Guaymas port to Asia): US$80.61/wmt
  - Resulting total transport costs of US$107.69/wmt.

19.4.2 Molybdenum Concentrates

The molybdenum concentrate is assumed to be sold to Molymex, which is a molybdenum process plant owned by a third party located in Cumpas, Sonora, Mexico. The minimum concentrate grade required by Molymex is 50% Mo. The following assumptions were applied in the cashflow analysis:

- Pay for 100.0% of molybdenum content
- No price participation applicable
- Treatment and refining charges (TC/RCs): 12.5% of the applicable Mo price, with a minimum deduction of US$1.00/lb and a maximum deduction of US$1.80/lb
- No penalties apply
- A concentrate transport loss of 0.2% (based on benchmark)
- A concentrate moisture of 2.0%
- Transport and freight costs of, assuming the route from project site to projected port facilities at San Francisquito (next to El Barril), sea freight from San Francisquito to Guaymas port, land transport from Guaymas port to Molymex facilities located in Cumpas, Sonora:
  - Land transport (assuming an approximate distance of 80 km from project site to San Francisquito (next to El Barril)): US$13.50/wmt
  - Port charges (at San Francisquito and Guaymas ports): US$27.88/wmt
  - Land transport from Guaymas to Molymex (assuming an approximate distance of 350 km by truck): US$32.29/wmt.
  - Resulting total transport costs of US$73.67/wmt.

19.4.3 Copper Cathodes

The copper cathodes are assumed to be sold to Asia and the USA, with approximately 50% of the sales to each region. The following assumptions were applied in the cashflow analysis:

- Copper content in cathodes = 100%
- Pay factors:
  - Pay for 100% of the copper content subject to the following premiums:

    - Asia: US$55/t premium
    - USA: no premium
- No price participation applicable
- Transport and freight costs of:
  - Land transport (assuming an approximate distance of 80 km from project site to San Francisquito (next to El Barril)): US$12.15/wmt
  - Port charges (at San Francisquito and Guaymas ports): US$25.09/wmt
  - Ocean freight (from Guaymas port to Asia)): US$80.00/wmt
  - Land transport from Guaymas port to Nogales AZ (≈425 km by rail): US$33.00/wmt
  - Resulting total transport costs for cathode from the mine site to Asia of US$117.24/wmt
  - Resulting total transport costs for cathode from the mine site to Nogales of US$70.24/wmt.

19.5 Taxation Considerations

The taxation modeled within the financial analysis is based on the taxation scheme that was provided and validated by Southern Copper (refer to Chapter 25.2 for reliance on registrant for macroeconomic trends).

The assumptions included:

- All expenses to be applied excluding value-added tax (IVA in the Spanish acronym)
- The following payments apply throughout the LOM:
  - Mining concessions: MXN19,351,850/a
  - Property payment: MXN61,865/a
  - Federal Maritime Terrestrial Zone Law and Shoreline: MXN919,458/a
- Extraordinary gold and silver tax rate of 0.5%:
  - Not deductible for special mining tax
  - Deductible for profit sharing tax and income tax

- Special mining tax rate of 7.5% (applied on earnings before interest, taxes, depreciation and amortization (EBITDA))
  - Deductible for profit sharing tax and income tax
- Profit sharing tax rate of 10% (applied on taxable income after deduction of special mining tax and extraordinary gold and silver royalty)
  - Deductible for income tax
- Corporate income tax rate of 30.0%
- Tax losses, if any, carried forward for a maximum of 10 years, otherwise lost

Tax depreciation will be straight line and will be split into the following categories:

- 1-year (expensed when incurred): mine development (pre-stripping) and capitalized operating costs
- 8 years: mining equipment
- 10 years: all other assets.

No previous expenses were depreciated or amortized in the analysis.

19.6 Results of Economic Analysis

The El Arco Project is anticipated to generate a pre-tax NPV of US$1,937.9 M at a 10.0% discount rate, an IRR of 17.7% and a payback of 4.9 years.

The financial analysis results show an after-tax NPV of US$474.8 M at a 10.0% discount rate, an IRR of 12.1% and a payback of 6.5 years.

Table 19-1 presents a summary of the financial analysis results. The cashflow on an annualized basis is provided in Table 19-2 to Table 19-6.

Table 19-1: Summary of Economic Results

Description	Units	Value
Mine life	Years	35
Copper payable	Mt	4.3
Gold payable	Moz	2.6
Silver payable	Moz	24.4
Molybdenum payable	Mt	0.04
After-Tax Valuation Indicators		
Undiscounted cash flow	US$M	8,929.8
NPV @ 10.0%	US$M	474.8
Payback period (from start of operations)	years	6.5
IRR	%	12.1
Project capital (initial)	US$M	3,537.1
Sustaining capital	US$M	788.6
Closure cost	US$M	125.0
Mining operating cost	US$M	3,953.8
Process operating cost	US$M	7,385.7
G&A	US$M	861.1

Note: Numbers have been rounded. Totals may not sum due to rounding.

Table 19-2: Cash Flow Forecast on an Annual Basis (Year -3 to Year 4)

	Units	Total	-3	-2	-1	1	2	3	4
Mine Production									
Waste mined	kt	805,606	—	—	9,539	9,575	1,718	722	3,516
Total ore mined	kt	1,410,027	—	—	10,461	20,425	58,282	61,378	50,984
Sulfide Ore Mined									
Sulfide ore mined	kt	1,229,540	—	—	106	60	28,164	37,727	49,243
Cu head grade	%	0.399	0.000	0.000	0.398	0.440	0.554	0.510	0.482
Au head grade	g/t	0.14	—	—	0.11	0.12	0.21	0.19	0.19
Ag head grade	g/t	1.78	—	—	1.78	2.00	2.31	1.95	1.85
Mo head grade	%	0.006%	0.000%	0.000%	0.006%	0.005%	0.005%	0.007%	0.006%
Oxide Ore Mined									
Oxide ore mined	kt	180,487	—	—	10,355	20,364	30,119	23,650	1,741
Cu head grade	%	0.236	0.000	0.000	0.351	0.332	0.384	0.316	0.132
Process Production									
Feed to Mill (Sulfides)									
Sulfide ore processed	kt	1,229,540	—	—	—	—	27,650	36,501	36,501
Cu feed grade	%	0.399	0.000	0.000	0.000	0.000	0.559	0.518	0.522
Au feed grade	g/t	0.14	—	—	—	—	0.21	0.19	0.21
Ag feed grade	g/t	1.78	—	—	—	—	2.32	1.98	1.94
Mo feed grade	%	0.006	0.000	0.000	0.000	0.000	0.005	0.007	0.007
Feed to Leach (Oxides)									
Oxide ore processed	kt	140,519	—	—	—	15,600	14,602	15,600	10,704
Cu feed grade	%	0.273	0.000	0.000	0.000	0.285	0.304	0.285	0.415
Metal Recovery									

	Units	Total	-3	-2	-1	1	2	3	4
Concentration									
Cu recovered	kt	4,221.6	—	—	—	—	133.0	162.7	163.8
Au recovered	koz	3,111	—	—	—	—	105	127	134
Ag recovered	koz	35,373	—	—	—	—	1,035	1,164	1,140
Mo recovered	kt	43.1	—	—	—	—	0.9	1.4	1.4
Leaching									
Cu recovered	kt	307.1	—	—	—	35.6	35.6	35.6	35.6
Payable Metals									
Cu payable	kt	4,339.5	—	—	—	35.6	162.6	191.0	192.0
Au payable	koz	2,555	—	—	—	—	88	105	113
Ag payable	koz	24,393	—	—	—	—	690	741	715
Mo payable	kt	43.0	—	—	—	—	0.9	1.4	1.4
Metal Value									
Cu payable value	US$000	31,579,731	—	—	—	259,698	1,183,794	1,390,610	1,398,146
Au payable value	US$000	4,088,005	—	—	—	—	140,020	168,119	180,045
Ag payable value	US$000	504,927	—	—	—	—	14,278	15,346	14,803
Mo payable value	US$000	853,471	—	—	—	—	17,036	27,271	27,494
Total Metal Value	*US$000*	*37,026,134*	—	—	—	*259,698*	*1,355,128*	*1,601,346*	*1,620,488*
Treatment and Refining Charges (TC&RCs)									
Cu concentrate TC&RCs	US$000	(2,333,589)	—	—	—	—	(73,514)	(89,920)	(90,542)
Mo concentrate TC&RCs	US$000	(106,684)	—	—	—	—	(2,129)	(3,409)	(3,437)
Total TC&RCs	*US$000*	*(2,440,273)*	—	—	—	—	*(75,643)*	*(93,329)*	*(93,979)*
Transport Costs									
Cu concentrate transport	US$000	(1,998,342)	—	—	—	—	(62,946)	(77,034)	(77,547)

	Units	Total	-3	-2	-1	1	2	3	4
Mo concentrate transport	US$000	(5,786)	—	—	—	—	(115)	(185)	(186)
Cathode transport	US$000	(28,786)	—	—	—	(3,334)	(3,334)	(3,334)	(3,334)
Total Transport Costs	*US$000*	*(2,032,914)*	—	—	—	*(3,334)*	*(66,395)*	*(80,552)*	*(81,067)*
Net Smelter Return	*US$000*	*32,552,948*	—	—	—	*256,364*	*1,213,089*	*1,427,464*	*1,445,442*
Production Costs									
Mining	US$000	(3,953,797)	—	—	—	(46,337)	(89,936)	(91,625)	(90,618)
Process	US$000	(7,385,725)	—	—	—	(45,297)	(203,445)	(252,838)	(252,838)
G&A	US$000	(861,055)	—	—	—	(12,505)	(25,010)	(25,010)	(25,010)
Total Production Costs	*US$000*	*(12,200,577)*	—	—	—	*(104,139)*	*(318,391)*	*(369,474)*	*(368,466)*
Property Taxes and Royalty									
Property taxes and payments	US$000	(32,348)	—	—	—	(924)	(924)	(924)	(924)
Extraordinary gold and silver royalty	US$000	(22,965)	—	—	—	—	(771)	(917)	(974)
Total Property Taxes and Royalty	*US$000*	*(55,313)*	—	—	—	*(924)*	*(1,696)*	*(1,842)*	*(1,898)*
Net Operating Earnings	*US$000*	*20,297,057*	—	—	—	*151,301*	*893,002*	*1,056,149*	*1,075,077*
Taxes									
Special mining tax	US$000	(1,523,465)	—	—	—	(11,348)	(67,033)	(79,280)	(80,704)
Profit share	US$000	(1,466,615)	—	—	—	—	(45,896)	(60,287)	(61,801)
Income tax	US$000	(3,926,524)	—	—	—	—	(90,583)	(162,775)	(166,862)
Total Taxes	*US$000*	*(6,916,605)*	—	—	—	*(11,348)*	*(203,512)*	*(302,341)*	*(309,366)*
Capital Costs									
Initial capital	US$000	(3,537,146)	(239,256)	(1,235,767)	(1,490,903)	(571,220)	—	—	—
Sustaining capital	US$000	(788,552)	—	—	—	(96,840)	(15,460)	(69,957)	(20,972)
Total Capital Costs	*US$000*	*(4,325,698)*	*(239,256)*	*(1,235,767)*	*(1,490,903)*	*(668,060)*	*(15,460)*	*(69,957)*	*(20,972)*
Closure Cost									

	Units	Total	-3	-2	-1	1	2	3	4
Closure cost	US$000	(125,000)	—	—	—	—	—	—	—
Working Capital									
Change in working capital	US$000	(0)	—	—	—	(33,857)	(151,061)	(33,658)	(3,134)
Net Cash Flow									
Before tax	US$000	15,846,359	(239,256)	(1,235,767)	(1,490,903)	(550,616)	726,481	952,533	1,050,971
After tax	US$000	8,929,754	(239,256)	(1,235,767)	(1,490,903)	(561,963)	522,969	650,192	741,604

Table 19-3: Cash Flow Forecast on an Annual Basis (Year 5 to Year 12)

	Units	5	6	7	8	9	10	11	12
Mine Production									
Waste mined	kt	10,446	9,467	13,034	12,169	13,223	16,342	13,422	15,425
Total ore mined	kt	53,843	46,844	41,466	42,331	44,576	41,371	41,223	39,229
Sulfide Ore Mined									
Sulfide ore mined	kt	35,518	37,688	36,848	35,807	36,506	33,775	39,916	36,501
Cu head grade	%	0.458	0.460	0.441	0.456	0.476	0.336	0.369	0.426
Au head grade	g/t	0.15	0.16	0.15	0.14	0.15	0.14	0.13	0.14
Ag head grade	g/t	1.80	1.99	1.66	1.72	1.85	1.85	1.67	1.73
Mo head grade	%	0.006	0.007	0.007	0.006	0.005	0.006	0.007	0.007
Oxide Ore Mined									
Oxide ore mined	kt	18,325	9,156	4,618	6,524	8,071	7,596	1,307	2,728
Cu head grade	%	0.183	0.203	0.136	0.127	0.177	0.086	0.080	0.115
Process Production									
Feed to Mill (Sulfide)									

	Units	5	6	7	8	9	10	11	12
Sulfide ore processed	kt	36,501	36,501	36,501	36,501	36,501	36,501	36,501	36,501
Cu feed grade	%	0.456	0.470	0.447	0.455	0.489	0.340	0.379	0.386
Au feed grade	g/t	0.15	0.16	0.15	0.14	0.15	0.14	0.13	0.13
Ag feed grade	g/t	1.79	2.00	1.67	1.72	1.80	1.87	1.70	1.70
Mo feed grade	%	0.006	0.007	0.008	0.006	0.005	0.006	0.007	0.007
Feed to Leach (Oxide)									
Oxide ore processed	kt	15,600	13,749	15,002	15,600	15,600	8,462	—	—
Cu feed grade	%	0.283	0.323	0.296	0.251	0.170	0.086	0.000	0.000
Metal Recovery									
Concentration									
Cu recovered	kt	143.3	147.5	140.3	142.8	153.5	106.6	118.9	121.2
Au recovered	koz	101	104	96	92	100	92	87	87
Ag recovered	koz	1,057	1,179	987	1,012	1,060	1,101	1,003	1,003
Mo recovered	kt	1.3	1.4	1.6	1.2	1.1	1.2	1.5	1.4
Leaching									
Cu recovered	kt	35.4	35.6	35.6	31.3	21.3	5.8	—	—
Payable Metals									
Cu payable	kt	172.2	176.4	169.6	167.7	167.9	107.6	113.5	115.7
Au payable	koz	82	85	77	73	80	78	71	71
Ag payable	koz	685	796	623	641	662	822	694	688
Mo payable	kt	1.3	1.4	1.6	1.2	1.1	1.2	1.5	1.4
Metal Value									
Cu payable value	US$000	1,253,884	1,284,615	1,234,710	1,220,769	1,222,129	783,141	825,955	842,037

	Units	5	6	7	8	9	10	11	12
Au payable value	US$000	131,617	135,985	123,987	116,578	127,270	124,265	114,060	114,075
Ag payable value	US$000	14,189	16,479	12,886	13,272	13,705	17,023	14,371	14,237
Mo payable value	US$000	25,288	27,786	31,138	24,359	21,723	23,712	29,986	27,834
Total Metal Value	*US$000*	*1,424,977*	*1,464,866*	*1,402,721*	*1,374,978*	*1,384,828*	*948,141*	*984,373*	*998,182*
Treatment and Refining Charges (TC&RCs)									
Cu concentrate TC&RCs	US$000	(79,126)	(81,485)	(77,453)	(78,793)	(84,712)	(59,068)	(65,699)	(66,964)
Mo concentrate TC&RCs	US$000	(3,161)	(3,473)	(3,892)	(3,045)	(2,715)	(2,964)	(3,748)	(3,479)
Total TC&RCs	*US$000*	*(82,287)*	*(84,958)*	*(81,345)*	*(81,838)*	*(87,427)*	*(62,032)*	*(69,447)*	*(70,444)*
Transport Costs									
Cu concentrate transport	US$000	(67,820)	(69,814)	(66,414)	(67,587)	(72,666)	(50,464)	(56,261)	(57,357)
Mo concentrate transport	US$000	(171)	(188)	(211)	(165)	(147)	(161)	(203)	(189)
Cathode transport	US$000	(3,315)	(3,334)	(3,334)	(2,934)	(1,994)	(543)	—	—
Total Transport Costs	*US$000*	*(71,306)*	*(73,336)*	*(69,959)*	*(70,686)*	*(74,808)*	*(51,167)*	*(56,464)*	*(57,545)*
Net Smelter Return	*US$000*	*1,271,384*	*1,306,572*	*1,251,416*	*1,222,454*	*1,222,593*	*834,942*	*858,461*	*870,193*
Production Costs									
Mining	US$000	(98,573)	(96,620)	(93,546)	(96,320)	(100,061)	(94,077)	(93,570)	(96,771)
Process	US$000	(252,592)	(252,838)	(252,838)	(247,607)	(235,315)	(216,336)	(207,541)	(207,541)
G&A	US$000	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)
Total Production Costs	*US$000*	*(376,176)*	*(374,468)*	*(371,394)*	*(368,937)*	*(360,386)*	*(335,424)*	*(326,122)*	*(329,323)*
Property Taxes and Royalty									

	Units	5	6	7	8	9	10	11	12
Property taxes and payments	US$000	(924)	(924)	(924)	(924)	(924)	(924)	(924)	(924)
Extraordinary gold and silver royalty	US$000	(729)	(762)	(684)	(649)	(705)	(706)	(642)	(642)
Total Property Taxes and Royalty	*US$000*	*(1,653)*	*(1,687)*	*(1,609)*	*(1,573)*	*(1,629)*	*(1,631)*	*(1,566)*	*(1,566)*
Net Operating Earnings	*US$000*	*893,555*	*930,417*	*878,413*	*851,943*	*860,578*	*497,888*	*530,773*	*539,304*
Taxes									
Special mining tax	US$000	(67,071)	(69,838)	(65,932)	(63,944)	(64,596)	(37,395)	(39,819)	(40,428)
Profit share	US$000	(44,901)	(47,608)	(42,678)	(40,059)	(43,496)	(9,879)	(33,229)	(48,985)
Income tax	US$000	(121,232)	(128,540)	(115,230)	(108,160)	(117,438)	(26,674)	(89,718)	(132,258)
Total Taxes	*US$000*	*(233,205)*	*(245,986)*	*(223,840)*	*(212,163)*	*(225,530)*	*(73,947)*	*(162,765)*	*(221,671)*
Capital Costs									
Initial capital	US$000	—	—	—	—	—	—	—	—
Sustaining capital	US$000	(10,911)	(70,225)	(11,645)	(15,682)	(11,222)	(10,894)	(15,162)	(13,491)
Total Capital Costs	*US$000*	*(10,911)*	*(70,225)*	*(11,645)*	*(15,682)*	*(11,222)*	*(10,894)*	*(15,162)*	*(13,491)*
Closure Cost									
Closure cost	US$000	—	—	—	—	—	—	(500)	(900)
Working Capital									
Change in working capital	US$000	31,009	(6,311)	9,389	4,459	(1,524)	65,702	(5,676)	(1,836)
Net Cash Flow									
Before tax	US$000	913,653	853,881	876,157	840,720	847,832	552,696	509,436	523,077
After tax	US$000	680,448	607,895	652,317	628,557	622,303	478,749	346,671	301,406

Table 19-4: Cash Flow Forecast on an Annual Basis (Year 13 to Year 20)

	Units	13	14	15	16	17	18	19	20
Mine Production									
Waste mined	kt	16,835	27,275	27,272	25,892	27,658	29,328	30,005	37,287
Total ore mined	kt	37,665	35,437	36,632	39,309	42,342	40,672	40,995	37,302
Sulfide Ore Mined									
Sulfide ore mined	kt	36,501	34,522	36,361	37,161	37,959	36,501	36,496	36,089
Cu head grade	%	0.388	0.383	0.420	0.387	0.388	0.376	0.385	0.359
Au head grade	g/t	0.13	0.12	0.13	0.14	0.14	0.16	0.12	0.11
Ag head grade	g/t	1.67	1.58	1.68	1.81	1.87	1.83	1.70	1.43
Mo head grade	%	0.007	0.006	0.005	0.005	0.007	0.007	0.007	0.006
Oxide Ore Mined									
Oxide ore mined	kt	1,164	915	271	2,148	4,383	4,171	4,499	1,213
Cu head grade	%	0.103	0.066	0.191	0.138	0.103	0.095	0.130	0.118
Process Production									
Feed to Mill (Sulfide)									
Sulfide ore processed	kt	36,501	36,501	36,501	36,501	36,501	36,501	36,501	36,500
Cu feed grade	%	0.401	0.398	0.428	0.396	0.396	0.378	0.387	0.358
Au feed grade	g/t	0.13	0.12	0.13	0.14	0.14	0.16	0.12	0.11
Ag feed grade	g/t	1.72	1.59	1.68	1.78	1.88	1.83	1.72	1.43
Mo feed grade	%	0.007	0.006	0.006	0.005	0.007	0.006	0.007	0.006
Feed to Leach (Oxide)									
Oxide ore processed	kt	—	—	—	—	—	—	—	—
Cu feed grade	%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Metal Recovery									

	Units	13	14	15	16	17	18	19	20
Concentration									
Cu recovered	kt	125.8	124.9	134.3	124.2	124.2	118.7	121.6	112.2
Au recovered	koz	84	80	87	92	91	101	78	72
Ag recovered	koz	1,016	939	988	1,050	1,106	1,080	1,011	843
Mo recovered	kt	1.4	1.2	1.2	1.1	1.4	1.4	1.5	1.2
Leaching									
Cu recovered	kt	—	—	—	—	—	—	—	—
Payable Metals									
Cu payable	kt	120.2	119.3	128.3	118.7	118.6	113.4	116.2	107.2
Au payable	koz	68	63	69	75	74	86	62	57
Ag payable	koz	688	614	640	727	783	770	695	551
Mo payable	kt	1.4	1.2	1.2	1.1	1.4	1.3	1.5	1.2
Metal Value									
Cu payable value	US$000	874,420	868,295	933,330	863,271	863,005	824,706	845,092	779,925
Au payable value	US$000	108,132	101,162	110,257	120,649	118,891	137,071	99,131	91,849
Ag payable value	US$000	14,250	12,717	13,241	15,049	16,209	15,949	14,383	11,409
Mo payable value	US$000	28,303	23,987	22,818	21,241	27,707	26,760	29,458	24,251
Total Metal Value	*US$000*	*1,025,105*	*1,006,162*	*1,079,646*	*1,020,210*	*1,025,811*	*1,004,485*	*988,064*	*907,433*
Treatment and Refining Charges (TC&RCs)									
Cu concentrate TC&RCs	US$000	(69,498)	(68,968)	(74,131)	(68,672)	(68,665)	(65,699)	(67,161)	(61,952)
Mo concentrate TC&RCs	US$000	(3,538)	(2,998)	(2,852)	(2,655)	(3,463)	(3,345)	(3,682)	(3,031)
Total TC&RCs	***US$000***	***(73,036)***	***(71,966)***	***(76,983)***	***(71,327)***	***(72,129)***	***(69,044)***	***(70,843)***	***(64,983)***
Transport Costs									
Cu concentrate transport	US$000	(59,562)	(59,145)	(63,575)	(58,803)	(58,785)	(56,176)	(57,565)	(53,126)

	Units	13	14	15	16	17	18	19	20
Mo concentrate transport	US$000	(192)	(163)	(155)	(144)	(188)	(181)	(200)	(164)
Cathode transport	US$000	—	—	—	—	—	—	—	—
Total Transport Costs	*US$000*	*(59,754)*	*(59,308)*	*(63,730)*	*(58,947)*	*(58,973)*	*(56,357)*	*(57,764)*	*(53,290)*
Net Smelter Return	*US$000*	*892,315*	*874,888*	*938,933*	*889,936*	*894,710*	*879,084*	*859,456*	*789,161*
Production Costs									
Mining	US$000	(96,513)	(107,015)	(112,491)	(116,579)	(121,854)	(120,946)	(126,628)	(132,200)
Process	US$000	(207,541)	(207,541)	(207,541)	(207,541)	(207,541)	(207,541)	(207,541)	(207,536)
G&A	US$000	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)
Total Production Costs	*US$000*	*(329,065)*	*(339,567)*	*(345,043)*	*(349,131)*	*(354,406)*	*(353,498)*	*(359,180)*	*(364,746)*
Property Taxes and Royalty									
Property taxes and payments	US$000	(924)	(924)	(924)	(924)	(924)	(924)	(924)	(924)
Extraordinary gold and silver royalty	US$000	(612)	(569)	(617)	(678)	(675)	(765)	(568)	(516)
Total Property Taxes and Royalty	*US$000*	*(1,536)*	*(1,494)*	*(1,542)*	*(1,603)*	*(1,600)*	*(1,689)*	*(1,492)*	*(1,441)*
Net Operating Earnings	*US$000*	*561,714*	*533,828*	*592,349*	*539,203*	*538,705*	*523,897*	*498,785*	*422,974*
Taxes									
Special mining tax	US$000	(42,099)	(40,050)	(44,442)	(40,491)	(40,454)	(39,350)	(37,451)	(31,762)
Profit share	US$000	(50,814)	(48,014)	(52,753)	(47,841)	(47,798)	(45,845)	(43,664)	(36,684)
Income tax	US$000	(137,197)	(129,637)	(142,432)	(129,170)	(129,055)	(123,781)	(117,893)	(99,047)
Total Taxes	*US$000*	*(230,110)*	*(217,701)*	*(239,627)*	*(217,501)*	*(217,307)*	*(208,975)*	*(199,008)*	*(167,492)*
Capital Costs									
Initial capital	US$000	—	—	—	—	—	—	—	—
Sustaining capital	US$000	(28,457)	(23,640)	(58,551)	(17,044)	(1,279)	(59,475)	(11,631)	(1,279)
Total Capital Costs	*US$000*	*(28,457)*	*(23,640)*	*(58,551)*	*(17,044)*	*(1,279)*	*(59,475)*	*(11,631)*	*(1,279)*
Closure Cost									

	Units	13	14	15	16	17	18	19	20
Closure cost	US$000	(1,000)	(400)	(400)	—	—	—	—	—
Working Capital									
Change in working capital	US$000	(4,052)	3,852	(10,854)	9,248	(419)	2,963	3,430	12,862
Net Cash Flow									
Before tax	US$000	528,204	513,641	522,544	531,407	537,007	467,384	490,583	434,558
After tax	US$000	298,094	295,940	282,917	313,906	319,700	258,409	291,575	267,066

Table 19-5: Cash Flow Forecast on an Annual Basis (Year 21 to Year 28)

	Units	21	22	23	24	25	26	27	28
Mine Production									
Waste mined	kt	36,193	37,669	38,193	38,925	37,484	33,617	30,634	39,186
Total ore mined	kt	34,511	36,331	37,307	36,575	35,516	40,305	43,866	36,419
Sulfide Ore Mined									
Sulfide ore mined	kt	31,704	35,000	37,167	36,320	33,363	38,208	41,248	35,505
Cu head grade	%	0.399	0.364	0.386	0.411	0.344	0.414	0.383	0.341
Au head grade	g/t	0.14	0.15	0.15	0.13	0.12	0.14	0.15	0.13
Ag head grade	g/t	1.64	1.75	2.04	2.00	1.63	1.80	1.85	1.64
Mo head grade	%	0.004	0.006	0.006	0.006	0.006	0.006	0.005	0.006
Oxide Ore Mined									
Oxide ore mined	kt	2,807	1,331	140	255	2,153	2,097	2,618	914
Cu head grade	%	0.124	0.144	0.107	0.142	0.125	0.085	0.101	0.094
Process Production									
Feed to Mill (Sulfides)									

Sulfide ore processed	kt	36,500	36,500	36,501	36,500	36,500	36,501	36,501	36,500
Cu feed grade	%	0.377	0.359	0.390	0.410	0.333	0.425	0.400	0.338
Au feed grade	g/t	0.14	0.14	0.15	0.13	0.12	0.14	0.15	0.13
Ag feed grade	g/t	1.62	1.74	2.06	1.99	1.61	1.82	1.92	1.63
Mo feed grade	%	0.004	0.006	0.006	0.006	0.006	0.006	0.005	0.006
Feed to Leach (Oxide)									
Oxide ore processed	kt	—	—	—	—	—	—	—	—
Cu feed grade	%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Metal Recovery									
Concentration									
Cu recovered	kt	118.2	112.7	122.3	128.6	104.5	133.4	125.6	106.2
Au recovered	koz	89	94	99	87	76	91	99	85
Ag recovered	koz	956	1,024	1,213	1,174	948	1,070	1,132	963
Mo recovered	kt	0.9	1.2	1.3	1.2	1.2	1.2	1.0	1.3
Leaching									
Cu recovered	kt	—	—	—	—	—	—	—	—
Payable Metals									
Cu payable	kt	112.9	107.6	116.8	122.8	99.8	127.5	120.0	101.4
Au payable	koz	73	79	83	71	62	73	83	71
Ag payable	koz	649	730	894	839	676	723	805	686
Mo payable	kt	0.9	1.2	1.3	1.2	1.2	1.2	1.0	1.3
Metal Value									
Cu payable value	US$000	821,680	782,888	849,694	893,567	726,332	927,333	872,781	738,070
Au payable value	US$000	117,285	126,427	132,049	112,956	99,365	117,522	132,216	113,240
Ag payable value	US$000	13,426	15,113	18,505	17,372	13,990	14,969	16,663	14,209

Mo payable value	US$000	18,345	23,287	26,658	24,681	23,843	23,074	20,694	24,832
Total Metal Value	*US$000*	*970,736*	*947,715*	*1,026,907*	*1,048,576*	*863,531*	*1,082,898*	*1,042,354*	*890,351*
Treatment and Refining Charges (TC&RCs)									
Cu concentrate TC&RCs	US$000	(65,356)	(62,356)	(67,696)	(71,075)	(57,795)	(73,710)	(69,485)	(58,767)
Mo concentrate TC&RCs	US$000	(2,293)	(2,911)	(3,332)	(3,085)	(2,980)	(2,884)	(2,587)	(3,104)
Total TC&RCs	**US$000**	**(67,649)**	**(65,267)**	**(71,028)**	**(74,160)**	**(60,775)**	**(76,595)**	**(72,072)**	**(61,871)**
Transport Costs									
Cu concentrate transport	US$000	(55,970)	(53,328)	(57,878)	(60,867)	(49,475)	(63,167)	(59,451)	(50,275)
Mo concentrate transport	US$000	(124)	(158)	(181)	(167)	(162)	(156)	(140)	(168)
Cathode transport	US$000	—	—	—	—	—	—	—	—
Total Transport Costs	*US$000*	*(56,094)*	*(53,485)*	*(58,059)*	*(61,034)*	*(49,637)*	*(63,323)*	*(59,591)*	*(50,443)*
Net Smelter Return	*US$000*	*846,993*	*828,963*	*897,819*	*913,381*	*753,119*	*942,980*	*910,691*	*778,037*
Production Costs									
Mining	US$000	(124,739)	(125,025)	(128,271)	(131,363)	(140,878)	(139,647)	(139,961)	(134,522)
Process	US$000	(207,536)	(207,536)	(207,541)	(207,536)	(207,536)	(207,541)	(207,541)	(207,536)
G&A	US$000	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)
Total Production Costs	*US$000*	*(357,285)*	*(357,571)*	*(360,822)*	*(363,909)*	*(373,425)*	*(372,199)*	*(372,513)*	*(367,069)*
Property Taxes and Royalty									
Property taxes and payments	US$000	(924)	(924)	(924)	(924)	(924)	(924)	(924)	(924)
Extraordinary gold and silver royalty	US$000	(654)	(708)	(753)	(652)	(567)	(662)	(744)	(637)
Total Property Taxes and Royalty	*US$000*	*(1,578)*	*(1,632)*	*(1,677)*	*(1,576)*	*(1,491)*	*(1,587)*	*(1,669)*	*(1,561)*
Net Operating Earnings	*US$000*	*488,130*	*469,760*	*535,320*	*547,896*	*378,203*	*569,195*	*536,510*	*409,407*
Taxes									
Special mining tax	US$000	(36,659)	(35,285)	(40,205)	(41,141)	(28,408)	(42,739)	(40,294)	(30,753)
Profit share	US$000	(42,867)	(41,522)	(48,088)	(48,979)	(33,357)	(51,486)	(48,361)	(36,363)

Income tax	US$000	(115,740)	(112,110)	(129,837)	(132,245)	(90,064)	(139,011)	(130,576)	(98,179)
Total Taxes	*US$000*	*(195,266)*	*(188,917)*	*(218,131)*	*(222,365)*	*(151,829)*	*(233,236)*	*(219,231)*	*(165,295)*
Capital Costs									
Initial capital	US$000	—	—	—	—	—	—	—	—
Sustaining capital	US$000	(17,824)	(2,959)	(8,762)	(40,774)	(1,823)	(11,556)	(20,306)	(27,128)
Total Capital Costs	*US$000*	*(17,824)*	*(2,959)*	*(8,762)*	*(40,774)*	*(1,823)*	*(11,556)*	*(20,306)*	*(27,128)*
Closure Cost									
Closure cost	US$000	—	—	—	—	—	—	—	—
Working Capital									
Change in working capital	US$000	(10,570)	3,398	(11,901)	(2,806)	29,164	(33,736)	6,012	22,949
Net Cash Flow									
Before tax	US$000	459,736	470,199	514,657	504,316	405,543	523,903	522,216	405,228
After tax	US$000	264,470	281,282	296,526	281,951	253,714	290,666	302,985	239,934

Table 19-6: Cash Flow Forecast on an Annual Basis (Year 29 to Year 36)

	Units	29	30	31	32	33	34	35	36
Mine Production									
Waste mined	kt	39,512	38,417	26,737	22,277	13,486	14,413	8,712	—
Total ore mined	kt	31,995	33,083	39,338	42,960	40,189	40,199	18,666	—
Sulfide Ore Mined									
Sulfide ore mined	kt	31,507	32,144	38,046	42,120	39,613	39,477	18,666	—
Cu head grade	%	0.318	0.311	0.314	0.327	0.401	0.378	0.435	0.000
Au head grade	g/t	0.13	0.11	0.13	0.13	0.14	0.14	0.12	—
Ag head grade	g/t	1.46	1.61	1.66	1.80	1.88	1.90	2.08	—

	Units	29	30	31	32	33	34	35	36
Mo Head Grade	%	0.006	0.005	0.005	0.006	0.006	0.007	0.012	0.000
Oxide Ore Mined									
Oxide ore mined	kt	488	939	1,291	840	576	721	—	—
Cu head grade	%	0.062	0.065	0.075	0.070	0.075	0.079	0.000	0.000
Process Production									
Feed to Mill (Sulfide)									
Sulfide ore processed	kt	36,500	36,501	36,500	36,501	36,501	36,501	33,866	—
Cu feed grade	%	0.306	0.302	0.314	0.342	0.414	0.386	0.353	0.000
Au feed grade	g/t	0.12	0.11	0.13	0.13	0.15	0.14	0.12	—
Ag feed grade	g/t	1.46	1.60	1.67	1.85	1.91	1.92	1.81	—
Mo feed grade	%	0.006	0.005	0.005	0.006	0.006	0.007	0.009	0.000
Feed to Leach (Oxide)									
Oxide ore processed	kt	—	—	—	—	—	—	—	—
Cu feed grade	%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Metal Recovery									
Concentration									
Cu recovered	kt	95.9	94.9	98.6	107.3	129.9	121.1	102.8	—
Au recovered	koz	80	72	83	87	96	92	72	—
Ag recovered	koz	860	940	983	1,090	1,125	1,131	991	—
Mo recovered	kt	1.2	1.1	1.1	1.3	1.3	1.5	1.7	—
Leaching									
Cu recovered	kt	—	—	—	—	—	—	—	—
Payable Metals									
Cu payable	kt	91.6	90.6	94.2	102.5	124.0	115.7	98.2	—

	Units	29	30	31	32	33	34	35	36
Au payable	koz	68	60	70	73	79	76	58	—
Ag payable	koz	610	693	726	810	787	815	723	—
Mo payable	kt	1.2	1.1	1.1	1.3	1.3	1.5	1.7	—
Metal Value									
Cu payable value	US$000	666,755	659,420	685,196	745,904	902,397	841,886	714,296	—
Au payable value	US$000	108,374	95,591	112,364	116,061	126,621	121,466	93,305	—
Ag payable value	US$000	12,623	14,340	15,021	16,765	16,298	16,876	14,960	—
Mo payable value	US$000	23,849	21,350	21,174	24,925	26,539	29,228	32,839	—
Total Metal Value	*US$000*	*811,601*	*790,701*	*833,755*	*903,655*	*1,071,855*	*1,009,457*	*855,401*	—
Treatment and Refining Charges (TC&RCs)									
Cu concentrate TC&RCs	US$000	(53,104)	(52,515)	(54,610)	(59,436)	(71,796)	(67,020)	(56,843)	—
Mo concentrate TC&RCs	US$000	(2,981)	(2,669)	(2,647)	(3,116)	(3,317)	(3,653)	(4,105)	—
Total TC&RCs	*US$000*	*(56,085)*	*(55,184)*	*(57,257)*	*(62,552)*	*(75,113)*	*(70,674)*	*(60,948)*	—
Transport Costs									
Cu concentrate transport	US$000	(45,417)	(44,917)	(46,673)	(50,808)	(61,468)	(57,346)	(48,655)	—
Mo concentrate transport	US$000	(162)	(145)	(144)	(169)	(180)	(198)	(223)	—
Cathode transport	US$000	—	—	—	—	—	—	—	—
Total Transport Costs	*US$000*	*(45,579)*	*(45,062)*	*(46,817)*	*(50,977)*	*(61,648)*	*(57,544)*	*(48,878)*	—
Net Smelter Return	*US$000*	*709,937*	*690,456*	*729,681*	*790,126*	*935,094*	*881,239*	*745,575*	—
Production Costs									
Mining	US$000	(137,713)	(134,502)	(130,891)	(132,577)	(117,970)	(124,793)	(88,664)	—
Process	US$000	(207,536)	(207,541)	(207,536)	(207,541)	(207,541)	(207,541)	(192,834)	—
G&A	US$000	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)	(25,010)	(23,205)	—
Total Production Costs	*US$000*	*(370,259)*	*(367,053)*	*(363,437)*	*(365,129)*	*(350,522)*	*(357,344)*	*(304,703)*	—

	Units	29	30	31	32	33	34	35	36
Property Taxes and Royalty									
Property taxes and payments	US$000	(924)	(924)	(924)	(924)	(924)	(924)	(924)	—
Extraordinary gold and silver royalty	US$000	(605)	(550)	(637)	(664)	(715)	(692)	(541)	—
Total Property Taxes and Royalty	*US$000*	*(1,529)*	*(1,474)*	*(1,561)*	*(1,588)*	*(1,639)*	*(1,616)*	*(1,466)*	—
Net Operating Earnings	*US$000*	*338,148*	*321,928*	*364,682*	*423,409*	*582,933*	*522,278*	*439,406*	—
Taxes									
Special mining tax	US$000	(25,406)	(24,186)	(27,399)	(31,805)	(43,699)	(39,114)	(32,884)	—
Profit share	US$000	(29,531)	(27,571)	(31,613)	(37,331)	(51,892)	(46,481)	(38,945)	—
Income tax	US$000	(79,735)	(74,443)	(85,355)	(100,793)	(140,108)	(125,498)	(105,151)	—
Total Taxes	*US$000*	*(134,672)*	*(126,200)*	*(144,367)*	*(169,929)*	*(235,698)*	*(211,093)*	*(176,979)*	—
Capital Costs									
Initial capital	US$000	—	—	—	—	—	—	—	—
Sustaining capital	US$000	(26,100)	(40,412)	(8,198)	(6,979)	(11,915)	—	—	—
Total Capital Costs	*US$000*	*(26,100)*	*(40,412)*	*(8,198)*	*(6,979)*	*(11,915)*	—	—	—
Closure Cost									
Closure cost	US$000	—	—	—	—	(1,000)	(1,450)	(1,500)	(17,000)
Working Capital									
Change in working capital	US$000	12,332	3,055	(7,060)	(10,574)	(26,940)	10,116	19,486	106,543
Net Cash Flow									
Before tax	US$000	324,381	284,571	349,424	405,855	543,078	530,944	457,392	89,543
After tax	US$000	189,708	158,371	205,058	235,926	307,379	319,851	280,412	89,543

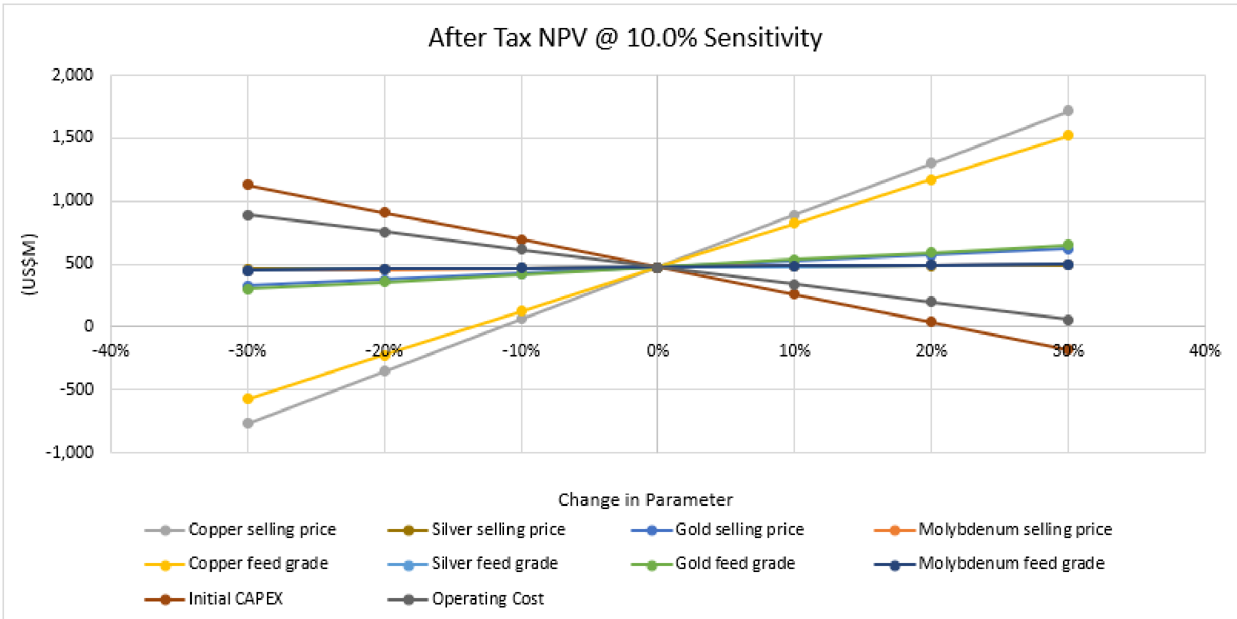
19.7 Sensitivity Analysis

A sensitivity analysis was performed to identify potential impacts on the after-tax NPV and IRR of variations in metal prices, grades, initial capital costs and operating costs. The results of this analysis are presented in Figure 19-1(NPV) and Figure 19-2 (IRR). For the purpose of the sensitivity to metal grades, it was assumed that the capacity of the processing facilities are not a constraint.

The El Arco Project is most sensitive to fluctuations in copper price and grade. It is less sensitive to changes in initial capital cost and operating costs. It is least sensitive to variations in gold price and grade, silver price and grade and molybdenum price and grade. Gold, silver and molybdenum grades sensitivities were excluded from the figures as price and grades sensitivities trends are similar for each of these metals.

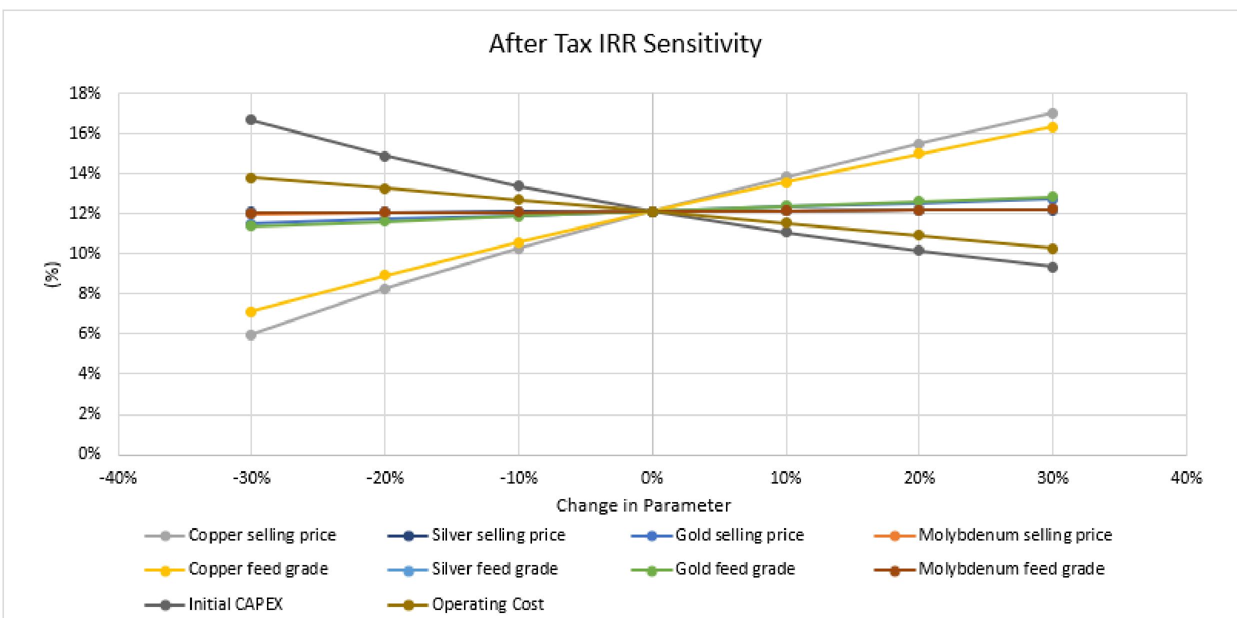
Table 19-7 presents the El Arco Project after-tax NPV at a range of discount rates from 8–12% with the base case highlighted.

Figure 19-1: After-Tax NPV Sensitivity (10% discount rate)



Note: Figure prepared by Wood, 2021.

Figure 19-2: After-Tax IRR Sensitivity (10% discount rate)



Note: Figure prepared by Wood, 2021.

Table 19-7: After-Tax NPV Sensitivity to Discount Rates (base case is highlighted)

Discount Rate	After-Tax NPV (US$ M)
NPV @ 8%	1,113.5
NPV @ 9%	765.7
NPV @ 10%	**474.8**
NPV @ 11%	230.2
NPV @ 12%	23.6

Note: Numbers have been rounded.

20 ADJACENT PROPERTIES

This Chapter is not relevant to this Report.

21 OTHER RELEVANT DATA AND INFORMATION

This Chapter is not relevant to this Report.

22 INTERPRETATION AND CONCLUSIONS

22.1 Introduction

Wood notes the following interpretations and conclusions, based on the review of data available for this Report.

22.2 Mineral Tenure, Surface Rights, Water Rights, Royalties and Agreements

The El Arco Project is owned and operated by Southern Copper Corporation, Sucursal del Perú.

Southern Copper holds 11 mining concessions, covering 72,133 ha

Surfaces rights in the deposit area are held by a combination of agrarian cooperatives (ejido) and private owners. Between 2010–2015, Southern Copper acquired 22,174.29 ha of surface rights from the Confederación Nacional Campesina ejido. Negotiations are underway to acquire 15,000 ha of surface rights from the Costeño ejido. Southern Copper indicated to Wood that there are sufficient surface rights envisaged for the LOM plan.

In 2013, the Mexican Federal government introduced a mining royalty, effective January 1, 2014, based on 7.5% of taxable earnings before interest and depreciation. In addition, precious metal mining companies must pay a 0.5% royalty on revenues from gold, silver, and platinum.

22.3 Geology and Mineralization

The El Arco deposit is an example of a porphyry copper deposit.

The geological understanding of the settings, lithologies, and structural and alteration controls on mineralization is sufficient to support estimation of mineral resources.

22.4 Exploration, Drilling, and Sampling

The exploration programs completed to date are appropriate for the deposit style.

The current drill database for the Project consists of 364 core and RC/rotary percussion drill holes (133,877 m). Core drilling supports the mineral resource estimate.

Drill spacing varies from approximately 50 m in isolated, better-drilled deposit areas to about 100 m spacing in the less well drilled portions of the deposit.

The term "true thickness" is not generally applicable to porphyry-style deposits as the entire rock mass is potentially mineralized and there is often no preferred orientation to the mineralization. In areas that display porphyry-style mineralization, in general, most drill holes intersect mineralized zones at an angle, and the drill hole intercept widths reported for those drill holes are typically greater than the true widths of the mineralization at the drill intercept point.

Density is estimated based on measurements obtained using the water-displacement method. Density data are considered acceptable for use in mineral resource and mineral reserve estimation.

The sample preparation, analysis, quality control, and security procedures are acceptable. The sample preparation, analysis, quality control, and security procedures are sufficient to provide reliable data to support estimation of mineral resources and mineral reserves.

The 2021 check sample program:

- Verified that, based on pulp data, legacy total copper, soluble copper, and molybdenum data are sufficiently accurate to support mineral resource estimation
- Found that core data for soluble copper and molybdenum show unexplained biases that may be related to sample storage, sample handling, or sampling. Those biases should be investigated by Southern Copper
- Concluded that gold and silver data from San Luis Potosi are biased by as much as 20% and 10% respectively lower than data from Bureau Veritas. Wood considers the original gold and silver data from San Luis Potosi to be useable for mineral resource estimation, recognizing that those data may be biased significantly low. Reassay of all of the existing samples for gold and silver is recommended.

Wood considers the uncertainties around gold and silver grades to be a factor that limits mineral resource classification to indicated at best.

22.5 Data Verification

Data verification performed by Wood included site visits, review of selected drill hole collars against topography, reviews of the geological models, a data integrity check on selected data. Wood also requested a re-assay program of selected pulp and core samples.

Wood considers that a reasonable level of verification has been completed, and that no material issues would have been left unidentified from the programs undertaken.

Wood is of the opinion that the data verification programs for Project data adequately support the geological interpretations, the analytical and database quality, and therefore support the use of the data in mineral resource estimation.

22.6 Metallurgical Testwork

Metallurgical testwork was conducted by metallurgical testwork facilities that were independent and in facilities that were operated by Southern Copper.

Industry-standard studies were performed as part of process development and initial plant designs. Metallurgical tests were completed at bench-scale (laboratory level) and at pilot-scale, on oxide and sulfide mineralization. Testwork programs were acceptable for the mineralization type.

There is a risk that low average head grades could result in variable molybdenum recoveries.

An analysis of the concentrate produced during the 1996 pilot trials indicated a high-quality copper concentrate with very minor amounts of deleterious elements. Arsenic in particular was not detected in the analysis.

Wood reviewed the metallurgical testwork results, and based on these checks, in Wood's opinion, the metallurgical testwork results and recovery forecasts support the estimation of mineral resources and mineral reserves and can be used in the economic analysis.

22.7 Mineral Resource Estimates

The mineral resource estimate is reported using the definitions set out in SK-1300, and the mineral resources are reported exclusive of those mineral resources converted to mineral reserves. The reference point for the estimate is in situ. The estimate is primarily supported by core drilling.

Wood initially classified the mineral resource estimates using drill spacing studies into measured, indicated and inferred. Following the analysis that classified the mineral resource estimates into the measured, indicated and inferred confidence categories, uncertainties regarding sampling and drilling methods, probable bias in gold and silver data, data processing and handling, geological modelling, and estimation were incorporated into the classifications assigned. The areas with the most uncertainty were assigned to the inferred category, and the areas with fewer uncertainties were classified as indicated. The incorporation of the uncertainties resulted in material that had initially been classified as measured on the basis of drill spacing alone, being reclassified as indicated, due to concerns with the gold and silver data. In addition, when considering technical and economic factors, the downgrade of the measured classification was supported by the uncertainty surrounding the ability to mine in proximity to areas that host species of garambullo monstruoso.

Areas of uncertainty that may materially impact all of the mineral resource estimates include: changes to long-term metal price and exchange rate assumptions; changes in local interpretations of mineralization geometry such as presence of unrecognized mineralization off-shoots; faults, dikes and other structures; and continuity of mineralized zones; changes to geological and grade shape, and geological and grade continuity assumptions; changes to metallurgical recovery assumptions; changes to the input assumptions used to derive the conceptual open pit shell that is used to constrain the estimates; changes to the forecast dilution and mining recovery assumptions; changes to the cut-off values applied to the estimates; variations in geotechnical (including seismicity), hydrogeological and mining method assumptions; and changes to environmental, permitting and social license assumptions.

Uncertainty around grade estimates due to weaknesses in the structural, alteration and current lithology models was a contributor to the decision to downgrade blocks with potential for Measured classification based on drill hole spacing metrics. Improvement to geological models will require a significant core relogging with quantitative tools including lithogeochemistry and bulk mineralogical analysis to standardize lithological and alteration units. Improved geological models will also benefit rock quality modeling and geotechnical recommendations for pit designs.

The volume of post-mineralization dikes is poorly constrained by vertical drill holes. The risk is that the volume of the dikes is greater than assumed in the model, therefore the diluted grades may be lower than those modelled. Any infill drilling should include inclined holes to provide better intersections with sub-vertical structures and lithological contacts such as the post-mineralization dikes.

The uncertainty on molybdenum, silver and gold grades is a contributor to the decision to downgrade blocks with potential for measured classification based on drill hole spacing metrics. Any future infill drilling sampling and assaying to upgrade confidence in indicated mineral resources should use a rigorous QA/QC program to provide data quality assurance for the by-product metals.

Wood assumed that the Valle de los Cirios Flora and Fauna Protection Area Management Plan can be amended to allow mining activities and garambullo monstruoso removal, and that the translocation of this species to new habitat is feasible. If this is not the case, the conceptual pit constraining the mineral resource estimate would need to be modified to remove the habitat area, and would result in a smaller tonnage and grade estimate.

22.8 Mineral Reserve Estimates

Mineral reserves were converted from indicated mineral resources. Inferred mineral resources were set to waste.

All current mineral reserves will be exploited using open pit mining methods.

Factors that may affect the mineral reserve estimates include: changes to long-term copper and molybdenum price assumptions; changes to exchange rate assumptions; changes to metallurgical recovery assumptions; changes to the input assumptions used to design the optimized open pit shell; changes to include operating, and capital assumptions used, including changes to input cost assumptions such as consumables, labor costs, royalty and taxation rates; variations in geotechnical, mining, dilution and processing recovery assumptions; including changes to mine designs as a result of changes to geotechnical, hydrogeological, and engineering data used, and changes to plans for infrastructure supporting the Project; changes to the NSR cut-off criteria used to constrain the open pit estimates; changes to the assumed permitting and regulatory environment under which the mine plan was developed; ability to maintain mining permits and/or surface rights; and the ability to obtain and maintain social and environmental license to operate.

22.9 Mining Methods

It is planned to use conventional open pit equipment and mining methods.

Available geotechnical data suggest rock conditions that are Good to Excellent, and the intact rock strength is generally classified as Strong Rock. Additional information on the rock fabric and major structures that cross the proposed open pit will be required to support more detailed studies. There is a pervasive structural fabric throughout the rock mass that is currently poorly characterized, but which appears to be responsible for consistent deviations in the core holes to the southwest.

Groundwater seepage into the open pit is expected.

The mine plan assumes that the open pit will be mined in eight phases over a 35-year mine life. The mine plan assumes two years of plant construction with third year used for the plant production ramp-up. The leach will have a one year construction period and be in full production starting year 2.

Two WRSFs are planned, together with a temporary ore stockpile.

Mining will be undertaken using a conventional truck-and-shovel fleet.

22.10 Recovery Methods

The process designs are based on existing technologies and proven equipment, and has no novel parameters. Two process routes are envisaged:

- Oxide SX/EW plant: designed to treat oxidized ores from a heap leach pad to extract copper and produce copper cathodes
- Concentrator: designed to treat sulfide material and produce a separate copper concentrate and separate molybdenum concentrate.

22.11 Infrastructure

The site is currently a greenfields site, with the only infrastructure being the exploration camp.

The mine plan includes both on and offsite infrastructure. Onsite infrastructure will include facilities to support mining and processing. Offsite infrastructure will include the accommodations camp, improved road access, desalination plant and port facilities.

22.12 Market Studies

The market for the proposed copper–gold–silver and molybdenum concentrates and copper cathode is reasonably understood. Southern Copper has experience in selling such products into the global market.

To establish the copper price forecasts Wood used a combination of information derived from 22 financial institutions, from pricing used in technical reports filed with Canadian regulatory authorities over the previous 12-month period, from pricing reported by major mining companies in public filings such as annual reports in the previous 12-month period, spot pricing, and three-year trailing average pricing. Wood considers that a long-term price forecast of US$3.30/lb Cu is reasonable.

It is in accordance with industry-accepted practice to use higher metal prices for the mineral resource estimates than the pricing used for mineral reserves. The copper price forecast of US$3.30/lb was increased by 15% to provide the mineral resource estimate copper price estimate of US$3.80/lb.

Wood reviewed the Southern Copper long term forecast price for molybdenum of US$9.00/lb, and concluded that the molybdenum price selected by Southern Copper is reasonable and conservative compared to what others have recently been using in the industry. Wood considers there is a reasonable probability that the realized price of molybdenum will be at or higher than forecast US$9.00/lb over the projected 35 year El Arco Project LOM. The Southern Copper molybdenum price forecast of US$9.00/lb was increased by 15% to US$10.35/lb to provide the input to the mineral resource constraining pit shell and NSR cut-off.

Mineral reserves and mineral resources were constrained by pit shells that used inputs from copper and molybdenum only, with no gold or silver contribution to the NSR value determinations. However, the economic analysis included the contribution from gold and silver. Gold and silver pricing was provided by Wood. To establish the gold and silver forecasts Wood used a combination of information derived from 22 financial institutions, from pricing used in technical reports filed with Canadian regulatory authorities over the previous 12 month period, from pricing reported by major mining companies in public filings such as annual reports in the previous 12-month period, spot pricing, and three-year trailing average pricing. Wood considers that a long-term price forecast of US$1,600/oz is reasonable for gold and US$20.70/oz is reasonable for silver.

Southern Copper expects that any mine product sales terms will be in line with contracts that Southern Copper has for its existing Mexican operations.

No contracts are currently in place for any services. When concluded, such contracts would be negotiated and renewed as needed. Contract terms are expected to be typical of similar mining-related contracts that Southern Copper has previously entered into in Mexico.

22.13 Environmental, Permitting and Social Considerations

The proposed mine site is located within the Valle de los Cirios Flora and Fauna Protection Area. Amendments to the Management Plan for the reserve will be required in support of Project operations.

An environmental impact assessment was prepared in 2008. A baseline study update was underway at the Report date.

The Project area has three species of flora considered to be at risk, and a number of endemic fauna species. A population of garambullo monstruoso occurs within the area of the mineral resource estimate, and a second population is adjacent the planned leach pad and temporary ore stockpile areas.

Wood estimates that the closure cost would be approximately $125 M. Some of the closure costs can be allocated during active mining including concurrent grading of parts of the heap leach facility, TSF and WRSFs.

Southern Copper's Environmental Management identified a list of 17 key permit requirements for mine construction, seven permits that must be in place prior to operations commencing, and a further two permits that must be granted for operations. Additional permits will be required for construction of the other offsite infrastructure.

Southern Copper developed a socio-economic baseline with information collected from 2010–2021 for two municipalities. There is an Indigenous presence (Cochimis population) in Guerrero Negro. The Project covers the Costeño and Confederación Nacional Campesina eijidos.

Southern Copper established mechanisms for citizen participation and has open communication channels to provide attention and answers for community concerns and manage grievances.

There is a process in place to obtain the "social license" to permit, construct, and operate the El Arco mine.

A community development model is used to identify expectations, local needs, and social issues, and engage with communities and other stakeholders to provide solutions.

Community understanding of the Project is established by Southern Copper, and the process for implementing social programs is operating as intended.

22.14 Capital Cost Estimates

Capital costs are reported using the criteria set out in SK1300, and have a pre-feasibility accuracy level of ±25%, and a contingency allocation of ≤15%.

A mining study was completed in 2009, which assumed a 100,000 t/d production rate of sulfide material. The cost estimates used in this Report are based on the 2009 and 2011 studies, as applicable, and escalated to Q2 2021. The studies are supported by 2009 quotes escalated to current dollars as well as recent quotes for similar equipment for other Southern Copper projects where required, for major capital items.

The capital cost estimate totals US$4,325.7 M, consisting of US$3,537.1 M in initial capital and US$788.6 M in sustaining capital.

22.15 Operating Cost Estimates

Operating costs are reported using the criteria set out in SK1300, and have a pre-feasibility accuracy level of ±25%, with no contingency applied.

Mine operating costs are forecast to average US$1.80/t mined over the LOM. Operating costs incorporated operational life, average availabilities, and efficiencies for the major mine equipment fleet. Other costs considered included drilling, personnel, explosives and consumables, and maintenance costs.

The estimated mill operating cost for El Arco is US$0.75/lb Cu recovered equivalent to US$5.69/t processed. Oxide material will be processed to obtain cathodes using a SX-EW plant. The estimated operating cost for the cathode production is US$0.58/lb or the equivalent of US$2.80/t ore processed

The total estimated annual G&A operating costs is US$25.0 M or the equivalent of US$0.70/t of milled ore.

22.16 Economic Analysis

The financial analysis was performed using a discounted cash flow (DCF) method. Net annual cash flows were estimated projecting yearly cash inflows (or revenues) and subtracting projected yearly cash outflows (such as capital and operating costs, and taxes).

The financial analysis was based on an after-tax discount rate of 10%. The currency used to document the cash flow was constant Q2 2021 US dollars. The economic analysis was based on 100% equity financing and was reported on a 100% Project ownership basis. The base case economic analysis assumed constant prices with no inflationary adjustments.

The El Arco Project is anticipated to generate a pre-tax NPV of US$1,937.9 M at a 10.0% discount rate, an IRR of 17.7% and a payback of 4.9 years.

The financial analysis results show an after-tax NPV of US$474.8 M at a 10.0% discount rate, an IRR of 12.1% and a payback of 6.5 years.

The El Arco Project is most sensitive to fluctuations in copper price and grades. It is less sensitive to changes in initial capital cost and operating costs. It is least sensitive to variations in gold price and grades, silver price and grades and molybdenum price and grades.

22.17 Risks and Opportunities

Factors that may affect the mineral resource and mineral reserve estimates were identified in Chapter 11.13 and Chapter 12.5 respectively.

22.17.1 Risks

The risks associated with the El Arco site are generally those expected with a proposed large surface mining operation and include social licence to operate, the accuracy of the resource model, unexpected geological features that cause geotechnical issues, and/or operational impacts, ability to permit, construct, and operate a desalination plant at El Barril.

Specific risks include:

- The prefeasibility level mine plans and infrastructure have been located to avoid the known colonies of garambullo monstruoso. For the purposes of mineral resource estimates exclusive of mineral reserves, Wood has assumed that the Valle de los Cirios Flora and Fauna Protection Area Management Plan can be amended to allow species removal, and that the translocation of this species to new habitat is feasible. If this is not the case, the conceptual pit constraining the mineral resource estimate would need to be modified to avoid the habitat area, and would result in a smaller tonnage and metal estimate
- The mineral reserve estimate excludes areas where known colonies of garambullo monstruoso occur. However, there is a risk that during permitting, exclusion zones to protect the cactus may require larger than envisaged no-mining polygons. This would affect the planned open pit, and could affect infrastructure locations, in particular the leach pad and temporary ore stockpiles. Changes to the pit design and locations would affect the capital cost estimate, the assumed operating cost estimates, and the financial analysis
- Geotechnical and hydrological assumptions used in mine planning are based on testwork. Any changes to the geotechnical and hydrological assumptions could affect mine planning, affect capital cost estimates if any major changes to the mine plan are required due changes in interpretations, affect operating costs due to mitigation measures that may need to be imposed as a result of the interpretational changes, and impact the economic analysis that supports the mineral reserve estimates

- The new Global Industry Standard on Tailings Management (GISTM) provides a set of industry standards to guide design and management of TSFs. Members and non-members of International Council on Mining and Metals (ICMM) are required to be in compliance with the GISTM over the next several years. The TSF design needs to be revisited and be revised as needed to be in full compliance with the recently-published global tailings standard (GISTM, 2020).
- Molybdenum recoveries are based on testwork; however, there is a risk that the low average head grades could result in variable molybdenum recoveries. This could affect the operating cost estimates, and revenue assumptions in the cashflow analysis;
- The LOM plan assumes that Southern Copper will purchase power from a private power provider. The assumed cost for this provision is US$91 MW/hr. it also assumes that a desalination plant can be constructed at El Barril and fully permitted. If permits cannot be obtained, there is a risk to the mine plan, including the capital cost estimate, the assumed operating cost estimates, and the financial analysis as suitable alternative sites would need to be assessed
- The LOM plan assumes that fuel can be readily supplied to the El Barril site at a reasonable cost to support the operation.
- The LOM plan assumes that the accommodations village to support operations can be constructed outside the town of Guerrero Negro
- Commodity price increases for key consumables such diesel, electricity, tires and chemicals would negatively impact the stated mineral reserves and mineral resources
- Labor cost increases or productivity decreases could also impact the stated mineral reserves and mineral resources, or impact the economic analysis that supports the mineral reserves.

As with any large mining project in Mexico, the El Arco Project is subject to certain risks, including:

- Potential social conflicts based on negative community or regulatory perceptions. These could include unfulfilled expectations, new leadership with new ideas as to how agreements should be concluded, differing ideas of appropriate compensation, or changes in the community boundaries

- Agreements with communities are not respected by certain members of a community and further demands are made for social investment or other considerations not covered by the agreements
- Governmental changes to mining policies and mining regulations
- Non-governmental organizations that promote an anti-mining culture.

22.17.2 Opportunities

Opportunities include:

- Conversion of some or all of the indicated mineral resources currently reported exclusive of mineral reserves to mineral reserves, with appropriate supporting studies;
- There are discontinuous patches of blocks with potential for measured classification based on drill hole spacing metrics that are classified as indicated mineral resources in the 2021 mineral resource estimate. A targeted infill drill program, consisting of 10–20 drill holes could be completed to upgrade confidence in a significant volume of this mineralization to the measured category
- Upgrade of some or all of the inferred mineral resources to higher-confidence categories, such that such better-confidence material could be used in mineral reserve estimation;
- A single drill hole was drilled to a depth of approximately 1,500 m below surface. The drill hole intercepted moderate- to high-grade material (0.3% Cu to 0.6% Cu). Molybdenum grades are higher at the bottom of the mine. Drilling of additional deep drill holes may allow deepening of the pit shell and expansion of the mineralization available for mineral resource estimation
- Higher metal prices than forecast could present upside sales opportunities and potentially an increase in predicted Project economics;
- Based on the relatively high RQD and RMR indicated for the major slope forming rocks, steeper slopes may be achievable. Where structure is not identified as a control to the achievable bench face angle, steeper bench faces, and steeper inter-ramp slopes may be possible. Additionally, it may be possible to double bench in some areas of the pit if pervasive structural controls are not present. There is currently no reliable subsurface structure orientation data that would allow such an assessment.

22.18 Conclusions

Under the assumptions presented in this Report, the El Arco Project has a mine plan that is technically feasible and economically viable. The positive net present value of the Project supports mineral reserves.

23 RECOMMENDATIONS

23.1.1 Introduction

The recommendations cover the discipline areas of geology, geotechnical, mineral resource and mineral reserve estimates, infrastructure and environmental. The total recommended budget estimate to complete the programs is US$11.5–US$13.7 M.

23.1.2 Geology

The confidence in the gold and silver assay data is limited by the bias observed between the San Luis Potosi and Bureau Veritas laboratories. A re-assay program of existing pulps and core, with a robust QA/QC program in place, should be undertaken, focusing on those areas within the planned open pit where there are no or limited numbers of silver and gold assay data. Pulps should be selected over core, because the uncertainties introduced by sample preparation could affect the core results. In every drill hole, any pulp interval that has not been assayed, should be submitted. The samples submitted for re-assay should also request a multi-element suite based on a four-acid digest be performed.

A re-logging program of available core is recommended to provide more robust data for inclusion in the structural, alteration and current lithology models. This program should use quantitative tools such as lithogeochemistry and bulk mineralogical analysis to support standardization of lithological and alteration units. The re-logging is recommended to be accompanied by spectral scanning of the drill core.

A 15,000 m drill program, consisting of angle drill holes, oriented to provide better understanding of location, thickness, and orientation of dikes in the geological model, should be completed. All of the drill holes should be assayed for copper, gold, silver, molybdenum and a multi-element suite to confirm the low level of deleterious elements.

Two oriented drill holes are recommended to provide structural data to explain the downhole deviations noted in historical drill holes completed in the northeastern quadrant of the deposit. A televiewer down-the-hole instrument should be used to provide information on the relationship between structures logged in the drill core and the structures downhole. Once all structural data are collected, the core should be submitted for assay.

Once the angle drill hole and geotechnical drilling programs are completed, a study should be completed to determine why the historical drill holes are deviating.

A budget estimate for this work, assuming an all-in drilling cost of US$200/m for unoriented drill core and US$250/m for oriented core, is about US$4.5–US$5 M.

23.1.3 Geotechnical

In support of advanced studies, a geotechnical investigation program should be developed to investigate the risks identified and to provide factual data for rock mass and structural characterization, and to confirm the pit slope design recommendations.

- Detailed geological and structural mapping of existing outcrops should be completed to support the pit slope design
- A 6,000 m geotechnical drill program, consisting of oriented core holes, should be completed to support pit slope designs. The drill holes should be logged for geotechnical parameters to provide quantitative geotechnical data to support analyses and pit slope designs. The drill holes should be surveyed using borehole televiewer surveys. Samples should be collected for geomechanical tests such as point load tests
- Once the geotechnical program is complete, the core holes should be submitted for analysis
- To the extent possible, hydrogeologic information should be collected from the drill holes by performing packer testing and installing vibrating wire piezometers in the completed holes.

The TSF design needs to be revisited and be revised as needed to be in full compliance with the recently-published global tailings standard (GISTM, 2020). This may require additional testwork of the selected TSF location.

A site-specific seismic hazard study and subsurface geotechnical investigations should be completed for the areas planned for the heap leach facility and TSF.

This program is estimated, assuming an all-in drilling cost of US$250/m for oriented drill core, at approximately US$3.5–US$4 M.

23.1.4 Mineral Resource and Mineral Reserve Estimation

Once results are available from the recommended geological and geotechnical programs, the mineral resource and mineral reserve estimates should be updated.

The current NSR cutoffs used in pit designs do not include gold or silver, and are based on copper and molybdenum only. The next resource and reserve update should include gold and silver in the pit optimizations.

This program is estimated at approximately US$0.2–US$0.3 M.

23.1.5 Infrastructure

The desalination and power plant location was selected as El Barril; however, earlier studies had located the plants at Laguna Manuela. A trade-off study should be conducted to determine the optimal plant locations

A trade-off study should be conducted to determine the optimal power supply and fuel source for the operation.

The study currently assumes that the accommodations camp will be located just north of Guerrero Negro. There is potential to reduce travel distance/time for employees if the accommodations camp could be located closer to the proposed mine site. A study should be completed that reviews potential alternative camp sites and provides cost estimates for each option such that the optimal site can be selected.

The current route of MX18 passes directly through the area of the proposed open pit, and the highway will need to be realigned to allow open pit mining. Southern Copper should evaluate the optimum locations for the highway diversion around the proposed operations, and prepare a list of the permits and consultations that must be conducted to allow the highway alignment to be changed.

This program is estimated at approximately US$0.3–US$0.4 M.

23.1.6 Environmental

Programs in collaboration with the Universidad de Baja California that are designed to evaluate the potential of translocation and propagation of the garambullo monstruoso should continue.

The area of the Valle de los Cirios Flora and Fauna Protection Area provides for mining activity under certain restrictions in some areas of the State's territory, including the El Arco Project. Southern Copper should continue discussions with the appropriate regulatory authorities as to the potential for mining within or immediately adjacent to the protected polygons covering garambullo monstruoso communities.

Baseline studies should be completed on the proposed desalination plant locations.

If the preferred location of the accommodations camp is not Guerrero Negro, baseline studies should be completed over the new area.

This program is estimated at approximately US$3–US$4 M.

24 REFERENCES

24.1 Bibliography

Bechtel Corporation, 1996: El Arco Project Feasibility Study, Report No. 23621-000: prepared for Grupo Mexico S.S. de C.V., El Arco, Baja California, Mexico, October 30, 1996.

Coolbaugh, D.F., Hernandez, A.O., Perez, A.E., and Muller, R.M., 1995: El Arco Porphyry Copper Deposit, Baja California, Mexico: in Pierce, F.W., and Bolm, J.G., eds., Porphyry Copper Deposits of the American Cordillera: Tucson, Arizona Geological Society Digest 20, pp. 525–534.

Corporacion Ambiental de Mexico, S.A. de C.V. and Arcadis U.S., Inc. 2021. Estudio deLinea Base Ambiental Proyecto – El Arco y Evaluacion de Dunas de Arena, Report No. CAM 20075_Rev01, prepared for Grupo Mexico S.S. de C.V., El Arco, Baja California, Mexico, February 2021.Coney, P.J., and Campa M. F., 1987: Lithotectonic Terrane Map of Mexico: US Geological Survey Miscellaneous Field Studies.

Echavarri P.A., 1975: Estudio de la Petrografia de la Alteración y de la Mineralizacion Hidrotermales en el Depósito El Arco, Baja California.

Faria Garcia, R., 1978: Geophysical Exploration of the El Arco Calmalli District, Baja California: Master of Science thesis, University of Arizona, 70 p.

Gastil, R.G., Phillips, R. and Allison, E., 1975: Reconnaissance Geology of the State of Baja California: Geological Society of America Memoir 140, 170 p.

Global Industry Standard on Tailings Management (GITSM), 2020: Global Industry Standard on Tailings Management, by International Council on Mining and Metals (ICMM), UN Environment Programme, Principles for Responsible Investment (PRI), published on GlobalTailingsReview.org, August 2020.

Golder 2008: Geochemical Characterization of Spent Ore and Tailings, El Arco Pilot Study: 083-92533.03, Golder Associates Technical Memorandum, December 15, 2008.

Grupo Mexico, 2021: Metal Price Forecasts: internal PowerPoint presentation, July, 2021, 25 p.

Kilmer, F.H., 1984: Geology of Cedros Island Baja California, Mexico: 69 p.

Kimbrough, D.L. and Moore, T.E., 2003: Ophiolite and Volcanic Arc Assemblages on the Vizcaino Peninsula and Cedros Island, Baja California Sur, Mexico; Mesozoic 185 Forearc Lithosphere of the Cordilleran Magmatic Arc: in S.E. Johnson, S.R. Paterson, J.M. Fletcher, M.S. Girty, D.L. Kimbrough and A. Martin-Barajas (Eds), Tectonic Evolution of Northwestern Mexico and the Southwestern USA., Special Paper - Geological Society of America, pp. 43–71.

M3 Engineering and Technology Corporation, 2009: El Arco Feasibility Study – NI 43-101 Technical Report, Report No. M3-PN08037: prepared for Southern Copper Mexicana del Arco, S.S. de C.V., El Arco, Baja California, Mexico, March 13, 2009.

Marinielli F., and Niccoli, W.L., 2000: Simple Analytical Equations for Estimating Ground Water Inflow to a Mine pit: Groundwater, v. 38, no. 2, pp. 311–314.

Mintec Inc, 2014. El Arco Project, Part 2: Reserve Estimate and Life of Mine Schedule Prepared for Mexicana del Arco. January 2014.

Radelli, L., 1989: The Ophiolites of Calmalli and the Olvidada Nappe Of Northern Baja California and West-Central Sonora: in P.L. Abbott, ed., Geologic Studies in Baja California, The Pacific Section of the Society of Economic Paleontologists and Mineralogists, Los Angeles, California, pp. 79–89.

Rangin, C., 1981: Aspectos Geodinamicos de la Region Noroccidental de Mexico: UNAM Instituto de Geologia Revista, 5(2), pp. 180–194.

Read, J. and Stacey, P., 2010: Guidelines for Open Pit Slope Design: CSIRO 2009, a Balkema Book, 496 p.

Sedlock, R., Ortega-Gutierrez, F. and Speed, R.C., 1993: Tectonostratigraphic Terranes and Tectonic Evolution of Mexico: Geological Society of America, Special Paper 278.

Sillitoe, R.H., 2010: Porphyry Copper Systems: Economic Geology, v. 105, p. 3–41.

Sinclair, W.D., 2007: Porphyry Deposits: *in* Goodfellow, W.D., ed., Mineral Deposits of Canada: A Synthesis of Major Deposit-Types, District Metallogeny, the Evolution of Geological Provinces, and Exploration Models: Geological Association of Canada, Mineral Deposits Division, Special Publication No. 5, p. 223–243.

Singer, D.A., Berger, V.I., and Moring, B.C., 2008: Porphyry Copper Deposits of the World: Database and Grade and Tonnage Models: U.S. Geological Survey Open-File Report 2008–1155 (http://pubs.usgs.gov/of/2008/1155).

Valencia, V.A., Barra, F., Weber, B., Ruiz, J., Gehrels, G., Chesley, J., and Lopez-Martinez, M., 2006: Re-Os and U-Pb Geochronology of the El Arco Porphyry Copper Deposit, Baja California Mexico: Implications for the Jurassic Tectonic Setting: Journal of South American Earth Sciences, vol 22, pp. 39–51.

Wesseloo, J. and Read, J., 2009: Acceptance Criteria: in Guidelines for Open Pit Slope Design., Read, J.R.L., and Stacey, P.F., eds., CSIRO Publishing, Melbourne, pp. 221–235.

Wood Mackenzie, 2021: Copper 2021 Update to 2040: June, 2021, 32 p.

24.2 Abbreviations and Symbols

Abbreviation/Symbol	Term
3D	three-dimensional
AAS	atomic absorption spectrometry
ARD	acid rock drainage
BQ core	36.4 mm diameter
CFE	Federal Electrical Commission (Comisión Federal de Electricidad)
CONAGUA	National Water Commission (Comisión Nacional del Agua)
G&A	general and administrative
HPGR	high pressure grinding rolls
HQ	63.5 mm core diameter
ICP	inductively coupled plasma
LGEEPA	General Law of Ecological Equilibrium and Environmental Protection (Ley General del Equilibrio Ecológico y la Protección al Ambiente)
LOM	life-of-mine
klb	thousand pounds
ML/ARD	metals leaching/acid rock drainage
MMBtu	million British thermal units
NI 43-101	Canadian National Instrument 43-101 “Standards of Disclosure for Mineral Projects”
NQ	47.6 mm core diameter
NSR	net smelter return
OK	ordinary kriging
PAG	potentially acid generating
QA/QC	quality assurance and quality control
QP	Qualified Person
ROM	run-of-mine
RQD	rock quality description

Abbreviation/Symbol	Term
SEDENA	Secretariat of National Defense (Secretaría de la Defensa Nacional)
SEMARNAT	Secretariat of Environment and Natural Resources (Secretaría del Medio Ambiente y Recursos Naturales)
SIDURT	Secretariat of Infrastructure, Urban Development and Territorial Reorganization (Secretaría de Infraestructura, Desarrollo Urbano y Reordenación Territorial) Baja California.
TSF	tailing storage facility
US	United States
US$	United States dollars
WRSF	waste rock storage facility

24.3 Glossary of Terms

Term	Definition
acid rock drainage/ acid mine drainage	Characterized by low pH, high sulfate, and high iron and other metal species.
alluvium	Unconsolidated terrestrial sediment composed of sorted or unsorted sand, gravel, and clay that has been deposited by water.
aquifer	A geologic formation capable of transmitting significant quantities of groundwater under normal hydraulic gradients.
arroyo	A steep-sided and flat-bottomed gulley in an arid region that is occupied by a stream only intermittently, after rains.
ball mill	A piece of milling equipment used to grind ore into small particles. It is a cylindrical shaped steel container filled with steel balls into which crushed ore is fed. The ball mill is rotated causing the balls themselves to cascade, which in turn grinds the ore.
beneficiation	Physical treatment of crude ore to improve its quality for some specific purpose. Also called mineral processing.
Bond work index (BWi)	A measure of the energy required to break an ore to a nominal product size, determined in laboratory testing, and used to calculate the required power in a grinding circuit design.
comminution/crushing/grinding	Crushing and/or grinding of ore by impact and abrasion. Usually, the word "crushing" is used for dry methods and "grinding" for wet methods. Also,

Term	Definition
	"crushing" usually denotes reducing the size of coarse rock while "grinding" usually refers to the reduction of the fine sizes.
concentrate	The concentrate is the valuable product from mineral processing, as opposed to the tailing, which contains the waste minerals. The concentrate represents a smaller volume than the original ore
cut-off grade	A grade level below which the material is not "ore" and considered to be uneconomical to mine and process. The minimum grade of ore used to establish reserves.
data verification	The process of confirming that data has been generated with proper procedures, has been accurately transcribed from the original source and is suitable to be used for mineral resource and mineral reserve estimation
density	The mass per unit volume of a substance, commonly expressed in grams/ cubic centimeter.
diabase	US terminology for an intrusive rock whose main components are labradorite and pyroxene, and characterized by an ophiolitic texture. Corresponds to a diorite.
dilution	Waste of low-grade rock which is unavoidably removed along with the ore in the mining process.
easement	Areas of land owned by the property owner, but in which other parties, such as utility companies, may have limited rights granted for a specific purpose.
electrowinning.	The removal of precious metals from solution by the passage of current through an electrowinning cell. A direct current supply is connected to the anode and cathode. As current passes through the cell, metal is deposited on the cathode. When sufficient metal has been deposited on the cathode, it is removed from the cell and the sludge rinsed off the plate and dried for further treatment.
encumbrance	An interest or partial right in real property which diminished the value of ownership, but does not prevent the transfer of ownership. Mortgages, taxes and judgements are encumbrances known as liens. Restrictions, easements, and reservations are also encumbrances, although not liens.
feasibility study	A feasibility study is a comprehensive technical and economic study of the selected development option for a mineral project, which includes detailed assessments of all applicable modifying factors, as defined by this section, together with any other relevant operational factors, and detailed financial analysis that are necessary to demonstrate, at the time of reporting, that extraction is economically viable. The results of the study may serve as the basis for a final decision by a proponent or financial institution to proceed with, or finance, the development of the project.

Term	Definition
	A feasibility study is more comprehensive, and with a higher degree of accuracy, than a pre-feasibility study. It must contain mining, infrastructure, and process designs completed with sufficient rigor to serve as the basis for an investment decision or to support project financing.
flotation	Separation of minerals based on the interfacial chemistry of the mineral particles in solution. Reagents are added to the ore slurry to render the surface of selected minerals hydrophobic. Air bubbles are introduced to which the hydrophobic minerals attach. The selected minerals are levitated to the top of the flotation machine by their attachment to the bubbles and into a froth product, called the "flotation concentrate." If this froth carries more than one mineral as a designated main constituent, it is called a "bulk float". If it is selective to one constituent of the ore, where more than one will be floated, it is a "differential" float.
flowsheet	The sequence of operations, step by step, by which ore is treated in a milling, concentration, or smelting process.
frother	A type of flotation reagent which, when dissolved in water, imparts to it the ability to form a stable froth
greenschist facies	one of the major divisions of the mineral facies classification of metamorphic rocks, the rocks of which formed under the lowest temperature and pressure conditions usually produced by regional metamorphism. Temperatures between 300 and 450 °C (570 and 840 °F) and pressures of 1 to 4 kilobars are typical. The more common minerals found in such rocks include quartz, orthoclase, muscovite, chlorite, serpentine, talc, and epidote
heap leaching	A process whereby valuable metals, usually gold and silver, are leached from a heap or pad of crushed ore by leaching solutions percolating down through the heap and collected from a sloping, impermeable liner below the pad.
high pressure grinding rolls (HPGR)	A type of crushing machine consisting of two large studded rolls that rotate inwards and apply a high pressure compressive force to break rocks.
indicated mineral resource	An indicated mineral resource is that part of a mineral resource for which quantity and grade or quality are estimated on the basis of adequate geological evidence and sampling. The term adequate geological evidence means evidence that is sufficient to establish geological and grade or quality continuity with reasonable certainty. The level of geological certainty associated with an indicated mineral resource is sufficient to allow a qualified person to apply modifying factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit.
induced polarization (IP)	Geophysical method used to directly detect scattered primary sulfide mineralization. Most metal sulfides produce IP effects, e.g. chalcopyrite, bornite, chalcocite, pyrite, pyrrhotite

Term	Definition
inferred mineral resource	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. The term limited geological evidence means evidence that is only sufficient to establish that geological and grade or quality continuity is more likely than not. The level of geological uncertainty associated with an inferred mineral resource is too high to apply relevant technical and economic factors likely to influence the prospects of economic extraction in a manner useful for evaluation of economic viability. A qualified person must have a reasonable expectation that the majority of inferred mineral resources could be upgraded to indicated or measured mineral resources with continued exploration; and should be able to defend the basis of this expectation before his or her peers.
Lerchs–Grossmann	An algorithm used to design the contour of an open pit so as to maximize the difference between the total mine value of ore extracted and the total extraction cost of ore and waste
lithogeochemistry	The chemistry of rocks within the lithosphere, such as rock, lake, stream, and soil sediments
locked cycle flotation test	A standard laboratory flotation test where certain intermediate streams are recycled into previous separation stages and the test is repeated across a number of cycles. This test provides a more realistic prediction of the overall recovery and concentrate grade that would be achieved in an actual flotation circuit, compared with a more simple batch flotation test.
measured mineral resource	A measured mineral resource is that part of a mineral resource for which quantity and grade or quality are estimated on the basis of conclusive geological evidence and sampling. The term conclusive geological evidence means evidence that is sufficient to test and confirm geological and grade or quality continuity. The level of geological certainty associated with a measured mineral resource is sufficient to allow a qualified person to apply modifying factors, as defined in this section, in sufficient detail to support detailed mine planning and final evaluation of the economic viability of the deposit.
mill	Includes any ore mill, sampling works, concentration, and any crushing, grinding, or screening plant used at, and in connection with, an excavation or mine.
mineral reserve	A mineral reserve is an estimate of tonnage and grade or quality of indicated and measured mineral resources that, in the opinion of the qualified person, can be the basis of an economically viable project. More specifically, it is the economically mineable part of a measured or indicated mineral resource, which includes diluting materials and allowances for losses that may occur when the material is mined or extracted.

Term	Definition
	The determination that part of a measured or indicated mineral resource is economically mineable must be based on a preliminary feasibility (pre-feasibility) or feasibility study, as defined by this section, conducted by a qualified person applying the modifying factors to indicated or measured mineral resources. Such study must demonstrate that, at the time of reporting, extraction of the mineral reserve is economically viable under reasonable investment and market assumptions. The study must establish a life of mine plan that is technically achievable and economically viable, which will be the basis of determining the mineral reserve. The term economically viable means that the qualified person has determined, using a discounted cash flow analysis, or has otherwise analytically determined, that extraction of the mineral reserve is economically viable under reasonable investment and market assumptions. The term investment and market assumptions includes all assumptions made about the prices, exchange rates, interest and discount rates, sales volumes, and costs that are necessary to determine the economic viability of the mineral reserves. The qualified person must use a price for each commodity that provides a reasonable basis for establishing that the project is economically viable.
mineral resource	A mineral resource is a concentration or occurrence of 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 economic extraction. The term material of economic interest includes mineralization, including dumps and tailings, mineral brines, and other resources extracted on or within the earth's crust. It does not include oil and gas resources, gases (e.g., helium and carbon dioxide), geothermal fields, and water. When determining the existence of a mineral resource, a qualified person, as defined by this section, must be able to estimate or interpret the location, quantity, grade or quality continuity, and other geological characteristics of the mineral resource from specific geological evidence and knowledge, including sampling; and conclude that there are reasonable prospects for economic extraction of the mineral resource based on an initial assessment, as defined in this section, that he or she conducts by qualitatively applying relevant technical and economic factors likely to influence the prospect of economic extraction.
net smelter return royalty (NSR)	A defined percentage of the gross revenue from a resource extraction operation, less a proportionate share of transportation, insurance, and processing costs.
open pit	A mine that is entirely on the surface. Also referred to as open-cut or open-cast mine.

Term	Definition
peridotite	A plutonic rock which has a mafic content equial to or gradter than 90, and the olivine content, divided by the total plagioclase, orthopyroxene and clinopyroxene content is greater than 40.
phyllic alteration	Minerals include quartz-sericite-pyrite
plant	A group of buildings, and especially to their contained equipment, in which a process or function is carried out; on a mine it will include warehouses, hoisting equipment, compressors, repair shops, offices, mill or concentrator.
potassic alteration	A relatively high temperature type of alteration which results from potassium enrichment. Characterized by biotite, K-feldspar, adularia.
preliminary feasibility study, pre-feasibility study	A preliminary feasibility study (pre-feasibility study) is a comprehensive study of a range of options for the technical and economic viability of a mineral project that has advanced to a stage where a qualified person has determined (in the case of underground mining) a preferred mining method, or (in the case of surface mining) a pit configuration, and in all cases has determined an effective method of mineral processing and an effective plan to sell the product. A pre-feasibility study includes a financial analysis based on reasonable assumptions, based on appropriate testing, about the modifying factors and the evaluation of any other relevant factors that are sufficient for a qualified person to determine if all or part of the indicated and measured mineral resources may be converted to mineral reserves at the time of reporting. The financial analysis must have the level of detail necessary to demonstrate, at the time of reporting, that extraction is economically viable
Probable Mineral Reserve	A 'Probable Mineral Reserve' is the economically mineable part of an Indicated and, in some circumstances, a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified.
propylitic	Characteristic greenish colour. Minerals include chlorite, actinolite and epidote. Typically contains the assemblage quartz-chlorite-carbonate
probable mineral reserve	A probable mineral reserve is the economically mineable part of an indicated and, in some cases, a measured mineral resource. For a probable mineral reserve, the qualified person's confidence in the results obtained from the application of the modifying factors and in the estimates of tonnage and grade or quality is lower than what is sufficient for a classification as a proven mineral reserve, but is still sufficient to demonstrate that, at the time of reporting, extraction of the mineral reserve is economically viable under reasonable investment and market assumptions. The lower level of

Term	Definition
	confidence is due to higher geologic uncertainty when the qualified person converts an indicated mineral resource to a probable reserve or higher risk in the results of the application of modifying factors at the time when the qualified person converts a measured mineral resource to a probable mineral reserve. A qualified person must classify a measured mineral resource as a probable mineral reserve when his or her confidence in the results obtained from the application of the modifying factors to the measured mineral resource is lower than what is sufficient for a proven mineral reserve.
proven mineral reserve	A proven mineral reserve is the economically mineable part of a measured mineral resource. For a proven mineral reserve, the qualified person has a high degree of confidence in the results obtained from the application of the modifying factors and in the estimates of tonnage and grade or quality. A proven mineral reserve can only result from conversion of a measured mineral resource.
pyroxenite	Ultramafic igneous rock consisting primarily of minerals of the pyroxene group
qualified person	A qualified person is an individual who is a mineral industry professional with at least five years of relevant experience in the type of mineralization and type of deposit under consideration and in the specific type of activity that person is undertaking on behalf of the registrant; and an eligible member or licensee in good standing of a recognized professional organization at the time the technical report is prepared. For an organization to be a recognized professional organization, it must: (A) Be either: (1) An organization recognized within the mining industry as a reputable professional association, or (2) A board authorized by U.S. federal, state or foreign statute to regulate professionals in the mining, geoscience or related field; (B) Admit eligible members primarily on the basis of their academic qualifications and experience; (C) Establish and require compliance with professional standards of competence and ethics; (D) Require or encourage continuing professional development; (E) Have and apply disciplinary powers, including the power to suspend or expel a member regardless of where the member practices or resides; and; (F) Provide a public list of members in good standing.
quebrada	Gorge or ravine
reclamation	The restoration of a site after mining or exploration activity is completed.

Term	Definition
refining	A high temperature process in which impure metal is reacted with flux to reduce the impurities. The metal is collected in a molten layer and the impurities in a slag layer. Refining results in the production of a marketable material.
resistivity	Observation of electric fields caused by current introduced into the ground as a means of studying earth resistivity in geophysical exploration. Resistivity is the property of a material that resists the flow of electrical current
right-of-way	A parcel of land granted by deed or easement for construction and maintenance according to a designated use. This may include highways, streets, canals, ditches, or other uses
rock quality designation (RQD)	A measure of the competency of a rock, determined by the number of fractures in a given length of drill core. For example, a friable ore will have many fractures and a low RQD.
royalty	An amount of money paid at regular intervals by the lessee or operator of an exploration or mining property to the owner of the ground. Generally based on a specific amount per tonne or a percentage of the total production or profits. Also, the fee paid for the right to use a patented process.
run-of-mine	Rehandle where the raw mine ore material is fed into the processing plant's system, usually the crusher. This is where material that is not direct feed from the mine is stockpiled for later feeding. Run-of-mine relates to the rehandle being for any mine material, regardless of source, before entry into the processing plant's system.
solvent extraction-electrowinning (SX/EW)	A metallurgical technique primarily applied to copper ores, in which metal is dissolved from the rock by organic solvents and recovered from solution by electrolysis.
supergene	Mineral enrichment produced by the chemical remobilisation of metals in an oxidised or transitional environment.
tailings	Material rejected from a mill after the recoverable valuable minerals have been extracted.

25 RELIANCE ON INFORMATION PROVIDED BY THE REGISTRANT

25.1 Introduction

Wood fully relied on the registrant for the guidance in the areas noted in the following sub-sections.

Wood considers it is reasonable to rely on Southern Copper because the company has considerable experience in developing and operating mines in Mexico.

25.2 Macroeconomic Trends

- Information relating to inflation, interest rates, discount rates, foreign exchange rates, taxes.

This information is used in the economic analysis in Chapter 19. It supports the mineral resource estimate in Chapter 11, and the mineral reserve estimate in Chapter 12.

25.3 Markets

- Information relating to market studies/markets for product, market entry strategies, marketing and sales contracts, product valuation, product specifications, refining and treatment charges, transportation costs, agency relationships, material contracts (e.g., mining, concentrating, smelting, refining, transportation, handling, hedging arrangements, and forward sales contracts), and contract status (in place, renewals)

This information is used when discussing the market, commodity price and contract information in Chapter 16, and in the economic analysis in Chapter 19. It supports the mineral resource estimate in Chapter 11, and the mineral reserve estimate in Chapter 12.

25.4 Legal Matters

- Information relating to the corporate ownership interest, the mineral tenure (concessions, payments to retain, obligation to meet expenditure/reporting of work conducted), surface rights, water rights (water take allowances), royalties, encumbrances, easements and rights-of-way, violations and fines, permitting requirements, ability to maintain and renew permits

This information is used in support of the property ownership information in Chapter 3, the permitting and closure discussions in Chapter 17, and the economic analysis in Chapter 19. It supports the mineral resource estimate in Chapter 11, and the mineral reserve estimate in Chapter 12.

25.5 Environmental Matters

- Information relating to baseline and supporting studies for environmental permitting, environmental permitting and monitoring requirements, ability to maintain and renew permits, emissions controls, closure planning, closure and reclamation bonding and bonding requirements, sustainability accommodations, and monitoring for and compliance with requirements relating to protected areas and protected species

This information is used when discussing property ownership information in Chapter 3, the permitting and closure discussions in Chapter 17, and the economic analysis in Chapter 19. It supports the mineral resource estimate in Chapter 11, and the mineral reserve estimate in Chapter 12.

25.6 Stakeholder Accommodations

- Information relating to social and stakeholder baseline and supporting studies, hiring and training policies for workforce from local communities, partnerships with stakeholders (including national, regional, and state mining associations; trade organizations; fishing organizations; state and local chambers of commerce; economic development organizations; non-government organizations; and, state and federal governments), and the community relations plan

This information is used in the social and community discussions in Chapter 17, and the economic analysis in Chapter 19. It supports the mineral resource estimate in Chapter 11, and the mineral reserve estimate in Chapter 12.

25.7 Governmental Factors

- Information relating to taxation and royalty considerations at the Project level, monitoring requirements and monitoring frequency.

This information is used in the economic analysis in Chapter 19. It supports the mineral resource estimate in Chapter 11, and the mineral reserve estimate in Chapter 12.