Southern Copper

and

Grupo México
MINERÍA

Tía María Project
Peru
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 "Tía María Project, Peru, 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"

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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 Tía María Project (the Project), located in the Province of Islay within the Arequipa Department, Peru.

The Tía María Project contains the Tía María and La Tapada deposits.

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 Tía María Project in Southern Copper's Form 10-K for the year ending December 31, 2021.

Mineral resources and mineral reserves are reported for the La Tapada and Tía María deposits.

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 Subpart 229.1300 – Disclosure by Registrants Engaged in Mining Operations in Regulation S–K 1300 (SK1300). The Report uses US English.

1.3 Property Setting

The Tía María Project is in the District of Cocachacra, Mejia and Deán Valdivia, Province of Islay, and Arequipa Region. The Project is located 118 km from Moquegua, 125 km from Arequipa, 120 km from the District of Ilo, and 980 km from Lima.

The Tía María Project is located between the municipalities of Mollendo and Ilo. From Arequipa, the Panamericana Sur national highway is followed to km 48 near the town of San José. From there the Project access road is followed to the Project site.

The climate is dry with an average yearly rainfall of 74.4 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.

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

The Project covers an area of approximately 34,790 ha in 55 concessions. Southern Copper was granted a beneficiation concession construction permit to be located in the districts of Mejía and Cocachacra, under Resolution and report No. 183-2019-MINEM-DGM-DTM/PB dated July 8, 2019, for a production capacity of 100,000 t/d.

Surface rights have been acquired for 21 surface properties (16,330.15 ha). There are also five mining easements, distributed in 11 lots that have a total area of 2,837.55 ha. Southern Copper indicated to Wood that there are sufficient surface rights envisaged for the LOM plan.

Southern Peru has easement agreements in place that cover the proposed powerline route and the planned water pipeline that will run from the envisaged desalination plant to the mine. A number of easement agreements with private individuals or associations are in place.

The Project currently holds no water rights. The mine plan assumes that water for process operations will be sourced from a desalination plant. The majority of the planned water pipeline route has agreements in place for surface rights.

A mining royalty is payable to the Government of Peru, based on operating income margins with graduated rates ranging from 1–12% of operating profits. There is also a mining tax payable, based on operating income, with rates that range from 2–8.4%.

1.5 Geology and Mineralization

The La Tapada and Tía María deposits are examples of porphyry copper deposits.

The basement to southwestern Peru consists of an extensive pre-Devonian metamorphic complex, comprising granulite to amphibolite grade gneisses, of the Arequipa Massif. The Arequipa Massif is intruded by the southern sections of the Mesozoic–Cenozoic composite Peruvian Coastal Batholith. In the Tía María district the batholith is represented by Cretaceous diorite, monzonite, granodiorite and granite bodies. Proterozoic to Lower Paleozoic shear zones cutting the Arequipa Massif rocks are intersected by numerous Cretaceous to Lower Tertiary brittle faults, breccias and crush zones. Tertiary and Quaternary continental sediments provide discontinuous cover.

The La Tapada deposit is approximately 1,250 m long, 800 m wide, and 630 m thick. Mineralization has been drill tested to a depth of about 630 m. The deposit remains open at depth. Weathering resulted in three zones of oxidation and mineralization, a leached cap, an oxide zone, and a primary or hypogene zone. There is no significant supergene enrichment at La Tapada. The economic mineralization at La Tapada is oxide copper consisting of chrysocolla, brochantite, antlerite, and atacamite with minor amounts of malachite and cuprite. In the primary zone, mineralization occurs as disseminated chalcopyrite and veinlets with a gypsum/anhydrite–chalcopyrite assemblage, chalcopyrite veinlets, and lesser chalcopyrite–bornite veinlets.

The Tía María deposit is approximately 1,750 m long, 300 m wide, and averages 300 m thick. Mineralization has been drill tested to a depth of 500 m. The deposit remains open at depth and along the northwest and southeast flanks; however, the open extents are mainly primary sulfide mineralization. Mineralization of economic interest is primarily copper oxide minerals in the oxide zone. Weathering produced three zones—a leached cap, an oxide zone, and a primary or hypogene zone. There is no significant supergene enrichment at Tía María. The oxide mineral assemblage is mainly chrysocolla with minor neotocite and malachite at depth. The hypogene zone includes disseminations and veinlets of pyrite and chalcopyrite with quartz. Traces of molybdenite occur with higher concentrations of chalcopyrite.

1.6 History

From 1994–1999, prior to involvement by Southern Copper, the Tía María Project area was evaluated by Teck Corporation, Phelps Dodge and Rio Tinto in the period . Work completed included geochemical sampling of outcrops and artisanal mine workings, stream sediment and soil geochemical sampling, ground radiometric and magnetic geophysical surveys, core and reverse circulation (RC) drilling, and preliminary metallurgical testwork.

Southern Copper acquired the Project in 2003, and has completed geochemical sampling, induced polarization ground geophysical surveys, drilling, metallurgical testwork, mining studies, mineral resource and mineral reserve estimation, collection of environmental and social baseline data, and community outreach programs.

1.7 Exploration, Drilling, and Sampling

1.7.1 Exploration

Southern Copper commissioned an induced polarization survey in 2006. The work was done by Arce Geofísicos and consisted of 18,150 m of pole-pole survey in 12 lines with 50 m electrode separation. These data defined both resistivity and chargeability anomalies in the area of the deposits.

1.7.2 Drilling

The drill database has 815 named drill holes comprising 236,072 m of drilling. Of those, 65 drill holes do not have collar (easting–northing) locations. Of the 750 drill holes with collar locations, 74 drill holes are missing elevation data. Drilling used in mineral resource estimation totals 318 drill holes (116,439 m) for La Tapada and 169 drill holes (36,262 m) for Tía María. All drilling was used for either geological modeling and/or mineral resource estimation.

All core was logged with the data recorded on paper using a standard logging format that captured information such as lithology, mineralization and oxidation state, alteration, and structures and fracturing.

Core recovery data for La Tapada indicate that 95% of the data have better than 80% recovery. Core recovery at Tía María is generally good with 96% of the intervals with >80% recovery. Southern Copper concluded that zones with poor recovery were scattered, with no apparent patterns.

At La Tapada, of the 318 drill holes in the database, only nine are not vertical. At Tía María, all but four holes are vertical. The method of surveying drill hole collar locations for the three campaigns at Tía Maria is unknown. There is no formal documentation to verify the collar information. The drill hole collar coordinate data provided by Southern Copper were in UTM coordinates. Collar surveys at La Tapada in 2007 and for some collars in 2006 and 2005 were surveyed using a total station instrument. A total of 157 La Tapada drill holes have collar survey documentation. Downhole surveys were not performed on the vertical Tía María exploration holes. The lack of survey data does not support classification of measured mineral resources. Downhole surveys, using a Flexit instrument, were performed for 206 of the La Tapada drill holes on 45–55 m intervals.

1.7.3 Sampling

Half core was sampled on strict 3 m intervals. Intervals shorter and longer than 3 m were from the tops of sampled intervals and bottoms of holes.

The specific gravity (SG) data includes a total of 35,078 results at La Tapada and 12,081 results at Tía María, all of which represent 2.5–4 cm long samples of core measured by Southern Copper personnel using the water displacement method. Wood had Southern Copper collect 20 samples for check SG determinations at SGS Perú, using a paraffin-coated immersion method that is better suited to porous samples. Results exhibited an overall positive bias for SGS Perú relative to Southern Copper. These results are unusual because the wax-coat method normally returns lower density values than the direct immersion method. These biases are not as yet explained, and present a risk to the La Tapada and Tía María mineral resource estimates because the tonnages may be underestimated by as much as 10% locally.

Independent analytical and sample preparation laboratories were based in Lima, and included SGS Perú, CIMM Perú in Lima (now Certimin), and ALS. All three laboratories are currently accredited to ISO 9001, ISO 14001, and ISO 17025. However, accreditations at the time the analyses were performed are not recorded in the database.

Core sample preparation procedures at SGS Perú and CIMM Perú are not recorded. At ALS, samples were dried, crushed to 70% passing 2 mm, split, and pulverized to 85% passing 75 µm. Depending on the laboratory, analytical methods could include:

- Gold: 30 g or 50 g fire assay with atomic absorption spectroscopy (AAS) finish
- Copper: aqua regia digestion with AAS finish
- Sequential copper:
  - Acid soluble copper (CuS): sulfuric acid digestion with AAS finish
  - Cyanide soluble copper (CuCN): sodium cyanide digestion with AAS finish
  - Residue analysis (CuR): aqua regia digestion with AAS finish on residue.

No systematic quality assurance or quality control (QA/QC) processes were in place for the initial assaying at Tía María. In 2006, approximately 20% of the samples, randomly selected from across the deposit, were reassayed at ALS. These check assays indicate that there are no significant biases in the CIMM Perú and SGS Perú data.

Limited QA/QC data are available for La Tapada, consisting of re-assays of original SGS Perú or CIMM Perú assays. The data show acceptably small biases for total copper. However, the 2005 and 2007 re-assay programs suggest a soluble copper bias, with ALS positively biased by about 6% from 0–0.3% CuS. Wood considers the soluble copper data to be adequate because the method is a partial extraction that is extremely dependent on time, temperature, and reagent strength.

Data were formerly stored in Excel spreadsheets, but during 2021, were migrated to an Access database and that software is now used for data management.

1.8 Data Verification

Selected Wood personnel in the disciplines of geology, mine-related engineering and geotechnical visited the Project site during 2021.

Wood investigated collar surveying at La Tapada, and discovered an approximately 80 m discrepancy in the collar elevations that is likely due to different elevation datums or geoids being used. Wood performed an integrity check on 30% of the La Tapada data stored as Excel files that was migrated to Access. When compared to original data, the database was found to be reasonably error-free.

During the site visit, selected drill hole collar locations at Tía María were compared to topography, using a hand-held global positioning system instrument, with acceptable results. Wood reviewed the Tía María geological model by comparing interpreted sections to drill data. The review found the models to be reasonable.

The data verification programs concluded that the data collected from the Tía María Project area adequately support the geological interpretations and constitute a database of sufficient quality to support the use of the data in mineral resource and mineral reserve estimation.

Wood determined that the measured confidence category for mineral resources could not be met due to concerns with apparent bias in density data, lack of down hole surveys, limitations on some of the QA/QC procedures, and risks regarding social license.

1.9 Metallurgical Testwork

Three laboratories performed the majority of the testwork supporting the plant design, the non-independent onsite metallurgical laboratory, and the independent SGS Peru, and CIMM Chile laboratories.

Four testwork phases were conducted. Work included mineralogy, comminution (Bond ball mill work index determinations), leach tests (bottle roll, mini-column, column, gabion), and solvent extraction and electrowinning (SX/EW) tests.

The comminution tests returned a value of 15.2 kWh/t for La Tapada, and a range from 14.4–14.9 kWh/t for Tía María. The leach tests resulted in the following process designs:

- La Tapada: particle size: P80 = 14.7 mm; irrigation rate: 10 L/h/m^2; average extraction: 69% CuT (considering a scale up factor, determined from similar operations); net acid consumption: 20 kg H+/kg Cu; irrigation period: 90 days

- Tía María: particle size: P80 = 14.7 mm; irrigation rate: 10 L/h/m^2; average extraction: 65% CuT (considering a scale up factor, determined from similar operations); net acid consumption: 20 kg H^+/kg Cu; irrigation period: 90 days.

The leaching cycle was set at 60 days, with a possibility of a 90-day cycle.

The average LOM copper recovery estimate based on the current mine plan and the recovery equations, is 69% for La Tapada ore and 65% for Tía María ore. The combined average copper recovery for both ores is projected to be 68%.

Metallurgical test samples were selected to best represent the distribution of the lithologies present in both the La Tapada and Tía María deposits. The selection of metallurgical samples also ensured adequate spatial coverage of the deposit.

No significant quantities of deleterious elements are known from the product sales perspective. Levels of aluminum and magnesium will need to be monitored as these may impact operating costs.

1.10 Mineral Resource Estimates

1.10.1 Estimation Methodology

Exploratory data analysis was completed on the assay data using histograms, contact plots, and box plots. The results validated the estimation domains that were constructed by Southern Copper.

A total of 10 estimation domains were constructed at Tía María, based on lithology and mineralization. Six estimation domains were identified based on lithology and mineralization at La Tapada. All contacts between estimation domains were treated as hard contacts.

Geological models were based on interpretations of lithology, alteration and mineralization from plans and sections. At La Tapada, no structural model was produced, and alteration was not used to define estimation domains because the majority of the mineralization was associated with potassic alteration and that model was consistent with the drill data. For Tía María, the lithology model included four units, consisting of Quaternary, diorite, gneiss, and porphyry. The mineralization model included four units, namely leach, oxide, mixed, and primary. Alteration included six alteration types, including Quaternary (unaltered), argillic, propylitic, phyllic, silicification, and potassic.

Density was estimated using inverse distance weighting to the second power (ID2).

Grade capping was imposed at grades ranging from 1–2% TCu.

Composites were created at 15 m bench intervals. Variograms were constructed to provide appropriate search ranges to be used during estimation.

Using ID2, Southern Copper estimated total and soluble copper for the La Tapada and Tía María deposits using MineSight software. Mineral resource estimation was based on 12.5 x 12.5 x 15 m blocks. A nearest neighbor (NN) model was used for validation purposes.

Wood validated the model by visual validation, global bias assessment, local bias assessment, and change of support analysis. No material issues were noted with the estimate.

Wood initially classified the mineral resource estimates using drill spacing studies. Wood determined that a drill spacing of 100 m was appropriate for measured mineral resources at La Tapada, and a drill spacing of 175 m was appropriate for indicated mineral resources. Mineral resources beyond 175 m spacing are considered to be inferred. At Tía María, Wood determined that a drill spacing of 75 m was appropriate for measured mineral resources and a drill spacing of 150 m was appropriate for indicated mineral resources. Mineral resources beyond 150 m spacing were considered to be inferred. Following the analysis that classified the mineral resource estimates into the measured, indicated and inferred confidence categories, uncertainties regarding sampling and drilling methods, 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 initially being classified as measured being reclassified as indicated, due to concerns with density data, lack of down hole surveys, and social license considerations.

Wood constrained the mineral resource estimates within conceptual pit shells using a Lerchs–Grossmann algorithm. Commodity prices used in resource estimation were 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 20-year LOM assumption that supports the mineral reserve estimates. The cut-off grade used for mineral resource estimation was 0.08% Cu. Wood considers those blocks within the constraining resource pit shell and above the cut-off applied to have reasonable prospects for economic extraction.

No estimates for gold, silver, or molybdenum are reported for leachable material as these elements cannot currently be recovered using the leach process envisaged.

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 estimates are current as of December 31, 2021.

The indicated mineral resource estimates for the La Tapada deposit are provided in Table 1-1. The inferred mineral resource estimates are included in Table 1-2. The indicated mineral resource estimates for the Tía María deposit are provided in Table 1-3. The inferred mineral resource estimates are included in Table 1-4. Wood is the QP Firm responsible for the estimates.

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 cut-off values applied to the estimates; variations in geotechnical (including seismicity), hydrogeological and mining assumptions; and changes to environmental, permitting and social license assumptions.

Specific factors that may affect the estimates include:

- Density determinations. La Tapada data for intrusive rocks show a positive 2–11% bias for SGS Perú relative to Southern Copper and gneiss shows a 2–12% positive bias for SGS Perú relative to Southern Copper. These biases are unexplained and present a risk to the La Tapada and Tía María mineral resource estimates because the tonnages may be underestimated by as much as 10% locally
- Lack of supporting documentation for a significant percentage of the collar locations is an uncertainty in the reliability of these data that contributes to data quality and verification issues limiting the maximum mineral resource classification to indicated
- Downhole surveys were not performed on Tía María exploration holes. As a consequence, the lack of survey data does not support classification of measured mineral resources.

Table 1-1: La Tapada Indicated Mineral Resource Statement

Confidence Classification	Tonnage (Mt)	Copper Grade (% Cu)	Contained Copper (M lbs)
Indicated	90.4	0.21	420.3

Table 1-2: La Tapada Inferred Mineral Resource Statement

Confidence Classification	Tonnage (Mt)	Copper Grade (% Cu)	Contained Copper (M lbs)
Inferred	1.6	0.18	6.4

Notes to Accompany La Tapada Mineral Resource Tables

1. The mineral resource estimates are current as of 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 constrained within a wireframe constructed at a 0.1% total copper grade.
3. Mineral resources are reported within a conceptual pit shell that uses the following input parameters: metal prices of US$3.80/lb Cu; metallurgical recovery assumptions of 69% for La Tapada and 65% for Tía María; base mining costs of US$1.40/t mined and incremental haul costs of US$0.017/t mined; process operating costs of US$3.78/t processed for La Tapada and US$3.61/t processed for Tía María; general and administrative costs of US$0.37/t processed; transport and freight costs of US$0.04/lb Cu; an assumed copper cathode premium of US$0.03/lb Cu, and a royalty payable of 1%. Average pit slope angles were used for the north and south geotechnical zones in each deposit, and ranged from 35º–39º.
4. No estimates for gold, silver, or molybdenum are reported for leachable material as these elements cannot currently be recovered using the leach process envisaged.
5. Numbers in the table have been rounded. Totals may not sum due to rounding.

Table 1-3: Tía María Indicated Mineral Resource Statement

Confidence Classification	Tonnage (Mt)	Copper Grade (% Cu)	Contained Copper (M lbs)
Indicated	35.5	0.17	135.2

Table 1-4: Tía María Inferred Mineral Resource Statement

Confidence Classification	Tonnage (Mt)	Copper Grade (% Cu)	Contained Copper (M lbs)
Inferred	21.8	0.22	107.8

Notes to Accompany Tía María Mineral Resource Tables

1. The mineral resource estimates are current as of 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 constrained within a wireframe constructed at a 0.1% total copper cut-off grade.
3. Mineral resources are reported within a conceptual pit shell that uses the following input parameters: metal prices of US$3.80/lb Cu; metallurgical recovery assumptions of 69% for La Tapada and 65% for Tía María; base mining costs of US$1.40/t mined and incremental haul costs of US$0.017/t mined; process operating costs of US$3.78/t processed for La Tapada and US$3.61/t processed for Tía María; general and administrative costs of US$0.37/t processed; transport and freight costs of US$0.04/lb Cu; an assumed copper cathode premium of US$0.03/lb Cu, and a royalty payable of 1%. Average pit slope angles were used for the north and south geotechnical zones in each deposit, and ranged from 35º–39º.
4. No estimates for gold, silver, or molybdenum are reported for leachable material as these elements cannot currently be recovered using the leach process envisaged.
5. Numbers in the table have been rounded. Totals may not sum due to rounding.

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 plans assume conventional open pit mining methods from the La Tapada and Tía María deposits.

Wood undertook a review of each of the La Tapada and Tía María block models, and made the following changes to the models:

- Alteration, lithology, and structural interpretations were extended to that portion of the La Tapada pit at the southwest, which lacked supporting data, to complete a pit stability assessment.
- Inconsistencies with slope sectors at both La Tapada and Tía María were addressed to align with recommendations made by third-party consultants, Vector, in 2007.

The surface topography, covering both deposits, was provided by Southern Copper. The block models were coded with a variable that represented the different geotechnical zones for each deposit, which corresponded to an overall slope angle; these ranged from a minimum of 31º to a maximum of 42.5º.

Pit optimization was performed using the Lerchs–Grossmann algorithm implemented in GEOVIA Whittle software. 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.

Metallurgical recoveries were assumed to be 69% for the La Tapada deposit and 65% for the Tía María deposit.

Mining costs included a base mining cost of US$1.40/t (includes drilling, blasting, loading, haulage, roads and waste rock storage facilities (WRSFs), general costs, and indirect costs), and a mining sustaining cost of US$0.049/t (includes mine equipment overhaul and site infrastructure costs). An incremental haulage cost of US$0.017/t was applied for each bench below reference level 360 masl for the La Tapada deposit and 750 masl for the Tía María deposit.

Process costs were estimated at US$3.779/t for the La Tapada deposit and US$3.614/t for the Tía María deposit (including operating, crushing, supervisory, leaching, SX/EW, and replacement costs). A process sustaining cost of US$0.155/t was used (including costs associated with the spent ore (ripios) facility expansion, and an additional primary crusher and overland conveying system for the Tía María open pit.

The general and administrative (G&A) cost in pit optimization was US$0.373/t.

Selling costs used in pit optimization included a rail transport cost of US$0.003/lb of copper cathode, a port charge cost (assuming the port of Matarani, Peru) of US$0.006/lb of copper cathode, and an ocean freight cost from Matarani to Shanghai, China, of US$0.025/lb of copper cathode. A copper cathode premium of US$0.026/lb Cu was included, and reduced the overall selling costs to a final value of US$0.008/lb Cu.

A 1% NSR royalty was applied during pit optimization to account for the minimum Modified Mining Royalty.

Ore versus waste determinations were made using a net smelter return (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 1-5. 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 copper 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, labor 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; and the ability to obtain and maintain the social and environmental license to operate.

1.12 Mining Methods

The proposed operations will use conventional open pit equipment and mining methods.

Pit designs were based on geotechnical recommendations from studies completed by third-party consultants, Vector, in 2007.

Water inflow rates to the La Tapada and Tía María open pits are predicted to be approximately 2.4 m^3/d and 1.7 m^3/d, respectively.

Hexagon's Mine Plan Schedule Optimizer program was used to generate the optimal life-of-mine schedule. The mine plan was based on the following key assumptions:

- 100,000 t/d process throughput (36 Mt/a)
- Approximately 120 kt/a of copper cathode production.

Table 1-5: Probable Mineral Reserve Statement

	Tonnage (Mt)	Grade (Cu%)	Contained Copper (M lbs)
La Tapada	487.6	0.41	4,449.2
Tía María	223.8	0.29	1,412.5
Total	***711.3***	***0.37***	***5,861.6***

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. Mineral reserves are constrained within an optimized pit shell that uses the following parameters: assumption of open pit mining methods; assumption of heap leach processing; copper price of US$3.30/lb; copper cut-off grade of 0.10% Cu; mining recovery of 100%; metallurgical recovery of 69% at La Tapada and 65% at Tía María; total mining costs (base, incremental and sustaining) of US$1.466/t mined; process costs of US$3.779/t processed at La Tapada and US$3.614/t processed at Tía María; process sustaining capital costs of US$0.155/t processed, general and administrative costs of US$0.373/t processed; transport costs (rail, port, freight) of US$0.034/lb Cu; a copper cathode premium payable of US$0.026/lb Cu; and assumption of a 1% royalty payment.
3. Numbers have been rounded and may not sum due to rounding.

The mine plan was optimized to maintain a 120 kt/a production rate when possible, and designs aimed for two concurrent operating phases, when possible, to provide mill feed. Eight benches were assumed to be mined per year. Mine operations were assumed to run 365 days a year, 24 hours per day.

The open pit life of mine is approximately 20 years. During the first 10 years only the La Tapada deposit will be mined. After Year 10, production will be from both the La Tapada and Tía María deposits. Tía María is mined later in the LOM plan as the deposit has lower copper grades than La Tapada, and so will produce less copper cathode. The mine plan assumes that La Tapada will be mined in four phases, and Tía María in two. A one-year pre-production period was envisaged for pre-stripping of waste material.

Four oxide stockpiles for material grading less than the run-of-mine cut-off but >0.08% Cu are planned, with two stockpile locations at each open pit. Sulfide-bearing mineralization is not included in the LOM plan in this Report. However, there may be potential in the future to treat this material. Southern Copper has elected to put copper-bearing sulfide material grading >0.115% Cu into designated sulfide stockpiles at each open pit. Stockpile and WRSF designs were matched to the required capacities envisaged in the LOM plan.

It is assumed that blasting services will be contracted out. Grade control will use 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.

Open pit mining will be undertaken using 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.

1.13 Recovery Methods

The process design is based on existing technologies and proven equipment. The design includes crushing, agglomeration and curing, dynamic heap leaching, and SX/EW. The process facilities are designed to treat a nominal rate of 100,000 t/d of copper oxide ore and produce 120,000 t/a of copper cathodes as final product. The Tía María process facility is expected to operate for 20 years, processing oxide ore from the La Tapada deposit for the first half of the proposed life-of-mine (LOM), and from both the La Tapada and Tía María deposits for the second half of the LOM plan.

The proposed plant will consist of primary, secondary and tertiary crushing, agglomeration/curing circuit, stacking of agglomerated ore onto two dynamic heap leach facilities, two irrigation stages on the heaps, and a SX/EW circuit. The final product will be copper cathodes. The design contemplates an estimated copper cathode production of 14 t/hr, with a 99.999 % Cu purity and a current efficiency of 91%.

Power will be supplied from the existing 220 kV Moquegua sub-station to a 220 kV/23 kV Tía María sub-station via an approximately 100 km long transmission line. The average annual power consumption for the plant is estimated to be 727,933 MW per year. Process water will be sourced from a desalination plant. Consumables used will include sulfuric acid, diluent, extractant, cobalt sulfate heptahydrate, and guar.

1.14 Infrastructure

The site is currently a greenfields site, with the only infrastructure being the exploration camp. Planned on-site infrastructure includes: two open pits, five WRSFs, a coarse ore stockpile, two sulfide stockpiles, four low-grade oxide stockpiles, one on/off leach facility, one spent ore facility, process facilities, warehouses, workshops, and offices, electrical substation and the power distribution system, water handling facilities, a permanent camp for operations and the temporary camp for construction, and a railway yard and sulfuric acid discharge station at

Pampa Cachendo. Off-site infrastructure will include an access road, 220 kV power transmission line, seawater desalination plant, desalinated water drive system, railway, and a sulfuric acid loading station at Matarani (Islay).

The mine gate will be situated at Pampa Cachendo. Mine access will be from the Pan-American Highway (PE 1S of the national network), diverting off the highway to the Project access road at km 1027–1028, between Arequipa and Moquegua, approximately 17 km before the town of El Fiscal.

There is an existing railway that runs from the Port of Matarani to Arequipa, which will be used from Matarani to Guerreros station. Guerreros station is located about 30 km northeast of the Port of Matarani. A new 33 km long railway line will be constructed from Guerreros station to the rail end at Pampa Cachendo. Southern Copper plans to use the railway system to transport cathodes, sulfuric acid and general cargo. All permits and authorizations for the planned railroad will be managed by Peru Rail under contract with Southern Copper. Peru Rail will be responsible for obtaining all of the required permits for line construction and operations, will provide the rolling stock, and will operate the railway.

Accommodations will include a temporary construction camp that will house 3,500 temporary workers, and a permanent camp for operations that will accommodate 704 workers.

During the Project construction phase, it is planned to use water from the La Ensenada canals that irrigate agricultural areas (La Motobomba beach) and/or water from the mouth of the Tambo River and/or water from the San Camilo canals that also irrigate agricultural areas . Temporary water authorizations will be sought for the use of such waters.

During the operations phase, water will be provided from a desalination plant to be constructed on the coast. Sea water will be captured by the direct intake method from the El Sombrero Beach, north of the town of Mejía, in the Mejía district at a rate of 2,448 m^3/hr. The 35 km long desalinated seawater pipeline from the beach in Mejía to Pampa Cachendo will follow the Mollendo–La Joya railway easement, which was acquired by Southern Copper. Two pumping stations will pump the desalinated water from the plant to the Pampa Cachendo site, where it will be stored in a pond.

1.15 Market Studies

Southern Copper provided Wood with an overview of the copper cathode market as sourced from third-party experts, Wood Mackenzie. The Wood Mackenzie report that Southern Copper used as the basis for the information provided to Wood has a date of June, 2021.

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.

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. Cathode copper is sold onto the Asian, European, Brazilian and/or North American markets. It is assumed that the end-purchasers of any cathodes from the Tía María Project will be in similar locations to those where Southern Copper already has a product 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.

The assumed exchange rate was US$1.00 = PENS/3.60. This exchange rate was provided by Southern Copper.

No contracts are in place for sale of any of the proposed cathode production. Southern Copper expects that any sales terms will be in line with contracts that Southern Copper has for its existing Peruvian operations. No contracts are currently in place for any services. When concluded, contracts would be negotiated and renewed as needed. Contract terms are expected to be typical of similar contracts that Southern Copper has entered into in Peru.

1.16 Environmental, Permitting and Social Considerations

1.16.1 Environmental Studies and Monitoring

Baseline and supporting studies included landscape, climate, air quality, noise, soil, flora, fauna, local resources, land use, and social environment. Key areas that will require monitoring include the heap leach facility, the spent ore facility, and the WRSFs.

A baseline was approved on August 1, 2014, and was included in the semi-detailed Environmental Impact Assessment (EIAd). The primary social information for the Project was collected during 2012.

A Social Diagnosis of the Tía María Mining Project was completed in 2019, which collected sociodemographic and socioeconomic information over the area of direct social influence (DSIA). The study area covered the Districts of Cocachacra, Dean Valdivia and Mejia, and included identification of stakeholders and analysis of local perceptions of the Project. There are no indigenous or native communities registered in the database of the Ministry of Culture of Peru within the DSIA. The main economic activities in the DSIA are agriculture and cattle raising

1.16.2 Closure and Reclamation Considerations

The closure plan includes three phases, progressive closure, final closure and post-closure. Progressive closure will include La Tapada open pit, sulfide dumps, La Tapada primary crusher and overland conveyor, and built infrastructure. Final closure will cover the Tía María open pit, WRSFs, spent ore stockpile, process facilities, and water management, built infrastructure and borrow pits (quarries). Post-closure will include closure monitoring and maintenance.

The closure cost assumed in the economic analysis is US$115.6 M. The estimate is inclusive of the Peruvian general sales tax.

1.16.3 Permitting

Southern Copper has an EIAd that was approved in 2014. In 2017 the EIAd was extended for two additional years. In 2019, Southern Copper obtained authorization to commence construction activities. Southern Copper must also manage the following authorizations: operating authorization; water use license; explosives use permit; Certificate of Non-existence of Archaeological Remains; EIA update; Closure Plan update (reclamation bond update); and mining plan update.

Where facility footprints have been approved, and Southern Copper intends on modifying those footprints to a larger facility size as part of the LOM plan outlined in this Report, permit modifications will need to be applied for, and approved.

1.16.4 Social Considerations, Plans, Negotiations and Agreements

1.16.4.1 Project History

Southern Copper has a complex history with stakeholders in the Project area of influence. The initial project configuration in 2009 drew controversy as the water requirements for the process operations were assumed to be sourced from groundwater through wells located in the Tambo River Valley, which is a significant local agricultural area. As a result, the Project was reconfigured to have the water required for operations sourced from a desalination plant to be constructed in the municipality of Mejia.

1.16.4.2 Current Considerations

During the years that Southern Copper has been working in the DSIA, a number of social programs were implemented to aid the economic and human development of the local communities including: "Good Neighbors", a basic health program; agricultural assistance and training; job skills training and internships; educational assistance and vocational guidance programs; and rural medical care.

Southern Copper has developed community development plans and diagnoses, set up a number of social and productive projects, and engaged with local communities in participatory mechanisms within the area of the DSIA. These steps show that Southern Copper has a process in place to obtain the social license within the social influence area, to permit, construct, and operate the Tía María mine. The information provided by Southern Copper on obtaining a social license supports a pre-feasibility level of study.

Southern Copper has a community development model based on a Good Neighbors policy, economic development, and human development. This model allows Southern Copper to identify expectations, local needs, and social issues, and engage with communities to provide solutions. Southern Copper has provided Wood with information supporting their proposed actions to recognize and mitigate social issues before they arise, or to address any social issues that may come up during pre-development, development, mine operating activities and mine closure.

Southern Copper confirmed to Wood that Southern Copper has proper internal control and follow up on their social projects and programs, which supports their process for establishing social communication. Community understanding of the Project has been established by Southern Copper and appears to be operating as intended.

Although Southern Copper has tried to ensure the local stakeholders are not opposed to the current Project as envisaged in this Report, the general environment in Peru can have the following risks for permitting and operating mining projects:

- Social conflicts due to negative perceptions from the communities and local authorities based on concerns about environmental management and the impacts of the Project on their economic activities
- Unfavorable position from the national government, prioritizing a political and social statement in spite of the legal licenses obtained by the Project
- Organizations promoting an anti-mining culture.

1.17 Capital Cost Estimates

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

A mining study was completed in 2007, which assumed a 120,000 t/d cathode production rate. In 2014, the 2007 study was used as a basis for an updated study completed by CAD Mexico. There were no more recent studies available to Wood. The cost estimates used in this Report are based on the 2014 and 2007 studies, as applicable, and escalated to second-quarter (Q2) 2021, referred to as current. The current capital estimate is supported by previous quotes escalated to Q2 2021 for major capital items and new budgetary quotes obtained for major mining equipment items.

The initial capital cost estimate includes:

- Mining: based on Owner operated open pit mining. Includes mining equipment, mine development (pre-stripping), mine facilities (access roads, power supply and distribution), and supporting infrastructure (workshops, storage, fuel, explosives, offices, change rooms)
- Process plant: includes ore crushing and overland conveying systems, stockpile, screening system, curing and agglomeration, dynamic leach pad, SX, tank yard and EW plant, solution recovery and handling system, and spent ore facility
- Plant infrastructure: consists of general plant buildings such as the administration building, workshops and storage, laboratory, and other supporting facilities (change house, control rooms, dining room, first aid, gatehouse and reagent storage).

- On- and off-site infrastructure: incorporates the site access road; railway from the existing Guerreros Station to the Project site; power supply, water supply consisting of sea water intake, desalination plant, pumping and pipeline, water storage; and accommodations camps.

A period of 36 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 production.

Sustaining capital costs were estimated by area and allocated over time using the same basis as was applied to the initial capital cost estimate. Indirect costs were estimated using the same percentage allowances as used in the initial capital cost estimate.

The capital cost estimate totals US$2,071.3 M, consisting of US$1,751.3 M in initial capital and US$320 M in sustaining capital.

Prior capital costs, totaling US$340.5 M, were excluded from the cash flow model because the costs are sunk, but the costs were carried over for financial and tax depreciation for Modified Mining Royalty and Special Mining Tax, and income tax calculations. Prior capital spent was not escalated. No allowance was added to cover for refurbishment of previously-purchased equipment.

Capital costs were applied in the financial model excluding value-added tax.

Table 1-6 summarizes the capital costs by cost area. Table 1-7 summarizes the estimated sustaining capital requirements.

1.18 Operating Cost Estimates

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

Mine operating costs are forecast to average US$1.43/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.

Table 1-6: Summary of Capital Cost by Area

Area	Sub-area	Updated Capital Estimate Excluding Prior Capital Spent (US$ M)	Prior Capital Spent (US$ M)	Total Project Cost (US$ M)
Mine	Mine development (pre-stripping) and mining equipment	209.9	1.2	211.1
Dry area	Primary and fine crushing, conveyor, heap leach facility, spent ore storage, general services, power supply to plant, acid storage	375.5	208.3	583.8
Wet area	SX/EW, tank yard	269.8	6.7	276.4
Facilities	Roads, general services, power supply, built infrastructure, gatehouse, acid storage, desalination plant and pipelines, accommodation camp, WRSFs, railway	322.7	9.4	332.1
Indirect costs	Indirect construction costs, EPCM, freight, import duties, Owner's costs	351.4	114.9	466.3
Contingency		222.1	—	222.1
Total		***1,751.3***	***340.5***	***2,091.8***

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

Table 1-7: Sustaining Capital Cost Estimate

Area	Sustaining Capital Cost (US$ M)
Mining equipment	159.6
Tía María sulfides WRSF	0.9
Spent ore facility	17.8
Additional crusher and conveyor – Tía María	94.3
Process plant to Tía María mining road	10.4
Indirect costs	37.0
Total	***320.0***

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

The estimated operating plant cost for the treatment of La Tapada ore is US$0.60/lb Cu recovered equivalent to US$3.76/t processed. The estimated operating plant cost for the treatment of Tía María ore is US$0.88/lb Cu recovered, equivalent to US$3.59/t processed. The processing cost includes all costs from primary crushing to cathode production, strapping, and storage.

The differences between the operating costs for the Tía María and La Tapada open pits is due to the cost of operating the on-terrain overland conveyors.

The total estimated annual G&A operating costs were approximately US$13.3 M/a or US$0.37/t of processed ore.

Table 1-8 is a summary of the operating cost estimates, exclusive of value-added taxes.

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 Tía María Project; mineral reserves; the cost and timing of any development of the Tía María Project; the proposed mine plan and mining strategy; dilution and extraction recoveries; processing method and rates and production rates; projected metallurgical recovery rates; infrastructure requirements; capital, operating and sustaining cost estimates; 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; federal and local tax laws; estimates of reclamation obligations; requirements for additional capital; environmental and social risks; and general business and economic conditions.

Table 1-8: LOM Operating Cost Estimate

Description	Total (US$M)	Unit Cost	
Mining*	1,876.7	US$/t mined	1.43
Process	2,474.3	US$/t processed	3.48
G&A	264.7	US$M/a	13.3
Total	***4,615.7***		

Note: * Excludes capitalized pre-stripping cost of US$42.4 M incurred in year -1. Numbers have been rounded and may not sum due to rounding.

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 PEN/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 -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 copper and the long-term copper 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 Peru. 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. Tax depreciation was straight line.

US$340.5 M of previous capital was excluded from the cash flow model because it is sunk, but it was carried over for financial and tax depreciation to modify the mining royalty, the special Mining Tax and the income tax calculations.

1.19.3 Economic Analysis

The Tía María Project is anticipated to generate a pre-tax NPV of US$1,402.1 M at a 10.0% discount rate, an IRR of 22.5% and a payback of 3.4 years.

The financial analysis results show an after-tax NPV of US$676.4 M at a 10.0% discount rate, an IRR of 16.6% and a payback of 4.3 years.

Table 1-9 presents a summary of the financial analysis 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 price, grades, initial capital costs and operating costs. The results of this analysis are presented in Figure 1-1 (NPV) and Figure 1-2 (IRR). For the purpose of the sensitivity to metal grades, it was assumed that the capacity of the processing facilities is not a constraint.

The Tía María Project is most sensitive to fluctuations in copper price and grades. It is less sensitive to changes in initial capital cost and operating costs.

1.20 Risks and Opportunities

Factors that may affect the mineral resource and mineral reserve estimates were identified in Chapter 1.10.2 and Chapter 1.11.2 respectively.

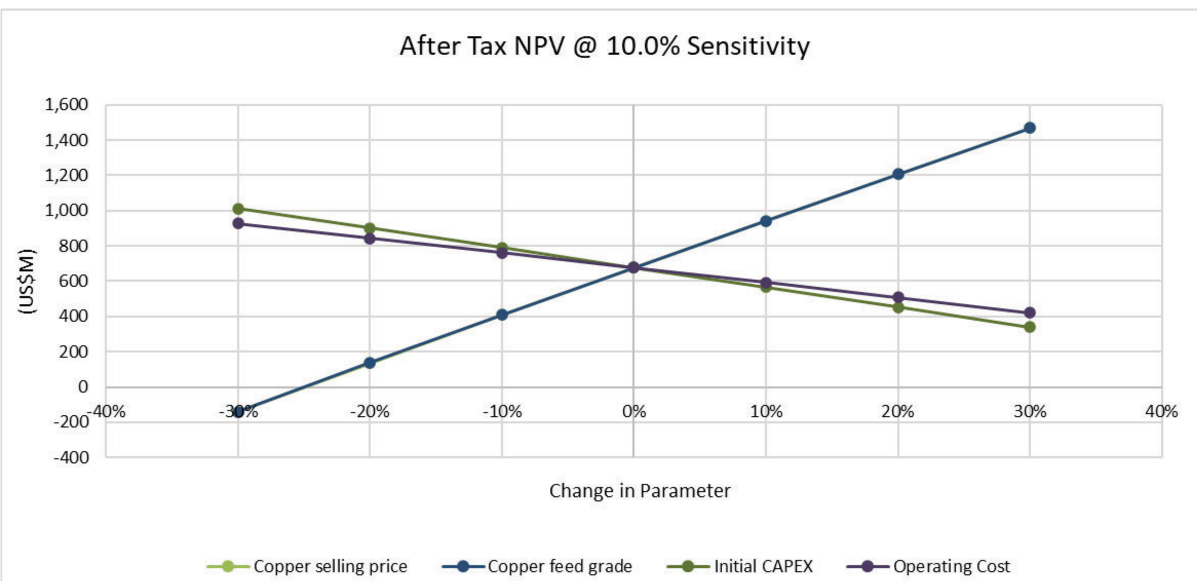
1.20.1 Risks

The risks associated with the Tía María 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.

Table 1-9: Summary of Economic Results

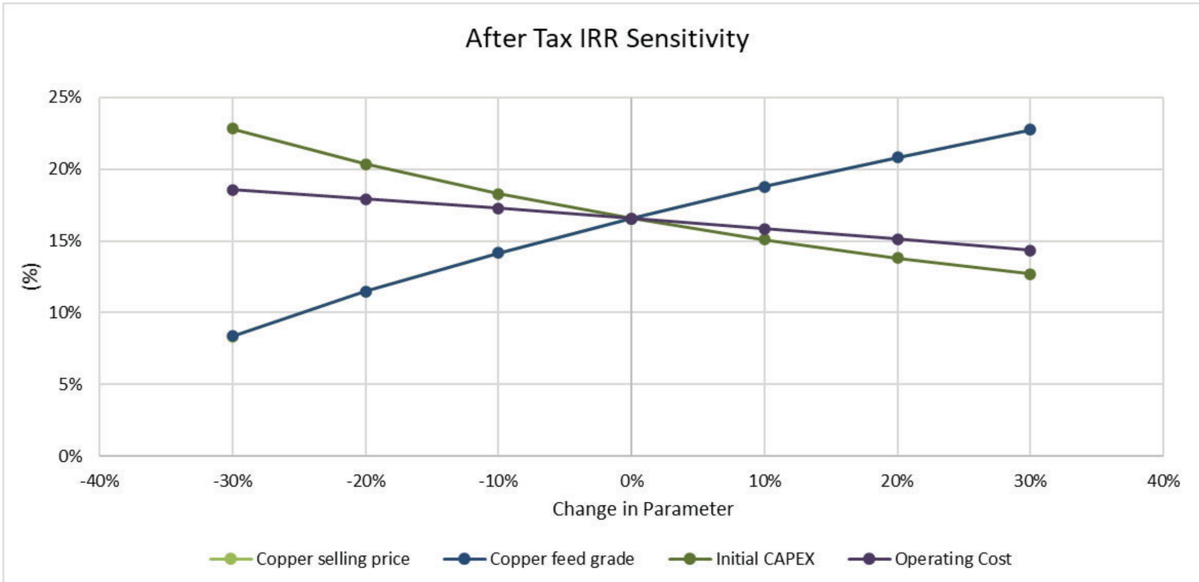
Description	Units	Value
Assumed throughput rate	Mt/a	36
Mine life	Years	20 plus one year of pre-production
Copper payable	kt	1,809
After-Tax Valuation Indicators		
Undiscounted cash flow	US$M	3,871.5
NPV @ 10.0%	US$M	676.4
Payback period (from start of operations)	years	4.3
IRR	%	16.6
Project capital (initial)	US$M	(1,751.3)
Sustaining capital	US$M	(320.0)
Closure cost	US$M	(115.6)
Mining operating cost	US$M	(1,876.7)
Process operating cost	US$M	(2,474.3)
G&A	US$M	(264.7)

Figure 1-1: Sensitivity of After-Tax NPV At A 10% Discount Rate



Note: Figure prepared by Wood, 2021. Capex = capital cost estimate.

Figure 1-2: Sensitivity of After-Tax IRR At A 10% Discount Rate



Note: Figure prepared by Wood, 2021. Capex = capital cost estimate.

- The largest risk facing the Project is the inability to obtain the social license to construct, operate and close the Project as envisaged. Southern Copper has a complex history with stakeholders in the Project area of influence, and an earlier iteration of the Project resulted in social conflict as it assumed process water could be obtained from groundwater wells in the Tambo River Valley. The Project as envisaged in this Report would obtain water from a coastal desalination plant
- Density check sampling returned unusual results because the wax-coat method normally returns lower density values than the direct immersion method and here, with the exception of two points out of 40, that is not the case. These biases are unexplained, and present a risk to the La Tapada and Tía María mineral resource estimates because the tonnages may be underestimated by as much as 10% locally
- There is no formal documentation to verify the drill collar information. Wood investigated collar surveying in the La Tapada area and discovered an approximately 80 m discrepancy in the collar elevations that is likely due to different elevation datums or geoids being used. The discrepancy, while significant, will not cause problems with mineral resource estimation or mine planning as long as the original datum is used consistently throughout (all sample data and engineering levels are

on the same basis). There is a danger that mixing datums will cause location data to be displaced by 80 m making sample locations and designs problematical. The lack of documentation is a risk because it is not possible to verify the collar locations in the database and it is not possible to discover the source of the 80 m discrepancy because there is no documentation of what was actually done in the original surveys

- The majority of the drilling is vertical. However, the lack of downhole surveys does not provide confidence that there has been no deviation in any of the vertical drill holes. As a consequence, the lack of survey data does not support classification of measured mineral resources
- 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
- Geotechnical and hydrological assumptions used in mine planning are based on historical performance, and to date historical performance has been a reasonable predictor of current conditions. Any changes to the geotechnical and hydrological assumptions could affect mine planning, affect capital cost estimates if any major rehabilitation is required due to a geotechnical or hydrological event, affect operating costs due to mitigation measures that may need to be imposed, 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.
- A total of 23 species of flora (15% of the total number of species sampled) were identified as endemic or had some type of conservation category assigned. This included three species listed in the Peruvian State's register, 10 species of plants in

the cactus family in that were included in the CITES Appendix II, and 12 endemic species. If there is a major impact predicted on the populations from the proposed mining activities, the environmental permits for the operations could be revised or even revoked.

Although Southern Copper has tried to ensure the local stakeholders are not opposed to the current Project as envisaged in this Report, the general environment in Peru can have the following risks for permitting and operating mining projects:

- Social conflicts due to negative perceptions from the communities and local authorities based on concerns about environmental management and the impacts of the Project on their economic activities
- Unfavorable position from the national government, prioritizing a political and social statement in spite of the legal licenses obtained by the Project
- Organizations promoting an anti-mining culture.

1.20.2 Opportunities

Opportunities for the Tía María Project include moving the stated mineral resources into mineral reserves through additional drilling and study work. The mineral reserves and mineral resources are based on conservative price estimates for copper so upside exists, either in terms of the potential to estimate additional mineral reserves and mineral resources or improved economics should the prices used for copper be increased.

Opportunities include:

- Conversion of some or all of the measured and indicated mineral resources currently reported exclusive of mineral reserves to mineral reserves, with appropriate supporting studies
- 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
- Higher metal prices than forecast could present upside sales opportunities and potentially an increase in predicted Project economics
- Slightly more tonnage may be able to be estimated due to the possible underestimation of specific gravity values.

1.21 Conclusions

Under the assumptions presented in this Report, the Tía María 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, mineral resource and mineral reserve estimates, geotechnical, metallurgy, infrastructure, and environmental. The total recommended budget estimate to complete the programs is approximately US$5.1–US$6.7 M.

Recommendations include:

- Geology:
  - Complete a density check program
  - Complete a re-survey program to locate all drill collars still visible in the field
  - Complete a downhole survey program on all drill holes that are more than 50 m deep, are still open, and can be surveyed
  - Investigate what magnetic declination correction was applied in each drill campaign, if any, and examine the impact on the resource estimate of any corrections.
- Mineral resource estimate:
  - Complete a variography study to provide robust variograms for the domains and elements to be estimated
- Geotechnical:
  - Complete a geotechnical program of oriented core holes in the southwest extension of the planned pit, in an area where the pit design is not supported either by structural or geotechnical drill data
  - Complete a short RC drill program to determine the depth to the water table in support of better support for factor-of-safety designs
  - Revisit and revise TSF designs to be in full compliance with the recently-published global tailings standard

- Metallurgy:
  - Complete a testwork program to cover future years of production. This should be based on PQ core collected from a dedicated 10,500 m metallurgical drill program.
  - Construct a geometallurgical model
- Infrastructure:
  - Review alternative designs for the spent ore and sulfide WRSF designs in support of potential cost reductions
  - Review the Guerreros–Pampa Cachendo railway option study, and update study and associated costs as required
  - Review proposed water supply costs and update where needed
- Environmental:
  - Continue with community relations efforts and plans
  - Continue with efforts to obtain the remaining surface rights agreements over the water pipeline route
  - Review all social, environmental, and permitting data should be undertaken to ensure that the information is current. Areas that require update should be clearly identified and action plans to address the gaps devised.

2 INTRODUCTION

2.1 Registrant

This technical report summary (the Report) was prepared for Southern Peru Copper Corporation (Southern Copper) by Wood Group USA, Inc. (Wood, acting as the QP Firm) on the Tía María Project (the Project), located in the Province of Islay within the Arequipa Department, Peru (Figure 2-1).

The Tía María Project contains the Tía María and La Tapada deposits.

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 Tía María Project in Southern Copper's Form 10-K for the year ending December 31, 2021.

Mineral resources and mineral reserves are reported for the La Tapada and Tía María.

2.2.2 Terms of Reference

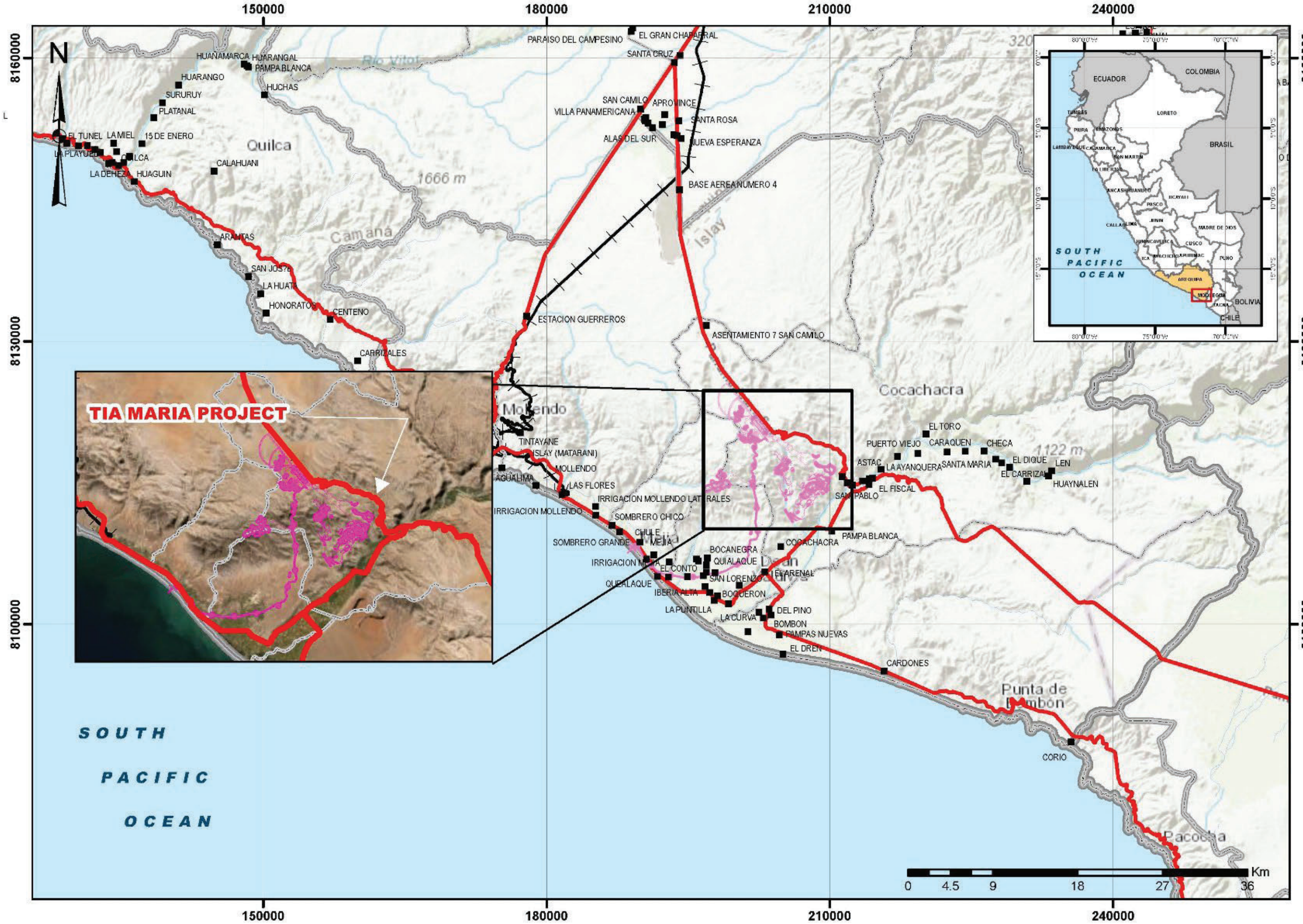
Unless otherwise indicated, all financial values are reported in United States (US) currency (US$) including all operating costs, capital costs, cash flows, taxes, revenues, expenses, and overhead distributions.

Unless otherwise indicated, the metric system is used in this Report.

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.

Figure 2-1: Project Location Plan



Note: Figure prepared by Wood, 2021. Red lines are roads, crossed lines are railways, and proposed project infrastructure locations are shown in pink.

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.

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	4–8 October, 2021	Discussed the Project history with the Southern Copper geology team. Performed quick logging of eight drill holes in the La Tapada deposit and six holes in the Tía María deposit. Reviewed the geological contacts of the lithology, mineralization and alteration zones. Visually inspected zones of mineralization and correlated the visual mineralization with assay data. Reviewed the drilling sampling methodology and quality assurance and quality control procedures. Inspected drill platforms Visited outcrops of lithologies included in the geological model.
Equipment	23–26 September, 2021	Inspected equipment previously purchased for the Project that is stored in a number of locations. Viewed the exterior of the Montalvo electrical substation. Viewed the portion of the transmission line that was completed prior to the Project construction being halted.
Infrastructure	13 October, 2021	Inspected proposed locations of the following facilities: • Access road and proposed by-pass • 33 km long railroad that will connect to the existing railway at Guerreros Station • Facilities for cathode shipment and unloading of sulfuric acid to be located at the Matarani port operated by TISUR • Desalination plant, and reviewed the alignment of the proposed water pipeline. Viewed the existing camp facility and temporary offices at the Project site.
Geotechnical	14 September, 2021	Inspected proposed locations of the open pit, on/off leach and spent ore facilities, stockpiles, and WRSFs. Viewed existing drainage and geologic features, landforms, and vegetation. However, foggy weather meant that potential interactions between planned facilities could not be viewed.
Social	18–19 October, 2021	Met with selected stakeholders Inspected social programs implemented by Southern Copper Visited community centers Interviewed local politicians

3 PROPERTY DESCRIPTION

3.1 Property Location

The Tía María Project is in the District of Cocachacra, Mejia and Deán Valdivia, Province of Islay, and Arequipa Region. The Project is located 118 km from Moquegua, 125 km from Arequipa, 120 km from the District of Ilo, and 980 km from Lima.

The Project centroid is at approximately 17º 00′ 21.06″ S and 71º 49′ 44.94″ W. using the WGS84 datum.

Locations for the deposits with mineral resource estimates are:

- Tía María: UTM 8,116,827 S; 205,757 E, zone 19K, WGS 84
- La Tapada: UTM 8 8,114,610 S; 208,130 E, Zone 19K, WGS 84.

3.2 Property and Title in Peru

Wood has not independently verified the following information which is in the public domain and have sourced the data from Elias (2019), Ernst and Young (2017), and KPMG (2016) as well as from official Peruvian Government websites.

3.2.1 Regulatory Oversight

The right to explore, extract, process and/or produce minerals in Peru is primarily regulated by mining laws and regulations enacted by Peruvian Congress and the executive branch of government, under the 1992 Mining Law. The law regulates nine different mining activities: reconnaissance; prospecting; exploration; exploitation (mining); general labor; beneficiation; commercialization; mineral transport; and mineral storage outside a mining facility.

The Ministry of Energy and Mines (MINEM) is the authority that regulates mining activities. MINEM also grants mining concessions to local or foreign individuals or legal entities, through a specialized body called The Institute of Geology, Mining and Metallurgy (INGEMMET).

Other relevant regulatory authorities include the Ministry of Environment (MINAM), the National Environmental Certification Authority (SENACE), the Supervisory Agency for Investment in Energy and Mining (OSINERGMIN), the Ministry of Agriculture, and the Ministry of Culture. The Environmental Evaluation and Oversight Agency (OEFA) monitors environmental compliance.

3.2.2 Mineral Tenure

Mining concessions can be granted separately for metallic and non-metallic minerals. Concessions can range in size from a minimum of 100 ha to a maximum of 1,000 ha.

A granted mining concession will remain valid providing the concession owner:

- Pays annual concession taxes or validity fees (derecho de vigencia), currently US$3/ha, by June each year. Failure to pay the applicable license fees for two consecutive years will result in the cancellation of the mining concession
- Meets minimum expenditure commitments or production levels. The minima are divided into two classes:
  - Achieve "Minimum Annual Production" by the first semester of Year 11 counted from the year after the concession was granted, or pay a penalty for non-production on a sliding scale, as defined by Legislative Decree N° 1320 which became effective on 1 January, 2019. "Minimum Annual Production" is defined as one tax unit (UIT) per hectare per year, which is which is S/4,400 in 2021 (about US$1,220)
  - Alternatively, no penalty is payable if a "Minimum Annual Investment" is made of at least 10 times the amount of the penalty.

The penalty structure sets out that if a concession holder cannot reach the minimum annual production on the first semester of the 11th year from the year in which the concessions were granted, the concession holder will be required to pay a penalty equivalent to 2% of the applicable minimum production per year per hectare until the 15th year. If the concession holder cannot reach the minimum annual production on the first semester of the 16th year from the year in which the concessions were granted, the concession holder will be required to pay a penalty equivalent to 5% of the applicable minimum production per year per hectare until the 20th year. If the holder cannot reach the minimum annual production on the first semester of the 20th year from the year in which the concessions were granted, the holder will be required to pay a penalty equivalent to 10% of the applicable minimum production per year per hectare until the 30th year. Finally, if the holder cannot reach the minimum annual production during this period, the mining concessions will be automatically expired.

Title-holders of mining concessions that were granted before December 2008 were obliged to pay the penalty from 2019 if the title-holder did not reach either the Minimum Annual Production or make the Minimum Annual Investment in 2018.

Mining concessions will lapse automatically if any of the following events take place:

- The annual fee is not paid for two consecutive years
- The applicable penalty is not paid for two consecutive years
- The Minimum Annual Production Target is not met within 30 years following the year after the concession was granted.

Beneficiation concessions follow the same rules as for mining concessions. A fee must be paid that reflects the nominal capacity of the processing plant or level of production. Failure to pay such processing fees or fines for two years would result in the loss of the beneficiation concession.

3.2.3 Surface Rights

Mining companies must negotiate agreements with surface landholders or establish easements. Where surface rights are held by communes, such easements must be approved by a qualified majority of at least two-thirds of registered commune members. In the case of surface lands owned by communities included in the indigenous community database maintained by the Ministry of Culture, a prior consultation process must be gone through before administrative acts, such as the granting of environmental permits, are finalized. Where surface lands owned by the government are planned to be purchased, an acquisition process with the Peruvian state must be followed through the Superintendence of National Properties.

3.2.4 Water Rights

Water rights are governed by Law 29338, the Law on Water Resources, and are administered by the National Water Authority (ANA) which is part of the Ministry of Agriculture. There are three types of water rights:

- License: this right is granted for water use for a specific purpose in a specific place. The license is valid until the activity for which it was granted terminates, for example, a beneficiary concession
- Permission: this temporary right is granted during periods of surplus water availability
- Authorization: this right is granted for a specified quantity of water and for a specific purpose. The grant period is two years, which may be extended for an additional year, for example for drilling.

To maintain valid water rights, the grantee must:

- Make all required payments including water tariffs
- Abide by the conditions of the water right in that water is only used for the purpose granted.

Water rights cannot be transferred or mortgaged. However, in the case of the change of the title holder of a mining concession or the owner of the surface land who is also the beneficiary of a water right, the new title holder or owner can obtain the corresponding water right.

3.2.5 Environmental Considerations

MINAM is the environmental authority, although the administrative authority is the Directorate of Environmental Affairs (DGAAM) of MINEM. The environmental regulations for mineral exploration activities were defined by Supreme Decree No. 020-2008-EM of 2008. New regulations for exploration were defined in 2017 by Supreme Decree No. 042-2017-EM.

An Environmental Technical Report (Ficha Técnica Ambiental or FTA) is a study prepared for approval of exploration activities with non-significative environmental impacts and less than 20 drilling platforms. The environmental authority has 10 working days to make observations.

An Environmental Impact Declaration (Declaración de Impacto Ambiental or DIA) has to be presented for Category I exploration activities which have a maximum of 40 drilling platforms or disturbance of surface areas of up to 10 ha. The environmental authority has 45 working days to make observations.

A semi-detailed Environmental Impact Study (Estudio de Impacto Ambiental Semi-Detallado or EIAsd) is required for Category II exploration programs which have between 40–700 drilling platforms or a surface disturbance of more than 10 ha. The environmental authority has 96 working days to make observations. The total process including preparation of the study by a registered environmental consulting company can take 6–8 months.

A full detailed Environmental Impact Study (Estudio de Impacto Ambiental Detallado or EIAd) must be presented for mine construction. The preparation and authorization of such a study can take as long as two years.

3.2.6 Permits

To start mineral exploration activities, a company is required to comply with the following requirements and obtain a resolution of approval from MINEM, as defined by Supreme Decree No. 020-2020-EM of 8 August 2020:

- Resolution of approval of the Environmental Impact Declaration
- Work program
- A statement from the concession holder indicating that it is owner of the surface land, or if not, that it has authorization from the owners of the surface land to perform exploration activities
- Water License, Permission or Authorization to use water
- Mining concession titles
- A certificate of non-existence of archeological remains (CIRA) whereby the Ministry of Culture certifies that there are no monuments or remains within a project area. However, even with a CIRA, exploration companies can only undertake earth movement under the direct supervision of an onsite archeologist.

3.2.7 Royalties

In 2011, the Peruvian Congress approved an amendment to the mining royalty charge. The mining royalty charge is based on operating income margins obtained from the sale of minerals with graduated rates ranging from 1–12% of operating profits; the minimum royalty charge is equivalent to 1% of net sales. If the operating income margin is 10% or less, the royalty charge is 1%, and for each 5% increment in the operating income margin, the royalty charge rate increases by 0.75%, to a maximum of 12%.

At the same time the Peruvian Congress enacted a Special Mining Tax that is also based on operating income. Rates range from 2–8.4%. If the operating income margin is 10% or less, the Special Mining Tax is 2%, and for each 5% increment in the operating income margin, the special mining rate increases by 0.4%, to a maximum of 8.4%.

3.2.8 Other Considerations

Producing mining companies must submit, and receive approval for, an environmental impact study that includes a social relations plan, certification that there are no archaeological remains in the area, and a draft mine closure plan. Closure plans must be accompanied by payment of a monetary guarantee.

In April 2012, Peru's Government approved the Consulta Previa Law (prior consultation) and its regulations approved by Supreme Decree Nº 001-2012-MC. This requires prior consultation with any indigenous communities as determined by the Ministry of Culture, before any infrastructure or projects, in particular mining and energy projects, are developed in their areas.

Mining companies also have to separately obtain water rights from the National Water Authority and surface lands rights from individual landowners.

3.2.9 Fraser Institute Survey

Wood used the Investment Attractiveness Index from the 2020 Fraser Institute Annual Survey of Mining Companies report (the Fraser Institute survey) as a credible source for the assessment of the overall political risk facing an exploration or mining project in Peru. The Fraser Institute annual 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 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 senior management, and forms a proxy for the assessment by the mining industry of the political risk in Peru.

In 2020, the rankings were from the most attractive (1) to the least attractive (77) jurisdiction, of the 77 jurisdictions included in the survey. Peru ranked 34 out of 77 jurisdictions in the attractiveness index survey in 2020; 42 out of 77 in the policy perception index; and 30 out of 77 in the best practices mineral potential index.

3.3 Ownership

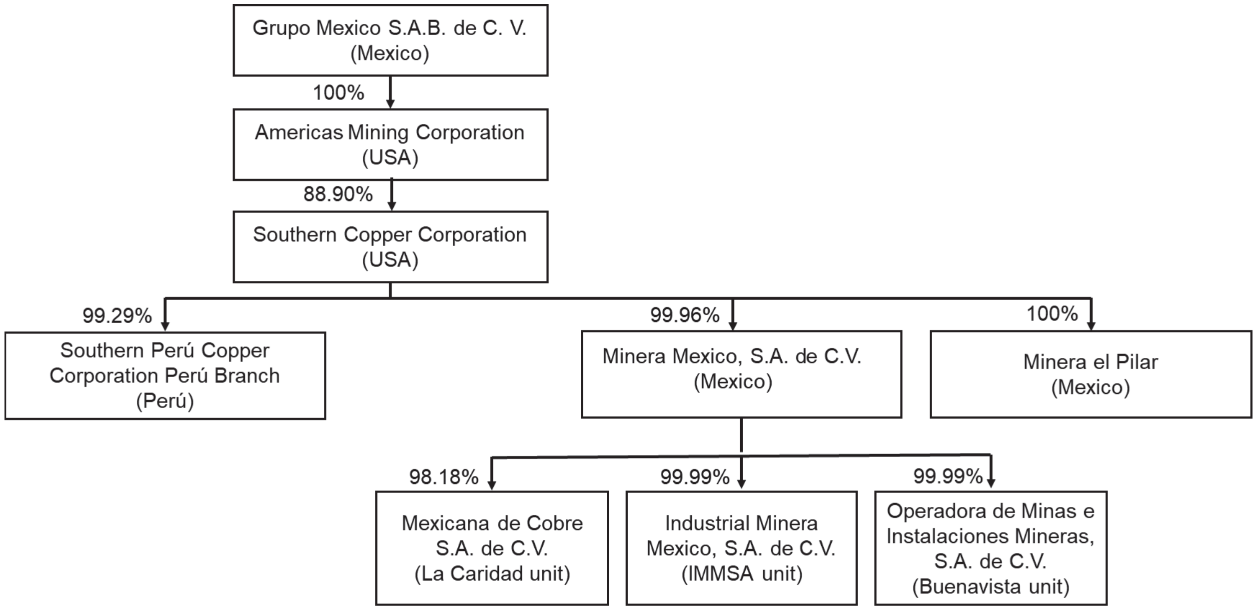
The Project is wholly owned by Southern Copper Corporation, Sucursal del Perú, which is a majority-owned, indirect subsidiary of Grupo Mexico S.A.B de CV. (Grupo Mexico). An ownership organogram is provided in Figure 3-1.

3.4 Mineral Title

The Project covers an area of 34,789.63 ha in 55 concessions. The mineral claims are summarized in Table 3-1, and the claims locations are shown in Figure 3-2.

Southern Copper was granted a beneficiation concession construction permit to be located in the districts of Mejía and Cocachacra, under Resolution and report No. 183-2019-MINEM-DGM-DTM/PB dated July 8, 2019, for a production capacity of 100,000 t/d.

Figure 3-1: Ownership Organogram



Note: Figure prepared by Southern Copper, 2021.

Table 3-1: Mineral Tenure Summary Table

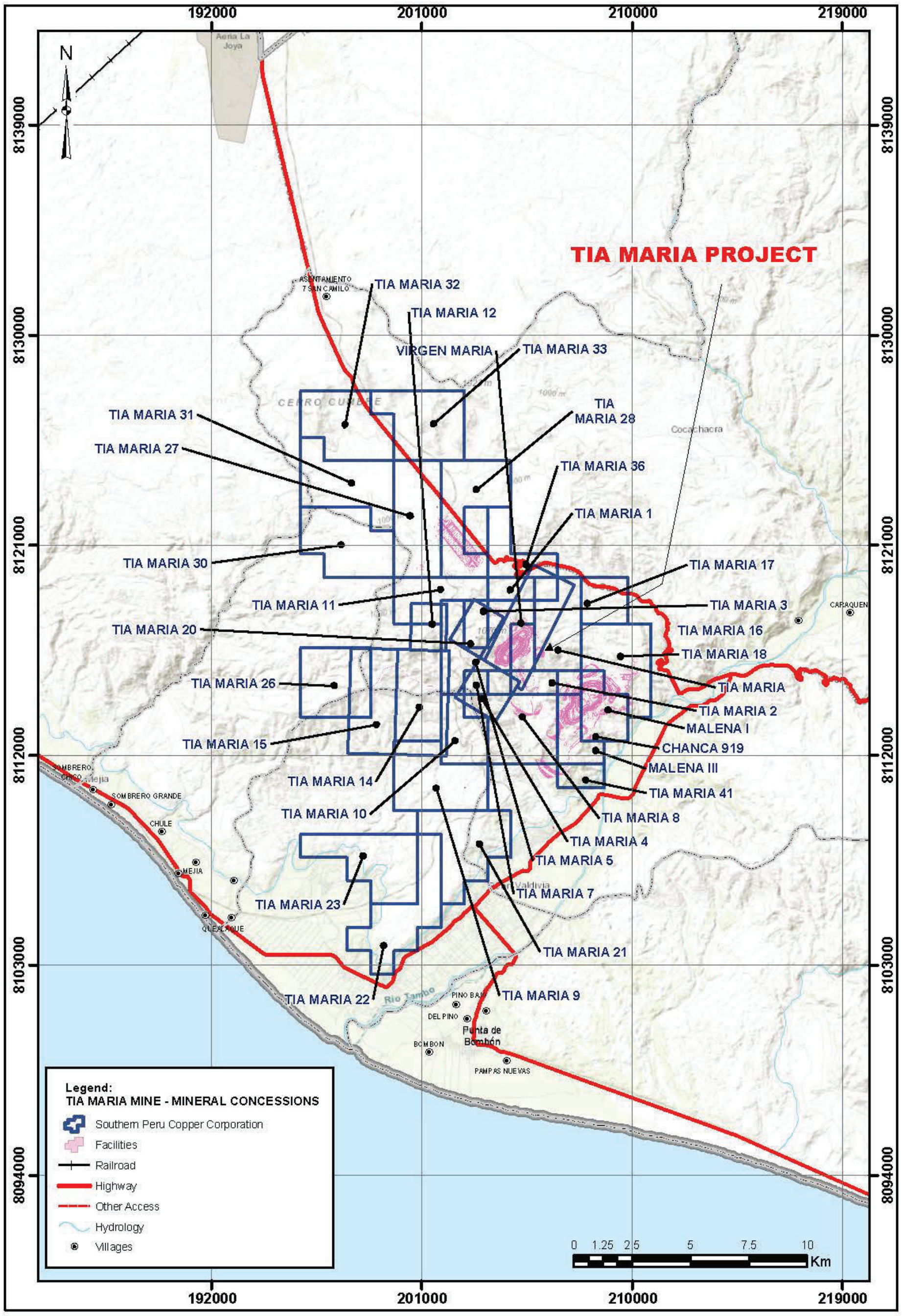
Code	Mining Concession	Holder	Date-Concession z Granted	Area (ha)
010034706	Chanca 919	Southern Peru	2006/03/13	200.25
010252794	Cruz De Mayo 4	Southern Peru	1994/07/26	300.00
010316793	Cruz De Mayo Cero	Southern Peru	1994/06/24	100.00
010040903	Malena I	Southern Peru	2003/10/07	377.50
010040803	Malena III	Southern Peru	2003/10/07	355.26
010040003	Tía María	Southern Peru	2003/09/30	464.30
010040103	Tía María 1	Southern Peru	2003/09/25	138.48
010040203	Tía María 2	Southern Peru	2003/09/30	147.07
010040303	Tía María 3	Southern Peru	2003/09/25	300.34
010040403	Tía María 4	Southern Peru	2003/09/25	400.45
010040503	Tía María 5	Southern Peru	2003/09/18	365.98
010040603	Tía María 6	Southern Peru	2003/07/25	1.97
010040703	Tía María 7	Southern Peru	2003/10/09	7.74

010323703	Tía María 8	Southern Peru	2004/02/04	855.20
010323803	Tía María 9	Southern Peru	2004/03/11	877.27
010323903	Tía María 10	Southern Peru	2004/02/17	422.34
010324003	Tía María 11	Southern Peru	2004/03/11	422.31
010324103	Tía María 12	Southern Peru	2004/03/04	300.00
010324203	Tía María 13	Southern Peru	2004/04/19	869.08
010324303	Tía María 14	Southern Peru	2004/02/04	989.49
010324403	Tía María 15	Southern Peru	2004/02/26	901.01
010366503	Tía María 16	Southern Peru	2004/03/08	600.00
010108604	Tía María 17	Southern Peru	2004/07/12	400.00
010108404	Tía María 18	Southern Peru	2004/08/13	900.00
010108504	Tía María 19	Southern Peru	2004/06/30	100.00
010040605	Tía María 20	Southern Peru	2005/04/08	19.29
010204007	Tía María 21	Southern Peru	2007/11/27	1,000.00
010204207	Tía María 22	Southern Peru	2007/06/14	1,000.00
010204107	Tía María 23	Southern Peru	2007/09/05	1,000.00
010204307	Tía María 24	Southern Peru	2007/07/18	1,000.00
010204407	Tía María 25	Southern Peru	2007/07/31	752.43
010203907	Tía María 26	Southern Peru	2007/07/31	631.96
010246607	Tía María 27	Southern Peru	2007/08/14	1,000.00
010246707	Tía María 28	Southern Peru	2007/09/05	1,000.00
010307707	Tía María 29	Southern Peru	2008/05/05	586.10
010307807	Tía María 30	Southern Peru	2007/09/05	1,000.00
010307907	Tía María 31	Southern Peru	2007/09/05	1,000.00
010308007	Tía María 32	Southern Peru	2007/09/05	1,000.00
010308107	Tía María 33	Southern Peru	2007/09/07	1,000.00
010308207	Tía María 34	Southern Peru	2007/09/07	1,000.00
010308307	Tía María 35	Southern Peru	2007/09/07	1,000.00
010308407	Tía María 36	Southern Peru	2007/09/07	460.10
010311907	Tía María 37	Southern Peru	2007/09/25	800.00
010312007	Tía María 38	Southern Peru	2007/09/07	900.00
010312107	Tía María 39	Southern Peru	2007/09/10	900.00

010312207	Tía María 40	Southern Peru	2007/09/12	600.00
010364407	Tía María 41	Southern Peru	2007/10/30	200.00
010148508	Tía María 42	Southern Peru	2008/09/30	1,000.00
010148408	Tía María 43	Southern Peru	2008/11/19	1,000.00
010148308	Tía María 44	Southern Peru	2008/09/30	1,000.00
010148608	Tía María 45	Southern Peru	2008/10/16	800.00
010270316	Tía María 47	Southern Peru	2016/10/19	800.00
010270416	Tía María 48	Southern Peru	2016/10/19	400.00
050011207	Vania	Southern Peru	2008/01/31	200.00
01004198X01	Virgen Maria	Southern Peru	1999/03/26	943.72
				34,789.63

Note: Southern Peru = Southern Peru Copper Corporation, Sucursal del Peru. Dates in year–month–day format.

Figure 3-2: Mineral Tenure Location Plan



Note: Figure prepared by Wood, 2021. Infrastructure in pink as shown in figure is proposed.

3.5 Property Agreements

Southern Peru has easement agreements in place that cover the following items.

- High voltage powerline easement: the route of the 220 kV transmission line from the existing Montalvo sub-station (located in Moquegua) to the proposed Tía María substation located in Pampa Cachendo, covering a route of approximately 100 km. Approximately 80 km of this transmission line was constructed by Abengoa Perú (from the existing Montalvo sub-station to the Tambo Valley area)
- Water line easement: the route for the water pipeline from the proposed desalination plant at Mejía to Pampa Cachendo will follow the route of the former Mollendo–La Joya railway. Southern Copper acquired the railway easement rights.

A number of easement agreements with private individuals or associations are in place, and listed in Table 3-2. These easements are for power line access.

3.6 Surface Rights

A total of 21 surface properties (16,330.15 ha) have been acquired for Project purposes, as summarized in Table 3-3.

Southern Copper holds five mining easements, covering 11 lots for a total area of 2,837.55 ha (Figure 3-3).

The 21 surface properties and the five mining easements are sufficient to allow construction of all required infrastructure for mining and processing operations.

Southern Copper has concluded surface rights agreements with a number of individuals that hold shares in certain communes. These agreements cover a collective area of 9,864.13 ha. These constitute all of the agreements that need to be concluded to support the planned operations.

There are agreements in place that cover the proposed water pipeline route for an area of 3,335.87 ha, as registered in the Public Registries. These agreements cover approximately 93% of the route of the proposed water pipeline. About 7% of the route has agreements that are in process, or consists of land over which agreements have yet to be negotiated.

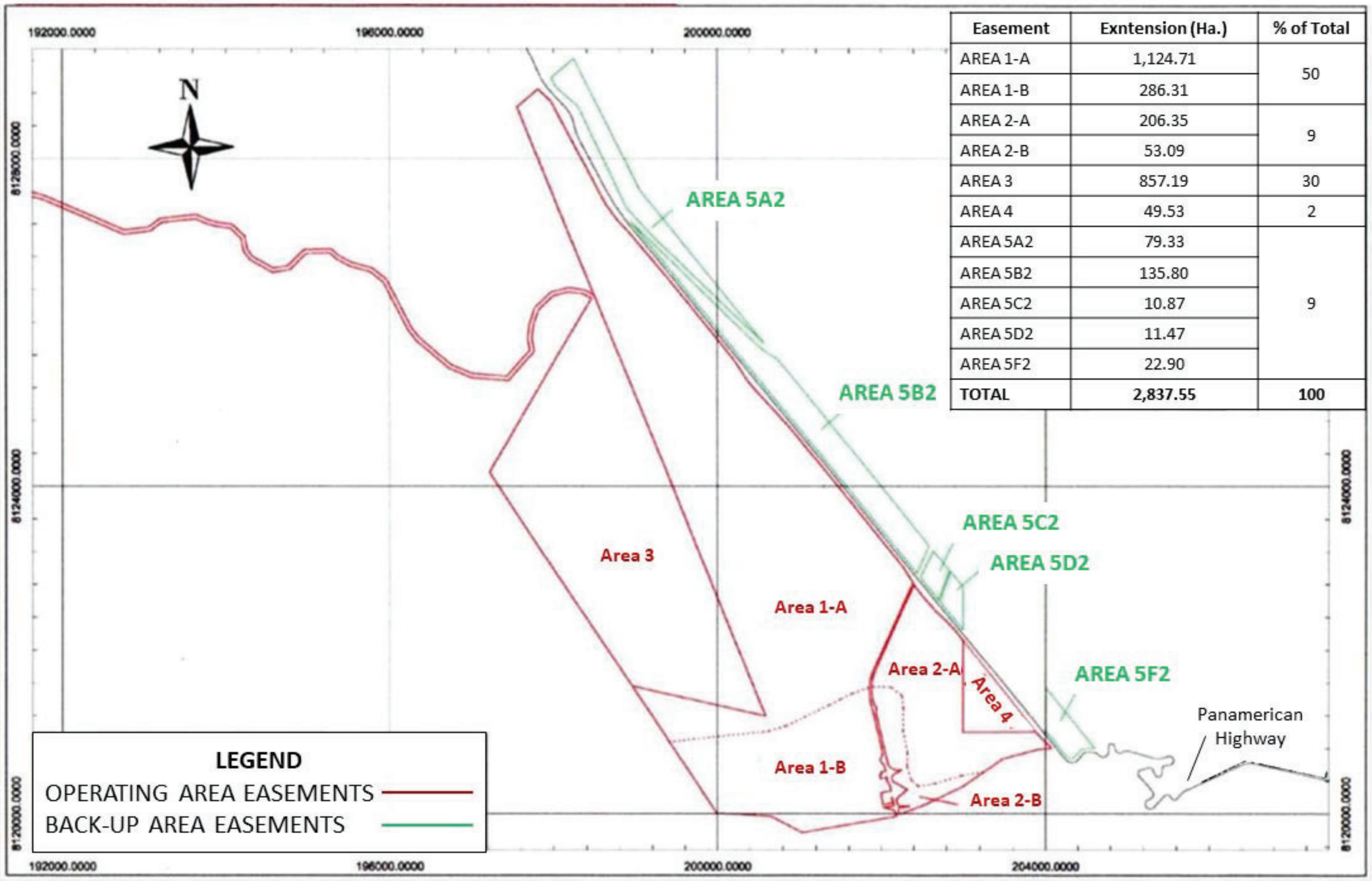
Table 3-2: Private Easement Agreements, Powerline

Owners/Associations	District	Area		
		Length	Width (m)	Total (m²)
Rufino Valdez	Moquegua	158.12	25	3,953.00
Mariano Leon Alcazar Valdez	Moquegua	157.50	25	3,937.50
Cristina Bernadina Nieto Ramos	Moquegua	135.00	25	3,375.00
Daniel Nieto Ramos	Moquegua	10.00	25	250.00
Graciano Peñaloza Tabala	Moquegua	232.69	25	5,817.25
Adrian Catunta Rivera	Moquegua	40.44	25	1,011.00
Asociación Forestal Medio Ambiente Vivienda	Moquegua	353.86	25	8,846.50
Manuel Manchego Linares	Moquegua	50.00	25	1,250.00
Asociación Irrigacion Pampa Guanero	Moquegua	1,245.55	25	31,138.75
Asociación Irrigacion Clemesi - Moquegua	Moquegua	20,108.04	25	502,701.00
Ricardo Meza Ampuero	Cocachacra	181.00	25	4,525.00
Alberto Perez Espinoza	Cocachacra	122.67	25	3,066.75
Ruperto Guillen Velasquez	Cocachacra	27.00	25	675.00
Leoncia Valeriana Carpio Herrera	Cocachacra	97.00	25	2,425.00
Maritza Elizabeth Copara Vargas	Cocachacra	67.00	25	1,675.00
				574,646.75

Table 3-3: Surface Agreements

Name/Description	Area (ha.)
Lomas Aparo Cachuyo	6,928.00
Las Cuchillas	754.79
Lomas de las Cuchillas	2,181.40
Loma Los Linares	6,210.00
Estación de Cachendo	2.06
Estación de Cachendo	3.10
Estación de Tambo	2.40
Terreno de Estación de Tambo	5.61
Estación de Pozco	26.13
Estación de Cahuintala	10.44
Estación de Huagri	1.86
Estación de Huagri	1.38
First auction from km 21.550 to km 86.898 (Ensenada – La Joya)	178.88
Second auction from km 15.000 to km 18.200	6.38
Embankment km. 2.400 and km. 3.062	0.3861
Embankment km. 3.062 and km. 5.9235	5.2388
Embankment km. 5.9235 and km. 9.1215	4.5457
Embankment km. 9.1215 and km. 11.165	3.7153
Embankment km. 11.165 and km. 13.950	2.6607
Embankment km. 11.165 and km. 13.950	0.3572
Embankment km. 11.165 and km. 13.950	0.7940
	16,330.15

Figure 3-3: Mining Easement Location Map



Easement	Exntension (Ha.)	% of Total
AREA 1-A	1,124.71	50
AREA 1-B	286.31	
AREA 2-A	206.35	9
AREA 2-B	53.09	
AREA 3	857.19	30
AREA 4	49.53	2
AREA 5A2	79.33	9
AREA 5B2	135.80	
AREA 5C2	10.87	
AREA 5D2	11.47	
AREA 5F2	22.90	
TOTAL	**2,837.55**	**100**

Note: Figure prepared by Wood, 2021.

3.7 Water Rights

The Project currently holds no water rights. The mine plan assumes that water for process operations will be sourced from a desalination plant (refer to Chapter 15.10).

3.8 Royalties

Apart from the mining royalty (see Chapter 3.2.7) there are no royalty agreements pertinent to the Project.

3.9 Encumbrances

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

3.10 Permitting

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

3.11 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 Tía María Project.

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

Known Project risks include:

- Ability to permit a desalination plant on the coast to provide water for Project process needs
- Ability to obtain the social license to operate, not just in the local communities, but in the larger Arequipa region

As with any large mining project in Peru, the Tía María 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 local 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.

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 Project is situated at altitudes ranging from 400–1,050 masl. The peaks of the Chichuando, Bronce, Cabo Homos and Yanamayo Mountains are above 900 masl. The La Tapada deposit is located at about 650 masl, and the Tía María deposit at approximately 870 masl. The process plant will be located at Pampa Cachendo, a flat area at about 1,000 masl.

The Project is located near the Tambo River, approximately 16 km from its confluence with the Pacific Ocean. Streams are typically narrow and incised.

Vegetation types vary, depending on terrain elevation and proximity to the coast. Where coastal mists occur, species can include epiphytes (air plants), grasses, and herbaceous species. Lower altitudes, away from the coast, can host shrubs and herbaceous species along the banks of water courses. Dryer areas are characterized by cacti species. In desert areas, if there is vegetation, it consists of thorny plants and shrubs.

Lowland areas with sufficient water are used for crops and livestock grazing.

The operational basis earthquake (OBE) was estimated to have a peak ground acceleration (PGA) of 0.45*g* under a 1-in-500-year design earthquake from a probabilistic analysis based on crustal and subduction zone sources (surficial seismic sources). The OBE corresponds to a 10% probability of exceedance within 50 years. This value was used to assess the stability of the proposed heap leach facility. The seismic hazard assessment was performed by the Geophysical Institute at the National University of San Agustin, located in Arequipa-Peru. Wood completed an update of the seismic hazard study in 2021 based on recent major earthquakes recorded in Peru and Chile. Based on this update, the PGA of the OBE was estimated to vary from 0.45*g* to 0.47*g*, which is similar to the National University of San Agustin estimate. These data were used to evaluate the heap leach configuration using the Makdisi and Seed (1978) method for estimating earthquake-induced slope displacement using an earthquake of magnitude 8.25 as a reference.

4.2 Accessibility

The Tía María Project is located between the municipalities of Mollendo and Ilo. From Arequipa, the Panamericana Sur national highway is followed to km 48 near the town of San

José. From there the Project access road is followed to the Project site. Drive time from Arequipa is about two hours.

Gravel roads are currently used to access the areas planned for infrastructure such as the open pits, and the waste rock storage facilities (WRSFs).

4.3 Climate

Climate conditions vary with altitude, from moderately temperate at lower elevations to intensely cold at high elevations. Annual temperatures average 18.3ºC.

The dry season can be defined as the months between June and November and wet season begins in December and ends in May. Average annual precipitation is 74.4 mm.

Wind speeds range, on average, from 2–7 m/sec., with higher wind speeds in summer.

Mining operations in the district operate year-round, and it is expected that any future mining operation at Tía María will be year-round. Exploration activities are conducted year-round, but may be temporarily curtailed by rare heavy rainfall events.

4.4 Infrastructure

Infrastructure that will be required to support the proposed operations is outlined in Chapter 13, Chapter 14, and Chapter 15 of this Report). These Report chapters also discuss water sources, electricity, personnel, and supplies for the LOM plan.

The site is currently a greenfields site with limited infrastructure that is only suitable to support exploration-level activities.

Water for exploration activities was trucked in as required. Water sources for operations would be sourced as allowed by any future water extraction permits. Some water will be trucked in, as is currently the case for exploration activities, or provided from bottle water sources.

Fuel for exploration activities is trucked to the site. It is likely that future operations would also truck fuel in.

Supplies for exploration-stage activities are sourced from Arequipa. Future mining operations are likely to source supplies from Arequipa, Ilo, or Lima.

There is an exploration camp at the Project site, with accommodations for 57 people. There is room for a future accommodations camp within the Pampa Cachendo area.

The estimated number of personnel needed for the Tía María Project in the construction phase varies between 2,500 and 3,500 workers. An average of 600 workers will be required for the operation phase.

The closest settlement to the Project is the village of Este del Valle Tambo, a distance of 3 km. Several towns and villages near the Project area can provide labor for the Project including Cocachacra, El Fiscal, La Curva, Chucarapi and Punta de Bombón. Cocachacra has the largest population.

5 HISTORY

[Describe:

(i) Previous operations, including the names of previous operators, insofar as known; and

(ii) The type, amount, quantity, and general results of exploration and development work undertaken by any previous owners or operators.

Delete this guidance when finalizing report]

Prior to involvement by Southern Copper with the Project, the Project area was explored by Teck Corporation (Teck), Phelps Dodge and Rio Tinto.

Work conducted included a district-wide geochemical program, including 562 rock samples from outcrops and trenches as well as from informal mining excavations, collection of 239 stream sediment samples and a 430 sample soil survey. A district-wide radiometric survey was conducted using a hand-held scintillometer on outcrops. Locally there is semi-detailed magnetometry information, reported as collected in 2003.

Teck completed a small drill program in 1994. Phelps Dodge planned a 5,000 m program for 1995; however, only 736 m was completed. Rio Tinto drilled 59 RC holes (9,250 m). The Rio Tinto program identified the Tía María deposit. Data from those drill holes were not used for mineral resource estimation support due to the lack of adequate records and/or sampling protocols or laboratory certificates.

Rio Tinto performed 80 bottle leaching tests using reverse circulation (RC) chip samples.

Southern Copper optioned the Virgen María Concession in 2003; this concession hosted the Tía María deposit. Exploration surrounding the deposit identified the Tía María Sur and Prosecutor prospects, and the presence of anomalous copper oxide mineralization in the Fiscal/Tambo area. The La Tapada deposit was discovered in 2006, and is a concealed southern extension of the Tía María deposit. It was the first blind deposit discovered in Peru, and was concealed beneath post-mineralization cover.

Table 5-1: Exploration and Development History

Year	Company	Activity
1994	Teck Cominco	Exploration drilling. 3 holes (764 m).
1995	Phelps Dodge	Exploration drilling. 5 holes (736 m).
1998	Billiton	Regional exploration that included geochemical sampling in the current Project area
1999	Rio Tinto	Exploration drilling. 63 holes (9,500 m) – 59 were RC (9,250 m) with four core holes (250 m)
2003	Southern Copper	Geochemical sampling, geophysical surveys, exploration drilling
2006	Southern Copper	La Tapada discovered by following up regional exploration targets. Induced polarization by Arce Geofísicos. 18,150 m, 12 profiles, pole-pole configuration with 50 m spacing Bechtel International (Bechtel), a third-party consultant, commissioned to complete a mining study on the Tía María deposit. Assumed a 120,000 t/a copper cathode production rate
2007	Southern Copper	La Tapada deposit included in mining study. Mining study updated assuming a 100,000 t/d mining rate. Metallurgical testing, 2 m columns
2008–2010	Southern Copper	8 m column tests, gabion tests at La Tapada
2014	Southern Copper	2007 study updated during 2014 by third-party consultants CAD Mexico using assumptions and parameters current at the time. Assumed 100,000 t/d mining rate

6 GEOLOGICAL SETTING, MINERALIZATION, AND DEPOSIT

6.1 Deposit Type

The La Tapada and Tía María deposits are examples of porphyry copper deposits.

Porphyry deposits range in age from Archean to Recent, although most are Jurassic or younger, and form in a variety of tectonic settings. Most copper–molybdenum 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 (Figure 6-1). 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.

Pyrite is typically the dominant sulfide mineral, in association with chalcopyrite, bornite, chalcocite, tennantite, enargite, other copper sulfides and sulfosalts, molybdenite and electrum.

6.2 Regional Geology

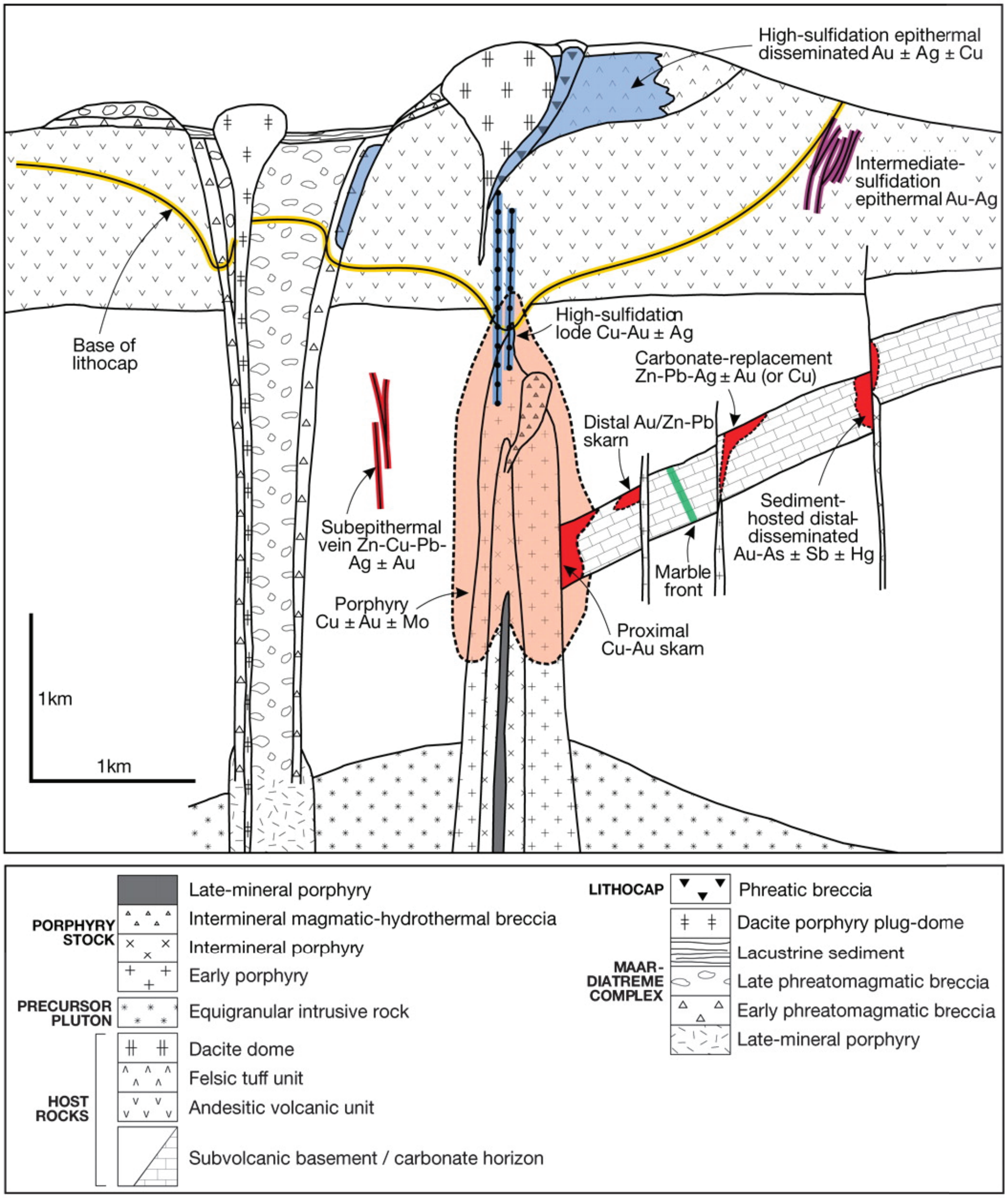
The basement to southwestern Peru consists of an extensive pre-Devonian metamorphic complex, comprising granulite to amphibolite grade gneisses, of the Arequipa Massif.

The Arequipa Massif is intruded by the southern sections of the Mesozoic–Cenozoic composite Peruvian Coastal Batholith. In the Tía María district the batholith is represented by Cretaceous diorite, monzonite, granodiorite and granite bodies.

Proterozoic to Lower Paleozoic shear zones cutting the Arequipa Massif rocks are intersected by numerous Cretaceous to Lower Tertiary brittle faults, breccias and crush zones. Tertiary and Quaternary continental sediments provide discontinuous cover.

A regional geology plan is provided in Figure 6-2.

Figure 6-1: Porphyry Deposit Cartoon



Note: Figure from Sillitoe, 2010.

Figure 6-2: Regional Geology Plan

Note: Figure prepared by Wood, 2021, based on a figure provided by Southern Copper

6.3 Local Geology

6.3.1 Lithologies and Stratigraphy

The major sedimentary and volcanic lithologies are presented in stratigraphic order in Table 6-1. Intrusive rock types in the Project area are summarized in Table 6-2.

6.3.2 Structure

The La Tapada and Tía Maria deposits are within the northwest–southeast-trending Tambo–El Toro structural corridor that appears to be a large dextral shear zone. There are a number of vein-hosted copper–gold–hematite deposits also associated with the corridor, outside Southern Copper's mineral tenure package.

6.3.3 Alteration

Alteration within the Project area is associated with the two porphyry systems currently outlined (see discussion in Chapter 6.4).

6.3.4 Mineralization

The only known mineralization is derived from oxidation of low-grade porphyry copper systems (see discussion in Chapter 6.4).

6.4 Property Geology

6.4.1 La Tapada

6.4.1.1 Deposit Dimensions

The La Tapada deposit is approximately 1,250 m long, 800 m wide, and 630 m thick. Mineralization has been drill tested to a depth of about 630 m. The deposit remains open at depth.

6.4.1.2 Lithologies

La Tapada consists of felsic intrusive rocks intruded into basement gneiss. Table 6-3 summarizes the lithologies at La Tapada. A geology map is provided as Figure 6-4.

Table 6-1: Sedimentary and Volcanic Lithology Stratigraphic Table

Unit	Age	Comment
	Recent	Alluvial, fluvial, and eolian deposits, marine terraces. Fluvial deposits are most important and consist of mixed gravel, sand, and clay.
Moquegua Formation	Late Oligocene–Early Miocene	Continental claystone, sandstone, conglomerate, tuffaceous sandstone, and tuffs.
Camaná Formation	Middle Oligocene	Marine sandstones and shales with abundant gypsum in veinlets and bands as well as salt (NaCl) disseminations
Toquepala Group	Upper Cretaceous	Thick sequence of volcanic flow breccias, agglomerates and fine-grained pyroclastic rocks. Compositions vary between andesite, dacite, trachyte and rhyolite.
Guaneros Formation	Middle Jurassic	Marine shales and coarse to fine-grained sandstones. Locally includes agglomerate beds with volcanic breccias of mainly porphyritic andesitic composition. The volcanic units unconformably overlie the Chocolate Volcanics
Chocolate Volcanics	Lower Jurassic	Andesite, basalt, and trachyte flows, tuffs and agglomerates. Intercalations of shales, quartzites, and reef limestone of Lower to Middle Jurassic age
Yamayo Group	Upper Triassic–Lower Jurassic	Coarse-grained sandstones, siltstones and volcanic rocks
Cocachacra Shale	Lower Permian	Shale and fossiliferous siltstone. Unconformably overlies the Pocoma Conglomerate.
Pocoma Conglomerate	Upper Paleozoic	Stratified remnants of well-consolidated and compact conglomerates
Arequipa Massif	Precambrian	Precambrian basement consisting of granulite to amphibolite grade gneiss, migmatite, schist, phyllite, amphibolite and quartzite

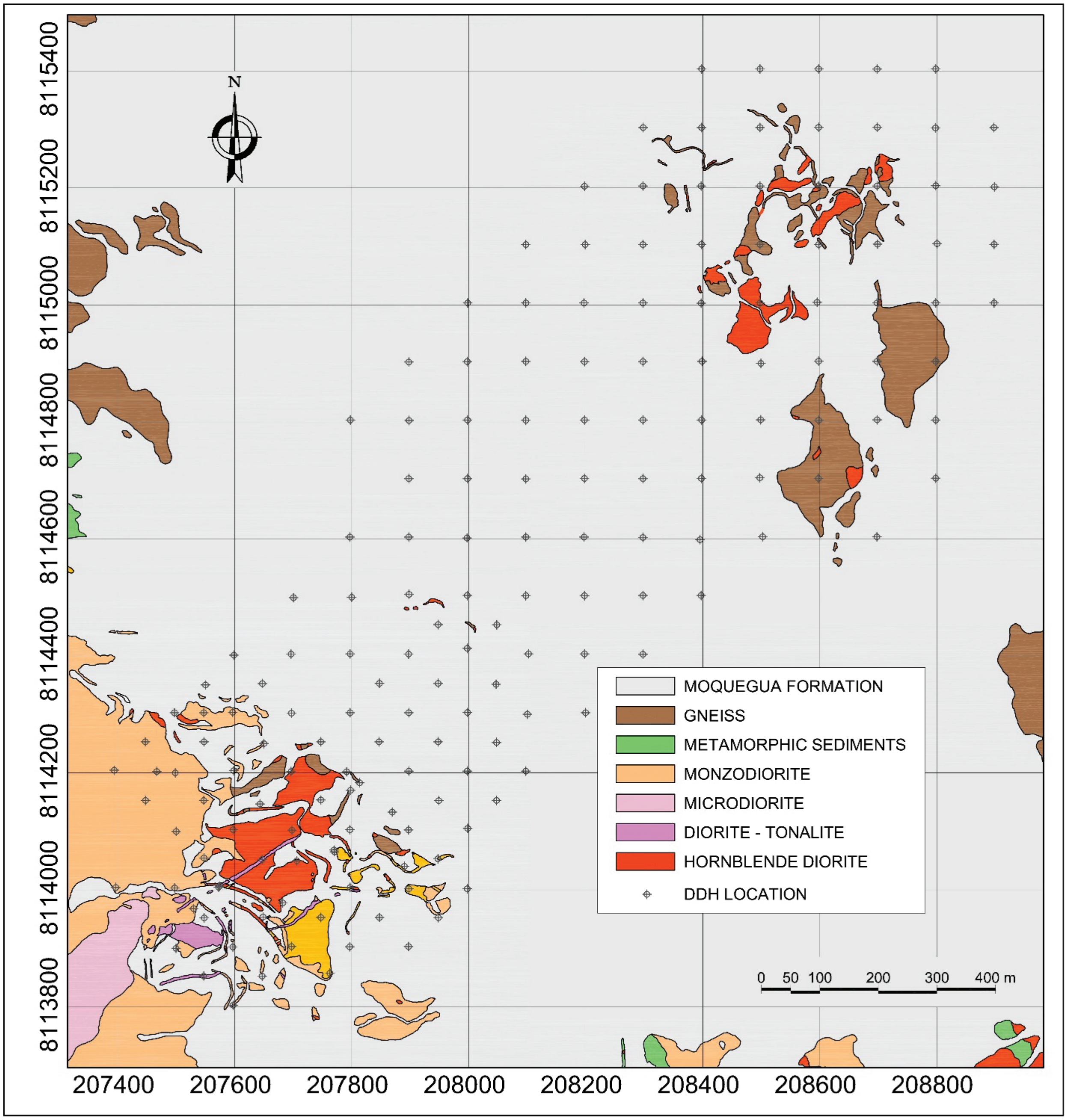
Table 6-2: Intrusive Lithology Table

Unit	Comment
Dikes	Microdiorite and porphyritic andesite dikes too small and discontinuous to model
Monzodiorite	Fine to medium grained, can be porphyritic, reddish–grey in color
Quartz feldspar porphyry	Medium to coarse grained, grey to reddish–grey
Hornblende diorite	Granular to porphyritic texture, coarse to medium grained. Light grey in color. Can display black bands where secondary biotite is present.
Gneiss	Banded: bands consist of silica, orthoclase, magnetite and mafic minerals.

Table 6-3: La Tapada Lithologies

Unit	Comment
Dikes	Microdiorite and porphyritic andesite dikes too small and discontinuous to model
Monzodiorite	Fine to medium grained, can be porphyritic, reddish–grey in color
Quartz feldspar porphyry	Medium to coarse grained, grey to reddish–grey
Hornblende diorite	Granular to porphyritic texture, coarse to medium grained. Light grey in color. Can display black bands where secondary biotite is present.
Gneiss	Distributed around the deposit. Banded quartz, orthoclase, magnetite, and mafic minerals. Locally altered with secondary biotite

Figure 6-3: La Tapada Geology Map



Note: Figure prepared by Wood, 2021.

6.4.1.3 Structure

La Tapada occurs in a graben-type depression controlled by normal faults. The graben is filled with continental sedimentary rocks of the Moquegua Formation. The northwest–southeast-trending Yamayo Fault cuts the deposit with down-to-the-northwest motion of about 100–150 m. Figure 6-5 is a total copper contour map that shows the location of the fault in relation to the mineralization.

6.4.1.4 Alteration

The La Tapada deposit is dominated by potassic alteration, onto which a retrograde alteration of local chloritization has been superimposed. An incipient quartz–sericite hydrothermal alteration is observed locally, and consists of sericitic clays developed in proximity to fault zones. There is also a mild supergene alteration due to weathering. The alteration types are summarized in Table 6-4.

6.4.1.5 Mineralization

Weathering resulted in three zones of oxidation and mineralization, a leached cap, an oxide zone, and a primary or hypogene zone (Figure 6-6). There is no significant supergene enrichment at La Tapada.

6.4.1.5.1 Leached Zone

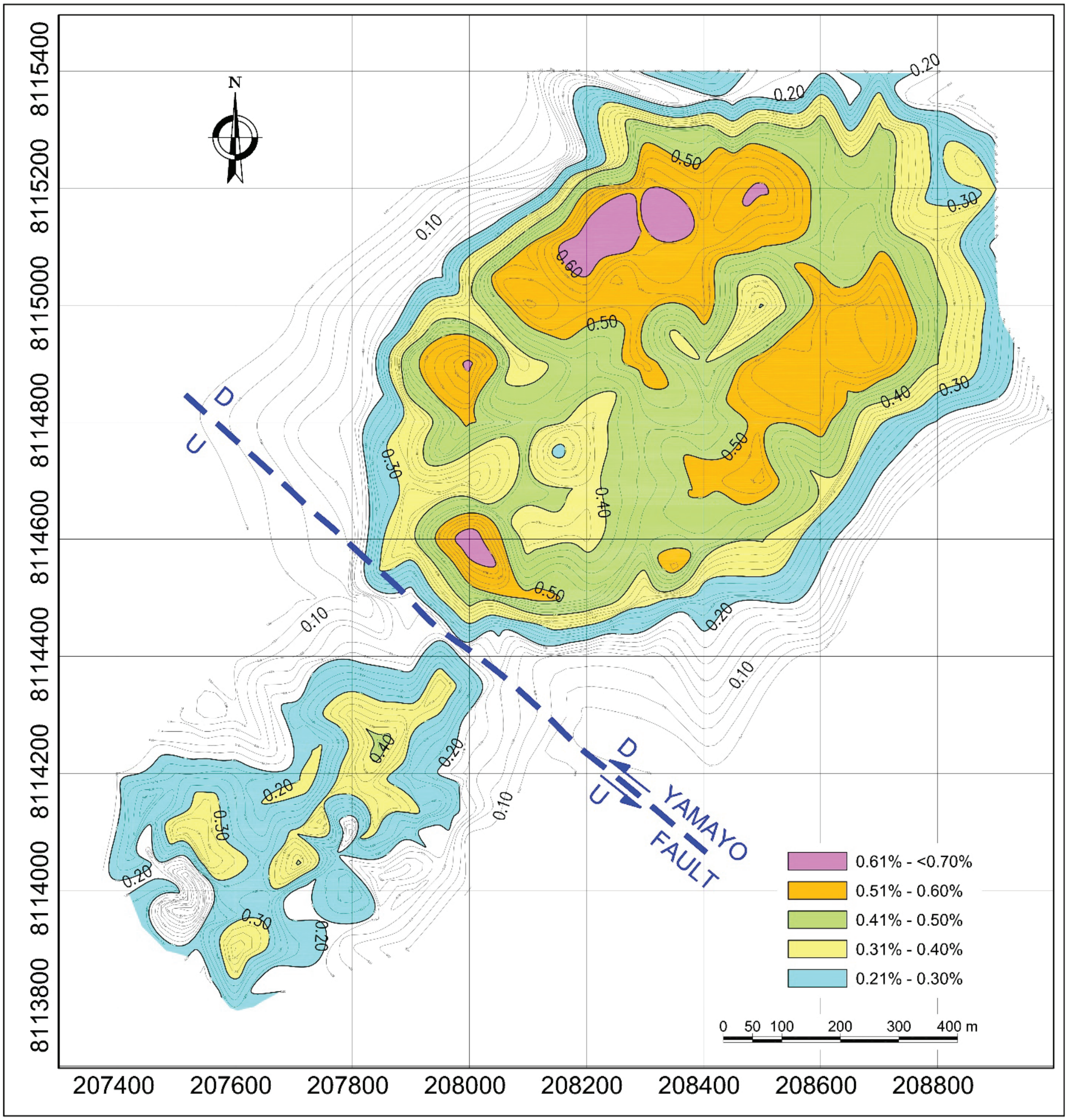
Leached cap mineralization consists of iron oxides (limonite, goethite, jarosite, and hematite) in fractures. Goethite and specularite hematite predominate over jarosite in some sections of the deposit. This zone is typically barren of copper but locally contains gold grades similar to the grades in unweathered rocks.

6.4.1.5.2 Oxide Zone

The economic mineralization at La Tapada is oxide copper consisting of chrysocolla, brochantite, antlerite, and atacamite with minor amounts of malachite and cuprite. Peripheral to this mineralization are veins and veinlets with oxide copper associated with specularite.

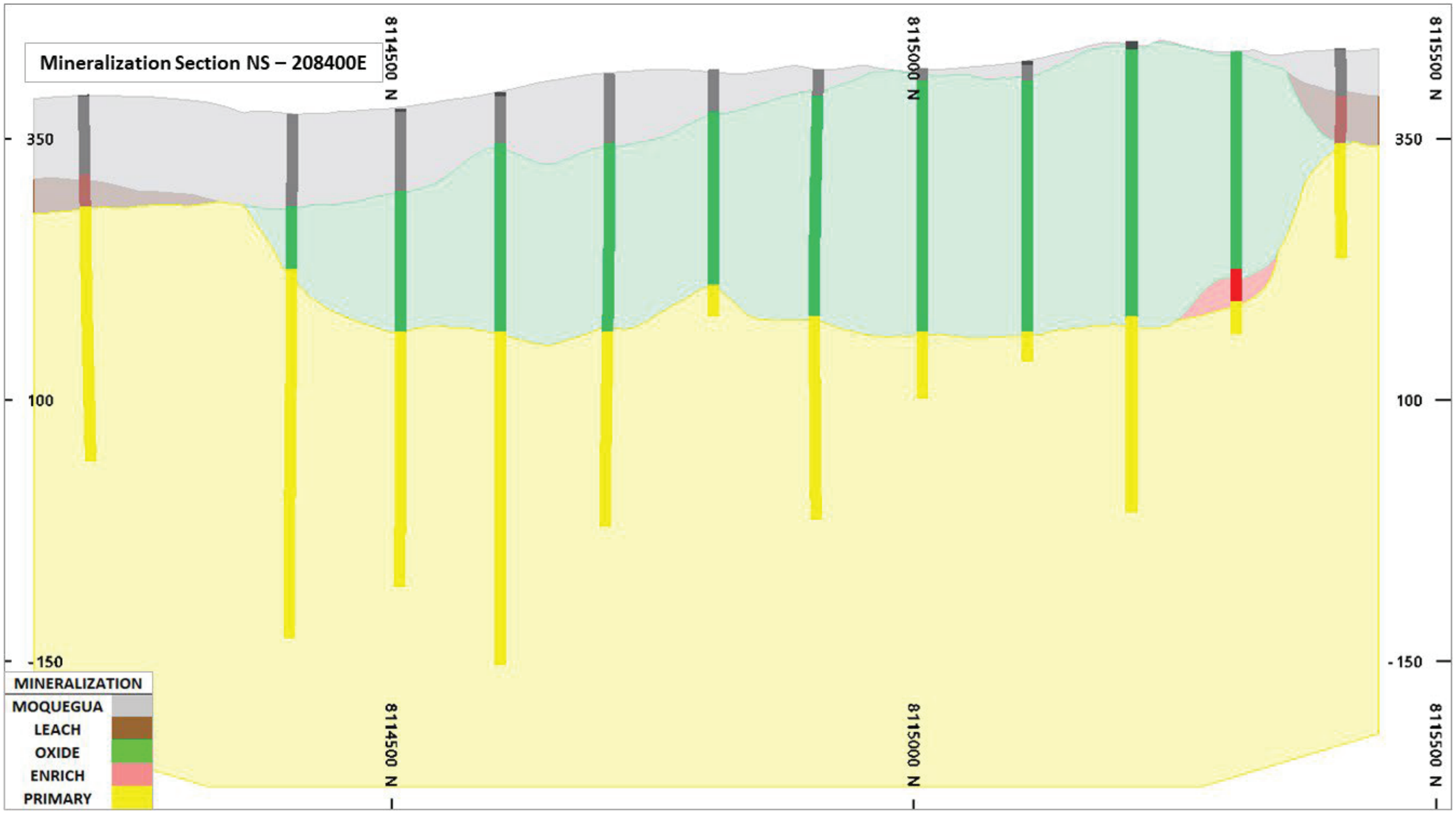
Molybdenite is infrequent and occurs in veinlets devoid of other sulfides or alteration haloes.

Figure 6-4: La Tapada CuT Contour Map Showing Yamayo Fault



Note: Figure prepared by Wood, 2021 from a map provided by Southern Copper.

Figure 6-5: La Tapada Section Showing Mineralization



Note: Figure prepared by Wood, 2021

Table 6-4: Alteration Types, La Tapada

Style	Comment
Potassic	Characterized by massive and disseminated aggregates of secondary biotite with minor early, irregular and discontinuous Type "A" veinlets (quartz, K-feldspar, anhydrite, chalcopyrite and traces of bornite). Developed indistinctly in the gneiss, the diorite/hornblendic tonalite stocks and the microdiorite dikes. "B" veins consisting of continuous, planar, internally banded quartz-anhydrite-sulfides (without K-feldspar). "B" veins do not have alteration halos, although in some cases there are bleached halos. Quartz is relatively coarse-grained.
Retrograde	Dominantly chlorite, with minor sericite and epidote. Pyrite is the primary sulfide mineral and is much more common than chalcopyrite. Chalcopyrite is generally disseminated and in veinlets throughout the host rock. In some areas, veinlets of epidote and chlorite with central suture of chalcopyrite occur, cutting irregular aggregates of secondary biotite and gypsum–chalcopyrite veins.
Phyllic	Disseminated pyrite and "D" type veinlets filling fractures with sericite halos. In some areas, chalcopyrite partially to incipiently replaced by chalcocite and covellite.
Gypsum/anhydrite	Both early and late. Occurs early in potassium alteration assemblages and as a component of type "A" veins and also in a late form controlled by fractures and as a component of younger veins.
Propylitic	Assemblage of epidote, chlorite, calcite (sparse) and quartz and is pervasive in metamorphic and intrusive rocks around the periphery of the potassic core of the deposit. Chlorite in the propylitic zone replaces ferromagnesian minerals and locally occurs in veins; however, it is difficult to distinguish it from the chlorite formed as part of the regional metamorphism that affected gneiss. Sparse epidote-chalcopyrite veins and pyrite veins with sericite-chlorite alteration halos are associated with the propylitic alteration zone.
Supergene	Weak to moderate argillic alteration featuring replacement of K-feldspar with clays.

6.4.1.5.1 Supergene Zone

Secondary sulfides replacing primary sulfides are primarily chalcocite with minor covellite and digenite. Cuprite and native copper occur rarely. There is no significant supergene enriched zone.

6.4.1.5.2 Primary Zone

Mineralization occurs as weak disseminations of chalcopyrite in the host rock matrix and as veins and veins associated with silica, gypsum/anhydrite and to a lesser extent as specularite.

At depth, copper mineralization consists of disseminated chalcopyrite and veinlets with a gypsum/anhydrite–chalcopyrite assemblage and chalcopyrite veinlets as thick as 1.5 cm

The dominant mineralized veinlets chalcopyrite–gypsum/anhydrite, chalcopyrite, specular chalcopyrite, chalcopyrite–pyrite assemblages, and to a lesser extent, chalcopyrite–bornite veinlets. Magnetite occurs as disseminated grains, but also occurs as veins, occasionally with chalcopyrite.

6.4.2 Tía María

6.4.2.1 Deposit Dimensions

The Tía María deposit is approximately 1,750 m long, 300 m wide, and averages 300 m thick. Mineralization has been drill tested to a depth of 500 m. The deposit remains open at depth and along the northwest and southeast flanks; however, the open extents are mainly primary sulfide mineralization.

6.4.2.2 Lithologies

Table 6-5 summarizes the key lithologies at Tía María. A geology map of the Tía María deposit is provided in Figure 6-7, and cross-sections through the deposit in Figure 6-8.

6.4.2.3 Structure

The Tía María deposit is located near the intersection of a northwest–southeast-trending fault, (the Yamayo Fault) with a northeast–southwest oriented fault, (the Cachuyo Fault). The faults were re-activated as normal faults post mineralization, forming a series of horst-and-graben blocks in the deposit area.

These faults generated a normal movement in staggered blocks and segmented the deposit into the North, Center and South blocks, where the South block has the greatest uplift.

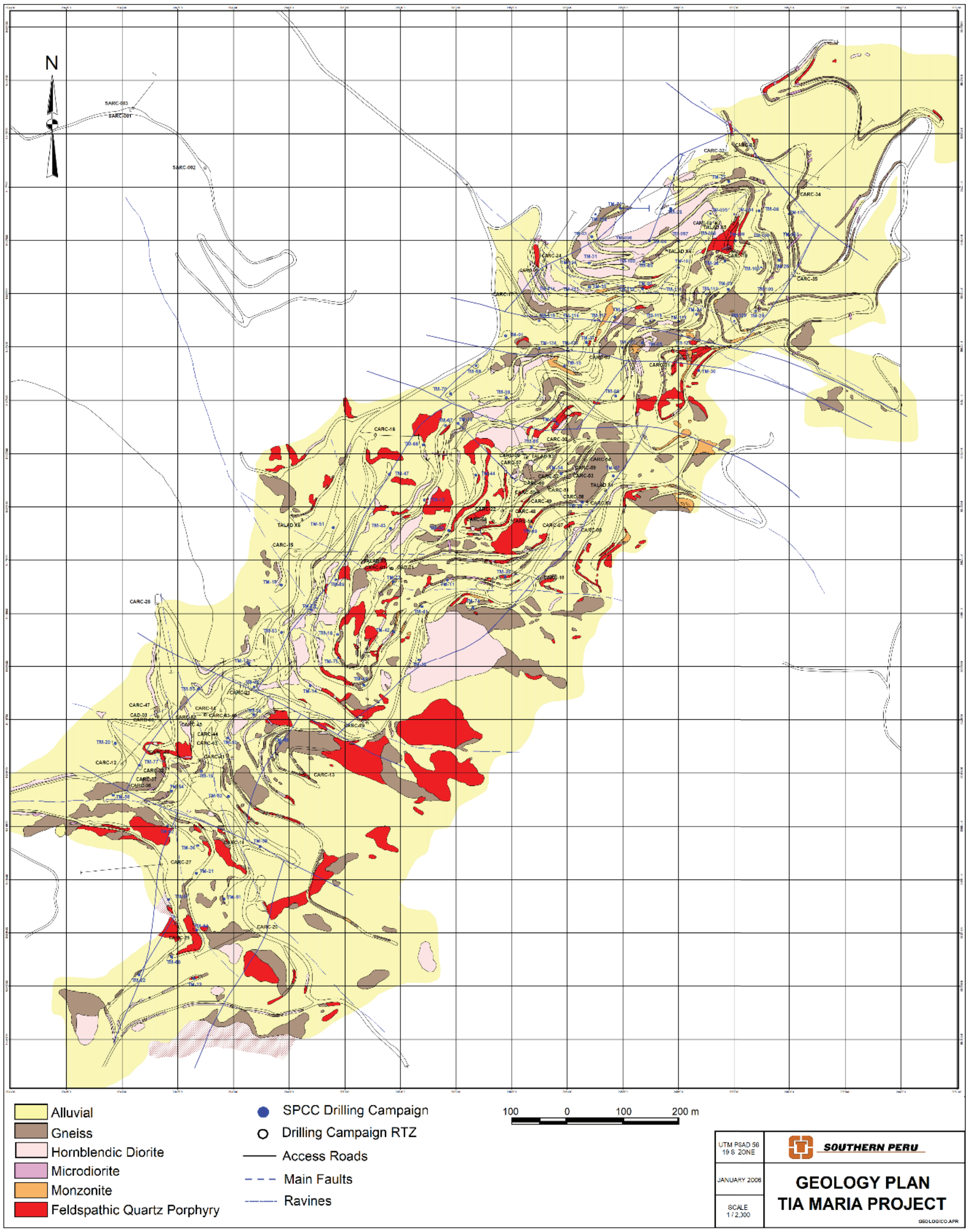
A series of splays are associated with the major fault directions, and form fracture systems and local zones of minor displacement that appear to have focused hydrothermal fluids.

A structural map of the Tía María area is provided in Figure 6-9.

Table 6-5: Tía María Lithologies

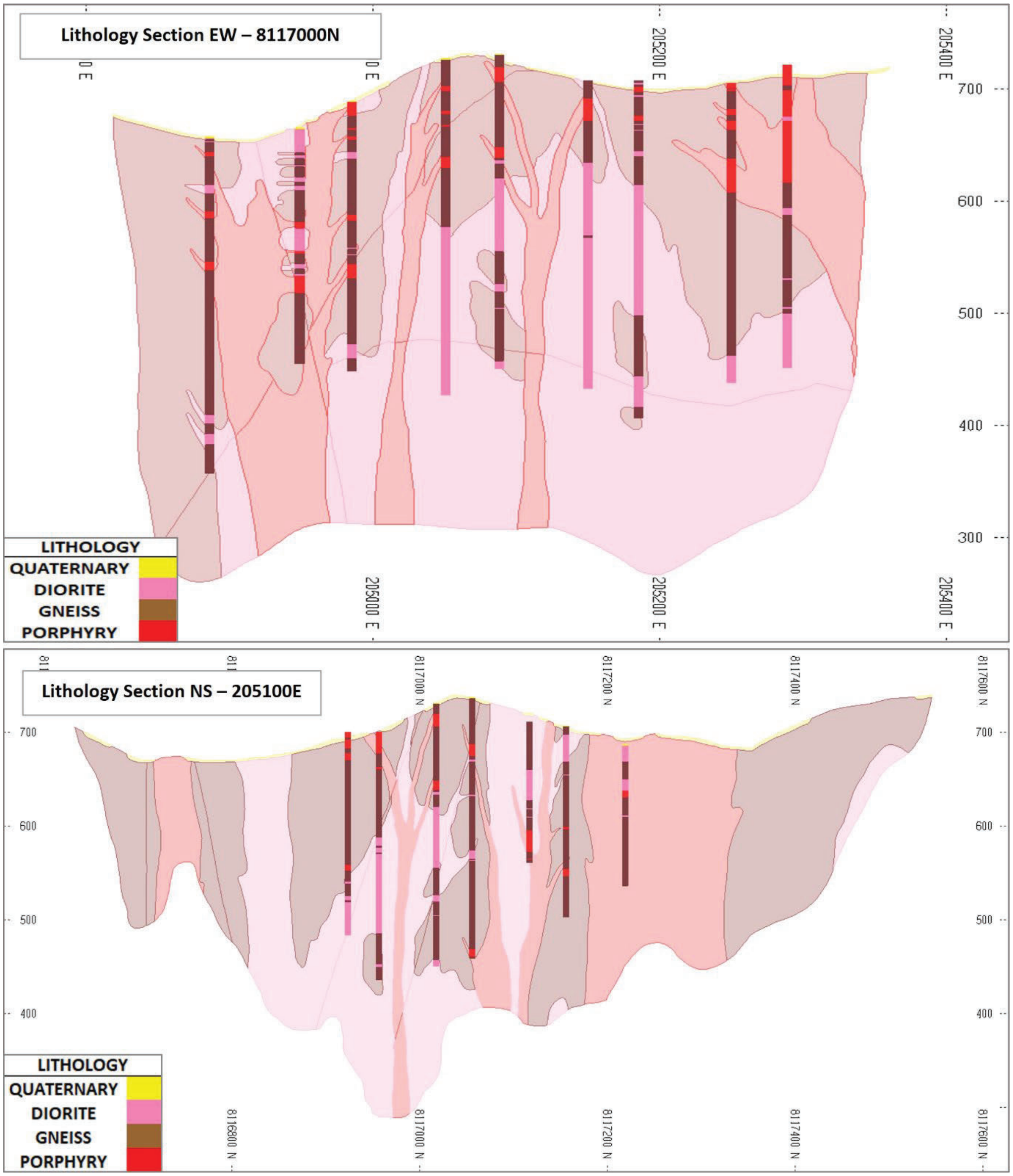
Unit	Comment
Dikes	Microdiorite and porphyritic andesite dikes too small and discontinuous to model
Monzodiorite	Fine to medium grained, can be porphyritic, reddish–gray in color
Quartz feldspar porphyry	Medium to coarse grained, grey to reddish–grey, monzodiorite porphyry, dikes and small stocks
Hornblende diorite	Granular to porphyritic texture, coarse to medium grained. Light gray in color. Displays black bands where secondary biotite is present.
Gneiss	Distributed around the deposit. Banded quartz, orthoclase, magnetite, and mafic minerals. Locally altered with secondary biotite

Figure 6-6: Tía María Local Geology Map



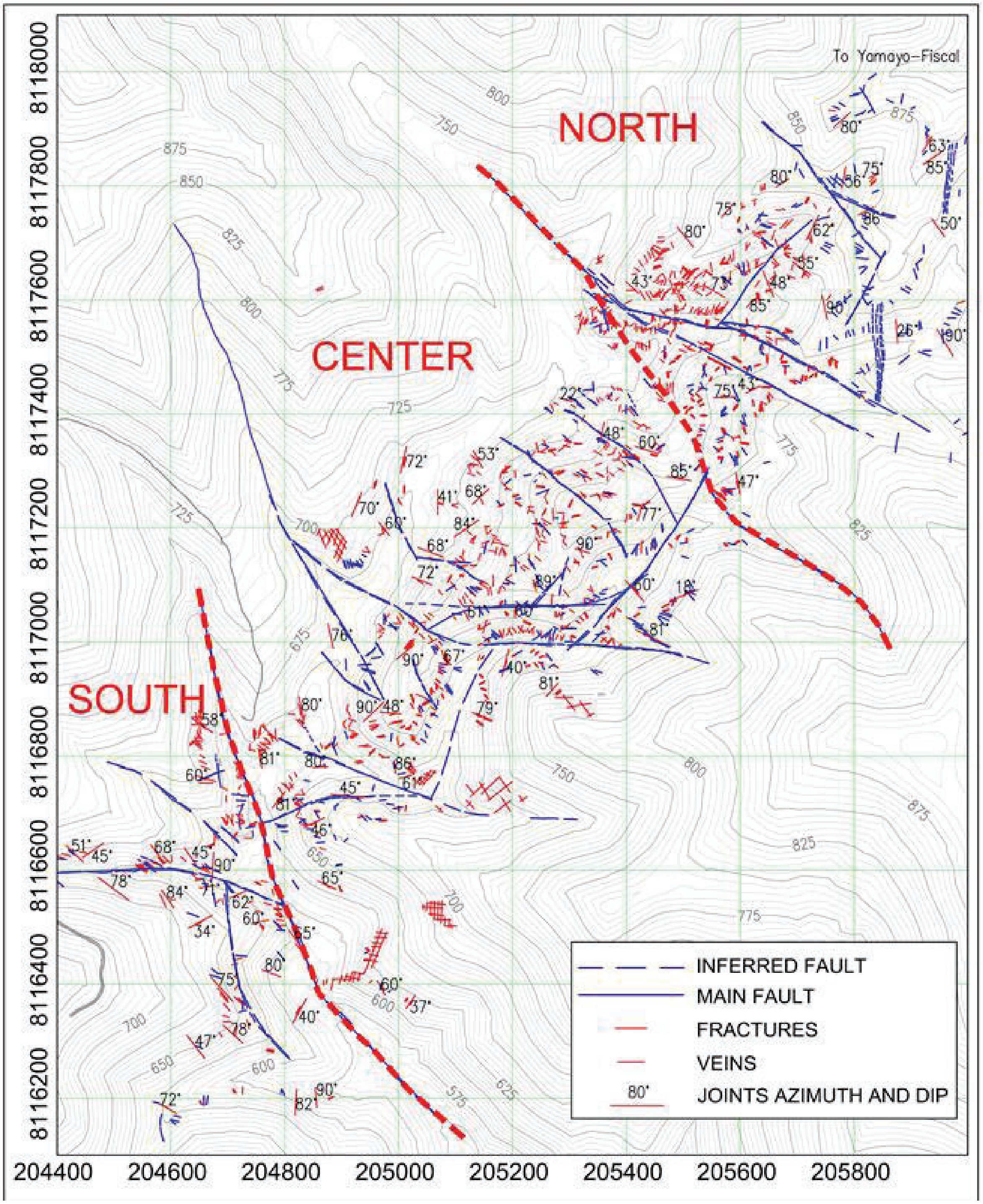
Note: Figure prepared by Southern Copper, 2006

Figure 6-7: Tía María Geological Cross-Section



Note: Figure prepared by Wood, 2021. Sections 8117000N looking north; 205100E looking west.

Figure 6-8: Tía María Structural Geology Map



Note: Figure prepared by Wood, 2021.

6.4.2.4 Alteration

Alteration does not form a regular or concentric distribution as is characterized in the typical porphyry deposit model. A summary of the alteration types is provided in Table 6-6, a map showing the alteration is presented as Figure 6-10, and a cross-section showing the alteration is included as Figure 6-11.

Potassic alteration is the most common alteration type. Locally, retrograde chloritization is superimposed on the potassic alteration. No quartz–sericite alteration has been observed; however, there are some indications of sericite clays linked to fault zones. There is also a mild supergene alteration.

6.4.2.5 Mineralization

Mineralization of economic interest is primarily copper oxide minerals in the oxide zone. Weathering produced three zones—a leached cap, an oxide zone, and a primary or hypogene zone. There is no significant supergene enrichment at Tía María.

6.4.2.5.1 Vein Types

A number of vein types are associated with local structures:

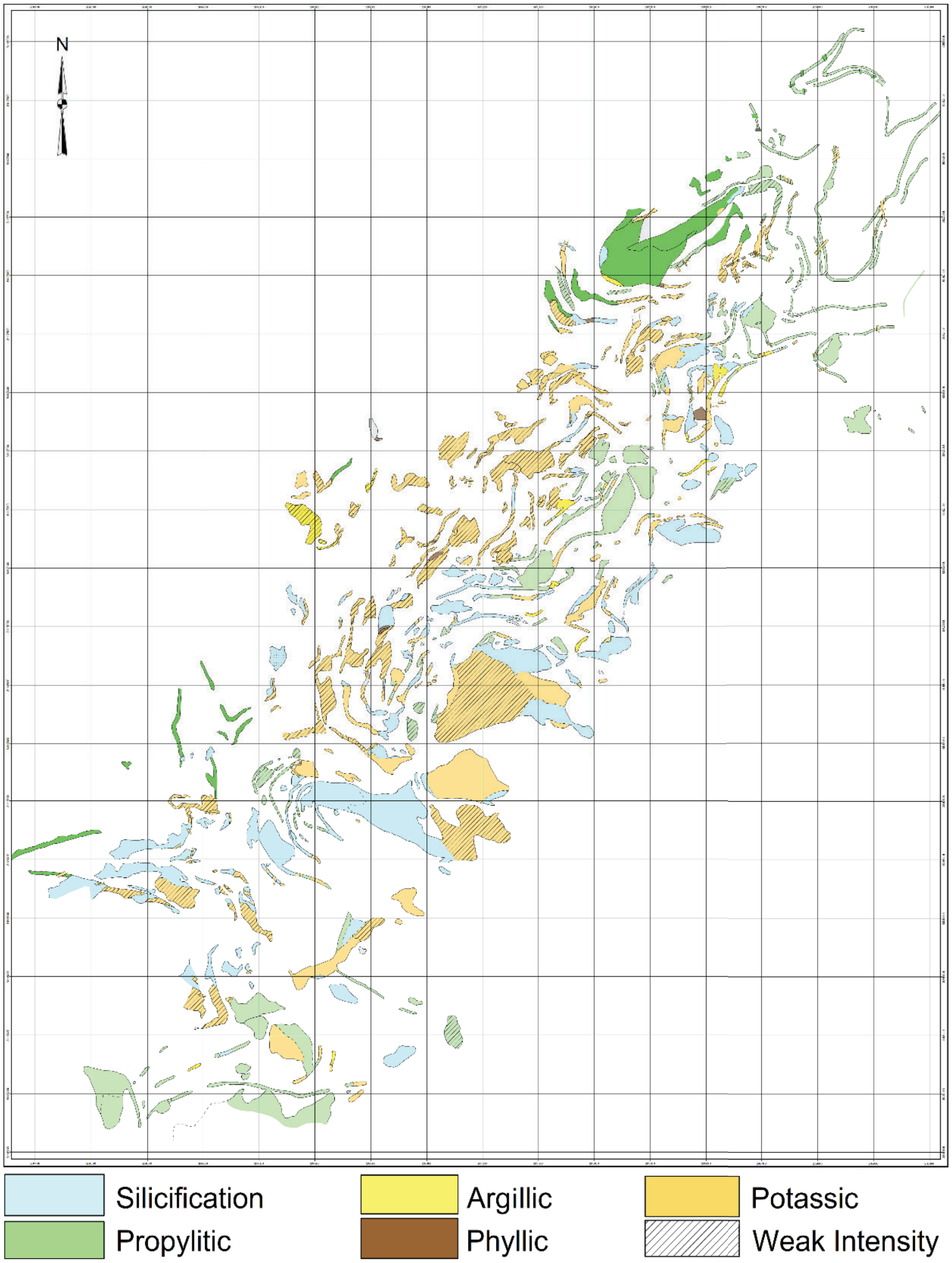
Stockworks occur throughout the deposit. They are oriented in all directions and are predominantly "A" veins with minor "D" veins and rare "B" veins:

- "A" veins are the most common and occur in all rock types, consisting of quartz veins with no sulfides
- "B" veins are uncommon, and found deep in the system. They consist of gray quartz with molybdenite
- "D" veins are irregularly distributed, but most commonly occur near porphyry intrusive units, and comprise gray quartz with K-feldspar halos. Pyrite and chalcopyrite can occur in the halo or in the vein centers
- Quartz veins composed of predominantly quartz with rare specularite, pyrite, chalcopyrite, and some gold. They are oriented northwest–southeast, and are 3–50 cm thick.

Table 6-6: Tía María Alteration Types

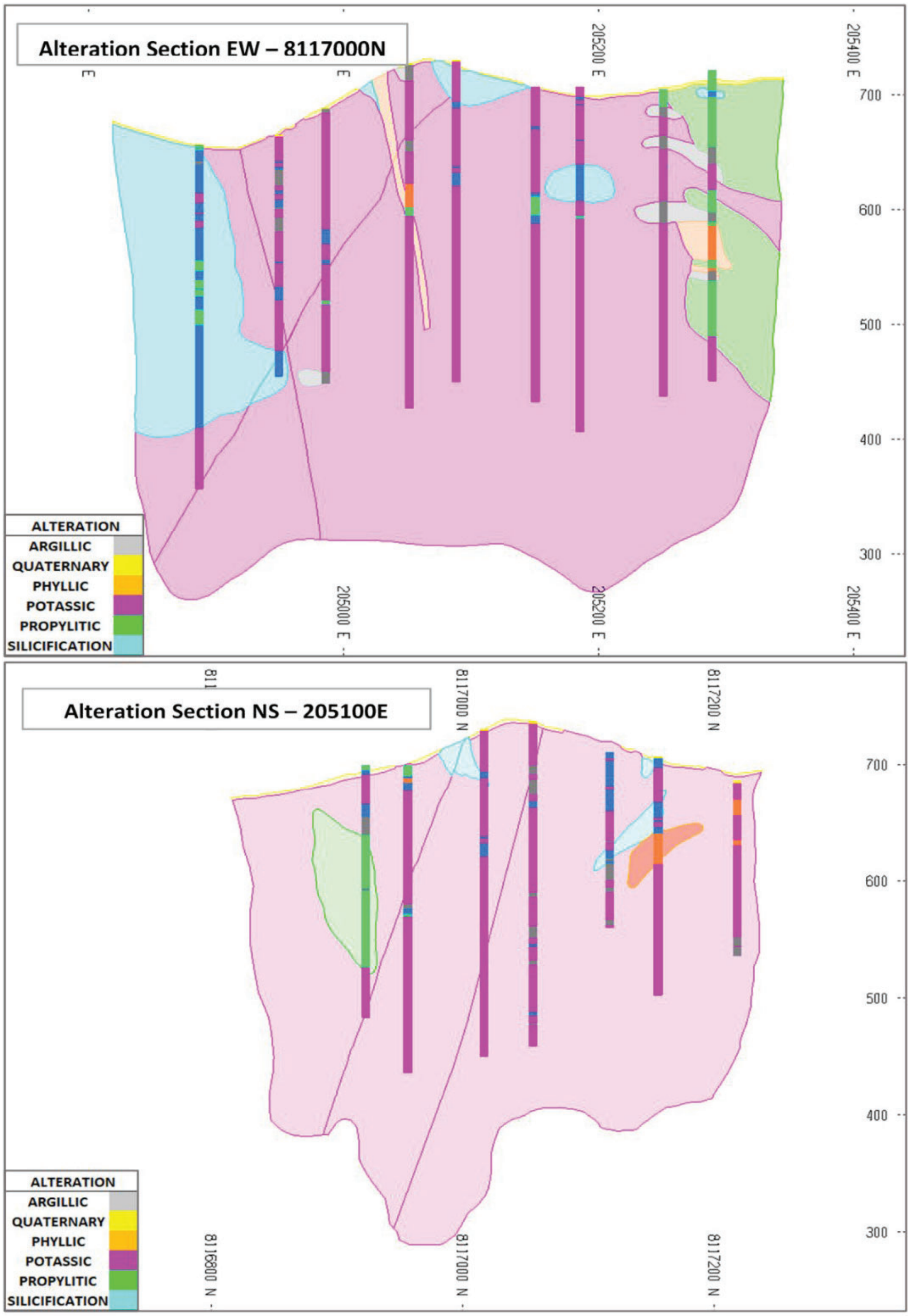
Style	Comment
Propylitic	Chlorite–epidote–pyrite mineral assemblage that occurs as a gradational halo of the potassic alteration and is most common on the west side of the deposit where it generated pyrite veins in addition to the normal alteration mineral assemblage
Potassic	Characterized by the presence of secondary biotite ± K-feldspar–silica–magnetite, veinlets of silica with K-feldspar halos and in some cases the rock matrix replaced by silica–K-feldspar alteration
Silicification	Typified by quartz veinlets. Most pervasive in gneissose rocks, where silicification destroys the original texture and is accompanied by accessory clay minerals, sericite and chlorite.
Chloritization	Retrograde alteration on the potassic event, characterized by chlorite ± clay ± silica.
Supergene	Generally occurs in gneiss. K-feldspar is replaced by sericitic clays. Locally observed in areas with strong fracturing and close to faults

Figure 6-9: Tía María Alteration Map



Note: Figure prepared by Southern Copper, 2007.

Figure 6-10: Tía María Alteration Cross-Section



Note: Figure prepared by Wood, 2021. Sections 8117000N looking north; 205100E looking west.

6.4.2.5.2 Leached Zone

Mineralization consists of iron oxides that are common in all leached rock types but occur with the greatest intensity in the gneiss. The most common minerals are hematite, magnetite and specularite with subordinate goethite and jarosite. There are traces of pitch limonite.

Within the intrusive rocks, the leached zone is very thin to non-existent. Common minerals include sparse disseminated and fracture-filling goethite and jarosite, traces of hematite and pitch limonite.

Specularite occurs in veinlets, and as cavity and fracture fill. The veinlets can approach a weak stockwork.

6.4.2.5.3 Oxide Zone

The oxide mineral assemblage is mainly chrysocolla with minor neotocite and malachite at depth. Gneiss is the dominant oxide host. Copper oxides are more common in zones of greater fracturing and along the gneiss–intrusive contact.

Specularite in veinlets and as cavity fill is associated with this zone. Minor amounts of hematite and magnetite occur.

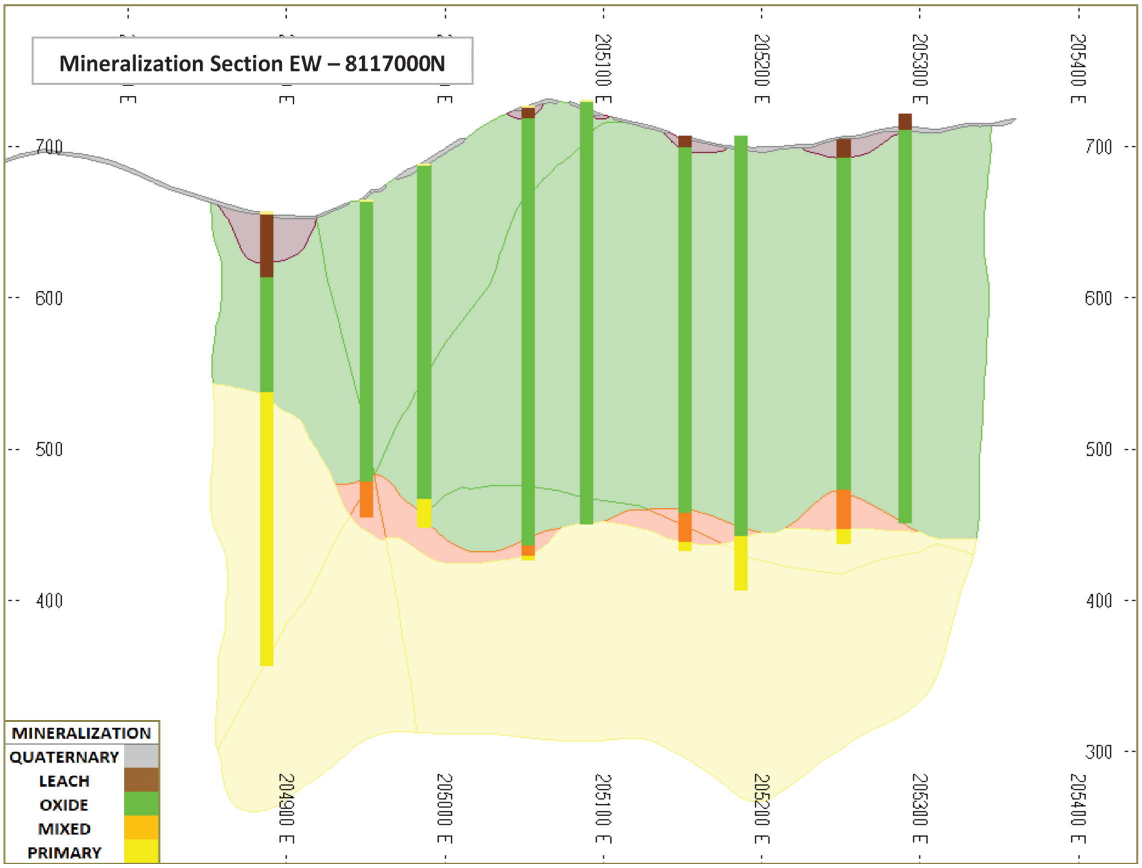
Quartz veins with gold and copper values occur within this zone. These veins cut through part of the deposit and host minor amounts of green copper oxides restricted to their (very local) environment.

6.4.2.5.4 Primary Zone

The hypogene zone includes disseminations and veinlets of pyrite and chalcopyrite with quartz. Traces of molybdenite occur with higher concentrations of chalcopyrite. Some chalcocite developed at the top of the primary zone and is evidence of an incipient enrichment process; however, there is no significant supergene enrichment. Molybdenite occurs in areas of higher chalcopyrite concentration.

A cross-section showing the mineralization is included as Figure 6-12.

Figure 6-11: Tía María Section Showing Mineralization



Note: Figure prepared by Wood, 2021. Section 8117000 N, looking north.

7 EXPLORATION

7.1 Exploration

7.1.1 Grids and Surveys

The topographic surveys used to estimate mineral resources were performed in February 2007. The survey data were acquired by Eagle Mapping Perú using UTM coordinates with the PSAD 56 datum.

Mapping and other locations are based on the local Cerro Antena benchmark which has UTM zone 19 K coordinates of 8,116,827 N and 205,757 E (PSAD 56 Datum) and 8,116,453 N and 205,569 E (WGS 84 datum).

7.1.2 Geological Mapping

Southern Copper staff completed geological mapping in the Project area at regional (1:25,000) and deposit (1:2,000) scales in 2006.

7.1.3 Geochemistry

Geochemical samples were completed as part of early-stage exploration and consisted of soil, rock chip and grab samples. The results are no longer considered relevant as these early-stage programs are superseded by drill data.

7.1.4 Geophysics

Arce Geofisicos conducted an induced polarization survey over portions of the Tía María property in 2006. The survey consisted of 12 profiles, for a total of approximately 18 km, with variable station spacing that ranged from 50–350 m. The survey used a IRIS receiver and a pole–pole configuration. ElrecPro provided simultaneous resistivity–chargeability measurements on seven centers.

The program defined anomalous zones of resistivity and chargeability that were used for drill targeting. The low resistivities corresponded to altered and/or fractured zones and the higher resistivities corresponded to compact or silicified rocks.

7.1.5 Qualified Person's Interpretation of the Exploration Information

The exploration conducted by Southern Copper provided vectors to geochemical surface and geophysical anomalies that were drill tested. This work identified the Tía María and La Tapada deposits.

7.1.6 Exploration Potential

Southern Copper is currently focused on developing the Tía María and La Tapada deposits. There remains potential for sulfide mineralization below the known copper oxide mineralization; however, Southern Copper has no current plans for additional exploration.

7.2 Drilling

7.2.1 Overview

7.2.1.1 Drilling on Property

The database currently contains 815 named drill holes (Table 7-1, Figure 7-1) for 236,072 m of drilling. Of those, 65 drill holes do not have collar (easting–northing) locations. Of the 750 holes with collar locations, 74 are missing elevation data. None of the drill holes are missing total depth data. These holes were drilled by Southern Copper for exploration and condemnation purposes.

Drilling supporting mineral resource estimation totals 318 holes (116,439 m) for La Tapada (Table 7-2) and 169 holes (36,262 m) for Tía María (Table 7-3). All drilling in both tables was used for geological modeling and mineral resource estimation. Collar locations are shown on Figure 7-2 and Figure 7-3.

From 2007–2008, 50 geotechnical core holes (4,881 m) were completed by Southern Copper. During 2009, 12 RC piezometer holes (2,689 m) were drilled.

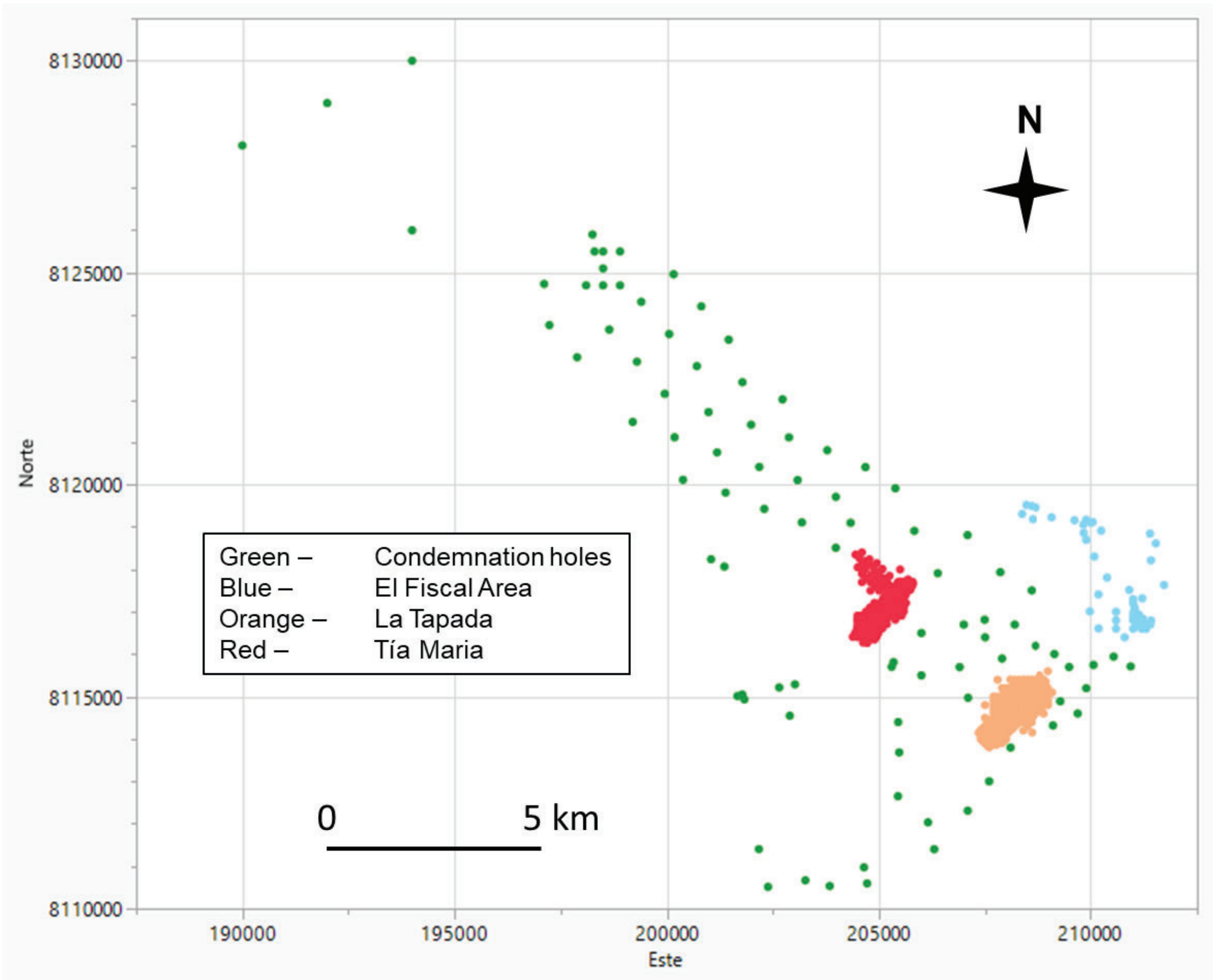
7.2.1.2 Drilling Excluded For Estimation Purposes

No drilling at La Tapada or Tía María was excluded from the database for estimation purposes.

Table 7-1: Drill Summary Table

	Year	Number of Holes	Total Meters
Drill holes with collar locations	2003	15	4,628.25
	2004	79	17,164.60
	2005	156	33,859.30
	2006	136	46,785.40
	2007	281	95,975.94
	2008	83	25,968.90
	Total	*750*	*224,382.39*
Drill holes without collar locations	2007	11	597.90
	2008	29	5,128.15
	2009	23	5,395.00
	Unknown	2	569.25
	Total	*65*	*11,690.30*
Total		***815***	***236,072.69***

Figure 7-1: Project Drill Collar Location Map



Note: Figure prepared by Wood, 2021.

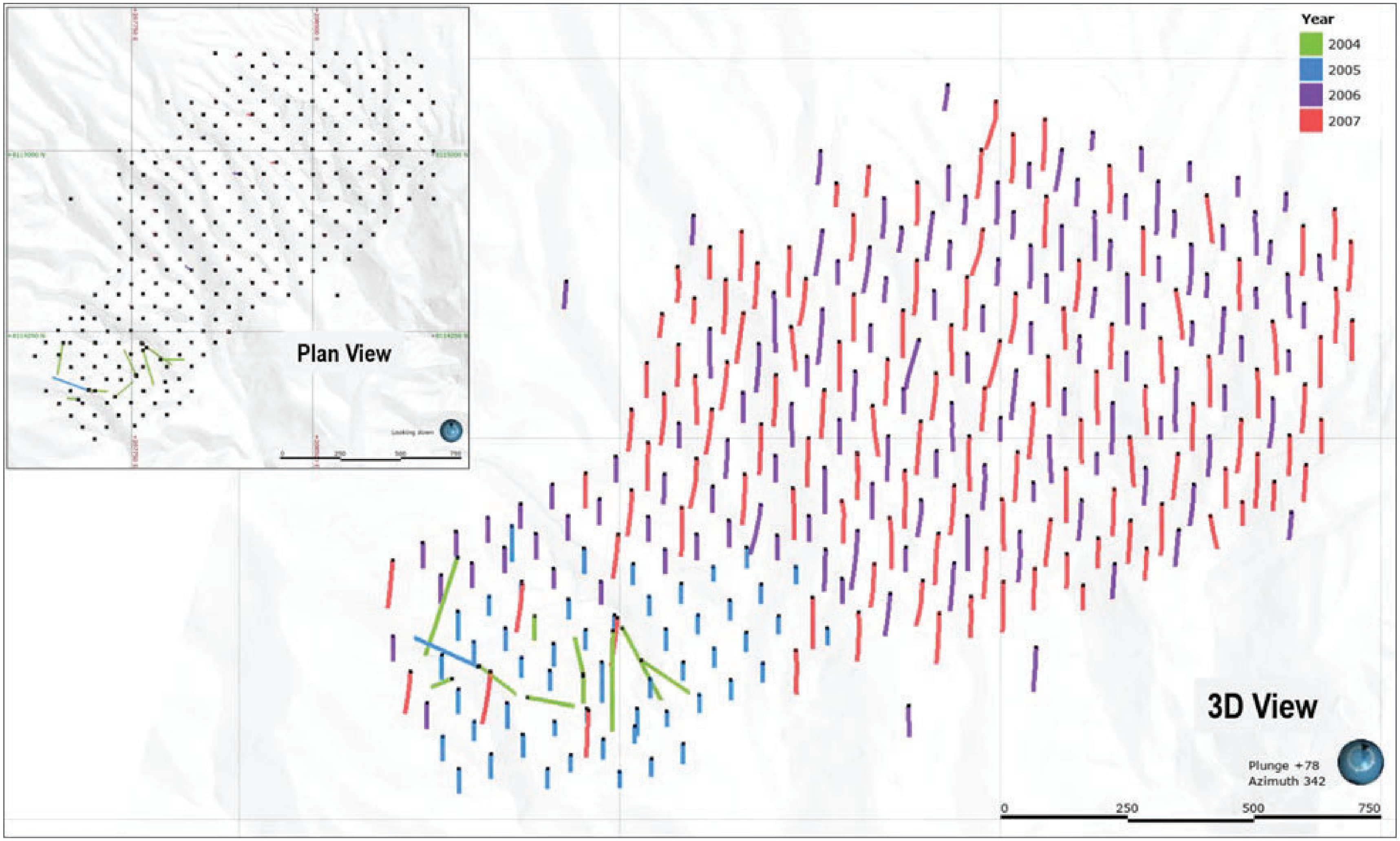
Table 7-2: Drill Summary Table, La Tapada

Campaign	Operator	Drill Method	Number of Holes	Meters
2004	Southern Copper	Core	10	2,551
2005	Southern Copper	Core	53	11,242
2006	Southern Copper	Core	131	44,675
2007	Southern Copper	Core	124	57,970
Total			***318***	***116,439***

Table 7-3: Drill Summary Table, Tía Maria

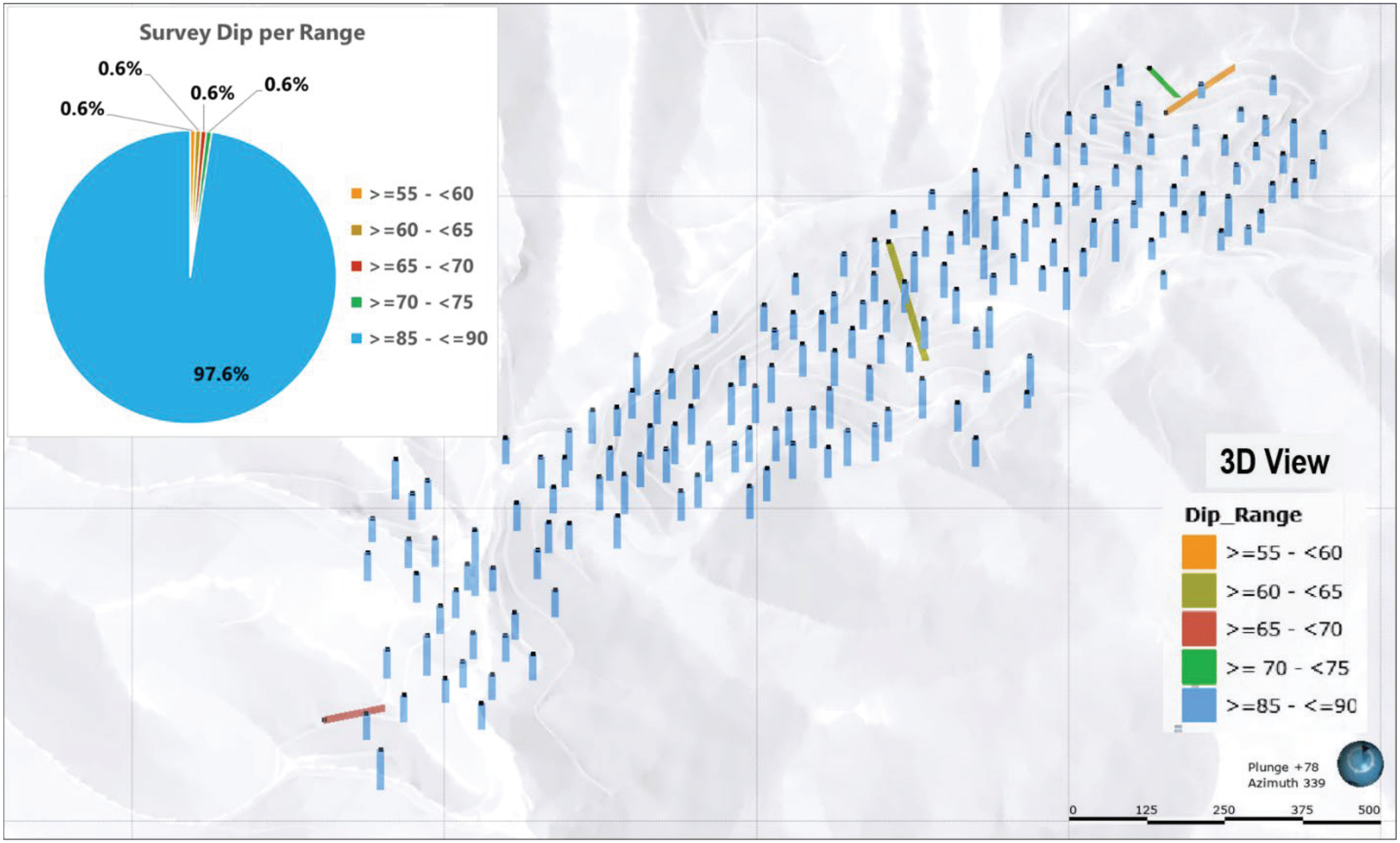
Campaign	Operator	Drill Method	Number of Holes	Meters
2003	Southern Copper	Core	15	4,628
2004	Southern Copper	Core	62	12,704
2005	Southern Copper	Core	92	18,930
Total			***169***	***36,262***

Figure 7-2: La Tapada Drill Collar Location Map



Note: Figure prepared by Wood, 2021.

Figure 7-3: Tía María Drill Collar Location Map



Note: Figure prepared by Wood, 2021.

7.2.2 Drill Methods

Southern Copper used Geodrill S.A. in their drill programs. Where known, drill rigs included Longyear 44, LF70, UDR 950, and a Baldor machine (Acker drill).

Core drilling used HQ- (63.5 mm core diameter) and NQ-diameter (47.6 mm) diamond-tipped tools and either split- or triple-tube methods. The change from HQ to NQ typically occurred between 70–190 m depth.

At La Tapada, of the 318 drill holes in the database, only nine are not vertical. Core drilling was performed by Geodrill, S.A. using HQ and NQ-diameter diamond-tipped tools. The change from HQ to NQ typically occurred between 100–200 m down hole. The type of drilling equipment is not recorded in the Project database.

At Tía María, all but four holes are vertical. Inclination of the angle holes is between -55^{o} and -85^{o}.

7.2.3 Logging

At both La Tapada and Tía María, core was moved from the drill by Southern Copper personnel and accompanied, when possible, by a drilling technician, at the end of each shift. Core boxes were covered. All core was logged with the data recorded on paper using a standard logging format. Logged items include:

- Lithology
- Mineralization and oxidation state
- Alteration
- Structures and fracturing.

7.2.4 Recovery

Core recovery data at La Tapada indicate that 95% of the data have better than 80% recovery. Intervals with <80% recovery are randomly scattered around the deposit.

Core recovery at Tía María is generally good with 96% of the intervals with >80% recovery. Intervals with <80% recovery are scattered about the deposit with no apparent patterns.

7.2.5 Collar Surveys

Collar surveys at La Tapada in 2007 and for some collars in 2006 and 2005 were surveyed by Global Mapping using a total station instrument. Global Mapping provided digital documentation to Southern Copper of locations surveyed. A total of 157 drill holes have documentation. The remainder are not documented. Survey methods and equipment used in 2004 and for some collars in 2005 and 2006 are not recorded in the database.

The method of surveying drill hole collar locations for the three campaigns at Tía Maria is unknown. It is assumed that Global Mapping, the contractor that surveyed La Tapada, performed the surveys with a total station instrument, but there is no formal documentation to verify the collar information. The drill hole collar coordinate data provided by Southern Copper were in UTM coordinates. This lack of documentation results in uncertainty about the integrity of the collar locations in the database. Some, but not all, collar locations were verified by Wood. This uncertainty in the integrity of the database is sufficient to limit mineral resource classification to Indicated.

7.2.6 Down Hole Surveys

Downhole surveys were performed for 206 of the La Tapada drill holes on 45–55 m intervals. GeoDrill S.A. performed the surveys using a Flexit instrument.

Downhole surveys were not performed on Tía María exploration holes. Because 98% of the drilling at Tía María is vertical, the lack of downhole surveys is not considered by Wood to be a material issue. However, the lack of surveys does not provide confidence that there has been no deviation in any of the vertical drill holes. As a consequence, the lack of survey data does not support classification of measured mineral resources.

Wood recommends that all drill holes more than 50 m deep have downhole surveys performed. Wood also recommends that an investigation be conducted to determine what magnetic declination correction was applied in each program, if any, and examine the impact on the resource estimate of any corrections.

7.2.7 Comment on Material Results and Interpretation

Drill spacing at the La Tapada deposit was conducted using a five-spot pattern at 100 m distances, which corresponds to a uniform drill spacing of 70.7 m. On the periphery of the deposits, the maximum drill spacing is 200 m from the main drill pattern.

For the Tía María deposit, drill spacing is irregular, at about 40–80 m in the core of the deposit, with 150 m spacing on the deposit periphery.

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.

7.3 Hydrogeology

7.3.1 Sampling Methods and Laboratory Determinations

Permeability tests were conducted in 2010 by Ausenco, consisting of installation of 2-inch diameter Casagrande-type piezometers in 12 purpose-drilled reverse circulation (RC) holes. Drill tests included injection–infiltration above the water table, measurements of water production where groundwater was encountered, and Lefranc variable load tests on six of the installed piezometers. Water samples were taken in nine of the 12 piezometers installed and sent to Corplab Environmental Analytical Services in Cerado-Arequipa, Peru (Corplab) for analysis. Corplab was independent of Southern Copper. There is no international standard of accreditation provided for hydrological testing laboratories or hydrological testing techniques.

Water was encountered in the RC holes at depths ranging from 6–300 m.

Permeability was shown to be highly variable, indicative of the presence of zones of moderate and discrete permeability separated by areas of rocks with much lower permeability. Quaternary sediments and diorite were somewhat more permeable than granodiorite and an order of magnitude more permeable than the Precambrian gneiss. However, relatively, the rock types display low to very low permeability values.

The groundwater had high total dissolved solids (TDS) counts, a wide range of electrical conductivity readings, and a range in pH values. A number of the sample points returned values that exceeded the limits for irrigation of vegetables, and some sample points returned values that exceeded limits for animal consumption, based on category 3 of the Estándares de Calidad Ambiental (ECAs; standards for environmental quality) for water.

Southern Copper has continued water sampling, with monthly water levels measurements taken from piezometers located in the Project area from 2010 to the Report effective date.

7.3.2 Groundwater Flow Modelling

Ausenco generated a conceptual groundwater flow model in 2010, which was calibrated with observed water levels. The model was used to estimate the inflow rates to the planned open pits, and the impact the pits could have on the Tambo River.

A 2013 study by Ego-Aguirre & Smuda SAC generated a new groundwater model, based on additional bore hole measurements gathered by Southern Copper between 2010–2013, and oriented to the regional fracture system, with a northwest to southeast trend. Water inflow rates from groundwater sources to the Tía María and La Tapada pits would be approximately 1.7 m^3/d and 2.4 m^3/d, respectively. No appreciable changes were observed in the simulated discharge to the Tambo River.

Direct recharge of groundwater infiltration from precipitation is negligible.

Using tritium (H^3) dating, the groundwater was found to be at least 60 years old, and likely older. Tritium concentrations did not show any evidence of the 1950s–1960s nuclear weapons-related enrichment, and so is older than at least the 1950s. Ego-Aguirre & Smuda concluded that the groundwater aquifers were likely Holocene-related (10,000 years) based on a combination of the lack of current recharge, tritium content, and stable H/O isotopes that are indicative of old waters.

7.3.3 Comment on Results

The available hydrological and hydrochemical data collected to date are suitable for use in mine designs and mine planning.

7.4 Geotechnical

Vector Perú S.A.C. (Vector) conducted studies in support of planned infrastructure and facility locations. The work included excavation of pits, drilling, field tests, quarry study, geological and geotechnical mapping, and laboratory tests.

Open pit slope geotechnical analysis and design is supported by data gathered from the 2007 geotechnical drill program, laboratory testing, and bench-scale structural mapping. The work was conducted by Vector (2007a, 2007b).

7.4.1 Sampling Methods and Laboratory Determinations

7.4.1.1 Tía María

The field investigation for the proposed open pit at Tía María consisted of six HQ3 diameter, triple-tube core holes. Core was oriented using clay impressions between core runs.

Geotechnical logging of the rock units is reported to have consisted of parameters such as intact rock strength based on International Society for Rock Mechanics (ISRM) guidelines, rock quality designation (RQD), fracture frequency, fracture condition. Geomechanical parameters were sufficient for Vector to estimate the rock mass rating of the core runs. Geotechnical logging of the Moquegua Formation consisted of logging soil characteristics.

Structural line mapping was performed at 41 locations to characterize geomechanical properties of the rock and discontinuities. Line mapping stations were 5 m long.

Testwork included unconfined compressive strength, triaxial, and direct shear tests. The tests were conducted by the Universidad Nacional de Ingenieria, Laboratorio de Mecanica de Rocas, Lima, Peru, which is independent of Vector and Southern Copper. There is no international standard of accreditation provided for geotechnical testing laboratories or geotechnical testing techniques.

7.4.1.2 La Tapada

The field investigation for the proposed open pit at La Tapada consisted of 12 HQ3 diameter, triple-tube core holes. Six of the core holes were drilled to investigate the geomechanical properties of the bedrock and discontinuities, and the remaining six drill holes were used to investigate the Moquegua Formation that overlies the bedrock. Core from the bedrock holes was oriented using clay impressions between core runs.

Geotechnical logging of the rock units is reported to have consisted of parameters such as intact rock strength based on ISRM guidelines, RQD, fracture frequency, fracture condition. Geomechanical parameters were sufficient for Vector to estimate the rock mass rating of the core runs. Geotechnical logging of the Moquegua Formation consisted of logging of soil characteristics.

Structural line mapping was performed at 10 locations to characterize geomechanical properties of the rock and discontinuities. Line mapping stations were 5 m long.

Testwork included unconfined compressive strength, triaxial, and direct shear tests. The tests were conducted by the Universidad Nacional de Ingenieria, Laboratorio de Mecanica de Rocas, Lima, Peru, which is independent of Vector and Southern Copper. There is no international standard of accreditation provided for geotechnical testing laboratories or geotechnical testing techniques.

7.4.2 Comment on Results

Lithologic and geomechanical logging protocols, and laboratory test equipment used, and quality assurance/quality control (QA/QC) checks on the logging and laboratory tests were not available for review by Wood.

Based on the Vector (2007a) report on the La Tapada geotechnical evaluations and the Vector (2007b) report on the Tía María geotechnical evaluations:

- There is no information available as to any quality assurance or QA/QC procedures that may have been in place during data collection
- Laboratory tests were stated to have been performed per the relevant ASTM standards
- No procedures and protocols for mine design were developed, and there is no mention of a geotechnical risk register.

Wood considers the geotechnical field investigation data and laboratory testing data presented in the Vector reports to be appropriate for the determination of rock mass properties for use in the pre-feasibility level design of the La Tapada and Tía María open pit slopes. The supporting data collection procedures are consistent with generally-accepted industry standard practice for the level of geotechnical effort required to support pre-feasibility level open pit slope designs (Read & Stacey, 2010).

8 SAMPLE PREPARATION, ANALYSES, AND SECURITY

[Describe:

(i) Sample preparation methods and quality control measures employed prior to sending samples to an analytical or testing laboratory, sample splitting and reduction methods, and the security measures taken to ensure the validity and integrity of samples;

(ii) Sample preparation, assaying and analytical procedures used, the name and location of the analytical or testing laboratories, the relationship of the laboratory to the registrant, and whether the laboratories are certified by any standards association and the particulars of such certification;

(iii) The nature, extent, and results of quality control procedures and quality assurance actions taken or recommended to provide adequate confidence in the data collection and estimation process;

(iv) The adequacy of sample preparation, security, and analytical procedures, in the opinion of the qualified person; and

(v) If the analytical procedures used are not part of conventional industry practice, a justification by the qualified person for why he or she believes the procedure is appropriate in this instance.

Delete this guidance when finalizing report]

8.1 Sampling Methods

8.1.1 Geochemical

Rock chip and grab samples were collected from fresh and altered rock outcrops, considered typical and representative of the area within a radius of 5 m. Samples were also taken in the places where mineralized rocks were observed. Where sufficient outcrop was present, sampling was performed on an approximate 200 x 200 m grid.

Soil samples were collected on a 200 m x 200 m grid with sample depths to 30 cm.

8.1.2 Core

Core was sampled on strict 3 m intervals. Intervals shorter and longer than 3 m were from the tops of sampled intervals and bottoms of holes. The logging geologist marked a cut line and a manual splitter was used to split whole core. One-half was bagged for sample preparation and analysis and the other half was returned to the core box.

8.2 Sample Security Methods

Core was transported by company personnel from the drills to the core shed. At the core shed, samples were attended by Southern Copper personnel or within the locked compound. No specific security measures are recorded.

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 Specific Gravity Determinations

The specific gravity (SG) data includes a total of 12,081 results at Tía María and 35,078 results at La Tapada, all of which represent 2.5–4 cm long samples of core. SG was determined by Southern Copper personnel at the core shed. Most of the 3 m long samples have a corresponding SG value. Samples were dried then weighed in air and weighed while suspended in water. The method is commonly used for samples with no (or very little) porosity; however, some of these samples may exhibit significant porosity that requires a different method for accurate determination of SG.

There is no indication in the record of any quality control measures being used for SG at Tía María or La Tapada. Wood had Southern Copper collect 20 samples to be used for check SG determinations from each deposit. Those samples were sent to SGS Perú for density determinations using a paraffin-coated immersion method that is better suited to porous samples but is very good for all samples except those with very large pores. Results at Tía María exhibited an overall positive bias for SGS Perú relative to Southern Copper for both intrusive samples (bias of 0–8% with two points showing a negative bias) and wall rock gneiss (bias = 1–12%). La Tapada data for intrusive rocks show a positive 2–11% bias for SGS Perú relative to Southern Copper and gneiss shows a 2–12% positive bias for SGS Perú relative to Southern Copper. These results are unusual because the wax-coat method normally returns lower density values than the direct immersion method and here, with the exception of two points out of 40, that is not the case. These biases are unexplained and present a risk to the

La Tapada and Tía María mineral resource estimates because the tonnages may be underestimated by as much as 10% locally.

8.4 Analytical and Test Laboratories

In 2003 (Tía María only), 2004 and 2005, SGS Perú in Lima was primarily used for sample preparation and analysis at both Tía María and La Tapada. Some samples from the 2003 and 2004 programs at Tía María were sent to CIMM Perú in Lima (now Certimin) for preparation and analysis. In 2006, samples were prepared and analyzed at SGS Perú, CIMM Perú, and ALS in Lima. In 2007, all samples were prepared and analyzed at ALS.

All three laboratories were independent of Southern Copper. All three laboratories are currently accredited to ISO 9001, ISO 14001, and ISO 17025. However, accreditations at the time the analyses were performed are not recorded in the database.

8.5 Sample Preparation

Sample preparation methods for geochemical samples are not recorded.

Sample preparation procedures at SGS Perú are not recorded.

Sample preparation at CIMM Perú included crushing to 90% passing 6 mm, crushing to 90% passing 10 mesh (1.68 mm), split 250 g, pulverize to 85% passing 75 µm. Every 15th sample is screened at each comminution step to ensure the proper particle size distribution.

At ALS, samples were dried, crushed to 70% passing 2 mm, split, and pulverized to 85% passing 75 µm.

8.6 Analysis

8.6.1 Geochemical Samples

Soil and rock chip/grab samples were analyzed for gold and a 36-element suite using inductively coupled plasma atomic emission spectroscopy (ICP–AES). Gold was analyzed by fire assay (50 g charge) with either an atomic absorption spectrophotometry (AAS) or gravimetric finish. Base metals were analyzed using AAS.

8.6.2 Tía María and La Tapada

SGS Perú used the following methods:

- Gold: 30 g fire assay with AAS finish

- Copper: three-acid digestion with AAS finish
- Sequential copper:
  - Acid soluble copper (CuS): digestion in 5% sulfuric acid with AAS finish
  - Cyanide soluble copper (CuCN): digestion in 10% sodium cyanide solution with AAS finish
  - Residue analysis (CuR): three-acid digestion with AAS finish on residue.

CIMM Perú used the following methods:

- Gold: 50 g fire assay with AAS finish
- Copper: four acid digestion with AAS finish
- Sequential copper:

ALS used the following methods:

- Gold: 30 g fire assay with AAS finish
- Copper:
- Sequential copper:
  - CuS: sulfuric acid digestion with AAS finish
  - CuCN: sodium cyanide digestion with AAS finish;
  - CuR: aqua regia digestion with AAS finish on residue.

8.7 Quality Assurance and Quality Control

8.7.1 Geochemical Sampling

No systematic QA/QC processes were in place for the exploration geochemical sampling at Tía María.

8.7.2 Core Sampling, Tía María

No systematic QA/QC processes were in place for the initial assaying at Tía María. In 2003-2006, approximately 20% of the samples, randomly selected from across the deposit, were reassayed at ALS. These check assays indicate that there are no significant biases in the CIMM Perú and SGS Perú data. That check assay program was accompanied by 55 standard reference materials (standards). Those results indicate that total copper was within reasonable limits for accuracy and that the laboratory was in control.

Thirty-five blank samples submitted with the check assays indicate that contamination was not significant.

8.7.3 Core Sampling, La Tapada

For the 2004 drill program, no record of QA/QC results exists. The database contains 90 check assays performed at ALS in 2007. Results indicate that the 2004 SGS Perú total copper and gold data are adequately accurate to support mineral resource estimation. Data to evaluate precision and contamination are not available.

No QA/QC data are available for the 2005 drill data; however, there are approximately 467 check assay data from ALS that were analyzed in 2005 and 2007. Total copper data show that the ALS data are negatively biased relative to SGS Perú by about 2.2%, which is within reasonable limits. Acid-soluble copper data show that ALS is positively biased by about 6% from 0–0.3% CuS. Above 0.3%, the bias is indeterminate because of scatter in the data. Total copper is adequate to support mineral resource estimation. Acid-soluble copper bias is slightly outside the ±5% generally accepted by the industry, but is within ±10% which is accepted as marginal. In this case, Wood considers the data to be adequate because the method is a partial extraction that is extremely dependent on time, temperature, and reagent strength.

No QA/QC data are available for either SGS Perú or CIMM Perú for assay work in 2006. ALS completed 730 check assays for SGS Perú data and 288 check assays for CIMM Perú data. In both cases, the data show acceptably small biases for total copper and soluble copper. Both are adequate to support mineral resource estimation.

In 2006, 2007, and 2008, ALS analyzed samples from the Project. Those samples were accompanied by systematic QC for total copper. The QC program included insertion of standards, duplicates, and blanks. Evaluation of those data indicate that the total copper data are adequately accurate, precise, and contamination-free to support mineral resource estimation.

8.8 Database

At both Tía María and La Tapada, data from sampling cards were entered in an Excel spreadsheet using a double-entry procedure to minimize errors. Those spreadsheets were used as a data management tool. Data from the laboratories were first formatted using an

Excel macro and later using a script in Access. Data were migrated to an Access database during 2021, and that software is now used for data management.

Collar data obtained from GeoSurvey were used to generate header and survey files.

Lithological contacts, alteration and mineralization data previously entered were extracted to generate the following files: geology.csv, Alter.csv and Miner.csv which were then imported into MineSight.

Data are periodically backed up to an external disk.

8.9 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 are adequate to support mineral resource estimation.

QA/QC procedures were not in place for the original assaying for any samples except for the latest data (2007–2008) at La Tapada. Check assaying at ALS has largely mitigated that risk, but there is still a small risk that a batch of poor quality data may have been loaded into the database.

9 DATA VERIFICATION

9.1 Internal Data Verification

Southern Copper resurveyed the locations of 61 drill holes in June 2021. When compared to the database x–y (easting, northing) differences were 2.15 m (x–east) and 3.2 m (y–north). The x–y discrepancies are small and consistent, so no adjustments were made.

Elevation (vertical) differences, however, were approximately 80 m. The vertical discrepancy has not been explained, but could be due to a different elevation datum or geoid being used. This is not considered to be a problem as long as a single datum is used for all location data.

Future surveying will need to determine the source and account for the discrepancies. All location data should be based on a verifiable datum.

9.2 Data Verification by Qualified Person

9.2.1 Site Visit

Representatives from Wood visited the Tía María 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.

9.2.2 La Tapada

Wood investigated collar surveying by comparing resurveyed locations of 61 collars provided by Southern Copper to locations in the database and discovered an approximately 80 m discrepancy in the collar elevations that is likely due to different elevation datums or geoids being used. The discrepancy, while significant, will not cause problems with mineral resource estimation or mine planning as long as a single datum is used consistently. Mixing datums will cause samples to be in the wrong place relative to each other. The lack of documentation is a risk because it is not possible to verify the collar locations in the database.

Wood performed an integrity check on 30% of the data stored as Excel files. Those data were migrated to Access. Data were found to have been migrated properly and when compared to original data, the database was found to be reasonably error-free. Errors that were noted were corrected.

9.2.3 Tía María

Wood compared the locations of 10 collars to the project topographic map during the site visit using a hand-held GPS, and found only minor differences that are within the limits anticipated for hand-held GPS instruments.

Wood reviewed the geological model by comparing interpreted sections to drill data. The review found the models to be reasonable. Wood observed that there were some isolated bodies that were not modeled; however, these bodies are too small to significantly impact the mineral resource estimate.

9.2.4 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 this Report. 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 individual QP's opinions, interpretations, recommendations, and conclusions as summarized by the QP Firm.

9.3 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 determined that the measured confidence category for mineral resources could not be met due to concerns with apparent bias in density data, lack of down hole surveys, limitations on some of the QA/QC procedures, and risks regarding social license.

10 MINERAL PROCESSING AND METALLURGICAL TESTING

10.1 Test Laboratories

Three laboratories performed the majority of the testwork supporting the plant design, the onsite metallurgical laboratory, SGS Peru, and CIMM Chile (Table 10-1). SGS Perú and CIMM Perú hold ISO 9001:2015 and ISO 14001:2015 for selected analytical procedures. There is no international mining standard of accreditation provided for metallurgical testing laboratories or metallurgical testing techniques.

10.2 Metallurgical Testwork

10.2.1 Mineralogy

Optical microscopy determined that the oxide copper phases at Tapada were copper-bearing limonite, chrysocolla and malachite.

Lesser tenorite (CuO), neotocite ($(Mn,Fe)SiO_3$), atacamite ($Cu_4(SO_4)(OH)_6$) and cuprite were also observed. Gangue minerals were primarily quartz, sericite and minor clays. Zones of supergene enrichment were characterized by chalcocite. Primary copper sulfides included chalcopyrite and bornite.

Copper oxides at Tía María included copper-bearing limonite, chrysocolla and malachite, with minor occurrences of tenorite, cuprite, and neotocite. Gangue minerals were primarily quartz, sericite and minor clays. Supergene enrichment zones are rare, and no primary mineralization was scanned.

10.2.1 Comminution

Initial comminution testwork consisted of Bond ball mill work index determinations, which returned a value of 15.2 kWh/t for La Tapada, and a range from 14.4–14.9 kWh/t for Tía María.

Table 10-1: Testwork Laboratories

Testing Phase	Laboratory	Location	Report Date	Independent	Data Verification
1	SGS	Chile	April, 2007	Yes	—
	Southern Copper	Peru	August, 2007	No	Selected samples were sent to CIMM Peru.
2	Southern Copper	Peru	February, 2008	No	Selected samples were sent to CIMM Peru
3	Southern Copper	Peru	December, 2009	No	—
	CIMM	Chile	July, 2010		—
4	Southern Copper	Peru	July, 2010	No	—

10.2.2 Leaching

10.2.2.1 Phase 1 Initial Testwork

Bottle roll leach tests were conducted at 2, 4, 8, 24, and 48 hours. Material from La Tapada had an initial rapid copper extraction of 65% the first day, and then reducing in extraction rate, reaching a total extraction of 70–72% after 48 hours. Tía María mineralization was also initially rapidly leached, with 75% copper extraction for gneiss and diorite and 83% copper extraction for a mixed lithology sample after a day, then reducing in extraction rate. At the end of the 48-hour leach, the rate was 79% copper extraction for gneiss and diorite, and 86% for the mixed lithology sample.

Acid consumption was higher in the La Tapada samples than in the Tía María samples.

Samples were agglomerated at four different sulfuric acid concentrations. The copper extraction in all the samples, after washing the agglomerated material, varied between 0.7 and 1.4 kg Cu/t ore. It is noticed that in the gneiss and diorite samples that when curing acid increases, the copper extraction and acid consumption also increases.

Two sets of column tests, one at 100 mm diameter and 1 m high (mini-columns), and the second at 200 m diameter and 2 m high were conducted to evaluate, for each sample, the effects of grain size and irrigation rate on the copper extraction kinetics and the acid consumption. For all samples, the copper extraction and acid consumption increased as feed particle size decreases. It was also observed that if the irrigation rate increases, the copper extraction also increased.

Leach solution from the column tests was collected to determine the composition of the solution that would be fed to a solvent extraction/electrowinning (SX/EW) circuit. This showed significant dissolution of aluminum and magnesium, but low levels of manganese and chloride. The elevated aluminum levels have the potential to generate phase separation problems since aluminum increases solution viscosity.

The suggested process design profile based on the testwork, and a leach cycle of 45 days was:

- La Tapada: crushed product size distribution of 80% minus 12.7 mm (½ inch); a continuous irrigation rate of 5 L/h/m_2 ; a mean leaching extraction of 69–72% total copper (CuT) (including an additional adjustment factor laboratory to commercial heap escalation as determined from similar operations), and a net acid consumption of 8 kg/kg Cu
- Tía María: a crushed product size distribution of 80% minus 12.7 mm; a continuous irrigation rate of 5 L/h/m^2; a mean leaching extraction of 66–69% CuT (including a laboratory to commercial heap correction factor), and a net acid consumption equal to 10 kg/kg Cu.

10.2.2.2 Phase 1 Trade-off Testwork

Mini-column tests were conducted at high irrigation rates to determine the minimum irrigation rate at which the mineralized material is solution-saturated. Rates tested ranged from 12–25 L/h/m^2. No column saturation was noted.

The effect of acid curing on the mineralization performance parameters was tested using mini-columns. Tests used a base of 25 kg/t, and variations of 50% and 75%. Column extraction performance was similar for all rates; however, there was a decrease in the total acid consumption at lower acid additions. The curing tests demonstrated that it is possible to reduce the curing acid addition to levels of 75%, or even 50% of the reference value (25 kg/t), without affecting the metallurgical results.

Repeat leach tests, using 2 m columns and the selected process design criteria were conducted. The results were similar in terms of extraction in both stages, while the acid consumption showed a slight increase.

10.2.2.3 Phase 2 Testwork

The second phase of tests used 8 m column heights, 12.5 kg/t of acid curing, a 10 L/h/m^2 irrigation rate, and a crush feed size of 80% minus 19 mm (¾ inch). Results were very different to the phase 1 results, showing significant reductions in the extraction efficiencies, and an increase in leaching times. The differences were attributed to a combination of coarser feed sizes, the higher column height, and potentially changes in water quality and an increase in the irrigation rate. A further round of testwork under controlled conditions was recommended.

10.2.2.1 Phase 3 Testwork

Testing consisted of an 8 m high gabion in closed circuit with an SX/EW circuit.

Leaching tests on La Tapada samples were carried out in eight-inch diameter by 8 m high columns to evaluate the effect of acid addition during agglomeration, concentration of acid in the irrigation solution, irrigation rate and particle size on the recovery of copper. Tests were carried out on a composite containing 59% gneiss and 41% diorite. The copper head assay grade was 0.489% and the solubility index was 85%.

The results show that the copper extraction increases as the particle size decreases. At a higher irrigation rate there is an increase in copper extraction, but at a higher acid consumption. Test results indicate that acid consumption is dependent mainly on acid addition during agglomeration and, to a lesser extent, on the irrigation rate, and acid content in the irrigation solution.

The results were used to derive a mathematical model to predict copper (total) recovery.

10.2.2.2 Phase 4 Testwork

A final test phase was conducted on a on blended sample consisting of 50% gneiss and 50% diorite, using an 8 m width by 8 m length by 8 m high gabion. The copper head assay grade was 0.50% and the solubility index of 85%. These tests resulted in the following process designs:

- La Tapada: particle size: P80 = 14.7 mm; irrigation rate: 10 L/h/m^2; average extraction: 69% CuT (considering a scale up factor, determined from similar operations); net acid consumption: 20 kg H^+/kg Cu; irrigation period: 90 days

- Tía María: particle size: P80 = 14.7 mm; irrigation rate: 10 L/h/m^2; average extraction: 65% CuT (considering a scale up factor, determined from similar operations); net acid consumption: 20 kg H^+/kg Cu; irrigation period: 90 days.

The leaching cycle was set at 60 days, with a possibility of a 90-day cycle.

10.3 Recovery Estimates

Copper recoveries forecast for operations were projected from modelling the 8 m height column and gabion results (Table 10-2). Over a period of 90 days the total copper recovery at the gabion was 4.14% lower than that reported from the column tests.

The results of the gabion tests are provided in Table 10-3.

The solubility index was calculated using the following equations:

- % CuSAc = acid-soluble copper/total copper x 100
- % CuSCN = cyanide-soluble copper/total copper x 100
- % CuINS = insoluble copper/total copper x 100.

The following equation is proposed to estimate the percentage of extraction of Cu_{total} for an irrigation period of 90 days:

- % Ext CuT (90 days) = (69.13 * SI CuSAc + 28.71 * %SI CuSCN + 18.39 * %SIS CuINS)/100.

The average LOM recovery estimate based on the current mine plan and the recovery equations is 69% for La Tapada ore and 65% for Tía María ore. The combined average copper recovery for both ores is projected to be 68%.

10.4 Metallurgical Variability

Samples were selected and prepared from exploration drill core based on the distribution of the key lithologies for each deposit provided by the Exploration group. Samples were selected to best represent the distribution of the lithologies present in both the Tía María and La Tapada deposits. The selection of samples also ensured adequate spatial coverage of the deposit.

Column leaching tests during the first phase of testing were performed on mineralization from Tía María and La Tapada to evaluate effects of grade variations on metallurgical performance.

Table 10-2: Copper Recovery Predictions

Time	% Recovery - Cu_{total}		
Days	**Gabion**	**Column**	**Modeling**
20	49.73	56.97	56.70
60	65.64	69.56	69.64
75	67.75	71.12	71.26
90	69.21	73.35	73.50

Table 10-3: Copper Recoveries, Gabion Testing

Assays	Head (%)	Residual (%)	Extraction (%)	Solubility Index (%)
Cu total	0.502	0.155	69.13	—
Cu Acid soluble	0.420	0.089	78.85	83.73
Cu cyanide soluble	0.006	0.004	28.71	1.12
Cu soluble total	***0.426***	***0.093***	***78.19***	***84.85***
Cu insoluble	0.076	0.062	18.39	15.15

The La Tapada mineralization showed a mean extraction rate of 80.3% with an acid consumption of 43 kg/t (11.7 kg/kg Cu), over a grade range from 0.4–0.6% CuT. Variations were noted for the solubility rate, which was 80% in the variability tests versus 78.5% for the initial tests.

The Tía María mineralization showed a mean extraction rate of 66.4% with an acid consumption of 46 kg/t (21.9 kg/kg Cu) over a grade range from 0.3–0.4% CuT. Variations were noted for the solubility rate, which was 60.8% in the variability tests versus 75% for the initial tests.

10.5 Deleterious Elements

The impurity dissolution levels from the gabion and column testing, after 90 days of leaching, are outlined in Table 10-4, and the levels in the pregnant leach solution, after the same leach interval, are presented in Table 10-5.

Table 10-4: Results Comparison, Gabion and Column Testing

Variable	Unit	Gabion	Column	Delta
Leaching time	days	90	90	0
Total copper extraction	%	69.21	73.35	-4.14
Leachable copper extraction	%	81.57	86.16	-4.59
Iron dissolution	%	0.55	1.53	-0.98
Aluminum dissolution	%	0.50	0.90	-0.40
Magnesium dissolution	%	2.27	4.59	-2.32
Manganese dissolution	%	11.09	11.09	0.00
Chloride dissolution	%	38.9	n/a	n/a
Sodium dissolution	%	33.8	n/a	n/a
Net acid consumption	kg/t	18.98	18.25	0.73

Table 10-5: Impurity Content, Pregnant Leach Solution from Gabion Testing

Variable	Unit	Gabion
Leaching time	days	90
Iron content	ppm	5.5
Aluminum content	ppm	6.5
Magnesium content	ppm	0.5
Manganese content	ppm	0.5
Chloride content	ppm	5.5
Calcium content	ppm	0.4
Sodium content	ppm	3.2

The solution shows significant dissolution of aluminum and magnesium. A high concentration of aluminum can generate phase separation problems since it increases the viscosity of the solution. The operation will require monitoring of aluminum and magnesium; this will not have impact on product quality, but there is a potential for increases in operating costs.

Manganese and chlorides are at low concentrations. A high chloride concentration can cause cathode corrosion problems, and a high concentration of manganese would increase the EW potential and a degradation of the organic in the SX circuit. Testwork indicates that the elements that may affect cathode quality, such as manganese and chloride, are present in low concentrations, therefore it is highly unlikely that the quality of the product would be affected.

Gabion testing was conducted in closed circuit, which means that the raffinate was obtained using a pilot SX/EW plant. The gabion irrigation was conducted using a solution with a high impurities content, including impurities such as iron, manganese, aluminum, and chloride. The amount of fresh water added to compensate for evaporation losses was minimal. Considering all of this, the use of desalinated make-up water would not have any significant impact on the testwork results.

10.6 Qualified Person's Opinion on Data Adequacy

A comprehensive amount of testwork have been completed in four phases, the testwork program included testing at bench scale as well as at industrial scale. The program has included samples from both deposits, La Tapada and Tía María. Testing was performed on composite samples representing the main lithologies of both deposits (gneiss and diorite). Samples to prepare the composites for testing for both deposits were selected from available drill core. The selection seems to have an adequate spatial coverage of the deposits.

The available metallurgical testwork information is considered to be of an acceptable quality to support a prefeasibility study and an indicated mineral resource classification. Further testwork to cover future years of production would enhance metallurgical projections and resources estimate and address opportunities to improve metallurgical performance. There is no indication that the quality of the product could be adversely affected by the presence of some deleterious elements.

11 MINERAL RESOURCE ESTIMATES

11.1 Introduction

Mineral resources were estimated for the La Tapada and Tía María deposits.

11.2 La Tapada

11.2.1 Exploratory Data Analysis

Wood performed exploratory data analyses on the assay and composited data using histograms and boxplots. Wood concluded that the defined domains were appropriate.

11.2.2 Geological Models

The geological model for La Tapada consists of interpreted lithology, alteration, and mineralization on 100 m spaced sections and 15 m spaced level plans.

No structural model was produced.

Alteration was not used to define estimation domains. Most mineralization is associated with potassic alteration and that model was consistent with the drill data.

Wood compared the geologic model on section and in plan view against the core hole intercepts and found reasonable three-dimensional consistency of the lithology, alteration and mineralization type. Minor adjustments to the lithology and mineralization models were made.

Six estimation domains were identified based on lithology and mineralization, and used in estimation (Table 11-1).

11.2.3 Density Assignment

Southern Copper reportedly estimated density using a weighted distance method. The power is not recorded, but it is believed to be ID2. Density was estimated within domains. Blocks not estimated were assigned the average density of the domain being estimated.

Table 11-1: La Tapada Estimation Domains

Domain Code	Mineralization		Lithology			
1	Leach		Metasedimentary rocks	Porphyry	Hornblende diorite	Gneiss
2	Oxide	Supergene		Porphyry	Hornblende diorite	
3	Oxide	Supergene				Gneiss
4	Hypogene			Porphyry	Hornblende diorite	
5	Hypogene					Gneiss
6	Other*		Other**			

Notes: * = oxide, primary, Moquegua Formation and leach; ** = metasedimentary rocks, micro diorite, diorite porphyry and Moquegua Formation.

11.2.4 Grade Capping/Outlier Restrictions

Southern Copper controlled outliers in the composites by estimation domains.

Wood performed an analysis of anomalous values using cumulative probability graphs and identified similar levels of capping for total copper to that selected by Southern Copper, except in domain 5 where there was a slight variation from 0.9% to 1.0%. The impact of this difference is, in Wood's opinion, not material.

11.2.5 Composites

Southern Copper used 15 m bench composites. Lithological, mineralization, and alteration boundaries were not considered so the composites are 15 m throughout. Angle holes, which represent about 2% of the composites, did not fall strictly on benches. Wood found the differences due to angled holes to be non-material.

11.2.6 Variography

A spherical variogram model with a single structure for total copper in each domain was used by Southern Copper.

Wood attempted to reproduce the variogram for the two main domains (DOM4 and DOM5) and found a better spatial representation using two structures rather than one. Both variogram models show a low nugget effect. The variogram ranges produced with two structures is greater than with only one structure, but the directions are consistent in both models. Southern Copper's variograms were used for the estimation, but Wood recommends that variography be updated during the next mineral resource estimate.

11.2.7 Estimation/interpolation Methods

The La Tapada mineral resource estimate is based on 12.5 x 12.5 x 15 m blocks without sub-blocking. Southern Copper estimated total copper, acid soluble copper, cyanide soluble copper and gold grades in the six estimation domains based on the distribution of total copper. In Wood's opinion the domains are applicable for total copper, acid soluble copper, and cyanide soluble copper; however only total copper is reported in the mineral resource estimate.

ID2 was used to interpolate all elements, with grades estimated in two passes. The search ranges and other estimation components are summarized in Table 11-2. Ranges were based on variography.

Wood completed a third pass because unestimated blocks were identified in the microdiorite, metasedimentary and dioritic porphyry lithologies. Southern Copper had initially grouped these lithologies with the Moquegua Formation, which is considered to be non-mineralized.

11.2.8 Validation

The La Tapada mineral resource estimate was validated by visual methods, global bias estimation, local bias estimation, and change of support evaluation.

Visual validation compared the estimated grades in the block model to composite grades and composites along drill hole traces. The block grades were considered to reasonably reflect the composite grades

Global bias was evaluated by comparing the ID2 model to a nearest neighbor (NN) model by estimation domain. Of the six domains, only one exhibited more than ±1% bias which is considered to be excellent correspondence. Domain 1 showed a 6.5% bias but that is based on very low grades in waste and is not considered to be material

Local bias was evaluated using north–south, east–west, and horizontal swath plots. Those plots compared the ID2 and NN estimates along swaths. No significant bias was detected

Table 11-2: La Tapada Estimation Plan

Estimation domain		1	2	3	4	5
Interpolation method		ID2	ID2	ID2	ID2	ID2
First rotation in Z		0	215.5	106.5	176	50.2
Second rotation in X		0	10.8	-9.3	30.7	24.2
Third rotation in Y		0	-31.6	-0.5	-30.3	41.6
First pass	Search parameters	Yes	Yes	Yes	Yes	Yes
	E–W search	120	120	120	120	120
	N–S search	120	120	120	120	120
	Vert. search	25	25	25	25	25
	Max 3D distance	120	120	120	120	120
	Ellipsoid search	Yes	Yes	Yes	Yes	Yes
	Range in Y	310	72.8	324.1	277.4	177.3
	Range in X	310	18.6	123.7	197.8	354.3
	Range in Z	310	34.9	276.5	152.2	110.7
	Min # composites	1	1	1	1	1
	Max # composites	5	5	5	5	5
	Max # composites per drill hole	1	1	1	1	1
Second pass	Search parameters	Yes	Yes	Yes	Yes	Yes
	E–W search	180	180	180	180	180
	N–S search	180	180	180	180	180
	Vert. search	50	50	50	50	50
	Max 3D distance	180	180	180	180	180
	Ellipsoid search	No	No	No	No	No
	Range in Y	—	—	—	—	—
	Range in X	—	—	—	—	—
	Range in Z	—	—	—	—	—
	Min # composites	1	1	1	1	1
	Max # composites	15	15	15	15	15
	Max # composites per drill hole	3	3	3	3	3
Third pass	Search parameters	Yes	Yes	Yes	Yes	Yes
	E–W search	360	360	360	360	360

Estimation domain		1	2	3	4	5
	N–S search	360	360	360	360	360
	Vert. search	100	100	100	100	100
	Max 3D distance	360	360	360	360	360
	Ellipsoid search	No	No	No	No	No
	Range in Y	-	-	-	-	-
	Range in X	-	-	-	-	-
	Range in Z	-	-	-	-	-
	Min # composites	2	2	2	2	2
	Max # composites	15	15	15	15	15
	Max # composites per drill hole	1	1	1	1	1

Wood evaluated the degree of smoothing of estimated total copper grade using a change of support methodology that involved comparing the ID2 model to a HERCO NN model. Wood concluded that the degree of smoothing of the total copper grades was reasonable at low, high, and very high total copper grades (0.2%, 0.4%, and 0.8% respectively).

11.2.9 Confidence Classification of Mineral Resource Estimate

11.2.9.1 Mineral Resource Confidence Classification

Wood initially classified the mineral resource estimate using drill spacing studies.

Wood determined that a drill spacing of 100 m was appropriate for measured mineral resources and a drill spacing of 175 m was appropriate for indicated mineral resources. Mineral resources beyond 175 m spacing are considered to be inferred.

11.2.9.2 Uncertainties Considered During Confidence Classification

Following the analysis that classified the mineral resource estimates into the measured, indicated and inferred confidence categories, uncertainties regarding sampling and drilling methods, 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 density data, and lack of down hole surveys. In addition, when considering technical and economic factors, the downgrade of the measured classification was supported by the uncertainty surrounding social license.

11.3 Tía María

11.3.1 Exploratory Data Analysis

Wood performed exploratory data analysis on the assay data and later on composite data used for mineral resource estimation to validate the domain definition strategies followed by Southern Copper and detect gaps that could impact the estimation process or estimated resources.

Wood examined the histograms of assays for hornblendic diorite and gneiss, two of the main lithological domains that host around 80% of the copper mineralization. Histograms of assays for oxide and primary mineralization zones were prepared. Wood prepared boxplots of copper grade for lithology and mineralization zones. These investigations largely supported Southern Copper’s choices for estimation domains.

Boxplots were prepared for composites by estimation domain. The results supported Southern Copper’s selections for estimation domains.

11.3.2 Estimation Domains

Southern Copper identified 10 estimation domains by grouping the lithological types into two groups within each mineralized zone:

- Group 1: diorite and gneiss
- Group 2: Quaternary sediments and porphyry.

These combinations are based on statistical similarities and the distribution of total copper. The domains are summarized in Table 11-3.

Contact plots prepared by Southern Copper and Wood indicate that the contacts between mineralized zones are hard contacts. All contacts between estimation domains were treated as hard contacts.

Table 11-3: Tía María Estimation Domains

Mineralization	Mineralization code	Lithology		Lithology Code	
Quaternary	201	Diorite	Gneiss	302	303
		Quaternary	Porphyry	301	304
Leach	202	Diorite	Gneiss	302	303
		Quaternary	Porphyry	301	304
Oxide	203	Diorite	Gneiss	302	303
		Quaternary	Porphyry	301	304
Primary	204	Diorite	Gneiss	302	303
		Quaternary	Porphyry	301	304
Mixed	205	Diorite	Gneiss	302	303
		Quaternary	Porphyry	301	304

11.3.3 Geological Models

The geological model is based on interpretations of lithology, alteration and mineralization. In each of the geological models, three sets of sections were interpreted, consisting of 50 m spaced east–west and north–south sections, and level plans at 15 m intervals.

Interpretations of lithology, mineralization and alteration made in plan were used to code the composites and the block model proportionally by the units within the interval or within the block respectively.

The lithology model included four units, consisting of Quaternary, diorite, gneiss, and porphyry. The mineralization model included four units, namely leach, oxide, mixed, and primary. Alteration included six alteration types, including Quaternary (unaltered), argillic, propylitic, phyllic, silicification, and potassic.

11.3.4 Density Assignment

The density was estimated using inverse distance weighting to the second power (ID2). Estimation was controlled by the total copper domains.

11.3.5 Grade Capping/Outlier Restrictions

Southern Copper used cumulative probability graphs of composites to determine capping limits by estimation domains. All domains were capped at 1% CuT except for the oxide–

diorite–gneiss domain, which was capped at 2% CuT. Wood performed a similar exercise and verified the grade caps in all but the oxide–diorite–gneiss domain. Wood was of the opinion that this domain required a grade cap of 1% CuT. The difference is considered by Wood to be non-material because composites with >1% CuT are <0.25% of the composites and the capping difference will have no impact on the mineral resource estimate.

11.3.6 Composites

Southern Copper composited using 15 m bench intervals that did not consider lithological and mineralization boundaries. Because most of the holes at Tía María are vertical, Wood considered the approach to be acceptable. There are four drill holes that are inclined that were not composited by bench but by 15 m down-hole composites. This error is considered by Wood to be non-material.

11.3.7 Variography

Southern Copper grouped the composites into three domains based on the number of available samples and statistics by type of mineralization and lithology. The variograms used a spherical model and a single structure.

Wood reproduced the variogram for the main domain, and found that better spatial representation was obtained using two structures. The variogram produced by Wood showed a low nugget effect, the ranges of the major (Y) and minor (X) axes were larger, while the vertical (Z) axis had a smaller range with respect to Southern Copper's variogram. The anisotropic directions are similar in both variograms. Southern Copper's variograms were used for the estimation, but Wood recommends that variography be updated during the next mineral resource estimate.

11.3.8 Estimation/interpolation Methods

Southern Copper estimated total copper and soluble copper, cyanide-soluble copper, molybdenum, gold, silver, lead, zinc, bismuth, arsenic, antimony and iron within each of the 10 estimation domains, using MineSight software. Mineral resource estimation is based on 12.5 x 12.5 x 15 m blocks and only total copper is reported in the estimates. In Wood's opinion the domains are appropriate.

Southern Copper used the ID2 method to interpolate the block data. Ranges were based on the variograms. Residual copper was calculated from interpolated data using the following equation:

- CuR -= CuT-CuS-CuCN.

In cases where CuT <CuS + CuCN, the CuS and CuCN values were normalized by their sum.

A nearest neighbor (NN) model was used for validation purposes.

A summary of the methods and values used is provided in Table 11-4.

11.3.9 Validation

Wood validated the model by visual methods, global bias assessment, local bias assessment, and change of support analysis:

- Visual validation consisted of comparing the block model to composites to ensure that the estimate adequately reflects the data. No concerns were identified
- Global bias was evaluated by comparing the ID2 model to the NN model for each estimation domain. Results for oxide, primary, and mixed zones were within the ±5% limits generally accepted by the industry. Results for the leach and Quaternary domains were outside the limits, but there is little of economic interest in these units so the results were acceptable
- Local bias was evaluated using north–south, east–west, and horizontal swath plots. Those plots compared the ID2 and NN estimates along swaths. No significant bias was detected
- Wood evaluated the degree of smoothing of the estimated total copper grade using a change of support methodology that involved comparing the ID2 model to a Hermitian-corrected (Herco) NN model. Wood concluded that the degree of smoothing of the total copper is reasonable at low, high, and very high total copper grades (0.2%, 0.4%, and 0.8% respectively).

Table 11-4: Tía María Estimation Plan for all Elements

Mineralization code		**201**		**202**		**203**		**204**		**205**	
Lithology code		302,303	301,304	302,303	301,304	302,303	301,304	302,303	301,304	302,303	301,304
Interpolation method		ID2	IDW2	IDW2	IDW2	IDW2	IDW2	IDW2	IDW2	IDW2	IDW2
First rotation in Z		150	49	150	49	150	49	40	40	150	49
Second rotation in X		0	27	0	27	0	27	0	0	0	27
Third rotation in Y		-65	0	-65	0	-65	0	0	0	-65	0
First pass	Search parameters	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	E–W search	125	125	125	125	125	125	125	125	125	125
	N–S search	125	125	125	125	125	125	125	125	125	125
	Vert. search	60	60	60	60	60	60	60	60	60	60
	Max 3D distance	180	180	180	180	180	180	180	180	180	180
	Ellipsoid search	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Range in Y	180	180	180	180	180	180	180	180	180	180
	Range in X	120	120	120	100	120	100	150	150	120	100
	Range in Z	360	120	120	120	120	120	360	360	120	120
	Min # composites	1	1	1	1	1	1	1	1	1	1
	Max # composites	5	5	5	5	5	5	5	5	5	5
	Max # composites per drill hole	1	1	1	1	1	1	1	1	1	1
Second pass	Search parameters	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	E–W search	200	200	200	200	200	200	200	200	200	200
	N–S search	200	200	200	200	200	200	200	200	200	200

Mineralization code		201		202		203		204		205	
	Vert. search	60	60	60	60	60	60	60	60	60	60
	Max 3D distance	250	250	250	250	250	250	250	250	250	250
	Ellipsoid search	No	No	No	No	No	No	No	No	No	No
	Range in Y	—	—	—	—	—	—	—	—	—	—
	Range in X	—	—	—	—	—	—	—	—	—	—
	Range in Z	—	—	—	—	—	—	—	—	—	—
	Min # composites	1	1	1	1	1	1	1	1	1	1
	Max # composites	15	15	15	15	15	15	15	15	15	15
	Max # composites per drill hole	3	3	3	3	3	3	3	3	3	3

11.3.10 Confidence Classification of Mineral Resource Estimate

11.3.10.1 Mineral Resource Confidence Classification

Wood initially classified the mineral resource estimate using drill spacing studies.

Wood determined that a drill spacing of 75 m was appropriate for measured mineral resources and a drill spacing of 150 m was appropriate for indicated mineral resources. Mineral resources beyond 150 m spacing were considered to be inferred.

11.3.10.2 Uncertainties Considered During Confidence Classification

Following the statistical analysis in Chapter 11.2.10.1 that classified the mineral resource estimates into the measured, indicated and inferred confidence categories, uncertainties regarding sampling and drilling methods, 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 density data, and lack of down hole surveys. In addition, when considering technical and economic factors, the downgrade of the measured classification was supported by the uncertainty surrounding social license.

11.4 Reasonable Prospects of Economic Extraction

11.4.1 Input Assumptions

Wood constrained the mineral resource estimate within a conceptual pit shell using a Lerchs-Grossmann algorithm and the parameters summarized in Table 11-5 and Table 11-6 for La Tapada and Tía María, respectively.

Each of La Tapada and Tía María were divided into two geotechnical zones, north and south. At La Tapada, an average slope angle of 39º was used for the north zone, and an average of 35º for the south zone. At Tía María, an average slope angle of 38º was used for the north zone, and an average of 39º for the south zone.

No estimates for gold, silver, or molybdenum are reported for leachable material as these elements cannot currently be recovered using the leach process envisaged.

Table 11-5: La Tapada Assumed Open Pit Parameters

Design Criteria	Unit	Value
Copper price	US$/lb Cu	3.80
Base mining cost	US$/t mined	1.40
Incremental haulage cost	US$/t mined	0.02
Copper recovery	%	69
Process cost	US$/t processed	3.78
G&A Cost	US$/t processed	0.37
Land transport (by rail 70 km)	US$/lb Cu	0.003
Port charges	US$/lb Cu	0.006
Ocean freight	US$/lb Cu	0.03
Copper cathode premium	US$/lb Cu	0.03
Royalties	%	1.0

Table 11-6: Tía María Assumed Open Pit Parameters

Design Criteria	Unit	Value
Copper price	US$/lb Cu	3.80
Base mining cost	US$/t mined	1.40
Incremental haulage cost	US$/t mined	0.02
Copper recovery	%	65
Process cost	US$/t processed	3.61
G&A Cost	US$/t processed	0.37
Land transport (by rail 70 km)	US$/lb Cu	0.003
Port charges	US$/lb Cu	0.006
Ocean freight	US$/lb Cu	0.03
Copper cathode premium	US$/lb Cu	0.03
Royalties	%	1.0

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.

11.4.2 QP Commodity Price

Commodity prices used in resource estimation are based on long-term analyst and bank forecasts, supplemented with research 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 20-year LOM that supports the mineral reserve estimates.

11.4.3 Cut-off

The cutoff grade for mineral resources was determined to be 0.08% Cu.

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

11.4.4 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 further work. Porphyry copper deposits are a well-known and studied deposit type, and Southern Copper has experience with mining operations that exploit these types of deposit.

There is sufficient time in the 20-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.

11.5 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 estimates are current as of December 31, 2021.

Table 11-7 summarizes the indicated mineral resources at La Tapada, and Table 11-8 provides the inferred mineral resource estimate.

Table 11-9 summarizes the indicated mineral resources for Tía María. Table 11-10 provides the inferred mineral resource estimate.

Wood is the QP Firm responsible for the estimates.

Table 11-7: La Tapada Indicated Mineral Resource Statement

Confidence Classification	Tonnage (Mt)	Copper Grade (% Cu)	Contained Copper (M lbs)
Indicated	90.4	0.21	420.3

Table 11-8: La Tapada Inferred Mineral Resource Statement

Confidence Classification	Tonnage (Mt)	Copper Grade (% Cu)	Contained Copper (M lbs)
Inferred	1.6	0.18	6.4

Notes to Accompany La Tapada Mineral Resource Tables

1. The mineral resource estimates are current as of 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 constrained within a wireframe constructed at a 0.1% total copper grade.
3. Mineral resources are reported within a conceptual pit shell that uses the following input parameters: metal prices of US$3.80/lb Cu; metallurgical recovery assumptions of 69% for La Tapada and 65% for Tía María; base mining costs of US$1.40/t mined and incremental haul costs of US$0.017/t mined; process operating costs of US$3.78/t processed for La Tapada and US$3.61/t processed for Tía María; general and administrative costs of US$0.37/t processed; transport and freight costs of US$0.04/lb Cu; an assumed copper cathode premium of US$0.03/lb Cu, and a royalty payable of 1%. Average pit slope angles were used for the north and south geotechnical zones in each deposit, and ranged from 35º–39º.
4. No estimates for gold, silver, or molybdenum are reported for leachable material as these elements cannot currently be recovered using the leach process envisaged.
5. Numbers in the table have been rounded. Totals may not sum due to rounding.

Table 11-9: Tía María Indicated Mineral Resource Statement

Confidence Classification	Tonnage (Mt)	Copper Grade (% Cu)	Contained Copper (M lbs)
Indicated	35.5	0.17	135.2

Table 11-10:Tía María Inferred Mineral Resource Statement

Confidence Classification	Tonnage (Mt)	Copper Grade (% Cu)	Contained Copper (M lbs)
Inferred	21.8	0.22	107.8

Notes to Accompany Tía María Mineral Resource Tables

1. The mineral resource estimates are current as of 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 constrained within a wireframe constructed at a 0.1% total copper cut-off grade.
3. Mineral resources are reported within a conceptual pit shell that uses the following input parameters: metal prices of US$3.80/lb Cu; metallurgical recovery assumptions of 69% for La Tapada and 65% for Tía María; base mining costs of US$1.40/t mined and incremental haul costs of US$0.017/t mined; process operating costs of US$3.78/t processed for La Tapada and US$3.61/t processed for Tía María; general and administrative costs of US$0.37/t processed; transport and freight costs of US$0.04/lb Cu; an assumed copper cathode premium of US$0.03/lb Cu, and a royalty payable of 1%. Average pit slope angles were used for the north and south geotechnical zones in each deposit, and ranged from 35º–39º.
4. No estimates for gold, silver, or molybdenum are reported for leachable material as these elements cannot currently be recovered using the leach process envisaged.
5. Numbers in the table have been rounded. Totals may not sum due to rounding.

11.6 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 cut-off values applied to the estimates
- Variations in geotechnical (including seismicity), hydrogeological and mining assumptions
- Changes to environmental, permitting and social license assumptions.

Specific factors that may affect the estimates include:

- Density determinations. La Tapada data for intrusive rocks show a positive 2–11% bias for SGS Perú relative to Southern Copper and gneiss shows a 2–12% positive bias for SGS Perú relative to Southern Copper. These biases are unexplained and present a risk to the La Tapada and Tía María mineral resource estimates because the tonnages may be underestimated by as much as 10% locally
- Lack of supporting documentation for a significant percentage of the collar locations is an uncertainty in the quality of these data that contributes to data quality and verification issues limiting the maximum mineral resource classification to indicated
- Downhole surveys were not performed on Tía María exploration holes. As a consequence, the lack of survey data does not support classification of measured mineral resources.

12 MINERAL RESERVE ESTIMATES

12.1 Introduction

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

The mine plans assume conventional open pit mining methods from the La Tapada and Tía María deposits.

12.2 Development of Mining Case

12.2.1 Block Model

Wood undertook a review of each of the La Tapada and Tía María block models, and made the following changes to the models:

- Alteration, lithology, and structural interpretations were extended to that portion of the La Tapada pit at the southwest, which lacked supporting data, to complete a pit stability assessment
- Inconsistencies with slope sectors at both La Tapada and Tía María were addressed to align with recommendations made by third-party consultants, Vector, in 2007.

12.2.2 Topography

The surface topography, covering both deposits, was provided by Southern Copper, and was used to code the rock percentage in the block model item TOPO in both block models. 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.

12.2.3 Slope Angles

The geotechnical designs for the pit optimizations used recommendations made by Vector (2007). The block models were coded with a variable that represented the different geotechnical zones for each deposit, which corresponded to an overall slope angle (OSA) assigned using GEOVIA Whittle software. The OSAs were estimated based on Southern Copper's 2014 pit designs, and ranged from:

- La Tapada: 31º–42.5º
- Tía María: 33.7º–40.7º.

12.2.4 Pit Optimization

Pit optimization was performed using the Lerchs–Grossmann algorithm implemented in GEOVIA Whittle software. A summary of the economic and operational parameters used for the pit optimization is presented in Table 12-1.

Nested pit shells were run from revenue factors ranging from 0.2 to 1.2 (Figure 12-1 to Figure 12-4). The revenue factor is a multiplier applied to the base metal price and, subsequently, used in the pit optimization. For example, a RF of 1.0 corresponds to a copper base price of $3.30/lb. 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.

The selected pit shell for final pit design used a copper price of US$3.00/lb, which equates to a copper price at US$3.30/lb and a revenue factor 0.909 pit.

12.2.5 Metallurgical Recoveries

Metallurgical recoveries were assumed to be 69% for the La Tapada deposit and 65% for the Tía María deposit.

12.2.6 Mining Costs

The base mining cost used for both deposits in pit optimization was US$1.40/t, and included drilling, blasting, loading, haulage, roads and dumps, general costs, and indirect costs. The mining sustaining cost used was US$0.049/t, and included mine equipment overhaul and site infrastructure costs. An incremental haulage cost of US$0.017/t was applied for each bench below reference level 360 masl for the La Tapada deposit and 750 masl for the Tía María deposit.

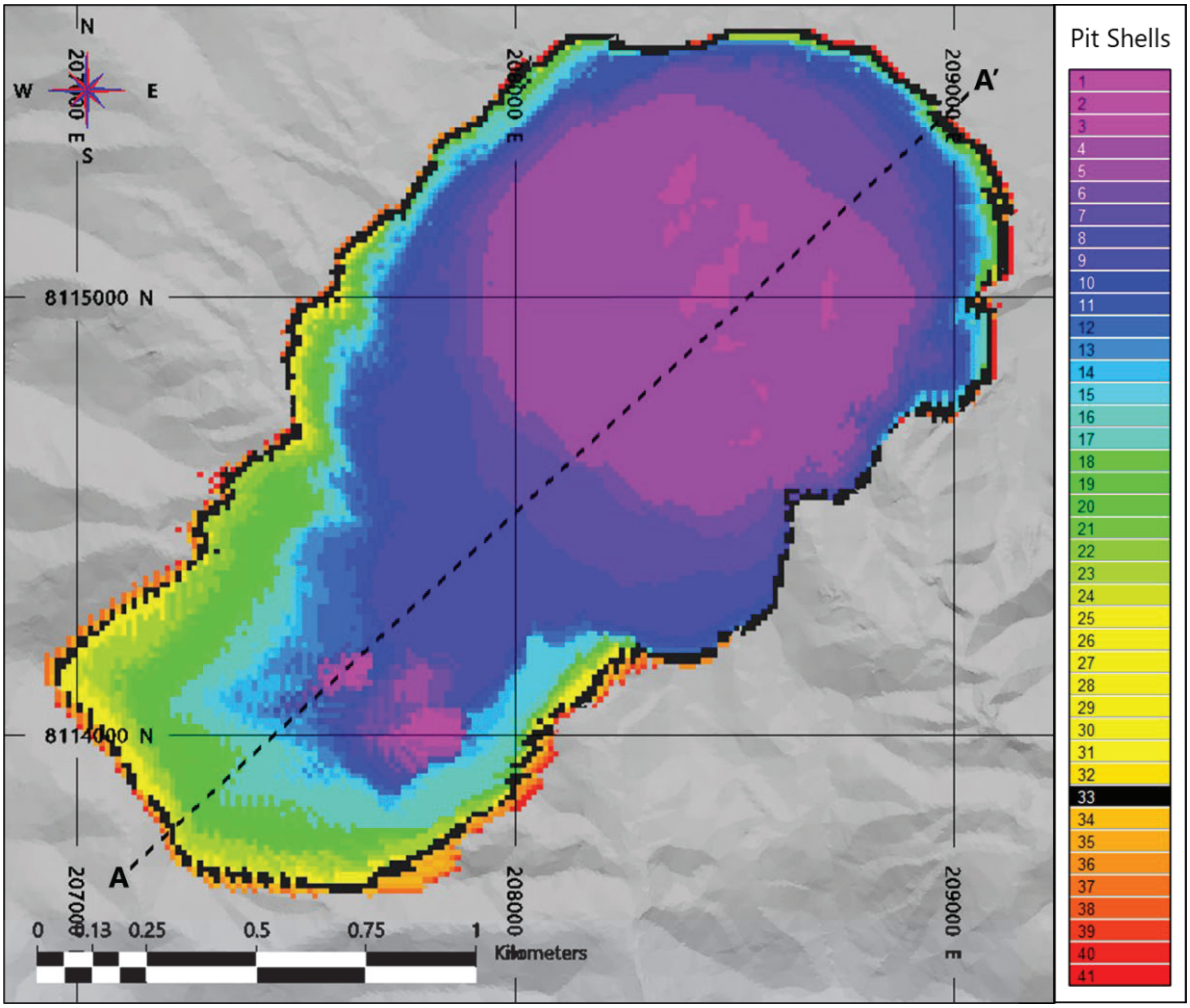
12.2.7 Process Costs

Process costs used in pit optimization consisted of US$3.779/t for the La Tapada deposit and US$3.614/t for the Tía María deposit. These cost estimates were inclusive of operating, crushing, supervisory, leaching, SX/EW, and replacement costs. A process sustaining cost of US$0.155/t was used for both deposits, which included costs associated with spent ore (ripios) facility expansion, and an additional primary crusher and overland conveying system for the Tía María open pit.

Table 12-1: Pit Optimization Parameters

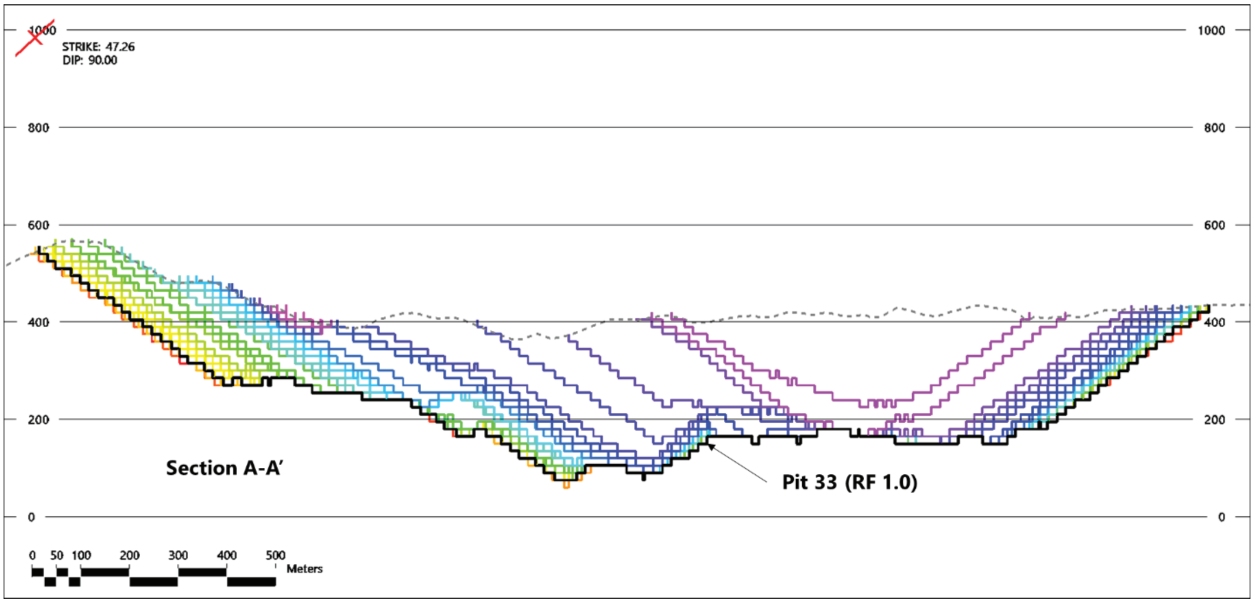
Design Criteria	Unit	Value	Comments
Copper price	US$/lb	3.30	
Discount rate	%	10.0	
Base mining cost	US$/t mined	1.40	Includes drilling, blasting, loading, haulage, roads and dumps, general, and indirect costs
Incremental haulage cost	US$/t mined	0.017	Below reference level 360 (La Tapada) Below reference level 750 (Tía María)
Mining sustaining cost	US$/t mined	0.049	Includes overhaul mine equipment and infrastructure
Mining dilution			Not considered
Mining recovery	%	100	
Primary crusher	t/d	100,000	36 Mt per year
Copper recovery, La Tapada	%	69	For leachable material
Copper recovery, Tía María	%	65	
Process cost, La Tapada	US$/t processed	3.779	Includes operation, crushing, supervision, leaching, SX/EW, and replacement costs
Process cost, Tía María	US$/t processed	3.614	Includes operation, crushing, supervision, leaching, SX/EW, and replacement costs
Process sustaining cost	US$/t processed	0.155	Includes ripios deposit expansion, primary crusher, and gross material transportation
G&A Cost	US$/t processed	0.373	Assumes an annual G&A cost of US$13.3 M
Closure cost	US$ M	—	Not included in pit optimization as per Southern Copper's standard practice
Land transport (by rail 70 km)	US$/lb Cu	0.003	Based on a 2007 study by CESEL, normalized to Q2-2021
Port charges	US$/lb Cu	0.006	At the port of Matarani
Ocean freight	US$/lb Cu	0.025	From Matarani to Shanghai
Copper cathode premium	US$/lb Cu	0.026	Applied as negative for total selling cost
Royalties	%	1.0	Peruvian minimum Modified Mining Royalty (applied to NSR for pit optimization)

Figure 12-1: La Tapada Nested Pit Shells from Pit Optimization (plan view)



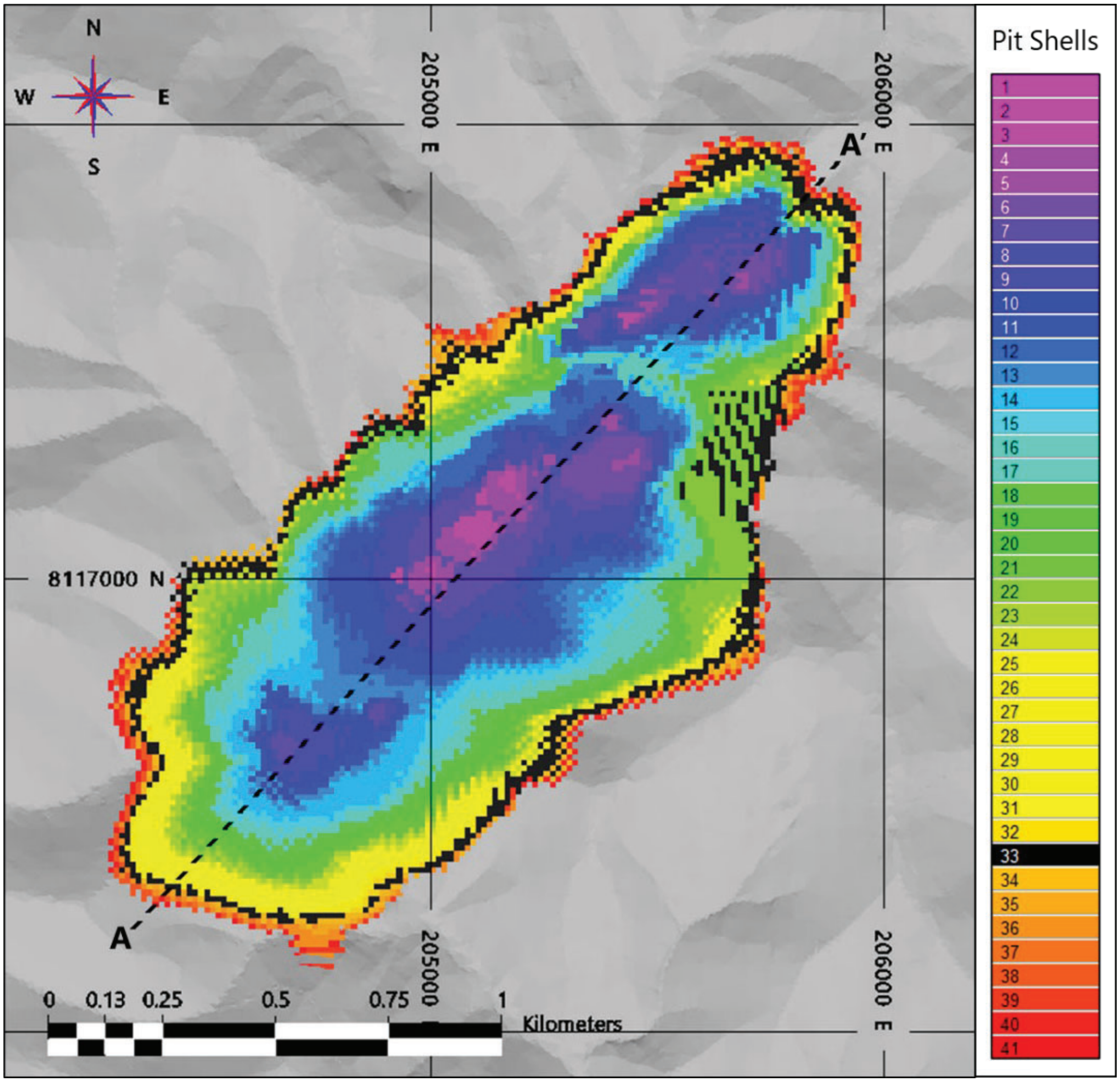
Note: Figure prepared by Wood, 2021

Figure 12-2: La Tapada Nested Pit Shells from Pit Optimization (section view)



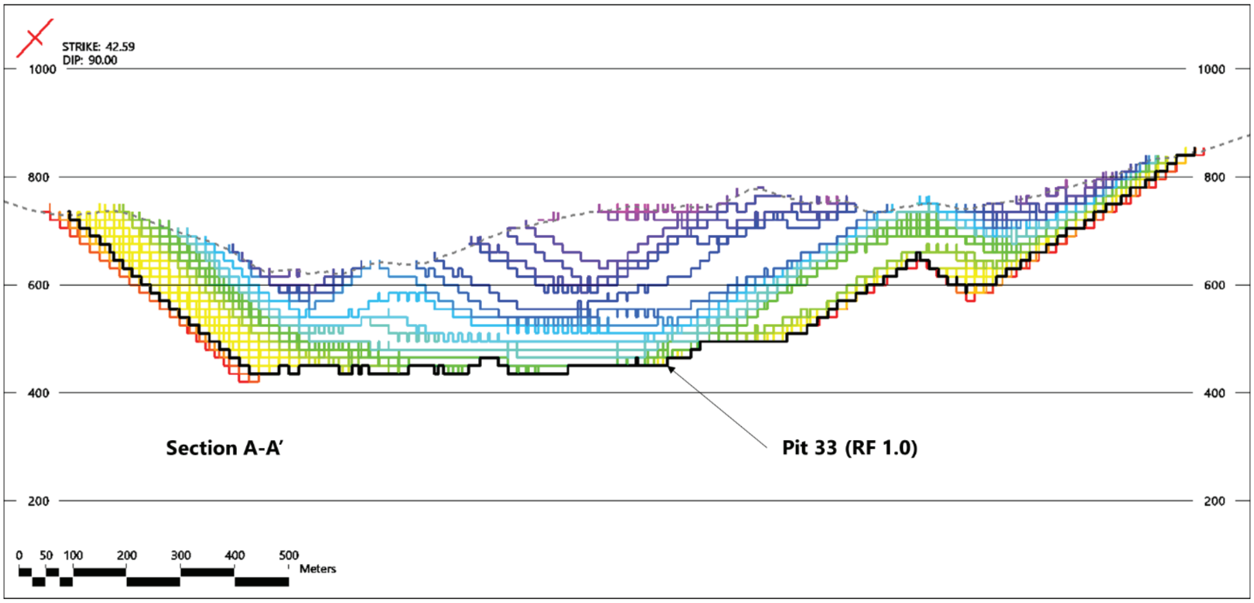
Note: Figure prepared by Wood, 2021

Figure 12-3: Tía María Nested Pit Shells from Pit Optimization (plan view)



Note: Figure prepared by Wood, 2021

Figure 12-4: La Tapada Nested Pit Shells from Pit Optimization (section view)



Note: Figure prepared by Wood, 2021

12.2.8 General and Administrative Costs

The general and administrative (G&A) cost in pit optimization was US$0.373/t for both deposits, and was based on a total annual G&A cost of US$13.3M divided by the average life of mine tonnage processed per year.

12.2.9 Selling Costs

The selling costs used in pit optimization included a rail transport cost of US$0.003/lb of copper cathode, a port charge cost (assuming the port of Matarani, Peru) of US$0.006/lb of copper cathode, and an ocean freight cost from Matarani to Shanghai, China, of US$0.025/lb of copper cathode.

A copper cathode premium of US$0.026/lb Cu was included, and reduced the overall selling costs to a final value of US$0.008/lb Cu.

12.2.10 Royalties

A 1% NSR royalty was applied during pit optimization to account for the minimum Modified Mining Royalty (see Chapter 3.2.7).

12.2.11 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.

12.3 Mineral Reserve Estimate

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 12-2. The estimates are current as of December 31, 2021.

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

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

- Changes to long-term metal price and exchange rate assumptions
- Changes to metallurgical recovery assumptions
- Changes to the input assumptions used to derive the mineable shapes applicable to the open pit mining methods used to constrain the estimates
- Changes to the forecast dilution and mining recovery assumptions;
- Changes to the NSR 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.

A pit optimization sensitivity analysis was performed in GEOVIA Whittle software by varying the copper price, base mining cost, concentration process cost, and concentration copper recovery. The metal price and metallurgical recovery generate the greatest impact on the mineral reserve estimates. Conversely, an increase in the mining and process costs does not generate a material impact on the mineral reserve estimates.

Table 12-2: Probable Mineral Reserve Statement

	Tonnage (Mt)	Grade (Cu%)	Contained Copper (M lbs)
La Tapada	487.6	0.41	4,449.2
Tía María	223.8	0.29	1,412.5
Total	***711.3***	***0.37***	***5,861.6***

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. Mineral reserves are constrained within an optimized pit shell that uses the following parameters: assumption of open pit mining methods; assumption of heap leach processing; copper price of US$3.30/lb; copper cut-off grade of 0.10% Cu; mining recovery of 100%; metallurgical recovery of 69% at La Tapada and 65% at Tía María; total mining costs (base, incremental and sustaining) of US$1.466/t mined; process costs of US$3.779/t processed at La Tapada and US$3.614/t processed at Tía María; process sustaining capital costs of US$0.155/t processed, general and administrative costs of US$0.373/t processed; transport costs (rail, port, freight) of US$0.034/lb Cu; a copper cathode premium payable of US$0.026/lb Cu; and assumption of a 1% royalty payment.
3. Numbers have been rounded and may not sum due to rounding.

13 MINING METHODS

13.1 Introduction

Conventional open pit mining methods will be used, based on drill-and-blast mining techniques. The open pit life of mine is approximately 20 years. During the first 10 years only the La Tapada deposit will be mined. After Year 10, production will be from both the La Tapada and Tía María deposits.

13.2 Geotechnical Considerations

Pit designs were based on recommendations from studies completed by third-party consultants, Vector, in 2007.

13.2.1 La Tapada

The Vector (2007) design report for the La Tapada open pit provided recommendations for bench face angles, catch bench widths, inter-ramp slope angles and overall slope angles (OSAs). Recommendations were based on kinematic analysis results, and limit equilibrium slope stability analysis results. Maximum inter-ramp slope angles and factors of safety under dry and wet conditions were evaluated.

The Moquegua Formation rocks are generally cemented; however, Vector identified some areas containing layers of altered ash including silt and clay that have less favorable geotechnical conditions from a pit slope stability perspective. Vector's pit slope stability recommendations vary by sector, based on the geology of the Moquegua Formation. Inter-ramp slope angles in the Moquegua Formation vary from 31º–35º.

Southern Copper, during a 2014 pit design study, included a southwestern pit extension that was not contemplated in the Vector mine design. However, there is no geotechnical drilling or structural information available for that southwest extension area. The geological and alteration units used in Vector's evaluations are the same units that will be exposed in the southwest extension area. These units, based on Vector's work, have favorable geotechnical conditions when exposed. Wood considered that it was reasonable to extend the slope design sectors defined by Vector in 2007 into the southwestern extension area, based on the following:

- Wood updated the lithology and alteration block models for the La Tapada pit and extended the block models to the south to provide coverage in the southwest extension pit area.
- The current lithologic and alteration models generally indicate favorable conditions for slope stability in the southwest extension of the La Tapada pit based on:
  - The prevailing lithology is modelled as diorite porphyry
  - The alteration types are predominantly potassic and siliceous.

Wood performed limit equilibrium slope stability analyses along seven cross sections through the 2014 Southern Copper pit design, using Rocscience Slide software. The factors of safety range from 1.28–1.48, and meet the minimum factor of safety of 1.2 that was defined by Vector (2007).

The 2014 Southern Copper pit design is based on single, 15 m benches. Wood reviewed the Southern Copper pit slope design assumptions, using bench face angles as the criteria, against Vector's 2007 recommendations. Southern Copper assumed an overall 65º bench face angle for all benches in the 2014 design.

Wood considers this to be a reasonable assumption as the achieved bench face angle will be variable, and 65º represents a reasonable average for mine planning purposes.

The 2014 Southern Copper pit design includes geotechnical benches, spaced at 150 m intervals, which were included to decouple the inter-ramp slopes and to reduce the overall slope angles. The design will allow for management of minor instabilities that exceed the containment capacity of the standard catch benches.

13.2.2 Tía María

Pit designs for Tía María are also based on Vector (2007) recommendations. Vector conducted geological and geotechnical mapping, laboratory analysis, geotechnical and structural evaluations, and stereographic analysis in support of slope stability recommendations.

For the open pit portion that will be excavated in oxide material, recommended inter-ramp pit slope angles ranged from 42º–48º.

Vector reviewed factors-of-safety using SLIDE software along six cross sections through the 2007 pit design, and concluded that, under dry conditions, the factor-of-safety was >1.2. However, if the water table is present at an elevation of 500 masl, for some pit sectors, the factor-of-safety fell below 1.2. It was recommended that the presence of the water table be confirmed.

13.3 Hydrogeological Considerations

Based on the evaluations discussed in Chapter 7.3, water inflow rates to the La Tapada and Tía María open pits would be approximately 2.4 m^3/d and 1.7 m^3/d, respectively.

Water that collects in the base of the planned open pits will be pumped into water trucks and will be used for dust suppression.

13.4 Operations

13.4.1 Mine Plan Assumptions

Hexagon's Mine Plan Schedule Optimizer program was used to generate the optimal life-of-mine schedule. The mine plan was based on the following key assumptions:

- 100,000 t/d process throughput (36 Mt/a)
- Approximately 120 kt/a of copper cathode production.

The mine plan was optimized to maintain a 120 kt/a production rate when possible, and designs aimed for two concurrent operating phases, when possible, to provide mill feed. Eight benches were assumed to be mined per year.

Mine operations were assumed to run 365 days a year, 24 hours per day.

13.4.2 Pit Design, Road and Ramp Design

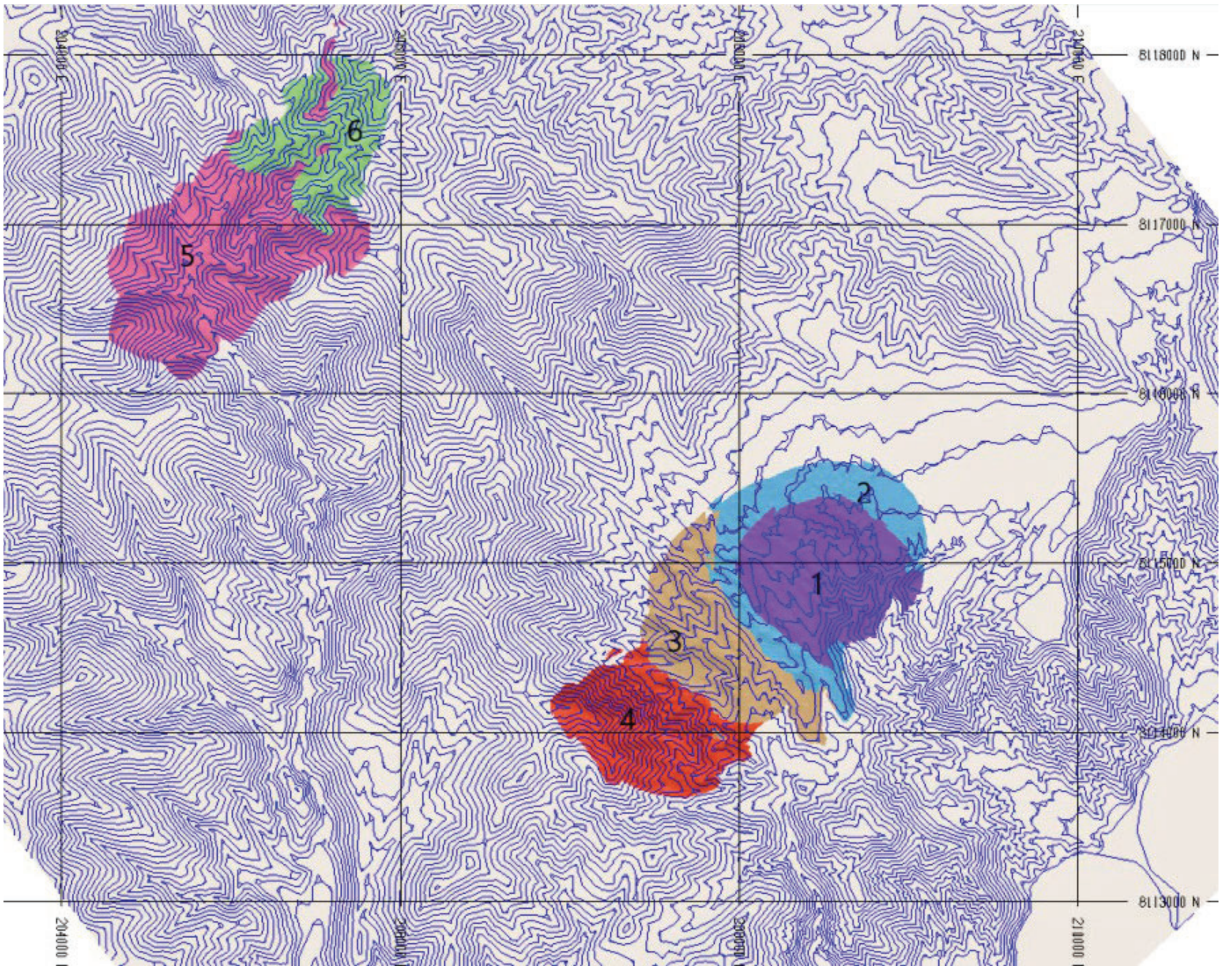
Catch bench widths were designed at 115 m for La Tapada and 100 m for Tía María. A minimum bench mining width of 150 m between phases was used.

The pit designs were based on using a ramp width of 35 m and maximum ramp gradient of 8%. The surface roads that were used in haulage profiling for cycle time generation in production schedule used a maximum ramp gradient of 10%.

13.4.3 Pit Phasing

The mine plan assumes that La Tapada will be mined in four phases, and Tía María in two. The final pit outlines are provided in Figure 13-1. The detailed evaluations of each pit phase for the deposits were included in Figure 12-1 to Figure 12-4.

Figure 13-1: Life-of-Mine Outline Map



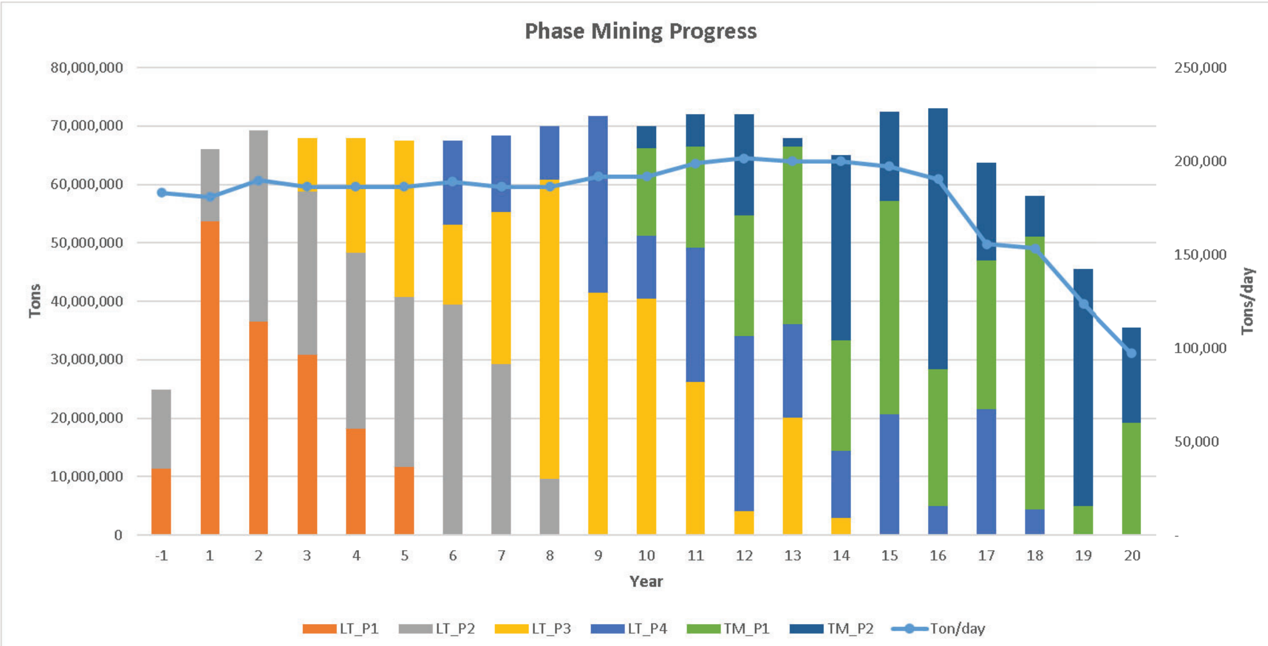
Note: Figure prepared by Wood, 2021. Map north is to top of figure as shown by northing grid.

A one-year pre-production period was envisaged for pre-stripping of waste material.

The mine plan assumes that the first 10 years of mine life will be from La Tapada, based on the deposit grade. Production from La Tapada will continue until about Year 18. Production from Tía María would commence in about Year 11, and would continue until the end of the mine life in Year 20. Tía María is mined later in the LOM plan as the deposit has lower copper grades than La Tapada, and so will produce less copper cathode.

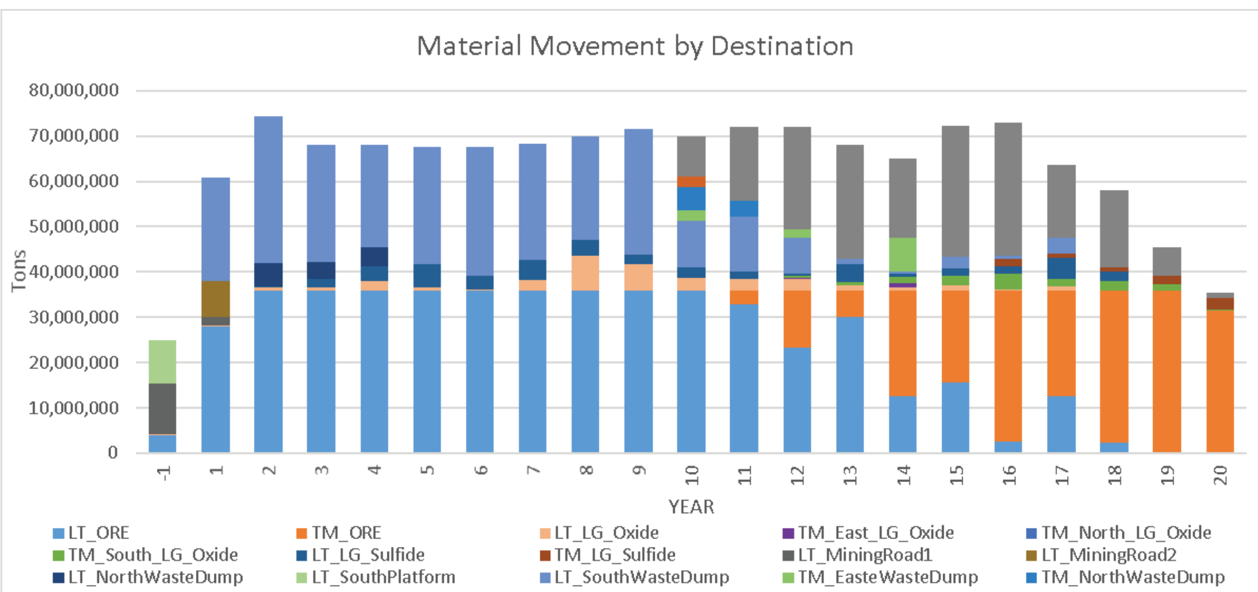
A production forecast by phase is provided in Figure 13-2; the material movement forecast is included as Figure 13-3, and the predicted cathode production is presented in Figure 13-4.

Figure 13-2: LOM Production Forecast by Pit Phase



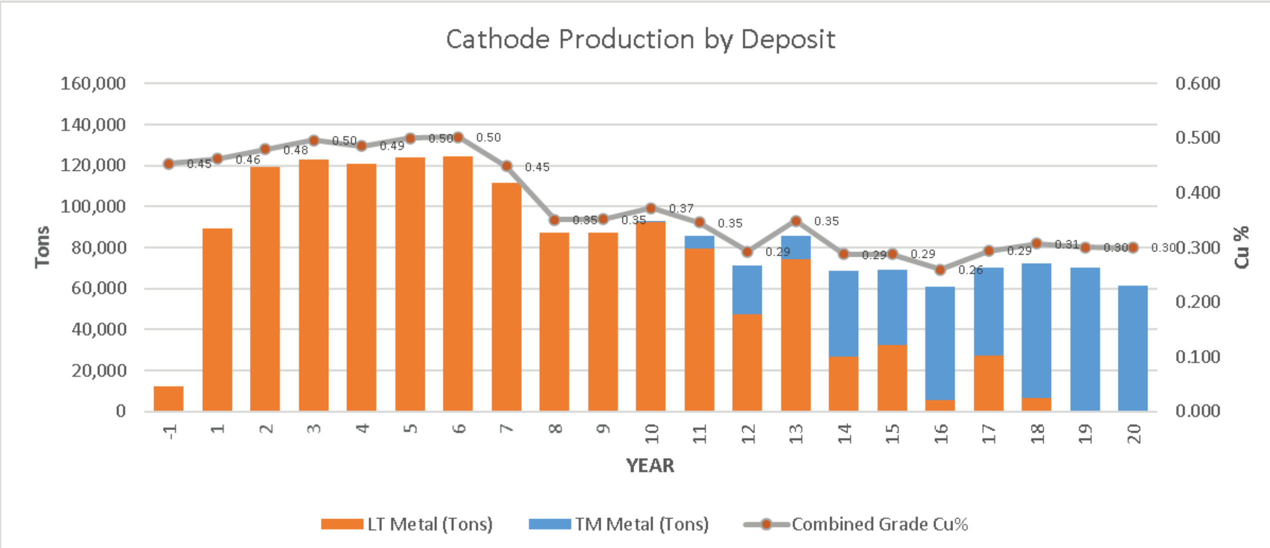
Note: Figure prepared by Wood, 2021. LT = La Tapada, TM = Tía María.

Figure 13-3: LOM Material Movement Forecast



Note: Figure prepared by Wood, 2021. LT = La Tapada, TM = Tía María, LG = low grade

Figure 13-4: LOM Cathode Production Forecast



Note: Figure prepared by Wood, 2021. LT = La Tapada, TM = Tía María.

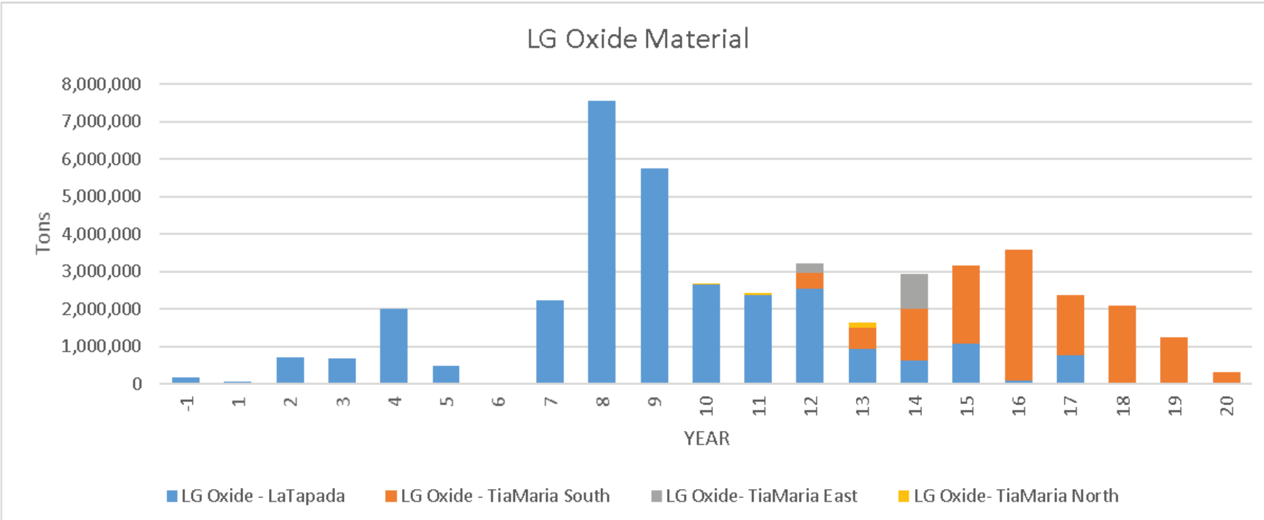
13.5 Stockpiles

Four oxide stockpiles are planned, with two stockpile locations at each open pit. Oxide material to be stockpiled will be below the mine cut-off grade, but will have a copper grade of >0.08% Cu. Material movement to the stockpiles is provided in Figure 13-5.

Sulfide-bearing mineralization is not included in the LOM plan in this Report. However, there may be potential in the future to treat this material. Southern Copper has elected to put copper-bearing sulfide material grading >0.115% Cu into designated stockpiles (sulfide stockpiles) at each open pit. The expected movement to the sulfide stockpiles is provided in Figure 13-6.

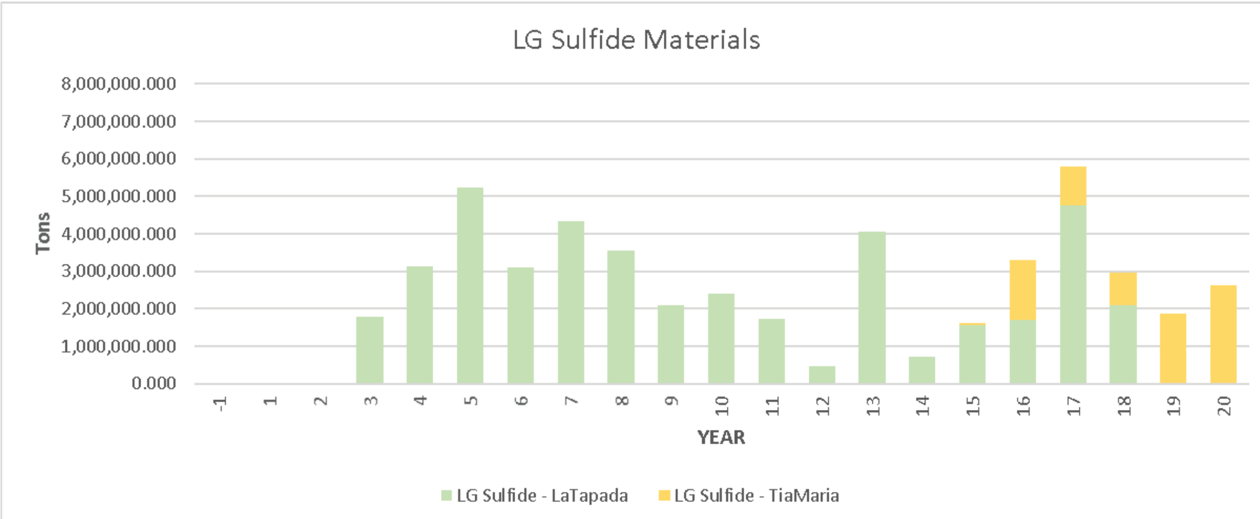
Facility capacities are included in Table 13-1, and proposed facility locations are shown in Figure 13-7 and Figure 13-8.

Figure 13-5: Oxide Stockpile Movement



Note: Figure prepared by Wood, 2021. LG = low grade.

Figure 13-6: Sulfide Stockpile Movement

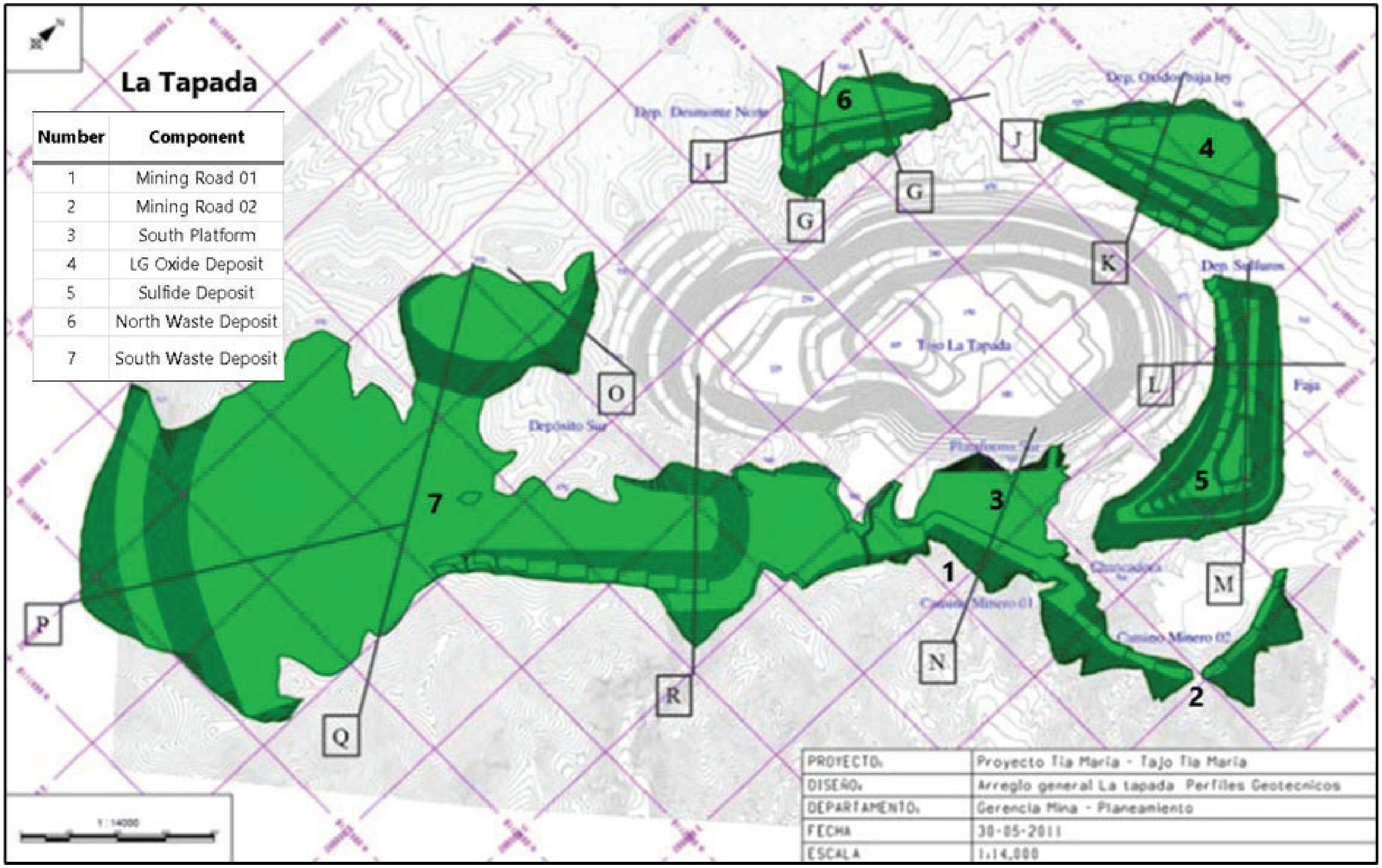


Note: Figure prepared by Wood, 2021. LG = low grade.

Table 13-1: Planned Stockpiles

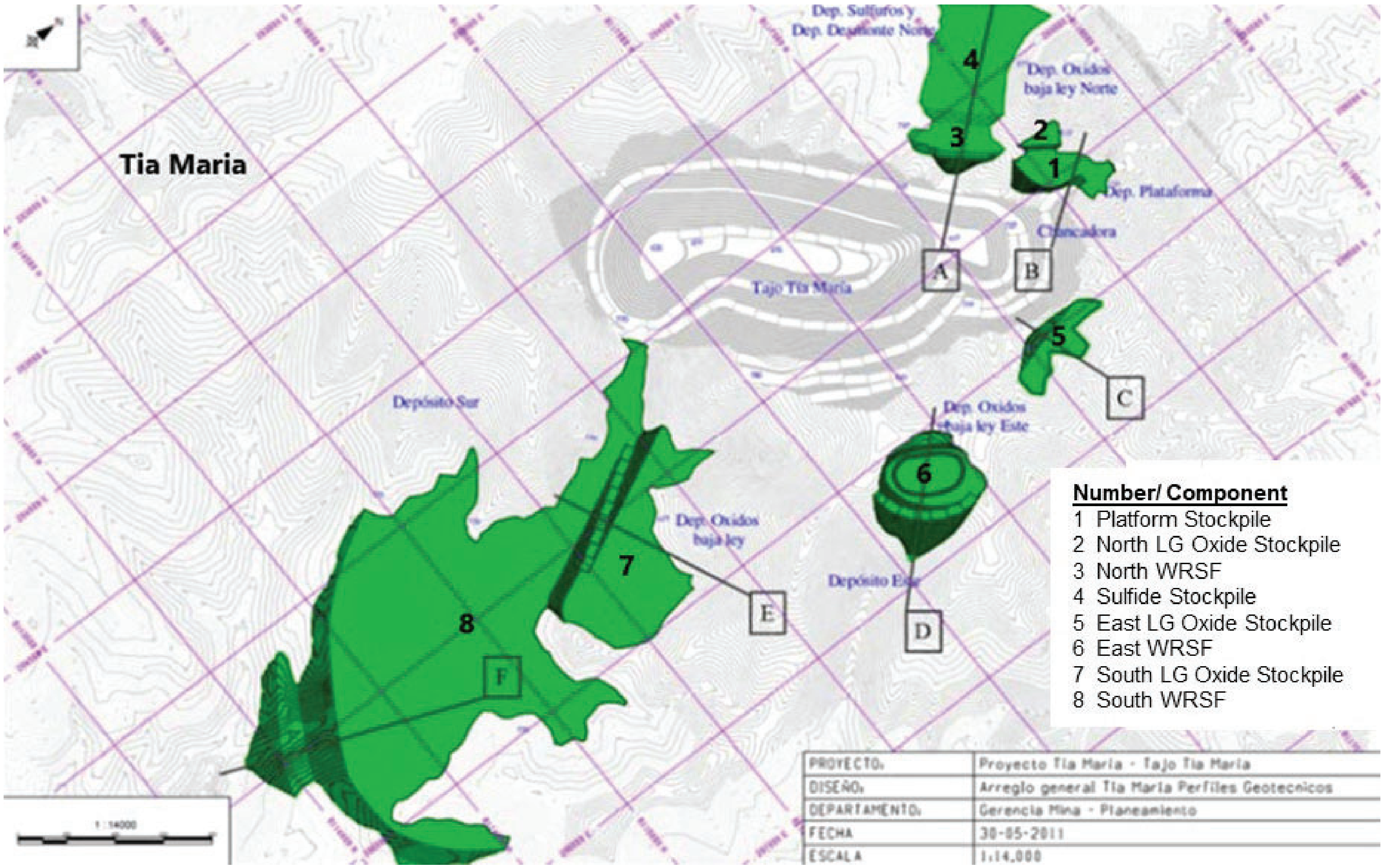
Open Pit	Stockpile Type	Design Capacity (Mm^3)
La Tapada	Low-grade oxide	16.45
	Sulfide	23.96
Tía María	North low-grade oxide	0.12
	Sulfide	8.09
	East low-grade oxide	0.65
	South low-grade oxide	8.80

Figure 13-7: Infrastructure Layout Map – La Tapada



Note: Figure prepared by Southern Copper, 2011.

Figure 13-8: Infrastructure Layout Map – Tía Maria



Note: Figure prepared by Southern Copper, 2011.

13.6 Waste Rock Storage Facilities

WRSF designs were matched to the required capacities envisaged in the LOM plan. Facility capacities are included in Table 13-2 and locations were shown on Figure 13-7 and Figure 13-8.

13.7 Blasting and Explosives

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

13.8 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 8 m spacing in ore and waste; however, 9 x 10 m spacing will be used in the Moquegua Formation conglomerate. The blast-hole diameter will be 279 mm.

13.9 Equipment

Open pit mining will be undertaken using 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.

13.10 Personnel

Mining personnel only will range from 142 to a peak of 278 over the LOM. The personnel numbers are expected to start to decline as the pits approach their final layout to reflect the smaller mining fleet needed to meet the reduced material movement targets for the remaining LOM.

Table 13-2: Waste Rock Storage Facilities

Open Pit	Facility Location	Design Capacity (Mm^3)
La Tapada	North	7.30
	South	181.77
Tía María	North	4.69
	East	6.48
	South	99.35

Table 13-3: Equipment List

Equipment	Number of Units
Primary	
P&H 320XPC	2
P&H 4100XPC-AC	2
Letourneau L2350	1
Komatsu 930E	18
Support	
Cat 336F excavator	1
Cat D10 dozer	4
Cat 834 RTD	3
Cat 777 water truck	3
Cat 16 grader	1
Cat 24 grader	1
Cat 740 fuel/lube truck	2
Ancillary Mine Equipment	
Truck-mounted 40 t crane	1
80 t rough terrain	1
5 t forklift	2
10 t forklift	2
Mechanic service truck	3
Small fuel/lube truck	1
CAT262 skid steer	1

Equipment	Number of Units
Flatbed truck	2
CAT TL1255 telehandler	1
Operations	
CAT 450F backhoe/loader	1
Cat H180DS hydraulic hammer/impactor	1
160 t lowboy	1
Compactor	1
Light plant	14
4,000 gallon water truck	1
Small dump truck	2
¾ t pickup	6
1 t pickup	6
Crew bus	5
Slope monitoring stations	2
980 k cable reeler	1
Communication system	1
Miscellaneous Equipment	
Pumps	1
Mine & geology software	1

14 PROCESSING AND RECOVERY METHODS

14.1 Process Method Selection

The process design is based on existing technologies and proven equipment. The design includes crushing, agglomeration and curing, dynamic heap leaching, and SX/EW.

The process facilities are designed to treat a nominal rate of 100,000 t/d of copper oxide ore and produce 120,000 t/a of copper cathodes as final product.

The Tía María process facility is expected to operate for 20 years, processing oxide ore from the La Tapada deposit for the first half of the LOM, and from both the La Tapada and Tía María deposits for the second half of the LOM plan.

14.2 Flowsheet

The crushing and agglomeration circuit flowsheet is presented in Figure 14-1, and the heap leach and SX/EW circuit in Figure 14-2.

14.3 Plant Design

14.3.1 Crushing

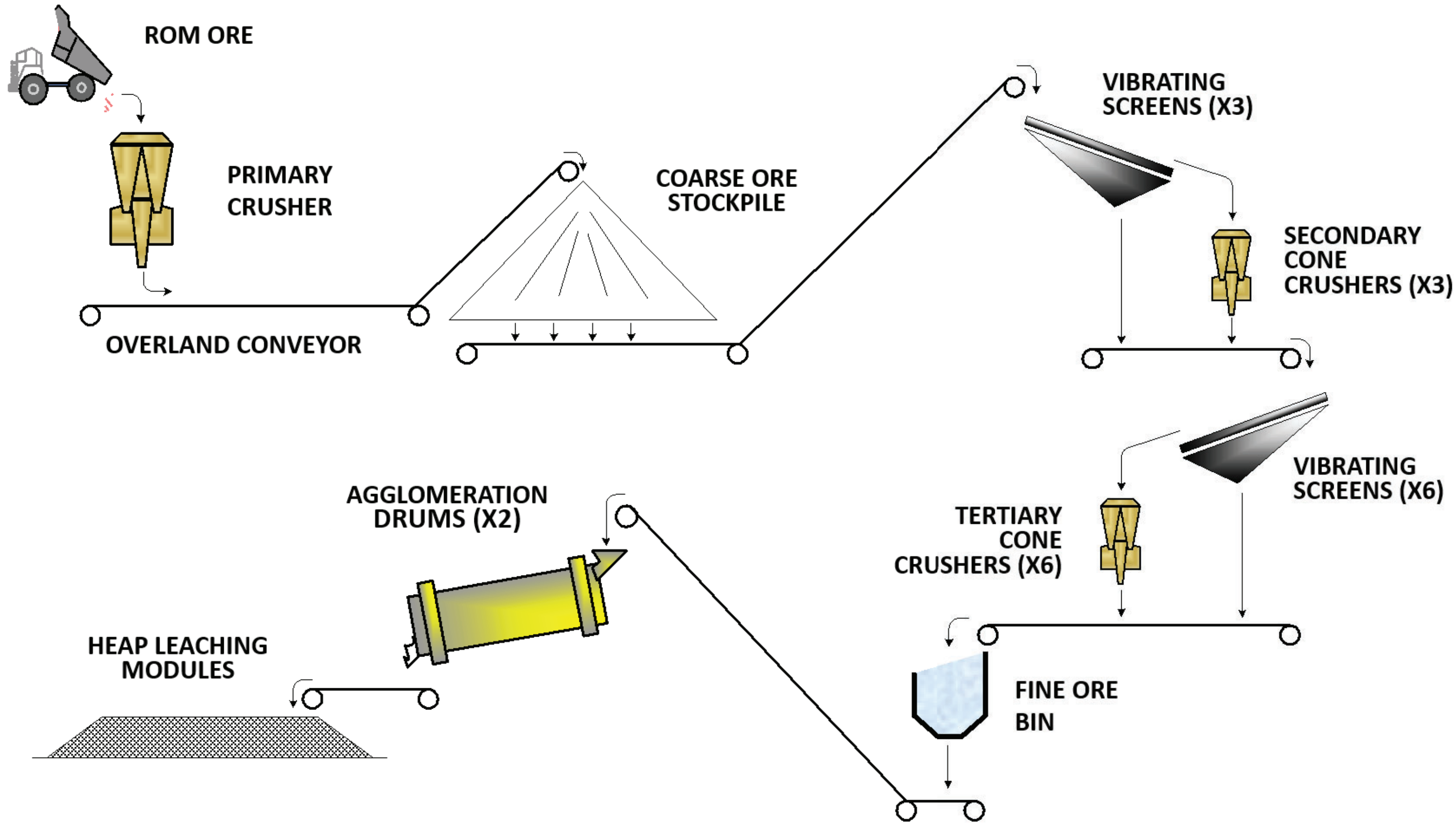
14.3.1.1 Primary Crushing

ROM ore will be transported from the mine in 290 t dump trucks and dumped into a 450 t live capacity hopper. The hopper will feed a 60” x 113” gyratory crusher with a nominal capacity of 6,410 t/hr (7,692 t/hr design) and an open side setting (OSS) to generate a passing 80% product (P_{80}) of 201.4 mm. The crushed material will discharge to a 600 t live capacity surge bin that will gravity feed a plate feeder.

Initially, a primary crushing unit will be installed and operated at the planned La Tapada open pit until the oxidize material is mined out. Subsequently, a crusher will be installed and operated next to the proposed Tía María open pit.

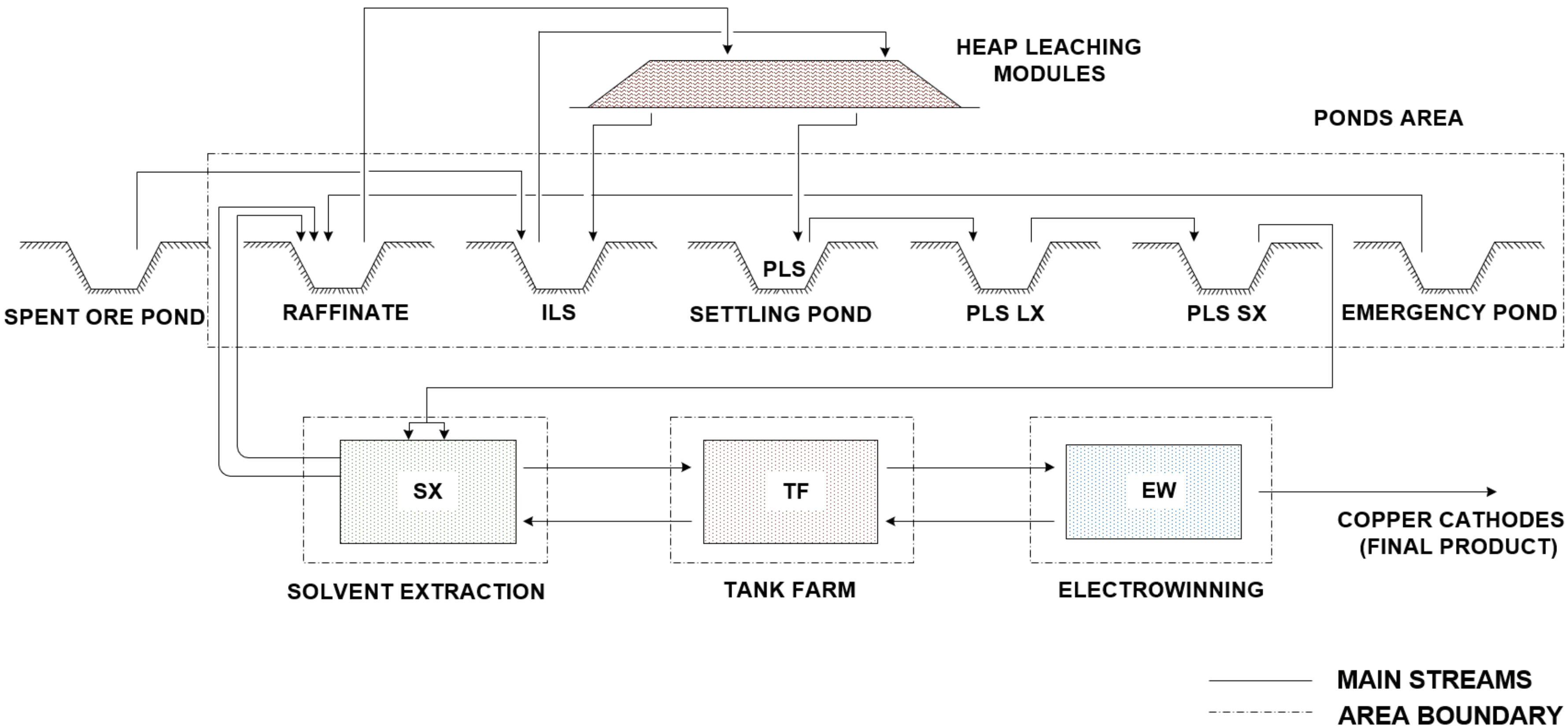
A plate feeder under the surge bin will take the crushed ore to a sacrificial belt that will then transfer the ore to a system of three overland conveyor belts operating in series. The overland conveyors will transfer the crushed ore to a coarse ore feed belt that will feed a covered coarse ore stockpile with a 60,000 t capacity through a chute.

Figure 14-1: Crushing and Agglomeration Circuit Flowsheet



Note: Figure provided by Southern Copper, 2021.

Figure 14-2: Heap Leach and Solvent Extraction Circuit



Note: Figure provided by Southern Copper, 2021.

The coarse ore stockpile will discharge to three process lines working in parallel, which will form the secondary crushing stage.

14.3.1.2 Secondary Crushing

Coarse ore will be recovered from underneath the coarse stockpile by six plate feeders that will discharge onto three conveyors. Each conveyor will feed one of the three secondary crushing lines, each consisting of a 3.7 x 7.3 m double-deck banana screen and an 885 kW cone crusher. The screen oversize material, with a P_{80} of 230 mm, will feed into the secondary crushers producing a material with a P_{80} of 43 mm. The screen undersize material will discharge to a conveyor that will also receive product from the crushers, generating a combined secondary crushing product with a P_{80} of 49 mm. The product of each line will be conveyed to three 600 t tertiary crushing feed hoppers.

The secondary crushing circuit is designed for a nominal ore flow of 5,560 t/hr (6,944 t/hr design) with the crusher OSS at 39 mm.

14.3.1.3 Tertiary Crushing

Two 1.83 m wide belt feeders will draw ore from each tertiary hopper to feed two 3.7 x 7.3 m single-deck banana tertiary screens per line. The oversize material with a P_{80} of 57 mm from each tertiary screen will be crushed in an 886 kW (1,188 HP) tertiary cone crusher. The undersize product from all six tertiary screens will be collected on a 1.5 m wide, 135 m long conveyor belt. The product from all six tertiary crushers with a P_{80} of 15 mm will be collected on a 1.8 m wide, 135 m long belt conveyor. These conveyors will discharge onto a 2.1 m wide, 28 m long common product belt conveyor. The tertiary crushing product will be stored in a fine ore bin.

The tertiary crushing circuit is designed for a nominal ore flow of 5,560 t/hr (6,944 t/hr design) with the crushers OSS at 14 mm to obtain a final crushing product P_{80} of 14.7 mm.

14.3.2 Agglomeration and Curing

The agglomeration/curing circuit is designed to operate in two parallel lines. The fine ore stored in the fine ore bin will feed each line, which will consist of an unloading feeder, a transfer belt and an agglomeration/curing drum. The agglomeration drums will be 4.7 m in diameter and 16.3 m long. Inside the drum will be two perforated pipes for raffinate and sulfuric acid addition. The raffinate will be added with the objective of increasing the ore moisture from 3.6% to 8%. Acid will be added at a rate of 15 kg/t of dry ore.

14.3.3 Agglomerated Ore Stacking

Agglomerated oxide ore will be stacked onto two dynamic leaching heaps, each with initial design pad dimensions of 330 m wide, 1,200 m long and 8 m high. Plans are to extend the pads to a total length of 1,620 m. The initial facility will be divided into 28 parcels that will be 330 m long, 42.8 m wide and 8 m high. The future case envisions 38 parcels. Each parcel will consist of three modules. Each module will have its own drainage system and share the drained solution recovery system with the other two modules in the parcel.

The facility will be fully lined with a composite liner system, with a leak detection system. On the top of the drainage layer, 600 mm of spent ore will be placed, and periodically replaced, to minimize potential issues with spent ore degradation due to leaching operations. The proposed spent ore layer will also prevent damage to the solution collection system and the geomembrane liner.

A corrugated polyethylene drainage piping system will be placed within the drainage layer. The drainage pipes will discharge into two HDPE-lined collector canals that will feed the pregnant leaching solution (PLS) pond and the intermediate leaching solution (ILS) pond, as applicable, through a high-density polyethylene (HDPE) pipeline.

14.3.4 Leaching

The stacked material will be left to settle for six days, which will provide sufficient time to achieve the sulfuric acid curing action on the copper ore before entering to the irrigation cycle for 60 days (balance) and 90 days (design).

The heap design will use a module as the minimum leaching unit. During normal operations and considering a 90-day design irrigation cycle, there will be 90 modules in irrigation, one module in loading, one module in spent ore discharge, one module with irrigation pipe installation, six modules in drainage and removal of irrigation pipes, six in the curing stage, two in bridge-turning areas, four in bridge-spacing areas, and three spare modules for a total of 114 modules.

The dynamic heap leaching process will be carried out in two irrigation stages. The first stage will be irrigated with ILS to generate PLS, and the second stage will use raffinate from the SX process to generate ILS. The irrigation system for both cases will start at the well pumps (raffinate or ILS) for both the southwest and the northeast heaps.

The heap drainage flow solution will be captured in two separate piping systems. The ILS will overflow to the ILS pond and be used to irrigate the heaps. The PLS will be collected in a settling pond that will overflow to the main PLS pond and be delivered by gravity to the SX trains.

The leach stage assumes a heap height of 8 m, a bulk density of the stacked material of 1.54 t/m^3 on a dry basis, an irrigation rate of 10 L/h/m^2 and a net acid consumption equal to 20 kg/t (98% H_2SO_4 basis).

The total copper recovery was estimated at 69% for La Tapada and 65% for Tía María ores. The PLS leach solution will contain about 4.7 g/L Cu^{+2}, 8–9 g/L of free H_2SO_4 and 5.0 g/L chlorides, with an expected pH of 1.8.

14.3.5 Spent Ore Reclaim and Deposition

Spent ore will be removed from the dynamic leach heap with a bucket wheel excavator that will discharge into a mobile hopper mounted on a 350 m long tracked mobile reclaim conveyor. The material will then be discharged onto a 2,272 m long discharge conveyor that transports the spent ore to a spent ore (ripios) facility, fully lined with a low-permeability soil. At the spent ore facility, the discharge conveyor will feed a train of conveyors consisting of a 2,250 m long mobile conveyor equipped with a tripper, and a spent ore spreader system.

The spent ore will have an initial moisture content of about 10% and part of this moisture will evaporate. The design includes the installation of an infiltration collection system above the low-permeability soil and a 5,000 m^3 event pond at the spent ore facility. The solution contained in this pond will be pumped to the ILS pond.

14.3.6 Solvent Extraction Circuit

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 two extraction trains operating in parallel. Each train will consist of three extraction mixer-settlers (E-1 to E-3), an organic post-decanter stage, a washing stage (W-1), and a stripping stage (S-1). Due to the moderately high chloride content in both the ore and the desalinated process water, a washing stage ahead of the stripping stage was incorporated to the design.

14.3.6.1 Extraction Stage E-1

Half of the total PLS flow will be fed to each extraction train. The PLS will enter the E1 extraction stage together with the semi-loaded organic solution from E2 stage. Both solutions will be mixed in a pump mixer followed by two auxiliary mixers allowing the transfer of copper from the PLS to the organic phase. The generated dispersion will overflow into the settling tank where the phases will be given time to separate. The less dense organic phase will float to the top and the heavy aqueous phase will sink. Both solutions will leave the settler via launders that will be located at the end of the decanter. The E1 aqueous phase will be fed to the pump mixer at the E2 stage, whereas the copper-loaded organic phase will report to the organic post-decanter stage.

The PLS solution feeding each SX train in series will have a nominal flow rate of 1,671 m^3/hr, with 4.7 g/L Cu and 6 g/L of free H_2SO_4.

14.3.6.2 Extraction Stage E-2

The aqueous phase from the E-1 stage will be transported to the pump mixer of the E-2 extraction stage and mixed with the slightly-loaded organic solution from the E-3 extraction stage, using pump mixers and two auxiliary mixers. After phase separation in the decanter, the E-2 semi-discharged aqueous solution will be collected and transferred to the pump mixer of extraction stage E-3. The copper semi-loaded organic phase will be transported to the extraction stage E-1. Both the aqueous and organic phases can be recycled from the launders back to the pump mixer within the E-2 stage.

14.3.6.3 Extraction Stage E-3

The semi-discharged aqueous solution from E-2 stage will enter to the third extraction stage E-3 together with the discharged organic solution from the stripping stage S-1. After mixing in the pump mixers and auxiliary mixers, and phase separation in the decanter, the aqueous solution will be discharged to the raffinate pond. The aqueous solution, or raffinate, at this stage will already have transferred approximately 90% of the copper to the organic phase. The organic phase, now slightly loaded with copper, will be transported to the E-2 extraction stage. Both aqueous and organic phases can be recycled from the launders back to the pump mixer within the E-3 stage.

The raffinate solution produced by each extraction train in series will have a nominal flow rate of 1,683 m^3/hr, with 0.5 g/L Cu and 12.5 g/L free H_2SO_4.

14.3.6.4 Organic Post-Decanter Stage

The organic post-decanter tank will receive the fully loaded organic phase from the E-1 extraction stage and will be mixed with process water, diluent, extractant and desalinated water. The settled loaded organic phase will be fed to the inlet of the washing stage W-1 pump mixer. The organic post-decanter tank will be equipped with baffles and an aqueous pump to remove any aqueous phase that may decant and pump that material to the E-3 extraction stage

14.3.6.5 Washing Stage W-1

The loaded organic solution from the organic post-decanter will enter the W-1 mixer-pump together with a recirculating aqueous solution from the W-1 decanter. For efficient washing, the aqueous flow will be similar to the organic flow. The aqueous washing solution will consist of demineralized water with the addition of electrolyte for the adjustment of acidity and copper content., and will reduce the content of contaminants such as iron and chloride form the organic phase solution coming from E-1 via the organic post-decanter. The contaminants are present in the organic solution as entrained aqueous solution and as co-extracted elements in the organic phase, and can be re-extracted during the washing stage. After the phase separation that takes place in the decanter, the now clean loaded organic solution will be transported to the re-extraction or stripping S-1 stage.

14.3.6.6 Stripping Stage S-1

The stripping stage S-1 will be performed in a single step. The loaded organic from the W-1 stage, and the spent electrolyte from the electrowinning process will be fed to the pump mixer followed by the auxiliary mixers. The electrowinning spent electrolyte will be mixed in a static mixer with concentrated sulfuric acid at 98% before entering the pump mixer. Due to the high acid content in the electrolyte, a transfer of copper contained in the organic phase to the spend electrolyte will take place during the mixing stage.

After the phase separation in the settler, the now discharged organic phase will be transported to the pump mixer of the E-3 extraction stage to restart the extraction cycle. The now copper-loaded rich electrolyte will be transported by gravity to the electrolyte filter tank at the tank farm area.

The S-1 stage will allow for the recycling of the electrolyte solution from its weir to the pump mixer. The recycle flow is controlled to adjust the aqueous to organic ratio to about 1:1.2.

The nominal flow rate of the rich electrolyte per train has been estimated at 472 m^3/hr, with an average composition of 53 g/L Cu and 161 g/L of free acid.

14.3.6.7 Treatment of Crud and Organic

The term crud refers to a stabilized emulsion generated at the interface between organic and aqueous phases. Crud is typically composed of organic solution, organic reaction products, fine and stable aqueous/organic solution emulsion, colloidal inorganic material, fungal and bacterial formations, and solids in suspension.

Crud tends to gather and accumulate at the discharge end of the settling tanks, and can extend along the entire settling tank area, reducing tank capacity. Poor-quality cathodes can be produced if crud contaminates the copper-rich electrolyte, and cost losses can occur if crud is present in the raffinate solution returning to the leaching circuit.

Crud accumulated in the decanters will be intermittently removed with a portable diaphragm pump that discharges to the organic solution treatment facilities. The recovered organic solution will contain impurities that will degrade the organic solution, affecting its loading capacity, extraction kinetics and phase separation characteristics. Therefore, the organic solution inventory needs to be treated approximately two times a year.

The organic treatment will be completed by mixing the organic with hydrous aluminum silicate clay, and filtered in a filter press. The filtrate-treated organic solution will be returned to the loaded organic tanks at the solvent extraction plant.

14.3.7 Tank Farm Area

The Tank Farm area will be the connection between the SX and EW circuits.

The copper-rich electrolyte coming from SX circuit will be pumped to five anthracite-sand filters (4.72 m dia. x 5.7 m height) operating in parallel. A combination of solids and organic phases will accumulate at the top of the filter vessel and will be purged to a crud tank. The filter media will be backwashed periodically to maintain filtration process efficiencies.

The filtered copper-rich electrolyte will be heated by the lean electrolyte coming out from the EW circuit via a plate heat-exchanger. The copper-rich electrolyte will pass through a second heat-exchanger where circulating hot water will increase the temperature to the required 45–50ºC.

The heated rich electrolyte will be sent to a two-compartment electrolyte recirculation tank. It will be mixed with a fraction of the lean electrolyte returning from the EW process. The copper-rich electrolyte temperature will be adjusted before it is fed to the EW cells. The lean electrolyte will report to the SX circuit.

14.3.7.1 Ancillary Units

14.3.7.1.1 Guar Plant

A water solution of Guar gum (ammonium lignosulfonate) will be added to the copper electrolyte to produce a smooth, bright and dense cathodic deposit. A Guar solution of 0.25% w/w will be added to the electrolyte pipelines feeding the EW cells. The guar preparation will consist of a guar feeder, a mixing and a distribution tank of 25 m^3 capacity, and two dosing pumps.

14.3.7.1.2 Cobalt Sulphate Plant

Cobalt will be used to reduce the corrosion in anodes during the electrowinning process by stabilizing the near-surface lead oxide layer in the anode. The cobalt will be supplied in the form of cobalt sulfate heptahydrate ($CoSO_4.7H_2O$) and will be prepared in a solution of 1% w/w with demineralized water. The preparation plant will consist of a single mixing/distribution tank of 12 m^3 and a dosing pump that will discharge the cobalt solution to the rich electrolyte compartment of the electrolyte recirculation tank.

14.3.7.1.3 Water Boilers and Air Compressor Units

The plant design includes three diesel fired heaters to produce hot water that will be used to maintain the electrolyte temperature in the EW cells. Hot water will be used at the stripping cathode machine, cathode washing, and washing of contacts bars on the EW cells. The design allows maintenance for one heater without heat loss in the system.

The air compressors will produce plant and instrumentation air for the process. The compressed air system will include three compressors of 113 kW each (two operating, one stand-by), an expansion tank (6 m^3), and dryers. The system will generate a total of 2,242 Nm^3/hr of air (design).

14.3.8 Electrowinning Circuit

The copper contained in the heated rich electrolyte will be electroplated on stainless steel cathodes at the electrowinning cells in the EW circuit by action of applied direct current. The electrolyte will overflow from the cells with a lower concentration of copper and will be pumped back to the electrolyte recirculation tank as spent electrolyte.

The EW plant design includes the installation of 270 electrolytic cells that will be divided into two banks of 134 and 136 cells. Each cell will contain 81 stainless steel cathodes of 1 m^2 of submerged area, and 82 lead–calcium–tin alloy anodes. The spacing between electrodes will be 101.6 mm. A total of 21,870 cathodes and 22,140 anodes will be used throughout the plant. The intermediate bars will be of the double contact type.

The tankhouse hall will include two bridge cranes each with two main hooks of 6.3 t lifting capacity and one auxiliary hook of 2 t capacity.

The cathodes will be processed in the electrolytic cells for six days, after which they will be harvested by the automatic cranes without interrupting the power supply. The crane will harvest one-third of the cathodes from a cell at a time, removing 27 cathodes. As the cathodes are lifted from the cell, the crane will pre-wash them with hot water to remove the electrolyte and acidic anti-fog spheres trapped on their surface. The same crane and lifting device will be used to remove the anodes during anode and cell maintenance operations.

The harvested cathodes will be transferred by automatic cranes from the electrowinning cell to the feed chain of the cathode stripping machine, where they will again be washed and automatically stripped. The steel plates, once the copper cathode has been removed, will be taken from the discharge chain of the stripping machine and returned to the electrolytic cells. The copper cathodes will be automatically sampled, corrugated, packed in bundles of approximately 2,500 kg, strapped, and marked with the production date, process information and bundle weight.

The electrical power supply to the cells will be provided by two rectifier/transformer groups. Each rectifier/transformer group feeds one bank of EW cells (134 or 136 cells). The design current is 55 kA and the voltage per bank is 315 VDC. The nominal and design values for current density are 293 and 341 A/m^2.

The design contemplates an estimated copper cathode production of 14 t/hr, with a 99.999 % Cu purity and a current efficiency of 91%.

14.3.9 Solution Handling and Collection

14.3.9.1 Raffinate Pond Facilities

This facility will consist of a 34,000 m^3 raffinate pond that will receive solution from the SX circuit and pump it to the leaching heap with a pumping capacity of 4,433 m^3/hr.

This facility will also include of a 48,800 m^3 dynamic heap emergency pond and a 126,000 m^3 major emergency pond.

14.3.9.2 ILS Pond Facilities

This facility will consist of a 16,000 m^3 ILS pond that will receive the ILS from some modules of the leaching heap. At a design rate of 4,100 m^3/hr the ILS will be pumped back to other modules in the leaching heap to generate the PLS.

14.3.9.3 PLS Pond Facilities

This facility will consist of a 44,000 m^3 PLS settling pond that will collect the PLS from the leaching heap and overflow to a 10,882 m^3 PLS-lixivant pond. At a design rate of 4,000 m^3/hr, the PLS will be transferred to a 40,000 m^3 PLS-SX pond which will gravity-feed the SX circuit.

14.4 Equipment Sizing

Major mechanical equipment and design parameters are summarized in Table 14-1.

14.5 Power and Consumables

14.5.1.1 Power

The process plant will require electrical power for crushing, ore conveying, solution pumping, mixing and electrowinning. The average annual power consumption for the plant is estimated to be 727,933 MW per year. The electrowinning and coarse crushing/overland conveyor will be the areas that will consume most of the power with 35% and 28% respectively.

Power will be supplied from the 220 kV Moquegua sub-station to the 220 kV/23 kV Tía María sub-station via a transmission line of approximately 100 km in length.

14.5.1.2 Water

Water for the process plant will be sourced from a desalination plant. The water will be used to replace the losses due to the effects of wetting the leachable ore, evaporation and irrigation of roads to mitigate dust in suspension. The water desalination system will consist of three reverse osmosis desalination plants and a potable water plant.

Table 14-1: Major Mechanical Equipment & Design Parameters

Area	Description	Units	Value
General design parameters	Plant throughput	t/d	100,000
	Copper cathode production	t/a	120,000
	Primary crushing, availability	%	65
	Fine crushing, agglomeration and stacking availability	%	75
	Leaching, SX, and EW availability	%	98
	Specific gravity (average in situ ore)		2.6
	Crushing Bond index	kWh/t	8.4
	Ore moisture	%	2
	PLS composition (design)		
	Cu	g/L	4.7
	Cl in PLS, ILS & raffinate (design max.)	g/L	5
	FeT	g/L	12
	pH		1.8
	Total suspended solids	ppm	30
Crushing, curing, stacking	Primary gyratory crusher, single unit	in x in	60 x 113
		kW	85
	Primary crusher OSS (design)	mm	175–250
	Primary crusher capacity (nominal / design)	t/hr	6,410/7,692
	Overland conveyor No.1	kW	2,700
		inch (W) x m (L)	72 x 862
	Overland conveyor No.2	kW	10,769
		inch (W) x m (L)	72 x 2,875
	Overland conveyor No.3	kW	10,769
		inch (W) x m (L)	72 x 4,606
	Secondary crushers, FLS Raptor XL, 3 units	kW	885
	Secondary crusher capacity, each (nominal / design)	t/hr	1,089/1,361
	Secondary crusher OSS (nominal / design)	mm	39 / 45
	Tertiary crushers, FLS Raptor XL, 6 units	kW	885
	Tertiary crusher capacity, each (nominal / design)	t/hr	609/761
	Tertiary crusher OSS (nominal / design)	mm	14/19

Area	Description	Units	Value
	Agglomeration drums, 2 units	m (dia) x m (L)	4.7 x 16.3
		kW	746
	Agglomerated ore moisture	%	8
	Copper feed to leaching (first 5 years)	%	0.5
	Leaching copper extraction, La Tapada ore (design)	%	69
	Leaching heap type		Dynamic on/off
	Heap height	m	8
	Irrigation rate	L/m^2-hr	10
	Net acid consumption	kg/t	20
	Leach pad feed conveyor	inch (W) x m (L)	72 x 2,145
		kW	1,215
	Mobile stacking bridge conveyor	inch (W) x m (L)	72 x 347
		kW	1,126
	Bucket wheel excavator	inch (W) x m (L)	84 x 24
		kW	1,358
	Mobile spent ore conveyor	inch (W) x m (L)	72 x 2,250
		kW	4,567
	Spent ore spreader system	inch (W) x m (L)	72 x 45
		kW	850
Solvent extraction and tank farm	Settling tanks per stage: 6 extraction, 2 post-settling, 2 washing, 2 stripping	m (W) x m (L)	35 x 23
	Electrolyte recirculation tank	m^3	1,660
	Electrolyte filters, 6 units	m (dia) x m (H)	4.7 x 5.7
	Electrolyte/electrolyte heat exchangers, 3 units.	m^2 (area)	550
	Electrolyte/hot water heat exchangers, 4 units.	m^2 (area)	41.5
	Hot water boilers, 3 units	MW	5.52
	PLS feed flow per train (nominal)	m^3/hr	1,671
	Ratio O/A (organic/aqueous)		1.2
	Organic flow per train (nominal)	m^3/hr	2,005
	Extractant/diluent concentration	%/%	12/88
	Rich electrolyte flow per train (nominal)	m^3/hr	472
	Copper recovery in SX	%	89

Area	Description	Units	Value
Electrowinning	Polymer concrete electrowinning cells, 270 units	m (L) x m (W) x m (H)	9.36 x 1.3 x 1.72
		m3 (Vol.)	15
	Polymer concrete anode washing cells, 2 units	m (L) x m (W) x m (H)	9.36 x 1.47 x 1.7
	Cathodes and anodes per cell	number/number	81/82
	Automatic harvesting cranes, 2 units	t (capacity)	6.3 x 2
	Gas scrubbers, 4 units	cascades number.	18
	Stripping cathode machine	kW/cathodes/hr	300 / 500
	Copper in rich electrolyte	g/l	40.5
	H_2SO_4 in electrolyte	g/l	180
	Electrolyte total flow (nominal)	m^3/hr	5,774
	Current density (nominal)	A/m^2	293
	Current efficiency (nominal)	%	92
	Cathode harvesting cycle	days	6
	Cathode effective area (per side)	m^2	1
	Copper cathode weight average (nominal)	kg	46
	Copper cathode bundle	t	2.5

The estimated nominal water consumption is as follows:

- 769.6 m^3/hr of industrial water
- 33.1 m^3/hr of process water
- 28.8 m^3/hr of demineralized water
- 10.2 m^3/hr of potable water.

14.5.1.3 Reagents

The major consumable will be sulfuric acid (H_2SO_4), which will be used as the leaching agent in the dissolution of copper oxides. Other consumables will include:

- Diluent (L/t Cu)
- Extractant
- Cobalt sulfate heptahydrate

- Guar (grain refining).

14.6 Personnel

The Project's LOM labor requirement for the Tía María plant management, supervision, operations and laboratory has been estimated as 211 people. In addition, a total of 147 people are estimated for the maintenance and planning superintendency.

15 INFRASTRUCTURE

15.1 Introduction

On-site infrastructure will include:

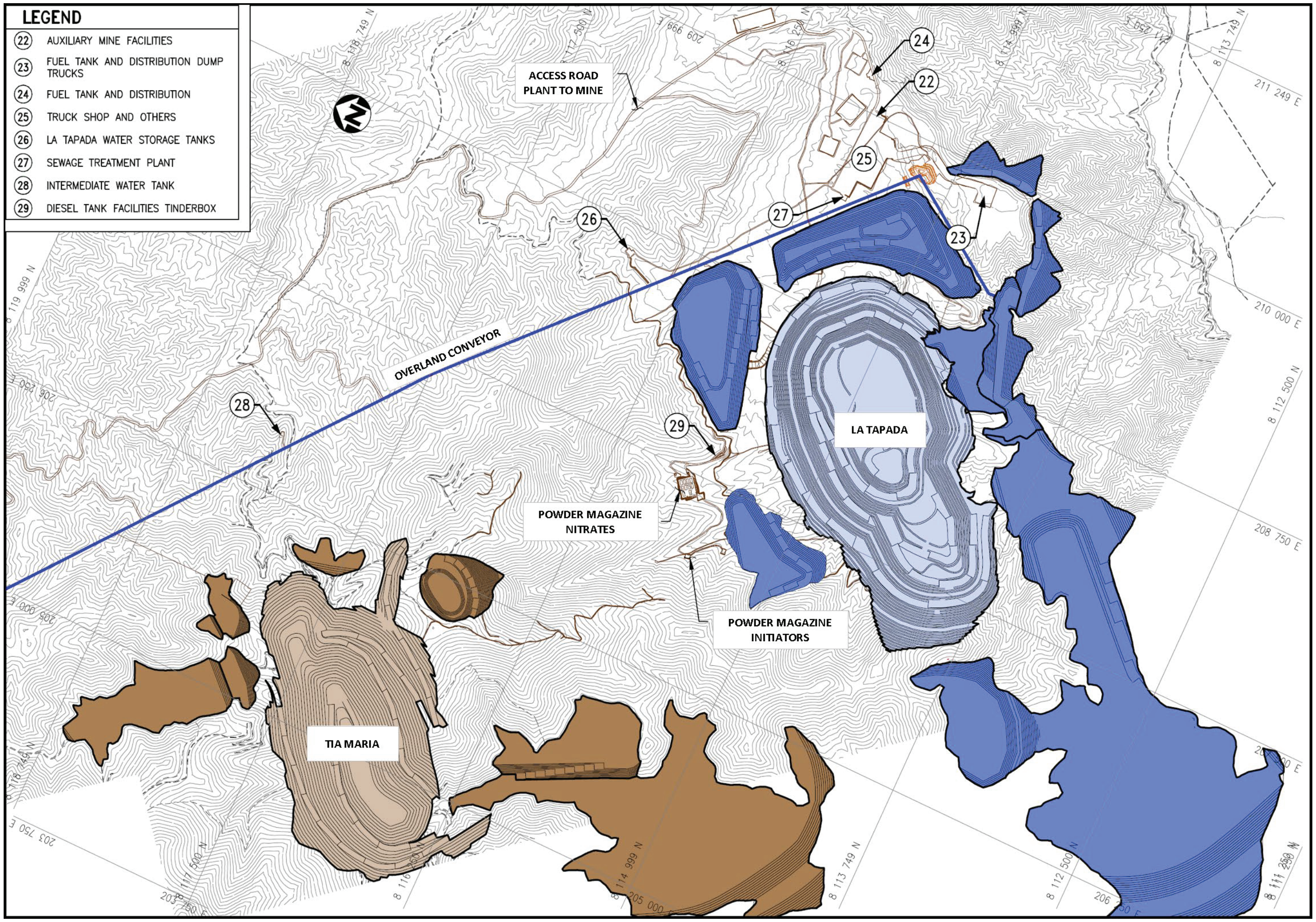
- Two open pits; Tía María and La Tapada
- Five WRSFs; two at La Tapada and three at Tía María
- Coarse ore stockpile
- Two sulfide stockpiles
- Four low-grade oxide stockpiles
- One on/off leach facility
- Spent ore facility
- Process facilities
- Warehouses, workshops, and offices
- Electrical substation and the power distribution system
- Water handling facilities
- Permanent camp for operations and the temporary camp for construction
- Railway yard and sulfuric acid discharge station at Pampa Cachendo

Off-site infrastructure will include:

- Access road
- 220 kV power transmission line
- Desalination plant
- Railway
- Sulfuric acid loading station at Matarani (Islay).

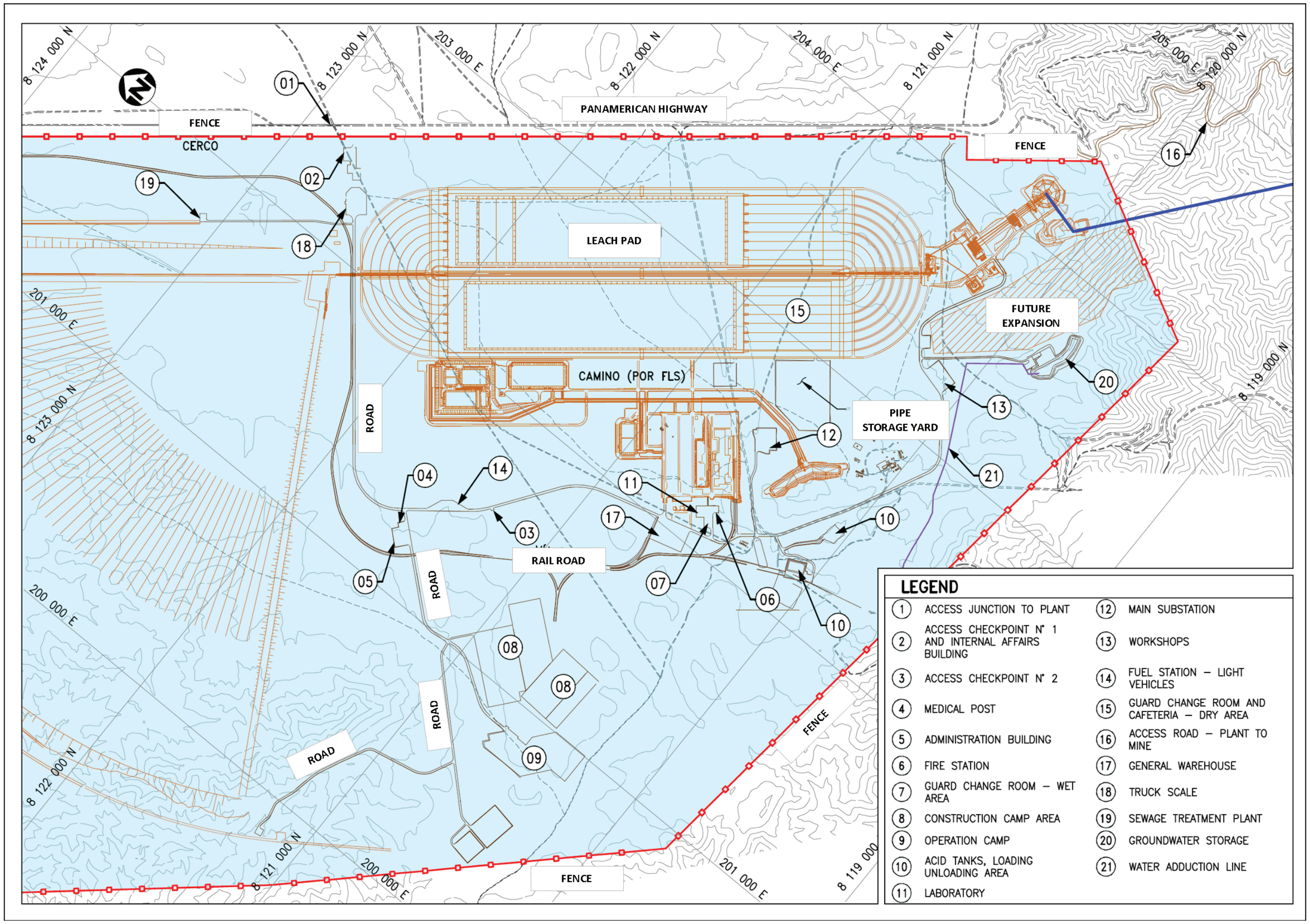
An infrastructure layout plan showing the location of the pit and process infrastructure is included as Figure 15-1 and Figure 15-2 respectively. Infrastructure locations required for each of the open pits was provided in Figure 13-7 and Figure 13-8.

Figure 15-1: Proposed Infrastructure Layout Map, Pit Area



Note: Figure prepared by Wood, 2021.

Figure 15-2: Proposed Infrastructure Layout Map, Process Area



Note: Figure prepared by Wood, 2021.

15.2 Roads and Logistics

15.2.1 Roads

The mine gate will be situated at Pampa Cachendo. Mine access will be from the Pan-American Highway (PE 1S of the national network), diverting off the highway to the Project access road at km 1027–1028, between Arequipa and Moquegua, approximately 17 km before the town of El Fiscal. Access routes include:

- From Arequipa: using the Pan-American Highway, passing through the town of San José (approximately 2 hr drive), and then turning onto the Project access road at km 1027–1028 of the Pan-American Highway
- From Lima: using the Pan-American Highway to Arequipa (12 hr) and then by the route from Arequipa
- From the Port of Matarani: using the Costanera Norte road, passing through Cocachacra, and taking a road that follows the Cachuyo stream to reach the Project site. Alternatively, the paved road leaving Cocachacra can be followed until the intersection with the Pan-American Highway, continuing to the town of El Fiscal then at km 1027–1028 taking the Project road
- From the Port of Ilo: using the Panamericana Sur highway to Cocachacra, and taking a road that follows the Cachuyo stream to reach the Project site. Alternatively, the paved road leaving Cocachacra can be followed until the intersection with the Pan-American Highway, continuing to the town of El Fiscal then at km 1027–1028 taking the Project road.

The Pan-American Highway will be modified in the area of Pampa Cachendo to include an overpass that will allow safe turns onto the mine road, and allow for the planned railway to pass under the highway. Prior to the bridge construction work, a temporary diversion road will be built parallel to the South Pan-American Highway, so as not to interrupt continuous traffic. After the completion of the bridge works, traffic on the Pan-American highway will resume and the temporary detour will be closed.

Personnel, some construction materials, fuel, construction equipment, Project equipment and some Project inputs will be brought to site using the road access.

15.2.2 Air

Arequipa can be reached by air from Lima, with a flying time of about 1 hr 10 min. The Alfredo Rodríguez Ballón International Airport, located in the city of Arequipa, is 127 km from the Project.

15.2.3 Rail

There is an existing railway that runs from the Port of Matarani to Arequipa. Southern Copper plans to use the railway system to transport cathodes, sulfuric acid and general cargo.

The existing Matarani–Arequipa railway line will be used from Matarani to Guerreros station, which is located about 30 km northeast of the Port of Matarani. A new 33 km long railway line will be constructed from the railway station at Guerreros to the rail end at Pampa Cachendo. The proposed rail route runs through land owned by the Peruvian Air Force, in the area of the Pampa de Caballo Blanco.

It is planned to transport sulfuric acid from the Port of Matarani to the rail end, using tank cars, at a rate of about 2,000 t/d. Copper cathodes, at the rate of approximately 300 t/d will be transported from the rail end to the Port of Matarani using specially-equipped rail cars with closed containers to preserve cathode quality. Closed wagons will transport cargos, at the rate of 150 t/d from the Port of Matarani to the rail end.

All permits and authorizations for the planned railroad will be managed by Peru Rail under contract with Southern Copper. Peru Rail will be responsible for obtaining all of the required permits for line construction and operations, will provide the rolling stock, and will operate the railway.

15.3 Stockpiles

A stockpiling strategy is planned, with mineralized material to be stored in both low-grade oxide and sulfide stockpiles (refer to discussion in Chapter 13.5). Two stockpiles will be constructed at La Tapada, and four at Tía María. Sulfide stockpiles will be lined with a low-permeability soil layer.

15.4 Waste Rock Storage Facilities

Several WRSFs are planned to be developed as part of both La Tapada and Tía María open pit operations (refer to discussion in Chapter 13.6). The WRSFs will be located on the pit perimeters, and will be stacked using bottom-up construction.

There is no specific description regarding the foundation characterization and foundation preparation in the design document provided by Southern Copper to Wood (Southern Copper, 2012). Waste rock is planned to be deposited directly without any foundation preparation.

As a part of the geotechnical monitoring and instrumentation of the WRSFs, Southern Copper has incorporated a limited number of extensometers. These extensometers will be located at the front face of the majority of the WRSFs or critical sections from slope stability monitoring (Geoservice, 2014).

To minimize runoff from the upstream catchment entering both open pits and WRSF areas, diversion channels are included as a part of the surface water management plan (Geoservice, 2014).

15.5 Spent Ore Facility

As currently planned, there will be no tailings storage facility, but a spent ore facility will be required as part of the heap leach operation. The spent ore facility will be located immediately northwest of the heap leach facility in relatively flat terrain with <5% slopes, and at an average elevation of 970 masl. The northeastern portion of the facility will be in proximity to the National Highway, and this area will have slopes of <1%. Spent ore will be stacked using a radial stacker to a maximum slope height of 85 m at an angle of repose of 37°.

The spent ore facility is planned to be fully lined with a low-permeability soil, along with an infiltration collection system consisting of corrugated polyethylene pipes and drain gravels, reporting to an event pond. The spent ore facility will be developed in two phases of similar footprint areas, with the second phase to be constructed prior to Year 9 after the initial phase.

15.6 Water Management Structures

Desalinated water will be stored in in a water retention pond that will be constructed at Pampa Cachendo, at an altitude of approximately 1,000 masl.

Stockpiles will have rainwater diversion channels to prevent surface waters from entering stockpiles and to handle contact water. This water will be used for dust suppression.

There will be two wo wastewater treatment plants, one located in the area of the LESDE plant at Pampa Cachendo and the other in La Tapada area. Both plants will be designed for primary and secondary treatment of all wastewater from the Project facilities (offices, workshops, workers' camp, and related facilities). Waste water will be reused and appropriately managed such that there will be no effluent discharge). An emergency pond will be constructed as part of the spent ore facility.

15.7 Built Infrastructure

There is currently no mine-related infrastructure at the site.

In the development of mining plans, support facilities are required that allow tasks to be carried out safely and efficiently. These facilities of support for the operation include:

- Mining and Maintenance Offices, change building
- Workshops for heavy equipment: Dump trucks, shovels and drills, auxiliary equipment, lubrication, welding, electrical workshop, light equipment workshop
- Equipment dispatch system
- Powder magazines: detonators, explosives and nitrate field
- Areas for preparation and storage of samples and tools
- Warehouses
- Electric power supply system through substations that will supply power to the primary crushing areas and mine equipment
- Water supply and dewatering/drainage system
- Telecommunications systems connected to the local and international network
- Water trucks: water supply
- Mobile and fixed fuel tanks and stations.

15.8 Camps and Accommodation

A temporary construction camp is planned that will house 3,500 temporary workers, and a permanent camp for operations is proposed, which will accommodate 704 workers.

15.9 Power and Electrical

Electricity will be provided via an approximately 100 km long, 220 kV overhead transmission line that will run from the existing Montalvo substation, located in Moquegua, to the new Tía María substation at Pampa Cachendo. The Montalvo substation, which is part of the SEIN (National Interconnected Electric System), will require construction of an additional warehouse.

Abengoa Peru designed the 220 kV transmission line, and is managing the permitting of the right-of-way, and line operations for Southern Copper.

15.10 Water Supply

During the Project construction phase, it is planned to request authorizations for temporary use of water from the La Ensenada canals that irrigate agricultural areas to La Motobomba beach and/or water from the mouth of the Tambo River and/or water from the San Camilo canals that also irrigate agricultural areas.

The first two water sources will require water tankers to truck the water from the source to the planned mine site, and will result in temporary road traffic increases. The third source will see the water tankers using the Pan-American highway, from San Camilo to km 1027, and this is not expected to result in major traffic impacts.

During the operations phase, water will be provided from a desalination plant to be constructed on the coast. Sea water will be captured by the direct intake method from the El Sombrero Beach, north of the town of Mejía, in the Mejía district at a rate of 2,448 m^3/hr. A reverse osmosis desalination plant will lower the amount of chloride in the water from 35,000 ppm to 500 ppm, and will have a brine discharge outfall into the sea. Two pumping stations will pump the desalinated water from the plant to the Pampa Cachendo site, where it will be stored in a pond. The first pumping station will be at the desalination plant, and the second station will be 15 km from the first, at an elevation of 200 masl. The second station will pump water the 20 km to the storage pond that will be at a 1,000 masl elevation.

The 35 km long desalinated seawater pipeline from the beach in Mejía to Pampa Cachendo will follow the Mollendo–La Joya railway easement, which was acquired by Southern Copper.

15.11 Previously-Purchased Equipment

During 2009–2011, Southern Copper acquired selected process equipment and equipment for the electricity supply, completed an expansion of the Montalvo electrical substation located in Moquegua, and completed 80 km of construction of the power transmission line. The construction activity was suspended when the Project as then envisaged was halted in 2011.

A portion of this equipment was transferred to other Southern Copper operations. Wood completed a site visit to the key storage areas to verify the existence of key equipment remaining for the purposes of supporting the capital cost estimate in Chapter 18.2.

The equipment viewed by Wood appears to be properly stored. Southern Copper advised Wood that all equipment is currently subject to a maintenance and preservation program.

16 MARKET STUDIES

16.1 Markets

The Tía María Project is expected to produce copper cathodes that will have a Cu >99.99% purity.

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.

16.2 Market Strategy

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. Cathode copper is sold onto the Asian, European, Brazilian and/or North American markets.

It is assumed that the end-purchasers of any cathodes from the Tía María Project will be in similar locations to those where Southern Copper already has a product market.

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.

The copper price forecasts used are:

- Mineral resources
  - Copper: US$3.80/lb
- Mineral reserves and cashflows:
  - Copper: US$3.30/lb.

The assumed exchange rate for cashflow analysis purposes was US$1.00 = PENS/3.60. This exchange rate was provided by Southern Copper.

16.4 Contracts

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

No contracts are in place for sale of any of the proposed cathode production. Southern Copper expects that any sales terms will be in line with contracts that Southern Copper has for its existing Peruvian 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 Peru.

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

17.1 Introduction

The main Project components will include the Tía María open pit, La Tapada open pit, crushing area, dynamic heap leach, spent ore facility area, SX/EW plant, desalination plant and water pipeline system, WRSFs, accommodation camp, railroad, and borrow pits.

The leaching and SX/EW metallurgical processes will not generate liquid effluents.

Domestic wastewater will be treated and used, subject to sanitary control, to irrigate access roads, mine roads, and green areas.

17.2 Overview

On August 1, 2014, Southern Copper received the final approval of Tía María's Environmental Impact Assessment (EIA). The construction permit for the 120,000 t/a SX/EW copper project was granted on July 8, 2019. This permit was obtained after completing an exhaustive review process, complying with all established regulatory requirements and addressing all observations raised.

On July 15, 2019, anti-mining groups staged a violent demonstration affecting economic as well as other activities in the Islay province. These actions were followed by the filing of three complaints, sponsored by groups opposing the Tía María Project, with the Mining Council, which is the Peruvian administrative authority responsible for ruling on these complaints. The Mining Council temporarily suspended the construction permit on August 8, 2019. On October 7, 2019, as part of the process, the Mining Council conducted a hearing on the complaints and Southern Copper's position. On October 30, 2019, the Mining Council of the Peruvian Ministry of Energy and Mines ratified the construction permit for the Tía Maria Project.

Southern Copper has been working to promote the welfare of the Islay province population. As part of these efforts, Southern Copper implemented social programs in education, healthcare and productive development to improve the quality-of-life in the region. The company also has promoted agricultural and livestock activities in the Tambo Valley and supported growth in manufacturing, fishing and tourism in Islay.

During the construction and operation phase, Southern Copper will make it a priority to hire local labor to fill the 9,000 jobs (3,600 direct and 5,400 indirect) that the company expects to generate during Tía María's construction phase. When operating, Southern Copper expects Tía María to directly employ 600 workers and indirectly provide jobs for another 4,200. Additionally, from day one of its operations, Southern Copper will generate significant contributions to revenues in the Arequipa region via royalties and taxes.

The Project will use state-of-the-art SX/EW technology with the highest international environmental standards. SX/EW plants are the most environmentally friendly facilities within the copper industry as they do not require a smelting process and, therefore, release no atmospheric emissions.

In the Moquegua region, Southern Copper participates in a "development roundtable" with local municipal authorities and community representatives to discuss the social needs and the way the company could contribute to sustainable development in the region. Currently, the roundtable is discussing the creation of a Moquegua Region Development Fund for which Southern Copper has offered a contribution of PEN1,000 million (approximately $275.9 million). While final funding is not yet settled, Southern Copper has committed to contribute PEN108.4 million (approximately $29.9 million) as an advance, which is being used to fund an educational project. In addition, there is a commitment to finance the construction of a residual water treatment plant at Ilo for PEN78.0 million (approximately $21.5 million).

Southern Copper has committed PEN86.9 million (approximately $24.0 million) for the construction of two infrastructure projects in the Moquegua region under the "social investment for taxes" (obras por impuestos) program, which allows the company to use these amounts as an advance tax payment.

17.3 Baseline and Supporting Studies

Baseline studies included:

- Landscape
- Climate
- Air quality
- Noise
- Soil
- Flora
- Fauna

- Local resources
- Land use
- Social environment.

The Project setting and climate were discussed in Chapter 4.1 and Chapter 4.2 respectively.

Four monitoring stations were used to obtain air quality results. One station had a PM 10 (inhalable particles, with diameters that are generally 10 µm and smaller) above the national standard.

Two noise level monitoring stations, one of which was in the town main square, exceeded the national standard of 60 decibels.

Soils were tested for pH, arsenic, barium, cadmium, chromium, mercury and lead, at three monitoring sites. One site had a pH reading that was outside the national standard.

A total of 23 species (15% of the total number of species sampled) were identified as endemic or had some type of conservation category assigned. This included three species listed in the Peruvian State's register (D.S. Nº 043-2006-AG), 10 species of plants in the cactus family in that were included in the CITES Appendix II, and 12 endemic species.

A baseline was approved on August 1, 2014, and was included in the EIAd. The primary social information for the Project was collected during 2012.

A Social Diagnosis of the Tía María Mining Project was completed in 2019, which collected sociodemographic and socioeconomic information over the area of direct social influence (DSIA). The study area covered the Districts of Cocachacra, Dean Valdivia and Mejia, and included identification of stakeholders and analysis of local Project perceptions.

There are no indigenous or native communities registered in the database of the Ministry of Culture of Peru within the DSIA.

The main economic activities in the DSIA are agriculture and cattle raising.

17.4 Environmental Considerations/Monitoring Programs

Key areas that will require monitoring include the heap leach facility, the spent ore facility, and the WRSFs.

17.5 Closure and Reclamation Considerations

The closure plan includes three phases, progressive closure, final closure and post-closure. Th conceptual closure plan assumes that closure activities will take place over nine years (four years of progressive closure and five years of final closure). Post-closure monitoring and maintenance activities will begin the year following the final closure year, and will extend for an additional five years.

Progressive closure will include La Tapada open pit, sulfides dumps, La Tapada primary crusher and overland conveyor, and built infrastructure. Final closure will cover the Tía María open pit, WRSFs, spent ore stockpile, process facilities, and water management, built infrastructure and borrow pits (quarries). Post closure will include closure monitoring and maintenance.

The following social programs as part of the closure plan:

- Development of agricultural skills for local citizens
- Development of local business and trade opportunities
- Health and safety education and support
- Educational opportunities for all age groups
- Development of technical capacities in environmental monitoring.

Due to the original desert conditions, revegetation in the area has not been considered. No aquatic habitat rehabilitation activities will be conducted.

As part of the post-closure maintenance and monitoring activities, the following will be performed:

- Physical maintenance
- Hydrological maintenance
- Biological maintenance
- Physical stability monitoring
- Geochemical stability monitoring
- Hydrologic stability monitoring
- Biological monitoring
- Post-closure social monitoring

- Air quality monitoring
- Water quality monitoring

The estimated reclamation bond for closure is US$115.6 M. The Tía María closure plan was approved on October 14, 2021. The closure plan must be updated every five years.

17.6 Permitting

Southern Copper conducted exploration activities from 2003–2013. Southern Copper has an EIAd approved in 2014 (R.D. N° 392-2014-MEM-DGAAM). In 2017 the EIAd was extended for two additional years (R.D. N° 168-2017-SENACE/DCA).

In 2019, Southern Copper obtained authorization to commence construction activities under R.D. N° 328-2019-MINEM-DGM/V.

A list of the granted permits is provided in Table 17-1. These permits allow construction activities.

In addition to the permits noted in Table 17-1, Southern Copper must manage the following authorizations:

- Operating Authorization
- Water use license
- Explosives use permit
- Certificate of Non-existence of Archaeological Remains
- EIA update
- Closure Plan update (reclamation bond update)
- Mining Plan Update.

Where facility footprints have been approved, and Southern Copper intends on modifying those footprints to a larger facility size as part of the LOM plan outlined in this Report, permit modifications will need to be applied for, and approved.

Table 17-1: Granted Permits

Permit Area	Permit Number	Permit	Date	Authorized By
Environmental	Resolución Directoral N° 392-2014-MEM/DGAAM	Approval of the Environmental Impact Study for Tía María	August 1, 2014	Ministry of Energy and Mines
Environmental	Resolución Directoral N° 168-2017-SENACE/DCA	Extension of term for the Tía María Environmental Impact Study	July 6, 2017	Ministry of Energy and Mines
Environmental	Resolución N° 1163-2017-MEM-DGM/V	Postponement of annual guarantee for the Closure Plan of the Tía María Mining Unit, for a maximum of three years	December 18, 2017	Ministry of Energy and Mines
Environmental	Resolucion Directoral N° 195 -2021/MINEM-DGAAM	Modification of the Mine Closure Plan of the Tía María Mining Unit	October 14, 2021	Ministry of Energy and Mines
Beneficiation	Resolución N° 0328-2019-MINEM-DGM/V	Approval of the "Tía María" benefit concession for an installed capacity of 100,000 t/d	July 8, 2019	Ministry of Energy and Mines

17.7 Social Considerations, Plans, Negotiations and Agreements

17.7.1 Project Background

Southern Copper has a complex history with stakeholders in the Project area of influence.

In 2009, a referendum was held in the province of Islay, promoted by the Province Coordinator of Fight Against Mining Aggression (Coordinadora Provincial de Lucha contra la Agresión Minera), where 90% of the population voted against Project development as the Project was then envisaged.

Social conflict was identified by the Ombudsman Office (the Peruvian authority tasked with identifying social conflicts and mitigating these) in 2009, and titled "Opposition of local authorities and a sector of the population of the province of Islay to the development and the exploitation of the Tía María Project initiated by the company Southern Peru Copper Corporation due to possible damage to the ecosystem of the area and reduction of water volumes of the Tambo River Valley".

The first Environmental Impact Assessment was prepared in 2011 but declared inadmissible by the Ministry of Energy and Mines. This study assumed that the Project would use groundwater through wells located in the Tambo River Valley, which is an agricultural area that produces rice, sugar cane, and paprika, among other products.

In 2013, Southern Copper developed a new Environmental Impact Assessment, in which the water source would be from a desalination plant to be located in the municipality of Mejia.

17.7.2 Site Visit

Wood undertook a site visit in October 2021 that included a site tour, review and inspection of selected social projects and review of participatory mechanisms that Southern Copper had implemented.

Wood was able to check that that Southern Copper is providing open and transparent mechanisms for the local population to participate in, and be informed about the Project. Southern Copper appears to be building collaborative relationships with authorities and national entities (technical and political). The progress is shown by positive comments made by local stakeholders to Wood regarding Southern Copper's social management. Social and productive projects are benefiting local villages and populations, and appear to be creating a positive local image and reputation for Southern Copper.

Having a positive local impression of the Project may help to align regional attitudes toward allowing Project development to that of the local community. The uncertainties with respect to political support at a local, regional and national level in Peru will remain an ongoing risk to the Project.

17.7.3 Current Consultation

During the years that Southern Copper has been working in the DSIA, a number of social programs were implemented to aid the economic and human development of the local communities including:

- "Good Neighbors", a basic health program
- Agricultural assistance and training
- Job skills training and internships
- Educational assistance and vocational guidance programs
- Rural medical care.

Southern Copper implemented a Social Management Plan, updated to 2021, to address issues raised as a result of the Covid-19 pandemic. The Social Management Plan includes the following policies:

- Good citizens, to establish positive and healthy coexistence between the Project and stakeholders
- Economic development, to strengthen the local economy and create new local economic opportunities
- Human development, to enhance population capabilities.

Southern Copper provides open communication channels, such as email addresses, telephone numbers and physical offices to allow the communities to raise concerns and issues with the company and discuss aspects of the Project. Southern Copper regularly collects updated social information to ensure that discussions are held in the context of the most up-to-date information.

To improve communication and social participation in determining which social programs should be developed and what issues are key community concerns, Southern Copper created four community committees to provide input:

- Valle Unido Cocachacra, established in 2017
- Valle Unido Deán Valdivia, established in 2017
- Valle Unido Mollendo, established in 2019
- Valle Unido Punta Bombón, established in 2017.

Southern Copper also set up a Community Care Service that is accessible by the communities to obtain Project information and to provide feedback to Southern Copper, whether positive or negative.

17.8 Qualified Person's Opinion on Adequacy of Current Plans to Address Issues

Wood conducted a review of the social information provided by Southern Copper. Wood considers it reasonable to rely on Southern Copper for this information as follows:

- Southern Copper provided supporting documentation on their studies to recognize the issues that might be of a concern to the local communities and that documentation meets what typically available for pre-feasibility level studies. Southern Copper has established citizen participation mechanisms and has open communication channels to provide attention to, and answers for, community concerns and address grievances

- Southern Copper has developed community development plans and diagnoses, set up a number of social and productive projects, and engaged with local communities in participatory mechanisms within the area of the DSIA. These steps show that Southern Copper has a process in place to obtain the social license within the social influence area, to permit, construct, and operate the Tía María mine. The information provided by Southern Copper on obtaining a social license is at a level that supports a pre-feasibility level of study
- Southern Copper has a community development model based on a Good Neighbors policy, economic development, and human development. This model allows Southern Copper to identify expectations, local needs, and social issues, and engage with communities to provide solutions. Southern Copper has provided Wood with information supporting their proposed actions to recognize and mitigate social issues before they arise, or to address any social issues that may come up during pre-development, development, mine operating activities and mine closure.
- Southern Copper confirmed to Wood that Southern Copper has proper internal control and follow up on their social projects and programs, which supports their process for establishing social communication. Community understanding of the Project has been established by Southern Copper and appears to be operating as intended.

Although Southern Copper has tried to ensure the local stakeholders are not opposed to the current Project as envisaged in this Report, the general environment in Peru can have the following risks for permitting and operating mining projects:

- Social conflicts due to negative perceptions from the communities and local authorities based on concerns about environmental management and the impacts of the Project on their economic activities
- Unfavorable position from the national government, prioritizing a political and social statement in spite of the legal licenses obtained by Southern Copper
- Organizations promoting an anti-mining culture.

18 CAPITAL AND OPERATING COSTS

18.1 Introduction

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

An internal mining study was completed in 2007, which assumed a 120,000 t/d cathode production rate. In 2012, the 2007 study was used as a basis for a cost estimate update. In 2014, the 2007 was used as a basis for an updated internal study completed by CAD Mexico. There were no more recent studies available to Wood.

The cost estimates used in this Report are based on the 2014 and 2007 studies and 2012 cost update, as applicable, and escalated to second-quarter (Q2) 2021, referred to as current in this Chapter.

The current capital estimate is supported by previous quotes escalated to Q2 2021 for major capital items and new budgetary quotes obtained for major mining equipment items.

18.2 Capital Cost Estimates

18.2.1 Basis of Estimate

The capital cost estimate includes:

- Mining: based on Owner operated open pit mining. Includes mining equipment, mine development (pre-stripping), mine facilities (access roads, power supply and distribution), and supporting infrastructure (workshops, storage, fuel, explosives, offices, change rooms)
- Process plant: includes ore crushing and overland conveying systems, stockpile, screening system, curing and agglomeration, dynamic leach pad, SX, tank yard and EW plant, solution recovery and handling system, and spent ore facility
- Plant infrastructure: consists of general plant buildings such as the administration building, workshops and storage, laboratory, and other supporting facilities (change house, control rooms, dining room, first aid, gatehouse and reagent storage).
- On- and off-site infrastructure: incorporates the site access road; railway from the existing Guerreros Station to the Project site; power supply, water supply consisting

of sea water intake, desalination plant, pumping and pipeline, water storage; and accommodations camps.

A period of 36 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 production.

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:

- 2012: 1.00 USD = 2.67 PEN
- 2021: 1.00 USD = 3.60 PEN (provided by Southern Copper)

No allowances were made for fluctuations in exchange rates.

A design allowance was included to cover inaccuracies in quantity estimates and the risk associated with engineering and construction. That allowance based on the level of detail and the quality of the information provided and was specified against each line item. The overall design allowance was 5.58% of total direct costs.

A rate per manhours approach was used to develop the overall installation cost that formed the basis for all discipline cost adjustments. Craft labor rates were based on Wood’s database of recent projects in Peru. A typical 30% percentage allowance of the installation cost was included to cover contractor distributable costs.

18.2.2 Prior Capital

Prior capital costs, totaling US$340.5 M, were excluded from the cash flow model because the costs are sunk, but the costs were carried over for financial and tax depreciation for the Modified Mining Royalty and Special Mining Tax, and for income tax calculations. Prior capital spent was not escalated. No allowance was added to cover for refurbishment of previously-purchased equipment.

18.2.3 Mining

Equipment capital costs for the major and support mine mobile equipment were based on vendor quotes provided specifically during 2021 for the Project. Quotes were ready-to-work (RTW) at the mine site and included costs for transportation from the factory to the mine site including port charges in the origin country, ocean freight, port charges in Peru (including cranes for unloading and loading of blade components), customs charges, insurance, land freight in Peru, unloading at the mine site, assembly, and commissioning. Starter spares were not included. Ancillary mine equipment was estimated based on previous budgetary quotations obtained for similar projects sourced from Wood's database and CostMine (2018).

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.

18.2.4 Process

Major process and infrastructure equipment costs were based on firm quotations obtained by Southern Copper in 2008–2010, normalized to Q2 2021, and actual expenditures on equipment acquisitions by Southern Copper. Bulk material and minor equipment costs were based on a combination of budgetary pricing from similar projects or previous estimated pricing escalated to 2021 using normalization factors.

18.2.5 Construction

Construction indirect costs were estimated as follows:

- Camp, bussing and meals: included at $3.0 per direct manhour
- Construction power supply: included as an allowance based on cost estimates from previous mining studies escalated to current
- Temporary construction facilities: included as an allowance based on cost estimates from previous mining studies escalated to current
- Security: included at 2% of the total installation cost.

Vendor representative costs are included at 1.2% of total equipment supply cost excluding mining equipment.

Capital spare parts were included at 2% of total equipment supply cost including mining equipment.

Start-up and commissioning services were included as an allowance based on the previous cost estimate escalated to current.

First fills were included at 3.3% of total equipment supply cost excluding mining equipment.

Freight was calculated at 8% of the total cost of imported materials and equipment, and 2% of total local goods. The transportation of existing equipment (already purchased) from warehouses to the plant site was calculated at 2% of the equipment cost.

The engineering, procurement and construction management (EPCM) cost was estimated on a factored basis of total direct cost (excluding prior capital spent and mining) as follows:

- Engineering and Project services: included at 5.4% of total direct cost, excluding prior capital spent and mining
- Construction management: included at 8.4% of total direct cost, including prior capital spent and excluding mining costs
- Materials handling: included as an allowance based on previous costs escalated to current
- Surveying services, QA/QC: included as an allowance based on previous costs escalated to current.

Owner's costs were estimated at 1.0% of the total Project cost. An allowance was included for temporary construction, camping maintenance and security costs, based on previous costs escalated to current.

18.2.6 Contingency

The overall contingency was approximately 14.52% of the total cost excluding the prior capital spent.

18.2.7 Sustaining Capital

Sustaining capital costs were estimated by area and allocated over time using the same basis as was applied to the initial capital cost estimate.

Mining sustaining costs were estimated based on the mine plan. Budgetary quotes were used for the major and support mine equipment estimate. Ancillary mine equipment was estimated based on previous budgetary quotations obtained for similar projects sourced from Wood's database and CostMine (2018).

Equipment and component life spans were estimated by Southern Copper, based on Southern Copper's experience. No replacement or refurbishment of equipment was estimated for the last three years of operations.

Liner quantities for the sulfide stockpiles and spent ore facilities were estimated by Wood based on the available design drawings.

An allowance was included to cover road costs for the Tía María deposit area based on previous costs escalated to current.

Indirect costs were estimated using the same percentage allowances as used in the initial capital cost estimate.

18.2.8 Capital Cost Estimate Summary

The capital cost estimate totals US$2,071.3 M, consisting of US$1,751.3 M in initial capital and US$320 M in sustaining capital.

Capital costs were applied in the financial model excluding value-added tax.

Table 18-1 summarizes the capital costs by cost area. Table 18-2 summarizes the estimated sustaining capital requirements.

18.3 Operating Cost Estimates

18.3.1 Basis of Estimate

Operating costs were based on the 2014 study, updated based on Wood's experience, data from Southern Copper's operating mines in 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 adjusted by Wood to reflect operational considerations. 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 Peru.

The majority 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.

Table 18-1: Summary of Capital Cost by Area

Area	Sub-area	Updated Capital Estimate Excluding Prior Capital Spent (US$ M)	Prior Capital Spent (US$ M)	Total Project Cost (US$ M)
Mine	Mine development (pre-stripping) and mining equipment	209.9	1.2	211.1
Dry area	Primary and fine crushing, conveyor, heap leach facility, spent ore storage, general services, power supply to plant, acid storage	375.5	208.3	583.8
Wet area	SX/EW, tank yard	269.8	6.7	276.4
Facilities	Roads, general services, power supply, built infrastructure, gatehouse, acid storage, desalination plant and pipelines, accommodation camp, WRSFs, railway	322.7	9.4	332.1
Indirect costs	Indirect construction costs, EPCM, freight, import duties, Owner's costs	351.4	114.9	466.3
Contingency		222.1	—	222.1
Total		***1,751.3***	***340.5***	***2,091.8***

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

Table 18-2: Sustaining Capital Cost Estimate

Area	Sustaining Capital Cost (US$ M)
Mining equipment	159.6
Tía María sulfides WRSF	0.9
Spent ore facility	17.8
Additional crusher and conveyor – Tía María	94.3
Process plant to Tía María mining road	10.4
Indirect costs	37.0
Total	***320.0***

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

Load-and-haul design criteria were based on the 2014 mining study and on 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.

Average maintenance parts and repair (M&R) costs over the equipment life cycle for the major mine equipment were estimated. The M&R cost includes the costs to repair and replace parts including rebuild 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$1.43/t mined over the LOM.

The total material mined without the pre-stripping (Year -1) is forecast to be 1,311 Mt. During the two initial years, there will be relatively short haul routes (1–1.4 km) due to the La Tapada open pit deepening only gradually, resulting in relatively low mining costs that average US$1.18/t mined. As the La Tapada pit deepens in Years 3 to 9, the mining costs will average US$1.41/t mined. When both deposits (Tía María and La Tapada) are mined together from Year 10 onwards, the mining cost will increase to an average US$1.50/t.

18.3.3 Process

The estimated operating plant cost for the treatment of La Tapada ore is US$0.60/lb Cu produced, equivalent to US$3.76/t processed. The costs were estimated based on a throughput rate of 100,000 t/d. The processing cost includes all costs from primary crushing to cathode production, strapping, and storage.

The estimated operating plant cost for the treatment of Tía María ore is US$0.88/lb Cu, equivalent to US$3.59/t processed.

The differences between the operating costs for the Tía María and La Tapada open pits is due to the cost of operating the on-terrain overland conveyors. Mineralization must be transported uphill to the process facilities from La Tapada, located at 350 masl, and Tía María, located at 780 masl.

18.3.4 General and Administrative

The two open pit mines 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 66 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$13.3 M/a or US$0.37/t of 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
Labor	3.2	0.09
Expenses	10.2	0.28
Total	***13.3***	***0.37***

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

Table 18-4: LOM Operating Cost Estimate

Description	Total (US$ M)	Unit Cost	
Mining*	1,876.7	US$/t mined	1.43
Process	2,474.3	US$/t processed	3.48
G&A	264.7	US$M/a	13.3
Total	***4,615.7***		

Note: * Excludes capitalized pre-stripping cost of US$42.4 M incurred in Year -1. Numbers have been rounded and 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 Tía María Project; mineral reserves; the cost and timing of any development of the Tía María Project; the proposed mine plan and mining strategy; dilution and extraction recoveries; processing method and rates and production rates; projected metallurgical recovery rates; infrastructure requirements; capital, operating and sustaining cost estimates; 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; federal and local tax laws; 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 PEN/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 internal rate of return (IRR), expressed as the discount rate that yields a net present value (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 reserve estimates are summarized in Chapter 12.5. The projected mine life is provided in Chapter 13.4.

The metallurgical recovery forecast is provided in Chapter 10.3. Recoveries in the cash flow model were applied over two years to account for leaching recovery lag time. That is, for La Tapada, 66.52% is recovered in the first year and 2.48% recovered in the second year; and for Tía María, 62.34% is recovered in the first year and 2.66% recovered in the second year.

Commodity prices are discussed in Chapter 16.2.

Capital costs are summarized in Chapter 18.2. Operating costs are summarized in Chapter 18.3. Capital and operating costs are reported using Q2 2021 US$.

Royalties are summarized in Chapter 3.8. The modified mining royalty is included in the cashflow analysis.

Closure costs are applied as incurred based on the proposed closure schedule described in Chapter 17.7 (progressive, final and post-closure). 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 assumed 60 days in accounts receivable (including revenue), and 30 days in accounts payable (including cathode selling costs, operating costs, special Mining Tax and Modified Mining Royalty).

The economic analysis is based on 100% equity financing and is reported on a 100% Project ownership basis. The base case economic analysis assumed a constant price with no escalation applied.

19.4 Commercial Terms

Southern Copper provided the long-term commercial terms and charges to be used in the economic analysis. These are based on contract terms from Southern Copper’s other operations in Peru. Transport costs are based on estimates provided by Southern Copper.

The following assumptions are applied in the cashflow analysis:

- 100% of the copper content is payable, subject to a cathode premium of US$58/t
- No price participation applies
- Transport and freight costs of:
  - Land transport (an estimated 70 km by rail): US$6.12/t
  - Port charges (at the port of Matarani): US$12.50/t
  - Ocean freight (from Matarani to Shanghai, China): US$55.00/t.

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.

The assumptions include:

- All expenses excluded the value-added tax (Impuesto General a las Ventas (IGV), except for closure costs that do include IGV
- Modified Mining Royalty (Law N° 29788)
- Special Mining Tax (Law N° 29789)
- Employee profit sharing of 8% of taxable income
- Corporate income tax rate of 29.5%
- Complementary mining pension fund applied at 0.5% of taxable income after employee profit sharing
- Tax loss carried forward not applicable.

Tax depreciation is straight line and is divided into the following categories:

- 3 years: mine development (pre-stripping)
- 10 years (10% annual): mining equipment and process plant and facilities, main electrical sub-station and control and communications networks
- 20 years (5% annual): Tía María crusher and conveyor
- 30 years (3.3% annual): all other facilities.

The same rates are used for financial depreciation, with the exception of pre-stripping that was depreciated over the mine life based on units of production.

No previous expenses were amortized in the analysis.

US$340.5 M of previous capital was excluded from the cash flow model because it is sunk, but it was carried over for financial and tax depreciation to modify the mining royalty, the Special Mining Tax and the income tax calculations.

19.6 Results of Economic Analysis

The Tía María Project is anticipated to generate a pre-tax NPV of US$1,402.1 M at a 10.0% discount rate, an IRR of 22.5% and a payback of 3.4 years.

The financial analysis results show an after-tax NPV of US$676.4 M at a 10.0% discount rate, an IRR of 16.6% and a payback of 4.3 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 19-4.

19.7 Sensitivity Analysis

A sensitivity analysis was performed to identify potential impacts on the after-tax NPV and IRR of variations in metal price, 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 is not a constraint.

The Tía María Project is most sensitive to fluctuations in copper price and grades. It is less sensitive to changes in initial capital cost and operating costs.

Table 19-5 presents the NPV for the Tía María Project at a range of discount rates from 8–12%, with the base case highlighted.

Table 19-1: Summary of Economic Results

Description	Units	Value
Assumed throughput rate	Mt/a	36
Mine life	Years	20 plus one year of pre-production
Copper payable	kt	1,809
After-Tax Valuation Indicators		
Undiscounted cash flow	US$M	3,871.5
NPV @ 10.0%	US$M	676.4
Payback period (from start of operations)	years	4.3
IRR	%	16.6
Project capital (initial)	US$M	(1,751.3)
Sustaining capital	US$M	(320.0)
Closure cost	US$M	(115.6)
Mining operating cost	US$M	(1,876.7)
Process operating cost	US$M	(2,474.3)
G&A	US$M	(264.7)

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 5)

	Units	Total	Year -3	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5
Mine Production										
Waste and low grade material mined	kt	624,887	—	—	21,000	37,950	33,203	32,000	32,000	31,499
Ore mined	kt	711,329	—	—	3,888	28,050	36,000	36,000	36,000	36,001
Cu head grade	%	0.374	0.000	0.000	0.454	0.462	0.480	0.496	0.486	0.500
Feed to Leach										
Ore processed	kt	711,329	—	—	—	31,938	36,000	36,000	36,000	36,001
Cu feed grade	%	0.374	0.000	0.000	0.000	0.461	0.480	0.496	0.486	0.500
Metal Recovery										
Cu recovered	kt	1,808.9	—	—	—	97.9	118.6	123.1	120.8	124.1
Payable Metals										
Cu payable	kt	1,808.9	—	—	—	97.9	118.6	123.1	120.8	124.1
Metal Value										
Cu payable value	US$000	13,265,436	—	—	—	718,270	869,711	902,456	885,942	909,897
Transport Costs										
Cathode transport	US$000	(133,175)	—	—	—	(7,211)	(8,731)	(9,060)	(8,894)	(9,135)
Net Smelter Return	***US$000***	***13,132,262***	—	—	—	***711,059***	***860,980***	***893,396***	***877,047***	***900,763***
Production Costs										
Mining	US$000	(1,876,674)	—	—	—	(73,969)	(85,598)	(91,903)	(94,004)	(96,970)
Process	US$000	(2,474,302)	—	—	—	(117,420)	(134,422)	(135,633)	(135,023)	(135,912)
G&A	US$000	(264,749)	—	—	—	(13,323)	(13,323)	(13,323)	(13,323)	(13,323)

	Units	Total	Year -3	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5
Production Costs	*US$000*	*(4,615,726)*	—	—	—	*(204,711)*	*(233,343)*	*(240,860)*	*(242,350)*	*(246,205)*
MMR and SMT										
Modified Mining Royalty	US$000	(220,030)	—	—	—	(10,429)	(16,311)	(17,537)	(16,633)	(17,683)
Special Mining Tax	US$000	(205,676)	—	—	—	(10,222)	(15,119)	(16,130)	(15,414)	(16,264)
MMR and SMT	***US$000***	***(425,706)***	—	—	—	***(20,651)***	***(31,430)***	***(33,667)***	***(32,047)***	***(33,947)***
Net Operating Earnings	***US$000***	***8,090,830***	—	—	—	***485,696***	***596,206***	***618,869***	***602,651***	***620,611***
Taxes										
Employee profit share	US$000	(458,488)	—	—	—	(22,787)	(31,544)	(33,315)	(33,296)	(34,729)
Complementary mining pension fund	US$000	(26,363)	—	—	—	(1,310)	(1,814)	(1,916)	(1,915)	(1,997)
Income tax	US$000	(1,547,643)	—	—	—	(76,917)	(106,479)	(112,457)	(112,393)	(117,228)
Taxes	***US$000***	***(2,032,494)***	—	—	—	***(101,014)***	***(139,837)***	***(147,688)***	***(147,603)***	***(153,953)***
Capital Costs										
Initial capital	US$000	(1,751,265)	(309,767)	(1,009,999)	(431,499)	-	-	-	-	-
Sustaining capital	US$000	(320,001)	—	—	—	(21,104)	(10,408)	(5,249)	(5,548)	(554)
Capital Costs	***US$000***	***(2,071,266)***	***(309,767)***	***(1,009,999)***	***(431,499)***	***(21,104)***	***(10,408)***	***(5,249)***	***(5,548)***	***(554)***
Closure Cost										
Closure costs	US$000	(115,566)	—	—	—	(149)	(149)	(149)	(149)	(149)
Working Capital										
Change in working capital	US$000	—	—	—	—	(98,956)	(21,530)	(4,554)	2,690	(3,445)
Net Cash Flow										
Before tax	US$000	5,903,998	(309,767)	(1,009,999)	(431,499)	365,487	564,119	608,917	599,644	616,462

	Units	Total	Year -3	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5
After tax	US$000	3,871,503	(309,767)	(1,009,999)	(431,499)	264,473	424,282	461,229	452,041	462,509

Table 19-3: Cash Flow Forecast on an Annual Basis (Year 6 to Year 13)

	Units	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Mine Production									
Waste and low grade material mined	kt	31,499	32,302	33,908	35,662	33,999	35,999	35,999	31,999
Ore mined	kt	36,001	36,001	36,001	36,001	36,001	36,001	36,001	36,001
Cu head grade	%	0.502	0.449	0.351	0.352	0.373	0.346	0.292	0.349
Feed to Leach									
Ore processed	kt	36,001	36,001	36,001	36,001	36,001	36,001	36,001	36,001
Cu feed grade	%	0.502	0.449	0.351	0.352	0.373	0.346	0.292	0.349
Metal Recovery									
Cu recovered	kt	124.7	112.0	88.1	87.4	92.4	85.9	71.6	85.5
Payable Metals									
Cu payable	kt	124.7	112.0	88.1	87.4	92.4	85.9	71.6	85.5
Metal Value									
Cu payable value	US$000	914,327	821,381	645,807	641,148	677,558	629,838	525,272	626,811
Transport Costs									
Cathode transport	US$000	(9,179)	(8,246)	(6,483)	(6,437)	(6,802)	(6,323)	(5,273)	(6,293)
Net Smelter Return	***US$000***	***905,148***	***813,135***	***639,323***	***634,711***	***670,756***	***623,515***	***519,998***	***620,518***
Production Costs									

	Units	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Mining	US$000	(96,975)	(97,579)	(97,650)	(100,100)	(99,057)	(100,389)	(99,694)	(99,330)
Process	US$000	(136,075)	(132,637)	(126,142)	(125,970)	(127,294)	(125,038)	(119,580)	(124,453)
G&A	US$000	(13,323)	(13,323)	(13,323)	(13,323)	(13,323)	(13,323)	(13,323)	(13,323)
Production Costs	***US$000***	***(246,373)***	***(243,540)***	***(237,115)***	***(239,393)***	***(239,675)***	***(238,750)***	***(232,597)***	***(237,105)***
MMR and SMT									
Modified Mining Royalty	US$000	(17,919)	(13,102)	(6,458)	(6,411)	(6,776)	(14,012)	(8,765)	(14,091)
Special Mining Tax	US$000	(16,452)	(12,573)	(5,892)	(5,573)	(6,513)	(12,538)	(8,327)	(12,583)
MMR and SMT	*US$000*	*(34,371)*	*(25,675)*	*(12,350)*	*(11,984)*	*(13,289)*	*(26,550)*	*(17,092)*	*(26,674)*
Net Operating Earnings	*US$000*	*624,403*	*543,920*	*389,858*	*383,334*	*417,793*	*358,214*	*270,310*	*356,739*
Taxes									
Employee profit share	US$000	(35,031)	(28,580)	(16,135)	(15,488)	(17,555)	(25,677)	(18,726)	(25,679)
Complementary mining pension fund	US$000	(2,014)	(1,643)	(928)	(891)	(1,009)	(1,476)	(1,077)	(1,477)
Income tax	US$000	(118,249)	(96,474)	(54,463)	(52,280)	(59,258)	(86,674)	(63,211)	(86,682)
Taxes	***US$000***	***(155,295)***	***(126,697)***	***(71,525)***	***(68,658)***	***(77,822)***	***(113,827)***	***(83,014)***	***(113,838)***
Capital Costs									
Initial capital	US$000	—	—	—	—	—	—	—	—
Sustaining capital	US$000	(93)	(1,545)	(26,682)	(21,356)	(149,014)	(9,263)	(220)	(369)
Capital Costs	***US$000***	***(93)***	***(1,545)***	***(26,682)***	***(21,356)***	***(149,014)***	***(9,263)***	***(220)***	***(369)***
Closure Cost									
Closure costs	US$000	(149)	(149)	(149)	(149)	(149)	(149)	(149)	(149)
Working Capital									

	Units	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Change in working capital	US$000	(676)	14,254	27,093	919	(5,825)	8,819	15,820	(15,449)
Net Cash Flow									
Before tax	US$000	623,486	556,480	390,120	362,748	262,805	357,621	285,760	340,771
After tax	US$000	468,191	429,783	318,594	294,090	184,983	243,794	202,746	226,933

Table 19-4: Cash Flow Forecast on an Annual Basis (Year 14 to Year 20)

	Units	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Mine Production								
Waste and low grade material mined	kt	28,999	36,375	36,969	27,709	22,112	9,541	4,163
Ore mined	kt	36,001	36,001	36,001	36,001	36,000	36,001	31,377
Cu head grade	%	0.288	0.288	0.260	0.294	0.307	0.301	0.300
Feed to Leach								
Ore processed	kt	36,001	36,001	36,001	36,001	36,000	36,001	31,377
Cu feed grade	%	0.288	0.288	0.260	0.294	0.307	0.301	0.300
Metal Recovery								
Cu recovered	kt	69.4	69.4	61.3	70.1	72.1	70.5	64.1
Payable Metals								
Cu payable	kt	69.4	69.4	61.3	70.1	72.1	70.5	64.1
Metal Value								
Cu payable value	US$000	508,571	508,579	449,795	514,406	529,026	516,846	469,797
Transport Costs								

	Units	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Cathode transport	US$000	(5,106)	(5,106)	(4,516)	(5,164)	(5,311)	(5,189)	(4,716)
Net Smelter Return	***US$000***	***503,466***	***503,473***	***445,280***	***509,241***	***523,715***	***511,657***	***465,081***
Production Costs								
Mining	US$000	(95,952)	(98,850)	(98,802)	(96,741)	(94,733)	(83,410)	(74,967)
Process	US$000	(117,189)	(117,669)	(113,361)	(117,399)	(116,226)	(115,407)	(101,453)
G&A	US$000	(13,323)	(13,323)	(13,323)	(13,323)	(13,323)	(13,323)	(11,612)
Production Costs	***US$000***	***(226,464)***	***(229,842)***	***(225,486)***	***(227,463)***	***(224,282)***	***(212,140)***	***(188,033)***
MMR and SMT								
Modified Mining Royalty	US$000	(8,060)	(7,674)	(5,107)	(7,617)	(7,777)	(8,963)	(8,705)
Special Mining Tax	US$000	(7,746)	(7,459)	(5,300)	(7,434)	(7,602)	(8,445)	(8,091)
MMR and SMT	***US$000***	***(15,806)***	***(15,132)***	***(10,408)***	***(15,052)***	***(15,380)***	***(17,408)***	***(16,796)***
Net Operating Earnings	***US$000***	***261,196***	***258,499***	***209,386***	***266,727***	***284,054***	***282,110***	***260,252***
Taxes								
Employee profit share	US$000	(17,709)	(17,321)	(13,392)	(17,360)	(17,784)	(18,768)	(17,612)
Complementary mining pension fund	US$000	(1,018)	(996)	(770)	(998)	(1,023)	(1,079)	(1,013)
Income tax	US$000	(59,777)	(58,468)	(45,205)	(58,598)	(60,029)	(63,353)	(59,451)
Taxes	***US$000***	***(78,504)***	***(76,785)***	***(59,367)***	***(76,955)***	***(78,836)***	***(83,201)***	***(78,076)***
Capital Costs								
Initial capital	US$000	—	—	—	—	—	—	—
Sustaining capital	US$000	(46,455)	(22,049)	(92)	—	—	—	—
Capital Costs	***US$000***	***(46,455)***	***(22,049)***	***(92)***	—	—	—	—

	Units	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Closure Cost								
Closure costs	US$000	(149)	(149)	(149)	(8,051)	(20,422)	(7,158)	(2,087)
Working Capital								
Change in working capital	US$000	17,571	221	8,868	(10,023)	(2,626)	1,161	5,663
Net Cash Flow								
Before tax	US$000	232,162	236,522	218,013	248,652	261,006	276,112	263,829
After tax	US$000	153,658	159,737	158,645	171,697	182,170	192,912	185,753

Table 19-5: Cash Flow Forecast on an Annual Basis (Year 21 to Year 30)

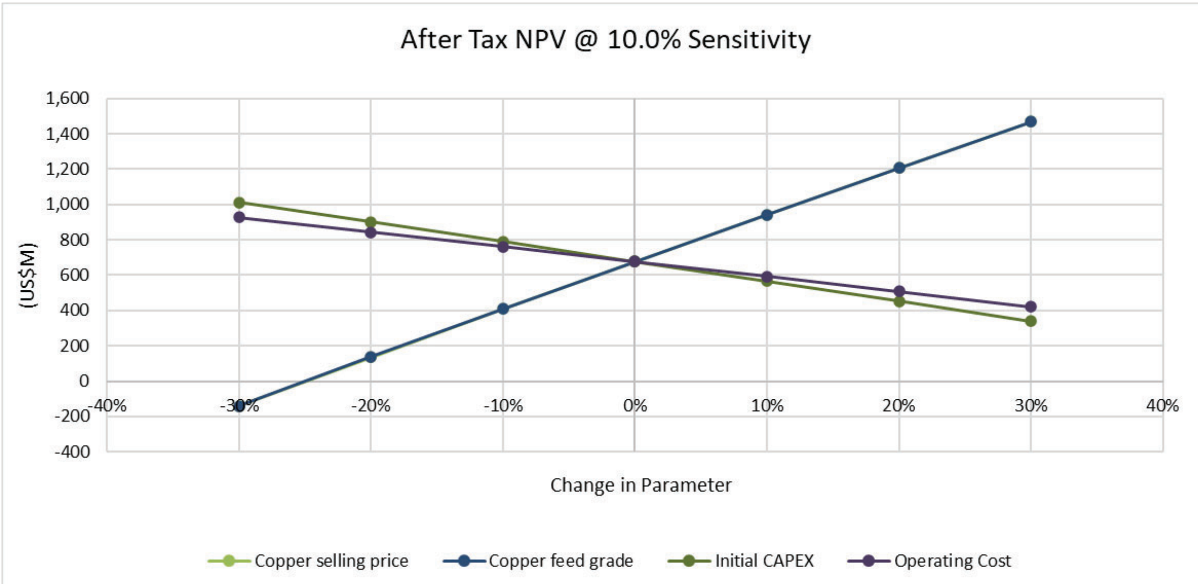
	Units	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Mine Production											
Waste and low grade material mined	kt	—	—	—	—	—	—	—	—	—	—
Ore mined	kt	—	—	—	—	—	—	—	—	—	—
Cu head grade	%	—	—	—	—	—	—	—	—	—	—
Feed to Leach											
Ore processed	kt	—	—	—	—	—	—	—	—	—	—
Cu feed grade	%	—	—	—	—	—	—	—	—	—	—
Metal Recovery											
Cu recovered	kt	—	—	—	—	—	—	—	—	—	—
Payable Metals											
Cu payable	kt	—	—	—	—	—	—	—	—	—	—

	Units	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Metal Value											
Cu payable value	US$000	—	—	—	—	—	—	—	—	—	—
Transport Costs											
Cathode transport	US$000	—	—	—	—	—	—	—	—	—	—
Net Smelter Return	***US$000***	—	—	—	—	—	—	—	—	—	—
Production Costs											
Mining	US$000	—	—	—	—	—	—	—	—	—	—
Process	US$000	—	—	—	—	—	—	—	—	—	—
G&A	US$000	—	—	—	—	—	—	—	—	—	—
Production Costs	***US$000***	—	—	—	—	—	—	—	—	—	—
MMR and SMT											
Modified Mining Royalty	US$000	—	—	—	—	—	—	—	—	—	—
Special Mining Tax	US$000	—	—	—	—	—	—	—	—	—	—
MMR and SMT	***US$000***	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**
Net Operating Earnings	***US$000***	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**
Taxes											
Employee profit share	US$000	—	—	—	—	—	—	—	—	—	—
Complementary mining pension fund	US$000	—	—	—	—	—	—	—	—	—	—
Income tax	US$000	—	—	—	—	—	—	—	—	—	—
Taxes	***US$000***	—	—	—	—	—	—	—	—	—	—
Capital Costs											

	Units	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Initial capital	US$000	—	—	—	—	—	—	—	—	—	—
Sustaining capital	US$000	—	—	—	—	—	—	—	—	—	—
Capital Costs	***US$000***	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**
Closure Cost											
Closure costs	US$000	(10,873)	(17,826)	(16,940)	(17,351)	(10,293)	(441)	(441)	(430)	(430)	(430)
Working Capital											
Change in working capital	US$000	60,004	—	—	—	—	—	—	—	—	—
Net Cash Flow											
Before tax	US$000	49,131	(17,826)	(16,940)	(17,351)	(10,293)	(441)	(441)	(430)	(430)	(430)
After tax	US$000	49,131	(17,826)	(16,940)	(17,351)	(10,293)	(441)	(441)	(430)	(430)	(430)

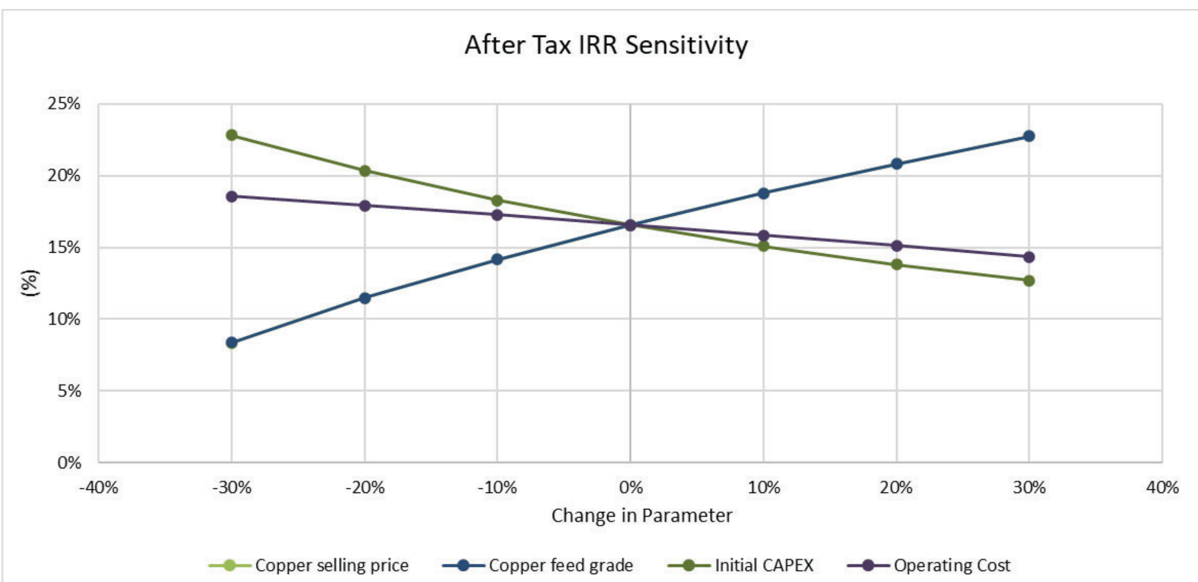
Note: MMR = Modified Mining Royalty or Regalia Minera Modificada in Spanish. SMT = Special Mining Tax or Impuesto Especial a la Mineria

Figure 19-1: Sensitivity of After-Tax NPV At A 10% Discount Rate



Note: Figure prepared by Wood, 2021. Capex = capital cost estimate.

Figure 19-2: Sensitivity of After-Tax IRR At A 10% Discount Rate



Note: Figure prepared by Wood, 2021. Capex = capital cost estimate.

Table 19-6: After-Tax NPV at Different Discount Rates (base case is highlighted)

Description	After-Tax NPV (US$ M)
NPV @ 8%	1,017.8
NPV @ 9%	836.1
NPV @ 10%	**676.4**
NPV @ 11%	535.7
NPV @ 12%	411.4

Note: Base case is highlighted.

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 Project is wholly owned by Southern Copper.

The Project covers an approximately area of 34,790 ha in 55 concessions.

Southern Copper was granted a beneficiation concession construction permit dated July 8, 2019, for a production capacity of 100,000 t/d.

Surface rights in the form of surface property parcels and easements have been obtained.

Southern Peru has easement agreements in place that cover the proposed powerline route and the planned water pipeline that will run from the envisaged desalination plant to the mine. A number of easement agreements with private individuals or associations are in place.

The Project currently holds no water rights. The mine plan assumes that water for process operations will be sourced from a desalination plant. The majority of the surface rights for the planned water pipeline have been acquired under agreement. Approximately 7% of the planned route requires agreements to be concluded.

A mining royalty is payable to the Government of Peru, based on operating income margins with graduated rates ranging from 1–12% of operating profits. There is also a mining tax payable, based on operating income, with rates that range from 2–8.4%.

22.3 Geology and Mineralization

The Tía María and La Tapada deposits are examples of porphyry copper deposits.

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.

Drilling totals 169 holes (36,262 m) for Tía María and 318 holes (116,439 m) in for La Tapada. All drilling was used for either geological modeling and/or mineral resource estimation.

Drill spacing at the La Tapada deposit was conducted using a five-spot pattern at 100 m distances, which corresponds to a uniform drill spacing of 70.7 m. On the periphery of the deposits, the maximum drill spacing is 200 m from the main drill pattern.

For the Tía María deposit, drill spacing is irregular, at about 40–80 m in the core of the deposit, with 150 m spacing on the deposit periphery.

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. Wood had Southern Copper collect 20 samples for check SG determinations at SGS Perú, using a paraffin-coated immersion method that is better suited to porous samples. Results exhibited an overall positive bias for SGS Perú relative to Southern Copper. These results are unusual because the wax-coat method normally returns lower density values than the direct immersion method. These biases not as yet unexplained and present a risk to the La Tapada and Tía María mineral resource estimates because the tonnages may be underestimated by as much as 10% locally.

The sample preparation, analysis, quality control, and security procedures are acceptable for heap leach copper deposits. The sample preparation, analysis, quality control, and security procedures are sufficient to provide reliable data to support estimation of mineral resources and mineral reserves. However:

- No systematic QA/QC processes were in place for the initial assaying at Tía María
- Limited QA/QC data are available for La Tapada, consisting of re-assays of original SGS Perú or CIMM Perú assays. The data show acceptably small biases for total copper. However, the 2005 and 2007 re-assay programs suggest a soluble copper bias, with ALS positively biased by about 10% from 0–0.3% CuS. Soluble copper should be used with caution as it is at the limit of acceptance.

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, and an integrity check on 30% of the La Tapada data.

The data verification programs concluded that the data collected from the Tía María Project area adequately support the geological interpretations and constitute a database of sufficient quality to support the use of the data in mineral resource and mineral reserve estimation.

Wood recommended that the measured category not be reported due to concerns with density data, lack of down hole surveys, and social license considerations.

22.6 Metallurgical Testwork

Metallurgical testwork was conducted by two metallurgical testwork facilities that were independent and in a facility that was operated by Southern Copper.

Industry-standard studies were performed as part of process development and initial plant designs. Metallurgical tests were carried out at bench-scale on oxide and sulfide mineralization. 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.

Recovery projections for copper and gold are based on formulae. Recovery factors estimated are based on appropriate metallurgical testwork, and are appropriate to the mineralization types and the selected process route. The average LOM recovery estimate based on the current mine plan and the metallurgical recovery forecast is 65% for Tía María ore and 69% for La Tapada ore. The combined average copper recovery for both ores is projected to be 68.04%.

Samples were selected to best represent the distribution of the lithologies present in both the Tía María and La Tapada deposits. The selection of samples also ensured adequate spatial coverage of the deposit.

No major deleterious elements are known from the product sales perspective. Levels of aluminum and magnesium will need to be monitored as these may impact operating costs.

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, 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 density data, and lack of down hole surveys. In addition, when considering technical and economic factors, the downgrade of the measured classification was supported by the uncertainty surrounding social license.

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 cut-off values applied to the estimates; variations in geotechnical (including seismicity), hydrogeological and mining assumptions; and changes to environmental, permitting and social license assumptions.

Specific factors that may affect the estimates include:

- Density determinations. The specific gravity data are negatively biased relative to check data. There is a risk that the tonnage may be underestimated by as much as 10%
- QA/QC procedures were not in place for the original assaying for any of these samples except for the latest data (2007–2008) at La Tapada. Check assaying at ALS

has largely mitigated that risk, but there is still a risk that unreliable data may have been included in the database

- Lack of supporting documentation for a significant percentage of the collar locations is an uncertainty in the quality of these data
- Downhole surveys were not performed on Tía María exploration holes. As a consequence, the lack of survey data does not support classification of measured mineral resources.

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 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 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 obtain and maintain social and environmental license to operate.

22.9 Mining Methods

The open pits will be mined using conventional open pit equipment and mining methods.

The mine plan assumes that La Tapada will be mined in four phases, and Tía María in two.

A one-year pre-production period was envisaged for pre-stripping of waste material.

The mine plan assumes that the first 10 years of mine life will be from La Tapada, based on the deposit grade. Production from La Tapada will continue until about Year 18. Production from Tía María would commence in about Year 11, and would continue until the end of the mine life in Year 20. Tía María is mined later in the LOM plan as the deposit has lower copper grades than La Tapada, and so will produce less copper cathode.

Four oxide stockpiles are planned, with two stockpile locations at each open pit. Sulfide-bearing mineralization is not included in the LOM plan in this Report. However, there may be potential in the future to treat this material, and a sulfide stockpile is planned at each open pit.

22.10 Recovery Methods

The process design is based on existing technologies and proven equipment. The design includes crushing, agglomeration and curing, dynamic heap leaching, and SX/EW.

The process facilities are designed to treat a nominal rate of 100,000 t/d of copper oxide ore and produce 120,000 t/a of copper cathodes as final product.

The Tía María process facility is expected to operate for 20 years, processing oxide ore from the La Tapada deposit for the first half of the proposed LOM, and from both the La Tapada and Tía María deposits for the second half of the LOM plan.

The final product will be copper cathodes.

Power will be supplied from the existing 220 kV Moquegua sub-station to a 220 kV/23 kV Tía María sub-station via an approximately 100 km long transmission line. Process water will be sourced from a desalination plant.

22.11 Infrastructure

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

The mine plan envisages infrastructure both on and offsite. Onsite infrastructure will include facilities to support mining and processing. Offsite infrastructure will include the desalination plant and port facilities.

22.12 Market Studies

The market for the proposed copper cathode is well established and reasonably understood. Southern Copper has experience in selling copper 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.

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

No contracts are currently in place for any services. When concluded, 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 Peru.

22.13 Environmental, Permitting and Social Considerations

Baseline studies have been conducted. Key areas that will require monitoring include the heap leach facility, the spent ore facility, and the WRSFs.

The Project holds an EIAd that was granted in 2014, and renewed in 2017 for an additional two year period.

A Social Diagnosis of the Tía María Mining Project was completed in 2019, which collected sociodemographic and socioeconomic information over the DSIA area.

There are no indigenous or native communities registered in the database of the Ministry of Culture of Peru within the DSIA.

The estimated reclamation bond for closure is US$115.6 M. The Tía María closure plan has been approved on October 14, 2021. The closure plan must be updated every five years.

Southern Copper was granted all permits allow construction activities. Where facility footprints have been approved, and Southern Copper intends on modifying those footprints to a larger facility size as part of the LOM plan outlined in this Report, permit modifications will need to be applied for, and approved.

Southern Copper has a complex history with stakeholders in the Project area of influence. The initial project configuration in 2009 drew controversy as the water requirements for the process operations were assumed to be sourced from groundwater through wells located in the Tambo River Valley, which is a significant local agricultural area. As a result, the Project was reconfigured to have the water required for operations sourced from a desalination plant to be constructed in the municipality of Mejia.

During the years that Southern Copper has been working in the DSIA, a number of social programs were implemented to aid the economic and human development of the local communities. Southern Copper provides open communication channels for the community to discuss concerns and issues with the company. These steps show that Southern Copper has a process in place to obtain the social license within the social influence area, to permit, construct, and operate the Tía María mine. The information provided by Southern Copper on obtaining a social license supports a pre-feasibility level of study.

Southern Copper has a community development model based on a Good Neighbors policy, economic development, and human development. This model allows Southern Copper to identify expectations, local needs, and social issues, and engage with communities to provide solutions. Southern Copper has provided Wood with information supporting their proposed actions to recognize and mitigate social issues before they arise, or to address any social issues that may come up during pre-development, development, mine operating activities and mine closure.

Southern Copper confirmed to Wood that Southern Copper has proper internal control and follow up on their social projects and programs, which supports their process for establishing social communication. Community understanding of the Project has been established by Southern Copper and appears to be operating as intended.

Although Southern Copper has tried to ensure the local stakeholders are not opposed to the current Project as envisaged in this Report, the general environment in Peru can have the following risks for permitting and operating mining projects:

- Social conflicts due to negative perceptions from the communities and local authorities based on concerns about environmental management and the impacts of the Project on their economic activities
- Unfavorable position from the national government, prioritizing a political and social statement in spite of the legal licenses obtained by the Project
- Organizations promoting an anti-mining culture.

Wood undertook a site visit in October 2021 that included a site tour, review and inspection of selected social projects and review of participatory mechanisms that Southern Copper had implemented.

Wood was able to check that that Southern Copper is providing open and transparent mechanisms for the local population to participate in, and be informed about the Project. Southern Copper appears to be building collaborative relationships with authorities and national entities (technical and political). The progress is shown by positive comments made to Wood by local stakeholders regarding Southern Copper's social management. Social and productive projects are benefiting local villages and populations, and appear to be creating a positive local image and reputation for Southern Copper.

Having a positive local impression of the Project may help to align regional attitudes toward allowing Project development to that of the local community. The uncertainties with respect to political support at a local, regional and national level in Peru will remain an ongoing risk to the Project.

22.14 Capital Cost Estimates

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

An internal mining study was completed in 2007, which assumed a 120,000 t/d copper cathode production rate. In 2014, the 2007 study was used as a basis for an updated internal study completed by CAD Mexico. There were no more recent studies available to Wood. The cost estimates used in this Report are based on the 2014 and 2007 studies, as applicable, and escalated to second-quarter (Q2) 2021. The studies are supported by new quotes as required for major capital items.

The capital cost estimate totals US$2,071.3 M, consisting of US$1,751.3 M in initial capital and US$320 M in sustaining capital.

Capital costs were applied in the financial model excluding value-added tax.

22.15 Operating Cost Estimates

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

Mining costs were estimated at US$1,876.7 M over the LOM, or US$1.43/t mined. Process costs were forecast at US$2,474.3 M, or US$3.48/t processed. General and administrative costs totaled US$264.7 over the LOM, or US$13.3 M/a.

The LOM operating cost estimate is US$4,615.7 M.

22.16 Economic Analysis

The financial analysis was performed using a 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 Tía María Project is anticipated to generate a pre-tax NPV of US$1,402.1 M at a 10.0% discount rate, an IRR of 22.5% and a payback of 3.4 years.

The financial analysis results show an after-tax NPV of US$676.4 M at a 10.0% discount rate, an IRR of 16.6% and a payback of 4.3 years.

The Tía María Project is most sensitive to fluctuations in copper price and grades. It is less sensitive to changes in initial capital cost and operating costs.

22.17 Risks and Opportunities

Factors that may affect the mineral resource and mineral reserve estimates were identified in Chapter 11.6 and Chapter 12.4 respectively.

22.17.1 Risks

The risks associated with the Tía María 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.

- The largest risk facing the Project is the inability to obtain the social license to construct, operate and close the Project as envisaged. Southern Copper has a complex history with stakeholders in the Project area of influence, and an earlier iteration of the Project resulted in social conflict as it assumed process water could be obtained from groundwater wells in the Tambo River Valley. The Project as envisaged in this Report would obtain water from a coastal desalination plant
- Density check sampling performed returned unusual results because the wax-coat method normally returns lower density values than the direct immersion method and

here, with the exception of two points out of 40, that is not the case. These biases not as yet unexplained and present a risk to the La Tapada and Tía María mineral resource estimates because the tonnages may be underestimated by as much as 10% locally

- There is no formal documentation to verify the drill collar information. The lack of documentation results in uncertainty about the integrity of the collar locations in the database. Some, but not all, collar locations were verified by Wood. This uncertainty in the integrity of the database is sufficient to limit mineral resource classification to indicated
- Wood investigated collar surveying in the La Tapada area and discovered an approximately 80 m discrepancy in the collar elevations that is likely due to different elevation datums or geoids being used. The discrepancy in elevation is not a problem as long as the original datum is used for all location data so that all data are internally consistent. There will be no impact on the mineral resource estimate. The source of the discrepancy must be discovered and resolved before the next mineral resource estimate is completed
- 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
- 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 EIA process required that the current spent ore and sulfide WRSF designs have a liner. The liner is not currently included in the capital cost estimate.
- 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.

- A total of 23 species of flora (15% of the total number of species sampled) were identified as endemic or had some type of conservation category assigned. This included three species listed in the Peruvian State's register, 10 species of plants in the cactus family in that were included in the CITES Appendix II, and 12 endemic species. If there is a major impact predicted on the populations from the proposed mining activities, the environmental permits for the operations could be revised or even revoked.

Although Southern Copper has tried to ensure the local stakeholders are not opposed to the current Project as envisaged in this Report, the general environment in Peru can have the following risks for permitting and operating mining projects:

- Social conflicts due to negative perceptions from the communities and local authorities based on concerns about environmental management and the impacts of the Project on their economic activities
- Unfavorable position from the national government, prioritizing a political and social statement in spite of the legal licenses obtained by the Project
- Organizations promoting an anti-mining culture.

22.17.2 Opportunities

Opportunities for the Tía María Project include moving the stated mineral resources into mineral reserves through additional drilling and study work. The mineral reserves and mineral resources are based on conservative price estimates for copper so upside exists, either in terms of the potential to estimate additional mineral reserves and mineral resources or improved economics should the prices used for copper be increased.

Opportunities include:

- Conversion of some or all of the measured and indicated mineral resources currently reported exclusive of mineral reserves to mineral reserves, with appropriate supporting studies;

- 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;
- Higher metal prices than forecast could present upside sales opportunities and potentially an increase in predicted Project economics
- Slightly more tonnage may be able to be estimated due to the possible underestimation of specific gravity values.

22.18 Conclusions

Under the assumptions presented in this Report, the Tía María 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

[If applicable, the qualified person must describe the recommendations for additional work with associated costs. If the additional work program is divided into phases, the costs for each phase must be provided along with decision points at the end of each phase.

Delete this guidance when finalizing report]

23.1 Introduction

The recommended work programs total approximately US$5.1–US$6.7 M.

23.2 Geology

The SG data have an overall positive bias for SGS Perú relative to Southern Copper, based on a check program requested by Wood that was performed in 2021. A more comprehensive density check program should be completed, using a paraffin-coated immersion method that is suited to porous samples, on samples that are at least 10–15 cm in length.

A re-survey program to locate all drill collars still visible in the field should be completed, as there is currently a lack of supporting documentation for a significant percentage of the collar locations.

A downhole survey program should be conducted on all drill holes that are more than 50 m deep, are still open, and can be surveyed.

Wood also recommends that an investigation be conducted to determine what magnetic declination correction was applied in each drill campaign, if any, and examine the impact on the resource estimate of any corrections.

The estimated program budget is US$0.15–US$0.2 M.

23.3 Mineral Resource Estimation

A variography study should be completed to provide robust variograms for the domains and elements to be estimated.

Once the programs set out in Chapters 23.2, 23.4 and 23.5 are completed, information should be incorporated in an updated mineral resource estimate.

The estimated program budget is US$0.15–US$0.2 M.

23.4 Geotechnical

Geotechnical drilling is recommended for the southwest extension of the planned pit, in an area where the pit design is not supported either by structural or geotechnical drill data. A 5,000 m oriented core program is recommended 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.

Pit designs were based on assumptions that under dry conditions, the factor-of-safety was >1.2. However, if the water table is present at an elevation of 500 masl, for some pit sectors, the factor of safety fell below 1.2. A program to determine the elevation of the water table is recommended, with the drill holes to be located along the six cross sections evaluated by Vector through the 2007 pit design. A total of 12 vertical RC holes (approximately 3,000 m) are proposed, with two drill holes per section line.

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.

This program is estimated, assuming an all-in drilling cost of US$250/m for oriented drill core, and US$100/m for RC, at US$2.5–US$3 M.

23.5 Metallurgy

Additional testwork to cover future years of production is recommended to enhance metallurgical recovery projections and address opportunities to improve metallurgical performance. This should be based on PQ core collected from a dedicated 5,000 m metallurgical drill program.

A geometallurgical model should be constructed.

Metallurgical tests should include mineralogy, comminution, flotation, and variability tests. Additional testwork may include rheology, and acid base accounting.

A budget estimate for this work is US$2–US$3 M, assuming an all-in drilling cost for PQ core of US$250/m.

23.6 Infrastructure

There may be potential to reduce the capital costs for the spent ore and sulfide WRSF designs. Alternative designs should be generated and reviewed. The EIA process required that the current designs have a liner; this requirement should be included in the alternatives analysis.

The proposed mine plan envisages a new 33 km long railway line will be constructed from Guerreros station to the rail end at Pampa Cachendo. The study supporting the railway option should be updated, and a new cost estimate based on the updated study should be completed.

The capital and operating cost assumptions for the proposed water supply should be reviewed and updated to support more detailed studies.

This program is estimated at US$0.1–US$0.15 M.

23.7 Environmental

Southern Copper should continue with its community relations efforts and plans.

About 7% of the water pipeline access route is not yet covered by surface rights access agreements. Efforts to conclude such agreements should continue.

A review of all social, environmental, and permitting studies should be undertaken to ensure that the information is current and can support, in particular, mine construction. Areas that require update should be clearly identified and action plans to address the gaps devised.

This program is estimated at US$0.05–US$0.1 M.

24 REFERENCES

24.1 Bibliography

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24.2 Abbreviations and Symbols

Abbreviation/Symbol	Term
3D	three-dimensional
AAS	atomic absorption spectrometry
DCF	discounted cash flow
DSIA	area of direct social influence
EIA	Environmental Impact Assessment
EIAd	semi-detailed Environmental Impact Assessment
G&A	general and administrative
GPS	global positioning system
HQ	63.5 mm core diameter
ICP-AES	inductively-coupled plasma atomic emission spectroscopy
kV	kilovolt
kW	kilowatt
kWh/t	kilowatt hour per tonne
ID2	inverse distance weighting to the second power
LOM	life-of-mine
L/t	litres per tonne
m^3/hr	cubic metres per hour
MW	megawatt
masl	metres above sea level
NN	nearest neighbor
NQ	47.6 mm diameter
NSR	net smelter return
OK	ordinary kriging
QA/QC	Quality assurance and quality control
QP	Qualified Person
PLS	Pregnant leach solution
RQD	rock quality description

Abbreviation/Symbol	Term
SG	specific gravity
SX	solvent extraction
t	ton
US	United States
US$	United States dollars
WRSF	waste rock storage facility

24.3 Glossary of Terms

Term	Definition
agglomeration	relies on a binder (typically cement) and tumbling motion to cause coalescence, or the building of fines into larger particles.
aquifer	A geologic formation capable of transmitting significant quantities of groundwater under normal hydraulic gradients.
argillic alteration	Introduces any one of a wide variety of clay minerals, including kaolinite, smectite and illite. Argillic alteration is generally a low temperature event, and some may occur in atmospheric conditions
azimuth	The direction of one object from another, usually expressed as an angle in degrees relative to true north. Azimuths are usually measured in the clockwise direction, thus an azimuth of 90 degrees indicates that the second object is due east of the first.
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 ball mill work index/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, "crushing" usually denotes reducing the size of coarse rock while "grinding" usually refers to the reduction of the fine sizes.
compressive strength test	mechanical test measuring the maximum amount of compressive load a material can bear before fracturing

Term	Definition
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.
dilution	Waste of low-grade rock which is unavoidably removed along with the ore in the mining process.
direct shear strength	Method used to determine the shear strength of a material. Shear strength is defined as the maximum resistance that a material can withstand when subjected to shearing
discounted cash flow (DCF)	Concept of relating future cash inflows and outflows over the life of a project or operation to a common base value thereby allowing more validity to comparison of projects with different durations and rates of cash flow.
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

Term	Definition
	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. 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.
flowsheet	The sequence of operations, step by step, by which ore is treated in a milling, concentration, or smelting process.
gangue	The fraction of ore rejected as tailing in a separating process. It is usually the valueless portion, but may have some secondary commercial use
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.
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.
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.

Term	Definition
internal rate of return (IRR)	The rate of return at which the net present value of a project is zero; the rate at which the present value of cash inflows is equal to the present value of the cash outflows.
initial assessment	An initial assessment is a preliminary technical and economic study of the economic potential of all or parts of mineralization to support the disclosure of mineral resources. The initial assessment must be prepared by a qualified person and must include appropriate assessments of reasonably assumed technical and economic factors, together with any other relevant operational factors, that are necessary to demonstrate at the time of reporting that there are reasonable prospects for economic extraction. An initial assessment is required for disclosure of mineral resources but cannot be used as the basis for disclosure of mineral reserves
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
life of mine (LOM)	Number of years that the operation is planning to mine and treat ore, and is taken from the current mine plan based on the current evaluation of ore reserves.
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. The determination that part of a measured or indicated mineral resource is economically mineable must be based on a preliminary feasibility (pre-

Term	Definition
	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 present value (NPV)	The present value of the difference between the future cash flows associated with a project and the investment required for acquiring the project. Aggregate of future net cash flows discounted back to a common base date, usually the present. NPV is an indicator of how much value an investment or project adds to a company.

Term	Definition
net smelter return (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.
phyllic alteration	Minerals include quartz–sericite–pyrite
pit shell	a defined area where mining will take place
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 (prefeasibility 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 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 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

Term	Definition
	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.
propylitic	Characteristic greenish colour. Minerals include chlorite, actinolite and epidote. Typically contains the assemblage quartz-chlorite-carbonate
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.
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.
reclamation	The restoration of a site after mining or exploration activity is completed.
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

Term	Definition
	impurities in a slag layer. Refining results in the production of a marketable material.
retrograde alteration	an alteration stage in which higher temperature, generally anhydrous, minerals are replaced by lower temperature, generally hydrous, minerals.
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.
silicification	The introduction of, or replacement by, silica
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.
specific gravity	The weight of a substance compared with the weight of an equal volume of pure water at 4°C.
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.
triaxial compressive strength	A test for the compressive strength in all directions of a rock or soil sample
uniaxial compressive strength	A measure of the strength of a rock, which can be determined through laboratory testing, and used both for predicting ground stability underground, and the relative difficulty of crushing.

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 Peru.

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, monitoring requirements and monitoring frequency, and bonding requirements.

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 government royalty considerations at the Project level.

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.