Teck

NI 43-101 Technical Report on Quebrada Blanca Phase 2 Feasibility Study 2016 Región de Tarapacá, Chile

Report prepared for:
Teck Resources Limited.

Prepared by:
Mr Rodrigo Marinho, P.Geo.
Mr Michael Nelson, FAusIMM.

Effective date:
3 February, 2017.

Report date:
23 February, 2017.

CERTIFICATE OF QUALIFIED PERSON

I, Michael Nelson, FAusIMM., am employed as the Project Director–Quebrada Blanca Phase 2, with Teck Resources Limited (“Teck”) at the Teck corporate office situated at Bentall 5, 550 Burrard St #3300, Vancouver, BC V6C 0B3, Canada.

This certificate applies to the technical report titled “NI 43-101 Technical Report on Quebrada Blanca Phase 2 Feasibility Study 2016, Región de Tarapacá, Chile” that has an effective date of 3 February, 2017 (the “technical report”).

I am Fellow of the Australasian Institute of Mining and Metallurgy #109173. I graduated from the University of Western Australia with a Bachelor of Science (Hons) degree in Chemistry and Soil Sciences in 1987. I also graduated from the Financial Services Institute of Australasia (FINSIA) with a Masters degree in Applied Finance (2010). I am a member of the Australian Institute of Company Directors.

I have practiced my profession for 29 years. I have been directly involved in mining operations, mining project design and commissioning, and project management for large mining projects and associated infrastructure in Australia, Russia, Mali, Philippines, Ghana, South Africa, Finland, the Dominican Republic and Chile.

As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43–101 *Standards of Disclosure for Mineral Projects* (NI 43–101).

I have most recently visited the Quebrada Blanca property from 29 February to 1 March 2016.

I am responsible for, or co-responsible for, Sections 1.1, 1.2, 1.3, 1.9, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19; Section 2; Section 3; Section 4; Section 5; Section 13; Section 17; Section 18; Section 19; Section 20; Section 21; Section 22; Section 24; Sections 25.1, 25.2, 25.5, 25.10, 25.11, 25.12, 25.13, 25.14, 25.15, 25.16, 25.17, 25.18; Section 26; Section 27, and Appendix A of the technical report.

I am not independent of Teck as independence is described by Section 1.5 of NI 43–101.

I have been involved with the Quebrada Blanca property since 2014 in my role as Project Director–Quebrada Blanca Phase 2.

I have read NI 43–101 and the sections of the technical report for which I am responsible have been prepared in compliance with that Instrument.

As of the effective date of the technical report, to the best of my knowledge, information and belief, the sections of the technical report for which I am responsible contain all scientific and technical information that is required to be disclosed to make those sections of the technical report not misleading.

Dated: 23 February 2017

“Signed”

Michael Nelson, FAusIMM.

CERTIFICATE OF QUALIFIED PERSON

I, Rodrigo Alves Marinho, P.Geo. am employed as the Technical Director, Reserve Evaluation, with Teck Resources Limited ("Teck") at the Teck corporate office situated at Bentall 5, 550 Burrard St #3300, Vancouver, BC V6C 0B3, Canada.

This certificate applies to the technical report titled "NI 43-101 Technical Report on Quebrada Blanca Phase 2 Feasibility Study 2016, Región de Tarapacá, Chile" that has an effective date of 3 February, 2017 (the "technical report").

I am registered as a Professional Geologist with the Association of Professional Engineers and Geoscientists of British Columbia #39505. I graduated from the University of Sao Paulo State with a Bachelor of Sciences degree in Geology in 1993.

I have practiced my profession for 24 years. I have been directly involved in mining operations, mineral resource and mineral reserve estimation, and analysis at open-pit and underground mines worldwide. I have experience in exploration, drilling program definition, geological mapping, interpretation and modeling, grade estimation and grade control, mine planning, pit optimization and mine design.

As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43–101 *Standards of Disclosure for Mineral Projects* (NI 43–101).

I most recently visited the Quebrada Blanca property from October 14–16 2016.

I am responsible for, or co-responsible for Sections 1.1, 1.2, 1.4, 1.5, 1.6, 1.7, 1.8, 1.10, 1.11, 1.18, 1.19; Section 2; Section 3; Section 6; Section 7; Section 8; Section 9; Section 10; Section 11; Section 12; Section 14; Section 15; Section 16; Section 23; Sections 25.1, 25.3, 25.4, 25.6, 25.7, 25.8, 25.9, 25.18,; Section 26; and Section 27 of the technical report.

I am not independent of Teck as independence is described by Section 1.5 of NI 43–101.

I have been involved with the Quebrada Blanca property since 2012 in my role as Technical Director, Reserve Evaluation.

I have read NI 43–101 and the sections of the technical report for which I am responsible have been prepared in compliance with that Instrument.

As of the effective date of the technical report, to the best of my knowledge, information and belief, the sections of the technical report for which I am responsible contain all scientific and technical information that is required to be disclosed to make those sections of the technical report not misleading.

Dated: 23 February 2017

"Signed and sealed"

Rodrigo Alves Marinho, P.Geo.

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1.0 Summary

1.1 Introduction

Mr. Rodrigo Alves Marinho, P.Geo., and Mr. Michael Nelson, F.AusIMM., prepared this technical report (the Report) for Teck Resources Limited (Teck) based on the 2016 Feasibility Study (FS2016) in respect of Phase 2 (QB2) of the Quebrada Blanca mining operation (the Project), located in Chile's Región de Tarapacá.

The Project owner is Compañia Minera Teck Quebrada Blanca S.A. (CMTQB). The shareholders of this company are Teck Resources Limited (Teck) which has an indirect 76.5% holding and is the Operator of the Project; Inversiones Mineras S.A (IMSA) which is a private Chilean company that has a 13.5% holding; and Empresa Nacional de Minería (ENAMI), the Chilean State-run minerals company, which has a 10% holding. Teck through its holdings generally controls the operation. QB2 is not subject to any royalties held by third parties.

The Report supports Teck's 2016 annual information form (AIF) filing and updated Mineral Resource and Mineral Reserve estimates.

Currency is expressed in US dollars unless stated otherwise; units presented are typically metric units, such as metric tonnes, unless otherwise noted. The Report uses Canadian English.

Calendar years are used in some sections of the Report, in relation to the proposed mine plan and execution plan. The years shown are for illustrative purposes; the actual timing may vary. Formal approval is required from Teck's Board for construction of the additional infrastructure for QB2, and additional permits need to be granted by the Government of Chile.

1.2 Project Highlights

- Project economics on after-tax basis for a Chilean-domiciled entity, on a 100% ownership basis:
    - After-tax net present value (NPV) of $1,253 million at an 8% discount rate;
    - Internal rate of return (IRR) of 11.7%;
    - Payback period of 5.8 years from first production;
- Total development capital cost estimate of $4,714 million; annual operating costs of $653 million;
- Assumption that project execution through to ore production can be achieved 42 months after the approval of the Estudio de Impacto Ambiental (Environmental Impact Assessment or EIA in the Spanish acronym), with the 2016 EIA approval timeframe anticipated to be 18 months;
- Proven and Probable Mineral Reserve estimate of:
    - 1,259 Mt grading 0.51% total copper (CuT) and 0.019% Mo;
- Measured and Indicated Mineral Resource estimate (exclusive of Mineral Reserves) of:
    - 1,324 Mt grading 0.38% CuT and 0.016% Mo.

1.3 Property Description, Location, and Access

The Quebrada Blanca open pit mine is located in Chile's Región de Tarapacá, approximately 165 km directly and 240 km by road southeast of the regional capital city of Iquique.

Road access to the Project from Iquique is via the Iquique–Alto Hospicio road, then Ruta 16, and Ruta 5 and then the Camino Pintados road. An alternative route from Iquique through Pozo Almonte, then taking Ruta A-65 to the Collahuasi mine and passing through Collahuasi to the Quebrada Blanca mine, is approximately 254 km by road.

Currently, copper cathodes produced from the existing leaching and solvent extraction/electrowinning (SX/EW) operation at Quebrada Blanca are trucked by road to the port of Iquique for ocean shipping. The port site location at Punta Patache, a bulk handling private port, is proposed as the shipping port for the bulk copper concentrate to be produced by QB2.

There are currently 119,587 ha of mining rights incorporating exploitation and exploration mining concessions held in the name of CMTQB. The exploitation mining concessions have no expiry date.

A request has been lodged for a maritime concession that allows for use of Patache Bay for the Project's marine facilities, and is waiting for final regulatory approval.

The surface rights for the current mining operation were appropriately secured. A surface rights study was completed to determine ownership for the lands required to support QB2. About 99% of the land was found to be under Chilean State control. CMTQB commenced the acquisition of mining easements on these lands through legal and judicial processes, and currently approximately 70% have been resolved in CMTQB's favour. The 1% of surface lands needed for the pipelines for the Project that are not owned by the State belong to a private party, with whom progress has been made towards an right-of-way (ROW) agreement. Several mining concession holders have been identified within some of the areas that are currently planned to host Project infrastructure; discussions with these parties are either underway or planned.

CMTQB currently holds highlands (Altiplano) water rights from the Salar de Michincha (315.9 L/s) and the Salar de Alconcha (120.3 L/s).

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

The Quebrada Blanca mine is situated within the Chilean Altiplano at an average elevation of 4,300 masl. The terrain is rugged, with the mountains being intersected by many steep canyons (quebradas). The planned tailings management facility (TMF) would be located south of the mine site at an average elevation of approximately 3,900 masl. The coast at the proposed port site is rocky, with a narrow coastal plain to the east before moderate cliffs ascend to a larger plateau. Plate seismic ratings, as defined in Chilean norm NCh 433, range from 2 for the area where the process plant will be sited to 3 nearer the ocean. The maximum ground acceleration is about 0.3*g* in the process plant area and 0.4*g* in the port area.

In the mine vicinity, rainfall is primarily restricted to the period January to March, averaging 95 mm annually. Intense short-duration storms may bring significant precipitation. The TMF area has a similar rainfall pattern to the mine area, averaging 91 mm annually. Precipitation at the planned port site location at Punta Patache is negligible.

Temperatures in the mine vicinity vary between highs of 11.4ºC and lows of -3.2ºC. In the TMF area, temperatures range from a maximum of 5.8ºC to a minimum of 0.5ºC throughout the year. Mild temperatures are present year-round at the port site.

A species of desert plant, the Llareta, occurs in close proximity to the planned mine and supporting mining facilities. Animal life in the area consists primarily of llama, vicuña – a relative to the llama, viscacha – a rodent that looks similar to a rabbit, and fox. The proposed TMF area has some vegetation in close proximity to drainage areas. The sea coast has limited vegetation.

1.4 History

Mineralization was identified at Quebrada Blanca as early as the 1800s. Mining activity, assumed to be in the period from about 1905 to 1930, included prospecting pits, shallow shafts and short adits. The underground mine workings were small, accounted for only small tonnage extractions, and there is no formal production record.

Exploration has been conducted by a number of entities and companies, including the Chile Exploration Company, Chilean Geological Survey, Codelco's Chuquicamata Division, the Superior Oil-Falconbridge Group through its Chilean subsidiary Compañía Exploradora Doña Inés Limitada, ENAMI, Compañía Minera Quebrada Blanca S.A., Aur Resources Inc., and Teck/CMTQB. Exploration activities have included surface geological mapping; pit mapping; geochemical sampling; ground magnetic and induced polarization (IP)/resistivity geophysical surveys, airborne magnetic geophysical surveys; reverse circulation (RC), core, and blast hole drilling; metallurgical testwork; and mining studies, including scoping, pre-feasibility and feasibility studies.

The current operations commenced in 1994 targeting supergene ore by means of open pit mining, leaching and SX/EW. From 2006 to 30 September 2016, a total of 73 Mt grading 0.93% soluble copper (CuS) was mined and sent to the heap leach pads. An additional 127 Mt, grading 0.44% CuS was sent to the run-of-mine (ROM) dump leach operation. A total of about 720,000 t of cathode product was produced from the operations during this period. Production has recently declined, and Teck expects the existing leachable supergene mineralization to be mined-out by 2017–2018.

1.5 Geological Setting, Mineralization, and Deposit Types

The porphyry-style mineralization at Quebrada Blanca is considered to be typical of an Andean porphyry copper–molybdenum deposit.

The deposit is hosted in the middle Eocene to early Oligocene metallogenic belt of northern Chile. Quebrada Blanca is part of a set of porphyry systems that includes the Ujina, Rosario and Copaquire (La Profunda) porphyry deposits. The complexes lie along a northwest-trending lineament that has developed in the Collahuasi Formation.

Quebrada Blanca has an intricate magmatic and hydrothermal history that includes a polyphase intrusive complex, multiple cross-cutting breccia facies, and at least two separate hydrothermal stages. Mineralization consists of supergene (chalcocite and, to a lesser degree, copper oxides such as atacamite, cuprite, and locally brochantite) and hypogene (chalcopyrite, bornite, molybdenite, and, to a lesser degree, silver and gold) mineralization.

Mineralization in the hypogene porphyry environment consists of disseminated and veinlet chalcopyrite with molybdenite in an east–northeast-trending area of approximately 2 x 5 km that is hosted within Eocene intrusions, hydrothermal breccias, and porphyritic dikes. Drill holes have intersected mineralization to an approximately 800 m vertical depth in the hypogene zone. The hypogene mineralization remains open to the northeast, east, southeast, and at depth.

Alteration zoning patterns are typical of those documented for porphyry copper deposits. Three main structural trends, to the east–northeast, north–northeast–north–northwest, and northwest, control aspects of the mineralization and intrusive emplacement.

1.6 Exploration

The mining operations use a combination of a local grid that is based on a truncation of the X and Y co-ordinates using the UTM PSAD 56 19S datum, and the SIRGAS WGS84 datum.

A number of geological mapping programs have been completed, at map scales ranging from a regional 1:10,000 scale, to pit mapping at 1:2,000 scale. Information from these programs is used to support the geological interpretations used in resource estimation.

Rock chip sampling was completed as part of the reconnaissance mapping programs. There is no information available as to the number of samples taken.

Airborne geophysical data, from regional surveys flown by third-parties in 1992 and 1999 have been used in support of structural interpretations. Ground geophysical data have been used to delineate areas of shallow geophysical responses that could correspond to porphyry copper mineralization.

1.7 Drilling

Drilling completed to 31 December, 2016 on the Quebrada Blanca Project has included 731 core drill holes (217,458 m) and 1,498 RC drill holes (204,281 m) for a total of 2,229 drill holes (totalling 421,739 m). Not all of the core drilling is used in estimation; the resource estimate is supported by 623 core holes (198,812 m). Drill campaigns that are not used were undertaken in 1975, 1990, 2000, and after the database close-out date in June 2013.

The RC drilling was not conducted for hypogene exploration or resource estimation purposes; rather it is a technique used in the active supergene mining operation to infill data ahead of mining, and to delineate leachable materials. Many of the areas where the RC drilling was conducted have subsequently been mined out. RC drill logs may be used to support geological interpretations, and assay results for acid-soluble copper (CuSH), cyanide soluble copper (CuCN), and CuT can be used to support estimation within oxidized domains that are not the primary zone domain. RC data cannot be used to support estimation within the primary zone domain.

Blast hole drilling has been conducted in support of mining operations. Blast hole data are used in the resource estimate variography for the supergene domains.

A number of core diameters have been employed over the history of the project, including BX (36.6 mm core diameter), NX (54.9 mm), HX (76.2 mm), HQ3 (63.5 mm), NQ3 (47.6 mm) and PQ core (85 mm) sizes.

The core drill holes were geologically logged for lithology, structure, alteration, and mineralization. Geological logging of RC chips records similar information to that described for the core programs. Percentage core recovery, rock quality designation (RQD), fracture frequency, and hardness were recorded for all drill cores to establish a geotechnical database. In general, most drill holes intersect mineralized zones at an angle, and the drill hole intercept widths reported for the Project are typically greater than the true widths of the mineralization at the drill intercept point.

Core recovery at Quebrada Blanca has been acceptable, averaging >95%. Approximately 10% of the data included in the database have recovery percentages that are less than 85%; however, most of these lower recoveries are related to the presence of faults or gravel.

Drill collars have been surveyed using global positioning instruments (GPS). From 2000 to date, a gyroscopic instrument has been used, with data collected at 10–20 m intervals down the core hole.

Metallurgical programs were completed from 2002 to 2012, in support of mining studies. Drill sizes included PQ and HQ core. Drill holes were located throughout the deposit, and with locations selected to represent the initial five years of the mine schedule, and to intersect the major geological and mineralogical domains.

1.8 Sampling, Analysis, and Data Verification

Core sampling provided the primary estimation support for the Mineral Resource estimate. Sampling was generally performed at fixed 2 m intervals, and core was halved where competent using a core saw. In less competent areas, a hydraulic split was used. The RC samples were typically taken on 1 m or 2 m intervals. Blast hole samples were cone-and-quarter sampled to form one complete sample over the hole length.

Density samples were taken approximately every 20 m or at a clear lithology change, to ensure there was sufficient representation of all lithology types. The database contains 4,429 density measurements within the deposit area, all obtained from post-2007 exploration drill programs. Average values for the key lithologies were used in the Mineral Resource interpolation.

Sample preparation and analytical laboratories used included the following independent laboratories: CESMEC, Iquique, Chile (accreditations unknown); Union Assay, Salt Lake City, USA (accreditations unknown); Assayers Canada, Vancouver, Canada (accreditations unknown); Acme Laboratories, Santiago, Chile (ISO 9001:2000); Andes Analytical Laboratories, Santiago (ISO 9001:2000 from 2006); Acme, Copiapó, Chile (ISO 9001:2000 from 2010); and Geoanalitica Laboratories (ISO 9001:2008). During the early campaigns, the onsite mine laboratory prepared exploration samples. The mine laboratory prepared and analysed the RC and blast hole samples. It is not accredited, and is not independent of Teck.

Sample preparation methods have included crushing and pulverizing; however, the crush and pulverization sizing has slightly changed over time. Currently, the protocol is crush to 70% passing -10 mesh, pulverize to 85% passing -200 mesh. Analytical methods have been primarily by atomic absorption spectroscopy (AAS) for copper and molybdenum. Multi-element suites have been determined for selected samples; these are reported using inductively-coupled plasma (ICP) methods.

No core prior to 2007 was subject to an onsite quality assurance and quality control (QA/QC) program; however, the laboratories selected during this period used internal quality control programs that conformed to international norms for the time. QA/QC measures adopted for the drilling after 2008 included submission of blank, standard reference materials (standards) and field duplicates. The QA/QC insertion rates consisted of 5% coarse blanks, 5% standard reference materials, and 5% half-core duplicates; these insertion rates are in line with industry norms. Review of the QA/QC data indicates that although there were batches that indicated QA/QC failures, after re-submission of the outlier samples to the laboratory, the resulting re-assay data was acceptable.

A number of check or re-assay programs have been completed:

- 1977 to 1983 drilling: re-assay of 2,461 sample pulps; re-assay of 23 historic drill holes;
- 2007 drilling: re-assay of 5% of the core.

Based on acceptable results from the check and re-assay programs, Teck decided to use all of the diamond drilling from these early programs in the feasibility model.

No major areas of bias or errors are considered to remain in the core sample database for copper. Repeated duplicate sampling of drill core has indicated that there are lower levels of sampling precision for molybdenum when duplicate sampling results are reviewed. This has been attributed to the nugget and veinlet mineralization style of the molybdenite. Overall, the copper and molybdenum data from drill cores are considered acceptable for use in resource estimation.

Geological, survey and assay data are currently stored in an acQuire database, which is under the supervision of a database administrator. Data are checked on database upload. The acQuire database is backed-up on a regular basis in accordance with Teck protocols.

There is no information available on the sample security measures in place for the 1975, 1977–1982, 1990, 2000, and 2005 drill programs. From 2007, samples have been stored in a secure area under 24-hour security. No significant security issues have been identified.

Two external data verification reviews were performed on the database that supported the FS2016. In each review, the quality and completeness of the database at the time was found sufficient to support a Mineral Resource estimate.

Teck prepares an annual resource and reserve report for its operations. Each report provides a review of the data used to support that year’s estimates. No issues that would materially affect the Mineral Resource estimates were noted during these annual reviews.

Three NI 43-101 technical reports have been filed on the Quebrada Blanca deposit and operations. These reports require that sufficient data verification is performed to support the Mineral Resource estimate at the time. A combination of Teck staff and the Qualified Persons for the reports provided information on the verification programs performed. No issues that would materially affect the Mineral Resource estimates were noted in any of the three reports.

The checks performed by Teck staff, including the continuous QA/QC checks conducted by the database administrator and Project geologists, annual QA/QC reviews, and verification conducted as part of compilation of NI 43-101 technical reports, in particular from 2008 to date, are in line with industry standards for data verification and have identified no material issues with the data or the Project database. Two external audits were conducted on the drill database that supported the FS2016 resource estimate, and identified no material issues.

This level of review has adequately verified the quality of the core database as sufficient for use in estimating Mineral Resources and Mineral Reserves, and for use in mine planning.

1.9 Mineral Processing and Metallurgical Testing

Much of the metallurgical testwork completed prior to the FS2016 has been superseded. Testwork that is superseded includes aspects of the comminution circuit design, and flotation, hardness, and pilot plant testing. Firms and laboratories involved in the current testwork include: Aminpro, Garibaldi Highlands, BC, Canada; DJB Consultants Inc., North Vancouver, BC, Canada; G&T Metallurgical Services Ltd., Kamloops, BC, Canada; Inspectorate PRA Group, Richmond, BC, Canada; Phillips Enterprises, Golden, Colorado, USA; SGS Lakefield, Santiago, Chile; JKTech Pty Ltd., Brisbane, Australia; and SimSAGe Pty Ltd., Brisbane, Australia.

Samples supporting the current process flowsheet were defined via the use of sequential copper leach assay data from core samples. Six domains: gravel, oxide, leached, enriched, transitional, and primary were defined. Pyrite and chalcopyrite are the dominant sulphide species, with minor levels of molybdenite and other copper sulphides (chalcocite, covellite, enargite and bornite). The major non-sulphide minerals are quartz, feldspar, plagioclase and sericite/muscovite. The metallurgical testwork completed to-date is based on samples which adequately represent the variability of the proposed mine plan.

Comminution testwork included Bond ball mill work index (BMWi) and SAG mill comminution (SMC) tests. The majority of Quebrada Blanca samples fall in the medium to hard categories as defined by the SMC tests, and have a medium resistance to abrasion breakage. The BMWi results indicate a medium hardness in terms of ball milling.

The flotation test program included flowsheet development, pilot plant campaigns, copper–molybdenum separation test work, and variability testing. Flowsheet development focused on establishing the flotation circuit and baseline conditions, and on developing design criteria. The pilot plant campaign was undertaken to generate bulk products for additional testing and to demonstrate flowsheet stability. Copper–molybdenum separation test work was undertaken to assess separation performance, develop design criteria, and generate final concentrates. Variability testing was used to assess variation in metallurgical performance across the orebody, and subsequently to develop metallurgical projections for concentrate grades and metal recoveries.

A series of ancillary tests to support process equipment selection were also completed, and included concentrate regrind tests, bulk concentrate and copper concentrate thickening tests, concentrate filtration tests, transportable moisture limit determinations, and tailings thickening tests.

Metallurgical projections were developed for the enriched, transitional and primary mineralization domains as defined in the resource model. The enriched and transitional zones collectively account for approximately 8% of the concentrator feed over the 25-year mine schedule. Recovery projections for the enriched material are fixed, and assumed as 80% Cu recovery into a copper concentrate grading 30% Cu, and a 50% Mo recovery into a molybdenum concentrate grading 50% Mo. For the transitional and primary materials, copper recoveries are capped at a lower value of 50.0% and an upper value of 93.2%. The copper concentrate grade is capped at 15.0% for low head grades, and capped at 30.0% for elevated head grades and Cu/S ratio. The loss of copper to the molybdenum concentrate is not considered significant to the project. The recovery values were determined from the 2013 Metallurgical Testing Program. This program relied on variability samples collected from the initial five-year mine pit. Teck personnel oversaw the test program and developed the recovery values / formulas. The test program was completed with desalinated water; earlier test programs had relied on seawater as the project make-up water source. This change in water type increased overall copper recovery by approximately 6% on an absolute basis. A summary of the recovery values by mineralized zone is presented in Table 1-1.

Table 1-1: Copper Recovery Values by Mineralized Zone

Min Zone	Brief Description	Estimate Type	Value
Leached, Oxide	Copper oxide minerals	Fixed value	0%
Enriched	Trace oxide and supergene copper minerals	Fixed value	80%
Transition	Supergene and primary copper minerals	Formulae	Formulae based on Cu grade and Cu/S ratios
Hypogene	Primary copper minerals	Formulae	Formulae based on Cu grade and Cu/S ratios

The copper and molybdenum concentrates generated in the copper–molybdenum separation program were submitted for detailed concentrate quality analysis. No elements are present at penalty levels in the copper concentrates. Credits may be obtained for silver and this represents upside potential for the Project. Gold is not present at payable levels. The average copper grade in the molybdenum concentrate is 1.40% Cu. Copper grades >1.00% Cu are expected to impact the molybdenum concentrate payment structure. No additional penalty elements are expected for the molybdenum concentrate.

1.10 Mineral Resource and Mineral Reserve Estimates

1.10.1 Mineral Resource Estimate

The resource block model was completed as follows:

- Block grades were estimated for total copper and soluble copper (CuS), which is the sum of the two-part sequential leach assay, part one being CuSH, and part two being CuCN within the potentially leachable zones. The primary zone was left un-estimated at this time. The drill hole data cut-off date for this phase of the update was 31 December, 2012. The geological interpretations and 3D geological wireframes were updated separately, and used in the estimation of grades in the primary zone. This phase of the model was completed on 31 October, 2013;
- Updating the block estimates for total copper in the primary zone, and the molybdenum estimates in all domains. The drill hole data cut-off for this phase of the update was 30 July, 2013;
- The two model phases were then merged into one overall model for resource reporting.

Drill data acquired after 30 July, 2013 were not used in estimation.

The resource block model required interpretations of oxidation state, lithology type, alteration type, mineralization type, and structural blocks for definition of estimation domains. Three-dimensional (3D) wireframe models were constructed for each geological variable of interest.

Data were composited on 4 m intervals. High-grade capping limits were established for each estimation domain to eliminate the influence of high-grade outliers; in general, very few outliers were identified for copper or molybdenum.

Exploratory data analysis (EDA) was performed on different combinations of oxidation state, lithology, mineralization and structural domains. Contact analysis plots were also prepared. The majority of boundaries were considered to be hard. Soft boundaries could be used where the contact analysis warranted.

Density values were assigned based on average density measurements for mineralization and lithology domains.

Experimental variography was conducted for total copper, molybdenum, and sulphur composites in each of the grade estimation domains. The variography from total copper was used for the CuSH and CuCN estimates, so that the final estimates would display similar correlations to the input data.

Sub-blocking was used for the Gravel, Leach Cap, Oxide, Enriched, Transition, and Primary domains. All grades were estimated using ordinary kriging (OK). A three-pass approach was used for total copper, while a two-pass approach was used in the estimation of molybdenum and sulphur.

Various measures were used to validate the resource block model including visual inspection, comparison of OK and nearest-neighbour models, and swath plots. The validation process showed that the model acceptably reproduces the source data.

Mineral Resource classification parameters were defined in relation to the number of drill holes used to estimate the block grades and the block-composite separation distance, as a function of the geological continuity for each domain.

Teck defined a resource pit shell for the purpose of consideration of reasonable prospects of eventual economic extraction that used the same parameters (costs, prices, metallurgical recoveries and pit slope angles) that were used for defining Mineral Reserves (see Section 15 and Section 16); however, the pit outline used for Mineral Resources was selected as the revenue factor (RF) 1 pit. The metallurgical recovery equations used were a function of head grade, copper-to-sulphur ratio, and mineralization type. For Mineral Resource estimation purposes, it was assumed that material with a net smelter return (NSR) value >$10.36/t would be classified as Mineral Resources, and any blocks that had an NSR value of <$10.36/t would be considered to be waste.

1.10.2 Stockpiles

Hypogene mineralization has been exposed while mining the supergene ore from the current operation, and has been stockpiled when encountered. Tonnages and grades have been tracked and recorded as part of grade control practices. These existing stockpiles are classified and reported as Indicated Mineral Resources and are not scheduled in the life-of-mine (LOM) plan (LOMP) described in the FS2016 and this Report.

1.10.3 Mineral Resource Statement

The Mineral Resource estimate is reported exclusive of those Mineral Resources that have been converted to Mineral Reserves, and uses the definitions set out in the Canadian Institute of Mining, Metallurgy and

Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (the 2014 CIM Definition Standards). The Qualified Person responsible for the estimate is Mr. Rodrigo Alves Marinho, P.Geo., Technical Director Reserve Evaluation, a Teck employee. Mineral Resources have an effective date of December 31, 2016. Table 1-2 summarizes the Measured, Indicated and Inferred Mineral Resources for the Project.

Table 1-2: Mineral Resource Summary Table

Category	Tonnes (x 1,000 t)	Total Copper (CuT %)	Molybdenum (Mo %)	Contained Metal	
				CuT (x 1,000 t)	Mo (x 1,000 t)
Measured	15,500	0.41	0.006	64	1
Indicated	1,308,900	0.39	0.015	5,126	191
Total Measured and Indicated	***1,324,400***	***0.38***	***0.016***	***5,190***	***192***
Inferred	2,140,800	0.37	0.018	7,850	376

Notes to Accompany Mineral Resource Table:

1. Mineral Resources are reported effective 31 December, 2016. The Qualified Person for the estimate is Mr. Rodrigo Alves Marinho, P.Geo, a Teck employee.
2. Mineral Resources are reported exclusive of those Mineral Resources converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
3. Mineral Resources are reported on a 100% basis using a net smelter return cut-off of $10.36/t, which assumes metal prices of $3.00/lb Cu and $10/lb Mo.
4. Mineral Resources are contained within a conceptual pit shell that is generated using the same economic and technical parameters as used for Mineral Reserves but at a selected revenue factor of 1. Direct mining costs are estimated at $1.46/t of material moved. Processing costs are $10.36/t of material milled and include mine general and administrative, port, and desalination costs. Payable metal is assumed to be 96.5% for Cu, and 99% for Mo. Metallurgical recoveries average around 91% for Cu and 76% for Mo, but are variable by block. Pit slope inter-ramp angles vary from 30–44º. Mineral Resources also include mineralization that is within the Mineral Reserves pit between NSR values of US$10.36/t and US$15.07/t which has been classified as Measured and Indicated, as well as all material classified as Inferred that is within the Mineral Reserves pit. In addition, Mineral Resources include 23.8 million tonnes of hypogene material grading 0.54% copper that has been mined and stockpiled during our existing supergene operations.
5. Tonnage and contained copper and molybdenum tonnes are reported in metric units and grades are reported as percentages.
6. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content.

Factors that could affect the Mineral Resource estimate include: metal price and exchange rate assumptions; changes to the assumptions used to generate the NSR cut-off; changes in local interpretations of mineralization geometry and continuity of mineralized zones; density and domain assignments; geometallurgical and oxidation assumptions; changes to geotechnical, mining and metallurgical recovery assumptions; changes to input and design parameter assumptions that pertain to the conceptual Whittle pit design constraining the estimate; and assumptions as to the continued ability to access the site, retain mineral and surface rights titles, maintain environmental and other regulatory permits, and maintain the social licence to operate.

1.10.4 Mineral Reserve Estimate

The mine plan was developed using Measured and Indicated Mineral Resources. Inferred was set to waste. Mining assumes conventional open pit operations using truck-and-shovel technology.

The estimated Mineral Reserves are reported using metal prices of $3.00/lb Cu and $10.00/lb Mo, and a variable grade cut-off approach based on a NSR value that ranges from $9.00/t to $29.22/t. The mine plan was optimized to obtain the highest net present value (NPV) utilizing COMET, a commercially-available mine schedule optimization software program. The plans generated were based on ore availability, material types, cut-off grades, and phase sequencing restrictions. Some of the metrics analyzed during the optimization process included: high/low-grade stockpile cut-off grades and stockpile capacities; mine production capacities; phase production capacities; mill throughput rates, and NSR cut-off values.

The TMF has a finite capacity for tailings (about 1.25 Bt). This constraint dictated the low-grade stockpile cut-off because the direct feed mineral rock plus the low-grade and high-grade stockpile material had to align with the constrained LOM concentrator production. The low-grade stockpile NSR cut-off value was established in this manner at $16.80/t. Any remaining mineralized rock above the marginal cut-off of NSR >$10.00/t was assumed to be sent to a marginal stockpile. The QB2 mine plan will treat the high- and low-grade stockpiles, but not the marginal-grade stockpile.

Any potential impacts to ore feed that may arise due to ore loss or dilution are not considered to be material, and no provision for ore loss or dilution is included in the mine plan or the Mineral Reserve estimate.

1.10.5 Mineral Reserve Statement

Mineral Reserves are reported effective 31 December, 2016 using the 2014 CIM Definition Standards. The Qualified Person for the estimate is Mr. Rodrigo Alves Marinho, P.Geo., a Teck employee. Mineral Reserves are summarized in Table 1-3.

Table 1-3: Mineral Reserve Summary Table

Category	**Tonnes (1,000 t)**	**Total Copper (CuT %)**	**Molybdenum (Mo %)**	**Contained Metal**	
				CuT (x 1,000 t)	**Mo (x 1,000 t)**
Proven	40,800	0.62	0.010	250	4
Probable	1,218,000	0.51	0.019	6,170	233
Total Proven and Probable	***1,258,800***	***0.51***	***0.019***	***6,420***	***237***

Notes to Accompany Mineral Reserves Table:

1. Mineral Reserves are reported effective 31 December, 2016. The Qualified Person for the estimate is Mr. Rodrigo Alves Marinho, P.Geo., a Teck employee.
2. Mineral Reserves are reported on a 100% basis using an average net smelter return cut-off of $15.07/t, which assumes metal prices of $3.00/lb Cu and $10/lb Mo.
3. Mineral Reserves are contained within an optimized pit shell. Mining will use conventional open pit methods and equipment, and use a stockpiling strategy. Direct mining costs are estimated at $3.37/t of material milled. Processing costs are $6.91/t of material milled and include concentrator, tailings management facility, port, and desalination costs. Infrastructure costs of $1.31/t include pipeline and general infrastructure operating costs. General and administrative costs are $1.16/t. Metallurgical recoveries average around 91% for Cu and 76% for Mo, but are variable by block. Pit slope inter-ramp angles vary from 30–44°. The life-of-mine strip ratio is 0.52.
4. Tonnage and contained copper and molybdenum tonnes are reported in metric units and grades are reported as percentages.
7. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content.

Factors that may affect the Mineral Reserve estimates include changes to the metal price assumptions, changes in the metallurgical recovery factors, changes to the operating cut-off assumptions for mill feed or stockpile feed, changes to the input assumptions used to derive the open pit outline and the mine plan that is based on that open pit design, ability to maintain social and environmental licence to operate, and changes to the assumed permitting and regulatory environment under which the mine plan was developed.

1.11 Mining Operations

Mining operations will continue to use open pit methods, and conventional truck-and-shovel operations. From an operational standpoint, QB2 represents a continuation of the existing supergene mining activities; however, there are significant differences between the two operations, such as the significant increase in the ultimate pit depth, the change in rock type from enriched supergene to hypogene, and the proposed increase to the mining extraction rate.

The geotechnical domain model for the feasibility study was based on work by E-Mining Technology S.A. in 2011 and updates by Piteau Associates (Piteau) from studies completed in 2015 and 2016. The 2016 final design pit was then evaluated by Piteau using all available geotechnical data into the kinematic and overall global stability analyses. The majority of issues identified were considered operationally manageable.

A total of 20 pumping wells, each extracting 2 L/s, are planned to be implemented over the course of seven years to manage pit dewatering. After this period, wells would be replaced on an as necessary basis to ensure suitable dewatering capacity meets the requirements of the dynamic pit development.

The pit design has five pit phases, a mine life of 25 years, and the Life of Mine processing capacity is aligned with the capacity of the TMF. The mine design assumes a 15 m bench height, and 40 m ramp widths. A summary of the key mine design assumptions is included in Table 1-4.

Table 1-4: Mine Plan Summary

Category	Unit	Mine Plan
Mine life	years	25
Average NSR ore value	$/t	28.69
Average copper head grade	% Cu	0.509
Average molybdenum head grade	% Mo	0.019
Total rock moved	Mt	1,912
Sent to marginal stockpile	Mt	151
Sent to waste dump	Mt	502
Total sent to crusher	Mt	1,259
Total sent to high-grade stockpile	Mt	77
Total sent to low-grade stockpile	Mt	61
Stripping ratio ([waste + marginal]:ore)	ratio	0.52
Measured Mineral Resources included in ore feed	Mt / (LOM %)	41 (3%)
Indicated Mineral Resources included in ore feed	Mt / (LOM %)	1,218 (97%)
Inferred Mineral Resources	Mt / (LOM %)	0 (0%)
Mine production capacity	Mt/a	101
Mill capacity	Mt/a	51.1
Average LOM copper recovery	%	91.22
Total copper recovered	kt	5,842
Average molybdenum recovery	%	76.21
Total molybdenum recovered	kt	179
Average copper concentrate grade	%	27.36
Total copper concentrate	kt	21,355
Average copper concentrate	kt/a	854
Average molybdenum concentrate	kt/a	15

The NSR value for planning considers the copper and molybdenum revenues, projected metal recoveries, as well as transportation, refining, and other logistical costs. The actual cut-off value ranges between $9.00/t and $29.22/t NSR, (mineral value minus realization costs).

The mine design includes a high-grade, a low-grade, and two marginal-grade stockpiles. Any material stored in the high grade and low grade stockpiles will be fed to the mill before the end of the 25 year mine life whereas the material placed into the marginal grade stockpiles will remain in stockpile at the end of the mine life. The capacities of the two marginal grade stockpiles are approximately 70 Mt and 81 Mt, respectively and they will contain material that has an NSR greater than $10.00/t but less than $16.80/t.

Two waste rock storage facilities (WRSF) are planned; with capacities of approximately 224 Mt and 278 Mt respectively.

Loading equipment, at peak, will consist of three electric rope shovels, one hydraulic shovel, and two large front-end loaders. The haulage fleet on site will peak at 30 Komatsu 930E-4SE haul trucks, six Komatsu 830E haul trucks, and 11 Komatsu 730E haul trucks. Support equipment requirements include, at peak, four tracked dozers, four wheel dozers, seven graders, five water trucks, one tracked excavator, three cable reelers and two mobile generators.

There is significant upside potential for the Project if additional TMF storage capacity is available. A future TMF site with a potential storage capacity of over 2,000 Mt has been identified and secured by CMTQB, and engineering design has been completed to transport tailings from site to the new location. The mine plan in this report does not incorporate the approximately 3.5 Bt of mineralized material that was estimated as Measured and Indicated Mineral Resources and that has not been converted to Mineral Reserves.

1.12 Processing and Recovery Operations

1.12.1 Plant Design

The primary crushing facility would contain a single primary crusher with a double-sided dump pocket for the mine haulage trucks. The coarse ore conveyor facility would consist of two overland conveyors to transport the crushed ore from the primary crusher to the coarse ore stockpile. The coarse ore stockpile will have a live capacity of 80,000 t, and an overall 270,000 t capacity. The concentrator facility would contain two semi-autogenous grinding (SAG) mills and four ball mills, cyclone feed pumps, and cyclone clusters. The pebble crushing area would include pebble transfer conveyors, storage bins, feeders, and crushers. The flotation system would include bulk rougher flotation cells, bulk rougher regrind cyclone clusters, high-intensity grinding (HIG) regrind mills, and cleaner/scavengers. The concentrator thickener area will include bulk concentrate and copper concentrate thickeners. The molybdenum plant would consist of the molybdenum rougher, first cleaner, second cleaner, and third cleaner flotation and regrind equipment, as well as the molybdenum concentrate thickener, filter, dryer and packaging equipment. The reagent facility would consist of equipment and systems for mixing, storing, and distributing the various reagents to their points of use. Two tailings thickeners and their associated equipment would comprise the tailings thickening area.

1.12.2 Market Considerations

Teck reviewed the estimated quality of, and potential markets for copper and molybdenum concentrates that would be produced by the Project. Input from market analyst leaders Wood Mackenzie and the industry analyst CPM Group (CPM) were used to support the assumptions for copper and molybdenum respectively.

The Project's copper concentrate is clean and contains low levels of deleterious elements, but lacks any distinguishing characteristics, so it is anticipated that it is unlikely to obtain a premium over the market Benchmark commercial terms. Key features of the bulk copper concentrate include:

- An average 27% copper grade, which would be accepted by most copper smelters in the custom market;
- Low levels of deleterious elements such as arsenic, zinc, mercury and lead, providing a competitive edge in the concentrate market.

The concentrate contains elevated silver levels; silver credits that are potentially payable in the copper concentrate represents upside potential for the Project. Silver credits are not currently factored into the economics of the project.

Teck's marketing strategy for copper concentrate would focus on the major custom smelting companies in the world that are logistically practical for the delivery of concentrates, with Asia the most likely destination. Teck would look to contract with companies that have a strong business base and that would be strategic long-term customers for the entire Teck suite of mines. Some production may also be sold on the spot market.

The molybdenum concentrate would be the product of differential copper–molybdenum flotation and would not be expected to require leaching for copper removal in order for it to be marketable. Teck would market the molybdenum concentrates on the global market in an unleached form. While rhenium is present in the concentrates, it is considered as an enhancement to the marketability of the molybdenum concentrate.

No contracts are currently in place for the concentrate to be produced by the planned mine expansion. It is expected that any sales contracts signed would be within market norms.

Copper and molybdenum prices of $3.00/lb and $10.00/lb respectively have been used as the long-term metal prices for marketing assumptions. These prices are supported by research from independent forecasters and analysts Wood Mackenzie and CPM.

1.13 Infrastructure, Permitting, and Compliance Activities

1.13.1 Infrastructure

The major facilities supporting QB2 would be located at three principal sites:

- Mine and concentrator at an elevation of approximately 4,300 masl;
- TMF at an elevation of approximately 3,900 masl and located approximately 7 km south of the concentrator site;
- Port and desalination plant at the coast.

A new (additional) access road bypassing Collahuasi, known as the A-97 bypass, would be constructed from the A65 highway to the mine, and internal roads constructed to act as haul roads, to connect the tailings site with the mine site, and to provide access to the pipelines for maintenance activities. In addition, there would be construction of a new overhead high voltage (HV) electric power transmission line, a concentrate pipeline system to the port, a tailings transport system to the TMF, a reclaim water pipeline system from the TMF, and a desalinated makeup water pipeline system to supply water from the port to the mine for use in the process.

Support buildings will include an accommodation camp, administration building, shop and warehouse, laboratory, change house and dining facility, and main gatehouse.

CMTQB has signed a number of power purchase agreements (PPAs), for electric power supply for QB2.

1.13.2 Environmental Considerations

A number of baseline and monitoring studies were performed in support of the Project Estudio de Impacto Ambiental Proyecto Minero Quebrada Blanca Fase 2 report (the 2016 EIA), and included the following key areas: climate and meteorology; air quality; noise; geology, geomorphology, and geological risks; soil; vibrations; hydrology; hydrogeology; water quality; marine water resources; terrestrial ecosystems; continental aquatic ecosystems; marine ecosystems; cultural heritage; landscape; protected areas and priority conservation sites; natural and cultural attractions; land use and relationship with planning; and the human environment.

The 2016 EIA was submitted to Chilean environmental authorities on 26 September, 2016.

Teck will develop monitoring, contingency and emergency plans in support of mining operations. Teck has also proposed measures to address unplanned situations deemed as environmental risks to the environment and communities within the areas of influence of the mine expansion project.

CMTQB has undertaken voluntary environmental commitments, to contribute to the improvement of relations between the mine, neighbouring communities, and the environment. These cover aspects of wildlife, cultural heritage, land use, and the human environment.

Closure is subject to separate sectorial regulatory requirements and approval must be sought from the Chilean Government National Geology and Mining Service agency, SERNAGEOMIN.

1.13.3 Permitting Considerations

After a major project has been granted its environmental approval in Chile, additional sector-specific applications to various governmental agencies and ministries are needed in order to construct or operate the facilities.

There are 198 different types of permits identified as being required for the QB2 project. Some of these permits are subject to environmental requirements and they are therefore included in the 2016 EIA. Other permits are considered sectorial permits only, because they do not have environmental requirements associated with them and they are not part of the 2016 EIA.

The number of permits is based on the project description included in the 2016 EIA and will be grouped wherever possible, to optimize the number of separate applications. A sectorial permitting strategy will be developed, dependent on project needs and considering preparation and processing times in relation to the planned project development schedule.

1.13.4 Social Considerations

The Quebrada Blanca Operations subscribe to Teck’s corporate policies and guidelines for corporate sustainability, which define the corporate expectations for sustainable conduct and sustainable development for all projects with which Teck or its subsidiaries become involved.

1.14 Capital and Operating Costs

1.14.1 Capital Costs

The estimates have been prepared to a target accuracy of ±15% as per the American Association of Cost Engineering International (AACE) Class 3 standard, and are based on first quarter 2016 pricing. The overall contingency allowance is 10.9%.

Costs were estimated using the following assumptions:

- Mine equipment capital estimates include freight, safety systems, assembly, and additional options required to meet Teck operating standards and are considered as all-in ready-to-work costs;
- The process plant estimate includes the estimated capital costs for the procurement, construction, pre-operational testing, and start-up of all facilities, which includes crushing, grinding, and flotation processes, and their ancillary operations and buildings;
- The access road estimate is an escalation of the costs prepared in 2012. The scope of the TMF estimate includes a starter dam foundation preparation, grout curtains, dam embankments, tailings sand cycloning, sands distribution, tailings distribution, and seepage and reclaim water systems. Subsequent dam lifts are on a continual basis, and are included in operating costs with some additional sustaining capital costs. Pipeline and tailings transport includes the concentrate transport system, makeup water transport system, reclaim water system, and the tailings transport system;
- Port facilities include all marine structures, floating mooring system, the ship loader feed conveyor, ship loader and the seawater intake system that would feed the desalination plant;
- Owner's costs typically include the costs for items such as, but not limited to, mineral resource and mineral reserve definition drilling, assays and other test work, permitting, land acquisition, project and site management, initial fills, and insurance;
- Total sustaining capital expenditures after the plant start-up period were estimated for all facilities; the TMF allocation included an estimate portion for closure;
- Closure costs were estimated at $147 million. A post closure payment of $36 million will be deposited into a government-administered fund to cover long-term closure costs required for the project.

The initial capital costs include engineering, procurement, and construction (EPC), and pre-operational testing, and as applied in accordance with the current execution plan and estimated 42-month schedule (from approval of the 2016 EIA to ore production). The initial capital costs also include the Owner's scope costs.

Capital costs are summarized in Table 1-5.

Table 1-5: Capital Cost Estimate Summary Table ($ million)

Estimate Description	Amount
Mine	195
Concentrator	1,416
TMF	285
Pipelines and pump stations	848
Port onshore and offshore structures	470
Access road off-site	49
Engineering, procurement and construction management (EPCM) services	633
Contingency and schedule growth allow	411
Owner's capital cost	26
Owner's cost	327
Owner contingency	54
Estimated Total Capital Cost, Second Quarter 2016	***4,714***

1.14.2 Operating Costs

Operating costs exclude indirect costs such as distributed Teck corporate head office costs for corporate management and administration, marketing and sales, exploration, project and technical developments, and other centralized corporate services.

The operating cost estimate includes all operational activities from mining and comminution of the QB2 ore, to production of a copper concentrate that would be transported via a pipeline to the port facilities at Punta Patache and loaded onto ships, and a molybdenum concentrate that would be trucked to destinations as required. The estimate also includes the transport and impoundment of the final tailings produced by the concentrator, along with the requisite ancillary activities. All estimated costs are based on an annual ore treatment rate of 51.1 Mt/a, or an average of 140,000 t/d.

Costs were estimated using the following assumptions:

- The mine operating cost estimate includes provision for key elements such as fuel, electricity, lubricants, grease, tires, and explosives. It also considers variable haulage distances and profiles, labour costs, and a 5% re-handle of ore mined. Mine pre-production costs are incorporated in the mine operating cost model;
- Concentrator operating costs include allocations for primary crushing, coarse ore stockpile/reclaim, concentrator operations, labour, maintenance, energy, supplies, contracts, and operating allowances;
- TMF operating costs include for the tailings classification system, tailings distribution system to dam, tailings impoundment, sand placement, reclaim water system, labour, maintenance, energy, supplies, contracts, and operating allowances;
- Port facilities operating costs include provision for filtration and ship loading, seawater treatment and desalination, labour, maintenance, energy, supplies, contracts, and operating allowances;

- Pipeline transport system facilities costs include allocations for labour, energy and fuels, supplies, and contracts;
- Infrastructure operating costs for the high-voltage powerlines and the access road include labour, contracts, and supplies assumptions;
- The G&A cost centre includes allocations for off-site facilities, ancillary buildings, and concentrator site utilities;

An operating cost summary for a nominal year of operation is provided in Table 1-6.

Table 1-6: Operating Cost Estimate Summary Table ($ million per year)

Cost Category	Mine	Concentrator	TMF	Port	Desalination Plant	Pipelines	Infrastructure	Site G&A	Global
Labour	25	21	5	7	3	1	1	15	78
Diesel fuel/gasoline	36	—	—	—	—	—	—	—	36
Electric power	5	140	11	2	11	55	—	5	229
Operating supplies	47	87	—	—	4	—	—	1	139
Maintenance supplies	1	24	2	4	4	7	—	2	43
Contracts	53	14	11	2	—	1	2	25	108
Other	7	2	—	—	—	—	—	12	21
Total	***174***	***288***	***29***	***14***	***22***	***64***	***3***	***59***	***653***

Note:

1. Totals may not sum due to rounding.
2. The operating costs shown here reflect total operating costs which consist of site operating costs excluding concentrate transportation and ocean freight costs

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1.15 Economic Analysis

1.15.1 Forward-Looking Information

The results of the economic analysis conducted to support Mineral Reserves, and the Mineral Resource and Mineral Reserve estimates represent forward-looking information that is subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here.

Forward-looking statements in this Report include, but are not limited to, statements with respect to future metal prices, exchange rates, and concentrate sales contracts; taxation; smelter and refinery terms; assumed mining and metallurgical recovery factors; the estimation of Mineral Reserves and Mineral Resources; the realization of Mineral Reserve estimates; the timing and amount of estimated future production, costs of production relevant to a high altitude mining operation in Chile; capital expenditures; operating costs; timing of the development of new open pit pushbacks; technological changes to the mining, processing and waste disposal activities outlined; permitting time lines for tailings storage dam raises;

requirements for additional capital; government regulation of mining operations; environmental risks; ability to retain social licence for operations; unanticipated reclamation expenses; title disputes or claims; and limitations on insurance coverage.

Additional risk can come from actual results of active reclamation activities; conclusions of economic evaluations; changes in Project parameters as mine, process and closure plans continue to be refined, possible variations in Mineral Resources or Mineral Reserves, grade, dilution, or recovery rates; geotechnical and hydrogeological considerations during mining; failure of plant, equipment or processes to operate as anticipated; shipping delays and regulations; accidents, labour disputes and other risks of the mining industry; and delays in obtaining renewals to governmental approvals.

1.15.2 Cashflow Analysis

The Project has been valued using a discounted cash flow (DCF) approach. Estimates have been prepared for all the individual elements of cash revenue and cash expenditures for ongoing operations.

The internal rate of return (IRR) is calculated as the discount rate that yields a zero NPV. The payback period is calculated as the time needed to recover the initial capital costs.

The economics are based on a 100% project ownership and the cash flow modeling was completed on an unlevered basis.

The base case economic analysis assumes constant prices with no inflationary adjustments. No salvage value has been allocated.

The analysis is based on a 26 calendar year operating life (2021–2046 with partial years in the first and last year of operation), with first mill production occurring in the third quarter of 2021 and nameplate mill throughput capacity of 140,000 t/d. Nameplate mill throughput capacity is expected to be achieved 12 months after first mill production. First major capital expenditures are assumed to occur in 2017. All expenditures prior to 2017 are not considered.

An average cost of $60/wet tonne of copper concentrate shipped and an average cost of $93.50/wet tonne of molybdenum concentrate shipped have been assumed.

Physical working capital requirements, such as spare parts and first fills, were included in the Owner’s cost component of the estimated initial capital expenditures.

QB2 is not subject to any royalties held by third parties.

The Project economics were modelled on an after-tax basis assuming project ownership by a Chilean-domiciled entity. The analysis assumes access to $525 million of pre-existing tax pools related to Project expenditures prior to 2017 which have not yet been depreciated.

At base assumptions, QB2 generates an IRR of 11.7 % and an NPV_8 of $1,253 million as of January 1, 2017, with payback before financing costs estimated to occur in June 2027, less than six years after first production. Table 1-7 summarizes the key financial metrics. The annual and cumulative free cash flows are presented graphically in Figure 1-1.

Table 1-7: Summary of Key Project Metrics and Estimated Project Economics

Category	Unit	Total (1)			Annual Average (2)		
		First 5 Years	First 10 Years	Life-of-Mine	First 5 Years	First 10 Years	LOM
Mining							
Total material moved	Mt	489	962	2,051	98	96	82
Processing							
Total ore processed	Mt	254	509	1,259	51	51	51
Head grade – copper	%	0.60%	0.56%	0.51%	0.60%	0.56%	0.51%
Head grade – molybdenum	%	0.020%	0.021%	0.019%	0.020%	0.021%	0.019%
Production							
Copper production	t x 1,000	1,375	2,583	5,842	275	258	238
Molybdenum production	t x 1,000	39	82	179	7.7	8.2	7.3
Copper equivalent production (3)	t x 1,000	1,504	2,856	6,440	301	286	262
Financial Summary							
Revenues (Net TCRC)	$ million	8,712	16,545	37,323	1,742	1,654	1,519
Operating costs	$ million	3,702	7,367	17,632	740	737	709
EBITDA	$ million	5,010	9,178	19,691	1,002	918	811
Free cash flow	$ million	4,555	7,610	9,960	911	761	610
Cash Costs (4)							
Before by-product credits	$/lb Cu	1.51	1.59	1.66	1.51	1.59	1.64
After by-product credits	$/lb Cu	1.28	1.33	1.41	1.28	1.33	1.39
Category	**Unit**	**Total (1) LOM**					
Capital Costs							
Development capital costs	$ million	4,714					
Sustaining capital costs	$ million	492					
Closure costs (5)	$ million	184					
Economic Summary							
Net present value (8%)	$ million	1,253					
Internal rate of return	%	11.7%					
Payback (from first production)	Years	5.8					
Mine life/payback (6)	—	4.3					

Notes:

1. Total numbers for first five years and first 10 years exclude the first partial year of operations in 2021;
2. Annual average numbers exclude the first partial year of operations in 2021 and in the case of the LOM annual average also exclude the last partial year of operations in 2046;

3. Copper equivalent figures are calculated by converting molybdenum production into equivalent copper tonnages using base case metal price assumptions;
4. Cash costs before by-product credits allocate all costs, except for specific molybdenum concentrate freight costs and roasting charges, to the payable copper produced. Cash costs after by-product credits deduct the revenue received from molybdenum concentrate sales, net of specific molybdenum concentrate freight costs and roasting charges, from cash costs before by-product credits. Cash cost are inclusive of all striping costs during operations, estimated at approximately $0.05 per pound of Cu over the life of mine.
5. Closure costs shown here reflect $147 million in closure costs, plus the NPV at a 1.65% discount rate of post-closure costs of $209 million, spent evenly over 350 years, which equates to a value of $36 million;
6. Mine life/payback ratio is the planned mine life in years divided by the number of years from first production that capital payback is achieved.
7. Operating costs shown here reflect total operating costs which comprise site operating costs plus concentrate transportation and ocean freight costs.

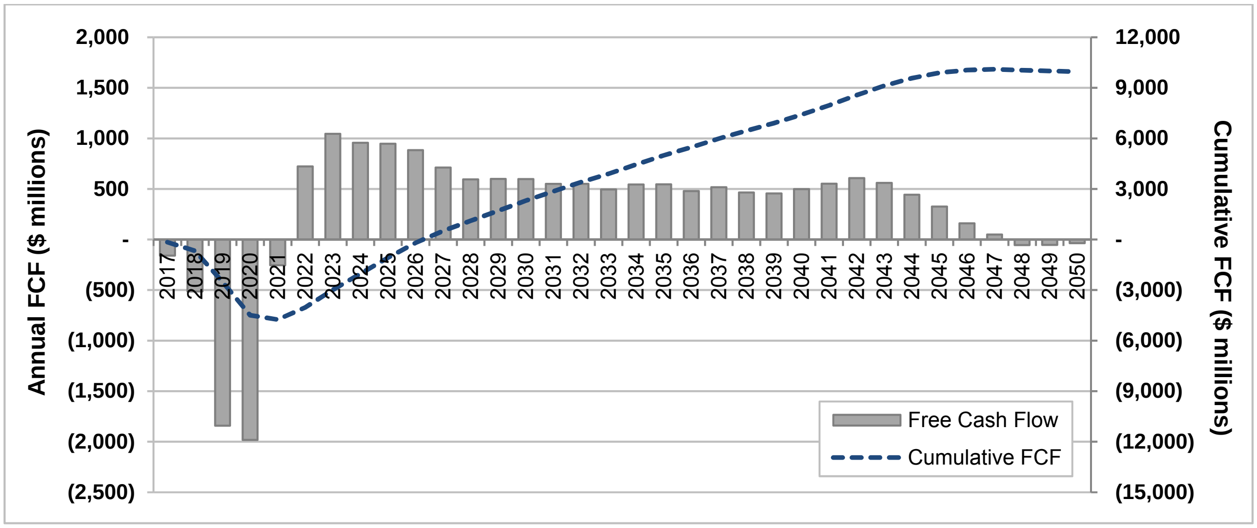

Figure 1-1: Annual and Cumulative Estimated Free Cash Flow

Note: Figure prepared by Teck, 2016. FCF = free cash flow.

1.16 Sensitivity Analysis

The NPV_8 is most sensitive to changes in copper price, and moderately sensitive to changes in site operating costs, initial capital, and exchange rate (Figure 1-2).

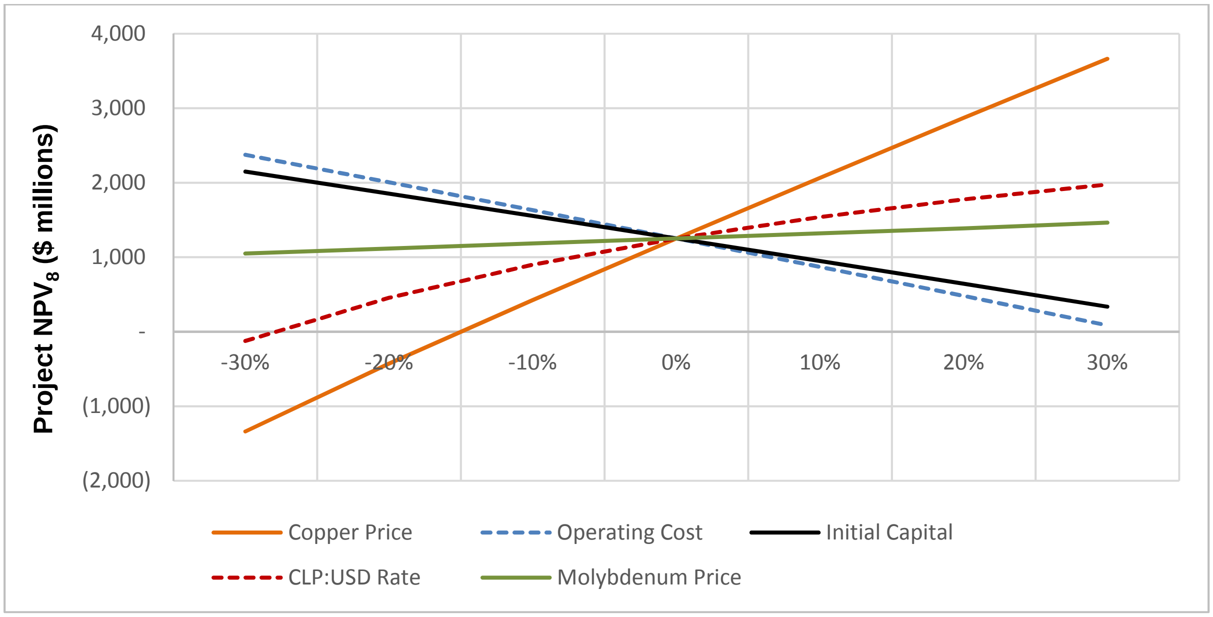

Figure 1-2: **Change in NPV8 for Percent Changes in Model Inputs**

Note: Figure prepared by Teck, 2016.

1.17 Execution Plan

Development of the project execution plan for QB2 was based on the use of an international engineering, procurement, and construction/contracts manager (EPC/CM) contractor for engineering, procurement, and construction management.

QB2 is estimated to be executed in 42 months after approval of the 2016 EIA. The EIA approval is anticipated to take 18 months from submission in late September 2016. The main critical paths are:

- Evaluation and approval of the 2016 EIA;
- Design, permitting (15 months after 2016 EIA), and construction of the starter dam for the TMF.

1.18 Interpretation and Conclusions

Under the assumptions discussed in this Report, the Project returns a positive economic outcome. The decision to initiate full construction activities rests with Teck management, and will require formal permit grants by a number of regulatory authorities.

1.19 Recommendations

On completion of the FS2016, each discipline area was reviewed to determine if additional testwork or investigative studies should be completed in support of detailed mine design.

A one-phase work program is proposed, and presented below by discipline area:

- Undertake additional geotechnical drilling to further support detailed engineering for design of the concentrator foundations;
- Complete additional infill drilling to potentially support upgrade of Mineral Resource confidence to the Measured category to cover the majority of the initial capital investment payback period;
- Confirm the silver and molybdenum content of the current hypogene stockpile, and determine the extent and impact of oxidation on metallurgical recoveries;
- Complete additional silver assays on existing core to support future estimation of silver in the block model;
- Develop detailed alteration models and in-situ fragmentation models;
- Collect additional diorite material for comminution testing
- Evaluate the metallurgical performance of the staged flotation reactor in a cleaning duty during detailed engineering.

No program is dependent on the results of another. The total program cost is estimated at approximately $7,280,000.

2.0 Introduction

Mr. Rodrigo Alves Marinho, P.Geo., and Mr. Michael Nelson, F.AusIMM., prepared this technical report (the Report) for Teck Resources Limited (Teck) based on the 2016 Feasibility Study (FS2016) for Phase 2 (QB2) in respect of the Quebrada Blanca mining operation (the Project), located in Chile's Región de Tarapacá (Figure 2-1).

The initial open pit mine at Quebrada Blanca (QB1 or the Quebrada Blanca Phase 1 operation) commenced operation in 1994, exploiting supergene copper mineralization. To date, operations at the mine have used a heap leach and dump leach and solvent extraction/electrowinning (SX/EW) process. The supergene ore is nearly depleted.

The FS2016 that is the subject of this Report primarily considers the hypogene copper–molybdenum mineralization. The Project is expected to include the construction of a new concentrating plant, a tailings facility and major infrastructure installations for transporting concentrate and desalinated water, and facilities to receive, filter and ship concentrate in the North Patache sector south of Iquique.

2.1 Terms of Reference

The Report supports Teck's annual information form (AIF) filing for 2016, and updated Mineral Resource and Mineral Reserve estimates.

The Project owner is Compañia Minera Teck Quebrada Blanca S.A. (CMTQB). The shareholders of this company are Teck Resources Limited (Teck) which has an indirect 76.5% holding; Inversiones Mineras S.A (IMSA) which is a private Chilean company that has a 13.5% holding; and Empresa Nacional de Minería, the Chilean State-run minerals company, which has a 10% holding. Teck through its holdings generally controls the operation. .

Currency is expressed in US dollars unless stated otherwise. The local currency is the Chilean peso (CLP). Units presented are typically metric units, such as metric tonnes, unless otherwise noted. The Report uses Canadian English. Total copper is expressed as CuT. Soluble copper is expressed as CuS, and consists of acid-soluble copper (CuSH) and cyanide-soluble copper (CuCN).

Calendar years are used in some sections of the Report, in relation to the proposed mine plan and execution plan. The years shown are for illustrative purposes; the actual timing may vary. Formal approval is required from Teck's Board for construction, and additional permits need to be granted by the Government of Chile.

2.2 Qualified Persons

The following serve as the qualified persons for this Technical Report as defined in National Instrument 43-101, Standards of Disclosure for Mineral Projects, and in compliance with Form 43-101F1:

- Mr. Rodrigo Alves Marinho, P.Geo., Technical Director, Reserve Evaluation, Teck Resources Limited;
- Mr. Michael Nelson, FAusIMM, Project Director–Quebrada Blanca Phase 2, Teck Resources Limited.

Figure 2-1: Project Location Map

Note: Figure prepared by MHW and Teck, 2016.

2.3 Site Visits and Scope of Personal Inspection

Mr Marinho has visited the property on a regular basis since December 2012. During his most recent visit from October 14–16 2016, Mr. Marinho reviewed drill hole core stored in the facilities of the town of Pozo Almonte, discussed geological interpretations with the geology group, and visited the QB1 supergene operations.

Mr Nelson visited the Project site from 29 February to 1 March 2016. During that time he inspected the sites for all planned facilities, including the port area, pipeline routes, access roads, Iquique port cargo handling facilities and the tailings management facility (TMF). At the site he inspected hydrogeological and geotechnical drilling activities, visited the temporary camps to be refurbished and reviewed safety performance with the site team. Additionally, Mr. Nelson visited the Escondida water supply project during March 2016 as a guest of a third-party engineering firm, to observe construction procedures for the pipeline and associated port facility. This project has a similar design concept to the facility planned for QB2.

2.4 Effective Dates

The Report has a number of effective dates as follows:

- Date of latest information on exploration and drilling programs: 31 December, 2016;
- Date of close-out of database used in resource estimation: 31 December, 2012;
- Date of resource model: 31 July, 2013;
- Date of Mineral Resource estimate: 31 December, 2016;
- Date of Mineral Reserve estimate: 31 December, 2016;
- Date of financial analysis: 3 February, 2017;
- Date of supply of latest information on mineral tenure, surface rights and Project ownership: 31 December, 2016

The overall effective date of the Report is taken to be the date of the financial analysis which is 3 February, 2017.

2.5 Information Sources and References

The principal information sources for the Report were:

- Teck Resources Limited: FS 2016 – Quebrada Blanca Phase 2: internal report prepared by Teck, dated February 2017, 23 vols (FS2016),
- Montgomery Watson Harza: Estudio de Impacto Ambiental Proyecto Minero Quebrada Blanca Fase 2: report prepared for Teck, August 2016 (2016 EIA).

The reports and documents listed in Section 2.6 (Previous Technical Reports), Section 3.0 (Reliance on Other Experts) and Section 27.0 (References) of this Report were used to support the preparation of the Report. Additional information was sought from Teck or CMTQB personnel where required.

2.6 Previous Technical Reports

Teck has previously publicly filed the following technical reports on the Quebrada Blanca deposit on SEDAR:

- Allan, M.J., Yuhasz, C., Witt, P., and Baxter, C., 2012: National Instrument 43-101 Technical Report, Quebrada Blanca Phase 2 Project, Region I, Chile: report prepared for Teck Resources Inc., effective date April 24, 2012;
- Barr, N.C., 2008: NI 43-101 Technical Report on Hypogene Mineral Resource Estimate, at Dec 31, 2007, Quebrada Blanca Region I, Chile: report prepared for Teck Cominco Limited and Compañía Minera Quebrada Blanca S.A, filing date 31 March, 2008.

Prior to Teck's interest in the Project, Aur Resources Inc. (Aur Resources) filed the following technical report:

- Barr, N.C. and Reyes, R., 2004: Report on Mineral Resources and Mineral Reserve Estimates at Dec. 31, 2003, Quebrada Blanca Copper Mine, Region I, Chile, report prepared for Aur Resources and Compañía Minera Quebrada Blanca S.A, filing date 31 March 2004.

3.0 Reliance on Other Experts

This section is not relevant to this Report. Information pertaining to mineral tenure, surface rights, royalties, environmental, permitting and social considerations, marketing and taxation were sourced from Teck experts in those fields as required.

4.0 Property Description and Location

4.1 Introduction

The Quebrada Blanca mine and its proposed copper concentrator are located in Chile's Región de Tarapacá, approximately 165 km directly and 240 km by road southeast of the regional capital city of Iquique and near the Bolivian border on the western flank of northern Chile's Andes Mountains.

The current open pit operation is located at approximately 21°00'08"S and 68°48'30"W.

The proposed site for the Project's tailings management facility (TMF) would be located approximately 7 km from the concentrator site at 20°59'33.46"S and 68°50'07.46"W.

The port facilities would be located at Punta Patache, which is approximately 145 km west of the mine and 60 km south of Iquique, at a location of 20°48'36.47"S and 70°12'01.49"W.

4.1.1 Taxation

Taxes payable in Chile include the following:

- The mining tax rate is based on a sliding scale of operating margin, with a minimum rate of 5.0% and a maximum rate of 14.0%; there is no provision in the current mining tax code for carrying mining tax losses forward.
- The corporate income tax rate under the partially integrated regime applicable to Quebrada Blanca Operations (QB) is 27.0% of taxable income from 2017 onwards. Some notable features of the regime are:
  - Accelerated depreciation for mining plant and equipment is generally at straight-line over 3 years.
  - Corporate income tax losses can be carried forward indefinitely.
  - The mining tax is deductible for income tax purposes.
  - Dividends that are paid to Teck Resources Chile Limitada (TRCL), the Teck subsidiary that directly holds Teck's interest in CMTQB, are not subject to any withholding tax.
  - Distributions made by TRCL to a non-resident corporate shareholder would be subject to a dividend withholding tax; the rate will depend on the country in which the corporate shareholder is domiciled and whether a tax treaty is in place between Chile and the country of domicile, among other things. Distributions to non-resident corporate shareholders are not considered in the financial analysis.

4.1.2 Fraser Institute Policy Perception Index

Teck has used the Investment Attractiveness Index from the 2015 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 Chile.

Teck has relied on 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, and forms a proxy for the assessment by industry of political risk in Chile from the mining perspective.

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.

Chile is overall ranked 11 out of the 109 jurisdictions in the 2015 Fraser Institute survey.

4.2 Project Ownership

Teck currently owns a 76.5% indirect interest in the mine. Teck's direct interest is held by TRCL, which in turn is owned by Teck and a number of other Teck wholly-owned subsidiaries.

The remaining interest is owned by:

- Inversiones Mineras S.A. (13.5% interest), a private Chilean company;
- The government of Chile (10% interest) through its State-run minerals company, Empresa Nacional de Minería (ENAMI).

4.3 Mineral Tenure

During the feasibility study, four major areas were identified that would require mineral tenure and surface rights. These were:

- Mine area: includes industrial land (Terreno Industrial Teck QB), concentrator plant, tailings transport system, and TMF;
- Linear works: includes the makeup water and concentrate pipelines, electric power transmission system, and the Bypass A-97 access road;
- Port area: includes port facilities and infrastructure, water desalination plant, and concentrate handling and shipping area;
- Pampa area: includes the temporary works camp, solids residue treatment plant, access roads, and explosives magazine for activities related to geotechnical, engineering and construction studies.

Teck currently owns and controls 119,587 ha of mining rights, incorporating exploitation and exploration mining concessions. A list of the exploitation concessions totalling 65,818 ha are shown in Table 4-1. All concessions are held in the name of CMTQB.

Table 4-1: Mining Exploitation Concession Summary Table

Concessions	Number of Concessions	Area (ha)	Sector Name	Purpose
Exploitation	43	41,903	Mine	Cover the existing open pit and all related infrastructure and ancillary buildings
	4	435	Port	Coastal sector of Patache and comprise the design area for the Project's construction of a port for concentrate shipment and a water desalination plant
	54	16,530	Pampa	Solids residue treatment plant, construction camp areas, and other supporting infrastructure for the Project
	10	3,000	Alconcha	Located southeast of the mine in the El Loa Province in the Antofagasta Region
	20	3,650	Access road to Quebrada Blanca	Cover access roads from Pintados to the mine
		65,518		

Exploitation mining concessions are granted indefinitely, and give the holder the right to explore and to exploit the any Mineral Resource found within their boundaries.

4.3.1 Mine Sector

The 43 exploitation mining concessions within the mine sector cover an area of 41,902 ha. Concession locations are shown in Figure 4-1 and the concession list is included in Table A-1 of Appendix A.

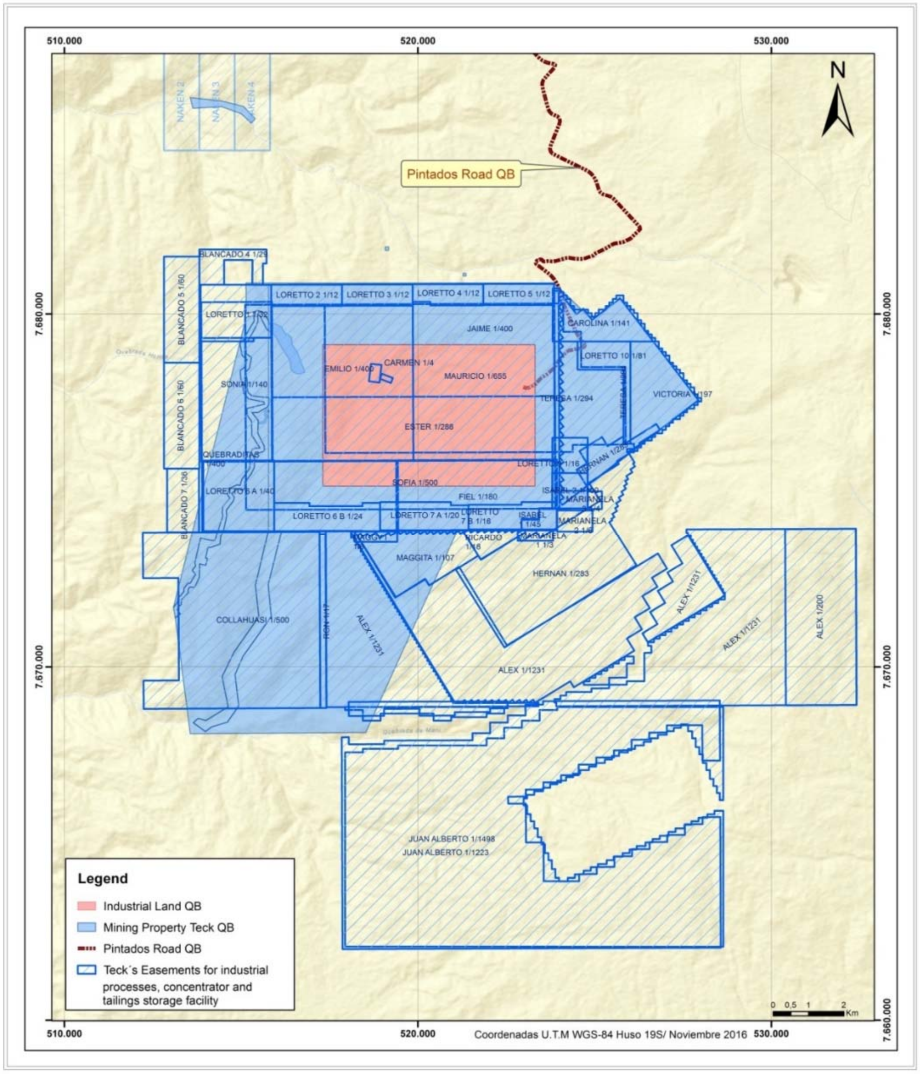

Figure 4-1: Location Map, Exploitation Mining Concessions within the Mine Sector

Note: Figure prepared by Teck, 2016.

4.3.2 Port Sector

Four exploitation mining concessions, with an area of 435 ha, cover the port area (refer to Table A-2 in Appendix A). Concession locations are shown in Figure 4-2.

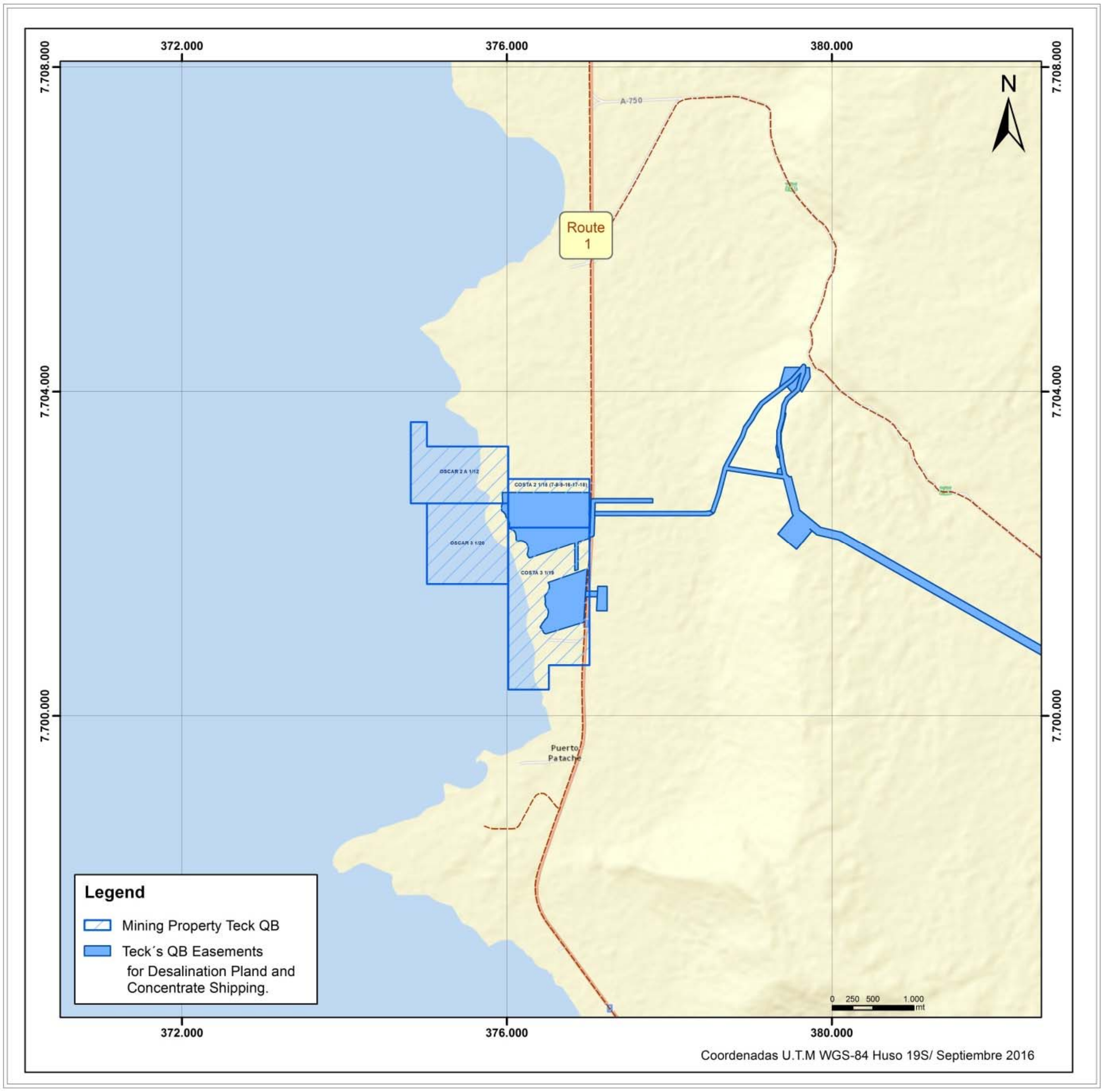

Figure 4-2: Location Map, Exploitation Mining Concessions within the Port Sector

Note: Figure prepared by Teck, 2016.

4.3.3 Pampa Sector

The Pampa area is covered by 55 exploitation mining concessions, with a total of 16,830 ha (refer to Table A-3 in Appendix A). Concession locations are shown in Figure 4-3.

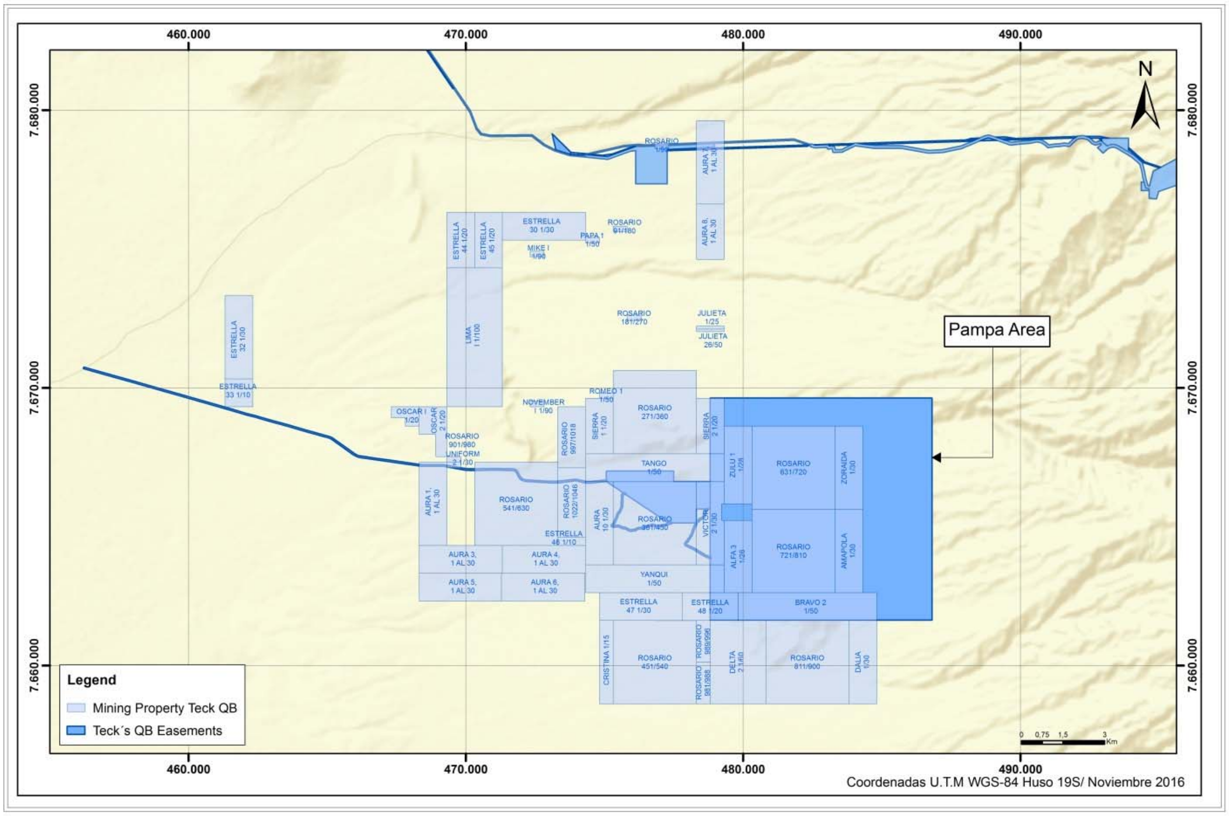

Figure 4-3: Location Map, Exploitation Mining Concessions within the Pampa Sector

Note: Figure prepared by Teck, 2016.

4.3.4 Alconcha Sector

The Alconcha sector is covered by 10 exploitation concessions, having a total area of 3,000 ha (refer to Table A-4 in Appendix A). Concession locations are shown in Figure 4-4.

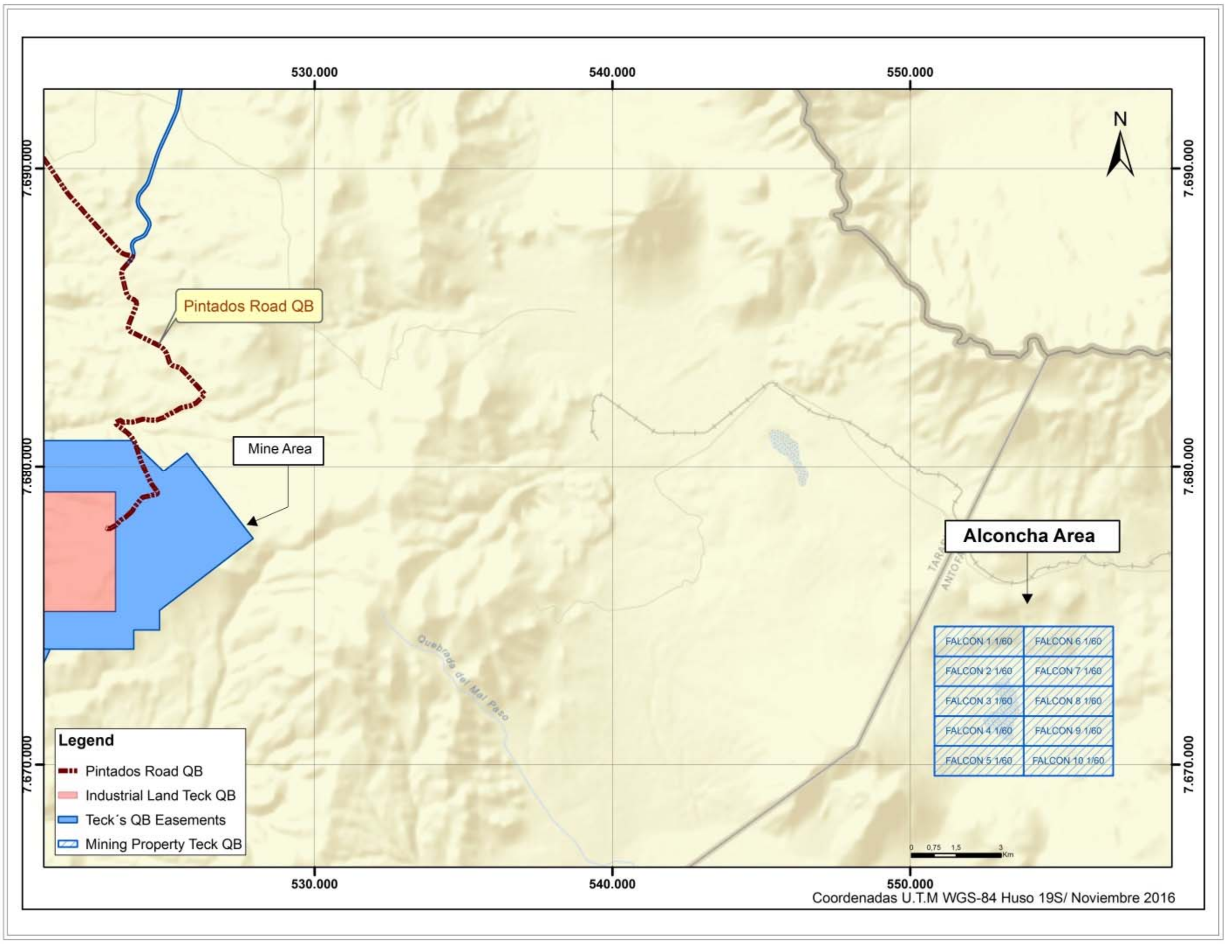

Figure 4-4: Location Map, Exploitation Mining Concessions within the Alconcha Sector

Note: Figure prepared by Teck, 2016.

4.3.5 Access Road Sector

The access road (camino) sector has a total area of 3,650 ha (refer to Table A-5 in Appendix A) in 20 exploitation concessions. Concession locations are shown in Figure 4-5.

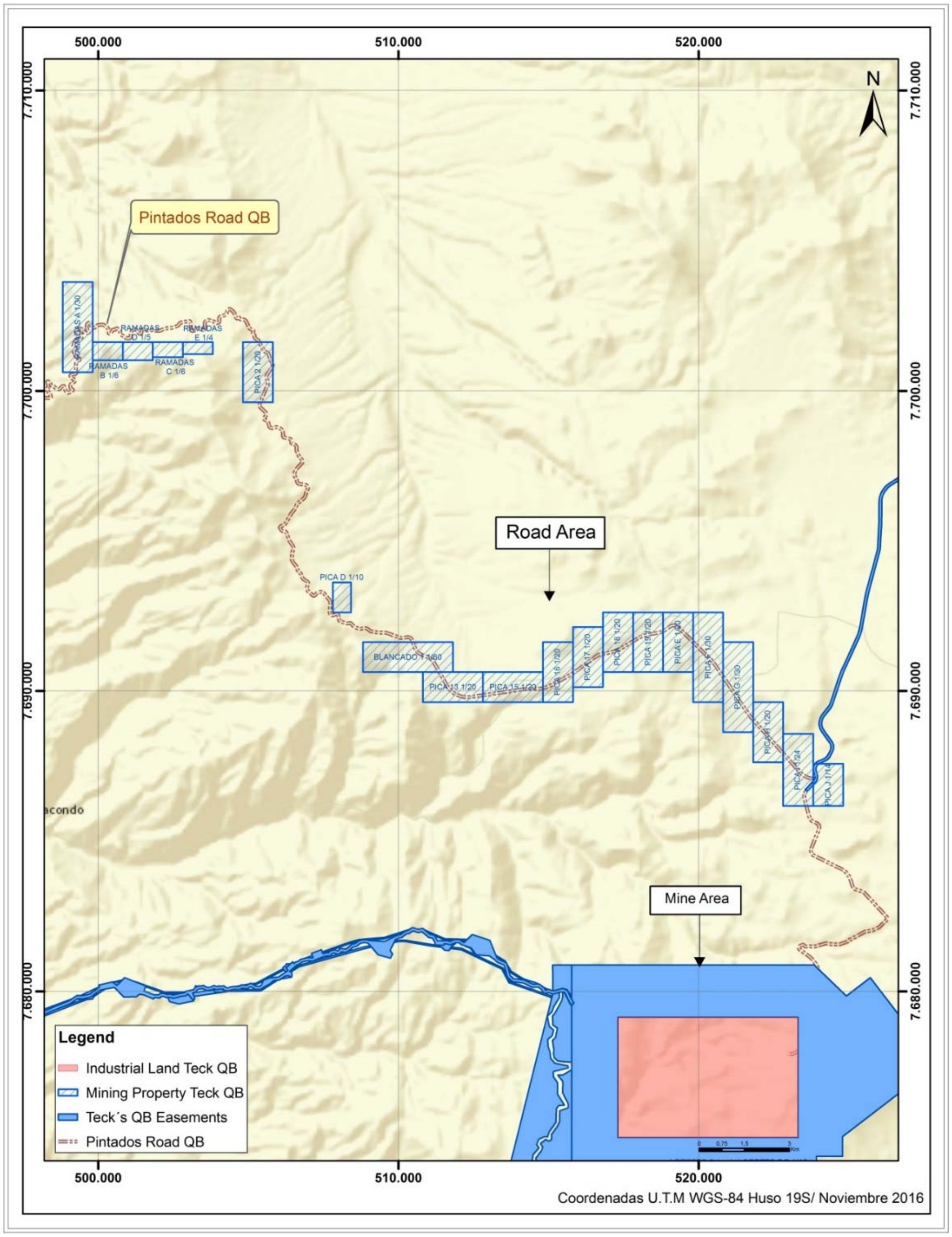

Figure 4-5 Location Map, Exploitation Mining Concessions within the Camino Sector

Note: Figure prepared by Teck, 2016.

4.4 Maritime Concession

On 22 May 2013, Teck filed a request with the Armada de Chile (Chilean Navy) for a maritime concession that allows for use of Patache Bay for the Project's marine facilities. This request has been processed by the local naval authorities and at the time of this Report is currently with the Army Undersecretary (Subsecretaría para las Fuerzas Armadas) for final approval.

4.5 Exploration Concessions

Teck also holds a number exploration concessions in the greater region surrounding the mine; however, these are not considered relevant to this Report as the assumption is that any discovery in these concessions could be developed as a stand-alone operation.

4.6 Surface Rights

A land acquisition study indicated that 99% of the surface lands where the Project's facilities will be located belong to the State. Teck has commenced the acquisition of mining easements on these lands through legal and judicial processes. Out of these easement processes, currently 70% have already been resolved in Teck's favour.

The 1% of surface lands needed for the pipelines for the Project that are not owned by the State belong to a private party, with whom negotiations are underway regarding a right-of-way (ROW) agreement.

The land acquisition study also identified several mining concession holders within some of the areas that are currently planned to host Project infrastructure. Teck is either currently in discussion with, or is planning dialogues with, these affected parties.

4.6.1 Mine Sector

A current easement covers 4,752 ha in the mine area for concentrator plant installation, WRSF, power lines, access roads, pipelines, and other necessary facilities for the Project.

A second easement, Terreno Industrial (industrial land), is current, covering 2,400 ha, and includes the open pit, as well as the required workshops, plants, and other facilities necessary for the Project's operations and the ongoing mining activities.

Easement areas are shown in Figure 4-6.

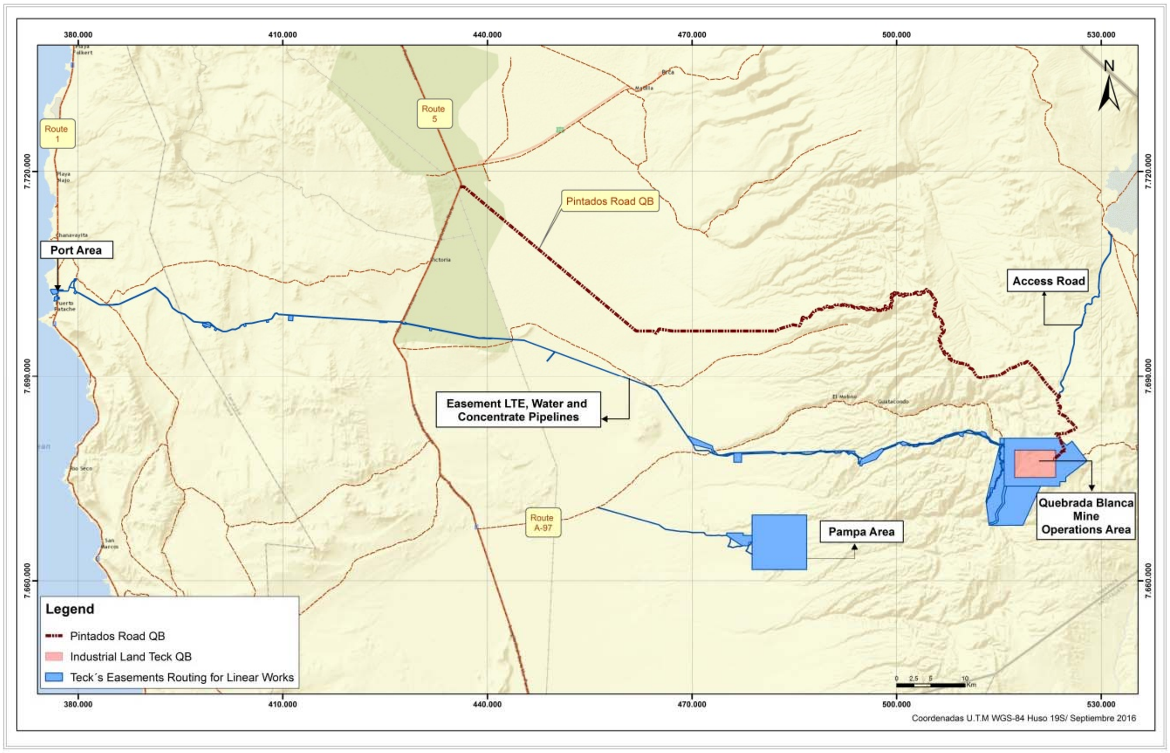

Figure 4-6: Location Map –Easements

Note: Figure prepared by Teck, 2016.

An access road coming from Colonia Pintado to the mine site (the Pintados–Quebrada Blanca road sector) is covered by a 600 ha active road easement.

4.6.2 Port Sector

The planned port site has a granted easement of 99.63 ha. The easement covers State-owned land. The easement location is included in Figure 4-6.

4.6.3 Tailings Management Facility

CMTQB has been granted 4,240 hectares of surface lands at the TMF site (formerly known as Area S21) for the purpose of constructing and operating all facilities and infrastructure necessary for the tailings deposition of the Project (refer to Figure 4-1).

Together with this easement, the Project also has a supplementary easement of 209.45 ha.

4.6.4 Pampa Sector

Three mining easements have been granted for access, occupation, and multiple use in the Pampa Sector, and total 6,400 ha. The easement locations are included in Figure 4-6.

4.6.5 Pipelines and Roads Sector

A mining easement has been granted to cover the corridor planned for the copper concentrate and makeup water pipelines, which covers 1,809.84 ha.

A mining easement of 733.48 ha has been approved, is currently in the registration inscription phase, and covers miscellaneous infrastructure areas that will host stockpiles, camps, and pumping stations.

The easement application for the power transmission line is in process, and is due to be brought before the Third Court of Iquique for consideration. The easement required for the Bypass A-97 access road has been granted. Easement areas are also shown in Figure 4-6.

4.7 Water Rights

CMTQB currently holds the following highland (Altiplano) water rights:

- Salar de Michincha: 315.9 L/s;
- Salar de Alconcha: 120.3 L/s.

4.8 Royalties and Encumbrances

There are no other royalties or encumbrances currently known on the Project other than the requirement to pay the Chilean mining tax.

4.9 Permits

Permitting for the Project is discussed in Section 20.

4.10 Environmental Considerations

The environmental setting and likely environmental considerations for the Project is discussed in Section 20.

4.11 Social License Considerations

Social licence considerations for the Project are discussed in Section 20.

4.12 Comments on Property Description and Location

Information from Teck and CMTQB land experts supports that the mining tenure held is valid and is sufficient to support the declaration of Mineral Resources and Mineral Reserves.

A significant portion of the required surface rights have been obtained in support of locations of Project infrastructure. Discussions are underway with remaining land holders to acquire the necessary surface rights for the planned pipelines. Discussions are either underway, or planned, with parties that hold mining concessions within some of the areas that are currently proposed to host Project infrastructure.

There are no other royalties or encumbrances currently known on the Project other than the requirement to pay the Chilean mining tax.

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

5.0 Accessibility, Climate, Local Resources, Infrastructure, and Physiography

5.1 Accessibility

5.1.1 Road

Iquique, the region's capital, is mainly accessed by a coastal highway, Chile's Ruta 1. There is an international airport in the region, which is situated on the coast approximately 45 km south of Iquique and is accessed via Ruta 1.

From Iquique, the Project can be accessed by taking the Iquique–Alto Hospicio road, continuing east on Ruta 16 to Pozo Almonte, then taking Ruta 5 south to Camino Pintados, a surfaced road approximately 130 km long, which intersects Ruta 5 at kilometre marker 1775 and continues to the Project area. The total distance to the mine by road is approximately 240 km. An alternative route from Iquique through Pozo Almonte, then taking Ruta A-65 to the Collahuasi mine and passing through Collahuasi to the Quebrada Blanca mine, is approximately 254 km by road.

5.1.2 Port

There are three major ports in the Región de Tarapacá: one at Iquique and two others south of Iquique at Caleta Patillos and Punta Patache. The port of Iquique is a multi-use commercial port that handles break bulk cargo in the Región de Tarapacá, while Caleta Patillos (salt) and Punta Patache (copper concentrates and coal) are both bulk handling private ports.

Currently, copper cathodes produced from the existing leach and SX/EW operation at Quebrada Blanca are trucked by road to Iquique for ocean shipping.

5.2 Climate

Rainfall typically occurs in the summer season, from January through March. While the annual total precipitation is limited, individual storms can be quite concentrated. The rain storms are routinely accompanied by lightning. The recorded annual rainfall for the mine area amounts to 94.9 mm per year. Recorded year-round temperatures at the proposed concentrator site vary between highs of 11.4ºC and lows of -3.2ºC.

The TMF area has recorded an average annual precipitation of 91 mm, with temperatures ranging from a maximum of 5.8ºC to a minimum of 0.5ºC throughout the year.

Precipitation at the port site location at Punta Patache is negligible, while temperatures are mild throughout the year.

5.3 Local Resources and Infrastructure

The closest major population centre to the mining operation is Iquique, which provides services for a number of large mining operations in the region.

Huatacondo is the closest town to the existing mining facilities, and is located within the Pozo Almonte comuna in the mountains. The small settlements of Tamentica, Quebrada Casillas (Choja Alto), Chiclla and Copaquiri are in proximity to areas planned for the TMF and concentrate and water pipelines. The population centres of Caramucho, Chanavayita and Cáñamo are in proximity to planned port operations.

Additional information on the Project infrastructure and setting is provided in Section 18 and Section 20.

5.4 Physiography

The Quebrada Blanca mine is situated in the Chilean Altiplano at an average elevation of about 4,300 masl. The terrain is rugged, with the mountains being intersected by many steep canyons or ravines (quebradas).

A species of desert plant, the Llareta, occurs in close proximity to the mine and planned supporting mining facilities. Animal life in the area consists primarily of llama, vicuña, viscacha, and foxes.

The planned TMF would be located southwest of the mine site at an average elevation of approximately 3,900 masl. The TMF area does not contain any relevant archeological sites; however, there is some vegetation in close proximity to drainage areas.

The sea coast has limited vegetation, which is typical of the west coast of South America. The planned port area is rocky, with moderate cliffs descending to the ocean, and is subject to strong breezes.

5.5 Seismic Considerations

The Project is within the zone of seismic intensity caused by the subduction of the Nazca Plate under the South American Plate. Plate seismic ratings, as defined in Chilean norm NCh 433, range from 2 for the proposed plant site to 3 nearer the ocean and planned port facilities. Earthquakes with energy release over seven on the Richter scale have a history of occurrence in the area. From the same Chilean norm, NCh 433, the maximum ground acceleration is $0.3g$ in the planned process plant area and $0.4g$ for the proposed port area.

6.0 History

6.1 Project History

Mineralization was identified at Quebrada Blanca as early as the 1800s. Mining activity, assumed to be in the period 1905–1930, included prospecting pits, shallow shafts and short adits. The underground mine workings were small, accounted for only small tonnage extractions, and there is no formal production record.

The current mining operations commenced in 1994 to exploit and process the deposit's supergene ore by means of leaching and SX/EW. This operation was originally designed to produce 75,000 t of cathode copper annually. It has produced as much as 85,000 t of cathode copper on an annual basis, but production has declined recently as the supergene portion of the deposit is nearly depleted. Teck expects the existing leachable supergene mineralization to be fully depleted by 2017–2018. The current leach operations have pre-stripped much of the underlying hypogene deposit.

The next mining phase is planned to develop the QB2 project to exploit the hypogene mineralization; this will see copper and molybdenum concentrates being recovered in a new concentrator facility that will use conventional grinding and flotation processes. The hypogene pit developed during QB2 will be an extension to, and expansion of, the current open pit.

A summary of the more recent work history for the Project is provided in Table 6-1.

The initial feasibility study on QB2, completed in 2012 (FS2012), was updated in 2016 (FS2016). After the FS2012 was completed, Teck continued to work on various aspects of the Project to refine the design and evaluate alternatives that could provide capital cost savings. The key changes between the 2012 and 2016 studies include:

- Relocation of the TMF site;
- Changes to power supply assumptions;
- Incorporation of updated geometallurgical information in plant design and mine plan;
- Incorporation of results of optimization studies undertaken in 2014 and 2015, primarily affecting process plant assumptions;
- Changes to the throughput rate assumption.

The remainder of this Report discusses the outcomes of the FS2016.

Table 6-1: Project History

Company	Active Period	Work Completed
Chile Exploration Company	1950s–1971	Claim staked
Chilean Geological Survey	1973–1975	Geological mapping program, IP and resistivity geophysical survey.
Codelco (Chuquicamata Division)	1975–1977	One core drill hole.
Superior Oil-Falconbridge Group	1977–1983	Optioned property. Exploration performed by subsidiary, Compañía Exploradora Doña Inés Limitada (Exploradora Doña Inés). Conducted detailed surface geological mapping, ground magnetic survey geochemical and mineralogical investigations, core drilling, underground tunnelling (2,600 m approx.), metallurgical testwork (flotation, crushing, grinding, column tests), focusing on supergene mineralization. However, a small number of core holes (15 holes for 5,598 m) specifically targeted hypogene mineralization. Completed a pre-feasibility study on the supergene mineralization, and although results were positive, the Superior Oil-Falconbridge Group did not exercise the option due to the poor commodity prices prevailing at the time.
Empresa Nacional de Minería (ENAMI)	1983–1989	Acquired Codelco's interest in the property. Sought partners to help develop the property in 1989.
Cominco	1989	Acquired a property interest
Compañía Minera Quebrada Blanca S.A	1989–2000	Compañía Minera Quebrada Blanca S.A. formed 1989. Initial ownership was Cominco Ltd. (76.5%), ENAMI (10%), and Sociedad Minera Pudahuel (13.5%). Cominco subsequently sold 29.5% of its property share to Teck Corporation. Pre-feasibility and feasibility studies completed during 1990 and 1991 on the supergene mineralization, with a decision to commence mining in 1992. First cathodes produced in 1994.
Regional exploration by third-parties	1992–1999	Codelco, 1992: regional-scale airborne magnetic survey Noranda, 1999: a regional-scale hyper-spectral survey
Aur Resources	2000–2007	Purchased the Teck and Cominco interests to obtain their 76.5% interest in Compañía Minera Quebrada Blanca S.A.

Company	Active Period	Work Completed
		Continued to operate the SX/EW operation, and prioritized exploration and infill drilling for leach ore. Treatment of low-grade run-of-mine (ROM) material via dump leaching methods commenced in 2003. Limited hypogene exploration performed. Exploration activities included IP/resistivity surveys (2000, 2003); ground magnetic survey (2002); acquisition of Codelco and Noranda airborne geophysical survey data and data interpretation (2003); transient electro-magnetic (TEM) survey (2004). Ongoing core and RC drilling.
Teck	2007 to date	Acquired Aur Resources in 2007. Compañía Minera Quebrada Blanca S.A. renamed to CMTQB. Continued with active supergene mining operations, with material being sent to heap leach or the ROM dump leach; annual Mineral Resource and Mineral Reserve estimates on the supergene mineralization. Completed core and RC drilling, metallurgical testwork, environmental studies, Mineral Resource and Mineral Reserve estimation in support of evaluation of the hypogene mineralization. Engineering studies on the hypogene mineralization included: advanced scoping study, 2009; tailings management site location study, 2009; pre-feasibility study, 2010; initial feasibility study, 2012; current feasibility study, 2016.

6.2 Production

From 2006 to 30 September 2016, a total of 73 Mt grading 0.93% CuS was mined and sent to the heap leach pads. An additional 128 Mt, grading 0.44% CuS was sent to the run-of-mine (ROM) dump leach operation. Approximately 719,000 t of copper cathode was produced by the operations during this period.

7.0 Geological Setting and Mineralization

7.1 Regional Geology

The Quebrada Blanca porphyry copper deposit is hosted in the middle Eocene to early Oligocene metallogenic belt of northern Chile, which coincides throughout much of its length with the Domeyko Fault System. This fault system formed as an intra-arc structural feature by contractional deformation during the Incaic tectonic event. Along the Andean margin, the Incaic tectonic event caused crustal shortening, uplift, and thickening, followed by a stage of weak crustal extension in the early Oligocene. Figure 7-1 shows the Chilean metallogenic belts and the locations of major deposits in the region.

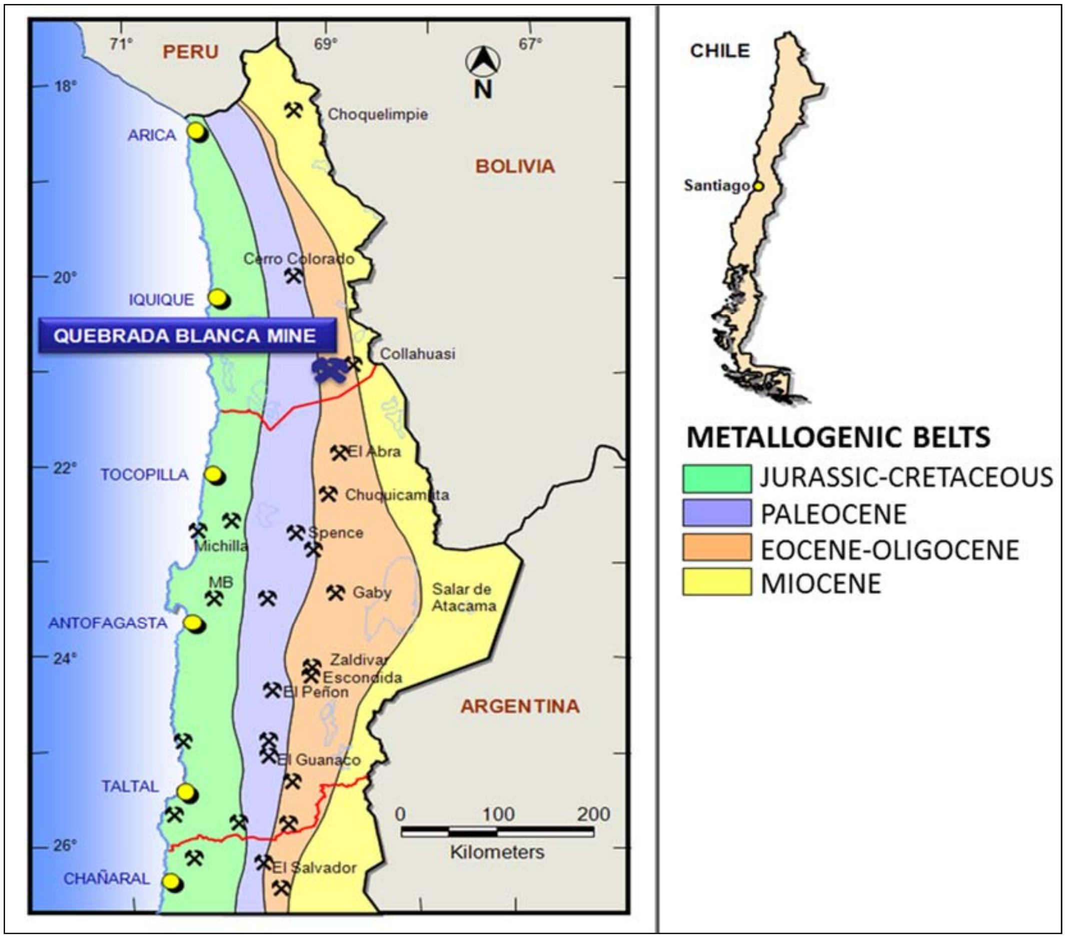

Figure 7-1: Regional Geology

Note: Figure prepared by Teck, 2016.

Quebrada Blanca is part of a set of porphyry systems that includes the Ujina, Rosario and Copaquire (La Profunda) porphyry deposits (held by third parties). The complexes lie along a northwest-trending lineament that has developed in the Collahuasi Formation. Tertiary volcanic activity, and formation of the porphyry complexes were controlled by sets of northwest- and northeast-trending faults developed as a result of sinistral movement along the Domeyko Fault System. The 37–36 million years Copaquire and Quebrada Blanca porphyries are located on north–northeast-trending second-order faults that splay off the Domeyko Fault. The porphyry copper deposits are uniformly associated with porphyritic monzodiorite to small monzonite dykes and stocks. These are typically weakly polyphase, consisting of two to three related intrusive stages. Ireland (2010) notes that the syn- or post-mineralization intrusions are slightly more mafic than pre-mineralization stages.

7.2 Deposit Geology

Quebrada Blanca has a complex magmatic and hydrothermal history that includes a polyphase intrusive complex, multiple cross-cutting breccia facies, and at least two separate hydrothermal stages.

7.2.1 Lithologies

The regional geology of the immediate Project area is included in Figure 7-2. Table 7-1 summarizes the key lithologies and units in the Quebrada Blanca deposit area. A plan view of the geology in the vicinity of the open pit is included as Figure 7-3. A longitudinal section through the deposit is provided in Figure 7-4.

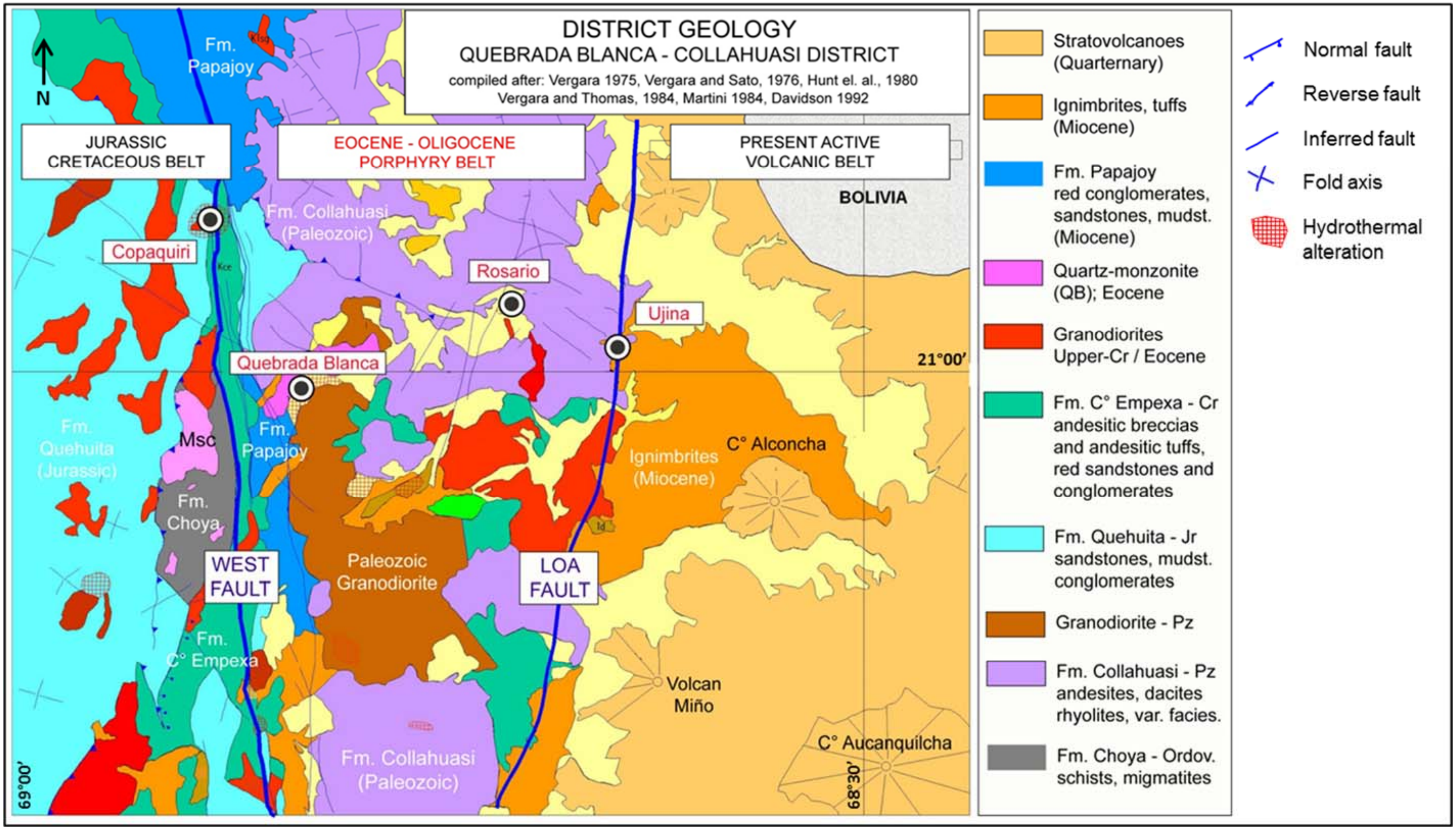

Figure 7-2: Project Geology

Note: Figure prepared by Teck, 2016

Table 7-1: Major Lithologies

Lithology or Unit	Code	Description
Gravel	GRA	Tertiary gravel
Leach Cap	Leach Cap	Leached zone
Andesite Dikes	AND	East–northeast- and north–northeast-trending narrow, aphanitic to micro-porphyritic green andesite dikes. Appear to post-date most of the intrusive rocks, but may predate the hydrothermal breccias, as dike fragments are frequently present within the hydrothermal breccia.
Quartz Feldspar Porphyry	FPLG	Dikes that are texturally similar to the FP dikes, but have a lower copper content (<0.2%) and a higher carbonate content (CaO>1.75%). Dikes intrude the hydrothermal breccias.
Tourmaline Breccia	TBX	Intrudes IBX. Consists of a hydrothermal breccia with fragments of QMZ, and FP within a tourmaline-quartz matrix. In general, when the unit is well developed, it is matrix supported; however, it may become clast supported or show similarities to crackle breccias and to a stockwork at the margins.
Late Hydrothermal Breccia	IBX2	Polymictic hydrothermal breccia with dominating matrix plus hydrothermal cement (<20%). Differentiated from the IBX units on copper content; copper content in IBX2 is much lower at <0.3% Cu. The breccia is fault-bounded.
Hydrothermal Breccia	IBX	Includes a number of subunits (IBX, IBFP1, IBFP2, HBB, HBK). Hydrothermal breccia facies vary from cement-dominated to cement plus matrix to matrix-dominated, clasts include QMZ and FP. Associated with higher-grade copper mineralization.
Quartz-Feldspar Porphyry	FP	A series of syn-mineral quartz feldspar porphyry (FP) dikes have intruded the central portion of the QMZ stock. FP consists of two types of porphyry dike: crowded quartz feldspar porphyry (FP1) and matrix-rich quartz feldspar porphyry (FP2). The dikes have been cut by a later hydrothermal breccia event and have been, in many cases, incorporated as block or fragments within the breccia units
Quartz Monzonite	QMZ	A range of units that intrude the Collahuasi Formation, and are mostly granodiorite in composition, but can also include quartz diorite, quartz monzonite, and porphyritic quartz monzonite. Considered to be a pre- to syn-mineral intrusion.
Diorite	DIO	Dark green to black equigranular diorite to quartz-diorite (DIO), with 1% to 5% quartz; 65% to 80% plagioclase; 10% to 35% pyroxene, amphibole, and biotite (BIO); and <5% potassium-feldspar (K-feldspar) and magnetite. Appears mostly in the northern portion of the open pit. Affected by a regional or early metasomatic event of biotite (hornfels) and local hydrothermal alteration and mineralization associated with the porphyry.
Collahuasi Formation	FCOLL	Andesitic and dacitic facies volcanic rocks and sedimentary rocks.

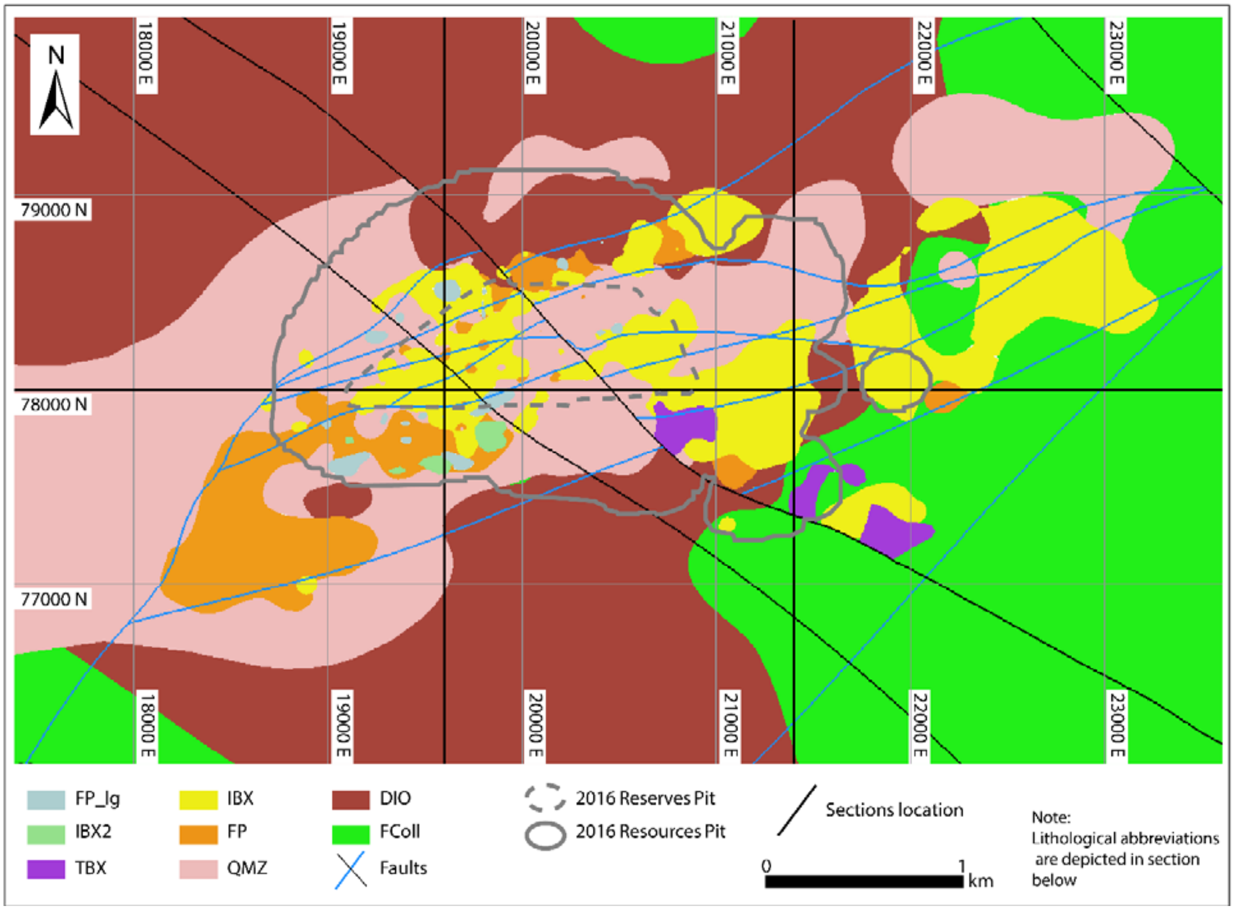

Figure 7-3: **Geological Plan (level 3850 m)**

Figure prepared by Teck, 2016.

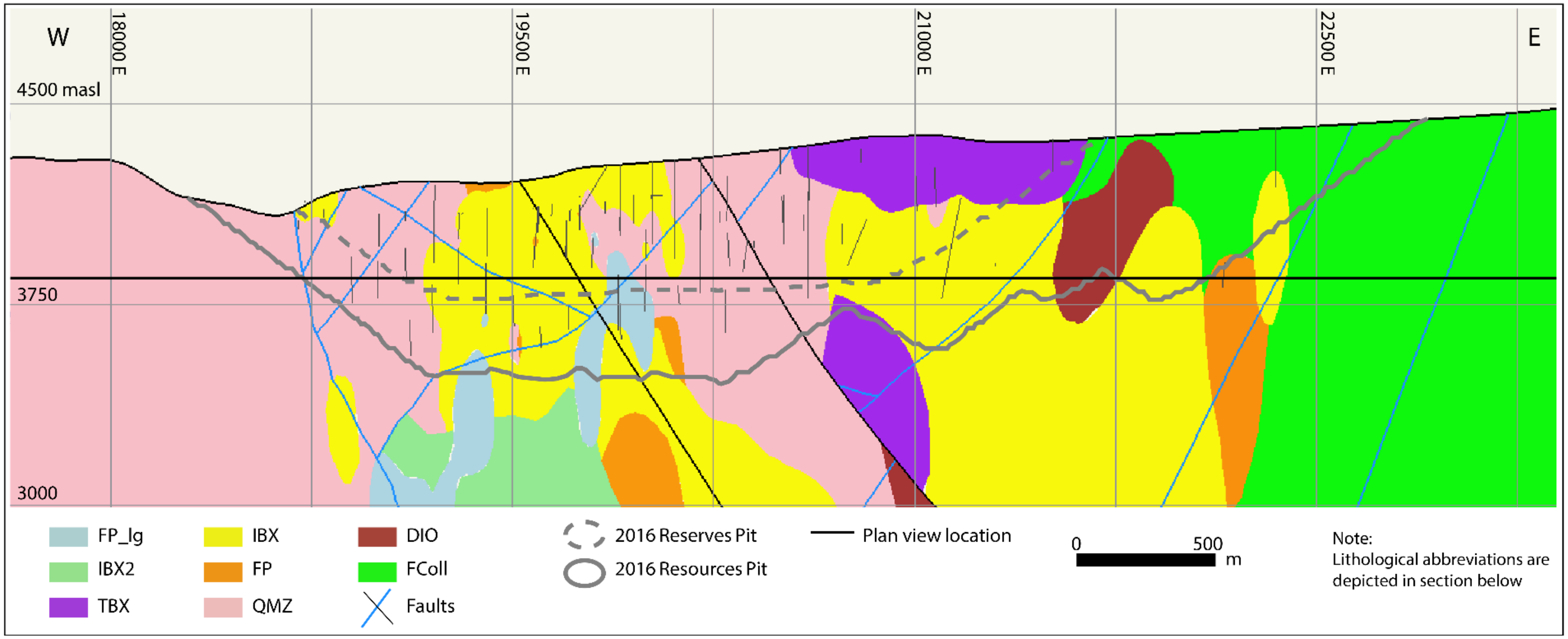

Figure 7-4: Longitudinal Geological Section (east–west section at 78,000 N)

Figure prepared by Teck, 2016. Grey lines on figure are drill traces projected to the section.

7.2.2 Structure

Three main structural trends (east–northeast, north–northeast–north–northwest, and northwest) have been defined in the Quebrada Blanca deposit area:

- The east–northeast structural trend is defined by the orientation of the QMZ stock, FP dikes, the igneous breccias, and hydrothermal breccias;
- The northwest-oriented faults are late intra-mineralization to post-mineralization, and are pre-supergene enrichment, as many contain well-developed chalcocite mineralization. These structures appear as oblique normal faults; however, the fault movement age is later than about 14 million years, as shown by offsets in the overlying Tertiary gravel. The normal fault motion is assumed to result from minor structural adjustments;
- The north–northeast–north–northwest trends are post-mineral faults characterized by the development of fault gouge and breccia.

Using these major trends, a set of structural domains were interpreted in the deposit area (Figure 7-5 and Figure 7-6).

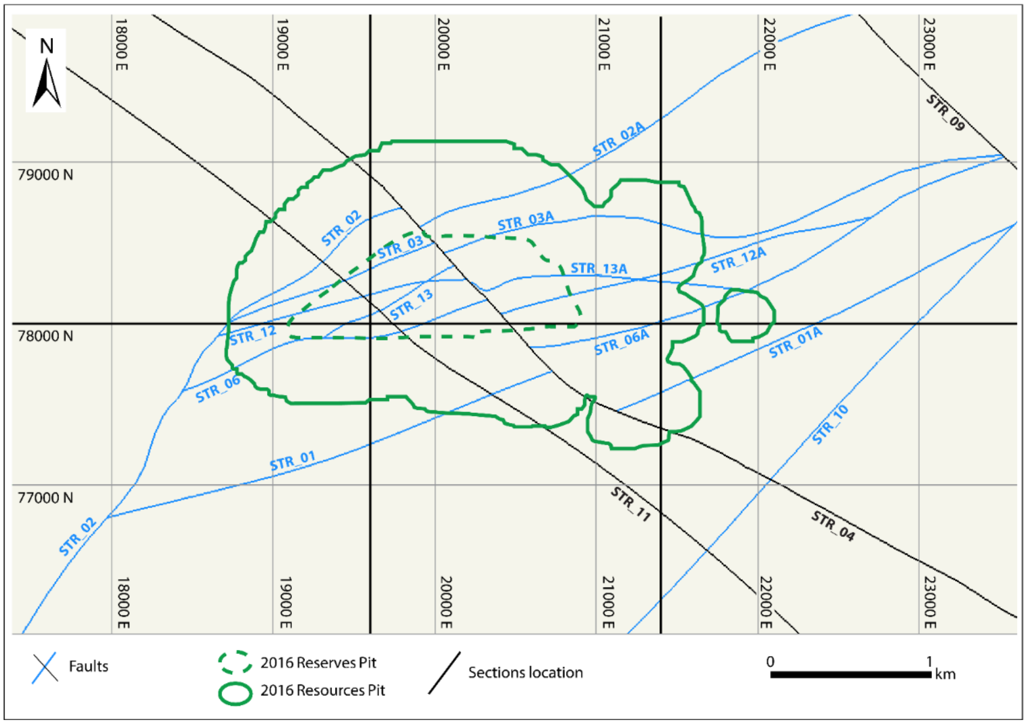

Figure 7-5: Structural Plan (level 3850 m)

Figure prepared by Teck, 2016.

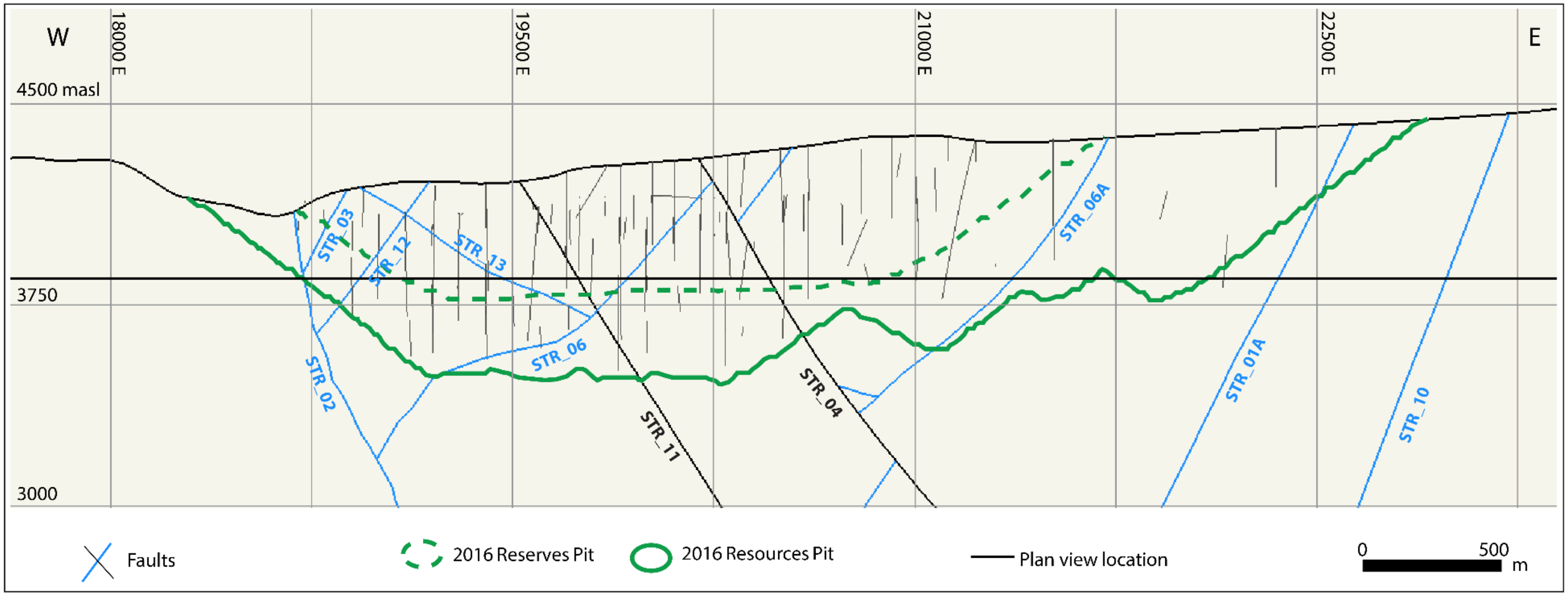

Figure 7-6: **Longitudinal Structural Section (east–west section at 78,000 N)**

Figure prepared by Teck, 2016. Grey lines on figure are drill traces projected to the section.

7.2.3 Alteration

Alteration zoning patterns are typical of those documented for porphyry copper deposits. Major alteration types include potassic (K-feldspar and secondary biotite); green mica; phyllic; propylitic; argillic; and contact metasomatic biotite (Table 7-2; Figure 7-7 and Figure 7-8).

Table 7-2: Alteration

Alteration	Code	Description
Contact metasomatism	Biomet	Affects the diorite on the outer edges of the deposit. Characterized by the development of biotite, quartz, and some pyrite. Locally, can incorporate some mineralization as an early stage or result in an overprinting of the early biotitization; however, it is generally non-mineralized. Can contain elevated levels of silica.
Argillic	ARG	Last alteration stage; characterized by supergene minerals such as kaolinite and montmorillonite. The argillic alteration distribution correlates with well-developed phyllic alteration zones.
Propylitic	Prop	Pervasive chlorite and epidote assemblage. Locally, veins of actinolite, epidote, calcite, magnetite, and specularite have been observed. Forms the outermost halo around the potassic core, enlarging the hydrothermal footprint to a conservative estimate of 6 x 5 km.
Phyllic	QS	Sericite, quartz, pyrite, chalcopyrite ± chlorite assemblage. Occurs throughout the deposit; most pronounced in zones that display well-developed faulting or jointing. In the southwestern part of the deposit, a strongly developed texture-destructive sericitization, followed by dissolution, formed distinctive, irregular cavities throughout the breccia (vuggy breccia).
Green Mica	GMica	Quartz–K feldspar–biotite–phlogopite–muscovite–corundum–andalusite alteration assemblage. Zones of moderate to intense green mica alteration coincide with copper grades >0.5%. The alteration type also surrounds the strong potassic bornite-rich alteration in the southern and southwestern parts of the deposit.
Potassic	K-Feld; BIO	Potassic alteration is associated with the QMZ stock, IBX, and FP dikes. The alteration type has an overall east–northeast trend. K-feldspar dominant alteration: primary feldspars are replaced or overgrown by K-feldspar. An increase in the intensity of the K-Feld alteration is observed in the southern portion of the deposit and at depth. This coincides with a decrease of secondary biotite and green mica alteration and with a reduction in the copper mineralization. Biotite dominant alteration: secondary biotite replaces primary mafic minerals and fine-grained biotite.

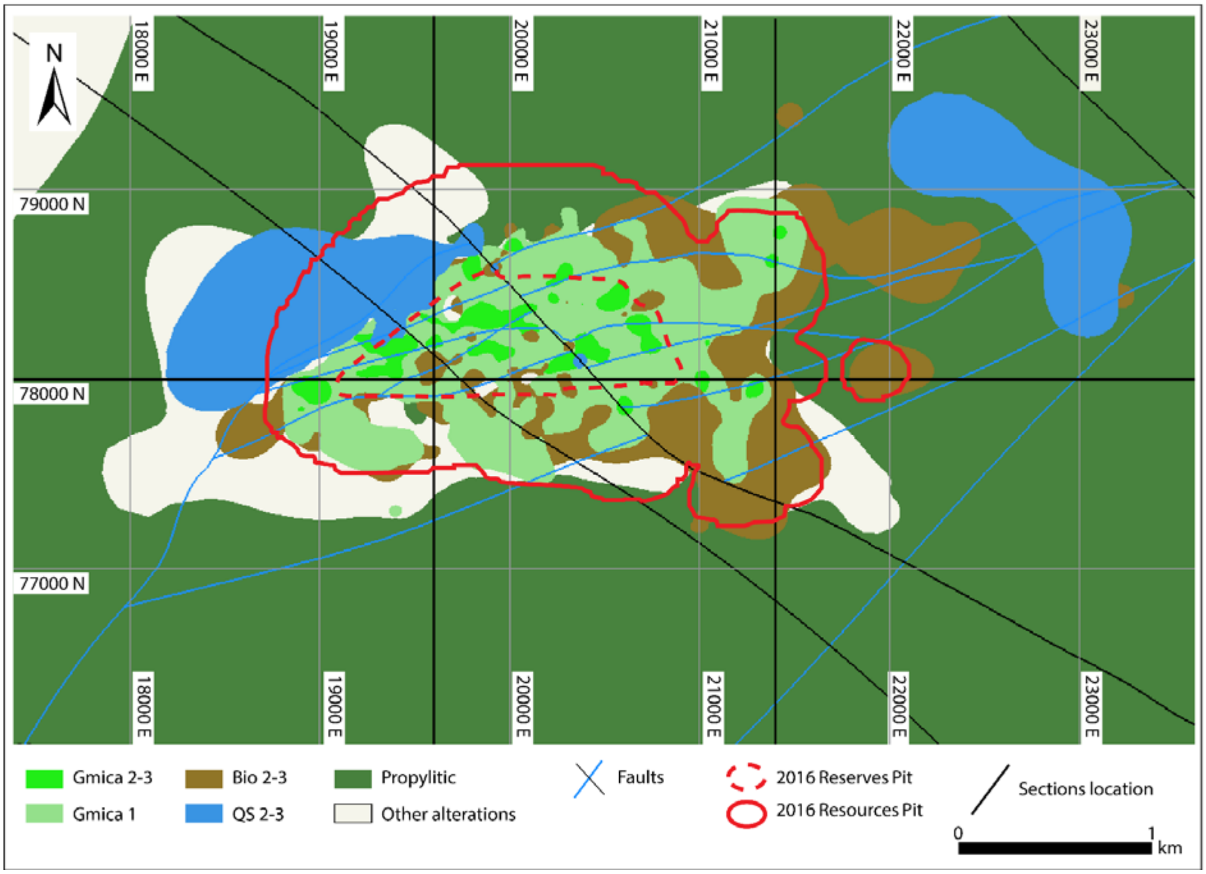

Figure 7-7: Alteration Plan (level 3850 m)

Figure prepared by Teck, 2016.

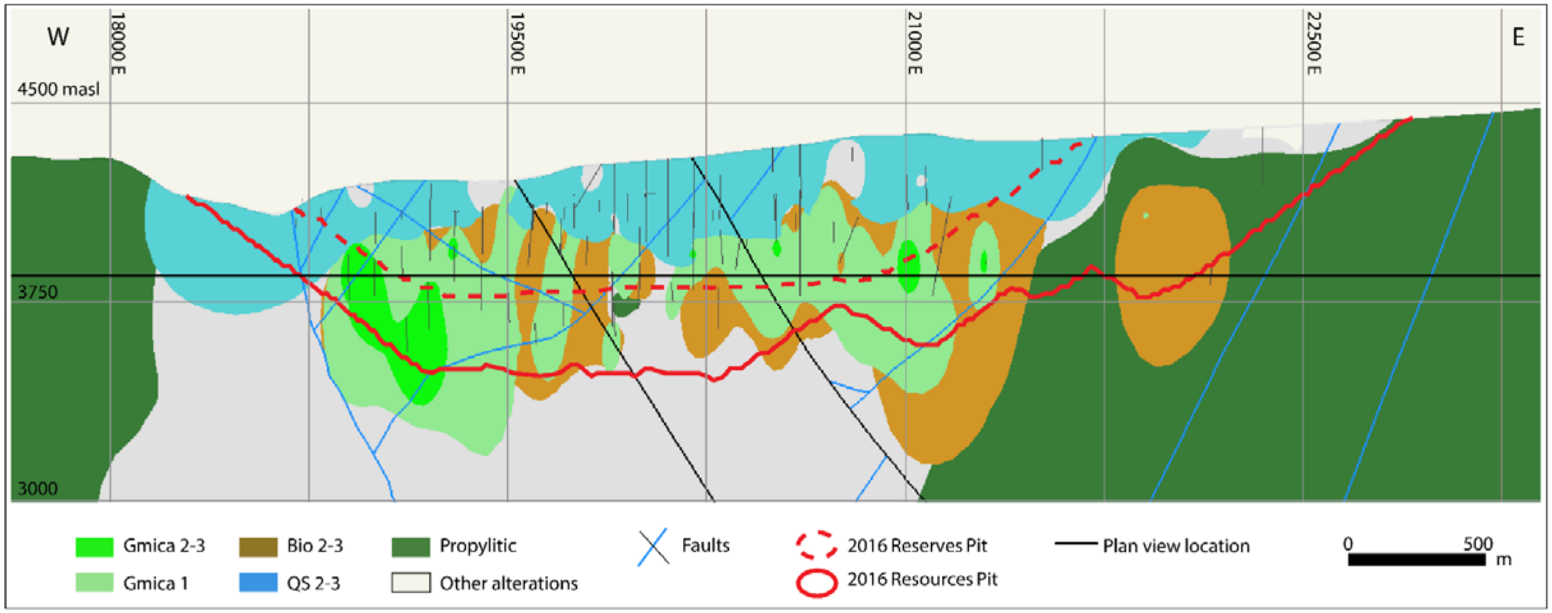

Figure 7-8: **Longitudinal Alteration Section (east–west section at 78,000 N)**

Figure prepared by Teck, 2016. Grey lines on figure are drill traces projected to the section.

7.2.4 Mineralization

Mineralization consists of supergene (chalcocite and, to a lesser degree, copper oxides such as atacamite, cuprite, and locally brochantite) and hypogene (chalcopyrite, bornite, molybdenite, and, to a lesser degree, silver and gold) mineralization.

Supergene

Secondary mineralization appears to be preferentially concentrated close to structures and more permeable rocks. The leach cap varies from about 7 to 200 m in thickness, whereas the thickness of the secondary copper zone ranges from 10 to 200 m. Continuous supergene copper mineralization has been traced over a 2.5 x 1.5 km area.

The lower portions of the secondary enrichment zone transition into primary copper mineralization, resulting in a mixed low-grade ore type that is currently being processed through ROM dump leaching.

Hypogene

Mineralization in the hypogene porphyry environment consists of disseminated and veinlet chalcopyrite with molybdenite in an east–northeast-trending area of approximately 2 x 5 km that is hosted within Eocene intrusions, hydrothermal breccias, and porphyritic dikes. Drill holes have intersected mineralization to an approximately 800 m vertical depth in the hypogene zone.

Hypogene mineralization remains open to the northeast, east, southeast, and at depth. Mineralization displays the following trends:

- Bornite mineralization forms two distinct zones that are interpreted to represent two different mineralizing centres as they do not spatially coincide with the higher copper grade areas hosted in chalcopyrite;
- Chalcopyrite mineralization is controlled by east–northeast-trending structures.
- Molybdenite mineralization is controlled by the same east–northeast-trending structures that control the higher copper grades (>0.5% Cu), but is also associated with northwest-trending structures in the eastern portion of the deposit;
- Gold and silver distribution correlates with mineralization grading >0.5% copper;
- Pyrite distribution is generally related to quartz–sericite alteration;

The locations of higher metal grades also appear to be structurally controlled, with grades increasing towards the hanging wall of the main fault.

Figure 7-9 is a plan showing the distribution of the copper sulphide mineralization; Figure 7-10 is a longitudinal section showing copper sulphide mineralization and Figure 7-11 shows the copper grade shells in a longitudinal view.

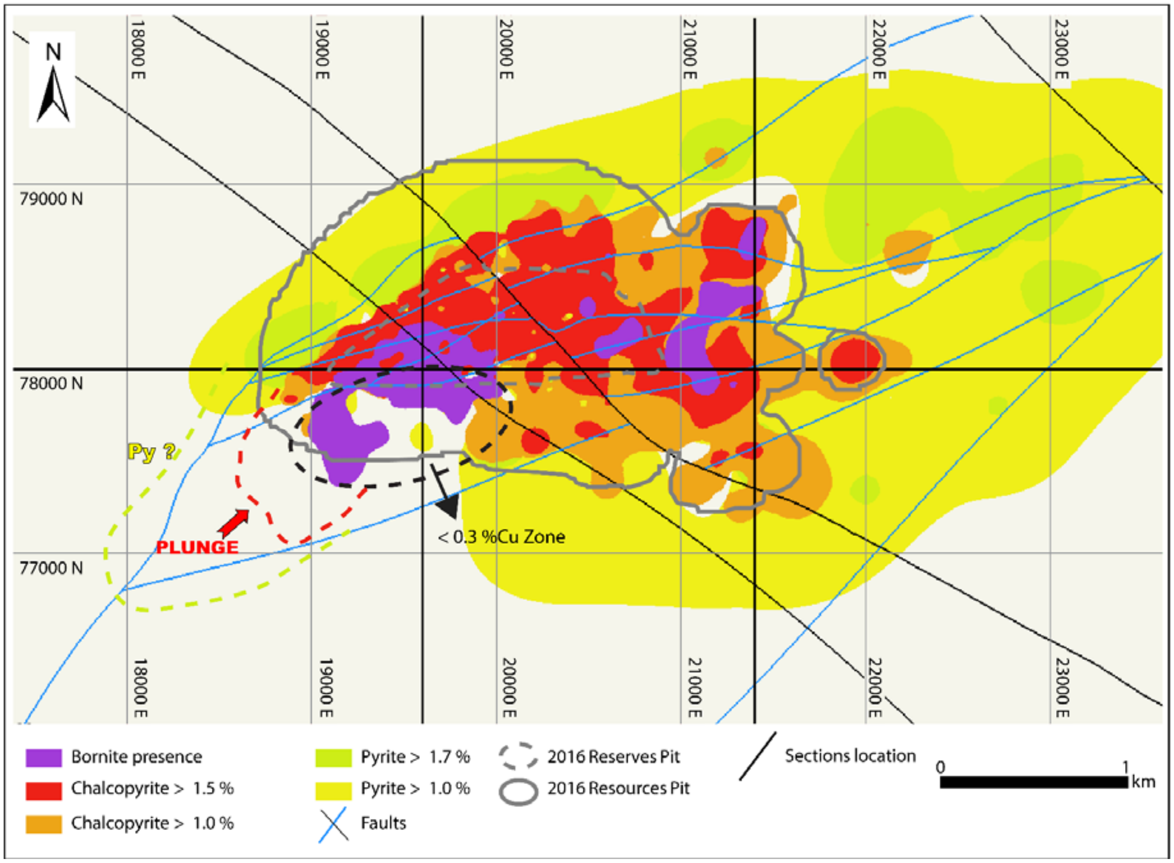

Figure 7-9: **Copper Sulphide Mineralization Plan (level 3850 m)**

Figure prepared by Teck, 2016.

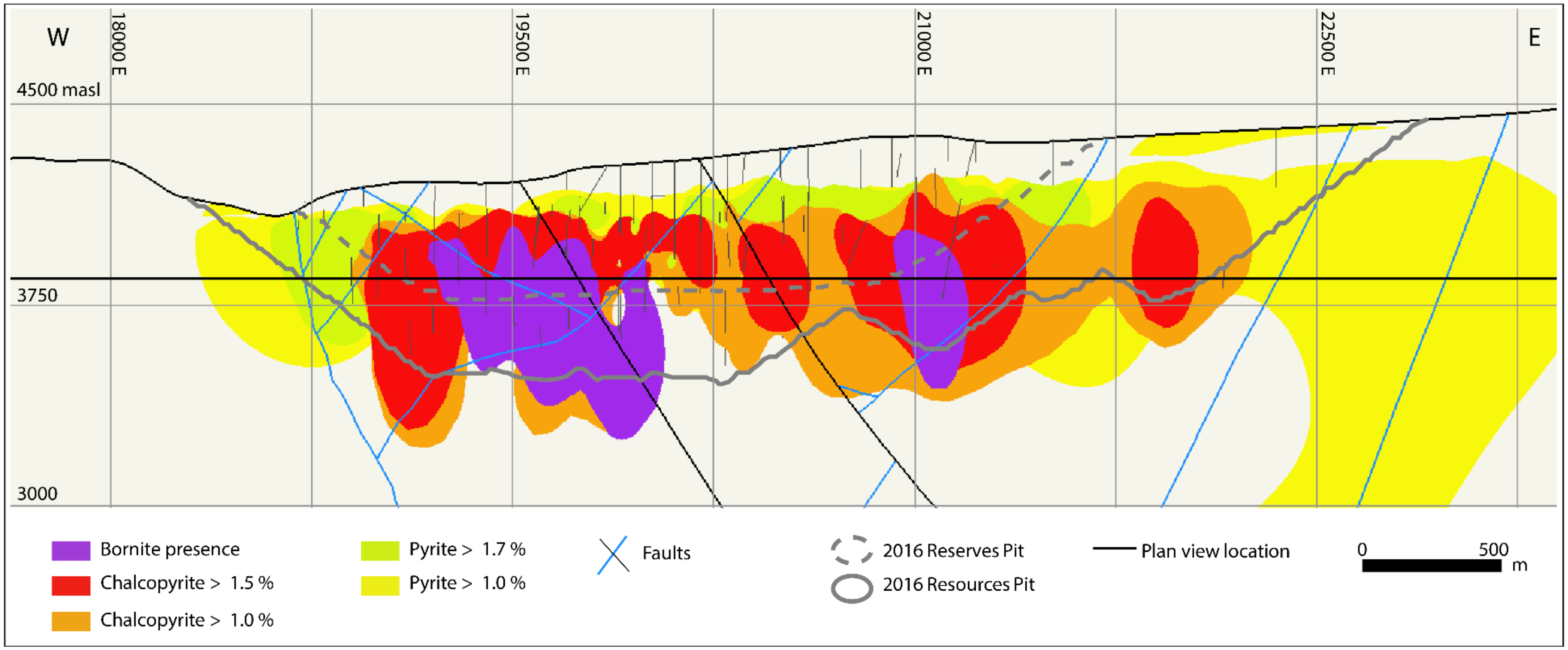

Figure 7-10: Longitudinal Copper Sulphide Mineralization Section (east-west section at 78,000 N)

Figure prepared by Teck, 2016. Grey lines on figure are drill traces projected to the section.

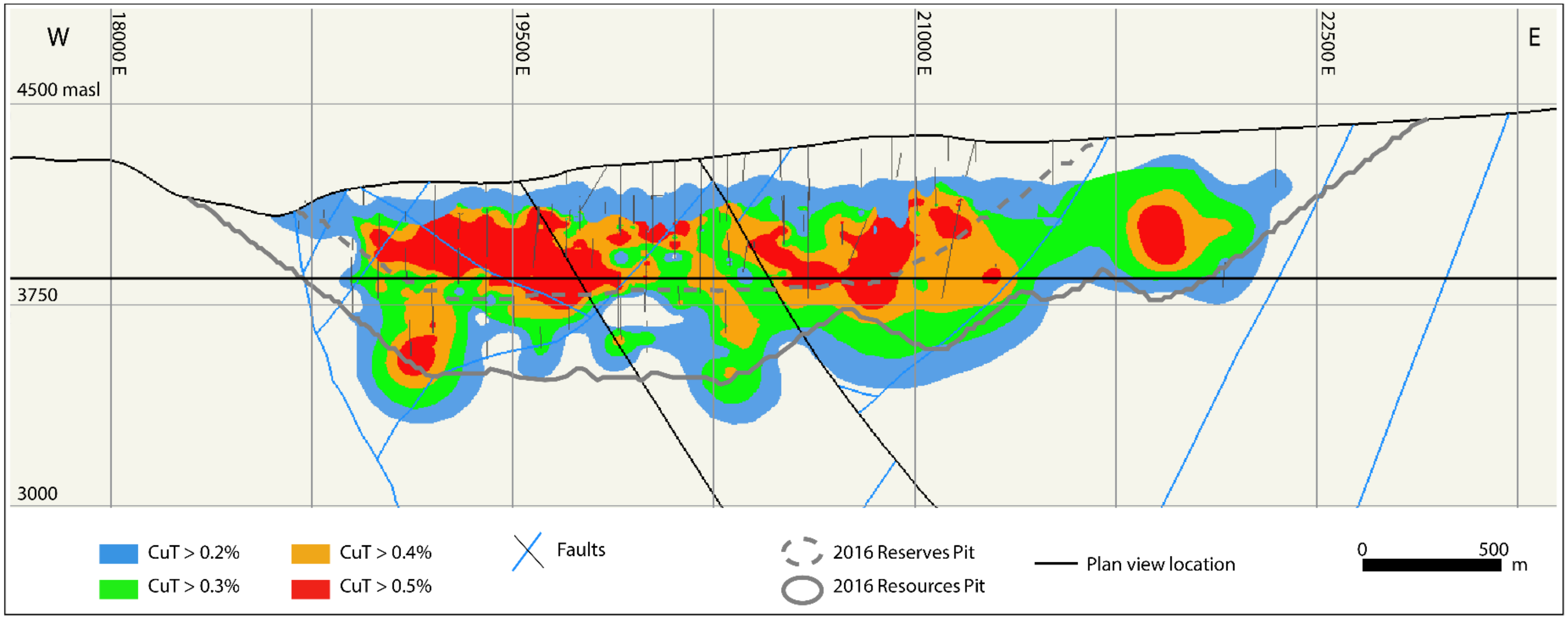

Figure 7-11: Longitudinal Copper Grade Shell Section (east–west section at 78,000 N)

Figure prepared by Teck, 2016. Grey lines on figure are drill traces projected to the section.

8.0 Deposit Types

8.1 Mineral Deposit Type

The porphyry-style mineralization at Quebrada Blanca is considered to be typical of an Andean porphyry copper–molybdenum deposit. Common features of this subset of porphyry-style deposits include:

- Large zones (>10 km^2) of hydrothermally altered rocks that commonly grade from a central potassic core to peripheral phyllic-, argillic-, and propylitic-altered zones;
- Mineralization is generally low grade and consists of disseminated, fracture, veinlet, and quartz stock-work controlled sulphide mineralization. Deposit boundaries are determined by economic factors that outline ore zones within larger areas of low-grade, concentrically-zoned mineralization;
- Mineralization is commonly zoned with a chalcopyrite–bornite–molybdenite core and peripheral chalcopyrite–pyrite and pyrite zones;
- The effects of surface oxidation commonly modify porphyry deposits in weathered environments. Low pH meteoric waters generated by the oxidation of iron sulphides will leach copper from hypogene copper sulphides and oxidized copper minerals such as malachite, chrysocolla, and brochantite, and redeposit copper as secondary chalcocite and covellite immediately below the water table in flat tabular zones of supergene enrichment. Supergene mineralization frequently develops immediately above lower-grade zones of hypogene mineralization.

The middle Eocene to early Oligocene metallogenic belt of northern Chile, which hosts the Quebrada Blanca deposit, is also host to other large porphyry copper deposits, such as Escondida, El Abra, Chuquicamata, and the nearby Collahuasi mine.

8.2 Comment on Deposit Types

The QP is of the opinion that exploration programs that use an Andean porphyry copper–molybdenum deposit model are appropriate for the region.

9.0 Exploration

9.1 Grids and Surveys

The supergene mining operations initially used the UTM PSAD 56 19S datum for all general surveying purposes. Chile moved the country's datum to the worldwide SIRGAS WGS84 in 1993. Quebrada Blanca operations transitioned to the new country official geodetic system in 1998 by connecting the total stations available at the time to the new SIRGAS WGS84.

For day-to-day mining operational convenience, however, local reference points based on PSAD 56 19S were established as the Quebrada Blanca local coordinate reference grid for which the actual easting (X) and northing (Y) coordinates were truncated by removing the first two digits. These local co-ordinates remain in use.

Translation scripts have been developed to move mine coordinates to SIRGAS WGS84 and vice-versa.

The original mine topographic surface was surveyed; annual end-of-year surfaces are also surveyed.

9.2 Geological Mapping

Field mapping was completed by Exploradora Doña Inés over a five-year period from 1977 to 1982, producing reports and several detailed maps depicting lithology, alteration, structure, mineralogy, and copper–molybdenum–gold–silver distributions.

A 1:10,000 scale geological mapping program over the Quebrada Blanca property was completed during 2008 and 2009. This mapping program differentiated the deposit by lithology, alteration, mineralization, and structures, which had not previously been done. The mapping program was extended during 2010 to areas outside the Quebrada Blanca concessions and resulted in the generation of several exploration targets. The geological interpretation was revisited during 2011 to incorporate findings from a high-resolution aero-magnetic/radiometric dataset into the 1:10,000 scale district maps.

Detailed geological mapping at 1:2,000 and 1:5,000 scale has been performed on selected exploration targets from 2012 onwards.

In 2014, a Project-wide initiative commenced to compile all available geoscientific data, including geological, geochemical, and geophysical interpretations. As part of this program, structural mapping and structural interpretation was conducted in 2015–2016 by consultant Matías Sánchez. Results of the initiative are still being reviewed by Teck staff.

Pit mapping of the operating supergene pit is conducted at 1:2,000 scale.

9.3 Geochemical Sampling

Rock chip sampling was completed as part of the reconnaissance mapping programs, with samples analysed for copper. No significant copper anomalies were generated by the program; although, some areas of elevated copper were identified.

Additional rock chip samples were taken during the regional geoscientific data compilation initiative; interpretation of the results is under review.

9.4 Geophysics

9.4.1 Airborne Surveys

Aur Resources acquired data from regional surveys flown by Codelco in 1992, and Noranda in 1999.

The Codelco survey covered most of northern Chile. Flight lines were oriented north–south and spaced at 500 m intervals. These files were sent to Quantec Geofisica Ltda (Quantec) for processing and the subsequent interpretations were used for regional exploration. A series of north–northeast, east–northeast and northwest lineaments was interpreted by Compañía Minera Quebrada Blanca S.A. (CMQB; a predecessor company to CMTQB) geological staff as potential structural controls for the Quebrada Blanca deposit.

Noranda's regional hyper-spectral survey included the Quebrada Blanca area. No additional details of the program are available. Spectral International Inc. processed the data and produced a series of maps for a suite of minerals including alunite, chlorite, hematite, illite, kaolinite, and tourmaline. The chlorite map was used to locate the extent of the propylitic alteration zone mapped to the north and south of the open pit.

9.4.2 Ground Surveys

In 1973, an IP and resistivity study was conducted by the Chilean Geological Survey over a 2 x 2 km area, directly centered over the current pit. The lines were oriented in several directions, with dipole spacings of 50 and 100 m in order to enhance the resolution of shallow features.

A magnetic survey over the Pampa Negra area in the east–central portion of the Quebrada Blanca property was conducted in 1978 to better define poorly-exposed magnetic breccias. The survey identified several zones with higher magnetic responses.

In 1992, CMQB performed an IP and resistivity survey that covered approximately 85% of the Quebrada Blanca mining concession. The survey was performed along north–south lines, with a line spacing of 1 km and dipole spacing of 200 m. The line spacing was reduced to 500 m over the area of the 1991 feasibility study design pit.

Quantec conducted a magnetic survey in 2002 on behalf of CMQB over an area measuring approximately 5.5 x 1.5 km located immediately north of the Quebrada Blanca open pit. The survey was performed along north–south lines, at a 100 m line spacing. The purpose of the survey was to define the diorite–quartz monzonite contact. The results, as interpreted by Quantec, showed that the contact was very irregular and marked by several moderately magnetic bodies extending from 100–250 m below the surface, with no apparent deeper root. Based on surface mapping, these magnetic bodies were found to coincide with the known diorite batholiths.

An IP/resistivity survey was conducted by CMQB in 2003 in the Colorado West area. This survey was performed to evaluate at mineralization in alluvial-filled graben and to generate an estimate of the depth of the graben.

During December 2004, CMQB undertook a transient electromagnetic survey (TEM) survey over the northeastern and east–northeastern portions of the Quebrada Blanca mine area where a zone of propylitic alteration had been mapped.

During 2011, a three-dimensional Mount Isa Mine's distributed acquisition system (3D-MIMDAS) geophysical survey was conducted over some of the targets generated during Teck's 2010 mapping program. These targets were situated south of Quebrada Blanca claims. In addition, an IP/resistivity survey was performed over selected targets. This work generated a target area that corresponds to the east–northeast extension of the mineralization in the open pit.

9.5 Petrology, Mineralogy, and Research Studies

A number of research studies have been completed over the Quebrada Blanca deposit, including three honours theses, three doctoral theses, and a number of published papers.

9.6 Exploration Potential

9.6.1 Quebrada Blanca Open Pit

The primary hypogene mineralization remains open to the immediate east–southeast of the FS2016 pit boundary. No infrastructure is currently planned for this area, and it retains exploration upside potential for the Project.

A zone of potentially higher-grade chalcopyrite–bornite mineralization was interpreted from sulphide mineral zoning studies at depth to the west–southwest of the 2016 Feasibility Study pit boundary (refer to Figure 7-9). The interpretation remains to be drill tested.

9.6.2 Near-Mine

A number of targets have been identified and tested since 2013 (Figure 9-1). The majority are not considered to retain significant near-surface exploration potential; however, the potential for hypogene mineralization is still being investigated.

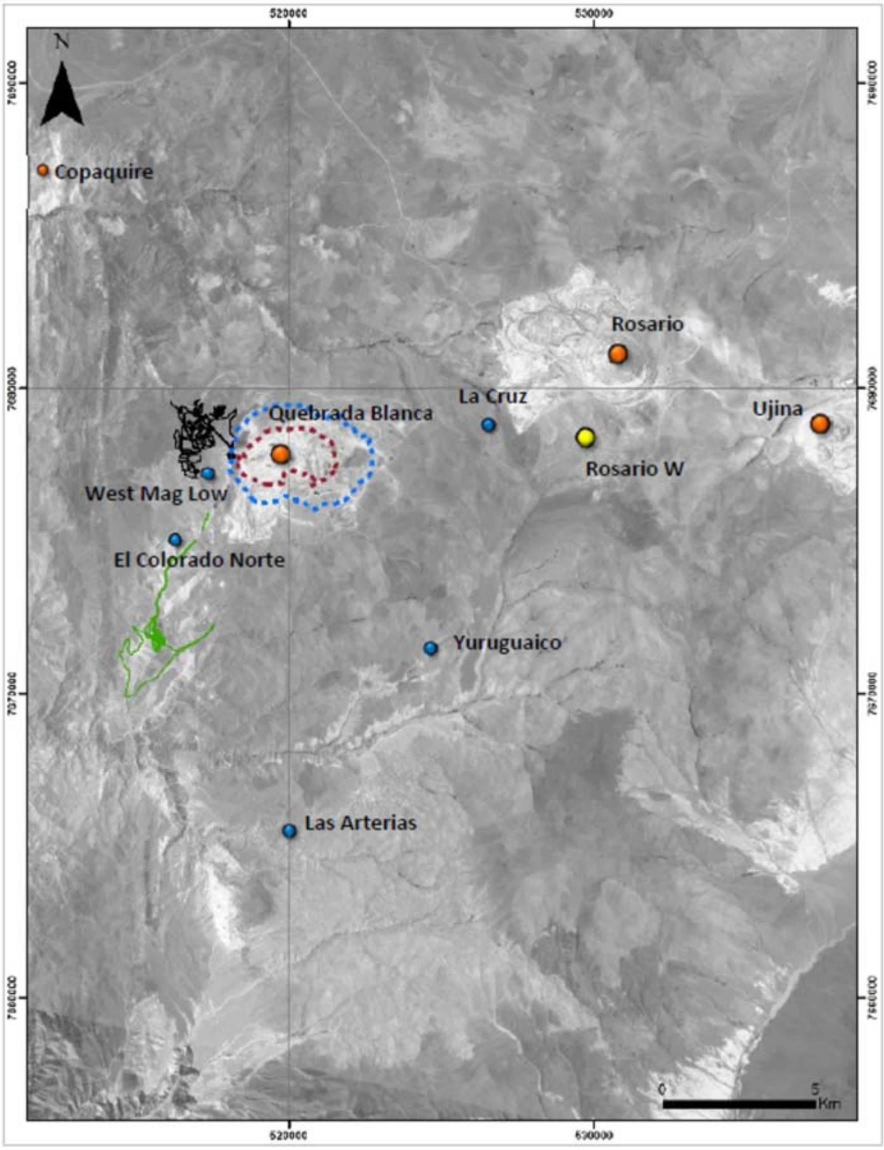

Figure 9-1: Exploration Prospects

Note: Figure prepared by Teck, 2016. Rosario and Ujina are mines held by third parties. Blue dashed line is the FS2016 resource pit, red dashed line is the FS2016 reserve pit; proposed concentrator location is shown in black, planned TMF location in green.

To the east–northeast of the FS2016 pit boundary is an area that contains quartz monzonite stocks, a large diorite roof pendant or fragment, and a few small porphyry dikes (refer to Figure 7-3). A well-developed propylitic alteration zone has been mapped, which is characterized by 3–30% chlorite and trace to 3% epidote. Northwest-striking zones of phyllic alteration, consisting of approximately 8–45% sericite and 2–20% quartz cross-cut the propylitic alteration. These zones contain 1–5% pyrite, and minor chalcopyrite, chalcocite, bornite and magnetite. The 2004 TEM survey identified a high chargeability and low resistivity anomaly in the approximate area of the alteration, which was attributed to the presence of pyrite and magnetite.

The 2004 TEM survey also identified a pronounced northeasterly-oriented magnetic high anomaly along the contact between quartz monzonite and Collahuasi Formation rhyolites. A drill program to test the boundary between the magnetic high and associated magnetic low was completed and returned anomalous copper values.

Drill testing of a zone of hydrothermal breccias in the eastern portion of this area also returned an anomalous copper intercept in drill hole DDH151 (Table 9-1).

Table 9-1: Drill Hole DDH151 Intercept

Hole ID	Easting	Northing	Elevation (m)	Azimuth (º)	Dip (º)	Total Depth (m)	Intercept From (m)	Intercept To (m)	Drilled Interval (m)	Grade (Cu %)
DDH151	21942.55	78052.89	4387.01	0	-90	504.75	232	504	272	0.54

9.7 Review of Proposed Concentrator Site for Exploration Potential

9.7.1 Concentrator Site Area

A compilation of all available geological, geophysical and geochemical data, plus information from the shallow geotechnical holes, together with field mapping, was undertaken to evaluate whether the area planned for the concentrator and its associated infrastructure could host significant mineralization to be exploited by open pit methods. Results of this work indicate that the site:

- Is primarily underlain by rocks of the Collahuasi Formation, which are the host unit to the Quebrada Blanca intrusive complex;
- Has no evidence for outcropping intrusions nor, specifically, Eocene aged rocks; such aged rocks are the causative intrusions of the Quebrada Blanca porphyry system;
- Is located over a magnetic high feature; this characteristic is inconsistent with features of Quebrada Blanca;
- Has weak hydrothermal alteration, dominated by epidote veins, at surface and in the geotechnical holes; this alteration is consistent with distal porphyry systems features;
- Lacks “proximal” hydrothermal indicators such as high-temperature potassic facies alteration, veins or stockworks, or hydrothermal breccias.
- Is located to the west of the main, north–northeast-trending Quebrada Blanca fault. This structure is currently interpreted to bound the western extent of the hypogene and supergene porphyry copper mineralization that is currently being exploited within the Quebrada Blanca pit.

Together, the above interpretations indicate that the area of the proposed concentrator site has low potential to host significant mineralization that could be exploited by open pit methods.

9.7.2 Concentrator Site Area (Southeast and South Sectors)

The review identified a northeast–southwest trending magnetic low feature situated immediately to the southeast of the proposed concentrator site. This feature has a similar geophysical texture and intensity to the known magnetic low associated with the mineralization being exploited through the current Quebrada Blanca pit. Field assessment and surface sampling in this area identified outcrops of a single, spatially restricted, Eocene intrusion. Quartz veins are present over the magnetic low feature; however, rock chip sampling of these veins showed a lack of elevated metals and associated pathfinder elements indicating low potential for associated copper sulphide mineralization of potentially economic interest. Historic IP survey results were also reviewed, and no elevated chargeability (a proxy for conductive minerals such as sulphides) was modelled.

The most prospective area for additional exploration targeting is considered to be to the south of the proposed concentrator infrastructure where there is a moderate magnetic feature, elevated chargeability, some copper geochemical anomalism, and the presence of quartz veins with glassy limonite and quartz–biotite veins hosted in the same type of quartz monzonite intrusion that hosts the Quebrada Blanca porphyry copper mineralization.

10.0 Drilling

10.1 Drill Summary

Drilling completed up to 31 December, 2016 on the Quebrada Blanca Project has included 731 core drill holes (217,458 m) and 1,498 RC drill holes (204,281 m) for a total of 2,229 drill holes (totalling 421,739 m). A summary of the drill campaigns is provided in Table 10-1. Figure 10-1 shows the collar locations of the core drill holes.

The RC drilling shown in Table 10-1 was not conducted for hypogene exploration or resource estimation purposes; rather it is a technique used in the active supergene mining operation to infill data ahead of mining, and to delineate leachable materials. Many of the areas where the RC drilling was conducted have subsequently been mined out.

Blast hole drilling has also been conducted in support of mining operations.

Not all of the core drilling is used in estimation. The resource estimate is supported by 623 core holes (198,812 m).

10.2 Drill Methods

A number of core diameters have been employed over the history of the project, including BX (36.6 mm core diameter), NX (54.9 mm), HX (76.2 mm), HQ3 (63.5 mm), NQ3 (47.6 mm) and PQ core (85 mm) sizes. The majority of the drilling has been NQ3 or greater sizing.

Relative proportions of core sizes used in core drilling campaigns completed between 2000 and 2009 are approximately 70% HQ and 30% NQ size. HQ core became the preferred core size in 2010, and currently represents about 80% of the total core drilling since that time. NQ core has been about 10% of the total, with the remaining 10% being PQ size and is primarily for metallurgical purposes.

10.3 Geological Logging

The core drill holes were geologically logged for lithology, structure, alteration, and mineralization. Geological logging of RC chips records similar information to that described for the core programs.

Percentage core recovery, RQD, fracture frequency, and hardness were recorded for all drill cores to establish a geotechnical database.

10.4 Recovery

Core recovery at Quebrada Blanca has been acceptable, averaging greater than 95%. Approximately 10% of the data included in the database have recovery percentages that are less than 85%. Most of these lower recoveries are related to the presence of faults and gravel.

Table 10-1: Drill Summary Table

Year	**Core Drilling**		**RC Drilling**		**Total**		**Operator**
	Number of Drill Holes	**Total Metres**	**Number of Drill Holes**	**Total Metres**	**Number of Drill Holes**	**Total Metres**	
1975*	1	unknown	—	—	—	—	Codelco
1977–1982	235	44,643	—	—	235	44,643	Exploradora Doña Inés
1990	5	2,394	—	—	5	2,394	Compañía Minera Quebrada Blanca S.A
1994	—	—	27	3,027	27	3,027	
1995	—	—	19	3,487	19	3,487	
1997	—	—	47	7,486	47	7,486	
2000	15	3,036	92	14,070	107	17,106	
2001	—	—	107	16,954	107	16,954	Aur Resources
2002	—	—	192	20,988	192	20,988	
2003	—	—	233	40,149	233	40,149	
2004	—	—	139	26,077	139	26,077	
2005	6	1,962	84	10,497	90	12,459	
2006	—	—	45	5,106	45	5,106	
2007	36	9,732	—	—	36	9,732	
2008	64	29,928	—	—	64	29,928	Teck
2009	36	19,182	—	—	36	19,182	
2010	119	48,311	76	9,492	195	57,803	
2011	115	30,610	172	14,888	287	45,498	
2012	63	20,347	177	21,235	240	41,582	
2013	27	5,509	60	7,319	87	12,828	
2014	—	—	10	836	10	836	
2015	10	1,804	18	2,570	28	4,374	
2016	—	—	—	—	—	—	
Totals	731	217,458	1,498	204,181	2,229	421,639	

Note: * not included in drill hole totals.

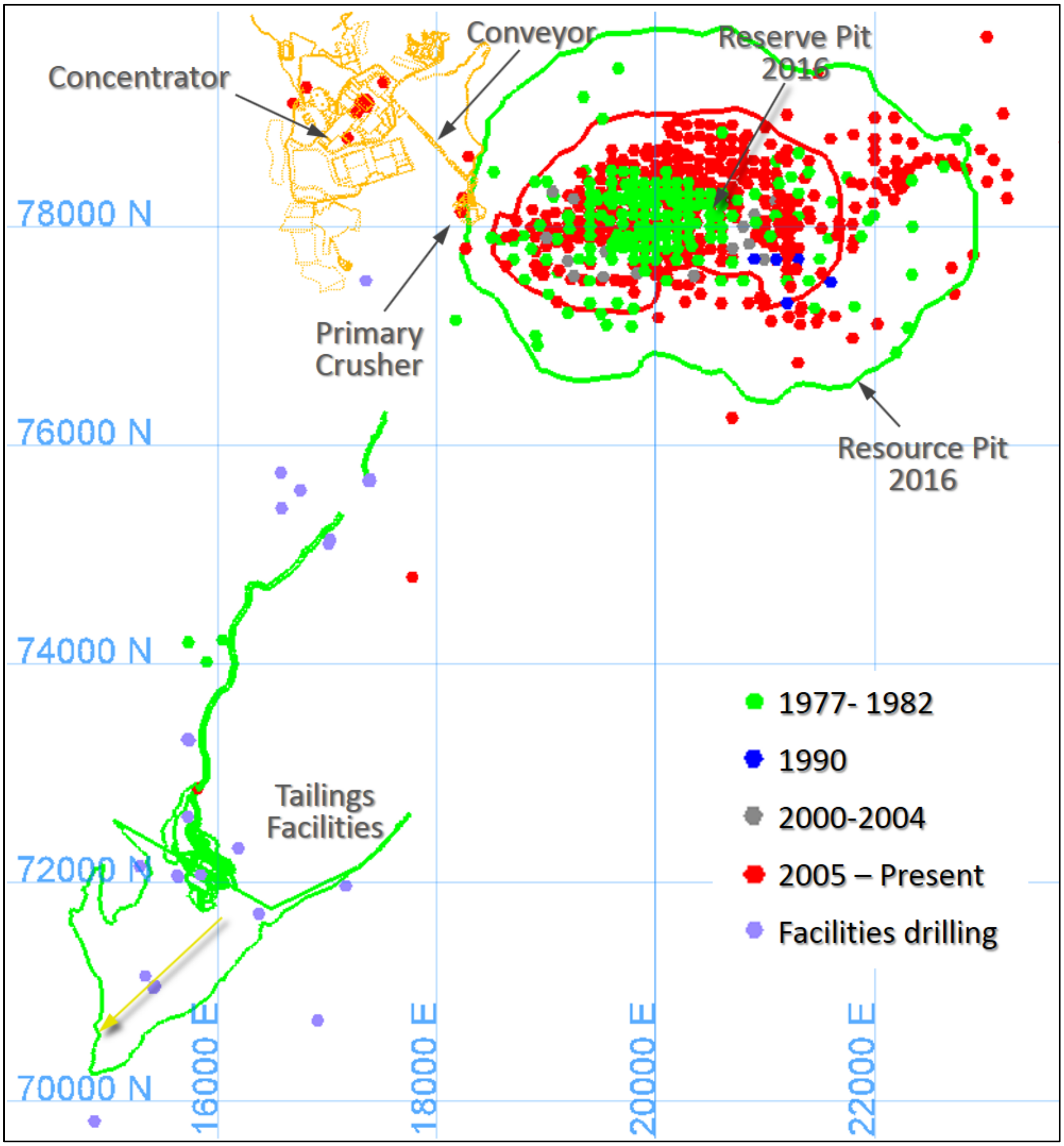

Figure 10-1: Drill Collar Location Plan

Note: Figure prepared by Teck, 2016. Map north is to top of plan. Facilities shown are proposed locations as part of QB2.

10.5 Collar Surveys

From the 1990s to 2005, a theodolite Wild Model T-1 was used to survey drill hole collars. Between 2005 and 2010, a Trimble GPS R7 and R6-2 and Trimble S6-3" Total Station, with a precision of ±5 mm was used. After 2010, the mine has used a Trimble GPS R8 (± 3 mm accuracy), and NET R9 and S6-2" and S6 3" Total Stations have been used as control stations.

Drill protocols in place since 2004 require that the initial drill collar location is surveyed prior to drilling, and after hole completion, the location is picked up by a survey crew. The requirement for two surveys is to ensure that there are minimum differences in the database between original and final collar locations.

10.6 Downhole Surveys

Limited information is available on the 1977–1982 core drill programs. A Single Shot instrument is known to have been used in the programs; however, the data available do not clearly differentiate drill holes with actual downhole surveys, and drill holes that use the collar inclination.

No surveys are known to have been performed on the six-hole 1990 drill program.

From 2000 to date, a gyroscopic instrument has been used, with data collected at 10–20 m intervals down the core hole.

10.7 RC Drilling

The RC drilling that was shown in Table 10-1 is primarily used for in-pit infill drill programs, as well as for leachable material exploration drilling.

RC drilling has been excluded from the Mineral Resource estimate of sulphide or hypogene mineralization. RC drill logs may be used to support geological interpretations, and assay results for CuSH, CuCN, and CuT can be used to support estimation within oxidized domains that are not the primary zone domain.

10.8 Blast Hole Drilling

The current mining operations maintains a blast hole database. Drill spacing ranges from a standard 10 x 10 m at the start of operations to a more variable 8 x 8 m or 10 x 10 m in current operations.

Blast hole data are used to generate variogram directions and ranges for total copper in the oxidation domains but not included in the estimation runs. The significant amount of close-spaced information available in the blast hole database provides better direction and range of continuity information for these domains than is available using the wider-spaced exploration and infill drill information.

10.9 Geotechnical and Hydrological Drilling

Geotechnical drill holes have been completed in the areas of the planned concentrator, conveyor belt, crusher, tailings management facilities.

10.10 Metallurgical Drilling

Metallurgical drilling programs were completed from 2002 to 2012, in support of mining studies. Drill sizes included PQ and HQ core. Drill holes were located throughout the deposit, and with locations selected to represent the initial five years of the FS2012 mine schedule, and to intersect the major geological and mineralogical domains.

10.11 Drill Coverage

The core of the Quebrada Blanca deposit has been delineated along 100 m spaced north–south-oriented sections, with drill holes spaced approximately 60–80 m along the sections. Outside the core area, drill spacing increases to about 100–150 m.

Drill holes completed prior to 2000 were typically vertical drill holes. From 2000 to date, most drill holes are inclined. Drill depths in the early, pre-2000, programs were shallow, as they targeted supergene mineralization. During these programs, only five drill holes were drilled at a vertical depth greater than 500 m (2% of the drill holes). Later programs extended coverage at depth, with 123 drill holes having depths greater than 500 m (7% of the drill holes) after 2000. There is very limited drill data at depths >700 m, and the deposit retains depth potential.

10.12 Drilling Completed Subsequent to the Mineral Resource Database Close-out Date

Drilling completed after the database close-out date (December 2012) to 31 December, 2016 included geotechnical holes completed in support of infrastructure locations, and exploration drilling of the copper anomalies to the east of the planned open pit.

A total of 17 drill holes (2,700 m) were completed within the footprint of the QB2 pit that do not inform resource estimation. The assay values and geological logging indicate similar assay tenors, mineralization intervals, lithologies and alteration styles to existing drill holes in the vicinity of these drill holes. Although the newer drilling within the resource model will change the grades locally, overall the new drilling should have a minimal effect on the average model grade.

10.13 Sample Length/True Thickness

Drill holes were initially oriented vertically, then were drilled inclined. The general orientation and trend of the porphyry system is to the east–northeast or northeast, and the majority of the drill sections are oriented north–south. In general, most drill holes intersect mineralized zones at an angle, and the drill hole intercept widths reported for the Project are typically greater than the true widths of the mineralization at the drill intercept point.

10.14 Comments on Drilling

Collection of the drill data on the Project is a team effort, with data collected between 1977 and 2016. The majority of the core data supporting the resource estimate for the hypogene mineralization was collected from 2007 onward. A total of 731 core holes (217,458 m) have been drilled; of this total, 623 core holes (198,812 m) support estimation. Drill spacings, at 60–80 m x 100 m in the area of the conceptual open pit that constrains the Mineral Resource estimate, are in line with industry norms for drill spacings for porphyry copper deposits.

Data from core drill campaigns completed in 1975, 1990, 2000, and after June 2013 do not support resource estimation. Information collected from the remaining core drilling campaigns, including geological logging, collar and down hole surveys, and core recoveries, supports the use of the data in Mineral Resource estimation.

Limited use is made of RC and blast hole data; where these data are used, the information is suitable for the purpose:

- RC drill data: geological interpretations, and assay results for CuS, CuCN, and total copper in oxide domains;
- Blast hole data: generation of variogram directions and ranges for copper in the oxidation domains.

11.0 Sample Preparation, Analyses, and Security

11.1 Sampling Methods

11.1.1 Core

Core drilling provides the primary estimation support for the Mineral Resource estimate.

Sampling was generally performed at fixed 2 m intervals. This is considered acceptable as changes in lithology, mineralogical types, and grade are generally transitional, which is typical for a porphyry copper deposit, and breaking the sampling at specific geological or other boundaries is not warranted.

Samples were halved using core sawing when core was sufficiently competent; when core was broken, a hydraulic split was used. One half of the core was placed back in the pertinent core box, and the other half was placed in a plastic sample bag. After each 2 m sampling interval was completed, a sample tag was attached to the bag, and the bag was sealed.

Core drilling in 1975 and in 2000 were sampled on shorter intervals; however, this drilling is not used in estimation.

11.1.2 Reverse Circulation (RC)

The RC samples were typically taken on 1 m or 2 m intervals. A small representative sample of rock cuttings for each interval was kept in labelled chip trays as a record of the interval.

Dry samples were collected at the drill rig, weighed, and halved or quartered in a riffle splitter. A rotary wet splitter was employed in extreme wet conditions, and two smaller splits were recovered in porous sample bags at the rig, labelled, and dried.

11.1.3 Blast Holes

The blast hole samples are collected using a 51 mm diameter ribbed tube. A total of 12 portions are collected from each blast hole cone using a cone-and-quartering method to form one complete sample. All material is placed into a polyethylene bag which contains a sample tag listing: date, bench number, blast number, and drill hole number.

11.2 Metallurgical Sampling

The drill core was sampled on 10 m metallurgical sampling intervals, and 2 m assay intervals. Core handling (cutting and bagging) was completed on site, and the samples shipped to metallurgical testing facilities.

11.3 Density Determinations

Density samples were taken approximately every 20 m or at a clear lithology change, to ensure sufficient representation of all lithology types. Geological information for each sample was entered into the acQuire database, together with information on the physical sample properties, and core diameter.

The samples were shipped to Andes Analytical Laboratories (Andes Analytical) in Santiago for measurement. This data is stored in acQuire.

A check calculation was performed using the database data as a verification step on the values supplied by Andes Analytical.

The database contains 4,429 density measurements within the deposit area, all obtained from post-2007 exploration drill programs (Table 11-1). Average values for the key lithologies are used in the Mineral Resource interpolation.

Table 11-1: Density Determinations

Units/Lithology	Density Measurements (number of samples)	Minimum (t/m^3)	Maximum (t/m^3)	Co-efficient of Variation	Average Density (t/m^3)
GRA*					2.21
LEACH CAP*					2.46
FCOLL	238	2.03	2.98	0.047	2.64
DIO	737	2.07	3.15	0.039	2.67
QMZ	1,408	2.01	3.16	0.039	2.60
FP	373	1.35	2.93	0.042	2.59
FPLG	224	2.05	2.86	0.034	2.60
IBX	1,283	2.06	4.01	0.045	2.60
IBX2	32	2.53	2.7	0.017	2.62
TBX	134	1.56	2.85	0.061	2.57

Note: *Based on mine reconciliation and experience

11.4 Analytical and Test Laboratories

A summary of the sample preparation, analytical and test laboratories used to date for core drilling is provided in Table 11-2.

Table 11-2: Sample Preparation and Analytical Laboratories

Program	Laboratory	Accreditation	Purpose	Independent
1975	Chuquicamata	Unknown	Sample preparation and primary analysis	
1977 to date	Quebrada Blanca site laboratory	None	Sample preparation for selected programs, primary analysis for blast hole samples	No
1977–1983	Centro de Estudios de Medición y Certificación de Calidad S.A (CESMEC), Iquique, Chile	Unknown	Primary analysis	Yes
	Union Assay, Salt Lake City, USA	Unknown	Check analysis	Yes
	Assayers Canada, Vancouver, Canada	Unknown	Check analysis	Yes
1994	Centro de Investigaciones Minero Metalúrgicas Technologies & Services S.A. (CIMM), Calama	Unknown	Sample preparation and primary analysis	Yes
1995	CIMM, location unknown	Unknown	Sample preparation and primary analysis	Yes
1997	CIMM, Antofagasta	Unknown	Sample preparation and primary analysis	Yes
2000	Actlabs Chile S.A.	Unknown	Sample preparation and primary analysis	Yes
2001	CESMEC	Unknown	Primary analysis for RC samples; pulp reanalysis	Yes
2002–2003	Quebrada Blanca site laboratory	None	Sample preparation	
	Geoanalitica Ltda (Geoanalitica)	Unknown	Primary analysis for RC samples	
2004–2005	Quebrada Blanca site laboratory	None	Sample preparation for selected samples	No
	Acme Laboratories, Santiago (Acme)	ISO 9001:2000	Sample preparation and primary analysis	Yes

Program	Laboratory	Accreditation	Purpose	Independent
2007–2008 *	Andes Analytical Laboratories, Santiago (Andes Analytical)	ISO 9001:2000 from 2006	Sample preparation and primary analysis	Yes
2009 to December 2012 *	Acme Laboratories, Santiago and Copiapó (Acme)	Santiago: ISO 9001:2000 from 2005 Copiapó: ISO 9001:2000 from 2010	Copiapó: sample preparation; Santiago: primary analysis	Yes
2010–2012 *	Quebrada Blanca site laboratory	None	Sample preparation for selected samples	No
	Geoanalitica	9001:2008	Primary analysis for RC samples	Yes
2013 to date *	Acme, Santiago and Copiapó	Santiago: ISO 9001:2000 from 2005 Copiapó: ISO 9001:2000 from 2010	Copiapó: sample preparation; Santiago: primary analysis	Yes

Note: * only laboratories with an asterisk have analytical samples that support Mineral Resource and Mineral Reserve estimation.

The grade control sample preparation and analysis is carried out at the mine laboratory which has no accreditation and is not independent. The mine laboratory has also performed sample preparation and analytical procedures for selected RC campaigns.

Analytical and test laboratories used in the metallurgical programs are discussed in Section 13.1.

Drilling completed prior to 2007 forms a small minority of the drill holes used in Mineral Resource estimation of the hypogene mineralization, and in the opinion of the QP, the fact that the laboratory accreditations are not known for the majority of the laboratories at the time is not considered to be material to the estimate.

11.5 Sample Preparation and Analysis

Sample preparation and analytical procedures, where known, are summarized in Table 11-3.

Table 11-3: Sample Preparation and Analysis

Program	Sample Preparation	Analysis	Comment
1977–1983	Site laboratory: crush to -6 mm; pulverize to -100 mesh	CESMEC: total copper, CuS and molybdenum analysis by atomic absorption spectroscopy (AAS). Assayers Canada: 49 elements suite by mass spectrometry	Union Assay: check total copper analysis using potassium iodide method
1990–1997	Unknown	Unknown	
1994 to date	Site laboratory: crush to -10 mesh, pulverize to -150 mesh.	Total copper by AAS; sequential soluble copper	Blast hole sampling
2000	Unknown	Unknown method. Assayed for total copper, CuS, CuCN, total non-soluble copper in the residue after the cyanide soluble analysis, and molybdenum	Used for core and RC
2001	Unknown	Total copper, sequential soluble copper (acid and cyanide), and molybdenum	RC only
2002	Unknown	Sequential soluble copper	RC only
2004–2005	Unknown	Unknown	
2007–2008	Crush to 80% passing -10 mesh, pulverize to 95% passing -150 mesh	Copper and molybdenum by AAS	
2009 to date	Crush to 80% passing -10 mesh, pulverize to 85% passing -200 mesh; crush to 70% passing -10 mesh, pulverize to 85% passing -200 mesh	Copper and molybdenum by AAS Total copper and molybdenum using sequential soluble copper method	Samples within the oxide, supergene, and transition zones were also analyzed for soluble copper

The site laboratory prepares and analyzes blast hole samples on a daily basis, and is equipped to perform total copper and sequential soluble copper analyses. The most common methods used by the laboratory include sample preparation, three-acid digestion with AAS finish, and determination of copper, molybdenum, CuSH, and CuCN.

11.6 Quality Assurance and Quality Control

Although drill programs prior to 2007 were not routinely subject to an onsite quality assurance and quality control (QA/QC) program, the laboratories selected during this period included internal quality control programs that conformed to international norms for the time.

All submissions of core drilling post-2008, have included QA/QC samples. The QA/QC insertion rates consisted of 5% coarse blanks, 5% standard reference materials, and 5% half-core duplicates. Key notes related to the QA/QC include:

- The blanks initially consisted of barren coarse quartz generally containing <20 ppm Cu, or 0.02% Cu. Since 2011, certified blanks have been purchased from Acme;
- Since 2007, the mine has had 14 separate certified standards, grouped in three grade ranges (low, medium, and high) in use at any given time. Teck uses purchased certified standards from CDN Resource Laboratories Ltd. The samples are all certified for total copper and molybdenum by a four-acid digest with either an ICP or an AAS finish. No standards are in use for soluble copper;
- Field duplicates consisted of halved drill core.

Reviews conducted on the QA/QC results indicated:

- Blanks: no contamination problems with either copper or molybdenum at the primary laboratory;
- Standards: acceptable ranges of accuracy for the total copper and molybdenum values;
- Duplicates: reasonable correlations for total copper; however, molybdenum showed significant variability. This was attributed to the nugget and veinlet mineralization style of the molybdenite.

Acme also included crusher and pulp duplicates in the analytical sample stream. Review of the crusher and pulp duplicate data indicated that sample preparation and analytical precision were acceptable.

QA/QC for the RC drilling completed prior to 2008 included submission of rig duplicates, coarse reject duplicates, and pulp checks. Post-2008, the same QA/QC protocols as used for core were applied to the RC programs. To date, sample preparation and analytical precision have been acceptable for the RC programs.

The current QA/QC protocol for blast hole sampling was initiated in 2011, and includes submission of field duplicates, standards (high, medium and low grade), field blank samples, crusher reject duplicates, pulp duplicates and check samples that are sent to an umpire (check) laboratory. Results to date indicate the sample preparation and analysis are acceptable.

11.7 Check and Re-assay Programs

An independent QA/QC checking procedure is in place for the mine site laboratory, and consists of sending about 1% of the total drill campaigns analysed by the site laboratory each year to two external laboratories, Geoanalitica and Andes Analytical. To date, the sample preparation and analysis have been shown to be acceptable.

11.7.1 Check Assays

A total of 5% of the 2007 drill core was sent for re-assay. Copper assays were found to be acceptable. There was some evidence of possible overestimation of molybdenum with the historical assays in the upper grade ranges (>0.05% Mo); however, there was good correlation around the average grade (0.02%) of the deposit.

A quality control check on the 2007 drilling campaign consisted of a check analysis program on 343 pulps at the Acme laboratory. Ten samples had a greater than 20% difference from the original assays; almost all of these samples were traced back to two drill holes from two job lots. These samples and at least 10 adjacent samples in the corresponding job lots were returned to Andes Analytical for re-analysis. The results of this check process were considered satisfactory.

Together with the results of the full re-assay program, it was determined that there was sufficient support for using all of the historical core drilling in resource estimation.

11.7.2 Re-assays

In 2002, a selection of 2,461 sample pulps was re-analyzed from the 1977 to1983 drilling campaign. The re-analysis showed that the original program was acceptable, but that the original samples may have had a slight positive copper bias. About that 2.5% of the samples had a greater than 20% difference, and the average copper grade of the original assay was 1.6% higher than the check assays.

In 2011, a re-assay program of 23 historical drill holes from the 1977 to 1983 drilling campaign was undertaken, with the objective of confirming the historical assay results. Based on acceptable results from the re-assay program, Teck decided to use all of the core drilling from these early programs in the feasibility model.

11.8 Comparison of Core and RC Drilling

A comparison of the core and RC data was performed, and is discussed in Section 14.

11.9 Databases

Until 2001, surface geological mapping and core and RC drill data were recorded within Excel spreadsheet tables. In 2002, a MS Access database was built, and the Excel tables were uploaded into it. The current acQuire database was constructed in 2009.

Geological logging data are uploaded by the database administrator from the original logging tablet. Pit mapping data are also captured and migrated into acQuire. Down hole and collar survey data are provided in electronic format by the drillers and surveyors respectively, and imported into the database. Assay data are received directly from the laboratory and QA/QC protocols (i.e. lower detection limits compliance, etc.) are completed prior to import the results into the database.

As a check on the database, assay results can be plotted in section and plan view to confirm that they acceptably match with historical data. Lithology sections are typically plotted after each drill hole is logged to highlight any inconsistencies. Drill core is visually re-checked if necessary.

The database is under the control of the geological group lead and the database administrator. The acQuire database is backed-up on a regular basis in accordance with Teck protocols.

The historical (pre-2009) geological and drilling information that was originally captured on paper is stored by the mine geological department, and its usage is restricted and controlled by the database administrator.

11.10 Sample Security

There is no information available on the sample security measures in place for the 1975, 1977–1982, 1990, 2000, and 2005 drill programs.

From 2007, samples have been stored in a secure area under 24-hour security. Teck staff prepare samples for transport to the laboratory, and maintain a list of the samples in each load. All samples remain in the custody of Teck on Teck property under the supervision of the sample supervisor, until they are transferred by a contract transportation company, Cargotrans SA, to the independent laboratory for preparation and analysis. Samples are checked on arrival at the laboratory and any issues with the delivery are advised to Teck.

No significant security issues have been identified.

11.11 Sample Storage

After the core sampling process was completed, core was placed in tagged metal trays. Historically drill core trays, pulps and rejects samples were stored in the open on site. Drill core boxes trays were also placed in racks or in wooden pallets. Some 148,000 m of drill core remains stored in this manner at the mine site. As the core trays are exposed to high altitude weathering conditions, there is some risk of sample degradation.

About 50,000 m of core has been transported to a core storage facility in Pozo Almonte, a location closer to the town of Iquique. There are plans to continue transporting the remaining drill core on site down to these facilities.

11.12 Comments on Sample Preparation, Analyses and Security

Collection of the analytical and QA/QC drill data on the Project is a team effort, with assay data collected between 1977 and 2016, and QA/QC data collected after 2008.

No formal site-based QA/QC programs were in place prior to 2007. As a result, the core drilling prior to 2007 was evaluated using a combination of re-assay and check assay programs in 2002 and 2011.

The QA/QC core data obtained from 2008 onwards were regularly monitored. Where outlier assays were encountered, for example blank samples with elevated copper values, the samples were returned to the laboratory and reanalysed.

No major areas of bias or errors are considered to remain in the core sample database for copper for those drill holes used in resource estimation. Repeated duplicate sampling of drill core has indicated that there are lower levels of sampling precision for molybdenum when duplicate sampling results are reviewed. This has been attributed to the nugget and veinlet mineralization style of the molybdenite.

Overall, the copper and molybdenum data from drill cores from those drill programs that were used in estimation are considered acceptable for supporting Mineral Resource estimates.

12.0 Data Verification

12.1 External Data Verification

A number of external checks have been performed on the data supporting the Mineral Resource estimate, and third-party reports were prepared on the audits and checks, including:

- Satchwell, S., and Sullivan. J, 2011: Quebrada Blanca Database Audit;
- Nowak, M., Doerksen, G., Pilotto, D., Murphy, B., Dance, A., 2012: SRK Database Audit, Quebrada Blanca.

These reviews consisted of an examination of the digital database at the time of examination, followed by a comparison of the digital database with physical logs and/or folders stored at the mine for approximately 10% of the data. Integrity and logical checks were performed for the individual database tables, to check for "from/to" interval mismatches, missing intervals, and records extending beyond the recorded end of hole depth. The checks included a review of the downhole survey measurements based on a maximum 3D angle deviation tolerance.

In each review, the quality and completeness of the database at the time was found sufficient to support a Mineral Resource estimate.

12.2 Internal Data Verification

12.2.1 Laboratory Visits

A visit to Andes Analytical Assay laboratory by Al Samis and Neil Barr (Regional Manager for Teck Cominco at that time) in early 2008 did not identify any irregularities in the Andes Analytical procedures. It was considered that the Andes Analytical internal quality control measures and laboratory information management system (LIMS) sample management software ensured that errors were minimized.

12.2.2 QA/QC

A summary of the QA/QC evaluations are described in Section 11.6 and Section 11.7.

12.2.3 Annual Mineral Resource and Mineral Reserve Reports

Teck prepares an annual Resource and Reserve report for the Quebrada Blanca operation. Each report provides a review of the data used to support that year's estimates, includes an annual summary of the results and interpretations of the QA/QC performed on exploration and blast hole data, and a discussion of the reconciliation trends and observations.

No issues with the exploration data collected each year that would materially affect the Mineral Resource estimates were noted during these annual reviews from 2009 to 2016.

12.2.4 Annual Process Audits

Teck's Reserve Evaluation Group conducts an annual process review at each operation, including the Quebrada Blanca mine. The reviews check that the processes set out corporately in terms of data collection, data verification and validation, and estimation procedures are being appropriately followed. The audits also review the results of the processes. The QP has been involved with every review of Quebrada Blanca from 2013 to date.

No issues that would materially affect the Mineral Resource estimates were noted during these annual reviews.

12.2.5 NI 43-101 Technical Reports

Three technical reports have been filed on SEDAR on the Quebrada Blanca deposit and operations:

- Allan, M.J., Yuhasz, C., Witt, P., and Baxter, C., 2012: National Instrument 43-101 Technical Report, Quebrada Blanca Phase 2 Project, Region I, Chile: report prepared for Teck Resources Inc., effective date April 24, 2012;
- Barr, N.C., 2008: NI 43-101 Technical Report on Hypogene Mineral Resource Estimate, at Dec 31, 2007, Quebrada Blanca Region I, Chile: report prepared for Teck Cominco Limited and Compañía Minera Quebrada Blanca S.A, filing date 31 March, 2008;
- Barr, N.C. and Reyes, R., 2004: Report on Mineral Resources and Mineral Reserve Estimates at Dec. 31, 2003, Quebrada Blanca Copper Mine, Region I, Chile, report prepared for Aur Resources and Compañía Minera Quebrada Blanca S.A, filing date 31 March 2004.

These reports require that sufficient data verification is performed to support the Mineral Resource estimate at the time. A combination of Teck staff and the Qualified Persons for the reports provided information on the verification programs performed. No issues that would materially affect the Mineral Resource estimates were noted in any of the three reports.

A draft update to the 2008 technical report was prepared in 2009, but was not filed:

- Barr, N.C., 2009: NI 43-101 Technical Report on Supergene Mineral Resource and Mineral Reserve Estimates at Dec. 31, 2008, Quebrada Blanca Copper Mine, Region I, Chile: draft report prepared for Teck Cominco Limited and Compañía Minera Quebrada Blanca S.A, effective date 31 March 2009.

The report included a review of data collected during 2008. No issues that would materially affect the Mineral Resource estimates were noted.

12.2.6 Production Monitoring

The data collected in the supergene zone is supported by about 22 years of production data (1994 to 2016). No significant issues have been noted during reconciliation with the exploration information that was collected. Although the hypogene mineralization has not been processed to date, similar methodologies were used from 2007 onwards in collection of the supergene information to that of the hypogene data.

12.3 Comments on Data Verification

The checks performed by Teck staff, including the continuous QA/QC checks conducted by the database administrator and Project geologists, annual QA/QC reviews, and verification conducted as part of compilation of NI 43-101 technical reports, in particular from 2008 to date, are in line with industry standards for data verification and have identified no material issues with the data or the Project database. Two external audits were conducted on the drill database that supported the FS2012 resource estimate, and identified no material issues with the information at the time. The QP has participated in every annual process review for the Quebrada Blanca Mineral Resources and Mineral Reserves from 2013 to date.

Overall, the level of review has adequately verified the quality of the core database as sufficient for use in estimating Mineral Resources and Mineral Reserves, and for use in mine planning.

13.0 Mineral Processing and Metallurgical Testing

13.1 Introduction

There have been various programs of metallurgical testwork conducted by Teck's third-party consultants throughout the Project's development history. To date, the consultants performing and overseeing or reviewing the testwork have included:

- Aminpro, Garibaldi Highlands, BC, Canada;
- DJB Consultants Inc. (DJB), North Vancouver, BC, Canada;
- G&T Metallurgical Services Ltd. (G&T), Kamloops, BC, Canada;
- Inspectorate PRA Group (PRA), Richmond, BC, Canada;
- Phillips Enterprises (Phillips), Golden, Colorado, USA;
- SGS Lakefield (SGS), Vancouver, Canada;
- JKTech Pty Ltd. (JKTech), Brisbane, Australia;
- SimSAGe Pty Ltd. (SimSAGe), Brisbane, Australia.

Other test work has been conducted, such as testing by vendors of process materials that were produced during the pilot plant operation in order to establish equipment sizing criteria.

13.2 Metallurgical Testwork

A substantial body of test work and assessments were undertaken to support the 2010 pre-feasibility study and the FS2012; the majority of this work is superseded. Testwork that is superseded included aspects of the comminution circuit design, and flotation, hardness, and pilot plant testing. Details of the superseded work are provided in Allan et al., 2012.

13.2.1 Sample Selection

Samples were generated from seven HQ-sized core holes completed in 2012. The drill hole locations were selected by Teck to represent the initial five years of the 2012 mine schedule, and to intersect the major geological and mineralogical ore domains. Table 13-1 summarizes the mineralization domains, and whether or not the mineralization in these domains will be recoverable through the proposed concentrator.

Table 13-1: Mineralization Domains

Mineralization	Interpretation	QB2 Concentrator
Oxide	Oxide copper minerals	Not recoverable
Leached	Leached zone	Not recoverable
Enriched	Secondary chalcocite replacement	Recoverable
Transitional	Chalcopyrite with chalcocite coatings	Recoverable
Primary	Chalcopyrite, pyrite, and bornite	Recoverable

Note: primary = fresh material.

Mineralized zones were defined via the use of sequential copper leach assay data. Assay data, specifically CuSH and CuCN, were used to generate the mineralization domains. Discrete 10 m intervals were selected every 30 m down the length of the drill hole. Intervals were selected such that they did not cross lithological boundaries. The core was split, with half core being used for comminution, and quarter core for flotation and assay samples.

The comminution samples were used to generate the master composite, the pilot plant composite, and for comminution variability tests. The flotation samples were used for flotation variability testing, and the assay samples were used as variability samples and to generate the pilot plant composite.

13.2.2 Mineralogical Characterization

Mineralogical examination of samples was carried out using QEMSCAN particle mineral analysis (PMA). Three size fractions for sample (+106, -106/+53 and -53 µm) were submitted.

Master Composite

Pyrite and chalcopyrite are the dominant sulphide species, with minor levels of molybdenite and other copper sulphides present. Pyrite is relatively coarse-grained with an average grain size of 46 µm, while chalcopyrite is considered fine-grained at 21 µm. Copper is overwhelmingly accounted for by chalcopyrite, with minor levels as other sulphides (chalcocite, covellite and enargite) or bornite.

The major non-sulphide minerals are quartz, feldspar, plagioclase and sericite/muscovite. The non-sulphide gangue minerals are fine-grained, with quartz averaging 26 µm and the remainder averaging below 20 µm.

Chalcopyrite is well liberated at the 150 µm primary grind size P_{80}, with 85% reporting as liberated. The remainder of the chalcopyrite is predominantly locked with non-sulphide gangue, and concentrated in the +106 µm size fraction.

Chalcopyrite is not commonly associated with pyrite and shows minor levels of locking. This indicates that the separation of pyrite and chalcopyrite should not be complicated by liberation issues.

Variability Samples

Pyrite and chalcopyrite are the most common sulphide minerals. The pyrite content ranges from 0.1% to 16.9% and averages 2.4%; similar to that observed in the master composite. The chalcopyrite content ranges from 0.3% to 6.0%, and averages 1.6%. The average ratio of pyrite to chalcopyrite is 1.5.

The major non-sulphide gangue minerals are quartz, feldspar, plagioclase, and sericite/muscovite. Clay levels averaged 3.5%, with a range of 0.7% to 9.5%.

Copper is chiefly accounted for by chalcopyrite, with an average value of 95.1%. Minor levels of bornite are present in several samples. Two samples showed notable levels of chalcocite and/or covellite.

Chalcopyrite is well liberated at the primary grind size P_{80} of 150 µm. Liberation ranges from 63.6% to 90.7%, and averages 80.0%. The unliberated chalcopyrite is predominantly associated with non-sulphide gangue, with an average locking value of 16.7%. Chalcopyrite locking with pyrite is uncommon. The occurrence of chalcopyrite locked with pyrite ranges from 0% to 8.6%, and averages 0.9%.

13.2.3 Comminution

Comminution testwork included BMWi and SMC tests. Results of the comminution testwork are provided in Table 13-2.

Table 13-2: Comminution Testwork

Parameter	SMC Parameters		BMWi
	Axb	t_a	kWh/t
Average	39.4	0.40	13.7
Median	36.0	0.36	13.6
Std. Dev.	14.1	0.14	1.41
Minimum	22.0	0.21	10.6
Maximum	109	1.04	18.3

The SMC test results indicated that the majority of Quebrada Blanca samples fall in the medium to hard categories with respect to resistance to impact breakage (Axb). The average value of abrasion index (t_a) was 0.40, categorizing the material as having medium resistance to abrasion breakage. The SMC tests were calibrated against the JKTech database to correct for the size effect.

The BMWi results ranged from 10.6 to18.3 kWh/t, and averaged 13.7 kWh/t. This indicates a medium hardness in terms of ball milling. The average BMWi test P_{80} value was 165 µm; in line with the primary grind target of 150 µm.

The comminution results were reviewed against:

- Geological characteristics (lithology and alteration);
- Assay and mineralogy (lithogeochemical and QEMSCAN);
- Geotechnical characteristics (RQD).

These groupings were designed to determine the drivers of ore hardness, and allow the selection of geometallurgical (geomet) units which could be reflected in the resource model and mine plan. Grouping the test results according to lithology proved effective.

The finalized geomet units were used as the basis for throughput predictions. These throughput rates were used for the Project's mine planning purposes and financial evaluation.

13.2.4 Flotation

The flotation test program included the following stages:

- Flowsheet development;
- Pilot plant campaigns;
- Copper–molybdenum separation test work;
- Variability testing.

Flowsheet development focused on establishing the flotation circuit and baseline conditions, and on developing design criteria. The pilot plant campaign was undertaken to generate bulk products for additional testing and to demonstrate flowsheet stability.

Copper–molybdenum separation test work was undertaken to assess separation performance, develop design criteria, and generate final concentrates.

Variability testing was used to assess variation in metallurgical performance across the orebody, and subsequently to develop metallurgical projections for concentrate grades and metal recoveries.

Water Quality

The entire flotation test program was carried out using synthetic process water. The purpose of the synthetic process water was to approximate the Project's water quality, with desalinated water as the makeup water source, during Year 5 of the operation. Teck selected the process water characteristics based on water quality modelling undertaken for a similar project.

Flowsheet Development

The master composite was used for the flowsheet development program. This program included rougher, open-circuit cleaner and locked-cycle tests:

- Rougher tests were undertaken to confirm the selection of the primary grind size, the retention time and reagents. The rougher test conditions were used as the basis for the remainder of the flowsheet development program and the variability testing program;
- Open-circuit cleaner tests were used to assess the number of cleaning stages, regrind targets, and reagent addition. Two stages of dilution cleaning and a cleaner–scavenger stage were selected for the open-circuit tests. The cleaning circuit parameters were used as the basis for the locked-cycle tests and the subsequent variability testing;
- Triplicate locked-cycle tests were completed. The locked-cycle tests returned a copper recovery of 91.6% at a concentrate grade of 27.1% Cu to the bulk concentrate. The recovery of molybdenum to the bulk concentrate was 83.9%, at a grade of 0.821% Mo. The cleaning efficiency was 97.6% for copper and 93.8% for molybdenum.

Pilot Plant

The flowsheet and operating conditions determined in the flowsheet optimization stage were used as the basis to commission and operate the pilot plant.

Methodology

The pilot plant composite was fed to a single-stage ball mill. The mill discharge was classified with a fitted 300 µm aperture Kason screen. Oversize material was returned to the mill and undersize material was directed to flotation. This arrangement was selected to target a P_{80} of 135 to 150 µm.

The flotation circuit consisted of a rougher stage, a concentrate regrind mill (in closed circuit with a hydrocyclone), two stages of dilution cleaning, and a cleaner-scavenger stage. Synthetic process water was added to the circuit and no process water was recycled.

The first cleaner–scavenger concentrate was directed to the regrind feed sump. This change was incorporated for materials handling purposes. Given the use of a hydrocyclone prior to regrinding, this change was not expected to impact performance or circuit stability.

Approximately 5 t of ore was processed through the pilot plant over a period of six days at an average feed rate of 99 kg/h. The feed material head assays averaged 0.53% Cu and 0.021% Mo.

Bench-Scale Tests

The rougher tailings, first cleaner–scavenger tailings, and bulk concentrate were collected as separate products throughout the six-day operating period.

Bench-scale rougher, cleaner, and locked-cycle tests were completed on the pilot plant composite prior to commencing operations:

- The single locked-cycle test yielded a copper recovery of 92.6% at a grade of 23.8% Cu in the bulk concentrate. Molybdenum recovery was 75.4% at a grade of 0.690% Mo. The cleaning efficiency values were 96.5% and 87.0% for copper and molybdenum, respectively;
- The copper flotation results were similar to the laboratory results. The pilot plant returned a copper recovery of 90.9% at a concentrate grade of 27.9%. The copper cleaning efficiency was 93.9%, in line with the laboratory tests. In the case of molybdenum, the pilot plant recovery was poor compared to the bench-scale tests. Molybdenum recovery to the bulk concentrate was 58.8% at a concentrate grade of 0.64% Mo. The results indicated that molybdenum losses were concentrated in the rougher tailings. The pilot plant rougher mass recovery was low (6.5%) compared to the locked-cycle test (16.0%). This appeared to have impacted molybdenum, although not copper, recovery. The molybdenum cleaning efficiency was 85.1%, in line with laboratory results.

Overall, the pilot plant was considered a success. The flowsheet proved stable and Teck considered the metallurgical performance results acceptable, with suitable products generated for further testing.

Copper–Molybdenum Separation

A sample of bulk concentrate was submitted to FLSmidth for concentrate thickening tests. The copper–molybdenum separation program included rougher, cleaner and locked-cycle tests. The bulk concentrate generated from the pilot plant was used as feedstock for the program. Tests were conducted in synthetic process water and nitrogen gas was used for flotation.

A series of rougher and open-circuit cleaner tests were completed for the purposes of flowsheet developed. The parameters targeted for optimization were flotation time, rougher concentrate regrind size, cleaning configuration, solution chemistry (Eh, pH), and reagent dosage. The selected cleaning circuit consisted of four stages of dilution cleaner. The first cleaner tailings were recycled to the rougher stage.

Following the completion of rougher and cleaner optimization tests on bulk concentrate, two duplicate locked-cycle tests were conducted. The locked-cycle test results indicate that on average 97.4% of the molybdenum was recovered to the final molybdenum concentrate, with a grade of 49.6% Mo. The average copper recovery to the final copper concentrate was 99.9%, at a grade of 25.7% Cu.

Variability Tests

The variability flotation test program included locked-cycle tests performed on 57 variability composites to assess the stability of the flowsheet and to allow the development of metallurgical projections.

Samples which yielded poor copper recovery, molybdenum recovery, or bulk concentrate copper grades were investigated. A sample with poor performance was defined as having a concentrate grade or recovery greater than two standard deviations away from the mean of the dataset.

The following trends were observed:

- Copper recovery was linked with head grades, pyrite content, alteration minerals, and chalcopyrite liberation;
- Bulk concentrate copper grade was linked with head grades, pyrite content, alteration minerals, and chalcopyrite liberation;
- Molybdenum recovery was weakly linked with clay content and head grade.

In terms of copper performance, it was proposed that there were two factors at work, which were the level of pyrite present, together with the type and intensity of alteration. The quantity of pyrite impacted both copper recovery and concentrate grade, while the type and intensity of alteration was linked with chalcopyrite liberation. Molybdenum performance appeared to be variable. A portion of the variability appeared to be due to the presence of clay minerals and the molybdenum head grade.

The enriched geomet domain (based on the distribution of copper as chalcocite/covellite) was insufficiently represented in the variability sampling; however, rougher and cleaner tests indicated that the recovery of copper and molybdenum from enriched material was successful in a laboratory setting. Compositing of enriched and primary material was not detrimental to flotation performance.

13.2.5 Ancillary Tests

A series of ancillary tests to support process equipment selection were completed. Results are summarized in Table 13-3.

Table 13-3: Ancillary Testwork

Testwork	Results Summary
Concentrate regrind	The installed power of the selected regrind equipment ranges from 5.8 to 7.5 kWh/t for the balance case and the design case
Bulk concentrate and copper concentrate thickening	Bulk concentrate: Solids loading rates of 0.04 to 0.15 t/(m^2·h) were reported without the use of flocculants. The selected bulk concentrate thickener yields solids loading rates at 0.09 to 0.12 t/(m^2·h) for the balance case and design case, respectively. The testwork yielded a thickener underflow density up to 68.1% solids without the use of flocculants. The targeted bulk concentrate thickener underflow density is 55% to 60% solids. Teck believes that the use of desalinated water will result in similar operational performance to the test work results for saline water Copper concentrate: The testwork indicated a minimum unit area of 0.05 (m^2·d)/t, and a flocculant dose of 15 to 20 g/t. The underflow density was 71% solids. The selected copper concentrate thickener yielded a unit area of 0.40 (m^2·d)/t. The flocculant dosing rate is 15 to 20 g/t and the underflow density target is 60% to 65% solids.
Concentrate filtration	Filtration rates of 150 to 300 kg/(m^2·h) could be achieved. However, these tests were conducted with saline process water. The use of seawater extended the

Testwork	Results Summary
	cycle time. Teck believes that the use of desalinated water will result in both higher filtration rates and lower moisture contents than the test work results for saline water. The filtration equipment (with two of three filters in operation) yields required filtration rates of 169 to 277 kg/(m^2·h) for the balance case and design case.
Transportable moisture limit	The targeted moisture value for the copper concentrate is <10.0%
Tailings thickening	Feed density: 8% to 16.2% on a fully diluted basis Flocculant dosing: 15 to 40 g/t of anionic flocculants Underflow density: 56% to 62% solids Minimum unit area: 0.04 to 0.08 (m^2·d)/t (Outotec), and 0.05 (m^2·d)/t (FLSmidth) Flocculant dosing rate of 20 to 30 g/t Underflow density of 50% to 59% solids Minimum unit area of 0.065 (m^2·d)/t

13.3 Recovery Estimates

Metallurgical projections were developed for the enriched, transitional and primary mineralization domains as defined in the resource model. The enriched and transitional zones collectively account for approximately 8% of the concentrator feed for the 25-year mine schedule.

13.3.1 Enriched Material

Fixed values were adopted for recovery and grades in the enriched material, reflecting the limited availability of data (Table 13-4).

Table 13-4: Recovery Projections, Enriched Material

Range	Recovery (Cu %)	Concentrate Grade (Cu %)	Recovery (Mo %)	Concentrate Grade (Mo %)
All	80.0	30.0	50.0	50.0

The adopted projections for the enriched material show:

- The copper recovery value is in line with the recoveries reported for the open-circuit tests;
- The copper concentrate value is in keeping with the limit applied to the primary material at elevated Cu:S ratios;
- Molybdenum recovery is in line with the range reported for the open-circuit tests;
- The molybdenum concentrate grade was kept in line with the hypogene predictions.

The projections are based on limited test work and it is recommended to conduct additional sampling and testing of the enriched material. The risk associated with these projections is mitigated by the small proportion of the concentrator feed (4.5%) classified as enriched.

13.3.2 Transitional and Primary Material

For the transitional and primary materials, copper recoveries are capped at a lower value of 50.0% and an upper value of 93.2%. The copper concentrate grade is capped at 15.0% for low head grades, and capped at 30.0% for elevated head grades and Cu/S ratio. The losses of copper to the molybdenum concentrate are considered negligible. The recovery projections are considered reasonable by Teck, tending to over-predict recovery values below approximately 92% (actual) and under-predicting above that value.

The under-prediction is partly related to the uniform recovery value of 93.2% utilized for samples with a head grade greater than 0.2% Cu and a Cu/S ratio greater than 0.75. The copper grade projections match well against the actual values. The projection tends to over-predict the concentrate grades below 27% Cu and under-predict above this value. Teck considers the copper projections suitable for use in mine planning and financial evaluation.

Molybdenum recovery is impacted in part by the molybdenum head grade and the level of clay present in the sample. The resource model does not incorporate an estimation of clay material; therefore, molybdenum recovery is predicted as a function of molybdenum head grade. The results of the copper–molybdenum separation test program indicated that a molybdenum concentrate grade of 49.6% Mo with a stage recovery of 97.4% could be achieved. The projections assume a constant grade of 50.0% Mo to the molybdenum concentrate and estimate a copper–molybdenum separation efficiency of 95.0%. Overall, the molybdenum recovery projections will tend to over-predict recovery for head grades below 0.0145% Mo and under-predict recoveries above this head grade. Teck considers the molybdenum projections suitable for use in mine planning and financial evaluation.

13.4 Metallurgical Variability

The metallurgical testwork completed to-date is based on samples which adequately represent the variability of the proposed mine plan.

13.5 Deleterious Elements

The copper and molybdenum concentrates generated in the copper–molybdenum separation program were submitted for detailed concentrate quality analysis.

No elements are present at penalty levels in the copper concentrates. Credits may be obtained for silver; however, the average value (47.8 ppm) is considered to be only marginally above the payable value. Gold is not present at payable levels.

The average copper grade in the molybdenum concentrates is 1.40% Cu. Copper grades >1.00% Cu are expected to impact the molybdenum concentrate payment structure. No additional penalty elements are expected.

14.0 Mineral Resource Estimates

14.1 Introduction

The 2013 resource block model for the QB deposit represents a significant update that combines supergene and hypogene interpretations into a single model, and is supported by 623 diamond drill holes. The model now includes additional exploration data from 2011 and 2012 drill campaigns, re-interpretations of alteration and structural data from the 2012 and 2013 re-logging campaigns were incorporated into the definitions of the estimation domains.

The exploration drill hole database is a combination of core and RC data and Teck staff compared core assay results to RC assay results to check for possible sample bias issues and define if all datasets could be used. The boundaries for the oxidation and enrichments zones were better defined based on pit mapping and the decision to use tighter spaced RC drill hole data. Although RC samples are not used for grade estimation or resource classification of hypogene materials, these holes were logged and used for geological interpretations.

14.1.1 RC and Core Comparison

An evaluation was performed comparing core assay results to RC assay results to check for possible sample bias issues. A bias was noted for total copper assay results in the primary oxidation domain, whereby a paired data analysis review indicated that the total copper assays were biased low in RC assays in comparison to the core assays. As a result, the RC drill holes were removed from the estimation database for the primary zone. The RC assay results were used for copper estimation (CuSH, CuCN, and CuT) within the other oxidized domains.

No bias was noted for molybdenum values; however, many of the historical RC drill holes were not analyzed for molybdenum, thus the same estimation database (core only) was used in the estimation of molybdenum for all domains. The majority of the RC drilling was conducted as part of infill drill programs to define the extent of the potential leach ore, and thus has limited influence on the primary zone.

14.1.2 Model Development Phases

The resource block model update was completed in two phases.

Phase one involved an update to the oxidation-state 3D surfaces, as related to potentially leachable ore, to allow for an update to the life of mine plan for the cathode production for mid-year 2013. This phase of the model was completed on 1 May, 2013. Using the updated surfaces, block grades were estimated for CuT and CuS, which is the sum of the two-part sequential leach assay, part one being CuSH and part two being CuCN within the potentially leachable zones. The primary zone was left un-estimated at this time. The drill hole data cut-off date for this phase of the update was 31 December, 2012.

While the phase one estimation update was occurring, the geological interpretations and subsequent 3D geological wireframes were also being updated, and were ultimately used for grade domains in the estimation of grades in the primary zone. This phase of the model was completed on 31 October, 2013.

Phase two involved taking the updated geology models that controlled the primary mineralization, updating the block estimates for total copper in the primary zone, and the % molybdenum (%Mo) in all domains. The drill hole data cut-off for this phase of the update was 30 July, 2013.

The two model phases were then merged into one overall model for Resource reporting. As noted in Section 10, not all drill data were used in estimation.

14.1.3 Sub-Blocks

Modelling considered sub-block proportions for the oxidation zones, and whole block "majority rules" for lithology, alteration, and mineralization. Models were constructed using the original mine topography, so that past production reconciliation validation studies could be undertaken.

Sub-blocking to a minimum 5 m x 5 m x 2.5 m was used in Vulcan to better honour the variability of the geological oxidation models. Grade was estimated into the parent block. The final model was re-blocked to the parent 20 m x 20 m x 15 m block size for all mine planning and reporting. The parent block size is appropriately aligned with mine selectivity and equipment size requirements.

14.2 Geological Models

The resource block model required interpretations of oxidation state, lithology type, alteration type, mineralization type, and structural blocks for definition of estimation domains.

The software Leapfrog Geo (with various forms and types (polylines, and points) of geology control points) was used to construct 3D wireframe models for each geological variable of interest. Manual manipulation was applied to each 3D geological model if and where required.

14.2.1 Oxidation Domains

Oxidation domains were produced using CuSH and CuCN to CuT ratios. Three-dimensional points were interpreted on 50 m spaced north–south sections, using point and polyline data.

14.2.2 Structural Domains

A complex network of anastomosing and offsetting faults were interpreted on vertical and horizontal sections, based on drill hole information, pit mapping data, and lithological offsets noted during geological interpretations. A total of 10 faults were interpreted, and turned into 3D surfaces in Leapfrog Geo.

14.2.3 Lithological Domains

A series of 40 geological cross-sections was manually prepared on north–south orientations at 100 m spacing and at 1:2,000 scale using all available drill hole data and the copper and molybdenum grade envelopes as support. The sections were turned into preliminary geological solids in Leapfrog Geo, and subsequently manipulated to fit field observations, pit mapping, and drill hole intersections in 3D space. The final Leapfrog 3D wireframes were then reviewed on section to compare back to the preliminary sectional interpretations, as a form of model validation.

14.2.4 Alteration Model

Alteration types and their corresponding intensities were interpreted on individual sections in the same manner as the lithological sections. A total of 280 alteration cross-sections were interpreted (seven alteration types for each of the 40 project sections). For each alteration type, except gravel, the logged intensity was also interpreted, so that each individual alteration type was separated into two intensities, a weakly-altered and a combined moderately and highly altered zone.

The alteration interpretation and alteration model were not directly used to constrain the resource estimation; however the discussion on the model preparation is included in this Report since it may be used in future resource estimates and geometallurgical characterization.

14.2.5 Mineralization Model

Three primary mineralization types and intensities were interpreted and modelled on individual sections in the same manner as the lithological sections. A total of 120 mineralization cross-sections were interpreted (three mineralization types for each of the 40 project sections).

14.3 Exploratory Data Analysis

Exploratory data analysis (EDA) was performed on different combinations of oxidation state, lithology, mineralization and structural domains with histograms, log probability plots, and box and whisker plots. Contact analysis plots were also prepared to analyze grade trends and contact relationships between the units.

Sequential copper (CuSH and CuCN), CuT, sulphur and molybdenum values were analyzed for grade trends, domain correlations, and contact relationships to establish the final estimation domains.

The majority of boundaries were considered to be hard. Soft boundaries could be used where the contact analysis warranted.

14.4 Density Assignment

The assigned block model density values were based on average density measurements for mineralization and lithology domains. The weathering profile mineralization domains were assigned average values that were obtained from the mining operational history. The transition and primary mineralization zones were assigned average values, by lithology type, which were obtained from statistical analysis.

14.5 Composites

The most common assay interval is 2 m (comprising approximately 94% of the data), with a small percentage of 1 m assays (approximately 5% of the data) from historical drilling. A 4 m composite length was chosen to preserve vertical variability for the sub-horizontal oxidation zones. Down-hole composites within oxidation domains were created, breaking the composite as the drill hole entered and exited the 3D wireframes. Short composites <1.0 m in size were removed from the composite file.

Post-compositing, each composite was back-tagged with a lithology, alteration, mineralization, and structural domain code based on the 3D geological wireframes. Composite preparation treated any missing assay intervals as missing for all domains.

14.6 Grade Capping/Outlier Restrictions

Each grade variable was reviewed using log probability plots and histograms. High-grade capping limits were established for each estimation domain to eliminate the influence of high-grade outliers. The analysis was performed using the 4 m composites and, in general, very few outliers were identified for copper or molybdenum.

- CuSH: grade caps imposed ranged from 0.128–1.2% CuSH; number of capped samples ranged from 16–37; total number of samples reviewed ranged from 2,700 to 14,704;
- CuCN: grade caps imposed ranged from 0.82–3.5% CuCN; number of capped samples ranged from 7–31; total number of samples reviewed ranged from 2,836 to 17,245;
- CuT: grade caps imposed ranged from 0.39–4.1% CuT; number of capped samples ranged from 1–39; total number of samples reviewed ranged from 16 to 17,245;
- Molybdenum: grade caps imposed ranged from 0.025–0.251% Mo; number of capped samples ranged from 2–50; total number of samples reviewed ranged from 1,430 to 9,589;
- Sulphur: grade caps imposed ranged from 2.7–8.8% S; number of capped samples ranged from 4–21; total number of samples reviewed ranged from 1,613 to 9,982.

14.7 Variography

Experimental variography was conducted using the commercially-available Supervisor software for total copper, molybdenum, and sulphur composites in each of the grade estimation domains.

The variography from total copper was used for the CuSH and CuCN estimates, so that the final estimates would display similar correlations to the input data.

Variography was prepared by individual domain where supported by sufficient data density. In domains with limited data, samples were shared on the basis of the contact analysis in order to achieve interpretable variography.

The exploration drill hole database was used for experimental variography in all primary domains. The blast hole database was used to generate directions and ranges for total copper in the oxidation domains. These directions and ranges were then superimposed on the exploration database and variogram models were adjusted for nugget and variance contributions. The use of the blast hole database for the oxidation domains generated a direction and range of continuity that was superior to that of the wide-spaced exploration data. However, as there are data variances between the datasets, an additional step to fit the nugget effect and variance contributions was undertaken to ensure a match with the data used for the estimation. The same directions and ranges are used in monthly and daily grade control models, creating more consistency between all of the current models.

14.8 Sequential Leach Estimation

During the early stages of exploration and mining at Quebrada Blanca, samples were not routinely analyzed using the CuSH and CuCN sequential leach method. All drilling post-2007 has been analyzed with the sequential leach method in areas where oxidation characteristics were noted. Once the drill hole passed into the primary oxidation zone, however, the sequential leach assaying was discontinued.

Aur Resources completed a pulp re-analysis program after acquiring a majority share in the property. The pulp re-analysis program was performed on intervals considered to be economically significant (intervals with an elevated total copper value), intervals where the pulps could be located, intervals in locations of interest, and intervals located below the active mining topography. The result of the re-analysis program was an incomplete, biased, sequential leach dataset, with the low values of the distribution not fully represented.

To obtain unbiased estimates for sequential copper, the modelling method was adapted to allow for sequential copper block calculations as a function of domain and total copper, using the following methodology:

- Step 1. Two separate datasets were generated for estimation;
    - One dataset contained the complete total copper dataset (Dataset A);
    - The second dataset contained paired total copper and sequential copper values (CuSH and CuCN) (Dataset B);
- Step 2. Ordinary kriging (OK) was used with Dataset B to estimate CuT, CuSH, and CuCN values;
- Step 3. Following the estimation, the proportion of CuSH and CuCN values were calculated as functions of CuT for each block;
- Step 4. OK was used with Dataset A to estimate a total copper value;
- Step 5. Final CuSH and CuCN values were calculated using the CuT value from Step 4 and the proportion values from Step 3.

This method generated estimates that were based on all available data, and which used the total copper to sequential leach by mineralization domain relationships to control the final values. The result is a block model with a complete suite of grade estimates (CuT, CuSH and CuCN) for each block.

14.9 Estimation/Interpolation Methods

Sub-blocking was used for the Gravel, Leach Cap, Oxide, Enriched, Transition, and Primary domains, to define the units, and improve resolution. Sub-blocking was not performed for any of the other geological domains. All grades were estimated using OK. A three-pass approach was used for total copper, while a two-pass approach was used in the estimation of molybdenum and sulphur. Key elements of the searches included:

- Oxidation domains (CuT, CuSH, CuCN): minimum four composites, maximum 20; no maximum requirements per drill hole; minor search range of 75 m, major range of 150 m;

- Primary domain (total copper): depending on area, minimum of 5–8 composites, maximum of 20; maximum of 8 composites for the first pass from any one drill hole; minor search ranges of 75–300 m, major ranges of 150–500 m;
- Molybdenum: depending on area, minimum of 4–12 composites, maximum 18–24; depending on pass, maximum of 3–6 composites from any one drill hole; minor search ranges of 75–60 m, major ranges of 100–1,150 m;
- Sulphur: depending on area, minimum of 6–8 composites, maximum of 20; maximum of 8 composites for the first pass from any one drill hole; minor search ranges of 80–600 m, major ranges of 300–1,500 m.

Sequential copper estimation (CuS and CuCN) was undertaken using the same criteria as used for total copper. The sequential copper estimation, using the paired dataset, required a larger search ellipsoid to fill values in blocks than those estimated with a total copper value from the complete dataset.

14.10 Block Model Validation

Various measures have been implemented to validate the resource block model including:

- Visual comparison of drill hole composites with resource block grade estimates by zone, both in plan and section. It was concluded that the block model visually represents the underlying composite data and trends;
- Statistical comparisons between block and composite data using OK and nearest-neighbour (NN) models. The model is not considered to contain any global bias, as no shift in the mean value was noted between the NN and OK models;
- Swath plot analysis (drift analysis) comparing the OK model with the underlying composite data, and declustered composite data (NN model). As expected, the mean grade of the declustered composited samples (NN model) was more variable than the mean grade of the blocks that were smoothed by kriging. The block averages, in general, bisected the sample plot, indicating no bias between the model estimate and the samples. Larger variations between the means can be correlated with a reduction in the number of samples.

The validation process showed that the model does an acceptable job of matching the source data. No global bias was observed as the OK model generated the same tonnes and grade as the NN model at a zero cut-off, with no shift in the mean value on the histogram comparisons.

14.11 Classification of Mineral Resources

The classification parameters are defined in relation to the number of drill holes used to estimate the block grades and the block-composite separation distance, as a function of the geological continuity for each domain. These classification criteria are intended to encompass zones of reasonably-continuous mineralization. Table 14-1 summarizes the classification criteria.

Table 14-1: Mineral Resource Confidence Classification

Domain	Category	Drill Hole Criteria	Comments
Leach Cap	Measured	N/A	Not possible due to nature of mineralization
	Indicated	4 holes, avg distance ≤40 m	Based on paired dataset (using sequential leach composite)
	Inferred	1 hole, ≤140 m	Based on complete dataset (using CuT composite)
Oxide Enriched	Measured	4 holes, avg distance ≤40 m	Based on paired dataset (using sequential leach composite)
	Indicated	4 holes, avg distance >40 m and ≤60 m	Based on paired dataset (using sequential leach composite)
	Inferred	1 hole, ≤140 m	Based on complete dataset (using CuT composite)
Transition	Measured	4 holes, avg distance ≤25 m	Based on paired dataset (using sequential leach composite)
	Indicated	4 holes, avg distance >25 m and ≤60 m	Based on paired dataset (using sequential leach composite)
	Inferred	1 hole, ≤140 m	Based on complete dataset (using CuT composite)
Primary	Measured	N/A	Currently undefined
	Indicated	2 holes, avg distance >40 m and ≤80 m and CuT estimated in Pass 1 or 2	Downgrade to inferred category if nearest domain composite is >80 m Downgrade to inferred resource category if Mo not estimated in pass 1 or 2
	Inferred	1 hole, ≤140 m	Downgrade below Inferred category if nearest domain composite is >140 m

14.12 Reasonable Prospects of Eventual Economic Extraction

The evaluation of reasonable prospects of eventual economic extraction assumes conventional open pit mining method, and an assumed throughput rate of about 100 Mt/a.

Teck used the commercially-available Geovia Whittle software to define a resource pit shell. The ultimate pit was created based on the same parameters (costs, prices, metallurgical recoveries and pit slope angles) that were used for defining Mineral Reserves (see Section 15 and Section 16); however, the pit outline used for Mineral Resources is selected the revenue factor (RF) 1 pit. The metallurgical recovery equations used were a function of head grade, copper-to-sulphur ratio, and mineralization type.

All blocks have a net smelter return (NSR) value that is calculated based on commodity prices, and mining and processing information supported by the FS2016, and these variables are used in the Whittle runs. Example script NSR calculations for copper and molybdenum include:

- nsr_cu=(cut/100*rec_cu/100*2204.623*0.965)*3.0-((0.09*(conc_cu*0.965*2204.623))+90+65.93)*(cut/100*rec_cu/100/conc_cu);
- nsr_mo=(mo/100*rec_mo/100*2204.623)*0.99*(10-(10*0.15))-145.83*mo/100*rec_mo/100/conc_mo.

Where: cut is the block total copper grade; rec_cu is the copper recovery for the block; conc_cu is the copper concentrate grade; mo is the block molybdenum grade; rec_mo is the molybdenum recovery for the block; conc_mo is the molybdenum concentrate grade.

The mine plan uses a variable cut-off grade strategy to maximize the value of the material delivered to the concentrator and averages $15.07/t NSR (mineral value minus realization costs). For Mineral Resource estimation purposes, it was assumed that material with an NSR value that was <$10.36/t would be considered to be waste and material above this NSR could be reported as Mineral Resources.

Input parameters to the Whittle shell are summarized in Table 14-2. Metal prices used in the Whittle evaluation for Mineral Resources and Mineral Reserves were the long-term metal prices from Teck's Commodity Price and Exchange Rates for Reserve and Resources Evaluations dated May 2016.

Table 14-2: Reasonable Prospects of Eventual Economic Extraction Parameters

Item	Unit	Value (Cu)	Value (Mo)
Metal prices	$/lb	3.0	10.0
Payable metal	%	96.5	99
Metallurgical recovery*	%	91	76
Treatment charge	$/dmt	90	90
Metallurgical Refining	$/lb	0.09	—
Total freight	$/dmt	65.93	97.40
Item	**Unit**	**Value**	**Comment**
Direct mining costs	$/t material moved	1.46	LOM average, varies by block
Processing costs	$/t material milled	10.36	Includes general and administrative, port and desalination costs
NSR	$/t	10.36	
Exchange rate	CLP:$	575:1	
NPV discount rate	%	8	
Geotechnical domain inter-ramp angle	º	30–44	
Geotechnical domain estimated global angle	º	30–37.9	
Diesel cost	$/kWh	0.66	Assumes a Western Texas Intermediate oil price of $75/barrel
Power cost	$/kWh	0.11	Assumes a coal price of $75/t

Note: * metallurgical recovery varies by domain and head grade, average presented.

14.13 Existing Hypogene Stockpile

Hypogene mineralization has been exposed while mining the supergene ore from the current operation, and has been stockpiled when encountered. Tonnages and copper grades have been tracked and recorded as part of grade control practices. These existing stockpiles are classified and reported as Indicated Mineral Resources and are not scheduled in the life-of-mine (LOM) plan (LOMP) described in the FS2016.

The molybdenum grade of the stockpile is unconfirmed as it was not tested at the time of extraction.

14.14 Mineral Resource Statement

The Mineral Resource estimate is reported exclusive of those Mineral Resources that have been converted to Mineral Reserves, and uses the definitions set out in the 2014 Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (the 2014 CIM Definition Standards). The Qualified Person for the estimate is Mr. Rodrigo Alves Marinho, P.Geo., Technical Director Reserve Evaluation, a Teck employee. Mineral Resources have an effective date of December 31, 2016. Table 14-3 summarizes the Measured, Indicated and Inferred Mineral Resources for the Project.

Table 14-3: Mineral Resource Summary Table

Category	**Tonnes (x 1,000 t)**	**Total Copper (CuT %)**	**Molybdenum (Mo %)**	**Contained Metal**	
				CuT (x 1,000 t)	**Mo (x 1,000 t)**
Measured	15,500	0.41	0.006	64	1
Indicated	1,308,900	0.39	0.015	5,126	191
Total Measured and Indicated	**1,324,400**	***0.38***	***0.016***	***5,190***	***192***
Inferred	2,140,800	0.37	0.018	7,850	376

Notes to Accompany Mineral Resource Tables:

1. Mineral Resources are reported effective 31 December, 2016. The Qualified Person for the estimate is Mr. Rodrigo Alves Marinho, P.Geo, a Teck employee.
2. Mineral Resources are reported exclusive of those Mineral Resources converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
3. Mineral Resources are reported on a 100% basis using a net smelter return cut-off of $10.36/t, which assumes metal prices of $3.00/lb Cu and $10.00/lb Mo.
4. Mineral Resources are contained within a conceptual pit shell that is generated using the same economic and technical parameters as used for Mineral Reserves but at a selected revenue factor of 1. Direct mining costs are estimated at $1.46/t of material moved. Processing costs are $10.36/t of material milled and include mine general and administrative, port, and desalination costs. Payable metal is assumed to be 96.5% for Cu, and 99% for Mo. Metallurgical recoveries average around 91% for Cu and 76% for Mo, but are variable by block. Pit slope inter-ramp angles vary from 30–44º. Mineral Resources also include mineralization that is within the Mineral Reserves pit between NSR values of US$10.36/t and US$15.07/t which has been classified as Measured and Indicated, as well as all material classified as Inferred that is within the Mineral Reserves pit. In addition, Mineral Resources include 23.8 million tonnes of hypogene material grading 0.54% copper that has been mined and stockpiled during our existing supergene operations.
5. Tonnage and contained copper and molybdenum tonnes are reported in metric units and grades are reported as percentages.
6. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content.

14.15 Factors That May Affect the Mineral Resource Estimate

Factors which may affect the Mineral Resource estimates include:

- Metal price and exchange rate assumptions;
- Changes to the assumptions used to generate the NSR cut-off;
- Changes in local interpretations of mineralization geometry and continuity of mineralized zones;
- Density and domain assignments;

- Geometallurgical and oxidation assumptions;
- Changes to geotechnical, mining and metallurgical recovery assumptions;
- Changes to input and design parameter assumptions that pertain to the conceptual Whittle pit design constraining the estimate;
- Assumptions as to the continued ability to access the site, retain mineral and surface rights titles, maintain environmental and other regulatory permits, and maintain the social licence to operate.

There are no other known environmental, legal, title, taxation, socioeconomic, marketing, political or other relevant factors that would materially affect the estimation of Mineral Resources that are not discussed in this Report.

15.0 Mineral Reserve Estimates

15.1 Introduction

The mine plan was developed using Measured and Indicated Mineral Resources. Inferred resources were set to waste. Mining assumes conventional open pit operations using truck-and-shovel technology.

The design reserve pit was based on a Lerchs–Grossmann optimization process using the Whittle software and a detailed phased pit design. Five mine phases were designed to prioritize the higher-grade zones within the mineral extraction plan, while maintaining suitable working widths that would enable high-productivity mining sequences using large-scale mining equipment. The mine plan was optimized by analyzing numerous scenarios that employed high- and low-grade stockpiling strategies, as well as a variable cut-off grade profile. The size of the open pit and the production rate are controlled by the storage capacity of the tailings management facility (TMF), which is in turn affected by site-specific constraints.

15.2 Mineral Reserve Statement

The estimated Mineral Reserves are reported using metal prices of $3.00/lb Cu and $10.00/lb Mo, and a variable grade cut-off approach based on NSR values that average $15.07/t over the planned LOM.

Mineral Reserves are reported effective 31 December, 2016 using the 2014 CIM Definition Standards. The Qualified Person for the estimate is Mr. Rodrigo Alves Marinho, P.Geo., a Teck employee. Mineral Reserves are summarized in Table 15-1.

Table 15-1: Mineral Reserve Statement

Category	Tonnes (1,000 t)	Total Copper (CuT %)	Molybdenum (Mo %)	Contained Metal	
				CuT (x 1,000 t)	Mo (x 1,000 t)
Proven	40,800	0.62	0.010	250	4
Probable	1,218,000	0.51	0.019	6,170	233
Total Proven and Probable	***1,258,800***	***0.51***	***0.019***	***6,420***	***237***

Notes to Accompany Mineral Reserves Table:

1. Mineral Reserves are reported effective 31 December, 2016. The Qualified Person for the estimate is Mr. Rodrigo Alves Marinho, P.Geo, a Teck employee.
2. Mineral Reserves are reported on a 100% basis using an average net smelter return cut-off of $15.07/t, which assumes metal prices of $3.00/lb Cu and $10.00/lb Mo.
3. Mineral Reserves are contained within an optimized pit shell. Mining will use conventional open pit methods and equipment, and use a stockpiling strategy. Direct mining costs are estimated at $3.37/t of material milled. Processing costs are $6.91/t of material milled and include concentrator, tailings management facility, port, and desalination costs. Infrastructure costs of $1.31/t include pipeline and general infrastructure operating costs. G&A costs are $1.16/t. Metallurgical recoveries average around 91% for Cu and 76% for Mo, but are variable by block. Pit slope inter-ramp angles vary from 30–44°. The life-of-mine strip ratio is 0.52.
4. Tonnage and contained copper and molybdenum tonnes are reported in metric units and grades are reported as percentages.
5. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content.

15.3 Factors that May Affect the Mineral Reserves

Factors that may affect the Mineral Reserve estimates include:

- Changes to the metal price assumptions;
- Changes to the estimated Mineral Resources used to generate the mine plan;
- Changes in the metallurgical recovery factors;
- Changes in the geotechnical assumptions used to determine the overall wall angles;
- Changes to the operating cut-off assumptions for mill feed or stockpile feed;
- Changes to the input assumptions used to derive the open pit outline and the mine plan that is based on that open pit design;
- Ability to maintain social and environmental licence to operate;
- Changes to the assumed permitting and regulatory environment under which the mine plan was developed.

There are no other known environmental, legal, title, taxation, socioeconomic, marketing, political or other relevant factors that would materially affect the estimation of Mineral Reserves that are not discussed in this Report.

15.4 Open Pit Assumptions and Considerations

Additional information on the pit design is provided in Section 16.

15.4.1 Key Assumption

The QB2 pit design is based on the final pit design surface of the existing Quebrada Blanca supergene pit (QB1) as projected in the 2017 LOMP. Much of the overlying material either has been, or will be, excavated prior to commissioning QB2.

15.4.2 Ore Loss and Dilution

An analysis was carried out to review the resource model for individual blocks that were surrounded by waste (potential loss) and waste blocks that were surrounded by ore (potential dilution). The potential for losses and dilution are minimal, based on the homogeneity of the deposit, elevated cut-off grades, typically gradual transitions between ore and waste contacts, and the planned use of large rope shovels equipped with high-precision GPS instruments. Any potential impacts to ore feed that might arise due to ore loss or dilution were not considered material, and no provisions for ore loss or dilution were included in the mine plan.

15.4.3 Topography

Variables that were used for the mine optimization and planning were cut by the projected supergene final pit surface as projected in the supergene operation’s Base Case 2017 LOMP.

Blocks above the projected supergene topography were set to “air.” The projected waste and dump pads placed by the supergene operation were added as fill material with no economic value.

15.4.4 Optimization Considerations

Phase designs were developed using Lerchs–Grossmann economic pit shell envelopes that were produced with Geovia’s commercially-available Whittle software. Blocks classified as Measured or Indicated were considered during the optimization step, while the blocks classified as Inferred were treated as waste. Additional variables required for the mine scheduling process were added to the block model and were updated as required. A set of 87 pit shells was generated in Whittle that corresponded to break-even shell geometries based on incremental copper prices ranging from $0.42/lb to $3.00/lb Cu.

The mine plan was optimized to obtain the highest net present value (NPV) utilizing COMET, a commercially-available mine schedule optimization software program. The plans generated were based on ore availability, material types, cut-off grades, and phase sequencing restrictions. Some of the metrics analyzed during the optimization process included: high/low-grade stockpile cut-off grades and stockpile capacities; mine production capacities; phase production capacities; mill throughput rates, and NSR cut-off values. Pit shell 36 was found to be the appropriate shell that provided Mineral Resources that most closely matched the available TMF capacity.

The QB2 pit phase progression is as detailed in Section 16. This strategy produced initial mine phases with low strip ratios that are amenable to rapid access of higher-value ore material. The subsequent mine pit expansions successively occupy new areas, and the corresponding strip ratios gradually increase, allowing for sufficient time to increase the mining fleet to meet increasing production demands while keeping the head grade of the mill feed as constant as practicable.

The TMF has a finite tailings capacity due to site constraints (about 1.25 Bt). This capacity dictated the low-grade stockpile cut-off because the direct feed mineral rock plus the low-grade and high-grade stockpile material had to align with the constrained LOM concentrator production. By a trial and error process, the low-grade stockpile NSR cut-off value was established at $16.80/t. Any remaining mineralized rock above the $10.00/t marginal NSR cut-off that is not required to meet mill capacity is sent to a marginal stockpile. The QB2 mine plan will treat the high- and low-grade stockpiles, but not the marginal-grade stockpile; however, the marginal-grade stockpile may be considered in potential future expansions or mine life extensions.

The selected production profile peaks at close to the loading capacity of the projected loading fleet in the early production years and progressively declines throughout the operational life.

15.4.5 Infrastructure Considerations

The final mine plan assumes that during early mining activities, some of the existing supergene operational infrastructure would be used; however, as the mine continues to grow and active mining areas expand, decommissioning and removal of existing infrastructure and construction of new infrastructure would be carried out as necessary.

16.0 Mining Methods

16.1 Overview

Mining operations will continue to use open pit methods, and conventional truck-and-shovel operations. From an operational standpoint, QB2 represents a continuation of the existing supergene mine activities; however, there are significant differences between the two operations, such as the significant increase in the ultimate pit depth and width, the change in rock type from enriched supergene to hypogene, and increases the mining extraction rate.

Mine design consisted of optimizing the planned pit using Measured and Indicated material only. Two production schedules were developed from the final optimized pit design. The base case mine plan uses Measured and Indicated material with the Inferred set to waste. In support of the 2016 EIA and permitting activities, a separate development case using Measured, Indicated and Inferred materials, which assumes that the Inferred is upgraded during mining activities to higher confidence categories, was also established. This Report discusses the results of the base case only.

16.2 Existing Operation

The conventional open pit supergene mining operation is expected to exhaust the remaining supergene ore in the open pit in late 2017 to early 2018 (leaching operations will continue while economically viable), at which time active mining operations in the area of the open pit will cease until the hypogene mining commences in 2021. The existing QB1 mining fleet will be used in pre-production and early works activities related to QB2, including the mass excavation required for the concentrator site, and mass earthworks associated with construction of the starter dam for the TMF.

16.3 Geotechnical Considerations

The geotechnical domain model for the feasibility study was based on work by E-Mining Technology S.A. in 2011 and updates by Piteau Associates (Piteau) from studies completed in 2015 and 2016.

To generate the required slope designs, the pit was subdivided into five geotechnical zones, each with different design inter-ramp slope angles (Figure 16-1).

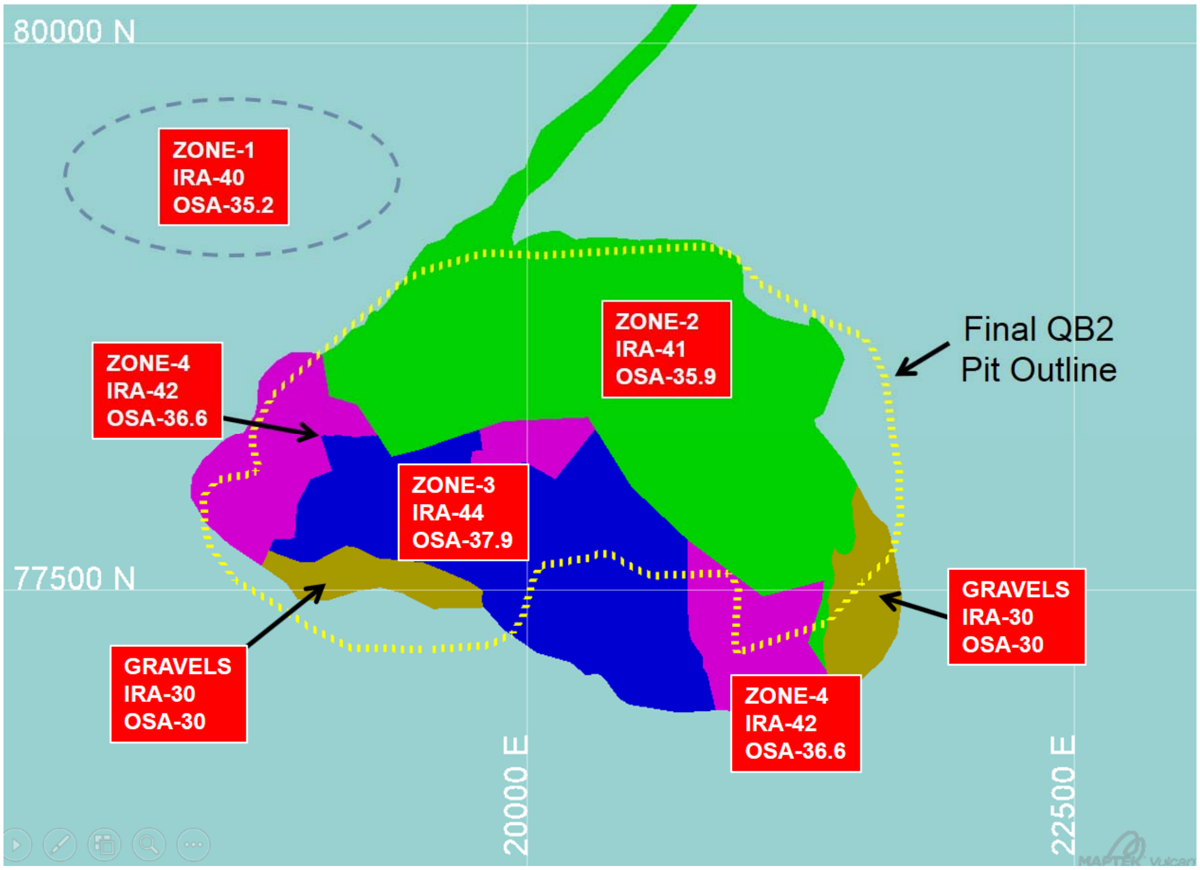

Figure 16-1: Geotechnical Zones for Pit Design

Note: Figure prepared by Teck, 2016. North is to top of figure. IRA = inter-ramp angle, OSA = overall slope angle.

The inter-ramp angle values were input into a custom calculator that estimated the overall slope angles considering the inter-ramp angles, forecast the quantity of ramps embedded in the phase designs, and estimated the required geotechnical decoupling berms required. The shallower global wall angles were input into Whittle in order to more closely approximate the pit geometries that would result with the incorporation of items such as haul roads and geotechnical berms into the detailed phase designs.

The 2016 final design pit was then evaluated by Piteau using all available geotechnical data into the kinematic and overall global stability analyses. The majority of issues identified were considered operationally manageable. Additional review was recommended of the fourth pit phase, due to lower than expected safety factors for one of the evaluated sections in the phase; however the recommendation was not considered to be design limiting.

16.4 Hydrogeological Considerations

A total of 20 pumping wells, each extracting 2 L/s, would need to be implemented over the course of seven years to manage pit dewatering. After this period, wells would be replaced on an as-necessary basis to ensure suitable dewatering capacity meets the requirements of the dynamic pit development. In total, 37 deep wells would be drilled, which would require installed pumps and discharge piping.

A horizontal drill hole (HDH) campaign would be required each year for specific pit wall pore depressurization.

A piezometer installation and monitoring program would be developed to support pit dewatering and would target new areas to be depressurized.

A requirement of eight sumps has been estimated to provide temporary storage for different water sources (e.g., deep wells, HDH, and seepages). The water would subsequently be pumped to larger facilities.

The pump design requires a pumping power load of 308 kW.

16.5 Open Pit Designs

A summary of the pit optimization considerations was presented in Section 15.4.

16.5.1 Design Criteria

The pit design criteria are summarized in Table 16-1.

Table 16-1: Pit Design Parameters

Area	Assumption/Comment
Ramp width	40 m, with a design grade of 10%
Minimum bench operational width	70 m
Bench face angle	65°
Inter-ramp angle	Varies from 30° to 44° depending on geotechnical zone
Bench height	15 m
Berm width	Typically 8 m, but adjusted for inter-ramp angle where necessary
Inter-ramp slope height	150 m
Geotechnical berm width	30 m (haulage ramps can replace geotechnical berms)

The detailed phased mine designs used the same geological, geotechnical, and metallurgical models as used in the pit shell development process. The pit shells were used to identify the logical pushback sequences for the detailed design, initiating in the center-west zone of the supergene pit and subsequently extending east and expanding outwardly. The location of the primary crusher at the western edge of the pit will generally allow for dual access on both the northern and southern pit walls. The inclusion of dual access will enable greater operational flexibility and reduce the risk of any operational disruption that could arise in the unlikely event of an access point becoming inaccessible.

The stockpiles and WRSF for QB2 are planned to be located to the north and south of the pit. Care was taken to ensure a suitable offset was maintained such that a potential pit pushback could be implemented with minimal interaction from WRSFs or stockpiles in close proximity to the pit crest. Additionally, the area to the east of the pit was excluded as the mineralization is currently still open in this direction.

16.5.2 Phases

The ultimate pit was designed to follow the pit shell that hosted a sufficient quantity of Measured and Indicated Mineral Resources that could meet plant feed requirements for a mine life of 25 years, and that aligned with the capacity of the TMF. Five phases were designed and used in the mine plan (Figure 16-2, Figure 16-3 and Table 16-2 describe the phases).

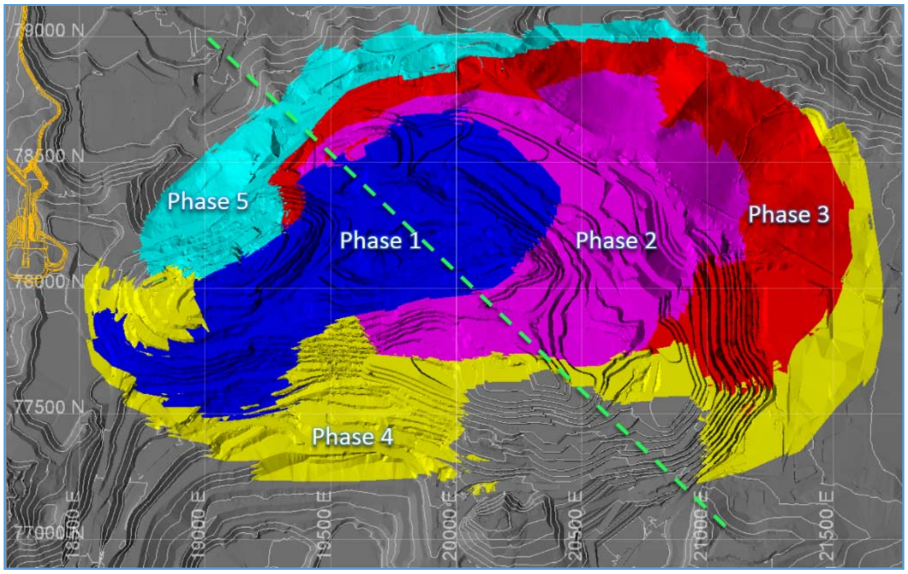

Figure 16-2: Plan View Phased Mine Designs

Note: Figure prepared by Teck, 2016. Dashed green line is the location of the section presented in Figure 16-3. Map north is to the top of the figure. Grid squares indicate scale, and are 500 x 500 m.

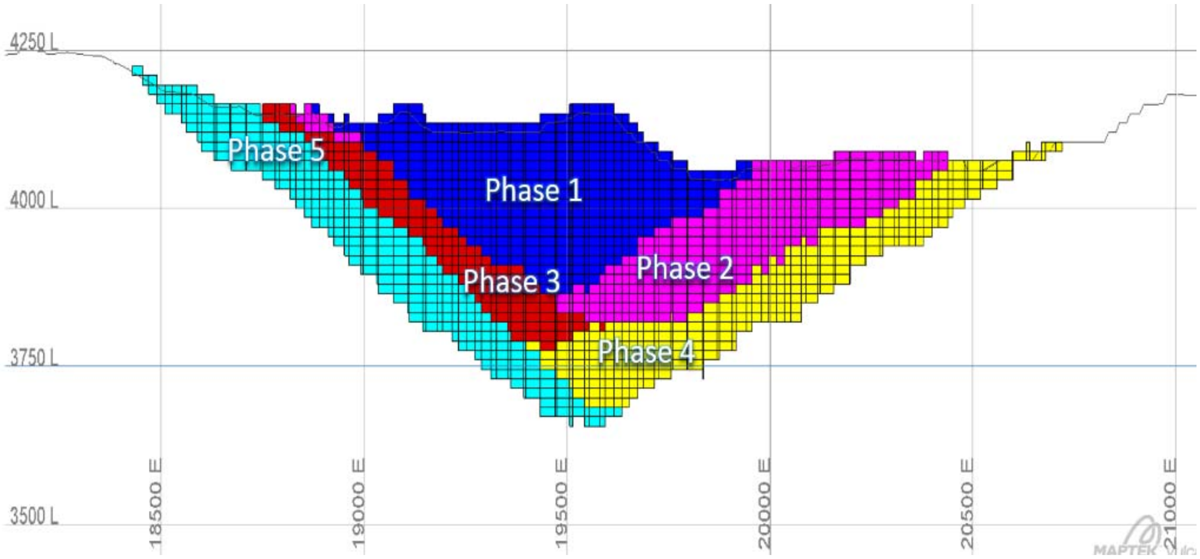

Figure 16-3: Section View Phased Mine Designs (looking northeast)

Note: Figure prepared by Teck, 2016.

Table 16-2: Pit Phases

Pit Phase	Description
1	Designed to take advantage of the readily accessible high-grade ore material exposed by the supergene operation. Approximate strip ratio of 0.12:1 (waste to ore). Has a dual ramp system, with the southern ramp being the most direct route to the primary crusher, and the northern ramp providing secondary access to the pit, a more direct route to the northern stockpiles and WRSFs. The northern ramp also serves a dual purpose as a geotechnical step-out. Phase will be completed at the 3,865 masl elevation.
2	Advances in an easterly direction from phase 1, and also deepens the pit. Maintains dual access to the north and south. Initial benches require pioneering work and pre-production work to establish roads and a suitable work front. Strip ratio will be 0.31:1. Phase will be completed at the 3,745 masl elevation.
3	Expands the pit to the north and east. Will require removal of some of the supergene infrastructure including the SX/EW plant, the power house and several other ancillary facilities. Has a strip ratio of 0.62:1. Phase will be completed at the 3,730 masl elevation.
4	Consists of a south wall pushback sequence and attains the final wall configuration in this sector. Requires the excavation of previously-placed waste rock material from the supergene operations Waste Dump 6. Has shallower inter-ramp angle in the south wall to account for a gravel layer. Requires the establishment of a new primary crusher access ramp. Will have some high walls >670 m in height. A number of geotechnical step-outs are necessary to conform to the design criteria; where logical, step-outs have been replaced by strategically

Pit Phase	Description
	incorporating required haul roads. Strip ratio of 0.67:1. Phase will be completed at the 3,685 masl elevation.
5	Final phase. Consists of a north wall pushback. Strip ratio of 0.95:1. Phase will be completed at the 3,640 masl elevation.

The mine plan uses a variable cut-off grade strategy to maximize the value of the ore delivered to the concentrator. The actual NSR cut-off value ranges between $9.00/t and $29.22/t NSR (mineral value minus realization costs). The NSR value considers the copper and molybdenum revenues, projected metal recoveries, as well as transportation, refining, and other logistical costs.

16.6 Stockpiles

The feasibility study design uses similar design concepts for the WRSF and the ore stockpiles (Table 16-3). Figure 16-4 shows the planned facility layout.

Table 16-3: Typical Design Criteria for Stockpile and WRSF

Criterion	Unit	Value
Lift height	m	45
Berm width	m	46
Angle of repose	°	37
Global angle	°	23
Ramp width	m	40
Dry density	t/m³	1.9
Toe distance from watershed limit	m	30

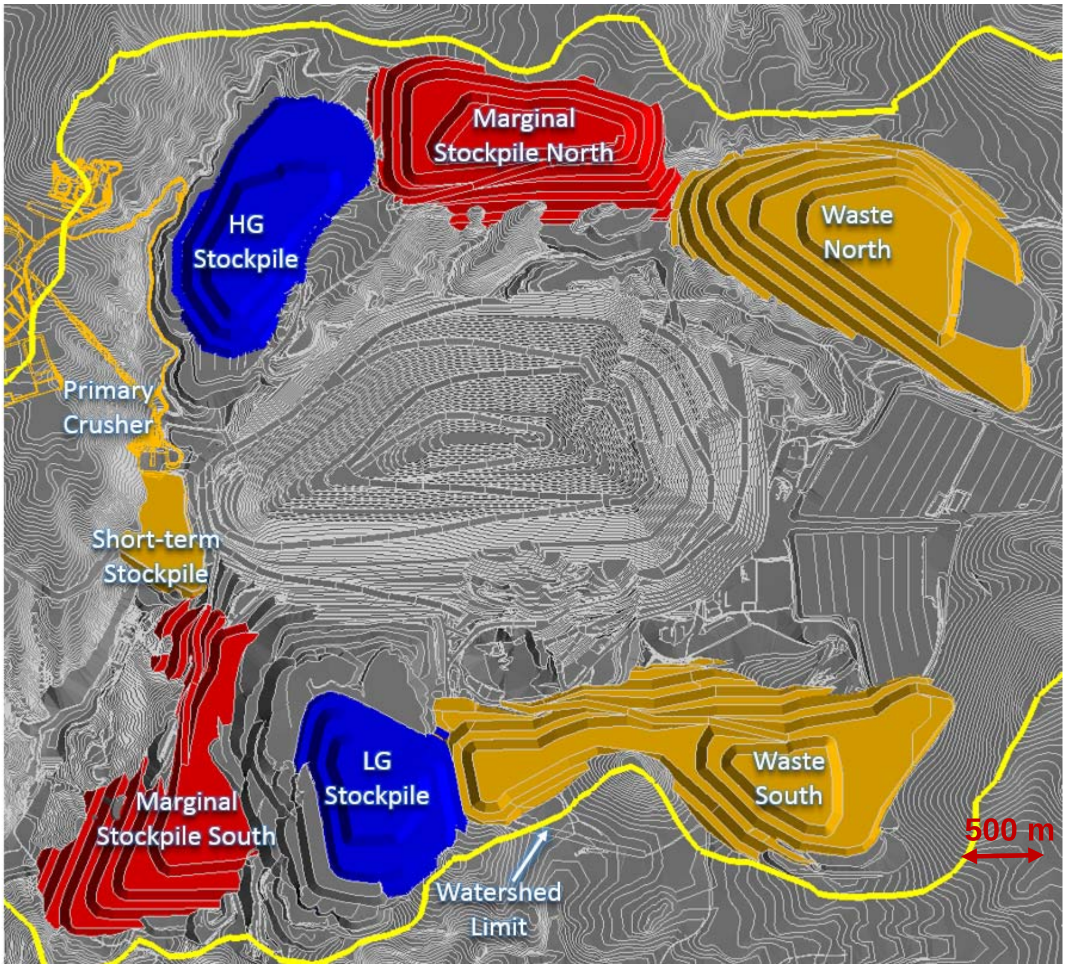

Figure 16-4: Stockpile and WRSF Layout Plan

Note: Figure prepared by Teck, 2016. Map north is to top of figure.

The high-grade stockpile (approximately 77 Mt capacity) is planned be located in the area located northwest of the pit because of the close proximity to the primary crusher. Any material that had an NSR value above $19.60/t that was not required to fill the mill capacity at the time of mining was assigned to this stockpile.

The low-grade stockpile (about 61 Mt capacity) will be located south of the pit which is also relatively close to the primary crusher. Material with an NSR value between $16.80/t and $19.60/t, and that was not required to fill the mill capacity at the time of mining was assigned to this stockpile. The lower bounding range was set at $16.80/t because this stockpile is to be the last material processed in the current mine plan. If a lower NSR value was used, it would result in excess material over and above the capacity of the TMF being treated.

Two marginal material stockpiles are planned to store material that has an NSR value of between $10.00/t and $16.80/t. The closer stockpile from a haulage perspective would be located southeast of the pit, and the second would be developed north of the pit. The southeast stockpile would have about 81 Mt of capacity, and approximately 71 Mt could be stored in the northern stockpile.

16.7 Waste Rock Storage Facilities

Two WRSF are planned, one to the northeast of the pit, and the second to the south of the pit (refer to Figure 16-4). The northeastern WRSF is planned to store the planned 278 Mt of waste, and the south WRSF will contain 224 Mt. The WRSF designs are not capacity-limited, and the waste rock storage capacity could be expanded, once applicable permits were received, if required.

16.8 Mine Plan

QB2 has a 25-year mine life, nominally from 2021 to 2046 and minor pre-stripping requirements.

The annual mine production peaks in year 3 and year 4 at 101 Mt/a, and progressively declines over the life of mine. This production profile enables the operation to provide higher-grade ore in the early years of the Project. The gradual decline in production over the life of mine balances additional mine equipment requirements given the deepening pit and growth of the WRSF and stockpiles. The mine plan also supports a smooth copper production profile and minimizes erratic variations in equipment and personnel requirements.

The annual material movements are summarized in Figure 16-5. The highest copper production years occur in the first 10 years of operation due to the higher feed copper grades (Figure 16-6). Metallurgical test work has shown that material designated as transitional has a recovery performance that is similar to that of the hypogene material therefore the same recovery projection formulas have been applied. In the case of enriched material, analysis has shown that reduced recovery performance is expected relative to primary and transitional mineralization zones. Given that a reduced recovery performance is expected, a fixed copper recovery projection of 80% was applied to this domain. A breakdown of the expected material types in the mill feed over the LOM is provided in Figure 16-7.

Table 16-4 summarizes the key mine plan attributes.

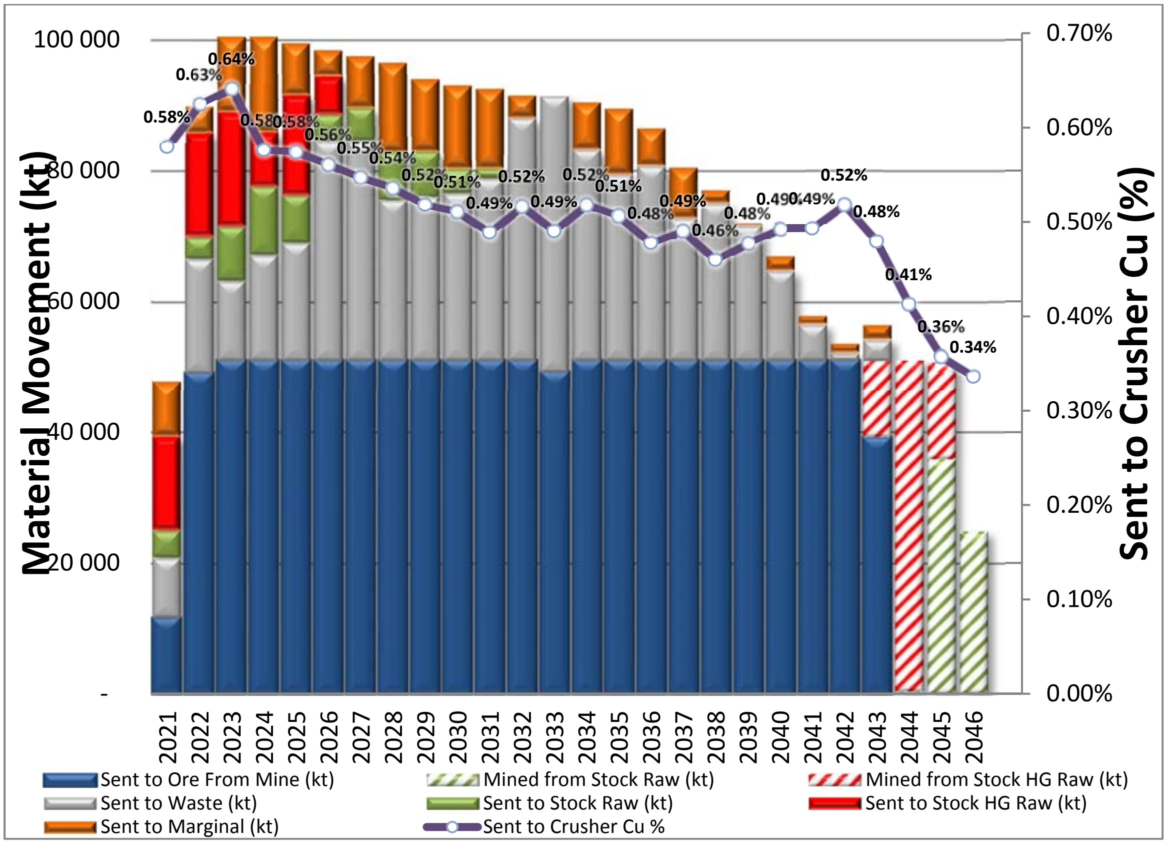

Figure 16-5: Material Movement

Note: Figure prepared by Teck, 2016. Calendar years shown are for illustrative purposes only.

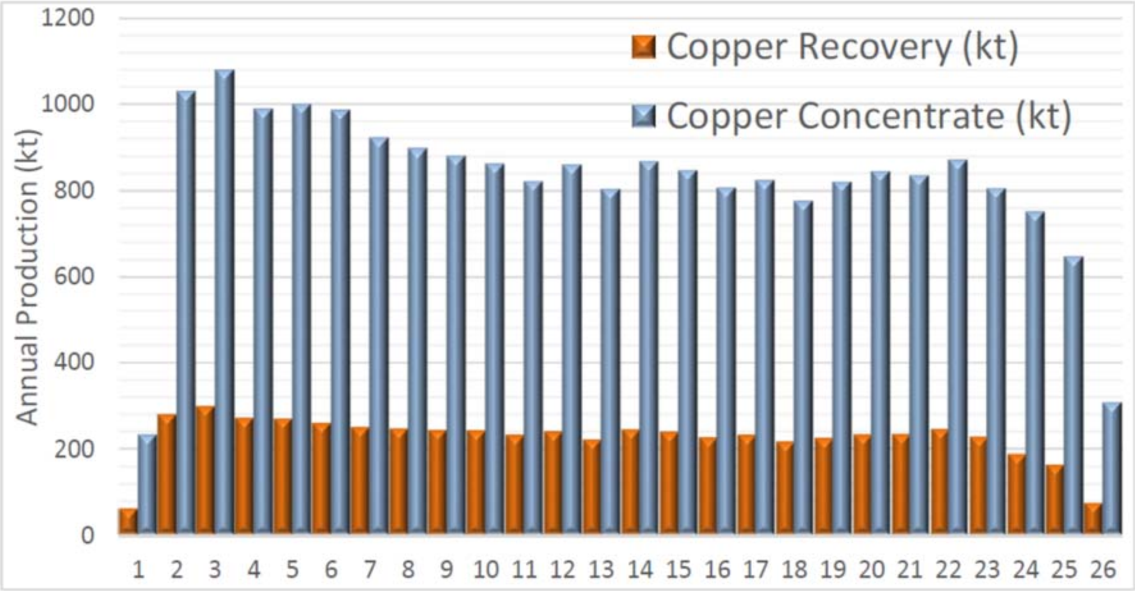

Figure 16-6: Production Profile of Copper Recovery and Copper Concentrate

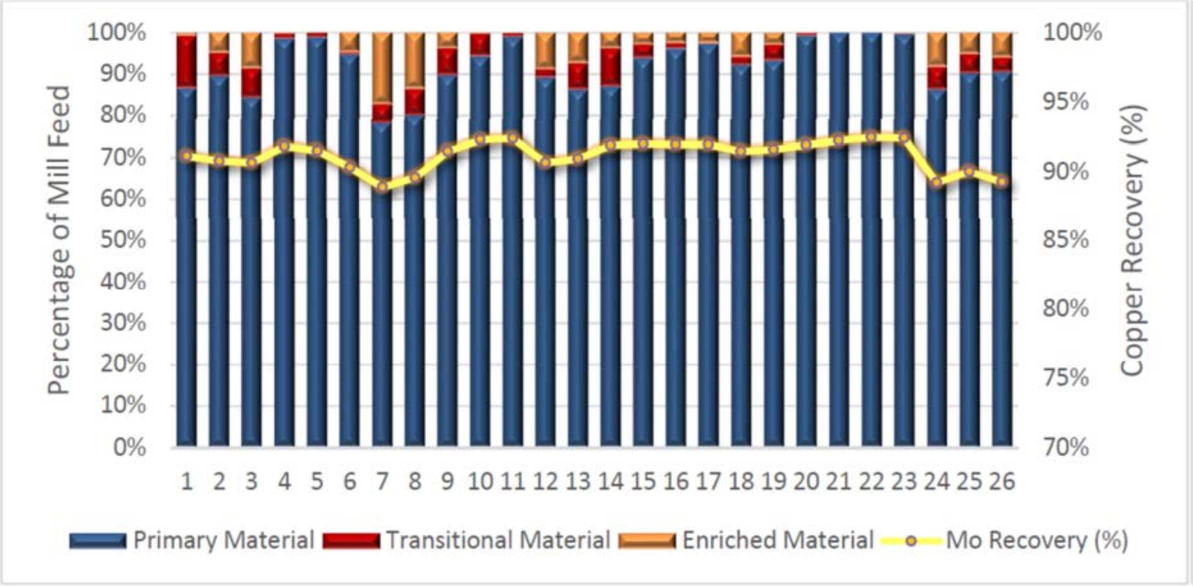

Figure 16-7: Supergene and Hypogene Material to Mill

Note: Figure prepared by Teck, 2016. X-axis shows operating years.

Table 16-4: Mine Plan Summary

Category	Unit	Mine Plan
Mine life	years	25
Average NSR ore value	$/t	28.69
Average copper head grade	% Cu	0.509
Average molybdenum head grade	% Mo	0.019
Total rock moved	Mt	1,912
Sent to marginal stockpile	Mt	151
Sent to waste dump	Mt	502
Total sent to crusher	Mt	1,259
Total sent to high-grade stockpile	Mt	77
Total sent to low-grade stockpile	Mt	61
Stripping ratio ([waste + marginal]:ore)	ratio	0.52
Measured Mineral Resources included in ore feed	Mt / (LOM %)	41 (3%)
Indicated Mineral Resources included in ore feed	Mt / (LOM %)	1,218 (97%)
Inferred Mineral Resources	Mt / (LOM %)	0 (0%)
Mine production capacity	Mt/a	101
Mill capacity	Mt/a	51.1
Average LOM copper recovery	%	91.22
Total copper recovered	kt	5,842
Average molybdenum recovery	%	76.21
Total molybdenum recovered	kt	179
Average copper concentrate grade	%	27.36
Total copper concentrate	kt	21,355
Average copper concentrate	kt/a	854
Average molybdenum concentrate	kt/a	15

Note: figures may be rounded.

16.9 Blasting and Explosives

Blasting services would be contracted to a third party. The mine plan assumes blast hole diameters of 270 mm in ore, and 311 mm in waste. Mine pattern spacing varies for ore and waste material and depending on rock type with typical burdens ranging between 5.6-6.0 m and spacing ranging between 6.5-7.0 m for ore and burdens between 8.0-9.0 m and spacing between 9.0-12.0 m for waste.

For wet holes, Fortis Extra 65 (or similar), a traditional ammonium nitrate and emulsion mix, would be used while dry holes would use Fortan Advantage 50. Wet blasting conditions are expected to be encountered at times during mining operations.

16.10 Mining Equipment

16.10.1 Loading

The primary loading units would be 58.1 m^3 (P&H 4100XPC AC) ultra-class electric rope shovels, which are well-matched (three-pass loading) to the 291 t haulage trucks (Komatsu 930E-4SE). The existing 27 m^3 hydraulic shovel fleet (Komatsu PC5500) would continue to remain in service, given the units' availability and remaining available service lives. The existing 18 m^3 front-end loader fleet (Komatsu WA1200-6) would continue to serve the mine and would be replaced as necessary to ensure two units are available at all times to serve the mine.

At its peak, the loading fleet would be three electric rope shovels, one hydraulic shovel, and two front-end loaders. All phases have been designed to achieve high productivity, taking advantage of double-side loading and working fronts in excess of 90 m in width.

16.10.2 Haulage

Eleven Komatsu 730E haul trucks and six Komatsu 830E haul trucks would remain from the supergene operations and would be utilized by the QB2 operations until reaching their expected service lifespan. As mine production rates will surpass the existing fleet capacity, 291 t capacity haul trucks (Komatsu 930E-4SE) will be purchased as necessary.

At the peak, the haulage fleet would require 30 Komatsu 930E-4SE haul trucks.

16.10.3 Support Equipment

At peak of operations, this will see equipment requirements will be four tracked dozers, four wheel dozers, seven graders, five water trucks, one tracked excavator, three cable reelers and two mobile generators.

16.11 Dispatch

A mine dispatch system would be implemented to ensure the safe and efficient operation of the mine. The technological support of the system would include communications, GPS applications, and real-time monitoring of equipment components.

16.12 Maintenance

Mine equipment maintenance will be carried out under a maintenance and repair contract (MARC) which will be serviced by a third party.

16.13 Comments on Mining Methods

There is significant upside potential for the Project if the design limitations imposed by the TMF can be addressed.

The current mine plan uses only a portion of the estimated Measured and Indicated Mineral Resources.

Project opportunities identified:

- Mineral Resources have been estimated for the existing hypogene stockpiles, (see Section 14.13), this material is not currently considered in the mine plan. Future test work is planned to determine the molybdenum grades of the material and also to evaluate the level of oxidation that may be present and any effects that oxidation may have on metal recovery. If the material can be demonstrated to be economically treatable, the stockpiles represent a future opportunity for potential incorporation in the mine plan;
- The mine schedule forecasts that, at the end of the 25-year base case LOM plan, about 151 Mt of mineralized rock with grades over the break-even cut-off grade would be accumulated in the marginal ore stockpiles. This material also represents Project upside;
- The pit shell analysis demonstrated that there are Mineral Resources available outside the final pit configuration that could be incorporated in a future mine plan;
- Mineralization within the pit shell that is currently classified as Inferred, and therefore set to waste for this study, may, with infill and blast hole drilling during the mining process, be upgraded to higher confidence categories. These resource blocks represent a future opportunity for potential incorporation into the mine plan.

17.0 Recovery Methods

17.1 Existing Operation

Active mining will temporarily cease in 2017–2018, and recommence in 2021. The heap leach piles will continue to be irrigated and leached, and the SX/EW plant will continue to operate, producing copper cathode, until uneconomical. The leaching facilities must be dismantled in the early years of the mine life in time to allow development of phase 3 of the QB2 open pit.

Ore is delivered from the pit to a primary crusher, crushed and then discharged by conveyor belt to a coarse ore stockpile. Ore is drawn from the coarse ore stockpile by conveyor belts feeding a vibrating screen with oversize in turn passing through a secondary standard cone crusher. The product is then conveyed to five surge bins, which feed five tertiary screens. The oversize product is passed through five tertiary crushers. Ore is received at the agglomeration drum from a conveyor belt discharging into a fine ore bin. Ore passes through one of two agglomeration drums. Agglomerated ore is transported by a system of overland conveyors, tripper, and grasshopper conveyors to a stacker in which ore is placed on the dynamic leach pads in 8 m high layers.

The heap leach is augmented by a run-of-mine dump leach.

Sulphuric acid leaching of ore is accomplished with a system of drip emitters placed on top of the leach pads. The pregnant leach solution (PLS) exiting the leach pads is stored in a pond prior to being sent to the SX/EW plant.

The PLS is mixed with organic and diluent to capture the copper and increase the concentration. The organic is stripped with spent electrolyte. Raffinate is sent to a raffinate storage pond to be recycled in the heap leaching process together with the dump leach PLS. The tank house consists of 264 cells containing 1 m^2 stainless steel cathodes. Cathodes are harvested 24 hours a day and are 100% LME grade A quality.

A process flowsheet showing the end of mine life operations for the supergene operation is included as Figure 17-1.

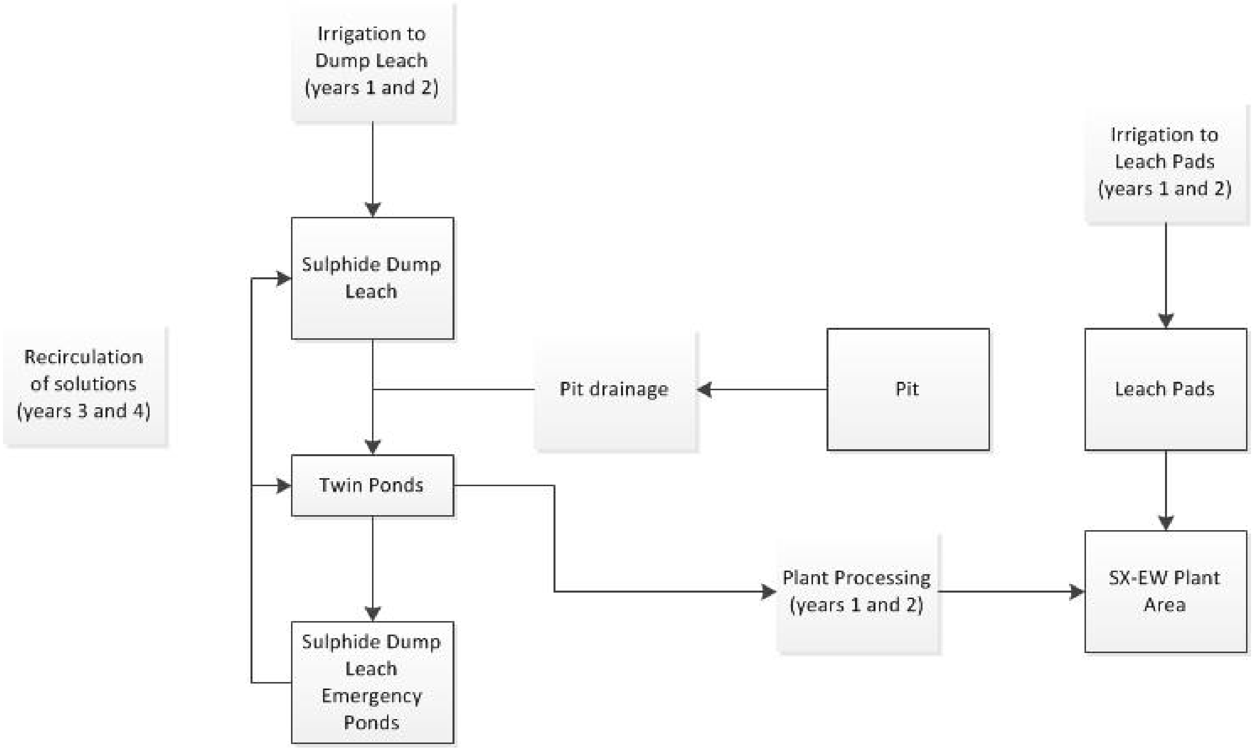

Figure 17-1: Supergene Process Flow Sheet

Note: Figure prepared by Teck, 2016.

17.2 QB2 Process Flow Sheet

A process flowsheet for QB2 is included as Figure 17-2.

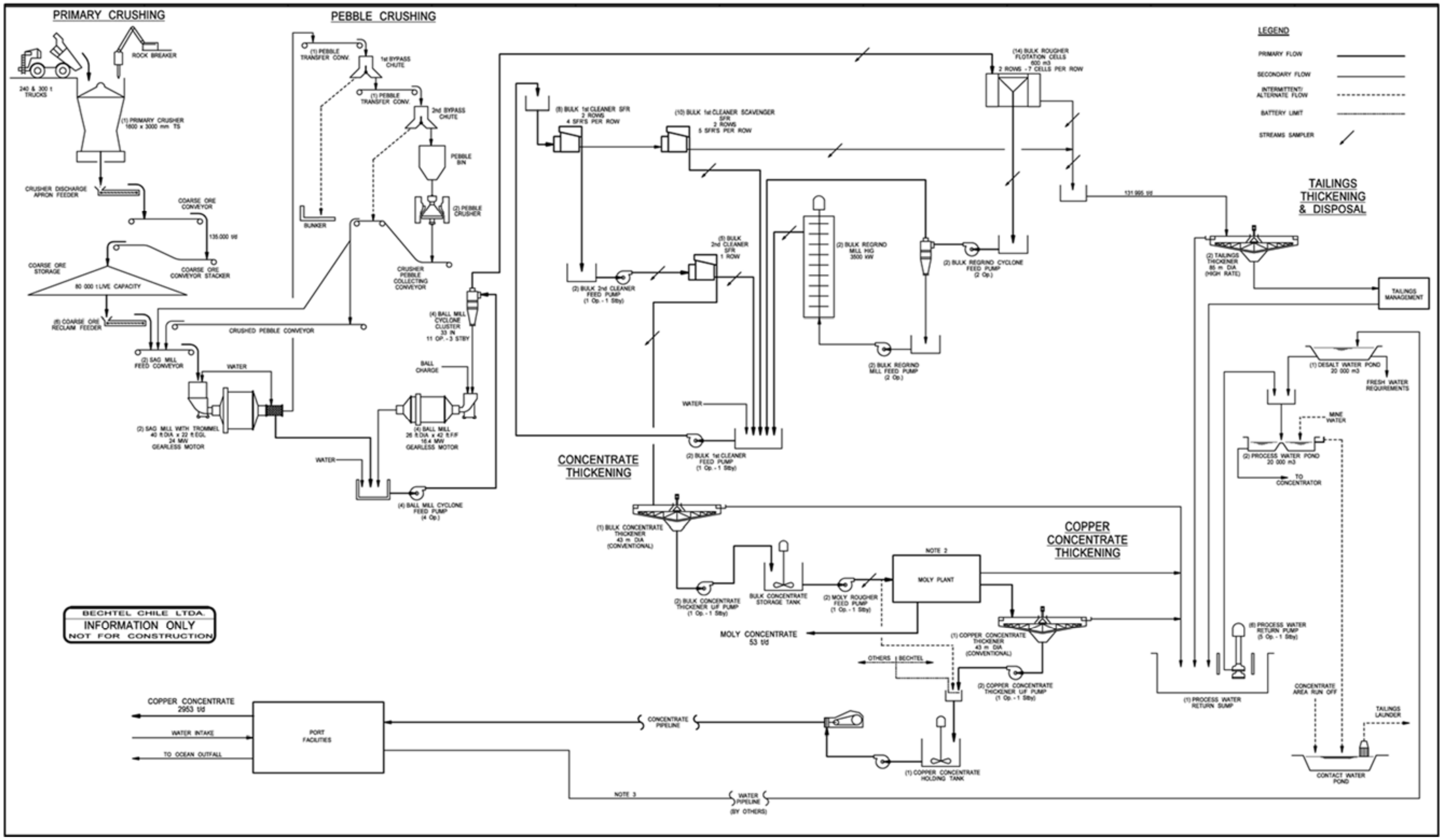

Figure 17-2: Process Flowsheet

Note: Figure prepared by a third-party engineering firm for Teck, 2016.

17.3 QB2 Plant Design

17.3.1 Primary Crusher

The primary crushing facility would contain a single gyratory crusher with a double-sided dump pocket for the mine haulage trucks. The crusher would be serviced by a mobile maintenance crane and the crusher station would be open on the discharge side with a mechanically stabilized earth (MSE) type retaining wall. The area would contain the following major equipment and structures:

- One 1,000 kW, 1,600 by 3,000 mm (63 by 118 inch) gyratory type crusher;
- One 3,150 mm wide by 12 m long variable speed apron feeder with hydraulic drive and two 185 kW motors;
- One hydraulic rock breaker;
- One dust suppression system.

17.3.2 Coarse Ore Conveyor

The coarse ore conveyor system would consist of two overland conveyors to transport the crushed ore from the primary crusher to the coarse ore stockpile. The area would contain the following major equipment and structures:

- One 260 m long by 1,830 mm wide steel cord, 10,000 t/h capacity coarse ore conveyor no. 1;
- One 1,216 m long by 1,830 mm wide steel cord, 10,000 t/h capacity coarse ore conveyor no. 2.

17.3.3 Coarse Ore Stockpile

The coarse ore stockpile is planned to be a conical shape fed by a fixed stacker conveyor fed from coarse ore conveyor no. 2, and will have a live capacity of 80,000 t, and an overall 270,000 t capacity. The coarse ore reclaim system would consist of two concrete coarse ore stockpile reclaim tunnels, reclaim apron feeders, and reclaim conveyors.

17.3.4 Storage Bins

Two 260 t capacity SAG mill ball storage bins with ball feeders and two 260 t capacity ball mill ball storage bins with ball feeders will be located on the south side of the grinding building.

17.3.5 Grinding Circuit

The concentrator facility would contain grinding mills, cyclone feed pumps, and cyclone clusters. The grinding equipment would be housed in a steel building. The area would contain the following major equipment and structures:

- Two 12.2 m diameter by 6.7 m effective grinding length (EGL), 24 MW SAG mills, driven by gearless type drives, each with a discharge trommel screen (6.2 m in diameter by 5.2 m long);
- Four 7.9 m diameter by 12.8 m flange-to-flange length, 16.4 MW ball mills, driven by gearless type drives;
- Four cyclone feed slurry pumps, rated at 8,817 m^3/h and 2,000 kW, with adjustable frequency drives;
- Four cyclone clusters with eleven operating and three standby 838 mm diameter cyclones in each cluster;
- A 102 m wide by 114 m long by 47 m high steel grinding building.

17.3.6 Pebble Crushing

This facility would consist of the pebble transfer conveyors, storage bins, feeders, and crushers. The crushers would be housed in an open steel building. The area would contain the following major equipment and structures:

- One 1,067 mm wide, 169 m long pebble collecting conveyor with 185 kW motor and AFD;
- One 914 mm wide, 87 m long pebble transfer conveyor with 150 kW motor;
- One 914 mm wide, 140 m long crushed pebble collecting conveyor with 100 kW motor;
- One 914 mm wide, 44 m long crushed pebble conveyor with 45 kW motor and AFD;
- Two 750 kW cone crushers.

17.3.7 Flotation and Regrind

This area would contain the following major equipment and structures:

- Fourteen 600 m^3 bulk rougher flotation tank cells (two rows of seven cells);
- Two bulk rougher regrind cyclone clusters;
- Two 3,500 kW high-intensity grinding (HIG) regrind mills;
- Eight bulk first cleaner staged flotation reactor (SFR) “SFR-2200” cells (two rows of four cells);
- Ten bulk cleaner/scavenger SFR “SFR-2200” cells (two rows of five cells);
- Five bulk second cleaner SFR “SFR-1300” cells.

17.3.8 Concentrate Thickening

This facility would consist of the bulk concentrate and copper concentrate thickeners. The area would contain the following major equipment and structures:

- One 43 m diameter bulk conventional concentrate thickener with rakes and underflow pumps;

- One 43 m diameter copper conventional concentrate thickener with rakes and underflow pumps.

17.3.9 Molybdenum Plant

This facility would consist of the molybdenum rougher, first cleaner, second cleaner, and third cleaner flotation and regrind equipment, as well as the molybdenum concentrate thickener, filter, dryer and packaging equipment. The area would contain the following major equipment and structures:

- Seven 42.5 m^3 molybdenum rougher cells (one row of seven);
- One 300 kW vertical molybdenum regrind mill;
- Six 14.2 m^3 molybdenum first cleaners (one row of six cells);
- One 3 m diameter second cleaner column cell;
- Two 1.5 m diameter third cleaner column cells;
- One molybdenum flotation cell exhaust gas scrubber with fan;
- One 15 m diameter molybdenum concentrate thickener with rakes and underflow pumps;
- One automated pressure filter, one heated-oil screw dryer, a 42 t capacity dry molybdenum storage bin, and a bulk bag molybdenum packaging system;
- One molybdenum concentrate dryer exhaust gas scrubber with fan.

17.3.10 Reagent Facilities

This facility would consist of the systems for mixing, storing, and distributing the various reagents to their points of use, including:

- Lime;
- Frother;
- Primary collector;
- Secondary collector;
- Sodium hydrosulphide (NaHS);
- Fuel oil;
- Liquid carbon dioxide;
- Liquid nitrogen;
- Flocculant.

17.3.11 Tailings Thickening

This facility would consist of two tailings thickeners and the associated equipment. The final concentrator tailings (combined bulk rougher plus bulk cleaner/scavenger tailings products), at approximately 28% solids, would flow by gravity from the concentrator flotation area via a lined launder to the tailings thickener distributor box. The tailings thickening area would contain the following major equipment and structures:

- Two 85 m diameter, high-rate tailings thickeners.

17.4 Power and Water

Power for the process plant will be sourced from the Chilean grid (see discussion in Section 18.12). Make up water will be from desalinated water (Section 18.10.3) with reclaim water from the TMF.

18.0 Project Infrastructure

18.1 Current Operations

All required infrastructure to support the current supergene mining operations is in place. This includes the SX/EW plant, maintenance shop, PLS, and raffinate ponds, power plant, heap leach pads, dump leach pads, spent ore dumps, and WRSFs.

18.2 QB2 Overview

The facilities supporting the mine expansion would be located at three principal sites:

- Mine and concentrator at an elevation of approximately 4,300 masl;
- TMF at an elevation of approximately 3,900 masl and located about 7 km south of the concentrator site;
- Port and desalination plant at the coast.

In addition, there would be an overhead high voltage (HV) electric power transmission line, a concentrate pipeline system to the port, a tailings transport system to the TMF, reclaim water pipeline system from the TMF, a desalinated makeup water pipeline system, and access roads.

Figure 18-1, Figure 18-2, Figure 18-3, and Figure 18-4 show the layout of the principal infrastructure components for QB2.

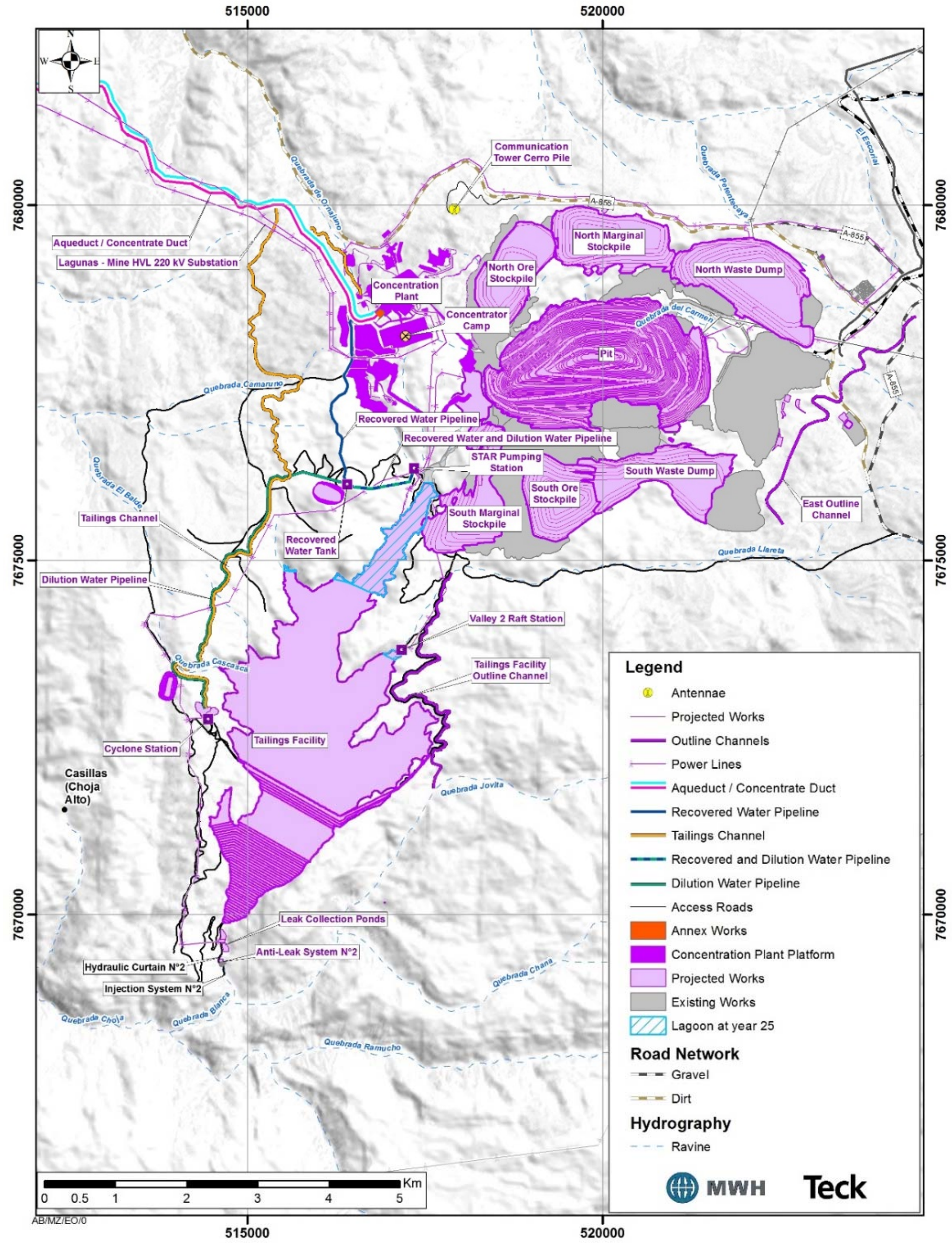

Figure 18-1: Mine Area Infrastructure Layout Plan

Note: Figure prepared by MWH and Teck, 2016.

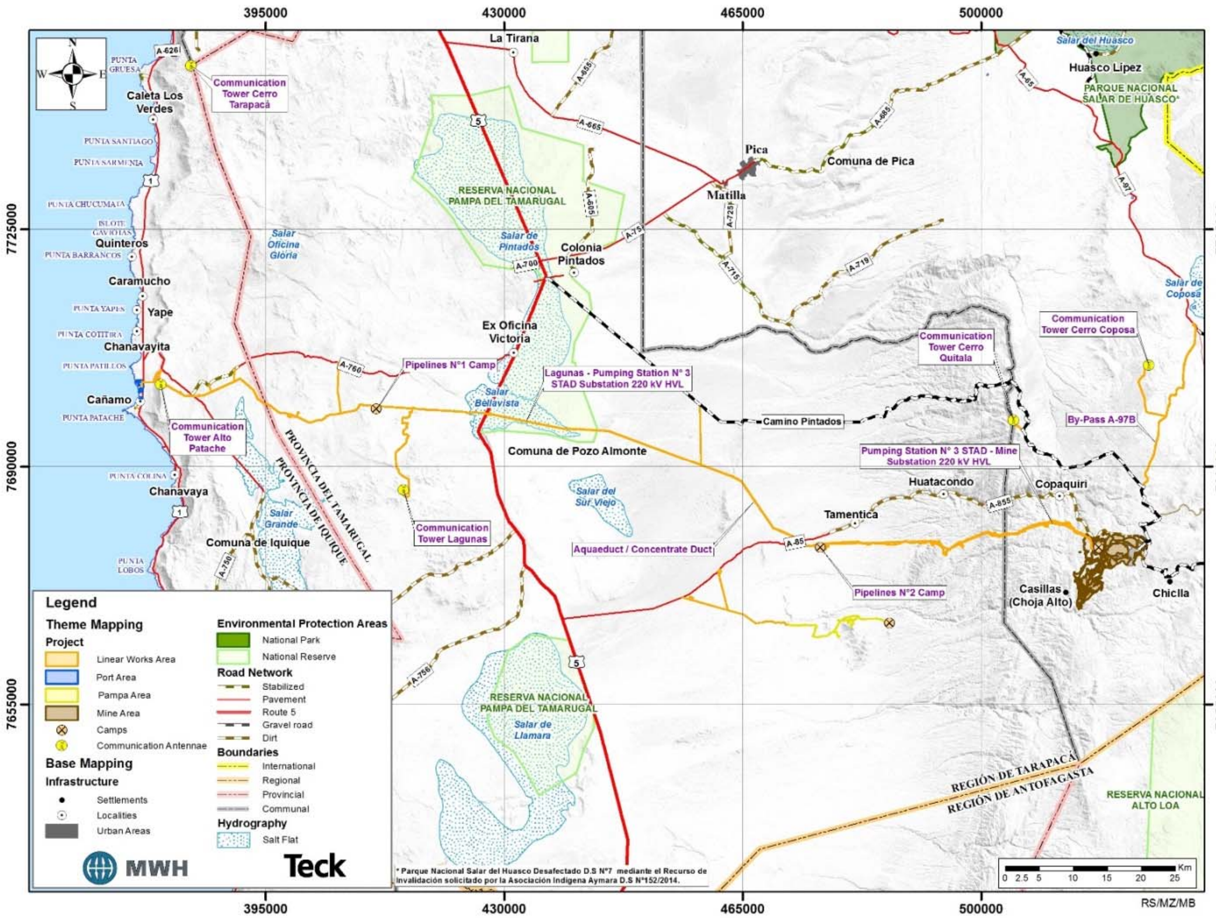

Figure 18-2: Linear Works Infrastructure Plan

Note: Figure prepared by MWH and Teck, 2016.

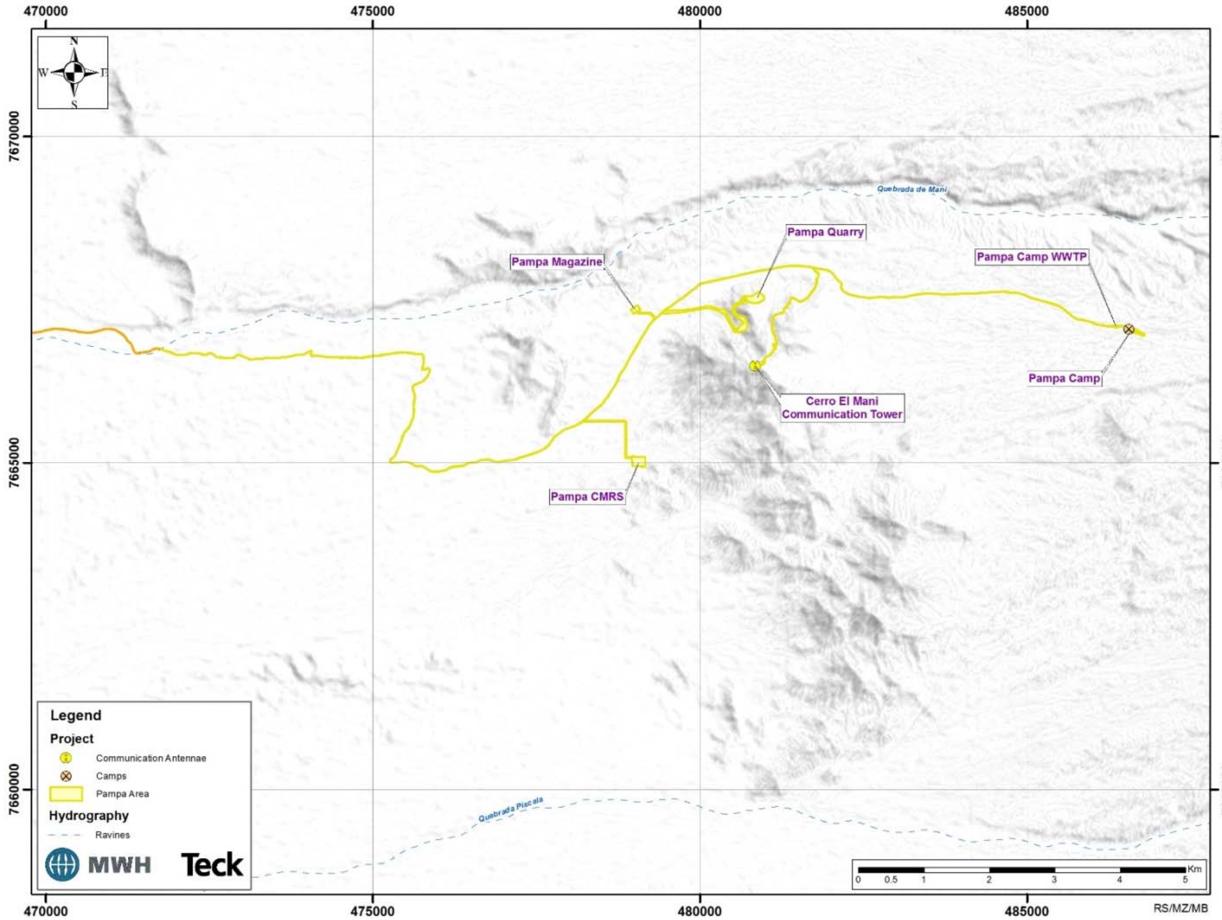

Figure 18-3: **Pampa Area Infrastructure Plan**

Note: Figure prepared by MWH and Teck, 2016.

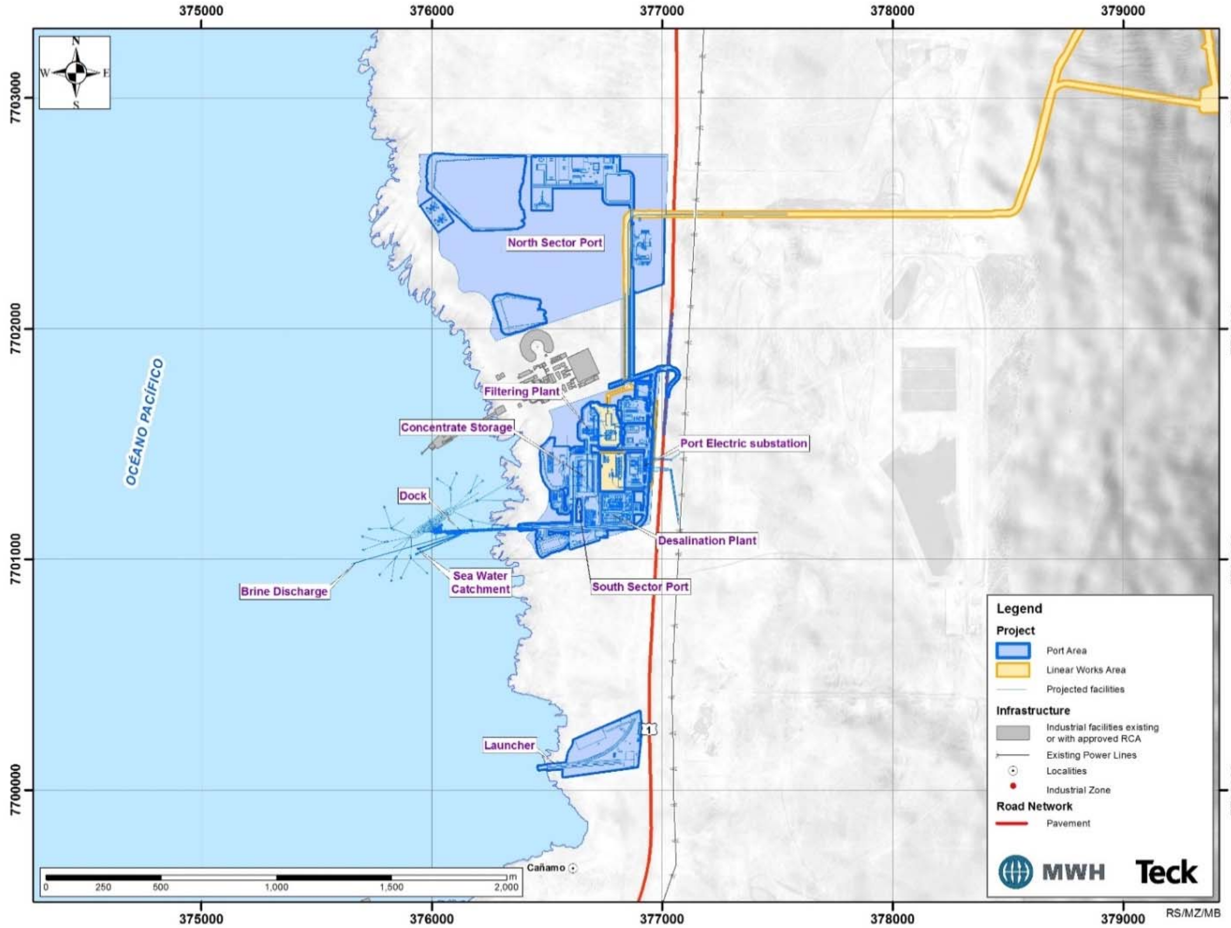

Figure 18-4: Port Area Infrastructure Plan

Note: Figure prepared by MWH and Teck, 2016.

18.3 Road and Logistics

18.3.1 Roads

A new, 28 km long road will be constructed from public road A-97B adjacent to the Salar Coposa police station to kilometre 120 of the Pintados private road. The design, performed by a third-party consultant, is stated to be in accordance with Chilean standards for unpaved roads, including road alignment, subgrade, sealing, drainage and signage. It will be a private, restricted-access road during construction, but following concentrator start-up, will be operated as an unrestricted public road and the construction access control at the junction with public road A-97B will be removed.

In addition, 12 km of the Pintados private road from kilometre 120 (A-97 bypass junction) to kilometre 132 (existing mine main gate) will be improved, including road re-alignment, subgrade improvements, sealing, improved drainage, and signage. A total of 8.7 km of public road A-855 from the main gate point planned for the mine expansion operations to the existing operations' main gate will also be improved.

18.4 Borrow Pits

A number of borrow pits (canteras) are planned to provide graded stone, rock, construction aggregate, riprap, sand, and gravel for construction activities:

- Cantera 5 will be located 2 km south of the concentrator site;
- Cantera 5A will be located adjacent to the TMF tailings dam on the north side;
- Cantera 9 will be located 2 km northwest of the TMF;
- Cantera Norte will be located in the Choja area 30 km southwest of the concentrator site;
- The A-85/Choja Road gravel pits will be located in the Choja area 30 km southwest of the concentrator site.

18.5 Tailings Management Facilities

Tailings from the process plant would be transported by gravity to the TMF, where the tailings would be separated, through a cyclone station, into fine and coarse fractions. The coarse sand fraction would be used for tailings dam construction, while the fines fraction would be deposited in the tailings impoundment.

The TMF site would be located in the Quebrada Blanca valley, approximately 7 km south of the process plant (refer to Figure 18-1). The TMF would have the capacity to store 1.25 Bt of tailings, representing 25 years of production.

The TMF is planned to be developed as a rockfill cofferdam, 120 m high rockfill starter dam, and then at the end of the 25 year mine life, this would have developed into a 310 m high tailings cyclone sand dam, and wing dam. The use of cycloned sand is a common practice in Chile, and has proven to be a safe and economical method of construction for large scale structures such as required for this site. Sand would be transported and placed hydraulically using cell construction. A drainage system at the base of the dam recovers the excess water and ensures a drained and unsaturated structure which eliminates the potential for sand to liquefy during a large earthquake.

In addition, a second pumping system would also be installed in the TMF to recover water from a second, smaller pond that will form during tailings deposition.

Foundation seepage control measures have been incorporated into the design to collect seepage from the under the foundation and impoundment of the facility. These measures include twin seepage collection ponds and a pump back station, as well as a downstream cut-off system.

18.5.1 Access

A haul road would be built between the south WRSF and the starter dam for hauling waste rock for starter dam construction. Internal roads would be constructed to access the dam crest and toe from the cyclone station, to access seepage ponds along the interception channel, for access to pumping and booster stations, and to allow access for construction and service of pipelines in the TMF.

Access roads linking the internal TMF roads to the concentrator and the existing supergene facilities would also be provided.

18.5.2 Cofferdam

The cofferdam would be a 20 m high rock fill structure (dam crest to natural ground on dam centreline) at crest elevation 3,765 masl, with upstream two-zone granular filters and the upstream surface lined with HDPE geomembrane. The crest width would be 30 m and slopes would be 2H:1V upstream and 1.4H:1V downstream. During the construction phase, the cofferdam would function as the upstream toe berm for the TMF starter dam. The HDPE liner would be extended several hundred metres upstream over natural ground to elevation 3,765 masl to provide storage and control gradients through the dam and foundation. Storage capacity would be approximately 300,000 m^3 and would protect excavation works for the starter dam foundation from flood events during construction.

18.5.3 Foundation Excavation

Trench excavations would be completed downstream of the cofferdam in the starter dam foundation for installation of a drainage system. The excavation would be in alluvial deposits and would be graded to drain to the south by gravity. The excavations would be lined with geotextile and filled with selected drain rock and pipes to promote drainage.

18.5.4 Starter Dam

The starter dam would be constructed as a compacted rock fill embankment with upstream two-zone granular filters and low permeability liner. The dam would be constructed using a concrete curb technique to facilitate the placement of filters. The liner would be HDPE and would cover the upstream dam face and would be joined to the liner of the cofferdam, which would include an extension of the liner some several hundred metres upstream of the dam toe on natural ground as a partial upstream blanket to limit seepage. The starter dam design life would be less than one year, after which it would be buried with tailings (upstream) and sand (downstream). The starter dam would have slopes of 1.4H:1V and would include upstream and downstream toe berms. The overall height of the starter dam would be 120 m.

18.5.5 Sand Dam

The sand dam would cross Quebrada Blanca and extend into a valley finger north-east of the starter dam. The sand dam in Quebrada Blanca would be raised above the starter dam over the mine life by the centreline raise method with local raises with upstream slopes of 2H:1V. The northeast portion of the dam would be raised by downstream raise method, with an upstream slope of 2H:1V.

Downstream slopes would be 3.5H:1V. Additional sand would be stacked in the downstream footprint of the sand dam for storage.

The upstream face of the dam would be lined with an HDPE geomembrane as required.

The sand would be placed hydraulically, using the underflow from the cyclones. Placement would follow common practice of a cycle of discharge from a sand header pipeline on the crest of the dam, drainage, then spreading and compaction, as required.

18.5.6 Cyclone Facility

The TMF cyclone facility would be located on the west abutment of the TMF dam and would consist of two fixed cyclone clusters, a dilution water tank, and three distribution boxes labelled the cyclone feed box, cyclone underflow box, and cyclone overflow box. The dilution water tank, cyclone clusters, and distribution boxes would be situated successively downhill to allow for an entirely gravity-operated system.

The cyclone overflow and underflow would be transported by pipelines for sand distribution (cyclone underflow) to the dam and as tailings (cyclone overflow) to the TMF. Overflow produced by the cyclone station would be discharged by gravity in a 1,220 mm diameter by 4.4 km long pipeline into the impoundment in accordance with the TMF deposition plan.

18.5.7 Tailings Distribution Pipelines and Corridors

A 508 mm diameter rubber-lined steel pipeline for sand (underflow) distribution would run from the cyclone station to the dam crest and would split to transport sand to the locations where it would be required. Sand transported to the crest of the dam would be deposited according to the dam construction schedule, and sand transported to the dam downstream areas would be used for dam construction and sand stacking. The same quality of sand would be used for dam construction and sand stacking. The sand transportation system would operate by gravity until approximately Year 20, when pumping would be required to transport sand to the farthest discharge points.

18.5.8 Tailings Transport System

A gravity-flow, open-channel tailings transport system would deliver concentrator tailings from the tailings thickener underflow collection box to the TMF south of the mine site. The total length of the tailings transport system would be 12.4 km.

18.5.9 Drainage System

From the seepage interception trench along the starter dam axis, a valley bottom basal drain trench of 25 m width and 1.5 m height would be constructed in the sand dam footprint.

Drainage from the sand dam would be collected at the seepage pond located to the south of the dam toe. The water would be pumped by vertical turbine pumps from the seepage intake structure to the dilution water tank at the cyclone station.

A downstream seepage cut-off and collection system would consist of a geomembrane-lined excavation through soil tied into a grout curtain installed in bedrock from a concrete plinth on bedrock. Wells would be installed upstream of the cut-off wall and actively pumped to lower the groundwater table. The function of the cut-off would be to impede seepage along the valley. Downstream of the cut-off, a series of wells would be installed that would be used to monitor water quality. The downstream wells would be located and sized so that they can be used as a secondary containment and collection system for groundwater flow.

The excavation would be approximately 15 m deep and 40 m long across the valley. The downstream face of the excavation would be lined with HDPE geomembrane. The excavation would be backfilled with selected rock fill to provide storage for seepage.

A pumping system would be included at the cut-off to actively lower the phreatic surface sufficiently to collect water flowing in the soil and shallow bedrock for pumping back to the seepage collection system, such that flow does not bypass the cut-off system. This system would be a series of pumped wells across the valley.

18.5.10 Seepage Pond

Sand transport water and seepage water would be transported to dual seepage collection ponds. Flow may be directed to either pond. The seepage collection ponds would be excavated in alluvial soils, and include earth-fill berms lined with HDPE geomembrane. Each pond would include a leak detection system and each pond would have 27,000 m^3 or 48 hours of storage to store sand transport water, plus an allowance for seepage and precipitation. Use of the ponds would be alternated such that the non-operational pond could be cleaned and maintained.

A 508 mm diameter pipeline would follow the seepage pond access road back to the cyclone station.

18.5.11 Monitoring

The following instrumentation and methodologies are planned to be used:

- Accelerometers;
- Topographical survey;
- Vibrating wire piezometers;
- Inclinometers (practical limit of 200 m for inclinometer casing);
- Inclinometers in the starter dam continue in the sand dam;
- Monitoring wells.

18.6 Water Management

18.6.1 Mine Diversion Channel

In the mine area it is proposed that a cut-off channel be constructed to manage the non-contact (clean run-off) water that is collected during rainfall events in the surrounding water catchment valleys. The channel would be developed around the eastern sector of the Quebrada Blanca basin and would have a length of 4.8 km. The water would discharge into Llareta Creek.

18.6.2 TMF Diversion Channel

The TMF diversion channel would start in Quebrada Llareta and would have an approximate length of 5 km to its discharge point into Quebrada Jovita. The channel would discharge into the quebrada (ravine) through a discharge chute, designed with a trapezoidal section, rip-rap lining, and side slopes of 1.5H:1V. Erosion control measures would be implemented at the discharge point.

18.6.3 Construction Water Pond

The construction water pond would provide water for construction, compaction and dust control and would be located in Quebrada Blanca approximately 3.5 km upstream of the construction area for the TMF starter dam. The construction pond would be excavated in the natural ground at the bottom of the Quebrada Blanca valley, with a downstream 5 m high earth fill embankment to provide storage capacity of approximately 49,500 m^3 (to the spillway invert elevation). The embankment would have 2H:1V upstream and downstream slopes and a 20 m wide crest. The entire pond would be lined with HDPE geomembrane.

18.6.4 Contact Water Control Pond

A control pond is planned to collect contact water downstream of the sulphide leach WRF emergency pond, and on the upstream side of the leakage pond. It will also capture water leaching from the south WRF. The 25,000 m^3 capacity, high-density polyethylene (HDPE)-lined pond would include a reclaim pumping system to return the water to the process plant.

18.6.5 Pit Dewatering

The existing pit dewatering system would be utilized by the QB2 project, and system additions and replacement would be undertaken on an as-needs basis. The system comprises a water collection and pumping system to send excess water to the tailings pond. Water entering the pit is primarily a combination of direct seasonal rains, run-off, and infiltration water.

The system would include pit dewatering pumps constructed in a series configuration.

Additional discussion is included in Section 16.4.

18.6.6 TMF Water Recovery

The water reclaim system at Quebrada Blanca would consist of two main reclaim water barges, three booster pump stations, and one permanent booster station with a pipeline connecting these stations. Two main reclaim barges would allow for barge movement during the 24-month ramp-up period while maintaining uninterrupted water reclaim.

Between approximately Year 1 and Year 25 of the mine's life, a second smaller pond would form in Quebrada Blanca. Pumping water from this pond would be from a barge to the permanent booster station. The pond barge would consist of one vertical pump mounted on a barge. The pond formed by tailings transport water would be allowed to form against natural topography and its location controlled by the tailings placement as the TMF is raised. The water reclaim barge would be moved periodically with the pond as necessary.

The water reclaim system at Quebrada Blanca would reclaim water from the main TMF operational pond and second smaller pond. Water would be pumped in a closed system to the recovered water distribution tank. From this tank, the water would flow by gravity to the dilution water tank and to the process plant area. The water reclaim barges would be moved periodically with the pond.

The reclaim water barges would initially pump to three successive booster pump stations installed within the TMF footprint to the permanent booster station. As the pond rises and the barges move closer to the permanent booster station, booster stations would be removed.

From the permanent booster station, water would be pumped through a CS pipe to the reclaim water tank located at an elevation that would allow gravity transport of the dilution water to the cyclone station and reclaim water to the process plant.

Pipeline corridors would follow the main TMF haul road along the bottom of Quebrada Blanca.

18.6.7 Concentrator Remediation Water Recharge System

Treated sewage water would be delivered to a point downstream of the tailings dam wall and would meet the environmental criteria established for the expanded operations.

18.7 Accommodation and Support Buildings

The permanent camp is the section of the main construction camp that would remain for operations' use. It would comprise various buildings and installations for the allocation of 1,300 beds. The complex would include a mess, offices, fire station, sleeping quarters, medical clinic, recreation buildings, access gate, bathrooms, gymnasium, luggage store, bus parking areas, vehicle parking areas, mini-football fields, camp administration office, emergency generator, laundry, meeting and training rooms, store, and garbage disposal area.

The mine and process areas will require the following support buildings:

- Administration building: would house the operations offices and the plant control room;

- Workshop and warehouse (two buildings): would initially be used for construction purposes before being handed over to operations once the plant is nearing completion;
- Laboratory: would contain areas for offices, lavatories, sample preparation (e.g., for jaw crusher, screens, or pulverizer), chemical and sample storage, analytical equipment, wet laboratory, and fume extraction system;
- Change house and dining room facility: would be located near the concentrator and would service the operations staff. The change house has been designed to accommodate 425 employees. The dining room would accommodate 150 people and would be located adjacent to the change house. A separate lunchroom accommodating 10 people would be provided in the molybdenum processing area;
- Main gatehouse.

18.8 Mine Area Facilities

Figure 18-1 included a layout plan for the mine-area infrastructure.

18.8.1 Roads

An established network of haul roads and infrastructure remaining from the supergene operation is available for the expansion project, and use of these will minimize many of the mine commissioning activities. Existing haul roads within the pit area would require widening to 40 m from the existing 30 m to support two-way traffic. A nominal amount of new haulage routes will be required to link the planned infrastructure, including the primary crusher, mine phase excavations, waste dump deposits, and stockpiles. Two additional haul roads will be required, one to link the pit to the mine equipment service shop location, and the second to enable construction material transport for the tailings starter dam.

18.8.2 Electrical

The majority of the mining equipment is planned to be electrical, including the rope shovels, rotary blast hole drills, and dewatering infrastructure. The power supply would be a 220 kV overhead line loop supplied from the TMF main substation and from the primary crusher electrical substation as a backup.

18.8.3 Explosive Plant

The existing explosive plant would be modified to meet the LOM production requirements. During the fourth year, the explosive plant would be relocated to the east side of the existing heap leach pads.

18.8.4 Truck Shop

The existing mine mobile equipment maintenance building would continue to be used to service mine equipment for the first five years of operation until it becomes necessary to construct a new facility at a different location. An initial pre-fabricated (Sprung structure) truck shop would support the existing building.

The permanent structure will include a truck wash, maintenance and service area, with a maintenance capacity for six mine haul trucks.

18.8.5 Sewage

The sewage treatment plant would be located behind the future main mine truck shop. It would be constructed to serve the construction workforce of 7,000 people at a plant capacity of 1,400 m^3/d. Following the construction period, it would be resized to operate with a smaller operations workforce of 2,800 persons maximum with a capacity of 540 m^3/d.

18.8.6 Solid Residue Management

The solid residue management facility would be located at Choja Sur and would be designed to manage solid sewage waste and other solids waste from construction activities.

18.9 Process Plant

Infrastructure required for the process plant is discussed in Section 17.

18.10 Linear Works/Pipeline Systems

A plan showing the locations of the planned linear works was included as Figure 18-2.

18.10.1 Pipeline Corridors

The main corridor for the pipelines encompasses the ROW for the concentrate transport system (CTS) and the make-up water transport system (MWS), and runs mainly in an east-west direction, connecting the port facilities and the mine site. The pipeline ROWs have been acquired.

A 72-strand fibre optic cable main backbone would be buried along the corridor together with the pipelines in order to transmit communications and supervisory data and control for the transport systems.

Access to the pipelines would be from existing roads, and the ROWs would be graded as required for construction equipment, operation, and slope restrictions for the CTS. Each pipeline would have a number of ravine, road, railroad, and power line crossings.

18.10.2 Concentrator Transport System

The CTS would commence at the concentrator pump station located at the mine site process plant and would terminate at the filter plant at the port site, a distance of 164 km. The capacity of the CTS would range from 97 to 165 t/h or 120 to 149 m^3/h (minimum to maximum).

The CTS pump station would be located at the concentrator area. The pump station would pump copper concentrate into the pipeline. The station would be the location of the primary control for the CTS flow.

CTS Choke Station No. 1 would be located at approximately kilometre 17.7 of the CTS pipeline; CTS Valve Station No. 1 at 30.1 km; CTS Choke Station No. 2 at 47.6 km; and CTS Valve Station No. 2 at 135 km. The function of the aboveground choke stations would be to control the pressure buildup with dynamic dissipation and the aboveground valve stations to control static pressure.

The CTS Terminal Station would be the delivery point of the CTS and would be located at approximately kilometre 164.4 of the CTS pipeline (at the port site). The function of this station would be to control static pressure.

Three pressure monitoring stations would be required to operate the CTS, and will be constructed at kilometre 69.7, kilometre 107.5, and kilometre 158.1. They will be solar-operated.

18.10.3 Make-up Water System

The MWS would transport desalinated water from the seawater treatment plant at the port site to the process water reservoirs at the concentrator. The transport system would have a capacity of 3,502 to 4,202 m^3/h (nominal/design values, respectively). The desalinated water would be pumped using a buried pipeline installed along the pipeline corridor.

MWS Pump Station No. 1 would be located within the port facility area, at kilometre 0.0, at an elevation of 65 masl; MWS Pump Station No. 2 at kilometre 26. at an elevation of 915 masl; MWS Pump Station No. 3 at kilometre 112.5 at an elevation of 1,621 masl; MWS Pump Station No. 4 at kilometre 130.0 at an elevation of 2,532 masl, and MWS Pump Station No. 5, the final station, at kilometre 142.6 at an elevation of 3,445 masl.

MWS pump station no. 1 would receive power from the port substation. MWS pump station no. 2 would receive its power from a 220/6.9 kV substation fed from a section substation installed in the existing Tarapacá–Lagunas 220 kV transmission line. MWS pump stations nos. 3, 4, and 5 would receive power from three 220/6.9 kV electrical substations fed from the new Lagunas–concentrator 220 kV transmission line.

The MWS terminal station is the delivery point for the MWS and would be located at the concentrator site at kilometre 159.0 of the MWS pipeline at an elevation of 4,370 masl.

18.11 Port Area Facilities

A plan of the proposed port area infrastructure was included as Figure 18-4.

18.11.1 Filter Plant

The copper concentrate will be filtered to produce a cake suitable for ocean transportation. The filter building will have two floors:

- The ground floor will contain the concentrate collection belt feeders, the tail end of the concentrate tripper conveyor, sump pumps, and filter air compressors;

- The top floor will host the pressure filters, tanks, and a laydown area for filter maintenance.

The system will consist of three parallel filtration systems, with each system consisting of an automated concentrate filter press, concentrate filter feed pump, and a concentrate (filter cake) collection belt feeder to recover the product. The three filtration systems would share a common filtrate receiving tank, a set of operating filter cloth wash pumps, a set of operating/standby filtrate transfer pumps, and four sump pumps.

18.11.2 Concentrate Storage and Reclaim

The concentrate handling and storage facilities would consist of a concentrate tripper conveyor, which would transport filtered concentrate from the collection belt feeders to a 75,000 t capacity stockpile enclosed in the concentrate storage building. Space will be left for a future additional stockpile to the south of the building. The building would also include a dust collection and ventilation system for dust control.

The concentrate reclaim system would use front-end loaders to transfer reclaimed concentrate product from the stockpile through floor-level grizzly screens to two 1 m wide by 31 m long, 800 t/h capacity reclaim belt feeders. The reclaim belt feeders would feed concentrate onto a 1 m wide by 259 m long, 1600 t/h reclaim conveyor, which in turn would feed the concentrate loadout pipe conveyor. The reclaim facilities would include feed hoppers, dust collectors at the transfer points, a metal detector, concentrate sampler system, and a weigh scale installed on the reclaim conveyor.

18.11.3 Loadout Conveyor and Ship Loader

The reclaim loadout conveyor would discharge concentrate to a 400 mm diameter, 607 m long, 150 kW and 1,600 t/h capacity loadout pipe conveyor (mounted, in part, on trestles), and would transfer the concentrate to the radial ship loader for loading into ocean-going bulk carrier.

18.11.4 Marine Facilities

The marine facilities would include an onshore abutment, an access trestle, a pump station platform, a ship loader platform, a boat berth, a standoff spread mooring system, two protection dolphins, and a ship access gangway.

18.11.5 Seawater Intake/Treatment/Pumping

Seawater from the Pacific Ocean would be pumped by offshore intake pumps to the desalination plant for processing. The various filter backwashes and seawater reverse osmosis brine would be directed by gravity flow back to the Pacific Ocean via the brine discharge outfall.

The seawater treatment plant would be fed with seawater from the seawater intake pumps and would produce desalinated and potable water via three main stages:

- Pre-treatment;
- Reverse osmosis;
- Post-treatment.

Brine would be the main waste product and would be discharged back into the ocean via the brine outfall pipeline from the brine outfall tank. The plant would also include a chemical and reagent storage and handling facility.

18.11.6 Offices and Warehouses

The following pre-engineered buildings would be required:

- Dining room;
- Administration building;
- Men's change house;
- Women's change house;
- Workshop and warehouse;
- Laboratory;
- Main gatehouse;
- Secondary gatehouse.

Access to these buildings would be provided by a new exit from Ruta 1 via the main entry gate. A guard house and parking area would be located at the entry gate.

18.12 Power and Electrical

18.12.1 Power Agreement

A number of power purchase agreements were signed with AES Gener in 2012 and thereafter, under which CMTQB would receive power in aggregate from a number of sources, including conventional and solar power plants.

18.12.2 Projected Usage

The projected power requirements for the key usage areas are summarized in Table 18-1.

Table 18-1: Estimated Power Usage

Facility Description	Installed Load	Demand Load	Energy
	P (MW)	P (MW)	(GWh)
Port site facilities	43	29	167
Pipeline systems	95	71	348
TMF	76	42	209
Concentrator site	206	180	1,267
Project Substations Total Load	***420***	***322***	***1,991***

18.12.3 Power Supply Requirements

The HV transmission system would consist of 220 kV transmission lines from various locations to the Quebrada Blanca 220 kV substations, including:

- HV Lagunas substation/switching station: includes the addition of two bays to the existing 220 kV Lagunas substation to feed the double-circuit HV transmission line to the concentrator;
- Concentrator HV transmission line: includes a double-circuit 220 kV transmission line from the Lagunas substation to MWS pump station nos. 3, 4, and 5 and the concentrator main substation. The HV transmission line would be carried on double-circuit transmission lines from the Lagunas substation to a location part-way between pump station nos. 4 and 5, then on parallel single-circuit transmission lines to pump station no. 5 and the concentrator;
- MWPS No. 2 HV transmission line: includes a deviation from the existing Tarapacá–Lagunas double-circuit 220 kV line to a new sectioning substation and double-circuit lines to the 220 kV substation at MWS pump station no. 2;
- RWPS HV transmission line: includes a double-circuit 220 kV transmission line from the concentrator 220 kV substation to the TMF 220 kV substation;
- HV Tarapacá substation/switching station: includes the addition of a single bay to the existing 220 kV Tarapacá substation and connection to the existing unused circuit on the Tarapacá–Condores double-circuit 220 kV transmission line;
- Port HV transmission line: includes deviation of the existing Tarapacá–Condores double-circuit 220 kV line to a new sectioning substation and double-circuit lines to the port 220 kV substation.

18.12.4 Concentrator

The concentrator main substation would be located in the concentrator area to the south of the grinding building.

A new 220 kV double circuit transmission would be installed from the Lagunas substation to the concentrator with intermediate connections to substations for MWS pump stations 3, 4 and 5. New switchgear would be required in the Lagunas substation to feed this new line.

The power line would be installed parallel to the makeup water pipeline and would supply the individual pump station electrical substations.

The concentrator main substation would be a step-down type in which the 220 kV incoming voltage would be stepped down to 23 kV for primary distribution to the concentrator facilities, mine facilities, permanent camp, and ancillary facilities. Power distribution would be through a radial feed system using duct banks, overhead lines, and cable trays. This system would feed several electrical rooms around the concentrator and mine.

18.12.5 Tailings Management Facility

Power would be supplied to the 220/23 kV substation at the TMF from the concentrator main electrical substation via a 220 kV double-circuit overhead line. The TMF's 220/23 kV substation would supply power at 23 kV to termination points at the various TMF areas via overhead lines. Final distribution from the TMF area termination points to the TMF equipment would be at 23 kV via overhead lines and cables.

The TMF substation would be located adjacent to the permanent booster station at an elevation of approximately 4,100 masl. The TMF substation would be a step-down type in which the 220 kV incoming voltage would be stepped down to 23 kV for distribution to the TMF facilities. In addition, this substation would also supply the primary crusher and the mine supply loop.

18.12.6 Port

Electric power would be distributed at 23 kV from the port site main substation switchgear by a radial feeder using duct banks and cable trays to supply power to several electrical rooms around the port facilities. Medium voltage and low voltage power would be distributed within each area from the switchgear mounted in electrical rooms around the port facilities.

18.13 Control and Communication Systems

The following subsystems would be provided for process control and communications:

- Process control system;
- Controllers provided by third parties;
- Process network;
- IT network (outside of building);
- Advanced control systems;
- Plant information management system;

- Instrumentation and equipment integration;
- Process and security closed-circuit television;
- Fire detection systems integration;
- Electrical supervisory control and data acquisition (SCADA) system integration;
- Voice radio system (project-wide);
- Mine communication network: facility for the existing operations' mining offices and employee mess, which would continue to serve the existing operation and would be connected to electrical distribution and fibre optic network implemented for the expansion project.

18.14 Water Supply

18.14.1 Process Water

Process water will primarily be sourced from the desalination plant on the coast and transported to the concentrator site through the MWS (see Section 18.10.3).

A portion of the process water will be reclaim water sourced from the TMF. A water recovery system will reclaim water from the TMF main operational pond. This water will be pumped to the recovered water distribution tank, and will subsequently flow by gravity to the end-user, which will either be the tailings cyclone station or to the concentrator.

18.14.2 Potable Water

The potable water plant would consist of a packaged reverse osmosis system that would provide potable quality water to the concentrator and camps. The capacity of the plant would be approximately 30 m^3/h and would be sized to include the feed to the main operations camp, as well as the local concentrator camp.

The system would be located adjacent to the feed source, which is the makeup water pond. It will include a 500 m^3 tank that would be used to distribute the treated water to the various consumer areas.

19.0 Market Studies and Contracts

19.1 Market Studies

Teck staff performed a review of the estimated quality of, and potential markets for, the copper and molybdenum concentrates that would be produced by QB2.

19.1.1 Copper Market Forecasts

For the period 2016 to 2025, Teck estimates that global copper concentrate production will be lower than the planned production and forecasts a reduction of 5% for unplanned disruptions. This forecast is lower than the annual average over the last 10 years.

Copper smelter capacity has increased by 66% globally since 2000 to 21.5 Mt of copper per year in 2015. Teck expects the global copper smelter capacity to continue increasing by a further 10% until 2025, when the total global copper smelting capacity would be 23.6 Mt of copper per year.

The gap between available copper concentrates and copper smelter demand will likely re-appear toward 2025, due to a lack of current investment. Teck is projecting that there will be an annual gap between production and demand in the copper concentrate market of over 5.02 Mt by 2025.

Anticipated changes in the future market are predictable. Clean high-grade copper concentrates will be most favourably treated. The opposite is true that when the concentrate market moves into balance or surplus, low-grade or high impurity complex copper concentrates will attract unfavourable economic terms. The copper concentrate from the Project is forecast to be cleaner than that of a number of existing and projected mines.

19.1.2 Quebrada Blanca Copper Concentrate

Teck estimates that the average annual life-of-mine copper concentrate production will be approximately 877,000 dmt per year, with a peak annual production of 1,080,000 dmt/a occurring in operating Year 3. The marketing program would account for annual changes in this quantity and would anticipate that production would be greater in the earlier years of the mine life.

The Project's copper concentrate is clean, contains low levels of deleterious elements, but lacks any distinguishing characteristics. It is anticipated that the concentrate is unlikely to obtain a premium over the market Benchmark commercial terms.

Key features of the concentrate include:

- An average 27% copper grade, which would be accepted by most copper smelters in the custom market;
- Low levels of deleterious elements such as arsenic, zinc, mercury and lead, providing a competitive edge in the concentrate market.

The concentrate contains elevated silver levels, ranging from 30 to 100 g/t Ag. Silver is not included in the financial model in Section 22, but silver credits payable in the copper concentrate represents upside potential for the Project.

19.1.3 Molybdenum Market Forecasts

With the downward trend of molybdenum prices continuing throughout 2016, interest from the investing community in financing risky new primary molybdenum projects has significantly waned. However, with lower copper prices, copper mining companies have been running their molybdenum circuits in order to reduce overall cash costs at their operations. Looking forward to 2025, there are still a number of large projects that could impact the global market if molybdenum prices were to recover by an appreciable amount.

Molybdenum concentrate demand is defined as the net feed requirement by the global molybdenum roasters, excluding feed from secondary or recycled inputs. Similar to the copper concentrate market, there is currently excess roasting capacity globally.

CPM estimates that global molybdenum roasting capacity is approximately 598 Mlb annually. This does not include underutilized or idled capacity in China, for which CPM estimates approximately 200 Mlb of active capacity in China, with another 200 Mlb of capacity sitting idle. Some of this capacity is in the process of being shut down, but CPM also identifies a significant number of planned capacity increases or replacements that have yet to be approved for development. CPM has estimated that with new projects, the global molybdenum roasting capacity could reach 1 Blb by 2020, but effectively the number is likely to be closer to 950 Mlb. This suggests that currently there is more than sufficient molybdenum roasting capacity to treat the available mine production and the known mine production increases over the next 10 years.

Due to the 70% fall in prices in 2015, molybdenum mine production was curtailed in 2016. This production cutback at the mines was not matched by a change in molybdenum roasting capacity. Based on current assumptions by Teck and CPM's data, it is unlikely that the gap between molybdenum concentrate production and molybdenum roasting capacity will be filled over the next 10 years. Including all of the mine projects currently being reviewed, the market could potentially move into a sizable surplus of molybdenum concentrate by 2025.

19.1.4 Quebrada Blanca Molybdenum Concentrate

The molybdenum concentrate would be the product of differential copper–molybdenum flotation and would not be expected to require leaching for copper removal in order for it to be marketable. The molybdenum concentrates will be of average quality and the above-normal copper contents (1.4.% vs. 0.6%), implies paying a greater discount or penalty.

The estimated average annual LOM molybdenum concentrate production rate level would be approximately 15,100 dmt/a, or approximately 16 Mlb/a of contained molybdenum. The peak molybdenum concentrate production rate would be 20,300 dmt/a, or approximately 22 Mlb/a contained molybdenum, occurring in operating Year 10.

The molybdenum concentrates contain elevated levels of rhenium, in the order of 350 to 500 g/t Re. No credit is given to the rhenium content in the financial analysis in Section 22.

19.2 Proposed Marketing Strategy

The sales strategy is based on selling the concentrates to companies with good reputations and economic situations. The companies will be ones which Teck maintains good commercial relations.

Concentrates will be sold on an annual or spot market basis, as applicable. Which strategy is used will be determined by the global offer and demand at the time of sale, and the concentrate characteristics (clean or complex).

19.3 Commodity Price Projections

19.3.1 Copper Price

The methodology for development of the base copper price forecast for the financial analysis in Section 22 uses various approaches for long-term price determination. The long-term base copper forecast price is based on a weighted average approach using several specific components, with the fundamental inputs to the forecast being projection of industry supply and demand totals, along with consideration of global and country-specific economics. As well, cost structure and incentive price have been incorporated into the price forecast for the feasibility study, together with industry market forecasts and historical prices.

Teck's long-term base copper price assumption used in the Project's financial analysis is $3.00/lb.

19.3.2 Molybdenum Price

Molybdenum prices are still typically determined by negotiation between producers, trading houses, and end users, with supply and demand fundamentals in the background. Surveys are done by a number of independent publications such as Platts Metals Week, Metals Bulletin, and CRU Consulting (CRU) regarding these negotiations and the estimated transaction prices are published on a regular basis. This pricing system is fairly opaque, as the quantity and nature of the transactions used to set prices are not readily available. Molybdenum is traded in various forms, including raw molybdenum concentrates, molybdenum oxide, ferromolybdenum, ammonium molybdate, and molybdenum powders.

The increase in molybdenum price volatility over the past eight years has encouraged several attempts to establish a forward pricing market to allow industry participants to hedge their price exposure. Most of these have failed to provide the necessary liquidity to successfully trade any future positions. The launch of the LME contract has been seen as the longest running futures contract, but liquidity of the contract remains an issue and has not been adopted by the industry.

Teck's internal metals sales department uses the published prices from publications such as the Metals Bulletin in its contracts and negotiations with its customers. The price of future concentrate shipments would be based on the amount of molybdenum contained in the raw molybdenum concentrates. Teck also negotiates penalties, discounts, roasting charges, shipping fees, and delivery terms with each of its customers to obtain final settlement prices.

For molybdenum, there are essentially two markets for supply: these being supply from primary molybdenum producers and supply from by-product producers that produce molybdenum from copper mines. In the case of by-product producers, the cost of producing molybdenum is highly dependent on the price of copper and is less impacted by movements in the molybdenum price. Conversely, primary molybdenum producers, where molybdenum is the only source of revenue, are highly dependent on movements in molybdenum prices. For this reason, Teck looks at the 90th percentile costs of the primary producers as being the point where production should be rationalized. This is then used as one of the bases for estimating future price trends. However, as most of the global primary mine production is based in China and comes from extremely small operations, it becomes difficult to estimate actual costs of production for these small producers. Therefore, other market indicators must also be considered.

Teck estimates that long-term prices of molybdenum will likely remain well supported above $7.00/lb from a fundamental supply/demand point of view. However, this level of pricing will not be sufficient to allow for the kind of return on investment necessary to develop any significant new primary molybdenum mine production outside of China. With significant underutilized mine capacity currently off-line in the West, and with several by-product projects still not operating at full capacity or as yet undeveloped, it is unlikely that a rise in molybdenum prices in the medium term would be sustained at previous historic levels. Without a significant increase in the price of oil, which would increase underlying molybdenum demand from the oil and gas sector, molybdenum prices are likely to remain subdued over the next five years, and potentially for the remainder of the period through 2025.

Teck’s long-term base molybdenum price assumption used in the Project’s financial analysis is $10.00/lb.

19.4 Contracts

19.4.1 Concentrates

Teck’s marketing strategy for copper concentrates would focus on the major custom smelting companies in the world that are logistically practical for the delivery of concentrates, with Asia a most likely destination. Teck would also look to contract with companies that have a strong business base and will be strategic long-term customers for the entire Teck suite of mines. Some production may also be sold on the spot market.

Teck would market the molybdenum concentrates on the global market in an unleached form. While rhenium is present in the concentrates, it is considered only as an enhancement to the marketability of the molybdenum concentrate, and is not included as an upside opportunity in the financial analysis.

No contracts are currently in place for the concentrates to be produced by the planned mine expansion. It is expected that any sales contracts signed would be within market norms:

- A typical long-term smelter contract would specify the quantity of copper concentrates, possibly with a range, and a term for the duration of the contract, with evergreen language following the initial term. The treatment charge, copper refining charge, and price participation, if any, would be negotiated periodically, such as on a calendar year basis. The remaining terms and conditions would be fixed for the duration of the contract;

- A typical contract structure for molybdenum concentrate sales would be for a fixed production quantity for the contract duration, with roasting charges to be agreed annually. It is also commonplace in the molybdenum industry to fix the roasting charges for more than a one-year period. Typical long-term contracts are similar in structure to those for copper concentrates.

Actual contracts that may be entered into for QB2 may show some variation from this, depending on the terms negotiated in the individual contract.

The assumed toll treatment and refining charges (TC/RC) used in the financial model are based on Teck's long-term view planning assumptions prepared in 2016, and reflect typical, historical terms:

- Copper;
  - Estimated treatment charge: $90/dmt conc;
  - Estimated copper payable: <22% Cu (minimum deduction 1.1); <32% Cu, 96.50% (minimum deduction 1); >=32% Cu, 96.65%; >=38% Cu, 96.75%;
  - Estimated copper refining charge: $0.90/lb;
- Molybdenum;
  - Payable: 99% of the molybdenum content in concentrate is payable;
  - Roasting deductions: for less than 0.6% copper in concentrate, a roasting deduction of 15%, with a cap deduction of $2.00/lb contained molybdenum and a floor of $0.90/lb; for less than 2.0% copper in concentrate, a roasting deduction of 20%, with a cap deduction of $2.50/lb contained molybdenum and a floor of $1.20/lb; for >2.0% copper in concentrate, a roasting deduction of 25%, with a cap deduction of $3.00/lb contained molybdenum and a floor of $1.50/lb.

19.4.2 Freight

The Project's port facility near Punta Patache would be a dedicated and modern, high-speed loading terminal capable of berthing and loading Handymax and up to Panamax-sized vessels. It is expected this would prove attractive to vessel owners and promote competition for carrying the Project's copper concentrates. The primary constraints would be customer inventory and port capacity (especially in Asia). Therefore, it is expected to attract highly-competitive rate levels versus other concentrate producers in the region. The longer-term planning ocean transportation costs for copper concentrates that have been used in the feasibility study is $60.00/wmt.

At the Project's start-up, Teck expects to arrange for spot vessels to handle the initial shipments to the marketplace, followed by multi-year contracts of affreightment (COAs) to lock in shipping terms, provide some protection from shipping cost fluctuations, and ensure the availability of quality vessels to carry the Project's product.

19.5 Comments on Market Studies and Contracts

A market review indicates that the copper and molybdenum concentrates will be saleable.

Silver credits have not been included in the financial analysis in Section 22 for the copper concentrate. The silver content would make the copper concentrate more marketable. Silver credits represent a Project financial upside opportunity.

Metallurgical tests showed commercially substantial levels of rhenium in the molybdenum concentrate; however, there is no established basis for a rhenium payment structure in molybdenum concentrate that Teck considers prudent for use in the feasibility study. Therefore, rhenium is considered only as an opportunity. The rhenium would, at minimum, make the molybdenum concentrate more marketable.

The copper concentrate market is forecast to be in a deficit during the period of time that the Project will be commissioning and ramping up production. That would be helpful to market development for products of the Project. It represents medium-sized capacity, so it should be relatively easy to place in the market. This, in conjunction with projected timing, would potentially correspond with a favourable market.

The QP has reviewed the market studies and analysis completed by Teck, and is of the opinion that the results support the assumptions in this Report.

20.0 Environmental Studies, Permitting, and Social or Community Impact

Montgomery Watson Harza prepared the Estudio de Impacto Ambiental Proyecto Minero Quebrada Blanca Phase 2 report (the 2016 EIA) that was dated August 2016 and submitted to the Chilean environmental authorities on 26 September, 2016. The 2016 EIA is based on the development case mine plan (see Section 16.1), and not the base case plan presented in this Report. In addition, the 2016 EIA report was completed before the feasibility study was finalised, and there may be, as a result, some variances between the project descriptions contained in this Report and those in the 2016 EIA.

20.1 Baseline Studies

Baseline studies and monitoring included:

- Climate and meteorology;
- Air quality;
- Noise;
- Geology, geomorphology, and geological risks;
- Soil;
- Vibrations;
- Hydrology;
- Hydrogeology;
- Water quality;
- Marine water resources;
- Terrestrial ecosystems;
- Continental aquatic ecosystems;
- Marine ecosystems;
- Cultural heritage;
- Landscape;
- Protected areas and priority conservation sites;
- Natural and cultural attractions;
- Land use and relationship with planning;
- Human environment.

Areas that were sensitive to changes were identified using cause–effect matrices. Where possible, the design strategy used impact minimization practices.

20.2 Environmental Considerations

Teck has proposed a number of measures to mitigate environmental risks to the environment and communities within the Project area of influence.

Teck will employ monitoring plans to help ensure that relevant environmental variables subject to environmental assessment are maintained as predicted. These plans will be prepared in accordance with the requirements defined in the Resolución Exenta no. 223/2015. The monitoring plans will use standard formats and will cover the following key areas:

- Biodiversity (including plants, fauna, soil and continental aquatic ecosystems);
- Cultural heritage and archaeology;
- Human environment and socio-economics;
- Human environment and anthropology;
- Air quality;
- Noise;
- Vibration;
- Water;
- Marine resources;
- Marine ecosystem biota;
- Land use and roads.

A number of territorial planning instruments were identified, including instruments established and approved by the Región de Tarapacá government, and the local governments of the communities of Pica, Pozo Almonte, Alto Hospicio, and Iquique. Specific areas covered include:

- Exploitation of the hypogene mineralization;
- Construction of waste management facilities;
- Construction of port facilities;
- Construction of the desalination plant and use of the desalinated water in production processes;
- Use of Route A-855 and construction of Bypass A-97B;
- Connection to high-voltage power lines via a substation;
- Implementation of a water management plan;
- Implementation of a voluntary early public participation process in relation to the 2016 EIA;
- Creation of working groups with specific communities;
- Local hiring.

CMTQB has also undertaken voluntary environmental commitments to contribute to the improvement of relations between the mine, neighbouring communities, and the environment. These commitments broadly cover fauna, cultural heritage, land use, and the human environment.

20.3 Closure Plan

Closure is subject to separate sectorial regulatory requirements, and approval of the plan must be obtained from SERNAGEOMIN.

20.3.1 Mine Area

The open pit and WRSF would be left in place. Closure activities would focus on stability control and maintaining safety measures such as access control to the open pit, and grading of the WRSF.

All mine structures, buildings, and equipment would be removed with the exception of those planned to be used during the post-closure phase (e.g., concentrator area camp and support facilities).

The majority of the non-contact water structures would be removed; however, the east contour channel in the mine and plant area would be enlarged to accommodate a 1:1,000-year return period design criteria for post-closure water diversion.

The open pit would act as a reservoir for contact run-off from waste and other stockpiles. It is expected that a pit lagoon will form. Natural evaporation is expected to control the water level without risk of overtopping the pit walls.

All contact water and recirculated process solution collection ponds that are not required for post-closure monitoring purposes would be emptied and backfilled.

20.3.2 TMF Area

The TMF impoundment and dam would be left in place. Closure activities would focus on stability control and maintaining safety measures, including placement of granular cover material, and a rock fill footwall for confinement of the downstream face.

The tailings impoundment contour channel would be backfilled and covered. A concrete spillway will be constructed next to the sand wing wall in order to drain excess water from the impoundment basin towards Quebrada Jovita during extreme rainfall events. Downstream infrastructure will include rock surfacing of the spillway discharge channel, followed by an energy dissipation structure. As a contingency measure, provisions have been made for periodic lime treatment for pH control and metal precipitation from water accumulated in ponds formed on the impoundment surface.

Part of the tailings impoundment water management infrastructure would be kept in use for downstream impoundment infiltration control. Other TMF infrastructure would be dismantled and removed from the site.

20.3.3 Linear Works

The closure plans for the concentrate transport pipeline and valve stations, desalinated water pipeline and pump stations, high-voltage power lines and accesses, electric power supply systems, Bypass A-97B road, access roads, emergency ponds, waste water treatment facilities, and communication systems assume buried infrastructure will remain in place, and surface infrastructure will be removed, dismantled and demolished. Where practicable, materials will be salvaged for reuse, recycle or scrap.

No post-closure activity or monitoring is assumed to be required.

20.3.4 Port Area

The closure plans cover the concentration filtration plant, concentrate storage building, concentrate transport conveyor, ship loader, seawater intake structure, desalination plant, brine discharge structure, wharf, mooring structures, emergency ponds, electrical substations, internal roads, control gates, offices, lunchrooms, change rooms, first-aid rooms, warehouses, control-rooms, water reservoirs, waste water treatment plant, equipment maintenance workshops, laboratory, and waste storage facilities. Buried and sub-marine infrastructure will remain in place, and surface infrastructure will be removed, dismantled and demolished. Where practicable, materials will be salvaged for reuse, recycle or scrap.

No post-closure activity or monitoring is assumed to be required.

20.3.5 Post-closure Activities

Post-closure activities would be focused on maintenance, inspections, monitoring and operation of water management systems following closure. These activities would aim to ensure that management measures comply with objectives in relation to the preservation of life, health and safety of people and the environment. Applied criteria focus on a passive approach in order to minimize intervention requirements. Closure elements such as signage, fencing, berms, grading/profiling, granular covers, rock fills, and other similar actions would be maintained.

Facilities that would remain in use during the post-closure phase include:

- Concentrator area camp and associated support facilities including potable water and waste water treatment plant and the power transmission system;
- Contact water treatment plant and associated facilities to be operated and maintained indefinitely or until drainage in Quebrada Blanca quality shows a reduction in acidity, metals and salts, indicating that conditions have returned to original water quality;
- East contour channel;
- No. 2 infiltration control system in Quebrada Blanca, to be operated and maintained to ensure hydraulic restitution corresponding to pre-mining groundwater flow conditions;
- TMF to be maintained and monitored to provide ongoing tailings containment.

Post-closure activities would include:

- Periodic lime treatment of tailings impoundment pond water for pH neutralization and metal precipitation;
- Supply of treated infiltration water to maintain base flow in Quebrada Blanca;
- Surface and groundwater monitoring as per the environmental monitoring plan that forms part of the 2016 EIA commitments;
- Inspection and maintenance of the TMF to ensure safety of structures and systems including dam wall and drains, infiltration control, and emergency spillway;
- Lime neutralization treatment of TMF pond water for pH and metal concentration control;
- Landfill leachate and groundwater monitoring.

Closure costs are incorporated in the cost estimates in Section 21.1.10.

20.4 Permitting

20.4.1 Environmental Sectorial Permitting

The environmental sectorial permits in Table 20-1 are included as part of the 2016 EIA and have associated environmental requirements.

Table 20-1: Applicable Permits Subject to Environmental Requirements

Permit Number and Name	Required For	Responsible Chilean Authority
PAS 115: Permiso para introducir o descargar materias, energía o sustancias nocivas o peligrosas de cualquier especie a las aguas sometidas a la jurisdicción nacional	Effluent discharge from the Puerto Patache desalination plant using a sub-marine outlet	Directemar
PAS 119: Permiso para realizar pesca de investigación	Puerto Patache environmental monitoring plan	Sernapesca
PAS 126: Permiso para la construcción, reparación, modificación y ampliación de toda instalación diseñada para el manejo de lodos de plantas de tratamiento de aguas servidas	Sludge landfill from two waste water treatment plants (one in the mine area and the other in the pampa area).	Seremi de Salud
PASM 132: Permiso para hacer excavaciones de tipo arqueológico, antropológico y paleontológico	Investigation test pits	Consejo Monumentos Nacionales
PASM 134: Permiso para el emplazamiento de instalaciones nucleares y radiactivas	Radioactive material warehouse	Comisión Chilena de Energía Nuclear/Seremi de Salud

Permit Number and Name	**Required For**	**Responsible Chilean Authority**
PASM 135: Permiso para la construcción y operación de depósitos de relaves	TMF	SERNAGEOMIN
PASM 136: Permiso para establecer un botadero de estériles o acumulación de mineral	Seven new facilities for waste rock storage and mineral stockpiles: • Rock storage facility (north, south) • Low-grade stockpile (south) • High-grade stockpile (north) • Marginal stockpile (north, south) • Run of mine (ROM) stockpile	SERNAGEOMIN
PASM 137: Permiso para la aprobación del plan de cierre de una faena minera	• Project closure plan for existing supergene facilities and new facilities for QB2.	SERNAGEOMIN
PASM 138: Permiso para la construcción, reparación, modificación y ampliación de cualquier obra pública o particular destinada a la evacuación, tratamiento o disposición final de desagües, aguas servidas de cualquier naturaleza	Construction or expansion of 10 waste water treatment plants or septic tanks: • Existing Tambo-Tarapacá waste water treatment plant (PTAS in the Spanish acronym) • Pipeline camp no. 1 PTAS • Pipeline camp no. 2 PTAS • Mine truck shop PTAS • Pampa PTAS • TMF PTAS • Concentrator PTAS • Port PTAS • Four satellite canteen septic tanks	Seremi de Salud

Permit Number and Name	Required For	Responsible Chilean Authority
	• Facility septic tanks (Lagunas substation)	
PASM 139: Permiso para la construcción, reparación, modificación y ampliación de cualquier obra pública o particular destinada a la evacuación, tratamiento o disposición final de residuos industriales o mineros	Desalination plant sub-marine effluent discharge outlet	Seremi de Salud
PASM 140: Permiso para la construcción, reparación, modificación y ampliación de cualquier planta de tratamiento de basuras y desperdicios de cualquier clase o para la instalación de todo lugar destinado a la acumulación, selección, industrialización, comercio o disposición final de basuras y desperdicios de cualquier clase	Seven waste management facilities: • Pampa area salvage yard • Pampa area debris trench (pit or ditch) • Pampa area industrial solid waste trench • Mine concentrator area debris trench • Mine concentrator area tire trench • Port area salvage yard • Port area debris trench	Seremi de Salud
PASM 141: Permiso para la construcción, reparación, modificación y ampliación de relleno sanitario	• Expansion of current mine site sanitary landfill • New sanitary landfill in Pampa area	Seremi de Salud
PASM 142: Permiso para todo sitio destinado al almacenamiento de residuos peligrosos	Four hazardous waste storage facilities: • Pampa area • Pipeline camp no. 1 • Pipeline camp no. 2 • Port area	Seremi de Salud
PASM 146: Permiso para la caza o captura de ejemplares de animales de especies protegidas para fines de investigación, para el establecimiento de centros de reproducción o criaderos y para la utilización sustentable del recurso	Capture of fauna for investigation purpose as part of mitigation, repair, and compensation plans	Servicio Agrícola y Ganadero

Permit Number and Name	Required For	Responsible Chilean Authority
PASM 151: Permiso para la corta, destrucción o descepado de formaciones xerofíticas	Cut, destruction, and grubbing of xerophytic formations at various locations in the mine, linear works, and pampa areas.	Corporación Nacional Forestal
PASM 155: Permiso para la construcción de ciertas obras hidráulicas	QB2's hydraulic works: • TMF and related works • East contour cannel • Tailings launder • Recovery water system: reclaim and dilution water systems	Dirección General de Aguas
PASM 156: Permiso para efectuar modificaciones de cauce	Watercourse streambed modifications for the following works: • TMF and related works • East contour channel • Contact water pond • Single and double corrugated steel drainage culvert • Concrete culverts • Armoured ford • Ford • Mine site infrastructure • Dumps for cut material from excavations	Dirección General de Aguas
PASM 160: Permiso para subdividir y urbanizar terrenos rurales o para construcciones fuera de los límites urbanos	Temporary and permanent buildings and installations located outside of urban territorial planning limits	Ministerio de Vivienda y Urbanismo (Minvu)/ Servicio Agrícola y Ganadero

There are two types of environmental sectorial permits within Chile:

- Permiso Ambiental Sectorial (sectorial environmental permit or PAS);
- Permiso Ambiental Sectorial Mixto (mixed content sectorial environmental permit or PASM).

The difference between the two sectorial permits is in the granting process, whereby environmental permits (PAS) only require a valid Resolución de Calificación Ambiental (environmental qualification resolution or RCA) because permit grant is based strictly on compliance with environmental requirements. Mixed permits (PASM), while also needing a valid RCA as a pre-requisite, are subject to additional requirements for specific technical content to be submitted as part of the application, and are subject to sectorial approval in a process that is independent from the 2016 EIA evaluation.

20.4.2 Other Sectorial Permits

After a major project has been approved by the SEIA, additional sector-specific applications to various governmental agencies and ministries are needed in order to construct or operate the proposed facilities.

Under current Chilean legal requirements, projects are subject to regulatory approvals through a global process that addresses environmental obligations, followed by sectorial requirements for which the environmental approval constitutes a pre-requisite. The first is achieved through submission of the 2016 EIA into the SEIA. Following receipt of the corresponding approval (the RCA), sectorial permits can be processed.

Project permitting will follow the standard process of:

- Identifying which permits will be required and the associated regulatory agency;
- Identifying the technical and administrative requirements prior to applying for the designated permit;
- Reviewing permit submissions to identify any synergies or sequencing requirements;
- Preparing applications and submitting the documentation to the applicable regulatory authority;
- Processing applications;
- Receipt of approvals and authorizations;
- Setting up documentation and administrative phases for the granted approvals;
- Ongoing monitoring.

To date, a total of 198 types of permits have been identified as being required for QB2. Some of these permits are subject to environmental requirements and are therefore included in the 2016 EIA. Other permits, however, are considered to be sectorial permits and are not part of the 2016 EIA.

The number of permits is based on the project description included in the 2016 EIA, and could result in as many as 700 applications, depending on the adopted submission strategy, which can vary from single to combined applications. The strategy that will be followed will be dependent on Project needs, and will be governed by the application preparation and processing times in relation to the planned development schedule.

Teck's permitting activities are currently centred on the preparation of a master permitting plan and corresponding schedule that will focus on permits that are on the critical path to meeting the proposed development schedule.

The two-phase permitting phase is planned to start in 2017. The first phase will be the preparation of documentation and determination of potential grouping of applications. This will be followed by an execution phase that will process the applications in conjunction with receipt of permit approvals.

20.5 Considerations of Social and Community Impacts

Teck has corporate policies and guidelines in place that address corporate sustainability. These define corporate expectations for sustainable conduct and sustainable development for all projects with which Teck or its subsidiaries become involved, and include:

- Providing a positive and transparent engagement environment and feedback system (including a participative environmental monitoring program) with local communities in order to obtain and maintain the social license for the expanded mining operation;
- Monitoring the effectiveness of the sustainable development plan and undertaking revisions as necessary;
- Avoiding mining operational impacts on local communities of interest where possible; and where impacts are unavoidable, seeking agreements on mitigation and compensation measures that may be required;
- Coordinating the mine's activities with those local communities potentially affected by those activities, including scheduling;
- Pursuing economic prosperity, environmental quality, and social equity within the mine's area of influence while also managing and effectively resolving conflicts that might arise between the competing goals of the mining operation and the communities of interest;
- Creating and promoting social, economic, and institutional strategic community programs designed for the enhancement and betterment of local and regional peoples, with special emphasis placed on the following vulnerable groups:
    - Indigenous peoples;
    - Children and youth;
    - Women;
    - Impoverished;
- Providing and promoting employment training for residents within the Región de Tarapacá;
- Fostering the development of and contracts with local businesses and local suppliers;

- Entering into strategic partnerships with schools, universities, non-governmental organizations, communities of interest, and local and regional governments for continuing development of and integration of the sustainable development plan for QB2 with community and regional plans;
- Establishing and maintaining programs, potentially with third-parties or partners, that are designed to promote and conserve the region’s biodiversity; specifically, flora and fauna impact mitigation and compensation programs would be developed for those areas where the mine expansion is expected to have direct impacts on biodiversity;
- Introducing the sustainable development plan and its key requirements and commitments to all relevant mining operation employees, including contractors or sub-contractors that will be associated with the Project.

21.0 Capital and Operating Costs

21.1 Capital Cost Estimates

21.1.1 Basis of Estimate

The estimates have been prepared to a target accuracy of ±15% as per AACE International Level 3 study recommendations, and are based on first quarter 2016 pricing.

A number of inputs were provided by third-party sources, including:

- Process plant, TMF, pipelines and pump station, port onshore and offshore structures, access road off site, contingency and schedule growth allowance, engineering, procurement and construction management (EPCM) services, adjustments;
- TMF;
- Port onshore and offshore structures;
- Pipelines
- Access road off site.

21.1.2 Labour Assumptions

Direct labour hourly rates reflect Chilean construction labour practice as of the first quarter of 2016 and include payroll additives, construction bonus, overtime premiums, and safety supplies.

The construction working hours at QB2 sites are currently based on 14 consecutive days on, at 11 hours per day, and 14 days off every four weeks, and it is assumed that the prevailing Chilean labour laws and union agreements would allow this to apply.

21.1.3 Contingency

Contingency allowances were applied, as appropriate, and were based on evaluations of all major cost categories. The overall contingency allowance is approximately 10.9%.

21.1.4 Mine Capital Costs

Mine equipment capital estimates were developed for the LOM plan. These estimates include freight, safety systems, assembly, and additional options required to meet Teck operating standards and are considered as all-in ready-to-work costs.

QB2 would employ the remaining mine equipment from the supergene operation until each unit reaches the end of its useful lifespan. This fleet would be used for construction, and all early works mining activities in the mine area, and would also be used for mine production, thereby reducing the initial capital requirements for mine equipment.

All mine capital costs that occur in the first half of Year 1 of the QB2 operation are considered part of the initial mine capital, while all subsequent capital costs are considered mine sustaining capital (see Section 21.1.9).

The total initial capital cost for the mine is approximately $195 million.

21.1.5 Process Capital Costs

The process plant estimate includes the estimated capital costs for the procurement, construction, pre-operational testing, and start-up of all facilities within the third-party engineering firm scope allocation, which includes crushing, grinding, and flotation processes, and their ancillary operations and buildings.

Quantities for the process plant estimate were typically developed from scope documents, engineering drawings, models, sketches, and factoring. Quantities were supported by backup consisting of drawings, sketches, calculations, and/or takeoff sheets where applicable.

The estimate is divided into direct and indirect costs:

- Direct costs (plant equipment, bulk materials, installation labour contracts, specialty contracts): $725 million;
- Indirect costs (common distributable costs, freight, vendor representative contracts, capital spare parts, initial fills, camp facilities and operations, and engineering services): $721 million.

The capital cost estimate for site development of the process plant is based on 80% of the mass excavation being performed by Teck using existing mine equipment.

21.1.6 Infrastructure Capital Costs

Access Road

The access road estimate is an escalation of the costs prepared in 2012.

Earthwork quantities for the access road were developed using preliminary design drawings. Quantities for paving, drainage, concrete works, and road signage were also calculated from the preliminary design. Pricing of construction equipment, materials, and labour was based on Chilean construction practice. Indirect costs included procurement and home office support.

The estimate is divided into direct and indirect costs:

- Direct costs (plant equipment, bulk materials, installation labour contracts, specialty contracts): $42,5 million;
- Indirect costs (engineering, common distributable costs, freight, vendor representative contracts, capital spare parts, initial fills, camp facilities and operations): $6.8 million.

TMF

The scope of the TMF estimate includes a starter dam foundation preparation, grout curtains, dam embankments, tailings sand cycloning, sands distribution, tailings distribution, and seepage and reclaim water systems. Subsequent dam lifts will be on a continual basis and are included in both operating and some sustaining capital costs.

For the TMF, estimate quantities were based on existing survey information and the preliminary dam design documents. Pricing of labour, materials, and equipment has been developed from information obtained from Chilean suppliers and contractors.

The estimate is divided into direct and indirect costs:

- Direct costs (plant equipment, bulk materials, installation labour contracts, specialty contracts): $256 million;
- Indirect costs (engineering, common distributable costs, freight, vendor representative contracts, capital spare parts, initial fills, camp facilities and operations): $29 million.

Pipeline and Tailings Transport

This includes the concentrate transport system, makeup water transport system, reclaim water system, and the tailings transport system.

The pipelines and tailings transport system estimate was based on material take-offs from design drawings, preliminary calculations, material quotations. The construction costs for all three pipelines were estimated from an analysis of the physical characteristics of the pipeline and tailings transport system routes.

The estimate is divided into direct and field costs:

- Direct costs pipelines and pump stations (plant equipment, bulk materials, installation labour, subcontracts, contractor indirect): $658 million;
- Direct costs tailings transport system (plant equipment, bulk materials, installation labour, specialty): $47 million;
- Field costs (temporary facilities, freight, vendor representative contracts, capital spare parts, initial fills and oil, camps, catering): $143 million.

Marine Facilities

This area includes all concentrate dewatering and storage, marine structures, floating mooring system, the ship loader feed conveyor, ship loader and the seawater intake system that would feed the desalination plant.

Marine costs were based on material take-offs from the design drawings, calculations, material quotations, and equipment quotes from equipment suppliers and Chilean marine construction contractors.

The estimate is divided into direct and indirect costs:

- Direct costs (plant equipment, bulk materials, installation labour, subcontracts, contractor indirect): $135 million for offshore facilities, $259 million for onshore facilities;
- Indirect costs (engineering, common distributable costs, freight, vendor representative contracts, capital spare parts, initial fills, camp facilities and operations): $26 million for offshore facilities, $50 million for onshore facilities.

21.1.7 Capital Cost Cash flow

The initial capital costs include engineering, procurement, and construction (EPC), and pre-operational testing, and as spent in accordance with the project execution plan through to ore production that can be achieved in 42 months after the approval of the Estudio de Impacto Ambiental (Environmental Impact Assessment or EIA in the Spanish acronym), with the 2016 EIA approval timeframe anticipated to be 18 months the cash flow is as shown below: The initial capital costs cash flow is presented in Table 21-1.

Table 21-1: Initial Capital Costs Cash Flow ($ million)

Project Area/Facility	2017	2018	2019	2020	2021	Total
Total plant	156	505	1,822	1,887	344	4,714

Note: totals may not sum due to rounding

21.1.8 Owner (Corporate) Capital Costs

Owner's costs typically include the costs for items such as, but not limited to, Mineral Resource and Mineral Reserve definition drilling, assays and other test work, permitting, land acquisition, project and site management, spares, initial fills, and insurances.

Project and operations development team job hours and costs were based on a staffing plan generated during the feasibility study. Project and operations development speciality contractor costs were developed by identifying specific requirements and estimating the job hours associated with the specified items. Estimates of required quantities were made for construction utilities, including power, water, fuel, shop equipment, first fills, operational readiness, land acquisition, mining rights, insurance, scope allowance and contingency.

Direct costs include allocations for mine site development and mine roads, mine site power supply and distribution, SWTP Tambo Tarapacá camp, fuel station, temporary truck shop, mining equipment, diversion channels, CMRS mine area, mobile equipment, waste facility port, mobile equipment, port laboratory equipment, CMRS QB2 Choja area, and the plant mobile equipment. These total $201 million.

21.1.9 Sustaining Capital

A replacement schedule was derived for all major mine equipment.

The estimated total sustaining capital expenditures after the plant start-up period are estimated at:

- Mine fleet: $431 million;
- TMF wing wall rock fill capital: $62 million.

The requirements for sustaining capital in the concentrator, port and pipelines has been assessed and given that the major equipment has bene designed to last for the life of mine, no sustaining capital has been allowed. Small equipment such as pumps, motors etc. are covered in the operating cost. Normal TMF wall raises are continual and covered under operating cost.

21.1.10 Closure Costs

Closure costs were estimated by Teck at $147.4 million based on a detailed analysis performed by an expert consultant. The major items included are:

- Demolition of project facilities and disposal of demolished materials;
- Closure of the TMF; including stabilization of the external dam surfaces with locally borrowed coarse material;
- Diversion of waste dump surface and drainage water to the mine pit.

A post-closure cost estimate was developed using current regulatory requirements. The post-closure costs were calculated as $209 million. This number includes value added tax (VAT) as per the current regulations.

21.1.11 Capital Cost Summary

The overall capital cost estimate for the QB2 Project is $4,714 million as detailed in Table 21-2.

Table 21-2: Capital Cost Estimate Summary Table (in $ million)

Estimate Description	**Amount**
Mine	195
Concentrator	1,416
TMF	285
Pipelines and pump stations	848
Port onshore and offshore structures	470
Access road off-site	49
Engineering, procurement and construction management (EPCM) services	633
Contingency and schedule growth allow	411
Owner's capital cost	26
Owner's cost	327
Owner contingency	54
Estimated Total Capital Cost, Second Quarter 2016 *	***4,714***

Note: totals may not sum due to rounding.

21.2 Operating Cost Estimates

Operating costs exclude indirect costs such as distributed corporate head office costs for corporate management and administration, marketing and sales, exploration, project and technical developments, and other centralized corporate services.

Input was used from third-party consultants to derive some of the costs as follows:

- Concentrator facilities;
- TMF;
- Port and desalination plant;
- Tailings launder and pipelines.

21.2.1 Basis of Estimate

The operating cost estimate includes all operational activities from mining and comminution of the QB2 ore, to production of a copper concentrate that would be transported via a pipeline to the port facilities at Punta Patache and a molybdenum concentrate that would be trucked to destinations as required. The estimate also includes the transport and impoundment of the final tailings produced by the concentrator, along with the requisite ancillary activities. All estimated costs are based on an annual ore treatment rate of 51,100,000 t/a, or an average of 140,000 t/d.

Prices for the main operating supplies were obtained from budgetary quotations during 2016 and were based on delivery to the point of usage. For the remaining supplies, pricing information from the FS2012 was used.

21.2.2 Mine Operating Costs

The mine operating cost estimate includes provision for key elements such as fuel, electricity, lubricants, grease, tires, and explosives. It also considers variable haulage distances to WRSFs and stockpiles, labour costs, and a 5% re-handle of ore feed consideration.

The labour associated with the direct mine operating costs consists primarily of equipment operators and includes a higher than normal absenteeism consideration of 15% to account for the remote high-elevation project location. All staff labour costs were estimated through reference to organization charts for the mine and the planning and development departments.

The estimated mine equipment maintenance costs were based on proposals for a full maintenance and repair contract (MARC) for haul trucks, shovels, drills, and mine support equipment. The existing mine fleet is currently serviced under a MARC and the existing maintenance facilities would continue to operate for the initial stages of the QB2 operation. The option of Owner maintenance will continue to be reviewed.

Life-of mine average costs are provided in Table 21-3. Unit direct mining costs (i.e., drilling, blasting, loading, and hauling) are estimated to be $1.46/t of material moved.

Table 21-3: Mining Cost Summary

Area	LOM Total ($ M)	LOM Average ($/t)
Drilling	313	0.15
Blasting	615	0.30
Loading	432	0.21
Hauling	1,640	0.80
Subtotal Direct Mining Costs	3,003	1.46 $/t moved
Mine general	1,242	0.61
Total	4,241	2.07 $/t moved 3.36 $/t milled

Note: totals may not sum due to rounding

21.2.3 Mine Pre-production Costs

Mine pre-production costs are incorporated in the mine operating cost model and pertain to the cost of operating the mine equipment before commissioning of the concentrator to prepare the ground for the construction of various buildings and infrastructure. These include the primary crusher and conveyor, concentrator site, starter dam construction, and connecting roads.

21.2.4 Concentrator Operating Costs

The operating cost estimate for the concentrator includes the following facility interfaces:

- Primary crushing of the ROM ore discharged from the mine trucks;
- Coarse ore transport of the crushed ore to the coarse ore stockpile;
- Coarse ore stockpile/reclaim of the coarse ore to be fed to grinding;
- Concentrator operations including grinding, pebble crushing, bulk flotation, regrind, concentrate thickening, molybdenum plant, reagents, and tailings thickening.

Future research and development costs, process royalties, and fees (none anticipated as of the effective date of the FS2016) were excluded from the estimate.

The operating and maintenance labour requirements for the concentrator and the corresponding labour rates were supplied by Teck.

A third-party engineering firm estimated the electric energy consumption for the concentrator using the average power load adjusted for online operating time for each operating area and the load factors derived from balance throughput values that established the operating electric energy consumption.

Estimates for operating supplies were developed by Teck, and were based on the metallurgical test results for reagents and on Teck's experience with such items as liner and filter cloth replacements. Vendor quotes, including freight, for consumable unit costs were obtained from Chilean suppliers for each consumable category.

Maintenance supply cost estimates were developed by Teck and were estimated as 5% of the fixed mechanical and electrical equipment purchase price for the operating process areas and 2% for the general process areas such as reagents, auxiliary buildings, and power distribution.

Operating and maintenance labour requirements for the concentrator and the corresponding labour rates were supplied by Teck. Labour costs for indirect personnel (contractors) were charged to the contracts category.

Contracts were assumed to be entered into for mobile equipment, maintenance service (e.g., conveyors, feeders, crushers, liners), internal electrical maintenance and molybdenum concentrate transportation, and cost allocations were made for each contract.

An allowance was included for external or check assays, training or seminars, and process consultants' costs.

A summary of the estimated concentrator and process costs is provided in Table 21-4.

Table 21-4: Concentrator and Process Cost Summary

Cost Category	**Operation ($ M/year)**	**Maintenance ($ M/year)**
Process general	13	14
Crushing / conveying	8	5
Grinding	166	17
Flotation	40	5
Tailings thickener	7	2
Reagents	1	1
Molybdenum plant	9	2
Total	***244***	***45***

Note: totals may not sum due to rounding

21.2.5 TMF Operating Costs

The TMF operating cost centre includes:

- Tailings classification system;
- Tailings distribution system to dam;

- Tailings impoundment;
- Reclaim water system.

The operating and maintenance labour requirements for the TMF were estimated by a third-party engineering firm. In addition, a portion of the pipeline systems' labour cost was assigned to the reclaim water system. Labour rates were supplied by Teck. Labour costs for indirect personnel (contractors) were charged to the contracts category.

The third-party engineering firm estimated the electric energy consumption for the tailings management system using the average power load adjusted for online operating time for each operating area and load factors derived from balance throughput values that established the operating power consumption. The maintenance materials costs for the tailings management system were also estimated by the third-party engineering firm. The sand dam costs are based on an annual cost between 2% and 5% of the equipment capital cost for items such as sand delivery pipelines, pumps and pump parts, valves, cyclone linings, and electrical components.

Contracts were assumed to be entered into for topography and QA/QC, sand dam development, and support equipment, and cost allocations were made for each contract.

The estimated total annual operating cost for tailings management would be approximately $29 million (Table 21-5).

Table 21-5: TMF Cost Summary

Cost Category	**Operation ($ M/year)**	**Maintenance ($ M/year)**
Labour	3	2
Electricity	11	—
Maintenance supplies	—	2
Contracts	11	—
Total	26	3

Note: totals may not sum due to rounding

21.2.6 Port Facilities and Desalination Plant Operating Costs

Teck prepared the port operating cost estimate with input from a third-party engineering firm. The port facilities were divided as follows for the purpose of operating cost estimation:

- Filtration and ship loading;
- Seawater treatment and desalination.

The estimated operating and maintenance labour requirements for the port facilities and the corresponding labour rates were supplied by Teck and the third-party engineering firm. Labour costs for indirect personnel (contractors) were charged to the contracts category.

Estimated electric energy consumption for the port site operations was based on the third-party engineering firm's calculations of the electrical operating loads. Operating costs for consumables and reagents for the port filtering area were developed by a third-party engineering firm. Seawater treatment and desalination reagent consumptions are based on a proposal from a major supplier, while the unit costs were obtained from local suppliers by a third-party engineering firm and Teck. Maintenance supplies costs were estimated by the third-party engineering firm for the port facilities and desalination plant based on an allowance of between 2% and 5% of the mechanical and electrical equipment purchase price. The third-party engineering firm also included supplies for marine facilities maintenance.

Allocations were made to cover stevedores, tugs, and pilot boats contracts, and demurrage (eight buoy arrangement).

The estimated total annual direct operating cost for the port would be approximately $36 million. Breaking this down by port areas, the filtering and ship loading facilities would have an estimated annual cost of approximately $14 million, while the seawater treatment and desalination facilities would have an estimated annual cost of approximately $22 million.

21.2.7 Pipeline Transport Operating Costs

A third-party engineering firm estimated the operating costs for the pipeline systems (tailings, concentrate, and make-up water transport). These included labour, energy and fuels, supplies, and contracts. An allowance was included for training and other miscellaneous costs.

The total annual operating cost for the pipeline transport systems is estimated to be approximately$64 million. Subdividing this by pipeline system, the concentrate transport system would have an estimated annual cost of about $4 million, the make-up water system would have an estimated annual cost of approximately $60 million, and the tailings transport system would have an estimated annual cost of about $1 million.

21.2.8 Infrastructure Operating Costs

The operating costs for infrastructure were estimated by Teck assuming labour, contracts, and supplies, and include:

- HV power line;
- Access roads.

Allocations included provision for access road maintenance supplies and access road maintenance contracts. The total annual operating costs are about $2 million, and maintenance is estimated at approximately $1 million.

21.2.9 General and Administrative Operating Costs

The estimated costs for the G&A cost centre comprise off-site facilities, ancillary buildings, and concentrator site utilities. The G&A cost estimates were developed by Teck. The estimated G&A costs include the management and administrative personnel working at Teck's Iquique office and the non-process-related programs they would administer for QB2. Also included in these estimated costs are the operating costs for all ancillary installations, including:

- Administration building;
- Shops and warehouse;
- Laboratory;
- Gate houses;
- Change houses;
- Lunch rooms.

The total estimated annual G&A operating cost is approximately $59 million. The majority of costs in the table are derived from labour and contracts costs.

21.2.10 Operating Cost Summary

Table 21-6 provides a summary of the estimated annual costs for a nominal year of operation.

Table 21-6: Estimated Annual Operating Cost Summary ($ million/year)

Cost Category	Mine	Concentrator	TMF	Port	Desalination Plant	Pipelines	Infrastructure	Site G&A	Global
Labour	25	21	5	7	3	1	1	15	78
Diesel fuel/gasoline	36	—	—	—	—	—	—	—	36
Electric power	5	140	11	2	11	55	—	5	229
Operating supplies	47	87	—	—	4	—	—	1	139
Maintenance supplies	1	24	2	4	4	7	—	2	43
Contracts	53	14	11	2	—	1	2	25	108
Other	7	2	—	—	—	—	—	12	21
Total	***174***	***288***	***29***	***14***	***22***	***64***	***3***	***59***	***653***

Note:

1. Totals may not sum due to rounding.
2. The operating costs shown here reflect total operating costs which consist of site operating costs excluding concentrate transportation and ocean freight costs

22.0 Economic Analysis

22.1 Forward-Looking Information

The results of the economic analysis conducted to support Mineral Reserves, and the Mineral Resource and Mineral Reserve estimates represent forward-looking information that is subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here.

Forward-looking statements in this Report include, but are not limited to, statements with respect to future metal prices, exchange rates, and concentrate sales contracts; taxation; smelter and refinery terms; assumed mining and metallurgical recovery factors; the estimation of Mineral Reserves and Mineral Resources; the realization of Mineral Reserve estimates; the timing and amount of estimated future production, costs of production relevant to a high altitude mining operation in Chile; capital expenditures; operating costs; timing of the development of new open pit pushbacks; technological changes to the mining, processing and waste disposal activities outlined; permitting time lines for tailings storage facility raises; requirements for additional capital; government regulation of mining operations; environmental risks; ability to retain social licence for operations; unanticipated reclamation expenses; title disputes or claims; and limitations on insurance coverage.

Additional risk can come from actual results of active reclamation activities; conclusions of economic evaluations; changes in Project parameters as mine, process and closure plans continue to be refined, possible variations in Mineral Resources or Mineral Reserves, grade, dilution, or recovery rates; geotechnical and hydrogeological considerations during mining; failure of plant, equipment or processes to operate as anticipated; shipping delays and regulations; accidents, labour disputes and other risks of the mining industry; and delays in obtaining renewals to governmental approvals.

22.2 Methodology Used

The financial evaluation is based on a discounted cashflow (DCF) model. The DCF approach involves projecting yearly estimated revenues and subtracting yearly estimated cash outflows such as operating costs including mining costs, milling costs, G&A costs and associated maintenance costs, initial and sustaining capital costs, taxes and royalties to obtain the estimated net annual free cash flows. These net cash flows are discounted back to the valuation date using a real, after-tax discount rate of 8%, and then summed to determine the net present value (NPV_8) of the project. The 8% discount rate reflects Teck's estimated weighted average cost of capital. There are no additional project or country specific risk factors or adjustments considered. For the purposes of discounting, the model assumes that all revenues, operating and capital costs, taxes, and resulting free cash flows occur at the end of each year.

The DCF model was constructed on a constant first quarter 2016 US dollar ($) basis and none of the inputs or variables were escalated or inflated. For discounting purposes, 01 January 2017 is considered to be the first period (valuation date). All cash expenditures related to the project before this date have been excluded. The benefit of accumulated tax pools as well as the use of certain physical equipment acquired as result of these prior expenditures has been incorporated in the evaluation. The primary outputs of the analysis are NPV_8, internal rate of return (IRR), payback period, annual earnings before interest, tax, depreciation and amortization (EBITDA) and annual free cash flow, all on a 100% project basis.

22.3 Financial Model Parameters

The financial model is based on the Mineral Reserves in Section 15, the mine plan in Section 16, the recovery plan in Section 17, infrastructure assumptions in Section 18, the marketing assumptions in Section 19, social, permitting and environmental considerations in Section 20, and the capital and operating costs in Section 21.

22.3.1 Mine Life

The DCF analysis is based on a 25 year operating life (2021–2046 with partial years in the first and last year of operation), with first mill production occurring in the third quarter of 2021 and nameplate mill throughput capacity of 140,000 t/d. Nameplate mill throughput capacity is expected to be achieved 12 months after initial production. First major capital expenditures are assumed to occur in 2017. No expenditures prior to 2017 are considered.

22.3.2 Smelting and Refining Terms

An estimate treatment charge cost of $90/dmt of copper concentrate and a refining cost of $0.90/lb of copper have been assumed.

22.3.3 Metal Prices

Base case metal price assumptions and exchange rate assumptions used are summarized in Table 22-1.

Table 22-1: Commodity Price and Exchange Rate Assumptions

Area	Item
Copper:	$3.00/lb
Molybdenum:	$10.00/lb
$ 1 = CLP 625	2017 through 2021
$ 1 = CLP 575	2022 through remaining LOM

22.3.4 Royalties

QB2 is not subject to any royalties held by third parties.

22.3.5 Working Capital

Physical working capital requirements, such as capital spares and first fills, were included in the Owner's cost component of the estimated initial capital expenditures.

22.3.6 Taxes

The Project economics were modelled on an after-tax basis assuming project ownership by a Chilean-domiciled entity. The economics do not include any potential withholding tax for the repatriation of dividends outside of the country.

The analysis assumes access to $525 million of pre-existing tax pools related to Project expenditures prior to 2017 which have not yet been depreciated.

Taxes payable in Chile include the following:

- The mining tax rate is based on a sliding scale of operating margin, with a minimum rate of 5.0% and a maximum rate of 14.0%; there is no provision in the current mining tax code for carrying mining tax losses forward;
- The corporate income tax rate under the partially-integrated regime applicable to the Quebrada Blanca Operations is 27.0% of taxable income from 2017 onwards. Some notable features of the regime are:
    - Accelerated depreciation for mining plant and equipment is generally at straight-line over three years;
    - Corporate income tax losses can be carried forward indefinitely;
    - Mining tax is deductible for income tax purposes;
    - Dividends that are paid to Teck Resources Chile Limitada (TRCL), the Teck subsidiary that directly holds Teck's interest in CMTQB, are not subject to any withholding tax;
    - Distributions made by TRCL to a non-resident corporate shareholder would be subject to a dividend withholding tax; the rate will depend on the country in which the corporate shareholder is domiciled and whether a tax treaty is in place between Chile and the country of domicile, among other things. Distributions to non-resident corporate shareholders are not considered in the financial analysis.

For the purposes of the financial analysis, all capital expenditures are depreciated over 10 years using the straight-line method for mining tax purposes and are accelerated to three years using the straight-line method for corporate income tax purposes. All capital assets relating to expenditures prior to mill start-up are assumed to be placed into service upon mill start-up in Q3 2021. Thereafter, all capital assets are assumed to be placed into service in the year the capital expenditure is incurred.

22.4 Financial Results

At base assumptions, QB2 generates an IRR of 11.7% and an 8% discount rate (NPV_8) of $1,253 million as of January 1, 2017, with payback before financing costs estimated to occur in April 2027, 5.8 years after first production.

Table 22-2 summarizes the key financial metrics. The annual and cumulative free cash flows are presented graphically in Figure 22-1.The cash flows on an annualized basis, post-tax, for a Chilean-domiciled entity, are included as Table 22-3 and Table 22-4.

Table 22-2: Summary of Key Project Metrics and Estimated Project Economics

Category	**Unit**	**Total (1)**			**Annual Average (2)**		
		First 5 Years	**First 10 Years**	**Life-of-Mine**	**First 5 Years**	**First 10 Years**	**LOM**
Mining							
Total material moved	Mt	489	962	2,051	97.7	96.2	82.4
Processing							
Total ore processed	Mt	254	509	1,259	50.7	50.9	50.9
Head grade – copper	%	0.60%	0.56%	0.51%	0.60%	0.56%	0.51%
Head grade – molybdenum	%	0.020%	0.021%	0.019%	0.020%	0.021%	0.019%
Production							
Copper production	t x 1,000	1,375	2,583	5,842	275	258	238
Molybdenum production	t x 1,000	39	82	179	7.7	8.2	7.3
Copper equivalent production (3)	t x 1,000	1,504	2,856	6,440	301	286	262
Financial Summary							
Revenues (Net TCRC)	$ million	8,712	16,545	37,323	1,742	1,654	1,519
Operating costs (4)	$ million	3,702	7,367	17,632	740	737	709
EBITDA	$ million	5,010	9,178	19,691	1,002	918	811
Free cash flow	$ million	4,555	7,610	9,960	911	761	610
Cash Costs (5)							
Before by-product credits	$/lb Cu	1.51	1.59	1.66	1.51	1.59	1.64
After by-product credits	$/lb Cu	1.28	1.33	1.41	1.28	1.33	1.39
Category	**Unit**	**Total (1) LOM**					
Capital Costs							
Development capital costs	$ million	4,714					
Sustaining capital costs	$ million	492					
Closure costs (6)	$ million	184					
Economic Summary							
Net present value (8%)	$ million	1,253					
Internal rate of return	%	11.7%					
Payback (from first production)	years	5.8					
Mine life/payback (7)	—	4.3					

Notes to Accompany the Key Metrics Table:

1. Total numbers for first five years and first 10 years exclude the first partial year of operations in 2021;

2. Annual average numbers exclude the first partial year of operations in 2021 and in the case of the LOM annual average also exclude the last partial year of operations in 2046;
3. Copper equivalent figures are calculated by converting molybdenum production into equivalent copper tonnages using base case metal price assumptions;
4. Operating costs shown here reflect total operating costs which are comprised of site operating costs plus concentrate transportation and ocean freight costs
5. Cash costs before by-product credits allocate all costs, except for specific molybdenum concentrate freight costs and roasting charges, to the payable copper produced. Cash costs after by-product credits deduct the revenue received from molybdenum concentrate sales, net of specific molybdenum concentrate freight costs and roasting charges, from cash costs before by-product credits. Cash costs are inclusive of all stripping costs during operations, which are estimated at approximately $0.05 per pound of copper over the life of mine.
6. Closure costs shown here reflect $147 million in closure costs, plus the NPV at a 1.65% discount rate of post-closure costs of $209 million, spent evenly over 350 years, which equates to a value of $36 million;
7. Mine life/payback ratio is the planned mine life in years divided by the number of years from first production that capital payback is achieved.

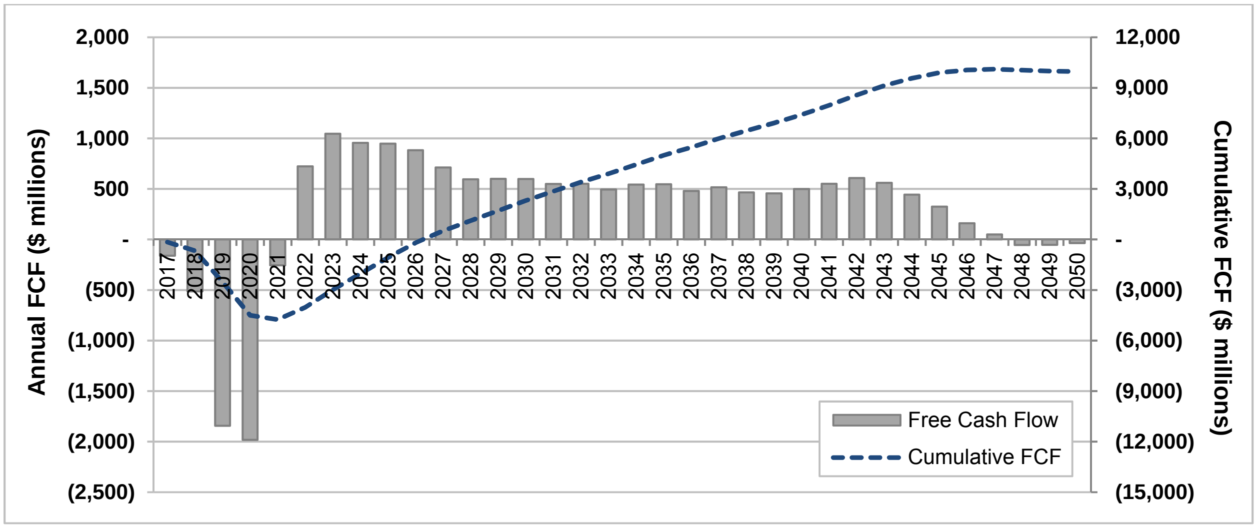

Figure 22-1: Annual and Cumulative Estimated Free Cash Flow

Note: Figure prepared by Teck, 2016. FCF = free cash flow

Table 22-3: Summary Cash Flow on an Annualized Basis (2017–2033)

QB2 Model Summary	Unit	LOM Sum / Avg.	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Commodity Prices																			
Copper	*US$/lb*		3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Molybdenum	*US$/lb*		10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Operating Summary																			
Total Material Moved	*Mt*	*2,051*	—	—	—	—	—	47.8	89.8	100.5	100.5	99.5	98.4	97.5	96.5	94.0	93.0	92.5	91.5
Ore Processed	*Mt*	*1,259*	—	—	—	—	—	11.6	49.2	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1
Copper Head Grade	*%*	*0.51%*	—	0.00	0.00	0.00	0.00	0.58	0.62	0.64	0.58	0.57	0.56	0.55	0.54	0.52	0.51	0.49	0.52
Moly Head Grade	*%*	*0.019%*	—	0.000	0.000	0.000	0.000	0.018	0.018	0.019	0.019	0.022	0.022	0.019	0.020	0.023	0.024	0.023	0.020
Copper Production	*kt*	***5,842***	—	—	—	—	—	***61***	***279***	***297***	***271***	***269***	***259***	***249***	***245***	***242***	***241***	***231***	***239***
Moly Production	*kt*	*179*	—	—	—	—	—	2	6	8	7	9	8	7	8	9	10	9	8
Copper Eq. Production	*kt*	*6,440*	—	—	—	—	—	67	300	323	296	298	287	273	271	273	274	262	265
C1 Cash Costs (before BPC)	*US$/lb*	*$1.66*	—	—	—	—	—	2.18	1.45	1.42	1.54	1.56	1.60	1.64	1.66	1.67	1.66	1.71	1.65
C1 Cash Costs (net BPC)	*US$/lb*	*$1.41*	—	—	—	—	—	1.96	1.26	1.22	1.32	1.30	1.33	1.40	1.41	1.36	1.33	1.38	1.40
Financial Summary																			
Revenues (Net of TC/RC)	*US$M*	*$37,323*	—	—	—	—	—	387	1,743	1,873	1,714	1,723	1,658	1,582	1,569	1,582	1,584	1,516	1,535
[-] Site Operating Costs	*US$M*	*$17,632*	—	—	—	—	—	236	644	674	681	685	675	675	681	676	670	667	661
[-] Transportation Costs	*US$M*	*$1,443*	—	—	—	—	—	16	69	73	67	68	67	62	61	60	59	56	58
EBITDA	*US$M*	***$19,691***	—	—	—	—	—	***136***	***1,030***	***1,127***	***966***	***970***	***917***	***845***	***828***	***846***	***855***	***793***	***816***
[-] Mining Taxes	*US$M*	*($783)*	—	—	—	—	—	—	21	25	17	17	15	11	10	11	25	45	47
[-] Cash Income Taxes	*US$M*	*($3,558)*	—	—	—	—	—	—	—	—	—	—	—	108	215	221	220	199	204
[-] Δ Net Working Capital	*US$M*	*$0*	—	—	—	—	—	67	211	20	(22)	1	(9)	(11)	(1)	1	(0)	(10)	2
Operating Cash Flow	*US$M*	*$15,350*	—	—	—	—	—	69	798	1,082	971	952	912	737	604	613	609	559	561
[-] Development Capital	*US$M*	*($4,714)*	—	156	505	1,822	1,887	344	—	—	—	—	—	—	—	—	—	—	—
[-] Sustaining Capital	*US$M*	*($492)*	—	—	—	—	—	92	81	37	15	5	28	25	9	13	11	10	11
[-] VAT Cash Flows	*US$M*	*$0*	—	4	9	20	95	(112)	(5)	(0)	(0)	(0)	0	(0)	(0)	(0)	(0)	(0)	(0)
[-] Closure Costs	*US$M*	*($184)*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Free Cash Flow	US$M	**$9,960**	—	**(160)**	**(514)**	**(1,842)**	**(1,982)**	**(255)**	**723**	**1,045**	**956**	**947**	**883**	**712**	**595**	**600**	**598**	**550**	**551**

Other Financial / Return Metrics		
Net Present Value (8%)	*US$M*	*1,253*
IRR	*%*	*11.7%*
Payback (from 1st production)	*years*	*5.8*
LOM / Payback	*years*	*4.3*

Table 22-4: Summary Cash Flow on an Annualized Basis (2034–2050)

QB2 Model Summary	**Unit**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**
Commodity Prices																		
Copper	*US$/lb*	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Molybdenum	*US$/lb*	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Operating Summary																		
Total Material Moved	*Mt*	90.4	89.5	86.5	80.5	77.0	72.0	67.0	57.9	53.6	56.5	51.1	50.7	24.8	—	—	—	—
Ore Processed	*Mt*	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	50.7	24.8	—	—	—	—
Copper Head Grade	*%*	0.52	0.51	0.48	0.49	0.46	0.48	0.49	0.49	0.52	0.48	0.41	0.36	0.34	0.00	0.00	0.00	0.00
Moly Head Grade	*%*	0.018	0.018	0.017	0.019	0.014	0.013	0.016	0.020	0.020	0.021	0.014	0.014	0.012	0.000	0.000	0.000	0.000
Copper Production	*kt*	***244***	***238***	***225***	***231***	***215***	***224***	***232***	***233***	***245***	***227***	***188***	***163***	***75***	**—**	**—**	**—**	**—**
Moly Production	*kt*	7	7	7	8	5	5	6	8	8	8	5	5	2	—	—	—	—
Copper Eq. Production	*kt*	268	262	247	256	233	240	252	259	271	254	205	181	82	—	—	—	—
C1 Cash Costs (before BPC)	*US$/lb*	1.62	1.66	1.73	1.69	1.78	1.73	1.66	1.63	1.53	1.64	1.78	1.99	2.64	—	—	—	—
C1 Cash Costs (net BPC)	*US$/lb*	1.38	1.42	1.49	1.42	1.57	1.55	1.44	1.36	1.27	1.35	1.55	1.72	2.41	—	—	—	—
Financial Summary																		
Revenues (Net of TC/RC)	*US$M*	1,557	1,523	1,434	1,485	1,355	1,395	1,465	1,500	1,576	1,474	1,182	1,041	468	—	—	—	—
[-] Site Operating Costs	*US$M*	660	664	659	656	650	649	642	632	617	622	555	555	354	—	—	—	—
[-] Transportation Costs	*US$M*	59	57	55	56	52	55	57	57	59	55	51	44	21	—	—	—	—
EBITDA	*US$M*	***839***	***802***	***720***	***773***	***654***	***691***	***766***	***812***	***900***	***797***	***577***	***442***	***93***	**—**	**—**	**—**	**—**
[-] Mining Taxes	*US$M*	50	46	39	44	35	37	44	48	56	47	31	21	3	—	—	—	—
[-] Cash Income Taxes	*US$M*	210	201	179	191	162	172	191	202	224	200	147	113	23	—	—	—	—

[-] Δ Net Working Capital	*US$M*	22	(4)	(13)	7	(18)	6	9	4	10	(14)	(44)	(20)	(91)	(85)	—	—	—
Operating Cash Flow	*US$M*	556	559	514	531	476	476	523	558	610	564	443	327	157	85	—	—	—
[-] Development Capital	*US$M*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
[-] Sustaining Capital	*US$M*	13	14	34	15	10	20	24	7	3	3	2	2	0	—	—	—	—
[-] VAT Cash Flows	*US$M*	0	0	0	(0)	(0)	0	(0)	(0)	(0)	0	(1)	0	(3)	(5)	—	—	—
[-] Closure Costs	*US$M*	—	—	—	—	—	—	—	—	—	—	—	—	—	39	55	53	36
Free Cash Flow	*US$M*	***544***	***545***	***479***	***516***	***465***	***456***	***499***	***552***	***607***	***561***	***443***	***325***	***160***	***50***	***(55)***	***(53)***	***(36)***

Notes to accompany cashflow tables: BPC = by-product credits (i.e. Mo); TC/RC = toll treatment charges/refining charges; EBITDA = annual earnings before interest, tax, depreciation and amortization; VAT = value-added tax.

22.5 Sensitivity Analysis

Figure 22-2 shows NPV_8 sensitivity to changes in key model inputs, based on ±10% changes in the base case assumption. Red bars indicate a -10% change to the input and green bars indicate a +10% change.

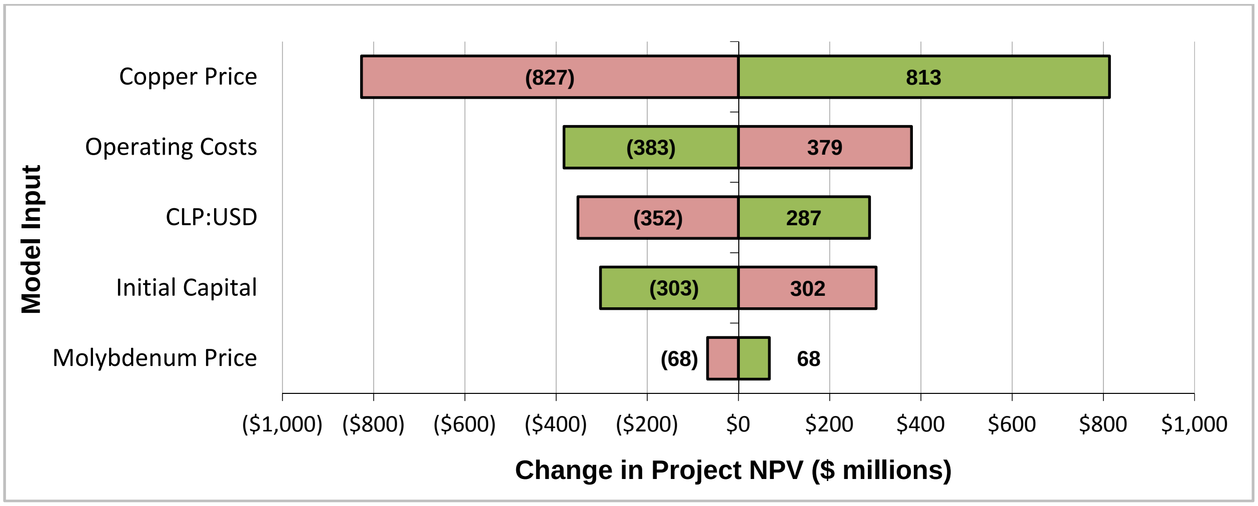

Figure 22-2: Sensitivity Analysis (10% Change)

Note: Figure prepared by Teck, 2016

The NPV_8 is most sensitive to changes in copper price, and moderately sensitive to changes in site operating costs, initial capital, and exchange rate (Figure 22-3).

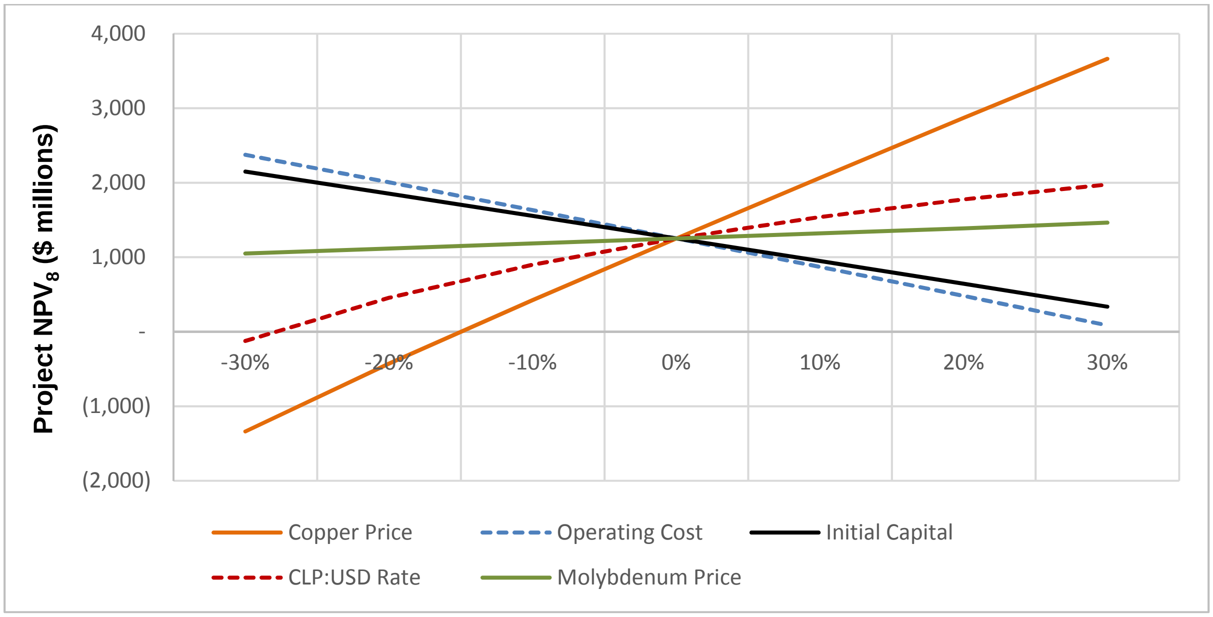

Figure 22-3: Change in NPV8 for Percent Changes in Model Inputs

Note: Figure prepared by Teck, 2016

A 1% change in copper recovery from the base assumption results in a change to QB2's NPV_8 of approximately $70 million. For every $0.25/lb change in copper price, over the range of sensitivities, QB2's NPV_8 changes by approximately $700 million; while every $0.25/lb change in molybdenum price changes the NPV_8 by approximately $17 million. A 10% change in initial capital and operating costs, on average across the range of sensitivities, results in changes to QB2's NPV_8 of approximately $300 million and $380 million, respectively.

23.0 Adjacent Properties

This section is not relevant to this Report.

24.0 Other Relevant Data and Information

24.1 Project Execution Plan

24.1.1 Work Plan

The proposed execution plan for the engineering, procurement, and construction/construction management (EPC/CM) for the mine expansion assumes that CMTQB would contract with a major international main contractor (referred to as the EPC/CM contractor) experienced in the design and construction of copper concentrator projects in the international market. It is expected that the EPC/CM contractor would use industry-standard practices. The execution plan assumes that Teck would have an Owner's team working with the contractor during the execution phase.

Engineering and procurement activities would be organized into the following work areas:

- Concentrator;
- TMF;
- Pipeline systems;
- Port and desalination plant.

Teck personnel would be responsible for work outside of the EPC/CM contractor's scope, including environmental and construction permitting, community relations, mine development, fuel and power supply.

24.1.2 Schedule

The schedule is based on the following key milestone events:

- EPC/CM limited notice to proceed: July 2012;
- Issue purchase orders for long-lead equipment: September 2012;
- Restart detailed engineering: first half of 2017;
- 2016 EIA approval: March 2018;
- Project notice to proceed to execution: mid-2018;
- Start concentrator mass earthworks: July 2018;
- Start grinding mill foundations: December 2018;
- Start grinding mill installation: July 2019;
- Start structural steel erection: July 2019;
- Permanent power available for concentrator: September 2020;
- First grinding line complete: June 2021;

- Second grinding line complete: September 2021.

The main critical paths are:

- Preparation, submittal, and approval of the 2016 EIA;
- Design, permitting and construction of the starter dam for the TMF.

The secondary critical paths are:

- Construction permits for the concentrator area;
- Execution of mass earthworks for grinding area;
- Execution of mass excavation balance for concentrator;
- Construction of grinding facility line number one (one SAG mill and two ball mills);
- Permanent power availability to the concentrator; required six months before mechanical completion;
- Concentrator pre-operational testing.

A schedule contingency of four months (representing the critical path for the concentrator) has been included in the schedule and there is currently an allowance of one month per year within the execution schedule. The contingency gives provision for uncertainties associated with variables in the schedule, such as quantities, equipment and material late deliveries, fabrication defects, labour productivity, activity durations, and construction interferences. The schedule contingency allocation does not include all possible delays, such as permitting delays, permanent power availability delays, or any force majeure event.

25.0 Interpretation and Conclusions

25.1 Introduction

The QPs note the following interpretations and conclusions in their respective areas of expertise, based on the review of data available for this Report.

25.2 Mineral Tenure, Surface Rights, Royalties and Agreements

Teck currently owns a 76.5% indirect interest in the mine, and is the mine operator.

Information from Teck's land experts supports that the mining tenure held is valid and is sufficient to support the declaration of Mineral Resources and Mineral Reserves.

A significant portion of the required surface rights have been obtained in support of locations of Project infrastructure. Discussions are underway with remaining land holders to acquire the necessary surface rights for the planned pipelines. Discussions are either underway, or planned, with parties that hold mining concessions within some of the areas that are currently proposed to host Project infrastructure.

There are no other royalties or encumbrances currently known on the Project other than the requirement to pay the Chilean mining tax.

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

25.3 Geology and Mineralization

The porphyry-style mineralization at Quebrada Blanca is considered to be typical of an Andean porphyry copper–molybdenum deposit.

The knowledge of the deposit settings, lithologies, mineralization style and setting, ore controls, and structural and alteration controls on mineralization is sufficient to support Mineral Resource and Mineral Reserve estimation.

The primary hypogene mineralization remains open to the immediate east–northeast of the FS2016 pit boundary. Exploration potential remains in the area to the east–northeast of the FS2016 pit boundary and additional exploration is warranted in this area.

25.4 Exploration, Drilling and Analytical Data Collection in Support of Mineral Resource Estimation

Exploration conducted to date has been appropriate to the porphyry copper deposit model. Work completed has included surface geological mapping; pit mapping; geochemical sampling; ground magnetic and IP/resistivity geophysical surveys, airborne magnetic geophysical surveys; RC , core, and blast hole drilling; metallurgical testwork; and mining studies, including scoping, pre-feasibility and feasibility studies.

Drilling completed to 31 December, 2016 on the Quebrada Blanca Project has included 731 core drill holes (217,458 m) and 1,498 RC drill holes (204,281 m) for a total of 2,229 drill holes (totalling 421,739 m). Not all of the core drilling is used in estimation; the resource estimate is supported by 623 core holes (198,812 m). Drill campaigns that are not used were undertaken in 1975, 1990, 2000, and after the database close-out date in June 2013. Information collected from the remaining core drilling campaigns, including geological logging, collar and down hole surveys, and core recoveries, supports the use of the data in Mineral Resource estimation. Limited use is made of RC and blast hole data; where these data are used, the information is suitable for the purpose (soluble copper determinations and variography, respectively).

Drill orientations are appropriate for the mineralization style. In general, most drill holes intersect mineralized zones at an angle, and the drill hole intercept widths reported for the Project are typically greater than the true widths of the mineralization at the drill intercept point.

Collection of the analytical and QA/QC drill data on the Project is a team effort, with assay data collected between 1977 and 2016, and QA/QC data collected after 2008. No formal site-based QA/QC programs were in place prior to 2007. As a result, the core drilling prior to 2007 was evaluated using a combination of re-assay and check assay programs in 2002 and 2011. Repeated duplicate sampling of drill core has indicated that there are lower levels of sampling precision for molybdenum when duplicate sampling results are reviewed. This has been attributed to the nugget and veinlet mineralization style of the molybdenite. Overall, the sampling, sample preparation, assay and density data for the drill programs used are suitable to support Mineral Resource and Mineral Reserve estimation.

The checks performed by Teck staff, including the continuous QA/QC checks conducted by the database administrator and Project geologists, annual QA/QC reviews, reviews in support of the annual Mineral Resource and Mineral Reserve estimates, internal process audits, and verification conducted as part of compilation of NI 43-101 technical reports, in particular from 2008 to date, are in line with industry standards for data verification and have identified no material issues with the data or the Project database.

Two external audits were conducted on the drill database that supported the 2012 FS resource estimate, and identified no material issues.

The data verification performed to date has adequately verified the quality of the core database as sufficient for use in estimating Mineral Resources and Mineral Reserves, and for use in mine planning.

25.5 Metallurgical Testwork

There have been various programs of metallurgical testwork conducted by Teck's third-party consultants throughout the Project's development history. Much of the testwork in support of the FS2012 has been superseded.

Testwork in support of the FS2016 has included mineralization characterization, variability testwork, Bond ball mill work index and SMC tests, flotation testing, a pilot plant campaign and copper–molybdenum separation tests. Additional test work, such as testing by vendors of process materials that were produced during the pilot plant operation in order to establish equipment sizing criteria, has also been completed.

Metallurgical projections were developed for the enriched, transitional and primary mineralization domains as defined in the resource model. The enriched and transitional zones collectively account for approximately 8% of the concentrator feed for the 25-year mine schedule.

The metallurgical testwork completed to-date is based on samples that adequately represent the variability of the proposed mine plan.

No elements are present at penalty levels in the copper concentrates. Credits may be obtained for silver; however, the average value (47.8 ppm) is considered to be only marginally above the payable value. Gold is not present at payable levels.

The average copper grade in the molybdenum concentrates is 1.40% Cu. Copper grades >1.00% Cu are expected to impact the molybdenum concentrate payment structure. No additional penalty elements are expected.

25.6 Mineral Resource Estimates

The resource block model update was completed in two phases, with the phases combined into one overall model for resource reporting. The model is effective 31 July, 2013. No drilling after this date supports the model.

The resource block model required interpretations of oxidation state, lithology type, alteration type, mineralization type, and structural blocks for definition of estimation domains.

All grades were estimated using OK. A three-pass approach was used for total copper, while a two-pass approach was used in the estimation of molybdenum and sulphur. The block model validation process showed that the model does an acceptable job of matching the source data.

The Mineral Resource estimate is reported exclusive of those Mineral Resources that have been converted to Mineral Reserves, and uses the definitions set out in the 2014 CIM Definition Standards. The Mineral Resource estimate includes material that will be mined by open pit methods, and hypogene material that has been stockpiled during the supergene mining activities.

Factors which may affect the Mineral Resource estimates include metal price and exchange rate assumptions; changes to the assumptions used to generate the NSR cut-off; changes in local interpretations of mineralization geometry and continuity of mineralized zones; density and domain assignments; geometallurgical and oxidation assumptions; changes to geotechnical, mining and metallurgical recovery assumptions; changes to input and design parameter assumptions that pertain to the conceptual Whittle pit design constraining the estimate; and assumptions as to the continued ability to access the site, retain mineral and surface rights titles, maintain environmental and other regulatory permits, and maintain the social licence to operate.

There are no other known environmental, legal, title, taxation, socioeconomic, marketing, political or other relevant factors that would materially affect the estimation of Mineral Resources that are not discussed in this Report.

25.7 Mineral Reserve Estimates

The mine plan was developed using Measured and Indicated Mineral Resources only. Mining assumes conventional open pit operations using truck-and-shovel technology. Mineralization that was classified as Inferred within the design pit was set to waste. The size of the open pit and the production rate are controlled by the storage capacity of the TMF, which is in turn affected by site-specific constraints.

Following evaluation, any potential impacts to ore feed that might arise due to ore loss or dilution were not considered material, and no provisions for ore loss or dilution were included in the mine plan.

The Mineral Reserve estimate uses the definitions set out in the 2014 CIM Definition Standards. Mineral Reserves are reported for material that will be mined by open pit methods only.

Factors that may affect the Mineral Reserve estimates include changes to the metal price assumptions; changes to the estimated Mineral Resources used to generate the mine plan; changes in the metallurgical recovery factors; changes in the geotechnical assumptions used to determine the overall wall angles; changes to the operating cut-off assumptions for mill feed or stockpile feed; changes to the input assumptions used to derive the open pit outline and the mine plan that is based on that open pit design; ability to maintain social and environmental licence to operate; and changes to the assumed permitting and regulatory environment under which the mine plan was developed.

There are no other known environmental, legal, title, taxation, socioeconomic, marketing, political or other relevant factors that would materially affect the estimation of Mineral Reserves that are not discussed in this Report.

25.8 Current Mining Operations

All required infrastructure to support the supergene mining operations is in place. This includes the SX/EW plant, maintenance shop, PLS and raffinate ponds, power plant, heap leach pads, dump leach pads, spent ore dumps, and WRFs.

The supergene mining operation commenced in 1994 and the remaining supergene ore in the open pit will be exhausted in 2017–2018, at which time active mining operations in the area of the open pit will cease until the hypogene operation commences in 2021.

The heap leach piles will continue to be irrigated and leached, and the SX/EW plant will continue to operate, producing copper cathode, until uneconomical to continue leaching.

The supergene mining fleet will be used in pre-production and early works activities related to QB2, including the mass excavation required for the concentrator site, and excavation of the starter dam for the TMF.

25.9 Mine Plan

Two production schedules were developed from the final optimized pit design. The base case mine plan uses Measured and Indicated material with the Inferred sent to waste and is the mine plan presented in this

Report. A development case using Measured, Indicated and Inferred was established in support of the 2016 EIA and permitting activities.

The design reserve pit was based on a Lerchs–Grossmann optimization process and a detailed phased pit design. Five mine phases were designed to prioritize the higher-grade zones within the mineral extraction plan, while maintaining suitable working widths that would enable high-productivity mining sequences using large-scale mining equipment.

QB2 will have a 25-year mine life, nominally from 2021 to 2046. The gradual decline in production over the life of mine should balance the additional mine equipment requirements given the deepening pit and growth of the WRSF and stockpiles. The highest copper production years occur in the first 10 years of operation due to the higher feed copper grades. Stockpiles will be treated in the last years of the operating life, with any material remaining on the high-grade stockpile treated prior to the processing of the low-grade stockpile.

The mine equipment from the supergene operation will be utilized for QB2; however, the higher production and milling rate will require a fleet size increase as production ramps up. The supergene operation fleet will be augmented with larger capacity haul trucks, electric-powered shovels, rotary blast hole drills and additional support equipment.

Mining operations will be conducted at an altitude that will see equipment performance that will be less than is seen in operations at lower altitudes; this is incorporated into mine planning and mining cost estimation assumptions.

Mine equipment maintenance will be carried out under MARC contracts.

There is significant upside potential for the Project if the design limitations imposed by the TMF can be addressed. The current mine plan uses only a portion of the estimated Measured and Indicated Mineral Resources. There is considerable upside potential if some or all of the remaining mineralization can be included in future mine plans.

25.10 Recovery Plan

The process flowsheet has evolved over time, and incorporates additional knowledge from testwork conducted after the FS2012 was completed.

The planned process is conventional. It will consist of primary crushing, coarse ore conveying, a coarse ore stockpile, and coarse ore reclaim from the stockpile, before the ore proceeds to ore grinding, pebble crushing, bulk flotation, copper–molybdenum separation, concentrate thickening, and reagent facilities.

25.11 Infrastructure

Infrastructure to support QB2 will be required at the mine site (4,300 masl elevation), the proposed TMF site (3,900 masl elevation), located about 7 km south of the concentrator site) and at the port site. The planned mine expansion requires significant supporting infrastructure, including an overhead HV electric power transmission line, a concentrate pipeline system to the port, a tailings transport system to the TMF, reclaim water pipeline system from the TMF, a desalinated makeup water pipeline system, and access roads.

25.12 Environmental, Permitting and Social Considerations

The EIA for QB2 was presented to the Chilean authorities on 26 September, 2016.

Teck will employ monitoring plans to help ensure that relevant environmental variables subject to environmental assessment are maintained.

Closure is subject to separate sectorial regulatory requirements and approval must be sought from SERNAGEOMIN.

To date, more than 198 types of permits have been identified as being required for the mine expansion project. Some of these permits are subject to environmental requirements and they are therefore included in the 2016 EIA. Other permits are considered sectorial permits only, because they do not have environmental requirements associated with them and they are not part of the 2016 EIA.

The Quebrada Blanca Operations subscribe to Teck's corporate policies and guidelines for corporate sustainability, which define the corporate expectations for sustainable conduct and sustainable development for all projects with which Teck or its subsidiaries become involved.

25.13 Markets and Contracts

Copper and molybdenum prices ($3.00/lb and $10.00/lb respectively) used for Mineral Resource and Mineral Reserve estimates were long-term metal prices from Teck's Commodity Price and Exchange Rates for Reserve and Resources Evaluations dated May 2016. These prices are supported by research from independent forecasters and analysts Wood Mackenzie and CPM.

Teck staff performed a review of the estimated quality of, and potential markets for, the copper and molybdenum concentrates that would be produced by the Project.

- The Project's copper concentrate is clean and contains low levels of deleterious elements, but lacks any distinguishing characteristics, so it is anticipated that it is unlikely to obtain a premium over the market Benchmark commercial terms;
- Molybdenum concentrates will be of average quality, with above normal copper contents (1.4% vs. 0.6%), which implies paying a greater discount or penalty.

Teck's marketing strategy for copper concentrates would focus on the major custom smelting companies in the world that are logistically practical for the delivery of concentrates, with Asia a most likely destination. Teck would also look to contract with companies that have a strong business base and will be strategic long-term customers for the entire Teck suite of mines. Some production may also be sold on the spot market. Which approach is used will be determined by the global offer and demand, and the concentrate characteristics (clean or complex).

No contracts are currently in place for the concentrates to be produced by the planned mine expansion. It is expected that any sales contracts signed would be within market norms.

The marketing approach is consistent with what is publicly available on industry norms, and the information can be used in mine planning and financial analyses for QB2 in the context of this Report.

Silver credits have not been included in the financial analysis in Section 22 for the copper concentrate. The silver content would make the copper concentrate more marketable. Silver credits represent a Project financial upside opportunity. The rhenium content of the molybdenum concentrate would, at minimum, make the molybdenum concentrate more marketable, and is also considered to be a Project upside opportunity.

25.14 Capital Cost Estimates

The estimates have been prepared to a target accuracy of ±15% as per AACE International Level 3 and are based on first quarter 2016 pricing. The overall contingency allowance is 10.9%. The estimated capital cost to build the operation is $4,714 million.

25.15 Operating Cost Estimates

The operating cost estimate includes all operational activities from mining and comminution of the QB2 ore, to production of a copper concentrate that would be transported via a pipeline to the port facilities at Punta Patache and a molybdenum concentrate that would be trucked or shipped to destinations as required. Operating costs for a nominal year of operation are estimated at about $653 million.

25.16 Economic Analysis

At base assumptions, QB2 generates an IRR of 11.7% and an 8% discount rate of $1,253 million as of January 1, 2017, with payback before financing costs estimated to occur in April 2027, 5.8 years after first production.

The analysis assumes access to $525 million of pre-existing tax pools related to project expenditures prior to 2017 which have not yet been depreciated.

The NPV_8 is most sensitive to changes in copper price, and moderately sensitive to changes in site operating costs, initial capital, and exchange rate.

25.17 Execution Plan

QB2 is estimated to be executed in 42 months after the submission of the 2016 EIA, with the EIA approval set at 18 months. The main critical paths are:

- Preparation, submittal, and approval of the 2016 EIA;
- Design, permitting and construction of the starter dam for the TMF.

25.18 Conclusions

Under the assumptions discussed in this Report, the Project returns a positive economic outcome. The decision to initiate construction activities rests with Teck management. Additional permit grants by the Government of Chile will also be required.

26.0 Recommendations

26.1 Introduction

On completion of the FS2016, each discipline area was reviewed to determine if additional testwork or investigative studies should be completed in support of detailed mine design.

A one-phase work program is proposed, and presented below by discipline area. No program is dependent on the results of another. The total program cost is estimated at approximately $7,280,000.

26.2 Drilling

Additional geotechnical drill holes are required to further support detailed engineering for design of concentrator foundations. Approximately five shallow drill holes are planned during detailed engineering to supplement the existing geotechnical data.

The estimated budget for the geotechnical work is approximately $150,000.

An Infill drilling program is recommended to provide support for potential resource confidence category upgrades to the Measured category, covering the majority of the payback period of the initial capital investment (approximately five years).

The estimated cost for the infill drilling work is approximately $6,400,000.

26.3 Hypogene Stockpile

Evaluations should be conducted to determine the molybdenum and silver grades of the current hypogene stockpile material and also to determine the level of oxidation that may be present and any effects that oxidation may have on metal recovery. This will require assaying of selected stockpile materials for molybdenum and silver, and a short metallurgical test program to determine any oxidation effects.

This program is estimated at about $200,000.

26.4 Silver Assays

Using available core, a reassay program is planned to provide sufficient coverage of the silver content of the deposit that the information can be used in resource modelling.

This program is estimated at about $150,000.

26.5 Resource Model

In-situ fragmentation models should be developed. These models will require that rock mass rating or RQD domains are developed and modelled within the resource model. Once the domains are adequately characterized, the information can be used to develop an understanding of the variability in throughput due to variations in RQD (and therefore ROM feed size distribution).

Development of detailed alteration models is also recommended. Alteration styles were found to affect flotation performance, and a better understanding of the alteration distributions in the resource model would allow for better characterization of the likely flotation variability.

This program is estimated at about $100,000.

26.6 Comminution

The collection of additional diorite material is recommended because of the lower number of samples tested during the 2013 geometallurgical program.

This program is estimated at about $100,000.

26.7 Staged Flotation Reactor

A testing program to assess the metallurgical performance of the staged flotation reactor in a cleaning duty should be undertaken. The program should consider side-by-side testing with staged flotation reactor and conventional laboratory flotation cells to assess any improvements in concentrate quality that may be attributable to the staged flotation reactor technology.

Confirmatory thickening (concentrate and tailings) and filtration (concentrate) testing should be conducted in parallel with the staged flotation reactor test program. This will provide an opportunity to assess the thickening and filtration performance with desalinated water instead of saline water.

This program is estimated at about $180,000 and should be conducted during the detailed engineering phase.

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APPENDIX A: EXPLORATION AND EXPLOITATION CONCESSION TABLES

Table A-1: Mine Sector Exploitation Concessions

Name	Title Holder	Area (ha)	Roll Number	Registration Data			
				Page	No.	Year	Municipality
Quebraditas 1/400	Cia Mra Teck Qda Blanca S.A.	2,000	01203-0019-9	805 vta	234	1990	Pozo Almonte
Fiel 1/180	Cia Mra Teck Qda Blanca S.A.	900	01203-0020-2	839 vta	235	1990	Pozo Almonte
Ester 1/288	Cia Mra Teck Qda Blanca S.A.	1,440	01203-0022-9	855 vta	236	1990	Pozo Almonte
Mauricio 1/655	Cia Mra Teck Qda Blanca S.A.	3,275	01203-0104-7	980	241	1990	Pozo Almonte
Sofia 1/500	Cia Mra Teck Qda Blanca S.A.	2,500	01203-0107-1	1022 vta	2420	1990	Pozo Almonte
Hernan 1/283	Cia Mra Teck Qda Blanca S.A.	133	01203-0147-0	33	4	1990	Pozo Almonte
Jaime 1/400	Cia Mra Teck Qda Blanca S.A.	2,000	01203-0154-3	918 vta	239	1990	Pozo Almonte
Teresa 1/294	Cia Mra Teck Qda Blanca S.A.	1,403	01203-0155-1	945 vta	240	1990	Pozo Almonte
Emilio 1/400	Cia Mra Teck Qda Blanca S.A.	2,000	01203-0158-6	891	238	1990	Pozo Almonte
Victoria 1/197	Cia Mra Teck Qda Blanca S.A.	380	01203-0331-7	306	100	1995	Pozo Almonte
Carolina 1/141	Cia Mra Teck Qda Blanca S.A.	270	01203-0332-5	298 vta	99	1995	Pozo Almonte
Loretto 10 1/81	Cia Mra Teck Qda Blanca S.A.	162	01203-0333-3	282	96	1995	Pozo Almonte
Loretto 9 1/16	Cia Mra Teck Qda Blanca S.A.	150	01203-0334-1	275 vta	95	1995	Pozo Almonte
Loretto 7 B 1/16	Cia Mra Teck Qda Blanca S.A.	140	01203-0335-K	269	94	1995	Pozo Almonte
Loretto 7 A 1/20	Cia Mra Teck Qda Blanca S.A.	195	01203-0336-8	263	93	1995	Pozo Almonte
Loretto 6 B 1/24	Cia Mra Teck Qda Blanca S.A.	225	01203-0337-6	256	92	1995	Pozo Almonte
Loretto 6 A 1/40	Cia Mra Teck Qda Blanca S.A.	400	01203-0338-4	250	91	1995	Pozo Almonte
Loretto 5 1/12	Cia Mra Teck Qda Blanca S.A.	120	01203-0339-2	245	90	1995	Pozo Almonte
Loretto 4 1/12	Cia Mra Teck Qda Blanca S.A.	115	01203-0340-6	294	98	1995	Pozo Almonte
Loretto 3 1/12	Cia Mra Teck Qda Blanca S.A.	120	01203-0341-4	239 vta	89	1995	Pozo Almonte
Loretto 2 1/12	Cia Mra Teck Qda Blanca S.A.	120	01203-0342-2	234	88	1995	Pozo Almonte
Isabel 1 1/45	Cia Mra Teck Qda Blanca S.A.	45	01203-0354-6	501	105	1996	Pozo Almonte
Isabel 2 1/100	Cia Mra Teck Qda Blanca S.A.	100	01203-0355-4	207	106	1996	Pozo Almonte
Sonia 1/140	Cia Mra Teck Qda Blanca S.A.	700	01203-0156-K	0873 vta	237	1990	Pozo Almonte
Loretto 1 1/32	Cia Mra Teck Qda Blanca S.A.	315	01203-0343-0	228	87	1995	Pozo Almonte
Blancado 4 1/29	Cia Mra Teck Qda Blanca S.A.	128	01203-0658-8	168	25	2004	Pozo Almonte
Blancado 7 1/36	Cia Mra Teck Qda Blanca S.A.	162	01203-0661-8	183	28	2004	Pozo Almonte
Collahuasi 1/500	Cia Mra Teck Qda Blanca S.A.	2,210	01203-0021-0	1	1	1964	Calama
Alex 1/1231	Cia Mra Teck Qda Blanca S.A.	5,691	01203-0093-8	1	1	1978	Iquique
Ricardo 1/18	Cia Mra Teck Qda Blanca S.A.	75	01203-0094-6	279	11	1978	Iquique
Hernan 1/283	Cia Mra Teck Qda Blanca S.A.	1,126	01203-0125-K	133	287	1996	Pozo Almonte
Maggita 1/107	Cia Mra Teck Qda Blanca S.A.	382	01203-0126-8	366 vta	148	1990	Pozo Almonte
Juan Alberto 1/1223	Cia Mra Teck Qda Blanca S.A.	5,476	01203-0150-0	386	149	1990	Pozo Almonte

Name	Title Holder	Area (ha)	Roll Number	Registration Data			
				Page	No.	Year	Municipality
Ron 1/17	Cia Mra Teck Qda Blanca S.A.	84	01203-0151-9	361	147	1990	Pozo Almonte
Juan Alberto 1/1498	Cia Mra Teck Qda Blanca S.A.	5,595	01203-0139-K	471	17	1976	Calama
Maggy I 1/6	Cia Mra Teck Qda Blanca S.A.	36	01203-0362-7	270	67	1996	Pozo Almonte
Marianela 1 1/3	Cia Mra Teck Qda Blanca S.A.	30	01203-0385-9	1307	282	1996	Pozo Almonte
Carmen 1/4	Cia Mra Teck Qda Blanca S.A.	20	01203-0157-8	96	19	1991	Pozo Almonte
Blancado 5 1/60	Cia Mra Teck Qda Blanca S.A.	300	01203-0659-6	173	26	2004	Pozo Almonte
Blancado 6 1/60	Cia Mra Teck Qda Blanca S.A.	300	01203-0660-K	178	27	2004	Pozo Almonte
Alex 1/200	Cia Mra Teck Qda Blanca S.A.	1,000	01203-0140-3	642	13	1981	Calama
Marianela 2 1/6	Cia Mra Teck Qda Blanca S.A.	60	01203-0376-7	276 vta	68	1996	Pozo Almonte
Marianela 3 1/4	Cia Mra Teck Qda Blanca S.A.	20	01203-0377-5	282	69	1996	Pozo Almonte
		41,903					

Note: vta = vuelta, or the back of the sheet.

Table A-2: Port Sector Exploitation Concessions

Name	Title Holder	Area (ha)	Roll Number	Registration Data			
				Page	No.	Year	Municipality
OSCAR 2 A 1/12	Cia Mra Teck Qda Blanca S.A.	90	01101-1574-1	1	1	2015	Iquique
OSCAR 3 1/20	Cia Mra Teck Qda Blanca S.A.	100	01101-1576-8	0842 vta	146	2014	Iquique
COSTA 3 1/19	Cia Mra Teck Qda Blanca S.A.	185	01101-1218-1	424	77	2014	Iquique
COSTA 2 1/18 (7-8-9-16-17-18)	Cia Mra Teck Qda Blanca S.A.	60	01101-1701-9	0041 vta	8	2013	Iquique
		435					

Table A-3: Pampa Sector Exploitation Concessions

Name	Title Holder	Area (ha)	Roll Number
Aura 1, 1 Al 30	Cia Mra Teck Qda Blanca S.A.	300	V-1434-2014
Aura 3, 1 Al 30	Cia Mra Teck Qda Blanca S.A.	300	V-1436-2014
Aura 4, 1 Al 30	Cia Mra Teck Qda Blanca S.A.	300	V-1437-2014
Aura 5, 1 Al 30	Cia Mra Teck Qda Blanca S.A.	300	V-1438-2014
Aura 6, 1 Al 30	Cia Mra Teck Qda Blanca S.A.	300	V-1439-2014
Aura 8, 1 Al 30	Cia Mra Teck Qda Blanca S.A.	200	V-1441-2014
Aura 7, 1 Al 30	Cia Mra Teck Qda Blanca S.A.	300	V-1440-2014

Name	Title Holder	Area (ha)	Roll Number
Mike I 1/90	Cia Mra Teck Qda Blanca S.A.	10	01204-2334-7
Lima I 1/100	Cia Mra Teck Qda Blanca S.A.	1,000	01204-2337-1
Oscar I 1/20	Cia Mra Teck Qda Blanca S.A.	55	01204-2339-8
November I 1/90	Cia Mra Teck Qda Blanca S.A.	10	01204-2340-1
Yanqui 1/50	Cia Mra Teck Qda Blanca S.A.	500	01204-2430-0
Bravo 2 1/50	Cia Mra Teck Qda Blanca S.A.	500	01204-2431-9
Tango 1/50	Cia Mra Teck Qda Blanca S.A.	500	01204-2433-5
Delta 2 1/60	Cia Mra Teck Qda Blanca S.A.	600	01204-2435-1
Oscar 2 1/20	Cia Mra Teck Qda Blanca S.A.	131	01204-2436-K
Romeo 1 1/50	Cia Mra Teck Qda Blanca S.A.	10	01204-2437-8
Papa 1 1/50	Cia Mra Teck Qda Blanca S.A.	10	01204-2438-6
Victor 2 1/30	Cia Mra Teck Qda Blanca S.A.	294	01204-2439-4
Sierra 1 1/20	Cia Mra Teck Qda Blanca S.A.	200	01204-2441-6
Sierra 2 1/20	Cia Mra Teck Qda Blanca S.A.	200	01204-2442-4
Uniform 2 1/30	Cia Mra Teck Qda Blanca S.A.	10	01204-2443-2
Alfa 3 1/26	Cia Mra Teck Qda Blanca S.A.	260	01204-2444-0
Zulu 1 1/28	Cia Mra Teck Qda Blanca S.A.	280	01204-2445-9
Rosario 91/180	Cia Mra Teck Qda Blanca S.A.	10	01204-2447-5
Rosario 181/270	Cia Mra Teck Qda Blanca S.A.	10	01204-2448-3
Rosario 271/360	Cia Mra Teck Qda Blanca S.A.	900	01204-2449-1
Rosario 361/450	Cia Mra Teck Qda Blanca S.A.	900	01204-2450-5
Rosario 451/540	Cia Mra Teck Qda Blanca S.A.	900	01204-2451-3
Rosario 541/630	Cia Mra Teck Qda Blanca S.A.	900	01204-2452-1
Rosario 631/720	Cia Mra Teck Qda Blanca S.A.	900	01204-2453-K
Rosario 721/810	Cia Mra Teck Qda Blanca S.A.	900	01204-2454-8
Rosario 811/900	Cia Mra Teck Qda Blanca S.A.	900	01204-2455-6
Rosario 901/980	Cia Mra Teck Qda Blanca S.A.	10	01204-2456-4
Rosario 981/988	Cia Mra Teck Qda Blanca S.A.	75	01204-2467-K
Rosario 989/996	Cia Mra Teck Qda Blanca S.A.	75	01204-2468-8
Rosario 997/1018	Cia Mra Teck Qda Blanca S.A.	220	01204-2472-6
Cristina 1/15	Cia Mra Teck Qda Blanca S.A.	150	01204-2755-5
Zoraida 1/30	Cia Mra Teck Qda Blanca S.A.	300	01204-2756-3
Julieta 26/50	Cia Mra Teck Qda Blanca S.A.	10	01204-2758-K
Amapola 1/30	Cia Mra Teck Qda Blanca S.A.	300	01204-2760-1
Julieta 1/25	Cia Mra Teck Qda Blanca S.A.	10	01204-2809-8

Name	Title Holder	Area (ha)	Roll Number
Estrella 32 1/30	Cia Mra Teck Qda Blanca S.A.	300	01204-2854-3
Estrella 33 1/10	Cia Mra Teck Qda Blanca S.A.	100	01204-2855-1
Estrella 44 1/20	Cia Mra Teck Qda Blanca S.A.	200	01204-2866-7
Estrella 45 1/20	Cia Mra Teck Qda Blanca S.A.	200	01204-2867-5
Estrella 46 1/10	Cia Mra Teck Qda Blanca S.A.	30	01204-2868-3
Estrella 47 1/30	Cia Mra Teck Qda Blanca S.A.	300	01204-2869-1
Estrella 48 1/20	Cia Mra Teck Qda Blanca S.A.	200	01204-2870-5
Estrella 30 1/30	Cia Mra Teck Qda Blanca S.A.	300	01204-2852-7
Aura 10 1/30	Cia Mra Teck Qda Blanca S.A.	300	01401-2100-2
Rosario 1022/1046	Cia Mra Teck Qda Blanca S.A.	250	01204-2473-4
Dalia 1/30	Cia Mra Teck Qda Blanca S.A.	300	01204-2759-8
Rosario 1/90	Cia Mra Teck Qda Blanca S.A.	10	01204-2446-7
		16,530	

Table A-4: Alconcha Sector Exploitation Concessions

Name	Title Holder	Area (ha)	Roll Number
Falcon 1 1/60	Cia Mra Teck Qda Blanca S.A.	300	02302-0381-4
Falcon 2 1/60	Cia Mra Teck Qda Blanca S.A.	300	02302-0382-2
Falcon 3 1/60	Cia Mra Teck Qda Blanca S.A.	300	02302-0383-0
Falcon 4 1/60	Cia Mra Teck Qda Blanca S.A.	300	02302-0384-9
Falcon 5 1/60	Cia Mra Teck Qda Blanca S.A.	300	02302-0385-7
Falcon 6 1/60	Cia Mra Teck Qda Blanca S.A.	300	02302-0386-5
Falcon 7 1/60	Cia Mra Teck Qda Blanca S.A.	300	02302-0387-3
Falcon 8 1/60	Cia Mra Teck Qda Blanca S.A.	300	02302-0388-1
Falcon 9 1/60	Cia Mra Teck Qda Blanca S.A.	300	02302-0389-K
Falcon 10 1/60	Cia Mra Teck Qda Blanca S.A.	300	02302-0390-3
		3,000	

Table A-5: Camino (Access Road) Sector Exploitation Concessions

Name	Title Holder	Area (ha)	Roll Number
Pica D 1/10	Cia Mra Teck Qda Blanca S.A	60	01203-0401-1
Pica E 1/20	Cia Mra Teck Qda Blanca S.A	200	01203-0402-K
Pica F 1/30	Cia Mra Teck Qda Blanca S.A	300	01203-0403-8
Pica G 1/30	Cia Mra Teck Qda Blanca S.A	300	01203-0404-6
Pica H 1/20	Cia Mra Teck Qda Blanca S.A	200	01203-0405-4
Pica I 1/24	Cia Mra Teck Qda Blanca S.A	240	01203-0406-2
Pica J 1/14	Cia Mra Teck Qda Blanca S.A	140	01203-0407-0
Pica 2 1/20	Cia Mra Teck Qda Blanca S.A	200	01203-0410-0
Pica 13 1/20	Cia Mra Teck Qda Blanca S.A	200	01203-0411-9
Pica 15 1/20	Cia Mra Teck Qda Blanca S.A	200	01203-0412-7
Pica 16 1/20	Cia Mra Teck Qda Blanca S.A	200	01203-0413-5
Pica 17 1/20	Cia Mra Teck Qda Blanca S.A	200	01203-0414-3
Pica 18 1/20	Cia Mra Teck Qda Blanca S.A	200	01203-0415-1
Pica 19 1/20	Cia Mra Teck Qda Blanca S.A	200	01203-0416-K
Ramadas A 1/30	Cia Mra Teck Qda Blanca S.A	300	01204-2460-2
Ramadas B 1/6	Cia Mra Teck Qda Blanca S.A	60	01204-2461-0
Ramadas C 1/6	Cia Mra Teck Qda Blanca S.A	60	01204-2462-9
Ramadas E 1/4	Cia Mra Teck Qda Blanca S.A	40	01204-2463-7
Ramadas D 1/5	Cia Mra Teck Qda Blanca S.A	50	01204-2464-5
Blancado 1 1/60	Cia Mra Teck Qda Blanca S.A	300	01203-0655-3
		3,650	