Fortuna Silver Mines Inc.: Caylloma Mine, Caylloma District, Peru

Technical Report
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1.1 Introduction

This Technical Report (the Report) on the Caylloma Mine in the Caylloma District, Peru, has been prepared by Mr Eric Chapman, P.Geo, and Mr Amri Sinuhaji, P.Eng. for Fortuna Silver Mines Inc. (Fortuna) in accordance with the disclosure requirements of Canadian National Instrument 43-101 (NI 43-101). The Report discloses updated Mineral Resource and Mineral Reserve estimates for the mine.

1.2 Property description, location and ownership

The Caylloma Mine is located in the puna region of Peru at an altitude of between 4,300 and 5,000 meters above sea level (masl). Surface topography is generally steep with vegetation being primarily comprised of grasses and small shrubs common at high altitudes. The mine facilities are located at approximately 4,300 masl.

Access to the Caylloma Mine is by a combination of sealed and gravel road. The mine is located 225 road kilometers from Arequipa, a city of approximately a million people that includes an international airport, and requires a trip of approximately 5 hours by vehicle. Access is available to all concessions via a network of unsealed roads.

The Caylloma Mine is an operating underground mine located in the Caylloma Mining District 14 km northwest of the town of Caylloma at the UTM grid location of 8192263E, 8321387N, (WGS84, UTM Zone 19S).

The underground mine is operated by Compania Minera Bateas S.A.C. (Bateas), a Peruvian subsidiary 100 % owned by Fortuna. The operation has infrastructure consisting primarily of the concentration plant, electrical power station, water storage facilities, tailings facilities, stockpiles, and workshop facilities, all connected by unsealed roads. Additional structures located at the mine include offices, dining hall, laboratory, core logging and core storage warehouses.

The property comprises mining concessions; surface rights; a permitted 1,500 tonnes per day (tpd) flotation plant; connection to the national electric power grid; as well as permits for the infrastructure necessary to sustain mining operations.

The Caylloma Mine consists of mineral rights for 66 mining concessions for a total surface area of 34,472 hectares (ha).

Bateas has signed 21 surface right or easement contracts covering a total of 3,529.89 ha with land owners to cover the surface area needed for the operation and tailings facilities.

1.3 History

The earliest documented mining activity in the Caylloma District dates back to that of Spanish miners in 1620. English miners carried out activities in the late 1800s and early 1900s. Numerous companies have been involved in mining the district of Caylloma but limited records are available to detail these activities.

The Caylloma Mine was acquired by Compania Minera Arcata S.A. (CMA), a wholly owned subsidiary of Hochschild Mining plc in 1981. Fortuna acquired the mine from CMA in 2005.

CMA focused exploration on identifying high-grade silver vein structures. Exploration was concentrated in the northern portion of the district and focused on veins including Bateas, El Toro, Paralela, San Pedro, San Cristobal, San Carlos, Don Luis, La Plata, and Apostles.

Production prior to 2005 came primarily from the San Cristobal vein, as well as from the Bateas, Santa Catalina and the northern silver veins (including Paralela, San Pedro, and San Carlos) with production focused on silver ores and no payable credits for base metals. While under CMA management production parameters fluctuated during the late 1990s, as reserves were depleted. Owing to low metal prices, funds were not available to develop the Mineral Resources at depth or extend along the strike of the veins. Ultimately this resulted in production being halted in 2002.

Production under Bateas management focused on the development of polymetallic veins producing lead and zinc concentrates with silver and gold credits. Total production since October 2006 through December 31, 2018 is estimated as 18.1 Moz of silver, 23 koz of gold, 117 kt of lead, and 163 kt of zinc.

1.4 Geology and mineralization

The mine is within the historical mining district of Caylloma, northwest of the Caylloma caldera complex and southwest of the Chonta caldera complex. Host rocks at the Caylloma Mine are volcanic in nature, belonging to the Tacaza Group. Mineralization is in the form of low to intermediate sulfidation epithermal vein systems.

Epithermal veins at the Caylloma Mine are characterized by minerals such as pyrite, sphalerite, galena, chalcopyrite, marcasite, native gold, stibnite, argentopyrite, and silver-bearing sulfosalts (tetrahedrite, polybasite, pyrargyrite, stephanite, stromeyerite, jalpite, miargyrite and bournonite). These are accompanied by gangue minerals, such as quartz, rhodonite, rhodochrosite, johannsenite (manganese-pyroxene) and calcite.

There are two different types of mineralization at Caylloma; the first is comprised of silver-rich veins with low concentrations of base metals and includes the Bateas, Bateas Techo, La Plata, Cimoide La Plata, San Cristobal, San Pedro, San Carlos, Paralela, and Ramal Paralela veins. The second type of vein is polymetallic in nature with elevated lead, zinc, copper, silver and gold grades and includes the Animas, Animas NE, Santa Catalina, Soledad, Silvia, Pilar, Patricia, and Nancy veins.

Underground operations are presently focused on mining the Animas and Animas NE veins.

1.5 Exploration, drilling, and sampling

CMA implemented a series of exploration programs to complement their mining activities prior to the closure of the operation in 2002. There is no reliable information available to detail the exploration conducted by CMA at the Caylloma Mine. Bateas were able to recover and validate information on 47 diamond drill holes totaling 8,177.67 m drilled by CMA between 1981 and 2003 at the Caylloma Mine.

Since Fortuna took ownership of the property in 2005 the principal exploration conducted at the deposit has been surface and underground drilling, to explore the numerous vein structures identified through surface mapping or geophysical surveys conducted by Bateas, or for infill purposes to increase the confidence level of the Mineral Resource estimates.

As of August 31, 2018, Bateas had completed 1,296 drill holes on the Caylloma Mine totaling 225,361.80 m since the company took ownership in 2005 and represents all data compiled as of the data cut-off date used for Mineral Resource estimation. All holes are diamond drill holes and include 544 from the surface totaling 151,774.55 m, and 752 from underground totaling 73,587.25 m. It is important to note that not all the holes presented encountered mineralization and only drill holes in areas where reasonable geological continuity of mineralized structures could be established were used in defining and ultimately estimating Mineral Resources.

Bateas has used a number of different drilling contractors to carry out exploration and definition drilling since it took ownership of the mine in 2005. Both HQ (63.5 mm) and NQ (47.6 mm) diameter core were obtained, depending on the depth of the hole. Ground conditions are generally good with core recovery averaging 94 %.

Proposed surface drill hole collar coordinates, azimuths and inclinations were designed based on the known orientation of the veins and the planned depth of vein intersection using geological plan maps and sections as a guide. Once the coordinates have been determined, the location of the collar is located in the field using differential global positioning system (GPS) instruments. The drill pad is then prepared at this marked location. Upon completion of the drill hole, a survey of the collar is performed using Total Station equipment, with results reported in the collar coordinates using reference Datum WGS84, UTM Zone 19S.

The geologist in charge of drilling is responsible for orienting the azimuth and inclination of the hole at the collar using a compass clinometer. Downhole surveys are completed by the drilling contractor using survey equipment such as a Flexit or Reflex tool at approximately 50 m intervals for all surface drill holes and for underground drill holes greater than 100 m in length. Bateas assesses the downhole survey measurements as a component of the data validation.

Drill holes are typically drilled on sections spaced 40 to 60 m apart along the strike of the vein with surface drilling focusing on exploring the extents of the Animas, Bateas and Nancy veins and underground drilling used for a mix of exploration and Mineral Resource and Mineral Reserve definition. The extent of drilling varies for each vein with those having the greatest coverage having drill holes extending over 4,000 m of the vein's strike length (Animas), to exploration prospects having only a few drill holes extending over 50 m (Antimonio).

The relationship between the sample intercept lengths and the true width of the mineralization varies in relation to the intersect angle between the steeply-dipping zone of mineralized veins and the inclined nature of the diamond core holes. Calculated estimated true widths (ETWs) are always reported together with actual sample lengths by taking into account the angle of intersection between drill hole and the mineralized structure.

In 2018 all logging became digital, being incorporated daily into the Maxwell DataShed database system. Data were recorded initially with Excel templates, and later with the Maxwell LogChief application using essentially the same structure. Both input methods used pick-lists and data validation rules to ensure consistency between loggers. Separate pages were designed to capture, lithology, alteration, veins, sulfide-oxide zones, minerals, structure (contacts, fractures, veins, and faults with attitudes to core axis), magnetic susceptibility, and special data (samples collected for geochemistry, thin section examinations, the core library, density, etc.). Intensity of alteration phases was recorded using a numeric 1 to 4 scale (weak, moderate, strong, very strong); abundance of veins and most other minerals were estimated in volume percent.

Geotechnical logging is conducted prior to cutting of the core and involves the collection of drill core recovery and rock-quality designation (RQD) data. Information is recorded in the field using the Maxwell LogChief application.

The sampling methodology, preparation, and analyses differ depending on whether it is drill core or a channel sample. All samples are collected by geological staff of Bateas with sample preparation and analysis being conducted either at the onsite Bateas Laboratory or transported to the ALS Global preparation facility in Arequipa prior to being sent on for analysis at their laboratory in Lima.

The Bateas laboratory operated by Bateas is not independent and does not hold an international recognized accreditation.

ALS Global is an independent, privately-owned analytical laboratory group. The preparation laboratory in Arequipa and the analytical laboratory in Lima are supported by a Quality Management System (QMS) framework which is designed to highlight data inconsistencies sufficiently early in the process to enable corrective action to be taken in time to meet reporting deadlines. The QMS framework follows the most appropriate ISO Standard for the service at hand i.e. ISO 9001:2015 for survey/inspection activity and ISO 17025:2005 UKAS ref 4028 for laboratory analysis.

Channel samples are collected from the backs of underground workings. The entire process is carried out under the geology department's supervision. Sampling is carried out at 2 m intervals within the drifts of all veins and 3 m intervals in stopes (except for Bateas and Soledad, where due to the thickness of the vein, sampling is carried out every 2 m in stopes). The channel lengths and orientations are identified using paint in the underground working and by painting the channel number on the footwall. The channel is between 20 cm to 30 cm wide and approximately 2 cm deep, with each individual sample being no longer than 1.5 m.

Drill core is laid out for sampling and logging at the core logging facility at the camp. Sample intervals are marked on the core and depths recorded on the appropriate box. A geologist is responsible for determining and marking the drill core intervals to be sampled, selecting them based on geological and structural logging. The sample length must not exceed 1.2 m or be less than 30 cm.

The elements of silver, copper, lead and zinc are assayed using either; atomic absorption (AA); inductively coupled plasma atomic emission spectroscopy (ICP-AES); or for high lead and zinc grades volumetric/titration techniques (VOL); or for high silver grades gravimetric techniques (GRAV) depending on the laboratory and assay value. Assay results and certificates are reported electronically by e-mail.

Bulk density samples have been primarily sourced from drill core with a limited number being sampled from underground workings. Bulk density measurements are performed at the ALS Global Laboratory in Lima using the OA-GRA09A methodology.

Sample collection and transportation of drill core and channel samples is the responsibility of Brownfields exploration and the Bateas mine geology departments and must follow strict security and chain of custody requirements established by Fortuna. Samples are retained in accordance with the Fortuna corporate sample retention policy.

Implementation of a quality assurance/quality control (QAQC) program is current industry best practice and involves establishing appropriate procedures and the routine insertion of certified reference material (CRMs), blanks, and duplicates to monitor the sampling, sample preparation and analytical process. Fortuna implemented a full QAQC program to monitor the sampling, sample preparation and analytical process for all drilling campaigns in accordance with its companywide procedures. The program involved the routine insertion of CRMs, blanks, and duplicates. Evaluation of the QAQC data indicate that the data are sufficiently accurate and precise to support Mineral Resource estimation.

1.6 Data verification

Bateas staff follow a stringent set of procedures for data storage and validation, performing verification of data on a monthly basis. The operation employs a Database Administrator who is responsible for overseeing data entry, verification and database maintenance. A separate Database Auditor is responsible for performing a detailed independent review of the database on a quarterly basis and submitting a report to Fortuna management detailing the findings. Any issues identified are immediately resolved by the administrator.

Data used for Mineral Resource estimation are stored in Maxwell GeoService's commercial SQL database system (DataShed), storing both mine related data (including channel samples) and drilling related results (exploration and infill drilling).

Data was transferred from an inhouse SQL database system to DataShed by early 2018 with the support of Maxwell personnel. Both databases were run in tandem until a full verification process had been completed to prove parity between the systems, at which point the original database was archived.

As a component of the 2018 Mineral Resource estimate, a preliminary validation of the Bateas database was performed by the Database Administrator in June 2018. The database has a series of automated import, export, and validation tools to minimize potential errors. Any inconsistencies identified were corrected during the analysis with the database then being handed over for final QP review on August 31, 2018 in Microsoft Access format.

In addition, data verification by the QP was also conducted through the inspection of selected drill core to assess the nature of the mineralization and to confirm geological descriptions as well as the inspection of geology and mineralization in underground workings of the Bateas, Animas/Animas NE, and Nancy veins.

A series of plan and cross sections were generated displaying the lithologic and mineralization interpretation by the Bateas geology and exploration departments and reviewed by the QP's of Fortuna.

The QP is of the opinion that the data verification programs performed on the data collected by Bateas are adequate to support the geological interpretations, the analytical and database quality, and Mineral Resource estimation at the Caylloma Mine.

1.7 Mineral processing and metallurgical testing

The Caylloma Mine has an extensive body of metallurgical investigation focused primarily on testwork conducted while treating ore at the operation since 2006. In the opinion of the QP, the Caylloma metallurgical samples tested and the ore that is presently treated in the plant is representative of the orebody as a whole in respect to grade and metallurgical response. Differences between vein systems are minimal with regard to recovery.

Metallurgical recovery values forecast in the LOM for sulfide material average 84 % for silver, 17 % for gold, 91 % for lead, and 90 % for zinc with the exception of the Ramal Piso Carolina vein that forecasts a metallurgical recovery rate of 75 % for Au. Metallurgical recovery is forecast for zinc oxide material to average 57 % for silver, 17 % for gold, 57 % for lead, and 35 % for zinc.

Until 2012 ore identified as containing high zinc oxide content was classified as not amenable for flotation. Laboratory and plant tests conducted since 2013 include metallurgical testing of material from the different levels of the Animas vein. The main conclusion was that zinc oxide contents greater than 0.20 % within the ore were related to lower metallurgical recoveries. In order to include this type of ore without affecting the metallurgical recoveries blending has to be performed to limit the high zinc oxide ore content to no more than 5 % of the feed to the plant.

Beyond the loss in metallurgical recovery related to elevated zinc oxide material, as described above, there are no additional deleterious elements that require special treatment in the plant as of the effective date of this Report.

1.8 Mineral Resources

The 2018 Mineral Resource update has relied on channel and drill hole sample information obtained by Bateas since 2005. Mineralized domains identifying potentially economically extractable material were modeled for each vein and used to code drill holes and channel samples for geostatistical analysis, block modeling and grade interpolation by ordinary kriging or inverse distance weighting.

Net smelter return (NSR) values for each mining block take into account expected commercial terms, the average metallurgical recovery, the average grade in concentrate and long term projected metal prices. Mineral Resources take into account operational costs and have been reported above a US$ 50/t NSR cut-off value for veins wider than two meters and amenable to extraction by semi-mechanized mining methods (Animas, Animas NE, Nancy, and San Cristobal veins); or above a US$ 135/t NSR cut-off value for veins narrower than two meters regarded as amenable to conventional mining methods (all other veins).

Resource confidence classification considers a number of aspects affecting confidence in the resource estimation including; geological continuity and complexity; data density and orientation; data accuracy and precision; and grade continuity. Mineral Resources are categorized as Measured, Indicated or Inferred. The criteria used for classification includes the number of samples, spatial distribution, distance to block centroid, kriging efficiency (KE) and slope of regression (ZZ).

Mineral Resources exclusive of Mineral Reserves for the Caylloma Mine are reported as of December 31, 2018 and detailed in Table 1.1.

Table 1.1 Mineral Resources as of December 31, 2018

Category	Tonnes (000)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Metal			
						Ag (Moz)	Au (koz)	Pb (kt)	Zn (kt)
Measured	**524**	**73**	**0.32**	**1.16**	**2.23**	**1.2**	**5**	**6**	**12**
Indicated	**1,633**	**77**	**0.29**	**1.23**	**2.25**	**4.1**	**15**	**20**	**37**
Measured + Indicated	**2,157**	**76**	**0.30**	**1.22**	**2.24**	**5.3**	**21**	**26**	**48**
Inferred	**5,354**	**102**	**0.32**	**2.40**	**3.83**	**17.6**	**56**	**129**	**205**

Notes on Mineral Resources

- Mineral Resources are as defined by the 2014 CIM Definition Standards for Mineral Resources and Mineral Reserves
- Mineral Resources are exclusive of Mineral Reserves
- Mineral Resources which are not Mineral Reserves do not have demonstrated economic viability
- Mineral Resources are estimated as of August 31, 2018 and reported as of December 31, 2018 taking into account production related depletion for the period through December 31, 2018
- Mineral Resources are reported above an NSR cut-off grade of US$ 50/t for wide veins and US$ 135/t for narrow veins based on actual operational costs
- Metal prices used in the NSR evaluation are US$ 18.25/oz for silver, US$ 1,320/oz for gold, US$ 2,270/t for lead and US$ 2,750/t for zinc
- Metallurgical recovery values used in the NSR evaluation of sulfide material are 84 % for silver, 17 % for gold, 91 % for lead, and 90 % for zinc with the exception of the Ramal Piso Carolina vein that uses metallurgical recovery rates of 75 % for Au
- Metallurgical recovery values used in the NSR evaluation of zinc oxide material are 57 % for silver, 17 % for gold, 57 % for lead, and 35 % for zinc
- Mining, processing and administrative costs used to determine NSR cut-off values were estimated based on first half of 2018 actual operating costs
- Eric Chapman, P.Geo. (APEGBC #36328) is the Qualified Person for resources being an employee of Fortuna Silver Mines Inc.
- Tonnes are rounded to the nearest thousand
- Totals may not add due to rounding

Factors that may affect the estimates include metal price and exchange rate assumptions; changes to the assumptions used to generate the cut-off grade; changes in local interpretations of mineralization geometry and continuity of mineralized zones; changes to geological and mineralization shape and geological and grade continuity assumptions; variations in density and domain assignments; geometallurgical assumptions; changes to geotechnical, mining, dilution, and metallurgical recovery assumptions; change to the input and design parameter assumptions that pertain to the conceptual stope designs constraining the estimates; and assumptions as to the continued ability to access the site, retain mineral and surface rights titles, maintain environment and other regulatory permits, and maintain the social license 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 or Mineral Reserves that are not discussed in this Report.

1.9 Mineral Reserves

Mineral Reserve estimates follow standard industry practices, considering only Measured and Indicated Mineral Resources as only these categories have sufficient geological confidence to be considered Mineral Reserves (CIM, 2014). Subject to the application of modifying factors, Measured Resources may become Proven Reserves and Indicated Resources may become Probable Reserves. Mineral Reserves are reconciled quarterly against production to validate dilution and recovery factors.

Mineral Reserve estimates for the Caylloma Mine are reported as of December 31, 2018 and detailed in Table 1.2.

Table 1.2 Mineral Reserves as of December 31, 2018

Category	Tonnes (000)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Metal			
						Ag (Moz)	Au (koz)	Pb (kt)	Zn (kt)
Proven	**149**	**85**	**0.26**	**2.09**	**3.23**	**0.4**	**1**	**3**	**5**
Probable	**2,477**	**77**	**0.18**	**2.12**	**3.71**	**6.1**	**14**	**52**	**92**
Proven +Probable	**2,626**	**77**	**0.18**	**2.11**	**3.69**	**6.5**	**15**	**56**	**97**

Notes on Mineral Reserves

- Mineral Reserves are as defined by the 2014 CIM Definition Standards for Mineral Resources and Mineral Reserves
- Mineral Reserves are estimated as of August 31, 2018 and reported as of December 31, 2018 taking into account production related depletion for the period through December 31, 2018
- Mineral Reserves are reported above NSR breakeven cut-off values based on the proposed mining method for extraction including; mechanized (breasting) at US$ 82.90/t; mechanized (enhanced) at US$ 70.30/t; semi-mechanized at US$ 93.10/t; and conventional at US$ 173.70/t
- Metal prices used in the NSR evaluation are US$ 18.25/oz for silver, US$ 1,320/oz for gold, US$ 2,270/t for lead, and US$ 2,750/t for zinc
- Metallurgical recovery values used in the NSR evaluation of sulfide material are 84 % for silver, 17 % for gold, 91 % for lead, and 90 % for zinc with the exception of the Ramal Piso Carolina vein that uses metallurgical recovery rates of 75 % for Au
- Metallurgical recovery values used in the NSR evaluation of zinc oxide material are 57 % for silver, 17 % for gold, 57 % for lead, and 35 % for zinc
- Mining, processing and administrative costs used to determine NSR cut-off values were estimated based on first half of 2018 actual operating costs
- Mining recovery is estimated to average 92 % with mining dilution ranging from 10 % to 40 % depending on the mining methodology
- Amri Sinuhaji, P.Eng (APEGBC #48305) is the Qualified Person for reserves being an employee of Fortuna Silver Mines Inc.
- Tonnes are rounded to the nearest thousand
- Totals may not add due to rounding

1.10 Mining methods

The mining method employed at the Caylloma Mine is cut-and-fill which is commonly used in the mining of steeply-dipping orebodies in stable rock masses. Cut-and-fill is a bottom up mining method that consists of removing ore in horizontal slices, starting from a bottom undercut and advancing upwards. The operation bases its mining plan on a mix of mechanized, semi-mechanized, and conventional extraction methods based on vein width and rock quality.

The mining production period extends from 2019 to 2023, almost 5 years. At full production the planned mining rate is 1,500 tpd (535,500 tonnes per annum). Planned LOM ore production is 2.63 Mt at an average silver grade of 77 g/t, gold grade of 0.18 g/t, lead grade of 2.11 %, and zinc grade of 3.69 %.

The QP is of the opinion that:

- The mining method being used is appropriate for the deposit being mined. The underground mine design, stockpiles, tailings facilities, and equipment fleet selection are appropriate for the operation
- The mobile equipment fleet presented is based on the actual mining operations, which is known to achieve the production targets set out in the LOM
- The mine plan method is based on standard industry practices and has been employed at the operation for the previous seven years, and presents low risk
- Inferred Resources are not included in the mine plan
- All mine infrastructure and supporting facilities meet the needs of the current mine plan and production rate

1.11 Recovery methods

The current process plant design is split into four principal stages including; crushing; milling; flotation; and thickening, filtering and shipping.

The QP considers process requirements to be well understood, and consistent based on the actual observed conditions in the operating plant. There is no indication that the characteristics of the material being mined will change and therefore the recovery assumptions applied for future mining are considered as reasonable for the LOM.

1.12 Project infrastructure

All mine and process infrastructure and supporting facilities are in place at the operation with an increase in tailings storage facility and designation of underground waste disposal area only required to meet the needs of the mine plan and production rate. The QPs note that:

- The Caylloma Mine is located 225 km, or 5 hours by road from the city of Arequipa, the main service center for the operation, with good year-round access
- The mine site infrastructure has a footprint of 91.12 ha associated with the Huayllacho beneficiation concession
- An expansion to the tailings facility was completed in January 2019, with a second phase planned for construction in 2021, providing sufficient capacity for the LOM
- Power demand on the mine site is 5.5 MW provided mainly (96 %) through the national power grid and two diesel generators on site to cover the shortfall and provide backup
- Water demand at the Caylloma Mine is 60 l/s, including 10 l/s for the camp. Approximately 70 % of the processing plant total water consumption is recovered from tailings facility N° 3 with the other 30 % from fresh water provided by the Santiago River
- All process buildings, offices, and camp facilities for operating the mine have been constructed

1.13 Market studies and contracts

Since the operation commenced production in October 2006 a corporate decision was made to sell the concentrate on the open market. In order to get the best commercial terms for the concentrates, it is Fortuna's policy to sign contracts for periods no longer than one year. All commercial terms entered between the buyer and Bateas are regarded confidential, but are considered to be within standard industry norms.

The QP has reviewed the information provided by Fortuna on marketing, contracts, metal price projections and exchange rate forecasts and notes that the information provided support the assumptions used in this Report and are consistent with the source documents, and that the information is consistent with what is publicly available within industry norms.

1.14 Environmental studies and permitting

The mining operation has been developed under strict compliance of norms and permits required by public institutions associated with the mining sector. Furthermore, all work follows quality and safety international norms as set out in ISO 14001 and OHSAS 18000.

In addition to these norms and permits obtained from the environmental department, the operation also ensures all environmental activities are regularly monitored and recorded as part of the quality control measures that are presented to the Ministry of Energy and Mining (MEM) and other legal regulatory organizations.

Of particular importance is monitoring of the quality of river water in the area. This activity involves monitoring the Santiago River, being the main river that passes through the property, employing people from the local communities to verify the results.

Bateas has a very strong commitment to the development of neighboring communities of the Caylloma Mine. In this respect, Bateas is committed to sustainable projects, direct support and partnerships that build company engagement in local communities while respecting local values, customs and traditions. The company aims to develop projects or programs based on respect for ethno-cultural diversity, open communication and effective interaction with local stakeholders that improve education, health and infrastructure.

Mine closure is also included in the environmental program. For 2019 a total of US$ 655,000 has been budgeted for the ongoing closure plan and environmental liabilities. The closure plan is performed to ensure compliance with the programs and plans submitted to the MEM. Budgeted mine closure costs for the LOM total US$ 11.3 million.

1.15 Capital and operating costs

Capital and operating cost estimates are based on established cost experience gained from current operations, projected budget data and quotes from manufacturers and suppliers.

The capital and operating cost provisions for the LOM plan that supports Mineral Reserves have been reviewed. The basis for the estimates is appropriate for the known mineralization; mining and production schedules; marketing plans; and equipment replacement and maintenance requirements.

The QP considers the capital and operating costs estimated for the Caylloma Mine as reasonable based on industry-standard practices and actual costs observed for 2018.

1.16 Economic analysis

Fortuna is using the provision for producing issuers, whereby producing issuers may exclude the information required under Item 22 for technical reports on properties currently in production and where no material production expansion is planned.

Mineral Reserve declaration is supported by a positive cashflow for the period set out in the LOM based on the assumptions detailed in this Report.

1.17 Conclusions, risks, and opportunities

This Report represents the most accurate interpretation of the Mineral Reserve and Mineral Resource available as of the effective date of this report. The conversion of Mineral Resources to Mineral Reserves was undertaken using industry-recognized methods, and estimated operational costs, capital costs, and plant performance data. Thus, it is considered to be representative of future operational conditions. This Report has been prepared with the latest information regarding environmental and closure cost requirements.

A number of opportunities and risks were identified by the QPs during the evaluation of the Caylloma Mine.

Opportunities include:

- Reduction in backfill costs through the optimization of the backfilling methodology in order to improve mining productivity by reducing work cycle times
- Reduction in mining costs via improvements in the underground communication system which would allow for faster and more efficient decision making, improve logistical coordination, and reduce downtime, hence improve overall mining productivity
- Reduction in overall pumping costs through improvements to the mine dewatering system resulting in reduced power consumption and maintenance requirements
- Potential to expand current resources through exploration of the Animas NE vein with mineralization remaining open to the northeast and at depth

Risks include:

- Bateas management occasionally receives requests from local authorities and/or civil organizations regarding unrealistic social expectations. Bateas are mitigating the risk of conflict regarding these demands by working with local authorities, land owners, and communities to address expectation levels and to take requests into account in preparing its annual community relations work program and budget

1.18 Recommendations

Recommendations for the next phase of work have been broken into those related to ongoing exploration activities and those related to additional technical and operational studies. Recommended work programs are independent of each other and can be conducted concurrently. The exploration phase is estimated to cost US$ 521,000 with additional technical studies estimated to cost US$ 280,000.

1.18.1 Exploration

- **Exploration**. It is recommended that Bateas continue surface mapping and TerraSpec analysis of key areas of interest including Animas, Antacollo, and Antimonio to identify potential future drill targets. The budgeted cost of the surface mapping activities for 2019 is US$ 36,000 (excluding personnel costs).
- **Delineation (infill) drilling**. Bateas is planning to continue the delineation drilling from underground in 2019 focusing on the junction between the Animas and Animas NE vein at depth. A total of 3,830 m of drilling and 55 m of development drift is planned at a budgeted total cost of US$ 480,000.
- **Bulk density determination**. It is recommended that the number of bulk density measurements by increased in veins that lack sufficient values for meaningful statistical analysis. In addition to this it is also recommended that a study be performed to improve the understanding of bulk density in the deposit. If a correlation between density and mineralogy could be established it may provide a superior alternative than the presently used density assignment methodology. This program is estimated at US$ 5,000.

1.18.2 Technical and operational studies

- **Underground communication system**. In 2019 it is recommended that the first phase of an improved underground communication system be installed to connect key areas of the mine at a budgeted cost of US$ 40,000. Based on positive results from the first phase the system could be extended throughout the mine to reach other production and production related areas.
- **Backfill system optimization**. It is recommended that an evaluation of the backfilling system is conducted at the operation. A trade off analysis should be conducted to benchmark the current hydraulic backfill system against alternative methods. The study should investigate the potential impacts on OPEX and CAPEX. The budgeted cost of the study is US$ 70,000.
- **Review of mining methodology**. The width of mineralization and rock quality varies greatly throughout the deposit. It is recommended that an evaluation of mining method be conducted to assess if smaller equipment could be used to extract mineralized material from narrow veins with poor rock quality, and if more massive mining methods such as long-hole stoping could be employed in wide veins with good rock quality. Any such study would need to account for the variable equipment that would be required to deal with multiple mining methods. The study could be conducted inhouse or externally, with an external cost estimated at US$ 50,000.
- **Plant expansion conceptual study**. A conceptual cost-benefit analysis is recommended to assess if the production rate at the Caylloma plant could be increased to reduce costs. The study could be conducted inhouse or externally, with an external cost estimated at US$ 120,000.
- **Zinc oxide study**. The response of zinc oxide material to the flotation process requires additional testwork. Initial plant testwork indicates that this material can be blended with low zinc oxide material and processed through flotation without

a significant loss in recovery, although the percentage blend at which the zinc oxide becomes detrimental has not been established. It is recommended that inhouse analysis be conducted to assess the impact of varying levels of zinc oxide on plant recovery to determine a blending threshold at which recovery is not affected.

2 Introduction

2.1 Report purpose

This Technical Report (the Report) on the Caylloma Mine in the Caylloma District, Peru, has been prepared by Mr Eric Chapman, P.Geo, and Mr Amri Sinuhaji, P.Eng. for Fortuna Silver Mines Inc. (Fortuna) in accordance with the disclosure requirements of Canadian National Instrument 43-101 (NI 43-101). The Report discloses updated Mineral Resource and Mineral Reserve estimates for the mine.

The mineral rights of the Caylloma Mine are held by Compania Minera Bateas S.A.C. (Bateas). Bateas is a Peruvian subsidiary that is 100 % owned by Fortuna and is responsible for running the Caylloma operation.

The primary purpose of this Report is to describe:

- Exploration and infill drilling activities conducted since June 30, 2015 (data cut-off date of previous Technical Report)
- Mineral Resources and Mineral Reserves as of December 31, 2018 taking into account all new relevant information as of August 31, 2018 and production related depletion
- Exploration of the Animas NE and associated veins

2.2 Scope of personal inspection

Mr. Eric Chapman has been employed as Fortuna's Vice President of Technical Services since January 2017 and prior to that as Mineral Resource Manager for Fortuna since May 2011. He has visited the property on multiple occasions, the most recent being on November 5, 2018. During his site visits Mr. Chapman has reviewed data collection, drill core, storage facilities, database integrity, procedures, and geological model construction. Discussions on geology and mineralization were held with Bateas personnel, and field site inspections were performed including a review of underground geology of the Animas NE, and inspection of operating underground drill machines. He worked with site geological personnel reviewing aspects of data storage (database) and analytical quality control.

Mr. Amri Sinuhaji has been the Director of Technical Services – Mine Planning for Fortuna since October 2018, and conducted site visits to the property including most recently on February 26, 2019. During this visit Mr. Sinuhaji reviewed geotechnical observations, infrastructure designs, mining methods, road access, and discussed environmental, social, permitting, operating and capital expenditure requirements with Bateas personnel.

2.3 Effective dates

The report has a number of effective dates, as follows:

- August 31, 2018: date of database cut-off for assays used in the Mineral Resource estimate for the Caylloma Mine
- September 15, 2018: date of the Mineral Resource estimate for the Caylloma Mine

- October 30, 2018: date of the Mineral Reserve estimate for the Caylloma Mine
- December 31, 2018: date of production-related depletion
- March 8, 2019: date to which drilling has been reported

The overall effective date of the Report is the date of the most recent supply of information on the ongoing drilling program, and is March 8, 2019.

2.4 Information sources and references

The main information sources referenced in this Report is the 2017 technical report:

- Chapman & Gutierrez, 2017. Amended Technical Report on the Caylloma Property, Caylloma District, Peru, prepared by Fortuna Silver Mines Inc., effective date 31 August 2016

Additional information was obtained from site personnel including metallurgical input from Marco Flores (Plant Superintendent) and social, environmental and permitting guidance from Eduardo Asmat (Legal Manager) and Maria Elena Vinatea (Manager of Community Relations).

2.5 Previous technical reports

Fortuna has previously filed the following technical reports on the Caylloma Mine, listed in reverse chronological order:

- Chapman & Gutierrez, 2017. Amended Technical Report on the Caylloma Property, Caylloma District, Peru, prepared by Fortuna Silver Mines Inc., effective date 20 August 2016
- Chapman & Kelly, 2013. Amended Technical Report on the Caylloma Property, Caylloma District, Peru, prepared by Fortuna Silver Mines Inc., effective date 22 March 2013
- Chapman & Acosta, 2012. Amended Technical Report on the Caylloma Property, Caylloma District, Peru, prepared by Fortuna Silver Mines Inc., effective date 7 May 2012
- Nielsen, Milne & Sandefur, 2009. Technical Review (NI 43-101), Caylloma Project, Peru, prepared by Chlumsky, Armbrust & Meyer, LLC., effective date 11 August 2009
- Sandefur, 2006. Technical Report, Caylloma Project, Arequipa, Peru, prepared by Chlumsky, Armbrust & Meyer, LLC., effective date 3 October 2006
- Armbrust, Kilpatrick & Sandefur, 2005. Technical Report, Caylloma Project, Arequipa, Peru, prepared by Chlumsky, Armbrust & Meyer, LLC., effective date 22 April 2005

2.6 Acronyms

Some of the more commonly used acronyms used in the Report are detailed in Table 2.2.

Table 2.1 Acronyms

Acronym	Description	Acronym	Description
Ag	silver	n/a	not applicable
Au	gold	NI	national instrument
cfm	cubic foot per minute	NN	nearest neighbor
cm	centimeters	nr	not recorded
COG	cut-off grade	NSR	net smelter return
Cu	copper	OK	ordinary kriging
g	grams	oz	troy ounce
g/t	grams per tonne	ppm	parts per million
ha	hectares	Pb	lead
kg	kilograms	psi	pounds per square inch
km	kilometers	QAQC	quality assurance/quality control
kV	kilovolts	RMR	rock mass rating
kW	kilowatts	RQD	rock-quality designation
lbs	pounds	s	second
l	liter	t	metric tonne
LOM	life-of-mine	t/m^3	metric tonnes per cubic meter
m	meters	tpd	metric tonnes per day
Ma	millions of years	yd	yard
masl	meters above sea level	yr	year
Moz	million troy ounces	Zn	zinc
Mn	manganese	US$/t	United States dollars per tonne
Mt	million metric tonnes	US$/g	US dollars per gram
MVA	megavolt ampere	US$/%	US dollars per percent
MW	megawatt		

3 Reliance on Other Experts

The QPs have not independently reviewed ownership of the Caylloma Mine and any underlying agreements, mineral tenure, surface rights, or royalties. The QPs have fully relied upon, and disclaim responsibility for, information derived from Fortuna and legal experts retained by Fortuna for this information through the following documents:

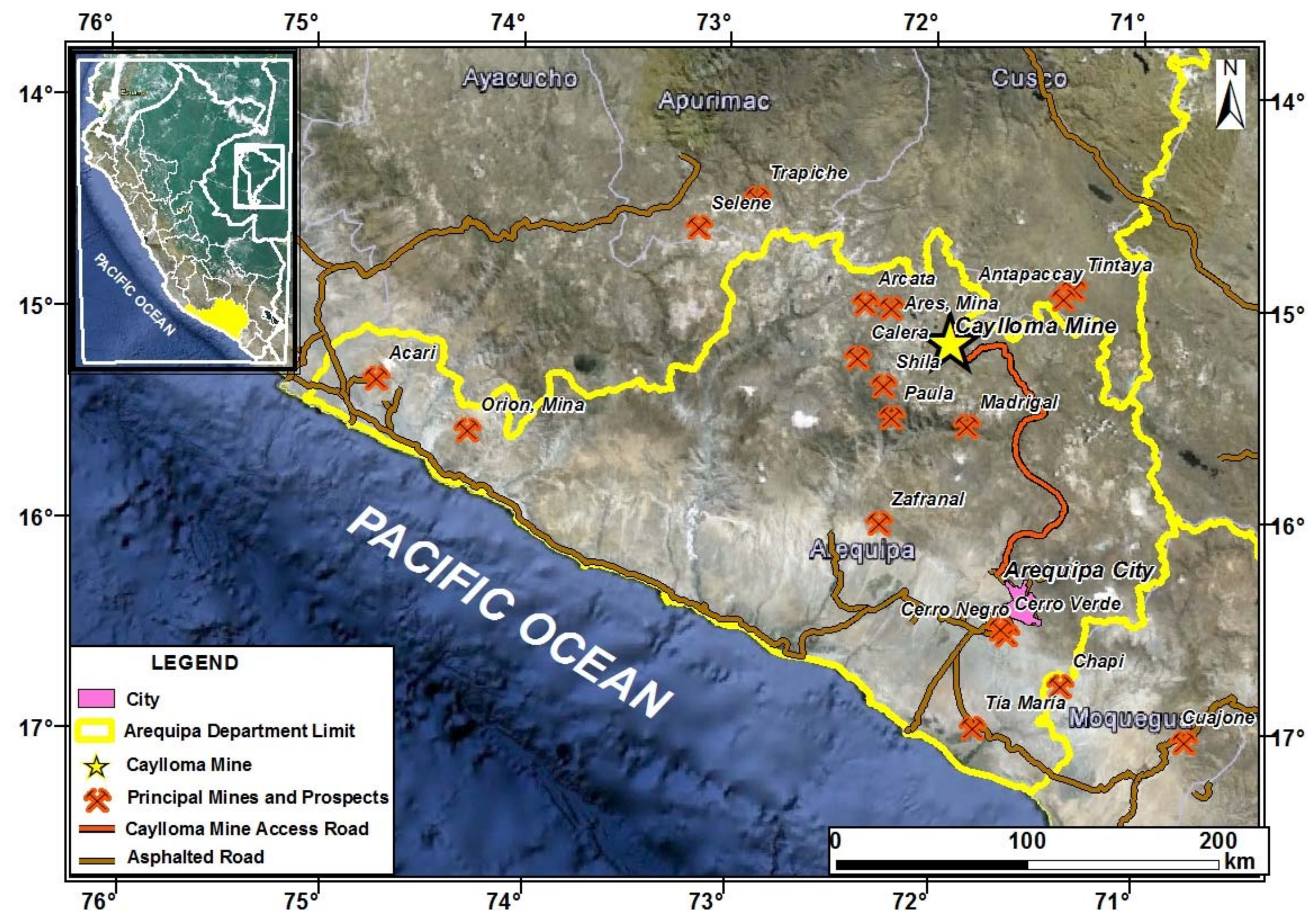
- Hernandez & Cia., 2019. Legal Opinion – Caylloma Mine prepared by Hernandez & Cia. Abogados for Fortuna Silver Mines Inc. dated January 16, 2019, 64 p.

This information is used in Section 4 of the Report. The information is also used in support of the Mineral Resource estimate in Section 14 and the Mineral Reserve estimate in Section 15.

4 Property Description and Location

The Caylloma Mine is located in the Caylloma District, 225 road-kilometers north-northwest of Arequipa, Peru. The property is 14 km northwest of the town of Caylloma at the UTM grid location of 8192263E, 8321387N, (WGS84, UTM Zone 19S). The location of the mine is shown in Figure 4.1.

Figure 4.1 Map showing the location of the Caylloma Mine



The Caylloma Mine is the only mine operated by Bateas, all other mines shown operated by third parties

Figure prepared by Bateas using Google Maps, Aug 2016

4.1 Mineral tenure

Fortuna Silver Mines Inc. acquired a 100 % interest in the Caylloma Mine in June 2005. The property comprises mining concessions; surface rights; a permitted 1,500 tpd flotation plant; connection to the national electric power grid; permits for camp facilities for 890 persons; and the infrastructure necessary to sustain mining operations.

4.1.1 Mining claims and concessions

The Caylloma Mine consists of mineral rights for 66 mining concessions for a total surface area of 34,472 hectares (ha). A list of the mining concessions showing the names, areas in hectares, and title details are presented in Table 4.1. In addition to these, the

Huayllacho mill-site (processing plant) has a titled beneficiation concession comprising 91.12 ha.

In Peru, mining concessions do not have expiration dates but an annual fee must be paid to retain the concessions in good standing. Bateas states that all fees are up to date and the concessions listed in Table 4.1 are all in good standing.

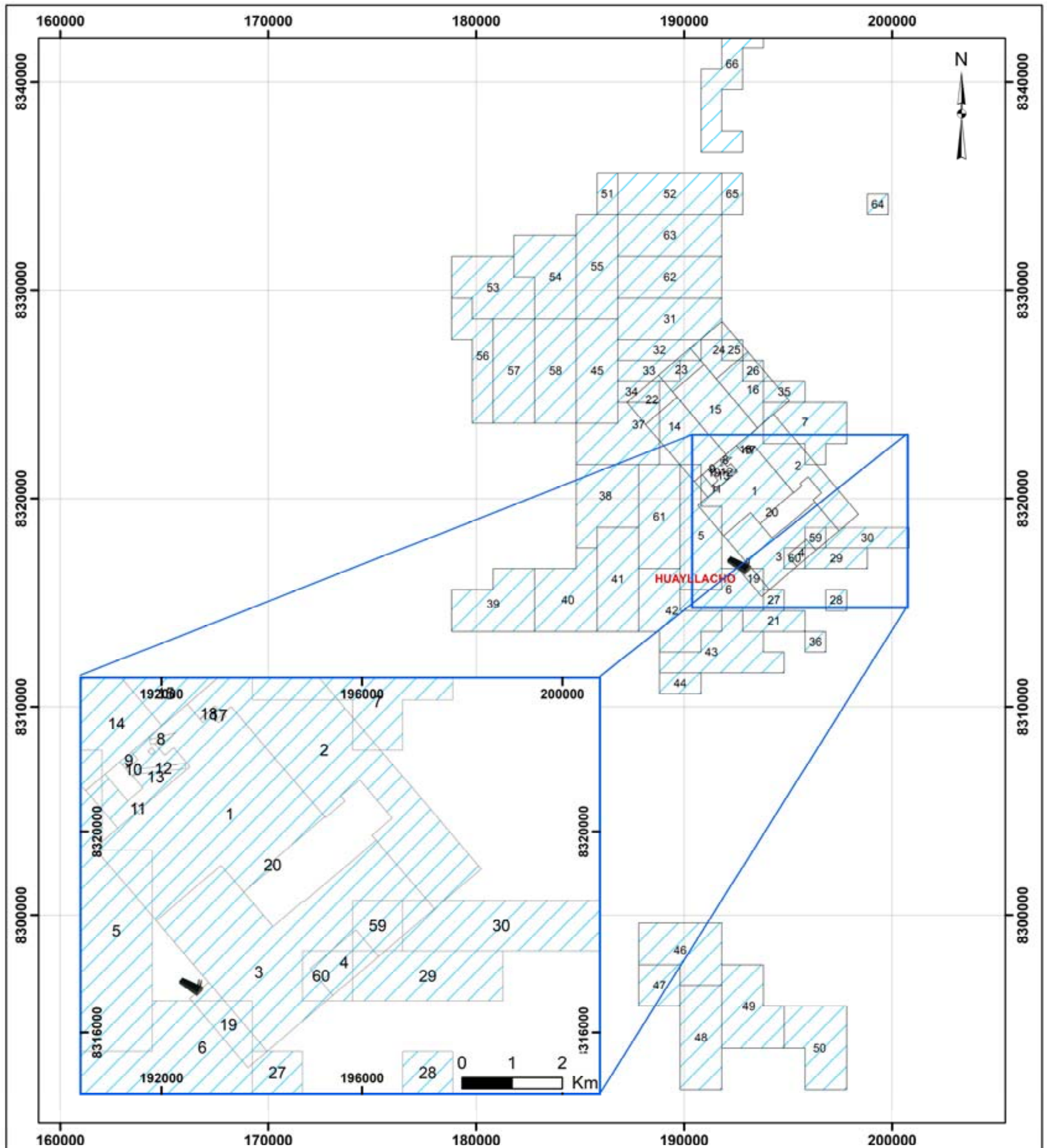
Table 4.1 Mineral concessions owned by Bateas

No.	Concession Name	Area (ha)	Title Number	Bateas Acquisition Date
1	Acumulacion Cailloma No. 1	989.53	R.J. No. 522-00-RPM	01/06/2005
2	Acumulacion Cailloma No. 2	920.41	R.D. No. 355-90/EM/DCMDE	01/06/2005
3	Acumulacion Cailloma No. 3	979.28	R.D. No. 410-90/EM/DCMDE	01/06/2005
4	Corona de Antimonio N.2	84.00	R.J. No. 8642-96-RPM	01/06/2005
5	Cailloma 4	788.77	R.J. No. 01391-2002-INACC/J	01/06/2005
6	Cailloma 5	514.19	R.J. No. 01405-2002-INACC/J	01/06/2005
7	Cailloma 6	678.88	R.J. No. 1401-2002-INACC/J	01/06/2005
8	Eureka 88	4.46	R.J. No. 2782-99-RPM	01/06/2005
9	Sandra No. 5	6.00	R.J. No. 6917-94-RPM	01/06/2005
10	Sandra No. 6	4.00	R.J. No. 6920-94-RPM	01/06/2005
11	Sandra No. 7	2.00	R.J. No. 7054-94-RPM	01/06/2005
12	Sandra No. 9	9.00	R.J. No. 6919-94-RPM	01/06/2005
13	Sandra No. 102-A	124.99	R.J. No. 2811-00-RPM	01/06/2005
14	Sandra 106	724.00	R.J. No. 404-91-RPM	01/06/2005
15	Sandra 107	794.00	R.D. No. 764-90-EM-DGM-DCM	01/06/2005
16	Sandra 108	614.00	R.D. No. 72-91-EM-DGM-DCM	01/06/2005
17	Sandra 120	4.00	R.D. No. 086-88-EM-DG-DCM	01/06/2005
18	Sandra 121	4.00	R.D. No. 173-88-EM-DGM-DCM	01/06/2005
19	Sandra 123	90.00	R.J. No. 1769-99-RPM	01/06/2005
20	S.P. No.16	0.12	R.M. No 2142	01/06/2005
21	Cristobal R1	300.00	R.P. No. 4573-2009-INGEMMET/PCD/PM	30/12/2009
22	Sandra 106-A	276.00	R.P. No. 1546-2010-INGEMMET/PCD/PM	02/06/2010
23	Sandra 107-A	206.00	R.P. No. 0685-2010-INGEMMET/PCD/PM	11/03/2010
24	Sandra 108-A	386.00	R.P. No. 1282-2010-INGEMMET/PCD/PM	17/05/2010
25	Sandra 108-B	3.58	R.P. No. 1767-2013-INGEMMET/PCD/PM	28/03/2014
26	Sandra 108-C	9.25	R.P. No. 1704-2013-INGEMMET/PCD/PM	28/03/2014
27	Cailloma 11	96.35	R.P. No. 2165-2010-INGEMMET/PCD/PM	18/08/2011
28	Cailloma 12	100.00	R.P. No. 2056-2010-INGEMMET/PCD/PM	18/08/2011
29	Cailloma 14	282.27	R.P. No. 2180-2010-INGEMMET/PCD/PM	18/08/2011
30	Cailloma 15	371.31	R.P. No. 2436-2010-INGEMMET/PCD/PM	18/08/2011
31	Cailloma 16	954.08	R.P. No. 2259-2010-INGEMMET/PCD/PM	18/08/2011
32	Cailloma 17	337.26	R.P. No. 3561-2010-INGEMMET/PCD/PM	18/08/2011
33	Cailloma 18	219.65	R.P. No. 4711-2010-INGEMMET/PCD/PM	18/08/2011
34	Cailloma 19	102.04	R.P. No. 2514-2010-INGEMMET/PCD/PM	18/08/2011
35	Cailloma 20	112.69	R.P. No. 2754-2010-INGEMMET/PCD/PM	18/08/2011
36	Cailloma 21	100.00	R.P. No. 3193-2010-INGEMMET/PCD/PM	23/08/2011
37	Cailloma 22	854.75	R.P. No. 2334-2012-INGEMMET/PCD/PM	31/05/2012
38	Cailloma 23	1,000.00	R.P. No. 0348-2012-INGEMMET/PCD/PM	22/06/2012
39	Cailloma 24	1,000.00	R.P. No. 1014-2012-INGEMMET/PCD/PM	23/07/2012
40	Cailloma 25	1,000.00	R.P. No. 0932-2012-INGEMMET/PCD/PM	23/07/2012
41	Cailloma 26	1,000.00	R.P. No. 3218-2012-INGEMMET/PCD/PM	01/03/2013
42	Cailloma 27	1,000.00	R.P. No. 1882-2012-INGEMMET/PCD/PM	23/07/2012
43	Cailloma 28	1,000.00	R.P. No. 1816-2012-INGEMMET/PCD/PM	23/07/2012
44	Cailloma 29	200.00	R.P. No. 0930-2012-INGEMMET/PCD/PM	23/07/2012

No.	Concession Name	Area (ha)	Title Number	Bateas Acquisition Date
45	Cailloma 30	1,000.00	R.P. No. 0346-2012-INGEMMET/PCD/PM	11/06/2012
46	Cailloma 38	1,000.00	R.P. N° 0616-2012-INGEMMET/PCD/PM	11/06/2012
47	Cailloma 39	400.00	R.P. N° 0419-2012-INGEMMET/PCD/PM	11/06/2012
48	Cailloma 40	1,000.00	R.P. N° 0227-2012-INGEMMET/PCD/PM	11/06/2012
49	Cailloma 41	1,000.00	R.P. N° 0507-2012-INGEMMET/PCD/PM	11/06/2012
50	Cailloma 42	1,000.00	R.P. N° 0498-2012-INGEMMET/PCD/PM	11/06/2012
51	Cailloma 43	200.00	R.P. No. 0949-2012-INGEMMET/PCD/PM	23/07/2012
52	Cailloma 44	1,000.00	R.P. No. 1521-2012-INGEMMET/PCD/PM	23/07/2012
53	Cailloma 45	1,000.00	R.P. No. 0497-2012-INGEMMET/PCD/PM	11/06/2012
54	Cailloma 46	1,000.00	R.P. No. 0638-2012-INGEMMET/PCD/PM	11/06/2012
55	Cailloma 47	1,000.00	R.P. No. 0640-2012-INGEMMET/PCD/PM	11/06/2012
56	Cailloma 48	700.00	R.P. No. 0909-2012-INGEMMET/PCD/PM	23/07/2012
57	Cailloma 49	1,000.00	R.P. No. 0989-2012-INGEMMET/PCD/PM	23/07/2012
58	Cailloma 50	1,000.00	R.P. No. 1074-2012-INGEMMET/PCD/PM	23/07/2012
59	Cailloma 51	5.35	R.P. No. 1718-2013-INGEMMET/PCD/PM	13/02/2014
60	Cailloma 52	10.66	R.P. No. 1740-2013-INGEMMET/PCD/PM	28/03/2014
61	Cailloma 10A	973.03	R.P. No. 1859-2012-INGEMMET/PCD/PM	24/09/2013
62	Gaya 9	1,000.00	R.P. No. 3114-2010-INGEMMET/PCD/PM	24/09/2013
63	Gaya 8	1,000.00	R.P. No. 2970-2010-INGEMMET/PCD/PM	24/09/2013
64	Gaya 22	27.14	R.P. No. 2163-2012-INGEMMET/PCD/PM	24/09/2013
65	Gaya 7-A	55.39	R.P. No. 2699-2010-INGEMMET/PCD/PM	24/09/2013
66	Gaya 10	854.45	R.P. No. 0890-2013-INGEMMET/PCD/PM	24/09/2013
Total		**34,472.88**		

Pursuant to an agreement dated March 10, 2016, Bateas granted to Compania de Minas Buenaventura S.A.A. (Buenaventura) the right to acquire an interest in the mineral concessions Cailloma 38 through Cailloma 42 as referred to in Table 4.1. To earn a 51 % interest in the concessions, Buenaventura must spend US$ 4 million in the exploration of the concessions over four years. Fulfillment of this condition would entitle Buenaventura to 51 % ownership of the concessions, while Bateas would own 49 %. Once the joint venture is formed, Buenaventura will have the option to invest an additional US$ 10 million over the next two years to increase its ownership to 70 %, with Bateas being reduced to 30 % ownership. If any party's ownership percentage is diluted below 10 %, its ownership interest will be replaced by a 3 % royalty. The concessions are located to the south of the Caylloma Mine (Figure 4.2). There are no known Mineral Resources or Mineral Reserves located in these concessions as of the effective date of this Report.

Figure 4.2 Location of mining concessions at the Caylloma Mine



N°	CONCESSION	N°	CONCESSION	N°	CONCESSION	N°	CONCESSION
BATEAS'S MINERAL RIGHT CONCESSION							
1	ACUMULACION CAILLOMA N° 1	20	S.P. N° 16	39	CAILLOMA 24	58	CAILLOMA 50
2	ACUMULACION CAILLOMA N° 2	21	CRISTOBAL R1	40	CAILLOMA 25	59	CAILLOMA 51
3	ACUMULACION CAILLOMA N° 3	22	SANDRA 106-A	41	CAILLOMA 26	60	CAILLOMA 52
4	CORONA DE ANTIMONIO N° 2	23	SANDRA 107-A	42	CAILLOMA 27	61	CAILLOMA 10A
5	CAILLOMA 4	24	SANDRA 108-A	43	CAILLOMA 28	62	GAYA 9
6	CAILLOMA 5	25	SANDRA 108-B	44	CAILLOMA 29	63	GAYA 8
7	CAILLOMA 6	26	SANDRA 108-C	45	CAILLOMA 30	64	GAYA 22
8	EUREKA 88	27	CAILLOMA 11	46	CAILLOMA 38	65	GAYA 7-A
9	SANDRA N° 5	28	CAILLOMA 12	47	CAILLOMA 39	66	GAYA 10
10	SANDRA N° 6	29	CAILLOMA 14	48	CAILLOMA 40		
11	SANDRA N° 7	30	CAILLOMA 15	49	CAILLOMA 41		
12	SANDRA N° 9	31	CAILLOMA 16	50	CAILLOMA 42		
13	SANDRA N° 102-A	32	CAILLOMA 17	51	CAILLOMA 43		
14	SANDRA-106	33	CAILLOMA 18	52	CAILLOMA 44		
15	SANDRA 107	34	CAILLOMA 19	53	CAILLOMA 45		
16	SANDRA 108	35	CAILLOMA 20	54	CAILLOMA 46		
17	SANDRA-120	36	CAILLOMA 21	55	CAILLOMA 47		
18	SANDRA 121	37	CAILLOMA 22	56	CAILLOMA 48		
19	SANDRA 123	38	CAILLOMA 23	57	CAILLOMA 49		

DATUM: WGS84, UTM Zone19S

0 1 2 3 4 5 Km

LEGEND

REGISTERED MINING CONCESSIONS

PROCESSING PLANT

Figure prepared by Bateas, Jan 2019

4.2 Surface rights

Surface rights and easements held by Bateas at Caylloma are detailed in Table 4.2.

Table 4.2 Surface rights for operations held by Bateas at Caylloma

No.	Name	Area (ha)	Type
1	Bahia Electrica	0.13	Surface Right
2	San Francisco	40.36	Surface Right
3		1.04	Surface Right
4		20.00	Surface Right
5	Huayllacho	186.73	Surface Right
6	Animas	214.41	Surface Right
7	Putosi-Chico	0.60	Easement
8	Palcacucho	1.48	Easement
9	Anchaca	0.43	Easement
10		0.005	Easement
11	Chulla Raccay Pampa	0.001	Easement
12	Cuchuquipa	17.49	Easement
13		0.0006	Easement
14		14.74	Easement
15		0.40	Easement
16	Jururuni	258.90	Easement
17	Huaraco Sahunana	1,091.85	Easement
18	Michihuasi	192.85	Easement
19	Tayayaque Trinidad	89.22	Easement
20		351.77	Easement
21	Vilafro	1,047.49	Easement

Regarding the current situation of the surface rights it is important to note the following:

- Peruvian legislation considers mining concessions as a right separate from the surface land where it is located.
- According to Peruvian Mining Law, a mining concessionaire requires a previous authorization from the surface owner or possessor of the land to undertake mining activities.

The majority of the surface right agreements detailed in Table 4.2 are not registered and were signed by landholders (owners or possessors) that may or may not have legal titles. The agreements signed by Bateas have all been formalized through Public Deeds that to the best of Bateas's knowledge provide sufficient rights to operate.

Fresh water supply for the Caylloma Mine is provided by the Santiago River which runs through the property, with a permanent water permit granted by the Ministry of Autoridad Nacional de Agua.

4.3 Royalties

The Caylloma Mine is subject to the following royalties:

- Pursuant to a royalty agreement between Bateas and Minera Arcata, dated 22nd May 2005, a royalty of 2 % of the NSR which will apply after not less than a total of 21 million ounces of silver have been recovered from certain mineral concessions processed through any mill. This contract is a permanent condition and will remain in total validity as long as a valid mining concession exists. This royalty was subsequently assigned by Minera Arcata to Lemuria Royalties Corp.

As of December 31, 2018, Bateas has produced a total of 18.1 million troy ounces of silver; therefore, this royalty condition has not yet been met.

- Holders of mineral concessions are obliged to pay to the Peruvian Government, a mining royalty, as a consideration for the exploitation of the metallic and non-metallic natural resources. The mining royalty is calculated based on the quarterly operating profit of the concession holder.

  In order to obtain the rate of the mining royalty, an effective rate (determined by law) is applied to the operating profit. This effective rate is variable and progressive, and it depends on the operating margin in the quarter for the concession holder.

  The amount paid as the mining royalty is the greater amount calculated when comparing the effective rate and 1% of income generated by sales in the quarter.

- In addition, the mineral concession holders are obliged to pay the Special Tax on Mining (Impuesto Especial a la Minería), which taxes their operating income arising from the sale of metallic natural resources on, or originating from the estate in which they operate. The tax base of the Special Tax on Mining is from the quarterly operating profit of the mining concession holder.

Other than these royalties, the concessions are not subject to any other encumbrances or back-in rights.

4.4 Environmental aspects, permits and social considerations

Bateas is in compliance with Environmental Regulations and Standards set out in Peruvian Law and has complied with all laws, regulations, norms and standards at every stage of operation of the mine.

Environmental aspects including water rights, approved permits and social considerations are set out in Section 20 of this Report.

The Caylloma area has a long history of mining activity, including small-scale and artisan operations dating back to the 1600s. There is an expectation that some environmental damage will have resulted from these activities.

4.5 Comment on Section 4

In the opinion of the QPs:

- Fortuna was provided with an independent legal opinion that supported that the mining tenure held by Bateas for the Caylloma Mine is valid and that Bateas has a legal right to mine the deposit

- Fortuna was provided with legal opinion that supported that the surface rights held by Bateas for the Caylloma Mine are in good standing. The surface rights are sufficient in area for the mining operation infrastructure and tailings facilities

- Fortuna was provided with legal opinion that outlined royalties payable for the concessions held by Bateas

Fortuna advised that to the extent known, there are no other significant factors and risks that may affect access, title or right or ability to perform work at the mine. The information discussed in this section supports the declaration of Mineral Resources. Mineral Reserves and the development of a mine.

5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

5.1 Access

Access to the Caylloma Mine is by a combination of sealed and gravel roads. The mine is located 225 road kilometers from Arequipa, a city of approximately a million people that includes an international airport, and requires a trip of approximately five hours by vehicle. Access is available to all concessions via a network of unsealed roads.

5.2 Climate

The climate in the area is characteristic of the puna, with rain and snow between December and March, followed by a dry season from April through September. The climate allows for year-round mining and processing, although surface exploration can be disrupted between December and March due to electrical storms, snow or heavy rainfall.

5.3 Topography, elevation and vegetation

The Caylloma Mine is located in the puna region of Peru at an altitude of between 4,300 and 5,000 meters above sea level (masl). Surface topography is generally steep with vegetation being primarily comprised of grasses and small shrubs common at high altitudes. The mine facilities are located at approximately 4,300 masl.

5.4 Infrastructure

The mine has been in operation intermittently for over 400 years. In 2011 and 2012 a number of new buildings were constructed to replace aging infrastructure. Newly-constructed facilities included a laboratory, offices, mess hall, core logging and core storage warehouses.

Experienced underground miners live in the nearby town of Caylloma and other local towns in the district and are transported to the mine by bus.

The camp and process facilities are located on the relatively flat valley floor while the entrance to the underground operations is via portals in the steep valley sides. Transport of ore is by a combination of rail, rubber-tired scoops and ore haulage trucks.

Sufficient water for the process plant and mining operations is available from the Santiago River that crosses the property.

The mine facilities are connected to the Electro Sur del Perú electric system, which supplies sufficient power for the operation.

More detailed information regarding the mine infrastructure is provided in Section 18.

5.5 Sufficiency of surface rights

The Caylloma Mine infrastructure has a limited footprint as detailed in Section 18 of this Report. The mine's processing facility and supporting infrastructure is located well within the area of surface rights and mineral tenement (as detailed in Section 4) owned by Bateas.

5.6 Comment on Section 5

In the opinion of the QPs, the existing infrastructure, availability of staff, the existing power, water, and communications facilities, the methods whereby goods are transported to and from the mine site, and any planned modifications or supporting studies are well-established, or the requirements to establish such, are well understood by Fortuna, and support the declaration of Mineral Resources and Mineral Reserves and the proposed mine plan.

Mining operations are conducted on a year-round basis.

6 History

6.1 Ownership history

The earliest documented mining activity in the Caylloma District dates back to that of Spanish miners in 1620. English miners carried out activities in the late 1800s and early 1900s. Numerous companies have been involved in mining the district of Caylloma but limited records are available to detail these activities.

The Caylloma Mine was acquired by Compania Minera Arcata S.A. (CMA), a wholly owned subsidiary of Hochschild Mining plc in 1981. Fortuna acquired the mine from CMA in 2005.

6.2 Exploration history

CMA focused exploration on identifying high-grade silver vein structures. Exploration was concentrated in the northern portion of the district and focused on veins including Bateas, El Toro, Paralela, San Pedro, San Cristobal, San Carlos, Don Luis, La Plata, and Apostles.

Extensive exploration and development were conducted on the Bateas vein due to its high silver content; however, exploration did not extend to the northeast due to the identification of a fault structure that was thought to truncate the mineralized vein.

Animas was one of the first vein structures identified by CMA; however, the mineralization style was identified as polymetallic in nature, rather than the high-grade silver veins CMA was seeking. Subsequently no further exploration or development was undertaken of this vein until Fortuna took ownership in 2005.

Table 6.1 details the drilling and channel information by vein produced by CMA that was validated by Bateas.

Table 6.1 Exploration by drill hole and channels conducted by CMA

Vein	Drill Holes	Channels
Paralela	-	624
San Pedro	8	1,939
San Cristóbal	20	3,833
San Carlos	-	221
Santa Catalina	-	735
Don Luis	1	-
Don Luis I	2	-
Elisa	2	-
La Plata	9	371
Cimoide La Plata	-	311
Ramal San Pedro	1	-
San Miguel	2	
Ursula	2	

6.3 Production history

Historically the Caylloma area has been known as a silver producer. Past production has been from several vein systems that ranged from centimeters, up to 20 m in width.

Individual ore shoots can strike for hundreds of meters with vertical depths ranging up to 300 m. Mining has historically taken place between the 4,380 masl and 5,000 masl. No reliable production records are available for the early mining activities.

6.3.1 Compania Minera Arcata

Production prior to 2005 came primarily from the San Cristobal vein, as well as from the Bateas, Santa Catalina and the northern silver veins (including Paralela, San Pedro, and San Carlos) with production focused on silver ores and no payable credits for base metals. During CMA management, production parameters fluctuated during the late 1990s as reserves were depleted. Owing to low metal prices, funds were not available to develop the Mineral Resources at depth or extend along the strike of the veins. Ultimately this resulted in production being halted in 2002. A summary of the production records at Caylloma under CMA management from 1998 through 2002 are included in Table 6.2. Production figures prior to 1998 are unavailable.

Table 6.2 Production figures during CMA management of Caylloma

Production	1998	1999	2000	2001	2002	Total
Ore processed (t)	125,509	129,187	167,037	180,059	164,580	766,372
Head grade Ag (g/t)	308	331	373	405	572	406
Head grade Au (g/t)	1.27	0.89	0.67	0.60	0.23	0.69
Recovery Ag (%)	85.1	87.7	87.0	87.2	87.4	86.9
Recovery Au (%)	78.9	72.9	61.6	68.2	55.2	66.5
Concentrate produced (t)	4,623	4,756	6,698	7,725	6,735	30,537
Concentrate grade Ag (g/t)	7,115	7,913	8,097	8,235	12,209	6,280
Concentrate grade Au (g/t)	27.29	17.68	10.31	9.45	3.05	8,821
Production Ag (oz)	1,057,535	1,207,550	1,743,535	2,045,398	2,643,788	8,697,806
Production Au (oz)	4,051	2,697	2,218	2,347	659	11,973

6.3.2 Bateas

Production under Bateas management focused on the development of polymetallic veins producing lead and zinc concentrates with silver and gold credits. A summary of total production figures since the mine reopened in October 2006 are detailed in Table 6.3 with production rates increased at the operation in 2011 from 1,000 tpd to 1,300 tpd and again in May 2016 to approximately 1,430 tpd.

Table 6.3 Production figures during Bateas management of Caylloma

Production	2006#	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
Ore processed (t)	33,460	250,914	331,381	395,561	434,656	448,866	462,222	458,560	464,823	466,286	514,828	529,704	534,773	5,326,034
Head grade Ag (g/t)	76	73	95	155	159	171	177	173	174	136	90	66	63	128
Head grade Au (g/t)	0.37	0.66	0.45	0.47	0.40	0.36	0.40	0.36	0.31	0.26	0.20	0.18	0.18	0.33
Head grade Pb (%)	1.12	1.70	2.48	3.10	2.44	2.15	1.99	1.92	1.70	2.47	3.06	2.81	2.62	2.39
Head grade Zn (%)	2.33	2.93	3.65	3.66	3.10	2.68	2.56	2.83	2.97	3.84	4.25	4.21	4.28	3.45
Production Ag (koz)*	56	443	805	1,685	1,906	2,008	2,039	2,104	2,203	1,696	1,256	943	911	18,055
Production Au (oz)*	166	3,328	2,197	2,747	2,556	2,393	2,781	2,212	1,820	1,163	533	491	693	23,080
Production Pb (t)	309	3,771	7,485	11,400	9,695	8,926	8,113	8,065	7,326	10,811	14,820	13,552	12,816	117,089
Production Zn (t)	603	6,300	10,561	12,900	11,855	10,625	10,158	11,436	12,411	16,252	19,597	20,115	20,631	163,444

* Recovery of silver and gold from lead and zinc concentrate
# Commercial production commenced in October 2006

7 Geological Setting and Mineralization

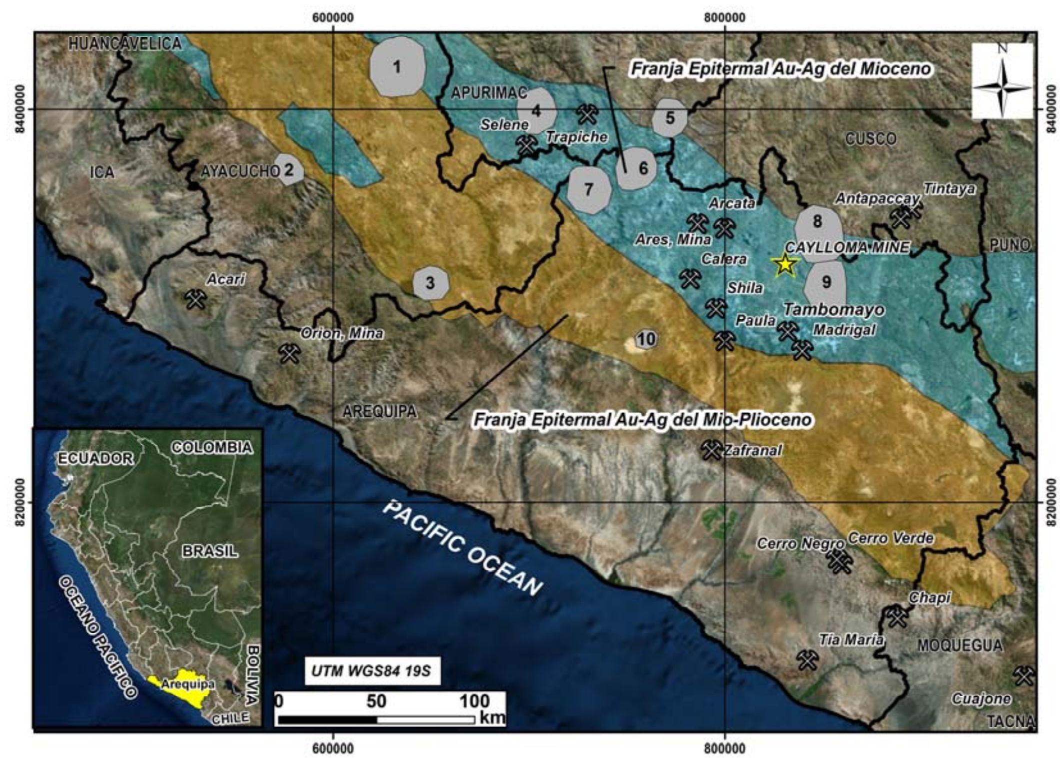
7.1 Regional geology

The Caylloma District is located in the Neogene volcanic arc that forms part of the Cordillera Occidental of southern Peru. This portion of the volcanic arc developed over a thick continental crust consisting of deformed Paleozoic and Mesozoic rocks.

Following the late Eocene to early Oligocene Incaic orogeny there was a period of erosion and magmatic inactivity prior to the eruption of the principal host rocks in the Caylloma District. Crustal thickening and uplift occurred between 22 Ma and 17 Ma accompanied by volcanism, faulting and mineralization in the Caylloma District.

The volcanic belt in the Caylloma District contains large, locally superimposed calderas (Figure 7.1) of early Miocene to Pliocene age comprising calc-alkaline andesitic to rhyolitic flows, ignimbrites, laharic deposits, and volcanic domes that unconformably overlie a folded marine sequence of quartzite, shale, and limestone of the Jurassic Yura Group.

Figure 7.1 Location map of the Caylloma District



Key

Principal Neogene calderas (grey) and epithermal deposits of the region:

1 = Ccarhuarazo; 2 = Pampa Galeras; 3 = Parinacocha; 4 = Tumiri; 5 = Teton; 6 = San Martín; 7 = Esquillay; 8 = Chonta; 9 = Caylloma; and 10 = Coropuna.

Black line = political (department) boundaries.

The Caylloma Mine is the only mine operated by Bateas, all other mines shown operated by third parties

Figure prepared by Bateas after Noble et al (1989), Aug 2016

7.2 Local geology

The mining district of Caylloma is located northwest of the Caylloma caldera complex (Figure 7.2).

Figure 7.2 Local geologic map of Caylloma District

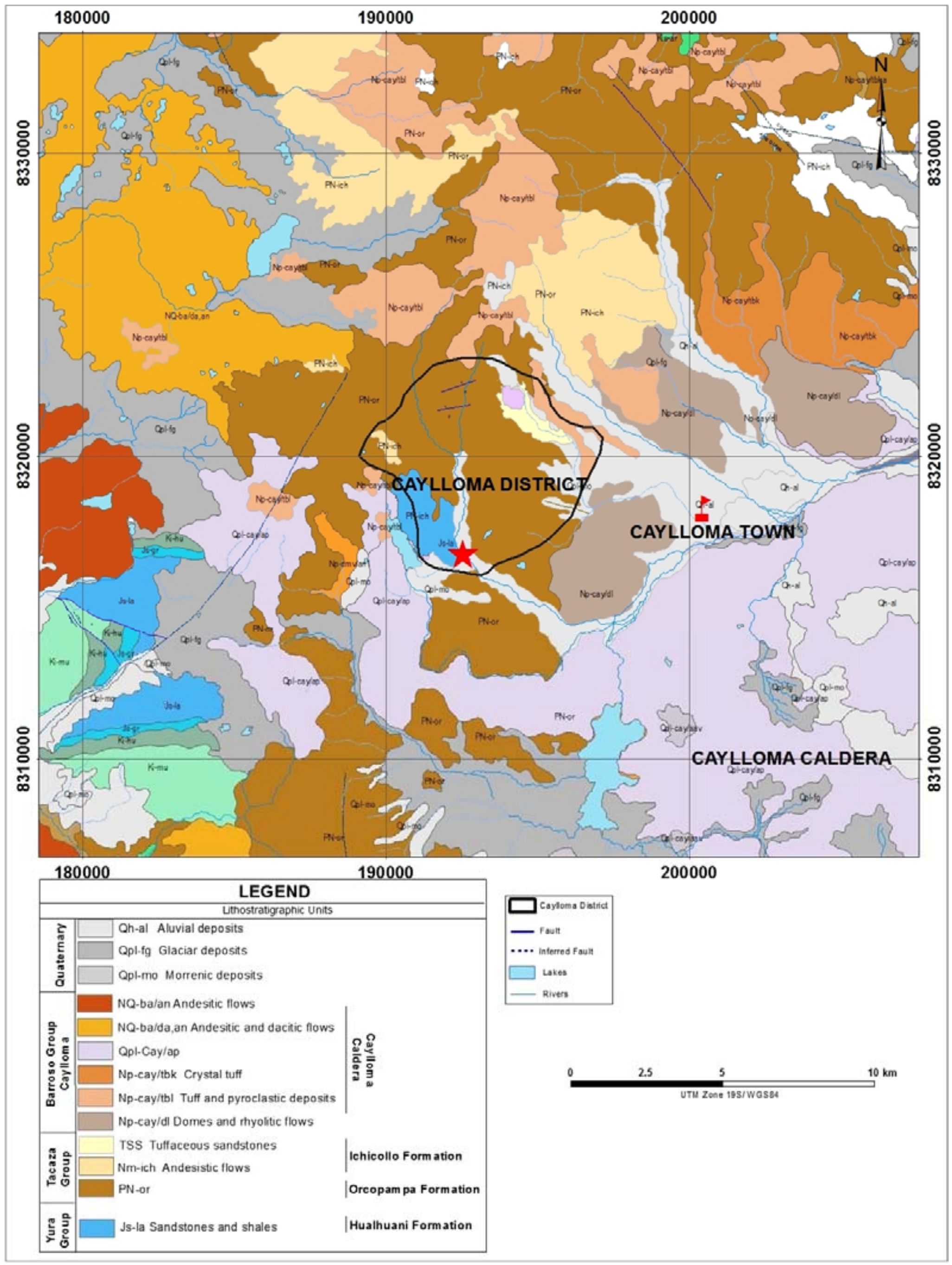


Figure prepared by Bateas from the Geological, Mining, and Metallurgical Institute of Peru's (INGEMMET) Sheet 31-S, Aug 2015

The host rock of the mineralized veins is volcanic in nature, belonging to the Tacaza Group (Figure 7.3). The volcanic units of the Tacaza Group lie unconformably over a sedimentary sequence of orthoquartzites and lutites of the Yura Group. Portions of the property are covered by variable thicknesses of post-mineral Pliocene-Pleistocene volcanic rocks of the Barroso Group and recent glacial and alluvial sediments.

Figure 7.3 Stratigraphic column of Caylloma District

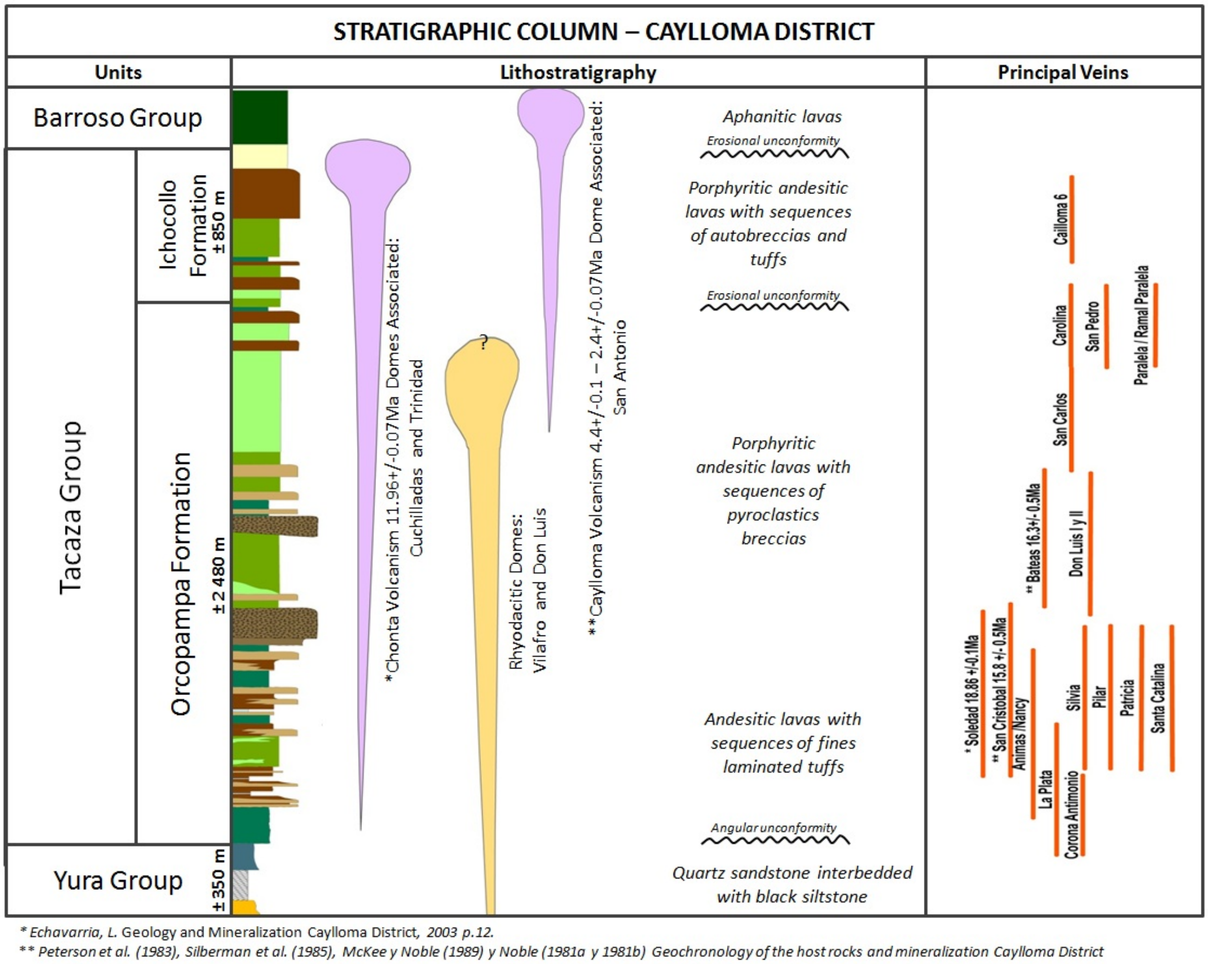


Figure prepared by Bateas, Aug 2016

7.2.1 Yura Group

The oldest rocks exposed in the Caylloma District belong to the Yura Group, and comprise white to gray ortho-quartzites, dark gray siltstones, and blackish greywackes, intercalated with thin layers of black lutites. The overall thickness of the group is approximately 400 m.

Outcrop evidence indicates Yura Group strata are strongly deformed with the presence of recumbent kink folds with straight limbs and narrow hinges. However, strain in the Yura Group is locally weaker at depth, as only open folds have been identified in the Caylloma Mine area (Echavarria et al., 2006).

7.2.2 Tacaza Group

The Tacaza Group consists of a sequence of effusive lavas and tuff breccias intercalated with tuff horizons that lie in angular unconformity and in fault contact with rocks of the Yura Group.

The Tacaza volcanic group comprises lavas of intermediate to silicic composition with a porphyritic texture. The dominant color is reddish-brown changing to greenish in areas of chloritic alteration. These volcanic rocks locally include a horizon of limestone that grades laterally to siltstone.

Estimated thickness of the Tacaza Group is 3,100 m, with some sequences showing thinning of volcanic horizons along strike and down dip. The Tacaza Group is of Lower Miocene age.

The Tacaza Group includes the Orcopampa and Ichocollo Formations. The Orcopampa Formation (Bulletin 40 – Cailloma Quadrangle, Sheet 31-S, INGEMMET) unconformably overlies the Mesozoic sedimentary sequence of the Yura Group and is comprised of volcaniclastics, volcanic breccias and greenish to purplish gray lavas of andesitic composition. The Ichocollo Formation unconformably overlies the Orcopampa Formation and is considered to represent the final stage of Tacaza volcanism. The Ichocollo Formation is exposed near San Miguel and Sukuytambo, located to the northeast of the Caylloma District, and consists of lavas and dacitic domes in the basal section and andesitic to basaltic andesite flows in the upper section. The lavas are dark gray to gray in color and noticeably porphyritic.

7.2.3 Tertiary volcanic deposits

Overlying the Tacaza Group with unconformable contacts are andesitic lavas, rhyolites, dacites and tuffs belonging to the Barroso Group. They are generally present in prominent outcrops with sub-horizontal stratification and are Plio-Pleistocene in age.

7.2.4 Recent clastic deposits

Quaternary clastic deposits locally cover portions of the Caylloma property. The valley floors and lower slopes are covered by alluvial material as well as glacial moraines, colluvium, and fluvio-glacial material.

7.2.5 Intrusive igneous rocks

The sedimentary and volcanic rocks in the Caylloma District have been intruded by post-mineral, fault-controlled rhyolitic domes (Cuchilladas and Trinidad domes) and dikes of the Chonta caldera sequence, characterized by coarse-grained quartz and sanidine phenocrysts, spherulites, and lithophysae, and well-developed laminations (Echavarria et al., 2006). In addition, recent mapping has identified outcrops of a rhyodacitic dome in the Vilafro area (Vilafro Dome) that host large alunite veins.

7.3 Property geology

The Caylloma Mine is characterized predominantly by a series of faulted fissure vein structures trending in a northeast-southwest direction (Figure 7.4). Locally northwest-southeast trending veins are also present (for example, the Don Luis veins).

Figure 7.4 Geology map of Caylloma Mine showing major vein systems

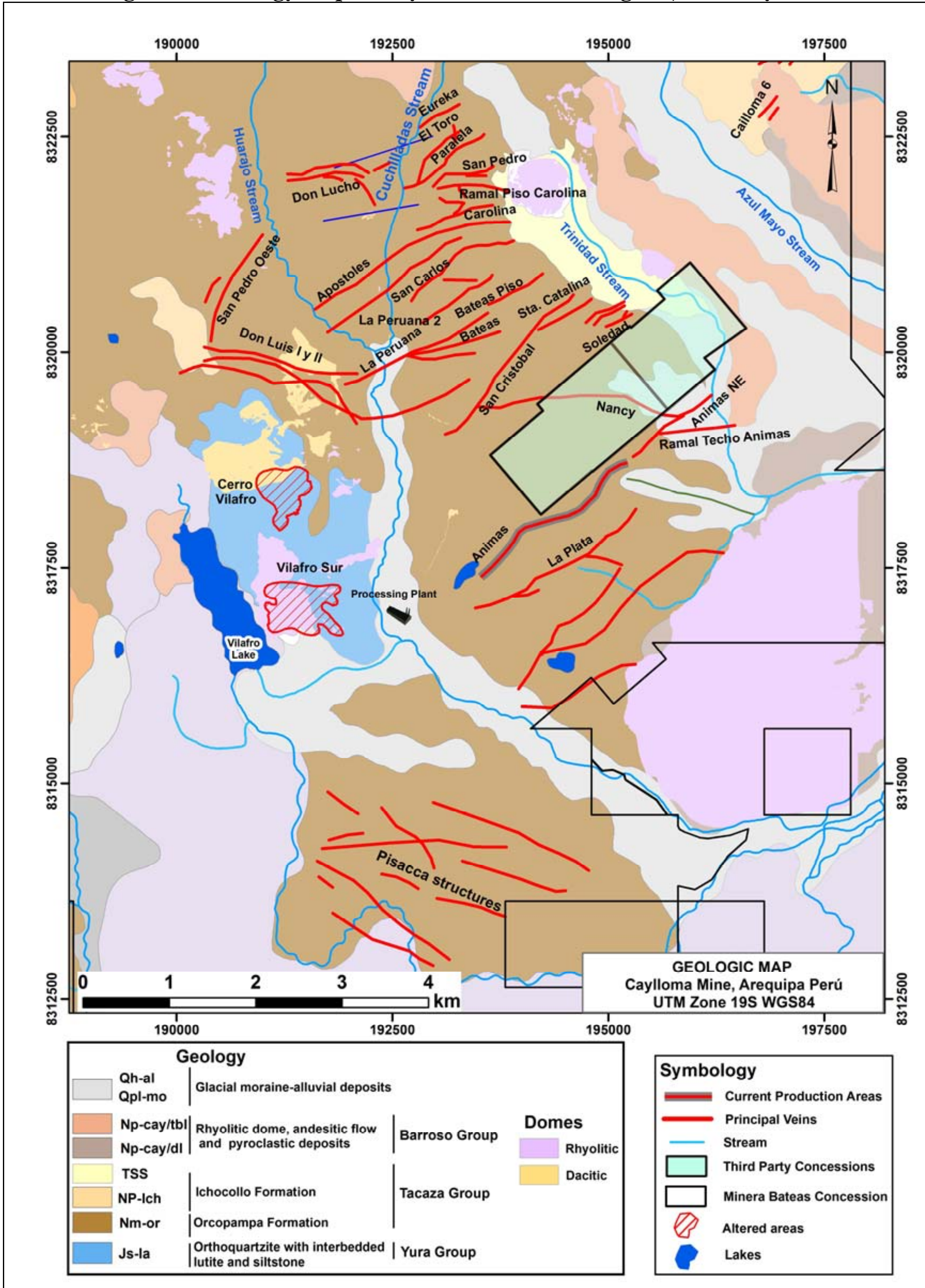


Figure prepared by Bateas, Aug 2016

7.3.1 Structural setting

Veins in the Caylloma District show structural patterns and controls typical of other vein systems hosted by Tertiary volcanic rocks in the western Peruvian Andean range. The Caylloma District vein system was developed as a set of dilatational structures as a consequence of tension generated during the main compressional event of the Andes. Veins are persistent along strike and dip. Locally, veins are displaced by post-mineral faulting along a north-northwest bearing. Horizontal displacement along these faults is minor and ranges from centimeters up to a few meters. No significant vertical displacement is observed on the structures. The vein system is not affected by any folding.

7.3.2 Alteration

Three types of hydrothermal alteration have been identified at the Caylloma Mine: (1) quartz-adularia; (2) quartz-illite; and (3) propylitic. The quartz-adularia (+pyrite +/-illite) alteration is restricted to the margins of the veins, with the thickness of the altered zone being generally proportional to the thickness of the vein. The width varies from a few centimeters to a few meters. Quartz replaces the volcanic matrix in the rocks, and quartz plus adularia occur as small veinlets or colloform bands. Pyrite is disseminated in the veinlets and in iron-manganese minerals in the wall rock. Illite is a product of alteration of the plagioclase and matrix of the volcanic host rocks. Quartz-adularia is absent in the upper parts of the vein systems. The alteration assemblage in the upper portions of the vein systems consists of a narrow selvage of quartz-illite near the vein. Quartz-illite grades into quartz-adularia at depth. Propylitic alteration is widespread throughout the property and may be regional in nature and unrelated to mineralizing events. The propylitic alteration is a fine aggregate of chlorite, epidote, calcite and pyrite.

7.3.3 Mineralization

There are two distinct types of mineralization at the Caylloma Mine, one with predominately elevated silver values (San Cristobal, La Plata, Bateas, San Carlos, Apostoles, San Pedro, and El Toro veins), and the other being polymetallic with elevated silver, lead, zinc, copper, and gold values (Animas, Nancy and Santa Catalina veins).

A supergene oxide horizon has been identified which contains the following secondary minerals: psilomelane, pyrolusite, goethite, hematite, chalcocite, covelite and realgar (Corona and Antimonio veins). The oxide zone is thin, with no evidence of secondary silver enrichment.

Veins are tabular in nature, with open spaces filled by episodic deposition of metallic sulfides and gangue minerals. According to Echavarria et al., (2006) most of the minerals, both silver and base metals, are related to the deposition of manganese mineralization occurring in bands, comprised of quartz, rhodonite, rhodochrosite and sulfides.

Vein systems at the Caylloma Mine have a general northeast-southwest bearing and predominant southeast dip. Host rocks are pyroclastic breccias, effusive andesitic lavas and volcaniclastics of the Tacaza volcanic group.

There are two different types of mineralization at Caylloma; the first is comprised of silver-rich veins with low concentrations of base metals. The second type of vein is polymetallic in nature with elevated silver, lead, zinc, copper, and gold grades.

Mineralization in these vein systems occurs in steeply dipping ore shoots ranging up to several hundred meters long with vertical extents of over 400 m. Veins range in thickness from a few centimeters to 20 m, averaging approximately 1.5 m for silver veins and 2.5 m for polymetallic veins.

7.3.4 Silver veins

The silver vein systems outcrop in the central and northern portions of the Caylloma District, with the best exposures of mineralization between the Santiago River, Chuchilladas and Trinidad streams. The mineralization is composed primarily of colloform banded rhodochrosite, rhodonite, and milky quartz, with silver sulfosalts present in certain veins. Vein systems extend to the eastern flank of the Huarajo Stream. Exposures in this area consist of quartz-calcite with low concentrations of manganese oxides. Silver veins can be sub-divided into two groups, 1) those that have sufficient geological information to support Mineral Resource estimates and 2) those that have been identified as exploration targets.

1) Bateas/Bateas Piso/Bateas Techo, La Plata/Cimoide La Plata, San Cristobal, San Pedro, San Carlos, Paralela/Ramal Paralela, Carolina, and Don Luis II
2) Eureka, El Toro, San Pedro Oeste, Apostoles, Santa Rosa, La Peruana, Vilafro Sur, Cerro Vilafro, Cailloma 6, Condorcoto, Llocococha, Pampuyo-Pumanuta, Giro, Antacollo

A more detailed description of the more important silver veins presently being exploited or explored is presented below.

Bateas/Bateas Piso & Bateas Techo

The Bateas vein splits into two branches, Bateas Techo is the southern branch, and Bateas is the northern branch. The vein outcrops on surface for approximately 900 m and can be traced from the escarpment of the Loma de Vilafro Hill extending to the northeast, at the summit of the hill the vein is covered by younger volcanic ash. The Bateas vein has been defined over 400 m down-dip and has an average thickness of 0.6 m. The Bateas Techo vein extends for 375 m along strike, 125 m down-dip and averages 0.4 m in thickness. Host rock is a volcaniclastic andesite with minor dacite and latite portions. The vein has a strike of 070º and dip of 82º to the southeast.

Polymetallic mineralization is present in two very well-defined zones. In the northeast, the vein contains chalcedonic and opaline quartz with disseminated silver sulfosalts, pyrite, and calcite. The southwestern end of the vein is characterized by a gangue of quartz, rhodonite and rhodochrosite containing veinlets of sphalerite, galena, chalcopyrite, and disseminated pyrite.

The northern branch of the Bateas vein is known as the Bateas Piso vein being defined over 110 m along strike, 250 m down-dip with an average thickness of 0.4 m and dipping at 52º to the northwest with a strike parallel to the Bateas Techo vein. At its most northeastern extent it opens into a cymoid loop. Mineralization in the vein is characterized by base metal sulfides, sphalerite, galena, and disseminated pyrite in a gangue of quartz, calcite, rhodonite, and rhodochrosite.

La Plata & Cimoide La Plata

The La Plata vein is associated with fracture filling along a regional fault extending for more than 2 km. The most representative part extends over approximately 400 m along strike, 180 m down-dip with an average vein thickness of 1.4 m and consists of quartz, calcite, rhodonite, and abundant manganese oxides in its central portion. The eastern portion of the vein consists of quartz with disseminated pyrite, and ruby silver stained with manganese oxides. The vein has been explored from surface downwards to level 7 (4,745 masl). A splay of the La Plata vein has been identified, referred to as the Cimoide

La Plata vein. It has the same characteristics as the La Plata vein with the vein being composed of gray silica with associated stibnite, pyrite and tetrahedrite. This cymoid has primarily been explored between level 7 and level 8 (4,745 masl and 4,695 masl).

San Cristobal

The San Cristóbal vein has a recognized strike length of 4 km with a 035° to 055° northeast strike, and 50 to 80° dip to the southeast. The vein has been modeled over a 2 km strike length, 100 m down-dip with an average thickness of 1.5 m. The primary sulfides in the vein are sphalerite, galena, polybasite, pyrargyrite, chalcopyrite and tetrahedrite distributed in gangue of pyrite, quartz, rhodonite and calcite. This is the most extensively developed structure on the property. The silver values are highly variable along the strike and throughout the thickness of the vein, forming localized enrichments. Silver values have a tendency to decrease gradually at depth, as can be observed at levels 4,600 masl (level 10), 4,540 masl (level 11), and 4,500 masl (level 12).

San Pedro

The San Pedro vein outcrops for 900 m on surface, has been defined over 100 m down-dip with a general strike of 045º and dipping at 85º to the southeast. Thickness of the vein averages 0.8 m and shows banded mineralization consisting of quartz, rhodonite, and manganese and iron oxides, with concentrations of ruby silver and native silver. This vein has been traced and mined down to 4,610 masl (level 10 of the mine). The distribution of silver values in the vein shows a gradual decrease with depth.

San Carlos

The San Carlos vein outcrops for approximately 300 m on surface; and has been defined over 480 m along strike, 50 m down-dip, having a strike direction of 045° and dip of 75° to the southeast. Thickness of the vein averages 0.4 m. The vein consists of tabular, open-space fillings with episodic periods of deposition. Most of the metals are related to the deposition of manganese minerals that occur in bands of quartz, rhodonite, and sulfides.

Paralela & Ramal Paralela

The Paralela and Ramal Paralela veins outcrop for 320 m on surface with a general strike of 040°, and dip at 72° to the southeast for 175 m. Thickness of the veins average 0.9 m. The veins consist of tabular, open-space fillings with episodic periods of deposition. Most of the metals are related to the deposition of manganese minerals.

Ramal Piso Carolina

The Ramal Piso Carolina vein outcrops for 435 m on surface with a general strike of 075° and dipping at 73° for 255 m to the southeast. Thickness of the vein ranges from 1.2 to 2 m, averaging 1.9m, and was recognized and partially exploited with underground workings by CMA in 3 levels (4800, 4750 and 4700 masl). In the southwest, the vein has a banded and colloform texture, with assemblages of rhodonite, quartz, calcite and Ag sulfosalts; to the northeast the vein has a brecciated texture with assemblages of quartz, calcite, Mn oxides and Ag sulfosalts.

During the development of the 2012 exploration program, potential mineralization was identified over 900 m along strike and extending to approximately 300 m in depth (level 4600 masl).

Don Luis II

The Don Luis I & II veins outcrop for 1,000 m at the surface, with a general strike between 95° to 115° and dipping at 40° and 68° to the southwest. The Don Luis II vein extends for 435 m along strike, 200m down-dip with an average vein thickness of 1.8 m, ranging from 1.5 to 2 m and have a brecciated texture composed of fragments of gray silica, tetrahedrite and stibnite.

Only limited exploration of the Don Luis veins was carried out by CMA and exploitation was restricted to minor workings on level 2 (4500 masl). Drilling carried out as part of the 2012-2014 exploration program demonstrated a mineralized column as described above for the Don Luis II vein.

7.3.5 Polymetallic veins

A series of polymetallic veins has been identified in the southern and central portions of the Caylloma Mine. These vein systems tend to be greater in strike length and thickness when compared to the silver vein systems. The main metallic minerals associated with the polymetallic veins are galena, sphalerite, pyrite, chalcopyrite, and in some zones pyrargyrite. The polymetallic veins can also be sub-divided into two groups, 1) those that have sufficient geological information to support Mineral Resource estimates and 2) those that have been identified as exploration targets.

1) Animas, Animas NE, Cimoide ASNE, Ramal Techo ASNE, Santa Catalina, Soledad, Silvia, Pilar, Patricia, Nancy, and Rosita veins
2) El Diablo and Antimonio veins

More detailed descriptions of the more important polymetallic veins presently being exploited or explored are presented below.

Animas & Animas NE

The Animas vein is one of the most prominent and well-defined structures in the southern portion of the Caylloma Mine. It is a base metal-rich polymetallic vein that is divided into two parts based on a fault structure that disrupts the vein's continuity. The vein to the southwest of the fault is known as Animas whereas to the northeast of the fault the vein is referred to as Animas NE.

The Animas polymetallic vein is present from level 5 (4,850 masl) to below level 15 (4,350 masl) in the mine. Several wide zones (over 12 to 14 m in thickness) are observed in levels 6, 9, 10, 12 and 15 (4,800 masl, 4,645 masl, 4,595 masl, 4,495 masl, and 4,350 masl respectively), especially in lateral exploration cross-cuts. The total vein outcrops along 1.5 km with silicified exposures stained with manganese oxides and has been identified through diamond drilling over a total strike length of 3.3 km as well as extending for at least 660 m down-dip. Vein thickness ranges up to 16 m, but averages approximately 4 to 5 m. Current exploitation has identified widths of up to 16 m in level 9 (4,650 masl) and 10 m in level 12 (4,500 masl) where it forms a sigmoidal loop approximately 300 m in length with widths between 2.5 to 12.40 m in the extreme northeast and 4 to 10 m at depth to level 15 (4,350 masl).

Vein mineralogy includes argentiferous galena, sphalerite, marmatite, and chalcopyrite accompanied by minor tetrahedrite and ruby silver. Gangue minerals are pyrite, quartz, calcite, rhodonite, rhodochrosite, and iron-manganese oxides displaying banded, colloform, and brecciated textures.

Cimoide ASNE

The Cimoide ASNE vein does not outcrop as there is 40-60 m of glacial moraine cover. The vein has been identified over a strike length of approximately 550 m and a down-dip length of 420 m through underground workings on level 12 (4,495 masl) of the mine. The strike of the vein varies between 30˚ to 210˚ while dipping 60˚ to 75˚ to the southeast. The width of the vein averaged 2 to 2.5 m. Mineralization is polymetallic in a gangue consisting of quartz/rhodonite. Minerals of economic importance include galena, sphalerite and chalcopyrite.

Ramal Techo ASNE

The Ramal Techo ASNE vein also does not outcrop at surface due to the same glacial moraine cover as described above. The vein extends for approximately 225 m along strike and 185 m down-dip, having been exploited to level 12 (4,495 masl) of the underground mine. The strike of the vein ranges between 80˚ to 260˚ while dipping 47˚ to 52˚ to the southeast. Vein width ranges from 2.0 to 2.5 m with polymetallic mineralization consisting primarily of galena, sphalerite and chalcopyrite located in a gangue of quartz and rhodonite.

Santa Catalina

The Santa Catalina vein has been defined over a distance of 385 m along a strike of between 245° to 260º, dipping for 150 m at 65º to 80º to the northwest with an average thickness of 1.8 m. The vein contains silver sulfosalts (pyrargyrite and proustite), sphalerite, galena and chalcopyrite in a gangue of quartz, calcite, rhodonite, and rhodochrosite. The host rock is an andesite that exhibits pseudo-stratification flow banding and massive coherent structures. Tectonic breccias are present in the footwall and hanging wall of the vein. Bateas has mined to 4,720 masl, below level 8, and diamond drilling has intercepted the vein to 4,773 masl (level 9), where polymetallic mineralization is present in well-defined fault-controlled zones. A base-metal-rich zone is present between 4,720 masl (level 8) and 4,773 masl (level 9). The average thickness of the vein is 2.5 m.

Soledad

The Soledad vein is partially exposed at the surface for approximately 250 m, being located to the northeast of the Santa Catalina vein. It has a defined strike length of 835 m along 248º to 251º and extends for 255 m down-dip at 76º to the northwest. The average thickness of the vein at the surface is 0.5 m. During 2012 the vein was exploited between Level 6 (4,820 masl) to below level 7 (4,750 masl). Exploration through diamond drilling and underground mine workings has confirmed that the vein continues down to at least level 8 (4,720 masl). The vein has an average thickness at depth of 1.0 m. The mineralization is polymetallic in nature, containing silver sulfosalts, sphalerite, galena, chalcopyrite, gray copper (enargite) and disseminated pyrite. The vein is banded with two recognized events: (1) an early phase, rich in base metal sulfides and elevated gold values in banded rhodonite, and (2) a second phase of quartz, rhodochrosite, with disseminated silver minerals and veinlets. The host rock is flow banded andesite with intercalated volcanic sediments.

Silvia

The Silvia vein is discontinuously exposed on the surface and has been defined over a strike distance of approximately 500 m and down-dip over 170 m. The thickness of the vein ranges from 0.8 to 1.8 m, averaging 1.3 m and the strike ranges between 250º and

262º. The vein dips to the northwest between 65 º and 82º. Mineralization is polymetallic, with sphalerite, galena, chalcopyrite, and silver sulfosalts (pyrargyrite) present in a gangue of quartz, calcite, rhodonite, and rhodochrosite. The vein has a banded to massive texture with bands of base-metal sulfides of variable thickness. The host rock is an andesitic volcanic rock with propylitic-chloritic alteration.

Pilar

The Pilar vein is considered to be part of the San Cristóbal system. The vein has been identified over a strike length of 252 m, having originally been exposed in a gallery at level 8 of the San Cristóbal underground workings. It appears to be a tensional feature of the San Cristóbal vein with banded rhodonite and quartz texture with disseminated sulfides of sphalerite, galena, and silver sulfosalts. The vein is thought to extend for approximately 110 m down-dip with an average vein thickness of 0.7 m, a strike direction of 153° and dipping at 48° to the southwest.

Patricia

The Patricia vein is a fissure-type structure, composed primarily of banded rhodonite, quartz, and rhodochrosite with mineralization present as veins and lenses in the bands of quartz/rhodonite, as well as being associated with fault zone structures and hydrothermal alteration in the host rock. The vein has been defined over a strike length of 380 m along strike, 130 m down-dip with an average thickness of 0.6m. The vein is located between the San Cristobal and Santa Catalina veins and was discovered from underground. Mineralization is comprised of silver sulfosalts such as tetrahedrite, proustite-pyrargyrite and veinlets of sphalerite, galena, pyrite and chalcopyrite set in a matrix of quartz rhodonite. The vein strikes towards 045˚ while dipping steeply at 85˚ to the northwest.

Nancy

The Nancy vein is thought to outcrop discontinuously over a distance of approximately 1,000 m. The strike of the vein ranges between 110˚ to 120˚ while dipping 60˚ to 70˚ to the southwest. The width of the vein ranges from 0.5 to 4.5 m, averaging 3.3 m, being wider near its intersection with the Animas vein. Mineralization is polymetallic in a gangue consisting of quartz and iron and manganese oxides. The metallic minerals of economic importance are galena, sphalerite and chalcopyrite. During 2012, the Nancy vein was defined by diamond drilling over approximately 360 m of its strike length and to a depth of approximately 260 m (elevation 4,420 masl). Mining of the Nancy vein commenced in January 2018.

Rosita

The Rosita vein is polymetallic in nature, being characterized by sphalerite, galena, pyrite, and chalcopyrite in a quartz-calcite matrix exhibiting a brecciated texture and hosted in andesitic volcanics. The vein strikes approximately east-west, dipping at 52° to the south. The vein was a blind discovery made while drilling underground holes to explore the northwest extension of the Nancy vein.

7.3.6 Oxidation

The mineralization present in all veins is sulfide with the exception of the uppermost portions of the Animas/Animas NE veins (Figure 7.5). The Animas vein has been explored close to surface and a supergene oxide horizon has been identified extending to a variable depth based on the presence of iron oxides and lesser amounts of manganese and zinc oxides. The location of elevated zinc oxide zones has been highlighted as this material reduces recovery in the plant.

Figure 7.5 Long section of Animas vein showing sulfide/oxide/zinc oxide zones

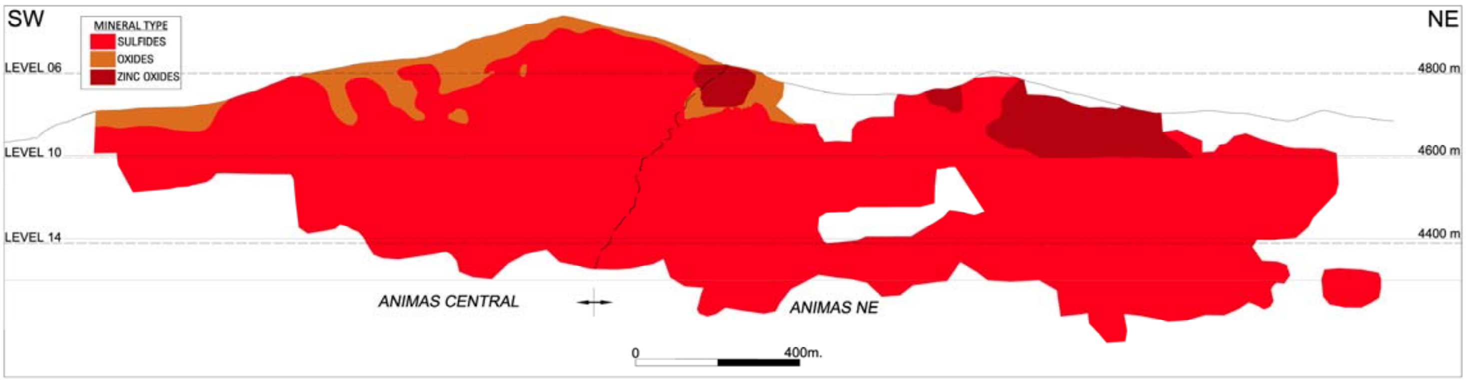


Figure prepared by Bateas, Jan 2019

7.4 Animas sectional drawings

The Animas/Animas NE vein is the primary source of mill feed at present at the Caylloma Mine. Representative sections displaying the geological interpretations of the Animas vein have been included in Section 10.

7.5 Comment on Section 7

In the opinion of the QPs, knowledge of the silver and polymetallic veins, the settings, the lithologies, as well as the structural and alteration controls on mineralization is sufficiently understood to support Mineral Resource and Mineral Reserve estimation.

8 Deposit Types

8.1 Mineral deposit type

The Caylloma polymetallic and silver-gold rich veins are characteristic of a typical low sulfidation epithermal deposit according to the classification of Corbett (2002) having formed in a relatively low temperature, shallow crustal environment (Figure 8.1). The epithermal veins in the Caylloma District are characterized by minerals such as pyrite, sphalerite, galena, chalcopyrite, marcasite, native gold, stibnite, argentopyrite, and various silver sulfosalts (tetrahedrite, polybasite, pyrargyrite, stephanite, stromeyerite, jalpite, miargyrite and bournonite). These are accompanied by gangue minerals such as quartz, rhodonite, rhodochrosite, johannsenite (Mn-pyroxene) and calcite.

Figure 8.1 Idealized section displaying the classification of epithermal and base metal deposits sourced

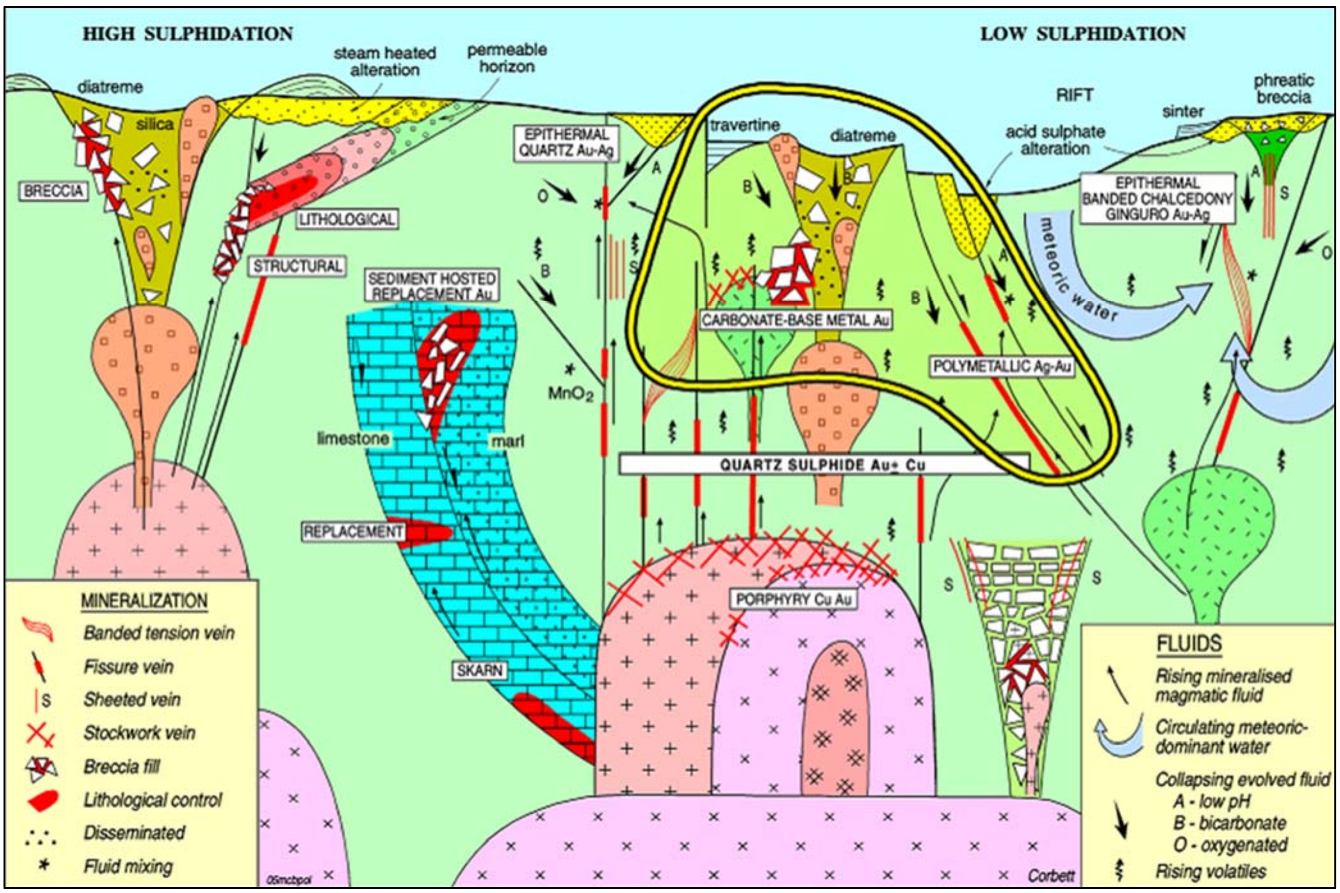


Figure prepared by Bateas from Corbett, 2002

The characteristics described above have resulted in the Caylloma veins being classified as belonging to the low sulfidation epithermal group of precious metals in quartz-adularia veins similar to those at Creede, Colorado; Casapalca, Peru; Pachuca, Mexico and other volcanic districts of the late Tertiary (Cox and Singer, 1992). They are characterized by Ag sulfosalts and base metal sulfides in a banded gangue of colloform quartz, adularia with carbonates, rhodonite and rhodochrosite (Echavarria et al., 2006). Host rock alteration adjacent to the veins is characterized by illite and widespread propylitic alteration.

8.2 Comment on Section 8

The Caylloma Mine is considered an example of a low sulfidation epithermal-style deposit, based on the following:

- Mineralization present in veins in the form of Ag sulfosalts and base metal sulfides including pyrite, sphalerite, galena, chalcopyrite, marcasite, stibnite, and argentopyrite
- Gangue minerals present in the form of banded colloform quartz, adularia with carbonates, rhodonite, rhodochrosite, and johannsenite (Mn-pyroxene)

Understanding of the geological setting and model concept of the Caylloma silver and base metal rich veins is adequate to provide guidance for mining exploitation and ongoing exploration.

9 Exploration

CMA implemented a series of exploration programs to complement their mining activities prior to the closure of the operation in 2002. Fortuna acquired the mine in 2005 and continued to conduct exploration of the property since the acquisition.

9.1 Exploration conducted by Compania Minera Arcata

There is no reliable information available to detail the exploration conducted by CMA at the Caylloma Mine.

9.2 Exploration conducted by Bateas

9.2.1 Geophysics

In 2007, induced polarization (IP) and resistivity studies were conducted by Arce Geophysics over the Nancy and Animas NE veins covering an area of 7 km^2. The survey was performed using an IRIS ELREC Pro receptor with a symmetrical configuration poly pole array with spacing of 50 m between electrodes.

Results of the geophysical studies identified three coincident zones of low IP potential associated with high chargeability and resistivity. The three geophysical anomalies were investigated through a targeted drilling campaign.

In 2012, magnetometry, IP and resistivity studies were carried out by Quantec Geoscience over Cerro Vilafro and Vilafro South, covering an area of 17 km^2 using a pole-dipole array configuration with spacing of 50 m between electrodes and 31.6 km lines in magnetometry studies. The surveys successfully identified coincident chargeability and resistivity anomalies in the Cerro Vilafro area.

In 2015 controlled-source audio-frequency magnetotellurics (CSAMT) geophysical surveys were completed covering the northeastern projection of the San Pedro and Paralela veins. Similar CSAMT geophysical surveys were completed in 2016 covering the Pisacca exploration target area, the extension of the Animas vein, and other important structure such as the San Cristobal vein to the northeast. In all areas, the CSAMT surveys were successful in identifying resistivity anomalies spatially associated with the projections of mapped vein structures. The 2015 and 2016 geophysical surveys were carried out by Quantec GeoScience.

9.2.2 Surface channel sampling

Extensive surface channel samples have been taken along all principal mineralized structures identified in the Caylloma District.

Exploration has focused on the delineation of major vein structures such as the Animas, Bateas, Santa Catalina, Soledad and Silvia veins. Additional exploration has also been conducted to define the mineral potential of other veins on the property such as the Carolina, Don Luis and Nancy veins (Figure 9.1).

Surface channel samples are not used for Mineral Resource estimation but as a guide for exploration drilling and to identify the vein structure on surface.

Figure 9.1 Plan map showing principal exploration targets

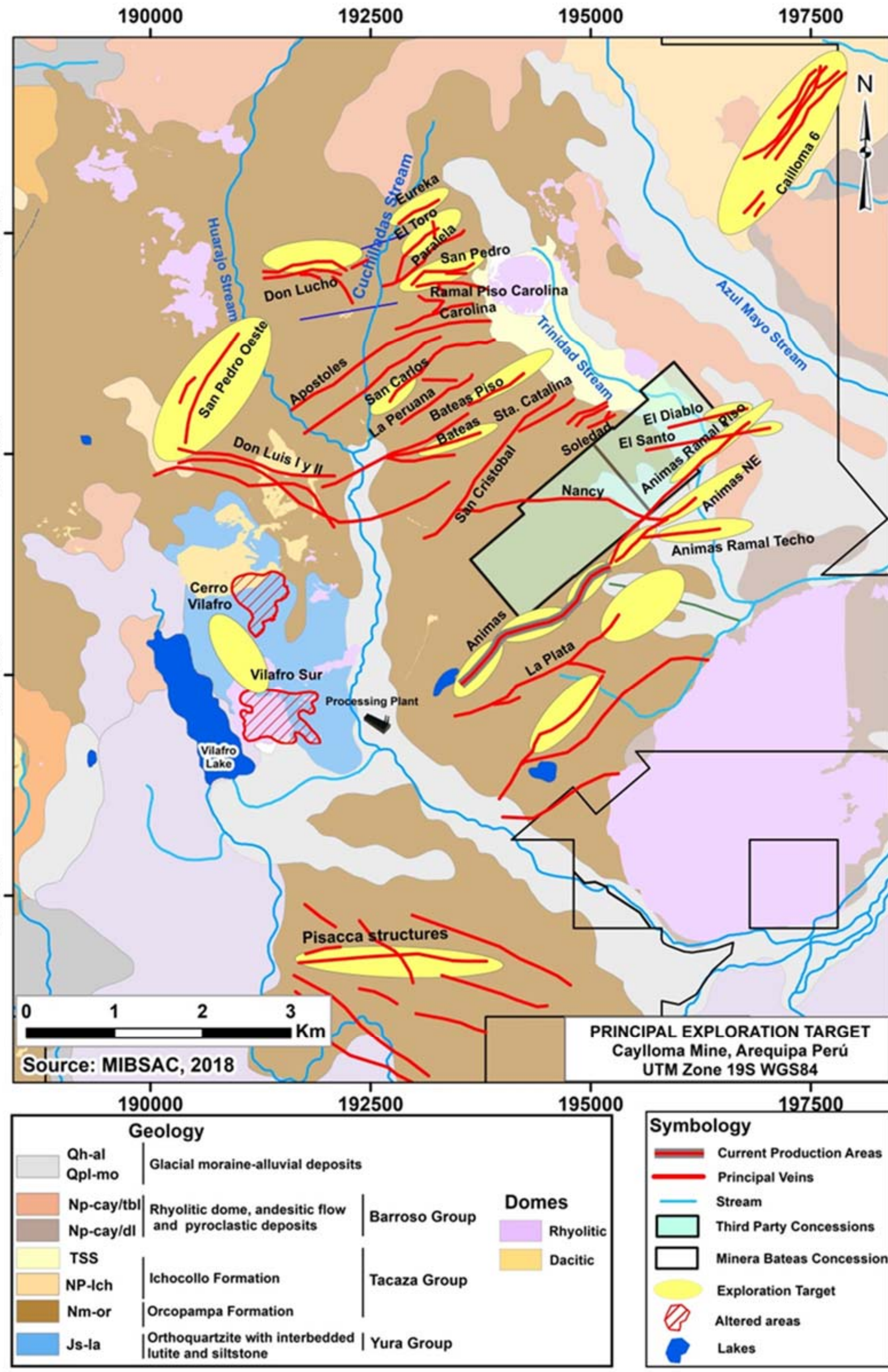


Figure prepared by Bateas, Dec 2018

9.2.3 Geological mapping of major structures

Animas & Animas NE

During 2006 and early 2007, a surface mapping campaign of the Animas vein structure was conducted in the northeastern portion of the property at a scale of 1:1,000. The mapping identified discontinuous outcrops of vein quartz and occasional brecciated zones (quartz and rhodonite) covered by a manganese oxide cap. Surface mapping was complemented by a drilling campaign (described in Section 10) that confirmed the continuity of the Animas structure at depth.

Exploration activities of the Animas vein resumed in 2010, during underground development of level 6 (4,800 masl); brecciated mineralization was discovered with fragments of rhodochrosite and rhodonite in quartz and silica matrix, with disseminations and veinlets of galena and silver sulfosalts.

Exploration of the Animas vein led to the discovery of the Animas NE vein and two splay veins located in its hangingwall. The Cimoide ASNE vein located 200 m to the south of Animas NE and the Ramal Techo ASNE located a further 30 m to the south. Exploration of these splay veins has been based on drilling since 2004 that targeted Animas NE but extended to the south.

Bateas

Exploration by Fortuna of the Bateas vein has been ongoing since 2007. Initial work involved surface mapping and the sampling of outcrops that returned anomalous silver grades. Based on the initial results a diamond drill program from surface was conducted in late 2007 and early 2008. Exploration has been conducted from the surface as well as from underground workings of the mine.

Silvia

The Silvia vein outcrops on surface discontinuously over a distance of approximately 200 m, and was mapped in 2013 at a scale of 1:1,000.

Soledad

The Soledad vein has been mapped on surface over a length of 250 m in 2013 at a scale of 1:1000, having been found to run parallel with the Santa Catalina vein, and displaying a similar strike (248° to 251º) and dip (76° to the northwest).

San Cristobal

There has been limited new exploration by Bateas of the San Cristóbal vein as significant information regarding the structure was available from historical underground workings. San Cristóbal is one of the most prominent veins of the Caylloma District and is known to have higher grade silver concentrations compared to other veins at the property. From 2006 to 2008 exploration drilling was conducted in order to explore the mineralization potential at depth. In 2011 underground exploration was conducted through 578 m of new mine workings on level 11, comprising 282 m of galleries with the remaining development comprising bypasses, cross-cuts, and chimneys. Underground observations identified a banded structure averaging 2.4 m in width and averaging 128 g/t Ag, consisting of quartz veinlets, calcite, and rhodonite with veinlet and disseminated silver sulfosalts.

During 2012, 489 m of additional underground workings were executed on level 11.

Nancy

From 2006 to 2008 reconnaissance work and geological mapping were conducted over portions of the Nancy vein not covered by glacial moraine deposits. Surface samples returned anomalous values. In 2007, resistivity and IP geophysical surveys were conducted in the area, with high chargeability anomalies providing evidence of potential mineralization. Exploration drilling confirmed the presence of a major mineralized structure, open laterally and to depth.

La Plata

The La Plata vein is associated with infilling of a fault striking northeast and dipping 60° to the southeast. The vein has been mapped over a length of 1,400 m, having an average width of 2.5 m.

In the first half of 2011, exploration of the vein was carried out with geological mapping and geochemical surface sampling. This involved a reinterpretation of the structure and excavation of exploratory trenches in the far northeastern extension of the vein, and the taking of 160 channel samples.

9.2.4 Geological mapping of exploration targets

Antimonio

This Antimonio vein was first recognized in the 1980s with the mapping of approximately 300 m of outcropping vein, with an average surface thickness of 2 m and consisting of massive milky quartz with traces of stibnite. In 2006, the mapping was reviewed and a limited drill program executed. In 2011 as part of the Southern Sector Exploration Program of the Caylloma Mine, geological mapping at a scale of 1:1,000 and geochemical analysis identified the presence of the vein over a total distance of one kilometer striking in a northeast to southwest direction. The presence of stibnite in this vein suggests a later stage of mineralization.

Vilafro

In December 2005 samples were collected from the 900 ha Vilafro area in relation to silica-alunite anomalies identified in ASTER images. In mid-2006, a review of the Vilafro surface geology was performed followed by geologic mapping and sampling in 2007.

During 2012, geochemical information from previous campaigns was compiled and reinterpreted. Detailed geological mapping was carried out at a 1:1,000 scale and grid geochemical sampling and geophysical surveys of magnetics, chargeability and resistivity were completed. Based on the work executed, potential exploration targets were identified in the Cerro Vilafro and Vilafro Sur areas.

Cerro Vilafro

Detailed surface mapping and channel sampling in the Cerro Vilafro area, located proximal to the Caylloma plant site, identified strong silver and gold values associated with a northeast to southwest trending vein swarm. The mineralization is hosted by Cretaceous quartzites and was evaluated as a potential bulk-minable, open-pit target. Sampling reported high-grade gold and silver values over narrow widths of veins and hydrothermal breccias. Sampling of zones of quartz veinlets between the primary structures resulted in lower silver and gold values (Figure 9.2).

Figure 9.2 Plan map showing surface geology and geochemistry of Cerro Vilafro

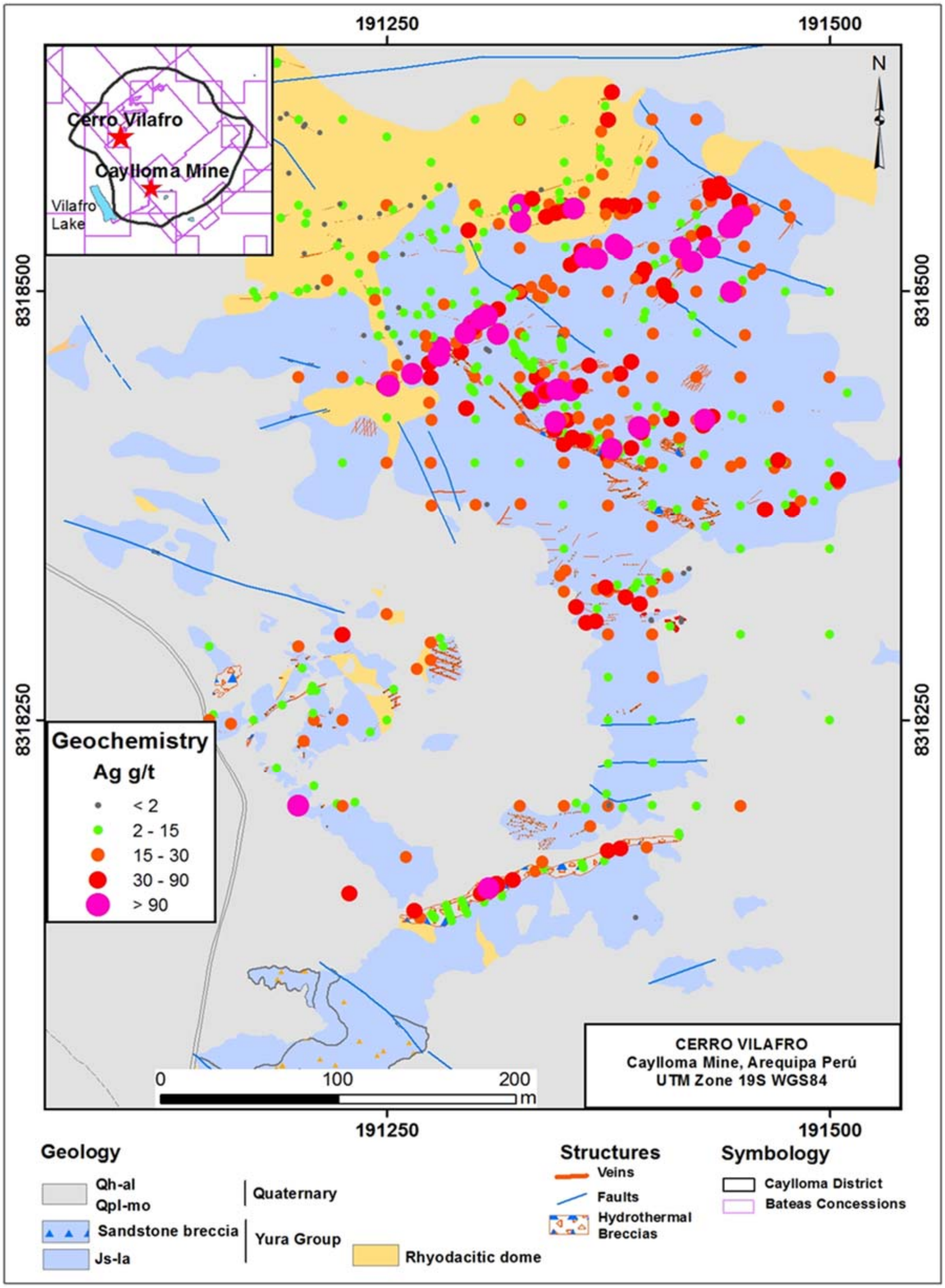


Figure prepared by Bateas, Aug 2016

Vilafro Sur

The Vilafro Sur lithocap is characterized by advanced argillic alteration assemblages extending over 1,000 m in a northwest to southeast direction and ranging up to approximately 400 m in width. The lithocap is open to the northwest and may extend beneath the Laguna Vilafro. The main portion of the lithocap outcrops from approximately 4,700 to 4,860 masl.

Surface geochemical values indicate that the alunite-bearing lithocap is generally barren of significant metal or pathfinder elements:

The geochemical signature of the Vilafro Sur lithocap is similar to that found at certain high sulfidation style deposits.

Surface geological mapping of the Vilafro Sur area was conducted in 2017 at a scale of 1:2,000.

Cailloma 6

Detailed surface mapping and channel sampling in the Cailloma 6 concession area identified a prominent vein striking 035° and dipping 80-85° to the southeast (Figure 9.3). The length of the outcropping vein is approximately 1,650 m with widths ranging from 0.2 to 0.8 m. To the northeast, the vein forms a sigmoidal loop of 500 m length with three splits of 100 to 150 m of length.

The mineralization is composed of veinlets and cavity fillings of quartz with crustiform texture, silver sulfosalts disseminations, hematite, goethite, and manganese oxides. The hydrothermal alteration bordering the vein consists of silicification with associated illite-pyrite mineralization ranging in width up to 3.5 m.

The Cailloma 6 veins are controlled by longitudinal faults with transverse faulting affecting the structure with small dextral and sinstral displacements.

Figure 9.3 Plan map showing surface geology and geochemistry of Cailloma 6

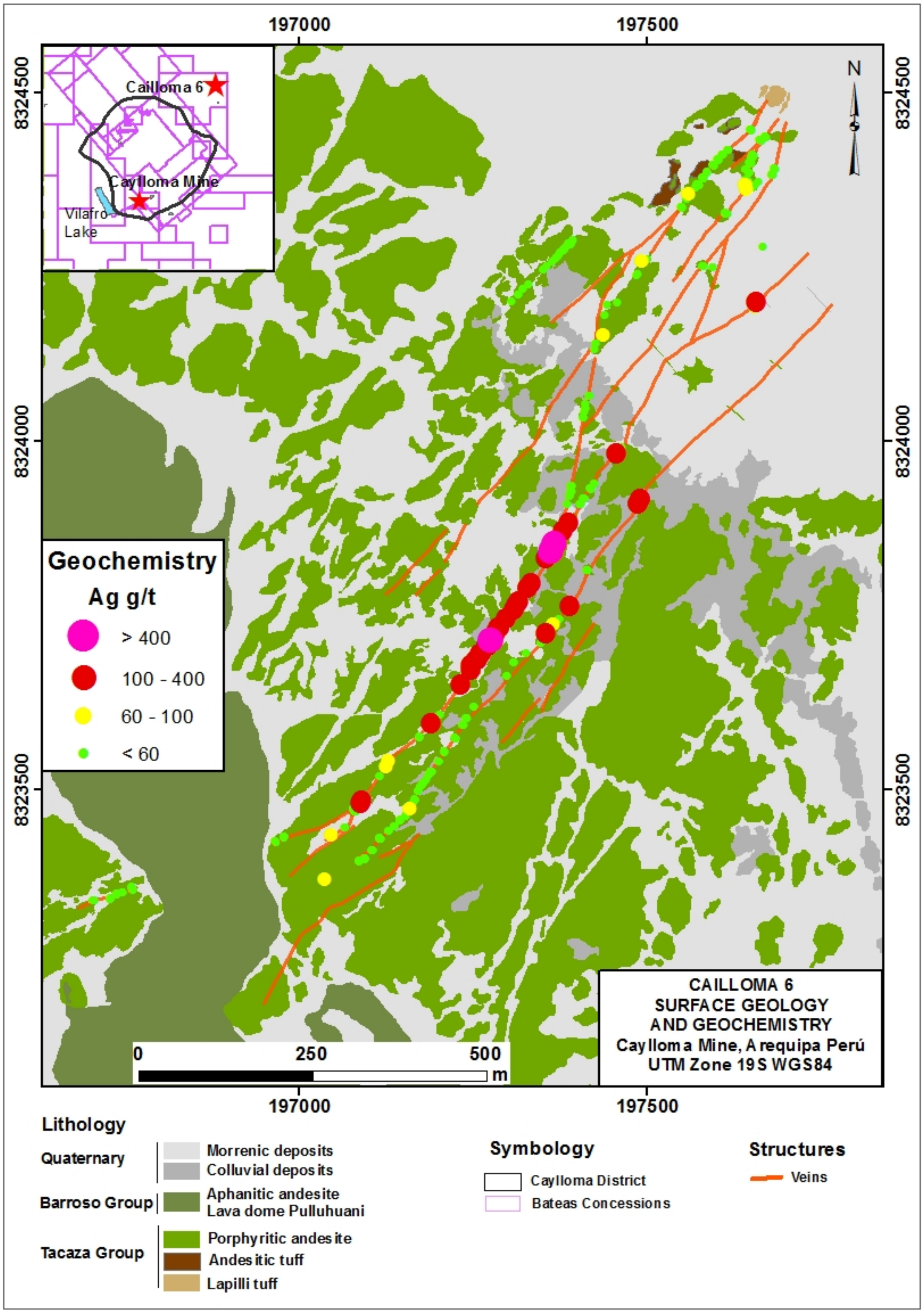


Figure prepared by Bateas, Aug 2016

9.3 Exploration potential

Bateas has identified multiple exploration targets at the Caylloma Mine property (Figure 9.4) for further investigation. Planned exploration projects include:

- Santa Rosa area: Three vein systems traced along a strike length of 300 m on surface, striking 280° and dipping 70° to the northeast
- Condorcoto area: A high sulfidation system with massive silica and moderate alunite-silica alteration
- Llocococha area: A high sulfidation system with silica alteration and silica-alunite alteration and iron oxides
- Pampuyo-Pumanuta area: A tectonic breccia system with a dacitic dome intrusion
- Giro area: Brecciated veins and veinlets system traced along a strike length of 30 m on surface, striking 060° and dipping 80° to the southeast
- Antacollo area: Vein system traced along a strike length of up to 700 m on surface, striking 075° and dipping 65° to the southeast

9.4 Comment on Section 9

In the opinion of the QPs:

- The mineralization style and setting of the Caylloma Mine area is sufficiently well understood to support Mineral Resource and Mineral Reserve estimation
- Exploration methods are consistent with industry practices and are adequate to support continuing exploration and Mineral Resource estimation
- Exploration results support Fortuna's interpretation of the geological setting and mineralization
- Continuing exploration may identify additional mineralization that could support Mineral Resource estimation

Figure 9.4 Plan map showing the location of exploration targets

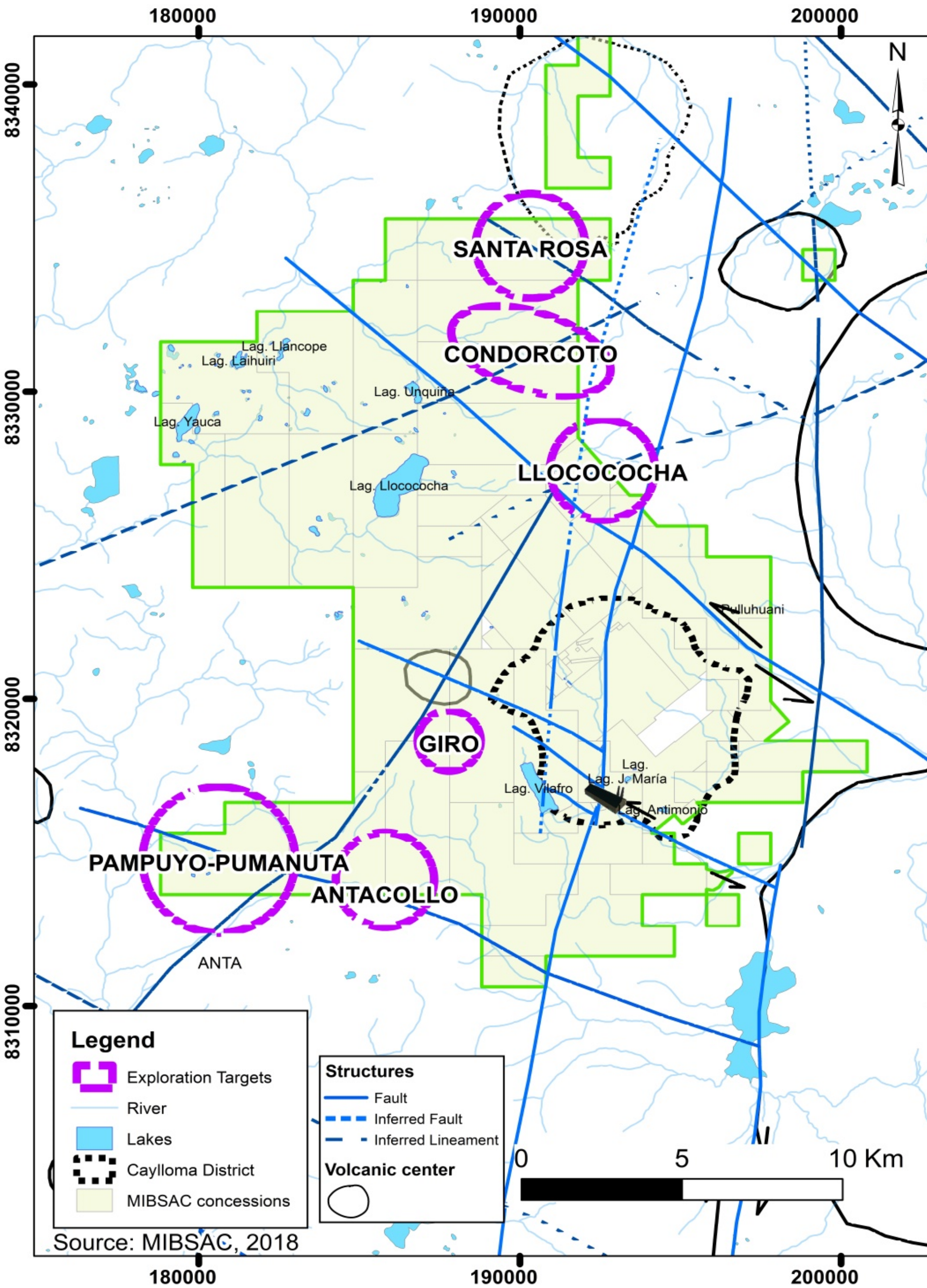


Figure prepared by Bateas, Dec 2018

10 Drilling

Exploration and definition drilling have been conducted at the Caylloma Mine by both CMA and Bateas. Diamond drilling has been the preferred methodology with other drilling techniques regarded as unsuitable due to the terrain and the required depths of exploration.

10.1 Drilling conducted by Compania Minera Arcata

Bateas were able to recover and validate information on 47 diamond drill holes totaling 8,177.67 m drilled by CMA between 1981 and 2003 at the Caylloma Mine. It is unlikely these are the only holes drilled over this period but data on additional drill holes could not be recovered and validated. Table 10.1 details the CMA exploration drilling information retrieved by Bateas.

Table 10.1 Exploration drilling conducted by CMA

Vein	Surface Drill holes		Underground Drill holes	
	Number	Meters	Number	Meters
San Pedro	-	-	8	1,252.85
San Cristóbal	2	882.65	18	1,903.20
San Miguel	2	367.25	-	-
Don Luis			1	130.87
Don Luis I	-	-	2	252.90
Elisa	-	-	2	239.10
La Plata	9	2,228.95	-	-
Ramal San Pedro	1	268.80	-	-
Ursula	2	651.10	-	-
TOTAL	**16**	**4,398.75**	**31**	**3,778.92**

10.2 Drilling conducted by Bateas

As of August 31, 2018, Bateas had completed 1,296 drill holes on the Caylloma Mine totaling 225,361.80 m since the company took ownership in 2005 (Table 10.2) and represents all data compiled as of the data cut-off date used for Mineral Resource estimation. All holes are diamond drill holes and include 544 from the surface totaling 151,774.55 m, and 752 from underground totaling 73,587.25 m. It is important to note that not all the holes presented encountered mineralization and only drill holes in areas where reasonable geological continuity of mineralized structures could be established were used in defining and ultimately estimating Mineral Resources. The locations of surface drill holes drilled by Bateas at the Caylloma Mine are displayed in Figure 10.1.

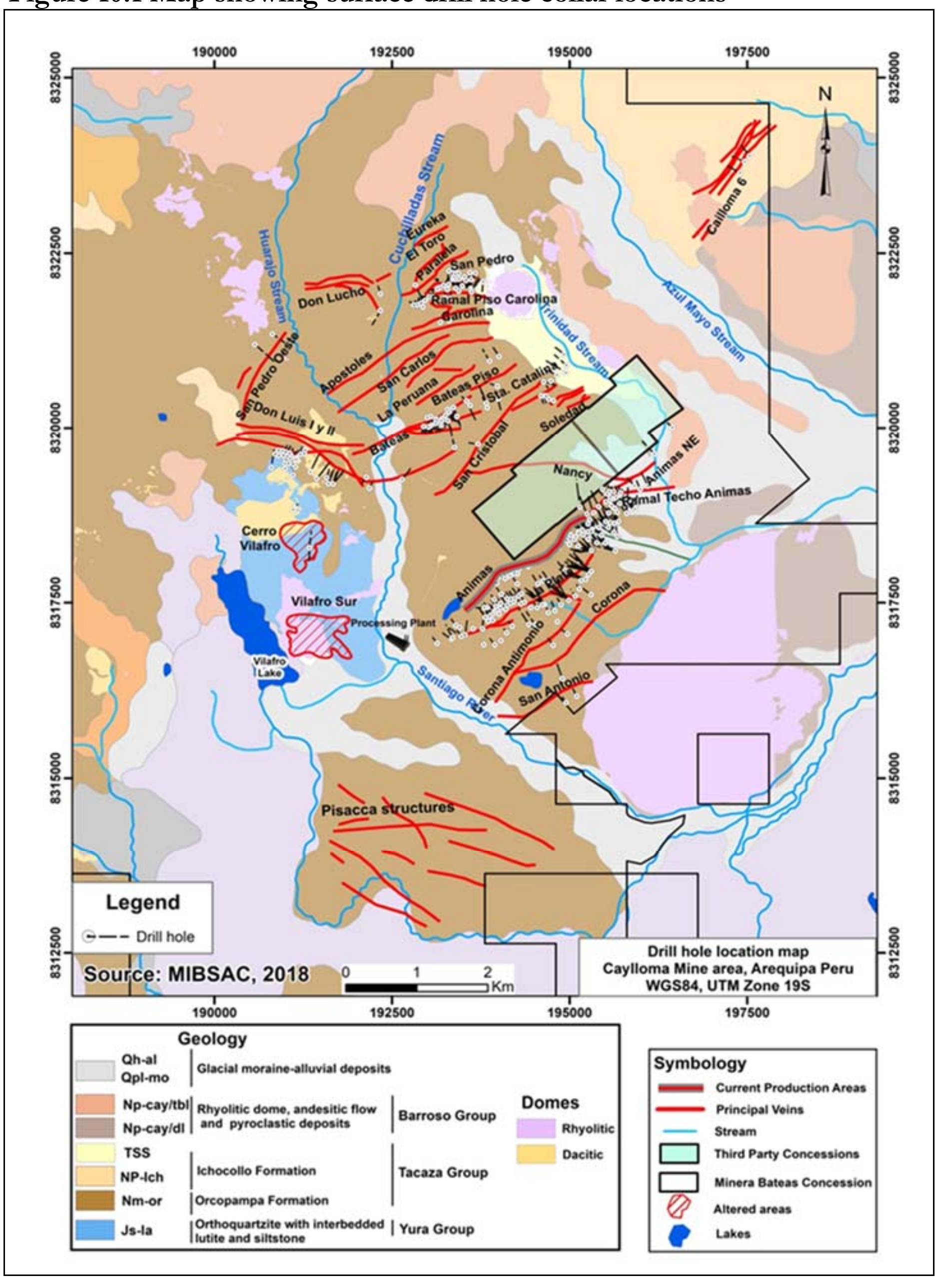
Table 10.2 Exploration drilling conducted by Bateas

Vein	Year	Surface drilling		Underground drilling	
		Number	Meters	Number	Meters
Animas, Animas NE, Cimoide ASNE & Ramal Techo ASNE	2005	0	0.00	94	2,028.00
	2006	37	7,638.75	2	111.15
	2007	34	9,514.85	0	0.00
	2008	8	2,921.60	0	0.00
	2010	21	2,300.45	9	805.40
	2011	12	3,411.10	10	1,745.75
	2012	18	4,966.20	30	3,944.10
	2013	0	0.00	10	1,970.55
	2014	9	1,858.00	15	1,695.20

Vein	Year	Surface drilling		Underground drilling	
		Number	Meters	Number	Meters
	2015	9	2,035.60	41	3,182.80
	2016	26	8,130.60	93	11,733.85
	2017	48	24,825.95	87	10,453.40
	2018*	28	11,080.65	47	5,230.80
Antimonio & Corona Antimonio	2006	5	1,117.50	0	0.00
Bateas	2007	9	3,605.40	0	0.00
	2008	2	774.90	0	0.00
	2009	0	0.00	10	829.50
	2010	0	0.00	9	510.20
	2011	3	1,040.85	38	2,714.10
	2012	18	5,006.65	28	2,596.90
	2013	0	0.00	49	4,318.70
	2014	32	4,351.40	1	152.10
	2015	16	2,791.3	11	1,666.40
Cailloma 6	2014	3	958.80	0	0.00
Carolina	2012	20	5,117.80	0	0.00
	2013	52	12,459.20	0	0.00
Corona	2012	1	344.60	0	0.00
Don Luis I & II	2010	12	2,265.40	0	0.00
	2012	6	2,487.00	0	0.00
	2013	21	7,133.80	0	0.00
	2014	3	666.90	0	0.00
El Toro	2012	1	177.70	0	0.00
Gaby	2013	2	382.50	0	0.00
La Plata & Cimoide La Plata	2005	1	152.22	10	450.40
	2006	10	2,109.75	8	547.85
	2011	12	2,495.85	1	257.40
	2012	0	0.00	3	812.05
	2013	0	0.00	1	199.20
Lucia	2012	0	0.00	8	1,300.20
Nancy	2006	1	86.60	0	0.00
	2007	6	1,205.50	0	0.00
	2008	12	3,094.00	0	0.00
	2012	5	1,432.50	2	768.00
	2013	5	935.50	0	0.00
	2017	5	2,600.70	10	1,087.20
	2018*	0	0.00	20	2,478.75
Patricia	2010	0	0.00	7	682.80
	2011	0	0.00	12	981.80
Pilar	2011	0	0.00	2	143.50
San Antonio	2011	2	391.50	0	0.00
San Carlos & San Carlos I	2006	0	0.00	10	481.00
	2014	2	495.80	0	0.00
San Cristóbal & Santa Catalina	2006	3	551.00	0	0.00
	2007	0	0.00	9	992.60
	2008	0	0.00	3	558.10
	2011	4	1,396.15	4	527.80
San Pedro	2012	6	2,456.00	0	0.00
San Pedro Oeste	2018	2	811.40	0	0.00
Silvia &	2008	0	0.00	7	967.75

Vein	Year	Surface drilling		Underground drilling	
		Number	Meters	Number	Meters
Soledad	2009	0	0.00	12	1,426.15
	2010	7	923.80	15	1,010.30
	2011	0	0.00	7	591.30
	2012	0	0.00	17	1,634.30
Vilafro	2010	2	304.30	0	0.00
	2017	2	681.10	0	0.00
Wendy	2014	1	285.10	0	0.00
Total	**2005-18***	**544**	**151,774.55**	**752**	**73,587.25**
*thru August 31, 2018					

Figure 10.1 Map showing surface drill hole collar locations



10.2.1 Drilling by vein

Animas and Animas NE

In 2005, 94 drill holes totaling 2,028.00 m were drilled from underground to evaluate the potential of the Animas structure at depth.

During 2006, 37 drill holes totaling 7,638.75 m were drilled from surface and two from underground in order to determine the continuity of the Animas vein to a depth of approximately 4,450 masl. Exploration of the Animas NE vein was directed towards the 4,800 masl and included nine drill holes, although only two holes intercepted any significant mineralization. Exploration drilling of the central Animas zone was focused between 4,700 masl (level 8) and 4,450 masl (level 13) and resulted in a number of significant intercepts. Drilling in the southwestern extension of the Animas vein included four drill holes.

In 2007, 34 drill holes totaling 9,514.85 m were drilled in the Animas structure. The objective was to verify the structural continuity and mineral content both horizontally and vertically from 4,600 masl to 4,500 masl in the central Animas area.

In 2008 the Animas structure was further explored through drilling of eight diamond drill holes including three drill holes to level 7 (4,595 masl) and one to level 12 (4,500 masl), where the structure was characterized by the presence of quartz breccia and rhodonite, with an average width of 4.7 m.

In 2010, a diamond drill program was designed to investigate the upper levels of the Animas vein between levels 5 (4,850 masl) and 6 (4,800 masl). Ten drill holes were completed resulting in the identification of high-grade silver mineralization in the upper portions of the Animas structure. Additional exploration drilling was also carried out in 2010 in the Animas Central area below 4,850 masl.

During 2011, 12 diamond drill holes totaling 3,411.10 m were drilled from surface to investigate the Animas NE vein between 4,650 masl and 4,500 masl. Results were positive with the identification of a new mineralized shoot.

In 2012, 16 diamond drill holes totaling 4,275.80 m were completed from surface in order to estimate the potential of the Animas NE shoot. Additionally, two diamond drill holes totaling 690.40 m were completed from the surface to evaluate the potential depth of Animas SW shoot.

From underground, 10 diamond drill holes totaling 2,649.40 m were completed in 2012 to evaluate the continuity of the Animas vein to the elevation of 4,390 masl (level 14), thereby further testing the continuity of shoots 2 and 3. Additional drilling was carried out from underground drill stations to provide information for ore control purposes.

During 2013, 10 drill holes totaling 1,970.55 m were drilled from underground for the purposes of potentially upgrading Inferred Mineral Resources estimated in the Animas NE area, between the elevations of 4,450 masl and 4,350 masl.

During 2014, nine drill holes totaling 1,858 m were drilled from surface for the purposes of potentially upgrading Inferred Mineral Resources in the Animas NE area between the elevations of 4,700 masl and 4,550 masl. In addition, 15 drill holes totaling 1,695.20 m were drilled from underground drill stations to support upgrading of Inferred Mineral Resources in the Animas and Animas NE areas.

From 2015 to June 2018, Bateas embarked on an extensive exploration and infill program to explore and improve the geological understanding of the Animas NE vein. Exploration drilling continued to explore the northeast end of the vein and the continuity of mineralization at depth, with most drilling between level 12 (4,495 masl) to below level 17 (4,240 masl). Exploration drilling identified two additional bands of mineralization in the Animas NE vein plunging steeply to the northeast. Infill drilling over the same period focused on providing support for upgrading Inferred Mineral Resources in Animas Central at depth, just below the present workings between level 13 (4,440 masl) and level 15 (4,340 masl). Over the 3.5-year period, 111 surface holes totaling 46,072.80 m and 268 underground holes totaling 30,600.85 were drilled. The exploration and infill programs were successful in expanding the resources in the Animas NE vein and increasing the confidence in the estimates to support upgrading of Inferred Mineral Resources, generally replacing the tonnes that were depleted through mining production over the same period.

Exploration drilling of the Animas NE vein has led to the discovery of two splay veins located in the hangingwall of the main Animas NE vein. The Cimoide ASNE vein is located 200 m to the south of Animas NE with the Ramal Techo ASNE located 230 m to the south. The Cimoide ASNE vein has been intersected by numerous drill holes drilled to investigate Animas NE between 2008 to 2018 with the majority of intercepts between 4,650 and 4,250 masl. The Ramal Techo ASNE vein was first intersected in 2004 and, similar to the Cimoide ASNE vein has been intercepted many times during the exploration of the Animas NE vein, particularly between 4,600 and 4,450 masl.

Antimonio and Corona Antimonio

In 2006, a limited drill program was executed in the Antimonio and Corona Antimonio vein area with the drilling of five surface diamond drill holes totaling 1,117.50 m.

Bateas

A diamond drill program involving 11 drill holes from surface was carried out to explore the Bateas vein in late 2007 and early 2008. The drilling confirmed the existence of a northeast-striking vein structure characterized by the presence of high-grade silver mineralization with manganese gangue minerals such as rhodonite, rhodochrosite, and alabandite.

In 2011, three diamond drill holes totaling 1,040.85 m were drilled from surface that successfully identified the continuity of the Bateas vein to the northeast. In addition, 38 drill holes totaling 2,714.10 m were completed from underground drill stations for ore definition and control purposes.

In 2012, 18 diamond drills totaling 5,006.65 m were completed from the surface with the objective to evaluate the resource potential from the level 10 upwards to the surface. Underground drilling continued for ore definition and upgrading purposes with the drilling of 28 diamond holes totaling 2,596.90 m.

During 2013, 49 drill holes totaling 4,318.70 m were drilled from underground drill stations for purposes of supporting upgrading of Inferred Mineral Resources between the elevations of 4,650 masl and 4,450 masl.

During 2014, 32 surface drill holes totaling 4,351.40 m were drilled for the purpose of supporting upgrading of Inferred Resources between the elevations of 4,750 masl and 4,650 masl.

During 2015, 16 surface drill holes totaling 2,791.30 m were drilled to support upgrading of Inferred Mineral Resources in the Bateas and Bateas Ramal Piso veins between the elevations of 4,800 masl and 4,650 masl. An additional 12 drill holes totaling 1,818.50 m were drilled from late 2014 into 2015 from underground drill stations for the purposes of supporting upgrading of Inferred Resources between the elevations of 4,650 masl and 4,550 masl.

Cailloma 6

During 2014, three surface drill holes totaling 958.80 m were drilled to test the mineralization potential of the Cailloma 6 vein.

Carolina

In 2012, 20 diamond drill holes totaling 5,117.80 m were completed from the surface for the purpose of evaluating the potential of the Carolina vein structure and to define the morphology of the mineralized shoot.

In 2013, 52 additional surface drill holes totaling 12,459.20 m were completed to further define and upgrade mineralization in the Carolina vein.

Corona

During 2011, one surface drill hole was completed in order to test the mineralization potential of the Corona vein; however, no anomalous grades were intersected.

Don Luis I & II

In mid-2010, seven diamond drill holes were drilled from surface to explore the Don Luis II vein. Positive results were achieved and the program was expanded to include five additional holes that were drilled prior to the end of 2010.

During 2012, six diamond drill holes totaling 2,487 m were completed from the surface to define the potential of this structure and to better understand the morphology of the mineralized shoot. The results were favorable with drilling identifying a mineralized vein structure up to 2.35 m in width.

In 2013 and 2014, saw an additional 24 surface drill holes totaling 7,800.70 m drilled to further define the mineralization potential of the Don Luis shoot.

El Toro

During 2012, one diamond drill hole totaling 177.70 m was completed from the surface for the purpose of exploring the potential of this vein to the east of the Cuchilladas creek. Anomalous silver values were intersected; however, due to other preferential targets, no follow-up drilling has been conducted of the El Toro structure as of the effective date of this Report.

Gaby

During 2013, two holes were drilled from surface totaling 382.50 m in order to test the mineralization potential of the Gaby vein. Narrow structures less than a meter in width were intercepted with anomalous silver grades.

La Plata and Cimoide La Plata

In 2005, 10 drill holes were drilled from underground drill stations and one from surface targeting the La Plata and Cimoide La Plata structures between the elevations of 4,745 masl (level 7) and 4,695 masl (level 8).

During 2006, 10 further drill holes were drilled from surface to confirm the continuity at the extreme western portion of the La Plata vein, between the elevations of 4,700 masl and 4,550 masl. Results confirmed the continuity of the vein with widths of 0.6 to 1.2 m. Eight diamond drill holes were also drilled from underground targeting the La Plata vein at a depth of 4,695 masl (level 8) to investigate the continuity of the ore shoot at depth.

In 2011, the La Plata drill program included 12 drill holes from surface and one from underground targeting elevations between 4,700 masl and 4,600 masl.

In 2012 three diamond drill holes totaling 812.05 m were executed from underground for the purpose of evaluating the continuity of the mineralized shoot at the 4,600 masl level.

In 2013, one further drill hole totaling 199.20 m was drilled from an underground drill station for the purposes of testing the mineralization at the 4,500 masl level.

Lucia

In 2012, eight diamond drills totaling 1,300.20 m were executed from underground drill stations for the purpose of evaluating the potential of this newly-identified structure. The results were not favorable, identifying only low-grade polymetallic mineralization.

Nancy

Exploration drilling from 2006 to 2007 included the drilling of seven diamond drill holes from surface totaling 1,292.10 m. The drilling identified a structure hosting a gray silica matrix and fragments of quartz with sulfides. In 2008, 12 additional drill holes were drilled from surface totaling 3,094.00 m that encountered a number of significant mineralized intercepts. In 2011, three drill holes designed to investigate the Animas NE vein also intercepted the Nancy vein, providing further information on the continuity and grade of the vein.

During 2012, five diamond drill holes totaling 1,432.50 m were completed from the surface.

In 2013, five further surface diamond drill holes totaling 935.50 m were completed.

As mining of the Animas NE vein progressed to the northeast during the 2014 to 2016 period, the potential to access the cross-cutting Nancy vein became apparent, resulting in the drilling of five further holes from surface totaling 2,600.70 m in 2017. In addition, 30 holes from underground totaling 3,565.95 m were drilled from 2017 to June 30, 2018, the data cut-off date for resource estimation. Mining of the Nancy vein commenced in 2018.

Patricia

In 2010, exploration of the Patricia vein commenced from underground with the drilling of seven drill holes totaling 682.80 m designed to investigate the vein structure at the 4,725 masl level.

In 2011, an additional 12 drill holes totaling 981.80 m were completed from underground drill stations to evaluate the continuity of the Patricia vein.

Pilar

In 2011, two exploration drill holes were completed from the underground workings of the San Cristóbal vein to investigate the possible continuity of the Pilar vein. Both drill holes intersected the Pilar structure. At the point tested, the structure was approximately 1 m in thickness and comprised banded rhodochrosite, rhodonite, and quartz with veinlets of sphalerite, galena, chalcopyrite, and pyrite.

San Antonio

Drilling of the San Antonio vein commenced in 2011 with the drilling of two drill holes from surface to investigate the potential of the vein. The vein thickness ranges from 0.7 to 6.0 m with mineralization consisting of massive quartz, brecciated quartz, and boxwork quartz with infillings of limonite, quartz geodes displaying crustiform textures, pyrite and barite.

San Carlos

During 2014, two holes were drilled from surface totaling 495.80 m in order to test the mineralization potential of the northeast portion of the San Carlos vein. The drilling encountered narrow structures between 0.30 m to 0.75 m in thickness and high-grade silver values.

Santa Catalina

Exploration of the Santa Catalina vein by Bateas commenced in 2006 with a drilling program from surface focused on investigating the mineral potential above and below level 8 (4720 masl). In 2007, exploration continued through underground drilling to test the vein between level 8 (4720 masl) and level 7 (4773 masl) and resulted in the intersection of a narrow structure less than 5 m wide composed of banded rhodonite-rhodochrosite with calcite and disseminated silver sulfosalts. Exploration drilling of the Santa Catalina vein also resulted in the discovery of additional polymetallic veins, such as Soledad, Silvia, Patricia, and Pilar.

San Cristobal

From 2007 to 2008, drilling was performed from underground in order to explore the mineralization potential between level 11 (4540 masl) and level 12 (4500 masl). The drilling did not intersect any significant mineralization.

In 2011 a drilling campaign was conducted to test for the extension of the San Cristóbal vein to the northeast. Four drill holes totaling 1,396.15 m were drilled from surface with three of the holes intersecting the vein structure but displaying limited mineralization. The fourth hole failed to intersect the vein. Field reconnaissance conducted post-drilling traced the projection of the San Cristobal vein to the northeast and identified the structure on surface in the Cailloma 6 concession.

San Pedro

During 2012, six diamond drill holes totaling 2,456.00 m were completed from the surface to potentially support Mineral Resource estimation and to further explore the structure at depth. The results were not favorable, intercepting lower values than previously encountered.

San Pedro Oeste

In 2018, exploration activities focused in the northwest of the property with the drilling of two holes from surface, totaling 811.40 m to investigate a mineralized structure identified on surface named San Pedro Oeste. The holes did not intersect any intervals of significant mineralization.

Silvia

In late 2007 and early 2008, a drilling program designed to investigate the Santa Catalina vein intersected mineralization averaging 0.6 m in width associated with the Silvia vein.

Since 2008, underground development of the vein on level 7 (4750 masl) has increased the understanding of the style of mineralization.

During 2009, 12 drill holes totaling 1,426.15 m were drilled from underground drill stations to further test the mineral potential of the Silvia vein.

During 2010, 15 drill holes totaling 1,010.30 m were drilled from underground to investigate the mineralized shoot between 4800 masl to 4670 masl. Results proved the continuity of the mineralization.

Twenty-four drill holes totaling 2,225.60 m were drilled from underground drill stations during 2011 and 2012 to further define the mineralization in the Silva vein.

Soledad

In 2007, drilling designed to investigate the Santa Catalina vein also intersected the Soledad vein with one drill hole intercepting 1.30 m of mineralization. In late 2008, a drill campaign was conducted from underground to confirm the continuity of the structure to level 9 (4650 masl).

In 2010, seven diamond drill holes totaling 923.8 m were drilled from surface to explore the Soledad vein to a depth of approximately 4800 masl. The drilling was successful at intersecting the mineralized structure.

Vilafro

In 2010 two surface drill holes totaling 304.30 m were completed in order to intersect fault structures associated with quartz veinlets and disseminated silver mineralization.

In late 2017, two surface drill holes totaling 681.10 m were drilled in order to intersect hydrothermal breccias hosted in sandstones of the Yura Group.

Wendy

In 2014, one drill hole totaling 285.10 m was drilled to test the mineralization potential of the Wendy vein. The hole intercepted a narrow vein of 0.42 m thickness.

10.2.2 Drilling since the Mineral Resource database cut-off date

An additional four drill holes totaling 388.2 m were completed after the August 31, 2018 data cut-off date used for Mineral Resource estimation. Assay results for significantly mineralized intervals in those drill holes are summarized in Table 10.3. The QP has reviewed the results against the block model, and has determined that the new drilling would have limited effects on the average grade of the deposit within the area of the currently-estimated Mineral Resources, and future inclusion of these results in an updated model would not materially impact the Mineral Resources or Mineral Reserves detailed in this Report.

Table 10.3 Significant drill results post the data cut-off date of August 31, 2018

Hole ID	Easting	Northing	Elevation	Azimuth (°)*	Dip (°)*	From (m)	To (m)	Int. (m)	ETW** (m)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Vein ID[#]
ANIM065518	195558	8318977	4606	120	-22	85.95	89.60	3.65	3.25	71	0.13	3.68	6.51	CASNE
						118.80	128.30	9.50	8.44	368	0.01	10.10	3.11	RTASNE
ANIM065718	195703	8318969	4533	143	54	19.15	21.10	1.95	1.51	62	0.20	3.56	3.69	ROS
ANIM065818	195700	8318967	4531	209	19	59.95	61.55	1.60	1.20	155	0.05	5.08	4.39	RTASNE
ANIM066018	195705	8318970	4531	104	24	53.25	59.20	5.95	2.69	69	0.17	2.19	7.98	RTASNE

*Azimuth and dip values taken at collar location
**ETW = Estimated True Width
[#] CASNE = Cimoide Animas NE; RTASNE = Ramal Techo Animas NE; ROS = Rosita

10.3 Diamond drilling methods

Bateas has used a number of different drilling contractors to carry out exploration and definition drilling since it took ownership of the mine in 2005. During 2012, drilling was conducted by two drilling contractors, Geodrill and Explomin. Multiple drill rigs were used during the campaign, including two Longyear 44s, two Geo-3000, and one TEC DRILL H-200 for underground drilling. Both HQ (63.5 mm) and NQ (47.6 mm) diameter core were obtained, depending on the depth of the hole. From 2013 onwards, exploration and resource definition drilling were carried out by drilling contractors, Geodrill and Explodrilling, as well as by Bateas-owned drill rigs.

Proposed surface drill hole collar coordinates, azimuths and inclinations were designed based on the known orientation of the veins and the planned depth of vein intersection using geological plan maps and sections as a guide.

The drilling platform, together with its access road and sedimentation pit, were prepared using a D7 tractor. The dimensions of the drilling platform are clearly marked in advance of construction with flags indicating the limits for earth movement in order to minimize soil disturbance and comply with government directive D.S. N° 020-2008-EM regarding Environmental Regulations for Exploration Activities.

10.4 Geological and geotechnical logging procedures

Drill core is stored in either wooden or plastic boxes with each box storing up to 3.0 m of core. Prior to transportation, core boxes are verified to ensure correct, consecutive labeling, as well as clear and legible drill hole codes. The inside of the box is checked for a direction arrow indicating the start and end of the core sequence. The lid of the core box is labeled to clearly show the accrued length and each side of the lid details the previous accrued length (From), and current accrued length (To).

Drill core boxes are only handled and transported by personnel appointed to this task. Boxes are checked and secured prior to transportation to minimize the risk of shifting or mixing of core samples during transportation. Care is taken to ensure that core boxes arrive at the logging facilities with minimal disturbance to the core or the depth markers.

In the logging facilities, geologists and geotechnical technicians carry out geotechnical measurements, logging and sampling of mineralized core. Core is first examined to capture geological information. Initially, quick logging is performed to prepare a brief description of the mineralization intersects. The logging sheet allows the recording of essential information in the form of both graphics and written descriptions. A photographic record of the core is taken using a digital camera.

In January 2018 all logging became digital, being incorporated daily into the Maxwell DataShed database system. Data were recorded initially with Excel templates, and later with the Maxwell LogChief application using essentially the same structure. Both input methods used pick-lists and data validation rules to ensure consistency between loggers. Separate pages were designed to capture, lithology, alteration, veins, sulfide-oxide zones, minerals, structure (contacts, fractures, veins, and faults with attitudes to core axis), magnetic susceptibility, and special data (samples collected for geochemistry, thin section examinations, the core library, density, etc.). Intensity of alteration phases was recorded using a numeric 1 to 4 scale (weak, moderate, strong, very strong); abundance of veins and most other minerals were estimated in volume percent.

Geotechnical logging is conducted prior to cutting of the core and involves the collection of drill core recovery and rock-quality designation (RQD) data. Information is recorded in the field using the Maxwell LogChief application.

10.5 Drill core recovery

Sample recovery for each drill interval is recorded by geotechnical technicians. Drill core recovery is generally good, on average greater than 90 % (Figure 10.2).

Figure 10.2 Graph of core recovery of Animas/Animas NE vein

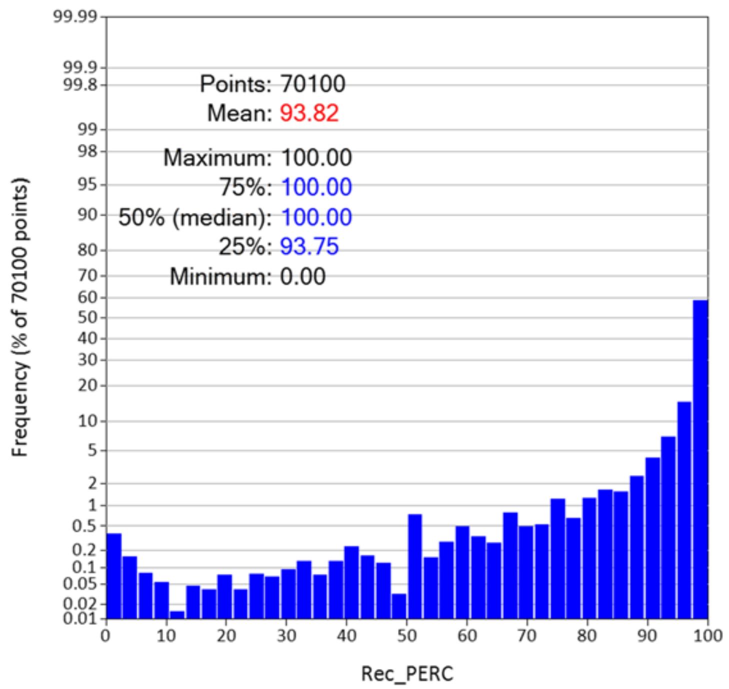


Figure prepared by Bateas, Sep 2018

Recoveries can be lower near surface or when fault structures are encountered due to the more fragmented nature of the core. Recovery is generally excellent through the mineralized vein structures. The core recovery values are used when considering the reliability of the sample for resource estimation purposes. The presence of bias due to core loss is detected by performing a correlation analysis on recovery and grade.

10.6 Extent of drilling

Drill holes are typically drilled on sections spaced 40 to 60 m apart along the strike of the vein with surface drilling focusing on exploring the extents of the Animas, Bateas and Nancy veins and underground drilling used for a mix of exploration and Mineral Resource and Mineral Reserve definition. The extent of drilling varies for each vein with those having the greatest coverage having drill holes extending over 4,000 m of the vein's strike length (Animas), to the exploration prospects least having only a few drill holes extending over 50 m (Antimonio).

10.7 Drill hole collar surveys

The coordinates for the proposed drill hole collar location are determined through assessing the azimuth and inclination of the proposed drill hole to achieve the desired depth of intercept in cross sections. Once the coordinates have been determined, the location of the collar is located in the field using differential global positioning system (DGPS) instruments. The drill pad is then prepared at this marked location. Upon completion of the drill hole, a survey of the collar is performed using Total Station equipment, with results reported in the collar coordinates using reference Datum WGS84, UTM Zone 19S.

10.8 Downhole surveys

The geologist in charge of drilling is responsible for orienting the azimuth and inclination of the hole at the collar using a compass clinometer. Downhole surveys are completed by the drilling contractor using survey equipment such as a Flexit or Reflex tool at approximately 50 m intervals for all surface drill holes and for underground drill holes greater than 100 m in length. Bateas assesses the downhole survey measurements as a component of the data validation.

Drill holes recovered from CMA do not include downhole survey information and drill hole azimuths and inclinations recorded at the collar have been used to project the hole to its full depth. The lack of downhole surveys for the CMA drill holes has been taken into account during resource classification where interpretations relating to holes reliant in only CMA data being classified as Inferred, if classified.

10.9 Drill Sections

Representative drill sections displaying the geologic interpretation of the Animas vein are displayed in Figures 10.4 and 10.7. A plan view showing the location of the sections is provided in Figure 10.3.

NSR values in US dollars (US$/t) indicated on the cross sections have been estimated for sulfides using US$ 0.45/g for Ag, US$ 6.81/g for Au, US$ 19.52/% for Pb and US$ 19.80/% for Zn based on metal prices of US$ 18.25/oz for Ag, US$ 1,320/oz for Au, US$ 2,270/t for Pb and US$ 2,750/t for Zn, expected metallurgical recoveries, and presently-agreed upon commercial terms. The NSR equation is discussed in more detail in Section 14.12.

Drill intercept values provided on the sections are for illustrative purposes, and provide an overview of the ranges of thicknesses and grades that can be encountered in the veins.

Figure 10.3 Plan map showing orientation of geologic sections

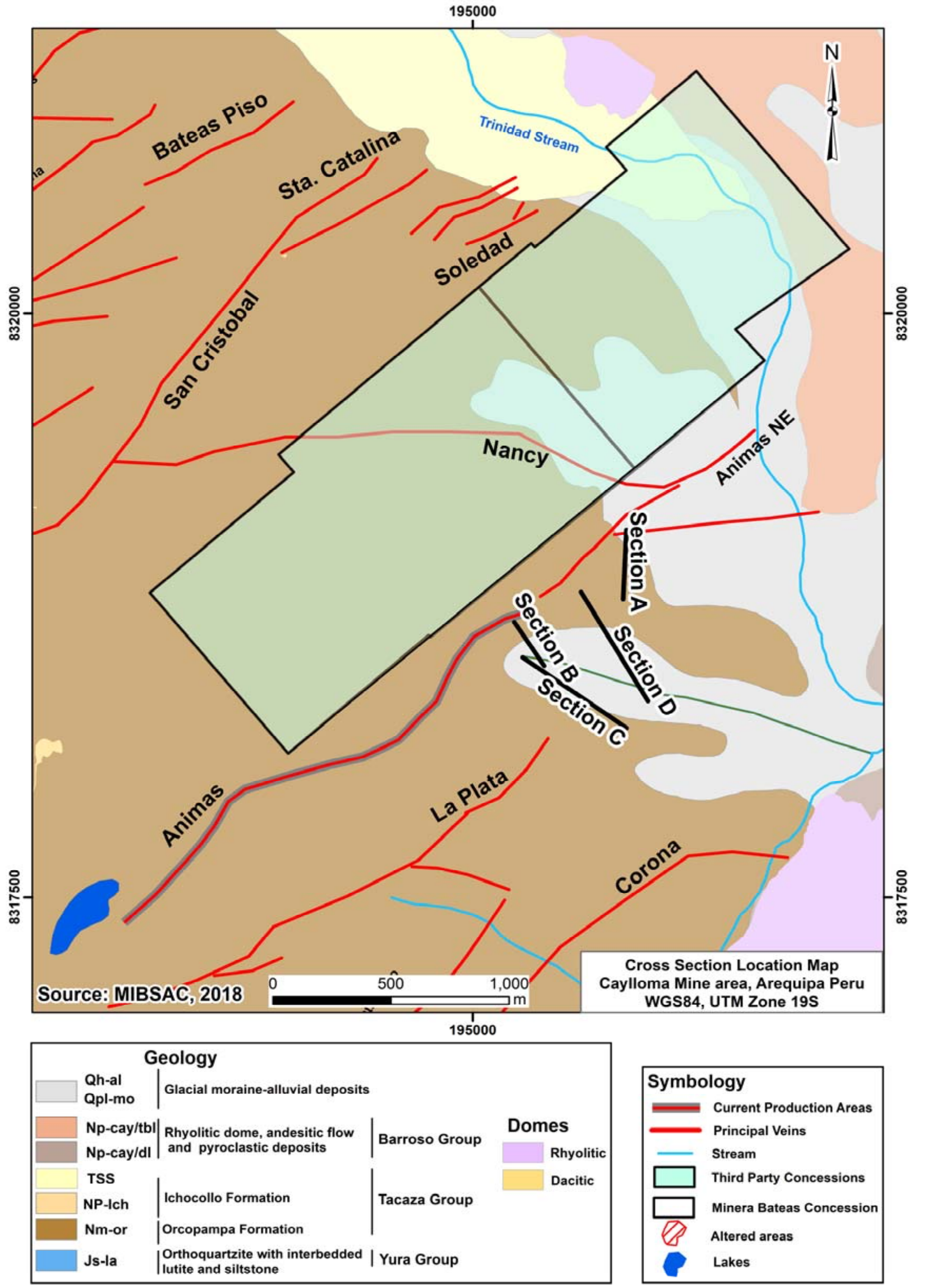


Figure prepared by Bateas, Dec 2018

Figure 10.4 Geologic interpretation of Animas & Nancy vein (Section A)

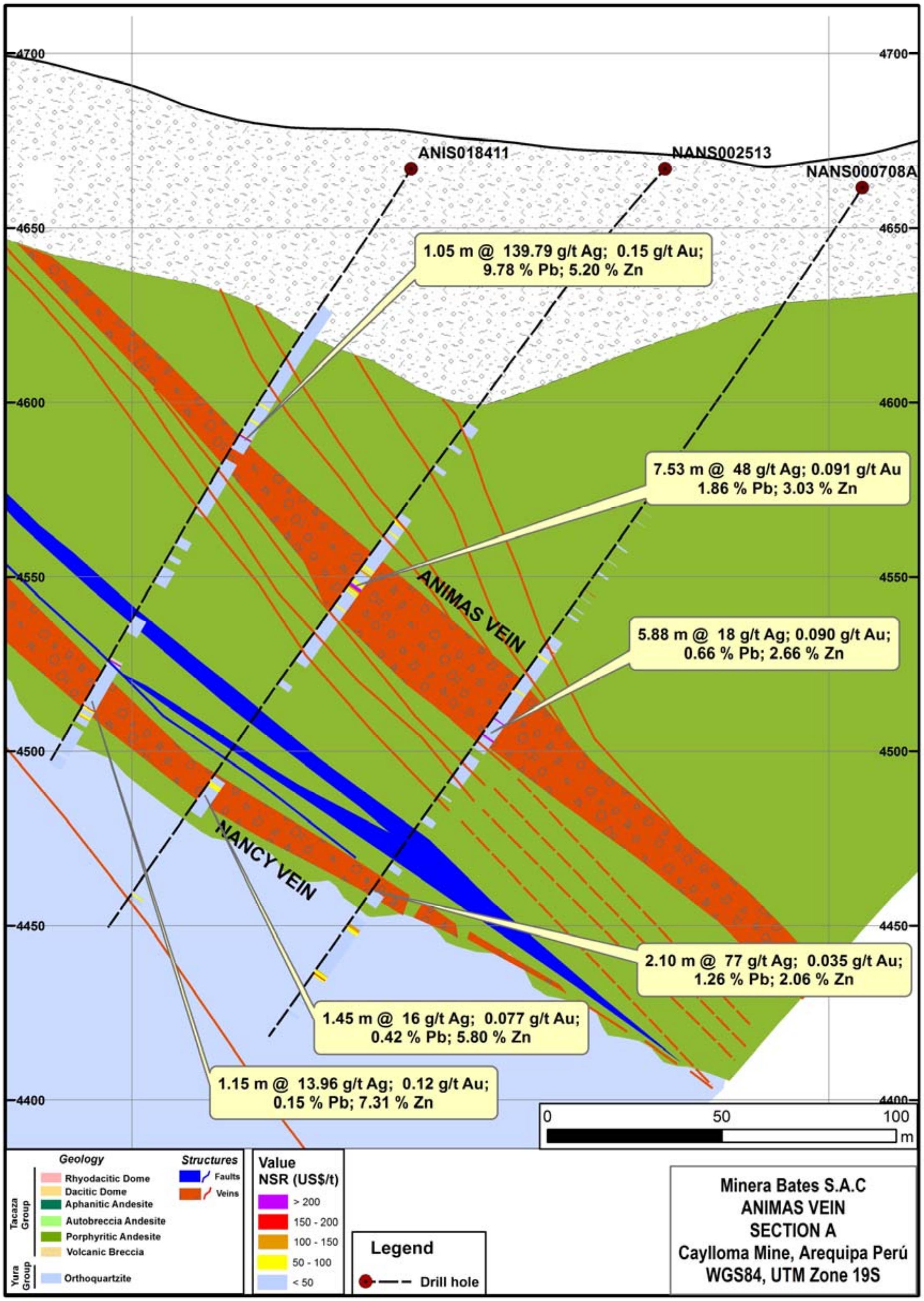


Figure prepared by Bateas, Dec 2018

Figure 10.5 Geologic interpretation of Animas vein (Section B)

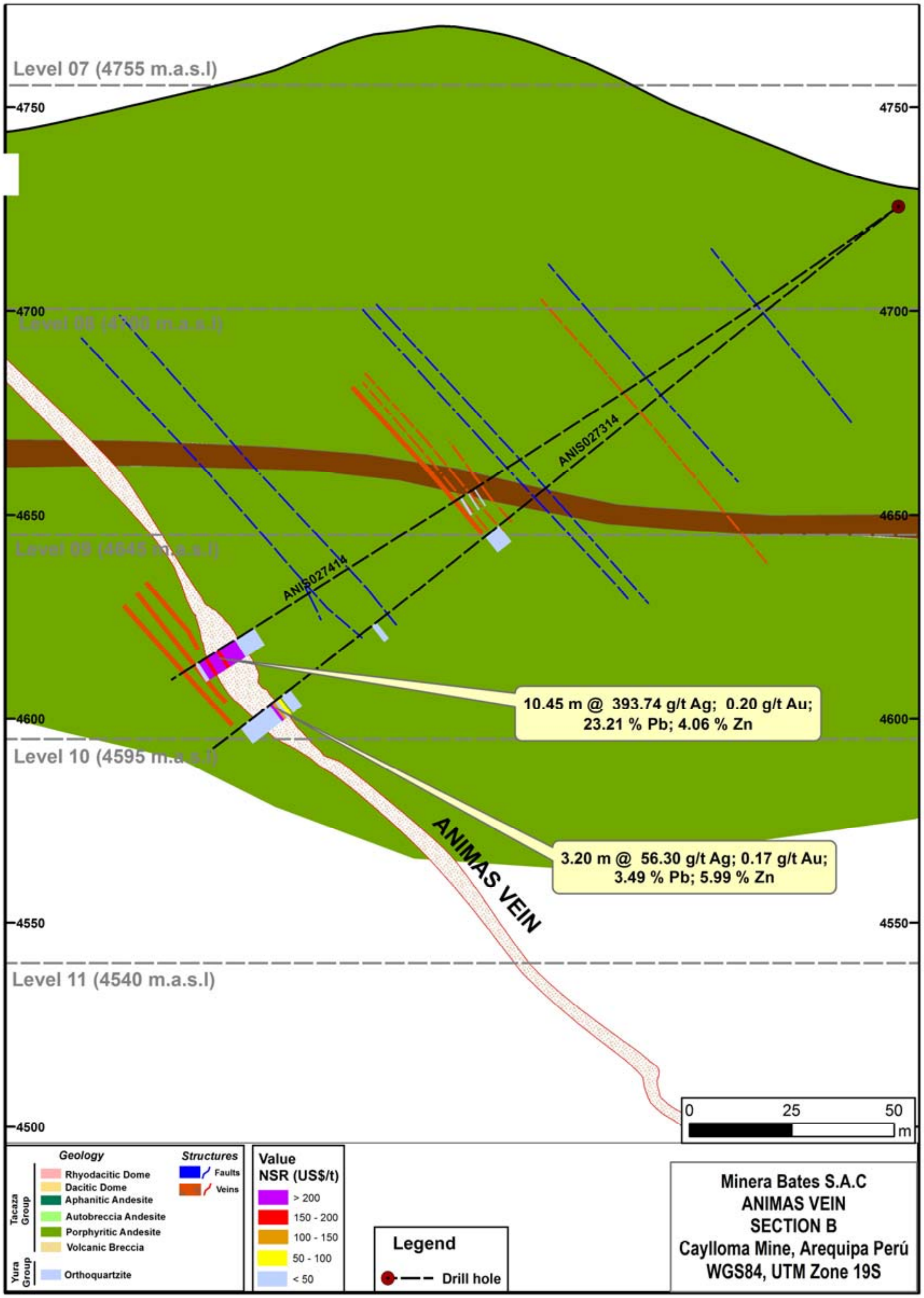


Figure prepared by Bateas, Dec 2018

Figure 10.6 Geologic interpretation of Animas vein (Section C)

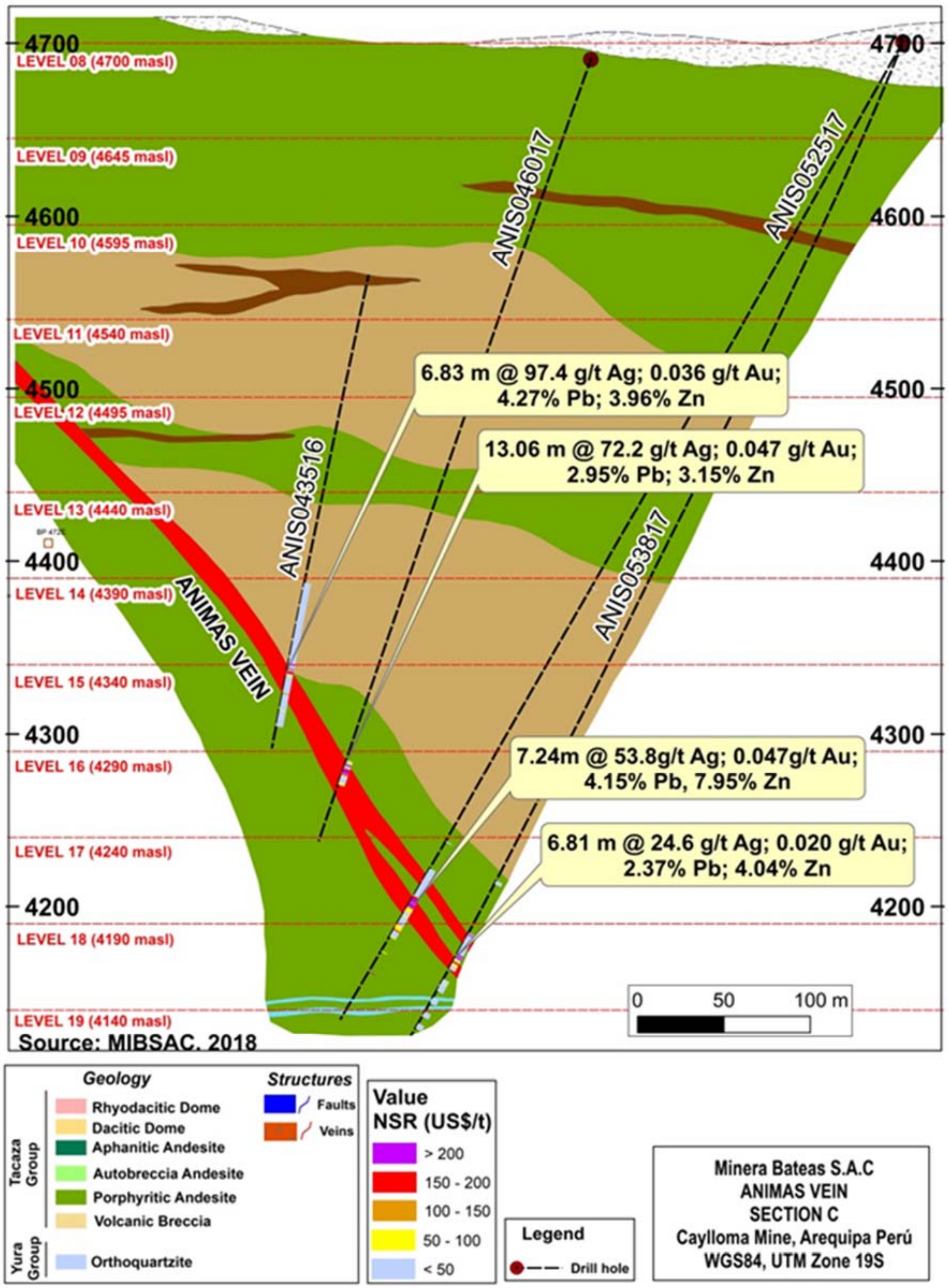


Figure prepared by Bateas, Dec 2018

Figure 10.7 Geologic interpretation of Animas NE vein (Section D)

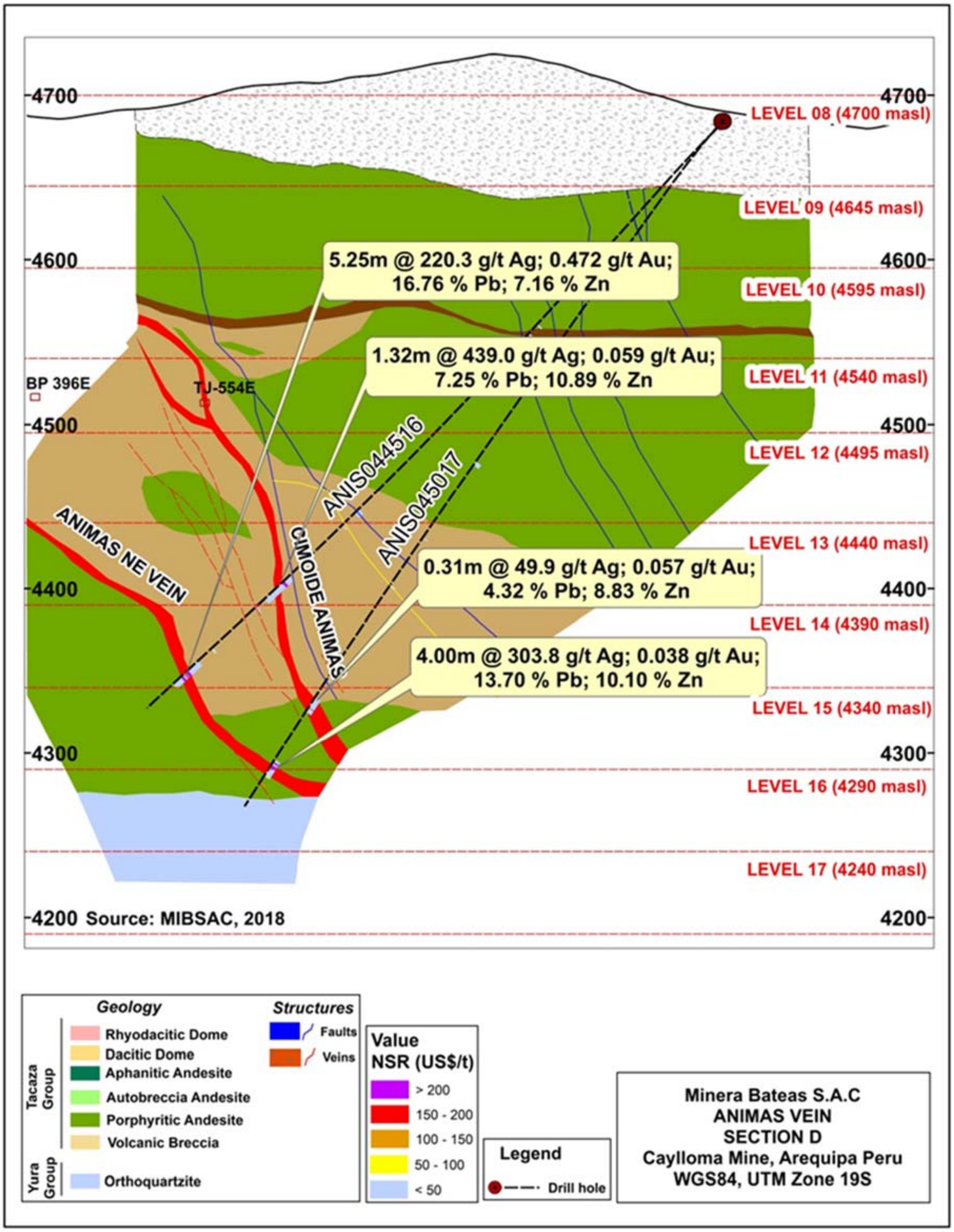


Figure prepared by Bateas, Dec 2018

10.10 Sample length versus true thickness

The relationship between the sample intercept lengths and the true width of the mineralization varies in relation to the intersect angle between the steeply-dipping zone of mineralized veins and the inclined nature of the diamond core holes. Calculated estimated true widths (ETWs) are always reported together with actual sample lengths by taking into account the angle of intersection between drill hole and the mineralized structure. Exaggeration of the true width of the mineralization does not occur during modeling as the actual vein contacts are modeled in three-dimensional space to create vein solids.

10.11 Example drill intercepts

Table 10.4 provides a list of typical drill hole intercepts encountered at the Caylloma Mine. It should be noted that the intervals listed are a subset for reference purposes only and do not represent the total mineralized intervals encountered from the 1,296 drill holes drilled at the Caylloma Mine.

Table 10.4 Example of representative drill results at the Caylloma Mine

Hole ID	Easting	Northing	Elevation	Azimuth (°)*	Dip (°)*	From (m)	To (m)	Int. (m)	ETW** (m)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Vein
ANIS012707	192364	8319219	4376	324	-69	303.30	303.90	0.60	0.53	20	0.23	0.75	1.37	Animas
ANIM026114	192856	8319518	4491	000	-29	No significant mineralized intervals								
ANIS003306	192834	8319664	4369	297	-90	292.50	295.50	3.00	1.85	68	0.21	1.94	2.71	
ANIM013110	193639	8317315	4605	159	-28	72.85	79.75	6.90	6.27	99	0.33	4.39	3.01	
including						75.25	76.15	0.90	0.82	221	0.41	10.51	7.49	
ANIS016510	192681	8319842	4165	321	-52	86.10	88.80	2.70	2.56	323	0.29	7.95	3.24	
ANIS011307	192809	8319496	4474	325	-66	402.80	409.40	6.60	5.88	125	0.16	5.52	6.26	
ANIM019611	193409	8319758	4643	001	-56	220.00	223.00	3.00	2.19	19	0.05	1.25	1.42	Animas NE
ANIS033116	193740	8320461	4188	312	-12	192.60	195.90	3.30	2.67	86	0.38	3.80	4.33	
ANIS055917	193767	8320119	4492	279	-61	No significant mineralized intervals								
ANIS044416	194077	8320186	4507	309	-72	443.60	456.80	13.2	9.01	116	0.04	7.77	9.39	
ANIM019211	194726	8317867	4441	336	-19	171.35	178.90	7.55	6.80	172	0.12	9.11	5.73	
including						176.20	178.20	2.00	1.80	390	0.18	19.76	10.46	
ANIS063018	194086	8320285	4433	323	-74	365.30	365.90	0.60	0.34	335	0.05	4.66	13.65	
NANS004417	196603	8320912	4539	306	-51	No significant mineralized intervals								Nancy
ANIM050717	195554	8318947	4459	328	-71	61.30	62.50	1.20	1.05	24	0.23	0.93	4.02	
including						61.60	61.90	0.30	0.26	54	0.64	2.25	9.57	
NANM003017	196413	8321018	4494	024	1	86.60	89.00	2.40	1.21	1	0.03	0.14	0.87	
NANM005818	196514	8321017	4455	054	23	78.90	91.80	12.9	3.26	27	0.10	1.11	4.10	
NANS003117	196539	8320934	4540	060	-49	231.20	233.30	1.90	1.84	71	0.19	4.70	10.86	
NANS002012	196547	8320984	4481	318	-60	130.60	140.50	9.90	6.88	91	0.07	5.30	7.62	
BATS008512	192654	8321323	4372	176	-44	137.50	138.70	1.20	0.81	61	0.02	0.02	0.06	Bateas
BATS018114	192676	8321306	4369	150	-69	136.90	137.50	0.60	0.22	752	0.30	0.34	0.48	
BATS016914	192697	8321382	4367	190	-57	98.90	99.80	0.90	0.41	3,629	0.59	0.50	0.81	
BATS019114	192529	8321266	4374	133	-44	No significant mineralized intervals								
BATM014813	192918	8321296	4358	299	-43	36.25	38.35	2.10	1.51	544	0.03	0.23	0.25	
BATS018514	193066	8319980	4665	159	-67	152.50	153.40	0.90	0.55	340	0.07	0.02	0.03	
including						152.80	153.10	0.30	0.18	988	0.19	0.05	0.06	
LPLS002506	193131	8318523	4706	332	-79	182.85	183.75	0.90	0.80	24	0.08	0.01	0.01	La Plata
LPLS002011	193763	8319019	4613	341	-50	190.55	190.95	0.40	0.35	70	0.57	0.01	0.04	
LPLS003411	195203	8317689	4543	305	-59	242.50	243.65	1.15	0.90	37	0.02	0.28	1.86	
including						242.90	243.15	0.25	0.20	58	0.01	0.23	2.48	
LPLS003011	194221	8319281	4588	325	-60	137.50	137.65	0.15	0.12	388	0.13	0.04	0.05	
LPLS003311	194465	8319414	4450	334	-46	No significant mineralized intervals								
LPLS001506	193621	8319019	4544	326	-64	105.00	109.65	4.65	3.70	498	0.19	0.10	0.69	

Hole ID	Easting	Northing	Elevation	Azimuth (°)*	Dip (°)*	From (m)	To (m)	Int. (m)	ETW** (m)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Vein
SCM-06-03	193308	8318734	4565	311	-85	47.80	48.80	1.00	0.65	21	0.16	0.01	0.04	San Cristobal
SCS000711	194867	8320977	4591	315	-45	No significant mineralized intervals								
SCS-08-02	193987	8319620	4535	311	-65	401.00	401.60	0.60	0.45	52	0.16	1.15	1.72	
SCM-3-02	193422	8318947	4568	357	-38	71.70	73.60	1.90	1.45	383	0.54	0.03	0.07	
SCM-04-02	190905	8321290	4767	83	-65	29.30	32.65	3.35	2.80	254	0.05	0.23	0.42	
*Azimuth and dip values taken at collar location **ETW = Estimated True Width														

10.12 Comment on Section 10

The QP has the following observations and conclusions regarding drilling conducted at the Caylloma Mine since 2005:

- Data were collected using industry standard practices
- Drill orientations are appropriate to the orientation of the mineralization
- Core logging meets industry standards for exploration of epithermal-style deposits
- Geotechnical logging is sufficient to support Mineral Resource estimation
- Collar surveys have been performed using industry-standard instrumentation
- Downhole surveys performed by Bateas during the drill programs have been performed using industry-standard instrumentation
- Drilling information is sufficient to support Mineral Reserve and Mineral Resource estimates

11 Sample Preparation, Analyses, and Security

11.1 Sample preparation prior to dispatch of samples

11.1.1 Channel chip sampling

Channel samples are collected from the backs of underground workings. The entire process is carried out under the geology department's supervision.

Since February 2011 the location of each channel has been surveyed using Total Station equipment. Surveyors use an underground survey reference point to locate the starting coordinates of each channel. Prior to February 2011, this process was performed by compass and tape measure.

The sampling process consists of making a channel perpendicular to the structure at variable intervals along the strike of the structure. Sampling is conducted according to lithological or mineralogical characteristics. Care is taken to ensure samples are representative, homogeneous and free of contamination.

Sampling is carried out at 2 m intervals within the drifts of all veins and 3 m intervals in stopes (except for Bateas and Soledad, where due to the thickness of the vein, sampling is carried out every 2 m in stopes). The channel lengths and orientations are identified using paint in the underground working and by painting the channel number on the footwall. The channel is between 20 cm to 30 cm wide and approximately 2 cm deep, with each individual sample being no longer than 1.5 m.

The area to be sampled is washed down to provide a clean view of the vein. Channels are cleaned beforehand by removing a layer of approximately 2 cm of surface material, which tends to be highly weathered and not representative of the structure. The channel is sampled by taking a succession of chips in sequence from the hanging wall to the footwall perpendicular to the vein based on the geology and mineralization.

Samples, comprised of fragments, chips and mineral dust, are extracted using a chisel and hammer, along the channel's length on a proportional basis. Proper marking of the channel is critical to ensuring that the proportions taken are representative.

For veins with narrow or reduced thickness (<0.20 m), the channel width is expanded to 0.40 m, thus providing the opportunity to obtain the necessary sample mass.

Sample collection is normally performed by two samplers, one using the hammer and pick, and the other holds the receptacle (cradle), to collect rock and ore fragments. Usually the cradle consists of a sack, with the mouth kept open by a wire ring. Based on ongoing evaluations of precision and the equipment available in the Bateas laboratory a sample mass of between 3 kg and 6 kg is generally collected.

Since August 2012 the entire sample is placed in a plastic sample bag with a sampling card and assigned sample ID and taken to the laboratory for homogenization and splitting.

Prior to August 2012, samples were prepared prior to being bagged using a cone and quarter methodology. The process involved homogenizing the sample by overturning the sample numerous times within a plastic sampling sheet, while taking care not to lose any material. Once the sample had been homogenized it was divided into four equal quarters and a representative sample collected from opposite quarters, diagonally (the other two quarters are discarded). Splitting could be performed more than once to ensure a sample no heavier than 2.5 kg to 3 kg was collected, corresponding to a full sampling bag. The obtained sample was then deposited in a plastic sample bag with a sampling card and assigned sample ID. The cone and quarter methodology were regarded as being inappropriate for sample splitting so the procedure was halted.

11.1.2 Core sampling

A geologist is responsible for determining and marking the intervals to be sampled, selecting intervals based on geological and structural logging. The sample length must not exceed 1.2 m or be less than 30 cm.

When core is of moderate to good competency, splitting is performed by diamond saw. The geologist carefully determines the line of cutting, in such a way that both halves of the core are representative. The core cutting process is performed in a separate building adjacent to the core logging facilities.

When core is fractured or of poor competency, splitting is performed using a riffle splitter after the sample has been crushed and homogenized.

Once the core has been split, it is washed with half the sample being placed in a sample bag. A sampling card with the appropriate information is inserted with the core. The other half of the core is returned to the core tray.

11.1.3 Bulk density determination

Samples for bulk density analysis are collected underground using a hammer and chisel to obtain a single large sample of approximately 6 kg. The sample is always taken of mineralized material in the same locality as a channel sample. The coordinates of the closest channel sample are assigned to the density sample. The sample is brought to the surface and delivered to the core cutting shed where each side of the sample is cut using a diamond saw to produce a smooth sided cube. The bulk density sample is labeled and bagged prior to being stored in the storage facilities to await transportation with other samples to the ALS Global laboratory in Arequipa prior to being sent to Lima.

Density tests are performed at the ALS Global laboratory in Lima using the OA-GRA09A methodology. This test consists of firstly cutting, weighing (maximum of 6 kg) and coating the sample in paraffin wax. Samples are then slowly placed into the bulk density apparatus which is filled with water. The displaced water is collected into a graduated cylinder and measured. The bulk density calculations are corrected for air temperature and the density of the wax coating.

Results of this analysis are included in Section 14.9 of this Report.

11.2 Dispatch of samples, sample preparation, assaying and analytical procedures

11.2.1 Sample dispatch

Once samples have been collected, they are assigned a batch number and either submitted to the Bateas onsite laboratory, or sent to the mine warehouse to await transportation (three times a week) to the ALS Global facility in Arequipa, and then on to the ALS Global laboratory in Lima for analysis.

The primary laboratory (Bateas) uses similar sample preparation, assaying and analytical procedures as are performed at the umpire laboratory (ALS Global).

11.2.2 Sample preparation

Upon receipt of a sample batch the laboratory staff immediately verifies that sample bags are sealed and undamaged. Sample numbers and IDs are checked to ensure they match that as detailed in the submittal form provided by the geology department. If any damaged, missing, or extra samples are detected the sample batch is rejected and the geology department is contacted to investigate the discrepancy. If the sample batch is accepted the samples are sequentially coded and registered as received.

Accepted samples are then transferred to individual stainless-steel trays with their corresponding sample IDs for drying. The trays are placed in the oven for two to four hours at a temperature of 110°C.

Once samples have been dried, they are transferred to a separate ventilated room for crushing using a two-stage process. Firstly, the sample is fed into a terminator crusher to reduce the original particle size so that approximately 90 % passes ½ inch mesh sieve size. The entire sample is then fed to the secondary Rhino crusher so that the particle size is reduced to approximately 85 % passing a 10-mesh sieve size. The percent passing is monitored daily to ensure these specifications are maintained. The crushing equipment is cleaned using compressed air and a barren quartz flush after each sample.

Once the sampling has been crushed it is reduced in size to 150 g ± 20 g using a single tier Jones riffle splitter. The reduced sample is returned to the sampling tray for pulverizing whereas the coarse reject material is returned to a labeled sample bag and temporarily placed in a separate storage room for transferal to the long-term storage facilities located adjacent to the core logging facilities.

Crushed samples are pulverized using a Rocklab standard ring mill so that 90 % of particles pass a 200-mesh sieve size. The pulp sample is carefully placed in an envelope along with the sample ID label. Envelopes are taken to the balance room where they are checked to ensure the samples registered as having being received and processed match those provided in the envelopes.

The Bateas laboratory's preparation facilities have been inspected by Mr. Eric Chapman, on various occasions, most recently in January 2019, and found to be clean and well organized. All weighing equipment is calibrated on a daily basis using in-house weights and externally calibrated once a year.

11.2.3 Assaying of silver, lead, copper and zinc

Upon receipt of samples in the analytical laboratory, all pulps are re-checked to ensure they match the list in the submittal form. Once completed, 0.5 g of the pulp is weighed and transferred into a 250 ml Teflon container. Added to this is 5 ml of HNO_3, 5 ml of HCl, 1 ml HF, and 1 ml of perchloric acid and the solution is placed in a small oven at 150°C to 200°C until the mixture becomes pasty in consistency. The paste is cooled before 25 % HCl is added to the container. This mixture is then boiled until it changes color. The solution is then transferred to a new vial, cooled and diluted with distilled water before being analyzed.

The elements of silver, copper, lead and zinc are assayed using either; atomic absorption (AA); inductively coupled plasma atomic emission spectroscopy (ICP-AES); or for high lead and zinc grades volumetric/titration techniques (VOL); or for high silver grades gravimetric techniques (GRAV) depending on the laboratory and assay value (see Section 11.4). An initial and duplicate reading is taken and an internal standard is inserted every ten samples to monitor and calibrate the equipment.

11.2.4 Assaying of gold

After checking that the pulps match the submittal form, 30 g of the pulp is weighed and added to a crucible, along with 120 g of flux, and 1 g to 5 g of KNO_3 if it is a sulfide sample or 1.5 g to 2.0 g of flour if it as an oxide sample. The material is carefully homogenized before being covered by a thin layer of borax.

The mixture is placed in an oven for approximately one to two hours and heated to 1,150°C ± 50°C. Once the crucibles have cooled the slag material is separated and discarded with the remaining material being transferred to a ceramic cup and placed in an oven for 45 to 60 minutes at a temperature of between 950°C to 1,050°C in order to evaporate any lead and leave behind a clean doré (Ag/Au).

The doré is careful transferred to a test tube and 1 ml of 15 % nitric acid is added before it is transferred to an oven and heated to 200°C ± 20°C and monitored until digestion is complete. The sample tubes are removed from the oven, cooled for five minutes before 2.5 ml of hydrochloric acid is added. The solution is heated once again until a pale-yellow solution is observed marking the end of the reaction and cooled once more for five minutes before 1 ml of 2 % aluminum nitrate. Distilled water is then added to the test tube to ensure the volume of solution is 5 ml, before it is covered and agitated. The test tubes are left to stand to allow sedimentation prior to analysis by AA or using GRAV if the grades exceed a set threshold.

11.3 Laboratory accreditation

The Bateas laboratory operated by Bateas is not independent and does not hold an international recognized accreditation.

ALS Global is an independent, privately-owned analytical laboratory group. The preparation laboratory in Arequipa and the analytical laboratory in Lima are supported by a Quality Management System (QMS) framework which is designed to highlight data inconsistencies sufficiently early in the process to enable corrective action to be taken in time to meet reporting deadlines. The QMS framework follows the most appropriate ISO Standard for the service at hand i.e. ISO 9001:2015 for survey/inspection activity and ISO 17025:2005 UKAS ref 4028 for laboratory analysis.

11.4 Sample security and chain of custody

Sample collection and transportation of both drill hole and channel samples is the responsibility of the geology department.

Core boxes are sealed and carefully transported to the core logging facility constructed in 2012 where there is sufficient room to layout and examine several holes at a time. The core logging facility is located at the mine site and is locked when not in use.

Once logging and sampling have been performed, the remaining core is transferred to the core storage facilities located adjacent to the logging facilities. The storage facilities consist of a secure warehouse constructed in 2011 to replace the older facilities that were located a kilometer to the north of the mine camp. The warehouse is dry and well illuminated, with metal shelving with sufficient capacity to store all historical drill core and plenty of space for the coming years.

The core is stored chronologically and location plans of the warehouse provide easy access to all core collected by Bateas. The storage facility is managed by the Brownfields

Exploration Manager and the Superintendent of Geology and any removal of material must receive their approval.

Coarse reject material for drill core, channel and exploration samples are collected from the Bateas laboratory every ten days and stored in a storage facility adjacent to the core storage facility. Storage of the core and exploration coarse rejects is the responsibility of the Brownfields Exploration Manager. Storage of the channel sample rejects is the responsibility of the resource modeling department. All drill core rejects are presently retained indefinitely. Channel reject material is stored between three and twelve months depending on the sample location.

Pulps for drill core, channel and exploration samples are returned to the originator for storage in a separate building adjacent to the Bateas laboratory. It is the responsibility of the originator to ensure these samples are stored in an organized and secure fashion. Samples are retained in accordance with the Fortuna corporate sample retention policy. All exploration drill core, coarse rejects, and pulps are stored for the life of mine. All underground infill drill core is retained until the stope from which the samples were collected has been mined, when the core that is located greater than 10 m from the mineralized vein can be disposed. Disposal of surface and underground channel coarse reject samples is performed after 90 days and is the responsibility of the Geology Superintendent.

11.5 Quality control measures

The routine insertion of certified reference material, blanks, and duplicates with sample submissions as part of a sample assay quality assurance/quality control (QAQC) program is current industry best practice. Analysis of QAQC data is performed monthly at the operation to assess the reliability of sample assay data and the confidence in the data used for estimation.

Bateas routinely inserts certified reference materials (CRMs), blanks, and field duplicates to the Bateas laboratory and regularly sends preparation (coarse reject), and pulp duplicates along with CRMs and blanks to the umpire ALS Global laboratory.

Previous technical reports (Armbrust et al, 2005; Sandefur, 2006; and Nielsen et al, 2009; Chapman & Vilela, 2012; Chapman & Kelly, 2013; Chapman & Gutierrez, 2017) have assessed the QAQC results from CMA and Bateas, and reported them as acceptable. A full evaluation of all available QC results has been conducted by Fortuna as a component of the resource estimation process. An assessment was performed on all QC samples submitted to the Bateas laboratory (responsible for preparation and assaying of underground channel samples and development drill core) and the ALS Global laboratory (responsible for preparation and assaying of exploration drill core) up to the August 31, 2018 data cut-off date for Mineral Resource estimation.

11.5.1 Certified reference material

CRMs are samples that are used to measure the accuracy of analytical processes and are composed of material that has been thoroughly analyzed to accurately determine its grade within known error limits. CRMs are inserted by the geologist into the sample stream, and the expected value is concealed from the laboratory, even though the laboratory will inevitably know that the sample is a CRM of some sort. By comparing the results of a laboratory's analysis of a CRM to its certified value, the accuracy of the result is monitored.

CRMs, whose true values are determined by a laboratory, have been placed into the sample stream by Bateas geologists to ensure sample accuracy throughout the sampling process. CRM results are assessed at the operation on a monthly basis using time series graphs to identify trends or biases.

Bateas laboratory

This analysis focuses on the submission of 10,441 CRMs submitted with 225,246 channel samples to the Bateas laboratory between January 5, 2007 and August 31, 2018 which represents a submission rate of one in 22 samples. As described above the Bateas laboratory employs a four-acid digestion methodology with atomic absorption (AA) for assaying silver, lead and zinc, unless the grade is greater than 1,500 g/t for silver, or 13 % for lead, or 13 % for zinc. If the silver grade was found to be greater than 1,500 g/t it was re-assayed by fire assay using a gravimetric finish (FA-GRAV). If the lead or zinc grades were found to be higher than their upper limits, they were re-assayed by volumetric methods (VOL). For gold, the sample is assayed using fire assay with atomic absorption finish (FA-AA) unless the gold grade is greater than 5 g/t Au, in which case the sample is re-assayed with FA-GRAV. A total of 38 different CRMs has been used at the Bateas laboratory since 2007.

The results for blind CRMs inserted by the geology department to the Bateas laboratory are displayed in Table 11.1.

Table 11.1 Results for CRMs submitted to the Bateas laboratory

Standard	Silver			Lead			Zinc			Gold		
	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)
AGA-03	361	0	100	361	0	100	361	0	100	361	4	98.9
AGB-01	266	0	100	266	0	100	266	0	100	266	1	99.6
AGM-02	391	0	100	391	0	100	391	0	100	391	1	99.7
AGA-05	311	0	100	311	0	100	311	0	100	311	0	100
AGM-04	252	0	100	252	0	100	252	0	100	252	0	100
CDN-FCM-2	119	1	99.2	119	1	99.2	119	1	99.2	119	1	99.2
CDN-FCM-3	178	1	99.4	178	3	98.3	178	10	94.4	178	2	98.9
CDN-FCM-6	152	1	99.3	152	1	99.3	152	1	99.3	152	2	98.7
CDN-FCM-7	109	0	100	109	0	100	109	0	100	109	1	99.1
CDN-HC-2	449	0	100	449	0	100	449	0	100	449	0	100
CDN-HLHC	175	0	100	175	4	97.7	175	1	99.4	175	1	99.4
CDN-HLHZ	114	0	100	114	0	100	114	1	99.1	114	0	100
CDN-HLLC	120	0	100	120	0	100	120	0	100	120	0	100
CDN-HZ-2	245	0	100	245	0	100	245	0	100	245	0	100
CDN-HZ-3	672	0	100	672	0	100	672	0	100	672	1	99.9
CDN-ME-1	139	0	100	139	0	100	139	0	100	139	0	100
CDN-ME-2	348	0	100	-	-	-	348	0	100	348	1	99.7
CDN-ME-3	149	0	100	149	0	100	149	0	100	149	0	100
CDN-ME-4	197	2	99.0	197	2	99.0	197	2	99.0	197	2	99.0
CDN-ME-5	597	0	100	597	0	100	597	1	99.8	597	2	99.7
CDN-ME-6	371	0	100	371	0	100	371	0	100	371	1	99.7
CDN-ME-7	252	2	99.2	252	2	99.2	252	2	99.2	252	2	99.2
CDN-ME-8	454	4	99.1	454	3	99.3	454	4	99.1	454	4	99.1
CDN-ME-11	325	0	100	325	0	100	325	0	100	325	1	99.7
CDN-ME-16	131	0	100	131	0	100	131	0	100	131	0	100
CDN-ME-19	218	0	100	218	0	100	218	0	100	218	1	99.5
CDN-ME-1206	187	0	100	187	0	100	187	0	100	187	0	100
CDN-ME-1302	404	0	100	404	0	100	404	1	99.8	404	0	100

Standard	Silver			Lead			Zinc			Gold		
	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)
CDN-ME-1306	174	0	100	174	0	100	174	0	100	174	1	99.4
CDN-SE-1	174	0	100	174	0	100	174	0	100	174	0	100
CDN-SE-2	189	0	100	189	0	100	189	0	100	189	0	100
PB111	6	0	100	6	1	83.3	6	0	100	-	-	-
PB114	47	0	100	47	0	100	47	1	97.9	-	-	-
PLA-03	430	0	100	430	2	99.5	430	1	99.8	430	0	100
PLB-01	508	0	100	508	0	100	508	1	99.8	508	1	99.8
PLM-02	482	0	100	482	0	100	482	1	99.8	482	1	99.6
PLA-05	335	0	100	335	0	100	335	0	100	335	0	100
PLM-04	410	0	100	410	0	100	410	0	100	410	5	98.8
Total	**10,441**	**11**	**99.9**	**10,093**	**19**	**99.8**	**10,441**	**28**	**99.7**	**10,388**	**37**	**99.6**

*Fail being a reported value >± 3 standard deviations from SRM best value

Submitted CRMs indicate the Bateas laboratory has acceptable levels of accuracy for silver, lead, zinc, and gold with all elements reporting greater than 99 % pass rates. The assay results for most CRMs demonstrate little or no bias.

ALS Global laboratory

Drill core (exploration and infill) is sent to ALS Global for assaying. As described above, silver, zinc, and lead are assayed by ICP-AES, unless the grade is greater than 100 g/t for silver, or 1 % for lead or zinc, in which case the sample is re-assayed by aqua regia digestion with an AA finish up to a maximum of 1,500 g/t silver, 30 % lead, or 60 % zinc. If the silver grade is greater than 1,500 g/t it is re-assayed by fire assay using a gravimetric finish. If the lead or zinc grades are found to be higher than their upper limits, they are re-assayed by titration. A total of 2,297 CRMs has been submitted by Bateas with drill core between July 1, 2017 and August 31, 2018 to the ALS Global facilities representing a submission rate of approximately 1 in 20 samples.

The results for blind CRMs inserted to the ALS Global laboratory are displayed in Table 11.2.

Table 11.2 Results for CRMs submitted to the ALS Chemex laboratory

Standard	Silver			Lead			Zinc			Gold		
	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)
AGA-03	158	1	99.4	158	6	96.2	158	7	95.6	158	29	81.6
AGB-01	175	17	90.3	175	20	88.6	175	6	96.6	175	2	98.9
AGM-02	238	7	97.1	238	14	94.1	238	2	99.2	238	4	98.3
AGA-05	13	0	100	13	0	100	13	0	100	13	0	100
AGM-04	20	0	100	20	0	100	20	2	90.0	20	1	95.0
CDN-FCM-2	39	12	69.2	39	2	94.9	39	2	94.9	39	0	100
CDN-FCM-3	9	0	100	9	0	100	9	0	100	9	0	100
CDN-FCM-6	114	1	99.1	114	6	94.7	114	2	98.2	114	4	96.5
CDN-HC-2	2	0	100	2	0	100	2	0	100	2	0	100
CDN-HLHC	9	0	100	9	7	22.2	9	1	88.9	9	0	100
CDN-HLHZ	39	0	100	39	5	87.2	39	5	87.2	39	0	100
CDN-HLLC	34	15	55.9	34	0	100	34	2	94.1	34	1	97.1
CDN-HZ-2	13	8	38.5	13	0	100	13	0	100	13	3	76.9
CDN-HZ-3	36	0	100	36	5	86.1	36	2	94.4	36	8	77.8
CDN-ME-2	84	0	100	-	-	-	84	2	97.6	84	2	97.6
CDN-ME-3	10	0	100	10	0	100	10	0	100	10	0	100

Standard	Silver			Lead			Zinc			Gold		
	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)
CDN-ME-4	21	1	95.2	21	0	100	21	3	85.7	21	0	100
CDN-ME-5	183	0	100	183	0	100	183	31	83.1	183	30	83.6
CDN-ME-6	13	0	100	13	0	100	13	0	100	13	0	100
CDN-ME-7	54	1	98.1	54	1	98.1	54	9	83.3	54	2	96.3
CDN-ME-8	63	2	96.8	63	1	98.4	63	2	96.8	63	2	96.8
CDN-ME-11	114	3	97.4	114	1	99.1	114	19	83.3	114	2	98.2
CDN-ME-12	33	0	100	33	0	100	33	2	93.9	33	0	100
CDN-ME-15	19	8	57.9	19	12	36.8	19	5	73.7	19	0	100
CDN-ME-16	6	0	100	6	0	100	6	0	100	6	0	100
CDN-ME-17	78	2	97.4	78	1	98.7	78	3	96.2	78	2	97.4
CDN-ME-19	4	0	100	4	0	100	4	0	100	4	0	100
CDN-ME-1302	32	0	100	32	0	100	32	0	100	32	0	100
CDN-ME-1306	37	0	100	37	0	100	37	0	100	37	0	100
CDN-SE-1	24	0	100	24	0	100	24		100	24	0	100
CDN-SE-2	32	0	100	32	0	100	32	1	96.9	32	0	100
PLA-03	140	3	97.9	140	0	100	140	9	93.6	140	4	97.1
PLB-01	150	7	95.3	150	11	92.7	150	9	94.0	150	9	94.0
PLM-02	93	12	87.1	93	8	91.4	93	3	96.8	93	12	87.1
PLA-05	71	1	98.6	71	3	95.8	71	4	94.4	71	8	88.7
PLM-04	137	0	100	137	1	99.3	137	2	98.5	137	6	95.6
Total	**2,297**	**101**	**95.6**	**2,213**	**104**	**95.3**	**2,297**	**135**	**94.1**	**2,297**	**131**	**94.3**

*Fail being a reported value >± 3 standard deviations from SRM best value

Results for CRMs submitted to the ALS Global laboratory indicate a reasonable level of accuracy is maintained for the four elements of interest with all reporting a pass rate of greater than 94 %.

11.5.2 Blanks

Field blank samples are composed of material that is known to contain grades that are less than the detection limit of the analytical method in use (or in the case of Pb and Zn are known to be very low) and are inserted by the geologist in the field. Blank sample analysis is a method of determining sample switching and cross-contamination of samples during the sample preparation or analysis processes. Bateas uses coarse quartz sourced from outside the area and provided by an external supplier as their blank sample material. The blank is tested to ensure the material does not contain elevated values for the elements of interest.

Bateas Laboratory

The analysis focuses on the submission of 9,158 blanks with channel samples from October 4, 2006 to August 31, 2018 representing a submission rate of one in 25 samples. The results of the analysis for each element are displayed in Table 11.3.

Table 11.3 Results for blanks submitted to the Bateas laboratory

Silver			Lead			Zinc			Gold		
No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)
9,158	0	100	9,158	0	100	9,158	2	99.9	9,158	9	99.9

The results of the blanks submitted indicate that cross contamination and mislabeling are not material issues at the Bateas laboratory.

ALS Global Laboratory

A total of 2,287 blanks were submitted with drill core between July 1, 2017 and August 31, 2018 to the ALS Global facilities representing a submission rate of approximately one in 20 samples.

The results for blind blanks inserted by Bateas to the ALS Global laboratory are displayed in Table 11.4.

Table 11.4 Results for blanks submitted to the ALS Chemex laboratory

Silver			Lead			Zinc			Gold		
No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)
2,287	14	99.4	2,287	26	98.9	2,287	59	97.4	2,287	5	99.8

The results of blanks used to monitor the ALS Global preparation and analytical facilities are regarded as acceptable and indicate that contamination and sample switching is not a significant issue at the laboratory.

11.5.3 Duplicates

The precision of sampling and analytical results can be measured by re-analyzing the same sample using the same methodology. The variance between the measured results is a measure of their precision. Precision is affected by mineralogical factors such as grain size and distribution and inconsistencies in the sample preparation and analysis processes. There are a number of different duplicate sample types which can be used to determine the precision for the entire sampling process. The terminologies for the duplicates employed by Fortuna at its operations are detailed Table 11.5.

Table 11.5 Terminology employed by Fortuna for duplicates

Duplicate Type	Description
Field	Sample generated by another sampling operation at the same collection point. Includes a second channel sample taken parallel to the first or the second half of drill core sample and submitted in the same or separate batch to the same (primary) laboratory.
Preparation	Second sample obtained from splitting the coarse crushed rock during sample preparation and submitted in the same batch by the laboratory.
Laboratory	Second sample obtained from splitting the pulverized material during sample preparation and submitted in the same batch by the laboratory.
Reject assay	Second sample obtained from splitting the coarse crushed rock during sample preparation and submitted blind to the same or different laboratory that assayed the original sample.
Duplicate assay	Second sample obtained from splitting the pulverized material during sample preparation and submitted blind at a later date to the same laboratory that assayed the original pulp.
Check assay	Second sample obtained from the pulverized material during sample preparation and sent to an umpire laboratory for analysis.

Numerous plots and graphs are used on a monthly basis to monitor precision and bias levels. A brief description of the plots employed in the analysis of duplicate data, is described below:

- Absolute relative difference (ARD) statistics: relative difference of the paired values divided by their average

- Scatter plot: assesses the degree of scatter of the duplicate result plotted against the original value, which allows for bias characterization and regression calculations
- Precision plot: half absolute difference (HAD) of the sample pairs against their mean
- Ranked half absolute relative difference (HARD) of samples plotted against their rank percent value

Duplicate results are reviewed monthly by Fortuna as part of an extensive quality assurance program and are regarded as demonstrating acceptable levels of precision.

Bateas laboratory

Bateas inserts field, preparation, and laboratory duplicates as part of a comprehensive QAQC program. Reject assays and check assays are sent to the certified laboratory of ALS Global to provide an external monitor to the precision of the Bateas laboratory. CRMs and blanks are also submitted with the reject and check assays to monitor the accuracy and contamination of the ALS results. Field duplicates, reject assays, duplicate assays, and check assays are required to be submitted at a rate of one in 40, whereas preparation and laboratory duplicates are submitted at a rate of one in 20. In the early years of the assaying program submission rates were lower but have been increased to meet the requirements according to Fortuna's QAQC procedural manual.

Results relating to the HARD analysis for the various types of duplicates submitted to the Bateas laboratory up to August 31, 2018 are displayed in Table 11.6.

Table 11.6 Duplicate results for Bateas laboratory

Type of Duplicate	Metal	Assay Technique	No. of duplicates analyzed[#]	HARD* value
Field Duplicate[1]	Ag	AA	6,686	20.4
		FA-GRAV	216	15.8
	Pb	AA	6,359	23.5
		VOL	543	13.8
	Zn	AA	6,074	21.6
		VOL	828	10.8
	Au	FA-AA	6,838	23.3
		FA-GRAV	64	45.6
Preparation dulpicate[2]	Ag	AA	8,202	3.9
		FA-GRAV	268	2.3
	Pb	AA	8,305	4.1
		VOL	220	2.2
	Zn	AA	8,114	3.6
		VOL	411	1.5
	Au	FA-AA	8,437	6.4
		FA-GRAV	43	7.3
Laboratory Duplicate[3]	Ag	AA	13,787	1.9
		FA-GRAV	374	0.9
	Pb	AA	13,837	1.7
		VOL	323	1.2
	Zn	AA	13,680	1.6
		VOL	482	0.6
	Au	FA-AA	5,249	6.5
		FA-GRAV	24	5.3

Type of Duplicate	Metal	Assay Technique	No. of duplicates analyzed#	HARD* value
Reject assays[4]	**Ag**	AA	5,754	6.7
		FA-GRAV	154	4.7
	Pb	AA	5,570	7.3
		VOL	338	5.6
	Zn	AA	5,382	7.8
		VOL	526	5.2
	Au	FA-AA	5,889	13.8
		FA-GRAV	19	9.2
Duplicate assays (pulps)[5]	**Ag**	AA	3,819	4.3
		FA-GRAV	172	2.7
	Pb	AA	3,713	4.1
		VOL	278	3.7
	Zn	AA	3,594	5.1
		VOL	397	3.2
	Au	FA-AA	3,968	14.3
		FA-GRAV	23	27.1

*HARD = Half Absolute Relative Difference

1. Acceptable HARD value for field duplicates is <30% at the 90th percentile
2. Acceptable HARD value for preparation duplicates is <20% at the 90th percentile
3. Acceptable HARD value for laboratory duplicates is <10% at the 90th percentile
4. Acceptable HARD value for reject assays is <20% at the 90th percentile
5. Acceptable HARD value for “duplicate assay” pulps is <10% at the 90th percentile

In general precision levels are reasonable with the majority of HARD values being less than the accepted threshold level. It should be noted that precision levels for gold assays are lower than for the other elements, particularly for the duplicate assays. This is because gold concentrations are much lower and variability is higher. Gold is not an economic driver in the operation and therefore the cost associated with increasing sample mass to ensure higher precision levels is not justified.

Check assays sent to the umpire laboratory showed reasonable levels of precision between the two laboratories. Quality control samples included with the duplicates sent to the umpire laboratory showed acceptable levels of accuracy and no issues with sample switching or contamination.

ALS Chemex laboratory

Prior to 2013 Bateas relied only on the insertion of preparation and laboratory duplicates by ALS Global to monitor precision levels of drill core samples submitted to the ALS facilities. The QAQC policy was revised in late 2012 and Brownfields exploration have since submitted the full array of blind duplicates with drill core since January 2013. Results relating to the HARD analysis for the duplicates submitted to the ALS Global laboratory are detailed in Table 11.7.

Table 11.7 Duplicate results for ALS Chemex laboratory

Type of Duplicate	Metal	Assay Technique	No. of duplicates analyzed#	HARD* value
Field Duplicate[1]	**Ag**	ICP-AES	738	33.8
		AA	97	22.0
	Pb	ICP-AES	738	37.1
		AA	214	24.5
	Zn	ICP-AES	738	32.1
		AA	214	19.8
	Au	FA-AA	746	33.3
Preparation dulpicate[2]	**Ag**	ICP-AES	1,061	10.2
		AA	82	7.0
	Pb	ICP-AES	1,061	8.1
		AA	111	5.1
	Zn	ICP-AES	1,067	7.0
		AA	169	3.7
	Au	FA-AA	1,082	14.3
Laboratory Duplicate[3]	**Ag**	ICP-AES	2,199	7.4
		AA	418	2.0
		FA-GRAV	23	1.2
	Pb	ICP-AES	2,202	5.3
		AA	427	1.6
		Vol	13	0.9
	Zn	ICP-AES	2,202	4.2
		AA	607	1.8
		VOL	30	3.8
	Au	FA-AA	2,063	14.3
		FA-GRAV	13	5.9
Reject assays[4]	**Ag**	ICP-AES	1,005	8.4
		AA	199	6.1
	Pb	ICP-AES	1,005	7.5
		AA	265	4.2
	Zn	ICP-AES	1,005	6.5
		AA	199	4.3
	Au	FA-AA	1,017	14.3
Duplicate assays (pulps)[5]	**Ag**	ICP-AES	845	6.7
		AA	162	3.0
	Pb	ICP-AES	845	4.7
		AA	262	2.7
	Zn	ICP-AES	845	4.2
		AA	382	3.2
	Au	FA-AA	850	12.8

*HARD = Half Absolute Relative Difference
Results based on 10 samples or less have been excluded as statistically unreliable

1. Acceptable HARD value for field duplicates is <30% at the 90th percentile
2. Acceptable HARD value for preparation duplicates is <20% at the 90th percentile
3. Acceptable HARD value for laboratory duplicates is <10% at the 90th percentile
4. Acceptable HARD value for reject assays is <20% at the 90th percentile
5. Acceptable HARD value for “duplicate assay” pulps is <10% at the 90th percentile

Results for duplicates submitted with drill core to the ALS Global laboratory show acceptable levels of precision are maintained at the laboratory, with the exception of the field duplicates, which are slightly above the acceptance levels and tend to be related to the insertion of low grade or low mass samples. Gold assays also tend to show poorer precision levels when compared to the other metals due to the higher variability of this element but are not regarded as sufficiently elevated to be a concern.

11.5.4 Quality control measures employed by CMA

It is understood from the technical reports submitted by CAM (Armbrust et al, 2005; Sandefur, 2006; and Nielsen et al, 2009) that CMA employed a comprehensive QAQC program that was reviewed and validated by the authors of these reports. Fortuna has not been able to review this information but believes the findings of these independent reports are reliable.

The estimation of Animas, Animas NE, Bateas, Bateas Techo, Silvia, Soledad, Santa Catalina, Patricia, and Pilar do not rely on any CMA information. Estimates of La Plata, Cimoide La Plata, Paralela, San Carlos, San Cristóbal, and San Pedro use drill hole and channel samples obtained by both CMA and Bateas. Bateas has had limited access to the underground workings from where these samples were obtained to establish the reliability of the original results. Initial channel sample assays obtained by Bateas from the San Cristobal vein tend to be lower than from CMA drill hole and channel samples. However, the area investigated is not extensive enough to draw meaningful conclusions at this time.

11.6 Comment on Section 11

Analysis of CRMs and blanks submitted to both the Bateas laboratory and the independent ALS Global facilities indicate acceptable levels of accuracy for silver, lead, zinc, and gold grades. The results of the blanks submitted indicate that contamination or mislabeling of samples is not a material issue at either of the laboratories. Precision levels are good for the Bateas laboratory with the exception of gold which is slightly below the acceptance criteria. However, gold is not an economic driver in the operation and therefore the cost associated with increasing sample mass to ensure high precision levels is not justified. Precision levels are also acceptable for the ALS Global laboratory.

It is the opinion of the QPs that the sample preparation, security, and analytical procedures used at the Caylloma Mine for samples sent to both the ALS Global and Bateas laboratories have been conducted in accordance with acceptable industry standards and that assay results generated following these procedures are suitable for use in Mineral Resource and Mineral Reserve estimation.

The QPs are unable to verify the accuracy and precision of the CMA channel data with any certainty due to insufficient data. Assay results obtained by Bateas in a limited portion of the San Cristóbal vein tend to be lower than those reported by CMA and therefore areas estimated using samples obtained by CMA should be regarded with a lower level of confidence. This has been taken into account during resource confidence classification.

12 Data Verification

12.1 Introduction

12.1.1 Compania Minera Arcata

Data relating to drill hole and channel samples taken by CMA were collated in 2008 and 2009 through a careful data recovery process from historical documents and assay certificates. Bateas were able to recover and validate information on 47 diamond drill holes totaling 8,177.67 m drilled by CMA between 1981 and 2003. It is unlikely these are the only holes drilled over this period but data on additional drill holes could not be recovered and validated.

12.1.2 Bateas

Since taking ownership in 2005 Bateas mine site staff have adhered to a stringent set of procedures for data storage and validation, performing verification of data on a monthly basis for all data relating to drilling and channel samples. The operation employs a Database Administrator who is responsible for oversight of data entry, verification and database maintenance.

Steps taken by the QP to verify the data used in the Mineral Resource and Mineral Reserve estimation process and detailed in this Report include evaluation of the following areas:

- Database
- Collars and down-hole surveys
- Geological logs and assays
- Metallurgical recoveries
- Estimation parameters
- Mine reconciliation

12.2 Database

Prior to 2018, Bateas data used for Mineral Resource estimation was stored in two SQL databases, while historical CMA data was stored in a Microsoft Access database. The databases were fully validated annually by Fortuna as part of the Mineral Resource estimation process.

In late 2017 and early 2018, Bateas worked with staff from Maxwell Geoservice to transfer all information into the commercial SQL database system, DataShed, employing a dedicated Data Manager to oversee the data transfer. All data must pass a series of validation checks prior to being imported into DataShed.

In addition, an independent audit of the database is conducted every quarter by a dedicated database auditor. A report is filed listing any discrepancies and Bateas staff are required to make the necessary corrections.

A further preliminary validation of the database was performed by the Bateas geology department in June 2018 prior to usage for resource updating.

The database was then reviewed and validated by Mr. Eric Chapman, P. Geo. The data verification procedure involved the following:

- Evaluation of minimum and maximum grade values
- Investigation of minimum and maximum sample lengths
- Randomly selecting assay data from the database and comparing the stored grades to the original assay certificates
- Assessing for inconsistences in spelling or coding (typographic and case sensitivity errors)
- Ensuring full data entry and that a specific data type (collar, survey, lithology, and assay) is not missing
- Assessing for sample gaps or overlaps

No significant inconsistencies were discovered.

12.3 Collars and downhole surveys

The QP checked randomly-selected collar and downhole survey information for each campaign against source documentation. In addition, the QP completed a hand-held GPS survey of randomly selected surface drill hole collars. The results showed a good correlation with locations recorded in the database.

Downhole surveys are taken using survey equipment such as a Flexit or Reflex tool. A validation of the readings is performed by the QP by randomly selecting readings taken from individual holes and assessing the level of deviation between successive data points. If significant discrepancies (e.g. > 15%) exist between data points the information is flagged and follow up checks performed.

12.4 Geologic logs and assays

In 2018 Bateas initiated the use of Maxwell LogChief software that supports the electronic collection of geologic and geotechnical information in the field using a standardized system of drop-down menus to promote consistency. In addition, all information is electronically transferred to the database thereby removing the risk of transcription errors.

For validation purposes, the QP randomly selected drill core to cross reference the geological descriptions recorded in the database with the geology seen in the physical core. No significant discrepancies were noted.

Assays received by Bateas are reported in both Portable Document Format (pdf) and Microsoft Excel format. Both documents are compared and only imported into the database if they are in agreement. Importation is performed electronically without requiring transcription.

Assay data is verified using a full QAQC program including the insertion of CRMs, blanks and duplicates for assays reported by both Bateas and ALS Global laboratories. A full description of this program and its results is provided in Section 11.5.

To further verify the assay data the QP randomly selected assay data from the database and compared the assay results stored to that of the original assay certificates.

12.5 Metallurgical recoveries

A daily log is produced by the Bateas plant that monitors the performance of the plant including the metallurgical recovery achieved for each metal produced. This daily log is supplemented with a monthly plant reconciliation report that reconciles the head grades with the concentrate and tailings grades to verify the recoveries being achieved at the operation. The QPs received a copy of the above information and have used this to determine that the proposed metallurgical recoveries set out in this Report are achievable and reasonable.

12.6 Estimation

The Mineral Resource and Reserve estimation methodology followed by Bateas, as described in Sections 14 and 15 of this Report, is defined in Fortuna's procedural manual, which is based on CIM (2003) best practice guidelines.

Each step of the process is documented and a checklist developed that is signed off by Bateas staff and the QP reviewer as it is completed.

12.7 Mine reconciliation

Bateas performs a reconciliation of the resource and reserve block model estimates against production following a corporate procedural manual on a quarterly basis and reports these results to Fortuna. The QPs are responsible for reviewing and validating the results reported and ensuring any discrepancies greater than 15 % are investigated and reasons for the variation explained.

Historical mine reconciliation results indicate that the estimation methodology is reasonable and production has reconciled well with the estimates for the last five years.

12.8 Comment on Section 12

The QP is of the opinion that the data verification programs performed on the data collected from the mine are adequate to support the geological interpretations, the analytical and database quality, and Mineral Resource and Reserve estimation at the Caylloma Mine and that, to the knowledge of the QPs, there are no limitations on or failure to conduct such verification that would material impact the results. This conclusion is based on the following:

- No material sample biases were identified from the QAQC programs. Analytical data that were considered marginal were accounted for in the resource classifications
- Sample data collected adequately reflect deposit dimensions, true widths of mineralization, and the style of the deposits
- Quarterly reviews of the database producing independent assessments of the database quality. No significant problems with the database, sampling protocols, flowsheets, check analysis program, or data storage were noted
- Bateas compiled and maintains a relational database (DataShed) for the Caylloma Mine which contains all collar, assay, density, survey and lithology information as well as all associated QAQC data

- Drill hole and channel collar and downhole surveys are conducted using standard industry techniques
- All geologic and assay data is electronically collected and imported into the database eliminating the potential for transcription errors
- Drill data is verified prior to Mineral Resource estimation, by running a software program check
- Estimation methodology is verified by a QP with each stage being reviewed and checklists completed
- Quarterly mine reconciliation reports monitor the performance of the resource and reserve block model estimates and indicate a high level of accuracy with production results typically within ±15 %

The QP has personally verified data used in Mineral Resource estimation, including the database, collars and down-hole surveys, geological logs and assays, metallurgical recoveries, estimation parameters, and mine reconciliation.

13 Mineral Processing and Metallurgical Testing

The Caylloma concentrator plant was purchased from CMA as part of the overall purchase of the Caylloma Mine. Major modifications have been made to the plant following the purchase of the mine by Fortuna.

13.1 Metallurgical tests

Numerous metallurgical tests and studies have been conducted in the concentrator plant since Bateas took over in order to optimize mineral processing.

Metallurgical recoveries for 2018 were 84.13 %, 91.30 %, and 90.20 % for silver, lead and zinc respectively. In the opinion of the QPs these recovery figures are representative of the deposit as a whole and similar numbers can be expected in the remaining life-of-mine (LOM) plan (with the exception of high zinc oxide material detailed below) and used to support Mineral Reserve and Mineral Resource estimates, as well as financial assumptions. Bateas continues to work on optimizing the mineral processing operation focusing on metallurgical recoveries and processing capacity. The studies or tests developed to achieve these goals include:

1. **Plant and metallurgical tests conducted on zinc oxide and sulfide material**

   Until 2012 ore identified as containing high zinc oxide content was classified as not amenable for flotation.

   Different plant and laboratory tests were carried out during 2012. The maximum metallurgical recoveries achieved during the plant test work were 63.98 % for silver, 46.45 % for lead and 32.35 % for zinc.

   More laboratory and plant tests have been conducted since 2013 including metallurgical testing of material from different levels of the Animas vein. The main conclusion being that zinc oxide content greater than 0.20 % resulted in lower metallurgical recoveries. In order to include this type of material without affecting the metallurgical recoveries blending has to be performed to limit the high zinc oxide content to no more than 5 % of the plant feed.

   Between 2015 and 2016, a range of metallurgical tests were conducted at the Bateas Laboratory using samples of oxidized mineralized material, with the intention of improving recoveries based on sulfurization tests and varying flotation reagents types. The testwork concluded that this material has a low metallurgical performance due to its mineralogical composition.

   Additional tests have included characterization of mine mineral samples (e.g. mechanical preparation of samples, grinding kinetics and soluble salts) as well as qualitative and quantitative microscopy studies.

   Between 2013 to 2018 an annual bond work index (Wi) assessment has been performed, which has demonstrated that as the mine has deepened the Wi has increased from 15.30 to 18 kWh/t.

2. **Metallurgical tests on lead and zinc circuits**

   In June 2012, Bateas requested Blue Coast Metallurgy (BCM) conduct a mineralogical study of concentrate and tailings products from the lead circuit. The study aimed to characterize the lead and silver mineral species in both products and identify the form(s) in which the lead and silver are recovered and lost in terms of size and liberation.

Based on the studies and testing developed between 2013 and 2018 for the different stages of the process some changes or adjustments have been implemented in the processing plant aimed at improving the metallurgical performance including:

- Adjustments to the grinding medium and size selection were made in order to achieve 58 % passing 75 µm as the final grinding product
- The Z-11 and Z-6 collectors in the lead flotation circuit, which were previously added as a mixed solution, are now added independently ensuring a superior effect and avoiding alteration in their properties
- The Z-11 collector was replaced with the Z-6 in the zinc circuit to improve recovery
- Collector agent AP-3418 (6 g/t) has been added to improve the recovery of silver in the lead circuit
- Sodium cyanide consumption, which is used as a lead and zinc depressor in the lead floatation circuit, was reduced from 20 to 6 g/t to improve silver and gold flotation
- The Denver mill critical speed was increased from 69 % to 76 % increasing the reduction ratio, resulting in an increase in the treatment capacity by 10 tpd
- The Magensa (6 foot by 6 foot) mill steel shell liners were changed to rubber increasing the reduction ratio from 1.2 to 1.6
- Automatic pH control was installed to stabilize the process, particularly in the zinc circuit, reducing lime consumption by 200 g/t
- Batch and locked cycle flotation tests are regularly carried out on material extracted from different levels of the mine and fed to the plant, in order to define the optimal operating parameters
- Metallurgical tests to control the operational parameters used in milling and flotation (e.g. concentration of reagents, dosages, density controls, reduction ratios, granulometry controls and pH controls) are performed on a regular basis
- Stabilization of the flotation process for lead and zinc was improved by improved control in reagent dosing
- In 2018, the pH of ore fed to the plant increased due to added cement for underground support. The increase affected lead flotation, with subsequent metallurgical tests demonstrating carbon dioxide (32 g/t) usage could reduce the issue

3. **Mineralogical balance and performance study**

Conducted by Metrix Plant Technologies in 2017, the study was designed to assess the performance of the Caylloma processing facility. Benchmarking analysis concluded that the chemical agents and doses used in the zinc flotation circuit are within standard norms. Silver losses in the tailings of the lead circuit are mostly fine grained acanthite (or low copper polybasite) that are problematic for recovery due to their close association with pyrite, sphalerite or quartz. Zinc content is primarily in the form of sphalerite and its recovery depends on activation in the lead circuit. For oxidize mineralization, the study concluded that galena makes up approximately 61% of the lead content with the rest being intercalated with non-floatable minerals, therefore lead recoveries are estimated to be no greater than 45% to 55%.

4. **Processing plant optimization**

   Aiming to reduce the recirculating load within the grinding circuit by improving the size selection, pilot tests to replace cyclones with high-frequency vibrating wet screens were run by the Derrick Plant in Buffalo, New York in November 2014.

   During 2016, the crushing product was improved from 9.5 mm to 8 mm, which was achieved by changing the lining profile of the secondary crusher from EC to C type and replacing the screens from 9.25 to 8 mm

   In March 2016, a plant optimization project (POP) was implemented with the installation of high frequency slots for grinding, resulting in the reduction of the circulating load from 250 to 170 % thanks to more efficient size classification which allowed the processing capacity of the plant to be increased from 1,300 to 1,500 tpd.

   The POP also led to an upgraded lead flotation circuit, with 6 OK 20 cells and 9 OK 3 cells replacing the agitair cells, thereby increasing the flotation time from 14 to 38 minutes and maintaining silver recoveries even though silver head grades have declined over time.

   In 2018, a zinc concentrate dryer was implemented, reducing moisture content in the concentrate by approxminately one percent.

   Optimization of the zinc flotation circuit with new cells to increase flotation time from 20 to 30 minutes is planned with testwork indicating that this could increase zinc recovery by as much as four percent.

5. **Metallurgical testwork on material from Ramal Piso Carolina**

   Metaluurgical testwork has been performed on several bulk samples comprised of drill core intersecting the Ramal Piso Carolina vein to assess the potential gold recovery if reagents were altered in the flotation process. In May 2013, a bulk sample comprising 50 samples averaging 5.7 g/t Au from 13 drill holes was sent to SGS for testing. In March 2015, a further three bulk samples comprising 14 drill core samples each was tested at the Bateas Laboratory. Batch flotation tests were conducted on these samples representing mineralized material from Ramal Piso Carolina averaging 4.67 g/t Au, 11.21 g/t Au, and 42.14 g/t Au. The samples were regarded as representative of the vein mineralization as a whole. Metallurgical recoveries of greater than 75 % for gold were achieved for all bulk samples tested.

13.2 Deleterious elements

Beyond the loss in metallurgical recovery related to elevated zinc oxide material, as described above, there are no additional deleterious elements that require special treatment in the plant as of the effective date of this Report.

13.3 Comments on Section 13

It is the opinion of the QP that the Caylloma Mine has an extensive body of metallurgical investigation comprising several phases of testwork as well as an extensive history of treating ore at the operation since 2006. In the opinion of the QP, the Caylloma metallurgical samples tested and the mineralized material that has been treated in the plant is representative of the future mineralization as a whole identified in the LOM in respect to grade variability and metallurgical response. Differences between vein systems are minimal with regard to recovery.

Metallurgical recovery values forecast in the LOM for sulfide material average 84 % for silver, 17 % for gold, 91 % for lead, and 90 % for zinc with the exception of the Ramal Piso Carolina vein that forecasts a metallurgical recovery rate of 75 % for Au. Metallurgical recovery is forecast for zinc oxide material to average 57 % for silver, 17 % for gold, 57 % for lead, and 35 % for zinc.

The presence of elevated zinc oxide dramatically impacts metallurgical recovery rates. The lower metallurgical rates are taken into account when assessing this material. There is an opportunity to improve metallurgical recovery of this material through blending based on recommended testwork as detailed in Section 26.2.

14 Mineral Resource Estimates

14.1 Introduction

The following sections describe in detail the Mineral Resource estimation methodology of the veins updated or estimated for the first time in 2018. These include the Animas, Animas NE, Cimoide ASNE, Ramal Techo ASNE, Rosita and Nancy veins.

If no new information for a vein was obtained since the previous estimate in 2017 the previous result was retained, albeit with the application of new metal prices, recoveries, and cut-off grades. Veins that did not require updating included Bateas/Bateas Piso, Bateas Techo, Santa Catalina, Soledad, Silvia, Patricia, Pilar, Paralela, San Cristobal, San Carlos, San Pedro, La Plata/Cimoide La Plata, Ramal Piso Carolina, and Don Luis II. A summary of the estimation methodology used to estimate these veins has been included for completeness.

14.2 Disclosure

Mineral Resources were prepared by Cesar Cerdan, an employee of Bateas, under the technical supervision of Eric Chapman, P.Geo. Mr. Chapman is a Qualified Person as defined in National Instrument 43-101 and an employee of Fortuna.

Mineral Resource estimates have an effective date of August 31, 2018.

14.2.1 Known issues that materially affect Mineral Resources

Fortuna does not know of any issues that materially affect the Mineral Resource estimates. These conclusions are based on the following, as of the effective date of this Report.:

- **Environmental**: Bateas is in compliance with Environmental Regulations and Standards set in Peruvian Law and has complied with all laws, regulations, norms and standards at every stage of operation of the mine.
- **Permitting**: Bateas has represented that permits are in good standing.
- **Legal**: Bateas has represented that there are no outstanding legal issues; no legal action, and injunctions are pending against the Project.
- **Title**: Bateas has represented that the mineral and surface rights have secure title.
- **Taxation**: No known issues.
- **Socio-economic**: Bateas has represented that the Project has strong local community support.
- **Marketing**: No known issues.
- **Political**: Bateas believes that the current government is supportive of the Project.
- **Mining**: Bateas has been successfully operating a mining facility at Caylloma since 2006, which has included extraction from the Animas, Animas NE, Bateas, Soledad, Silvia, Santa Catalina, and Nancy veins. Underground mining has also been successfully performed (prior to the collapse in silver metal prices in the late 1990s and early 2000s) by CMA including extraction of mineralized material

from the San Cristóbal, Bateas, Santa Catalina, San Pedro, Paralela, and San Carlos veins.

- **Metallurgical**: Bateas presently successfully treats ore extracted from the Caylloma Mine in the onsite processing plant to produce lead and zinc concentrates with gold and silver credits (Section 13).
- **Infrastructure**: No known issues.
- **Other relevant issues**: No known issues.

14.3 Assumptions, methods and parameters

The 2018 Mineral Resource estimates for those veins estimated for the first time or requiring updating (Animas, Animas NE, Cimoide ASNE, Ramal Techo ASNE, Rosita and Nancy veins) were prepared in the following steps:

- Data validation as performed by Fortuna
- Data preparation including importation to various software packages
- Geological interpretation and modeling of mineralization domains
- Coding of drill hole and channel data within mineralized domains
- Sample length compositing of both drill holes and channel samples
- Analysis of extreme data values and application of top cuts
- Exploratory data analysis of the key constituents – silver, gold, lead, zinc, and density
- Analysis of boundary conditions
- Variogram analysis and modeling
- Derivation of kriging plan
- Kriging neighborhood analysis and creation of block models
- Grade interpolation of Ag, Au, Pb, Zn, and sample length, assignment of density values
- Validation of grade estimates against input sample data
- Classification of estimates with respect to CIM guidelines
- Assignment of an NSR based on long term metal prices, metallurgical recoveries, smelting costs, commercial contracts, and average concentrate grades
- Depletion of blocks identified as extracted or inaccessible
- Mineral Resource tabulation and reporting based on NSR cut-off grades

If no new information for a vein was available since the previous Mineral Resource estimate the grade values were not re-estimated. However, the methodology and results were reviewed and updated metal prices, recoveries, and costs applied to the calculation of NSR values. This was the case for the Bateas/Bateas Piso, Bateas Techo, Santa Catalina, Soledad, Silvia, Patricia, Pilar, Paralela, San Cristobal, San Carlos, San Pedro, La Plata/Cimoide La Plata, Ramal Piso Carolina, and Don Luis II.

14.4 Supplied data, data transformations and data validation

Bateas information used in the 2018 estimation is sourced from the Maxwell DataShed industry standard database system.

The database storing the Bateas channel and drill hole data has been used for the estimation of the Animas, Animas NE, Cimoide ASNE, Ramal Techo ASNE, Rosita and Nancy veins. Veins that are reported but were not updated in the 2018 Mineral Resource estimate included all other veins.

Bateas supplied all available data as of August 31, 2018.

14.4.1 Data transformations

Historical assays recorded by CMA in paper format were in troy ounces per tonne and these were transformed to grams per tonne prior to entry into DataShed. The transformation was made by multiplying the troy ounces by 31.1035 to calculate the equivalent grams. No other data transformations were required.

14.4.2 Software

Mineral Resource estimates have relied on several software packages for undertaking modeling, statistical, geostatistical and grade interpolation activities. Wireframe modeling of the mineralized envelopes was performed in Leapfrog version 2.6. Data preparation, block modeling and grade interpolations were performed in Datamine RM version 1.4.126. Statistical and variographic analysis was performed in Supervisor version 8.6.

14.4.3 Data preparation

Collar, survey, lithology, and assay data exported from DataShed provided by Bateas were imported into Datamine and used to build three dimensional representations of the drill holes and channels. Assay values at or below the detection limit were corrected to half the detection limit. The number of surface drill holes, underground drill holes and channels available for the geologic interpretation process is shown in Table 14.1.

Table 14.1 Drill holes and channels available for geologic interpretation

Vein	Surface Drill holes		Underground Drill holes		Channels	
	Number	Meters	Number	Meters	Number	Meters
Animas	94	30,097	77	12,186	36,091	89,636
Animas NE	161	50,244	110	13,911	19,420	54,652
Animas Techo					119	369
Cimoide ASNE			6	841	346	1,042
Ramal Techo ASNE					66	108
Bateas	80	17,571	45	4,857	16,682	15,062
Bateas Techo					289	254
Silvia			17	1,725	1,176	1,872
Soledad	7	924	1	32	6,804	6,682
Santa Catalina	3	551	8	1,123	1,743	3,582
Patricia	7	683			36	32
Pilar					63	105
La Plata*#	26	5,776	12	1,746	373	292
Cimoide La Plata*					311	377
San Cristóbal*	4	1,396	7	770	5,201	10,030
Paralela					623	936

Vein	Surface Drill holes		Underground Drill holes		Channels	
	Number	Meters	Number	Meters	Number	Meters
San Carlos*	2	496			295	145
San Pedro*	6	2,456			2,006	2,646
San Pedro Oeste	2	811				
Santo Domingo					26	73
Santa Rosa					6	13
Antimonio	3	594				
Caylloma 6	3	959				
Corona Antimonio	2	524				
Corona	1	345				
Elisa					7	7
Gabriela	2	383				
Lucia			8	1,300		
San Antonio	2	392				
San Carlos & San Carlos II	2	496	10	481		
El Toro	1	178				
Vilafro	4	985				
Wendy	1	285				
Nancy	34	9,355	32	4,354	114	356
Carolina & Ramal Piso Carolina	72	17,577				
Don Luis II	45	12,553				
Total	**561**	**155,628**	**333**	**43,326**	**91,813**	**188,338**

Notes: Some drill holes intersect multiple veins - number and meters are attributed to the primary target vein
* Includes CMA channel samples.
# Drill holes intersect both La Plata and Cimoide La Plata veins
Totals may not add due to rounding

14.4.4 Data validation

An extensive data validation process was conducted by the Bateas operational staff and Mineral Resource groups of Fortuna prior to Mineral Resource estimation.

Validation checks were also performed upon importation into Datamine mining software and included searches for overlaps or gaps in sample and geology intervals, inconsistent drill hole identifiers, and missing data. No significant discrepancies were identified.

14.5 Geological interpretation and domaining

Caylloma is a low-sulfidation epithermal style deposit, primarily consisting of sulfosalts and silver sulfides and base metal sulfides. Mineralization is associated with distinct veins characterized by silver sulfosalts and base metal sulfides in a banded gangue of quartz, rhodonite and calcite. Host rocks adjacent to the veins are characterized by local illite and widespread propylitic alteration.

Major vein systems recognized at the Caylloma Mine, all have a general northeast to southwest strike orientation and dipping predominantly to the southeast. Host rocks are andesitic lavas, pyroclastics and volcaniclastics of the Tacaza volcanic group.

There are two different types of mineralization at Caylloma; the first is comprised of silver-rich veins with low concentrations of base metals. The second type of vein is polymetallic in nature with elevated silver, lead, zinc, copper, and gold grades.

Silver veins

- Bateas, Bateas Piso, Bateas Techo, La Plata, Cimoide La Plata, San Cristóbal, San Pedro, San Carlos, Paralela, Ramal Piso Carolina, and Don Luis II veins.

Polymetallic veins

- Animas, Animas NE, Cimoide ASNE, Ramal Techo ASNE, Rosita, Santa Catalina, Soledad, Silvia, Pilar, Patricia, and Nancy veins.

Mineralized envelopes were constructed by the Bateas mine geology department based on the interpretation of the deposit geology and refined using the drill hole, channel and underground mapping information. The mineralized wireframes were modeled in Leapfrog based on channel and drill hole intersections that have an average combined (Ag, Au, Pb, and Zn) NSR value greater than US$ 50 (regarded as being potentially economically extractable). Prices used for determining the metal value were based on long term metal prices as summarized in Table 14.2.

Table 14.2 Metal prices used to define mineralized envelopes

Metal	Price
Ag	18.25 US$/oz
Au	1,320 US$/oz
Pb	2,270 US$/t
Zn	2,750 US$/t

14.6 Exploratory data analysis

14.6.1 Compositing of assay intervals

Compositing of sample lengths was undertaken so that the samples used in statistical analyses and estimations have similar support (i.e., length). Bateas sample drill holes and channels at varying interval lengths depending on the length of intersected geological features and the true thickness of the vein structure. Sample lengths were examined for each vein and composited according to the most frequently sampled length interval (Table 14.3). The composited and raw sample data were compared to ensure no sample length loss or metal loss had occurred.

Table 14.3 Composite length by vein

Vein	Composite length (m)
Animas	2.5
Animas NE	2.5
Ramal Techo ASNE	2
Cimoide ASNE	2
Bateas (inc. Techo & Piso)	1
Silvia	1.5
Soledad	1
Santa Catalina	2
Patricia	1
Pilar	1

Vein	Composite length (m)
La Plata	1
Cimoide La Plata	1
San Cristobal	2
Paralela	1
Rosita	2
San Carlos	1
San Pedro	1
Nancy	2
Ramal Piso Carolina	1
Don Luis II	1

The Datamine COMPDH downhole compositing process was used to composite the samples within the estimation domains (i.e. composites do not cross over the mineralized domain boundaries). The COMPDH parameter MODE was set to a value of one to allow adjusting of the composite length while keeping it as close as possible to the composite interval; this is done to minimize sample loss.

Due to the variable thickness of the veins it was noted that composite lengths were still variable with a high proportion being less than the composite length. In previous estimates this composite length variation has been successfully dealt with by weighting the estimate by the composite length and therefore this methodology was employed in 2018.

14.6.2 Statistical analysis of composites

Exploratory data analysis was performed on composites identified in each geological vein (Table14.4). Splays have been identified separately and samples composited within these domains as detailed below. Statistical and graphical analysis (including histograms, probability plots, scatter plots) were investigated for each vein to assess if additional sub-domaining was required to achieve stationarity.

High-grade domains have been identified and separated in a number of the veins, including Animas/Animas NE, Animas NE splay, the La Plata, Bateas Piso and Nancy veins.

Bateas used probability assigned constrained kriging (PACK) to estimate the location of high-grade regions of the deposit. PACK was designed to define economic envelopes around mineralized zones digitally that are difficult to outline and delineate using more traditional and labor-intensive methods such as wireframing. Probabilistic envelopes are first generated using indicators to define the limits of the economic mineralization and then the envelopes are used in the resource estimation to confine the higher-grade assays from smearing into lower-grade zones and restrict lower-grade assays from diluting the higher-grade zones.

PACK models were constructed for the Animas/Animas NE, Ramal Techo ASNE, Rosita (Lead and Zinc), Animas NE splay (silver only), the La Plata, Bateas Piso (silver only) and Nancy (gold and zinc) veins as follows:

- Indicator thresholds were selected for samples in the mineralized domain with grades above the threshold set to one and below to zero
- Indicator values were estimated by inverse distance weighting into the block model

- Upon completion of the estimate, all blocks with a probability value greater than or equal to 0.5 were assigned a code of one and blocks with a probability below 0.5 were assigned a code of zero
- A wireframe was generated identifying the location of the block codes equal to one for each of the thresholds of interest (i.e. the high-grade domain)

The high-grade regions are domained separately so as to prevent smearing of the higher grades into the lower grade areas and vice versa during the estimation process by controlling the search neighborhoods, as described in Section 14.8.3.

Table 14.4 Univariate statistics of undeclustered composites by vein

Vein	Grade	Count	Minimum	Maximum	Mean	Variance	Std. Dev.
Animas High grade domain	Ag (g/t)	4,049	3.00	15,351	**508**	550,877	742
	Au (g/t)	21,612	0.001	168.36	**0.63**	9.03	3.00
	Pb (%)	9,782	0.0001	44.04	**4.47**	12.30	3.51
	Zn (%)	15,382	0.0001	35.00	**5.72**	12.12	3.48
Animas Low grade domain	Ag (g/t)	31,065	0.10	12,261	**89**	28,760	170
	Au (g/t)	13,524	0.001	73.64	**0.17**	0.74	0.86
	Pb (%)	25,349	0.0001	36.06	**1.02**	1.49	1.22
	Zn (%)	19,742	0.0001	24.64	**1.60**	2.61	1.62
Animas (Splay)	Ag (g/t)	202	2.0	153	**40**	781	28
	Au (g/t)	202	0.029	4.68	**0.19**	0.08	0.28
	Pb (%)	202	0.045	9.05	**2.06**	2.77	1.66
	Zn (%)	202	0.0916	12.32	**3.98**	5.44	2.33
Animas NE High grade domain	Ag (g/t)	6,844	5.00	5,330	**194**	20,552	143
	Au (g/t)	4,862	0.10	92.53	**0.60**	3.81	1.95
	Pb (%)	12,477	0.0001	55.90	**5.40**	22.47	4.74
	Zn (%)	19,738	0.0001	40.13	**5.17**	13.66	3.70
Animas NE Low grade domain	Ag (g/t)	15,186	0.10	1,682	**69**	4,846	70
	Au (g/t)	17,165	0.001	54.05	**0.20**	0.24	0.49
	Pb (%)	9,553	0.0001	48.69	**1.35**	2.98	1.73
	Zn (%)	2,282	0.0001	29.41	**1.20**	2.94	1.72
Animas NE (Splay)	Ag High (g/t)	197	5.00	2,553	**217**	94,771	308
	Ag Low (g/t)	83	1.13	139	**47**	950	31
	Au (g/t)	280	0.06	94.36	**1.35**	33.32	5.77
	Pb (%)	280	0.05	12.18	**2.35**	4.38	2.09
	Zn (%)	280	0.11	9.68	**2.09**	2.148	1.47
Ramal Techo Animas NE	Ag High(g/t)	136	4.00	3,873	**283**	135,814	369
	Ag Low (g/t)	114	0.10	815	**53**	7,723	88
	Au (g/t)	250	0.001	14.54	**0.13**	0.84	0.92
	Pb High (%)	76	0.13	47.92	**6.49**	39.73	6.30
	Pb Low (%)	174	0.0001	28.41	**1.75**	7.48	2.74
	Zn High (%)	169	0.0001	40.14	**7.60**	34.16	5.84
	Zn Low (%)	81	0.0001	40.41	**2.35**	27.28	5.22
Cimoide ASNE	Ag (g/t)	874	0.10	2,848	**85**	16,419	128
	Au (g/t)	874	0.001	6	**0.16**	0.08	0.29
	Pb (%)	874	0.0001	39	**3.02**	12.14	3.48
	Zn (%)	874	0.0001	43	**6.57**	27.73	5.27

Vein	Grade	Count	Minimum	Maximum	Mean	Variance	Std. Dev.
Rosita	Ag (g/t)	82	2.00	492	**67**	6,294	79
	Au (g/t)	82	0.01	0.36	**0.14**	0.01	0.08
	Pb High (%)	61	0.18	8.99	**2.30**	2.96	1.72
	Pb Low (%)	21	0.06	3.41	**0.58**	0.60	0.78
	Zn High (%)	60	0.29	14.76	**6.00**	14.41	3.80
	Zn Low (%)	22	0.22	9.72	**2.52**	6.89	2.62
Bateas	Ag (g/t)	14,113	0.1	31,294	**874**	2,504,687	1,583
	Au (g/t)	14,113	0.0005	117.32	**0.32**	6.94	2.63
	Pb (%)	14,113	0.0001	12.80	**0.60**	0.61	0.78
	Zn (%)	14,113	0.0001	23.92	**0.90**	1.37	1.17
Bateas (Splay)	Ag (g/t)	162	3.0	11,653	**1,132**	2,444,645	1,564
	Au (g/t)	162	0.007	28.82	**0.87**	9.83	3.14
	Pb (%)	162	0.005	3.20	**0.76**	0.46	0.68
	Zn (%)	162	0.01	4.75	**1.36**	1.35	1.16
Bateas Piso	Ag High (g/t)	726	8.00	29,077	**2,359**	9,506,940	3,083
	Ag Low (g/t)	366	3.00	3,600	**202**	52,135	228
	Au (g/t)	1,092	0.01	49.50	**0.67**	6.417	2.53
	Pb (%)	1,092	0.0001	2.82	**0.30**	0.13	0.36
	Zn (%)	1,092	0.0001	6.52	**0.55**	0.41	0.64
Bateas Techo	Ag (g/t)	148	0.10	2,503	**171**	88,146	297
	Au (g/t)	148	0.003	59.50	**0.46**	14.99	3.87
	Pb (%)	148	0.0001	0.43	**0.04**	0.00	0.06
	Zn (%)	148	0.0001	1.27	**0.06**	0.02	0.14
Silvia	Ag (g/t)	1,303	0.50	2,784	**91**	16,305	128
	Au (g/t)	1,303	0.0025	94.15	**0.62**	12.85	3.58
	Pb (%)	1,303	0.0005	17.68	**1.73**	5.70	2.39
	Zn (%)	1,303	0.0005	23.92	**2.59**	6.79	2.61
Soledad (Main)	Ag (g/t)	6,604	1.00	52,224	**458**	1,984,597	1,409
	Au (g/t)	6,604	0.0008	170.99	**2.35**	39.36	6.27
	Pb (%)	6,604	0.0028	25.14	**1.36**	3.43	1.85
	Zn (%)	6,604	0.0094	15.94	**1.69**	2.35	1.53
Soledad (Splay)	Ag (g/t)	298	3.00	1,820	**161**	30,485	175
	Au (g/t)	298	0.035	46.75	**3.94**	36.62	6.05
	Pb (%)	298	0.015	19.73	**2.63**	4.89	2.21
	Zn (%)	298	0.0198	17.97	**4.56**	10.08	3.17
Santa Catalina	Ag (g/t)	1,824	0.50	2,043	**135**	25,709	160
	Au (g/t)	1,824	0.0025	86.65	**1.20**	17.44	4.18
	Pb (%)	1,824	0.0005	29.65	**1.67**	4.06	2.02
	Zn (%)	1,824	0.0005	14.44	**2.42**	3.74	1.93
Patricia	Ag (g/t)	71	9.22	1,948	**207**	98,862	314
	Au (g/t)	71	0.0175	6.63	**0.69**	1.57	1.25
	Pb (%)	71	0.0103	6.42	**0.52**	1.08	1.04
	Zn (%)	71	0.02	8.05	**0.70**	1.61	1.27
Pilar	Ag (g/t)	50	0.50	897	**117**	26,621	163
	Au (g/t)	50	0.0025	44.10	**1.88**	37.57	6.13
	Pb (%)	50	0.0005	4.14	**0.53**	0.65	0.81
	Zn (%)	50	0.0005	7.19	**0.59**	1.22	1.10

Vein	Grade	Count	Minimum	Maximum	Mean	Variance	Std. Dev.
La Plata (High grade)	Ag (g/t)	192	3.1	14,184	**3,085**	8,602,103	2,933
	Au (g/t)	192	0.0025	107.60	**4.01**	87.67	9.36
La Plata (Low grade)	Ag (g/t)	107	0.1	6,109	**308**	586,110	766
	Au (g/t)	107	0.0025	53.80	**1.30**	33.86	5.82
Cimoide La Plata	Ag (g/t)	378	4.0	22,144	**483**	2,369,246	1,539
	Au (g/t)	378	0.001	137.45	**2.42**	101.14	10.06
San Cristóbal	Ag (g/t)	5,116	0.5	17,471	**290**	501,220	708
	Au (g/t)	5,116	0.0025	99.86	**0.33**	7.09	2.66
Paralela	Ag (g/t)	910	0.7	15,676	**310**	518,869	720
	Au (g/t)	210	0.005	4.52	**0.68**	0.76	0.87
San Carlos	Ag (g/t)	294	15.55	3,060	**396**	327,777	572.52
	Au (g/t)	106	0.1	21.3	**0.70**	4.79	2.19
San Pedro	Ag (g/t)	2,385	3.11	18,000	**534**	1,304,900	1,142
	Au (g/t)	305	0.005	126	**3.89**	74.49	8.63
Nancy (High grade)	Ag (g/t)	194	3.89	594	**68**	4,981	71
	Au (g/t)	16	0.03	127	**19.44**	1,502	38.76
	Pb (%)	85	0.09	44.75	**5.53**	37.93	6.16
	Zn (%)	148	0.30	25.21	**6.31**	19.35	4.40
Nancy (Low grade)	Ag (g/t)	63	0.1	167	**16**	536	23
	Au (g/t)	241	0.001	22	**0.26**	2.26	1.50
	Pb (%)	172	0.0001	6.75	**0.97**	1.12	1.06
	Zn (%)	109	0.0001	11.03	**1.98**	3.52	1.87
Ramal Piso Carolina	Ag (g/t)	97	0.5	1,759	**112**	52510	229
	Au (g/t)	97	0.005	60.16	**4.61**	85.95	9.27
Don Luis II (Main)	Ag (g/t)	56	30.48	1,894	**372**	175,039	418.38
	Au (g/t)	56	0.015	110.17	**3.38**	219.94	14.83
Don Luis II (Splay)	Ag (g/t)	18	0.93	181	**81**	3,011	54.87
	Au (g/t)	18	0.0025	1.58	**0.24**	0.17	0.41

14.6.3 Sub-domaining

In addition to the high-grade domains explained above, the Animas and Animas NE veins have been explored closer to the surface than any of the other veins. Through the investigation of the mineralogy and grade characteristics a partially oxidized domain and a zinc oxide domain have been identified. Samples have been coded as oxide or sulfide for estimation purposes and areas of high zinc oxide (> 0.2 % ZnO) have been sub-domained in the block model as this material results in a decrease in metallurgical recovery when fed to the plant.

A number of the veins are comprised of a main component and a separate splay vein, as detailed in Table 14.4. The main and splay veins have been domained and estimated separately to ensure grades are not smeared between the veins.

Internal waste was also identified as being present in the Animas/Animas NE vein and to a lesser degree in the Bateas vein. These areas of internal waste were sub-domained and samples identified within coded as waste for estimation purposes.

14.6.4 Extreme value treatment

Top cuts of extreme grade values prevent over-estimation in domains due to disproportionately high-grade samples. Whenever the domain contains an extreme grade value, this extreme grade will overly influence the estimated grade.

If the extreme values are supported by surrounding data, are a valid part of the sample population, and are not considered to pose a risk to estimation quality, then they can be left untreated. If the extreme values are not considered to be a valid part of the population (e.g., they belong in another domain or are simply erroneous), they should be removed from the domains data set. If the extreme values are considered a valid part of the population but are considered to pose a risk for estimation quality (e.g., because they are poorly supported by neighboring values), they should be top cut. Top cutting is the practice of resetting all values above a certain threshold value to the threshold value.

Fortuna examined the grades of all metals to be estimated (Ag, Pb, Zn, and Au) to identify the presence and nature of extreme grade values. This was done by examining the sample histogram, log histogram, log-probability plot, and by examining the spatial location of extreme values. Top cut thresholds were determined by examination of the same statistical plots and by examination of the effect of top cuts on the mean, variance, and coefficient of variation (CV) of the sample data. Top cut thresholds used for each vein are shown in Table 14.5. If insufficient data is present to determine appropriate top cut values for a splay vein the values from the main vein have been applied.

Table 14.5 Topcut thresholds by vein

Vein	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Animas - High Grade	5,000	40	30	24
Animas - Low Grade	700	1.5	12	9
Animas (splay)	3,500	10	30	25
Animas NE - High grade	1,000	9	35	21
Animas NE - Low grade	480	2	20	9
Ramal Techo ASNE – High grade	880	0.2	14	20
Ramal Techo ASNE – Low grade	180	0.2	8	3
Cimoide ASNE	400	0.7	12	19
Bateas	10,000	7	5	8
Bateas Piso (Low grade)	18,000 (500)	11	2	3.5
Ramal Bateas	1,500	1	1	2.5
Bateas Techo	1,200	2	-	1
Silvia	550	6	12	17
Soledad	6,500	40	11	16
Santa Catalina	1,500	15	11	13
Patricia	550	5	-	-
Pilar	550	6	-	-
La Plata - High grade	11,000	25	0.2	0.2
La Plata - Low grade	200	4	0.05	0.2
Cimoide La Plata	10,000	60	-	-
San Cristóbal	900	55	-	-
Paralela	4,000	2.5	-	-
San Carlos	3,000	18	-	-
San Pedro	8,000	20	-	-
Nancy - High grade	185	5	12	12
Nancy - Low grade	40	1	3	5
Ramal Piso Carolina	1,000	15	0.6	1
Rosita (Low grade)	180	0.3	7 (2)	13 (5)
Don Luis II	-	15	1	2

14.6.5 Boundary conditions

The boundary conditions at Caylloma are well established with underground workings identifying a sharp contact between the mineralized vein structures and the host rock in all veins. Subsequently domain boundaries were treated as hard boundaries. Only samples coded within a vein were used to estimate blocks within that vein, to prevent smearing of high-grade samples in the vein into the low-grade host rock, and vice versa.

The boundary conditions between oxide and sulfide material in the Animas/Animas NE veins is gradational in nature occurring over tens of meters. This boundary has been treated as a soft boundary with samples from either domain being used for estimation in the vein. This allows a gradational effect in the grade estimates.

The boundary between high- and low-grade areas is also gradational but less so than the oxide/sulfide boundary and is regarded as firm. To prevent high grades smearing into low grade areas a two-stage approach is used in the estimate where a small search ellipse is allowed to estimate grades across the boundary over short distances but a larger search ellipse is restricted to selecting composites and estimating grades within the defined high- or low-grade domain.

14.6.6 Data declustering

Descriptive statistics of sample populations within a domain may be biased by clustering of sample data in particular areas of the domain. To reduce any bias caused by clustering of sample data, Fortuna declustered the input sample data using a grid system. Declustered data statistics are used when comparing estimated grade values and input sample grades during model validation.

14.6.7 Sample type comparison

A comparison between drill hole and channel samples was conducted, comparing the different sampling types over a similar spatial coverage. The results showed a bias indicating that grades returned from channel samples on average tend to return higher values compared to grades from drill core samples.

However, in the majority of cases channel samples are clustered around historical and present-day workings, whereas drilling is focused on exploring the periphery of the veins and is therefore generally located away from the workings so finding examples where they share the same spatial coverage is difficult.

The estimation predominately uses channel samples with drill hole samples generally only used to infer resources at the edge of the mineralized envelopes. Both samples types are required to provide a reasonable assessment of the deposit with reconciliation results supporting the usage of channels and drill holes.

14.7 Variogram analysis

14.7.1 Continuity analysis

Continuity analysis refers to the analysis of the spatial correlation of a grade value between sample pairs to determine the major axis of spatial continuity.

The grade distribution has a log-normal distribution therefore traditional experimental variograms tended to be poor in quality. To counteract this, data was transformed into a normal score distribution for continuity analysis.

Horizontal, across strike, and down dip continuity maps were examined (and their underlying variograms) for Ag, Au, Pb, and Zn to determine the directions of greatest and least continuity. As each vein has a distinct strike and dip direction analysis was only required to ascertain if a plunge direction was present.

Continuity analysis confirmed that some veins have insufficient data to allow variogram modeling, including the Patricia, Pilar, Paralela, San Cristóbal, Nancy, San Carlos, San Pedro, Ramal Piso Carolina, Rosita, Don Luis II and any splay veins. In the case of these veins inverse distance weighting was used as an alternative estimation technique.

14.7.2 Variogram modeling

The next step is to model the variograms for the major, semi-major, and minor axes. This exercise creates a mathematical model of the spatial variance that can be used by the ordinary kriging algorithm. The most important aspects of the variogram model are the nugget effect and the short-range characteristics. These aspects have the most influence on the estimation of grade.

The nugget effect is the variance between sample pairs at the same location (zero distance). Nugget effect contains components of inherent variability, sampling error, and analytical error. A high nugget effect implies that there is a high degree of randomness in the sample grades (i.e., samples taken even at the same location can have very different grades). The best technique for determining the nugget effect is to examine the downhole variogram calculated with lags equal to the composite length.

After determining the nugget effect, the next step is to model directional variograms in the three principal directions for Ag, Au, Pb, and Zn based on the directions chosen from the variogram fans. It was not always possible to produce a variogram for the minor axes, and in these cases the ranges for the minor axes were taken from the downhole variograms, which have a similar orientation (perpendicular to the vein) as the minor axes. Modeled variograms were back transformed from normal score as grade estimation is conducted without data manipulation. Variogram parameters are detailed in Table 14.6.

Table 14.6 Variogram model parameters

Vein	Metal	Major axis orientation	C_0§	C_1§	Ranges (m)†	C_2§	Ranges (m)†	C_3§	Ranges (m)†
Animas	Ag	00° → 240°	0.24	0.17	12,11,2	0.25	33,64,5	0.34	874,125,50
	Au	-44° → 164°	0.21	0.23	9,10,4	0.40	45,31,6	0.16	119,112,13
	Pb	-44° → 164°	0.26	0.17	12,12,5	0.22	42,30,9	0.35	294,246,37
	Zn	-44° → 164°	0.24	0.17	15,13,5	0.18	46,29,17	0.41	366, 473 ,1248
Animas NE	Ag	00° → 235°	0.28	0.21	10,15,1	0.31	39,51,6	0.20	226,386,16
	Au	00° → 235°	0.35	0.18	14,21,2	0.12	32,48,10	0.35	1203,366,16
	Pb	00° → 235°	0.27	0.27	12,17,4	0.22	47,52,7	0.24	189,170,11
	Zn	00° → 235°	0.34	0.27	15,15,3	0.18	35,34,4	0.21	161,404,16
Bateas	Ag	69° → 047°	0.37	0.27	10,9,1	0.26	35,34,4	0.11	161,9999,5
	Au	69° → 047°	0.55	0.20	7,6,1	0.13	26,19,9	0.13	95,52,16
	Pb	-20° → 062°	0.20	0.30	8,7,1	0.33	36,38,3	0.17	220,220,16
	Zn	69° → 047°	0.21	0.31	9,8,2	0.31	44,42,4	0.16	180,180,6
Silvia	Ag	00° → 250°	0.31	0.40	7,10,2	0.28	25,24,4		
	Au	00° → 250°	0.57	0.30	10,7,2	0.14	28,20,3		
	Pb	00° → 250°	0.26	0.44	6,5,2	0.29	17,24,3		
	Zn	00° → 250°	0.33	0.37	7,10,3	0.29	77,20,4		

Vein	Metal	Major axis orientation	C_0§	C_1§	Ranges (m)†	C_2§	Ranges (m)†	C_3§	Ranges (m)†
Soledad	Ag	00° → 250°	0.30	0.25	6,4,3	0.24	21,26,4	0.21	197,78,5
	Au	00° → 250°	0.39	0.19	8,5,2	0.17	15,19,4	0.25	150,120,5
	Pb	00° → 250°	0.28	0.30	9,8,1	0.15	15,16,2	0.26	59,41,3
	Zn	00° → 250°	0.24	0.25	7,5,1	0.22	15,15,2	0.29	77,46,3
Santa Catalina	Ag	00° → 250°	0.46	0.19	7,6,2	0.11	16,18,3	0.24	130,56,4
	Au	-60° → 340°	0.34	0.35	6,6,2	0.13	18,14,5	0.17	64,60,7
	Pb	-60° → 340°	0.23	0.31	6,7,1	0.18	13,20,2	0.27	69,34,3
	Zn	00° → 250°	0.16	0.25	6,5,2	0.23	15,26,4	0.37	100,41,6
La Plata	Ag	-60° → 155°	0.32	0.18	55,6,4	0.5	94,80,6		
	Au	00° → 245°	0.52	0.29	12,4,4	0.19	15,9,6		
Cimoide La Plata	Ag	00° → 245°	0.42	0.36	5,7,3	0.21	33,13,5		
	Au	-55° → 155°	0.35	0.44	43,6,7	0.21	57,15,12		

Note: § variances have been normalised to a total of one; † ranges for major, semi-major, and minor axes, respectively; structures are modelled with a spherical model

14.8 Modeling and estimation

14.8.1 Block size selection

Block size was selected principally based on drill hole spacing, mineralized domain geometry, and the proposed mining method. Quantitative kriging neighborhood analysis (QKNA) was also used to assess the optimum block size based on kriging efficiency (KE) and slope of regression (ZZ) in the veins where variogram models had been established (Animas, Animas NE, Bateas, Santa Catalina, Silvia, Soledad, and La Plata). Results were assessed from a centroid likely to be mined in the next 12 months.

The objective of QKNA is to determine the optimal combination of search neighborhood and block size that limits conditional bias and, subsequently provides the best possible estimation with the evaluable data (Vann et al, 2003).

The slope of regression is a measure of the regression between the theoretical actual and estimated values for blocks. The values should be from 0 to 1. Values close to one indicate low conditional bias.

Kriging efficiency indicates the degree of smoothing (averaging) in the estimation. Values close to 100 % are not smoothed very much and values close to 0 % are highly smoothed. Where the kriging efficiency is negative, the global mean is considered a better estimate of grade than the kriged estimate.

In conjunction with the QKNA process, the veins' geometry and the size of the equipment used in extraction are also considered. The narrow and undulating nature of the vein is a justification to subdivide the blocks into smaller subcells. This ensures the block model is volumetrically representative. The incremental block sizes selected for each vein are detailed in Table 14.7

14.8.2 Block model parameters

Vein structures are generally orientated in a northeast to southwest direction. Such an orientation can be problematic when filling the vein wireframes with blocks as these are orientated orthogonally which can result in large discrepancies in volumes. To counteract this each vein has been rotated so that the strike direction of the vein is orientated in an orthogonal direction (i.e. east to west) for block modeling. Splitting of the parent blocks was allowed to ensure a close fit to the wireframe, although estimation was applied to parent cells only (all sub-cells in a parent cell have the same grade). To ensure a successful estimation the drill hole and channel composites were also rotated to coincide with the veins. Table 14.7 gives the block model parameters for the 2017 Caylloma Mineral Resource models with coordinates using the WGS84, UTM Zone 19S system prior to rotation.

Each vein has been block modeled separately with care taken to ensure that overlapping blocks do not exist. Additional to this each block in the vein has been coded using the field name "TIPO" (Type) as being oxide (OXs), zinc oxide (OXz), sulfide (SFRs) or internal waste (RDN). This code corresponds to that assigned to the sample data and has been used for estimation and reporting purposes.

Table 14.7 Caylloma block model parameters by vein

Vein	Rotation	Direction	Minimum	Maximum	Increment
Animas	59	X	193258	194458	4
		Y	8317064	8318136	2
		Z	4,307	4939	2
Animas NE	59	X	194402	195778	4
		Y	8317604	8319150	2
		Z	4150	4821	2
Ramal Techo ANSE	52	X	195607	195820	4
		Y	8318800	8318970	2
		Z	4385	4609	2
Cimoide ASNE	39	X	195245	195675	4
		Y	8318505	8318970	2
		Z	4239	4700	2
Bateas	70	X	192890	193737	6
		Y	8319894	8320223	1
		Z	4404	4830	2
Bateas Piso	70	X	193247	193339	6
		Y	8320080	8320160	1
		Z	4580	4829	2
Bateas Techo	70	X	193089	193474	6
		Y	8319983	8320044	1
		Z	4457	4740	2
Silvia	85	X	194710	194800	8
		Y	8320195	8320290	1
		Z	4551	4973	6
Soledad	73	X	194300	195100	8
		Y	8320232	8320550	1
		Z	4611	4899	6
Santa Catalina	67	X	194455	194805	5
		Y	8320495	8320655	1
		Z	4640	4775	5
Patricia	75	X	194340	194870	8
		Y	8320325	8320510	1
		Z	4650	4850	6

Vein	Rotation	Direction	Minimum	Maximum	Increment
Pilar	75	X	194300	194710	8
		Y	8320150	8320325	1
		Z	4600	4965	6
La Plata	60	X	193850	195300	6
		Y	8316799	8318144	1
		Z	4500	4867	6
Cimoide La Plata	60	X	194000	194490	6
		Y	8317052	8317515	1
		Z	4551	4827	6
San Cristobal	45	X	194826	194748	8
		Y	8320946	8321050	2
		Z	4520	4761	8
Paralela	45	X	192869	193060	6
		Y	8321790	8322056	1
		Z	4510	4677	6
San Carlos	50	X	192595	193055	6
		Y	8320752	8321039	1
		Z	4601	4772	6
San Pedro	60	X	192748	193558	6
		Y	8321829	8322740	1
		Z	4516	4646	6
Nancy	93.5	X	195481	195845	4
		Y	8318856	8319135	2
		Z	4386	4656	2
Ramal Piso Carolina	105	X	193200	193800	6
		Y	8321978	8322155	2
		Z	4531	4879	4
Rosita	110	X	195655	195729	4
		Y	8318918	8318959	2
		Z	4504	4536	2
Don Luis II	110	X	190800	191300	6
		Y	8319484	8319796	2
		Z	4500	4904	4

14.8.3 Sample search parameters

Quantitative kriging neighborhood analysis (QKNA) was undertaken on the Caylloma veins to determine the optimal search parameters for the Mineral Resource estimates. This study, which was consistent with Fortuna's experience with the deposit, showed that the best estimation results in terms of slope of regression, kriging efficiency, and kriging variance were obtained using the following search strategy:

- A search range of approximately 20 m to 30 m along strike and down dip and 2 m to 5 m across the vein
- A minimum of 10 composites per estimate
- A maximum of 20 composites per estimate
- A maximum of two (Animas NE, La Plata, Cimoide La Plata, and Bateas) or three samples (all other veins) from a single channel or drill hole

The search ellipsoid used to define the extents of the search neighborhood has the same orientation as the continuity directions observed in the variograms.

Distances used were designed to match the configuration of the drill hole data (i.e., areas of sparse drilling have larger ellipses than more densely drilled or sampled areas). This was achieved by using a dynamic search ellipsoid where a second search equal to two times the maximum variogram range and requiring a minimum of six composites was used wherever the first search did not encounter enough samples to perform an estimate; if enough samples were still not encountered, a third search equal to three times the primary search range and requiring one composite was used. The exception to this was for the Bateas, Nancy, Ramal Piso Carolina and Don Luis II veins that used a third search ellipse four times the primary search range with a minimum of three composites. The larger search ellipses were used in cases where peripheral sample numbers were low and using a single composite for estimation purposes was problematic. For blocks where the minimum number of samples required was not encountered, no estimate was made.

In the veins where a high-grade domain had been identified, the search neighborhood was used to control which composites were allowed to inform which domains to prevent smearing. The first and smallest search ellipse as described above was allowed to use composites from both grade domains for estimation, whereas the second and third, were restricted to using composites to estimate grades into blocks from the same grade domain (i.e. high to high, or low to low).

14.8.4 Grade interpolation

Estimation of grades into blocks was performed using either ordinary kriging (OK) or inverse distance weighting (Table 14.8) based on the success of generating a variogram model.

Table 14.8 Estimation method by vein

Vein	Estimation Method
Animas	Ordinary Kriging
Animas (Splay)	Inverse distance weighting (power=2)
Animas NE	Ordinary Kriging
Animas NE (Splay)	Inverse distance weighting (power=2)
Ramal Techo ASNE	Ordinary Kriging
Cimoide ASNE	Inverse distance weighting (power=2)
Bateas*	Ordinary Kriging*
Bateas (Splay)	Ordinary Kriging
Bateas Piso	Ordinary Kriging
Bateas Techo	Ordinary Kriging
Silvia	Ordinary Kriging
Soledad (Main)	Ordinary Kriging
Soledad (Splay)	Inverse distance weighting (power=2)
Santa Catalina	Ordinary Kriging
Patricia	Inverse distance weighting (power=2)
Pilar	Inverse distance weighting (power=2)
La Plata	Inverse distance weighting (power=2)
Cimoide La Plata	Ordinary Kriging
San Cristóbal	Inverse distance weighting (power=2)
Paralela	Inverse distance weighting (power=2)
San Carlos	Inverse distance weighting (power=2)

Vein	Estimation Method
San Pedro	Inverse distance weighting (power=2)
Nancy	Ordinary Kriging
Ramal Piso Carolina	Inverse distance weighting (power=2)
Rosita	Ordinary Kriging
Don Luis II	Inverse distance weighting (power=2)
*Gold grades estimated by inverse distance weighting (power=2)	

Parameters were derived from block size selection, search neighborhood optimization, and variogram modeling. The sample data were composited and, where necessary, top cut prior to estimation.

The sample data and the blocks were categorized into mineralized domains for the estimation. Each block is discretized (an array of points to ensure grade variability is represented within the block) and grade interpolated into parent cells (Datamine ESTIMA parameter PARENT=1).

Due to the variable lengths of the composites a weighting system has been employed to nullify this volume variance issue when estimating into the three-dimensional block models, which involves the following steps: -

1. Generation of a grade aggregate in the sample file by multiplying the grade of the composite by its length
2. Estimation of the grade aggregate into the block model using the parameter files detailed above
3. Estimation of the composite length into the block model by inverse distance weighting (power = 2) using the same search and estimation parameters as were used to estimate the grade aggregate
4. Estimated aggregate grades are divided by the corresponding composite length estimate to provide the final grade

This procedure was employed for the previous Mineral Resource estimates and reconciliation results indicated a positive result. The methodology has therefore been maintained for the 2018 Mineral Resource update.

14.9 Bulk density

There has been a total of 5,074 density measurements taken by Bateas as of August 31, 2018. Of these 4,607 were taken from underground and 467 from drill core. Density analysis was performed on each vein separately with twenty samples regarded as the minimum to ensure representative statistics. Extreme values that were thought not to be representative of the sample population were discarded reducing the total density measurement numbers used in the analysis to 4,525 (Table 14.9).

Table 14.9 Density statistics by vein

Vein	No. of samples	Mean (t/m^3)	Minimum (t/m^3)	Maximum (t/m^3)	Variance
Animas/Animas NE (Sulfide)					
Elevation > 4800	299	**2.79**	2.03	3.51	0.13
Elevation > 4755 and < 4800	153	**3.04**	2.49	3.64	0.07
Elevation < 4755	2,652	**3.15**	2.40	3.96	0.11
Animas/Animas NE (Oxide)	123	**2.53**	1.73	3.36	0.11

Vein	No. of samples	Mean (t/m³)	Minimum (t/m³)	Maximum (t/m³)	Variance
Cimoide ASNE	7	**2.82**	2.46	3.53	0.14
Bateas	567	**3.01**	2.52	3.54	0.06
Bateas Techo	7	**2.67**	2.43	2.97	0.03
Silvia	84	**3.35**	2.57	4.19	0.11
Soledad	314	**3.09**	2.49	3.84	0.31
Santa Catalina	17	**3.13**	2.52	3.63	0.09
Pilar	3	**3.63**	3.29	4.23	0.27
La Plata	41	**2.59**	2.33	2.76	0.01
San Cristóbal	41	**2.75**	2.54	3.09	0.02
Nancy	54	**2.61**	2.13	3.26	0.06
Ramal Piso Carolina	117	**2.55**	2.29	2.86	0.01
Don Luis II	46	**2.42**	2.03	2.76	0.03

Due to the insufficient spatial coverage of density measurements, estimation was regarded as being inappropriate. Subsequently each vein's mean density value has been applied to all blocks in that vein with the exception of the Animas and Animas NE veins. Sufficient density measurements are available in these related veins to suggest a trend of increasing density with depth. Based on these statistics a variable density was assigned to both the Animas and Animas NE veins based on depth (Table 14.10).

Table 14.10 Density assigned in the 2018 estimation update

Vein	Density assigned for 2018 estimate (t/m³)
Animas & Animas NE (Sulfide)	
Elevation > 4800	**2.79**
Elevation > 4755 and < 4800	**3.04**
Elevation < 4755	**3.15**
Animas-Animas NE (Oxide)	**2.53**
Ramal Techo ASNE	**3.15**
Cimoide ASNE	**3.15**
Bateas	**3.01**
Bateas Techo	**3.01**
Silvia	**3.35**
Soledad	**3.09**
Santa Catalina	**3.09**
Patricia	**3.33**
Pilar	**3.35**
La Plata	**2.59**
Cimoide La Plata	**2.59**
San Cristóbal	**2.75**
Paralela	**3.00**
San Carlos	**3.00**
San Pedro	**3.00**
Nancy	**2.61**
Ramal Piso Carolina	**2.55**
Rosita	**3.15**
Don Luis II	**2.42**

In respect to veins that have insufficient samples to determine the density the following was applied:

- In the cases where veins splayed, the same density was applied to the splay as was assigned to the main vein (i.e. Ramal Soledad assigned the same density as Soledad)
- San Pedro, San Carlos, and Paralela were assigned a density of 3.0 t/m^3, being the global average density for all veins

14.10 Model validation

The techniques for validation of the estimated tonnes and grades included visual inspection of the model and samples in plan, section, and in three-dimensions; cross-validation; global estimate validation through the comparison of declustered sample statistics with the average estimated grade per domain; and local estimate validation through the generation of slice validation plots.

14.10.1 Cross validation

In defining the modeled variograms, estimation and search neighborhoods there are a range of potential values that can be set. In order to optimize these values cross validation, or jack-knifing, was performed. This technique involves excluding a sample point and estimating a grade in its place using the remaining composites. This process is repeated for all the composites being used for estimation and the average estimated grade is compared to the actual average grade of the composites (Table 14.11).

Table 14.11 Cross validation results by vein

Vein	Ag (g/t)		Au (g/t)		Pb (%)		Zn (%)	
	Composite	Estimate	Composite	Estimate	Composite	Estimate	Composite	Estimate
Animas	134	134	0.40	0.40	1.98	1.98	3.40	3.41
Animas NE	107	107	0.26	0.27	3.64	3.65	4.74	4.76
Ramal Techo ASNE	147	150	0.07	0.07	2.98	3.02	5.40	5.47
Animas NE Splay	152	152	0.91	0.89	2.34	2.34	2.05	2.05
Cimoide ASNE	83	83	0.15	0.15	3.00	3.00	6.56	6.58
Nancy	48	48	0.40	0.40	1.98	2.01	3.80	3.89
Bateas	852	856	0.20	0.20	0.59	0.59	0.90	0.90
Bateas Piso	1,702	1,712	0.57	0.57	0.30	0.30	0.55	0.55
Bateas Techo	194	196	0.20	0.21	0.06	0.06	0.03	0.03
Bateas Splay	948	958	0.39	0.39	0.73	0.73	1.35	1.36
La Plata (High grade)	1,842	1,862	2.29	2.31	0.015	0.013	0.02	0.02
La Plata (Low grade)	158	204	0.27	0.36	0.07	0.09	0.37	0.49
Cimoide La Plata	446	443	2.10	2.13	0.01	0.01	0.02	0.02
Soledad	421	420	2.22	2.21	1.33	1.33	1.69	1.69
Silvia	87	87	0.42	0.42	1.70	1.70	2.57	2.57
Ramal Piso Carolina	118	110	4.66	4.82	0.05	0.05	0.09	0.08
Rosita	57	57	0.13	0.13	1.64	1.64	4.71	4.65
Don Luis II	334	411	3.63	4.87	0.07	0.07	0.15	0.12
Santa Catalina	135	135	1.01	1.01	1.64	1.66	2.42	2.42
Patricia	165	182	0.66	0.66	0.52	0.56	0.70	0.71
Pilar	114	113	1.18	1.21	0.54	0.54	0.58	0.60
San Cristóbal	209	210	0.23	0.23	0.09	0.09	0.16	0.16
Paralela	278	279	0.08	0.06	0.20	0.16	0.59	0.46
San Carlos	369	388	0.11	0.11	0.00	0.00	0.01	0.01
San Pedro	506	504	0.34	0.35	0.00	0.00	0.00	0.00

Using this methodology, a variety of estimation techniques, search neighborhoods and variogram models were tested to establish the parameters that provided the most accurate result.

Results of the cross validation confirmed that ordinary kriging is a reasonable estimation method when sufficient data is available for variogram analysis (Animas, Animas NE, Bateas, and Bateas Techo). For veins that have insufficient data, inverse distance weighting proved a superior estimation technique (Bateas Piso and La Plata). Cross validation also assisted in the fine tuning of the variogram and search neighborhood parameters.

14.10.2 Global estimation validation

Global validation of the estimate involves comparing the mean ordinary kriged grade for each vein against the mean declustered grade generated using a nearest-neighbor (NN) estimation approach. Analysis was performed by classification to ensure low confidence areas do not distort the results from higher confidence regions (Table 14.12, Table 14.13, and Table 14.14). The results for blocks classified as Measured are regarded as reasonable, with differences being generally less than 5 %. Differences greater than 5 % are due to either the over-estimation of the NN grade due to the presence of isolated high-grade composites or due to low overall grade concentrations.

Table 14.12 Global validation statistics of Measured Resources at a zero cut-off grade (COG)

Vein	Ag (g/t)			Au (g/t)			Pb (%)			Zn (%)		
	OK-Ac	NN	Diff (%)	OK-Ac	NN	Diff (%)	OK-Ac	NN	Diff (%)	OK-Ac	NN	Diff (%)
Animas	108	109	**0**	0.34	0.34	**0**	1.69	1.71	**1**	2.98	2.99	**0**
Animas NE	102	104	**1**	0.27	0.27	**1**	3.47	3.51	**1**	4.29	4.33	**1**
Animas NE (Splay)	152	154	**2**	0.82	0.86	**4**	1.96	1.95	**0**	1.76	1.75	**-1**
Ramal Techo ASNE	127	121	**-4**	0.07	0.07	**-5**	3.10	3.02	**-3**	4.19	4.18	**0**
Cimoide ASNE*	84	83	**-1**	0.14	0.14	**-4**	2.98	2.95	**-1**	6.78	6.62	**-2**
Nancy	33	34	**2**	0.27	0.30	**12**	1.42	1.41	**-1**	3.65	3.58	**-2**
Bateas	723	717	**-1**	0.17	0.16	**-4**	0.56	0.56	**1**	0.84	0.84	**0**
Bateas Piso	1,142	1,288	**11**	0.48	0.47	**0**	0.24	0.26	**7**	0.43	0.47	**8**
Rosita	54	58	**8**	0.13	0.13	**3**	1.57	1.51	**-4**	4.30	4.18	**-3**
Silvia	85	84	**-1**	0.35	0.39	**9**	1.53	1.54	**1**	2.45	2.49	**2**
Soledad	353	323	**-9**	1.80	1.77	**-2**	1.11	1.09	**-2**	1.51	1.48	**-2**
Santa Catalina	129	130	**1**	1.07	1.02	**-4**	1.50	1.56	**3**	2.16	2.13	**-2**

*Estimated by inverse distance weighting (power=2)

Results for blocks classified as Indicated and Inferred are also regarded as reasonable. Any large discrepancies (>10 %) were investigated and were generally attributed to low tonnages or isolated higher-grade values.

Table 14.13 Global validation statistics of Indicated Resources at a zero COG

Vein	Ag (g/t)			Au (g/t)			Pb (%)			Zn (%)		
	OK-Ac	NN	Diff (%)	OK-Ac	NN	Diff (%)	OK-Ac	NN	Diff (%)	OK-Ac	NN	Diff (%)
Animas	55	53	**-4**	0.24	0.24	**-2**	1.05	0.98	**-7**	2.29	2.21	**-4**
Animas NE	66	66	**1**	0.27	0.29	**4**	2.15	2.07	**-4**	3.44	3.35	**-3**
Animas NE (Splay)	111	103	**-8**	0.62	0.60	**-4**	1.38	1.23	**-13**	1.51	1.33	**-14**
Ramal Techo ASNE*	127	139	**8**	0.07	0.06	**-8**	3.27	2.98	**-10**	4.61	4.34	**-6**
Cimoide ASNE	64	65	**1**	0.14	0.13	**-7**	2.35	2.31	**-1**	4.90	4.63	**-6**
Nancy	40	43	**6**	0.22	0.42	**47**	1.33	1.48	**10**	3.22	3.42	**6**
Bateas	260	240	**-8**	0.09	0.09	**3**	0.19	0.18	**-10**	0.31	0.29	**-9**
Bateas Piso	1,090	1,145	**5**	0.23	0.18	**-22**	0.19	0.17	**-15**	0.33	0.29	**-14**
La Plata (High)*	1,248	990	**-26**	1.61	1.29	**-25**	-	-	**n/a**	-	-	**n/a**
Cimoide La Plata	378	357	**-6**	1.70	1.08	**-58**	-	-	**n/a**	-	-	**n/a**
Rosita	47	36	**-33**	0.11	0.10	**-5**	1.58	1.59	**1**	4.33	4.93	**12**
Silvia	63	62	**-1**	0.48	0.47	**-1**	0.90	0.87	**-3**	1.82	1.83	**1**
Soledad	178	163	**-9**	1.66	2.16	**23**	0.97	0.91	**-6**	1.33	1.28	**-4**
Santa Catalina	85	71	**-19**	0.59	0.44	**-34**	0.93	0.81	**-15**	1.44	1.29	**-11**
San Cristobal*	174	163	**-6**	0.14	0.12	**-19**	0.26	0.26	**-1**	0.44	0.41	**-5**
*Estimated by inverse distance weighting (power=2)												

Table 14.14 Global validation statistics of Inferred Resources at a zero COG

Vein	Ag (g/t)			Au (g/t)			Pb (%)			Zn (%)		
	OK-Ac	NN	Diff (%)	OK-Ac	NN	Diff (%)	OK-Ac	NN	Diff (%)	OK-Ac	NN	Diff (%)
Animas	46	42	**-10**	0.24	0.23	**-5**	0.76	0.74	**-3**	1.74	1.70	**-2**
Animas NE	65	63	**-4**	0.13	0.12	**-8**	2.41	2.32	**-4**	3.69	3.64	**-1**
Ramal Techo ASNE*	66	50	**-32**	0.06	0.05	**-28**	1.75	1.08	**-63**	3.35	2.81	**-19**
Cimoide ASNE	59	63	**6**	0.09	0.09	**-2**	2.62	2.65	**1**	4.86	4.86	**0**
Nancy	52	56	**8**	0.15	0.47	**69**	2.14	2.24	**5**	3.08	3.38	**9**
Bateas	263	282	**6**	0.10	0.12	**14**	0.15	0.13	**-15**	0.23	0.22	**-3**
Bateas Piso	550	606	**9**	0.14	0.12	**-17**	0.08	0.09	**4**	0.20	0.21	**4**
Bateas Techo	120	123	**2**	0.12	0.12	**0**	0.01	0.01	**-6**	0.03	0.03	**1**
La Plata (High)*	93	86	**-8**	0.94	0.95	**0**	-	-	**n/a**	-	-	**n/a**
La Plata (Low)*	106	85	**-24**	0.31	0.27	**-14**	-	-	**n/a**	-	-	**n/a**
Cimoide La Plata	136	155	**12**	0.70	0.62	**-14**	-	-	**n/a**	-	-	**n/a**
Silvia	61	63	**2**	0.50	0.44	**-14**	0.76	0.78	**2**	1.53	1.54	**1**
Soledad	98	88	**-12**	0.80	1.18	**32**	0.62	0.56	**-11**	1.09	1.16	**6**
Santa Catalina	55	61	**9**	0.27	0.24	**-13**	0.42	0.38	**-13**	0.65	0.60	**-8**
Patricia*	130	130	**-1**	0.50	0.48	**-4**	0.52	0.50	**-3**	0.71	0.70	**-2**
Pilar*	145	160	**10**	1.26	1.33	**6**	0.41	0.47	**13**	0.34	0.36	**5**
San Cristobal*	175	161	**-9**	0.09	0.08	**-22**	0.11	0.11	**-5**	0.16	0.15	**-4**
Paralela*	402	412	**2**	0.32	0.27	**-19**	0.19	0.15	**-27**	0.58	0.49	**-18**
Rosita	48	35	**-37**	0.12	0.12	**5**	1.48	1.31	**-13**	4.31	5.09	**15**
San Carlos*	346	367	**6**	0.11	0.06	**-96**	0.03	0.04	**2**	0.21	0.21	**-1**
San Pedro*	505	545	**7**	1.65	1.89	**13**	-	-	**n/a**	-	-	**n/a**
Ramal Piso Carolina*	129	146	**12**	3.84	4.06	**5**	0.06	0.07	**15**	0.10	0.12	**14**
Don Luis II*	335	279	**-20**	0.89	0.83	**-7**	0.04	0.04	**-8**	0.09	0.09	**5**
*Estimated by inverse distance weighting (power=2)												

14.10.3 Local estimation validation

Slice validation plots of estimated block grades and declustered input sample grades were generated for each of the veins by easting, northing, and elevation to validate the estimates on a local scale. Validation of the local estimates assesses each model to ensure over-smoothing or conditional bias is not being introduced by the estimation process and an acceptable level of grade variation is present. An example slice (or swath) plot for Animas is displayed in Figure 14.1.

Figure 14.1 Slice validation plot of the Animas vein

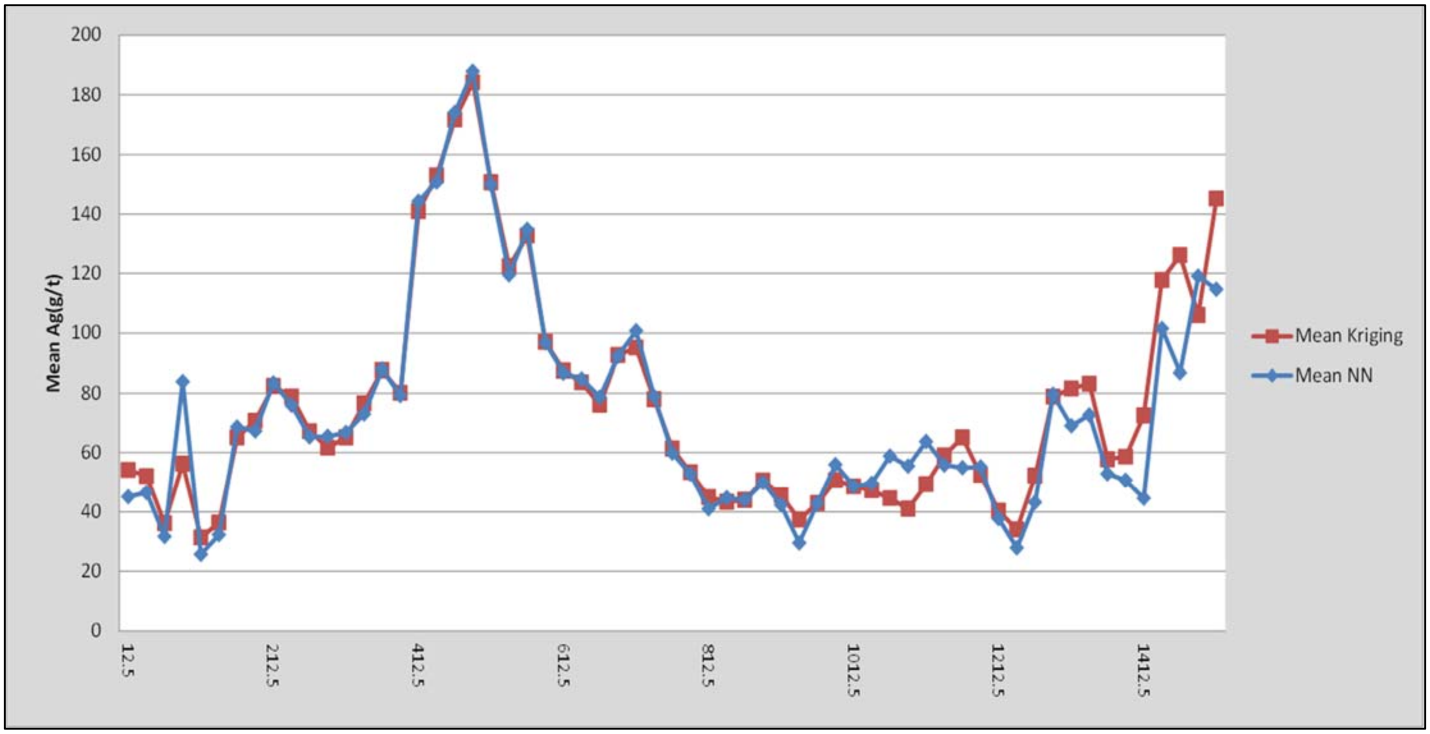


Figure prepared by Bateas, Aug 2018

The slice plots display a good continuity between the ordinary kriged estimates and declustered nearest neighbor estimates indicating that the kriging is not over-smoothing. Areas that do not have a good correlation, such as the far west of the Animas vein are related to areas where sample numbers are limited. Based on the above results it was concluded that ordinary kriging was a suitable interpolation method and provided reasonable global and local estimates of all economical metals.

14.10.4 Mineral Resource reconciliation

The ultimate validation of the block model is to compare actual grades to predicted grades using the established estimation parameters. Evaluation of the mineral in-situ from channel samples taken from October 2017 to December 2018 provided an estimation of the actual grades. In order to test the ability of the estimation process to predict grades in areas that channel sampling had yet to be performed, all samples collected after October 2017 were filtered from the database and the estimation run using the remaining samples. The reconciliation results for the previous 15 months display acceptable results for the resource block model with differences no greater than 15 %, within the expected levels of tolerance.

14.10.5 Mineral Resource depletion

All underground development and stopes are regularly surveyed using Total Station methods at Caylloma as a component of monitoring the underground workings. The survey information is imported into Datamine and used to generate three dimensional solids defining the extracted regions of the mine. Each wireframe is assigned a date corresponding to when the material was extracted providing Bateas a history of the progression of the mining since 2006.

The three-dimensional solids are used to identify resource blocks that have been extracted and assign a code that corresponds to the date of extraction. Table 14.15 details the codes stored in the resource block model and the date ranges that they represent. Blocks with a ZONA (Zone) code of one or greater are excluded from the reported Mineral Resources.

Removal of extracted material often results in remnant resource blocks being left in the model that will likely never be exploited. These represent inevitable components of mining such as pillars and sills, or lower grade peripheral material that was left behind. To take account of this, areas were identified by the mine planning department as being fully exploited, and any remnant blocks within these areas were identified in the block model using the code "RM = 1" and excluded from the reported Mineral Resources.

Table 14.15 Depletion codes stored in the resource block model

ZONA	Description
0	Mineral In-situ (not extracted)
1	Mineral extracted prior to June 2017
2	Mineral extracted from July to December 2017
3	Mineral extracted from January to June 2018
4	Mineral extracted as developments (Galleries)
5.1	Mineral extracted in July 2018
5.2	Mineral extracted in August 2018
5.3	Mineral extracted from September to December 2018

14.11 Mineral Resource classification

Resource classification considers a number of aspects affecting confidence in the estimation, such as:

- Geological continuity (including geological understanding and complexity)
- Data density and orientation
- Data accuracy and precision
- Grade continuity (including spatial continuity of mineralization)
- Estimation quality

14.11.1 Geological continuity

There is substantial geological information to support a good understanding of the geological continuity at the Caylloma Mine. Detailed surface mapping identifying vein structures are supported by extensive exploration drilling.

The Bateas exploration geologists log drill core in detail including textural, alteration, structural, geotechnical, mineralization, and lithological properties, and continue to develop a detailed understanding of the geological controls on mineralization.

Understanding of the vein systems is greatly increased by the presence of extensive underground workings allowing detailed mapping of the geology. Underground observations have greatly increased the ability to accurately model the mineralization. The proximity of resources to underground workings has been taken into account during resource classification.

14.11.2 Data density and orientation

The estimation relies on two types of data, channel samples and drill holes. Bateas has explored the Caylloma veins using a drilling pattern spaced roughly 50 m apart along strike. Each hole attempts to intercept the vein perpendicular to the strike of mineralization but this is rarely the case, with the actual intercept angle being between 70 to 90 degrees.

Exploration drilling data is supplemented by a wealth of underground information including channel samples taken at approximately 3 m intervals perpendicular to the strike of the mineralization. Geological confidence and estimation quality are closely related to data density and this is reflected in the classification of resource confidence categories.

14.11.3 Data accuracy and precision

Classification of resource confidence is also influenced by the accuracy and precision of the available data. The accuracy and the precision of the data may be determined through QAQC programs and through an analysis of the methods used to measure the data.

Analysis of CRMs and blanks for the Bateas laboratory indicate acceptable levels of accuracy for silver, lead, zinc, and gold grades. The results of the blanks submitted indicate that contamination or mislabeling of samples is not a material issue at the Bateas laboratory. Preparation and laboratory duplicates indicate acceptable levels of precision in the Bateas laboratory for silver, lead, zinc, and gold grades.

The high levels of accuracy and lack of contamination indicate that grades reported from the Bateas laboratory are suitable for Mineral Resource estimation.

Fortuna have been unable to verify the accuracy and precision of the CMA channel data used in the estimation of the Paralela, San Pedro, and San Carlos veins and therefore this has been taken into consideration during classification.

14.11.4 Spatial grade continuity

Spatial grade continuity, as indicated by the variogram, is an important consideration when assigning resource classification. Variogram characteristics strongly influence estimation quality parameters such as kriging efficiency and regression slope.

The nugget effect and short-range variance characteristics of the variogram are the most important measures of continuity. For the Caylloma veins, the variogram nugget variance for Ag and Au is between 21 % and 57 % of the population variance, demonstrating the high variability of these precious metals. The variogram nugget variance for Pb and Zn is lower being between 16 % and 34 %. This shows that in general the lead and zinc grades have good continuity at short distances which results in a higher confidence in these estimated grades.

14.11.5 Estimation quality

Estimation quality is influenced by the variogram, the scale of the estimation, and the data configuration. Estimations of small volumes have poorer quality than estimations of large volumes. Measures such as kriging efficiency, kriging variance, and regression slope quantify the quality of local estimations.

Fortuna used the estimation quality measures to aid in assignment of resource confidence classifications. The classification strategy has resulted in the expected progression from higher to lower quality estimates when going from Measured to Inferred Resources.

14.11.6 Classification

The Mineral Resource confidence classification of the Caylloma resource block models incorporated the confidence in the drill hole and channel data, the geological interpretation, geological continuity, data density and orientation, spatial grade continuity, and estimation quality. The resource models were coded as Inferred, Indicated, and Measured in accordance with the 2014 CIM standards. Classification was based on the following steps:

- Blocks estimated using primary search neighborhoods were considered for the Measured Resource category
- Blocks estimated using secondary search neighborhoods were considered for the Indicated Resource category
- Blocks estimated using tertiary search neighborhoods were considered as Inferred Resources
- KE and ZZ values were assessed and the classification adjusted to take into account this information
- Perimeter strings were digitized in Datamine and the block model coded as either CAT=1 (Measured), CAT=2 (Indicated) or CAT =3 (Inferred) based on the above steps

The above criteria ensure a gradation in confidence with making it impossible that Inferred blocks are adjacent to Measured. It also ensures that blocks considered as Measured are informed from at least three sides, blocks considered as Indicated from two sides, and blocks considered as Inferred from one side. An example of a classified vein is provided in Figure 14.2.

Figure 14.2 Longitudinal section showing Mineral Resource classification for the Animas vein

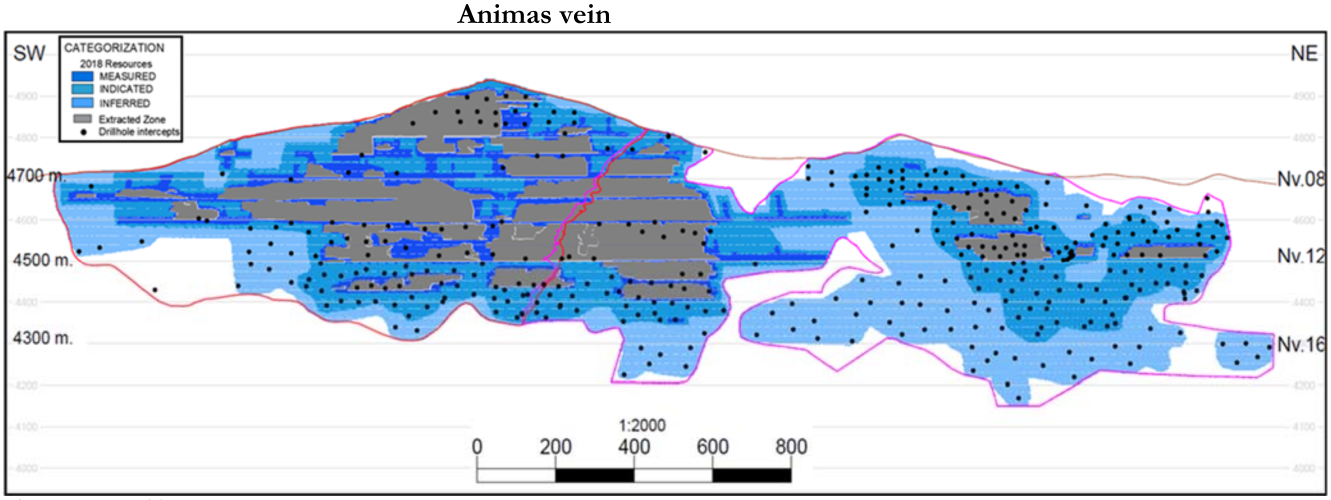


Figure prepared by Bateas, Aug 2018

14.12 Mineral Resource reporting

14.12.1 Reasonable prospects for eventual economic extraction

An NSR for each metal was calculated to take into consideration the commercial terms expected for 2019, the average metallurgical recovery, average grade in concentrate and long-term metal prices.

Different metallurgical recoveries were assigned according to whether the rock type was sulfide or high zinc oxide (>0.2% ZnO) in nature. Details of the values for each parameter used in the NSR determination are displayed in Table 14.16 (sulfide).

Table 14.16 Parameters used in NSR estimation - sulfide

Zinc and Lead			
Item	**Unit**	**Zinc**	**Lead**
Metal Price (a)	**US$/t**	**2,750**	**2,270**
Concentrate grade (b)	%	50	62
Deduction	%	85	95
Minimum deduction	%	8	3
Payable grade (e)	%	42	58.9
Payment per tonne (f)	**US$/t**	**1,155**	**1,337**
Smelting costs	US$/t	-55	-7
Escalator1	US$/t	0	0
Escalator 2	US$/t	0	0
Penalties	US$/t	0	0
Total Charges (g)	**US$/t**	**-55**	**-7**
Concentrate value (h)	**US$/t**	**1,100**	**1,330**
Met. recovery – (i)	**%**	**90**	**91**
Value – (j)	**US$/%**	**19.80**	**19.52**
Notes: f = (a x e)/100 h = (f – g) j = ((h x i)/(100 x b))			

Gold and Silver			
Item	**Unit**	**Silver**	**Gold**
Metal Price (a)	**US$/oz**	**18.25**	**1,320**
Deduction (b)	%	95	95
Refining Charges (c)	US$/oz	0.6	8
Escalator1	US$/oz	0.13	
Value after Met. Recovery (d)	US$/oz	15.33	224.4
Payable metal (e)	US$/oz	14.56	213.18
Met. recovery – (f)	**%**	**84**	**17**
Value – (h)	**US$/g**	**0.45**	**6.81**
Notes: d = (a x f)/100 e = (d x b-(c x f x b))/100 h = e/31.1035			

Metallurgical parameters and concentrate characteristics have been based on historical recoveries observed in the plant by Bateas in 2017 and 2018.

Metal prices were defined by Fortuna's financial department based on standard industry long term predictions. The proposed metal prices were reviewed and agreed upon by the company's Qualified Persons.

Areas of high zinc oxide were identified in the model and alternative metallurgical recoveries (and subsequent NSR values) applied to this material based on operation evidence from the plant in 2017. Metallurgical recovery values were 56.9 % for silver, 17 % for gold, 56.8 % for lead, and 35.4 % for zinc with subsequent point metal values (taking into account metal price, concentrate recovery, smelter cost, metallurgical recovery) used for NSR evaluation being US$ 0.30/g for silver, US$ 6.81/g for gold, US$ 12.12/% for lead, and US$ 7.79/% for zinc (Table 14.17).

Table 14.17 Parameters used in NSR estimation – zinc oxide

Zinc and Lead			
Item	**Unit**	**Zinc**	**Lead**
Metal Price (a)	**US$/t**	**2,750**	**2,270**
Concentrate grade (b)	%	50	55
Deduction	%	85	95
Minimum deduction	%	8	3
Payable grade (e)	%	42	52
Payment per tonne (f)	**US$/t**	**1,155**	**1,180**
Smelting costs	US$/t	-55	-7
Escalator1	US$/t	0	0
Escalator 2	US$/t	0	0
Penalties	US$/t	0	0
Total Charges (g)	**US$/t**	**-55**	**-7**
Concentrate value (h)	**US$/t**	**1,100**	**1,173**
Met. recovery – (i)	**%**	**35.4**	**56.8**
Value – (j)	**US$/%**	**7.79**	**12.12**
Notes: f = (a x e)/100 h = (f – g) j = ((h x i)/(100 x b))			

Gold and Silver			
Item	**Unit**	**Silver**	**Gold**
Metal Price (a)	**US$/oz**	**18.25**	**1,320**
Deduction (b)	%	95	95
Refining Charges (c)	US$/oz	0.6	8
Escalator1	US$/oz	0.13	
Value after Met. Recovery (d)	US$/oz	10.38	224.40
Payable metal (e)	US$/oz	9.47	211.89
Met. recovery – (f)	**%**	**56.9**	**17**
Value – (h)	**US$/g**	**0.30**	**6.81**
Notes: d = (a x f)/100 e = (d x b-(c x f x b))/100 h = e/31.1035			

In the case of the Ramal Piso Carolina vein, which is gold rich, testwork conducted in the plant suggested that adjustments could be made to maximum gold recovery and therefore a metallurgical recovery rate of 75 % has been used for gold, being the equivalent of $30.05/g Au in the NSR calculation for this vein.

Cut-off grade determination

The cut-off value used for reporting Mineral Resources is based on average operating costs for the operation in 2017 determined by Fortuna's finance and operations departments. There are two methods of extraction based on the thickness of the vein and in 2018 this has been taken into consideration in setting the cut-off value for Mineral Resources.

Veins classified as wide, being on average greater than two meters, are amenable to extraction by semi-mechanized mining methods with a mine to mill cost reported as US$ 61.60/t. Taking into account a 15% upside in metal prices for the evaluation of long-term resources a US$ 50/t NSR cut-off value is applied to the wide veins including Animas, Animas NE, Cimoide ASNE, Nancy, Rosita, and San Cristobal.

Veins classified as narrow, being on average less than 2 m, are amenable to extraction by conventional mining methods with a mine to mill cost estimated as US$ 165/t. Taking into account a 15% upside in metal prices for the evaluation of long term resources **a** US$135 /t NSR cut-off value is applied to the narrow veins including Bateas, Bateas Piso, Bateas Techo, La Plata, Cimoide La Plata, Soledad, Santa Catalina, Silvia, Ramal Piso Carolina, Paralela, San Carlos, San Pedro, Patricia, Pilar, and Don Luis II.

It is the opinion of the QPs that by reporting resources based on actual mining, processing and smelting costs; actual metallurgical recoveries achieved in the plant; reasonable long-term metal prices; and the application of a transparent cut-off grades, the Mineral Resources have 'reasonable prospects for eventual economic extraction'.

14.12.2 Mineral Resource statement

Eric Chapman P. Geo. is the QP for the Mineral Resource estimate for the Caylloma Mine. Mineral Resources have an effective date of December 31, 2018. Mineral Resources for the Project are summarized in Table 14.18. Mineral Resources are reported undiluted and in-situ in areas identified as accessible for underground mining above either a US$ 50/t or US$ 135/t NSR value, depending on the vein thickness and proposed mining method (see above). The Measured and Indicated Mineral Resources are exclusive of those Mineral Resources modified to produce the Mineral Reserves through the process described in Section 15.

Table 14.18 Mineral Resources exclusive of Mineral Reserves reported as of December 31, 2018

Category	Tonnes (000)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Metal			
						Ag (Moz)	Au (koz)	Pb (kt)	Zn (kt)
Measured	**524**	**73**	**0.32**	**1.16**	**2.23**	**1.2**	**5**	**6**	**12**
Indicated	**1,633**	**77**	**0.29**	**1.23**	**2.25**	**4.1**	**15**	**20**	**37**
Measured + Indicated	**2,157**	**76**	**0.30**	**1.22**	**2.24**	**5.3**	**21**	**26**	**48**
Inferred	**5,354**	**102**	**0.32**	**2.40**	**3.83**	**17.6**	**56**	**129**	**205**

Notes on Mineral Resources

- Mineral Resources are as defined by the 2014 CIM Definition Standards for Mineral Resources and Mineral Reserves
- Mineral Resources are reported exclusive of Mineral Reserves
- Mineral Resources are estimated and reported as of August 31, 2018 and reported as of December 31, 2018 taking into account production-related depletion for the period through December 31, 2018
- Resources for veins classified as wide (Anima, Animas NE, Cimoide ASNE, Nancy, Rosita, and San Cristobal) are reported above an NSR cut-off value of US$ 50/t. Resources for veins classified as narrow (all other veins) are reported above an NSR cut-off value of US$ 135/t
- Metal prices used in the NSR evaluation are US$ 18.25/oz for silver, US$ 1,320/oz for gold, US$ 2,270/t for lead and US $2,750/t for zinc
- Metallurgical recovery values used in the NSR evaluation are 84 % for silver, 17 % for gold, 91 % for lead, and 90 % for zinc with the exception of high zinc oxide material that used 57 % for silver, 17 % for gold, 57 % for lead, and 35 % for zinc; and 75 % for gold in the Ramal Piso Carolina vein
- Point metal values (taking into account metal price, concentrate recovery, smelter cost, metallurgical recovery) used for NSR evaluation are US$ 0.45/g for silver, US$ 6.81/g for gold, US$ 19.52/% for lead, and US$ 19.80/% for zinc with the exception of high zinc oxide material that used US$ 0.30/g for silver, US$ 6.81/g for gold, US$ 12.12/% for lead, and US$ 7.79/% for zinc; and for the Ramal Piso Carolina vein which used US$ 30.05/g for gold
- Eric Chapman, P.Geo. (APEGBC #36328) is the Qualified Person for resources being an employee of Fortuna Silver Mines Inc.
- Tonnes are rounded to the nearest thousand
- Totals may not add due to rounding
- Mineral Resources in this table are not additive to the Mineral Resources reported in Table 14.19, Table 14.20, and Table 14.21

Factors that may affect the estimates include metal price and exchange rate assumptions; changes to the assumptions used to generate the cut-off grade; changes in local interpretations of mineralization geometry and continuity of mineralized zones; changes to geological and mineralization shape and geological and grade continuity assumptions; variations in density and domain assignments; geometallurgical assumptions; changes to geotechnical, mining, dilution, and metallurgical recovery assumptions; change to the input and design parameter assumptions that pertain to the conceptual stope designs constraining the estimates; and assumptions as to the continued ability to access the site, retain mineral and surface rights titles, maintain environment and other regulatory permits, and maintain the social license 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 or Mineral Reserves that are not discussed in this Report.

14.12.3 Mineral Resources by key geologic attributes

The following section provides a breakdown of the resources based on various key geologic attributes. It important to note that all numbers presented in this section are not additive to the Mineral Resources presented in Table 14.18. A cornerstone of this analysis involves the evaluation of the Mineral Resource inclusive of Mineral Reserves for the Caylloma Mine, as summarized in Table 14.19. Mineral Resources are reported undiluted and in-situ using either a US$ 50/t or US$ 135/t NSR value cut-off depending on vein width (see notes below).

Table 14.19 Mineral Resources inclusive of Mineral Reserves reported as of December 31, 2018

Category	Tonnes (000)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Metal			
						Ag (Moz)	Au (koz)	Pb (kt)	Zn (kt)
Measured	1,221	98	0.35	1.84	3.02	3.9	14	22	37
Indicated	4,263	91	0.27	2.02	3.50	12.5	37	86	149
Measured + Indicated	5,484	93	0.29	1.98	3.40	16.3	50	109	186
Inferred	5,345	102	0.32	2.40	3.83	17.6	56	128	205

Notes on Mineral Resources

- Mineral Resources are as defined by the 2014 CIM Definition Standards for Mineral Resources and Mineral Reserves
- Mineral Resources are reported inclusive of Mineral Reserves
- Mineral Resources are estimated and reported as of August 31, 2018 and reported as of December 31, 2018 taking into account production-related depletion for the period through December 31, 2018
- Resources for veins classified as wide (Anima, Animas NE, Cimoide ASNE, Nancy, Rosita, and San Cristobal) are reported above an NSR cut-off value of US$ 50/t. Resources for veins classified as narrow (All other veins) are reported above an NSR cut-off value of US$ 135/t
- Metal prices used in the NSR evaluation are US$ 18.25/oz for silver, US$ 1,320/oz for gold, US$ 2,270/t for lead and US$ 2,750/t for zinc
- Metallurgical recovery values used in the NSR evaluation are 84 % for silver, 17 % for gold, 91 % for lead, and 90 % for zinc with the exception of high zinc oxide material that used 57 % for silver, 17 % for gold, 57 % for lead, and 35 % for zinc; and 75 % for gold in the Ramal Piso Carolina vein
- Point metal values (taking into account metal price, concentrate recovery, smelter cost, metallurgical recovery) used for NSR evaluation are US$ 0.45/g for silver, US$ 6.81/g for gold, US$ 19.52/% for lead, and US$ 19.80/% for zinc with the exception of high zinc oxide material that used US$ 0.30/g for silver, US$ 6.81/g for gold, US$ 12.12/% for lead, and US$ 7.79/% for zinc; and for the Ramal Piso Carolina vein which used US$ 30.05/g for gold
- Eric Chapman, P.Geo. (APEGBC #36328) is the Qualified Person for resources being an employee of Fortuna Silver Mines Inc.
- Tonnes are rounded to the nearest thousand
- Totals may not add due to rounding
- Mineral Resources in this table are not additive to the Mineral Resources reported in Table 14.18, Table 14.20, and Table 14.21
- Above notes are applicable to both oxide (Table 14.20) and sulfide (Table 14.21) reported resources

The Mineral Resource can be further assessed by examining the tonnes and grade associated with each vein for material identified as oxide (Table 14.20) and sulfide (Table 14.21).

Table 14.20 Mineral Resources inclusive of Mineral Reserves (Oxide) as of December 31, 2018

Category	Vein	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Measured Resources	Animas	77,000	170	0.32	0.99	1.47
	Animas NE	77,000	148	0.61	3.29	2.93
	Total	**153,000**	**159**	**0.46**	**2.13**	**2.20**
Indicated Resources	Animas	89,000	180	0.39	0.88	1.36
	Animas NE	304,000	118	0.55	3.15	2.20
	Total	**393,000**	**132**	**0.51**	**2.63**	**2.01**
Measured + Indicated Resources	**Total**	**546,000**	**140**	**0.50**	**2.49**	**2.06**
Inferred Resources	Animas	76,000	65	0.34	0.73	1.66
	Animas NE	180,000	99	0.43	2.90	2.53
	Total	**257,000**	**88**	**0.40**	**2.26**	**2.27**
Refer to notes on Mineral Resources below Table 14.20 Mineral Resources in Table 14.18, Table 14.19 and Table 14.21 are not additive to the Mineral Resources reported in this table						

The above Measured and Indicated Mineral Resources include 366,000 tonnes averaging 122 g/t Ag, 0.55 g/t Au, 3.19 % Pb and 2.36 % Zn of zinc oxide material with Inferred Mineral Resources including 178,000 tonnes averaging 99 g/t Ag, 0.43 g/t Au, 2.93 % Pb and 2.55 % Zn of zinc oxide material.

Table 14.21 Mineral Resources inclusive of Mineral Reserves (Sulfide) as of December 31, 2018

Category	Vein Type	Vein	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Measured Resources	**Silver Veins**	Bateas	13,000	694	0.14	0.51	0.78
		Total	**13,000**	**694**	**0.14**	**0.51**	**0.78**
	Polymetallic Veins	Animas	712,000	66	0.29	1.41	2.85
		Animas NE	257,000	89	0.26	2.94	3.86
		Ramal Techo ASNE	8,000	94	0.06	2.39	3.71
		Cimoide ASNE	24,000	70	0.13	2.37	6.13
		Rosita	2,000	59	0.12	1.87	4.81
		Nancy	14,000	32	0.34	1.17	3.27
		Santa Catalina	5,000	165	1.24	2.09	2.59
		Soledad	27,000	457	2.18	1.40	1.85
		Silvia	5,000	135	0.55	2.58	3.67
		Total	**1,054,000**	**82**	**0.33**	**1.82**	**3.16**
Total Measured Resources			**1,067,000**	**89**	**0.33**	**1.80**	**3.14**
Indicated Resources	**Silver Veins**	Bateas	49,000	582	0.14	0.23	0.39
		Cimoide La Plata	22,000	698	3.75	0.01	0.02
		La Plata	18,000	1,386	1.73	0.02	0.00
		San Cristóbal	151,000	216	0.17	0.35	0.58
		Total	**238,000**	**419**	**0.60**	**0.27**	**0.45**
	Polymetallic Veins	Animas	881,000	49	0.25	1.29	2.92
		Animas NE	2,134,000	67	0.18	2.40	4.15
		Ramal Techo ASNE	24,000	126	0.07	2.98	4.25
		Cimoide ASNE	364,000	68	0.14	2.32	5.00
		Rosita	4,000	58	0.13	1.80	4.56
		Nancy	161,000	41	0.24	1.30	3.30
		Santa Catalina	11,000	176	1.48	1.94	2.54
		Soledad	38,000	295	2.11	1.76	1.92
		Silvia	13,000	120	0.63	2.26	3.75
		Total	**3,631,000**	**65**	**0.22**	**2.07**	**3.87**
Total Indicated Resources			**3,870,000**	**87**	**0.24**	**1.96**	**3.66**
Total Measured + Indicated Resources			**4,937,000**	**87**	**0.26**	**1.92**	**3.54**
Inferred Resources	**Silver Veins**	Bateas	24,000	660	0.13	0.16	0.28
		Bateas Piso	6,000	778	0.13	0.12	0.29
		Bateas Techo	4,000	627	0.70	0.04	0.07
		Cimoide La Plata	31,000	440	2.24	0.02	0.03
		La Plata	12,000	420	0.98	0.17	0.80
		San Cristóbal	78,000	277	0.12	0.13	0.20
		Paralela	35,000	519	0.38	0.21	0.65
		San Carlos	6,000	600	0.29	0.08	0.43
		San Pedro	50,000	866	2.99	0.00	0.00
		Ramal Piso Carolina	117,000	158	6.03	0.07	0.12
		Don Luis II	96,000	579	0.84	0.07	0.14
		Total	**457,000**	**440**	**2.29**	**0.09**	**0.19**
	Polymetallic Veins	Animas	434,000	49	0.24	0.90	2.12
		Animas NE	3,412,000	72	0.10	2.83	4.41
		Ramal Techo ASNE	36,000	81	0.07	2.12	4.11
		Cimoide ASNE	411,000	64	0.08	3.03	6.16
		Nancy	293,000	62	0.16	2.62	3.61
		Silvia	13,000	147	0.86	1.86	3.33
		Soledad	20,000	266	1.52	1.80	2.66
		Santa Catalina	2,000	133	0.62	1.85	2.80
		Pilar	6,000	255	2.56	0.80	0.70
		Patricia	4,000	276	0.99	1.54	1.78
		Total	**4,631,000**	**70**	**0.13**	**2.64**	**4.28**
Total Inferred Resources			**5,089,000**	**103**	**0.32**	**2.41**	**3.91**

Refer to notes on Mineral Resources below Table 14.20
Mineral Resources in Table 14.18, Table 14.19 and Table 14.20 are not additive to the Mineral Resources reported in this table

14.12.4 Comparison to previous estimate

The primary reasons for changes in the reported Mineral Resources compared to the previous estimate are due to:

- Infill drilling of the Animas, Animas NE, Ramal Techo ASNE, Cimoide ASNE, and Nancy veins
- Exploration drilling of the Animas NE and Cimoide Animas NE veins
- Production related depletion and sterilization of material mined out since previous estimate
- Geological reinterpretation
- Changes in metal prices and projected commercial terms

The most significant changes occurred in the Animas NE vein where infill and exploration drilling, and mineral extraction was focused.

14.13 Comment on Section 14

The QPs are of the opinion that the Mineral Resources for the Caylloma Mine, which have been estimated using core drill and channel data, have been performed to industry best practices, and conform to the requirements of CIM (2014). The Mineral Resources are acceptable to support declaration of Mineral Reserves.

Furthermore, it is the opinion of the QPs that by Bateas performing an annual depletion exercise where material identified as inaccessible to underground mining due to economic or geotechnical reasons is sterilized and that the resource evaluation is based on actual mining, processing and smelting costs; actual metallurgical recoveries achieved in the plant; reasonable long-term metal prices; and the application of a transparent cut-off grade, the Mineral Resources have ‘reasonable prospects for eventual economic extraction’.

15 Mineral Reserve Estimates

The following section describes the Mineral Reserve estimation methodology. Mineral Reserves are estimated as of August 31, 2018 and reported as of December 31, 2018 taking into account production-related depletion for the period of September 1, 2018 through December 31, 2018.

15.1 Mineral Resource handover

The Mineral Resource is comprised of Measured, Indicated and Inferred categories.

Upon receipt of the block model a review was conducted to confirm the Mineral Resource was reported correctly and to validate the various fields in the block model.

For estimating Mineral Reserves, only Measured and Indicated Resources that are considered accessible have been considered. Inferred Mineral Resources were treated as waste material.

The Mineral Reserve estimation process considered the Mineral Resources above a US$ 50/t NSR value for wide veins and US$ 135/t NSR value for narrow veins in the Animas, Animas NE, Cimoide ASNE, Ramal Techo ASNE, Bateas, Nancy, La Plata, Cimoide La Plata, and San Cristobal veins.

15.2 Mineral Reserve methodology

The Mineral Reserve estimation procedure conducted by Bateas for the Caylloma deposit is defined as follows:

- Review of Mineral Resources
- Identification and removal of inaccessible Mineral Resources to account for recovery based on current mining practices observed from January 2018 including crown pillars and isolated areas
- Set Inferred Mineral Resources to waste
- Dilution of tonnages and grades for each vein based on dilution factors calculated by the planning department based on operational observations from July 2017
- After obtaining the resources with diluted tonnages and grades, the value per tonne of each block is determined based on metal prices and metallurgical recoveries for each metal and recorded as a NSR value (US$/t)
- A breakeven cut-off grade is determined for each vein based on operational costs for mining, processing, administration, commercial, and general administrative costs (total operating cost in US$/t). If the NSR value of the block is higher than the breakeven cut-off grade, the block is considered a Mineral Reserve, otherwise it is considered as either Mineral Resource exclusive of reserve, or waste
- Depletion of Mineral Reserves relating to operational extraction between September 1 and December 31, 2018
- Reconciliation of the reserve block model against mine production between September 1 and December 31, 2018 to confirm estimation parameters
- Mineral Reserve tabulation and reporting as of December 31, 2018

Each vein has a different operating cost; therefore, Mineral Reserve evaluation was performed for each individual vein.

15.3 Key Mining Parameters

15.3.1 Mining Recovery

Mining recovery levels vary due to the geometry of the vein and geotechnical characteristics of the material being mined. Some mineralized material cannot be economically extracted due to its isolated location; thickness being below the minimum mineable width; or due too other technical or economic constraints.

Overall mining recovery is 92 %. Measured and Indicated Resources were reduced by 2.12 Mt representing material below the required breakeven cut-off for Mineral Reserves, 280,000 t due to crown pillars and 716,000 t due to non-accessible material based on stope designs. Mineral losses were estimated based on mine designs and specific analysis of isolated areas where mineral extraction is not viable due to technical difficulties or excessive operating cost demands at this time.

15.3.2 Dilution

Dilution refers to the waste material (below breakeven cut-off grade) that is not separated from the ore (above breakeven cut-off grade) during mining. The dilution factor considers operational (over-break) and mucking effects. Dilution factors for the wider veins and the alternative narrow veins have been assessed independently. The assumption was made that non-mineralized material is waste that carries no grade; therefore, waste material was set at a zero value for metal contents.

The Caylloma Mine considers two types of dilution; operational and mucking.

Operational dilution

The estimate of the operational dilution (*OP*) was based on the proportion of extracted mineral versus in-situ mineral obtained by reconciliation data for the previous 12 months. It includes both the planned and unplanned components displayed in Figure 15.1.

Planned dilution is caused by the inclusion of waste inside the planned mining section based on the minimum mining width allowed by the mechanized equipment. Within this mining width, it is not possible to differentiate waste material from ore. The unplanned dilution is caused by waste material located outside the defined mining area. This material is also difficult to avoid because of mining geometry, over break impacts from blasting activities or geotechnical conditions.

Figure 15.1 Conceptual diagram of operational dilution

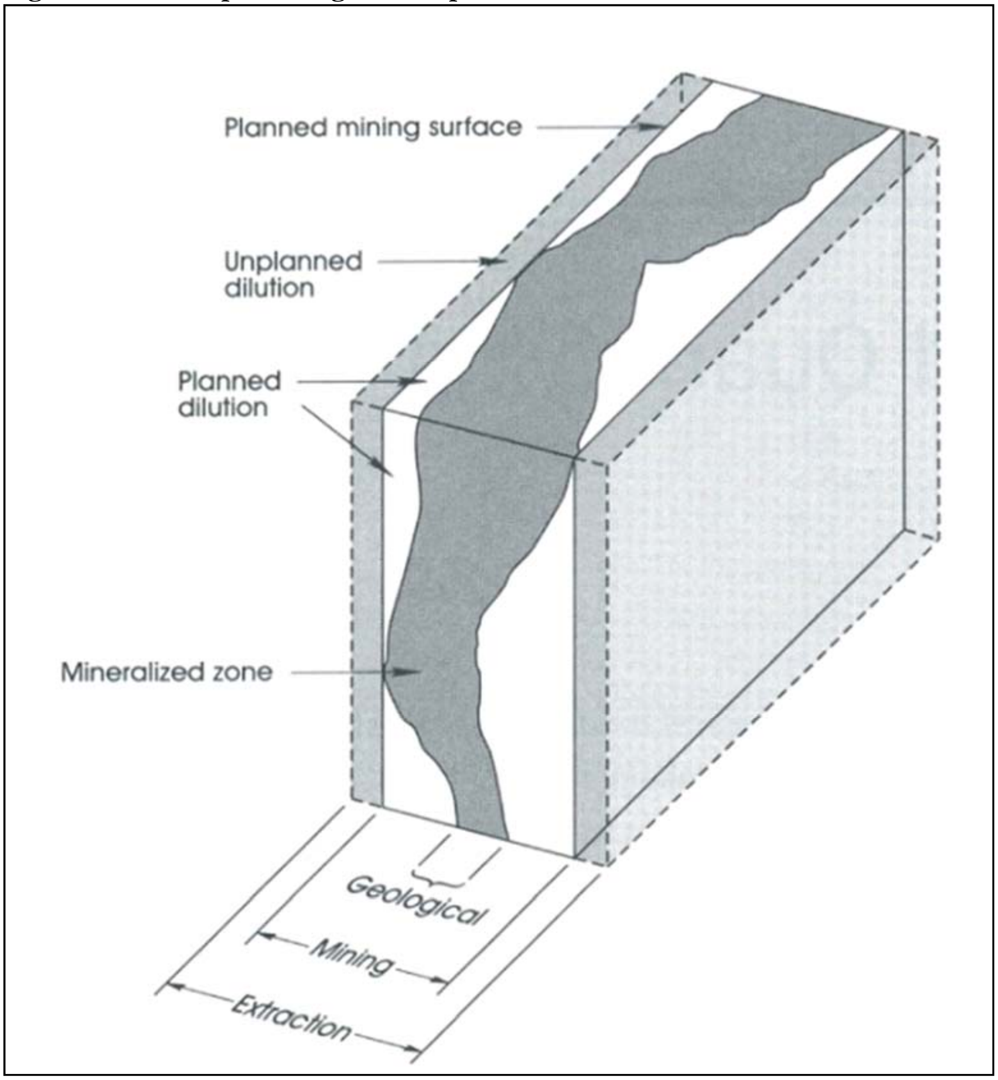


Figure prepared by Bateas from William et al (2001)

The unplanned dilution was calculated based on underground surveys defining the mined volumes between July 2017 and June 2018, or total material encountered (ore and waste) at a zero-cut-off grade. The following formula was applied to calculate the total dilution, sourced from William et al (2001) dilution definitions, equation number 2.

$$\text{Dilution} = \text{Tonnes waste mined} / (\text{Tonnes ore mined} + \text{Tonnes waste mined})$$

Based on the above a dilution factor was estimated for each vein in accordance with the vein width.

Mucking Dilution

The mucking dilution (*MD*) estimates the undesired waste material extracted as part of the mucking process and is based on operational experience for the twelve months prior to the reserve estimation.

$$MD = 4\,\%$$

Based on the above, the total dilution (*TD*) applied for the reserves estimate is defined by the following formula:

$$TD = OP + MD$$

The dilution factor applied varies according to the vein thickness, the proposed mining methodology and rock quality (for mechanized mining). The average dilution factor applied at the Caylloma Mine by proposed mining method is detailed in Table 15.1.

Table 15.1 Average dilution factors for wide and narrow veins

Mining methodology	Rock Type	Average Dilution Factor (%)
Mechanized (breasting)	Type IV (RMR=21-40)	31
Mechanized (enhanced)	Type III (RMR=41-60)	10
Semi-mechanized	Type III (RMR=41-60)	22
Conventional	Type III (RMR=41-60)	40

15.3.3 Metal prices, metallurgical recovery and NSR values

Metal prices used for Mineral Reserve estimation (Table 15.2) were determined as of May 2018 by the corporate financial department of Fortuna from market consensus.

Table 15.2 Metal prices

Metal	Price
Silver (US$/oz)	18.25
Gold (US$/oz)	1,320
Lead (US$/t)	2,270
Zinc (US$/t)	2,750

Metallurgical recoveries used for Mineral Reserve estimation are displayed in Table 15.3 and were based on achieved recoveries observed in the processing plant by Bateas during the period of July 2017 to June 2018, and in the case of the elevated zinc oxide areas (>0.2% ZnO), by metallurgical testwork conducted by the Bateas plant.

Table 15.3 Metallurgical recoveries

Metal	Metallurgical Recovery (%)	
	Sulfide	Zinc Oxide
Silver	84	57
Gold	17	17
Lead	91	57
Zinc	90	35

NSR values depend on various parameters including metal prices, metallurgical recovery, price deductions, refining charges and penalties. Methodology for NSR determination is the same as that described in Section 14.11. NSR values used for Mineral Reserve estimation are detailed in Table 15.4.

Table 15.4 NSR values

Metal	NSR Value	
	Sulfide	Zinc Oxide
Silver (US$/g)	0.45	0.30
Gold (US$/g)	6.81	6.81
Lead (US$/%)	19.52	12.12
Zinc (US$/%)	19.80	7.79

15.4 Cut-off grade determination

Breakeven cut-off values were determined for each mining method based on actual operating costs incurred in the period July 2017 to June 2018 (Table 15.5). These include exploitation and treatment costs, general expenses and administrative, and commercialization costs (including concentrate transportation).

Table 15.5 Operating costs by mining method

Area	Cost (US$/t)			
	Mechanized (Breasting)	Mechanized (enhanced)	Semi-mechanized	Conventional
Mine	43.20	30.40	55.10	115.90
Plant	13.90	14.10	13.10	15.00
General services	10.10	10.20	9.80	9.00
Administrative services	6.90	6.90	6.60	26.10
Concentrate transportation	6.70	6.70	6.70	7.80
Management fee	1.40	1.40	0.90	-
Community support activities	0.60	0.60	0.10	-
Breakeven cut-off	**82.90**	**70.30**	**93.10**	**173.70**

15.5 Mineral Reserves

Mineral Reserves reported by vein as of December 31, 2018 are detailed in Table 15.6. Measured Resources have been converted to Proven Reserves and Indicated Resources have been converted to Probable Reserves.

Table 15.6 Mineral Reserves as of December 31, 2018

Category	Vein	Tonnes	NSR (US$/t)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Metal			
								Ag (koz)	Au (koz)	Pb (kt)	Zn (kt)
Proven	Animas NE (Oxide)	10,000	128	118	0.30	4.81	4.20	39	0.1	0.5	0.4
	Animas NE (Sulfide)	33,000	166	101	0.27	2.77	3.28	107	0.3	0.9	1.1
	Animas (Sulfide)	95,000	123	66	0.26	1.59	3.03	202	0.8	1.5	2.9
	Cimoide ASNE	9,000	150	56	0.08	1.82	4.47	15	0.0	0.2	0.4
	Ramal Techo ASNE	2,000	140	65	0.04	2.50	3.10	3	0.0	0.0	0.0
	Bateas	1,000	483	1,042	0.58	0.18	0.32	39	0.0	0.0	0.0
	Total	**149,000**	**137**	**85**	**0.26**	**2.09**	**3.23**	**406**	**1.2**	**3.1**	**4.8**
Probable	Animas NE (Oxide)	53,000	115	117	0.32	4.12	3.49	198	0.5	2.2	1.8
	Animas NE (Sulfide)	1,686,000	154	63	0.13	2.35	3.98	3,401	7.2	39.6	67.2
	Animas (Sulfide)	355,000	118	49	0.24	1.47	3.32	558	2.7	5.2	11.8
	Cimoide ASNE	192,000	145	61	0.09	1.83	4.11	374	0.6	3.5	7.9
	Ramal Techo ASNE	27,000	144	88	0.05	2.24	3.04	75	0.0	0.6	0.8
	Nancy	72,000	110	41	0.22	1.50	3.07	96	0.5	1.1	2.2
	Bateas	14,000	267	577	0.14	0.10	0.19	268	0.1	0.0	0.0
	Cimoide La Plata	16,000	264	538	3.13	0.01	0.01	280	1.6	0.0	0.0
	La Plata	11,000	730	1,599	1.55	0.00	0.00	569	0.5	0.0	0.0
	San Cristóbal	50,000	105	196	0.07	0.35	0.49	317	0.1	0.2	0.2
	Total	**2,477,000**	**149**	**77**	**0.18**	**2.12**	**3.71**	**6,136**	**13.9**	**52.4**	**92.0**
Total Proven + Probable Reserves		**2,626,000**	**148**	**77**	**0.18**	**2.11**	**3.69**	**6,542**	**15.2**	**55.5**	**96.8**

Notes on next page:

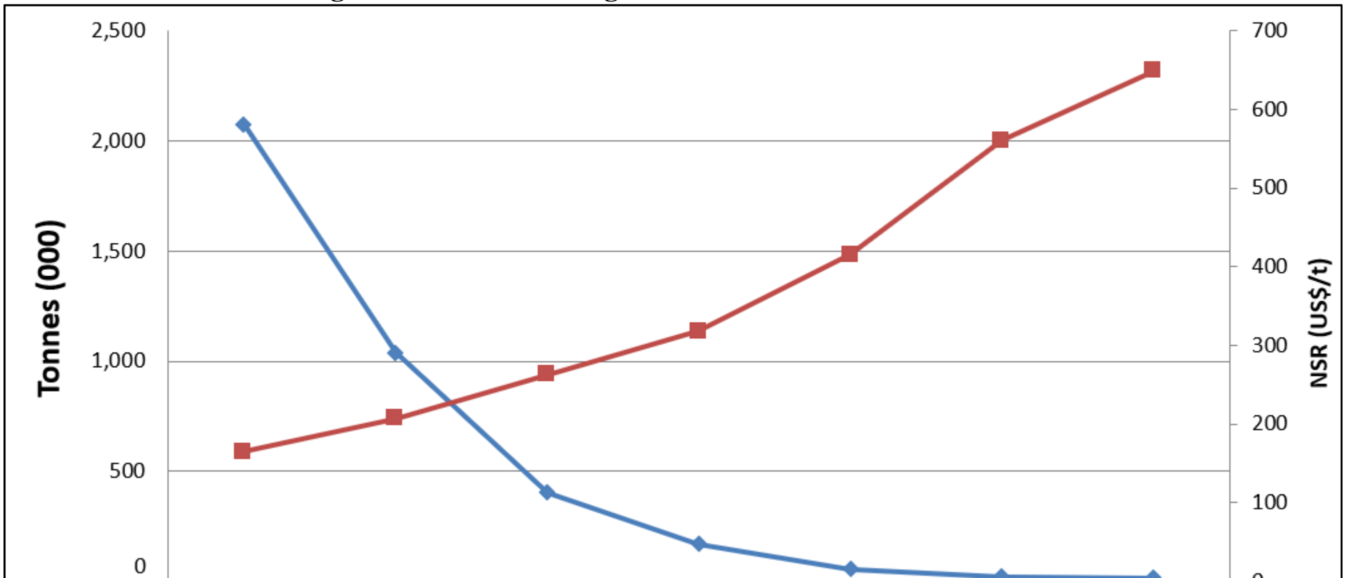
- Mineral Reserves are as defined by the 2014 CIM Definition Standards for Mineral Resources and Mineral Reserves
- Mineral Reserves are estimated as of August 31, 2018 and reported as of December 31, 2018 taking into account production-related depletion for the period of September 1, 2018 through December 31, 2018
- Mineral Reserves are reported above NSR breakeven cut-off values based on the proposed mining method for extraction including; mechanized (breasting) at US$ 82.90/t; mechanized (enhanced) at US$ 70.30/t; semi-mechanized at US$ 93.10/t; and conventional at US$ 173.70/t
- Metal prices used in the NSR evaluation are US$ 18.25/oz for silver, US$ 1,320/oz for gold, US$ 2,270/t for lead and US$ 2,750/t for zinc
- Metallurgical recovery values used in the NSR evaluation are 84 % for silver, 17 % for gold, 91 % for lead, and 90 % for zinc with the exception of high zinc oxide material that used 57 % for silver, 17 % for gold, 57 % for lead, and 35 % for zinc
- Operating costs were estimated based on actual operating costs incurred from July 2017 through June 2018
- Mining recovery is estimated to average 92 % with mining dilution ranging from 10 % to 40 % depending on the mining methodology
- Amri Sinuhaji, P.Eng. (APEGBC #48305) is the Qualified Person for reserves being an employee of Fortuna Silver Mines Inc.
- Reserve tonnes are rounded to the nearest thousand
- Totals may not add due to rounding

Factors that may affect the estimates include metal price and exchange rate assumptions; changes to the assumptions used to generate the cut-off grade; changes in local interpretations of mineralization geometry and continuity of mineralized zones; changes to geological and mineralization shape and geological and grade continuity assumptions; variations in density and domain assignments; geometallurgical assumptions; changes to geotechnical, mining, dilution, and metallurgical recovery assumptions; change to the input and design parameter assumptions that pertain to the conceptual stope designs constraining the estimates; and assumptions as to the continued ability to access the site, retain mineral and surface rights titles, maintain environment and other regulatory permits, and maintain the social license 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 Reserves that are not discussed in this Report.

A grade-tonnage curve has been estimated to display the effect of varying the NSR cut-off value on tonnes and NSR value (Figure 15.2).

Figure 15.2 Grade-tonnage curve - tonnes versus NSR value



Cut-off (NSR $/t)	100	150	200	250	300	350	400
Tonnes (000)	2074	1039	404	170	57	23	16
NSR (US$/t)	165	207	263	318	415	560	649

Figure prepared by Bateas, Jan 2019

A long section showing the location of Mineral Reserves and the stope design is displayed in Figure 15.3.

Figure 15.3 Longitudinal section showing Proven and Probable Reserves, Mineral Resources exclusive of reserves and stope design for the Animas vein

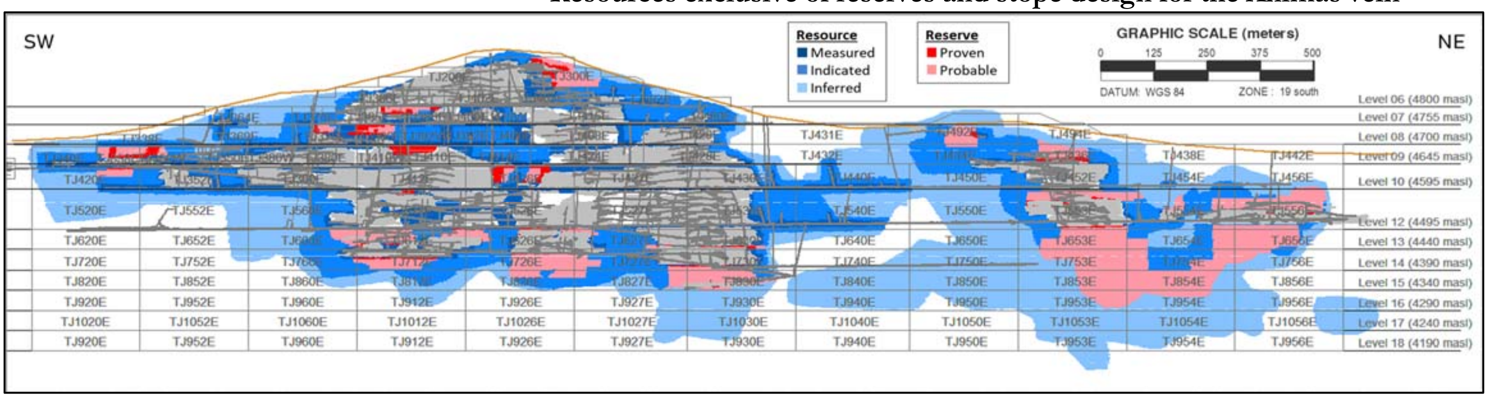


Figure prepared by Bateas, Jan 2019

15.6 Comments on Section 15

Mineral Reserves are to be extracted using an underground cut-and-fill mechanized, semi-mechanized, or conventional mining methodology, and in the opinion of the QP, are reported appropriately with the application of reasonable mining recovery and dilution factors based on operational observations and a transparent breakeven cut-off grades based on actual mining, processing and smelting costs; actual metallurgical recoveries achieved in the plant; and reasonable long-term metal prices based on market consensus.

The QP is of the opinion that the Proven and Probable Mineral Reserve estimate has been undertaken with reasonable care, and has been classified using the 2014 CIM Definition Standards. Furthermore, it is their opinion that Mineral Reserves are unlikely to be materially affected by mining, metallurgical, infrastructure, permitting or other factors, as these have all been well established over the last 10 years of mining.

16 Mining Methods

This section summarizes the mine design and planning work completed to support the preparation of the Mineral Reserve statement. The mining method applied in the exploitation of the main vein (Animas) is overhand cut-and-fill using either mechanized, semi-mechanized or conventional extraction methods. All mining is undertaken by contractors in a southwest to northeast direction following the strike of the vein. Production capacity at the mine is 1,500 tpd.

16.1 Hydrogeology

The most recent hydrogeological study was carried out by SRK Consulting in November 2017 to characterize and quantify the penetration of groundwater into the underground workings. The model provides a tool for developing the conceptual understanding of the groundwater system and to quantify a range of possible dewatering rates to consider for mine design.

Based on the transient hydrogeological modeling, the estimated groundwater inflows to the present underground workings reach a nominal 120 l/s with a maximum depth of approximately 4400 masl. The area receiving the majority of inflow is approximately 250 m in length, and an estimated 300 m below the pre-mined groundwater table.

To estimate future inflow, the hydrogeologic study has relied on work by Goodman et al. (1965) and El Tani (2003) to assess the water inflow stability regime. Models were calibrated using the current inflow data and hydraulic load estimates on the deeper workings below the pre-mined groundwater table. It was assumed that the length of tunnels receiving inflow will not change significantly within the next few years. It was also assumed that the hydraulic conditions at depths to level 17 will be similar to the current ones found at level 14, and that the previous or current drainage in the workings of the Bateas, San Cristóbal, and other veins, will not significantly affect the inflow to the Animas vein. Results indicate that nominal inflow can be expected to reach between 120 l/s and 200 l/s at the level 17.

Rainfall analysis and runoff assessment data was collected for the region and hydrological models were developed that predict average annual flows are minor and not expected to significantly impact the Caylloma Mine. Surface water flows were modelled for development of surficial water management facilities.

Dewatering requirements are discussed in Section 16.7.8.

16.2 Mine geotechnical

The Bateas Geotechnical Department continuously undertakes geotechnical evaluation through the classification of rock mass using RQD, rock mass rating (RMR) and Q (classification of rock mass quality for underground opening) systems. Results of the geotechnical evaluations for the presently-mined Animas and Nancy veins indicate the quality of the rock mass ranges from regular to good (Table 16.1), which is consistent with the behavior observed underground.

Table 16.1 Classification of rock mass

Vein	RQD (%)	RMR	Q
Animas	40-60	25-60	1-4
Nancy	<40	20-40	0.1-2

The rock quality allows openings with dimensions of up to 11 m wide, 4.5 m high, and 50-80 m long in the Animas vein and 6 m wide, 4.5 m high, and 80 m long in the Nancy vein. Based on these values the mining method of overhand cut-and-fill (with hydraulic and waste backfill) is regarded as the most suitable. It is possible that a bulk mining method, such as sub-level stoping, could be applied in the Animas vein, however the dip of the vein (43°-46° average) would make sub-level stoping difficult.

16.3 Mining methods

The mining method is cut-and-fill which is used in mining steeply-dipping orebodies in stable rock masses. Cut-and-fill is a bottom up mining method that consists of removing ore in horizontal slices, starting from a bottom undercut and advancing upwards. The following describes the cut-and-fill mechanized, semi-mechanized, and conventional extraction methods.

16.3.1 Mechanized cut-and-fill

Mechanized mining uses a jumbo drill rig and scoop tram for loading. The ore haulage is performed by trucks. Rock support is applied through rock bolts and shotcrete. The average mining width ranges between 3.5 m and 17 m. Mechanized mining is regarded as only being suitable for the Animas, Animas NE and their associated splays, as well as the Nancy vein based on the geological structure and geotechnical studies (Section 16.4). The majority of production came from the Animas/Animas NE and associated splay veins in 2018. Mechanized cut-and-fill comprises 93 % of mining planned in the LOM.

The mechanized mining sequence is shown in Figure 16.1 and includes: drilling (with a jumbo drill rig), blasting, support, loading (with a scoop tram) and haulage.

Figure 16.1 Schematic showing mechanized mining sequence

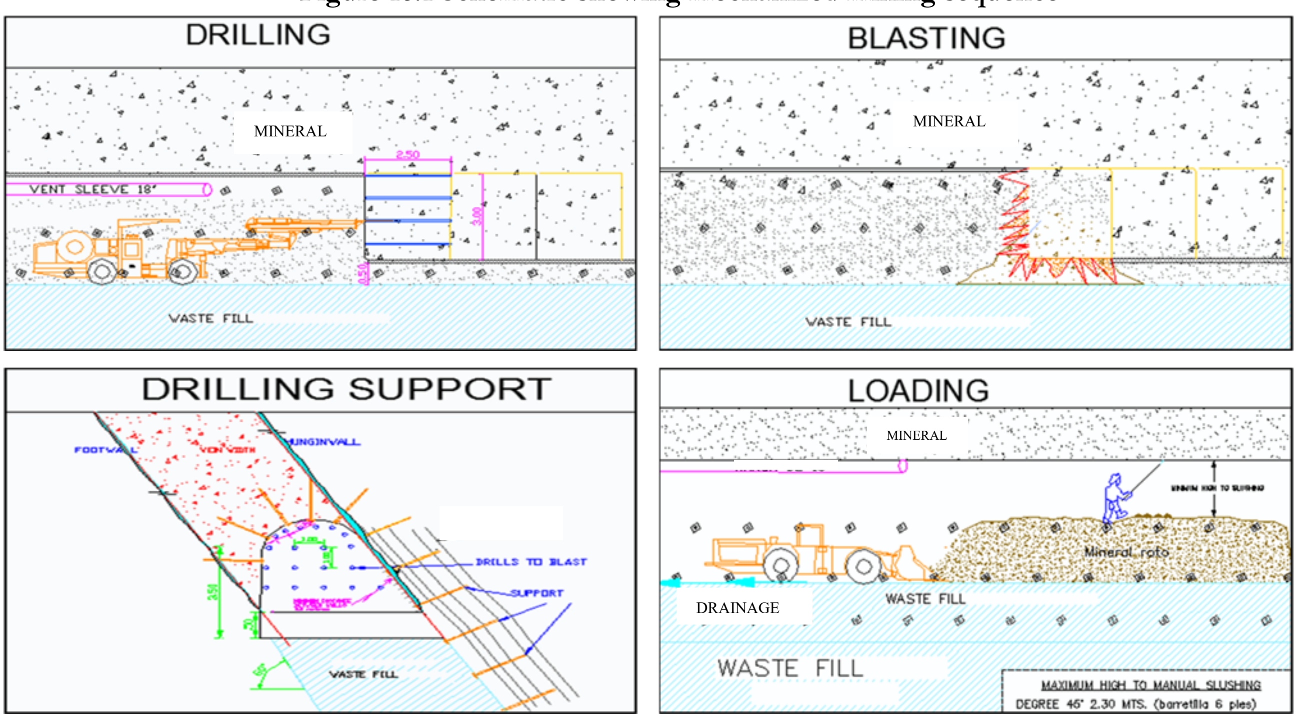


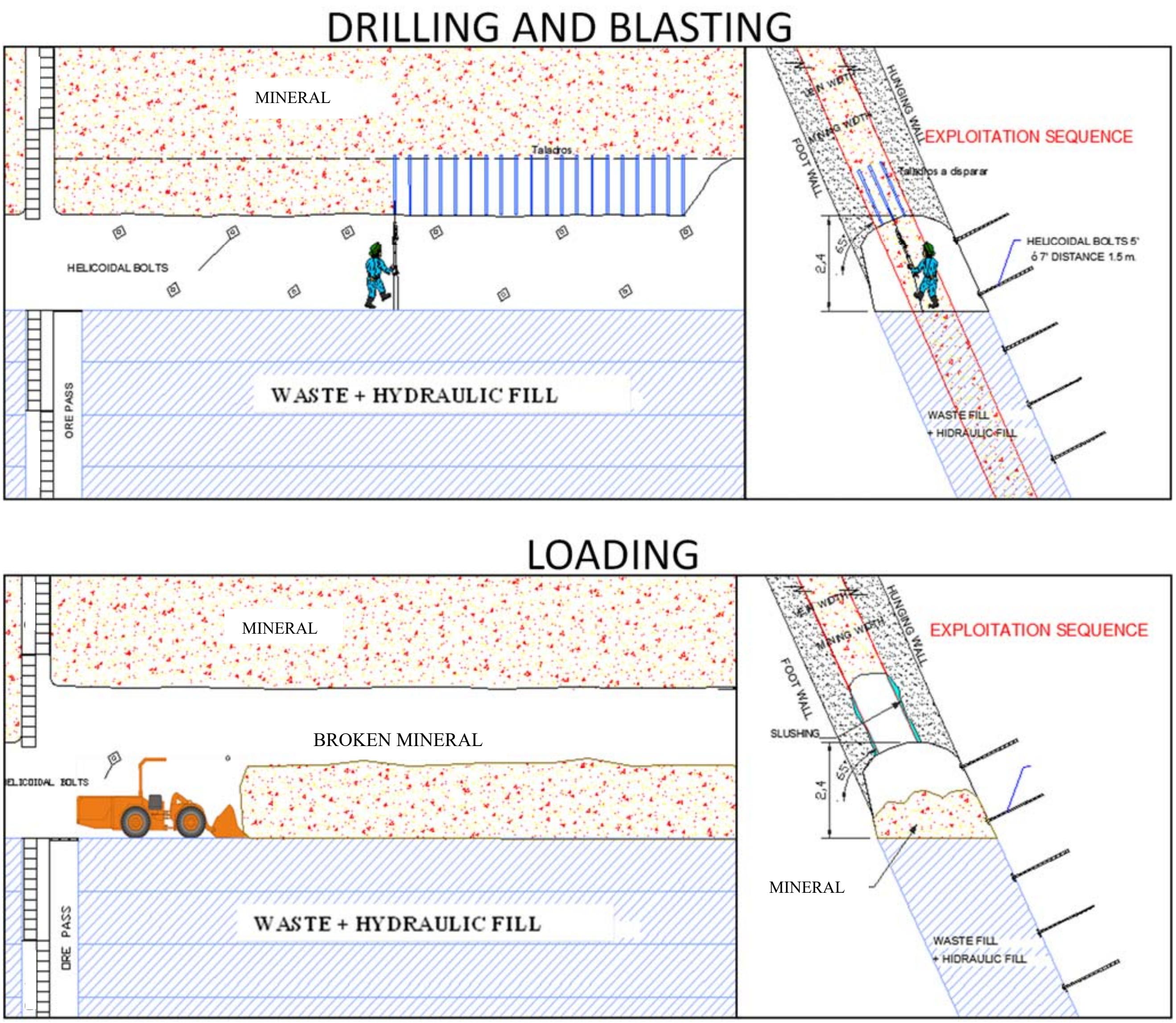
Figure prepared by Bateas, Aug 2015

16.3.2 Semi-mechanized cut-and-fill

Semi-mechanized mining is performed using handheld drilling equipment (jacklegs) and scoops for loading. Ore haulage is performed by truck. Rock support is supplied using rock bolts installed using manual drilling and installation techniques. Semi-mechanized mining is applied to narrow veins with average widths between 0.8 m and 2.0 m.

The semi-mechanized mining sequence is shown in Figure 16.2 and involves: drilling (with jacklegs), blasting, support, loading and haulage. Depending on vein width, once the ore has been extracted the walls have to be drilled and blasted in order to allow the minimum working width, especially for the loading equipment.

Figure 16.2 Schematic showing semi-mechanized mining sequence (continued on next page)



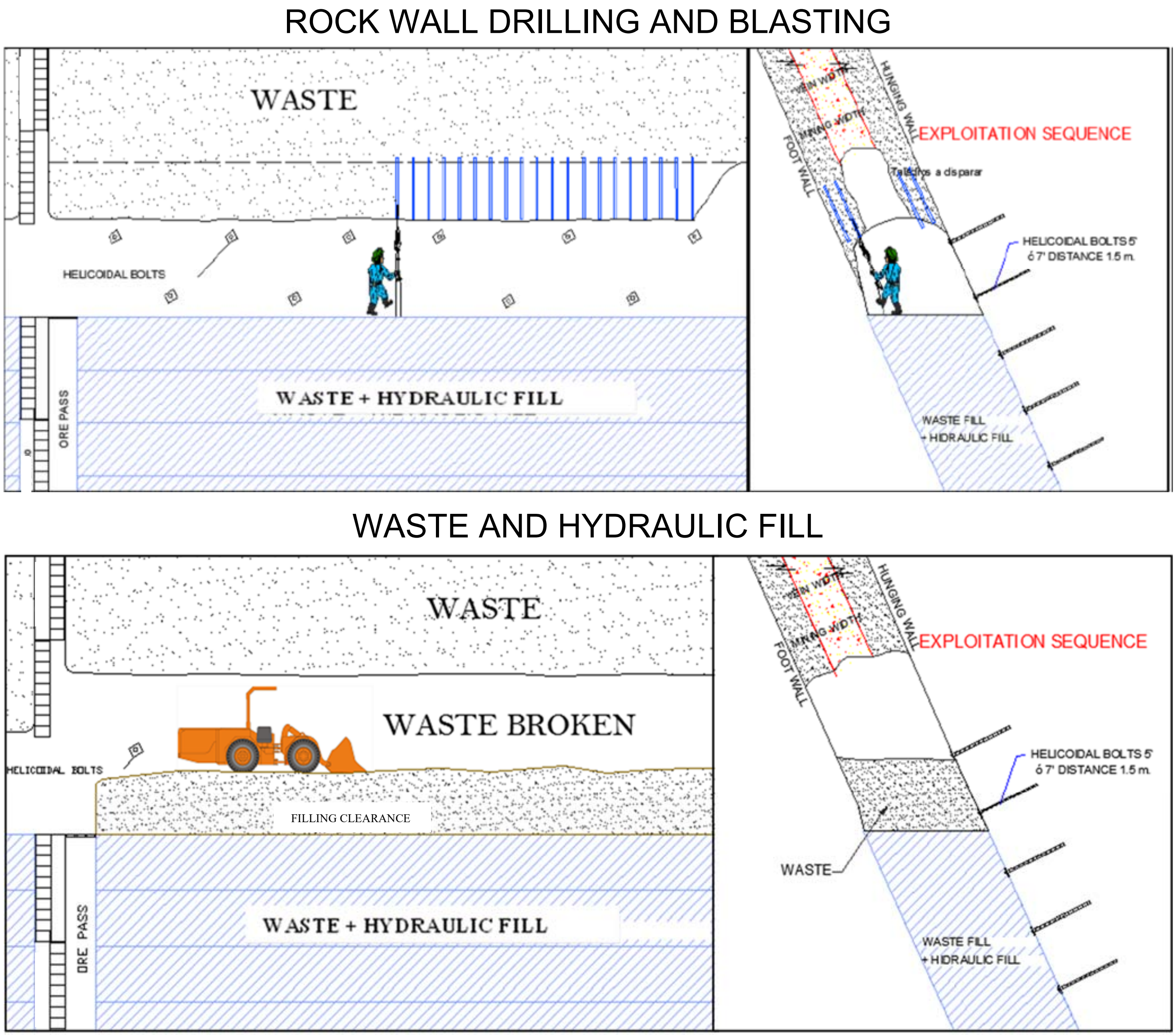


Figure prepared by Bateas, Aug 2015

16.3.3 Conventional cut-and-fill

Conventional mining is performed using handheld drilling equipment (jacklegs) and scrapers for loading. The ore haulage is done with trucks and the support is applied with rock bolts in manual form. This system is applied in narrow veins with average widths between 0.5 m and 0.8 m. This mining method is only applicable to the Bateas, La Plata, Cimoide La Plata and San Cristobal veins that are scheduled for mining in the final years of the LOM.

The mining production period extends from 2019 to 2023, almost five years. At full production the planned mining rate is 1,500 tpd (535,500 tonnes per annum). Planned LOM production is 2.63 Mt at an average silver grade of 77 g/t, gold grade of 0.18 g/t, lead grade of 2.11 %, and zinc grade of 3.69 % (see Table 16.2).

Table 16.2 Caylloma life-of-mine production schedule

Vein	2019	2020	2021	2022	2023	Total
Animas NE	322,300	385,300	375,200	349,500	339,800	1,782,200
Animas	99,600	96,800	94,600	92,900	66,700	449,600
Cimoide ASNE	73,000	41,100	39,800	22,500	24,200	200,600
Nancy	24,000	12,400	18,300	17,900	0	72,600
Ramal Techo ASNE	17,500	0	7,600	2,900	0	28,100
Cimoide La Plata	0	0	0	16,200	0	16,200
San Cristobal	0	0	0	33,600	16,800	50,400
La Plata	0	0	0	0	11,100	11,100
Bateas	0	0	0	0	15,600	15,600
Total	**535,500**	**535,500**	**535,500**	**535,500**	**484,000**	**2,626,000**

16.4 Mine production schedule

Measured and Indicated Mineral Resources were converted to Mineral Reserves and any Inferred Resources in the mine design considered as waste. Table 16.3 details the annual production plant feed and concentrate production for the Caylloma Mine.

The LOM annual tonnage and head grades have been obtained from the Mineral Reserves estimate based on the processing plant treatment capacity and the established mining sequence.

Metallurgical recoveries, concentrate production and metal content for the LOM have been estimated based on the estimated head grades, processing plant historical metallurgical recoveries as well as metallurgical testing.

Table 16.3 Caylloma life-of-mine production schedule

Type	Item	2019	2020	2021	2022	2023	Total
Treatment	Tonnes	535,500	535,500	535,500	535,500	484,000	**2,626,000**
	Ag (g/t)	64	54	60	125	86	**77**
	Au (g/t)	0.18	0.15	0.16	0.29	0.10	**0.18**
	Pb (%)	2.53	2.04	1.80	1.96	2.25	**2.11**
	Zn (%)	3.87	3.67	3.58	3.41	3.93	**3.69**
Metallurgical Recovery	Ag (%)	84	83	83	84	87	**84**
	Au (%)	17	13	13	12	19	**14**
	Pb (%)	91	90	89	90	92	**90**
	Zn (%)	90	90	90	90	91	**80**
Concentrate	Pb (t)	20,100	16,100	14,100	15,400	16,500	**82,200**
	Zn (t)	35,200	33,300	32,300	30,900	32,500	**164,300**
Recovered Metal	Ag (oz)	922,000	770,000	856,000	1,794,000	1,163,000	**5,504,000**
	Au (oz)	520	340	370	600	310	**2,150**
	Pb (t)	12,300	9,800	8,600	9,400	10,000	**50,100**
	Zn (t)	18,700	17,700	17,100	16,400	17,200	**87,100**

The dilution factor applied varies according to the vein thickness and the proposed mining methodology. The average dilution factor by vein applied at the Caylloma Mine varies between 10 and 40 %. Waste material is considered to contain no mineralization.

16.4.1 Economic cut-off value

The initial stope design was based on NSR values defined using a silver price of US$ 18.25 per ounce, gold price of US$ 1,320 per ounce, lead price US$ 2,270 per tonne, and zinc price US$ 2,750 per tonne, a process recovery for sulfide material of 84 % for silver, 17 %

for gold, 91 % for lead, and 90 % for zinc (for zinc oxide material process recovery of 56.3 % for silver, 17 % for gold, 56.8 % for lead, and 35.4 % for zinc), and NSR breakeven cut-off values based on the proposed mining method for extraction including; mechanized (breasting) at US$ 82.90/t; mechanized (enhanced) at US$ 70.30/t; semi-mechanized at US$ 93.10/t; and conventional at US$ 173.70/t. The operating costs were estimated based on actual operating costs incurred from July 2017 through June 2018. Bateas used an in situ cut-off grade to design mining shapes in the resource block model. Mining shapes were interrogated with the mine planning software and checked against a cut-off grade that includes an allowance for internal dilution.

16.4.2 Stope design

The exploitation infrastructure required to service mechanized mining is similar to that used to service semi-mechanized mining. This includes a center ramp connecting to sub level development running parallel to the vein. A cross cut from the sub level is developed to intersect the vein perpendicularly and allow exploitation. Each cross cut allows the exploitation of a 150 m long stope by mechanized mining or a 90 m long stope by semi-mechanized mining. Additionally, development may include raises used for ventilation, service systems or as ore passes adjacent to stopes.

Conventional mining requires less development. A center raise is driven in the vein to allow access for exploitation and extraction, giving access to a 60 m long stope (30 m each side of the raise). Two additional raises allow for access, ventilation and services.

16.5 Underground mine model

16.5.1 Mine layout

The mine plan includes a program for mine development which can be divided into three types: 1) development, 2) stope preparation and 3) exploration. In order to produce 1,500 tpd, approximately 654 m of new development is required each month. Development includes infrastructure such as ore passes, ramps, bypasses, and ventilation raises; preparation consists of all workings for exploitation purposes; and mine exploration is to assist with the exploration of the veins.

16.5.2 Lateral development

A summary of the lateral development requirements for the life-of-mine are detailed in Table 16.4.

Table 16.4 Summary of lateral development requirements for LOM

Activity	2019	2020	2021	2022	2023	Total
By pass (m)	245	120	595	293	454	1,707
Drift (m)	1,675	966	787	398	468	4,293
Crosscut (m)	102	0	0	27	55	184
Drive (m)	40	0	9	9	2	59
Gallery (m)	678	493	493	0	0	1,664
Ramp (m)	1,354	2,019	1,097	918	186	5,574
Sub Level (m)	855	727	404	404	790	3,180
Stope access (m)	1,714	1,487	1,207	441	390	5,240
Total (m)	**6,663**	**5,811**	**4,592**	**2,491**	**2,345**	**21,901**

Lateral development totals 21,901 m, equivalent to a development ratio of 120 t/m.

16.5.3 Raising requirements

Table 16.5 is a summary of LOM raising requirements. With vertical development totaling 4,538 m, all being ventilation raises.

Table 16.5 Summary of vertical development requirements for LOM

Activity	2019	2020	2021	2022	2023	Total
Chimney (m)	521	323	292	921	849	2,906
Raise bore (m)	665	170	186	247	363	1,632
Total	**1,186**	**493**	**478**	**1,169**	**1,212**	**4,538**

16.6 Development schedule

Development advance rates have been planned to take into account potential bottlenecks such as available ventilation, capacity to move muck, congestion in the main ramp, and the availability of trained operating and maintenance crews. Development meters required for production per year, in accordance with the production schedule is detailed in Table 16.6.

Table 16.6 LOM development schedule

Vein	Type	2019	2020	2021	2022	2023	Total
Animas	Horizontal (m)	2,434	2,009	2,175	376	638	7,632
	Incline (m)	3,067	3,647	2,416	872	483	10,485
	Vertical (m)	965	493	478	151	72	2,159
	Total (m)	**6,466**	**6,149**	**5,069**	**1,399**	**1,193**	**20,276**
Nancy	Horizontal (m)	758	0	0	0	0	758
	Incline (m)	404	156	0	0	0	560
	Vertical (m)	222	0	0	0	0	222
	Total (m)	**1,384**	**156**	**0**	**0**	**0**	**1,540**
Cimoide La Plata	Horizontal (m)	0	0	0	473	0	473
	Incline (m)	0	0	0	426	0	426
	Vertical (m)	0	0	0	741	0	741
	Total (m)	**0**	**0**	**0**	**1,640**	**0**	**1,640**
San Cristobal	Horizontal (m)	0	0	0	207	63	270
	Incline (m)	0	0	0	136	107	243
	Vertical (m)	0	0	0	276	118	394
	Total (m)	**0**	**0**	**0**	**619**	**288**	**907**
La Plata	Horizontal (m)	0	0	0	0	120	120
	Vertical (m)	0	0	0	0	260	260
	Total (m)	**0**	**0**	**0**	**0**	**380**	**380**
Bateas	Horizontal (m)	0	0	0	0	934	934
	Vertical (m)	0	0	0	0	762	762
	Total (m)	**0**	**0**	**0**	**0**	**1,696**	**1,696**
Total all veins (m)		**7,850**	**6,305**	**5,069**	**3,658**	**3,557**	**26,439**

16.7 Equipment, manpower, services, and infrastructure

16.7.1 Contractor development

The underground mine is operated by a mining contractor selected by Bateas based on a competitive bidding process. The scope of work for the mining contractor generally includes mine decline and raise development, stope preparation development, stoping, backfilling, and all related services required for the operation of a 1,500 tpd narrow vein silver-gold-lead-zinc mine.

16.7.2 Mining equipment

Table 16.7 shows Bateas's estimate of the mining fleet required to execute the mine plan including the supporting surface units. The maximum number of units is shown for each equipment type, as actual equipment requirements vary throughout the mine life.

Replacement equipment required during the mine life is not included in the list shown.

Table 16.7 Planned mining equipment

Equipment	Quantity	Type	Model	Capacity
Scoop	5	Caterpillar	R1300 LHD	4.2 yd^3
Scoop	1	Atlas Copco	ST7G	4.2 yd^3
Scoop	1	Atlas Copco	ST1030	6.0 yd^3
Scoop	1	Wagner	ST2D	2.5 yd^3
Scoop	1	Paus	PFL-18	2.5 yd^3
Jumbo	1	Atlas Copco	Rocket - Boomer 281	2 arms
Jumbo	5	Sandvik	DD310	1 arm
Truck	11	Volvo	FMX	15 m^3
Tractor	1	Komatsu	D39EX-22	n/a
Excavator	1	Caterpillar	329DL	2.4 m^3
Front-end loader	2	Caterpillar	950-H	4.0 yd^3
Mixer	2	Putzmeister	Mixcret 4	4 m^3
Mixer	1	Not recorded	Not recorded	4 m^3
Concrete sprayer	1	Putzmeister	SPM 4210	250 l
Concrete sprayer	1	Alpha	Not recorded	Not recorded
Scaler	1	Paus	852	n/a
Telehandler	1	Not recorded	Dedaluz-28.7	n/a
Bolter 88	2	Not recorded	Not recorded	n/a
Loader	1	Bobcat	S650	n/a

16.7.3 Mine manpower

Bateas estimates a total of 1,073 employees are required for mine-related activities in 2019, consisting of 697 contractors and 376 Bateas staff. The operating costs for the LOM are based on maintaining similar staffing numbers, although Fortuna has identified an opportunity to potentially reduce numbers in future years.

16.7.4 Production drilling

Mechanized

For mechanized drilling, Bateas uses a jumbo drilling machine, with the drilling taking place in horizontal benches (breasting) with average advance of 2.8 m and vertical average advance of 2.5 m. The minimum mining width varies according to the thickness of the vein. Production starts from the lower level and proceeds to higher levels of the stope by leaving an intermediate 3 m crown pillar between stopes for safe operating conditions.

The production drill holes for breasting and vertical drilling use drill pipe of 10 ft length and drill bits of 51 mm and 45 mm.

The drilling pattern varies according to the hardness of the rock and type of cut.

Semi-mechanized

For semi-mechanized drilling, Bateas uses handheld drilling equipment (jacklegs). Similar to the mechanized drilling, the drilling takes place in horizontal benches (breasting) with average advances of 2.3 m and vertical advances averaging 1.8 m. The minimum mining width varies according to the thickness of the vein. Production starts from the lower level and proceeds to higher levels of the stope by leaving an intermediate 3 m crown pillar between stopes for safe operating conditions.

The production drill holes for breasting and vertical drilling use drill pipes of 8 and 6 ft lengths and drill bits of 41 mm.

The drilling pattern varies according to the hardness of the rock and type of cut.

Conventional

For conventional drilling, Bateas uses handheld drilling equipment (jacklegs). The drilling takes place with vertical advances averaging 1.6 m. The minimum mining width varies according to the thickness of the vein. Production starts from the lower level and proceeds to higher levels of the stope by leaving intermediate 3 m crown pillar between stopes for safe operating conditions.

Production drill holes for vertical drilling use drill pipes of 4 and 6 ft lengths and drill bits of 41 mm.

The drilling pattern varies according to the hardness of the rock and type of cut.

16.7.5 Ore and waste handling

A combination of 4.2 yard load-haul-dump (LHD) units and 25 t trucks were selected as being the most economical option for ore and waste haulage. Broken ore from the stopes is mucked by LHDs to an ore pass, or loaded directly into the 25 t trucks. Waste rock from development headings is mucked by LHDs directly to the trucks or to local waste storage areas. The waste rock is then hauled by truck to the surface storage facilities where it is classified and trucked to the hydraulic backfill plant.

16.7.6 Mine ventilation

The estimated air flow required for the Animas underground mine is 479,220 cfm for a production rate of 1,500 tpd based on the utilization of the planned mining equipment. Air intake is through the main access ramp for levels 6, 7, 8, 9 and 12 which represents an estimated 517,738 cfm. Ventilation is controlled by four fans (two of 120,000 cfm and two of 100,000 cfm) that draw in contaminated air from the underground levels, stopes, galleries, and raises and expels the air at surface.

Stopes in operation are ventilated via auxiliary fans (10,000 to 40,000 cfm) that move fresh air from the ramps with ducting along the level access crosscuts and along the vein to active work areas.

16.7.7 Backfill

Backfill required by the mine to complete the mining sequence is provided by waste rock and classified mill tailings. While waste rock backfill is generated by underground development, the quantity produced is generally insufficient to meet mine backfill requirements. To supplement the waste rock from development activities, classified mill tailings or hydraulic backfill is produced by a small plant on the surface. The proportion of waste and hydraulic backfill is 25 % and 75 %, respectively. The total volume of backfill required by the mine is estimated to be 192,000 m^3 per annum.

16.7.8 Mine dewatering system

The underground mine dewatering system has been designed to handle an estimated peak rate of 200 l/s.

The dewatering of the Animas vein is primarily through a series of sumps located in the following stations:

- Station 1 at Animas level 15 has two submersible pumps capable of handling up to 120 l/s
- Station 2 at Animas level 14 has two submersible auxiliary pumps capable of handling 90 l/s and 35 l/s
- Station 3 at Animas level 13 has two stationary pumps capable of handling up to 200 l/s
- Station 4 at Animas level 11 has a sump with a capacity to hold up to 1,000 m^3 of water
- Station 5 at Animas level 12 has two submersible auxiliary pumps capable of handling up to 120 l/s
- Station 6 at Animas level 12 has a sump with a capacity to hold up to 1,500 m^3 of water

Water is pumped through high-density polyethylene (HDPE) cased boreholes (305 mm inside diameter) from the station 1 at Animas level 15 to the sump located at Station 4 and then onwards to the sump at Station 6 where water is treated to avoid any environmental contamination prior to discharge.

16.7.9 Maintenance facilities

Maintenance facilities for the underground mobile fleet consist of a surface maintenance shop for major failures of the equipment and two underground work shops for minor repairs and lubrication performed as part of the preventive maintenance program. A new underground work station is planned for construction in 2019 on level 14 of the Animas vein.

16.7.10 Electrical power distribution

Power to support the mine infrastructure is provided from the main site electrical substation via a 15-kV line connected to the national power grid line from Callalli via a 66-kV line. Bateas signed a contract with distribution company ENGIE for the electricity supplied.

Electrical energy requirements for the Bateas operation are as follows; plant concentrator 2,700 kilowatts; mine 3,800 kilowatts; and general services and camp 300 kilowatts, with a total of 28 electrical substations distributed throughout the operation area to meet the electrical power demand.

Primary line

Bateas has two overhead 15 kV transmission lines from the Caylloma substation to the onsite substation located at the power distribution room.

Secondary line

The main onsite substation distributes electrical power to the main operational centers via overhead 15 kV lines to:

- Plant concentrator
- Animas vein
- Bateas vein

There are two principal substations located on the surface, Substation N° 15 and Substation No. 29, that reduce electrical voltage from 15 kV to 3.2 kV and distribute electric power to production and mine development activities. Six additional substations, reducing voltage from 3.2 kV to 0.44 kV, are located on levels 12, 13 and 14 of the mine, and distribute electric power to mine equipment such as fans, jumbos, and pumps. Substation No. 5, located on surface, distributes electric power with an overhead of 3.2 kV, via a transformer, to distribute 440 and 220 V electricity to the camp and administrative areas.

In addition, Bateas maintains three backup power sources to generate electric power by using diesel power generation to cover the Animas demand for ventilation and water pumps on the 13, 14 and 15 levels as detailed below:

- GE01: Cummins C2000D6 of 1.2 MW (1,200 kW), 0.46 kV, connected to Substation No. 02
- GE02: Cummins C2000D6 of 1.2 MW (1,200 kW), 0.46 kV, connected to Substation No. 29
- GE03: Cummins GEC15 of 800 kW, 0.46 kV, connected to the Substation No. 29

16.7.11 Other services

Compressed air supply

Average compressed air consumption during the mine production is estimated at approximately 1,000 cfm. The compressed air is supplied from the surface by air compressors (one electric and two diesel powered). These provide compressed air of 85 psi for the development and mining activities.

16.8 Comments on Section 16

The QP is of the opinion that:

- The mining methods being used are appropriate for the deposit being mined. The underground mine design, tailings facility design, and equipment fleet selection are appropriate to reach production targets
- The mine plan is based on historically successful mining philosophy and planning, and presents low risk
- Inferred Resources are regarded as waste in the mine plan
- Mining equipment requirements are based on actual operational conditions experienced at the Caylloma Mine producing 1,500 tpd
- All mine infrastructure and supporting facilities meet the needs of the current mine plan and production rate with new infrastructure, such as underground workshops, being constructed as required

17 Recovery Methods

The following section provides a description of the current process plant design including the equipment characteristics and specifications at each step of the process.

17.1 Processing plant design

The Bateas processing plant is a typical flotation operation and consists of five stages: crushing; milling; flotation; thickening and filtering and tailings disposal. Each of the main stages is comprised of multiple sub-stages. A summary of each stage is as follows:

- **Crushing**: includes three stages, primary, secondary, and tertiary
- **Milling**: includes two stages, primary and secondary
- **Flotation**: consists of two operating flotation circuits (lead–silver, and zinc) and one copper flotation circuit on standby
- **Thickening and filtering** are performed separately for the concentrates, which after filtering undergo a drying process before being placed in their respective storage bins to await transportation
- **Tailings disposal**: Final tailings are classified through cyclones. The coarse fraction (underflow) is placed onto a concrete pad and transported to the mine to be used as hydraulic fill. The finer fraction (overflow) is pumped to the tailing's storage facility

The Caylloma concentrator plant resumed operations in October 2006, treating 600 tpd of polymetallic mineral. Capacity increased progressively. With the installation of a 1.8 m by 2.4 m ball mill in 2009 the plant reached a treatment capacity of 1,300 tpd, and with the installation of two Derrick Stack Sizer vibrating wet screens the plant achieved a treatment capacity of 1,500 tpd at the end of March 2016. The treatment process is differential flotation. Initially, two concentrates were obtained: lead–silver and zinc. From late 2009 to January 2011, a copper–silver concentrate was also produced, but due to unfavorable commercial terms the production of copper concentrate was suspended and the copper circuit put on standby.

17.1.1 Crushing and milling circuits

The crushing and milling circuits are shown in Figure 17.1. The crushing process is fed from the 10,000 t capacity stock pile used for ore storage and blending. The process commences with feed to the coarse hopper, which has a 450 t active capacity with 30 cm separation grates. The mineral is extracted from the coarse hopper through the apron feeder that feeds the vibrating grizzly with variable separation that, in turn, feeds the Kurimoto jaw crusher, resulting in a product size varying between 76 mm and 90 mm. The mineral is transported on two conveyor belts to the two-deck vibrating 6 by 14-foot (1.82 x 4.27 m) screen. The screen's undersize is fed to the stockpile via conveyer belts with the oversize going to a Sandvik CH-420 secondary crusher, the product of which goes to the two-deck vibrating 5 by 14 foot (1.52 x 4.27 m) screen, the undersize of this screen feeds the stockpile. The oversize is fed through a conveyor belt to the Sandvik CH-430 tertiary crusher, the discharge of which returns to the initial conveyer belt, closing the circuit.

Figure 17.1 Crushing and milling circuits at the Caylloma processing plant

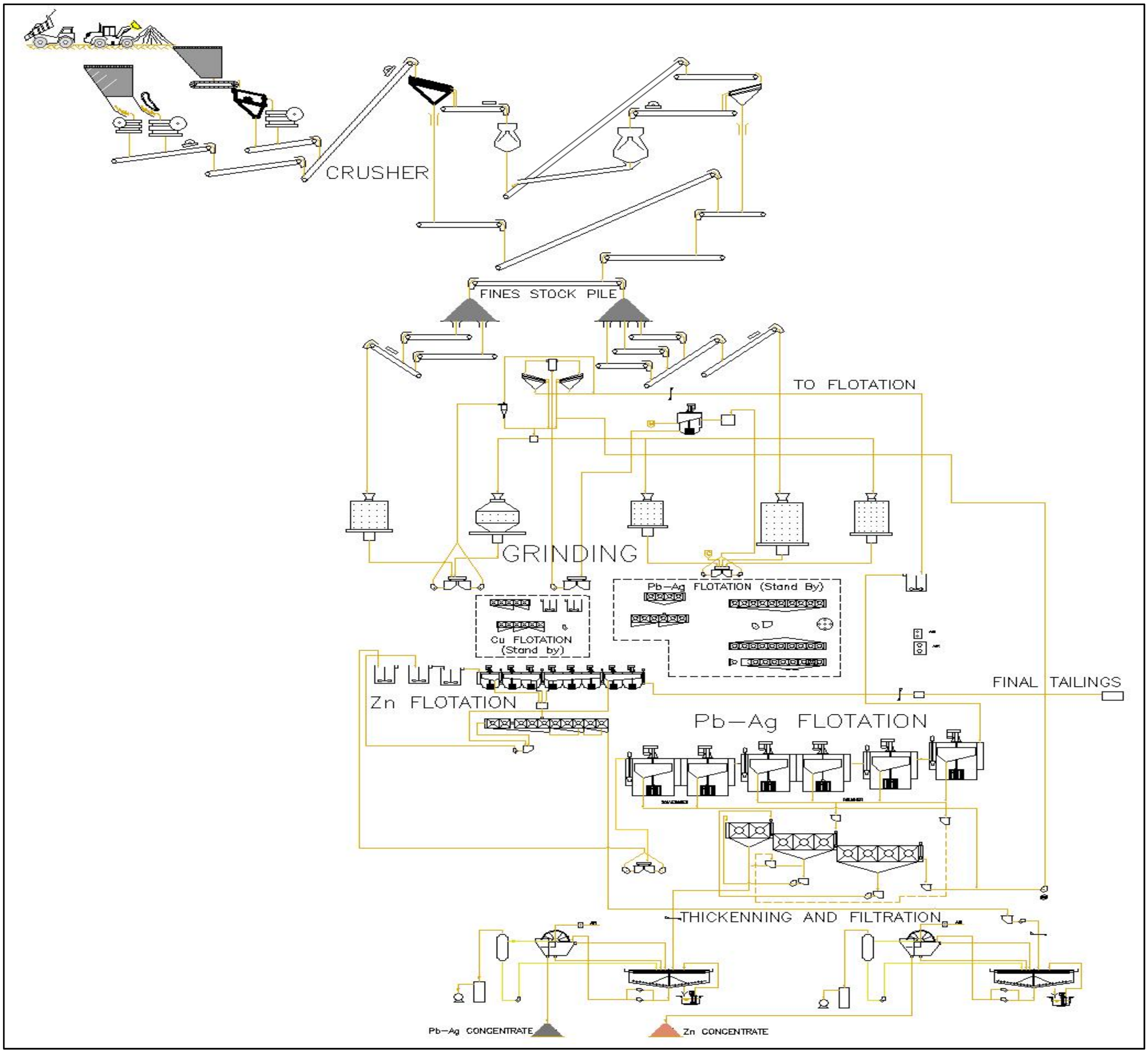


Figure prepared by Bateas, Aug 2016

Additionally, there is a standby primary crushing circuit that starts at a 100 t capacity coarse hopper. From the hopper, the mineral is fed to a Kueken 24 by 36-inch (0.6 x 0.9 m) jaw crusher through a Ross chain feeder. The discharge from this crusher is transported via conveyors 19 and 20 to conveyor 2-A. There are three permanent magnets and one electromagnet on the conveyors to prevent the entry of tramp iron.

The grinding circuit has two stages. The primary stage operates in an open circuit, consisting of two ball mills (Comesa 2.4 m by 3.0 m and a Denver 2.1 m by 2.1 m). The secondary stage operates in closed circuit and consists of three ball mills, a Magensa 1.8 m by 1.8 m, a Hardinge 2.4 m by 0.9 m and a Liberty 1.8 m by 2.4 m. The final product of the grinding circuit is 60 % passing 75 μm.

The Comesa and Denver primary grinding mills are fed independently by conveyor belts. The Comesa primary mill operates with the Magensa and Libertad secondary mills. The Comesa mill discharge feeds a flash cell (SK 240) with concentrate from the flash cell being sent to the lead thickener. Tailings are fed to a 6 by 6-inch (15 x 15 cm) horizontal pump which in turn feeds the Derrick Stack Sizer. The undersize goes to the flotation circuit and the oversize feeds the three secondary ball mills.

The Denver primary ball mill operates with the Hardinge secondary ball mill. Discharge from this mill feeds a 6 by 4-inch (15 x 10 cm) horizontal pump, which in turn feeds the D-15 cyclone. The cyclone's overflow goes to the flotation circuit and the underflow returns to the three secondary ball mills.

17.2 Metallurgical treatment

Metallurgical treatment is through a process of differential flotation; the first step is the flotation of lead–silver followed by zinc flotation.

17.2.1 Lead-silver flotation circuit

The D-15 cyclone overflow and the Derrick Stack Sizers undersize are fed to a conditioner before going to the TC-20-unit cell of 20 m^3 capacity. The unit cell tailings are fed to three TC-20 rougher cells. The unit cell concentrate together with the rougher concentrate are fed to the primary cleaner cells, consisting of four 3 m^3 OK-3 cells. The primary cleaner concentrate is fed to the secondary cleaner cells, consisting of three 3 m^3 OK-3 cells. The secondary cleaner concentrate is fed to the tertiary cleaner cells, consisting of two 3 m^3 OK-3 cells. Concentrate from the tertiary cleaner forms the final lead-silver concentrate. Tailings from the secondary and tertiary cleaner cells return to the head of the primary and secondary cleaner cells, respectively.

The rougher tailings feed the scavenger flotation bank, consisting of two TC-20 cells. The scavenger concentrate, as well as the primary cleaner tailings are pumped to join the Derrick Stack Sizers with oversize returning to the secondary grinding circuit. The scavenger tailings feed the zinc flotation circuit.

17.2.2 Zinc flotation circuit

The lead-silver flotation tailings are sent to three conditioners (two 2.4 x 2.4 m, one 3 x 3 m). The conditioned pulp is fed to the zinc rougher flotation stage, consisting of six 8 m^3 OK8U cells working in series. The rougher concentrate is fed to the cleaner flotation circuit, comprised of three stages consisting of five, three and two 2.8 m^3 Sub-A30 cells for the primary, secondary and tertiary cleaner stages respectively. These stages work in series, the concentrate from the primary cleaner feeds the secondary cleaner and the concentrate of this feeds the tertiary cleaner. The concentrate from the latter is the final product from the zinc flotation circuit. The zinc concentrate goes through an automatic sampler and is then sent to the zinc thickener.

The rougher tailings feed the scavenger flotation circuit that is comprised of two 8 m^3 OK8U cells. The scavenger concentrate is sent to a conditioner before returning it to the rougher circuit. The scavenger tailings are the final tailings of the whole process.

The flotation process in 2018 achieved metallurgical recoveries of 84.1 % for silver, 21.9 % for gold, 91.3 % for lead, and 90.2 % for zinc. Historical data show consistent achievable metallurgical recoveries of 91 % for lead, 84 % for silver (in the lead concentrate) and 90 % for zinc.

17.2.3 Concentrates thickening and filtration

The lead–silver concentrate is thickened in an Outotec 9.0 m diameter thickener; the underflow is pumped to a 1.8 m diameter disc filter (six discs). The filtered lead concentrate contains on average 7.5 % moisture.

The zinc concentrate is thickened in an Outotec 12.0 m diameter thickener; the underflow is pumped to a 1.8 m diameter disc filter (eight discs). The filtered zinc concentrate contains on average 9.0 % moisture.

Each filtered concentrate is discharged into a covered temporary storage area from where it is loaded by a front-end loader into trucks for transport to the concentrate purchaser's storage facilities in Matarani, Arequipa for the zinc concentrate and Callao, Lima for the lead-silver concentrate.

17.2.4 Tailings disposal

Tailings from the concentration process are pumped and classified through cyclones. The underflow is accumulated in a temporary storage area for later transportation to the mine as hydraulic backfill. Approximately 40 % of the tailings are used as backfill material in the mine.

The overflow is pumped to the tailing's facility for final disposal. The water collected from the tailing's impoundment is pumped back to the processing plant and reused in the process. Usage of the new tailing's storage facility (N° 3) commenced in January 2013, with the capacity increased to 905,000 m^3 in January 2019 (sufficient to handle tailings for 3.5 years at current production levels) with a further expansion planned in 2021.

17.3 Requirements for energy, water, and process materials

Electric power requirements are supplied through the Callalli substation from the national grid. The whole operation requires 6.8 MW of energy including 2.7 MW required by the processing plant. The operation also keeps two diesel generators on site as a backup power supply in case of emergencies.

The processing plant water consumption is 2.23 m^3/t. Approximately 66 % (1.46 m^3/t) is recovered from the tailings facility and pumped back to the plant to be re-used in the process along with 34 % (0.78 m^3/t) fresh water.

All process materials are available from Arequipa and Lima. Reagents are provided from local service representatives representing international reagent suppliers. Reagents and consumables used in the processing include sodium cyanide (6 g/t), copper sulphate (204 g/t), zinc sulfate (523 g/t), xantato Z-11 (3 g/t), xantato Z-6 (21 g/t), calcium oxide (350 g/t), foaming agent MC 5 (95 g/t), steel balls (700 g/t).

17.4 Comment on Section 17

The QP considers process requirements to be well understood, and consistent based on the actual observed conditions in the operating plant. There is no indication that the characteristics of the material being mined will change, with the expectation of the high zinc oxide material that has been accounted for, and therefore the recovery assumptions applied for future mining are considered as reasonable for the LOM. The plant is of a conventional design and uses conventional consumables.

18 Project Infrastructure

The Caylloma Mine has a well-established infrastructure used to sustain the operation. The infrastructure includes a main access road from the city of Arequipa, mine access roads, tailing storage facilities, mine waste storage facilities, mine ore stockpiles, camp facilities, concentrate transportation, power generation and communications systems (Figure 18.1).

Figure 18.1 Plan view of mine camp

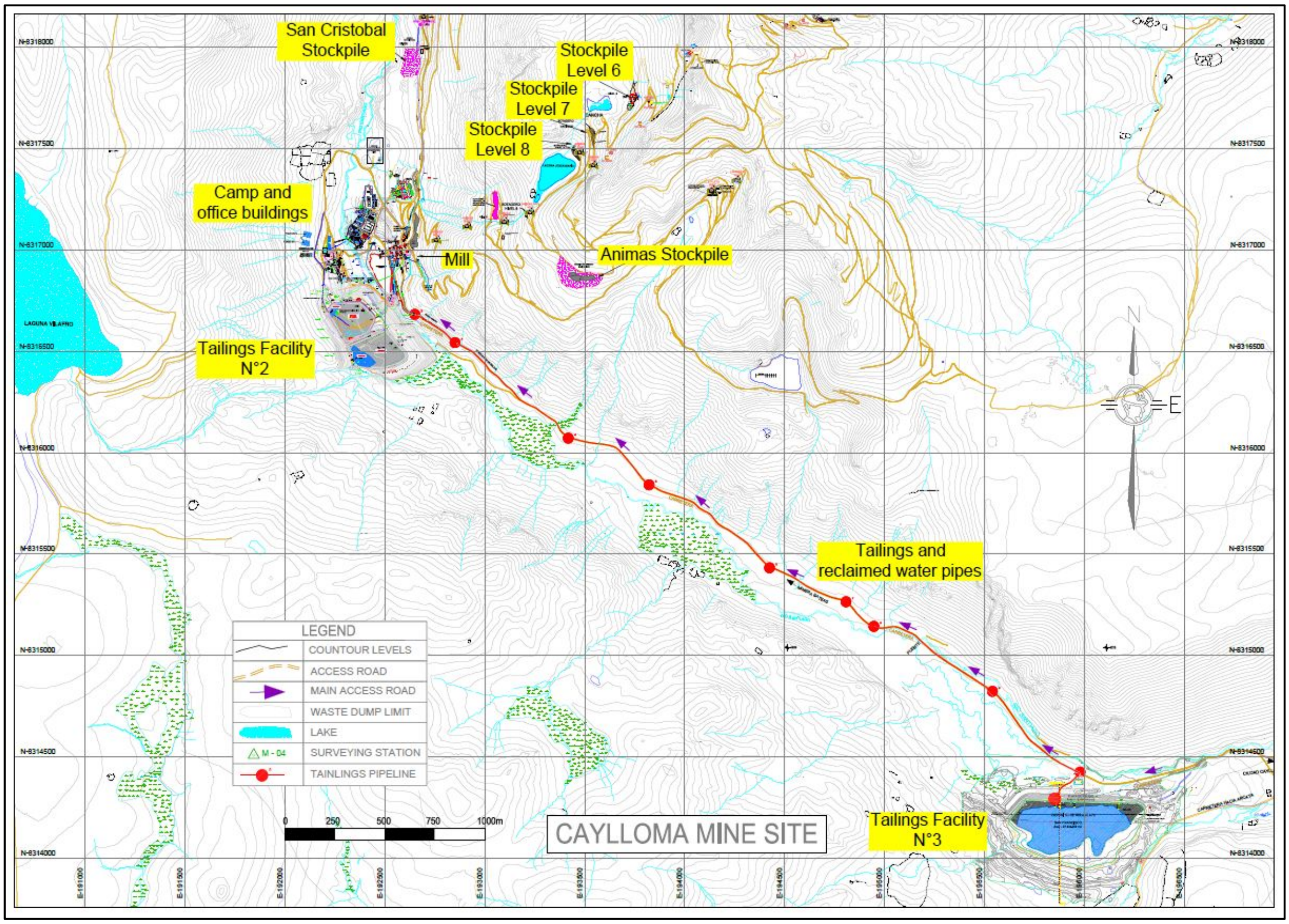


Figure prepared by Bateas, Dec 2018

18.1 Roads

Roads on the property are shown in Figure 18.1. Access roads are unpaved but are in good condition due to regular maintenance. Water tankers are used in summer to dampen the roads to reduce dust pollution. Roads interconnect all the facilities on the property and allow access through various portals to the underground operations.

18.2 Tailing storage facilities

The mine currently operates two tailings storage facilities, Tailings Deposit N° 3 and Tailings Deposit N° 2 as a contingency.

The Tailings Deposit N° 3 operation permit was issued by the Ministry of Energy and Mines in December 2012. According to the 2019 plant treatment capacity of 1,500 tpd and mine backfill demand, the second stage facility (2A) completed in January 2019, with a tailings embankment elevation of 4,419 masl, will provide an additional capacity of three and a half years till mid-2022. The next stage (2B) is planned to be constructed in 2021 and should provide capacity for an additional three and a half years of operation till the end of 2025, based on current production rates.

The south embankment of Tailings Deposit N° 2 (4,474 masl) provides a small additional capacity (two months) as a contingency plan for tailings storage.

18.3 Mine waste stockpiles

The mine currently operates one waste stockpile, Bateas Level 12, which is used for storing waste material that could not be effectively disposed of underground. The current waste stockpile capacity is one year. Bateas is in the process of obtaining a permit to allow the construction of a new underground waste storage facility in 2019 to be located in Animas Level 6 with an additional storage capacity of 18 months. Beyond this an internal study on waste management has identified Level 8 of the Animas vein as the best location for storing waste beyond 2021. A detailed engineering study to establish exact designs and construction costs is planned for late 2020, with estimated construction costs budgeted in the LOM plan for 2021.

18.4 Ore stockpiles

The mine currently has four ore stockpiles which store mine production, oversized, low grade and already crushed ore. The total stockpile capacity is approximately 60,000 t. The total stockpile tonnage as of December 2018 was 46,000 t.

18.5 Concentrate production and transportation

In March 2015, the processing capacity was increased from 1,300 to 1,500 tpd by improving the grinding and flotation circuits. The LOM is based on this 1,500 tpd capacity.

Concentrate transportation is carried out using 30 tonne capacity trucks. Before the trucks depart camp, they are weighed at the truck scale. All trucks are systematically registered and controlled so that the delivered concentrate weighed at the storage port reconciles with that which left the mine.

18.6 Power generation

The power demand on the mine site is 5.5 MW on average, power supply is obtained mainly (96 %) through the national power grid. The mine site also maintains two diesel generators on site with a total capacity of 2.2 MW to cover the shortage (4 %) and also as backup.

In January 2016, Bateas increased the power supply capacity from 3.2 MW to 6.8 MW including a new 15kV power line and the installation of a new 7.5 MVA transformer to replace the 3.75 MVA transformer at the Caylloma substation. Currently, the power demand of the operation is slightly higher than the capacity of the transformer, this deficit is compensated by the diesel generators.

Additional information on power is provided in Section 16.7.10.

18.7 Communications systems

The Caylloma mine site is equipped with cellular phone and internet connection provided by local suppliers. The cellular phone signal is provided by an antenna located in the Caylloma District (approximately 6 km from the mine) and sent to the site via microwave. The signal is captured by an amplifier and sent to the camp via a relay station located in the top level of the mine. The internet signal is provided through optic fiber to Callalli (approximately 75 km from the mine) and sent to the camp via microwave. Along with the internet signal the camp also gets fixed telephone service and data link.

A communication system for the underground operation is presently under review and planned for implementation in 2019.

18.8 Water supply

The fresh water supply for the Caylloma Mine is provided by the Santiago River which runs through the property. The permanent water permit was granted by the Ministry of Autoridad Nacional de Agua. Currently, the fresh water demand is 60 liters per second, including 10 liters per second for the camp.

Approximately 70 % of the processing plant total water consumption is recovered from the Tailings Storage Deposit N° 3 and pumped back to the plant for reuse in the process along with 30 % of fresh water.

18.9 Comments on Section 18

The majority of the infrastructure required to support the LOM plan is in place and is operational. Bateas is in the process of permitting a new underground waste storage facility. Increases in the capacity of the tailings storage facility are in progress to support the LOM plan.

19 Market Studies and Contracts

19.1 Market studies

The Caylloma Mine is an operating mine with concentrate sales contracts in place for 2019. As a result, market studies are not relevant to the operation.

In 2018, Bateas signed a contract with Trafigura Peru S.A.C. (Trafigura) to provide 20,400 wet tonnes of lead concentrate and a contract with Glencore to provide 38,800 wet tonnes of zinc concentrate. These quantities represent the estimated concentrate production of the Caylloma Mine from January to December 2019.

Projected metal prices used in the LOM and economic analysis are based on consensus estimates from multiple financial institutions on price behavior over the next 5 years.

In 2018, Fortuna entered into zero cost collars for an aggregate 6,000 t of zinc with a floor price of US$ 3,050/t and a cap price of US$ 3,300/t, maturing between November 2018 and June 2019. This payable price for zinc has been accounted for in the economic analysis.

Commercial terms entered between the buyer and Bateas are regarded as confidential, but are considered to be within standard industry norms.

19.2 Commodity price projections

The Fortuna financial department provides Bateas with metal price projections to be used in their analysis and as used in the Report. Fortuna established the pricing using a consensus approach based on long-term analyst and bank forecasts prepared in May 2018.

The QPs have reviewed the key input information, and considers that the data reflect a range of analyst predictions that are consistent with those used by industry peers. Based on these sources, price projections are considered acceptable as long-term consensus prices for use in mine planning and financial analyses for the Caylloma Mine in the context of this Report.

The long-term price forecasts that are applicable to the Caylloma Mine are summarized in Table 19.1.

Table 19.1 Long-term concensus commodity price projections

Commodity	2019	2020	2021	2022	2023	Average
Silver (US$/oz)	18.00	18.00	18.50	18.75	18.00	18.25
Gold (US$/oz)	1,320	1,330	1,310	1,350	1,300	1,320
Lead (US$/lb)	1.10	1.09	1.00	1.01	0.94	1.03
Zinc (US$/lb)	1.42	1.32	1.25	1.15	1.10	1.25

Bateas has used a Peruvian nuevo sol exchange rate of 3.30 soles to the US dollar for financial analysis purposes, which conforms with general industry-consensus.

19.3 Contracts

19.3.1 Lead concentrate

Trafigura has stipulated the specifications for lead concentrate to be delivered from Bateas in 2019, which are regarded to be within standard industry norms.

All parameters in the lead concentrate were found to be at, or within, specification limits as of the effective date of this Report.

19.3.2 Zinc concentrate

Glencore has stipulated the specifications for zinc concentrate to be delivered from Bateas in 2019, which are regarded to be within standard industry norms.

All parameters in the zinc concentrate were found to be at, or within, specification limits as of the effective date of this Report.

19.3.3 Operations

Bateas have seven major contracts for services relating to operations at the mine regarding mining activities, ground support, raise boring, drilling, transportation, plant and mine maintenance, explosives and civil works. Contracts are negotiated and renewed as needed. Contract terms are typical of similar contracts in Peru that Fortuna is familiar with.

19.4 Comments on Section 19

The QPs have reviewed the information provided by Fortuna on marketing, contracts, metal price projections and exchange rate forecasts, and note that the information provided is consistent with the source documents used, and that the information is consistent with what is publicly available on industry norms. The information can be used in mine planning and financial analyses for the Caylloma Mine in the context of this Report.

Long-term metal price assumptions used in the Report are based on a consensus of price forecasts for those metals estimated by numerous analysts and major banks. The analyst and bank forecasts are based on many factors that include historical experience, current spot prices, expectations of future market supply, and perceived demand. Over a number of years, the actual metal prices can change, either positively or negatively from what was earlier predicted. If the assumed long-term metal prices are not realized, this could have a negative impact on the operation's financial outcome. At the same time, higher than predicted metal prices could have a positive impact.

20 Environmental Studies, Permitting and Social or Community Impact

20.1 Environmental compliance and considerations

Bateas operates pursuant to environmental regulations and standards set out in Peruvian law, and are in compliance with all laws, regulations, norms and standards for each stage of the mine's operation.

The Caylloma operation (legally referred to as the Economic Management Unit of San Cristóbal) has fulfilled its Program for Environmental Compliance and Management (PAMA) requirements, as approved by the Directorial Resolution No. RD 087-97-EM/DGM dated June 3, 1997 as set out by the Ministry of Mines.

In 2006, PAMA identified a number of programs to complete in order for the operation to conform to regulations and standards. The main projects outlined in the PAMA program were: the construction of a retaining wall and vegetation of tailings facility No. 2, building of a retaining wall at the base of tailings facility No 3, as well as monitoring and treatment of mine water. All of which have been conducted by Bateas.

In 2002 the Ministry of Mines through the Mining Inspection Department conducted an audit of the programs specified in the PAMA document and approved on November 8, 2002 with a formal resolution 309-2002-EM/DGM RD.

The regulations required the approval of the mine closure plan, at a conceptual level, which was approved by WSF Directorial Resolution No. 328-207 MEM/AAM dated 10th December, 2007 by the Ministry of Mines.

The mine closure plan was approved by Executive Resolution No. 365-2009-MEM/AAM dated November 13, 2009. On November 12, 2012 Bateas filed a request for modification and update to the mine closure plan in accordance with mine closure regulations.

An Environmental Impact Study for the "Expansion of Mine and processing plant Huayllacho to 1,500 tpd from 1,030 tpd" was approved with Directorial Resolution 173-2011-MEM/AAM dated June 8, 2011.

The Ministry of Energy and Mines, by Resolution N° 351-2010-MEM-DGM/Vn dated September 9, 2010 authorized the use of Tailings Deposit N° 2 for tailings disposal.

On December 20, 2012, the Ministry of Energy and Mines, by Resolution N° 0274-2012 MEM/DG, authorized the use of Tailing Deposit N° 3 Stage 1A for tailings disposal up to the 4,410 masl elevation.

The upgrade of the mine closure plan was approved by Resolution N° 085-2013-MEM-AAM., dated March 22, 2013.

On September 2, 2013 by Resolution N° 459-2013-MEM/AAM., approved modification of Environmental Impact Study "Expansion of Mine and processing plant Huayllacho, project primary electric line SE Caylloma-Bateas 15 kV".

On September 30, 2014 by Resolution N° 492-3014-MEM-DGAAM., approved modification monitoring program – Point Monitoring water tailings, Tailing N°3 of the UEA San Cristobal.

On January 13, 2014, the Ministry of Energy and Mines, by Resolution N° 0015-2014-MEM-DGM/V., approved the South side elevation (from 4,470 to 4,474 masl) of the Deposit Tailings N° 2, pending the elevation and operation, of the north side of the facility.

On June 15, 2014, the Ministry of Energy and Mines, by Resolution N° 0216-2014-MEM-DGM_V, authorized the elevation and use of Tailings Deposit N° 3 Stage 1B up to the 4,415 masl elevation.

On July 3, 2015, the Ministry of Energy and Mines, by Resolution N° 0750-2015-MEM/DGM, approved the Bateas request to extend the "Huayllacho" concession area from 73.63 to 91.12 Ha to include some additional facilities.

On December 1, 2014, the Ministry of Energy and Mines, by Resolution 588-2014-MEM-DGAAM, approved the closure of 25 mining environmental liabilities from old operations located within the Bateas mining concessions.

On August 21, 2015, the Ministry of Energy and Mines, by Resolution N° 327-2015-MEM/AAM, approved the Mine Closure Plan modification requested by Bateas.

On April 8, 2015, the National Water Authority (ANA) by R. D. N° 0048-2015-ANA/AAA.XI-PA updated the authorization to use superficial water which covers the operational surface water demand.

On March 28, 2017, by Directorial Resolution No. 092-2017 MEM-DGAAM, the second modification of the Mine Closure Plan was approved.

On June 14, 2017, by Directorial Resolution No. 172-2017 MEM-DGAAM, the second modification of the Environmental Impact Study, for the Huayllacho Mining and Plant Expansion Project from 1,030 tpd to 1,500 tpd, was approved.

On December 19, 2017, by Directorial Resolution No. 355-2017 MEM-DGAAM, the modification of 9 components to the Mining Environmental Liabilities Closure Plan was approved.

On December 7, 2018, by Directorial Resolution No. 224-2018 MEM-DGAAM, the third modification of the Mine Closure Plan was approved.

In August 2012 Bateas submitted to the Ministry of Mines and Energy (MEM) its "Environmental Quality Standards and Maximum Acceptable Limits Implementation Plan" complying with the MEM requirements and deadlines. No observations were issued regarding this plan by the MEM.

On March 14, 2017, Bateas submitted by Letter No. 032-2017-GCB to the MEM, complementary information in regards to the "Integral Plan for the implementation of Maximum Acceptable Limits" for discharge of mining and metallurgical effluents in accordance with the updated Environmental Quality Standards for Water. Approval is pending as of the effective date of this Report.

20.2 Permitting

The major permits that have been granted to allow Bateas to operate at the Caylloma Mine are as follows:

- The Caylloma Mining Unit (Administrative Economic Unity St. Cristobal) was granted under the Ministry of Mines Resolution No. 139-89-EM-DGM/DCM. The required minimum investment has been made.

- The permit for mineral processing in the Caylloma District was granted by resolution of the Ministry of Mines dated October 21, 1908. This permit is permanent.
- Authorization of the treatment plant for operation was granted by Resolution No. 102-80-EM/DCFM, dated July 7, 1980. The permit is permanent.
- Authorization for direct discharge of effluent solids was granted on June 25, 2004 by Resolution No. 0744-2004-DIGESA/SA and is permanent.
- Authorization for the use of gasoline and diesel storage tanks was registered through resolution CDFJ No.001-04-2004, dated May 26, 2006. It is permanent.
- Authorization for the development of thermal power generation activities with energy above 500 kW was granted by order of the Ministry of Mines No. 391-2005-MEM/DM, dated September 12, 2005. The permit is permanent.
- The Tax Stability Agreement was granted for a period of ten years in relation to the investment plan detailed in the study of technical and economic feasibility (stability of the tax) through Executive Resolution No.370-2006 mine MEM-DGM, dated August 21, 2006.
- Authorization to restart activities in wastewater treatment plant was granted with issuance of resolution No.1078-2006-MEM-DGM/V, dated September 6, 2006. The permit is permanent.
- Directorial Resolution No. 1035-2007/DIGESA/SA of March 22, 2007, authorizes the usage of a sanitary system for domestic wastewater treatment and disposal in the ground, with permanent effect.
- Authorization for the Tailings Deposit N° 2 consistent with the approved mine closure plan through Resolution No. 351-2010-MEM-DGM/V.
- Authorization for the operation of the Huayllacho beneficiation plant was awarded by resolution of the Ministry of Mines PB-0015-2010/MEM-DGM-DTM, dated January 14, 2010. The permit is permanent.
- Authorization to operate the concentrator plant with an expanded capacity of 1,030 tpd was granted by resolution No. 007-2010-MEM-DGM/V, dated January 14, 2010. The permit is permanent.
- Authorization for the development of a 15-kV transmission was granted by order of the Ministry of Mines No. 052-2010-EM, dated August 21, 2010. The permit is permanent.
- Authorization for the Tailings Deposit N° 3 (Stage 1A, 4,410 masl) operation. Approved by Resolution N° 0274-2012 MEM/DG, dated December 20, 2012.
- Certificate of Non-Existence of Archaeological Remains of several components of the Caylloma mining unit, approved by CIRA No. 2012-172/MC, dated May 17, 2012.
- Authorization for the Tailings Deposit N° 2 embankment elevation (From 4,470 to 4,474 masl) approved by Resolution Nº 306-2013 MEM-DGM/V, dated August 9, 2013.

- Authorization for the Tailings Deposit N° 2 elevated embankment (South side) operation. Approved by Resolution No. 0015-2014 -MEM-DGM/V dated January 13, 2014.
- Authorization for the Tailings Deposit N° 3 (Stage 1B, 4,415 masl) operation. Approved by Resolution N° 0216-2014 MEM-DGM_V, dated June 15, 2014.
- Authorization for water effluent discharge sample point E-03. Approved by Resolution N° 040-2015-ANA-DGCRH, dated February 13, 2015. The authorization is valid until May 2019 and Bateas has submitted documentation required to renew the permit to the ministry and is awaiting approval.
- Authorization for the use of fresh (surficial) water. Approved by the ANA (Acronym in Spanish for National Water Authority) with Directorial Resolution N° 0048-2015 ANA/AAA.XI-PA, dated April 8, 2015.
- Authorization renewal for water effluent discharge sample points EF-3 and E-05. Approved by Resolution N° 123-2015-ANA-DGCRH, dated May 11, 2015. The authorization is valid for four years.
- Authorization for the processing plant construction and operation with increased capacity to 1,500 tpd. Approved by Resolution N° 0539-2015-MEM-DGM/V, dated November 4, 2015.
- Authorization renewal for an underground ANFO magazine by Resolution N°. 00614-2016-SUCAMEC/GEP, dated March 21, 2016.
- Authorization renewal for water effluent sampling points E-04, E-08 and E-12. Approved by Resolution N° 083-2016-ANA-DGCRH, dated April 25, 2016. The authorization is valid for four years.
- Authorization for disposing of treated industrial wastewater from tailings pond No. 3, approved by Directorial Resolution No. 071-2018 ANA-DCERH, dated April 24, 2018. The authorization is valid for six years.
- The 2017 Consolidated Annual Declaration was provided to the MEM with file No. 2825595 on June 18, 2018.
- The Mining Operation Certification (COM) No. 037-2019-C was approved on November 15, 2018.
- On December 7, 2018, the renewal of the authorization for the acquisition and use of explosives and related materials was obtained with the approval of Management Resolution No. 03129-2018-SUCAMEC/GEPP valid until December 31, 2019.
- On November 10, 2017 Resolution No. 1061-2017 MEM/DGM/V granted Bateas the right to civil works and auxiliary facilities required for the construction of the second stage of tailings disposal facility No 3, with construction divided into two sub-stages (Stage 2Ato a height of 4,419.50 masl and Stage 2B to 4,423.50 masl).

In addition to these norms and permits obtained from the environmental department, the operation also ensures all environmental activities are regularly monitored and recorded as part of the quality control measures that are presented to the Ministry of Energy and Mining and other legal regulatory organizations.

Of particular importance is monitoring of the quality of river water in the area. This activity involves monitoring the Santiago River, being the main river that passes through the property, employing people from the local communities to verify the results.

In the case of water monitoring, Bateas has eight points of control along the Santiago River. These sampling points were selected based on the likely discharge locations of the different levels of the mine and the concentrator plant. The samples obtained are sent to the ALS Global laboratories in Lima and Arequipa with the results being presented to representatives of the local community to confirm the water quality meets or exceeds the required standards.

Bateas has also obtained and maintains its ISO 14001 Environmental Management Certification since 2008. The mine works continually to improve its operational standards.

20.3 Social or community impact

Bateas has a very strong commitment to the development of neighboring communities of the Caylloma Mine. In this respect, Bateas is committed to sustainable projects, direct support and partnerships that build company engagement in local communities while respecting local values, customs and traditions. The company aims to develop projects or programs based on respect for ethno-cultural diversity, open communication and effective interaction with local stakeholders that improve education, health and infrastructure. These projects have included:

1. **Education**:
   i. Post-secondary Education Scholarship Program for outstanding students. The scholarship provides financial support for food, housing and student transportation expenses. In 2018, Bateas invested US$ 42,089 in this program, which benefited 22 students (20 from the Caylloma District and 2 from neighboring districts)
   ii. Technical Productive Training Center in Caylloma to improve productivity of local trades. The company donated equipment and funded the center operation. Approximately 40 students have received technical training in different industrial areas. Bateas investment in this project was US$ 74,848 in 2016
   iii. Supply of 1,200 school kits to children in elementary and primary schools in Caylloma in 2018
   iv. Support for the implementation of school libraries in the local communities of Taltahuarahuarco, Pusa Pusa, and Coraza in 2017
   v. Support for the educational "*Learn and grow*" program, developed in seven primary schools, benefiting more than 420 students achieve improvements in reading and mathematics. The program has received recognition from the Regional Education Management in Arequipa
2. **Health:**
   i. "Essential Measures for Children" project which helped families with children under three years of age and pregnant women to overcome factors

that influence and predispose children to chronic malnutrition and anemia. The project ran till 2016 and provided training in healthy eating habits and hygiene for schoolchildren in all schools in the district

ii. Inter-institutional Cooperation Agreement with the Regional Education Management and the Regional Health Management authorities to improve integral care services for the community. Two important programs were developed through this agreement:

   a. Improvement of the health center's equipment to benefit women and children

   b. The implementation of the "*Healthy Schools and Family*" program

iii. Project "*Family Health 2018*", involving the development of eight integrated health campaigns attended by up to 1,205 people. The program specialized in subjects including: general medicine; pediatrics; dentistry; laboratory; nutrition; and obstetrics. The program included the testing of 597 children for anemia with 249 children being identified as anemic and receiving treatment

iv. Handwashing campaign conducted in 2017 and 2018, where 750 oral and hand cleaning kits were delivered to children between the ages of 3 and 12 in primary and secondary schools of Caylloma

3. **Infrastructure:**

i. Construction and operation of a sanitary landfill for the town of Caylloma

ii. Garbage compactor truck donation

iii. Access and internal roads maintenance and improvements

iv. Trout farming infrastructure donation and operation support

v. Multipurpose complex for the town of Caylloma

vi. Donation for the construction of the Mariscal Street in Caylloma at a cost of US$ 45,455

vii. Construction of an armory for the Caylloma District Police at a cost of US$ 4,200

viii. Construction of hygiene facilities at the parish church hall in the Caylloma District at a total cost of US$ 17,471

ix. Construction of dining facilities in the primary school of Taltahuarahuarco at a cost of US$ 1,979

x. Donation of materials for improving public lighting in the town center of Caylloma as a cost of US$ 7,510

xi. Construction of six ponds for the recovery of natural grass in the Taltahuarahuarco annex at a cost of US$ 19,000

4. **Development**

i. Breeding program of South American camelids; benefiting 303 farmers. The program treated 54,000 animals that were given vitamins and anti-parasite drugs

ii. As of the effective date of this Report, 467 modules for alpacas have been acquired, which include livestock nets. Each module represents 10,000 m², with a US$ 303,030 investment resulting in the recovery of 467 ha of natural grassland

In 2018 Bateas allocated US$ 0.3 million to community support activities, increasing this commitment to US$ 1.5 million in June 2018, as part of a social agreement fund to be paid until 2020.

The increased employment that the mine brings to the area has resulted in the generation of secondary and tertiary employment through companies which provide different services to the operation. This has a significant positive economic impact in the area.

20.4 Mine closure

Mine closure is also included in the environmental program. For 2019 a total of US$ 655,000 has been budgeted for the ongoing closure plan and environmental liabilities. The closure plan is performed to ensure compliance with the programs and plans submitted to the MEM. A breakdown of the budgeted mine closure costs for the LOM are presented in Table 20.1 and totals US$ 11.3 million.

Table 20.1 Mine closure budget

Item	2019	2020	2021	2022	2023	Total
Budget (US$000)	655	405	380	4,950	4,920	11,311

20.5 Comment on Section 20

It is the opinion of the QPs that the appropriate environmental, social and community impact studies have been conducted to date at the Caylloma Mine. Bateas have maintained all necessary permits to support mining activities.

21 Capital and Operating Costs

Caylloma Mine is a producing operation managed by Bateas having mined underground continuously since 2006. Capital and operating cost estimates are based on the established cost experience gained from the operation, projected budgets, and quotes from manufacturers and suppliers. Overall, the cost estimation is of sufficient detail that, with the current experience at Bateas, Mineral Reserves can be declared. The analysis includes forward estimates for sustaining capital. Inflation is not included in the cost projections and exchange rates were estimated at S/3.30 (Peruvian Soles) to one US dollar.

21.1 Sustaining capital costs

Projected capital costs for the Caylloma Mine LOM are summarized in Table 21.1.

Table 21.1 Summary of projected major capital costs for the LOM

Capital Cost Item (MUS$)*	2019	2020	2021	2022	2023
Development	5.51	3.14	2.84	1.67	1.07
Brownfields	0.80	0.00	0.00	0.00	0.00
Infill	0.48	0.50	0.50	0.50	0.50
Mine Development & Brownfields	**6.79**	**3.64**	**3.34**	**2.17**	**1.57**
Mine	2.54	1.45	0.23	0.39	0.25
Plant	0.52	0.14	0.22	0.40	0.10
Tailings dam	0.00	0.03	4.50	0.00	0.00
Maintenance and Energy	0.23	2.66	1.13	0.31	0.06
General services	0.68	0.62	0.41	0.29	0.00
Equipment and Infrastructure	**3.97**	**4.90**	**6.49**	**1.39**	**0.41**
Mine Closure & Site Rehabilitation	**0.66**	**0.41**	**0.38**	**4.95**	**4.92**
Total Capital Expenditure	**11.42**	**8.95**	**10.21**	**8.50**	**6.90**
*Numbers may not total due to rounding					

Capital costs include all investments in mine development, equipment and infrastructure necessary to maintain the mine facilities and sustain the continuity of the operation. Capital costs are split into three main areas; mine development and Brownfields; equipment and infrastructure; and mine closure and site rehabilitation.

21.1.1 Mine development

Mine development includes the main development and infrastructure of the mine through the generation of ramps, ore and waste shafts, ventilation shafts, and level extraction. It also includes the development of drives for Brownfield exploration to allow investigation of areas that are inaccessible from the surface. Infill delineation drilling is included under mine development costs as this activity has the objective of increasing the confidence in currently defined Mineral Resources. Capital costs for the mine are higher in the next two years due to a US$ 1.5 million investment proposed in 2019 to improve the pumping system and proposed improvements to power lines planned for 2020.

21.1.2 Equipment and infrastructure

Equipment and infrastructure costs are attributed to all departments of the mine including: mine, plant, tailing facilities, maintenance and energy, safety, information technology, administration and human resources, logistic, camps, geology, planning, laboratory and environmental.

21.1.3 Mine closure and rehabilitation

Mine closure costs are attributed to site rehabilitation costs required to remediate the area where the mine is located and to meet mine closure requirements.

21.2 Operating costs

Projected operating costs for the LOM are detailed in Table 21.2.

Table 21.2 Life-of-mine operating costs

Area	Units	2019	2020	2021	2022	2023
Mine	US$/t	41.3	41.3	40.3	38.1	37.7
Plant	US$/t	14.6	14.6	14.6	14.6	14.6
General Services	US$/t	10.8	10.8	10.8	10.8	10.8
Administrative Services	US$/t	8.7	8.7	8.7	8.7	8.7
Management Fee	US$/t	0.7	0.7	0.7	0.7	0.7
Distribution	US$/t	6.2	5.6	5.0	5.2	5.9
Community Support Activities	US$/t	1.8	1.7	0.6	0.6	0.6
Total	**US$/t**	**84.2**	**83.4**	**80.7**	**78.7**	**79.0**

Operating costs include the site costs and other operating expenses for the operation. These operating costs are analyzed on a functional basis and the cost structure is not similar to the operating costs reported by financial statements of Fortuna Silver Mines Inc. The site costs relate to activities that are performed on the property including mine, plant, general services, and administrative service costs. The other operating expenses include costs associated with distribution, management, and community support activities.

21.3 Comment on Section 21

The capital and operating cost provisions for the LOM plan that supports Mineral Reserves have been reviewed. The basis for the estimates is appropriate for the known mineralization, mining and production schedules, marketing plans, and equipment replacement and maintenance requirements.

The QP considers the capital and operating costs estimated for the Caylloma Mine as reasonable based on industry-standard practices and actual costs observed for 2018.

22 Economic Analysis

22.1 Economic analysis

Fortuna is using the provision for producing issuers, whereby producing issuers may exclude the information required under Item 22 for technical reports on properties currently in production and where no material production expansion is planned.

Mineral Reserve declaration is supported by a positive cashflow.

22.2 Comments on Section 22

An economic analysis was performed in support of estimation of the Mineral Reserves; this indicated a positive cashflow for the period set out in the LOM using the assumptions detailed in this Report.

23 Adjacent Properties

This section is not relevant to this Report.

24 Other Relevant Data and Information

This section is not relevant to this Report.

25 Interpretation and Conclusions

The QPs note the following interpretations and conclusions in their respective areas of expertise, based on the review of data available for this Report.

25.1 Mineral tenure, surface rights, water rights, royalties and agreements

Fortuna was provided with a legal opinion that supports that the mining tenure held by Bateas for the Caylloma Mine is valid and that Fortuna has a legal right to mine the deposit.

The mineral tenement holdings cover 66 mining concessions for a total surface area of 34,472 hectares (ha). In Peru, mining concessions do not have expiration dates but an annual fee must be paid to retain the concessions in good standing. Bateas states that all fees are up to date and the concessions are all in good standing.

Bateas has signed 21 surface right or easement contracts covering a total of 3,529.89 ha with land owners to cover the surface area needed for the operation and tailings facilities.

The Caylloma Mine is subject to a 2% NSR royalty payable to Lemuria Royalties Corp. which is applied after not less than a total of 21 million ounces of silver have been recovered from certain mineral concessions. As of December 31, 2018, Bateas has produced a total of 18.1 million troy ounces of silver; therefore, this royalty condition has not yet been met.

In addition to this, holders of mineral concessions are obliged to pay to the Peruvian Government, a mining royalty, as a consideration for the exploitation of metallic natural resources. The mining royalty is calculated based on quarterly operating profit.

The mineral concession holder is also obliged to pay the Special Tax on Mining (Impuesto Especial a la Minería), which taxes their operating income arising from the sale of metallic natural resources on, or originating from the estate in which they operate. The tax base of the Special Tax on Mining is from the quarterly operating profit of the mining concession holder.

25.2 Geology and mineralization

The mine is within the historical mining district of Caylloma, northwest of the Caylloma caldera complex and southwest of the Chonta caldera complex. Host rocks at the Caylloma Mine are volcanic in nature, belonging to the Tacaza Group. Mineralization is in the form of low to intermediate sulfidation epithermal vein systems.

Epithermal veins at the Caylloma Mine are characterized by minerals such as pyrite, sphalerite, galena, chalcopyrite, marcasite, native gold, stibnite, argentopyrite, and silver-bearing sulfosalts (tetrahedrite, polybasite, pyrargyrite, stephanite, stromeyerite, jalpite, miargyrite and bournonite). These are accompanied by gangue minerals, such as quartz, rhodonite, rhodochrosite, johannsenite (manganese-pyroxene) and calcite.

There are two different types of mineralization at Caylloma; the first is comprised of silver-rich veins with low concentrations of base metals and includes the Bateas, Bateas Techo, La Plata, Cimoide La Plata, San Cristobal, San Pedro, San Carlos, Paralela, and Ramal Paralela veins. The second type of vein is polymetallic in nature with elevated lead, zinc, copper, silver and gold grades and includes the Animas, Animas NE, Santa Catalina, Soledad, Silvia, Pilar, Patricia, and Nancy veins.

Underground operations are presently focused on mining the Animas and Animas NE veins.

25.3 Exploration, drilling and analytical data collection in support of Mineral Resource estimation

Drill holes drilled under Bateas management in the period 2005 to 2018 have data collected using industry-standard practices. Drill orientations are appropriate to the orientation of the mineralization and core logging meets industry standards for exploration of an epithermal-style deposit.

Geotechnical logging is sufficient to support Mineral Resource estimation with the data having been having been used to support detailed mine planning for the underground mine for the last seven years of operation.

Collar and downhole surveys have been performed using industry-standard instrumentation. Any uncertainties in survey information have been incorporated into subsequent resource confidence category classification.

All collection, splitting, and bagging of channel and core samples were carried out by Bateas personnel since 2005 representing 96 % of all information collected at the mine. No material factors were identified with the drilling programs that could affect Mineral Resource or Mineral Reserve estimation.

Sample preparation and assaying for samples that support Mineral Resource estimation has followed approximately similar procedures for most drill programs since 2005. The preparation and assay procedures are adequate for the type of deposit, and follow industry standard practices.

Sample security procedures met industry standards at the time the samples were collected. Current core and pulp sample storage procedures and storage areas are consistent with industry standards.

Fortuna has conducted regular audits and verification of all information used in the most recent Mineral Resource and Mineral Reserve estimates to support the assumptions. The verification process focused on the database; collars and downhole surveys; lithological logs; assays; bulk density measurements, core recovery, and QAQC results. Fortuna checked all collar and downhole survey information for each campaign against source documentation and completed a hand-held GPS survey of randomly selected drill hole collars. The results showed a good agreement with locations in the database.

The QP is of the opinion that the data verification programs performed on the data collected from the mine are adequate to support the geological interpretations, the analytical and database quality, and Mineral Resource estimation at the Caylloma Mine. This conclusion is based on the following:

- No material sample biases were identified from the QAQC programs. Analytical data that were considered marginal were accounted for in the resource classifications
- Sample data collected adequately reflect deposit dimensions, true widths of mineralization, and the style of the deposits

- Quarterly reviews of the database producing independent assessments of the database quality. No significant problems with the database, sampling protocols, flowsheets, check analysis program, or data storage were noted
- Bateas compiled and maintains a relational database for the Caylloma Mine which contains all collar, assay, density, survey and lithology information as well as all associated QAQC data
- Drill hole and channel collar and downhole surveys are conducted using standard industry techniques
- All geologic and assay data is electronically collected and imported into the database eliminating the potential for transcription errors
- Drill data is verified prior to Mineral Resource estimation, by running a software program check
- Estimation methodology is verified by a QP with each stage being reviewed and checklists completed
- Quarterly mine reconciliation reports monitor the performance of the resource and reserve block model estimates and indicate a high level of accuracy with production results typically within ±15 %

The QP has personally verified data used in the Mineral Resource estimation, including the database, collars and downhole surveys, geological logs and assays, metallurgical recoveries, estimation parameters, and mine reconciliation.

25.4 Metallurgical testwork

It is the opinion of the QP that the Caylloma Mine has an extensive body of metallurgical investigation focused primarily on testwork conducted while treating ore at the operation since 2006. In the opinion of the QP, the Caylloma metallurgical samples tested and the ore that is presently treated in the plant is representative of the orebody as a whole in respect to grade and metallurgical response. Differences between vein systems are minimal with regard to recovery.

Until 2012 ore identified as containing high zinc oxide content was classified as not amenable for flotation. Laboratory and plant tests have been conducted since 2013 including metallurgical testing of material from the different levels of the Animas vein. The main conclusion was that zinc oxide contents greater than 0.20 % within the ore were related to lower metallurgical recoveries. In order to include this type of ore without affecting the metallurgical recoveries blending has to be performed to limit the high zinc oxide ore content to no more than 5 % of the feed to the plant.

Metallurgical recovery values forecast in the LOM for sulfide material average 84 % for silver, 17 % for gold, 91 % for lead, and 90 % for zinc with the exception of the Ramal Piso Carolina vein that forecasts a metallurgical recovery rate of 75 % for Au. Metallurgical recovery is forecast for zinc oxide material to average 57 % for silver, 17 % for gold, 57 % for lead, and 35 % for zinc.

Beyond the loss in metallurgical recovery related to elevated zinc oxide material, as described above, there are no additional deleterious elements that require special treatment in the plant as of the effective date of this Report.

25.5 Mineral Resource estimation

The 2018 Mineral Resource update has relied on channel and drill hole sample information obtained by Bateas since 2005. Mineralized domains identifying potentially economically extractable material were modeled for each vein and used to code drill holes and channel samples for geostatistical analysis, block modeling and grade interpolation by ordinary kriging or inverse distance weighting.

Economic values (NSR) for each mining block take into account the commercial terms of 2019, the average metallurgical recovery, the average grade in concentrate and long term projected metal prices. Mineral Resources have been reported above a US$ 50/t NSR cut-off value for veins wider than two meters and amenable to extraction by semi-mechanized mining methods (Animas, Animas NE, Nancy, and San Cristobal veins); or above a US$ 135/t NSR cut-off value for veins narrower than two meters regarded as amenable to conventional mining methods (all other veins).

Mineral Resources are categorized as Measured, Indicated or Inferred. The criteria used for classification includes the number of samples, spatial distribution, distance to block centroid, KE and ZZ.

The QP is of the opinion that the Mineral Resources have been estimated using standard industry practices, and conform to the requirements of CIM (2003). The Mineral Resources are acceptable to support the declaration of Mineral Reserves.

Furthermore, it is the opinion of the QP that by the application of US$ value for each metal taking into consideration projected commercial terms, the average metallurgical recovery, average grade in concentrate and long-term metal prices as well as the exclusion of Mineral Resources identified as being isolated or economically unviable, the Mineral Resources have 'reasonable prospects for eventual economic extraction'.

25.6 Mineral Reserve estimation

The Mineral Reserve estimation procedure for Caylloma is defined as follows:

- Review of Mineral Resources
- Identification and removal of inaccessible Mineral Resources to account for recovery based on current mining practices observed from January 2018 including crown pillars and isolated areas
- Set Inferred Mineral Resources to waste
- Dilution of tonnages and grades for each vein based on dilution factors calculated by the planning department based on operational observations from July 2017
- After obtaining the resources with diluted tonnages and grades, the value per tonne of each block is determined based on metal prices and metallurgical recoveries for each metal and recorded as an NSR value (US$/t)
- A breakeven cut-off grade is determined for each vein based on operational costs for mining, processing, administration, commercial, and general administrative costs (total operating cost in US$/t). If the NSR value of the block is higher than the breakeven cut-off grade, the block is considered a Mineral Reserve, otherwise it is considered as either Mineral Resource exclusive of reserve, or waste

- Depletion of Mineral Reserves relating to operational extraction between September 1 and December 31, 2018
- Reconciliation of the reserve block model against mine production between September 1 and December 31, 2018 to confirm estimation parameters
- Mineral Reserve tabulation and reporting as of December 31, 2018

Each vein has a different operating cost; therefore, Mineral Reserve evaluation was performed for each individual vein.

Mineral Reserves will support a four-year and 10-month LOM considering 350 days in the year for production and a capacity rate of 1,500 tpd. The expectation based on an optimized production schedule is for an annual average production of approximately 1 Moz of silver and 10 kt of lead and 17 kt of zinc.

The conversion of Mineral Resources to Mineral Reserves was undertaken using industry recognized methods, actual operational costs, capital costs, and plant performance data. Thus, it is considered to be representative of future operational conditions. This Report has been prepared with the latest information regarding environmental and closure cost requirements.

25.7 Mine plan

Mining at Caylloma is conducted by contractors based on conventional overhand cut-and-fill using mechanized, semi-mechanized and conventional extraction methodologies.

Since October 2006 Bateas has successfully managed the underground operation of the Caylloma Mine, processing over 5.3 Mt of ore and producing 18 Moz of silver, 23 koz of gold, 117 kt of lead, and 163 kt of zinc as of December 31, 2018. During this period considerable investment has been made to improve the processing plant, develop the underground infrastructure, and increase the capacity of the tailings facilities.

The QP is of the opinion that:

- The mining method being used is appropriate for the deposit being mined. The underground mine design, stockpiles, tailings facilities, and equipment fleet selection are appropriate for the operation
- The mine plan is based on historical mining and planning methods practiced at the operation for the previous twelve years, and presents low risk
- Inferred Resources are not included in the mine plan
- The mobile equipment fleet presented is based on the actual mining operations, which is known to achieve the production targets set out in the LOM
- All mine infrastructure and supporting facilities meet the needs of the current mine plan and production rate

25.8 Recovery

The current process plant design is split into four principal stages including; crushing; milling; flotation; and thickening, filtering, shipping.

The QP considers process requirements to be well understood, and consistent based on the actual observed conditions in the operating plant. There is no indication that the characteristics of the material being mined will change and therefore the recovery assumptions applied for future mining are considered as reasonable for the LOM.

25.9 Infrastructure

The QP is confident that all mine and process infrastructure and supporting facilities are included in the present general layout to ensure that they meet the needs of the mine plan and production rate and notes that:

- The Caylloma Mine is located 225 km, or 5 hours by road from the city of Arequipa, the main service center for the operation, with good year-round access
- The mine site infrastructure has a footprint of 91.12 ha associated with the Huayllacho beneficiation concession
- An expansion to the tailings facility was completed in January 2019, with a second phase planned for construction in 2021, providing sufficient capacity for the LOM
- Power demand on the mine site is 5.5 MW provided mainly (96 %) through the national power grid and two diesel generators on site to cover the shortfall and provide backup
- Water demand at the Caylloma Mine is 60 l/s, including 10 l/s for the camp. Approximately 70 % of the processing plant total water consumption is recovered from tailings facility N° 3 with the other 30 % from fresh water provided by the Santiago River
- All process buildings, offices, and camp facilities for operating the mine have been constructed

25.10 Markets and contracts

Since the operation commenced production in October 2006 a corporate decision was made to sell the concentrate on the open market. In order to get the best commercial terms for the concentrates, it is Fortuna's policy to sign contracts for periods no longer than one year. All commercial terms entered between the buyer and Bateas are regarded confidential, but are considered to be within standard industry norms.

The QP has reviewed the information provided by Fortuna on marketing, contracts, metal price projections and exchange rate forecasts and notes that the information provided support the assumptions used in this Report and are consistent with the source documents, and that the information is consistent with what is publicly available within industry norms.

25.11 Environmental, permitting and social considerations

The mining operation has been developed under strict compliance of norms and permits required by public institutions associated with the mining sector. Furthermore, all work follows quality and safety international norms as set out in ISO 14001 and OHSAS 18000.

In addition to these norms and permits obtained from the environmental department, the operation also ensures all environmental activities are regularly monitored and recorded as part of the quality control measures that are presented to the Ministry of Energy and Mining (MEM) and other legal regulatory organizations.

Of particular importance is monitoring of the quality of river water in the area. This activity involves monitoring the Santiago River, being the main river that passes through the property, employing people from the local communities to verify the results.

Bateas has a very strong commitment to the development of neighboring communities of the Caylloma Mine. In this respect, Bateas is committed to sustainable projects, direct support and partnerships that build company engagement in local communities while respecting local values, customs and traditions. The company aims to develop projects or programs based on respect for ethno-cultural diversity, open communication and effective interaction with local stakeholders that improve Education, health and infrastructure.

Mine closure is also included in the environmental program. For 2019 a total of US$ 655,000 has been budgeted for the ongoing closure plan and environmental liabilities. The closure plan is performed to ensure compliance with the programs and plans submitted to the MEM. Budgeted mine closure costs for the LOM total US$ 11.3 million.

It is the opinion of the QPs that the appropriate environmental, social and community impact studies have been conducted to date at the Caylloma Mine. Bateas have maintained all necessary environmental permits that are prerequisite for operation of project infrastructure and the maintenance of mining activities.

25.12 Capital and operating costs

Capital and operating cost estimates are based on established cost experience gained from current operations, projected budget data and quotes from manufacturers and suppliers.

The capital and operating cost provisions for the LOM plan that supports Mineral Reserves have been reviewed. The basis for the estimates is appropriate for the known mineralization, mining and production schedules, marketing plans, and equipment replacement and maintenance requirements.

The QP considers the capital and operating costs estimated for the Caylloma Mine as reasonable based on industry-standard practices and actual costs observed for 2018.

25.13 Economic analysis

Fortuna is using the provision for producing issuers, whereby producing issuers may exclude the information required under Item 22 for technical reports on properties currently in production and where no material production expansion is planned.

Mineral Reserve declaration is supported by a positive cashflow for the period set out in the LOM based on the assumptions detailed in this Report.

25.14 Risks and opportunities

A number of opportunities and risks were identified by the QPs during the evaluation of the Caylloma Mine.

Opportunities include:

- Reduction in backfill costs through the optimization of the backfilling methodology in order to improve mining productivity by reducing work cycle times

- Reduction in mining costs via improvements in the underground communication system which would allow for faster and more efficient decision making, improve logistical coordination, and reduce downtime, hence improve overall mining productivity
- Reduction in overall pumping costs through improvements to the mine dewatering system resulting in reduced power consumption and maintenance requirements
- Potential to expand current resources through exploration of the Animas NE vein with mineralization remaining open to the northeast and at depth

Risks include:

- Bateas management occasionally receives requests from local authorities and/or civil organizations regarding unrealistic social expectations. Bateas are mitigating the risk of conflict regarding these demands by working with local authorities, land owners, and communities to address expectation levels and to take requests into account in preparing its annual community relations work program and budget

26 Recommendations

Recommendations for the next phase of work have been broken into those related to ongoing exploration activities and those related to additional technical studies focused on operational improvements. Recommended work programs are independent of each other and can be conducted concurrently unless otherwise stated. The exploration phase is estimated to cost US$ 521,000 with additional technical studies estimated to cost US$ 280,000 if not conducted in-house.

26.1 Exploration

- It is recommended that Bateas continue surface mapping and TerraSpec analysis of key areas of interest including Animas, Antacollo, and Antimonio to identify potential future drill targets. The budgeted cost of the surface mapping activities for 2019 is US$ 36,000 (excluding personnel costs).
- Bateas is planning to continue the delineation drilling from underground in 2019 focusing on the junction between the Animas and Animas NE vein at depth. A total of 3,830 m of drilling and 55 m of development drift is planned at a budgeted total cost of US$ 480,000.
- It is recommended that the number of bulk density measurements by increased in veins that lack sufficient values for meaningful statistical analysis. In addition to this it is also recommended that a study be performed to improve the understanding of bulk density in the deposit. If a correlation between density and mineralogy could be established it may provide a superior alternative than the presently used density assignment methodology. This program is estimated at US$ 5,000.

26.2 Technical and operational

A number of additional studies are recommended to improve estimates as well as operational decision making and mining costs

- **Underground communication system.** In 2019 it is recommended that the first phase of an improved underground communication system be installed to connect key areas of the mine at a budgeted cost of US$ 40,000. Based on positive results from the first phase the system could be extended throughout the mine to reach other production and production related areas.

- **Backfill system optimization.** It is recommended that an evaluation of the backfilling system is conducted at the operation. A trade off analysis should be conducted to benchmark the current hydraulic backfill system against alternative methods. The study should investigate the potential impacts on OPEX and CAPEX. The budgeted cost of the study is US$ 70,000.

- **Review of mining methodology.** The width of mineralization and rock quality varies greatly throughout the deposit. It is recommended that an evaluation of mining method be conducted to assess if smaller equipment could be used to extract mineralized material from narrow veins with poor rock quality, and if more massive mining methods such as long-hole stoping could be employed in wide veins with good rock quality. Any such study would need to account for the variable equipment that would be required to deal with multiple mining methods.

The study could be conducted inhouse or externally, with an external cost estimated at US$ 50,000.

- **Plant expansion conceptual study.** A conceptual cost-benefit analysis is recommended to assess if the production rate at the Caylloma plant could be increased to reduce costs. The study could be conducted inhouse or externally, with an external cost estimated at US$ 120,000.
- **Zinc oxide study.** The response of zinc oxide material to the flotation process requires additional testwork. Initial plant testwork indicates that this material can be blended with low zinc oxide material and processed through flotation without a significant loss in recovery, although the percentage blend at which the zinc oxide becomes detrimental has not been established. It is recommended that inhouse analysis be conducted to assess the impact of varying levels of zinc oxide on plant recovery to determine a blending threshold at which recovery is not affected.

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Certificates

CERTIFICATE of QUALIFIED PERSON

(a) I, Eric Chapman, Vice President of Technical Services for Fortuna Silver Mines Inc., 650-200 Burrard St, Vancouver, BC, V6C 3L6 Canada; do hereby certify that:

(b) I am the co-author of the technical report titled "Fortuna Silver Mines Inc. Caylloma Mine, Caylloma District, Peru" that has an effective date of March 8, 2019 (the "Technical Report").

(c) I graduated with a Bachelor of Science (Honours) Degree in Geology from the University of Southampton (UK) in 1996 and a Master of Science (Distinction) Degree in Mining Geology from the Camborne School of Mines (UK) in 2003. I am a Professional Geologist of the Association of Professional Engineers and Geoscientists of the Province of British Columbia (Registration No. 36328) and a Chartered Geologist of the Geological Society of London (Membership No. 1007330). I have been practicing as a geoscientist and preparing resource estimates for approximately fifteen years and have completed more than twenty resource estimates for a variety of deposit types such as epithermal gold/silver veins, porphyry gold deposits, banded iron formations and volcanogenic massive sulfide deposits. I have completed at least eight Mineral Resource estimates for polymetallic projects over the past seven years.

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").

(d) I last visited the mine on from November 5, 2018 for two days;

(e) I am responsible for the preparation of sections 1.1 to 1.6, 1.8, 1.18.1, 2 to 12, 14, 25.1 to 25.3, 25.5, and 26.1.

(f) I am not independent of Fortuna Silver Mines Inc ("Fortuna") as independence is described by Section 1.5 of NI 43–101. I am a Fortuna employee.

(g) I have been an employee of Fortuna and involved with the mine that is the subject of the Technical Report since May 2011.

(h) I have read NI 43–101 and Form 43-101F1, and the sections of the Technical Report for which I am responsible have been prepared in compliance with that Instrument and Form.

(i) 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 the Technical Report not misleading.

Dated at Vancouver, BC, this 28th day of March 2019.

[signed]

Eric Chapman, P. Geo.

CERTIFICATE of QUALIFIED PERSON

(a) I, Amri Sinuhaji, Technical Services Director – Mine Planning of Fortuna Silver Mines Inc., 650-200 Burrard St, Vancouver, BC, V6C 3L6 Canada; do hereby certify that:

(b) I am the co-author of the technical report titled "Fortuna Silver Mines Inc. Caylloma Mine, Caylloma District, Peru" that has an effective date of March 8, 2019 (the "Technical Report").

(c) I graduated with a Bachelor of Science Degree in Mining from UPN Veteran Jogjakarta, Jogjakarta, Indonesia in 1997. In addition, I obtained a Master of Science Degree in Mining Engineering from the University of Arizona, USA, in 2007. I am a Professional Engineer of the Association of Professional Engineers and Geoscientists of the Province of British Columbia (Registration No.48305). I have practiced my profession for 23 years. My experience has covered various operational, technical, managerial and consultancy functions on early stage projects through to producing mines in Peru, Chile, Argentina, Australia, Mongolia, Indonesia, Canada, United States of America, and Mexico.

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").

(d) I last visited the mine on February 26, 2019 for three days;

(e) I am responsible for the preparation of sections 1.7, 1.9 to 1.17, 1.18.2, 13, 15 to 24, 25.4, 25.6 to 25.14, and 26.2.

(f) I am not independent of Fortuna Silver Mines Inc ("Fortuna") as independence is described by Section 1.5 of NI 43–101. I am a Fortuna employee.

(g) I have been an employee of Fortuna and involved with the mine that is the subject of the Technical Report since October 2018.

(h) I have read NI 43–101 and Form 43-101F1, and the sections of the Technical Report for which I am responsible have been prepared in compliance with that Instrument and Form.

(i) 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 the Technical Report not misleading.

Dated at Vancouver, Canada, this 28th day of March 2019.

[signed]

Amri Sinuhaji, P. Eng.