FORTUNA
SILVER MINES INC.

TO: British Columbia Securities Commission
Alberta Securities Commission
Manitoba Securities Commission
Ontario Securities Commission

April 15, 2013

Re: Filing of Amended Technical Report

The technical report entitled "Fortuna Silver Mines Inc.: Caylloma Property, Caylloma District, Peru" dated as of March 22, 2013 (the "Technical Report") and prepared for Fortuna Silver Mines Inc. was filed on SEDAR on March 26, 2013.

This amended version of the Technical Report is being filed in order to correct clerical errors in Table 15.8 thereof as follows:

- In the Proven category, numbers provided for "Animas (Oxide)" apply to "Animas NE (Sulfide)" and vice-versa; and
- In the Probable category, numbers provided for "Animas (Oxide)" apply to "Animas NE (Sulfide)" and vice-versa.

No other changes have been made to the Technical Report and the effective date of the Technical Report remains March 22, 2013.

"Eric N. Chapman"
Eric N. Chapman, P.Geo., C. Geol. (FGS)
Mineral Resource Manager – Fortuna Silver Mines Inc.

"Thomas Kelly"
Thomas Kelly, E.M. Fellow AusIMM, Registered Member SME
Director – Fortuna Silver Mines Inc.

FORTUNA
SILVER MINES INC.

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

Amended Technical Report
Effective Date: March 22, 2013
Original Report Date: March 22, 2013
Amended Report Date: April 15, 2013

Prepared by

Eric Chapman, P.Geo.
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Date and Signature Page

Technical Report

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

Effective date of this report is March 22, 2013

Issued by:

Fortuna Silver Mines Inc.

Eric N. Chapman	15th April 2013
[signed and sealed]	Date

Thomas Kelly	15th April 2013
[signed]	Date

Tables

Figures

1 Summary

This Technical Report refers to the Caylloma property, an operating underground mine located in the Caylloma Province, Peru. Since June 2005, the Caylloma property has been 100 % owned by Minera Bateas S.A.C. (Minera Bateas), a Peruvian subsidiary of Fortuna Silver Mines Inc. (Fortuna).

The Caylloma property is located in the Caylloma Mining District, 225 kilometers north-northwest of Arequipa, Peru. The property 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 property 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 property 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 Cristóbal, 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 Bateas veins. Exploration in 2012 focused on the expansion and delineation of the Animas and Animas NE veins as well as the exploration of the recently discovered Nancy vein.

The 2012 Mineral Resource update has relied on channel and drill hole sample information obtained by Minera 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.

Mineral Resource and Mineral Reserve estimates for the Caylloma property are reported as of December 31, 2012 and detailed in Table 1.1 and Table 1.2.

Economic values (NSR) for each mining block take into account the commercial terms of 2012, the average metallurgical recovery, the average grade in concentrate and long term projected metal prices. Mineral Reserves have been reported above a break-even cut-off value calculated for each vein, based on NSR values and operating costs. Mineral Resources have been reported above a US$30/t cut-off value based on NSR values.

Mineral Resources are categorized as Measured, Indicated and 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 Reserve estimates have considered only Measured and Indicated Mineral Resources as only these categories have sufficient geological confidence to be considered Mineral Reserves (CIM, 2010). Subject to the application of certain economic and mining-related qualifying factors, Measured Resources may become Proven Reserves and Indicated Resources may become Probable Reserves.

Table 1.1 Mineral Reserves as of December 31, 2012

Vein type	Category	Tonnes (000)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Metal	
							Ag (Moz)	Au (koz)
Silver Veins	Proven	11	872	0.06	0.43	0.64	0.3	0.0
	Probable	246	386	0.96	0.31	0.51	3.1	7.6
	Proven +Probable	257	407	0.93	0.31	0.51	3.4	7.7
Polymetallic Veins	Proven	1,242	92	0.33	1.48	2.20	3.7	13.2
	Probable	2,809	121	0.33	1.66	2.27	10.9	30.2
	Proven +Probable	4,052	112	0.33	1.60	2.25	14.6	43.4
Combined-All Veins	Proven	1,253	99	0.33	1.47	2.19	4.0	13.2
	Probable	3,055	142	0.38	1.55	2.13	14.0	37.8
	Proven +Probable	4,308	130	0.37	1.52	2.15	17.9	51.1

Table 1.2 Mineral Resources as of December 31, 2012

Category	Tonnes (000)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Metal	
						Ag (Moz)	Ag (Moz)
Measured	431	72	0.30	0.88	1.53	1.0	4.2
Indicated	1,170	82	0.34	0.75	1.40	3.1	12.8
Measured + Indicated	1,601	79	0.33	0.79	1.43	4.1	17.0
Inferred	6,633	101	0.27	1.84	2.58	21.5	58.5

Notes

- Mineral Reserves and Mineral Resources are as defined by CIM Definition Standards on 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
- There are no known legal, political, environmental, or other risks that could materially affect the potential development of the Mineral Resources or Mineral Reserves at Caylloma or San Jose.
- Mineral Resources and Mineral Reserves are estimated as of June 30, 2012 and reported as of December 31, 2012 taking into account production-related depletion for the period of July 1, 2012 through December 31, 2012 with the exception of the Animas and Animas NE veins which were re-estimated using all exploration drilling information as of December 31, 2012
- Mineral Reserves are reported above a NSR breakeven cut-off of US$74.69/t for Animas, Animas NE, and San Cristóbal; US$226.77/t for Bateas, Cimoide La Plata, and La Plata; US$138.34/t for Soledad, Silvia, and Santa Catalina
- Mineral Resources are reported above a NSR cut-off of US$30/t
- Metal prices used in the NSR evaluation for Mineral Reserves are US$29.36/oz for silver, US$1,544/oz for gold, US$2,245/t for lead and US$2,139/t for zinc
- Metal prices used in the NSR evaluation for Mineral Resources are US$25.14/oz for silver, US$1,391.63/oz for gold, US$2,116/t for lead and US$2,006/t for zinc
- Metallurgical recovery values used in the NSR evaluation of sulfides are 82 % for silver, 45 % for gold, 93 % for lead, and 88 % for zinc; and of oxides are 64 % for silver, 45 % for gold, 46 % for lead, and 30 % for zinc
- Operating costs were estimated based on 2012 actual costs

- Tonnes are rounded to the nearest thousand
- The quantity and grade of the Inferred Resources reported in this estimation are conceptual in nature, and it is uncertain if further exploration will result in upgrading of Inferred Resources to Indicated or Measured Resource categories
- Totals may not add due to rounding

Minera Bateas continues to successfully manage the operation, mining 462,000 t of ore from underground to produce 2.0 Moz of silver, 2.8 koz of gold, 17.9 Mlbs of lead, and 22.4 Mlbs of zinc in 2012 while continuing to improve the mine infrastructure.

Fortuna believes there is good potential for a significant increase of the Mineral Resources at the Caylloma property particularly from the continuity of the current veins in operation as well as from the discovery of new veins. During 2012 important exploration projects were developed and new exploration targets were identified. Fortuna is committed in continuing its intensive exploration program, budgeting US$ 6.7 million to continue developing ongoing exploration projects over identified structures as well as the discovery of new targets. In addition to this US$ 4 million has been budgeted for work designed to upgrade Inferred Resources.

The construction of the first stage of the new tailings facility (N° 3) as well as the granting of the operation permit by the Ministry of Energy and Mines in December 2012 has been a major milestone for Minera Bateas in order to assure available tailings disposal capacity for the coming years. The designed capacity of this facility is 15 years based on a 1,300-tpd processing capacity. The first two stages will provide a total capacity of six years. Construction of the first stage (two year capacity) was concluded in 2012 and the second stage is planned to be constructed in 2013.

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.

Minera Bateas continues developing sustainable programs to benefit the local communities including educational, nutritional and economical programs. The socio–environmental responsibilities of these programs contribute toward establishing a good relationship between the company and local communities.

This Technical Report represents the most accurate interpretation of the Mineral Reserve and Mineral Resource available at the effective date of this report. The conversion of Mineral Resources to Mineral Reserve was made using industry-recognized methods, actual operational costs, capital costs, and plant performance data. Thus, it is considered to be representative of actual and future operational conditions.

2 Introduction

Information contained within this section has been reproduced from the Fortuna 2012 Technical Report (Chapman & Vilela, 2012) and updated where necessary.

This Technical Report has been prepared by Fortuna Silver Mines Inc. (Fortuna) in accordance with the disclosure requirements of Canadian National Instrument 43-101 (NI 43-101) to disclose recent information about the Caylloma Property. This information has resulted from additional underground development and sampling, exploration drilling, delineation drilling, and updated Mineral Resource and Reserve estimates.

The Caylloma Property is 100 % owned by Fortuna (formerly Fortuna Ventures Inc.) and is located approximately 225 km by road from Arequipa in the Caylloma region of southern Peru.

Fortuna is based in Vancouver, British Columbia with management offices in Lima, Peru and is listed on the Toronto (TSX:FVI), Lima (BVL:FVI), New York (NYSE:FSM), and Frankfurt (FSE:F4S) stock exchanges.

The mineral rights of the Caylloma Property are held by Minera Bateas S.A.C. (Minera Bateas) and renewed on an annual basis. Minera Bateas is a Peruvian subsidiary 100 % owned by Fortuna and is responsible for running the Caylloma operation. Fortuna also owns Compania Minera Cuzcatlan S.A. de C.V. which operates the San Jose silver-gold mine located in the state of Oaxaca, Mexico.

Fortuna acquired the Caylloma Property in 2005, and placed it into production in September 2006 with a refurbished mill which included separate circuits for silver-lead, zinc, and later (in 2009) copper. The current operation exploits the Animas vein and other polymetallic (Ag-Pb-Zn) veins, in addition to the silver-gold veins previously exploited by Compania Minera Arcata, a subsidiary of Hochschild Mining plc.

The cut-off date for the channel sample information used in the Mineral Resource estimate is June 30, 2012. The Mineral Resources and Reserves are reported as of December 31, 2012 with the estimates being depleted to take into account production and updated for significant exploration drilling results obtained in the Animas and Animas NE veins between June and the end of 2012.

The December 31, 2012 Mineral Resource and Mineral Reserve estimates supersede the Mineral Resource and Mineral Reserve estimates reported by Fortuna (Chapman & Vilela, 2012) on May 7, 2012.

Field data was compiled and validated by Minera Bateas and Fortuna staff. Geological description of the samples, geological interpretations and 3-D wireframes of the veins were completed by Minera Bateas and reviewed by Fortuna personnel. The June 2012 Mineral Resource estimates and December 2012 re-estimates of the Animas and Animas NE veins were undertaken by Fortuna under the technical supervision of the Qualified Person, Mr. Eric Chapman.

The June 2012 Mineral Reserves estimate and December 2012 depletions and re-estimates were undertaken by Fortuna's Mine Planning & Engineering department under the technical supervision of the Qualified Person, Mr. Thomas Kelly.

The authors of this Technical Report are Qualified Persons as defined by NI 43-101. Mr Eric Chapman has been employed as Mineral Resource Manager by Fortuna since May 2011 and has visited the property on numerous occasions, the most recent being October 31, 2012. Mr Thomas Kelly has been an independent Director of Fortuna since April 2011 and has also conducted regular visits to the property.

Responsibilities for the preparation of the different sections of this Technical Report are shown in Table 2.1.

Table 2.1 Author's responsibilities

Author	Responsible for section/s
Eric Chapman	1. Summary; 2. Introduction; 3. Reliance on Other Experts; 4. Property Description and Location; 5. Accessibility, Climate, Local Resources, Infrastructure and Physiography; 6. History; 7. Geological Setting and Mineralization; 8. Deposit Types; 9. Exploration; 10. Drilling; 11. Sample Preparation, Analyses and Security; 12. Data Verification; 14. Mineral Resource Estimates; 23. Adjacent Properties; 24. Other Relevant Data and Information; 25. Interpretation and Conclusions; 26. Recommendations; 27. References
Thomas Kelly	1. Summary; 13. Mineral Processing and Metallurgical Testing; 15. Mineral Reserve Estimates; 16. Mining Methods; 17. Recovery Methods; 18. Project Infrastructure; 19. Market Studies and Contracts; 20. Environmental Studies, Permitting and Social or Community Impact; 21. Capital and Operating Costs; 22. Economic Analysis; 24. Other Relevant Data and Information; 25. Interpretation and Conclusions; 26. Recommendations; 27. References

Definitions of terms and acronyms used in the report are provided in Table 2.2.

Table 2.2 Acronyms

Acronym	Description	Acronym	Description
Ag	Silver	NI	National Instrument
Au	Gold	NN	Nearest Neighbor
cfm	Cubic foot per minute	NSR	Net smelter return
cm	Centimeters	OK	Ordinary Kriging
COG	Cut-off grade	oz	Troy ounce
Cu	Copper	oz/t	Troy ounce per tonne
g	Grams	ppm	Parts per million
g/t	Grams per tonne	Pb	Lead
ha	Hectares	QAQC	Quality assurance/Quality control
kg	Kilograms	RMR	Rock Mass Rating
km	Kilometers	RQD	Rock Quality Designation
kg/t	Kilogram per tonne	t	Metric tonne
lbs	Pounds	t/m^3	Metric tonnes per cubic meter
m	Meters	tpd	Metric tonnes per day
Ma	Millions of years	yr	Year
masl	Meters above sea level	Zn	Zinc
Moz	Million troy ounces	$US/t	United States dollars per tonne
Mn	Manganese	$US/g	US dollars per gram
Mt	Million metric tonnes	$US/%	US dollars per percent

3 Reliance on Other Experts

There has been no reliance on other experts who are not qualified persons in the preparation of this report except for information relating to the mineral concessions at the Caylloma Property.

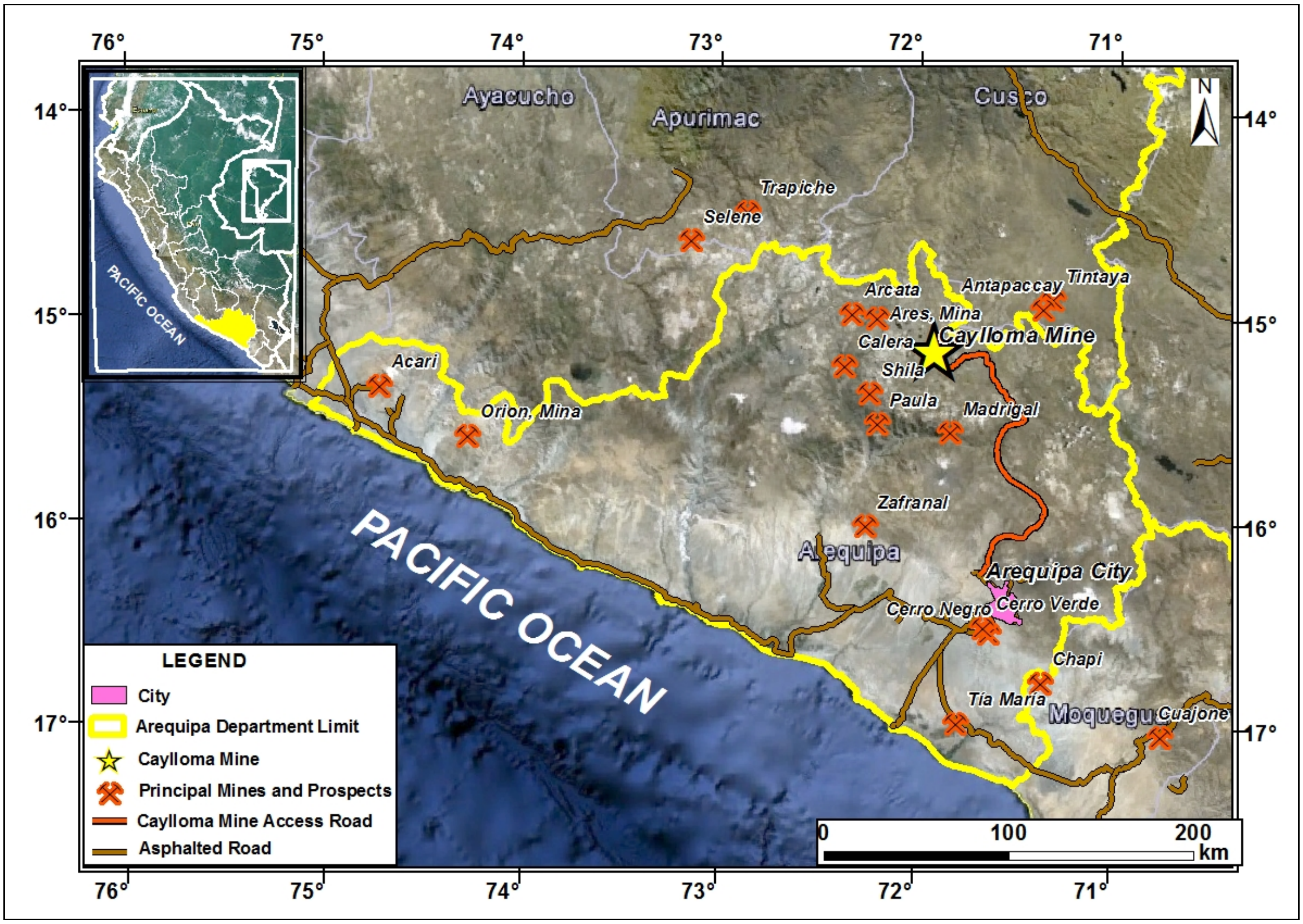
Fernando Pickmann, a lawyer and Partner of law firm Gallo Barrios Pickmann reviewed and confirmed by letter dated January 25, 2013 that all mineral concessions and surface rights in the Caylloma district held by Minera Bateas, a subsidiary of Fortuna (as summarized in Section 4) are in good standing and comply will all legal obligations required by Peruvian mining laws and regulations.

4 Property Description and Location

Information contained within this section has been reproduced from the Fortuna, 2012 Technical Report and updated where necessary.

The Caylloma Silver-Lead-Zinc Mine is located in the Caylloma Mining District, 225 road-kilometers north-northwest of Arequipa, Peru. The property is 14 kilometers northwest of the town of Caylloma at the UTM grid location of 8192263E, 8321387N, (WGS84, UTM Zone 19S) and covers a total of 30,228.66 hectares. The location of the mine is shown in Figure 4.1.

Figure 4.1 Map showing the location of the Caylloma Mine



4.1 Mineral tenure

Fortuna Silver Mines Inc. acquired a 100 % interest in the Caylloma Property in June of 2005. The property comprises mining concessions (Table 4.1 and Figure 4.2); surface rights (Table 4.2); a permitted flotation plant; connection to the national electric power grid; permits for camp facilities for 890 men as well as the infrastructure necessary to sustain mining operations.

4.1.1 Mining claims and concessions

The Caylloma Property consists of mineral rights for 64 mining concessions for a total surface area of 30,228.66 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) concession is titled, and comprises 71.41 ha, increased from 2.22 ha in December 2012 via resolution 0274-2012-MEM/DGM granted by the Ministry of Energy and Mines.

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

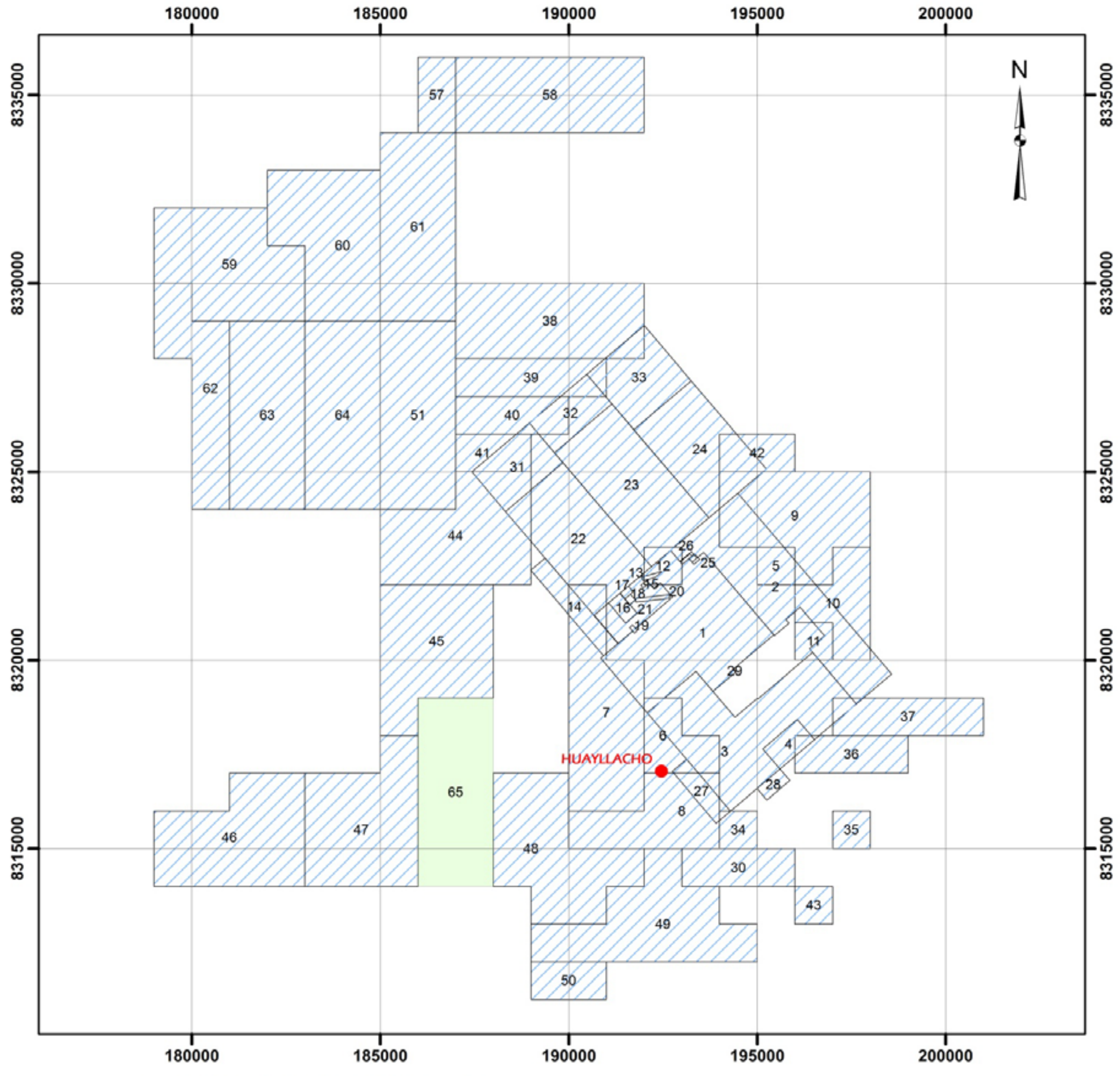
Table 4.1 Mineral concessions owned by Minera Bateas

No.	Concession Name	Area (Ha)	Title details	Minera Bateas Acquisition Date
1	Acumulacion Cailloma No. 1	989.53	20005129 AREQUIPA	01/06/2005
2	Acumulacion Cailloma No. 2	920.41	20001891 AREQUIPA	01/06/2005
3	Acumulacion Cailloma No. 3	979.28	20001892 AREQUIPA	01/06/2005
4	Corona de Antimonio N.2	84.00	2025645 LIMA	01/06/2005
5	Cailloma 1	5.18	20005170 AREQUIPA	01/06/2005
6	Cailloma 2	108.67	20005171 AREQUIPA	01/06/2005
7	Cailloma 4	788.77	11020415 AREQUIPA	01/06/2005
8	Cailloma 5	514.19	11020416 AREQUIPA	01/06/2005
9	Cailloma 6	678.88	11020417 AREQUIPA	01/06/2005
10	Cailloma 7	223.04	11020419 AREQUIPA	01/06/2005
11	Cailloma 8	2.28	11020413 AREQUIPA	01/06/2005
12	Cailloma 9	0.07	11026023 AREQUIPA	01/06/2005
13	Eureka 88	4.46	20004520 AREQUIPA	01/06/2005
14	Sandra No37	149.14	2025648 LIMA	01/06/2005
15	Sandra No14	1.00	2025654 LIMA	01/06/2005
16	Sandra No4	28.00	2025650 LIMA	01/06/2005
17	Sandra No5	6.00	2025651 LIMA	01/06/2005
18	Sandra No6	4.00	2025652 LIMA	01/06/2005
19	Sandra No7	2.00	2025642 LIMA	01/06/2005
20	Sandra No9	9.00	2025653 LIMA	01/06/2005
21	Sandra 102-A	124.99	20004673 AREQUIPA	01/06/2005
22	Sandra 106	724.00	20001071 AREQUIPA	01/06/2005
23	Sandra 107	794.00	20001072 AREQUIPA	01/06/2005
24	Sandra 108	614.00	20001073 AREQUIPA	01/06/2005
25	Sandra 120	4.00	20001211 AREQUIPA	01/06/2005
26	Sandra 121	4.00	20001212 AREQUIPA	01/06/2005
27	Sandra 123	90.00	20004461 AREQUIPA	01/06/2005
28	Sandra 124	32.00	20001241 AREQUIPA	01/06/2005
29	S.P.No16	0.12	2002858 LIMA	01/06/2005
30	Cristobal R1	300.00	11172025 AREQUIPA	30/12/2009
31	Sandra 106-A	276.00	11172022 AREQUIPA	02/06/2010
32	Sandra 107-A	206.00	11172024 AREQUIPA	11/03/2010
33	Sandra 108-A	386.00	11171025 AREQUIPA	17/05/2010
34	Cailloma 11	96.35	11199656 AREQUIPA	18/08/2011
35	Cailloma 12	100.00	11199657 AREQUIPA	18/08/2011
36	Cailloma 14	282.27	11199757 AREQUIPA	18/08/2011

No.	Concession Name	Area (Ha)	Title details	Minera Bateas Acquisition Date
37	Cailloma 15	371.31	11199759 AREQUIPA	18/08/2011
38	Cailloma 16	954.08	11199763 AREQUIPA	18/08/2011
39	Cailloma 17	337.26	11199770 AREQUIPA	18/08/2011
40	Cailloma 18	219.65	11199774 AREQUIPA	18/08/2011
41	Cailloma 19	102.04	11199775 AREQUIPA	18/08/2011
42	Cailloma 20	112.69	11199776 AREQUIPA	18/08/2011
43	Cailloma 21	100.00	11199777 AREQUIPA	23/08/2011
44	Cailloma 22	1000.00	11228688 AREQUIPA	31/05/2012
45	Cailloma 23	1000.00	11220908 AREQUIPA	22/06/2012
46	Cailloma 24	1000.00	11228690 AREQUIPA	23/07/2012
47	Cailloma 25	1000.00	11228529 AREQUIPA	23/07/2012
48	Cailloma 27	1000.00	11228600 AREQUIPA	23/07/2012
49	Cailloma 28	1000.00	11228543 AREQUIPA	23/07/2012
50	Cailloma 29	200.00	11228534 AREQUIPA	23/07/2012
51	Cailloma 30	1000.00	11220907 AREQUIPA	11/06/2012
52	Cailloma 38	1000.00	11220647 AREQUIPA	11/06/2012
53	Cailloma 39	400.00	11220680 AREQUIPA	11/06/2012
54	Cailloma 40	1000.00	11220675 AREQUIPA	11/06/2012
55	Cailloma 41	1000.00	11220679 AREQUIPA	11/06/2012
56	Cailloma 42	1000.00	11220668 AREQUIPA	11/06/2012
57	Cailloma 43	200.00	11228686 AREQUIPA	23/07/2012
58	Cailloma 44	1000.00	11228505 AREQUIPA	23/07/2012
59	Cailloma 45	1000.00	11220650 AREQUIPA	11/06/2012
60	Cailloma 46	1000.00	11220649 AREQUIPA	11/06/2012
61	Cailloma 47	1000.00	11220648 AREQUIPA	11/06/2012
62	Cailloma 48	700.00	11228515 AREQUIPA	23/07/2012
63	Cailloma 49	1000.00	11228549 AREQUIPA	23/07/2012
64	Cailloma 50	1000.00	11228685 AREQUIPA	23/07/2012
Total		**30,228.66**		

In addition to the 64 registered mining concessions detailed above Minera Bateas has an additional mining concession (Cailloma 26, covering 989.53 ha) that has been granted but not registered as of the effective date of this report.

Figure 4.2 Location of mining concessions at the Caylloma Property



BATEAS'S MINERAL RIGHT CONCESSIONS

N°	CONCESSION	N°	CONCESSION	N°	CONCESSION
1	ACUMULACION CAILLOMA N° 1	23	SANDRA 107	45	CAILLOMA 23
2	ACUMULACION CAILLOMA N° 2	24	SANDRA 108	46	CAILLOMA 24
3	ACUMULACION CAILLOMA N° 3	25	SANDRA-120	47	CAILLOMA 25
4	CORONA DE ANTIMONIO N° 2	26	SANDRA 121	48	CAILLOMA 27
5	CAILLOMA 1	27	SANDRA 123	49	CAILLOMA 28
6	CAILLOMA 2	28	SANDRA 124	50	CAILLOMA 29
7	CAILLOMA 4	29	S.P. N° 16	51	CAILLOMA 30
8	CAILLOMA 5	30	CRISTOBAL R1	52	CAILLOMA 38
9	CAILLOMA 6	31	SANDRA 106-A	53	CAILLOMA 39
10	CAILLOMA 7	32	SANDRA 107-A	54	CAILLOMA 40
11	CAILLOMA 8	33	SANDRA 108-A	55	CAILLOMA 41
12	CAILLOMA 9	34	CAILLOMA 11	56	CAILLOMA 42
13	EUREKA 88	35	CAILLOMA 12	57	CAILLOMA 43
14	SANDRA N° 37	36	CAILLOMA 14	58	CAILLOMA 44
15	SANDRA N° 14	37	CAILLOMA 15	59	CAILLOMA 45
16	SANDRA N° 4	38	CAILLOMA 16	60	CAILLOMA 46
17	SANDRA N° 5	39	CAILLOMA 17	61	CAILLOMA 47
18	SANDRA N° 6	40	CAILLOMA 18	62	CAILLOMA 48
19	SANDRA N° 7	41	CAILLOMA 19	63	CAILLOMA 49
20	SANDRA N° 9	42	CAILLOMA 20	64	CAILLOMA 50
21	SANDRA N° 102-A	43	CAILLOMA 21	65	CAILLOMA 26
22	SANDRA-106	44	CAILLOMA 22		

DATUM:PSAD 56, UTM Zone 19S

0 1 2 3 4 5 Km

LEGEND

NON REGISTERED MINING CONCESSIONS
REGISTERED MINING CONCESSIONS
PROCESSING PLANT

4.2 Surface rights

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

Table 4.2 Surface rights held by Minera Bateas at Caylloma

No.	Name	Owner	Area	Type
1	Animas	Minera Bateas	214.41 ha	Surface Right
2	Michihuasi Toldoña Cancha	Saturnino Llacma Cayllahue	192.45 ha	Easement Right
3	Carrtera Veta Animas Plata	Lorenzo Supo Llallacachi	14.74 ha	Easement Right
4	San Francisco I & II	Minera Bateas	62.00 ha	Surface Right
5	Plata	Minera Bateas	255.63 ha	Surface Right
6	Trinidad Tayayaque	Minera Bateas	441 ha	Surface Right
7	Bahia Electrica	Minera Bateas	1,284 m^2	Surface Right
8	Huaraco Vilafro Sahuañaña	Domingo Llallacachi	1,091.85 ha	Easement Right
9	Huayllacho	Minera Bateas	186.73 ha	Surface Right
10	Jururuni Vilafro	Toribio Ynfa Llacho	258.89 ha	Easement Right
11	Cuchuquipa (Tailings)	Lorenzo Supo Llallacachi	17.49 ha	Easement Right
12	Cuchuquipa	Lorenzo Supo Llallacachi	4,025 m^2	Easement Right
13	Palcacucho	Juana Nicolasa Cayllahue Ccalachua	6,125 m^2	Easement Right
14	Anchacca	Hereditary succession Escarza Murguia	4,375 m^2	Easement Right

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 the Mining Law, a mining concessionaire requires a previous authorization from the surface owner or possessor of the land to undertake mining activities in it.
- In the region where Fortuna's concessions are located, the government, through the corresponding local entity (COFOPRI) is involved in a process to identify the properties existing in the area, plot them on a map and establish cadaster where the owners of the different properties can be duly identified. This process has not yet been completed. Once the cadaster process is completed, the recognized possessors can commence with the registration of their surface rights in the Public Registry.

4.3 Royalties

The Caylloma Property is not subject to any royalties, back-in rights, payments or encumbrances with the exception of the following:

- The purchase agreement of Minera Bateas, dated 6th May 2005, includes the following royalty contract term "*Minera Bateas S.A.C. grants Minera Arcata S.S. a royalty of 2.0 % of the Net Smelter Return which will apply after not less than a total of 21 million ounces of silver have been recovered from the Huayllacho beneficio (mill site) concession right. This contract is a permanent condition and will remain in total validity as long as a valid mining concession exists.*"

  As of December 31, 2012 Minera Bateas has produced a total of 8.9 million troy ounces of silver; therefore this royalty condition has not yet been met.

- In accordance with the Mining Royalty Act approved by Peruvian Law No. 28258 and its corresponding regulations, federal royalties are determined by applying the monthly rates of 1 %, 2 % or 3 % (scales are provided by the Regulations of the Act) on revenues net of a transport deduction. Importantly, the amount paid in royalties and mining costs can be deducted as expenses for purposes of calculating income tax. Government royalty payments are set at a base rate of 1 % up to US$60 million, 2 % on the excess of US$60 million and up to US$120 million, and 3 % on the excess of US$120 million. Fortuna is on the scales of 1 % and 2 % and is current on payment of royalties. The application of the Mining Royalty Act mentioned above is guaranteed by the company's Legal Stability Agreement signed with the Peruvian government.

  Additionally and in accordance with Mining Special Royalty Act approved by Peruvian Law No. 29790 in 2011, royalties are determined by applying quarterly rates ranging from 4 % to 12 % (scales provided by the Regulations of the Act) on operating income. Any royalties due resulting from the application of this new Act are only paid in excess of royalties already paid under the original Mining Royalty Act.

4.4 Environmental aspects

Minera 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.

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.

The 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 at the base of the old tailings, vegetation of the old tailings, building a retaining wall at the base of the active tailings and monitoring and treatment of mine water. The budgeted cost of the program was US$365,000.

In 2002 the Ministry of Energy and Mines (MEM) 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.

The Sanitary Authorization for Treatment System Water was approved with Directorial Resolution No. 2307-2009/DIGESA/SA on May 18, 2009.

An Environmental Impact Assessment (EIA) 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.

Through Resolution No. 351-2010-MEM-DGM/V authorization of the disposal of tailings in Tailings Deposit No. 2 Huayllacho has been confirmed.

4.5 Permits

To the extent known, all permits that are required by Peruvian law for the mining operation have been obtained.

5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

Information contained within this section has been reproduced from the Chapman and Vilela (2012) Technical Report and updated where necessary.

5.1 Access

Access to the Caylloma Property is by a combination of sealed and gravel road. The property is located 225 road kilometers from Arequipa and requires a trip of approximately 5 hours by vehicle.

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 Property is located in the puna region of Peru at an altitude of between 4,300 masl (meters above sea level) and 5,000 masl. Surface topography is generally steep. 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 have been constructed to replace aging infrastructure. Newly constructed facilities include 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 property 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 property infrastructure is provided in Section 18.

6 History

Information contained within this section has been reproduced from the Chapman and Vilela (2012) Technical Report and updated where necessary.

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

6.2 Exploration history and evaluation

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

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 were hoping to exploit. 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 produced by CMA that was validated by Minera Bateas.

Table 6.1 Exploration by drill hole and channels conducted by CMA

Vein	Drill Holes	Channels
Paralela	-	623
San Pedro	8	2,006
San Cristóbal	20	3,833
San Carlos	-	295
Don Luis	1	-
Don Luis 1	2	-
Elisa	2	-
La Plata	9	-
Ramal San Pedro	1	-
San Miguel	2	-
Ursula	2	-

6.3 Historical resources and reserves

Prior to Fortuna's ownership of the property, Mineral Reserves and Mineral Resources were estimated by CMA on behalf of Hochschild Mining plc. The most recent estimate prior to Fortuna's purchase of the property was conducted in June 2004 (CMA, 2004).

Mineral Reserves and Mineral Resources estimated by CMA in June 2004 were not prepared in accordance with NI 43-101 and should not be relied upon. CMA classified resources using two criteria: the commonly accepted method based on the degree of confidence in the resource (Measured, Indicated, and Inferred); and a method based on economic criteria (NSR). The NSR value used for each metal for reporting Mineral Reserves and Mineral Resources was US$0.13/g for silver, and US$9.2/g for gold.

Mineral Reserves were reported above a breakeven NSR cut-off grade of US$40.26/t (Table 6.2). Measured and Indicated Resources were subdivided into those that had an estimated NSR value between US$28.79/t and US$40.26/t, regarded as "marginal" (Table 6.3) and those that had an estimated NSR value less than US$28.79/t, where Measured and Indicated Resources were combined and regarded as "sub-marginal" (Table 6.4).

Table 6.2 Mineral Reserves reported by CMA in June 2004

Vein Type	Category	Vein	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Ag oz
Silver	**Proven**	San Cristóbal	106,117	505	0.40	0.02	0.02	1,722,929
		San Pedro	48,741	452	1.12	0.00	0.00	708,311
		San Carlos	3,304	1,014	0.34	0.46	1.17	107,713
		La Plata	6,839	597	2.62	0.20	0.09	131,268
		Cimoide (La Plata)	28,037	629	3.73	0.02	0.06	566,987
		Paralela	9,971	665	0.16	0.02	0.03	213,182
		TOTAL	**203,008**	**529**	**1.10**	**0.03**	**0.04**	**3,452,708**
	Probable	San Cristóbal	32,222	566	0.47	0.25	0.31	586,354
		San Pedro	29,604	387	0.98	0.04	0.07	368,343
		San Carlos	6,248	831	0.15	0.33	0.82	166,930
		La Plata	1,448	971	5.49	0.09	0.10	45,204
		Cimoide (La Plata)	4,436	532	3.83	0.06	0.11	75,874
		Paralela	4,013	770	0.00	0.09	0.17	99,346
		TOTAL	**77,971**	**535**	**0.90**	**0.15**	**0.24**	**1,341,152**
Proven + Probable			**280,979**	**531**	**1.04**	**0.06**	**0.10**	**4,796,887**

Table 6.3 Measured and Indicated Resources (Marginal - NSR value between US$28.79/t and US$40.26/t) reported by CMA in June 2004

Vein Type	Category	Vein	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Ag oz
Silver	**Measured**	San Cristóbal	46,320	270	0.00	0.00	0.00	402,090
		San Pedro	5,322	283	0.08	0.02	0.08	48,423
		San Carlos	1,127	247	0.00	0.00	0.00	8,950
		La Plata	0	-	-	-	-	-
		Cimoide (La Plata)	0	-	-	-	-	-
		Paralela	9,307	292	0.00	0.00	0.00	87,374
		Ramal Paralela	0	-	-	-	-	-
		TOTAL	**62,076**	**274**	**0.01**	**0.00**	**0.01**	**546,846**
	Indicated	**TOTAL**	**0**	**-**	**-**	**-**	**-**	**-**

Table 6.4 Measured & Indicated Resources (Sub-marginal - NSR value less than US$28.79/t) reported by CMA in June 2004

Vein Type	Category	Vein	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Ag oz
Silver	**Measured + Indicated**	San Cristóbal	325,317	112	0.04	0.00	0.00	1,171,429
		San Pedro	57,683	124	0.03	0.00	0.00	229,964
		San Carlos	21,185	107	0.00	0.00	0.01	72,879
		La Plata	2,075	110	0.28	0.09	0.26	7,338
		Cimoide (La Plata)	7,493	120	0.14	0.00	0.00	28,909
		Paralela	8,099	213	0.00	0.00	0.00	55,463
		Ramal Paralela	0	-	-	-	-	-
		TOTAL	**421,852**	**115**	**0.04**	**0.00**	**0.00**	**1,559,729**

Additional to the Mineral Resources detailed above, CMA also reported combined Indicated and Inferred Resources above a breakeven NSR cut-off grade of US$40.26/t (Table 6.5).

It should be noted that CMA silver grades were originally reported in troy ounces per tonne but for the purposes of this Technical Report have been converted to grams per tonne for comparison purposes.

Table 6.5 Indicated and Inferred Resources (NSR greater than US$40.26/t) reported by CMA in June 2004

Vein Type	Category	Vein	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Ag oz
Silver	**Indicated + Inferred**	San Cristóbal	127,815	439	0.22	0.33	0.42	1,804,004
		San Pedro	132,252	361	0.12	0.51	1.16	1,534,972
		San Carlos	11,956	1,066	0.31	0.64	1.63	409,764
		La Plata	34,910	770	2.88	0.18	0.81	864,235
		Cimoide (La Plata)	5,333	311	2.75	0.06	0.09	53,324
		Paralela	78,863	458	0.01	0.13	0.24	1,161,261
		Ramal Paralela	63,818	511	0.10	0.36	0.98	1,048,468
		TOTAL	**454,948**	**470**	**0.37**	**0.34**	**0.74**	**6,874,651**

Since Minera Bateas took ownership of the property three independent NI 43-101 Technical Reports have been published reporting Mineral Resources and Mineral Reserves (CAM, 2005; CAM, 2006; and CAM 2009).

Mineral Resources and Reserves reported in the CAM 2005 Technical Report are based on the estimates prepared by CMA as of June 30, 2004 and adjusted by Fortuna to account for additional mining dilution and recovery.

Mineral Reserves were reported above a breakeven NSR cut-off grade of US$40.26/t (Table 6.6).

Metal prices used in the evaluation were US$5.87/oz for silver, US$391.99/oz for gold, US$896/t for lead, US$1,010.70/t for zinc, and US$2,685.16/t for copper. The NSR value for each metal used for reporting silver veins was US$0.13/g for silver, US$9.2/g for gold, whereas the NSR values used for reporting the Animas polymetallic vein was US$0.11/g for silver, US$1.22/g for gold, US$5.59/% for lead, and US$5.20/% for zinc.

Table 6.6 Mineral Reserves reported by CAM in April 2005

Vein Type	Category	Vein	Tonnes	Ag (g/t)*	Au (g/t)	Pb (%)	Zn (%)	Contained Ag oz
Silver	**Proven**	San Cristóbal	116,729	455	0.36	0.02	0.02	1,707,581
		San Pedro	53,615	407	1.01	0.00	0.00	701,571
		San Carlos	4,295	710	0.24	0.32	0.82	98,042
		La Plata	8,891	418	1.83	0.14	0.06	119,486
		Cimoide (La Plata)	36,448	440	2.37	0.01	0.04	515,605
		Paralela	10,968	599	0.14	0.02	0.03	211,225
		TOTAL	**230,946**	**452**	**0.87**	**0.02**	**0.04**	**3,355,645**
	Probable	San Cristóbal	35,444	509	0.42	0.23	0.28	580,031
		San Pedro	32,564	348	0.88	0.04	0.06	364,341
		San Carlos	8,122	582	0.11	0.23	0.57	151,977
		La Plata	1,882	680	3.84	0.06	0.07	41,145
		Cimoide (La Plata)	5,766	372	2.37	0.04	0.08	68,962
		Paralela	4,414	693	0.00	0.08	0.15	98,346
		TOTAL	**88,192**	**461**	**0.74**	**0.14**	**0.20**	**1,306,124**
	Proven + Probable		**319,138**	**454**	**0.84**	**0.06**	**0.08**	**4,659,415**
Polymetallic	**Proven**	Animas	316,418	172	0.35	3.01	4.86	1,752,956
	Probable	Animas	140,794	160	0.37	3.18	4.94	726,497
	Proven + Probable		**457,212**	**169**	**0.35**	**3.06**	**4.88**	**2,482,661**
Total Mineable Reserves			**776,350**	**286**	**0.55**	**1.83**	**2.91**	**7,142,420**
*Silver was originally reported in oz/t but has been converted to g/t for comparison purposes.								

CAM was unable to confirm the Indicated and Inferred Resources reported by CMA and therefore combined both and reported as Inferred Resources (Table 6.7).

Table 6.7 Inferred Resources reported by CAM in April 2005

Vein Type	Vein	Tonnes	Ag (g/t)*	Au (g/t)	Pb (%)	Zn (%)	Contained Ag oz
Silver	San Cristóbal	127,815	439	0.22	0.33	0.42	1,804,004
	San Pedro	132,252	361	0.12	0.51	1.16	1,534,972
	San Carlos	11,956	1,066	0.31	0.64	1.63	409,764
	La Plata	34,910	770	2.88	0.18	0.81	864,235
	Cimoide (La Plata)	5,333	311	3.00	0.00	0.00	53,324
	Paralela	78,863	458	0.00	0.00	0.00	1,161,261
	Ramal Paralela	63,818	511	0.10	0.36	0.98	1,048,468
	TOTAL	**454,947**	**470**	**0.38**	**0.32**	**0.70**	**6,878,799**
Polymetallic	Animas	**691,652**	**330**	**0.61**	**3.62**	**5.49**	**7,338,428**
Total Inferred Resources		**1,146,599**	**386**	**0.52**	**2.31**	**3.59**	**14,217,828**
*Silver was originally reported in oz/t but has been converted to g/t for comparison purposes.							

Mineral Resources and Reserves reported in the CAM 2006 Technical Report were also based on the estimates prepared by CMA as of June 30, 2004 and adjusted by Fortuna to account for the new Animas vein model, changes in prices and costs, adjustments in mining dilution and recovery.

Mineral Reserves were reported above a breakeven NSR cut-off grade of US$48/t (Table 6.8). Mineral Resources were reported above a NSR cut-off grade of US$36.50/t (Table 6.9).

Metal prices used in the evaluation were US$8/oz for Ag, US$500/oz for gold, US$800/t for lead, and US$1,803/t for zinc. The NSR value for each metal used for reporting purposes was US$0.19/g for silver, US$7.22/g for gold, US$4.81/% for lead, and US$7.10/% for zinc.

Table 6.8 Mineral Reserves reported by CAM in October 2006

Category	Vein	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Ag oz
Proven	San Cristóbal	145,851	422	0.30	0.00	0.00	1,980,562
	San Pedro	52,102	407	1.00	0.00	0.00	682,646
	San Carlos	5,392	622	0.20	0.30	0.70	107,751
	La Plata	8,537	478	2.10	0.20	0.10	131,184
	Cimoide (La Plata)	30,269	575	3.40	0.00	0.10	560,075
	Paralela	11,200	592	0.10	0.00	0.00	213,294
	TOTAL	**253,351**	**451**	**0.90**	**0.00**	**0.00**	**3,675,513**
Probable	San Cristóbal	35,989	507	0.40	0.20	0.30	58,641
	San Pedro	3,365	340	0.90	0.00	0.10	368,157
	San Carlos	7,921	656	0.10	0.30	0.70	16,702
	La Plata	1,954	720	4.10	0.10	0.10	45,213
	Cimoide (La Plata)	5,691	414	3.00	0.00	0.10	75,814
	Paralela	4,491	688	0.00	0.10	0.20	99,339
	TOTAL	**89,695**	**465**	**0.80**	**0.10**	**0.20**	**1,341,953**
Proven + Probable		**343,046**	**454**	**0.80**	**0.10**	**0.10**	**5,017,466**

Table 6.9 Mineral Resources exclusive of Reserves reported by CAM in October 2006

Category	Vein	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Ag oz
Measured	Animas	48,454	152	0.80	2.30	4.20	2,388,782
Indicated	Animas	688,786	137	0.50	2.30	4.20	3,037,544
Measured + Indicated		**1,173,326**	**143**	**0.70**	**2.30**	**4.20**	**5,426,326**
Inferred	San Cristóbal	135,513	407	0.20	0.30	0.40	1,771,635
	San Pedro	92,896	369	0.20	0.70	1.40	1,100,831
	San Carlos	16,626	766	0.20	0.50	1.20	409,654
	La Plata	40,540	663	2.50	0.20	0.70	863,893
	Cimoide (La Plata)	7,326	231	2.00	0.00	0.10	54,330
	Paralela	52,473	563	0.00	0.20	0.30	950,452
	Ramal Paralela	90,094	362	0.10	0.30	0.70	1,049,011
	Animas	980,032	243	0.50	2.70	4.20	7,626,114
Inferred (Total)		**1,415,499**	**305**	**0.40**	**2.00**	**3.10**	**13,825,919**

Mineral Resources and Reserves reported in the CAM 2009 Technical Report are reported as of December 31, 2008 and rely on data gathered by Minera Bateas and CMA. Mineral Reserves were reported above a breakeven NSR cut-off grade of US$47.80/t (Table 6.10). Mineral Resources were reported above a NSR cut-off grade of US$37.15/t (Table 6.11).

Metal prices used in the evaluation were US$13.38/oz for Ag, US$830.05/oz for gold, US$1,698/t for lead, and US$2,161/t for zinc. The NSR value for each metal used for reporting purposes was US$0.27/g for silver, US$9.80/g for gold, US$11.51/% for lead, and US$10.90/% for zinc.

Table 6.10 Mineral Reserves reported by CAM as of December 31, 2008

Category	Vein type	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Proven	Silver Veins	421,320	387	0.83	0.01	0.02
	Polymetallic Veins	3,280,100	103	0.52	2.03	3.09
	TOTAL	**3,701,420**	**136**	**0.55**	**1.80**	**2.74**
Probable	Silver Veins	228,500	369	0.55	0.05	0.09
	Polymetallic Veins	103,000	426	0.44	1.74	2.41
	TOTAL	**331,500**	**387**	**0.51**	**0.58**	**0.81**
Proven + Probable (All Veins)		**4,032,920**	**156**	**0.55**	**1.70**	**2.58**

Table 6.11 Mineral Resources exclusive of Reserves reported by CAM as of December 31, 2008

Category	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Cu (%)	Width (m)
Measured	247,070	63	0.31	1.19	2.23	0.11	1.69
Indicated	20,400	71	0.29	1	1.4	0.15	2.74
Measured + Indicated	**267,470**	**64**	**0.31**	**1.18**	**2.17**	**0.11**	**1.77**
Inferred	**1,279,000**	**187**	**0.29**	**1.92**	**3.25**	**-**	**2.58**

The CAM 2008 Mineral Resources and Mineral Reserves represent the most recent independent evaluation of the Caylloma Property. There have not been significant changes to Mineral Resources and Mineral Reserves since this evaluation. The last disclosure of resources and reserves prior to this update was detailed in the Chapman and Vilela (2012) Technical Report and are summarized in Table 6.12 and Table 6.13.

Table 6.12 Mineral Reserves reported by Fortuna as of December 31, 2011

Category	Vein type	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Proven	Silver Veins	26,000	687	0.28	0.32	0.32
	Polymetallic Veins	1,318,000	87	0.32	1.59	2.39
	TOTAL	**1,344,000**	**98**	**0.32**	**1.57**	**2.35**
Probable	Silver Veins	755,000	365	0.42	0.06	0.06
	Polymetallic Veins	2,543,000	86	0.31	1.59	2.31
	TOTAL	**3,297,000**	**150**	**0.34**	**1.23**	**1.76**
Proven + Probable (All Veins)		**4,642,000**	**135**	**0.33**	**1.33**	**1.93**

Table 6.13 Mineral Resources exclusive of Reserves reported by Fortuna as of December 31, 2011

Category	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Measured	574,000	100	0.31	1.17	1.75
Indicated	1,684,000	131	0.30	0.74	1.11
Measured + Indicated	**2,258,000**	**123**	**0.30**	**0.85**	**1.28**
Inferred	**3,258,000**	**112**	**0.36**	**0.99**	**1.50**

6.4 Production

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.

6.4.1 Compania Minera Arcata

Production prior to 2005 came primarily from the San Cristóbal 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 1990's, 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 6.14. Production figures prior to 1998 are unavailable.

Table 6.14 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	
Head grade Au (g/t)	1.27	0.89	0.67	0.60	0.23	
Recovery Ag (%)	85.1	87.7	87.0	87.2	87.4	
Recovery Au (%)	78.9	72.9	61.6	68.2	55.2	
Concentrate produced (t)	4,623	4,756	6,698	7,725	6,735	
Concentrate grade Ag (g/t)	7,115	7,913	8,097	8,235	12,209	
Concentrate grade Au (g/t)	27.29	17.68	10.31	9.45	3.05	
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

6.4.2 Minera Bateas

Production under Minera 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 6.15.

Table 6.15 Production figures during Minera Bateas management of Caylloma

Production	2006	2007	2008	2009	2010	2011	2012	Total
Ore processed (t)	33,460	250,914	331,381	395,561	434,656	448,866	462,222	2,357,060
Head grade Ag (g/t)	76	73	95	155	159	171	177	145
Head grade Au (g/t)	0.37	0.66	0.45	0.47	0.40	0.36	0.40	0.44
Head grade Pb (%)	1.12	1.70	2.48	3.10	2.44	2.15	1.99	2.32
Head grade Zn (%)	2.33	2.93	3.65	3.66	3.10	2.68	2.56	3.06
Head grade Cu (%)	-	0.12	0.17	0.25	0.21	0.18	0.16	0.18
Production Ag (oz)*	55,529	442,741	805,056	1,685,026	1,906,423	2,008,488	2,038,579	8,941,842
Production Au (oz)*	166	3,328	2,197	2,747	2,556	2,393	2,781	16,168
Production Pb (t)	309	3,771	7,485	11,400	9,695	8,926	8,113	49,699
Production Zn (t)	603	6,300	10,561	12,900	11,855	10,625	10,158	63,002
Production Cu (t)	0	0	0	86	465	16	-	567
* Recovery of silver and gold from lead and copper concentrate								

Production rates were increased at the operation in 2011 from around 1,000 tpd to approximately 1,300 tpd. The plant has the potential to increase production to 1,500 tpd but is presently restricted by power availability. The use of onsite power generators is regarded as being too expensive and uneconomical therefore Minera Bateas is currently working to increase power availability through the national grid.

7 Geological Setting and Mineralization

The following description of regional and property geology is summarized from several reports including: Echavarria et al, (2006); CMA (2004); CAM (2006); CAM (2009) and Chapman and Vilela (2012).

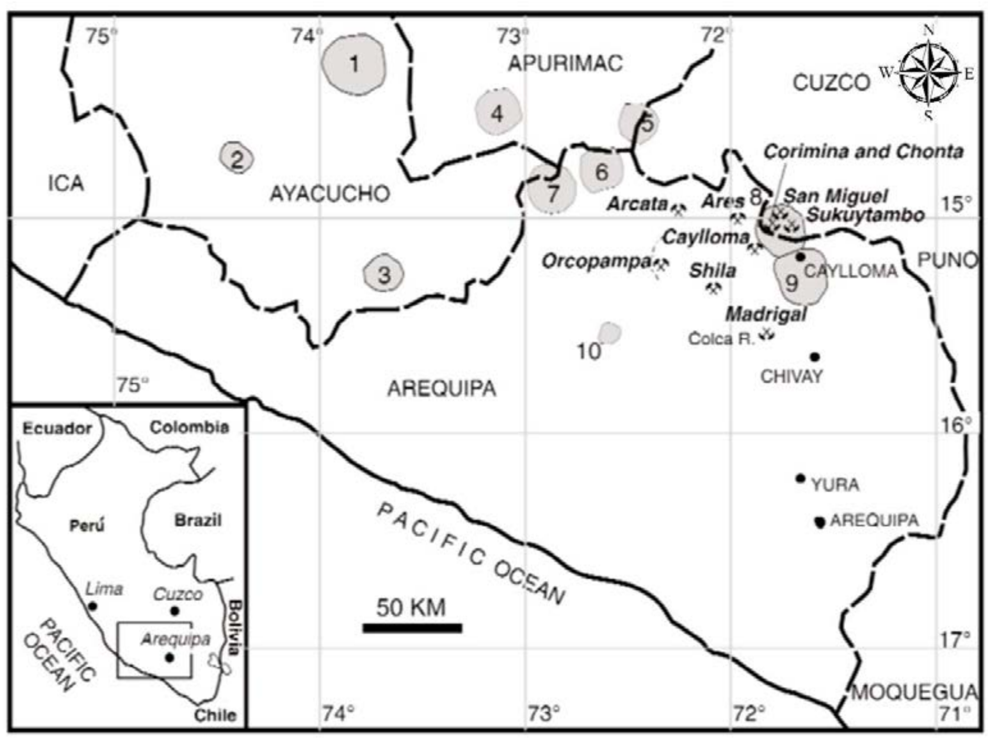
7.1 Regional geology

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 comprised 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 17 Ma and 22 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 comprised of 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 from Echavarria et al (2006)

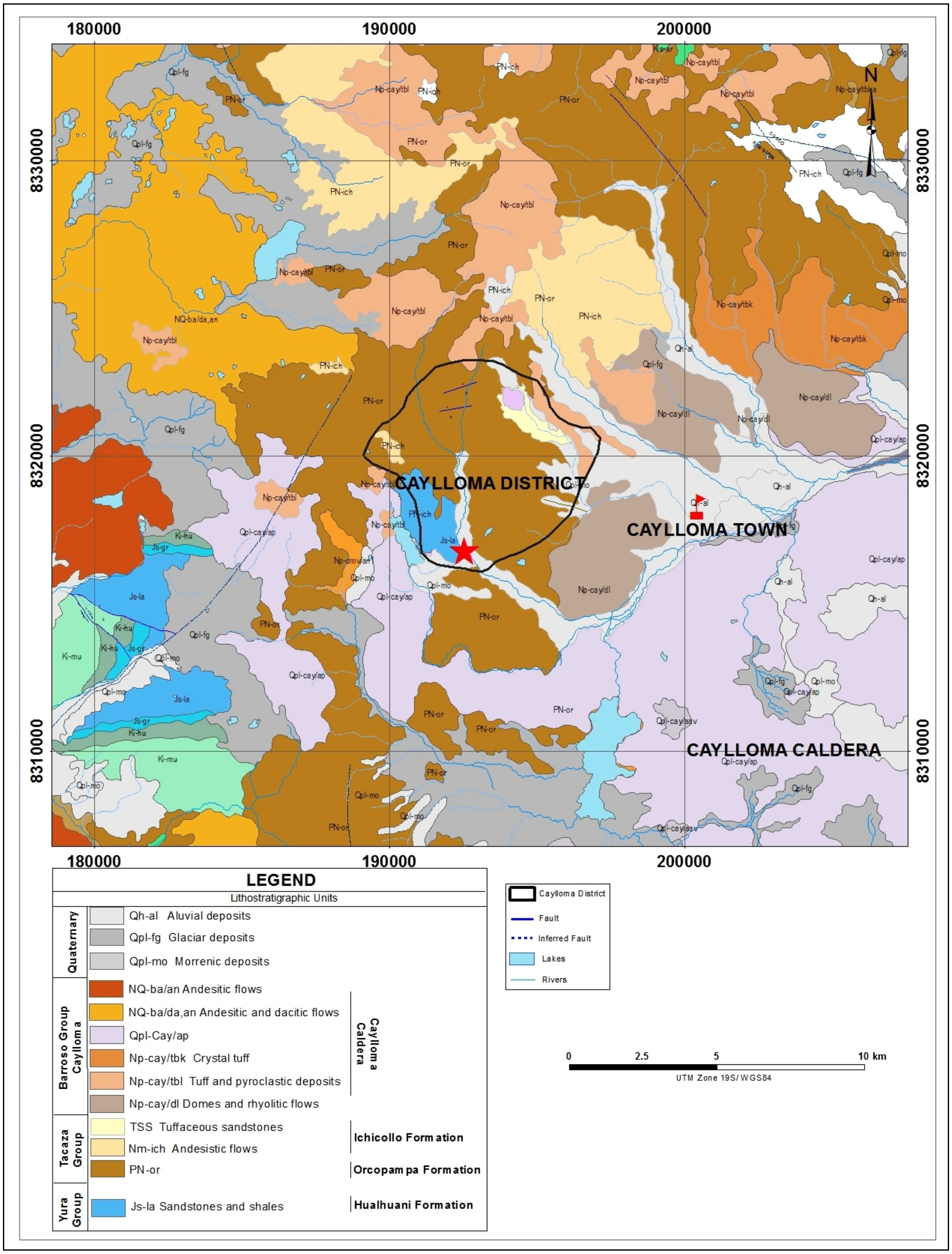


Principal Neogene calderas (gray) and epithermal deposits of the region (after Noble et al, 1989). Calderas: 1 = Ccarhuarazo, 2 = Pampa Galeras, 3 = Parinacocha, 4 = Tumiri, 5 = Teton, 6 = San Martín, 7 = Esquillay, 8 = Chonta, 9 = Caylloma, and 10 = Coropuna.
Bold dashed line = political (department) boundaries.

7.2 Local geology

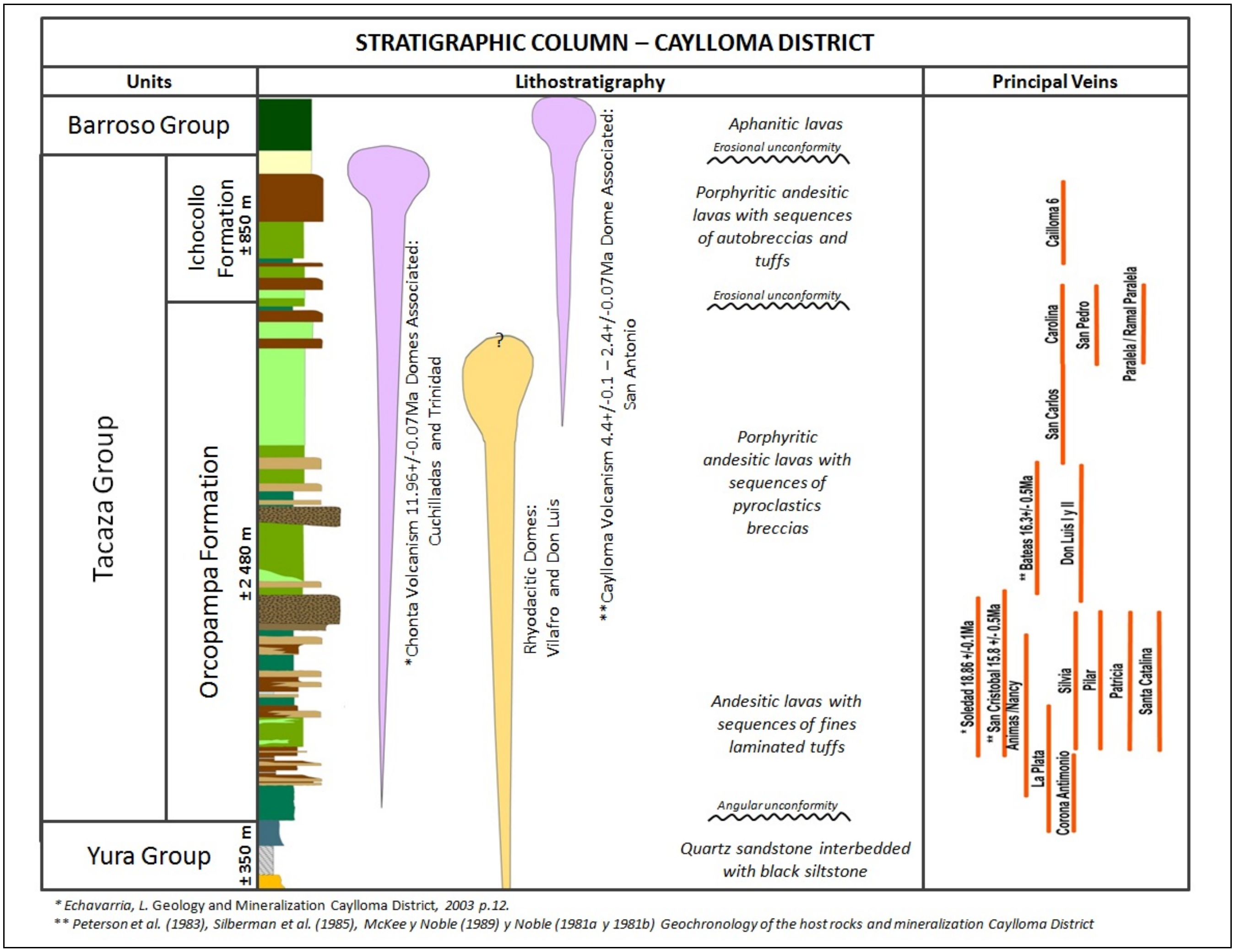
The mining district of Caylloma is located northwest of the Caylloma Caldera Complex (Figure 7.2).

Figure 7.2 Local geologic map of Caylloma District (INGEMMET; Sheet 31-S)



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

Figure 7.3 Stratigraphic column of Caylloma District



7.2.1 Yura Group

The oldest rocks exposed in the Caylloma District belong to the Yura Group of Upper Jurassic to Lower Cretaceous age. The Yura Group is composed of 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.

Evidence from outcrops indicates 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 where only open folds have been observed 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 is comprised of 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 sandstones, breccias and greenish to purplish gray lavas of andesitic composition. The Ichocollo Formation unconformably overlies the Orcopampa Formation and is considered 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 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.

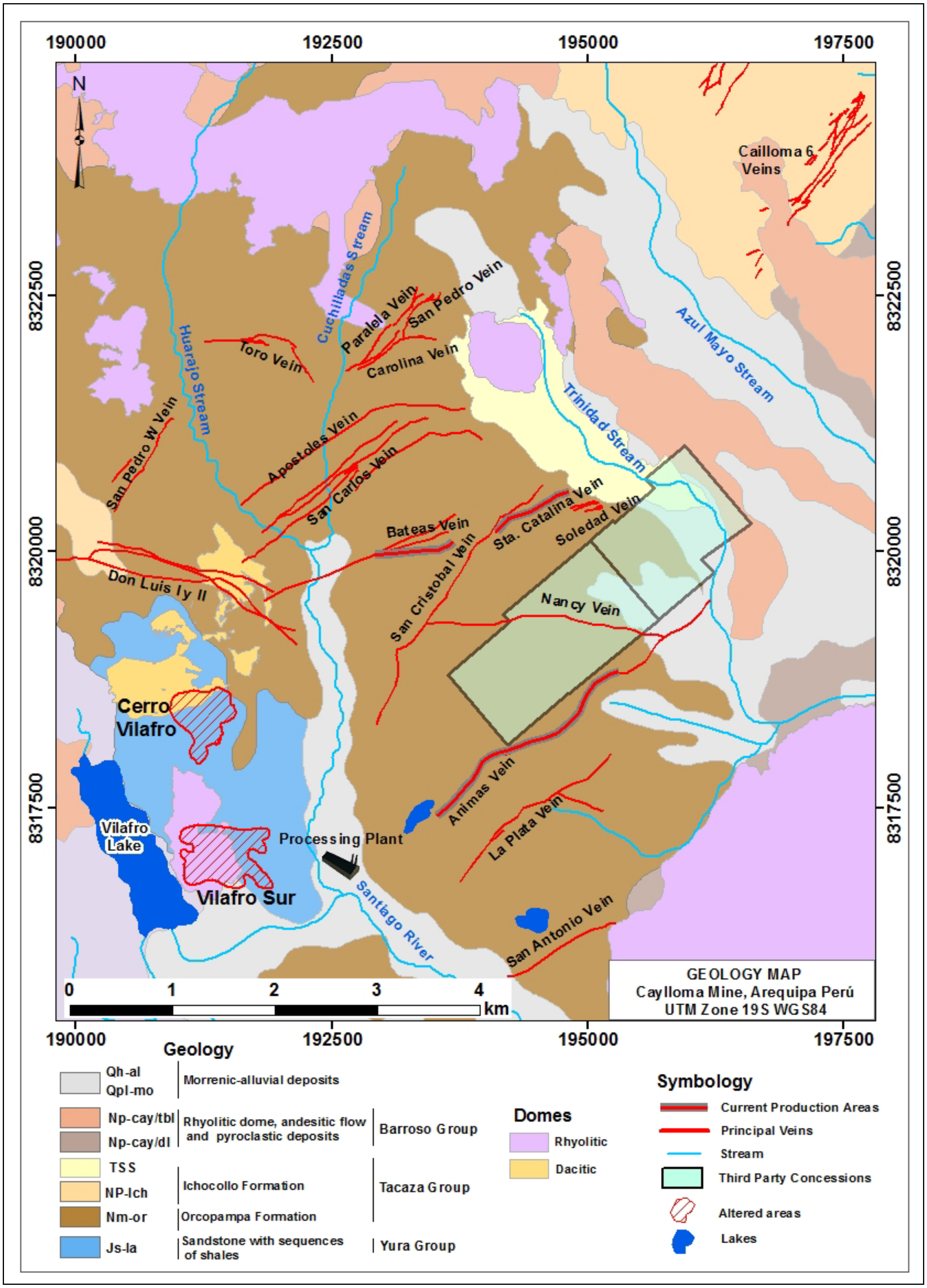
7.2.5 Intrusive igneous rocks

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 and is interpreted to be pre-mineral.

7.3 Property geology

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

Figure 7.4 Geology map of Caylloma Property showing vein systems



7.3.1 Epithermal mineralization

There are two distinct types of mineralization at the Caylloma Property, one with predominately elevated silver values (San Cristobal, La Plata, Bateas, San Carlos, Apostoles, San Pedro, El Toro and Trinidad 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 any secondary silver enrichment.

7.3.2 Hydrothermal alteration

Three types of hydrothermal alteration have been identified at the Caylloma Property: (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. 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 part of the vein system. The alteration assemblage in the upper area 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 and perhaps unrelated to mineralizing events. The propylitic alteration is a fine aggregate of chlorite, epidote, calcite and pyrite.

7.4 Description of mineralized zones

Veins in the Caylloma District show structural patterns and controls typical of other vein systems hosted by Tertiary volcanic rocks in the western Peruvian mountain 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 very 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.

Veins are tabular in nature, with open spaces, filled by episodic deposition. 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 Property all 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 meters, averaging approximately 1.5 m for silver veins and 2.5 m for polymetallic veins.

7.4.1 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 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 Techo, La Plata, Cimoide La Plata, San Cristobal, San Pedro, San Carlos, Paralela, and Ramal Paralela.
2) Eureka, Copa de Oro, El Toro, La Blanca, Santa Rosa, and Santa Isabel, Trinidad, Elisa, Leona, Apóstoles, Jerusalén, Santo Domingo, La Peruana, Alerta, Carolina, Don Luis and Cercana.

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

Bateas & Bateas Techo

The Bateas vein splits into two branches, Bateas Techo is the southern branch, and Bateas is the northern branch. The Bateas Techo vein outcrops on surface for approximately 1,800 m and can be traced from the escarpment of Loma de Vilafro Hill extending to the northeast. At the summit of the hill the vein is covered by recent volcanic ash. 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, also known as the Bateas Piso vein, dips 52º to the northwest and has 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. As of December 2012 the Bateas vein exploration has been focused between 4,505 masl (level 12A) and 4,660 masl (level 10).

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 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 down to level 7 (4,745 masl). A splay of the La Plata has been identified, being referred to as the Cimoide La Plata. It has the same characteristics of 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. Its thickness ranges from 5 m to 6 m at the upper levels to 2 m to 2.5 m at the 4,600 masl lower levels (level 11). 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, with a general strike of 045º and dipping at 85º to the southeast. Thickness of the vein varies from 2 m to 3 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), and contains enrichment zones of up to 1,100 g/t Ag. The distribution of silver values in the vein shows a gradual decrease with depth. Core sampled from diamond drill holes drilled by CMA returned values ranging from 271 g/t Ag and 669 g/t Ag below 4,520 masl.

San Carlos

The San Carlos vein outcrops for approximately 300 m on surface; having a strike direction of 045° and dip of 75° to the southeast. Thickness of the vein varies from 0.8 m to 1.05 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 400 m on surface with a general strike of 040° and dipping at 72° to the southeast. Thickness of the veins ranges from 1 m to 1.25 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.

Carolina

This vein outcrops for 500 m on surface with a general strike of 075° and dipping at 73° to the southeast. Thickness of the vein ranges from 1.2 m to 2 m 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 assemblage of rhodonite, quartz, calcite and Ag sulfosalts; to the northeast the vein has a brecciated texture with assemblage of quartz, calcite, Mn oxides and Ag sulfosalts.

During the development of the 2012 Exploration Program, mineralization was recognized over 900 m along strike and extending to approximately 300 m in depth (level 4600 masl).

Don Luis I & II

This vein outcrops for 1,000 m at the surface, with a general strike between 95° to 115° and dipping at 40° and 68° to the southwest. Thickness of the vein ranges from 1.5 m to 2 m and has 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 exploration program demonstrated a mineralized column of approximately 300 m for the Don Luis veins.

7.4.2 Polymetallic veins

A series of polymetallic veins has been identified in the southern and central portion of the Caylloma Property. 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, Santa Catalina, Soledad, Silvia, Pilar, Patricia, and Nancy 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

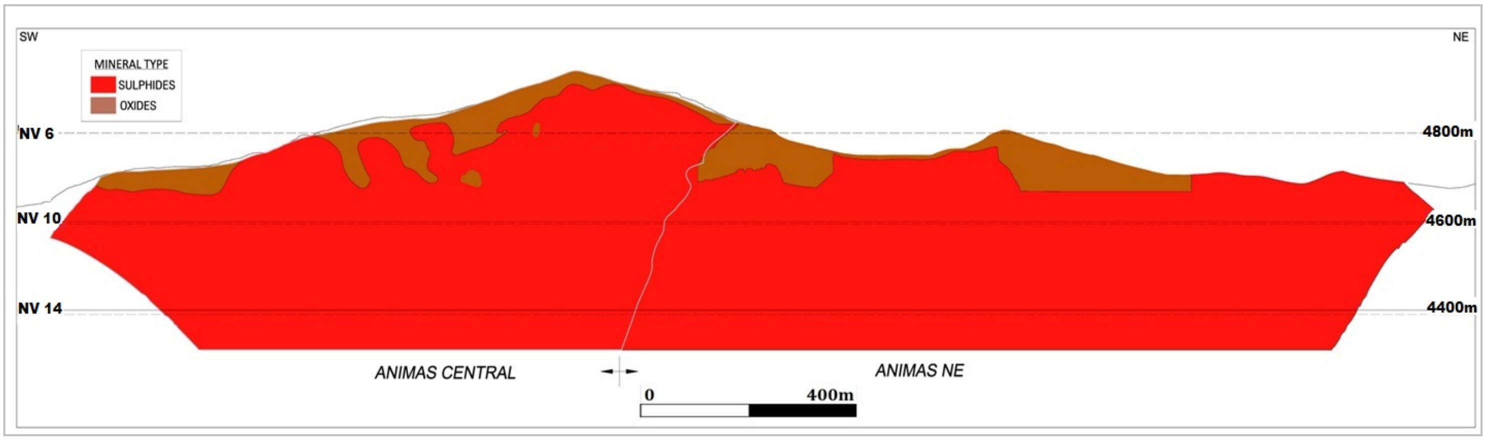
The Animas vein is one of the most prominent and well-defined structures in the southern portion of the property. It is a base metal-rich polymetallic vein that is divided into two parts based solely on a fault structure that disrupts the vein's continuity. The vein to the southwest of the fault is known 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 12 (4,495 masl) in the mine. Several wide zones (over 12 m to 14 m thick) are observed in levels 6, 9 and 10 (4,800 masl, 4,645 masl, and 4,595 masl respectively), especially in lateral exploration cross-cuts. The 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 3.8 km. Vein thickness can be up to 14 m, but averages approximately 4 m 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 m to 12.40 m in the extreme northeast

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.

The mineralization present in all veins is sulfide with the exception of the uppermost portions of the Animas/Animas NE vein. The Animas vein has been explored close to the surface and a supergene oxide horizon has been identified extending to a variable depth below the surface based on the presence of iron oxides and lesser amounts of manganese oxides. Figure 7.5 displays the extent of the oxide horizon in the Animas vein.

Figure 7.5 Long section of Animas vein showing oxide-sulfide horizon



Santa Catalina

Surface outcrops of this vein extend over a distance of 700 m along a strike of between 245° to 260º, dipping at 65º to 80º to the northwest with an average thickness on surface of 1.90 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 banding and massive structures. Tectonic breccias are present in the footwall and hanging wall of the vein. Minera 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 exposed at the surface for approximately 250 m, being located to the northeast of the Santa Catalina vein. It has a strike of 248º to 251º and a dip of 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 have confirmed the vein continues down to at least level 8(4,720 masl). The vein has an average thickness at depth of 1.1 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 andesite with pseudo-stratification and intercalated volcanic sediments.

Silvia

The Silvia vein is discontinuously exposed on the surface over a strike distance of approximately 200 m. The thickness of the vein ranges from 0.8 m to 1.8 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.

Pilar

The Pilar vein is considered to be part of the San Cristóbal system. The vein has been identified over a strike length of 85 m 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 average thickness of the vein is 2 m, with 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.

Nancy

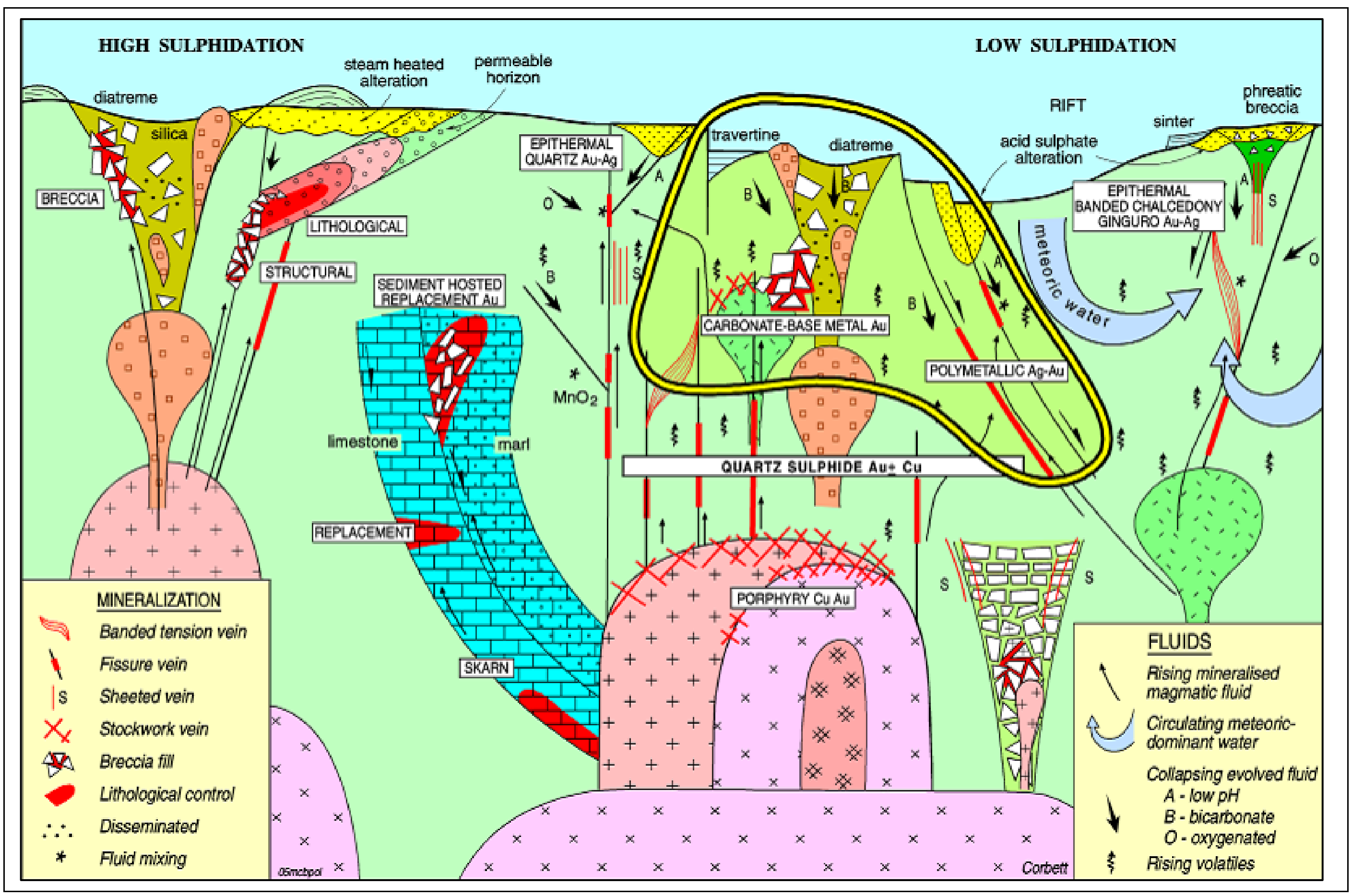
The Nancy Vein outcrops discontinuously over a distance of approximately 1,000 m. The strike of the vein ranges between 110˚ to 120˚ while dipping 60˚ to 70˚ to the southwest. The width of the vein ranges from 0.5 to 4.5 m, being wider near its intersection with the Animas Vein. Mineralization is polymetallic 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 explored by diamond drilling over approximately 400 m of its strike length and to a depth of approximately 250 m (elevation 4,420 masl).

8 Deposit Types

The Caylloma polymetallic, silver-gold 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.

The characteristics described above have resulted in the Caylloma veins being classified as belonging to the 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 (Echavarría et al., 2006). Host rock alteration adjacent to the veins is characterized by illite and widespread propylitic alteration.

Figure 8.1 Idealized section displaying the classification of epithermal and base metal deposits sourced from Corbett (2002)



9 Exploration

Mining activity in the Caylloma District dates back to workings by Spanish miners in the 1620s. English miners carried out activities in the late 1800s and early 1900s. The property was acquired by Compania Minera Arcata in 1981 who implemented a series of exploration programs to complement their mining activities prior to the closure of the operation in 2002.

Fortuna acquired the property in 2005 and placed it into production in September 2006 with a refurbished mill. Fortuna has continued to conduct extensive exploration of the property since the acquisition.

9.1 Exploration conducted by Compania Minera Arcata

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

9.2 Exploration conducted by Minera Bateas

Since 2005 exploration activities have been directed by Fortuna.

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 seven square kilometers. The survey was performed using an IRIS ELREC Pro receptor with a symmetrical configuration poly pole array with spacing of 50 meters 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, induced polarization (IP) and resistivity studies were carried out by Quantec Geoscience over Cerro Vilafro and Vilafro South, covering an area of 17 kilometers in IP/resistivity studies with a pole-dipole array configuration with spacing of 50 meters between electrodes and 31.6 kilometers in magnetometry studies. The survey was performed using an IRIS ElREC-Pro receptor and GEM GSM-19 Overhauser respectively. Coincident anomalies of chargeability and resistivity have been identified in the Cerro Vilafro area; drill testing of these anomalies is planned for the first semester of 2013.

9.2.2 Surface channel sampling

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

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 with samples ranging from 0.2 m and 1.0 m in length. Care is taken to ensure samples are representative, homogeneous and free of contamination.

Channel widths vary between 0.2 m and 0.3 m. Channels are cleaned beforehand by removing a layer of approximately 0.02 m of surface material, which tends to be highly weathered and unrepresentative of the structure. Once the surface material is removed the sample is extracted using a hammer and chisel, with the average sample weight being 3 kg.

The sample is bagged and a label inserted recording the following information; channel azimuth and inclination, structural, lithological and mineralogical descriptions. The UTM coordinate of the first sample is recorded using a handheld GPS. The spatial locations of subsequent samples in the channel are estimated from the first sample according to the azimuth and inclination of the channel and the length of each sample.

Exploration has focused on the delineation of major vein structures such as Animas, Bateas, Santa Catalina, Soledad and Silvia. However 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.

9.2.3 Mapping

Animas

During 2006 and early 2007, a surface mapping campaign of the Animas vein structure was conducted in the northeastern portion of the property. The mapping identified discontinuous outcrops of 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 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.

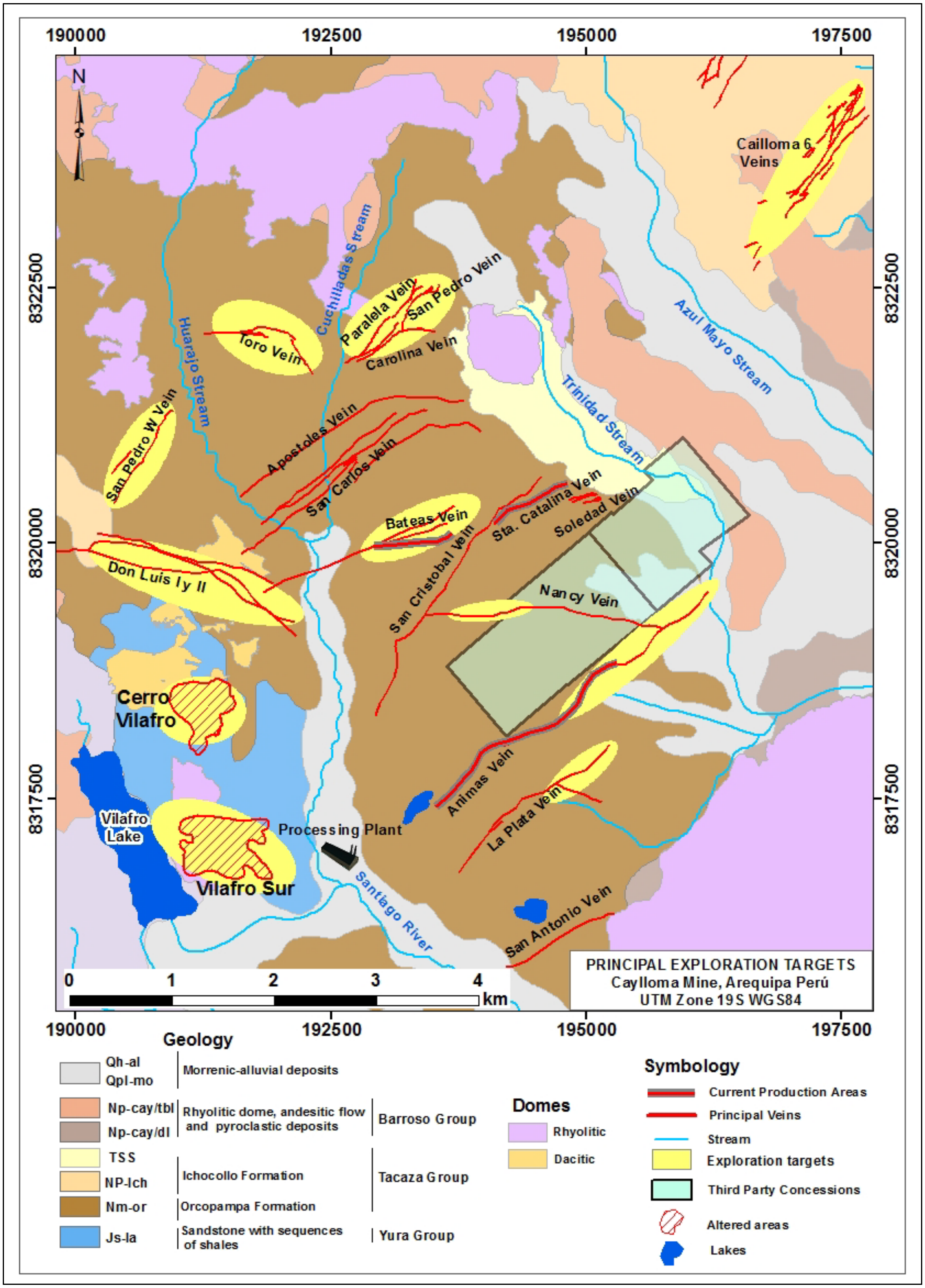
Antimonio

This vein was first recognized in the 1980s with the mapping of approximately 300 m of outcropping vein, with an average surface thickness of 2.0 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 Property, geological mapping and geochemical analysis identified the presence of the vein over a total distance of 1 km striking in a northeast to southwest direction. Geochemical sampling of the vein returned values of up to 3.13 g/t Au, 401 g/t Ag and concentrations greater than 10,000 ppm Sb, as well as elevated arsenic and base metal grades. The presence of stibnite in this vein suggests a later stage of mineralization.

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, being described in Section 10. Exploration has been conducted from the surface as well as from underground workings of the mine.

Figure 9.1 Plan map showing principal exploration targets



Silvia

The Silvia vein outcrops on surface discontinuously over a distance of approximately 200 m, varying in thickness from 0.80 m to 1.80 m with a variable strike direction of between 250° to 262° and dipping at 65° to 82° to the northwest. The vein is composed of rhodonite, rhodochrosite, quartz and calcite associated with sulfides such as sphalerite, galena, chalcopyrite and sulfosalts of silver (pyrargyrite). It has a banded to massive texture with varying band widths of basic sulphides. The host rock is an andesitic volcanic rock with propylitic-chloritic alteration.

Exploration continues to be conducted from underground developments and galleries to characterize the polymetallic mineralization.

Soledad

The Soledad vein has been mapped on surface over a length of 250 m running parallel with the Santa Catalina vein, and displaying a similar strike (248º to 251º) and dip (76 ° to the northwest). The vein is approximately 0.45 m in thickness, having a banded texture consisting of sphalerite, galena, chalcopyrite, gray copper, silver sulfosalts, and disseminated pyrite. Two well-defined mineralization events have been identified in the vein; the first event corresponds to banded rhodonite with the presence of anomalous gold sulfides, and a second event, which disrupts the first, consisting of rhodochrosite with disseminated silver and quartz veinlets.

The structure of the Soledad vein continues to be explored from underground (via the Santa Catalina workings). A structural control to the mineralization has been observed with faults of both pre- and post-mineralization origin being identified.

Patricia

In 2010, exploration of the Patricia vein commenced and was carried out from underground with the drilling of seven drill holes (described in Section 10) designed to investigate the vein structure at 4,725 masl.

San Cristobal

There has been limited new exploration by Minera 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 property and is known to have enriched silver concentrations compared to other veins at the property. From 2006 to 2008 exploration drilling (described in Section 10) was conducted in order to explore the mineralization potential at depth. In 2011 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 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.

Santa Catalina

Santa Catalina is a vein that has been exploited historically. Exploration by Minera Bateas commenced in 2006 with a series of drilling programs as described in Section 10

Nancy

From 2006 to 2008 reconnaissance work and geological mapping was conducted on portions of the Nancy vein not covered by glacial moraine. Surface samples returned anomalous values of up to 461 g/t Ag and 5.63 g/t Au. In 2007, resistivity and induced polarization geophysical surveys were conducted in the area, with high chargeability anomalies providing evidence of potential mineralization. Exploration drilling, as described in Section 10, has confirmed the presence of an important structure at the property. The structure is open laterally and at depth.

La Plata

The La Plata vein is associated with infilling of a fault oriented northeast to southwest 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.

Mineralogy consists of quartz, calcite, banded rhodonite, johannsenite (silicate of calcium and manganese) in the presence of silver sulfosalts, tetrahedrite and manganese oxides. In the first half of 2011 exploration of the vein was resumed 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 that returned values of up to 0.36 g/t Au, 302 g/t Ag and locally values greater than 10,000 ppm Sb.

Vilafro

In December 2005 samples were collected from the Vilafro area (887 ha) 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 for the Vilafro area. 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 zones of interest 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 NE-SW trending vein swarm. The mineralization is hosted by Cretaceous quartzites and is currently being 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).

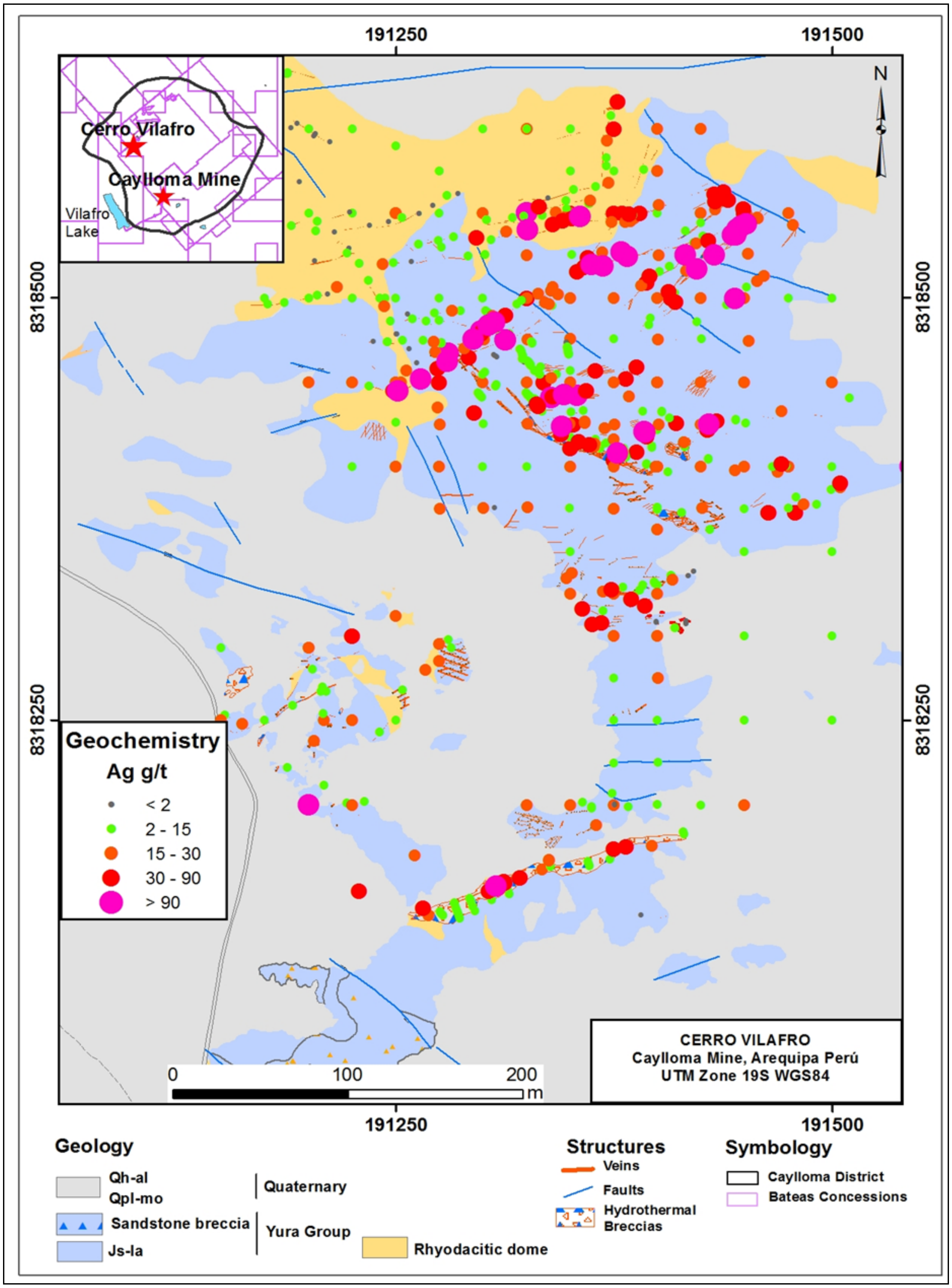
Highlights of the surface channel sample results at Cerro Vilafro include the following mineralized intervals:

- CH 503715: 0.40 m averaging 3.23 g/t Au and 827 g/t Ag
- CH 503708: 0.40 m averaging 2.14 g/t Au and 2,440 g/t Ag
- CH 503716: 0.95 m averaging 0.83 g/t Au and 459 g/t Ag
- CH 503726: 0.25 m averaging 0.57 g/t Au and 791 g/t Ag

- CH 503615: 0.60 m averaging 0.41 g/t Au and 661 g/t Ag

Initial drill testing of the Cerro Vilafro target is planned for the second quarter of 2013 (Figure 9.2).

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



Vilafro Sur

The Vilafro Sur lithocap with advanced argillic alteration assemblages extends over 1,000 m in a NW-SE direction and ranges up to approximately 400m 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:

- Au: low, ranging to maximum of 32 ppb
- Ag: low, generally less than 5 ppm
- Ag/Au ratio: low, ranging from 10 to 74
- As: generally low, ranging to 90 ppm, a few values greater than 300 ppm with a maximum value of 1,230 ppm
- Ba: moderately to strongly anomalous with values generally in the 100 to 500 ppm range; maximum of 1,220 ppm
- Bi: low, generally below detection limit, one anomalous value of 39 ppm
- Cu: generally low with values ranging to approx. 35 ppm; maximum value of 224 ppm
- Hg: generally less than 2 ppm
- K: moderately anomalous with values typically in the range of 0.20 to 0.50 %; maximum of 0.52 %
- Mo: low, generally less than 5 ppm; one anomalous value of 39 ppm
- Pb: low, generally less than 50 ppm, a couple of outlier values ranging to 150 ppm
- Sb: low to moderately anomalous ranging to 50 ppm; maximum value of 117 ppm
- Zn: low, generally less than 50 ppm, single outlier value of 228 ppm

The geochemical signature of the Vilafro Sur lithocap is not unlike that found at certain high sulfidation style deposits. Future exploration will need to focus on detailing the structural and alteration history of the area in order to locate potential structural feeders of the system and any possible subjacent porphyry system.

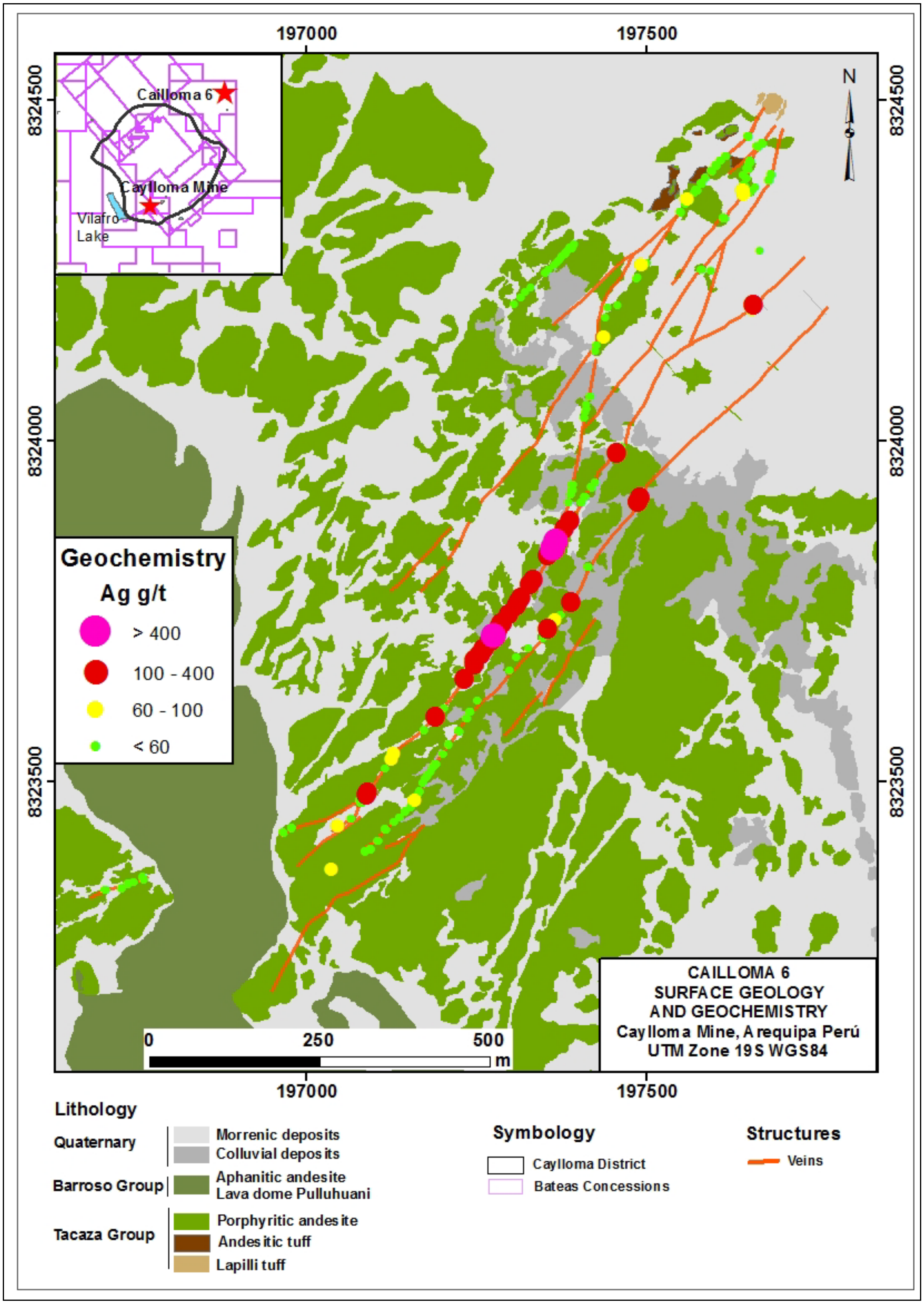
Cailloma 6

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. The length of the outcropping vein is approximately 1,650 m with widths ranging from 0.2 m to 0.8 m. To the northeast, the veins form a sigmoidal loop of 500 m length with three splits of 100 m to 150 m of length. The host rock is andesitic flows with a porphyritic texture.

The mineralization is composed by veinlets and cavity fillings of quartz with crustiform texture, silver sulfosalts disseminations, hematite, goethite, and manganese oxides. The hydrothermal alteration bordering the vein is comprised 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).

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



Highlights of the surface channel sample results include the following mineralized intervals:

- CH 505473: 0.70 m averaging 0.184 g/t Au and 776 g/t Ag
- CH 505469: 0.20 m averaging 0.382 g/t Au and 419 g/t Ag
- CH 505510: 0.70 m averaging 0.141 g/t Au and 122 g/t Ag
- CH 504999: 0.25 m averaging 0.667 g/t Au and 82 g/t Ag
- CH 505450: 0.30 m averaging 0.511 g/t Au and 267 g/t Ag

Other veins

In 2010 remapping of vein structures in the northern portion of the Caylloma District was carried out in order to improve their structural interpretations and evaluate the potential for significant epithermal mineralization.

9.2.4 Recent exploration activities

Exploration conducted between July 2011 and December 2012 has been carried out with a focus on increasing the silver-bearing mineral resources within the limits of the Minera Bateas concessions.

During 2012 a regional mapping and stream sediment sampling of the areas surrounding the Caylloma District were executed at a scale of 1:10,000 covering the 19,500 hectares of new concessions solicited in 2011.

In conjunction with an extensive drilling program, a comprehensive geological review has been performed throughout the area in order to better understand the structural behavior of the district and redefine potential exploration targets. Regional exploration work included:

- Geological fieldwork (mapping, outcrop sampling)
- Geological and structural mapping of the district
- Identification of 36.4 km of additional vein structures on surface (new veins and extensions)
- Surface sampling (channels and chips)
- Re-logging of drill holes to better define the structure of the district, as well as the lithostratigraphic column
- Confirmation of continuity towards the northeast of the San Cristóbal vein (into the Cailloma 6 concession)

10 Drilling

Exploration and definition drilling has been conducted at the Caylloma Property by both CMA and Minera Bateas. Diamond drilling has been the preferred methodology with all other drilling techniques being unsuitable due to the terrain and the required depths of exploration.

10.1 Drilling conducted by Compania Minera Arcata

Minera Bateas were able to recover and validate information on 43 diamond drill holes totaling 7,159.32 m drilled by CMA between 1981 and 2003 on the Caylloma Property. 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 Minera 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
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	-	-
TOTAL	**12**	**3,380.40**	**31**	**3,778.92**

10.2 Drilling conducted by Minera Bateas

As of the end of 2012 Minera Bateas had drilled 637 drill holes on the Caylloma Property totaling 97,507.10 m of drilling completed since the company took ownership in 2005. All holes are diamond drill holes and include 276 from the surface totaling 68,889.95 m, and 361 from underground totaling 28,617.15 m. Table 10.2 provides a summary of the drilling used in the 2012 Mineral Resource update.

The collar locations of surface drill holes drilled by Minera Bateas at the Caylloma Property are displayed in Figure 10.1.

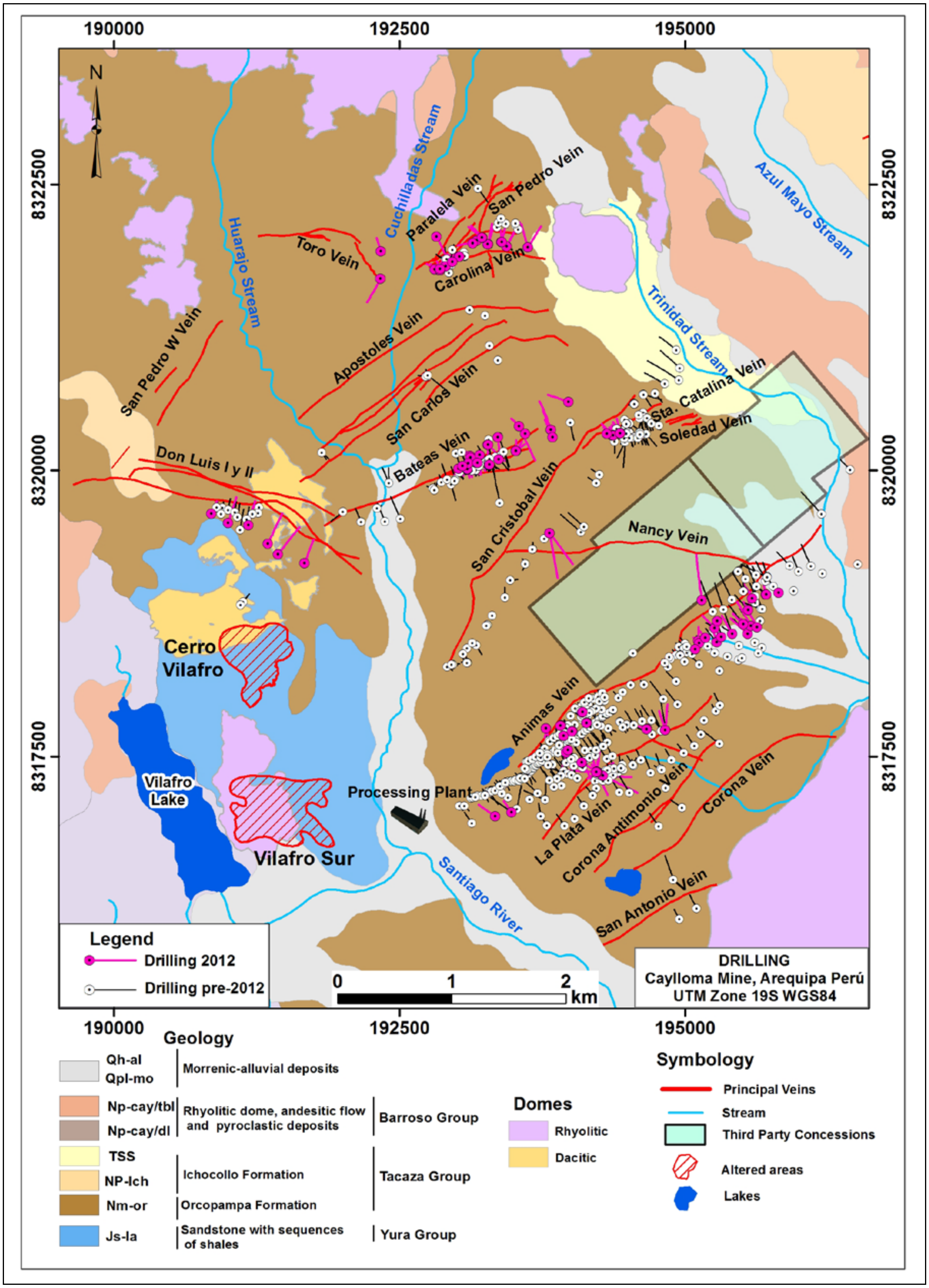
Table 10.2 Exploration drilling conducted by Minera Bateas

Vein	Year	Surface drilling		Underground drilling	
		Number	Meters	Number	Meters
Animas & Animas NE	2005	0	0.00	94	2,028.00
	2006	37	7,638.75	2	110.65
	2007	32	8,770.35	0	0.00
	2008	10	3,666.10	0	0.00
	2009	0	0.00	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

Vein	Year	Surface drilling		Underground drilling	
		Number	Meters	Number	Meters
Antimonio & Corona Antimonio	2006	5	1,117.50	0	0.00
Bateas	2007	7	2,786.10	0	0.00
	2008	4	1,594.20	0	0.00
	2009	0	0.00	10*	829.50
	2010	0	0.00	9*	510.20
	2011	2	640.55	38*	2,714.10
	2012	18	5,006.65	23	2,054.00
Carolina	2012	20	5,117.80	0	0.00
San Pedro	2012	6	2,456.00	0	0.00
Corona	2012	1	344.60	0	0.00
Lucia	2012	0	0.00	8	1,300.20
Toro	2012	1	177.70	0	0.00
Silvia & Soledad	2008	0	0.00	6	816.70
	2009	0	0.00	13	1,577.20
	2010	7	923.80	15	1,010.30
	2011	0	0.00	7*	591.30
	2012	0	0.00	17	1,634.30
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 Cristóbal & Santa Catalina	2006	3	551.00	10	480.55
	2007	0	0.00	8	850.60
	2008	0	0.00	4	700.10
	2009	0	0.00	0	0.00
	2010	0	0.00	0	0.00
	2011	4	1,396.15	4	527.80
Nancy	2006	1	86.60	0	0.00
	2007	6	1205.50	0	0.00
	2008	12	3,094.00	0	0.00
	2012	5	1,432.50	2	768.00
Don Luis II	2010	12	2,265.40	0	0.00
	2012	6	2,487.00	0	0.00
Vilafro	2010	2	304.30	0	0.00
La Plata & Cimoide La Plata	2005	0	0.00	7	289.05
	2006	11	2,262.30	11	709.20
	2007	0	0.00	0	0.00
	2008	0	0.00	0	0.00
	2009	0	0.00	0	0.00
	2010	0	0.00	0	0.00
	2011	11	2,495.85	0	0.00
	2012	0	0.00	3	812.05
Total	**2005-12**	**276**	**68,889.95**	**361**	**28,617.15**

*Definition drilling for ore control purposes

Figure 10.1 Map showing surface drill hole collar locations



Animas and Animas NE

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

During 2006, 37 drill holes totaling 7,638.75 meters 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 level and included nine drill holes, although only two holes intercepted any significant mineralization. Exploration drilling of the Animas central 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, 32 drill holes totaling 8,770.35 meters 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 Animas central area.

In 2008 the Animas structure was further explored through drilling of ten diamond drill holes including three drill holes to level 10 (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 a width of 4.7 m and averaging 83 g/t Ag.

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, twelve 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 ore shoot.

In 2012, 16 diamond drills totaling 4,275.80 m were completed from surface in order to estimate the resource potential of the Animas NE ore shoot. Additionally, two diamond drills totaling 690.40 were completed from the surface to evaluate the potential depth of Animas SW (ore shoot 1).

From underground, ten diamond drills 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 ore shoots 2 and 3. Additional drilling was carried out from underground drill stations to provide information for ore control purposes.

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 consisting of a gray silica matrix and fragments of quartz with sulfides. In 2008, twelve drill holes were drilled from surface totaling 3,094.00 m and resulted in a number of important 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, 5 diamond drill holes totaling 1,432.50 m were completed from the surface with the purpose of defining the resource potential of the Nancy Vein.

Bateas

A diamond drill program involving eleven 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 and manganese gangue minerals such as rhodonite, rhodochrosite, and alabandite.

In 2011, two diamond drill holes totaling 640.55 m were drilled from surface that successfully identified the continuity of the Bateas vein to the northeast with the most significant intercept being 1.6 m of mineralization with grades of 220 g/t Ag and 0.33 g/t Au. 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 up to the surface.

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 drills totaling 2,487.00 m were completed from the surface to define the potential of this structure and to better understand the morphology of the mineralized ore shoot. The results were favorable with drill hole DLUS001612 reporting 2.35 m width averaging 459 g/t Ag and 0.42 g/t Au.

Carolina

In 2012, 20 diamond drills 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 ore shoot. The most important intercept was in drill hole CARS000512 with 0.90 m width averaging 152 g/t Ag and 8.85 g/t Au.

San Pedro

During 2012, six diamond drills totaling 2,456.00 m were completed from the surface for the purpose of confirming reserves and to further explore the structure at depth. The results were not favorable, intercepting lower values than previously reported.

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.

El Toro

During 2012, one diamond drill 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. The results were favorable, intercepting 466 g/t Ag and 0.08 g/t Au over a width of 1.20 m in drill hole TORS000112.

La Plata and Cimoide La Plata

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

During 2006, eleven drill holes were drilled from surface to confirm the continuity at the extreme western portion of the La Plata vein, between the elevations of 4,550 masl and 4,700 masl. Results confirmed the continuity of the vein with grades between 20 g/t Ag and 100 g/t Ag and widths of 0.6 m to 1.2 m. Eleven 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 twelve drill holes targeting elevations between 4,600 masl and 4,700 masl, with the most significant intercept returning grades of 260 g/t Ag and 5.74 g/t Au over a vein width of 1.90 m.

In 2012 three diamond drill holes totaling 812.50 m were executed from underground for the purpose of evaluating the continuity of the mineralized ore shoot at the 4,600 masl. The best intercept was in drill hole LPLM003612 with 0.80 m averaging 359 g/t Ag and 0.32 g/t Au.

Silvia

In late 2007 and early 2008, a drilling program designed to investigate the Santa Catalina vein intersected the Silvia vein. Drill hole STCM000507 intercepted 0.60 m of mineralization associated with the Silvia vein returning elevated grades of lead (5.61 %), zinc (4.94 %), copper (1.05 %), and silver (152 g/t). Since 2008, underground development of level 7 (4,750 masl) of the vein has increased the understanding of the style of mineralization. At the end of 2008 diamond drill holes collared from level 8 of the Santa Catalina vein have been used to explore the Silvia vein.

During 2010, 15 drill holes totaling 1,010.30 m were drilled from underground to investigate the ore shoot between 4,800 masl to 4,670 masl. Results proved the continuity of the ore shoot with the best result intercepting 2.07 meters of mineralization averaging 319 g/t Ag and 0.66 g/t Au.

Definition drilling accounts for the underground drill holes drilled since 2011.

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 and returning high grades of silver (534 g/t), and gold (1.81 g/t). In late 2008, a drill campaign was conducted from underground to confirm the continuity of the structure to level 9 (4,650 masl) of the vein.

In 2010, seven diamond drill holes totaling 923.8 m were drilled from surface to explore the Soledad vein to a depth of approximately 4,800 masl. The drilling intersected the mineralized structure with most significant intercept being a 1.3 m length averaging 135 g/t Ag and 0.62 g/t Au.

Patricia

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

In 2011, an additional twelve drill holes were completed from underground to evaluate the continuity of the vein and allow a preliminary estimate of the Inferred Resource.

Pilar

In 2011, two exploration drill holes were completed from the underground workings of the San Cristóbal vein to investigate the continuity of the Pilar vein. Both holes intersected the Pilar structure, being approximately 1.0 m in thickness and comprised of 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 varies from 0.7 m 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.

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 diamond drill holes from surface.

In 2011, a single drill hole was completed to investigate the Antimonio/Corona Antimonio veins at depth. The hole failed to intersect any significant mineralization.

San Cristobal

From 2006 to 2008, drilling was performed from surface and underground in order to explore the mineralization potential at depth from level 11(4,540 masl) to level 12 (4,500 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 Cristóbal vein to the northeast and identified the structure on surface in the Cailloma 6 concession (Figure 9.1).

San Catalina

Exploration of the Santa Catalina vein by Minera Bateas commenced in 2006 with a drilling program from surface focused on investigating level 8 (4,720 masl). In 2007 exploration continued through underground drilling to test the vein between level 8 (4,720 masl) and level 9 (4,773 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.

Vilafro

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

10.3 Diamond drilling methods

Minera Bateas has used a variety of different drilling contractors to carry out exploration drilling since it took ownership of the property 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.

Proposed surface drill hole collar coordinates azimuths and inclinations were designed based on the veins known orientation 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.

Drill core is stored in waterproof cardboard 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.

10.4 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 %. 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.

10.5 Extent of drilling

Drill holes are typically drilled on sections spaced 40 m to 60 m apart along the strike of the vein with surface drilling in 2012 focusing on exploring the extents of the Animas, Bateas and Nancy veins and underground drilling used for a mix of exploration and resource and 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 veins strike length (Animas), to the least having only a couple of drill holes extending over 50 m (Antimonio).

10.6 Drill hole collar surveys

The coordinates for the proposed drill hole collar location are determined through assessing the azimuth and inclination of the 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 GPS. The drilling 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.

10.7 Downhole surveys

The geologist in charge of drilling is responsible for measuring 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 Minera Bateas drill holes and underground drill holes greater than 100 m in length with the exception of underground delineation drill holes that are not downhole surveyed but have an azimuth and dip reading taken at the collar.. Minera Bateas assess the downhole survey readings as a component of the data validation. If the underground drill hole is less than 100 m a minimum of two readings are taken to assess the trajectory of the hole.

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.

10.8 Drill Sections

Representative drill sections displaying the geologic interpretation of the Animas and Bateas veins are displayed in Figures 10.3 to 10.5. A plan view showing the location of the sections is provided in Figure 10.2.

Figure 10.2 Plan map showing orientation of geologic sections

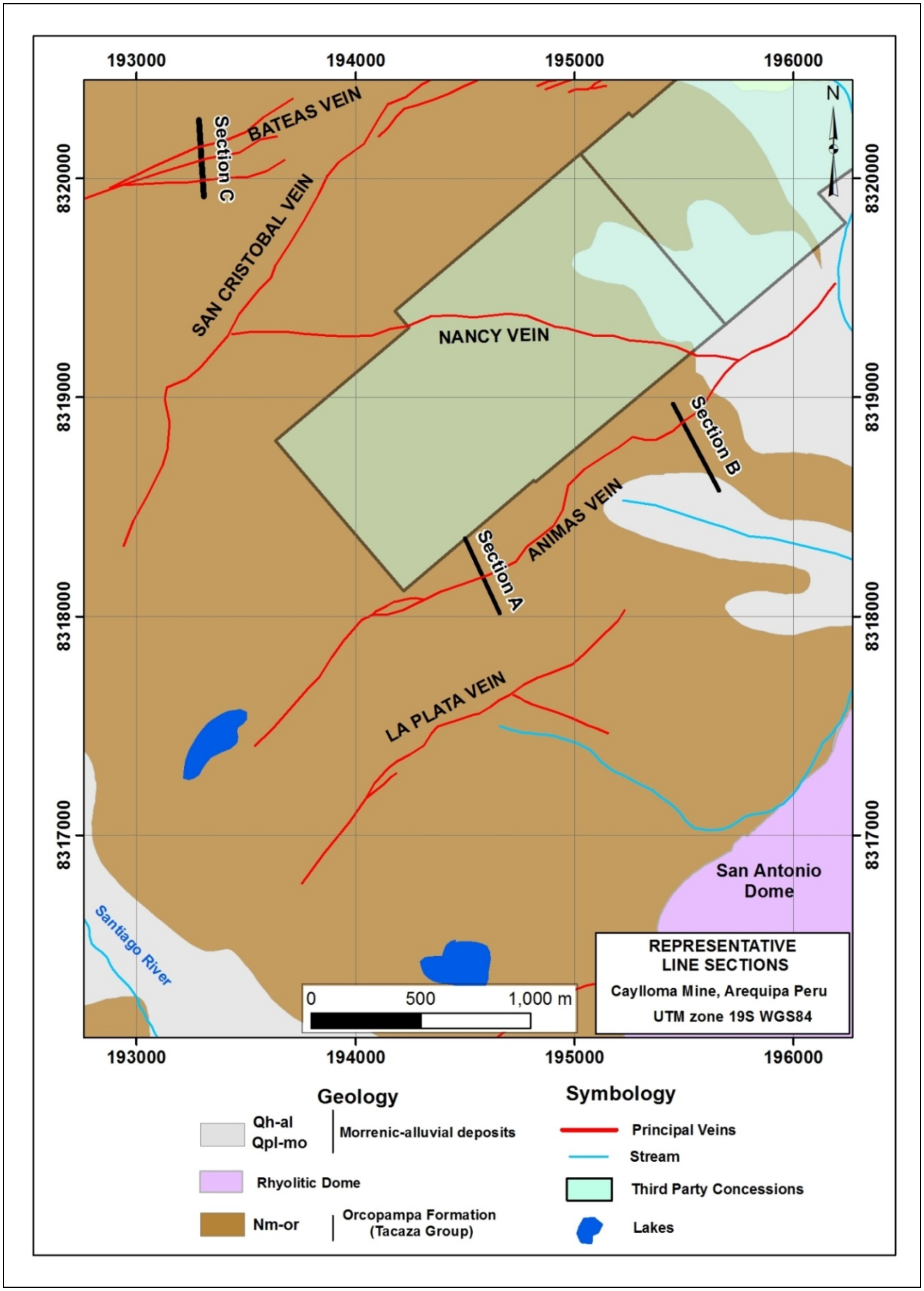


Figure 10.3 Geologic interpretation of Animas vein (Section A)

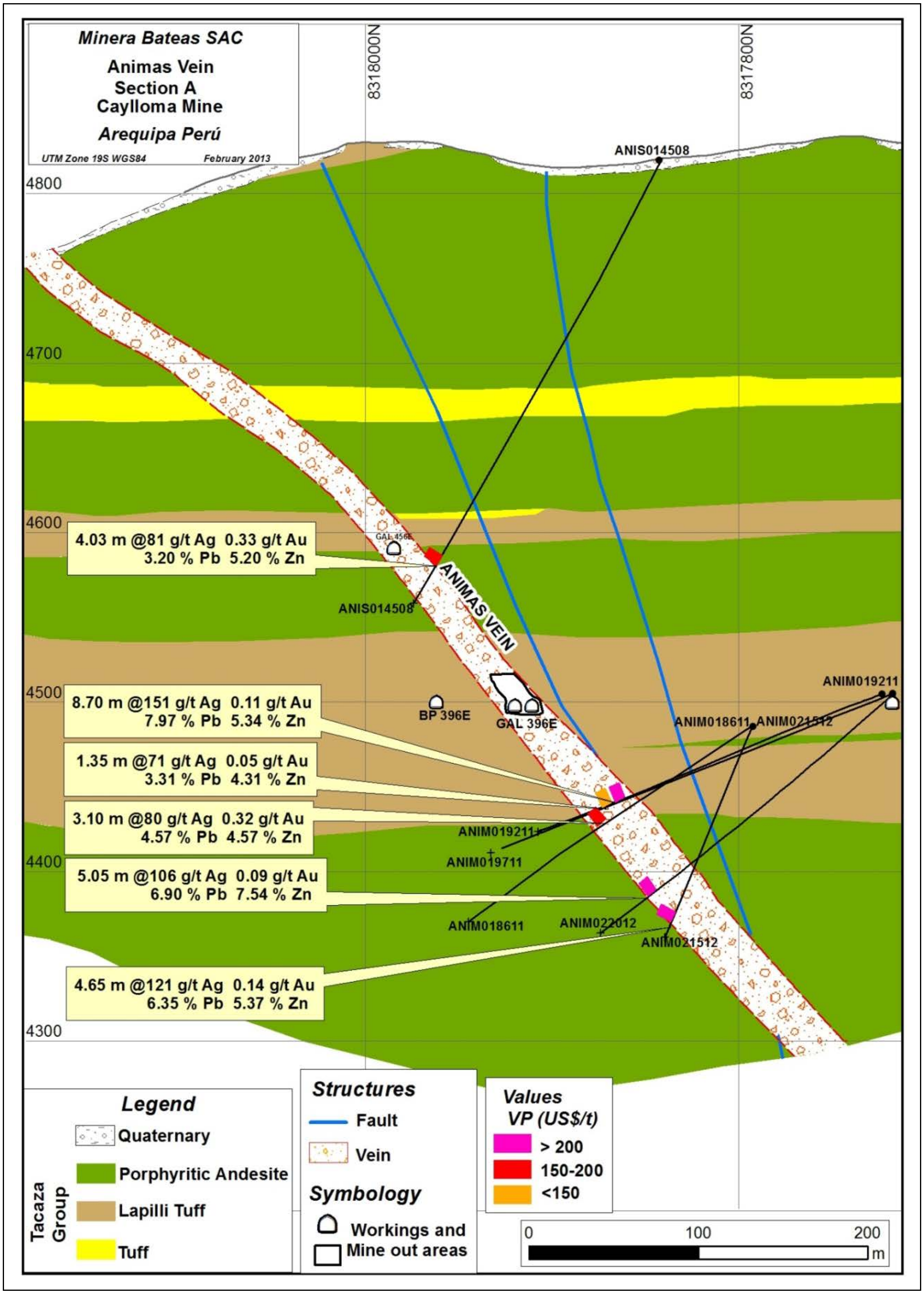


Figure 10.4 Geologic interpretation of Animas vein (Section B)

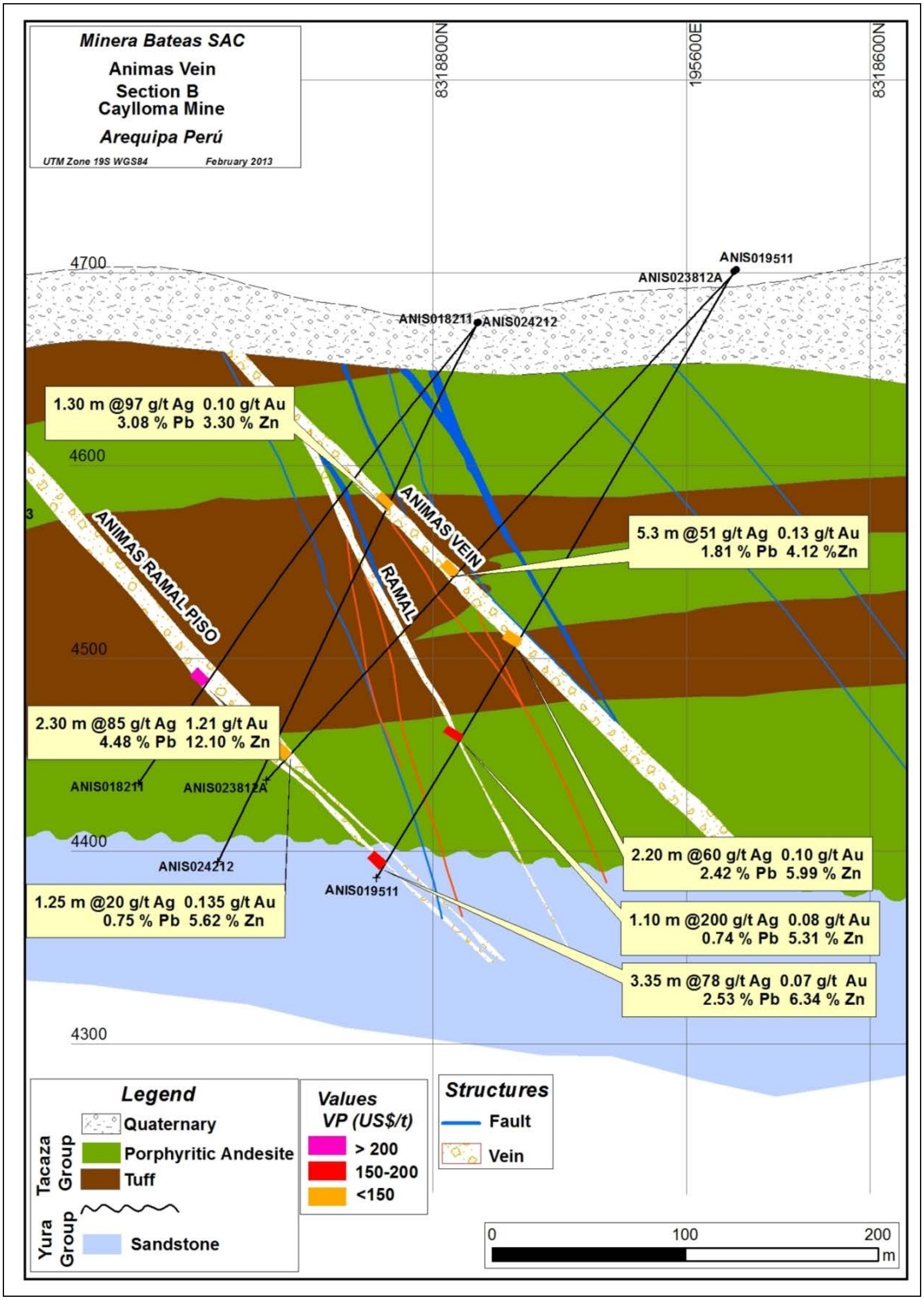
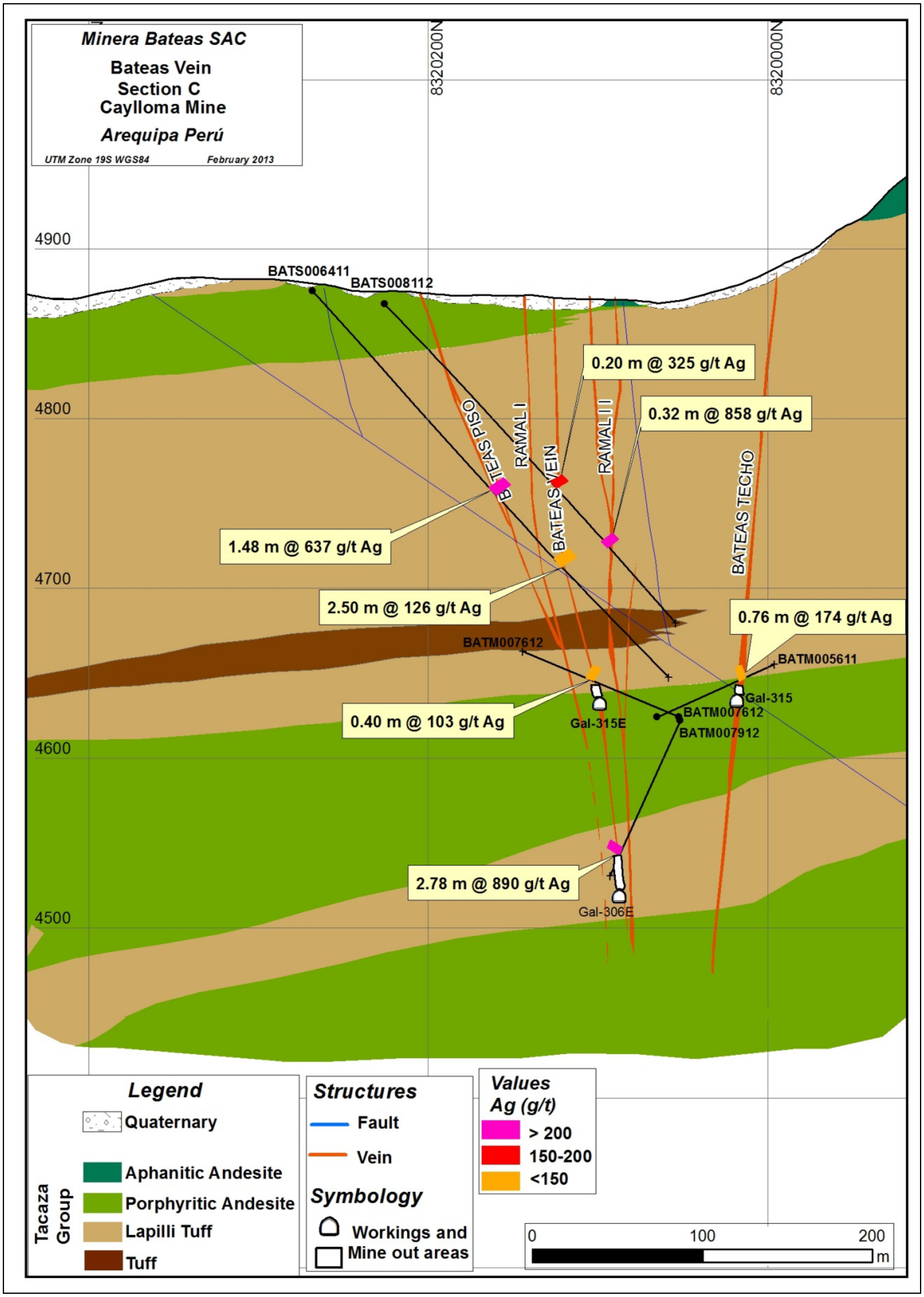


Figure 10.5 Geologic interpretation of Bateas vein (Section C)



11 Sample Preparation, Analyses, and Security

All samples at Caylloma are collected by geological staff of Minera Bateas with sample preparation and analysis being conducted either at the onsite Bateas laboratory (channel samples and underground development drill core) or the ALS Chemex laboratory in Lima (exploration drill core). The Bateas on-site laboratory is not a certified laboratory. Therefore, pulp splits and preparation duplicates, along with reference standards and blanks are routinely sent to the ISO certified ALS Chemex laboratory in Lima to monitor the performance of the Bateas laboratory.

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.

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 channels length and orientation 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. 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 pick 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 an evaluation of the Fundamental Sampling Error (FSE) 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 was 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 them based on geological and structural logging. The sample length must not exceed 1 m or be less than 10 cm.

Splitting of the core 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. Water used to cool the saw is not re-circulated but stored in drums to allow any fines to settle before final disposal.

Once the core has been split, half the sample is placed in a sample bag. A sampling card with the appropriate information is inserted with the core.

11.1.3 Bulk density determination

Samples for density analysis are collected underground using a hammer and chisel to obtain a single large sample of approximately six kilograms. The sample is always taken of mineralized material in the same locality as a channel sample. The coordinates of the closest channel sample is 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 sample is labeled and bagged prior to being stored in the storage facilities to await transportation with other samples to the ALS Chemex laboratory in Arequipa.

Density tests are performed at the ALS Chemex 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 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.

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 Minera Bateas onsite laboratory, or sent to the mine warehouse to await transportation (three times a week) to the ALS Chemex facility in Arequipa , and then on to the ALS Chemex laboratory in Lima for analysis.

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

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 ID's 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 ID's 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 Minera Bateas laboratory's preparation facilities have been inspected by Mr. Eric Chapman on various occasions 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 atomic absorption techniques. 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 atomic absorption.

11.3 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 Minera 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 Minera 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 surface drill core and exploration pulps are stored for the life of mine. Disposal of exploration coarse reject samples is performed after 90 days and is controlled by the exploration department. All underground drill core and pulps obtained during underground sampling are retained for the life of mine. Disposal of underground coarse reject samples is performed after 90 days and is the responsibility of the Geology Superintendent.

11.4 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 made to assess the reliability of sample assay data and the confidence in the data used for the estimation.

Minera Bateas routinely inserts certified standards, blanks, and field duplicates to the Minera Bateas laboratory and regularly sends preparation (coarse reject), and pulp duplicates along with standards and blanks to the umpire ALS Chemex laboratory.

Previous technical reports (CAM, 2006; CAM, 2009; Chapman and Vilela, 2012) have assessed the QAQC results of CMA and Minera Bateas and reported them as acceptable. These historical results were reviewed in 2011 by Fortuna and are regarded as acceptable according to industry best practices. A more detailed analysis has focused on the most recent results prior to the updated estimation including the performance of the Cuzcatlan laboratory over the twelve months prior to the June 30, 2012 data cut-off date (responsible for preparation and assaying of underground channel samples and development drill core) and the ALS Chemex laboratory over the 18 months prior to December 31, 2012 (responsible for preparation and assaying exploration drill core).

11.4.1 Standard reference material

Certified reference material (SRM) 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. SRMs 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 SRM of some sort. By comparing the results of a laboratory's analysis of a SRM to its certified value, the accuracy of the result is monitored.

SRMs, or standards, whose true values are determined by a laboratory, have been placed into the sample stream by Minera Bateas geologists to ensure sample accuracy throughout the sampling process. SRM results detailed in this Technical Report are presented in a tabular form; however results are assessed at the operation on a monthly basis using time series graphs to identify trends or biases.

<u>Bateas Laboratory</u>

This analysis focuses on the submission of 893 standards with channel samples between July 1, 2011 and June 30, 2012 to the Bateas laboratory which represents a submission rate of 1 in 34 samples. The grade characteristics of the eleven different SRMs used for analysis are provided in Table 11.1.

Table 11.1 Accepted values for standards inserted at Bateas laboratory

Standard	Silver (g/t)		Lead (%)		Zinc (%)		Gold (g/t)	
	Value	SD	Value	SD	Value	SD	Value	SD
CDN-FCM-6	156.8	3.95	1.52	0.03	9.27	0.22	2.15	0.08
CDN-HZ-3	27.3	1.60	0.707	0.018	3.16	0.08	0.055	0.005
CDN-ME-2	14.0	0.65	-	-	1.35	0.05	2.1	0.055
CDN-ME-4	402	12.5	4.25	0.12	1.10	0.03	2.61	0.15
CDN-ME-5	206.1	6.55	2.13	0.06	0.579	0.01	1.07	0.07
CDN-ME-6	101	3.55	1.02	0.04	0.517	0.02	0.27	0.014
CDN-ME-7	150.7	4.35	4.95	0.15	4.84	0.085	0.219	0.012
CDN-ME-8	61.7	2.35	1.94	0.04	1.92	0.04	0.093	0.009
CDN-ME-11	79.3	3.0	0.86	0.05	0.96	0.03	1.38	0.05
CDN-ME-16	30.8	1.1	0.879	0.02	0.807	0.02	1.48	0.07
CDN-ME-19	103	3.5	0.98	0.03	0.75	0.02	0.62	0.031

The results for blind SRM's inserted by the geology department to the Bateas laboratory are displayed in Table 11.2.

Table 11.2 Results for SRM's submitted to the Bateas laboratory

Standard	Silver (g/t)			Lead (%)			Zinc (%)			Gold (g/t)		
	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-FCM-6	100	0	100	100	0	100	100	0	100	100	0	100
CDN-HZ-3	1	0	100	1	0	100	1	0	100	1	0	100
CDN-ME-2	133	0	100	-	-	-	133	0	100	133	0	100
CDN-ME-4	82	1	99	82	0	100	82	0	100	82	0	100
CDN-ME-5	125	0	100	125	0	100	125	0	100	125	0	100
CDN-ME-6	106	0	100	106	0	100	106	0	100	106	0	100
CDN-ME-7	22	0	100	22	0	100	22	0	100	22	0	100
CDN-ME-8	147	0	100	147	1	99	147	1	99	147	0	100
CDN-ME-11	130	0	100	130	0	100	130	0	100	130	0	100
CDN-ME-16	12	0	100	12	0	100	12	0	100	12	0	100
CDN-ME-19	35	0	100	35	0	100	35	0	100	35	0	100
Total	**893**	**1**	**99.9**	**760**	**1**	**99.9**	**893**	**1**	**99.9**	**893**	**0**	**100**
*Fail being a reported value >± 3 standard deviations from SRM best value												

Submitted certified standards indicate the Bateas laboratory has acceptable levels of accuracy for silver, lead, zinc, and gold with only one failure for silver and one for lead. The assay results for most standards demonstrate little or no bias.

<u>ALS Chemex</u>

A total of 1,030 standards were submitted with drill core between July 1, 2011 and December 31, 2012 to the ALS Chemex facilities representing a submission rate of 1 in 10 samples.

The results for blind SRM's inserted by Minera Bateas to the ALS Chemex laboratory are displayed in Table 11.3.

Table 11.3 Results for SRM's submitted to the ALS Chemex laboratory

Standard	Silver (g/t)			Lead (%)			Zinc (%)			Gold (g/t)		
	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-FCM-2	39	12	69	39	2	95	39	2	95	39	0	100
CDN-FCM-3	9	0	100	9	0	100	9	0	100	9	0	100
CDN-FCM-6	102	0	100	102	4	96	102	2	98	102	2	98
CDN-HC-2	2	0	100	2	0	100	2	0	100	2	0	100
CDN-HLHC	9	0	100	9	7	22	9	1	89	9	0	100
CDN-HLHZ	39	0	100	39	5	87	39	5	87	39	0	100
CDN-HLLC	34	15	56	34	0	100	34	2	94	34	1	97
CDN-HZ-2	13	8	38	13	0	100	13	0	100	13	3	77
CDN-HZ-3	36	0	100	36	5	86	36	2	94	36	8	78
CDN-ME-2	83	0	100	0	-	-	83	2	98	83	2	98
CDN-ME-3	10	0	100	10	0	100	10	0	100	10	0	100
CDN-ME-4	21	0	100	21	0	100	21	3	86	21	0	100
CDN-ME-5	194	0	100	194	0	100	194	31	84	194	22	89
CDN-ME-6	13	0	100	13	0	100	13	0	100	13	0	100
CDN-ME-7	53	1	98	53	0	100	53	4	92	53	2	97
CDN-ME-8	70	2	97	70	0	100	70	1	99	70	0	100
CDN-ME-11	102	3	97	102	0	100	102	14	86	102	2	98
CDN-ME-12	33	0	100	33	0	100	33	0	100	33	0	100
CDN-ME-15	7	0	100	7	1	86	7	0	100	7	0	100
CDN-ME-16	10	0	100	10	0	100	10	0	100	10	0	100
CDN-ME-17	80	0	100	80	0	100	80	0	100	80	0	100
CDN-ME-19	15	0	100	15	0	100	15	0	100	15	0	100
CDN-SE-1	24	0	100	24	0	100	24	0	100	24	0	100
CDN-SE-2	32	0	100	32	0	100	32	2	94	32	0	100
Total	**1,030**	**41**	**96**	**947**	**24**	**97**	**1,030**	**71**	**93**	**1,030**	**42**	**96**
*Fail being a reported value >± 3 standard deviations from SRM best value												

Results for SRM's submitted to the ALS Chemex laboratory indicate a reasonable level of accuracy is maintained by the laboratory for the four elements of interest. The number of failures for zinc assays is approaching the acceptable limit of a 90 % pass rate and should be carefully monitored in the future.

11.4.2 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. Minera 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 960 blanks between July 1, 2011 and June 30, 2012 representing a submission rate of 1 in 31 samples. The results of the analysis for each element are displayed in Table 11.4.

Table 11.4 Results for blanks submitted to the Bateas laboratory

Silver (g/t)			Lead (%)			Zinc (%)			Gold (g/t)		
No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)
960	0	100	960	1	99.9	960	1	99.9	960	0	100

The results of the blanks submitted indicate that cross contamination and mislabeling are not material issues at the Bateas laboratory. Of the 960 blank samples submitted only one for lead and one for zinc exceeded the threshold limit indicating an excellent result.

ALS Chemex

A total of 1,022 blanks were submitted with drill core between July 1, 2011 and December 31, 2012 to the ALS Chemex facilities representing a submission rate of 1 in 10 samples.

The results for blind blanks inserted by Minera Bateas to the ALS Chemex laboratory are displayed in Table 11.5.

Table 11.5 Results for blanks submitted to the ALS Chemex laboratory

Silver (g/t)			Lead (%)			Zinc (%)			Gold (g/t)		
No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)	No. inserted	No. fails*	Pass rate (%)
1,022	3	99.7	1,022	3	99.7	1,022	6	99.0	1,022	4	99.6

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

11.4.3 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 11.6.

Table 11.6 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.

Duplicate Type	Description
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. The reference lines indicate different levels of precision.
- Ranked half absolute relative difference (HARD) of samples plotted against their rank % value. For preparation (coarse reject) duplicate samples, the sample threshold is accepted to be approximately 20 % or below at the 90th percentile, depending on the nature of mineralization.

Previous technical reports (CAM, 2006 and CAM, 2009, Chapman and Vilela, 2012) have assessed duplicate results and reported them as acceptable. Results obtained in previous years have been reviewed by Fortuna and are regarded as demonstrating acceptable levels of precision. A more detailed analysis has focused on the performance of the Bateas and ALS Chemex laboratory over the twelve months prior to the Mineral Resource update.

<u>Bateas Laboratory</u>

Minera 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 Chemex to provide an external monitor to the precision of the Bateas laboratory. Standards and blanks are also submitted with the reject and check assays to monitor the accuracy of the ALS results.

Results relating to the absolute relative difference for the various types of duplicates submitted to the Bateas laboratory between July 1, 2011 and June 30, 2012 are displayed in Table 11.7.

Table 11.7 Duplicate results for Bateas laboratory

Type of Duplicate	Metal	No. of duplicates analyzed#	Percent of samples meeting ARD* acceptance criteria
Field Duplicate[1]	Ag (g/t)	648	79
	Pb (%)	917	75
	Zn (%)	922	76
	Au (g/t)	579	77
Preparation dulpicate[2]	Ag (g/t)	306	100
	Pb (%)	363	100
	Zn (%)	364	100
	Au (g/t)	316	100
Laboratory Duplicate[3]	Ag (g/t)	2537	95
	Pb (%)	2981	86
	Zn (%)	3008	92
	Au (g/t)	224	80
Reject assays[4]	Ag (g/t)	629	95
	Pb (%)	881	86
	Zn (%)	914	92
	Au (g/t)	558	80
Check assays (pulps)[5]	Ag (g/t)	631	96
	Pb (%)	909	75
	Zn (%)	914	80
	Au (g/t)	607	56

*ARD = Absolute Relative Difference
Values that are less than x10 the lower detection limit for both laboratories have been excluded from the statistics.
1. Acceptable ARD value for field duplicates is >90% of the population being less than 0.3.
2. Acceptable ARD value for preparation duplicates is >90% of the population being less than 0.2.
3. Acceptable ARD value for laboratory duplicates is >90% of the population being less than 0.1.
4. Acceptable ARD value for reject assays is >90% of the population being less than 0.2.
5. Acceptable ARD value for “check assay” pulps is >90% of the population being less than 0.1.

In general precision levels are reasonable with the majority of ARD values being greater than 90%. Field duplicate results are lower than the accepted 90 % threshold level and subsequently through the year practices to improve the precision were implemented including; closer supervision of the sampling process; increasing the sampling mass; and estimation of the fundamental sampling error. These implementations resulted in an improvement in the precision levels through the year.

It should also be noted that precision levels for gold assays are lower than for the other elements. 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 high precision levels is not justified.

Duplicates sent to the umpire laboratory showed reasonable levels of precision between the two laboratories, although the lead and zinc results for check assays are below the accepted tolerance levels. The poor precision levels for zinc and lead were reported to the Bateas laboratory and measures taken to improve the analytical techniques resulting in an improvement in results for last quarter of 2012.

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

Minera Bateas relies on the insertion of preparation and laboratory duplicates by ALS Chemex to monitor precision levels of drill core samples submitted to the ALS facilities. Field duplicates, reject assays, and check assays were not submitted to ALS Chemex in the 18 months preceding the Mineral Resource update.

Results relating to the absolute relative difference for the preparation and laboratory duplicates submitted between July 1, 2011 and December 31, 2012 are displayed in Table 11.8.

Table 11.8 Duplicate results for ALS Chemex laboratory

Type of Duplicate	Metal	No. of duplicates analyzed#	Percent of samples meeting ARD* acceptance criteria
Preparation dulpicate[1]	Ag (g/t)	53	98
	Pb (%)	116	97
	Zn (%)	137	90
	Au (g/t)	40	96
Laboratory Duplicate[2]	Ag (g/t)	833	91
	Pb (%)	1,323	94
	Zn (%)	1,434	95
	Au (g/t)	548	79

*ARD = Absolute Relative Difference
Values that are less than x10 the lower detection limit for both laboratories have been excluded from the statistics.
1. Acceptable ARD value for preparation duplicates is >90% of the population being less than 0.2.
2. Acceptable ARD value for laboratory duplicates is >90% of the population being less than 0.1.

Results for duplicates submitted with drill core to the ALS Chemex laboratory show acceptable levels of precision are maintained at the laboratory, with the exception of laboratory duplicates for gold. This situation is being carefully monitored by Minera Bateas. Submission levels for preparation duplicates is low at one in every 320 samples for Ag and no blind duplicates (field, reject assays, or check assays) have been submitted with drill core to date. The QAQC policy was revised in 2012 and brownfields exploration are set to implement the submission of blind duplicates with drill core in January 2013.

11.4.4 Quality control measures employed by Compania Minera Arcata

It is understood from the technical reports submitted by CAM (CAM, 2005, CAM, 2006 and CAM, 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. However 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 Minera Bateas. Minera 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 Minera Bateas from the San Cristóbal 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.

11.4.5 Conclusions regarding quality control results

Analysis of standards and blanks submitted to both the Bateas laboratory and the independent ALS Chemex 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 generally reasonable 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 acceptable for the ALS Chemex laboratory although additional blind samples are required to ensure this is not an issue at the laboratory.

The high levels of accuracy, precision and lack of contamination indicate that grades reported from the Bateas and ALS Chemex laboratories are suitable for Mineral Resource estimation.

Fortuna was unable to verify the accuracy and precision of the CMA channel data with any certainty due to insufficient data. However assay results obtained this year in San Cristóbal tend to be lower than the reported CMA assays and if this trend continues the legitimacy of the CMA results would be called into question.

11.5 Opinion on adequacy of sample preparation, security, and analytical procedures

It is the opinion of Fortuna’s Mineral Resource Manager Mr. Eric Chapman (P. Geo.) that the sample preparation, security, and analytical procedures 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.

12 Data Verification

Minera Bateas mine site staff adhere to a stringent set of procedures for data storage and validation, performing verification of its data on a monthly basis. The operation employs a Database Administrator who is responsible for oversight of data entry, verification and database maintenance.

Data used for Mineral Resource estimation are stored in three databases. Minera Bateas information is stored in two of these databases, one stores data relating to the mine (including channel samples) and the other for storage of drilling results. Both databases are in a SQL Server format. A separate Microsoft Access database is used for the storage of recovered CMA information.

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. The databases are fully validated annually by Fortuna as part of the Mineral Resource estimation process. The database storing CMA information was not validated in 2012 based on the fact that no new information has been acquired since the previous validation in 2010.

A preliminary validation of the Minera Bateas databases was performed by Fortuna's Database Management team at the end of May 2012. The onsite databases have a series of automated import, export, and validation tools to minimize potential errors.

Both databases were then reviewed and validated by Mr. Eric Chapman, P. Geo. The data verification procedure involved the following

- Inspection of selected drill core to assess the nature of the mineralization and to confirm geological descriptions.
- Inspection of geology and mineralization in underground workings of the Animas and Bateas veins.
- Verification that collar coordinates coincide with underground workings or the topographic surface.
- Verification that downhole survey bearing and inclination values display consistency.
- Evaluation of minimum and maximum grade values.
- Investigation of minimum and maximum sample lengths.
- Randomly selecting assay data from the databases 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.

A small number of inconsistences were noted generally relating to coding (i.e. geological codes entered in both upper and lower case) and were subsequently corrected.

After correcting all inconsistencies, the databases were accepted as validated on June 30, 2012. A copy of the databases was stored in a designated folder on the server and no further data inputs were accepted after June 30, 2012 with the exception of brownfields exploration drilling information for the Animas and Animas NE veins that were accepted and validated as of December 31, 2012 following the same procedures detailed above. No inconsistencies were noted.

Based on the data verification detailed above, Fortuna's Mineral Resource Manager Mr. Eric Chapman, P. Geo. considers the Minera Bateas and CMA data to be suitable for the estimation of classified Mineral Resources and Mineral Reserves.

13 Mineral Processing and Metallurgical Testing

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

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

Silver recovery rates for 2012 were 77.33 %, compared to 81.43 % in 2011 and 85.67 % in 2010. Minera Bateas continues to work on optimizing the methods of mineral processing with focus on increasing silver recovery which has been declining since mid-2010. This has included the following test work in 2012:

1. Plant test work for oxides.

   Although no specific test work had been conducted, Minera Bateas metallurgists considered the material classified as oxides (material with irregular PbOx and ZnOx content) as not amenable for flotation processing. The declining silver recovery during 2012 was believed to be related to the presence of this oxide material.

   In order to evaluate the maximum metallurgical recovery associated with the oxide material in May 2012 the processing plant ran a test program during three days with material exclusively from the Ánimas vein upper level (Level 6) which is predominantly comprised of oxide material.

   The test work lasted approximately three days with a total treatment of 3,861 t with an average grade of 211 g/t Ag, 0.65 % Pb, and 0.89 % Zn. Average oxide content was 0.20 % PbOx and 0.26 % ZnOx. During the test work the average final grinding product was 55 % passing 75 microns.

   The maximum recoveries achieved during the test work were 63.98 % for silver, 46.45 % for lead and 32.35 % for zinc. The scenarios tested were primarily designed to test the amount and mix of reagents with no adjustments made for size grinding or selection.

   In order to optimize the metallurgical response of the oxide material more test work is required. Laboratory and plant tests are scheduled for 2013, as well as reagents response, finer grinding and flotation time test work.

   During 2012 approximately 76,000 t of oxide material was processed in the plant.

2. Mineralogical balancing of products for the lead circuit.

   In June 2012 Minera Bateas requested Blue Coast Metallurgy (BCM) to 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.

   Samples were collected by Minera Bateas from the lead circuit in June 2012 over a period of two weeks and sent to BCM in Canada.

Results show that most of the lead in the concentrate was in the form of galena (98.5 %) Most of the silver in the concentrate was in the form of tetrahedrite (66 %) with polybasite (21 %) and acanthite (13 %) making up the remainder of mineral species.

In the case of the tailings most of the lead was in the form of barysilite (45 %), galena (23 %) and coronadite (23 %) and most of the silver was polybasite (60 %) with also tetrahedrite (16 %) and acanthite (11 %).

In terms of size and liberation the study showed, in the case of the galena, very good recoveries of the liberated and partially liberated particles for all size fractions. The majority of the losses for the galena occurred on fully locked particles. Most of the lead in the tailings is present in mineral species with poor response to flotation.

The silver bearing particles in the tailings are much finer in size than those found in the concentrate and tend to be locked in the gangue. Most of the silver in the tailings is in the form of the same floatable minerals found in the concentrate.

According to the overall conclusion of the study the potential to increase metallurgical recoveries for lead and silver lies in finer grinding. Laboratory test work was recommended in order to define optimal grinding sizes and what can feasible be achieved in the processing plant.

By the end of 2012 and based on the BCM study as well as the results from the oxide test work some adjustments have been implemented in the processing plant aimed at improving the metallurgical performance:

1. Finer grinding.
    a. The grinding circuit configuration has been modified to achieve a more efficient grinding and size selection. Originally the primary mills worked with only one D-20 hydrocyclone and the underflow was distributed to the three secondary mills. Currently the D-20 cyclone has been replaced by two D-15 hydrocyclones. Each primary mill operates with its own hydrocyclone and secondary mills. Working pressure for the hydrocyclones was increased from 10 to 15 psi.
    b. The percentage solids of the pulp in the Comesa and Denver primary mills have been increased from 75 % and 70 % to 79 % and 75 % solids respectively.
    c. Adjustments to the grinding medium have been made. Steel balls used in the primary grinding process were previously divided into 60 % having a 4-inch diameter and 40 % having a 3-inch diameter. This has been changed so that 40 % have a 3.5-inch diameter and 60 % have a 3-inch diameter. For the secondary grinding the same size steel balls were maintained, 2-inch and 1.5-inch, however the proportional split was altered from 60 % and 40 % to 40 % and 60 % respectively.

With all these adjustments the plant has been able to achieve a finer final grinding product of 60 % passing 75 microns.

2. Flotation.
    a. The Z-11 and Z-6 collectors in the lead floatation circuit, which were previously added as a mixed solution, are now added independently assuring a superior effect and avoiding alteration in their properties.
    b. The quantity of Aerophine 3418 collector (a specific silver collector diluted with water to a 10 % concentration) has been increased from 5 g/t to 17 g/t in order to replace different secondary collectors used before November 2012.
    c. The quantity of Methyl Isobutyl Carbinol (MIBC) frother has been increased from 40 g/t to 68 g/t in order to speed up froth removal.
    d. In December 2012 the plant started operating a brand new 5,000-cfm blower which replaced the two previously operating units. The new blower has increased the airflow and pressure to the flotation circuit.

All these adjustments are being monitoring though the continuous operating test work and are still part of the improvement process but for November and December 2012 the plant achieved 80.60 % and 90.65 % average metallurgical recovery for silver and lead respectively. The composition of the material fed to the plant has not changed registering the same proportion of ore from the veins and levels as for the rest of the year, including the material described as "oxides".

Metallurgical recovery improvement is an ongoing process but based on the information from the test work and studies the plan for 2013 includes:

- The increase of the rougher flotation time in the lead circuit, currently 14 minutes, by replacing the current old flotation cells.
- The installation of a bank of four (04) D-15 hydrocyclones for the grinding circuit.
- Improve and modernize instrumentation especially for grinding and flotation in order to enhance current operating controls.

14 Mineral Resource Estimates

14.1 Introduction

The following chapter describes in detail the Mineral Resource estimation methodology of the veins warranting updating. These include the Animas, Animas NE, Bateas, Bateas Techo, Soledad, Silvia, Santa Catalina, La Plata, Cimoide La Plata, Patricia, Pilar, and San Cristóbal veins. The chapter also describes the first time estimation of the newly drilled Nancy vein.

If no new information for a vein was obtained since the previous resource statement (Fortuna, 2012) the previous result was retained. Veins that did not require updating included San Carlos, Paralela, Ramal Paralela, and San Pedro however classification of these veins was re-evaluated as part of the process. A summary of the estimation methodology used to estimate these veins has been included for completeness.

14.2 Disclosure

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

Mineral Resources are reported as of December 31, 2012. A preliminary Mineral Resource update was conducted using all drilling and channel data available as of June 30, 2012. The Mineral Resource estimate was revised as of December 31, 2012 to deplete the estimate of ore extracted between July and December of 2012 and to adjust the geological model to take into account any significant exploration drilling intercepts obtained over the same period. In the second half of 2012 extensive exploration drilling was conducted in the Animas (Central) and Animas NE veins resulting in these veins being re-estimated using the new exploration information available as of December 31, 2012.

Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

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:

Environmental

Minera 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

Minera Bateas has represented that permits are in good standing.

Legal

Minera Bateas has represented that there are no outstanding legal issues; no legal action, and injunctions are pending against the Project.

Title

Minera Bateas has represented that the mineral and surface rights have secure title.

Taxation

No known issues.

Socio-economic

Minera Bateas has represented that the Project has strong local community support.

Marketing

No known issues.

Political

Minera Bateas believes that the current government is supportive of the Project.

Other relevant issues

No known issues.

Mining

Minera 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 veins. Underground mining has also been successfully performed (prior to the collapse in silver metal prices in the late 1990's and early 2000's) by Compania Minera Arcata including extraction of mineralized material from the San Cristóbal, Bateas, Santa Catalina, San Pedro, Paralela, and San Carlos veins.

Metallurgical

Minera 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.

14.3 Assumptions, methods and parameters

The 2012 Mineral Resource estimates for new veins and those requiring updating (Animas, Animas NE, Bateas, Bateas Techo, Soledad, Silvia, Santa Catalina, La Plata, Cimoide La Plata, Patricia, Pilar, Nancy and San Cristóbal) 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 – Ag, Au, Pb, Zn, 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 a net smelter return (NSR) based on long term metal prices, metallurgical recoveries, smelting costs, commercial contracts, and average concentrate grades.
- Mineral Resource tabulation and reporting.

If no new information for a vein was available since the previous Mineral Resource estimation the grade values were not re-estimated. However the methodology and results were reviewed and updated metal prices and costs were applied to provide a current NSR value, and the resource classification was reassessed. This was the case for the San Carlos, Paralela, Ramal Paralela (a splay of the Paralela vein), and San Pedro veins.

14.4 Supplied data, data transformations and data validation

Minera Bateas information used in the 2012 estimation is sourced from two databases, one stores data relating to the mine (including channel samples) and the other for storage of drilling results. Both databases are in a SQL Server format. A separate Microsoft Access database is used for the storage of recovered CMA information.

The two databases storing the Minera Bateas channel and drill hole data have been used for the estimation of the Animas, Animas NE, Bateas, Bateas Techo, Silvia, Soledad, Santa Catalina, Patricia, Nancy and Pilar veins.

The database storing the historical CMA data has also been used for estimating the La Plata, Cimoide La Plata, and San Cristóbal veins. Additionally, veins that are reported but were not updated in the 2011 Mineral Resource estimate (Paralela, Ramal Paralela, San Carlos, and San Pedro) use CMA drill hole and channel data stored in this database.

Minera Bateas supplied all available data as of June 30, 2012, with the exception of the Animas and Animas NE veins that also utilized exploration drilling information available as of December 31, 2012.

14.4.1 Data transformations

Historical assays recorded by CMA were in troy ounces per tonne and these were transformed to grams per tonne by before being saved in the database. 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 2.4. Data preparation, block modeling and grade interpolations were performed in Datamine

Studio version 3.18.2751. Statistical and variographic analysis was performed in Supervisor version 8.

14.4.3 Data preparation

Collar, survey, lithology, and assay data exported from the drill hole database, mine (channels) database, and CMA database provided by Minera Bateas were imported into Datamine and used to build 3D 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 used in the geologic interpretation process during the Caylloma 2012 Mineral Resource estimate is shown in Table 14.1.

Table 14.1 Drill holes and channels used in the 2012 Mineral Resource estimate

Vein	Surface Drill holes		Underground Drill holes		Channels	
	Number	Meters	Number	Meters	Number	Meters
Animas	76	20,340	145	8,634	22,515	53,933
Animas NE	59	12,069			6,587	17,033
Silvia			28	2,644	1,176	1,871
Soledad	7	924	13	1,351	6,520	6,426
Santa Catalina	3	551	11	1,500	1,740	3,580
Bateas	32	10,427	66	5,005	8,438	6,655
Bateas Techo			3	838	179	178
Patricia			19	1,665	38	32
Pilar			2	144	129	106
La Plata*#	17	3,547	18	998	371	290
Cimoide La Plata*#					311	376
Paralela & Ramal Paralela*					623	936
San Carlos*					295	145
San Cristóbal*	2	883	17	1,676	5,201	10,030
San Pedro*			6	1,046	2,006	2,646
Nancy	23	5,362				
Total	**219**	**54,103**	**373**	**29,426**	**56,129**	**104,237**

Notes: Some drill holes intersect multiple veins. Number and meters were attributed to the primary target vein
* Includes CMA channel samples.
\# Drill holes intersect both La Plata and Cimoide La Plata veins.

14.4.4 Data validation

An extensive data validation process was conducted by the Database Management and Mineral Resource groups of Fortuna prior to Mineral Resource estimation with a more detailed description of this process provided in Section 12.

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 Ag 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 Property, all have a general northeast to southwest strike orientation and dipping predominantly to the southeast. Wall 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 Techo, La Plata, Cimoide La Plata, San Cristóbal, San Pedro, San Carlos, Paralela , and Ramal Paralela veins.

Polymetallic veins

- Animas, Animas NE, Santa Catalina, Soledad, Silvia, Pilar, Patricia, and Nancy veins.

For the estimation of Animas, Animas NE, Bateas, Bateas Techo, Santa Catalina, Silvia, Soledad, La Plata, Cimoide La Plata, Patricia, Pilar, Nancy, and San Cristóbal the mineralized envelopes were constructed by the Minera Bateas geological 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$30 (regarded as being potentially economically extractable). Prices used for determining the metal value were based on long term metal prices as reported by CAM (2012) and summarized in Table 14.2.

Table 14.2 Metal prices used to define mineralized envelopes

Metal	Price	
Ag	25.14	US$/oz
Au	1391.63	US$/oz
Pb	0.96	US$/lb
Zn	0.91	US$/lb

Veins estimated in 2010 (Paralela, Ramal Paralela, San Carlos, and San Pedro) were not modeled using wireframes. Instead AutoCAD was used to generate 2D polygons representing the mineralized envelope into which were estimated grade and thickness characteristics as obtained from CMA channel and drill hole data.

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). Minera 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
Bateas	1
Bateas Techo	1
Silvia	1.5
Soledad	1
Santa Catalina	2
Patricia	1
Pilar	1
La Plata	1
Cimoide La Plata	1
Nancy	1
San Cristobal	2

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.

In the case of Parallel, Ramal Parallel, San Carlos, and San Pedro the total channel length was used as the composite, i.e. each channel is considered a composite and represents the vein thickness.

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 2012 and further explained in Section 14.8.4.

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.

Table 14.4 Univariate statistics of undeclustered composites by vein

Vein	Grade	Count	Minimum	Maximum	Mean	Variance	Std. Dev.
Animas (Main)	Ag (g/t)	21,227	0.15	15,351	**133**	113,925	338
	Au (g/t)	21,227	0.001	168.36	**0.52**	7.99	2.83
	Pb (%)	21,227	0.0005	32.61	**1.90**	6.01	2.45
	Zn (%)	21,227	0.0005	31.13	**3.30**	10.10	3.18
Animas (Splay)	Ag (g/t)	199	1.29	153	**41**	853	29
	Au (g/t)	199	0.0121	4.68	**0.19**	0.11	0.33
	Pb (%)	199	0.0138	9.05	**2.06**	2.84	1.68
	Zn (%)	199	0.0197	12.32	**3.96**	5.67	2.38
Animas NE (Main)	Ag (g/t)	8,283	0.50	4,136	**120**	16,657	129
	Au (g/t)	8,283	0.0025	92.53	**0.34**	1.96	1.40
	Pb (%)	8,283	0.0005	44.56	**3.48**	15.68	3.96
	Zn (%)	8,283	0.0005	29.69	**4.01**	9.49	3.08
Animas NE (Splay)	Ag (g/t)	533	1.13	3,402	**153**	97,371	312
	Au (g/t)	533	0.0370	38.54	**1.06**	6.46	2.54
	Pb (%)	533	0.0502	14.11	**2.20**	5.48	2.34
	Zn (%)	533	0.1090	8.70	**2.03**	2.38	1.54
Bateas (Main)	Ag (g/t)	6,527	0.50	31,294	**801**	2,561,441	1,600
	Au (g/t)	6,527	0.0010	97.64	**0.23**	6.94	2.64
	Pb (%)	6,527	0.0005	10.19	**0.68**	0.73	0.86
	Zn (%)	6,527	0.0005	13.01	**0.99**	1.54	1.24
Bateas (Splay)	Ag (g/t)	59	0.50	996	**156**	38,470	196
	Au (g/t)	59	0.0025	0.41	**0.04**	0.00	0.06
	Pb (%)	59	0.0005	1.28	**0.07**	0.03	0.17
	Zn (%)	59	0.0005	2.19	**0.10**	0.08	0.28
Bateas Techo	Ag (g/t)	81	0.50	3,465	**168**	184,003	429
	Au (g/t)	81	0.0025	12.14	**0.28**	1.86	1.36
	Pb (%)	81	0.0005	2.12	**0.06**	0.06	0.24
	Zn (%)	81	0.0005	1.59	**0.09**	0.05	0.23
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)	6,499	0.50	52,224	**459**	1,994,228	1,412
	Au (g/t)	6,499	0.0018	187.56	**2.34**	40.50	6.36
	Pb (%)	6,499	0.0005	27.35	**1.38**	3.66	1.91
	Zn (%)	6,499	0.0005	15.06	**1.70**	2.39	1.55
Soledad (Splay)	Ag (g/t)	330	2.00	1,757	**170**	26,622	163
	Au (g/t)	330	0.0350	47.76	**3.68**	26.86	5.18
	Pb (%)	330	0.0150	26.66	**2.77**	5.63	2.37
	Zn (%)	330	0.0198	17.97	**4.61**	8.12	2.85
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

Vein	Grade	Count	Minimum	Maximum	Mean	Variance	Std. Dev.
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	0.0200	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
Nancy	Ag (g/t)	99	2.00	321	**79**	4,577	68
	Au (g/t)	99	0.0072	117.21	**1.99**	146.90	12.12
	Pb (%)	99	0.0305	21.10	**3.16**	15.21	3.90
	Zn (%)	99	0.0281	18.54	**3.50**	19.21	4.38
La Plata	Ag (g/t)	410	0.1	58,830	**3,014**	38,648,836	4,352
	Au (g/t)	410	0.0	267.8	**4.38**	292.72	12.18
Cimoide La Plata	Ag (g/t)	353	1.67	22,144	**499**	269,027,184	1,597
	Au (g/t)	353	0.0	137	**2.36**	93.80	9.69
Paralela (Main+splay)	Ag (g/t)	210	20.17	3900	**458**	363,211	603
	Au (g/t)	210	0.1	2.84	**0.98**	0.54	0.73
San Carlos	Ag (g/t)	294	15.55	3,060	**396**	327,777	572.52
	Au (g/t)	106	0.1	21.3	**74.64**	4.79	2.19
San Cristóbal	Ag (g/t)	4,232	1.44	11,737	**288**	428,795	655
	Au (g/t)	4,232	0.0016	3,105.99	**23.13**	17779.76	133.34
San Pedro	Ag (g/t)	752	9.95	4267	**611**	782,996	885
	Au (g/t)	298	0.1	151	**4.06**	144	11.98

14.6.3 Sub-domaining

Mineralization in the Animas and Animas NE veins has 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 has been identified. Samples have been coded as oxide or sulfide for estimation purposes.

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.

A high grade domain was identified and separated in the La Plata vein. The high grade domain is defined by the presence of 49 composite samples in a restricted region of the vein, averaging 10,510 g/t Ag and 16.16 g/t Au whereas the rest of the vein averages 1,997 g/t Ag and 2.78 g/t Au. The high grade region was sub-domained so as to prevent smearing of the higher grades into the lower grade domain.

Sub-domaining was not required for any other veins.

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.

Table 14.5 Topcut thresholds by vein

Vein	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Animas	2,500	12	25	20
Animas NE	1,000	3	30	20
Bateas	17,000	10	6	9
Bateas Techo	17,000	10	6	9
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	20,000	100	-	-
Cimoide La Plata	10,000	60	-	-
Nancy	-	5.5	12	15
Paralela	3,900	-	-	-
San Carlos	3,060	-	-	-
San Cristóbal	900	55	-	-
San Pedro	4,270	-	-	-

14.6.5 Boundary conditions

The boundary conditions at Caylloma are well established with underground workings identifying a sharp contact between the mineralized vein structure 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.

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 Bateas Techo, Patricia, Pilar, Paralela, San Carlos, San Cristóbal, Nancy, San Pedro and any splay veins. In the case of these veins inverse power of distance 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 OK 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	-44° → 164°	0.4	0.14	6,8,3	0.22	27,21,5	0.24	108,108,11
	Au	-07° → 067°	0.36	0.27	4,6,5	0.21	19,24,6	0.16	68,58,7
	Pb	-45° → 155°	0.32	0.07	7,7,3	0.17	16,18,7	0.44	108,85,15
	Zn	-45° → 155°	0.28	0.07	10,8,3	0.16	21,16,7	0.49	108,102,15
Animas NE	Ag	-45° → 130°	0.38	0.12	15,6,5	0.19	17,19,7	0.31	116,59,22
	Au	00° → 220°	0.48	0.07	6,17,6	0.12	22,48,7	0.32	160,95,16
	Pb	00° → 220°	0.25	0.19	11,4,5	0.22	22,12,7	0.34	94,41,8
	Zn	00° → 220°	0.24	0.14	6,7,4	0.32	15,13,6	0.3	114,39,7
Bateas	Ag	-20° → 062°	0.35	0.29	10,13,1	0.37	56,35,3		
	Au	-69° → 229°	0.57	0.21	8,8,3	0.22	45,38,5		
	Pb	-20° → 062°	0.3	0.19	9,13,1	0.51	46,33,3		
	Zn	-20° → 062°	0.25	0.21	9,9,1	0.54	49,39,3		
Silvia	Ag	00° → 250°	0.31	0.4	7,10,2	0.28	25,24,4		
	Au	00° → 250°	0.57	0.3	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		
Soledad	Ag	00° → 250°	0.3	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	0.3	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

Vein	Metal	Major axis orientation	C_0 §	C_1 §	Ranges (m)†	C_2 §	Ranges (m)†	C_3 §	Ranges (m)†
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 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 2012 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" as being either oxide (OX) sulfide (SR) or internal waste (RD). This code corresponds to that assigned to the sample data and has been used for estimation and reporting purposes.

The veins estimated in 2010 (Paralela, Ramal Paralela, San Carlos, and San Pedro) used an alternative methodology to that described above. The block models for these veins are two dimensional with blocks being rotated so that they are perpendicular to the vein (along strike and down dip) being 2 m by 2 m in size. Thickness and grade were then estimated into each block.

Table 14.7 Caylloma block model parameters

Vein	Rotation	Direction	Minimum	Maximum	Increment
Animas	53	X	194241	194439	4
		Y	8318016	8318132	2
		Z	4310	4941	4
Animas NE	72	X	195698	195800	4
		Y	8319061	8319150	2
		Z	4310	4807	4
Bateas	70	X	193712	193750	6
		Y	8320227	8320327	1
		Z	4391	4829	6
Bateas Techo	80	X	193456	193500	6
		Y	8320009	8320052	1
		Z	4381	4849	6
Silvia	85	X	194710	194800	8
		Y	8320195	8320290	1
		Z	4551	4973	6
Soledad	73	X	194961	195099	8
		Y	8320465	8320560	1
		Z	4601	4909	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
Pilar	75	X	194300	194710	8
		Y	8320150	8320325	1
		Z	4600	4965	6
La Plata	60	X	193660	194990	6
		Y	8316760	8317640	1
		Z	4460	4860	6

Vein	Rotation	Direction	Minimum	Maximum	Increment
Cimoide La Plata	60	X	193983	194957	6
		Y	8317050	8317539	1
		Z	4460	4812	6
San Cristobal	45	X	194826	194	8
		Y	8320946	8321050	1
		Z	4520	4950	8
Nancy	10	X	195430	195740	4
		Y	8319038	8319175	2
		Z	4431	4697	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 3 samples 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 maximum variogram range and requiring one composite was used. If the minimum number of samples required will still not encountered, no estimate was made.

14.8.4 Grade interpolation

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

Table 14.8 Estimation method by vein

Vein	Block Model Type	Estimation Method
Animas (Main)	3D	Ordinary Kriging
Animas (Splay)	3D	Inverse Power of Distance (power=2)
Animas NE (Main)	3D	Ordinary Kriging
Animas NE (Splay)	3D	Inverse Power of Distance (power=2)
Bateas (Main)	3D	Ordinary Kriging
Bateas (Splay)	3D	Inverse Power of Distance (power=2)

Vein	Block Model Type	Estimation Method
Bateas Techo	3D	Inverse Power of Distance (power=2)
Silvia	3D	Ordinary Kriging
Soledad (Main)	3D	Ordinary Kriging
Soledad (Splay)	3D	Inverse Power of Distance (power=2)
Santa Catalina	3D	Ordinary Kriging
Patricia	3D	Inverse Power of Distance (power=2)
Pilar	3D	Inverse Power of Distance (power=2)
La Plata	3D	Ordinary Kriging
Cimoide La Plata	3D	Ordinary Kriging
Nancy	3D	Inverse Power of Distance (power=2)
Paralela	2D	Inverse Power of Distance (power=2)
San Carlos	2D	Inverse Power of Distance (power=2)
San Cristóbal	3D	Inverse Power of Distance (power=2)
San Pedro	2D	Inverse Power of Distance (power=2)

Parameters were derived from block size selection (Section 14.8.1), search neighborhood optimization (Section 14.8.3), and variogram modeling (Section 14.7.2). The sample data were composited (Section 14.6.1) and, where necessary, top cut (Section 14.6.4) prior to estimation.

The sample data and the blocks were categorized into mineralized domains for the estimation (Section 14.6.3). Each block is discretized (an array of points to ensure grade variability is represented within the block) into 4 points along strike by 4 points down dip by 2 points across strike 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 support issue when estimating into the 3D 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 2012 Mineral Resource update.

Veins estimated in 2010 (Paralela, Ramal Paralela, San Carlos, and San Pedro) used inverse power of distance to estimate gold, silver and thickness attributes.

14.8.5 Density

There have been a total of 2,557 density measurements taken by Minera Bateas as of June 30, 2012. Of these 2,512 were taken from underground and 45 from drill core. Density analysis was performed on each vein separately with ten 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 2,496 (Table 14.9).

Table 14.9 Density statistics by vein

Vein	No. of samples	Mean (t/m^3)	Minimum	Maximum	Variance
Animas (Sulfide)	1,379	**3.17**	1.30	5.79	0.14
Animas (Oxide)	47	**2.67**	1.30	3.43	0.17
Animas NE	262	**3.22**	2.30	4.95	0.12
Bateas	294	**3.01**	2.44	3.98	0.08
Bateas Techo	16	**2.96**	2.59	3.19	0.04
Silvia	85	**3.33**	2.32	4.78	0.22
Soledad	309	**3.09**	2.49	4.98	0.14
Santa Catalina	17	**3.19**	2.52	4.30	0.09
San Cristóbal	36	**2.76**	2.54	3.29	0.03
Pilar	6	**3.14**	2.89	4.23	0.19
La Plata	45	**2.59**	2.18	3.08	0.02

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.

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).
- A density of 3.33 t/m^3 was assigned to Patricia as this vein has a similar mineralogy to the Silvia vein.
- Nancy was assigned a density of 3.22 t/m^3 as this vein has a similar mineralogy than the Animas vein.
- Oxide material in Animas NE was assigned the same density as oxide material from Animas.
- Veins estimated in 2010 (San Pedro, San Carlos, and Paralela) were assigned a density of 3.0 t/m^3, being the global average density for all veins in June 2010.

Density measurements assigned in the 2012 Mineral Resource update are detailed in Table 14.10.

Table 14.10 Density assigned in the 2012 estimation update

Vein	Density assigned for 2012 estimate (t/m^3)
Animas (Sulfide)	3.17
Animas (Oxide)	2.67
Animas NE (Sulfide)	3.22
Animas NE (Oxide)	2.67
Bateas	3.01
Bateas Techo	2.96
Silvia	3.33
Soledad	3.09
Santa Catalina	3.19
Patricia	3.33
Pilar	3.14
La Plata	2.59
Cimoide La Plata	2.59
Nancy	3.22
Paralela	3.00
San Carlos	3.00
San Cristóbal	2.76
San Pedro	3.00

14.9 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.

14.9.1 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.

Using this methodology a variety of estimation techniques, search neighborhoods and variographic models were tested to establish the parameters that provided the most accurate result. Table 14.11 displays the estimated mean values for each element in each vein, as compared to the composite mean.

Table 14.11 Cross validation results

Vein	Ag (g/t)		Au (g/t)		Pb (%)		Zn (%)	
	Composite	Estimate	Composite	Estimate	Composite	Estimate	Composite	Estimate
Animas	130	130	0.44	0.44	1.90	1.91	3.24	3.25
Animas NE	115	116	0.30	0.30	3.47	3.49	4.07	4.09
Bateas	798	803	0.14	0.14	0.67	0.68	0.99	0.99
Silvia	87	87	0.42	0.42	1.70	1.70	2.57	2.57
Bateas Techo	169	153	0.25	0.23	0.06	0.06	0.09	0.08
Soledad	421	421	2.20	2.19	1.34	1.34	1.70	1.70
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
La Plata	2,346	2,350	3.63	3.59				
Cimoide La Plata	446	431	2.12	2.13				

Results of the cross validation confirmed that ordinary kriging is the best estimation method for all veins with the exception of Bateas Techo, Patricia and Pilar where inverse power of distance proved a superior estimation technique. Cross validation also assisted in the fine tuning of the variograms and search neighborhoods.

14.9.2 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 reasonable, with differences being generally less than 5 % for the majority of veins with the exception being for lead and zinc grades in Animas NE. The reason for this discrepancy is due to the relatively low tonnage of Measured Resources in the Animas NE vein and an over-estimation of lead and zinc grades for the nearest neighbor estimate due to the presence of several isolated higher grade composites.

Results for blocks classified as Indicated and Inferred are also regarded as being comparable. Any large discrepancies (>10 %) were investigated and were generally attributed to low tonnages or a tendency for the nearest neighbor estimate to over-estimate grades due to the presence of isolated higher grade values.

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	109	110	**0.76**	0.38	0.38	**-1.75**	1.56	1.58	**1.01**	2.79	2.82	**1.40**
Animas NE	100	107	**6.77**	0.28	0.29	**4.37**	2.86	3.16	**10.60**	3.17	3.57	**12.75**
Bateas	627	641	**2.22**	0.11	0.11	**1.57**	0.56	0.59	**4.42**	0.83	0.86	**4.26**
Silvia	92	91	**-1.26**	0.36	0.38	**7.97**	1.75	1.75	**-0.16**	2.64	2.71	**2.84**
Soledad	353	336	**-4.74**	1.86	1.80	**-3.33**	1.21	1.23	**1.79**	1.61	1.60	**-1.07**
Santa Catalina	134	138	**2.86**	1.12	1.09	**-2.82**	1.63	1.74	**7.01**	2.37	2.38	**0.31**

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	120	113	**-5.80**	0.34	0.30	**-10.47**	1.09	1.04	**-4.92**	1.94	1.83	**-5.27**
Animas NE	84	77	**-8.50**	0.27	0.27	**1.76**	2.24	2.02	**-9.78**	2.44	2.46	**0.88**
Bateas	340	361	**6.32**	0.11	0.10	**-8.88**	0.34	0.33	**-1.12**	0.52	0.51	**-0.91**
Bateas Techo*	144	177	**23.59**	0.22	0.19	**-13.22**	0.03	0.03	**-1.14**	0.05	0.04	**-15.62**
Silvia	176	163	**-7.30**	1.20	1.63	**36.36**	1.09	1.03	**-6.06**	1.47	1.36	**-7.41**
Soledad	81	73	**-9.85**	0.55	0.44	**-20.73**	0.95	0.81	**-14.56**	1.46	1.31	**-10.09**
Santa Catalina	70	65	**-6.86**	0.60	0.57	**-4.71**	1.07	1.00	**-6.21**	2.00	2.02	**1.00**
La Plata	1,714	1,524	**-11.11**	2.04	1.87	**-8.35**						
Cimoide La Plata	428	341	**-20.45**	2.52	1.10	**-56.51**						

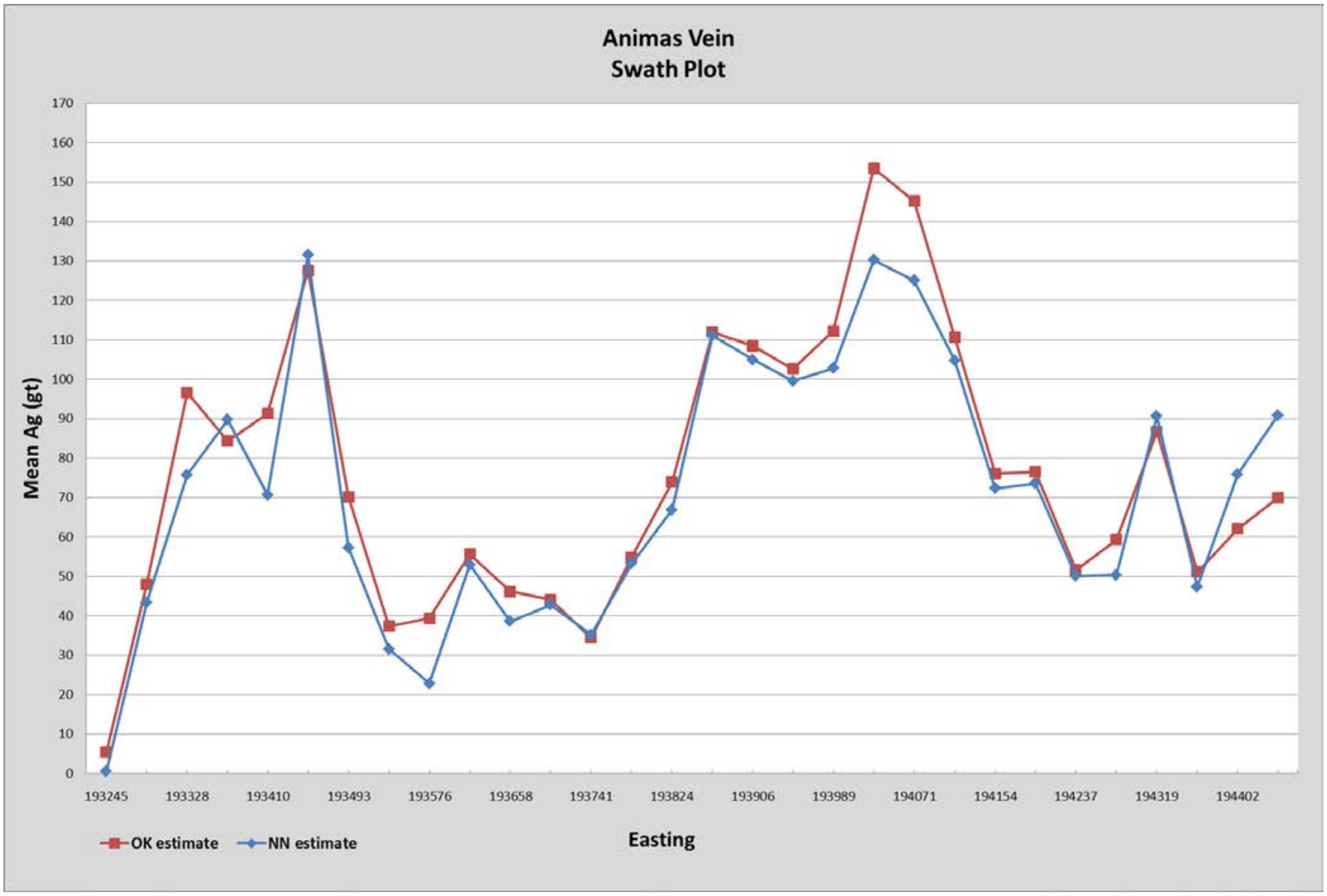
Table 14.14 Global validation statistics of Inferred Resources at a zero COG

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	69	67	**-1.71**	0.24	0.21	**-10.71**	0.87	0.80	**-7.40**	1.81	1.64	**-9.38**
Animas NE	60	56	**-6.57**	0.12	0.12	**3.89**	2.38	2.08	**-12.48**	2.24	2.21	**-1.46**
Bateas	282	220	**-21.91**	0.22	0.21	**-4.92**	0.24	0.21	**-13.27**	0.39	0.35	**-12.03**
Bateas Techo*	70	77	**10.11**	0.07	0.07	**5.60**	0.01	0.01	**-23.46**	0.03	0.02	**-10.98**
Silvia	60	60	**-0.66**	0.70	0.51	**-26.40**	0.74	0.63	**-13.98**	1.43	1.33	**-6.60**
Soledad	99	88	**-11.33**	0.80	1.02	**27.20**	0.62	0.56	**-9.88**	1.09	1.12	**2.89**
Santa Catalina	53	59	**11.91**	0.24	0.24	**-1.09**	0.43	0.38	**-11.38**	0.65	0.64	**-2.51**
Patricia*	148	148	**0.32**	0.62	0.56	**-9.59**	0.35	0.33	**-5.73**	0.51	0.48	**-5.84**
Pilar*	156	168	**8.06**	1.38	1.43	**3.93**	0.43	0.49	**12.48**	0.37	0.39	**3.37**
Nancy	73	73	**-0.43**	0.31	0.33	**7.13**	2.71	2.65	**-2.08**	2.59	2.57	**-0.74**
La Plata	92	101	**9.69**	0.15	0.18	**18.84**						
Cimoide La Plata	156	188	**20.59**	0.86	0.74	**-13.68**						

14.9.3 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



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.

14.9.4 Ore 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 June 2011 to July 2012 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 post June 2011 were filtered from the database and the estimation run using the remaining samples. The results of this evaluation are displayed in Table 14.15.

Table 14.15 Reconciliation of the Mineral Resource estimate against Mineral In-situ extracted between July 2011 and June2012

Vein	Mineral In Situ					Block Model					Error (%)				
	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Tonnes	Ag	Au	Pb	Zn
Animas	215,744	283	0.59	1.25	1.72	217,233	274	0.57	1.26	1.75	**-1**	**3**	**3**	**-1**	**-1**
Animas NE	155,568	104	0.23	3.55	4.13	158,034	98	0.22	3.2	3.8	**-2**	**7**	**5**	**11**	**8**
Bateas	26,067	712	0.21	0.58	0.86	25,934	661	0.2	0.55	0.82	**1**	**8**	**6**	**6**	**6**
Soledad	15,738	190	0.8	2.5	2.38	17,285	186	0.94	2.23	2.14	**-9**	**2**	**-14**	**12**	**11**
Total	413,117	239	0.44	2.12	2.6	418,487	227	0.43	1.99	2.48	**-1**	**5**	**2**	**6**	**5**

Comparison of the total mineral in-situ extracted against the Mineral Resource indicates a reasonable estimate with a difference of less than 10 % for tonnes and grades in the majority of cases, with the exception of gold, lead, and zinc grades from the Soledad vein due to the small quantity of material extracted from this vein. It also should be noted that the estimate tends to be conservative in its prediction of both tonnes and grade.

It is believed that there are three main reasons for discrepancies in grades.

- Animas NE vein occasionally encounters high grade veinlets or pods that boost the grade of the mineral in-situ. It is not possible to predict the location of these high grade pods and therefore a more conservative background grade is applied through the kriging estimate.
- The operation mines according to short term metal prices different to those used in the long term Mineral Resource model.
- The operation is able to mine to a level of selectivity that the model is unable to represent.

In conclusion the ore reconciliation results indicate the estimation tends to be conservative in nature, reporting lower tonnes and grade than is generally encountered underground, but the error is within expected levels of tolerance for Measured or Indicated Resource reporting.

14.9.5 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 3D solids defining the extracted regions of the mine. Each wireframe is assigned a date corresponding to when the material was extracted providing Minera Bateas a history of the progression of the mining since 2006.

The 3D solids are used to identify resource blocks that have been extracted and assign a code that corresponds to the date of extraction. Table 14.16 details the codes stored in the resource block model and the date ranges that they represent.

Blocks with a ZONA code of one or greater are excluded from the reported Mineral Resources.

Table 14.16 Depletion codes stored in the resource block model

ZONA	Description
0	Mineral In-situ (not extracted)
1	Mineral extracted prior to June 2011
2	Mineral extracted from July to December 2011
3	Mineral extracted from January to June 2012
4	Mineral extracted as developments (Galleries)
5	Mineral extracted from July to December 2012

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.

14.10 Resource classification

Resource confidence classification considers a number of aspects affecting confidence in the Resource 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

14.10.1 Geological continuity

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

The Minera Bateas exploration geologists log drill core in detail including textural, alteration, structural, geotechnical, mineralization, and lithological properties, and continue to develop a good 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.

14.10.2 Data density and orientation

The estimation relies on two types of data, channel samples and drill holes. Minera 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 intercept angle being between 70 to 90 degrees.

Exploration drilling data is supported 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.

14.10.3 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 standards 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.

14.10.4 Spatial grade continuity

Spatial grade continuity, as indicated by the variogram, is an important consideration when assigning Resource confidence 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. At the Caylloma deposits, the variogram nugget effect for Ag and Au is between 11 % and 37 % of the population variance with the exception of La Plata that has a nugget variance of 50 % for silver grades. The variogram nugget for Pb and Zn is between 15 % and 32 %, with the exception of the Bateas vein that has a nugget variance of 51 % for lead and 54 % for zinc. This shows that in general the grades have good continuity at short distances which results in a higher confidence in the estimated grades.

14.10.5 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.

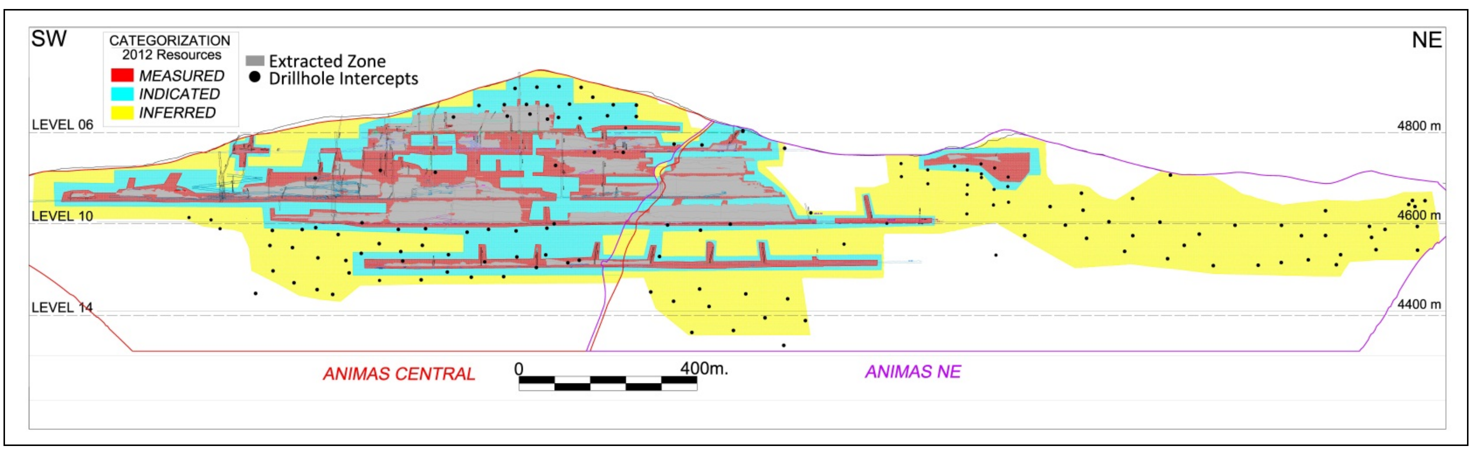
14.10.6 Classification

The Mineral Resource confidence classification of the Caylloma Mineral Resource 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 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.
- Kriging efficiency (KE) and regression slope (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



14.11 Mineral Resource reporting

A net smelter return (NSR) for each element was calculated to take into consideration the commercial terms for 2012, the average metallurgical recovery, average grade in concentrate and long term metal prices. In this way the value of all metals produced at the operation could be taken into account during Mineral Resource reporting

Metallurgical parameters and concentrate characteristics have been based on historically achievable recoveries observed in the plant by Minera Bateas.

Metal prices were defined using a three year trailing average at (60 %) and the two year projection (40 %) price evaluation as of December 31, 2011 (CAM, 2012).

The various parameters used to determine the NSR for each metal were reviewed by Mr. Thomas Kelly, with the methodology determined as being reasonable according to industry best practices. Details of the values for each parameter used in the NSR determination are displayed in Table 14.17.

Table 14.17 Parameters used in Net Smelter Return (NSR) estimation for sulfides and oxides

ZINC and LEAD			
Item	**Unit**	**Zinc**	**Lead**
Concentrate			
Metal Price (a)	**US$/t**	**2,006**	**2,116**
Concentrate grade (b)	%	51.66	56.61
Deduction	%	85	95
Minimum deduction	%	8	3
Payable grade (e)	%	43.66	53.61
Payment per tonne (f)	**US$/t**	**876**	**1,135**
Smelting costs	US$/t	-107	-259
Escalator1	US$/t	-1	-32
Escalator2	US$/t	0	0
Escalator3	US$/t	9	0
Penalties	US$/t	-8	0
Total Charges (g)	**US$/t**	**-108**	**-291**
Concentrate value (h)	**US$/t**	**768**	**843**
Met. recovery – sulfides (i)	**%**	**88**	**93**
Met. recovery – oxide (i)	**%**	**30**	**46**
Value – sulfides (j)	**US$/%**	**13.15**	**13.80**
Value – oxides (j)	**US$/%**	**4.46**	**6.85**

Note:
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$/oz**	**25.14**	**1,391.63**
Deduction (b)	%	95	95
Refining Charges (c)	US$/oz	2.3	15
Value after Met. Recovery (d)	US$/oz	20.61	626.23
Payable metal (e)	US$/oz	19.58	594.92
Met. recovery – sulfides (f)	**%**	**82**	**45**
Met. recovery – oxides (f)	**%**	**64**	**45**
Value – sulfides (h)	**US$/g**	**0.57**	**18.92**
Value – oxides (h)	**US$/g**	**0.45**	**18.92**

Note:
d = (a x f)/100
e = (d x b)/100
g = (e – (c x b x f)/10,000)
h = g/31.1035

The cut-off grade (COG) used for reporting Mineral Resources is based on average operating costs for the operation in 2010 determined by Fortuna's finance department (Table 14.18).

Table 14.18 Costs used for cut-off grade determination

Area	Activity	US$/t
Mine	Hauling and loading	0.43
	Mine Power	0.29
	Preparation	3.05
	Filling	3.37
	Extraction	9.08
	Auxiliary services	1.53
	Support	1.54
	Transportation	1.78
Plant	Plant power	0.64
	Thickening	0.07
	Filtering	0.14
	Flotation	1.44
	Grinding	2.33
	General services	0.41
	crushing	1.22
General	Power	2.47
	Chemical laboratory	0.16
TOTAL		**29.94**

The COG used for reporting Mineral Resources has been rounded to US$30/t and all material with a NSR greater than this value is regarded as having the potential for economic extraction. The COG applied is the same as that used in previous Mineral Resource reporting for consistency.

Mineral Resource estimates are reported as of December 31, 2012. Tonnes and grades have been reported above a US$30/t cut-off value. Oxide Mineral Resources (Table 14.19) have been reported separately from sulfide Mineral Resources (Table 14.20).

Table 14.19 Mineral Resources (Oxide) as of December 31, 2012

Category	Vein	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Measured Resources	Animas	93,800	136	0.31	1.15	1.95
	Animas NE	101,000	136	0.45	1.76	1.38
	Total	**194,800**	**136**	**0.38**	**1.45**	**1.66**
Indicated Resources	Animas	507,200	231	0.43	0.53	0.89
	Animas NE	187,700	140	0.48	2.53	1.84
	Total	**694,900**	**203**	**0.44**	**1.07**	**1.15**
Measured + Indicated Resources	**Total**	**889,700**	**191**	**0.43**	**1.16**	**1.26**
Inferred Resources	Animas	299,000	190	0.36	0.51	0.93
	Animas NE	141,000	92	0.37	1.34	0.92
	Total	**440,000**	**159**	**0.36**	**0.78**	**0.93**

Please see qualifying notes below Table 14.20.

Table 14.20 Mineral Resources (Sulfide) as of December 31, 2012

Category	Vein Type	Vein	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Measured Resources	**Silver Veins**	Bateas	41,900	327	0.06	0.40	0.59
		Total	**41,900**	**327**	**0.06**	**0.40**	**0.59**
	Polymetallic Veins	Animas	994,200	80	0.32	1.25	2.50
		Animas NE	461,400	86	0.31	2.38	2.70
		Santa Catalina	17,100	101	0.70	1.25	1.67
		Soledad	49,600	269	1.30	0.89	1.34
		Silvia	11,500	83	0.34	1.49	2.40
		Total	**1,533,800**	**88**	**0.35**	**1.58**	**2.51**
Total Measured Resources			**1,575,700**	**94**	**0.34**	**1.55**	**2.46**
Indicated Resources	**Silver Veins**	Bateas	98,600	359	0.11	0.37	0.56
		Bateas Techo	11,500	235	0.34	0.04	0.05
		Cimoide La Plata	47,500	444	2.61	0.00	0.01
		La Plata	29,100	1,179	1.21	0.13	0.08
		San Cristóbal	198,000	186	0.63	0.43	0.76
		Total	**384,700**	**339**	**0.78**	**0.33**	**0.55**
	Polymetallic Veins	Animas	1,837,300	90	0.32	1.38	2.55
		Animas NE	860,100	94	0.30	2.58	2.98
		Santa Catalina	75,000	87	0.59	1.05	1.60
		Soledad	80,000	182	1.24	1.12	1.51
		Silvia	50,700	78	0.65	1.20	2.24
		Total	**2,903,100**	**93**	**0.35**	**1.71**	**2.61**
Total Indicated Resources			**3,287,800**	**122**	**0.40**	**1.55**	**2.37**
Total Measured + Indicated Resources			**4,863,500**	**113**	**0.38**	**1.55**	**2.40**
Inferred Resources	**Silver Veins**	Bateas	232,000	351	0.28	0.29	0.47
		Bateas Techo	39,000	199	0.21	0.13	0.16
		Cimoide La Plata	117,000	206	1.11	0.03	0.07
		La Plata	45,000	414	0.59	0.12	0.17
		Paralela	48,000	412	0.05	0.31	0.42
		Ramal Paralela	5,000	1,595	0.45	2.16	5.01
		San Carlos	33,000	270	0.02	0.04	0.12
		San Cristóbal	140,000	223	0.39	0.14	0.28
		San Pedro	81,000	534	1.31	0.19	0.40
		Total	**740,000**	**328**	**0.53**	**0.19**	**0.34**
	Polymetallic Veins	Animas	1,107,000	54	0.26	1.28	2.74
		Animas NE	3,645,000	63	0.16	2.40	3.23
		Santa Catalina	47,000	72	0.33	0.65	0.92
		Soledad	76,000	140	1.12	0.87	1.54
		Silvia	81,000	73	0.86	0.90	1.74
		Patricia	31,000	149	0.62	0.36	0.51
		Pilar	34,000	158	1.40	0.44	0.38
		Nancy	432,000	84	0.36	3.16	3.05
		Total	**5,453,000**	**65**	**0.23**	**2.15**	**3.02**
Total Inferred Resources			**6,193,000**	**97**	**0.27**	**1.92**	**2.70**

Notes on Mineral Resources

- Mineral Resources are as defined by CIM Definition Standards on Mineral Resources and Mineral Reserves 2010.

- Mineral Resources and Mineral Reserves are estimated as of June 30, 2012 and reported as of December 31, 2012 taking into account production-related depletion for the period of July 1, 2012 through December 31, 2012 with the exception of the Animas and Animas NE veins which were re-estimated using all exploration drilling information as of December 31, 2012.
- Mineral Resources are inclusive of Mineral Reserves.
- Mineral Resources which are not Mineral Reserves do not have demonstrated economic viability.
- The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues.
- Resources are reported above a NSR cut-off value of US$30/t.
- Metal prices used in the NSR evaluation are US$25.14/oz for silver, US$1,391.63/oz for gold, US$2,116/t for lead and US$2,006/t for zinc.
- Metallurgical recovery values used in the NSR evaluation of sulfides are 82 % for silver, 45 % for gold, 93 % for lead, and 89 % for zinc.
- Metallurgical recovery values used in the NSR evaluation of oxides are 64 % for silver, 45 % for gold, 46 % for lead, and 30 % for zinc.
- Point metal values (taking into account metal price, concentrate recovery, smelter cost, metallurgical recovery) used for NSR evaluation of sulfides are US$0.57/g for silver, US$18.92/g for gold, US$13.80/% for lead, and US$13.15/% for zinc.
- Point metal values (taking into account metal price, concentrate recovery, smelter cost, metallurgical recovery) used for NSR evaluation of oxides are US$0.45/g for silver, US$18.92/g for gold, US$6.85/% for lead, and US$4.46/% for zinc.
- The quantity and grade of the Inferred Resources reported in this estimation are conceptual in nature, and it is uncertain if further exploration will result in upgrading of the Inferred Resources to Indicated or Measured Resources.
- Measured and Indicated Resource tonnes are rounded to the nearest hundred, and Inferred Resource tonnes are rounded to the nearest thousand.
- Totals may not add due to rounding.

14.11.1 Comparison to previous estimates

The Chapman and Vilela (2012) Technical Report released by Fortuna in May 7, 2012 details the Mineral Reserves and Mineral Resources of Caylloma as of December 31, 2011. This Mineral Resource estimate is summarized in Table 14.21 and Table 14.22, being inclusive of Mineral Reserves. Mineral Resources are based on estimated NSR values using 2011 long term metal prices of US$26.59/oz Ag, US$1,279.31/oz Au, US$2,116/t Pb and US$2,2028/t Zn; historic metallurgical recovery rates of 82 % for Ag, 45 % for Au, 93 % for Pb and 88 % for Zn; and historic operating costs adjusted for inflation. Mineral Resources are reported above an NSR cut-off value of US$30/t.

Table 14.21 Summary of Mineral Resources (Oxide) reported as of December 31, 2011

Category	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Measured	228,900	162	0.38	1.62	1.93
Indicated	848,100	207	0.39	0.84	1.10
Measured + Indicated	**1,077,000**	**197**	**0.39**	**1.00**	**1.28**
Inferred	**544,000**	**143**	**0.27**	**0.55**	**0.94**

Table 14.22 Summary of Mineral Resources (Sulfide) reported as of December 31, 2011

Category	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Measured	1,637,900	103	0.35	1.69	2.57
Indicated	3,741,200	149	0.36	1.28	1.88
Measured + Indicated	**5,379,100**	**135**	**0.36**	**1.41**	**2.09**
Inferred	**2,714,000**	**106**	**0.38**	**1.08**	**1.61**

Measured and Indicated Resource tonnes have decreased from 1,077,000 t to 889,700 t for oxide and from 5,379,100 t to 4,863,500 t for sulfide. Silver grades have decreased by approximately 3 % in the oxide domain and 27 % in the sulfide domain. Total Inferred Resource tonnes (Oxide +Sulfide) have doubled from 3.3 Mt to 6.6 Mt. The primary reasons for these changes are:

- Depletion of material extracted from December 31, 2011 to December 31, 2012.
- Adjustment in assigned density from 3.17 t/m^3 to 2.67 t/m^3 in the oxide domains as a result of new density measurement information.
- Usage of new metallurgical recovery rates for oxide material following test work conducted by Minera Bateas in 2012.
- Reclassification of the Paralela, San Pedro, and San Carlos veins from Indicated to Inferred Resources due to new sampling indicating lack of certainty in the Hochschild drilling results.
- Extensive exploration drilling of the Animas, Animas NE, and Nancy veins.
- Development of exploration galleries to explore Animas, Animas NE, and Bateas veins.

15 Mineral Reserve Estimates

The following chapter describes in detail the Mineral Reserve estimation methodology based on the Mineral Resources estimated as of June 30, 2012, with the exception of Animas and Animas NE that were re-estimated as of December 31, 2012 to take into account significant new exploration conducted between July and December 2012. Mineral Reserves are reported as of December 31, 2012 and take into account depletion of reserves that has taken place through production between July 1 and December 31, 2012.

Mineral Resources have been reported in three categories, Measured, Indicated, and Inferred. The Mineral Reserve estimate has considered only Measured and Indicated Mineral Resources as only these categories have sufficient geological confidence to be considered Mineral Reserves (CIM, 2010). Measured Resources may become Proven Reserves and Indicated Resources may become Probable Reserves.

15.1 Mineral Reserve methodology

The Mineral Reserve estimation procedure for Minera Bateas is defined as follows:

- Review of Mineral Resources.
- Identification of accessible Mineral Resources using current mining practices.
- Removal of inaccessible Measured and Indicated Mineral Resources.
- Removal of Inferred Resources.
- Dilution of tonnages and grades for each vein based on a dilution factor calculated by the planning department as determined from the operational history of each vein.
- 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.
- A break even cut-off grade (total operating cost in US$/t) is determined for each vein based on operational costs of mining, processing, administration, commercial, and general administrative costs. If the net smelter return (NSR) of a block is higher than the break even cut-off grade, the block is considered a part of the Mineral Reserve, otherwise the block is considered as Mineral Resource.

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

15.2 Mineral Resource handover

The Mineral Resource reported by the Mineral Resource Group (Tables 14.18 and 14.19) are 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 model.

For estimating Mineral Reserves, only accessible Measured and Indicated Resources have been considered. Table 15.1 shows the total of Measured and Indicated Resources that were considered for conversion into Mineral Reserves.

Table 15.1 Measured and Indicated Resources considered for Mineral Reserves

Category	Vein	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Measured Resources	Animas (Sulfide)	994,200	80	0.32	1.25	2.50
	Animas (Oxide)	93,800	136	0.31	1.15	1.95
	Animas NE (Sulfide)	461,400	86	0.31	2.38	2.70
	Animas NE (Oxide)	101,000	136	0.45	1.76	1.38
	Santa Catalina	17,100	101	0.70	1.25	1.67
	Soledad	49,600	269	1.30	0.89	1.34
	Silvia	11,500	83	0.34	1.49	2.40
	Bateas	41,900	327	0.06	0.40	0.59
	Total	**1,770,500**	**99**	**0.35**	**1.54**	**2.37**
Indicated Resources	Animas (Sulfide)	1,837,300	90	0.32	1.38	2.55
	Animas (Oxide)	507,200	231	0.43	0.53	0.89
	Animas NE (Sulfide)	860,100	94	0.30	2.58	2.98
	Animas NE (Oxide)	187,700	140	0.48	2.53	1.84
	Santa Catalina	75,000	87	0.59	1.05	1.60
	Soledad	80,000	182	1.24	1.12	1.51
	Silvia	50,700	78	0.65	1.20	2.24
	Bateas	98,600	359	0.11	0.37	0.56
	Bateas Techo	11,500	235	0.34	0.04	0.05
	Cimoide La Plata	47,500	444	2.61	0.00	0.01
	La Plata	29,100	1,179	1.21	0.13	0.08
	San Cristóbal	198,000	186	0.63	0.43	0.76
	Total	**3,982,700**	**137**	**0.41**	**1.47**	**2.16**
Measured +Indicated Resources	**TOTAL**	**5,753,200**	**125**	**0.39**	**1.49**	**2.22**

This is the total of Mineral Resources to which dilution factors were applied for the estimation of Mineral Reserves.

15.3 Dilution

The dilution factor applied to each vein has been calculated based on historical reports from 2011 and 2012. The dilution factor considers vein geometry, blasting and loading effects. The dilution factors for the wider Animas vein and the alternative narrow veins have been assessed independently. In the dilution factor calculation waste material is considered to contain no mineralization, grades are set at a zero value.

15.3.1 Dilution factor – Animas vein

Geometric dilution is measured in meters and is calculated using the height of exploitation (hc), inclination of the mineralized structure (dip) and the contouring factor (FC) with the application of the following formula:

$$hc * \cos(dip) * (1-FC).$$

FC being a contouring factor in the range of <0,1> related to how similar (in geometry) the final workings are in relation to the hanging and footwall of the vein. For Animas, the FC is 90 % based on the results observed at the operation.

Blasting dilution is measured in lineal meters and its application is given perpendicular to the vein. It accounts for overbreak of waste that occurs in the hangingwall and footwall during blasting. In the case of the Animas vein operational experience indicates the blasting dilution factor is 0.3 m.

Loading dilution depends on the type of loading equipment and is measured as the percentage of waste that is taken in respect to ore during loading. Loading dilutions applied vary according to the thickness of the vein:

- 3.85 % for scoop tram and veins 3.5 m wide or wider.
- 2.78 % for scrapers and veins between 2.0 and 3.5 m wide.
- 2.70 % for scrapers and veins 2.0 m wide or narrower.

Based on the above, the total dilution applied is as follows:

Total dilution (DT) = D3 + (D1 + D2) / (Vein width + D1 + D2) x 100

Where:

D1 = Geometric dilution.

D2 = Blasting dilution.

D3 = Loading dilution.

Based on this formula, the dilution factors applied for the Animas vein are detailed in Table 15.2.

Table 15.2 Average dilution factors for Animas vein

Vein	Average Dilution Factor (%)
Animas (Sulfide)	14.59
Animas NE (Sulfide)	9.69
Animas (Oxide)	8.60
Animas NE (Oxide)	9.44

15.3.2 Dilution factor – Narrow veins

Dilution factor estimates for narrow veins do not consider vein geometry due to the steepness of the structures, only blasting and loading effects are accounted for. An average overbreak of 10 centimeters at each side of the vein has been considered for blasting dilution. For loading dilution, a percentage depending on the equipment used has been applied.

The total dilution factor applied depends on whether the horizontal width of the vein is less than or greater than 0.6 m based on current operational conditions:

Horizontal width < 0.6 m

$$\textbf{Total dilution (DT)} = D3 + ((0.6 + D2 - \text{horizontal width})/0.6 + D2) \times 100$$

Horizontal width > 0.6 m

$$\textbf{Total dilution (DT)} = D3 + (D2)/(\text{horizontal width} + D2) \times 100$$

Where:

D2 = blasting dilution (0.2 m)

D3 = Loading dilution (loading with scoop 2.5 % and loading with scraper 2.0 %)

Based on these formulae, the dilution factor was calculated for each narrow vein included in the Measured and Indicated Resources. The results are shown in Table 15.3.

Table 15.3 Average dilution factors for narrow veins

Vein	Dilution Factor (%)
Bateas	15.41
Silvia	7.28
Soledad	19.67
Cimoide La Plata	35.40
La Plata	24.24
Santa Catalina	20.20
San Cristóbal	24.76

15.4 Prices, metallurgical recovery and NSR values

Metal prices used for Mineral Reserve estimation (Table 15.4) were determined by the corporate financial department of Fortuna using the same methodology as adopted by CAM (three year trailing average (60 %) and the two year projection (40 %)).

Table 15.4 Metal prices

Metal	Price
Silver (US$/oz)	29.36
Gold (US$/oz)	1,544.00
Lead (US$/t)	2,245.00
Zinc (US$/t)	2,139.00

Metallurgical recoveries used for Mineral Reserve estimation are displayed in Table 15.5 and were based on historically achievable recoveries observed in the plant by Minera Bateas.

Table 15.5 Metallurgical recoveries

Metal	Sulfides Metallurgical Recovery (%)	Oxides Metallurgical Recovery (%)
Silver	82	64
Gold	45	45
Lead	93	46
Zinc	88	30

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 15.6.

Table 15.6 NSR values

Metal	NSR Value (Sulfides)	NSR Value (Oxides)
Silver (US$/g)	0.68	0.53
Gold (US$/g)	21.02	21.02
Lead (US$/%)	14.99	7.42
Zinc (US$/%)	14.07	4.80

15.5 Operating costs

The breakeven cut-off values were determined for each vein based on the 2012 variable and fixed costs applicable to the operation. These include exploitation and treatment costs, general expenses and administrative and commercialization costs (including concentrate transportation). As operations are not centralized, each vein has a different operating cost, mainly due to transportation (mine to plant), support, and power consumption. Breakeven cut-off values used for Mineral Reserve estimation are detailed in Table 15.7.

Table 15.7 Breakeven cut-off values applied to each vein

Vein	Breakeven cut-off value(US$/t)
Animas	67.36
Animas NE	67.36
Bateas	239.55
Silvia	136.90
Soledad	136.90
Cimoide La Plata	239.55
La Plata	239.55
Santa Catalina	136.90
San Cristóbal	67.36

In general the operating costs have increased compared to 2011, due primarily to an increase in services and materials costs in 2012. This has resulted in an increase in the breakeven cut-off values. In the case of narrow veins like Bateas the increase has been particularly high due to relatively low productivity compared to considerable development and preparation costs related to the mining methodology. In the majority of cases the additional costs were related to the rock walls having to be cut in order to provide the minimum working space. For 2013 mining in narrow veins will return to a conventional mining method in order to reduce the current amount of drifting and related operational cost.

In the case of the Animas vein, which accounts for more than 90 % of the treated ore, there has been a significant increase in the amount of rock support as well as additional service and materials costs in 2012. The increased rock support costs are due to the ground conditions in the upper levels requiring more rock bolts and shotcrete.

15.6 Mineral Reserves

Blocks whose NSR values are higher than the operating cost (breakeven cut-off value) have been reported within the Mineral Reserve inventory. Table 15.8 shows Mineral Reserves estimated as of December 31, 2012. Measured Resources have been converted to Proven Reserves and Indicated Resources have been converted to Probable Reserves. There are no mining, metallurgical, economic, legal, environmental, social or governmental issues that would result in Measured Resources being classified as Probable Reserves. Mineral Resources exclusive of Mineral Reserves as of December 31, 2012 are reported in Table 15.9.

Table 15.8 Mineral Reserves as of December 31, 2012

Category	Vein	Tonnes	NSR (US$/t)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Width m
Proven	Animas (Sulfide)	754,800	106	77	0.30	1.11	2.18	5.90
	Animas (Oxide)	56,200	106	160	0.31	1.00	1.62	6.11
	Animas NE (Sulfide)	339,400	136	86	0.29	2.36	2.58	9.21
	Animas NE (Oxide)	66,200	102	139	0.44	1.78	1.40	7.51
	Santa Catalina	1,600	177	155	1.28	1.24	1.85	2.72
	Soledad	22,400	315	378	1.66	0.67	0.97	0.99
	Silvia	1,700	163	110	0.37	2.34	3.20	1.91
	Bateas	10,800	608	872	0.06	0.43	0.64	0.99
	Total	**1,253,100**	**122**	**99**	**0.33**	**1.47**	**2.19**	**6.75**
Probable	Animas (Sulfide)	1,498,000	124	92	0.30	1.41	2.45	5.73
	Animas (Oxide)	457,300	141	236	0.42	0.48	0.74	12.12
	Animas NE (Sulfide)	691,900	154	95	0.27	2.75	3.01	9.87
	Animas NE (Oxide)	117,500	127	160	0.49	3.05	1.91	8.65
	Santa Catalina	3,300	149	139	0.82	1.08	1.54	2.46
	Soledad	31,600	227	236	1.47	1.23	1.29	1.05
	Silvia	9,600	152	103	0.38	2.06	3.04	1.87
	Bateas	40,700	447	634	0.15	0.40	0.61	1.16
	Cimoide La Plata	27,800	397	478	3.43	0.00	0.01	2.02
	La Plata	22,200	913	1305	1.29	0.09	0.00	1.98
	San Cristóbal	155,400	147	174	0.69	0.37	0.64	2.55
	Total	**3,055,300**	**148**	**142**	**0.38**	**1.55**	**2.13**	**7.39**
Total Proven + Probable Reserves		**4,308,400**	**141**	**130**	**0.37**	**1.52**	**2.15**	**7.20**

Notes

- Mineral Reserves and Mineral Resources are as defined by CIM Definition Standards on Mineral Resources and Mineral Reserves.
- Reserves are reported above a NSR breakeven cut-off value of US$74.69/t for Animas, Animas NE, and San Cristóbal; US$226.77/t for Bateas, Cimoide La Plata, and La Plata; US$138.34/t for Soledad, Santa Catalina, and Silvia.
- Metal prices used in the NSR evaluation are US$29.36/oz for silver, US$1,544.00/oz for gold, US$2,245/t for lead and US$2,139/t for zinc.
- Metallurgical recovery rates used in the NSR evaluation of sulfides are 82 % for silver, 45 % for gold, 93 % for lead, and 87 % for zinc. Metallurgical recovery rates used in the NSR evaluation of oxides are 64 % for silver, 45 % for gold, 46 % for lead, and 30 % for zinc.
- Operating costs were estimated based on 2012 actual costs.
- Reserve tonnes are rounded to the nearest hundred, totals may not add due to rounding.

Table 15.9 Mineral Resources exclusive of Mineral Reserves as of December 31, 2012

Category	Vein	Tonnes	NSR (US$/t)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Measured	Animas (Sulfide)	195,400	67	54	0.24	0.72	1.68
	Animas (Oxide)	36,300	57	77	0.27	1.13	2.12
	Animas NE (Sulfide)	77,000	69	53	0.34	0.99	1.44
	Animas NE (Oxide)	41,300	72	110	0.41	1.44	1.13
	Santa Catalina	16,000	104	95	0.63	1.23	1.62
	Soledad	22,200	103	107	0.72	0.77	1.36
	Silvia	9,900	98	77	0.33	1.32	2.23
	Bateas	33,100	87	130	0.06	0.36	0.54
	Total	**431,200**	**72**	**72**	**0.30**	**0.88**	**1.53**
Indicated	Animas	463,900	63	46	0.24	0.70	1.72
	Animas (Oxide)	86,900	64	109	0.30	0.57	1.31
	Animas NE	186,900	74	52	0.27	1.10	1.80
	Animas NE (Oxide)	67,000	63	90	0.40	1.27	1.35
	Santa Catalina	72,400	87	84	0.58	1.04	1.04
	Soledad	55,100	122	127	0.95	0.91	1.44
	Silvia	41,800	94	71	0.70	0.98	2.02
	Bateas	63,900	98	151	0.07	0.31	0.47
	Bateas Techo	11,500	142	235	0.34	0.04	0.05
	Cimoide La Plata	27,600	175	273	1.00	0.00	0.00
	La Plata	11,500	197	320	0.54	0.15	0.15
	San Cristóbal	81,100	83	122	0.22	0.34	0.34
	Total	**1,169,600**	**78**	**82**	**0.34**	**0.75**	**1.40**
Total Measured + Indicated Resources		**1,600,800**	**77**	**79**	**0.33**	**0.79**	**1.43**
Inferred	Animas	1,107,000	89	54	0.26	1.28	2.74
	Animas (Oxide)	299,000	100	190	0.36	0.51	0.93
	Animas NE	3,645,000	115	63	0.16	2.40	3.23
	Animas NE (Oxide)	141,000	62	92	0.37	1.34	0.92
	Santa Catalina	47,000	68	72	0.33	0.65	0.92
	Soledad	76,000	133	140	1.12	0.87	1.54
	Silvia	81,000	93	73	0.86	0.90	1.74
	Bateas	232,000	216	351	0.28	0.29	0.47
	Bateas Techo	39,000	121	199	0.21	0.13	0.16
	Cimoide La Plata	117,000	140	206	1.11	0.03	0.07
	La Plata	45,000	251	414	0.59	0.12	0.17
	Paralela	48,000	246	412	0.05	0.31	0.42
	Ramal Paralela	5,000	1,013	1,595	0.45	2.16	5.01
	San Carlos	33,000	156	270	0.02	0.04	0.12
	San Cristóbal	140,000	140	223	0.39	0.14	0.28
	San Pedro	81,000	337	534	1.31	0.19	0.40
	Pilar	34,000	128	158	1.40	0.44	0.38
	Patricia	31,000	108	149	0.62	0.36	0.51
	Nancy	432,000	138	84	0.36	3.16	3.05
Total Inferred Resources		**6,633,000**	**120**	**101**	**0.27**	**1.84**	**2.58**

Note:

- Mineral Reserves and Mineral Resources are as defined by CIM Definition Standards on 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.
- There are no known legal, political, environmental, or other risks that could materially affect the potential development of the Mineral Resources or Mineral Reserves at Caylloma.
- Mineral Resources are reported above a NSR cut-off value of US$30/t.
- Metal prices used in the NSR evaluation of Mineral Resources are US$25.14/oz for silver, US$1,391.63/oz for gold, US$2,116/t for lead and US$2,006/t for zinc.
- Metallurgical recovery rates used in the NSR evaluation of sulfides are 82 % for silver, 45 % for gold, 93 % for lead, and 89 % for zinc.
- Metallurgical recovery rates used in the NSR evaluation of oxides are 64 % for silver, 45 % for gold, 46 % for lead, and 30 % for zinc.
- Measured and Indicated Resource tonnes are rounded to the nearest hundred, and Inferred Resource tonnes are rounded to the nearest thousand.
- The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues.
- The quantity and grade of the Inferred Resources reported in this estimation are conceptual in nature, and it is uncertain if further exploration will result in upgrading of the Inferred Resources to Indicated or Measured Resources.
- Totals may not add due to rounding.

16 Mining Methods

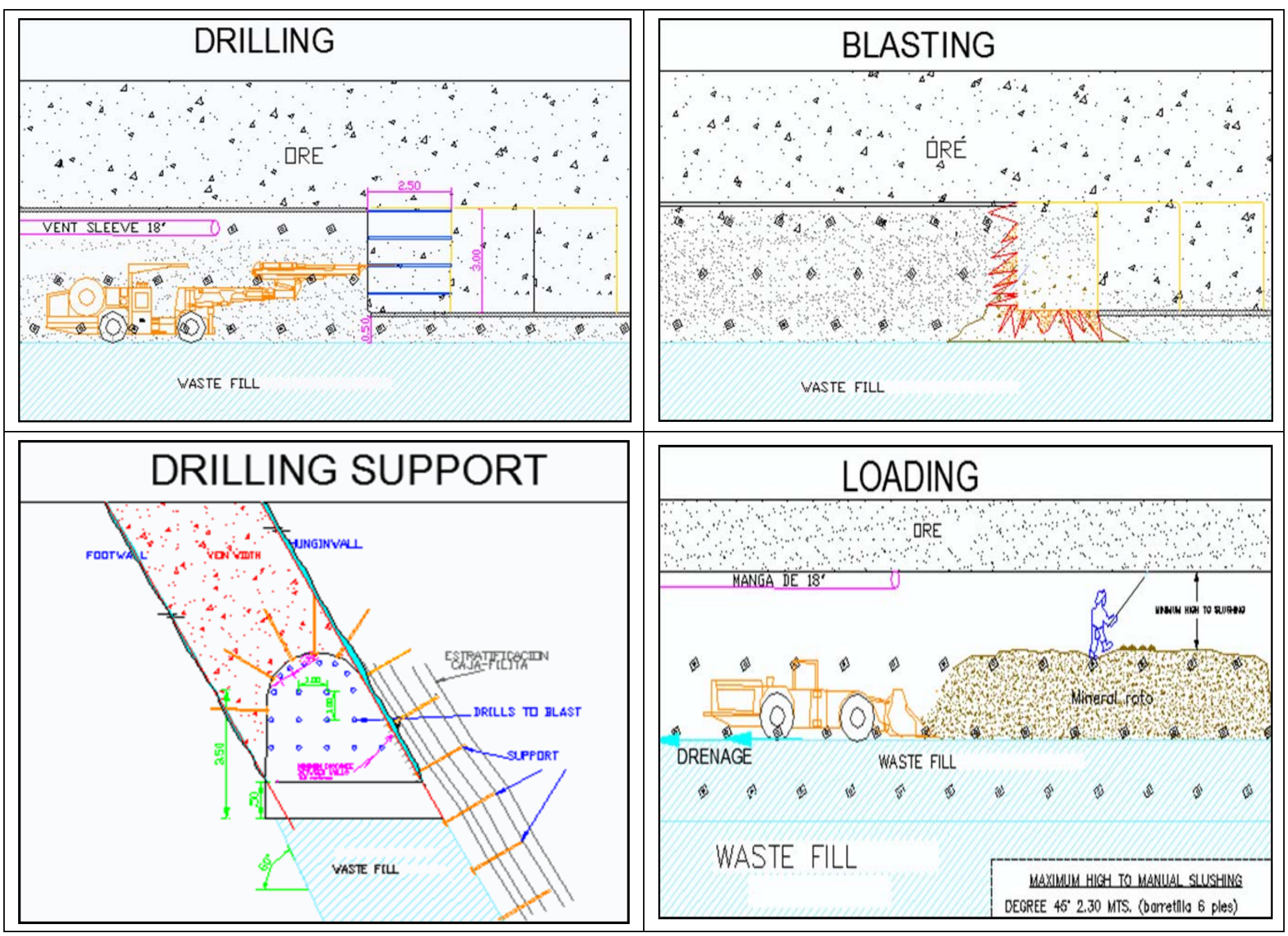
The mining method applied in the exploitation of the three main veins (Animas, Bateas, and Soledad) is overhand cut and fill using either a mechanized, semi-mechanized or conventional extraction methods. All mining is undertaken in a southwest to northeast direction following the strike of the veins. Production capacity at the mine is approximately 1,300 tonnes per day (tpd).

16.1 Mechanized mining

Mechanized mining utilizes a jumbo drill rig and scoop tram for loading. The ore haulage is performed by a combination of locomotives and 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 vein based on the geological structure and geotechnical studies (Section 16.4). This results in 90 % of production coming from the Animas vein.

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 Mechanized mining sequence

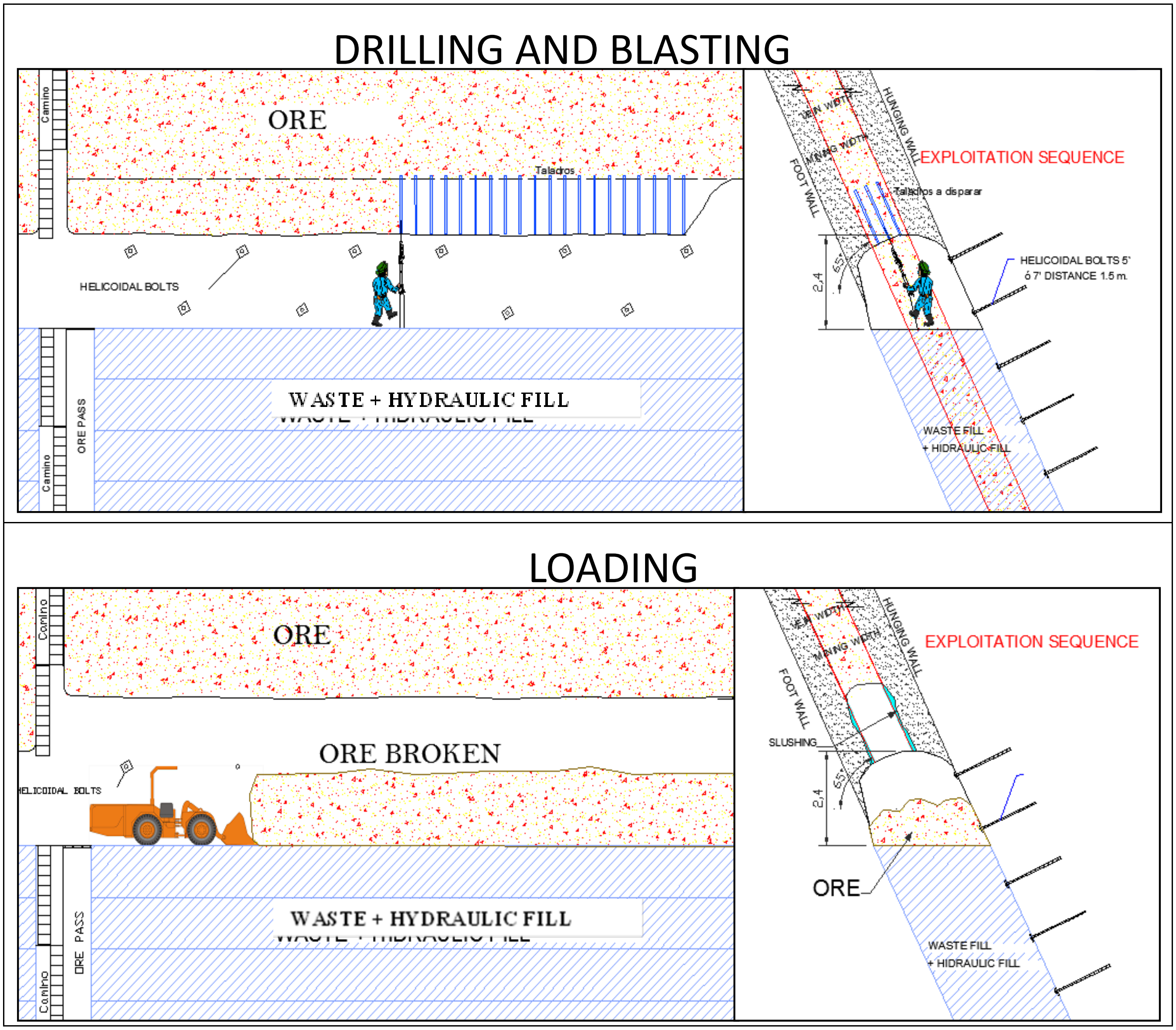


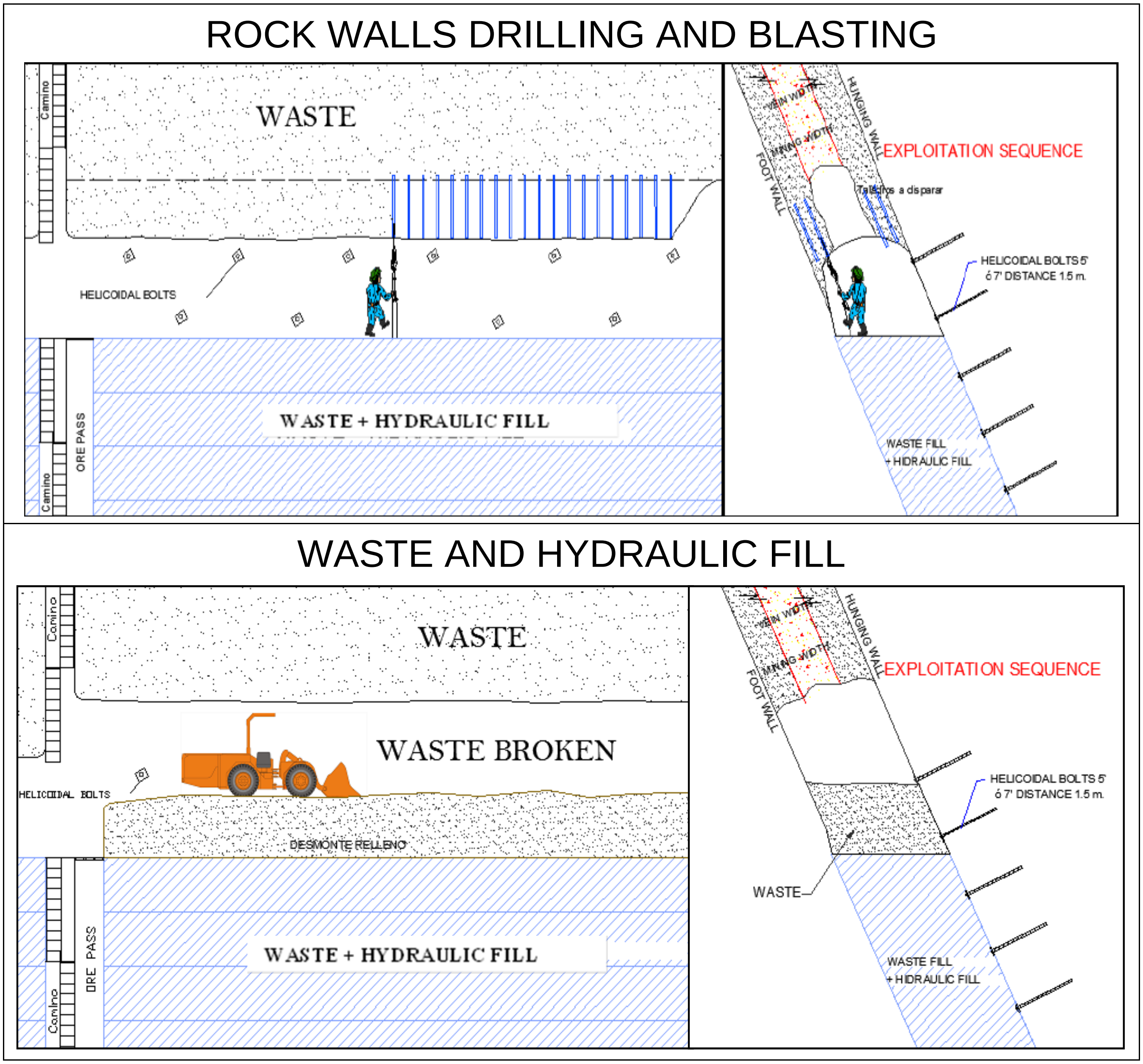
16.2 Semi-mechanized mining

Semi-mechanized mining is performed using handheld drilling equipment (jacklegs) and micro scoops (0.75 cubic yards) for loading. Ore haulage is performed by a combination of locomotives and dump trucks. Rock support is supplied using rock bolts installed using manual drilling and installation techniques. This method of mining is applied in 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 (via a scoop tram with a 0.75 cubic yard bucket) and haulage. Depending on vein width, but in the majority of cases, 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. Bateas, Silvia, and Soledad veins are presently worked by semi-mechanized mining methodologies.

Figure 16.2 Semi mechanized mining sequence





16.3 Conventional mining

Conventional mining is performed using handheld drilling equipment (jacklegs) and scrapers for loading. The ore haulage is done with trains and rail system 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. Only the Bateas Vein (Level 13) is presently mined using conventional mining methods.

16.4 Mining infrastructure

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 Geotechnical, hydrological and other parameters relevant to mine designs

The Geotechnical department of Minera Bateas continuously undertakes geotechnical evaluation through the classification of rock mass using RQD, RMR and Q systems. Results of the geotechnical evaluations for the different veins indicate the quality of the rock mass ranges from regular to good which is consistent with the behavior observed underground and allows openings with dimensions of up to 20 m wide, 6 m high, and 50 m long in the Animas vein.

The average indexes of rock mass for the mine (Animas, Bateas and Soledad veins) are: RQD 60%, RMR 42 to 75 and Q 0.8 to 31. Based on these values the mining method of overhand cut and fill (with hydraulic and waste fill) 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° average), which is responsible for 90 % of production tonnage, would make sub-level stoping difficult.

16.6 Production rates, mine life, dimensions and dilution factors

The average production rate at the operation since October 2011 is 1,300 tpd.

Mineral Reserves are estimated as 3.4 million tonnes, which is sufficient for a 7 year life of mine considering 353 days in the year for production. Minera Bateas expects an average annual production of 1.9 million of troy ounces of silver based on an average 170 g/t Ag head grade. Achieving the projected life of mine silver production relies on the expectation that the Mineral Resources will be expanded through exploration as the present Mineral Reserves have an average head grade of 102 g/t Ag which would require the depletion of higher grade material to achieve the expected head grade. The expectation of exploration success is reasonable based upon Bateas' successful exploration results in the past.

Dilution factors are estimated to be approximately 11 % in veins such as Animas. In narrow veins, such as Bateas, Silvia and Soledad, dilution can be up to 25 %. This can be reduced by using suitable equipment (scoop trams and micro scoop trams) and better blasting control.

16.7 Requirements for underground development and backfilling

The mine plan includes a program for mine development which can be divided into three types: 1) development, 2) preparation and 3) mine exploration. In order to produce 1,300 tpd, approximately 900 m of new development is required each month. Development includes infrastructure like 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.

Backfill required by the mine to complete the mining sequence is provided by rock waste and classified mill tailings. Rock waste backfill is generated by underground development, however the quantity produced is generally insufficient to provide the mine with the total required backfill. To supplement the rock waste, classified mill tailings or hydraulic backfill is produced by a small plant on the surface. The proportion of waste and hydraulic backfill is 60 % and 40 % respectively. The total volume of backfill that will be required by the mine is estimated to be 156,000 m3 per annum.

16.8 Required mining fleet and machinery

The mining fleet consists of:

- Ten haul trucks (15 m^3 capacity)
- Two haul trucks (10 m^3 capacity)
- Six scooptrams (3.2 m^3)
- One scooptram (1.7 m^3)
- One scooptram (0.6 m^3)
- One scooptram (2.7 m^3)
- Five single boom jumbos (electric/ hydraulic)
- Three electric locomotives (trolley)
- Three battery locomotives

Mining operations in Minera Bateas are fully contracted. The majority of the equipment is provided and maintained by the contractors.

17 Recovery Methods

The Bateas processing plant is a typical flotation operation and consists of five stages: crushing; milling; flotation; thickening and filtering; tailing 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 three flotation circuits: Lead – Silver, Zinc and Copper.
- Thickening and filtering is performed separately for all the concentrates, which after filtering undergo a drying process before being placed in their respective storage bins to await transportation.
- The process 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 tailings facility.

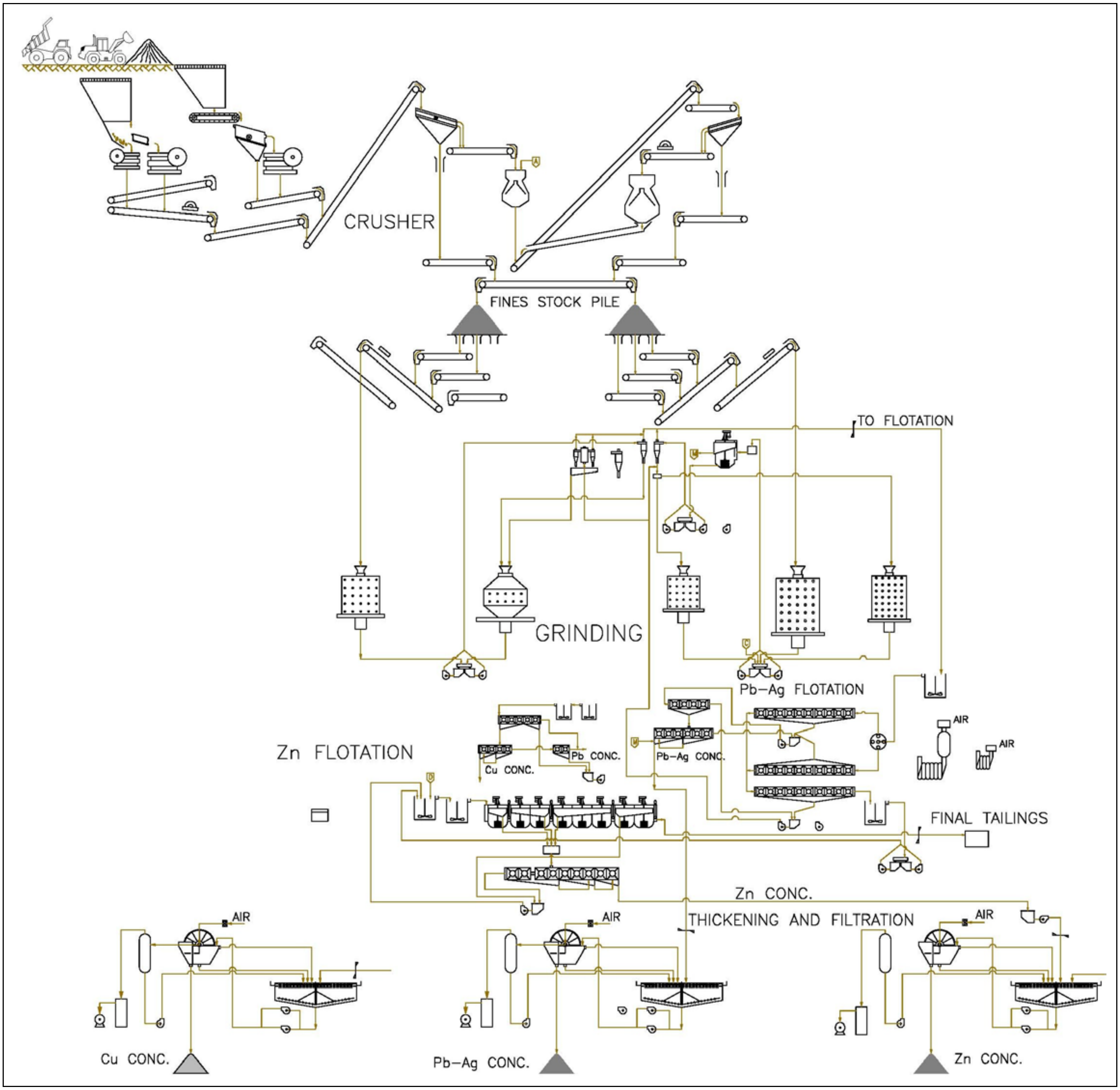
A flow sheet diagram detailing the configuration of the process plant is provided in Figure 17.1. Details of the equipment shown in the flow sheet are also provided in Figure 17.1

The Caylloma concentrator plant resumed operations in October 2006, treating 600 tpd of polymetallic mineral. Capacity increased progressively and, 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. 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 Crushing and milling circuits

The crushing and milling circuits are displayed 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 cm and 90 mm. The mineral is transported on two conveyor belts (1-A and 2-A) to the two-deck vibrating screen. The screen's undersize is fed to the stock pile through belt 3-A and the oversize to the Sandvik H-2800 secondary crusher through belt 4-A, the product of which goes to the two-deck vibrating screen through belt 1, the undersize of this screen feeds the stock pile through belts 3, 4 and 5, and the oversize is fed through conveyor belt 2 to the Sandvik CH-430 tertiary crusher, the discharge of which returns to belt 1, closing the circuit.

Figure 17.1 Crushing and milling circuits at the Caylloma processing plant



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 jaw crusher through a Ross chain feeder. The discharge from this crusher goes 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 grinding which operates in an open circuit, consists of two ball mills (Comesa 2.4 m by 3.0 m and a Denver 2.1 m by 2.1 m). The secondary grinding 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 microns.

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 horizontal pump which sends pulp to the MCC 125 Warman pump that in turn feeds the D-15 cyclone. The cyclone's overflow goes to the flotation circuit and the underflow feeds the Magensa and Libertad secondary ball mills which operate in closed circuit with the D-15 cyclone.

The Denver primary ball mill operates with the Hardinge secondary ball mill. Discharge from this mill feeds a 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 Hardinge mill.

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.

<u>Lead-silver flotation circuit</u>

The D-15 cyclones overflow is fed to a conditioner and then goes to a pulp distribution box that feeds two rougher flotation banks, consisting of ten 1.4 m^3 Agitair cells per bank. The rougher concentrate is fed to the primary cleaner cells, consisting of four 1.4 m^3 Sub-A24 cells. The primary cleaner concentrate is fed to the secondary cleaner cells, consisting of three 1.4 m^3 Sub-A24 cells. The secondary cleaner concentrate is fed to the tertiary cleaner cells, consisting of three 1.4 m^3 Sub-A24 cells. The tertiary cleaner concentrate is 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 ten 1.4 m^3 Agitair cells. The scavenger concentrate, as well as the primary cleaner tailings are pumped to join the D-15 cyclone underflow returning to the Comesa secondary grinding circuit. The scavenger tailings feed the Zinc flotation circuit.

<u>Zinc flotation circuit</u>

The lead-silver flotation tailings are sent to three conditioners (two 2.4 m by 2.4 m, one 3.0 m by 3.0 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 achieves a lead concentrate containing an average of 55 % lead and a zinc concentrate containing an average of 52 % zinc. Historical data show achievable metallurgical recoveries of 92 % for lead, 82 % for silver (the lead concentrate) and 87 % for zinc.

Concentrates thickening and filtration

The lead 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 Lima.

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 35 % of the whole tailings are used as backfill material in the mine.

The overflow is pumped to the tailings facility for final disposal. The water collected from the tailings impoundment is pumped back to the processing plant and reused in the process. Usage of the new tailings facility (N° 3) commenced in January 2013.

17.3 Requirements for energy, water, and process materials

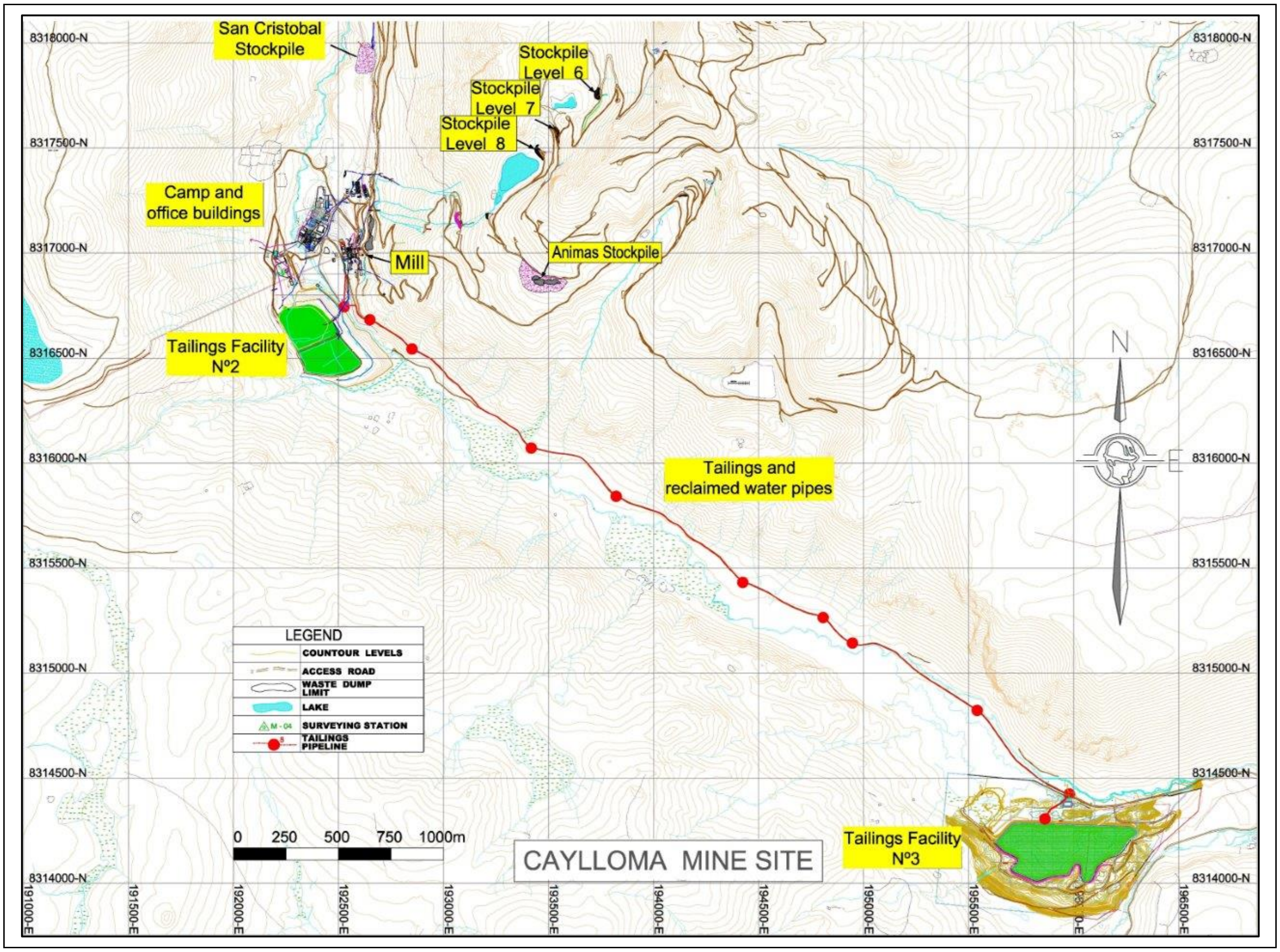
Electric power requirements are supplied through the Callalli substation from the national grid. The camp requires 3.6 megawatts of energy and the plant uses an additional 1.8 megawatts. The mine also has three diesel generators that are available in case of emergencies that can provide power to the plant and mine if there was a power outage from the main substation.

All process materials are available from Arequipa and Lima. Reagents are provided from local service representatives representing international reagent suppliers.

18 Project Infrastructure

The Caylloma Property has a well-established infrastructure used to sustain the operation. The infrastructure includes roads, tailing disposal facilities, mine waste disposal facilities, mine ore stockpiles, camp facilities, concentrate transportation, power generation and communications systems (Figure 18.1).

Figure 18.1 Plan view of mine camp



18.1 Roads

Roads on the property are shown in Figure 18.1. Access roads are unpaved but are in good condition due to semi-continual 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 disposal facilities

The new Tailings Facility (N° 3) operation permit was issued by the Ministry of Energy and Mines in December 2012. The designed capacity of this facility is 15 years based on a 1,300-tpd processing capacity. The first two stages will provide a total capacity of six years. Construction of the first stage (two year capacity) was concluded in 2012 and the second stage is planned to be constructed in 2013.

Currently the Tailings Facility (N° 2) provides a small additional capacity as a contingency plan for tailings disposal. The project to extend the capacity of this facility has been filed and is pending permitting by the Ministry of Energy and Mines.

18.3 Mine waste stockpiles

The mine currently has six waste stockpiles used for storing waste material that could not be effectively disposed of underground. The stockpiles are named after the location from where the waste was extracted. The six waste stockpiles are as follows:

- San Cristóbal level 10
- San Cristóbal level 12
- Animas level 8
- Animas level 12
- Bateas level 12
- San Pedro

18.4 Ore stockpiles

The mine currently has seven ore stockpiles which store low grade silver ore, or oxide material pending evaluation. This stockpiled material is evaluated because it is a sulfide/oxide mix or may require additional sampling to establish its grade. Once the results are obtained the geology department in accordance with the mine and planning departments take the decision on whether to transport this material to the plant.

18.5 Concentrate transportation

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

Power supply to the mine is obtained from the national power grid through the Callalli electrical substation (main line of Caylloma District).

Bateas is currently working to increase the power consumption from the national power grid. The permitting process for the required additional installations begun in 2012 with works budgeted for in 2013.

18.7 Communications systems

The mine is equipped with cellular and fixed telephones, intranet, internet and video conferencing. The telephone and internet signal is provided by an antenna located in the Caylloma District (6 km from the mine) and sent to the mine. The signal is captured by an amplifier and sent to the camp via a relay station located in the top level of the mine (Level 5.5 of the Animas vein).

18.8 Camp facilities

Camp facility improvement works started at Caylloma in December 2011 with the construction of new offices and mess hall. The works continued in 2012 with the construction of a new workers camp and related facilities. This stage of the project should be concluded by March 2013.

By April 2013 Minera Bateas will start the construction of the new employees' camp as well as other additional facilities scheduled to be finished by September 2013. The total investment in camp facilities is US$ 9.6 Million.

19 Market Studies and Contracts

Minera Bateas has signed a contract with Glencore Peru S.A.C. to provide 10,000 wet tonnes of zinc concentrate. Another contract for 7,500 wet tonnes of lead concentrate has been signed with Cormin S.A. Those quantities represent the estimated concentrate production of the Caylloma mine from January to June 2013. A new tender will be issued for concentrate purchases in the second half of the year.

All the commercial terms entered between Minera Bateas and both Glencore and Cormin are within the standards and industry norms.

20 Environmental Studies, Permitting and Social or Community Impact

20.1 Environmental compliance

Minera Bateas operates pursuant to environmental regulations and standards set out in Peruvian law, and are complying with all laws, regulations, norms and standards for each stage of the mines operation.

20.2 Environmental considerations

Minera 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.

The Caylloma operation (legally referred to as the Economic Management Unit of San Cristóbal) has fulfilled its PAMA (Program for Environmental Compliance and Management) 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.

The 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 was: the construction of a retaining wall at the base of the old tailings, vegetation of the old tailings, building a retaining wall at the base of the active tailings and monitoring and treatment of mine water. The budgeted cost of the program was US$365,000.

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 Minera Bateas filed a request for modification and update to the mine closure plan in accordance to mine closure regulations.

The Sanitary Authorization for Treatment System Water was approved with Directorial Resolution No. 2307-2009/DIGESA/SA on May 18, 2009.

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 “Mine Closure Plan” was submitted on June 7, 2012. This document was included in the November 12, 2012 application, after consultation with the Ministry of Energy and Mines in order to obtain a single environmental authorization.

Through Resolution No. 351-2010-MEM-DGM/V authorization of the disposal of tailings in Tailings Deposit No. 2 Huayllacho has been confirmed. Authorization to increase storage capacity of this tailings facility by raising the height of the dam is pending confirmation from the Ministry of Energy and Mines.

By Resolution No. 0274-2012-MEM/DGM, the Ministry of Energy and Mines authorized the increase in area of the processing concession named Huayllacho (Code No. P0100211) from 2.22 ha to 73.63 ha. The same resolution authorizes the operation of the Tailings Facility (N^{o} 3).

In August 2012 Minera 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 have been issued by the MEM as of the effective date of this report and approval is still pending.

20.3 Environmental permitting

The major permits that have been granted to allow Minera Bateas to operate at the Caylloma Property 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 and the permission is permanent in nature.
- 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 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 restart activities in wastewater treatment plant was awarded with awarding of resolution No.1078-2006-MEM-DGM / V, dated September 6, 2006. The permit is permanent.
- The 2010 Consolidated Annual Declaration (DAC) was provided to the MEM on June 25, 2012.
- 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.
- The Certificate for Mining Operations for 2013 (COM 2013) was granted on December 3, 2012 under resolution No. 029-2012-C.
- 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.

- Global Expansion Authorization H2 2011 was approved by Executive Resolution No. 4356-2011-IN-1703-2 on November 16, 2011.
- By Resolution No.231-2013-SUCAMEC-CEPP, dated January 13, 2013, SUCAMEC granted the authorization of explosive use for the first semester of 2013.
- The renewal of the Explosives Magazine License for ANFO product was approved by Executive Resolution No. 1425-2009-IN-1703-2 as of March 28, 2011. The permit is valid for five years.
- The license for the use of water for mining activities was granted by Administrative Resolution No. 013-2006, GRA / PR-DRAG-ATDR.CSCH, dated February 13, 2006. The license 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 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 of the disposal of tailings in Tailings Deposit No. 2 consistent with the approved mine closure plan through Resolution No. 351-2010-MEM-DGM / V.
- Authorization for water use by a population for mining purposes through administrative Order No. 013-2006.GRA/PR-DRAG-ATDR.CSCH, dated February 13, 2006. 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.
- 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.
- Directorial Resolution No. 0231-2011-ANA-DGCRH of November 22, 2011, authorizing the suspension of monitoring station EF-5 used for monitoring treated mine water from the Don Luis II level 12. The resolution is valid for two years.
- The authorization for disposal of treated mine water from the Vehicle Washing Site is pending approval from the National Water Authority.
- Approval of the Mine Closure Plan of San Cristóbal and UEA through directorial resolution No. 365-2009 MEM / AAM, dated November 13, 2009. The last modification and update was requested on November 12, 2012.

- Authorization of the construction, installation and refurbishment of the regrowth of tailings No.2 through resolution No. 902-2009-MEM/DGM/V dated November 25, 2009.
- Directorial Resolution No. 0031-2010-ANA-DCPRH of March 24, 2010, authorizing the suspension of monitoring station E-03 used for monitoring Pumahuasai Bateas effluent. As this resolution is valid for only two years Minera Bateas filed for a renewal of the permit in March 2012.
- Directorial Resolution No. 103-2010-ANA-DGCRH of December 10, 2010, authorizing the suspension of monitoring station E-5 used for monitoring treated mine water from the San Cristóbal level 12. As this resolution is valid for only two years Minera Bateas has filed for a renewal of the permit
- Directorial Resolution No. 192-2011-ANA-DGCRH, 20 September 2011, authorizing the suspension of monitoring station E-8 used for monitoring treated mine water from the San Cristóbal level 11, effluent waste water from the tailings deposit, and E-12 industrial wastewater effluent from the concentrator. The resolution is valid for two years.
- Approval of the Environmental Impact Study included in the report entitled "Expanding mine and processing plant Huayllacho 1030 TMD to 1500 TMD" through resolution N ° 173 -2011-MEM/AAM dated June 8, 2011.
- Approval of the environmental impact study in the semi-detailed exploration project entitled "Accumulation Caylloma 1, 2 and 3" through resolution N ° 374 - 2011-MEM/AAM dated December 20, 2011.

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.

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 crosses the property, employing people from the local communities to verify the results.

In the case of water monitoring, Bateas mine has seven 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 Chemex 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.

Minera Bateas has also obtained and maintains its ISO 14001 Environmental Management Certification since 2008. The mine works continually to improve its operational standards.

20.4 Social or community impact

Bateas Mine has a significant commitment to community development. The community relationship department works closely with the local communities and has many proactive programs to improve the welfare of local residents. These include:

1. **Educational assistance**. The mine provided a computer room with personal computers (including educational programs) and specialized teachers with the target of increasing the educational level of the population of Caylloma (children and adults).

2. **Agricultural and livestock programs.** These programs bring better technology to the communities in order to improve the agricultural and animal husbandry techniques.

3. **Camp familiarization**. This is a special program that consists of regular visits to the mine camp by the community population (especially children) in order to describe all of the processes of the mine, be transparent in our activities and permit the children to see and understand what their fathers or mothers do for a living.

The increased employment that the mine brings to the area has resulted in the generation of secondary and tertiary employment through companies servicing the operation. This has greatly increased employment in the area and resulted in local people creating their own companies. Examples of communal companies working at the mine are Etramin SRL and San Servicios SRL (SRL: Limited Responsibility Service).

20.5 Mine closure

Mine Closure is also included in the environmental program. For 2013 a total of US$ 196,000 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 Ministry of Energy and Mining.

21 Capital and Operating Costs

Minera Bateas capital and operating cost estimates for Caylloma (Summarized in Table 21.1 and Table 21.2) are based on 2012 costs. The analysis includes forward estimates for sustaining capital. Inflation is not included in the cost projections and exchange rates remain unchanged.

Capital costs include all investments in mine development, equipment and infrastructure necessary to upgrade the mine facilities and sustain the continuity of the operation.

Table 21.1 Summary of projected major capital budget for 2013

Capital Item	Cost (MUS$)
Mine Development	
Development & Infrastructure	7.55
Brownfields Exploration	6.70
Total Mine Development and Exploration	**14.25**
Equipment and Infrastructure	
Mine	1.74
Plant	2.35
Tailings Facility	3.60
Maintenance & Energy	4.79
Safety	0.15
IT	0.51
Logistics, Camp, Geology, Exploration, Planning	8.56
Laboratory	0.69
Environment	0.77
Total Equipment and Infrastructure	**23.16**
Total Capital Expenditure	**37.41**

Table 21.2 Summary of projected major operating costs for 2013

Operating Item	Cost US$/t
Cash cost	
Mine (*Mine Cash Cost per tonne was calculated using extracted ore*)	**41.36**
Plant	**15.17**
Cash Cost	**56.52**
Mine Operating Expenses	
General services	**16.11**
Administration mine	**9.47**
Total Mine Operating Expenses	**25.58**
Total Cash Cost and Mine Operating Expenses	**82.10**

21.1 Sustaining capital costs

A total of US$37.41 million is budgeted for 2013 in order to improve the mine facilities and sustain the operation. Capital costs are split into two areas, 1) mine development and 2) equipment and infrastructure.

21.1.1 Mine development and exploration

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. Brownfield exploration (diamond drilling) is included under mine development costs as this activity has the objective of discovering new Mineral Resources in order to increase the life of mine. The budget for these activities in 2013 is US$14.25 million.

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. The budget for these areas is US$ 23.16 million, camp facilities being the biggest project accounting for U$ 8.17 million or 35 % of the budget. Another US$ 3.43 million has been budgeted for the second stage of the Tailings Facility (N° 3).

The capital cost budget in 2012 was US$ 33.53 million with yearend capital costs totaling US$ 26.30 million. Most of the planned investment assigned to the optimization of the processing plant and energy supply was not realized due to pending studies and permits. Part of this proposed investment was rolled over into the 2013 budget.

Capital costs for 2013 are regarded as reasonable to sustain the operation improving camp facilities, power supply and processing plant.

21.2 Operating costs

Operating costs for 2013 include the cash costs (US$56.52/t) and operating expenses (US$25.58/t) for the operation.

Cash costs relate to activities that are performed on the property including mine, plant, general services, and administrative service costs. Operating expenses include costs associated with distribution, general and administrative services, and community support activities.

21.2.1 Mine operating costs

Mining costs include drilling, blasting, support, loading and haulage. The 2013 budget for mining is US$ 19.62 million which is based on the projected extraction of 474,500 t of ore and represents an equivalent unit cost of US$ 41.36/t. The budget is based on the actual mine operating costs for 2012. The budgeted cost for 2012 was US$ 38.54/t with the actual cost for the year being US$ 40.49/t for the production of 455,090 t. The increased cost for 2012 was due to additional rock support and ancillary service requirements in the mine than was estimated. This increase has been considered in the 2013 budget.

21.2.2 Plant operating costs

Plant costs are distributed over five areas: crushing, milling, flotation, thickening and filtering, and tailings disposal. The 2013 budget for plant operating costs is US$ 7.04 million based on the projected treatment of 464,100 t representing an equivalent unit cost of US$ 15.17/t. The budgeted cost for 2012 was US$ 13.11/t, actual results for that year being US$ 14.05/t. This unit cost was achieved through milling a total of 462,222 t compare to the 450,796 t budgeted. The higher cost mainly reflects an increase in maintenance costs due to the reduction of the number of programmed plant shutdowns for maintenance through the year.

21.2.3 General services costs

General Service costs for 2013 are estimated to be US$ 7.48 million based on 2012 figures. The general service costs cover operations management, energy, maintenance, geology, planning, safety, environmental and laboratory costs. The budgeted cost for 2012 was US$16.64/t with actual results for the year being US$ 14.97/t. The lower cost reflects some relocated payroll adjustments as well as studies and consulting activities not fully realized during the year.

21.2.4 Administrative mine costs

Administrative costs for 2013 are estimated to be US$ 4.39 million based on the actual 2012 figures. Administrative service costs include administration, human resources, storage, hospital, legal, communication systems, accounting and cash, social assistance, community relations, camps, energy for the camp, and depreciation and amortization for equipment. Estimated costs for 2012 were US$ 7.69/t with the actual costs for the year being US$ 8.33/t. The extra US$ 0.64/t was mainly due to a change in the workers roster as well as other improvements for personnel transport.

21.2.5 Operating expenses

Operating expenses as opposed to Mine Operating Expenses (General services and Mine Administration) are shared between distribution (transport and supervision of concentrate), general and administrative services (Lima office) and community support activities (jobs with communities). Operating expenses for 2013 are estimated to be US$ 8.75 million based on the actual 2012 figures.

Estimated operating expenses for 2012 were US$ 7.62 million with the actual figure for the year being US$ 7.49 million mostly due to lower than budgeted administrative services and community support activities expenses.

Operating costs for 2013 are comparable to other operations with similar production levels located in this region.

22 Economic Analysis

A description of the economic analysis has not been included in the Technical Report as the Caylloma mine is currently in production and there has been no material change in current production/operational parameters since the CAM (2009) Technical Report.

23 Adjacent Properties

There is no information regarding adjacent properties applicable to the Caylloma Property for disclosure in this report.

24 Other Relevant Data and Information

Fortuna considers that the Technical Report contains all the relevant information necessary to ensure the report is understandable and not misleading.

25 Interpretation and Conclusions

Minera Bateas continues to successfully manage the Caylloma operation, processing 462,222 t of ore in 2012 from its underground mining operations. That same year Caylloma produced 2.04 Moz of silver while investing heavily in the construction of the new tailings facility as well as improving camp facilities.

Fortuna believes there is good potential for a significant increase of the Mineral Resources at the Caylloma Property particularly from the continuity of the current veins in operation as well as from the discovery of new veins. During 2012 important exploration projects were developed and new exploration targets were identified. Exploration development and investigation will continue through 2013.

Proven and Probable Mineral Reserves total 4.3 Mt at an average grade of 130 g/t Ag, 0.37 g/t Au, 1.52 % Pb, and 2.15 % Zn as of December 31, 2012. The conversion of Mineral Resources to Mineral Reserves considered different NSR cut-off values for each vein in accordance with the operation costs, metal prices and plant performance data.

The construction of the first stage of the new tailings facility (N° 3 as well as the granting of the operation permit by the Ministry of Energy and Mines in December 2012 has been a major milestone for Minera Bateas in order to assure available tailings disposal capacity for the coming years. The new Tailings Facility (N° 3) operation permit was issued by the Ministry of Energy and Mines in December 2012. The designed capacity of this facility is 15 years based on a 1,300-tpd processing capacity. The first two stages will provide a total capacity of six years. Construction of the first stage (two year capacity) was concluded in 2012 and the second stage is planned to be constructed in 2013.

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.

Minera Bateas continues developing sustainable programs to benefit the local communities including educational, nutritional and economical programs. The socio–environmental responsibilities of these programs ensure a good relationship between the company and local communities. This will help the growth and continuity of the mining operation while local communities improve their economies and living standards.

Operating costs are reasonable for production rates in a mine of this size and are comparable to other mines in the area with similar characteristics.

Sustaining capital costs are regarded as reasonable in order to improve the camp facilities and ensure continuity and sustainability of the mining operation.

26 Recommendations

Recommended work programs planned for 2013 to improve the operation include the following:

1. **Brownfields exploration**. In 2012 exploration focused on expanding or discovering new Mineral Resources to increase the life of mine. Fortuna is committed in continuing its intensive exploration program, budgeting US$ 6.7 million to continue developing ongoing exploration projects over identified structures as well as the discovery of new targets. In addition to this US$ 4 million has been budgeted for work designed to upgrade Inferred Resources. It is recommended that investment in exploration activities continue for the foreseeable future.

2. **Underground development.** The most important recommended mine project is the integration of the different levels of the Ánimas vein with underground ramps. An important effort in 2012 was made to improve ventilation which has allowed the operation to introduce the use of ANFO for stoping and drifting. The mine plan for 2013 includes 1,050 m of raise boring in order to comply with the ventilation requirements associated with the development of the mine especially in the case of the Ánimas vein. The budgeted cost of this work program in 2013 is US$1.8 million.

3. **Metallurgical studies to improve silver recovery.** Important efforts have been made in 2012 in order to optimize the metallurgical performance of the plant in general but especially to increase silver recovery. Metallurgical studies found important upside potential as most of the silver in the tailings is in the form of the same floatable minerals found in the concentrate. It is recommended that metallurgical test work and studies continue in 2013 in an attempt to improve silver recoveries in the future. The budgeted cost for these metallurgical studies in 2013 is US$0.2 million.

4. **Metallurgical studies to improve oxide recovery.** The response of "oxide" material to the flotation process requires additional testwork. The plant test conducted in 2012 demonstrated this material could be processed through flotation albeit at reduced recoveries. Metallurgical laboratory testing has been scheduled for March 2013. Results will help to adjust plant operating parameters to improve metallurgical response. The budgeted cost for these metallurgical studies in 2013 is US$80,000.

In addition to the confirmed projects for 2013 the following work is recommended:

- Increase the number of bulk density measurements in veins that lack sufficient values for a meaningful statistical analysis. In addition to this it is also recommended that a study be performed to improve the understanding of the 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 global density assignment.

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Certificates

CERTIFICATE of QUALIFIED PERSON

(a) I, Eric N. Chapman, Mineral Resource Manager 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 amended technical report titled Fortuna Silver Mines Inc. Caylloma Property, Caylloma District, Peru dated effective March 22, 2013 (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 preparing resource estimates for approximately nine years and have completed more than twenty resource estimates for a variety of deposit types such as epithermal gold veins, porphyry gold deposits, banded iron formations and volcanogenic massive sulfide deposits. I have completed at least five Mineral Resource estimates for polymetallic projects over the past four years.

I have read the definition of 'qualified person' set out in National Instrument 43-101 ("the Instrument") and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfill the requirements of a 'qualified person' for the purposes of the Instrument.

(d) I last visited the property from October 29 to November 1, 2012;

(e) I am responsible for the preparation of sections 1: Summary; 2: Introduction; 3: Reliance on other experts; 4: Property description and location; 5: Accessibility, climate, local resources, infrastructure and physiography; 6: History; 7:Geological setting and mineralization; 8: Deposit types; 9: Exploration; 10: Drilling; 11: Sample preparation, analyses and security; 12: Data verification; 14: Mineral Resource estimates; 23: Adjacent properties; 24: Other relevant information; 25: Interpretation and conclusions; 26: Recommendations; 27: References of the Technical Report.

(f) I am an employee of the issuer, Fortuna Silver Mines Inc.

(g) I have been an employee of Fortuna and involved with the property that is the subject of the Technical Report since May 2011.

(h) I have read the Instrument and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

(i) As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all the scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated at Vancouver, BC, this 15th day of April 2013.

[signed]

Eric N. Chapman, P. Geo., C. Geol. (FGS)

CERTIFICATE of QUALIFIED PERSON

(a) I, Thomas Kelly, President of Andes Colorado Corp., Calle 11, Rinconada Baja, Condominio Los Portales, Casa 135, La Molina, Lima, Peru; do hereby certify that:

(b) I am the co-author of the amended technical report titled Fortuna Silver Mines Inc. Caylloma Property, Caylloma District, Peru dated effective March 22, 2013 (the "Technical Report").

(c) I graduated with a Bachelor of Science Degree in Mining from the Colorado School of Mines, Golden, CO, USA in 1974. I have a Masters Degree in Mining Engineering from the Colorado School of Mines granted in 1995. I am a Registered Member of the Society of Mining Engineers (Number 1696580) and a Fellow of the Australasian Institute of Mining and Metallurgy - AusIMM (Membership No. 109746). I have practiced my profession for 38 years. I have been directly involved in underground operations, mining consulting, and assisting in the development of mining projects in Perú, Bolivia, Chile, Venezuela, Indonesia, Canada, United States and Mexico.

I have read the definition of 'qualified person' set out in National Instrument 43-101 ("the Instrument") and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfill the requirements of a 'qualified person' for the purposes of the Instrument.

(d) I last visited the property in August 2011;

(e) I am responsible for the preparation of sections 1: Summary; 2: Introduction; 13: Mineral processing and metallurgical testing; 15: Mineral Reserve estimate; 16: Mining Methods; 17: Recovery methods; 18: Project Infrastructure; 19: Market studies and contracts; 20: Environmental studies, permitting and social or community impact; 21: Capital and operating costs; 22: Economic analysis; 25: Interpretation and conclusions; 26: Recommendations; 27: References of the Technical Report.

(f) I am an independent consultant and Director of Fortuna Silver Mines Inc., the issuer. I have not been compensated for this work.

(g) I have been an independent director of Fortuna Silver Mines since April 2011.

(h) I have read the Instrument and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

(i) As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all the scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated at Lima, Peru, this 15th day of April 2013.

[signed]

Thomas Kelly, E.M. Fellow AusIMM, Registered Member SME