OreWin

Independent Mining Consultants

SSR Mining Inc.

Puna 2021
Technical Report

February 2022

Job No. 21015

IMPORTANT NOTICE

This notice is an integral component of the Puna 2021 Technical Report (Puna21TR) and should be read in its entirety and must accompany every copy made of the report. The Puna21TR has been prepared using the Canadian National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101).

The Puna21TR has been prepared for SSR Mining Inc. (SSR) by OreWin Pty Ltd (OreWin). The Puna21TR is based on information and data supplied to OreWin by SSR and other parties and where necessary OreWin has assumed that the supplied data and information are accurate and complete.

This report is a Feasibility Study (FS) that represents forward-looking information. The forward-looking information includes metal price assumptions, cash flow forecasts, projected capital and operating costs, metal recoveries, mine life and production rates, and other assumptions used in the FS. Readers are cautioned that actual results may vary from those presented. The factors and assumptions used to develop the forward-looking information, and the risks that could cause the actual results to differ materially are presented in the body of this report under each relevant section.

The conclusions and estimates stated in the Puna21TR are to the accuracy stated in the Puna21TR only and rely on assumptions stated in the Puna21TR. The results of further work may indicate that the conclusions, estimates and assumptions in the Puna21TR need to be revised or reviewed.

OreWin has used its experience and industry expertise to produce the estimates and approximations in the Puna21TR. Where OreWin has made those estimates and approximations, it does not warrant the accuracy of those amounts and it should also be noted that all estimates and approximations contained in the Puna21TR will be prone to fluctuations with time and changing industry circumstances.

The Puna21TR should be construed in light of the methods, procedures, and techniques used to prepare the Puna21TR. Sections or parts of the Puna21TR should not be read or removed from their original context.

The Puna21TR is intended to be used by SSR, subject to the terms and conditions of its contract with OreWin. Recognising that SSR has legal and regulatory obligations, OreWin has consented to the filing of the Puna21TR with the Canadian Securities Administrators and its System for Electronic Document Analysis and Retrieval (SEDAR). Except for the purposes legislated, any other use of this report by any third party is at that party's sole risk.

Title Page

Project Name:	Puna Operations
Title:	Puna 2021 Technical Report
Location:	Jujuy, Argentina
Effective Date of Technical Report:	31 December 2021
Effective Date of Mineral Resources:	31 December 2021
Effective Date of Mineral Reserves:	31 December 2021

Qualified Persons:

- Gregory Gibson , BSc (Mining Engineering), MSc (Mining & Earth Systems Engineering), SME Registered Member (4134135), employed by SSR Mining Inc. as Vice President of Operations - Americas, was responsible for the preparation of Sections 1 to 27.
- Bernard Peters, BEng (Mining), FAusIMM (201743), employed by OreWin Pty Ltd as Technical Director - Mining, was responsible for the overall preparation , the Mineral Reserve estimates, and Sections 1 to 6; Section 13; Sections 15 to 27.
- Sharron Sylvester, BSc (Geol), RPGeo AIG (10125), employed by OreWin Pty Ltd as Technical Director - Geology, was responsible for the preparation of the Mineral Resources, Sections 1 to 12; Section 14; Sections 23 to 27.

Signature Page

Project Name:	Puna Operations
Title:	Puna 2021 Technical Report
Location:	Jujuy, Argentina
Date of Signing:	23 February 2022
Effective Date of Technical Report:	31 December 2021

/s/ Gregory Gibson

Gregory Gibson, Vice President Operations - Americas, SSR Mining Inc., BSc (Mining Engineering), MSc (Mining & Earth Systems Engineering), SME Registered Member (4134135)

/s/ Bernard Peters

Bernard Peters, Technical Director – Mining, OreWin Pty Ltd, BEng (Mining), FAusIMM (201743)

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1 SUMMARY

1.1 Introduction

This Puna 2021 Technical Report (Puna21TR) has been in prepared using the Canadian National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101).

The Puna project (Puna or the Project) comprises the Chinchillas property and the Pirquitas property, both of which are located the Jujuy Province in far north Argentina.

Puna is directly owned (100%) by SSR Mining Inc. (SSR) through a subsidiary company Puna Operations Inc. (POI) which through other 100% owned subsidiaries owns Mina Pirquitas S.A. (MPSA). MPSA operates the project.

Ore from the Chinchillas mine is transported to the Pirquitas plant for processing. The Chinchillas mine is located approximately 45 km from the Pirquitas plant. The open pit mine at Pirquitas has been completed.

SSR is a gold mining company with four producing assets located in the USA, Turkey, Canada, and Argentina, and with development and exploration assets in the USA, Turkey, Mexico, Peru, and Canada. SSR is listed on the NASDAQ (NASDAQ:SSRM), the Toronto Stock Exchange (TSX:SSRM), and on the Australian Stock Exchange (ASX:SSR).

This Puna21TR was prepared by appropriately experienced technical professionals employed by OreWin Pty Ltd (OreWin), an independent mining consultancy based in South Australia, with input and assistance from SSR personnel.

1.2 Property Description and Location

1.2.1 Property Description and Location – Chinchillas

The Chinchillas Property is located in the Puna region of north-western Argentina, in the province of Jujuy, department of Rinconada, approximately 290 km north-west of San Salvador de Jujuy, the capital of Jujuy Province. The property is centred at approximately 3,473,150E and 7,512,360N (Gauss Kruger, Argentina, Posgar Zone 3; 22°30'13" S, 66°15'39" W) at elevations ranging from 4,000–4,200 masl.

Access to the Chinchillas Property is by paved road to the town of Abra Pampa via National Route No. 9 and then 66 km west across public gravel roads, through the village of Santo Domingo. Santo Domingo is equipped with electricity, and water services. Abra Pampa has a hospital, and, along with San Salvador, provides other supplies necessary for exploration. Access between the Pirquitas Operation and the Chinchillas Property is via National Route No. 40 that leads to Provincial Route No. 70.

1.3 Land Tenure and Ownership

The Chinchillas Concession or Project is composed of three contiguous claims, totalling 2,041 ha, and the Pirquitas property includes surface rights covering an area of approximately 7,500 ha, which is used for purposes such as housing, infrastructure facilities, processing facilities, tailings facility and other facilities to support mining operations for the Project.

1.3.1 Property Description and Location – Pirquitas

The Pirquitas Property is also located in the Rinconada Department in the Province of Jujuy, approximately 45 km south-west of the Chinchillas Property and approximately 335 km north-west of San Salvador. Activities at the Property are centred at 22°42′ south latitude and 66°30′ west longitude at elevations of between 4,000–4,450 masl.

1.4 Geological Setting and Mineralisation

The Chinchillas and Pirquitas properties are within the Bolivian tin-silver–zinc belt that extends from the San Rafael tin-copper deposit in southern Peru into the Puna region of Jujuy. Deposits with similar environments and styles of mineralisation include San Cristóbal, Potosí, and Pulacayo.

These deposits are generally associated with intrusion of dacite dome complexes. Mineralisation is hosted in shear zones and breccias within the dacite domes and/or shear zones and breccias within the host rocks. More rarely, as in the case of the Chinchillas Property and San Cristóbal, the deposits also contain flat-lying manto bodies within sedimentary and pyroclastic rocks that are cut by 'feeder' shear zones. All the deposits have large vertical extents.

The Chinchillas and Pirquitas properties are within the Puna geological belt. Stratigraphy in the belt includes metamorphosed Proterozoic sedimentary rocks in the basement, Paleozoic marine back arc sedimentary rocks, and younger volcanic and continental sedimentary rocks. In the Jujuy Province, the Puna terrane is an important host for mineral deposits, including mesothermal quartz veins with native gold and base metals; polymetallic quartz-sulfide veins with base and precious metals; gold, tin and copper placer deposits; SEDEX deposits with lead zinc–silver; and Bolivian-type tin silver sulfide veins related to intrusive stocks.

1.4.1 Geological Setting and Mineralisation – Chinchillas

The Chinchillas deposit is within a dacitic volcanic centre. The deposit was controlled by a dilational jog on a regional scale east–west trending fault where a magmas intruded through marine meta-sedimentary basement rocks. The explosive volcanic eruption resulted in an elliptical shaped topographic depression approximately two kilometres long by 1.6 km wide, subsequently infilled with pyroclastic rocks including breccias and tuffs. At the contact between pyroclastic volcanic rocks and basement metasedimentary rock, a wide zone of hydraulic fracturing and brecciation formed. Dacitic lavas, flow domes and subvolcanic intrusions occur on the southern margin of the basin at the contact between metasedimentary and pyroclastic rocks.

Significant silver-lead-zinc mineralisation occurs in four main areas at Chinchillas: the Silver Mantos and Mantos Basement zones in the west part of the Project, and the Socavon del Diablo and Socavon Basement zones in the east part.

1.4.2 Geological Setting and Mineralisation – Pirquitas

The Pirquitas deposit is hosted by the Ordovician Acoite Formation, a strongly folded package of low-grade metamorphosed marine sandstone, siltstone, and minor shale beds. These rocks crop out within fault-bounded and likely uplifted structural blocks that occur southwest and east of the mine area. Late Ordovician to Early Devonian compressional tectonism resulted infolding of the Paleozoic sedimentary rocks and development of well-defined axial planar cleavage. High-angle thrust faults were also generated during this event. In the mine area, axial planes of folds strike north to north–north-east and are sub-vertical to moderately inclined.

Sulphide-rich veins cut the axial planes of the folds and the related axial planar cleavage at high angles. Four main vein sets are recognised on the Pirquitas Property.

Bolivian-type Ag-Sn deposits generally consist of sulphide and quartz-sulphide vein systems typically containing cassiterite and a diverse suite of base and trace metals, including silver, in a complex assemblage of sulphide and sulfosalt minerals. The vein systems are generally spatially and likely genetically associated with epizonal (subvolcanic) quartz-bearing peraluminous intrusions one to two kilometres in diameter but may be entirely hosted by the country rocks into which the intrusive stocks were emplaced.

1.5 Exploration and Drilling

1.5.1 Exploration and Drilling – Chinchillas

At Chinchillas, surface exploration programmes included detailed mapping with emphasis on structure, rock chip sampling, trenching, soil sampling and talus sampling. These programmes identified major structural zones, the strong east–west control on basin formation, and new mineralised target areas. Geophysical surveys were also conducted, including Induced Polarisation/Resistivity (IP), Controlled-Source Audio-Magnetotelluric Technique (CSAMT), and Magnetics.

Prior to SSR, Golden Arrow completed five drilling programmes (~50,000 m of drilling) that contributed to the initial resource database.

1.5.2 Exploration and Drilling – Pirquitas

Prior to SSR, the Sunshine Mining and Refining Company (Sunshine) completed comprehensive mineral exploration on the property, including geological mapping, geophysical surveying (44 line-kilometres of ground magnetics and 19.2 line-kilometres of induced polarisation surveying), underground rock sampling and multiple programmes of RC and diamond drilling. In May 2004, SSR fully acquired Sunshine's ownership in the property and continued to advance the project through detailed drilling, underground resource definition, and mining.

1.6 Sample Preparation, Analyses and Security

All drilling was completed by professional drilling companies using standard industry methods.

Sample and assay procedures applied in the drilling programme are consistent with generally accepted industry best practices. The statistical analysis of quality control data shows good accuracy and precision with no significant contamination.

1.7 Data Verification

No material sample bias was identified during the review of the drill data and assays. SSR has identified an issue with some pre-2009 drillhole collar locations in the Pirquitas drilling and has made a reasonable attempt at rectifying the issue. This issue is not expected to have a material effect on the quantity and quality of the Mineral Resource inventory and should be able to be managed operationally.

Data collection procedures are in accordance with generally accepted industry best practices and the resultant data is suitable for use in mineral resource estimation.

1.8 Mineral Resource and Mineral Reserve Estimates

Mineral Resources and Mineral Reserves in the Puna21TR meet the CIM Definition Standards on Mineral Resources and Reserves 2014 (CIM Definition Standards) and conform to the Canadian National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101).

1.8.1 Mineral Resource Estimate – Chinchillas Property

The Mineral Resource has been estimated for the Chinchillas Property is in conformity with generally accepted guidelines and reported in accordance with NI 43-101. The Chinchillas resource model presented in this Puna21TR was completed on 28 August 2020.

The Mineral Resource estimate has been generated for the Mantos Deposit from drillhole sample assay results and the interpretation of a geological model which relates to the spatial distribution of silver, lead, and zinc. Interpolation characteristics were defined based on the geology, drillhole spacing, and geostatistical analysis of the data.

Estimations were made from 3D cell models based on geostatistical applications using commercial software. The model uses a cell size of 8 m L x 8 m W x 5 m H.

The Mineral Resource was classified according to proximity to sample data locations.

Table 1.1 and Table 1.2 summarise the estimate of Mineral Resource for the Chinchillas project effective as of 31 December 2021. Mineral Resources that 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. The quantity and grade of reported Inferred Mineral Resources are uncertain in nature and there has been insufficient exploration to classify these Inferred Mineral Resources as Indicated or Measured Mineral Resources. It cannot be assumed that all or any part of an Inferred Mineral Resource will be upgraded to an Indicated or Measured Mineral Resource as a result of continued exploration.

In determining the cut-off grade, the reasonable prospects for eventual economic extraction requirement generally implies that the quantity and grade estimates meet certain economic thresholds taking into account an open pit extraction scenario with road transport and processing at the Pirquitas Operation. This includes consideration of the technical and economic parameters listed above, but also includes additional operating costs, estimated at $12/t, related to the handling and transportation of ore from the Chinchillas Property to the Pirquitas Operation.

1.8.1.1 Socavon Deposit

A review of the pit optimisation work for the Socavon deposit was undertaken using the NSR and other assumptions used for the Mantos Deposit. The review concluded that there was no suitable pit shell produced to meet the standard of reasonable prospects for extraction. Therefore, the Socavon Mineral Resource that was previously reported by SSR has not been included in the 2021 Puna Mineral Resource.

Table 1.1 Summary of Chinchillas Mineral Resource Estimate Exclusive of Mineral Reserve (as at 31 December 2021) Based on $22.00/oz Silver, $0.95/lb Lead, and $1.15/lb Zinc

Mineral Resource Classification	Tonnage	Grades			Contained Metal		
	(kt)	Ag (g/t)	Pb (%)	Zn (%)	Silver (koz)	Lead (klb)	Zinc (klb)
Measured	1,110	99.2	0.86	0.31	3,540	21,040	7,584
Indicated	4,904	101.1	0.88	0.19	15,943	95,630	20,454
Measured + Indicated	**6,013**	**100.8**	**0.88**	**0.21**	**19,483**	**116,670**	**28,038**
Inferred	165	101.9	0.48	0.16	540	1,750	580

1. Mineral Resources are reported based on 31 December 2021 topography surface.
2. The Mineral Resource is contained within a pit shell generated using an NSR cut-off of $33.20/t.
3. The Mineral Resource estimate is based on metal price assumptions of $22.00/oz silver, $0.95/lb lead, and $1.15/lb zinc.
4. Metallurgical recoveries vary with grade and average recoveries are, 98% silver, 95% lead and 63% for zinc.
5. The point of reference for Mineral Resources is the point of feed into the processing facility.
6. Mineral Resources are reported exclusive of Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
7. SSR has 100% ownership of the Project.
8. All ounces reported represent troy ounces, and g/t represents grams per metric tonne.
9. Totals may vary due to rounding.

Table 1.2 Summary of Metallurgical Recoveries and Cut-off Values of Chinchillas Mineral Resource Estimate Exclusive of Mineral Reserve (as at 31 December 2021) Based on $22.00/oz Silver, $0.95/lb Lead, and $1.15/lb Zinc

Mineral Resource Classification	Tonnage	Grades			Metallurgical Recovery			Cut-off
	(kt)	Ag (g/t)	Pb (%)	Zn (%)	Silver (%)	Lead (%)	Zinc (%)	NSR ($/t)
Measured	1,110	99.2	0.86	0.31	98	95	63	33.20
Indicated	4,904	101.1	0.88	0.19	98	95	63	33.20
Measured + Indicated	**6,013**	**100.8**	**0.88**	**0.21**	**98**	**95**	**63**	**33.20**
Inferred	165	101.9	0.48	0.16	98	95	63	33.20

1. Mineral Resources are reported based on 31 December 2021 topography surface.
2. The Mineral Resource is contained within a pit shell generated using an NSR cut-off of $33.20/t.
3. The Mineral Resource estimate is based on metal price assumptions of $22.00/oz silver, $0.95/lb lead, and $1.15/lb zinc.
4. Metallurgical recoveries vary with grade and average recoveries are, 98% silver, 95% lead and 63% for zinc.
5. The point of reference for Mineral Resources is the point of feed into the processing facility.
6. Mineral Resources are reported exclusive of Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
7. SSR has 100% ownership of the Project.
8. All ounces reported represent troy ounces, and g/t represents grams per metric tonne.
9. Totals may vary due to rounding.

1.8.2 Mineral Resource Estimate – Pirquitas Deposit

The Mineral Resource has been estimated for the Pirquitas Property in conformity with generally accepted guidelines and reported in accordance with NI 43-101. The Pirquitas resource model presented in this Puna21TR was completed on 30 September 2013 and the reasonable prospects of the underground mining scenario was completed on 24 January 2018.

The Mineral Resource estimate has been generated for the Mining Area veins from drillhole sample assay results and the interpretation of a geological model which relates to the spatial distribution of silver and zinc. Interpolation characteristics were defined based on the geology, drillhole spacing, and geostatistical analysis of the data.

Estimations were made from 3D cell models based on geostatistical applications using commercial software. The model uses a cell size of 4 m x 4 m x 8 m cells to be compatible with the grade control model.

The Mineral Resource was classified according to proximity to sample data locations.

Table 1.3 and Table 1.4 summarise the estimate of Mineral Resource for the Pirquitas project effective as of 31 December 2021. Mineral Resources that 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. The quantity and grade of reported Inferred Mineral Resources are uncertain in nature and there has been insufficient exploration to classify these Inferred Mineral Resources as Indicated or Measured Mineral Resources. It cannot be assumed that all or any part of an Inferred Mineral Resource will be upgraded to an Indicated or Measured Mineral Resource as a result of continued exploration.

In determining the cut-off grade, the reasonable prospects for eventual economic extraction requirement generally implies that the quantity and grade estimates meet certain economic thresholds, taking into account an underground mining extraction scenario.

Table 1.3 Summary of Pirquitas Mineral Resource Estimate Exclusive of Mineral Reserve (as at 31 December 2021) Based on $20.00/oz Silver, $1.10/lb Lead, and $1.30/lb Zinc

Mineral Resource Classification	Tonnage	Grades			Contained Metal		
	(kt)	Ag (g/t)	Pb (%)	Ag (g/t)	Silver (koz)	Lead (Mlb)	Zinc (Mlb)
Measured	79	444.5	0.20	1.17	1,129	0.4	2
Indicated	2,555	287.7	0.20	4.56	23,627	1.0	257
Measured + Indicated	**2,634**	**292.4**	**0.20**	**4.46**	**24,756**	**1.5**	**259**
Inferred	1,080	206.9	0.00	7.45	7,185	0.1	177

1. The Mineral Resource estimate is contained within underground mining shapes based on $90/t to $100/t NSR cut-off.
2. The Mineral Resource estimate is based on metal price assumptions of $20.00/oz silver, $1.30/lb zinc, and $1.10/lb lead.
3. Metallurgical recoveries vary with grade and on average are, 87% silver and 85% for zinc and 50% for lead.
4. The point of reference for Mineral Resources is the point of feed into the processing facility
5. Mineral Resources are reported exclusive of Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. SSR has 100% ownership of the Project.
7. All ounces reported represent troy ounces, and g/t represents grams per metric tonne.
8. Totals may vary due to rounding.

Table 1.4 Summary of Metallurgical Recoveries and Ownership of Pirquitas Mineral Resource Estimate Exclusive of Mineral Reserve (as at 31 December 2021) Based on $20.00/oz Silver, $1.10/lb Lead, and $1.30/lb Zinc

Mineral Resource Classification	Tonnage	Grades			Metallurgical Recovery			Cut-off NSR
	(kt)	Ag (g/t)	Pb (%)	Zn (%)	Silver (%)	Lead (%)	Zinc (%)	($/t)
Measured	79	444.5	0.20	1.17	87	50	85	100
Indicated	2,555	287.7	0.20	4.56	87	50	85	100
Measured + Indicated	**2,634**	**292.4**	**0.20**	**4.46**	**87**	**50**	**85**	**100**
Inferred	1,080	206.9	0.00	7.45	87	50	85	100

1. The Mineral Resource estimate is contained within underground mining shapes based on $90/t to $100/t NSR cut-off.
2. The Mineral Resource estimate is based on metal price assumptions of $20.00/oz silver, $1.30/lb zinc, and $1.10/lb lead.
3. Metallurgical recoveries vary with grade and on average are, 87% silver and 85% for zinc and 50% for lead.
4. The point of reference for Mineral Resources is the point of feed into the processing facility
5. Mineral Resources are reported exclusive of Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. SSR has 100% ownership of the Project.
7. All ounces reported represent troy ounces, and g/t represents grams per metric tonne.
8. Totals may vary due to rounding.

1.9 Mineral Reserve Estimate – Chinchillas

Mineral Resources and Mineral Reserves in the Puna21TR meet the CIM Definition Standards on Mineral Resources and Reserves 2014 (CIM Definition Standards) and conform to the Canadian National Instrument 43 101 Standards of Disclosure for Mineral Projects (NI 43 101).

Open pit mining is carried out by MPSA as an owner mining operation with ore hauled from Chinchillas pit to the Pirquitas plant. The Mineral Reserves were developed based on mine planning work completed in 2021 that included pit optimisation and redesign of the pit phases. Table 1.5 and Table 1.6 summarise the Mineral Reserve for Chinchillas. The Chinchillas Mineral Reserve estimate has been generated for the Mantos Deposit based on the following inputs: metal prices, resource model, geotechnical information, operating costs, mineral processing recoveries, concentrate transport, off site costs and charges. Costs for all areas of the operation are estimated from actual costs. These were used to calculate an NSR and $44.11/t NSR was used for the Mineral Reserve cut-off.

Metal prices for the Mineral Reserve cut-off were estimated after analysis of consensus industry forecasts and compared to metal prices used in other published studies. The prices selected were then reduced from the average long-term prices to take a conservative view of the long-term price. The long-term prices for the cut-off were assumed to apply from the start of 2026. The metal prices are representative of the range of price estimates publicly reported for Mineral Reserve cut-offs.

Table 1.5 Summary of Chinchillas Mineral Reserve Estimate (as at 31 December 2021) Based on $18.50/oz Silver, $0.90/lb Lead, and $1.05/lb Zinc

Mineral Reserve Classification	Tonnage	Grade			Contained Metal		
	(kt)	Ag (g/t)	Pb (%)	Zn (%)	Silver (koz)	Lead (klb)	Zinc (klb)
Proven	2,379	168.9	1.33	0.34	12,918	69,747	17,830
Probable	5,041	155.3	1.29	0.25	25,174	143,364	27,784
Probable Stockpiles	187	141.0	1.33	0.50	846	5,483	2,061
Proven + Probable	**7,606**	**159.2**	**1.30**	**0.28**	**38,938**	**218,595**	**47,675**

1. Mineral Reserves are reported based on 31 December 2021 topography surface.
2. The Mineral Reserves estimate is based on metal price assumptions of $18.50/oz silver, $0.90/lb lead, and $1.05/lb zinc.
3. The Mineral Reserves estimate is reported at a cut-off grade of $44.11/t NSR.
4. Economic analysis for the Mineral Reserve has been prepared using long-term metal prices of $21.00/oz silver, $0.90/lb lead, and $1.20/lb zinc
5. Processing recoveries vary based on the feed grade. The average recovery is estimated to be 98% for silver, 95% for lead and approximately 63% for zinc.
6. Metals shown in this table are the contained metals in ore mined and processed.
7. The point of reference for Mineral Resources is the point of feed into the processing facility.
8. SSR has 100% ownership of the Project.
9. All ounces reported represent troy ounces, and g/t represents grams per metric tonne.
10. Totals may vary due to rounding.

Table 1.6 Summary of Metallurgical Recoveries of Chinchillas Mineral Reserve Estimate (as at 31 December 2021) Based on $18.50/oz Silver, $0.90/lb Lead, and $1.05/lb Zinc

Mineral Reserve Classification	Tonnage	Grades			Metallurgical Recovery			Cut-off NSR
	(kt)	Ag (g/t)	Pb (%)	Zn (%)	Silver (%)	Lead (%)	Zinc (%)	($/t)
Proven	2,379	168.9	1.33	0.34	98	95	63	44.11
Probable	5,041	155.3	1.29	0.25	98	95	63	44.11
Probable Stockpiles	187	141.0	1.33	0.50	98	95	63	44.11
Proven + Probable	**7,606**	**159.2**	**1.30**	**0.28**	**98**	**95**	**63**	**44.11**

1. Mineral Reserves are reported based on 31 December 2021 topography surface.
2. The Mineral Reserves estimate is based on metal price assumptions of $18.50/oz silver, $0.90/lb lead, and $1.05/lb zinc.
3. The Mineral Reserves estimate is reported at a cut-off grade of $44.11/t NSR.
4. Economic analysis for the Mineral Reserve has been prepared using long-term metal prices of $21.00/oz silver, $0.90/lb lead, and $1.20/lb zinc
5. Processing recoveries vary based on the feed grade. The average recovery is estimated to be 98% for silver, 95% for lead and approximately 63% for zinc.
6. Metals shown in this table are the contained metals in ore mined and processed.
7. The point of reference for Mineral Resources is the point of feed into the processing facility.
8. SSR has 100% ownership of the Project.
9. All ounces reported represent troy ounces, and g/t represents grams per metric tonne.
10. Totals may vary due to rounding.

1.10 Metallurgy and Processing

The metallurgical testing of Chinchillas ore types commenced in 2013 and continued until 2016. The first testwork was focused on silver recovery by both leaching and flotation methods with flotation proving to be superior at this early stage. The second programme continued process development of flotation into separate lead/silver and zinc concentrates. The third testwork campaign was designed to advance the flotation process and test specifically these ore types in the Pirquitas mill flow sheet.

The Pirquitas process plant operating performance since commencement on Chinchillas ores is used to provide the concentrate grade recovery and mass pull relationships, Table 1.7 and Table 1.8.

Table 1.7 Silver / Lead Concentrate Relationships

Variable	Variable Formula
Ag Recovery	(–0.0631 x Pb recovery2) + (11.655 x Pb recovery) -447.4
Pb Recovery	(–2.6303x Pb Feed2) + (12.329 x Pb Feed) + 80.654
Zn Recovery	(-5.2817 x Zn Feed2)+(Zn Feed x –6.31) + 20.546
Mass Pull	(–0.0024 x Pb Feed2) + (0.0164 x Pb Feed)+-0.0007

Table 1.8 Zinc Concentrate Relationships

Variable	Variable Formula
Ag Recovery	(–3.4843 x Zn feed2) + (7.2499 x Zn feed)+0.8295
Pb Recovery	(0.024 x (Pb feed/Zn feed)2) + (-0.5988 x (Pb feed/Zn feed)+ 3.1292
Zn Recovery	(–195921 x (mass pull Zn)2 + (5620.3 x mass pull Zn)+28.709
Mass Pull	(0.007 x Zn feed2) + (0.0041 x Zn feed+0.0011

1.11 Environment, Communities, and Permitting

There are seven communities located in the project's area of influence. and are included in management plans for training and capacity building.

The Project does not intrude upon any protected areas. Water quality in the surface waters draining the Project area is typical of a mineralised zone, including some observed elevated metals parameters, but with generally neutral pH. The waste rock is expected to be largely non-acid generating, with a small portion that may be weakly acid generating under certain oxidising conditions. The waste rock with potential for acid production will be placed so any drainage will report to the pit and avoid introduction to the environment.

Although there is no specific mine closure legislation nor bonding requirements in Argentina, a conceptual closure plan has been developed for the Project. Closure costs are estimated at $30.6M. MPSA is also responsible for the closure costs associated with the Pirquitas pit.

An Environmental and Social Impact Assessment (ESIA) was completed for the Chinchillas project and submitted to the regulatory authorities of the province of Jujuy for review, with the license obtained in December 2017. The biannual update of the ESIA was submitted in due time and form, being pending approval by the regulatory authorities of the province of Jujuy. In addition, an addendum to the ESIA for the Pirquitas mine was obtained from MPSA to use the Pirquitas pit for tailings deposition at the Pirquitas Operation, and this authorisation must be renewed.

1.12 Production

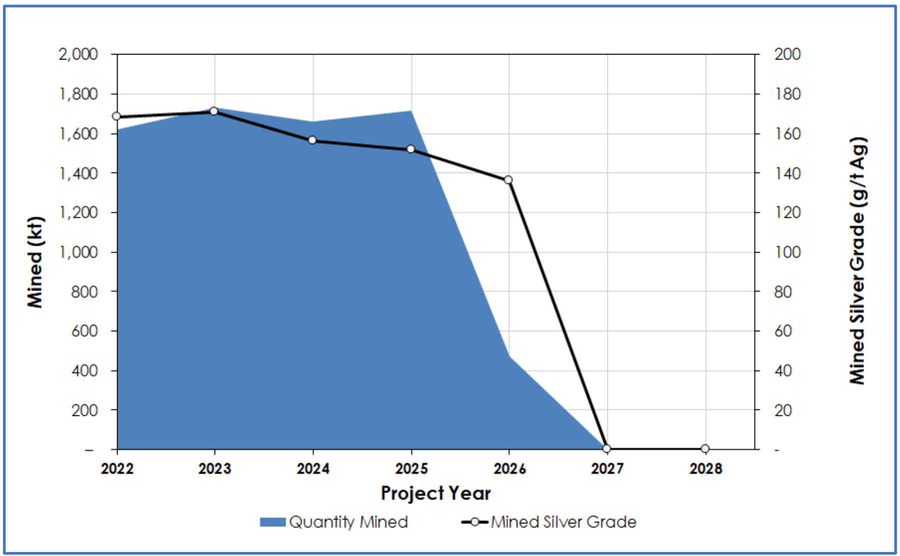
Future proposed mine production has been scheduled to optimise the mine output and meet the plant capacity. The mining production forecasts are shown in Table 1.9. Mine, process, and metal production are shown in Figure 1.1 to Figure 1.3.

Table 1.9 Mining Production Statistics

Item	Unit	Total LOM
Ore Processed		
Processed	kt	7,352
Ag Feed Grade	g/t	160
Pb Feed grade	%	1.32
Zn Feed grade	%	0.29
Silver Recovery	%	95.5
Concentrate Produced		
Lead Concentrate – in Stockpile	kt	4
Zinc Concentrate – in Stockpile	kt	1
Lead Concentrate – Produced	kt	135
Zinc Concentrate – Produced	kt	27
Lead Concentrate – Total	kt	139
Zinc Concentrate – Total	kt	28
Metal Produced		
Silver	koz	37,210
Lead	Mlb	204
Zinc	Mlb	29

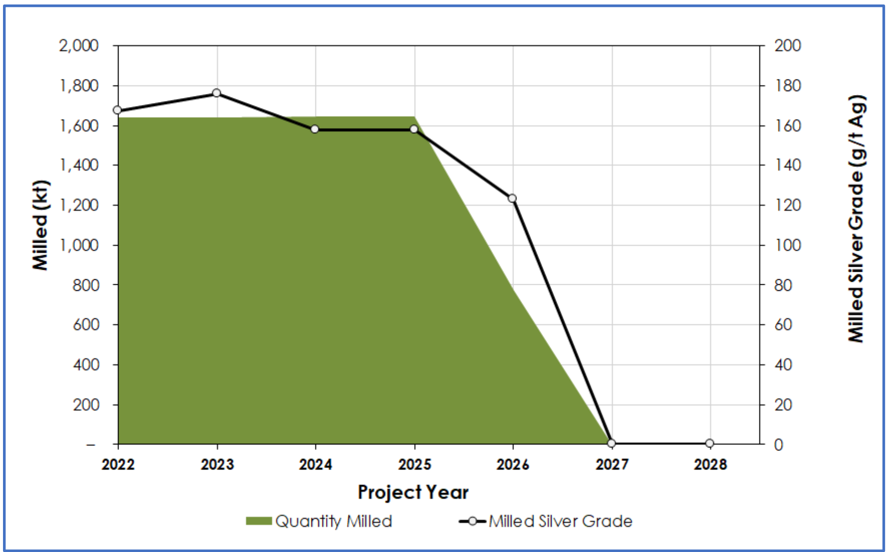
Metal produced includes current concentrate stockpiles containing 242 koz silver and 5 Mlb lead.

Figure 1.1 Mining Production Profile



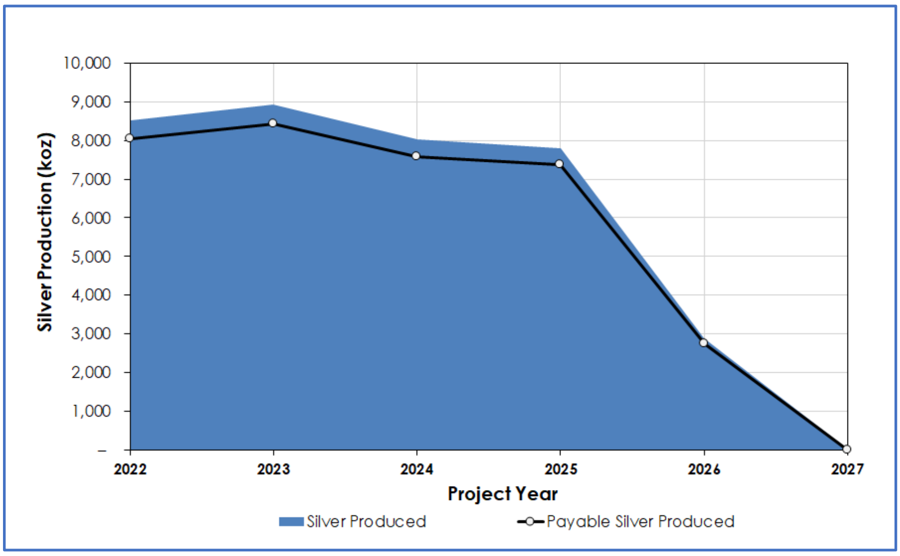
OreWin, 2021

Figure 1.2 Process Feed Profile



OreWin, 2021

Figure 1.3 Silver Production



OreWin, 2021

1.13 Capital and Operating Costs

The cost estimate was prepared by the SSR technical department at site. OreWin reviewed the assumptions, parameters, and methods used to prepare the cost estimate and is of the opinion that they are sufficient for the purposes of validating the economics of the Mineral Reserve. Total capital expenditure is estimated to be $99M.

The life of mine operating costs are approximately $52.67/t of ore milled, as summarised in Table 1.10.

Table 1.10 Operating Cost Summary

Description	Amount ($M)	LOM Average ($/t milled)
Mining Costs	110	15.01
Processing Costs	183	24.95
G&A Costs	93	12.71
Total	387	52.67

1.14 Economic Analysis

The estimates of cash flows have been prepared on a real basis as at 1 January 2022 and a mid-year discounting is used to calculate NPV.

The projected financial results include:

- After-tax NPV at an 5% real discount rate is $228M.
- Mine life of five years.

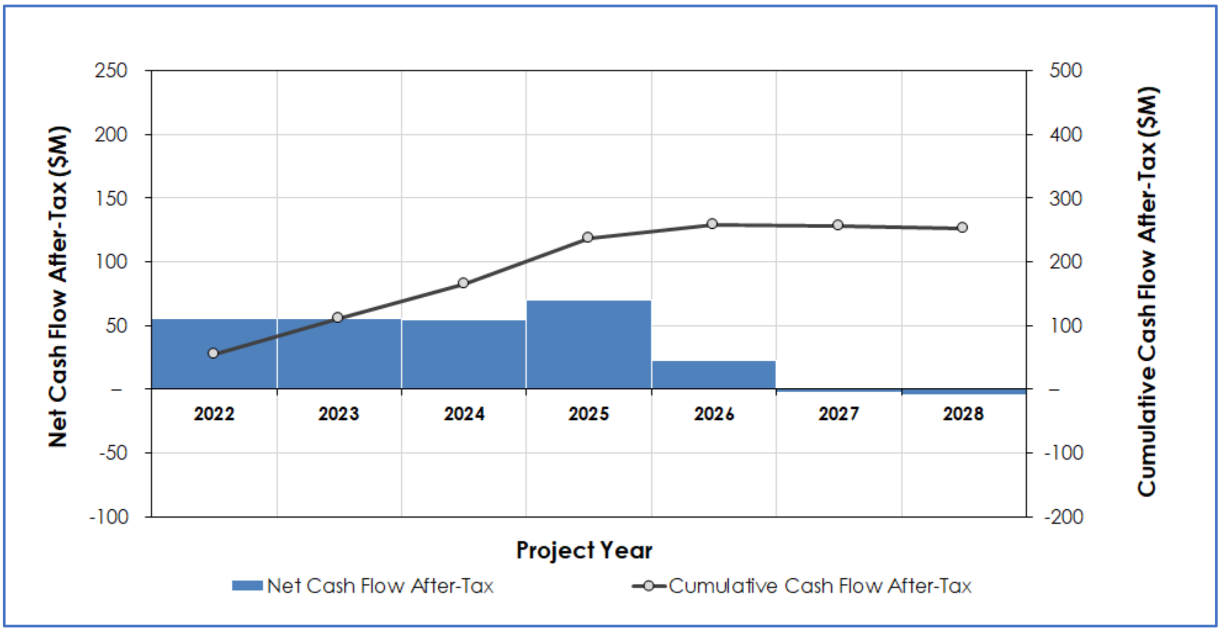
The estimated total cash costs for the LOM is $11.63/oz payable silver. AISC for the LOM, which includes infrastructure capital, capital development and reclamation, averages $13.57/oz payable silver. Unit costs include concentrate in stockpile. Silver provides the primary revenue for the analysis, with contributions from lead and zinc. Credits from lead and zinc are included in the cash cost.

The key results of the Puna21TR are summarised in Table 1.11. The projected financial results for undiscounted and discounted cash flows and before and after tax, at a range of discount rates are shown in Table 1.12.

Metal price assumptions are shown in Table 1.13. The results of NPV5% sensitivity analysis to a range of changes in silver price (primary commodity) and discount rates is shown in Table 1.14.

A chart of the cumulative cash flow is shown in Figure 1.4.

Figure 1.4 After Tax Annual and Cumulative Cash Flow



OreWin, 2021

Table 1.11 Puna21TR Results Summary

Description	Unit	Total LOM
Processed		
Processed	kt	7,352
Ag Feed grade	g/t	160
Pb Feed grade	%	1.32
Zn Feed grade	%	0.29
Silver Recovery	%	95.5
Concentrates		
Lead Concentrate – in Stockpile	kt	4
Zinc Concentrate – in Stockpile	kt	1
Lead Concentrate – Produced	kt	135
Zinc Concentrate – Produced	kt	27
Lead Concentrate - Total	kt	139
Zinc Concentrate - Total	kt	28
Metal Produced		
Silver	koz	37,210
Lead	Mlb	204
Zinc	Mlb	29
Key Financial Results		
Mine Site Cash Cost	$/oz payable Silver	11.61
Royalties and Refining Costs	$/oz payable Silver	6.10
Credits	$/oz payable Silver	–6.08
Total Cash Costs (after credits)	$/oz payable Silver	11.63
AISC	$/oz payable Silver	13.57
Site Operating Costs	$/t milled	52.67
Average Silver Price	$/oz	22.38
NPV	$M	228
Discount Rate	%	5
Mine Life	years	5

Metal produced includes current concentrate stockpiles containing 242 koz silver and 5 Mlb lead.

Table 1.12 Financial Results

Discount Rate	NPV ($M)	
	Before-tax	After-tax
Undiscounted	279	253
2.0%	268	242
5.0%	253	228
10.0%	231	206
12.0%	223	199
15.0%	212	188
18.0%	202	179
20.0%	195	173

NPV includes concentrate in stockpile

Table 1.13 Metal Prices

Commodity	Unit	2022	2023	2024	2025	Long-Term
Silver	$/oz	24.00	23.00	22.00	21.00	21.00
Lead	$/lb	1.00	0.95	0.93	0.92	0.90
Zinc	$/lb	1.30	1.20	1.20	1.20	1.20

Table 1.14 After-Tax NPV5% Sensitivity to Silver Price and Discount Rates

After-Tax NPV	Long-term Silver Price ($/oz)								
	10.00	**15.00**	**18.50**	**19.00**	**21.00**	**22.00**	**24.00**	**27.00**	**30.00**
Discount Rate	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**
Undiscounted	–17	105	192	204	253	278	327	401	474
2%	–17	101	183	195	242	266	313	384	454
5%	–16	95	172	183	**228**	250	294	360	427
10%	–14	86	156	166	206	226	266	327	387
12%	–14	83	150	160	199	218	257	315	373

1.15 Interpretation and Conclusions

1.15.1 Mineral Resources

Mineral Resources for the Puna21TR are reported using the Canadian National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101).

Areas of uncertainty that may materially impact the Mineral Resource estimates include:

- Assumptions used to generate the data for consideration of reasonable prospects of eventual economic extraction for the Puna deposit.
- Environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues.
- Commodity prices and exchange rates.
- Cut-off grades.

1.15.1.1 Chinchillas

The resource model developed for the Chinchillas deposit uses accepted modelling and grade estimation methods. The model is a reasonable reflection of deposit geology. The approach used to generate the cell model is in accordance with accepted industry standards. OreWin has checked the data and methods used to develop the resource model and has validated the resource models. The methods used for the estimate of Mineral Resources and Mineral Reserves is in accordance with NI 43-101.

1.15.1.2 Pirquitas

The resource model developed for the Pirquitas deposit uses accepted modelling and grade estimation methods. The model is a reasonable reflection of deposit geology. The approach used to generate the cell model is in accordance with accepted industry standards. OreWin has checked the data and methods used to develop the resource model and has validated the resource models. The methods used for the estimate of Mineral Resources and Mineral Reserves is in accordance with NI 43-101.

1.15.2 Mineral Reserves

Mineral Reserves for the Puna21TR are reported using the Canadian National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101).

Areas of uncertainty that may impact the Mineral Reserve estimate include:

- Any changes to the resource model as a result of further definition drilling at the site.
- Changes to mining conditions that have an impact to operating costs, production rates or mining recovery factors.
- Commodity prices and exchange rates.

1.15.3 Further Assessment

The key areas for further studies/work are:

- Potential remains to expand the current Mineral Resource, and to define new Mineral Resources on the property.
- Optimisation of metal prices and cost input parameters.
- More detailed planning and design for rock storage and the general site layout
- Additional metallurgical laboratory testwork as detailed in Section 13.4.
- Update site standard operating procedures to include a transparent Mineral Resource and Mineral Reserve process, clearly documenting the key input parameters applied, and an audit trail of approvals for each phase of the work performed.
- Continue with on-going review of capital and operating cost estimates and performance and productivity tracking.

2 INTRODUCTION

2.1 Introduction and Terms of Reference

Mineral Resources and Mineral Reserves in the Puna21TR meet the CIM Definition Standards on Mineral Resources and Reserves 2014 (CIM Definition Standards) and conform to the Canadian National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101).

The Puna project (Puna or the Project) comprises Chinchillas and the Pirquitas property, both of which are located the Jujuy Province in far north Argentina. Ore from the Chinchillas mine is transported to the Pirquitas plant for processing. The Chinchillas mine is located approximately 45 km from the Pirquitas plant. The open pit mine at Pirquitas has been completed.

Puna is directly owned (100%) by SSR Mining Inc. (SSR) through a subsidiary company Puna Operations Inc. (POI) which through other 100% owned subsidiaries owns Mina Pirquitas S.A. (MPSA). MPSA operates the project.

SSR is a gold mining company with four producing assets located in the USA, Turkey, Canada, and Argentina, and with development and exploration assets in the USA, Turkey, Mexico, Peru, and Canada. SSR is listed on the NASDAQ Capital Markets (NASDAQ:SSRM), the Toronto Stock Exchange (TSX:SSRM), and on the Australian Stock Exchange (ASX:SSR).

The purpose of this Puna21TR is to report the Mineral Resources and Mineral Reserves for the project.

The primary source of data for the Puna21TR is the Puna 2021 Project Update Report.

2.2 Qualified Persons and Property Inspections

The QP's are:

- Gregory Gibson , BSc (Mining Engineering), MSc (Mining & Earth Systems Engineering), SME Registered Member (4134135), employed by SSR Mining Inc. as Vice President of Operations - Americas, was responsible for the preparation of Sections 1 to 27.
- Bernard Peters, BEng (Mining), FAusIMM (201743), employed by OreWin Pty Ltd as Technical Director - Mining, was responsible for the overall preparation , the Mineral Reserve estimates, and Sections 1 to 6; Section 13; Sections 15 to 27.
- Sharron Sylvester, BSc (Geol), RPGeo AIG (10125), employed by OreWin Pty Ltd as Technical Director - Geology, was responsible for the preparation of the Mineral Resources, Sections 1 to 12; Section 14; Sections 23 to 27.

Gregory Gibson visited the Project 17 June to 1 July 2021 and 28 January to 9 February 2022. The site visits included briefings on geology, mine operations, processing, environmental, permitting, and site inspections of current mining and plant and infrastructure. In addition, Gregory has weekly calls with site leadership regarding the day-to-day operations and quarterly reviews of the operation performance.

Bernard Peters has not visited the Project due to travel restrictions.

Sharron Sylvester has not visited the Project due to travel restrictions.

2.3 Units and Currency

Unless otherwise stated, all units in this Puna21TR are metric and all currency values are expressed in US dollars.

3 RELIANCE ON OTHER EXPERTS

OreWin has relied on the following information provided by SSR in preparing the findings and conclusions in this Technical Report regarding the following aspects of modifying factors:

- Macroeconomic trends, data, and assumptions, and interest rates.
  - This has been used in Section 19 and 22
- Marketing information and plans within the control of the registrant.
  - This has been used in Sections 19 and 22
- Legal matters outside the expertise of the qualified person, such as statutory and regulatory interpretations affecting the mine plan.
  - This has been used in Sections 4 and 20
- Environmental matters outside the expertise of the qualified person.
  - This has been used in Sections 4 and 20
- Accommodations the registrant commits or plans to provide to local individuals or groups in connection with its mine plans.
  - This has been used in Sections 4 and 20
- Governmental factors outside the expertise of the qualified person.
  - This has been used in Sections 4 and 22

The source for all this information is the Puna 2021 Project Update Report

OreWin considers it reasonable to rely on SSR because SSR employs professionals and other personnel with responsibility in these areas and these personnel have the best understanding of these areas. OreWin is not qualified to provide advice on legal, permitting and ownership matters.

4 PROPERTY DESCRIPTION AND LOCATION

4.1 Chinchillas Property

4.1.1 Location

The Chinchillas Property is located in the Puna region of north-western Argentina, in the province of Jujuy, department of Rinconada, approximately 290 km from the provincial capital of San Salvador de Jujuy (Figure 3.1). The property is centred at approximately at 3,473,150E and 7,512,360N (Gauss Kruger, Argentina, Posgar Zone 3; 22°30′13″ S, 66°15′39″ W) at elevations ranging from 4,000–4,200 masl.

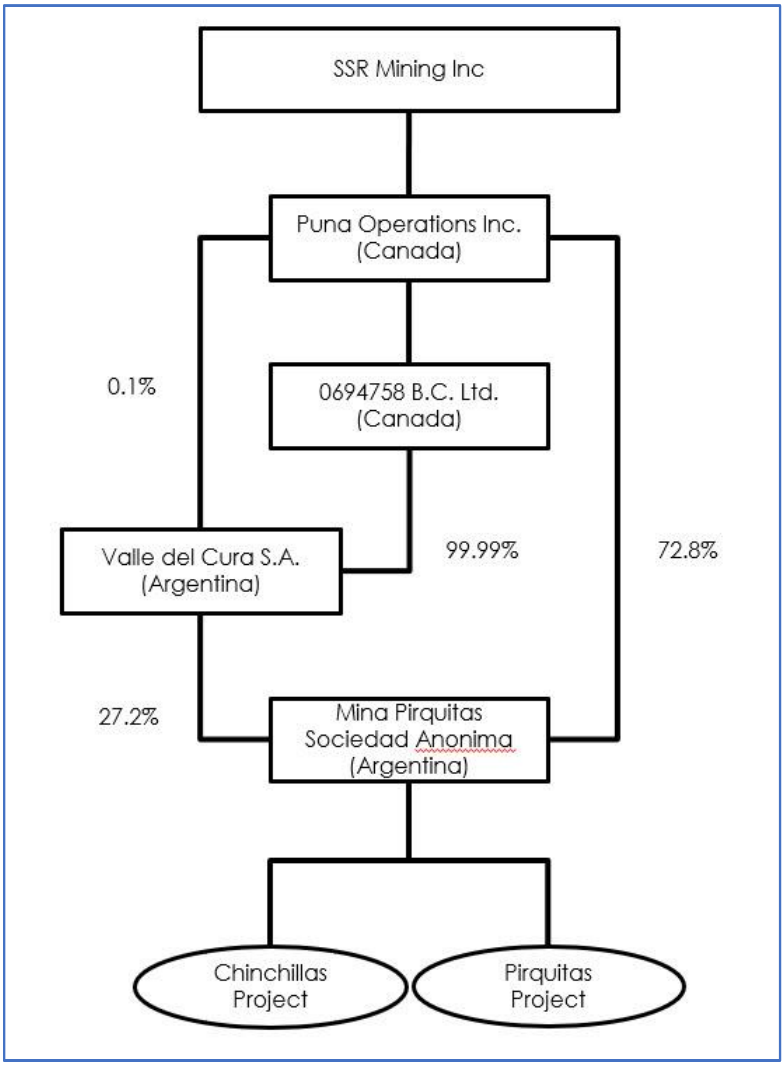
Figure 4.1 Puna Operation Location

SSR, 2021

4.2 Ownership

SSR has 100% ownership of the Puna project is. The corporate structure that links the Puna project and SSR is shown in Figure 4.2. Puna is directly owned (100%) by SSR Mining Inc. (SSR) through a subsidiary company Puna Operations Inc. (POI) which through other 100% owned subsidiaries owns Mina Pirquitas S.A. (MPSA). MPSA operates the project.

Figure 4.2 Puna Corporate Structure



SSR, 2021

4.3 Chinchillas Land Tenure

Exploitation concessions in Argentina are called 'Minas'. Minas are defined by the following categories:

- First Category Minas include substances such as gold, silver, platinum, iron, lead, copper, zinc, aluminium, lithium, potassium, etc. and
- Second Category Minas comprise substances such as precious stones in riverbeds, any metal not included in the first category and others.

The Mina is comprised of one or more 'pertenencias', which are units of mining properties. Pertenencias must be rectangular in shape.

In disseminated deposits, such as Chinchillas, the pertenencias can encompass up to 100 ha. The mining property fee or 'canon' for a Mina is charged every year. It is currently ARS$320 per pertenencia per year (article 215 Mining Code).

Individuals are entitled to explore for, exploit, and dispose of Minas as owners by means of a legal licence or legal concession granted by the competent authority under the provisions of the Argentine Mining Code. The legal concessions granted for the exploitation of Minas are valid for an undetermined period of time and are considered 'real property' giving the concessionaire the right to recover metals from the subsurface vertically underneath the concession, provided that the title holder complies with the obligations set out in the Argentine Mining Code.

The Chinchillas Property consists of three contiguous First Category Minas that cover an area of approximately 2,042.56 ha, as set out in Table 4.1 (see also Figure 4.3).

Table 4.1 Chinchillas Exploitation Concessions

Concession	File No.	Area (ha)
Chinchilla	469-M-56	329
Chinchilla I	079-D-96	830.98
Chinchilla II	1943-V-2013	882.58

The Chinchilla Mina is broken down into four pertenencias, while the Chinchilla I Mina has 9 pertenencias and Chinchilla II has 9 pertenencias.

By July 2015, Valle Del Cura S.A. (VDC) completed option payments to earn a 100% interest in the Chinchilla and Chinchilla I properties, to a total of $1,866,000 paid.

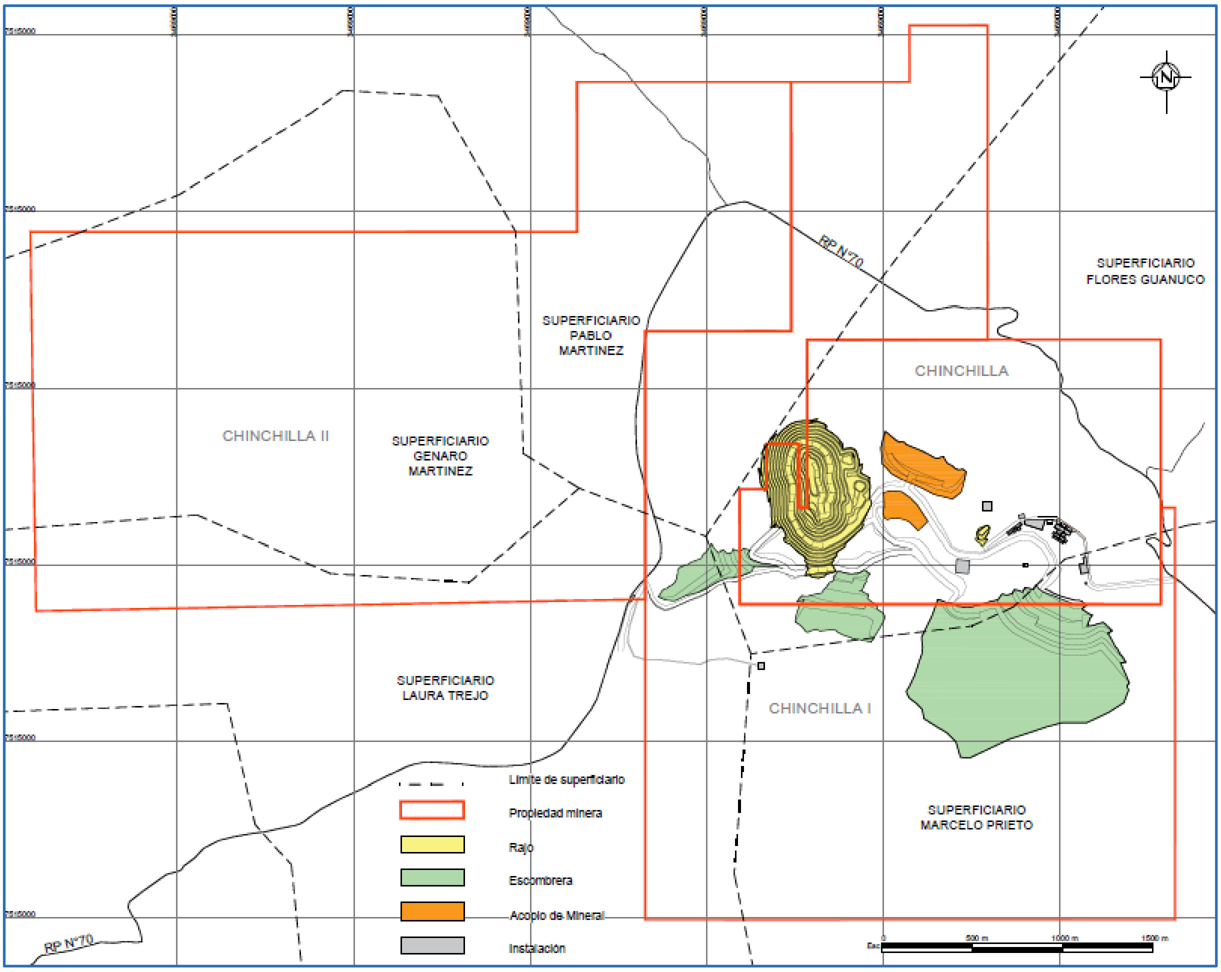
Subsequently, Mina Pirquitas S.A., upon commencement to build a mine on these two properties paid $1,200,000 to the vendors.

The Chinchilla II Mina was acquired directly by VDC and is not subject to option payments. All Minas are valid and in good standing.

Concentrates produced at the Project are subject to a maximum 3% 'mouth of mine value' royalty that is payable to the Province of Jujuy. This royalty payment is based on the net recoverable value of the contained metals less certain operating costs.

MPSA and SSR have advised that all necessary permits and titles are in place for the current operations. Additional permitting updates may be required but MPSA advise that these are expected to be approved.

Figure 4.3 Property Map Showing Chinchilla, Chinchilla I ,and Chinchilla II Concessions



SSR, 2021

4.4 Chinchillas Surface Rights

MPSA entered into agreements with occupants and owners of the land on which Mina Chinchilla, Mina Chinchilla I and Mina Chinchilla II are located to acquire the rights to carry out the Project. All of the Minas comprising the Chinchillas Property, which provide exploration and exploitation rights, are valid and in good standing.

4.5 Chinchillas Permitting

According to the biannual Environmental Impact Study renewal, MPSA also submitted the second Update of Chinchillas Mine in October 2021. This report is currently being reviewed by Mining Authorities.

4.6 Chinchillas Environmental Liabilities

Prior to initiating work on the Chinchilla Mina, an inspection was performed by the mining and environmental authorities regarding potential pre-existing environmental liabilities. There are remnants of historic mining activities in the Project area, such as small buildings, small areas of workings excavated in the 1960`s, historic drilling platforms, trenches and holes. All of these liabilities were declared as pre-existing in Golden Arrow's ESIA for the Chinchilla Mina, there were no findings and/or requests by the environmental authorities, and the Chinchilla ESIA report was approved.

4.7 Chinchillas Factors and Risks

Except as set out herein, to the extent known, there are no additional factors or risks that may affect the access, title, right or ability to perform work on the Chinchillas Property.

4.8 Pirquitas Property

The Pirquitas Operation is also located in the Rinconada Department in the Province of Jujuy. The property is centred at 22°42′ south latitude and 66°30′ minutes west longitude. The city of San Salvador de Jujuy, (Jujuy) the provincial capital, is located approximately 335 km southeast of the property (Figure 1.2). The property is characterised by sparsely vegetated, mountainous terrain at elevations of between 4,000–4,450 masl.

MPSA and SSR have advised that all necessary permits and titles are in place for the current operations. Additional permitting updates may be required but MPSA advise that these are expected to be approved.

4.9 Pirquitas Operation Surface Rights

The Pirquitas Operation includes the surface rights to a group of nine contiguous land parcels covering an area of approximately 7,500 ha, as set out in Table 4.2 and shown in Figure 4.4. This area corresponds to the surface property owned by MPSA, the area of the mining concession is larger.

4.10 Pirquitas Exploitation Concessions

Mina Pirquitas comprises 54 mining properties (concessions) that cover an area of approximately 9,742 ha shown in Figure 4.4.

Table 4.2 Pirquitas Operation Surface Rights

Parcel No.	Registration No.	Area (ha)
531	L-1111	1,000.1
532	L-1112	1,000.0
533	L-1113	750.0
534	L-1114	749.6
535	L-1115	1,000.0
536	L-1116	1,000.0
537	L-1117	1,005.0
538	L-1118	496.0
539	L-1119	500.1

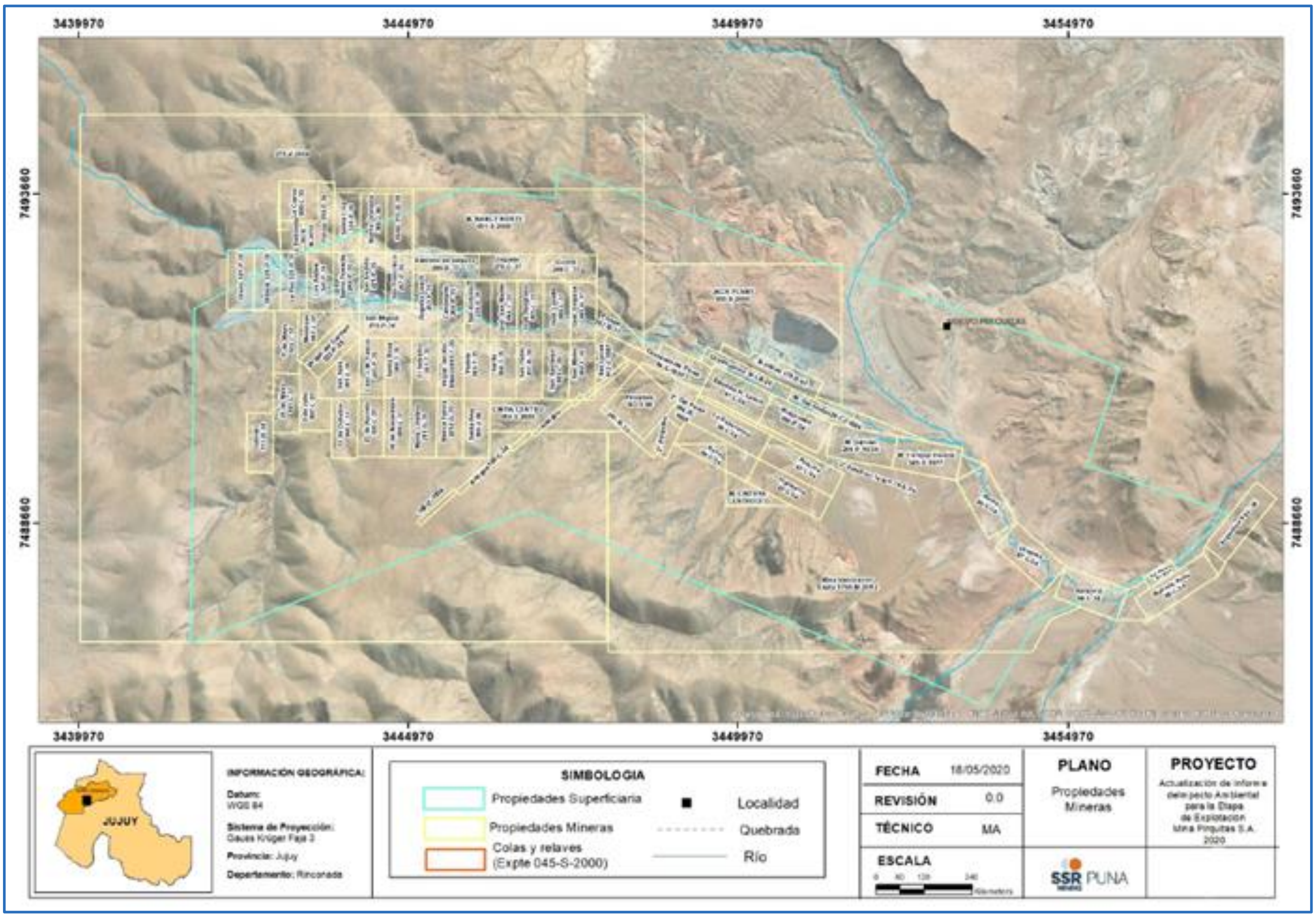
These parcels were used for purposes such as housing, infrastructure, processing, and tailings facilities. MPSA is the freehold title holder of the area covered by such surface rights.

4.11 Pirquitas Operation Permitting

The capacity of the current tailings facility at Pirquitas has been exhausted and to maintain mining and processing production disposal of tailings has been into the Pirquitas pit. Mining at the Pirquitas pit was completed in January 2017, a number of upgrades have been undertaken to allow tailings to be transported from the Chinchillas Project to a portion of the Pirquitas pit. These upgrades included constructing a pipeline for in-pit disposal, and construction of the discharge system from the tailings transport pipeline, an in-pit water reclaim system, and a pipeline from the Pirquitas pit to the Pirquitas plant to return water for reuse. These upgrades have allowed for additional tailings capacity for the processing of Chinchillas ore.

The use of the Pirquitas pit for tailings deposition at the Pirquitas Operation is a modification to the mining activities not contemplated in MPSA's ESIA for the Pirquitas mine until 2016. On August 2017 MPSA issued to Mining Authorities an Addendum of the 2016 ESIA Update that included the upgrades to conduct the tailings to the pit of Mina Pirquitas. The permit was obtained on September the 24th, 2018 by Resolution N° 056/2018. Since then, MPSA has submitted to Mining Authorities the ESIA Update for Mina Pirquitas on September 2020 which document is being reviewed.

Figure 4.4 Property Map Showing Pirquitas Concessions



5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

Ore from the Chinchillas mine is transported to the Pirquitas plant for processing. The Chinchillas mine is located approximately 45 km from the Pirquitas plant.

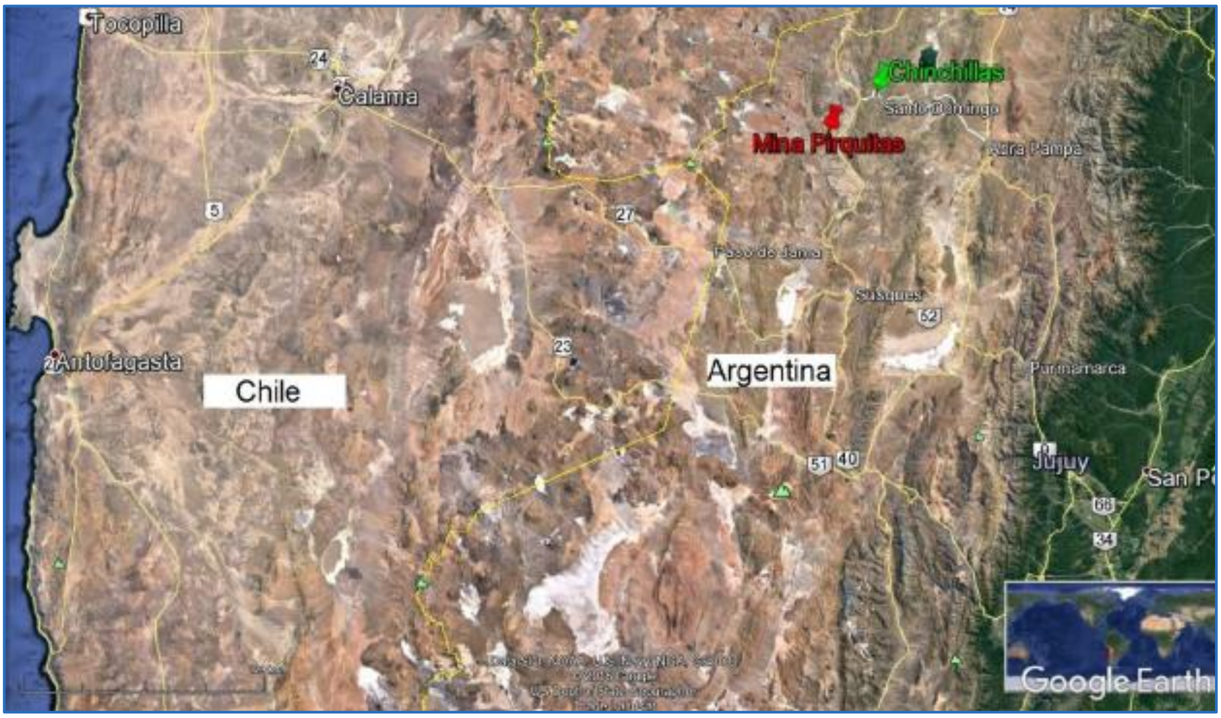
5.1 Accessibility

The Chinchillas Property is accessed most directly from the provincial capital of San Salvador de Jujuy via National Route No. 9, northwards along the Humahuaca River to the town of Abra Pampa. The route continues along Provincial Route No. 7 westward for 66 km, through the village of Santo Domingo. The roads are maintained by the Province and are accessible year round. Several temporary rivers cross the route so four wheel drive vehicles are recommended in the rainy season.

The other route to the Chinchillas Property and to the Pirquitas Operation follows National Route No. 9 northwards from San Salvador de Jujuy to Purmamarca, then turns north-west on paved road No. 52 to the town of Susques. From there, National Route No. 40 heads to Provincial Route No. 70 that leads to Chinchillas at the Fundiciones mountain pass. This route is more appropriate for heavy transport vehicles and is used by traffic to the Pirquitas mine and mill, located approximately 45 km to the south-west of Chinchillas along the route. (Figure 5.1).

Concentrate shipments from Pirquitas are currently trucked to Susques, Jujuy from Pirquitas via Route 77, and from there to Buenos Aires via Route 9. At arrival to the terminal, the material is directly dispatched from the port facilities to the concentrate buyers.

Figure 5.1 Location Map with Access Routes to the Project Area



SSR, 2021

5.2 Physiography, Climate, and Vegetation

The Chinchillas deposit terrain has an elliptical, caldera-like shape with steep rolling hills surrounding the caldera depression. It is located near the Fundiciones mountain pass, with the Rinconada and Carahuasi ranges extending from north–south. Elevations range from about 4,000–4,200 masl. The highest elevation in the area is Cerro Granada at 5,696 masl, 28 km to the south-west. The Uquillayoc river runs through the Project area and is fed by many small tributaries.

At Pirquitas, elevations on the property range from 4,000–4,450 masl. The processing plant, tailings impoundment and main workers camp are located in the eastern third of the Pirquitas property in an area of relatively open ground that lies at an elevation of 4,100 masl, and the Pirquitas pit, which ceased mining operations in January 2017, is situated about seven kilometres west of the mill at a slightly higher elevation.

The regional climate is similar at both Chinchillas and Pirquitas and is arid to semi-arid, tropical-subtropical influenced by high desert (Blasco, 2011). Rain is scarce and mainly occurs during the rainy season (November to March), with a mean annual precipitation of 300 mm. The annual mean temperature is 18°C, however during the winter it ranges down to –7.7 °C to 7.5 °C. Dry and windy conditions often prevail in the area.

Natural vegetation is patchy to sparse and consists of xerophilous and steppe bushes like iro (Festuca ortophylia), and coirón (Stipachrysophylla). Acantoliphia haustata is the predominant species with the yareta (Azorella compacta), less frequent. The tola (Parastrepia ssp) and small trees like the queñoa (Polylepis tomentella) can be found in depressions (Blasco, 2011).

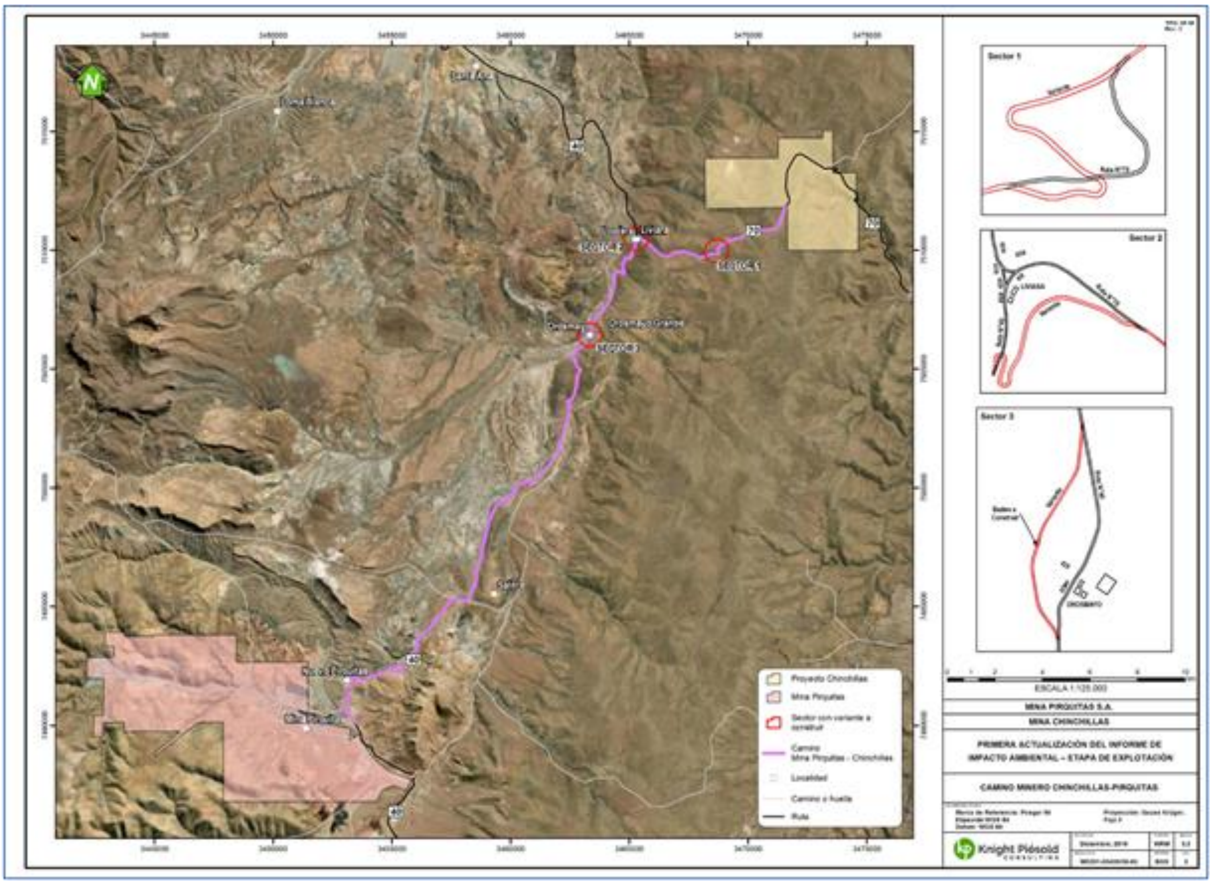
Animal species found in the area include mammals such as llamas, puna foxes and vizcachas, as well as several mice species, chinchillas and ferrets. Other fauna in the area include lizards, and birds such as small rheas, owls, ducks, condors and falcons (Blasco, 2011).

5.3 Local Resources and Infrastructure

Chinchillas and Pirquitas are located in the rural zone of Rinconada Department, with an approximate population of 2,500 people. It covers an area of 6,407 km^2, includes over twenty small communities, and has basic public services including a police department and health centre. The nearest community to Chinchillas is the village of Santo Domingo, and nearest to Pirquitas is the village of Nuevo Pirquitas. Historically, the local population was mainly employed in ranching, however the operation at Pirquitas has created a significant local trained mining workforce. Basic amenities are supplied from Susques and Abra Pampa, while supplies for mining are obtained through the provincial capital of San Salvador de Jujuy, which has an airport with daily commercial air service to Buenos Aires.

The nearest hospital is located in Abra Pampa, 66 km east of Chinchillas.

Figure 5.2 Chinchillas and Pirquitas Access Route



MPSA, 2021

5.3.1 Chinchillas Infrastructure

The Chinchillas site has offices, workshops, a lunchroom, change room, explosives magazines, security and first aid buildings, solid waste storage facility, open pit, and waste dumps at the site. Existing exploration infrastructure includes two office containers, a core logging facility, a core cutting machine, two storage tents, two cisterns for diesel fuel (1,500 and 10,000 litres) and six warehouses of 144 m2 each, for the storage of the core boxes.

To generate electricity the Pirquitas Operation uses natural gas to power three Wärtsila generator sets, each with a capacity of five megawatts (MW) of power. In addition, the same electrical plant has three diesel-powered Cummins generators, each yielding 1.1 MW. There is 6.7 km of gas pipeline on the Pirquitas property. The pipeline is 152 mm diameter, constructed of API5L Grade B steel with 4.8 mm wall thickness in normal applications and 7.1-mm wall thickness at river or drainage crossings.

Power for the Chinchillas mine site supplied along existing power lines from the natural gas powered generators at Pirquitas. EJESA is the local power authority that owns the lines. The power line from Pirquitas that goes directly past the rural EJESA line at the town of Nuevo Pirquitas (approximately five kilometres from Pirquitas). The rural power line then goes from Nuevo Pirquitas to all villages along Route No. 40 and Route No. 70 and directly to Santo Domingo. This line is able to carry the 1MW load for Chinchillas, with a small spur line (approximately four kilometres in length) to take power into the mine.

No ore processing is done at Chinchillas therefore power requirements are minimal. In the event of power loss at Pirquitas. Back-up power from the EJESA grid that amounts to 100 kVa can be drawn. This back-up power is designated for critical telecommunications systems and the first aid building.

5.3.2 Pirquitas Infrastructure

Pirquitas has been a permitted commercial mine operated by SSR since December 2009, with existing infrastructure that includes:

- A processing plant;
- A permitted tailings facility;
- A fully serviced workers camp sufficient for approximately 670 personnel;
- A communications system including cellular and intranet access;
- Fully serviced office buildings; and
- Wastewater treatment facilities, organic waste landfill and a recycling centre.

The Pirquitas processing plant consists of primary, secondary and tertiary crushing operations which deliver ore to a stockpile. The crushing circuit throughput is 6,000 tpd. Ore is transferred from the crushed ore stockpile to a ball mill and after that a differential flotation circuit to obtain Lead-Silver and Zinc concentrates.

The Pirquitas plant uses a tailings thickener to improve water recovery. Post thickened tailings are deposited in the tailings storage facility and secondary water recovery is achieved using barge mounted reclaim pumps.

MPSA has the surface rights covering the Pirquitas Operation. Electricity is produced from natural gas and diesel generators at the Pirquitas site.

Water supply is from a San Marcos which is located within the property a short distance downstream from where the Pirquitas River drains into the Collahuaima River. Domestic water is pumped from a diversion upstream of the open pit for use at the camp. Potable water is supplied by MPSA from bottled water.

Pirquitas has a trained workforce for the processing plant and open pit mining operations, including local workers, operators, supervision, management and senior staff.

6 HISTORY

6.1 Chinchillas

Chinchillas was first prospected and mined in small scale in the eighteenth century by Jesuit missionaries. Relics of furnaces used to melt lead and silver can still be found at the Chinchillas Property (Kulemeyer, 2011). In 1956, Mr. Antonio Mercado requested a concession based on the discovery of galena veins in the basement rock. In 1968, the mine was sold to Ing. Pichetti who later formed the Sociedad Pirquihuasi Company together with the Pirquitas Company, and some adits and tunnels were opened for small scale production. In 1982, the mine licence expired and the mine was acquired by Shell CAPSA S.A. From December 1982 to 1989, a consulting geologist for Shell, Jorge Daroca, carried out exploration work and, after Shell dropped the property, Mr. Daroca requested it for himself, convinced of the good potential of the area (Daroca, undated). Roads, remnants of infrastructure, and minor underground workings remain from this activity but no records of this work are available.

In 1994, Aranlee Resources conducted surface sampling and drilled seven reverse circulation drillholes for a total of approximately 780 m. Assay results from this work are available, but there are no samples for re-analysis or quality control information, therefore the data have not been incorporated into the Mineral Resource estimate. In 2004 Silex, a subsidiary of Apex Silver, conducted preliminary reconnaissance work including trenching, pitting and surface sampling, with a total of 165 samples taken. Between October 2007 and July 2008, 40 manual pits and nine trenches were sampled. Surface mapping was also completed at different scales across the Chinchillas property, and a total of 1,036 surface samples were collected. At the beginning of 2008, Quantec Geoscience Argentina S.A. (Quantec) performed a 16 km IP resistivity survey, comprising nine sections. The pole-dipole interval was 50 m with 300 m depth readings. The objective of the programme was to detect and delineate sulfides related to an intermediate to high-sulfidation epithermal system, however the mineralised zones at Chinchillas do not appear to be related to chargeability. Nevertheless, there is a strong resistivity contrast between volcanic units and basement schists and the resistivity data have been an effective tool for imaging the volcanic diatreme shape (Quantec, 2008). Silex subsequently drilled 2,220 m in seven diamond drillholes with drillhole samples taken at one or two metre intervals. Silex had planned to drill 22 holes but cut the programme short during the 2008–2009 global financial crisis. In early 2009 Apex entered Chapter 11 bankruptcy protection, and with a payment due on the property, opted to drop Chinchillas in favour of its more advanced El Quevar project. The core from the Silex drill programme remains at Chinchillas (Silex, 2008 and Caranza and Carlson, 2012).

In 2011, Golden Arrow acquired the property, completed five phases of drilling over the subsequent five years and outlined mineral resources which are summarised in six technical reports and preliminary economic assessments (Davis and Howie 2013, Davis et al., 2014, Davis et al., 2015, Davis et al., 2016, Kuchling et al., 2014, Kuchling et al., 2015). In October 2015 Golden Arrow announced that it had entered into the Agreement with SSR to form a joint venture comprising of the Chinchillas Property, the Pirquitas pit and the Pirquitas Operation. The agreement included an 18-month pre-development period to advance Chinchillas, including the infill drilling, engineering and environmental studies, and permitting.

On September 18, 2019, the Company completed the acquisition of the remaining 25% interest in Puna from Golden Arrow Resources Corporation for aggregate consideration totalling approximately $32.4M. The transaction allowed the Company to consolidate ownership in Puna and streamline its reporting.

6.2 Pirquitas

Between the 1930s and 1995, the area of the Pirquitas mine had multiple small mining operations to recover silver and tin from placer and vein deposits.

The Argentine branch of Sunshine Mining and Refining Company acquired the Pirquitas mining concessions in November 1995. In the years following its acquisition of Pirquitas, Sunshine Argentina carried out comprehensive mineral exploration on the property, including underground rock sampling and multiple programmes of revere circulation and diamond drilling. These culminated in a feasibility study in February of 2000.

In May 2002, Silver Standard acquired 43.4% of Sunshine Argentina, Inc. (Sunshine Argentina) from Stonehill Capital Management of New York and in October 2004. Silver Standard acquired the remaining 56.6% of Sunshine Argentina from Elliott International L.P., The Liverpool Limited Partnership and Highwood Partners, L.P. Silver Standard operated the Pirquitas mine property as Sunshine Argentina until it changed the company name to Mina Pirquitas, Inc. in May 2008, and further changed the name to MPLLC in December 2014. In August 2018, Mina Pirquitas LLC. changed its name to Mina Pirquitas S.A.(MPSA).

On 24 November 2015, MPSA was incorporated as 1056353 B.C. Ltd., and changed its name to Puna Operations Inc. on 2 May 2017.

Silver Standard approved the start of the Pirquitas mine in October 2006 commenced construction in 2007. The Pirquitas processing plant has been in continuous operation since such date.

The Pirquitas plant has not been expanded since start up; however, minor changes in the flotation flow sheets have occurred to optimise performance. Since 2010, no tin concentrate production has occurred.

Historical records for metal production from the Pirquitas property between 1933 and 1989 indicate that approximately 777,600 kg of silver, or about 25 Moz, along with 18,200 t of tin were recovered by previous operators. An additional 9,100 t of tin was reportedly recovered from the placer deposits found downstream from the lode deposits.

7 GEOLOGICAL SETTING AND MINERALISATION

7.1 Regional Geology

North-western Argentina consists of three main geological belts or terranes that together trend north–north-east. These are, from east to west, the Sub-Andean Range (*Sierras Subandinas*), the Eastern Cordillera (*Cordillera Oriental*), and the Argentine Altiplano or *Puna* belt.

These belts are distinguished by their basement lithology complexes, tectonic histories, magmatism, metallogeny and geomorphological features. The Pirquitas and Chinchillas deposits are located in the Puna belt.

7.1.1 The Sub-Andean Belt

The Sub-Andean belt comprises multiple north to north-west trending, low mountain ranges separated by broad flatlands. Elevations range from about 300 masl to a maximum of 2,500 masl. An Early Cambrian to Middle Ordovician carbonate platform, which defines a passive continental margin, dominates this belt. Middle to Upper Ordovician clastic marine rocks cover the carbonate platform in the eastern and central sectors. Paleozoic sedimentary successions display regional-scale open folds. Large intrusions and volcanic complexes related to Andean tectonism are not present in this belt. Mineral deposits of economic significance are rare, although natural gas fields are exploited in the eastern lowlands.

7.1.2 The Eastern Cordillera

The Eastern Cordillera is a 70–130 km wide fold and thrust belt with elevations ranging from 1,300–6,200 masl. Proterozoic basement consisting of medium grade metamorphosed sedimentary rocks are unconformably overlain by Paleozoic sedimentary rocks deposited in a back arc basin. The back arc sequence is composed of Early Cambrian to Middle Ordovician clastic marine sedimentary rocks, which in turn are unconformably overlain by Silurian to Devonian sedimentary rocks (Ramos, 2000). The Paleozoic successions are locally covered by Cretaceous sedimentary rocks belonging to the Salta Group.

Late Ordovician to Devonian collision of the composite Arequipa-Antofalla metamorphic basement terrane with the Pampian terrane, which forms the crustal basement in of the majority of northwestern Argentina, resulted in folding and faulting of the Paleozoic rocks at Pirquitas (Ramos, 2000). The faults and axial planes related to the large-scale folds formed during this event strike north to northeast. Uplift of structural blocks has exposed elongate, Ordovician-age batholithic granitoid intrusions.

The metallogeny of the Eastern Cordillera is relatively simple. The most important mineral deposit in the belt is the Ordovician age Aguilar Sedimentary Exhalative (SEDEX) type Pb-Zn(-Ag) deposit, located about 50 km south of Abra Pampa.

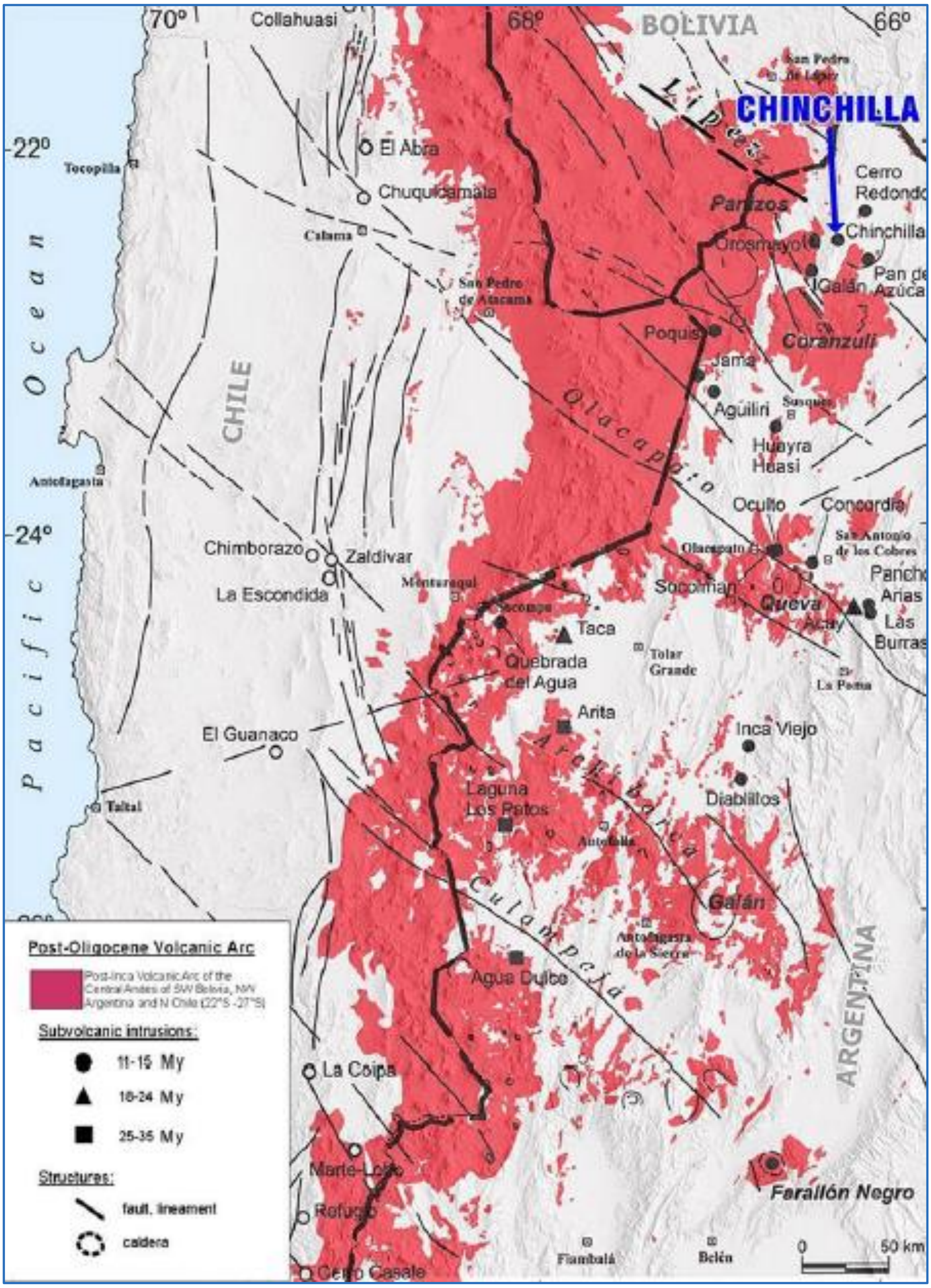
7.1.3 Puna Belt

To the west of the Eastern Cordillera, at elevations of 3,900–6,700 masl, is the Puna belt. The Puna belt consists of nearly the same sedimentary sequences that occur in the Eastern Cordillera. Late Ordovician to Early Devonian compressive tectonism also affected the Paleozoic rocks in the Puna belt, but to a lesser degree than in the Eastern Cordillera. A Paleogene compressive event related to Andean-style tectonics resulted in minor folding and thrust-faulting. By the late Miocene the tectonic regime transitioned to extension, resulting in basin and range geomorphology. Thinning of the upper crust resulted in the upwelling of magma and the development of andesitic to dacitic stratovolcanoes as well as multiple very large calderas (Figure 6.2). Large volumes of regionally extensive ignimbrite sheets erupted from the calderas, with approximately 1,800–1,200 km^3 of material ejected from the Valdema caldera alone (Soler et al., 2007). Subaerial volcanism continued into the Pleistocene. This volcanic activity, and associated mineral deposits, was concentrated along corridors defined by lineaments such as Coranzuli Lipez, El Toro Olacapato and Arizaro (Figure 7.1) (Ramos, 1999, Coira et al., 2004, Gorustovich et al., 2011).

Younger rocks include basaltic lavas, continental sedimentary rocks, and the formation of high-altitude salt flats. In terms of mineral deposit endowment, the Puna belt is by far the most important of the three terranes in Jujuy Province. Below are the main deposit types documented in the Puna belt:

- Devonian mesothermal quartz veins and saddle reefs containing native gold, minor base metals and accessory gangue minerals of ankerite and chlorite, with the Rinconada district being the most important for this type of mineralisation.
- Polymetallic quartz-sulphide veins related to eroded Neogene volcanic centers, with the veins containing variable amounts of Pb, Zn, Sb, As, Ag, and Au.
- Bolivian-type Sn-Ag sulphide-rich veins related to middle to late Miocene subvolcanic intrusive stocks.
- Pleistocene to recent placer deposits of Au (Rinconada), Sn (Pirquitas) and Au-Cu (Eureka).

Figure 7.1 Oligocene-Miocene Volcanic Arc. Subvolcanic Intrusions: solid dots 11–15 My



SSR, 2022

7.2 Chinchillas Geology

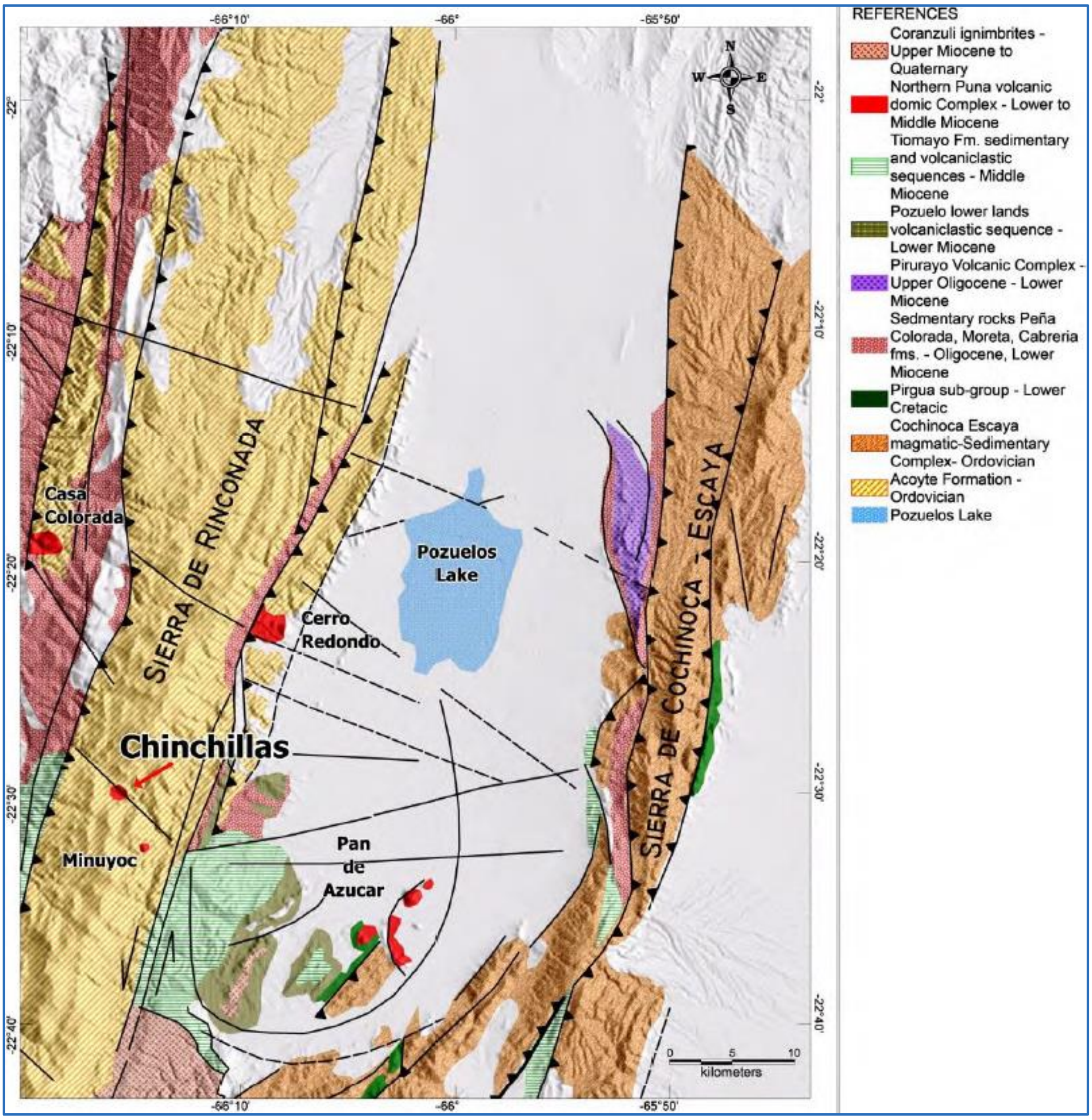
The Chinchillas silver-lead-zinc deposit is in the north–north-east trending Puna belt in the western half of Jujuy province and southern part of the Rinconada Range (Figure 7.2). The range has a regional north–north-east trend and is delimited by thrust faults to the west and east. Miocene-age volcanic dome complexes and associated hydrothermal alteration are present in the area, including Cerro Redondo, Pan de Azucar, Rachaite, and the Chinchillas dome complex. High-angle faulting and folding also characterise the area. Chinchillas is located within a structural window at the intersection of northwest fracturing associated with the Lipez-Coranzuli regional lineament, the east–west controlling structure, and lesser north-east trending structures.

The Chinchillas deposit is hosted by the Ordovician Acoite Formation and Miocene dacite. The Acoite Formation, described by Board et. al., (2011), is a strongly folded package of low-grade metamorphosed marine sandstone, siltstone and minor shale beds. Deformation of these sedimentary rock occurred during the Ocloyic Phase (Coira et al., 2004) of the late Ordovician. The Acoite Formation is unconformably overlain by Cretaceous marine clastic sedimentary rocks. The Cretaceous sedimentary rocks are overlain by Oligocene to middle Miocene dacite tuff, continental sedimentary rocks, and volcaniclastic lithologies. The dacitic volcanic centre has an age of 13±1 Ma (Caffe and Coira, 2008) and is a product of a phreatomagmatic diatreme. The resulting topographic depression is elliptical in shape, approximately 2 km long by 1.6 km wide, and infilled with pyroclastic rocks (breccias and tuffs). At the contact between pyroclastic volcanic rocks and basement metasedimentary rocks is a zone of hydraulic fracturing and brecciation up to 150 m wide which is the main host of basement mineralisation. Dacitic lavas, flow domes and subvolcanic intrusions occur on the southern margin of the basin at the contact between metasedimentary and pyroclastic rocks (Figure 7.3).

Pyroclastic breccias and tuffs erupted from the volcanic centre and filled in the resulting depression, contouring the vent walls. This most likely occurred via airfall deposition and flows of ignimbrites as there is no observed evidence of water-lain deposits or sediments. The breccias and tuffs are mainly matrix-supported and rarely are clast-supported. The clasts are sub-rounded to angular and vary from fine grained to large metre-scale blocks. The clasts are predominantly fragments of re-worked pyroclastic tuffs, lava, dacite, and basement pelite and sandstone. Most of the volcanic clasts and matrix are altered by intense hydrothermal activity, whereas the sedimentary basement clasts are generally better preserved (Figure 7.7).

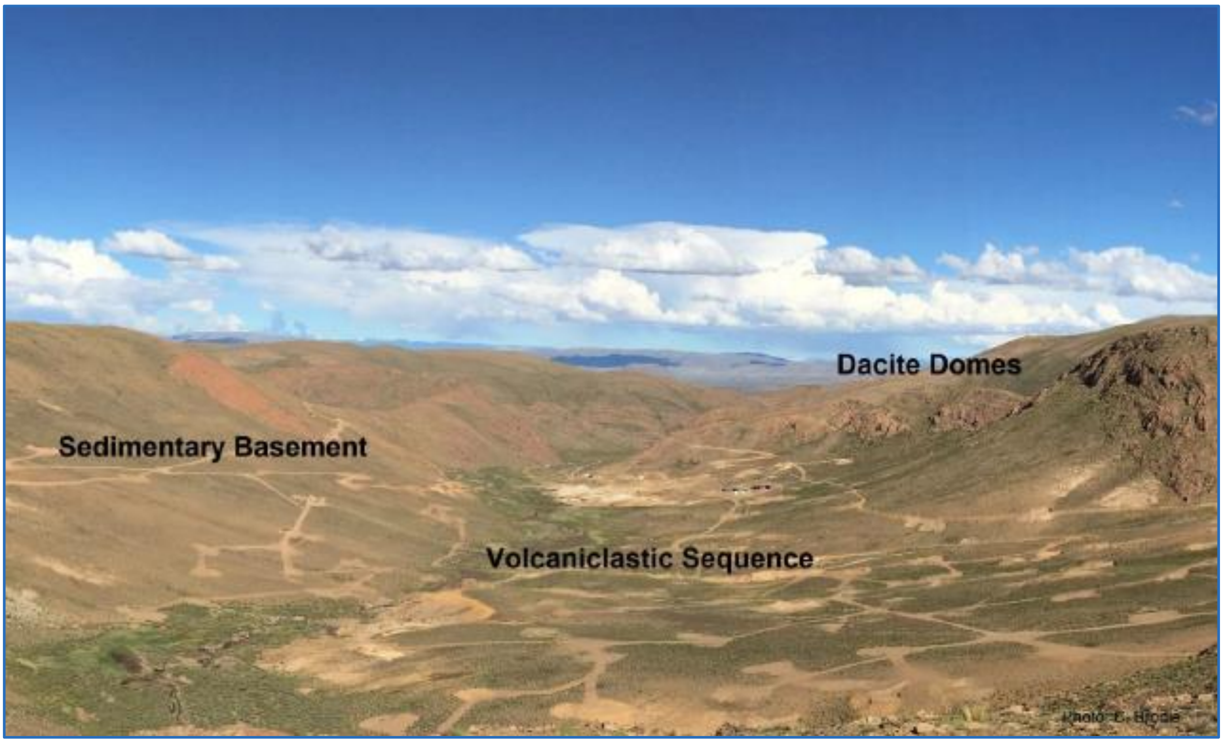
Three main dacite domes outcrop along the south-east edge of the Chinchillas basin between the pyroclastic breccias and basement contact. The domes have a medium to fine grained porphyritic texture with phenocrysts of quartz, (35% to 45%) plagioclase, biotite and minor sanidine (Caffe and Coira, 2008). The dacite domes are generally massive with limited flow banding and some flow brecciation along the margins. Drilling confirms that the dacite outcrops are part of larger bodies below the Socavon del Diablo area. At surface they lie horizontally above tuff breccias (Figure 7.9).

Figure 7.2 Map Showing Tertiary Volcanism from Mega Caldera Complexes Near the Chinchillas Deposit



Note the location of the Chinchillas deposit relative to major faults Modified from Caffe 2002

Figure 7.3 View of the Chinchillas Deposit, Looking East



Note outcrop of the sedimentary basement rocks, the volcaniclastic sequence infilling the depression, and the dacite domes flanking the southern border of the deposit.

Figure 7.4 Chinchillas Geology Map

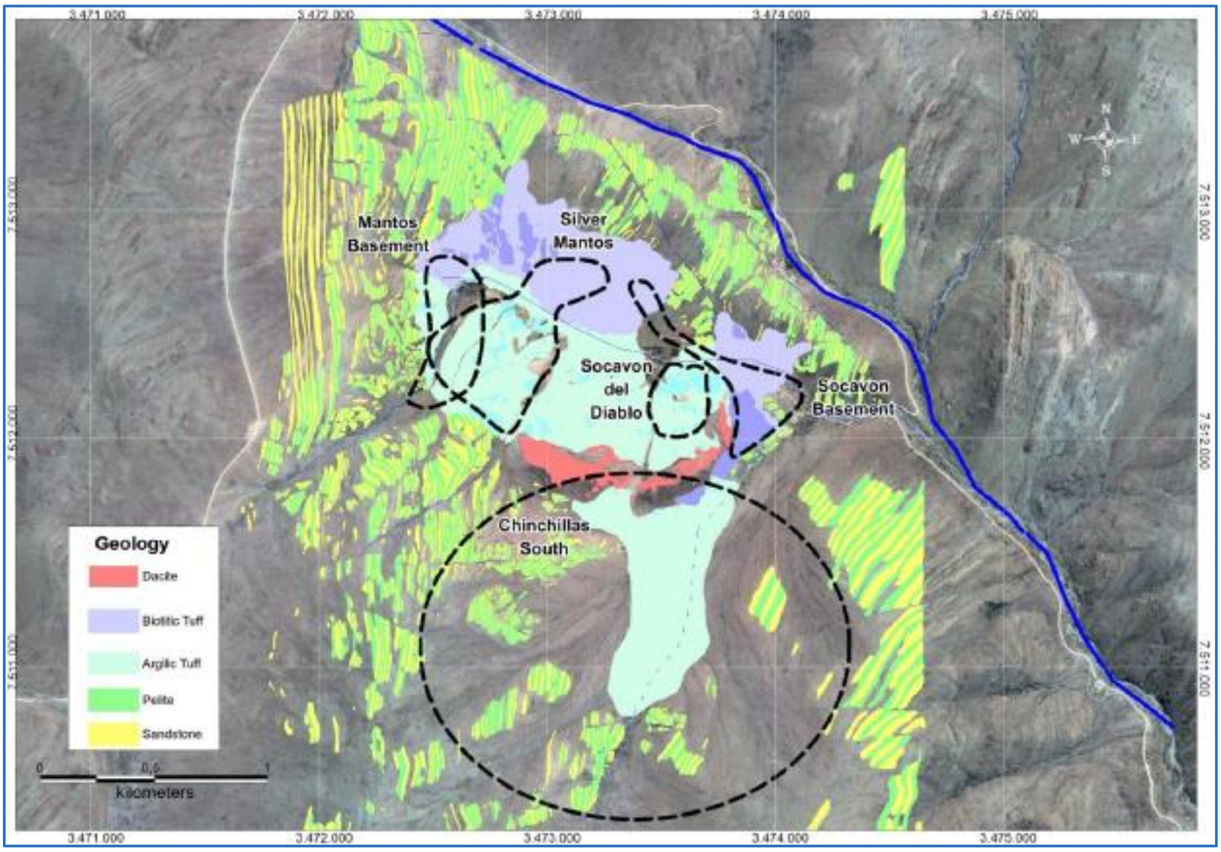
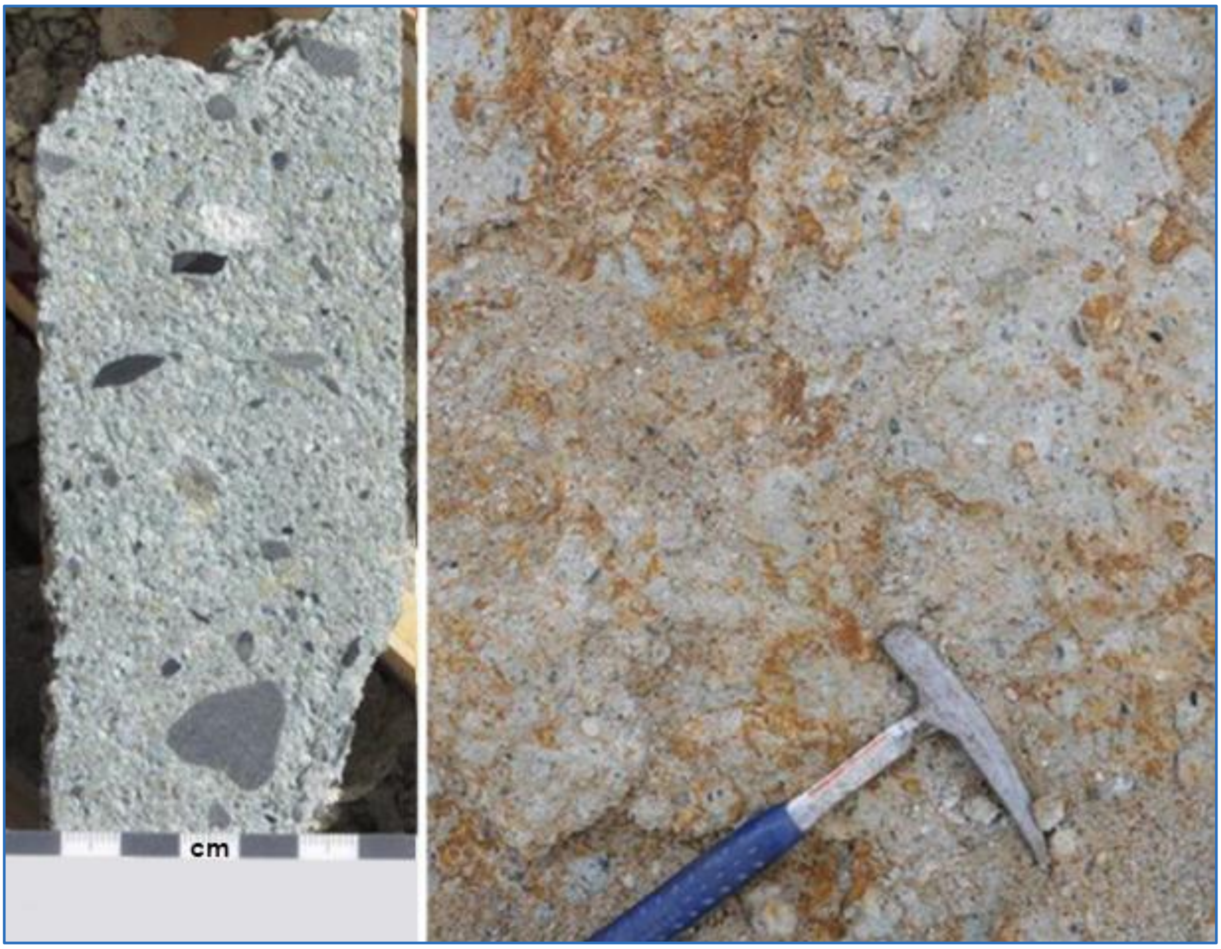


Figure 7.5 Interbedded Sequence of Marine Sandstone and Pelite with Near-Vertical Dip at Chinchillas

Figure 7.6 Brecciated Basement Sediments with Fine Volcanic Matrix Near Contact Between Pyroclastic Sequence and Basement Sediments

Figure 7.7 Typical Chinchillas Medium Grained Pyroclastic Breccia



With Dacitic Volcanic Clasts Dominant and Secondary Dark Grey Clasts of Basement Sandstone and Pelite

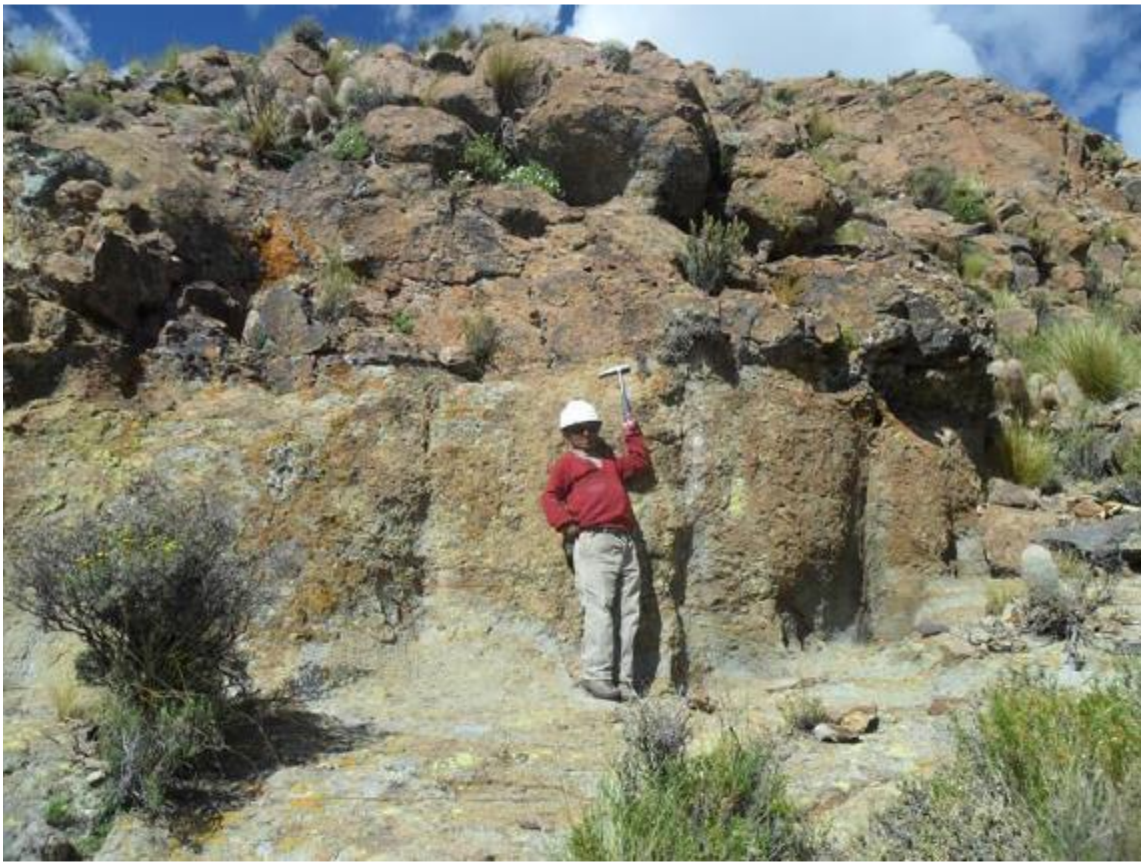
7.2.1 Chinchillas Alteration

Typical hydrothermal alteration is described below for basement sedimentary sequences, pyroclastic volcanic rocks and dacite flows.

7.2.1.1 Alteration in the Marine Sedimentary Basement

In the basement sedimentary sequence mineralisation is restricted to breccias, fracture filling, and veinlets with variable frequency and intensity. Alteration of the host pelite or sandstone is typically very weak, typified by carbonate, clay and chlorite alteration proximal to sheared structures. Abundant siderite with lesser iron and manganese oxides are observed on fractures. Disseminated diagenetic pyrite is abundant in sedimentary rocks.

Figure 7.9 Contact Between Dacite Flow Overlaying the Tuff Breccias



7.2.1.2 Alteration in Pyroclastic Tuffs and Breccias

Pyroclastic tuffs and breccias have undergone several different types of alteration, including clay alteration, sericitisation, silicification, and carbonate alteration primarily as siderite. Clay alteration is most extensive with feldspar, silica and pumiceous fragments altered to various assemblages including quartz–adularia–sericite, illite–quartz-sulfide, and siderite-sphalerite-pyrite. Biotite is commonly altered to sericite-kaolinite-quartz (Caffe, 2013). Extensive fine-grained silicification within the suite of rocks is also documented. Clay alteration, sericitisation and silicification are observed to overprint each other, indicating the alteration event was prolonged and the result of a range of temperature and pressure. Carbonate alteration is locally pervasive and appears late in the paragenesis based on thin section analysis(Marshall and Mustard, 2012). Plagioclase feldspar is commonly replaced by siderite and illite (Caffe, 2013).

7.2.1.3 Alteration in the Dacitic Domes

Porphyritic dacite rocks were hydrothermally altered to sericite and siderite with minor silicification. Alteration is more developed in the matrix and in the plagioclases crystals (Caffe, 2013).

7.2.2 Chinchillas Mineralisation

Mineralisation at Chinchillas is dominated by silver with lesser amounts of lead and zinc. Mineralisation occurs as disseminated sulfides, matrix infilling within the volcanic tuffs, and as matrix and fracture filling in breccias within the basement metasediments. Dacite volcanic rocks are rarely mineralised in shear zones, veinlets or vein-like structures. Within the basement lithologies shear zones and faults are more commonly mineralised. Depth of oxidation is a few metres within the volcanic rocks and is insignificant within the basement rocks. Silver, lead, and zinc-bearing minerals include silver sulfosalts, freibergite, boulangerite, tetrahedrite, schalenblende, sphalerite, and galena. Associated mineral associations include chalcopyrite, quartz, pyrite, siderite, limonites, manganese oxides, cerusite, smithsonite, anglesite and malachite (Marshall and Mustard, 2012 and Coira et al., 1993).

The geological model for the Chinchillas deposit includes significant silver-lead-zinc mineralisation in the Silver Mantos and Mantos Basement zones in the western part of the Project (Figure 7.8 and Figure 7.9). Similar mineralisation is present at the adjacent Socavon deposit. A recent review of the Socavon deposit has resulted in its removal from Mineral Resource inventory in 2022.

The main structural elements controlling the location of mineralisation are the contact between basement sediments and overlying volcanic rocks and the dominant east–west and subordinate north-west, north, and north–north-east trending structures that control the Chinchillas volcanic centre. The phreatomagmatic explosion that produced the diatreme generated a symmetrical cylindrical shaped caldera, with mineralised brecciated basement rocks along the contacts and disseminated mineralisation in sub-horizontal tuff layers.

7.2.2.1 Silver Mantos Mineralisation

Mineralisation is disseminated in several shallow (± 5º) dipping layers hosted within clay altered pyroclastic tuffs and breccias. The mineralisation occurs between surface and 100 m depth in sub-horizontal mantos that range between two and 60 m thick, averaging greater than 20 m in thickness. These layers are open for expansion to the east.

7.2.2.2 Mantos Basement Mineralisation

Located below the Silver Mantos, the Mantos Basement comprises an area 600 m wide and up to 210 m thick, with an average thickness of 80 m, dipping at approximately 40° to the east (Figure 7.80). The zone has been traced down dip approximately 350 m. The Mantos Basement is hosted entirely within basement pelites and sandstones and is comprised predominantly of breccias, crackle breccias with minor small veinlets, and fracture fill.

7.2.2.3 Socavon del Diablo Mineralisation

The Socavon del Diablo zone (Socavon) is located in the eastern area of the deposit (Figure 7.8). Mineralisation is dominated by manto-style disseminated sulfides within favourable shallow dipping volcanic tuff horizons.

Mineral occurrences, textures, alteration and ore types within the volcaniclastic lithologies are similar to those described for the Silver Mantos target but the mineralisation is thought to be related to a different fluid event based on compositional differences. There may have been a different vent source within the volcanic centre as the Socavon del Diablo mineralisation is generally lower in silver and higher in zinc content.

A recent review of the economics of the Socavon deposit has resulted in its removal from Mineral Resource inventory in 2022.

7.2.2.4 Socavon Basement Mineralisation

The Socavon Basement zone is mainly hosted within the Ordovician interbedded pelite and sandstone basement. The east limit of the Socavon del Diablo zone is a dacitic dome intruded in the tuff units and flowed over the tuff at surface (Figure 7.9). Immediately to the east of the dacite dome, biotitic sub-horizontal tuff layers of up to 80 m thick cover the Socavon Basement zone. Here, the mineralisation is hosted in breccias filled with argentiferous galena and a stockwork of sphalerite-siderite-galena within a halo of low-grade zinc up to 320 m thick.

The most significant mineralisation in this target is located at more than 150 m depth from surface. The mineralised fluids may have precipitated sulfide minerals as a result of interaction with the water table or decrease in pressure.

A recent review of the economics of the Socavon deposit has resulted in its removal from Mineral Resource inventory in 2022.

Figure 7.8 Silver Mantos and Mantos Basement Zones with Drillhole Locations and Mineralised Zones Projected to Surface

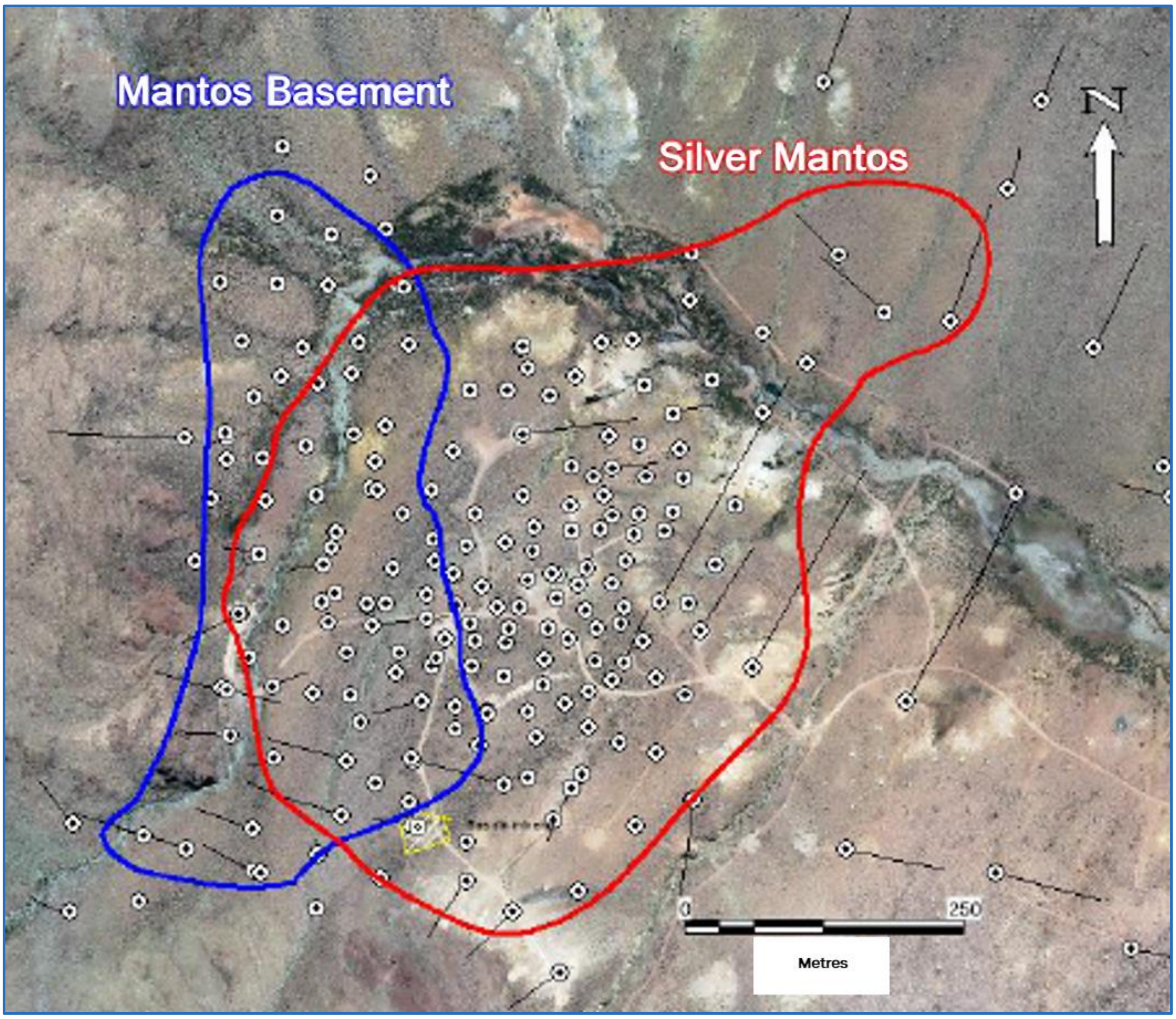
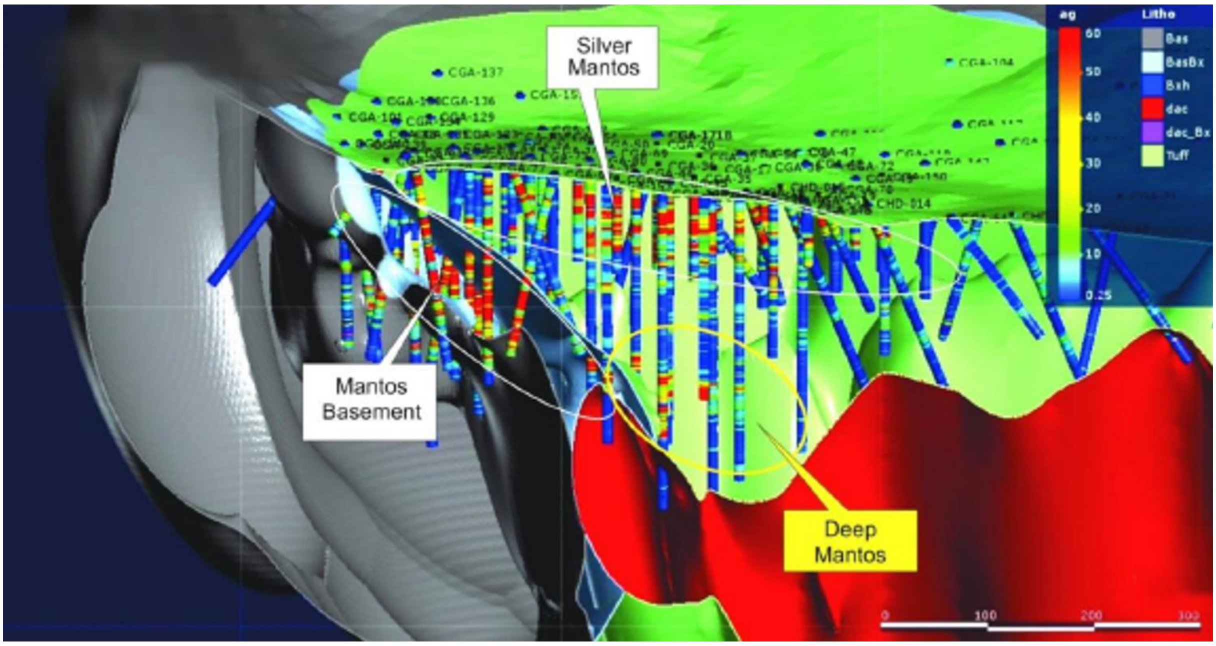


Figure 7.9 East–West Cross-Section with Deep Manto Mineralisation



7.2.3 Chinchillas Resource Expansion Opportunities

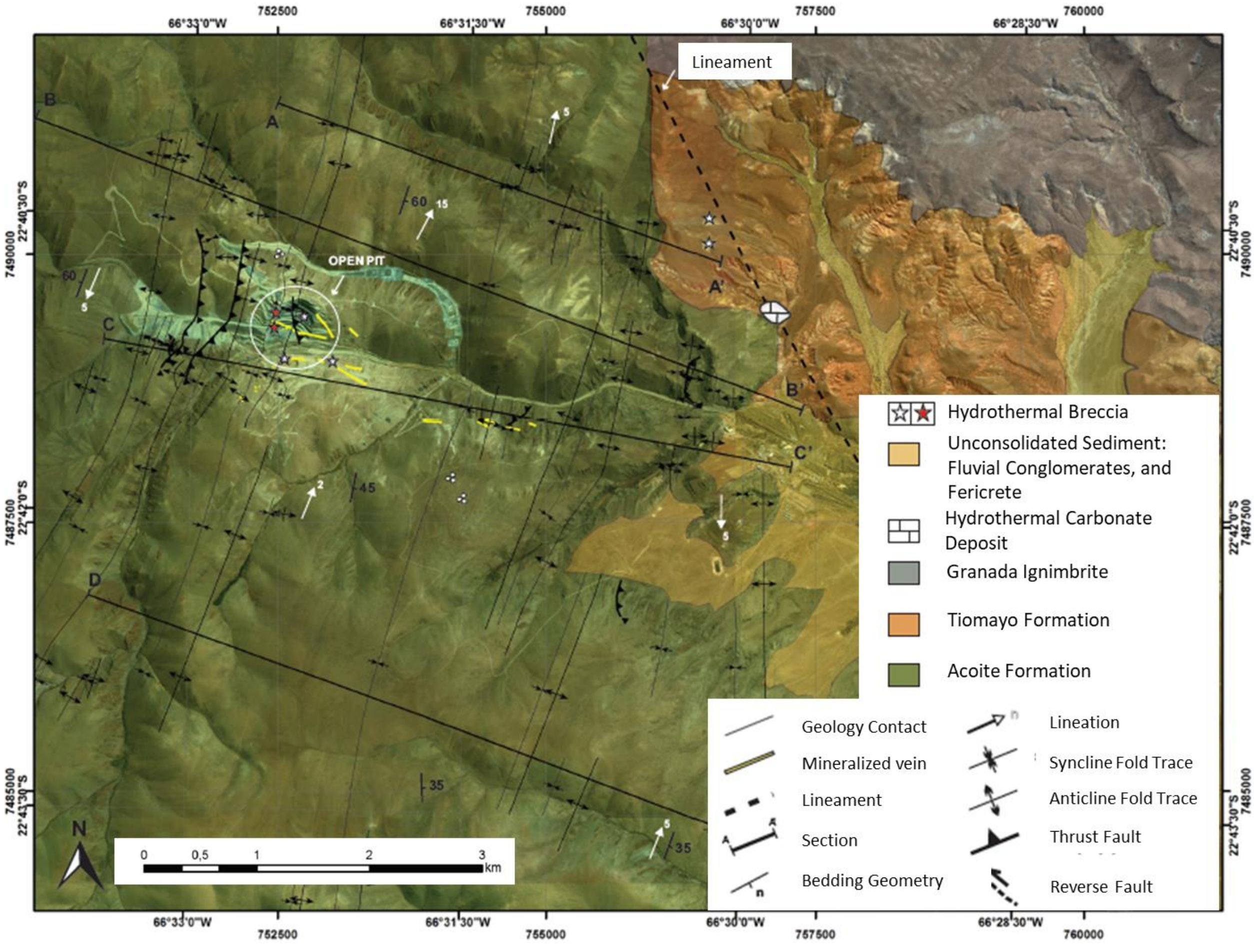
Mineralisation at Chinchillas in the Silver Mantos, Mantos Basement, Socavon Basement, and Socavon del Diablo are still open to expansion, particularly the deeper zones of Silver Mantos and Socavon Basement. Other targets include: the northern slope of the basin; the area between the Silver Mantos and Socavon zones; and the dacite domes.

A recent review of the economics of the Socavon deposit has resulted in its removal from Mineral Resource inventory in 2022.

7.3 Pirquitas Geology

The majority of the Pirquitas property covers intensely folded Ordovician Acoite Formation marine sedimentary rocks (Figure 7.10). Well exposed along the length of the Pircas River valley, this formation is composed of interbeds fine to medium grained lithic wacke tens of centimetres to a few meters thick, greywacke siltstone, and less abundant black shale that range in thickness from a few centimetres up to several metres. Underlying the north-eastern sector of the property is a sequence of continental sedimentary rocks, mainly hematite-stained arkosic sandstone intercalated with thin polymictic conglomerate beds and cream-coloured reworked dacitic tuff units. This sequence is inferred to belong to the shallow east-northeast dipping Tiomayo Formation of Early to Middle Miocene age. Several kilometres east of the property a medium-grained granodiorite intrusion forms the small mountain of Cerro Galan, which represents the only substantial intrusive rock body proximal to the mine area.

Figure 7.10 Pirquitas Geology Map

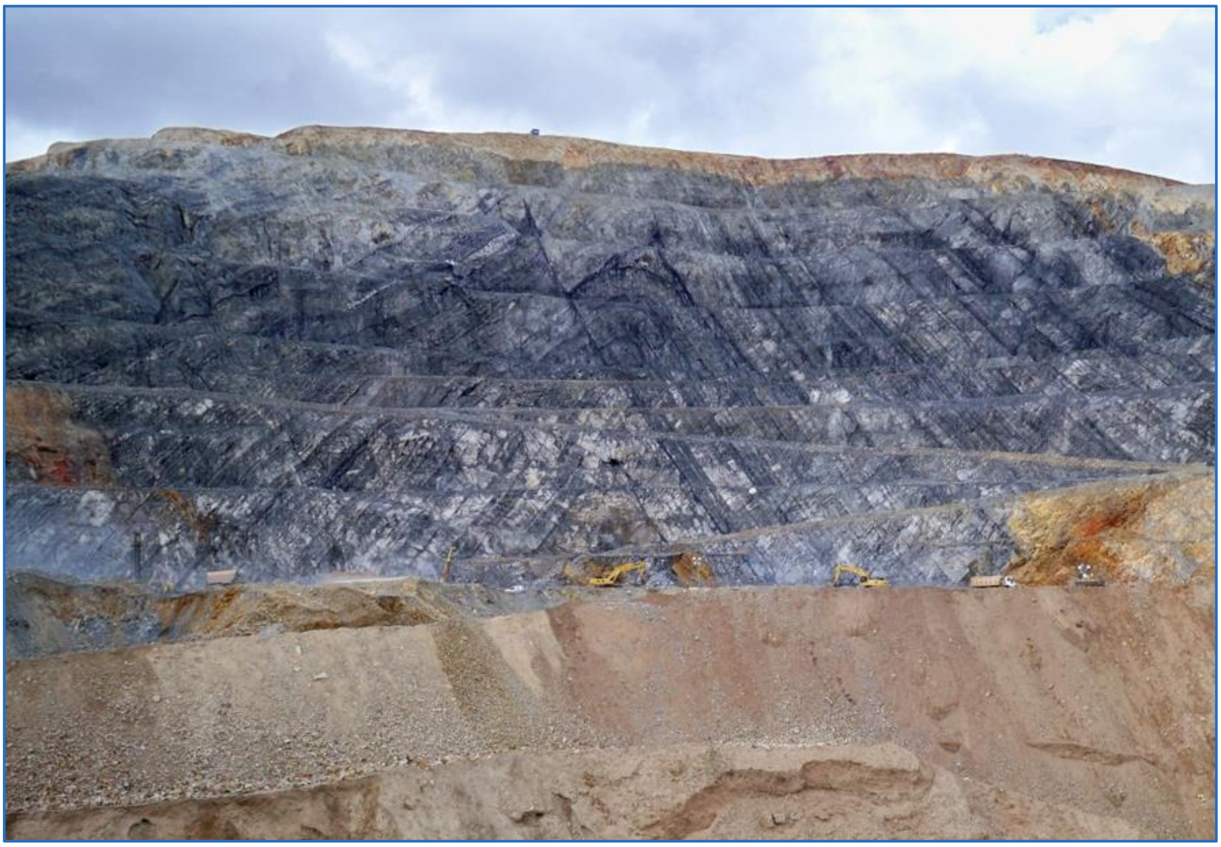


Folds with shallow-plunging hinge lines and amplitudes ranging from tens of metres to several hundred metres crop out in this area (Figure 7.11). Mining on the north face of the San Miguel open pit has exposed a 'textbook' example of a chevron-style anticline (Figure 7.12). High-angle, mostly reverse faults cut the folds, displacing fold limbs by metres to tens of metres.

Axial planar cleavage is well developed in the Paleozoic rocks, especially in the siltstone and shale beds. The well-formed cleavage does not appear to have acted as a receptive structural fabric for quartz-hosted Ag-bearing Fe-Zn-Sn-Pb sulphide veins, although a minor amount of weakly-auriferous quartz veins were deposited along cleavage planes.

Figure 7.11 Anticline Developed in Interbedded Sandstone, Siltstone and Shale of the Ordovician Acoite Formation, Pircas River Valley, Pirquitas Mine Area

Figure 7.12 Chevron Fold and High Angle Thrust Fault in the Acoite Formation Host Rocks. North Wall San Miguel Open Pit.



The Pirquitas Mine open pit exploits previously un-mined portions of the Potosí, San Miguel and Chocoya vein systems. Sheeted sulphide veins and associated disseminated mineralisation of the San Miguel system occur in a swarm that is 160 m wide in the north-south direction and a maximum of 400 m along strike in the east–west direction. The Potosí Vein is located on the northern margin of the current pit; the Chocaya Vein system is located on the southern margin and the uppermost part of the Oploca system, known as the Oploca breccia, was exploited by the southern edge of the open pit.

A major system of sulphide-rich veins cut the axial surfaces of the folds and the related cleavage fabric at high angles. Three main and one minor vein sets are recognised at the Pirquitas Mine:

Vein Set 1

In the dominant orientation veins strike close to 290° and are generally subvertical. Veins with this orientation include the majority of those in the Potosí, San Miguel, Chocaya, and Oploca areas (Figure 7.13). The Potosí Vein is the largest known single vein on the property, with a strike length of approximately 500 m and maximum thickness of 2.5–3.0 m. Other veins of this orientation typically have a strike length between 100 and 500 m, with average widths of 30–50 cm. The larger of these veins include localised matrix-supported breccias with angular clasts of quartz-sericite altered wallrock in a matrix of Fe and Zn +/- Sn-Ag-Cu sulphides.

Vein Set 2

The secondary vein set is represented by the Veta Blanca and Colquechaca, veins and narrow (50 cm to 2 m) veins in the Oploca area. The veins are steeply to moderately south dipping and strike close to 310°.

Vein Set 3

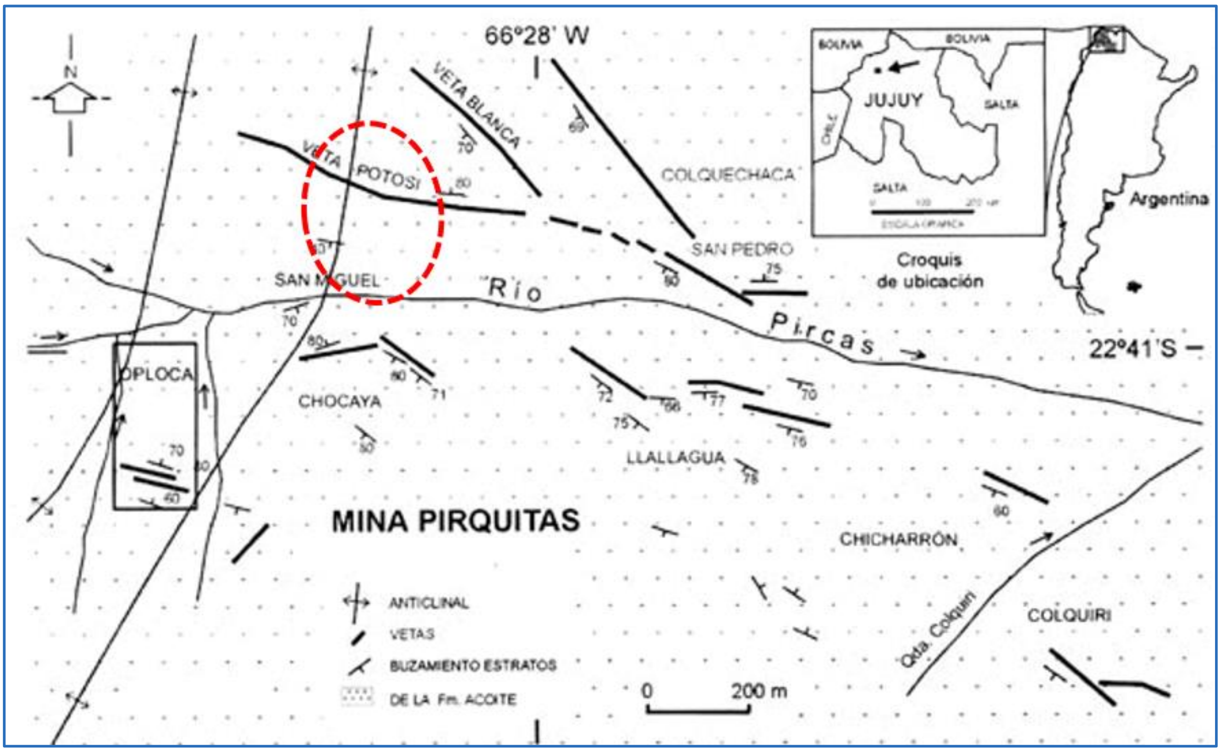
The Crucero vein is a series of saddle reefs that follow the axial plane of the antiform in the middle of the Pirquitas pit. Sulphide Mineralisation within the Crucero vein is irregularly developed along fractures within white crystalline syn-deformational quartz.

Vein Set 4

At approximately 200 m below surface to the south of the pit is a 4 m thick, 100 x 200 m vein that dips 30° to the north-east and strikes close to 320°. In addition to the veins, zinc-rich mineralisation is hosted within pipe-like breccia bodies that are interpreted to be breccia diatremes.

The Pirquitas open pit exploited previously un-mined portions of the Potosí and San Miguel veins in addition to a set of sheeted sulphide veinlets with associated disseminated mineralisation. The sheeted veins occur in a swarm that is 120–140 m wide in the north–south direction and a maximum of 300 m along strike in the east–west direction. The Potosí Vein is in the northern margin of the current pit; the Chocaya Vein system is south of the open pit (Figure 7.13)

Figure 7.13 Map of the Pircas Valley showing Main Ag-Sn-Zn Vein Systems



Red outline represents approximate limits of San Miguel open pit
SSR, 2022

7.3.1 Pirquitas Alteration

Hydrothermal alteration is not particularly well-developed in the host rocks of the Pirquitas deposit (Board et. al., 2011). An assemblage of sericite + quartz + disseminated pyrite replaces original wallrock minerals along the margins of the larger veins, thus forming thin bleached *halos* to the veins. This sericite-quartz-pyrite alteration is also recognised in wallrock clasts within vein breccia. Disseminated subhedral pyrite is widespread in the deposit, generally constituting less than a few percent of the wallrock by volume; it tends to be more abundant in shale and siltstone beds.

7.3.2 Pirquitas Mineralisation

The fracture and breccia-hosted mineralisation at the Pirquitas Mine consists of Fe and Zn sulphides with accessory cassiterite (Sn oxide) and a large variety of Ag-Sn-Zn (-Pb-Sb-As-Cu-Bi) sulphides and sulfosalts. Crystalline quartz, along with chalcedony in the upper levels of the system, and kaolinite are the main gangue minerals in the veins and mineralised breccias. The main sulphides, specifically pyrite, pyrrhotite, sphalerite and wurtzite, form colloform bands parallel to vein margins, which together with crustiform and drusy vein textures suggest that the mineralisation is epithermal in origin. The vein textures imply that the mineralisation was deposited from relatively low temperature hydrothermal fluids within about 500 m of the paleosurface. However, mineralogical evidence suggests that the initial temperature of the mineralising fluids was possibly greater than 400°C. A detailed study by L. Malvicini (1978) provides relationships between 26 sulphide and sulphosalt mineral phases.

8 DEPOSIT TYPES

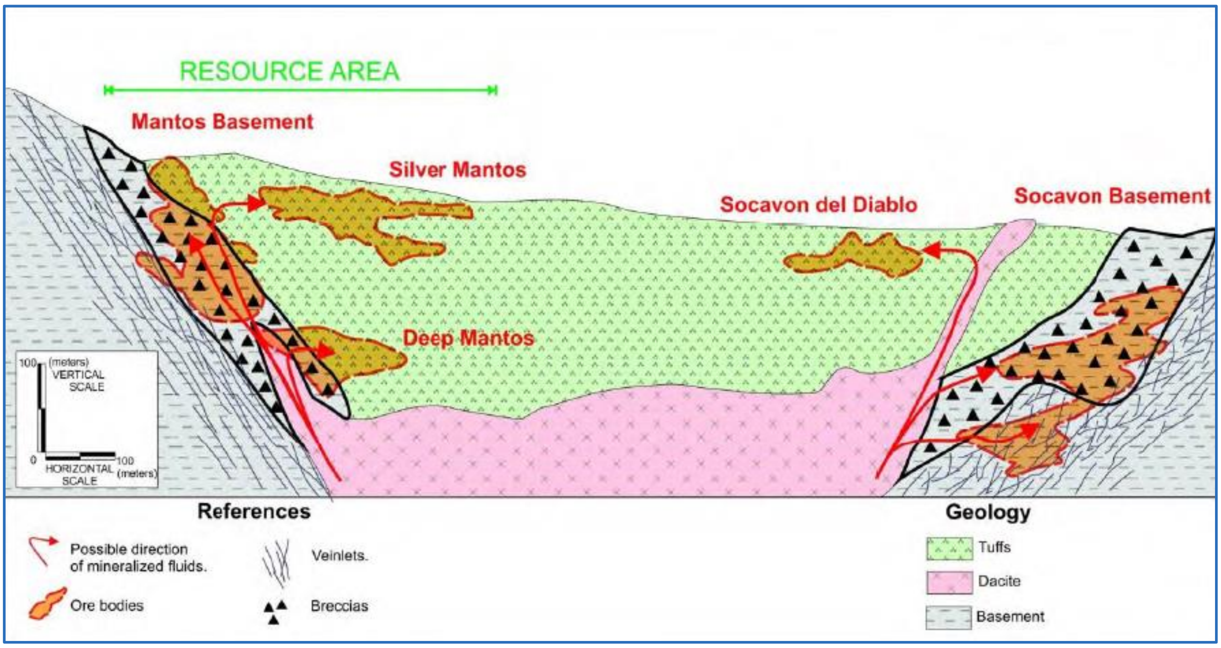
The Chinchillas and Pirquitas deposits are within the Bolivian tin-silver-zinc belt which occupies the back-arc portion of the central Andes and extends from the San Rafael tin-copper deposit in southern Peru to northern Argentina (Figure 8.1). The Bolivian tin-silver deposits are typically associated with felsic volcanic domes of broadly rhyodacitic composition (Cunningham et al., 1991). Bolivian-type Ag-Sn deposits generally consist of sulphide and quartz-sulphide vein systems typically containing cassiterite and a diverse suite of base and trace metals, including Ag in a complex assemblage of sulphide and sulfosalt minerals. The vein systems are generally spatially and likely genetically associated with epizonal (subvolcanic) quartz-bearing peraluminous intrusions one to two kilometres in diameter, although the mineralisation may be entirely hosted by the country rocks into which the intrusive stocks were emplaced. The Chinchillas deposit is modelled as a Tertiary-aged diatreme volcanic centre that has intruded Paleozoic sedimentary basement rocks. The mineralisation occurs mostly as disseminations, veinlets, and matrix fill (Figure 8.2).

Most of these deposits depicted in Figure 8.1 are characterised by the intrusion of dacite dome complexes with mineralisation hosted in shear zones and breccia within the dacite domes and/or within shear zones and breccia within the host rocks. At Pulacayo, Potosí and San Cristóbal, where associated domes are present, there is significant mineralisation within the domes. More rarely, as in the case of Chinchillas and San Cristóbal, the deposits include disseminated mineralisation in flat lying manto bodies within sedimentary and pyroclastic rocks. Chinchillas demonstrates phreatomagmatic diatreme morphology associated with a dome structure.

Figure 8.1 Bolivian Tin-Silver-Zinc Belt with Major Deposits

Golden Arrow, 2013

Figure 8.2 Schematic Geological Model on West–East Cross-Section showing Chinchillas Deposit



Golden Arrow, 2015

9 EXPLORATION

The most comprehensive exploration programme was completed by Golden Arrow between 2011 and 2017 at Chinchillas and included detailed mapping, sampling, and geophysics. Emphasis was placed on mapping lithologies, alteration and structures to understand the controls of the mineralisation. In the basement rocks bedding, foliation and brecciation were recorded. A handheld X-ray Fluorescence (XRF) analyser was used to measure approximate silver, lead, and zinc values in all prospective outcrops.

A 2013 geophysical survey (IP/Resistivity, CSAMT, Magnetics), together with the re-interpretation of the 2008 IP survey, was used to target the Chinchillas South area, detecting deep structure and defining the contact between the tuff unit and basement rocks. The methods used to explore the Chinchillas Property are in accordance with industry standards and there are no indications of sample biases.

SSR's exploration at Pirquitas has predominantly involved RC and diamond core drilling. Sunshine Argentina completed detailed geological mapping on the property and commissioned approximately 44 line-kilometres of ground magnetics surveying and 19.2 line-kilometres of induced polarisation surveying centred on what is now the San Miguel open pit. Sunshine Argentina's drilling programmes ended in September 1998, after which the parent company completed an internal Pre-Feasibility Study of the project. Since fully acquiring the project in 2005, the Company has carried out additional geophysical programmes, including in 2012 a 14.4 line-kilometre Quantec Titan-24 DC-IP survey, a ground gravity and differential GPS survey, and in 2018 a Drone Airborne magnetic survey. Between 2008 and 2021 numerous prospecting and geological mapping surveys evaluated the mineral potential of the property.

10 DRILLING

10.1.1 Chinchillas Summary

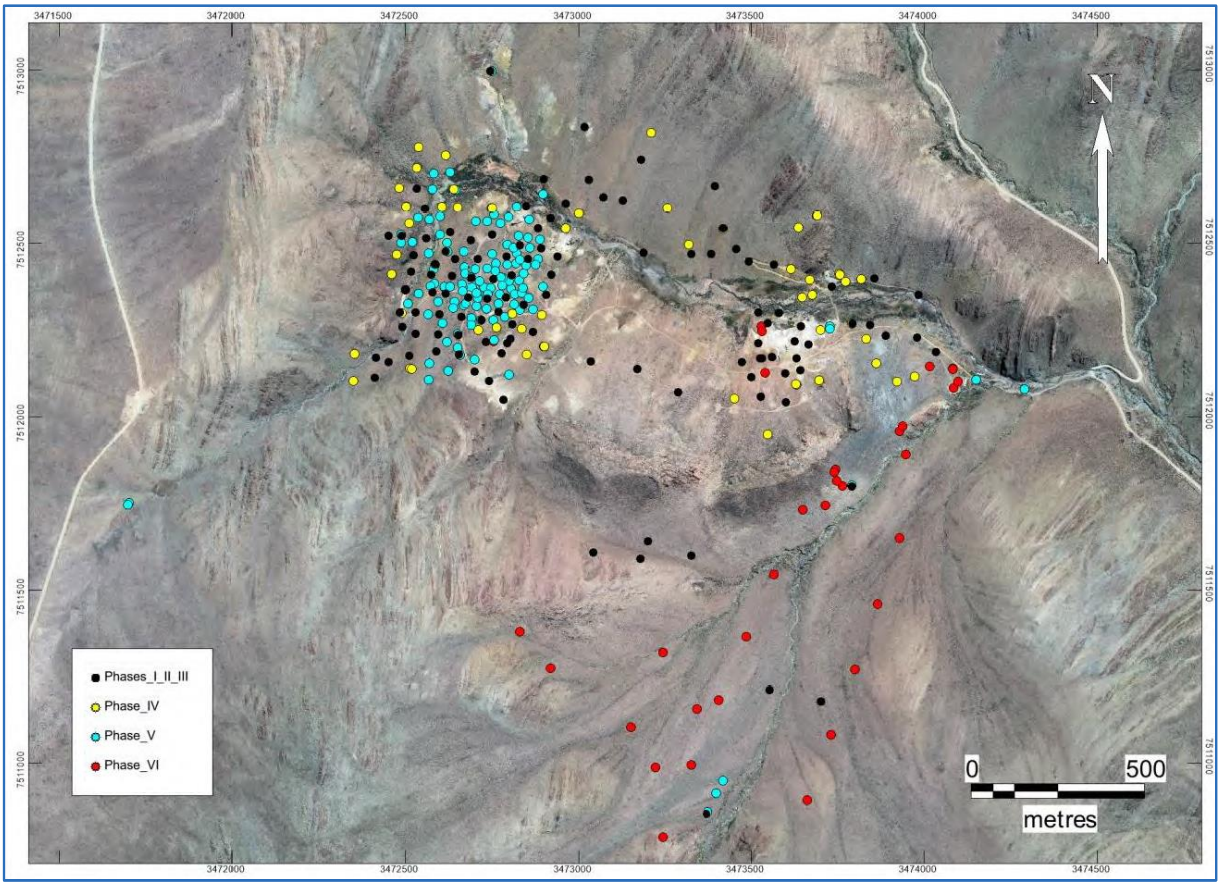
The historical drilling programmes at Chinchillas are summarised in Table 10.1. Aranlee Resources completed the first programme in 1994, which comprised seven reverse circulation holes. The results from the Aranlee holes were not used in any Mineral Resource modelling as there is no quality control data.

Table 10.1 Drill Programmes Completed at the Chinchillas Property

Company	BHIDs Sequence	Count	Year	Metres drilled
Aranlee Resources	CH-1–7	7	1994	782
Silex Argentina S.A.	CHD-010–016	7	2007–2008	2,220
Golden Arrow (Phase 1-V)	CGA-017–297	284	2012–2015	45,803
Golden Arrow / SSR (Phase VI – VII)	CGA-212W + CGA-298–340	44	2016	8,945

The average recovery from the 45,803 m of Golden Arrow drilling used in the 2017 Mineral Resource was 94%, including the first six metres where recovery was commonly less than 50%. Figure 10.1 shows the location of the Golden Arrow drilling separated into six different phases. For details on Chinchillas historical drilling refer to the 2017 technical report (Kuchling et. al., 2017).

Figure 10.1 Location of Drillhole Collars at the Chinchillas Deposit



Golden Arrow, 2016

10.1.2 Pirquitas Summary

Initial drilling on the Pirquitas Property was conducted by Sunshine Argentina and included a total of 51,863.62 m in 241 drillholes (Table 10.2).

The 2005 drilling programme was designed to test targets in the Oploca, Llallagua, and Colquechaca areas (Table 10.2). The 2007 and 2008 drilling programmes included exploration drilling, resource definition drilling, drilling for metallurgical testing, and condemnation drilling. All drilling was conducted from surface, with the majority completed by RC methods (approximately 84% of the total metreage drilled). Diamond drillholes were generally drilled HQ-size, sequentially reducing to NQ then BQ at depth, as needed.

Diamond core drilling was conducted between July 2010 and September 2011. The majority of this drilling was for resource definition in and around the existing open pit (approximately 89% of the drillholes), with the remainder consisting of exploration drillholes targeting the Cortaderas Breccia Zone (aprroximately6% of the drillholes) and other exploration targets (e.g. Veta Blanca).

In 2012, diamond core drilling was conducted between March and November. Most of the drilling was for resource definition in the Cortaderas Breccia Zone (approximately 89% of the drillholes), with the remaining drillholes being exploration drillholes at the pit margins.

The main objective of the 2018 Potosí drilling programme was to determine if the vein extends eastwards, and to study whether the vein crosses the proposed descending ramp that would access the Cortaderas vein breccia located 500 m to the north. While the main 2–3 m wide Potosi vein does not project into the area, there is a thin and commonly less than 1 m vein intersected in select drill holes.

In 2019–2020, the objective of the deep Granada drill programme was to test the theorised intersection between the southwest dipping Cortaderas vein breccia and the steeply north-dipping Potosi vein beneath the San Miguel pit. Three HQ holes were completed between 6 October 2019 and 31 January 2020 for a total length drilled of 3,430.40 m. Holes from the Granada programme intersected two different mineral compositions that correspond with historically described veins. Mineralisation commonly fills open spaces related to fracturing, brecciation, and faulting, usually as massive or semi-massive veins or veinlets. These veins and veinlets typically range in width from 5–30 cm but may locally approach 3.5 m. The Granada target was not encountered at the anticipated depth, but the programme did identify significant intersections of gold values below the elevation of previous mining within the San Miguel open pit (~4,000 m). The gold grades are commonly associated with elevated concentrations of Ag, As, Bi, Cu, and Sn. The most encouraging broad, low-grade interval from this programme was intersected in GR-396.

As a result of the elevated gold results encountered in the deep drilling in the 2019–2020 Granada drilling programme, select reject and pulp material from historic Cortaderas drilling programmes were re-analysed in 2021 using fire assay gold and multi-element ICP. There were no gold analyses included for any of the original Cortaderas drilling programmes. Two phases of sampling were completed with the first phase including samples from 13 drillholes. The intervals were selected to test a range of high-grade Ag, Zn, and/or Sn intercepts and addition to multiple elevations ranging from the upper portion of the vein (elevation 4,100–4,200 m) to deeper in the breccia system (elevation 3,850-4,000 m). Gold demonstrates a positive correlation between Sb, Cu, Ag, Bi, Mn, and Zn. As a result of the anomalous results, a more-detailed Phase 2 sampling programme was completed that included re-analysis of samples from two drillholes, DDH-214 and DDH-230. An additional198 rejects were submitted for evaluation and represent continuous intervals (DDH-214: 150 m; DDH-230: 219 m). These results further support an elevation control to the gold mineralisation, with higher grades in the lowermost section of the deposit.

Table 10.2 Drill Programmes Completed at the Pirquitas Property

Company	Programme Description	Count	Year	Metres drilled
Sunshine Argentina	San Miguel Deposit (DD)	46	Pre-2004	12,645.72
	Underground (DD)	25	Pre-2004	4,284.50
	San Miguel Deposit (RC)	170	Pre-2004	34,933.40
SSR	Oploca (4), Llallagua (6), Colquechaca (4)	14 *	2005	3,299.65
	San Miguel (24), Cortaderas (6), San Miguel (4), Potosí (1)	35 *	2007	7,723.45
	San Miguel (115), Potosí (52), Oploca (32), Cortaderas (12), Pircas (4), Médanos (10)	225 *	2008	41,112
	San Miguel (38), Oploca (17), Veta Blanca (2), Cortaderas (4)	61 *	2010–2011	12,665.40
	San Miguel (69), Cortaderas (5), Other Targets (5)	79 *	2011	17,549.95
	Cortaderas (126), Médanos (1), West of Pit (9), South of Pit (4), North of Pit (2)	142 *	2012	52,804.30
	Pirquitas Property	17	2013	6,923.00
	Pirquitas Surface (16) and underground (2)	18	2014	3,553.00
	Pirquitas Underground	44	2015	10,961.00
	Potosi – East Extension	15	2018	2,399.30
	Deep Granada	3	2019–2020	3,430.40

* Drillholes used in the 2013 resource modelling

10.2 Drill Core Handling Protocol

The diamond drill core is extracted from the core tube and placed in appropriate boxes marked with drill hole number and the hole depth in metres. The boxes are transported, by pickup truck, from the drill site to the core shack at the end of each shift by trained personnel. The drill contractor used a single shot Reflex survey instrument to measure the down hole deviation. Following completion of the hole, a PVC tube is cemented at the drill collar with hole number, depth, and azimuth inscribed on a metal ticket.

Measurements of core recovery and geotechnical measurements (fracture frequencies and rock quality designation (RQD)) are recorded. The core boxes are then photographed and select intervals are temporarily removed for specific gravity measurements. Geological descriptions are recorded and the samples for analysis are marked at one metre intervals in mineralised zones and two metre intervals in areas with no expected mineralisation. The drill core is split using an electric diamond core saw and sampled according to the marked intervals.

11 SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 Chinchillas

The following summarises the sample preparation, analysis and security details used by Golden Arrow and SSR in their drill campaigns at Chinchillas and remains unchanged from the most-recent Technical Report (Davis et al, 2016). For details of methodologies used by Silex in the earlier drill campaign, the reader is referred to the penultimate Technical Report (Davis and Howie, 2013).

11.1.1 Sampling Method – Chinchillas

Following the splitting of core, half the core is returned to the box while the other half is bagged. Corresponding tags are inserted, one in the plastic sample bag and the second in the core box. Quality control samples are inserted in sample bags and allocated in order for the laboratory to have a control sample in every batch.

11.1.2 Sample Custody and Security – Chinchillas

Samples bags are placed in larger sacks (between six and ten samples per sack) and are sealed. Sealing numbers are recorded in the Chain of Custody database. The sacks were shipped by private truck to the Alex Stewart (Assayers) Argentina S.A. laboratory in Mendoza, (Alex Stewart) where the sample preparation and analysis are performed.

Samples are received by the laboratory and the reception is reported to Golden Arrow. No damage or missing samples were ever reported during transportation.

11.1.3 Sample Preparation – Chinchillas

Samples are prepared by method 'P-5', which includes drying the samples at 90°C, crushing the entire sample up to 80% passing 10 mesh, splitting 1,000 g with a Jones riffle splitter and pulverising to 95% passing 140 mesh. The pulverised material or pulp is then sampled and 200 g of pulp is sent to the laboratory.

11.1.4 Sample Analysis – Chinchillas

Alex Stewart was the primary laboratory and ALS in Peru (ALS) was used as the secondary laboratory for check samples (see Section 11.1.6.4 for details). All samples are tested for a suite of 39 elements including silver, lead, and zinc by a four-acid digestion method and analysis by Inductively Coupled Plasma atomic emission spectroscopy (ICP) (method ICP-MA-39). Silver greater than 200 ppm is assayed by fire assay using a 50 g sample with gravimetric finish (method Ag4A-50). Lead and zinc greater than 10,000 ppm are re-assayed by an oxidising acid digestion for ore grade material and reading by ICP (method ICP-ORE).

In order to speed the reception of assay results, ALS acted as the primary laboratory for one batch of 876 samples in the Phase V programme. Quality control procedures were applied in the same manner as with the rest of the samples.

Alex Stewart is an international laboratory certified under ISO 9001:2008, ISO 17025:2008 and ISO 14001: 2004. Alex Stewart is independent from Golden Arrow and SSR.

11.1.5 Density – Chinchillas

To determine density, samples of drill core measuring about ten centimetres in length, at approximately fifteen metre intervals are collected. Samples are dried for two hours at 90°C in an electric oven. After cooling, the samples are sealed with plastic (cellophane) film. The weight of the plastic is ignored in the calculations since the volume is insignificant (less than 1 g of plastic film compared with the 900 g average weight of each sample). The samples are weighed in air and then weighed again while submerged in water. The formula used to calculate density values is as follows:

Density = (Weight in air) / (Weight in water)

A total of 2,586 samples of drill core were tested for density from Phases II, III, IV and V drilling. The results averaged 2.59 t/m^3 for the basement rocks, 2.40 t/m^3 for the dacites and 2.08 t/m^3 for the tuffs, with an overall average of 2.31 t/m^3.

11.1.6 Quality Assurance and Quality Control – Chinchillas

Golden Arrow established a Quality Assurance and Quality Control (QA/QC) system for its drilling programmes. The system specified the procedures for handling and sampling of drill core including, logging procedures, the frequency of inclusion of QA/QC samples and the procedure for the chain of custody between the drill and the assay lab. QA/QC samples, including blanks and certified reference materials (CRM) are inserted in each batch in the field to check the precision and accuracy of the laboratory. This section reports the results from the Phase V programme. Results from prior phases of drilling are detailed in the previous Technical Reports (Davis & Howie, 2013; Davis et al., 2014, Davis et al., 2015). The QC results from previous drilling programmes indicate the samples from those programmes are of sufficient quality to support Mineral Resource estimation.

A total of 1,792 quality control samples were inserted as shown in Table 11.1.

Table 11.1 Summary of QA/QC Samples – Chinchillas

Type of Sample	Number of Samples	Percentage of Total (%)
Core samples	10,468	85.4
Coarse Blanks	369	3.0
Fine Blanks	377	3.1
Coarse Duplicates Lab 1	185	1.5
Fine Duplicates Lab 1	191	1.6
Fine Duplicates Lab 2	293	2.4
Reference Material	377	3.1
Total	12,260	100

11.1.6.1 Blanks – Chinchillas

Coarse and fine blanks were used to detect contamination problems and cross labelling in the process. The blank used was not a certified material from a vendor. The coarse blank, named BL-CH-1G, was made from a tuff breccia with no silver mineralisation and low-grade base metals values. It was sampled by Golden Arrow personnel and assayed by Alex Stewart Assayers.

The blank material used for QC purposes was not certified by a round robin process at several accredited laboratories; however, assay QC results indicate the material appears to be sufficiently homogeneous to detect sample contamination. The acceptance values were three times the reference value. In the case of the Ag the acceptance value was three times the detection limit (1.5 ppm Ag).

From the 369 coarse blank samples, all Ag, Pb, and Zn values are under the Acceptance Limit except for one sample with 221 ppm Pb, just above the limit of 198 ppm Pb.

The fine blanks were made from the fine rejects of coarse blanks of the previous drilling phase. They were named BL-CH-2F, BL-CH-2aF and BL-CH-3F. The original assays were averaged and internal reports were produced. The acceptance values were three times the reference value. During the Phase V drilling programme, a total of 377 fine blanks were inserted in the batches as part of the QC programme. Ag values were always below the acceptance limit of 1.5 ppm Ag. Lead and zinc values were also below the acceptance limit except for two outliers in Pb and Zn. These outliers might reflect some contamination in the laboratory but the absolute values, even above the acceptance limit, are not considered significant.

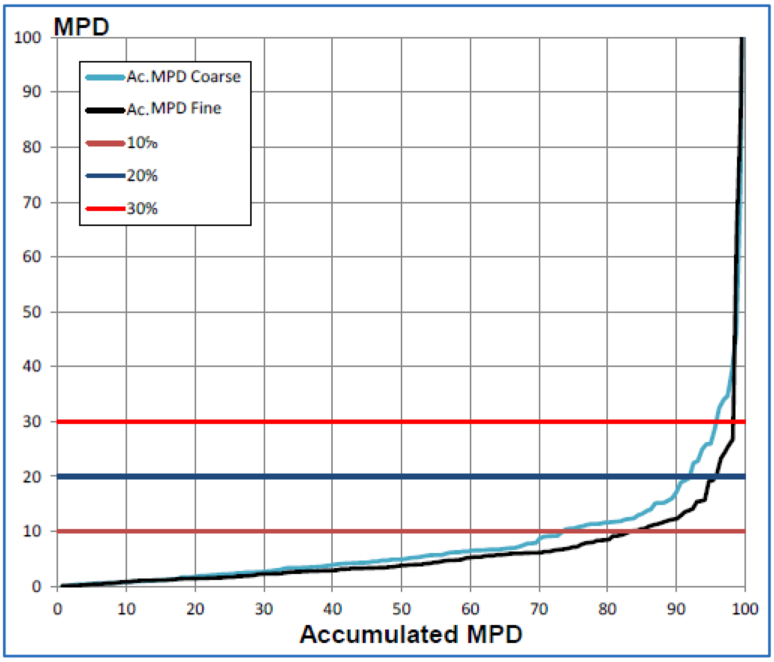
11.1.6.2 Coarse and Fine Duplicates – Chinchillas

During the Phase V drill programme coarse and fine duplicates were incorporated in the quality control process. A total of 185 of the coarse rejects (at 10 mesh) were re-labelled with a new number, re-assayed at Alex Stewart and considered as coarse duplicates. The same procedure was applied to 191 fine rejects (pulps) and these were considered as fine duplicates. Assay of the fine duplicates is not intended to validate the assay process since each part of the duplicate pair was assayed in the same laboratory. Pairs of values below 3 ppm Ag were removed due to the poor precision of results. Figure 11.1 shows a summary of the coarse and fine duplicates for Ag comparing the Mean Percentage Difference (MPD) to the Accumulated MPD. The MPD is calculated as the percentage of lx1-x2l / (x1+x2)/2.

Curves for Pb and Zn show similar tendency as for Ag.

Field duplicates were not taken during the Phase V drill programme. As shown in previous phases, the comparison between ¼ core versus ½ core had low representativeness and usefulness.

Figure 11.1 Ag Values for the Two Types of Duplicates – Chinchillas



11.1.6.3 Certified Reference Materials – Chinchillas

A set of Certified Reference Materials (CRM) standards was used to check the accuracy and precision of the laboratory. The same three CRMs used during Phases III and IV were used during the Phase V programme, referred to as 1-CH, 2-CH and 3-CH. These standards were originally prepared by ACME-Mendoza, at the request of Golden Arrow, from rejects of previous drill core from the Chinchillas Property. CRMs 1-CH and 2-CH have low (41 ppm) and intermediate (146 ppm) Ag grades and were packaged in 30 g envelopes because they do not require fire assay. Standard 3-CH has higher silver content (862 ppm) and, therefore, was packaged in 120 g envelopes to accommodate the larger sample requirements of the fire assay testing.

A total of 148 CRM of 1-CH, 157 of 2-CH and 72 of 3-CH were inserted along the Phase V drilling. The assay results from the 1-CH all fall within three standard deviations (SD)of the accepted value (Figure 11.2). In the case of the 2-CH, only one value is above three SD of the accepted value. The results of 3-CH, shown in Figure 11.3, show that all assay results are within two SD of the accepted value.

Figure 11.2 Ag Values from CRM 1-CH and 2-CH – Chinchillas

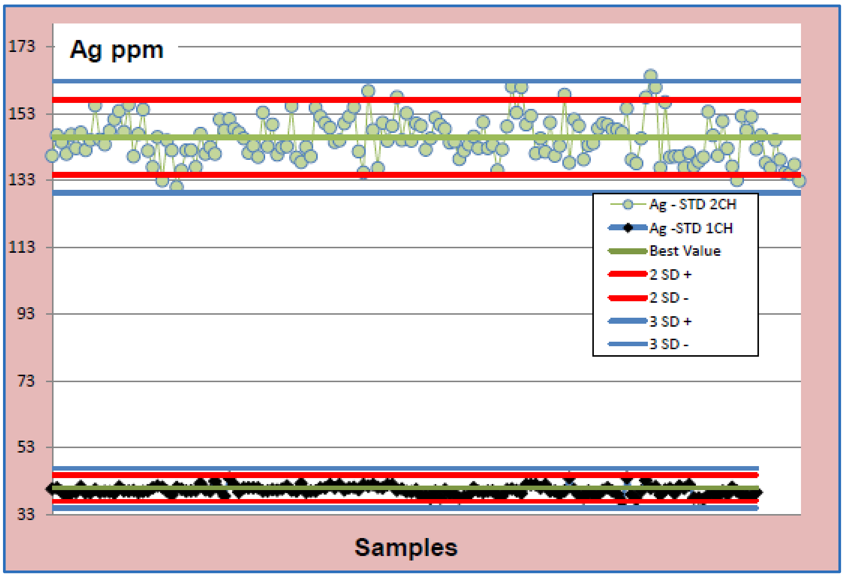
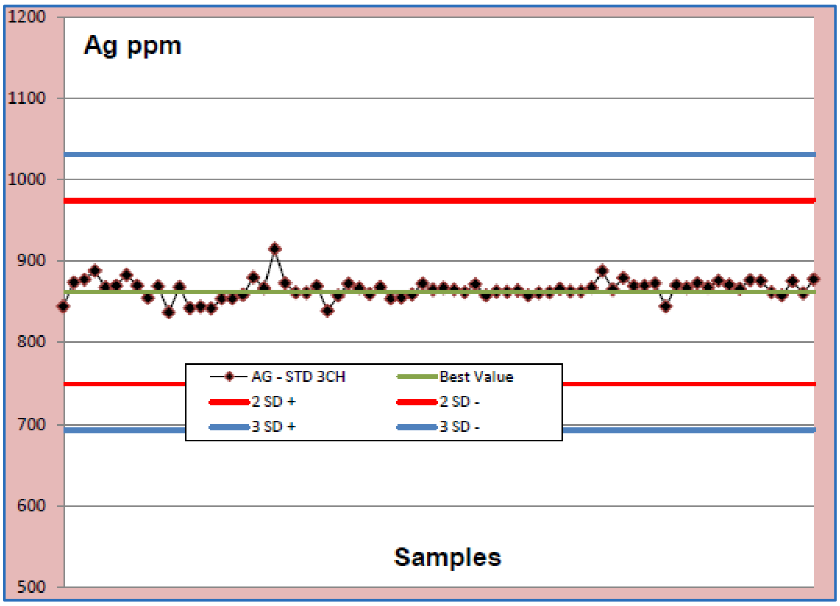
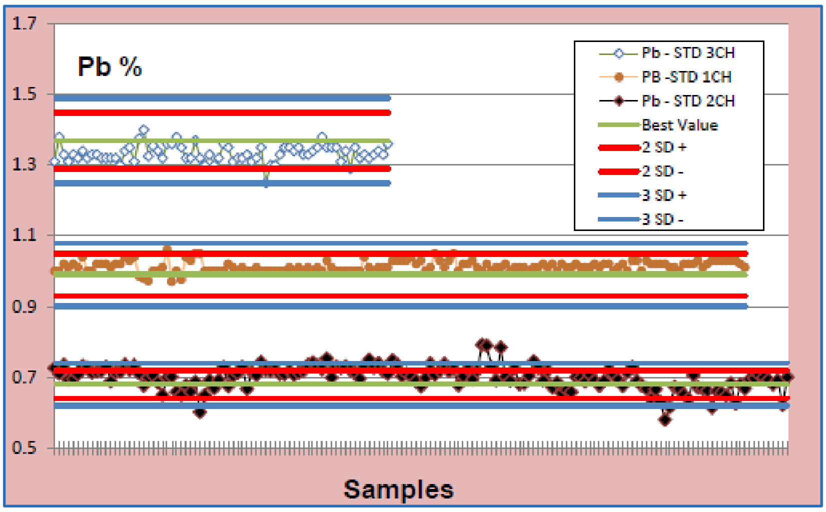


Figure 11.3 Ag Values from CRM 3-CH – Chinchillas



The results for lead, in Figure 11.4, shows some outliers in standard 2-CH. Samples immediately before and after this potentially suspect standard result were re-assayed and no significant difference was detected from the original assays.

Figure 11.4 Pb Values from CRM 1-CH, 2-CH and 3-CH – Chinchillas



In the case of zinc, reference materials 2-CH and 3-CH were assayed by method ICP-MA and all values are within +/- two SD, except for one sample that is less than three SD from the accepted value (Figure 11.5 and Figure 11.6).

Figure 11.5 Zn Values from CRM 1-CH and 3-CH – Chinchillas

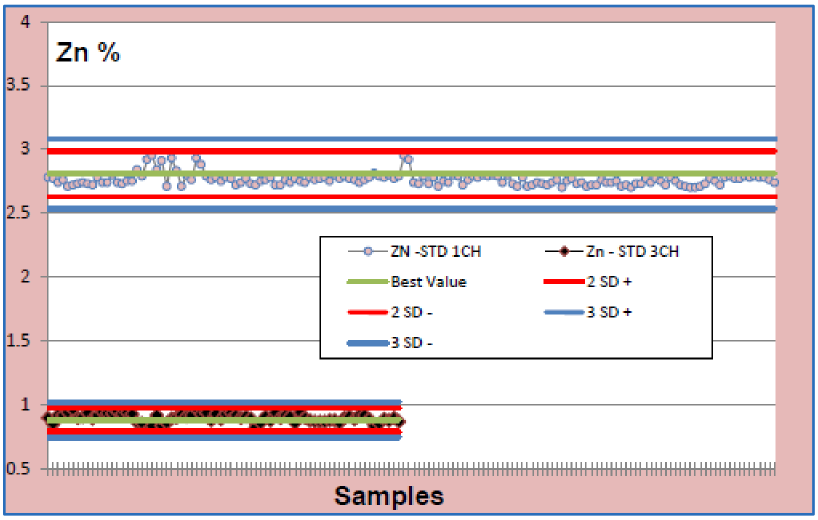
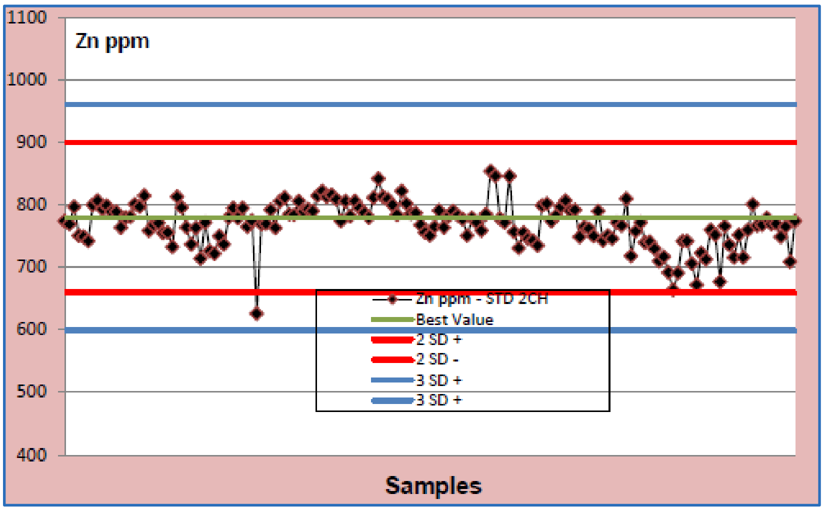


Figure 11.6 Zn Values from CRM 2-CH – Chinchillas



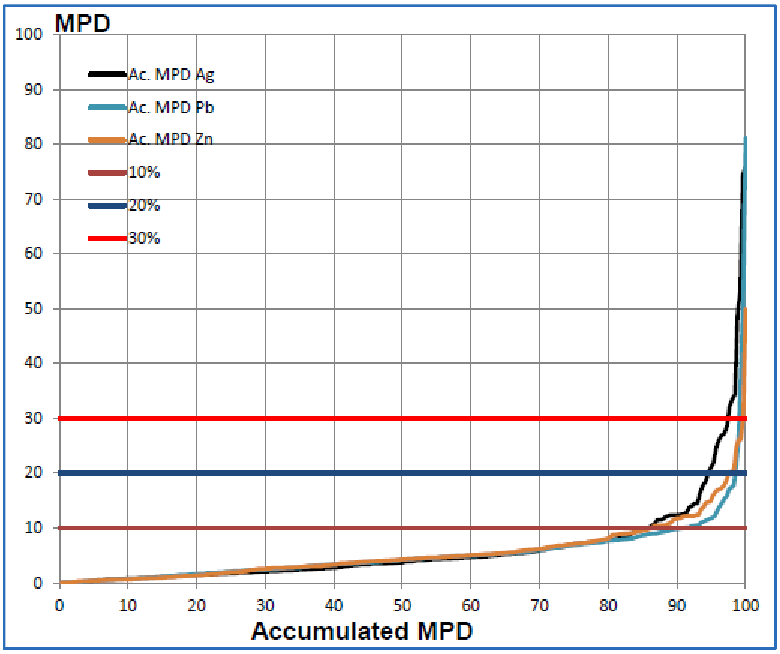
11.1.6.4 Secondary Laboratory for Checks – Chinchillas

ALS was used as secondary laboratory. A total of 293 pulps were sent to ALS to be tested by method ME-ICP61 based on a four-acid digestion and reading by ICP. Samples greater than 1% Pb or 1% Zn were re-tested using ore grade method Pb-OG62 and Zn-OG62. Samples greater than 100 ppm Ag were re-assayed by fire assay with gravimetric finish (method Ag-GRA22). ALS is part of an international laboratory system and has ISO 9001:2008 and 17025:2005 certifications. ALS is independent from Golden Arrow and SSR.

As with the field/coarse duplicates, the lab duplicate pairs with values close to the lower limit of detection were removed due to the poor precision of results, leaving only the greater than three ppm silver values.

Figure 11.7 shows the mean percentage difference of the Ag, Pb, and Zn values in check samples between the primary and secondary laboratory.

Figure 11.7 Comparison of Ag, Pb, and Zn Results between Lab Duplicates – Chinchillas



11.1.7 Conclusions and Recommendations – Chinchillas

The authors believe that the sample preparation, security, and analytical procedures meet or exceed industry standards for data quality and integrity. There are no factors related to sampling or sample preparation that would materially impact the accuracy or reliability of the samples or the assay results. The outcomes of the QA/QC procedures indicate that the assay results are within acceptable levels of accuracy and precision and the resulting database is sufficient to support the estimation of Mineral Resources.

11.2 Pirquitas

The following summarises the sample preparation, analysis and security details used by Sunshine Argentina and SSR in their drill campaigns at Pirquitas and remains unchanged from the most-recent Technical Report (Board et al, 2011).

11.2.1 Sampling Method – Pirquitas

11.2.1.1 Sunshine Argentina

RC drillhole cuttings were collected and split into 30–40 kg samples at the drill rig. A three-tier Jones-style splitter was used to split these samples. A 3–5 kg sample was sent to the relevant analytical laboratory for sample preparation and analysis.

Drillhole core (HQ and NQ) was marked for sampling and cut in half using a diamond saw. One half of the core was geologically logged and stored on site. The other half of the core was sent to the laboratory for sample preparation and analysis.

A total of 2,788 underground channel samples were collected over a total distance of 1,600 m from mineralised veins and sheeted vein systems in the main ore zone of the San Miguel zone, as well as from the Oploca, Potosí, Blanca, San Pedro, and Llallagua vein systems. Samples of approximately 2 kg per linear metre in weight were chiselled from channels.

11.2.1.2 SSR

Dry RC samples were split to approximately one-eighth (~12.5%) of the original sample size using a three-tier Jones-style splitter, then split to one-sixteenth using a one-tier Jones splitter. This sample was sent to the laboratory. Wet RC samples were initially halved using a wet splitter, with one half split again to one-eighth using a three-tier Jones splitter, then halved again to produce a one-sixteenth sample to be sent to the laboratory.

Drillhole core was marked for sampling and cut in half using a diamond saw. One half of the core was geologically logged and stored on site. The other half of the core was sent to the laboratory for sample preparation and analysis. All drillhole samples generated from the 2010–2011 drilling programmes were diamond drillhole core samples.

Following the splitting of core, half the core is returned to the box while the other half is bagged. Corresponding tags are inserted, one in the plastic sample bag and the second in the core box. Quality control samples are inserted in sample bags and allocated in order for the laboratory to have a control sample in every batch.

11.2.2 Sample Custody and Security – Pirquitas

The analytical laboratories took possession of the samples at the Pirquitas site and the samples were in their custody throughout the sample preparation and analysis steps, including sample transportation from site to the respective analytical laboratory.

SSRs sampling protocol included the labelling of sample bags and closing with a security seal. The samples were then sent to Jujuy by company truck.

11.2.3 Sample Preparation – Pirquitas

11.2.3.1 Sunshine Argentina

Sunshine Argentina's drilling programme was effectively conducted in two phases, with the transition being marked by a change in analytical laboratories from American Assay Laboratories (AAL) to the SGS Chile laboratory partway through its drilling programme. RC drillholes AR 001-AR 092 and diamond core drillholes DDH 001-DDH 042 were analysed by AAL, RC drillholes AR 093-AR 164 and diamond core drillholes DDH 043-DDH 069 were analysed by SGS Chile.

Sample preparation procedures were similar at both analytical laboratories:

- Samples were initially dried for two to three hours at 105°C.
- Dried samples were crushed to less than 18 mm in diameter using a jaw crusher, through to less than 2 mm to less than 0.18 mm in diameter using a roll crusher.
- A Jones-style riffle splitter was used to collect sample splits of approximately 250 g (AAL) and 400 g (SGS Chile).
- Sample splits were pulverised in ring/disk pulverisers to less than 0.10 mm in diameter, homogenised, and packaged for analysis.

All coarse rejects from the AAL prepared sample splits were stored on-site at Pirquitas; a minimum of 0.25 kg per sample was returned for on-site storage at Pirquitas by SGS Chile. A split of each sample pulp was also returned for on-site storage at Pirquitas.

11.2.3.2 SSR

RC and diamond drill core samples were shipped to the ALS Chemex analytical laboratory in Mendoza, Argentina. The following sample preparation was conducted by ALS Chemex:

- Samples were logged into the ALS Chemex Webtrieve sample tracking system (ALS Chemex procedure LOG-21), weighed (WEI-21), and then dried (DRY-21).
- Dried samples were crushed to between 70% and 80% passing a nominal –2 mm (CRU-31 or CRU-35), and split using a riffle splitter (SPL-21) to produce a representative 250-g split for pulverisation. The sample split was pulverised to better than 85% passing 75 µm (PUL-31 or PUL-32, depending on sample size).

11.2.4 Sample Analysis – Pirquitas

11.2.4.1 Sunshine Argentina

Sample pulps were digested in aqua regia and analysed for Ag using atomic absorption spectrometry (AAS). Samples with values higher than 500 ppm Ag were analysed a second time using fire assay methods. For Sn analyses, the sample pulps were fused with sodium peroxide and caustic pellets to ensure the Sn was completely dissolved before being analysed by AAS.

A total of six assay laboratories were used during Sunshine's two drilling phases:

- Phase I - After sample preparation, AAL sent the samples to the Laboratorio Quimíco Guayacan Ltda. analytical laboratory in La Serena, Chile for silver analysis, and to the AAL analytical laboratory in Santiago, Chile for tin analysis. Samples were also submitted to the Centro de Investigación Minera y Metalúrgica (CIMM) in Santiago, Chile for check assaying of Ag, and to the Instituto de Investigaciónes Minero-Metalúrgicas in Oruro, Bolivia for check assaying of Sn.
- Phase II – Prepared samples were sent to the SGS Chile analytical laboratory in Quilicura, Santiago, Chile for assaying, and to the Acme Labs in Santiago, Chile analytical laboratory for check assaying purposes. The analytical laboratories received 60 g pulps for Ag analyses and 20 g pulps for Sn analyses.

11.2.4.2 SSR

The analytical methodology changed during SSRs 2005–2008 drilling programme. Samples were initially analysed using the ICP mass spectrometry method, then aqua regia digestion followed by 36 element atomic emission ICP spectroscopy (ME-ICP41). Ag grades were found to be understated by both the ICP mass spectrometry method and, to a lesser degree, the ICP agua regia method. As a result of this SSR elected to switch to a third method: Four-acid 'near total' digestion followed by 34 element atomic emission ICP spectroscopy (ME-ICP61a, including Sn). Over limit Pb (>10%), Zn (>10%), and Ag (>200 ppm) grades were re-analysed using a four-acid digestion followed by AAS finish (Pb, Zn, or Ag-AA62 procedures). Ag grades still over limit (>1,500 ppm) were analysed by fire assay with a gravimetric finish (Ag-GRA21). Additional Sn analyses were conducted using AAS (Sn-AA82). All ICP mass spectrometry samples were re-assayed using this method by ALS Chemex.

Four-acid 'near total' digestion followed by 34 element atomic emission ICP spectroscopy (ME-ICP61a, including Sn) was the primary analytical technique used during the 2010-2011 drilling programme.

11.2.5 Density – Pirquitas

The method of density determination is not specifically discussed in historical documentation.

11.2.6 Quality Assurance and Quality Control – Pirquitas

11.2.6.1 Sunshine Argentina

Approximately 12% of the samples submitted for assays were QA/QC samples consisting of field standard, blank, and duplicate control samples. The QA/QC results showed that:

- Overall, Ag analyses of CRM and blank control samples were within acceptable limits.
- Field duplicate control samples of Ag were considered acceptable.
- Sn analyses were initially biased low, resulting in the re-assaying of 3,252 samples. No significant biases were noted in the Sn assay data for the Phase II drilling. Limited cross-contamination in Sn assay data was rectified through a programme of sample batch re-assaying. Sn data displayed a relatively high degree of inherent variability.

11.2.6.2 CRMs

CRM standard, blank, and field duplicate control samples were inserted into the sample stream on a one-in-twenty basis. Approximately 5% of the total number of submitted samples was submitted to the third-party analytical laboratory for check assaying. QA/QC samples included six different reference CRMs covering a representative range of Ag, Sn, and Zn grades, blanks generated from barren sandstone, and field duplicates (prepared as discussed above).

The QA/QC results showed that:

- The control values of the CRMs were not initially correctly calibrated, resulting in extensive failures of the field standard control samples relative to no failures in the analytical laboratory standard control samples. Recalibration of these values indicates that the key assay data from the 2005 through 2008 drilling programmes are unbiased and accurate.
- Field blank control samples indicated that sample cross-contamination was generally not an issue during the analytical work conducted on SSRs 2005–2008 drilling data.
- Field duplicate control samples, whilst indicating a degree of variability in the assay data, were reported at acceptable levels of precision for Ag, Sn, and Zn, given the nugget effect (inherent variability) and the variability associated with quarter-core versus half-core samples.

12 DATA VERIFICATION

12.1 Database Validation

12.1.1 Collar Coordinate Validation

12.1.1.1 Chinchillas

Validation of collar elevation data at Chinchillas was done by comparing elevations from DGPS field surveys against the satellite photo digital elevation model (DEM). Precision of the DGPS is between 15–70 cm.

12.1.1.2 Pirquitas

Drillhole collar locations at Pirquitas were validated by an independent surveyor for the 2011 resource modelling study.

In the 2013 modelling study, it became apparent that there was a discrepancy in some pre-2009 holes in the form of displacement of mineralised vein intervals relative to the vein interpretation and grade control data. An example of this issue is shown for drillhole AR-315, which has a high-grade interval that falls outside of the Veta Blanca vein model (Figure 12.1). The vein model in this location has been informed by many grade control drillholes, causing the position of AR-315 to be called into question.

A thorough investigation was undertaken and similar issues were identified in 96 drillholes.

Efforts were made to identify the possible source of the issue and, if a transposition error, remedy those errors definitively, however the age of the data and the inability to re-survey the collars due to them having been mined made this unachievable.

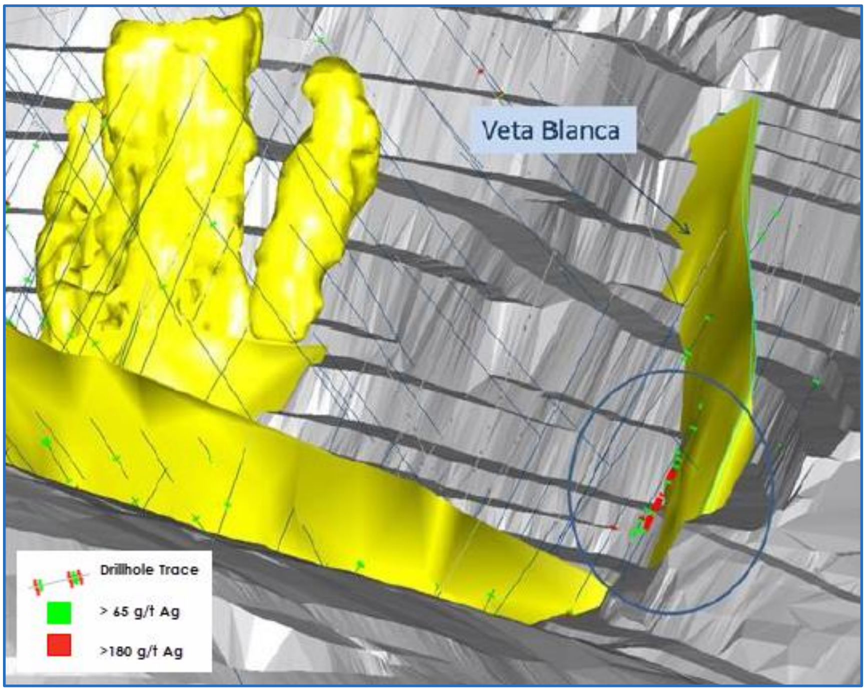
To remedy the issue in the modelling, the collar locations of the affected holes were adjusted to bring the vein intercept into expected location, making it concordant with observations in surrounding holes. While this is not an ideal situation, the intervals in question are likely to be captured by grade control at the time of mining, therefore it is not expected to cause a volumetric difference. However, further ongoing assessment would be required to definitively identify and remedy the incorrect historical data. Some new drilling should be considered to re-check vein locations in the areas afflicted by suspect holes.

Downhole Survey Validation

The down-hole survey data were validated by searching for large discrepancies between the dip and azimuth reading against the previous reading. No significant discrepancies were found.

Before the beginning of Phase III drilling at Chinchillas it was noted that the correction of the magnetic declination between true north and magnetic north was correct in angle but had the opposite direction. For this reason, all azimuths of drillholes of Phases I and II were corrected by 13° counter-clockwise. No other adjustments were necessary for the other drilling phases.

Figure 12.1 Vein model with Exploration Drillhole AR-315 Outside of the Vein



SSR, 2013

12.1.2 Assay Verification

To validate the Chinchillas data, the following checks were confirmed:

- The maximum depth of samples were checked against hole depth;
- The values of less than the detection limit were converted into a positive number one-half the detection limit;
- The highest Ag values and at least one random value from each drillhole were checked against the original assay certificate;
- The units were converted from ppm into percent (%) for Pb and Zn values;
- Silex drillhole assay data were validated as reported in a previous Mineral Resource Estimate (Davis et al, 2013).

For Pirquitas, approximately 10% of the pre-2010 drilling assay data set was checked and compared to the original assay certificates, to generate additional confidence in this data. Detailed checks of assay data from the 2010–2011 drilling programme was undertaken, with iterative corrections made for any anomalies (generally typographic errors, including mislabelled samples, and mislabelled sample intervals).

12.2 QA/QC Protocol

A review of the Chinchillas QA/QC protocols was conducted prior to drilling and formalised in a detailed QA/QC manual developed by Golden Arrow. Onsite reviews were conducted during all drilling phases by a QP. The procedures for core processing, the insertion of blanks and standards were examined and considered appropriate.

At Pirquitas, QA/QC information for all exploration drilling programmes was analysed. Review of real-time QA/QC data monitoring was undertaken by SSR, especially timing and effectiveness of remedial action taken with respect to failed batches

12.3 Geological Data Verification and Interpretation

While several geology variables were captured during core logging, only lithology was used to constrain the Chinchillas Mineral Resource estimation. Therefore, geology data verification was limited to determining that the lithology designation was correct in each sample interval. This included the following:

- FROM – TO intervals for gaps, overlaps and duplicated intervals;
- Collar and SampleID mismatches;
- Correct geology codes.

A geological legend was provided by Golden Arrow and compared to the values logged in the database. Data were examined on screen for discrepancies in logging.

12.4 Assay Database Verification

The assay data from 15 randomly selected drillholes, representing approximately 5% of the Chinchillas database, was manually compared to the original assay certificates. These holes contained a total of 1,890 individual samples, in which eight samples were found to have differences in the values of the second decimal value. Differences of this nature are not considered to be 'errors' as they have no measurable impact on the estimation of Mineral Resources. The results of this test indicate the database is sound and free of errors.

For Pirquitas, approximately 10% of the pre-2010 drilling assay data set was checked and compared to the original assay certificates. Detailed checks of assay data from the 2010–2011 drilling programme was undertaken.

12.5 Conclusion

No material sample bias was identified during the review of the drill data and assays. Observation of the drill core during the site visits and inspection and validation of the data collected indicate that the drill data is adequate for the estimation of Inferred and Indicated Mineral Resources.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Chinchillas

The metallurgical development of Chinchillas ore types commenced in 2013 and continued through 2016. The first testwork was focussed on silver recovery by both leaching and flotation methods, with flotation proving to be superior at the early stage. The second programme continued process development of flotation into separate lead/silver and zinc concentrates. The third testwork campaign was designed to advance the flotation process and test specifically these ore types to the Pirquitas mill flow sheet.

13.1.1 Initial Testwork 2013

A scoping metallurgical test programme was initiated in January 2013. This testwork was undertaken by Bureau Veritas Commodities Canada Ltd. All testing was bench-scale. Results from the early testwork stages are summarised in a previous Technical Report (Kuchling et al, 2014).

13.1.2 Second Phase Testwork 2014

The second testing programme was conducted on composite samples from the silver Mantos zone (MAN-2), the Socavon Del Diablo Zone (SOC-2) and the Mantos Basement zone (BAS-1). This programme included locked cycle testing and provided the most representative view of the overall metallurgical performance of the samples to date. The following summary is an excerpt from the final report titled "2014 Project Report on Metallurgical Testing on the Chinchillas Project" prepared by Bureau Veritas Commodities Canada Ltd, Inspectorate Metallurgical Division, (Chen and Redfearn, 2014):

> *"Seven core samples (received on October 15, 2013 weighing 102 kg), were air dried and separated into three composites. Each composite was individually crushed to 6 mesh, mixed and split into the required samples for testing. Silver contents range from 94.2–150.6 g/t and base metals include lead and zinc.*
>
> *In this testing programme, it was confirmed that Chinchillas samples are usually amenable to the conventional lead and zinc sequential flotation process. For most of the samples, the majority of silver was recovered in the lead circuit. Overall silver, lead, and zinc recoveries are above 95%. Most rougher concentrates responded well to the subsequent cleaner flotation stages. Upgrading of composites BAS-1, MAN-2, and SOC-2 generated lead final concentrates with grades ranging from 65% to 79% lead and zinc final concentrates with grades from 52% to 62% zinc."*

Locked cycle tests on three samples (BAS-1, MAN-2, and SOC-2) showed that high silver and lead recoveries in the lead circuit can be achieved along with good lead final concentrate grades. For composites BAS-1 and SOC-2, good final zinc concentrates grading 51.8% and 60.1% respectively were obtained.

To assist with future metallurgical development, mineralogical analysis was undertaken of the three ore types (BAS, MAN, SOC) and two flotation testwork concentrates (BAS lead second cleaner concentrate and lead scavenger concentrate generated during one of the flotation tests).

The report concluded:

> *"The three composites assayed 100–150 g/t silver and 0.6% to 2.2% lead. Freibergite was the dominant silver bearing mineral, constituting over 75% of the total feed silver. The remaining silver was contained in pyrargyrite, stephanite and tetrahedrite. The lead was mostly contained in galena.*
>
> *The three composites also assayed 70–300 g/t copper and 130–330 g/t arsenic. The copper was predominantly carried by freibergite and chalcopyrite.*
>
> *The arsenic was mostly carried by arsenopyrite and krutovite."*

The objective of this second phase flotation testwork was to produce sequential lead/silver and zinc concentrates. This was successful with high recoveries achieved of the target metals to marketable quality concentrates. The mineralogical analysis highlighted that the lead was contained in galena, and the silver was contained in the very typical series of silver sulfosalt minerals.

13.1.3 Third Phase Testwork 2016

The 2016 flotation testing programme was developed to determine the compatibility of Chinchillas mineralisation types to the Pirquitas process plant flow sheet and capacity. Testwork included comminution and focused on producing lead/silver and zinc concentrates by sequential flotation. In addition, a comparison between the flotation reagent scheme used in the historical testwork programmes and the current Pirquitas scheme was undertaken.

The testwork was completed at ALS Metallurgy, Kamloops, British Columbia, Canada.

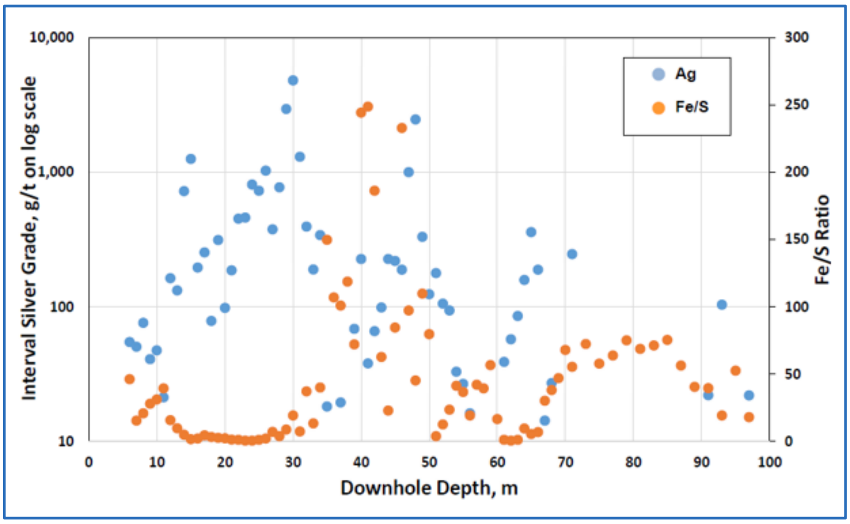
13.1.3.1 Selection of Drill Intervals for Testing

A review of the drill assay database assays was used to imply mineralogy; specifically iron to sulfur ratio (Fe/S, a proxy for pyrite content). It was suggested at the start of the testwork programme that silver might be partially associated with pyrite. A typical example of both silver content and Fe/S versus drillhole depth is shown for drillhole CGA-35 in Figure 13.1. However, the varying iron to sulfur ratio appeared to be independent of Ag grade – therefore, a poor association with pyrite.

The criteria for selection of individual core intervals for selection for metallurgical testing were:

- Within pit shell (excluding the SOC zone, not in the initial mine plan)
- Ag grades similar to mine plan grades
- Fe/S ratio into High and Low classes
- Lithology into either Manto or Basement

Figure 13.1 Drillhole CGA, Variation in Ag Grade and Fe/S Ratio Downhole



Nominally four separate drillhole intervals were identified for each of the four mineralisation types. These were named Manto Low and Manto High, and Basement Low and Basement High with the designations corresponding to Fe/S ranges of >15 or <5 respectively. Figure 13.2 shows the selected drill interval locations within the pit. The pit is planned in two mining phases, the first shown as the red pit shell and the second as the green pit shell.

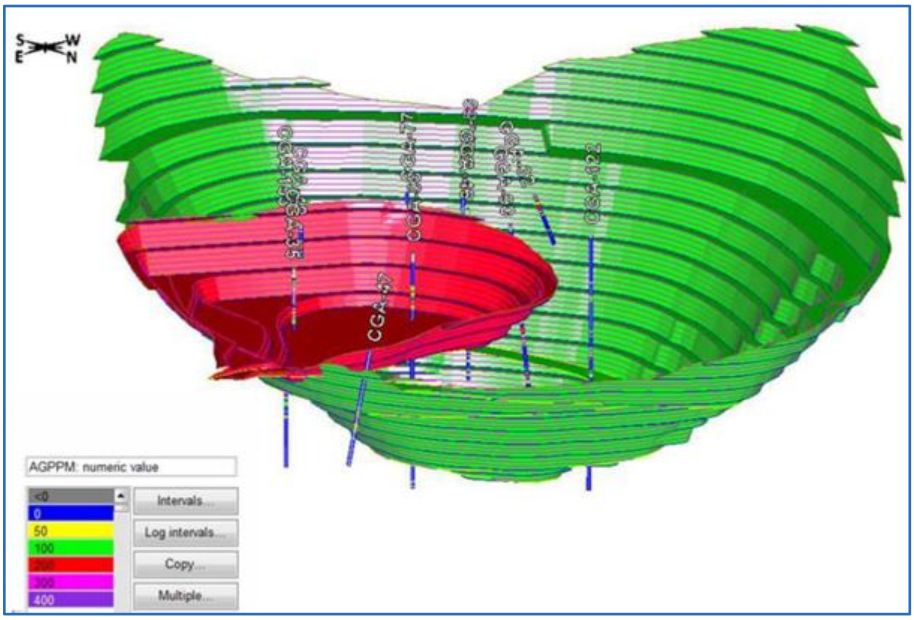
These identified intervals were recovered from the Chinchillas site drill core library and re-sawn into quarter core by Golden Arrow geological staff. Once securely bagged and labelled, approximately 350 kg of material was shipped directly to the laboratory in Kamloops, Canada.

In addition to the economic metals, additional analysis was completed for lead and zinc oxides, total and sulfide sulfur and silver (by both fire assay and three-acid ICP methods).

Observations included:

- Low amounts of lead and zinc oxide with no effect expected on flotation;
- High proportion of the total sulfur is present as sulfide i.e. limited sulfates;
- Variation of silver by the two methods is low which implies most silver is sulfide hosted.

Figure 13.2 Metallurgical Sample Locations within the Two Pit Shells (Mining Phases)



The Master composites ranged in grade between 154–238 g/t Ag, 0.31%–1.77% Pb and 0.16%–1.02% Zn. The Fe to S ratio ranged from 5–30. In terms of composite grades, the selection of samples was based on an initial mine plan. This initial plan had no mining in Socavon zones and therefore, no samples were selected from this Project area for the 2016 flotation testwork programme. Variability samples are selected to cover a range of grades above and below this mine plan.

Metallurgical testwork development followed a general plan of:

- comminution testing;
- reagent optimisation on the four Master composites;
- batch rougher/cleaner flotation on Master and Variability composites;
- locked cycle flotation on the four Master composites; and
- additional flotation tailings were generated for thickening tests and water chemistry.

13.1.3.2 Comminution

Two of the Master composites, Basement Low and Manto Low, and individual composite CGA-89 Manto High, were tested for Bond Work Index values. For comparison, the Pirquitas' plant design was 15.2 kWh/t (Table 13.1).

Table 13.1 Bond Ball Mill Work Index Test Results

Composite Sample	BWi, kWh/t
Basement Low	11.5
Manto Low	15.5
Manto High (CGA-89)	16.2

13.1.3.3 Master Composite Rougher Flotation

The previous metallurgical programme in 2013 utilised a flotation reagent scheme quite different from the standard Pirquitas flotation reagent scheme. The initial series of batch sequential rougher flotation tests were performed on the four Master composites testing these two alternate reagent schemes. Neither of these schemes utilised sodium cyanide for pyrite or sphalerite depression.

Primary grind was maintained in the target P_{80} size range of 120–160 µm, consistent with both previous testwork and Pirquitas operating experience on similar ore types.

The Pirquitas reagent scheme recovered more silver to the lead concentrate. For Basement Low and High samples, the increase in silver recovery to the lead/silver concentrates was 3.6% and 11.8%. For Manto Low and High, the increase in silver recovery to the lead/silver concentrates was 19.6% and 28.7%. Therefore, the Pirquitas reagent scheme was used for all subsequent flotation testing (both batch rougher/cleaner and locked cycle work).

13.1.3.4 Master Composite Rougher/Cleaner Flotation

For each of the four Master composites, a rougher/regrind/cleaner test was completed, yielding separate lead and zinc concentrates.

For all Master composites, a high Pb grade lead concentrate was produced, with the contained Ag grade varying directly with the lead to silver proportion in the heads. Open circuit cleaning recovery was good. For the very low zinc grade Manto High composite, no zinc flotation was attempted. The remaining three Master composites produced marketable zinc concentrates.

13.1.3.5 Variability Composite Rougher/Cleaner Flotation

For each of the Variability composites, a rougher/cleaner flotation test was completed to assess the effect of head grade variation on metal recoveries and cleaner concentrate grades.

Pirquitas' operating experience has demonstrated difficulty in achieving a marketable grade zinc concentrate when zinc feed grades are below 0.4% Zn. For the Chinchillas variability testwork, no zinc flotation was completed for any composite with a head grade below 0.2% Zn.

As with lead/silver flotation, there is generally consistent flotation performance between the Master and the Variability composites.

This reagent scheme employed at the Pirquitas plant, using $ZnSO_4$, lime, AP3418A and MIBC, avoids the use of cyanide in the lead flotation stage, thus eliminating any cyanide concerns with tailings effluent and the possible need for cyanide destruction.

13.2 Socavon / Chinchilla

13.2.1 Testwork 2018

In 2018, ALS Metallurgy, Argentina conducted preliminary metallurgical testwork on Socavon / Chinchilla and Pirquitas Manto / Basement composites.

The Socavon / Chinchillas composites were tested by flotation to determine if a lead / silver and a marketable zinc concentrate could be produced. Additionally to access the blend results of the Socavon / Chinchilla and Pirquitas Manto / Basement composites. Two metallurgical test composites were constructed representative of the Socavon zone of the Chinchillas deposit. The composites were identified as Socavon / Chinchillas Composite A and Socavon / Chinchillas Composite D. An additional composite was constructed for blend testing and was identified as Pirquitas Basement/Manto composite.

The primary objective of the test programme was to determine the effect of blending the Socavon / Chinchillas composites with a Pirquitas Manto / Basement composite. Lead feed grade measured 0.56% and 0.78% in Socavon / Chinchillas Composite A and D, respectively. The Pirquitas Basement / Manto composite measured the highest lead grade at 0.96%. Lead soluble in ammonium acetate digestion, indicative of lead in oxide form measured about 20% of the total lead in the Socavon / Chinchillas Composite A.

Zinc feed grade measured 0.56% and 1.78% for Socavon / Chinchillas Composite A and D, respectively. The Pirquitas Basement / Manto composite measured approximately 0.76% Zn. Zinc soluble in an ammonium acetate digestion measured 0.06% or less indicating a low percent of the zinc as non-sulphide minerals. Silver feed grade measured 16–34 g/t Ag for the Socavon / Chinchillas Composites A and D, respectively, and measured significantly higher in the Pirquitas Basement / Manto composite at 190 g/t Ag. Sulphur content in the samples ranged from 0.7%–4.4% S.

Initial cleaner testing on the Socavon / Chinchillas Composites A and D indicated that approximately 71% and 87% of the lead could be recovered to lead concentrates grading 55% and 30% respectively. Lower lead recoveries measured in the Socavon / Chinchillas Composite A test was likely due to the high percentage of the lead in the feed associated with lead oxide minerals. About 87% and 83% of the silver was also recovered to the respective lead concentrates. The low lead grade of the Composite D concentrate was due the high levels of zinc dilution in the lead concentrate. Optical microscope assessment of the lead concentrate indicated that the majority of the zinc minerals were well liberated and rejection should be possible with the correct flotation chemistry.

The Pirquitas Basement / Manto composite was tested using similar test conditions and recovered 94% of the lead and 92% of the silver to the lead cleaner concentrate which graded about 60% lead and 1.1g/t Ag. Zinc recovery to the lead concentrate was about 20%, similar to the Socavon / Chinchillas Composite A.

A series of blend tests were conducted using the Socavon / Chinchillas and Pirquitas composites. Results from these tests indicated that lead and silver recoveries to the lead concentrates typically decreased when higher ratios of the Socavon / Chinchillas composites were added to the various blends. The lead grade in the Socavon / Chinchillas Composite D blend tests decreased as more of the composite was used in the blends, as a result of increased zinc in the lead concentrate. This trend was also observed for zinc in the zinc circuit.

Measured lead and zinc recoveries in the blend tests were typically lower than the calculated recoveries of the various blend ratios. However, the measured concentrate grades for the blend tests were higher than the calculated concentrate grades and it is likely they exist on a similar grade recovery curves. Zinc recoveries to the lead concentrates were about 5% lower than calculated values. This suggests that there was room for improvement within the lead circuit in the baseline Socavon / Chinchillas tests.

Tests were conducted using MBS as a replacement for zinc sulphate and the results indicated that the addition of MBS at the dosages employed had no significant effect on depressing zinc in the lead circuit. Additionally, closed circuit testing would be beneficial for providing a better estimate of metallurgical performance in the zinc circuit.

Preliminary relationships, Table 13.2, of recovery and mass pull to produce a silver / lead concentrate and zinc concentrate for Socavon material have been derived.

Table 13.2 Preliminary Socavon Recovery Relationships

		Unit	Silver / Lead Concentrate	Zinc Concentrate
Recovery	Silver	%	90	2.5
	Lead	%	55 x Pb% feed + 45	1
	Zinc	%	(Pb/Zn feed x –46) + 56	Zn feed x 13.8 + 21.5
Mass Pull to concentrate	Concentrate	t conc./ t feed	Pb% feed x 0.055 - 0.02	Zn% feed x 0.004 + 0.001

Further optimisation flotation testwork is recommended including liberation testing, mineralogy and flotation reagent optimisation.

13.3 Metallurgical Performance Estimates

The Pirquitas process plant operating performance since commencement on Chinchillas ores is used to provide the concentrate grade recovery and mass pull relationships, Table 13.3 and Table 13.4.

Table 13.3 Silver / Lead Concentrate Relationships

Variable	Variable Formula
Ag Recovery	(–0.0631 x Pb recovery2) + (11.655 x Pb recovery) -447.4
Pb Recovery	(–2.6303x Pb Feed2) + (12.329 x Pb Feed) + 80.654
Zn Recovery	(-5.2817 x Zn Feed2)+(Zn Feed x –6.31) + 20.546
Mass Pull	(–0.0024 x Pb Feed2) + (0.0164 x Pb Feed)+-0.0007

Table 13.4 Zinc Concentrate Relationships

Variable	Variable Formula
Ag recovery	(–3.4843 x Zn feed2) + (7.2499 x Zn feed)+0.8295
Pb recovery	(0.024 x (Pb feed/Zn feed)2) + (-0.5988 x (Pb feed/Zn feed)+ 3.1292
Zn recovery	(–195921 x (mass pull Zn)2 + (5620.3 x mass pull Zn)+28.709
Zn recovery	
Mass Pull	(0.007 x Zn feed2) + (0.0041 x Zn feed+0.0011

13.4 Recommendations for Additional Testwork

It was identified that low zinc grade material would not generate a saleable zinc concentrate and the zinc circuit would be bypassed when Zn grade is less than 0.4%.

The Chinchillas mineralogy showed lead occurred predominantly as galena, silver as a series of sulfosalts and zinc as sphalerite.

Additional metallurgical laboratory testwork should include the following:

- Detailed geometallurgical study to understand the distribution of possible future smelter penalty elements (e.g. antimony for lead concentrate and silica for zinc concentrate).
- Additional Bond Work and Abrasion Index testing on samples throughout the deposit.

14 MINERAL RESOURCES ESTIMATES

Mineral Resources and Mineral Reserves in the Puna21TR meet the CIM Definition Standards on Mineral Resources and Reserves 2014 (CIM Definition Standards) and conform to the Canadian National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101).

14.1 Chinchillas

The Chinchillas Mineral Resource was developed in August 2020 by independent consultant company Red Pennant Geoscience. The Chinchillas Mineral Resource has been estimated in accordance with generally accepted industry guidelines and is reported in accordance with NI 43-101. Mineral Resources are not Mineral Reserves and they do not have demonstrated economic viability.

The effective date of the resource cell model is 28 August 2020. The effective date of the Mineral Resource is 31 December 2021 after accounting for depletion from mining from the August 2020 model.

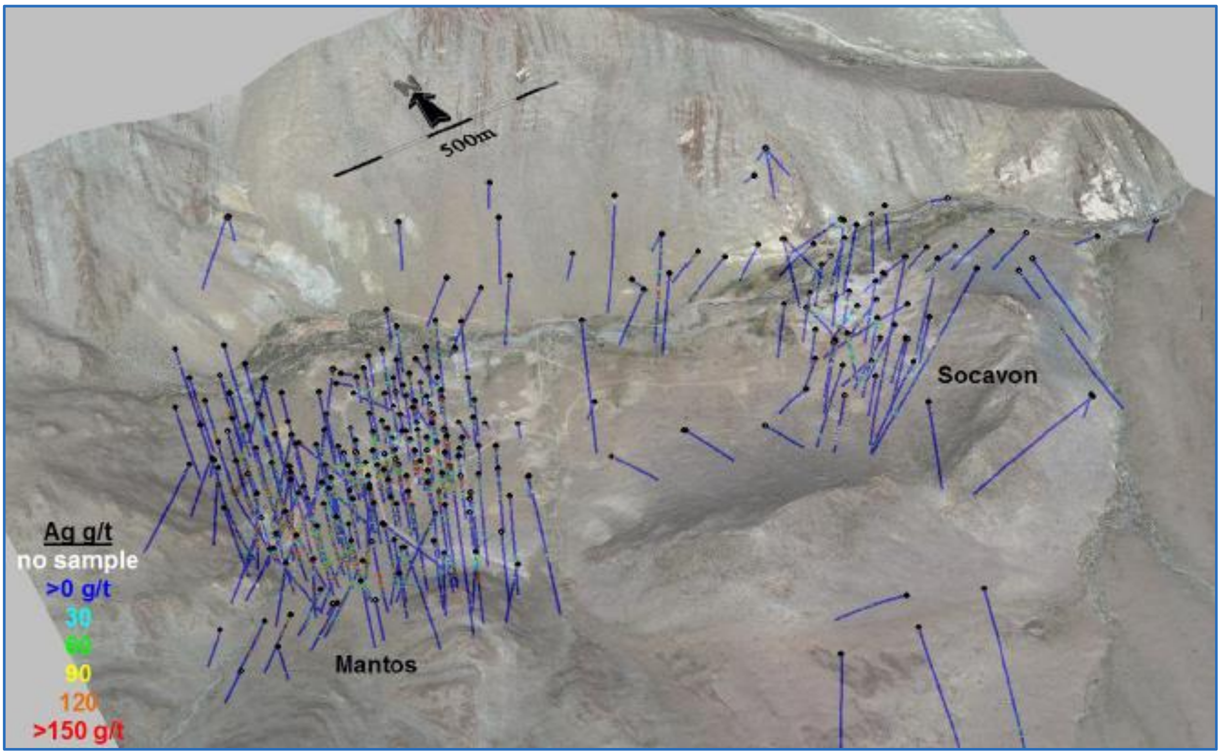
The previous Mineral Resource estimate for the Chinchillas Property had an effective date of 12 April 2016 and is described in the NI 43-101 Technical Report dated 27 May 2016 (Davis, et al., 2016).

14.1.1 Available Data – Chinchillas

The database available at the time of the resource modelling comprised a total of 335 diamond drill (DD) holes with 56,641 m of logged data and 55,905 m of assay data.

The spatial distribution of the drilling is shown in Figure 14.1.

Figure 14.1 Isometric View showing the Chinchillas Drillhole Database used in Resource Modelling



SSR, 2020

14.1.2 Compositing – Chinchillas

Raw sample lengths were generally up to 2 m in waste rock and 1 m or less in mineralised rock. A minimum sample length of 0.1 m was permitted on samples from highly mineralised structures such as veins, stockworks, and breccias.

A composite length of 5.0 m was considered most suitable for the Chinchillas drillhole data. Data were composited to the selected composite length within the interpreted wireframe solid. Residual lengths were retained.

14.1.3 Exploratory Data Analysis – Chinchillas

Exploratory data analysis was conducted to understand the distribution of the metals within the different lithological units and as well in different structural domains.

Five estimation domains were used to inform the estimation process, the lithological data along with the rock geochemistry informed these estimation domains. The raw and composited statistics for silver, lead and zinc are provided in Table 14.1.

Table 14.1 Estimation Domain Statistics

	Count	Mean	SD	CV	Min	Max
Domain 1						
Ag g/t	3,270	81.70	181.23	2.22	0.25	2,908.62
Pb%	3,270	0.79	1.63	2.07	–	29.64
Zn%	3,270	0.29	0.59	2.04	–	8.99
Domain 2						
Ag g/t	3,635	72.71	211.79	2.91	0.25	8,970.34
Pb%	3,635	0.69	1.37	1.98	–	28.00
Zn%	3,635	0.39	0.60	1.52	0.01	6.10
Domain 3						
Ag g/t	5,444	87.77	238.53	2.72	0.25	5,395.45
Pb%	5,444	0.62	1.02	1.66	–	15.38
Zn%	5,444	0.74	1.19	1.60	–	11.90
Domain 4						
Ag g/t	3,061	47.68	112.85	2.37	0.25	2,466.14
Pb%	3,061	0.34	0.72	2.14	–	12.44
Zn%	3,061	0.21	0.57	2.72	–	13.08
Domain LO						
Ag g/t	20,821	47.68	112.85	2.37	0.25	2,466.14
Pb%	20,821	0.07	0.15	2.10	–	10.90
Zn%	20,821	0.15	0.38	2.52	–	15.31

The majority of the samples were analysed by ICP for a suite of 39 elements. The silver, lead, zinc, and sulfur data was extracted from the main database for use in the development of the resource model.

The database contains a total of 2,586 samples that have been tested for density. These samples were obtained from core selected at approximately 15 m intervals down most drillholes giving a relatively consistent distribution of density data throughout the deposit areas.

Individual assay sample intervals ranged from 0.1–10 m and averaged 1.34 m in length. Some 72% of the samples were exactly 1 m in length and 25% of the samples are 2 m long. Values analysed below the detection limit (<DL) were assigned values equal to one half of the detection limit (½DL).

Diamond drill core recovery averages 96%. Recoveries do not vary significantly between rock types (average recoveries: Tuff 95%, Dacite 98%, Basement Breccia 97% and Basement 97%). There was no indication of a relationship between core recovery and grade.

14.1.4 Evaluation of Outlier Grades – Chinchillas

The 5m composited data were examined for outliers using cumulative probability plots and for loss metal of due to capping of higher-grade values. Multiple scenarios were run to understand the effect of capping and compared with the tonnes and grade within the mined out areas. The capping shown in Table 14.2 was used in the estimation domains.

Table 14.2 Estimation Domain Capping

	Domain 1	Domain 2	Domain 3	Domain 4	Domain LO
Ag g/t	900	1,000.00	1,300.00	843.50	12.60
Pb %	8	7.90	6.30	5.00	1.00
Zn %	3	2.50	5.00	2.50	1.50

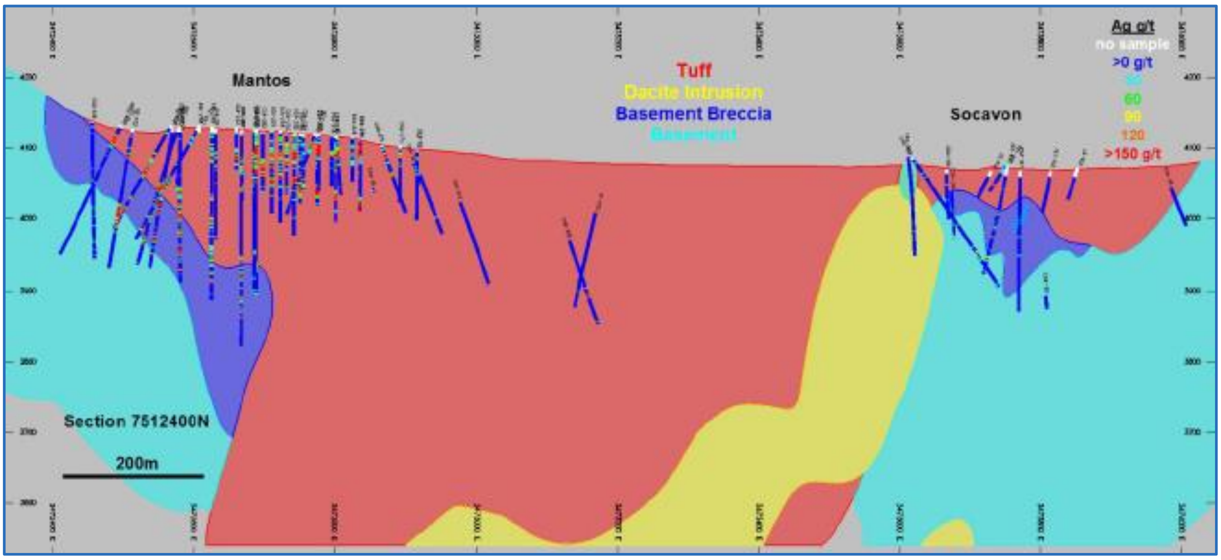
14.1.5 Geological Model – Chinchillas

As described in Section 8, the Chinchillas deposit is interpreted to be formed as a result of a Tertiary aged diatreme intrusion into a host of Paleozoic basement schists. Heat from the intrusion resulted in mineralisation in the form of disseminations, veinlets and matrix filling within the volcanic breccias and tuffs as well as within the original schists.

14.1.5.1 Lithological Model – Chinchillas

The general spatial distribution of the main lithological units at Chinchillas is shown in cross-section in Figure 14.2. The higher grade silver-lead-zinc mineralisation occurs predominantly in the tuffaceous phase of the intrusive rocks and also within the brecciated zone in the underlying basement schists. However, relatively high-grade mineralisation can be found in all rock types.

Figure 14.2 Cross-Section Showing Rock Types and Silver Grades in Drilling



SSR, 2020

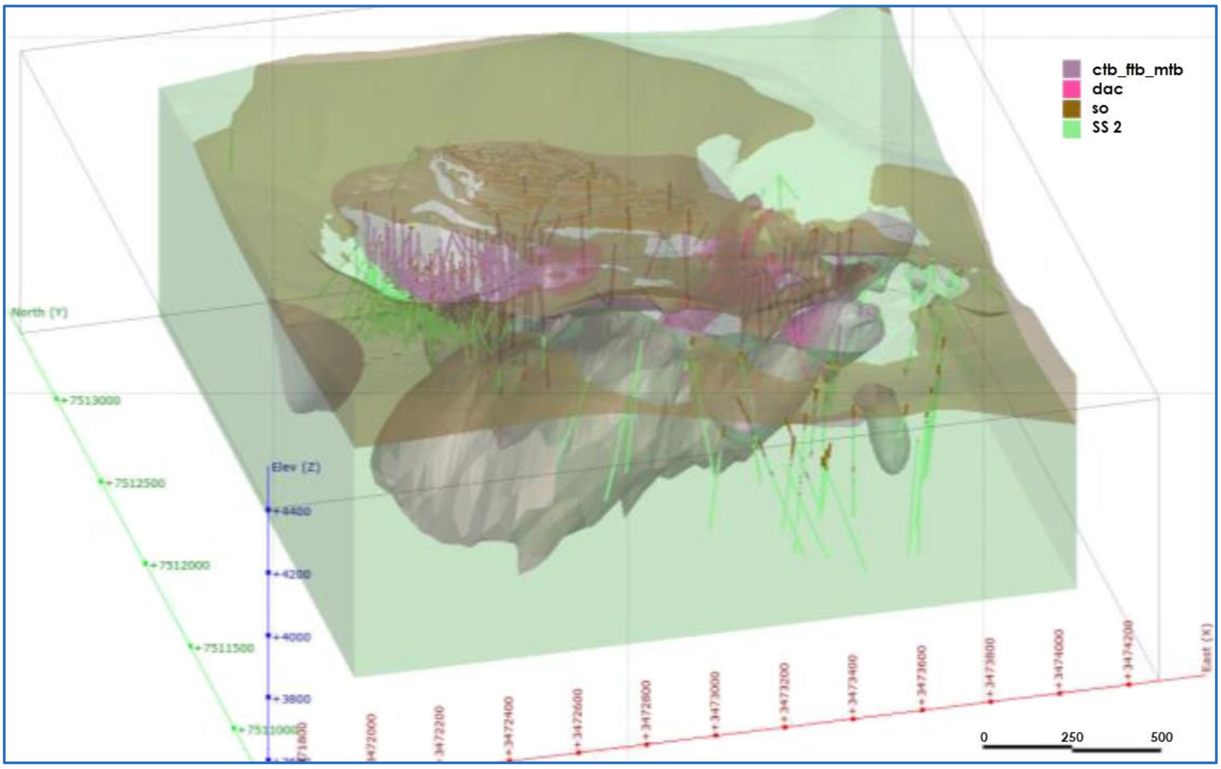
The mineralisation in the Mantos area of the deposit exhibits two general styles or trends; a more flat-lying mantos-style distribution which is more common in the tuffs and a second basement trend of mineralisation which tends to be sub-parallel to the basement / tuff contact.

The comprehensive logging of lithological types (20) and alteration style (6) and intensity (5) results in the potential for 600 combinations. The lithological and alteration codes were rationalised into a small number of units for practical purposes.

A simplified 3D implicit model was created of the key lithological units (Figure 14.3):

- 'so' (surficial materials),
- 'dac' (dacite intrusive), and
- combined 'ctb', 'ftb' and 'mtb' tuff and breccia units.
- Ss2 basement

Figure 14.3 Isometric View of Simplified Lithology Model

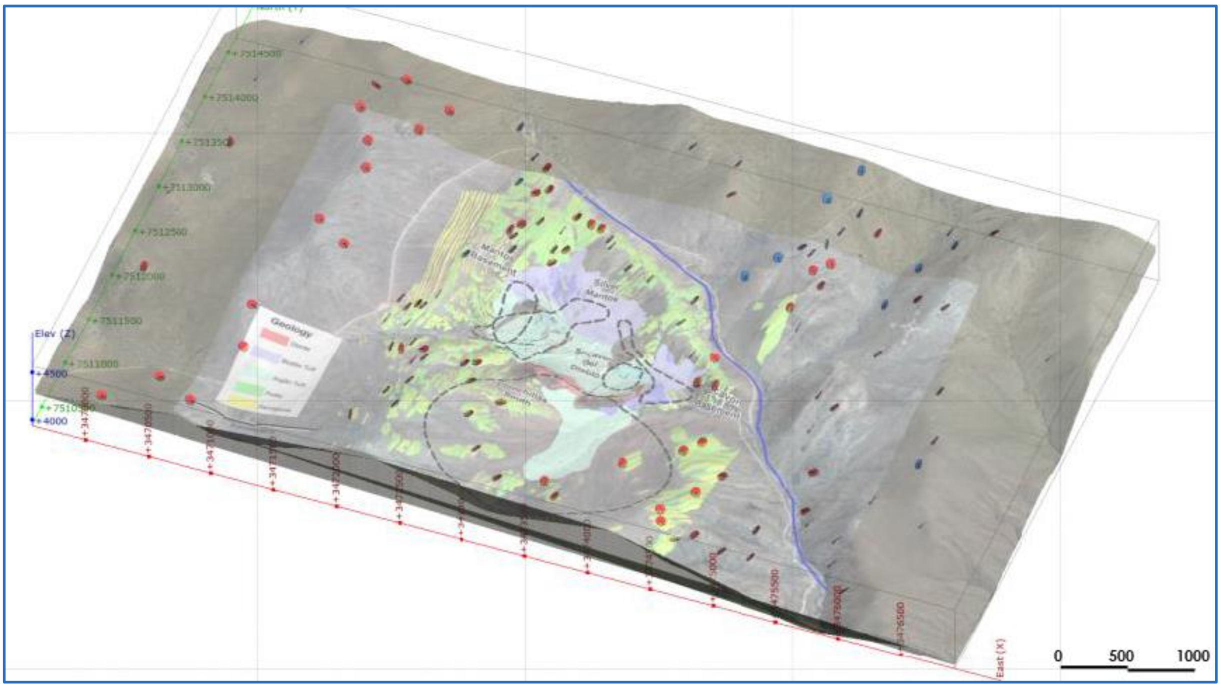


SSR, 2020

14.1.5.2 Structural Model – Chinchillas

High resolution satellite imagery and SRTM and client-supplied topography data were combined into a 3D model. As the outcrop patterns are not obscured by vegetation, it was possible to carry out a 'virtual' field mapping exercise to measure the strike and dip of the locality (Figure 14.4). These measurements were used to develop a structural model in the form of structural surfaces to aid interpretation of the morphology and depth extension of the diatreme.

Figure 14.4 Bedding Attitudes Represented as Disks Mapped on Topographic DTM



SSR, 2020

14.1.5.3 Multi-Element Geochemistry Model – Chinchillas

An implicit geochemistry-based model was constructed using K-means clusters defined by assay statistics.

A clustering algorithm was used to partition the assay dataset into distinct, exclusive clusters so that the data points within each group show as little variability as possible. The reduction in variability within each of the clusters should help to minimise the coefficient of variation and improve geostatistical estimation within each domain by improving the likelihood of geostatistical stationarity. The advantage of the clustering process is that the variability can be automatically and quantifiably assessed by a computer algorithm much more efficiently than by human visual processing.

The elements used for the clustering exercise were: Ag, Al, As, Ba, Ca, Co, Cr, Fe, Ga, K, La, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, S, Sr, Ti, V, Y, Zn, and Zr.

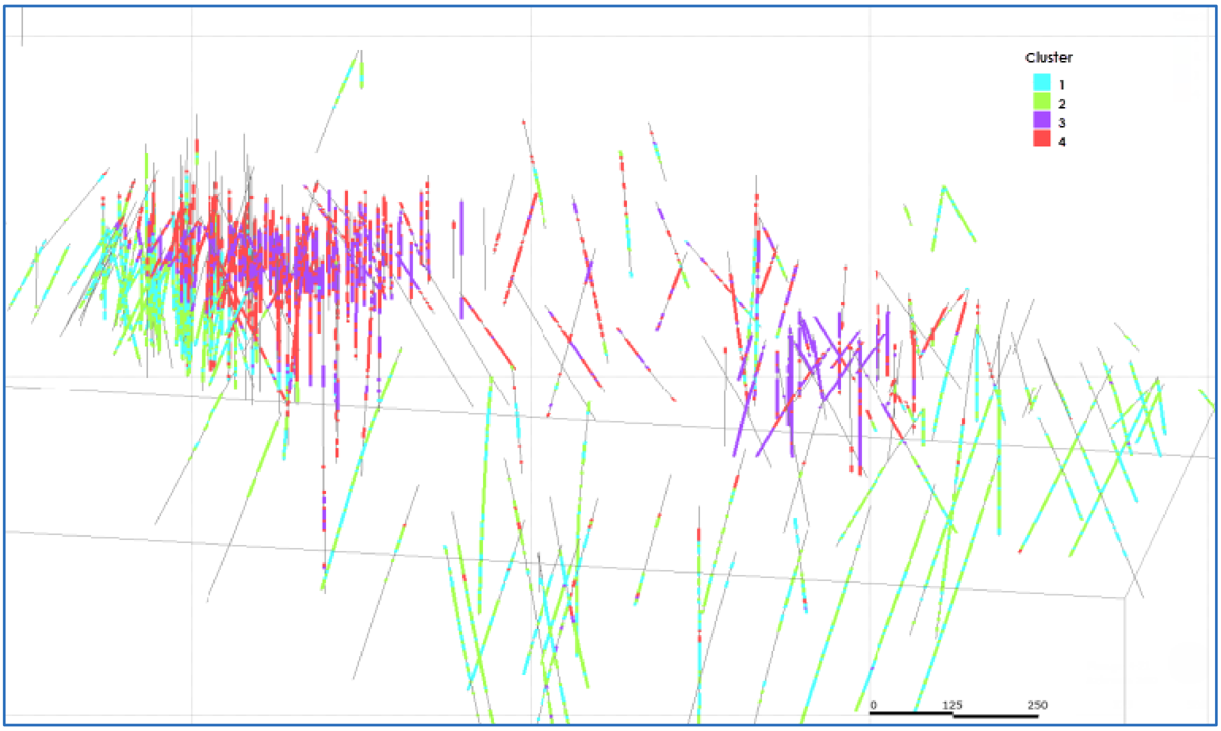
Generally, the way K-means algorithms proceeds via an iterative refinement process, as follows:

- Each data point is randomly assigned to a cluster (number of clusters is pre-determined),
- The centroid of each cluster (the mean within the cluster) is calculated in n-dimensional space, and
- Each data point is assigned to its nearest centroid (iteratively to minimise the within-cluster variation).

Two cluster cases were assessed: four-cluster and seven-cluster solutions. The seven-cluster solution was geometrically complex and was not pursued further.

The pattern of the four-cluster solution was simpler than the seven-cluster solution, conformed to the general geometry of known geological features, and provided only 14% more variability. Consequently, it was decided to proceed with the simpler four-cluster solution. The cluster allocation was coded onto the drill data (Figure 14.5). A 3D model was made of the four-cluster geochemical model using known geometry, including the trends of the diatreme and associated lithological units. Clusters 1 and 2 were largely confined to the exterior of the diatreme, while clusters 3 and 4 show a flatter geometry interior to the steep west-plunging diatreme.

Figure 14.5 K-means Four-Cluster Multi-Element Geochemistry Model



SSR, 2013

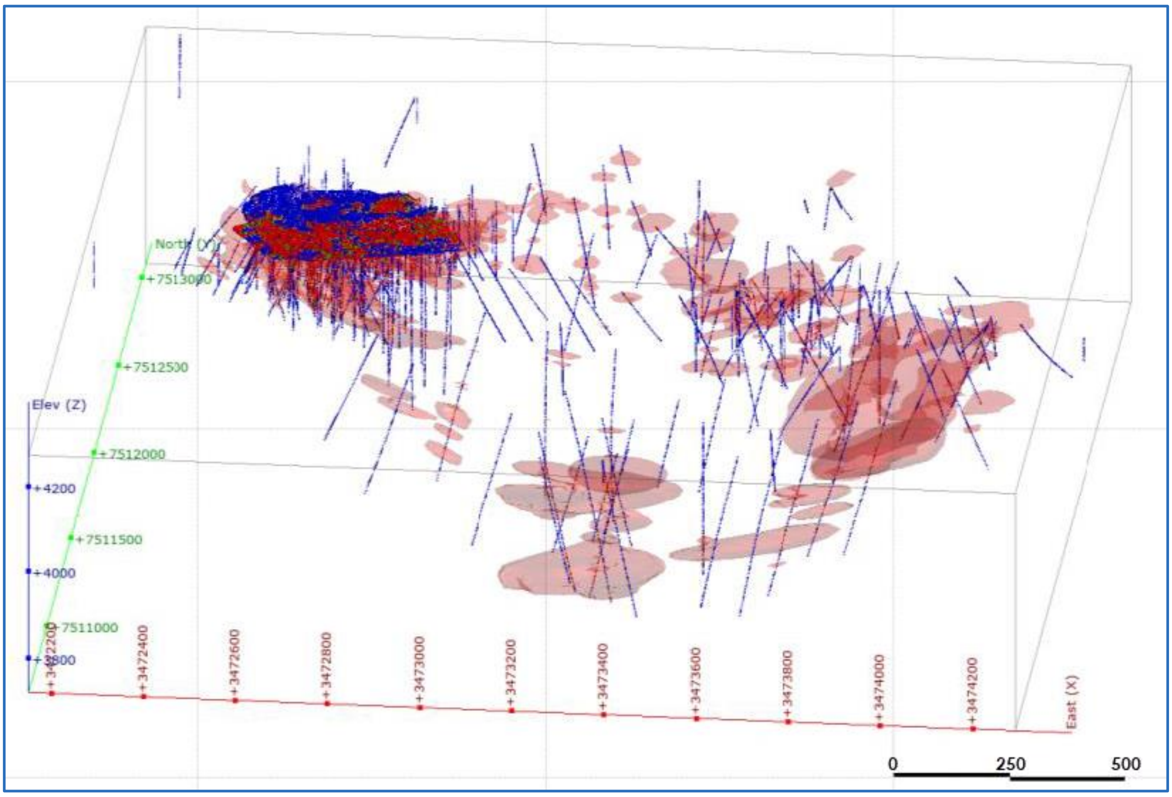
14.1.5.4 Indicator Probability Constraint – Chinchillas

To provide a limit to estimation and to partly fulfil the requirement of 'reasonable prospects of eventual economic extraction', an indicator interpolant was created. Based on experimentation, a 15 g/t Ag value and a 30% probability were used to provide the limiting probability shell. Experimental indicator variograms were modelled and used in the indicator estimation.

The resulting indicator shells conformed to the geometry of the mineralised zones and were used to restrict the four-cluster domains to better mineralised regions (Figure 14.6).

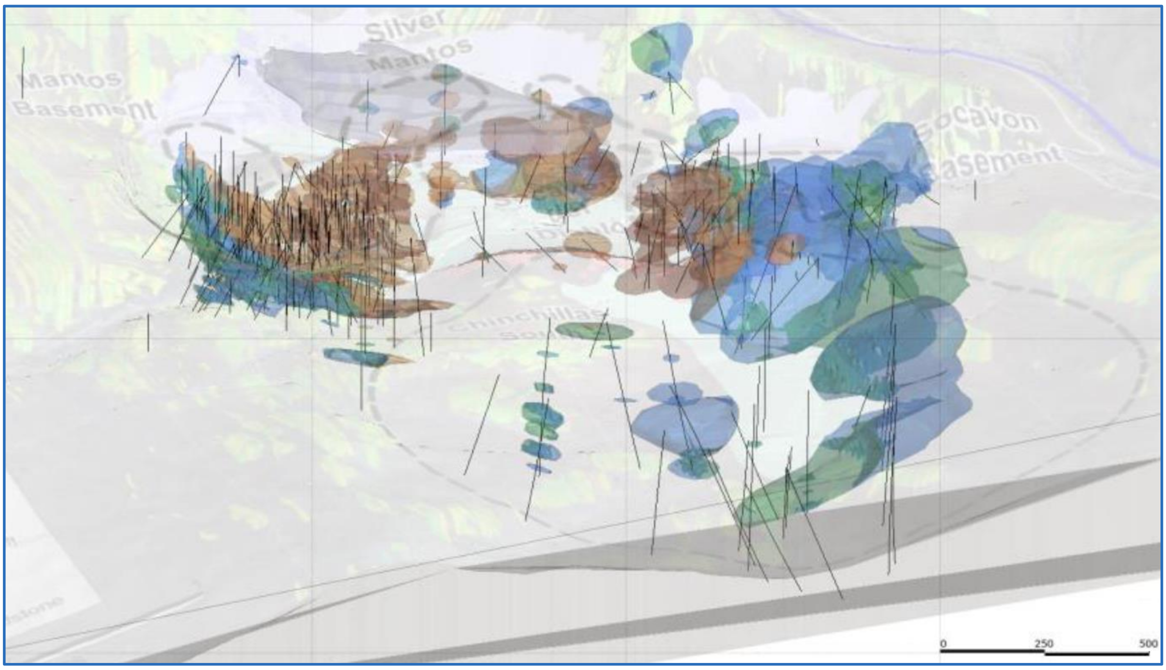
The cluster model combined with the probability shell provided the final estimation domain framework (Figure 14.7).

Figure 14.6 Volumes with >30% Probability of Exceeding 15 g/t Ag



SSR, 2020

Figure 14.7 Estimation Domains based on K-means Clusters of Multi-Element Geochemistry



SSR, 2020

14.1.6 Grade Estimation – Chinchillas

Estimation was carried out within a cell model with 16 m x 16 m x 10 m cells (Table 14.3). Sub-cells of 4 m x 4 m x 5 m were permitted to improve boundary resolution. The model is not rotated.

The cell model was subsequently split down into 8 m x 8 m x 5 m cell sizes for mine planning purposes.

Table 14.3 Cell Model Limits – Chinchillas

Direction	Minimum	Maximum	Cell Size (m)	Number of Cells
East	3,472,100	3,474,404	8	288
North	7,510,644	7,512,996	8	294
Elevation	3,750	4,300	5	110

Cells in the model were coded on a majority basis with the various domains.

The proportion of cells that occur below the topographic surface are also calculated and stored in the model as individual percentage items. These values are used as weighting factors when determining the in situ Mineral Resource for the deposit.

Estimation was undertaken within the four-cluster domains as well as outside of those domains, with only like-coded samples permitted to inform the estimates. Grades within peripheral unestimated blocks and the rock dumps were set to zero.

Three methods were used to populate Ag, Pb, Zn, and S estimates into the cell model:

- Nearest neighbour (NN)
- Inverse distance to the power of two (ID2), and
- Ordinary kriging (OK).

Normal scores variography was modelled and a locally varying orientation was used for both the ID2 and OK estimates. The varying directions follow the generally centrally dipping pattern seen in the geological modelling of the flat Mantos and steep Socavon marginal zones.

The OK grade estimates are regarded as definitive, while the ID2 and NN estimates were used for validation purposes.

14.1.7 Density – Chinchillas

Density was estimated from the previous PFS model using a nearest neighbour approach.

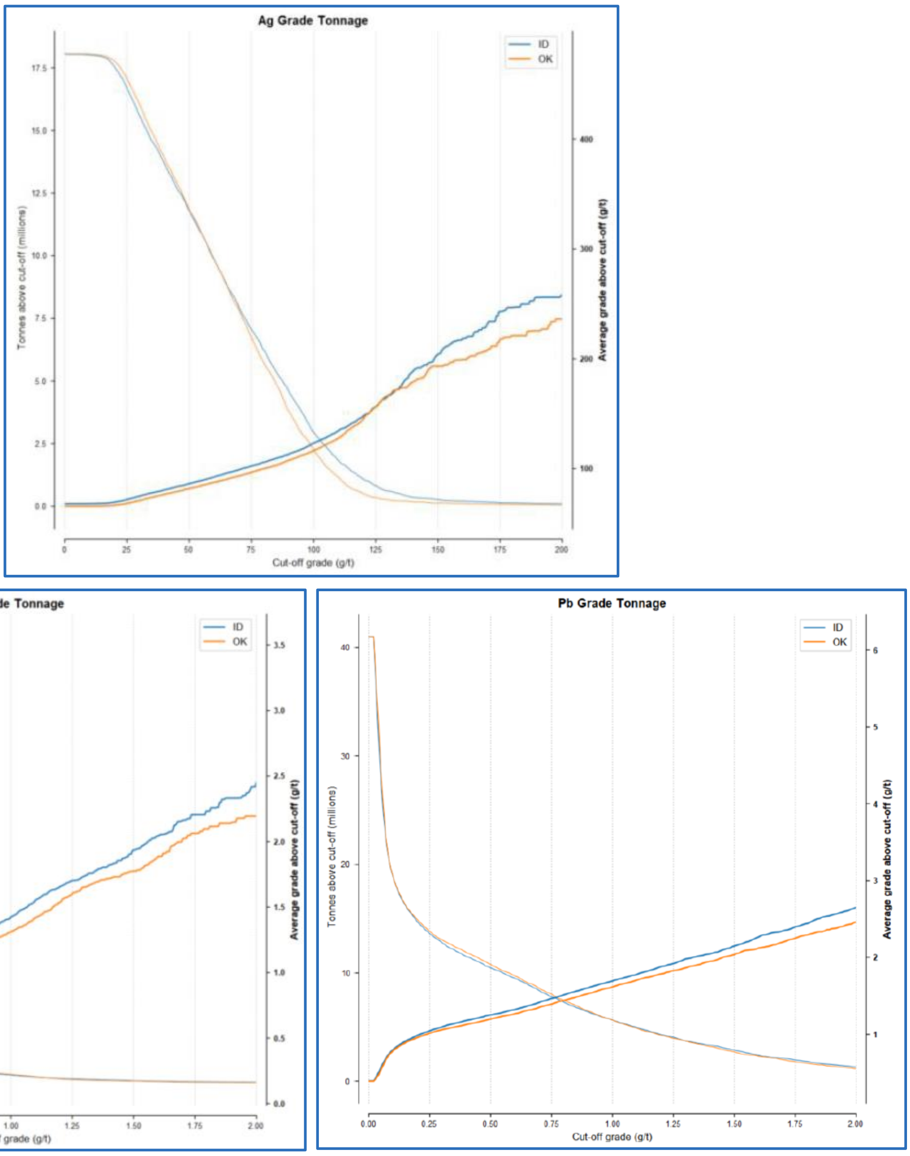
Density was estimated in the 2016 using the ID2 method. Densities are estimated with a maximum of two composites per drillhole and a maximum of six composites in total. The lithology domains provide hard boundary conditions during estimation and samples below 1.75 t/m^3 excluded as these are considered to be anomalous.

14.1.8 Validation – Chinchillas

Grade-tonnage comparisons of the ID2 vs. OK estimates were undertaken to validate the estimates (see Figure 14.8). In general, the ID2 and OK results are similar.

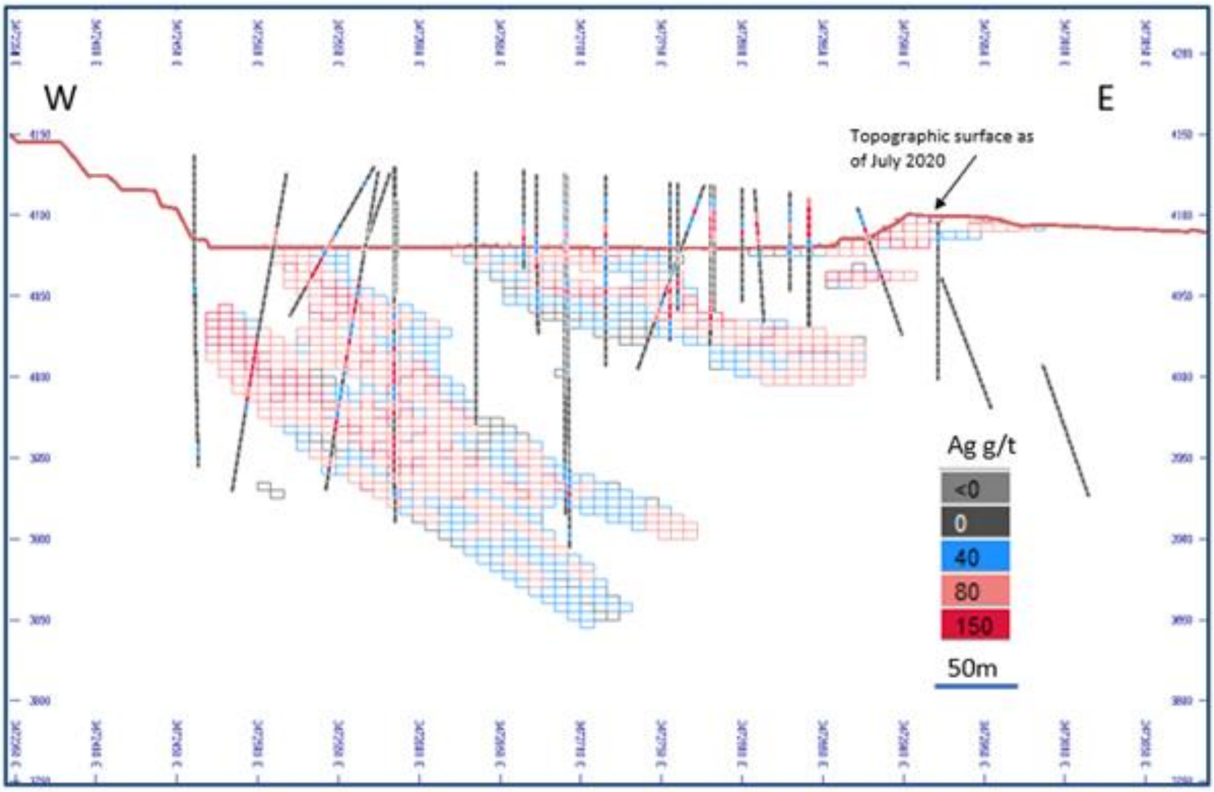
A cross-section showing the conformity between exploration drillhole data and the model estimates is shown in Figure 14.9.

Figure 14.8 Chinchillas Grade Tonnage Comparison within Pit 3 Volume – Ag, Zn, and Pb



SSR, 2020

Figure 14.9 Chinchillas Cross-Section at 7,512,400 mN showing Ag Composites and Estimates



SSR, 2020

14.1.9 Classification – Chinchillas

Classification was undertaking in accordance with the same method used in the 2016 resource model; that being minimum and maximum distance from drillhole data. The classification criteria used are shown in Table 14.4. Model cells that sit within the economic pit shell and meet the classification criteria are reported as Mineral Resource.

Table 14.4 Classification Parameters – Chinchillas

Class Description	Class Number	Average Distance to Assay from Three Drillholes	
		Minimum	Maximum
Measured	1	0	25
Indicated	2	25	50
Inferred	3	50	75

14.1.10 Mineral Resource Estimate – Chinchillas

The Chinchillas Mineral Resource estimate is contained within a pit shell generated using an NSR cut-off of $33.20/t that is based on metal prices of $22.00/oz for silver. $0.90/lb lead and $1.15/lb for zinc.

Metal prices for the Mineral Resource cut-off were estimated after analysis of consensus industry forecasts and compared to metal prices used in other published studies. The prices selected were then reduced from the average long-term prices to take a conservative view of the long-term price. The long-term prices for the cut-off were assumed to apply from the start of 2026. The metal prices are representative of the range of price estimates publicly reported for Mineral Resource cut-offs. The Chinchillas Mineral Resource is assumed to be mined by open pit.

In determining the cut-off grade, the reasonable prospects for eventual economic extraction requirement generally implies that the quantity and grade estimates meet certain economic thresholds taking into account an open pit extraction scenario with road transport and processing at the Pirquitas plant. This includes consideration of the technical and economic parameters listed above, but also includes additional operating costs, estimated at $12/t, related to the handling and transportation of ore from the Chinchillas Property to the Pirquitas plant. Using this operating scenario, the cut-off grade is estimated to be 60 g/t silver-equivalent. It should be noted that this determination considers site operating costs and ignores the pay factors for any concentrate generated and sold to a smelter.

MPSA have advised that there are no known factors related to environmental, permitting, legal, title, taxation, socio-economic, marketing, or political issues which could materially affect the Mineral Resource. Mineral Resources do not have demonstrated economic viability. The quantity and grade of Inferred Mineral Resources are uncertain in nature and there has been insufficient exploration to classify these as Indicated or Measured, but it is reasonably expected that a majority of the reported Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration. Mineral Resources are exclusive of Mineral Reserves.

The Chinchillas Mineral Resource by classification is summarised in Table 14.5 and shown with recovery and ownership detail in Table 14.6.

Table 14.5 Summary of Chinchillas Mineral Resource Estimate Exclusive of Mineral Reserve (as at 31 December 2021) Based on $22.00/oz Silver, $0.95/lb Lead, and $1.15/lb Zinc

Mineral Resource Classification	Tonnage (kt)	Grades			Contained Metal		
		Ag (g/t)	Pb (%)	Zn (%)	Silver (koz)	Lead (klb)	Zinc (klb)
Measured	1,110	99.2	0.86	0.31	3,540	21,040	7,584
Indicated	4,904	101.1	0.88	0.19	15,943	95,630	20,454
Measured + Indicated	**6,013**	**100.8**	**0.88**	**0.21**	**19,483**	**116,670**	**28,038**
Inferred	165	101.9	0.48	0.16	540	1,750	580

1. Mineral Resources are reported based on 31 December 2021 topography surface.
2. The Mineral Resource is contained within a pit shell generated using an NSR cut-off of $33.20/t.
3. The Mineral Resource estimate is based on metal price assumptions of $22.00/oz silver, $0.95/lb lead, and $1.15/lb zinc.
4. Metallurgical recoveries vary with grade and average recoveries are, 98% silver, 95% lead and 63% for zinc.
5. The point of reference for Mineral Resources is the point of feed into the processing facility.
6. Mineral Resources are reported exclusive of Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
7. SSR has 100% ownership of the Project.
8. All ounces reported represent troy ounces, and g/t represents grams per metric tonne.
9. Totals may vary due to rounding.

Table 14.6 Summary of Metallurgical Recoveries and Ownership of Chinchillas Mineral Resource Estimate Exclusive of Mineral Reserve (as at 31 December 2021) Based on $22.00/oz Silver, $0.95/lb Lead, and $1.15/lb Zinc

Mineral Resource Classification	Tonnage (kt)	Grades			Metallurgical Recovery			Cut-off NSR ($/t)
		Ag (g/t)	Pb (%)	Zn (%)	Silver (%)	Lead (%)	Zinc (%)	
Measured	1,110	99.2	0.86	33.20	98	95	63	33.20
Indicated	4,904	101.1	0.88	33.20	98	95	63	33.20
Measured + Indicated	**6,013**	**100.8**	**0.88**	**33.20**	**98**	**95**	**63**	**33.20**
Inferred	165	101.9	0.48	33.20	98	95	63	33.20

1. Mineral Resources are reported based on 31 December 2021 topography surface.
2. The Mineral Resource is contained within a pit shell generated using an NSR cut-off of $33.20/t.
3. The Mineral Resource estimate is based on metal price assumptions of $22.00/oz silver, $0.95/lb lead, and $1.15/lb zinc.
4. Metallurgical recoveries vary with grade and average recoveries are, 98% silver, 95% lead and 63% for zinc.
5. The point of reference for Mineral Resources is the point of feed into the processing facility.
6. Mineral Resources are reported exclusive of Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
7. SSR has 100% ownership of the Project.
8. All ounces reported represent troy ounces, and g/t represents grams per metric tonne.
9. Totals may vary due to rounding.

14.1.11 Comparison with Previous Estimates – Chinchillas

The Mineral Resources have been compared to the previous Mineral Resource which was based on the EOY 2020 pit surface.

Key changes in the Mineral Resource have resulted from:

Socavon

A review of the pit optimisation work for the Socavon deposit was undertaken using the NSR and other assumptions used for the Mantos Deposit. The review concluded that there was no suitable pit shell produced to meet the standard of reasonable prospects for extraction. Therefore, the Socavon Mineral Resource that was previously reported by SSR has not been included in the 2021 Puna Mineral Resource. This represented approximately 26% of the contained metal in the Mineral Resource.

Updated Resource Pit Shell

Updating the Resource Pit Shell reduced the contained metal by 14%

Depletion

Mining depletion is the remaining source of change in the Mineral Resource and was approximately 6% of contained metal.

14.1.12 Recommendations

It is recommended that MPSA examine advanced grade control (using reverse circulation drilling) at a grid spacing of 20 m, to determine if it will improve prediction particularly where the grade trends are horizontal.

The shallow eastward dip of high grades should be carefully managed by pit mapping and advanced grade control drilling to provide appropriate levels of confidence to manage risk.

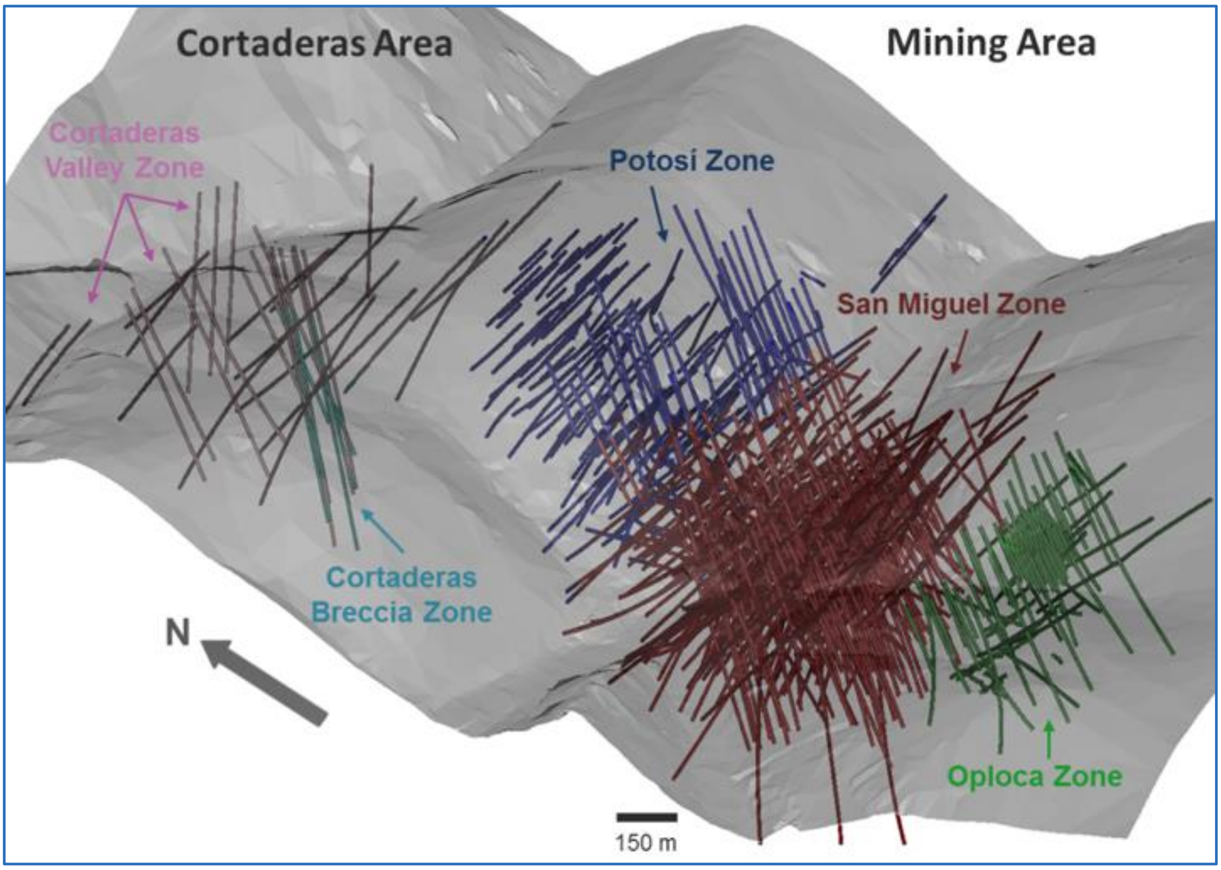
14.2 Pirquitas

14.2.1 Available Data – Pirquitas

The 2011 Mineral Resource estimate database contains assay data derived from diamond core drillholes and RC drillholes. The finalised valid drillhole database used as input for the modelling contains 551 collar (326 DDH and 225 RC).

The spatial distribution of the drilling completed to date at Pirquitas is shown in Figure 14.1.

Figure 14.10 Isometric View showing the Pirquitas Drillhole Database used in Resource Modelling



SSR, 2011

14.2.2 Exploratory Data Analysis – Pirquitas

The 2013 modelling dataset contains 14,246 downhole survey, and 88,220 sample records, of which 88,788 have associated Ag assay data (for a total metreage of 108,815.6 m of Ag assays).

The majority of the samples were analysed by four-acid 'near total' digestion followed by 34 element atomic emission ICP spectroscopy (ME-ICP61a, including Sn).

Individual assay sample intervals in the database ranged from 0.001–5.0 m and averaged 1.31 m in length. Values analysed below the detection limit (<DL) were assigned values equal to one half of the detection limit (½DL). The basic statistical summary of the assay sample data used in the 2013 resource modelling at Pirquitas is shown in Table 14.7.

Table 14.7 Statistical Summary of Raw Assay Data Used in 2013 Modelling – Pirquitas

Element	No. of Samples	Total Length (m)	Min.	Max.	Mean	Standard Deviation	Coeff. of Variation
Ag (g/t)	82,788	108,815.6	0.10	41,330	43.45	341.09	7.85
Zn (%)	82,787	108,814.6	0.001	36.6	0.93	2.34	2.51

Drilling recovery generally ranged between 95% and 100% for diamond core drillholes, and generally between 80% and 100% for RC drillholes, except where drillholes intersected old underground workings.

14.2.3 Domain Interpretations – Pirquitas

SSR considers the Pirquitas deposit as comprising the Mining Area, which includes the San Miguel, Potosi, and Oploca Vein zone, and the Cortaderas area, which consists of the Cortaderas Breccia zone and the Cortaderas Valley zone (see Figure 14.10). It is the Mining Area that is the subject area for the 2013 resource modelling.

From July to October 2013, wireframes of the majority of mappable veins within the San Miguel, Potosi, and Oploca areas were created in MineSight software using a 65 ppm silver-equivalent (AgEq) cut-off to define vein margins. The AgEq is calculated using the following formula:

$$AgEq = Ag\ (ppm) + 14 \times Zn\%$$

Visual analysis of colour-coded uncomposited grade control bench assay data was conducted to assess the general orientation of the veins within the domains. Figure 14.12 shows the available grade control data, colour coded for AgEq. Clear trends of veins are obvious at this scale, the 010° trend follows the orientation of an anticline hinge where there is a concentration of mineralisation where it is intersected by the more common north-west trending veins.

For the majority of veins the process of wireframe construction began with the snapping of points on what were determined to be hangingwall and footwall pierce points of veins on the exploration drillholes. This was done in 3D space on a vein by vein basis. A different methodology was applied to the central part of the Crucero vein where it crosses the San Miguel pit, the Potosi Breccia and Mr Blobby. For these models, bench polygons were made around >65 g/t AgEq grade intercepts and then linked to form wireframes.

The wireframes were trimmed at surface where they were not controlled by exploration drilling to ensure that they did not extend above topography or overburden material. They were also intersected where one vein crossed or touched another in order to reduce the possibility of coding errors.

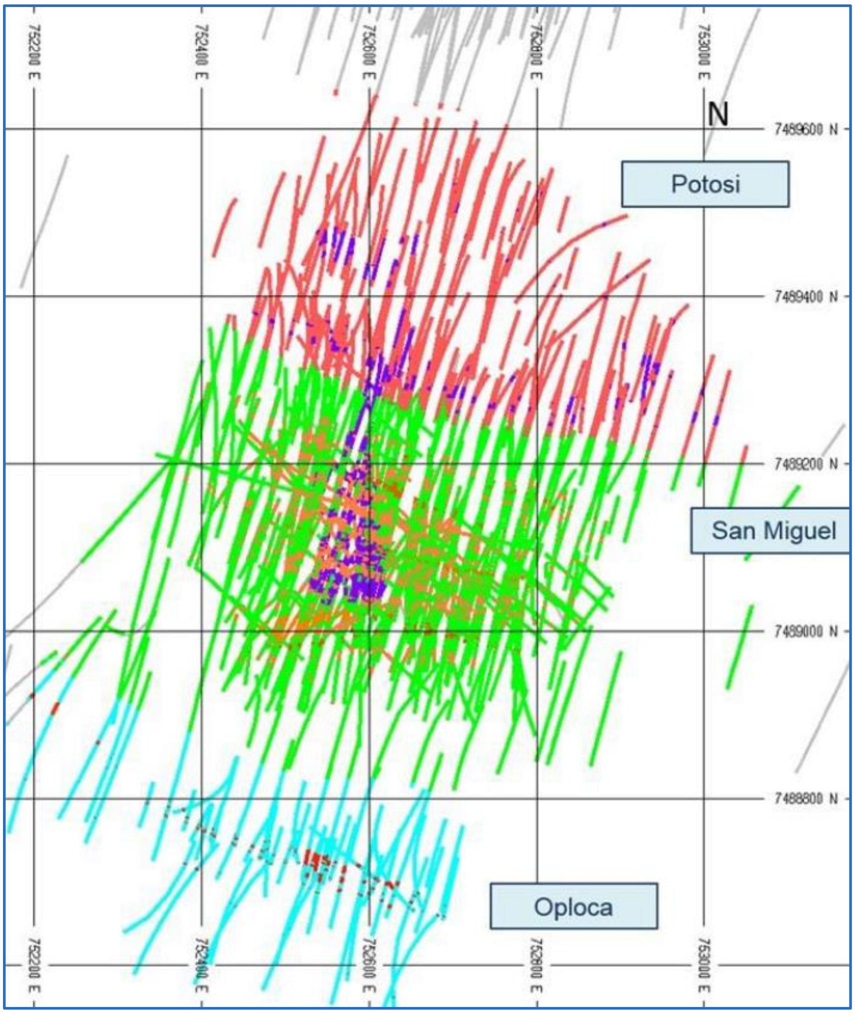
The result of this process was that the Mining Area was broadly sub-domained into three zones:

- Central San Miguel zone – characterised in the field by essentially sub-vertical veins and vein stockworks.

- Northern Potosí zone – characterised in the field by veins and vein stockworks steeply dipping toward the north.
- Southern Oploca Vein zone – characterised in the field by veins steeply dipping toward the south.

Details of the domain coding used in the generation of the 2013 model are shown in Figure 14.11.

Figure 14.11 Pirquitas Plan showing Drillholes Coded using Wireframe Vein Models

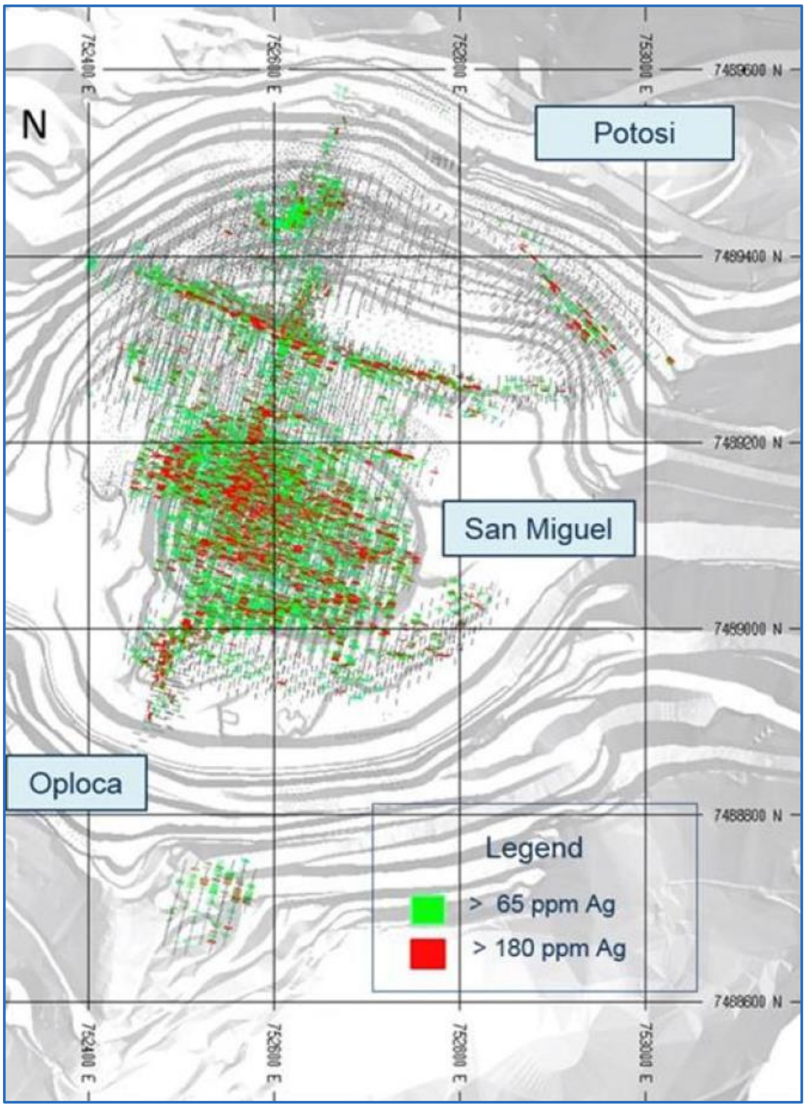


SSR, 2013

Table 14.8 Pirquitas Mineralisation Domain Codes

Location	Zone	Mineralisation Domain Code
Mining Area	San Miguel	10
	Potosí	20
	Oploca	30

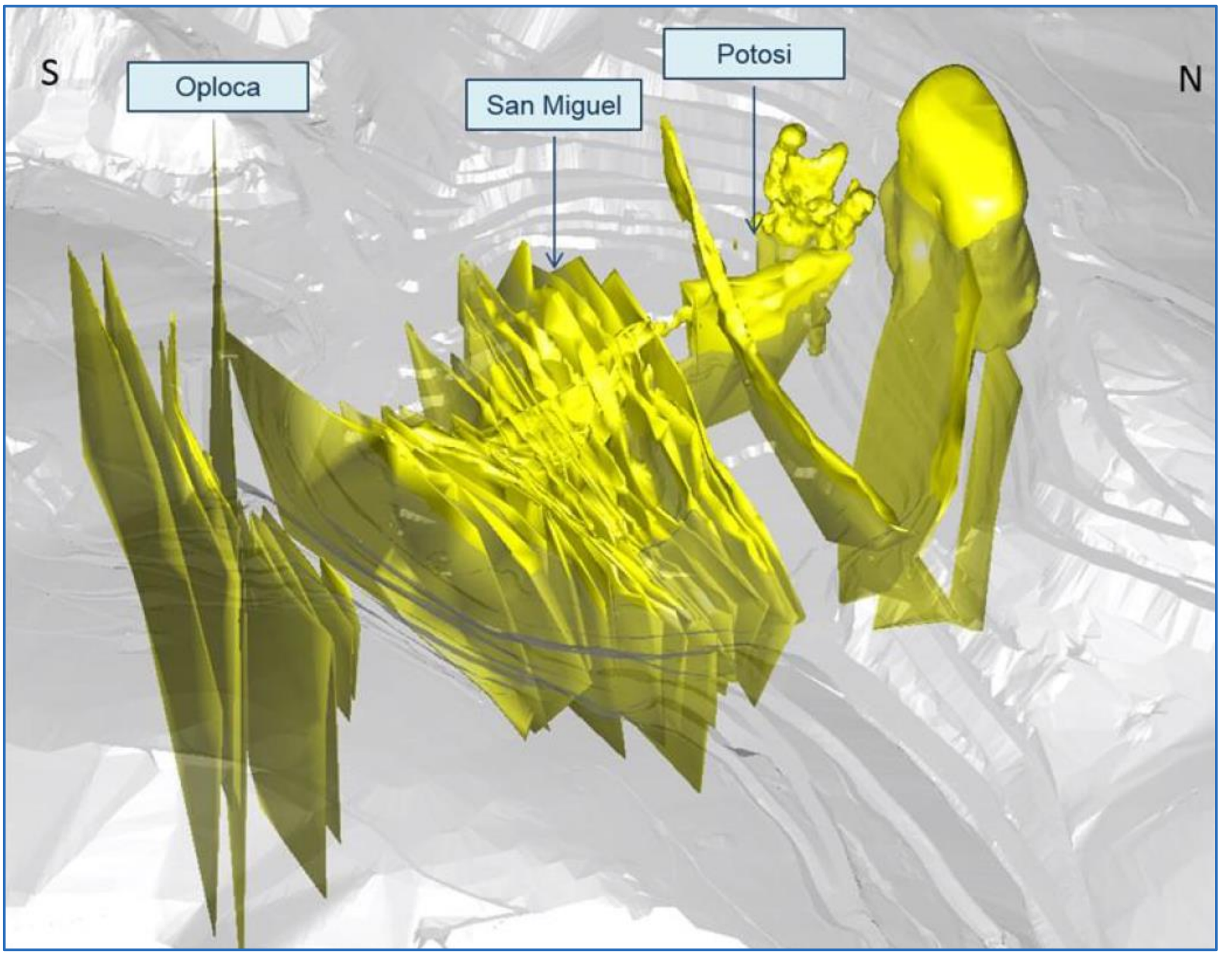
Figure 14.12 Plan showing Grade Control Bench Assays Colour Coded for Ag (ppm)



SSR, 2013

Wireframe models for Pirquitas are presented as an isometric view inside the September 2013 EOM survey pickup and 2013 designed pit in Figure 4.3.

Figure 14.13 Isometric View of Final Pirquitas Wireframe Vein Models – 2013 Resource Model



SSR, 2013

After the wireframes were created the 'LITHO' field in the drillhole file was coded for the domains and vein wireframes. Each intercept on different veins was given a unique identifier representing a 'material type'. This assignment of material type codes by vein allowed for the control of grade estimation within the veins. The drillhole traces back-coded for vein material types are shown in Figure 14.11

14.2.4 Compositing – Pirquitas

Raw sample lengths were generally up to 2 m in waste rock and 1 m or less in mineralised rock. A minimum sample length of 0.1 m was permitted on samples from highly mineralised structures such as veins, stockworks, and breccias.

A composite length of 2.0 m was considered most suitable for the Pirquitas drillhole data. Data were composited to the selected composite length within the interpreted wireframe solid. Residual lengths were retained.

14.2.5 Evaluation of Outlier Grades – Pirquitas

Top cut analyses were conducted on all finalised domain-coded drillhole composite data to assess the potential impact of extreme values during grade estimation.

The process of assessing the need for top cuts was an iterative one and included the analysis of statistics including lognormal probability distribution plots and the reconciliation of estimated parent cell grades to grade control. Ultimately, the best reconciliation to grade control was obtained by applying a 9,000 g/t Ag upper cut 20% Zn upper cut.

14.2.6 Continuity Analysis – Pirquitas

A variographic analysis was undertaken to help define the continuity characteristics of the domained data.

Three dimensional variography analysis (pairwise relative) was undertaken on 2 m composite intervals for Ag and Zn. Downhole variograms (omni-directional) were used to determine the nugget effect.

Due to the low amount of data within each vein wireframe the general orientation and shape of the veins or groups of veins (San Miguel and Oploca) was used to determine the orientation and dimensions of the search parameters for grade interpolation. Thus the variogram parameters from the variogram model, that is the nugget, first, and second structure were the same for all kriging interpolations for both Ag and Zn, the search ellipse orientation and dimensions.

14.2.7 Grades Estimation – Pirquitas

Estimation was carried out within a cell model with 4 m x 4 m x 8 m cells to be compatible with the grade control model. The Cell model limits are shown in Table 14.9. The model is not rotated.

Table 14.9 Cell Model Limits – Pirquitas

Direction	Minimum	Maximum	Cell Size (m)	Number of Cells
East	751,900	753,340	4	360
North	7,488,300	7,490,340	4	510
Elevation	3,838	4,510	8	84

Cells in the model were coded on a majority basis with the various domains.

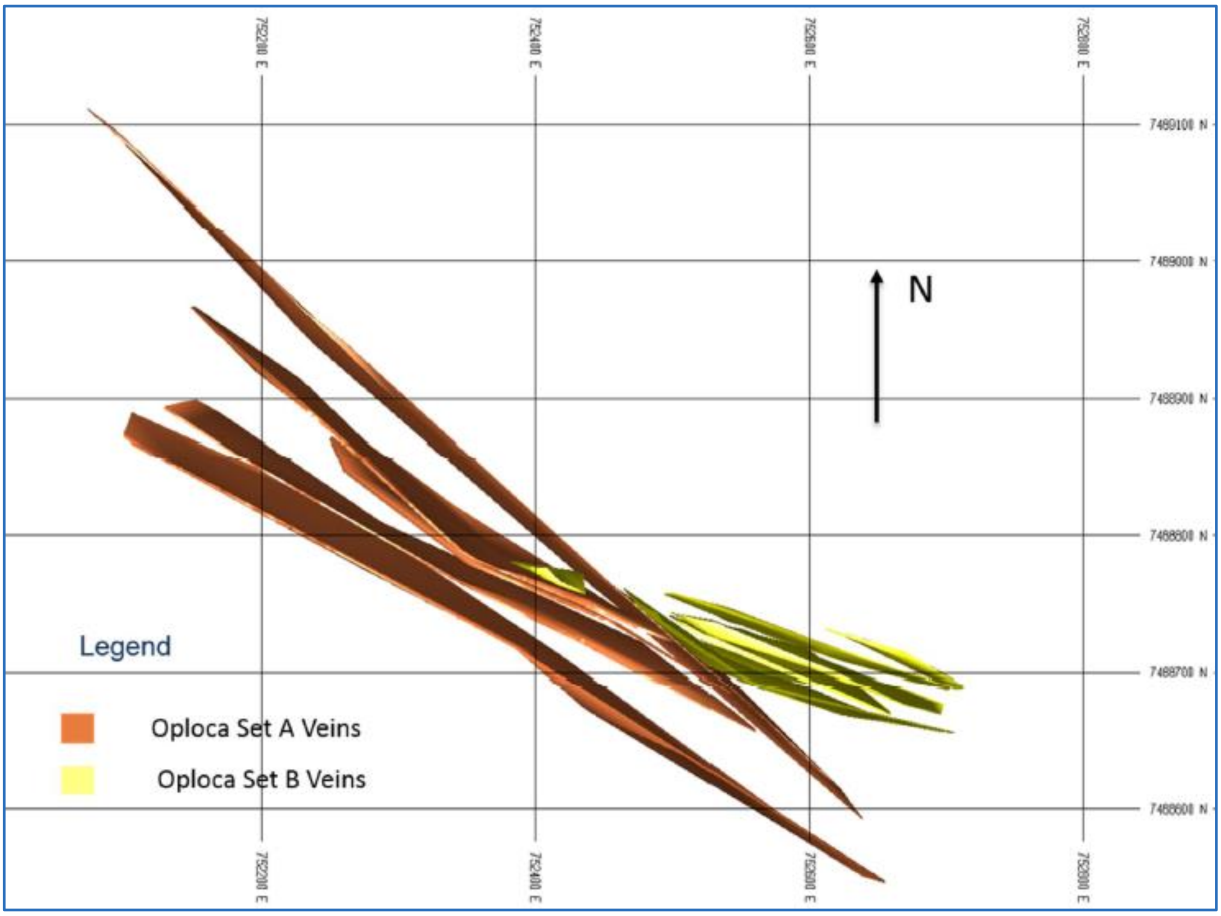
The wireframe surfaces and solids representing topography, oxide surface, overburden, and vein interpretation were used to code each cell with the proportion of its volume relative to these features.

14.2.7.1 Grades Estimation – Pirquitas Mining Area

Ag and Zn grades were estimated into Domains 10, 20, and 30 in the cell model using ordinary kriging (OK). The vein boundaries were treated as hard boundaries such that the composites within the vein interpretations were only permitted to inform estimates in cells that fall within the veins (this estimate is stored in a field called 'AGPV' for Ag and 'ZN%V' for the Zn estimates), and likewise composites outside the veins were only permitted to inform estimates in cells that have some proportion outside of the veins (this estimate is stored in a field called 'AGPVD' for Ag estimates and 'ZNPVD' for Zn estimates).

Veins in the San Miguel and Oploca areas were estimated separately. The veins in the Oploca area were separated into two sets for estimation: Oploca Set A and Set B veins have generally different orientations these are shown in Figure 14.14

Figure 14.14 Pirquitas Cross-section showing Two Distinct Oploca Vein Sets



SSR, 2013

Whole cell grades were calculated after estimation completed into fields called 'AGP' for silver and 'ZN%' for zinc. The calculation takes into account the proportion of the cell that is inside/outside the vein by calculating the weighted average based on stored volume information.

14.2.7.2 Density – Pirquitas

An analysis of density data was undertaken. It was determined that density could be estimated satisfactorily using a formula underpinned by Ag grade as follows:

agp = agpv * veinp / 100 + agpvd * (100 - veinp) / 100

temp = 0.39 * (ALOG (agp + 10) / ALOG (10)-1) + 2.64 * (1 - oxide) + 1.8 * oxide

bulk density = temp * (1 - void% / 100)

Where:

AGPV	*= estimated Ag grade from sample inside a vein*
VEINP	*= proportion of the cell that falls inside a vein wireframe*
AGPVD	*= estimated Ag grade from sample outside the veins*
OXIDE	*= proportion of cell in oxide material*
VOID%	*= proportion of cell not in rock (i.e. in underground workings)*
2.64	*= the average density of fresh waste rock*
1.8	*= the average density of oxidised rock*

14.2.7.3 Validation – Pirquitas

Validation was conducted at the end of each model preparation step, as well as of the completion of the process. Model validation included visual validation in plan and section, and statistical validation by domain, of cell model codes. Additional validation was conducted on cells coded with UGVOID% values of greater than 0.001% to ensure that the in situ volume estimate was correctly discounted for previously-mined material.

In addition to the ongoing and iterative validation steps conducted throughout the modelling process, the resultant model that forms the basis of the Mineral Resource was subjected to the following validation steps:

- Visual comparison of estimated grades for Ag and Zn against the input drillhole data on a series of plan views and oblique cross-sections through the model. This was reviewed at numerous times during model generation to ensure that the modelled grades and grade distribution closely reflected that of the input data.
- Comparison of average grades for each grade variable in each domain between the input drillhole data and model estimates, to assess for potential global estimation bias in the model.
- Comparison of average grades for each grade variable in each domain between the input drillhole data and the cell model along northing, easting, and elevation swathes to assess potential spatial bias in the model.
- Grade-tonnage data were reported using different software to ensure validity of final grade-tonnage reports.

- Reconciliation of the cell model to grade control and production data on a bench-by-bench basis in the mined-out part of the deposit.

Results of the various detailed model validation steps summarised above indicate that the 2013 grade estimates are honour the input geological and drillhole data both globally and locally and have an acceptable level of smoothing for the cell size selected.

14.2.7.4 Classification – Pirquitas

Following an assessment to determine suitability, the resource confidence classification method for the 2013 model used the same method described in the 2011 Technical Report. The following is a description of the 2011 analysis.

Mineral Resource classification was conducted using a combination of drillhole spacing, search volume, and distance from underground workings, mineralisation continuity considerations, comparisons in locations of high-grade vein and stockwork structures between the model and open-pit observations, reconciliation between the model and grade control and production data, and discussions with mine-based geological staff. Resource confidence classification was focussed on the Ag variable, being the economically most important constituent at the Pirquitas deposit, however, prior to finalisation, the classification was reviewed with respect to Zn and Sn to ensure that there were no anomalies. Care was taken to ensure that coherent zones of high-confidence (Measured Mineral Resources) and reasonably good confidence (Indicated Mineral Resources) estimates were modelled to avoid a scattered resource classification. To this end the various model classification criteria discussed above were incorporated in the generation of wireframe solids for the classification of the Mineral Resource into Measured Mineral Resources and Indicated Mineral Resources.

The Mineral Resource confidence classification scheme can be broadly simplified as follows:

- All estimates informed by the third search pass in the Mining Area (Domains 10, 20, and 30) were classified as Inferred Mineral Resource.
- All estimates informed by sufficient samples from drillholes spaced closer than effectively 40 m (generally 20–35 m), in areas where there is reasonably good confidence in the modelled location of the mineralised veins and for which there is reasonably good confidence in the modelled location of the underground workings, were classified as Indicated Mineral Resource.
- Estimates classified as Measured Mineral Resource were informed by sufficient samples from drillholes spaced closer than effectively 25 m (generally less than 15 m), in areas for which there is high confidence in the modelled location of the mineralised veins and for which there is high confidence in the modelled location of the underground workings.

The wireframes used for classification in 2011 were added to the 2013 cell model. The ranges of distance to the cell centroid from the nearest composite, number of holes and number of composites relative to the 2011 resource cell model are given in Table 14.10.

Table 14.10 Pirquitas 2013 Resource Classification Results, Valid at a Cut-off of 65 g/t AgEq

Resource Class	Average Distance	Average No. of Holes	Average No. Comps
Measured	17.44	7	21
Indicated	29.70	6	6
Inferred	51.85	2	4

14.2.8 Mineral Resources – Pirquitas

The Pirquitas Mineral Resource estimate is contained within underground mining shapes using an NSR cut-off of $100/t that is based on metal prices of $20.00/oz for silver, $1.10 for lead and $1.30/lb for zinc. The NSR cut-off grade selected for the Pirquitas Mineral Resource assumes underground mining will be used for extraction, that the processing facility could be used for processing. It is recommended that the Mineral Resource estimate be re-evaluated and assessed with a study to determine the development horizon available prior to the completion of the Chinchillas open pit and the impact of the current operation on the Pirquitas Mineral Resource.

Metal prices for the Mineral Resource cut-off were estimated after analysis of consensus industry forecasts and compared to metal prices used in other published studies. The prices selected were then reduced from the average long-term prices to take a conservative view of the long-term price. The long-term prices for the cut-off were assumed to apply from the start of 2026. The metal prices are representative of the range of price estimates publicly reported for Mineral Resource cut-offs.

The Pirquitas Mineral Resource by classification is summarised in Table 14.11 and shown with recovery and ownership detail in Table 14.11.

SSR has advised that there are no known factors related to environmental, permitting, legal, title, taxation, socio-economic, marketing, or political issues which could materially affect the Mineral Resource. Mineral Resources do not have demonstrated economic viability. The quantity and grade of Inferred Mineral Resources are uncertain in nature and there has been insufficient exploration to classify these as Indicated or Measured, but it is reasonably expected that a majority of the reported Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration. Mineral Resources are exclusive of Mineral Reserves.

Table 14.11 Summary of Pirquitas Mineral Resource Estimate Exclusive of Mineral Reserve (as at 31 December 2021) Based on $20.00/oz Silver, $1.10/lb Lead, and $1.30/lb Zinc

Mineral Resource Classification	Tonnage	Grades			Contained Metal		
	(kt)	Ag (g/t)	Pb (%)	Ag (g/t)	Silver (koz)	Lead (Mlb)	Zinc (Mlb)
Measured	79	444.5	0.20	1.17	1,129	0.4	2
Indicated	2,555	287.7	0.20	4.56	23,627	1.0	257
Measured + Indicated	**2,634**	**292.4**	**0.20**	**4.46**	**24,756**	**1.5**	**259**
Inferred	1,080	206.9	0.00	7.45	7,185	0.1	177

1. The Mineral Resource estimate is contained within underground mining shapes based on $90/t to $100/t NSR cut-off.
2. The Mineral Resource estimate is based on metal price assumptions of $20.00/oz silver, $1.30/lb zinc, and $1.10/lb lead.
3. Metallurgical recoveries vary with grade and on average are, 87% silver and 85% for zinc and 50% for lead.
4. The point of reference for Mineral Resources is the point of feed into the processing facility
5. Mineral Resources are reported exclusive of Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. SSR has 100% ownership of the Project.
7. All ounces reported represent troy ounces, and g/t represents grams per metric tonne.
8. Totals may vary due to rounding.

Table 14.12 Summary of Metallurgical Recoveries and Ownership of Pirquitas Mineral Resource Estimate Exclusive of Mineral Reserve (as at 31 December 2021) Based on $20.00/oz Silver, $1.10/lb Lead, and $1.30/lb Zinc

Mineral Resource Classification	Tonnage	Grades			Metallurgical Recovery			Cut-off
	(kt)	Ag (g/t)	Pb (%)	Zn (%)	Silver (%)	Lead (%)	Zinc (%)	NSR ($/t)
Measured	79	444.5	0.20	1.17	87	50	85	100
Indicated	2,555	287.7	0.20	4.56	87	50	85	100
Measured + Indicated	**2,634**	**292.4**	**0.20**	**4.46**	**87**	**50**	**85**	**100**
Inferred	1,080	206.9	0.00	7.45	87	50	85	100

1. The Mineral Resource estimate is contained within underground mining shapes based on $90/t to $100/t NSR cut-off.
2. The Mineral Resource estimate is based on metal price assumptions of $20.00/oz silver, $1.30/lb zinc, and $1.10/lb lead.
3. Metallurgical recoveries vary with grade and on average are, 87% silver and 85% for zinc and 50% for lead.
4. The point of reference for Mineral Resources is the point of feed into the processing facility
5. Mineral Resources are reported exclusive of Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. SSR has 100% ownership of the Project.
7. All ounces reported represent troy ounces, and g/t represents grams per metric tonne.
8. Totals may vary due to rounding.

14.2.9 Comparison with Previous Estimates – Pirquitas

The new Mineral Resource estimate is compared to the previous Mineral Resource estimate dated 2011 and supported by the Technical Report dated 27 May 2016 (Davis et al., 2016). The Mineral Resources estimated in 2011 are based on metal prices of $11/oz silver $0.70/lb lead and $0.70/lb for zinc and $5.00/ln Sn and an NSR cut-off of $15.00/t NSR.

There was no change since EOY 2020 as there was no updated work on the Mineral Resource.

14.3 Subpart 1300 of US Regulation S-K Mining Property Disclosure Rules

The Mineral Resources reported in the Puna21TRS are suitable for reporting as Mineral Resources using Subpart 1300 of US Regulation S–K Mining Property Disclosure Rules (S–K 1300).

15 MINERAL RESERVE ESTIMATES

15.1 Summary

Mineral Resources and Mineral Reserves in the Puna21TR meet the CIM Definition Standards on Mineral Resources and Reserves 2014 (CIM Definition Standards) and conform to the Canadian National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101).

Open pit mining is carried out by MPSA as an owner mining operation with ore hauled from Chinchillas pit to the Pirquitas plant. The Mineral Reserves were developed based on mine planning work completed in 2021 that included pit optimisation and redesign of the pit phases. Table 15.1and Table 15.2 summarise the Mineral Reserve for Chinchillas. The Chinchillas Mineral Reserve estimate has been generated for the Mantos Deposit based on the following inputs: metal prices, resource model, geotechnical information, operating costs, mineral processing recoveries, concentrate transport, off site costs and charges. Costs for all areas of the operation are estimated from actual costs. These were used to calculate an NSR of $44.11/t NSR used for the Mineral Reserve cut-off.

Metal prices for the Mineral Reserve cut-off were estimated after analysis of consensus industry forecasts and compared to metal prices used in other published studies. The prices selected were then reduced from the average long-term prices to take a conservative view of the long-term price. The long-term prices for the cut-off were assumed to apply from the start of 2026. The metal prices are representative of the range of price estimates publicly reported for Mineral Reserve cut-offs.

15.2 Mineral Reserves Statement

Table 15.1 summarises the Mineral Reserves statement for the Puna Operations.

Table 15.1 Summary of Chinchillas Mineral Reserve Estimate (as at 31 December 2021) Based on $18.50/oz Silver, $0.90/lb Lead, and $1.05/lb Zinc

Mineral Reserve Classification	Tonnage	Grade			Contained Metal		
	(kt)	Ag (g/t)	Pb (%)	Zn (%)	Silver (koz)	Lead (klb)	Zinc (klb)
Proven	2,379	168.9	1.33	0.34	12,918	69,747	17,830
Probable	5,041	155.3	1.29	0.25	25,174	143,364	27,784
Probable Stockpiles	187	141.0	1.33	0.50	846	5,483	2,061
Proven + Probable	**7,606**	**159.2**	**1.30**	**0.28**	**38,938**	**218,595**	**47,675**

1. Mineral Reserves are reported based on 31 December 2021 topography surface.
2. The Mineral Reserves estimate is based on metal price assumptions of $18.50/oz silver, $0.90/lb lead, and $1.05/lb zinc.
3. The Mineral Reserves estimate is reported at a cut-off grade of $44.11/t NSR.
4. Economic analysis for the Mineral Reserve has been prepared using long-term metal prices of $21.00/oz silver, $0.90/lb lead, and $1.20/lb zinc
5. Processing recoveries vary based on the feed grade. The average recovery is estimated to be 98% for silver, 95% for lead and approximately 63% for zinc.
6. Metals shown in this table are the contained metals in ore mined and processed.
7. The point of reference for Mineral Resources is the point of feed into the processing facility.
8. SSR has 100% ownership of the Project.
9. All ounces reported represent troy ounces, and g/t represents grams per metric tonne.
10. Totals may vary due to rounding.

Table 15.2 Summary of Metallurgical Recoveries of Chinchillas Mineral Reserve Estimate (as at 31 December 2021) Based on $18.50/oz Silver, $0.90/lb Lead, and $1.05/lb Zinc

Mineral Reserve Classification	Tonnage	Grades			Metallurgical Recovery			Cut-off
	(kt)	Ag (g/t)	Pb (%)	Zn (%)	Silver (%)	Lead (%)	Zinc (%)	NSR ($/t)
Proven	2,379	168.9	1.33	0.34	98	95	63	44.11
Probable	5,041	155.3	1.29	0.25	98	95	63	44.11
Probable Stockpiles	187	141.0	1.33	0.50	98	95	63	44.11
Proven + Probable	**7,606**	**159.2**	**1.30**	**0.28**	**98**	**95**	**63**	44.11

1. Mineral Reserves are reported based on 31 December 2021 topography surface.
2. The Mineral Reserves estimate is based on metal price assumptions of $18.50/oz silver, $0.90/lb lead, and $1.05/lb zinc.
3. The Mineral Reserves estimate is reported at a cut-off grade of $44.11/t NSR.
4. Economic analysis for the Mineral Reserve has been prepared using long-term metal prices of $21.00/oz silver, $0.90/lb lead, and $1.20/lb zinc
5. Processing recoveries vary based on the feed grade. The average recovery is estimated to be 98% for silver, 95% for lead and approximately 63% for zinc.
6. Metals shown in this table are the contained metals in ore mined and processed.
7. The point of reference for Mineral Resources is the point of feed into the processing facility.
8. SSR has 100% ownership of the Project.
9. All ounces reported represent troy ounces, and g/t represents grams per metric tonne.
10. Totals may vary due to rounding.

15.3 Factors that Affect the Mineral Reserves Estimates

Factors that affect the Mineral Reserve estimates include but are not limited to dilution; metal prices; off-site costs; metallurgical recoveries, pit slope designs; capital and operating cost estimates; and the effectiveness of managing environmental impacts. The main factors that affect the Mineral Reserve estimations reported in this section are:

- Commodity prices, particularly silver price
- Processing recoveries
- The effectiveness of managing environmental impacts for waste rock and downstream water flows
- Pit slope design criteria

The Mineral Reserves estimate has taken into account all known legal, political, environmental or other risks that could materially affect the potential development of the Mineral Reserves, as discussed in various sections of this Puna21TR.

15.4 Comparison of 2021 Mineral Reserves to 2020 Mineral Reserves

The Mineral Reserves have been compared to the previous Mineral Resource which was based on the EOY 2020 pit surface. Comparison of the 2021 Mineral Reserve with the 2020 Mineral Reserve shows a net decrease in contained silver of 4.07 Moz (-9%). Mining depletion (-16%)occurred but there was an increase in Mineral Reserves (+5%) due to model updates, pit design changes and a small impact from increased metal prices.

15.5 Subpart 1300 of US Regulation S-K Mining Property Disclosure Rules

The Mineral Reserves reported in the Puna21TRS are suitable for reporting as Mineral Resources using Subpart 1300 of US Regulation S–K Mining Property Disclosure Rules (S–K 1300).

16 MINING METHODS

16.1 Geotechnical Review

A review of the geotechnical reports provided by MPSA was carried out. The following reports were provided and form the basis of this review:

- Knight Piesold, 2016. 2015 Geotechnical Site Investigation Report
- Knight Piesold, 2016. Pre-Feasibility Pit Slope Design VA201-439/3-2 Rev0
- Knight Piesold, 2016. Hydrogeologic Conceptual Model and Preliminary Pit Inflow Estimates
- Puna Operations Inc, 2016. NI 43-101 Technical Report

It is important to note, the Knight Piesold - 2015 Site Investigations report suggested a study regarding waste rock dumps but have not been sourced or reviewed. SSR report that the review has not been undertaken. Knight Piesold (KP) prepared a report in 2020 after an inspection of the pit. OreWin did not review this report as it was not available during the Puna21TR preparation.

16.1.1 Knight Piesold 2015 Site Investigation

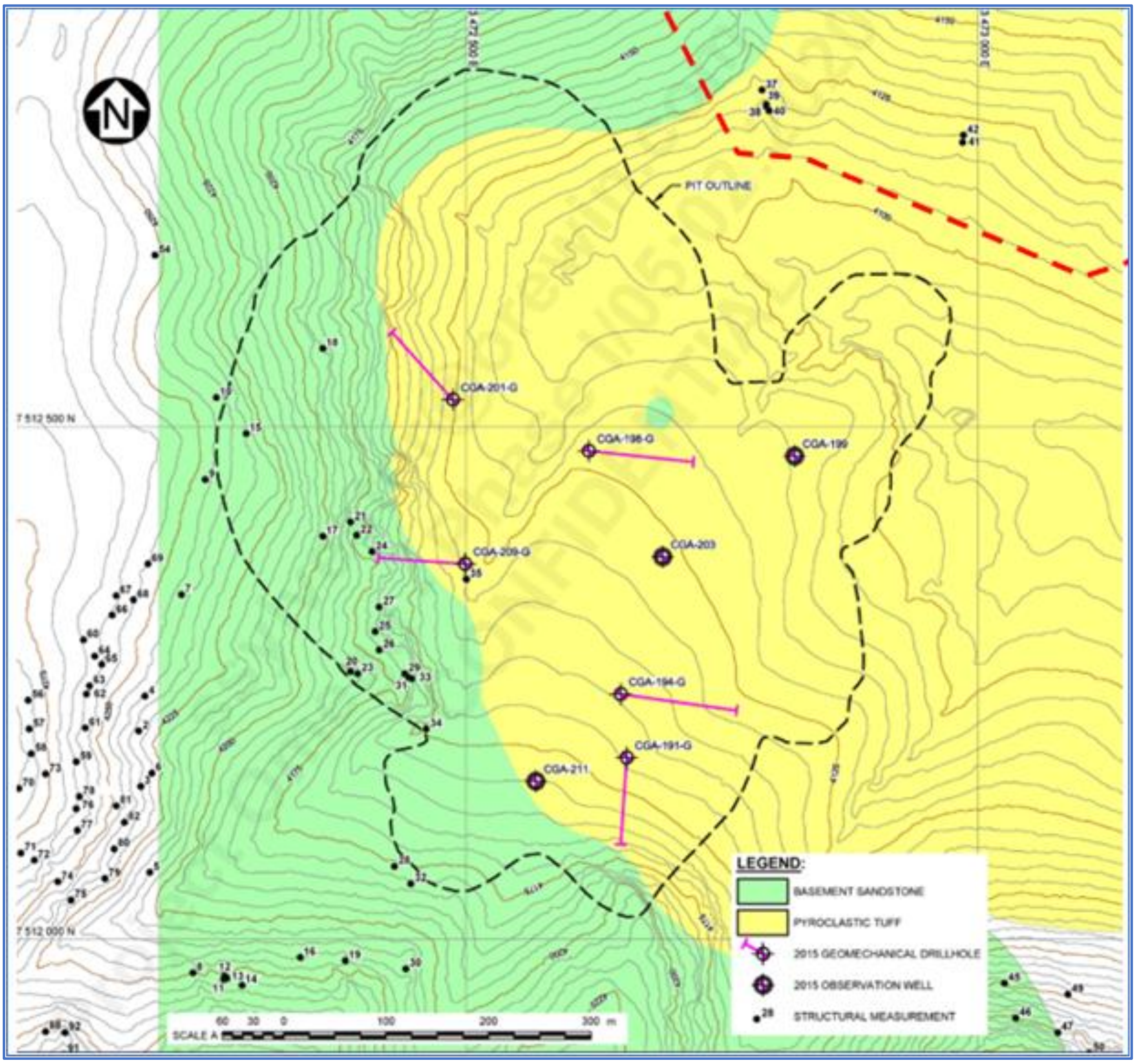
The Knight Piesold 2015 site investigations were addressed in a report issued in February 2016. The report and the data therein provided the key source of information for additional Knight Piesold Geotechnical studies.

Figure 13.1 provides an overview of the extent of the Knight Piesold site investigations of which comprised:

- Five cored boreholes, geotechnically logged and with oriented core utilised in defining orientation of defects where possible.
- Packer testing was conducted in two boreholes and falling head testing in the other three boreholes.
- Observation wells in three vertical exploration boreholes and with slug testing therein.

Of particular note, Knight Piesold utilised mapping data of exposures carried out by GAR during exploration, Figure 16.1.

Figure 16.1 Overview of Knight Piesold Site Investigation



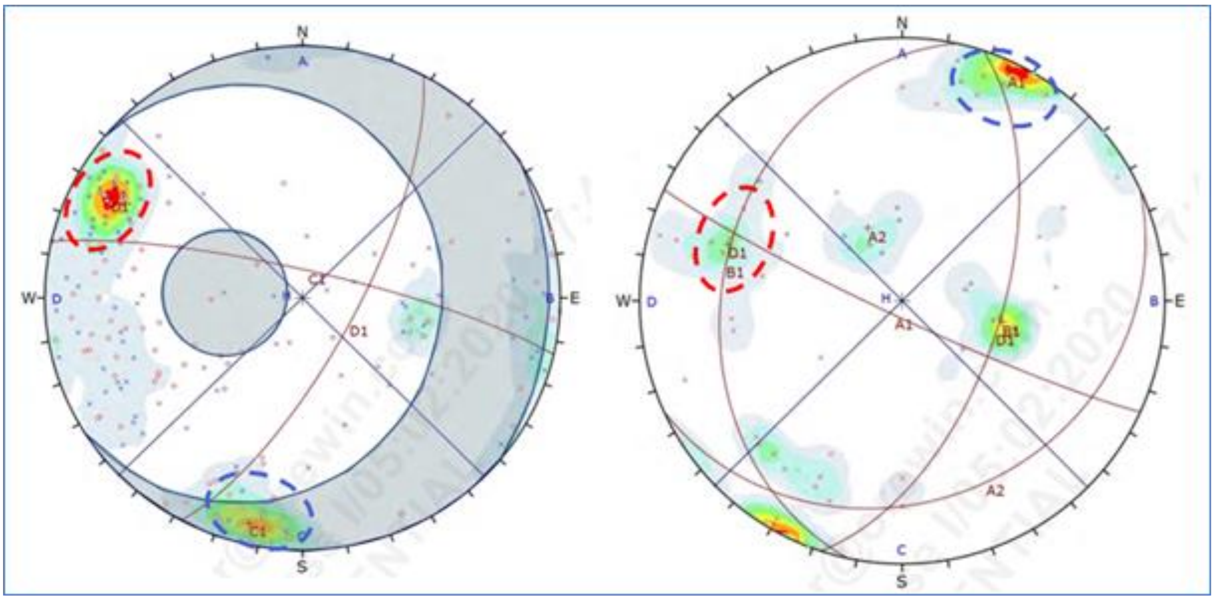
Knight Piesold, 2015

The extent of studies is considered appropriate. Key aspects of note from the studies include the following:

- Two key lithologies are present, Metasediments (basement sandstone) which has been overlain by a pyroclastic Tuff, Figure 13.1.
- Metasediments are steeply dipping to the west. Intact strength is potentially underestimated from laboratory testing (average UCS of 30MPa).
- Pyroclastic Tuff has shallow bedding and has low intact strength due to alteration and with UCS of 10MPa.
- The available orientated data in the Pyroclastic Tuff (from two boreholes) is limited. There are 33 data points which indicate widely spaced defects.

- The available orientated data in the Metasediments (from four boreholes) is significant. Nearly 700 data points, which indicate a more jointed rock mass but with a lack of orientation of any faulting. Review of the logging and core photos suggest such faulting is present and the absence of understanding of orientation is considered as a significant gap in the studies.
- Comparison of the surface mapping (mostly in Metasediments) and orientated data from borehole CGA-209-G (in closest proximity to mapping and entirely in Metasediments) shown in Figure 13.2, indicates very good comparison. Of note is the good match between defect sets D1 (looped in red) and sets C1 and A1(looped in blue). Of note is slightly flatter dip of set D1 in the surface mapping. The oriented data indicates the bedding (diamond symbols in set D1) is steeply dipping south to east. The variance from the broader interpretation noted above is owing to rotation introduced by intrusion of an underlying diatreme. However, the bedding noted in the surface mapping is moderately dipping to the southwest (set A2) and also moderately dipping to the west (set B1). This is at odds with the provided geological overview where bedding is steeply dipping in the Metasediment and shallow dipping in the pyroclastic Tuffs. The bedding has the potential to significantly control stability of the overall slopes, therefore this discrepancy needs to be resolved.
- Other oriented boreholes in the Metasediments provide somewhat poorer comparison with mapping as this is a function of the blind zones impacting on the other boreholes.

Figure 16.2 Surface Mapping and orientated data from borehole GCA-209-G



Knight Piesold, 2016. Note: Defect sets annotated by OreWin. The blind zone (grey shading), where defects will be underrepresented in oriented core

16.1.2 Knight Piesold PFS Pit Slope Design

The Knight Piesold 2016 Pre-Feasibility Pit Slope Design VA201-439/3-2 Rev0 report provides the pit slope recommendations for PFS studies. The following comments are based on a review of this report:

- The kinematic assessment, which has been largely utilised to provide batter angles is considered appropriate for the Metasediments. However, owing to the lack of knowledge on faults, there is a degree of uncertainty on inter-ramp scale stability.
- Overall pit wall stability has been addressed through limit equilibrium stability analyses. The analyses utilised the Hoek & Brown (HB) rock mass strength criterion. The inputs of the analysis are considered largely appropriate based on the 2015 Geotechnical Site Investigation Report , however caution of the following three aspects.
  - Knight Piesold have assumed a Disturbance Factor (D value) of 0.85. This value may be appropriate near created slope faces where blast damage may be present but is not considered appropriate for the rock mass within the pit slope.
  - Knight Piesold have adopted an Ru value of 0.2 in the analyses, which nominally equates to a slope where the phreatic surface aligns with the mined surface and groundwater conditions are nominally 50% hydrostatic. This level of depressurisation is considered optimistic at the PFS stage.
  - The HB criterion is poorly suited for rocks of low intact strength such as the Pyroclastic Tuff. As such, the inter-ramp slope angle in the Tuff is considered marginally high and an overall angle in the order of 37° is considered more appropriate.
- The Knight Piesold design parameters are provided in Table 13.1 and maintain similar berm widths in all areas and with variation in batter angle. An alternative would be to utilise 70° batter angles in all areas and utilise 10 m wide berms in the southwest and northwest (IRA of 49° maintained), 14 m wide berms in the south (IRA of 43° maintained) and 17 m wide berms in the east (IRA of 39°). A haul road would reduce the overall angle in the east wall but depending on placement may require revision of berm widths.
- Knight Piesold recommend that for the west wall, the un-interrupted IRA not exceed 150 m in height and with a wider bench or haul ramp of the order of 20–30 m to limit overall angle to 46 to 47°. In practice, with the ramp location unknown, would suggest placement of a wider berm in the southwest and northwest at nominally mid-height of the overall slope.

Table 16.1 Recommended Inter-ramp Angles (Assuming Quadruple Benching)

Pit Design Sector	Geotechnical Unit	Bench Face Angle (°)	Bench Height (m)	Bench Width (m)	Inter-ramp Angle (°)
East	Pyroclastic	60	20	10	43
South	Basement Sandstone & Pyroclastic	60	20	10	43
South-west	Basement Sandstone	70	20	10	49
North-west	Basement Sandstone	70	20	10	49

16.1.3 2021 Pit Design Slope Criteria

SSR prepared new pit designs in 2021, the interpretation of the slope design recommendations used by SSR in the 2021 designs is shown in Table 16.2. The pit slope angles for both pit and dumps were based on those recommended by Knight Piesold but subject to some alteration by SSR. The 2021 pit designs have not been subjected to an independent geotechnical review and it is important that this review is carried out and the revised designs confirmed to meet the slope design criteria. This should be carried out as soon as possible in 2022.

Ore and waste are mined in five metre benches. Final wall 20 m benches are formed by joining four working benches together. Haulage roads are 30 m wide, which is sufficient for 2-way traffic of 100 t trucks, plus enough space to build a ditch and a safety berm. Inter-ramp angles for the west and east walls are 49 and 43 degrees, respectively. For every 150 m of slope height, either a 20 m geotechnical berm or a haulage road was added to the slope.

Table 16.2 Mine Design Criteria

Criteria	Unit	Value	Remarks
Bench height (final wall)	m	20	Ore and waste will be mined in 5 m benches
Bench face angle	degree	60 & 75	60° in East and South; the rest 75°
Catch bench width	m	11.4–13.3	On final walls
Geotechnical berm	m	20	For every 150 m height
Inter-Ramp angle	degree	40, 47 & 50	40° in East and South; 47° in the south-west; the rest 50°
Haulage road width	m	30	2-way roads, includes berm and ditch
Maximum road grade	%	10	
Rock dump face angle of repose	degree	35	25 m lifts and overall slope of 26°

16.1.4 Knight Piesold Hydrogeologic Conceptual Model and Preliminary Pit Inflow Estimates

The 2016 Hydrogeologic Conceptual Model and Preliminary Pit Inflow Estimates report has utilised the available knowledge to summarise hydrogeological parameters, provide a conceptual groundwater model and provide inflow estimates. This study is considered appropriate at a PFS level.

16.1.5 2016 NI 43-101 Technical Report

The NI 43-101 Technical Report of December 2016 provides limited additional geotechnical value to that indicated in the previous Knight Piesold reports. The pit designs utilised overall angles 3° flatter than those indicated in Table 16.1. The flatter slope angle was to allow for haulage ramps (20m to 30m width) and a geotechnical berm every 150m of slope height as proposed by Knight Piesold (albeit this was only recommended for the west wall).

The haul road placement shown in the 2016 NI 43-101 Technical Report , and as provided by OreWin, transects the east wall and such that the overall angle of 37° is largely achieved.

The report places the ex-pit waste dump to the northeast of the pit, which is represented by a red dashed line in Figure 16.2, and where the topography suggests a somewhat uniform slope dipping to the south. The following information is inferred:

- The slope , dump footprint, has a dip of nominally 13°.
- The dump would be constructed in a bottom-up sequence.

The Waste rock dump (WRD) investigations in the 2015 Geotechnical Site Investigation Report utilised test pitting, indicated typically a shallow depth to rock in the dump footprint. Although no previous WRD geotechnical studies have been sourced for this review, it's anticipated with clearing of overburden from the footprint of the first dump lift there should be negligible risk of waste dump instability.

16.1.6 Summary of Geotechnical Studies Review

Following is an overview of comments for the geotechnical studies review for the Chinchillas Project:

- Review of the logging and core photos in the Metasediments suggest faulting is present. The absence of understanding of orientation is considered as a significant gap in the geotechnical studies. Owing to the lack of knowledge on faults, there is a degree of uncertainty on inter-ramp scale stability. It's recommended that Puna consider three boreholes in the western quadrant with use of televiewer (ATV) logging. ATV which uses scanning of the borehole wall is far 2016 more reliable in providing the orientation of major structures which are typically present in recovered core as rubble zones, broken core or highly jointed zones which invariably cannot be orientated in oriented core as used in the PFS investigations.
- Bedding in the surface mapping shown in Figure 16.2, is moderately dipping to the southwest (set A2) and moderately dipping to the west (set B1). This is at odds with the provided geological overview where bedding is steeply dipping in the Metasediment and shallow dipping in the Pyroclastic Tuffs. As bedding has the potential to significantly control stability of the overall slopes this discrepancy needs to be resolved.
- Overall pit wall stability was addressed in the PFS study through limit equilibrium stability analyses utilising the Hoek & Brown (HB) rock mass strength criterion. It's considered the inputs as largely appropriate. However, caution of the following three aspects is recommended.
- Knight Piesold have assumed a Disturbance Factor (D value) of 0.85. This value may be appropriate near created slope faces where blast damage may be present but is not considered appropriate for the rock mass within the pit slope.
- The level of depressurisation in the analyses is optimistic at PFS stage.
- The HB criterion is poorly suited for rocks of low intact strength such as the Pyroclastic Tuff. As such, the inter-ramp slope angle in the Tuff is considered marginally high and an overall angle in the order of 37° is considered more appropriate.
- The Knight Piesold design parameters are provided in Table 16.1 and maintain similar berm widths in all areas and with variation in batter angle. An alternative would be to utilise 70° batter angles in all areas and utilise 10 m wide berms in the southwest and northwest (IRA of 49° maintained), 14 m wide berms in the south (IRA of 43° maintained) and 17 m wide berms in the east (IRA of 39°). A haul road would reduce the overall angle in the east wall but depending on placement may require revision of berm widths.
- The 2021 pit designs have not been subjected to an independent geotechnical review and it is important that this review is carried out and the revised designs confirmed to meet the slope design criteria. This should be carried out as soon as possible in 2022.

16.2 Mining

Open pit mining is carried out by MPSA as an owner mining operation with ore hauled from Chinchillas pit to the Pirquitas plant.

The Chinchillas deposit is located in the high lands of the Andes. The topography of the property consists of several mountains and hills on the sides of property with a small valley in the middle. The orebody is located mainly in the bottom of the valley with extensions stretching to the west on the hillside. The elevation varies from about 4,090 masl in the east side of the valley to 4,300 masl on the peaks in the west. There is a small creek in the middle of valley running from west to the east.

The Chinchillas deposit is mined as a conventional open pit operation. Most of the in-pit haulage for both ore and waste is carried out using 100 t haulage trucks. Ore is mined in five metre benches and stockpiled in a staging area close to the pit. From the staging area, ore is transported to the crusher at the Pirquitas Operation which is 42 km away from Chinchillas. Throughout the mining operation, low grade ore is stockpiled near the pit rim to be processed at the end of mine life. The mining operation is conducted by the owner. Ore haulage was changed to owner operated in 2021.

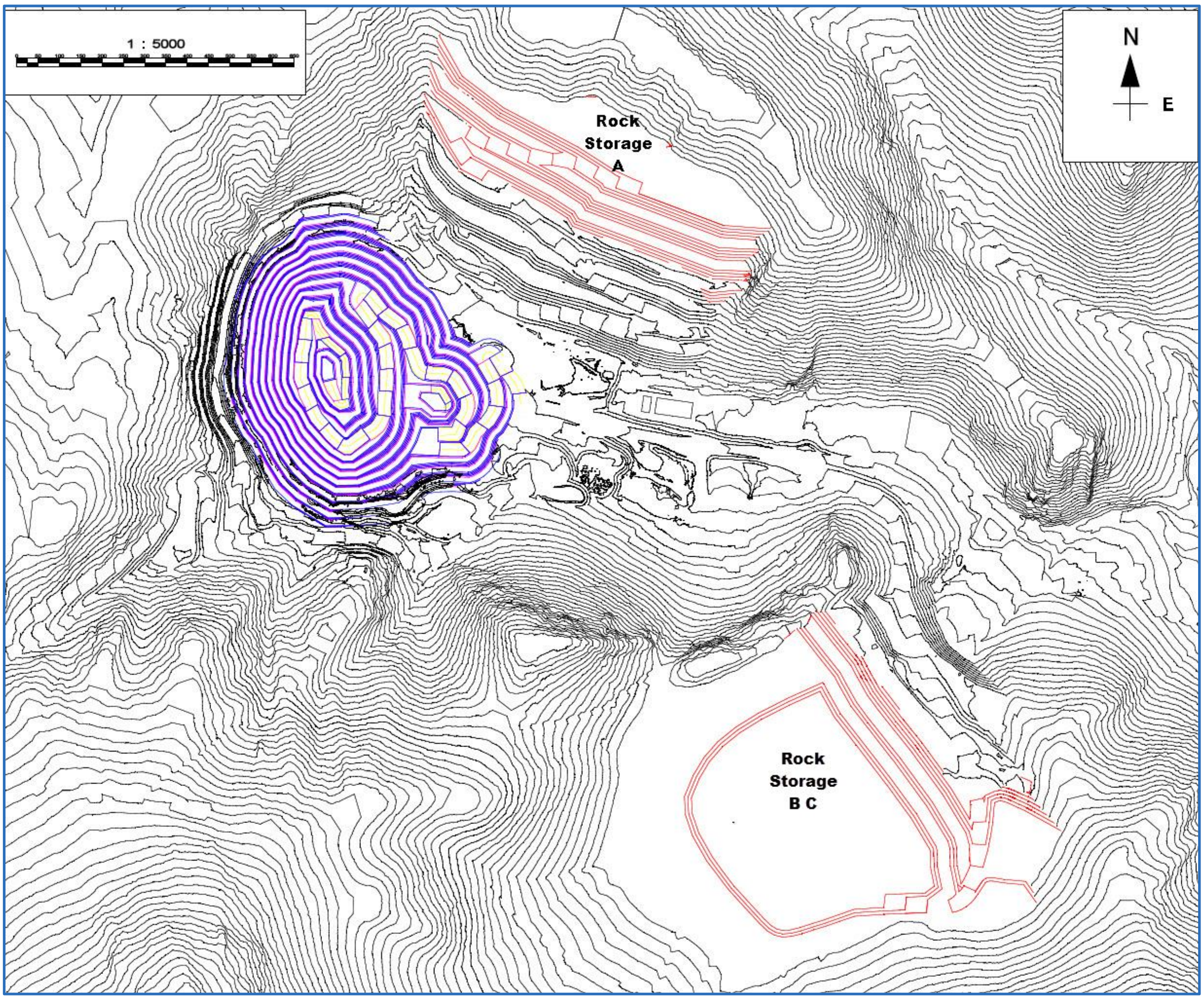
Waste rock is mined and hauled to two major on-site rock storage facilities based on geochemical characteristics.

For the mine planning work the NSR is calculated for each block. No dilution is included in the block model. Ore is placed in the ore staging area as it is mined from the pit. The ore is then loaded onto haul trucks and transferred to Pirquitas on a daily basis. Material that falls between the Resource cut-off and the Reserve cut-off is stockpiled separately as mineralised waste.

16.3 Mine Design

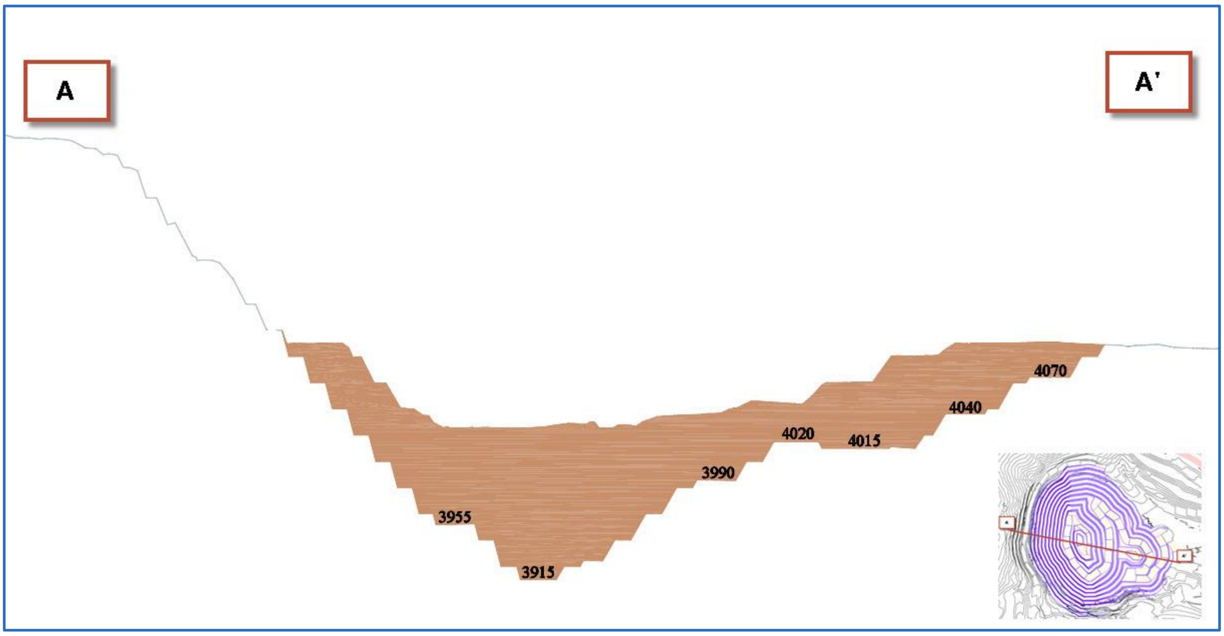
The Mineral Reserves were developed based on mine planning work completed in 2021 that included pit optimisation and redesign of the pit phases. The 2021 ultimate pit design and the waste dumps at Chinchillas are shown in Figure 16.3. Figure 16.4 shows a section of the main pit from east–west.

Figure 16.3 Chinchillas 2021 Ultimate Pit Design



SSR, 2020

Figure 16.4 Long Section of the 2021 Pit Design



SSR, 2020

16.4 Rock Storage Facilities

Some of the waste types have the potential to leach metals and are separated from the neutral waste material. Based on geochemical characteristics, waste is classified into three groups designated A, B and C. Type 'A' waste is stored close to the pit as it has the potential to leach metals. This is so that the drainage can be collected in the pit and if necessary be treated. Type B and C are stored together in the same location.

According to this classification, two waste rock storage facilities have been designed for Chinchillas to accommodate different rock types. These can be seen in the general site layout Figure 16.3.

Rock storage A is close to the pit, on a hill side to the north-east of the Chinchillas pit. The toe of this dump is 100 m offset from the pit rim. Rock storage B and C are located to the south-east of the active mining area on somewhat flatter terrain. Waste Rock Facilities are built with 25 m lifts and 15 m berms. The angle of repose for each lift is 35 degrees and the overall slope angle of dumps is 26°. Access to the dump is by 30 m wide haulage roads. The total height of the dumps are approximately 100 m.

16.5 Mining Equipment and Personnel

The mine operates 355 days a year with two 12-hour shifts per day. The amount of mining equipment required for the operation varies by the tonnages of material moved in each period.

The mining operation utilises 12 m^3 wheel loaders to load 100 t off-highway trucks. Two main drills and two smaller drills will be sufficient for the life of mine. D9 dozers and graders provide ancillary support. The graders are also used for maintaining the 42 km ore haulage road.

The mining personnel are grouped into three sections as operation, maintenance and management/technical.

16.6 Production Scheduling

Mining production is scheduled throughout the current mine life which is five years. Ore is classified into grade bins: low grade and high-grade ore. Milling cut-off grade is calculated to be $44.11/t NSR.

Table 16.3 Production Schedule for Chinchillas Project

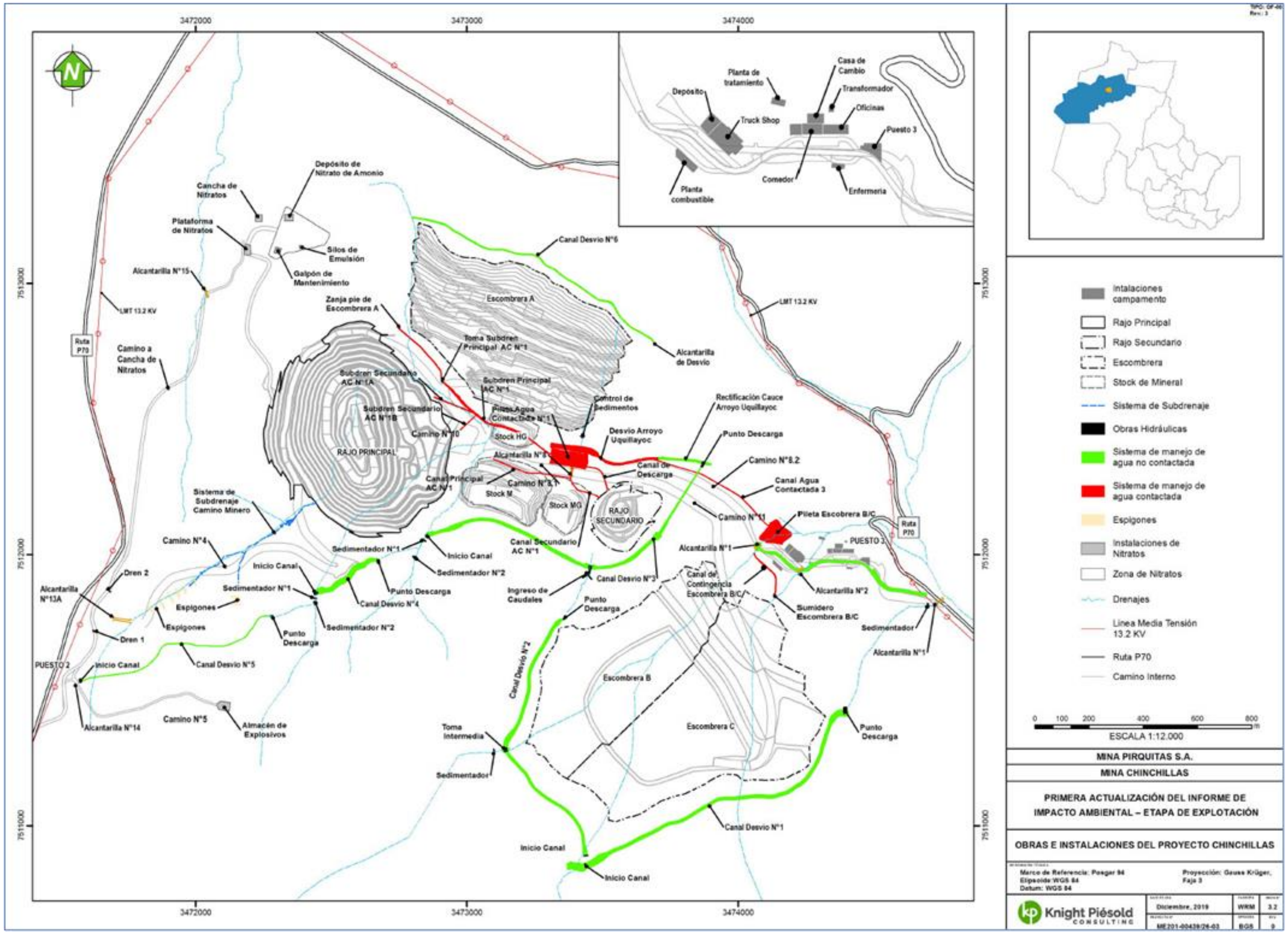
Description	Unit	Total	Project Year				
			2022	2023	2024	2025	2026
Total Movement	kt	29,671	10,652	9,168	5,316	3,725	809
Waste Mined	kt	22,469	9,033	7,437	3,655	2,008	336
Ore Mined	kt	7,202	1,619	1,732	1,661	1,717	473
Strip Ratio	kt	3.1	5.6	4.3	2.2	1.2	0.7
Processed	kt	7,352	1,643	1,643	1,647	1,647	773
Ag Feed grade	g/t	160	168	176	158	158	123
Pb Feed grade	%	1.32	1.24	1.38	1.43	1.43	0.94
Zn Feed grade	%	0.29	0.47	0.34	0.19	0.19	0.22
Silver Recovery	%	95.5	96.2	96.2	96.2	93.6	94.7
Silver Produced	koz	37,210	8,529	8,924	8,026	7,809	3,921
Payable Silver Produced	koz	35,135	8,051	8,427	7,581	7,375	3,701

Metal produced includes current concentrate stockpiles containing 242 koz silver and 5 Mlb lead.

16.7 General Mine Site Layout

Figure 16.5 shows the general site layout of Chinchillas mine.

Figure 16.5 Chinchillas General Mine Site Layout



Knight Piesold, 2019

17 RECOVERY METHODS

Chinchillas material is processed at a rate of up to 1.7 Mtpa through the existing Pirquitas Operation process plant. The Pirquitas plant was commissioned in 2009 and has since been in continuous operation.

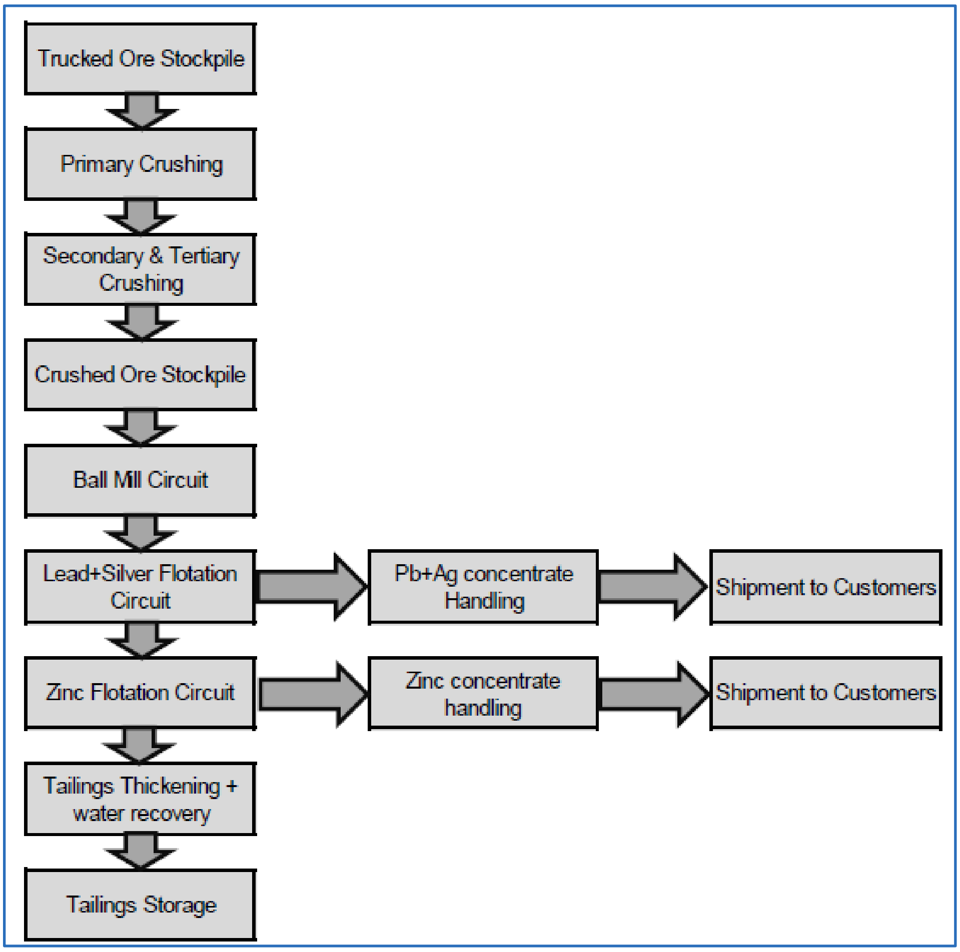
The plant has not been expanded since start-up; however, minor changes in the flotation flow sheets have occurred to optimise performance.

17.1 Process Overview for Chinchillas

The Pirquitas plant was upgraded in 2017 to process the Chinchillas ore types, producing a silver / lead concentrate and a zinc concentrate.

A schematic diagram of the Chinchillas process flow sheet is shown in Figure 17.1.

Figure 17.1 Chinchillas Processing Flow Sheet Overview



17.1.1 Stockpiling and Crushing

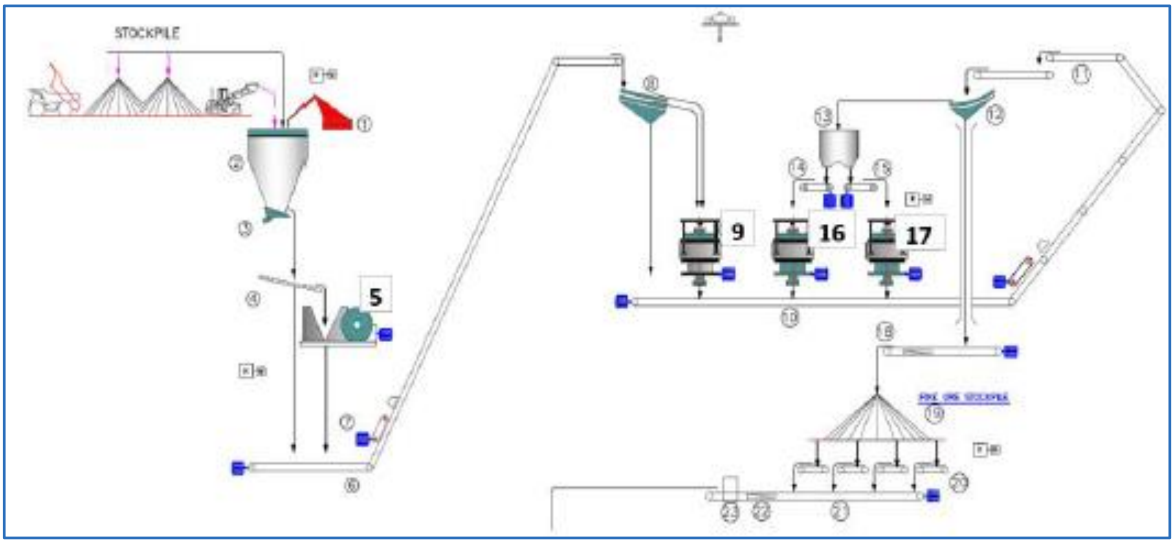
The trucked material is delivered to suitable stockpiles at the primary jaw crusher. The jaw crusher is fed directly via 35-42 t truck dumping or with a front-end loader. Mill operations decides daily feed blending from the ore stocked looking for steady head grade according to the production plan.

Secondary/tertiary crushing and screening operations will reduce this material to an 80% passing size of 9 mm. This material is discharged onto a crushed feed stockpile with four feeders located beneath the stockpile.

The crushing circuit was designed to process up to 6,000 tpd.

Figure 17.2 shows the crushing circuit flow sheet.

Figure 17.2 Chinchillas Crushing Circuit



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17.1.2 Grinding

The ball mill circuit grinds crushed ore to the optimum size at a rate of 4,500 tpd. The ball mill is 4.8 m in diameter by 6.25 m long with 2,400 kW of installed power. Mill discharge is pumped to a cyclone nest where the underflow is returned to milling operations and the overflow reports to flotation.

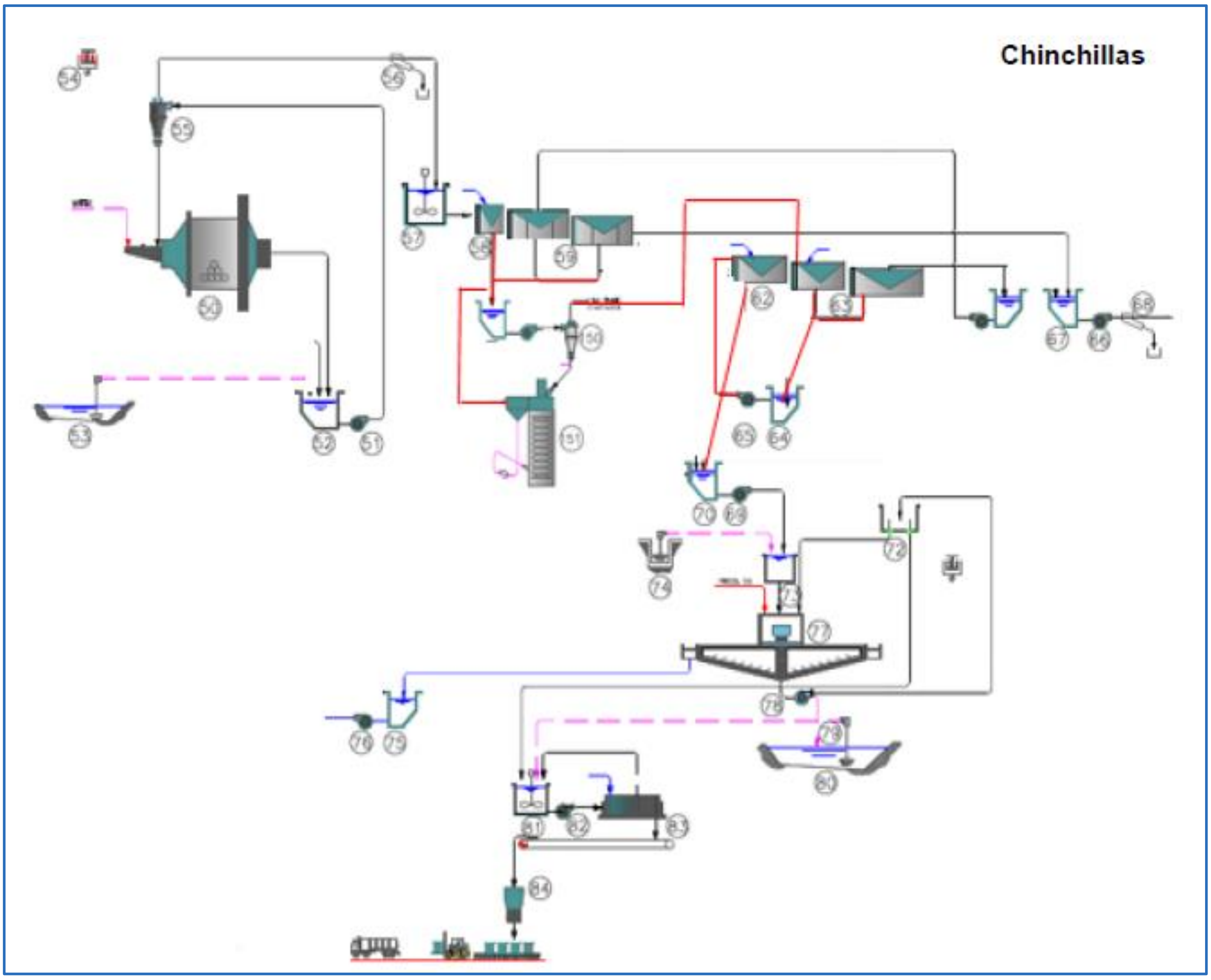
The addition of granular lime to the ball mill feed belt is done for flotation pH control. The pyrite/sphalerite depressant and frother are added into the mill. The lead/silver flotation collector and a reinforcement of frother are added to the cyclone overflow.

17.1.3 Lead / Silver Flotation

The lead/silver flotation section consists of rougher, and in the concentrate cleaning stage with a scavenger stage.

Figure 17.3 shows the lead/silver recovery circuit for Chinchillas ore.

Figure 17.3 Grinding and Lead / Silver Recovery Circuits for Chinchillas



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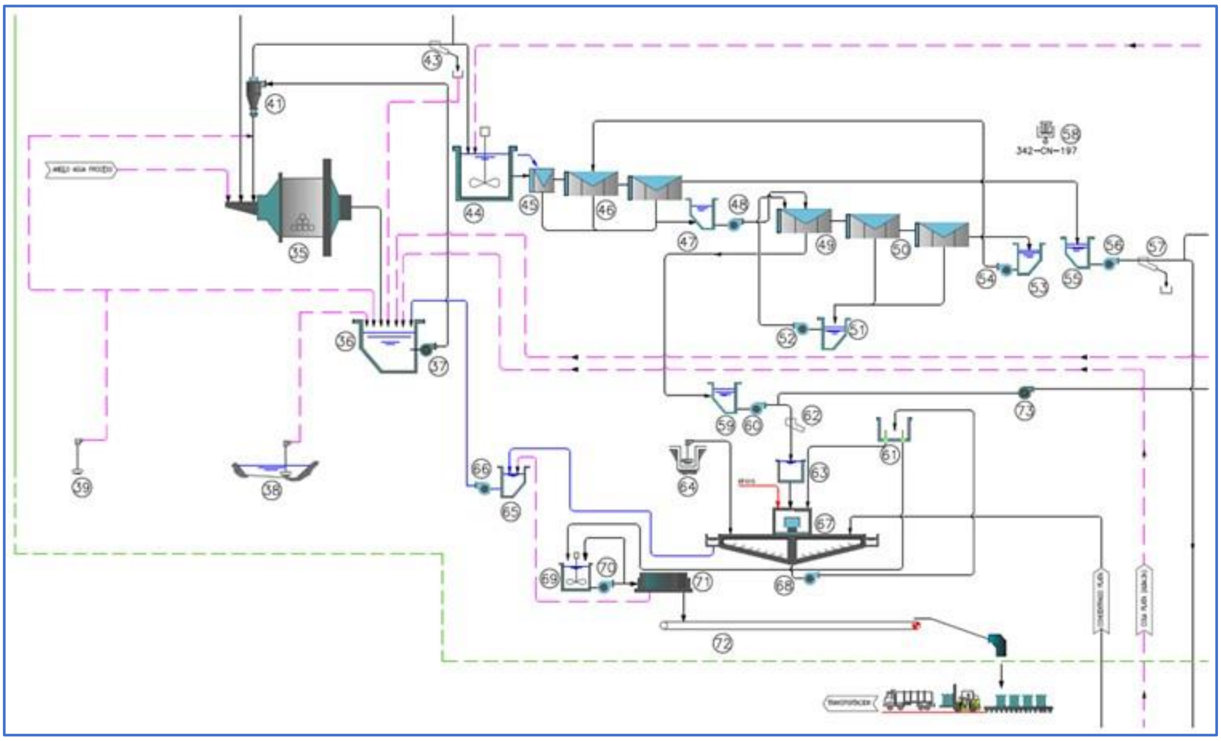
17.1.4 Zinc Flotation

The zinc flotation circuit consists of rougher, and one stage of conventional cell concentrate cleaning followed by one stage of column cell cleaning.

Figure 17.4 shows the zinc recovery flow sheet for processing Chinchillas material.

Figure 17.4 Zinc Recovery Circuit for Chinchillas



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17.1.5 Concentrate Handling

The Pirquitas silver / lead concentrate dewatering circuit consists of a thickener, holding tank and pressure filter. However, as higher lead feed grades are mined after the first few years of operation, the existing tin concentrate thickener will be recommissioned along with an additional new filter press to handle the higher lead/silver concentrate production.

The Pirquitas zinc concentrate dewatering circuit consists of a thickener, holding tank and filter.

After filtering, the concentrates are bagged into one tonne bulk bags. Sampling will be by manually inserted spear samplers.

17.1.6 Tailings Handling

The Pirquitas plant tailings thickener was designed to treat a low density, tin circuit tailings (~20% solids) at 4,090 tpd. The Pirquitas plant has operated successfully on zinc tailings at higher tonnages. The thickened solids (55% to 58% solids) are pumped 6 km to a portion of the mined-out Pirquitas pit for storage. Water recovery is a combination of tailings thickener overflow and in-pit pond, both recycled to the plant reclaim water system.

17.2 Process Plant Performance

The Pirquitas process plant has continued to improve performance after upgrading and converting to Chinchillas ores in 2018. These improvements have included better understanding of flotation characteristics of the ores, improved operating and maintenance practices and a change of cyclone in the grinding circuit.

These changes have seen improvement from the expected 4,000 tpd capacity to 4,500 tpd achieved in 2021.

Table 17.1 summarises mill feed and grade, with recovery and production for metals in concentrate.

Table 17.1 Mill Production Summary 2018 to 2021

	Unit	2018	2019	2020	2021
Ore Milled	kt	1,420	1,393	1,118	1,643
Ag Feed	g/t	114	184	164	158
Zn feed	%	0.84	0.54	0.51	0.57
Pb Feed	%	0.85	0.89	0.77	1.12
Silver Recovery	%	72.1	93.2	94.6	95.8
Zinc Recovery	%	39.3	49.2	55.5	65.6
Lead Recovery	%	82.6	85.8	90.2	93.0
Silver Produced	koz	3,747	7,674	5,581	8,010
Zinc Produced	klb	8,775	8,392	6,988	13,641
Lead Produced	klb	3,107	23,958	17,193	37,695

18 PROJECT INFRASTRUCTURE

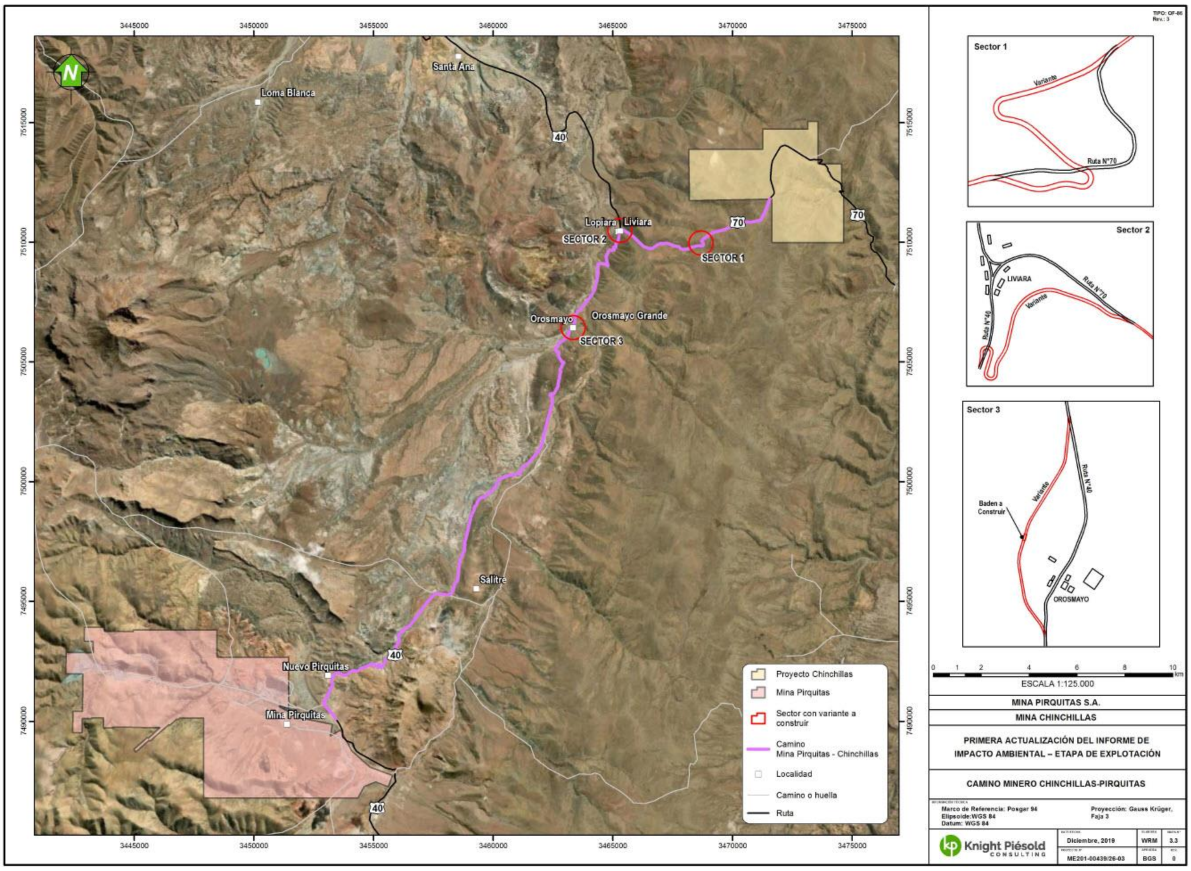
The main approach to infrastructure for the Project is to maximise the use of existing infrastructure and facilities at the Pirquitas Operation and minimise the building of new items at the Chinchillas site.

The Pirquitas Operation includes significant infrastructure used to sustain mining and processing operations over the last seven years, much of which remains suitable for continued operation. These facilities include roads, a gas pipeline, power generation facilities, water diversion systems, tailings dams, mine waste stockpiles, camp facilities, office buildings, maintenance shops and communications systems.

18.1 Ore Haulage

The ore transport road from Pirquitas to Chinchillas is the National Route No. 40 that leads to Provincial Route No. 70. The route required upgrading in order to have the increased traffic, including 35-42 t ore haulage trucks, safely and efficiently travel the route. A road survey was completed and a road design was developed and constructed to widen roads and improve route conditions, including bypasses of the local villages of Orosmayo and Liviara to minimise social impacts. This design, along with improved river and creek crossings and the requirement for road surface topping. Figure 18.1 shows the access road route.

Figure 18.1 Access Road for the Project and Proposed Modifications



Knight Piesold, 2019

18.2 Gas Pipeline and Power Supply

For its source of electricity the Pirquitas Operation uses natural gas to power three Wärtsila generator sets, each with a capacity of five megawatts (MW) of power. In addition, the same electrical plant has three diesel-powered Cummins generators, each yielding 1.1 MW. There is 6.7 km of gas pipeline on the Pirquitas property. The pipeline is 152 mm diameter, constructed of API5L Grade B steel with 4.8 mm wall thickness in normal applications and 7.1-mm wall thickness at river or drainage crossings.

Power for the Chinchillas mine site supplied along existing power lines from the natural gas powered generators at Pirquitas. EJESA is the local power authority that owns the lines. The power line from Pirquitas that goes directly past the rural EJESA line at the town of Nuevo Pirquitas (approximately five kilometres from Pirquitas). The rural power line then goes from Nuevo Pirquitas to all villages along Route No. 40 and Route No. 70 and directly to Santo Domingo. This line is able to carry the 1MW load for Chinchillas, with a small spur line (approximately four kilometres in length) to take power into the mine.

No ore processing is done at Chinchillas therefore power requirements are minimal. In the event of power loss at Pirquitas. Back-up power from the EJESA grid that amounts to 100 kVa can be drawn. This back-up power is designated for critical telecommunications systems and the first aid building.

18.3 Water Supply

Water supply for the Pirquitas Operation comes from the northwards flowing Collahuaima River which lies immediately east of the property. Water is pumped seven kilometres to the mill from a site known as San Marcos located within the mine property, a short distance downstream from where the Pirquitas River drains into the Collahuaima River. By means of Permit No. 201/002, originally granted to Sunshine Argentina by the Dirección Provincial de Recursos Hidricos de Jujuy and recorded by the Ministerio de Obras y Servicios Publicos on 23 July 1998, the mine is allowed to draw up to 32 L/s of water from the river.

Water supply for the Chinchillas mine will be supplied via local pumping wells. There is allowance for a water distribution system, equipment washing, road dust control, sewage and fire water facilities. Potable water for Chinchillas will be supplied by bottles and larger water totes.

18.4 Tailings

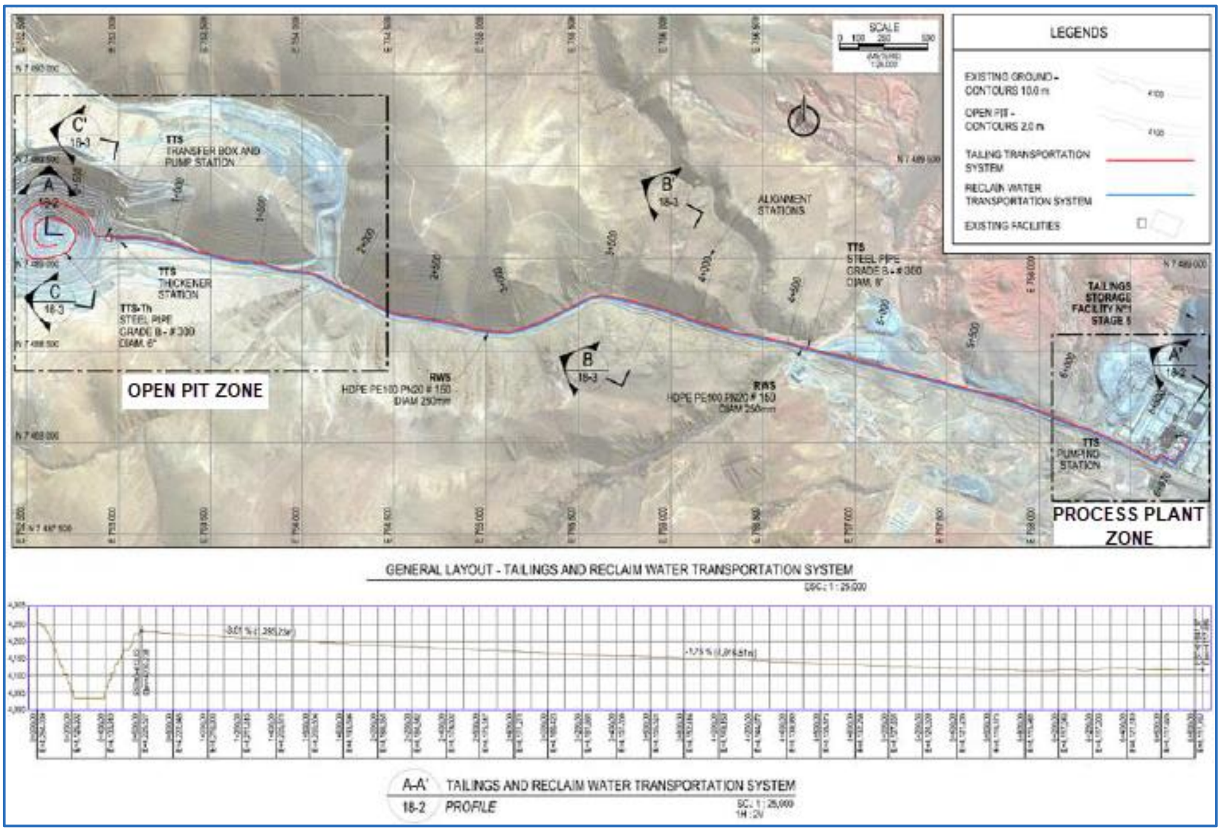
MPSA is currently using the Pirquitas pit as a tailings reservoir. These tailings come from the processing of the Mina Chinchillas ore.

The use of the Pit as a tailings reservoir was approved by the Authority through Resolution No. 056/2018, after submitting the Addendum to the Authority in August 2017.

Placing the tailings inside the pit involves transporting them from the process plant to the pit by means of a pumping system and a 6.3 km pipeline to the tailings box located on the edge of the pit, to be discharged to the pit. Likewise, the tailings reservoir has a water recovery system to pump the water (from the tailings, the flows that enter the pit by filtration, direct rain and surface runoff) to the process plant for reuse. This pipe follows the same route as the pipe that transports the tails. The disposal of the tailings in the pit began in April 2019.

Thickened tailings (55% solids) are transported to a portion of the Pirquitas pit through a pipeline for in-pit disposal, tailings in-pit discharge system from the tailings transport pipeline, in-pit water reclaim system, and pipeline from the Pirquitas pit to the Pirquitas plant for reuse. Water recovery will be a combination of tailings thickener overflow and in-pit pond, both recycled to the plant reclaim water system. These proposed upgrades will allow for additional tailings capacity in connection with the processing of Chinchillas ore. The distance from the Pirquitas plant to the Pirquitas pit is six kilometres and the grades vary from 1.7% to 3.0% uphill. The alignment and gradient is shown in Figure 18.2.

Figure 18.2 Alignment and Gradient of the Tailings Line for In-pit Disposal



SSR, 2021

18.5 Communications Systems

The Pirquitas site is equipped with both cellular and landlines. This equipment uses cell phone towers to communicate to Abra Pampa and is connected via a land line to the Pirquitas mine offices and buildings. On-site communication at Chinchillas is via radio communication and local phone.

18.6 Camp, Office, and Chinchillas Infrastructure

The Pirquitas camp site is equipped with housing sufficient for a maximum of 673 personnel. This housing is a mix of rehabilitated housing from prior mining operations and modular housing that was installed during construction. It is anticipated that Chinchillas and Pirquitas operating management and senior staff will be housed at the Pirquitas camp while local workers and operators will be transported to their local villages.

Camp food is catered by a contractor and is provided on a seven day per week schedule. Food as required by Chinchillas workers will be delivered daily to Chinchillas.

Office buildings at Pirquitas are a mix of rehabilitated offices from prior mining operations and modular office space installed during mine construction.

The following facilities are located at Chinchillas:

- Mine and administration offices
- Truck shop
- Lunchroom (food preparation and storage is at the Pirquitas camp – daily delivery)
- Change room / Bathrooms / Training room
- Water wells, distribution and sewage system
- Lighting and heating facilities
- IT network
- Explosives magazines, and transfer of emulsion silos from MPLLC
- Fire and lightening protection
- Oil and fuel storage
- Security and first aid buildings
- Solid waste storage facility

Solid waste materials will be collected at the mine site and will be delivered to Pirquitas for recycling. A small landfill facility will be developed at Chinchillas site for small amount of solid waste produced at site. The explosives facilities are located at Pirquitas in accordance with Argentine mining regulations.

The infrastructure and facilities listed above can be seen in general site layout in Figure 16.5.

18.7 Mine Short Term/Long Term Ore Stockpiles

In the east side of the pit, adjacent to the pit rim, a pad has been developed using type C waste materials for multipurpose tasks. The size of the pad is approximately 400 m x 300 m. This includes a staging area for loading ore onto the haulage trucks to be transported to the mill. A short-term ore stockpile of ore will be formed in this area, with the amount of stockpiling varying by period. A small amount (690 kt) of low-grade ore will also be stockpiled on this pad as long-term stockpile. This will be milled at the end of mine life before closing the mine. Refer to Figure 16.5 for general site layout where the location of short-term and long-term stockpiles are shown.

18.8 Rock Storage Facilities

The mine currently has two waste stockpiles as described in Section 16.4. Rock storage facilities are classified by their geochemistry attributes as discussed in Section 20. Potential Acid Generating (Type A) will be disposed close to the pit rim so that its drainage will be collected in the pit and treated accordingly at closure. Mineralised waste will be separated and stockpiled with Type A material, but adjacent to the ore stockpiles, for potential processing opportunities at a later date. High metal leaching materials (Type B) will be stored with Type C (non-hazardous materials) with a controlled drainage system. Rock storage facilities can be seen in general site layout at Figure 16.5. More information about managing Type A and B materials can be found in Section 20.

18.9 Other Pirquitas Infrastructure

The Pirquitas site has a permitted wastewater treatment facility for treatment of liquid waste from camp operations. This system is designed to allow for discharge of treated waste-water to national standards.

The site has a landfill for organic waste and a recycling centre for plastics, wood and metal products. Most wood products are donated to the local communities and are used as fuel or for construction supplies. Scrap steel and specialty steels are recycled via local vendors.

Domestic water comes from a water diversion located in the Medano Canyon area which is approximately 300 m upstream from the Pirquitas mine open pit. Water is pumped from that location to a site water treatment facility for filtering and chlorination and is then used within the camp site. At the date of this Puna21TR, potable water is currently supplied by bottles and totes for drinking and cooking purposes.

Concentrate shipments from Pirquitas are currently trucked to Susques, Jujuy from Pirquitas via Route 77, and from there to Buenos Aires via Route 9. At arrival to the terminal, the material is directly dispatched from the port facilities to the concentrate buyers.

19 MARKET STUDIES AND CONTRACTS

The Project is a poly-metallic project containing three principal metals – silver, lead and zinc. Production is from two separate concentrates: a high silver content lead concentrate and a zinc concentrate.

The lead concentrate contains most of the recovered silver metal and is the more valuable of the two concentrates. Trace amounts of minor penalty elements are present in both of the concentrates.

19.1 Metal Prices

Silver is traded on a global basis on a number of metals and commodity market exchanges. The price is determined by a number of factors that follow short and long-term trends and is most commonly established on the London Metal Exchange.

Metal prices for the economic analysis were estimated after analysis of consensus industry forecasts and compared to metal prices used in other published studies. The metal prices are representative of industry forecasts. Lead and zinc are relatively low compared to the consensus prices. The prices used for the economic analysis are shown in Table 19.1

Table 19.1 Metal Price Assumptions

Commodity	Unit	2022	2023	2024	2025	Long-Term
Silver	$/oz	24.00	23.00	22.00	21.00	21.00
Lead	$/lb	1.00	0.95	0.93	0.92	0.90
Zinc	$/lb	1.30	1.20	1.20	1.20	1.20

19.2 Concentrate Terms

The Chinchillas concentrates are commodities and are sold and traded in global markets. Sales are either made directly to smelter operations or through commodity traders.

The logistics, required customs procedures, and exporting requirements are therefore well understood by the MPSA.

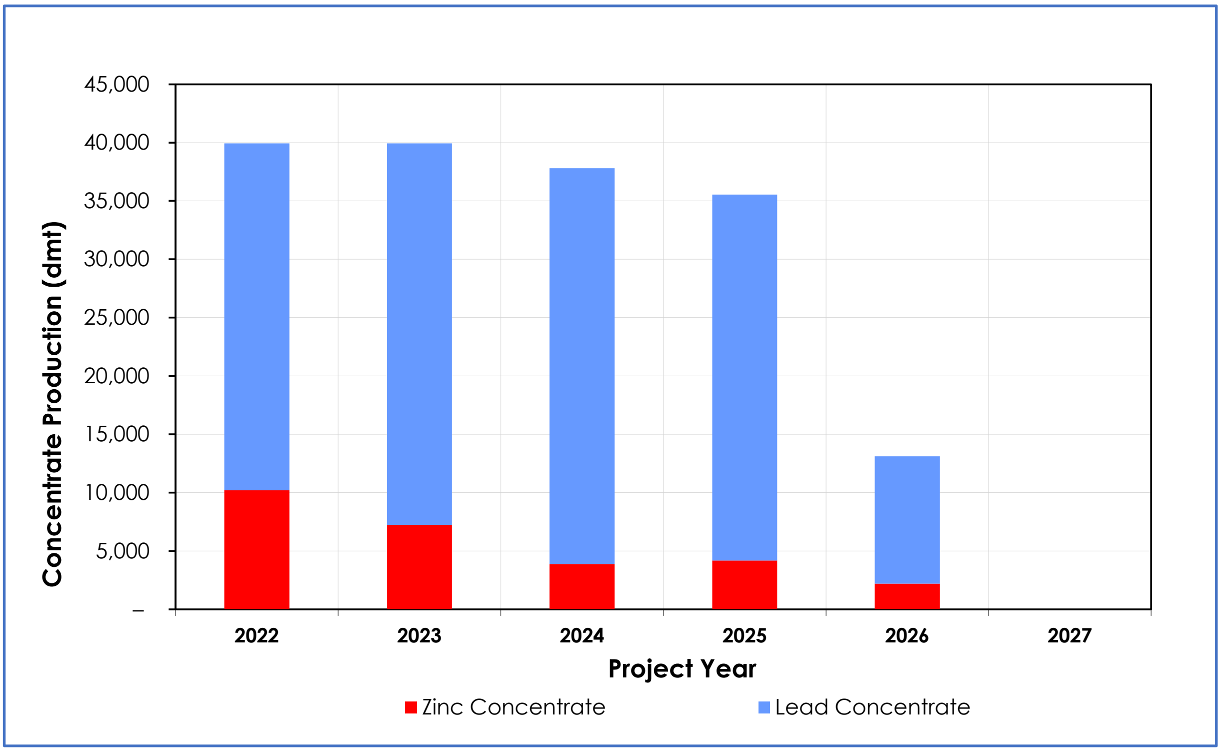
Average concentrate terms and transport are based on experience at the Puna Operations and are shown in Table 19.2.

Table 19.2 Concentrate Marketing Terms and Charges

Item	Unit	Lead Concentrate	Zinc Concentrate
Treatment and Refinery Charge	$/t Conc	1,191	724
Payability – Silver	%	95	75
Payability – Lead	%	95	
Payability – Zinc	%		85
Deduction – Lead	%	3	
Deduction – Zinc	%		8
Minimum Payout Factor	%	63	39
Royalty	%	3	3
Export Duty (Rev. Less TCRC's)	%	5	5
Puna Credit (Rev. Less TCRC's)	%	2.5	3

The concentrate quantities produced by period are displayed graphically in Figure 18.2 and are derived from the annual mine production schedule.

Figure 19.1 Concentrate Production



OreWin, 2021

20 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

Significant environmental and social analysis has been conducted for both Mines. A summary of key physical, chemical, and biological information is provided in the following sub-sections.

20.1 Mina Chinchillas

20.1.1 Surface Hydrology and Water Quality

The Chinchillas Property is located in a small, contained valley near the headwaters of the Colquimayo and Orosmayo rivers. Drainage from small ephemeral streams into the Project area collect in the valley bottom in the Arroyo Uquillayoc, which drains to the east into Rio Colquimayo.

Flows in the small tributaries that drain the Project area are governed primarily by rainfall, which is typically highest between December and March. Typical flows in the Arroyo Uquillayoc near the Project site are low, ranging from 0–1.5 litres per second (L/s) during the dry period, and between 0.3 and 20.0 L/s during the rainy season.

Surface water quality samples were obtained and analysed from 22 sites between 2011 and 2016, from within the Project area in the Arroyo Uquillayoc as well as far-field sites site in Quebrada San Pedro, the Rio Colquimayo and Rio Cincel, as well as the Rio Orosmayo.

Both surface and groundwater baseline sampling show the influence of native mineralisation in the host rock. While surface water chemistry is generally circumneutral, Arroyo Uquillayoc near the Project site seasonally shows variation from acidic (pH 5.9) during higher flows to basic (maximum pH 8.0) during lower flows. Annual average pH at these sites was neutral, between 6.8 and 7.2.

In Argentina, the Environmental Protection for Mining Activity Law (Ley de Protección Ambiental para la Actividad Minera in Spanish) specifies limits of parameter concentrations in water quality in the absence of site-specific data for various end uses, including drinking water, aquatic life, irrigation, and livestock watering. Metals such as aluminium, antimony, arsenic, barium, boron, cadmium, copper, chromium, iron, lead, manganese, nickel, vanadium, and zinc occasionally are at, or exceed, these concentrations in the baseline water sampling.

Surface water parameters in the Quebrada de San Pedro exhibited generally more neutral pH, but with similar metal concentrations.

The sampling location in the Arroyo Uquillayoc as it exits the Chinchillas valley will be used during operations as a point of control to monitor water quality during operations. In the baseline condition, samples from the Arroyo Uquillayoc at the outlet of the Chinchillas valley exhibited exceedances for a number of the limits set by the Environmental Protection for Mining Activity Law. This suggests that some metal parameters occur naturally in higher concentrations in Project area waters, which would be expected, as they are draining the valley that contains the mineralised zone. Mitigation and management programmes are part of the Project permitting. These programmes consider the naturally elevated baseline parameters.

Currently MPSA monitors 17 of the original 22 sites given the expansion of the mine. The monitoring programme includes 1 control point and 2 compliance points. MPSA monitoring to indicates that the water quality values are between the maximum and minimum baseline parameters.

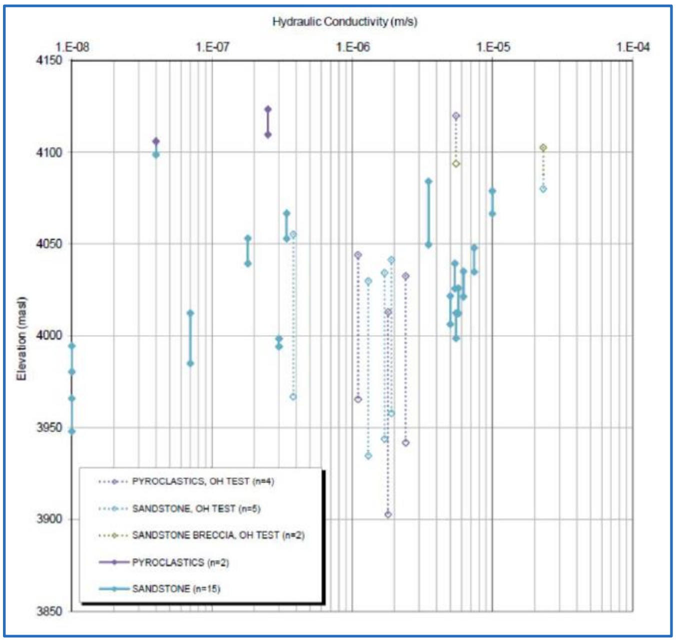
20.1.2 Hydrogeology

The Chinchillas site is located in a caldera or bowl-like feature in the side of the mountain range, resulting in some flow towards the bowl from the north and south as well as from the east. The bowl is somewhat like a shallow open pit.

Groundwater discharges to topographic lows, such as the local drainage in the deposit area depression and to the regional low elevation at the base of the range to the east and west of the Project area. Elevations are highest along the south–south-west–north–north-east divide of the Sierras and decrease towards the east and west. Groundwater gradients are therefore steepest towards the east and west, and groundwater is expected to generally flow in these directions following topography.

Hydrogeological data were collected during a 2015 site investigation consisting of drillhole logs, hydraulic conductivity testing (packer tests and open-hole tests), water level observations, and drilling circulation records. Sixteen packer tests and nine open-hole falling head tests were completed in three geotechnical drillholes in the deposit area. Hydraulic conductivity values estimated from the packer tests range from less than 1 x 10–8 m/s to 1 x 10–5 m/s (Figure 20.1).

Figure 20.1 Response Test Hydraulic Conductivity by Lithology



MPSA, 2021

The metasediments outside the caldera feature are expected to have a relatively low hydraulic conductivity. Storage values are expected to be low, provided almost entirely by joints, fractures, bedding planes and faults. Within approximately 300 m from the contact margins with the overlying tertiary pyroclastics, the permeability of the metasediments increases due to the strongly fractured nature of the rock.

North-west trending faults likely provide partial barriers to groundwater flow across the faults and enhanced flow parallel to faults. The fractured zone adjacent to the metasediments has relatively high hydraulic conductivity, likely in excess of 1 x 10–6 m/s.

Groundwater discharges occur primarily in topographic lows, often into stream beds. The indications from the available surface flow measurements are that groundwater discharge contributes from 1.5 L/s to upwards of 4 L/s to stream flows at the eastern extent of the Chinchillas valley. The groundwater reporting to the pit area is estimated to be 1.8 L/s.

Arid climatic conditions result in relatively high evapotranspiration rates that ultimately minimise the amount of precipitation available for groundwater recharge. The variation in annual precipitation impacts the precipitation available for groundwater recharge from one year to the next.

Recharge could vary from insignificant to about 50 mmpa, depending on climatic conditions and surface materials. This is expected to result in water level increases of a few metres in wet years, which would decrease over drier years. Smaller variations can be expected on a seasonal basis.

Currently the dewatering system consists of sumps located on the base of the pit and discharged through a pump to a contact water pool near the facility (A Pond – Contact water). This water is used for dust control.

MPSA is evaluating the necessity of a dewatering system consisting of wells containing submersible pumps located in the perimeter of the pit.

Groundwater quality samples from monitoring wells immediately adjacent to the Project area were collected in 2015 and 2016. Similar water quality parameters were observed in the groundwater to those identified in the surface water samples discussed above.

Sample results were compared to limits specified in the Environmental Protection for Mining Activity Law. As was noted in the surface water, exceedances were noted in the baseline condition for some metals parameters. These variably included exceedances of the drinking water, aquatic life, irrigation, and livestock watering limits. However, these exceedances are considered natural and represent water that drains from within and around the mineralised zone and are carefully documented as part of the baseline monitoring programme.

The current monitoring programme includes one well located downstream of the Chinchillas Mine. The most recent shows water quality values are between the maximum and minimum baseline parameters.

20.1.3 Geochemistry

Geochemical investigations were undertaken in order to assess the potential for net acid generation and the potential for metal leaching. As described above, both surface water samples and groundwater samples in the area of the mineralisation show circum-neutral pH values. Water samples exhibited slightly elevated sulfates (ranging from <25 mg/L SO4 to 100 mg/L SO4), alkalinity up to 100 mg/L and a range of dissolved and total metals. There are no strongly acidic seepages found in the Project area, either in the surface drainage or the groundwater. Of particular interest in the prediction of water chemistry from the Project, there are slightly elevated values of aluminium, zinc, cadmium, iron, manganese and antimony found in some baseline samples. These metals are consistent with the mineralisation of the Project area and the Chinchillas deposit.

The regional geology comprises a package of sediments overlain by volcanics. Within this region, the deposit was formed by a major east–west trending fault structure along which volcanic intrusions and mineralising events have resulted a zone of pyroclastic rocks (breccias, tuffs and ash) forming a roughly elliptical deposit. The deposit has undergone several different types of alteration, primarily clay alteration with lesser sericitisation, silicification, and carbonate alteration. The deposit lithology is therefore broadly grouped by lithology into (meta)sediments and volcanics, and further by alteration.

Silver, lead and zinc bearing minerals include silver sulfosalts, boulangerite, tetrahedrite, freibergite, sphalerite, and galena. Associated mineral assemblages include chalcopyrite, pyrite, siderite, limonites, manganese oxides, and malachite. The mineralisation occurs as disseminated within the breccias but primarily along structure within the volcanics and basement rocks. Considering the environmental geochemistry, this deposit would be considered a low sulfide system and a low carbonate (alkalinity) system.

A suite of 34 samples were selected for geochemical testing to provide spatial coverage of the expected mine areas and to evaluate the characteristics of the various lithological and alteration units, and mineralisation within ore and waste for the deposit. The extensive exploration ICP database was evaluated before selecting the samples in order to ensure that representatives of low grade ore and waste rock were selected.

Testing included both standard elemental analyses (by ICP) and acid base accounting to characterise the range of sulfide content (and therefore potential for acid generation) and carbonate content (and therefore potential for neutralisation).

The static test results are consistent with those expected from the deposit geology; relatively low sulfur content and low carbonate content, and mineralisation concentrated in the breccias. The metal contents reflect the main minerals in the deposit, with zinc and cadmium associated with the sphalerite, aluminium associated with the clay alteration, and copper occurring in the freibergite and chalcopyrite.

The key findings with respect to the potential for net acid generation are:

- Paste pH of the samples range from neutral to slightly acidic, with the majority of the samples between paste pH of 5.7 to 8.1.

- Total sulfide content of the samples is low, ranging from <0.01% to 4% S, with one sample of breccia at 7% S. This is consistent with the statistical analysis of the entire exploration IPC database of the deposit (including ore) which shows sulfide concentrations range from <0.1 wt % to >10 wt % with an average of 0.75 wt % for the deposit.
- Carbonate concentrations are relatively low, ranging from less than detection to 4.3 kg/t CaCO3 equivalent.
- Sulfate sulfur concentrations are low in the rock samples, indicating minimal in situ oxidation of the sulfides. This is consistent with the geological model of a shallow oxidation front.
- The ratio of neutralisation potential to acid potential (NP/AP) is used to indicate the potential for net acid generation from a static test. Approximately 75% of the samples are considered non-acid generating based on the NP:AP ratio or the low sulfur content. Approximately 25% of the samples could be considered potentially weakly acid generating, however given the relatively low sulfide content this may represent only local zones of potential net acidity.

This is consistent with the baseline observations of generally circum-neutral water quality in the project area.

Selected samples were tested using a various short-term leach extraction tests to provide an indication of potential metal leaching from these samples. These tests are designed as 'batch' or instantaneous tests to maximise dissolution of metals from a sample; these tests can overestimate actual drainage water chemistry in the longer term. The short-term filter extraction tests were used to indicate the potential for metal leaching for the range of rock samples encountered in both waste rock and low grade materials. Sample results indicated that certain units of waste rock may have leachable aluminium, cadmium, copper, lead, and zinc where lower pH values occur.

The static tests and the evaluation of the ICP database confirm that the samples selected cover the range of expected sulfide concentrations in the mining material. On-site materials have a low neutralisation potential. Therefore, the classification of materials is primarily a function of the content of sulfur and metal. These results indicate that most of the waste rock has low potential for acid drainage and metal leaching, mainly due to relatively low sulfide and mineralisation outside the ore zones.

A combination of sulfide, zinc and paste pH are used to identify waste rock that is a potential source of metals leaching or acid drainage. These parameters are included in the mine block model and are used for the design of the waste rock handling.

The mine block model is used to manage the waste rock according to the net acid generation potential and / or metal leaching potential in the waste rock storage areas. This is accomplished through segregation of potentially reactive waste rock (Class A) placement in the dumps with contained drainage. These waste rock storage areas have controlled drainage and, in the long term, can be directed to the open pit if necessary. Non-reactive waste rock (Class B or C) are placed separately further downstream in the catchment.

A rock sampling programme is projected on 2022 in order to update the geochemical information. The programme will include kinetic ARD assays of the rock.

20.1.4 Water Management

During the Project life, water quantity and quality is managed to maximise diversions and maintain 'non-contact' water. The site water management plan is designed to 'keep clean water clean' as much as possible. Diversion ditches have been designed around the dumps, pit and stockpiles to convey clean or non-contact freshwater around these disturbed areas, where it is physically practical. The 'Class A' Rock Storage Area stores potentially reactive rock and is located such that it can drain into a contact water pond (A Pond – Contact Water), to allow monitoring and batch treatment if required before discharge. Currently the contact water is used for dust control given that the quality is appropriate for this use.

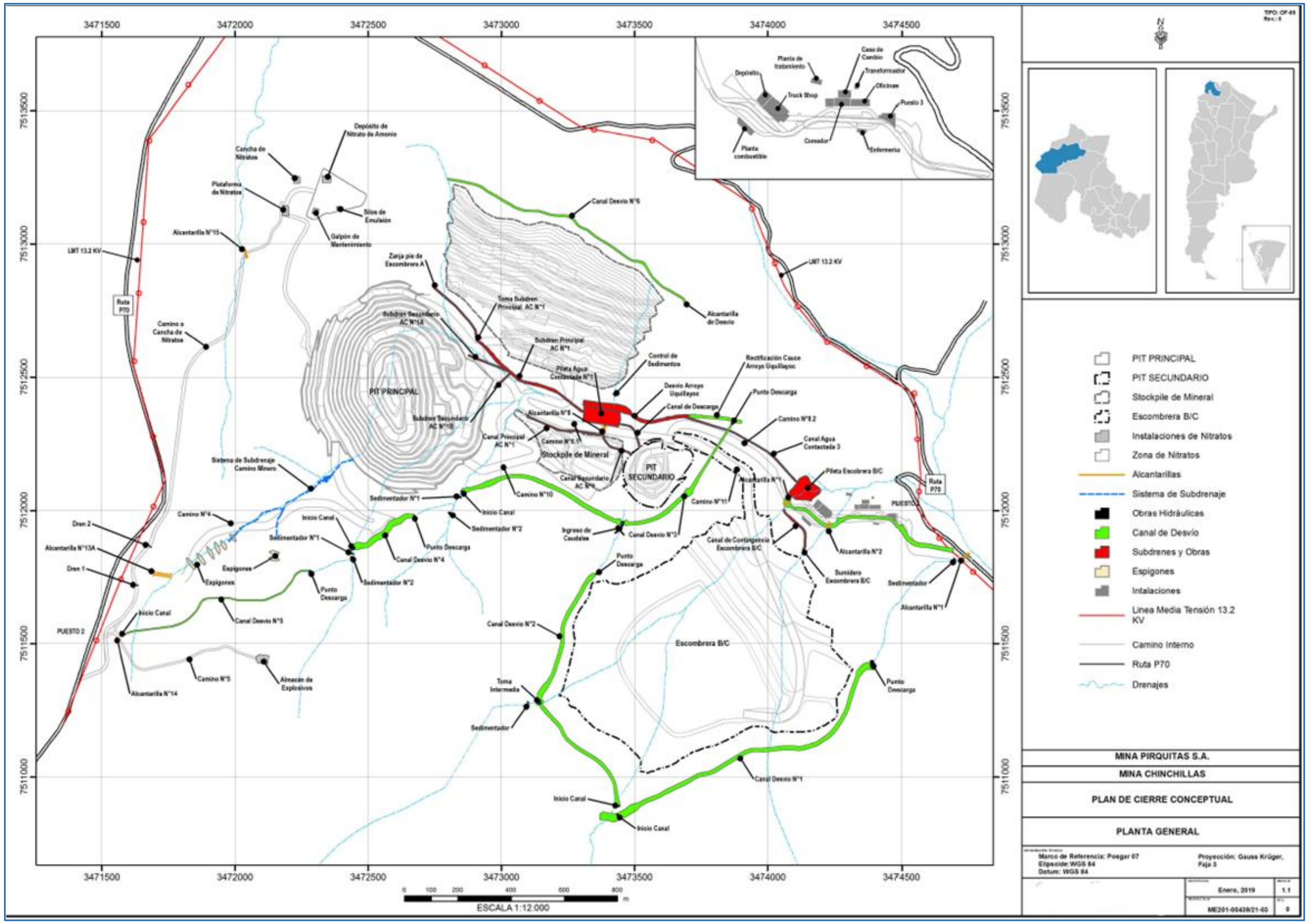
Water that accumulates on Project infrastructure is collected for settling and testing prior to any discharge. No water will be discharged to the environment that would have adverse environmental impact.

The dewatering and water management plan is comprised of three systems:

- Diversion Ditches
- Pit Groundwater Dewatering Sumps (non-contact water)
- Surface Contact Water Runoff Dewatering

Water collected within the catchments of the open pit and each waste rock dump area are directed to two ponds constructed at the low point of each area. The water of both ponds in used for dust control. A general arrangement of this system is included in Figure 20.2. The contact water diversion channels are shown in red; this water is currently used for dust control. The non-contact water diversion channels are shown in green, these water flows are drained to Uquillayoc river.

Figure 20.2 Project General Arrangement and Water Management Features



MPSA, 2021

20.1.5 Flora and Fauna

The Chinchillas Property area is a mix of high Andean plains and Puna landscape, characterised by grassy steppes and low-growing shrub land (Figure 20.3 and Figure 20.4), interspersed with bare soil and alkaline wetlands (peladares). Where standing water is encountered, such as at ponds and streams, surrounding wetland vegetation are collectively known as 'vegas', dominated by the families Juncaceae, Cyperaceae, Poaceae, Oxalidáceas and Scrofulariaceas (Figure 20.5). In upland drier zones, cactus such as Maihueniopsis and Lobivia can be found.

Figure 20.3 Grassland Steppes on the Western Edge of the Project Area

The effects of the high-altitude environment include increased solar radiation, constant winds, and large temperature fluctuations. Soils are typically young with low levels of organic material. These conditions have influenced the development of plant species in this area, where species of different families often show similar morphologies. Grasses typically have a high proportion of cellulose and lignin for added rigidity, and extra layers of cutin or suberin to restrict water loss. Woody plants are typically found as shrubs, with almost no tree layers evident.

Fauna of the Project area are highly correlated to wetter and humid areas, including the vegas. Several species of insects have been recorded, along with three species of amphibians. Three species of reptiles (two lizards and one snake) have also been documented in the area.

Figure 20.4 Shrub Land on the Northern Edge of the Project Area

There are at least 72 species of birds known to be present for at least part of the year in the Project area. The most abundant of these are the Ash-breasted sierra finch (Phygilus atriceps) and the Bright-rumped yellow finch (Sicalis uropygialis). Other birds in the area of note include the Andean Condor (Vultur gryphus), the Ornate Tinamou (Nothoprocta ornate), the Puna Rhea (Pterocnemia tarapacensis), the Mountain Parakeet (Bulborhynchus aurifrons), and the Bare-faced Ground Dove (Metriopelia ceciliae).

Studies completed in 2015 identified nine native and one exotic mammalian species. Numerous domestic species (e.g. llamas) were also noted in the area. The most common native mammals were the Vicuña (Vicugna vicugna) and the Vizcacha (Lagidium viscacia).

Some displacement of vegetation communities and attendant wildlife habitat has occurred within and adjacent to the Project footprint as a result of project development. These impacts have been assessed and approved in the Resolution 014/2017 (DIA Mina Chinchillas). As a result of the approval of the EISA of Chinchillas Mine, since 2018 MPSA developed a biannual Community Environmental Monitoring Program that includes fixed monitoring stations of flora, fauna and limnology, as well as water, air and soil quality.

Figure 20.5 Vega Habitat

20.1.6 Protected Areas

There are 15 protected areas within the Province of Jujuy, however the majority of these are far removed from the Project area. The Laguna de Pozuelos represents the most important protected area within the Chinchillas Property region.

The Laguna de Pozuelos is a large, permanent, high-altitude lake located approximately 25 km from the Project area. It is an important migratory bird stopover, particularly known as habitat for the Andean Flamingo, as well as many other species.

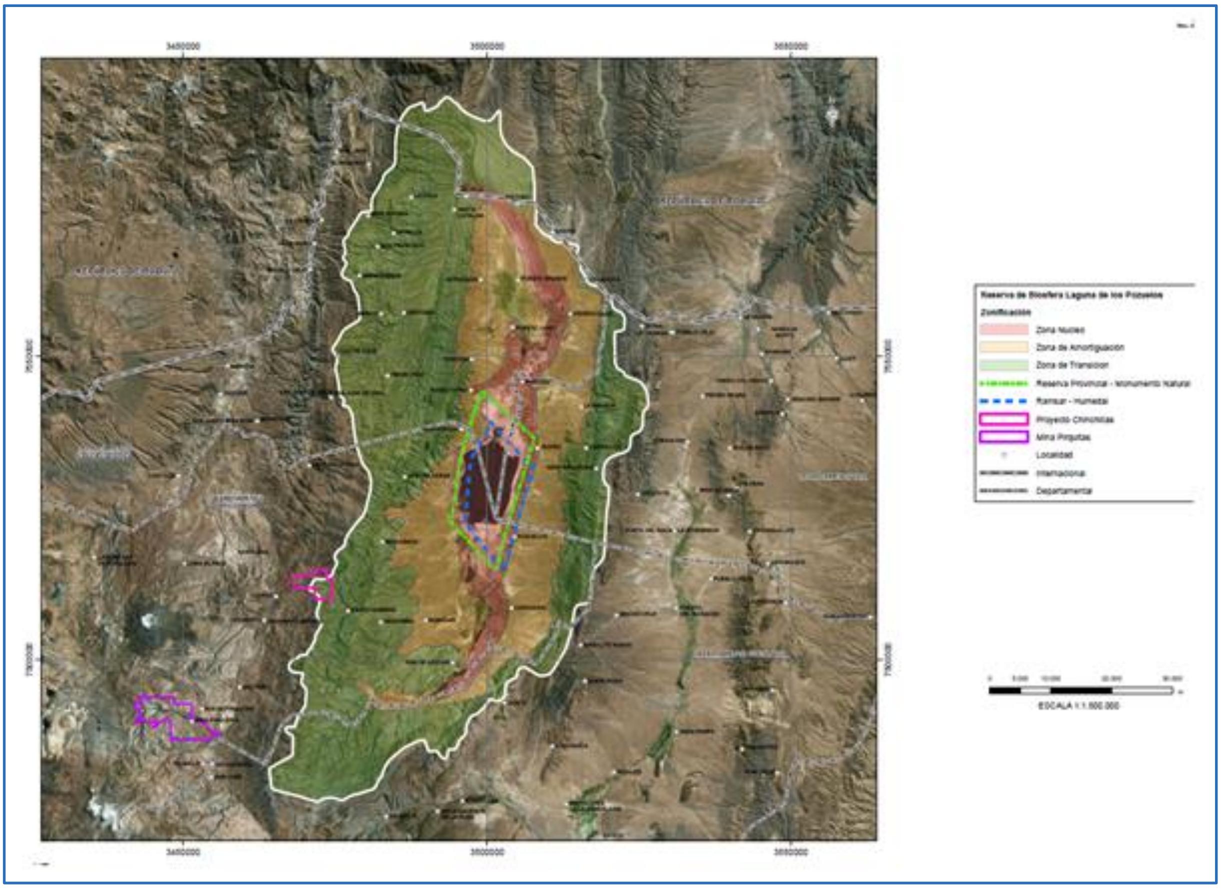
The Laguna is located within a National Natural Monument, protected by the 'Administracion de Parques Nacionales' (National Parks Administration) as well as a United Nations Educational Scientific and Cultural Organisation (UNESCO) designated Biosphere Reserve and RAMSAR Wetland of International Importance.

The National Natural Monument covers a surface of approximately 16,000 hectares and in this area all economic activities, including mining, are prohibited.

The National Natural Monument is surrounded by a buffer zone of approximately 380,000 hectares defined as a RAMSAR Wetland of International Importance that is administered by the multi-sector organisation 'Corporación para el Desarrollo de la Cuenca de Pozuelos' (CODEPO: Corporation for the Development of the Pozuelos Watershed) that is responsible for promoting sustainable development in the buffer zone. This buffer zone is recognised by UNESCO, who note that one of the objectives of the Reserve buffer zone is to make development compatible with conservation (www.unesco.org).

As shown in Figure 20.6, the Jujuy Ministry of Mining GIS data indicates that the Chinchillas property is located just inside the buffer zone, while boundaries provided by the University Nacional de Jujuy (UNJ) follow the UNESCO model and divide the buffer zone into an outer transition zone, with the Chinchillas property located outside of both zones. Taking the Ministry data of the buffer outline as the most recent and correct suggests that Chinchillas falls within the Ministry buffer zone, and within the UNESCO transition zone. In either case, economic activities, including mining and exploration, are permitted in these areas.

Figure 20.6 Laguna de los Pozuelos Buffer Zones



MPSA, 2021

20.2 Social and Community Engagement

20.2.1 Local Communities

The Project is located in a rural area in the department of Rinconada in the province of Jujuy. The Rinconada department has an area of 6,407 km^2 and a population of only 2,489 (2010 Census). The department is divided into two municipalities; Rinconada Municipality and Mina Pirquitas Municipality.

The nearest population centres to the Project include the village of Santo Domingo (approximately 6 km distant) and the larger city of Abra Pampa (approximately 75 km distant), which is located in the adjacent department of Cochinoca. Additionally there are four villages located between the Chinchillas site and the Pirquitas Operation; Liviara (approximately 9 km distant) Orosmayo Grande and Orosmayo (approximately 14 km distant), Coyaguayma (40 km of distant) and Nuevo Pirquitas (approximately 29 km distant). Each community is considered aboriginal communities, with predominant Colla ethnicity. Colla people historically occupied the high Puna regions throughout northern Argentina, western Chile, and southern Bolivia. They traditionally speak a dialect of the Quechua language.

It is estimated that 78 people live in Santo Domingo, the village most proximate to the Project. A further 60 people are estimated to live dispersed throughout the surrounding area. Similarly, an estimated 17 people live in Liviara, 12 in Orosmayo, 25 in Osormayo Grande and 116 in Nuevo Pirquitas. Abra Pampa, the largest urban area in the region, has a population of approximately 16,000.

The livelihood of the area's population is primarily tied to small-scale livestock management, typically goats and llamas, with some limited production of sheep. Sale of livestock, meat, and wool is typically done in Abra Pampa, from where it may eventually reach markets farther afield such as San Salvador de Jujuy.

Outside of agriculture, regional inhabitants are employed by the public sector (e.g. schoolteachers), or work in the mining industry. Many local rivers are exploited for low volumes of placer gold, and several hard rock mines, including the Pirquitas mine, have operated in the area. The majority of workers from Liviara and Orosmayo are employees of the Pirquitas mine.

Currently MPSA employs or hires 149 workers that come from direct and indirect communities (ESIA Mina Chinchillas 2021).

20.2.2 Archaeology

The Puna region of Argentina has a rich history of occupation, dating from at least 10,000 years before present. Hunter gatherers roamed throughout the region, gradually domesticating llamas and moving to greater reliance on agriculture within the last 3,000 years. The Incas arrived in the region in 1475, which had a great effect on the social order and use of resources. Spanish conquistadors arrived in 1535, further altering the socio-economy of the area and ushering in the colonial era.

Mining occurred historically at the Chinchillas area on a small scale in the eighteenth century by Jesuit missionaries. In the late 1960's, there was a period of small underground production by a local company using adits and tunnels.

An archaeological survey was conducted at the Chinchillas Property in 2015. A total of 11 archaeological sites were identified proximate to the project itself. Other sites were identified in the surrounding area totalling 31 finds.

Prior to the start of exploitation of the Chinchillas Mine, in February 2018 the archaeological clearance of 15 sites that were going to be affected by the mine facilities was carried out (approved in resolution 014/2017 - DIA of the Chinchillas Mine). The final clearance was obtained by Resolution N°453/2018 issued by Cultural and Tourism Ministry. In April 2019 an additional clearance of a historical sites carried out under the authorization of Resolution N°151/2019. The remaining sites are being protected by the company and are subject to annual monitoring.

20.3 Project Permitting

The legal framework for mine permitting is derived mainly of the second section of the Mining Code of the Nation and its supporting National Law No. 24.585. The institutional Framework for the permitting process is driven by stipulations in Law No. 24.585, with technical support of UGAMP and the National Mining Secretariat.

The main focus of permitting is the detailed Environmental and Social Impact Assessment, which must be submitted prior to commencement of operations. Upon successful review of the ESIA, a DIA is awarded. Annex III of Law 24.585 establishes the minimum contents of the EIA, which must include:

- Description of the Environment (physical, biological, and socio-economic);
- Project Description;
- Description of Environmental Impacts;
- Environmental Management Plan (which includes measures and actions to prevent and mitigate environmental impact);
- Plan of Action on Environmental Contingencies; and
- Methodology Used.

An ESIA for the Project was developed and submitted for review in September 2016. which was subject to review by the Mining Department and UGAMP and approved on 22 December 2017 by Resolution N°014/2017. It is subject to review by the Mining Department and UGAMP, a process that is expected to conclude with issue of a DIA in mid to late 2022 . Since then, two more ESIA Updates have been developed and submitted to Mining Authorities, ESIA Mina Chinchillas 2019 and ESIA Mina Chinchillas 2021. Both are being reviewed by Mining Authorities and it is expected to have the final DIA soon.

The UGAMP is a multi-stakeholder group chaired by a technical appointee from the Mining Department who recommends approval or rejection of the ESIA and related work application to the provincial mining authorities. Meetings are held to allow UGAMP members to review the proposed materials with members of Golden Arrow. UGAMP representatives appurtenant to the Project include:

- Representatives from the local Communities of Santo Domingo, Orosmayo, Liviara, Orosmayo Grande, Nuevo Pirquitas and Coyaguayma;
- Mining Workers Unions;
- Provincial Department of Water Resources;
- Department of Mines and Energy;
- Provincial Secretary of Mining;
- Surface Landowners;
- Provincial Collage of Geologists;
- Provincial Department of Environment;
- Provincial Department of Human Rights and Indigenous Communities;
- National University of Jujuy;
- Jujuy Chamber Mining;
- National Parks Administration;
- Corporation for the Development of the Pozuelos River;
- Provincial Secretary of Public Health;
- Provincial Department of Agriculture and Livestock Control; and
- Provincial Department of Industry and Commerce

Chinchillas has maintained all previous exploration activity permits in good standing, each of which required the submission of an ESIA and receipt of a DIA. As the review of the mining ESIA proceeds, precedent suggests that the DIA will also be granted.

The use of the Pirquitas pit for tailings deposition at the Pirquitas Operation is a modification to the mining activities not contemplated in MPSA's ESIA until 2016 for the Pirquitas mine. On August 2017 MPSA issued to Mining Authorities an Addendum of the 2016 ESIA Update that included the upgrades to conduct the tailings to the pit of Mina Pirquitas. The permit was obtained on September the 24th, 2018 by Resolution N° 056/2018. Since then, MPSA has submitted to Mining Authorities the ESIA Update for Mina Pirquitas on September 2020 which document is being reviewed.

20.4 Mine Closure

A conceptual closure plan and cost has been developed for the Project. There are no specific laws in Argentina that specify mine closure requirements, and there is no bonding requirement. The closure plan for the Project has been developed in consideration of best industry practice. The closure plan was designed to accommodate the following objectives:

- Health and security of the public
- Protection of the environment
- Ensure physical and chemical stability of post-closure structures
- Ensure unrestricted and unimpacted natural surface water flow
- Prevent erosion of post-closure structures from wind or water
- Safe removal of impacted surface structures and buildings
- Safety and security for people, wildlife, and livestock

20.4.1 Closure Activities

Buildings and surface structures will be cleaned of residual fuels, lubricants, reagents, and wastes prior to being deconstructed and dismantled. Recyclable wastes will be reused wherever possible. All structures will be removed to ground level, with concrete slabs or other inert foundations covered with stored topsoil. All access roads to the pit and waste rock storage areas will be blocked for safety using earthen berms accompanied by warning signs.

The water diversion systems employed during operations will be fortified for long term use in managing water post-closure. This will include maintaining all upgradient runoff as non-contact water passed downstream to the Arroyo Uquillayoc.

The pit will be allowed to flood to the phreatic level. A large safety berm accompanied by appropriate signage will be constructed around the pit rim to prevent access.

Ongoing monitoring of the closure measures will be conducted over a period of five years to ensure successful implementation. Due to the fact that the exploitation and mineral extraction stage of the Pirquitas pit has ended, some components of the Pirquitas Mine are currently in the mine closure stage, so the activities currently being carried out are those linked to the ore processing and mine closure. Closure costs for Chinchillas Mine have been estimated at $30.6M. MPSA is reviewing these costs and suggested that the closure costs will be lower than this.

20.5 Pirquitas Mine

20.5.1 In-Pit Tailings Disposal

MPSA is currently using the Pirquitas pit as tailings reservoir. These tailing comes from the processing of the Mina Chinchillas ore. The use of the Pit as a tailings reservoir was approved by the Authority through Resolution No. 056/2018, after submitting the Addendum to the Authority in August 2017.

Placing the tailings inside the Pit involves transporting them from the Process Plant to the Pit by means of a pumping system and a 6.3 km pipeline to the tailings box located on the edge of the Pit, to be discharged to the pit. Likewise, the tailings reservoir has a water recovery system to pump the water (from the tailings, the flows that enter the pit by filtration, direct rain and surface runoff) to the Process Plant for reuse. This pipe follows the same route as the pipe that transports the tails. The disposal of the tailings in the pit began in April 2019.

Due to the fact that the exploitation and mineral extraction stage of the Pirquitas pit has ended, some components of the Pirquitas Mine are currently in the mine closure stage, so the activities currently being carried out are those linked to the ore processing and mine closure.

20.5.2 Pirquitas Pit

Pirquitas pit within the same watershed as the Homonymous River. During the operation of Mina Pirquitas, the surface runoff influent to the pit was captured and conveyed along the southern perimeter of the pit to a discharge point in the Pircas River, downstream of the pit. The main tributaries to the pit correspond to the Pircas and Maray streams (contacted waters in the Pircas dump), and the Médanos stream (waters not contacted), the convergence of these three (3) channels naturally formed the Pircas River, precisely in the pit sector.

In January 2017, with the cessation of mining in Pirquitas, the mine dewatering ceased and surface runoff from the upper basins was directed towards the pit. As a result, the pit lagoon increased in volume until it reached approximately 40% of the depth of the pit. The increase in volume led to various hydrogeological studies and models, to establish the design criteria for the tailings reservoir.

The studies concluded that the open pit acts as a sink and can contain the tailings and their processes associated with the proposed methodology for the disposal of the tailings.

As a result of the studies, a critical maximum elevation of the water level has been determined at 4207.70 masl, where the pit would cease to be a sink. Likewise, the overflow level of the Pit was established at 4230 masl.

To maintain the required water levels for the tailings reservoir, it was necessary to construct a water management system to avoid the inflow of surface water to the pit. These works were completed in February 2020.

Based on the operational and meteorological conditions, the pit water balance is annually updated.

20.5.3 Environmental and Social description and Closure

20.5.3.1 Water Quality

In December 1998, consulting engineering firm KP completed an ESIA for Sunshine Argentina. The ESIA contained a description and evaluation of environmental conditions that existed at the time, as well as foreseeable potential effects that development of the Pirquitas mine could have on the surrounding environment. The scope of the ESIA was commensurate with the norms for environmental protection associated with Argentina's applicable mining laws and guidelines established by international lending institutions such as the World Bank. The discussion below is either paraphrased or taken directly from the ESIA, with updates to include information about the Pirquitas mine subsequent to the date of such ESIA.

Remnants of historic mining activities at the Pirquitas mine included derelict buildings, mine structures and tin-silver jig tailings and tin placer tailings along the Río Pircas. Flotation tailings had been discharged into the Río Pircas and piles of gold placer tailings were left above the current level of the Río Pircas on paleo-river terraces near the mine camp. These areas comprise some 107 hectares of surface disturbance that existed prior to Sunshine Argentina's acquisition of the property, some of which are now associated with acid rock drainage into the Río Pircas watershed.

Surface and ground waters are known to be acidic and metalliferous down gradient from the historic mines above the Río Pircas canyon at Tres Placas, which is located downstream from the Pirquitas pit. In addition, acidic and metalliferous ground water is present in the abandoned underground workings and some natural springs in the area, suggesting natural oxidation of sulfide mineralisation which is widespread in the rocks found on the property is also contributing to background surface water contamination.

Furthermore, the only condition the Argentina Ministry of Mines and Energy applied to its approval of Sunshine Argentina's ESIA, apart from the mandatory two-year update to the report, was the requirement that water quality monitoring be carried out.

MPSA is currently monitoring the water quality both upstream and downstream of the mine. The monitoring programme includes 21 sites for superficial water and eight sites for groundwater monitoring. The general characterisation of the water continues the same as the original in 1998.

20.5.3.2 Flora and Fauna

In the area of influence of Mina Pirquitas, the Altoandina and Puna ecoregions are distinguished. The physiognomy of the climax vegetation corresponds to an herbaceous (High Andean) or shrubby (Puna) steppe, however, it is possible to find a mixed ecotonal community between these two ecoregions in nearby environments.

The plant physiognomy in the Puna consists of shrubby and gramineous steppes or grasslands, with low plant cover and extensive areas of bare areas. In the sectors associated with wetlands, such as lagoons and streams, there are springs, with vegetation dominated by grasses such as Festuca sp. (chillagua), sedges such as Scirpus sp., and rushes that completely cover the ground, constituting a privileged habitat for being sites where there is a high concentration of biodiversity. In the rocky areas there are species of cacti of the Maihueniopsis and Lobivia genera.

The species, both herbaceous and shrubby, have the shape of cushions (camephytes or hemicryptophytes), and settle on the ground in a scattered manner, leaving areas of bare soil. The physiognomy of the vegetation resembles a high altitude desert; however, there are endemic species and others that only appear in the rainy season (late summer), which provides a significant richness of species. The families best represented in these environments are: Poaceae, Asteraceae and Solanaceae

Given that in the Mina Pirquitas area, there is great variability in terms of the floristic composition of the vegetation units, the area of influence was subdivided into 6 sub-basins. These areas are monitored twice a year since 2011.

The area of Mina Pirquitas and its immediate surroundings in Jujuy, has a high value from the point of view of conservation, mainly of Puno and high Andean habitats, but also in terms of its biodiversity.

The upper Pilcomayo basin, represented by the Pirquitas area, constitutes, together with the adjoining endorheic basins of Pozuelos and Vilama, a considerable area of outstanding quality of this ecosystem.

The faunal indicators selected to carry out fauna monitoring did not show, at a general level, tangible changes in the richness of species in the area and in the structure of the communities, which at this scale shows that the impacts of the activities carried out in Mina Pirquitas for the groups of fauna involved, they are stable or compensated on this spatial and temporal scale.

As a result of the approval of the EISA of Pirquitas Mine, since 2018 MPSA develop biannual Community Environmental Monitoring Program that includes fixed monitoring stations of flora, fauna and limnology, as well as water, air and soil quality

20.5.3.3 Local Communities

The Area of Direct Influence (AID) is made up of the localities that have the greatest connection with the Mine, either due to geographical proximity, because of the employment relationship of a large part of the active labour population, or because of the community relationship programmes that are implemented jointly. with the company. The localities are: Nueva Pirquitas (approximately 4.5 km), Loma Blanca (approximately 50 km distance), Coyaguayma (14 km), Orosmayo- Orosmayo Grande (25 km) and Liviara (30 km).

The linkages that are carried out between the locations of the AID and the Mine are fundamentally due to the proximity that exists between the operational areas and the communities, where they share communication routes and road infrastructure; Part of the workforce of the Mine is from nearby towns and community investment policies are executed by the Company, which is headed by the Municipal Commission of Nueva Pirquitas.

The highest percentage of personnel working at Mina Pirquitas S.A belongs to the Province of Jujuy. That is, 163 people belong to the province of Jujuy, 96 people to the communities of the Area of Direct Influence (AID), 17 people to the communities of the Area of Indirect Influence (AII).

20.5.3.4 Pirquitas Permitting

In 1998, the Original ESIA of the Pirquitas Project was developed by KP firm, which was prepared in accordance with the requirements of the National Law for Mining Environmental Protection, Law No. 24,585 and other substantive and formal regulations in force. The document was approved by Resolution No 16/99. However, the mining activities provided for in the 1998 ESIA for the exploitation of the Mine were not started.

In 2005, a new stage of exploration began in order to identify new mineralised areas. This year, the primary focus was a geological reconnaissance of the Oploca veins, with the aim of expanding in-depth geological and mineralogical knowledge.

The first Update of the ESIA was delivered to authorities in 2008 and was approved by Resolution No 35/08. In June 2008, the pre-production stage began, starting the production of concentrates on April 6, 2009.In 2008, a second ESIA was completed by KP following start-up of mining activities and initiation of plant construction. While there were no observations or restrictions placed on MPSA at that time, this study began to focus on the water management plan and conceptual plans for mine waste stockpiles. A conceptual water treatment plant for neutralisation of acid waters was proposed as a contingency with a treatment capacity estimated to be as much as 150 L/s. Alternative water management measures to date have reduced the source of acidic waters, and such treatment plant has not yet been required.

A party wishing to commence or modify any exploration or mining-related activity under Argentina's mining laws, including property abandonment or mine closure activity, must prepare and submit an ESIA, which must include a description of the nature of the proposed work, its potential risk to the environment and the measures that will be taken to mitigate that risk. The most recent update permit to MPSA's ESIA for the Pirquitas mine, which included engineering studies for the design of water management structures and mine closure design, was submitted in December September 2016 and the addendum for in-pit disposal was submitted in August 2017. These ESIA´s were approved in September 2018 by Resolution 056/2018.

The preceding update was submitted in December 2014 and formally approved in January 2016. An addendum to this ESIA regarding the closure of the Pirquitas mine was filed in December 2015, which reflected the revised mine plan projecting the completion of the Pirquitas pit, with lower grade stockpile processing expected to commence upon cessation of open pit mining activities at the Pirquitas pit. In July 2016, an updated closure plan, which included more detailed engineering of the selected closure measures and costing for both active closure and longer term care and maintenance, was submitted to the regulatory authorities. Due to the approval of Mina Chinchillas ESIA in December 2017 (Resolution 014/2017) the closure plan for Pirquitas Mine was archived and any work proposed on this closure plan in currently submitted in the ESIA Updates every two years. and is currently under review.

The most recent ESIA submitted to authorities is the ESIA 2020 Update which is currently on revision under review by mining authorities.

The cessation of open pit mining activities at the Pirquitas pit in January 2017 has resulted in a significant reduction in workforce, as well as reduced indirect economic benefits to the surrounding and supporting communities with the start of exploitation of the Chinchillas mine, new contracts were made at Mina Pirquitas as of 2018 and currently MPSA hires 840 workers between Chinchillas and Pirquitas mines. A social impact assessment study was commissioned in 2015 and formed the basis of the social closure plan for the Pirquitas mine. The potential risks, as well as actions to reduce those risks and support the employees and the community, were developed as part of the reclamation and closure plan submitted in 2016 .

20.5.4 Closure

Argentina currently has no specific mine closure legislation other than the requirement to prepare and submit and regularly update an ESIA, including with respect to mine closure activity. However, it is expected that closure options will be proposed as part of the review of MPSA's updated closure plan and may include passive or active neutralisation features to return discharged waters to baseline conditions (acidic at the time of baseline studies) with monitoring requirements. The closure requirements for the Pirquitas pit may change in the future and MPSA may be subject to increased obligations for both the technical and social aspects associated with such mine closure and reclamation, which would impact the closure plan and the duration of the associated closure activities.

The current closure and reclamation plan addresses a range of closure risks, design criteria and costs that are anticipated in order to comply with internationally accepted practices. It considers both the physical reclamation of the site and the social closure plan for the neighbouring communities for whom the mine provides employment and community support. The closure plan considers the short-term decommissioning and reclamation measures, as well as longer term care and maintenance activities and related costs and risks. The actual costs of reclamation and mine closure are uncertain and planned expenditures may differ from the actual expenditures required. Therefore, the amount required to be spent could be materially higher than current estimates.

MPSA is developing an update of the Puna closure plan that will includes both Chinchillas and Pirquitas Mines to possible changes to the closure requirements and obligations. .

21 CAPITAL AND OPERATING COSTS

21.1 Capital Costs

The Project utilises the existing processing facilities at the Pirquitas Operation, therefore most capital items are related to the mining equipment and infrastructure required at the mine site.

The estimated capital costs required to achieve the Mineral Reserve LOM are summarised in Table 18.1. The capital costs were estimated by the MPSA using actual costs and other information.

The sustaining capital costs include:

- Surface infrastructure construction such as upgrades to the camp and kitchen, IT upgrades, and asset integrity costs.
- Mill improvements and replacement of major components.
- Tailings management facility costs.
- Mobile equipment such as new and replacement purchases and major rebuilds.

Table 21.1 Summary of Capital Expenditures

Description	**Total ($M)**
Exploration and Development	21
Sustaining Capex	47
Closure & Reclamation	31
Total Capital Cost	99

Capital includes only direct project costs and does not include non-cash shareholder interest, management payments, foreign exchange gains or losses, foreign exchange movements, or tax pre-payments.

21.2 Operating Costs

Operating costs are estimated using current operating experience at Pirquitas operation, actual quotes from vendors and first principles. Operating costs are estimated by MPSA for the areas such as mining, processing, tailings and general and administration.

The operating expenses estimated to validate the positive cash flow for the Mineral Reserve LOM. The LOM operating costs are approximately $52.67/t of ore milled, as are summarised in Table 21.2. The mining expense includes all labour, supplies / consumables, and equipment maintenance to complete mining related processes/activities, less exploration diamond drilling and capital excavations and construction. The milling expense includes all labour and supplies / consumables to complete milling related processes / activities. The administrative expense includes all labour, supplies / consumables, and equipment maintenance to complete administrative, finance, human resources, environmental, safety, supply chain, site services, camp and kitchen, and travel related processes / activities.

Table 21.2 Operating Costs

Description	Total ($M)	LOM Average ($/t milled)
Mining Costs	110	15.01
Processing Costs	183	24.95
G&A Costs	93	12.71
Total	387	52.67

22 ECONOMIC ANALYSIS

22.1 Economic Assumptions

The modelling and taxation assumptions used in the Puna21TR are discussed in detail below.

All monetary figures expressed in this report are in US Dollars ($) unless otherwise stated. Cash flows are assumed to occur evenly during each year and a mid-year discounting approach is taken. The estimates of cash flows have been prepared on a real basis as 1 January 2022 and a mid-year discounting is used to calculate net present value (NPV).

22.1.1 Pricing and Discount Rate Assumptions

Metal price assumptions are shown in Table 22.1. Other key assumptions in the economic modelling relating to product pricing are tabulated in Table 22.2. A discount rate of 5% is used for calculating net present value (NPV).

Table 22.1 Metal Prices

Commodity	Unit	2022	2023	2024	2025	Long Term
Silver	$/oz	24.00	23.00	22.00	21.00	21.00
Lead	$/lb	1.00	0.95	0.93	0.92	0.90
Zinc	$/lb	1.30	1.20	1.20	1.20	1.20

Table 22.2 Key Economic Assumptions

Item	Unit	Lead Concentrate	Zinc Concentrate
Treatment and Refinery Charge	$/t Conc	1,191	724
Payability – Silver	%	95	75
Payability – Lead	%	95	
Payability – Zinc	%		85
Deduction – Lead	%	3	
Deduction – Zinc	%		8
Minimum Payout Factor	%	63	39
Royalty	%	3	3
Export Duty (Rev. Less TCRC's)	%	4.5	4.5
Puna Credit (Rev. Less TCRC's)	%	2.5	2.5

In the analysis, carry balances such as tax and working capital calculations are based on nominal dollars and outputs are then deflated for use in the integrated cash flow calculation.

22.2 Overview and Results

The estimates of cash flows have been prepared on a real basis as at 1 January 2022 and a mid-year discounting is used to calculate NPV.

The projected financial results include:

- After-tax NPV at an 5% real discount rate is $228M.
- Mine life of five years.

The estimated total cash costs for the LOM is $11.63/oz silver. AISC, which includes infrastructure capital, capital development and reclamation, average for the LOM is $13.57 per payable ounce of silver sold. Unit costs include concentrate in stockpile. Silver provides the primary revenue for the analysis, with contributions from lead and zinc. Credits from lead and zinc are included in the cash cost.

The key results of the Puna21TR are summarised in Table 22.3.

Table 22.3 Puna21TR Results Summary

Description	Unit	Total LOM
Processed		
Processed	kt	7,352
Ag Feed grade	g/t	160
Pb Feed grade	%	1.32
Zn Feed grade	%	0.29
Silver Recovery	%	95.5
Concentrates		
Lead Concentrate – in Stockpile	kt	4
Zinc Concentrate – in Stockpile	kt	1
Lead Concentrate – Produced	kt	135
Zinc Concentrate – Produced	kt	27
Lead Concentrate – Total	kt	139
Zinc Concentrate – Total	kt	28
Metal Produced		
Silver	koz	37,210
Lead	Mlb	204
Zinc	Mlb	29
Key Financial Results		
Mine Site Cash Cost	$/oz payable Silver	11.61
Royalties and Refining Costs[1]	$/oz payable Silver	6.10
Credits	$/oz payable Silver	–6.08
Total Cash Costs (after credits)[1]	$/oz payable Silver	11.63
AISC	$/oz payable Silver	13.57
Site Operating Costs	$/t milled	52.67
Average Silver Price	$/oz	22.38
NPV[1]	$M	228
Discount Rate	%	5
Project Life	years	5

Metal produced includes current concentrate stockpiles containing 242 koz silver and 5 Mlb lead.

22.2.1 Production and Cost Summary

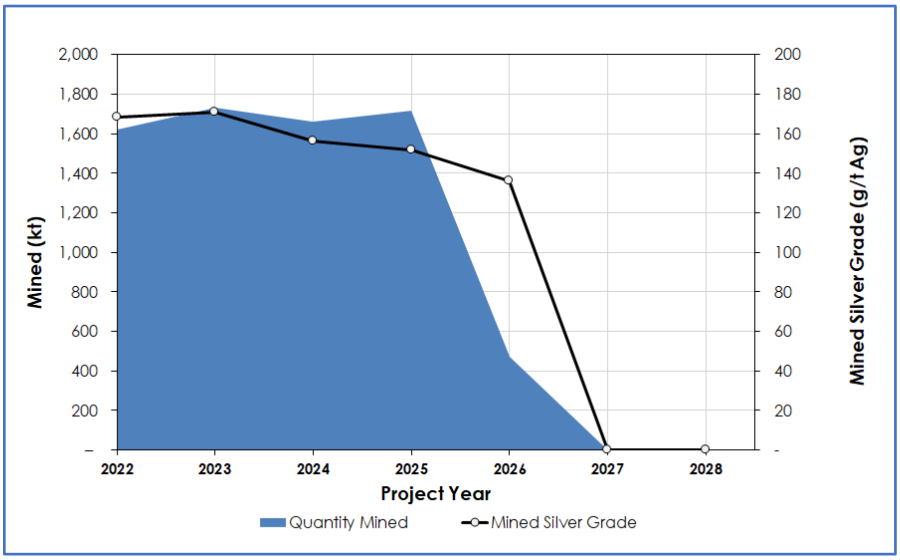
The process production forecasts are shown in Table 22.4 and forecast tonnes mined are shown in Figure 22.1. The processing tonnes and metal production are summarised in Figure 22.2 and Figure 22.3 respectively.

Table 22.4 Production Forecast

Item	Unit	Total LOM
Ore Processed		
Processed	kt	7,352
Ag Feed Grade	g/t	160
Pb Feed grade	%	1.32
Zn Feed grade	%	0.29
Silver Recovery	%	95.5
Concentrate Produced		
Lead Concentrate – in Stockpile	kt	4
Zinc Concentrate – in Stockpile	kt	1
Lead Concentrate – Produced	kt	135
Zinc Concentrate – Produced	kt	27
Lead Concentrate - Total	kt	139
Zinc Concentrate - Total	kt	28
Metal Produced		
Silver	koz	37,210
Lead	Mlb	204
Zinc	Mlb	29

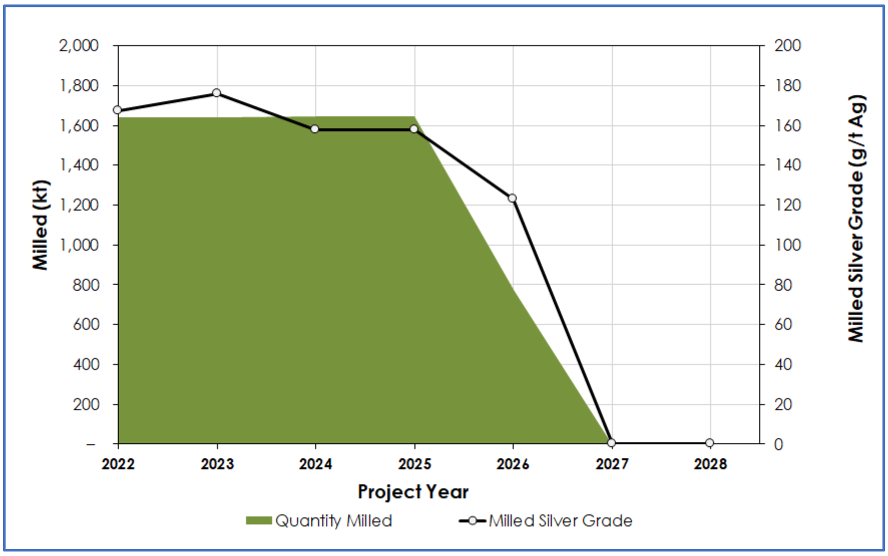
Metal produced includes current concentrate stockpiles containing 242 koz silver and 5 Mlb lead.

Figure 22.1 Mining Production Profile



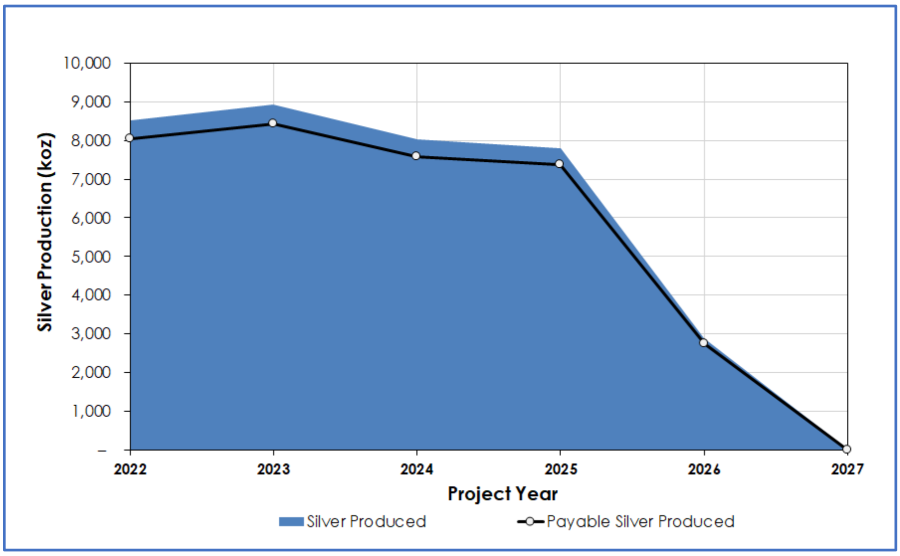
OreWin, 2021

Figure 22.2 Process Feed Profile



OreWin, 2021

Figure 22.3 Silver Production



OreWin, 2021

The estimated Mine site cash costs are shown in Table 22.5. The estimated total cash costs for the LOM is $11.63/oz payable silver. AISC, which includes infrastructure capital, capital development and reclamation, average for the LOM is $13.57/oz payable silver. Silver provides the primary revenue for the analysis, with contributions from lead and zinc. Credits from lead and zinc are included in the cash cost.

These estimated costs include only direct operating costs of the mine site, namely:

- Mining
- Processing
- General and administrative (G&A) costs
- Government fees and charges (excluding corporate taxation)

The projected financial results include:

- After-tax net present value (NPV) at an 5% real discount rate is $228M.
- Mine life five years.

Table 22.5 Cash Costs

Item	LOM Average ($/oz Ag)
Mine Site Cash Cost	11.61
Royalties and Refining Costs	6.10
Credits	–6.08
Total Cash Costs (after credits)	11.63
AISC (after credits)	13.57

Note: Includes concentrate in stockpile

The estimated revenues and operating costs have been presented in Table 22.6, along with the estimated net sales revenue value.

Table 22.6 Operating Costs and Revenues

Description	TOTAL ($M)	LOM Average ($/t milled)
Revenue		
Gross Sales Revenue	1,000	136.01
Less Realisation Costs		
Treatment & Refining Charges	179	24.28
Royalties	36	4.89
Total Realisation Costs	214	29.17
Net Sales Revenue	785	106.84
Less Site Operating Costs		
Mining Costs	110	15.01
Processing Costs	183	24.95
G&A Costs	93	12.71
Total	387	52.67
Operating Margin	398	54.17

Note: Includes concentrate in stockpile

Table 22.7 Total Project Capital Costs

Description	Total ($M)
Exploration & Development	21
Sustaining Capex	47
Closure & Reclamation	31
Total Capital Cost	99

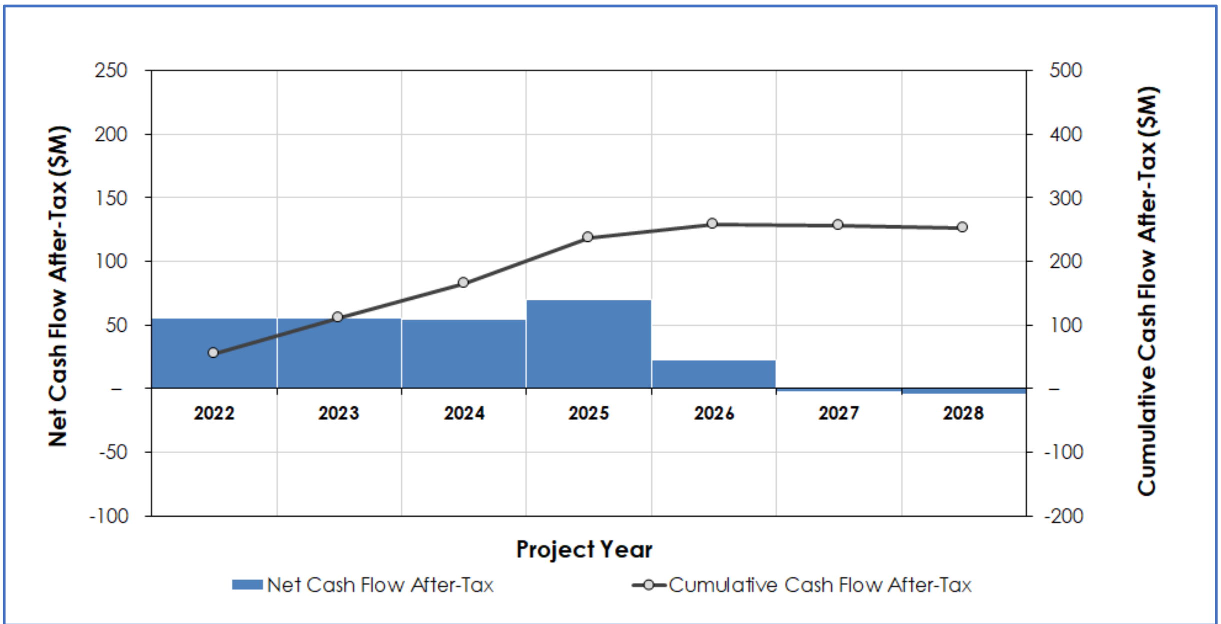
Capital includes only direct project costs and does not include non-cash shareholder interest, management payments, foreign exchange gains or losses, foreign exchange movements, tax pre-payments, or exploration phase expenditure.

The projected financial results for undiscounted and discounted cash flows, at a range of discount rates are shown in Table 22.8.

The results of NPV5% sensitivity analysis to a range of changes in silver price (primary commodity) and discount rates is shown in Table 22.9. NPV sensitivity analysis for changes to operating and capital costs are shown in Table 19.9.

A chart of the after tax cumulative cash flow is shown in Figure 22.4 and details of the cash flow is shown in Table 22.11.

Figure 22.4 After Tax Annual and Cumulative Cash Flow



OreWin, 2021

Table 22.8 Financial Results

Discount Rate	NPV ($M)	
	Before-tax	After-tax
Undiscounted	279	253
2.0%	268	242
5.0%	253	228
10.0%	231	206
12.0%	223	199

Note: Includes concentrate in stockpile

Table 22.9 After-Tax NPV Sensitivity to Silver Price and Discount Rates

After Tax NPV	Long-term Silver Price ($/oz Ag)								
	10.00	15.00	18.50	19.00	21.00	22.00	24.00	27.00	30.00
Discount Rate	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**
Undiscounted	–17	105	192	204	253	278	327	401	474
2%	–17	101	183	195	242	266	313	384	454
5%	–16	95	172	183	**228**	250	294	360	427
10%	–14	86	156	166	206	226	266	327	387
12%	–14	83	150	160	199	218	257	315	373

Note: NPV includes concentrate in stockpile

Table 22.10 After-Tax NPV5% Sensitivity to Operating and Capital Cost Changes

Discount Rate	Changes to Cost (%)								
	–30%	–20%	–10%	–5%	–	+5%	+10%	+20%	+30%
Operating	342	304	266	247	228	208	189	151	113
Capital	238	234	231	229	228	226	224	221	217

Note: NPV includes concentrate in stockpile

Table 22.11 Estimated Cash Flow

Description	Total ($M)	2022 ($M)	2023 ($M)	2024 ($M)	2025 ($M)	2026 ($M)	2027 ($M)	2028 ($M)
Total Gross Revenue	999.9	245.2	244.0	214.4	198.7	97.7	–	–
Total Realisation Costs	214.5	50.1	50.8	47.7	43.9	21.9	–	–
Net Revenue	785.5	195.0	193.2	166.7	154.7	75.8	–	–
Site Operating Costs								
Mining Costs	110.3	35.4	30.6	24.6	12.8	7.0	–	–
Processing Costs	183.4	41.6	40.8	41.3	42.0	17.9	–	–
G&A Costs	93.5	22.2	21.0	20.8	19.8	9.8	–	–
Total Operating Costs	387.2	99.2	92.3	86.6	74.5	34.6	–	–
Operating Surplus / (Deficit)	398.3	95.9	100.9	80.1	80.2	41.2	–	–
Capital Costs								
Exploration & Development	20.8	3.1	4.7	10.1	–	2.9	–	–
Sustaining Capex	47.2	15.6	13.9	9.8	4.8	3.1	–	–
Closure & Reclamation	30.6	3.8	7.8	–	–	–	14.7	4.4
Total Capital	98.6	22.4	26.4	19.9	4.8	5.9	14.7	4.4
Working Capital	20.6	5.1	10.2	–0.2	3.3	2.2	–	–
Pre-tax Cash Flow	279.1	68.3	64.3	60.4	72.1	33.0	–14.7	–4.4
Tax Payable	26.0	13.0	8.5	6.0	1.6	10.1	–12.8	–0.2
After-tax Cash Flow	253.0	55.4	55.9	54.4	70.5	23.0	–2.0	–4.1

Note: Table shows $M, includes concentrate in stockpile

23 ADJACENT PROPERTIES

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24 OTHER RELEVANT DATA AND INFORMATION

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25 INTERPRETATION AND CONCLUSIONS

Mineral Resources and Mineral Reserves in the Puna21TR meet the CIM Definition Standards on Mineral Resources and Reserves 2014 (CIM Definition Standards) and conform to the Canadian National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101.

Significant factors that could materially affect the Mineral Resources and Mineral Reserve are:

- Environmental, Permitting Social and Community – Argentina currently has no specific mine closure legislation other than the requirement to prepare and submit and regularly update an ESIA, including with respect to mine closure activity. MPSA is developing an update of the Puna closure plan that will includes both Chinchillas and Pirquitas Mines to possible changes to the closure requirements and obligations. In order to operate the mine, MPSA must maintain appropriate relations with all the authorities and stakeholders. Social, community and government relations are managed by MPSA and include programmes and engagement with the local communities and both local and national governments.
- Mine planning to maximise the current Mineral Resources is an important activity that MPSA has identified and commenced. Expediting this work will optimise the project and has the potential expand on the current project opportunities.
- Metal price impacts – silver is the primary revenue element and is produced from lead and zinc concentrates. Zinc prices have ben relatively high compared to the long-term forecasts. As the operation has a short life evaluation of the prices for all metals will needed to maximise the value of extracted metal.
- Geotechnical impacts – the mine designs for Chinchillas were revised in 2021, a review by geotechnical engineers of the updated designs should be prepared to confirm that the designs are suitable for the current slope recommendations.
- The location of the project means that the concentrates are required to be transport ed a significant distance to customers. Delays or other issues pose a risk to revenue and MPSA needs to maintain planning and strategies to provide for an efficient logistics function.
- Closure of the processing plant may limit the development options of the Pirquitas underground Mineral Resource.

26 RECOMMENDATIONS

Key recommendations for the project are:

- Potential remains to expand the current Mineral Resource and to define new Mineral Resources on the property.
- At Chinchillas it is recommended that MPSA examine advanced grade control (using reverse circulation drilling) at a grid spacing of 20 m, to determine if it will improve prediction particularly where the grade trends are horizontal. This examination should identify the targets and cost of the programme.
- The shallow eastward dip of high grades should be carefully managed by pit mapping and advanced grade control drilling to provide appropriate levels of confidence to manage risk. A detailed review of Socavon should be undertaken to determine whether portions may be amenable to economic extraction.
- Prepare a study to re-evaluate and assess the Pirquitas Mineral Resource and determine the development horizon available prior to the completion of the Chinchillas open pit and the impact of the current operation.
- Upgrade the Pirquitas density estimation method in future modelling.
- Conduct a review by geotechnical engineers of the updated designs should be prepared to confirm that the designs are suitable for the current slope recommendations.
- Undertake a geotechnical study of the waste rock dumps.
- Further pit optimisation using a range of metal prices and cost input parameters.
- Prepare additional detailed planning and design for rock storage and the general site layout.
- Prepare a geometallurgical study and design a testwork programme.
- Continue with on-going review of capital and operating cost estimates and performance and productivity tracking.
- Finalise the update of the Puna closure plan and associated costs for Chinchillas and Pirquitas Mines including analysis of the possible changes to requirements and obligations.

Costs for this work cost included in the cash flows and as the work will be primarily undertaken by site and other SSR personnel the costs are not considered significant extra costs above the budgeted operating and capital costs.

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