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Preliminary Economic Assessment
Velardeña Project
Durango State, Mexico

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1.0 SUMMARY

This report has been prepared for the Golden Minerals Company (Golden Minerals) for the Velardeña Project (the Project) held by Minera William S.A. de R.L. de C.V. (Minera William) a wholly owned subsidiary of Golden Minerals.

This report has been prepared for the purposes of: detailing exploration and drilling data collected by Minera William since the previous Technical Report; detailing the methods and results of updated mineral resource estimation; and presenting a Preliminary Economic Assessment (PEA) based on updated resources. The PEA investigates the potential minability of measured, indicated and inferred sulfide resources for a select group of veins where Golden Minerals has concentrated their most recent exploration efforts.

1.1 LOCATION, PROPERTY DESCRIPTION & OWNERSHIP

The Project is located in the Velardeña mining district, within the municipality of Cuencamé, in the northeast quadrant of the State of Durango, Mexico. The property is situated approximately 65 km southwest of the city of Torreón and 150 km northeast of the city of Durango. The location of the Project is shown in **Figure 1-1**.

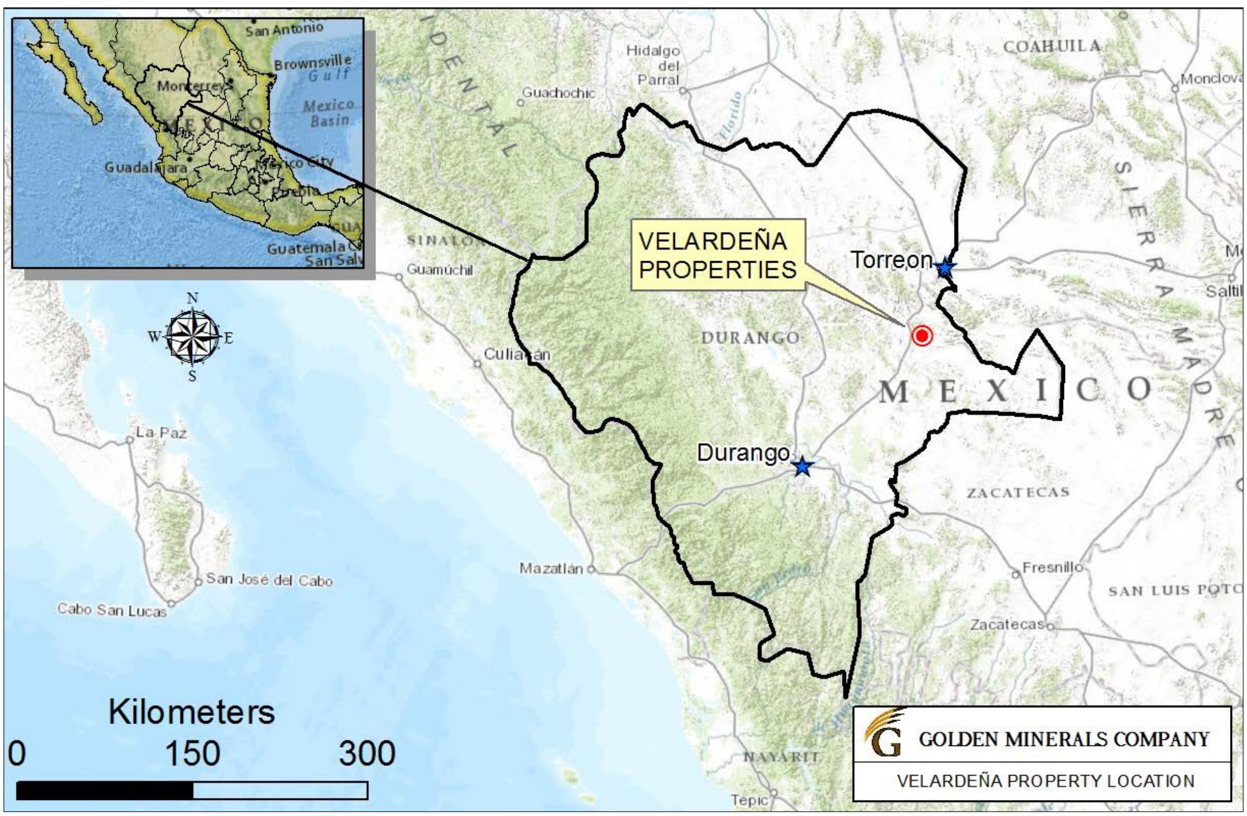


Figure 1-1: General Location Map

1.2 Geology & Mineralization

The Project is located at the easternmost limit of the Sierra Madre Occidental, near its boundary with the Sierra Madre Oriental (Mesa Central sub-province). The deposits of the Sierra de Santa Maria (where Peñoles' Santa Maria mine is located) and Sierra San Lorenzo (where Golden Minerals' Velardeña Project is located), like many other polymetallic, hydrothermal deposits in northern Mexico, are situated along this fundamental boundary which separates thick Tertiary volcanic sequences with Mesozoic basement rocks to the west from Mesozoic carbonates with Paleozoic and older basement to the east.

The regional geology is characterized by a thick sequence of limestone and minor, calcareous clastic sediments of Cretaceous age, intruded by Tertiary plutons of mostly felsic to intermediate composition. During the Laramide event, sediments were subject to an initial stage of compression which resulted in formation of large amplitude, upright to overturned folds generating the distinctive strike ridges of limestone which dominate topography. Fold axes trend northerly in the northern part of the region but are warped or deflected to west northwest azimuths in the south. The northeast trending hinge line or deflection which controls this fundamental change in strike passes through the Velardeña district.

1.3 Exploration, Sampling & QA/QC

The Project has been extensively explored from the surface using geologic mapping, vein mapping and vein sampling. Underground exploration consisted of geologic level mapping, vein level mapping, vein sampling, drilling, and drift and stope development. The author is unaware of any geophysical surveys completed on the property.

Sample preparation, analyses and security procedures followed by Minera William staff meet industry common practice standards and are sufficient to support the estimation of resources. The quality control sampling results are typical of an operation given the amount of throughput and data handling. Previous quality control procedures and results have been reviewed by previous authors, those reviews resulted in improved protocols and performance, but previous authors ultimately concluded the data was sufficient to support estimation of resources.

Current drill hole analysis is completed by ALS Chemex in Vancouver, Canada and mine channel and mill samples are tested at the onsite laboratory facility constructed in 2013. ALS Chemex in Vancouver is independent of the issuer and is ISO 17025 accredited, the accreditation of ALS Vancouver encompasses preparation processes completed at ALS Chihuahua. The onsite laboratory is not independent of the issuer and is not accredited. Alva Kuestermeyer of Tetra Tech inspected the onsite laboratory in December 2014 and found the facility and the procedures followed to be of excellent standard.

1.4 Mineral Processing & Metallurgical Testing

There are two processing plants at the Project. Plant #1 treats sulfide material by conventional crush, grind, and differential flotation technologies for the production of Pb, Zn and pyrite concentrates. Process Plant #2 has two production circuits for separately processing oxide and sulfide Au-Ag material for the production of a Au-Ag doré by cyanide leach/Merrill-Crowe and Au-Ag concentrate by flotation, respectively. Production at both plants was suspended in June 2013. Golden Minerals recently restarted production at Plant #1 in November 2014; however, Plant #2 remains on care and maintenance.

Because of the historical production for Plant #1, the liberation characteristics of the material and their response to differential flotation are within typical design criteria and known by the operations personnel. There are no geological, lithological or mineralogical changes in the process plant feed anticipated for the envisaged future production as compared to previous operations. Existing legacy operational data supports the existing process flow sheet for potential future production at Plant #1. Further, the use of existing and refurbished equipment within the pre-existing facilities is Golden Minerals' preferred method of future treatment.

1.5 Mineral Resource Estimation

Resources have been estimated independently for 60 vein surfaces representing main veins, fault offsets and splits of 39 known veins. Estimation was completed using a centerline guiding surface and a variable thickness block model oriented in the best fit plane of the vein. Grade multiplied by thickness (GxT) and thickness attributes have been estimated using inverse distance weighting to a power of 2.5. **Figure 1-2** shows the vein surfaces from the Santa Juana area on the right and the Terneras, San Mateo and San Juanes areas on the left.

Estimated mineral resources for the Velardeña project are shown in **Table 1-1** and **Table 1-2** below, as well as the mineral type portions for each resource class.

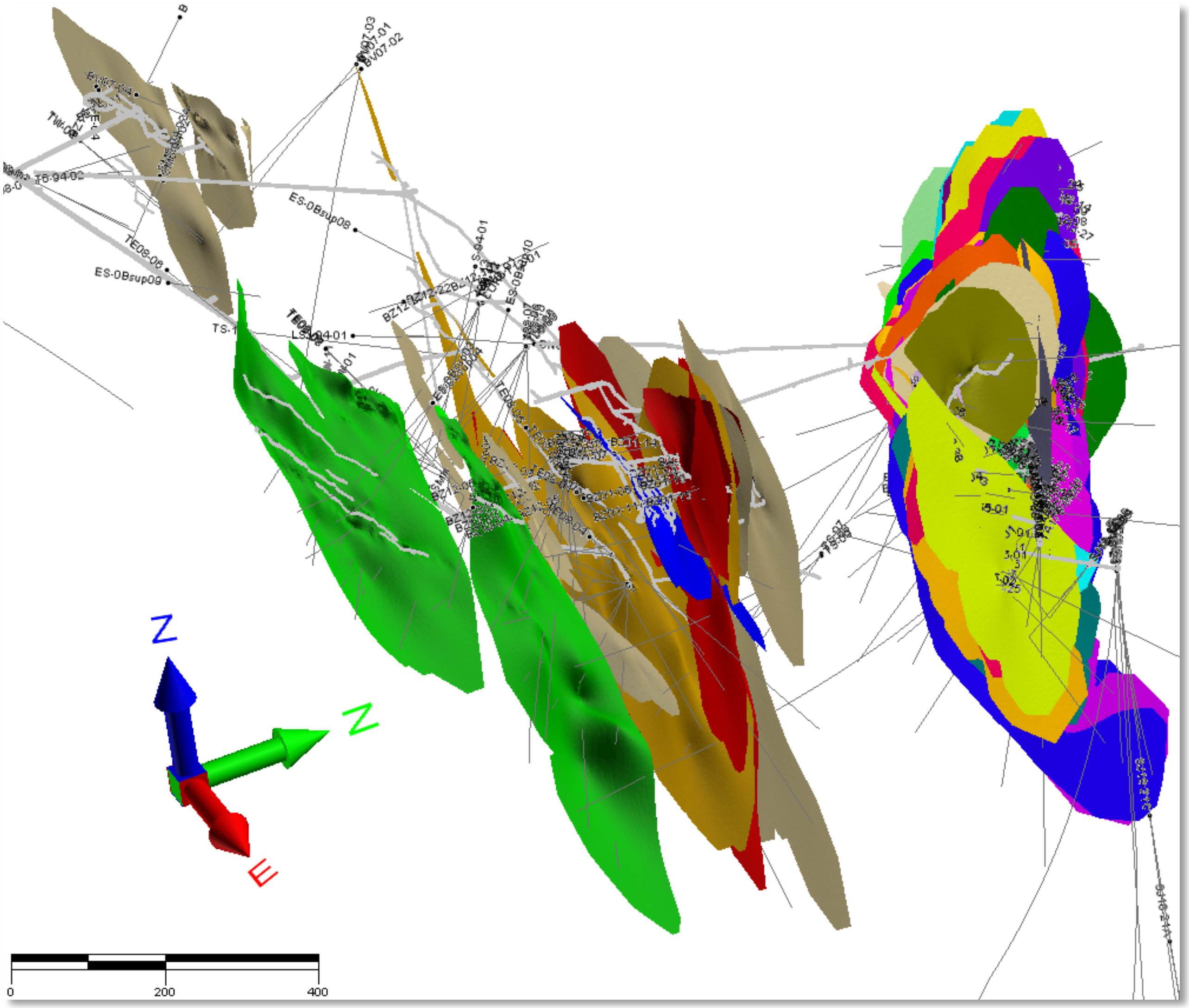


Figure 1-2: 3D View of Vein Centerline Surfaces Looking NW from Above

Table 1-1: Velardeña Project Resources with Base Case Cutoff Inputs

Classification	Mineral Type	NSR Cutoff	Tonnes	Grade Ag g/T	Grade Au g/T	Grade Pb%	Grade Zn%	Ag toz	Au toz	Pb lb	Zn lb
Measured	Oxide	100	210,000	282	4.4	1.6	1.3	1,900,000	30,000	7,200,000	5,920,000
Indicated	Oxide	100	450,000	283	3.7	1.7	1.3	4,130,000	55,000	17,350,000	13,190,000
Measured + Indicated	Oxide	100	660,000	283	4	1.7	1.3	6,030,000	84,000	24,550,000	19,110,000
Inferred	Oxide	100	470,000	332	4.4	2.5	1.3	5,010,000	66,000	25,750,000	13,400,000
Measured	Sulfide	100	320,000	280	4.2	1.3	1.5	2,920,000	44,000	9,190,000	10,950,000
Indicated	Sulfide	100	810,000	259	3.6	1.3	1.6	6,710,000	93,000	22,430,000	28,950,000
Measured + Indicated	Sulfide	100	1,130,000	265	3.8	1.3	1.6	9,620,000	137,000	31,620,000	39,910,000
Inferred	Sulfide	100	1,670,000	254	4.0	1.2	1.5	13,650,000	216,000	44,710,000	55,450,000
Measured	All	100	530,000	281	4.3	1.4	1.4	4,810,000	74,000	16,390,000	16,870,000
Indicated	All	100	1,260,000	268	3.6	1.4	1.5	10,840,000	148,000	39,780,000	42,150,000
Measured + Indicated	All	100	1,790,000	272	3.8	1.4	1.5	15,650,000	222,000	56,170,000	59,010,000
Inferred	All	100	2,140,000	271	4.1	1.5	1.5	18,660,000	282,000	70,470,000	68,840,000

Notes:

(1) Reported measured and indicated resources are equivalent to mineralized material under SEC Industry Guide 7

(2) Inferred resource is not a recognized category under SEC Industry Guide 7

(3) Resources are reported as diluted Tonnes and grade to 1m fixed width

(4) Metal prices for NSR cutoff are three year trailing average as of December 2014: US$17/troy ounce Ag, US$1,250/troy ounce Au, US$0.85/lb Pb, and US$0.95/lb Zn

(5) Columns may not total due to rounding

Table 1-2: Velardeña Project Resources with Alternative Case Cutoff Inputs

Classification	Mineral Type	NSR Cutoff	Tonnes	Grade Ag g/T	Grade Au g/T	Grade Pb%	Grade Zn%	Ag toz	Au toz	Pb lb	Zn lb
Measured	Oxide	100	150,000	334	5.1	1.8	1.4	1,660,000	25,000	5,980,000	4,800,000
Indicated	Oxide	100	330,000	338	4.3	2	1.5	3,560,000	45,000	14,570,000	10,800,000
Measured + Indicated	Oxide	100	480,000	337	4.6	1.9	1.5	5,220,000	71,000	20,550,000	15,600,000
Inferred	Oxide	100	330,000	410	5.3	2.5	1.4	4,360,000	57,000	18,080,000	10,140,000
Measured	Sulfide	100	260,000	313	4.7	1.4	1.7	2,670,000	40,000	8,390,000	10,040,000
Indicated	Sulfide	100	620,000	297	4	1.5	1.9	5,940,000	81,000	19,920,000	25,990,000
Measured + Indicated	Sulfide	100	890,000	302	4.2	1.5	1.8	8,610,000	121,000	28,310,000	36,030,000
Inferred	Sulfide	100	1,260,000	297	4.5	1.5	1.8	12,070,000	183,000	40,520,000	50,620,000
Measured	All	100	420,000	321	4.9	1.6	1.6	4,320,000	65,000	14,370,000	14,830,000
Indicated	All	100	950,000	311	4.1	1.7	1.8	9,500,000	126,000	34,490,000	36,790,000
Measured + Indicated	All	100	1,370,000	314	4.4	1.6	1.7	13,830,000	192,000	48,860,000	51,630,000
Inferred	All	100	1,590,000	320	4.7	1.7	1.7	16,430,000	239,000	58,590,000	60,760,000

Notes:

(1) Reported measured and indicated resources are equivalent to mineralized material under SEC Industry Guide 7

(2) Inferred resource is not a recognized category under SEC Industry Guide 7

(3) Resources are reported as diluted Tonnes and grade to 1m fixed width

(4) Metal prices for NSR cutoff are current as of December 2014: US$25/troy ounce Ag, US$1,446/troy ounce Au, US$0.96/lb Pb, and US$0.91/lb Zn

(5) Columns may not total due to rounding

Block attributes were estimated in three passes from small to large. Estimation was completed using anisotropic inverse distance weighting for each block in the model. **Table 1-3** details the search ellipse sizes, orientations along with sample selection criteria, and classification. Resource classification was assessed by pass (maximum search), number of samples and the nearest composite and average distance. Measured or Indicated classification was only permitted in pass one, 75 m maximum search, and was primarily but not exclusively defined within blocks haloing the existing drifts and stopes.

Table 1-3: Pass Parameters and Classification

Pass	Method	Max Search	Ratio 1st:2nd:3rd	Sectors	Max Per Sector	Comp Min	Comp Max	Classification
First	IDW 2.5	75	See vein parameter table	4	2	1	8	Inferred, Indicated if; comps >=3 and nearest comp <= 50m, Measured if; comps >=4 and nearest comp <= 16m and average comp distance <= 25
Second	IDW 2.5	150	1:0.25:0.5	1	2	1	2	Not classified, Inferred if; nearest comp <= 125m
Third	IDW 2.5	200	1:0.5:0.5	1	2	1	2	Not classified

1.6 MINING METHODS

The Project is currently in operation as an exclusively underground operation. The current conceptual mine plan includes only the sulfide material below previous workings.

Mining recommenced at the Project on July 1, 2014 with milling operations recommencing on November 3, 2014.

A site visit was conducted on December 17, 2014. Shrinkage stoping was observed to be the primary method of extraction, as well as resuing and cut and fill techniques. These three techniques are considered for the PEA and are discussed below. These methods are suitable to the steeply dipping veins found at the Project.

Conceptually planned stopes for mining are based on measured, indicated and inferred resources which total 410,000 Tonnes for mining over four years, from stopes and stope development. This tonnage is a subset of the total resource that was selected for proximity to current mine development in the Terneras, San Mateo, and Santa Juana areas. **Table 1-4** details the conceptual annual mining schedule.

Table 1-4: Annual Mining Schedule

Period	Notes		Overall	2015	2016	2017	2018
Tonnes stoping	From Stope Schedule	T	312,162	70,753	80,440	75,888	85,081
Tonnes development	From Stope Schedule	T	98,032	31,679	22,171	26,642	17,541
Tonnes mill feed		T	410,194	102,432	102,611	102,530	102,622
Vein development	Stope sill drives	m	5,199	1,660	1,184	1,528	828
Main ramps	Main ramps	m	2,825	1,910	840	75	-
Lateral development	Cross cuts and footwall drives	m	9,174	2,443	3,083	3,648	1,439
Vent shaft / raises	Level connections for return air	m	1,880	1,505	360	15	-
Grade Au		g/T	4.2	3.3	3.4	4.1	6.2
Grade Ag		g/T	198	224	190	197	182
Grade Zn		%	1.4	1.9	1.8	1.2	0.6
Grade Pb		%	0.9	1.6	1.1	0.6	0.4

1.7 Recovery Methods

There are two existing process plants, Plant #1 and Plant #2, at the Project. Plant #1 is for treating sulfide material for the production of Pb, Zn and pyrite concentrates and is located near the village of Velardeña, approximately eight kilometers from the mining operations. Plant #1 has an operating capacity of 300 T/d with effective capacity of 285 T/d at a 95% availability, equal to 102,000-103,000 Tonnes per year (T/yr) on a 360 day schedule. Plant #2 is a process plant for treating Au-Ag material, for the production of a Au-Ag flotation concentrate and a Au-Ag doré. Plant #2 was purchased by Williams Resources in 1996. Operations were suspended at both plants in June 2013. In July 2014, Golden Minerals restarted mining operations to feed Plant #1, which started production on November 3, 2014. During the shutdown, Golden Minerals completed several capital projects at Plant #1 prior to its restart including: overhauling the electrical system, installing new concentrate filters, and refurbishing the flotation cells. Plant #2 remains on care and maintenance. Based on the current resource estimates, there are no plans to restart Plant #2 at this time.

1.8 Infrastructure

Infrastructure facilities at the Project include the following:

- Access roads;
- Power line;
- Ancillary buildings; and
- Water wells.

There are no man-camp facilities at the Project site. The Project is located in the Mexican state of Durango, approximately 65 kilometers southwest of the city of Torreón and 150 kilometers northeast of the city of Durango. A major 4-lane highway, Highway 40, connects these cities. The Velardeña Plant #1 is located adjacent to the village of Velardeña which is approximately 500 meters west of Highway 40D. The Velardeña mines are located about eight kilometers from Plant #1 via a gravel road. Plant #2 is located approximately 3.5 kilometers from the Velardeña mine, also via gravel roads.

1.9 Market Studies & Contracts

Mill operations, which re-commenced in November 2014, produce Pb, Zn and pyrite concentrates. The Pb and Zn concentrates are purchased by Transamine and contracts are in place, pending annual renewals, for the proposed duration of operation.

Previous arrangements with Newmont for sale of pyrite concentrates have expired. Golden Minerals is in discussions with brokers for future pyrite concentrate sales and have been provided general concentrate terms. For purposes of the PEA, it is assumed that Golden Minerals will be successful in securing a buyer for pyrite concentrates.

1.10 Environmental Permitting

Minera William's Velardeña Operations consist of existing underground mining and surface mineral processing facilities located on controlled property. Numerous historical mining operations have occurred at the Velardeña Operations with records showing the existence of mining in the district dating back to the early 1800s. Significant mining activity began in 1902 and included mining of both the Terneras and Santa Juana veins and the construction and operation of a 2,500 T/d smelter. Other small scale development was conducted by local miners throughout most of the 1900s. Many of these historical operations have been incorporated into the current mining activities while others remain inactive and separate from the current activities. Minera William anticipates continued mining operations at this location.

In early 2012, Golden Minerals applied for and was accepted into the Mexican National Environmental Auditing Program ("NEAP"). Under NEAP, Golden Minerals participated in an audit program to verify compliance with existing regulations and identify non-regulated potential issues that could result in environmental contingencies. Golden Minerals holds various permits required for conducting their current operations at the Velardeña operations, and their participation in NEAP allows them to continue their current operations during the remediation of any potential non-compliance matters. This program was in play for Plant #1 until the spring of 2014, at which time Golden Minerals had achieved 85% compliance, but the plant was placed on care and maintenance.

Golden Minerals is required to update their environmental licenses and environmental impact assessments for any expansion of or modification to any of the existing two plants. The construction of new infrastructure beyond the current plant facilities would require additional permitting, including environmental impact assessments and possibly land use permits. Golden Minerals does not expect to have difficulty obtaining additional permits or environmental impact assessments.

Tetra Tech is unaware of any outstanding environmental liabilities attached to the Velardeña properties and is unable to comment on any remediation which may have been undertaken by previous companies.

1.11 Capital & Operating Costs

Capital costs for the Velardeña Mine are summarized in **Table 1-5**.

Table 1-5: Capital Costs (2015-2018)

Item	Total ($000s)
Mine Equipment	$1,000
Process Plant	$90
Reclamation	$2,568
2015-18 Capital	**$3,658**

Operating costs for the Velardeña Mine are summarized in **Table 1-6**.

Table 1-6: Operating Costs (2015-2018)

Item	Total ($000s)	Unit Cost ($/T)
Mining costs	$23,336	$56.89
Milling costs	$11,075	$27.00
Mine & Process	**$34,412**	**$83.89**
Site Administration	$6,540	$15.94
G&A	$8,526	$20.78
Royalty[1]	$331	$0.81
2015-18 Operating	**$49,809**	**$121.43**

Note:
1. Mexican federal royalty on precious metals production of 0.5%.

1.12 Economic Analysis

Project cost estimates and economics developed in the Technical-Economic Model (TEM) are prepared on a monthly basis for the LoM. The following preliminary economic analysis includes measured, indicated and inferred mineral resources; mineral resources are not mineral reserves and do not have demonstrated economic viability. This preliminary economic analysis also includes inferred mineral resources that are too speculative for use in defining reserves. Based upon design criteria presented in this report, the level of accuracy of the estimate is considered ±35%. Economic results are summarized in **Table 22-1**. The analysis suggests the following conclusions, assuming no debt:

- Remaining Mine Life: four years;
- Post-Tax $NPV_{8\%}$: US$11.1 million, IRR: 180%;
- Payback (Post-Tax): six months;
- Federal Precious Metal Royalty: US$331,000; and

- Income Tax: US$937,000.

1.13 Interpretations & Conclusions

1.13.1 Geology & Resources

Drill hole and channel samples have been collected, and analyzed using industry standard methods and practices and are sufficient to support the characterization of grade and thickness and to further support the estimation of measured, indicated and inferred mineral resources.

1.13.2 Mining

Results of the PEA indicate mining is potentially economically viable based on the inclusion of inferred mineral resources. However, due to the nature of the mineralization and the scale of the operations, extensive resource drilling of the deposit is not planned. For this reason detailed mine plans and schedules are not expected to be produced for the deposit. The consequence of this is that residual risk remains for mining of the project and planning of grades and stope tonnages can only be done on a short term basis.

The success of the proposed plan is sensitive to mining dilution, which could increase the costs of saleable products but also provides opportunity as any potential reductions in dilution from the mining would greatly benefit the project.

1.13.3 Metallurgy & Process

There are no geological, lithological or mineralogical changes in the process plant feed anticipated for the envisaged potential future production as compared to previous operations. Existing legacy operational data fully supports the existing process flow sheet for future production at the Plant #1.

The use of existing and refurbished equipment within the pre-existing facilities, and the production of marketable concentrates, is Golden Minerals' preferred method of treating potential future production.

1.14 Recommendations

1.14.1 Geology & Resources

- Continue to collect specific gravity measurements and refine current estimations of specific gravity. Additional measurement should ideally be made with a paraffin wax or epoxy coating;
- Implement procedures of duplicate channel sampling of drifts by secondary sampling teams prior to stope development to ensure grade and thickness characteristics and to serve as field duplication of channel samples;
- Setup of strict control sample review procedures and tolerances involving review of control sample failure on receipt of each batch's results, and automatic triggering of batch reanalysis immediately after being alerted to failures;
- Improve sample data transcription methods to reduce control sample labeling errors and immediately resolve errors when encountered;

- Perform a detailed model reconciliation on a completed stope early in the proposed mine life and alter the estimation methods if the result of the reconciliation suggest refinements should be made;
- Continue to advance exploration drilling down dip of current inferred resources as new levels are established. Preferentially target the Terneras, San Mateo, Roca Negra and A4 veins; and
- The costs for additional drilling have not been included in the LoM PEA but any further resource expansion would be dependent on additional drilling at about the same scale, ~9,000 m, as was completed in 2014.

1.14.2 Mining

It is recommended that Golden Minerals conducts a trade-off study on using cut and fill mining where waste and vein material are blasted separately in order to reduce ore dilution. The trade-off would consider that more total Tonnes would be mined/blasted in each section though vein Tonnes would be reduced but mined with a resulting higher grade.

It is also recommended that the current mine plan is optimized based on exclusion of stope development Tonnes that are diluted to the point that mill costs are not paid. In addition the mine plan developed for the PEA should be optimized and undertaken at a more detailed level for a period of four to five years, which will enable a greater understanding of mining constraints, costs and resulting mill feed.

1.14.3 Metallurgy & Process

Sb and As are penalty elements in the Pb and Zn concentrates and need to be added to the database and spatially modeled. Additional metallurgical test work is recommended to investigate the depression of Sb and As from the final Pb and Zn concentrates, and Zn from the pyrite concentrate.

2.0 INTRODUCTION

This report has been prepared for Golden Minerals Company (Golden Minerals) for the Velardeña Project (the Project) held by Minera William S.A. de R.L. de C.V. (Minera William) a wholly owned subsidiary of Golden Minerals. Additionally, Golden Minerals wholly owns Minera Labri S.A. de C.V. (Mineral Labri), which holds title to Plant #1, the private property it resides on and additional property within the Project area.

This Technical Report was prepared to fulfill Golden Minerals' obligation to file a Technical Report in accordance with Section 4.2(1)(j)(ii) of Canadian National Instrument 43-101 - Standards of Disclosure for Mineral Projects (NI 43-101). This report has been prepared by Qualified Persons employed by Tetra Tech.

This report has been prepared for the purposes of: detailing exploration and drilling data collected by Minera William since the previous Technical Report; detailing the methods and results of updated mineral resource estimation; and presenting a Preliminary Economic Assessment (PEA) based on updated resources. The PEA investigates the potential minability of measured, indicated and inferred sulfide resources for a select group of veins where Golden Minerals has concentrated their most recent exploration efforts.

Golden Minerals is a Delaware corporation based in Golden, Colorado, USA. Golden Minerals' shares are listed on the Toronto Stock Exchange under the symbol AUM and on the NYSE MKT Exchange under the symbol AUMN.

2.1 SOURCES OF INFORMATION

Sections 4.0 to **11.0** as described in the previous technical report on the property by Chlumsky, Armbrust and Meyer, L.L.C. (CAM) in 2012 have been utilized in this report where appropriate and applicable. Content in these sections has been collated by various authors contributing to previously issued reports, prepared by CAM 2012, Micon International Limited (Micon) (2009, 2008, 2006, and 1998), Roscoe Postle and Associates Inc. (RPA, 2005), Broad Oak Associates (Broad Oak, 2006) and in various government and other publications listed in **Section 27** "References". No previous authors have been relied on for content in this report.

Golden Minerals and Minera William staff have contributed the following data and inputs in support of this Technical Report:

- Drill hole and channel database information;
- Initial interpretations of veins;
- Geologic and vein level and surface maps;
- Existing ramp and level development and mined cavities;
- Production reports;
- Mill cost reports;
- Mineral processing flowsheets, equipment list, and facility layouts for both Plants #1 and #2;
- Freshwater well and infrastructure data;

- Smelting and refining contract terms for Pb, Zn and pyrite concentrates;
- Tax rates and royalty terms for economic analysis;
- Affected environment and baseline data, current permit status and requirements, and the environmental monitoring program; and
- Community relations and social responsibility.

2.2 Property Inspection

Property inspections have been completed by Qualified Persons Geoffrey Elson, Mark Horan and Alva Kuestermeyer.

Mr. Elson visited the site on three separate occasions from February 6, 2013 to July 18, 2013, and was on site for a total of 11 days. The inspections entailed observations of mining, exploration drilling, channel sample locations, survey locations, underground mine accesses, vein drifts and stopes, stockpiled material, and discussions with the mine staff regarding past estimation methods, database structure and vein interpretations.

Mr. Horan visited the site on December 17, 2014 and observed surface infrastructure, development, stoping, ramp development, adits and Plant sites #1 and #2.

Mr. Kuestermeyer visited the site on December 17, 2014 and observed surface infrastructure, the analytical laboratory, mine accesses, mine material transport routes, stockpiles and the facilities at Plant #1 and #2.

2.3 Units of Measure

All references to dollars in this report are to US dollars (US$) unless otherwise noted. Distances, areas, volumes, and masses are expressed in the metric system unless indicated otherwise.

For the purpose of this report, common measurements are given in metric units. All tonnages shown are in Tonnes of 1,000 kilograms, and precious metal grade values are given in grams per tonne (g/T), precious metal quantity values are given in troy ounces (toz). To convert to English units, the following factors should be used:

- 1 short ton = 0.907 tonne (T);
- 1 troy ounce = 31.1035 grams (g);
- 1 troy ounce/short ton = 34.286 grams per tonne (g/T);
- 1 foot = 30.48 centimeters (cm) = 0.3048 meters (m);
- 1 mile = 1.61 kilometer (km); and
- 1 acre = 0.405 hectare (ha).

The following is a list of abbreviations used in this report.

Abbreviation	**Unit or Term**
2D	two-dimensional

3D	three-dimensional
Ag	silver
AR	risk analysis
As	Arsenic
ASARCO	American Smelting & Refining Company
Au	gold
BLS	Bureau of Labor Statistics
Broad Oak	Broad Oak Associates
CAM	Chlumsky, Armbrust & Meyer, LLC
CCP	Comprehensive Closure Plan
CFE	Comisión Federal de Electridad
°C	degrees Celsius
cm	centimeter
cm^3	cubic centimeters
CONAGUA	Comisión Nacional del Agua
Cu	copper
CUS	Land Use Change
CUSF	change in forestry land use
ECU	ECU Silver Mining
EIA	Environmental Impact Assessment
ERSA	Ensayes y Representaciones, S.A.
ETJ	Technical Justification Study
g	gram
g/T	grams per tonne
g/cm^3	grams per cubic centimeter
Golden Minerals	Golden Minerals Company
Golden Tag	Golden Tag Resources Ltd.
GxT	grade multiplied by thickness
ha	hectare
ID	identification
IMMSA	Industrial Mineral de Mexico S.A.
INAH	National Institute of Anthropology and History
kg	kilogram
km	kilometer
km^2	square kilometers
km/hr	kilometers per hour
KVA	kilovolt amp
K-Ar	potassium argon
LAU	Licencia Única Ambiental
lb	pound
LGEEPA	General Law of Ecological Equilibrium and Environmental Protection
LGPGIR	Ley General para la Prevención y Gestión Integral de los Residuos
LoM	Life of Mine
m	meter
M	million
MIA	Manifestación de Impacto Ambiental
Micon	Micon International Limited
Minera Labri	Minera Labri S.A. de C.V.
Minera William	Minera William S.A. de R.L. de C.V.
Mm	millimeter
mm/yr	millimeters per year
Mya	million years before present
m/s	meters per second

MXN	Mexican Peso
NEAP	Mexican National Environmental Auditing Program
NI 43-101	Canadian Securities Administrators' National Instrument 43-101
NOM-120-SEMARNAT-1997	Mexican Official Standard
NSR	Net Smelting Return
Pb	lead
PEA	Preliminary Economic Assessment
PMLU	Post-Mining Land Use
PPA	Accident Prevention Plan
PPI	producer price indexes
ppb	parts per billion
ppm	parts per million
PROFEPA	Federal Bureau of Environmental Protection
Project	Velardeña
QA/QC	quality assurance/quality control
RoM	Run of Mine
RPA	Roscoe Postle and Associates, Inc.
Sb	Antimony
SEDENA	Ministry of Defense
SEMARNAT	Secretaria del Medio Ambiente y Recursos Naturales
SMT	Special Mining Taxes
T	metric ton
TEM	Technical Economic Model
toz	Troy ounces
T/d	Tonnes per day
T/yr	Tonnes per year
US$	United States dollars
V	volt
µm	micrometer
yd^3	cubic yard
yr	year
/	per
Zn	Zinc

3.0 RELIANCE ON OTHER EXPERTS

The authors of this report are relying on statements and information provided by the issuer concerning legal, environmental, tax and royalty matters included in **Sections 4.0, 19.0, 20.0, and 22.0** of the Technical Report.

The authors of the Technical Report are relying on statements and documents provided by Warren Rehn, Senior Vice President and Robert Vogels, Chief Financial Officer of Golden Minerals:

- Standing of environmental permits and compliance;
- Standing of mining, exploration and associated permits to continue mining operations;
- Location of claims and standing;
- Surface access agreements;
- Smelting terms and contracts; and
- Leasing, royalty and purchase agreements relating to the claims.

The author of **Section 20.0** of this report is relying on a number of reports and information provided regarding environmental matters:

- Environmental Impact Statement (Manifestación de Impacto Ambiental - MIA), Velardeña Mine Exploration and Mining Project Located in the Town of Cuencamé of Ceniceros, Durango; April 2013, prepared by consultants of Minera William located at Río Támesis 2505, Col. Magdalenas, Torreón, Coahuila, 27010, and has summarized the relevant conclusions of the report.

- Conceptual Closure Plan, Golden Minerals Company, Velardeña Operations prepared by Kermit C. Behnke, July 2012, in its entirety.

- Statements and documents provided by Warren Rehn, Senior Vice President of Golden Minerals, particularly in the area regarding community agreements and social impacts.

4.0 PROPERTY DESCRIPTION & LOCATION

The Project includes two properties located within the Velardeña mining district: the Velardeña property and the Chicago property.

4.1 LOCATION

The Project is located in the Velardeña mining district, within the municipality of Cuencamé, in the northeast quadrant of the State of Durango, Mexico. The property is situated approximately 65 km southwest of the city of Torreón and 150 km northeast of the city of Durango. The location of the Project is shown in **Figure 4-1**.

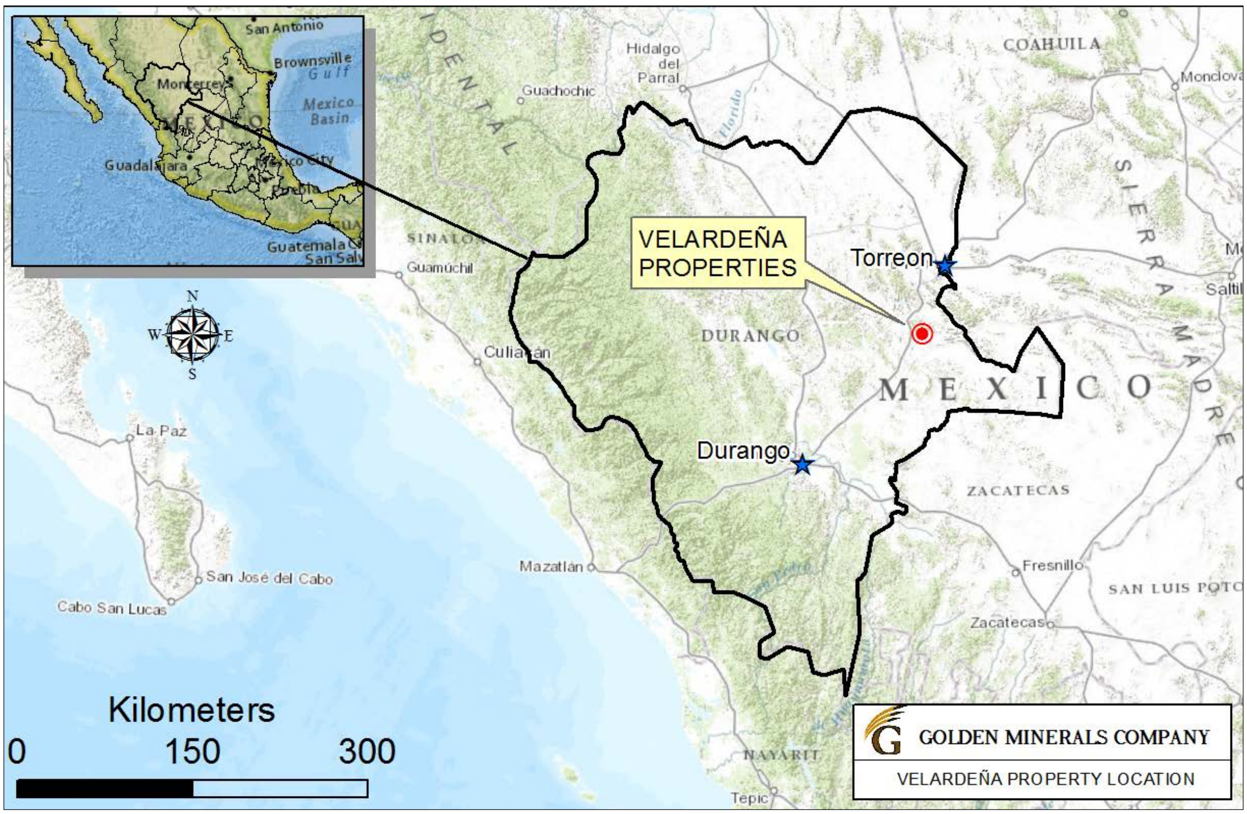


Figure 4-1: General Location Map

4.2 PROPERTY DESCRIPTION

The Project is comprised of two properties:

- The Velardeña property is centered on UTM grid coordinates 2774300 N and 632200 E (WGS 84 datum, zone 13). This property contains the Santa Juana mine, as well as the historical Terneras, San Juanes and San Mateo mines; and
- The Chicago property is located approximately 2 km south of the Velardeña property and is centered at UTM grid coordinates 2772480 N and 631867 E (WGS 84 datum, zone 13). This property contains the historical Los Muertos-Chicago mine.

4.3 Claims, Lease & Royalty Structure

4.3.1 Claims

The Project consists of 29 claims covering the Velardeña and Chicago properties controlled by Golden Minerals through its subsidiaries Minera William or BLM Minera Mexicana. **Table 4-1** details the concession and their respective area.

Table 4-1: Project Claims

Contiguous Area	Claim Name	Claim Owner	Title / Concession#	Issue Date	Expiration Date	Concession Area (Has)
Velardeña	AMPL. DEL ÁGUILA MEXICANA	Minera William	85580	10/13/1936	10/12/2061	19.86
Velardeña	ÁGUILA MEXICANA	Minera William	168290	4/2/1981	4/1/2031	18.94
Velardeña	LA CUBANA	Minera William	168291	4/2/1981	4/1/2031	2.55
Velardeña	TORNASOL	Minera William	168292	4/2/1981	4/1/2031	4
Velardeña	SAN MATEO NUEVO	Minera William	171981	9/21/1983	9/20/2033	8
Velardeña	SAN MATEO	Minera William	171982	9/21/1983	9/20/2033	4.61
Velardeña	RECUERDO	Minera William	171983	9/21/1983	9/20/2033	8.23
Velardeña	SAN LUIS	Minera William	171984	9/21/1983	9/20/2033	2.4
Velardeña	LA NUEVA ESPERANZA	Minera William	171985	9/21/1983	9/20/2033	9.93
Velardeña	LA PEQUEÑA	Minera William	171988	9/21/1983	9/20/2033	1
Velardeña	BUEN RETIRO	Minera William	172014	9/21/1983	9/21/2033	6.09
Velardeña	UNIFICACIÓN SAN JUAN EVANGELISTA	Minera William	172737	6/28/1984	6/27/2034	13.94
Velardeña	UNIFICACIÓN VIBORILLAS	Minera William	185900	12/14/1989	12/13/2039	46.43
Velardeña	BUENAVENTURA No. 3	Minera William	188507	11/29/1990	11/28/2040	6.01
Velardeña	EL PÁJARO AZÚL	Minera William	188508	11/29/1990	11/28/2040	15
Velardeña	BUENAVENTURA 2	Minera William	191305	12/20/1991	12/19/2041	5.37
Velardeña	BUENAVENTURA	Minera William	192126	12/19/1991	12/18/2041	30
Velardeña	LOS DOS AMIGOS	Minera William	193481	12/19/1991	12/18/2041	25.33
Velardeña	VIBORILLAS NO. 2	Minera William	211544	5/31/2000	5/30/2050	1.6
Velardeña	KELLY	Minera William	218681	12/3/2002	12/2/2052	3.91
Chicago	SANTA TERESA	Minera William	171326	9/20/1982	9/19/2032	22.34
Chicago	SAN JUAN	Minera William	171332	9/20/1982	9/19/2032	8.17
Chicago	LOS MUERTOS	Minera William	171986	9/21/1983	9/20/2033	3.53
Chicago	EL GAMBUSINO	Minera William	171987	9/21/1983	9/20/2033	6.65
Chicago	AMPLIACIÓN SAN JUAN	Minera William	183883	11/23/1988	11/22/2038	10.8
Chicago	MUÑEQUITA	Minera William	196313	7/16/1993	7/15/2043	15.45
Chicago	SAN AGUSTÍN	Minera William	210764	11/26/1999	11/25/2049	7.46
Chicago	LA CRUZ	Minera William	189474	12/6/1990	12/5/2040	7.91
Chicago	EL PISTACHÓN (BLM MINERA MEXICANA)	BLM Minera Mexicana(1)	220407	7/25/2003	7/24/2053	241.47

(1) Remaining assets of BLM Minera Mexican are in the process of being transferred to Mineral William.

4.3.2 Surface Rights, Agreements & Obligations

The surface rights are owned by either private persons or Ejidos (rural co-operative communities). Typically, a verbal authorization with no consideration is granted for prospecting and sampling and a simple letter agreement or contract will be used for drilling, trenching, basic road building and similar exploration activities. A small monetary consideration and/or the obligation to fix a road or fence, build an earth dam, paint the local town church or school, etc. is usually required to perform any extensive work programs and the landholders must also be compensated should the land be required for development.

Golden Minerals reports that it has a valid agreements with two local Ejidos that control surface rights over the claims. The contract with Ejido Velardeña is for ten years and was signed in 2012, which provides surface rights to certain roads and other infrastructure at the Velardeña property of the Project. As part of the contract the company makes payments of US$2,000 every quarter.

The Chicago property is part of the Vista Hermosa Ejido which controls the surface rights. Golden Minerals and the Ejido have signed an agreement regarding surface rights and access. The contract with Ejido Vista Hermosa is for 25 years and was signed in March 2013 and provides exploration access and access rights for roads and utilities for the Chicago area of the Velardeña project properties. As part of the contract the company makes a payment of 400,000 Mexican Pesos (MXN) plus consumer price index (CPI) adjustments by March 24th of every year.

Golden Minerals has acquired the surface rights for the land underlying the oxide mill from Vista Hermosa Ejido in addition to the land it already owned in the area of surface installations at the entrance of the Terneras mine (San Mateo ramp), the sulfide plant, the area containing the concentrates warehouse, and where one of the wells used by the mill is located.

4.3.3 Royalties and Tax

A royalty of 0.5% on precious metal production (Au, Ag) is paid yearly to the Federal government for the purposes of returning a portion of production to the local community. There are no other known production royalties. In addition, all operations in Mexico are required to pay a 7.5% special mining tax.

4.3.4 Mineral Property Encumbrances

The history of consolidation of the Velardeña concessions and operation of the mine is long and complex, and no attempt has been made to conduct specific due diligence into the status of underlying agreements. It is, however, the author's understanding that the previous royalty provisions attached to acquisition of individual properties have now been extinguished, and that all of the properties are now controlled 100% by Golden Minerals.

In late 2004, a predecessor company purchased an interest in a flotation mill located in the town of Velardeña to treat sulfide production from the Project. Since that time Golden Minerals has increased its ownership interest in the holding company, Minera Labri S.A. de C.V., (Minera Labri) to 100%.

4.4 Environmental Liabilities

This information was sourced from CAM (2012).

In early 2012, Golden Minerals applied for and was accepted into the Mexican National Environmental Auditing Program ("NEAP"). Under NEAP, Golden Minerals will participate in an audit program to verify compliance with existing regulations and identify non-regulated potential issues that could result in environmental contingencies. Golden Minerals holds various permits required for conducting their current operations, and their participation in NEAP allows them to continue their current operations during the remediation of any potential non-compliance matters.

Golden Minerals is required to update their environmental licenses and environmental impact assessments for any expansion of or modification to any of the existing plants. The construction of new infrastructure beyond the current plant facilities would require additional permitting, including environmental impact assessments and possibly land use permits. Golden Minerals does not expect to have difficulty obtaining additional permits or environmental impact assessments.

Tetra Tech is unaware of any outstanding environmental liabilities attached to the Velardeña properties and is unable to comment on any remediation which may have been undertaken by previous companies.

4.5 Permitting

This information was sourced in part from CAM (2012).

Mining projects in Mexico are subject to Mexican federal, state and municipal environmental laws and regulations for the protection of the environment. The principal legislation applicable to mining projects in Mexico is the federal General Law of Ecological Balance and Environmental Protection, which is enforced by the Federal Bureau of Environmental Protection, commonly known as PROFEPA.

In order to begin an exploration program on a concession upon which no substantial mining has been conducted, Golden Minerals would have to comply with the Mexican Official Standard: NOM-120-SEMARNAT-1997, which provides, among other things, that mining exploration activities to be carried out must be conducted in accordance with the environmental standards set forth in NOM-120-SEMARNAT-1997; otherwise, concession holders are required to file a preventive report or an environmental impact study prior to the commencement of the exploration program. However, an environmental impact study may not be necessary if the concessionaire files an application with the environmental authorities confirming the concessionaire's commitment to observe and comply with NOM-120-SEMARNAT-1997. If the exploration program requires the removal of vegetation, a permit to change the land use will also be required.

Golden Minerals reports it has obtained and maintained other permits and agreements that include an explosive use permit (from the Secretaria de Defensa Nacional) subject to renewal each year, surface land use agreement ("ocupación temporal" agreement with the Ejido Velardeña), water use permit (Comisión Nacional del Agua) and other environmental permits from the Secretaria del Medio Ambiente y Recursos Naturales (SEMARNAT).

4.6 Significant Risk Factors

Access to the project is granted through agreements with two Ejidos, Vista Hermosa and Velardeña. The relationship between Golden Minerals and the Ejidos is positive; however, should Golden Minerals fail to make payments to the Ejidos, access to the property could be affected.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE & PHYSIOGRAPHY

5.1 ACCESSIBILITY

The Project is located in the State of Durango approximately 65 km southwest of the city of Torreón and 150 km northeast of the city of Durango. A four-lane toll highway connecting Torreón and Durango passes approximately 500 m east of the village of Velardeña. The village is connected to the mine site via a seven km gravel road. An aerial view of the Velardeña Project area is presented below (**Figure 5-1**).

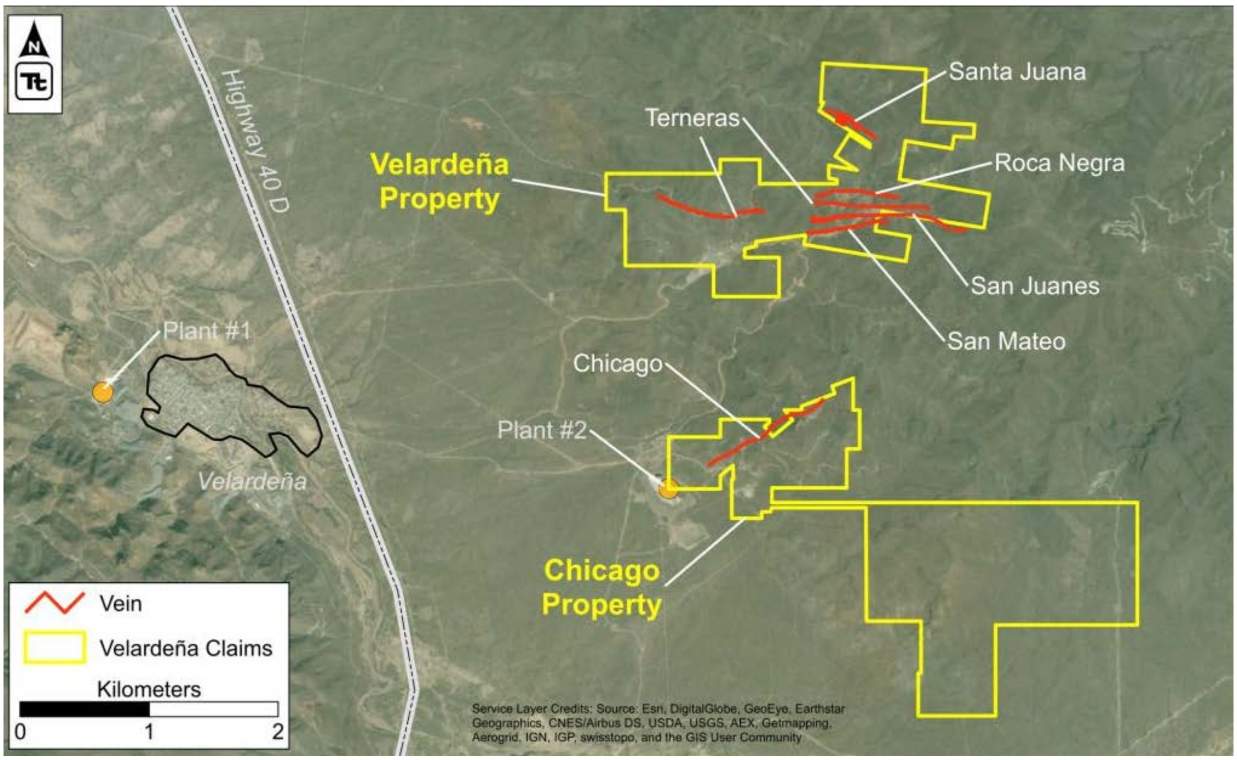


Figure 5-1: Aerial View of the Project

5.2 CLIMATE AND PHYSIOGRAPHY

This information was sourced from the Environmental Impact Statement for the Velardeña Mine Project Exploration and Mining Operation (MIA), dated April 2013.

The area in which the Project is situated is semi-arid with a climate predominantly warm and dry. Mean annual temperature is 21.1° C with rainfall averaging 243.7 millimeters per year (mm/yr). Temperatures can drop below freezing in the winter and commonly reach the high thirties from July through to September. The predominant winds are northeast-southwest, with speeds of 8 to 22 kilometers per hour (km/hr). The length of the operating season is year-round. Access to the site may be temporarily inhibited by major rain events where flow in drainages is such to prevent the passage of highway vehicles at unimproved crossings.

The Project is located on the northwestern edge of the Meseta Central physiographical province, within the Sierras Transversas sub-province, on the eastern flank of the Sierra Madre Occidental mountain range. The village of Velardeña is located in the valley floor set between two northwest trending ranges. To the west is the Sierra Santa Maria which rises approximately 300 m above the valley floor and, to the east, is the Sierra San Lorenzo rising approximately 750 m from the valley, which hosts the Velardeña and Chicago properties.

In physiographic terms, the zone is mature with a mixed topography. Streams within the area drain either to internal drainage systems or tributaries of the Nazas and Aguanaval rivers which are connected to the Laguna de Mayrán. All of the streams are intermittent and short lived during the rainy season only. A series of water dams were built over the years to control water flow from the two rivers for irrigation and water management purposes. The Francisco Zarco dam, located 25 km to the west, is the closest to the Velardeña properties.

The geomorphology shows characteristics typical of a cycle of arid to semi-arid areas. There is an abundance of valleys and flat alluvial plains variably filled with erosional debris derived from adjacent highlands. The drainage systems are generally dendritic and poorly defined; many channels disappear when they reach the valley floor due to infiltration into poorly consolidated alluvial sediments.

According to the classification of INEGI- INE (1996), the type of vegetation where the project is located corresponds to a vegetation type known as Desert Shrubland rosetophilous (rosette-forming vegetation) and submontane scrub.

There are 106 recorded animal species in the State of Durango: 35 mammals, 13 species of reptiles; and 58 species of birds. The fauna present in the State of Durango represent 19% of the total Mexican fauna, the aviary species represent 32% and the reptilian fauna represent 19% of the total species registered for the country.

5.3 Local Resources & Infrastructure

Torreón was founded in 1907 by cotton growers and cattle ranchers. It is now a major industrial center which is host to a Peñoles smelter, a coal-fired electricity plant and one of the largest dairy industries in Mexico. The Francisco Sarabia airport, located in Torreón, is one of the many international airports in Mexico with flights not only to major national hubs, but to some international destinations, including Dallas, Houston and Los Angeles. Torreón has a population of approximately 609,000 according to the 2010 census.

Durango is an old colonial city, founded in 1563, which served as the political and ecclesiastical capital of the Nueva Vizcaya province of New Spain until 1823. Mining is the chief industry, but the city is also an agricultural, commercial and tourist center. The city has a population of approximately 519,000 (2010 census). Durango hosts an international airport with numerous regional flights to other major Mexican cities.

An experienced labor force is available in the village of Velardeña and in several nearby communities. The properties are supplied with electric power via the national grid. Supplies and equipment are directly available from Torreón, Monterrey, Chihuahua and Durango, as well as from specialized suppliers elsewhere in Mexico, Canada and the USA.

Fresh water for the Velardeña project is sourced from wells which tap local aquifers. Golden Minerals has a total of six wells - three located near Process Plant #1 and three near Process Plant #2. These wells are authorized, regulated and permitted by the Mexican Comisión Nacional Del Agua (CONAGUA). In 2015, Golden Minerals has planned the construction of a 4-inch diameter water line from Plant #2 to Plant #1, a distance of five kilometers.

Golden Minerals owns and operates a 300 tonne per day (T/d) flotation mill (Plant #1) which produces three concentrates of Pb, Zn and pyrite. This plant is situated near the town of Velardeña and was upgraded in 2014 including the overhaul of the electrical system, installing new concentrate filters and refurbishing the flotation cells. The tailings from the pyrite flotation section represents the final plant tailings which are pumped to the Tailings Dam #3 which is located adjacent to Plant #1. Tailings Dam #3 has sufficient capacity to hold 3.9 years of tailings from Plant #1. The Velardeña mines, Plants #1 and #2 are connected to the national grid of Comisión Federal de Electricidad (CFE) via a substation located near the entrances of Plant #1 and Peñoles' Velardeña mine. Plant 1 also contains a fully functioning analytical laboratory.

The company also owns a 600 T/d processing plant with two circuits for separately treating oxide and sulfide Au-Ag ores. This plant is currently on care and maintenance. The main buildings hosting this equipment are open to the environment because of the mild climate, and they have ancillary buildings for warehousing, offices and maintenance.

6.0 HISTORY

6.1 EARLY HISTORY OF THE VELARDEÑA DISTRICT

Mining in the greater Velardeña District reportedly dates from the 16th century, primarily exploitation of oxide ores in and around the Santa Maria dome (Gilmer et al, 1988). It is impossible to estimate the production of Ag, Pb and Zn during this early mining period with any accuracy. Records for the 19th century are sporadic and it is only in the later part of the century that larger scale exploitation of mineralized bodies appears to have made a comeback in the district. The following is taken from the account of Gilmer et al. (1988) and Hamilton (2003).

In 1888, the Velardeña Mining and Smelting Company was formed, a smelter was installed, and larger scale production began. At this time many of the smaller operations were consolidated within the larger group. According to Pinet (2000), a report written in 1913 recorded that in four years commencing in 1888, the Velardeña District in Durango produced 120,000 kilograms (kg) of Ag, 19,000 T of Pb and 519 kg of Au.

In 1902, the American Smelting and Refining Company (ASARCO) gained control of the operations and installed a new smelter processing 2,500 T/d, principally from the Santa Maria, Terneras and Reina del Cobre mines. Both the Terneras and Santa Juana veins were mined on a significant scale by ASARCO during the period from 1902 to 1926. The San Mateo vein supported a small-scale operation by an independent company at about the same time. Several other smaller mining companies were also active in the area such as Salida Mining Co., America Mexico Mining and Development Co. and Mexico Texas Co. (Mexican Mining Journal, 1909).

ASARCO and independent operators worked the mines continuously until 1926, when low metal prices and an unstable political environment contributed to their closure. In addition, the softer oxide ore was diminishing with depth, and the operations were encountering harder sulfide ore that made mining more difficult. After the mine closures, the smelter was dismantled and moved to San Luis Potosi (Pinet, 2000). Old reports indicate that early in the twentieth century, the average grade of the Terneras mineralization was 3.5 g/T Au, 835 g/T Ag and 3.85% Pb. Production statistics for the years 1920 to 1924 show that the Terneras mine produced 138,331 T with an average grade of 4.0 g/T Au, 419.7 g/T Ag, 2.1% Pb, 0.3% Cu and 2.5% Zn (Pinet, 2000, and references therein). In 1924, the Terneras shaft was sunk to the 14th level, and a cross-cut was driven to intersect the Santa Juana vein. Also in 1924, it was reported that production from the Santa Juana vein totaled 37,000 T (in excess of 100 T/d), with an average grade of 5.9 g/T Au and 573 g/T Ag. Lesser production was also reported from the Santa Isabel chimney zone (562 T grading 0.6 g/T Au and 401 g/T Ag) and from the Industrial Minera de Mexico S.A. (IMMSA) controlled, El Pilar zone (863 T grading 2.3 g/T Au and 162 g/T Ag) (Pinet, 2000, and references therein).

After 1926, the mines in the district were worked on a small scale by local miners until the advent in 1961 of nationalization by the Mexican government, which precluded foreign ownership of the majority of shares in mining ventures. As a consequence, ASARCO became a minority shareholder in IMMSA, who revived their interest in the area and IMMSA consolidated mineral concessions in two areas in the district. Exploration and development work recommenced in the Santa Maria and Reina del Cobre mines in 1968, and approximately 300,000 T/y were processed by IMMSA in their plant through 2002.

In 1969, IMMSA abandoned several mineral concession blocks, including those underlying the Terneras and San Diego mines. These were acquired by a consortium of individuals headed by Alejandro Gaitan of

Torreón. During the 1970's through the late 1980's several mines in the district were exploited by gambusinos for direct shipping of the Au/Ag ores. Operations by the Gaitan Group on the project area consisted of the removal of material from the old waste dumps and several thousand Tonnes of fill left in the stopes from earlier mining. This material was processed in a mill approximately 100 km from the mines. In 1990, Mr. Gaitan purchased a 50 T/d flotation mill located approximately 13 km from the mines. Ores from several veins within the Santa Juana mine were extracted and processed through the mill at a reported average grade of 396 g/T Ag, 5.9% Pb, 7.6% Zn and a mean grade of 4 g/T Au. The mill was operated intermittently at a low throughput due to a lack of mill-feed. The mines and mill were idled in early 1992.

6.2 MINING & EXPLORATION ACTIVITIES TO 2011

In 1994, Williams Resources acquired the concessions owned by the Gaitan consortium via their Mexican affiliate BLM Minera. During that year, they carried out a Feasibility Study at the Velardeña Mine and commenced pre-production development and mine construction in July 1995 (Duke et al. 1995). From 1995 to 1997, Williams Resources carried out a surface mapping and sampling program on the various concessions, as well as an underground sampling program, principally on the Santa Juana vein system. Williams Resources also drove the Terneras adit, providing access to the 6^{th} level of the Terneras mine, which in turn allowed access to the 12^{th} level of the Santa Juana Mine via a pre-existing cross-cut. The Santa Juana winze was deepened 42 m to the 15.5 level, and a ramp was driven to the 17^{th} level.

In 1996, Williams Resources purchased a 600 T/d processing plant and located it 3.5 km from the mine site. In May of that year they commenced treatment of dump material, which was mixed with minor quantities of development muck from the Santa Juana mine. Williams Resources ceased operation in mid-1997. Exploration from 1995 to 1997, apart from underground sampling and drilling, included general geological mapping, sampling of the veins exposed on surface and limited surface drilling.

In December 1997, ECU Gold (the predecessor company of ECU) purchased 93.48% of BLM Minera and 100% of Minera William from Williams Resources.

ECU restarted operations at Velardeña in January 1998 and the mine has been producing intermittently since that date. Production figures for the period 1998-2008 are summarized in Micon (2009); relevant data for the period 2009-2011 are tabulated below (**Table 6-1**).

In 2011, Golden Minerals merged with ECU. As a consequence both Minera William and BLM are now wholly-owned subsidiaries of Golden Minerals.

Table 6-1: Summary of Production by Mine Area - Velardeña Property (2009-2011)

Mine Area	Tonnes	Au g/T	Ag g/T	Pb %	Zn %	Cu %	Au Oz	Ag Oz	Ag Eq Oz
Chicago Oxide	39,788	1.66	59.78	1.01	0.92	0.06	2,119	76,477	182,445
San Juanes Oxide	34,344	1.49	135.97	0.52	0.46	0.09	1,650	150,140	232,658
Santa Juana Oxide	209,534	3.61	153.52	0.56	0.54	0.16	24,349	1,034,193	2,251,656
San Mateo Oxide	7,494	2.78	133.07	0.59	0.91	0.06	669	32,060	65,499
Terneras Oxide	13,318	1.05	155.35	1.50	0.57	0.03	448	66,518	88,899
Total Oxides	**304,478**	**2.99**	**138.87**	**0.66**	**0.59**	**0.13**	**29,235**	**1,359,388**	**2,821,156**
Chicago Sulfide	20,982	1.82	82.28	1.67	1.87	0.07	1,227	55,508	116,845
San Juanes Sulfide	17,195	1.44	210.50	1.71	0.53	0.05	797	116,373	156,231
Santa Juana Sulfide	50,652	3.58	185.53	0.71	0.86	0.22	5,834	302,137	593,813
San Mateo Sulfide	756	2.35	156.35	0.65	1.06	0.06	57	3,800	6,660
Terneras Sulfide	3,303	0.66	203.42	1.05	0.84	0.04	70	21,602	25,103
Total Sulfides	**92,888**	**2.67**	**167.23**	**1.12**	**1.03**	**0.15**	**7,985**	**499,420**	**898,652**

Source: Velardeña Mine Geology Department

Exploration statistics for the period 1995-2008 are summarized in **Table 6-2**. These results have been summarized by Micon (2009), and have not been independently verified by the author.

Table 6-2: Summary of Historic Drilling on the Velardeña Properties (1995-2008)

Company	Target Area	Drill Program	# Holes	Total Length m
Williams Resources	Santa Juana	Underground	94	6,438
Williams Resources	San Juanes	Surface	6	973
Williams Resources	Terneras	Surface	3	282
Williams Resources	Other	Surface	6	750
	Total		**109**	**8,443**
ECU	Chicago	Surface	14	8,709
ECU	Santa Juana, Terneras	Underground BQ	11	5,533
ECU	various	Underground EX	59	2,750
	Total		**130**	**16,992**

Data taken and modified from Micon 2009 report.

6.2.1 Exploration Drilling (2009-2011)

Compared to previous exploration programs, relatively little drilling was completed during the period 2009-2011 (**Table 6-3**). The objectives were similar to previous programs; namely to confirm the continuity of the known veins, to discover new veins, and to test for deep projections of massive sulfide veins in the Santa Juana area. Based on a review of drill cores and data on-site, these objectives were at least partially achieved, notably with the discovery of deep, massive sulfide mineralization down dip of the A4 vein structure (**Figure 6-1**).

Table 6-3: Summary of ECU's Drilling Programs (2009-2011)

Description	Number of Drill Holes	Total Meters	Total Number of Samples
Surface	0	0	0
Underground (NQ)	3	1,234.6	483
Underground (EX)	35	1,212.1	214
Total	38	2,446.7	697

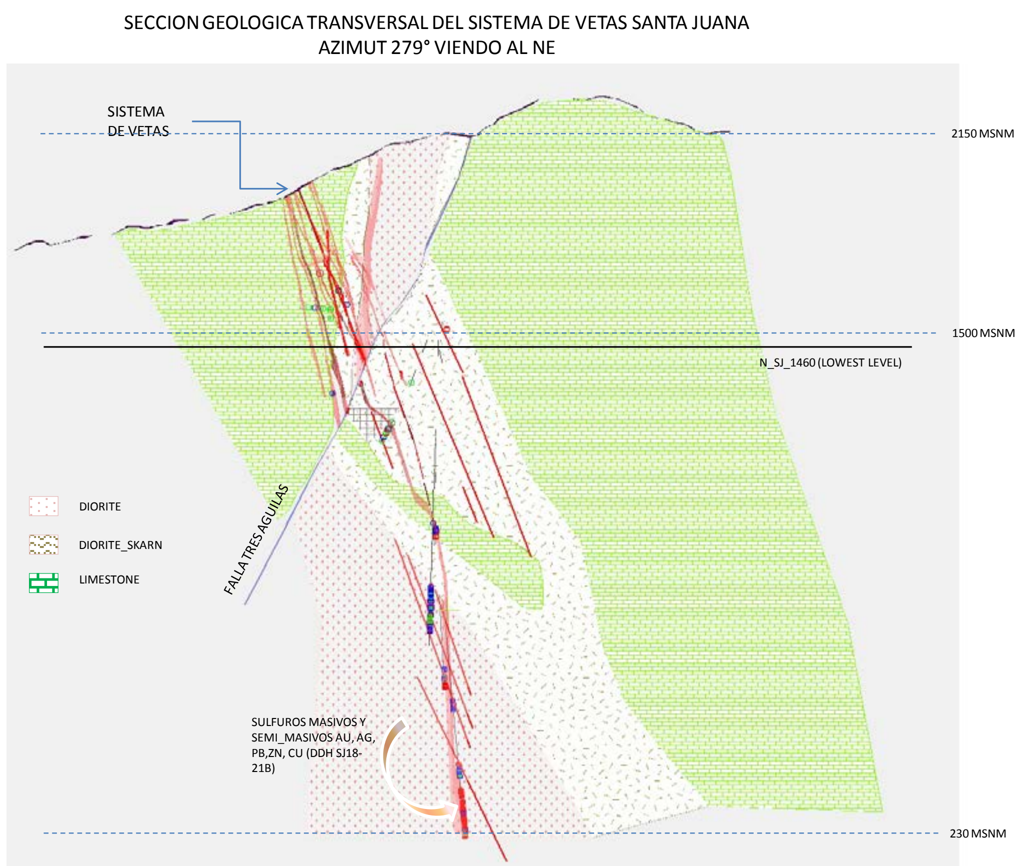


Figure 6-1: Transverse Section - Santa Juana

6.2.2 Underground Development (2009-2011)

In addition to drilling programs, ECU drove underground drifts, ramps and raises to develop the mineralization as well as explore the extent of the mineralization. **Table 6-4** summarizes the underground drifting, ramping and raising completed from 2009 to 2011.

Table 6-4: Summary of the Underground Drifting, Ramping and Raising (2009 to 2011)

Year	Drifts & Ramps m	Raises m
2009	3,368.6	770.0
2010	4,42.8	1,381.0
2011	4,218.9	1,457.5

6.3 Production From 2012 to 2014

After the merger with ECU in 2011, Golden Minerals continued production from the Santa Juana, San Juanes, Chicago, and San Mateo mine areas at an approximate rate of 400 tpd operating both Plant #1 and Plant #2 to treat sulfide, oxide, and mixed mineral types.

As a result of the substantial declines in silver prices in early 2013, Golden Minerals decided to temporarily cease mining and processing operations at the end of June 2013. Just prior to ending operations, the San Mateo ramp was successfully connected with the Santa Juana workings on the Santa Juana 20 level, allowing full access to the deeper portions of the Santa Juana vein system without using the internal Santa Juana winze.

During the shutdown period in 2013 and the first half of 2014, exploration drilling was completed from the San Mateo ramp to test the Terneras and San Mateo vein systems. Mining restarted July 1, 2014 with the commissioning of a new ramp to access deeper levels on the Terneras and San Mateo veins, as well as the Roca Negra vein. Mine production rates ramped up over the second half of 2014 approaching the target rate of 285 tpd by year end. Mined material was stockpiled through October 2014 and mill processing recommenced in November 2014 at the newly refurbished Plant #1 flotation mill. **Table 6-5** summarizes yearly production from the Project as presented in the company's annual 10K filings, with adjusted Ag equivalent values for consistency with the Golden Minerals most recent filings.

Table 6-5: Summary of Production by Year - Velardeña Property (2012-2014)

Year	Tonnes	Au (g/t)	Ag (g/t)	Pb (%)	Zn (%)	Payable Oz Au	Payable Oz Ag	Payable Oz Ag Eq
2012	185,907	2.02	125	0.28	0.41	6,435	457,265	907,715
2013	72,063	2.56	163	0.36	0.53	2,349	252,256	416,686
2014	13,922	2.69	320	2.06	2.42	194	28,746	42,326

Source: 2013 Year-end 10k Filings and Company Documents
Notes: Ag:Au = 70:1

7.0 GEOLOGICAL SETTING & MINERALIZATION

7.1 GEOLOGICAL & STRUCTURAL SETTING

The Project is located at the easternmost limit of the Sierra Madre Occidental, near its boundary with the Sierra Madre Oriental (Mesa Central sub-province). The deposits of the Sierra de Santa Maria and Sierra San Lorenzo, like many other polymetallic, hydrothermal deposits in northern Mexico, are situated along this fundamental boundary which separates thick Tertiary volcanic sequences with Mesozoic basement rocks to the west from Mesozoic carbonates with Paleozoic and older basement to the east.

The regional geology is characterized by a thick sequence of limestone and minor, calcareous clastic sediment of Cretaceous age, intruded by Tertiary plutons mostly of felsic to intermediate composition. During the Laramide event, sediments were subject to an initial stage of compression which resulted in formation of large amplitude, upright to overturned folds generating the distinctive strike ridges of limestone which dominate topography. Fold axes trend northerly in the northern part of the region but are warped or deflected to west northwest azimuths in the south. The northeast trending hinge line or deflection which controls this fundamental change in strike passes through the Velardeña district (**Figure 7-1**).

Tertiary volcanic and semi-consolidated alluvial sediments survive as erosional remnants on earlier basement rocks. The volcanic rocks may have been derived from an eruptive center located west of the pueblo of Velardeña where andesites have yielded age dates of 45 million years ago (Mya) (Gilmer et al, 1988).

Tertiary stocks intruded the Cretaceous sediments in the Velardeña area along an axis subparallel to the hinge line described above, resulting in formation of a series of complex limestone domes cored by the younger intrusive rocks (i.e. the Sierra de Santa Maria, Sierra de San Lorenzo, and San Diego Dome). The Santa Maria quartz latite porphyry intrusion, west of the village of Velardeña, has yielded a potassium-argon (K-Ar) date of 33.1 Mya (Gilmer et al, 1988 and references therein).

Intrusions range in composition from mafic diorite to felsic alaskite and rhyolite. Thermal metamorphism of sediments at and near intrusive contacts is widespread, generating calc-silicates, hornfels, and bleached/marbleized limestone. Higher temperature, calc-silicate rocks are characterized by the prograde assemblage garnet - wollastonite and by the absence of pyroxene. The various mineral deposits of the Velardeña District occur in close proximity to intrusive centers, contact aureoles, and accompanying alteration zones. Mineralization has been dated at approximately 31 Mya (Gilmer et al, 1988), suggesting a genetic as well as spatial association with the intrusions.

Multiple, high angle, northwest trending faults have been mapped throughout the district; these are sub-parallel to the terrain boundary described above and are therefore likely candidates for deep, basement-penetrating structures which may have served as magma conduits (Clark et al, 1988). Reactivation of the northwest structures and formation of northeast trending faults resulted in a grid of younger, calcite-filled structures which off-set mineralized veins. This is well demonstrated at the Terneras mine where the northeast trending Tres Aguilas fault offsets the mineralized northwest trending Santa Juana veins.

Figure 7-1 illustrates the location of the Velardeña mining district with respect to regional lithologic and structural features.

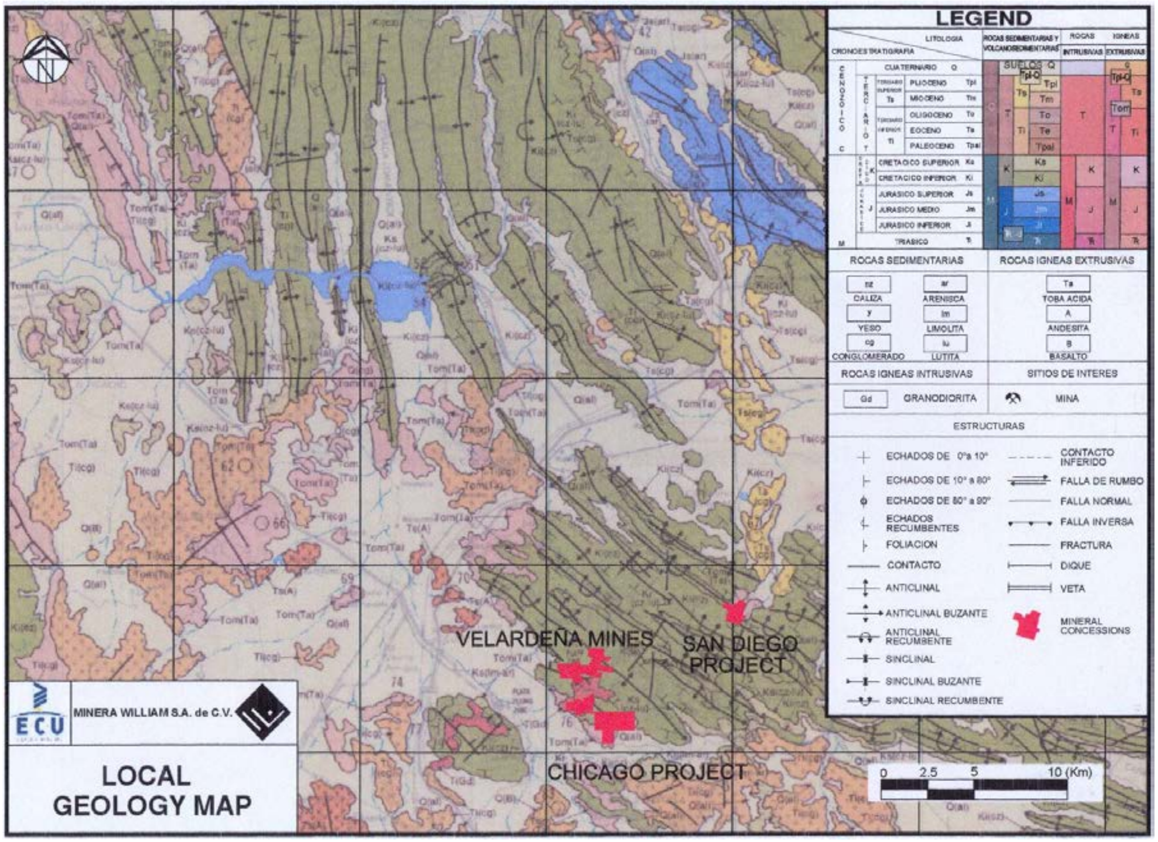


Figure 7-1: Local Geology Map

7.2 PROPERTY GEOLOGY

7.2.1 Velardeña Property

Medium to thick-bedded limestone of the Aurora Formation comprises basement rock in the project area. Limestone was first folded then intruded by the multiphase diorite/monzodiorite Terneras stock and related dikes of Tertiary age that outcrop over a strike length of approximately 2.5 km. In detail, intrusive contacts range from sharp to broad zones characterized by the presence of numerous large, partially metamorphosed blocks of limestone. Alteration of host carbonates consists of a broad front of bleaching and marble formation, with more localized calc-silicate and hornfels. Although intrusive rocks appear fresh in general, alteration and local endoskarn development occurs near contacts. The diorite stock and the contact zone between limestone and intrusive rock primarily host the veins of the Santa Juana, Terneras, San Juanes, and San Mateo deposits (**Figure 7-2**). Veins extend into relatively unaltered limestone especially in the northwestern portion of the Santa Juana veins and eastern portion of the San Juanes vein.

The Velardeña property is transected by a series of northeast to northwest striking, west dipping, post-mineral normal faults. From east to west these are the Tres Aguilas, Los Bancos, Buenaventura and Ordenanza faults which are generally characterized by meters-thick banded calcite vein filling. These normal faults demonstrate west-side-down displacements with the result that that the western blocks expose higher portions of the hydrothermal system, have a higher calcite content and generally lower precious metal contents.

Two main vein systems are present on the Velardeña property. The first is the northwest striking system found in the Santa Juana deposit, while the second is the east-west trending vein array which includes the Terneras, San Juanes, Roca Negra and San Mateo deposits. In **Figure 7-2** vein traces are projected to surface and do not cut alluvium.

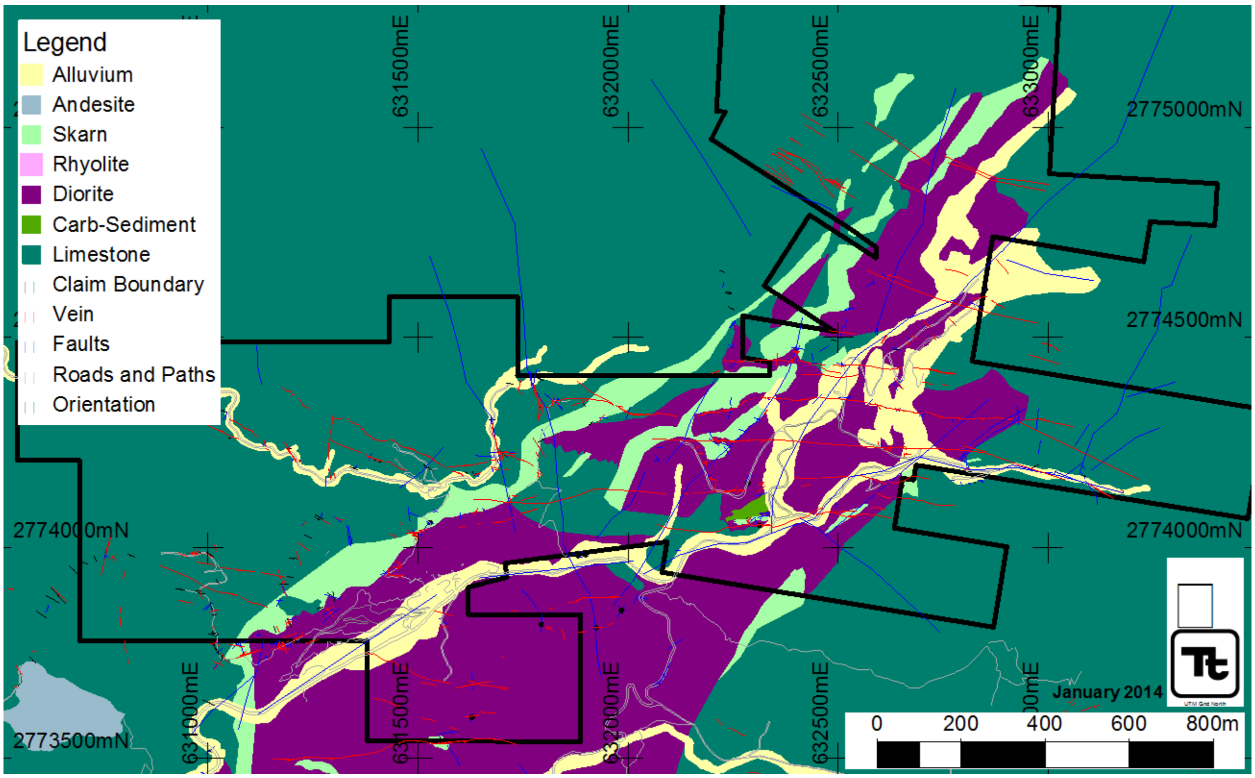


Figure 7-2: Velardeña Property Geology Map

7.2.2 Chicago Property

The geologic setting of the Chicago property is very similar to that at Velardeña (**Figure 7-3**). The oldest rocks outcropping at Chicago are folded limestone of the Aurora Formation which were intruded by Tertiary diorite stocks and dikes. Intrusive rocks occupy the western portion of the property with a preferential orientation northeast-southwest. The limestone-diorite contact exhibits widespread recrystallization and marble formation, overprinted by a distinctive green calc-silicate alteration dominated by grossular garnet and lesser wollastonite.

As at Velardeña, a system of post-mineralization faults striking northwest-southeast cuts and locally displaces mineralized structures. These faults are normally filled with calcite and can have widths up to 10 m near surface.

In the Chicago mine, rhyolitic volcanic rocks and calcareous conglomerate of the Ahuichila Formation unconformably overlie the mineralized sequence across the eastern half of the area. Mineralization is similar to that encountered at Santa Juana mine in terms of mineralogy, host rocks, geometry of the structures and vein continuity. The difference between the two is orientation: northwest strike, dipping to the northeast for the Santa Juana system; instead of northeast strike, dipping to the southeast for the

Chicago system. **Figure 7-3** shows the geology of the Chicago area with vein traces projected to their assumed surface intersection, veins are not hosted in alluvial material.

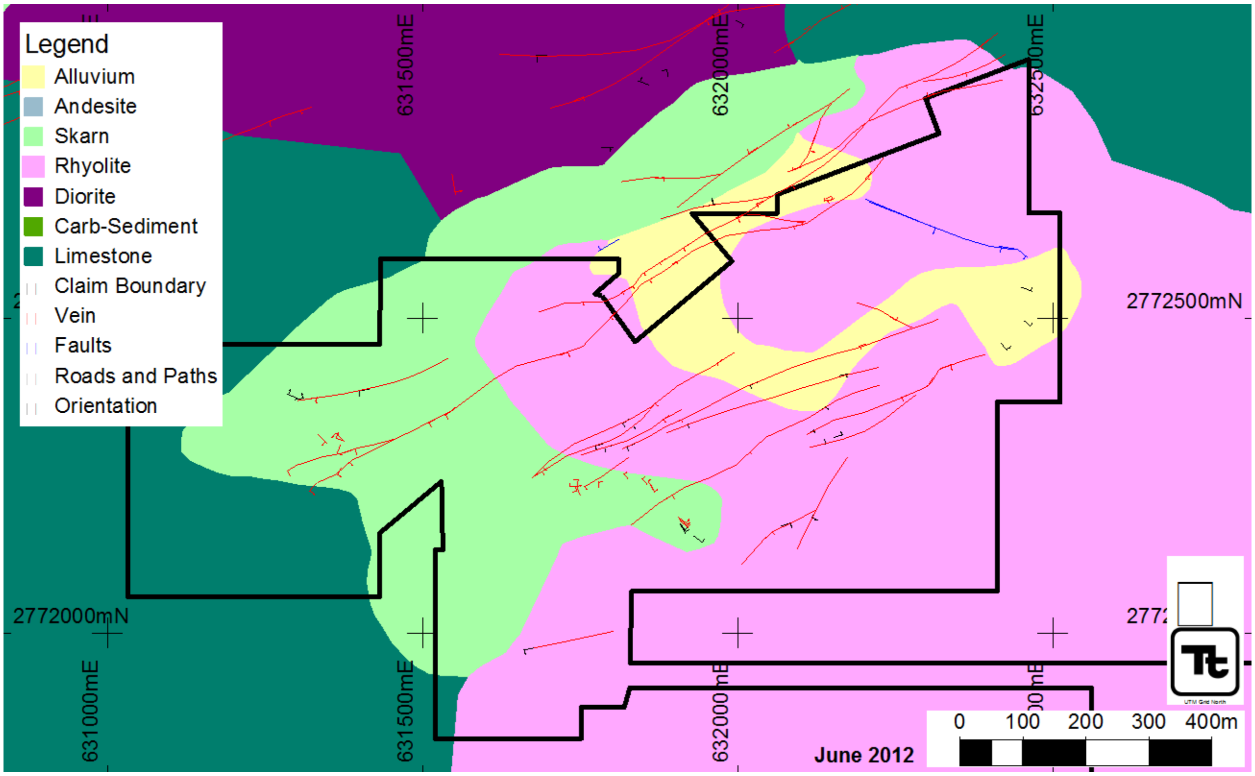


Figure 7-3: Chicago Property Geology Map

7.3 Mineralization

7.3.1 Regional Setting

In a metallogenic sense, Velardeña sits near the northern end of the Mexican Silver Belt, a 1,200 km long, northwest trending corridor of Au-Ag and Ag-Pb-Zn vein deposits. Within the belt, the Fresnillo, Guanajuato, Zacatecas and San Francisco del Oro-Santa Barbara districts have all produced in excess of 10,000 T of Ag. Currently Mexico's largest Ag production comes from the Santo Niño and San Carlos veins developed by Peñoles in the Fresnillo district, which have been traced for over 4 km along strike and 500 m in depth with widths up to 4 m (Micon, 2009; Trejo, 2001).

In addition to the mines and prospects which are the subject of this report, numerous other historic workings exist within the Velardeña District (**Table 7-1**).

Table 7-1: Geologic Characteristics and Grades for Deposits of the Velardeña District

Mine	Deposit Type / Genesis
Los Azules	Sulfide bodies /felsic intrusive contacts (mesothermal)
San Nicholas	Breccia hosted / felsic intrusive related (mesothermal)
Industria	Veins / limestone, intrusive hosted (epithermal)
Santa Maria	Massive sulfide replacement bodies along dike contacts (mesothermal)

Gilmer et al, 1988

Mineralization is variously described as “mesothermal” or “epithermal” based on temperature determinations from fluid inclusion analyses (Gilmer et al, 1988). Mesothermal deposits are typically sulfide-rich, lens-like masses dominated variously by pyrite, arsenopyrite, or pyrrhotite. Epithermal deposits in the Industria Mine are located distal to the intrusive core and consist of tabular veins exhibiting banding, crustification and open-space filling textures. In all cases, there is a persistent association of mineralization with intrusive rocks and with contacts between felsic intrusive rocks and (altered) carbonate host rocks.

7.3.2 Mineralization at Velardeña

Mineralization consists primarily of calcite-quartz veins with minor calc-silicate hosted (“skarn”) and massive sulfide replacement bodies. All mineralization is essentially polymetallic, Ag, Au, Pb, Zn plus or minus Cu. Individual veins are usually thin (0.2 m to 0.5 m) but remarkably consistent along strike and down dip. Coxcomb and rhythmically banded textures are common in some vein exposures. Historical production in the district has been primarily from the oxide portions of the veins that can extend to depths of several hundred meters. Previous workers have suggested a vertical zonation with increasing Au:Ag and Cu:Pb with depth (Pinet, 2000). Physical characteristics of the main vein sets are summarized below as **Table 7-2**.

Table 7-2: Physical Characteristics of Select Veins and Vein Sets: Velardeña Mine

Vein	Orientation	Width	Minimum Dimensions Strike m x Vertical m	Host Rocks
Santa Juana Series				
NW Subset 1(Santa Juana, A 5-7)	NW curvilinear	0.2 - 1.0	350 x 400	limestone, intrusive, skarn
NW Subset 2 (CO, CC, C1,G1,A 1-4, B's, D1, DD, E)	NW linear	0.2 - 1.0	Variable by vein, up to 600 x 1200 (CC)	limestone, intrusive, skarn
Trans Set	EW/steep S	0.2 - 1.0	100 x 600	limestone, intrusive skarn
Terneras	EW/70-85N	0.3-2	1500 x 650	Intrusive>limestone
San Juanes	EW/85N	0.05-1.9	950 x 600	limestone, intrusive, skarn
San Mateo	EW/75N	0.4-0.5	700 x 500	intrusive, skarn>limestone
Roca Negra	EW/75N	0.15 - 1.15	500 x 600	intrusive, skarn

The mineralization at the Chicago property is similar to that encountered at the Santa Juana mine in terms of mineralogy, host rocks, geometry of the structures and continuity at depth and laterally. The difference between the two is geometric, northwest dipping to the northeast instead of northeast dipping to the southeast.

Characteristics of the mineralization are summarized below based on previous reports and the author's observations:

- Veins occur in limestone, marble, calc-silicate and intrusive host rocks. The geometry of the veins is typically wider but more irregular in the limestone. In addition to being more consistent in width, veins within skarn and intrusive rocks tend to be narrower but higher grade with respect to precious metals. Skarn is the least favorable vein host.

- Although individual veins are typically narrow, zones of vein intersections and certain contacts between intrusions and limestone have focused brecciation and silicification, yielding mineralized chimneys which can reach seven m in width and extend for tens of meters vertically.

- Within the Santa Juana sector, a zone of sheeted veins has been discovered near the intersection of northwest and east west trending veins. The overall dimensions of this corridor are approximately 500 m along strike and 250 m vertically (level 12 to level 18), with widths up to 100 m.

- Gangue minerals consist of calcite and quartz, which generally represent less than 20% of the volume of individual veins. Higher grade segments of veins generally conform to areas dominated by quartz or quartz-calcite mixtures; calcite rich zones are generally low grade. There is a distinct tendency for the upper portions of many of the veins to be calcite dominant, hence lower grades. Lateral changes in the gangue mineral composition have been observed, suggesting controls other than elevation are at work.

- Depth of oxidation is quite variable and the distribution of oxide and mixed mineral types complex. Within limestone host rocks, the veins are oxidized down to depths of up to 450 m. Oxides are rare in intrusive and calc-silicate host rocks, reportedly encountered only near the Tres Aguilas and Los Bancos faults, due to increased fracture controlled permeability and fluid flow.

- The alteration zone along vein margins is generally less than 10 centimeters (cm) and is comprised of argillic alteration and silicification of the intrusive and skarn host rocks, and localized silicification and recrystallization of limestone. While precious and base metal mineralization is generally confined to the veins, sulfide stringers were observed extending outwards along bedding planes within altered limestone.

- Underground drifting and drilling suggests that many of the veins are open at depth below the 19th level.

7.3.3 Mineralogy & Paragenesis

Little detailed work has been carried out on the mineralogy of the veins. The sulfide assemblages are quite diverse within the zone of hypogene mineralization and mineralogy is even more so within the zone of partial oxidation. Accurate mapping of this transition has important implications respect metallurgical recovery, vein density and metal grade.

7.3.3.1 Oxide Mineralogy

The oxide portions of the veins are composed of oxides, halides, carbonates and remnants of sulfide minerals. Concentrations of Cu oxides and carbonates are commonly seen along vein selvages in underground workings.

7.3.3.2 Sulfide Mineralogy

Within the sulfide zone, mineralization consists primarily of galena and sphalerite with lesser amounts of chalcopyrite, tetrahedrite, freibergite, and sulfosalts. Accessory sulfides including arsenopyrite, stibnite, pyrite, and pyrrhotite are locally abundant. Free gold or electrum is rarely seen as microscopic inclusions in pyrite and arsenopyrite

Disseminated and stringer pyrite is very common in all rock types below 500 m depth and persists to much shallower levels within intrusive and calc-silicate host rocks.

7.3.4 Controls on Mineralization

7.3.4.1 Stratigraphic Controls

As described previously, veins in the district are localized in intrusive rocks and near contacts between intrusions and thermally metamorphosed country rocks but extend up to one kilometer away from these contacts. In detail, however, veins do not conform to these contacts, but in many cases cross at high angles and mineralize limestone, skarn/marble, and intrusive hosts. Observations summarized above suggest that - on average - veins within intrusive are narrower, more regular in form, and higher grade than those in limestone. Skarn is typically a poor vein host with widths and grades less than in diorite or limestone hosts. Observations by mine geological staff suggest that veins may be genetically related to the intrusion of late, felsic porphyries (**Figure 7-4**).

Although data are sparse, it seems likely that at least some of the deeper, massive sulfide mineralization intersected in past drilling will possess more obvious control by stratigraphy, particularly skarn assemblages, than is typical at shallower levels. This would in turn suggest the possible presence of larger mineralized bodies such as have been exploited around the Santa Maria dome.

7.3.4.2 Structural Controls

Observations underground confirm that at least some veins show an intimate relationship with brittle faulting. In the Santa Juana deposit, two main fracture sets are observed. The most economically significant is a steeply dipping, northwest-trending set that has created dilatant zones that acted as a major control for vein emplacement. A second more spatially extensive fracture swarm trends 110° and, although less obvious, appears to control the orientation of the Trans veins. These veins dip steeply south and, where they intersect the northwest-trending vein set, produce broader stockwork or breccia zones which can be up to seven meters in width. The east-west fracture set also controlled the localization of the parallel Terneras, San Juanes, San Mateo, and Roca Negra veins.

Cross-cutting relationships between the two vein systems are ambiguous, indicating that the two vein sets probably formed contemporaneously as part of a conjugate fault system. A similar structural setting is reported to occur in the Santa Maria mines.

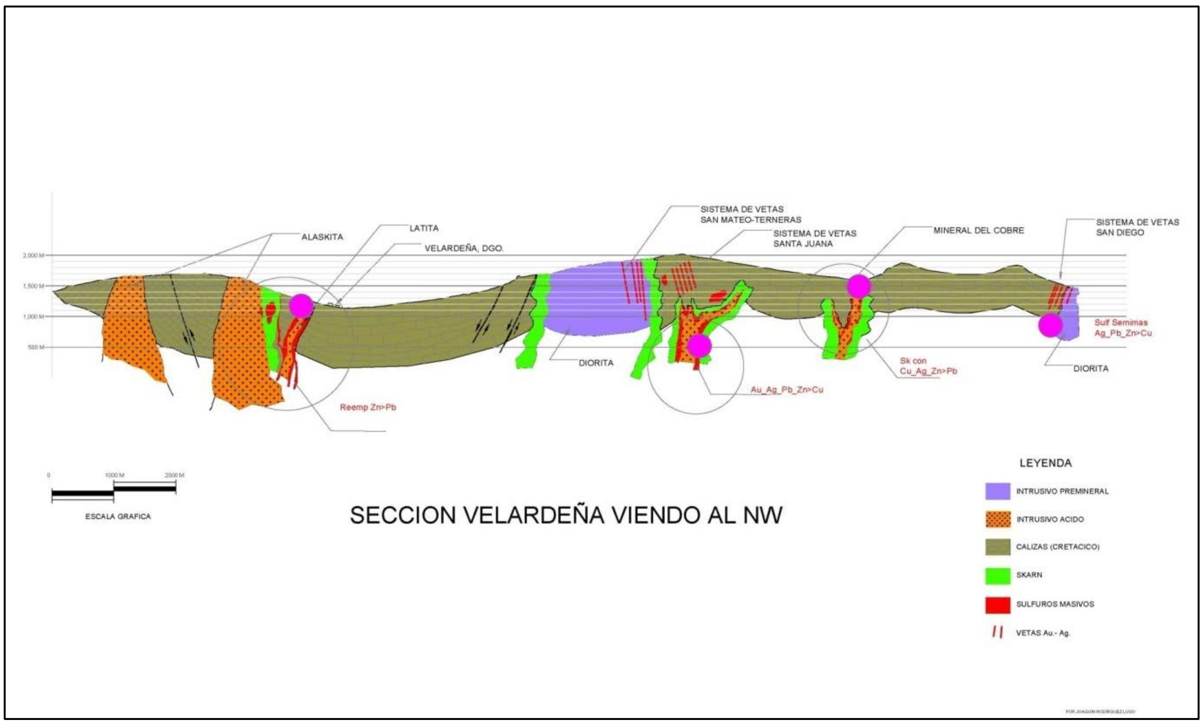


Figure 7-4: Velardeña Section Looking Northwest

8.0 DEPOSIT TYPE

Although detailed petrologic studies of veins in the Velardeña property have not been completed, individual deposits within the nearby Santa Maria dome have been studied in some detail, and found to correspond to both shallow epithermal and deeper-seated mesothermal styles of mineralization. Epithermal veins, often displaying banded and open-space-filling quartz, occur at the Industria Mine where they are clearly distal to the main intrusive mass (Gilmer et al., 2008). The higher level veins at Velardeña appear to be of this type Many veins, especially at deeper levels in the Santa Juana and Terneras mines, are dominated by high modal percentages of coarse and fine grained, polymetallic sulfides, have little silicate gangue, and occupy a position within and proximal to intrusions and their thermally metamorphosed aureoles.

True epithermal veins occur at Velardeña, but at depth the majority of veins, breccias, and massive sulfide replacements are mesothermal in character, commonly contain arsenopyrite, and may be related to a deeper intrusive source.

Exploration strategies at the Project are informed by the above model concepts. Current exploration models explore the deposit in the context of vein controls. It has been recently discovered that east-west trending vein sets, in general, tend to have lower concentrations of deleterious elements (As and Sb) and slightly thicker true widths. Drill hole exploration continues to target these veins down dip of current development as the mineralization style transitions away from more typical epithermal Ag-Au veins to deeper-seated mineralization elevated in Au and base metals.

9.0 EXPLORATION

The Project has been extensively explored from the surface using geologic mapping, vein mapping and vein sampling. Underground exploration consisted of geologic level mapping, vein level mapping, vein sampling, drift and stope development. The author is unaware of any geophysical surveys completed on the property.

9.1 RECENT UNDERGROUND DEVELOPMENT

In addition to exploration drilling programs, Golden Minerals has driven underground drifts, ramps and raises to develop the mine as well as explore the extent of the mineralization. **Table 9-1** summarizes the underground drifting, ramping and raising completed from 2012 to 2014 since the last Technical Report has been published.

Table 9-1: Summary of the Underground Drifting, Ramping and Raising (2012 to 2014)

Year	Drifts and Ramps m	Raises m
2012	5,995	1,630
2013	1,991	221
2014	2,136	427

Source: Mine Engineering Department

9.2 SAMPLING METHODS & APPROACH

Channel samples are taken at drift faces, cross-cuts and stope walls and/or backs according to the following guidelines:

- During level mapping, geologists paint sample locations on the back or development face to guide samplers.
- Samples are collected by chiseling out the painted area, ideally cut five to seven cm into the material. Often this is not achievable due to rock hardness.
- The sample widths range from 0.2 m to 2.5 m.
- The sample's weight is usually between two kg and five kg. The sample contains a minimum of ten rock pieces (<20 cm in size) as well as fine material.
- Sampling is carried out as perpendicular to the vein strike as possible and the true width is measured by sighting the vein dip and tilting the measuring tape accordingly.
- Stope and face samples are collected at three m intervals across strike. Wall rock and vein material are sampled separately. When dictated by geological features, samples are taken at closer intervals.

- Sampling along cross-cuts is carried out continuously.

- The locations of the samples are initially determined by means of sighting and taping from established survey markers and annotated on the level plan. The locations are subsequently corrected by the installment of a new survey marker when the drift has been developed completely.

Channel sampling is subject to numerous sources of error, particularly relating to the differential hardness of material being sampled, and the tendency to include a disproportionate volume of softer rock. Diligent and systematic collection of channel samples generates a very large data set which in most cases is statistically representative, but never completely free of errors or potential bias.

The previous author observed the collection of several channel samples in the Chicago mine and noted that the procedures used conformed to those outlined above and follow accepted engineering practices for channel sampling. The current author has not observed the collection of channels at the Project but has spot checked sample locations throughout the mine and thoroughly discussed procedure with the mine staff. The author concludes channel sampling procedures used at the Project result in samples which are reasonably representative of the mineralization and meet industry best practice guidelines for this type of sampling. The resulting data is sufficient to support the estimation of resources.

9.3 Significant Results

The channel database contains 32,006 sample intervals, of which 14,534 intervals have been interpreted as intersecting a named vein. **Table 9-2** shows grade statistics for channel intervals within the database and those identified as on-vein. **Figure 9-1** shows the channel intervals as undiluted net smelting return (NSR) US$/T for the Santa Juana area.

Table 9-2: Channel Sample Data Statistics

Dataset	Selection	Count	Mean Ag g/T	Mean Au g/T	Mean Pb%	Mean Zn%	Mean Apparent Thickness
Channel	All	32,006	281	5.1	1.6	1.6	0.66
Channel	On Vein	14,534	518	9.2	2.8	2.7	0.47

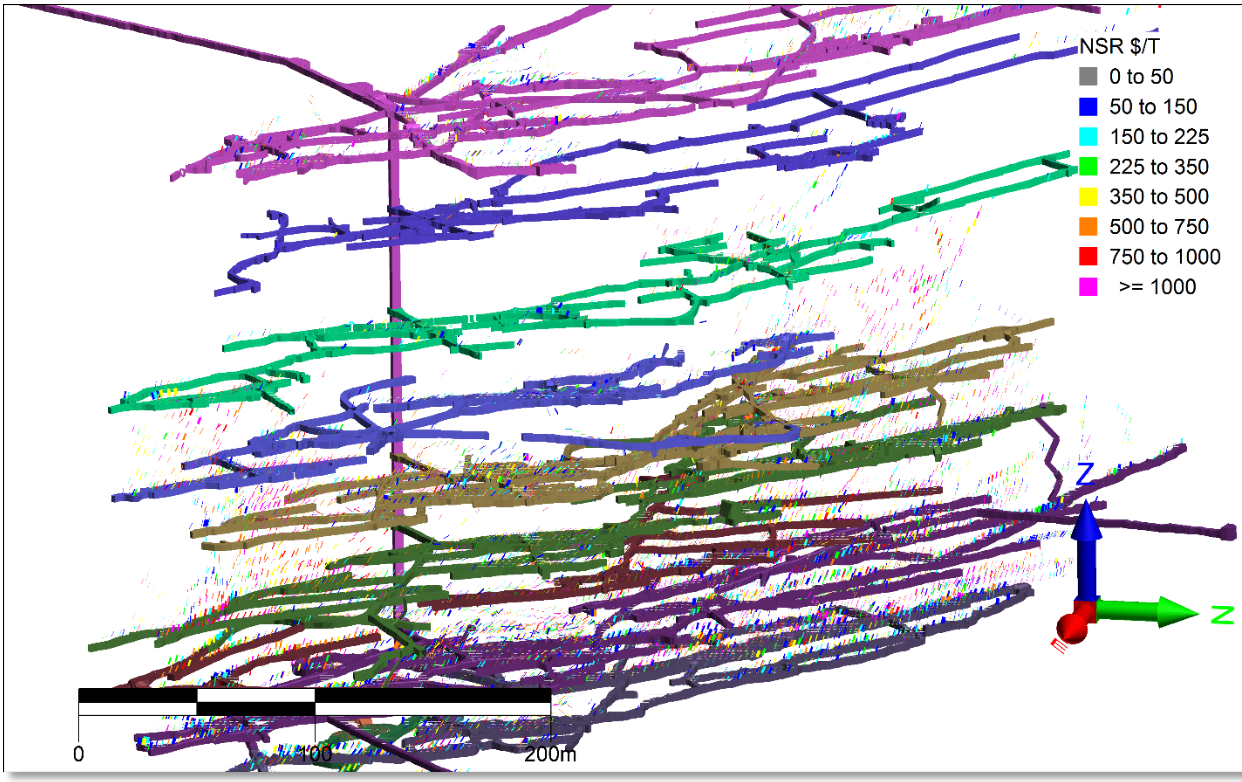


Figure 9-1: 3D View Channel Samples Santa Juana Area

9.4 Exploration Potential

Strike extents for most known veins have been identified by exploration but in many cases mineralized shoots at depth have not yet been defined nor have the down dip extensions been condemned. It is likely that as deeper levels are developed additional mineralized shoots will be identified.

The current exploration strategy is focused on the potential of the deeper sulfide portions of the Terneras, San Mateo and Roca Negra veins where the deleterious elements are less concentrated and previous development ceased at the termination of oxides.

Exploration potential in the Santa Juana area in the near term is focused on developing the A4 vein in the Tres Aguilas southeast fault block where the A4 vein appears to have a greater and more sustained thickness than the other Santa Juana veins. Long term exploration potential in the Santa Juana area is indicated by deep wedge drilling also under the Tres Aguilas southeast fault block where encouraging intervals of massive sulfide mineralization hosted within skarn have been observed (**Figure 9-2**).

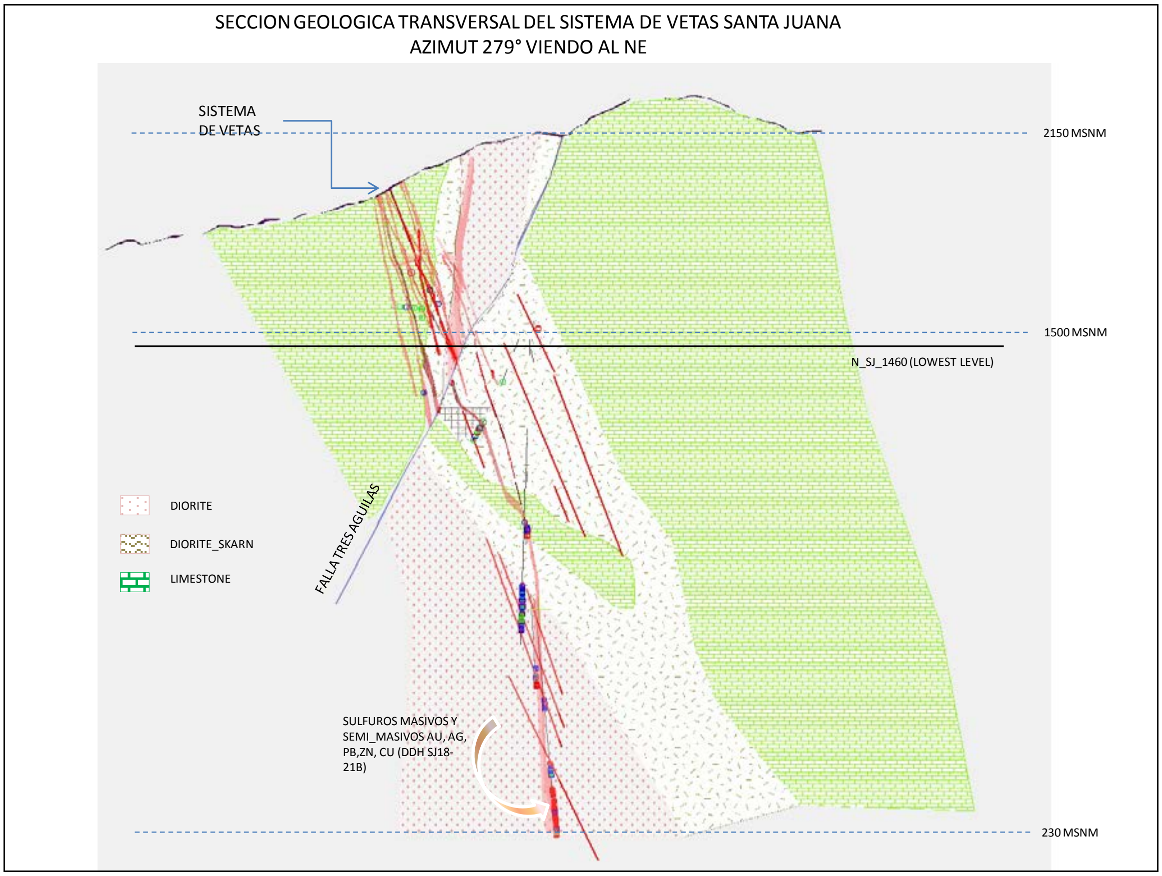


Figure 9-2: Santa Juana Section

There are no plans to explore the Chicago property in the near term but limited drilling on the undeveloped Chicago NE vein shows promise. Upside exists in further exploring the elevated base metal content on the main Chicago veins which could provide useful for material blending if required in the future.

10.0 DRILLING

Since the previous technical report in 2012, Golden Minerals has completed 47 diamond core holes. The majority were completed in 2014, and drilled from underground targeting: the San Mateo, Terneras, and Roca Negra veins. Four holes were drilled from underground in the Santa Juana area targeting primarily the A4 vein.

Table 10-1: Drilling 2013-2014

Year	Area	Number of Holes	Length m
2012	Santa Juana	4	186
2014	San Mateo, Terneras, Santa Juana	43	8,875
	Total	47	9,062

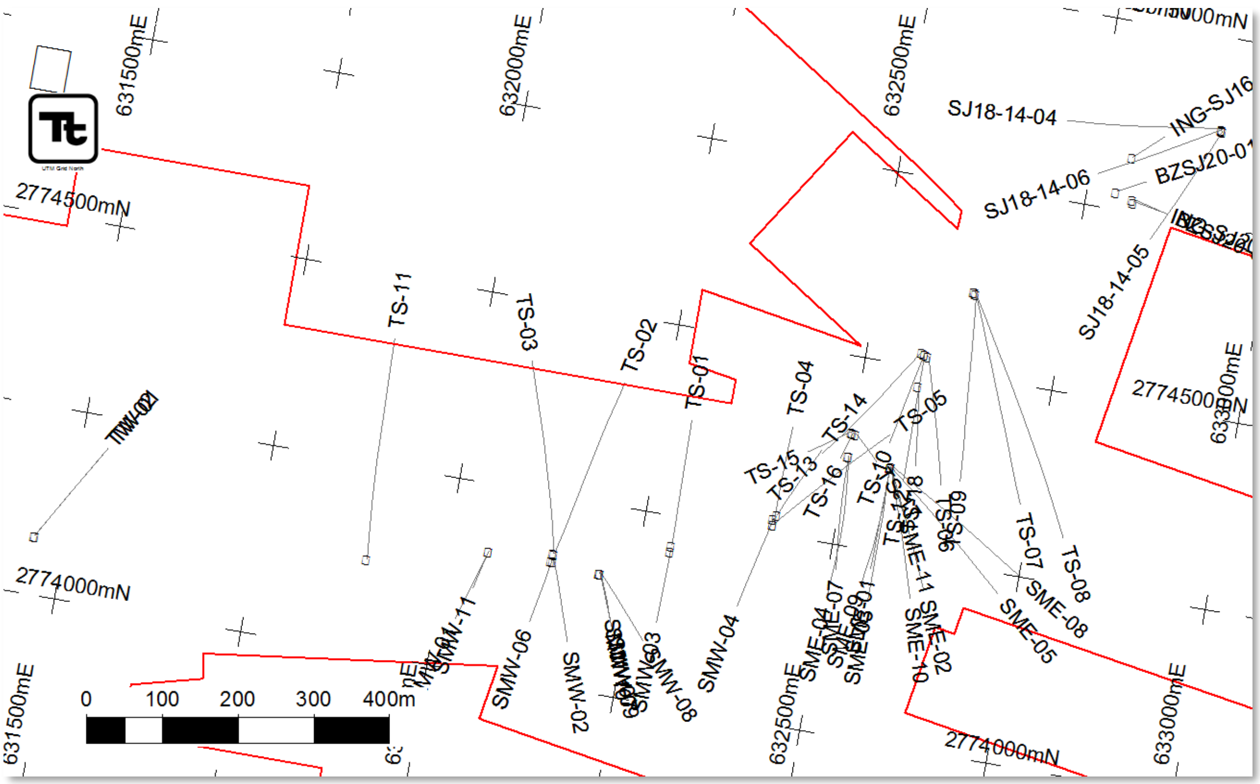


Figure 10-1: Drill Hole Location Map 2013-2014

10.1 SAMPLING METHODS

Diamond drill core samples are taken according to the following criteria:

- Drill core is split using a manual rock splitting device.

- Samples are taken from core sections with visible evidence of mineralization and from 1.5 to 2.0 m of surrounding wall rock.
- Wall rock between two veins is sampled when the distance is less than six m.
- The information recorded in the drill logs for each sample includes depth, length, core angle and rock/ore type.

Mineralized sample intervals for either the NQ or BQ size core have a minimum core length of 20 cm and a maximum length of one m. For areas sampled outside of the mineralization the maximum sample length for the NQ core is 1.20 m and for BQ core the maximum sample length is 1.50 m. In general, the maximum sample length is 1.50 m except for those areas in which two veins can be joined together in which case the maximum sample length is two m.

Sampling was conducted on core not only with visible evidence of mineralization, such as veins and stringers, but also on barren core to preserve the sampling continuity in between mineralized zones and to test for broad zones of lower grade material as well. The sampling of the wall rock next to the zone of mineralization also assists in understanding the grade of the external dilution associated with mining some of the mineralized zones on the Velardeña properties.

Manual splitting of the core can be subject to a number of sampling biases based usually on the hardness of the material being split. In the case of very hard core, the core may twist in the splitter which may result in uneven core fragments and in a slightly greater split than 50% being sent to the assay laboratory or left in the box as a representative sample. In the case of soft core, the core may crumble when being split or may split along natural fracture lines which again results in uneven core representation. Also, to prevent contamination, the splitter and pans used to collect the samples must be cleaned after each sample. Despite the potential to introduce a bias into the sampling procedure as a result of uneven sample sizes, the splitting of drill core continues to remain a common practice in the exploration and mining industries.

Bazooka drilling is undertaken from the development headings in order to identify the width of a zone where the hanging wall is not visible or where a secondary mineralized system is suspected as in the case of the sheeted veins. Cores obtained from these programs are not split and are sampled completely.

These drill core sampling procedures are consistent with commonly practiced procedures used throughout the mineral industry. Along with in-house standards, blanks, and duplicates included in the sample stream, routine check assays are conducted on the samples by a second laboratory as well.

Drill core sampling practices are consistent with industry standards adequate for use in preparing a mineral resource estimate.

10.2 Core Recovery

In the case of large diameter core (NX, BX), recoveries were reported to average around 60% in oxide mineralization and 90% - 97% in the sulfides. For the smaller Bazooka (EX) drill cores, overall recoveries ranged from 30% - 40%. Recovery for Bazooka cores are poor and may result in underestimation of mineralized widths and grades. In the case of bazooka drilling, drifting is usually conducted afterward to identify the true nature of the mineralization, especially if a secondary zone or vein is suspected. Typically, chip samples from such drifts result in higher grades than initially indicated by the bazooka drilling.

11.0 SAMPLE PREPARATION, ANALYSES & SECURITY

Sample preparation, analyses and security procedures followed by Minera William meet industry common practice standards and are adequate to support the estimation of resources. The quality control (QC) sampling results throughout the campaigns and laboratories are typical of an operation given the amount of throughput and data handling. Current drill hole analyses are completed by ALS Chemex in Vancouver, Canada (ALS Chemex) and mine channel and mill samples are tested at the on-site Labri laboratory facility (Labri), constructed in 2013. A review of QC samples analyzed since 2012 suggests the on-site laboratory could benefit from further improvements and increased real-time review of performance. Based on the QC sample review, the analytical results determined by the on-site laboratory are less accurate and less precise than those determined by ALS Chemex, however the sampling density is much greater than the drill hole samples and in general the extrapolation is less and therefore the determinations are adequate and do not require the same precision and accuracy as the drill hole samples.

Previous quality control procedures and results have been reviewed by previous authors, those reviews have resulted in improved protocols and performance, but ultimately previous authors concluded the data is sufficient to support estimation of resources. The drill hole and channel analytical databases are extensive and include results from several campaigns and laboratories. **Table 11-1** details when each laboratory has been used, and the accompanying umpire laboratory. **Table 11-2** details the accreditation and the relationship to Golden Minerals of each laboratory used. Data within both databases, regardless of testing laboratory, is considered current and equivalent.

Table 11-1: Analytical Laboratory Listing

Time Period	Laboratory Used	Umpire Laboratory Used
Pre-2009	Labri (on-site), Ensayes y Representaciones, S.A. (ERSA)	Servicio Geológico Mexicano (SGM), ALS Chemex
2009 to 2013	Labri (on-site), Ensayes y Representaciones, S.A. (ERSA), SGS	SGS
2013 to Present	Labri (on-site), ALS Chemex	Pulp Duplicate Resubmittal to ALS Chemex

Table 11-2: Laboratory Accreditation and Independence

Laboratory	Accreditation	Relationship
Labri	Not Accredited	Not independent, operated by Golden Minerals
SGM	Not Accredited	Independent of Golden Minerals
ERSA	Not Accredited	Independent of Golden Minerals
SGS	ISO 17025	Independent of Golden Minerals
ALS Chemex	ISO 17025	Independent of Golden Minerals

Current drill hole analyses are completed by ALS Chemex and channel samples are tested on-site at the Labri laboratory. ALS Chemex is independent of the issuer and is ISO 17025 accredited: the accreditation of ALS Vancouver encompasses preparation processes completed at ALS Chihuahua. The on-site laboratory is not independent of the issuer and is not accredited. Alva Kuestermeyer of Tetra Tech inspected the on-site laboratory in December 2014 and found the facility and the procedures followed to be of adequate standard.

11.1 Sample Preparation

11.1.1 Diamond Drill Core Samples

Drillhole samples are prepared by splitting the core with a manual rock splitting device or core saw using personnel who have been hired by Minera William for this purpose. The Minera William personnel who conduct the core splitting and sampling are supervised by Minera William's geological staff in order to ensure the integrity of the core splitting and sampling procedures. Half of the core remains in the core box with its identifying ticket while the other half is bagged with a matching ticket. The samples are delivered by mine staff to ALS Chemex's preparation laboratory in Chihuahua or Zacatecas where they are shipped to ALS Chemex in Vancouver for analysis.

11.1.2 Underground Chip Samples

Development chip samples are collected by sampling support staff who are instructed to chip away sample transects painted by the geologist. Sampling is observed by geologic staff. Samples are bagged and transported to the on-site laboratory for preparation and analysis.

11.2 Security, Storage & Transport

11.2.1 Core, Pulp & Reject Storage

The core is stored at the Santa Juana mine site in either a closed building, a shed, or on a prepared uncovered area (in which case durable plastic covering is provided) behind a fence. In each case the core remains in a securely locked area. Pulps and rejects are stored in closed areas and are individually packed in plastic bags in order to avoid contamination. The mine facility is guarded by security personnel 24 hours a day.

11.2.2 Underground Chip, Pulp & Reject Storage

The chip sampling pulps and rejects are obtained from the assay laboratory and are stored in a secured area at the Santa Juana mine site in either a closed building or a shed. The chip sample rejects and pulps remain in a securely locked area.

11.3 Analyses for Drill Hole Samples

Drill hole samples are analyzed by ALS Chemex initially for Au using fire assay with atomic absorption spectroscopy finish (AA24) with re-run for values exceeding 10 g/T Au using fire assay with gravimetric finish (GRA22).

Samples are initially analyzed for Ag, Pb, Zn, Cu, and 32 additional element using aqua regia inductively coupled plasma - atomic emission spectroscopy (ICP41) with re-run for values exceeding 100 g/t Ag, and 1% Pb, Zn, or Cu using aqua regia digestion and inductively coupled plasma - atomic emission spectroscopy (OG46).

11.4 Analyses for Channel Samples

Channel samples are prepared and then analyzed by the on-site facility for Au, Ag, Pb, Zn, Cu and As. Gravimetric fire assay is used to determine Au and Ag grade. Pb, Zn, Cu and As are analyzed by atomic absorption spectroscopy with hydrochloric and nitric acid digestion.

11.5 QA/QC Program

As a result of the CAM Quality Assurance and Quality Control (QA/QC) review performed in 2012 QA/QC procedures were refined. Within both the drill hole and channel sampling programs standards, blanks and duplicates are inserted in the sample stream. Quality control samples are inserted in a repeating order depending on the last digit of the sample identification (ID). The effective QC submittal for the drill core and channel campaign is approximately one control sample for ten collected samples. **Table 11-3** details the QC sample submittals for the 2014 drilling and 2013-2014 channel campaigns.

Table 11-3: In-Stream Quality Control Samples

QC Sample Type	Drill Hole Stream	Channel Stream
Blank	23	134
Pulp Duplicate	44	197
Standards	51	183
Combined	**118**	**514**
QC % of Samples	**9%**	**~10%**

11.5.1 Standards

In 2014, 27 low grade standard samples along with 24 high grade standard samples were analyzed in the drill hole sample stream. The high and low grade standard are custom made and tested by SGS. The standard results were reviewed and demonstrate adequate performance. Few errors exist that are most likely attributed to sample ID mislabeling and should be addressed prior to performance analysis. It is suggested that in future campaigns the effectiveness of monitoring be improved and standards should be sourced that more closely bound the actual data averages. **Table 11-4** shows the standards insert during the drilling campaign.

Table 11-4 Custom Standard Reference Material for 2014 Drill Hole Stream

Standard Name	Mean Au ppm	Mean Ag ppm	Mean Pb %	Mean Zn %	Standard Deviation Au	Standard Deviation Ag	Standard Deviation Pb	Standard Deviation Zn
M-4 87438	1.239	1.78	0.0083	0.0194	0.032	0.11	0.00812	0.021
M-3 87427	17.38	1503	2.71	1.29	0.330	14.55	0.10	0.06

From the time of the previous report to the end of 2014, 197 standard samples were analyzed in the channel sample stream at the on-site laboratory. The high and low grade standards are custom made and tested by SGS. Two of the standards used in the drill hole stream are used in the channel sample stream as well, which provides a check of both labs. The standard results were reviewed and demonstrate reasonable performance but suggest additional improvements should be made. **Table 11-5** shows the standards inserted during the channel sampling campaign.

Table 11-5 Custom Standard Reference Material for Channel Stream

Standard Name	Mean Au ppm	Mean Ag ppm	Mean Pb %	Mean Zn %	Standard Deviation Au	Standard Deviation Ag	Standard Deviation Pb	Standard Deviation Zn
M-1 87440	0.961	8.7	0.73	0.16	0.015	0.19	0.037	0.007
M-2 87439	9.06	379	3.18	4.50	0.029	6.50	0.03	0.04
M-3 87427	17.38	1503	2.71	1.29	0.330	14.55	0.10	0.06
M-4 87438	1.239	1.78	0.0083	0.0194	0.032	0.11	0.00812	0.021

Few noticeable errors exist in the testing of the high-grade standards where significantly higher or lower grades are reported for singular metals or Au and Ag together. The nature of the results indicates the execution of the gravimetric process protocols at the on-site laboratory could be tightened and refined.

The results of the analysis of M-4 87438 at both the on-site laboratory and ALS suggests the on-site laboratory provides more variable results at the low grade end for Au and Ag, often under-reporting the concentration of Au and Ag. This is most likely attributed to issues with the use of Ag inquart technique modifications to the gravimetric procedures for lower grade analysis. **Figure 20-9** compares standards M-3 87427 and M-4 87438 for Au and Ag, which were both tested at the on-site laboratory and ALS Chemex. ALS Chemex testing is shown on the left and the on-site laboratory is shown on the right. Except for the few noticeable issues, the testing of the high-grade standard at ALS Chemex and the on-site facility are similar, the results of the lower grade standard show the on-site laboratory is less precise and less accurate compared to ALS Chemex.

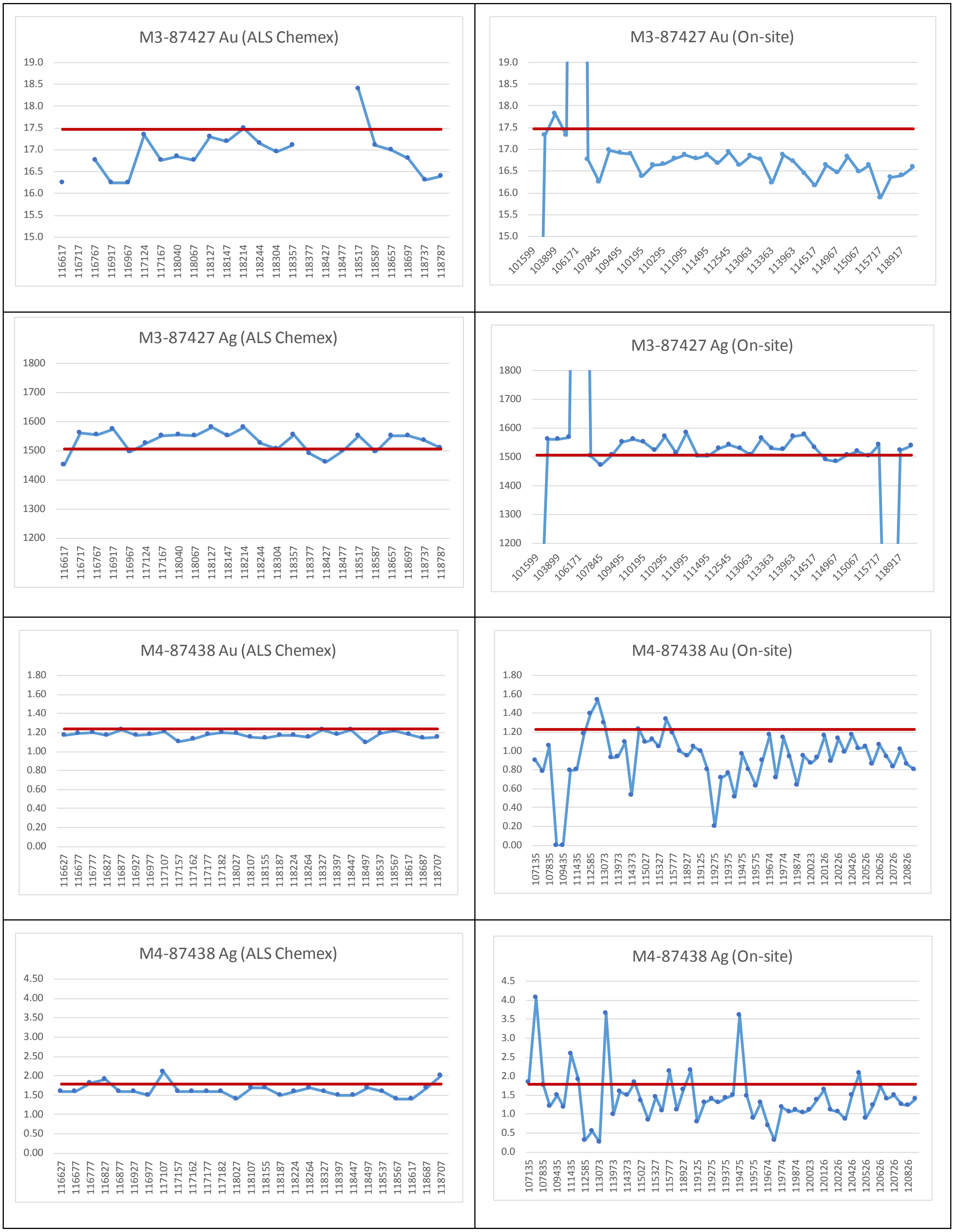


Figure 11-1: Standard Performance Comparison

11.5.2 Duplicates

In 2014, 44 pulp duplicates were analyzed within the drill hole sample stream. Review of the duplicates indicates good reproducibility. **Figure 11-2** shows Au, Ag, Pb, and Zn in a single log ten transformed scatter plot.

Figure 11-3 shows in-stream pulp duplicates tested at the on-site laboratory also in a single log ten transformed scatter plot with Au, Ag, Pb, and Zn. In general, the sample pair fit for each element is good with few examples for high-grade Ag duplication issues, suggesting, as mentioned above in the review of the standard analysis, that gravimetric process protocols could be improved. The duplicate analyses also indicate that error bias could be positive. Based on visual inspection of the scatter plot, noted duplication errors do not appear to be balanced on either side of the 1:1 fit line. The noted issues in the standards and duplicates suggest improvements but are infrequent and do not suggest invalidation of the results obtained from the onsite facility.

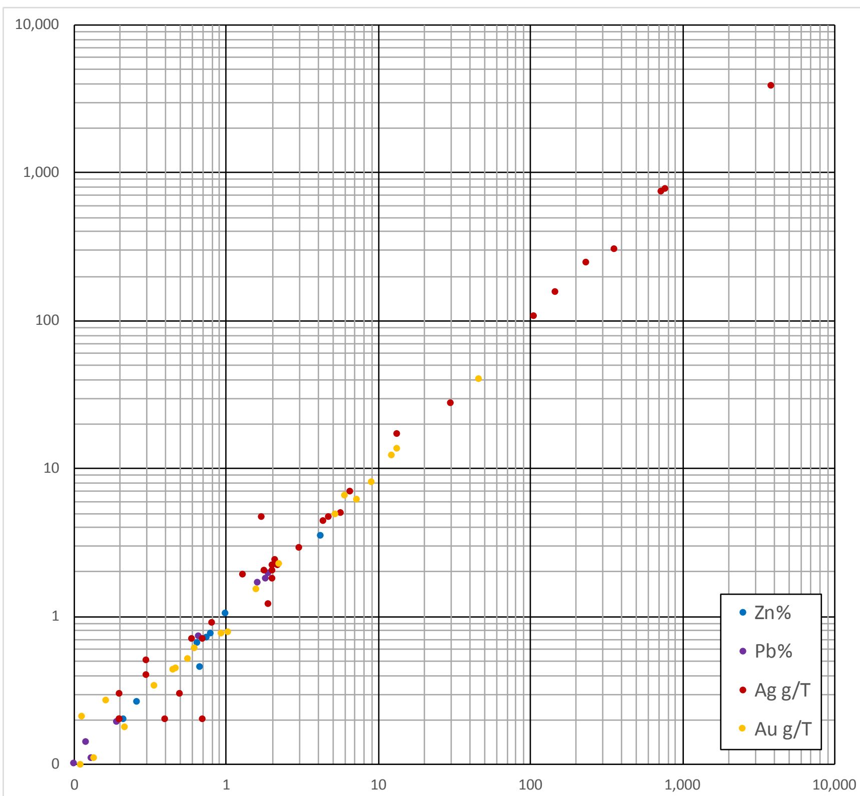


Figure 11-2: 2014 Drill Hole ALS Chemex Pulp Duplicates

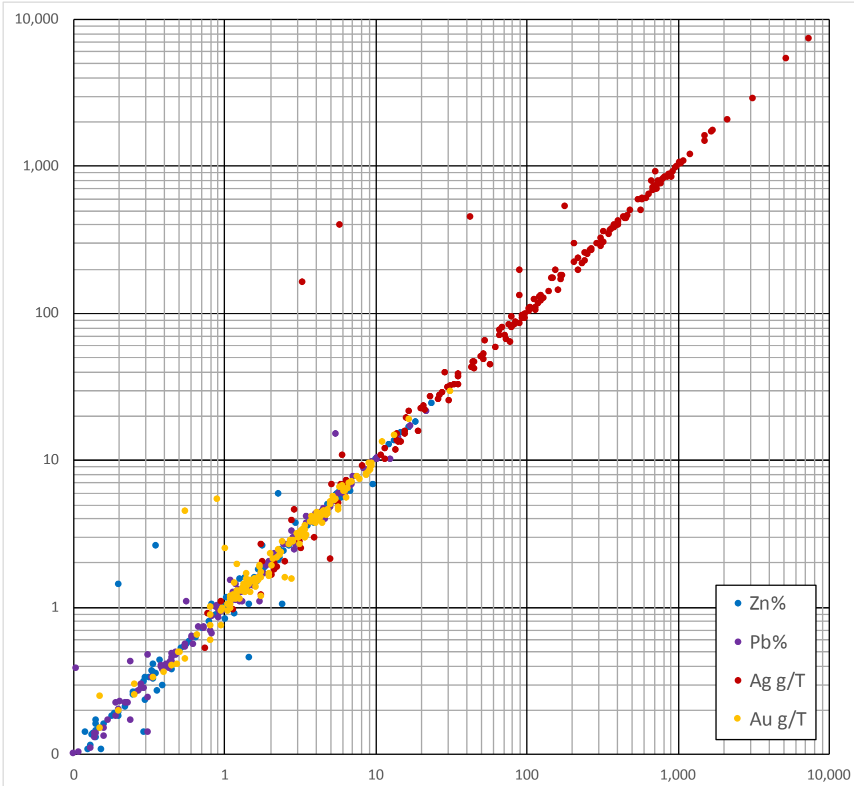


Figure 11-3: On-site Channel Sample Pulp Duplicates

11.5.3 Blanks

In 2014, 23 blanks were analyzed within the drill hole sample stream and performed well for Au, Pb and Zn but suggest the sourced blank material is containinated with low grade Ag, **Figure 11-4**. Samples showing elevated Ag, have been individually investiagted and are preceeded by near dectection limit samples which rules out laboratory contamination. Testing of the low-grade standard M-4 87438, which has a near dectection Ag value, supports the conclusion that instrumentation error or laboratoy contamination are not the likely source of the issue.

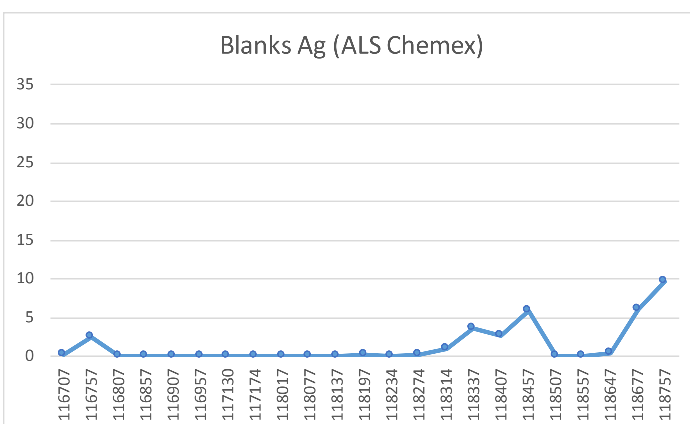


Figure 11-4: 2014 Ag Blanks

The performance of channel sample stream blank material, sourced separately from drill hole blank material, was reviewed and is reasonable for Au, showing few noted errors that are typically found in a QA/QC program but the performance of the blank material for Ag, Pb and Zn is not good.
Poor blank performance for Ag, Pb, and Zn suggests the blank material is contaminated and should be replaced immediately. The poor performance could also indicate low-levels of laboratory contamination and low precision at lower grade analysis but it can't be definitely determined because of the likely contamination of the source blank material.

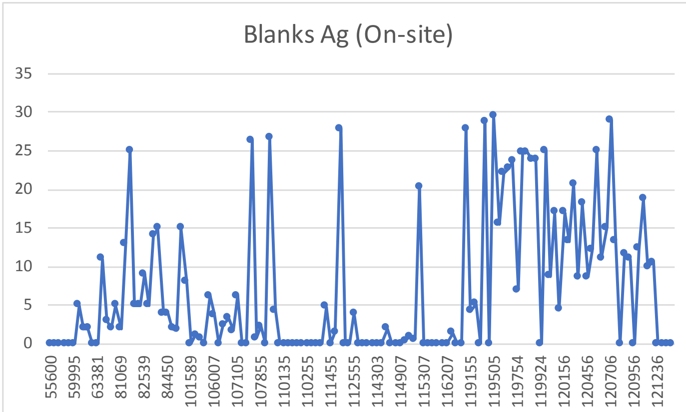


Figure 11-5: On-site Channel Sample Ag Blanks

11.6 QA/QC Recommendations

Although QA/QC samples are being inserted and generally reviewed, it is recommend that stricter monitoring and action protocols are designed and implemented to catch issues and potential tolerance exceedance as soon as results from each batch are returned. The most effective QA/QC monitoring would involve a first pass screening of labeling mix-ups and a second pass of technical review of laboratory performance. It is the author's understanding that the project database willbe migrated to the database management software GeoBank™, which has the capabilities to support these recommendations. In addition, the most optimized QA/QC program would involve standards closer to the actual grades of interest than those that are currently being used. If additional custom standards are envisioned for multiple element purposes it is suggested that certification of the standards involve more tests than the five at SGS for the current standards, and an additional laboratory is included in the certification of the values. The current blank material should be replaced with certified blank material that has been subjected to extensive pre-analysis to confirm the absence of Au, Ag, Pb and Zn. The current blanks have not proven useful for their intended purpose and have contributed more to doubt than certainty.

11.7 Analysis Pre-2009 Methodology (Micon)

The following has been sourced from Micon 2009.

11.7.1 Laboratories, Methods & Procedures

ECU used the Ensayes y Representaciones, S.A. (ERSA) laboratory in Torreón, Coahuila as its primary laboratory. The ERSA laboratory is an independent laboratory in Mexico which is currently in the process of acquiring its ISO 9002 certification.

Analyses performed at the laboratory are based on international and certified standards for Au, Ag, Cu and Zn in high concentrations as well as for atomic absorption and plasma. The laboratory is also in charge of the assay interchange with the smelters where they perform assays as part of round robins every six months. In this respect, the ERSA laboratory is no different from any number of small independent commercial laboratories which are operated in Canada and which participate in round robins but do not have ISO certification. While the assay laboratory in Torreón is currently not certified, Micon believes that the laboratory has sufficient experience and QA/QC procedures in place for it to serve as ECU's primary assay laboratory in Mexico.

At the ERSA laboratory, a sample is first reduced to quarter inch fragments using a jaw crusher. It is further reduced to ten mesh size through the use of a small cone crusher. The material is then split in a Jones-type splitter until 300 g of the sample is collected. The split sample is then pulverized to minus 150 mesh, homogenized for about three minutes and placed in a tagged plastic bag. When the sample contains moisture, it is dried at 110° C for approximately four hours prior to the aforementioned process.

11.8 Quality Control Pre-2009 (Micon Assessment)

The following has been sourced from Micon 2009.

Quality control procedures conducted include the routine incorporation of certified geochemical standards, blanks and sample duplicates, according to the following protocol:

- Diamond Drilling: alternate insertion of a laboratory certified laboratory standard or blank for every 10th sample.

- RC Drilling: For every alternate 10th sample, a duplicate sample of the preceding interval was taken as a field duplicate, or a certified laboratory check standard or blank sample was submitted respectively.

- Trenching: For every alternate 10th sample, a duplicate sample of the preceding interval was taken as a field duplicate, or a certified laboratory check standard or blank sample was submitted respectively.

11.8.1 In-House Reference Material

ECU's on-site reference material consists of finely ground material from the Santa Juana mine. The material was collected, crushed and mixed at one time. Several samples have been assayed at various laboratories to assure constant values prior to their use as an on-site reference. One on-site reference sample for every twenty samples is sent to the laboratory. The statistics regarding the on-site reference sample are summarized in **Table 11-6**.

Table 11-6: Summary of the In-House Reference Material for the Velardeña and Chicago Properties

Element	Units	Average Value	Minimum Value	Maximum Value	Standard Deviation
Au	g/t	9.6	0.7	13.1	2.2
Ag	g/t	1,094	215	2,241	258
Pb	%	8.01	0.82	14.52	2.37
Zn	%	13.15	1.34	19.46	4.49
Cu	%	1.24	0.01	2.04	0.35
As	%	4.16	1.13	5.44	0.72
Fe	%	14.74	1.45	22.35	4.66

The on-site standard was derived from a total of 51 samples which were collected, crushed and mixed together. Table provided by ECU Silver Mining Inc.

ECU created its on-site reference samples as there were no low or high grade Ag standard reference standards available on the market. While this is not always the recommended course of action in a QA/QC program, it is preferable to not including a reference sample. If a commercially available high or low grade Ag reference sample becomes available with similar characteristics to the mineralization located on the Velardeña and Chicago projects, Micon would recommend that ECU purchase it for its use. It could be argued that any commercially available standard polymetallic reference sample would be preferable to the use of an on-site reference sample; however, given the relatively high grade Ag encountered at the Velardeña and Chicago properties, the use of a standard reference sample without a high grade Ag component almost ensures that the assay methods used by ECU's various assay laboratories to assay for high grade Ag would go unchecked. Micon therefore believes that in this case it is preferable to use an on-site reference sample as a check against the assaying procedures.

11.8.2 Blanks

The material used for blank samples is barren limestone collected from a nearby location for which reasonably constant values have been previously tested in several laboratories. One blank for every 20 samples is sent to the laboratory. The statistics regarding ECU's blanks are summarized in **Table 11-7**.

Table 11-7: Summary of the Blank Material for the Velardeña and Chicago Properties

Element	Average Value	Minimum Value	Maximum Value	Standard Deviation	Units
Au	0.16	0	2.6	0.4	g/t
Ag	12	0	110	19.04	g/t
Pb	0.2	0.00	2.85	0.48	%
Zn	0.51	0.00	19.15	2.75	%
Cu	0.01	0.00	0.16	0.02	%
As	0.14	0.00	0.87	0.18	%
Fe	0.92	0.09	4.6	0.85	%

Total samples =51. Table provided by ECU Silver Mining Inc.

11.8.3 Duplicate Samples

Field duplicates from the stopes and mill have been assayed occasionally in order to test ECU's mill laboratory (LABRI), comparing it against the results from the regular ERSA laboratory. The on-site laboratory was used to verify stope sampling and mill assaying. The on-site mill laboratory has not been used to assay the samples contained in the database.

Underground samples collected by ECU between 1997 and 2001 were assayed at the previous mill laboratory which was sold to Hecla Mining Company in 2001. The use of an on-site laboratory to assay the development sampling at a mine is a common practice in the mining industry and in the majority of cases this database is also used in the resource estimate. This sampling is considered historical and the development sampling dating to this period is contained for the most part in mined out areas. Thus, these assays were not used in the current resource estimate.

Duplicate sampling using the rejects is not conducted on the core or development chip samples. Micon recommends that ECU begin to conduct some duplicate assaying on the core and development chip rejects. The assaying of a portion of the reject core will assist in checking both the variance in the mineralization and the sample preparation procedures and the assay laboratories.

11.8.4 Re-Assays

Re-assaying has been systematically carried out on batches of pulp samples. In the case of pulp samples these are conducted on a random grouping of samples approximately every three months.

Each pulp sample selected for re-assaying is re-assayed at the following two laboratories.

Sample pulps are sent to the ALS Chemex laboratory facilities in Guadalajara (Mexico) and Vancouver (Canada). The ALS Chemex Guadalajara laboratory conducted the sample preparation and then sent the pulps by plane to the Vancouver laboratory for assaying. ALS Chemex is committed to having ISO 9001:2001 certification at all locations. The assaying procedures used by ALS Chemex for these samples have been described earlier in this section.

Sample pulps are sent to the Servicio Geológico Mexicano (SGM) laboratory in Chihuahua, Mexico. This laboratory is a Mexican government facility which services the mining industry and University of Chihuahua. This laboratory conducts both assaying and mineralogical testwork. This government facility is an ISO 9001:2000 and BS EN ISO 9001:2000 certified laboratory.

ECU has conducted a number of comparisons using the assay results from these laboratories against the original assays conducted at ERSA. An example of these comparisons made on the average grades for 113 samples from the three assay laboratories is summarized in **Table 11-8**.

Table 11-8: Summary of the Assay Laboratory Comparisons for the Average Grades Based on 113 Samples

Assay Laboratories	Averages					
	Au g/T	Ag g/T	Pb %	Zn %	Cu %	As %
ERSA	2.82	178.9	0.68	0.58	0.22	1.08
Chemex	2.91	153.7	0.67	0.57	0.21	1.14
SGM	2.14	168.0	0.80	0.71	0.20	1.15
	Differences (%)					
	Au	Ag	Pb	Zn	Cu	As
ERSA/ALS Chemex	-3.2	14.0	2.4	1.2	4.8	-5.4
ERSA/SGM	24.0	6.0	-17.0	-22.0	6.0	-6.0
ALS Chemex/SGM	24.0	-9.0	-20.0	-24.0	2.0	-1.0
	Correlation					
	Au	Ag	Pb	Zn	Cu	As
ERSA/ALS Chemex	0.98	0.95	1.00	0.99	1.00	0.95
ERSA/SGM	0.63	0.17	1.00	0.84	1.00	0.93
ALS Chemex/SGM	0.62	0.18	1.00	0.84	1.00	0.98

Table provided by ECU Silver Mining Inc.

As indicated by **Table 11-8** the correlation between ERSA and ALS Chemex for the pulp samples is very good. For the assay correlations between ERSA and SGM as well as ALS Chemex and SGM, the correlation for the base metals ranges from fair in the case of Zn to good for Pb, Cu and arsenic (As). However, for the precious metals it is poor for Au and nonexistent for Ag.

Since one of the samples (No. 43293) included in the batch of 113 samples sent to the other two laboratories was very high in Ag, this sample was removed and a comparison of the average grades for the remaining 112 samples was conducted. The comparison conducted on the 112 samples is summarized in **Table 11-9**.

Table 11-9: Summary of the Assay Laboratory Comparisons for the Average Grades Based on 112 Samples

Assay Laboratories	Averages					
	Gold (g/t)	Silver (g/t)	Lead (%)	Zinc (%)	Copper (%)	Arsenic (%)
ERSA	2.75	128.2	0.68	0.58	0.16	1.05
Chemex	2.83	123.9	0.67	0.57	0.15	1.11
SGM	2.13	155.1	0.80	0.71	0.15	1.12
	Differences (%)					
	Gold	Silver	Lead	Zinc	Copper	Arsenic
ERSA/ALS Chemex	-2.8	3.0	2.5	1.2	2.3	-5.4
ERSA/SGM	23.0	-21.0	-17.0	-22.0	2.0	-7.0
ALS Chemex/SGM	25.0	-25.0	-20.0	-24.0	0.0	-2.0
	Correlation					
	Gold	Silver	Lead	Zinc	Copper	Arsenic
ERSA/ALS Chemex	0.99	0.99	1.00	0.99	1.00	0.95
ERSA/SGM	0.63	0.04	1.00	0.84	1.00	0.93
ALS Chemex/SGM	0.63	0.09	1.00	0.84	1.00	0.98

Table provided by ECU Silver Mining Inc.

As indicated by **Table 11-9,** the correlation between ERSA and ALS Chemex for pulp samples is very good. For the assay correlations between ERSA and SGM as well as ALS Chemex and SGM, the correlation for the base metals ranges from fair in the case of Zn to good for Pb, Cu and As. However, for the precious metals it is again poor for Au and nonexistent for Ag.

Due to the very poor laboratory correlation between SGM and both ERSA and ALS Chemex for the precious metals, ECU is in the process of looking for another laboratory to act as a third laboratory in its re-assay program.

11.9 2009 to 2012 Sample Preparation & Assaying (CAM Assessment)

The following has been sourced from CAM 2012.

A significant proportion of samples from the latest exploration program were analyzed at the ERSA laboratory which is not certified. Additionally the pulps and course rejects from this work were lost. Analysis of the available QA/QC data for these assays indicated the quality of the ERSA assays was not satisfactory. For these reasons CAM recommended and Golden Minerals agreed, that these samples be redone at a certified laboratory. Because the pulps and coarse rejects were lost this required a re-sampling, prep and assay according to the following steps:

1. A resplit of the remaining sample at the Velardeña site.

2. Insertion of QA/QC samples into the sample stream and an approximate rate of one in 15.

3. Transport of the samples to the SGS laboratory in Durango.

4. Dry, crush to 75% passing through a two millimeter (mm) screen, subsample 250 g and pulverize to 85% passing through a 75 micrometer (µm) screen.

5. Assay using standard SGS procedures. Because of detection limits multiple assays were sometimes run on the same sample pulps.

11.9.1 General QA/QC

There are several types of QA/QC samples which are regularly inserted into the sample stream to assure that the results obtained are representative of the samples and are correct in terms of contained metal.

Types of QA/QC samples include:

- **Standards.** Standards are samples usually pulps that have a known value. Standards may be purchased commercially and have an accepted value provided by the commercial entity preparing the standard for at least some elements. Internal standards are prepared by the company (often using contractors because of the larger volumes desirable for standards) with the accepted value being estimated as a result of a series of round-robin assays at various labs. Commercial standards have the advantage that at least some assay values are known a priori. Commercial standards may have the disadvantage that not all elements of interest for given operation are provided by the commercial vendor. For example in a polymetallic deposit like Velardeña, several different standards are required from a commercial lab to cover all the elements of interest. Internal standards are less independent than commercial standards but have the advantage that they tend to be more representative of the mineralogy of the specific deposit and are more likely to cover the elements of interest in more reasonable grade ranges.

- **Blanks.** Blanks may be considered a special type of standard with elemental values of zero. However, blanks, particularly prep blanks, are extremely useful in detecting cross-contamination between samples. Generally blanks are prepared by the company.

- **Replicates.** Replicates are repeats of prior assay values and for most operations are duplicates. However, the term replicate is used because in some cases multiple analyses for the same element by the same method are run on the same pulp. There are several types of replicate samples including a prep replicate, which is a re-preparation of the course rejects after the first size reduction step. Prep replicates are also called coarse replicates or in spanish “Fino”, if multiple pulp envelopes are available the pulp replicates may be submissions of the same envelope or another envelope. For any reputable laboratory there are also replicates out of the same pulp envelope. These are typically used by laboratory for internal QA/QC.

11.9.2 QA/QC SGS Re-Assays

A total of 10,755 assay records in 197 batches from SGS were provided to CAM in tab delimited spreadsheets by Golden Minerals, In addition to these assay records 561 internal lab duplicates by SGS were provided.

Relative to non-QA/QC samples this represents a QA/QC sample rate of almost 15% which is consistent with best industry practice. This 15% does not include the internal SGS duplicates.

Velardeña is transitioning from manual and labor-intensive data handling and resource estimation techniques to computerized data handling methods, and CAM encountered several cases of misspellings, inconsistent use of blank, "_", and "-" in evaluating the QA/QC data. All of these inconsistencies were reported to Golden Minerals and there was significant improvement over the several months while the assays were in progress.

SGS provided assays on 35 different elements by 47 different assay methods (multiple assay methods are required for some elements because of the detection capabilities of the analytical equipment). CAM only reviewed QA/QC on the elements impacting NSR which were Au, Ag, Cu, Pb, Zn, As and antimony (Sb). QA/QC review of all of these elements were reported to Golden Minerals; however, for this report only QA/QC data for Au and Ag are discussed. These results are representative of results for the other elements.

A detailed table of QA QC samples is given in **Table 11-10**.

Table 11-10: Count of Velardeña QA/QC Samples by Type

Type	Count
Blank	252
Pulp Duplicate	222
Coarse Duplicate	343
Standards	
STD 1-87440	54
STD 3-87427	60
STD Au 0.0849 ppm	40
STD Au 4.086 ppm	35
STD CDN-ME-18	173
STD CDN-ME-4	169
STD OREAS 134a	26
Total Standards	**557**

Graphical review of QA/QC data is the easiest way to determine if there are issues in QA/QC. Figures of QA/QC results are shown in **Figure 11-6** through **Figure 11-15**. Brief comments are presented following the figures.

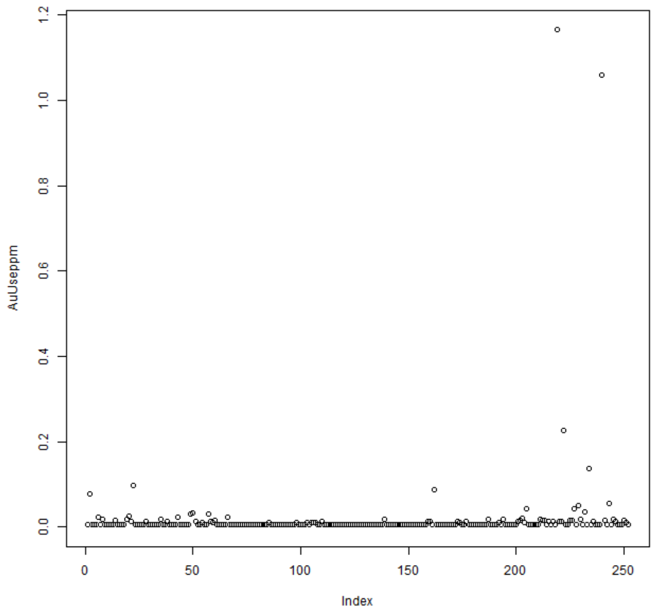


Figure 11-6: Gold Blanks

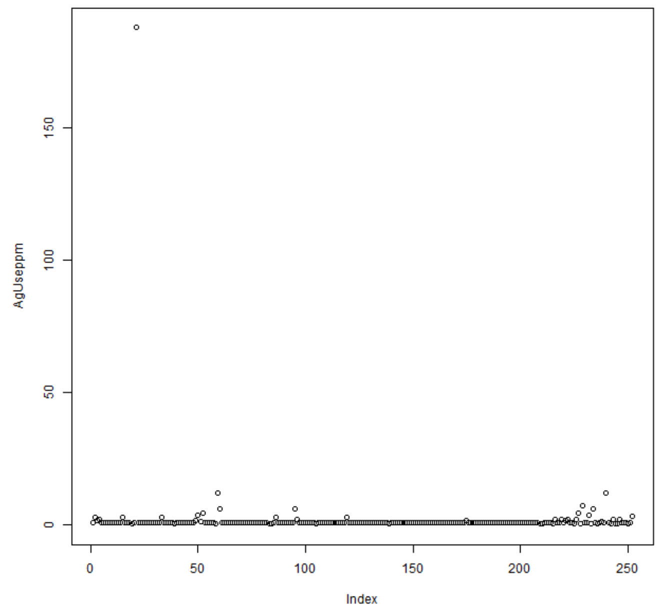


Figure 11-7: Silver Blanks

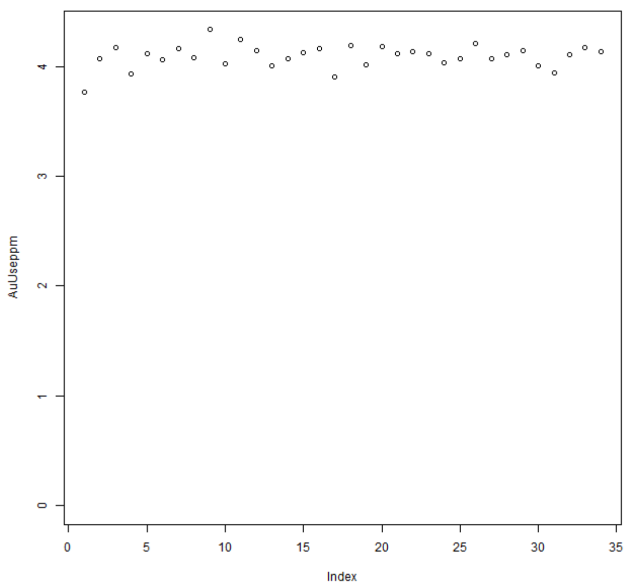


Figure 11-8: Typical Gold Standard

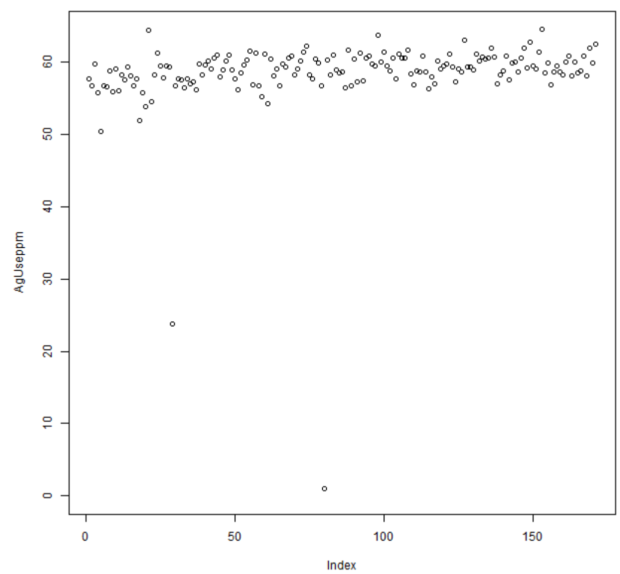


Figure 11-9: Typical Silver Standard

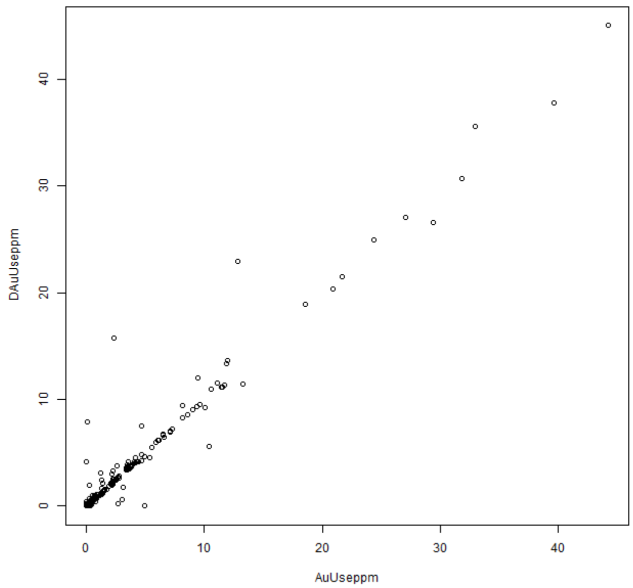


Figure 11-10: Gold Course Duplicates

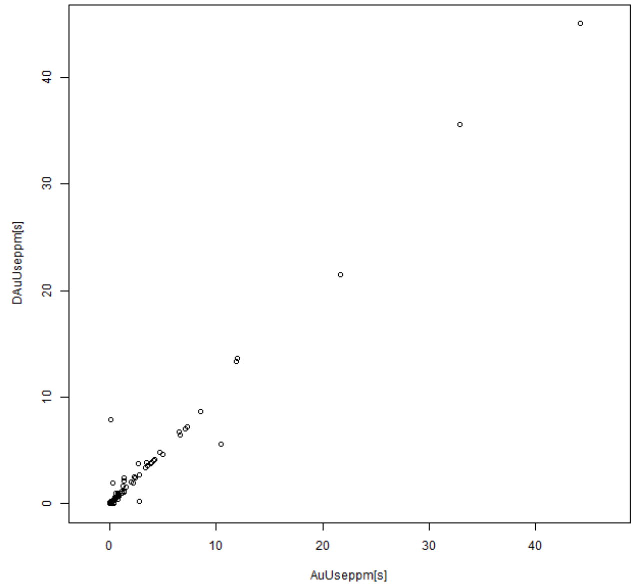


Figure 11-11: Gold Fine Duplicates

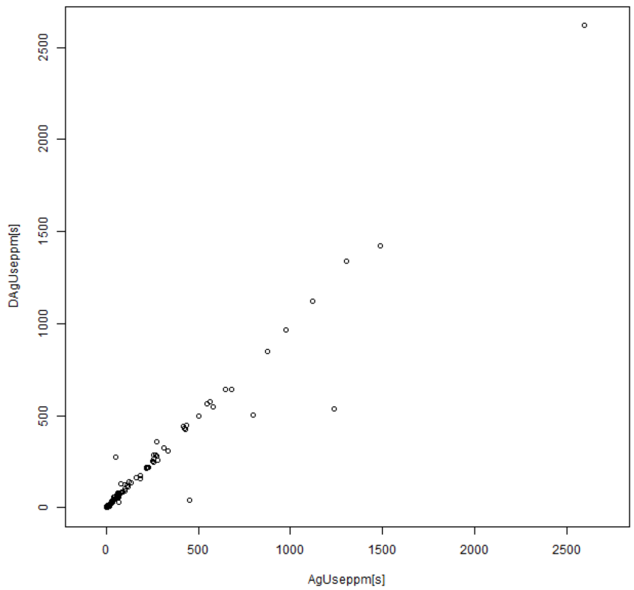


Figure 11-12: Silver Course Duplicates

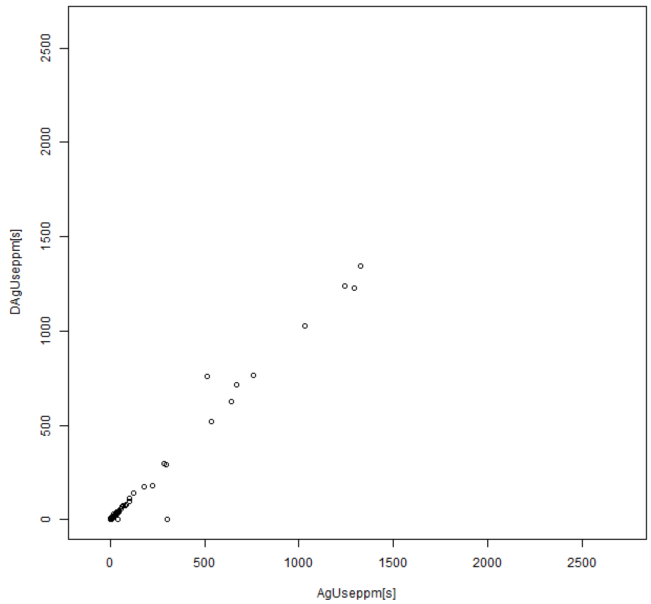


Figure 11-13: Silver Fine Duplicates

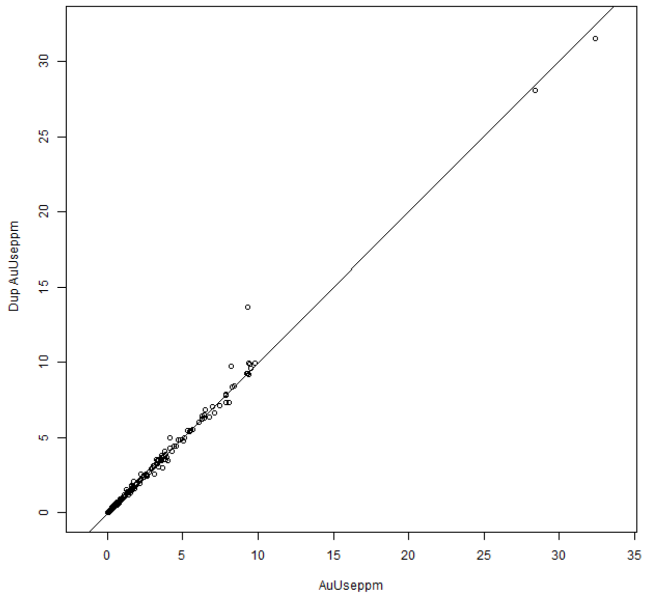


Figure 11-14: SGS Gold Internal Duplicates

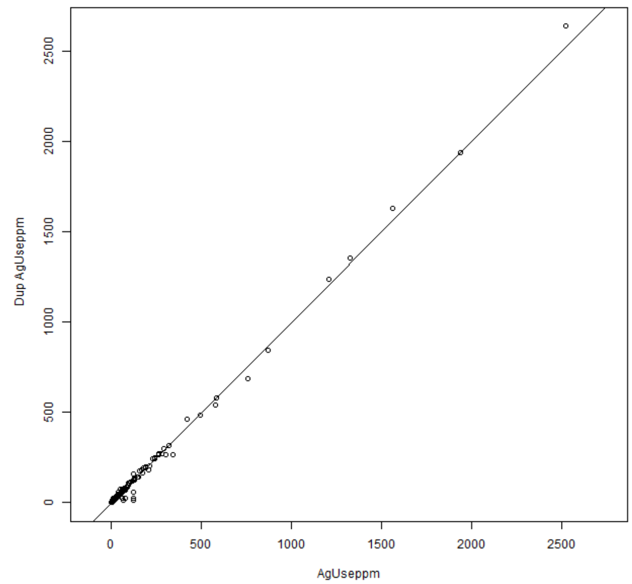


Figure 11-15: SGS Internal Silver Duplicates

Figure 11-6 two anomalous values of over of over one g/T but is still less than a 1% anomaly rate.

Figure 11-7 shows only one anomalous value.

No anomalous values are shown in **Figure 11-8**.

Two anomalous values are shown in **Figure 11-9**, with an anomaly rate of just over 1%.

Figure 11-10 shows four or five anomalous points; a higher anomaly rate is typical for duplicates than for blanks and standards.

Figure 11-11 shows two or three anomalous points; a higher anomaly rate is typical for coarse duplicates than for fine duplicates.

Figure 11-12 shows three or four anomalous points; as with Au the anomaly rate for duplicates is higher than for blanks and standards.

Figure 11-13 shows one or two anomalous points; as with Au the anomaly rate for fine duplicates is lower than for coarse duplicates.

Figure 11-14 shows one anomalous data point, which is unusual for internal duplicates because normally batches containing these are re-run and never reported to the client. CAM recommended that Golden Minerals review SGS reporting standards to determine why this anomaly occurred. In this same context internal standards for SGS reruns should be disclosed to the client.

There are no immediately obvious anomalous points in **Figure 11-15**. However it appears that scatter on the low end is somewhat higher than for the Au duplicates in terms of percentage. Since Ag is a significant revenue element, routinely including log-log plots of replicates is suggested.

11.9.2.1 Conclusions on the SGS Re-Assay Dataset

Minera William has followed best practices in terms of the number of QA/QC samples and the number of statistically anomalous values observed in the QA/QC charts occur at a rate of less than 2%. Hence, CAM concluded that the SGS re-assay dataset is suitable for use in calculation of measured, indicated and inferred resources.

11.10 Specific Gravity Determinations

Specific gravity measurements have been made on chip, and core samples for varying lithological units and mineral types (oxide, mixed and sulfide) present at each area of the Project (Santa Juana, Terneras, and Chicago). Samples were selected to represent the major lithology, alteration, and mineralization types.

Several thousand density samples were available from water-immersion measurements on core samples and some hand specimens. The data are of sufficient accuracy for use in resources estimation, but new samples should be routinely collected and used for resource estimation.

Specific gravity is calculated by the following formula:

Specific Gravity = weight dry / (weight dry - weight submerged).

Table 11-11 lists the averages by process type and **Table 11-12** lists the averages by vein by process type.

Table 11-11: Velardeña Average Densities by Mineral Type

Mixed	Oxide	Sulfide
3.34	2.82	3.57

Table 11-12: Velardeña Average Density by Vein and Process Type

Vein	Ore Type	Average Density
A1	Oxide	2.39
	Mixed	3.38
A2	Sulfide	3.65
A4	Oxide	2.97
	Mixed	3.76
	Sulfide	3.55
Bs	Oxide	2.88
	Mixed	3.57
CO	Oxide	3.00
SJ	Sulfide	3.81
C1	Oxide	2.90
CC	Oxide	2.98
	Sulfide	4.03
E	Sulfide	3.50

Vein	Ore Type	Average Density
E1	Mixed	2.86
G1	Oxide	2.77
Nueva	Oxide	2.89
	Mixed	3.59
	Sulfide	3.59
San Juanes	Sulfide	3.81
San Mateo	Oxide	2.67
	Sulfide	3.41
Oriente	Sulfide	3.21
Terneras	Oxide	2.81
Flechas	Oxide	2.55
Roca Negra	Sulfide	3.18
Trans	Oxide	2.85
Gambusino	Oxide	2.94
	Mixed	3.05
Escondida	Mixed	3.19

11.10.1 Comparing Specific Gravity Datasets

There is a very high level of variability in sulfide densities due to highly variable sulfide assemblages and modal proportions. Conclusions regarding densities include:

- Oxides are generally consistent.
- Mixed does not appear in the 2005 dataset and only in the Santa Juana set for 2011. Within the latter, densities are consistent.
- Densities for diorite, limestone and skarn are generally consistent - locally high densities on limestone presumably represent a calc-silicate component.

The variation in total sulfide and sulfide mineral assemblages within sulfide mineral types are the main source of density variations and overshadow relatively subtle differences in host rock. It is important to accurately estimate volumes of vein versus host rock mined as this will have significant impacts on density/tonnage factors as well as grade dilution.

12.0 DATA VERIFICATION

The data collected by the mine staff is in support of operations planning and many of the data inputs provided by Golden Minerals are supported by historic and current production actuals and through this activity have been verified. Additional verification procedures are described below.

12.1 GEOLOGIC DATA INPUTS

To verify geologic data inputs the qualified person reviewed provided digital data in context of other data provided along with physical observations while on site. For example: the level mapping was reviewed alongside selected vein samples, geologic mapping was reviewed in conjunction with drill hole geologic interval logging, on-vein development was compared to sample locations, mine stopes were compared to development and channel sampling.

Traditional drill hole database validation checks were run on the drill hole and channel database and errors were provided to Minera William staff for correction. Each provided on-vein interval for every modeled vein was reviewed in three-dimensional (3D) view, level plan, and in section during model construction and were checked for consistency of location and grade in context of nearby samples.

The quantity of data provided is immense and is not free of errors and omissions. Data provided often required additional organization and in some instances alterations to be internally consistent with respect to location. Location inconsistencies are often related to levels not being perfectly flat and often partially following ramps; two-dimensional (2D) data representation without regard to vertical position; and 2D data representation with respect to idealized vein planarity.

The geologic data provided is adequate for the purposes used in the technical report.

12.2 MINE PLANNING DATA INPUTS

Mark Horan conducted a site visit to the Velardeña mine to verify that parameters used in mine planning are adequate for use in the PEA. This included visiting underground stopes applying the mining techniques discussed in the PEA. This site visit allowed for verification of mining parameters used in the PEA, confirming that the parameters are adequate.

12.3 MINERAL PROCESSING DATA INPUTS

Technical and cost data were obtained during the Project site visit and in subsequent communications with Golden Minerals personnel at the Velardeña site and in Golden Minerals' Golden, Colorado office. The data provided by Golden Minerals conforms to industry standards and is considered to be within the accuracy of this PEA study and verified for use in this PEA study.

At no time was there any limitation to, or failure to provide the requested technical and cost data for the processing plants or infrastructure to Tetra Tech's metallurgical or infrastructure personnel during or subsequent to the Project site visit.

The technical and cost data for the processing plants and infrastructure collected during the site visit to Velardeña and subsequent communications with Golden Minerals are adequate for the assemblage and production of this PEA study.

12.4 Economic Data Inputs

A technical economic model template and cost data were obtained in subsequent communications with Golden Minerals. The data provided by Golden Minerals conforms to industry standards and is considered to be within the accuracy of this PEA study and verified for use in this PEA study.

At no time was there any limitation to, or failure to provide the requested technical and cost data for the economic model to Tetra Tech.

The technical and cost data for the economic model are adequate for the assemblage and production of this PEA study.

12.5 Environmental Information

A list of current permits was obtained in subsequent communications with Golden Minerals. The information provided by Golden Minerals conforms to the requirements of Mexican environmental regulations; however no information regarding an environmental monitoring program or adherence thereto was reviewed.

13.0 MINERAL PROCESSING & METALLURGICAL TESTING

There are two processing plants at the Project. Plant #1 treats sulfide material by conventional crush, grind, and differential flotation technologies for the production of Pb, Zn and pyrite concentrates. Process Plant #2 has two production circuits for separately processing oxide and sulfide Au-Ag material for the production of a Au-Ag doré by cyanide leach/Merrill-Crowe and Au-Ag concentrate by flotation, respectively. Production at both plants was suspended in June 2013. Golden Minerals recently restarted production at Plant #1 in November 2014; however, Plant #2 remains on care and maintenance.

Because of the historical production for Plant #1, the liberation characteristics of the material and their response to differential flotation are within typical design criteria and known by the operations personnel. There are no geological, lithological or mineralogical changes in the process plant feed anticipated for the envisaged future production as compared to previous operations. Existing legacy operational data supports the existing process flow sheet for potential future production at Plant #1. Further, the use of existing and refurbished equipment within the pre-existing facilities is Golden Minerals' preferred method of future treatment. **Table 13-1** summarizes recent production data for Process Plant #1 for November and December 2014, and forecast production for the remaining LoM. There are no grade-recovery curves from which to estimate the metal recoveries and concentrate grades shown in **Table 13-1**. The values were estimated based on the projected head grades.

Table 13-1: Historical & Forecast Production Data for Plant #1

Description	Units	Nov 2014 Actual(1)	Dec 2014 Actual(2)	2015 (3)	2016	2017	2018
Material Processed	Tonnes	6,127	8,195	102,432	102,611	102,530	102,622
Head Grade							
Au	g/T	1.55	1.78	3.3	3.4	4.1	6.2
Ag	g/T	90	127	223.6	190.0	197.0	182.4
Pb	%	0.72	0.79	1.6	1.1	0.6	0.4
Zn	%	0.96	1.16	1.9	1.8	1.2	0.6
Lead Concentrate	Tonnes	117.45	151.0	3,200.3	2,317.9	1,404.3	908.0
Au	g/T	18.79	27.41	34.3	47.0	85.8	222.5
Ag	g/T	4 458	5,631	5,868	6,730	11,504	16,491
Pb	%	28.07	33.95	40.0	36.0	34.0	32.0
Zn	%	5.00	4.93	5.5	6.4	6.1	4.7
As	%	NR	0.89	0.90	0.80	0.75	0.70
Sb	%	NR	2.56	2.60	2.50	2.40	2.30
Zinc Concentrate	Tonnes	75.53	126	2,622.2	2,499.9	1,613.5	788.2
Au	g/T	2.19	1.66	4.3	4.9	9.5	32.0
Ag	g/T	365	422	472	468	626	1187
Pb	%	1.07	1.69	1.17	0.87	0.74	0.91
Zn	%	50.30	55.86	56.0	56.0	55.0	54.0
As	%	NR	0.22	0.20	0.20	0.20	0.20

Description	Units	Nov 2014 Actual(1)	Dec 2014 Actual(2)	2015 (3)	2016	2017	2018
Sb	%	NR	0.10	0.10	0.10	0.10	0.10
Pyrite Concentrate	Tonnes	385.68	137.0	2,188	2,167	1,885	1,592
Au	g/T	7.84	10.55	32.9	35.7	50.7	99.1
Ag	g/T	147	217	471	540	643	705
Pb	%	0.59	0.98	1.0	1.0	1.0	1.0
Zn	%	1.24	1.43	1.4	1.4	1.4	1.4
Recoveries:							
Lead Concentrate	% of Au	28.28	28.4	32.0	31.0	29.0	32.0
	% of Ag	78.42	82.2	82.0	80.0	80.0	80.0
	% of Pb	75.23	79.2	79.0	77.0	76.0	73.0
	% of Zn	9.95	7.88	9.0	8.0	7.0	7.0
Zinc Concentrate	% of Au	2.12	1.4	3.3	3.5	3.7	4.0
	% of Ag	4.13	5.1	5.4	6.0	5.0	5.0
	% of Pb	1.84	3.29	1.9	2.0	1.9	1.8
	% of Zn	64.29	74.4	75.0	75.0	73.0	70.0
Pyrite Concentrate	% of Au	38.73	9.9	21.0	22.0	23.0	25.0
	% of Ag	8.51	2.86	4.5	6.0	6.0	6.0
	% of Pb	5.22	2.06	1.8	2.0	3.0	4.0
	% of Zn	8.07	2.05	3.8	5.0	5.0	5.0

Source: Golden Minerals; November-December, 2014 data.

(1) November 3-30, 2014

(2) December 1-31, 2014

(3) Steady state conditions, after ramp up

14.0 MINERAL RESOURCE ESTIMATES

Resources have been estimated independently for 60 vein surfaces representing main veins, fault offsets and splits of 39 known veins. Estimation was completed using a centerline guiding surface and a variable thickness block model oriented in the best fit plane of the vein. Grade multiplied by thickness (GxT) and thickness attributes have been estimated using inverse distance weighting to a power of 2.5. **Figure 14-1** shows the vein surfaces from the Santa Juana area on the right and the Terneras, San Mateo and San Juanes areas on the left.

Estimated mineral resources for the Velardeña project are shown in **Table 14-1** and **Table 14-2** below, as well as the mineral type portions for each resource class.

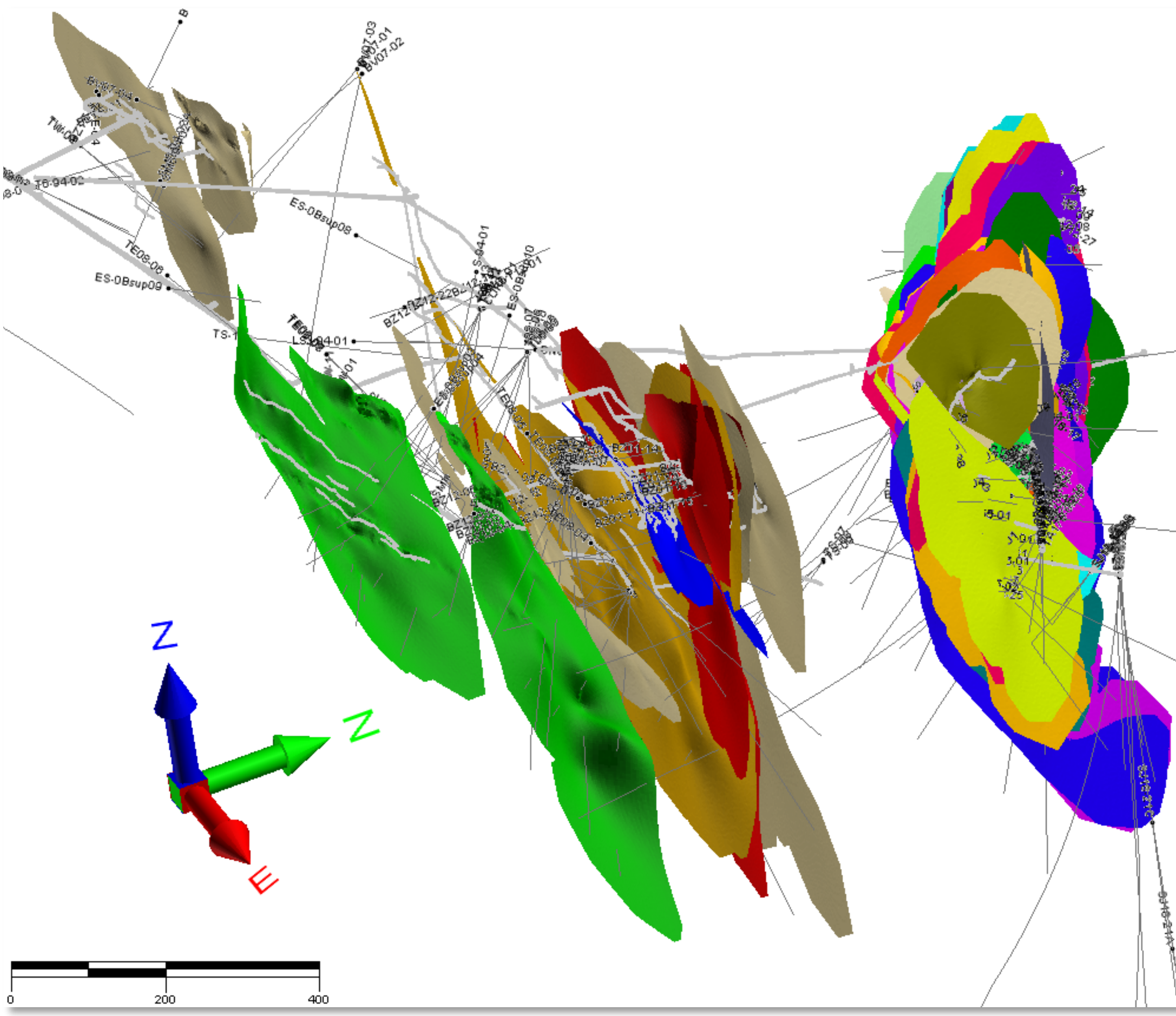


Figure 14-1: 3D View of Vein Centerline Surfaces Looking NW from Above

Table 14-1: Velardeña Project Resources Base Case Cutoff Inputs

Classification	Mineral Type	NSR Cutoff	Tonnes	Grade Ag g/T	Grade Au g/T	Grade Pb%	Grade Zn%	Ag toz	Au toz	Pb lb	Zn lb
Measured	Oxide	100	210,000	282	4.4	1.6	1.3	1,900,000	30,000	7,200,000	5,920,000
Indicated	Oxide	100	450,000	283	3.7	1.7	1.3	4,130,000	55,000	17,350,000	13,190,000
Measured + Indicated	Oxide	100	660,000	283	4	1.7	1.3	6,030,000	84,000	24,550,000	19,110,000
Inferred	Oxide	100	470,000	332	4.4	2.5	1.3	5,010,000	66,000	25,750,000	13,400,000
Measured	Sulfide	100	320,000	280	4.2	1.3	1.5	2,920,000	44,000	9,190,000	10,950,000
Indicated	Sulfide	100	810,000	259	3.6	1.3	1.6	6,710,000	93,000	22,430,000	28,950,000
Measured + Indicated	Sulfide	100	1,130,000	265	3.8	1.3	1.6	9,620,000	137,000	31,620,000	39,910,000
Inferred	Sulfide	100	1,670,000	254	4.0	1.2	1.5	13,650,000	216,000	44,710,000	55,450,000
Measured	All	100	530,000	281	4.3	1.4	1.4	4,810,000	74,000	16,390,000	16,870,000
Indicated	All	100	1,260,000	268	3.6	1.4	1.5	10,840,000	148,000	39,780,000	42,150,000
Measured + Indicated	All	100	1,790,000	272	3.8	1.4	1.5	15,650,000	222,000	56,170,000	59,010,000
Inferred	All	100	2,140,000	271	4.1	1.5	1.5	18,660,000	282,000	70,470,000	68,840,000

Notes:

(1) Reported measured and indicated resources are equivalent to mineralized material under SEC Industry Guide 7

(2) Inferred resource is not a recognized category under SEC Industry Guide 7

(3) Resources are reported as diluted Tonnes and grade to 1m fixed width

(4) Metal prices for NSR cutoff are three year trailing average as of December 2014: US$25/troy ounce Ag, US$1,446/troy ounce Au, US$0.96/lb Pb, and US$0.91/lb Zn

(5) Columns may not total due to rounding

Table 14-2: Velardeña Project Resources Alternative Case Cutoff Inputs

Classification	Mineral Type	NSR Cutoff	Tonnes	Grade Ag g/t	Grade Au g/t	Grade Pb%	Grade Zn%	Ag toz	Au toz	Pb Lbs	Zn Lbs
Measured	Oxide	100	150,000	334	5.1	1.8	1.4	1,660,000	25,000	5,980,000	4,800,000
Indicated	Oxide	100	330,000	338	4.3	2	1.5	3,560,000	45,000	14,570,000	10,800,000
Measured + Indicated	Oxide	100	480,000	337	4.6	1.9	1.5	5,220,000	71,000	20,550,000	15,600,000
Inferred	Oxide	100	330,000	410	5.3	2.5	1.4	4,360,000	57,000	18,080,000	10,140,000
Measured	Sulfide	100	260,000	313	4.7	1.4	1.7	2,670,000	40,000	8,390,000	10,040,000
Indicated	Sulfide	100	620,000	297	4	1.5	1.9	5,940,000	81,000	19,920,000	25,990,000
Measured + Indicated	Sulfide	100	890,000	302	4.2	1.5	1.8	8,610,000	121,000	28,310,000	36,030,000
Inferred	Sulfide	100	1,260,000	297	4.5	1.5	1.8	12,070,000	183,000	40,520,000	50,620,000
Measured	All	100	420,000	321	4.9	1.6	1.6	4,320,000	65,000	14,370,000	14,830,000
Indicated	All	100	950,000	311	4.1	1.7	1.8	9,500,000	126,000	34,490,000	36,790,000
Measured + Indicated	All	100	1,370,000	314	4.4	1.6	1.7	13,830,000	192,000	48,860,000	51,630,000
Inferred	All	100	1,590,000	320	4.7	1.7	1.7	16,430,000	239,000	58,590,000	60,760,000

Notes:
(1) Reported measured and indicated resources are equivalent to mineralized material under SEC Industry Guide 7
(2) Inferred resource is not a recognized category under SEC Industry Guide 7
(3) Resources are reported as diluted Tonnes and grade to 1m fixed width
(4) Metal prices for NSR cutoff are current as of December 2014: US$17/toz Ag, US$1,250/toz Au, US$0.85/lb Pb, and US$0.95/lb Zn
(5) Columns may not total due to rounding

Block attributes were estimated in three passes from small to large. Estimation was completed using anisotropic inverse distance weighting for each block in the model. **Table 14-3** details the search ellipse sizes, orientations along with sample selection criteria, and classification. Resource classification was assessed by pass (maximum search), number of samples and the nearest composite and average distance. Measured or Indicated classification was only permitted in pass one, 75 m maximum search, and was primarily but not exclusively defined within blocks haloing the existing drifts and stopes.

Table 14-3: Pass Parameters and Classification

Pass	Method	Max Search	Ratio 1st:2nd:3rd	Sectors	Max Per Sector	Comp Min	Comp Max	Classification
First	IDW 2.5	75	See vein parameter table	4	2	1	8	Inferred, Indicated if; comps >=3 and nearest comp <= 50m, Measured if; comps >=4 and nearest comp <= 16m and average comp distance <= 25
Second	IDW 2.5	150	1:0.25:0.5	1	2	1	2	Not classified, Inferred if; nearest comp <= 125m
Third	IDW 2.5	200	1:0.5:0.5	1	2	1	2	Not classified

14.1 Input Data

The project database contains 10,597 assayed drill hole and 32,006 channel sample intervals. Of those, 749 drill hole intervals and 14,534 channel intervals have been interpreted as intersecting a named vein and subsequently used for resource modeling. **Table 14-4** shows grade statistics for intervals within the overall project database and those selected for resource modelling. **Figure 14-2** shows input data intervals as NSR US$/T in plain view for both drill holes and channels in the Santa Juana area.

Table 14-4: Input Data Statistics

Dataset	Selection	Count	Mean Ag g/T	Mean Au g/T	Mean Pb%	Mean Zn%	Mean Apparent Thickness
Channel	All	32,006	281	5.1	1.6	1.6	0.66
Drill hole	All	10,597	45	1.0	0.2	0.3	0.85
All	All	42,603	223	4.1	1.3	1.3	0.71
Channel	On Vein	14,534	518	9.2	2.8	2.7	0.47
Drill hole	On Vein	749	274	5.0	0.7	1.2	0.59
All	**On Vein**	**15,283**	**506**	**9.0**	**2.7**	**2.6**	**0.48**

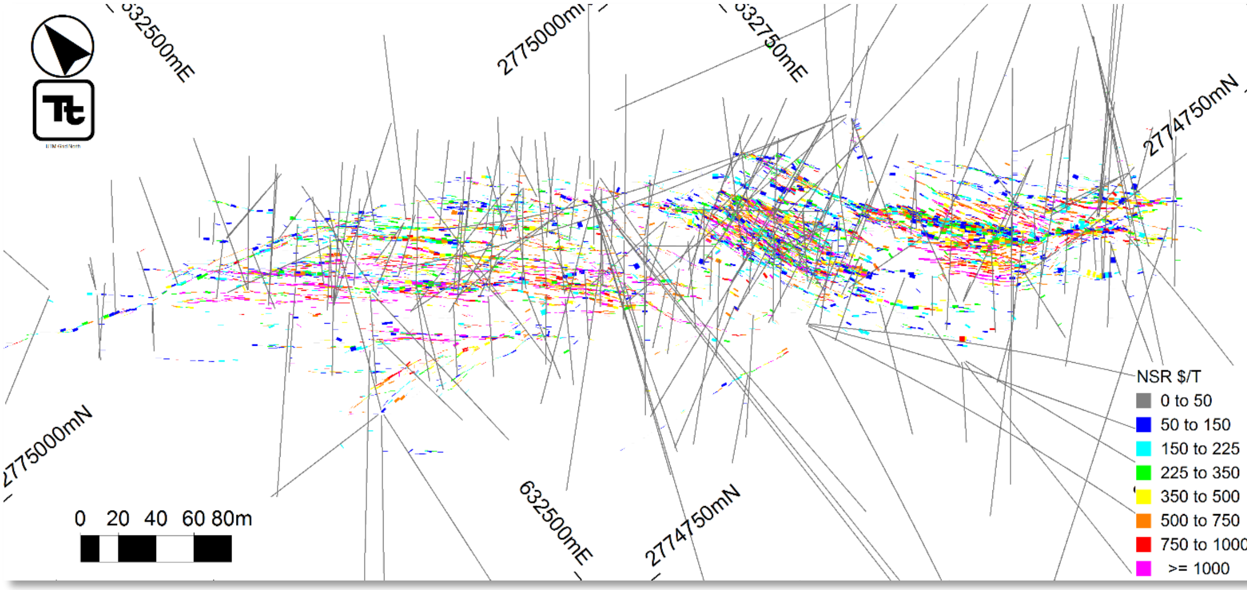


Figure 14-2: Plan View Map Input Data Intervals Santa Juana Area

14.2 Compositing

Each drill hole and channel that intersected the vein was composited into one variable length composite and a generated centroid coordinate. Each composite represents an accumulation of the intervals from the hanging wall to footwall of the vein. A channel sample set or drill hole was permitted to have only one composite per vein. There was no predetermined interval length for the composites. Composite true thickness was then calculated using the apparent thickness and the average strike and dip of the vein. **Figure 14-3** shows a histogram of the calculated true thickness for composites.

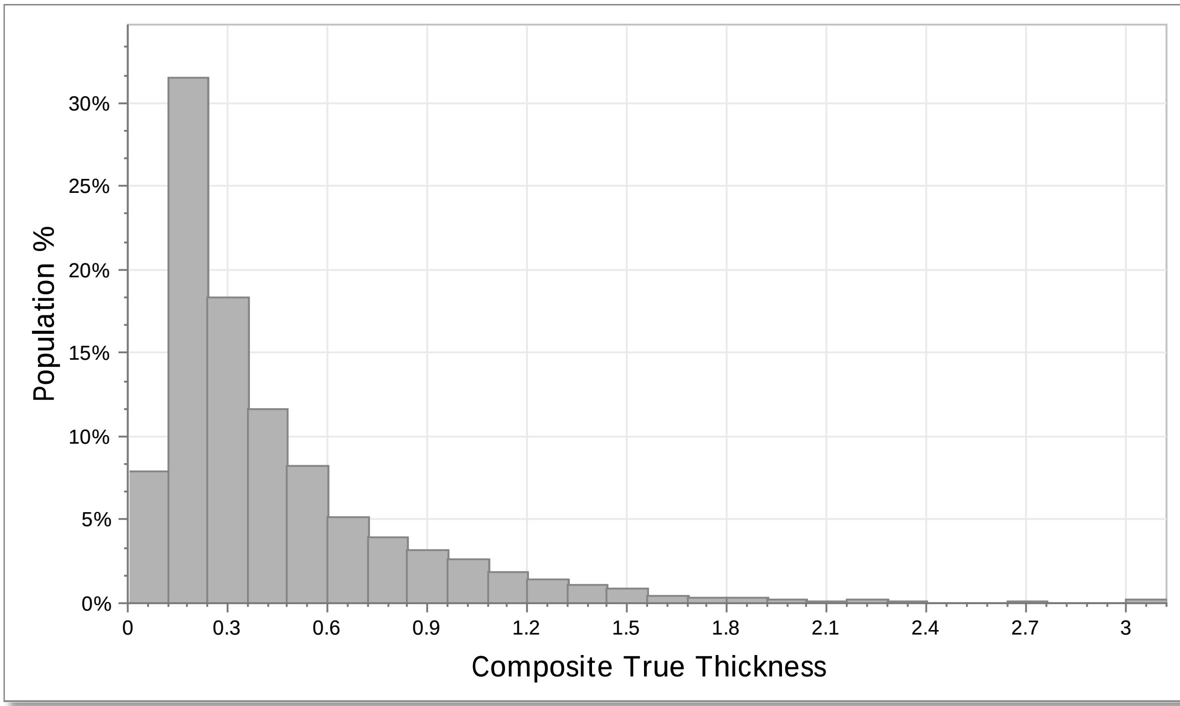


Figure 14-3: Composite True Thickness Histogram

14.3 Grade Capping

Assay intervals from the combined drill hole and channel sample database that were identified as being on-vein were analyzed as a natural log transformed population to determine upper grade limits. Upper limits were applied to composited vein intervals. The upper limit chosen for Ag was 4,000 g/T and 55 g/T for Au, and 20% for both Pb and Zn. **Table 14-5** shows capping statistics and the effects on the population mean **Figure 14-4** shows probability plots for Ag, Au, Pb, and Zn. A traditional interpretation of the probability plots, shown in **Figure 14-4** could conclude higher capping limits are justified, however limits higher than selected would not be supported by observed vein variability.

Table 14-5: Capping Statistics

Element	Uncapped Mean g/T	Upper Limit g/T	Number Capped	Capped Mean g/T
Ag	518	4000	149	496
Au	9.2	55	149	8.9
Pb	2.89	20	167	2.81
Zn	2.72	20	165	2.66
True Thickness (m)	0.46 m	3 m	26	0.46 m

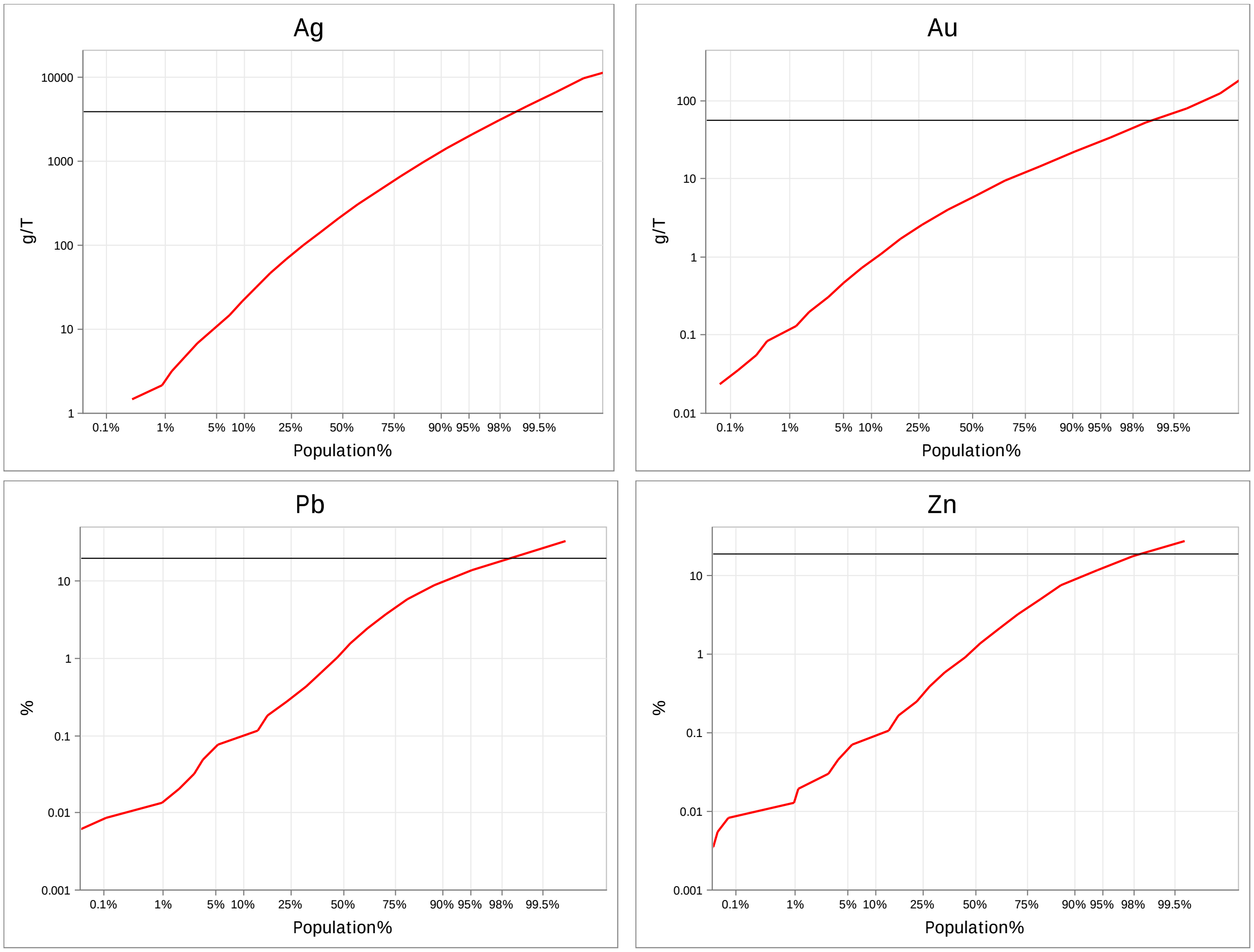


Figure 14-4: Upper Limit Analysis Probability Plots

14.4 Vein Modeling

The veins at the Project are interpreted to be epithermal type formed by fluids that have flooded relatively narrow structurally prepared zones. Initial vein intervals were provided by Golden Minerals as an attribute in the project database along with indicative vein surface models.

These initial picks were reviewed in 3D in context of the vein mapping and underground development mapping provided by the company. Initial vein intervals were used to generate a vein centerline surface. Intervals were adjusted to construct the most spatially probable vein surface. The highest grade vein interval was not necessarily chosen when fitting the vein centerline surface. Gentle curvature in surfaces were common as veins extended away from ideal host lithologies and became distal to the features that prepared the host structures. **Figure 14-5** shows the vein assignments in level plan for level 1460 in the Santa Juana Mine area. The vein model proposed assumes a continuous traceable vein structure as suggested in the level mapping. Vein splays were captured and assigned subordinate identifiers where they could be traced along dip and strike. Each interval interpreted to be on-vein was given a numeric vein code, position code (center, hanging wall, or footwall), and a fault side indicator where offsets existed. Following vein assignment centerline surfaces were generated for each unique combination of identifiers. Combinations without extensive sample support or spatial continuity were not generated into centerline surfaces. The black text alongside the channel sample intervals are numeric vein codes and the pick text is the position identifier. These samples have a fault position identifier of "NW", for northwest of the Tres Aguilas fault.

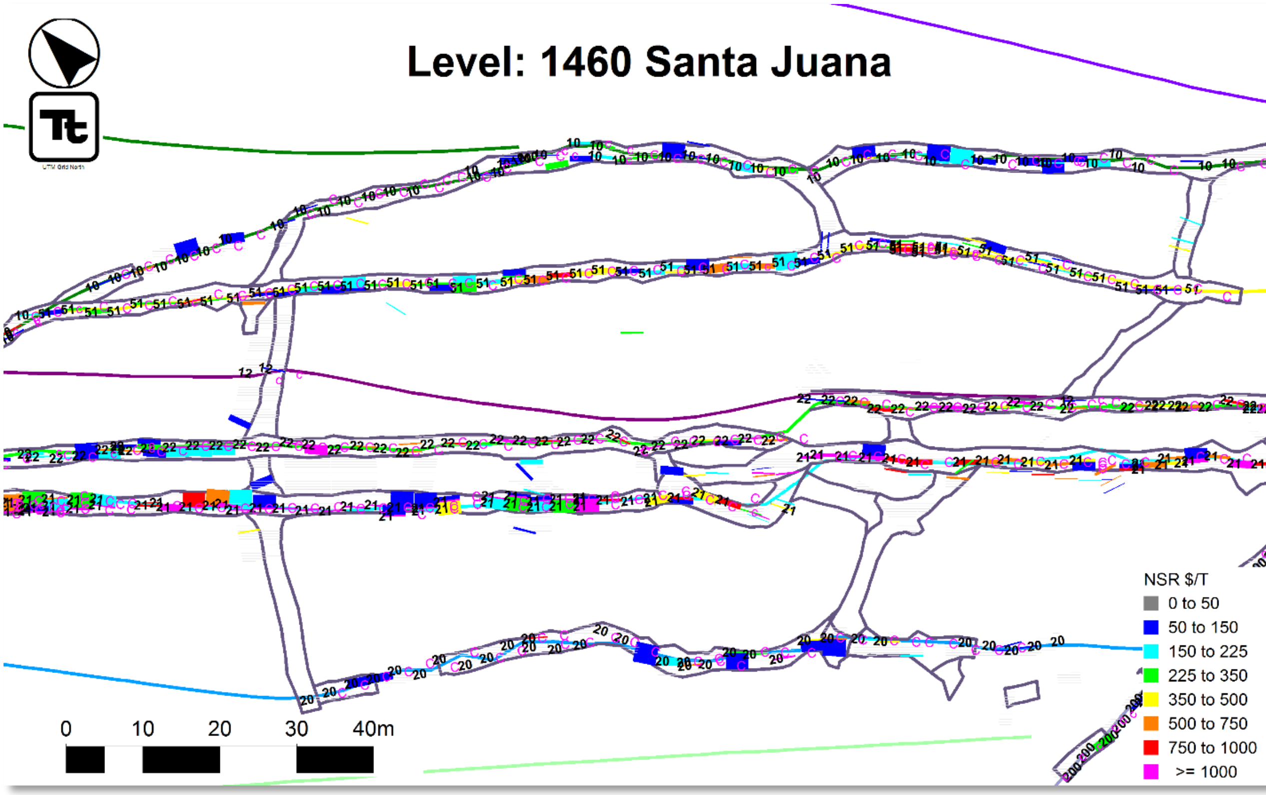


Figure 14-5: 1460 Level Plan Selected Vein Intervals

The centerline surface was interpolated using implicit modeling on a fixed four m by four m grid. The surfaces are not "snapped" to the vein intervals due to resistance in the implicit modeling algorithm and insignificant localized positioning error. Where initial vein extrapolations deviated greatly additional spatial control points were added to guide the model. The extrapolation of the vein surfaces was limited by spherical buffers, the topography, and known termination points. Each vein surface was pierced by each drill hole in the database. If a vein was pierced by a drill hole and a composite was not previously identified for that drill hole, a composite was inserted with a given thickness of 0.001 m and half detection limit grade attributes. Very low values were used instead of "0" because of the issue caused with "0" when estimating GxT and converting back to grade. The effect of these inserted composites, was block model attributes that pinched in grade and thickness at pierce points that were not flagged as on-vein. **Figure 14-6** to **Figure 14-9** show 3D views of modeled vein centerline surfaces.

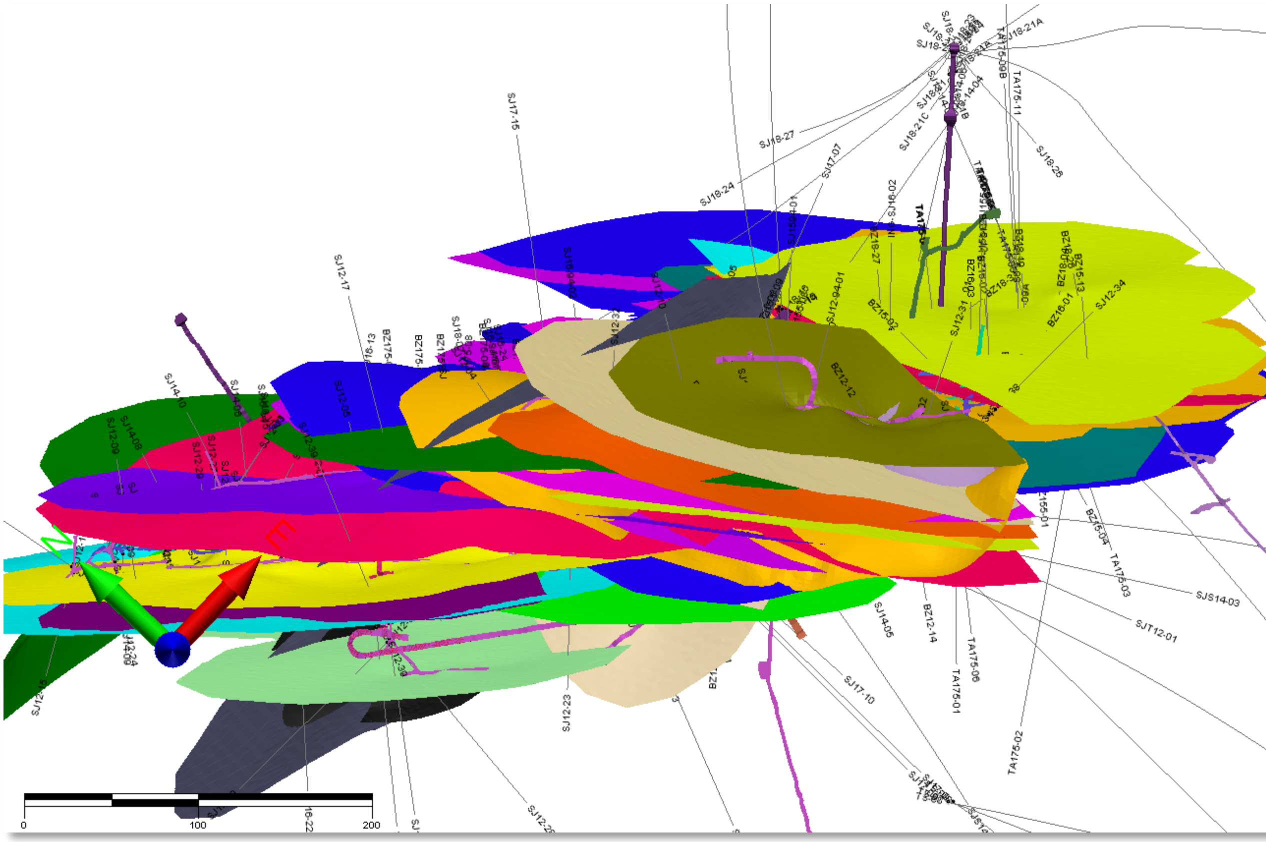


Figure 14-6: 3D View of the Vein Centerline Surface Models Santa Juana Area

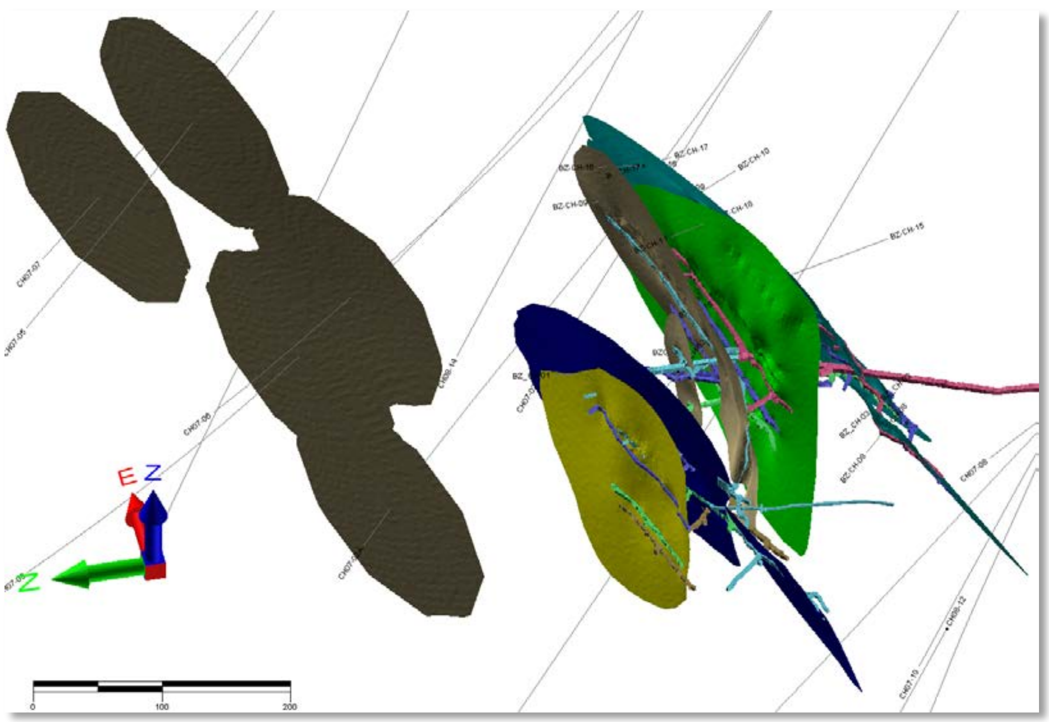


Figure 14-7: 3D View of the Vein Centerline Surface Models Chicago Area

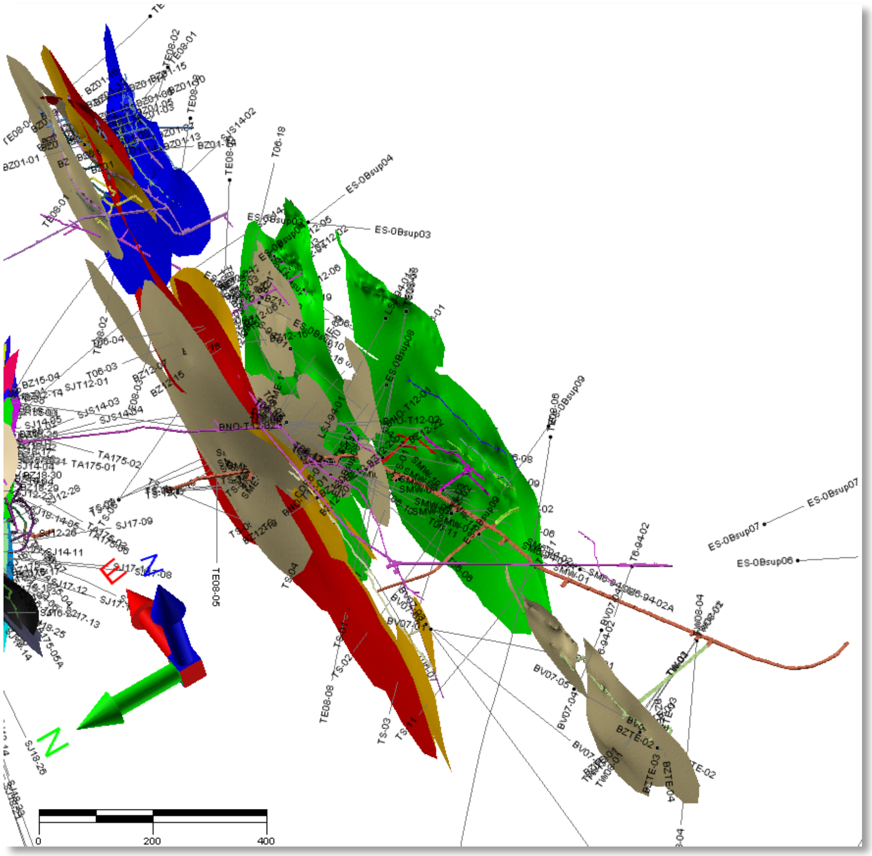


Figure 14-8: 3D View of the Vein Centerline Surface Models San Mateo, Terneras and San Juanes Areas

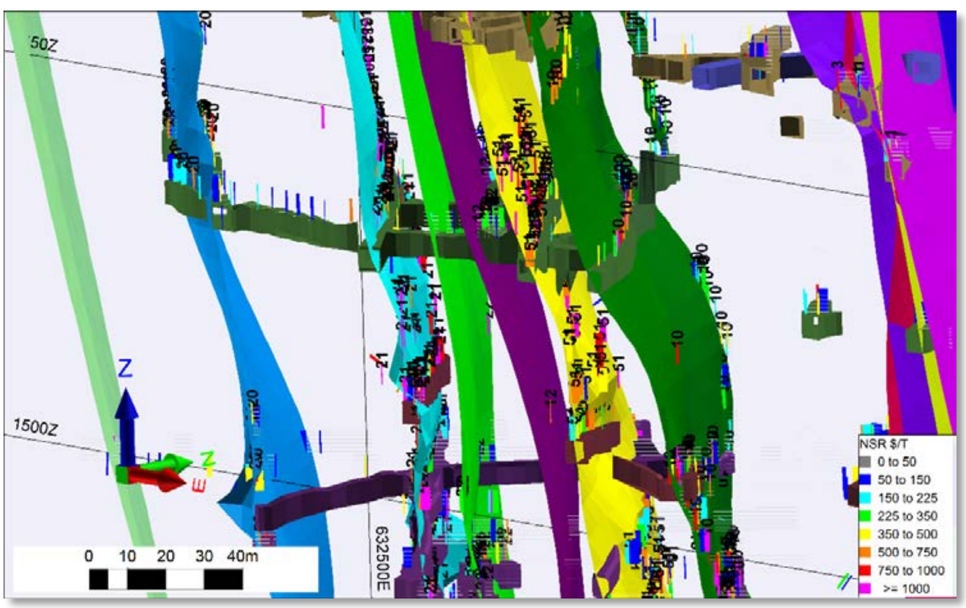


Figure 14-9: 3D Cross-Section of the Vein Centerline Surface Model Santa Juana Area

14.4.1 Mineral Type Boundaries

Mineral types have been estimated as attributes in the block model along with grade attributes. Each drill hole and channel interval was assigned a one for oxidized, 1.5 for mixed, or two for sulfide mineral types. Planar or elevation boundaries were not used to define mineral type due to the spatial complexity influenced by irregular surface oxidation profiles, fault related oxidation, instances of deep oxidation, and differences across host rock lithologies not related to elevation.

14.4.2 Boundary Exclusions

Each block has been flagged by historic and recent mine cavity (stope) polygons and assigned a mined out code of "1". In addition, resource reporting has been limited to within the claim boundary by adding an on-claim designation to the block model.

Long-sections showing the block model and the depleted blocks have been provided to the mine site geologist for verification. Due to the three dimensionality of the current block model and the mine working primarily in 2D, and often in false coordinate space, the depletion boundaries are not exact when reviewed in context of the channel positions. The current model and the composite positions are relative to each other in as close to true 3D as possible. Where ambiguity exists between the depleted boundaries and the current model, the depleted boundary was extended.

14.4.3 Density Determination

Golden Minerals' geologists have made several thousand measurements on core and hand samples collected from underground workings using the water immersion method. Samples were collected where accessible and were not collected on all veins. Where measurements were not made, values associated with nearby veins or the default values based on mineral types were used.

Vein density values for oxide, mixed and sulfide mineral types were assigned to blocks of the same vein and mineral type. For purposes of dilution, waste was assigned a density of 2.6 g/cm^3. **Table 14-6** details the density values used for each vein.

Table 14-6: Vein Density Used in Model

Surface	Vein Name	Oxide	Mixed	Sulfide
1NWc	A1_NW	2.39	3.38	3.57
1NWhw1	A1_NWHW1	2.39	3.38	3.57
1SEc	A1_SE	2.39	3.38	3.57
2SEc	A2_SE	2.82	3.34	3.65
2NWc	A2_NW	2.82	3.34	3.65
3NWc	A3_NW	2.82	3.34	3.57
4SEc	A4_SE	2.97	3.76	3.55
4NWc	A4_NW	2.97	3.76	3.55
9SEc	AA4SE_A4Alto	2.82	3.34	3.57
10NWc	Bs_NW	2.88	3.57	3.57
10NWhw	Bs_NWhw	2.88	3.57	3.57
12NWc	G2_NW	2.82	3.34	3.57
20NWc	C0_NW	3	3.34	3.57
21NWc	CC_NW	2.98	3.34	4.03
21SEc	F1_SE_CCSE	2.82	3.34	3.57
22NWc	C1_NW	2.9	3.34	3.57
23NWc	C2_NW	2.82	3.34	3.57
30NWc	D0_NW	2.82	3.34	3.57
31NWc	D1_NW	2.82	3.34	3.57
31SEc	D1_SE	2.82	3.34	3.57
32NWc	D2_NW	2.82	3.34	3.57
33NWc	DD_NW	2.82	3.34	3.57
39NWc	Ds_NW	2.82	3.34	3.57
40NWc	E_NW	2.82	3.34	3.5
41NWc	E1_NW	2.82	2.86	3.57
43NWc	EE_NW	2.82	3.34	3.57
51NWc	G1_NW	2.77	3.34	3.57
61Ec	Hiletas	2.82	3.34	3.57
61Wc	Hiletas	2.82	3.34	3.57
61fw1	Hiletas_1_fw1	2.82	3.34	3.57

Surface	Vein Name	Oxide	Mixed	Sulfide
100NWc	SantaJuana_NW	2.82	3.34	3.81
100SEc	SantaJuana_SE	2.82	3.34	3.81
100SEf	SantaJuanaFW1_SE	2.82	3.34	3.81
200NWc	Trans_NW	2.85	3.34	3.57
201NWc	Trans_Alto_NW	2.85	3.34	3.57
300c	SantaJuanes	2.82	3.34	3.81
300fw1	SantaJuanes_fw1	2.82	3.34	3.81
320c	Terneras_Sur	2.81	3.34	3.57
320Wc	Terneras_Norte	2.81	3.34	3.57
320hw1	Terneras_Sur_hw1	2.81	3.34	3.57
330c	Terneras_Norte	2.81	3.34	3.57
330Wc	Terneras_Sur	2.81	3.34	3.57
400Ec	SanMateo_E	2.67	3.34	3.41
400Wc	SanMateo_W	2.67	3.34	3.41
500NWc	VetaOriente_NW	2.82	3.34	3.21
700NEc	Chicaco_NE	2.82	3.34	3.57
700SWc	Chicaco_SW	2.82	3.34	3.57
701c	ChicacoNE	2.82	3.34	3.57
704NEc	Gambusino_NE	2.94	3.05	3.57
704SWc	Gambusino_SW	2.94	3.05	3.57
705c	LaEscondida_NE	2.82	3.19	3.57
706c	Nueva	2.89	3.59	3.59
707c	Brenda	2.82	3.34	3.57
708c	LosMuertos	2.82	3.34	3.57
710c	Estrato_Chicago	2.81	3.34	3.57
810Ec	Terneras_Poniente_E	2.82	3.34	3.57
810Mc	Terneras_Poniente_M	2.82	3.34	3.57
810Wc	Terneras_Poniente_W	2.82	3.34	3.57
830Ec	Roca_Negra	2.82	3.34	3.18
830Wc	Roca_Negra	2.82	3.34	3.18

14.5 Estimation Methods and Parameters

Resources have be estimated for each named vein using a variable thickness block model oriented in the best fit plane of the vein. Grade and thickness attributes have been estimated using inverse distance weighting to a power of 2.5.

14.5.1 Variography and Search

The grade distance relationship was investigated for Ag, Au, Pb, and Zn using natural log transformed omni-directional variography on composited vein intervals. The entire composite dataset contributed to the variogram model without cross-vein influence. Composites from each vein were shifted to false space by a separation distance of the maximum range of the analysis. This enabled the mineralized system to be analyzed all at once.

Experimental and modeled variograms are shown in **Figure 14-10**, and **Table 14-7** details the modeled components. Nugget and sill portions have not been made relative to a total sill of one or 100% to correspond with the graphical output presented in **Figure 14-10**. Each variogram was well formed with Ag and Au having better-formed experimental variograms than Pb and Zn.

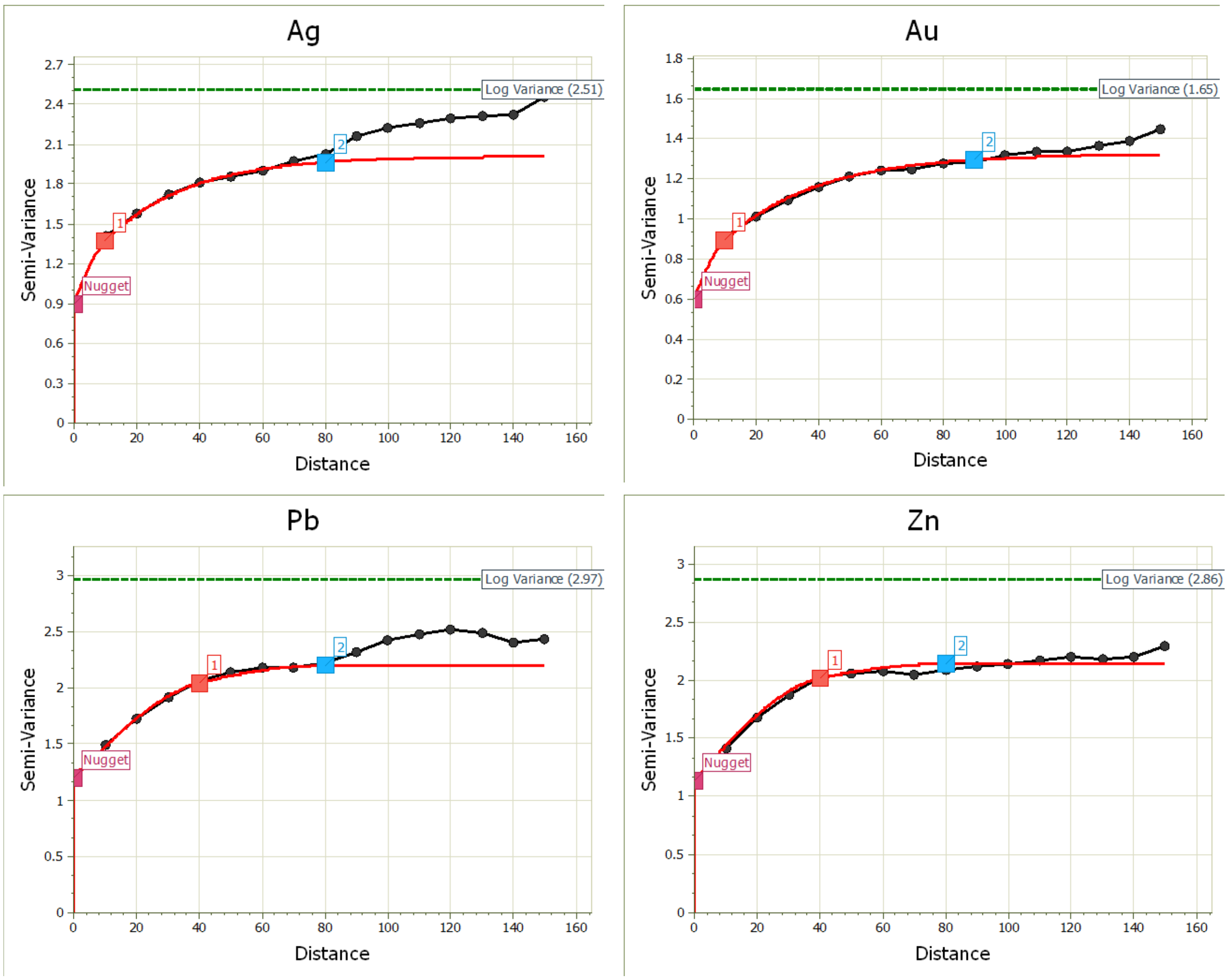


Figure 14-10: Natural Log Transformed Omni-Directional Variography

Table 14-7: Modeled Variograms

Element	Nugget	C1 Partial	C1 Range m	C2 Partial Sill	C2 Range m	Total Sill
Ag	0.9	0.18	10	1	85	2.1
Au	0.6	0.125	10	0.6	90	1.3
Pb	1.2	0.5	40	0.5	80	2.2
Zn	1.14	0.6	40	0.4	80	2.1

Although grade-distance relationships were investigated the ultimate search distances, classifications, orientations and anisotropies implemented were guided by a combination of the results of the Ag and Au variography, visual review of the vein and professional judgment. Search orientation, anisotropies, and maximum ranges are shown in **Table 14-8**.

Table 14-8: Vein Estimation Parameters

Surface Name	Vein Name Character	Dip+	Dip Direction+	Radius Pass1	Axis1 Azi	Axis1 Plunge	Axis2 Plunge	Buffer
61Ec	Hiletas	75	345	75	345	75	0	60
61Wc	Hiletas	80	0	75	340	78	0	60
320c	Terneras_Sur	88	240	75	190	80	0	105
320Wc	Terneras_Norte	87	358	75	0	87	0	150
330c	Terneras_Norte	87	185	75	96	78	10	105
330Wc	Terneras_Sur	86	354	75	0	87	0	150
400Ec	SanMateo_E	77	355	75	355	76	0	150
400Wc	SanMateo_W	80	345	75	345	80	0	150
830Ec	Roca_Negra	87	10	75	110	78	12	150
830Wc	Roca_Negra	84	352	75	110	78	12	150
2SEc	A2_SE	72	35	75	55	80	0	150
4SEc	A4_SE	76	35	75	45	75	0	150
21NWc	CC_NW	80	41	75	123	69	-21	105
700NEc	Chicaco_NE	72	140	75	140	72	0	105
700SWc	Chicaco_SW	72	140	75	140	72	0	105
701c	ChicacoNE	83	150	75	140	83	0	105
704NEc	Gambusino_NE	65	140	75	140	65	0	105
704SWc	Gambusino_SW	60	150	75	150	60	0	105
705c	LaEscondida_NE	89	160	75	160	89	0	105
706c	Nueva	74	160	75	160	74	0	105
707c	Brenda	79	148	75	148	79	0	60
708c	LosMuertos	86	150	75	258	83	7	105
61fw1	Hiletas_1_fw1	78	357	75	357	78	0	60
300c	SantaJuanes	60	3	75	25	60	-7	105
300fw1	SantaJuanes_fw1	60	325	25	25	60	-7	105
320hw1	Terneras_Sur_hw1	71	165	75	165	71	0	105
710c	Estrato_Chicago	82	168	75	168	82	0	105
810Ec	Terneras_Poniente_E	80	190	75	190	80	0	105
810Mc	Terneras_Poniente_M	80	190	75	190	80	0	105
810Wc	Terneras_Poniente_W	80	190	75	190	80	0	105
1NWc	A1_NW	76	57	75	65	79	0	105
1NWhw1	A1_NWHW1	76	57	75	65	79	0	105
1SEc	A1_SE	75	49	75	140	58	32	105
2NWc	A2_NW	76	57	75	68	79	0	105
3NWc	A3_NW	76	57	75	68	79	0	105
4NWc	A4_NW	76	57	75	68	79	0	105
9SEc	AA4SE_A4Alto	77	50	75	54	77	0	105
10NWc	Bs_NW	74	58	75	65	79	-5	105
10NWhw	Bs_NWhw	73	40	75	65	79	-5	105
12NWc	G2_NW	77	35	75	35	77	0	105
20NWc	C0_NW	84	40	75	112	73	-16	105
21SEc	F1_SE_CCSE	70	61	75	85	70	-8	105
22NWc	C1_NW	77	49	75	40	73	1	105
23NWc	C2_NW	78	34	75	40	73	1	105
30NWc	D0_NW	76	57	75	57	76	0	105
31NWc	D1_NW	76	57	75	57	76	0	105
31SEc	D1_SE	77	47	75	47	77	0	105
32NWc	D2_NW	76	57	75	57	76	0	105
33NWc	DD_NW	76	57	75	57	76	0	105
39NWc	Ds_NW	75	48	75	48	75	0	105
40NWc	E_NW	60	51	75	51	60	0	105
41NWc	E1_NW	72	46	75	46	72	0	105
43NWc	EE_NW	72	66	75	66	72	0	105
51NWc	G1_NW	77	35	75	20	75	6	105
100NWc	SantaJuana_NW	75	58	75	58	75	0	105
100SEc	SantaJuana_SE	75	49	75	97	70	-14	105
100SEf	SantaJuanaFW1_SE	77	51	75	97	70	-14	105
200NWc	Trans_NW	70	182	75	130	53	30	105
201NWc	Trans_Alto_NW	70	182	75	130	53	30	105
500NWc	VetaOriente_NW	54	15	75	338	51	19	105
2NWc	A2_NW	76	57	75	68	79	0	105
3NWc	A3_NW	76	57	75	68	79	0	105
4NWc	A4_NW	76	57	75	68	79	0	105
9SEc	AA4SE_A4Alto	77	50	75	54	77	0	105
10NWc	Bs_NW	74	58	75	65	79	-5	105
10NWhw	Bs_NWhw	73	40	75	65	79	-5	105

A tilted and rotated point model was generated from the nodes of the modeled vein centerline surface. This was possible because each surface was triangulated on a grid with four m by four m cells. The point models generated are not typical fixed array block models. The location of each node is dependent on the interpolated surface and not centered at typical block model centroids. Each point node has been assigned the vein ID and estimated grade and thickness attributes.

GxT was generated for each composite and used to estimate block grades for Ag, Au, Pb and Zn. True thickness As, Cu, Fe and mineral type were estimate without GxT calculations.

Block attributes were estimated in three passes from small to large. **Table 14-9** details the search ellipse sizes and orientations along with sample selection criteria and classification. Resource classification was assessed by pass (maximum search), number of samples, and the nearest composite and average distance. Maximum extrapolation and therefore total potential was limited by the extent of the modeled vein surface, see column 'Buffer' in **Table 14-8**, as well as the clipping limitations where veins were known to be limited. Measured or Indicated classification was only permitted in pass one, 75 m maximum search, and was primarily but not exclusively defined within blocks haloing the existing drifts and stopes.

Table 14-9: Pass Parameters and Classification

Pass	Method	Max Search	Ratio 1st:2nd:3rd	Sectors	Max Per Sector	Comp Min	Comp Max	Classification
First	IDW 2.5	75	See vein parameter table	4	2	1	8	Inferred, Indicated if; comps >=3 and nearest comp <= 50m, Measured if; comps >=4 and nearest comp <= 16m and average comp distance <= 25
Second	IDW 2.5	150	1:0.25:0.5	1	2	1	2	Not classified, Inferred if; nearest comp <= 125m
Third	IDW 2.5	200	1:0.5:0.5	1	2	1	2	Not Classified

14.5.2 Dilution

Grade and thickness estimation was completed as undiluted. Diluted thickness and grades were calculated after estimation for each estimated point node. The dilution assumes a minimum mining width of one m, and has accounted for hanging wall and footwall waste where true thickness was less than one m. If a block is estimated to have a true thickness less than one meter, the diluted thickness is one m. If a block is estimated to have a true thickness greater than or equal to one m, the diluted thickness is equal to true thickness. Grades were diluted by the ratio of true thickness to diluted thickness. Variable vein density was used for the true thickness vein portion and the waste portion was assigned a density of 2.6.

14.5.3 Cutoff Grade and NSR Calculation

Resources have been tabulated using a US$100/T cutoff grade for each four m by four m block with the price assumptions shown in **Table 14-10**. The base case resource tabulation is presented as the three year trailing average prices as of December 2014, as mandated by the United States Securities and Exchange Commission (SEC). An alternative and more conservative price assumption case has been calculated using Ag, Au, Pb and Zn prices closer to the current spot price and in-line with general industry consensus. The base case and alternative cases cutoff grades have been calculated using estimated inputs of US$53/T mining, US$27/T milling and US$20/T general and administrative.

Table 14-10: Cutoff Price Assumptions

Assumption	Base Case	Alternative Case
Ag Price $/toz	25	17
Au Price $/toz	1,446	1,250
Pb Price $/lb	0.96	0.85
Zn Price $/lb	0.91	0.95

NSR has been calculated with concentrate characteristics and marketing terms supplied by Golden Minerals. Metal contributions are dependent on the concentrate and mineral type, the overall recoveries are shown in **Table 14-11**.

Table 14-11: NSR Metallurgical Recovery Assumptions

Metal	Sulfide Metallurgical Recovery%	Oxide Metallurgical Recovery%	Mixed Metallurgical Recovery%
Au	68	71	29
Ag	89	68	50
Pb	83	0	25
Zn	83	0	37

For the oxide and mixed NSR equations the payable terms were combined as single factors with the recoveries and were provided by Golden Minerals. Oxide and mixed mineral types are not the subject of the subsequent sections of this report that assess preliminary economics. Independent NSR cutoff calculations have been applied to oxide and mixed mineral types but the tabulated resources have been grouped in the oxide category. The sulfide NSR equation has been updated for proposed mining areas that are the subject of this PEA, and is based on metallurgical testing from that area.

14.6 Deleterious Elements

Deleterious elements that are relevant to the potential extraction of resources are As and Sb. The Project database has inconsistent coverage for these elements. Recently collected channel and drill hole samples have the most complete information for As, but Sb is limited to recent drilling. Concentrate characteristics for As and Sb, determined through testing and mill actuals, have been used for purposes of resource NSR cutoff calculations, instead of the incomplete project drill hole and channel database. This approach is the best alternative because the presence of As and Sb is most relevant in achieved concentrates; however it does not account for spatial variability.

14.7 Statement of Resources

Resources using the base case cutoff inputs are shown in **Table 14-12** and alternative case cutoff inputs resources in **Table 14-13**. **Figure 14-11** to **Figure 14-16** show the grade and tonnage relationship at a range of NSR cutoffs using the base case price inputs.

Table 14-12: Velardeña Project Resources with Base Case Cutoff Inputs

Classification	Mineral Type	NSR Cutoff	Tonnes	Grade Ag g/T	Grade Au g/T	Grade Pb%	Grade Zn%	Ag toz	Au toz	Pb lb	Zn lb
Measured	Oxide	100	210,000	282	4.4	1.6	1.3	1,900,000	30,000	7,200,000	5,920,000
Indicated	Oxide	100	450,000	283	3.7	1.7	1.3	4,130,000	55,000	17,350,000	13,190,000
Measured + Indicated	Oxide	100	660,000	283	4	1.7	1.3	6,030,000	84,000	24,550,000	19,110,000
Inferred	Oxide	100	470,000	332	4.4	2.5	1.3	5,010,000	66,000	25,750,000	13,400,000
Measured	Sulfide	100	320,000	280	4.2	1.3	1.5	2,920,000	44,000	9,190,000	10,950,000
Indicated	Sulfide	100	810,000	259	3.6	1.3	1.6	6,710,000	93,000	22,430,000	28,950,000
Measured + Indicated	Sulfide	100	1,130,000	265	3.8	1.3	1.6	9,620,000	137,000	31,620,000	39,910,000
Inferred	Sulfide	100	1,670,000	254	4.0	1.2	1.5	13,650,000	216,000	44,710,000	55,450,000
Measured	All	100	530,000	281	4.3	1.4	1.4	4,810,000	74,000	16,390,000	16,870,000
Indicated	All	100	1,260,000	268	3.6	1.4	1.5	10,840,000	148,000	39,780,000	42,150,000
Measured + Indicated	All	100	1,790,000	272	3.8	1.4	1.5	15,650,000	222,000	56,170,000	59,010,000
Inferred	All	100	2,140,000	271	4.1	1.5	1.5	18,660,000	282,000	70,470,000	68,840,000

Notes:
(1) Reported measured and indicated resources are equivalent to mineralized material under SEC Industry Guide 7
(2) Inferred resource is not a recognized category under SEC Industry Guide 7
(3) Resources are reported as diluted Tonnes and grade to 1m fixed width
(4) Metal prices for NSR cutoff are three year trailing average as of December 2014: US$25/troy ounce Ag, US$1,446/troy ounce Au, US$0.96/lb Pb, and US$0.91/lb Zn
(5) Columns may not total due to rounding

Table 14-13: Velardeña Project Resources with Alternative Case Cutoff Inputs

Classification	Mineral Type	NSR Cutoff	Tonnes	Grade Ag g/T	Grade Au g/T	Grade Pb%	Grade Zn%	Ag toz	Au toz	Pb lb	Zn lb
Measured	Oxide	100	150,000	334	5.1	1.8	1.4	1,660,000	25,000	5,980,000	4,800,000
Indicated	Oxide	100	330,000	338	4.3	2	1.5	3,560,000	45,000	14,570,000	10,800,000
Measured + Indicated	Oxide	100	480,000	337	4.6	1.9	1.5	5,220,000	71,000	20,550,000	15,600,000
Inferred	Oxide	100	330,000	410	5.3	2.5	1.4	4,360,000	57,000	18,080,000	10,140,000
Measured	Sulfide	100	260,000	313	4.7	1.4	1.7	2,670,000	40,000	8,390,000	10,040,000
Indicated	Sulfide	100	620,000	297	4	1.5	1.9	5,940,000	81,000	19,920,000	25,990,000
Measured + Indicated	Sulfide	100	890,000	302	4.2	1.5	1.8	8,610,000	121,000	28,310,000	36,030,000
Inferred	Sulfide	100	1,260,000	297	4.5	1.5	1.8	12,070,000	183,000	40,520,000	50,620,000
Measured	All	100	420,000	321	4.9	1.6	1.6	4,320,000	65,000	14,370,000	14,830,000
Indicated	All	100	950,000	311	4.1	1.7	1.8	9,500,000	126,000	34,490,000	36,790,000
Measured + Indicated	All	100	1,370,000	314	4.4	1.6	1.7	13,830,000	192,000	48,860,000	51,630,000
Inferred	All	100	1,590,000	320	4.7	1.7	1.7	16,430,000	239,000	58,590,000	60,760,000

Notes:

(1) Reported measured and indicated resources are equivalent to mineralized material under SEC Industry Guide 7
(2) Inferred resource is not a recognized category under SEC Industry Guide 7
(3) Resources are reported as diluted Tonnes and grade to 1m fixed width
(4) Metal prices for NSR cutoff are current as of December 2014: US$17/troy ounce Ag, US$1,250/troy ounce Au, US$0.85/lb Pb, and US$0.95/lb Zn
(5) Columns may not total due to rounding

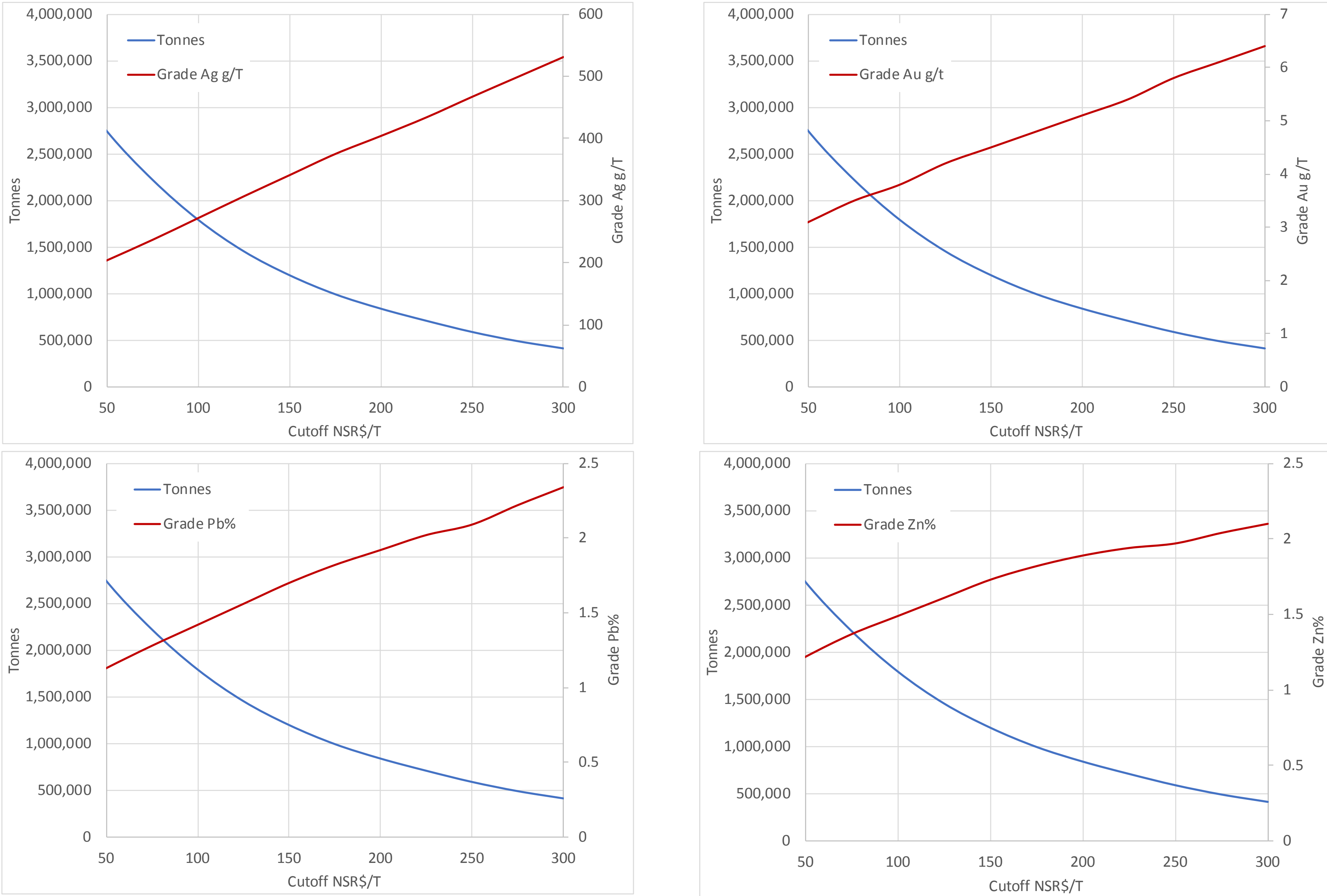


Figure 14-11: Grade Tonnage Curves Measured + Indicated Resources Base Case

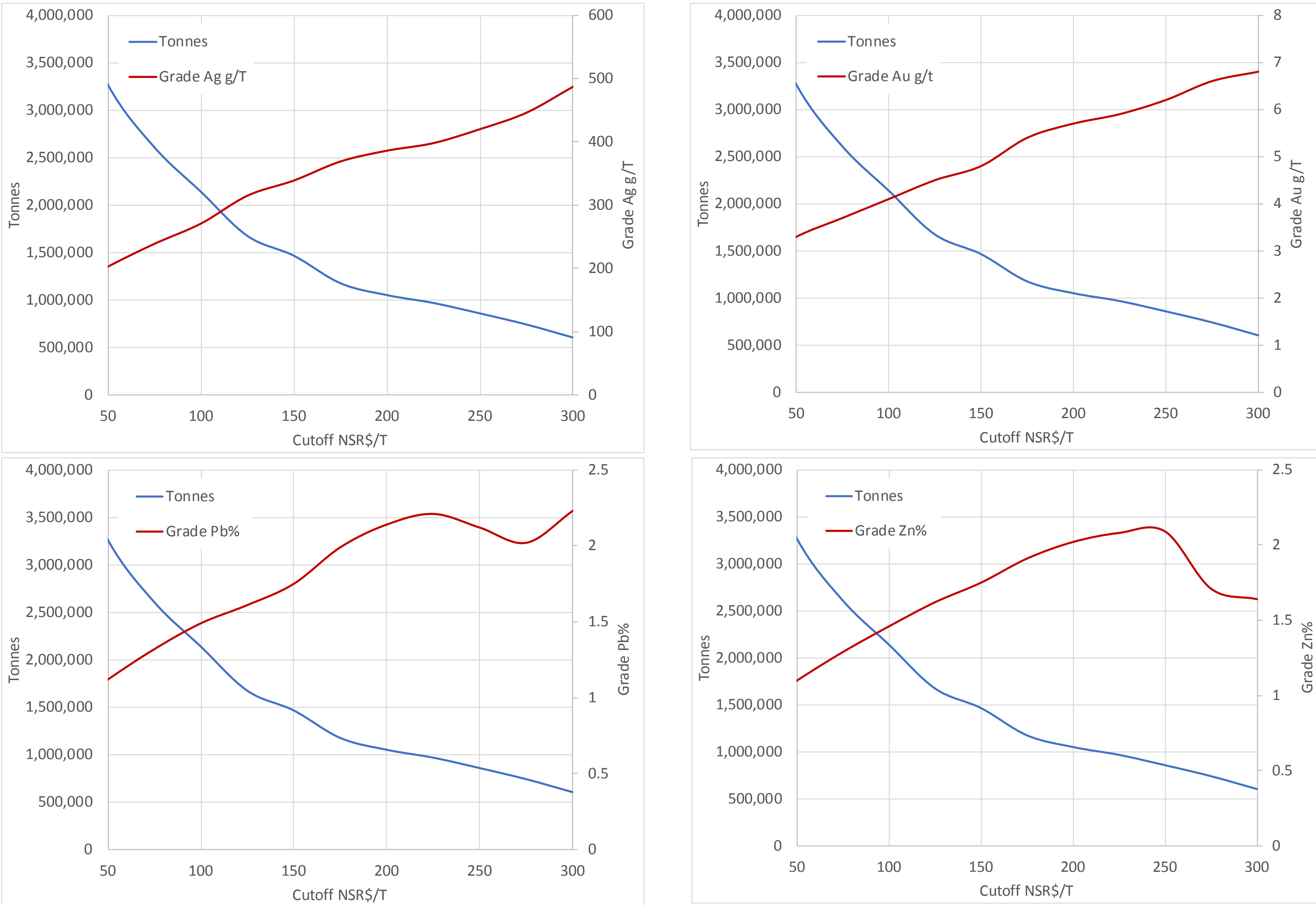


Figure 14-12: Grade Tonnage Curves Inferred Resources Base Case

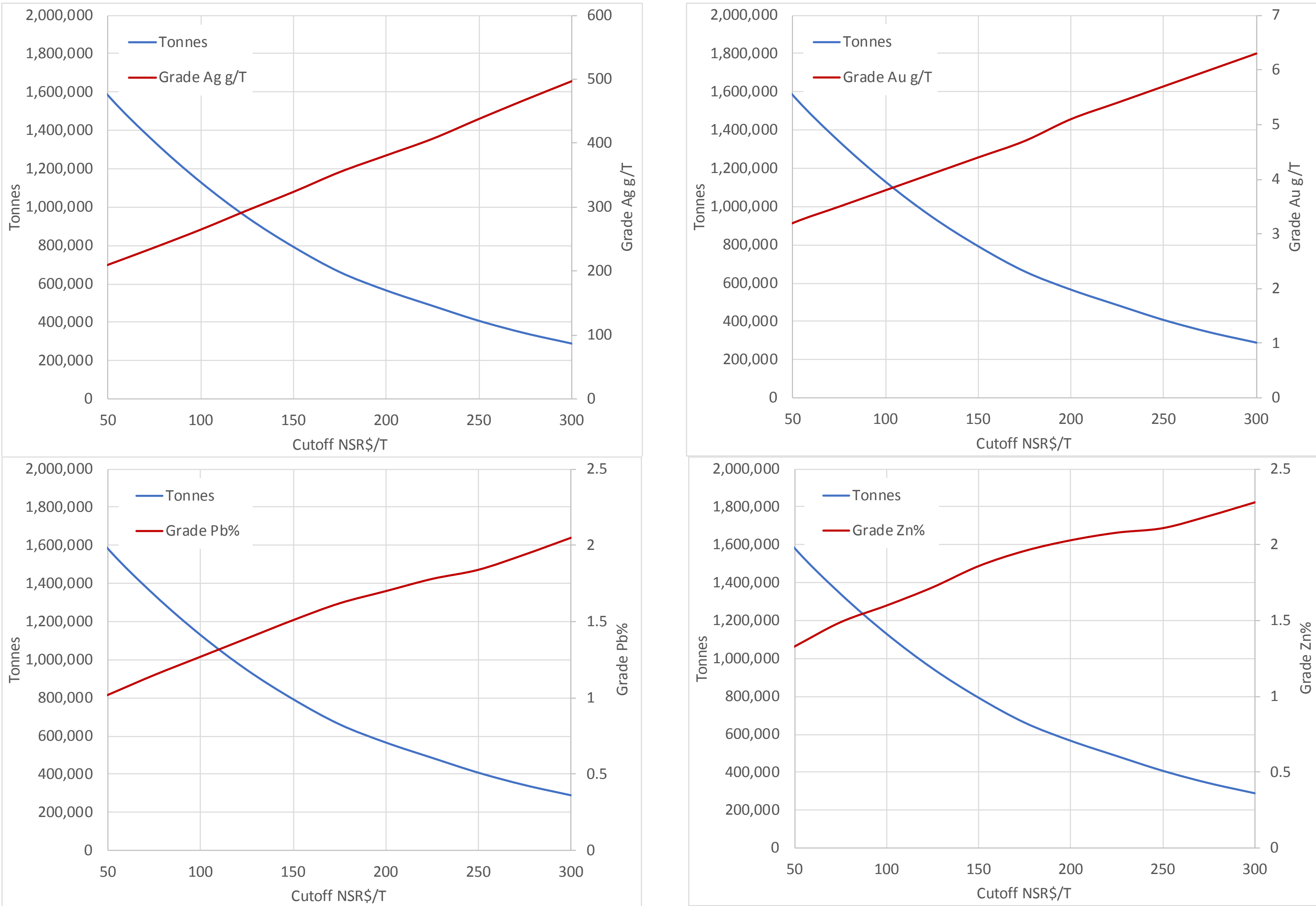


Figure 14-13: Grade Tonnage Curves Measured + Indicated Sulfide Resources Base Case

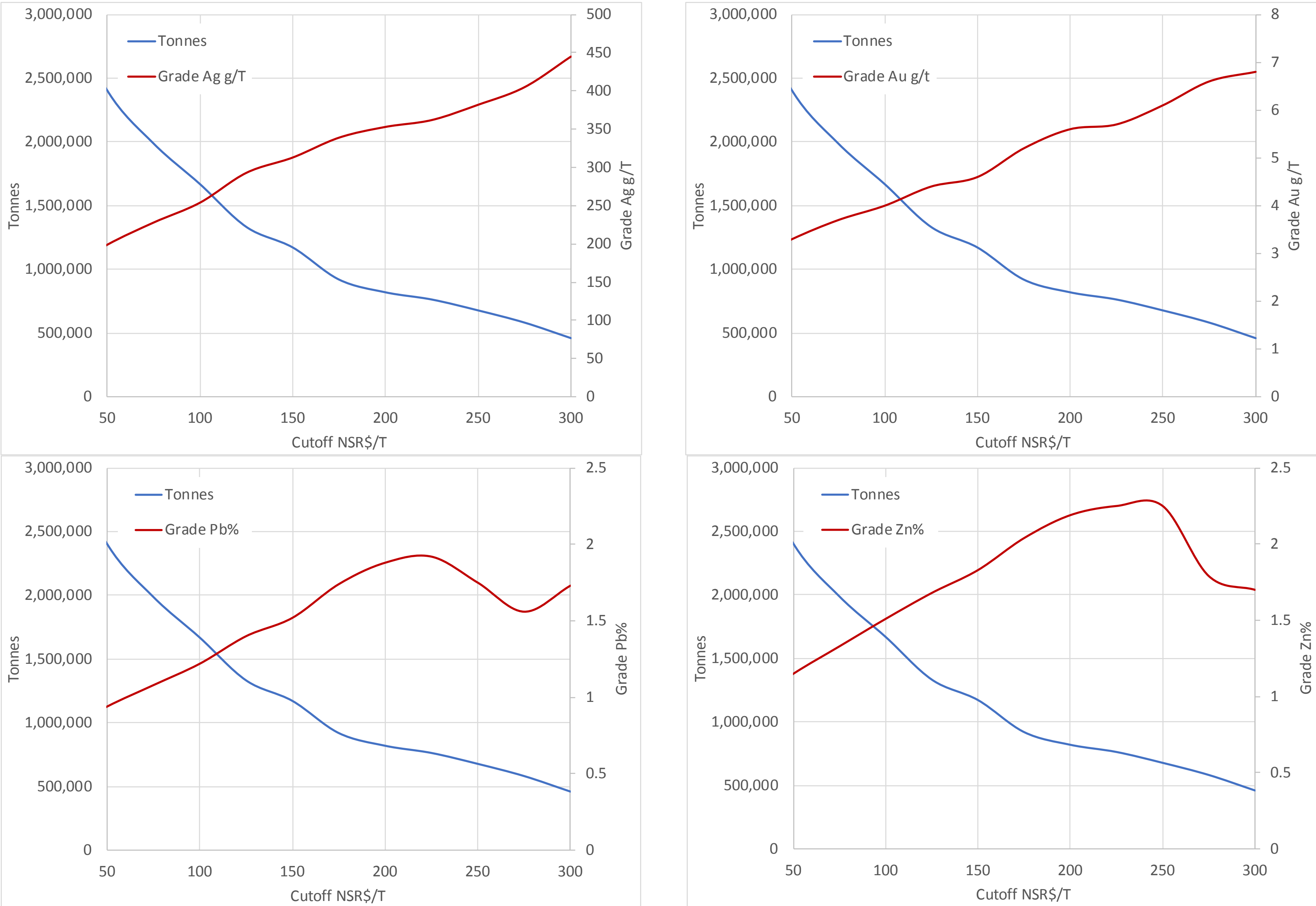


Figure 14-14: Grade Tonnage Curves Inferred Sulfide Resources Base Case

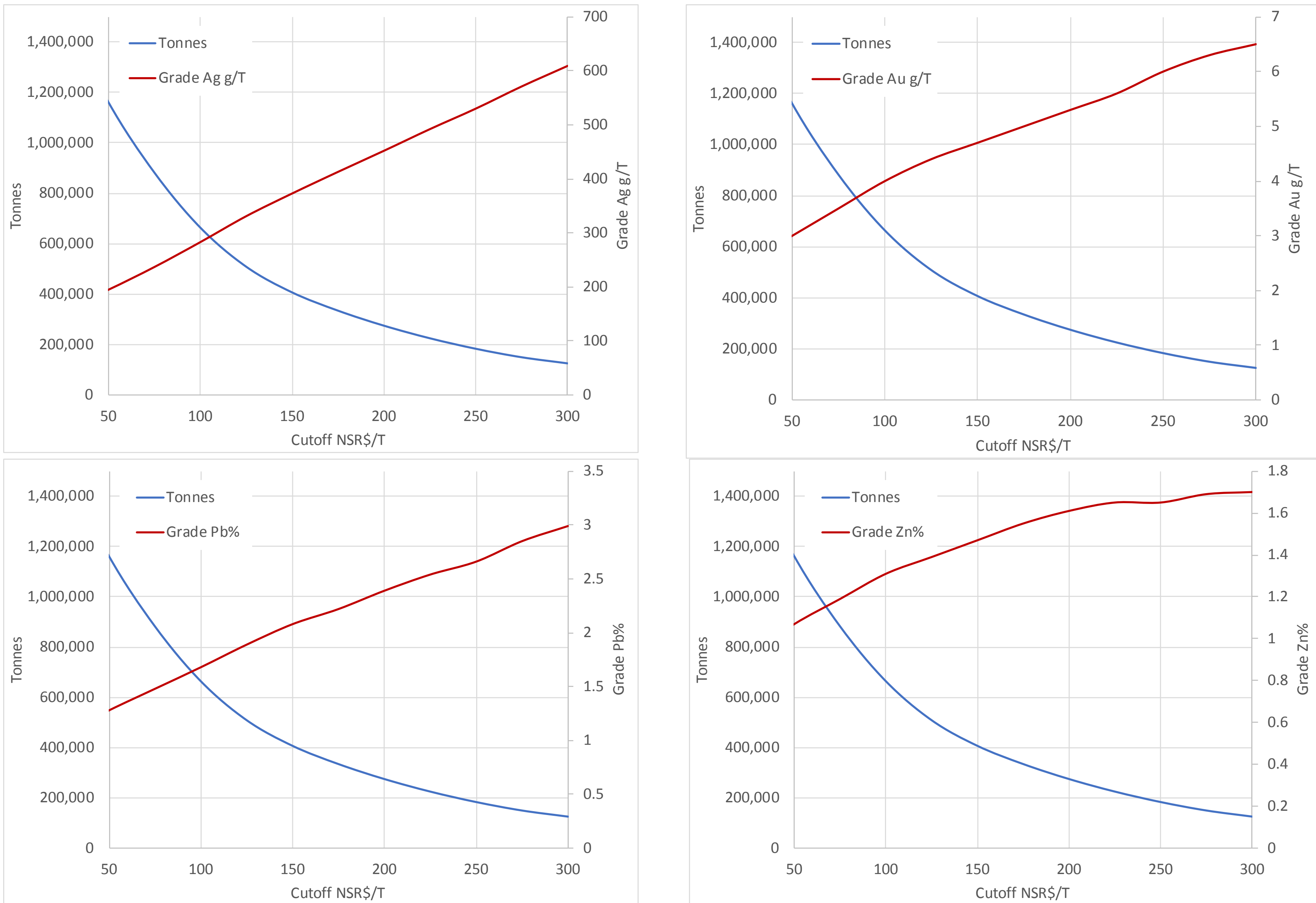


Figure 14-15: Grade Tonnage Curves Measured + Indicated Oxide Resources Base Case

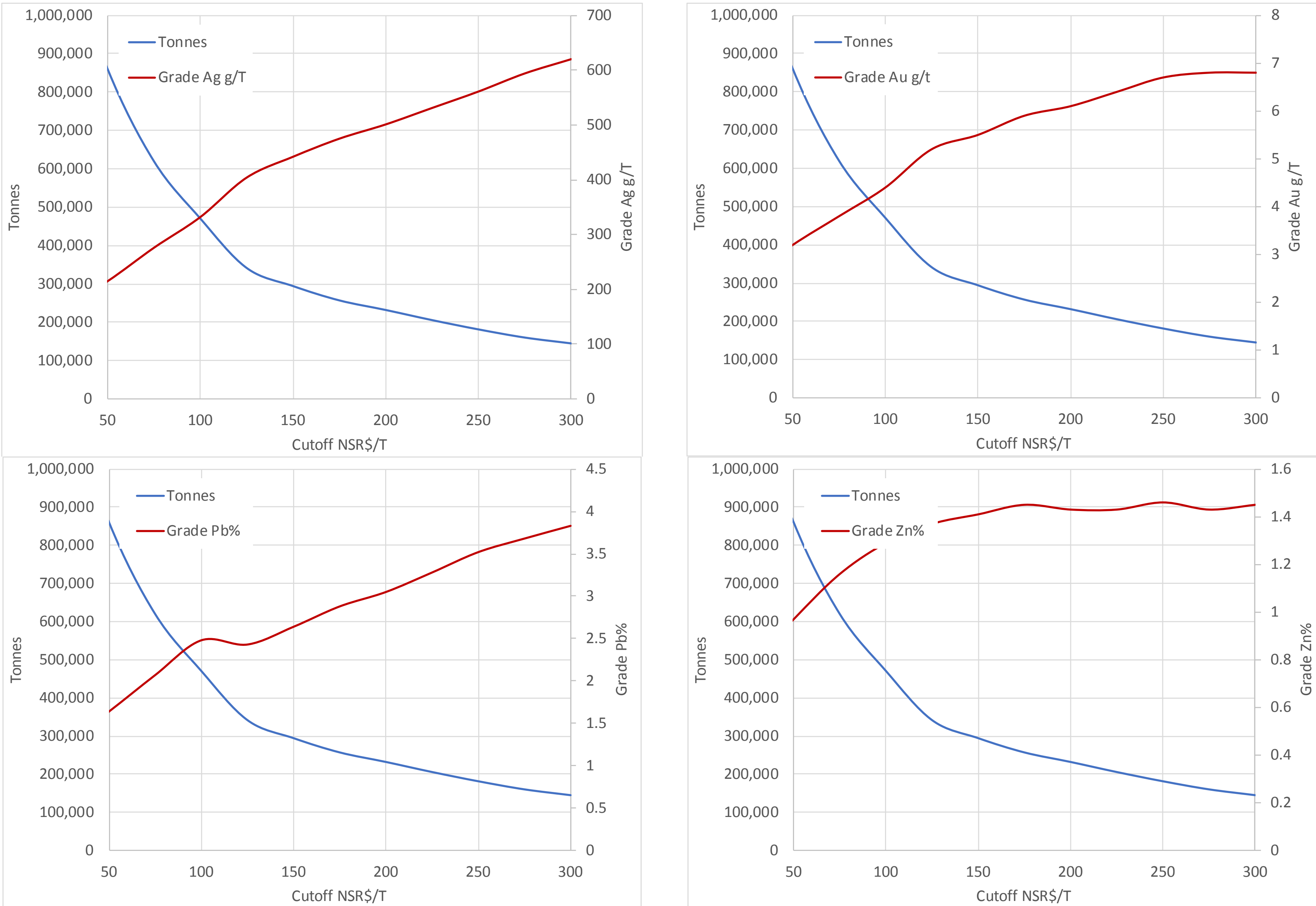


Figure 14-16: Grade Tonnage Curves Inferred Oxide Resources Base Case

14.8 Model Verification

Resource estimations have been verified by visual review, and population analysis.

The grade population was tracked for Ag from input assays (drill hole and channel), to composites, and to block grades. The grade progression histograms are estimated by smoothed lines in **Figure 14-17** and are population-relative as well as log normal transformed. The population comparison shows the means throughout the progression are sufficiently similar and that the high grade component of the raw assays and composites have been satisfactorily moderated in the block population. Also observable in the figure below is the result of grade capping on both the composites and blocks.

Figure 14-17: Sample Population Progression Histogram

Figure 14-18 clarifies the histogram shapes observed in **Figure 14-17**. The overall block population resembles the drill hole population more than the composite population because there are more blocks supported by drilling than composites. Blocks supported by drilling tend to have more extrapolated inferred resources. This logic is supported by the resource tabulation, search radius and search criteria for measured and indicated classification vs. inferred. **Figure 14-18** compares the drill hole population with the inferred blocks and the channel population with the measured and indicated blocks.

Figure 14-18: Sample Population Comparison Histogram

Long-section review of composite samples and block grades verify that the estimation respects the input data well. **Figure 14-19** to **Figure 14-23** is a series of long-sections looking north for the Terneras vein as an example, showing composite values and resulting block grades for Ag, Au, Pb, Zn, and true thickness, and classification. **Figure 14-24** shows the location of channel samples and the location of drill hole intercepts in relation to blocks classified as measured, indicated and inferred.

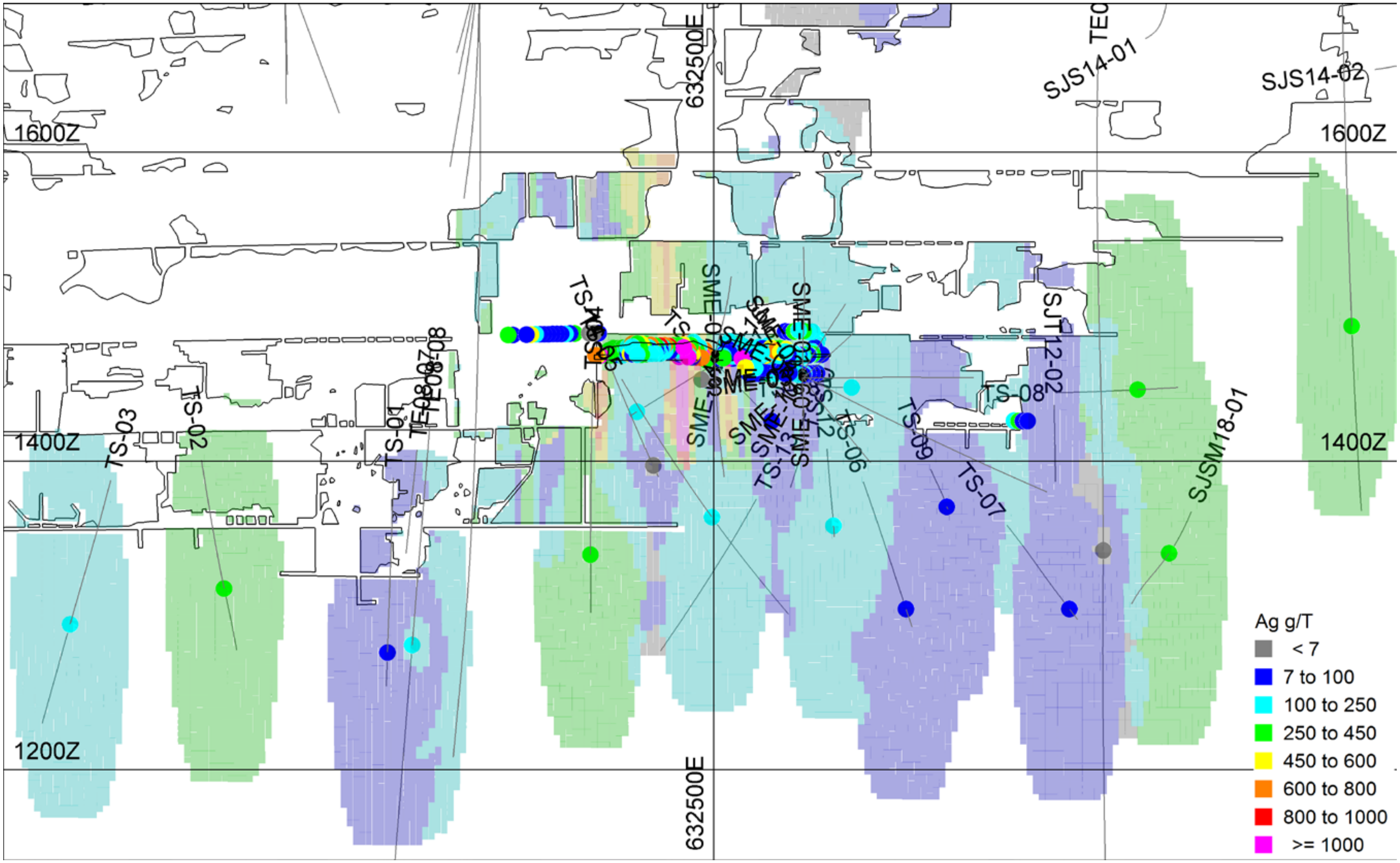


Figure 14-19: Long Section Terneras Vein Ag, Composites and Blocks

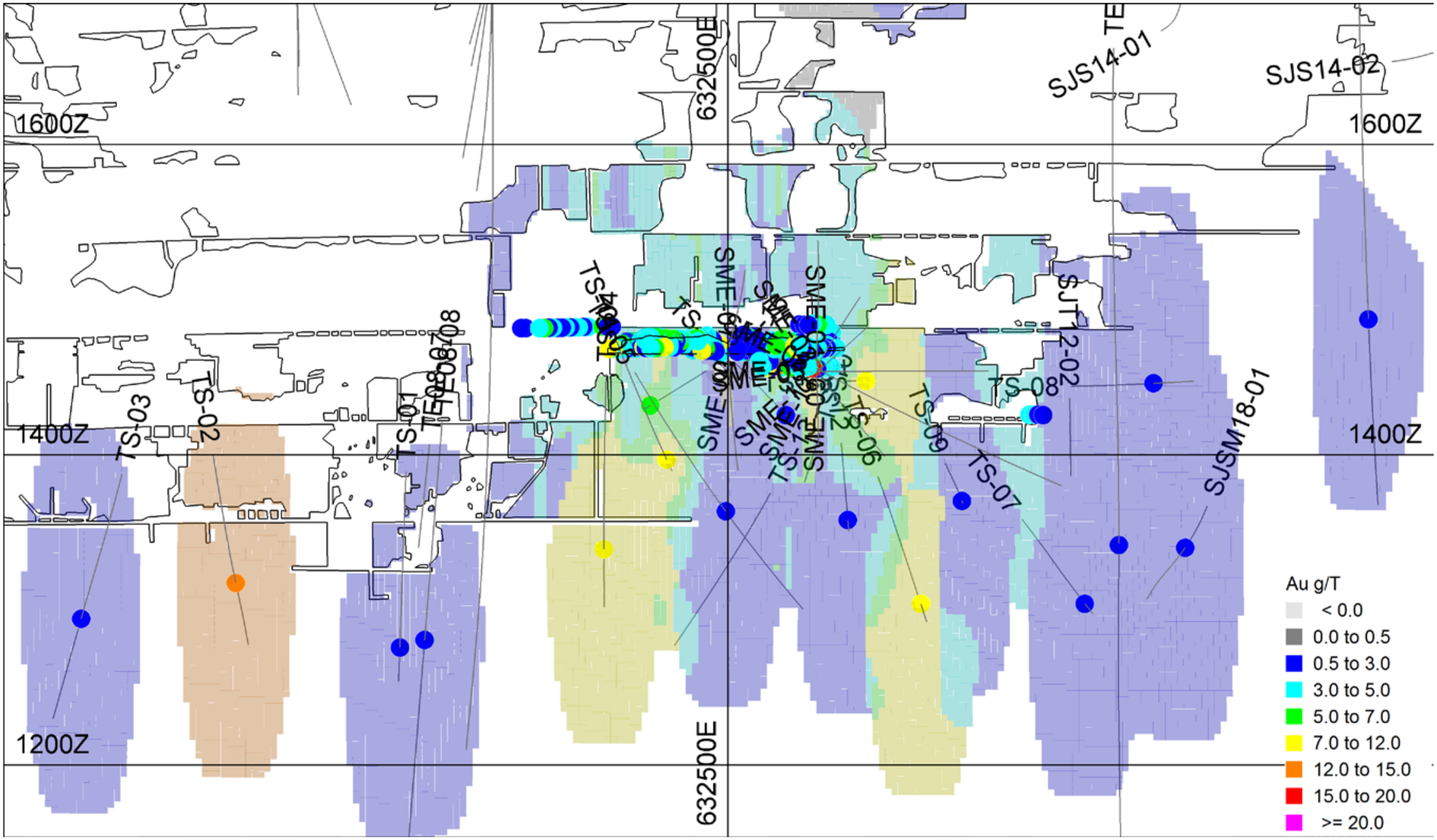


Figure 14-20: Long Section Terneras Vein Au, Composites and Blocks

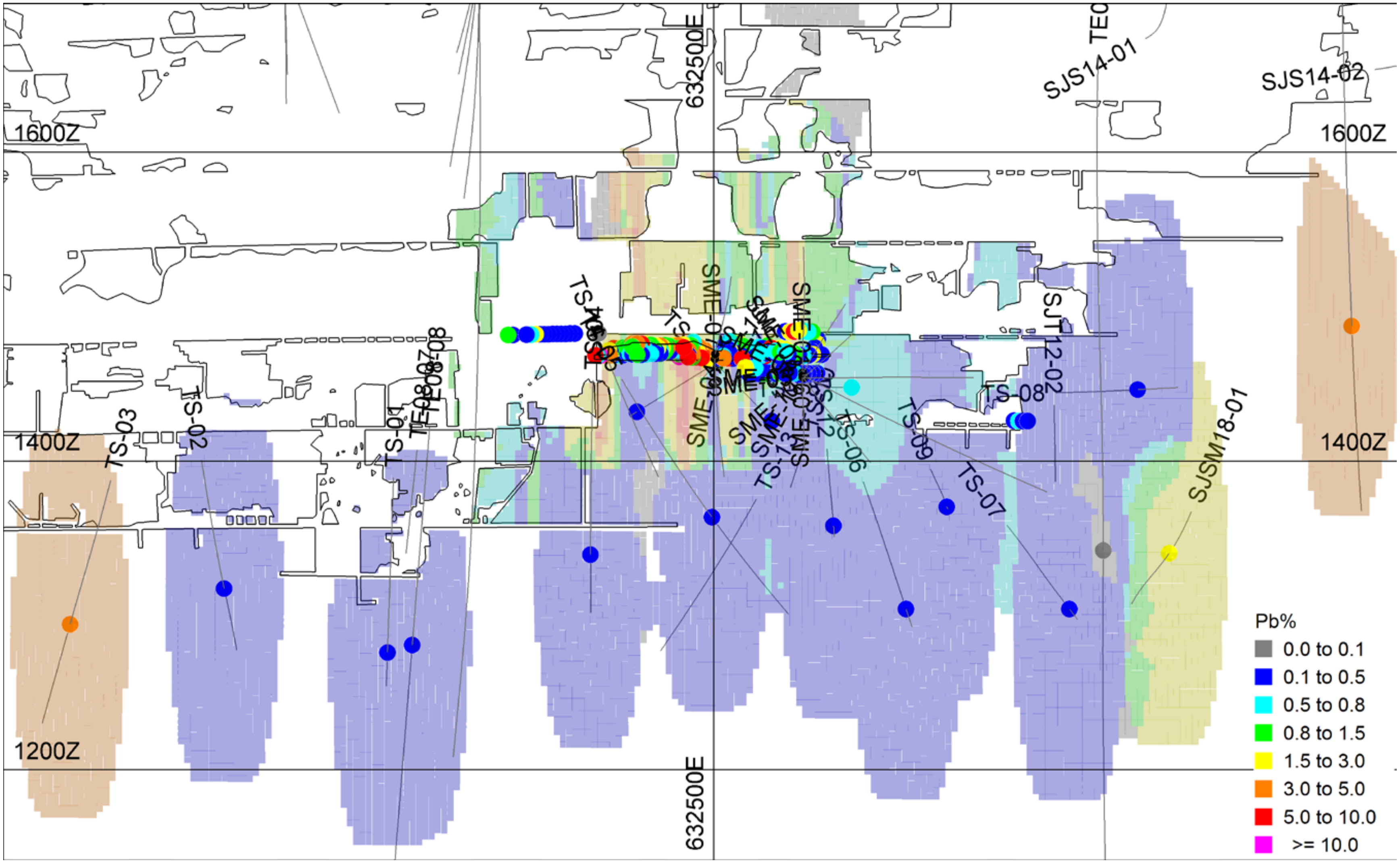


Figure 14-21: Long Section Terneras Vein Pb%, Composites and Blocks

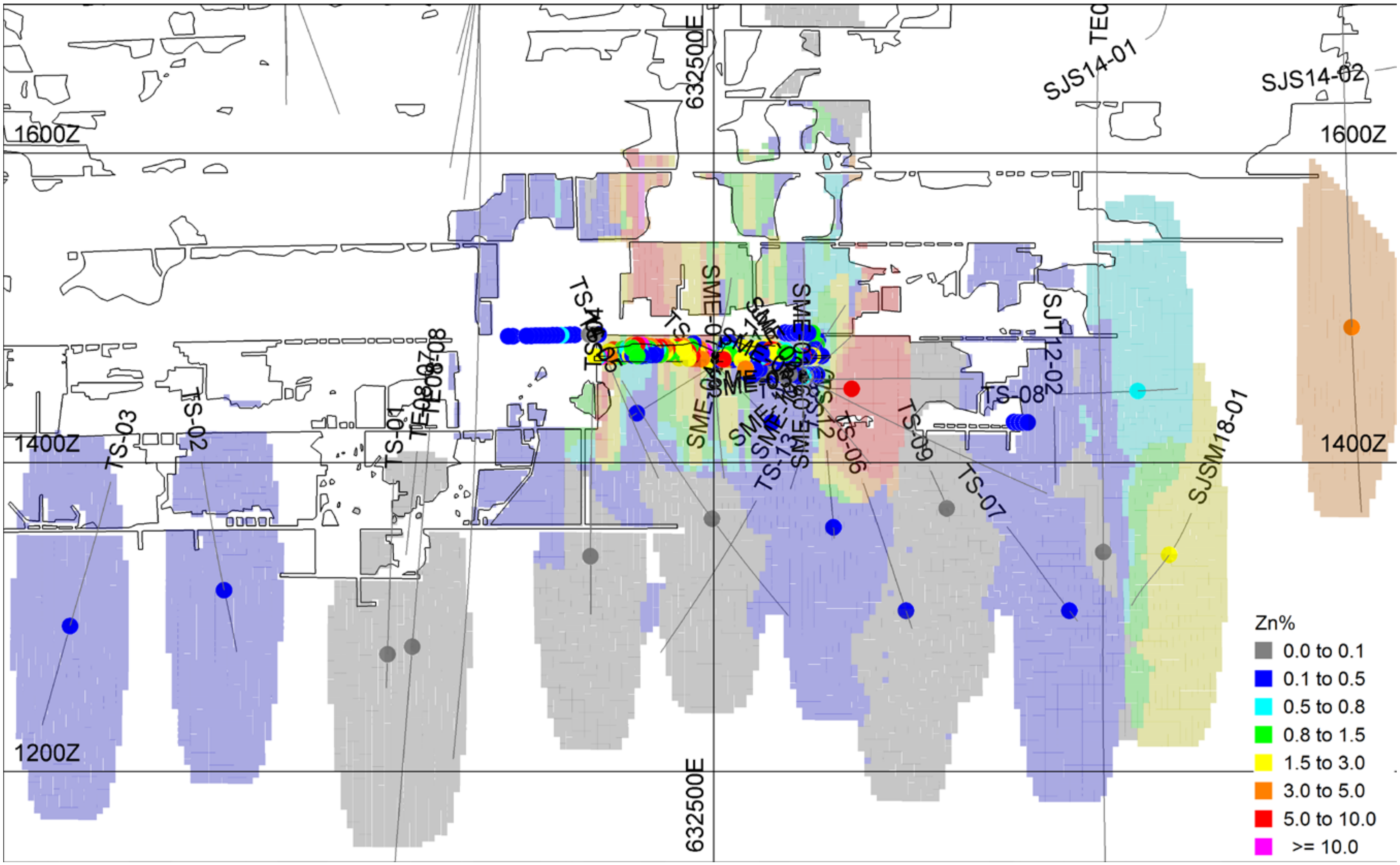


Figure 14-22: Long Section Terneras Vein Zn%, Composites and Blocks

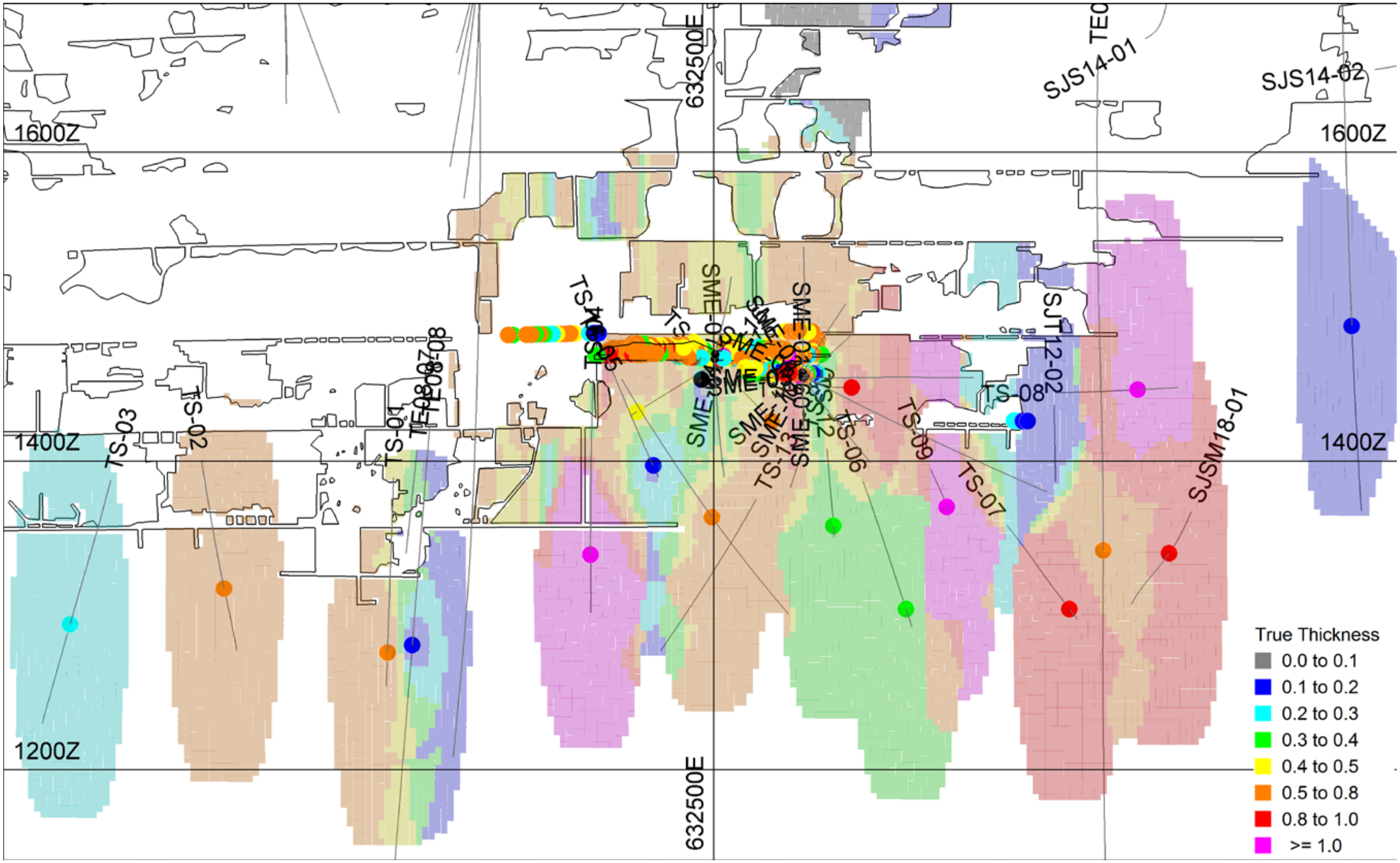


Figure 14-23: Long Section Terneras Vein True Thickness, Composites and Blocks

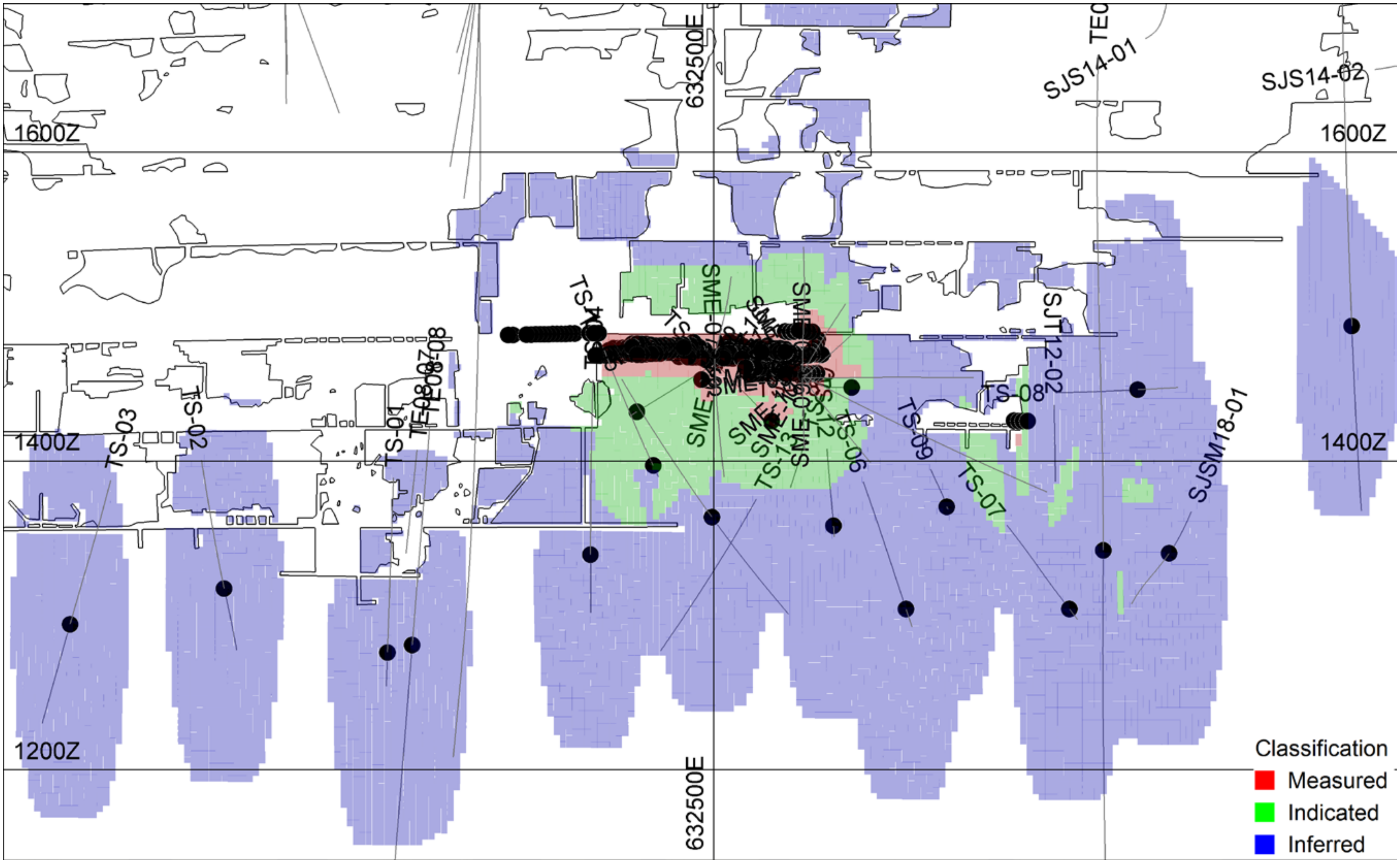


Figure 14-24: Long Section Terneras Vein Classification, Composites and Blocks

14.9 Resource Expansion Targets

The following discussion of resource expansion targets is conceptual in both tonnage and grade. There has been insufficient exploration to define these areas as a mineral resource and it is uncertain if further exploration will result in the target being delineated as a mineral resource. Quantification of resource expansion potential is presented in **Table 14-14** and has been limited to the extent of the vein surface buffers and the potential classification estimated within passes two and three. Maximum extrapolation is 150 m and maximum search is 200 m. True resource expansion potential is most likely much greater but additional quantifications cannot be currently justified. Previous estimates for potential were extrapolated 300 m from data points excluding the tonnage where resources were classified; whereas this estimate for potential only represents the distance between the currently defined resources and the maximum vein buffer, 105 m to 150 m, with the classified resource excluded. In comparison to the previous, this estimate for potential is substantially more conservative.

Table 14-14: Quantifiable Resource Expansion Targets

Mineral Type	Cutoff NSR	Tonnes	Grade Ag g/T	Grade Au g/T	Grade Pb%	Grade Zn%
All	50	1,000,000 to 1,500,000	175 to 225	3 to 4	1 to 1.5	0.5 to 1

Notes:

(1) Resource expansion potential is not resource and is not a recognized resource category under SEC Industry Guide 7 or NI 43-101

(2) Resource expansion potential is reported as diluted Tonnes and grade

(3) There is no guarantee or expectation that the above tonnage can be demonstrated or upgraded to a recognized resource classification

Most of the known veins' strike extents have been identified by exploration but in many cases mineralized shoots at depth have not yet been defined nor have the down dip extensions been condemned. It is likely that as deeper levels are developed additional mineralized shoots will be identified and enrich the resource base. Demonstrating measured and indicated resources below existing development levels is particularly difficult in a mine of this mineralization style. Resource expansion is unlikely to outpace level development due to the cost of drilling versus the achieved sample spacing.

Deep wedge drilling under the Tres Aguilas southeast fault block in the Santa Juana Mine area shows encouraging intercepts well below the deepest quantified potential. These intercepts have not been included in resource estimation because sufficient information regarding mineralizing style and orientation is not known. They do however suggest the system is mineralized well below the current resource area. **Figure 14-25** shows drill hole traces and the mine areas looking west in relation to the deep wedge drill traces originating from the Santa Juana mine area.

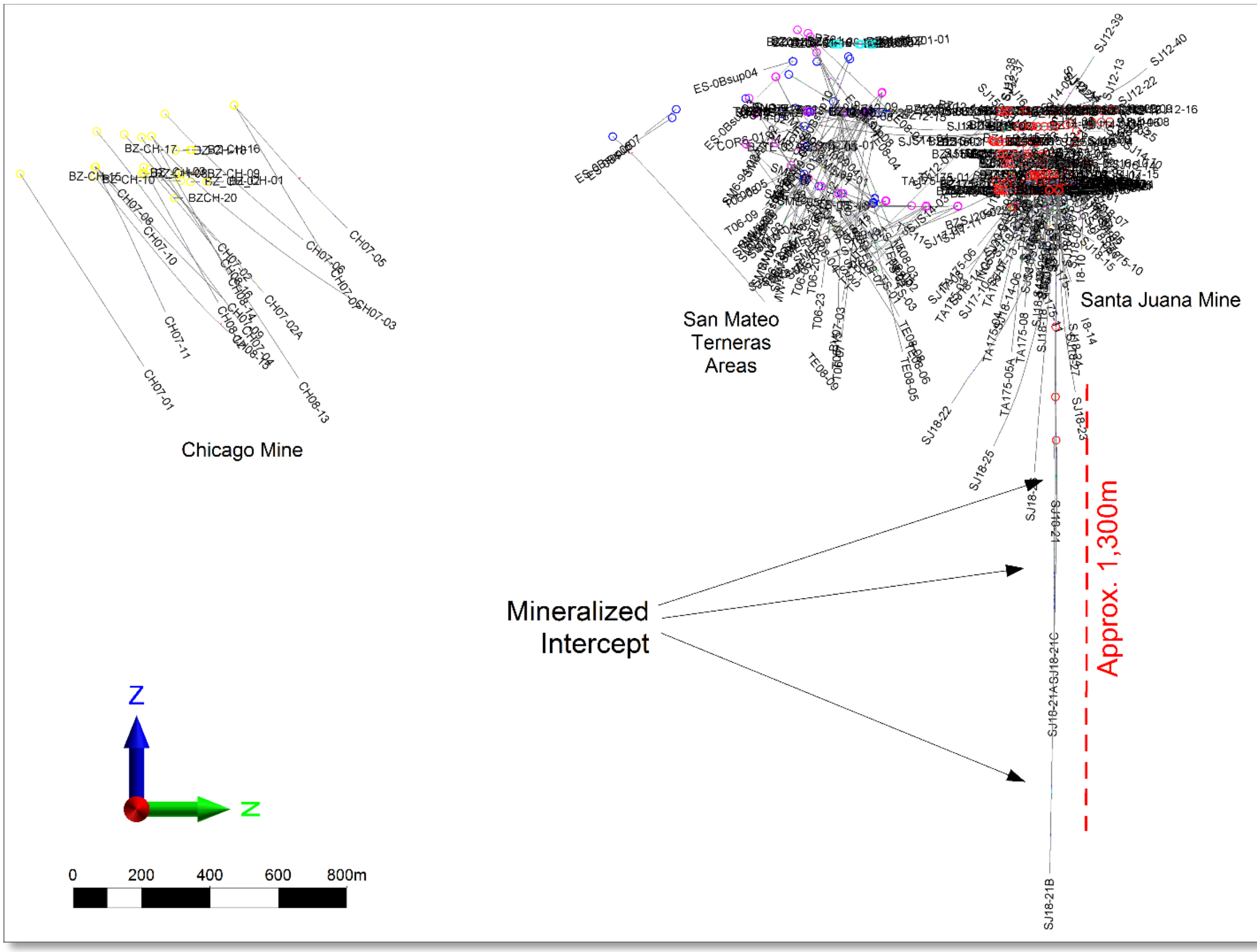


Figure 14-25: Resource Expansion Potential

14.10 Comparison to Previous Methods

This estimation and the previous estimation share the same fundamental basis; the vein thickness observed in the input data informs the estimation of tonnage. As well as sharing the vein interval assignments initially, **Table 14-15** explores categories where the two estimations differ and generalizes the effects of those difference. The differences between the two estimation have not been directly quantified but have been ordered from most significant to least.

Table 14-15: Previous Model Comparison Discussion

Model Comparison	Previous Estimation	Current Estimation	Discussion
Cutoff Scale	Proposed Mining Panel	Block Size (4x4)	This is the most significant difference, and accounts for most of the difference in tonnage and grade between the two estimations. The previous estimate weight-averaged all polygons that were contained within a proposed mining panel drawn by the estimator. This allowed for tonnage from below cutoff polygons to be averaged with above cutoff polygons. The cutoff was then applied at the scale of the averaged panel. This approach allows for mining outside of the most optimized areas, and can direct mine planning outside of mineralized shoots and unintentionally dilute tonnage. The current approach permits mine planners to target with better resolution and does not assume a mining panel area.
Interpolation and Extrapolation	Polygonal	Inverse Distance Weighting	The previous estimate did not smooth or mix data during the process of interpolation and extrapolation. The current estimation averages data points found within the search ellipse. Polygonal estimations typically have fewer tons and higher grade, this is not the case however due to the scale at which the cutoff was applied.
Anisotropy	Isotropic	Anisotropic	The previous model was isotropic, meaning the extrapolation of resource was equal down-dip and along strike. The current model extrapolates data half as far along strike as it does down dip in the first pass and a third in pass two. In cases of single data support, the tonnage within the search area of the current model is half the previous in pass one and 91% of the tonnage in pass two. In closely spaced areas there is little effect.
Grade Capping	Uncapped	Capped	Extreme high grade intervals have less influence on estimation of grade. This difference affects overall grade marginally but has minimal to no impact on estimation of tonnage, because areas where grades have been limited are usually above cutoff with or without capping.
Sample Selection	Concentrated Nearest Proposed Panel	All On-Vein Samples	The previous model used samples selected near the proposed panel and sometimes not strictly on the vein plane and could allow for multiple samples from a channel set or drill hole that exceeded a reasonable mining thickness to be accumulated as continual on-vein tonnage. The current model has chosen the most probable course of the vein at a reasonable mining thickness. Lower grade samples on the periphery of stope areas were permitted to influence estimation via search ellipse averaging in the current model.
3D Constraint	2D	3D	The previous estimate generally coincided with proposed vein centerline surfaces but selected samples could deviate and were flattened to 2D space for estimation. In the current model the vein centerline surface has been generated from the selected samples and samples that cause the surface to deviate beyond a reasonable surface were omitted.
Continued Exploration	Data as of January 2012	Data as of January 2015	The current model accounts for an accumulation of channel samples from mining since January 2012 and an exploration drill campaign. Local variations caused by new data have not been evaluated on a case by case basis. The effect of these differences is less than expected due to the above discussed differences in the anisotropy and previous inclusion of wedge drill holes below the Santa Juana area.
Interim Mining	Mining since of January 2012	Mining as of December 2014	The current model has been depleted with mining since the last estimation. Differences in global estimation of tonnage are marginally different because of this.

Notes: Description of previous model methodology is summarized from what was described in the most recent previous technical report on the property, input for this assessment has not been provided by the previous author.

14.11 Relevant Factors

If subsequently converted to reserves and mined, the inability to precisely predict the true shape and orientation of mineralized shoots could materially affect the mineral resources. The geologic controls dictating the extents of the mineralized shoots is not currently known in much of the inferred resource areas. Interpolation and extrapolation of channel and drill hole samples represents an unbiased approximation of mineralized shoot shape, but will fall short of predicting the shape exactly.

NSR calculations are based on reasonable price and contracts assumptions. The inability to market concentrates or changes in prices or contract terms could materially affect the quantified resources in relation to the NSR cutoff. The estimation of in situ tonnage and grade attributes estimated would not be affected.

There are no additional environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that the author of this report is aware of that could materially affect the mineral resource estimate. The property is currently in operation and many of the above factors have been studied in detail and addressed in the initial permitting process and have not affected the resource estimates to date. It is possible complications with any or all of the above mentioned factors could arise in the future, but currently no material complications are known.

15.0 MINERAL RESERVE ESTIMATES

Though measured and indicated resources have been estimated at the Velardeña mine, this preliminary economic assessment includes inferred mineral resources that are too speculative for use in defining reserves. Standalone economics have not been undertaken for the measured and indicated resources and as such no reserves have been estimated for the Project.

16.0 MINING METHODS

The Project is currently in operation as an exclusively underground operation. The current mine plan includes only the sulfide material below previous workings.

Mining recommenced at the Project on July 1, 2014 with milling operations recommencing on November 3, 2014.

Tetra Tech has conceptually planned stopes for mining based on measured, indicated and inferred resources which total 410,000 Tonnes for mining over four years, from stopes and stope development. This tonnage is a subset of the total resource that was selected for proximity to current mine development in the Terneras, San Mateo, and Santa Juana areas

A site visit was conducted on December 17, 2014. Shrinkage stoping was observed to be the primary method of extraction, as well as resuing and cut and fill techniques. These three techniques are considered for the PEA and are discussed below. These methods are suitable to the steeply dipping veins found at the Project.

16.1 Shrinkage Mining

The Shrinkage mining method involves mining from the base of the stope using jackleg drilling in short cuts. The blasted rock would be left in the stope to create a working platform for the miners, with the swell (30 to 35%) drawn off to create working space. The backfilled material would be subsequently recovered once the full height of the stope is obtained. During the initial phase, roughly 1.5 m cuts would be done by drilling uppers.

Stope development would be initiated by driving a crosscut from the main access ramp to the bottom elevation of the planned stope. Mining begins near the 1,500 m elevation within the San Mateo area and would continue deeper as work progresses to the main access ramps. The dimensions of the stope are shown in **Figure 16-1**. A 2.5 m x 2.6 m level drift would then be driven along the vein strike using jacklegs and small scoop trams. This drift would then function as the haulage level for material to be mucked and transported by a two cubic yard (yd3) Load Haul Dump (LHD) to a centralized muck bay nearer the San Mateo Ramp. Here a six yd3 LHD would load a 28 Tonne truck for transport of mined material to surface. Above the level drift would be a sill pillar with 2.5 m in thickness. Stopes would typically be 30 m high with an additional three m crown pillar left in situ at the top of the stope. Rib pillars of a minimum of 3 m would be left between stopes.

Figure 16-1 below shows a graphic representation of the above discussed method (Gustavson, 2014).

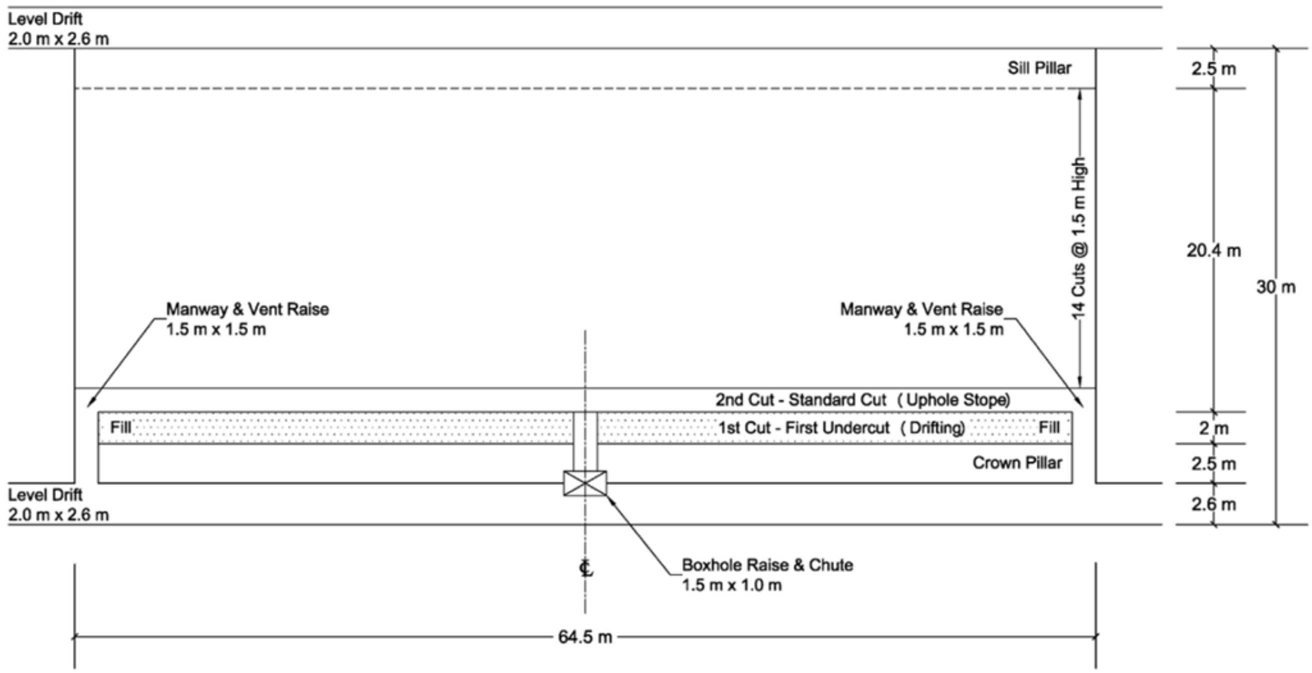


Figure 16-1: Mining Method at Velardeña

Each stope would be planned for a length of roughly 65 m by 30 m high. Currently no rock support is being used to support the back in the drifts or open working stopes. Once the on-vein drift below the stope is completed, a manway would be raised on either side of the stope with dimensions of 1.5 m x 1.5 m. A boxhole raise with dimensions of 1.5 m by 1.0 m would also be driven through the sill pillar.

The initial cut above the sill pillar would be mined out to a height of 2 m. The minimum mining width currently being employed in these stopes is 1 m. Once the first cut is drilled, blasted, and mucked, mining would continue upwards in 1.5 m cuts. As discussed above, only a percentage of the total blasted material would be mucked. The remaining would be left behind and used as the working level for the next cut. In this case the second cut and subsequent cuts thereafter would be 1.5 m in height.

Shrinkage stoping would be the predominant mining method. However, Velardeña is experimenting with another method, which is a slight variation of the Shrinkage stoping, in an attempt to increase head grade to the mill while decreasing the tons of material.

16.2 Resue Mining

A modified form of shrinkage stoping is also used at Velardena called “Resue Mining” (also called “slusher cut and fill”) is shown in **Figure 16-2** and **Figure 16-3**. With this method the ore is mucked to an ore chute using a slusher after the blasting of each cut. A subsequent waste blast adjacent to the ore is done to slash waste rock into the stope for use as a working platform for the next ore cut.

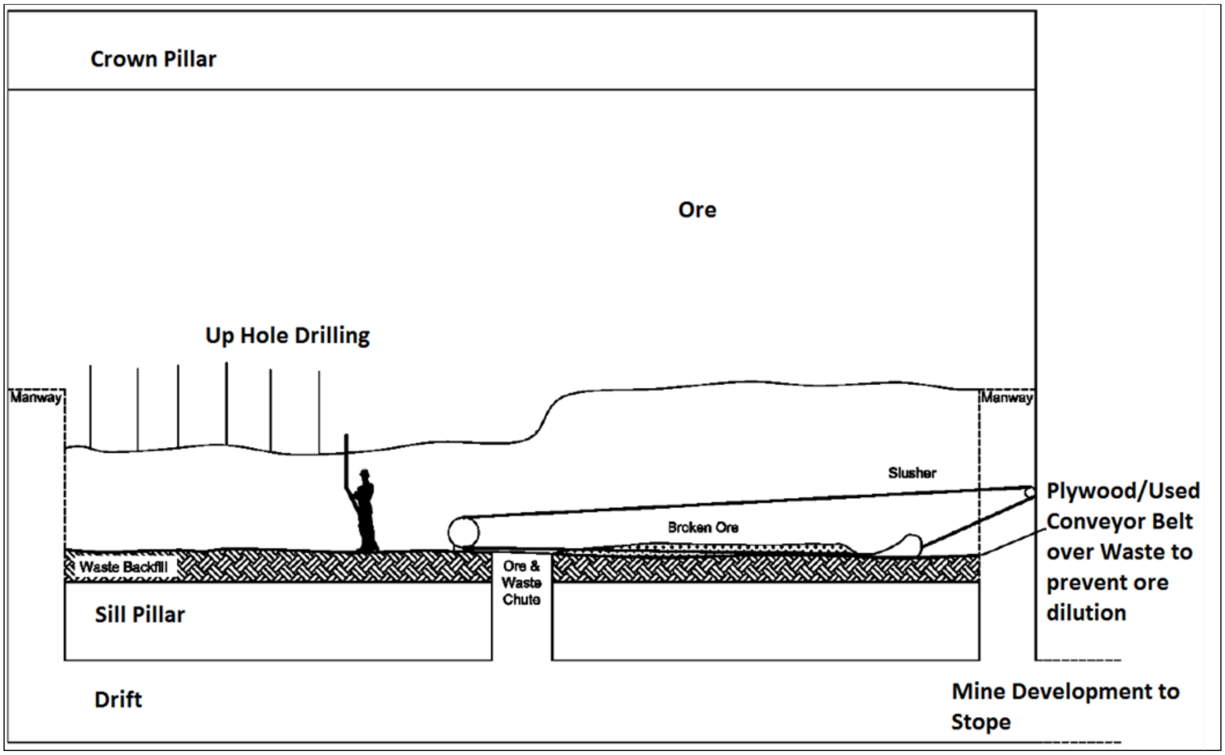


Figure 16-2: Typical Resue Mining (Also Called Slusher Cut and Fill)

Resue Mining also allows continuous material recovery as none of it is held up in the stopes while mining subsequent cuts as in traditional shrinkage stoping. At Velardeña the minimum cut into the vein is roughly 0.75, after which the stope width is increased by slashing waste rock into the stope.

Figure 16-3 shows an illustration of a stope utilizing the resuing method as applied at Velardeña.

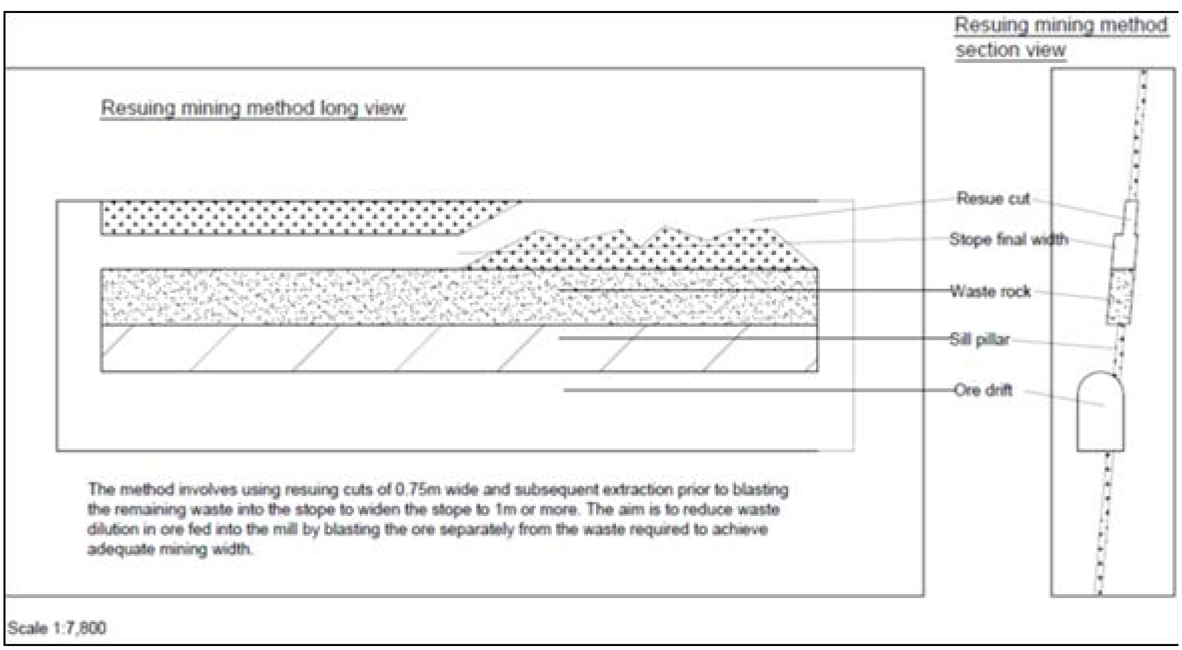


Figure 16-3: Illustration of Resuing Mining Method as Applied at Velardeña

16.3 Cut & Fill Mining

The operation utilizes a semi-mechanized cut and fill approach in the Santa Juana area, where vein widths justified this method. However, as opposed to fully mechanized cut and fill, jacklegs are used for the drilling of blast holes. A smaller scooptram then transports the blasted material to the muck bay close to the San Mateo Ramp, where a larger scooptram loads the underground haul trucks for material to be transported to the surface. Blasted waste rock is then deposited in the open stopes using a scooptram and is filled so that the cut above can be blasted.

16.4 Geotechnical Analysis

A geotechnical analysis for the Project has not been conducted or reviewed by the author. The mine is currently operating without significant underground support. A number of the areas of the underground workings were inspected during the site visit and it was observed that the rock mass is competent and self-supporting. No areas of concern were noted. It is recommended that, for mining at depth greater than the current, the services of rock engineering firm are engaged to provide expertise on stope layout and future potential rock mass stability concerns that may arise due to increased stress.

16.5 Dilution

Due to the narrow vein widths, waste dilution is greater than typical for underground mining operations. **Table 16-1** outlines the estimated dilution methods for the PEA. In addition a minimum drift width of 2.5 m has been estimated for stope development.

Stopes have been planned using a weighted average vein width of 0.67 m, with a weighted average stoping width of 0.98 m, resulting in an average dilution of 42% for stoping and 226% for development.

Table 16-1: Mining Dilution Estimation Parameters

Mining Method	Minimum Mining Widths	Dilution Applied
Shrinkage	0.95 m	Vein width less than 0.75 - mining width is estimated at 0.95 Vein widths above 0.75 - mining width is estimated as vein width plus 0.2 m
Resue	0.7 m	Vein width less than 0.5 - mining width is estimated at 0.7 Vein widths above 0.5 - mining width is estimated as vein width plus 0.2 m
Cut and fill	3 m	Vein width less than 2.6 m - mining width is estimated at 3 m Vein widths above 2.6 m - mining width is estimated as vein width plus 0.4 m

16.6 Mining Extraction & Recovery

Overall extraction of planned stopes has been estimated at 63%.

For the purpose of this PEA, the loss of resources available to mining through mining extraction losses has been considered. The considerations include stoping with both shrinkage and resue mining which require the leaving of rib, sill and crown pillars. See **Figure 16-1** for the preliminary stoping long section layout.

For the PEA rib and sill pillars have been included as 2.5 m in width with crown pillars included as three m. An additional 10% of the mineable Tonnes have been deducted from the extractable Tonnes.

A mining loss of 5% has been included, which accounts for blasted material left in situ in stopes, above pillars and in stope drifts after stope completion.

16.7 Mining Equipment

Table 16-2 and **Table 16-3** show the list of equipment available at the Project as provided by Golden Minerals. The key pieces of equipment required for mining are the scooptrams, underground trucks and drilling jumbos. The current equipment fleet is expected to be adequate to achieve the 285 T/d of mill feed for processing and, as such, no additional equipment is expected to be purchased. Not listed here, but owned by Golden Minerals, are jacklegs required for stoping and underground development (narrow drifts) and ventilation equipment in use underground.

Table 16-2: Velardeña Equipment List

List of equipment used by Minera William, S.A. de C.V.								
Scoop Trams								
#	Tag #	Model	Manufac.	Stat.	Yr	Series	Motor	Motor Series
1	ST-1	MTI-270	MTI	Used	1989	3215	DEUTZ F5L912W	O8820768
2	ST-8	LT-125	MTI	Used	1975	509	DEUTZ F4L912W	77295034
3	ST-12	LT-125	MTI	Used	---------	91382-RB2008	DEUTZ F4L912W	O8819178
Scoop Trams								
4	ST-13	LT-270	MTI	Used	1987		DEUTZ F5L912W	O8820770
5	ST-16	LT-250	MTI	Used	---------	67095 REAC	DEUTZ F6L914	O8840412
6	ST-17	ST 1030	ATLAS COPCO	New	2011	AVO 11X265/8997 317800	Cummins QSL	73229540
7	ST-18	LT-250	MTI	Used			DEUTZ F6L914	O8840764
8	ST-19	LH-203	SANDVIK	New	2012	L203D767	DEUTZ BF6L914	O8864979
9	ST-20	LH-203	SANDVIK	New	2011	L103D778	DEUTZ BF6L914	O8861259
10	ST-23	LT-210	MTI	New	2012	4313	DEUTZ F4L912W	O8852297
11	ST-25	ST 1030	ATLAS COPCO	Used	2007	AVO 07X430/8997 149900	Cummins QSL	46737785
12	ST-26	LH-203	SANDVIK	Used	2010	L003D685	DEUTZ BF6L914	O8825602
13	ST-29	LH 307	SANDVIK	Used	2010	L007D303	MB OM906LA	906-99-1-00 869690

List of equipment used by Minera William, S.A. de C.V.								
15	ST-30	LH-203	SANDVIK	New	2012	L203D790	DEUTZ BF6L914	
Drilling Jumbos								
#	**Tag #**	**Model**	**Manufac.**	**Stat.**	**Yr**	**Series**	**Motor**	**Motor Series**
1	JB-01	BOOMER S1D	ATLAS COPCO	Used	2010	AVO 11A239/8991894700		
2	JB-03	BOOMER S1D	ATLAS COPCO	Used	2008	AVO 08A640/8991 7 74400	DEUTZ D914L04	08815521
3	JB-02	BOOMER T1D	ATLAS COPCO	New	2011	AVO11A362/8991895700		
Motor Grader								
#	**Tag #**	**Model**	**Manufac.**	**Stat.**	**Yr**	**Series**	**Motor**	**Motor Series**
1	MOTO-01	CAT 140M	CATERPILLAR	New	2011	CAT0140MLB9D02937		
Kubota (personnel transport)								
#	**Tag #**	**Model**	**Manufac.**	**Stat.**	**Yr**	**Series**	**Motor**	**Motor Series**
1	KU-02	RTV 900	KUBOTA	New		A5KB1FDACBG0C4078		
2	KU-03	RTV 900	KUBOTA	New		A5KB1FDAHBG0C6068		
3	KU-04	RTV 900	KUBOTA	New		A5KB1FDAKBG0C7535		
Kubota (personnel transport)								
4	KU-06	RTV 900	KUBOTA	New		A5KB1FDAPCG0D4307		
5	KU-07	RTV 900	KUBOTA	Used		A5KB1FDAACG0D1107	KUBOTA D902-ET03	BKBXL898KCB
6	KU-08	RTV 900	KUBOTA	New		A5KB1FDACG0D3167		
7	KU-10	RTV 1140	KUBOTA	New				
Underground Trucks								
#	**Tag #**	**Model**	**Manufac.**	**Stat.**	**Yr**	**Series**	**Motor**	**Motor Series**
1	CBP-01	JCI 704	MTI	Used	1984		DEUTZ F6L914	08870328
2	CBP-02	JCI 704	MTI	Used	1997		DEUTZ F6L914	08873455
3	CBP-03	ELMAC 7 T	MTI	Used	1997		DEUTZ F6L914	08833274
4	CBP-04	JCI 1304	MTI	Used	--------	80988	DEUTZ BF6M-1013EC	11106210

List of equipment used by Minera William, S.A. de C.V.								
5	CBP-05	JCI 704	MTI	Used		RB-148-0812	DEUTZ F6L914	08870398
6	CBP-06	JCI 704	MTI	Used		RB-149-0812	DEUTZ F6L914	O8870399
7	CBP-07	MT 431B (264)	ATLAS COPCO	New	2012	AVO 12X463/8997 422500	DETROIT S-60	06R1050421
8	CBP-08	MT 431B (265)	ATLAS COPCO	New	2012	AVO12X513	DETROIT S-60	
9	CBP-09	TH-320	SANDVIK			4565	MERCEDES BENZ	9269290084388
10	CBP-10	TH-320	SANDVIK			4649	MERCEDES BENZ	9299219008485
Front-End Loaders								
#	**Tag #**	**Model**	**Manufac.**	**Stat.**	**Yr**	**Series**	**Motor**	**Motor Series**
1		916	CATERPILLAR	Used	------	2XB01887		
2		930G	CATERPILLAR	Used	--------	CAT0930GETWR02020		
Telehandler								
#	**Tag #**	**Model**	**Manufac.**	**Stat.**	**Yr**	**Series**	**Motor**	**Motor Series**
1	TH-01	TH 580 B	CATERPILLAR	Used	-------	CATTH580JSLH01098		
TLB (tractor, loader, backhoe)								
#	**Tag #**	**Model**	**Manufac.**	**Stat.**	**Yr**	**Series**	**Motor**	**Motor Series**
1		420E	CATERPILLAR	Used	--------	CAT0420ELKMW01116		
Bobcat								
#	**Tag #**	**Model**	**Manufac.**	**Stat.**	**Yr**	**Series**	**Motor**	**Motor Series**
1		236B	CATERPILLAR		---------	Machine used in exploration in Chicago area		
Compressors								
#	**Tag #**	**Model**	**Manufac.**	**Stat.**	**Yr**	**Series**	**Motor**	**Motor Series**
1		TS-20 250-60	SULLAIR	New	2010	9962		
2		EAU99P	GARDNER DENVER	Used	--------	S290593		
Tractors								

List of equipment used by Minera William, S.A. de C.V.								
#	Tag #	Model	Manufac.	Stat.	Yr	Series	Motor	Motor Series
1	TR-01	2635	MASSEY FERGUSON	New	2012	FX729539	TSJ436E 05190 / MF 2635 4WD STD2	
2	TR-02	2635	MASSEY FERGUSON	New	2012	FX729535	MF 2635 4WD STD2	
3	TR-03	2635	MASSEY FERGUSON	New	2012	FX752999	MF2635 /MF 2635 4WD STD2	
4	TR-04	2635	MASSEY FERGUSON	New	2012	FX777239	MF2635 /MF 2635 4WD STD2	

Table 16-3: Velardeña Equipment List

Vehicles for transporting personnel and cargo				
14	EX65140	International	CHASIS CABINA TANDEM 740	2007
15	EX01679	International	CHASIS C 7400-300 CAMION	2007
18	EX01622	International	CHASIS C 4400-250 CAMION	2008
33	EX05301	International	CHASIS CORAZA 3300 210 CE	2012
34	EX01616	International	CHASIS CABINA 7400 310	2012
35	EX01625	International	CHASIS CABINA 7400 310	2012
	EX05302	International	AUTOBUS 4700 22 FE	2012

16.8 Waste Rock

Waste rock from the underground mine consists of tonnage from the ramp and lateral development. Since the mining methods include cut and fill, the waste from the stopes would either be stored underground in mined out stopes or transported to the mill with the diluted mined material. Currently limited cut and fill mining is undertaken and, as such, the majority of waste rock is planned for surface storage.

The waste rock that would not be stored underground would be contained along the valley between the San Mateo adit and the Santa Juana adit.

16.9 Tailings

The process plant is located approximately eight kilometers away from the underground mine adit. The diluted mined material hauled to surface using the underground haul trucks is then deposited in a short term stockpile to the east of the San Mateo adit. It is then loaded on to contractor haul trucks and mine owned dump trucks for transport to the processing plant.

A tailings facility is located in close proximity to the process facility. There is no current consideration for underground backfilling of tailings.

16.10 DEWATERING

Neither a water balance nor dewatering investigations were performed for this PEA. No significant water infiltration was noted at the underground mine site during the site visit. Seepage and dewatering are not expected to be of concern; it is not anticipated that excessive dewatering costs will be incurred during the life of mine, but further studies are recommended to confirm this.

16.11 VENTILATION

The current underground workings at the Project are naturally ventilated, with the main ramp used as an intake airway and the old Santa Juana mining areas and shafts for exhausting air. However, Golden Minerals is installing a booster fan which will force air from the San Mateo and Terneras areas, down the main adit and ultimately out of the old Santa Juana mining areas (reference **Figure 16-4)**.

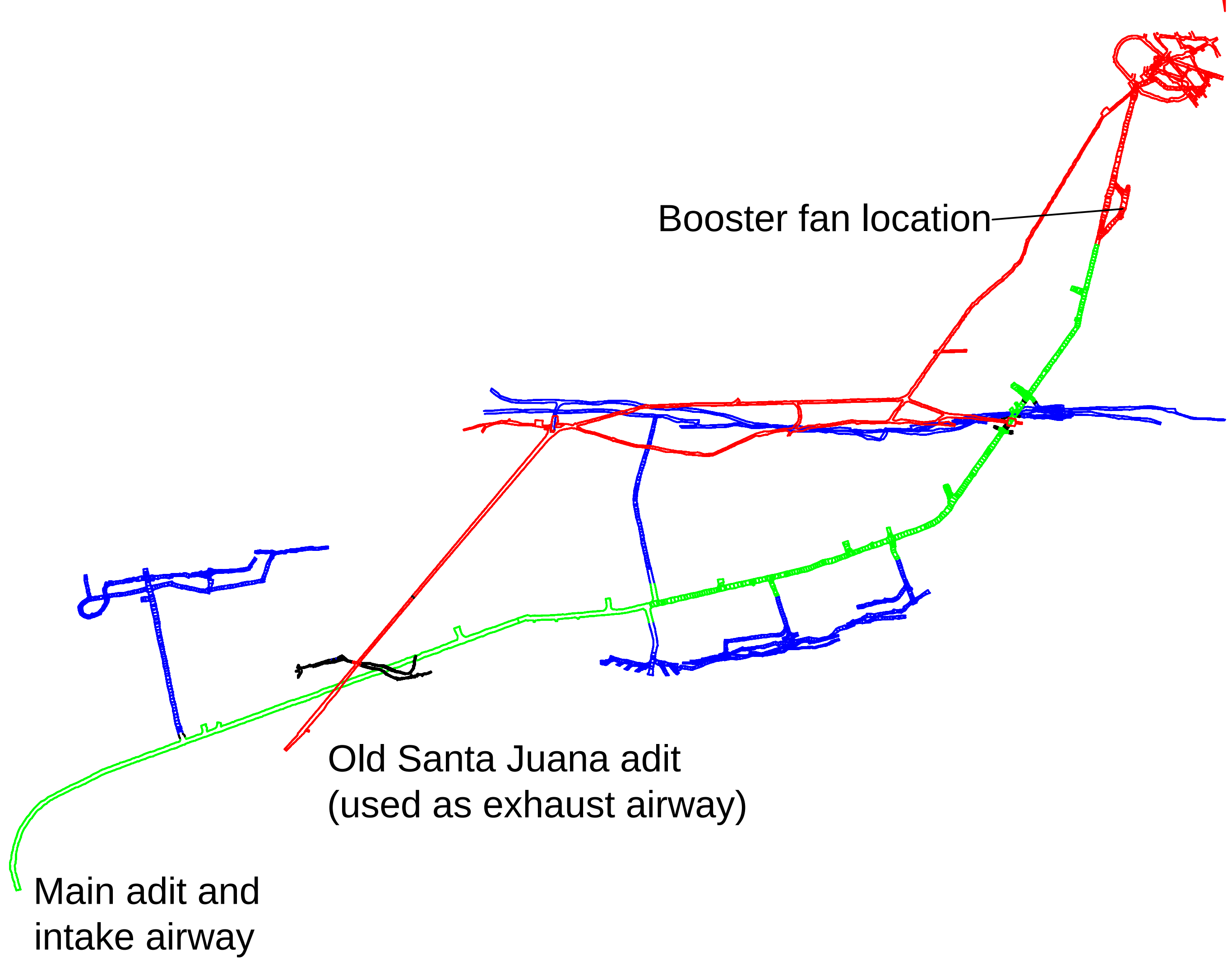
Access to the old shafts within the Santa Juana Mine is still possible and provides access for inspections to ensure that the old excavations remain open to provide exhaust.

Ventilation circuits are created in stoping areas through forced ventilation, via fans and ducting of various sizes. Stopes are set up to have a minimum of two entrances, which when connected provide for thorough ventilation.

No further evaluation on the ventilation has been performed but it is expected that the main booster fan, once installed, will be adequate for mine ventilation.

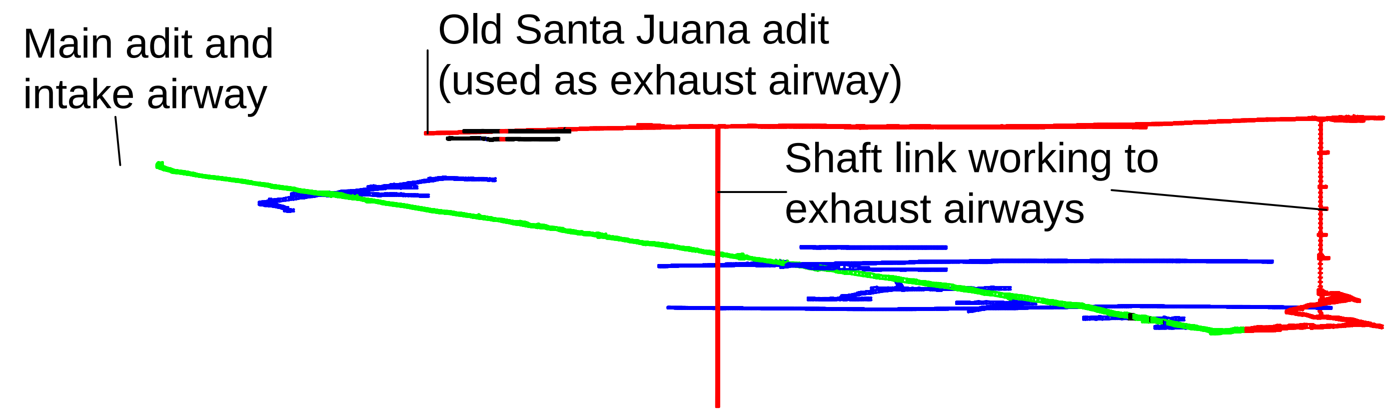
Velardena Mine Ventilation: Plan view

Air enters the mine at the current main adit west on the San Mateo minig areas. A booster fan is currently being installed as shown which will force air through the old Santa Juana mining areas and shafts. The return airway is the old Santa Juana adit. An additional ventilation shaft connection exists in the Terneras area.



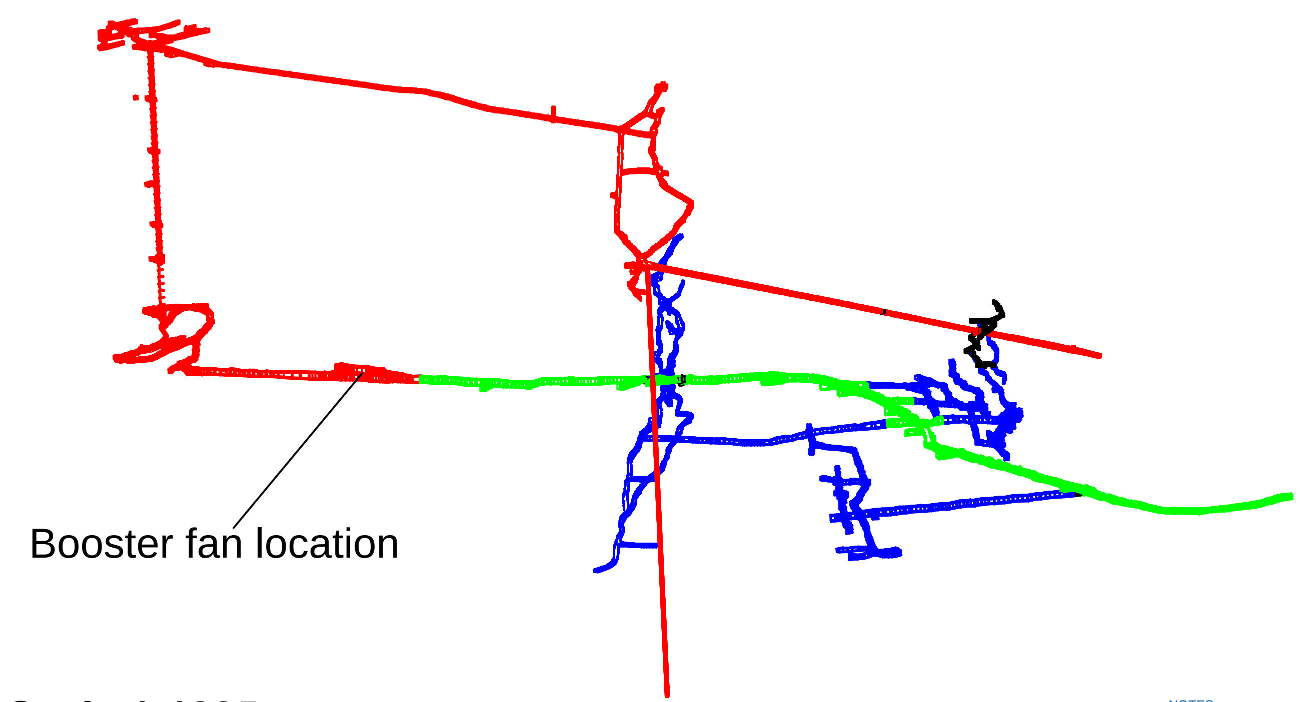
Scale 1:1200

Velardena Mine Ventilation: Mine long section looking west



Scale 1:1000

Velardena Mine Ventilation: View looking North East



Scale 1:1235

NOTES
BASED ON DRAWING PROVIDED BY GOLDEN MINERALS

- Intake airways (green)
- Section ventilation circuits (blue)
- Return (exhaust airways) (red)

CLIENT: Golden Minerals	VELARDENA, DURANGO, MEXICO				
	VENTILATION LAYOUT				
TETRA TECH	PROJECT NO. 119-910295	DWN MPH	CKD	REV 0	Figure 16.4
	OFFICE MMI	DATE November 21, 2013			

C:\Users\Mark.Horan\Documents\projects\Velardena\CAD plans\Ventilation.dwg [FIGURE 16.4] February 06, 2015 - 4:18:46 pm (BY: HORAN, MARK)

16.12 Mine Plan

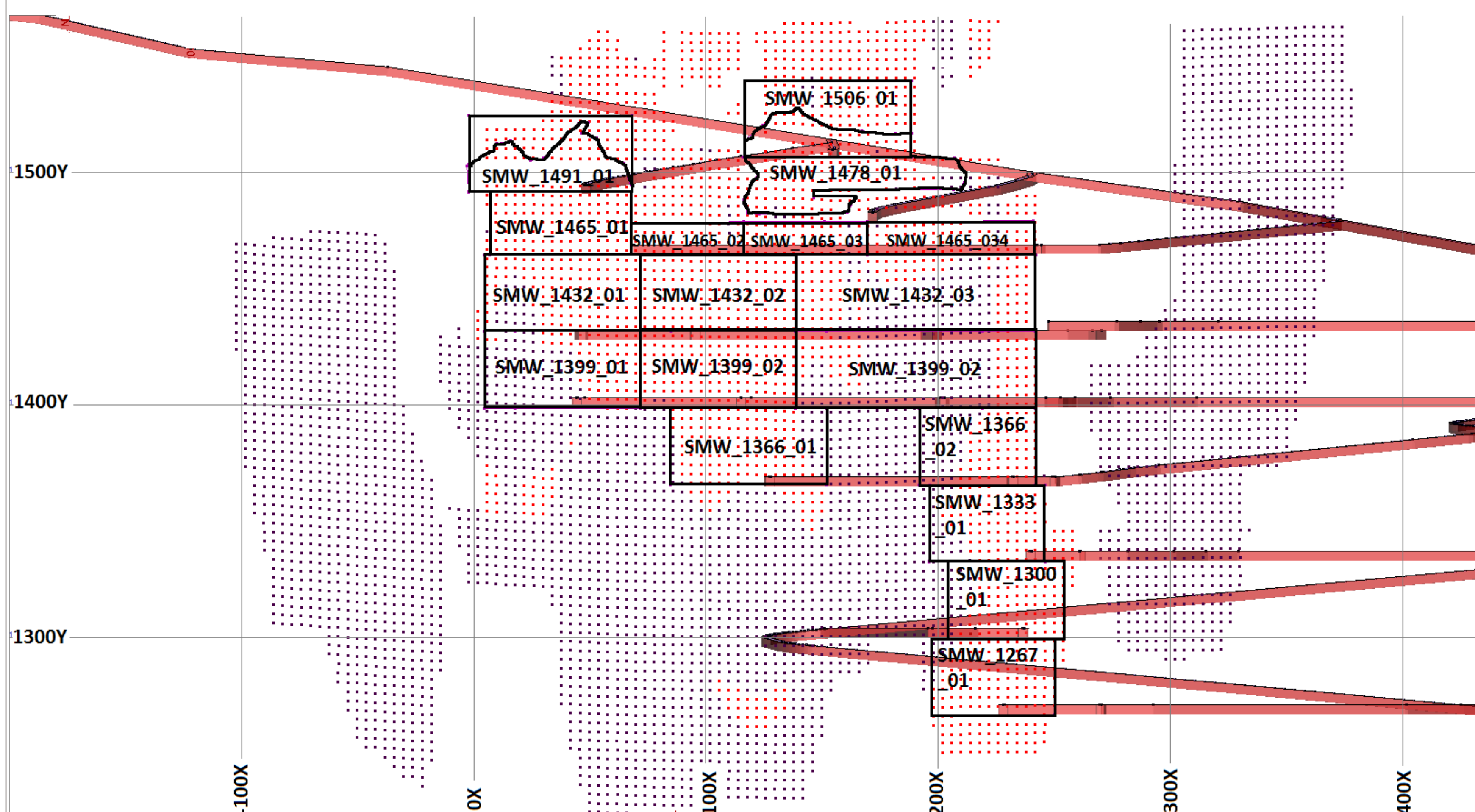
In order to plan stopes for the PEA, areas were selected where: the estimated diluted NSR for a minimum of a one m mining width; exceeds US$90; and which are reasonably accessible considering midterm mine development plans. **Table 16-4** shows the overall tonnage and the tonnage ultimately included for scheduling.

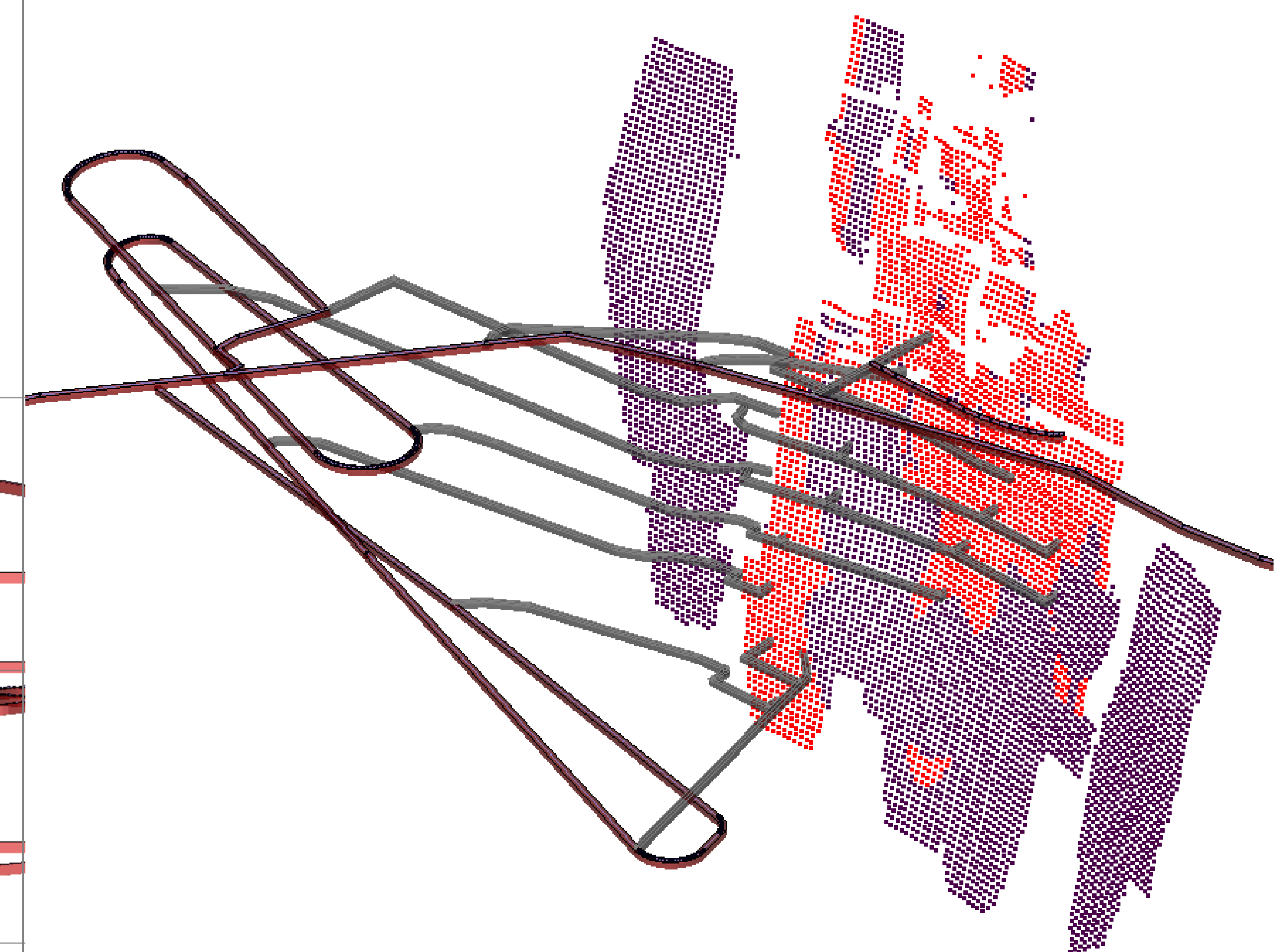
Table 16-4: Summary of Stope & Development Tonnes & Grade Included in the Proposed Mine Plan

Aspects	Vein		Dilution		Total	
	Stoping	Development	Stoping	Development	Stoping	Development
Total stope tonnage (T)	300,662	38,967	125,610	87,961	426,272	126,927
Dilution percentage (%)			42%	226%		
Grade for all stopes						
Au g/T	7.7	7.7	-	-	5.4	2.3
Ag g/T	290	290	-	-	206	87
Zn%	2.0%	2.0%	-	-	1.5%	0.6%
Pb%	1.3%	1.3%	-	-	1.0%	0.4%
				Tonnage scheduled	312,162	98,032
				Au g/T		4.2
				Ag g/T		198
				Zn%		1.4%
				Pb%		0.9%

16.12.1 Stope Layout

Resources were selected with a diluted NSR above US$90 and conceptual 2D stope shapes created for these areas. Current plans and development layouts were considered for the mine plan; however the mine plan developed for the PEA differs in naming convention from the Golden Minerals short-term internal mine plan. **Figure 16-5** to **Figure 16-13** shows the 2D stope plans used as basis for the mine plan including the Tonnes of mill feed estimated from these stopes. The stope shapes were then used to isolate the resource blocks within the stope, in order to extract width and grade estimates for each stope from the resource model. Mining, dilution, extraction, and stope development parameters were applied to each individual stope in order to estimate grades and tonnages of potential mill feed from each stope.





STOPE	MILL FEED FROM STOPES (t)	MILL FEED FROM DEVELOPMENT (t)	Diluted NSR ($/t)
SMW_1500_01	1,992	0	$599
SMW_1510_01	3,090	0	$302
SMW_1478_01	2,668	0	$261
SMW_1465_01	2,646	1,128	$339
SMW_1465_02	536	894	$124
SMW_1465_03	680	980	$119
SMW_1465_04	939	1,296	$112
SMW_1432_01	3,834	1,219	$164
SMW_1432_02	3,956	1,235	$159
SMW_1432_03	6,166	1,892	$117
SMW_1399_01	2,913	1,213	$65
SMW_1399_02	4,473	1,264	$181
SMW_1399_03	6,069	1,880	$68
SMW_1366_01	4,038	1,245	$141
SMW_1366_02	2,132	905	$93
SMW_1333_01	2,109	902	$93
SMW_1300_01	2,087	899	$87
SMW_1275_01	2,224	953	$88

LEGEND

NSR ABOVE $90/tonne

NSR BELOW $90/tonne

NOTES

STATUS

CLIENT

GOLDEN MINERALS COMPANY

TETRA TECH

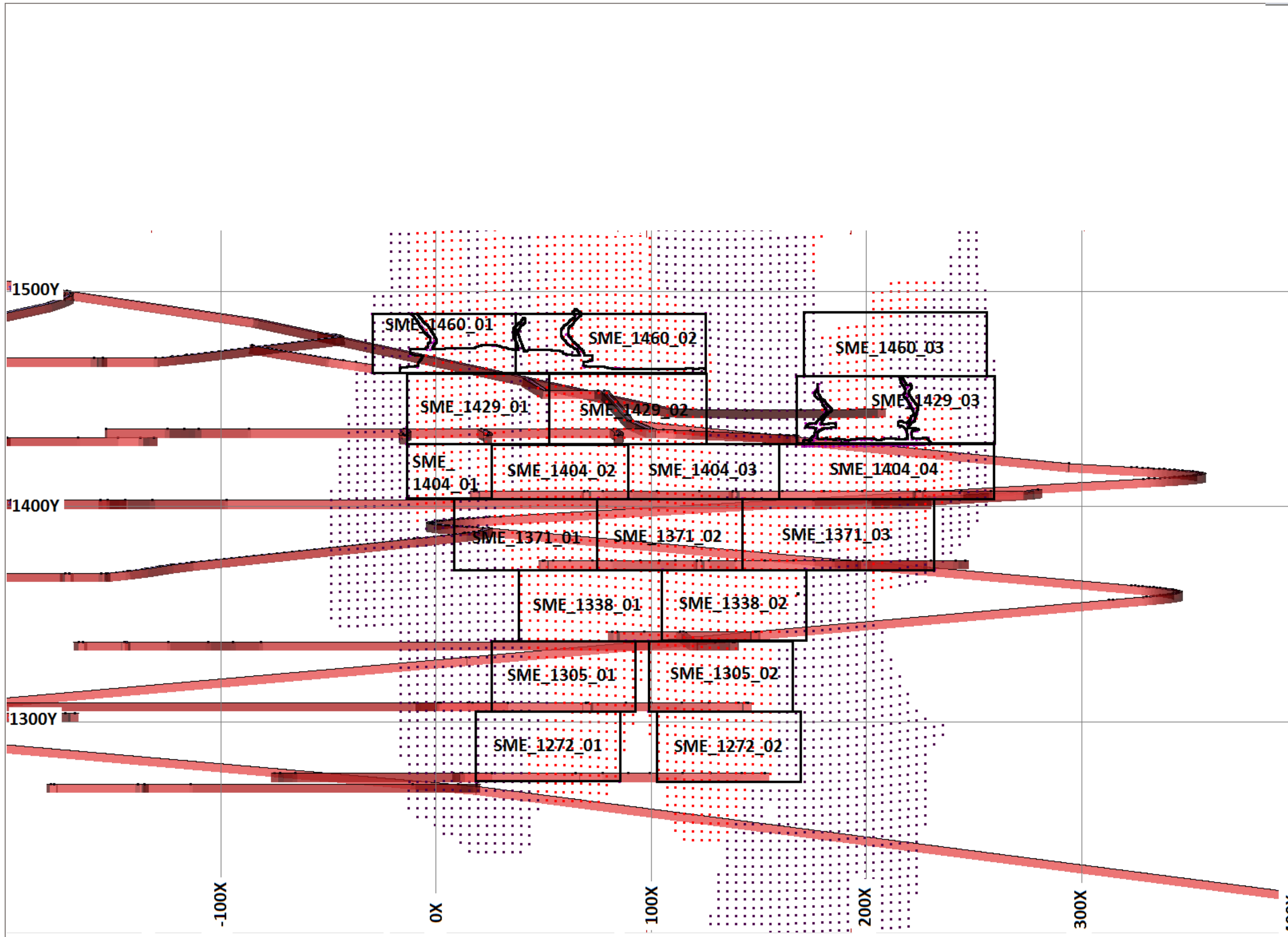
Velardena - Preliminary Economic Assessment

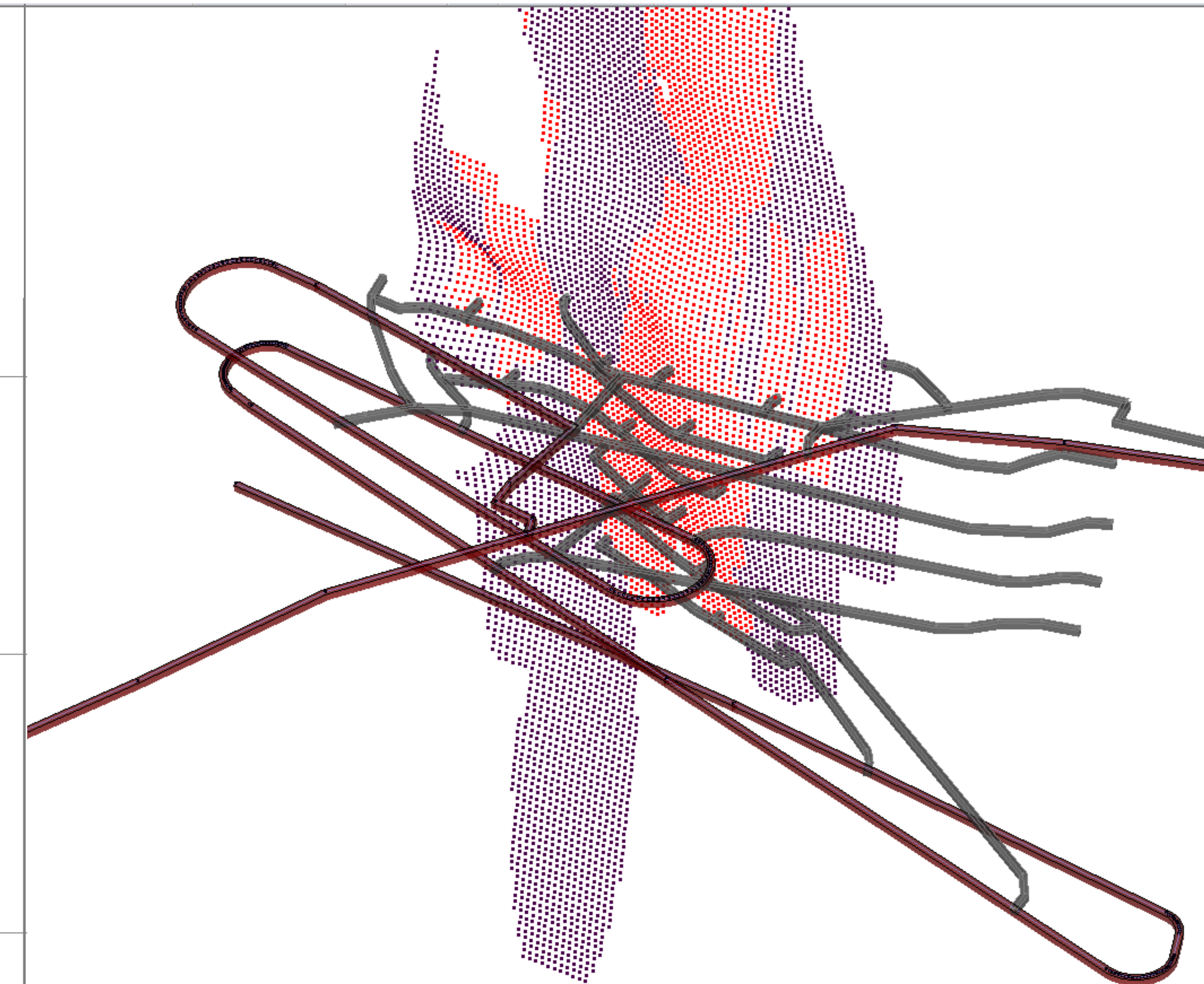
San Mateo West

PROJECT NO.	DWN	CKD	APVD	REV
	CS		MH	

OFFICE	DATE
EBA-VANC	February 5, 2015

Figure 16.5





STOPE	MILL FEED FROM STOPES (t)	MILL FEED FROM DEVELOPMENT (t)	Diluted NSR ($/t)
SME_1460_01	2,243	0	$101
SME_1460_02	4,689	0	$147
SME_1460_03	3,751	1,822	$57
SME_1420_01	2,721	1,411	$93
SME_1420_02	4,040	1,559	$132
SME_1420_03	3,703	0	$140
SME_1404_01	1,360	830	$69
SME_1404_02	2,563	1,176	$147
SME_1404_03	2,083	1,280	$97
SME_1404_04	3,852	1,795	$74
SME_1371_01	4,234	1,257	$141
SME_1371_02	4,056	1,248	$159
SME_1371_03	4,236	1,645	$92
SME_1338_01	5,860	1,305	$162
SME_1338_02	3,891	1,226	$97
SME_1305_01	4,669	1,271	$144
SME_1305_02	3,866	1,226	$99
SME_1272_01	4,234	1,257	$135
SME_1272_02	3,963	1,236	$80

LEGEND

NSR ABOVE $90/tonne

NSR BELOW $90/tonne

NOTES

STATUS

CLIENT

GOLDEN MINERALS COMPANY

TETRA TECH

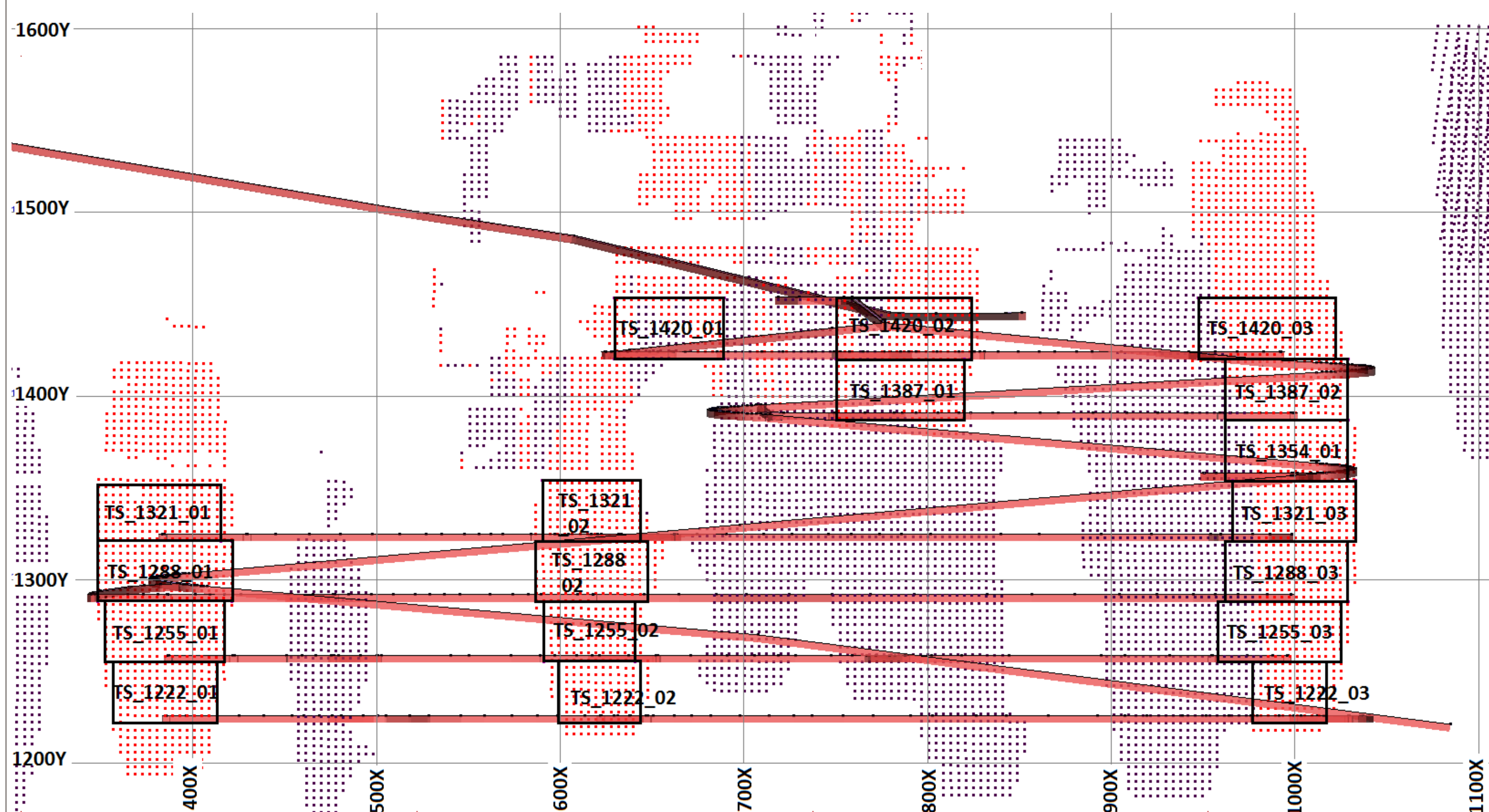
Velardena - Preliminary Economic Assessment

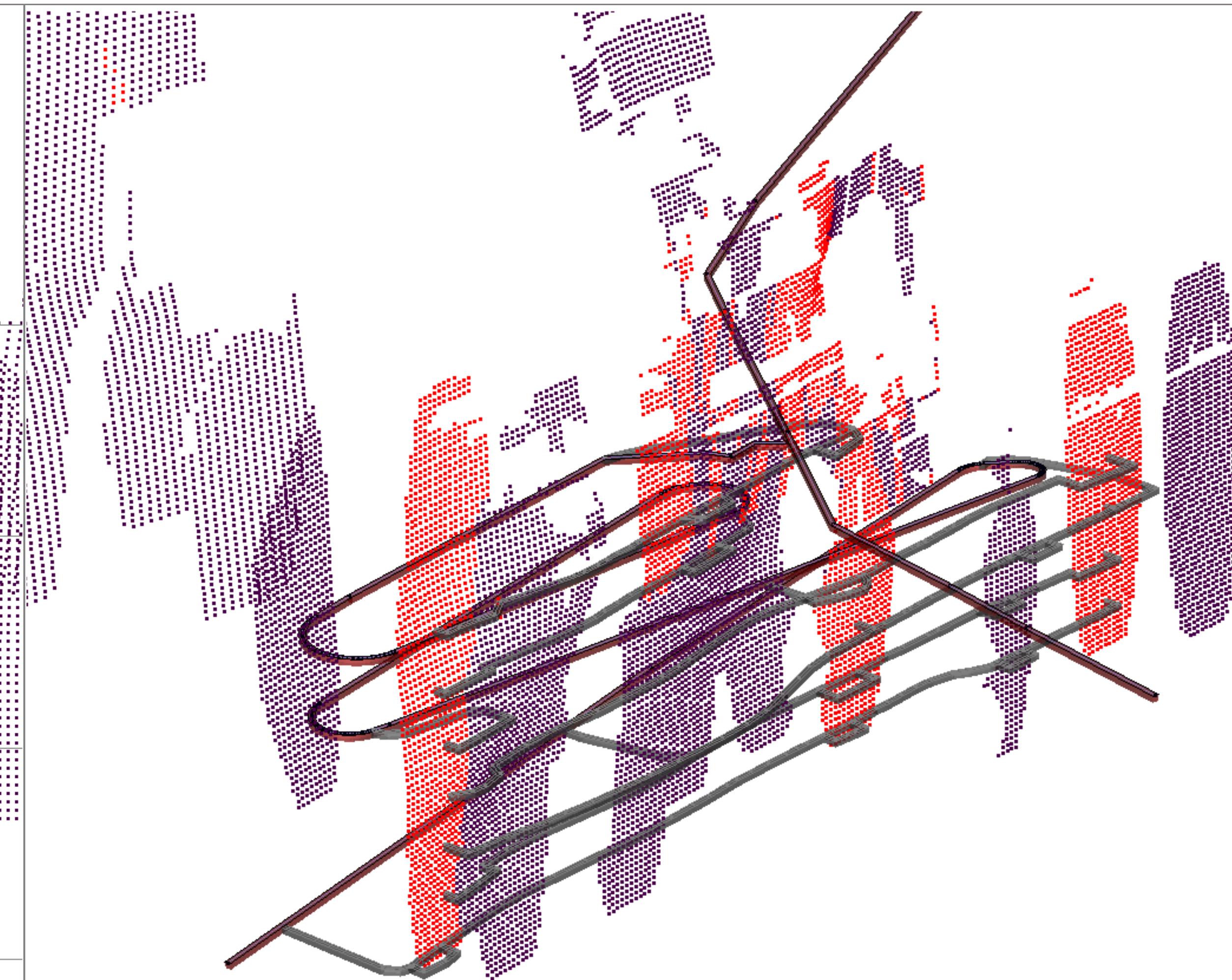
San Mateo East

PROJECT NO. | DWN CS | CKD | APVD MH | REV

OFFICE EBA-VANC | DATE February 5, 2015

Figure 16.6





STOPE	MILL FEED FROM STOPES (t)	MILL FEED FROM DEVELOPMENT (t)	DILUTED NSR ($/t)
TS_1453_01	3,389	1,241	$82.73
TS_1453_02	1,594	777	$175.64
TS_1420_01	6,196	1,468	$89.82
TS_1420_02	4,696	1,375	$155.35
TS_1420_03	3,417	1,105	$125.91
TS_1387_01	4,979	1,299	$98.92
TS_1387_02	4,260	1,305	$116.36
TS_1354_01	4,314	1,276	$92.87
TS_1321_01	4,266	1,275	$98.49
TS_1321_02	5,272	1,092	$227.16
TS_1321_03	3,612	1,244	$200.56
TS_1288_01	4,266	1,275	$93.54
TS_1288_02	6,461	1,257	$247.76
TS_1288_03	4,415	1,355	$203.97
TS_1255_01	4,266	1,275	$87.67
TS_1255_02	4,827	1,206	$244.54
TS_1255_03	3,890	1,207	$203.73
TS_1222_01	2,474	762	$108.71
TS_1222_02	4,591	920	$247.73
TS_1222_03	3,390	1,058	$203.55

LEGEND

NSR ABOVE $90/tonne

NSR BELOW $90/tonne

NOTES

STATUS

CLIENT

GOLDEN MINERALS COMPANY

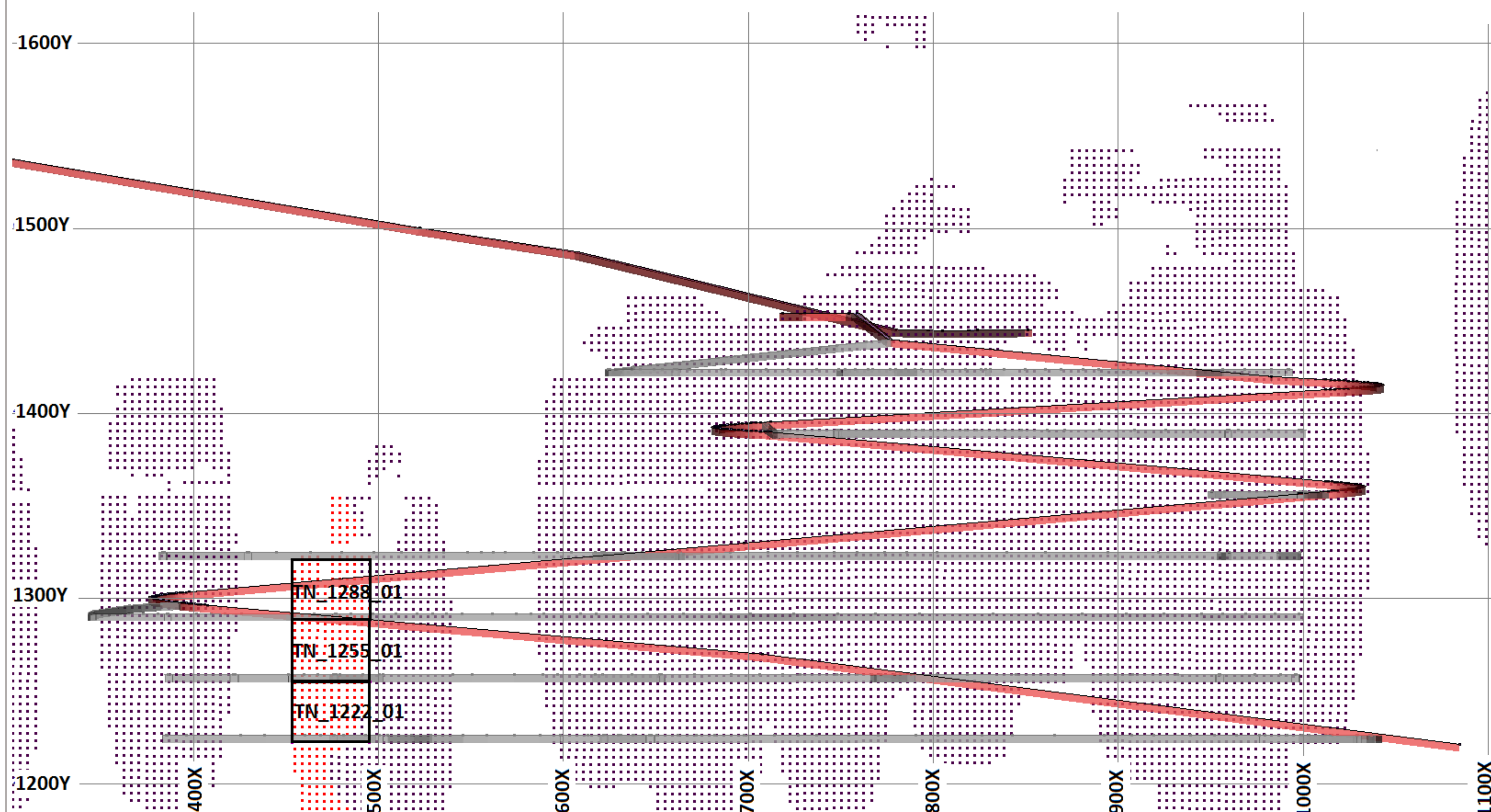
TETRA TECH

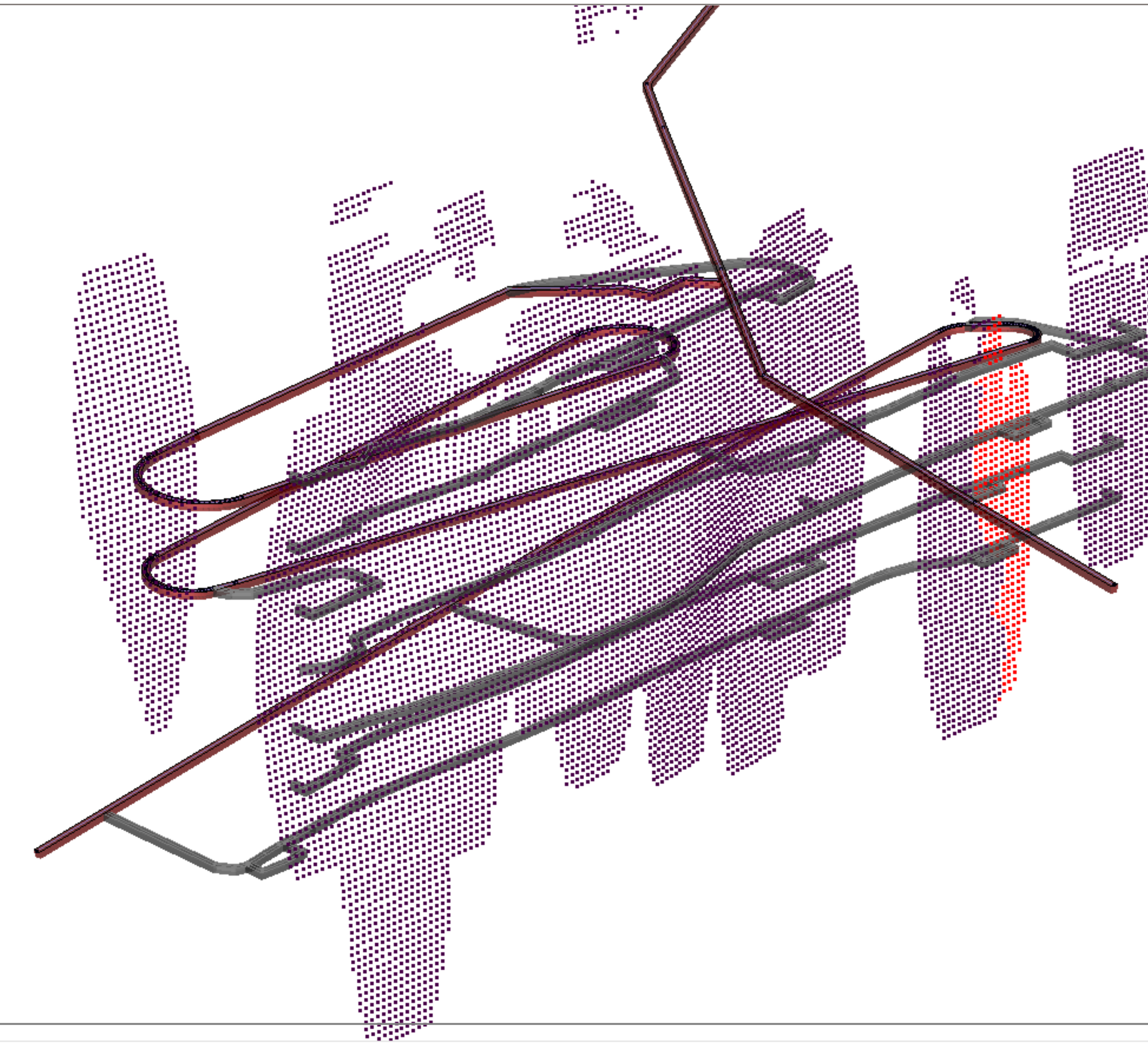
Velardena - Preliminary Economic Assessment

Terneras South

PROJECT NO.	DWN	CKD	APVD	REV
	CS		MH	
OFFICE	DATE			
EBA-VANC	February 5, 2015			

Figure 16.7





STOPE	MILL FEED FROM STOPES (t)	MILL FEED FROM DEVELOPMENT (t)	DILUTED NSR ($/t)
TN_1288_01	3,024	814	$84.82
TN_1255_01	3,077	817	$85.91
TN_1222_01	2,820	808	$81.98

LEGEND

NSR ABOVE $90/tonne

NSR BELOW $90/tonne

NOTES

STATUS

CLIENT

GOLDEN MINERALS COMPANY

TETRA TECH

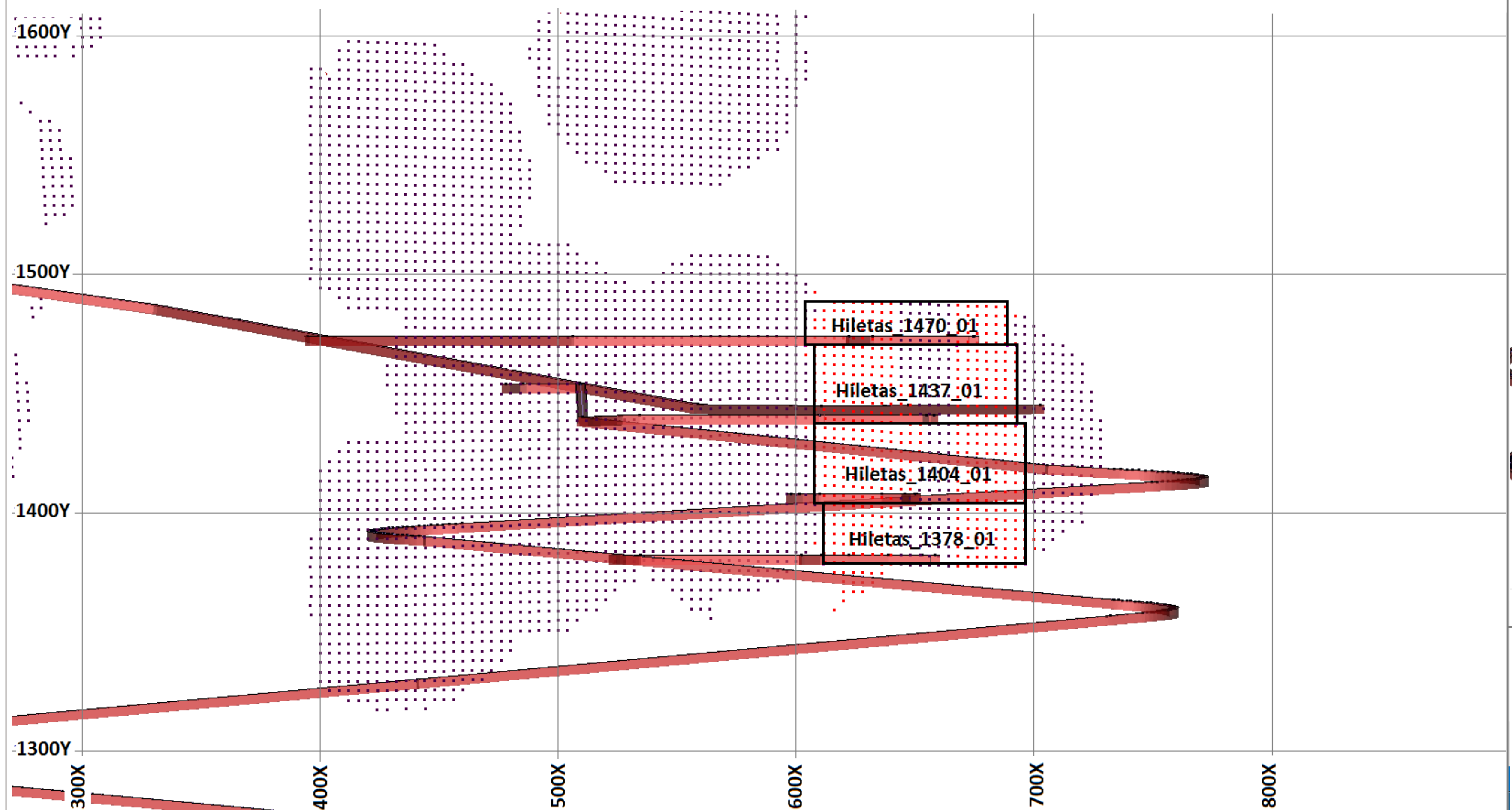
Velardena - Preliminary Economic Assessment

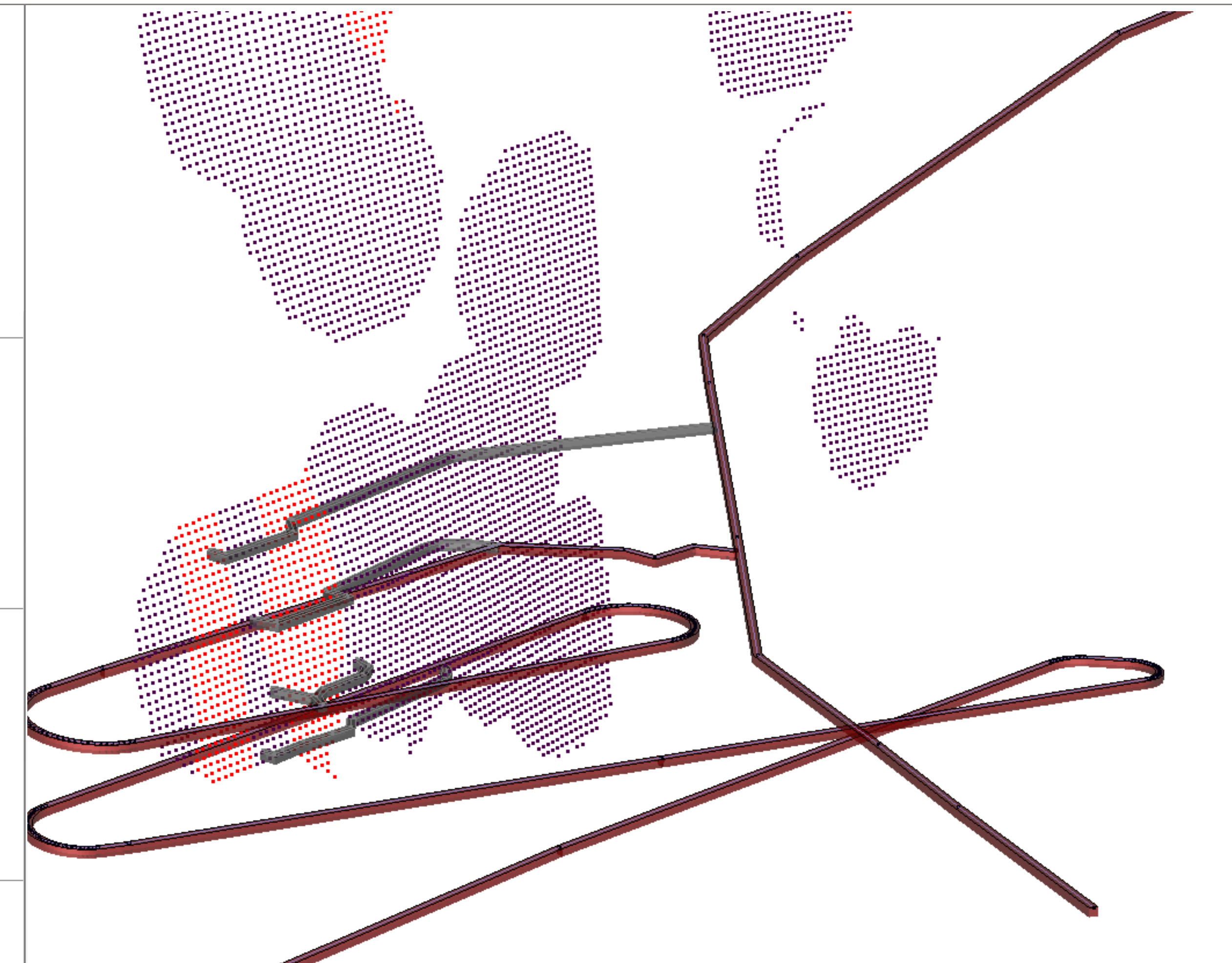
Terneras North

PROJECT NO.	DWN	CKD	APVD	REV
	CS		MH	

OFFICE	DATE
EBA-VANC	February 5, 2015

Figure 16.8





STOPE	MILL FEED FROM STOPES (t)	MILL FEED FROM DEVELOPMENT (t)	DILUTED NSR ($/t)
H_1470_01	2,102	1,586	$69.47
H_1437_01	5,225	1,586	$88.62
H_1404_01	5,384	1,645	$85.79
H_1378_01	3,768	1,504	$80.26

LEGEND

NSR ABOVE $90/tonne

NSR BELOW $90/tonne

NOTES

STATUS

CLIENT

GOLDEN MINERALS COMPANY

TETRA TECH

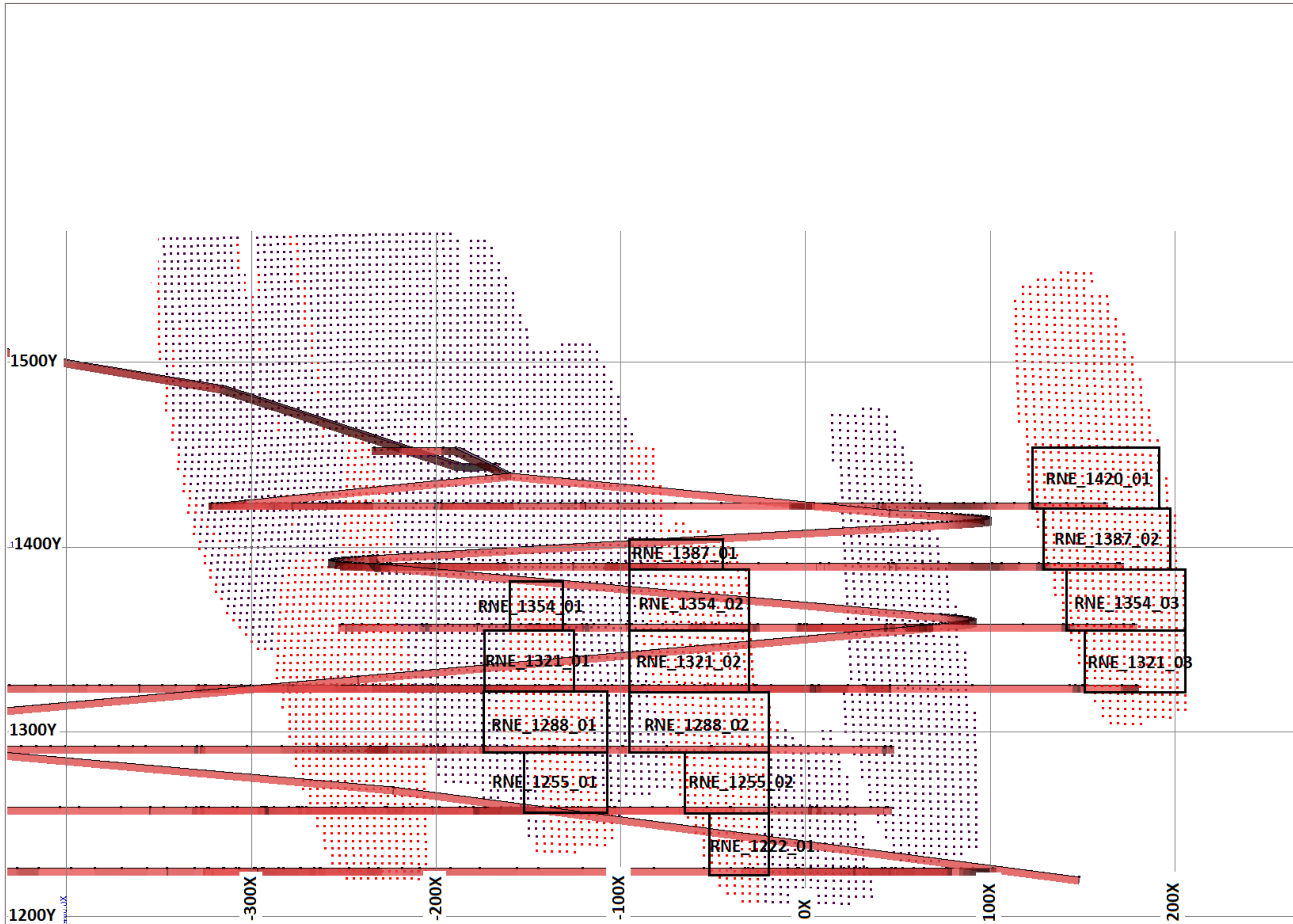
Velardena - Preliminary Economic Assessment

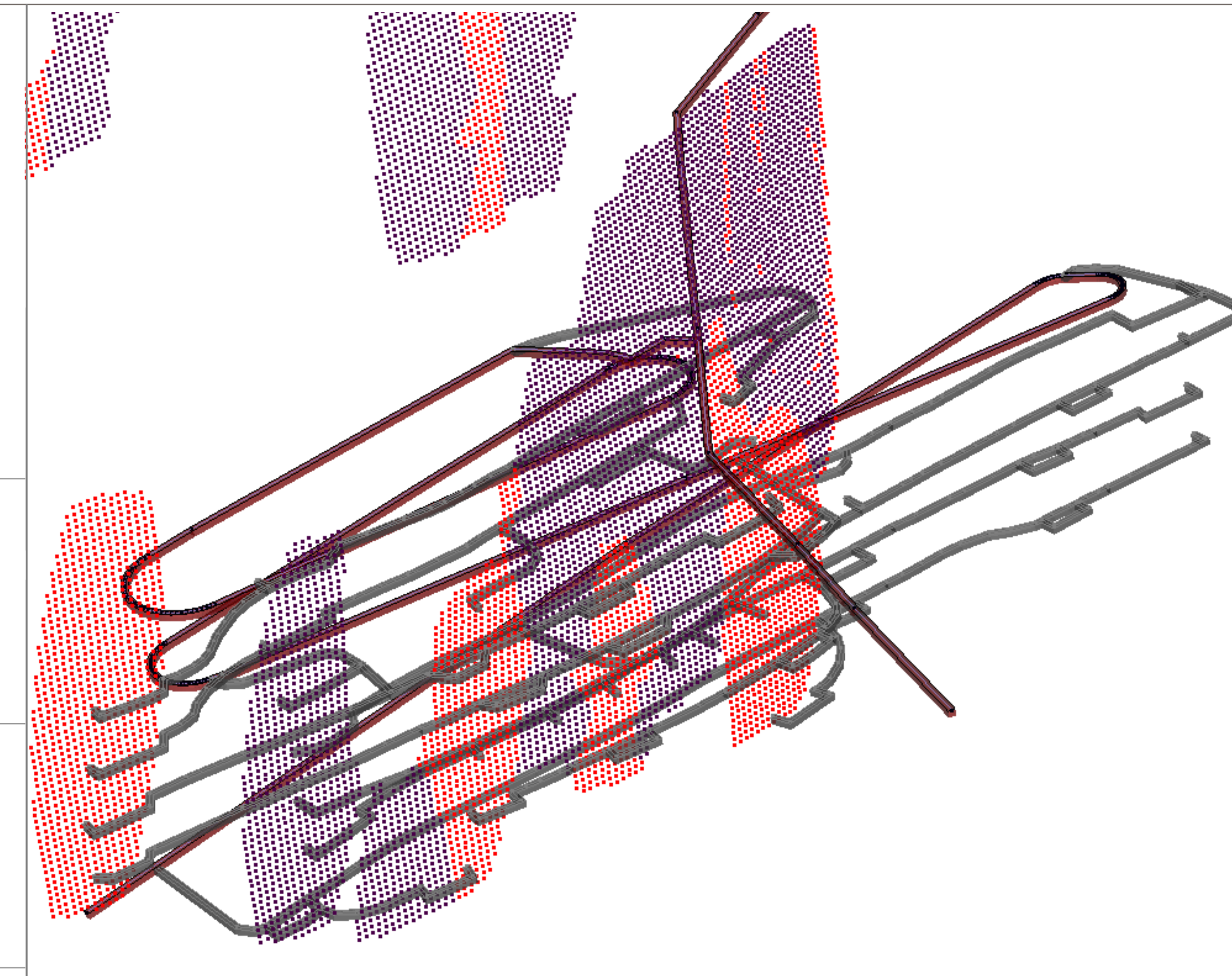
Hiletas

PROJECT NO.	DWN	CKD	APVD	REV
	CS		MH	

OFFICE	DATE
EBA-VANC	February 5, 2015

Figure 16.9





STOPE	MILL FEED FROM STOPES (t)	MILL FEED FROM DEVELOPMENT (t)	DILUTED NSR ($/t)
RNE_1420_01	2,853	1,223	$85.47
RNE_1387_01	2,853	1,223	$85.47
RNE_1387_02	1,245	949	$116.78
RNE_1354_01	2,681	1,152	$85.42
RNE_1354_02	4,215	1,188	$163.08
RNE_1354_03	800	519	$78.38
RNE_1321_01	2,240	973	$85.17
RNE_1321_02	4,174	1,188	$165.59
RNE_1321_03	1,955	869	$82.34
RNE_1288_01	5,509	1,393	$138.86
RNE_1288_02	2,758	1,193	$85.13
RNE_1255_01	2,502	824	$182.09
RNE_1255_02	1,819	810	$84.98
RNE_1222_01	1,659	580	$119.95

LEGEND

- NSR ABOVE $90/tonne (red)
- NSR BELOW $90/tonne (purple)

NOTES

STATUS

CLIENT: GOLDEN MINERALS COMPANY

TETRA TECH

Velardena - Preliminary Economic Assessment

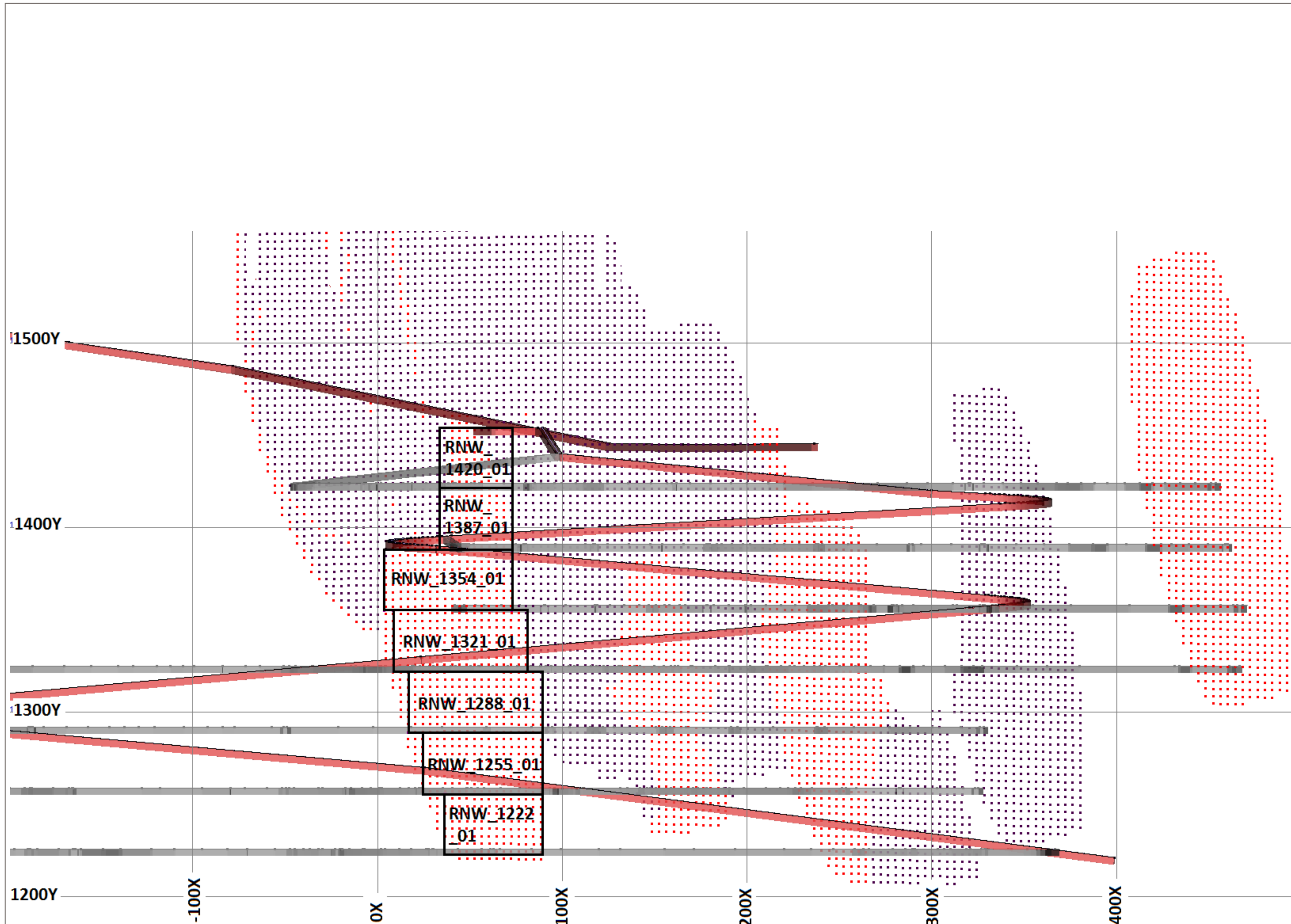
Roca Negra East

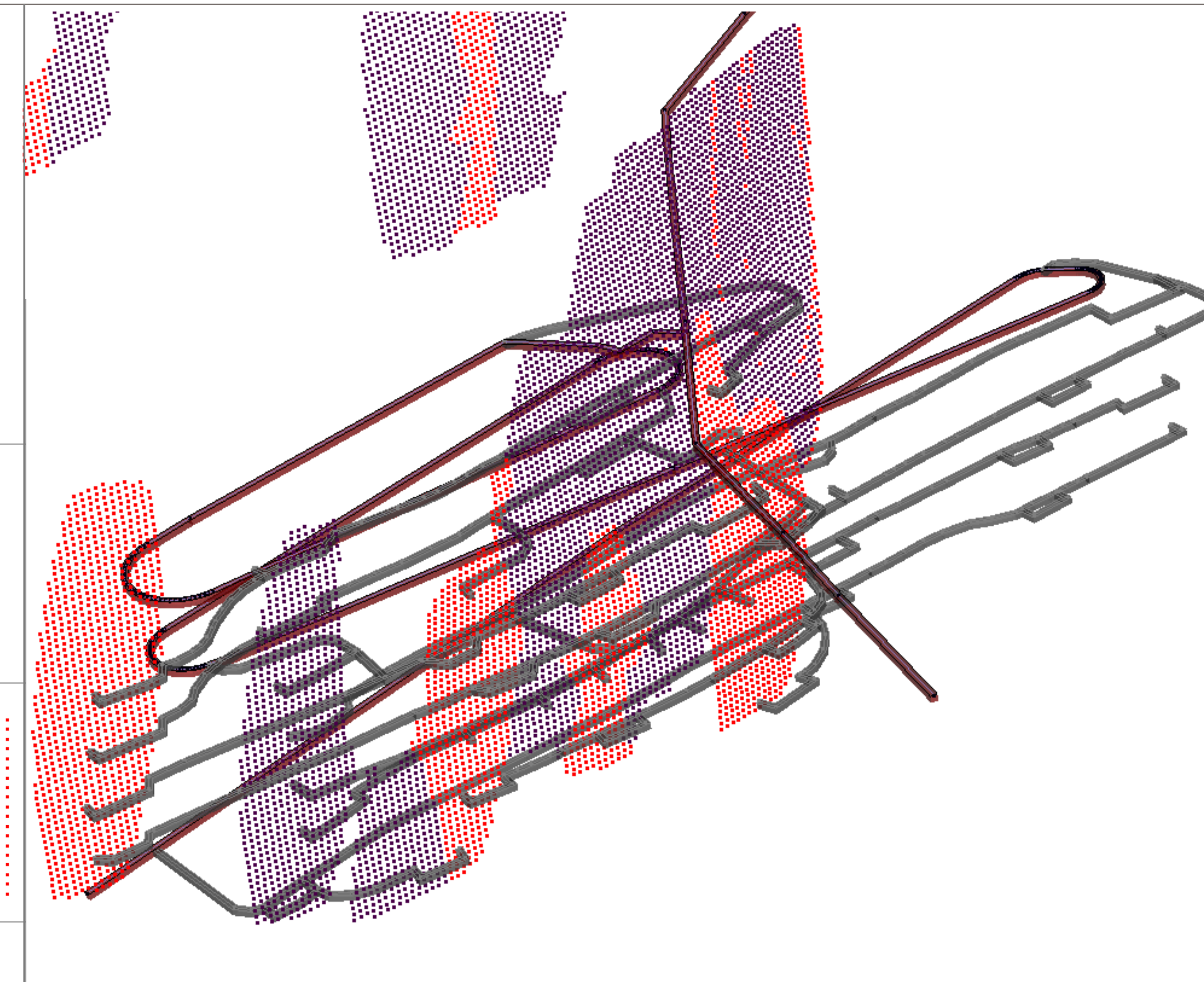
PROJECT NO.	DWN	CKD	APVD	REV
	CS		MH	

OFFICE: EBA-VANC

DATE: February 5, 2015

Figure 16.10





STOPE	MILL FEED FROM STOPES (t)	MILL FEED FROM DEVELOPMENT (t)	DILUTED NSR ($/t)
RNW_1420_01	1,962	684	$79.28
RNW_1387_01	2,013	691	$98.80
RNW_1354_01	4,108	1,262	$158.83
RNW_1321_01	4,632	1,304	$174.04
RNW_1288_01	4,585	1,303	$170.93
RNW_1255_01	4,089	1,167	$178.10
RNW_1222_01	3,319	956	$177.90

LEGEND

NSR ABOVE $90/tonne

NSR BELOW $90/tonne

NOTES

STATUS

CLIENT

GOLDEN MINERALS COMPANY

TETRA TECH

Velardena - Preliminary Economic Assessment

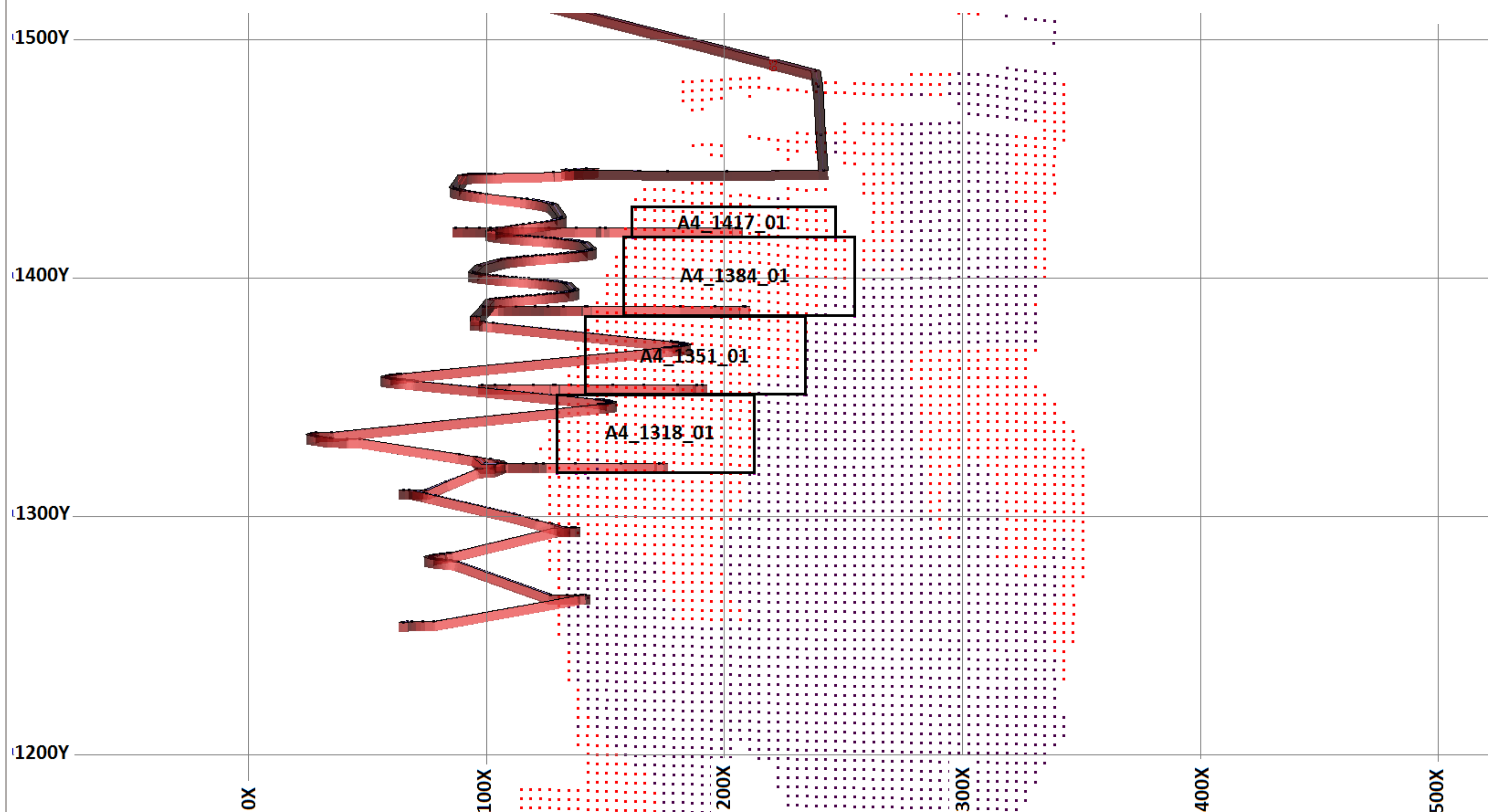
Roca Negra West

PROJECT NO.	DWN	CKD	APVD	REV
	CS		MH	

OFFICE: EBA-VANC

DATE: February 5, 2015

Figure 16.11



STOPE	MILL FEED FROM STOPES (t)	MILL FEED FROM DEVELOPMENT (t)	DILUTED NSR ($/t)
A4-SE_1417_01	1,281	1,696	$139.68
A4-SE_1384_01	8,579	1,928	$136.15
A4-SE_1351_01	8,352	1,835	$184.15
A4-SE_1318_01	6,758	1,630	$162.98

LEGEND

- NSR ABOVE $90/tonne
- NSR BELOW $90/tonne

NOTES

STATUS

CLIENT

GOLDEN MINERALS COMPANY

TETRA TECH

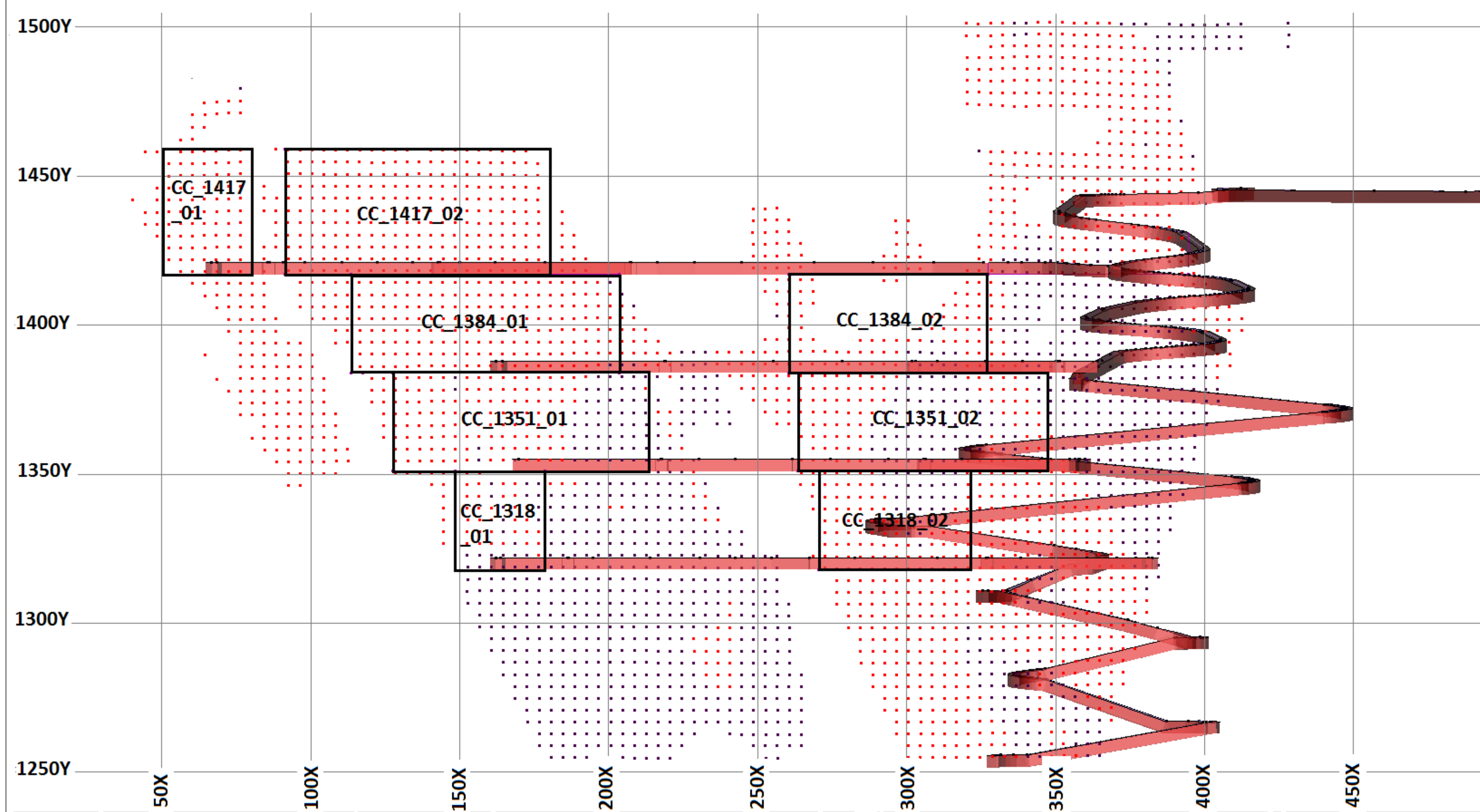
Velardena - Preliminary Economic Assessment

A4_SE

PROJECT NO.	DWN	CKD	APVD	REV
	CS		MH	

OFFICE	DATE
EBA-VANC	February 5, 2015

Figure 16.12



STOPE	MILL FEED FROM STOPES (t)	MILL FEED FROM DEVELOPMENT (t)	DILUTED NSR ($/t)
CC-NW_1417_01	3,597	1,213	$156.29
CC-NW_1417_02	7,984	1,728	$449.32
CC-NW_1384_01	1,314	1,240	$153.04
CC-NW_1384_02	5,431	1,688	$370.25
CC-NW_1351_01	4,972	1,563	$156.24
CC-NW_1351_02	4,609	1,535	$197.91
CC-NW_1318_01	2,918	936	$131.49
CC-NW_1318_02	1,631	539	$114.92

LEGEND

NSR ABOVE $90/tonne

NSR BELOW $90/tonne

NOTES

STATUS

CLIENT

GOLDEN MINERALS COMPANY

TETRA TECH

Velardena - Preliminary Economic Assessment

CC_NW

PROJECT NO.	DWN	CKD	APVD	REV
	CS		MH	

OFFICE: EBA-VANC

DATE: February 5, 2015

Figure 16.13

16.12.2 Main Access Ramps

The mine plan includes using the current San Mateo decline as a main access for mining the stopes. Two internal mine ramp systems (the San Mateo and the Santa Juana ramp systems), currently in development, would be used as a basis for development planning. The San Mateo ramp (reference **Figure 16-5** to **Figure 16-11)** serves the San Mateo, Terneras, Hiletas and Roca Negra stopes. The Santa Juana ramp (**Figure 16-12** and **Figure 16-13)** provides access to CC and A4 areas of the Santa Juana vein systems. The main access ramps have been planned with a maximum of 15% gradient.

16.12.3 Cross Cuts & Footwall Development

Figure 16-5 to **Figure 16-13** show the cross cuts and footwall development required to access each stope for mining. Stope designs wherein the length of development resulted in negative cash flow have not been included in the schedule. Cross cuts have been designed for stopes included in the plan. This mine plan includes some stopes already in production, and as such, additional development was not required for access. Footwall development has been placed a minimum of ten m from the stopes. Footwall development is primarily used for connecting stopes on one level and for creating additional access to the ends of stopes from the crosscuts as necessary.

Table 16-6 to **Table 16-9** show the mining schedule including ramp and lateral development.

16.12.4 Production Schedule

A mining scheduled was developed based on the stopes described above. The scheduling parameters are listed below.

- Maximum annual production of 102,600 Tonnes;
- Target monthly production of 8,500 Tonnes (stockpiling would buffer monthly production);
- Maximum number of stopes running in one period of 15;
- Production per period (month) possible from shrinkage stopes:
  - Month 1 - 340 Tonne (initial stope development);
  - Month 2 to 3 - 480 Tonnes (shrinkage phase);
  - After month 3 - 2,000 Tonnes;
- Production per period possible from resue stopes:
  - Month 1 - 170 Tonnes;
  - After month 1 - 360 Tonnes;
- Maximum development meters for stoping and crosscut - 90 m per month; and
- Maximum ramp development meters 198 m per month or 6.6 meters per day.

- The following was assumed for the development of the mining schedule:
- Stope on-vein development was scheduled before the month prior to commencement with stoping;
- Stope crosscut and footwall drift development was scheduled for completion one month prior to stope on-vein development; and
- With few exceptions, on-vein development for stopes selected for the schedule would be fed into the mill.

Table 16-5 shows the annualized mining schedule and **Table 16-6** to **Table 16-9** show the mining schedule by month. The mining schedule includes development required to maintain stopes in production and for accessing new areas.

Table 16-5: Annual Mining Schedule

Period	Notes		Overall	2015	2016	2017	2018
Tonnes stoping	From Stope Schedule	T	312,162	70,753	80,440	75,888	85,081
Tonnes development	From Stope Schedule	T	98,032	31,679	22,171	26,642	17,541
Tonnes mill feed		T	410,194	102,432	102,611	102,530	102,622
Vein development	Stope sill drives	m	5,199	1,660	1,184	1,528	828
Main ramps	Main ramps	m	2,825	1,910	840	75	-
Lateral development	Cross cuts and footwall drives	m	9,174	2,443	3,083	3,648	1,439
Vent shaft / raises	Level connections for return air	m	1,880	1,505	360	15	-
Grade Au		g/T	4.2	3.3	3.4	4.1	6.2
Grade Ag		g/T	198	224	190	197	182
Grade Zn		%	1.4	1.9	1.8	1.2	0.6
Grade Pb		%	0.9	1.6	1.1	0.6	0.4

Table 16-6: Mining Schedule for Year 1

Golden Minerals: Velardeña PEA		Year 1											
Summary of mining schedule by month		**Jan-15**	**Feb-15**	**Mar-15**	**Apr-15**	**May-15**	**Jun-15**	**Jul-15**	**Aug-15**	**Sep-15**	**Oct-15**	**Nov-15**	**Dec-15**
Period	Overall mine life (4 years)	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 8	Period 9	Period 10	Period 11	Period 12
Tonnes stoping	312,162	2,400	3,730	4,880	5,268	5,552	7,188	4,966	5,365	6,346	6,968	8,569	9,521
Tonnes development	98,032	2,970	3,423	4,095	2,444	2,908	2,022	3,103	3,932	2,059	3,036	1,688	-
Mill feed	410,194	5,370	7,153	8,975	7,712	8,460	9,210	8,069	9,297	8,405	10,004	10,257	9,521
Development meters on-vein	5,199	139	174	223	134	150	111	170	209	107	152	90	-
Development ramp	9,174	125	125	185	290	293	248	120	105	105	105	105	105
Lateral waste development	2,600	488	313	250	256	242	293	264	125	92	83	-	37
Head feed grade													
Au g/T		1.7	1.6	2.7	3.0	3.1	3.5	3.5	3.3	3.6	3.0	4.8	5.0
Ag g/T		190	279	229	210	212	222	189	204	230	190	261	257
Zn%		2.1	2.5	2.1	1.9	2.0	2.3	1.6	1.6	1.9	1.6	1.9	1.8
Pb%		1.7	2.1	1.8	1.7	1.5	1.7	1.3	1.3	1.5	1.3	1.7	1.7

Table 16-7: Mining Schedule for Year 2

Golden Minerals: Velardeña PEA		**Year 2**											
Summary of mining schedule by month		**Jan-16**	**Feb-16**	**Mar-16**	**Apr-16**	**May-16**	**Jun-16**	**Jul-16**	**Aug-16**	**Sep-16**	**Oct-16**	**Nov-16**	**Dec-16**
Period	Overall mine life (4 years)	Period 13	Period 14	Period 15	Period 16	Period 17	Period 18	Period 19	Period 20	Period 21	Period 22	Period 23	Period 24
Tonnes stoping	312,162	8600	6489.01	3766.01	3856.01	4351.01	5301.01	7001.01	8735.01	8259.01	7365.01	8421.01	8296.01
Tonnes development	98,032	-	1,375	1,586	3,569	5,828	5,637	2,531	-	-	1,645	-	-
Mill feed	410,194	8,600	7,864	5,352	7,425	10,179	10,938	9,532	8,735	8,259	9,010	8,421	8,296
Development meters on-vein	5,199	-	73	85	196	311	293	137	-	-	89	-	-
Development ramp	9,174	-	-	-	-	-	75	180	180	180	75	75	75
Lateral waste development	2,600	177	275	441	582	381	135	-	-	126	180	275	511
Head feed grade													
Au g/T		3.1	3.1	3.8	4.5	3.9	3.6	3.0	3.8	3.4	3.2	3.0	2.8
Ag g/T		241	206	168	169	170	191	170	190	192	180	215	186
Zn%		1.9	1.6	1.1	1.4	1.5	1.5	2.1	2.1	1.8	1.6	2.5	2.5
Pb%		1.5	1.2	0.6	0.8	1.0	0.8	0.9	1.0	1.1	0.9	1.5	1.2

Table 16-8: Mining Schedule for Year 3

Golden Minerals: Velardeña PEA		Year 3											
Summary of mining schedule by month		**Jan-17**	**Feb-17**	**Mar-17**	**Apr-17**	**May-17**	**Jun-17**	**Jul-17**	**Aug-17**	**Sep-17**	**Oct-17**	**Nov-17**	**Dec-17**
Period	Overall mine life (4 years)	Period 25	Period 26	Period 27	Period 28	Period 29	Period 30	Period 31	Period 32	Period 33	Period 34	Period 35	Period 36
Tonnes stoping	312,162	6910.01	4105	4829.01	5911.01	7738	10092	8860	8433	5068	4217	4601	5124
Tonnes development	98,032	3,931	2,329	3,954	2,915	1,630	-	-	2,723	2,182	3,653	1,236	2,089
Mill feed	410,194	10,841	6,434	8,783	8,826	9,368	10,092	8,860	11,156	7,250	7,870	5,837	7,213
Development meters on-vein	5,199	205	124	307	170	83	-	-	151	114	199	67	109
Development ramp	9,174	75	-	-	-	-	-	-	-	-	-	-	-
Lateral waste development	2,600	424	524	374	180	90	213	377	293	347	234	322	270
Head feed grade													
Au g/T		3.3	4.0	3.3	3.9	4.3	4.9	4.3	3.7	3.8	3.6	5.2	4.9
Ag g/T		189	193	138	166	232	255	215	170	187	181	224	220
Zn%		1.9	1.5	0.8	1.0	1.2	1.4	1.6	1.4	0.9	0.7	0.8	0.7
Pb%		0.9	0.7	0.4	0.5	0.6	0.7	0.7	0.6	0.6	0.5	0.5	0.4

Table 16-9: Mining Schedule for Year 4

Golden Minerals: Velardeña PEA		**Year 4**											
Summary of mining schedule by month		**Jan-18**	**Feb-18**	**Mar-18**	**Apr-18**	**May-18**	**Jun-18**	**Jul-18**	**Aug-18**	**Sep-18**	**Oct-18**	**Nov-18**	**Dec-18**
Period	Overall mine life (4 years)	Period 37	Period 38	Period 39	Period 40	Period 41	Period 42	Period 43	Period 44	Period 45	Period 46	Period 47	Period 48
Tonnes stoping	312,162	6459	8043	7112	6743	5737	5997	5760	8333	6873	5640	8077	10307
Tonnes development	98,032	2,836	-	1,355	1,698	1,206	3,423	4,189	956	-	-	-	1,878
Mill feed	410,194	9,295	8,043	8,467	8,441	6,943	9,420	9,949	9,289	6,873	5,640	8,077	12,185
Development meters on-vein	5,199	144		73	91	59	184	226	52				
Development ramp	9,174												
Lateral waste development	2,600	90	202	180	245	336	354	32					
Head feed grade													
Au g/T		5.5	6.6	5.7	4.2	4.2	5.1	5.6	7.5	7.1	7.9	8.3	6.6
Ag g/T		217	180	197	194	207	192	180	201	175	176	147	137
Zn%		0.8	0.8	0.8	1.1	0.8	0.5	0.4	0.4	0.8	0.3	0.1	0.3
Pb%		0.5	0.5	0.5	0.6	0.5	0.3	0.2	0.2	0.4	0.4	0.2	0.4

17.0 RECOVERY METHODS

There are two existing process plants, Plant #1 and Plant #2, at the Project. Plant #1 is for treating sulfide material for the production of Pb, Zn and pyrite concentrates and is located near the village of Velardeña, approximately eight kilometers from the mining operations. Plant #1 has an operating capacity of 300 T/d with effective capacity of 285 T/d at a 95% availability, equal to 102,000-103,000 Tonnes per year (T/yr) on a 360 day schedule. Plant #2 is a process plant for treating Au-Ag material, for the production of a Au-Ag flotation concentrate and a Au-Ag doré. Plant #2 was purchased by Williams Resources in 1996. Operations were suspended at both plants in June 2013. In July 2014, Golden Minerals restarted mining operations to feed Plant #1, which started production on November 3, 2014. During the shutdown, Golden Minerals completed several capital projects at Plant #1 prior to its restart including: overhauling the electrical system, installing new concentrate filters, and refurbishing the flotation cells. Plant #2 remains on care and maintenance. Based on the current resource estimates, there are no plans to restart Plant #2 at this time.

Plant #1 processes sulfide material in a conventional flow sheet of crushing, grinding, and differential flotation for the production of three separate concentrates - Pb-Ag, Zn, and pyrite. Plant #1 has an effective nominal operating capacity of 285 T/d and is located adjacent to the village of Velardeña, approximately eight kilometers from the mining operations. **Figure 17-1** shows the processing flow sheet for Plant #1, and **Figure 17-2** shows a layout of Plant #1 and the tailings dams. **Table 17-1** lists the major equipment at Plant #1. Reagents used in Plant #1 include lime, collectors, depressants and frothers.

Run of Mine (RoM) material is received from the underground mines by truck and unloaded onto a small area near the Plant #1 crushing circuit. The RoM material is reclaimed by a front-end loader and fed to a jaw crusher for primary crushing. The primary crushed material is sized by a vibrating screen operating in closed-circuit with a secondary cone crusher. The crushed fine material is conveyed to a 350 T fine ore bin ahead of the grinding circuit. The fine material is ground in two ball mills operating in parallel. The ball mill discharge is classified by cyclones, with the cyclone oversize returned back to the ball mills and the cyclone undersize, at 80% minus 200 mesh, is sent to a conditioning tank ahead of Pb flotation. After conditioning, the slurry is fed to the Pb flotation circuit comprised of rougher, scavenger, and three stages of cleaner cells. The Pb concentrate from the cleaner cells represents the final Pb concentrate, which is then thickened and filtered to a moisture content of 10-12%, by weight, for shipment. The final Pb concentrate has a low projected grade of 35-40% Pb, which is rich in Au and Ag byproducts. The Pb and Ag recoveries to the Pb concentrate are projected to be between 77-80%.

The tailings from the Pb flotation circuit is fed to a conditioning tank ahead of the Zn flotation circuit. The conditioned slurry is fed to the Zn flotation circuit comprised of rougher, scavenger, and three stages or cleaner cells. The Zn concentrate from the cleaner cells represents the final Zn concentrate, which is then thickened and filtered to a moisture of 10-12%, by weight, for shipment. The final Zn concentrate has a high projected Zn content of over 55% Zn. The Zn recovery to the Zn concentrate is projected to be approximately 74%. Both the Pb and Zn concentrates contain levels of As and Sb impurities (see **Table 13-1**).

The tailings from the Zn flotation circuit is fed to a conditioning tank ahead of the pyrite flotation circuit. The conditioned slurry is fed to the pyrite flotation circuit comprised of rougher, scavenger, and two stages of cleaner cells. The pyrite concentrate from the cleaners represents the final pyrite concentrate, which is then thickened and filtered to a moisture content of 10%, by weight, for shipment. The final pyrite concentrate contains high Au values, which are payable, given preliminary discussions with smelters.

The tailings from pyrite flotation represents the final plant tailings which are pumped to the Tailings Dam #3 located adjacent to Plant #2 (see **Figure 17-2**). Tailings Dam #3 has sufficient capacity to hold 3.9 years of tailings from Plant #1. Any additional capacity in Tailings Dam #3 would need to be permitted.

Plant #1 obtains power from the national Comisión Federal de Electricidad (CFE) power grid. The nominal electrical consumption for Plant #1 is approximately 33 kWh/tonne of material processed. Fresh water for Plant #1 is obtained from existing water wells located near Plant #1 and Plant #2 at an average consumption rate of 184 cubic meters per day. Historically, some fresh water has been trucked from Plant #2 to Plant #1 during periods of insufficient water flow. In 2015, Golden Minerals plans to construct a 4-inch diameter water line from Plant #2 to Plant #1, a distance of about 5 kilometers. **Table 17-2** summarizes the process materials consumed in Plant #1. The consumption rates for electrical, water and process materials are forecast to remain constant over the remaining LoM.

Table 17-1: Major Process Plant Equipment List for Plant #1

Description	Quantity	Function
Coarse Ore Bin; 120 Ton Capacity	1	ROM Feed Ore Bin
Jaw Crusher; 10 inch by 30 inch; 100 HP	1	Primary Crusher
Cone Crusher; Sandvik Model H3800; 200 HP	1	Secondary Crusher
Vibrating Screen; FIMSA 4 ft by 6 ft; 10 HP	1	Size Classification
Fine Ore Bin; 350 Ton Capacity	1	Surge Capacity
Ball Mill #1; FIMSA; 7 ft by 10 ft; 200 HP	1	Ore Grinding
Ball Mill #2: MERCY; 5 ft by 8 ft; 125 HP	1	Ore Grinding
Cyclones; D6	3	Size Classification
Lead Conditioning Tank; 6 ft by 6 ft; 10 HP	1	Conditioning
Lead Rougher Flotation Cells; FIMSA; 100 cu ft; 60 HP	4	Lead Rougher Flotation
Lead Scavenger Flotation Cells; FIMSA; 100 cu ft; 20/30 HP	4	Lead Scavenger Flotation
Lead Cleaner Flotation Cells; FIMSA; 3 stages; 24 cu ft; 7.5/10 HP	6	Lead Cleaner Flotation
Lead Concentrate Thickener; 25 ft diameter; 2 HP	1	Thicken Final Lead Concentrate
Lead Concentrate Filter; SEW; 6 ft diameter; 3 Discs; 2 HP	1	Filter Lead Concentrate
Zinc Conditioning Tank; 6 ft by 6 ft; 10 HP	1	Conditioning
Zinc Rougher Flotation Cells; Denver; 100 cu ft; 15 HP	6	Zinc Rougher Flotation
Zinc Primary Scavenger Flotation Cells; Denver; 50 cu ft; 15 HP	6	Zinc Scavenger Flotation
Zinc Secondary Scavenger Flotation Cells; Denver; 50 cu ft; 15 HP	4	Zinc Scavenger Flotation
Zinc Cleaner Flotation Cells; Denver; 3 stages; 24 cu ft; 7.5 HP	6	Zinc Cleaner Flotation
Zinc Concentrate Thickener; 25 ft diameter; 2 HP	1	Thicken Final Zinc Concentrate
Zinc Concentrate Filter; Filter Press; 0.25 HP	1	Filter Zinc Concentrate
Pyrite Conditioning Tank; 6 ft by 6 ft; 10 HP	1	Conditioning
Pyrite Rougher Flotation Cells; MINPRO; 100 cu ft; 30 HP	4	Pyrite Rougher Flotation
Pyrite Scavenger Flotation Cells; Denver; 50 cu ft; 25/30 HP	5	Pyrite Scavenger Flotation
Pyrite Cleaner Flotation Cells; Denver; 2 stages; 25 cu ft; 7.5 HP	8	Pyrite Cleaner Flotation
Pyrite Concentrate Thickener; 25 ft diameter; 2 HP	1	Thicken Final Pyrite Concentrate
Pyrite Concentrate Filter; 0.25 HP	1	Filter Pyrite Concentrate

Table 17-2: Process Materials for Plant #1

Process Materials	Consumption Rate (kg/ton processed)
Grinding Balls - 2.5 inch diameter	0.83
Grinding Balls - 2 inch diameter	0.72
Grinding Balls - 1.5 inch diameter	0.17
Lime	1.16
Sodium Cyanide	0.07
Sulfate	0.88
Xanthate 350	0.8505
Aeropromoter 211	0.02
Aeropromoter 3416	0.0675
Aerofloat 31	0.054
Frother 1065	0.0945
Aerofloat 70	0.01
P404	0.03
P242	0.04
Copper Sulfate	0.92

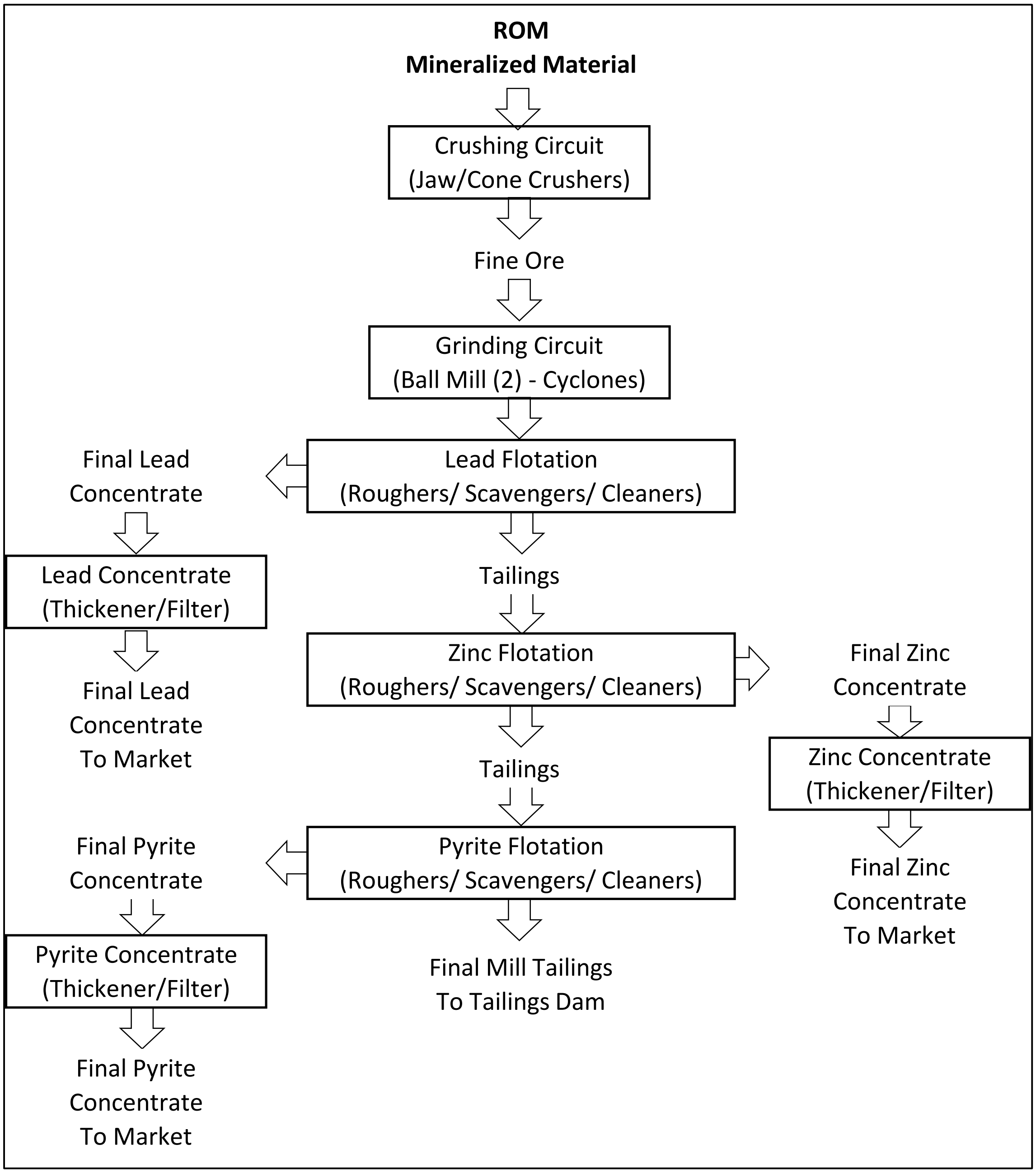
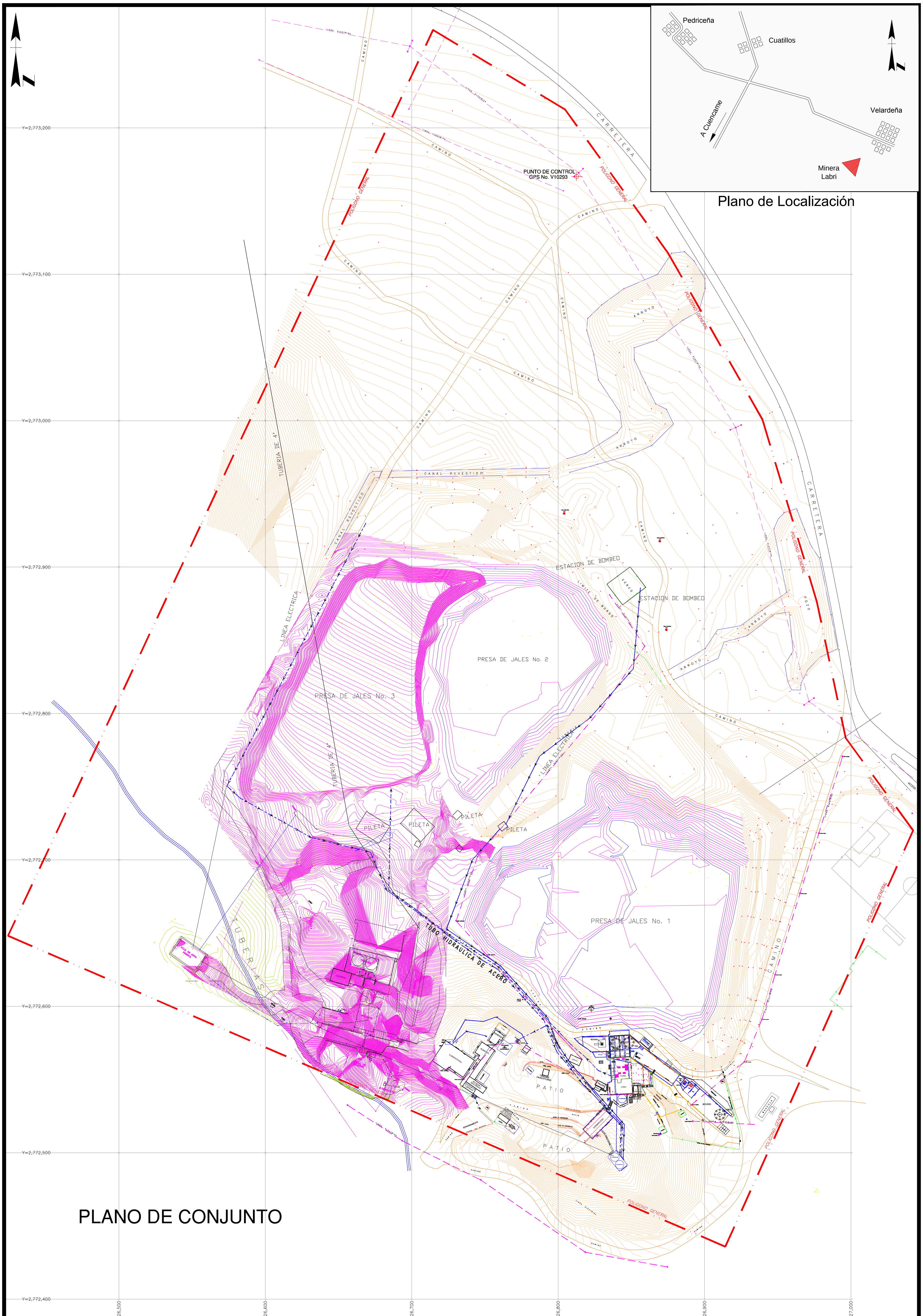


Figure 17-1: Process Plant Flow Sheet for Plant #1



Planos de Conjunto Minera LABRI

En Coordenadas UTM WGS 84 Esc. 1:2,500

Minera Labri, S.A. de C.V.

Plant #2 is capable of processing both oxide and sulfide material in two conventional flow sheets for the production of a Au-Ag doré for oxide material and a Au-Ag flotation concentrate for sulfide material. Plant #2 has an operating capacity of 600 Tonnes per day. **Figure 17-3** shows the processing flow sheet for Plant #2, and **Figure 17-4** shows a layout the Plant #2 and tailings dams. **Table 17-3** lists the major equipment at Plant #2. Plant #2 is located approximately 3.5 kilometers from the mining operations. RoM material was received from the underground mines by truck and unloaded in an area near the Plant #2 crushing circuit. The RoM material was campaigned through Plant #2 as either oxide or sulfide. The RoM material was reclaimed by a front-end loader and fed onto an apron feeder to a jaw crusher for primary crushing. The primary crushed material was sized by a vibrating screen operating in closed-circuit with a secondary standard cone crusher. The crushed fine material was conveyed to a 500 tonne fine ore bin ahead of grinding. The fine material was ground in a ball mill operating in closed-circuit with cyclones for size classification. The cyclone undersize was returned back to the ball mill and the cyclone oversize to a thickener for oxide material or a conditioning tank for sulfide material ahead of flotation. For the oxide material, the cyclone overflow was sent to a thickener with the thickener underflow fed to the cyanide leach tanks. The discharge from the cyanide leach tanks was to a four stage CCD thickener circuit. The solution from the first stage was a Au-Ag rich solution, termed pregnant liquor solution (PLS). The PLS was clarified of any fine particles and pumped to a Merrill-Crowe circuit where Zn dust is added to precipitate out the contained Au and Ag from the PLS. The resulting Zn precipitate was smelted in an induction furnace for the production of doré that was shipped to refineries. The underflow from the last CCD thickener represented the final tailings from the oxide circuit which was pumped to the nearby tailings dam (see **Figure 17-4**).

For sulfide material, the cyclone overflow was fed to the sulfide flotation circuit comprised of roughers, scavengers and cleaner cells (two stages). The sulfide concentrate from the cleaners represented the final sulfide concentrate, which was rich in Au and Ag. The final sulfide concentrate was thickened and filtered for shipment. The tailing from the sulfide flotation circuit represented the final Plant #2 sulfide tailings that was pumped to the nearby tailings dam (see **Figure 17-4**). Reagents used in Plant #2 were cyanide, Zn dust, diatomaceous earth, flocculants, lime, collectors and frothers.

Table 17-3: Major Process Plant Equipment List for Plant #2

Description	Number	Function
Coarse Ore Bin; 7 ft by 11 ft by 14 ft; 50 Ton Capacity	1	ROM Feed Ore Bin
Coarse Ore Apron Feeder: 4 ft by 17 ft; 3 HP	1	Feed Jaw Crusher
Jaw Crusher; 24 inch by 36 inch; Allis-Chalmers; 100 HP	1	Primary Crusher
Cone Crusher; 4 ft diameter Standard; Symons; 100 HP	1	Secondary Crusher
Vibrating Screen; Double-Deck; TYLER, 6 ft by 10 ft; 20 HP	1	Size Classification
Fine Ore Bin; 8 m by 9 m; 500 Ton Capacity	1	Surge Capacity
Ball Mill; Allis-Chalmers; 10.5 ft by 13 ft; 800 HP	1	Ore Grinding
Cyclones; Krebs D6	10	Size Classification
Primary Thickener; 16 meter diameter by 3 meter high; 3 HP	1	Thicken Cyclone Overflow
Leach Tanks; Agitated; 8 meter by 8.5 meters; 25 HP	8	Cyanide leach Au and Ag
CCD Thickeners; 60 ft diameter; 5 HP	4	Solid-liquid separation; PLS
PLS Tank; 8 meters diameter by 4 meters high	1	PLS Surge Tank
Clarifiers; 52 square meters; Diatomaceous Earth; 1.5 HP	2	Clarify PLS
Clarified PLS Tank; 5 meters diameter by 6 meters high	1	Clarified PLS Surge Tank

Zinc Filter Presses; 1.84 m diameter by 1.84 m high; 4.89 cu m	2	Filter Zinc Precipitate
Primary Flotation Cells; WEMCO; 75 cu m; 15 HP	3	Au-Ag rougher flotation
Cleaner Flotation Cells; First Stage; DENVER; 25 cu ft; 5 HP	2	First stage cleaners
Cleaner Flotation Cells; Second Stage; DENVER; 45 cu ft; 10 HP	4	Second stage cleaners
Conditioner; 1.7 meter diameter by 2 meters high; 25 HP	1	Conditioning
Concentrate Thickener; 6.84 m diameter by 2.45 m high; 3 HP	1	Thicken Final Concentrate
Concentrate Filter; Vacuum; Komline-Sanderson	1	Concentrate Filter
Smelting Furnace; IDUCTOHERM, 650 kg charge; 150 KW	1	Precipitate Smelting
Filter Presses; DURCO/PERRIN/HYSTAR	3	Filter

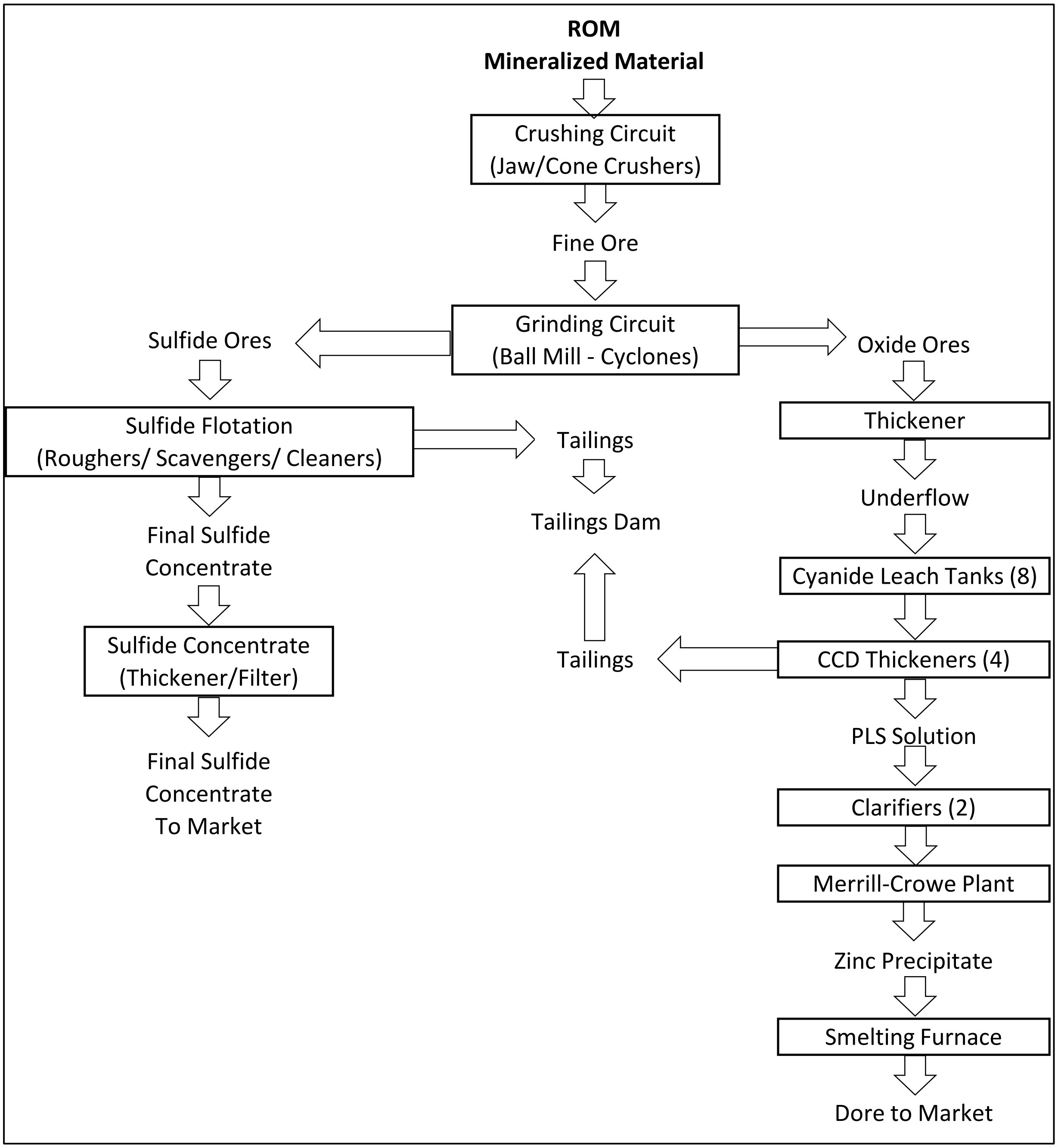
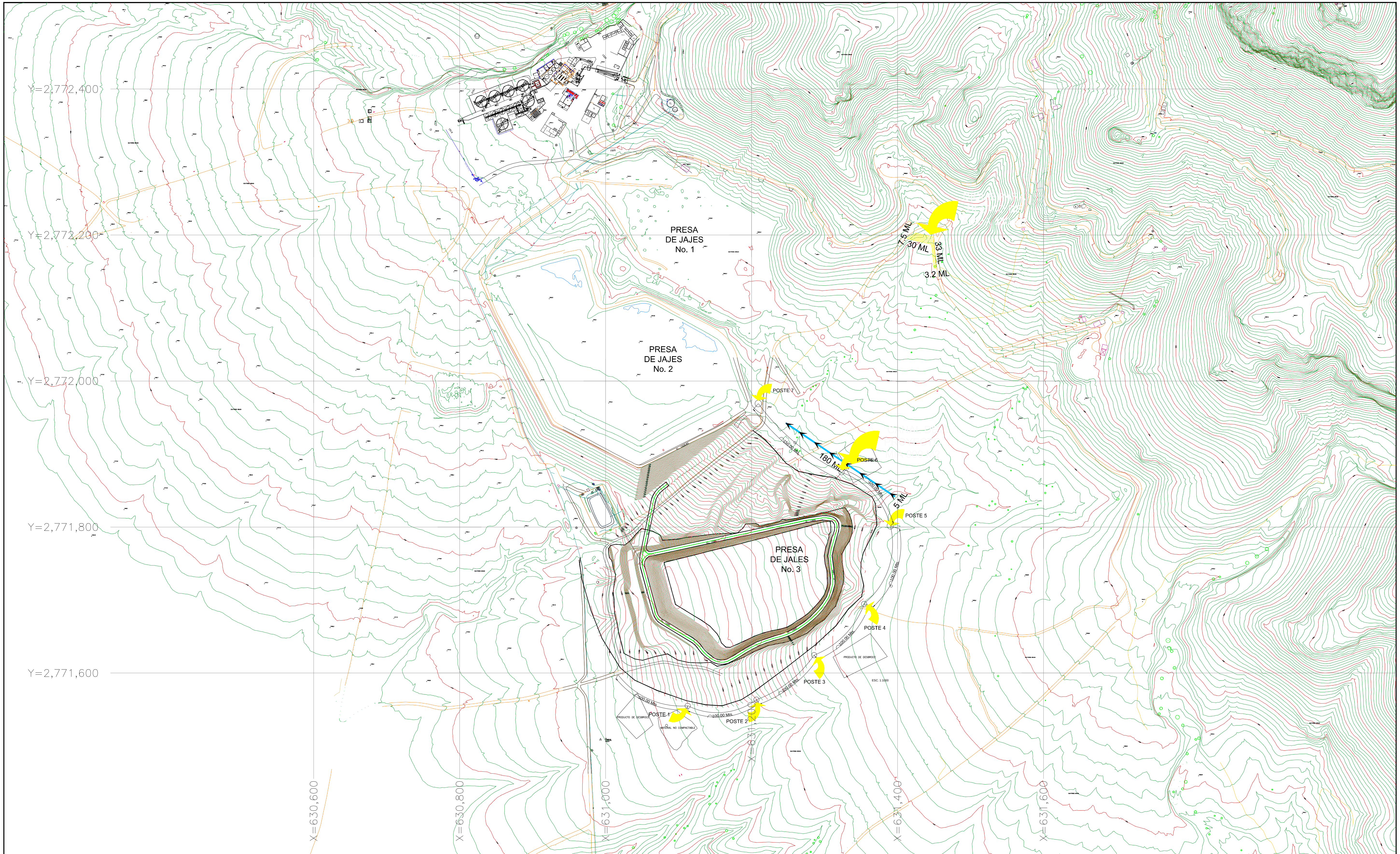


Figure 17-3: Process Plant Flow Sheet for Plant #2



GEOLOGIA	ANCLAJE	DETALLES	ESTA COPIA ES REPRODUCCION FIEL DE UN ORIGINAL QUE HA SIDO APROBADO	MINERA WILLIAM S.A.deC.V. MINA VELARDEÑA	TITLE: MINERA WILLIAM S.A. DE C.V.
En zonas mineralizadas, barrene dentro de las marcas pintadas pro los geologos.		Izq. Der. + –			Planta No. 2
INGENIERIA	MINE SERVICES:	VENTILACION:			CENTRO DE COSTO:
En zonas de tepetate siguir la linea proveido por topografia		Mantenga la manga de ventilacion a 15m del tope.	FIRMADO Luis Serna		SCALE: 1:5000 Salvo Otra Indicación FECHA DE PLOTEO: 20

18.0 INFRASTRUCTURE

Infrastructure facilities at the Project include the following:

- Access roads;
- Power line;
- Ancillary buildings; and
- Water wells.

There are no man-camp facilities at the Project site.

18.1 Access Roads

The Project is located in the Mexican state of Durango, approximately 65 kilometers southwest of the city of Torreón and 150 kilometers northeast of the city of Durango. A major 4-lane highway, Highway 40, connects these cities. The Velardeña Plant #1 is located adjacent to the village of Velardeña which is approximately 500 meters west of Highway 40D. The Velardeña mines are located about eight kilometers from Plant #1 via a gravel road. Plant #2 is located approximately 3.5 kilometers from the Velardeña mine, also via gravel roads.

18.2 Power Lines

The mines, Plants #1 and #2 are connected to the national grid of CFE via a substation located near the entrances of Golden Minerals' Plant #1 and Peñoles Velardeña mine. The total installed capacity of Plant #1 in two transformers of 500 kilovolt amps (KVA) is 34,500 with a step down to 480 volts (V).

18.3 Ancillary Buildings

Ancillary buildings for the Project include administration buildings, warehouses, maintenance shops, offices, metallurgical laboratory and an analytical laboratory for the preparation and assaying of mine and plant samples. Security gates are located at the entrances of the mines and both Plant #1 and #2.

18.4 Water Wells

There are six existing water wells (three at Plant #1 and three at Plant #2) for extracting water from local aquifers. These wells are authorized, regulated and permitted by CONAGUA, the Mexican Comisión Nacional Del Agua. **Table 18-1** and **Table 18-2** summarize the data for these wells.

Table 18-1: Data for Water Production Wells - Plant #1

Pump	Well Depth (m)	Well Pump Submersible	Authorized Volume	
			m^3/d	m^3/yr
Discordia	25	2 inch	67.53	24,655
Noria	25	2 inch	67.53	24,655
Rancho	200	2 inch	49.165	17,946

Source: Golden Minerals, December 2014 Site Visit

Table 18-2: Data for Water Production Wells - Plant #2

Pump No.	Well Depth (m)	Well Pump Submersible	Flow Rate (L/s)	Authorized Volume	
				m^3/d	m^3/yr
1	220	4 inch	8	460.65	168,192
2	400	4 inch	5	201.5	73,584
3	431	6 inch	11	431.8	157,680

Source: Golden Minerals, December 2014 Site Visit

In 2015, Golden Minerals has planned the construction of a 4-inch diameter water line from Plant #2 to Plant #1, a distance of five kilometers, at a capital cost US$90,000.

19.0 MARKET STUDIES & CONTRACTS

19.1 MARKETS

Mill operations, which re-commenced in November 2014, produce Pb, Zn and pyrite concentrates. Markets for the Pb and Zn concentrates include metal brokers and direct sales to Pb and Zn smelters. The concentrates produced are typical within the Mexican mining industry and the concentrate market within Mexico and worldwide is liquid. Potential markets for the pyrite concentrate produced include mineral processing operations utilizing autoclaves to process relatively low grade material, and smelting operations in China.

The Pb and Zn concentrates are currently purchased by Transamine (a metal broker) and contracts are in place for the proposed duration of operation. Although they require annual renewal. Previous arrangements with Newmont for sale of pyrite concentrates have expired. Golden Minerals is in discussions with brokers for future pyrite concentrate sales and have been provided general concentrate terms. For purposes of the PEA, it is assumed that Golden Minerals will be successful in securing a buyer for pyrite concentrates.

19.1.1 Marketing Studies

Concentrates are currently produced at the project and successfully sold by Golden Minerals in the concentrate market. Concentrate grade and quality has been managed by the mill to produce marketable concentrates. Marketing studies in addition to discussions and negations with current and potential buyers have not been completed and therefore have not been reviewed by the author of this section.

19.2 CONTRACTS

Existing contracts for concentrates currently secured by Golden Minerals are within industry norms. Sales terms for the concentrates are as follows:

19.2.1 Lead Concentrate Terms

Pay Fors:

- Pay for 95.0% maximum of the contained Pb based of the final Pb concentrate content, subject to a minimum deduction of three units, will be paid at the LME settlement for Pb quotations, as published in the Metal Bulletin, during the quotation period.

- Pay for 95.0% maximum of the contained Ag based on the final Ag content with a deduction of 50.0 g/T Ag in Pb concentrate with the remaining paid at 95.0% at the quote of LME London Spot, as published at the Metal Bulletin, during the period of quotations. Fractions in proportion.

- Pay for 95.0% maximum of the contained Au based on the final Au content with a deduction of 1.0 g/T Au in Pb concentrate with the remaining paid at 95.0% at the quote of LME London Spot, as published at the Metal Bulletin, during the period of quotations. Fractions in proportion.

TC/RCs:

- Pb Concentrate Treatment charge: US$299/T of Pb concentrate.
- Au Refining Charge: US$8.00/toz of payable Au.
- Ag Refining Charge: US$2.50/toz of payable Ag.

Penalties:

- Arsenic: For As contents less than 0.3% As, there is no penalty. If the As content is greater than 0.3% As and less than 1.0% As, there is a penalty of US$4.00/T of Pb concentrate for every 0.1% As greater than 0.3% As. If the As content is greater than 1.0% As, there is a penalty of US$5.00/T of Pb concentrate for every 0.1% As greater than 1.0% As.
- Antimony: For Sb contents less than 0.3% Sb, there is no penalty. If the Sb content is greater than 0.3% Sb and less than 1.0% Sb, there is a penalty of US$4.00/T of Pb concentrate for every 0.1% Sb greater than 0.3% Sb. If the Sb content is greater than 1.0% Sb, there is a penalty of US$5.00/T of Pb concentrate for every 0.1% Sb greater than 1.0% Sb.
- Others: Penalties for other impurities over respective limits are charged at US$20.00/T of Pb concentrate.

19.2.2 Zinc Concentrate Terms

Pay Fors:

- Zinc: Pay for 85.0% maximum of the contained Zn based on the final Zn concentrate content, subject to a minimum deduction of eight units, will be paid at the LME settlement for Zn quotations, as published in the Metal Bulletin, during the quotation period.
- Silver: A deduction of 93.30 g/T Ag in Zn concentrate with the remaining paid at 70.0% at the quote of LME London Spot, as published in the Metal Bulletin, during the period of quotations. Fractions in proportion.
- Gold: A deduction of 1.0 g/T Au in Zn concentrate and a pay for of 70% of the remaining Au at LME market quote. Fractions in proportion.

TC/RCs:

- Treatment charge of US$260.00/T of Zn concentrate.

Penalties:

- Arsenic: For As contents less than 0.3% As, there is no penalty. If the As content is greater than 0.3% As and less than 1.5% As, there is a penalty of US$3.00/T of Zn concentrate for every 0.1% As greater than 0.3% As. If the As content is greater than 1.5% As, there is a penalty of US$5/T of Zn concentrate for every 0.1% As greater than 1.5% As.

- Antimony: For Sb contents less than 0.3% Sb, there is no penalty. If the Sb content is greater than 0.3% Sb and less than 1.5% Sb, there is a penalty of US$3.50/T of Zn concentrate for every 0.1% Sb greater than 0.3% Sb. If the Sb content is greater than 1.5% Sb, there is a penalty of US$5.00/T of Zn concentrate for every 0.1% Sb greater than 1.5% Sb.

- Others: Penalties for other impurities are charged at US$4.00/T of Zn concentrate.

19.2.3 Pyrite (Fe) Concentrate Terms

Pay Fors:

- If Au content in pyrite concentrate is less than 20 g/T of pyrite concentrate, pay at 63.5% based on the final Au content in the pyrite concentrate.

- If Au content in pyrite concentrate is greater than 20 g/T of pyrite concentrate, pay at 65.5% based on the final Au content in the pyrite concentrate.

- Paid at the LME settlement for Au quotations, as published in the Metal Bulletin, during the quotation period.

TC/RCs:

- Pyrite Concentrate Treatment charge: US$170/T of pyrite concentrate.

- There is no refining charge.

Penalties:

For Zn contents less than 0.5% Zn, there is no penalty. If the Zn content is greater than 0.5% Zn, there is a penalty of US$5.00 for every 0.1% Zn greater than 0.5% Zn.

20.0 ENVIRONMENTAL STUDIES, PERMITTING & SOCIAL OR COMMUNITY IMPACT

The Project consists of the existing Velardeña and Chicago mines, the Labri Mill sulfide ore processing facility (Plant #1), an oxide processing facility (Plant #2), and related ancillary facilities including tailings impoundments, access roads, storage buildings and water pumping stations. The Project is located near Cuencamé; State of Durango, México.

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20.1 INTRODUCTION

The Project is a group of properties held by Golden Minerals' wholly-owned subsidiary, ECU Silver Mining, within the Velardeña mining district of México. The Velardeña mining district is located within the municipality of Cuencamé, in the northeast quadrant of the State of Durango, Mexico. The property is situated approximately 65 km southwest of the city of Torreón in the State of Coahuila and 150 km northeast of the city of Durango, capital of the State of Durango. (**Figure 20-1**).

Golden Minerals holds the Velardeña Operations through its 100% owned Mexican subsidiary Minera William S.A. de C.V. (Minera William). At present, the properties comprise a total of 28 mineral concessions (20 for the Velardeña Property and 8 for the Chicago Property). In addition, Minera William holds a 50% joint venture interest in the San Diego project, which is a nearby exploration property not included as part of the Velardeña Mining Operations. The mineral concessions in each of the properties vary in size and the concessions comprising each mineral property are contiguous. (**Figure 20-2**).

The Minera William operating properties include the Velardeña Mines, the Chicago property, the Labri Mill, and related infrastructure. The Velardeña Mining Complex includes the Santa Juana mine, which has been the focus of ECU's mining efforts since 1995, as well as the Terneras, San Juanes, and San Mateo mines. The Chicago Mining Project is located approximately two km south of the Velardeña Mining Complex. Associated with the Velardeña Mining Complex and Chicago Mine are two primary minerals processing facilities. Plant #1, which is a 300 tonne per day sulfide plant, is located on the west side of the town of Velardeña. Plant #2, located just west of the Chicago Mine, is a 550 T/d oxide processing plant. (**Figure 20-3**).

20.2 Current Property Status & Environmental Liabilities

Minera William's Velardeña Operations consist of existing underground mining and surface mineral processing facilities located on controlled property. Numerous historical mining operations have occurred at the Velardeña Operations with records showing the existence of mining in the district dating back to the early 1800s. Significant mining activity began in 1902 and included mining of both the Terneras and Santa Juana veins and the construction and operation of a 2,500 T/d smelter. Other small scale development was conducted by local miners throughout most of the 1900s. Many of these historical operations have been incorporated into the current mining activities while others remain inactive and separate from the current activities. Minera William anticipates continued mining operations at this location.

In early 2012, Golden Minerals applied for, and was accepted into, the Mexican National Environmental Auditing Program ("NEAP"). Under NEAP, Golden Minerals participated in an audit program to verify compliance with existing regulations and identify non-regulated potential issues that could result in environmental contingencies. Golden Minerals holds various permits required for conducting their current operations at the Velardeña operations, and their participation in NEAP allows them to continue their current operations during the remediation of any potential non-compliance matters. This program was in play for Plant #1 until the spring of 2014, at which time Golden Minerals had achieved 85% compliance, but the plant was placed on care and maintenance.

Golden Minerals is required to update their environmental licenses and environmental impact assessments for any expansion of or modification to any of the existing two plants. The construction of new infrastructure beyond the current plant facilities would require additional permitting, including environmental impact assessments and possibly land use permits. Golden Minerals does not expect to have difficulty obtaining additional permits or environmental impact assessments.

Tetra Tech is unaware of any outstanding environmental liabilities attached to the Velardeña properties and is unable to comment on any remediation which may have been undertaken by previous companies.

20.3 Mexican Permitting Framework

Environmental permitting of the mining industry in Mexico is mainly administered by the federal government body SEMARNAT, the federal regulatory agency that establishes the minimum standards for environmental compliance. Guidance for the federal environmental requirements is largely held within the General Law of Ecological Equilibrium and Environmental Protection (Ley General Del Equilibrio Ecológico y la Protección al Ambiente, or LGEEPA). Article 28 of the LGEEPA specifies that SEMARNAT must issue prior approval to parties intending to develop a mine and mineral processing plant. An environmental impact assessment (by Mexican regulations called a Manifestación de Impacto Ambiental, or "MIA") must be filed with SEMARNAT for its evaluation and, if applicable, further approval by SEMARNAT through the issuance of an Environmental Impact Authorization; the document specifies approval conditions where works or activities have the potential to cause ecological imbalance or have adverse effects on the environment. Further requirements for compliance with Mexican environmental laws and regulations are supported by Article 27 Section IV of the Ley Minera and Articles 23 and 57 of the Reglamento de la Ley Minera. Article 5 Section X of the LGEEPA authorizes SEMARNAT to provide the approvals for the works specified in Article 28. The LGEEPA also contains articles for soil protection, water quality, flora and fauna, noise emissions, air quality, and hazardous waste management.

The Ley de Aguas Nacionales provides authority to CONAGUA, an agency within SEMARNAT, to issue water extraction concessions, and specifies certain requirements to be met by applicants.

Another important piece of environmental legislation is the LGDFS. Article 117 of the LGDFS indicates that authorizations must be granted by SEMARNAT for land use changes to industrial purposes. An application for change in forestry land use CUSF, must be accompanied by a technical study that supports the Technical Justification Study (Estudio Técnico-Justificativo ETJ). In cases requiring a CUSF, a MIA for the change of forestry land use is also required.

Mining projects also must include a Risk Analysis (AR) and an Accident Prevention Plan (PPA) from SEMARNAT.

The Ley General para la Prevención y Gestión Integral de los Residuos (LGPGIR) also regulates the generation and handling of hazardous waste coming from the mining industry. The LGPGIR also regulates the generation and handling of hazardous waste coming from the mining industry. Guidance for the environmental legislation is provided in a series of NOM. These regulations provide specific procedures, limits and guidelines and carry the force of law.

20.4 Project Permitting Requirements & Status

There were a number of environmental permits required to put the project into operation. Most of the mining regulations are at a federal level through SEMARNAT, but there are also a number regulated and approved at state and local level. There are three SEMARNAT permits that were required prior to construction; MIA, CUS and AR, which are described below. A construction permit was also required from the local municipality and an archaeological release letter from the National Institute of Anthropology and History (INAH); and an explosives permit was required from the Ministry of Defense (SEDENA) before construction as well. The key permits and the stage at which they are required are summarized in **Table 20-1**.

Environmental Impact Manifest - Regulations within Mexico require that an MIA be prepared by a third-party contractor for submittal to SEMARNAT. The MIA must include a detailed analysis of climate, air quality, water, soil, vegetation, wildlife, cultural resources and socio-economic impacts.

Analysis of Risk - A second required permit is an AR. A study is developed to obtain this permit. This study identifies potential environmental releases of hazardous substances and evaluates the risks in order to establish methods to prevent, respond to, and control environmental emergencies. In the Project, since no hazardous substances will be used or processed, SEMARNAT will not need an AR to be done for current project conditions.

Land Use Change (CUS) - The third permit is CUS. In Mexico, all land has a designated use. The various areas comprising the project site are designated as forest land, cattle grazing, and agriculture. The CUS is a formal instrument for changing the designation to allow mining on these areas. The CUS study is based on the Forestry Law and its regulations. It requires that an evaluation be made of the existing conditions of the land, including a plant and wildlife study, an evaluation of the current and proposed use of the land and impacts on natural resources and an evaluation of the reclamation and revegetation plans. The establishment of agreements with all affected surface land owners is also required.

A construction permit is required from the local municipality and an archaeological release letter is required from the INAH. An explosives permit is required from the SEDENA before construction begins.

Water discharge and usage must be granted by CONAGUA. A project-specific unique environmental license (Licencia Única Ambiental, LAU), which states the operational conditions to be met, is issued by SEMARNAT when the agency has approved the project operations. The key permits and the stages at which they are required are summarized in **Table 20-1**.

Table 20-1: Permitting Requirements

Key Environmental Permits		
Permit	**Mining Stage**	**Agency**
Environmental Impact Assessment - MIA	Construction/Operation/Post-Operation	SEMARNAT
Land Use Change - CUS	Construction/Operation	SEMARNAT
Risk Analysis - RA	Construction/Operation	SEMARNAT
Construction Permit	Construction	Local Municipality
Explosive & Storage Permits	Construction/Operation	SEDENA
Archaeological Release	Construction	INAH
Water Use Concession	Construction/Operation	CONAGUA
Water Discharge Permit	Operation	CONAGUA
Unique Environmental License	Operation	SEMARNAT
Accident Prevention Plan	Operation	SEMARNAT

The project has acquired permits for mineral exploration and construction of the Project works, including water concessions, ramp, hazardous waste generator and the archaeological release. The permitted activities and the corresponding permit numbers are listed in **Table 20-2**.

Golden Minerals personnel report that the Project holds and has retained the necessary permits to operate the mines and plants at Velardeña, and further there are no unresolved issues with the environmental regulatory agencies. They do not anticipate any limitations on the operations due to future inspections or evaluations by the environmental authorities.

The following has been sourced from CAM 2012.

In order to begin an exploration program on a concession upon which no substantial mining has been conducted, Golden Minerals would have to comply with the Mexican Official Norm: NOM-120-SEMARNAT-1997, which provides, among other things, that mining exploration activities to be carried out must be conducted in accordance with the environmental standards set forth in NOM-120-SEMARNAT-1997; otherwise, concession holders are required to file a preventive report or an environmental impact study prior to the commencement of the exploration program. However, an environmental impact study may not be necessary if the concessionaire files an application with the environmental authorities confirming the concessionaire's commitment to observe and comply with NOM-120-SEMARNAT-1997. If the exploration program requires the removal of vegetation, a permit to change the land use will also be required.

Golden Minerals reports that it has obtained and maintained other permits and agreements that include an explosive use permit (from the Secretaria de Defensa Nacional) renewable each year, surface land use agreement (“ocupación temporal” agreement with the Ejido Velardeña), water use permit (Comisión Nacional del Agua) and other environmental permits from SEMARNAT.

Table 20-2: Permitting Status

No.	Activity	MIA/Permit Number/Date	Comments
	Plant #1 Permitting: Plant #1 and Tailings		
	MIA Expansion of the Tailings Dam at Plant #1 - Environmental Impact Study for tailings for the Plant 1 Expansion	**SG/130.2.1.1/001013/11** **Dated: June 16, 2011**	
	With the above MIA there is also a Technical Justification Study (Estudio Técnico-Justificativo - ETJ)	ETJ SG/130.2.2/001189/11, Dated: June 28, 2011	
1	Site and Construction Preparation		Disturbance = 2.2257 hectares
2	Operation: No extraction, ramps or mining works	Valid from June 2016 through 2018	
3	Abandonment - 45 days prior to renewal.	Valid from June 2016 through 2018	
4	Single Environmental License (LAU)	SG/130.2.1/001312 July 4, 2008	
5	Voluntary National Environmental Auditing Program (NEAP) on hold for Plant 1		Enrolled until spring of 2014 for Plant 1 (achieved 85% compliance) but placed program on hold when plant shut down. Eligible to re-enroll and this effort is in progress.
	Mine Site and Plant #2		
	Environmental Impact Study for Production and Operation of the Velardeña Mines (MIA Explotacion y Operacion Minas de Velardeña)	SG/130.2.1.1/002384/13 August 29, 2013	Complements previous MIA filed in 1996 which cover much of the previous construction at the mine site and at Plant 2.
	BLM Minera Mexicana, S.A de C.V. for operation activities related to the construction, operation, maintenance and abandonment in an area of 75-00-00. The activity refers to re-opening and operation of the following: **San Juan evangelist, Buen Retiro and Viborillas**. The construction and operation of the processing plant and tailings dam were added with Permit No. **DOO. DGOEIA04852**, October 2, 1996. On May 28, 2001, through Memorandum No. 10.1.MA/243, transfer of environmental impact of BLM MEXICAN MINING LTD A HECLA MINING LTD was authorized.		
	Plant #2 (Minera William Permits): Applicable only if ore screening is performed. Permits for tailings facilities and operation of the plant are listed below:		
a.	Unique Environmental License (LAU) SEMARNAT	10/LU-0310/10/09; SG/130.2.1/002086 dated November 3, 2009; LAU-10 / 035-2009	
b.	Environmental Impact Study MIA-P Mining Project for Minera William Phase III Tailings Project" SEMARNAT	10DU11M0806 August 29, 2013	Filed with Center for Integrated Services (CIS) of the Federal Delegation Durango, under SEMARNAT.
c.	Conditional authorization for the Tailings Dam Construction Minera William. SEMARNAT	SG/130.2.1.1/002292/11 December 7, 2011	
d.	CUS - Tailings Dam Construction	SG /130.2.2/001291/12	

No.	Activity	MIA/Permit Number/Date	Comments
	III	May 21, 2012	
f.	MIA Approved for Beneficiation Plant Expansion of the Minera William II and IV Tailings Dams SEMARNAT	April 23, 2012	

Table provided by Minera William

20.4.1 Environmental Monitoring Program

As part of the MIA for the Project and in compliance with environmental regulations, Minera William has established an Environmental Monitoring Program that identifies potential impacts during each of the phases of the project along with actions to prevent, mitigate and compensate the effects. The program requires internal control and periodic reporting to verify compliance with the program. Golden Minerals has retained an independent consultant to evaluate compliance with current environmental reporting and requirements.

20.5 Environmental Baseline Data

The following has been sourced from the Environmental Impact State for the Velardeña Mine Project Exploration and Mining Operation, MIA (April 2013).

A variety of studies have been completed in order to characterize the natural environment of the area. The Project has completed a number of MIAs, the most recent report completed in April 2013.

20.5.1 Flora & Fauna

20.5.1.1 Flora

According to the classification of INEGI- INE (1996), the type of vegetation where the project is located corresponds to a vegetation type known as Desert Shrubland rosetophilous (rosette-forming vegetation) and submontane scrub.

The project area is in a transition zone between two types of ecosystems; the desert scrub rosetophilous and the submontane scrub. However, there is no demarcation that determines the separation between the ecosystems, so it is possible to find species from the two ecosystems. In the lower parts of the Project Area, the type of vegetation presented in the middle and lower mountains was the Xeric Scrub, which includes Desert Shrubland rosetophilous and submontane scrub. This vegetation is sparse in places, while less extensive areas may have higher densities with the presence of shrubs and trees (Prosopis laevigata (Smooth mesquite), Acacia constricta (Whitethorn acacia), Dasylirion palmeri, Yucca carnerosana (Giant Spanish Dagger), Fouqueira splendens (ocotillo) and Flourensia cernua (tarbush).

Based on the results obtained in the field and bibliographic records, on-site and surrounding areas and six sampling sites, a total of 24 plant species were registered. The best represented family was the Cactaceae (cactus) family, represented with a total of eight species, followed by the Fabaceae (legume, pea or bean) family with four species.

Of the 24 species of flora recorded for the Project study area, only one species is reported within a risk category: Mammillaria candida (snowball cactus), falls under the category of endangered according NOM-059- SEMARNAT- 2010.

The densest vegetation is located in the northern study area, where the following species could be found: Acacia farneciana (needlebush), Agave lechuguilla ("lechuguilla"), Jatropha dioica (Leatherstem and Sangre de Drago), Fouquieria splendes (Ocotillo), Opuntia microdasy (Bunny Ears Cactus, Bunny Cactus or Polka-dot Cactus) and Larrea tridentata (Creosote bush).

In the south of the mineral processing plant area the density of the vegetation of Desert Shrubland rosetophilous is low and species like Agave lechuguilla, Jatropha dioica, Fouquieria splendes, Opuntia microdasy, Lippia graveolens (Mexican oregano) and Larrea tridentata are present.

The vegetation in the Project study area is diverse, abundant and has been deteriorated in areas with significant traffic of locals and paths. The arid ecosystem provides for a predominately shrub vegetation cover mainly by species from Gobernadora (creosote), Ocotillo and Lechuguilla which contribute to soil stability. An indication of the stability maintained in this environmental is shown by the abundance of various cacti species.

Among the species that should be monitored due to their intrinsic biological and ecological characteristics, include the species: conglomeratus Echinocereus cactus (Hedgehog cactus), Mammillaria heyderi (Ball Cactus, Cream Cactus, Cream Pincushion, Flat Cream Pincushion), Mammillaria candida (snowball cactus), Opuntia imbricata (Giant Tree or Cane Cholla) , Opuntia microdasy (Bunny Ears Cactus), Opuntia violácea (Violet Prickly Pear), Opuntia leptocaulis (Desert Christmas cactus), Opuntia humifusa (Creeping Prickly Pear) and Fouquieria Splende (Ocotillo).

The area where the mineral processing plant will be located does not currently have any type of vegetation. Because no roads will be built and existing dirt roads will be used, the disturbance will generally be low in terms relative to the size of the project. Where soil degradation and erosion processes are likely, the affected area will be covered with rock, or other, material to hold the soil in place.

20.5.1.2 Fauna

There are 106 recorded animal species in the State of Durango: 35 mammals; 13 species of reptiles; and 58 species of birds.

The fauna present in the State of Durango represent 19% of the total Mexican fauna, the aviary species represent 32% and the reptilian fauna represent 19% of the total species registered for the country.

The Project area is located within the mammalian fauna area known as Zacatecana. The 35 mammal species identified in the zone are distributed in 26 subgroups and 17 families. Two of the mammal spices are considered threatened: Vulpes Macortis, commonly known as the Kit fox, and Peromyscus Boylii; commonly known as the Brush mouse. One species is considered Endangered: Erethizon dorsatum; commonly known as the North American porcupine.

Within the State of Durango there are 13 areas of importance for the conservation of birds, although; none of the areas is located close to the Velardeña Project. Of the 58 species of birds that were identified in the study area: four of the species are under special protection: Red-tailed hawk, Peregrine falcon, Pine siskin, and Townsend's solitaire; one is an endangered species: Falco mexicanus, commonly known as the Prairie Falcon; and another is considered threatened: Vireo atricapillus, known as the Black-capped vireo.

Finally, in the general area of the Chihuahuan desert that extends to the north in the country, there are 13 species of amphibians and reptiles that have been identified. Two of the species are considered threatened; Coluber constrictor (Black racer) and Masticophis flagellum (Coachwhip snake); and another two are identified under special protection; Cnemidophorus neomexicanus (New Mexico Whiptail), and Crotalus Lepidus (Rock rattlesnake).

20.5.2 Climate, Topography & Vegetation

The following has been sourced from CAM 2012.

The area in which the Velardeña properties are situated is semi-arid with a climate predominantly warm and dry, with a mean annual temperature of 21.1° C and rainfall averaging 243.7 millimeters per year (mm/yr). Temperatures can drop below freezing in the winter and commonly reach the high thirties from July through to September. The predominant winds are northeast-southwest, with speeds of 2.1 to 6.0 meters per second (m/s).

The Velardeña district is located on the northwestern edge of the Meseta Central physiographical province, within the Sierras Transversas sub-province, on the eastern flank of the Sierra Madre Occidental mountain range. The village of Velardeña is located in the valley floor set between two northwest trending ranges. To the west is the Sierra Santa Maria which rises approximately 300 m above the valley floor and, to the east, is the Sierra San Lorenzo rising approximately to 750 m. The Sierra San Lorenzo hosts the Velardeña, Chicago and San Diego properties, the latter being located farthest to the east into the Cerros El Trovador.

In physiographic terms, the zone is mature with a mixed topography. Streams within the area drain either to internal drainage systems or tributaries of the Nazas and Aguanaval rivers which are connected to the Laguna de Mayrán. All of the streams are intermittent and flow only during the rainy season. A series of water dams were built over the years to control water flow from the two rivers for irrigation and water management purposes. The Francisco Zarco dam, located 25 km to the west, is the closest to the Velardeña properties.

The geomorphology shows characteristics typical of a cycle of arid to semi-arid areas. There is an abundance of valleys and flat alluvial plains variably filled with erosional debris derived from adjacent highlands. The drainage systems are generally dendritic and poorly defined; many channels disappear when they reach the valley floor due to infiltration into poorly consolidated alluvial sediments.

20.5.3 Hydrology

The Velardeña project property is located in the Hydrologic Region RH 6 Nazas-Aguanaval on the center-west part of the State of Durango. The Hydrologic Region consists of five basins: R. Aguanaval, R. Nazas-Rodeo, P. Lazaro Cardenas, L. de Mayran y Viesca, and R. Nazas-Torreón.

The project property is located in the Rio Nazas- Torreón basin, next to the Rio Aguanaval basin. The two water bodies are connected by both surface and groundwater. Due to previous mining activity and the nature of the operations, the Project environmental impact is negligible.

20.5.3.1 Surface Water Hydrology

The Cuencamé River is the dominant stream course in the region with the headwaters located in the Sierrilla Atotonilco. There are a number of small springs that are tributary to this river. In the watershed there are 17 washes or stream courses; however all but two of these are ephemeral and flow only for a brief time after a rainfall event. The two permanents waters are the Aguanaval River located roughly 29 Km, and the Nazas River located 35 km, respectively, from the site.

Two dams were identified, the Francisco Zarco and Las Mercedes located 27.8 km and 29.9 km from the site, respectively. These were constructed in the 1950's to divert flood water and for irrigation water storage, and are located north of the Cuencamé Community within the Nazas River basin.

20.5.3.2 Geohydrology

The Project is located in the area containing Pedriceña-Velardeña aquifer (identified with key 1021 according to the Geographic Information of Underground Water). The surface area extent of the aquifer is approximately 3,000 square kilometers (km^2) and is located in middle of the state of Durango.

The majority of the aquifer is located under the municipality of Cuencamé and a small portion lies underneath Peñon Blanco. The aquifer is mainly used for irrigation of crops and a small proportion of the water is used for the urban community. There is no district or irrigation unit, and neither is there a Technical Committee of Underground Water. According to the federal water law, in force since 2008, the municipality of Cuencamé and Peñon Blanco are classified as areas of beneficial use.

20.6 Community Relations & Social Responsibilities

Minera William holds agreements (contracts) with both Ejido communities: Velardeña and Vista Hermosa. The Project plants, as well as the majority of the surface facilities at the mine portals, are on private land owned by Minera William or Minera Labri. Agreements with the Velardeña and Vista Hermosa Ejidos are in place for access easements and surface disturbance outside of these private parcels. Minera William pays an annual rental fee to both Ejidos.

The agreements also state that the mine will preferentially hire residents from the Ejidos and currently approximately 90% of the hourly employees are from Vista Hermosa and Velardeña. When it is not possible to hire from either of the Ejidos, Golden Minerals seeks candidates from the local communities of Cuencamé, Cuatillos or Pedriceña.

The following has been sourced from the Environmental Impact State for the Velardeña Mine Project Exploration and Mining Operation, MIA (April 2013).

According to the results of the 2005 National Census of Population and Housing, the municipality has a total of 53 people who speak an indigenous language. According to the 1995 National Census of Population and Housing conducted by the National Institute of Statistics and Geography (Instituto Nacional de Estadistica y Geografia or INEGI), the total population of the region included 34,660 inhabitants, of which 17,521 are men and 17,139 are women; the growth rate in the period 1990-1995 was 0.02%. The population density is 7.2 inhabitants per square kilometer. The population of the municipality regarding the state represents 2.42%. The largest concentration of population is located in the county seat.

The residents are predominantly Catholic, subsequently followed by the Protestant and Evangelical.

For the provision of educational services at the basic level, there are 36 campuses of pre-school education, 56 primary, 21 secondary schools, two middle and one high school.

Health services in the region are provided by the Ministry of Health and Welfare (SSA), the Institute for Social Security and Services for State Workers (ISSSTE) and the Mexican Social Security Institute (IMSS).

The SSA runs a health center which provides outpatient services and first aid. A laboratory and five hospital rooms are available and are attended by two general physicians who serve an average of 40 patients per day usually with common problems such as colds, stomach ailments and first aid. More serious problems are channeled to the Regional General Hospital of Cuencamé or the city of Gomez Palacio or Guadalupe Victoria.

The Regional Hospital serves the inhabitants of the towns of: Cuencamé, Nazas, Simon Bolivar, Santa Clara, White Rock, Guadalupe Victoria, San Juan de Guadalupe; Juan Aldama and Miguel Auza in the state of Zacatecas; and has general consultation, consultation Obstetrics and Gynecology, Surgery, Dentistry, Pediatrics, Orthopedics, hospitalization, Emergency Medical, Laboratory, X-ray, pharmacy; 13 medical specialists 8 general physicians, 44 nurses, 3 radiology technicians, 3 laboratory technicians, and myriad additional personnel.

The workforce generally consists of a total of 8,500 people, representing 24% of the total population of the area, which is mainly engaged in agriculture, livestock and mining industry. A further breakdown of workforce and the respective industries shows that approximately 2,300 persons, (27% of the total) are engaged in agriculture, forestry, hunting and fishing; 2,100 people (25%) are dedicated to mining, oil and gas, manufacturing, electricity , water and construction; and 4,100 people, (48%) , are dedicated to trade, transport , government and other services.

20.7 Closure & Reclamation

In July 2012, a “Conceptual Closure Plan, Golden Minerals Company, Velardeña Operations” was prepared by Kermit Behnke for the Project. The purpose of this Conceptual Closure Plan (CCP) was to present the conceptual plan for closure and reclamation of the Minera William Velardeña Operations located near Cuencamé; State of Durango, Mexico in substantial accordance with international mine closure standards. The Velardeña Operations consist of the Velardeña and Chicago mining facilities, the Labri Mill sulfide ore processing facility (Plant #1), an oxide processing facility (Plant #2), and related ancillary facilities including tailings impoundments, access roads, storage buildings, and water pumping stations.

20.7.1 Reclamation Statement of Responsibility

Golden Minerals has assumed the responsibility for the reclamation of surface disturbances that are attributable to the Velardeña Mineral Properties consistent with the Mining Rights of Public Lands Under Article 27 of the Mexican Constitution (the government may establish compulsory measures for the preservation and restoration of land and ecological equilibrium), Article 98 (land reclamation should consider all the necessary actions to prevent land degradation), and Article 35 (reclamation conditions defined in the approved Environmental Impact Statement are binding) of the General Law of Ecological Equilibrium and the Protection of the Environment. The Mining Law establishes that holders of mining concessions are subject to the compliance of all Mexican general regulations and official norms that relate to the environmental protection and ecological equilibrium. All areas that have been disturbed at the Velardeña Mineral Properties by Golden Minerals and owned predecessors will be reclaimed to a safe and stable condition upon cessation of mining operations.

20.7.2 Reclamation Approach

All mobile and stationary equipment and constructed facilities associated with the mining operations will be removed prior to or during closure and reclamation. All disturbed areas that have been associated with Golden Minerals mining and processing activities will be reclaimed to a safe and stable condition in accordance with the 2012 CCP upon cessation of mining operations.

20.7.3 Description of Facilities

A main highway (Mexico Hwy 40D) and improved gravel roads provide access to the operations from the town of Velardeña. Other off-highway access roads are maintained from the facilities entrance to the office, mine, and plant locations. The mining operations at these facilities include mining the Ag, Au, and associated base metals ore from the underground workings and transporting the ore to the surface metallurgical processing plants to develop a final salable product. The metallurgical operations include the use of equipment typical of the respective type of processing operations and include feeders, crushers, conveyors, screens, fine ore bins, grinding mills, flotation equipment, leach plant, and other associated stationary and mobile equipment in support of mining and processing operations.

Minera William anticipates continued mining operations at this location including the expansion of the disturbance areas as necessary for continued mining and processing activities. This plan addresses only the current disturbance areas and structures as generally described on the attached figures and within the 2012 CCP.

The Velardeña Mine area consists of both the Minera William current operations and the historic mine workings. As depicted on the following figures the current active operations are delineated with orange boundaries, the historic mine disturbance areas excluded from this plan are delineated with a green boundary line, and general existing access roads are depicted with black boundaries:

- **Figure 20-4**: Velardeña West Reclamation Area Map;
- **Figure 20-5**: Velardeña East Reclamation Area Map;
- **Figure 20-6**: Velardeña Complex Reclamation Detail Map;
- **Figure 20-7**: Chicago Reclamation Area Map;
- **Figure 20-8**: Chicago Reclamation Detail Map; and
- **Figure 20-9**: Labri Mill Reclamation Detail Map.

The Velardeña Complex is an active underground mining area and consists of underground access portals including the San Mateo Portal, Santa Juana Portal, and the San Juanes Portal. The surface facilities include security offices, mine offices, maintenance shops, fueling areas, a warehouse, material storage areas, a compressor installation, electrical substations, and other miscellaneous support facilities. Other ground disturbances in the area include primary, secondary, and inter-plant access roads, ore stockpiles, and waste rock dumps (**Figure 20-6**).

The Chicago Project area consists of active underground mining and process plant activities in addition to historic mining disturbances as depicted in **Figure 20-7**. The Chicago Mine consists of access roads, the Chicago Portal, mine support structures, and a waste rock dump. The process area includes Plant #2 (a 550 T/d oxide leach processing facility), an active tailings stockpile with a decant pond system, a reclaimed tailings stockpile, an overburden stockpile, and a borrow area. Existing facility structures located at Plant #2, (**Figure 20-8**), include security offices, a warehouse, maintenance shops, an ore dump pocket, a crusher, conveyor, grinding mill, flotation mill, numerous leach tanks, and Cu recovery facilities. Other ground disturbances in the Plant #2 area include primary, secondary, and inter-plant access roads, material storage areas, and parking areas.

The Labri Mill (Plant #1) is a 300 T/d sulfide ore flotation plant that is located on the west side of the town of Velardeña. The area consists of the Labri Mill operating facilities inclusive of security offices, a warehouse, maintenance shops, a ore dump pocket, a crusher, conveyor, grinding mill, flotation mill, numerous leach tanks, and Cu recovery facilities. Other facilities include the active tailings stockpile and the inactive tailings stockpile (**Figure 20-9**).

20.7.4 Property Acreage

The respective areas of the mining facilities and the current mining disturbances at this operation are further described in **Table 20-3**.

Table 20-3: Reclamation & Disturbance Areas

Area Description	Description	Acres
Reclamation Areas	Areas within the orange boundary lines as depicted on the reclamation maps	104
Historic Mining Disturbances	Areas within the green boundary lines as depicted on the reclamation maps	Not Applicable
Local Roads	Roads not associated with current mining activities as depicted on the reclamation maps with black-font dashed boundaries	Not Applicable

20.7.5 Post-Mining Land Use

Minera William will remove the mining equipment and structures at the facilities that are not required for the Post-Mining Land Use (PMLU) and will regrade all of the applicable disturbed areas of the property to a safe and stable condition suitable for the PMLU upon completion of mining activities as further described herein.

It is anticipated that the PMLU will include:

- Future mining operations;
- Other future industrial use;
- Livestock grazing; and

- Open space.

20.8 Reclamation Approach

The following reclamation activities were adapted from the 2012 CCP and are assumed to meet the requirements necessary for the PMLU discussed in **Section 20.7.5**.

20.8.1 Equipment & Building Removal

All equipment (mobile equipment, feeders, crushers, conveyor belts, screens, stackers, etc.) and structures (offices, shops, tanks, process buildings, fuel and oil tanks, etc.) will be removed from the property upon completion of operations. Structures may remain if requested by the subsequent owner for the PMLU. Any contaminated soils resulting from vehicle traffic and maintenance, or from other processing activities, may be subject to remediation prior to closure according to applicable environmental rules.

20.8.2 Roads, Power Lines, Water Lines & Fences

Any roads constructed or used specifically for mining and processing operations at this facility and not required for the PMLU will be reclaimed. The roads will be regraded and ripped to inhibit erosion and to promote revegetation seed growth as appropriate. Roads required for use during reclamation and closure will be reclaimed upon completion of reclamation and closure activities. Primary power lines and water lines installed on the property for mining and processing operations will generally remain in place as designated for the PMLU.

20.8.3 Area Regrade & Closure

Upon cessation of mining activities, all disturbed areas of the property will be assessed for any hazardous conditions including unstable soils or slopes, hazardous depressions, potential erosion conditions, and drainage requirements. Potentially unstable slopes or hazardous depressions will be regraded to a stable condition. Mine shafts or portals will be plugged, bulkheaded, sealed, or capped. All areas will be regraded to blend with natural topography and ripped, as appropriate, prior to the application of a hydro-mulched seed mix as appropriate.

20.8.4 Slope Stabilization

Final slopes will have a slope of approximately 1(H):1(V) (angle of repose) or less (i.e., flatter) depending upon the characteristics of the material. Slopes deemed unstable at their operational slopes will be regraded to minimize erosion and provide geotechnical stability.

20.8.5 Soil Conservation

Stockpiles of salvaged soil (plant growth material) that may be developed during mining operations may be located on the property as soil stockpiles and maintained for use during reclamation activities. All soil stockpiles will be stabilized as necessary during operations to prevent excessive losses from erosion or fugitive dust emissions. During reclamation activities, areas will be regraded and ripped as necessary to incorporate plant growth materials, to prevent excess compaction, and to achieve a suitable soil zone to enhance voluntary plant growth.

20.8.6 Revegetation

Where surface disturbances result in compaction of the soil, ripping, disking, or other measures will be employed to reduce compaction and establish a suitable root zone to promote the hydro-mulched revegetation growth.

20.8.7 Measures to Achieve Post-Mining Land Use

1. Measures to restrict public access to hazardous surface features:

   All equipment and structures not required for the PMLU will be removed from the property. Additionally, all scrap metal, wood, trash, and other debris will be removed, and disturbed areas will be regraded, bermed, and/or fenced to remove any unstable slopes or hazardous depressions and to restrict public access. All portals and shafts associated with the Minera William operations will either be sealed or fenced as discussed in **Section 20.8.3**. Warning signs will be posted in locations where public access is available.

2. Measures will be taken to address erosion control and stability:

   The site will be regraded utilizing existing storm water drainage control and will be ripped to promote rainfall infiltration and reduce run-off and erosion. Local storm water containment ponds (charcos) will be constructed and rip-rap will be installed for bank protection, as appropriate.

3. Measures will be taken to address revegetation:

   All disturbed areas will be regraded and ripped to promote vegetation growth and a suitable seed mix will be hydro-mulched on disturbed areas during reclamation.

20.8.8 Schedule of Reclamation

The anticipated schedule for reclamation is as follows:

- Reclamation will be initiated within one year following cessation of mining activity.
- Minera William may extend the period in which to initiate reclamation at this facility if there is a reasonable likelihood that the facility may resume operations based upon:
  - The existence of additional Ag and Au ore or other mineral commodities;
  - Historical fluctuations in the value of the commodity; or
  - The design life of any process components existing at the facility.
- Once initiated, Minera William will continue the final reclamation measures as discussed until complete unless mining is reinitiated.

20.8.9 Reclamation & Closure Costs

Reclamation costs were adapted from the 2012 CCP. Unit costs applied to the 2012 CPP were verified by comparing equipment and labor costs used in the 2012 CCP to industry standard cost estimating material. Upon review these unit costs were deemed reasonable and reflective of the prescribed reclamation activities. The 2012 reclamation costs were then adjusted to reflect 2015 dollars by accounting for inflation from 2012 to 2015. An average inflation rate from 2012 to 2015 was calculated to be approximately 0.74% based on the following three producer price indexes (PPI) from the US Bureau of Labor Statistics (BLS):

- PPI - Total Manufacturing Industries = 0.72%;
- PPI - All Commodities = 0.38%; and
- PPI - Industrial Commodities = 1.11%.

All reclamation and closure costs will be wholly born by Minera William, with Golden Minerals Company as its parent company. The total costs as developed on the **Table 20-4** are summarized as:

Table 20-4: Closure Cost Estimate

Activity		Total Cost (US$)
Direct Costs		
Mobilization & Demobilization		$26,000
Infrastructure Removal		$1,002,523
Regrade / Rip		$326,227
Revegetation		$187,259
Total Direct Cost		**$1,542,008**
Site Maintenance Costs		$75,675
Indirect Costs		
Project Engineering, Surveying (8% of Direct Costs)	4.0%	$61,680
Project Management & Owner's Costs (4% of Direct Costs)	8.0%	$123,361
Financial Assurance (3% of Direct Costs)	3.0%	$46,260
Contractor Profit (15% of Total Direct Cost)	15.0%	$231,301
Legal Support (3% of Direct Costs)	3.0%	$46,260
Total Indirect Cost		**$508,863**
Subtotal - Direct; Maintenance; Indirect		**$2,126,547**
Contingency Applied to Total Direct Costs; 25%		$385,502
Total Reclamation Costs		**$2,512,049**
Inflation Adjustment Applied Over Three Years		0.74%
2015 Reclamation Costs		**$2,567,975**

There are no known performance bonds or financial guarantees, either required or posted by Golden Minerals, with respect to closure and reclamation activities.

20.9 Mine Closure

20.9.1 Mining & Processing Areas

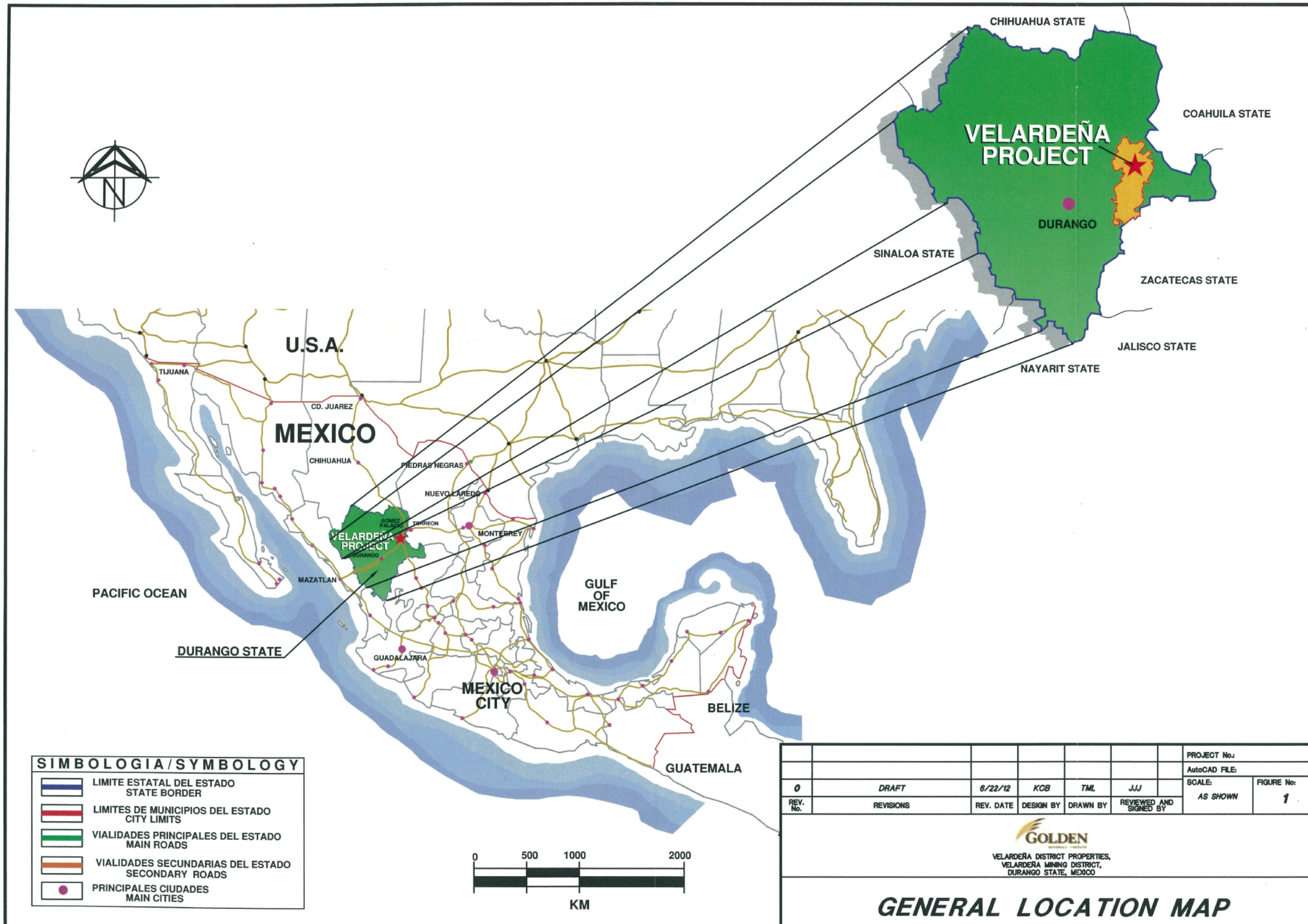
Reclamation of the mine disturbances, processing plants, tailing piles, and the associated mining areas as described in this report and in the 2012 CCP will be initiated within one year after cessation of mining activity as the site.

20.9.2 Personnel

Minera William personnel will inspect and maintain this facility as appropriate during the post-closure period until such time as closure and reclamation is complete. Minera William will not have any full time personnel assigned to this facility following completion of the reclamation project.

20.9.3 Monitoring

The closure of operations at this site will be monitored by Minera William personnel to assure final reclamation is in accordance with the conditions of this report and the 2012 CCP.



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PROJECT No.:

AutoCAD FILE:

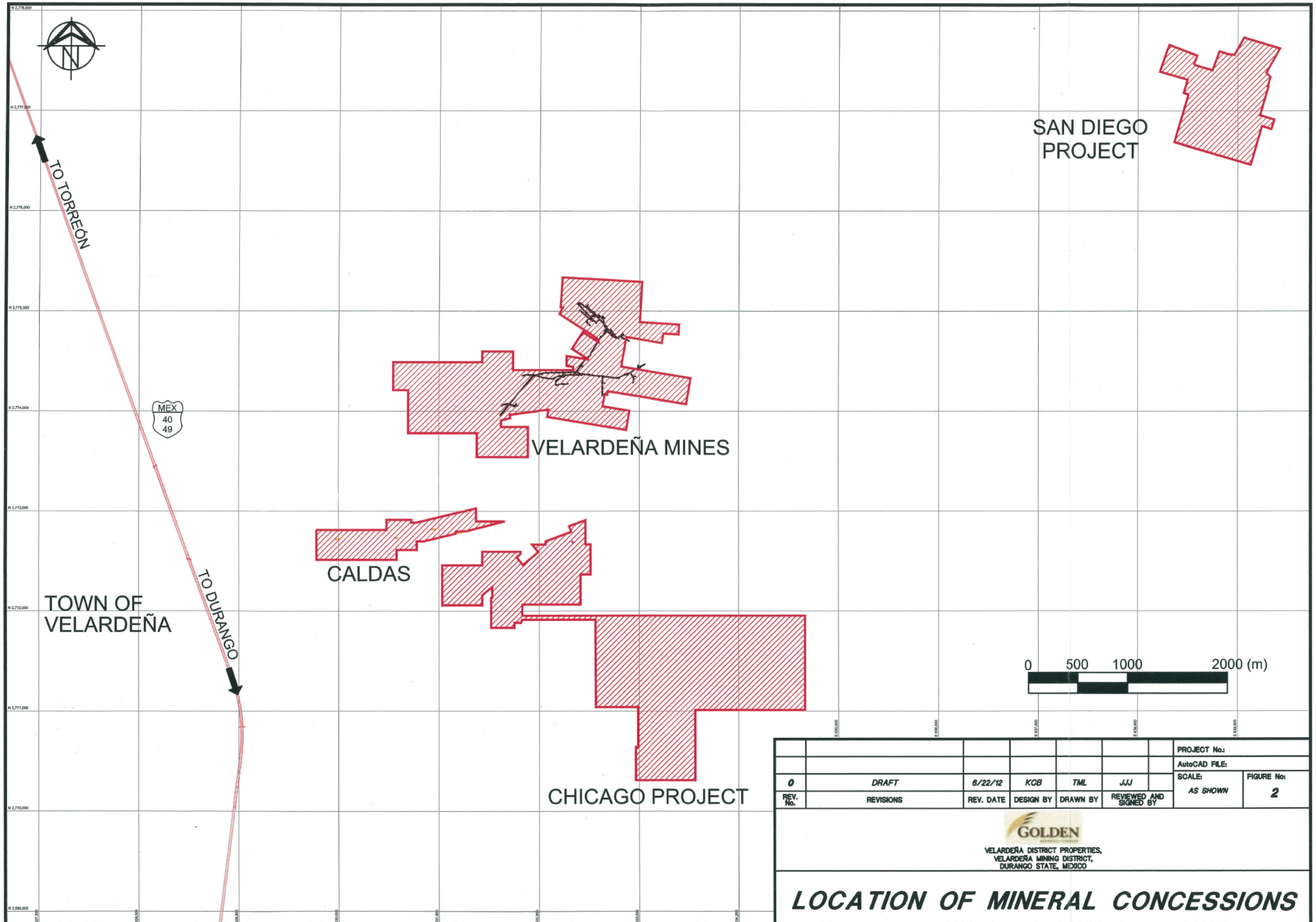
SCALE: AS SHOWN

FIGURE No: 1

GOLDEN

VELARDEÑA DISTRICT PROPERTIES,
VELARDEÑA MINING DISTRICT,
DURANGO STATE, MEXICO

GENERAL LOCATION MAP


SAN DIEGO PROJECT
TO TORREÓN
MEX 40 49
VELARDEÑA MINES
CALDAS
TOWN OF VELARDEÑA
TO DURANGO
CHICAGO PROJECT
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PROJECT No.:
AutoCAD FILE:
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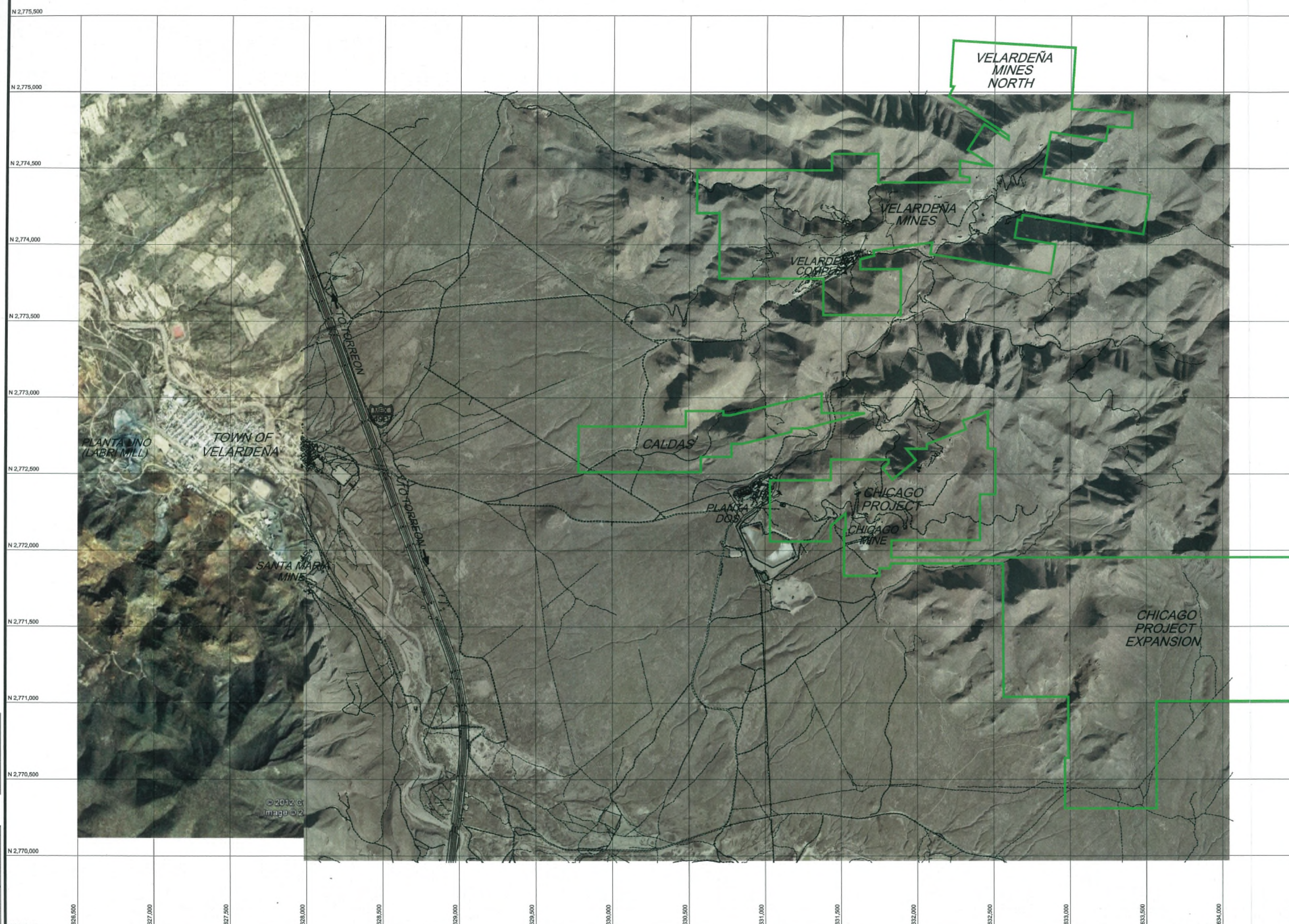
FIGURE No: 2
GOLDEN
VELARDEÑA DISTRICT PROPERTIES, VELARDEÑA MINING DISTRICT, DURANGO STATE, MEXICO
LOCATION OF MINERAL CONCESSIONS



AutoCAD FILE: Figure 3 - Velardena Chicago Planta Uno Location Map.dwg DATE: JUNE 22, 2012

SCALE

300m 0 300m 600m

CONTOUR INTERVAL 2m

LEGEND

- MINERAL CONCESSIONS BOUNDARY
- NORTHING & EASTING GRID LINE
- TOPOGRAPHY
- ROAD
- DIRT ROADS
- BUILDING

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GOLDEN MINERALS COMPANY

VELARDEÑA DISTRICT PROPERTIES,
VELARDEÑA MINING DISTRICT,
DURANGO STATE, MEXICO

PROJECT: **VELARDENA MINE**

DRAWING TITLE: **VELARDENA, CHICAGO, PLANTA UNO LOCATION MAP**

Sheet 1 Of 1 Sheets

SCALE: AS SHOWN

FIGURE No. 3

SCALE

75m 0 75m 150m

CONTOUR INTERVAL 2m

LEGEND

- NORTHING & EASTING GRID LINE
- ROADS
- BUILDING / STRUCTURES
- CURRENT FACILITIES
- HISTORIC DISTURBED AREAS

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GOLDEN

VELARDEÑA DISTRICT PROPERTIES,
VELARDEÑA MINING DISTRICT,
DURANGO STATE, MEXICO

PROJECT: **VELARDENA MINE**

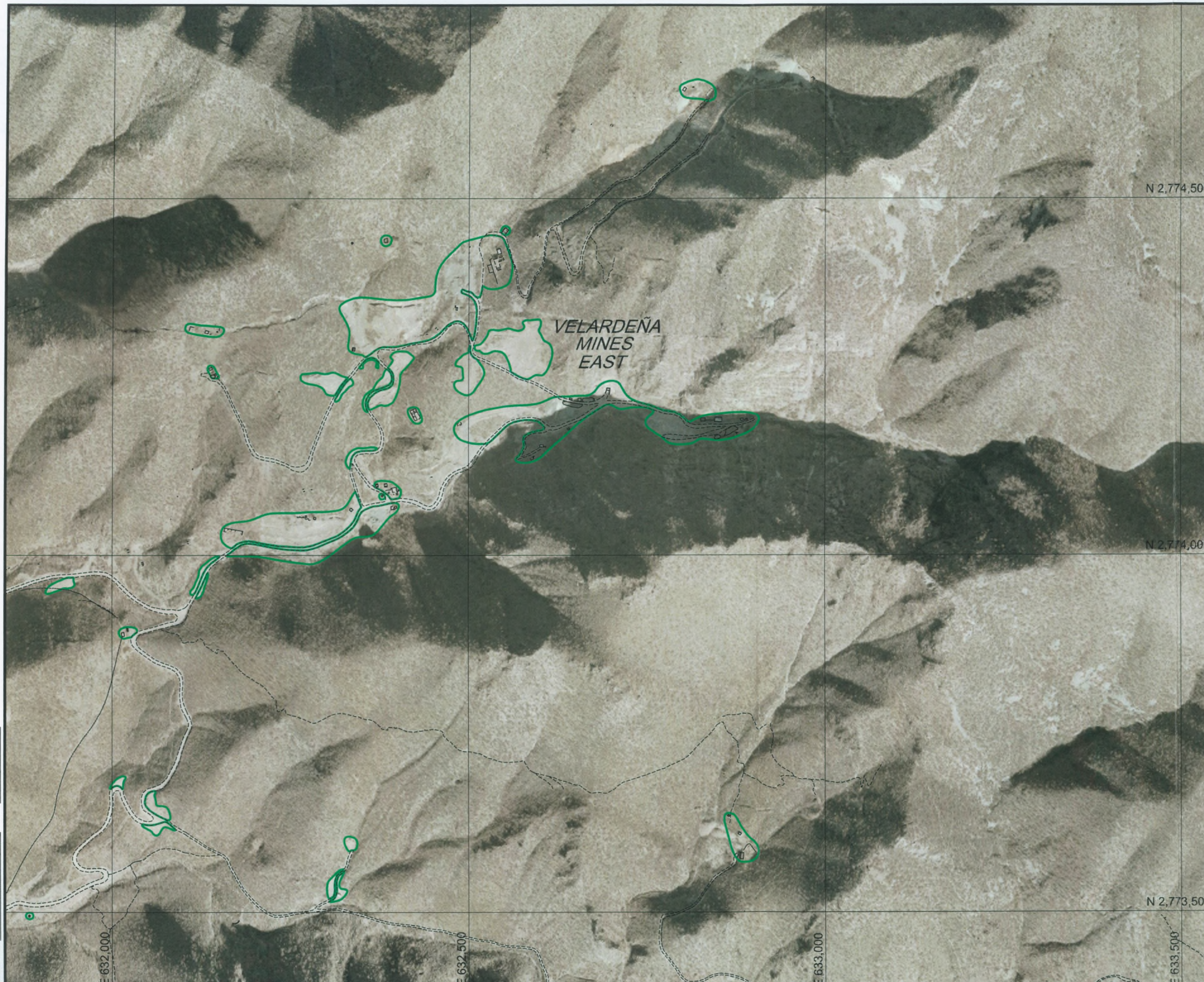
DRAWING TITLE: **VELARDENA WEST RECLAMATION AREA MAP**

Sheet 1 Of 1 Sheets

SCALE: AS SHOWN

FIGURE No. 4

AutoCAD FILE: Velardena-Reclamation Maps.dwg DATE: JUNE 22, 2012



AutoCAD FILE: Velardena-Reclamation Maps.dwg DATE: JUNE 22, 2012

SCALE

75m 0 75m 150m

CONTOUR INTERVAL 2m

LEGEND

- NORTHING & EASTING GRID LINE
- ROADS
- BUILDING / STRUCTURES
- CURRENT FACILITIES
- HISTORIC DISTURBED AREAS

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
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VELARDEÑA DISTRICT PROPERTIES,
VELARDEÑA MINING DISTRICT,
DURANGO STATE, MEXICO

PROJECT:
VELARDENA MINE

DRAWING TITLE:
VELARDENA EAST RECLAMATION AREA MAP

Sheet 1 Of 1 Sheets

SCALE: AS SHOWN

FIGURE No. 5

LEGEND

- NORTHING & EASTING GRID LINE
- ROADS
- BUILDING / STRUCTURES
- CURRENT FACILITIES
- HISTORIC DISTURBED AREAS

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
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GOLDEN MINERALS COMPANY

VELARDEÑA DISTRICT PROPERTIES,
VELARDEÑA MINING DISTRICT,
DURANGO STATE, MEXICO

PROJECT: **VELARDENA MINE**

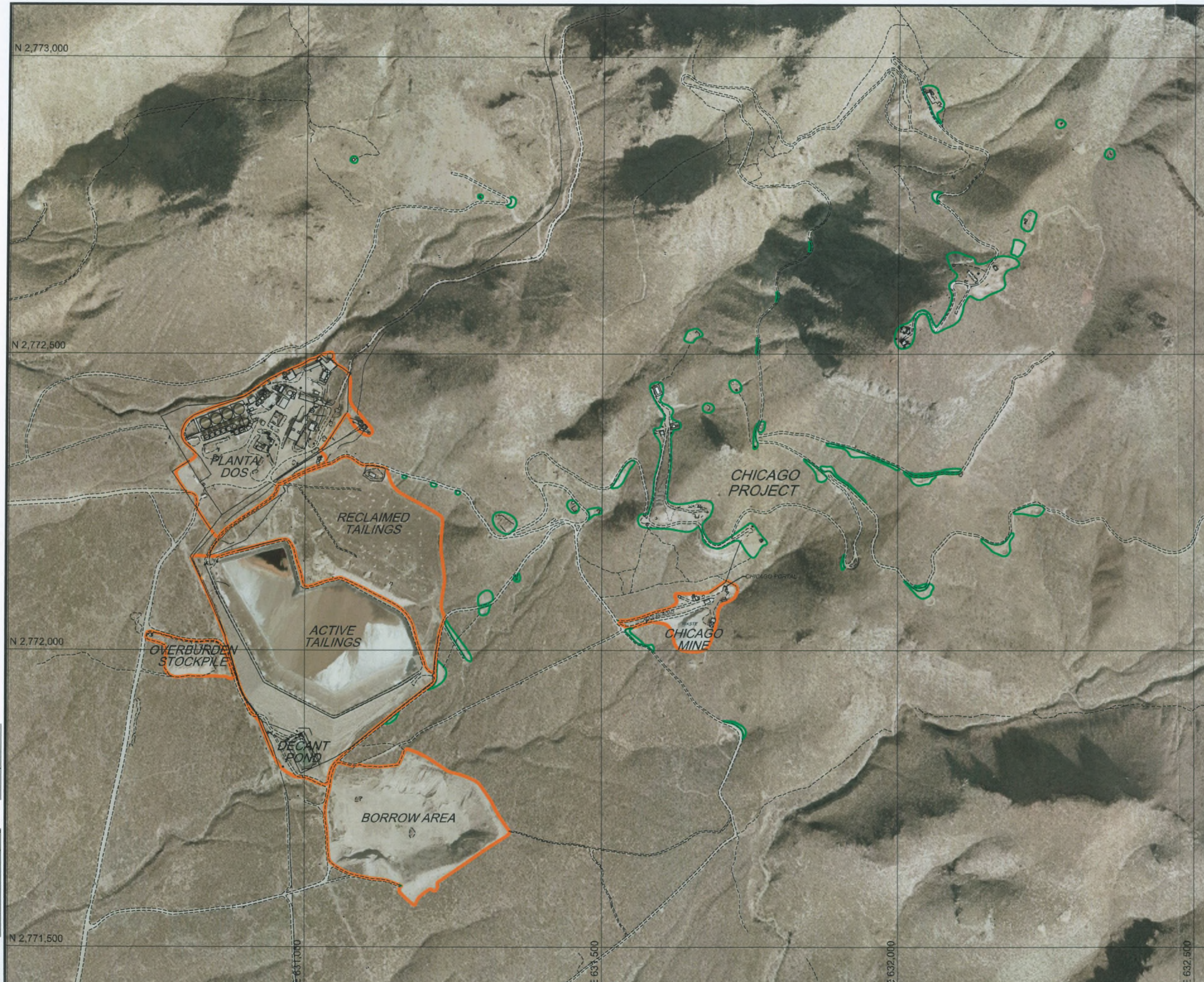
DRAWING TITLE: **VELARDENA COMPLEX RECLAMATION DETAIL MAP**

Sheet 1 Of 1 Sheets

SCALE: AS SHOWN

FIGURE No. 6

AutoCAD FILE: Velardena-Reclamation Maps.dwg DATE: JUNE 22, 2012



SCALE

80m 0 80m 160m

CONTOUR INTERVAL 2m

LEGEND

- NORTHING & EASTING GRID LINE
- ROADS
- BUILDING / STRUCTURES
- CURRENT FACILITIES
- HISTORIC DISTURBED AREAS

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
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VELARDEÑA DISTRICT PROPERTIES,
VELARDEÑA MINING DISTRICT,
DURANGO STATE, MEXICO

PROJECT: **VELARDENA MINE**

DRAWING TITLE: **CHICAGO RECLAMATION AREA MAP**

Sheet 1 Of 1 Sheets

SCALE: AS SHOWN

FIGURE No. 7

AutoCAD FILE: Velardena-Reclamation Maps.dwg DATE: JUNE 22, 2012

SCALE

20m 0 20m 40m

CONTOUR INTERVAL 2m

LEGEND

- NORTHING & EASTING GRID LINE
- ROADS
- BUILDING / STRUCTURES
- CURRENT FACILITIES
- HISTORIC DISTURBED AREAS

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
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GOLDEN MINERALS COMPANY

VELARDEÑA DISTRICT PROPERTIES,
VELARDEÑA MINING DISTRICT,
DURANGO STATE, MEXICO

PROJECT: **VELARDENA MINE**

DRAWING TITLE: **CHICAGO RECLAMATION DETAIL MAP**

Sheet 1 Of 1 Sheets

SCALE: AS SHOWN

FIGURE No. 8

AutoCAD FILE: Velardena-Reclamation Maps.dwg DATE: JUNE 22, 2012

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
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GOLDEN

VELARDEÑA DISTRICT PROPERTIES,
VELARDEÑA MINING DISTRICT,
DURANGO STATE, MEXICO

PROJECT: **VELARDENA MINE**

DRAWING TITLE: **LABRI MILL RECLAMATION DETAIL MAP**

Sheet 1 Of 1 Sheets

SCALE: AS SHOWN

FIGURE No. 9

AutoCAD FILE: Velardena-Reclamation Maps.dwg DATE: JUNE 22, 2012

21.0 CAPITAL & OPERATING COST ESTIMATES

The Project is currently in operation without quoted reserves. Many of the costs have been provided to Tetra Tech based on Golden Minerals' current production data and internal forecasts; which Tetra Tech has reviewed and found consistent with a mine of this type.

21.1 CAPITAL COSTS

Remaining capital cost expenditures over the remaining LoM are estimated to be US$3.7 million as shown in **Table 21-1**. For the restart of operations (prior to 2015), Golden Minerals spent:

- US$60,000 for new mining equipment, infrastructure support and development; and
- US$900,000 for the process facility including; overhauling the electrical system, installing new concentrate filters, and refurbishing the flotation cells. There are no major capital investments for Plant #1 planned for the remaining LoM.

Table 21-1: Capital Costs (2015-2018)

Item	Total ($000s)
Equipment and Repairs	$1,000
Process Plant	$90
Reclamation	$2,568
2015-18 Capital	**$3,658**

Planned expenditures over the remaining four years of mine life include US$250,000 per year for capitalized equipment and repairs. A forecast for actual expenditure items planned in 2015 was used to estimate capital costs in 2015 as well as the remaining annual LoM capital costs. In addition a US$90,000 expenditure in 2015 for the construction of a 4-inch diameter, 5-kilometer water pipeline from Plant #2 to Plant #1; and US$2.6 million for mine closure (as discussed in **Section 20.9** of this report).

21.2 OPERATING COSTS

Operating Costs will average about US$121/T milled over the remaining LoM as shown in **Table 21-2**. This projection is based upon actual operating costs and adjusted, as appropriate to reflect planned activities.

Table 21-2: Operating Costs (2015-2018)

Item	Total ($000s)	Unit Cost ($/T)
Mining costs	$23,336	$56.89
Milling costs	$11,075	$27.00
Mine & Process	**$34,412**	**$83.89**
Site Administration	$6,540	$15.94
G&A	$8,526	$20.78
Royalty	$331	$0.81
2015-18 Operating	**$49,809**	**$121.43**

22.0 ECONOMIC ANALYSIS

Project cost estimates and economics developed in the Technical-Economic Model (TEM) are prepared on a monthly basis for the LoM as based on the selected portion of the total project resource. The following preliminary economic analysis includes measured, indicated and inferred mineral resources, mineral resources are not mineral reserves and do not have demonstrated economic viability. This preliminary economic analysis also includes inferred mineral resources that are too speculative for use in defining reserves. Based upon design criteria presented in this report, the level of accuracy of the estimate is considered ±35%. Economic results are summarized in **Table 22-1**. The analysis suggests the following conclusions, assuming no debt:

- Remaining Mine Life: four years;
- Post-Tax $NPV_{8\%}$: US$11.1 million, IRR: 180%;
- Payback (Post-Tax): six months;
- Federal Precious Metal Royalty: US$331,000; and
- Income Tax: US$937,000.

22.1 Inputs & Assumptions

Technical assumptions used in the economic analysis are presented in **Table 22-1**. All costs are in Q1 2015 US dollars. A ratio of USD1.00: MXN13.5 is used, where applicable. Market prices are a reflection of current conditions. Taxes are estimated using the current tax code. Results reflect an 8% hurdle rate. No debt is assumed.

Table 22-1: Input and Assumptions Summary

Description	Value	Units
Market Prices:		
Gold (Au)	$1,250.00	/oz
Silver (Ag)	$17.00	/oz
Lead (Pb)	$0.85	/lb
Zinc (Zn)	$0.95	/lb
Taxes:		
Federal Precious Metal Royalty	0.50%	-
Special Mining Tax (SMT)	7.50%	-
Depr. Basis-Development	UOP	-
Depr. Basis-Capital	SL	-
Financial:		
Discount Rate	8%	-
Working Capital	2	weeks
Debt (Gearing)	None	-

Mine and process plant production summaries over the 2015-18 LoM are summarized in **Table 22-2** and **Table 22-3**, respectively. These schedules are discussed in detail in other sections of this report.

Table 22-2: RoM Summary

Description	Value	Units
RoM Milled	**410**	**kt**
RoM Grades:		
Gold (Au)	4.2	g/T
Silver (Ag)	194	g/T
Lead (Pb)	0.88%	-
Zinc (Zn)	1.34%	-
Metal Contained in RoM		
Au	55	koz
Ag	2,553	koz
Pb	7,926	klb
Zn	12,092	klb

Pb values in the Zn and pyrite concentrates as well as Zn values in the Pb and pyrite concentrates are not paid-for by the smelters and are therefore not reported in the table. Au and Ag pay-fors are different for each concentrate produced and are appropriately accounted for in the TEM.

Table 22-3: Process Summary

Description	Unit	Total	Pb Conc	Zn Conc	Fe Conc
Concentrate:	**kst-dry**	**21,976**	**7,497**	**7,249**	**7,230**
Payable Metal Recoveries					
Gold (Au)	%	57%	31%	4%	22%
Silver (Ag)	%	90%	80%	5%	5%
Lead (Pb)	%	76%	76%	0%	0%
Zinc (Zn)	%	73%	0%	73%	0%
Contained Metals:					
Gold (Au)	koz	31	17	2	12
Silver (Ag)	koz	2,308	2,035	136	137
Lead (Pb)	klb	6,061	6,061	0	0
Zinc (Zn)	klb	8,879	0	8,879	0

Payable metals for each concentrate type are derived using the smelter terms as described in **Section 19** and shown in aggregate in **Table 22-4**. These metals account for the gross value of the concentrates.

Table 22-4: Payable Metals

Description	Value	Units
Au	26	koz
Ag	2,014	koz
Pb	5,565	klb
Zn	7,547	klb
AuEq	**62**	**koz**
AgEq	**4,592**	**koz**

22.2 TECHNICAL-ECONOMIC RESULTS

Technical-economic results are presented in **Table 22-5**. Over the remaining LoM, the Project is projected to return a cash flow, discounted at 8%, of approximately US$11.1 million. Given current conditions, positive cash flow is projected to occur in six months, or June 2015.

Table 22-5: Technical-Economic Results - 2015-18 (US$000s)

Item	Total ($000s)	Pb Concentrate	Zn Concentrate	Fe Concentrate
Gross Payable	**$78,069**	**$57,713**	**$10,304**	**$10,051**
TCs	($5,355)	($2,242)	($1,885)	($1,229)
RCs	($4,963)	($4,963)	$0	$0
Freight & Insurance (1)	$0	$0	$0	$0
Penalties	($2,179)	($1,825)	($29)	($325)
NSR	**$65,571**	**$48,684**	**$8,390**	**$8,497**
$/t-conc	$2,984	$6,494	$1,157	$1,175
Operating Costs				
Mining costs	**($23,336)**			
Milling costs	**($11,075)**			
Site G&A	**($6,540)**			
G&A	**($8,526)**			
Federal Mining Royalty	**($331)**			
	($49,808)			
$/t-RoM	($121.43)			
Operating Margin	**$15,763**			
Capital Costs	**($1,090)**			
Working Capital	**$225**			
Mine Reclamation	**($2,568)**			
Income Tax	**($937)**			
Cash Flow	**$11,393**			
$NPV_{8\%}$	**$11,071**			
IRR	**180%**			
Payback (months)	**6**			

Cash and all-in costs are projected to be US$13.57 and US$13.80/AgEq-oz. These values, shown in **Table 22-6**, are similar given the relatively low remaining capital expenditures.

Table 22-6: Cash & All-In Operating Costs (per payable oz)

Description	$/AgEq-oz	$/Ag-oz	$/Au-oz
Cash Operating Costs(1)	$13.57	$9.17	$633
All-In Operating Costs(2)	$13.80	$9.71	$676

(1) Cash operating costs net of by-product credits.
(2) All-In costs include capital costs.

The LoM cash flow results are presented in **Table 22-7** on an annual basis.

Table 22-7: LoM Cash Flow Results

Item	Total	2015	2016	2017	2018	2019
Lead NSR						
Gross Payable	$57,713	$14,237	$13,693	$13,803	$15,981	
TCs	($2,242)	($857)	($693)	($420)	($271)	
RCs	($4,963)	($1,289)	($1,218)	($1,263)	($1,193)	
Penalties	($1,825)	($722)	($563)	($331)	($208)	
Lead NSR	**$48,684**	**$11,368**	**$11,219**	**$11,788**	**$14,308**	**$0**
Zinc NSR						
Gross Payable	$10,304	$2,969	$3,197	$2,341	$1,798	
TCs	($1,885)	($610)	($650)	($420)	($205)	
RCs	$0	$0	$0	$0	$0	
Penalties	($29)	($9)	($10)	($6)	($3)	
Zinc NSR	**$8,390**	**$2,349**	**$2,537**	**$1,915**	**$1,590**	**$0**
Pyrite NSR						
Gross Payable	$10,051	$1,347	$2,036	$2,514	$4,154	
TCs	($1,229)	($270)	($368)	($320)	($271)	
RCs	$0	$0	$0	$0	$0	
Penalties	($325)	($71)	($98)	($85)	($72)	
Zinc NSR	**$8,497**	**$1,006**	**$1,570**	**$2,109**	**$3,812**	**$0**
Gross Payable	**$65,571**	**$14,723**	**$15,325**	**$15,812**	**$19,710**	**$0**
Operating Costs						
Mining costs	$23,336	$6,406	$5,898	$5,534	$5,498	
Milling costs	$11,075	$2,766	$2,770	$2,768	$2,771	
Site G&A	$6,540	$1,438	$1,701	$1,701	$1,701	
G&A	$8,526	$1,777	$2,250	$2,250	$2,250	
Federal Mining Royalty	$331	$71	$75	$81	$103	
Operating Costs	**$49,808**	**$12,458**	**$12,694**	**$12,334**	**$12,323**	**$0**
Operating Margin	**$15,763**	**$2,266**	**$2,632**	**$3,479**	**$7,387**	**$0**
Capital Costs	**($1,090)**	($340)	($250)	($250)	($250)	
Working Capital	**$225**	($962)	$125	($94)	($289)	$1,444
Mine Reclamation	**($2,568)**	$0	$0	$0	($2,568)	
Income Tax	**($937)**	($144)	($124)	($188)	($481)	
Cash Flow	**$11,393**	**$820**	**$2,382**	**$2,947**	**$3,799**	**$1,444**
$NPV_{8\%}$	**$11,071**	**$719**	**$2,119**	**$2,399**	**$4,790**	**$1,043**
IRR	**180%**					
Payback (months)	**6**					

22.3 SENSITIVITIES

Project sensitivity to market prices, capital and operating costs are shown in **Figure 22-1**. As shown, the project is most sensitive to metal price. Given the low remaining required capital expenditures, it is logical that the Project is least sensitive to capital.

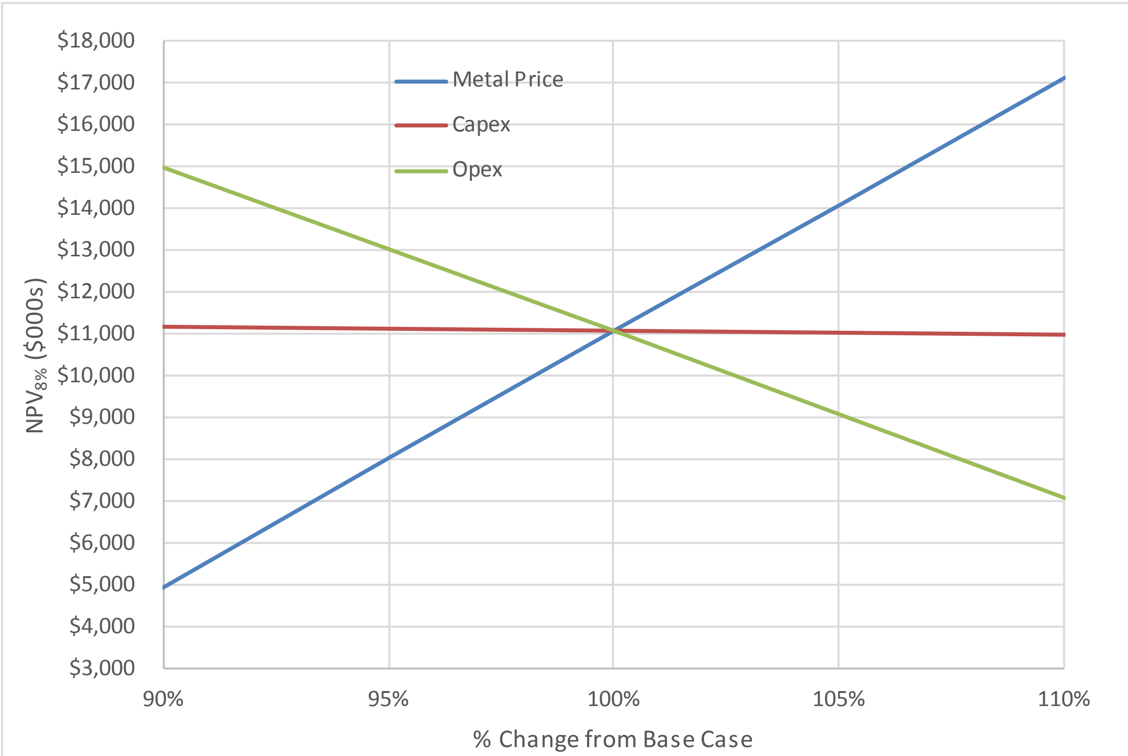

Figure 22-1: Sensitivities

23.0 ADJACENT PROPERTIES

The Project is surrounded by claims held by various entities, the most significant holdings are controlled by Industrias Peñoles, S.A.B. de C.V. (Peñoles) and Grupo México S.A.B. de C.V. (Grupo Mexico). Publically available data regarding exploration results, mineral resources, and mineral reserves for adjacent properties were not located.

As described in **Section 6**, the Velardeña property is located within a broader district of the same name which is host to a number of significant, past-producing Ag-Au-Pb-Zn mines. The most important of these cluster within the Santa Maria Dome, west of the pueblo of Velardeña, and include the Santa Maria, Industria, San Nicholas, and Los Azules mines. In addition, the San Diego project, located nine kilometers east of Velardeña, is a 50:50 Joint Venture between Golden Minerals and Golden Tag resources.

24.0 OTHER RELEVANT DATA & INFORMATION

The authors are not aware of any additional information for which the exclusion thereof would render this report misleading.

25.0 INTERPRETATIONS & CONCLUSIONS

With the inclusion of measured, indicated and inferred mineral resources the findings of this PEA suggest the Project is conceptually economically viable. The PEA has been based on mineral resources, which are not mineral reserves and do not have demonstrated economic viability, therefor, without the definition of reserves and subsequent feasibility or pre-feasibility studies, the project can't be determined to be economically viable.

25.1 Geology & Resources

Drill hole and channel samples have been collected, and analyzed using industry standard methods and practices and are sufficient to support the characterization of grade and thickness and further support the estimation of measured, indicated and inferred resources.

25.2 Mining

Results of the PEA indicate mining is potentially economically viable based on the inclusion of inferred mineral resources. However, due to the nature of the mineralization and the scale of the operations, extensive resource drilling of the deposit is not planned. For this reason detailed mine plans and schedules are not expected to be produced for the deposit. The consequence of this is that residual risk remains for mining of the project; and, planning of grades and stope tonnages can only be done on a short term basis.

The success of the proposed plan is sensitive to mining dilution, which could increase the costs of saleable products but also provides opportunity as any potential reductions in dilution from the mining would greatly benefit the project.

25.3 Metallurgy & Process

There is no geological, lithological or mineralogical changes in the process plant feed anticipated for the envisaged potential future production as compared to previous operations. Existing legacy operational data fully supports the existing process flow sheet for future production at the Plant #1.

The use of existing and refurbished equipment within the pre-existing facilities, and the production of a marketable concentrates, is Golden Minerals' preferred method of treating potential future production.

25.4 Significant Risk Factors

Factors that could affect the potential economic viability of the project could include underestimations of operating capital and declines in any or all of the metal prices. Estimation of resources could be affected by changes in metal prices and the actual mineralized shoot shapes and orientations. Successful implementation of the proposed mine plan is subject to the successful conversion of inferred resources to indicated or measured classification as well as conversion of measured and indicated mineral resources to mineral reserves, the prediction of stope layout and shape which is controlled by the actual shape of mineralized shoot and their orientations, and the ability of the mining operations to control waste dilution.

Many of the above stated risks are balanced with the opportunity to add potential value in excess of what has been described in this PEA.

26.0 RECOMMENDATIONS

The following recommendations are made to refine the current operation, but are not integral to the implementation of the plan proposed in this PEA. Many costs and improvements have been made to the Project prior to initiation of this study. **Table 26-1** outline estimated significant costs if the following recommendations were completed.

Table 26-1: Estimated Costs Associated with Recommendations

Description	$USD
Exploration Drilling ($130/m)[1]	1,117,000
Geologic Data Capture and Improvements	50,000
Mining Trade-off Studies	35,000
Metallurgical Testwork	50,000
Total	**1,305,000**

Note[1]: Assuming 9,000 m drill program.

26.1 GEOLOGY & RESOURCES

- Continue to collect specific gravity measurements and refine current estimations of specific gravity. Additional measurement should ideally be made with a paraffin wax or epoxy coating;
- Implement procedures of duplicate channel sampling by secondary sampling teams of drifts prior to stope development to ensure grade and thickness characteristics and to serve as field duplication of channel samples;
- Setup of strict control sample review procedures and tolerances. Involving review of control sample failure on receipt of each batch's results, and automatic triggering of batch reanalysis immediately after being alerted to failures;
- Improve sample data transcription methods to reduce control sample labeling errors and immediately resolve errors when encountered;
- Perform a detailed model reconciliation on a completed stope early in the proposed mine life and alter the estimation methods if the result of the reconciliation suggest refinements should be made;
- Continue to advance exploration drilling down dip of current inferred resources as new levels are establish. Preferentially target the Terneras, San Mateo, Roca Negra and A4 veins; and
  - The costs for additional drilling has not been included in the LoM PEA but any further resource expansion would be dependent on additional drilling at about the same scale, ~9,000 m as was completed in 2014.

26.2 MINING

It is recommended that Golden Minerals conducts a trade-off study on using cut and fill mining where waste and vein material are blasted separately in order to reduce ore dilution. The trade-off would consider that more total Tonnes would be mined/blasted in each section though vein Tonnes would be reduced but mined with a resulting higher grade.

It is also recommended that the current mine plan be optimized based on exclusion of stope development Tonnes that are diluted to the point that mill costs are not paid. In addition, the mine plan developed for the PEA should be optimized and undertaken at a more detailed level for a period of four to five years, which will enable a greater understanding of mining constraints, costs and resulting mill feed.

26.3 METALLURGY & PROCESS

Sb and As are penalty elements in the Pb and Zn concentrates and need to be added to the database and spatially modeled. Additional metallurgical test work is recommended in order to investigate the depression of Sb and As from the final Pb and Zn concentrates, and Zn from the pyrite concentrate.

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28.0 QUALIFIED PERSONS

The Consultants preparing this Technical Report are specialists in the fields of geology, exploration, mineral resource and mineral reserve estimation and classification, underground mining, geotechnical, environmental permitting, metallurgical testing, mineral processing, processing design, capital and operating cost estimation, and mineral economics.

None of the Consultants or any associates employed in the preparation of this report has any beneficial interest in Golden Minerals. The Consultants are not insiders, associates, or affiliates of Golden Minerals. The results of this Technical Report are not dependent upon any prior agreements concerning the conclusions to be reached, nor are there any undisclosed understandings concerning any future business dealings between Golden Minerals and the Consultants. The Consultants are being paid a fee for their work in accordance with normal professional consulting practice.

The following individuals, by virtue of their education, experience and professional association, are considered Qualified Persons (QP) as defined in the NI 43-101 standard, for this report, and are members in good standing of appropriate professional institutions.

This Technical Report was prepared by the following QPs, Certificates and consents of which are contained herein:

Name	Title, Company	Responsible for Sections
Geoff Elson, P.G.	Geologist, Tetra Tech, Inc.	1.0, 1.1, 1.2, 1.3, 1.5, 1.13.1, 1.14.1, 2.0, 3.0, 4.0, 4.1, 4.2, 4.3, 5.1, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 12.1, 14.0, 23.0, 24.0, 25.1, 26.1, 27.0, 28.0
Mark Horan, P.Eng	Senior Mining Engineer, Tetra Tech, Inc.	1.6, 1.13.2, 1.14.2, 12.2 16.0, 25.2, 26.2
Alva Kuestermeyer, QP	Principal Metallurgist, Tetra Tech, Inc.	1.4, 1.7, 1.8, 1.13.3, 1.14.3, 5.3, 12.3, 13.0, 17.0, 18.0, 25.3, 26.3
Nick Michael, QP	Principal Mineral Economist, Tetra Tech, Inc.	1.9, 1.11, 1.12, 12.4, 19.0, 21.0, 22.0
Vicki J. Scharnhorst, P.E., LEED AP	Principal Consultant, Tetra Tech, Inc.	1.10, 4.4, 4.5, 4.6 5.2, 12.5, 20.0

Section 15.0 does not require a QP.

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To accompany the Report Entitled: "NI 43-101 Compliant Technical Report, Preliminary Economic Assessment Velardeña Project, Durango State, Mexico" (Technical Report), effective February 20, 2015, issued March 27, 2015.

I, **Geoffrey Elson, P.G.**, of Golden, Colorado, do hereby certify:

1. I am a Senior Geologist with Tetra Tech, Inc. with a business address at 350 Indiana Street, Suite 500, Golden, Colorado 80401, USA.

2. I graduated with a bachelor's of science degree in geology from Michigan State University in 2006. I have worked as an exploration geologist and modeler continuously for seven years. I am a professional geologist in the State of Wyoming (#PG-3808) and a Registered Member of the Society for Mining, Metallurgy, and Exploration (SME) (#4168238). I have read the definition of "qualified person" set out in National Instrument 43-101 and certify that by reason of my education, affiliation with a professional association and relevant work experience, I fulfill the requirements of a "qualified person" for the purposes of NI 43-101.

3. I have visited and inspected the subject property on three occasions for a total of eleven day from February 6, 2013 to July 18, 2013.

4. I am responsible for Sections 1.0, 1.1, 1.2, 1.3, 1.5, 1.13.1, 1.14.1, 2.0, 3.0, 4.0, 4.1, 4.2, 4.3, 5.1, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 12.1, 14.0, 23.0, 24.0, 25.1, 26.1, 27.0 and 28.0.

5. I satisfy the requirements of independence according to Section 1.5 of NI 43-101.

6. I have had prior involvement with the Property that is the subject of the Technical Report that involved geologic and vein modeling in support of past operations.

7. I have read National Instrument 43-101, Form 43-101F1, and 43-101CP, and the Technical Report has been prepared in compliance with that instrument, form, and companion policy.

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

Signed and dated March 27, 2015.

[Signed, Sealed]

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Geoffrey Elson, P.G.

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To accompany the Report Entitled: "NI 43-101 Compliant Technical Report, Preliminary Economic Assessment Velardeña Project, Durango State, Mexico" (Technical Report), effective February 20, 2015, issued March 27, 2015.

I, **Mark Horan, P.Eng**, of Golden, Colorado, do hereby certify:

1. I am senior mining engineer at Tetra Tech Inc. at 886 Dunsmuir Street, Vancouver, British Columbia, Canada V6C 1N5.

2. I am a graduate of the University of Witwatersrand, 1997, with a BSc. Mining Engineering and I am a graduate of Rhodes University, 2002 with an MSc. Since 1998 to present I have been employed in the mining industry in various roles, I have worked in gold, coal, chrome and industrial mineral mining. I have previously been author of technical reports for mining operations in South Africa, Mexico and Canada. I am a Registered Professional Engineer, with the Association of Professional Engineers and Geoscientists of British Columbia), registration number 170768.

3. I have completed a personal inspection of the Property on December 17, 2014.

4. I am responsible for Sections 1.6, 1.13.2, 1.14.2, 12.2 16.0, 25.2 and 26.2. I share responsibility with others for Section 21.1 and 21.2 of the Technical Report.

5. I satisfy the requirements of independence according to Section 1.5 of NI 43-101.

6. I have no prior involvement with the Property that is the subject of the Technical Report.

7. I have read National Instrument 43-101, Form 43-101F1, and 43-101CP, and the Technical Report has been prepared in compliance with that instrument, form, and companion policy.

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

Signed and dated March 27, 2015.

[Signed, Sealed]

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To accompany the Report Entitled: "NI 43-101 Compliant Technical Report, Preliminary Economic Assessment Velardeña Project, Durango State, Mexico" (Technical Report), effective February 20, 2015, issued March 27, 2015.

I, **Alva L. Kuestermeyer, QP**, of Golden, Colorado, do hereby certify:

1. I am a Principal Consultant with Tetra Tech, Inc. with a business address at 350 Indiana Street, Suite 500, Golden, Colorado 80401, USA.

2. I am a graduate of South Dakota School of Mines and Technology with a Bachelor of Science degree in Metallurgical Engineering (1973) and Colorado School of Mines with a Master of Science degree in Mineral Economics (1982). My relevant experience includes 41 years of metallurgical engineering and mineral economics experience on mining projects. I am a "Qualified Person" for purposes of National Instrument 43-101 (the "Instrument").

3. I have completed a personal inspection of the Property on December 17, 2014.

4. I am responsible for Sections 1.4, 1.7, 1.8, 5.3, 12.3, 1.13.3, 1.14.3, 13, 17, 18, 25.3, 26.3. I share responsibility with others for Section 21.1 and 21.2 of the Technical Report.

5. I satisfy the requirements of independence according to Section 1.5 of NI 43-101.

6. I have no prior involvement with the Property that is the subject of the Technical Report.

7. I have read National Instrument 43-101, Form 43-101F1, and 43-101CP, and the Technical Report has been prepared in compliance with that instrument, form, and companion policy.

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

Signed and dated March 27, 2015.

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I, **Nick Michael, QP**, of Golden, Colorado, do hereby certify:

1. I am a Principal Mineral Economist with Tetra Tech, Inc. with a business address at 350 Indiana Street, Suite 500, Golden, Colorado 80401, USA.

2. I am a graduate of the Colorado School of Mines in Golden, Colorado USA in mining engineering (1983) and received and received an MBA from Willamette University (1986). I have practiced my profession continuously since 1987. Since 1990, I have completed valuations, evaluations (technical-economic models), and have audited a variety of projects including exploration, pre-production (feasibility-level), operating and mine closure projects. I have also served as expert witness with respect to technical-economic issues.

3. I have not completed a personal inspection of the Property.

4. I am responsible for Sections 1.9, 1.11, 1.12, 12.4, 19.0 and 22.0. I share responsibility with others for Section 21.1 and 21.2 of the Technical Report.

5. I satisfy the requirements of independence according to Section 1.5 of NI 43-101.

6. I have no prior involvement with the Property that is the subject of the Technical Report.

7. I have read National Instrument 43-101, Form 43-101F1, and 43-101CP, and the Technical Report has been prepared in compliance with that instrument, form, and companion policy.

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

Signed and dated March 27, 2015.

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I, **Vicki J. Scharnhorst, P.E., LEED AP**, of Golden, Colorado, do hereby certify:

1. I am a Principal Consultant with Tetra Tech, Inc. with a business address at 350 Indiana Street, Suite 500, Golden, Colorado 80401, USA.

2. I am a graduate of Kansas State University with a Bachelor of Science degree in Civil Engineering (1982). My relevant experience includes 30 years of civil engineering experience on large water resources projects inclusive of water quality programs, environmental impact studies, permitting and civil works. I am a licensed Engineer in the states of Nevada, Michigan, Missouri and Colorado; a water right surveyor in the State of Nevada; a LEED Accredited Professional with the U.S. Green Building Council; and have served on the Nevada State Board of Professional Engineers and Land Surveyors. I am a "Qualified Person" for purposes of National Instrument 43-101 (the "Instrument").

3. I have not completed a personal inspection of the Property.

4. I am responsible for Sections 1.10, 4.4, 4.5, 4.6, 5.2, 12.5 and Section 20.0.

5. I satisfy the requirements of independence according to Section 1.5 of NI 43-101.

6. I have no prior involvement with the Property that is the subject of the Technical Report.

7. I have read National Instrument 43-101, Form 43-101F1, and 43-101CP, and the Technical Report has been prepared in compliance with that instrument, form, and companion policy.

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

Signed and dated March 27, 2015.

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Vicki J. Scharnhorst, P.E., LEED AP