GOLDEN
MINERALS COMPANY

Velardeña Project

Technical Report Summary

Durango State, Mexico

August 2023

Project No. 117-8133007

TETRA TECH

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ACRONYMS & ABBREVIATIONS

3D	Three dimensional
Ag	Silver
Ar	Argon
As	Arsenic
ASARCO	American Smelting and Refining Company
Au	Gold
BAT	Batch amenability tests
BIOX	Bio-oxidation
CAPEX	Capital expenditures
CCD	Counter current decantation
cm	Centimeter
Cu	Copper
cu ft	Cubic feet
DMT	Dry metric tonne
Fe	Iron
ft	Feet
g/t	Grams/tonne
HP	Horsepower
IDW	Inverse distanced weighted
IMMSA	Industrial Minera de México S.A
in	Inch
IRR	Internal rate of return
k	Thousand
kg	Kilogram
km	Kilometer
kt	Thousand tonnes
lb	Pound
LOM	Life of mine
m	Meter
M	Million
MI	Measured and Indicated
MII	Measured, Indicated, and Inferred
mm	Millimeters
m/s	Meters per second
Mt	Million tonnes
MXN	Mexican Pesos
mya	Million years ago
NPV	Net present value
NSR	Net smelter return
OPEX	Operating expenditure
oz	Troy ounce
Pb	Lead

PEA	Preliminary Economic Assessment
PLS	Pregnant leach solution
QA/QC	Quality assurance/quality control
QP	Qualified Person
ROM	Run of mine
SEMARNAT	Secretaria del Medio Ambiente y Recursos Naturales
t	Tonnes
tpd	Tonnes per day
tpy	Tonnes per year
TRS	Technical Report Summary
TSF	Tailings storage facility
USD	United States dollars
yd	Yard
yr	year
Zn	Zinc

1. EXECUTIVE SUMMARY

This Technical Report Summary (TRS) is prepared for Golden Minerals Company (Golden Minerals) to report Mineral Resources for the Velardeña Project (the Project) in Velardeña, Durango, Mexico. The purpose of this report is to summarize the results of an Initial Assessment for the property as defined under the U.S. Securities and Exchange Commission's Regulation S-K 1300.

1.1 Property Description and Ownership

The Project is held by Minera William S.A. de R.L. de C.V. (Minera William), a wholly owned subsidiary of Golden Minerals, and is comprised of two properties:

- The Velardeña property is centered on UTM grid coordinates 2,774,300 N and 632,200 E (WGS 84 datum, zone 13). This property contains the Santa Juana mine which has been the focus of mining efforts since 1995, as well as the historical Terneras, San Juanes, and San Mateo mines.
- The Chicago property is located approximately 2 km south of the Velardeña property and is centered at UTM grid coordinates 2,772,480 N and 631,867 E (WGS 84 datum, zone 13). This property contains the historical Los Muertos-Chicago mine. The Project's location relative to the major cities of Torreón and Durango is shown in Figure 1-1.

Figure 1-1: Velardeña Project location

The Project also has two processing plants. Plant 1 treats sulfide material by conventional crush, grind, and differential flotation technologies to produce Pb, Zn, and pyrite concentrates. The Project consists of 28 claims covering the Velardeña and Chicago properties controlled by Golden Minerals through its Mexican subsidiary Minera William, with a total area of 315.5264 hectares. Surface rights pertaining to the Project are held by Golden Minerals as well as two local ejidos (rural cooperative communities). Golden Minerals has entered into agreements with the ejidos to obtain rights for surface access and to perform work.

1.2 Geology and 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 María 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.

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 geologic 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 local 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. 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.

1.3 Property Status

The mines at the Project are in advanced development stage. Production stopped in 2015 and the mines are currently in care and maintenance. The Project has been extensively explored from the surface using geologic mapping, vein mapping, and vein sampling. Underground exploration consisted of diamond drilling, geologic level mapping, vein level mapping, vein sampling, and drift and stope development. Underground development includes 10,122 meters of drift and ramp development and 2,278 meters of raise development.

Plant 1 is under care and maintenance after operation ceased in 2015, but has been restarted in 2023 to begin test processing in advance of a planned production restart at Velardeña. Historical operational results support the existing process flow sheet for potential future production at the plant. Previous studies on the Project have included recovery from a BIOX® plant to be constructed near Plant 2. Due to the results from recent metallurgical and economic analyses performed by Golden Minerals, along with favorable terms for the sale of pyrite concentrate, the results presented in this study exclude this process.

1.4 Mineral Resource Estimates

Estimated Mineral Resources with an effective date of June 1, 2023, for the Velardeña Project are shown in Error! Reference source not found. The Resource is reported by mineral type and Resource class for all veins. Resources were calculated as diluted to a minimum of 0.7 meters and are reported at a $195 NSR cutoff. For the oxide mineralized material, Zn and Pb were previously reported as Resources. It has since been determined they do not have a reasonable expectation of economic extraction at this time and have not been included in this update.

Table 1-1: Velardeña Project Sulfide Mineral Resources

Classification	Mineral Type	NSR Cutoff	Tonnes	Grade Ag g/t	Grade Au g/t	Grade Pb%	Grade Zn%	Ag oz	Au oz	Pb lb	Zn lb
Measured	Sulfide	195	203,200	402	6.02	1.71	2.08	2,625,900	39,300	7,680,000	9,306,300
Indicated	Sulfide	195	462,700	402	5.32	1.68	2.08	5,983,000	79,200	17,090,700	21,173,100
Measured + Indicated	Sulfide	195	665,900	402	5.54	1.69	2.08	8,608,900	118,500	24,770,700	30,479,400
Inferred	Sulfide	195	1,059,900	413	5.10	1.81	2.26	14,067,200	173,700	42,294,600	52,697,800

Notes:
1. *Resources are reported as diluted tonnes and grade to 0.7 m fixed width*
2. *Metal prices for NSR cutoff are: $22.71/oz-Ag, $1,826/oz-Au, $1.02/lb-Pb, and $1.31/lb-Zn*
3. *Columns may not total due to rounding*

Table 1-2: Velardeña Project Oxide Mineral Resources

Classification	Mineral Type	NSR Cutoff	Tonnes	Grade Ag g/t	Grade Au g/t	Ag oz	Au oz
Measured	Oxide	195	95,200	318	6.62	973,000	20,300
Indicated	Oxide	195	194,000	323	6.01	2,016,800	37,500
Measured + Indicated	Oxide	195	289,200	321	6.21	2,989,800	57,800
Inferred	Oxide	195	269,400	500	5.56	4,326,400	48,200

Notes:
1. *Resources are reported as diluted tonnes and grade to 0.7 m fixed width*
2. *Metal prices for NSR cutoff are: $22.71/oz-Ag, $1,826/oz-Au, $1.02/lb-Pb, and $1.31/lb-Zn*
3. *Pb and Zn are not considered to be recoverable at this time and have not been included in this Resource estimate*
4. *Columns may not total due to rounding*

Table 1-3: Velardeña Project Mineral Resources

Classification	Mineral Type	NSR Cutoff	Tonnes	Grade Ag g/t	Grade Au g/t	Grade Pb%	Grade Zn%	Ag oz	Au oz	Pb lb	Zn lb
Measured	All	195	298,400	375	6.21	1.71	2.08	3,598,900	59,600	7,680,000	9,306,300
Indicated	All	195	656,700	379	5.53	1.68	2.08	7,999,800	116,700	17,090,700	21,173,100
Measured + Indicated	All	195	955,100	378	5.74	1.69	2.08	11,598,700	176,300	24,770,700	30,479,400
Inferred	All	195	1,329,300	430	5.19	1.81	2.26	18,393,700	221,900	42,294,600	52,697,800

Notes:

1. *Resources are reported as diluted tonnes and grade to 0.7 m fixed width*
2. *Metal prices for NSR cutoff are: $22.71/oz-Ag, $1,826/oz-Au, $1.02/lb-Pb, and $1.31/lb-Zn*
3. *Columns may not total due to rounding*

1.5 Mineral Reserve Estimates

Mineral Reserves have not been estimated for the Velardeña Project.

1.6 Capital and Operating Costs

Two capital and operating cost estimates were generated for the Project to support two economic analysis cases. One case considers Measured, Indicated, and Inferred (MII) Mineral Resources and the other considers only Measured and Indicated Mineral (MI) Resources. Capital and operating costs are based on Golden Minerals internal forecasts, which Tetra Tech has reviewed and found to be consistent with a mine of this type. Both capital and operating costs have a 15% contingency applied. Tetra Tech considers these cost estimates to be within 50%.

Capital costs total $7.2M for the case considering the MII material, and $4.6M for the MI case. Operating costs for the MII and MI cases total $273.4M and $112.6M, respectively. Variations in the capital costs are attributable to sustaining capital requirements over the longer life-of-mine in the MII case, as well as a $0.3M allocation for tailings storage facility expansion in the MII case that is not required in the MI scenario. Similarly, the operating cost variance is due to the increased mine life in the MII plan. Both plans have a unit cost per tonne processed of $224.82/t.

1.7 Economic Analysis

Two economic models were prepared for the Project: one includes Inferred Mineral Resources in the analysis (MII case), and the second excludes the Inferred material (MI case). The economic model results are based on Mineral Resources that, unlike Mineral Reserves, do not have demonstrated economic viability.

The MII case has a mine life of 10.5 years and an after-tax NPV of $87.6M with an IRR of 860.7%. The MI case has a mine life of 4.5 years and reports an after-tax NPV of $52.3M with an IRR of 1266.8%. Both cases were discounted at 8%.

1.8 Permitting Requirements

Areas with permitting requirements at the Project include the Velardeña mine and Plant 1. Golden Minerals personnel report the Project holds and has retained the necessary permits to operate the mines and plants at Velardeña, and that 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. Details of the required permits and their status are contained in Section 3.3.

1.9 Conclusions

1.9.1 Geology and 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.

1.9.2 Mining

Results of the study indicate mining is potentially economically viable. However, due to the thin-veined nature of the mineralization and the scale of the operations, extensive Resource drilling of the deposit is not planned at this time. Conceptual stope outlines have been used for the purposes of this study.

The Project 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 mine plan would greatly benefit the Project. Test mining was completed in 2018, 2021, and 2022 and has confirmed a minimum selective mining width of 0.7 m is achievable, which can contribute to reducing dilution.

1.9.3 Metallurgy and 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 supports the existing process flow sheet for future production at 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.

1.9.4 Significant Risk Factors

Factors that could affect the potential economic viability of the Project could include underestimations of operating and capital costs and declines in any or all metal prices. Changes to the contract sales terms could significantly impact the Project's economic viability.

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 shoots and their orientations, and the ability of the mining operations to control waste dilution.

The results of the report summarized in this study are not based on a full feasibility study, and there is no assurance the company will be successful in realizing the economics described in this TRS. There is increased uncertainty and risk in restarting the mine without a feasibility level study.

An ongoing dispute between Unifin and Minera William could materially impact the restart of Velardeña, as Minera William holds the mine and processing plant. A preliminary hearing was initially scheduled to take place in April 2023 but was rescheduled to June 2023. In June 2023 Minera William and Unifin agreed to settle the matter and the Court agreed to suspend trial to allow Minera William and Unifin to negotiate a settlement agreement. As of June 30, 2023, the terms and timing of the settlement are uncertain.

1.10 Recommendations

1.10.1 Geology and 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.
- 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.

1.10.2 Mining

It is recommended that Golden Minerals implements cut and fill mining where waste and vein material are blasted separately to reduce ore dilution. This practice would consider more total tonnes blasted in each section. Vein tonnes would be reduced, but the resulting grade would be higher. Recent tests on selective mining widths of 0.7 m have proven to be achievable. Because this practice requires efficient operations control, Tetra Tech recommends having detailed control in drilling and blasting.

The mine plan developed for the study should be optimized and undertaken at a more detailed level, which will enable a greater understanding of mining constraints, costs, and resulting mill feed. Additionally, the oxide Resource should be evaluated for inclusion into future mine plans.

1.10.3 Metallurgy and Process

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

1.10.4 Economic Analysis

Currently, it is anticipated that the salvage sale of equipment will cover the reclamation costs (estimated at $1.5M). However, the salvage value of the mine and plant equipment at the end of the LOM has not been estimated. It is recommended that an estimate of the salvage value of the Project's assets be determined and incorporated into the economic analysis alongside the closure cost estimates to increase the resolution of the Project's economics.

2. INTRODUCTION

This Technical Report Summary (TRS) is prepared for Golden Minerals Company (Golden Minerals) to report Mineral Resources for the Velardeña Project (the Project) in Velardeña, Durango, Mexico. The Project is held by Minera William S.A. de R.L. de C.V. (Minera William), a wholly owned subsidiary of Golden Minerals. The purpose of this report is to summarize the results of an Initial Assessment level study for the property as defined under the U.S. Securities and Exchange Commission's Regulation S-K 1300.

All references to dollars in this report are to US dollars (USD) unless otherwise noted. Distances, areas, volumes, and masses are expressed using metric units unless indicated otherwise. All tonnages are in tonnes (1,000 kilograms), precious metal grade values are reported in grams per tonne (g/t), and precious metal quantities are presented as troy ounces (oz).

2.1 Sources of Information

This TRS summarizes the information contained in the Canadian National Instrument 43-101 compliant Preliminary Economic Assessment report entitled *Preliminary Economic Assessment Update Technical Report of the Velardeña Project, Durango State, Mexico* prepared by Tetra Tech, with an effective date of *June 1, 2023*. Additional sources of information include materials and comments provided to Tetra Tech by Golden Minerals personnel, as described in Section 25.

2.2 Site Inspection

Tetra Tech Qualified Persons (QPs) Dr. Guillermo Dante Ramírez Rodríguez and Ms. Kira Johnson visited the site on May 23, 2023. The visit included observations of geologic interpretations, mining, exploration drilling, channel sample locations, survey locations, underground mine accesses, the Santa Juana vein (San Mateo ramp), the Chicago veins (Chicago ramp), drifts and stopes, stockpiled material, processing Plant 1, Golden Minerals' laboratory, and surface infrastructure. Tetra Tech's QPs had discussions with Golden Minerals personnel regarding estimation methods, database structure, and vein interpretations. Mr. Randolph P. Schneider visited the plant on December 10, 2019.

3. PROPERTY DESCRIPTION

The Project includes 28 mining concessions covering the Velardeña and Chicago mines controlled by Golden Minerals through its Mexican subsidiary Minera William and located within the Velardeña mining district. Processing Plants 1 and 2 are located within land owned by Golden Minerals. Surrounding ejido-owned land contains some of the associated installations and infrastructure. The Project is comprised of two properties:

- The Velardeña property is centered on UTM grid coordinates 2,774,300 N and 632,200 E (WGS 84 datum, zone 13). This property contains the Santa Juana mine, which has been the focus of mining efforts since 1995, as well as the historical Terneras, San Juanes, and San Mateo mines.
- The Chicago property is located approximately 2 km south of the Velardeña property and is centered at UTM grid coordinates 2,772,480 N and 631,867 E (WGS 84 datum, zone 13). This property contains the historical Los Muertos-Chicago mine.

The Project's location relative to the major cities of Torreón and Durango is shown in Figure 3-1.

Figure 3-1: Velardeña property location

3.1 Mineral Tenure

The Project consists of 28 claims covering the Velardeña and Chicago properties controlled by Golden Minerals through its Mexican subsidiary Minera William. Golden Minerals holds 315.5264 hectares within all the concessions. Details of the concessions are shown in Table 3-1.

Table 3-1: Project Mineral Concessions

Location	Claim Name	Claim Owner	Concession Number	Issue Date	Expiration Date	Concessions Area (ha)
Velardeña	Ampl. del Águila Mexicana	Minera William	85580	10/13/1936	10/12/2061	19.8593
Velardeña	Águila Mexicana	Minera William	168290	4/2/1981	4/1/2031	18.9372
Velardeña	La Cubana	Minera William	168291	4/2/1981	4/1/2031	2.5520
Velardeña	Tornasol	Minera William	168292	4/2/1981	4/1/2031	3.9968
Velardeña	San Mateo Nuevo	Minera William	171981	9/21/1983	9/20/2033	8.0000
Velardeña	San Mateo	Minera William	171982	9/21/1983	9/20/2033	4.6134
Velardeña	Recuerdo	Minera William	171983	9/21/1983	9/20/2033	8.2265
Velardeña	San Luis	Minera William	171984	9/21/1983	9/20/2033	2.4000
Velardeña	La Nueva Esperanza	Minera William	171985	9/21/1983	9/20/2033	9.9260
Velardeña	La Pequeña	Minera William	171988	9/21/1983	9/20/2033	1.0000
Velardeña	Buen Retiro	Minera William	172014	9/21/1983	9/21/2033	6.0899
Velardeña	Unificación San Juan Evangelista	Minera William	172737	6/28/1984	6/27/2034	13.9445
Velardeña	Unificación Viborillas	Minera William	185900	12/14/1989	12/13/2039	46.4333
Velardeña	Buenaventura No. 3	Minera William	188507	11/29/1990	11/28/2040	6.0139
Velardeña	El Pájaro Azul	Minera William	188508	11/29/1990	11/28/2040	15.0000
Velardeña	Buenaventura 2	Minera William	191305	12/20/1991	12/19/2041	5.3745
Velardeña	Buenaventura	Minera William	192126	12/19/1991	12/18/2041	30.0000
Velardeña	Los Dos Amigos	Minera William	193481	12/19/1991	12/18/2041	25.3325
Velardeña	Viborillas No. 2	Minera William	211544	5/31/2000	5/30/2050	1.6020
Velardeña	Kelly	Minera William	218681	12/3/2002	12/2/2052	3.9104
Chicago	Santa Teresa	Minera William	171326	9/20/1982	9/19/2032	22.3366

Location	Claim Name	Claim Owner	Concession Number	Issue Date	Expiration Date	Concessions Area (ha)
Chicago	San Juan	Minera William	171332	9/20/1982	9/19/2032	8.1731
Chicago	Los Muertos	Minera William	171986	9/21/1983	9/20/2033	3.5320
Chicago	El Gambusino	Minera William	171987	9/21/1983	9/20/2033	6.6565
Chicago	Ampliación San Juan	Minera William	183883	11/23/1988	11/22/2038	10.7989
Chicago	Muñequita	Minera William	196313	7/16/1993	7/15/2043	15.4518
Chicago	San Agustín	Minera William	210764	11/26/1999	11/25/2049	7.4563
Chicago	La Cruz	Minera William	189474	12/6/1990	12/5/2040	7.909

3.2 Surface Rights

Surface rights pertaining to the Project are held by Golden Minerals and two local ejidos (rural cooperative communities).

Ejido Velardeña holds surface rights at the Project's Velardeña property. Golden Minerals reports it has an agreement with the ejido for surface access and to perform work related to exploration and mining on the property. The agreement requires quarterly payments of $4,000 to be paid to the ejido and is valid through 2032.

Ejido Vista Hermosa holds surface rights for the Project's Chicago property. Golden Minerals reports it has an agreement with the ejido allowing access to the property to perform work related to mineral exploration and mining. The agreement was formalized before a notary and is valid until 2038. As part of the agreement, Golden Minerals makes a payment of $400,000 MXN plus applicable taxes by the 24th of March each year.

Golden Minerals owns the surface of the land underlying the oxide mill and owns the land in the areas of surface installations at the entrance of the Velardeña mine (San Mateo ramp), the sulfide plant (Plant 1), the concentrate warehouse, and a well that provides water to the mill.

3.3 Permitting

Areas with permitting requirements at the Project include the Velardeña mine and Plant 1. 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. Details of the permits required, and the status of the permits, are provided in **Section 17.3**.

3.4 Encumbrances

There is a lien reported in favor of IIG bank on some concession titles within the Velardeña property regarding a loan made to BLM Minera Mexicana S.A. de C.V., an entity owned by ECU (now a part of Golden Minerals). Golden Minerals reports this loan was repaid in 2001; however, the lien notation on the concession titles was never cleared following the repayment and still shows as an active lien in the Mexican Mining Registry. Golden Minerals states it is 100% confident all debts with IIG have been settled and the company filed the documents required to cancel the mortgage with the Public Registry of Mining in November 2022.

3.5 Other Significant Factors and Risks

The author is unaware of any other significant risk factors that may affect access, title, or right or ability to perform work on the property.

4. ACCESSIBILTY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, AND PHYSIOGRAPHY

4.1 Topography, Elevation, and Vegetation

The Project is located on the northwestern edge of the Mesa Central physiographical province on the eastern flank of the Sierra Madre Occidental Mountain range and is characterized by a mixed topography. The two properties that are the subject of this report are located within the Sierra San Lorenzo range at an elevation of approximately 1,680 to 2,000 meters above sea level.

According to INEGI's classification, the type of vegetation where the Project is located corresponds to a vegetation type known as Desert Shrubland *rosetophilous* (rosette-forming vegetation) and sub montane scrub.

4.2 Access

The Project is in the State of Durango, approximately 65 km southwest of the city of Torreón, Coahuila, and 150 km northeast of the city of Durango. A four-lane toll highway connecting the cities of Torreón and Durango passes approximately 500 m east of the village of Velardeña. The village is connected to the mine site via a 7 km gravel road maintained in good condition for year-round use.

The major cities of Durango and Torreón have airports which are served by major regional and international carriers.

4.3 Climate

Climate at the Project is characterized as semi-arid, with a mean annual temperature of 21.1°C and an average annual rainfall of 243.7 mm/yr. Temperatures can drop below freezing in the winter and can reach the high 30s (°C) from July through September. The climate allows for a year-round operating season.

4.4 Infrastructure

The Project is located within an area with a long and active history of mineral exploration and mining. The nearby cities of Torreón, Gómez Palacio, and Lerdo de Tejada have an extensive history of manufacturing equipment for mining and metallurgical processing projects. Supplies and equipment are directly available from the cities of Monterrey, Chihuahua, and Durango, as well as from specialized suppliers elsewhere in Mexico, Canada, and the United States of America.

Fresh water for the Project is sourced from six wells which tap local aquifers. These wells are fully permitted and controlled by Golden Minerals.

Golden Minerals owns a processing plant capable of processing mineralized material from the Velardeña mines. Plant 1 is a 300 tpd flotation mill which produces concentrates of Pb, Zn, and pyrite. The plant is located near the town of Velardeña and was upgraded in 2014.

The mines and processing plants are connected to the national electric grid via substations located near Plant 1 and the Peñoles Velardeña mine.

An experienced labor force is available in the town of Velardeña and in nearby cities and communities.

5. HISTORY

5.1 Early History

The earliest significant mining operation in the Velardeña District occurred in 1888 with the formation of the Velardeña Mining and Smelting Company. In 1902, the American Smelting and Refining Company (ASARCO) took over the operations and installed a new smelter processing 2,500 tpd from various mines in the area, with the most significant operations occurring in the Terneras and Santa Juana veins. ASARCO and various small independent operators worked the area until 1926.

In the 1960s, ASARCO became a minority shareholder in Industrial Minera de México S.A. (IMMSA), and exploration and development work recommenced in the Santa María and Reina del Cobre mines in 1968. In 1969 IMMSA abandoned several mining concessions, including those underlying the Terneras and San Diego mines, which were acquired by the Gaitán Group. Small-scale operations worked the concessions until 1992.

5.2 Mining and Exploration

William Resources acquired the concessions owned by the Gaitán Group via their Mexican affiliate BLM Minera in 1994. William Resources carried out surface mapping and sampling work on the concessions, with a focus on the Santa Juana vein system. William Resources also performed development work on the Terneras and Santa Juana mines and processed 600 tpd of dump material and development muck. Operations ceased in 1997.

In 1997 ECU Gold purchased 93.48% of BLM Minera and 100% of Minera William from William Resources, and in 2011 Golden Minerals merged with ECU. ECU resumed operations at the Project in 1998 and production continued through 2015 (as Golden Minerals after the merger), with a brief shutdown from July 2013 through June 2014. During the 2009-2011 period, ECU drove 8,030 m of drifts and ramps as well as 3,608 m of raises at the Project. Development work during the 2012-2014 period included a new ramp to access deeper levels of the Terneras and San Mateo veins, as well as the Roca Negra vein.

William Resources and ECU completed 10,714 m of surface and 6,278 m of underground exploration drilling during the period of 1995-2008. Exploration work during the period of 2009-2011 consisted of underground drilling and sampling. This included 1,235 m of NQ drilling and 1,212 m of EX drilling. No surface drilling was conducted during this period. The NQ drill program yielded 483 samples and the EX drill program yielded 214 samples.

6. GEOLOGICAL SETTING, MINERALIZATION, AND DEPOSIT

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 María 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.

6.1 Regional Geology

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 6-1** illustrates the location of the Velardeña mining district with respect to regional lithologic and structural features.

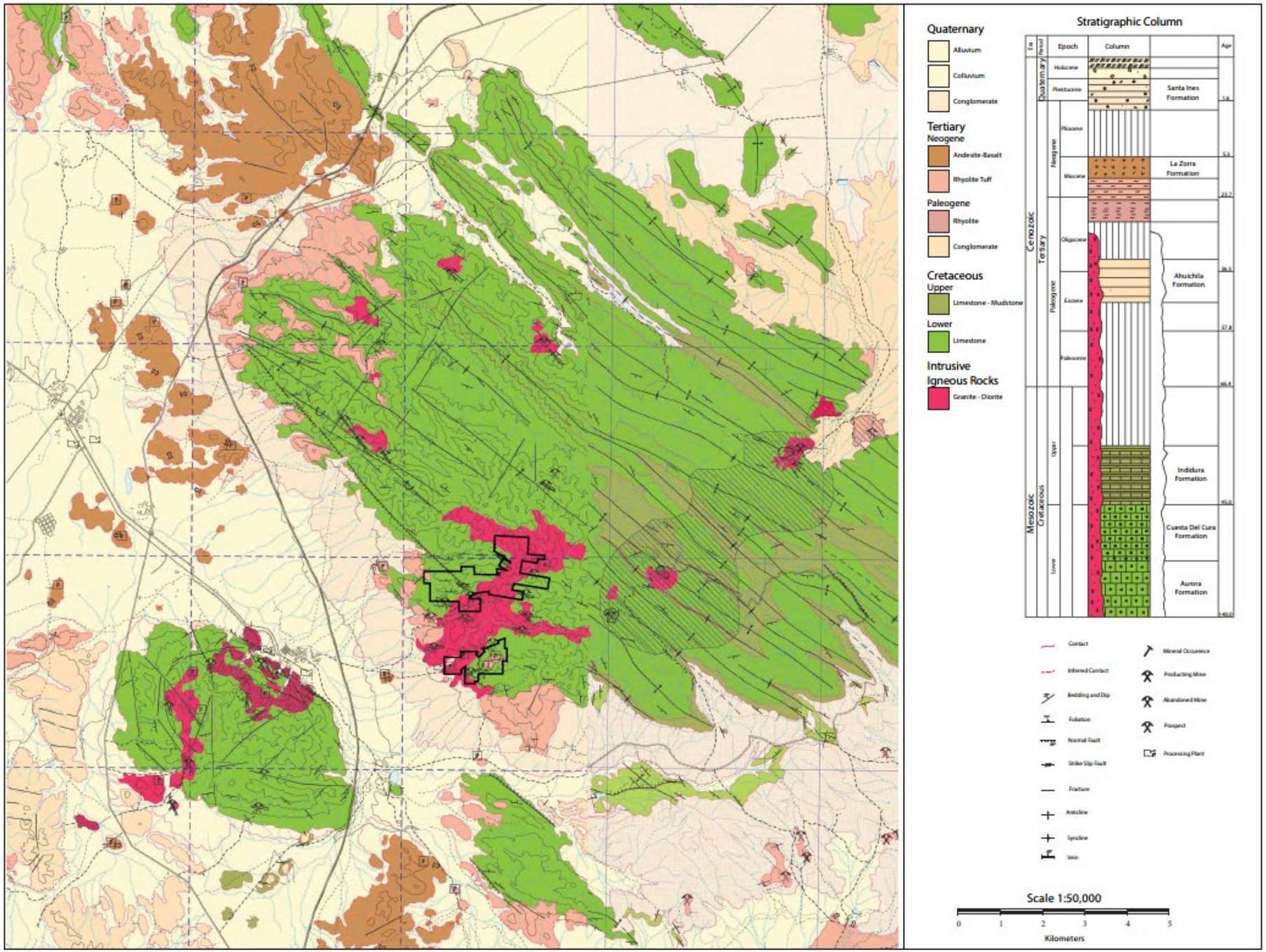


Figure 6-1: Velardeña regional geology

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 mya.

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 María, Sierra de San Lorenzo, and San Diego Dome). The Santa María quartz latite porphyry intrusion, west of the village of Velardeña, has yielded a potassium-argon (K-Ar) date of 33.1 mya.

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 near intrusive centers, contact aureoles, and accompanying alteration zones. Mineralization has been dated at approximately 31 mya, 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. 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 Águilas fault offsets the mineralized northwest trending Santa Juana veins.

6.2 Property Geology

6.2.1 Velardeña Property

Medium to thick-bedded limestone of the Cretaceous Aurora Formation comprises basement rocks in the project area. Limestone was first folded then intruded by the multiphase diorite/monzo-diorite 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. 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 Águilas, 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 veins in the western blocks are exposed in 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 6-2** vein traces are projected to surface and do not cut alluvium.

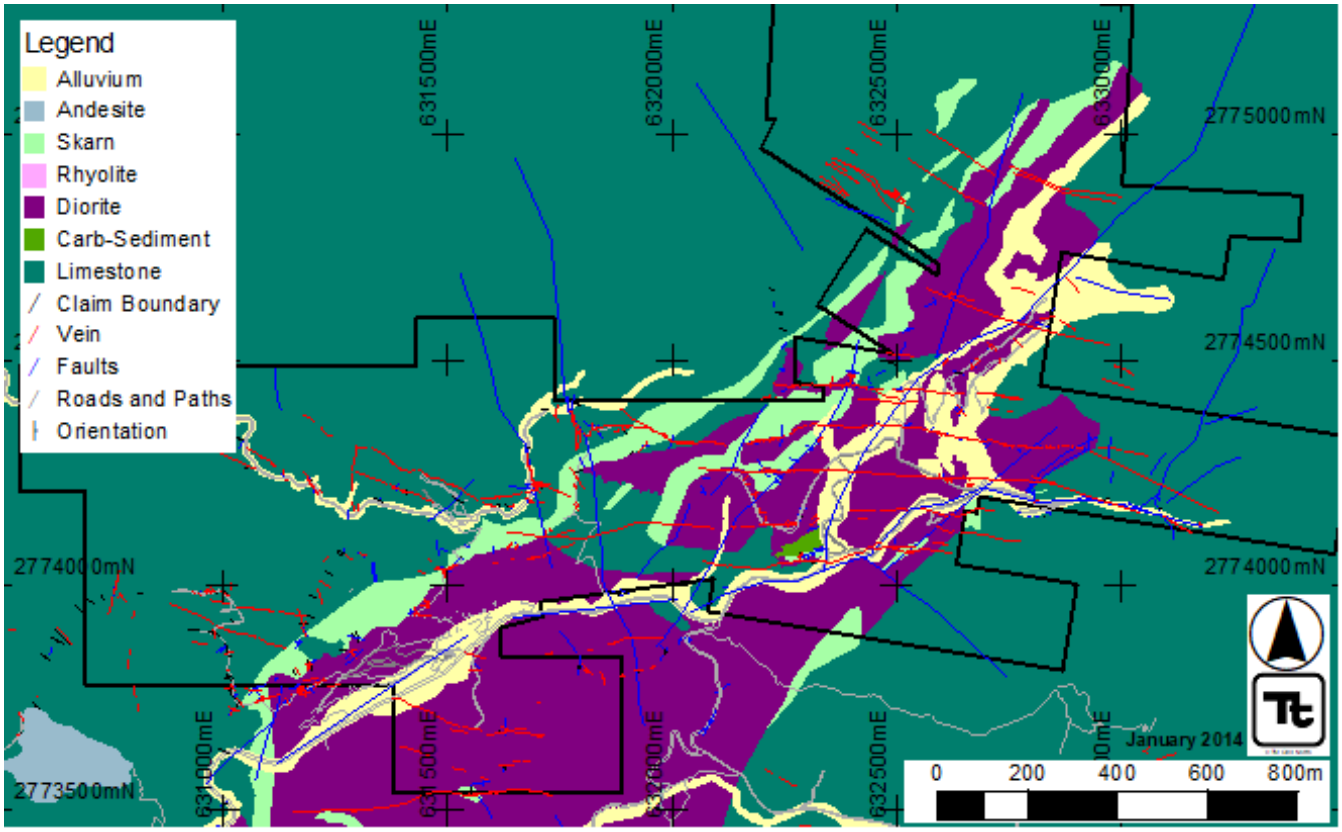


Figure 6-2: Velardeña property geology map

6.2.2 Chicago Property

The geologic setting of the Chicago property is similar to the geology at Velardeña. 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 northeast orientation. 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 the 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 the 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 6-3** shows the geology of the Chicago area with vein traces projected to their assumed surface intersection. Veins are not hosted in alluvial material.

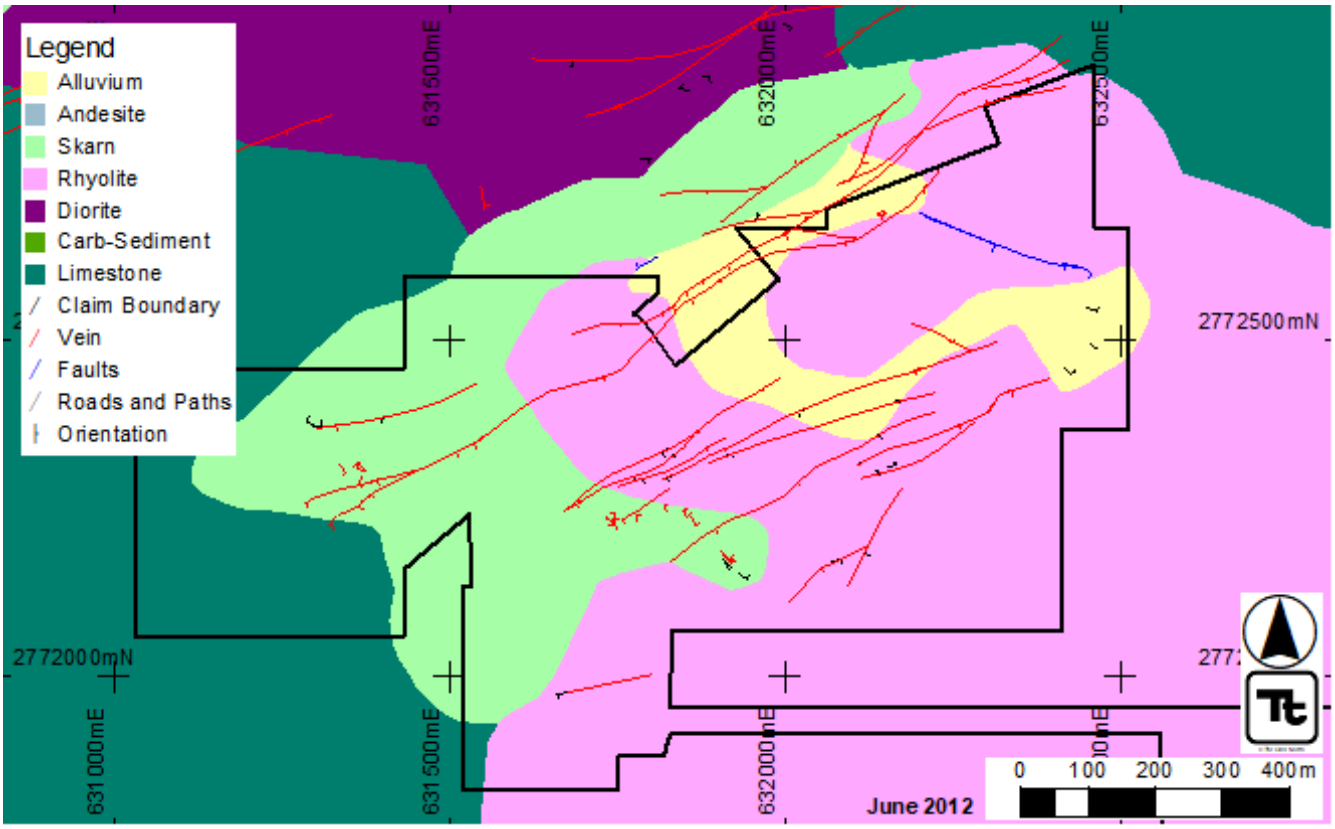


Figure 6-3: Chicago property geology map

6.3 Mineralization

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, and 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. Physical characteristics of the main vein sets at Velardeña are summarized in **Table 6-1**.

Table 6-1: Physical Characteristics of Select Veins and Vein Sets at Velardeña

Vein	Orientation	Width	Minimum Dimensions Strike m x Vertical m	Host Rocks
Santa Juana NW Subset 1 (Santa Juana, A 5-7)	NW curvilinear	0.2 - 1.0	350 x 400	limestone, intrusive, skarn
Santa Juana 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
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,
San Mateo	EW/75N	0.4 - 0.5	700 x 500	intrusive,
Roca Negra	EW/75N	0.15 - 1.15	500 x 600	intrusive, skarn

Mineralization at the Chicago property is similar to the Santa Juana mine in terms of mineralogy, host rocks, geometry of the structures, and continuity.

The oxide portions of the veins are composed of oxides, halides, carbonates, and remnants of sulfide minerals. 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. Disseminated and stringer pyrite is common in all rock types below 500 m depth and persists to much shallower levels within intrusive and calc-silicate host rocks.

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 to limestone, skarn/marble, and intrusive hosts. Observations summarized above suggest that, on average, veins within intrusive rocks 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. 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.

Observations underground confirm 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 which 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 María mine. **Figure 6-4** shows a cross-section of the Velardeña mineralization.

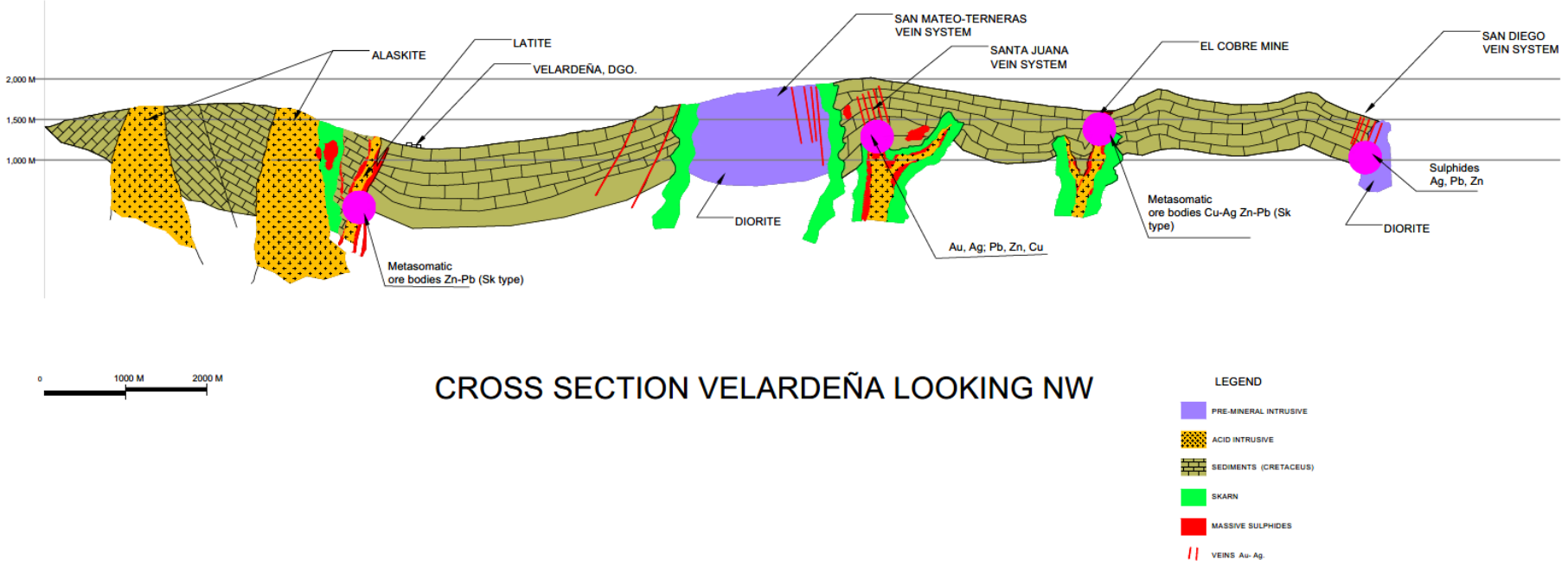


Figure 6-4: Velardeña section looking northwest

6.4 Deposit Types

Although detailed petrologic studies of veins in the Velardeña property have not been completed, individual deposits within the nearby Santa María 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, describe the higher-level veins at Velardeña. 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 with little silicate gangue. The veins occupy a position within and proximal to intrusions and their thermally metamorphosed aureoles.

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

7. EXPLORATION

The Project has been extensively explored from the surface using geologic mapping, vein mapping, and vein sampling. Underground exploration consisted of diamond drilling, geologic level mapping, vein level mapping, vein sampling, and drift and stope development. Underground development includes 10,122 meters of drift and ramp development and 2,278 meters of raise development. Channel samples are collected from drift faces, crosscuts, and stope walls and/or backs.

7.1 Channel Samples

Channel samples are collected using 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 cutting a 5-7 cm wide sample. 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 3 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 channel database contains 32,006 sample intervals, of which 14,534 intervals have been interpreted as intersecting a named vein. **Table 7-1** shows grade statistics for channel intervals within the database and those identified as on-vein.

Table 7-1: 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

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 large data set which in most cases is statistically representative, but never completely free of errors or potential bias.

The collection of several channel samples was observed for previous studies in the Chicago mine and it was noted the procedures used conformed to those outlined above and follow accepted engineering practices for channel sampling. Due to the mine being in a state of care and maintenance, the 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.

7.2 Drilling

Historic exploration drilling statistics for the period 1995-2008 are summarized in **Table 7-2**. These results have been summarized by Micon (2009) and have not been independently verified by the author.

Table 7-2: Summary of Historic Drilling on the Velardeña Properties (1995-2008)

Company	Drill Program	Number of Drill Holes	Total Length (m)
William Resources	Underground	94	6,438
William Resources	Surface	6	973
William Resources	Surface	3	282
William Resources	Surface	6	750
Total		**109**	**8,443**
ECU	Surface	14	8,709
ECU	Underground BQ	11	5,533
ECU	Underground EX	59	2,750
Total		**84**	**16,992**

Data taken and modified from Micon 2009 report.

The objectives of the 2009-2011 program conducted by ECU were 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. The completed holes are summarized in **Table 7-3**. 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.

Table 7-3: Summary of ECU's Drilling Programs (2009-2011)

Description	Number of Drill Holes	Total Meters
Underground (NQ)	3	1,235
Underground (EX)	35	1,212
Total	**38**	**2,447**

Golden Minerals conducted drilling in 2013-2014 and drilled from underground targeting the San Mateo, Terneras, and Roca Negra veins. Three holes were drilled from underground in the Santa Juana area targeting primarily the A4 vein. **Table 7-4** shows the summary of the drilling from 2013-2014 completed by Golden Minerals. **Figure 7-1** shows the location of the drill holes at the site.

Table 7-4: Summary of Golden Minerals Drilling (2012-2014)

Year	Description	Number of Drill Holes	Length (m)
2013	Chicago	3	1,233
2014	San Mateo, Terneras, Santa Juana	40	8,191
	Total	**43**	**9,424**

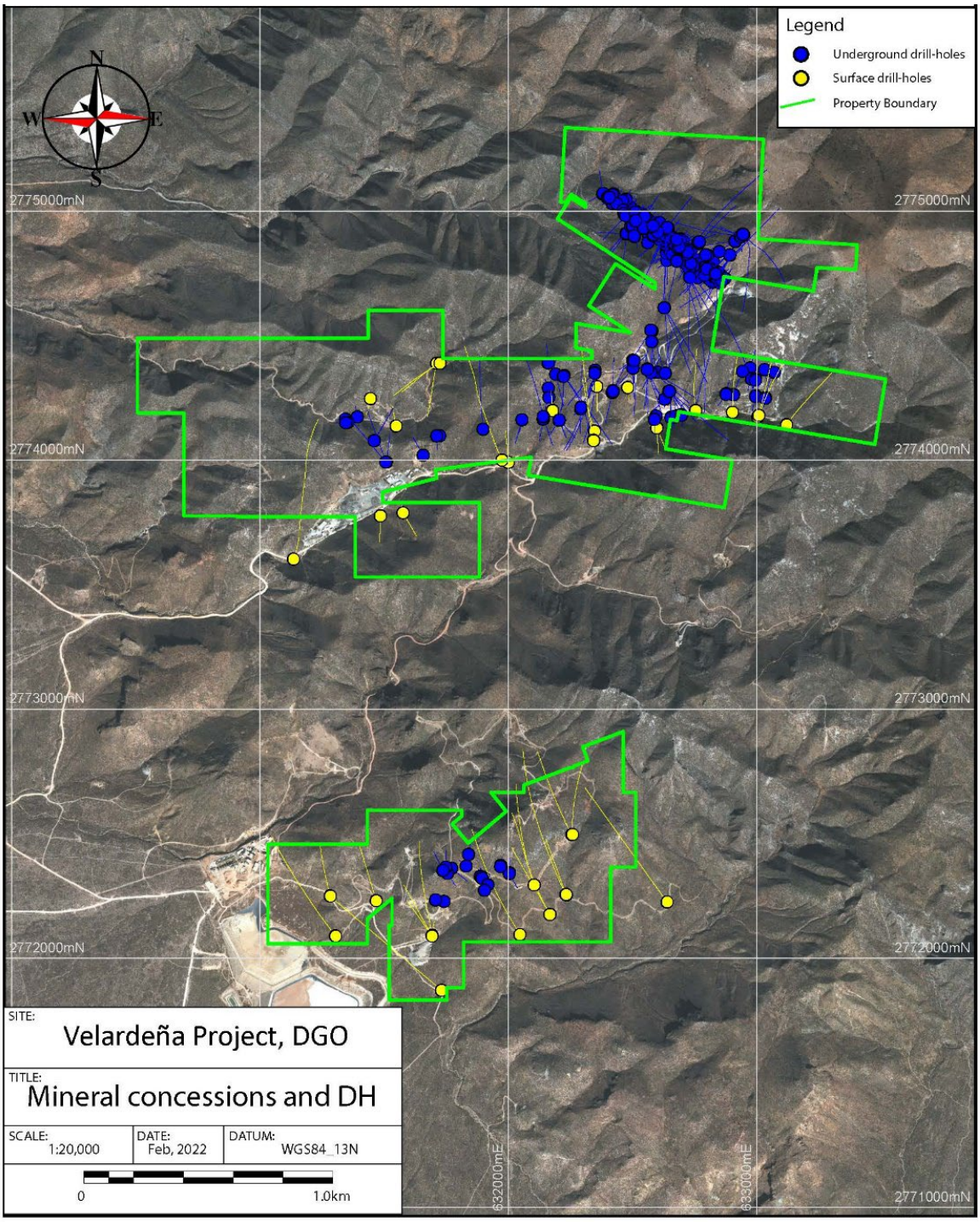


Figure 7-1: Drill hole locations for the Velardeña Project

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

- Drill core is split using a manual rock splitting device or using a core saw.
- 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 6 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 HQ, NQ, or BQ size core have a minimum core length of 20 cm and a maximum length of 1 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 2 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 several 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.

In the case of large diameter core (HQ, 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.

7.3 Data Adequacy

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 certified, independent laboratory as well.

Drill core sampling practices are consistent with industry standards adequate for use in preparing a Mineral Resource estimate for a project at this level.

8. SAMPLE PREPARATION, ANALYSES, AND 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 from 2012-2017 suggested the on-site laboratory could benefit from further improvements and increased real-time review of performance. In 2017 a lab audit and review were conducted by both internal and external resources. Frequent annual and quarterly ongoing reviews, including and not limited to analytical and mechanical instruments, processes, and an enhanced rigorous QA/QC protocol for all Velardeña samples are performed. Based on recent (2017-2022) QC sample review, the analytical results determined by the on-site laboratory are within tolerance to those determined by ALS Chemex.

Previous quality control procedures and results have been reviewed by previous authors and 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 8-1** details when each laboratory has been used, and the accompanying umpire laboratory.

Table 8-2 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 8-1: 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 8-2: 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. Tetra Tech inspected the on-site laboratory in January 2022 and found the facility and the procedures followed to be of adequate standard for the purpose of this study.

8.1 Sample Preparation and Analysis

8.1.1 Diamond Drill Core Samples

Drill hole 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 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.

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 elements 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).

8.1.2 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.

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.

8.2 Security, Storage, and Transport

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 to avoid contamination. The mine facility is guarded by security personnel 24 hours a day.

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.

8.3 Quality Control

For the current drill hole and channel sampling programs, Golden Minerals inserts standards, blanks, and duplicates 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. The control samples include standards, duplicates, and blanks, which is in line with industry best practices.

8.3.1 Standards

A total of four standards are utilized for QA/QC. The high- and low-grade standards for 2014 were custom made and tested by SGS. The standard results were reviewed and demonstrate adequate performance. The few errors observed are likely attributed to sample ID mislabeling and should be addressed prior to performance analysis.

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.

Sampling and QA/QC protocols were updated in 2017 using verified blank material and standards to better reflect the vein grades (low-, medium-, and high-grade) and deposit type. Additional sample analysis verification for blank and standard material is conducted on a routine basis to ensure the results are as expected. This review work led Golden Minerals to identify better performing standards, along with having more confidence in the QA/QC program.

8.3.2 Duplicates

Pulp duplicates are analyzed within the drill hole sample stream. Review of the duplicates indicate good reproducibility. Noted issues in the standards and duplicates are infrequent and do not suggest invalidation of the results from the on-site laboratory.

8.3.3 Blanks

Blanks are inserted into the sample stream. Previous work indicated a contamination of low-grade Ag in the blank material. The material being used for blanks was replaced and was sourced from Abrasivos de Laguna SA de CV. Golden Minerals submitted five samples of the new blank material to both the Velardeña Lab and to ALS Chemex for analysis for Au and Ag to ensure that the material contained minimal Au and Ag. The results were within tolerance for blank material and both labs had similar results.

As part of the updated QA/QC procedures, the QA/QC data is reviewed continually to check for problems with the analytical data including reviewing the standard, blank, and duplicate samples. Scheduled analytical maintenance occurs regularly, with additional lab checks reviewed by lab management over short and long-term schedules.

To check potential contamination during sample preparation, a batch of high-grade samples from the Rodeo mine was submitted with a blank sample being inserted into the sample stream after each high-grade sample.

8.4 Adequacy of Data

The procedures followed by Minera William are within Industry Best Practices and the data is adequate for the use in this level of study.

9. 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 production actuals and, through this activity, have been verified. Additional verification procedures are described below.

9.1 Geologic Data Inputs

To verify geologic data inputs the qualified person reviewed provided digital data in context with 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 was checked for consistency of location and grade in context of nearby samples.

After the 2015 PEA, Minera William examined the database intervals that intercept the vein. Each interval was examined alongside the mine level maps, as well as existing wireframes. If it was deemed that the vein code was not correct, the database was corrected. Special attention was also given to intervals and whether they contain dilution or not in the sampling. This recoding of intervals was used for the Resource update in this study.

9.2 Mine Planning Data Inputs

Tetra Tech conducted a site visit to the Velardeña mine to verify parameters used in mine planning are adequate for use in this study. This included visiting underground workings, as well as test mining areas. This site visit allowed for verification of mining parameters used in the study, confirming the parameters are adequate.

9.3 Mineral Processing Data Inputs

Technical and cost data were obtained during the Project site visit and in subsequent communications with Golden Minerals personnel. The data provided by Golden Minerals conforms to industry standards and is within the accuracy of this study and verified for use in this 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 after 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 study.

9.4 Economic Data Inputs

A technical economic model was developed using data obtained in communications with Golden Minerals. The data provided by Golden Minerals conforms to industry standards and is within the accuracy of this study.

9.5 Environmental Information

A list of current permits was obtained from 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 and the waste rock area permits will need to be updated before mining recommences.

9.6 Data Adequacy

At no time was there any limitation to, or failure to provide, the requested technical and cost data for the Velardeña Property during or after the site visit. Data provided was adequate for the assemblage and production of this study.

10. MINERAL PROCESSING AND METALLURGICAL TESTING

Golden Minerals owns two processing plants in the vicinity of the Project. Plant 1 is designed to treat sulfide material by conventional crush, grind, and differential flotation to produce Pb, Zn, and pyrite concentrates. For the purposes of the study, all mineralized material produced by the Velardeña mine will be processed through the sulfide flotation circuit at Plant 1.

Operation of Plant 1 was discontinued in late 2015 due to a combination of low metal prices, dilution, and metallurgical challenges.

Restart of Plant 1 is proposed to treat sulfide mineralized material from the Velardeña mine. Liberation characteristics of the sulfide material and subsequent response to differential flotation are within typical design criteria and known by the operations personnel from historical production data. There are no geological, lithological, or mineralogical changes in the process plant feed anticipated for the envisaged future production as compared to previous operations. Historical operational results support the existing process flowsheet 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. Recent test mining and processing of mineralized material from the Velardeña veins have demonstrated favorable results from the flotation circuit, as shown in **Table 10-1**.

Table 10-1: Accumulated Metallurgical Balance – Test Processing through May 11, 2023

Product	Dry Tonnes	Assays					Recoveries				
		g/ton		%			%				
		Au	Ag	Pb	Zn	Fe	Au	Ag	Pb	Zn	Fe
Feed	2,933.08	5.07	240	1.06	1.53	6.85	100	100	100	100	100
Conc. Pb	87.3	12.62	5,950	21.92	6.45	4.72	7.40	73.70	61.28	12.58	2.05
Conc. Zn	47.2	3.55	707.76	2.45	41.98	4.39	1.12	4.74	3.70	44.24	1.03
Conc. Fe	681.4	17.87	143.61	0.56	2.11	21.47	81.81	13.89	12.26	32.12	72.80
Tails	2,117.3	0.68	25.52	0.34	0.23	2.29	9.66	7.67	22.77	11.05	24.12

Based on the metallurgical results shown above, the recovery assumptions shown in **Table 10-2** have been used for the production plan and economic analysis included in this study.

Table 10-2: Long-term Metallurgical Recovery Assumptions

Recovery Item (%)	NSR Calculations
Pb Concentrate	
Concentrate Grade – Ag (g/t)	6,250
Au Rec	7.45
Ag Rec	75.83
Pb Rec	63.01
Zn Rec	12.35
As Rec	3.11

Recovery Item (%)	NSR Calculations
Zn Concentrate	
Concentrate Grade - Zn (%)	**50.26**
Au Rec	0.80
Ag Rec	3.03
Pb Rec	1.99
Zn Rec	53.12
As Rec	0.65
Pyrite Concentrate	
Concentrate Grade - Au (g/t)	**19.66**
Au Rec	80.76
Ag Rec	13.43
Pb Rec	12.24
Zn Rec	22.66
As Rec	81.41

In 2007 the potential to increase Au recovery from Plant 1 and improve project economics by installing a bio-oxidation circuit to treat pyrite concentrate on-site and recover Au and Ag to doré was explored by sending samples to SGS in South Africa for test work. Since then, in 2019 and 2020, two additional sets of representative Au-bearing iron pyrite concentrate samples were sent to Outotec in South Africa to confirm uniformity of the BIOX® processing results and to further define the bio-oxidation residence time required for subsequent Au recovery by cyanide leaching. The test work indicated Velardeña pyrite concentrate could be successfully oxidized with the BIOX® process prior to cyanidation; however, results to date do not support the capital investment for a bio-oxidation circuit at this time, and therefore the BIOX® process is not considered in this study. SGS and Outotec are independent of Golden Minerals.

10.1 Data Adequacy

The data provided by Golden Minerals conforms to industry standards and is within the accuracy of this study and verified for use in this study. Historic production from multiple veins at the mine demonstrates the capability of the plant to process the mineralized material and produce concentrates.

11. MINERAL RESOURCE ESTIMATES

Initial vein intervals were provided by Golden Minerals as an attribute in the project database along with indicative vein surface models. The provided vein intervals and surface models were reviewed in 3D in context of the vein mapping and underground development mapping. Intervals were evaluated and coded by vein, which were used to create wireframe vein models. Resources have been estimated independently for 60 vein surfaces representing main veins, fault offsets, and splits of 39 known veins. The primary veins include CC, C1, A4, F1, G1, San Mateo, Roca Negra, Hiletas, Terneras, Chicago, and Escondida. Point models were used to estimate the Resource models for each vein. Attributes have been estimated using inverse distance to a power of 2.5 (IDW 2.5).

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 in Micromine software. Table 11-1 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 11-1: 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

Estimated Mineral Resources with an effective date of June 1, 2023 for the Velardeña Project are shown in Error! Reference source not found.. The Resource is reported by mineral type and Resource class for all veins. Resources were calculated as diluted to a minimum of 0.7 meters and are reported at a $195 NSR cutoff. For the oxide mineralized material, Zn and Pb were previously reported as Resources. It has since been determined they do not have a reasonable expectation of economic extraction at this time and have not been included in this update.

Table 11-2: Velardeña Project Sulfide Mineral Resources

Classification	Mineral Type	NSR Cutoff	Tonnes	Grade Ag g/t	Grade Au g/t	Grade Pb%	Grade Zn%	Ag oz	Au oz	Pb lb	Zn lb
Measured	Sulfide	195	203,200	402	6.02	1.71	2.08	2,625,900	39,300	7,680,000	9,306,300
Indicated	Sulfide	195	462,700	402	5.32	1.68	2.08	5,983,000	79,200	17,090,700	21,173,100
Measured + Indicated	Sulfide	195	665,900	402	5.54	1.69	2.08	8,608,900	118,500	24,770,700	30,479,400
Inferred	Sulfide	195	1,059,900	413	5.10	1.81	2.26	14,067,200	173,700	42,294,600	52,697,800

Notes:
1. *Resources are reported as diluted tonnes and grade to 0.7 m fixed width*
2. *Metal prices for NSR cutoff are: $22.71/oz-Ag, $1,826/oz-Au, $1.02/lb-Pb, and $1.31/lb-Zn*
3. *Columns may not total due to rounding*

Table 11-3: Velardeña Project Oxide Mineral Resources

Classification	Mineral Type	NSR Cutoff	Tonnes	Grade Ag g/t	Grade Au g/t	Ag oz	Au oz
Measured	Oxide	195	95,200	318	6.62	973,000	20,300
Indicated	Oxide	195	194,000	323	6.01	2,016,800	37,500
Measured + Indicated	Oxide	195	289,200	321	6.21	2,989,800	57,800
Inferred	Oxide	195	269,400	500	5.56	4,326,400	48,200

Notes:
1. *Resources are reported as diluted tonnes and grade to 0.7 m fixed width*
2. *Metal prices for NSR cutoff are: $22.71/oz-Ag, $1,826/oz-Au, $1.02/lb-Pb, and $1.31/lb-Zn*
3. *Pb and Zn are not considered to be recoverable at this time and have not been included in this Resource estimate*
4. *Columns may not total due to rounding*

Table 11-4: Velardeña Project Mineral Resources

Classification	Mineral Type	NSR Cutoff	Tonnes	Grade Ag g/t	Grade Au g/t	Grade Pb%	Grade Zn%	Ag oz	Au oz	Pb lb	Zn lb
Measured	All	195	298,400	375	6.21	1.71	2.08	3,598,900	59,600	7,680,000	9,306,300
Indicated	All	195	656,700	379	5.53	1.68	2.08	7,999,800	116,700	17,090,700	21,173,100
Measured + Indicated	All	195	955,100	378	5.74	1.69	2.08	11,598,700	176,300	24,770,700	30,479,400
Inferred	All	195	1,329,300	430	5.19	1.81	2.26	18,393,700	221,900	42,294,600	52,697,800

Notes:

1. *Resources are reported as diluted tonnes and grade to 0.7 m fixed width*
2. *Metal prices for NSR cutoff are: $22.71/oz-Ag, $1,826/oz-Au, $1.02/lb-Pb, and $1.31/lb-Zn*
3. *Columns may not total due to rounding*

Mineral Resources have been tabulated using a US$195/t NSR cutoff grade based on the price assumptions shown in **Table 11-5**. The Resource tabulation is presented based on the long-term average consensus prices from 22 banks. The prices used are US$22.71/troy ounce Ag, US$1,826/troy ounce Au, US$1.02/lb Pb, and US$1.31/lb Zn. The NSR cutoff for the Resource is defined by the sum of the mining cost, processing cost, and G&A per tonne.

Table 11-5: Cutoff Price Assumptions

Assumption	Value
Ag Price $/oz	22.71
Au Price $/oz	1,826
Pb Price $/lb.	1.02
Zn Price $/lb.	1.31

NSR has been calculated with concentrate characteristics and marketing terms supplied by Golden Minerals. Metal contributions are dependent on the concentrate and mineral type, and the gross payable recoveries are shown in **Table 11-6**. The formula used was:

NSR/t block value = (28.20*Au)+(0.54*Ag)+(10.54*Pb)+(9.00*Zn)

Where the block value (NSR/t) is calculated using the diluted block grades, metal prices, gross payable recoveries, and treatment and refining charges.

Table 11-6: NSR Gross Payable Sulfide Recovery Assumptions

Metal	Sulfide Recovery %
Au	64
Ag	81
Pb	51
Zn	42

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. The sulfide NSR equation has been updated for proposed mining areas that are the subject of this report and is based on metallurgical testing from that area.

The qualified person considers the information provided for this Resource estimate to be at a level of detail to be used for an Initial Assessment. 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 are not currently known in much of the Inferred Resource areas. Interpolation and extrapolation of channel and drill hole samples represent an unbiased approximation of mineralized shoot shape but will generally not predict the exact shape. NSR calculations are based on reasonable price and contract 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 has been 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 the above-mentioned factors could arise in the future, but currently no material complications are known.

12. MINERAL RESERVE ESTIMATES

Mineral Reserves have not been estimated for the Velardeña Project.

13. MINING METHODS

The Project is planned to be operated as an exclusively underground operation. The current mine plan includes only the sulfide material from the principal veins, which include veins CC, C1, A4, F1, G1, San Mateo, Roca Negra, Hiletas, Terneras, Chicago, and Escondida. The plan targets an annual maximum of 118,625 tonnes.

13.1 Geotechnical Analysis

A geotechnical analysis for the Project has not been conducted or reviewed by Tetra Tech. The mine has historically operated without significant underground support. Several 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 firms are engaged to provide expertise on stope layout and future potential rock mass stability concerns that may arise due to increased stress and/or depth.

13.2 Dewatering

Neither a water balance nor dewatering investigations were performed for this study. The water handing system currently in place relies on a chain of submersible dirty water pumps to evacuate the inflow from the mine. 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, and it is not anticipated that excessive dewatering costs will be incurred during the life of mine, but further studies are recommended to confirm this.

13.3 Mine Layout Parameters and Production Plans

Tetra Tech has conceptually planned stopes for two scenarios to determine potentially mineable Resources, targeting a mill feed of 118,625 tonnes per year. Scenario 1 includes Measured, Indicated, and Inferred Resources, and Scenario 2, excluding the Inferred material. Scenario 1 contains a potentially Minable Resource totaling 1,216 kt for mining over 10.5 years, and Scenario 2 contains a potentially Mineable Resource of 501 kt for mining for 4.5 years. A summary of the two production scenarios is shown in **Table 13-1,** and annual production for each case is shown in **Table 13-2** and **Table 13-3**.

Table 13-1: Summary of ROM Material Included in Each Production Scenario

Category	Scenario 1 Total/Avg	Scenario 2 Total/Avg.
Tonnes (kt)	1,216	501
Ag (g/t)	359	396
Ag (koz)	14,046	6,383
Au (g/t)	5.44	5.64
Au (koz)	213	91
Pb (%)	2.21	2.32
Pb (klb)	59,278	25,587
Zn (%)	1.88	2.20
Zn (klb)	50,308	24,337
Mine Life	10.5	4.5

Table 13-2: Annual Mine Production - Scenario 1

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Total
Tonnes (kt)	88	119	119	119	119	119	119	119	119	119	60	1,216
Au (g/t)	4.98	6.81	6.75	6.16	5.93	5.18	5.70	4.88	3.54	3.68	6.80	5.44
Ag (g/t)	277	278	312	325	338	386	408	351	376	509	382	359
Pb (%)	3.88	3.11	2.61	2.20	1.22	1.42	1.84	1.54	2.04	2.21	3.12	2.21
Zn (%)	2.33	1.98	1.63	1.59	1.31	1.40	1.85	2.23	1.62	2.29	3.16	1.88

Table 13-3: Annual Mine Production - Scenario 2

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Tonnes (kt)	88	119	119	119	57	501
Au (g/t)	6.43	7.05	5.25	4.40	4.89	5.64
Ag (g/t)	367	445	380	357	456	396
Pb (%)	2.29	1.98	2.52	2.22	2.84	2.32
Zn (%)	1.14	1.99	2.68	2.11	3.51	2.20

An underground site visit was conducted on May 23, 2023. The past extraction methods observed during the visit were mechanized cut and fill stoping, mechanized resuing cut and fill stoping, and shrinkage stoping. These methods are considered for the conceptual plan and are suitable for the steeply dipping veins found at the Project.

Resue mining methods considered a minimum width of 0.7 meters, which was demonstrated in recent test mining at the site. Main access ramps will be 4 meters high by 4 meters wide. Crosscuts and footwall development were considered in the plan. 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. For the conceptual plan rib, sill, and crown pillars have been included as 3 m in width.

Potentially minable resources were determined by developing 3D stope shapes using Micromine software around blocks with a diluted NSR value above $195/t. Stope dimensions have a minimum length along strike of 10 m and a maximum vertical extent of 30 m. Existing development will be rehabilitated for use in accessing the veins. An example of the conceptual stope layout is shown in **Figure 13-1**.

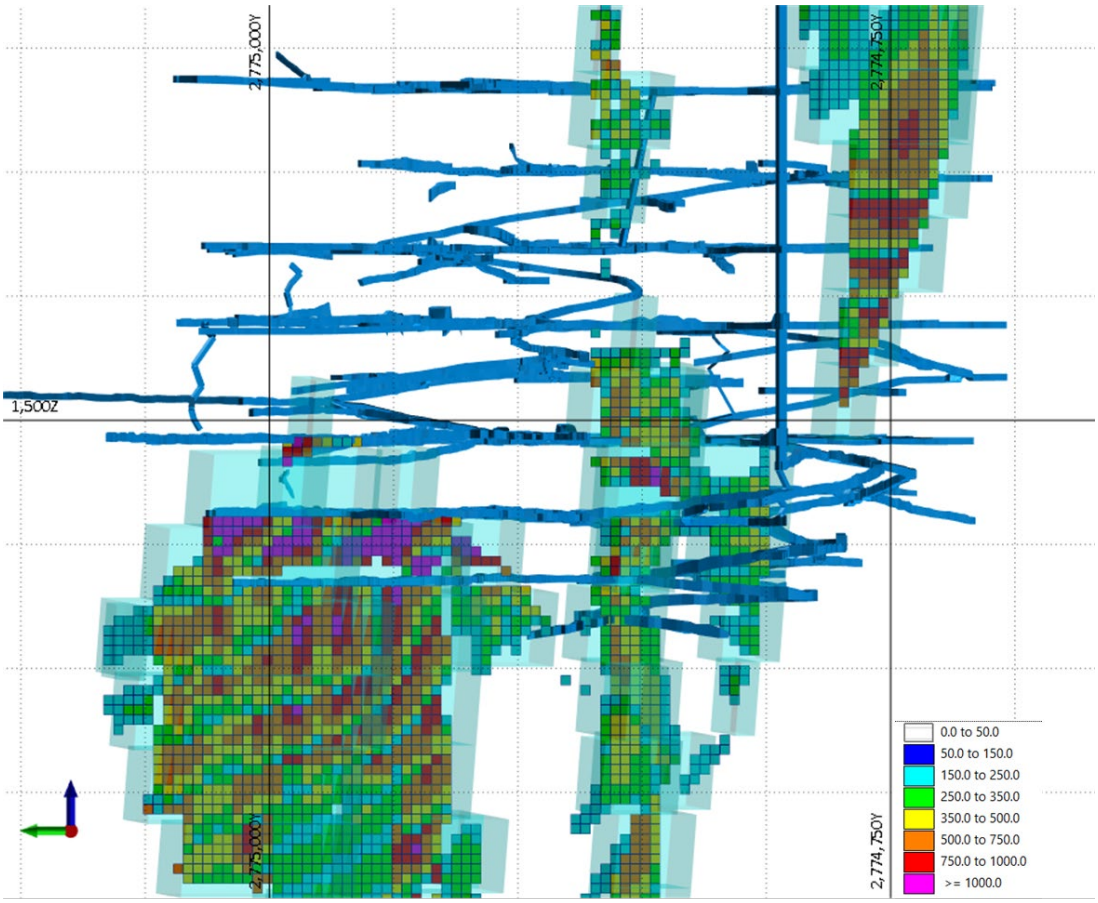


Figure 13-1: View of the Santa Juana area, CC vein, showing conceptual stopes, existing development, and blocks above NSR $195 (see legend)

Stope tonnages have been planned using the weighted average vein width of 0.7 m. An additional dilution factor of 10% has been applied to the recoverable tonnes to align with current reconciliation data from the test mining operations at the Project. Overall stope extraction has been estimated at 93%, including a mining loss of 5% which accounts for blasted material left in-situ in stopes, above pillars and in stope drifts after stope completion.

13.4 Other Mining Requirements

13.4.1 Mining Equipment and Personnel

Table 13-4 shows the list of equipment available at the Project as provided by Golden Minerals. The key pieces of equipment required for mining are scoop-trams, underground trucks, and drilling jumbos. The current equipment fleet is expected to be adequate to achieve the 338 tpd 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 for use underground. Golden Minerals plans to use a mining contractor, who will lease a subset of the equipment from Minera William and provide operators for the equipment.

Table 13-4: Velardeña Equipment List

List of Available Equipment					
#	**Tag #**	**Model**	**Manufacturer**	**Series**	**Motor**
Scoop Trams					
1	ST-1	MTI-270	MTI	3215	Deutz F5L912W
2	ST-04	EJC 100A	Emco Jarvis Clark	9171808	Deutz F6L413FW
3	ST-8	LT-125	MTI	509	Deutz F4L912W
4	ST-13	LT-270	MTI	9171808	Deutz F5L912W
5	ST-10	EJC-100	Sandvik	O8861795	Deutz F6L914
6	ST-11	ST-2D	Wagner	RBO42009	1RBO42009
7	ST-17	ST 1030	Atlas Copco	AVO 11X265/8997 3178 00	Cummins QSL
8	ST-18	LT-250	JCI	67695	Deutz F6L914
9	ST-19	LH-203	Sandvik	L203D767	Deutz BF6L914
10	ST-20	LH-203	Sandvik	L103D778	Deutz BF6L914
11	ST-23	LT-210	MTI	4314	Deutz F4L912W
12	ST-24	LT-210	MTI	4313	Deutz F4L912W
13	ST-25	ST 1030	Atlas Copco	AVO 07X430/8997 149900	Cummins QSL
14	ST-26	LH-203	Sandvik	L003D685	Deutz BF6L914
15	ST-27	LH-203	Sandvik	L103D787	Deutz BF6L914
16	ST-28	LH-203	Sandvik	L007D303	Deutz BF6L914
17	ST-29	LH 307	Sandvik	L007D303	MB OM906LA
18	ST-30	LH-203	Sandvik	L203D790	Deutz BF6L914
19	ST-31	50M	JCI	87388	
Drilling Jumbos					
1	JB-01	Boomer S1D	Atlas Copco	AVO 11A239/8991894700	
2	JB-03	Boomer S1D	Atlas Copco	AVO 08A640/8991 7 74400	Deutz D914L04
3	JB-02	Boomer T1D	Atlas Copco	AVO11A362/8991895700	
Motor Grader					
1	MOTO-01	CAT 140M	Caterpillar	CAT0140MLB9D02937	
Personnel Transport (Underground)					
1	KU-01	RTV 900	Kubota	A5KB1FDACBG0C4080	
2	KU-02	RTV 900	Kubota	A5KB1FDACBG0C4078	
3	KU-03	RTV 900	Kubota	A5KB1FDAHBG0C6068	
4	KU-04	RTV 900	Kubota	A5KB1FDAKBG0C7535	
5	KU-06	RTV 900	Kubota	A5KB1FDAPCG0D4307	
6	KU-07	RTV 900	Kubota	A5KB1FDAACG0D1107	Kubota D902-ET03
7	KU-08	RTV 900	Kubota	A5KB1FDACG0D3167	
8	KU-08	RTV 900	Kubota	A5KB1FDACG0D3167	
9	KU-10	RTV 1140	Kubota	A5KB1FDAHCG0D6374	
Underground Trucks					
1	CBP-01	JCI 704	MTI		Deutz F6L914
2	CBP-02	JCI 704	MTI		Deutz F6L914
3	CBP-05	JCI 704	MTI	RB-148-0812	Deutz F6L914
4	CBP-06	JCI 704	MTI	RB-149-0812	Deutz F6L914
5	CBP-07	MT 431B (264)	Atlas Copco	AVO 12X463/8997 4225 00	Detroit S-60
6	CBP-08	MT 431B (265)	Atlas Copco	AVO12X513	Detroit S-60
7	CBP-09	TH-320	Sandvik	4565	Mercedes-Benz
8	CBP-10	TH-320	Sandvik	4649	Mercedes-Benz
Front End Loader					
1		916	Caterpillar	2XB01887	
2		930G	Caterpillar	CAT0930GETWR02020	
3		930G	Caterpillar	CAT0930GHTWR01237	
Telehandler					
1	TH-01	TH 580 B	Caterpillar	CATTH580JSLH01098	
TLB (Tractor, Loader, Backhoe)					
1		420E	Caterpillar	CAT0420ELKMW01116	

List of Available Equipment					
#	Tag #	Model	Manufacturer	Series	Motor
2		416E	Caterpillar	CAT0420ELKMW1116	
3		416D	Caterpillar	CAT0416DAB2D00688	
Bobcat					
1		236B	Caterpillar		
Compressors and Generators					
1	COM	TS-20-250-60	Sullair	9963	
2	COM	SSR-EPE300	Ingersoll Rand	E1241U94053	
3	COM	EAU99P	Gardner Denver	S290593	
4	COM	SSR-XF100	Ingersoll Rand	F8769U94104	
5	COM	267913U66327	Ingersoll Rand	185WJD-196-D	
6	COM	P375WCU	Ingersoll Rand	309961UCK413	
7	COM	9185WJD	Ingersoll Rand	347689UG0221	
8	COM	P185WJD	Ingersoll Rand	267913UGG327	
9	COM	ZR-4	Atlas Copco		
10	GEN	432R5L2014A-		UH3509556	
Tractors					
1	TR-01	2635	Massey Ferguson	FX729539	TSJ436E 05190 / MF 2635 4WD STD2
2	TR-02	2635	Massey Ferguson	FX729535	MF 2635 4WD STD2
3	TR-03	2635	Massey Ferguson	FX752999	MF2635 /MF 2635 4WD STD2
4	TR-04	2635	Massey Ferguson	FX777239	MF2635 /MF 2635 4WD STD2
Vehicles for Transporting Personnel and Cargo					
14	EX65140	International	Chasis Cabina Tandem 740		
15	EX01679	International	Chasis C 7400-300 Camión		
18	EX01622	International	Chasis C 4400-250 Camión		
33	EX05301	International	Chasis Coraza 3300 210 CE		
34	EX01616	International	Chasis Cabina 7400 310		
35	EX01625	International	Chasis Cabina 7400 310		
4	EX05302	International	Autobus 4700 22 FE		

13.4.2 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 planning to install 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.

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 adequate ventilation.

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

13.4.3 Access and Development

Existing underground development includes 10,122 meters of drift and ramp development and 2,278 meters of raise development. Development requirements to restart mining are minimal.

The main access ramps are 4 meters high by 4 meters wide. The ramps are driven at slopes no greater than 15%. The ramps are equipped with HDPE lines carrying compressed air, drill water, and mine water drainage. The Velardeña planned advance rate for ramps is 4.4 meters per day. Single boom hydraulic jumbos will be used to drill and 6 cubic yard capacity LHD units will be used to muck.

Cross cuts and footwall development are required to access each stope. Stope size will vary by vein width.

13.4.4 Power

Underground power is available from a primary substation located at the portal. The power taken into the mine is stepped down at the substation to 4,160 volts. The 4,160 is stepped down to a typical working voltage of 440 volts using mobile mine load centers or pad mount transformers set on concrete. The power is stepped down to 120/240 single phase in many locations at the load centers. The mine power system was modernized in 2011.

14. PROCESSING AND RECOVERY METHODS

Golden Minerals owns two plants at the Velardeña Project. Plant 1 is designed to treat sulfide material to produce Pb, Zn, and pyrite concentrate and is located near the village of Velardeña, approximately eight kilometers from the mining operations. It has an operating capacity of 338 tpd with net capacity of 325 tpd, equal to 118,625 tpy on a 351-day schedule.

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 restart including overhauling the electrical system, installing new concentrate filters, and refurbishing the flotation cells. Operation of Plant 1 was discontinued in late 2015 due to a combination of low metal prices, dilution, and metallurgical challenges, but was restarted in 2023 to begin test processing in advance of a planned production restart at Velardeña.

14.1 Plant 1

Plant 1 is designed to process sulfide material in a conventional flow sheet of crushing, grinding, and differential flotation to produce three separate concentrates: Pb-Ag, Zn, and pyrite.

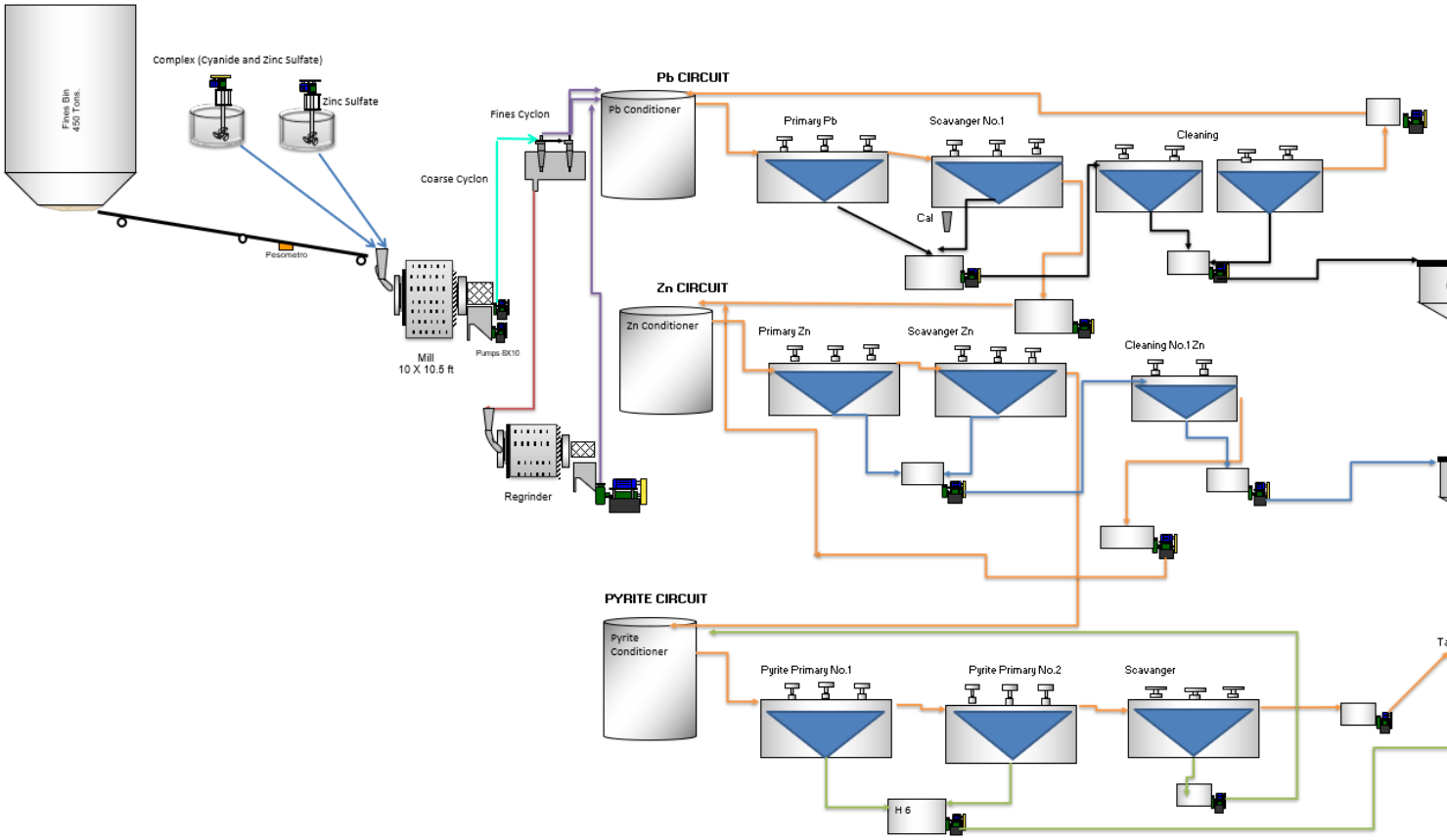


Figure 14-1 shows the processing flow sheet for Plant 1, and **Figure 14-2** shows a layout of Plant 1 and the tailings dams. **Table 14-1** and **Table 14-2** list the major equipment and process materials in use at Plant 1. Reagents used in Plant 1 include lime, collectors, depressants, and frothers.

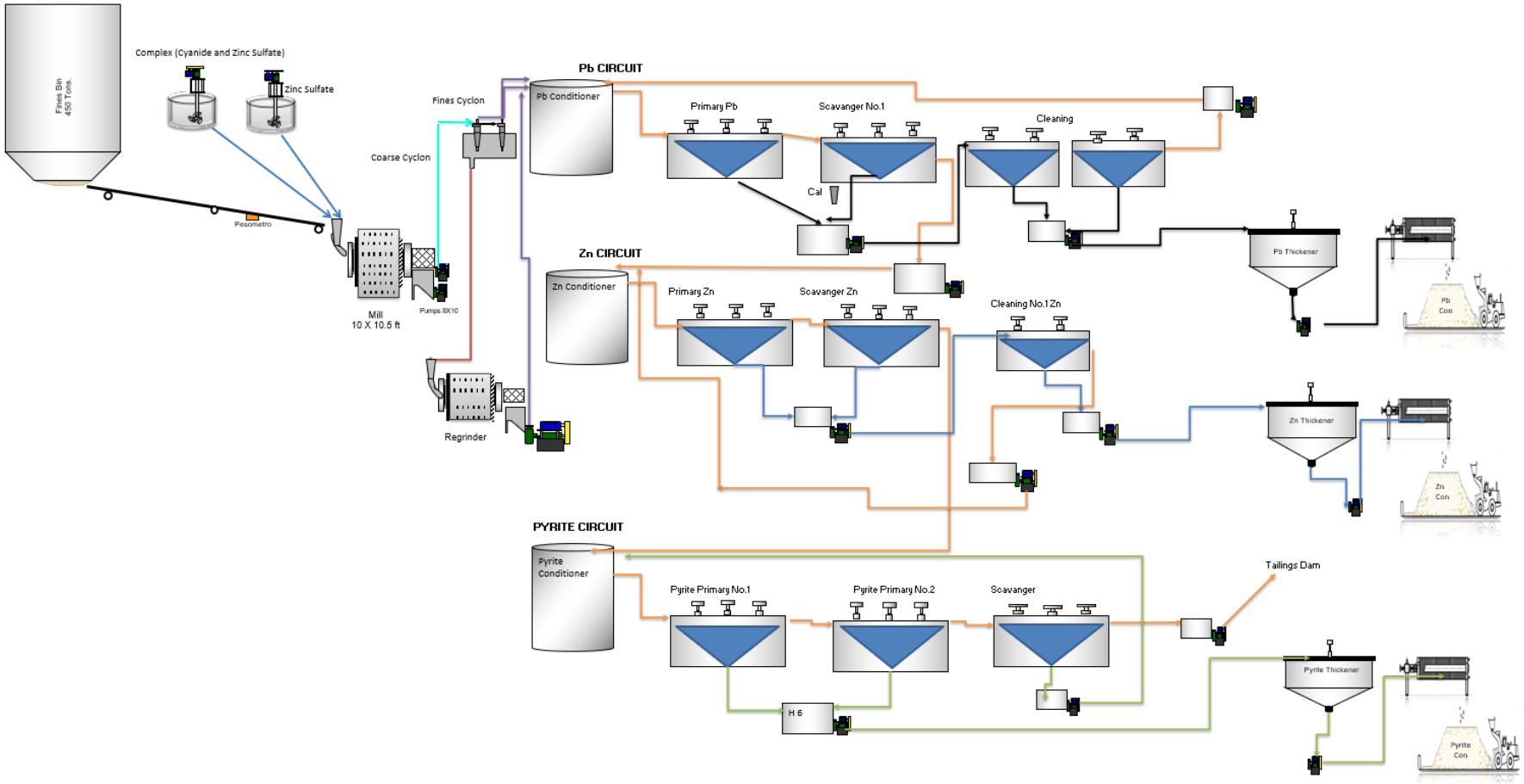


Figure 14-1: Process plant flow sheet for Plant 1

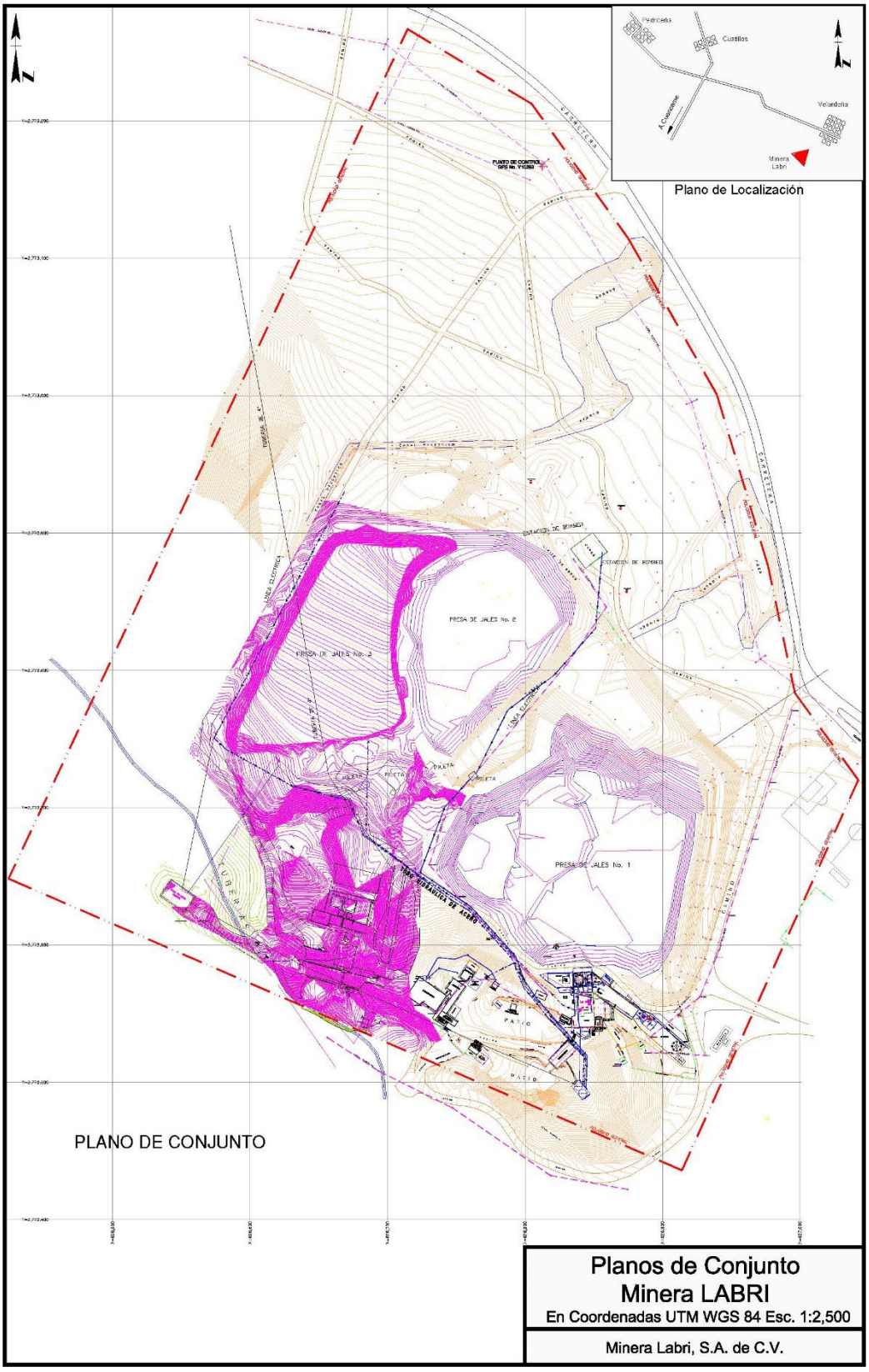


Figure 14-2: Site layout for Plant 1

Table 14-1: Major Process Plant Equipment for Plant 1

Description	Quantity	Function
Coarse Ore Bin; 120 t Capacity	1	ROM Feed Ore Bin
Jaw Crusher; 10 in. by 30 in.; 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 t 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 14-2: Process Materials for Plant 1

Process Materials	Consumption Rate (kg/t processed)
Grinding Balls - 2.5 in. diameter	0.83
Grinding Balls - 2 in. diameter	0.72
Grinding Balls - 1.5 in. 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

Process Materials	Consumption Rate (kg/t processed)
Aerofloat 31	0.054
Frother 1065	0.0945
Aerofloat 70	0.01
P404	0.03
P242	0.04
Copper Sulfate	0.92

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 underflow (oversize material) returned to the ball mills and the cyclone overflow (product), at 80% minus 200 mesh, advances 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 over 65% and about 70% respectively.

The tailings from the Pb flotation circuit are 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 of 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 is projected to contain over 40% Zn. The Zn recovery to the Zn concentrate is projected to be over 70%. Both the Pb and Zn concentrates contain levels of As and Sb impurities.

Tailings from the Zn flotation circuit are fed to a conditioning tank ahead of the pyrite flotation circuit. The conditioned slurry advances to the pyrite flotation circuit comprised of roughers, scavengers, and two stages of cleaner cells. The concentrate from the cleaners represents the final pyrite concentrate, containing high Au and Ag values.

The tailings from pyrite flotation represent the final flotation plant tailings that are pumped to Tailings Dam #3 located adjacent to Plant 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/t 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. Golden Minerals plans to construct a 4-in diameter water line from Plant 2 to Plant 1, approximately five kilometers.

Nine personnel are required for day shift operations along with eight mechanics, and night shifts require seven operators.

14.2 Plant 2

Due to recent metallurgical testing and economic modeling by Golden Minerals, along with favorable terms for the sale of the pyrite concentrate, material from the Velardeña mine is not planned for processing at Plant 2, and therefore Plant 2 has been excluded from this study.

14.3 Proposed BIOX® Plant

Previous studies on the Project have included recovery from a BIOX® plant constructed near Plant 2. Due to the results from recent metallurgical and economic analyses performed by Golden Minerals along with favorable terms for the sale of pyrite concentrate, the results presented in this study exclude this process.

15. INFRASTRUCTURE

Infrastructure for the project currently includes access roads, power, ancillary buildings, and water wells. No additional infrastructure is required for the site to resume production. **Figure 15-1** shows the site infrastructure.

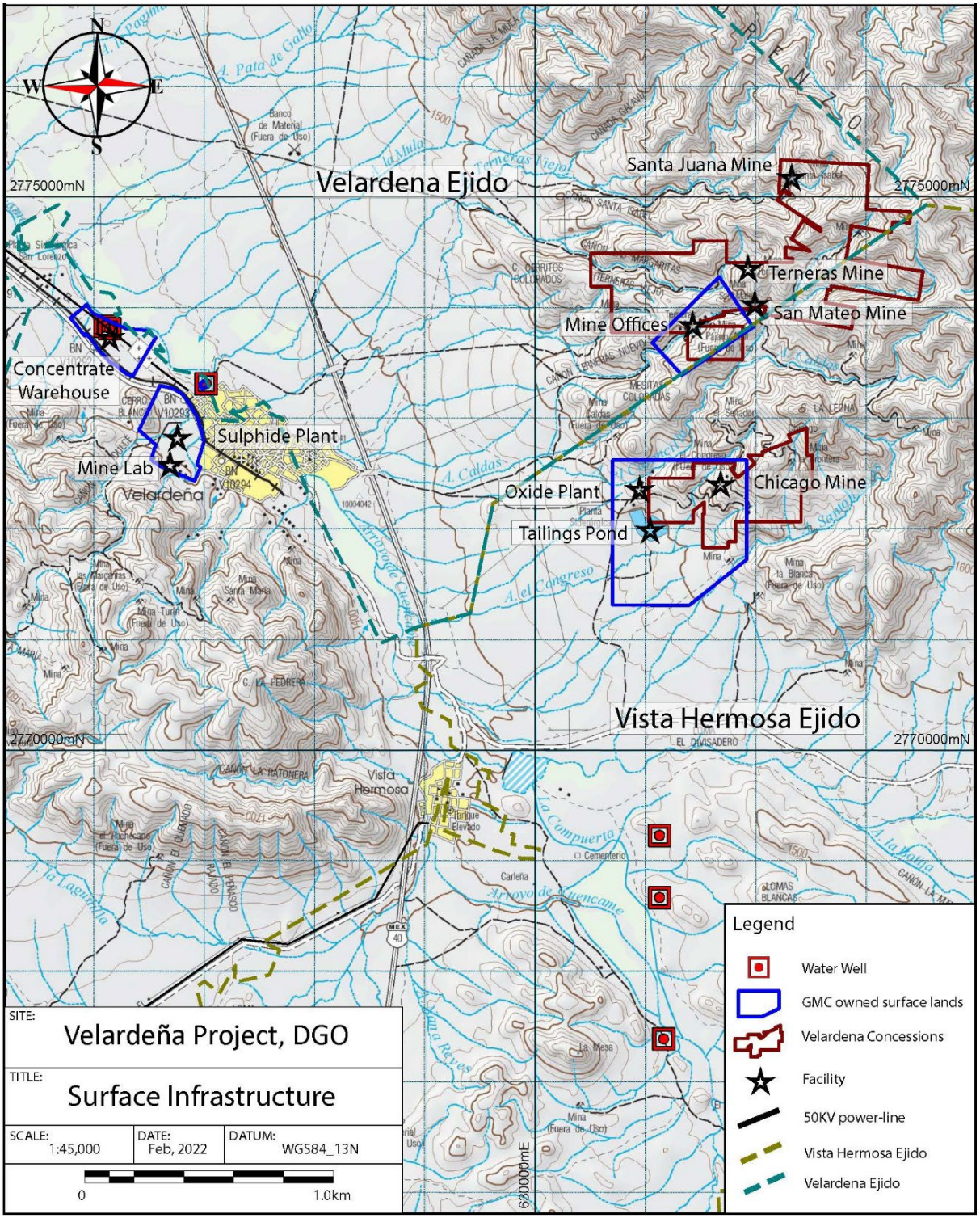


Figure 15-1: Surface infrastructure

15.1 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. Plant 1 is located adjacent to the village of Velardeña, which is approximately 500 meters west of the highway. The Velardeña mines are located about eight kilometers from Plant 1 via a gravel road.

15.2 Waste Rock

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

The waste rock not stored underground will be deposited along the valley between the San Mateo adit and the Santa Juana adit.

15.3 Tailings

The dry tailings located near Plant 1 are suitable for spreading on the fill of each cut to eliminate the dilution and losses associated with blasting process grade material on course placed fill. Tailings will be hauled from Plant 1 to the active mine and dumped at a centralized area. Trucks will then haul the tailings underground to a stope area where an LHD will spread the material on top of the recently placed course fill, a cover of approximately 15 cm. The planning and calculated production rates used in this estimate contain time for placing the tailings cover.

15.4 Power

Underground power is available from a primary substation located at the portal. The power taken into the mine is stepped down at the substation to 4,160 volts. The 4,160 is stepped down to a typical working voltage of 440 volts using mobile mine load centers or pad mount transformers set on concrete. The power is stepped down to 120/240 single phase in many locations at the load centers. The mine power system was modernized in 2011.

15.5 Water Wells

There are six existing water wells (three associated with Plant 1 and three associated with Plant 2) for extracting water from local aquifers. These wells are authorized, regulated, and permitted by CONAGUA, the Mexican *Comisión Nacional del Agua*. Prior to start-up, Golden Minerals will install a 5 km, 4-inch diameter water line from Plant 2 to Plant 1 to provide an adequate water supply.

16. MARKET STUDIES AND CONTRACTS

Detailed market studies have not been performed for the Velardeña Project. Markets for the Pb, Zn, and pyrite concentrates include metal brokers and direct sales to smelters. The concentrates produced are typical within the Mexican mining industry and the concentrate and markets within Mexico and worldwide are liquid. For purposes of this study, it is assumed that Golden Minerals will be successful in securing buyers for its concentrates.

Metal prices are based on long-term average consensus prices from 22 banks from April 2023 and are shown in **Table 16-1**.

Table 16-1: Commodity Price Assumptions - Long-term Consensus Pricing

Commodity	Value	Units
Gold (Au)	$1,826.00	/oz
Silver (Ag)	$22.71	/oz
Lead (Pb)	$1.02	/lb
Zinc (Zn)	$1.31	/lb

16.1 Concentrates

The sulfide plant at the Velardeña operations contains a typical flotation circuit that produces Pb, Zn, and pyrite concentrate products for sale to customers. Pb and Zn concentrates comprise approximately 15% and 7% of total concentrate production from the sulfide plant, respectively. Pyrite concentrate comprises approximately 78% of total concentrate production from the sulfide plant. All concentrate products will be sold under annual contracts, which are generally re-negotiated each calendar year. The concentrate products are generally shipped in covered trucks and the company generally incurs the cost of freight to the customer. Golden Minerals has shipped concentrate products to refining customers under the general terms described below.

16.1.1 Pb Concentrate

The Pb concentrate has an assay range is 19-25% Pb, 5,000-7,000 g/t Ag, and 15-22 g/t Au. After metal deductions, the company is generally paid for 95% of the contained Pb, Ag, and Au. Concentrate treatment charges would be negotiated annually and generally reflect market terms for the industry for similar products. The following treatment charges have been assumed for purposes of the study:

- Pb concentrate treatment charge: $60 per dry metric tonne of Pb concentrate
- Pb concentrate treatment charge escalator: $0.1 for each dollar above $2,100/tonne of realized lead price
- Au refining charge of $20.00 per payable ounce
- Ag refining charge of $0.45 per payable ounce
- Penalties:
    - Arsenic: Penalty of $1.50/t of Pb concentrate for every 0.1% As greater than 0.8%.

16.1.2 Zn Concentrate

The Zn concentrate has an assay range of 40-45% Zn, 500-600 g/t Ag, and 4-5 g/t Au. After metal deductions, the Company is generally paid for approximately 85% of contained Zn and 70% of Ag. Concentrate treatment charges would be negotiated annually and generally reflect market terms for the industry for similar products. The following treatment charges have been assumed for purposes of the study:

- Zn concentrate treatment charge: $375 per dry metric tonne of Zn concentrate
- Penalties:
    - Arsenic: $1.50/t of Zn concentrate for every 0.1% As greater than 0.5% but less than 0.6%, increasing to $3.00/t of concentrate for As values over 0.6%.

16.1.3 Pyrite Concentrate

The pyrite concentrate has an assay range of 100-200 g/t Ag, and 14-19 g/t Au. After metal deductions, the Company is generally paid for approximately 75% of contained Au and 85% of Ag. Concentrate treatment charges would be negotiated annually and generally reflect market terms for the industry for similar products. The following treatment charges have been assumed for purposes of the study:

- Pyrite concentrate treatment charge: $150 per dry metric tonne of Zn concentrate
- Penalties:
    - Arsenic: Penalty of $1.00/t of Pyrite concentrate for every 0.1% As greater than 0.5%.

16.2 Contract Mining

Golden Minerals has selected a mining contractor with skilled miners who are familiar with the cut and fill and resue mining methods intended to be used at the Project. The contractor will work under a fixed price per unit contract structure, and support positions will be invoiced daily. The contract is undergoing the final round of negotiations as of the effective date of this study.

17. ENVIRONMENTAL STUDIES, PERMITTING, AND PLANS, NEGOTIATIONS, OR AGREEMENTS WITH LOCAL INDIVIDUALS OR GROUPS

17.1 Environmental Baseline Studies

A variety of studies have been completed to characterize the natural environment of the Project area. The most recent Environmental Impact Statement for the Project was completed in April 2013.

According to INEGI-INE classification, the type of vegetation in the Project area corresponds to Desert Shrubland (rosette-forming vegetation) and sub-montane scrub, however; there is no demarcation that determines the separation between the ecosystems, so it is possible to find species from both. The vegetation in the vicinity of the Project is diverse and abundant but has deteriorated in areas with significant traffic. The arid ecosystem provides for a predominately shrub vegetation cover which contributes to soil stability. An indication of the stability maintained in this environment is shown by the abundance of various cacti species. Of the 24 species of flora recorded for the Project area, only one species is reported within a risk category: *Mammillaria candida* (snowball cactus), which falls under the category of endangered according to SEMARNAT.

Mammal species identified in the Project area include two species considered threatened, *Vulpes macortis*, (kit fox) and *Peromyscus boylii* (brush mouse); and one species considered endangered, *Erethizon dorsatum* (North American porcupine). Of the bird species identified at the Project, four are under special protection (red-tailed hawk, peregrine falcon, pine siskin, and Townsend's solitaire); one is considered endangered (*Falco mexicanus* or prairie falcon); and one is considered threatened (black-capped vireo). Of the amphibian and reptile fauna in the Project area, two are considered threatened (black racer and coachwhip snake) and two are identified under special protection (New Mexico whiptail and rock rattlesnake).

17.2 Requirements and Plans for Waste and Tailings Disposal

As part of the Environmental Impact Statement 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.

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

The dry tailings from Plant 1 are suitable for spreading on the fill of each cut to eliminate or reduce the dilution and losses associated with blasting and mucking process grade material on coarse placed fill.

17.3 Permitting Requirements and Status

Permitting requirements and status are shown in

Table 17-1 below. There is no reclamation bond required for this operation.

Table 17-1: Permitting Requirements

Authorization, Procedure, or Project	Number	Authorization Date	Comment
Plant 1 Permitting			
Environmental Risk Study	NA	Aug. 27, 2008	Valid
Accident Prevention Program	DGGIMAR.710/004071	May 21, 2021	Valid
Single Environmental License	SG/130.2.1/001312	Jul 4, 2008	Valid
Special Conditions for Ducts and	DGGCARETC/0418/2011	Aug 19, 2011	Valid as long as the conditions of the
La Discordia Well	B00-L-0459-21-09-15	Dec 4, 2015	Valid through December 5, 2025
El Rancho Well	B00.909.01.02/1508	Jul 7, 2018	Valid through July 8, 2028
La Noria Well	BOO.E.231.1/0478	Sep 29, 2014	Valid
Plant 2 and Velardeña Mine Sites Permitting			
Environmental Impact Study for	SG/130.2.1.1/002387/13	Aug 29, 2013	Valid
Environmental Impact Study for	SG/130.2.1.1/001783/12	Jul 16, 2012	Valid for operations through June
Environmental Risk Assessment	NA	Oct 30, 2015	Valid but must be modified if the
Accident Prevention Program	DGGIMAR.710/006062	Jul 27, 2016	Valid but must be modified if the
Single Environmental License	SG/130.2.1/002086	Nov 3, 2009	Valid
Single Environmental License	SG/130.2.1/001398/17	May 24, 2017	Valid
Special Conditions for Ducts and	DGGCARETC/774/2017	Dec 19, 2017	Valid
Mine Waste Management Plan	DGGIMAR.710/0006148	Jul 31, 2018	Valid through July 31, 2048
Hazardous Waste Management	DGGIMAR.710/0004490	Jun 13, 2018	Valid
Water Well #1	B00.E.23.1.1/0481002930	Sep 17, 2014	Valid
Water Well #2	B00.E.23.1.1/0479002928	Sep 17, 2014	Valid
Water Well #2	B00.3.23.1.1/0480002929	Sep 17, 2014	Valid
Environmental Impact	SG/130.2.1.1/002292/11	Dec 7, 2011	Valid for operations through July 2031
Preventive Report of the Tailings	SG/130.2.1.1/2126/16	Nov 28, 2016	Valid through September 2024,
Technical Justification Study for	SG/130.2.2/000098/16	Jan 12, 2017	Currently valid; a request was
Extension Authorization	SG/130.2.2/0053/2020	Jan 13, 2020	Valid
Explosives Permit	4596-Dgo	Oct 15, 2021	Valid; renewable each year

17.4 Plans, Negotiations, or Agreements with Local Individuals or Groups

Surface rights to some of the Project's concession areas are held by local ejidos (rural co-operative communities).

Ejido Velardeña holds surface rights at the Project's Velardeña property. Golden Minerals reports that it has an agreement with the ejido for surface access and to perform work related to exploration and mining on the property. As part of this agreement, Golden Minerals Golden Minerals has negotiated an agreement, which

requires quarterly payments of $4,000 and is valid through 2032. Golden Minerals remains in good standing with the community and is finalizing renegotiation of the agreement.

Ejido Vista Hermosa holds surface rights for the Project's Chicago property. Golden Minerals reports that it has an agreement with the ejido allowing access to the property to perform work related to mineral exploration and mining. The agreement was formalized before a notary and is valid until 2038. As part of the agreement, Golden Minerals makes a payment of $400,000 MXN plus applicable taxes by the 24th of March each year.

17.5 Mine Closure Plans and Costs

Golden Minerals has developed closure plans for the mines and processing plants presented in this TRS in conjunction with an independent consulting firm. Closure and reclamation costs for the Plant 1 area are estimated to total $1.5M.

17.6 Qualified Person's Opinion on Adequacy of Current Plans

The information provided by Golden Minerals contains legal documentation related to environmental compliance, and SEMARNAT, the governmental office in charge of the environmental aspects. Golden Minerals also has provided documents that support operations from the permitting side, which are official files for mine operations, haulage, waste, and water aspects. There are also documents related to agreements with the communities for other related activities that are described next. The data provided is in good standing to the knowledge and understanding of the QPs of this report.

18. CAPITAL AND OPERATING COSTS

Two capital and operating cost estimates were generated for the Project to support two economic analysis cases. One case considers Measured, Indicated, and Inferred (MII) Mineral Resources and the other considers only Measured and Indicated Mineral (MI) Resources. Capital and operating costs are based on Golden Minerals internal forecasts, which Tetra Tech has reviewed and found to be consistent with a mine of this type. Both capital and operating costs have a 15% contingency applied. Tetra Tech considers these cost estimates to be within 50%.

18.1 Capital Costs

Capital costs for the two cases are summarized in **Table 18-1** and **Table 18-2**. The capital cost estimate for the plan including Inferred Mineral Resources contains a tailings expansion provision of $0.3M that is not required for the plan based on Measured and Indicated Resources only.

Table 18-1: Capital Cost Estimates - MII Plan

Capital Costs	Pre-Production	LOM	Full LOM
Mine Equipment	$763	$0	$763
Process Plant	$115	$0	$115
Sustaining Capital	$0	$3,630	$3,630
Surface Infrastructure and Other Capex	$0	$275	$275
Closure and Reclamation			$1,500
Contingency (15%)	$132	$586	$942
Total[(1)]	**$1,010**	**$4,491**	**$7,225**

[1]Column values may not total due to rounding

Table 18-2: Capital Cost Estimates - MI Plan

Capital Costs	Pre-Production	LOM	Full LOM
Mine Equipment	$763	$0	$763
Process Plant	$115	$0	$115
Sustaining Capital	$0	$1,650	$1,650
Surface Infrastructure and Other Capex	$0	$0	$0
Closure and Reclamation			$1,500
Contingency (15%)	$132	$473	$604
Total[(1)]	**$1,010**	**$3,623**	**$4,632**

[1]Column values may not total due to rounding

Capital costs common to both scenarios include preproduction costs of $763k for rehabilitation of the LHD fleet, installation of air compressors, installation of underground air doors, installation of the mine dewatering system, and other equipment purchases, and $115k for capital improvements to Plant 1 prior to restart.

Planned expenditures over the life of mine include $100k per year as sustaining capital for the Project, and an additional sustaining capital amount of $230k per year for the tailings system.

18.2 Operating Costs

Operating costs for the two cases are summarized in **Table 18-3** and

Item	Total ($000s)	Unit Cost ($/t)
Mining Costs	$154,407	$126.99
Processing Costs	$33,921	$27.90
G&A and Overhead	$49,375	$40.61
Contingency	$35,655	$29.32
Total1	**$273,358**	**$224.82**
Mexico Precious Metals Royalty	$2,679	$2.20

1Columns may not total due to rounding

Table 18-4. Costs for underground development are included in the mining cost as the Project does not have declared Mineral Reserves. Unit operating costs were provided by Golden Minerals based on expected mining contract terms and actual and forecasted costs for processing and G&A.

Table 18-3: Operating Cost Estimates - MII Plan

Item	Total ($000s)	Unit Cost ($/t)
Mining Costs	$154,407	$126.99
Processing Costs	$33,921	$27.90
G&A and Overhead	$49,375	$40.61
Contingency	$35,655	$29.32
Total[1]	**$273,358**	**$224.82**
Mexico Precious Metals Royalty	$2,679	$2.20

[1]Columns may not total due to rounding

Table 18-4: Operating Cost Estimates - MI Plan

Item	Total ($000s)	Unit Cost ($/t)
Mining Costs	$63,606	$126.99
Processing Costs	$13,973	$27.90
G&A and Overhead	$20,339	$40.61
Contingency	$14,688	$29.32
Total[1]	**$112,607**	**$224.82**
Mexico Precious Metals Royalty	$1,181	$2.36

[1]Columns may not total due to rounding

19. ECONOMIC ANALYSIS

Two economic models were prepared for the Project: one includes Inferred Mineral Resources (MII Plan) in the analysis, and the second excludes the Inferred material (MI Plan). The economic model results are based on Mineral Resources that, by definition, are not Mineral Reserves, and do not have demonstrated economic viability. The economic assumptions shared between both models are summarized in **Table 19-1**. Commodity prices were obtained in April 2023 from long-term consensus price forecasts from 22 banks. For both economic analyses, reclamation costs are assumed to be canceled by salvage value and are therefore not included.

Table 19-1: Economic Model Input Parameters

Description	Value	Units
Market Prices:		
Gold (Au)	$1,826.00	/oz
Silver (Ag)	$22.71	/oz
Lead (Pb)	$1.02	/lb
Zinc (Zn)	$1.31	/lb
Taxes:		
Federal Precious Metal Royalty	0.50	%
Financial:		
Discount Rate	8	%
Mexico Special Mining Tax	7.5	%
Income Tax	30	%

Mine and process plant summaries over the LOM are shown in **Table 19-2** through **Table 19-5** below.

Table 19-2: ROM Production – MII Plan

Description	Value	Units
Material Mined	1,216	kt
ROM Grades		
Au	5.44	g/t
Ag	359	g/t
Pb	2.21	%
Zn	1.88	%
Metal Contained in ROM		
Au	213	koz
Ag	14,046	koz
Pb	59,278	klb
Zn	50,308	klb

Table 19-3: ROM Production - MI Plan

Description	Value	Units
Material Mined	501	kt
ROM Grades		
Au	5.64	g/t
Ag	396	g/t
Pb	2.32	%
Zn	2.20	%
Metal Contained in ROM		
Au	91	koz
Ag	6,383	koz
Pb	25,587	klb
Zn	24,337	klb

Table 19-4: Process Summary - MII Plan

Description	Unit	Total Conc. (t)	Pb Conc. (t)	Zn Conc. (t)	Pyrite Conc. (kt)
Products		348,940	53,007	24,118	271,816
Metal Recoveries					
Au	%	88.2%	7.5%	0%	80.8%
Ag	%	92.3%	75.8%	3.0%	13.4%
Pb	%	63.0%	63.0%	0%	0%
Zn	%	53.1%	0%	53.1%	0%
Contained Metals					
Au	koz	187.7	15.8	0	171.8
Ag	koz	12,963	10,651	426	1,886
Pb	klb	37,351	37,351	0	0
Zn	klb	26,724	0	26,724	0

Table 19-5: Process Summary - MI Plan

Description	Unit	Total Conc. (t)	Pb Conc. (t)	Zn Conc. (t)	Pyrite Conc. (kt)
Products		151,859	24,088	11,667	116,105
Metal Recoveries					
Au	%	88.2%	7.5%	0%	80.8%
Ag	%	92.3%	75.8%	3.0%	13.4%
Pb	%	63.0%	63.0%	0%	0%
Zn	%	53.1%	0%	53.1%	0%
Contained Metals					
Au	koz	80.2	6.8	0	73.4
Ag	koz	5,891	4,840	193	857
Pb	klb	16,122	16,122	0	0
Zn	klb	12,928	0	12,928	0

Economic penalties for As are included in the smelter contracts according to the terms described in **Section 0.** Assays for As content have not been incorporated into the geological block model and therefore As contents in the concentrate streams are assumed based on metallurgical test performance and smelter assays. Assumed As recoveries into each concentrate product are shown in **Table 19-6**. An average run-of-mine grade of 0.49% As has been assumed based on recent test mining and test processing results.

Table 19-6: Assumed Arsenic Recoveries in Concentrate

Concentrate	Value	Units
Pb	3.11	%
Zn	0.65	%
Fe	81.41	%

19.1 Economic Model Results – MII Plan

Economic model results for the MII Plan are summarized in **Table 19-7** and presented on an annual basis in **Table** 19-8. Over the 10.5-year LOM, the Project is projected to return an after-tax $NPV_{8\%}$ of $87.6M with an IRR of 860.7%. Due to the minimal capital investment required for the Project, the payback period is less than one year.

Table 19-7: Economic Model Results – MII Plan

Production Summary	Total - LOM
Material Mined and Processed (kt)	1,216
Grade Au (g/t)	5.44
Grade Ag (g/t)	359
Grade Pb (%)	2.21
Grade Zn (%)	1.88
Lead Concentrate	
Au Recovered (koz)	15.85
Ag Recovered (koz)	10,651
Pb Recovered (klbs)	37,351
Au Grade in Concentrate (g/t)	9.30
Ag Grade in Concentrate (g/t)	6,250
Pb Grade in Concentrate (%)	31.96
Zinc Concentrate	
Zn Recovered (klbs)	26,724
Ag Recovered (koz)	426
Zn Grade in Concentrate (%)	50.26
Ag Grade in Concentrate (g/t)	548.88

Financial Summary	Total ($M)
Gross Payable	601.7
TCs, RCs and Freight	(84.8)
Penalties	(3.5)
NSR	513.4
Operating Costs	
Mining	(154.4)
Processing	(33.9)
G&A	(49.4)
Contingency	(35.7)
Total Operating Cost	(273.4)
Federal Mining Royalty	(2.7)
EBITDA	237.4
Capital Costs	
Mine Equipment	(0.8)
Processing Plant	(0.1)
Sustaining Capital	(3.6)
Surface Infrastructure and Other	(0.3)
Closure and Reclamation	(1.5)

Production Summary	Total - LOM
Pyrite Concentrate	
Au Recovered (koz)	171.81
Ag Recovered (koz)	1,886
Au Grade in Concentrate (g/t)	19.66
Ag Grade in Concentrate (g/t)	216
Smelter Payable	
Payable Au (koz)	143.91
Payable Ag (koz)	12,020
Payable Pb (klbs)	35,484
Payable Zn (klbs)	22,715

Financial Summary	Total ($M)
Contingency	(0.9)
Total Capital Costs	**(7.2)**
Change in Working Capital	**(1.4)**
Salvage	1.7
Pre-tax Cash Flow	**230.4**
$NPV_{8\%}$	**136.7**
IRR	**1,320.2%**
Mexico SMT	(17.8)
Income Tax	(64.6)
After-tax Cash Flow	**148.0**
$NPV_{8\%}$	**87.6**
IRR	**860.7%**

Table 19-8: LOM Cash Flow - MII Plan

			Total	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
	Cash Flow Summary														
	Gold Price	US$/oz		-	1,826.00	1,826.00	1,826.00	1,826.00	1,826.00	1,826.00	1,826.00	1,826.00	1,826.00	1,826.00	1,826.00
	Zinc Price	US$/lb		-	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31
	Lead Price	US$/lb		-	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
	Silver Price	US$/oz		-	22.71	22.71	22.71	22.71	22.71	22.71	22.71	22.71	22.71	22.71	22.71
	Gross Revenue	**US$ M**	**601.7**	**-**	**39.9**	**60.7**	**61.6**	**59.1**	**56.9**	**57.5**	**62.9**	**54.9**	**50.3**	**62.1**	**35.7**
	TC/RC and Freight	US$ M	(84.8)	-	(5.7)	(9.6)	(9.4)	(8.8)	(8.4)	(7.8)	(8.7)	(7.8)	(6.1)	(7.1)	(5.4)
	Penalties	US$ M	(3.5)	-	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.4)	(0.4)	(0.4)	(0.2)
	Net Smelter Revenue	**US$ M**	**513.4**	**-**	**33.9**	**50.8**	**51.9**	**50.0**	**48.2**	**49.3**	**53.8**	**46.7**	**43.9**	**54.7**	**30.1**
	Operating Costs	US$ M	(273.4)		(19.8)	(26.7)	(26.7)	(26.7)	(26.7)	(26.7)	(26.7)	(26.7)	(26.7)	(26.7)	(13.6)
	Federal Precious Metal Royalty	US$ M	(2.7)		(0.2)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.2)	(0.2)	(0.3)	(0.2)
	EBITDA	**US$ M**	**237.4**		**14.0**	**23.9**	**24.9**	**23.1**	**21.3**	**22.4**	**26.9**	**19.8**	**17.0**	**27.8**	**16.4**
	Change in Working Capital	US$ M	(1.4)	0.1	(2.2)	(0.8)		0.0	(0.0)					0.0	1.5
	Capital Costs	US$ M	(7.2)	(1.0)	(0.4)	(0.4)	(0.4)	(0.4)	(0.7)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)
	Salvage	US$ M	1.7												1.7
	Pre-tax Net Cash Flow	**US$ M**	**230.4**	**(0.9)**	**11.3**	**22.8**	**24.6**	**22.7**	**20.6**	**22.0**	**26.5**	**19.4**	**16.6**	**27.4**	**17.5**
	Mexico SMT	US$ M	(17.8)		(1.0)	(1.8)	(1.9)	(1.7)	(1.6)	(1.7)	(2.0)	(1.5)	(1.3)	(2.1)	(1.2)
	Income Tax	US$ M	(64.6)		(3.2)	(6.4)	(6.9)	(6.3)	(5.8)	(6.1)	(7.4)	(5.4)	(4.6)	(7.6)	(4.9)
	After-tax Net Cash Flow	**US$ M**	**148.0**	**(0.9)**	**7.1**	**14.6**	**15.8**	**14.6**	**13.1**	**14.2**	**17.1**	**12.5**	**10.7**	**17.7**	**11.4**
	Pre-tax $NPV_{8\%}$ (US$ M)	**136.7**													
	Pre-tax IRR	**1320%**													
	Pre-tax Payback Period (yrs)	**0.1**													
	After-tax $NPV_{8\%}$ (US$ M)	**87.6**													
	After-tax IRR	**861%**													
	After-tax Payback Period (yrs)	**0.1**													
Production Summary															
	Material Mined and Processed	kt	1,216	-	88	119	119	119	119	119	119	119	119	119	60
	Grade Au	g/t	5.44	-	4.98	6.81	6.75	6.16	5.93	5.18	5.70	4.88	3.54	3.68	6.80
	Grade Ag	g/t	359	-	277	278	312	325	338	386	408	351	376	509	382
	Grade Pb	%	2.21	-	3.88	3.11	2.61	2.20	1.22	1.42	1.84	1.54	2.04	2.21	3.12
	Grade Zn	%	1.88	-	2.33	1.98	1.63	1.59	1.31	1.40	1.85	2.23	1.62	2.29	3.16
	Lead Concentrate														
	Au Recovered	koz	15.85	-	1.05	1.94	1.92	1.75	1.68	1.47	1.62	1.39	1.01	1.04	0.98
	Ag Recovered	koz	10,651	-	594	804	901	941	977	1,118	1,180	1,015	1,087	1,473	561
	Pb Recovered	klbs	37,351	-	4,746	5,119	4,306	3,619	2,013	2,343	3,036	2,539	3,369	3,649	2,612
	Au Grade in Concentrate	g/t		-	11.05	15.05	13.31	11.63	10.77	8.23	8.57	8.54	5.79	4.43	10.93
	Ag Grade in Concentrate	g/t		-	6,250	6,250	6,250	6,250	6,250	6,250	6,250	6,250	6,250	6,250	6,250
	Pb Grade in Concentrate	%		-	72.84	58.05	43.56	35.05	18.78	19.11	23.45	22.80	28.24	22.58	42.42
	Zinc Concentrate														
	Zn Recovered	klbs	26,724	-	2,405	2,750	2,271	2,212	1,814	1,944	2,570	3,091	2,254	3,182	2,230
	Ag Recovered	koz	426	-	23.73	32.11	36.01	37.60	39.04	44.66	47.16	40.55	43.45	58.86	22.43

			Total	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
	Zn Grade in Concentrate	%		-	50.26	50.26	50.26	50.26	50.26	50.26	50.26	50.26	50.26	50.26	50.26
	Ag Grade in Concentrate	g/t		-	340	402	546	586	742	792	632	452	664	638	347
	Pyrite Concentrate														
	Au Recovered	koz	171.81	-	11.38	20.98	20.80	18.98	18.25	15.95	17.55	15.04	10.92	11.32	10.64
	Ag Recovered	koz	1,886	-	105	142	160	167	173	198	209	180	193	261	99
	Au Grade in Concentrate	g/t		-	19.66	19.66	19.66	19.66	19.66	19.66	19.66	19.66	19.66	19.66	19.66
	Ag Grade in Concentrate	g/t		-	182	133	151	173	186	244	234	235	347	453	184
NSR															
	Payable Au	koz	143.91	-	9.53	17.58	17.43	15.90	15.29	13.36	14.70	12.60	9.14	9.48	8.91
	Payable Ag	koz	12,020	-	670	907	1,017	1,062	1,103	1,261	1,332	1,145	1,227	1,662	633
	Payable Pb	klbs	35,484	-	4,509	4,863	4,091	3,438	1,913	2,226	2,884	2,412	3,201	3,466	2,482
	Payable Zn	klbs	22,715	-	2,044	2,337	1,931	1,880	1,542	1,653	2,184	2,628	1,916	2,704	1,895
	Gross Revenues	**US$ M**	**601.7**	**-**	**39.9**	**60.7**	**61.6**	**59.1**	**56.9**	**57.5**	**62.9**	**54.9**	**50.3**	**62.1**	**35.7**
	TCs, RCs, and Freight	US$ M	(84.8)	-	(5.7)	(9.6)	(9.4)	(8.8)	(8.4)	(7.8)	(8.7)	(7.8)	(6.1)	(7.1)	(5.4)
	Penalties	US$ M	(3.5)	-	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.4)	(0.4)	(0.4)	(0.2)
	Net Smelter Revenue	**US$ M**	**513.4**	**-**	**33.9**	**50.8**	**51.9**	**50.0**	**48.2**	**49.3**	**53.8**	**46.7**	**43.9**	**54.7**	**30.1**
Operating Costs															
	Mining Operating Cost	US$/t processed	(154.4)		(11.2)	(15.1)	(15.1)	(15.1)	(15.1)	(15.1)	(15.1)	(15.1)	(15.1)	(15.1)	(7.7)
	Processing Operating Cost	US$/t processed	(33.9)		(2.5)	(3.3)	(3.3)	(3.3)	(3.3)	(3.3)	(3.3)	(3.3)	(3.3)	(3.3)	(1.7)
	G&A	US$/t processed	(49.4)		(3.6)	(4.8)	(4.8)	(4.8)	(4.8)	(4.8)	(4.8)	(4.8)	(4.8)	(4.8)	(2.4)
	Contingency	US$ M	(35.7)		(2.6)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(1.8)
	Total Operating Costs	**US$ M**	**(273.4)**		**(19.8)**	**(26.7)**	**(26.7)**	**(26.7)**	**(26.7)**	**(26.7)**	**(26.7)**	**(26.7)**	**(26.7)**	**(26.7)**	**(13.6)**
	Mexico NSR Royalty	US$ M	(2.7)		(0.2)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.2)	(0.2)	(0.3)	(0.2)
	EBITDA	**US$ M**	**237.4**		**14.0**	**23.9**	**24.9**	**23.1**	**21.3**	**22.4**	**26.9**	**19.8**	**17.0**	**27.8**	**16.4**
	Change in Working Capital	US$ M	(1.4)	0.1	(2.2)	(0.8)		0.0	(0.0)					0.0	1.5
Capital Costs															
	Mine Equipment Capital	US$ M	(0.8)	(0.8)											
	Mine Development Capital	US$ M	-												
	Processing Capital	US$ M	(0.1)	(0.1)											
	Closure	US$ M	(1.5)	-	-	-	-	-	-	-	-	-	-	-	(1.5)
	Sustaining Capital	US$ M	(3.6)	-	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
	Surface Infrastructure and Other	US$ M	(0.3)	-	-	-	-	-	(0.3)	-	-	-	-	-	-
	Contingency	US$ M	(0.7)	(0.1)	(0.0)	(0.0)	(0.0)	(0.0)	(0.1)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.3)
	Total Capital Costs	**US$ M**	**(7.2)**	**(1.0)**	**(0.4)**	**(0.4)**	**(0.4)**	**(0.4)**	**(0.7)**	**(0.4)**	**(0.4)**	**(0.4)**	**(0.4)**	**(0.4)**	**(2.1)**
	Salvage	US$ M	1.7												1.7
	Net Cash Flow Before Taxes	**US$ M**	**230.4**	**(0.9)**	**11.3**	**22.8**	**24.6**	**22.7**	**20.6**	**22.0**	**26.5**	**19.4**	**16.6**	**27.4**	**17.5**
Tax															
	Mexico SMT	US$ M	(17.8)		(1.0)	(1.8)	(1.9)	(1.7)	(1.6)	(1.7)	(2.0)	(1.5)	(1.3)	(2.1)	(1.2)
	Income Tax	US$ M	(64.6)		(3.2)	(6.4)	(6.9)	(6.3)	(5.8)	(6.1)	(7.4)	(5.4)	(4.6)	(7.6)	(4.9)
	Net Cash Flow After Taxes	**US$ M**	**148.0**	**(0.9)**	**7.1**	**14.6**	**15.8**	**14.6**	**13.1**	**14.2**	**17.1**	**12.5**	**10.7**	**17.7**	**11.4**

After-tax Project NPV sensitivities to metal prices, capital and operating costs, and metallurgical recoveries are shown in **Table 19-9**. A sensitivity study on the after-tax NPV of the Project to a selection of discount rates was also performed and the results are shown in Figure **19-1.** The sensitivities were performed by adjusting each input parameter in 5% increments up to ± 20% of the base value. For metallurgical recovery sensitivities, maximum recovery caps were applied to ensure the overall metallurgical recovery did not exceed 100% for any metal of interest.

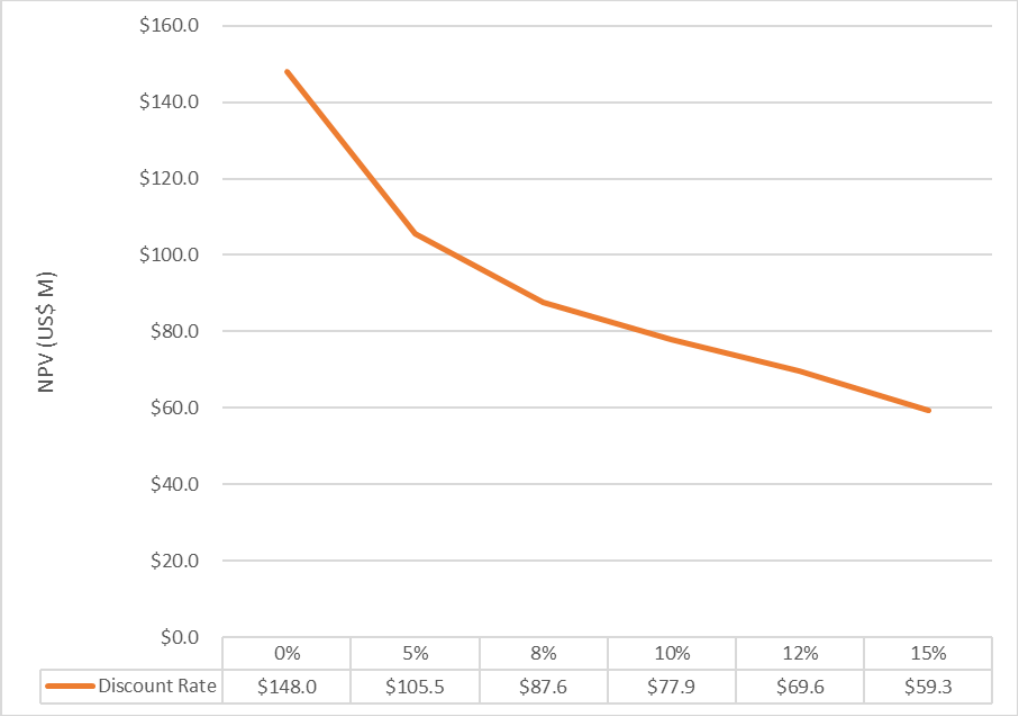
Results of the sensitivity analyses show the Project is most sensitive to precious metal prices, operating costs, and precious metal recoveries as shown in **Figure 19-2**. A 10% change in operating costs resulted in a 12% change in Project NPV. Due to the sensitivity to operating costs, efforts to control or reduce the operating costs are key to the economic success of the Project. Increasing the precious metal recoveries in the lead and pyrite concentrates may not be technically feasible; however, the sensitivity results highlight the impact to the NPV of the Project if the baseline metallurgical assumptions used in this Initial Assessment are not realized during production.

Table 19-9: Velardeña Project Sensitivity Results – MII Scenario

Sensitivity Item	Percentage of Base Case								
	80%	85%	90%	95%	**Base**	105%	110%	115%	120%
Gold Price	$66.6	$71.8	$77.1	$82.3	**$87.6**	$92.8	$98.1	$103.3	$108.6
Silver Price	$67.0	$72.2	$77.3	$82.4	**$87.6**	$92.7	$97.9	$103.0	$108.1
Lead Price	$84.9	$85.7	$86.4	$87.1	**$87.6**	$88.1	$88.6	$89.1	$89.6
Zinc Price	$85.3	$85.9	$86.4	$87.0	**$87.6**	$88.2	$88.7	$89.3	$89.9
Capital Costs	$88.2	$88.1	$87.9	$87.7	**$87.6**	$87.4	$87.3	$87.1	$86.9
Operating Costs	$109.2	$103.8	$98.4	$93.0	**$87.6**	$82.2	$76.8	$71.3	$65.9
Overall Recovery – Au	$71.4	$75.5	$79.5	$83.5	**$87.6**	$91.6	$95.7	$97.2	$97.8
Overall Recovery – Ag	$68.0	$72.9	$77.8	$82.7	**$87.6**	$92.5	$93.7	$94.5	$95.3
Overall Recovery – Pb	$84.6	$85.4	$86.1	$86.8	**$87.6**	$88.3	$89.1	$89.8	$90.5
Overall Recovery - Zn	$86.1	$86.5	$86.9	$87.2	**$87.6**	$87.9	$88.3	$88.7	$89.0

Notes:

1. *Gold prices evaluated in the sensitivity analysis range from $1,461/oz to $2,191/oz; silver prices range from $18.17/oz to $27.25/oz; lead prices range from $0.82/lb to $1.22/lb; and zinc prices range from $1.05/lb to $1.57/lb.*
2. *Total metallurgical recoveries range from 70.6% to 98.9% for Au; 73.8% to 99.8% for Ag; 50.4% to 75.6% for Pb; and 42.5% to 63.7% for Zn.*



	0%	5%	8%	10%	12%	15%
Discount Rate	$148.0	$105.5	$87.6	$77.9	$69.6	$59.3

Figure 19-1: Velardeña Project sensitivity to discount rate

	80%	85%	90%	95%	100%	105%	110%	115%	120%
Gold Price Factor	$66.6	$71.8	$77.1	$82.3	$87.6	$92.8	$98.1	$103.3	$108.6
Silver Price Factor	$67.0	$72.2	$77.3	$82.4	$87.6	$92.7	$97.9	$103.0	$108.1
OPEX Factor	$109.2	$103.8	$98.4	$93.0	$87.6	$82.2	$76.8	$71.3	$65.9
Metallurgical Recovery Factor - Au	$71.4	$75.5	$79.5	$83.5	$87.6	$91.6	$95.7	$97.2	$97.8
Metallurgical Recovery Factor - Ag	$68.0	$72.9	$77.8	$82.7	$87.6	$92.5	$93.7	$94.5	$95.3

Figure 19-2: After-tax sensitivity results of the most influential factors

19.2 Economic Model Results – MI Plan

Economic model results for the MI Plan are summarized in **Table 19-10** and presented on an annual basis in **Table 19-11**. The life of mine is 4.5 years, with an after-tax NPV of $52.3M. Due to the low capital investment required, the payback period for the Project is less than one year.

Table 19-10: Economic Model Results – MI Plan

Production Summary	Total - LOM
Material Mined and Processed (kt)	**501**
Grade Au (g/t)	5.64
Grade Ag (g/t)	396
Grade Pb (%)	2.32
Grade Zn (%)	2.20
Lead Concentrate	
Au Recovered (koz)	6.77
Ag Recovered (koz)	4,840
Pb Recovered (klbs)	16,122
Au Grade in Concentrate (g/t)	8.74
Ag Grade in Concentrate (g/t)	6,250
Pb Grade in Concentrate (%)	30.36
Zinc Concentrate	
Zn Recovered (klbs)	12,928
Ag Recovered (koz)	193
Zn Grade in Concentrate (%)	50.26
Ag Grade in Concentrate (g/t)	515.60
Pyrite Concentrate	
Au Recovered (koz)	73.39
Ag Recovered (koz)	857
Au Grade in Concentrate (g/t)	19.66
Ag Grade in Concentrate (g/t)	230
Smelter Payable	
Payable Au (koz)	61.47

Financial Summary	Total ($M)
Gross Payable	**266.3**
TCs, RCs and Freight	**(37.2)**
Penalties	**(1.4)**
NSR	**227.7**
Operating Costs	
Mining	(63.6)
Processing	(14.0)
G&A	(20.3)
Contingency	(14.7)
Total Operating Cost	**(112.6)**
Federal Mining Royalty	(1.2)
EBITDA	**113.9**
Capital Costs	
Mine Equipment	(0.8)
Processing Plant	(0.1)
Sustaining Capital	(1.7)
Surface Infrastructure and Other	(0)
Closure and Reclamation	(1.5)
Contingency	(0.6)
Total Capital Costs	**(4.6)**
Change in Working Capital	**(1.4)**
Salvage	1.7
Pre-tax Net Cash Flow	**109.7**
$NPV_{8\%}$	**81.8**
IRR	**1,950.0%**
Mexico SMT	(8.5)
Income Tax	(30.9)

Production Summary	Total - LOM
Payable Ag (koz)	5,462
Payable Pb (klbs)	15,316
Payable Zn (klbs)	10,988

Financial Summary	Total ($M)
After-tax Net Cash Flow	70.2
$NPV_{8\%}$	52.3
IRR	1266.8%

Table 19-11: LOM Cash Flow - MI Plan

Annual Cash Flow		Total	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5
Cash Flow Summary									
Gold Price	US$/oz		-	-	1,826.00	1,826.00	1,826.00	1,826.00	1,826.00
Zinc Price	US$/lb		-	-	1.31	1.31	1.31	1.31	1.31
Lead Price	US$/lb		-	-	1.02	1.02	1.02	1.02	1.02
Silver Price	US$/oz		-	-	22.71	22.71	22.71	22.71	22.71
Gross Revenue	**US$ M**	**266.3**	**-**	**-**	**46.7**	**72.5**	**61.1**	**54.0**	**32.1**
TC/RC and Freight	US$ M	(37.2)	-	-	(6.7)	(10.4)	(8.6)	(7.3)	(4.3)
Penalties	US$ M	(1.4)	-	-	(0.2)	(0.3)	(0.3)	(0.4)	(0.2)
Net Smelter Revenue	**US$ M**	**227.7**	**-**	**-**	**39.8**	**61.8**	**52.2**	**46.4**	**27.6**
Operating Costs	US$ M	(112.6)			(19.8)	(26.7)	(26.7)	(26.7)	(12.8)
Federal Precious Metal Royalty	US$ M	(1.2)			(0.2)	(0.3)	(0.3)	(0.2)	(0.1)
EBITDA	**US$ M**	**113.9**			**19.8**	**34.8**	**25.2**	**19.5**	**14.7**
Change in Working Capital	US$ M	(1.4)		0.1	(2.2)	(0.8)		0.0	1.6
Capital Costs	US$ M	(4.6)	-	(1.0)	(0.4)	(0.4)	(0.4)	(0.4)	(2.1)
Salvage	US$ M	1.7	-	-	-	-	-	-	1.7
Pre-tax Net Cash Flow	**US$ M**	**109.7**	**-**	**(0.9)**	**17.2**	**33.6**	**24.8**	**19.1**	**15.9**
Mexico SMT	US$ M	(8.5)			(1.5)	(2.6)	(1.9)	(1.5)	(1.1)
Income Tax	US$ M	(30.9)			(4.8)	(9.4)	(6.9)	(5.3)	(4.5)
After-tax Net Cash Flow	**US$ M**	**70.2**		**(0.9)**	**10.9**	**21.6**	**16.0**	**12.3**	**10.3**
Pre-tax $NPV_{8\%}$ (US$ M)	**81.8**								
Pre-tax IRR	**1950%**								
Pre-tax Payback Period (yrs)	**0.1**								
After-tax $NPV_{8\%}$ (US$ M)	**52.3**								
After-tax IRR	**1267%**								
After-tax Payback Period (yrs)	**0.1**								
Production Summary									
Material Mined and Processed	**kt**	501	-	-	88	119	119	119	57
Grade Au	g/t	5.64	-	-	6.43	7.05	5.25	4.40	4.89
Grade Ag	g/t	396	-	-	367	445	380	357	456
Grade Pb	%	2.32	-	-	2.29	1.98	2.52	2.22	2.84
Grade Zn	%	2.20	-	-	1.14	1.99	2.68	2.11	3.51

			Total	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5
	Lead Concentrate									
	Au Recovered	koz	6.77	-	-	1.36	2.00	1.49	1.25	0.67
	Ag Recovered	koz	4,840	-	-	787	1,288	1,099	1,032	634
	Pb Recovered	klbs	16,122	-	-	2,800	3,264	4,148	3,663	2,247
	Au Grade in Concentrate	g/t		-	-	10.76	9.72	8.48	7.58	6.58
	Ag Grade in Concentrate	g/t		-	-	6,250	6,250	6,250	6,250	6,250
	Pb Grade in Concentrate	%		-	-	32.41	23.10	34.39	32.36	32.33
	Zinc Concentrate									
	Zn Recovered	klbs	12,928	-	-	1,172	2,759	3,729	2,927	2,340
	Ag Recovered	koz	193	-	-	31.46	51.47	43.93	41.23	25.32
	Zn Grade in Concentrate	%		-	-	50.26	50.26	50.26	50.26	50.26
	Ag Grade in Concentrate	g/t		-	-	925	643	406	485	373
	Pyrite Concentrate									
	Au Recovered	koz	73.39	-	-	14.69	21.72	16.18	13.57	7.24
	Ag Recovered	koz	857	-	-	139	228	195	183	112
	Au Grade in Concentrate	g/t		-	-	19.66	19.66	19.66	19.66	19.66
	Ag Grade in Concentrate	g/t		-	-	187	207	237	265	305
NSR										
	Payable Au	koz	61.47	-	-	12.31	18.19	13.55	11.36	6.06
	Payable Ag	koz	5,462	-	-	889	1,454	1,241	1,164	715
	Payable Pb	klbs	15,316	-	-	2,660	3,101	3,941	3,480	2,135
	Payable Zn	klbs	10,988	-	-	996	2,345	3,170	2,488	1,989
	Gross Revenues	**US$ M**	**266.3**	**-**	**-**	**46.7**	**72.5**	**61.1**	**54.0**	**32.1**
	TCs, RCs, and Freight	US$ M	(37.2)	-	-	(6.7)	(10.4)	(8.6)	(7.3)	(4.3)
	Penalties	US$ M	(1.4)	-	-	(0.2)	(0.3)	(0.3)	(0.4)	(0.2)
	Net Smelter Revenue	**US$ M**	**227.7**	**-**	**-**	**39.8**	**61.8**	**52.2**	**46.4**	**27.6**
Operating Costs										
	Mining Operating Cost	US$/t processed	(63.6)			(11.2)	(15.1)	(15.1)	(15.1)	(7.2)
	Processing Operating Cost	US$/t processed	(14.0)			(2.5)	(3.3)	(3.3)	(3.3)	(1.6)
	G&A	US$/t processed	(20.3)			(3.6)	(4.8)	(4.8)	(4.8)	(2.3)
	Contingency	US$ M	(14.7)			(2.6)	(3.5)	(3.5)	(3.5)	(1.7)
	Total Operating Costs	**US$ M**	**(112.6)**			**(19.8)**	**(26.7)**	**(26.7)**	**(26.7)**	**(12.8)**
	Mexico NSR Royalty	US$ M	(1.2)			(0.2)	(0.3)	(0.3)	(0.2)	(0.1)
	EBITDA	**US$ M**	**113.9**			**19.8**	**34.8**	**25.2**	**19.5**	**14.7**
	Change in Working Capital		(1.4)		0.1	(2.2)	(0.8)	0.0	0.0	1.6

		Total	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5
Capital Costs									
Mine Equipment Capital	US$ M	(0.8)		(0.8)					
Processing Capital	US$ M	(0.1)		(0.1)					
Closure	US$ M	(1.5)	-	-	-	-	-	-	(1.5)
Sustaining Capital	US$ M	(1.7)	-	-	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
Contingency	US$ M	(0.6)	-	(0.1)	(0.0)	(0.0)	(0.0)	(0.0)	(0.3)
Total Capital Costs	US$ M	**(4.6)**	**-**	**(1.0)**	**(0.4)**	**(0.4)**	**(0.4)**	**(0.4)**	**(2.1)**
Salvage		1.7	-	-	-	-	-	-	1.7
Net Cash Flow Before Taxes	US$ M	**109.7**	**-**	**(0.9)**	**17.2**	**33.6**	**24.8**	**19.1**	**15.9**
Tax									
Mexico SMT	of EBITDA	(8.5)			(1.5)	(2.6)	(1.9)	(1.5)	(1.1)
Income Tax		(30.9)			(4.8)	(9.4)	(6.9)	(5.3)	(4.5)
Net Cash Flow After Tax		**70.2**		**(0.9)**	**10.9**	**21.6**	**16.0**	**12.3**	**10.3**

After-tax Project NPV sensitivity to metal prices, capital and operating costs, and metallurgical recoveries are shown in **Table 19-9**. A sensitivity study on the after-tax NPV of the Project to a selection of discount rates was also performed and the results are shown in **Table 19-12.** The sensitivities were performed by adjusting each input parameter in 5% increments up to ± 20% of the base value. For metallurgical recovery sensitivities, maximum recovery caps were applied to ensure the overall metallurgical recovery did not exceed 100% for any metal of interest.

Results of the sensitivity analyses show the Project is most sensitive to precious metal prices, operating costs, and precious metal recoveries as shown in **Figure 19-2**. A 10% change in operating costs resulted in an 11% change in Project NPV. Due to the sensitivity to operating costs, efforts to control or reduce the operating costs are key to the economic success of the Project. Increasing the precious metal recoveries in the lead and pyrite concentrates may not be technically feasible; however, the sensitivity results highlight the impact to the NPV of the Project if the baseline metallurgical assumptions used in the preparation of this report are not realized during production.

Table 19-12: Velardeña Project Sensitivity Results – MI Plan

Sensitivity Item	Percentage of Base Case								
	80%	85%	90%	95%	**Base**	105%	110%	115%	120%
Gold Price	$41.3	$44.1	$46.8	$49.6	**$52.3**	$55.0	$57.8	$60.5	$63.2
Silver Price	$40.4	$43.4	$46.3	$49.3	**$52.3**	$55.3	$58.2	$61.2	$64.2
Lead Price	$51.0	$51.3	$51.7	$52.0	**$52.3**	$52.5	$52.8	$53.0	$53.3
Zinc Price	$50.9	$51.3	$51.6	$51.9	**$52.3**	$52.6	$53.0	$53.3	$53.6
Capital Costs	$52.7	$52.6	$52.5	$52.4	**$52.3**	$52.2	$52.1	$52.0	$51.9
Operating Costs	$63.4	$60.6	$57.8	$55.1	**$52.3**	$49.5	$46.7	$44.0	$41.2
Overall Recovery – Au	$43.9	$46.0	$48.1	$50.2	**$52.3**	$54.4	$56.5	$57.3	$57.6
Overall Recovery – Ag	$40.9	$43.8	$46.6	$49.4	**$52.3**	$55.1	$55.8	$56.3	$56.8
Overall Recovery – Pb	$50.8	$51.2	$51.5	$51.9	**$52.3**	$52.7	$53.0	$53.4	$53.8
Overall Recovery - Zn	$51.4	$51.6	$51.9	$52.1	**$52.3**	$52.5	$52.7	$52.9	$53.1

Notes:

1. *Gold prices evaluated in the sensitivity analysis range from $1,461/oz to $2,191/oz; silver prices range from $18.17/oz to $27.25/oz; lead prices range from $0.82/lb to $1.22/lb; and zinc prices range from $1.05/lb to $1.57/lb.*
2. *Total metallurgical recoveries range from 70.6% to 98.9% for Au; 73.8% to 99.8% for Ag; 50.4% to 75.6% for Pb; and 42.5% to 63.7% for Zn.*

	0%	5%	8%	10%	12%	15%
Discount Rate	$70.2	$58.2	$52.3	$48.8	$45.6	$41.4

Figure 19-3: Velardeña Project sensitivity to discount rate

	80%	85%	90%	95%	100%	105%	110%	115%	120%
Gold Price Factor	$41.3	$44.1	$46.8	$49.6	$52.3	$55.0	$57.8	$60.5	$63.2
Silver Price Factor	$40.4	$43.4	$46.3	$49.3	$52.3	$55.3	$58.2	$61.2	$64.2
OPEX Factor	$63.4	$60.6	$57.8	$55.1	$52.3	$49.5	$46.7	$44.0	$41.2
Metallurgical Recovery Factor - Au	$43.9	$46.0	$48.1	$50.2	$52.3	$54.4	$56.5	$57.3	$57.6
Metallurgical Recovery Factor - Ag	$40.9	$43.8	$46.6	$49.4	$52.3	$55.1	$55.8	$56.3	$56.8

Figure 19-4: After-tax sensitivity results of the most influential factors

20. ADJACENT PROPERTIES

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

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.

21. OTHER RELEVANT DATA AND INFORMATION

Golden Minerals has announced its intention to restart production at Velardeña during the second half of 2023.

The results of the report summarized in this TRS are not based on a full feasibility study, and there is no assurance the company will be successful in realizing the economics described in this TRS. There is increased uncertainty and risk in restarting the mine without a feasibility level study.

22. INTERPRETATIONS AND CONCLUSIONS

With the inclusion of Measured, Indicated, and Inferred Mineral Resources the findings of this study suggest the Project is conceptually economically viable. The study has been based on Mineral Resources, which are not Mineral Reserves and do not have demonstrated economic viability.

22.1 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.

22.2 Mining

Results of the study indicate mining is potentially economically viable. However, due to the thin-veined nature of the mineralization and the scale of the operations, extensive Resource drilling of the deposit is not planned at this time. Conceptual stope outlines have been used for the purposes of the report.

The Project 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. Recent test mining at the site has confirmed a minimum selective mining width of 0.7 m is achievable, which can contribute to reducing dilution.

22.3 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 supports the existing process flow sheet for future production at 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. Previous studies on the Project have included recovery from a BIOX® plant constructed near Plant 2. Due to the results from recent metallurgical and economic analyses performed by Golden Minerals, along with favorable terms for the sale of pyrite concentrate, the results presented in this study exclude this process.

22.4 Economic Analysis

Based on the two separate economic analyses, including and excluding the Inferred Resources, the findings of this study suggest the Project is conceptually economically viable in both scenarios. The study has been based on Mineral Resources, which by definition are not Mineral Reserves and have not demonstrated economic viability.

22.5 Significant Risk Factors

Factors that could affect the economic viability of the Project include underestimations of operating and capital costs and declines in any or all metal prices. Changes to the contract sales terms could significantly impact the Project's economic viability. 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 shoots and their orientations, and the ability of the mining operations to control waste dilution.

The results of the report summarized in this TRS are not based on a full feasibility study, and there is no assurance the company will be successful in realizing the economics described in this TRS. There is increased uncertainty and risk in restarting the mine without a feasibility level study.

An ongoing dispute between Unifin and Minera William could materially impact the restart of Velardeña, as Minera William holds the mine and processing plant. A preliminary hearing was initially scheduled to take place in April 2023 but was rescheduled to June 2023. In June 2023 Minera William and Unifin agreed to settle the matter and the Court agreed to suspend trial to allow Minera William and Unifin to negotiate a settlement agreement. As of June 30, 2023, the terms and timing of the settlement are uncertain.

Opportunities to add potential value to the Project exist, which may offset some of the risk factors described above.

23. RECOMMENDATIONS

The following recommendations are made to refine the current operation but are not integral to the implementation of the plan proposed in the study.

23.1 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 results 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.
- Current Resource drilling under consideration includes a 9,000 meter drill program, which would cost approximately US$500,000.

23.2 Mining

It is recommended that Golden Minerals implements cut and fill mining where waste and vein material are blasted separately in order to reduce ore dilution. This practice would consider more total tonnes blasted in each section. Vein tonnes would be reduced, but the resulting grade would be higher. Recent tests on selective mining widths of 0.7 meters have proven to be achievable. Because this practice requires efficient operations control, Tetra Tech recommends having detailed control in drilling and blasting.

The mine plan developed for the study should be optimized and undertaken at a more detailed level, which will enable a greater understanding of mining constraints, costs and resulting mill feed. Currently, only sulfide material is being considered for the conceptual mine layout. In the future, it could be economical to include oxide material, as processing allows.

23.3 Metallurgy & Process

Antimony and arsenic are penalty elements in the lead and zinc concentrates and could be added to the database and spatially modeled. Additional metallurgical test work is recommended to investigate the depression of antimony and arsenic from the final lead and zinc concentrates, and zinc from the pyrite concentrate.

Additional metallurgical testing should be completed on the oxide mineralized material to determine if it is suitable for processing in the company's plant facilities.

23.4 Economic Analysis

Currently, it is anticipated that the salvage sale of equipment will cover the reclamation costs (estimated at $1.5M). However, the salvage value of the equipment and infrastructure at the end of the LOM has not been estimated. It is recommended that an estimate of the salvage value of the Project's assets be determined and incorporated into the economic analysis alongside the closure cost estimates to increase the resolution of the Project's economics.

24. REFERENCES

Tetra Tech. 2023. "Preliminary Economic Assessment Update - NI 43-101 Technical Report of the Velardeña Project." NI 43-101 Technical Report, Lakewood, CO.

25. RELIANCE ON INFORMATION PROVIDED BY THE REGISTRANT

Tetra Tech is relying on documents and statements provided by Golden Minerals personnel regarding:

- Resource block model estimation
- Mine and plant production data
- Status of mineral concessions
- Status and timelines of permits, contracts, and agreements required for operation
- Capital and operating cost estimates
- Mine and plant closure plans and associated costs