NI 43-101 TECHNICAL REPORT
BOLÍVAR MINE
Chihuahua State, Mexico

PREPARED FOR

SIERRA METALS

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1. SUMMARY (ITEM 1)

1.1 Introduction

Gustavson Associates, LLC (Gustavson) was commissioned initially by Dia Bras Exploration (Dia Bras), Mexico and after a recent name change to Sierra Metals Inc. (Sierra Metals) to prepare an independent Prefeasibility Study (PFS) for the Bolívar Mine in southern Chihuahua, Mexico, which was completed and delivered on April 15, 2013. This report is the NI 43-101 Technical Report that presents and documents the findings of the Prefeasibility Study.

Within this report there are figures and text that still refer to Dia Bras in that they were developed prior to the change of name, but the reference to Dia Bras and Sierra Metals are both correct during the timing of this report. The purpose of this report is to refine and expand upon the information that was presented in the Technical Report of the Mineral Resources, dated October 15, 2012.

The mineral resource estimate and description of the geology of the Bolívar Mine with respect to silver, copper and zinc mineralization was to documented the results of an independent review of existing geologic data and observations recorded during field reconnaissance and was presented within the October 15, 2012 NI43-101. Some of the information reported in the October 15, 2012 NI 43-101 is repeated herein and is applicable to this document. This is a NI 43-101 Technical Report to document the Prefeasibility Study Report and none of the Inferred Resource was used in the conversion to Reserves or in the mine planning. Also, this report includes more recent modeling to quantify and include the gold Resources.

This report was prepared to comply with public reporting obligations according to and in compliance with NI 43-101 Standards of Disclosure for Mineral Projects, and Definition Standards for Mineral Resources and Mineral Reserves according to the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) for reporting following a press release for updated resources dated April 17, 2013. The mineral resource estimate and interpretations and conclusions reported here are based on technical data available prior to April 5, 2012. The mining, gold, Reserve statement and information that are presented in this report include data through the effective date of this report - December 31, 2012.

1.2 Property Description and Ownership

Sierra Metals is a reporting issuer listed on the Toronto Stock Venture Exchange (TSX-V). The company's main corporate office is located in Toronto, Canada; and the office of its wholly owned subsidiary, Dia Bras Mexicana S.A. de C.V., is located in Chihuahua, Mexico.

The Bolívar Mine is a silver, copper, gold and zinc mining project consisting of 14 mineral concessions covering approximately 6,800 ha located approximately 397 km south by road from the city of Chihuahua, Mexico. The Bolívar property is a district-scale property considered prospective for new discoveries of precious metal and bulk-tonnage copper-skarn deposits. The property also hosts Sierra Metals' most advanced asset, the Bolívar Mine.

Sierra Metals (Dia Bras at that time) purchased the claims for the Bolívar Mine between 2003 and 2004, and has conducted mining activities at the Bolívar Mine since February 2005. In 2012, the monthly mining rate was approximately 23,300 tonnes per month from the El Gallo Mine. Mined materials are currently transported to Sierra Metals' Piedras Verdes Mill. The mill has a capacity of 1,000 tonnes per day and contains a grinding and two flotation circuits: one for production of copper-silver-gold concentrate and one for production of zinc concentrate. The concentrates are shipped offsite for sale.

Based on the ongoing mining and beneficiation activities, the Bolívar Mine is considered an advanced property (i.e., property that is in production). This report is required to state Resources, Reserves, provide a mining method, define the current and future processing operations and to provide an economic analysis to bring the Project into compliance with the standards.

The initial production decision was not based on a feasibility study of Mineral Reserves demonstrating economic viability. There is an increased uncertainty and economic and technical risks of failure associated with this production decision. Production and economic variables may vary considerably, due to the absence of a complete and detailed site specific risk analysis. This PFS has been completed to state Mineral Reserves demonstrating economic viability.

1.3 Geology and Mineralization

The geologic setting of the Bolívar Mine is a volcano-sedimentary assemblage of Cretaceous age comprised of andesite and basalt flows and tuff, with interbedded greywacke, limestone, and shale beds. Two distinct periods of volcanic activity have been recognized: the Lower Volcanic Series (LVS), which is Upper Cretaceous to Lower Tertiary in age, and the Upper Volcanic Series (UVS), which is Upper Tertiary in age.

Rocks of the LVS include andesitic agglomerates, flows, and tuffs, which grade upward into a felsic volcanic assemblage. These rocks are intruded by intermediate to felsic plutonic bodies, including two generations of granodiorite intrusion, one at 85 Ma and a second at 45.3 Ma (Valencia-Moreno et al., 2006). The LVS is widely capped by continental rhyolitic and dacitic ignimbrites and tuffs of the UVS. These rocks dip generally to the east, and are cut by strike-slip faults, listric normal faults, and tensional fractures in the vicinity of the Bolívar Mine.

The rocks at the Bolívar Mine are a sequence of medium grained sandstones, shales, and limolites interbedded with andesitic flows and limey shales. These rocks are altered to dark gray fine-textured biotite hornfels and light green pyroxene hornfels, and occasionally these rocks are replaced as brown, microblastic, grossularitic skarn near intrusive contacts.

Structure at Bolívar is dominated by NNW trending, steeply northeast or southwest dipping fault and fracture zones.

Skarn mineralization in the Bolívar district is retrograde and strongly zoned. The general sequence from proximal to distal is characterized by: red-brown garnet to brown garnet with chalcopyrite±bornite±magnetite to green garnet±pyroxene with chalcopyrite±sphalerite to massive sulfide (sphalerite±chalcopyrite±galena) to marble with stylolites and other fluid escape structures.

The most extensive mineralization in Bolívar skarn is a discontinuous horizon of disseminated Cu – Fe (Fig 7-5), which is dominated by chalcopyrite and magnetite and hosted in a volcano-sedimentary protolith. There is a strong stratigraphic control on skarn mineralization. Magnesian skarn is developed from a dolomitic protolith and contains abundant magnetite as well as Mg silicate minerals such as olivine, phlogopite, and vesuvianite. Mineralization in carbonate rocks at Bolívar is similar to other Cu-Zn skarn deposits and is zoned relative to fluid flow channels, many of which are centered on igneous contacts, indicating that hydrothermal fluids flowed up along those contacts and subsequently out along faults, stratigraphic contacts, and zones of brecciation.

The most favorable target on the Bolívar property is the zone of continuous prograde skarn alteration along the Piedras Verdes Granodiorite contact. This skarn extends from the Bolívar Mine to the El Gallo and La Narizona Mines. There is a strong stratigraphic control on skarn mineralization. The abundant, but not quite massive, magnetite in the Mina de Fierro and El Gallo zones is due to dolomitic wall rocks rather than solely a proximal location (Reynolds, 2008).

1.4 Concept and Status of Exploration

Sierra Metals has conducted exploration activities at the Bolívar Mine since 2003. Exploration includes geologic mapping in the El Gallo, Increíble and Alta Ley areas which are located within the area of resource modeling, and in the La Narizona, La Montura, La Pequena and El Val areas, which are located outside the area of resource modeling.

To date, Gustavson has received diamond drill data for 683 drill holes located within the area of the underground mine workings and in the Bolívar III, Bolívar IV, Piedres Verdes, and El Gallo concessions to characterize the skarn-type Cu-Fe mineralization.

1.5 Mineral Resource Estimate

Table 1-1 shows the measured, indicated, and inferred mineral resources estimated within the Bolívar Mine, using data received by Gustavson as of April 5, 2012. Mineral resources are reported using a 0.66% copper equivalent (Cueq) cut-off.

In January 2013 it was decided that the potential for Resources containing gold should be investigated and where possible, added to the Resource report. The Resource model was re-run adding the existing gold information (as of April 1, 2012) and it was determined that there was sufficient data to report the gold additions in Gallo Superior and Inferior. This addition was done as an add-on to the October 15, 2013 Resource Report and the gold listed in Table 1-1 is not in the copper equivalent calculations. The model defines where there are Measured or Indicated blocks based on the copper equivalent calculation and the search distances. The gold within these reported Measured and Indicated blocks are assigned gold quantities and grades based on the additional Resource modeling.

Table 1-2 shows what portion of the total Measured and Indicated Resources above 0.66 Cueq cut-off are within each deposit. The re-run of the Resource model to include gold was only done for the Gallo Superior and Inferior because this is the focus of the mining activity for the next 10 to 11 years and they are the deposits that have sufficient data to model. There are no tonnes shown in Table 1-2 for Increible because all of the Increible Resources are classified as Inferred.

It is the opinion of Gustavson that additional drilling and data collection in the proper areas will not only help to move some of the Inferred Resources to a higher category, but may also improve the Resources for what is now referred to as Alto Ley.

The mineral resource statement for the Bolívar Mine was completed by Zachary J. Black, SME-RM, Gustavson Associate Resource Geologist and QP. This mineral resource estimate was prepared in accordance with NI 43-101 and CIM.

Table 1-1 Total Resources for the Bolívar Mine

Total Bolivar Measured Resources											
Cutoff	**Tonne**	**Copper Equivalent**		**Silver**		**Copper**		**Zinc**		**Gold**	
Cueq (%)	**(x 1000)**	**%**	**lbs. (x 1000)**	**gpt**	**oz. (x 1000)**	**%**	**lbs. (x 1000)**	**%**	**lbs. (x 1000)**	**gpt**	**oz. (x1000)**
1%	5,071	1.76%	196,808	29.7	4,845	1.09%	121,965	1.38%	154,750	0.3	30.8
0.85%	6,394	1.59%	223,658	26.4	5,431	1.00%	140,780	1.20%	169,658	0.3	37.5
0.75%	7,584	1.46%	244,605	24.2	5,891	0.93%	155,501	1.08%	181,048	0.3	43.6
0.66%	**8,847**	**1.35%**	**264,205**	**22.3**	**6,333**	**0.87%**	**169,423**	**0.98%**	**190,851**	**0.2**	**49.6**
0.55%	10,800	1.22%	290,252	19.9	6,917	0.79%	188,163	0.85%	203,091	0.2	58.3
0.45%	12,927	1.10%	313,629	17.8	7,410	0.72%	204,787	0.76%	215,594	0.2	65.5
0%	50,449	0.33%	369,959	5.4	8,748	0.22%	241,177	0.23%	255,600	0.1	80.3

Note: Gold grade is not included in copper equivalent calculation and is only estimated in El Gallo Superior and El Gallo Inferior.

Total Bolivar Indicated Resources											
Cutoff	**Tonne**	**Copper Equivalent**		**Silver**		**Copper**		**Zinc**		**Gold**	
Cueq (%)	**(x 1000)**	**%**	**lbs. (x 1000)**	**gpt**	**oz. (x 1000)**	**%**	**lbs. (x 1000)**	**%**	**lbs. (x 1000)**	**gpt**	**oz. (x1000)**
1%	2,627	1.65%	95,470	22.4	1,888	0.94%	54,248	1.28%	73,923	0.3	12.7
0.85%	3,898	1.41%	121,079	19.2	2,401	0.81%	69,412	1.26%	108,330	0.3	18.3
0.75%	5,075	1.27%	141,788	17.2	2,806	0.74%	82,669	1.15%	128,432	0.3	24.6
0.66%	**6,557**	**1.14%**	**164,706**	**15.6**	**3,285**	**0.67%**	**97,316**	**1.05%**	**151,389**	**0.2**	**30.8**
0.55%	9,190	0.99%	199,624	13.5	4,003	0.59%	120,449	0.89%	179,440	0.2	38.7
0.45%	12,611	0.85%	237,264	11.9	4,824	0.52%	145,938	0.75%	207,845	0.2	46.4
0%	84,934	0.17%	323,757	2.6	7,004	0.11%	200,752	0.13%	248,910	0.1	64.1

Note: Gold grade is not included in copper equivalent calculation and is only estimated in El Gallo Superior and El Gallo Inferior.

Total Bolivar Measured + Indicated Resources											
Cutoff	**Tonne**	**Copper Equivalent**		**Silver**		**Copper**		**Zinc**		**Gold**	
Cueq (%)	**(x 1000)**	**%**	**lbs. (x 1000)**	**gpt**	**oz. (x 1000)**	**%**	**lbs. (x 1000)**	**%**	**lbs. (x 1000)**	**gpt**	**oz. (x1000)**
1%	7,697	1.72%	292,279	27.2	6,733	1.04%	176,213	1.35%	228,673	0.3	43.6
0.85%	10,292	1.52%	344,738	23.7	7,832	0.93%	210,192	1.23%	277,987	0.3	55.8
0.75%	12,659	1.38%	386,393	21.4	8,697	0.85%	238,170	1.11%	309,480	0.3	68.2
0.66%	**15,404**	**1.26%**	**428,912**	**19.4**	**9,619**	**0.79%**	**266,739**	**1.01%**	**342,240**	**0.2**	**80.4**
0.55%	19,990	1.11%	489,876	17.0	10,920	0.70%	308,613	0.87%	382,530	0.2	97.0
0.45%	25,538	0.98%	550,893	14.9	12,234	0.62%	350,725	0.75%	423,440	0.2	111.9
0%	135,383	0.23%	693,716	3.6	15,752	0.15%	441,928	0.17%	504,510	0.1	144.5

Note: Gold grade is not included in copper equivalent calculation and is only estimated in El Gallo Superior and El Gallo Inferior.

Total Bolivar Inferred Resources											
Cutoff	**Tonne**	**Copper Equivalent**		**Silver**		**Copper**		**Zinc**		**Gold**	
Cueq (%)	**(x 1000)**	**%**	**lbs. (x 1000)**	**gpt**	**oz. (x 1000)**	**%**	**lbs. (x 1000)**	**%**	**lbs. (x 1000)**	**gpt**	**oz. (x1000)**
1%	1,924	1.91%	81,104	30.3	1,877	1.22%	50,610	1.38%	58,579	0.3	10.5
0.85%	3,824	1.42%	119,675	22.2	2,729	1.24%	74,558	1.12%	94,046	0.3	23.3
0.75%	5,035	1.27%	140,846	19.9	3,222	1.23%	87,390	1.05%	116,141	0.3	31.2
0.66%	**6,164**	**1.17%**	**158,434**	**18.1**	**3,590**	**1.26%**	**99,796**	**0.93%**	**126,582**	**0.3**	**38.1**
0.55%	7,772	1.05%	179,615	16.1	4,033	1.29%	114,431	0.81%	139,629	0.2	46.0
0.45%	9,120	0.97%	194,470	15.1	4,413	1.27%	124,009	0.74%	149,547	0.2	50.5
0%	133,426	0.10%	293,720	1.7	7,445	1.10%	180,858	0.08%	229,753	0.1	68.5

Note: Gold grade is not included in copper equivalent calculation and is only estimated in El Gallo Superior and El Gallo Inferior.

Table 1-2 Deposit with Tonnes and Grade

Zone	Tonnes	Ag (gpt)	Cu (%)	Zn (%)	Cueq (%)	Au (gpt)
El Gallo Superior	2,041,527	30.920	1.226	0.468	1.663	0.208
El Gallo Inferior	8,550,959	20.820	0.757	0.366	1.064	0.243
Increible	-	-	-	-	-	Not Modeled
Alta Ley	4,811,788	12.161	0.649	2.530	1.446	Not Modeled
Total	15,404,274	19.454	0.785	1.055	1.263	0.236

Note: CUEQ>0.66 AND M&I

Quality and grade are estimates and are rounded to reflect the fact that the resource estimate is an approximation.

Mineral reserves estimate was prepared separately. Mineral resources are not mineral reserves and do not demonstrate economic viability. There is no certainty that all or any part of the mineral resource will be converted to mineral reserves. The calculation of the mineral reserves is shown in other sections of this report.

The equations for copper equivalent and the estimated cut-off are presented below.

Equation 1-1 Equation for Copper Equivalent Cut-Off

$$Cueq(\%)Cutoff = \frac{Mine\ Cost + Process\ Cost}{Cu\ price\ * Cu\ recovery\ * 2204.6}$$

Values used for copper equivalent calculation are provided below:

- Mine Cost is $22.94.
- Process Cost is $19.57.

Cueq is the copper equivalent used to calculate the cutoff. The copper equivalent was calculated with the following equation:

Equation 1-2 Equation for Copper Equivalent

$$Cueq(\%) = Cu\,\% + \frac{Zn\,\% * Zn\ price\ * Zn\ recovery}{Cu\ price\ * Cu\ recovery} + \frac{Ag\ gpt * Ag\ Price\ * Ag\ recovery}{22.0462\ * Cu\ price\ * 31.10348 * Cu\ recovery}$$

Values used for copper equivalent calculation are provided below:

- Copper
  - $3.56 per pound
  - 82% recovery
- Zinc
  - $0.96 per pound
  - 81% recovery
- Silver
  - $26.28 per pound
  - 77% recovery.

Gustavson knows of no existing environmental, permitting, legal, socio-economic, marketing, political, or other factors that might materially affect the mineral resource estimate.

1.6 Mineral Reserve Statement

The mineral Reserve statement for the Bolívar Mine was completed by Karl D. Gurr, SME-RM, Gustavson Associate Resource Geologist and QP. This mineral Reserve estimate was prepared in accordance with NI 43-101 and CIM. The average grades and estimated prices and recoveries used in the metal equivalent calculations are given in section 1.5 of this report. Because the deposit is already in production, actual costs and recoveries were used in the reserve estimation, and Gustavson sees no potential for the reserve estimates to be materially affected by mining, metallurgical, infrastructure, permitting or other factors. The actual costs and recoveries used in the reserve estimations are given in section 22.2 of this report.

Gustavson's initial approach to estimating the Reserves was to study and verify the mine plans developed by the client and then independently estimate the Reserves. The client's mine plans did not incorporate all of the information on Resources that was presented in the October 15, 2012 Gustavson NI 43-101 Technical Report. Additionally, the dip of the deposit as shown within the block model was at a 33 degree angle and not the 24 degree angle used by the client. Therefore, it was then necessary for Gustavson to develop the mine planning and Reserve estimate directly from the updated Resource model completed during the Resource estimating dated October 15, 2012.

This report, mine plan and Reserve estimate are based on Gustavson's work and mine plan. The relationship of the four Resource areas, (Alto Ley, Increible, Gallo Superior and Gallo Inferior) as defined in Section 14 is shown in Table 1-2. The four areas were modeled as definitively different areas, but the Alto Ley may only be another area of the Upper Skarn. Current drilling shows that Alto Ley does not hold together well enough to apply a logical mining method. Also, Alto Ley has much higher zinc, but lower silver and copper than the other deposits. Increible has a lower grade, needs additional drilling, is an Inferred Resource, and has an issue with the local residents near the site. Therefore, the Reserve evaluation for the Prefeasibility Study focused on Gallo Superior and Gallo Inferior.

The Reserve calculations and mining schedule considered five separate areas:

1. Gallo Superior (the current mining areas),
2. Gallo Superior Magnetita,
3. Gallo Inferior Main Pod,
4. Gallo Inferior North Pod, and
5. Gallo Inferior Southeast Pod.

The reason for this separation is shown in Figures 15-2 and 15-4. Each of the five areas was then calculated for total insitu M+I above cut-off tonnes and a mine plan was developed for each of the areas. The exception to this was for Gallo Superior area that was considered in the Resource model to be either mined or sterilized and therefore no Reserves are listed for Gallo Superior. Gustavson understands that there is current mining in Gallo Superior that will add production within 2013, but with the information available, it is impossible to quantify the remaining volume.

The recovered tonnes, including dilution, for each area were then scheduled for production and the Reserves mined each year of the mine life are shown in Table 15-8. The total tonnes and grades shown in Table 1-3 constitute the Reserve Statement for the Bolivar Project as of the date of date of the PFS report.

Table 1-3 Combined Reserve Statement for the Bolivar Project with Effective Date December 31, 2012

RoM Tonnes + Diluted Grades	Tonnes	Ag gpt	Cu %	Zn %	Cueq % (no Au)	Au gpt
Waste External	0	0.00	0.00%	0.00%	0.00%	0.000
RoM - Proven	4,339,914	22.52	0.84%	0.19%	1.11%	0.223
RoM - Probable	3,116,893	15.35	0.65%	0.52%	0.95%	0.231
Waste Internal	102,002	14.56	0.62%	0.56%	0.91%	0.234
Total P+P	**7,456,806**	**19.52**	**0.76%**	**0.33%**	**1.04%**	**0.226**
Total P+P+Waste	7,558,808	19.45	0.76%	0.33%	1.04%	0.227

1.7 Mining Method

The El Gallo ore body consists of two sub-deposits, “El Gallo Superior” (Superior) and “El Gallo Inferior” (Inferior). Currently the Superior deposit is being mined by the room and pillar method. It is recommended that mining of the Superior be modified so that the mining layout for continuing production is in compliance with the November 2012 rock mechanics study, which defines the minimum pillar size to utilize. Current mining has shown that the hanging wall and foot wall consist of competent rock and strong formations, but the present system is leaving too little pillars and sterilizing some Resources. This also applies to mining of the Gallo Superior Magnetita Deposit as it is being developed.

The Inferior deposit, which at this time has not been mined, will require a modified room and pillar method of mining to accommodate the physical characteristics of the deposit.

Figure 16-1 shows the general arrangement of the ore body in plan view and Figure 16-2 shows a typical cross section of the deposit that also shows the dip of the deposit.

The room and pillar method of mining is a well-established method which allows great flexibility in production and roof support.

The Inferior deposit has been calculated to obtain a 50% extraction rate on advance with the total resource recovery at about 76-79% after the retreat mining is completed. The production rate for Superior deposit is expected to continue at 800 tpd per production heading until the deposit is completely mined during 2013.

The Inferior stopes will be mined at a rate of 615 tpd at each open face. New faces can be opened if necessary to accommodate the mill's 2,000 tpd capacity. The mine life for the Inferior deposit is approximately 10 years. A 5% dilution rate was used to provide RoM tonnages.

1.8 Recovery Methods

Sierra Metals Inc. requested preparation of this technical document of the Prefeasibility Study of the Bolívar Project mineral deposit. The company is in a unique situation because they have already built and are operating a concentrator which can process ± 1,000 mtpd of ore and are currently expanding the mill to a 2,000 mtpd capacity. The minerals of economic value currently being recovered are copper, silver, gold and zinc. The operating data for the last eight months of 2012 from the existing operation was reviewed in order to estimate the current recoveries and project the recoveries of metals in the future when the plant will be processing lower-grade material.

The metallurgical data for the plant operation for the last eight months of 2012 was reviewed. The following observations were noted for the operations:

- The plant feed was fairly consistent with average grades of 1.18% Cu and 24.6 g/t Ag.
- The lowest feed grade processed in the plant was 0.84% Cu and 6.8 g/t Ag. When the plant encountered low copper grades, the silver grade was generally high and vice versa.
- The average recoveries in the copper concentrate, assaying ± 25% Cu and 500 g/t Ag, were 83.6% for copper and 77.9% for silver.

- The zinc concentrate, assaying ± 54% Zn, recovered ± 80% of the zinc in the plant feed when the feed grade was over 2% Zn.
- The zinc concentrate recovery and grade dropped significantly when the feed grade dropped to ± 1%. The concentrate recovered 52% to 62% of zinc at a grade of 40% to 45% Zn.

Since the plant will be processing lower grade feed material in the future, recoveries were projected for varying copper and silver grades in the plant feed. Gold recoveries are held constant at 70%. These values are given in Table 17- 1. The feed grade of zinc is projected to be extremely variable and periodically very low in the future. Based on the historical data from the plant, the marketable-grade zinc concentrate will be difficult to produce.

1.9 Infrastructure

Existing project infrastructure is shown in the General Arrangement in Figure 18-1. As shown in Figure 18-1, the entire infrastructure is currently in place to support the current mine, mill, and employee housing. The distance of the plant from the other infrastructure components and also to include plans that were of a scale to allow proper review, a separate figure has been included to show the footprint of the plant and its location relative to the other facilities (Figure 18-2). A new mine man camp is currently being constructed closer to the mill and proposed portal of the El Gallo Mines. Additional power is currently being routed to the mill site to support the ongoing expansion of the processing facility to 2,000 tpd. Power distribution will also be supply electricity to the proposed adit facilities and access at the El Gallo Inferior.

A tailings disposal area has been constructed to hold all the tails produced from processing the ore. The tailings disposal site is located directly downhill from the mill. The tailing disposal area is being constructed in a modified method of using the fines to build the impoundment and sending the water to the back of the impoundment to evaporate or be pumped back to the mill. This method is similar to cycloning without the use of cyclones. The tails are then pushed up to the front of the facility and compacted by a dozer in order to increase the size of the impoundment.

Design of the tailings disposal area was provided to Gustavson in February 2013, which shows the final tailings dam height at 1,285 meters above sea level, with a southwesterly grade of 2-horizontal: 1-vertical slope, as shown on Figure 18-3. The approval documents for the tailings design from the Mexican Government have been reviewed by Gustavson and appear to be in order.

1.10 Capital and Operating Costs

The capital and operating costs are based on Sierra Metals actual capital and operating expenditures, projected budgets and Gustavson Associates estimates using in-house database information. The mine is currently in production with equipment similar and/or identical to the additional equipment required. The mill, also currently operating, underwent construction and expansion in the last 9 months providing actual data and budgeted data. Capital and operating costs are to be within +/- 25% at this Prefeasibility level of accuracy and capital costs contingencies are typically 15%. Gustavson has included a 10% contingency on the mining capital, based on recent mine acquisitions; 15% on process and infrastructure capital; and 0% on owner capital, as the owner capital is supplied from Sierra Metals operating data. The general operating inputs used for the capital and operating costs are shown in Table 1-4.

Table 1-4 General Operating Inputs

	Factor	Unit
Currency		
Peso to US$	12.892	
Operating Costs		
Power Cost - Energy	$0.120	$/kWh
Power Cost - Demand	$12.00	$/kW
Diesel Cost	$0.852	$/liter
Lube Cost	$2.145	$/liter
ANFO Cost (AN @ $1165/t), Caps, Etc.	$1.200	$/t
Material Parameters		
Bulk Density	3.27	g/cm3
Swell Factor	1.50	
Fill Factors	95%	%
Operating Parameters		
Days per Year	350	
Shifts per Day	2	
Hours per Shift	10	
Operator Availability	83%	
Mechanical Availability	85%	

The Project has a mining life of 10 years, with the mill operating through year 11 on RoM stockpiled material. Capital costs are US$43.0 million, with initial capital costs of US$7.0million and sustaining capital over the LoM of US$36.0 million. The LoM capital costs are presented in Table 1-5: Capital Cost Summary. It is important to understand that almost all of the front-end or initial capital costs are sunk costs that have already been paid.

Table 1-5 Capital Cost Summary

	Initial (000s)	Sustaining (000s)	LoM (000s)
Mining	$1,601	$9,620	$11,220
Process	$2,245	$8,097	$10,342
Infrastructure	$9	$0	$9
Owner	$3,148	$18,249	$21,397
Other	$0	$0	$0
Total Capital	**$7,002**	**$35,966**	**$42,968**

Project operating costs average US$32.16/t-milled. Gustavson estimated the mining costs based on the modified mine plan discussed in Section 16. Sierra Metals actual and budgeted labor, mining, process and general and administrative costs are incorporated within Gustavson's estimated costs.

The Project operating cost summary is presented in Table 1-6 Operating Cost Summary. The operating costs are based on the general operating parameters presented in Table 1-4 General Operating Inputs.

Table 1-6 Operating Cost Summary

	$/t-milled	LoM ($000s)
Mining	$16.04	$119,594
Process	$13.38	$99,783
G&A	$2.74	$20,418
Total Operating Cost	**$32.16**	**$239,795**

The details of the capital and operating costs are provided in detail in Section 21.

1.11 Economic Analysis

The economic results of this report are based upon work performed by Gustavson Associates. The results are prepared on an annual basis. All costs are in Q4 2012 US constant dollars. Sierra Metals actual costs were reviewed and incorporated into the economics as appropriate.

The economic model was prepared on an unleveraged, post-tax basis and the results are presented in this section. Key criteria used in the analysis are discussed in detail throughout this report. Economic assumptions are summarized in the Tables in Section 22.

This is a currently producing mine. The mine has reserves to operate 10 years and builds a RoM ore stockpile that feeds the mill into year 11. The mine production model parameters are shown in Table 1-7 Mine Production Summary.

Table 1-7 Mine Production Summary

Description	Value	units
Mine Production		
Waste	390	kt
Ore	7,457	kt
Total Material	**7,847**	**kt**
Daily Ore Capacity	2,131	tpd
RoM Grade		
Copper Equiv	1.119%	%
Copper	0.759%	%
Zinc	0.329%	%
Gold	0.226	gpt
Silver	19.519	gpt
Contained Metal		
Copper	124,815	klb
Zinc	54,133	klb
Gold	54	koz
Silver	4,680	koz

A producing mill exists adjacent to the mine. This mill is dedicated to treating mine ore. The mill operates 11 years on the stated mine reserves. The mill production model parameters are shown in Table 1-8 Mill Production Summary.

Table 1-8 Mill Production Summary

Description	Value	units
RoM Ore Milled	**7,457**	kt
Daily Capacity	1,500	tpd
Cu Flotation Circuit		
Mass Pull	2.48%	%
Moisture Content	8%	%
Concentrate Grade	25%	Copper
Recovery		
Copper	82%	%
Gold	70%	%
Silver	71%	%
Concentrate	**185**	**kt (dry)**
Copper	101,917	klb
Gold	38	koz
Silver	3,312	koz
Zn Flotation Circuit		
Mass Pull	0.40%	%
Moisture Content	7%	%
Concentrate Grade	43%	Zinc
Zn Recovery	52%	%
Concentrate	**30.0**	**kt (dry)**
Zinc	28,149	klb

The economic analysis results are shown in Table 1-9 Technical Economic Results. The economic analysis is based on market price assumptions for a 36 month trailing average of US$3.69/lb-Cu, US$0.95/lb-Zn, US$1,487/oz-Au, and US$28.80/oz-Ag. The analysis indicates a NPV $_{8\%}$ of US$91.7 million (after estimated taxes) with an incalculable IRR, as there is no initial negative cash flow. With a positive initial cash flow in Year 1, payback will be in less than 1 year. The following provides the basis for the Gustavson Associates LoM plan and economics:

- Proven + Probable Reserves;
- Mine life of 10years with RoM stockpiles to supply the mill an additional year;
- LoM mill recoveries of 81.7% Cu, 52.0% Zn, 70.0% Au, and 70.8% Ag;
- Operating costs of US$32.16/t-RoM or US$1.85/lb-Cueq
- Capital costs of US$43.0 million, with initial capital costs of US$7.0million and sustaining capital over the LoM of US$36.0million;
- Sierra Metals provided Year 1(2013) capital budget costs, mill expansion and mine equipment costs sunk;
- Mine closure costs estimated at US3.0 million (incl. in sustaining capital); and
- No salvage value provisions at end of life (EOL).

Table 1-9 Technical Economic Results

	Value	Units
Market Prices		
Copper	$3.69	/lb-Cu
Zinc	$0.95	/lb-Zn
Gold	$1,487.00	/oz-Au
Silver	$28.80	/oz-Ag
Estimate of Cash Flow (all values in $000s)		
Net Smelter Return (NSR)		$/t-conc
Copper Concentrate	$459,964	$2,487
Molybdenum Concentrate	$17,313	$576
NSR	**$477,277**	
Freight & Handling	($1,005)	
Gross Revenue	**$476,272**	
Royalty	$0	
Net Revenue	**$476,272**	
Operating Costs		$/t-ore
Mining	$119,594	$16.04
Processing	$99,783	$13.38
G&A	$20,418	$2.74
Total Operating	**$239,795**	**$32.16**
Operating Margin (EBITDA)	**$236,477**	
Initial Capital	$7,002	
LoM Sustaining Capital	$35,966	
Income Tax	$60,183	
Cash Flow Available for Debt Service	**$133,325**	
NPV 8%	**$91,665**	
IRR	**Init CF +**	

Note: Init CF +, there is no negative Year 1 cash flow to calculate an IRR

1.12 Conclusions

The production decision was not based on a feasibility study of Mineral Reserves demonstrating economic viability. There is an increased uncertainty and economic and technical risks of failure associated with this production decision. Production and economic variables may vary considerably, due to the absence of a complete and detailed site according to and in compliance with NI 43-101 Standards of Disclosure specific risk analysis.

The state of drill core/cuttings and storage/security conditions were inspected by Gustavson and found to be appropriate. Gustavson examined a core hole as compared to the interpreted geology and alteration from the drill hole log and the associated assay results. Geologic logging and assay sample interval selection procedures were found to be in accordance with industry best practices.

Gustavson examined the electronic drill hole database for completeness and accuracy. Collar survey records for each historic drill hole in the paper archives were compared to the electronic database with minimal errors found.

Gustavson conducted an independent audit of the Project database, including the exploration and drill hole data, and finds the quality of data collected to date adequate for use in estimating the mineral resources of the Bolívar Mine.

While on site, Gustavson discussed drilling procedures, sample collection, handling, and chain of custody procedures and compared them to documented practices. Gustavson deems Sierra Metals' stated drilling and sampling QA/QC program to be in-line with industry best practices.

Gustavson considers the drill hole data provided was sufficiently reliable to be adequate for the preparation of a resource estimate and is sufficient for the development of mine plans and the calculation of Reserves.

Gustavson considers the sample preparation, security, and analytical procedures employed by Sierra Metals to be acceptable according to industry standards and adequate for use in this mineral resource estimate.

A mining system was developed that suits the geometry of the deposits. This system was applied to the currently defined deposits to calculate the Reserves.

There are sufficient Reserves to allow mining in the Gallo Superior and Gallo Inferior for 10 years plus processing from a stockpile for an additional year for a total of 11 years. These Reserves have been scheduled using the selected mining method.

All RoM ore is shipped to the new and operating plant that is located approximately 5 km from the Gallo Mines. The plant operates at 1,000 tpd until the expansion to 2,000 tpd is complete in late June 2013. This plant has been processing the Gallo ore for 9 months in 2012 and the result of the ongoing plant operation was used to set the projections for the future.

All required infrastructure for the operation of the mines and plant has been constructed and is supporting the operations. A tailings facility is located downhill from the plant.

The economic results show an NPV of $91.7 million US Dollars with a production life of 11 years. The NPV may be improved when Sierra Metals considers the tax rates on a companywide calculation as opposed to the tax rates used in this economic model

Given the data and information presented in this report, Gustavson is of the opinion that Sierra Metals continue with their Project development and operations.

There exists an iron potential at Bolívar, further investigation is suggested.

1.13 Risks

The operation of mining and processing facilities has inherent risks by the nature of the industry. Gustavson is of the opinion that the site specific risks for the Bolivar operation are:

- The location of the operation and the surrounding environment.
- The geometry of the deposit requires a well-planned design of the mining method. Deviations from the mine plan could induce unsafe working conditions and cause Reserves to be sterilized that otherwise could be mined.
- The current operations leaves too small of pillars and the November 2012 rock mechanics study needs to be implemented and followed.
- Both the process plant and the tailings facility footprints are larger than the permits allow. This needs to be addressed by actual onsite survey data and the addition of the used area to the permits.
- The construction of the tailings facility has been approved by the Mexican Government, but there needs to be a continuous program to monitor the compaction of the dam and any movement of the dam.
- The mining operations need an update to their safety programs when increasing the production and during the development of the Inferior Mine.
- Increasing the production to 3,000 tpd from the 2,000 tpd used in this report will shorten the mine operation life.
- The environmental outstanding issues of reclamation of old drill roads and historical dumps as mentioned in Section 20.

1.14 Recommendations

The recommended work should be completed in two phases as follows:

Phase I

The 2013 drilling program should focus on adding Resources to Gallo Superior and to add Resources between the pods in Gallo Inferior. This will increase the life of Superior and hopefully provides information for the Inferior to be developed in a more continuous mine plan that should add Reserves.

All new drilling and sampling should also be assayed to determine the gold content.

The results of the 2013 drilling should be added to the Resource model database and a new Resource statement be developed that has gold as part of the new Resources.

Phase II

Once the Resource model is complete with the 2013 drilling data, then the Prefeasibility Study should be updated to add the new and additional Reserves.

A study should be done on the iron mining potential for the Bolivar deposits.

The tailings facility will need testing for compaction and a new design be completed for the additions to the facility.

The economics of increasing the production to 3,000 tpd should also be done as part of the update to the PFS. This may best be done as a trade-off study prior to the PFS update and then the best case utilized for the PFS update.

The operational data from the process plant should be studied by a specialist to determine if the overall yield of the contained metals can be improved.

The estimated costs for the recommendations are provided in Table 1-10.

Table 1-10 Estimated Recommendations Budget

Task	Additional Detail	Cost
Phase I		
Additional Drilling	1000 meters	$300,000
Phase II		
Process Plant Yield Improvement Study		$100,000
Tailings Dam Inspection & Tests		$150,000
Rock Mechanics and Ventilation for Inferior		$50,000
Iron Scoping Review		$75,000
Updated PFS w/3,000 tpd Trade-off		$400,000
Total		$1,075,000

2. INTRODUCTION (ITEM 2)

2.1 Terms of Reference and Purpose of the Report

Gustavson Associates, LLC (Gustavson) was commissioned initially by Dia Bras Mexico and after a recent name change to Sierra Metals Inc. (Sierra Metals) to prepare an independent Prefeasibility Study for the Bolívar Mine in southern Chihuahua, Mexico. Within this report there are figures that still refer to Dia Bras in that they were developed prior to the change of name, but the reference to Dia Bras and Sierra Metals are both correct during the timing of this report. The purpose of this report is to refine and expand upon the information that was presented in the Technical Report of the Mineral Resources, dated October 15, 2012. The 2012 report describes geology and mineral resources of the Bolívar Mine and documents the results of a new, independent review of existing geologic data and observations recorded during field reconnaissance as was reported in the October 15, 2012 NI 43-101 Report. This document is to summarize the findings within the Prefeasibility Study and provide NI43-101 Technical Report, this document, that is based on a mine plan and positive economic results.

Sierra Metals purchased the claims for the Bolívar Mine between 2003 and 2004, and has conducted mining activities at the Bolívar Mine since February 2005. In 2012, the monthly mining rate was approximately 23,300 tons per month from the El Gallo and Alta Ley Mines. Mined materials are transported to Sierra Metals' Piedras Verdes Mill. The mill has a capacity of 1,000 tonnes per day and contains a grinding and two flotation circuits: one for production of copper concentrate and one for production of zinc concentrate. The concentrates are shipped offsite for sale.

Based on the ongoing mining and beneficiation activities, the Bolívar Mine is considered an operating property. While the October 2012 Technical Report meets the NI 43-101 requirements for reporting resources, Sierra Metals commissioned Gustavson to prepare a compliant Prefeasibility Study, and this NI43-101 Technical Report is based on the results of the Prefeasibility Study.

The initial production decision was not based on a Feasibility Study of Mineral Reserves demonstrating economic viability. There is an increased uncertainty and economic and technical risks of failure associated with this production decision.

The October 15, 2012 report was prepared to comply with public-reporting obligations for Mineral Projects, and Definition Standards for Mineral Resources and Mineral Reserves according to the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) for reporting following a press release for updated resources dated August 30, 2012. The mineral resource estimate and interpretations and conclusions reported here are based on technical data available prior to April 5, 2012. The PFS includes data and information through the effective date of this report - December 31, 2012.

2.2 Qualified Persons

Mr. Donald Hulse, P.E., SME-RM, V.P. and Principal Mining Engineer for Gustavson, is a Qualified Person as defined by NI 43-101. Mr. Hulse acted as project director and client contact during preparation of this report and is specifically responsible for report Sections 1 through 12 and 23 through 28, and for the overall content and organization of the report.

Mr. Zachary J. Black, SME-RM, Associate Geological Engineer for Gustavson, is a Qualified Person as defined by NI 43-101. Mr. Black acted as project geologist during preparation of this report and is specifically responsible for report Section 14.

Mr. Karl Gurr, SME-RM, Associate Principal Mining Engineer, is a Qualified Person as defined by NI 43-101. Mr. Gurr Acted as the project manager during the preparation of this report and is responsible for Sections 15, 16, 18-22 and is also responsible for the overall organization and content of this document.

Mr. Deepak Malhotra, PhD, SME-RM, President of Resource Development, Inc. (RDi) is a Qualified Person as defined by NI 43-101. Mr. Malhotra is specifically responsible for report Sections 13 and 17.

2.3 Site Visit of Qualified Person

Mr. Hulse visited the Bolívar Mine site March 20-22, 2012 for three days. Gustavson conducted general geologic field reconnaissance and visually inspected the condition of several historic collar markers. The state of drill core/cuttings and storage/security conditions were also inspected.

A second site visit was made by the mining engineers October 8-12, 2012. Mr. Karl Gurr and Mr. Nick Sheremeta, Senior Engineer, of Gustavson, were given a complete tour of the existing mines and most specifically Gallo Superior on October 9, 2012. On October 10 the process plan and the entire infrastructure was visited to include the water supply dam, the new road to Gallo Inferior, all shops, the tailings dam, the new camp and the existing offices and camp. Gustavson was also able to review the mine planning documents and requested and were provided with most of the material that forms the basis of this report. Subsequence meeting for the Project were held in the Chihuahua City offices in December 2012 and January 2013.

2.4 Sources of Information

The information, opinions, conclusions, and estimates presented in this report are based on the following:

- Information and technical data provided by Sierra Metals and their Mexican subsidiary;
- Review and assessment of previous investigations;

- Assumptions, conditions, and qualifications as set forth in the report;
- Review and assessment of data, reports, and conclusions from other consulting organizations; and
- The references listed in Section 25.

These sources of information are presented throughout this report and in Section 28 – References. In addition, Sierra Metals provided much of the information presented in Sections 4 through 13, and 23. The qualified persons are unaware of any material technical data other than that presented by Sierra Metals.

2.5 Units of Measure

Units in this report are metric and tonnage figures are dry, metric tons, unless otherwise indicated. Precious metal content is reported in grams of metal per metric ton (gpt or g/t) and reference to base metal content is reported in parts per million (ppm) or percent (%). Monetary considerations are reported in US dollars unless otherwise stated. Exceptions are the Resource Statement, Reserve Statement, Processing and Economics were it is necessary to present some values in US Standard Measures to define units consistent with the sales products of the copper, silver, zinc and gold.

3. RELIANCE ON OTHER EXPERTS (ITEM 3)

During preparation of this report, Gustavson relied in good faith on information provided by Mr. Armando Alexandri, past Director General, Mr. Serigo Ramires Pineda, current Director General, Mr. Hector Salas, past Director of Geology-Exploration, and Mr. Javier Bahena Geologist on property ownership, (Sections 4.2 and 4.3) and environmental information (Section 20). Mr. Luis Ponce Fernandes, the Mine General Manager and various members of the mining staff were the main source of information for the second site visit. The second site visit was coordinated by Martin Sanchez Estrada, who also provided information on the plant and tailings dam. Tomas E. Sanchez R. the superintendent of the process plant led the plant tour and provided the process information. Gustavson did not independently verify the status of the property ownership or mineral tenure, and is unaware of any material technical data other than that provided by Sierra Metals. It is important to remember that Bolívar is an active mine with current construction projects that would be stopped if they were not in compliance with all Mexican regulations.

4. PROPERTY DESCRIPTION AND LOCATION (ITEM 4)

Sierra Metals, through its Mexican subsidiary, has owned and operated the Bolívar Mine since December 2003.

4.1 Location

The Bolívar property is located in the municipality of Urique, approximately 255 km southwest of Chihuahua, Chihuahua, and roughly 1,250 km northwest of Mexico City (Figure 4-1). The Project area is situated in the rugged mountainous terrain of the Sierra Madre Occidental (INEGI, 2012), bounded to the by Copper Canyon, located 50 km north and east of the Bolívar Mine, the El Fuerte River, located 18 km south of the Bolívar property, and the villages of Piedras Verdes, 1.5 km north of the Bolívar Mine, and Cieneguita, Chihuahua, located 7.5 km north and west of the Bolívar Mine. The geographic center of the property is located at approximately 27° 05’ N Latitude and 107° 59’ W Longitude.

Source: Roscoe Postle, 2005

Figure 4-1 Location Map

4.2 Mineral Tenure, Agreements, and Exploration Permits

4.2.1 Mineral Rights and Agreements

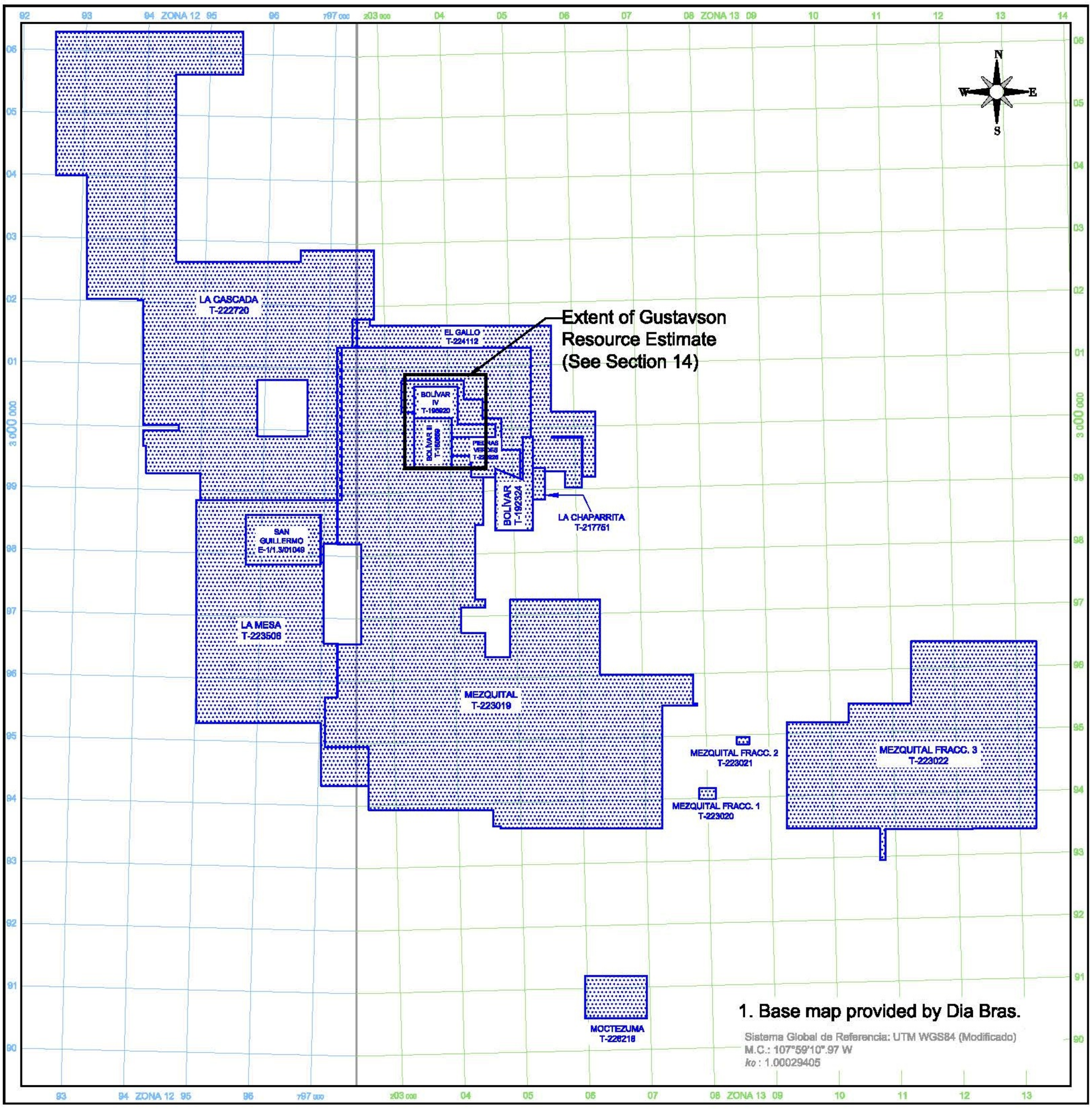
Information regarding agreements, rights, and titles was provided by the Sierra Metals Legal Department. Sierra Metals wholly holds “Titulo de Concession Minera” rights for exploration and mining to 14 mineral concessions in the Project area as listed in Table 4-1. Locations of the claims for the Bolívar Mine are shown on Figure 4-2. A site map showing the main features for the mining and processing operations is shown on Figure 4-3.

Sierra Metals holds an agreement for surface rights for exploration and mining with the Piedras Verdes Ejido, the village where the Bolívar Mine is located.

Production from the Bolívar Mine is not subject to any royalties; however, the concessions are subject to a Federal Taxes of approximately 36.50 Mexican Pesos per hectare to the Mexican Government.

Table 4-1 Concessions for the Bolívar Mine

Claim Name	Surface Area (Hectares)	File Number	Title Number	Expiration Date
La Cascada	1,944.33	016/32259	222720	2054-08-26
Bolívar III	48.00	321.1/1-64	180659	2037-07-13
Bolívar IV	50.00	321.1/1-118	195920	2042-09-22
Piedras Verdes	92.47	016/31958	220925	2053-10-27
Mezquital	2,475.41	016/32157	223019	2054-10-04
Mezquital Fracc. 1	4.73	016/32157	223020	2054-10-04
Mezquital Fracc. 2	2.43	016/32157	223021	2054-10-04
Mezquital Fracc. 3	974.57	016/32157	223022	2054-10-04
El Gallo	251.80	016/32514	224112	2055-04-07
Bolívar	63.56	321.1/1-100	192324	2041-12-18
La Chaparrita	10.00	1/1.3/00882	217751	2052-08-12
La Mesa	718.95	016/32556	223506	2055-01-11
Moctezuma	67.43	1/1/01432	226218	2055-01-12
San Guillermo	96.00	099/02161	196862	In Process
TOTAL	**6,799.69**			



Note: Claims for the Sierra Metals Bolívar Mine are shown on UTM WGS84 coordinates system.
Source: Sierra Metals, 2012

Figure 4-2 Concession Map of Bolívar Mine

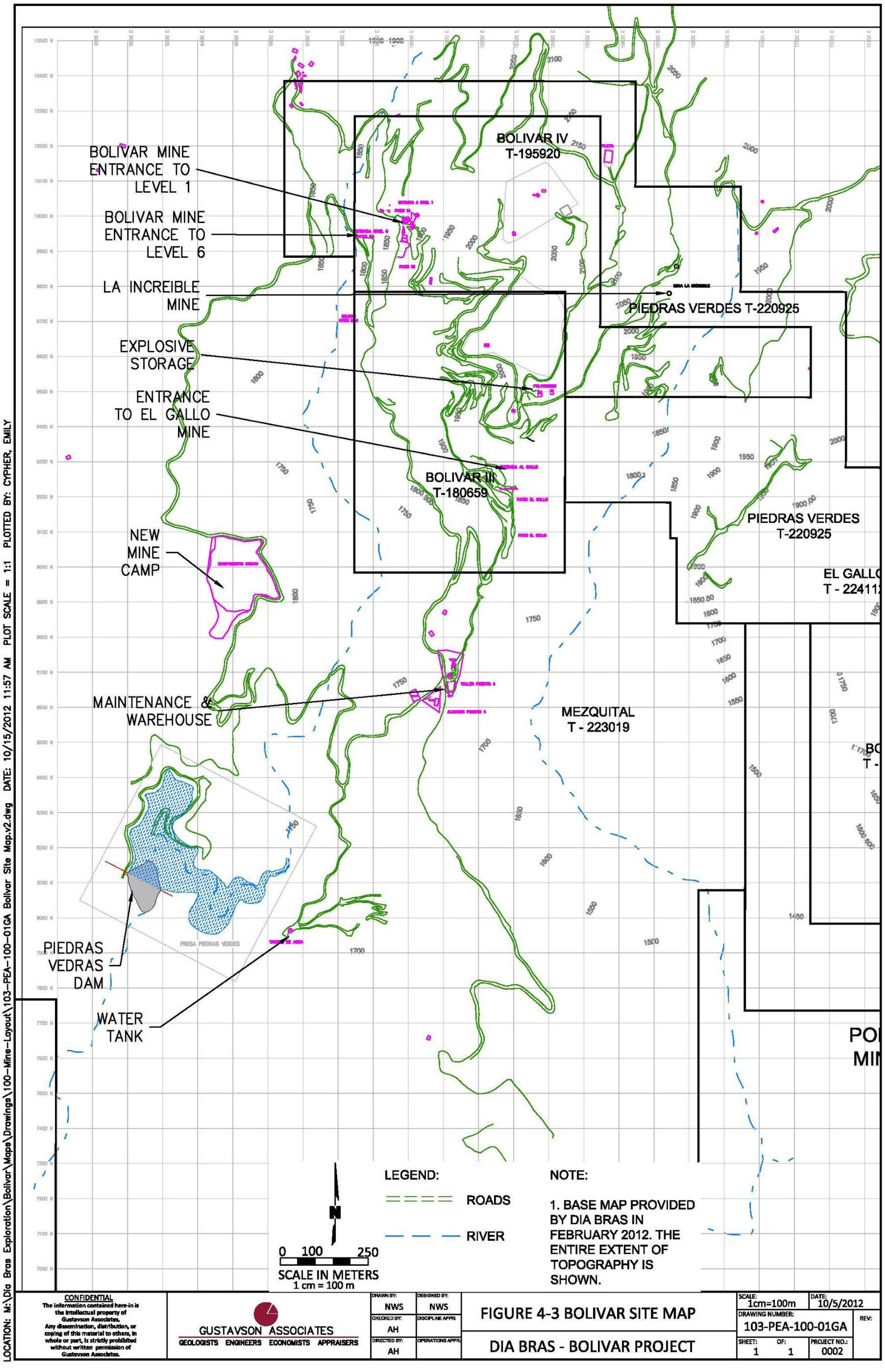


Figure 4-3 Bolívar Site Map

4.3 Purchase Agreements for Mineral Concessions

The concessions listed in Table 4-1 are presented in more detail in this section.

4.3.1 La Cascada

On August 2004, Dia Bras entered into an Option to Purchase Agreement with Polo y Ron Minerales, S.A. de C.V. to acquire the La Cascada claim for $10,000.

4.3.2 Bolívar III and Bolívar IV

In 2004, Dia Bras purchased from Minera Senda de Plata, SA de CV, 50% of all the rights of Bolívar III and IV. On October 2, 2007, the remaining 50% was purchased from Mr. Javier Octavio Bencomo Munoz and his wife Carmen Beatriz Chavez Marquez. Dia Bras Mexicana stands as owner of all rights to the lots listed. Currently, there is an ongoing litigation brought by an individual who claims to be the owner of the aforementioned lots purchased on October 2, 2007; which is in process getting resolved.

4.3.3 Piedras Verdes

In December 2007, Dia Bras entered into an Option to Purchase Agreement with Mr. Raul Tarín Melendez and Mrs. María Francisca Carrasco Valdez to purchase the Piedras Verdes concession for $200,000.

4.3.4 Mezquital, Mezquital Fracción 1 through 3, and El Gallo

On November 2005, Dia Bras entered into an Option to Purchase Agreement with Polo y Ron Minerales, S.A. de C.V. to acquire the Mezquital, Mezquital Fracción 1, Mezquital Fracción 2, Mezquital Fracción 3, and El Gallo concessions for $5,000.

4.3.5 Bolívar

In January 2008, Dia Bras entered into a purchase agreement with Marina Fernandez regarding the Bolívar property for $85,000 paid between 2008 and 2009.

4.3.6 La Chaparrita

In January 29, 2008, Dia Bras entered into an Option to Purchase Agreement with Mr. Jesús Fernández Loya on behalf of Minera Senda de Plata S.A. de C.V. to purchase the La Chaparrita concession for $85,000.

4.3.7 La Mesa

In January 2005, Dia Bras staked the La Mesa claim, at Dirección General de Minas, México.

4.3.8 Moctezuma

In November 2010, Dia Bras entered into an Option to Purchase Agreement with Mr. Juan Orduño García, Mr. Jesús Manuel Chávez González, and Mr. Armando Solano Montes to purchase the Moctezuma concession. The terms of the agreement included a total cash payment of MX$3,500,000 (Mexican Pesos).

4.3.9 San Guillermo

In October 2011, Dia Bras entered into a purchase agreement with Minera Potosi Silver a sister company of Minera Piedras Verdes del Norte, S.A. de C.V. for the San Guillermo for MX$464,000.

4.4 Legal Contingencies

4.4.1 Bolivar III and IV Law Suit

In 2009, a personal action was filed in Mexico against one of the Company's subsidiaries, Dia Bras Mexicana S.A. de C.V. (DBM), by an individual, Ambrosio Bencomo Muñoz as administrator of the intestate succession of Ambrosio Bencomo Casavantes y Jesus Jose Bencomo Muñoz, claiming the annulment and revocation of the purchase agreement of two mining concessions, Bolívar III and IV between Minera Senda de Plata S.A. de C.V. and Ambrosio Bencomo Casavantes, and with this, the nullity of purchase agreement between DBM and Minera Senda de Plata S.A. de C.V.

In June 2011, the Sixth Civil Court of Chihuahua, Mexico, ruled that the claim was unfounded and dismissed the case, the plaintiff appealed to the State Court ruling. The process is in the appealing court. The Company will continue to vigorously defend this action and is confident that such claim is of no merit.

4.4.2 Polo y Ron Law Suit

In October 2009, Polo y Ron Minerals, S.A. de C.V. ("P&R") sued the Company and one of its subsidiaries, Dia Bras Mexicana S.A. de C.V. P&R claimed damages for the cancelation of an option agreement (the "Option Agreement") regarding the San Jose properties in Chihuahua, Mexico (the "San Jose Properties"). The Company believes that it has complied with all of its obligations pertaining to the Option Agreement.

In October 2011, the 8th Civil Court of the Judicial District of Morelos in Chihuahua issued a resolution that absolved the Company from the claims brought against it by P&R on the basis that P&R did not provide evidence to support any of its claims. P&R appealed this resolution to the State Court, which overruled the previous resolution and ordered the Company to: (i) transfer to P&R 17 mining concessions from the Company's Bolivar project, including the mining concessions where mine operations are located; and (ii) pay US$422,674 to P&R.

In February 2013, a Federal Court in the State of Chihuahua has granted the Company a temporary suspension of the adverse resolution issued by the State Court of Chihuahua, Mexico. A final verdict by the Federal Court is pending. The Company will continue to vigorously defend this claim by applying the proper legal resources necessary to defend its position. Sierra Metals continues to believe that the original claim is without merit.

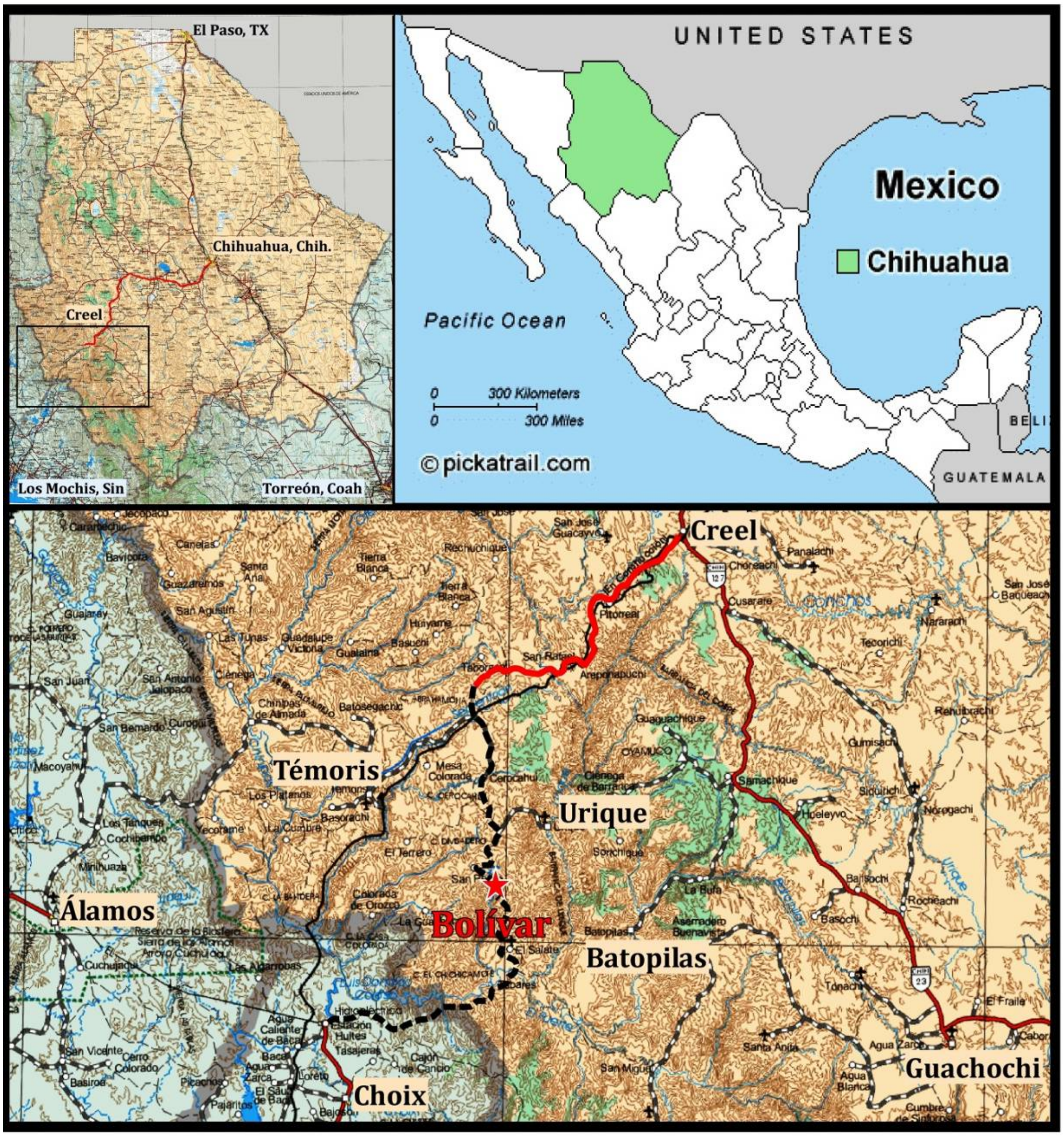
The San Jose Properties are not located in any areas where Dia Bras Mexicana, S.A. de C.V currently operates, nor are these properties included in any resource estimates of the Company.

Environmental liabilities and permitting is discussed in Section 20 – Environmental Studies, Permitting and Social or Community Impact.

5. ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY (ITEM 5)

5.1 Accessibility, Infrastructure, and Local Resources

Access to the Bolívar Mine is located approximately 397 km from Chihuahua City, consisting of 325 km along paved roads 70 km by all-season gravel roads to Piedras Verdes village, then 2 km north of the Bolívar Mine. A regional map showing the Bolívar Mine is provided in Figure 5-1.



Source: INEGI, 2012

Figure 5-1 Access Map, Bolívar Property

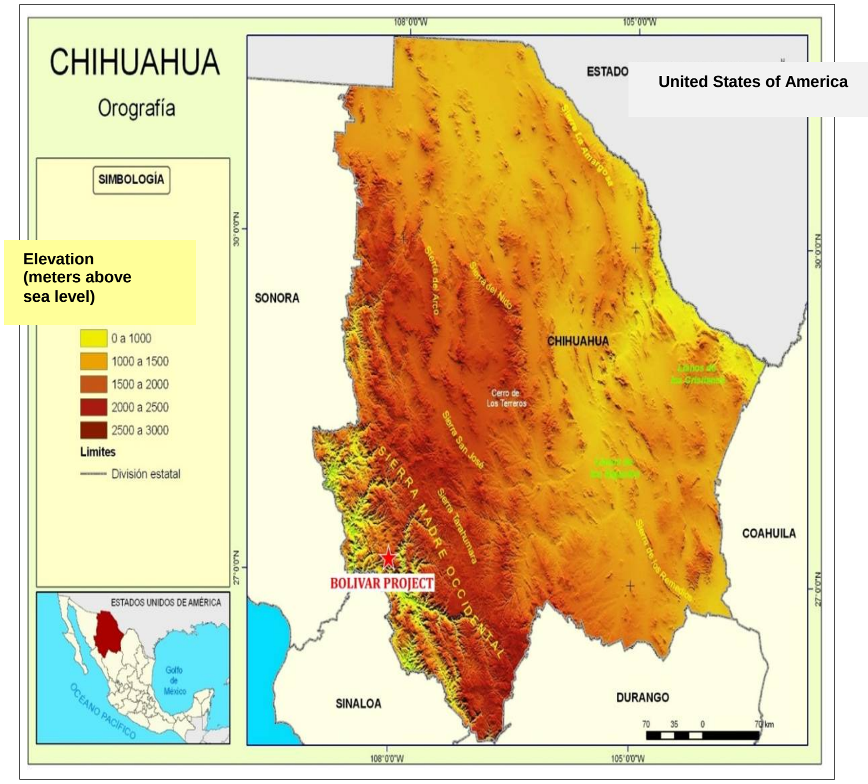
Sierra Metals obtains electricity from the Mexico main grid system with back-up generators at the Bolívar Mine operations. The villages of Piedras Verdes and Cieneguita are located close to the Bolívar mineral concessions, with a combined population of approximately 1,000 people (approximately 750 for Cieneguita and 250 for Piedras Verdes), including some of the mine employees. Company vehicles provide transportation to the Bolívar Mine.

Industrial water is obtained from the Piedras Verdes Dam, a reservoir that is owned and operated by Sierra Metals. The reservoir drains to the El Fuerte River, located approximately 2 km south of the Bolívar Mine. According to Sierra Metals, water from the Piedras Verdes Dam is sufficient to supply mine operations, exploration, and mill requirements. Potable water is available from local sources, and according to Sierra Metals, is sufficient for mining operations.

The surface rights are sufficient for mining operations, inclusive of waste disposal and plant site.

5.2 Topography, Elevation, Vegetation, and Climate

The Bolívar Mine is located within the Sierra Madre Occidental mountain chain. Local topography is rugged, with elevation ranging from 600 to 2,100 m above mean sea level, as shown on Figure 5-2.



Source: INEGI, 2012

Figure 5-2 Physiographic Map

Outcrops are common in the Project area along road cuts and creeks. Overburden thickness ranges from 1 to 3 m with an average thickness of approximately 1.5 m. The overburden consists of unconsolidated conglomerate with pebbles and boulders of volcanic rocks in a matrix of sand and minor clay. A layer of recent volcanic ash also comprises a portion of the overburden.

Vegetative cover at the Project area consists of oak and eucalyptus trees at low elevations and pine trees at higher elevations. The land around the property is used for agriculture. The villages in the area use the land to raise cattle rather than to grow crops. Wildlife in the area includes various species of insects, lizards, snakes, birds, and small mammals.

The climate in western Chihuahua is semi-arid, with a hot season from May through November and a milder season from December through to April. The mean annual temperature is 25° C and average annual precipitation is approximately 758 mm. The region experiences a relatively rainy season from June to October, with a rate of precipitation ranging from 83 mm to 188 mm, and a relatively dry season, with an average monthly precipitation of approximately 26 mm, during the rest of the year. In the past, the Bolívar Mine has operated year-round and operations were not limited by the normal seasonal climatic variations.

Infrastructure and local resources are discussed in Section 18 – Infrastructure.

6. HISTORY (ITEM 6)

6.1 Ownership

Previous owner and acquisition dates of the mineral concessions are shown in Table 6-1.

Table 6-1 Ownership History of Mineral Concessions

Claim Name	Previous Owner	Acquired
La Cascada	Polo y Ron Minerales, S.A. de C.V.	August 10, 2004
Bolívar III	Javier Bencomo Muñoz	September 14, 2004
Bolívar IV	Javier Bencomo Muñoz	September 14, 2004
Piedras Verdes	Raúl Tarín Meléndez	December 11, 2007
Mezquital	Polo y Ron Minerales, S.A. de C.V.	November 11, 2005
Mezquital Fracc. 1	Polo y Ron Minerales, S.A. de C.V.	November 11, 2005
Mezquital Fracc. 2	Polo y Ron Minerales, S.A. de C.V.	November 11, 2005
Mezquital Fracc. 3	Polo y Ron Minerales, S.A. de C.V.	November 11, 2005
El Gallo	Polo y Ron Minerales, S.A. de C.V.	November 11, 2005
Bolívar	Minera Senda de Plata, S.A. de C.V.	January 29, 2008
La Chaparrita	Minera Senda de Plata, S.A. de C.V.	January 29, 2008
La Mesa	Sierra Metals staked claim concession from Dirección General de Minas	January 12, 2005
Moctezuma	Juan Orduño García /Jesús Chávez González / Armando Solano Montes	November 5, 2010
San Guillermo	Minera Piedras Verdes del Norte, S.A. de C.V.	October 4, 2011

6.2 Historical Exploration

Minera Frisco conducted a mapping and exploratory drilling program from 1968 to 1970 for porphyry copper at Piedras Verdes District. In 1992, the Consejo de Recursos Minerales (Mexican Geological Service) completed a single visit for Minera Senda de Plata. No documentation for these historical exploration activities has been identified.

6.3 Historical Resource and Reserve Estimates

No resource or reserve estimates completed by former owners or operators of the Bolívar Mine are known to exist.

6.4 Historical Production

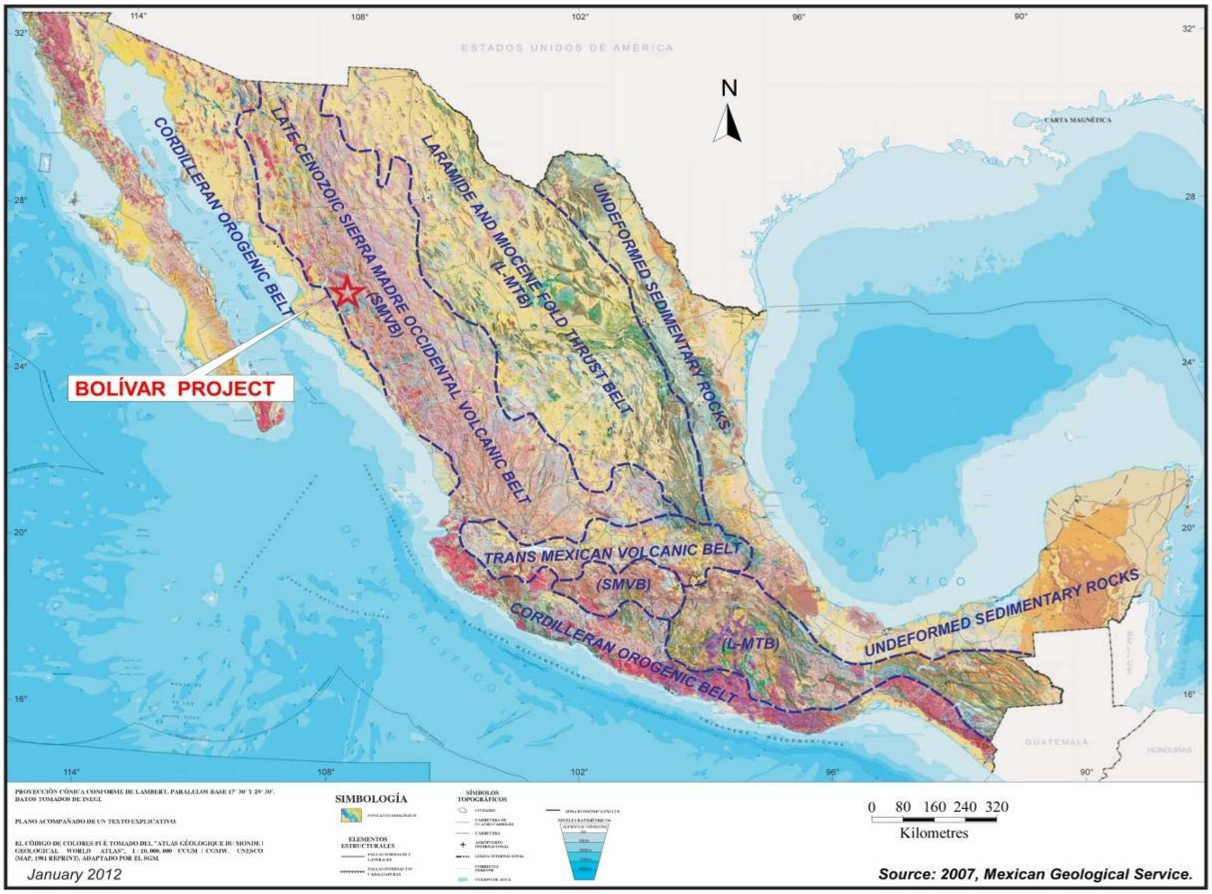
Small scale mining was conducted in the Piedras Verdes district during the Spanish Colonial days, but historical records of production were not maintained and production values are unknown.

An estimated 300,000 tonnes of mineralized material was reportedly mined from 1998 to 2000, while the Bolívar Mine was under the control of Bencomo Family, but production records for this period are not available (De la Fuente, et. al., 1992).

7. GEOLOGICAL SETTING AND MINERALIZATION (ITEMS 7)

7.1 Regional Geology

The Piedras Verdes mining district lies within the Sierra Madres Occidental Volcanic Belt of northwestern Mexico. Regional geology is characterized by a Cretaceous volcano-sedimentary series, which represents two distinct periods of volcanic activity: the Lower Volcanic Series (LVS) and Upper Volcanic Series (UVS). The LVS is composed of andesitic and basaltic flows and tuffs intercalated by greywacke, limestone, and shale horizons. These rocks are widely capped by continental rhyolitic and dacitic ignimbrites and tuffs of the UVS, and are intruded by intermediate to felsic plutonic bodies which also intrude the deformed basement rocks of the underlying Guerrero terrane.



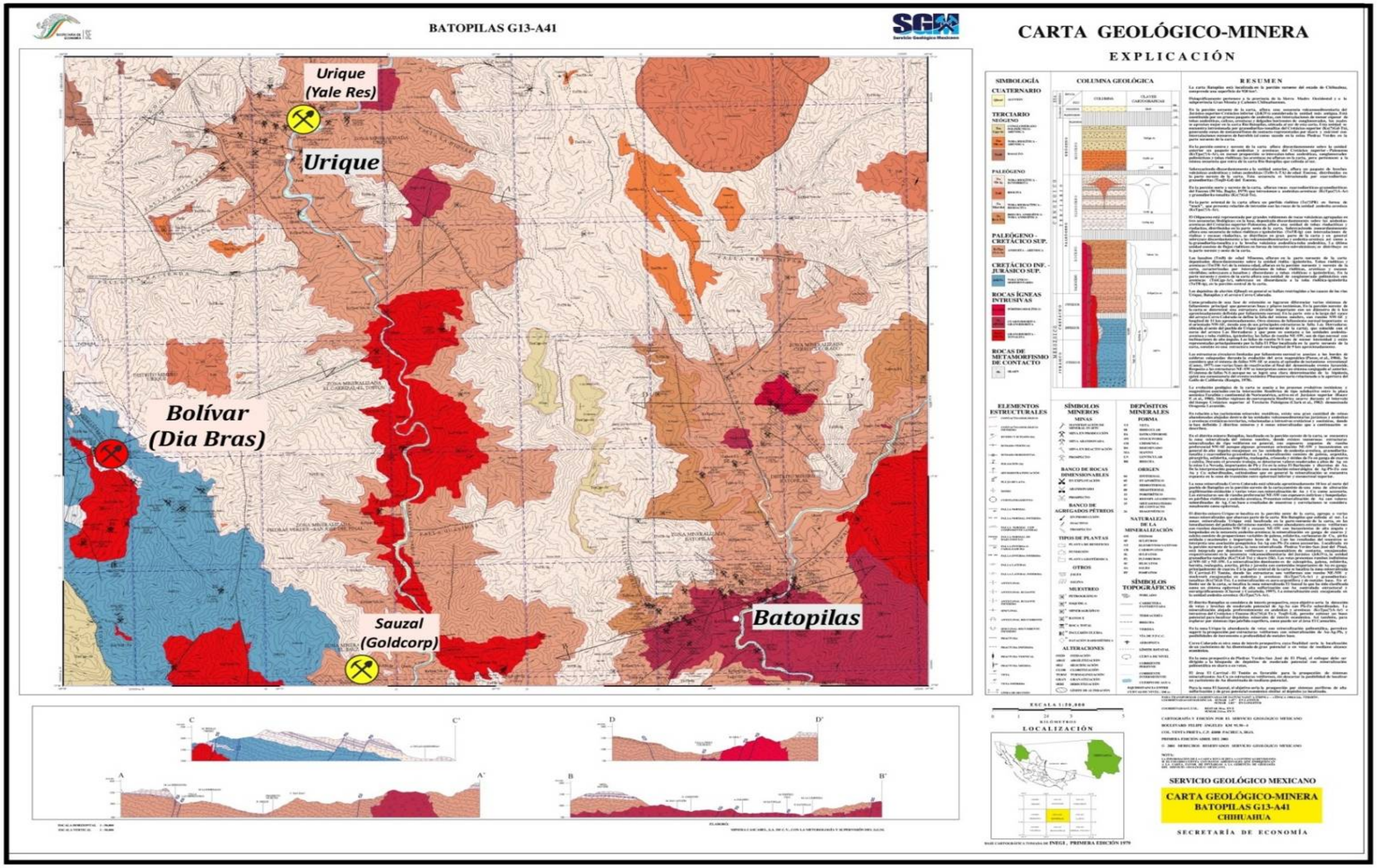
Source: Mexican Geological Service, 2007

Figure 7-1 Geological Map of Mexico

The rhyolitic and dacitic rocks of the UVS are Middle Tertiary in age, deposited between 30 and 26 Ma (Wilkerson et al, 1988). The LVS is Upper Cretaceous to Lower Tertiary Age (80-90 to 40-50 Ma) (Wilkerson et al, 1988), and includes a variety of intrusive and extrusive rocks, but is generally dominated by andesitic agglomerates, flows, and tuffs grading upward into a felsic volcanic assemblage. The overall thickness of the LVS is about 750 m in the vicinity of the Bolívar Mine, though the contact between the Cretaceous basement and the LVS is not clearly defined (Exploration Department, Sierra Metals Exploration, 2012).

Two generations of granodiorite intrusions are recognized, one at 85.0 Ma and a second at 45.3 Ma (Valencia-Moreno et al., 2006). Intrusions of quartz diorite were emplaced between 47.9 Ma and 28.3 Ma (Wilkerson et al., 1988). A 40 km wide linear belt of these intrusive bodies is exposed in windows throughout the State of Chihuahua (Consejo de Recursos Minerales, 1994). The rocks are relatively fresh but zones of alteration including hornfels, marbles, and skarns occur along the margins of some of the intrusive bodies.

Although the layered rocks of the UVS tilt roughly 30° to the northeast, strata in the Project area are generally undeformed with the exception of strike-slip faults, listric normal faults, and tensional fractures. All lithologic units are strongly faulted, but stratigraphic displacements along faults do not exceed 200 m (Servicio Geológico Mexicano, 2001). Most of the fractures, dikes, and veins of the region strike between N35°E and N30°W (Figure 7-2).

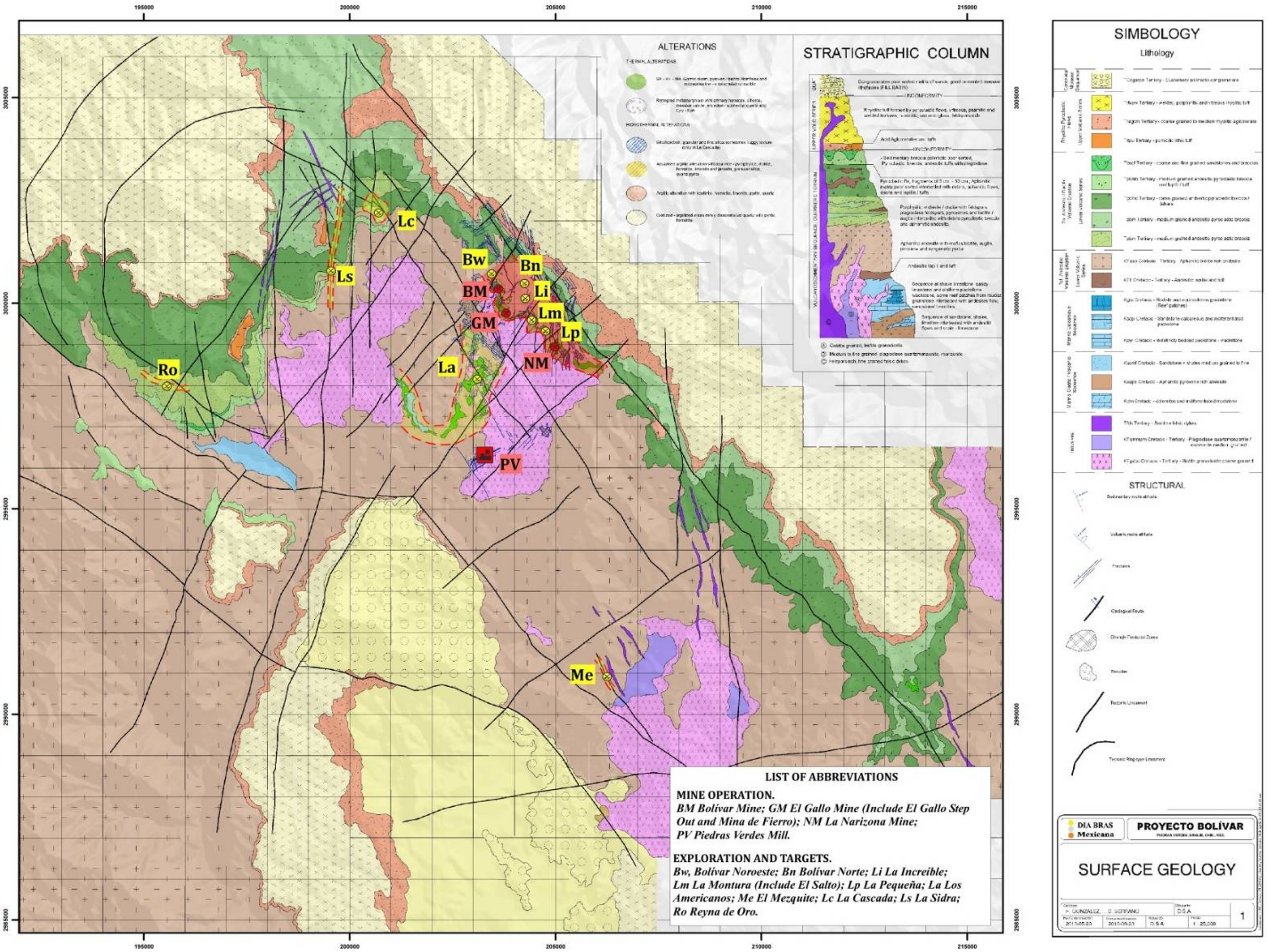


Source: Mexican Geological Service, 2007

Figure 7-2 Geological Map of Urique Area

7.2 Local Geology

Information provided by Sierra Metals (2012) indicates that the property is overlain by a >500 m sequence of tuff and rhyolite of the UVS. Mineralized trends are related to a granitic-granodioritic intrusion of the volcano-sedimentary rocks of the underlying LVS (Braun 2007). The site specific geology for Bolívar is shown in Figure 7-3.



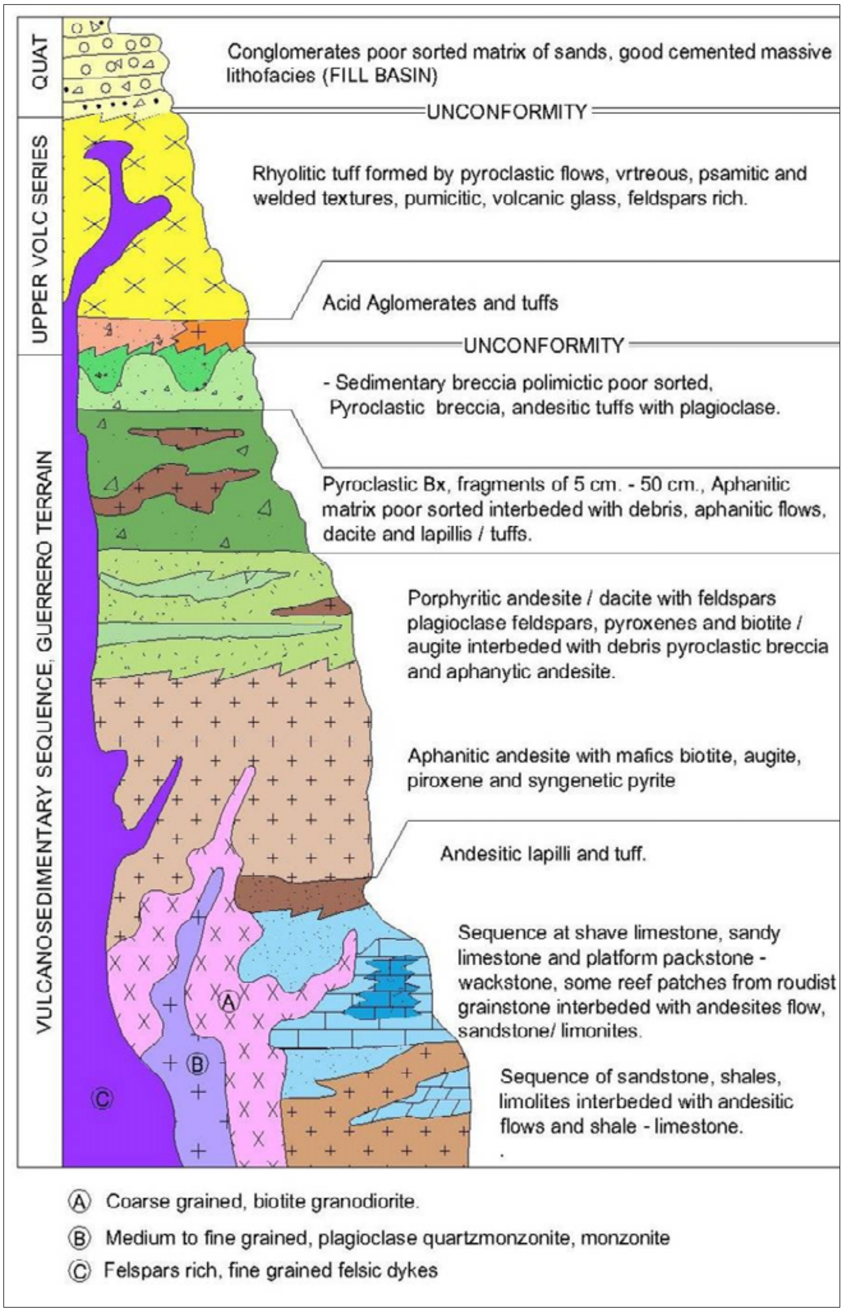
Source: Sierra Metals, 2012

Figure 7-3 Geological Map of Bolívar Area

The rocks at Bolívar Mine are a sequence of medium grained sandstones, shales, and limolites interbedded with andesitic flows and limey shales (Figure 7-4 Stratigraphic Column). These rocks are altered to dark gray fine-textured biotite hornfels and light green pyroxene hornfels, and occasionally these rocks are replaced as brown, microblastic, grossularitic skarn near intrusive contacts (Meinert 2007).

Limestone at the Bolívar Mine is part of the Guerrero terrane, and is typically light gray in color and ranges in composition from wackestone to fossiliferous grainstone with occasional chert. In places, the limestone is altered to cryptocrystalline marble containing wollastonite with pyroxene hornfels, or skarn rich in andradite, more so than grossularite.

Overlying the limestone, are dark gray to brown andesitic flows, lapilli tuffs, and tuffs rich in mafic minerals such as augite, biotite, and pyroxene, which are also part of the Guerrero volcano-sedimentary sequence. Alteration of the mafic minerals accounts for the presence of chlorite, epidote, and disseminated pyrite.



Source: Sierra Metals, 2012

Figure 7-4 Stratigraphic Column

Near the intrusive contact, andesite is replaced by light brown skarn, with dark grey to honey colored garnets (grossularite>andradite), and actinolite, subhedral quartz and hematite, and dark grey pyroxene hornfels.

With respect to the intrusive sequence, the following paragraphs are extracted (with minor modifications) from Meinert el al. (2008), a consultant to Sierra Metals.

The Piedras Verde Granodiorite and related dikes and sills exhibit many textural variations. All are somewhat porphyritic but none are true porphyry with bimodal grain size distribution and a very fine grained groundmass. Five samples were analyzed by Chemex Labs in Vancouver, B.C. Samples were analyzed for major and minor elements by XRF. REE were analyzed by ICP-MS and ferrous Fe was analyzed by wet chemistry (trituration).

The five textural variants of the Piedras Verde Granodiorite span a considerable compositional range but the average is a close match with the average composition of plutons related to Cu skarns. In terms of oxidation state, the Piedras Verde Granodiorite is fairly close to typical Cu skarn plutons and there is no indication of a gold association.

In terms of petrogenesis, rare earth elements (REE) provide one way of interpreting the origin of igneous rocks. Bolívar REE concentration data have been ratioed against standard chondritic meteorites. This allows easier interpretation of the data by smoothing out fluctuations due to natural abundance variations and exposing those anomalies due to geological processes. The Chondrite reference values used in these plots are based on Nakamura (1974). The overall pattern is typical of subduction-related magmas and the slight negative Europium (Eu) anomaly is consistent with normal fractionation of plagioclase. The REE plots of the individual igneous samples show that the various textural variants of the Piedras Verde pluton are all genetically related.

The lack of a strong porphyry texture indicates that the Piedras Verde Granodiorite formed several km and more likely 5-7 km beneath the surface. The 5-7 km depth of formation estimate is supported by the size and mineralogy of the metamorphic aureole. Limestone is converted to marble for hundreds of meters away from the contact, and garnet-wollastonite skarnoid is developed in rocks of impure composition for significant distances away from the main igneous contact.

Locally, such as along the Guadalupe (or Fernandez) structural trend, skarnoid is developed even further from the contact. The lack of higher temperature mineral assemblages such as anorthite-wollastonite makes it unlikely that the pluton depth was more than 7 km. In contrast, the andesite and felsite dikes in the district have planar, chilled contacts and are generally fined grained and/or porphyritic. The dikes locally cut the granodiorite and both the texture and crosscutting relations indicate that the dikes are younger and shallower than the granodiorite. Both granodiorite and andesite dikes have alteration, locally skarn, along their contacts. In addition, endoskarn affects both the granodiorite and in rare cases, the andesitic dikes. Thus, these rocks are older than or at best coeval with alteration/mineralization.

The presence of skarn veins cutting an andesitic dike is clear evidence that at least some skarn is later than at least some of the andesitic dikes. A closer association of granodiorite with skarn alteration and mineralization is suggested by local K-silicate veining of the granodiorite and the zonation of skarn relative to this contact.

Since the andesitic and rhyolitic volcanic rocks in the district dip ~30° NE and assuming that these rocks are younger than the Bolívar Granodiorite, then this stock must also be tilted ~30° to the NE. This means that the NE corner, near the Bolívar Mine is the shallowest part of the pluton and the logical focal point of fluid flow. Along the same line of reasoning, the southern part of the pluton represents the deepest part of the system and thus, is less prospective for high grade mineralization.

7.3 Structure

Description of structures at the Bolívar Mine is extracted (with minor modifications) from Meinert et al. (2008), and Ferrari et al. (2007).

Structure at Bolívar is dominated by NNW trending, steeply northeast or southwest dipping fault and fracture zones. younger system related of NE trending faults crosses the older NNW faults. In Late Cretaceous-Early Tertiary the Laramide Orogenic System occurred, a period of folding and metamorphism of the pre-existing rocks. Simultaneously, strong magmatic activity with volcanism and intrusions formed the Sierra Madre Occidental.

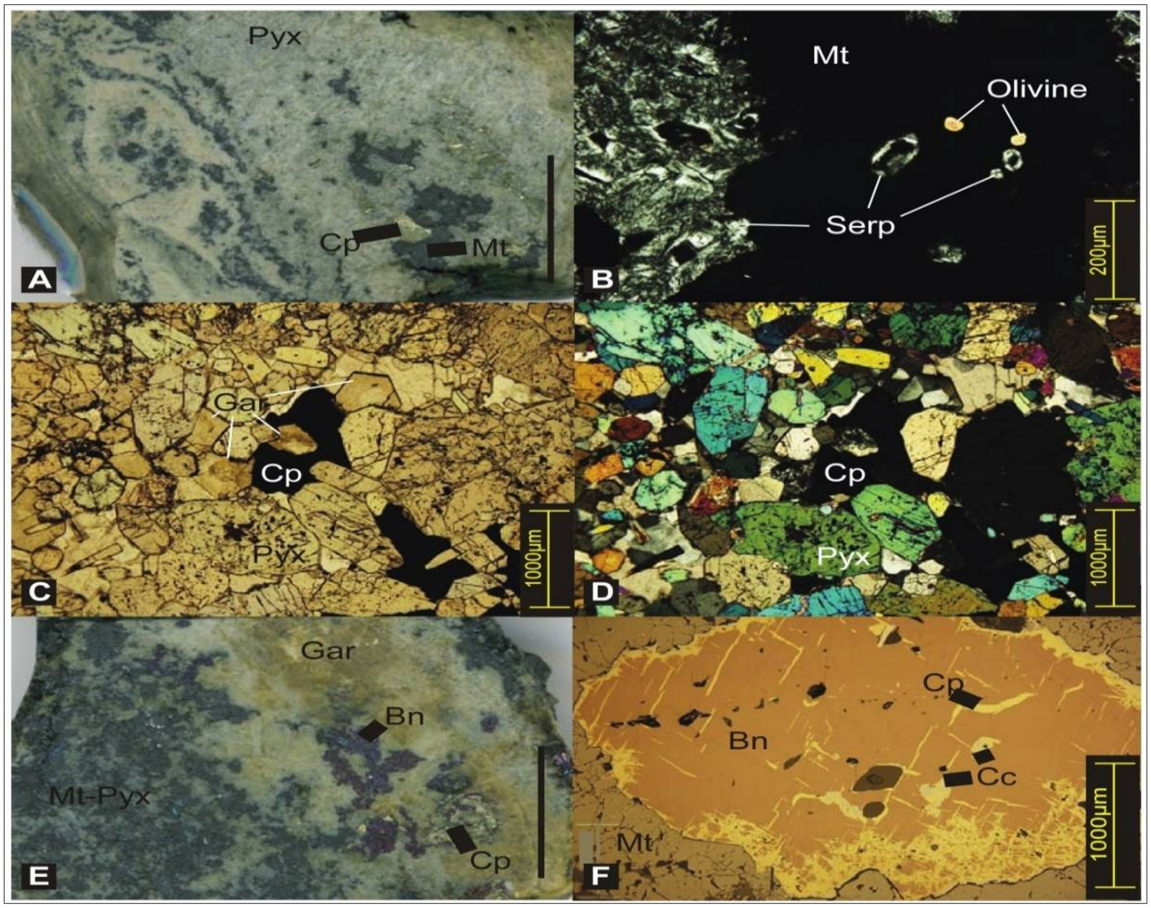
The local Guerrero suite has partial ductile deformation with low ductile penetrations, and low grade pencil structures, which indicates that ductile deformation was related to regional, major, thrust faults and would be associated with Laramide Compressional Deformation.

At the end of Laramide Orogeny, Mexican Basin and Range faulting formed NNW normal faults related to extensional tectonic development. Later opening of the California Gulf continued the cortical extension of the zone, overprinting new mineralized features at oldest volcanic and volcano-sedimentary features. Structural systems include strike-slip and normal type faulting with listric faults and detachment planes along an extensional asymmetric deformation (Ferrari, et.al. 2007).

7.4 Mineralization

Skarn mineralization in the Bolívar district is retrograde and strongly zoned (Meinert, 2005). The general sequence from proximal to distal is characterized by: red-brown garnet to brown garnet with chalcopyrite±bornite±magnetite to green garnet±pyroxene with chalcopyrite±sphalerite to massive sulfide (sphalerite±chalcopyrite±galena) to marble with stylolites and other fluid escape structures.

The most extensive mineralization at Bolívar skarn is a discontinuous horizon of disseminated Cu – Fe (Figure 7-5), which is dominated by chalcopyrite and magnetite and hosted in a volcano-sedimentary protolith (Reynolds, 2008).

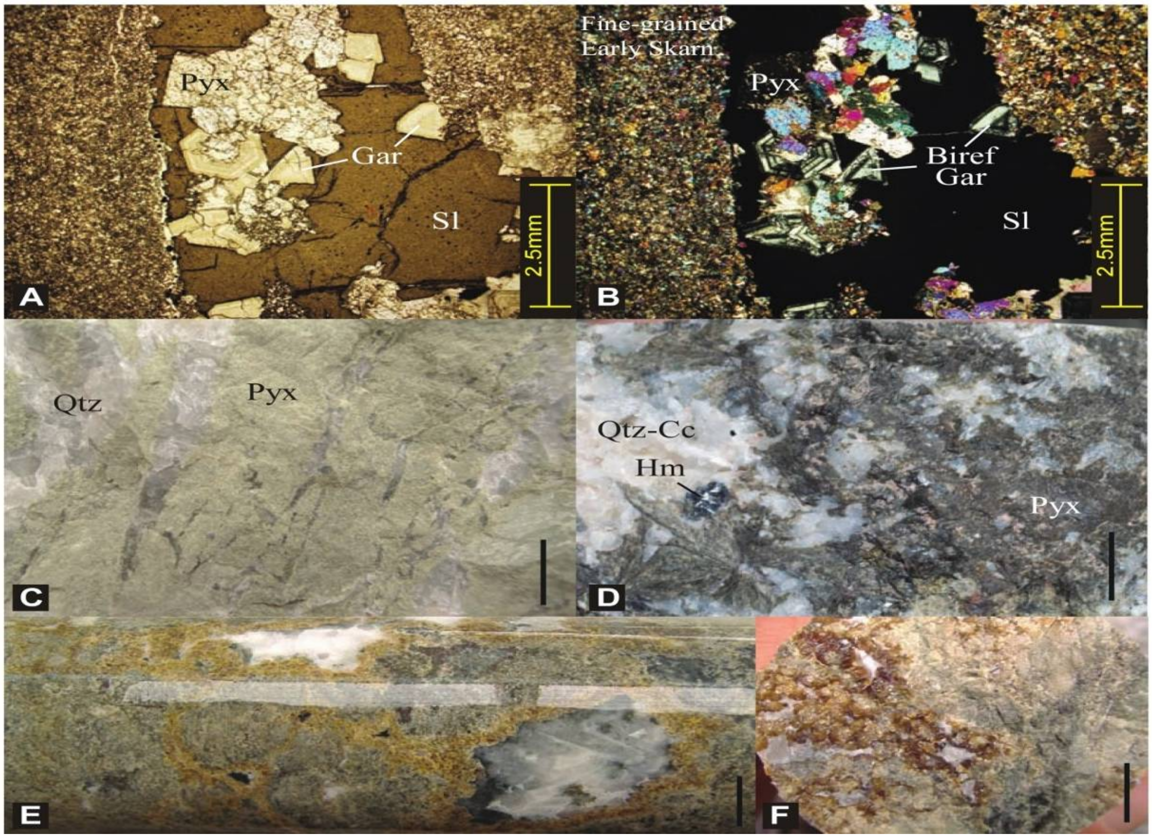


This hand sample, which contains pyroxene, magnetite, and chalcopyrite, is representative of lower skarn rocks. Scale bar is 1cm. B. Photomicrograph of intensely altered sample (XPL). All olivine and pyroxene have been altered to serpentine except for two grains of olivine that are armored in magnetite. C. Abundant pyroxene typical of the lower skarn, a rare occurrence of birefringent garnet, and chalcopyrite (PPL). D. Same as C but in XPL. E. Hand sample containing yellow-brown garnet, bornite, chalcopyrite, magnetite, and pyroxene. Scale bar is approximately 1cm. F. Photomicrograph of bornite, magnetite, chalcopyrite, and chalcocite in reflected light (Photo by Reynolds, 2008).

Figure 7-5 Samples of the Cu-Fe Skarn

Mineralization in carbonate rocks at Bolívar is similar to other Cu-Zn skarn deposits of the world (Meinert et al., 2005) and like most, is zoned relative to fluid flow channels, many of which are centered on igneous contacts, indicating that hydrothermal fluids flowed up along those contacts and subsequently out along faults, stratigraphic contacts, and zones of brecciation (Figure 7-6).

The most favorable target on the Bolívar property is the zone of continuous prograde skarn alteration along the Piedras Verdes Granodiorite contact. This skarn extends from the Bolívar Mine to the El Gallo and La Narizona Mines.



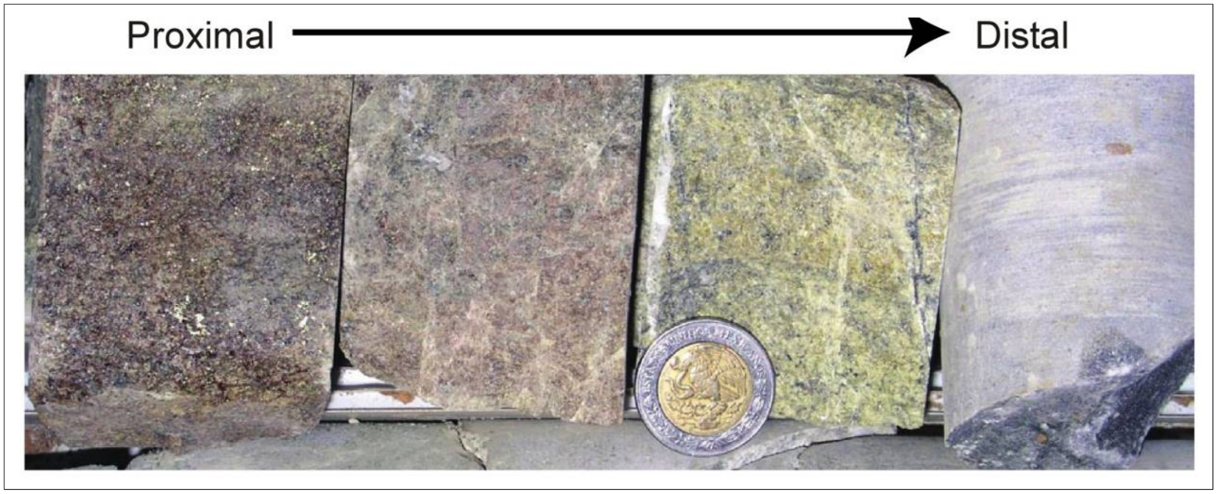
Scale bar is 1cm unless otherwise specified. A. Photomicrograph of pyroxene and garnet skarn (PPL). Early crystals are fine-grained whereas later crystals are coarse-grained. Sphalerite is associated with later, coarse-grained prograde alteration. (Photo by L. Meinert) B. Same as A, but in XPL. (Photo by L. Meinert) C. Hand sample from Bolívar with quartz and light green, proximal pyroxene. D. Hand sample from east of Bolívar Mine with radiating crystals of dark green-brown, distal pyroxene. Sample also contains quartz, calcite, and specular hematite. (Photo by L. Meinert) E. Core sample of green and yellow-brown garnet skarn with patches of quartz and calcite. F. A freshly broken piece of E shows that the early green garnet is fine-grained whereas the later yellow-brown garnet associated with quartz and calcite is coarser-gained (Photo by Reynolds, 2008).

Figure 7-6 Pictures from the Cu-Fe Skarn showing Brecciation

There is a strong stratigraphic control on skarn mineralization. Magnesian skarn is developed from a dolomitic protolith and contains abundant magnetite as well as Mg silicate minerals such as olivine, phlogopite, and vesuvianite. Typically, magnesian skarn contains bornite instead of or in addition to chalcopyrite. The abundant, but not quite massive, magnetite in the Mina de Fierro and El Gallo zones is due to dolomitic wall rocks rather than solely a proximal location (Reynolds, 2008).

Another distinctive lithology is a lower shaley-siltstone unit(s). This altered to a biotite hornfels and where more intensely altered, to a blue-green pyroxene hornfels with dark reddish brown garnet nodules and layers. Although locally mineralized this unit seldom is ore grade and is useful mainly as a stratigraphic marker (Meinert, 2007).

Most skarn has disseminated Cu-Zn mineralization whereas massive (>50%) sulfide is localized near skarn-marble contacts. In particular, high Zn zones are associated with green garnet in distal regions near the marble front. In contrast, high Cu zones are more proximal and associated with brown garnet or, in magnesian skarn zones, with bornite and yellow-green garnet or Mg-silicate minerals such as olivine, phlogopite, and serpentine (Figure 7-7).



The dark red garnet sample on the left is the most proximal. The brown garnet, yellow-green garnet, marble (left to right) are progressively more distal. (Photo by L. Meinert, 2007)

Figure 7-7 Zonation Sequence of Garnet at Bolívar Mine

There are two main stratigraphic zones that host ore, an upper calcic carbonate horizon that predominantly hosts Zn rich ore and a lower dolomitic horizon that predominantly hosts Cu-rich ore. In both cases the highest grade ores are developed along structures and associated breccia zones, which cross the favorable horizons near skarn marble contacts.

8. DEPOSIT TYPES (ITEM 8)

Skarns can be subdivided according to several criteria. Exoskarn and endoskarn are common terms used to indicate a sedimentary or igneous protolith, respectively. Magnesian and calcic skarn can be used to describe the dominant composition of the protolith and resulting skarn minerals. Such terms can be combined, as in the case of a magnesian exoskarn which contains forsterite-diopside skarn formed from dolostone (Meinert, et al. 2005).

Calc-silicate hornfels is a descriptive term often used for the relatively fine-grained calc-silicate rocks that result from metamorphism of impure carbonate units such as silty limestone or calcareous shale. Reaction skarns can form from isochemical metamorphism of thinly interlayered shale and carbonate units where metasomatic transfer of components between adjacent lithologies may occur on a small scale (perhaps centimeters) (e.g. Vidale, 1969; Zarayskiy et al., 1987).

Skarnoid is a descriptive term for calc-silicate rocks that are relatively fine-grained, iron-poor, and which reflect, at least in part, the compositional control of the protolith (Korzkinskii, 1948; Zharikov, 1970). Genetically, skarnoid is intermediate between a purely metamorphic hornfels and a purely metasomatic, coarse-grained skarn.

For all of the preceding terms, the composition and texture of the protolith tend to control the composition and texture of the resulting skarn. In contrast, most economically important skarn deposits result from large scale metasomatic transfer, where fluid composition controls the resulting skarn and ore mineralogy.

8.1 Copper Skarns

Copper skarns are perhaps the world’s most abundant skarn type. They are particularly common in orogenic zones related to subduction, both in oceanic and continental settings. Major reviews of copper skarns include Einaudi et al. (1981) and Einaudi (1982a, b). Most copper skarns are associated with I-type, magnetite series, calc-alkaline, porphyritic plutons, many of which have co-genetic volcanic rocks, stockwork veining, brittle fracturing and brecciation, and intense hydrothermal alteration.

These are all features indicative of a relatively shallow environment of formation. Most copper skarns form in close proximity to stock contacts with a relatively oxidized skarn mineralogy dominated by andraditic garnet. Other phases include diopsidic pyroxene, idocrase, wollastonite, actinolite, and epidote. Hematite and magnetite are common in most deposits and the presence of dolomitic wall rocks is coincident with massive magnetite lodes which may be mined on a local scale for iron. As noted by Einaudi et al. (1981), copper skarns commonly are zoned with massive garnetite near the pluton and increasing pyroxene and finally idocrase and/or wollastonite near the marble contact.

In addition, garnet may be color zoned from proximal dark reddish-brown to distal green and yellow varieties. Sulfide mineralogy and metal ratios may also be systematically zoned relative to the causative pluton. In general, pyrite and chalcopyrite are most abundant near the pluton with increasing chalcopyrite and finally bornite in wollastonite zones near the marble contact.

In copper skarns containing monticellite bornite-chalcocite are the dominant Cu-Fe sulfides rather than pyrite-chalcopyrite (e.g. Big Gossan, Irian Jaya; Meinert et al., 1997).

The largest copper skarns are associated with mineralized porphyry copper plutons. These deposits can exceed 1 billion tons of combined porphyry and skarn ore with more than 5 million tons of copper recoverable from skarn.

The mineralized plutons exhibit characteristic potassium silicate and sericitic alteration that can be correlated with prograde garnet-pyroxene and retrograde epidote-actinolite, respectively, in the skarn. Intense retrograde alteration is common in copper skarns and in some porphyry-related deposits may destroy most of the prograde garnet and pyroxene (e.g. Ely, Nevada; James, 1976).

9. EXPLORATION (ITEM 9)

9.1 Sierra Metals Exploration

The following information is modified from the February 2009 NI 43-101 Resource Technical Report prepared by SGS Geostat.

History of exploration conducted between 2003 and 2005 was reported in RPA (2005) and SGI (2008). During this period, Dia Bras carried out an exploration program of geological mapping, sampling, topographic survey.

Refer to Section 11 – Sample Preparation, Analysis and Security for detailed information on sampling methods and quality.

Overall, the exploration has shown presence a polymetallic skarn mineralization within the Bolívar Project.

Table 9-1 Exploration Conducted by Sierra Metals Exploration, 2003-2012

2003 to 2005. During this period, Dia Bras carried out an exploration program of geological mapping, outcrop sampling, topographic survey, 1:250 and 1:500 scale, including detailed 2 x 2m panel sampling perpendicular to the mineralized structures Sierra Metals completed semi-regional prospecting, reconnaissance and representative sampling in to the Bolívar District at the La Montura and Narizona prospects. Pilot mining started at the Bolívar Mine. Development drifting conducted to the Brecha Linda ore body discovery
2006. Dia Bras Exploration performed detailed 1:500 scale geologic mapping in the Bolívar and Bolívar South areas, including 2 x 2m panel sampling Dia Bras Exploration did some prospecting in other mineralized area to the south, like El Gallo Such detailed geology was accompanied by a rock panel geochemical survey. The results of the El Gallo prospecting supported the drilling program.
2007. Detailed underground 1:250 scale geological mapping was complete on the El Gallo and La Narizona areas, including detailed 2 x 2m panel sampling. This exploration identified two mineralized stratiform horizons in the El Gallo area, Gallo Superior and Gallo Inferior, similar to the stratiform ore body at La Narizona. Preliminary geologic mapping to support the drilling was completed on three other mineralized areas to the south, La Montura, La Pequeña and El Val.
2008. Detailed 1:500 scale surface geology mapping was done at the Bolívar North zone, including representative chips sampling, yielding a geochemical anomaly consistent with the NW structural trend. Mining was mainly concentrated in the Titanic, Selena and San Francisco areas on and under level 6 (Rosario), Guadalupe, Rebeca and San Angel, which were high grade, individual ore bodies, geologically related to the calcareous upper stratigraphic favorable horizon.
2009. Detailed 1:250 scale geologic mapping was done at San Francisco and Los Americanos North, including detailed 2 x 2m panel sampling. Regional 1:25,000 scale geology and detailed stream sediment sampling was done over the entire Bolívar Property, yielding the new targets of Los Americanos – Lilly Skarn (Cu-Zn), La Cascada - Sidra (Au) and El Mezquite (Au). Underground 1:250 scale detailed mapping was done at San Francisco and La Increíble Mines, including detailed 2 x 2m panel sampling. Mining was mainly concentrated at the Bolívar Mine in the high grade ore bodies (Rosario, La Foto, Fernandez, Rosario Magnetita, and San Angel areas). Dia Bras Exploration announced the construction of the new Piedras Verdes Mill with capacity of 1000 TPD.
2010. 1:1000 geologic mapping was done at La Cascada – La Sidra areas, including chips channel sampling; and a TITAN IP Geophysical Survey (done by the contractor QUANTEC). A drilling program was done indicating low grade gold. Regional 1:25,000 scale geologic mapping was done over the entire Bolívar Property, including lithology units, regional faulting and dikes, and alterations, confirming the previous geochemical anomalies on Los Americanos – Lilly Skarn (Cu-Zn), La Cascada - Sidra (Au) and El Mezquite (Au) targets. Underground 1:250 scale detailed mapping, including detailed 2 x 2m panel sampling was done at El Gallo, La Increíble and La Narizona Mines. Mining was mainly concentrated now at Narizona, El Gallo, and Rosario areas, while Sierra Metals continued with the construction of new Piedras Verdes Mill.
2011. New geological interpretations indicated the continuity of El Gallo trends to southeast toward La Montura, and northeast toward La Increíble, discovering the El Salto and El Gallo step out areas respectively. Underground development and production drifting detailed 1:250 scale mapping was done at Bolívar, El Gallo, and La Narizona Mines. Mining of 360 TPD was terminated during late October and the new Piedras Verdes Mill started with commercial production of 1,000 TPD operation, mainly from El Gallo mine.
2012. Underground development and production drifting detailed 1: 250 mapping was done at Bolívar, El Gallo, and La Narizona Mines. Production of 1000 TPD processing at Piedras Verdes Mill began receiving ore principally from the upper stratigraphic horizon from El Gallo Mine. Exploration on the El Gallo step out and El Salto areas continues using a drilling contractor. Preliminary drilling started at La Montura and La Pequeña areas, located in between El Gallo and Narizona mines

9.2 Exploration Drilling

There are 691 drill holes totaling 122,834m.

Table 9-2 Drill Hole Summary

Area	Drillhole Number	Total Meters
Bolívar Alta Ley	117	21,787.42
Bolívar Noroeste	21	3,422.83
Bolívar Norte	12	3,262.10
Bolívar Sur	42	10,583.75
Brecha Linda	10	948.00
Brecha Linda Este	2	336.00
El Gallo	84	20,152.17
El Salto	11	3,945.55
El Val	8	3,777.00
Fernández	8	666.30
Fernández	19	2,467.10
Guadalupe	57	7,682.55
La Bota	7	544.30
La Herradura	6	819.00
La Increíble	29	9,418.14
La Montura	11	2,588.80
La Narizona	28	5,115.50
La Pequeña	7	2,344.05
Manto Gordo	2	73.30
Mina N01 CE 868E	3	182.20
Mina N01 CE 898N	8	748.85
Mina N01 R 9860S	15	1,068.70
Nivel 1	4	402.00
Nivel 6	1	141.00
Rebeca	15	1,764.00
Rosario	18	1,553.10
San Ángel	37	4,808.90
San Francisco	34	4,548.00
Selena	30	2,966.60
Selena 2	1	90
Titanic	16	1,460.70
Titanic 2	28	3,167.00
Total	**691**	**122,834.91**

The results of this drilling led to better definition of grade distribution in the deposits and suggested that iron be considered as another potentially economic commodity in skarn.

10. DRILLING (ITEM 10)

10.1 Historical Drilling

Minera Frisco drilled short diamond holes between 1968 and 1970, but existing records do not provide a reliable register of the number of holes, meters drilled, or the results of drilling.

10.2 Sierra Metals Exploration Drilling

Diamond core drilling carried out at the Bolívar Mine totals 691 holes over 122,834 meters. The objective of the drilling programs is to explore for mapped and projected polymetallic sulfide mineralization in calc-silicate rocks dipping moderately east-northeast. Drilling locations completed within the area of study for this report since 2003 are shown on Figure 10-1.

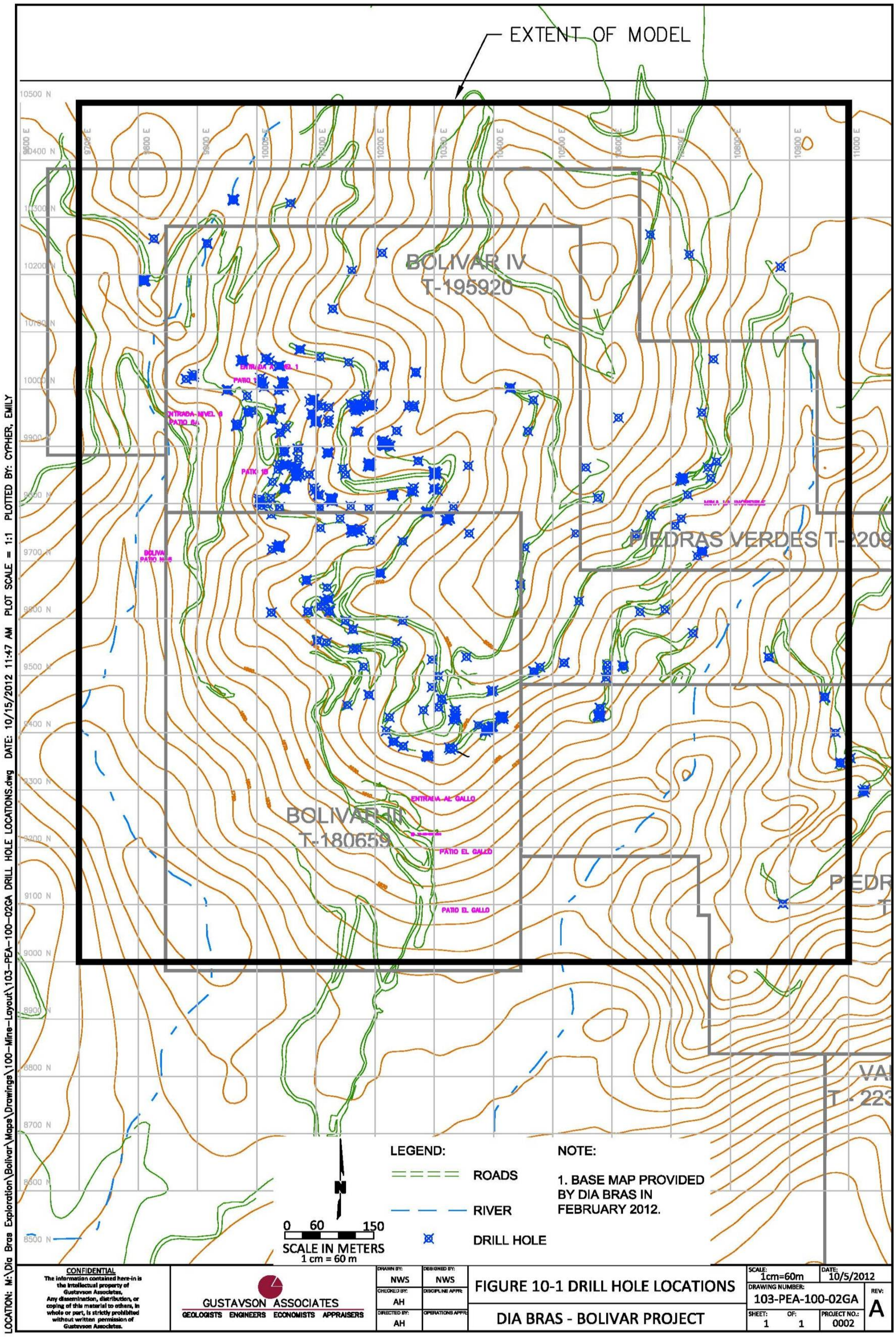


Figure 10-1 Drill Hole Locations

Dia Bras provided a drill hole database containing drill hole locations (collars), survey (azimuth and dip), total depth of drill hole, assay results for copper, zinc, gold, silver, lead, iron, and molybdenum, observations for lithology and mineralization. Locations of drill holes are shown on Figure 10-1. From 2003 to 2012 drilling activities, Dia Bras has provided a drill hole database to Gustavson containing data for the drill holes as shown in Table 10-1.

Table 10-1 Summary of Drill Hole Data Provided to Gustavson

Zone	No. of Drill Holes
Bolívar Alta Ley	117
Bolívar Noroeste	21
Bolívar Norte	12
Bolívar Sur	42
Brecha Linda	10
Brecha Linda Este	2
El Gallo	80
El Salto	8
El Val	8
Fernandez	8
Fernández	19
Guadalupe	57
La Bota	7
La Herradura	6
La Increíble	29
La Montura	10
La Narizona	28
La Pequeña	7
Manto Gordo	2
Mine Sampling (Mina N01 CE 868E)	3
Mine Sampling (Mina N01 CE 898N)	8
Mine Sampling (Mina N01 R 9860S)	15
Mine Sampling (Nivel 1)	4
Mine Sampling (Nivel 6)	1
Rebeca	15
Rosario	18
San Angel	36
San Francisco	34
Selena	31
Selena 2	1
Titanic	16
Titanic 2	28
Total	**683**

Overall, exploration drilling has identified copper-rich skarn mineralization commonly with magnetite-rich zones within the Bolívar III, Bolívar IV, Piedres Verdes, and El Gallo concessions. These features indicate exploration potential for skarn type Cu-Fe mineralization. Recent drilling is focused to better outline the copper mineralization in this area and to discover new mineral deposits to the south (Dia Bras Exploration, Exploration Department, 2012).

10.3 Drilling Methodology

The procedures used during diamond drilling include:

- Holes are drilled to produce HQ (63 mm) or NQ-sized (48 mm) core.
- The collar locations of all drill holes are surveyed using Geographic Positioning System (GPS) and local coordinates, marked correctly in the field by topographic engineers (Surveyors) with azimuth and inclination of each hole.
- All drill core is washed, re-aligned and digitally photographed prior to logging and sampling.
- Lithologic logging is done on drill core and geotechnical observations are made by the Sierra Metals geologists. This includes marking lithologic contacts, descriptive geology, core angles, core diameter, and percentage of core recovered, true thickness calculations, and graphic log depicting all down-hole data including assay values. All information is recorded on handwritten logs. Systematic measurements of Rock Quality Designation (RQD) are also included as part of the drill hole logging. Logged information is summarized in a digital database.

11. SAMPLE PREPARATION, ANALYSIS, AND SECURITY (ITEM 11)

11.1 Sample Collection and Handling

11.1.1 Core Samples

Sample collection and handling are conducted by Sierra Metals. Drill core is sawed in half and one half is sampled for geochemical analysis. All halved drill core is stored in a secure facility for future analytical verification/reference.

Sample intervals are based on the geological logs in an effort to separate different lithologies and styles of mineralization and alteration. Sample length generally does not exceed 1.5 m or less than 0.3 m and where possible correlates all the mineralized segments.

If any significant veins, veinlets, or healed breccias are present, the Sierra Metals geologist will mark a line down the length of the core where the core should be sawed or split to ensure a representative sample is taken by the sampler.

After logging is complete, sample intervals are marked and assigned a unique sample identification (sample tag), with the sample tag inside of the box at the end of each sample interval. If contamination is present due to down-hole caving, that interval is flagged and is not sampled.

Gustavson considers the sample preparation, security, and analytical procedures employed by Sierra Metals Exploration to be acceptable according to industry standards and adequate for use in this mineral resource estimate.

Samples were transported under Sierra Metals chain of custody to ALS Chemex (ISO-9001), in Hermosillo, Sonora, Mexico for assay.

11.2 Sample Security

11.2.1 Sample Shipping Procedures

When all of the samples are prepared for shipment, they are laid out in order and recorded in the digital database (including control samples). Drill core samples are placed into big bags, and each bag is sealed with a numbered security seal.

Only samples from a single drill hole are included in a shipment. A sample submittal form is prepared with the shipment number, security seal numbers, the sample numbers, the type of analyses requested, and the authorized Sierra Metals personnel that will receive the results.

Two hard copies of the submittal form are included with the sample shipment to ALS Chemex in Hermosillo, Sonora, Mexico (one per project, one per laboratory, and one for return to the project signed by the lab of samples received). A chain of custody form is filled out by the person who prepares the shipment. This form includes the sample shipment number, the location the samples are shipped from, the total number of containers in the shipment, the security seal numbers, name of the person who prepared the shipment, name of the person who transported the shipment, and the name of the person who received the shipment at the lab.

When the form is completed at the lab by the receiving individual, any damage or discrepancies are noted on the form and the form is sent back to Sierra Metals. The samples are shipped to the lab by Sierra Metals´ trucks, and the driver of each truck is required to sign off on the chain of custody form.

11.3 Internal QA/QC

The complete quality assurance-quality control (QA-QC) of Sierra Metals is described below.

As described in RPA (2005), “Dia Bras submitted duplicate samples after every 10th sample and sending it to the laboratory. These duplicate samples show copper and zinc assays are within ±10% of the expected values, and the majority of the gold and silver assays of the standards (both high-grade standards as well as low-grade standards) are within one standard deviation of the mean”. RPA submitted 7 independent samples for assay at SGS in Don Mills, Ontario. The RPA samples confirm the presence of copper, zinc, silver and gold values at similar orders of magnitude as the Chemex laboratory assays.

Gustavson is of the opinion that the quality of data collected to date to be adequate for use in estimating the mineral resource of the Bolívar Mine.

12. DATA VERIFICATION (ITEM 12)

While on site, Gustavson discussed drilling procedures, sample collection, handling, and chain of custody procedures and compared them to documented practices. Gustavson deems Sierra Metals' stated drilling and sampling QA/QC program to be in-line with industry best practices.

The state of drill core/cuttings and storage/security conditions were inspected by Gustavson and found to be appropriate. Gustavson examined a core hole as compared to the interpreted geology and alteration from the drill hole log and the associated assay results. Geologic logging and assay sample interval selection procedures were found to be in accordance with industry best practices.

Gustavson examined the electronic drill hole database for completeness and accuracy. Collar survey records for each historic drill hole in the paper archives were compared to the electronic database with minimal errors found.

Conversion of the local mine grid coordinates (10000, 10000) to an established coordinate system WGS84 is normally used by Sierra Metals. These holes were then used as reference points to create a projection file that corrects the mine grid coordinates to standardized system.

All checked samples matched the original assay certificates. Database assay values are all converted to a standardized unit of measure (grams per tonne, %, tonnes) for all elements assayed.

Gustavson conducted an independent audit of the Project database, including the exploration and drill hole data, and finds the quality of data collected to date is adequate for use in estimating the mineral resources of the Bolívar Mine.

12.1 Validation of Assay Data

Gustavson conducted an independent review of the assay data in the database provided by Sierra Metals for resource estimate. The database contained gold, silver, copper, zinc, iron, molybdenum, and lead assay results. Gustavson attempted to demonstrate that the assay data in the database match are the same as those presented in assay certificates within a 99% confidence level, with a confidence interval, or margin of error, of 4%.

The database provided by Sierra Metals contained 17,035 data points with assay data. To provide a 99% confidence level, 981 of the 17,035 data points are to be verified: this assumes the worst case scenario that 50% of the data in the database may be different than the assay certificate.

The data points to be verified correspond to approximately 6% of the 17,035 data points in the database. In order to verify 6% of the data, Gustavson conducted the following:

- Gustavson compared the first datum point in each assay certificate
    - For assay certificates with less than 10 points, no other datum point of the assay certificate was verified.
    - For assay certificates containing 10 or more points but less than 20 points, Gustavson verified the 10^{th} datum point of the assay certificate.
    - For assay certificates with greater than 20 data points, Gustavson verified the 20^{th} data point in the assay certificate.
        - For residual points, that is, data points that exceed the last multiple of 20 data points, Gustavson checked the 5^{th} datum point of residual points.

12.1.1 Results of Assay Data Validation

Sierra Metals provided a total of 334 assay certificates to Gustavson. Gustavson intended to verify the results of all 334 assay certificates using the scheme as described in Section 12.1, but following review of 221 assay certificates, no additional verification was conducted as the results meet the hypothesis of 99% confidence level within a margin of error of 4%. The results of assay data validation are presented in this section.

Assay certificates were issued by ALS Chemex of Mexico in Hermosillo, Sonora. Of the 221 assay certificates that were verified, 79 assay certificates contained drill core, rock samples, and pulp samples from 2007 through 2011. Sierra Metals confirmed that the data in these 79 assay certificates are appropriate for exclusion from the resource estimate.

For those assay certificates containing data in the database, a total of 379 data points was spot checked and 4 errors were identified, corresponding to 1.1% error, or 98.9% match between data in database and assay certificates. For a population with 17,350 data points in the database, with a sample size of 379 data points, and 98.9% match, the resulting confidence interval is 1.38. These results suggest a confidence level of 99% with a margin of error of ±1.38% that the assay data in the database used for resource estimate are the same as those data presented in assay certificates. As this statistic met the acceptable criterion of 99% confidence level with 4% margin of error, the data base is determined to be acceptable for resource estimate.

13. MINERAL PROCESSING AND METALLURGICAL TESTING (ITEM 13)

As of the date of this report, Sierra Metals has completed metallurgical testing using composite samples from the composite samples containing iron-rich upper skarn and copper rich lower skarn from the El Gallo Superior deposit. The sample for the upper skarn consisted of a grind followed by copper and zinc flotation circuits.

Sierra Metals also completed several metallurgical tests but they were not representative of all of the deposits.

The following table presents, recovery results of the Piedras Verdes treatment plant for 2012 (January-September). The Piedras Verdes plant has only been in operation since January 2012, although preliminary metallurgical and systems testing began in September 2011. Prior to that, material was trucked to the Malpaso mill, also owned by Sierra Metals, near Cuauhtemoc Chihuahua.

Table 13-1 Piedras Verdes Recovery Results

2012							
MES/AÑO	TMS MOLIDAS	LEY DE CABEZA			% RECUPERACION		
		Ag (gr/ton)	%Cu	%Zn	Ag	Cu	Zn
Enero 2012	18,323	24.7	1.01	2.83	73.57	81.13	79.35
Febrero 2012	18,588	30.4	1.13	3.10	79.92	83.02	79.96
Marzo 2012	25,038	32.3	1.17	2.73	73.51	82.11	80.56
Abril 2012	28,033	24.9	1.25	2.30	77.56	82.70	79.96
Mayo 2012	28,023	26.0	1.17	2.13	80.91	82.89	79.61
Junio 2012	30,005	22.4	1.22	3.05	74.94	83.22	80.76
Julio 2012	22,600	20.7	1.03	1.75	75.40	82.58	75.01
Agosto 2012	27,340	19.7	1.14	0.98	80.85	82.99	62.46
Septiembre 2012	21,299	26.1	1.19	0.92	77.40	85.74	56.38
TOTAL 2012	**219,249**	**25.0**	**1.15**	**2.19**	**77.12**	**82.97**	**77.74**

Note: Table is as received from Sierra Metals and is included in Spanish

Recoveries of 2012 (January to September) are:

- Ag 77.12%, 1% above calculation of copper equivalent
- Cu 82.97%, 2% above calculation of Copper equivalent
- Zn 77.74% - 4% lower than used in the calculation

The historical recoveries of copper @ 82%, zinc @ 81%, and silver @ 77% were used in this report for the copper equivalent grade calculation. The actually recoveries for the operation of the Piedras Verdes Mill for 2012 were used in the reserve estimate, mine plan and economics for this report (Section 17 for specific results).

Based on the limited data and information, Gustavson has concluded these recoveries to be in line with similar type deposits.

14. MINERAL RESOURCE ESTIMATE (ITEM 14)

The mineral resource statement for the Bolívar Mine, using data received as of April 5, 2012, was completed by Zachary J. Black, SME-RM, Gustavson Associate Resource Geologist and QP. This mineral resource estimate was prepared in accordance with NI 43-101 and CIM.

14.1 Data Used in Resource Estimation

Gustavson created a 3-Dimensional (3D) block model for estimating mineral resources at the Bolívar Mine. The block model was created with individual block dimensions of 10 x 10 x 3 meters, and the model extends from 9,700 east to 11,000 east, 9,000 north to 10,500 north, and 2,702 elevation to 1,250 elevation. All coordinates are reported within a local mine grid. The portion of each block lying below the surface topography was estimated. Individual blocks were allowed to split into 1 x 1 x 1 meters in the area of the mine workings for better resolution representing mined out material. The block model is split into three zones, one for each advanced exploration target: El Gallo, Alta Ley, and Increíble, as shown on Figure 14-1.

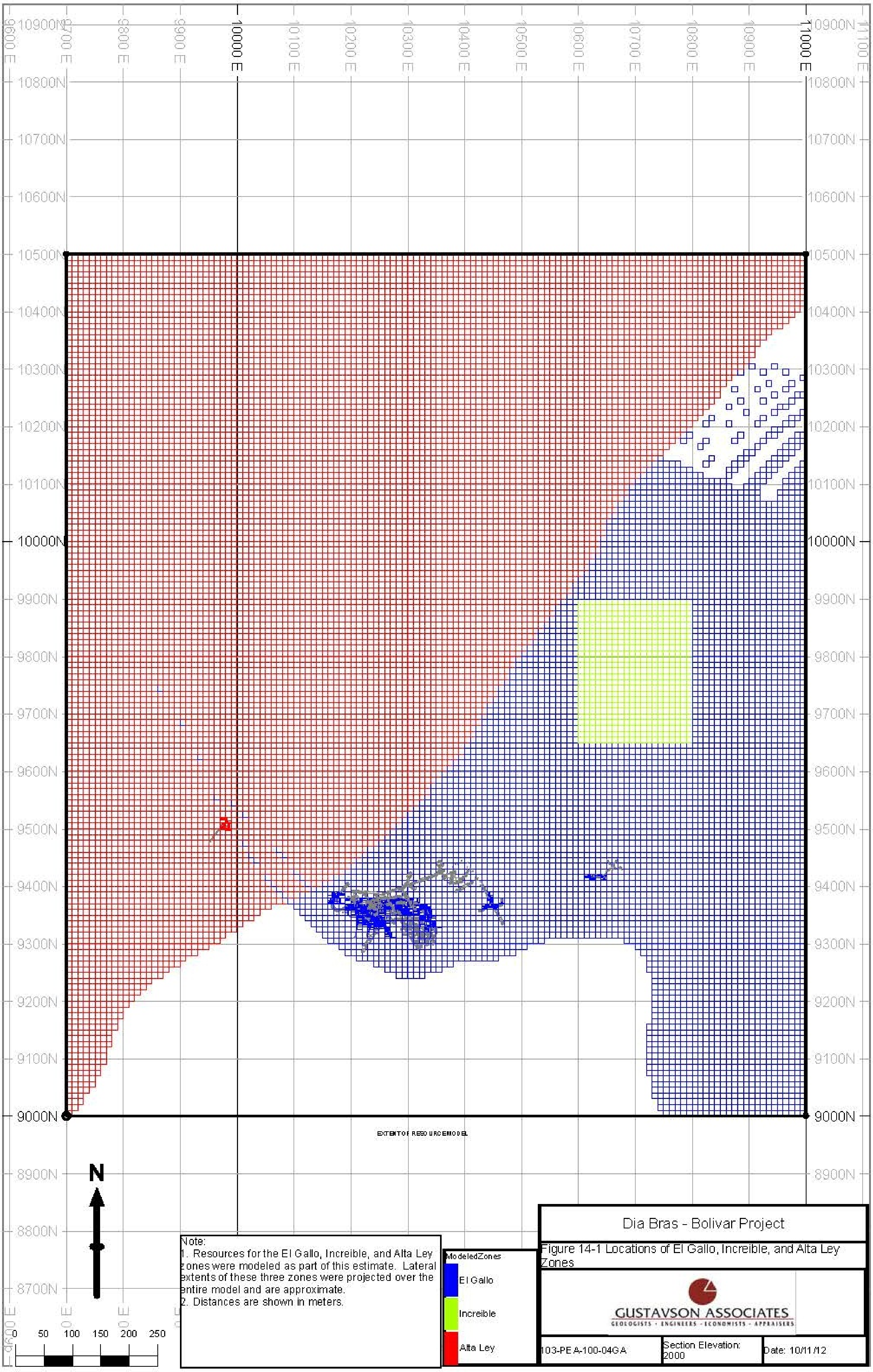


Figure 14-1 Location of El Gallo, Alta Ley, and Increíble Zones

Drill hole data, including collar coordinates, down hole surveys, sample assay results, lithology, and alteration intervals were provided by Sierra Metals in a Microsoft Access database. The Bolívar Mine drill hole database contains assay data with gold and silver grades in ppm, and copper, lead, iron, molybdenum, and zinc grades in percent for 682 drill holes (347 surface, 286 underground mine, and 49 outside model limits). Sierra Metals also provided Gustavson with AutoCAD cross sections of the drill holes with interpreted mineralization and geology. The cross sections were used by Gustavson for reference but were not relied upon for resource estimation. Gustavson considers the data provided sufficiently reliable to be adequate for the preparation of a resource estimate.

14.2 Geologic Modeling

Gustavson created a geologic model and a grade model using the available data, with limitations as described in this report. Lithologies intercepted by drill holes were logged during each drilling campaign. Generally, lithology data was available from the database as a single code including lithology and alteration (Skarn trace Sphalerite → SK Sp tr). The codes were split into two groups, lithology and alteration, for construction of the geologic model.

To avoid potential inconsistencies in the lithological interpretations by different geologists over different drilling campaigns, Gustavson grouped the interpreted lithologies into formations, and coded the drill hole database according to Table 14-1.

Table 14-1 Grade Lithology

Formation/Grouped Lithology	Database Lithology
Intrusive Dikes	Andesite Dike Brecciated Dike Dacite Diabase Dike Felsic Dike Granodiorite Dike Intermediate Dike Diabase Sill Sill
Fault Zone	Fault Fracture Zone
Granite	Granite Granodiorite
Hydrothermal Breccia	Clay Breccia Zone of Argillization and Oxidation
Overburden	Alluvium Overburden
Volcanics	Andesite Diorite Andesite Tuff
Sedimentary	Agglomerate Limestone Massive Calcite Pyroxene Hornfelds Marble Metasediments Skarn

The geologic model was built based on the database lithologies and the geologic map (Figure 14-2). Lithologies included in the geologic model are limited to granite, rocks of the UVS, and rocks of the LVS. Mineralization is associated with stocks, dykes, and breccia pipes of quartz diorite and granodiorite composition, which intrude the carbonate rocks and calcareous volcanics or tuffs of the LVS. These intrusions form stratiform or tabular bodies, vertical pipes, narrow lenses, and irregular zones

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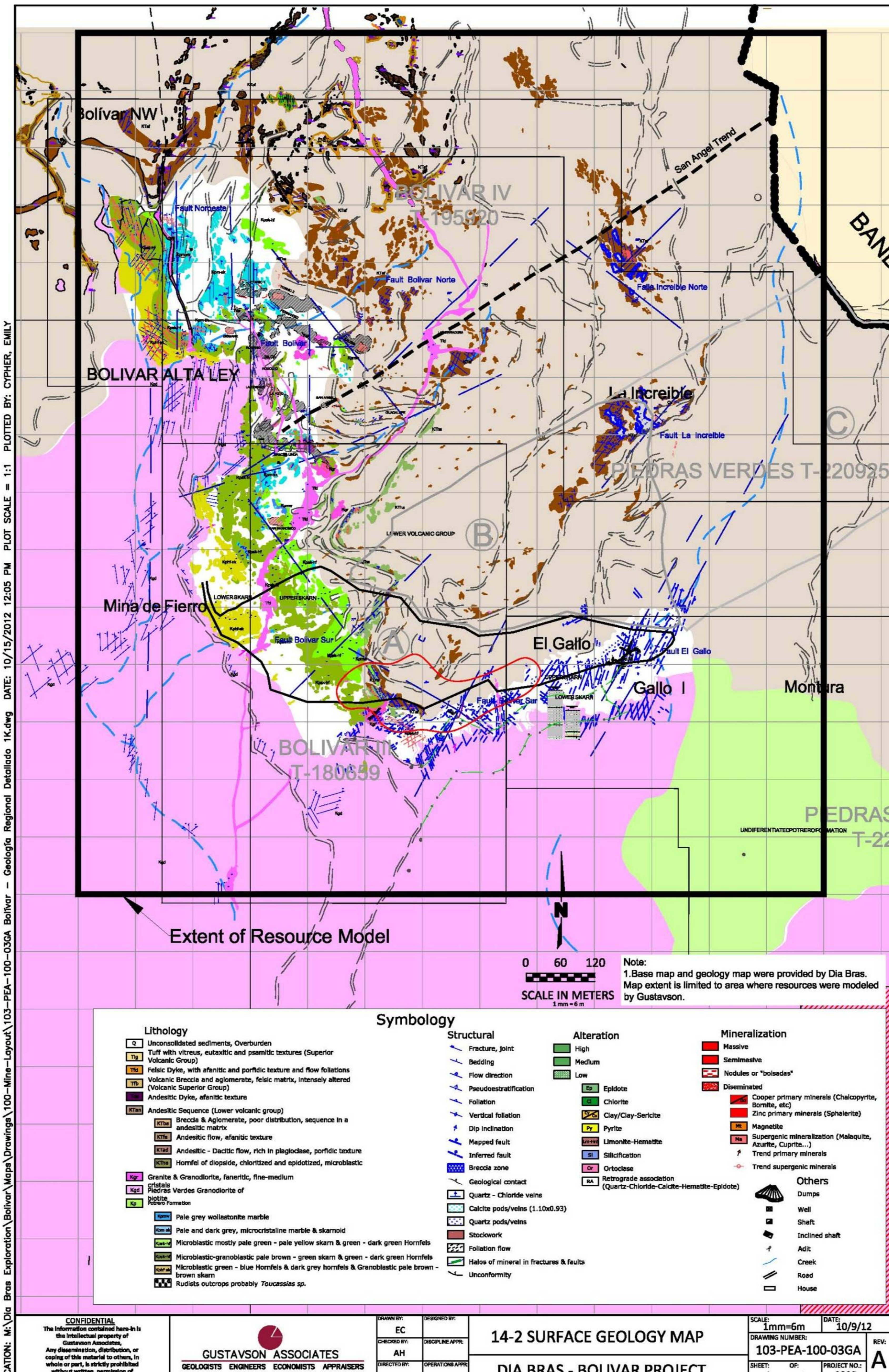

Figure 14-2 Surface Geology Map for Modeled Area

El Gallo was modeled as two stratigraphically controlled tabular bodies referred to as the upper and lower skarn. The alteration and mineralization can be determined from drill core; however Gustavson was not provided with adequate data to interpret the differences. Gustavson used the stratigraphic intercept of the assayed interval with the skarn lithology to model the two main bodies of mineralization in the El Gallo zone. As a result of the geologic interpretation of the El Gallo zone, the two mineral estimation domains, the upper and lower skarn, were identified (Figure 14-3).

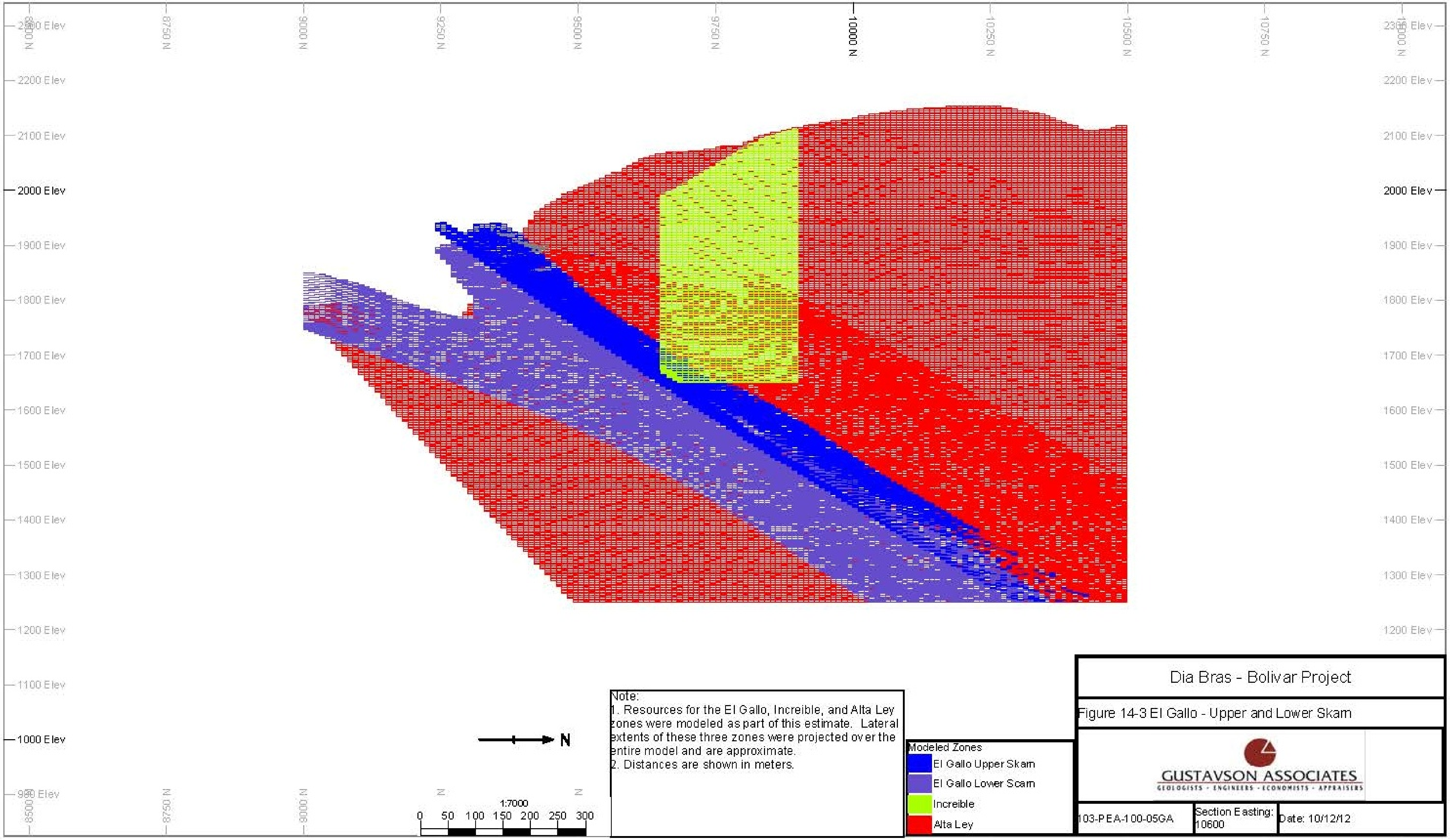

Figure 14-3 El Gallo Upper and Lower Skarn

Skarn and associated mineralization within the Increíble and Alta Ley zones occurs in highly erratic vertical pipes, narrow lenses, and irregular zones. The intense folding, faulting, and erratic mineralization make it difficult to model the skarn with any reliability.

14.3 Estimation Methodology

Major structures and mineralized zones were evaluated using two different estimation methods. Skarn mineralization within the El Gallo zone was modeled as a stratigraphic unit with pockets of mineralization. The two estimated domains are the upper and lower skarns. These domains represent long continuous tabular bodies that grade from proximal to distal with mineralization changing from copper dominant to zinc dominant. Both domains were estimated using an ordinary kriging algorithm. All drill holes that intersected the modeled structures were coded for estimation. If a sample was not assayed, it was replaced with a value equal to half of the detection limit for the analysis in order to prevent spreading potentially economic metal values into areas without assays. Gustavson assumes that areas without assays are not mineralized, and warrant the use of a below detection limit value.

Mineralization within the Alta Ley and Increíble zones is very complex. To overcome the complexity and adequately represent the multiple directions of mineralization, Gustavson used a Median Indicator Kriging (MIK) algorithm. This algorithm allows for the estimation of multiple grade cutoffs as probabilities of an entire block. The probabilities of a block exceeding a particular cutoff are then used to recreate the weighted average block grade. Missing sample intervals were replaced with a value equal to half of the detection limit for the analysis.

14.4 Statistical Data

Investigation into grade-lithology relationships initially focused on the seven grouped lithologies presented in Table 14-1. Gustavson statistically analyzed three metals (silver, copper, and zinc) within each recorded lithology (Table 14-2) and within the two mineral estimation domains of El Gallo. Samples were selectively sent for assay analysis based on their geologic characteristics, primarily visible sulfides, resulting in a high level of correlation form one lithology to the next for the majority of the samples.

Table 14-2 Lithology Analysis

Copper Sample Descriptive Statistics						
Lithology	**Number**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**	**COV**
Volcanic	668	0.0001	7.11	0.10	0.46	4.39
Metasedimentary	12957	0.0001	42.07	0.47	1.46	3.12
Granite	403	0.0004	12.90	0.20	0.81	4.13
Intrusive Dikes	452	0.0001	5.55	0.18	0.36	1.97
Hydrothermal Breccia	1461	0.0001	11.75	0.26	0.81	3.19
Faults	95	0.0006	2.05	0.15	0.34	2.35
Not Logged	284	0.0004	28.30	1.51	2.98	1.98
ALL	16320	0.0001	42.07	0.43	1.39	3.26
Zinc Sample Descriptive Statistics						
Lithology	Number	Minimum	Maximum	Mean	Std. Dev.	COV
Volcanic	668	0.0010	11.80	0.07	0.48	7.30
Metasedimentary	12957	0.0001	49.82	1.37	4.84	3.54
Granite	403	0.0010	3.52	0.04	0.18	4.71
Intrusive Dikes	452	0.0016	22.30	0.28	1.65	5.90
Hydrothermal Breccia	1461	0.0010	30.00	0.46	2.39	5.14
Faults	95	0.0011	20.80	0.24	1.76	7.30
Not Logged	284	0.0010	52.09	6.38	13.53	2.12
ALL	16320	0.0001	52.09	1.22	4.80	3.92
Silver Sample Descriptive Statistics						
Lithology	Number	Minimum	Maximum	Mean	Std. Dev.	COV
Volcanic	668	0.0010	928.00	3.50	29.23	8.35
Metasedimentary	12957	0.0010	4720.00	12.33	61.58	5.00
Granite	403	0.0010	246.00	5.50	20.65	3.75
Intrusive Dikes	452	0.1000	569.00	4.94	19.35	3.92
Hydrothermal Breccia	1461	0.1000	1240.00	10.67	53.69	5.03
Faults	95	0.1000	402.00	4.66	18.51	3.98
Not Logged	284	0.0010	551.00	23.84	50.36	2.11
ALL	16320	0.0010	4720.00	11.30	57.14	5.05

*** Copper and Zinc are reported in % and Silver is reported in gpt**

Nearly 80 percent of the samples assayed were logged as pyroxene hornfels, limestone, metasediment, marble, or skarn. The remaining 20 percent of assay samples represent lithologies in contact or proximal to the main altered sedimentary rocks. A combined histogram (Figure 14-4) of the copper assays from the two data sets shows that these assays exhibit behavior similar to the endoskarns, mantles, and breccia pipes.

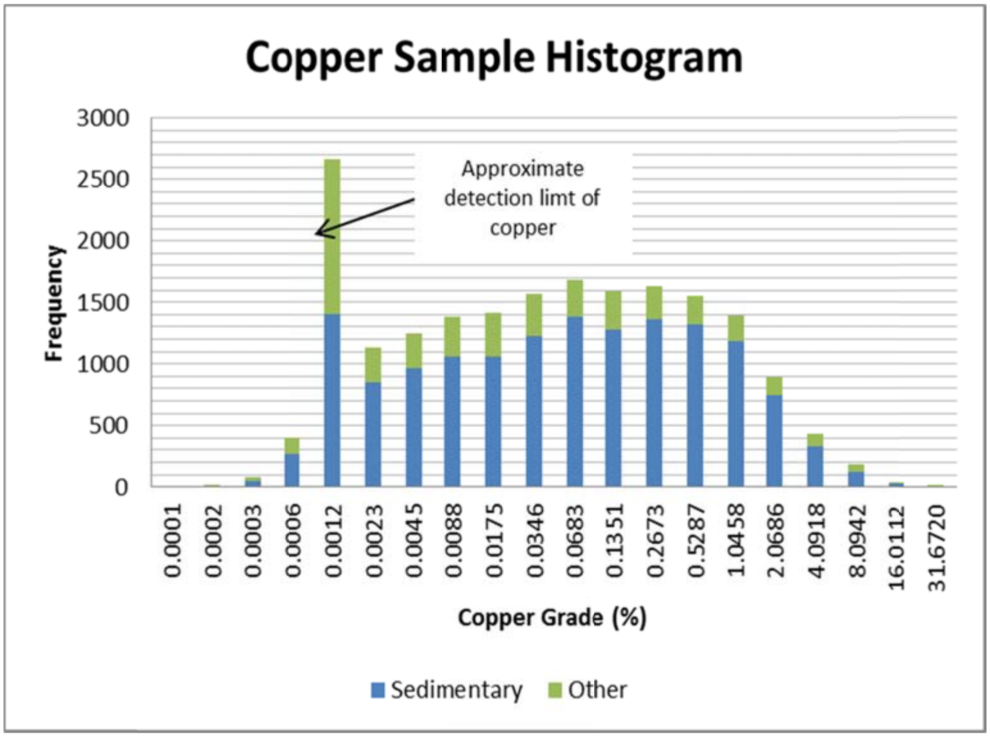

Figure 14-4 Combined Copper Assay Histogram

14.5 <u>Compositing</u>

El Gallo assay samples were coded based on the skarn intersected. The samples within each individual skarns were calculated down-the-hole at intervals as close to three meters as possible, but composite intervals were adjusted to fit between unassayed intervals. El Gallo composite statistics are summarized in Table 14-3.

Table 14-3 El Gallo Composite Statistics Summary

Copper Composite Descriptive Statistics						
Skarn	**Number**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**	**COV**
Increible	481	0.0002	10.12	0.24	0.66	2.73
Alta Ley	3815	0.0002	37.59	0.56	1.69	3.02
Zinc Composite Descriptive Statistics						
Skarn	**Number**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**	**COV**
Increible	481	0.0011	21.67	0.25	1.18	4.74
Alta Ley	3815	0.0010	47.69	2.26	5.84	2.58
Silver Composite Descriptive Statistics						
Skarn	**Number**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**	**COV**
Increible	481	0.1000	333.00	9.45	29.02	3.07
Alta Ley	3815	0.0010	674.17	13.53	30.64	2.27
El Gallo Skarn Thickness Composite Descriptive Statistics						
Skarn	**Number**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**	**COV**
Upper	101	0.5500	86.57	13.43	12.29	0.92
Lower	122	0.6200	51.50	20.11	9.58	0.48
El Gallo Skarn Copper Composite Descriptive Statistics						
Skarn	**Number**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**	**COV**
Upper	64	0.0021	8.05	1.05	0.97	0.93
Lower	108	0.0084	4.89	0.65	0.42	0.64
El Gallo Skarn Zinc Composite Descriptive Statistics						
Skarn	**Number**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**	**COV**
Upper	64	0.0098	14.39	0.39	1.02	2.64
Lower	108	0.0035	5.65	0.16	0.33	2.08
El Gallo Skarn Thickness Composite Descriptive Statistics						
Skarn	**Number**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**	**COV**
Upper	64	0.8667	262.41	29.70	43.85	1.48
Lower	108	0.3333	119.81	16.60	21.59	1.30
El Gallo Skarn Gold Composite Descriptive Statistics						
Skarn	**Number**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**	**COV**
Upper	245	0.0025	9.54	0.234	1.01	4.32
Lower	710	0.0025	4.02	0.20	0.38	1.89

*** Copper and Zinc are reported in % and Silver and Gold are reported in gpt. Thickness is reported in meters.**

Alta Ley and Increíble assay samples were also calculated down-the-hole at intervals as close to three meters as possible and composite intervals were adjusted to be fit between unassayed intervals. Alta Ley and Increíble composite statistics are summarized in Table 14-4.

Table 14-4 Alta Ley and Increíble Compositie Statistics Summary

Copper Composite Descriptive Statistics						
Skarn	**Number**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**	**COV**
Increíble	481	0.0002	10.12	0.24	0.66	2.73
Alta Ley	3815	0.0002	37.59	0.56	1.69	3.02
Zinc Composite Descriptive Statistics						
Skarn	**Number**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**	**COV**
Increíble	481	0.0011	21.67	0.25	1.18	4.74
Alta Ley	3815	0.0010	47.69	2.26	5.84	2.58
Silver Composite Descriptive Statistics						
Skarn	**Number**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**	**COV**
Increíble	481	0.1000	333.00	9.45	29.02	3.07
Alta Ley	3815	0.0010	674.17	13.53	30.64	2.27

*** Copper and Zinc are reported in % and Silver is reported in gpt.**

14.6 Variography

A variography analysis was completed for the Increíble zone, the Alta Ley zone, and the domains (upper and lower skarns) of the El Gallo zone to establish the spatial variability of mineralization for each metal estimated within a zone or domain. Variography establishes the appropriate contribution that any specific composite should have when estimating a block volume value within a model. This is performed by comparing the orientation and distance used in the estimation to the variability of other samples of similar relative direction and distance. An example of a spherical variogram constructed from the major axis of the El Gallo lower skarn domain using a "Pairwise Relative" method of organizing the variance pairs is shown in Figure 14-5.

Variograms were created for both horizontal and vertical orientations within each zone and/or domain in increments of 30° horizontally and 15° vertically. Search ellipsoid axis orientations were based on the results of that analysis. The sill and nugget values for each metal were taken from the omnidirectional and downhole variograms, respectively. The resultant variogram directions and parameters are presented in Tables 14-5 and 14 -6, respectively.

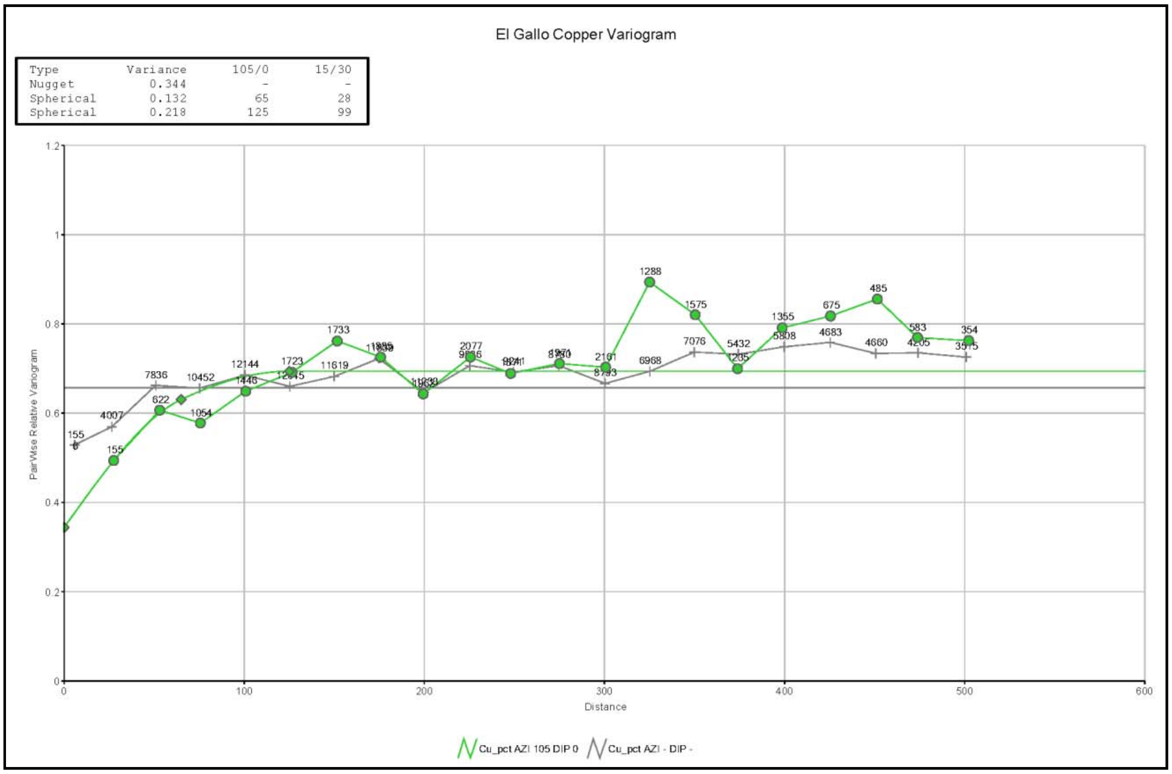

Figure 14-5 El Gallo Pairwise Copper Variogram

Table 14-5 Comparitive Variogram Direction

	El Gallo		Increíble	Alta Ley
	Upper Skarn	Lower Skarn		
Dip	15	15	140	218
Dip Direction	30	30	69	48

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Table 14-6 Ordinary Kriging Parameters

	Copper				Zinc				Silver				Gold	
	El Gallo		Increible	Alta Ley	El Gallo		Increible	Alta Ley	El Gallo		Increible	Alta Ley	El Gallo	
	Upper Skarn	Lower Skarn			Upper Skarn	Lower Skarn			Upper Skarn	Lower Skarn			Upper Skarn	Lower Skarn
Model Type	**Spherical**	**Spherical**	**Spherical**	**Spherical**	**Spherical**	**Spherical**	**Spherical**	**Spherical**	**Spherical**	**Spherical**	**Spherical**	**Spherical**	**Spherical**	**Spherical**
C_0	0.431	0.344	0.152	0.190	0.488	0.344	0.372	0.190	0.316	0.297	0.309	0.190	0.541	0.585
C_1	0.260	0.132	0.486	0.578	0.146	0.181	0.110	0.578	0.146	0.157	0.071	0.578	0.383	0.415
C_2	0.317	0.218	0.362	---	0.283	0.311	0.519	---	0.355	0.247	0.620	---	---	---
$Range_{x1}$	42.5	65.0	72.0	11.5	71.0	64.0	24.0	13.0	46.0	28.0	20.0	11.4	74.0	52.9
$Range_{x2}$	85.0	28.0	74.0	---	125.0	57.0	32.0	---	70.0	54.0	76.0	---	---	---
$Range_{Y1}$	42.5	29.0	35.0	13.2	29.0	12.0	92.0	14.8	29.0	12.0	40.0	13.3	57.0	40.7
$Range_{Y2}$	82.0	125.0	35.0	---	75.0	197.0	78.0	---	73.0	62.0	33.0	---	---	---
$Range_{Z1}$	30.0	99.0	157.0	15.8	29.0	145.0	47.0	12.9	29.0	157.0	70.0	14.0	20.0	14.3
$Range_{Z2}$	64.0	73.0	232.0	---	64.0	39.0	170.0	---	75.0	60.0	231.0	---	---	---

14.7 Methodology

Gustavson used two different estimation methods for the three zones. The El Gallo zone was subdivided into the upper and lower skarn estimation domains, and was estimated using an ordinary kriging method. The Increíble and Alta Ley zones were estimated utilizing Multiple Indicator Kriging (MIK) in an effort to mimic the erratic distribution of mineralization.

14.7.1 Ordinary Kriging Estimation

The parameters used for ordinary kriging grade interpolation for the upper and lower skarn domains of El Gallo, including nugget, sill, search ellipse orientation, and range, are listed in Table 14-6. Both domains were estimated using a minimum of 5 composites and maximum of 15 composites, with no more than 3 composites from a single drill hole.

Gustavson completed an analysis of the silver, copper, and zinc assays to evaluate if capping of the assayed values was warranted. Irregular sampling intervals like those found in the Bolívar database can bias the statistics toward extreme highs or lows. To properly analyze a sample population for outliers, the sample intervals need to be of equal length. Cumulative Frequency Plots (CFP) of the composited values for each metal in each of the upper and lower skarns were generated. From this distribution Gustavson concluded that capping was not necessary for the Bolívar mineral resource estimation. The CFP for silver in the lower skarn shows no significant statistical outliers (Figure 14-6).

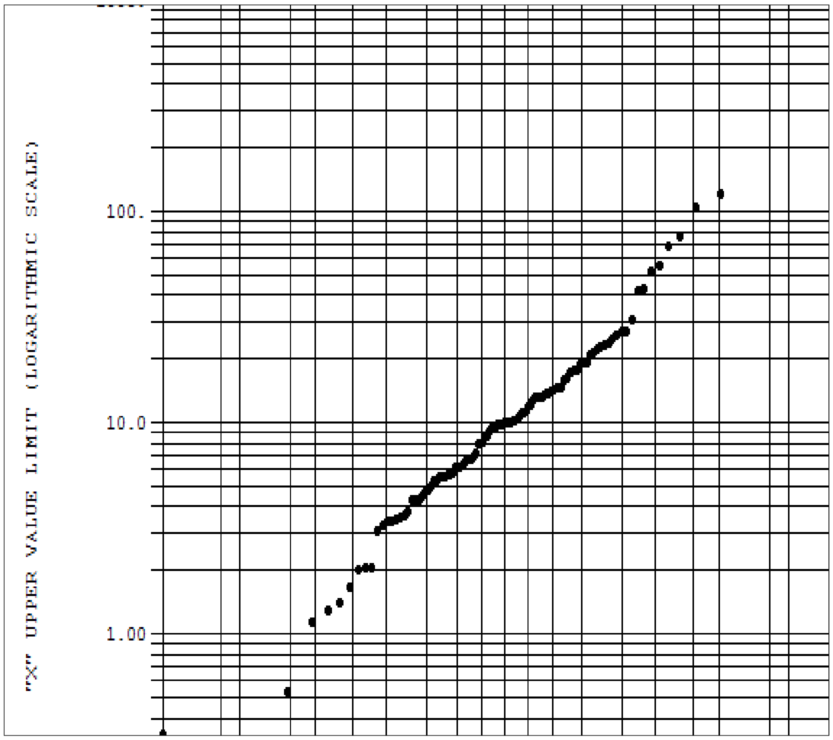

Figure 14-6 El Gallo Lower Skarn Cumulative Frequency Plots for Silver

14.8 Multiple Indicator Kriging Estimation

A Multiple Indicator Kriging (MIK) model was used to estimate the erratic mineralization found in the Increíble and Alta Ley zones while controlling extreme high grade samples. MIK provides a discrete approximation of the Cumulative Distribution Function (CDF) for the samples found within a defined search neighborhood on a block by block basis. As this distribution is based on the samples found within the search neighborhood centered on a block centroid, it changes from block to block to reflect local grade variability.

Cut-off classes were selected for both zones to maintain an equal percentage of samples between each cut-off. The cut-offs were set to the deciles for the zone sample population excluding un-sampled intervals. The cut-offs of both the Increíble and Alta Ley zones are summarized in Table 14-5. Both zones were estimated using a minimum of 5 composites and maximum of 11 composites with no more than 3 composites from a single drill hole. Capping was not applied for estimation because grade estimation is done by grade cut-off intervals. Variography was completed on the median indicator for both zones and the grades were estimated at each cut-off using the median indicator variogram model. Estimation parameters are presented in Table 14-7.

Table 14-7 Estimation Parameters

Decile	Alta Ley			Increíble		
	Cut-off					
	Copper	Silver	Zinc	Copper	Silver	Zinc
10	0.003	0.3	0.007	0.001	0.1	0.006
20	0.010	0.6	0.015	0.003	0.2	0.009
30	0.025	1.2	0.030	0.005	0.3	0.012
40	0.055	2.2	0.064	0.011	0.7	0.016
50	0.113	3.9	0.162	0.023	1.2	0.023
60	0.208	6.5	0.422	0.045	2.4	0.040
70	0.381	11.3	0.966	0.142	5.2	0.075
80	0.663	19.5	2.306	0.330	9.5	0.216
90	1.330	35.0	5.869	0.697	23.0	0.434

14.9 Bulk Density

Ten samples as representative as possible, were obtained from the production areas intercepted by drill cuttings which are directed to the works.

- Sample 1. - Drillhole DB12B399 and was taken to 233.65 meters, which is described as a massive chalcopyrite grossularite skarn with massive magnetite and disseminated chalcopyrite.
- Sample 2. –Drillhole DB12B399 consists of massive magnetite with disseminated chalcopyrite corresponding to 279.5 meters depth of El Gallo area.
- Sample 3. - Skarn with disseminated chalcopyrite and magnetite semi massive, the sample was obtained from borehole DB12B394 to 100.15 meters.
- Sample 4. – Surface drillhole DB12B394 at 106.60 meters depth, which belongs to the Gallo Superior mineralized zone, in which there is an andradite skarn with disseminated chalcopyrite and nodules, disseminated magnetite.
- Sample 5. - La Narizona mine; massive sphalerite, chalcopyrite disseminated on skarn andradite.
- Sample 6. - Andradite skarn with chalcopyrite in sphalerite semi massive traces, taken from La Narizona.
- Sample 7. - Work mine 0-204, yellow skarn with disseminated chalcopyrite
- Sample 8. –El Gallo 0-160; samples were obtained of massive magnetite disseminated with disseminated chalcopyrite.

- Sample 9. - Skarn with disseminated chalcopyrite corresponding to 1-366 recess.
- Sample 10. – El Gallo 1-310 pit; skarn with chalcopyrite, traces to disseminated bornite.

The results are presented in Table 14-8.

Table 14-8 Bulk Density Testing Results

DATA	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 4	SAMPLE 5	SAMPLE 6	SAMPLE 7	SAMPLE 8	SAMPLE 9	SAMPLE 10
W1 WEIGTH OF PYCNOMETER + SAMPLE WEIGTH	22.332	22.574	22.421	23.914	22.339	22.849	22.882	24.266	22.566	22.974
W2 WEIGTH OF PYCNOMETER + SAMPLE WEIGTH + WEIGTH OF WATER	46.800	46.981	46.850	48.060	46.777	47.035	47.194	48.298	46.954	47.302
SAMPLE WEIGTH	1.927	2.169	2.016	3.509	1.933	2.444	2.476	3.861	2.161	2.568
WEIGTH OF WATER IN W2	24.468	24.407	24.429	24.146	24.438	24.186	24.312	24.032	24.388	24.329
VOLUME OF WATER IN W2	24.536	24.475	24.497	24.214	24.507	24.254	24.380	24.099	24.456	24.397
SAMPLE VOLUME	0.464	0.525	0.503	0.786	0.493	0.746	0.620	0.901	0.544	0.603
SAMPLE SPECIFIC WEIGTH	4.155	4.130	4.009	4.464	3.921	3.274	3.994	4.287	3.975	4.258

The bulk density for mineralized zones is 3.7 g/cm^3 based on these data and the site knowledge of the QP.

14.10 Estimation Validation

The model was validated by comparing the block statistics against actual drill hole assay data to determine if the estimated blocks fit the grade of the various domains of the deposit. Grade and thickness plan maps from the upper and lower skarn are presented in Figures 14-7 through 14-10. Composite grades match well with estimated average block grades, indicating the modeling method is appropriate.

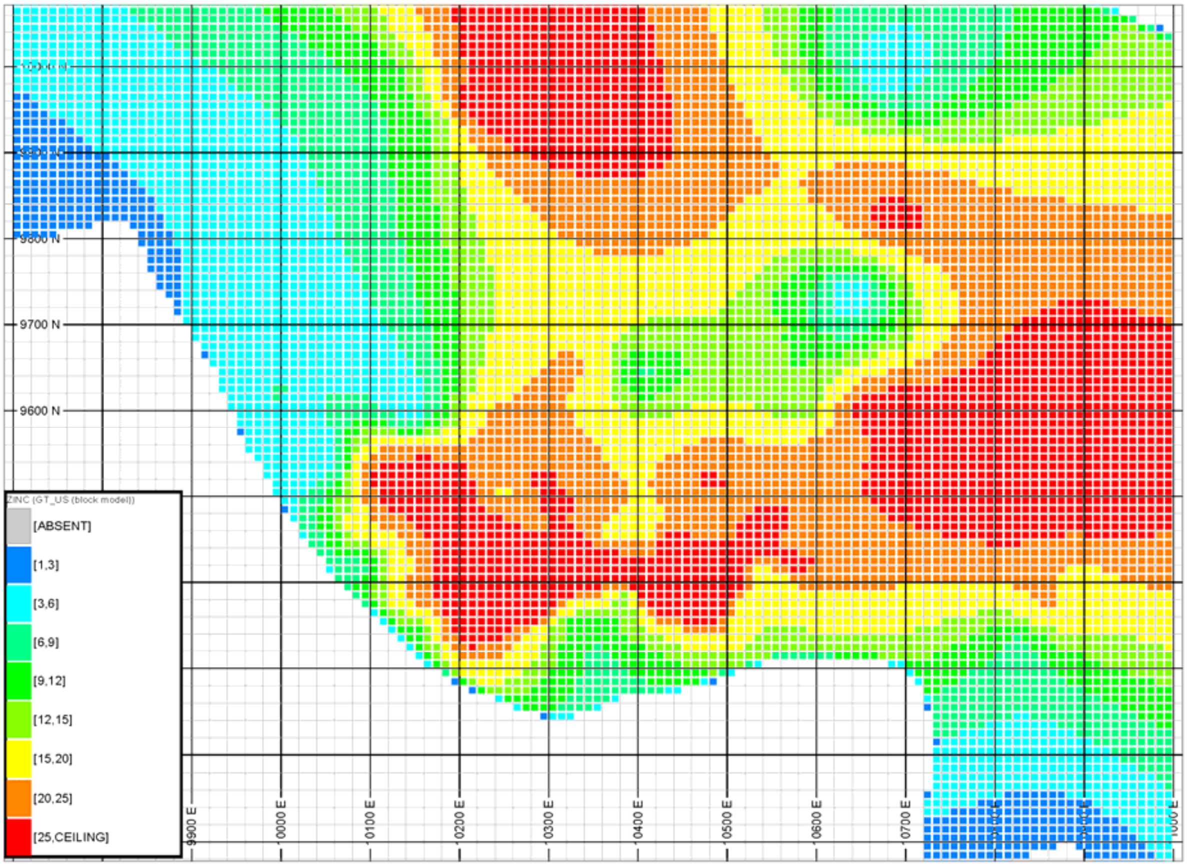

Figure 14-7 Zinc Grade Thickness Map for Upper Skarn

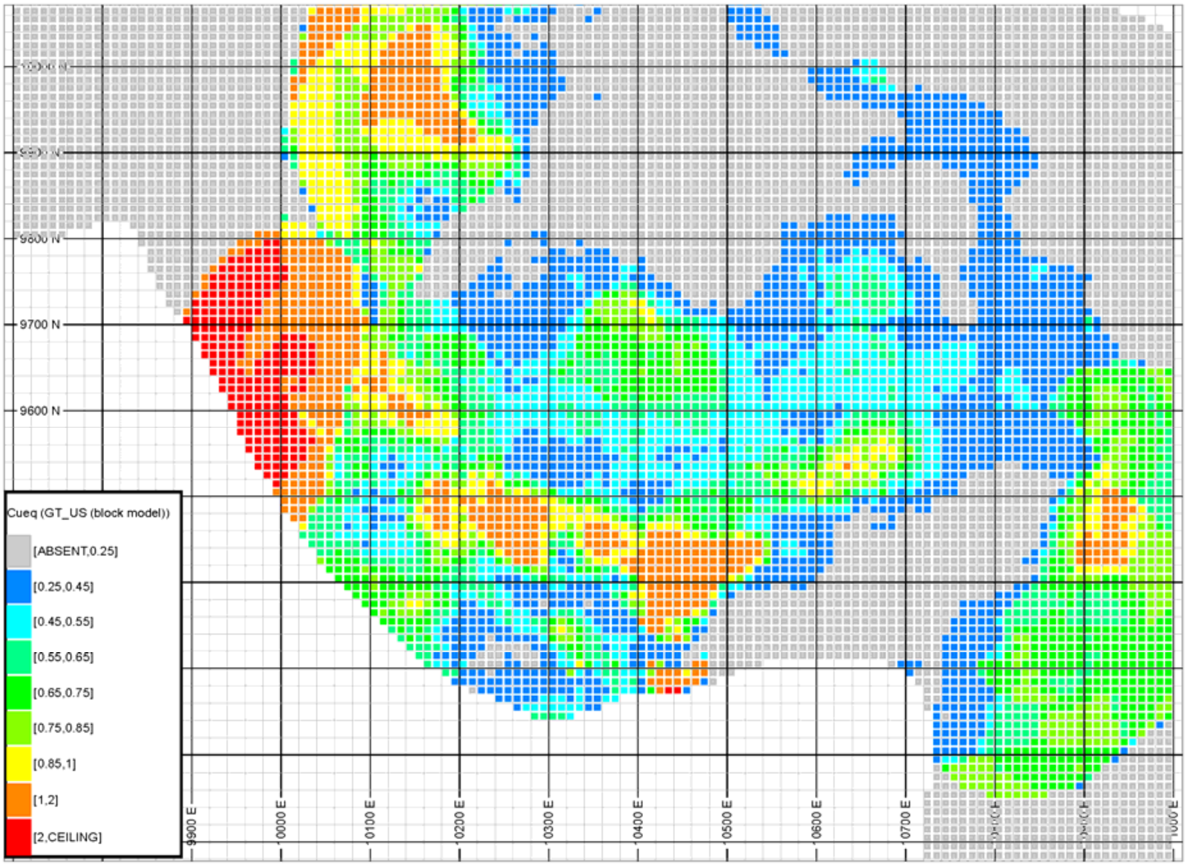

Figure 14-8 Copper Equivalent Grade Thickness Map for Upper Skarn

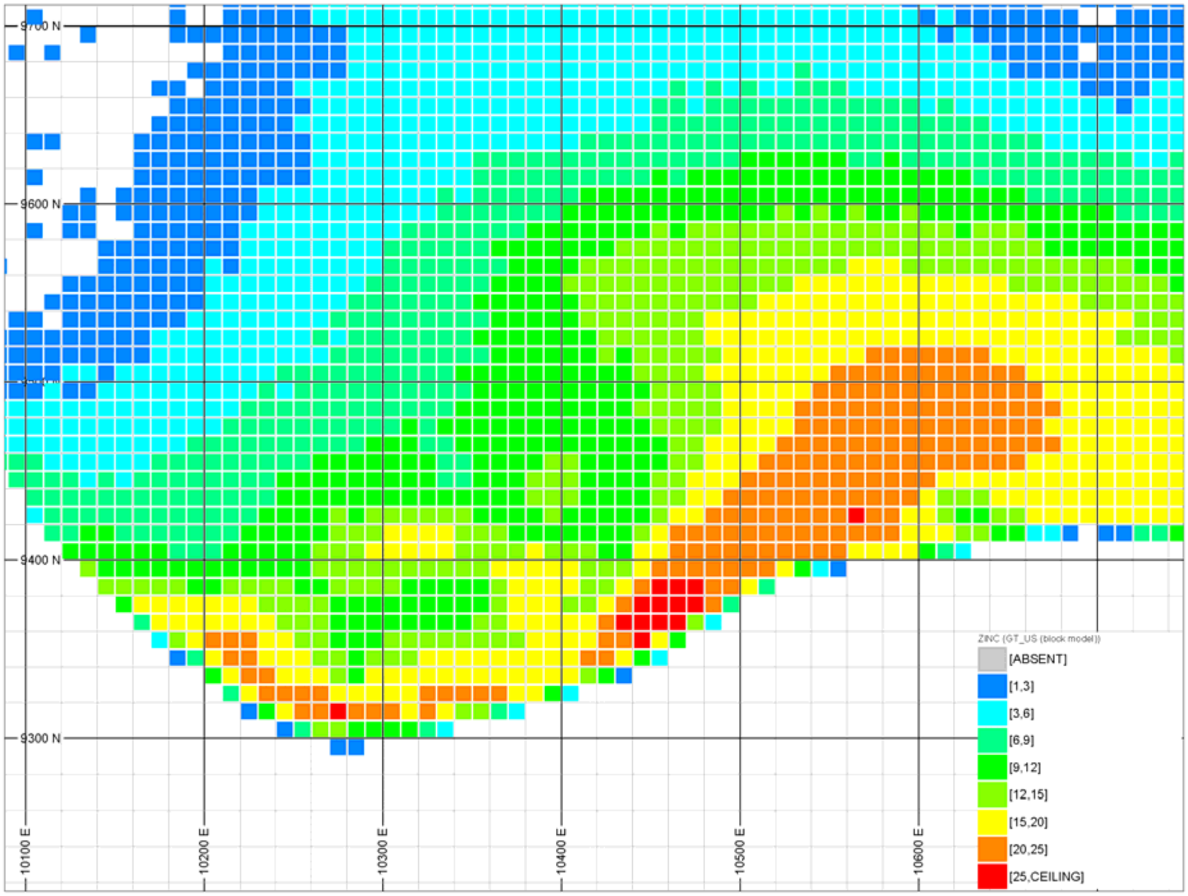

Figure 14-9 Zinc Grade Thickness Map for Lower Skarn

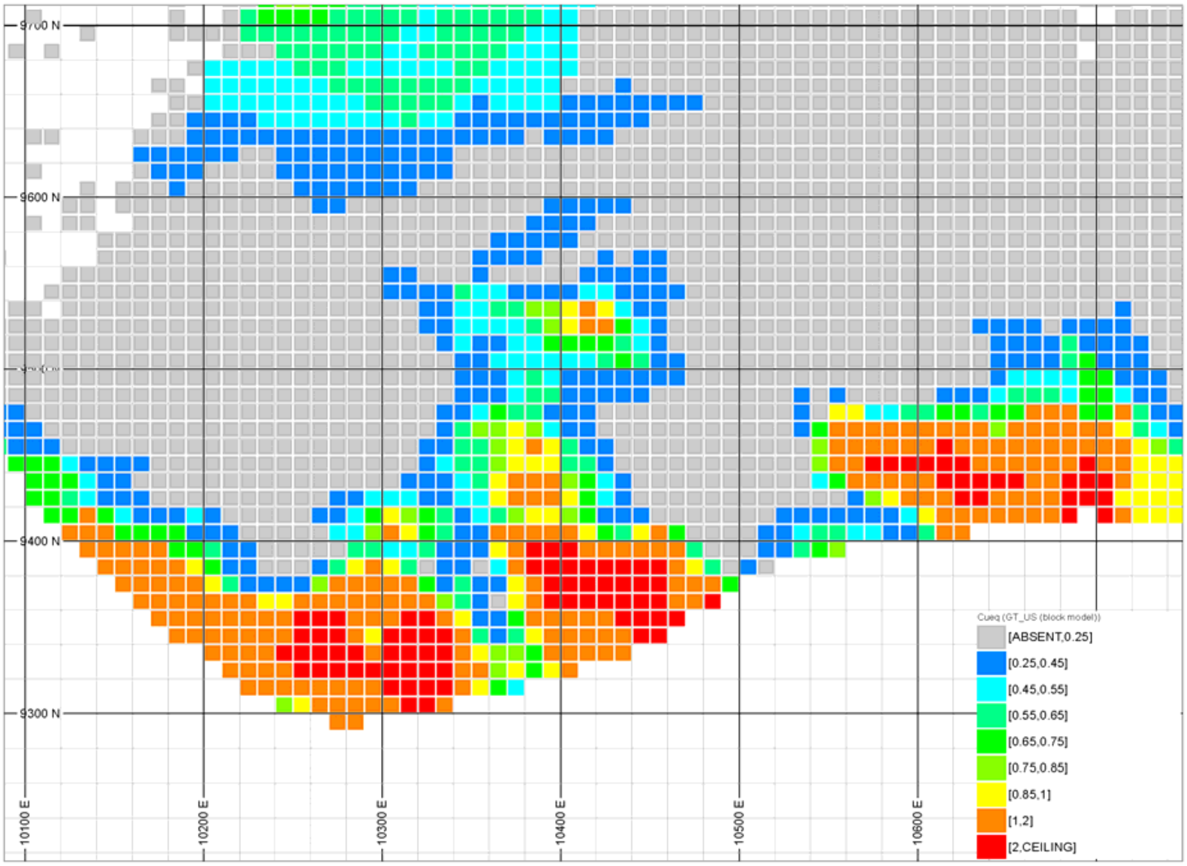

Figure 14-10 Copper Eqiuvalent Grade Thickness Map for Lower Skarn

14.11 <u>Mineral Resource Classification</u>

The mineral resources at Bolívar are classified as measured, indicated, and inferred in accordance with CIM.

The resource was placed into measured, indicated and inferred categories based on the transformed distance to the nearest composite. The transformed distance is calculated by rotating the composite data into the coordinate system of the search ellipse, placing the center of the search ellipse on the center of the block being estimated, and using the following formula:

Equation 14-1 Equation for Transformed Distance

$$D = \sqrt{[}\left(\frac{X}{Axis1}\right) * 2 + \left(\frac{Y}{Axis2}\right) * 2 + \left(\frac{Z}{Axis3}\right) * 2]$$

Where D is the transformed distance, X, Y, and Z are the rotated distances from the block centroid to the composite centroid, and Axis 1, Axis 2, and Axis 3 are the lengths of the axes of the search ellipse.

Copper is the main metal of interest at Bolívar and all blocks were classified based on the copper estimation. The distances, in meters, used to assign classifications are listed in Table 14-9. These classifications were substantiated by overlaying the classified blocks over the drill hole sections to confirm that the criteria were appropriate.

Table 14-9 Classification Distances

Domain	Measured	Indicated	Inferred
Upper Skarn	65	130	260
Lower Skarn	71	142	284
Increíble	---	18	250
Alta Ley	10	16	48

14.12 Mineral Resource Estimate

Table 14-10 shows the measured, indicated, and inferred mineral resources estimated for the Bolívar mine, using data received as of April 5, 2012. Mineral resources are reported using a 0.66% equivalent copper cut-off.

In January 2013 it was decided that the potential for Resources containing gold should be investigated and where possible, added to the Resource report. The Resource model was re-run adding the existing gold information (as of April 2012) and it was determined that there was sufficient data to report the gold additions in Gallo Superior and Inferior. This addition was done as an add-on to the October 15, 2013 Resource Report and the gold listed in Tables 1-1 and 14-10 is not in the copper equivalent calculations. The model defines where there are Measured or Indicated blocks based on the copper equivalent calculation and the search distances and the gold within these reported Measured and Indicated blocks are assigned gold quantities and grades based on the additional Resource modeling.

Table 14-11 shows what portion of the total Measured and Indicated Resources above 0.66 Cueq cut-off are within each deposit. The re-run of the Resource model to include gold was only done for the Gallo Superior and Inferior because this is the focus of the mining activity for the next 10 to 11 years and is the deposits that have sufficient data to model. There are no tonnes shown in Table 14-11 for Increible because all of the Increible Resources are classified as Inferred.

It is believed by Gustavson that additional drilling and data collection in the proper areas will not only help to move some of the Inferred Resources to a higher category, but may also improve the Resources for what is now referred to as Alto Ley.

Table 14-10 Total Resources for the Bolívar Mine

Total Bolivar Measured Resources

Cutoff	Tonne	Copper Equivalent		Silver		Copper		Zinc		Gold	
Cueq (%)	(x 1000)	%	lbs. (x 1000)	gpt	oz. (x 1000)	%	lbs. (x 1000)	%	lbs. (x 1000)	gpt	oz. (x1000)
1%	5,071	1.76%	196,808	29.7	4,845	1.09%	121,965	1.38%	154,750	0.3	30.8
0.85%	6,394	1.59%	223,658	26.4	5,431	1.00%	140,780	1.20%	169,658	0.3	37.5
0.75%	7,584	1.46%	244,605	24.2	5,891	0.93%	155,501	1.08%	181,048	0.3	43.6
0.66%	**8,847**	**1.35%**	**264,205**	**22.3**	**6,333**	**0.87%**	**169,423**	**0.98%**	**190,851**	**0.2**	**49.6**
0.55%	10,800	1.22%	290,252	19.9	6,917	0.79%	188,163	0.85%	203,091	0.2	58.3
0.45%	12,927	1.10%	313,629	17.8	7,410	0.72%	204,787	0.76%	215,594	0.2	65.5
0%	50,449	0.33%	369,959	5.4	8,748	0.22%	241,177	0.23%	255,600	0.1	80.3

Note: Gold grade is not included in copper equivalent calculation and is only estimated in El Gallo Superior and El Gallo Inferior.

Total Bolivar Indicated Resources

Cutoff	Tonne	Copper Equivalent		Silver		Copper		Zinc		Gold	
Cueq (%)	(x 1000)	%	lbs. (x 1000)	gpt	oz. (x 1000)	%	lbs. (x 1000)	%	lbs. (x 1000)	gpt	oz. (x1000)
1%	2,627	1.65%	95,470	22.4	1,888	0.94%	54,248	1.28%	73,923	0.3	12.7
0.85%	3,898	1.41%	121,079	19.2	2,401	0.81%	69,412	1.26%	108,330	0.3	18.3
0.75%	5,075	1.27%	141,788	17.2	2,806	0.74%	82,669	1.15%	128,432	0.3	24.6
0.66%	**6,557**	**1.14%**	**164,706**	**15.6**	**3,285**	**0.67%**	**97,316**	**1.05%**	**151,389**	**0.2**	**30.8**
0.55%	9,190	0.99%	199,624	13.5	4,003	0.59%	120,449	0.89%	179,440	0.2	38.7
0.45%	12,611	0.85%	237,264	11.9	4,824	0.52%	145,938	0.75%	207,845	0.2	46.4
0%	84,934	0.17%	323,757	2.6	7,004	0.11%	200,752	0.13%	248,910	0.1	64.1

Note: Gold grade is not included in copper equivalent calculation and is only estimated in El Gallo Superior and El Gallo Inferior.

Total Bolivar Measured + Indicated Resources

Cutoff	Tonne	Copper Equivalent		Silver		Copper		Zinc		Gold	
Cueq (%)	(x 1000)	%	lbs. (x 1000)	gpt	oz. (x 1000)	%	lbs. (x 1000)	%	lbs. (x 1000)	gpt	oz. (x1000)
1%	7,697	1.72%	292,279	27.2	6,733	1.04%	176,213	1.35%	228,673	0.3	43.6
0.85%	10,292	1.52%	344,738	23.7	7,832	0.93%	210,192	1.23%	277,987	0.3	55.8
0.75%	12,659	1.38%	386,393	21.4	8,697	0.85%	238,170	1.11%	309,480	0.3	68.2
0.66%	**15,404**	**1.26%**	**428,912**	**19.4**	**9,619**	**0.79%**	**266,739**	**1.01%**	**342,240**	**0.2**	**80.4**
0.55%	19,990	1.11%	489,876	17.0	10,920	0.70%	308,613	0.87%	382,530	0.2	97.0
0.45%	25,538	0.98%	550,893	14.9	12,234	0.62%	350,725	0.75%	423,440	0.2	111.9
0%	135,383	0.23%	693,716	3.6	15,752	0.15%	441,928	0.17%	504,510	0.1	144.5

Note: Gold grade is not included in copper equivalent calculation and is only estimated in El Gallo Superior and El Gallo Inferior.

Total Bolivar Inferred Resources

Cutoff	Tonne	Copper Equivalent		Silver		Copper		Zinc		Gold	
Cueq (%)	(x 1000)	%	lbs. (x 1000)	gpt	oz. (x 1000)	%	lbs. (x 1000)	%	lbs. (x 1000)	gpt	oz. (x1000)
1%	1,924	1.91%	81,104	30.3	1,877	1.22%	50,610	1.38%	58,579	0.3	10.5
0.85%	3,824	1.42%	119,675	22.2	2,729	1.24%	74,558	1.12%	94,046	0.3	23.3
0.75%	5,035	1.27%	140,846	19.9	3,222	1.23%	87,390	1.05%	116,141	0.3	31.2
0.66%	**6,164**	**1.17%**	**158,434**	**18.1**	**3,590**	**1.26%**	**99,796**	**0.93%**	**126,582**	**0.3**	**38.1**
0.55%	7,772	1.05%	179,615	16.1	4,033	1.29%	114,431	0.81%	139,629	0.2	46.0
0.45%	9,120	0.97%	194,470	15.1	4,413	1.27%	124,009	0.74%	149,547	0.2	50.5
0%	133,426	0.10%	293,720	1.7	7,445	1.10%	180,858	0.08%	229,753	0.1	68.5

Note: Gold grade is not included in copper equivalent calculation and is only estimated in El Gallo Superior and El Gallo Inferior.

Table 14-11 Deposit with Tonnes and Grade

Zone	Tonnes	Ag (gpt)	Cu (%)	Zn (%)	Cueq (%)	Au (gpt)
El Gallo Superior	2,041,527	30.920	1.226	0.468	1.663	0.208
El Gallo Inferior	8,550,959	20.820	0.757	0.366	1.064	0.243
Increible	-	-	-	-	-	Not Modeled
Alta Ley	4,811,788	12.161	0.649	2.530	1.446	Not Modeled
Total	15,404,274	19.454	0.785	1.055	1.263	0.236

Note: CUEQ>0.66 AND M&I

Quality and grade are estimates and are rounded to reflect the fact that the resource estimate is an approximation.

A mineral reserves estimate was not prepared. Mineral resources are not mineral reserves and do not demonstrate economic viability. There is no certainty that all or any part of the mineral resource will be converted to mineral reserves. The calculation of the mineral reserves is shown in other sections of this report.

The equations for copper equivalent and the estimated cut-off are presented below.

Equation 14-2 Equation for Copper Equivalent Cut-Off

$$Cueq(\%)Cutoff = \frac{Mine\ Cost + Process\ Cost}{Cu\ price\ * Cu\ recovery\ * 2204.6}$$

Values used for copper equivalent calculation are provided below:

- Mine Cost is \$22.94.
- Process Cost is \$19.57.

Cueq is the copper equivalent used to calculate the cutoff. The copper equivalent was calculated with the following equation:

Equation 14-3 Equation for Copper Equivalent

$$Cueq(\%) = Cu\,\% + \frac{Zn\,\%\ * Zn\ price\ * Zn\ recovery}{Cu\ price\ * Cu\ recovery} + \frac{Ag\ gpt * Ag\ Price\ * Ag\ recovery}{22.0462\ * Cu\ price\ * 31.10348 * Cu\ recovery}$$

Values used for copper equivalent calculation are provided below:

- Copper
  - $3.56 per pound
  - 82% recovery
- Zinc
  - $0.96 per pound
  - 81% recovery
- Silver
  - $26.28 per pound
  - 77% recovery.

Gustavson knows of no existing environmental, permitting, legal, socio-economic, marketing, political, or other factors that might materially affect the mineral resource estimate.

15. MINERAL RESERVE ESTIMATE (ITEM 15)

The mineral Reserve statement for the Bolívar Mine was completed by Karl D. Gurr, SME-RM, Gustavson Associate Resource Geologist and QP. This mineral Reserve estimate was prepared in accordance with NI 43-101 and CIM.

Gustavson’s initial approach to estimating the Reserves for the report was to study and verify the mine plans developed by the client and then independently estimate the Reserves. Unfortunately, the client’s mine plans did not incorporate all of the information on Resources that was presented in the October 15, 2012 Gustavson NI 43-101 Technical Report. Additionally, the dip of the deposit as shown within the block model was at a 33 degree angle and not the 24 degree angle currently used by the client. Therefore, it was then necessary for Gustavson to develop the mine planning and Reserve estimate directly from the updated Resource model completed during the Resource estimating and from the NI 43-101.

This report, the PFS Report, mine plan and Reserve estimate are based on Gustavson’s work and mine plan. The relationship of the four Resource areas, (Alto Ley, Increible, Gallo Superior and Gallo Inferior) as defined in Section 14 is shown in Figure 15-1, where red indicates Alto Ley, lime green indicates Increible, dark blue indicates Gallo Superior (Upper Skarn) and violet indicates Gallo Inferior (Lower Skarn). The Figure 15-1 view was chosen to best illustrate the relative positions of the 4 deposits, but in the software where the deposits can be viewed in a 3-D rotation, it is more evident that the deposits are separate and distinct. These were modeled as definitively different areas, but the Alto Ley may only be another area of the Upper Skarn. Current drilling shows that Alto Ley does not hold together well enough to apply a logical mining method. Also, Alto Ley has much higher zinc, but lower silver and copper than the other deposits. Increible has a lower grade, needs additional drilling and has an issue with the local residents near the site. Therefore, the Reserve evaluation for this Technical Report focuses only on Gallo Superior and Gallo Inferior.

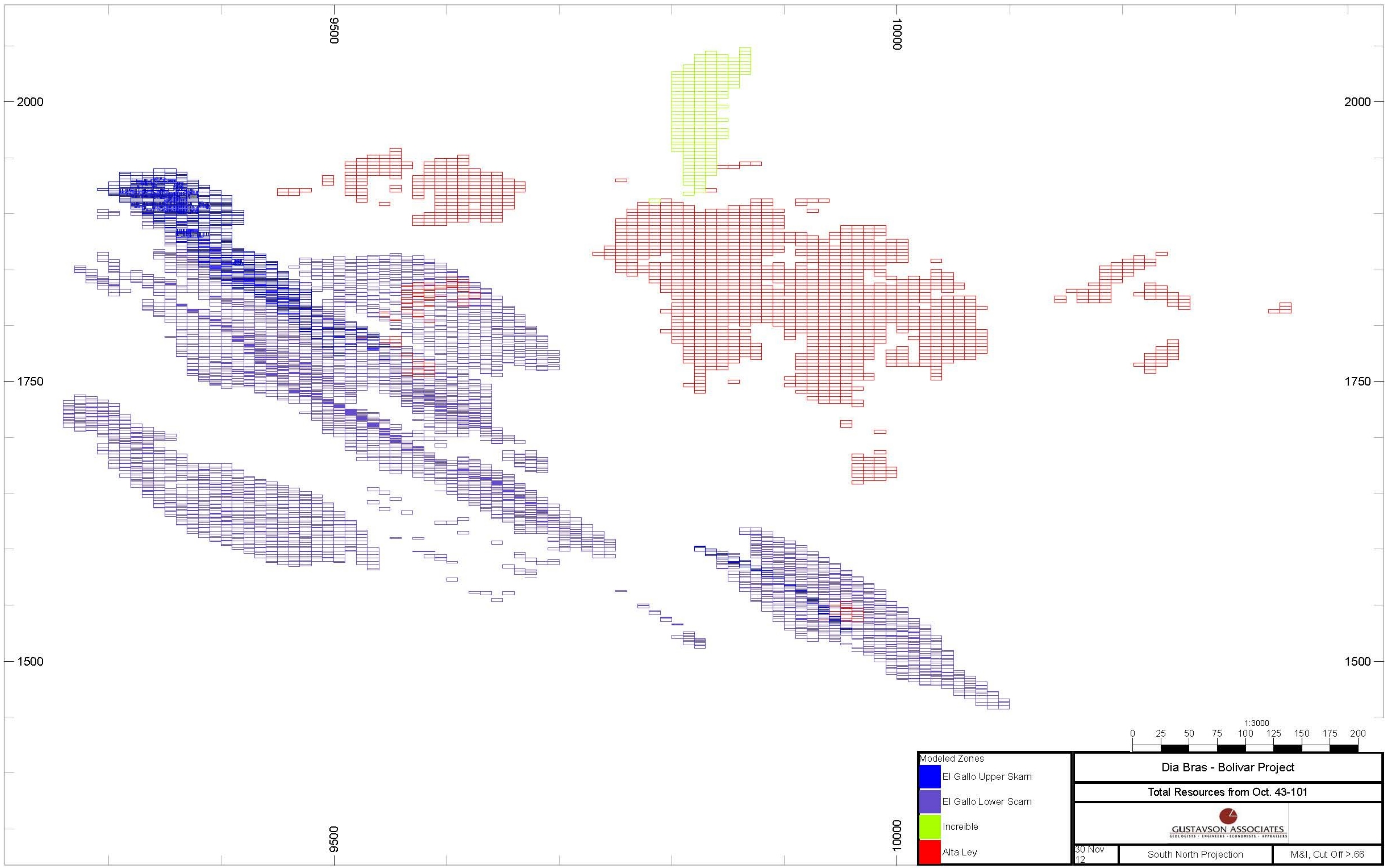

Figure 15-1 Modeled Zones

The tonnages associated with each deposit zone, classified as Measured or Indicated and above the cut-off grade 0.66 % Cueq (no Au), are presented in Table 15-1. Note that no tonnes are included for Increible (all Increible tonnes are classified as Inferred). The 15.4 million tonnes matches the total Bolivar Measured and Indicated resources presented in Section 14, Table 14-10.

Table 15-1 Deposit with Tonnes and Grade

Zone	Tonnes	Ag (gpt)	Cu (%)	Zn (%)	Cueq (%)	Au (gpt)
El Gallo Superior	2,041,527	30.920	1.226	0.468	1.663	0.208
El Gallo Inferior	8,550,959	20.820	0.757	0.366	1.064	0.243
Increible	-	-	-	-	-	Not Modeled
Alta Ley	4,811,788	12.161	0.649	2.530	1.446	Not Modeled
Total	15,404,274	19.454	0.785	1.055	1.263	0.236

Note: CUEQ>0.66 AND M&I

15.1 Mining Method and Development

The mining method and mine planning is presented in Section 16.

15.2 Mineral Reserve Estimate – Gallo Superior

Gallo Superior consists of two separate Resource areas referred to as Gallo Superior and Gallo Superior Magnetita. Figure 15-2 shows a plan view of the extent of the Resource area for each of the Gallo Superior areas. The total contained Resources for both areas are provided in Table 15-1 Resources of Gallo Superior.

The Resources for Gallo Superior are presented in Table 15-2.

Table 15-2 Gallo Superior Resources Prior to Mining Activity, M+I >=0.66% Cueq

Blocks in Gallo Superior						
Category (% Cueq)	**Tonnes**	**Ag (gpt)**	**Cu (%)**	**Zn (%)**	**Cueq (%) (no Au)**	**Au (gpt)**
0.65 < 0.75	91,000	14.031	0.510	0.172	0.698	0.112
0.75 < 0.85	91,000	16.854	0.595	0.133	0.800	0.114
0.85 < 1	113,000	18.892	0.693	0.158	0.926	0.174
1 < 2	580,000	27.034	1.052	0.440	1.442	0.213
2+	394,000	58.883	1.909	0.821	2.722	0.444
Totals	**1,269,000**	**34.543**	**1.215**	**0.492**	**1.695**	**0.267**

Note: the Cueq calculation does not include gold.

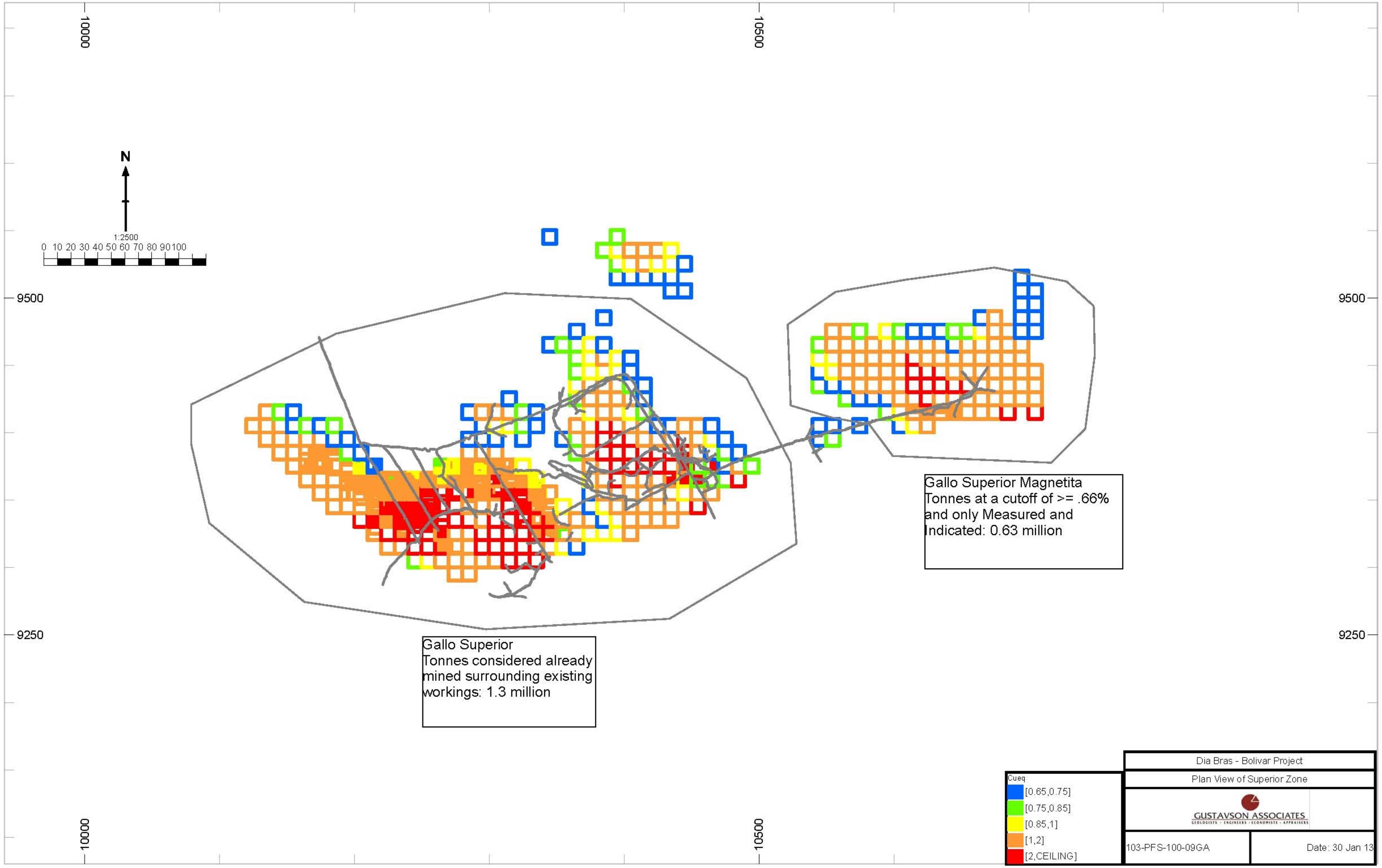

Figure 15-2 Gallo Superior Resources

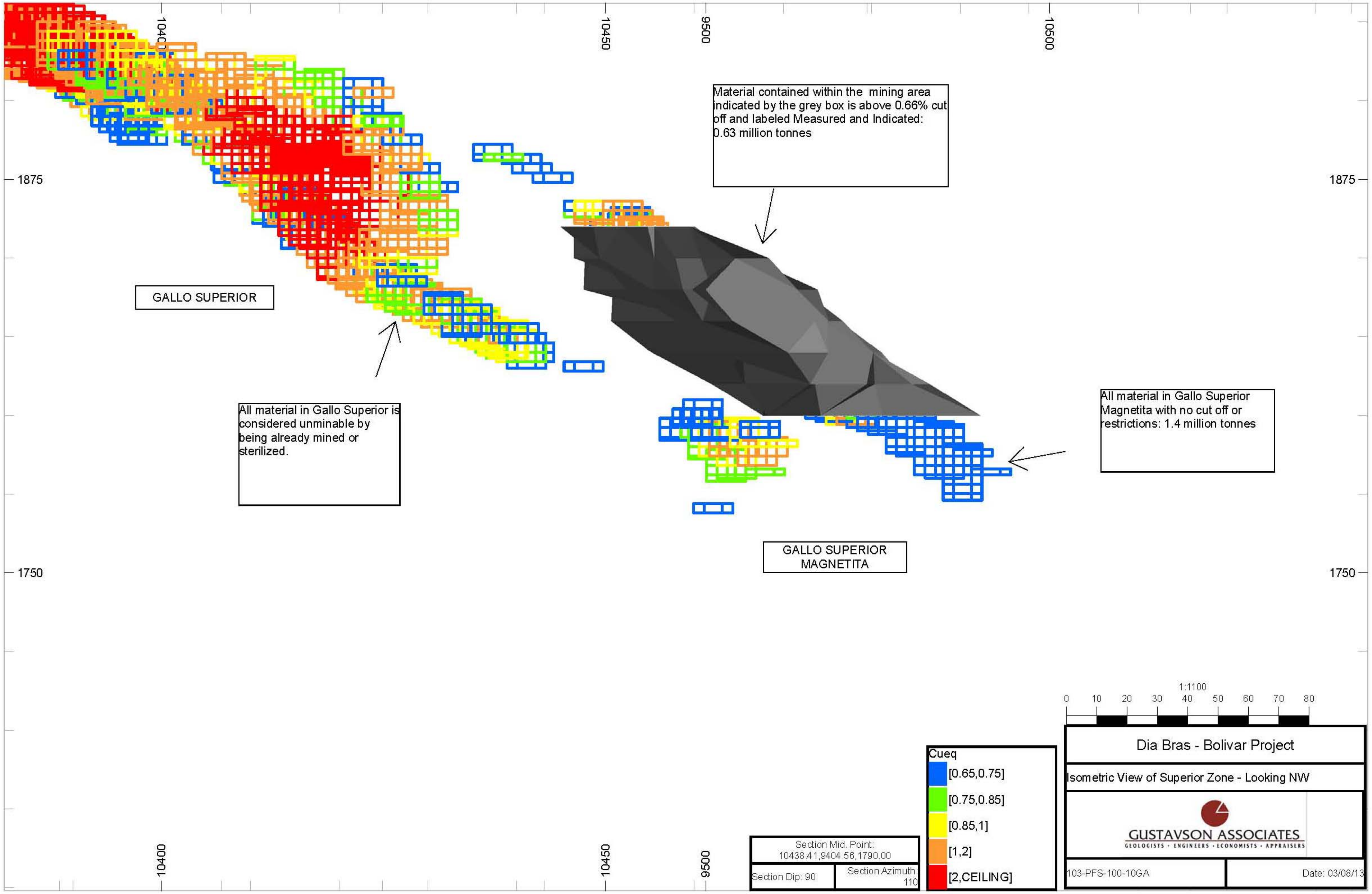

Figure 15-3 Gallo Superior Mineable Resources

Table 15-1 shows that the mineable tonnes in the M+I categories total 2.04 million tonnes for the entire Gallo Superior deposit. The Gallo Superior deposit includes two separate pods – Gallo Superior and Gallo Superior Magnetita.

Table 15-2 lists the total tonnes in the M+I categories that are above cut-off grade for Gallo Superior at 1.27 million tonnes. During the modeling of Gallo Superior it was difficult to determine what blocks had already been mined. It was even more difficult to determine how many tonnes were sterilized or left behind, The sterilized or bypassed blocks include blocks with grades between 0.66% – to 1.0% Cueq or any mineable areas that were left in place and were planned to be mined later (such as the high zinc chimney in Superior that was viewed during the site visits). Due to all of these reasons, the Resource listed for the Gallo Superior was modeled as either mined or sterilized and no mineable tonnes are included in the calculation of the Reserves for Gallo Superior. It is believed by Gustavson that there are still mineable tonnes within Gallo Superior and that additional tonnes from adjacent areas will add additional mineable tonnes, but with the current information, Gustavson reports no mineable Reserves in Gallo Superior.

Table 15-3 Gallo Superior Magnetita Resources M+I >= 0.66% Cueq

Blocks in Gallo Superior Magnetita						
Category (%)	**Tonnes**	**Ag (gpt)**	**Cu (%)**	**Zn (%)**	**Cueq (%) (no Au)**	**Au (gpt)**
0.65 < 0.75	74,707	10.207	0.570	0.077	0.694	0.053
0.75 < 0.85	30,738	12.482	0.659	0.065	0.802	0.139
0.85 < 1	49,377	14.170	0.767	0.075	0.930	0.091
1 < 2	368,702	24.341	1.230	0.125	1.509	0.126
2+	102,678	32.538	1.828	0.165	2.201	0.180
Totals	**626,202**	**22.615**	**1.185**	**0.119**	**1.445**	**0.124**

Note: the Cueq calculation does not include gold.

Gallo Superior Magnetita (GSM) is considered to be a Resource and the 0.63 million tonnes were considered in the Reserve calculations. Figure 15-3 shows that the total mineralized material in GSM is 1.4 million tonnes, but in the mine plan and Reserve calculations only M+I categories above the 0.66 Cueq cut-off were considered resulting in the 0.63 million tonnes shown in Table 15-3 and Figure 15-3. It was calculated that the overall recovery in GSM could be up to 85% and this recovery was applied to the available Resources to estimate a Reserve for GSM. These calculations were done in the mine plan (Section 16) and within the economic evaluation (Section 22). The calculation was done block by block in all M+I blocks that were above the cut-off grade. In some cases outlying blocks were not included due to the block position in relationship to the mining area (Figure 15-3 the low grade at the bottom of the deposit and the outlying areas below and above). This mining method is similar to the methods used in Gallo Inferior with the room and pillars mined on advance and because of the comparatively smaller size of the deposit; minimum material was left as crown pillars. The Reserves recovered in GSM are stated in Table 15-4. These Reserves include a 5% dilution factor, but due to the ability to selective mine areas using this mining method, the dilution factor may be reduced in a more detailed feasibility study.

Table 15-4 Gallo Superior Magnetita Reserve Statement

RoM Tonnes + Diluted Grades	Tonnes	Ag gpt	Cu %	Zn %	Cueq % (no Au)	Au gpt
Waste - Internal	0	0.0	0.00%	0.00%	0.00%	0.000
RoM –Proven	346,121	22.5	1.15%	0.11%	1.41%	0.142
RoM –Probable	158,304	22.2	1.17%	0.13%	1.43%	0.082
Waste - External	7,804	13.1	0.86%	0.07%	1.01%	0.056
Total P+P	**504,424**	**22.41**	**1.16%**	**0.12%**	**1.41%**	**0.123**
Total P+P+Waste	512,228	22.3	1.15%	0.12%	1.41%	0.122

Note: Gold is not included in the Cueq calculation.

15.3 Mineral Reserve Estimate – Gallo Inferior

Mining of the Gallo Inferior includes three deposit areas; Main Zone, North Pod and Southeast Pod as shown in Figure 15-4. The three areas shown on Figure 15-4 are all M+I above the copper equivalent of 0.66%. The three pods total insitu tonnes match the El Gallo Inferior tonnage presented in Table 15.1 (within a rounding error). The mine plan and sequence of extraction was done level by level from top down and mining the crown pillars on retreat from the bottom up. The generalized sequence is that the Main Zone is mined to a level that is best suited for access to the North Pod, which is then developed and retreated. The mining continues to near the bottom of the Main Zone and access is developed to the Southeast Pod, which in mined and retreated. The final mining will be the retreat in the Main Zone. Gustavson is of the opinion that additional drilling will define more M+I above cut-off Resources that will infill the areas between the pods and allow a more continuous mine plan, but that will need to be assessed after additional drilling is completed.

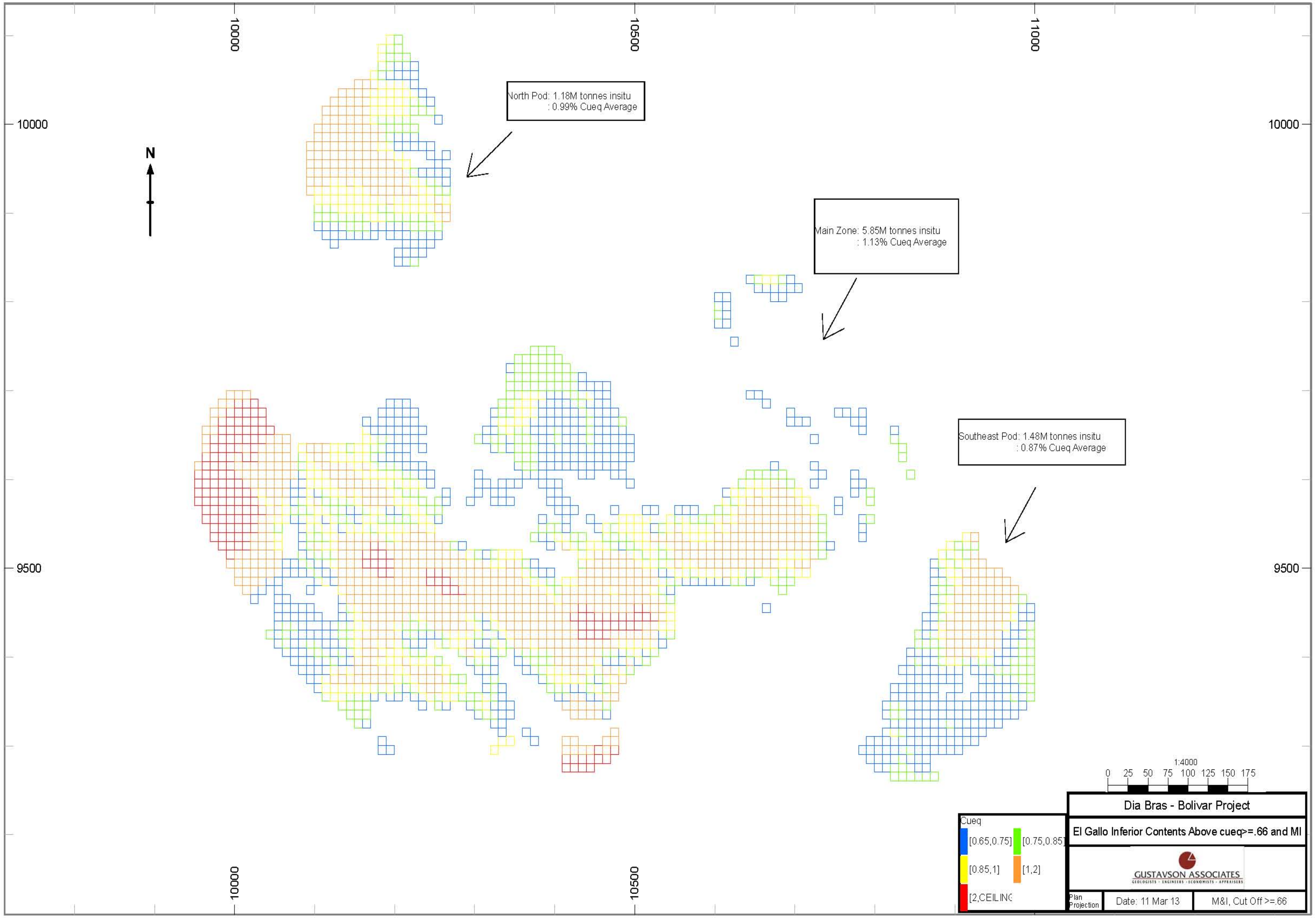

Figure 15-4 Gallo Inferior Mineable Pods

15.3.1 Main Zone Reserves

The Measured and Indicated Resources for the Gallo Inferior was extracted from the Resource model and a block model, by level, was developed to use for mine planning. The mine plan includes all the Resources that could be accessed in a logical mining unit. Outlying or small Resource areas that would require additional access were not included, such as the small disconnected Resource blocks to the northeast of the Main Zone (Figure 15-4). The Resources within the mine plan were then planned to be extracted in a logical sequence and the result of this process developed and defined the Reserves for the Main Pod.

Table 15-5 Main Zone Reserves

RoM Tonnes + Diluted Grades	Tonnes	Ag gpt	Cu %	Zn %	Cueq %(noAu)	Au gpt
Waste Internal	0	0.0	0.00%	0.00%	0.00%	0.000
RoM - Proven	3,525,186	23.5	0.83%	0.14%	1.11%	0.229
RoM –Probable	1,196,999	16.7	0.71%	0.45%	1.00%	0.209
Waste - External	19,272	25.4	0.93%	0.62%	1.35%	0.276
Total P+P	**4,722,185**	**21.8**	**0.80%**	**0.22%**	**1.08%**	**0.224**
Total P+P+Waste	4,741,457	21.8	0.80%	0.22%	1.08%	0.224

Note: Gold is not included in the Cueq calculation.

15.3.2 North Pod Reserves

The North Pod is accessed from the Main Pod when it can be done to minimize the development ramp(s). The actual development and mining for the North Pod is integrated into the overall mining sequence. Figure 15-5 shows the relationship of the North Pod to the Main Pod with the angle and distance that was required when constructing the access.

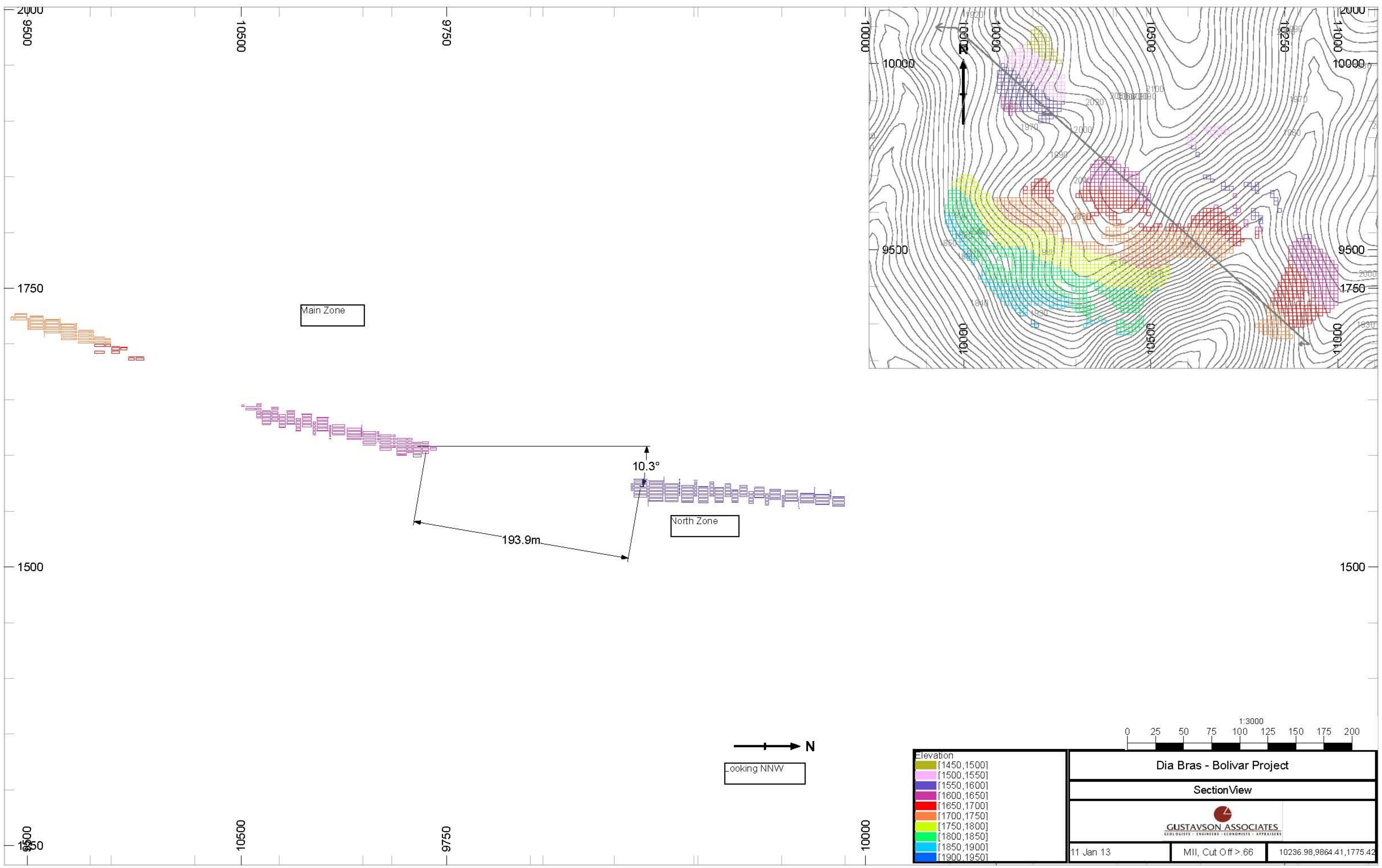

Figure 15-5 North Pod Access from Main Zone

Table 15-6 lists the Reserves that were estimated for the North Pod during mining.

Table 15-6 North Pod Reserves

RoM Tonnes + Diluted Grades	Tonnes	Ag gpt	Cu %	Zn %	Cueq % (no Au)	Au gpt
Waste - Internal	0	0.0	0.00%	0.00%	0.00%	0.000
RoM -Proven	145,298	17.1	0.46%	1.76%	1.11%	0.162
RoM –Probable	837,488	15.3	0.44%	1.20%	0.92%	0.248
Waste - External	42,017	13.3	0.39%	1.00%	0.79%	0.239
Total P+P	**982,787**	**15.58**	**0.45%**	**1.29%**	**0.95%**	**0.235**
Total P+P+Waste	1,024,804	15.5	0.44%	1.28%	0.94%	0.235

Note: Gold is not included in the Cueq calculation.

15.3.3 Southeast Pod Reserves

The Southeast Pod is accessed from the Main Pod when it can be done to minimize the development ramp(s). The actual development and mining for the Southeast Pod is integrated into the overall mining sequence. Figure 15-6 shows the relationship of the Main Pod to the Southeast Pod with the angle and distance that was required when constructing the access.

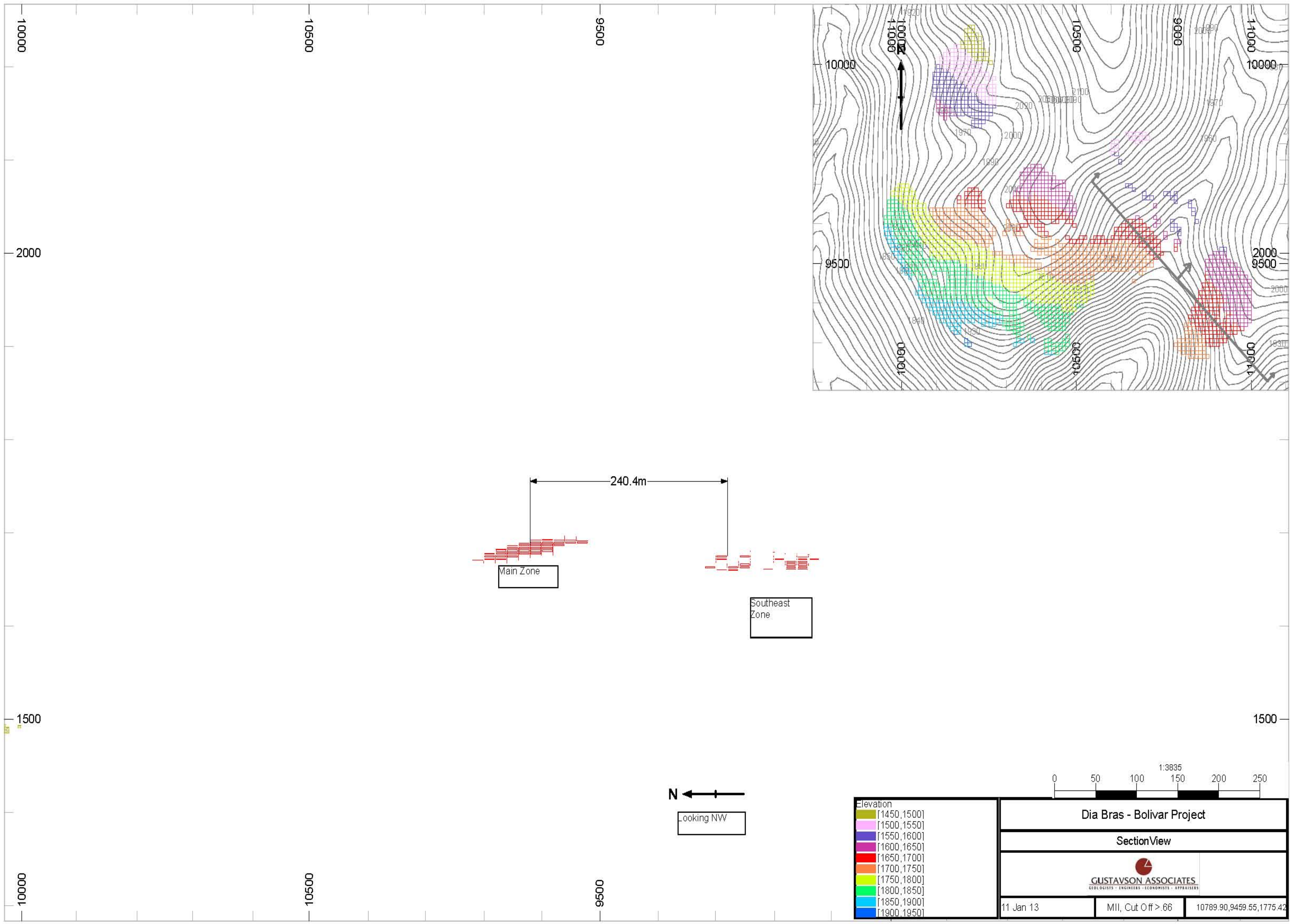

Figure 15-6 Southeast Pod Access from Main Zone

Table 15-7 lists the Reserves that were estimated for the Southeast Pod during mining.

Table 15-7 Southeast Pod Reserves

RoM Tonnes + Diluted Grades	Tonnes	Ag gpt	Cu %	Zn %	Cueq % (no Au)	Au gpt
Waste - Internal	0	0.0	0.00%	0.00%	0.00%	0.000
RoM - Proven	323,309	14.0	0.68%	0.09%	0.85%	0.273
RoM - Probable	924,102	12.4	0.68%	0.08%	0.83%	0.271
Waste - External	32,908	10.1	0.66%	0.07%	0.78%	0.246
Total P+P	**1,247,410**	**12.86**	**0.68%**	**0.08%**	**0.83%**	**0.271**
Total P+P+Waste	1,280,319	12.8	0.68%	0.08%	0.83%	0.271

Note: Gold is not included in the Cueq calculation.

15.3.4 Combined Reserve Statement – Gallo Superior and Inferior

Table 15-8 lists the Reserves that were estimated for Gallo Superior and Inferior during the mine sequencing.

Table 15-8 Reserves and Grades as Mined by Year

		85.0%	**RoM Extraction**						
		80.0%	**Crown Pillar Extraction EoL**						
Diluted Production		**5.0%**	**Ore Dilution**						
Production	**Annual**	**Annual**	**Annual**	**Annual**	**Annual**	**Annual**	**Annual**	**Annual**	**Annual**
Year	**Tonnes**	**Cueq %**	**Ag ppm**	**Cu %**	**Zn %**	**Au ppm**	**Develop**	**Develop**	**Level**
	M+I @ 85%	**(no Au)**	**Ag gpt**			**Au gpt**	**Ore**	**Waste**	**Waste**
	Tonnes						**Tonnes**	**Tonnes**	**Tonnes**
2013 Sup	504,424	1.415%	22.414	1.158	0.117	0.123	0	0	7,804
2013 Inf	254,319	1.252%	39.636	0.830	0.080	0.309	0	0	794
2013 Inf	68,670	1.000%	25.194	0.724	0.082	0.279	68,670	22,900	0
Total - 2013	827,413	1.330%	27.938	1.021	0.103	0.193	68,670	22,900	8,598
2014	697,110	1.373%	42.135	0.919	0.107	0.236	0	14,100	922
2015	735,898	1.177%	18.967	0.952	0.126	0.191	0	0	2,145
2016	722,143	0.957%	13.076	0.724	0.379	0.227	0	32,000	3,106
2017	733,042	0.943%	12.190	0.734	0.322	0.242	0	32,000	6,061
2018	733,124	0.775%	14.674	0.584	0.162	0.198	0	191,526	5,894
2019	747,333	0.936%	14.071	0.628	0.624	0.257	0	0	22,891
2020	740,967	0.883%	13.108	0.529	0.828	0.279	0	0	38,879
2021	808,765	0.902%	13.607	0.626	0.522	0.214	0	0	4,146
2022	711,010	1.165%	26.353	0.872	0.102	0.232	0	0	4,851
2023									
2024									
Totals	**7,456,806**	**1.044%**	**19.519**	**0.759**	**0.329**	**0.226**	**68,670**	**292,526**	**97,493**
Note 1: The data above is based on a 0.66 Cueq%									
Note 2: Copper equivalent calculation based on the following parameters									
	Copper	3.56	$/lb	82%	recovery				
	Zinc	0.96	$/lb	81%	recovery				
	Silver	26.28	$/oz	77%	recovery				

The combined Resource Statement is presented in Table 15-9. This is the combination of Proven, Probable and Proven + Probable for the Gallo Superior Magentita and the Gallo Inferior's Main, North and Southeast Pods.

The average grades and estimated prices and recoveries used in the metal equivalent calculations are given in section 14 of this report. Because the deposit is already in production, actual costs and recoveries were used in the reserve estimation, and Gustavson sees no potential for the reserve estimates to be materially affected by mining, metallurgical, infrastructure, permitting or other factors. The actual costs and recoveries used in the reserve estimations are given in section 22.2 of this report.

Table 15-9 Combined Reserve Statement for the Bolivar Project with Effective Date December 31, 2012

RoM Tonnes + Diluted Grades	Tonnes	Ag gpt	Cu %	Zn %	Cueq % (no Au)	Au gpt
Waste - Internal	0	0.00	0.00%	0.00%	0.00%	0.000
RoM - Proven	4,339,914	22.52	0.84%	0.19%	1.11%	0.223
RoM - Probable	3,116,893	15.35	0.65%	0.52%	0.95%	0.231
Waste - External	102,002	14.56	0.62%	0.56%	0.91%	0.234
Total P+P	**7,456,806**	**19.52**	**0.76%**	**0.33%**	**1.04%**	**0.226**
Total P+P+Waste	7,558,808	19.45	0.76%	0.33%	1.04%	0.227

16. MINING METHODS (ITEM 16)

16.1 Relevant Resource Information

The El Gallo ore body consists of two sub-deposits, "El Gallo Superior" (Superior) and "El Gallo Inferior" (Inferior). Currently the Superior deposit is being mined by the room and pillar method. It is recommended that mining of the Superior (both Superior and Superior Magnetita as defined in Section 15) be modified so that the mining layout for continuing production is in compliance with the recent rock mechanics, which defines the minimum pillar size to utilize. Current mining has shown that the hanging wall and foot wall consist of competent and strong formations, but the present system is leaving two pillars that are too small and also they are sterilizing some Resources.

The Inferior deposit, which at this time has not been mined, will require a modified room and pillar method of mining to accommodate the physical characteristics of the deposit.

The dip of the Inferior deposit requires that access to the room and pillar stoping areas be achieved by excavations at a maximum ramp inclination of 13% which will allow rubber tire equipment to operate. In addition to facilitate mining the Inferior deposit has been split into two sections; above elevation 1812 and below elevation 1812.

Figure 16-1 shows the general arrangement of the ore body in plan view and Figure 16-2 shows a typical cross section of the deposit that also shows the dip of the deposit.

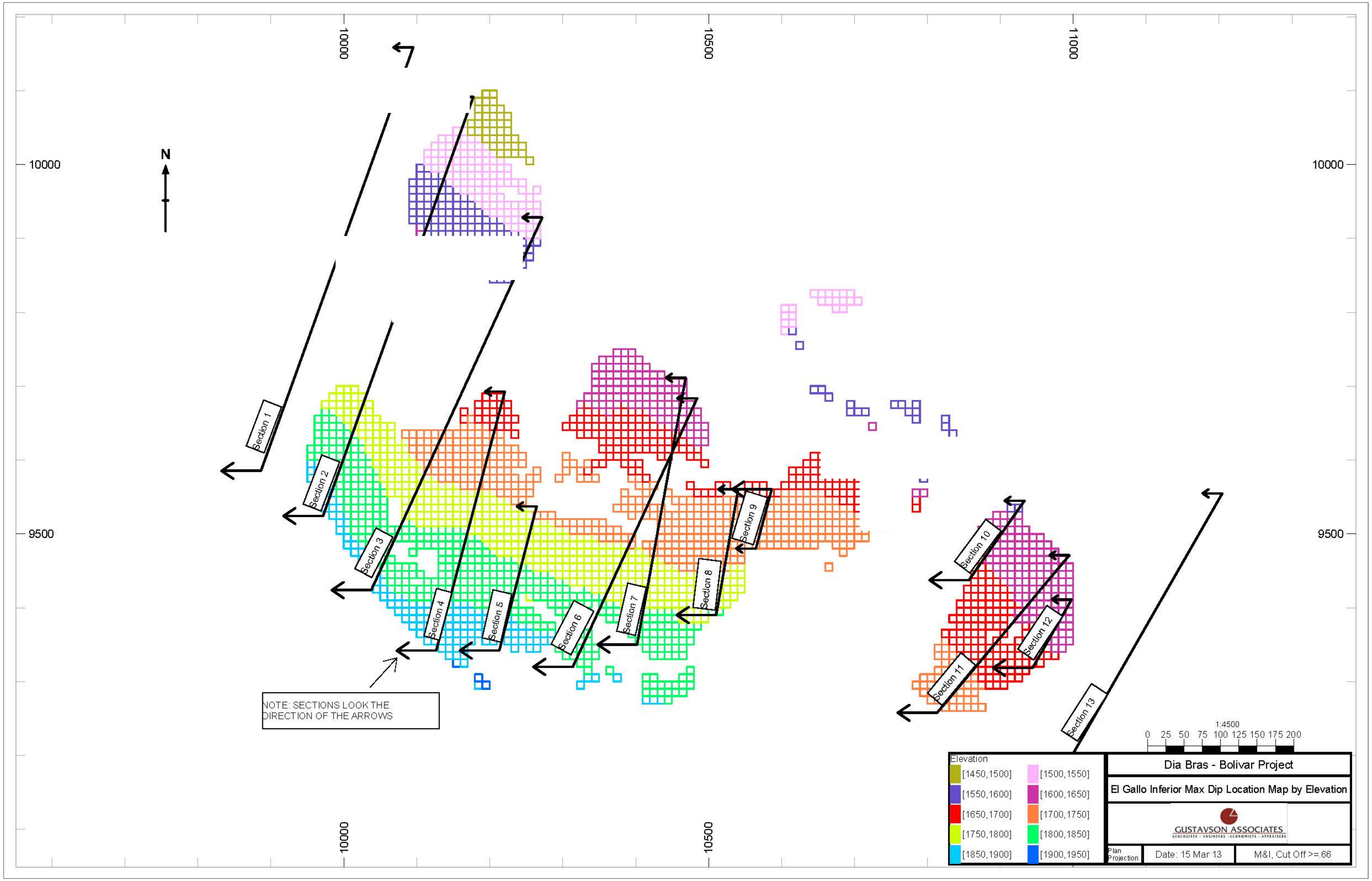

Figure 16-1 El Gallo Inferior Max Dip Location Map by Elevation

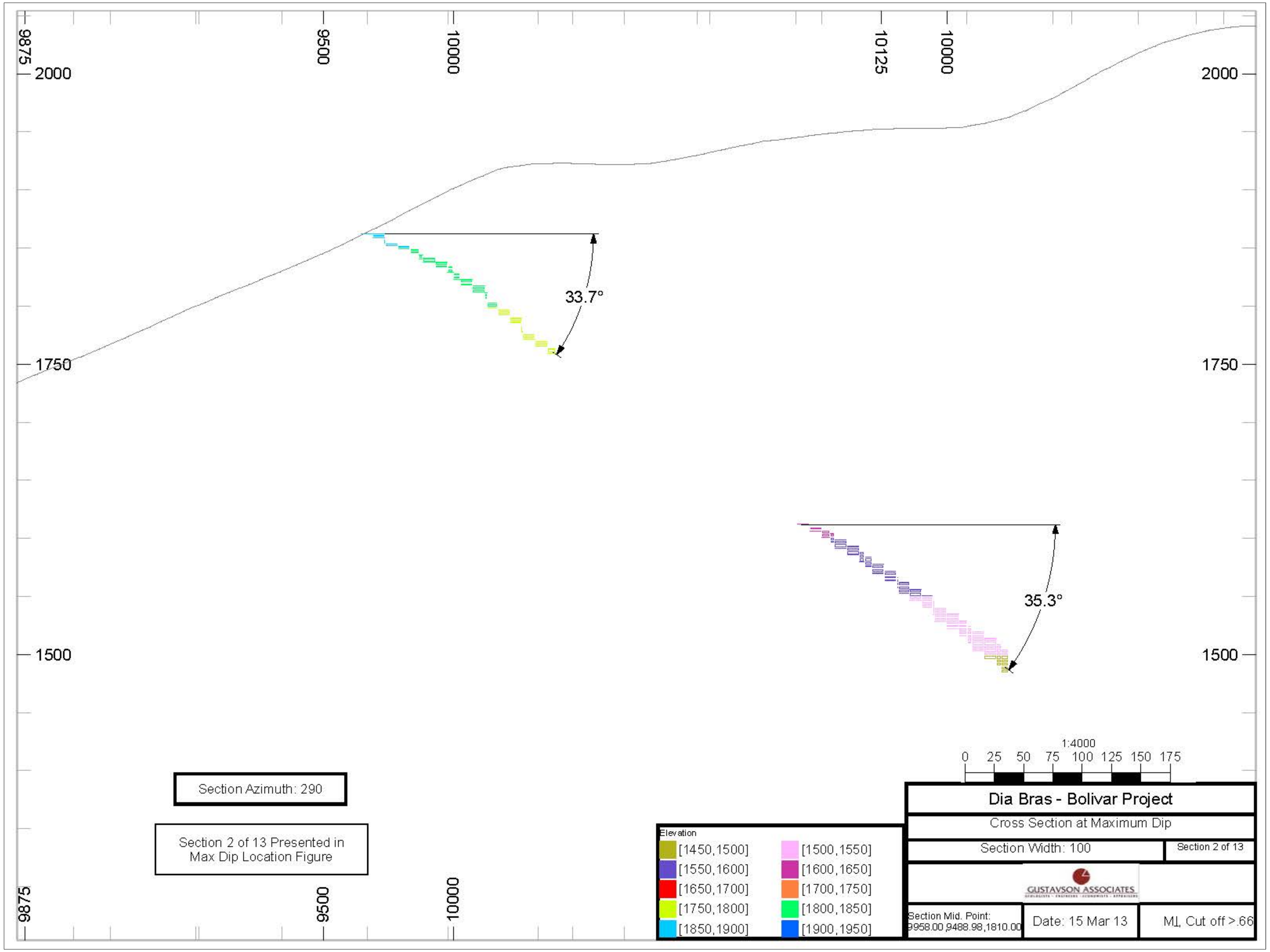

Figure 16-2 Cross Section 2 at Maximum Dip Represented in Figure 16-1

There are no records that show the existence of any aquifer or perched water that might jeopardize the integrity of the mine.

16.2 Proposed Mining Methods

As stated above, the recommendation is that the Superior deposit room and pillar mining system be modified in accordance with a new rock mechanics report. The rock mechanics report by Engineers Ramos, Garcia and Nava completed in October 2012 proposes that roof bolts and mesh be added to open faces. The report also suggests that the pillars in the room be of a size at least 5 m by 5 m square. The safety factor calculated for these sizes of pillars will require the room to be at most 10 m wide.

With regard to the Inferior deposit, the relatively low dip of the ore body (approximately 33 degrees) in combination with a varying thickness of around 25 m, but up to 70 m suggests that a horizontal room and pillar mining method be used in conjunction with access ramps.

The room and pillar method of mining is a well-established method which allows great flexibility in production and roof support.

16.3 Relevant Parameters

The Inferior deposit has been calculated to obtain a 50% extraction rate on advance with the total resource recovery at about 76-79% after the retreat mining is completed. In order to achieve that extraction rate on advance, an approximate 6m by 6m pillar will be necessary for every 9m room. The deposit has been split up into 4 vertical meter levels and each stope is regarded as 5 levels. Each stope will be separated by an 8m crown pillar.

16.3.1 Primary Development - Adit

The main Adit will enter the topography at 1800 and will reach the ore body in a +5% grade ramp to Level 1812. Two parallel main haulage roads will be created inside the ore body from this level.

This Adit will allow ore and waste haulage from the Inferior and will be designed to be 7m wide by 4m high. This width will accommodate both mining equipment and have an extra space for a divider wall, which will be used for ventilation purposes. The access adit is shown on Figure 16-3 and a section of the adit with the ventilation is shown on Figure 16-4 (in the PFS only).

16.3.2 Secondary Development – Main Haulages

Once the Adit reaches the ore body, two parallel main haulage roads that are 4m high by 5m wide will be driven inside the ore body. These main haulage roads will be separated by a 15m pillar, and protected by both an 8m sill and an 8m crown pillar (Figure 16-3).

The Main Haulage roads are designed to be driven the full length of the ore body, approximately 500 m. This full length gives the opportunity for future development if future drilling proves inferred material to be measured or indicated. This level can also be mined using the same room and pillar method designed for the Upper and Lower Zones.

From these main haulage roads, the two ramps that will access the upper and lower parts of the Inferior ore body, referred to herein as Upper Zone and Lower Zone, respectively, and will allow access to start the room and pillar system. These ramps are shown in Figures 16-5 and 16-6.

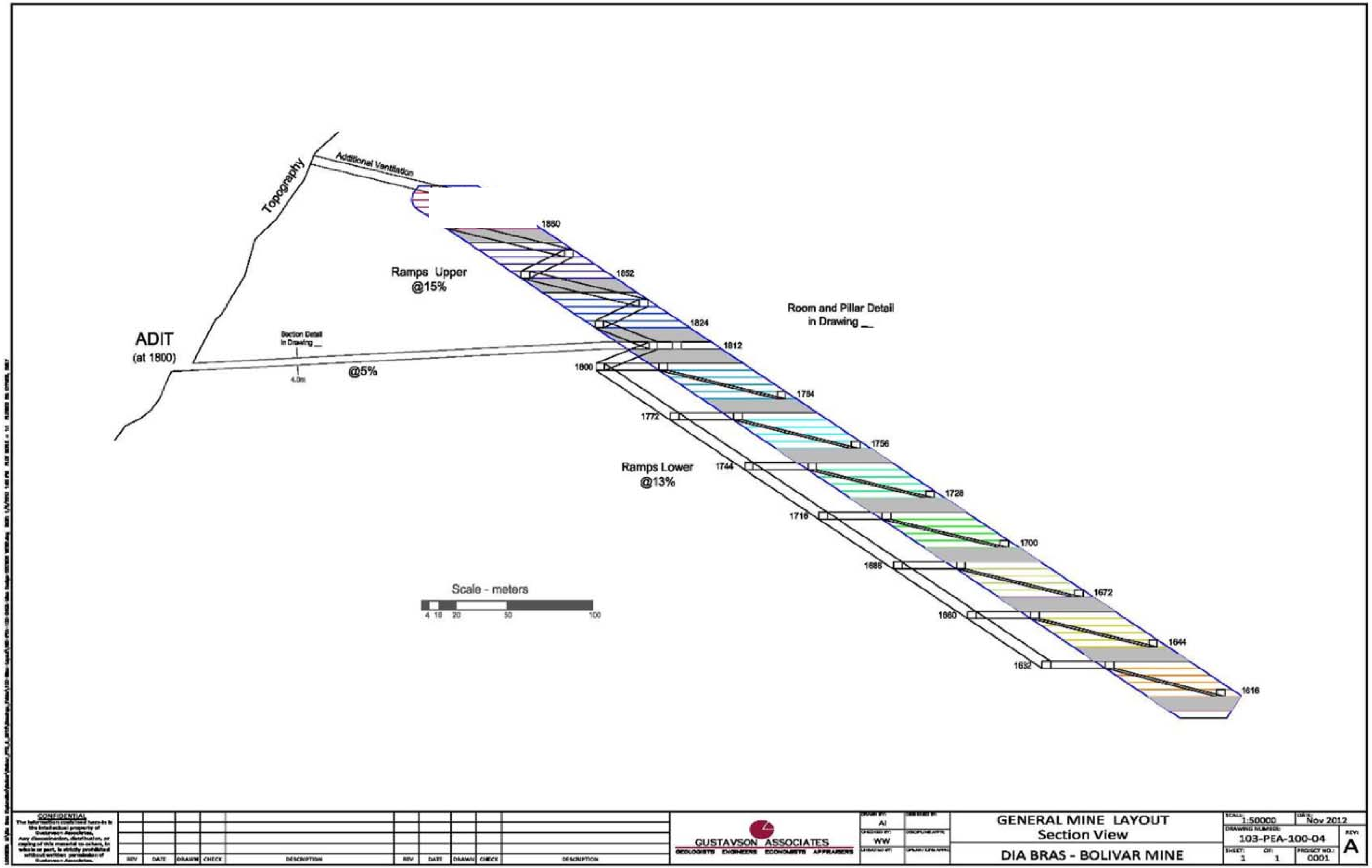

Figure 16-3 General Mine Layout – Section View

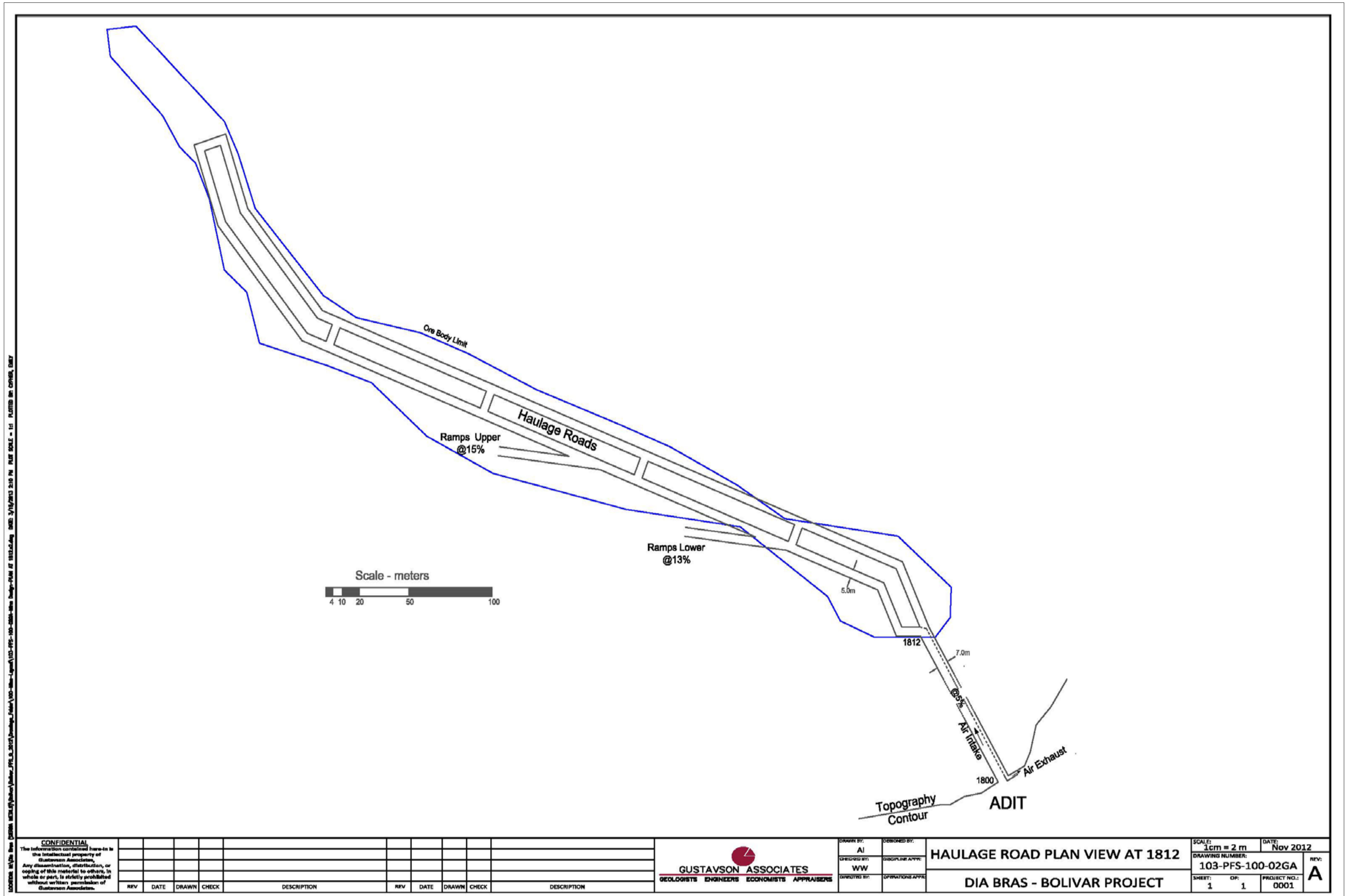

Figure 16-4 Haulage Road Layout

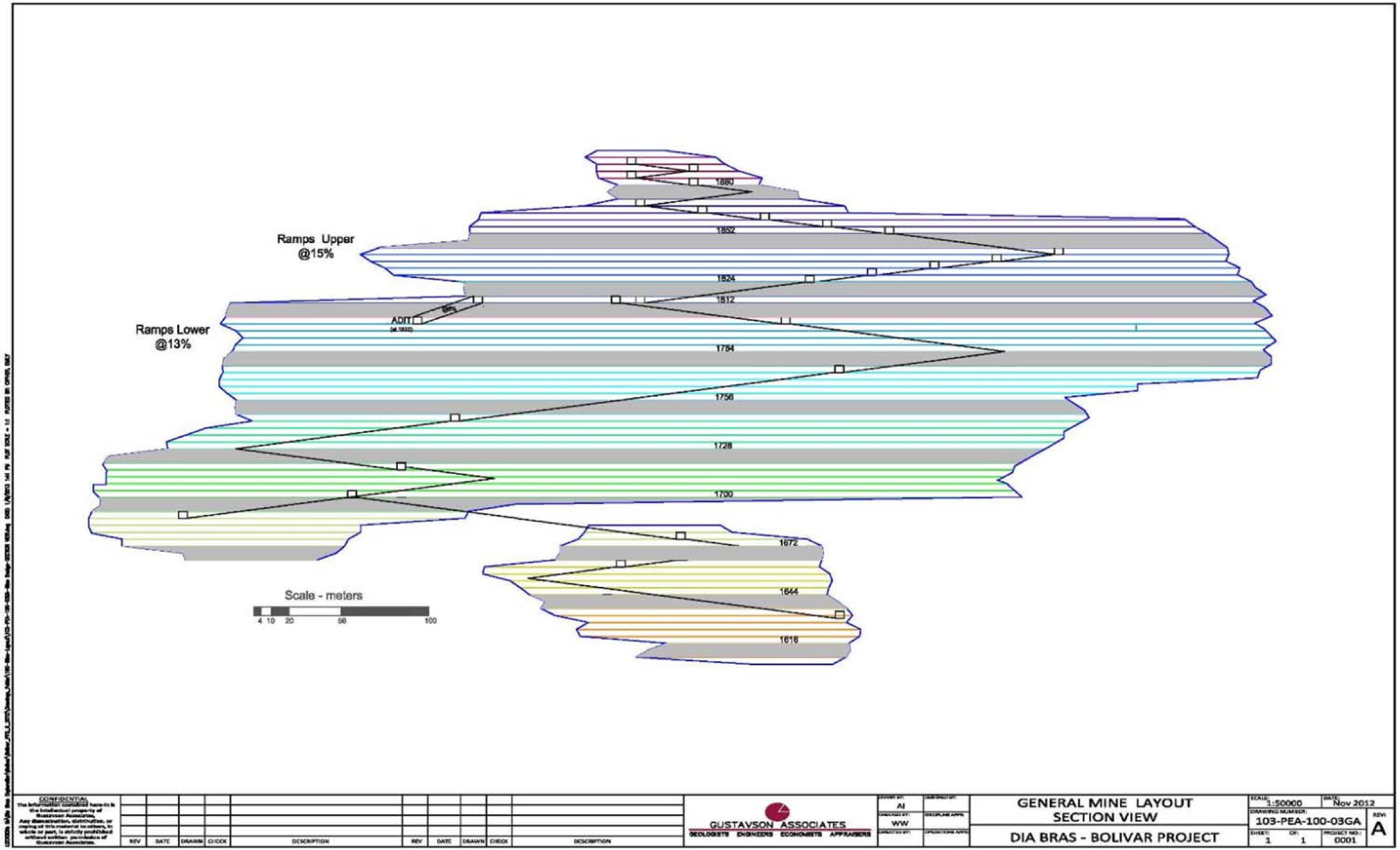

Figure 16-5 General Mine Layout – Section View

16.3.3 Inferior – Upper Zone Development and Production

The Upper Zone development ramp will be driven from the Main Haulage road at a +15% grade, through the ore body to Level 1900. This ramp will be 5m wide by 4m high. Production will start from the top level and mined using the room and pillar system. When all of the mineable areas of the deposit have been extracted, the crown pillars and various pillars will be mined as each area is retreated. The North Pod (Figure 16-1) will be accessed from a level in the Upper Zone, mined from top down using the room and pillar method and the remaining crown and some regular pillars will be extracted as the area is abandoned.

16.3.4 Inferior – Lower Zone Development and Production

The Lower Zone ramp will be driven at -13% in the footwall. This ramp will also be 5m wide by 4m high. The ore body will be accessed by crosscuts from this ramp to the lowest elevation of each stope. Production will start from the bottom level and mined using an in stope ramp and the room and pillar system. When all of the mineable areas of the deposit have been mined, the crown pillars and some regular pillars will be mined as each area is retreated.

The Southeast Pod will be accessed from the Lower Zone and mined similar to the North Pod.

Gustavson understands that additional drilling in the future may define more Resources adjacent to the Inferior Zone and as these Resources are defined, the mine plan must be re-evaluated to insure retreat mining does not sterilize any additional Resources.

16.4 Production Rates, Mine Life, Unit Dimensions and Dilution

The production rate for Superior deposit is expected to continue at 800 tpd per production heading until the deposit is completely mined during year 1 (2013). The production plan for Year 1 (2013) is more tonnes that the mill can process so approximately 310,000 tonnes will be placed in stockpile. Gustavson feels that this over production in 2013 is necessary to sufficiently develop Inferior to be at a 2,000 tpd capacity by 2014. The definition of additional Resources for the Superior deposit may allow the development of Inferior in a better schedule that reduces the tonnage sent to a stockpile.

The Inferior stopes will be mined at a rate of 615 tpd at each open face. New faces can be opened if necessary to accommodate the mill's 2,000 tpd capacity. The mine life for the Inferior deposit is approximately 10 years. A 5% dilution rate was used to provide RoM tonnages.

16.4.1 Development Productivity

Mine development production was determined by cycle calculations based on heading sizes, ground conditions and expected equipment performances. Individual cycle times were determined in four different sections: Adit, Ramp at +15%, Ramp at -13% and Room and Pillar.

Productivity and development are based on two - 10 hour working shifts per day.

16.4.2 Adit Development Productivity

The Adit is expected to be driven at 3.35 m/day. The haulage roads are scheduled to be driven at 4.25 m/day.

16.4.3 Ramp at +15% Development Productivity

The Inferior upper in-stope ramp is expected to be driven at 3.9 m/day.

16.4.4 Ramp at -13% Development Productivity

The Inferior lower foot wall (FW) Ramp is expected to be driven at 4.2 m/day. Once the ramp reaches the lower level of each stope, there is a 20 m cross cut that will be driven to the ore at a rate of 4.2 m/day as well.

16.4.5 Room and Pillar Productivity

The productivity for the room and pillar mining is scheduled to be 615 tpd in each open face. Table 16-1 shows the scheduled production rates for the room and pillar mining in the Inferior Zone. Gustavson acknowledges that Table 16-1 is too large for a proper review, but it is included to show how much detail went into the calculations.

Figures 16-7, 16-8 and 16-9 are included to provide detail of the layout of the working stopes. Figure 16-8 also shows the suggested support systems for the stope and Figure 16-9 is a 3-D drawing of a typical stope. Please see the PFS for Figures 16-7, 16-8,

Table 16-1 Main Room and Pillar Production

Inferior Main Room and Pillar Production
CYCLE WORK-SHEET

Company Gustavson Assoc Inc.
Address Union Blvd
Town, Zip Lakewood Blvd,

October 28, 2012
BY BW

ACTIVITY DATA		
ACTIVITY DESCRIPTION	FW Ramp	
UNITS:	English	
FACE MUCK-BACK DIST AVERAGE	200.0	0.00% Grade
REMUCK DIST AVERAGE ONE WAY	870.0	0.00% Grade
OUTSIDE HAUL DIST ONE WAY	450.0	0.00% Grade
TOT REMUCK DISTANCE ONE WAY	1320.0	

Jumbo Coverage = 16' x 16

NOTES	
ROOF SUPPORT DESCRIPTION	

Inferior Main Room and Pillar Production
CYCLE WORK-SHEET

PRODUCTIVITY INPUT DATA	
HOURS / SHIFT	10.00
SHIFTS / DAY	2
PROD. MIN/HOUR	50.00
NO of HEADINGS	1
UTILIZATION FACTOR	1.00

HEADING INPUT DATA			
WIDTH	29.50 FT	LENGTH DRILLED	12.00 FT
HEIGHT	13.12 FT	LENGTH BROKEN	11.00 FT
SPRINGLINE	13.12 FT	ROCK DENSITY	204 LB/CU FT
OVERBREAK	0.50 FT	DRILL HOLE DIAM	1.75 IN
SWELL FACTOR	1.50		

HEADING CALCULATED DATA				
THEORETICAL		INCLUDING OVERBREAK		
AREA OF FACE	387.04 CU FT	AREA	415.41 SQ FT	
SOLID CU YD / ROUND	157.68 / ROUND	SOLID CU YD /ROUND	169.24 / ROUND	15.39 CU YD
BROKEN CU YD / ROUND	236.52 / ROUND	BROKEN CU YD /ROUND	253.86 / ROUND	23.08 CU YD
SHORT TONS / ROUND	434.26 / ROUND	SHORT TONS /ROUND	466.09 / ROUND	42.37 ST

ELEMENT 1 DRILLING INPUT DATA	
DRILL SETUP TIME	30.0 MIN
DRILL TEARDOWN & MOVE OUT TIME	5.0 MIN
MOVE BOOM TIME	0.5 MIN
CHANGE RELIEF HOLE BIT TIME	5.0 MIN
COLLAR TIME /HOLE	0.5 MIN
PENETRATION RATE	3.0 FPM
NO. OF DRILLS-BOOMS	1.00 DRILLS
NO OF RELIEF HOLES	3.0 HOLES
EQUIV BLAST HOLES /RELIEF HOLE	2.0 HOLES
NO OF BLAST HOLES	65.0 HOLES
TOTAL NO OF EQUIV BLAST HOLES	71.0 HOLES
CALCULATED DATA	
DRILL TIME / EQUIV BLAST HOLE / DRILL	5.0 MIN
DRILLING TIME / DRILL	177.5 MIN
SET UP, TEAR DOWN, BIT CH & MOVE	40.0 MIN
DRILLING TIME PER ROUND	217.5 MIN
EQUIV LENGTH DRILLED PER RND	852.0 FT
SUBTOTAL DRILL	217.5 MIN

ELEMENT 2 LOADING & BLASTING INPUT DATA	
SETUP TIME	10.0 MIN
UNLOADED RELIEF HOLES	3.0 EA
LOADED WITH H.E.	0.0 EA
LOADED WITH ANFO	62.0 EA
LOAD TIME /HOLE	2.0 MIN
WIRE-UP TIME	30.0 MIN
SMOKE TIME	30.0 MIN
STEMMING / HOLE	0.00 FT
WEIGHT / LB ANFO	1.0 LB
WEIGHT / STICK - H.E.	1.00 LB
STICKS / HOLE - H.E.	10 EA
LOAD DENSITY - ANFO	0.95 LB
MEN LOADING	2 MEN
VOL / FT OF LOADED HOLE	28.86 CU INS
WT /CU IN ANFO LOADED	0.025 LB
WT ANFO /FT LOAD HOLE	0.7 LB
WT OF ANFO / RND	536.9 LB
CALCULATED DATA	
PF - ANFO	3.40 LB/CU YD
PF - H.E.	0.00 LB/CU YD
PF - TOTAL	3.40 LB/CU YD
LOADING TIME	82.7 MIN
SETUP	10.0 MIN
WIREUP	30.0
SMOKE	30.0
SUBTOTAL L & B	152.7 MIN

ELEMENT 3 GROUND SUPPORT INPUT DATA	
SETUP TIME	0.0 MIN
SCALING TIME	20.0 MIN
BOLTS / LIN FT	0.00 BOLTS
ROCKBOLT LENGTH	6.0 FT
DRILL RATE	2.0 FT/MIN
DRILL TIME/BOLT	3.0 MIN
INSTALL TIME/BOLT	1.0 MIN
TIME /BOLT	4.0 MIN
NO. of DRILLS	2.0 DRILLS
MATS/FT	0.00 MATS
WIRE / FT	0.00 SQ FT
SET SPACING	0.0 FT
INSTALL TIME / SET	0.0 MIN
SHOTCRETE / FT	0.00 CU YD
SHOTCRETE TIME /CU YD	6.0 MIN
SHOTCRETE SET UP	0.0 MIN
CALCULATED DATA	
BOLTS REQUIRED/RND	0.0 BOLTS
BOLTS / DRILL	0.0 FT
MATS REQUIRED/RND	0.0 MATS
WIRE REQUIRED	0.0 SQ FT
SETS REQUIRED/RND	0.0 SETS
SHOTCRETE REQ'D/RND	0.0 CU YD
BOLTING TIME/RND	0.0 MIN
ST SET TIME/RND	0.0 MIN
SHOTCRETE TIME /RND	0.0 MIN
MATS & MESH TIME	0.0
SET UP & SCALING	20.0 MIN
SUBTOTAL SUPPORT	20.0 MIN

ELEMENT 4 MUCKING INPUT DATA	
LOAD TIME / BUCKET	0.50 MIN
DUMP TIME / BUCKET	0.25 MIN
CLEAN-UP	30.0 MIN
MECH. DELAY	0.0 MIN
BUCKET CAPACITY	3.5 CU YD
BUCKET FILL FACTOR	0.95
FACE MUCK DIST	200.0 FT
TRAM SPEED - FULL	350.0 FT/MIN
TRAM SPEED - EMPTY	525.0 FT/MIN
MULT. LHD UTILIZATION	100.00 %
NO. of LOADERS	1 LHD
TIME PER BUCKET	1.9
CALCULATED DATA	
NET BUCKET CAP.	3.3 CU YD
BUCKETS/ROUND	77.0 BUCKETS
MUCKING TIME	145.8 MIN
CLEAN-UP TIME	30.0 MIN
MECH.DELAY TIME	0.0 MIN
OTHER DELAYS	0.0 MIN
SUBTOTAL MUCKING	175.8 MIN

ELEMENT 5 REMUCKING INPUT DATA	
SERVICE TIME	0.00 MIN
LOAD TIME / BUCKET	0.50 MIN
DUMP TIME / BUCKET	0.25 MIN
DUMP TIME / TRUCK	0.50 MIN
MISC DELAY	5.00 MIN
CLEAN-UP	20.00 MIN
LHD BUCKET CAPACITY	3.5 CU YD
LHD BUCKET FILL FACTOR	0.95 CU YD
TRUCK CAPACITY	13.0 CU YD
DISTANCE MUCKED	50.0 FT
DISTANCE HAULED	1320.0 FT
TRAM SPEED - FULL	325.0 FT/MIN
TRAM SPEED - EMPTY	525.0 FT/MIN
HAUL SPEED - FULL	440.0 FT/MIN
HAUL SPEED - EMPTY	660.0 FT/MIN
NO. of TRUCKS	2 TRUCKS
CALCULATED DATA	
NET BUCKET CAP.	3.3 CU YD
BUCKETS/TRUCK	4.0 BUCKETS
TRUCK TRIPS/ROUND	19.5 TRIPS
LOAD TIME/TRUCK	4.0 MIN
HAUL TIME /LOAD	5.5 MIN
HAUL TIME /ROUND	53.7 MIN
CLEANUP DELAY TIME	20.0 MIN
OTHER DELAYS	5.0 MIN
SUBTOTAL REMUCKING	78.7 MIN

ELEMENT 6 UTILITIES INPUT DATA	
SETUP TIME	10.0 MIN
VENT LINE X 42" TUBE / 20 FT	20.0 MIN
COMP AIR LINE / 20 FT	15.0 MIN
WATER LINE / 20 FT	10.0 MIN
PUMP DISCHARGE LINE / 20 FT	0.0 MIN
HANGER INST / 20 FT	15.0 MIN
POWER CABLE & CENTER / 1000 FT	0.0 MIN
CALCULATED DATA	
UTILITY TIME PER 20 FT	70.0 MIN
SUBTOTAL UTILITIES / RND	7.7 MIN

AVAILABLE TIME	MINUTES	HOURS
BASIC SHIFT TIME	600.0	10.0
TRAVEL TO & FROM	30.0	0.5
TRAVEL IN & OUT	0.0	0.0
LUNCH	30.0	0.5
INSPECT & SFTY MTG	30.0	0.5
MISC	10.0	0.2
TOTAL TIME AVAILABLE	500.0	8.3

ROUND TIMES	MINUTES PER ROUND	HOURS /ROUND	CRIT PATH FACTOR	HOURS @ 50 MIN/HR
DRILLING	217.5	3.63	1.0	4.35
LOADING & BLASTING	152.7	2.54	1.0	3.05
GROUND SUPPORT	20.0	0.33	1.0	0.40
MUCKING	175.8	2.93	1.0	3.52
REMUCKING	78.7	1.31	0.0	0.00
UTILITIES	7.7	0.13	1.0	0.15
TOTAL ROUND TIME	652.3	10.87		11.47

		ACTIVITY SUMMARY	
RNDS / SHIFT:	0.73 ROUNDS	TOTAL RNDS	120.0
RNDS / DAY:	1.45 ROUNDS		
EFFIC	1.00		
FT / SHIFT	7.99 FT	TOTAL FT	1320.0
FT / DAY	15.98 FT		
USE	16.0 FEET	TOTAL S TONS	55,931
ST / DAY	677.9 TONS	TOTAL DAYS	82.6

SUMMARY SUPPLIES & MATERIAL	UNITS	UNITS / RND	UNITS / FT
MATERIALS			
ROCK BOLTS	NO	0.0	0.00
MATS	EACH	0.0	0.00
WIRE MESH	SQ FT	0.0	0.00
SHOTCRETE	CU YD	0.0	0.00
SUPPORT SETS	NO	0.0	0.00
CRIBBING	BF		
DIRECT SUPPLIES			
ANFO	LB	536.9	48.81
HIGH EXPLOSIVES	LB	0.0	0.00
CAPS	NO	62.0	5.64
BITS & STEEL - DRL	FT	217.5	19.77
BITS & STEEL - GS	FT	0.0	0.00

EQUIPMENT OPERATING COSTS - RAMP AT 4000 FT (AV HAUL 2000FT)

MAJOR FACE EQUIPMENT INPUT DATA	NO REQU'D OP'G	ELEMENT FACTOR – MACHINE HOURS PER SUB-TASK: DRILL	LOAD & SHOOT	GROUND SUPPORT	FACE MUCK	REMUCK	UTILITIES	PERS TRANSP	TOTAL MACHINE HOURS ROUND
		NOTE: 15 % ADDED TO EQUIP OP TIME FOR MISC UTILITY.							
PERSONNEL CARRIER	0.0	0.0	0.0	0.0	0.0	0.0	100.0	1.2	101.15
JUMBO - 2 BOOM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
JUMBO 1 BOOM	1.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00
TRUCK - POWDER	1.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	3.51
ROCK-BOLTER	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
SHOTCRETE MACHINE	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
TRANSPORTER - SHOTCR	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
JACKLEGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.00
LHD - 6 CU YD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
LOADER 3.5 CU YD	1.0	0.0	0.0	0.0	4.0	0.0	0.0	2.0	4.04
TRUCK - 20 TONNE	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
									0.00
SCISSOR LIFT	1.0	0.0	0.0	0.5	0.0	0.0	0.2	0.6	0.61
BACKFILL RAMMER	1.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.00
MAJOR SURF EQUIP									
COMPRESSOR DSL 750 CFM	1.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.00
CAT 950	1.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.00
FORK LIFT	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
PICK-UP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
CREW VAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.00
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00

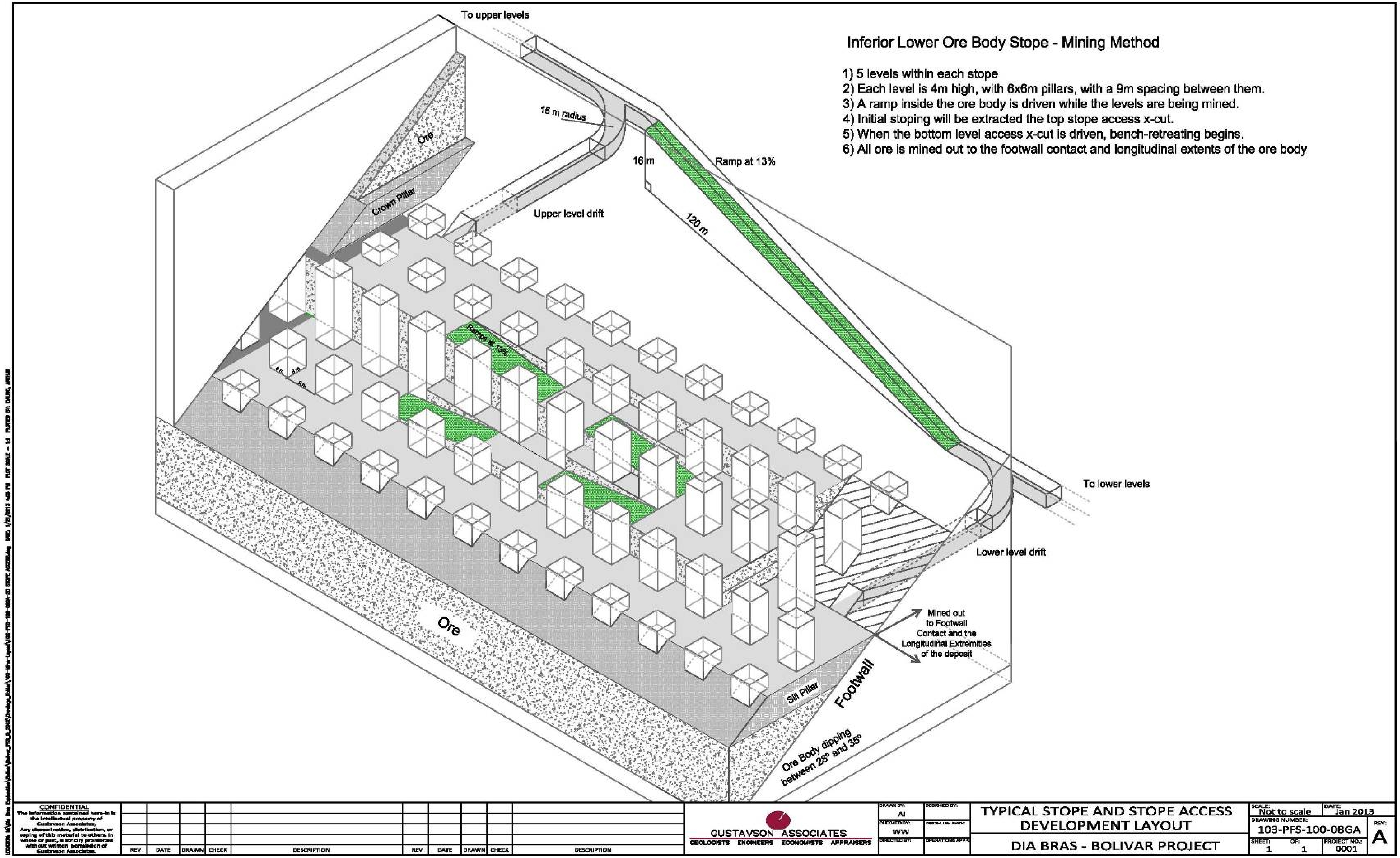

Figure 16-6 Stope and Stope Access in 3D View

16.5 Development Requirements

The layout of the ramps will follow the trend of the ore bodies in order to minimize development cost. Careful consideration will be given to the design and installation of the roof support system of the ramps so that both short and long term requirements will be satisfied.

16.6 Mining Fleet and Requirements

This is a producing mine. Current mining is done with the equipment as listed in Table 16-2:

Table 16-2 Equipment (Provided by Sierra)

Equipment	Quantity
Underground Truck	3
Scoop Tram	6
Jumbo	2
Scissor Truck	1
Tractor P/Explos.	1
Trascabo	1
Bulldozer	2
Retruo Excav.	1
Skydor	1
Motograder	1
Compressor	4
Generator	2
MAQ Long Hole Driller	3
Jacklegs	20

In order to achieve the 2,000 tpd expectation of the mill, the 13 tonne trucks will have to be replaced by 20 tonne trucks as production begins in the Inferior Mine. The average LoM equipment list for the Inferior is shown in Table 16-3

Table 16-3 New Equipment List

Total Units Required		
AC Boomer Drill Jumbo	**Units**	4.00
Explosive Loader	**Units**	5.00
Load-Haul-Dump 3.5yd	**Units**	4.00
Truck 13yd	**Units**	4.00
Roof Bolter	**Units**	4.00
Grout Machine	**Units**	4.00
Scissor Truck	**Units**	4.00
Skid-steer	**Units**	4.00
Jacklegs	**Units**	4.00
Wheel Loader 5cy	**Units**	1.00
Dozer D8R	**Units**	1.00
Dozer D6N	**Units**	1.00
Motorgrader 140H	**Units**	1.00
Water Truck - 13cy Trk	**Units**	1.00
Backhoe	**Units**	1.00
Compressor 890cfm	**Units**	2.00
Compressor 323cfm	**Units**	2.00
Generator 1500kw	**Units**	2.00
Pickups 3/4t	**Units**	5.00
Miscellaneous	**Units**	1.00

16.7 Ventilation

The main Adit will act as a dual ventilation system, intake and exhaust. The extra adit width is divided from the haulage area by a concrete block wall and will be used for air exhaustion, while the haulage area will act as intake (Figure 16-4). The clean air will then be separated in the two haulage roads as required.

Ventilation raises will be created as the mine progresses into the ore bodies, to increase ventilation efficiency. The ventilation of the North Pod will need to be carried from Upper Zone of the Inferior. The ventilation for the Southeast Pod will need further review to determine if adits can be developed to the outcrop. Gustavson strongly recommends that a ventilation engineer be consulted for further studies.

Stope ventilation will be accomplished by drawing air from the ramp by means of an auxiliary fan set up in the sub drift and sized to meet the requirements of the diesel equipment operating in the stope.

17. RECOVERY METHODS (ITEM 17)

The company is in a unique situation because they have already built and are operating a concentrator which can process ± 1,000 mtpd of ore and are currently expanding the mill to a 2,000 mtpd capacity. The minerals of economic value currently being recovered are copper, silver, gold and zinc.

The operating data for the last eight months of 2012 from the existing operation was reviewed in order to estimate the current recoveries and project the recoveries of metals in the future when the plant will be processing lower-grade material. Note that the units used in this section are primarily in US Standard Units due to the design information supplied by Sierra Metals was in the US Units.

17.1 Plant Process Flowsheet

The ROM ore from the mine is trucked and dumped into the hopper with a 14 in by 18 in grizzly. The ore is conveyed to a Cedar Rapids Jaw Crusher. The crushed product is conveyed to a Cedar Rapids double deck screen which removes the ¾ inch product which is sent to two bins each having 1000t capacity. The plus ¾ inch ore is processed in a secondary crusher (Sandvick 6800). The crushed product is conveyed back to the double deck screen.

The ore from the fine ore bins is fed to the 9.5 ft. by 14 ft. Dominion ball mill having a HP of 600. The ground product is pumped to cyclones and the cyclone underflow is returned to the mill. The cyclone overflow goes to a conditioner ahead of copper flotation cells. There are seven 300 ft^3 cells in the copper circuit for rougher and scavenger flotation. Five cells float rougher concentrate and two cells float scavenger concentrate. The scavenger concentrate along with the first cleaner flotation tailing is recycled to the rougher flotation. The first-cleaner flotation circuit, having two 300 ft^3 cells, floats combined rougher concentrate and second-cleaner tailings. The second-cleaner flotation circuit, having five 100 ft^3 cells, produces a final concentrate which goes to a thickener and then to disk filter. The final copper concentrate containing most of the silver and gold minerals and assaying ± 25% Cu and ± 500 g/t Ag is stored.

The copper circuit tailings go to the zinc conditioner, where the zinc minerals are activated, and on to the flotation circuit which has a similar configuration to the copper circuit. Rougher zinc flotation consists of six 300 ft^3 cells followed by two 300 ft^3 cells for scavengers. There are two 300 ft3 cells for the first-cleaner flotation and six 100 ft^3 cells for the second-cleaner flotation. The final zinc concentrate is thickened and filtered using similar equipment as for copper concentrate. The process plant flowsheets are given in Figures 17-1 to 17-4.

The Project is expanding the processing plant to process ±2,000 mtpd of ore in early 2013. They believe the current crushing circuit is capable of crushing 2,000 mtpd of ore. They have already purchased a ball mill which will be installed to expand the comminution facility. Additional flotation cells have been purchased to expand the flotation capacity and additional filters to filter both copper and zinc concentrates. The funds for this upgrade are included in the 2013 Budget, which was used in the economic evaluation.

17.2 Metallurgical Results

The metallurgical data for the plant operation for the last eight months of 2012 was reviewed. The following observations were noted for the operations:

- The plant feed was fairly consistent with average grades of 1.18% Cu and 24.6 g/t Ag.
- The lowest feed grade processed in the plant was 0.84% Cu and 6.8 g/t Ag. When the plant encountered low copper grades, the silver grade was generally high and vice versa.
- The average recoveries in the copper concentrate, assaying ± 25% Cu and 500 g/t Ag, were 83.6% for copper and 77.9% for silver.
- The zinc concentrate, assaying ± 54% Zn, recovered ± 80% of the zinc in the plant feed when the feed grade was over 2% Zn.
- The zinc concentrate recovery and grade dropped significantly when the feed grade dropped to ± 1%. The concentrate recovered 52% to 62% of zinc at a grade of 40% to 45% Zn.

Since the plant will be processing lower grade feed material in the future, recoveries were projected for varying copper and silver grades in the plant feed. Gold recoveries are held constant at 70%. These values are given in Table 17- 1. The feed grade of zinc is projected to be extremely variable and periodically very low in the future. Based on the historical data from the plant, the marketable-grade zinc concentrate will be difficult to produce. The zinc recovery is projected at 52% for a plant feed grade of less than 1% zinc. The zinc circuit is operating at the lower feed grades. When the feed is between 1% and 2% zinc, the recovery will improve to 58% and when the feed grade is greater than 2% the zinc recovery will be 80%. A 0.5% feed grade is high enough to consistently produce a marketable-grade product.

Table 17-1 Projected Copper and Silver Recoveries in Cu Concentrate for varying Feed Grades

Feed Grade	Concentrate Recovery %	
Percent Cu:	**Copper**	**Silver**
1.2	83.6	-
1.0	83.6	-
0.7	82.0	-
0.5	80.3	-
g/t Ag:		
25	-	77.9
20	-	77.9
15	-	73.9
10	-	60.5

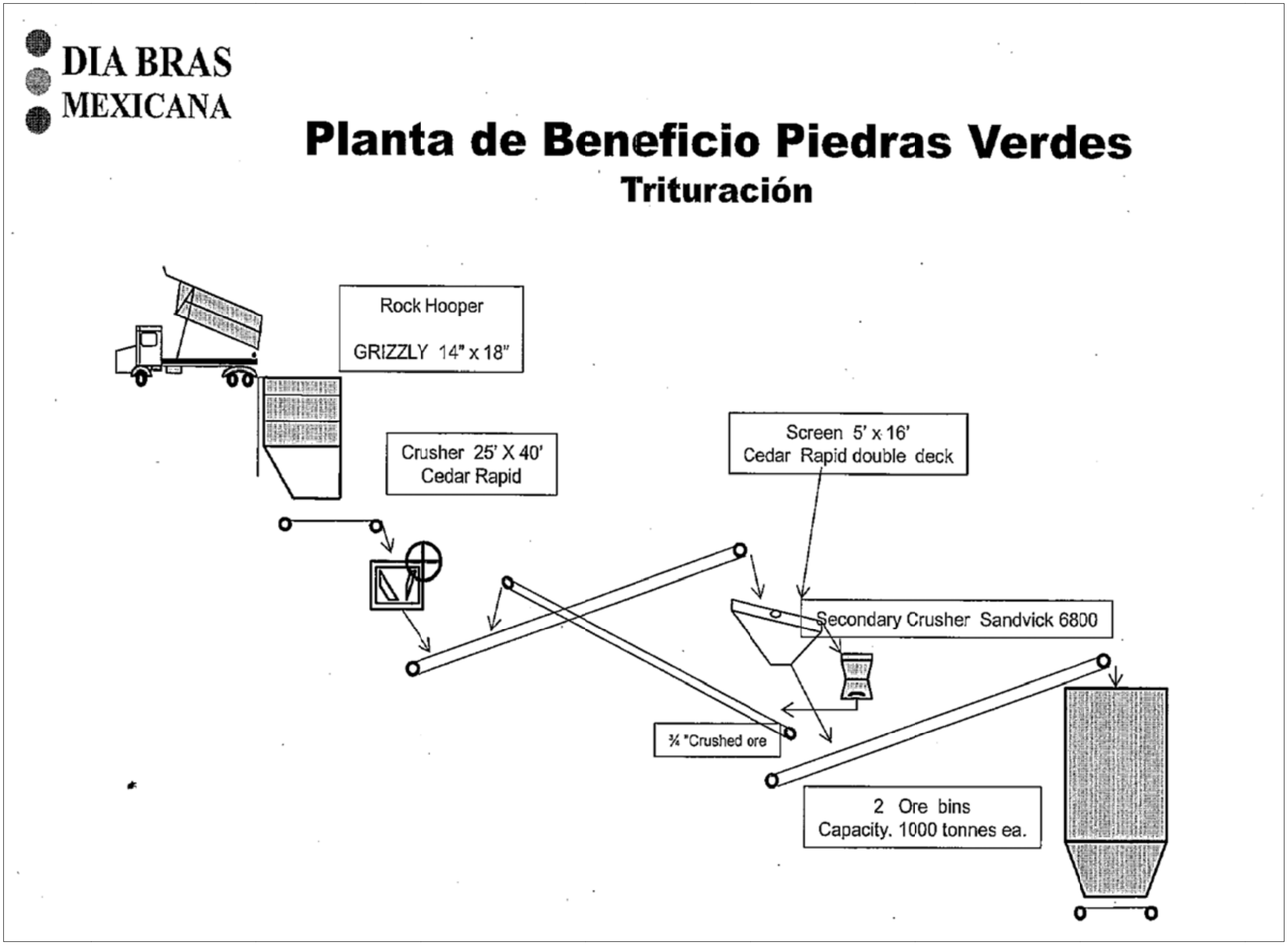

Figure 17-1 Receiving and Crushing Circuit

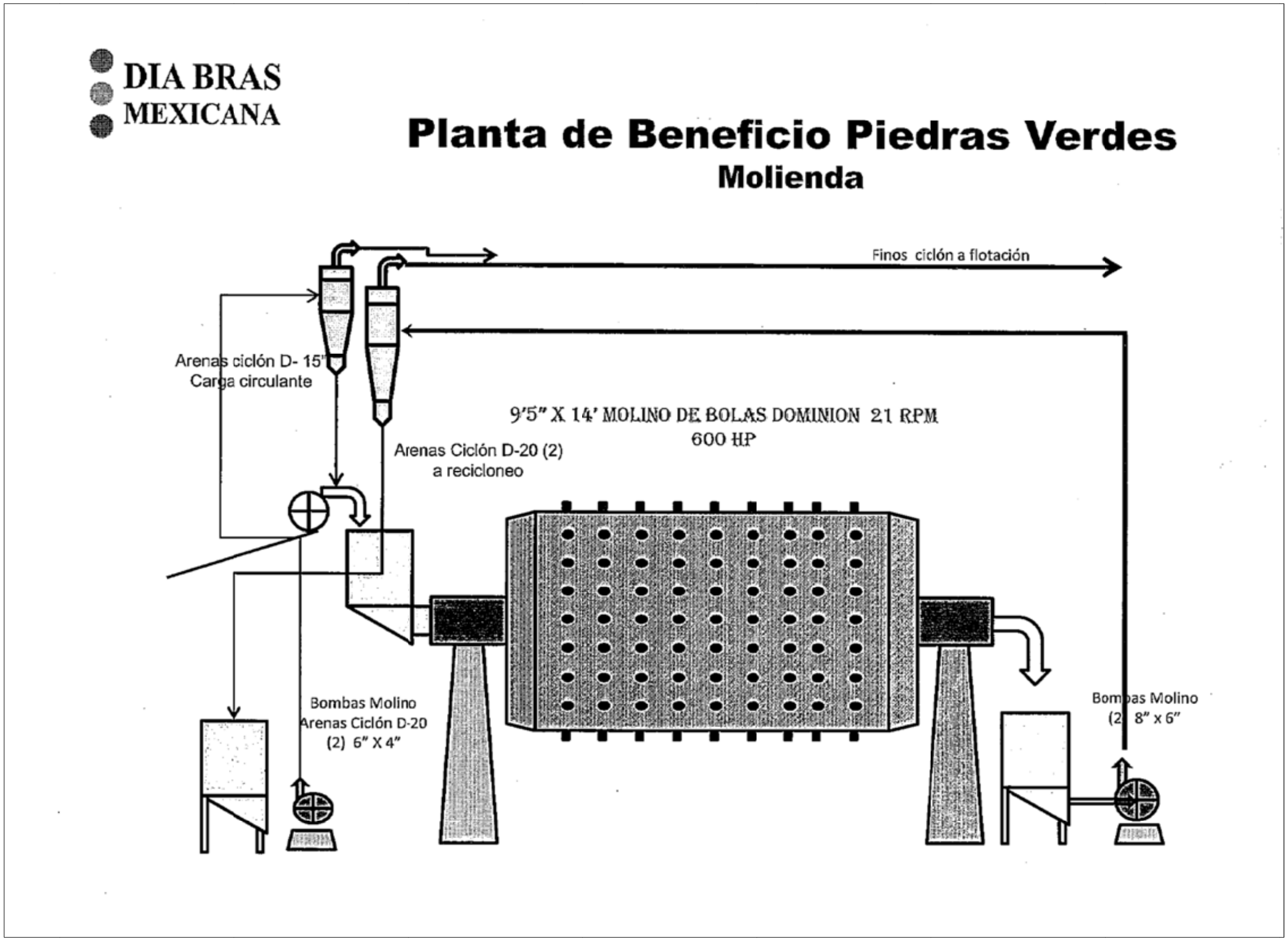

Figure 17-2 Grinding Circuit

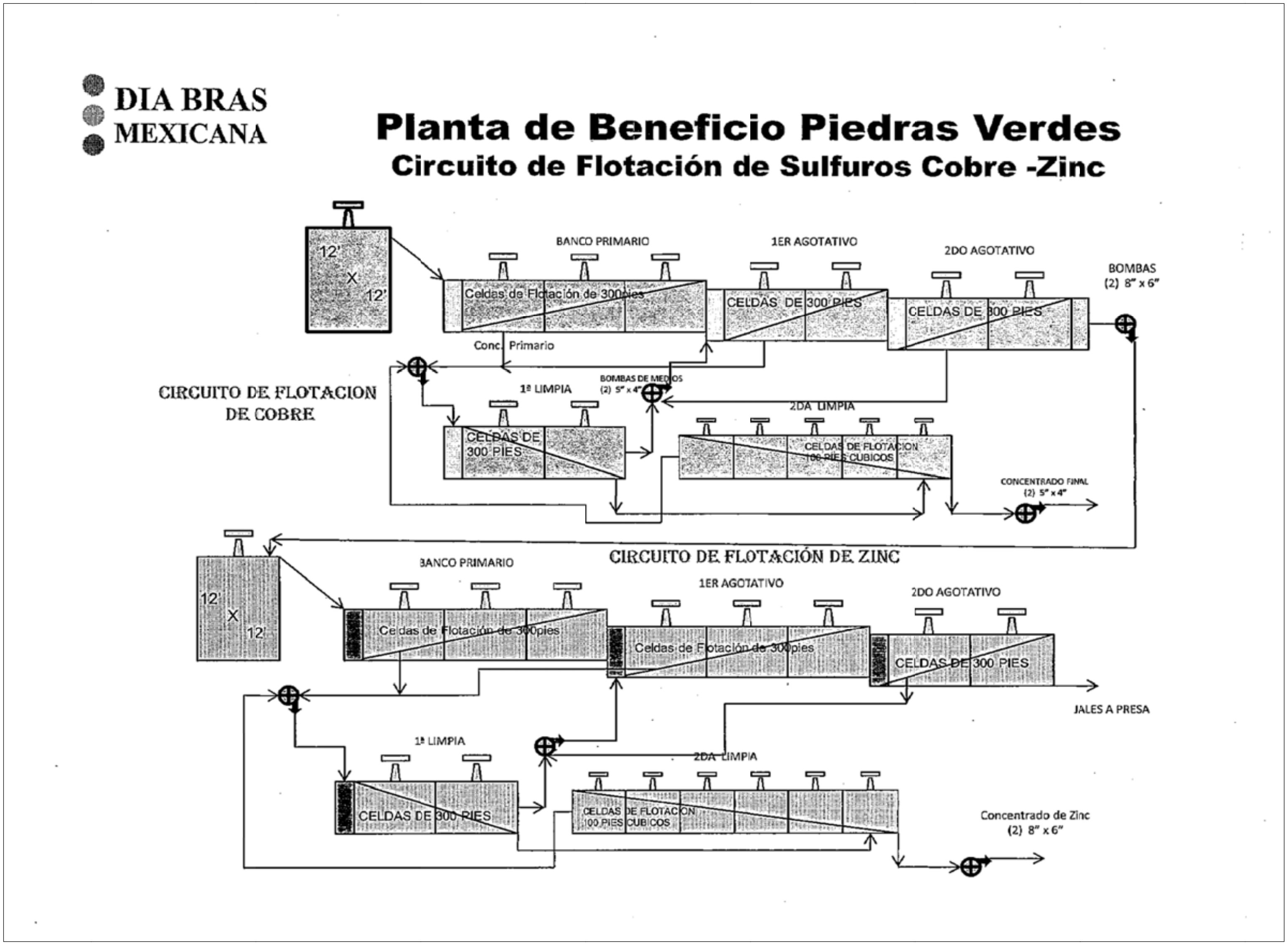

Figure 17-3 Flotation Circuits

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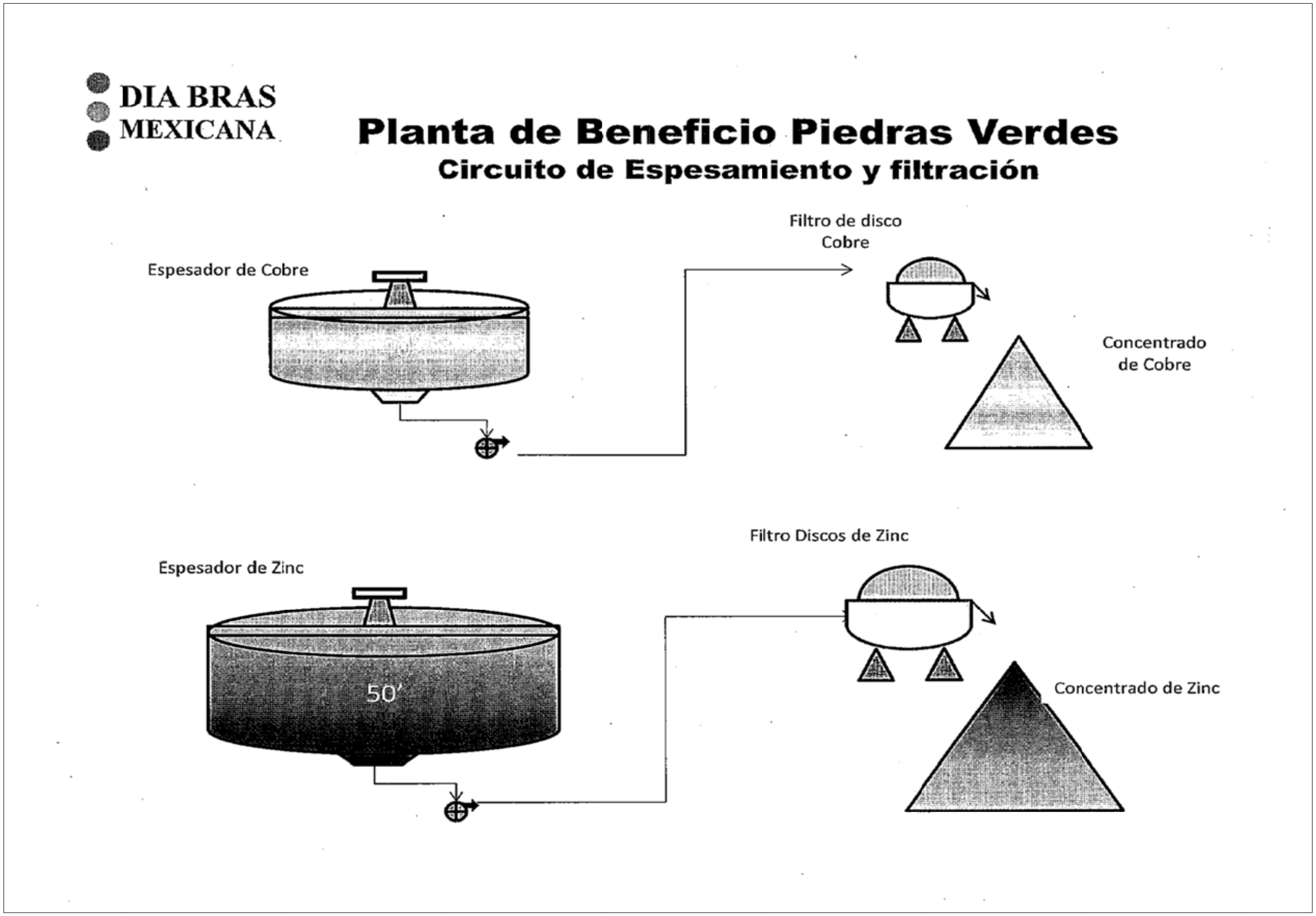

Figure 17-4 Thickner and Filter Circuits

18. INFRASTRUCTURE (ITEM 18)

Existing project infrastructure is shown in the General Arrangement in Figure 18-1. As shown in Figure 18-1, the entire infrastructure is currently in place to support the current mine, mill, and employee housing. The distance of the plant from the other infrastructure components and also to include plans that were of a scale to allow proper review, a separate figure has been included to show the footprint of the plant and its location relative to the other facilities (Figure 18-2). A new mine man camp is currently being constructed closer to the mill and proposed portal of the El Gallo Mines. Additional power is currently being routed to the mill site to support the ongoing expansion of the processing facility to 2,000 tpd. Power distribution will also be supply electricity to the proposed adit facilities and access at the El Gallo Inferior.

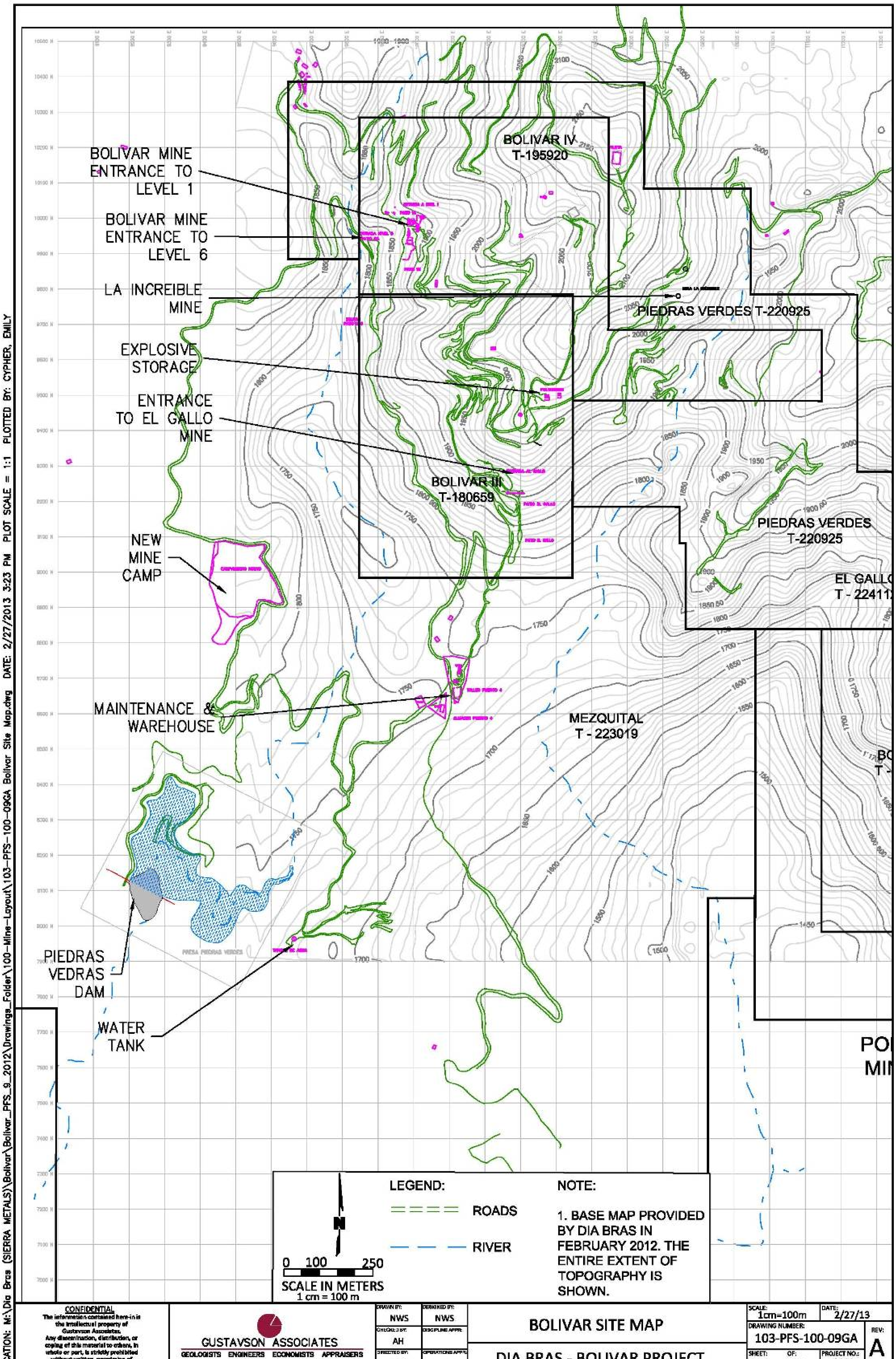

Figure 18-1 Bolívar Site Map

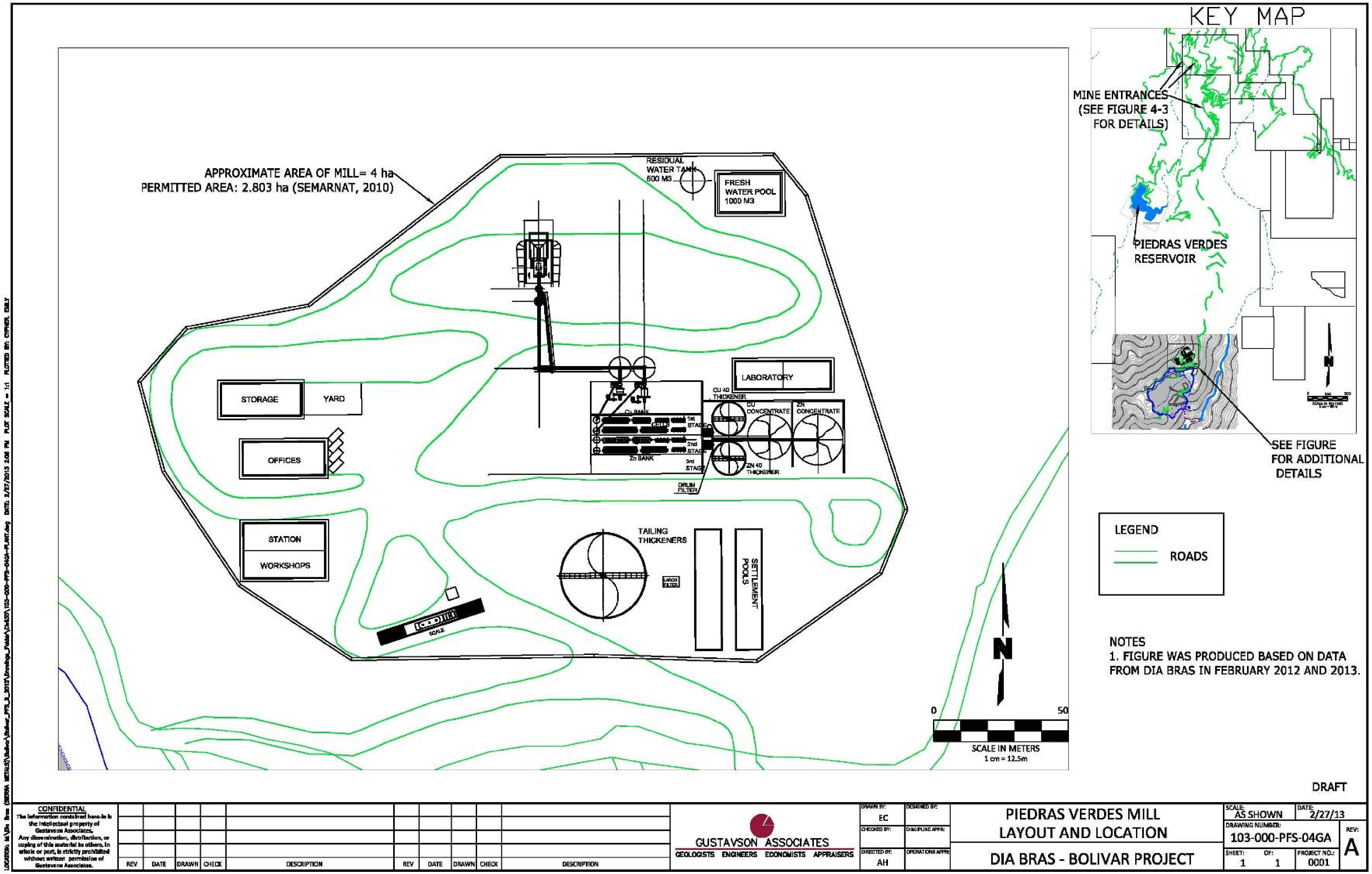

Figure 18-2 Piedras Verdes Mill Layout

18.1 Infrastructure and Logistic Requirements

18.1.1 Support Services

At each facility site, power will be supplied by the distribution system, a local sewer system, water supply and, at areas where it is required, a potable water system.

18.1.2 Compressed Air

Currently, compressed air is provided to the El Gallo Superior mine area. Compressors are located on the surface of the mine at the Bolívar mine entrance. Compressed air is routed to the El Gallo Superior via the ramp connecting the Bolívar mine area and the El Gallo Superior mine area.

Compressors for El Gallo Inferior Mine will be located on the surface at the proposed mine portal. These compressors will supply compressed air during the initial phase of construction and air lines will be distributed through the mine as required. Due to the depth of El Gallo Inferior, it may be more efficient to locate an underground compressed air station in the future.

18.1.3 Mine Dewatering

Currently, the mine does not require any dewatering. If the mine requires dewatering in the Inferior portion, then an underground sump and small pumps may be required to handle any residual water that may be encountered.

18.1.4 Electrical Systems

Electrical power is currently provided to all portions of the mine. Access lines from the main power grid connects to the mine, mill, and camp. Backup generators are present in case of power failures. Currently, a 33kV distribution line has been completed to the mill in order to provide the mill sufficient power for the proposed expansion. Power distribution is currently being constructed to the camp and El Gallo Inferior mine.

18.1.5 Communications

Underground communications will be critical to safe development and operation of the mine. The mine currently has hard line underground mine phones located at strategic locations. The mine phone system will be expanded as the mine expands further into the Superior zone. A new communication system will be installed in the El Gallo Inferior mine. New phones will be installed at permanent underground ventilation and electrical facilities, underground shop and refuge stations as appropriate. A leaky feeder communication system will also be installed to allow for mobile communication within the mine.

18.2 Maintenance Shop

There is a primary maintenance workshop at the portal of the Bolívar mine. Routine tire repairs, oil changes, and preventative maintenance are performed at this facility. Day to day servicing of equipment takes place underground. A new maintenance facility has been constructed at the entrance of the El Gallo Inferior mine to service the underground equipment.

A new surface maintenance and storage facility has been constructed recently. All surface equipment is maintained at this location. This facility will continue to service all mine surface equipment in the future.

18.3 Health and Safety Considerations

18.3.1 Refuge Stations

Refuge chambers are provided in the El Gallo Superior mine area. Based on the mine plan for El Gallo Inferior, refuge chambers will be necessary. Refuge stations can be economically constructed from re-muck bays that are no longer in use. Walls designed according to the minimum required strength can be erected and fitted with doors, and the rooms furnished with appropriate supplies at a low cost.

18.3.2 Office and Change House Requirement

There is currently a man camp for all mine employees. A brand new mine camp was constructed closer to the mill and mine entrance location. Due to the limited space at the mine entrance, all change house facilities are located at the man camp. A separate mine office is currently located at the Bolívar mine portal. A new office has been constructed at the portal of El Gallo Inferior.

18.3.3 Roads

There are no major access roads in the area of the mine. All roads in the mine area are maintained by Sierra Metals and consist of graded gravel roads. These roads are sufficiently sized and maintained to allow for 20 tonne haul trucks to transport ore from the mine to the mill. A new road is currently under construction from the surface maintenance facility to the proposed entrance of El Gallo Inferior.

Access to the mine area is gained by a mix of paved and gravel roads from Chihuahua. The 397 km road is approximately 325 km of paved road and 72 km of unpaved roads. It takes approximately 8 hours by road to reach the Bolívar mine area.

Concentrated material from the mill is transported to a rail load out approximately 40km away via a gravel road.

18.3.4 Rail

Concentrate is shipped to either the port in Guaymas, Sonora, Mexico for the copper or to a port in Manzanillo for the zinc via rail line. Both concentrates are sold FOB port.

18.3.5 Dams

Industrial water is obtained from the Piedras Verdes Dam, a reservoir that is owned and operated by Sierra Metals. According to Sierra Metals, water from the Piedras Verdes Dam is sufficient to supply mine operations, exploration, and mill requirements. As of September 4th, 2012 the reservoir contains 1,279,335 cubic meters of water and is 86% of capacity. The dam as constructed appears to be sufficient to withhold the 1.5 million cubic meters of water necessary for processing.

18.3.6 Dumps

There is very little mine waste associated with the method of mining being used. Most develop takes place within the ore body. Any waste that is associated with the mine is permitted to be discharged from a ventilation portal into the valley below. Waste dumps are not expected to be necessary to contain mine waste for El Gallo Inferior.

18.3.7 Stockpiles

Mined ore is stored either within the mine or in a small stockpile at the loadout. The mill has a stockpile sufficient to store 5 days of mined material. The current and proposed mining method allows for adequate ore storage to take place in the area that is mined and will be mucked out when needed, thus eliminating the need for any significant stockpiling on surface.

18.3.8 Pipelines

There is a pipeline that transports water from the Piedras Verdas reservoir to the water towers at the mill. A pump and pump house is present at the base of the reservoir in order to deliver water from the reservoir to the storage tanks at the mill.

A second pipeline transports tails from the mill to the tailings facility. Delivery of the tails through this pipeline is facilitated by gravity.

18.4 Tailings Facility

A tailings disposal area has been constructed to hold all the tails produced from processing the ore. The tailings disposal site is located directly downhill from the mill at a valley floor. The tailing disposal area is being constructed in a modified method of using the fines to build the impoundment and sending the water to the back of the impoundment to evaporate or be pumped back to the mill. This method is similar to cycloning without the use of cyclones.

Tailings slurry is transported from the mill through a pipeline and is discharged into the tailings facility at the front of the impoundment. The impoundment is sloped to allow the water to flow to the back of the impoundment where it is evaporated. The tails are then pushed up to the front of the facility and compacted by a dozer in order to increase the size of the impoundment.

Design of the tailings disposal area was provided to Gustavson in February 2013, which shows the final tailings dam height at 1,285 meters above sea level, with a southwesterly grade of 2-horizontal: 1-vertical slope, as shown on Figure 18-3. In our review, Gustavson notes the following:

- The tailings disposal area capacity appears adequate for the 3 years design life.
- No geotechnical evaluation showing appropriate angle of repose for tailings was provided to Gustavson. If it has not been completed already, Gustavson recommends a geotechnical evaluation to evaluate the effect of height and weight of tailings, compaction, moisture, grain size distribution on the stability of the tailings dam in the long-term, potential failure modes, and the appropriate engineering parameters for the long-term stability of the tailings disposal area. Engineering parameters may include methods to divert incident and precipitation from areas upslope of the tailings dam away from the tailings disposal area, and embankment structures (such as dikes or buttresses) to stabilize the tailings disposal area.
- The following details were not provided to Gustavson: liner, monitoring during construction (i.e., compaction, moisture content), and long-term monitoring after tailings dam is completed.
- Bolívar's environmental permit (SEMARNAT, 2010) states that an area of 9.266 hectares is permitted for the tailings dam, but the area of the reported tailings dam is 20 hectares. Gustavson did not review the environmental monitoring program associated with the tailings dam for permit compliance.
- As described in Section 7, the ore material is pyritic, and thus, may be susceptible to acid generation in the presence of oxygen and water.

Gustavson concludes that further design evaluation of the tailings disposal area be conducted to ensure its long-term stability and compliance with permit requirements. The approval documents from the Mexican government were reviewed by Gustavson. The approval document shows that the design was reviewed and approved by the appropriate authority, but Gustavson's has included tailings storage facility construction capital to address the ongoing expansions of the tailings facility.

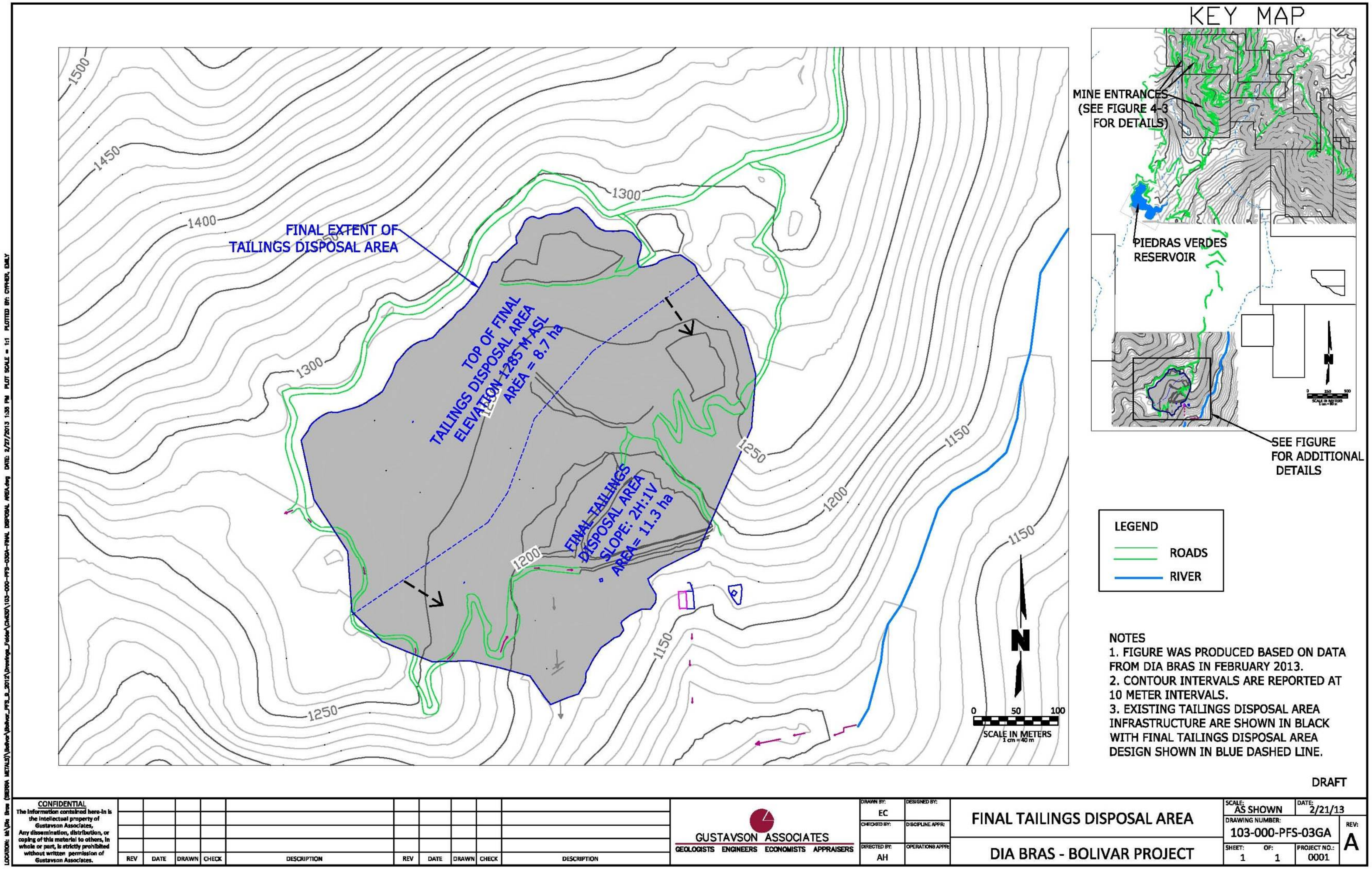

Figure 18-3 Final Tailings Disposal Area

GUSTAVSON ASSOCIATES

19. MARKET STUDIES AND CONTRACTS (ITEM 19)

Table 19-1 below shows the market prices used for copper, zinc, silver and gold used in the economic evaluation, all of which are the three year trailing average as of the end of December 2012 and is in line with industry practice. The table also depicts the Project Net Smelter Return (NSR) terms used in the economic evaluation. The NSR terms are existing contracts. Sierra Metals is currently shipping concentrates in accordance with the terms of these contracts.

Table 19-1 Market Prices and NSR Terms

Market Price - NSR Terms		
Market Price		
Copper	$3.69	$/lb
Zinc	$0.95	$/lb
Gold	$1487.00	$/oz
Silver	$28.80	$/oz
Copper Concentrate - Grade, Moisture		
Cu Conc Grade - dry	25.0%	%
Cu Conc Moisture	8.4%	%
Copper Concentrate - Loss, Deducts, TC, RC		
Cu Conc Losses	0.3%	%
Cu Pay For	96.5%	%
Cu Minimum Deduction	1.0%	%
Au Pay For	95.0%	%
Au Minimum Deduction	1.0	gpt
Ag Pay For	95.0%	%
Ag Minimum Deduction	50.0	gpt
Cu Concentrate - Treatment Charge	$108.50	$/t-conc-dry
Cu - Refining Charge	$0.064	$/lb
Au - Refining Charge	$5.00	$/oz
Ag - Refining Charge	$0.35	$/oz
Copper Concentrate - Penalties		
Avg Bi Grade	0.66%	%
Bi Penalty assessed >	0.10%	%
Bi Penalty Increment	0.01%	%
Bi Penalty	$1.50	$/t-conc-dry
Avg Pb + Zn Grade	10.16%	%
Pb + Zn Penalty assessed >	4.00%	%
Pb + Zn Penalty Increment	1.00%	%
Penalty Pb + Zn	$2.00	$/t-conc-dry
Copper Concentrate - Price Participation, Insurance		
Price Participation - Base Price	none	$/t-Cu-dry
Price Participation - Increment < Base Price	$0.00	%
Price Participation - Increment > Base Price	$0.00	%
Zinc Concentrate - Grade, Moisture		
Zn Conc Grade - dry	42.5%	%
Zn Conc Moisture	7.3%	%
Zinc Concentrate - Loss, Deducts, TC, RC		
Zn Conc Losses	0.3%	%
Zn Conc Minimum Deduction	8.0%	%
Zn Conc Standard Deduction	85.0%	%
Zn Concentrate - Treatment Charge	$236.00	$/t-conc-dry
Zn - Refining Charge	$0.000	$/lb
Zinc Concentrate - Penalties		
Avg Cobalt Grade	700	ppm
Cobalt Penalty assessed >	500	%
Cobalt Penalty Increment	100	%
Cobalt Penalty	$1.50	$/t-conc-dry
Price Participation - Base Price	$2,000	$/t-Zn-dry
Price Participation - Increment < Base Price	2.00%	%
Price Participation - Increment > Base Price	5.00%	%

20. ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT (ITEM 20)

20.1 Environmental Liabilities

During preparation of this report, Sierra Metals' Security Department identified potential environmental liabilities, as follows:

1. Old drill roads that have not been reclaimed
2. Small dumps from historical mining operations that have not been reclaimed.

Necessary reclamations actions will be undertaken by Sierra Metals to mitigate old drill roads and historical dumps.

20.1.1 Tailings Dam Remediation

The current tailings dam has a life of several years from the date of this report with an approximate capacity of 2,600,000 tonnes. Sierra Metals intends to build additional tailings capacity concurrent with mine operations. .

Remediation consists of covering the entire surface of the dam with a layer of topsoil, water deviation and reforestation with indigenous flora of the region.

20.1.2 Permits Required for Full Scale Mining

Sierra Metals is currently operating and has all the permits required to operate the Bolívar Mine as shown in Table 20-1.

Table 20-1 Permits Required for Full Scale Mining in Mexico

Permit	Agency	Status
Environmental Impact Statement (MIA)	Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT)	Waived by SEMARNAT
Land Use Change	Local Governments, Ejido and Registro Agrario Nacional	Waived by local governments
- Local Zoning for Tailings Dam	SEMARNAT	In Place – Letter dated January 16, 2012
- Contract for Land Use	Ejido Piedras Verdes	Permit dated January 10, 2011
- Contract for Land Use	Ejido Piedras Verdes	Permit dated November 17, 2012 (supersedes contract dated December 14, 2004)
- Contract for Land Use	Ejido Piedras Verdes	Permit dated November 10, 2010 (supersedes contract dated April 14, 2010)
Water Use Registry	Ejido	Agreement with Ejido for water for mining and mill operations
- Water Rights Permit	Ejido Piedras Verdes and Municipality of Urique	Permit dated June 29, 2010
Construction Permit	Local Governments, Ejido and Registro Agrario Nacional	Not applicable as mine is developed, and no construction is ongoing
- Mill Construction Permit	Urique, Chihuahua Presidencia Municipal	In Place – Permit dated August 4, 2010
- Mill Construction Permit	SEMARNAT	In Place – Permit dated May 7, 2010
Explosives Purchase and Use Permit (Expansion) - Permit No. 4042	Secretaría de la Defensa Nacional (SEDENA)	Patented – Expires December 31, 2012
Archeological Release Letter	National Institute of Archeology and History (INAH)	In Place – dated April 29, 2005

****Information provided by Sierra Metals (August 21, 2012).**

21. CAPITAL AND OPERATING COSTS (ITEM 21)

The capital and operating costs are based on Sierra Metals actual capital and operating expenditures, projected budgets and Gustavson Associates estimates using in-house database information. The mine is currently in production with equipment similar and/or identical to the additional equipment required. The mill, also currently operating, underwent construction and expansion in the last 9 months providing actual data and budgeted data. Capital and operating costs are to be within +/- 25% at a Prefeasibility level of accuracy and capital costs contingencies are typically 15%. Gustavson has included a 10% contingency on the mining capital, based on recent mine acquisitions; 15% on process and infrastructure capital; and 0% on owner capital, as the owner capital is supplied from Sierra Metals operating data.

21.1 Capital Costs

The Project has a mining life of 10 years, with the mill operating through year 11 on RoM stockpiled material. Capital costs are US$43.0 million, with initial capital costs of US$7.0million and sustaining capital over the LoM of US$36.0 million. The LoM capital costs are presented in Table 21-1 Capital Cost Summary. It is important to understand that almost all of the front-end or initial capital costs are sunk costs that have already been paid.

Table 21-1 Capital Cost Summary

	Initial (000s)	Sustaining (000s)	LoM (000s)
Mining	$1,601	$9,620	$11,220
Process	$2,245	$8,097	$10,342
Infrastructure	$9	$0	$9
Owner	$3,148	$18,249	$21,397
Other	$0	$0	$0
Total Capital	**$7,002**	**$35,966**	**$42,968**

21.1.1 Mine Capital Costs

LoM mine capital costs are estimated at US$11.2 million. Initial mine equipment is estimated at US$1.6million. Capital items are largely used equipment, which include a drill jumbo, explosive loader, load-haul-dump, 13yd underground truck, roof bolter, and the support equipment for an underground mine. Sustaining mine equipment is US$9.6 million for LoM. The sustaining equipment is estimated as either major rebuilds or new replacement equipment.

Sierra Metals provided Year 1 (initial) mining capital budget costs as shown in Table 21-2 Mining Capital Costs as Supplied by Sierra Metals. Gustavson estimated the sustaining capital costs as shown in Table 21-3 Mining Capital Costs. The mining capital costs include a 10% contingency.

Table 21-2 Mining Capital Costs as Supplied by Sierra Metals

BOLIVAR MINE INVESTMENT 2013 BUDGET															
DESCRIPTION			**01-JAN**	**02-FEB**	**03-MAR**	**04-APR**	**05-MAY**	**06-JUN**	**07-JUL**	**08-AUG**	**09-SEP**	**10-OCT**	**11-NOV**	**12-DEC**	**TOTAL YEAR 2013**
1.-Machinery and Equipment															
	Long Drill	$ 200,000													$ 200,000
	Long Drill rehabilitation	$ 50,000		$25,000	$ 25,000										$ 50,000
	Jumbo maintenance, rehabilitation	$ 75,000					$ 25,000	$ 25,000	$25,000						$ 75,000
	Compressor, electric 1500 cfm	$ -													
	Compressor, diesel 600 cfm	$ -													
	Scop tram, 3.5cy	$ 250,000						$250,000							$ 250,000
	Scoop tram maintenance, rehabilitation	$ 75,000									$25,000	$ 25,000	$25,000		$ 75,000
	Truck - 15 tons	$ 250,000			$250,000										$ 250,000
	Truck maintenance, rehabilitation	$ 75,000							$25,000	$ 25,000	$25,000				$ 75,000
	Shotcrete machine	$ 50,000					$ 50,000								$ 50,000
	3 submersible pumps - 30hp	$ 50,000	$16,667	$16,667						$ 16,667					$ 50,000
	Front end loader 950	$ -													
	Motorgrader	$ -													
	Scissors truck	$ 75,000										$ 75,000			$ 75,000
	Scaler	$ 100,000								$100,000					$ 100,000
	Machine legs	$ 10,000	$10,000												$ 10,000
	Total	**$1,260,000**	**$26,667**	**$41,667**	**$275,000**	**$ -**	**$ 75,000**	**$275,000**	**$50,000**	**$141,667**	**$50,000**	**$100,000**	**$25,000**	**$ -**	**$1,260,000**
2.- Service Equipment															
	Mine vehicles	$ 50,000		$16,667			$ 16,667				$16,667				$ 50,000
	Surface vehicles	$ 50,000					$ 25,000			$ 25,000					$ 50,000
	Ambulance	$ 35,000				$35,000									$ 35,000
	Vehicle Maintenance	$ 20,000			$ 5,000	$ 5,000		$ 5,000	$ 5,000						$ 20,000
	Personnel carrier	$ 40,000						$ 40,000							$ 40,000
	Surveying equipment	$ -													
	Total	**$ 195,000**	**$ -**	**$16,667**	**$ 5,000**	**$40,000**	**$ 41,667**	**$ 45,000**	**$ 5,000**	**$ 25,000**	**$16,667**	**$ -**	**$ -**	**$ -**	**$ 195,000**
TOTAL		**$1,455,000**	**$26,667**	**$58,334**	**$280,000**	**$40,000**	**$116,667**	**$320,000**	**$55,000**	**$166,667**	**$66,667**	**$100,000**	**$25,000**	**$ -**	**$1,455,000**
	Note: This table was supplied by Sierra Metals as their actual Capital Expenditures for the mine in 2013.														

Table 21-3 Mining Capital Costs

	Initial	Sustaining	LoM
AC Boomer Drill Jumbo	$325	$3,776	$4,101
Explosive Loader	$50	$0	$50
Load-Haul-Dump 3.5yd	$325	$2,280	$2,605
Truck 13yd	$325	$1,809	$2,134
Roof Bolter	$100	$0	$100
Grout Machine	$50	$0	$50
Scissor Truck	$75	$0	$75
Skid-steer	$0	$0	$0
Jacklegs	$10	$0	$10
Wheel Loader 5cy	$0	$488	$488
Dozer D8R	$0	$0	$0
Dozer D6N	$105	$0	$105
Motorgrader 140H	$0	$0	$0
Water Truck - 13cy Trk	$0	$0	$0
Backhoe	$0	$0	$0
Compressor 890cfm	$0	$26	$26
Compressor 323cfm	$0	$16	$16
Generator 1500kw	$0	$201	$201
Pickups 3/4t	$0	$150	$150
Miscellaneous	$90	$0	$90
Shops Equip. & Spares	$0	$0	$0
Mine Support Equip.	$0	$0	$0
Site Development	$0	$0	$0
Subtotal	**$1,455**	**$8,745**	**$10,200**
Contingency (10%)	$146	$875	$1,020
Total Mine Capital	**$1,601**	**$9,620**	**$11,220**

The mining capital costs are based on the following individual equipment costs presented in Table 21-4 Primary Equipment Capital Costs and Table 21-5 G&A Equipment Capital Costs. The initial capital is the Sierra Metals used equipment 2013 budget items, with the sustaining capital being either new replacement equipment or rebuilds of existing equipment at new equipment prices.

Table 21-4 Primary Equipment Capital Costs

	Bolivar Budget Initial Capital Cost ($000s)	Sustaining Capital Cost ($000s)
Atlas Copco Boomer Drill Jumbo	$325.0	$755.2
Explosive Loader, Mine Vehicles	$50.0	$383.9
Load-Haul-Dump 3.5yd	$325.0	$570.0
Load-Haul-Dump 6yd		$817.4
Roof Bolter	$100.0	$874.9
Grout Machine	$50.0	$22.4
Scissor Truck	$75.0	$276.5
Skid-steer		$219.7
Jacklegs	$10.0	$9.5
Truck 13yd	$325.0	$402.0
Wheel Loader 5cy		$244.0

Table 21-5 G&A Equipment Capital Costs

	Units	Bolivar Budget Initial Capital Cost ($000s)	Sustaining Capital Cost ($000s)
Dozer D8R	1		$713.60
Dozer D6N, Surface Vehicles	1	$105.00	$324.80
Backhoe	1		$159.20
Motorgrader 140H	1		$305.00
Water Truck - Old 13cy Truck	1		$402.00
Compressor 890cfm	2		$51.60
Compressor 323cfm	2		$31.00
Generator 1500kw	2		$402.00
Pickups 3/4t	5		$30.00
Miscellaneous, Pumps	1	$90.00	$100.00

21.1.2 Process Capital Costs

LoM process capital costs are estimated at US$10.3million. Initial process capital is estimated at US$2.2million. The initial capital is for tailings storage facility (TSF) construction. The initial mill and mill expansion have been completed. Sustaining capital is US$8.1million for LoM. The sustaining capital includes major rebuilds for the initial mill, mill expansion, and additional TSF capacity. The plant capital costs are presented in Table 21-6 Plant Capital Costs below. The process capital costs include a 15% contingency.

Table 21-6 Plant Capital Costs

	Initial ($000s)	Sustaining ($000s)	LoM ($000s)
Process Facility			
Mill Construction - 1,000tpd	$0	$2,000	$2,000
Mill Expansion - 2,000tpd	$0	$1,750	$1,750
Tailings Dam			
TSF Construction	$1,735	$0	$1,735
TSF Expansion	$0	$2,800	$2,800
Subtotal	**$1,735**	**$6,550**	**$8,285**
EPCM (7.5%)	$130	$491	$621
Spare Parts (5.0%)	$87	$0	$87
Subtotal	**$1,952**	**$7,041**	**$8,993**
Contingency (15%)	$293	$1,056	$1,349
Total Plant Capital	**$2,245**	**$8,097**	**$10,342**

The plant and infrastructure capital costs from year 2013 through 2021 are incurred as shown in Table 21-7 Process Plant and Infrastructure Capital Costs. A TSF expansion occurs every 2 years following the initial TSF upgrade construction. The mill and mill expansion rebuilds occur approximately half way through the Project life.

Table 21-7 Process Plant and Infrastructure Capital Costs

	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021
Process Facility										
Mill Construction - 1,000tpd	1						$1,500		$250	
Mill Expansion - 2,000tpd	1							$1,500		$250
Tailings Dam										
TSF Construction	1	$1,735								
TSF Expansion	1			$700		$700		$700		$700
Process EPCM, Spare Parts, Contingency										
EPCM	7.5%									
Spare Parts	5.0%									
Contingency	15.0%									
Infrastructure										
Workshops/Warehouse	1	$8								
Communications	1	$0								
Miscellaneous	1	$0								
Infrastructure Contingency										
Contingency	15.0%									

21.1.3 Infrastructure Capital Costs

The LoM infrastructure costs, all initial capital, are minimal at US$9k for additional workshops/warehouse. The infrastructure capital costs include a 15% contingency. The infrastructure capital costs are presented in Table 21-8 Infrastructure Capital Costs below.

The mine and mill are currently in production. Access roads, water supply systems, electrical power distribution, concentrate load out facilities, and similar operational infrastructure exist for the Project.

Table 21-8 Infrastructure Capital Costs

	Initial ($000s)	Sustaining ($000s)	LoM ($000s)
Infrastructure			
Workshops/Warehouse	$8	$0	$8
Communications	$0	$0	$0
Miscellaneous	$0	$0	$0
Subtotal	**$8**	**$0**	**$8**
Contingency (15%)	$1	$0	$1
Total Infrastructure Capital	**$9**	**$0**	**$9**

21.1.4 Owner Capital Costs

LoM owner costs are US$21.4million. These costs are based on Sierra Metals actual capital expenditures and budgets for the drilling and engineering studies programs. Initial owner capital is US$3.1million and sustaining owner capital is US$18.3million. The owner capital costs include a 0% contingency, as these are Sierra Metals provided budget numbers.

Gustavson Associates estimated US$3.0 million mine closure costs which are included in sustaining capital. No salvage value provision is included at end of life (EOL). The owner capital costs are presented in Table 21-9 Owner Capital Costs below.

Table 21-9 Owner Capital Costs

	Initial ($000s)	Sustaining ($000s)	LoM ($000s)
Owner Costs			
Drilling Program	$1,083	$7,581	$8,664
Drilling Equipment	$1,617	$6,468	$8,085
Drilling Fixed assets	$300	$1,200	$1,500
Engineering Studies	$148	$0	$148
Corporate Services	$0	$0	$0
Mine Concessions	$0	$0	$0
Mine Closure	$0	$3,000	$3,000
Subtotal	**$3,148**	**$18,249**	**$21,397**
Contingency (0%)	$0	$0	$0
Total Owners Capital	**$3,148**	**$18,249**	**$21,397**

The owner capital costs from year 2013 through 2021+ are incurred as shown in Table 12-10 Owner Costs by Year.

Table 21-10 Owner Costs by Year

Owner Costs ($000s)										
	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021+
Owner Costs										
Drilling Program	1	$1,083	$1,083	$1,083	$1,083	$1,083	$1,083	$1,083	$1,083	
Drilling Equipment	1	$1,617	$1,617	$1,617	$1,617	$1,617				
Drilling Fixed assets	1	$300	$300	$300	$300	$300				
Engineering Studies	1	$148								
Corporate Services	1	$0								
Mine Concessions	1	$0								
Mine Closure	1									$3,000
Owner Cost Contingency										
Contingency	0.0%									

21.2 Operating Costs

Project operating costs average US$32.16/t-milled. Gustavson estimated the mining costs based on the modified mine plan discussed in Section 16. Sierra Metals actual and budgeted labor, mining, process and general and administrative costs are incorporated within Gustavson's estimated costs.

The Project operating cost summary is presented in Table 21-11 Operating Cost Summary. The operating costs are based on the general operating parameters presented in Table 21-12 General Operating Inputs.

Table 21-11 Operating Cost Summary

	$/t-milled	LoM ($000s)
Mining	$16.04	$119,594
Process	$13.38	$99,783
G&A	$2.74	$20,418
Total Operating Cost	**$32.16**	**$239,795**

Table 21-12 General Operating Inputs

	Factor	Unit
Currency		
Peso to US$	12.892	
Operating Costs		
Power Cost - Energy	$0.120	$/kWh
Power Cost - Demand	$12.00	$/kW
Diesel Cost	$0.852	$/liter
Lube Cost	$2.145	$/liter
ANFO Cost (AN @ $1165/t), Caps, Etc.	$1.200	$/t
Material Parameters		
Bulk Density	3.27	g/cm3
Swell Factor	1.50	
Fill Factors	95%	%
Operating Parameters		
Days per Year	350	
Shifts per Day	2	
Hours per Shift	10	
Operator Availability	83%	
Mechanical Availability	85%	

21.2.1 Mine Operating Costs

The LoM Project mining costs average US$15.24/t-matl or $US16.04/t-RoM. Table 21-13 Mining Operating Costs presents functional costs.

Table 21-13 Mining Operating Costs

	$/t-mined	LoM ($000s)
Drilling & Blasting	$2.13	$16,690
Loading & Underground Haulage	$2.93	$23,027
Rockbolting - Utilities	$0.68	$5,345
Transfer and Contract Haul	$5.34	$41,920
Roads & Dumps	$0.82	$6,430
Mine Support	$1.39	$10,911
Mine G&A Labor	$1.95	$15,272
Mine Operating Cost	**$15.24**	**$119,594**

The mine operating costs are based on the extraction factors presented in Table 21-14 Mining Extraction Factors and the mining productivity factors presented in Table 21-15 Underground Mining Productivities. The extraction factors and mining productivities are based on the Gustavson mine plan.

Table 21-14 Mining Extraction Factors

	Factor %
RoM Extraction Percentage	85.0%
Pillar Extraction Percentage	80.0%
Mining System Dilution Percentage	5.0%

Table 21-15 Underground Mining Productivities

	Productivity	Drill Jumbo	Blast Loader	Muck LHD	ReMuck LHD	ReMuck Truck	Roof Support	Utilities Support
	t/d	hrs/day	hrs/day	hrs/day	hrs/day	hrs/day	hrs/day	hrs/day
Room and Pillar Production								
Superior Ore	800.0	9.10	6.38	7.42	9.78	19.55	0.00	1.00
Inferior Ore	614.9	7.00	4.91	5.71	7.52	15.04	1.33	1.25
Adit Production								
Inferior Ore	309.9	5.76	3.83	4.56	0.83	1.65	3.78	1.25
Ramp Development (Up at 15%)								
Inferior Ore	303.4	4.74	4.47	4.54	3.30	6.60	3.89	1.25
Ramp Development (Down at 13%)								
Inferior Waste	326.8	4.74	4.47	4.64	4.08	8.15	3.89	1.25

Mine operating costs are estimated by Gustavson. The mining cost is derived from the required equipment production hours, based on mining productivities and annual mine tonnages.

Mine salaried and hourly labor staffing is presented in Table 21-16 Mining Salary Labor Summary and Table 21-17 Mining Hourly Labor Summary. Sierra Metals existing mine labor rates are presented in Table 21-18 Mine Labor.

Table 21-16 Mining Salary Labor Summary

	Units	Empl/Yr
Salaried		
Administrative		
Director General	men	1
Operations Manager	men	1
Administrative Tech	men	2
Warehouseman	men	2
Warehouse Helper	men	1
Graphics/Drafting	men	2
Technicians	men	0
Computer Technicians	men	0
Medical Personnel	men	1
Total Administrative Personnel	men	10
Mining		
Mine Supervisor	men	1
Maintenance Supervisor	men	1
Administration Supervisor	men	1
Geology Director	men	1
Geologist	men	5
Maintenance Foreman	men	2
Mine Foreman	men	3
Surveyor	men	2
Shift Foreman	men	1
Personnel	men	0
Security Foreman	men	1
Surface Ops Foreman	men	1
Total Mining Personnel	men	19
Total Salaried Personnel	**men**	**29**

Table 21-17 Mining Hourly Labor Summary

	Units	Empl/Yr
Hourly		
Mine Operations		
Drilling & Blasting	men	21
Loading & Underground Haulage	men	49
Rockbolting - Utilities	men	31
Transfer and Contract Haul	men	9
Roads & Dumps	men	20
Other	men	0
Total Mine Operations Personnel	men	129
Mine Maintenance		
Welder	men	3
Electrician	men	3
Lead Mechanic	men	11
Mechanic Helper	men	11
General Laborer	men	0
Total Mine Maintenance Personnel	**men**	**28**
Mine Surveying		
General Laborer	men	6
Operator	men	0
Lead Mechanic	men	0
General Laborer	men	0
Watchman	men	0
Total Mine Surveying Personnel	men	6
General Staff		
Janitors	men	6
General Laborers	men	3
Security Guard	men	15
Total Mine General Staff Personnel	men	24
Total Hourly Personnel	**men**	**187**

Table 21-18 Mine Labor

Job Classification	Base Rate	Base Rate	Hours per Year [2]	Base Cost	Bonus + Benefits [3]	Annual Cost [4]	Annual Cost
	($Pesos/hr)	(US$/hr)	(hrs)	(US$/yr)	(%)	US($)	(US$/hr)
SALARIED [1]	12.892						
Administration							
Director General	222.74	17.28	-	49,759	0.0%	49,759	17.28
Director de operaciones - Operations Manager	113.54	8.81	-	25,364	40.0%	35,510	12.33
Asistente de Administracion - Administrative Technicians	62.50	4.85	-	13,962	40.0%	19,547	6.79
Warehouse							
Almacenista - Warehouseman	58.33	4.52	-	13,031	40.0%	18,244	6.33
Auxiliar de Almacen - Warehouse Helper	43.75	3.39	-	9,774	40.0%	13,683	4.75
Graphics/Drafting							
Dibujante - Graphics/Drafting	81.88	6.35	-	18,290	40.0%	25,607	8.89
Soporte tecnico - Technicians	63.33	4.91	-	14,148	40.0%	19,808	6.88
Computer/Database							
Base de Datos - Computer Technicians	77.08	5.98	-	17,220	40.0%	24,108	8.37
Medical Personnel							
Médico - Medical Personnel	29.38	2.28	-	6,562	40.0%	9,187	3.19
Mine Operations Supervision							
Superintendente de Operaciones Mina - Mine Superintendent	270.83	21.01	-	60,503	40.0%	84,704	29.41
Jefe de Mantenimiento - Maintenance Superintendent	114.59	8.89	-	25,598	40.0%	35,837	12.44
Jefe de Administracion - Administration Superintendent	104.17	8.08	-	23,270	40.0%	32,578	11.31
Director Geologia/Exploracion - Geology Director	338.54	26.26	-	75,628	40.0%	105,880	36.76
Geologos - Geologist	83.19	6.45	-	18,585	40.0%	26,019	9.03
Supervisor de Mantenimiento - Maintenance Foreman	68.75	5.33	-	15,358	40.0%	21,502	7.47
Supervisores de Mina - Mine Foreman	92.08	7.14	-	20,571	40.0%	28,799	10.00
Topografo - Surveyor	85.00	6.59	-	18,989	40.0%	26,584	9.23
Mayordomo de Turno - Shift Foreman	68.75	5.33	-	15,358	40.0%	21,502	7.47
Profesionista en desarrollo - Personnel	50.00	3.88	-	11,170	40.0%	15,638	5.43
Supervisor de Seguridad - Security Foreman	75.00	5.82	-	16,755	40.0%	23,456	8.14
Supervisor de Obra Civil - Surface Operations Foreman	54.17	4.20	-	12,100	40.0%	16,941	5.88
HOURLY [1]							
Operación Mina - Mining							
Operadores de 1a - Operators 1st Class	55.63	4.31	2,400	12,426	40.0%	17,397	6.04
Operadores - Operators	50.63	3.93	2,400	11,309	40.0%	15,833	5.50
Perforistas - Drillers	50.63	3.93	2,400	11,309	40.0%	15,833	5.50
Ayudantes Perforistas - Drill Helpers	31.88	2.47	2,400	7,121	40.0%	9,969	3.46
Oficial de Mantenimiento - Lead Mechanic	50.63	3.93	2,400	11,309	40.0%	15,833	5.50
Ayudantes Generales (Presa) - Tailings Laborer	29.38	2.28	2,400	6,562	40.0%	9,187	3.19
Mantenimiento - Maintenance							
Electro Mec Soldador - Welder	55.63	4.31	2,400	12,426	40.0%	17,397	6.04
Electro Mecanico - Electrician	53.13	4.12	2,400	11,868	40.0%	16,615	5.77
Oficial de Mantenimiento - Lead Mechanic	50.63	3.93	2,400	11,309	40.0%	15,833	5.50
Ayudantes Mantenimiento - Mechanic Helper	31.88	2.47	2,400	7,121	40.0%	9,969	3.46
Ayudante General - General Laborer	29.38	2.28	2,400	6,562	40.0%	9,187	3.19
Transportación - Transportation							
Operadores - Operators	50.63	3.93	2,400	11,309	40.0%	15,833	5.50
Choferes - Drivers	50.63	3.93	2,400	11,309	40.0%	15,833	5.50
Topografía - Surveyor							
Ayudantes Generales - General Laborer	29.38	2.28	2,400	6,562	40.0%	9,187	3.19
Operador de Obra - Operator	50.63	3.93	2,400	11,309	40.0%	15,833	5.50
Oficial de Mtto de obra - Lead Mechanic	50.63	3.93	2,400	11,309	40.0%	15,833	5.50
Ayudantes Generales de Obra - General Laborer	29.38	2.28	2,400	6,562	40.0%	9,187	3.19
Velador - Watchman	31.88	2.47	2,400	7,121	40.0%	9,969	3.46
Construcción - Construction							
Electro Mecanico Soldador - Welder	55.63	4.31	2,400	12,426	40.0%	17,397	6.04
Oficial de Mantenimiento - Lead Mechanic	50.63	3.93	2,400	11,309	40.0%	15,833	5.50
Ayudantes Generales - General Laborer	29.38	2.28	2,400	6,562	40.0%	9,187	3.19
Exploracion/Geologia - Exploration/Geology							
Perforistas Maq diam - Drillers	50.63	3.93	2,400	11,309	40.0%	15,833	5.50
ElectroMecanico Soldador - Welder	55.63	4.31	2,400	12,426	40.0%	17,397	6.04
Ayudantes Perf Maq Diam - Driller Helper	31.88	2.47	2,400	7,121	40.0%	9,969	3.46
Operador (Muestreo) - Sampler	50.63	3.93	2,400	11,309	40.0%	15,833	5.50
Ayudante Generales (Muestreo) - Sampler Helper	29.38	2.28	2,400	6,562	40.0%	9,187	3.19
Ayudantes Generales (Explora) - General Laborers	29.38	2.28	2,400	6,562	40.0%	9,187	3.19
G&A							
Limpieza y Asseo - Janitors	29.38	2.28	2,400	6,562	40.0%	9,187	3.19
Ayudante Generales - General Laborers	29.38	2.28	2,400	6,562	40.0%	9,187	3.19
Guardia de Seguridad - Security Guard	31.88	2.47	2,400	7,121	40.0%	9,969	3.46
(1) Salaried and Hourly rates provided by Dia Bras, October 2012							
(2) 2sh/d, 10hr/sh, 3 crews							
(3) Salaried and Hourly Benefits provided by Dia Bras, October 2012							
(4) Annual Rates are based on 8hr/day, 30days/month							

Functional operating costs are estimated based on the fuel consumptions and hourly equipment operating costs presented in Table 21-19 Primary Equipment Operating Costs and Table 21-20 G&A Equipment Operating Costs.

Table 21-19 Primary Equipment Operating Costs

	Fuel (lph)	Lube (lph)	Tires ($/hr)	Overhaul ($/hr)	Maint. ($/hr)	Wear Items ($/hr)
Atlas Copco Boomer Drill Jumbo	3.633	1.640	$0.05	$7.31	$5.98	$5.82
Explosive Loader, Mine Vehicles	9.627	0.930	$0.42	$2.71	$5.03	$0.00
Load-Haul-Dump 3.5yd	15.841	1.401	$6.19	$7.24	$13.45	$2.82
Load-Haul-Dump 6yd	21.080	1.993	$6.26	$10.38	$19.28	$3.46
Roof Bolter	8.805	1.986	$0.21	$9.70	$7.94	$7.34
Grout Machine	3.518	0.084	$0.07	$0.25	$0.20	$0.00
Scissor Truck	9.627	0.699	$0.42	$1.95	$6.62	$0.00
Skid-steer	20.650	0.691	$3.26	$1.47	$2.74	$0.33
Jacklegs	0.000	0.410	$0.00	$0.16	$0.13	$7.34
Truck 13yd	19.264	1.226	$3.92	$1.42	$2.63	$0.00
Wheel Loader 5cy	24.207	0.778	$10.68	$1.46	$2.72	$0.35

Table 21-20 G&A Equipment Operating Costs

	Fuel (lph)	Lube (lph)	Tires ($/hr)	Overhaul ($/hr)	Maint. ($/hr)	Wear Items ($/hr)
Roads and Dumps						
Dozer D8R	39.436	1.913	$0.00	$4.32	$6.47	$12.81
Dozer D6N, Surface Vehicles	19.082	0.881	$0.00	$2.23	$3.34	$8.24
Motorgrader 140H	17.294	0.824	$1.25	$2.15	$4.00	$0.80
Water Truck - Old 13cy Truck	19.264	1.226	$3.92	$1.42	$2.63	$0.00
G&A						
Backhoe	10.354	0.456	$0.00	$1.80	$2.70	$1.38
Compressor 890cfm	8.853	0.110	$0.00	$1.14	$0.94	$0.00
Compressor 323cfm	3.317	0.068	$0.00	$0.69	$0.56	$0.00
Generator 1500kw	295.296	2.646	$0.00	$4.38	$5.35	$0.00
Pickups 3/4t	11.415	0.399	$0.20	$0.20	$0.37	$0.00
Miscellaneous Pumps						$50.00

The RoM ore is contract hauled from the mine portal to the mill in $10m^3$ trucks. The contract haul is US$5.20/t. Table 21-21 Truck Operating Parameters presents the truck haulage productivity and contract haul rates.

Table 21-21 Truck Operating Parameters

	Capacity (t)	Loaded (t)	Load Time (min)	Spot Time (min)	Dump Time (min)	Contract $/t
Truck $10m^3$ (13yd)						
RoM to Mill	21.7	20.0	1.50	0.50	1.00	$5.20
Concentrate - Mill to Rail	-	-	-	-	-	$2.32

21.2.2 Process Operating Costs

The LoM Project process operating costs average US$13.38/t-milled. Table 21-22 Process Operating Costs presents component costs.

Table 21-22 Operating Costs

	$/t-milled	LoM ($000s)
Reagents	$1.31	$9,769
Ball Mill	$1.13	$8,424
Electrical Energy	$3.04	$22,668
Lubricants	$0.07	$523
Diesel	$0.77	$5,740
Tires	$0.18	$1,341
Gasoline	$0.08	$609
Make-up water, well	$0.00	$0
Repair Parts	$1.02	$7,608
Outside Services	$1.50	$11,191
Other Material and Supplies	$3.34	$24,942
Process Labor	$0.93	$6,967
Process Operating Cost	**$13.38**	**$99,783**

Process operating costs are based on Sierra Metals operating expenditures and projected budgets. Gustavson reviewed the component costs and concurs with the component cost estimate.

Process salaried and hourly labor staffing is presented in Table 21-23 Process Salary Labor Summary and Table 21-24 Process Hourly Labor Summary. Sierra Metals existing mill labor rates are presented in Table 21-25 Process Labor.

Table 21-23 Process Salary Labor Summary

	Units	Empl/Yr
Salaried Process Labor		
Director General	men	1
Operations Manager	men	1
Administrative Tech	men	2
Warehouseman	men	3
Maintenance Superintendent	men	1
Metallurgist	men	1
Security Foreman	men	1
Special Watchman	men	3
Maintenance Foreman	men	3
Plant Foreman	men	3
Lab Foreman	men	1
Personnel	men	1
Total Salaried Personnel	**men**	21

Table 21-24 Process Hourly Labor Summary

	Units	Empl/Yr
Hourly		
Mill Operations		
Plant Operators 1st Class	men	3
Operators	men	6
Plant Operators	men	6
Plant Operator Helpers	men	9
Total Mill Operations Personnel	men	24
Mill Maintenance		
Welder	men	3
Electrician	men	3
Lead Mechanic	men	3
Mechanic Helper	men	3
General Laborer	men	3
Total Mill Maintenance Personnel	men	15
Plant G&A		
Security Guard	men	1
Security Guard	men	3
Category B	men	0
Janitors	men	3
General Laborers	men	3
Category C	men	0
Total Plant G&A Personnel	men	10
Total Hourly Personnel	**men**	49

Table 21-25 Plant Labor

Job Classification	Base Rate	Base Rate	Hours per Year (2)	Base Cost	Bonus +Benefits (3)	Annual Cost (4)	Annual Cost
	($Pesos/hr)	(US$/hr)	(hrs)	(US$/yr)	(%)	US($)	(US$/hr)
SALARIED (1)	12.892						
Administration							
Director General	222.74	17.28	-	49,759	0.0%	49,759	17.28
Director de operaciones - Operations Manager	113.54	8.81	-	25,364	40.0%	35,510	12.33
Asistente de Administracion - Administrative Technicians	52.08	4.04	-	11,635	40.0%	16,289	5.66
Warehouse							
Almacenista - Warehouseman	50.00	3.88	-	11,170	40.0%	15,638	5.43
Mill Operations Supervision							
Jefe de Mantenimiento - Maintenance Superintendent	158.33	12.28	-	35,371	40.0%	49,519	17.19
Metalurgia - Metallurgist	112.50	8.73	-	25,132	40.0%	35,185	12.22
Supervisor de Seguridad - Security Foreman	75.00	5.82	-	16,755	40.0%	23,456	8.14
Vigilante especial - Special Watchman	71.25	5.53	-	15,917	40.0%	22,284	7.74
Supervisor de Mantenimiento - Maintenance Foreman	67.50	5.24	-	15,079	40.0%	21,111	7.33
Supervisores de Planta - Plant Foreman	66.77	5.18	-	14,916	40.0%	20,883	7.25
Supervisores de Laboratorio - Lab Foreman	64.58	5.01	-	14,428	40.0%	20,199	7.01
Profesionista en desarrollo - Personnel	50.00	3.88	-	11,170	40.0%	15,638	5.43
HOURLY (1)							
Operación Planta - Plant							
Operadores Especial de Planta - Operators 1st Class	52.50	4.07	2,400	11,728	40.0%	16,419	5.70
Operadores - Operators	50.63	3.93	2,400	11,309	40.0%	15,833	5.50
Operadores de Planta - Plant Operators	48.13	3.73	2,400	10,751	40.0%	15,051	5.23
Ayudante de Planta - Plant Operator Helpers	31.88	2.47	2,400	7,121	40.0%	9,969	3.46
G&A							
Vigilante - Security Guard	54.38	4.22	2,400	12,147	40.0%	17,006	5.90
Guardia de Seguridad - Security Guard	31.88	2.47	2,400	7,121	40.0%	9,969	3.46
Categoria B	30.63	2.38	2,400	6,841	40.0%	9,578	3.33
Limpieza y Asseo - Janitors	29.38	2.28	2,400	6,562	40.0%	9,187	3.19
Ayudante Generales - General Laborers	29.38	2.28	2,400	6,562	40.0%	9,187	3.19
Categoria C	23.75	1.84	2,400	5,306	40.0%	7,428	2.58

(1) Salaried and Hourly rates provided by Dia Bras, October 2012

(2) 2sh/d, 10hr/sh, 3 crews

(3) Salaried and Hourly Benefits provided by Dia Bras, October 2012

(4) Annual Rates are based on 8hr/day, 30days/month

21.2.3 G&A Operating Costs

The LoM Project G&A operating costs average US$2.74/t-milled. Table 21-26 G&A Operating Costs presents the costs.

Table 21-26 G&A Operating Costs

	$/t-milled	LoM ($000s)
O&M	$1.45	$10,828
Labor	$1.29	$9,590
G&A Operating Cost	**$2.74**	**$20,418**

Administrative staffing and operations and maintenance costs are based on Sierra Metals operating expenditures and projected budgets. Gustavson reviewed the component costs and concurs with the component cost estimate. Table 21-27 G&A Administrative O&M Costs presents Project G&A operating costs.

Table 21-27 G&A Administrative O&M Costs

	Units	Annual ($000s)
Administrative O&M		
Administrative Salaries and Benefits	ls	$984
Consult and Prof Fees	ls	$160
Legal fees	ls	$114
Audit fees	ls	$27
Travelling expense	ls	$206
Rent expense	ls	$38
Penalties and taxes	ls	$11
Insurance expense	ls	$31
Maintenance and repairs	ls	$15
Communications expense	ls	$69
Supplies	ls	$25
Bank charges	ls	$27
Other	ls	$156

22. ECONOMIC ANALYSIS (ITEM 22)

The economic results of this report are based upon work performed by Gustavson Associates. The results are prepared on an annual basis. All costs are in Q4 2012 US constant dollars. Sierra Metals actual costs were reviewed and incorporated into the economics as appropriate.

22.1 Model Parameters

The economic model was prepared on an unleveraged, post-tax basis and the results are presented in this section. Key criteria used in the analysis are discussed in detail throughout this report. Economic assumptions are summarized in the Tables below.

This is a currently producing mine. The mine has reserves to operate 10 years and builds a RoM ore stockpile that feeds the mill into year 11. The mine production model parameters are shown in Table 22-1 Mine Production Summary.

Table 22-1 Mine Production Summary

Description	Value	units
Mine Production		
Waste	390	kt
Ore	7,457	kt
Total Material	**7,847**	**kt**
Daily Ore Capacity	2,131	tpd
RoM Grade		
Copper Equiv	1.119%	%
Copper	0.759%	%
Zinc	0.329%	%
Gold	0.226	gpt
Silver	19.519	gpt
Contained Metal		
Copper	124,815	klb
Zinc	54,133	klb
Gold	54	koz
Silver	4,680	koz

A producing mill exists adjacent to the mine. This mill is dedicated to treating mine ore. The mill operates 11 years on the stated mine reserves. The mill production model parameters are shown in Table 22-2 Mill Production Summary.

Table 22-2 Mill Production Summary

Description	Value	units
RoM Ore Milled	**7,457**	kt
Daily Capacity	1,500	tpd
Cu Flotation Circuit		
Mass Pull	2.48%	%
Moisture Content	8%	%
Concentrate Grade	25%	Copper
Recovery		
Copper	82%	%
Gold	70%	%
Silver	71%	%
Concentrate	**185**	**kt (dry)**
Copper	101,917	klb
Gold	38	koz
Silver	3,312	koz
Zn Flotation Circuit		
Mass Pull	0.40%	%
Moisture Content	7%	%
Concentrate Grade	43%	Zinc
Zn Recovery	52%	%
Concentrate	**30.0**	**kt (dry)**
Zinc	28,149	klb

Copper and zinc concentrates are produced, transported to shipping ports and sold to offshore smelters. Freight and handling costs are US$2.32/t-conc. to transport both copper and zinc concentrates by truck to the rail line. The copper concentrates are shipped by rail to the Guaymas port at a cost of US$2.00/t-conc. The zinc concentrates are shipped to the Manxanillo port also at a cost of US$2.00/t-conc.

The mill operates under existing smelting contracts. The smelting contracts take control of the concentrates at the port. Smelting and refinery costs, as well as payable metals, are summarized in the following table.

Table 22-3 Smelter Schedule

Description	Value	units
Copper Concentrate		
Copper		
Losses	0.30%	%
Deduction	3.50%	%
Treatment Charge	$108.50	/t-conc
Refining Charge	$0.064	/lb-Cu
Penalties	$3.500	/t-conc
Price Participation	none	
Insurance	0.00%	%
Payable Copper	100,595	klb-Cu
Gold		
Losses	0.30%	%
Deduction	5.00%	%
Refining Charge	$5.000	/oz-Au
Insurance	0.00%	%
Payable Gold	32	koz-Au
Silver		
Losses	0.00	%
Deduction	5.000%	%
Refining Charge	$0.350	/oz-Ag
Insurance	0.00%	%
Payable Silver	3,003	koz-Ag
Zinc Concentrate		
Losses	0.30%	%
Deduction	15.00%	%
Treatment Charge	$236.00	/t-conc
Refining Charge	$0.00	/lb-Zn
Penalties	$1.50	/t-conc
Price Participation	$2,000.00	
Insurance	0.00%	%
Payable Zinc	25,820	klb-Zn

There are no gross proceeds royalties, NSR royalties or severance taxes assessed to the Project. A corporate income tax rate of 28% is assessed on all project years. Depreciation is calculated on a 10% straight-line basis. Corporate income tax is computed by subtracting all allowable operating expenses, overhead, depreciation, amortization and depletion from the current year revenues to arrive at taxable income. The corporate tax rate is then applied. A Project operating loss is used to offset taxable income, thereby reducing taxes owed.

Gustavson presents a Project specific post tax economic analysis. Sierra Metals actual corporate tax structure may reduce the corporate tax rate computed by Gustavson and a lower tax rate may be reflected in an improvement to the NPV.

22.2 Project Economics

The economic analysis results are shown in Table 22-4 Technical Economic Results, the cashflow on an annualized basis is presented in Table 22-11. The economic analysis is based on market price assumptions for a 36 month trailing average of US$3.69/lb-Cu, US$0.95/lb-Zn, US$1,487/oz-Au, and US$28.80/oz-Ag. The analysis indicates a NPV $_{8\%}$ of US$91.7 million (after estimated taxes) with an incalculable IRR, as there is no initial negative cash flow. With a positive initial cash flow in Year 1, payback will be in less than 1year. The following provides the basis for the Gustavson Associates LoM plan and economics:

- Proven + Probable Reserves;
- Mine life of 10years with RoM stockpiles to supply the mill an additional year;
- LoM mill recoveries of 81.7% Cu, 52.0% Zn, 70.0% Au, and 70.8% Ag;
- Operating costs of US$32.16/t-RoM or US$1.85/lb-Cueq
- Capital costs of US$43.0 million, with initial capital costs of US$7.0million and sustaining capital over the LoM of US$36.0 million;
- Sierra Metals provided Year 1 (2013) capital budget costs, mill expansion and mine equipment costs sunk;
- Mine closure costs estimated at US3.0 million (incl. in sustaining capital); and
- No salvage value provisions at end of life (EOL).

Table 22-4 Technical Economic Results

	Value	Units
Market Prices		
Copper	$3.69	/lb-Cu
Zinc	$0.95	/lb-Zn
Gold	$1,487.00	/oz-Au
Silver	$28.80	/oz-Ag
Estimate of Cash Flow (all values in $000s)		
Net Smelter Return (NSR)		$/t-conc
Molybdenum Concentrate	$459,964	$2,487
Zinc Concentrate	$17,313	$576
NSR	**$477,277**	
Freight & Handling	($1,005)	
Gross Revenue	**$476,272**	
Royalty	$0	
Net Revenue	**$476,272**	
Operating Costs		$/t-ore
Mining	$119,594	$16.04
Processing	$99,783	$13.38
G&A	$20,418	$2.74
Total Operating	**$239,795**	**$32.16**
Operating Margin (EBITDA)	**$236,477**	
Initial Capital	$7,002	
LoM Sustaining Capital	$35,966	
Income Tax	$60,183	
Cash Flow Available for Debt Service	**$134,155**	**$133,325**
NPV 8%	**$91,665**	
IRR	**Init CF +**	

Note: Init CF +, there is no negative Year 1 cash flow to calculate an IRR

The NSR royalties shown in the Technical Economic results above are from copper concentrates and zinc concentrates. The copper concentrate grades and contained metal are shown in Table 22-5 Copper Concentrate – Grades, Contained Metal.

Table 22-5 Copper Concentrate

	Value	units
Copper Concentrate	185	kt
25.0%	%	%
0.0%	%	%
6.39	gpt	gpt
557.14	gpt	gpt
Contained Metal		
101,917	klb	klb
0	klb	klb
38	koz	koz
3,312	koz	koz

The copper, gold and silver revenues are shown in the following tables.

Table 22-6 Copper Revenues

	Value	units
Payable Copper		
Cu in Concentrate	101,917	klb
Cu Losses (0.30%)	(306)	klb
Cu Payment (96.5%)	(1,016)	klb
Payable Copper	**100,595**	**klb**
Copper Revenue		
Cu Gross Revenue	**376,072**	**$000s**
Cu TC/RC		
Cu Losses	(1,128)	$000s
Cu Payments	(3,749)	$000s
TC	(20,003)	$000s
RC	(6,388)	$000s
Penalty - Bi	(15,376)	$000s
Penalty Pb + Zn	(2,270)	$000s
Price Participation	0	$000s
Cu Insurance	0	$000s
Cu TC/RC	**(48,914)**	**$000s**
	(0.48)	$/lb-Cu
Cu Revenue	**327,158**	**$000s**
Realized Price	$3.21	$/lb-Cu

Table 22-7 Gold Revenues

	Value	Units
Payable Gold		
Au in Concentrate	38	koz
Au Losses (0.30%)	(0)	koz
Au Payment (95.0%)	(6)	koz
Payable Gold	**32**	**koz**
Gold Revenue		
Au Gross Revenue	**56,513**	**$000s**
Au TC/RC		
Au Losses	(170)	**$000s**
Au Payments	(8,819)	**$000s**
Refinery Charge	(160)	**$000s**
Au Insurance	0	**$000s**
Au TC/RC	**(9,149)**	**$000s**
	(241)	$/oz
Au Revenue	**47,364**	**$000s**
Realized Price	1,246	$/oz-Au

Table 22-8 Silver Revenues

	Value	Units
Payable Silver		
Ag in Concentrate	3,312	koz
Ag Losses (0.30%)	(10)	koz
Ag Payment (95.0%)	(299)	koz
Payable Silver	**3,003**	**koz**
Silver Revenue		
Ag Gross Revenue	**95,393**	**$000s**
Ag TC/RC		
Ag Losses	(286)	**$000s**
Ag Payments	(8,620)	**$000s**
Refinery Charge	(1,051)	**$000s**
Ag Insurance	0	**$000s**
Ag TC/RC	**(9,957)**	**$000s**
	(3.01)	$/oz
Ag Revenue	**85,436**	**$000s**
Realized Price	25.79	$/lb-Cu

The zinc concentrate NSR (grade, contained metal, and revenues) is shown in Table 22-9 Zinc Concentrate NSR below.

Table 22-9 Zinc Concentrate NSR

	Value	Units
Zinc Concentrate	30	dst
Grade		
Copper	0.0%	%
Zinc	42.5%	%
Gold	0.00	gpt
Silver	0.00	gpt
Contained Metal		
Copper	0	klb
Zinc	28,149	klb
Gold	0	koz
Silver	0	koz
Payable Zinc		
Zn in Concentrate	28,149	klb
Zn Losses	(84)	klb
Zn Deduction	(2,245)	klb
Payable Zinc	**25,820**	**klb**
Zinc Revenue		
Zn Gross Revenue	26,742	$000s
Zn TC/RC		
Zn Losses	(80)	$000s
Zn Payments	(2,133)	$000s
TC	(7,069)	
RC	0	
Cobalt Penalty	(90)	
Price Participation	(57)	$000s
Zn Insurance	0	$000s
Zn TC/RC	**(9,428)**	**$000s**
	(0.33)	$/lb-Zn
Zn Revenue	**17,313**	**$000s**
Realized Price	$0.62	$/lb-Zn

22.3 Sensitivity

Sensitivity analysis for key economic parameters is shown in Table 22-10 Project Sensitivities below. The Project is most sensitive to metal prices (revenues), less sensitive to operating costs and least sensitive to capital costs. Both NPV and IRR sensitivities are tabulated. Note that the IRR sensitivities never have Year 1 negative cash flows, therefore the IRR is incalculable in the sensitive ranges presented.

Table 22-10 Project Sensitivities

	Value	-25%	-15%	0%	15%	25%
NPV Sensitivities						
Revenues	$000s	23,000	51,000	92,000	119,000	159,000
Capital Costs	$000s	99,000	96,000	92,000	89,000	84,000
Operating Costs	$000s	123,000	110,000	92,000	79,000	61,000
IRR Sensitivities						
Revenues		440%	Init CF +	Init CF +	Init CF +	Init CF +
Capital Costs		Init CF +	Init CF +	Init CF +	Init CF +	Init CF +
Operating Costs		Init CF +	Init CF +	Init CF +	Init CF +	Init CF +

Note: Init CF +, there is no negative Year 1 cash flow to calculate an IRR

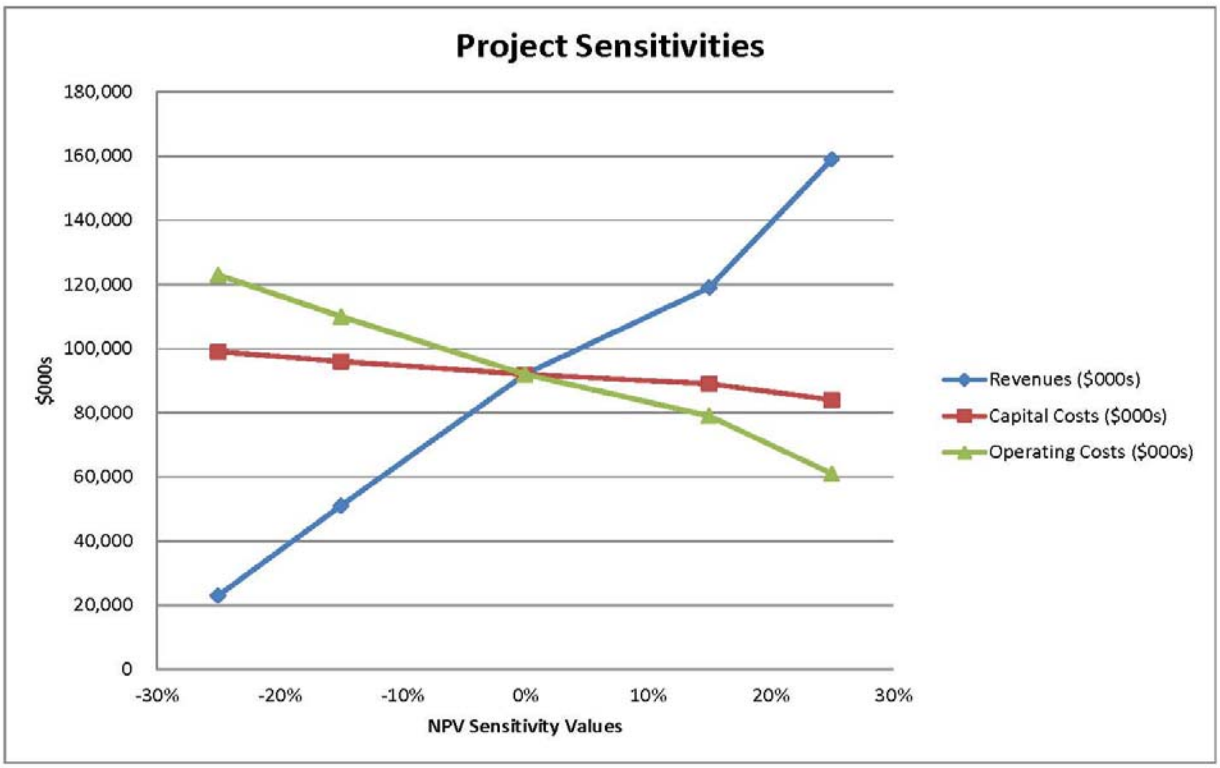

Figure 22-1 Project Sensitivies

Table 22-11 Project Cashflow

Prefeasibility

COMPANY	DIA BRAS Exploration
BUSINESS UNIT	BOLIVAR MINE
OPERATION	CASH FLOW SCHEDULE

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	value /	units /	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	EOL 2023	2024
	factor	sensit.	or Avg.	1	2	3	4	5	6	7	8	9	10	11	12
PRODUCTION SUMMARY															
Mine Summary															
Daily Ore Mining Rate	350	tpd	2,131	2,364	1,992	2,103	2,063	2,094	2,095	2,135	2,117	2,311	2,031	0	0
Mined Ore	-	kt	7,457	827	697	736	722	733	733	747	741	809	711	0	0
Milled Ore	-	kt	7,457	525	700	700	700	700	700	700	700	700	700	632	0
Process Summary															
Cu Concentrate	8.4%	kt	184.9	17.9	21.1	21.9	16.6	16.9	13.1	14.1	11.9	14.1	20.0	17.3	0.0
Zn Concentrate	7.3%	kt	30.0	0.7	0.9	1.1	3.2	2.8	1.4	5.3	7.1	4.5	0.9	2.2	0.0
Payable Metals															
Copper	-	klb	100,595	9,749	11,488	11,892	9,037	9,167	7,137	7,678	6,473	7,654	10,887	9,432	0
Zinc	-	klb	25,820	566	789	930	2,791	2,368	1,194	4,591	6,098	3,841	747	1,903	0
Gold	-	koz	32	2	3	2	3	3	3	4	4	3	3	2	0
Silver	-	koz	3,003	338	699	279	151	138	178	168	159	162	429	302	0
CASH FLOW SCHEDULE															
Estimate of Cash Flow															
Net Smelter Return															
Copper Concentrate	-	$000s	459,964	43,829	61,714	50,040	38,168	38,590	32,264	35,074	31,510	33,829	52,059	42,886	0
Zinc Conc.	-	$000s	17,313	380	529	624	1,871	1,588	801	3,079	4,089	2,576	501	1,276	0
NSR	-	$000s	477,277	44,209	62,243	50,664	40,039	40,178	33,065	38,152	35,599	36,404	52,561	44,162	0
Freight & Handling															
Truck - Cu to Rail	$2.32	$000s	(465)	(45)	(53)	(55)	(42)	(42)	(33)	(35)	(30)	(35)	(50)	(44)	0
Rail - Cu to Guaymas	$2.00	$000s	(401)	(39)	(46)	(47)	(36)	(37)	(28)	(31)	(26)	(31)	(43)	(38)	0
Truck - Zn to Rail	$2.32	$000s	(75)	(2)	(2)	(3)	(8)	(7)	(3)	(13)	(18)	(11)	(2)	(6)	0
Rail - Zn to Manzanillo	$2.00	$000s	(64)	(1)	(2)	(2)	(7)	(6)	(3)	(11)	(15)	(10)	(2)	(5)	0
Transportation	-	$000s	(1,005)	(87)	(103)	(107)	(93)	(92)	(68)	(91)	(89)	(87)	(98)	(91)	0
Gross Revenue	-	$000s	476,272	44,122	62,140	50,557	39,946	40,086	32,997	38,061	35,511	36,318	52,463	44,071	0
Gross Revenue Royalty	0.00%	$000s	0	0	0	0	0	0	0	0	0	0	0	0	0
Gross Income		$000s	476,272	44,122	62,140	50,557	39,946	40,086	32,997	38,061	35,511	36,318	52,463	44,071	0
Operating Costs															
Mining	-	1.00	119,594	11,096	11,078	11,215	11,294	11,395	12,248	11,437	11,474	11,602	11,090	5,666	0
Process	-	1.00	99,783	7,287	9,334	9,334	9,334	9,334	9,334	9,334	9,334	9,334	9,334	8,487	0
G&A	-	1.00	20,418	1,864	1,864	1,864	1,864	1,864	1,864	1,864	1,864	1,864	1,864	1,776	0
Operating Costs	-	$000s	239,795	20,247	22,276	22,413	22,492	22,593	23,447	22,635	22,672	22,800	22,289	15,929	0
		$/t-ore	$32.158	$24.47	$31.96	$30.46	$31.15	$30.82	$31.98	$30.29	$30.60	$28.19	$31.35		
		$/lb-Cu	$2.384												
Operating Cost as % of Revenue		%	50%												
MARGIN (EBITDA)		US$000	236,477	23,875	39,864	28,143	17,454	17,493	9,551	15,426	12,838	13,517	30,174	28,142	0

Prefeasibility

COMPANY	DIA BRAS Exploration
BUSINESS UNIT	BOLIVAR MINE
OPERATION	CASH FLOW SCHEDULE

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														EOL	
	value /	units /	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	factor	sensit.	or Avg.	1	2	3	4	5	6	7	8	9	10	11	12
Cash Available for Debt Service															
Operating Margin		$000s	236,477	23,875	39,864	28,143	17,454	17,493	9,551	15,426	12,838	13,517	30,174	28,142	0
Project Capital (Equity)	100%	$000s	(42,968)	(7,002)	(3,268)	(3,865)	(5,591)	(5,016)	(8,196)	(3,885)	(1,660)	(1,174)	(309)	(3,000)	0
Income Tax		$000s	(60,183)	(6,685)	(10,874)	(7,513)	(4,400)	(4,319)	(1,924)	(3,535)	(2,843)	(3,075)	(7,801)	(7,213)	0
Working Capital		$000s	0	(4,049)	(406)	(27)	(16)	(20)	(171)	162	(7)	(26)	102	1,272	3,186
CADS		**$000s**	**133,325**	**6,138**	**25,315**	**16,737**	**7,447**	**8,137**	**(740)**	**8,168**	**8,328**	**9,242**	**22,166**	**19,201**	**3,186**
Loan Repayment		$000s	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Expense		$000s	0	0	0	0	0	0	0	0	0	0	0	0	0
Free Cash Flow		**$000s**	**133,325**	**6,138**	**25,315**	**16,737**	**7,447**	**8,137**	**(740)**	**8,168**	**8,328**	**9,242**	**22,166**	**19,201**	**3,186**
				6,138	31,453	48,191	55,638	63,775	63,035	71,203	79,531	88,773	110,939	130,140	133,325
IRR		Init CF +													
Present Value		8.0%	91,665	6,138	23,440	14,350	5,912	5,981	(504)	5,147	4,859	4,993	11,089	8,894	1,366
				6,138	29,578	43,928	49,840	55,821	55,317	60,464	65,323	70,317	81,405	90,299	91,665
Peak Funding			740												
PROJECT CAPITAL - See backup tabs for capital cost details.															
Capital		1.00													
Mining		$000s	11,220	1,601	268	0	2,591	1,151	5,259	83	268	0	0	0	0
Process		$000s	10,342	2,245	0	865	0	865	1,854	2,720	309	1,174	309	0	0
Infrastructure		$000s	9	9	0	0	0	0	0	0	0	0	0	0	0
Owner		$000s	21,397	3,148	3,000	3,000	3,000	3,000	1,083	1,083	1,083	0	0	3,000	0
Other		$000s	0												
Total Capital		**$000s**	**42,968**	**7,002**	**3,268**	**3,865**	**5,591**	**5,016**	**8,196**	**3,885**	**1,660**	**1,174**	**309**	**3,000**	**0**
Initial		$000s	7,002												
Ongoing		$000s	35,966												
Working Capital															
Beginning Balance		$000s	-	0	4,049	4,455	4,483	4,498	4,519	4,689	4,527	4,534	4,560	4,458	3,186
Ending Balance		20.0%	-	4,049	4,455	4,483	4,498	4,519	4,689	4,527	4,534	4,560	4,458	3,186	0
Change		**$000s**	**0**	**(4,049)**	**(406)**	**(27)**	**(16)**	**(20)**	**(171)**	**162**	**(7)**	**(26)**	**102**	**1,272**	**3,186**

23. ADJACENT PROPERTIES (ITEM 23)

At the time of this report, there are no known adjacent properties.

24. OTHER RELEVANT DATA AND INFORMATION (ITEM 24)

Gustavson is not aware of any other relevant data and information.

25. CONCLUSIONS (ITEM 25)

The production decision was not based on a feasibility study of Mineral Reserves demonstrating economic viability. There is an increased uncertainty and economic and technical risks of failure associated with this production decision. Production and economic variables may vary considerably, due to the absence of a complete and detailed site according to and in compliance with NI 43-101 Standards of Disclosure specific risk analysis.

The state of drill core/cuttings and storage/security conditions were inspected by Gustavson and found to be appropriate. Gustavson examined a core hole as compared to the interpreted geology and alteration from the drill hole log and the associated assay results. Geologic logging and assay sample interval selection procedures were found to be in accordance with industry best practices.

Gustavson examined the electronic drill hole database for completeness and accuracy. Collar survey records for each historic drill hole in the paper archives were compared to the electronic database with minimal errors found.

Gustavson conducted an independent audit of the Project database, including the exploration and drill hole data, and finds the quality of data collected to date adequate for use in estimating the mineral resources of the Bolívar Mine.

While on site, Gustavson discussed drilling procedures, sample collection, handling, and chain of custody procedures and compared them to documented practices. Gustavson deems Sierra Metals' stated drilling and sampling QA/QC program to be in-line with industry best practices.

Gustavson considers the drill hole data provided was sufficiently reliable to be adequate for the preparation of a resource estimate and is sufficient for the development of mine plans and the calculation of Reserves.

Gustavson considers the sample preparation, security, and analytical procedures employed by Sierra Metals to be acceptable according to industry standards and adequate for use in this mineral resource estimate.

A mining system was developed that suits the geometry of the deposits. This system was applied to the currently defined deposits to calculate the Reserves.

There are sufficient Reserves to allow mining in the Gallo Superior and Gallo Inferior for 10 years plus processing from a stockpile for an additional year for a total of 11 years. These Reserves have been scheduled using the selected mining method.

All RoM ore is shipped to the new and operating plant that is located approximately 5 km from the Gallo Mines. This plant has been processing the Gallo ore for 9 months in 2012 and the result of the ongoing plant operation was used to set the projections for the future.

All required infrastructure for the operation of the mines and plant has been constructed and is supporting the operations. A tailings facility is located downhill from the plant.

The economic results show an NPV of $96.6 million US Dollars with a production life of 11 years. The NPV may be improved when Sierra Metals considers the tax rates on a companywide calculation as opposed to the tax rates used in this economic model

Given the data and information presented in this report, Gustavson is of the opinion that Sierra Metals continue with their Project development and operations.

There exists an iron potential at Bolívar, further investigation is suggested.

26. RISKS

The operation of mining and processing facilities has inherent risks by the nature of the industry. Gustavson believes that the site specific risks for the Bolivar operation are:

- The location of the operation and the surrounding environment.
- The geometry of the deposit requires a well-planned design of the mining method. Deviations from the mine plan could induce unsafe working conditions and cause Reserves to be sterilized that otherwise could be mined.
- The current operations leaves too small of pillars and the recent rock mechanics study needs to be implemented and followed.
- Both the process plant and the tailings facility footprints are larger than the permits allow. This needs to be addressed by actual onsite survey data and the addition of used area to the permits.
- The construction of the tailings facility has been approved by the Mexican Government, but there needs to be a continuous program to monitor the compaction of the dam and any movement of the dam.
- The mining operations need an update to their safety programs when increasing the production and during the development of the Inferior Mine.
- Increasing the production to 3,000 tpd from the 2,000 tpd used in this report will shorten the mine operation life.
- The environmental outstanding issues of reclamation of old drill roads and historical dumps as mentioned in Section 20.

27. RECOMMENDATIONS (ITEM 26)

The recommended work should be completed in two phases as follows:

Phase I

The 2013 drilling program should focus on adding Resources to Gallo Superior and to add Resources between the pods in Gallo Inferior. This will increase the life of Superior and hopefully provides information for the Inferior to be developed in a more continuous mine plan that should add Reserves.

All new drilling and sampling should also be assayed to determine the gold content.

The results of the 2013 drilling should be added to the Resource model database and a new Resource statement be developed that has gold as part of the new Resources.

Phase II

Once the Resource model is complete with the 2013 drilling data, then the Prefeasibility Study should be updated to add the new and additional Reserves.

A study should be done on the iron mining potential for the Bolivar deposits.

The tailings facility will need testing for compaction and a new design be completed for the additions to the facility.

The economics of increasing the production to 3,000 tpd should also be done as part of the update to the PFS. This may best be done as a trade-off study prior to the PFS update and then the best case utilized for the PFS update.

The operational data from the process plant should be studied by a specialist to determine if the overall yield of the contained metals can be improved.

The estimated costs for the recommendations are provided in Table 35-10.

Table 27-1 Estimated Recommendations Budget

Task	Additional Detail	Cost
Phase I		
Additional Drilling	1000 meters	$300,000
Phase II		
Process Plant Yield Improvement Study		$100,000
Tailings Dam Inspection & Tests		$150,000
Rock Mechanics and Ventilation for Inferior		$50,000
Iron Scoping Review		$75,000
Updated PFS w/3,000 tpd Trade-off		$400,000
Total		$1,075,000

28. REFERENCES (ITEM 27)

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<u>Certificate of Author Forms</u>

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CERTIFICATE of AUTHOR

I, Donald E. Hulse do hereby certify that:

1. I am currently employed as Vice President and Principal Mining Engineer by Gustavson Associates, LLC at:

   274 Union Boulevard
   Suite 450
   Lakewood, Colorado 80228

2. I am a graduate of the Colorado School of Mines with a Bachelor of Science in Mining Engineering (1982), and have practiced my profession continuously since 1983.
3. I am a registered Professional Engineer in the State of Colorado (35269).
4. I have worked as a mining engineer for a total of 29 years since my graduation from university; as an employee of a major mining company, a major engineering company, and as a consulting engineer. I have performed resource estimation and mine planning on numerous silver and base metals deposits for over 10 mining companies in three countries working as a consultant as well as an engineer or engineering manager for the projects
5. I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
6. I am responsible for Sections through 12 and 23 through 28 of the technical report entitled “NI 43-101 Technical Report of the Bolívar Mine, Chihuahua Province, Mexico”, dated May 31, 2013, with an effective date of December 31, 2012, (the “Report”). I visited the project site March 20, 2012 for three days.
7. I have had prior involvement with the Bolívar Project that is the subject of this Technical Report. I was responsible for Sections 1 through 13, and 15 through 19 of the technical report titled “NI 43-101 Technical Report on Mineral Resources of the Bolívar Mine,”

dated October 15, 2012. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101.

8. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101.
9. I have read National Instrument 43-101 and Form 43-101, and the Technical Report has been prepared in compliance with that instrument and form.
10. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.
11. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of May, 2013

Donald E. Hulse
Signature of Qualified Person

Donald E. Hulse
Printed Name of Qualified Person

Zachary J. Black, SME-RM

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CERTIFICATE of AUTHOR

I, Zachary J. Black do hereby certify that:

1. I am currently employed as an Associate Geological Engineer by Gustavson Associates, LLC at:

   274 Union Boulevard
   Suite 450
   Lakewood, Colorado 80228

2. I am a graduate of the University of Nevada with a Bachelor of Science in Geological Engineering, and have practiced my profession continuously since 2005.
3. I am a registered member of the Society of Mining Metallurgy and Exploration (No. 4156858RM).
4. I have worked as a Geological Engineer/Resource Estimation Geologist for a total of seven years since my graduation from university; as an employee of a major mining company, a major engineering company, and as a consulting engineer. I have estimated numerous mineral resources containing copper/silver and have 7 years of precious and base metals experience.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
6. I am responsible for Section 14 of the report entitled "NI 43-101 Technical Report of the Bolívar Mine, Chihuahua Province, Mexico", dated May 31, 2013, with an effective date of December 31, 2012 (the "Report"). I have not visited the project site.
7. I have had prior involvement with the Bolívar Project that is the subject of this Technical Report. I was responsible for Section 14 of the technical report titled "NI 43-101 Technical Report on Mineral Resources of the Bolívar Mine," dated October 15, 2012. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101.

8. I am independent of Sierra Metals Inc. applying all of the tests in Section 1.5 of National Instrument 43-101.
9. I have read National Instrument 43-101 and Form 43-101, and the Technical Report has been prepared in compliance with that instrument and form.
10. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.
11. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of May, 2013

Zachary J. Black
Signature of Qualified Person

Zachary J. Black, SME-RM
Printed Name of Qualified Person

Karl D. Gurr, SME-RM

Associate Principal Mining Engineer
Gustavson Associates, LLC
274 Union Boulevard, Suite 450
Lakewood, Colorado 80228
Telephone: 720-407-4062 Facsimile: 720-407-4067
Email: kgurr@gustavson.com

CERTIFICATE of AUTHOR

I, Karl D. Gurr do hereby certify that:

1. I am currently employed as an Associate Principal Mining Engineer by Gustavson Associates, LLC at:

   274 Union Boulevard
   Suite 450
   Lakewood, Colorado 80228

2. I am a graduate of the University of Utah with a Bachelor of Science in Geology (1974) and a second Bachelor of Science in Mining Geological Engineering (1975), and have practiced my profession continuously since 1975.
3. I am a registered member of the Society of Mining Metallurgy and Exploration (No. 1265880RM).
4. I have worked as a Mining Engineer, Geologist, Engineering Manager, Production Management and Project Manager for a total of thirty seven years since my graduation from university; as an employee of major mining companies, major engineering companies, and as a consulting engineer. I have at least 5 years of experience copper/silver deposits and in the mining method utilized for the Bolívar Project.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
6. I am responsible for Sections Sections 15, 16, 18-22 and am responsible for the overall organization and content of this document for the report entitled "NI 43-101 Technical Report of the Bolívar Mine, Chihuahua Province, Mexico", dated May 31, 2013, with an effective date of December 31, 2012 (the "Report"). I visited the project site October 8-12.
7. I have not had prior involvement with the properties that are the subject of the Technical Report.

8. I am independent of Sierra Metals Inc. applying all of the tests in Section 1.5 of National Instrument 43-101.
9. I have read National Instrument 43-101 and Form 43-101, and the Technical Report has been prepared in compliance with that instrument and form.
10. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.
11. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of May, 2013

Karl D. Gurr
Signature of Qualified Person

Karl D. Gurr, SME-RM
Printed Name of Qualified Person

DEEPAK MALHOTRA, PhD
President
Resource Development, Inc.
11475 West I-70 Front Road North
Wheat Ridge, Colorado 80033
Telephone: (303) 422-1176 Facsimile: (303) 424-8580
Email: dmalhotra@aol.com

CERTIFICATE OF AUTHOR

I, Deepak Malhotra, PhD do hereby certify that:

1. I am President of:

   Resource Development, Inc. (RDi)
   11475 W. I-70 Frontage Road North
   Wheat Ridge, CO, USA, 80033

2. I graduated with a degree in Master of Science from Colorado School of Mines in 1973. In addition, I have obtained a PhD in Mineral Economics from Colorado School of Mines in 1977.

3. I am a registered member of the Society of Mining, Metallurgy and Exploration, Inc. (SME), member no. 2006420RM.

4. I have worked as a mineral processing engineer and mineral economist for a total of 40 years since my graduation from university.

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

6. I am responsible for Sections 13 and 17 of the report entitled "NI 43-101 Technical Report of the Bolívar Mine, Chihuahua Province, Mexico," dated May 31, 2013, with an effective date of December 31, 2012 (the "Report").

7. I have had prior involvement with the Bolívar Project that is the subject of this Technical Report. I was responsible for Section 13 of the technical report titled "NI 43-101 Technical Report on Mineral Resources of the Bolívar Mine ," dated October 15, 2012,. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101.

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

9. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

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

Dated this 31st day of May, 2013

Deepak Malhotra
Signature of Qualified Person

Deepak Malhotra
Print name of Qualified Person