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# Tres Cruces Oxide Project

## Form 43-101F1 Technical Report

## Preliminary Economic Assessment

### Northern Peru


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Prepared For:

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## DATE AND SIGNATURES PAGE

The effective date of this report is 17 August 2023. See Appendix A, Feasibility Study Contributors and Professional Qualifications, for certificates of qualified persons. These certificates are considered the date and signature of this report in accordance with Form 43-101F1.

**TRES CRUCES OXIDE PROJECT**
**FORM 43-101F1 TECHNICAL REPORT**
**PRELIMINARY ECONOMIC ASSESSMENT**

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# 1 SUMMARY

## 1.1 INTRODUCTION

M3 Engineering & Technology Corporation (M3) was commissioned by Steppe Gold Limited (Steppe) to prepare an independent Technical Report on the Tres Cruces Oxide Project (the Project) located in north central Peru approximately 100 kilometres (km) east of the city of Trujillo. The purpose of this report is to update the prior Preliminary Economic Assessment (PEA) Technical Report (prepared by M3 and others) for the oxide and transition resource as an executable standalone project. This PEA provides a framework for further expenditures for exploration drilling, more detailed metallurgical study, and related engineering. The study work focused on the mining and heap leaching of oxide gold mineralization. This PEA has been prepared in accordance with the guidelines provided in NI 43-101 Standards of Disclosure for Mineral Projects and conforms to Form 43-101F1 for technical reports. Qualified Persons have visited the Project site as recently as August 2023.

On June 28, 2023, Steppe completed the acquisition of Anacortes Mining Corporation (Anacortes) which held a 100% interest in the Tres Cruces Mineral concessions through its wholly owned subsidiary, Aurífera Tres Cruces S.A. (ATC). The Project is considered an advanced stage exploration project, as 379 holes with a total of 75,084 m have been drilled to-date using both reverse circulation (RC) and diamond drill (DD) coring.

The gold mineralization at Tres Cruces was a grass-roots discovery made by New Oroperu Resources Inc. (Oroperu) and initially drilled in 1996. Oroperu completed 61 drill holes by the end of 1997. Battle Mountain Canada Ltd. (BMC) optioned the property and completed an additional 108 drill holes in 1998 and 1999. Barrick Gold Corporation (Barrick), through its Peruvian operating subsidiary, Minera Barrick Misquichilca S.A. (MBM), advanced the Project under an option agreement with Oroperu, with the drilling of an additional 202 drill holes from 2000 to 2008.

The Project is accessed via a paved road from Trujillo and then along a 3 km gravel road that extends into the Project area, which is located in the District of Quiruvilca in the Province of Santiago de Chuco and the Department of La Libertad. The Lagunas Norte mining operation is a further 12 km to the north on the main paved highway and is operated by Minera Boroo Misquichilca S.A. (MBM), the Peruvian subsidiary of Boroo Pte. Ltd. (Boroo). Currently, there is no infrastructure associated with the Project other than the pre-existing drill roads and pads.

## 1.2 PROPERTY DESCRIPTION AND LOCATION

The Project site is located in north-central Peru about 100 km east of the city of Trujillo, a major city located 574 km northwest of Lima. The Project area ranges in elevation from 3900 to 4200 m asl in the central part of the Western Cordillera of north central Peru. The Project area consists of four mineral concessions totaling 3,000 hectares (ha), situated within the Department of La Libertad and within Peruvian National Topographic System (NTS) map area Santiago de Chuco, number 17G. The Tres Cruces mineral concessions are centered at approximately 78° 16' west latitude and 08° 02' south longitude.

## 1.3 LAND TENURE

Steppe holds a 100% interest in the four Tres Cruces mineral concessions through its wholly owned subsidiary ATC. To maintain the concessions in good standing, there is a basic annual fee payment of USD 3 per ha, equaling USD 8,753.82, in total, which must be submitted to the Peruvian government annually. After certain periods, an additional annual "non-production fee" penalty is assessed if a minimum production level is not achieved. ATC complied with the minimum required levels of investment in the mining concessions for the year 2022 as credited on the Annual Consolidated Report ("*Declaración Annual Consolidada – DAC*"), and therefore no penalties were assessed in 2022. The latest annual concession fees were paid on June 9, 2023, and the concessions are in good standing until June 30, 2024. To conduct detailed exploration work, permits must be obtained from the Peruvian Ministry of Mines; however, it is not necessary to obtain permits for prospecting activities, such as mapping and geochemical sampling of surface and streams. Concession holders are also required to submit an annual report detailing annual exploration expenditures to the Peruvian Ministry of Mines.

## 1.4 ROYALTIES, BACK-IN RIGHTS, PAYMENTS, AND OTHER AGREEMENTS

The Tres Cruces mineral concessions are subject to a 1.5% net smelter return (NSR) royalty to Pan American Silver Corporation (PAAS) that was subsequently transferred to Maverix Metals Inc. (MMI), except for the Tres Cruces 1 concession, which has a 2.5% NSR royalty, capped at USD 1,250,000 which would be paid out prior to the 1.5% NSR royalty paid out to the same. There are no known environmental liabilities within the Project area other than reclamation requirements for drill pads and drill roads, and small artisanal mining pits and trenches.

## 1.5 SITE INFRASTRUCTURE

There is currently no infrastructure located on the Project site except for pre-existing drill roads and pads. All previous exploration activity on the Project site was carried out using the existing roads, and services were provided from nearby towns, as well as from Boroo's Lagunas Norte operation (during the period when MBM had the option on the property). Manpower, equipment, and supplies required for exploration activities were transported to the Project site by way of highway from the city of Trujillo and local roads from Quiruvilca and other nearby towns.

## 1.6 HISTORY

Modern mining activity has been ongoing in the region since the 1920's, when Compañía Minera Quiruvilca started mining high-grade Pb-Zn-Ag veins at Quiruvilca. In 1996, Oroperu acquired the key concessions of the Tres Cruces property from a private party and entered into a 50-50 joint venture with PAAS on a combined land package, including adjoining ground held by PAAS that covered portions of the Tres Cruces mineralization. Assets for this joint venture were held by ATC. Drill campaigns utilizing RC and DD drilling equipment were conducted by Oroperu in 1996 and 1997, completing 61 drill holes, and later BMC in 1998 and 1999. BMC relinquished their option of the Project in 1999 after drilling 69 DD and 28 RC holes.

In May 2002, Oroperu secured an option to acquire PAAS's 50% interest in ATC, which owned the Tres Cruces Oxide Project, to increase its interest to 100%, subject to work expenditures, royalty, and back-in provisions. Concurrently, Oroperu entered into an agreement with MBM that would further the exploration of the Project. In September 2003, the agreement with MBM was finalized and a definitive option agreement was signed. In October 2003, Oroperu finalized their agreement with PAAS regarding their interest in the Project, acquiring 100% of ATC through issuance of Oroperu shares and granting a 1.5% NSR royalty to PAAS (later transferred to Maverix Metals Inc.).

The MBM exploration program began with geological mapping, re-logging of existing drill core, and Induced Polarization (IP) and gravity geophysical studies. MBM drilled 29 DD core holes in the period from 2002 to 2004. No further drilling was undertaken until 2006, when 29 additional DD core holes were completed. In 2007, MBM drilled 42 DD holes and 87 RC holes. In 2008, MBM drilled 7 DD holes and 6 RC holes. The price of gold was between USD 278 and USD 1,024 per ounce during this period.

Between 2008 and 2018, MBM carried out a number of studies on the project; however, no field work was undertaken. On December 31, 2020, the option agreement signed in 2002 between Barrick and New Oroperu expired as a result of MBM not making a production decision in accordance with the option agreement. Subsequently, control of the Tres Cruces Oxide Project lapsed back to New Oroperu.

In October of 2021, New Oroperu and First Light Capital merged to form Anacortes Mining Corporation, a company registered in British Columbia, Canada. The transfer of ownership of surface rights, drill core and all related data associated with the project from MBM to Anacortes, facilitated by Boroo who had purchased Lagunas Norte from Barrick in early 2021, was completed later in October 2021.

In November of 2021, Anacortes commissioned M3 to prepare an independent Technical Report on the Project. The NI43-101F1 Technical Report was published on March 14, 2022. In June and July of 2022, Anacortes undertook diamond drilling on the Property to check results of previous holes and to test the mineralized system at depth.

Eight holes were attempted, however, two of the holes could not be completed to their target depths and were abandoned. Two holes were drilled in areas of known mineralization to provide PQ-size core for metallurgical testwork. The entire core from these holes was used for testing; therefore, it was not assayed. The remaining four holes were drilled as confirmation of mineralization, testing areas between previous holes, or twinning holes with known strong mineralization. Confirmation holes were cored at HQ size, and reduced to NQ, if required. A total of 1376.9 m of drilling was completed.

The four confirmation holes were successful in determining limits of mineralization and corroborating gold grades as expected. Results of the drilling program are discussed below in Section 10. Results of metallurgical testwork conducted on the core from two of the drill holes are discussed below in Section 13.

A minor metallurgical testwork program was conducted on five samples in 2022. The program conducted at Plenge laboratory in Lima, Peru, and comprised of comminution, flotation, and cyanidation tests. The results did not materially change the conclusions from previous work.

On June 28, 2023, Steppe completed the acquisition of Anacortes and commissioned the update of the March 2022 PEA to include the addition drilling and metallurgical testwork conducted after the technical report was issued.

## 1.7 GEOLOGY

The Tres Cruces property is located within a NW-SE trending belt of Paleogene volcanic rocks of predominantly andesitic composition called the Calipuy Volcanics. This volcanic belt trends from central to northern Peru and hosts world-class deposits such as Newmont's Yanacocha Mine and Barrick's Pierina Mine. The Tres Cruces property lies near the heart of the Quiruvilca mining district, which includes the Quiruvilca copper-lead-zinc-silver vein systems. Precious metal deposits in the area include the Lagunas Norte mine, an epithermal gold deposit which has produced over 10 million ounces of gold and has current resources of 4.2 million ounces (Barrick Annual Report, 2019).

The Calipuy volcanic package overlies a Cretaceous sedimentary sequence (Chimu Formation) of quartz arenite and mudstone that shows a strong degree of deformation resulting from early Cenozoic SW-NE compression. This was later followed by E-W extension allowing loci of volcanic activity to develop. The Quiruvilca District is host to several mineral deposits all classified as epithermal type. MBM's Lagunas Norte located 10 km north-northeast of Tres Cruces is classified as a high sulphidation system. Tres Cruces is of the low to intermediate sulphidation epithermal type and is located four km southeast of the Quiruvilca deposit, but it is unlikely to be related to that system since the Tres Cruces mineralizing event is estimated to be 9 million years older.

Gold mineralization at Tres Cruces is hosted by a bimodal suite of andesitic to rhyolitic flows, domes, breccias, and volcaniclastics. Gold occurs with a fine grained, dark, arsenical pyrite, generally disseminated within its volcanic host, along structural zones, and lithologic contacts. Accompanying the pyrite, trace amounts of associated minerals include marcasite, arsenopyrite, galena, stibnite, realgar, orpiment, and enargite. Silver shows a moderate correlation with gold at a ratio of about 3:1 based on over 43,200 drill sample intervals assayed for both metals. The gold is extremely fine, with over 95% having a diameter of less than 5 µ. Rare coarse visible gold occurs in quartz veinlets. Hydrothermal alteration in the core of the deposits is dominated by illite with subordinate quartz, kaolinite, and smectite. Oxidation of the pyritic mineralization has occurred from a few metres up to 100 m below the surface, developed primarily in rhyolitic host rocks.

## 1.8 RECOVERY METHODS

The Project will employ open pit mining with conventional heap leach processing on a 365 day per year, 24 hour per day operating basis. The process will consist of a crushing circuit, a heap leach pad, a recovery plant, and water management ponds. Mined rock from the pit will be transported to the crusher by haul truck. The three-stage crushing plant will reduce run-of-mine (ROM) material to minus 16 mm. Crusher product will be transported to the heap leach pad via a conveyor belt and stacker system.

The heap leach pad will be lined with a geomembrane and will include a solution recovery system to contain and capture the process solution. The crushed material will be conveyed and stacked in lifts on the leach pad by a mobile radial stacker. The stacker will be fed by a series of mobile grasshopper conveyors placed across the heap that will be fed from the main overland conveyor from the crushing circuit. Sections of the conveyor transporting crushed material to the heap will be permanent, and some sections located on the overliner will be semi-permanent and mobile to allow them to be moved as needed, allowing for phased construction of the pad and overliner placement over the life of the mine.

The lifts will be stacked to a target of 8 m with a total heap height of 85 m. Stacking will advance continuously; whereas intermittently, areas will be placed under leach through the irrigation of dilute cyanide solution delivered from the Adsorption Desorption Recovery (ADR) plant by an infrastructure of distribution piping. The cyanide solution leaches gold from the stacked heap and the rate of recovery and ultimate recovery is enhanced by increasing the surface exposure of mineralisation by crushing and by the stacking of multiple lifts on top of each other.

Above the geomembrane within the coarse-crushed overliner, a series of perforated collection piping transports the pregnant leach solution (PLS) to the ADR plant for gold recovery by carbon adsorption. The gold recovery strategy incorporates a vertical multi-stage carbon column, intermittent scheduled carbon transfer to the elution circuit for stripping under high temperature and pressure, and the electrowinning of the high-tenor strip solution to sludge on cathode. Electrowinning sludge will be dried in a retort where mercury can be condensed and recovered. Subsequently, the sludge is fluxed and smelted to produce precious metal doré bars for sale to an offsite refinery. Note that while silver is a byproduct of gold production, there is no resource presented in this Technical Report since the geological and metallurgical databases lack the detail to evaluate the potential contribution.

PLS will flow by gravity to the ADR plant but can be bypassed to the pregnant solution pond in the event of a precipitation event. Further upset can be stored in the Overflow Pond. Make-up cyanide, pH level and water from the barren solution pond can be added to the ADR barren solution tank before recirculating the solution back to the heap by pumping. Use of raincoats on the heap, back up power-supply for pumps, and containment surge volume within the process water ponds are some of the means used to address storm upset in the system.

## 1.9 MINERAL RESOURCES

The current resource, published in March 2021, was an update of the Technical Report by Lacroix and Associates (L&A), dated September 2012 for Oroperu. The estimate used the geologic models of lithology and alteration that were developed for the L&A resource, but divided the deposit by mineralization type (oxide, transition, or sulphide). This PEA considers only the processing of oxide and transition mineralization.

Gold grade correlation based on geology was not readily apparent and the decision was made to use a 0.2 g/t grade shell as control for grade estimation; this shell was generated using an indicator estimation method (See Section 14.6).

A total of 327 holes have been used for this estimate; of these, 159 were RC and 168 were core holes. Sample grades were composited to a down-hole length of 3 m. Assays, subdivided by grade domain, were capped in a conventional manner prior to compositing.

Gold grades were estimated inside and outside the mineralized grade shell by ordinary kriging, into blocks with dimensions of 10m x 10m x 5m (X/Y/Z). Average density values were assigned by lithology based on 2,700 core density measurements.

The resource has been classified based on spatial parameters related to drill density and configuration, and the generation of an optimised pit. Blocks were initially classified as Inferred where the average distance to the closest three holes is within 80 m, and as Indicated where the average distance to the closest three holes is within 50 m. Pit optimization included variable cost and recovery values dependent on mineralization type; all material included in the Mineral Resource Estimate is contained within the optimized shell.

**Table 1-1: Mineral Resource Estimates**

| Resource Classification | Indicated | | | Inferred | | |
|---|---|---|---|---|---|---|
| | Tonnes (1000's) | Au (g/t) | Oz Au (1000's) | Tonnes (1000's) | Au (g/t) | Oz Au (1000's) |
| Oxide (0.3 g/t Cut-off) | 9,636 | 1.37 | 425 | 487 | 0.75 | 12 |
| Transition (0.3 g/t Cut-off) | 5,707 | 1.12 | 205 | 361 | 0.60 | 7 |
| Sulphide (0.9 g/t Cut-off) | 31,132 | 1.84 | 1,844 | 1,713 | 1.55 | 85 |
| Total | 46,475 | 1.65 | 2,474 | 2,561 | 1.26 | 104 |

## 1.10 CAPITAL AND OPERATING COSTS

Operating costs are shown in Table 1-2.

**Table 1-2: Overall Operating Cost**

| Area | Life of Mine |
|---|---|
| Mine Operating Cost | $146,345 |
| Process Plant Operating Cost | $63,582 |
| Water Treatment Plant | $2,970 |
| Site & Services | $8,685 |
| G & A | $35,618 |
| Treatment & Refining Charges | $1,586 |
| Royalties | $12,193 |
| Closure | $26,157 |
| **Total ($000)** | **$297,136** |
| **$/t processed (US$)** | **$19.93** |

Direct capital costs are shown in Table 1-3. Full capital costs are discussed in Section 21.

**Table 1-3: Tres Cruces Capital Cost Estimate Summary**

| Item | Base Cost (US$) |
|---|---|
| **Subtotal Direct Cost, without Mining** | **$56,572,660** |
| Mobilization | $1,114,143 |
| Camp Administration, Bussing & Meals | $683,687 |

| Item | Base Cost (US$) |
|---|---|
| Temporary Construction Power | $56,573 |
| Fee - Contractor | In Direct Cost |
| **Total Constructed Cost** | **$58,427,062** |
| Management & Accounting | $424,300 |
| Engineering | $3,094,400 |
| Project Services | $565,700 |
| Project Control | $424,300 |
| Construction Management | $3,677,200 |
| EPCM Fee | $848,590 |
| EPCM Construction Trailers | $169,718 |
| Vendor Supervision of Specialty Const. | $296,180 |
| Vendor Pre-commissioning | $98,727 |
| Vendor Commissioning | $98,727 |
| Capital and Commissioning Spares | $493,634 |
| Freight | $4,711,978 |
| **Total Contracted Cost** | **$73,330,516** |
| Contingency | $18,332,629 |
| **Total Contracted Cost with Contingency** | **$91,663,145** |
| Mining | $22,207,173 |
| Mining Contingency | $1,665,538 |
| Owner's Cost | $13,666,668 |
| First Fills | $523,500 |
| Peruvian IGV | $0 |
| Escalation | $767,526 |
| **Total Contracted and Owner's Cost** | **$130,493,550** |

## 1.11 ECONOMIC ANALYSIS

The base case economic analysis indicates that the project has an after tax NPV at 5% discount rate of $157.6 million, IRR of 31.0% and a payback of 2.1 years. This assumes a gold price of $1,700/oz.

## 1.12 CONCLUSIONS

Although both sulphide and oxide mineralized material exist at Tres Cruces, this PEA considers only the processing of oxide and transition mineralization. The processing of sulphide mineralization is outside the scope of the PEA and is considered as a future opportunity, requiring additional studies.

The mineral resource for Anacortes Mining's Tres Cruces Oxide Project was estimated by Mr. James N. Gray of Advantage Geoservices Limited and reported by Oroperu with an effective date of March 16, 2021, replacing the 2012 Lacroix estimate. The resource estimate includes data from 327 drill holes (159 RC and 168 diamond core holes) of 371 drill holes that were completed between 1996 and 2008 by Oroperu, BMC and MBM, and remains current in support of this technical report. The following interpretations and conclusions are made by those authors:

- Indicated Mineral Resources are estimated to contain 46.5 million tonnes (Mt) grading 1.65 g/t Au for a total of 2.5 million ounces (Moz) of contained Au metal. Inferred Mineral Resources are estimated at 2.6 Mt grading 1.26 grams per tonne (g/t) Au for 0.1 Moz Au. These estimates are reported at a 0.3 g/t Au cut-off, for oxide and transition material, and at a 0.9 g/t cut-off for sulphide mineralization. These cut-off grades are considered appropriate based on currently available metallurgical testwork and the assumed mining parameters and gold price.

- The near surface Indicated Mineral Resource is comprised of 9.64 Mt of oxide mineralization grading 1.37 g/t Au for 425,000 contained ounces of gold, and the immediately underlying transition material comprised of 5.71 Mt grading 1.12 g/t Au for 205,000 contained ounces. This forms the basis for a heap leach operation. Potential exists to increase the size of, and the confidence in, the resource through further drilling. Drilling areas presently classified as Inferred Mineral Resource, particularly in areas where holes ended in mineralization, could add or upgrade significant resource tonnage.

- Additional near-surface oxide mineralization may be present in areas covered by shallow post-mineralized volcanic rocks.

- No estimate has been made by the authors for silver content within the mineral resources, although the potential for additional value exists at current silver prices. Indications are that silver grades are generally low and concentrated mainly in the deeper, sulphide portion of the gold deposit. Based on this updated gold resource scenario, overall silver grades would be expected to range between 1.5 and 2.5 g/t, potentially containing 2.5 to 3.5 Moz of silver. Any silver recovered with the gold would enhance overall project economics, albeit with silver recovery being lower relative to that for the gold.

- While metallurgical testing still requires further detailed work, a baseline recovery of about 82% or better of the contained gold has been established for heap leaching of oxide and transition mineralization. Gold recoveries do not necessarily depend on total sulphur content. Samples with both high gold recovery and sulphur content were observed in testing and are primarily derived from shallower depths while those with high total sulphur and lower recoveries are from deeper intervals. It is probable that, in those samples exhibiting higher recoveries, some of the sulphur occurs in sulfate minerals (i.e., in an oxide state), or lower total sulphur content may be due to partial leaching of sulphide sulphur following oxidation, or the gold may deport as free grains. Such mineralization is treatable by heap leaching or other low-cost recovery techniques.

- The Tres Cruces oxide mineralization and the immediately underlying sulphide transition materials can provide the foundation to develop the deposit as an initial standalone heap leach operation, which could then transition to the exploitation of the sulphides. The tabular geometry of the oxide mineralization would, when extracted, expose some of the higher-grade areas of sulphide mineralization.

- The sulphide mineralization cut-off of 0.9 g/t Au was established by considering processing using pressure oxidation. Recommendations have been made by metallurgical consultants to further evaluate the treatment of the sulphide portion of the resource by various other less expensive treatment methods, including fine grinding, CIL leaching, alternative oxidative pre-treatment technology, flotation to create concentrates for shipping, or flotation with oxidative pre-treatment of the concentrate for ultimate gold recovery of gold and silver by leaching.

- Significant mineralization exists at depth below the currently optimized pit and beyond the northern property boundary, extending onto adjacent claims.

- The Cardoso Zone is the least densely drilled area and contains only Inferred Mineral Resources and none of them have been designated as oxides and included in this PEA Additional drilling at closer spacings is required to bring these resources into higher-confidence categories.

- The Tres Cruces mineral resource estimate has been carried out to industry standard techniques and classified in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (CIM, 2014).

## 1.13 RECOMMENDATIONS

The following recommendations are made by the authors. Additional Recommendations can be found in Section 26 of this PEA.

### 1.13.1 Exploration, Geology and Drilling

- Exploration drilling should test favorable targets defined by geological modelling, or geophysical surveying outside of the known areas of mineralization.
- Geological mapping and modelling should be directed toward evaluating the potential for higher-grade zones of mineralization, as well as possible mineralization hidden beneath thin layers of post-mineral rock units.
- Geochemical mapping should be performed for mercury, copper, sulphur, silver, and any other parameters that are required for metallurgical predictions and environmental management.
- Alteration mapping and geochemical analyses of drill samples should be compiled and augmented with additional analyses from samples in storage to help further develop geological modelling of the deposit.
- Drilling should be undertaken to better define mineralization in areas of the drill grid where holes are greater than 50 m apart, where there are unexplained discrepancies in zone continuity or grades between holes, or in areas where holes end in mineralized material.
- Drilling should be undertaken to define the edges of mineralized zones to better define resources and allow for detailed pit planning, and condemnation drilling is required in the areas of the proposed facilities and waste dumps.
- Condemnation drilling is required in areas planned for other future project infrastructure.
- As a number of the previous drill holes ended in mineralization, selected areas should be drilled at depth to determine the ultimate limits of mineralization, especially within or close to current expected pit limits.
- An accurate topographic survey should be carried out for the entire property prior to the next study stage.

### 1.13.2 Resource Model Update

Improve the accuracy of the boundary between directly leachable gold mineralization and refractory gold mineralization using metallurgical testwork, geometallurgical interpretation, and geological mapping.

### 1.13.3 Metallurgy

- Heap leach development tests to determine crush size and leaching conditions are required.
- Balances of mercury, copper, silver, cyanide, and acid generating potential to mitigate risks and generate data for process engineering.
- Water treatment options such as cyanide destruction and metal precipitation, to achieve effluent quality discharge requirements.
- Soluble gold extraction tests and cobalt assays should be integrated with exploration sample analysis workflow as a tool to map and characterize oxidation state structure within the deposit and to differentiate refractory sulphide from leachable resources, as well as to better characterize the leach impact of base metals.

- Given the potential economic contribution by silver whether by heap leaching or other processing strategies, future mineral resource estimates should include silver. Models for mercury and copper that may impact the leach and plant recovery strategy should be developed.
- The sulphur grade should be populated into the mining block model.
- Additional metallurgical testwork is recommended to better quantify recoveries for the different rock types considering lithology and alteration, oxidation state, and mine schedule (zonation) as well as to refine the processing methodology going forward. Additional recommendations for metallurgical testing include:
  - Cyanide destruction testing to select best method and reagent consumptions
  - Column and bottle testing should include analysis of solution for mercury and copper to help determine carbon loading levels expected
  - Column tests should optimize the leach cycle
  - Water treatment – parameters for water treatment should be identified
- Further column and bottle roll testing will allow for optimization of the crusher product sizing and does not preclude the possible future selection of run-of-mine dump leaching.
- The optimization of cyanide and lime consumption for each type of mineralized material. This should include cyanide concentration in the application solution.
- Testing to confirm geotechnical loading parameters with and without agglomeration of crusher products should be undertaken.

### 1.13.4 Process Facilities

- Crusher work index and abrasion tests should be conducted to confirm crusher design and wear rates.
- Confirmation testing to determine dry bulk density of material for crushing and heap leaching
- Percolation and drain down testing with simulated heap loading to ensure that the heap will perform as predicted.
- Geotechnical investigations into the heap stability.

### 1.13.5 Geotechnical Investigations

- Geotechnical and hydrological drilling is required to support detailed mine design.
- Geotechnical drilling and analysis are required to support detailed design of the processing facilities including the ADR, Crushing circuit, and heap leach pad.

### 1.13.6 Capital and Operating Cost Estimates

### 1.13.7 Infrastructure

#### 1.13.7.1 Electric Power

- Advance design of electrical power supply connection and distribution across the site. Electric power is expected to be supplied by a connection to the existing national power grid.
- Further refinement of the capital equipment necessary to connect to the national grid should be investigated to improve the estimate to a pre-feasibility level.

#### 1.13.7.2 Water

- Develop a comprehensive site-wide water balance that integrates the various process facilities with their water demands, rainfall/runoff relationships, contact versus non-contact waters, etc.

- Water sourcing demands and availability from both groundwater and surface water sources on a seasonal and life of mine basis needs to be estimated.

### 1.13.8 Other

#### 1.13.8.1 Preferred Development Option

- Given the grade of the oxide and transition, the construction of a whole ore leaching facility (mill and CIL) might be leveraged to reduce the future capital cost of sulphide processing with the increase in operating and capital costs offset by an incremental recovery improvement.
- The PEA describes a low capital, oxide heap leaching project. The preferred process option presented in the PEA of three stage crushing and heap leaching of oxide and transition mineralized materials, requires validation and further optimization.
- Future evaluation may consider the potential opportunities related to the proximity of the Lagunas Norte site, such as the purchase of leached ore for the use in construction of overliner for the Tres Cruces heap leach pad, rental of Boroo's existing camp infrastructure, evaluation of potential use of processing facilities infrastructure such as the gold room, and use of the airstrip.

#### 1.13.8.2 Environmental Baseline

- Continued collection of environmental baseline data should be continued. Studies on acid/base accounting for the waste rock should be included in an updated reclamation and closure plan. This plan will evaluate the opportunity for concurrent reclamation and the mitigation and possible treatment of any acid drainage.

#### 1.13.8.3 Stakeholder Engagement

- Define a comprehensive strategy for the engagement of local, regional, and national stakeholders. Evaluate the social and economic impacts to the communities surrounding the project that might accompany project development. Study the availability of skilled and unskilled labor for project construction and operation.
- It is recommended that the next stage of testwork assess the risks associated with mercury, copper, and sulphide in the oxide resource, and develop solutions to control any risks found.
- Low cobalt (oxidized) material extends below the bottom of the pit in some areas. This could be an opportunity for increasing the oxide resource.

# 2 INTRODUCTION

## 2.1 PURPOSE AND BASIS OF REPORT

M3 Engineering & Technology Corporation (M3) was retained by Steppe Gold Limited to prepare an independent update to the March 2022 PEA-level Technical Report on the Tres Cruces Oxide Project located in north central Peru about 100 km east of the city of Trujillo. The purpose of this update is to integrate the 2022 drilling and metallurgical testwork that was completed by Anacortes after the report was issued. This Technical Report conforms to NI 43-101 Standards of Disclosure for Mineral Projects.

On June 28, 2023, Steppe completed the acquisition of Anacortes which held a 100% interest in the Tres Cruces Mineral concessions through its wholly owned subsidiary, Aurifera Tres Cruces S.A. (ATC). The Project has received advanced stage exploration and delineation work, with 379 holes drilled on and adjacent to the Project site to date; this included both reverse circulation (RC) and diamond drill (DD) coring.

Tres Cruces is a grass-roots discovery made by New Oroperu (Oroperu) and initially drilled in 1996. Oroperu completed 61 drill holes by the end of 1997. Battle Mountain Canada Ltd. (BMC) optioned the Property and completed an additional 108 drill holes in 1998 and 1999. Barrick Gold Corporation (Barrick), through its Peruvian operating subsidiary, Minera Barrick Misquichilca S.A. (MBM, owned by Barrick), has most recently advanced the Project under an option agreement with Oroperu with the drilling of an additional 202 drill holes from 2000 to 2008. The results of these drill campaigns are contained in this Technical Report. Qualified persons have visited the Project site as recently as December 2021. There has been a limited amount of diamond drilling and metallurgical testwork undertaken in 2022, following a long hiatus since 2008, when the extensive exploration and drilling activity on the Project was curtailed.

Currently, there are no major assets or facilities associated with the Project, located in the District of Quiruvilca in the Province of Santiago de Chuco and the Department of La Libertad. Current infrastructure includes the drill roads and pads. The Project has paved road access from the city of Trujillo, located about 100 km to the west on the Pacific coast, as well as being interconnected to Boroo Pte. Ltd.'s (Boroo) Lagunas Norte mining operation about 12 km to the north.

## 2.2 SOURCES OF INFORMATION

In July of 2023, Mr. John Woodson, P.E., and Mr. Steven Botts met with ATC to transfer all data generated by the additional drilling and metallurgical testwork program that occurred after the March 2022 NI 43-101 technical report issuance. These results were reviewed and incorporated into this technical report.

A Site visit and examination of the Tres Cruces Oxide Project area was carried out by Mr. John Woodson, of M3 Engineering and Technology Corporation, P.E., Mr. Steven Botts, of Santa Barbara Consultants, and Mr. Julio Rodas, of ATC, on August 15, 2023. During this visit the group was able to view and confirm 7 of the 8 2022 drill site locations as well as some locations from prior drilling programs. The group also viewed property access and general topographic layout at the site and then proceeded to a warehouse outside of Trujillo, Peru, to confirm the security of the core storage and availability of the historical core and RC chips along with 2022 core.

During a previous site visit, Mr. Peter Lacroix, on behalf of Oroperu, examined logging and sample preparation procedures, data acquisition, quality assurance and control measures, and data verification, as well as inspecting diamond drill core from the 2006 and 2007 drilling programs. Mr. Lacroix documented his findings in a National Instrument 43-101 Technical Report dated September 28, 2012 (Lacroix, 2012) and the authors accept Mr. Lacroix's qualified evaluation of the drilling and sampling procedures. Several representative samples of split core from Tres Cruces drilling were taken by Mr. Lacroix from the storage facility at Lagunas Norte and check-assayed in Lima.

In 2020, Mr. Castro Ocampo visited the Tres Cruces site and along with Mr. Jeff Rowe and Mr. Jim Gray reviewed the available data provided by Lacroix (2012) on behalf of Oroperu. The authors in this study were of the opinion that the previous programs had been conducted in a professional manner and the quality of the data and information produced meets or exceeds acceptable industry standards and subsequently reported their findings as a Resource Update by Technical Report that conforms to NI-43-101 Standards of Disclosure for Mineral Projects (Rowe, Gray, and Ocampo, 2020).

The mineral resource estimates and information contained in this report are based on data and reports provided by Barrick, BMC, and Oroperu. Much of the data, including the drill assay and geological database upon which the estimates are based, has undergone thorough scrutiny by Anacortes staff and consultants, as well as certain data verification procedures by the authors.

Much of the background information for this report, including geological descriptions and interpretations, was derived from previous NI 43-101 reports prepared for Oroperu by Reeder and McCrea (2002) and Lacroix (2012). Land tenure was provided in a title report by CMS Grau, legal counsel for ATC and Oroperu. Other sources of information included hydrology review from FloSolutions as well as environmental and geotechnical studies by WSP - Golder Associates. The documentation that has been reviewed, as well as other sources of information, are listed at the end of this report in Section 27, References. All contributions to each section have been reviewed and accepted by the corresponding Qualified Persons as shown in Table 2-1.

**Table 2-1: List of Qualified Persons**

| Name of Qualified Person | Company | Qualification | Site Visit Date | Area of Responsibility |
|---|---|---|---|---|
| John Woodson | M3 Engineering & Technology | P.E. | 15-Aug-2023 | Sections 1, 2, 3, 18, 19, 20, 21, 22, 23, 24, 25, 26, and 27. |
| Laurie Tahija | M3 Engineering & Technology | QP-MMSA | N/A | Section 17, 21.2.1-21.2.2, and corresponding sections of 1, 25 and 26. |
| Jeff Rowe | Independent Geologist | P.Geo. | N/A | Sections 4, 5, 6, 7, 8, 9, 10, 11, and 12, and corresponding sections of 1, 25 and 26. |
| Adam Johnston | Transmin Limited | FAusIMM CP(Met) | 3-Mar-2022 | Section 13, and corresponding sections of 1, 25 and 26. |
| Jim Gray | Advantage Geoservices Limited | P.Geo. | N/A | Section 14, and corresponding sections of 1, 25 and 26. |
| John Nilsson | Nilsson Mine Services Ltd. | P. E. | N/A | Sections 15, 16, 21.1.3, 21.2.3, and corresponding sections of 1 and 26. |

## 2.3 LIST OF ABBREVIATIONS

Units of measurement used in this report conform to the SI (metric) system. All currency in this report is US dollars (USD) unless otherwise noted. Table 2-2 shows the terms and abbreviations used in this Technical Report.

**Table 2-2: Terms and Abbreviations**

| Abbreviation | Term |
|---|---|
| °C | degrees Celsius |
| µm | nanometer |
| A | Ampere |
| a | Annum |
| AA | Atomic Absorption |
| AAA | Administrative Water Authority |
| ADR | adsorption-desorption-recovery |
| ADR | Adsorption Desorption Recovery |
| AES | atomic emission spectroscopy |
| Ag | silver |
| AGUE | Global Authorization for the Use of Explosives |
| ALA | Local Water Authority |
| AMTEL | Advanced Mineral Technology Laboratory Ltd. |
| ANA | National Water Authority |
| Anacortes | Anacortes Mining Corporation |
| APV | andesite porphyry-volcanic contact |
| ARD | Acid Rock Drainage |
| As | arsenic |
| ATC | Aurífera Tres Cruces S.A. |
| Barrick | Barrick Gold Corporation |
| bbl | Barrels |
| BMC | Battle Mountain Canada Ltd. |
| Boroo | Boroo Pte. Ltd. |
| Btu | British thermal units |
| C$ | Canadian dollars |
| cal | Calorie |
| CAPEX | capital cost estimate |
| CCTV | closed-circuit television |
| cfm | cubic feet per minute |
| CIC | Carbon in column |
| CIL | carbon in leach |

| Abbreviation | Term |
|---|---|
| CIRA | Certificate of Non-Existence of Archaeological Remains |
| cm | Centimetre |
| $cm^2$ | square centimetre |
| CMOP | Carbonaceous Material Optimization Project |
| Cu | copper |
| CV | coefficient of variation |
| d | Day |
| DCS | distributed control system |
| DD | diamond drill |
| DIA | Declaración de impacto ambiental |
| dia. | Diameter |
| DIGESA | General Health Directorate (La Dirección General de Salud Ambiental) |
| dmt | dry metric tonne |
| dwt | dead-weight ton |
| ECA | Environmental Quality Standards |
| EDA | exploratory data analysis |
| EIA-sd | Estudio de Impacto Ambiental semidetallado |
| ft | Foot |
| ft/s | foot per second |
| $ft^2$ | square foot |
| $ft^3$ | cubic foot |
| FTA | Ficha técnica ambiental |
| g | Gram |
| G | giga (billion) |
| g/L | grams per litre |
| g/t | grams per tonne |
| Gal | Imperial gallon |
| GCL | Geosynthetic Clay Liner |
| gpm | Imperial gallons per minute |
| GPS | global positioning system |

| Abbreviation | Term |
|---|---|
| gr/ft$^3$ | grain per cubic foot |
| gr/m$^3$ | grain per cubic metre |
| ha | Hectare |
| HCl | hydrochloric acid |
| HDPE | high-density polyethylene |
| Hg | Mercury |
| HLF | Heap Leach Facility |
| hp | Horsepower |
| hr | Hour |
| ID3 | inverse distance cubed model |
| in | Inch |
| in$^2$ | square inch |
| INEI | National Institute of Statistics |
| IP | induced polarization |
| J | Joule |
| k | kilo (thousand) |
| kcal | Kilocalorie |
| kg | Kilogram |
| km | Kilometre |
| km/h | kilometre per hour |
| km$^2$ | square kilometre |
| kPa | kilopascal |
| kt | thousand tonnes |
| kVA | kilovolt-amperes |
| kW | kilowatt |
| kWh | kilowatt-hour |
| L | liter |
| L&A | Lacroix and Associates |
| L/s | liters per second |
| LMP | Permissible Maximum Limits |
| m | metre |
| M | mega (million) |
| M | million |
| m$^2$ | square metre |
| m$^3$ | cubic metre |
| M3 | M3 Engineering & Technology Corporation |
| m$^3$/h | cubic metres per hour |

| Abbreviation | Term |
|---|---|
| Ma | million years ago. |
| MASL | metres above sea level |
| MBM | Minera Barrick Misquichilca S.A. |
| min | Minute |
| MINCU | Ministry of Culture |
| MINEM | Energy and Mines Ministry |
| mm | millimetre |
| MMI | Maverix Metals Inc. |
| MMI | Mobile Metal Ions |
| Mo | molybdenum |
| Moz | million ounces |
| Mpa | million pascals or megapascal |
| mph | miles per hour |
| Mt | million tonnes |
| Mt/a | million tonnes per year |
| MTC | Ministry of Transportation and Communications |
| MVA | megavolt-amperes |
| MW | megawatt |
| MWh | megawatt-hour |
| NaCN | sodium cyanide |
| NaOH | caustic |
| NN | nearest neighbour |
| NPV | Net present value |
| NSR | Net Smelter Return |
| NTS | Peruvian National Topographic System |
| NW | northwest |
| ºC | degree Celsius |
| ºF | degree Fahrenheit |
| OK | ordinary kriging |
| OPEX | operating cost estimate |
| opt, oz/st | ounce per short ton |
| Oroperu | New Oroperu Resources Inc. |
| OSINERGMIN | The Supervisory Organism of Investment in Energy and Mines |
| oz | Troy ounce (31.1035g) |
| oz/dmt | ounce per dry metric tonne |
| PAAS | Pan American Silver Corporation |
| Pb | lead |

| Abbreviation | Term |
|---|---|
| PEA | Preliminary Economic Assessment |
| PEN | Peruvian sol (i.e. the national currency of Peru) |
| pH | measure of acidity |
| PIMA | Portable Infrared Mineral Analyser |
| PLS | pregnant leach solution |
| PMR | proyecto material refractario |
| ppb | parts per billion |
| ppm | parts per million |
| PRA | Process Research Associates Ltd. |
| psia | pound per square inch absolute |
| psig | pound per square inch gauge |
| QAC | Quality Assurance Control |
| QLT | quick leach tests |
| RC | reverse circulation |
| RMR | Rock Mass Ratings |
| ROM | run-of-mine |
| RQD | rock quality designation |
| s | second |
| Sb | Antimony |
| SE | southeast |
| Se | Selenium |
| SENACE | Environmental Certification for Sustainable Investments |
| st | short ton |
| stpa | short ton per year |
| stpd | short ton per day |
| SUCAMEC | National Superintendence for the Control of Security Services, Arms, Ammunition and Explosives for Civilian |
| SUNAT | National Tax Administration Management of Peru |

| Abbreviation | Term |
|---|---|
| t | metric tonne |
| t/d | tonnes per day |
| $t/m^3$ | tonne per cubic metre |
| Tcac | Andesitic Flows |
| Tcac | Volcanic Breccia |
| Tcap | Andesite Porphyry |
| Tcdp | Dacite Porphyry |
| Tchb | Polymictic Hydrothermal Breccia (with fragments of sandstone) |
| Tcls | Volcanic Sediments |
| Tcpm | Andesitic Domes |
| Tcr | Undifferentiated Pyroclastics |
| TDEM | Time Domain Electromagnetic |
| Te | tellurium |
| Tl | Thallium |
| tpa | metric tonne per year |
| tpd | metric tonne per day |
| Tuff_Bx | Tuff Breccia |
| USD | United States dollar |
| USg | United States gallon |
| USgpm | US gallon per minute |
| UTM | Universal Transverse Mercator |
| V | volt |
| W | watt |
| W | tungsten |
| wmt | wet metric tonne |
| $yd^3$ | cubic yard |
| yr | year |
| Zn | zinc |
| µ | Micron |
| µg | Microgram |

# 3 RELIANCE ON OTHER EXPERTS

For the purposes of this report, the authors have relied on ownership information and title opinion provided by ATC. The authors have not researched Property title or mineral rights for the Tres Cruces property and express no opinion as to the ownership status of the Property.

The authors have relied on ATC for guidance on applicable taxes, royalties, and other government levies or interests, including Environmental information presented in Section 20, that may be applicable to the Project.

Much of the background information for this report, including geological descriptions and interpretations, was derived from previous NI 43-101 reports prepared for Oroperu by Reeder and McCrea (2002) and Lacroix (2012). Land tenure was provided in a title report by CMS Grau, legal counsel for ATC and Oroperu. Other sources of information included hydrology review from FloSolutions as well as environmental and geotechnical studies by WSP - Golder Associates. The documentation that has been reviewed, as well as other sources of information, are listed at the end of this report in Section 27, References. All contributions to each section have been reviewed and accepted by the corresponding Qualified Persons as shown in Table 2-1.

Except for the purposes legislated under provincial securities laws, any use of this report by any third party is at that party's sole risk.

# 4 PROPERTY DESCRIPTION AND LOCATION

## 4.1 PROPERTY LOCATION AND AREA

The Project is located in north-central Peru about 100 km east of the city of Trujillo, a major city located 574 km northwest of Lima (Figure 4-1). The Tres Cruces property consists of four mineral concessions totaling 3,000 ha (Figure 4-2) located in the eastern part of the Western Cordillera of northern Peru in the District of Quiruvilca in the Province of Santiago de Chuco. The concessions are located within the Department of La Libertad and within Peruvian National Topographic System (NTS) map area Santiago de Chuco, number 17G. The center of the Tres Cruces concession is at approximately 78° 16' west latitude and 08° 02' south longitude. Table 4-1 lists the concessions and their sizes and entry codes.


Figure 4-1: Location Map – North-Central Peru

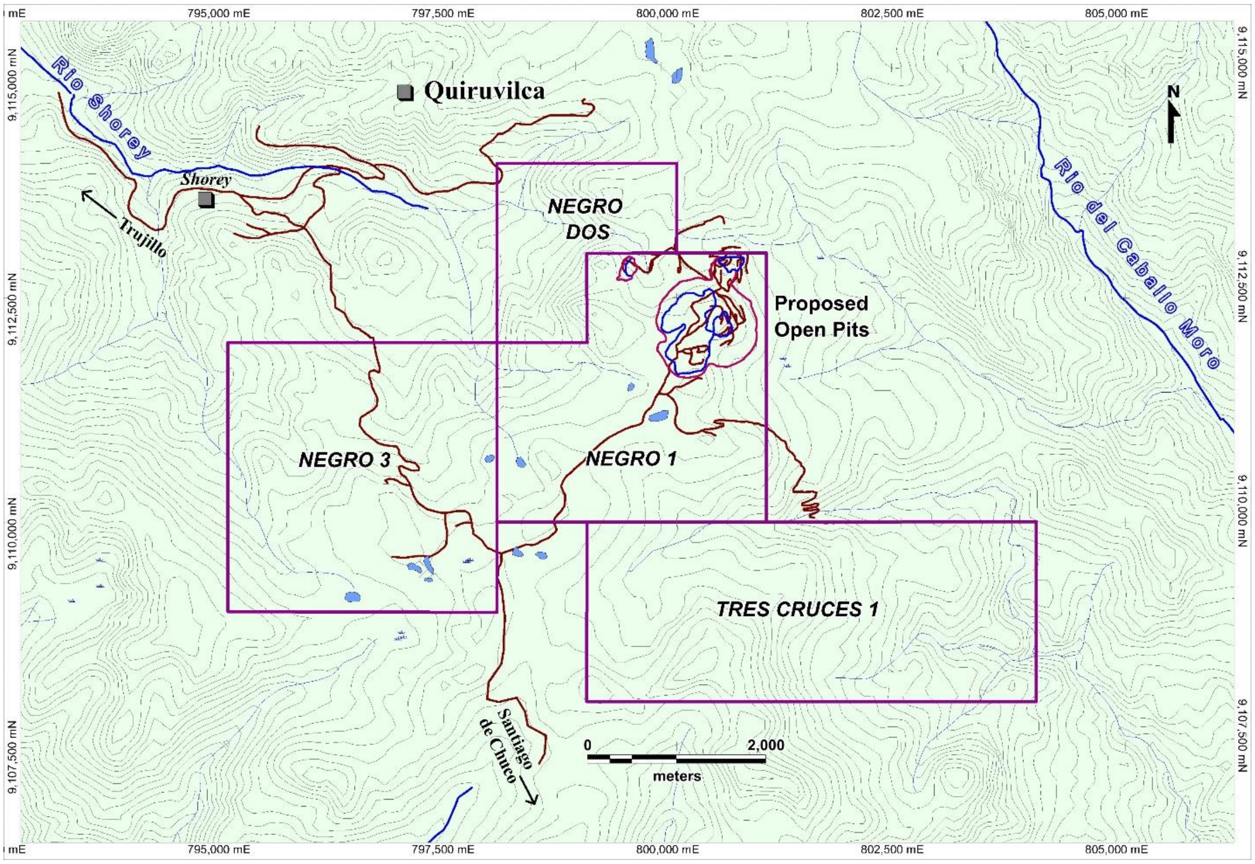



**Figure 4-2: Tres Cruces Property Concessions**

## 4.2 LAND TENURE

Steppe holds a 100% interest in the four Tres Cruces mineral concessions through its wholly owned subsidiary ATC. To maintain the concessions in good standing, there is a basic annual fee payment of USD 3 per ha, equaling USD 8,753.82, in total, which must be submitted to the Peruvian government annually. After certain periods, an additional annual "non-production fee" penalty is assessed if a minimum production level is not achieved. ATC complied with the minimum required levels of investment in the mining concessions for the year 2022 as credited on the Annual Consolidated Report ("*Declaración Annual Consolidada – DAC*"), and therefore no penalties were assessed in 2022. If the minimum investment is not met by ATC during 2023 (S/ 2,948,285.34), a penalty of S/ 294,828.53 (USD 80,774.94, exchange rate S/ 3.65) will be assessed. The latest annual concession fees were paid on June 9, 2023, and the concessions are in good standing until June 30, 2024. To conduct detailed exploration work, permits must be obtained from the Peruvian Ministry of Mines; however, it is not necessary to obtain permits for prospecting activities, such as mapping and geochemical sampling of surface and streams. Concession holders are also required to submit an annual report detailing annual exploration expenditures to the Peruvian Ministry of Mines. The Tres Cruces mineral concessions are subject to a 1.5% net smelter return (NSR) royalty to Pan American Silver Corporation (PAAS) that was subsequently transferred to Maverix Metals Inc. (MMI), except for the Tres Cruces 1 concession, which has a 2.5% NSR royalty, capped at USD 1,250,000 which would be paid out prior to the 1.5% NSR royalty paid out to the same. There are no known environmental liabilities within the Project area other than reclamation requirements for drill pads and drill roads, and small artisanal mining pits and trenches.

Through the application of an UEA, two or more mineral concession of the same kind, and held by the same titleholder (as registered titleholder or lessee) can be grouped to facilitate compliance with minimum required production, minimum investment, and certain reporting obligations. An UEA is not a new mineral concession.

ATC's economic administrative unit (UEA), namely "Tres Cruces 2022" with code N° 010000224 was granted by way of Resolution N° 1126-2022-INGEMMET/PE/PM dated March 22, 2022. The Tres Cruces UEA grouped together all four mineral concessions.

Once approved, production attained, or investments incurred in one or more mineral concessions comprising the UEA will apply towards the UEA as a whole. While not in production, annual investments on a given UEA which fall below the minimum legal levels on a given year, will result in non-compliance with the minimum investment obligation, and trigger penalties on each of the mineral concessions comprising the UEA, payable on the following year.

The UEA will terminate due to the transfer or assignment/lease of the mineral concessions comprising the UEA to another juridical entity; or the termination of the mineral concessions comprising the UEA.

**Table 4-1: Tres Cruces Mineral Concessions**

| N° | Mining Concession | Identification Code | Available Extent (Hectares)[1] |
|---|---|---|---|
| 1 | Negro I | 010204693 | 800 |
| 2 | Negro Dos | 010188697 | 300 |
| 3 | Negro 3 | 010323494 | 878 |
| 4 | Tres Cruces I | 010245093 | 1000 |
| **Total** | | | **2,978** |

## 4.3 ROYALTIES, BACK-IN RIGHTS, PAYMENTS, AND OTHER AGREEMENTS

The Tres Cruces mineral concessions are subject to a 1.5% net smelter return (NSR) royalty to Pan American Silver Corporation (PAAS) that was subsequently transferred to Maverix Metals Inc. (MMI), except for the Tres Cruces 1 concession, which has a 2.5% NSR royalty, capped at USD 1,250,000 which would be paid out prior to the 1.5% NSR royalty paid out to the same. There are no known environmental liabilities within the Project area other than reclamation requirements for drill pads and drill roads, and small artisanal mining pits and trenches.

## 4.4 ENVIRONMENTAL LIABILITIES

There are no known environmental liabilities within the Property limits other than reclamation of some drill pads and drill roads. There are some small artisanal workings (pits, trenches, shafts) on vein showings in the North and Cardoso Zones that may require remediation or sealing.

## 4.5 REQUIRED PERMITS

See Section 20.3 for a discussion of permitting required for this study.

## 4.6 SURFACE OWNERSHIP

The study framework considers the current surface right boundaries in locating infrastructure, and this area may be expanded in the future by land acquisition. The surface rights boundary may be different than the area designated by the four Tres Cruces mineral concessions.

On December 18, 2006, ATC and MBM entered into a Mining Assignment Agreement (Contrato de Cesión Minera) for the purpose of MBM's operations on the Tres Cruces Property, which subsequently terminated on September 10, 2021. Following the completion of the qualifying transaction between First Light and Oroperu on October 7, 2021 (Newswire, 2021), and pursuant to the Mining Assignment Agreement, ATC, Oroperu's wholly owned Peruvian subsidiary, and Boroo entered into agreements for the transfer to ATC and payment to Boroo at book value for the land surface rights held by Boroo (formerly held by Barrick's MBM) over the Tres Cruces Property. ATC made payment of USD 1,620,709 to Boroo and completed the transfer on October 18, 2021 (Market Herald, 2021). Following the payment and transfer of the surface land rights to ATC, the termination of the May 31, 2002 Share Purchase Option and Joint Participation Agreement between MBM and Anacortes was executed. In addition to the surface rights, all Tres Cruces drill core held by Boroo was released to ATC.

Through its acquisition of ATC, Steppe now owns the land surface rights over the Tres Cruces Property that were held by ATC.

As a result of this transaction, the authors have not identified any significant risks associated with mineral title, site access, land title, or the right or ability to perform work on the Property.

# 5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

## 5.1 ACCESSIBILITY

The Tres Cruces property can be accessed by paved and gravel roads from Trujillo, a metropolis with population of just under 1 million, which is located 574 km northwest of Lima. From Trujillo the trip to the Property is approximately 130 km and takes about 3 hours driving time. The main road accessing the Project from the city of Trujillo was upgraded in 2004 during the construction phase of Barrick's Lagunas Norte project. Subsequently, there has been significant additional road upgrading including major re-routing and paving. There is also an airstrip that services the Lagunas Norte operation, which is located about 5 km north of the Project. Salaverry, located 10 km south of Trujillo, is the closest deep-water port to the mine.

## 5.2 CLIMATE

Near the Tres Cruces concessions, at the town of Quiruvilca, average daily recorded temperatures generally show little variance during the year, with highs ranging between 14º and 19ºC, and lows between 3º and 10ºC; however, at higher elevations on the Property, temperatures may show greater extremes. Cooler temperatures typically occur during the months of June and July. The rainy season in this part of the Andes is from November to April, often totalling 150 – 200 mm of precipitation per month and commonly accompanied by dense fog, with March generally the wettest month (World Weather Online, 2021).

## 5.3 LOCAL RESOURCES

The Property is located 4 km southeast of Lida Resource's Quiruvilca Mine (Newswire, 2020) and 12 km south of Boroo's Lagunas Norte mining operation, which produced approximately 10 million ounces (Moz) gold during operations from 2005 to 2019. Currently, both mines are on care and maintenance. In the past, there was a significant local work force for these mine operations, which could be utilized to construct and operate a potential mine site at Tres Cruces. Limited supplies and accommodations are available in the nearby local towns of Quiruvilca, Shorey, Santiago de Chuco and Huamachuco. Trujillo, a 3-hour drive to the west, is a major city from which supplies can be obtained. Sources of power and water sufficient for a mining/milling operation are also available in the area.

## 5.4 INFRASTRUCTURE

There is currently no infrastructure located on the Tres Cruces property other than access roads and drill pads. All exploration activity on the Property has been facilitated by existing infrastructure and services located in nearby towns and at Boroo's Lagunas Norte operation, as well as by employees and contractors from elsewhere in Peru and other countries. Manpower, equipment, and supplies are transported to the Property by local roads from Quiruvilca and other nearby towns and the paved main highway from Trujillo.

## 5.5 PHYSIOGRAPHY

The Tres Cruces property ranges in elevation between 3,900 and 4,200 m above sea level. The terrain is of moderate relief and the slopes in the Tres Cruces area are typically covered with low brush and grasses. Nearby, at lower elevations (less than 3,500 m) there is abundant agricultural activity typical of the Andes.

# 6 HISTORY

Mining activity has been ongoing in the nearby region since the 1920's, when Compañía Minera Quiruvilca started mining high-grade Pb-Zn-Ag veins at Quiruvilca. During the 1990's, Peru's new mining laws attracted several international mining companies to the area. Yanacocha, Latin America's largest gold mine commenced commercial operation in the early 1990's and for several peak years produced over 1.5 Moz of gold annually (as high as 3.3 Moz in 2005). In 1998, Barrick reached commercial production at the Pierina deposit that has produced 8 million ounces of gold. Both the Yanacocha and Pierina mines are hosted in the Calipuy Volcanics, a similarity that Tres Cruces shares.

Small artisanal mining pits and shallow underground workings, some from pre-1800's, are found on the Property, primarily in the areas now known as the North and Cardoso Zones. The targets of the work were narrow, gold-bearing quartz veins, but gold recovery appears to have been quite limited.

In June 1995, Oroperu personnel visited the Tres Cruces area located 4 km to the southeast of the Quiruvilca Mine. Encouraged by the positive surface sampling results from the North Zone, a follow up program consisting of detailed sampling, alteration evaluation by Portable Infrared Mineral Analyser (PIMA), and mapping was completed. By October of 1996 Oroperu acquired the key concessions in the area and entered into a 50-50 joint venture agreement with PAAS on a combined land package, including adjoining ground held by PAAS that covered portions of the projected Tres Cruces mineralization. Assets for the joint venture were held by ATC.

The initial drilling by Oroperu, conducted in December 1996, returned significant gold intercepts in four drill holes. Additional drill campaigns by Oroperu in 1997, and later by BMC in 1998 and 1999, outlined a mineral resource of 34.5 Mt grading 1.40 g/t Au, containing 1.6 Moz Au using a 0.75 g/t Au cut-off (Cooper, 1999). This resource, based on the results of 83 diamond drill holes and 87 reverse circulation holes, was classified as Indicated; however, it is now considered historic. BMC completed metallurgical testing on selected sections of the drill core consisting of bottle rolling and irrigation column testing, the data of which is referred to in Section 13. BMC evaluated the potential to heap leach the sulphides using oxidative pre-treatment of the crushed material by bio-oxidation and that data is not referenced in this study as the PEA study does not consider the sulphides. Following takeover of BMC by Newmont, BMC withdrew from the Project in late 1999.

In April of 2002, Barrick announced a major discovery north of Tres Cruces called the Lagunas Norte deposit (formerly the Alta Chicama project). At that time, it was estimated to contain a total resource of 7.3 Moz Au (News Release, Barrick, July 10, 2002). Lagunas Norte was developed by Barrick and commenced production in mid-2005. Open pit mining and heap leaching of the near-surface oxide portion of the deposit up to December 2015 produced 9.0 Moz of gold and 9.0 Moz of silver from approximately 222 Mt of ore averaging 1.53 g/t Au and 3.7 g/t Ag (Evans et al., 2016). In June 2015, Barrick reportedly completed an internal PEA study to evaluate the mining logistics and the construction of a mill and processing facilities capable of reasonable prospects for eventual economic extraction of the gold from the deeper-lying sulphide mineralization. The subsequent December 2015 PFS outlined a Refractory Project phase that anticipated an 8-year operation processing stockpiled sulphides and freshly mined ore, subject to construction and commissioning of a new 6,000 tpd grinding-flotation-autoclave and carbon-in-leach processing plant over 2 years (Barrick Gold Corporation, 2015). Barrick shut down mining operations at Lagunas Norte and entered residual heap leach operations in 2019. Subsequently, Lagunas Norte was sold to Boroo in early 2020.

In May 2002, Oroperu secured an option to acquire PAAS's 50% interest in Tres Cruces, to increase its interest to 100%, subject to work expenditures, royalty, and back in provisions. Concurrently, Oroperu entered into an agreement with Barrick's MBM that would further the exploration of the Project. In September 2003, the agreement with MBM was finalized and a definitive option agreement was signed.

In October 2003, Oroperu finalized its agreement with PAAS regarding its interest in the Project, acquiring 100% of ATC through issuance of Oroperu shares and granting a 1.5% NSR royalty to PAAS (since acquired by MMI), and subsequently entered into an agreement with Barrick to explore and develop the Tres Cruces property, consisting of the four claims.

The Barrick exploration program began at Tres Cruces with geological mapping, re-logging of existing drill core, and Induced Polarization (IP) and gravity geophysical studies. Barrick drilled 29 diamond core holes in the period 2002-04. No further drilling was undertaken until 2006, when 29 additional diamond core holes were completed. In 2007, Barrick drilled 44 diamond core holes and 87 RC holes. In 2008, Barrick drilled 7 diamond core holes and 6 RC holes.

No further drilling was carried out on the Property; however, some metallurgical testwork consisting of cyanide-soluble gold extraction (referred to as quick leach testing) and CIL cyanidation testing was undertaken by Barrick in various laboratories from 2006 to 2011 and is described in more detail in Section 13. Further flotation and cyanidation work on the sulphide material was also undertaken historically, but not further referenced in this study since that material does not appear amenable to conventional heap leaching.

Between 2008 and 2018 Barrick maintained control of the Tres Cruces claims, but never formally advanced a resource estimate, nor published an evaluation of the potential integration of Tres Cruces with the Lagunas Norte Mine. On December 31, 2020, the option agreement signed in 2002 between MBM and Oroperu expired as a result of Barrick not making a production decision in accordance with the option agreement terms. Subsequently, the Project returned to the control of Oroperu. In October of 2021, New Oroperu and First Light Capital, merged to form Anacortes Mining Corporation, a company registered in British Columbia, Canada.

The transfer of ownership of surface rights, drill core and all related data associated with the project, from Minera Boroo Misquichilca S.A. to Anacortes, was completed later in October 2021 by the transaction described in Section 4.6.

Anacortes applied for and received the necessary permits to allow the drilling of diamond core holes to commence in June 2022. Eight holes were undertaken for infill drilling within the known oxide resource, metallurgical sampling, and testing for extensions of previous high-grade intercepts that ended in gold and silver mineralization. Two of the holes were abandoned prior to reaching target, but the results of the remaining holes were successful. The drilling program was paused after these holes, and not resumed. Anacortes sought a partner, which resulted in the company's acquisition by Steppe in June 2023.

# 7 GEOLOGICAL SETTING AND MINERALIZATION

The Tres Cruces Property is situated in the Cordillera Occidental of north-central Peru. It lies near the heart of the Quiruvilca mining district, which includes the Quiruvilca copper-lead-zinc-silver underground mine (Figure 7-1). Precious metal deposits in the area include the Lagunas Norte mine, a high sulphidation epithermal gold deposit that has produced over 10 Moz of gold and has reserves (as of December 1, 2021) of 3.95 Moz gold and 9.9 Moz silver in the Proven plus Probable categories (Boroo Pte. Ltd. press Release Dec 1, 2021) and the Tres Cruces epithermal gold deposit as described in this report, with Indicated Resources of 2.5 Moz of gold. Although the nearby known mineral deposits are hosted by similar geological features to those of the Tres Cruces Property that is not necessarily indicative of the tenure of mineralization that may be present on the Tres Cruces property.

The Tres Cruces deposit is a low to intermediate sulphidation type epithermal system. Gold mineralization is hosted by a bimodal suite of andesitic to rhyolitic flows, domes, breccias, and volcaniclastics. Gold occurs with a fine grained, dark, arsenical pyrite, generally disseminated within its volcanic host, along structural zones, and lithologic contacts. Hydrothermal alteration in the core of the deposits is dominated by illite with subordinate quartz, kaolinite, and smectite. Based on limited analyses, the gold is extremely fine, having a diameter of less than 5μ. Rare coarse visible gold occurs in quartz veinlets. Oxidation of the pyritic mineralization has occurred from a few metres up to 100 m below the surface, developed primarily in rhyolitic host rocks.

## 7.1 REGIONAL SETTING

The Cordillera Occidental in the region is underlain primarily by Paleogene volcanic rocks of predominantly andesitic composition which overlie Mesozoic sedimentary rocks. The Cretaceous sedimentary sequence (Chimu Formation) of quartz arenite and mudstone was deposited in a marine basin and deltaic environment, which unconformably overlies the Jurassic Chicama Group, comprised of mudstone with subordinate siltstone and sandstone. This back-arc basinal setting was replaced by an Early Paleogene subduction regime, typified by compressive episodes, extensive plutonic and subaerial volcanic activity, crustal thickening, and major uplift (Benavides-Cáceres, 1999).

The Mesozoic basement rocks deposited in the back-arc basin were affected by deformation and crustal shortening during the Early Paleogene Incaic orogeny. The Incaic fold and thrust belt (approximately 59-55 Ma) resulted in the creation of large thrusts and tight, upright folds that are reflected at a regional scale by the distribution of the Chimu Formation (Figure 7-1). Following this deformation, volcanic deposits were formed in association with a number of volcanic centers that range from Eocene to Miocene in age.

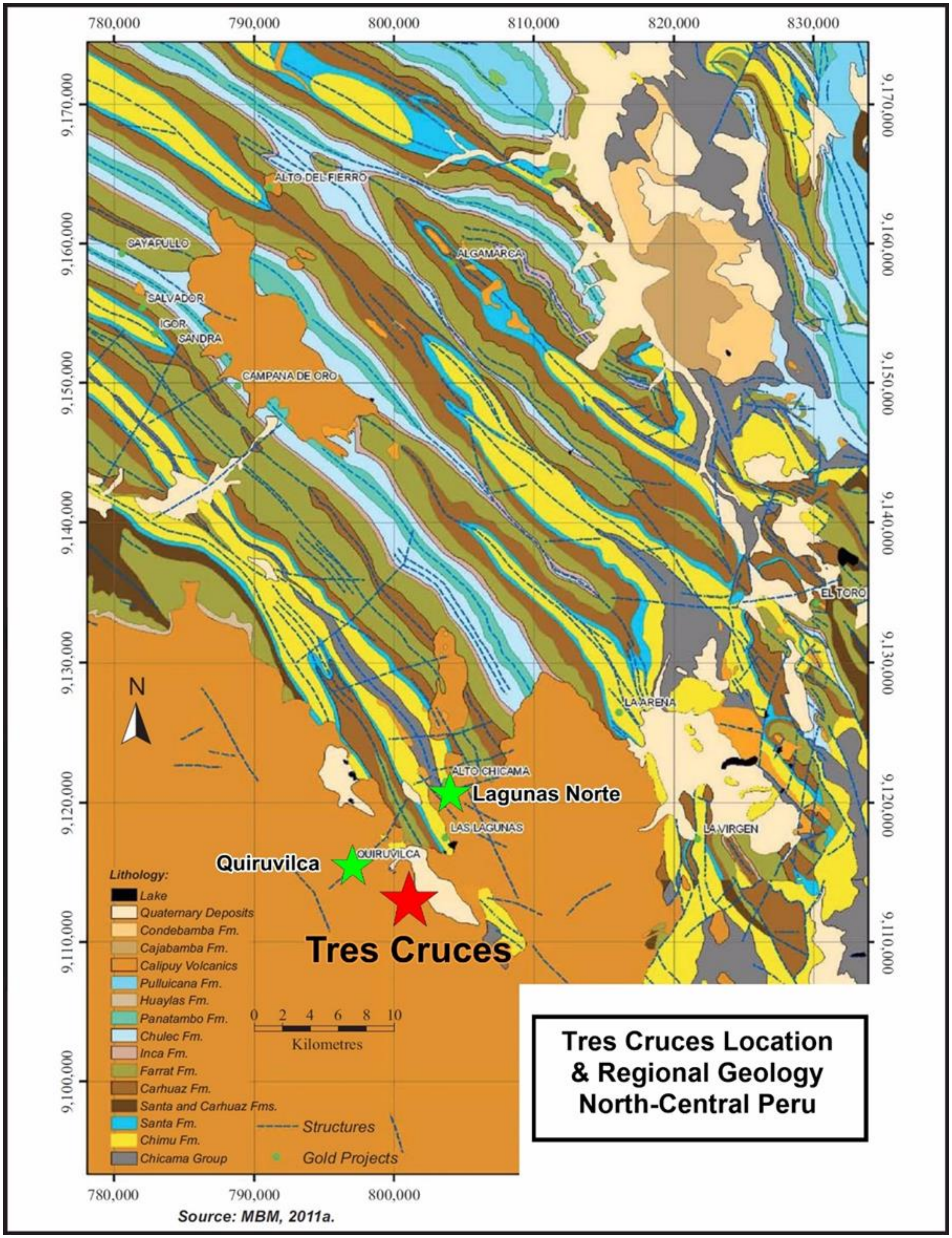



Figure 7-1: Tres Cruces Location and Regional Geology

Benavides-Cáceres (1999) proposed that the volcanic rocks in the Cordillera Occidental of northern Peru belong to three major volcanic sequences, referred to as the Llama-Calipuy volcanic sequence (54-43 Ma), the Lower and Upper Tacaza volcanic sequences (42-17 Ma), and the Sillapaca volcanic sequence (16-8 Ma). All the volcanic sequences are separated by compressional orogenic events.

In the Tres Cruces area, the Cretaceous Chimu Formation is well exposed to the north of the Property, where it is composed of steeply dipping to tightly folded beds of quartzite, siltstone, and shale with minor beds of anthracitic coal. On the Property, Cretaceous sedimentary rocks are exposed only in the southeastern quadrant. Clasts of Chimu are common constituents of hydrothermal and phreatic explosion breccias seen in outcrop in dyke-like and breccia bodies in the Project area, and in many drill holes.

Regionally, folding in the Cretaceous rocks consists of SW-NE directed compressional tectonics, which was followed by E-W extension and extensive volcanism. A northwest-trending linear break 2 km northeast of the Project places the Oligocene - Miocene Calipuy volcanics on the west against the Chimu Formation to the east. The break is probably a graben bounding fault, with the graben hosting the Calipuy volcanics (Battle Mountain Canada Ltd., Tres Cruces Staff, 1999b).

The primary volcanic package in the Tres Cruces region belongs to the Calipuy Group, comprising a volcanic pile of flows, domes, debris deposits, and minor sediments. Age dating of individual units shows the Group to be 53 Ma (Atherton et al., 1985) at its base.

Heyl and Livingstone (1998) observed that most of the metal districts in the region are located within a 25-km-wide belt trending N45°W. Northeast-trending cross faults appear to have provided local structural control, with many districts occurring at these structural intersections.

Many precious metal deposits in the region are primarily hosted in the Cretaceous Chimu Formation. Mineralization is structurally and lithologically controlled, often lies at antiformal crests, and often is spatially and/or genetically associated with high level intrusions of dacitic composition, thought to be Miocene in age. In general, these deposits are of the high sulphidation epithermal type.

Yanacocha and Pierina are world-class gold deposits in north-central Peru, in a similar geologic and geographic setting to that of Tres Cruces. They are hosted by felsic volcanics of the Calipuy Group and are high sulphidation type. Yanacocha has been dated at 11 Ma, Pierina at 14 Ma. Tres Cruces is older, between 22 and 25 Ma. Although the nearby known mineral deposits are hosted by similar geological features to those of the Tres Cruces property, that is not necessarily indicative of the tenure of mineralization that may be present on the Tres Cruces property.

The Quiruvilca Cu-Pb-Zn-Ag district encompasses over 100 veins in the area about 4 km northwest of Tres Cruces. The veins are predominantly hosted by andesitic to dacitic Calipuy flows, domes, and breccias. Veins occupy N70°E tension gashes generated around E-W trending left-lateral strike slip faults. Four outwardly concentric zones of mineralization have been identified, distinguished individually by predominance of enargite, transition minerals, lead-zinc, and stibnite. Quiruvilca is a system related to a deep low-grade porphyry copper deposit and is classically zoned, with an enargite-rich Cu-Ag core, zoning outward to Zn-Pb-Ag and finally to Sb-As. Past production since 1789 from over 100 working faces has totalled about 10 Mt (Bartos, 1987). As reported in PAAS's annual information form for the year ending Dec 31, 2002, the remaining Proven + Probable Reserves at that time were 2.11 Mt @ 186 g/t Ag, 4.39% Zn, 1.59% Pb, 0.47% Cu. Quiruvilca mineralization has been dated at 14 Ma and late intrusions nearby have been dated at 10 to 12 Ma (Lyons, 1999). Lyons (1999) notes that the Tres Cruces deposit, located four km southeast of Quiruvilca, is unlikely to be related to that system since it is of the low sulphidation type and estimated to be 9 million years older.

The Lagunas Norte deposit, located 12 km north-northeast of Tres Cruces, is a high sulphidation epithermal deposit hosted within an Oligocene-Miocene sequence of andesitic and dacitic volcanic rocks that unconformably overlie

Cretaceous sedimentary rocks. The deposit is localized at the unconformity, with mineralization occurring in both the Calipuy volcanic pyroclastic rocks and in the underlying Chimu Formation, which is comprised of quartz sandstone and minor siltstone, carbonaceous mudstone, and coal. The predominant gold-bearing host rocks are the Chimu quartzose sediments. The mineralization is disseminated in a sub-horizontal body controlled by sedimentary lithology and structures. Sulphide mineralization is dominated by pyrite and enargite, which has been partially oxidized by supergene alteration.

The Lagunas Norte gold deposit was discovered in 2002 and was mined from 2005 until 2019 as a heap leach operation, producing over 10 Moz of gold from near surface oxide mineralization (Barrick Annual Reports). In June 2021, the mine was purchased by Boroo Pte. Ltd., which intends to continue residual leaching, and resume mine production from both carbonaceous oxides and high sulphide gold mineralization subject to new process plant development and construction.

## 7.2 LOCAL GEOLOGY

Tres Cruces geology was first mapped by Heyl and Livingstone (1998) and the regional stratigraphy and structural setting was investigated by Lyons (1999). Heyl and Livingstone's report discussed Project geology and mineralization with an emphasis on alteration and genetic models. Subsequent mapping and drilling by Battle Mountain Canada Ltd. (BMC) in 1998-1999 and by Barrick's MBM geologists, from 2003 to 2020, have added significantly to the geology and mineralization concepts. Four rock samples were K-Ar dated establishing an age of Tres Cruces mineralization of between 22 and 25 Ma.

The Project was mapped by BMC at scales of 1:1,000, 2,500, and 5,000, varying for different areas. Detailed maps at 1:1,000 were prepared for the North, South, and Southwest zones, whereas maps plotted at scales of 2,500, 5,000, and 10,000 cover all the mineralized zones and most exploration targets. General Project geology, prepared by BMC, is shown in Figure 7-2 and a description of map units, summarized from BMC reports, follows below.

## 7.3 PROJECT GEOLOGY

The Tres Cruces area is underlain by Calipuy Group calc-alkaline volcanic rocks, predominantly andesitic, with minor dacitic and locally rhyolitic units. At depth, unconformably underlying these volcanics, is a Mesozoic sedimentary sequence which includes the Cretaceous Chimu formation, comprised of quartz sandstone, interbedded siltstone, shale, and minor coal. These Mesozoic rocks have been folded and faulted by early Paleogene compressional and late Paleogene to Neogene extensional tectonic events. Regional mapping by Lyons (1999) suggests that the erosional surface of the Chimu unit is highly irregular, similar to today's surface relief. A composite unit of andesitic volcaniclastic rocks, including lahars, breccias, tuffs, and flows (Figure 7-2, Tcac), of the Calipuy Group was deposited on this surface and is the oldest volcanic unit at Tres Cruces. A sample from an andesite dike just north of the Property, believed by Lyons to be of equivalent age to the andesitic volcaniclastics, was dated at 31.1 Ma.

Underlying and intruding the andesitic clastic rocks are at least three andesite porphyry plugs (Tcap). They lie in the northeast corner of the Property, as well as below the mineralized zones in the core of the Property and in the southeast quadrant. Two small intrusions are relatively well exposed; however, their overall dimensions at depth are not well understood. The porphyry body below the central mineralized zones is not exposed. Where drill tested, porphyry contacts are steeply dipping (>70°), and usually dip outwards from the intrusive center. A sample of andesite porphyry intrusive from drill hole DTC-077 at a depth of 302 m, beneath the South Zone, was dated by Lyons (1999) using K-Ar radiometric dating at 25.1 Ma.

Following a period of significant erosion that leveled the surfaces of both the porphyry bodies and the volcaniclastic units, a later phase of Calipuy Group volcanism emplaced dacite porphyry (Tcdp) dikes and small domes, with associated ejecta, rhyolitic (Tcr) flows and volcaniclastic rocks. These felsic intrusive units appear to have been emplaced adjacent to the pre-existing contact zone (APV Zone) between andesite porphyry and andesitic volcaniclastic rocks.

A 50-m-wide by 80-m-long breccia pipe (Tchb) is present in the northeast part of the Property adjacent to a dacite porphyry body. Chimu quartz sandstone fragments locally constitute over 50% of some of the hydrothermal breccias, with rounded clasts up to 0.5 m in diameter. Drilling in the nearby Cuevas area intercepted beds of well-sorted sandstone and conglomerate with a significant quartz sandstone component. These beds lie on top of the andesites and were probably formed by sedimentary reworking of the diatreme ejecta (Battle Mountain Canada Ltd., Tres Cruces Staff, 1999b).

Hydrothermal fluids with associated mineralization followed the emplacement of the felsic volcanics, and hydrothermal centers with extensive breccia development were preferentially located in permeable channel-ways along the APV contacts. Heyl and Livingstone (1998) noted that rhyolites are often silicified by opaline and chalcedonic quartz and in the south part of the deposit this forms a silica cap over the mineralization.

During the waning stages of mineralization, a closed topographic depression formed near the center of the Property. Lacustrine andesitic to rhyolitic sediments, intercalated limestone, shale, chert and a second unit of lacustrine andesitic sediments, collectively shown as Tcls on Figure 7-2, were deposited into this basin. The fresh-water limestone probably was derived from warm-spring bicarbonate solutions venting into the shallow lake. These units are not mineralized.

Basaltic andesite flows dated at 22.2 Ma and an andesite plug at Cerro Negro (17.5 Ma) overlie and intrude the above-described units. Gold mineralization is therefore bracketed between 25.1 Ma (the andesite porphyry) and 22.2 Ma (the first post-mineral flow).

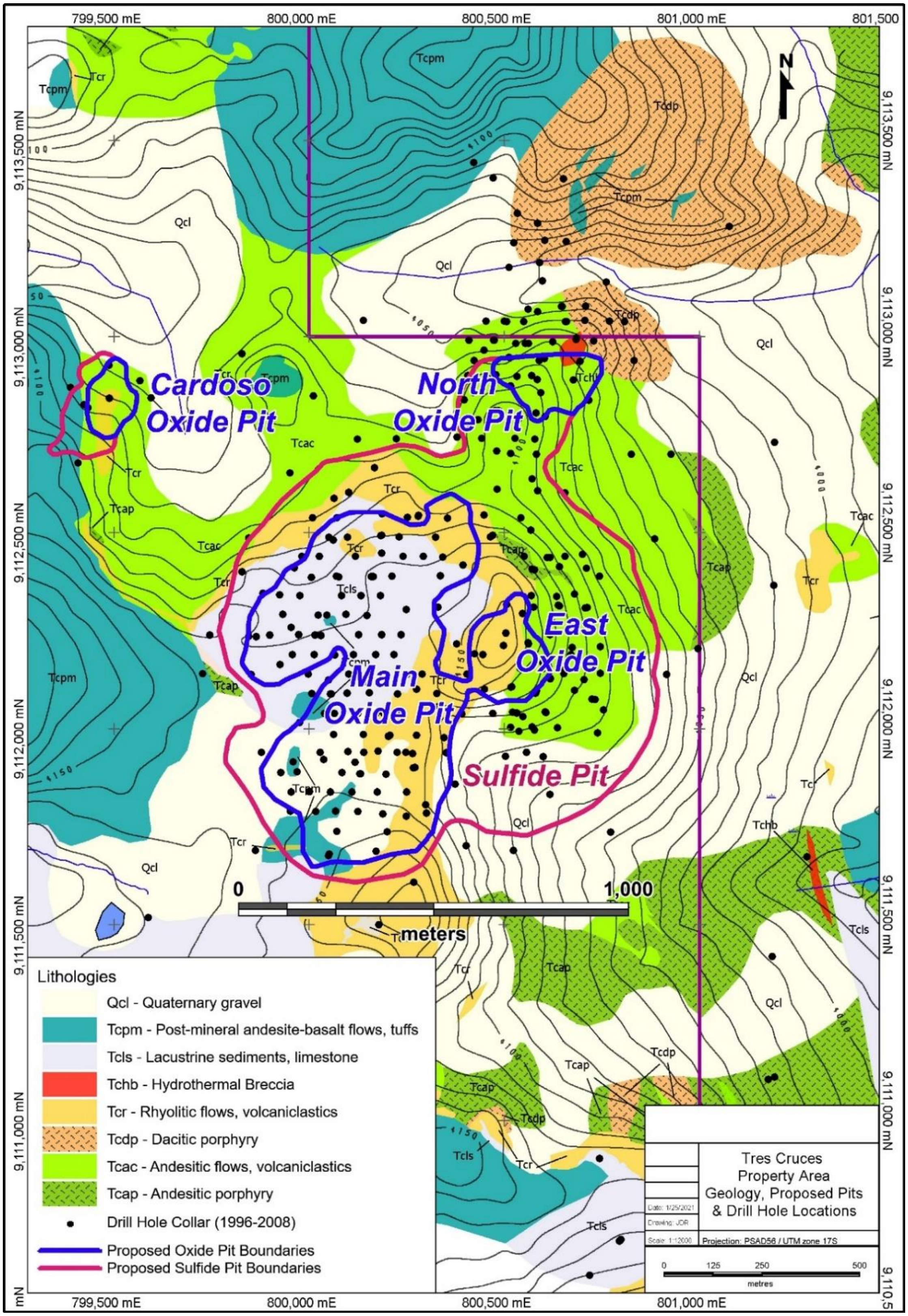



**Figure 7-2: Property Area Geology, Drill Hole Locations & Proposed Pits**

### 7.4 LITHOLOGIC UNITS

Drilling at Tres Cruces has intersected various lithologies of the Calipuy Group including the overlying post-mineral part of the group. The various units encountered in the drill holes have been described in more detail by Macedo et al. (2012) and are summarized below, approximately from oldest to youngest.

- *Andesite Porphyry (Tcap)*

  The andesitic porphyry is an intrusive rock that forms the base of the volcanic pile, as well as comprising later pulses that have intruded the pile. It has abundant phenocrysts of weakly altered plagioclase and minor amounts of altered hornblende phenocrysts. The intrusive rocks contain sparse disseminated pyrite crystals and traces of fine dark pyrite. Occasionally located along contacts with andesitic flows, polymictic breccias and faults contain moderately abundant disseminations and veinlets of fine dark pyrite. Also, in some cases, veinlets consist of banded calcite and silica with fine dark pyrite. Locally, near contacts with overlying rocks, the porphyry contains illite, chlorite and weak muscovite alteration in its matrix and in the phenocrysts. Age dating conducted on andesite porphyry by Lyons (1999) returned a date of 25.1 Ma.

- *Andesitic Flows (Tcac)*

  Andesitic volcanic lavas have porphyritic textures, containing phenocrysts of plagioclase and argillized feldspars. This is the main rock unit encountered in drilling and hosts most of the sulphide mineralization. This unit largely overlies the buried andesitic porphyry intrusive described above. This unit also includes autoclastic andesitic breccias intercalated with the flows, containing sub-rounded fragments of similar andesite with porphyritic textures.

- *Volcanic Breccia (Tcac)*

  These are a group of breccias with monomictic and polymictic fragments with diverse matrix, which includes tuff, granular quartz, and rock flour according to the mode of deposition. They contain sparse to moderate disseminated crystalline pyrite and minor fine dark pyrite. These breccias were likely formed by explosive volcanism and commonly overlie the autoclastic breccias and underlie the undifferentiated pyroclastic rocks.

- *Dacite Porphyry (Tcdp)*

  In the northeast part of the Project, dacitic rocks have porphyritic textures with feldspar phenocrysts and quartz eyes of different shapes, with minor disseminated pyrite. These rocks intrude porphyritic andesite and all pre-mineral rocks. The age of these intrusions is not known, but they may be a later phase of the andesite porphyry intrusions.

- *Undifferentiated Pyroclastics (Tcr)*

  This is a group of primarily felsic, subaerial pyroclastic rocks deposited in a volcanic explosive event composed of rhyolite, dacite, andesite and breccias of the same compositions. These rocks are distributed from south to north in the central part of the Project and form resistant outcrops due to the intense silicification, and they often contain opaline silica with vitroclastic textures and areas with broken quartz crystals. In several areas this unit overlies the andesitic flows and tuff breccias.

- *Dacitic Flows and Intrusions (Tcdp)*

  Local dacitic volcanic lavas with fluid textures contain sub-rounded quartz crystals in a grey to light grey matrix. They form lenticular bodies near the surface in the north part of the Project and small stock like bodies and dykes.

- *Polymictic Hydrothermal Breccia (with fragments of sandstone) (Tchb)*

  These hydrothermal breccias that cut some of the mineralized Calipuy volcanics contain sandstone fragments derived from underlying sedimentary rocks. They are found at the borders of dacite porphyry in the north part of the Project. They are also seen in the southern area and to the southeast of the Project. The breccias contain fragments of sub-angular sandstone up to 15 cm in diameter, which appear to have been carried upward by hydrothermal fluids from the underlying Cretaceous Chimu formation. These breccia "pipes" may have channeled mineralizing fluids and they have been replaced in lower levels by grey silica with fine dark grey sulphide minerals that commonly include gold mineralization.

- *Tuff Breccia (Tuff_Bx)*

  These are subaerial pyroclastic breccias composed of tuffs with subangular clasts of andesite layered and intercalated with andesitic flows and dacitic pyroclastics. These rocks represent the final explosive portion of the tuffaceous sequence that is found locally underlying the volcanic sediments. In some outcrops there is weak argillization.

- *Volcanic Sediments (Tcls)*

  These are sub-horizontal sedimentary rocks of volcanic origin deposited in a sedimentary basin, as part of a geothermal event with associated siliceous travertine. These rocks have also been called lacustrine sediments on some geology maps. The unit includes intercalated siltstone, limestone, and dark brown amorphous chert, collectively attaining a maximum thickness of about 30 m. At the base, sporadic volcanic tuff is intercalated with the volcanic sediments. It extends from southwest of the Project and reaches the center-east area of the Property, where it blankets a large part of the Main Oxide mineralized area. It does not contain mineralization.

- *Andesitic Domes (Tcpm)*

  These are fresh rocks in the north part of the Project forming stratified tabular bodies of andesitic composition with porphyritic textures comprised of phenocrysts of biotite, hornblende, and feldspar. They locally overlie the Volcanic Sediments (Tcls) unconformably. This unit is post-mineral and dated by Lyons (1999) at 22.2 Ma. Cerro Negro, a younger andesitic plug located nearby, was dated at 17.5 Ma.

## 7.5 ALTERATION

The Tres Cruces gold deposits display a predictable vertical and lateral zonation in the alteration pattern that varies by host rock lithology. Alteration assemblages have been determined by both visual inspection and by a Portable Infrared Mineral Analyzer (PIMA). Surface PIMA analyses were undertaken by Oroperu in 1997 and 1998. Systematic downhole PIMA was carried out by BMC and Oroperu in 1998 and 1999. Clemson (Battle Mountain Canada Ltd., Tres Cruces Staff, 1999b) examined thin sections of selected mineralized core samples from various parts of the Project focusing on host rock lithology, alteration and sulphide mineralogy.

Tres Cruces is primarily an argillically-altered system, with clay minerals exceeding non-clay minerals in relative abundance in most mineralized zones. Host rocks can be divided into two main groups, andesite and rhyolite, and alteration in the mineralized zones is consistent across the Project with respect to the host lithology. Andesitic flow rocks, volcaniclastics, hydrothermal breccia and, to a lesser degree, andesitic porphyry comprise the main gold bearing host rocks. Alteration is predictably zoned, with illite and quartz at the core, grading laterally to illite-smectite and finally to propylitic alteration. Most of the deep holes display illite alteration locally, with quartz and sericite increasing toward the bottom. Rhyolite is the second primary host rock and is characterized by hypogene silicification. Kaolinite and alunite are present as supergene alteration minerals, occurring in the oxide zone, particularly in rhyolite, and often extend downward into the sulphide zones. Supergene oxidation is only extensively developed in the rhyolite, primarily due to greater permeability found along open fractures. Oxidation in andesitic rocks and hydrothermal breccia is generally limited to within a few metres of the surface because of the high clay content and low permeability. Sulphide mineralization in the rhyolite is almost entirely oxidized to depths of 100 m or more.

## 7.6 GOLD ZONES

Drilling by Oroperu and BMC indicated five zones of gold-bearing mineralization on the Tres Cruces Property, which included sulphide mineralization, as well as considerable overlying oxide mineralization locally.

Detailed drilling by BMC further delineated the South Zone, the largest of the five deposits. This area encompasses what is currently envisaged as the East Oxide Pit area and the east part of the proposed Main Oxide Pit area (Figure 7-3). At the surface, this zone is characterized by strong trace element geochemistry and erratic but generally low gold values. Rhyolite crops out above and to the west of the South Zone. Andesitic volcaniclastics and hydrothermal breccia have been exposed by road cuts and natural outcrops to the east of and underlying the rhyolite. Surface alteration overlying the South Zone is dominated by quartz and minor alunite, with kaolinite prevailing to the east and west. At depth, gold-bearing sulphide mineralization occurs in a 60- to 100-m-wide envelope adjacent to the andesite porphyry-volcanic contact (APV). Silicified rhyolite overlies the western half of the deposit, and mineralization occurs laterally along the basal part of the rhyolite unit, primarily as oxides, that range in thickness from a few metres to commonly up to 30 m, and locally to as much as 60 m (approximate true thickness) (Figure 7-4).

In a portion of the APV contact, which strikes nearly due north and dips approximately 80° east, gold grades of more than 2.0 g/t extend for 250 m along strike and are bracketed vertically between 60 m and 300 m below the surface. Hydrothermal breccia is present at the intrusive contact, with numerous splays into the hangingwall volcaniclastic rocks. Gold mineralization occurs with sooty microcrystalline pyrite in replacements, disseminations, and veinlets. Coarse grained pyrite stockwork veinlets, fracture-fills and disseminations are present throughout but are more abundant in the andesite porphyry. Hydrothermal alteration is predominantly illite. Silicification is generally weak but increases to moderate levels in the hydrothermal breccia. The breccias are usually matrix supported and contain lithic clasts of quartzite, siltstone, and locally coal from the underlying Chimu Formation. Rare rhyolite clasts provide strong evidence that some breccias post-date the overlying rhyolite. Several types of hydrothermal breccia are present, with clast to matrix support, silicified to argillic matrix, and rounded to angular clasts. Silicification occurs in several stages, including early veinlets, silicification of the matrix, and late stage drusy crystals. Gold mineralization is directly related to sooty fine-grained sulphides in both veinlets and massive replacement forms.

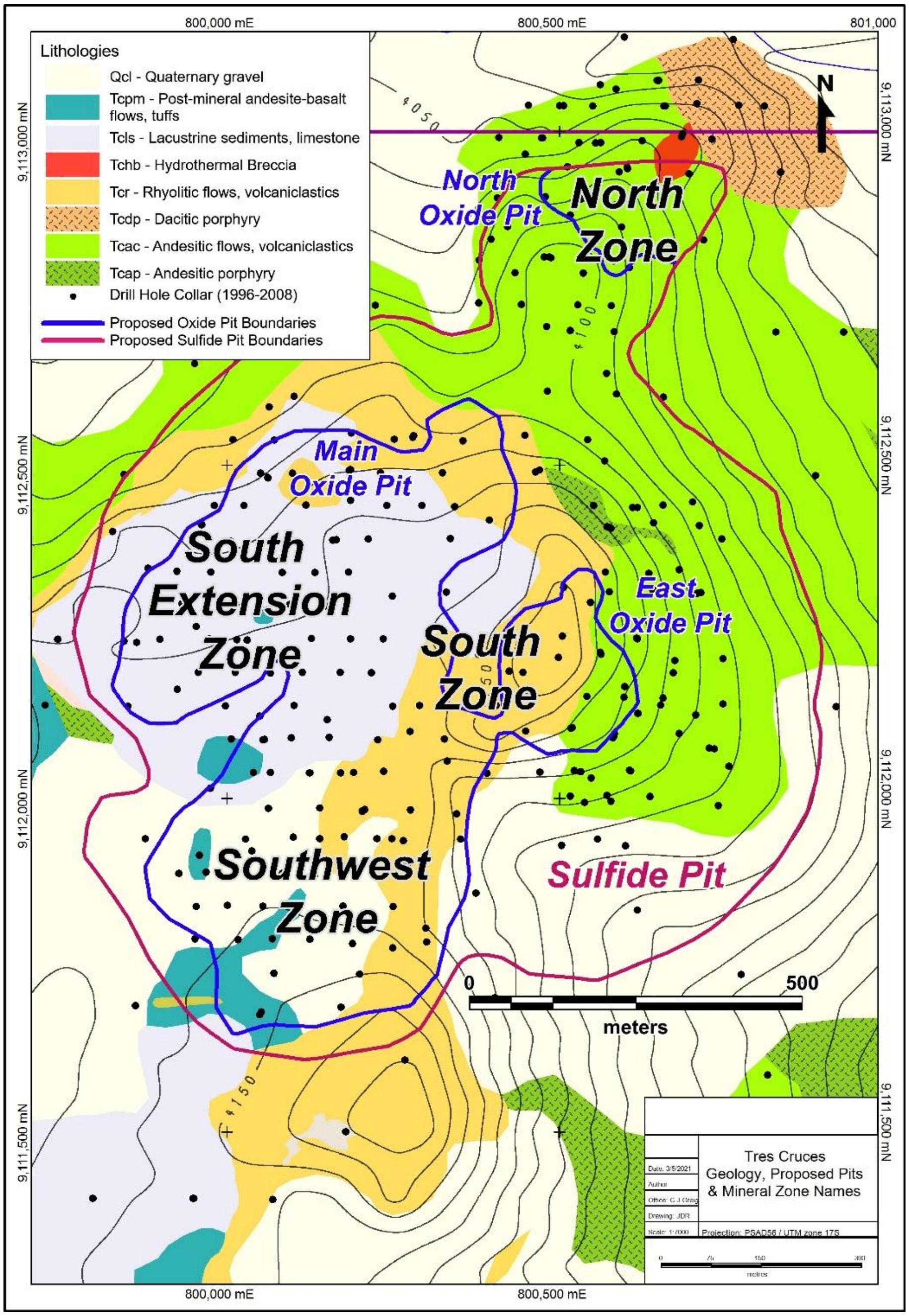



**Figure 7-3: Geology, Drill Hole Locations & Proposed Pits with Mineral Zone Names**

The Southwest Zone is a tabular zone of oxide and sulphide mineralization at the rhyolite-andesite contact that is within the south part of the currently proposed Main Oxide Pit area (Figure 7-3). Quaternary gravel, post-mineral limestone and lacustrine sediments overlie the western part of the deposit. At surface, the rhyolite is silicified and contains weakly anomalous values of the trace elements Hg and As and minor alunite but is not preferentially altered compared to other rhyolites at Tres Cruces. The limestone and lacustrine sediments are unaltered. Drilling of this flat-lying zone appears to show good lateral continuity, with an oxide layer measuring more than 250 m in diameter with thicknesses of up to 30 m, or more. The rhyolite-hosted gold-bearing sulphide mineralization has been entirely oxidized and the underlying andesite-hosted mineralization remains primarily sulphidic, as illustrated schematically on Figure 7-4. Oxide mineralization is characterized by iron oxides after pyrite and is moderately to intensely fractured. The rhyolite is strongly silicified everywhere, but degree of silicification does not correlate with gold grade. Immediately below the red-ox boundary at the rhyolite-andesite contact there is often a layer of semi-massive sooty to brassy pyritic sulphide up to a few metres thick. No detailed studies of these sulphides have been completed, but it is likely that some of the sulphide is marcasite of supergene origin. Sulphide-hosted gold mineralization in the andesite is usually related to fine grained pyrite and, in this zone, it is usually less than 10 m thick. BMC geologists postulated that the Southwest Zone was probably formed by ponding of hydrothermal solutions beneath the impermeable silicified rhyolite. Repetitive breaching of the silicified rock by hydrofracturing and phreatic explosions resulted in pressure loss and gold deposition just above the rhyolite-andesite contact.

The South Extension Zone lies to the west of, and is nearly a mirror image of, the South Zone and lies on the western APV contact. This correlates to the west side of the proposed Main Oxide Pit area (Figure 7-3). This Zone also contains oxidized mineralization at the base of the rhyolite along the contact with the underlying andesitic rocks and is continuous to that in the South and Southwest Zones, which collectively comprise the Main Oxide Pit area. Rhyolite with moderately anomalous trace elements is exposed at the north end of the zone, but this is the only evidence of the underlying gold mineralization. The zone has been tested by drill fences spaced 50 m apart with holes spaced at approximately 50 m along each fence. The APV contact strikes northerly and dips west at its southern end and swings to an easterly strike and north dip at its northern end. The bulk of the gold mineralization occurs where the contact strikes northeast and dips northwest. Rhyolite and post mineral sedimentary rocks up to 80 m thick overlie the deposit. The South Extension Zone is a composite of South Zone and Southwest Zone styles of mineralization, with gold along both the steep APV contact and at the flat lying rhyolite-andesite contact. Rhyolite-hosted gold mineralization is primarily oxidized. The main difference from the South Zone is that gold mineralization in the South Extension Zone does not appear to have the same continuity down dip or along strike. Additionally, gold mineralization is not as closely confined to the APV contact. Other structural controls may exist here that have not yet been identified and, as well, there may have been insufficient properly oriented drilling to intersect the favorable APV contact along the central buried andesite porphyry intrusion in this area.

The North Zone mineralization is hosted by andesitic volcaniclastics and hydrothermal breccia and includes the North Oxide area. The zone is more strongly silicified than the other andesite-hosted deposits and is cut by numerous quartz-filled fractures. Surface alteration is dominated by silicification with peripheral kaolinite. Gold mineralization is quite strong at the surface, and many of the quartz veinlets were prospected in shallow pits for gold during Spanish times and later. Much of the North Zone has been drilled on 50 m centers to establish gold continuity along silicified structures. Gold grades greater than 1.0 g/t are restricted to within 100 to 120 m of the surface. Below this level, in addition to quartz, the veins contain calcite, and gold grades are generally low. Gold mineralization in the zone is centered on a hydrothermal breccia that measures approximately 80 m in diameter. The breccia developed along a N70°E structural zone where it intersects the contact between dacite porphyry and volcaniclastic rocks. The dacite occurs as a dike and a dome and appears to have intruded along a pre-existing APV contact, similar to the scenario envisaged for the rhyolite to the south.

The Cardoso Zone, located 500 m northwest of the South Extension Zone (outside of the proposed Main Pit area), is hosted in andesitic volcaniclastics and rhyolite (Figure 7-2). There is a small zone containing oxide and sulphide resources in this area, although it is poorly defined due to a lack of drill testing. The zone is primarily controlled by N70°E/70SE structures below a north-trending ridge of rhyolite. Individual structures locally contain greater than 10 g/t gold at the surface and were exploited historically by open cuts and shallow underground workings. Andesitic volcaniclastic-hosted gold is associated with abundant sooty sulphide minerals and rhyolite-hosted mineralization is strongly silicified and commonly oxidized.

## 7.7 PARAGENESIS

The paragenetic sequence of geologic units and mineralization at Tres Cruces shown schematically on Figure 7-4 is as follows:

- Deposition of the Calipuy Group andesitic volcaniclastic piles, underlain and intruded by the andesite porphyry (APV), with possible widespread propylitic alteration.
- Erosion of the dome and volcaniclastics to a sub-horizontal surface.
- Emplacement of rhyolite-dacite domes, typically along the APV contacts, with associated ejecta (felsic pyroclastics) surrounding domes.
- Hydrothermal brecciation and upwelling of solutions carrying gold mineralization preferentially along the APV contact and ponding at the base of the rhyolite unit. The magmatic source of the dacite-rhyolite is inferred to be the heat engine driving the hydrothermal systems.
- Deposition of post-mineral lacustrine volcanic-debris sediments and limestone.
- Post mineral andesite flows and tuff.
- Oxidation of sulphides in siliceous units with associated supergene alteration and enrichment.

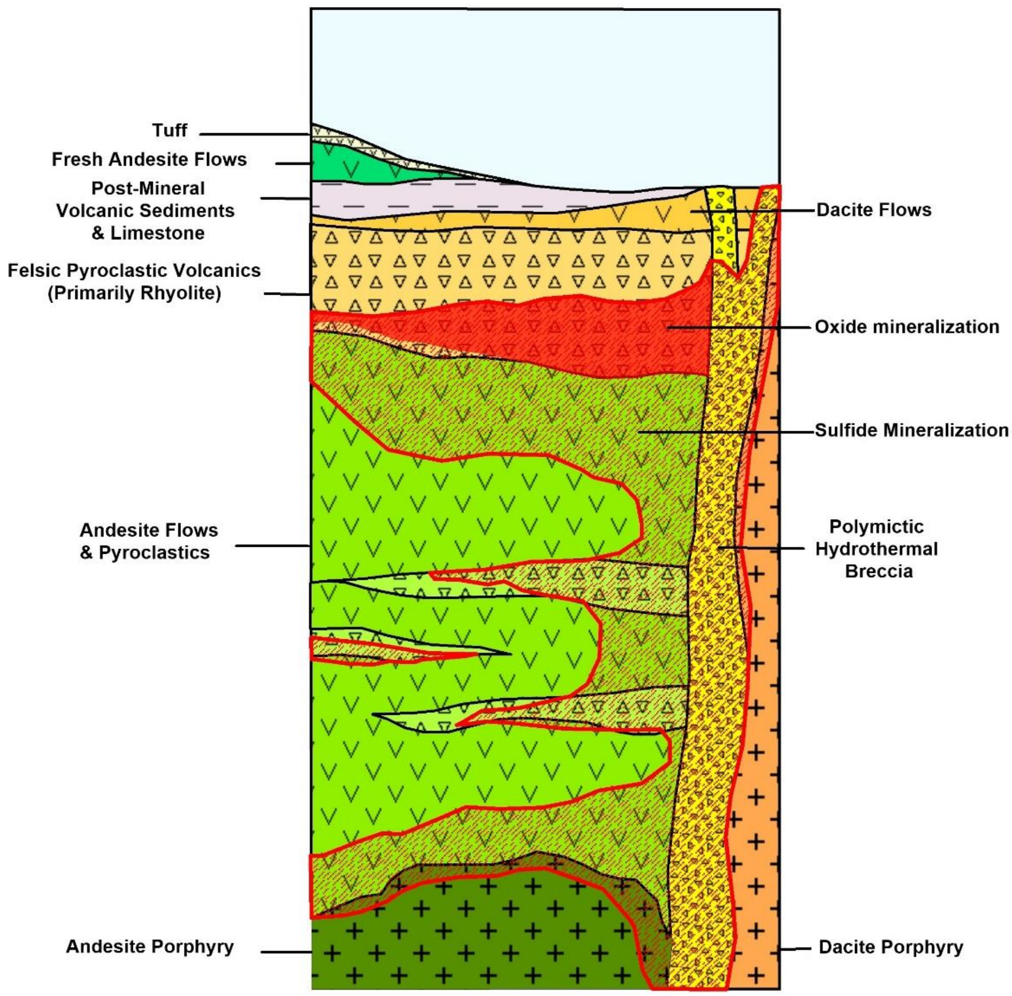



**Figure 7-4: Tres Cruces Schematic Stratigraphic Column**

## 7.8 MINERALIZATION

Gold mineralization at Tres Cruces is mainly associated with pyrite, with occasional traces of other sulphide minerals. The auriferous pyrite is very fine grained, gray to blackish gray (commonly called "fine black pyrite") and is present as disseminations and in very thin veinlets that locally form areas of stockworks (Macedo et al., 2012). Black pyrite also occurs as rims on earlier pyrite forming a colloform-banded texture. Clemson (Battle Mountain Canada Ltd., Tres Cruces Staff, 1999b) noted colloform-banding for this stage of pyrite, often with repetitive oscillatory bands of sooty and crystalline pyrite. The late-stage black pyrite is directly associated with the main-stage gold event. Early formed, non-gold-bearing pyrite is coarsely crystalline, anhedral to euhedral, poikilitic, and is evenly disseminated through the andesitic rocks. A second stage, also coarsely crystalline, is subhedral to euhedral and occurs primarily in veinlets and fractures. In addition, minor amounts of marcasite, arsenopyrite, galena, stibnite, realgar, orpiment, and enargite have been identified in some mineralized core. Some carbonate minerals and rhodochrosite are also found in areas of pyrite veining. Age of mineralization is bracketed between measured age dates of 25.1 Ma from andesite porphyry host rocks and 22.2 Ma from a post-mineral flow; however, there may have been multiple pulses of mineralizing fluids during this period.

Advanced Mineral Technology Laboratory Ltd. (AMTEL), in a document by Battle Mountain Canada Ltd. Tres Cruces Staff (1999a) also completed a study on gold deportment on several core samples. The main forms of gold were found as free native grains, grains in pyrite, and in gangue. AMTEL reports the microcrystalline pyrite contains very high concentrations of gold and arsenic (up to 141 g/t and 10%, respectively). There is a strong positive correlation of the gold in pyrite with its arsenic content. AMTEL also commented that the high surface area of the fine-grained pyrite would make it more susceptible to oxidation.

Gold deposition appears to have been controlled by both structural and stratigraphic features. Subvertical controls of the mineralization are located along the intrusive contacts of andesite porphyry and dacite porphyry bodies. Steeply-dipping, commonly northeast-trending faults that cut the intrusive bodies may have provided deep-seated conduits for mineralizing hydrothermal solutions driven by heat from underlying magma. The rising high-pressure fluids caused the formation of breccia “pipes” containing fragments of sandstone that were carried up from older underlying rocks. Hydrothermal fluids carrying mineralization rose through the breccia and emanated laterally into adjacent flows, flow breccias and pyroclastic rocks. Rhyolitic pyroclastics in the upper part of the pile may have been less permeable than the underlying andesitic rocks, thereby causing the mineral-rich hydrothermal fluids to pool under the rhyolite and spread laterally for considerable distances. Decreasing temperature and/or pressure of the hydrothermal fluids initiated the deposition of gold and sulphide minerals within stockwork veins in the fractured host rocks. Mineralization has been found to extend only short distances into andesitic and dacitic intrusive rocks, which may be due to lower permeability or less favorable chemical characteristics.

The Tres Cruces deposit contains both oxide and sulphide mineralization. Gold-bearing sulphide mineralization is mainly hosted in the older andesitic pyroclastic rocks and to a limited extent in andesite porphyry. The rhyolites also host mineralization but only near or along the andesite – rhyolite contact. Most of the rhyolite hosted mineralization along this contact has been oxidized, possibly due to strong fracturing of the siliceous rhyolite, which allowed deep circulation of surface waters. The underlying andesitic rocks have developed only weak oxidization of the sulphide minerals, believed to be due to the abundance of clay minerals resulting in poor permeability (Battle Mountain Canada Ltd., Tres Cruces Staff, 1999b).

# 8 DEPOSIT TYPES

The Tres Cruces property hosts gold deposits that have characteristics of a low- to intermediate-sulphidation type epithermal system. Epithermal gold-silver deposits are shallowly formed vein, stockwork, disseminated, and replacement deposits that are mined primarily for their gold and silver contents; some deposits also contain substantial resources of lead, zinc, copper, and/or mercury. Epithermal gold-silver deposits range in size from 10,000 to >1 billion tonnes and have gold contents of 0.1 to >30.0 g/t, and silver contents of <1 to several thousand g/t. Although epithermal deposits are commonly known for their high gold grades, many bulk tonnage deposits with as little as 1 g/t gold or less are presently being exploited by open-pit mining.

Lindgren (1933) theorized that certain Au-Ag deposits formed by the discharge of hydrothermal fluids from magmatic sources at low temperatures (<200°C). It has more recently been recognized that epithermal deposits form at temperatures as high as about 300°C and at depths from about 50 m to as much as 1,500 m below the water table, and that these deposits commonly represent the shallow parts of larger hydrothermal systems (Henley and Ellis, 1983).

Epithermal gold-silver deposits form in a variety of regional tectonic settings, but most commonly occur as veins or breccias developed in local extensional or dilational fault and fracture zones. Disseminated and replacement mineralization also commonly forms in permeable lithologies where such horizons have been intersected by faults or fractures that acted as conduits for mineralizing fluids. Most epithermal districts world-wide have been found in Cenozoic volcanic rocks associated, on a continental scale, with subduction zones at plate boundaries. Epithermal deposits are shallow, extending to maximum depths about 1,500 m and are therefore susceptible to erosion in tectonically unstable regions. Sillitoe (1987) noted that, although older epithermal deposits have been discovered, they are less common probably because many have been destroyed by erosion or overprinted by metamorphism.

Most deposits are genetically related to hydrothermal systems that are associated with subaerial volcanic rocks and intrusions ranging from basalt to rhyolite, with the bulk of epithermal deposits hosted by lava domes and associated diatreme complexes. Most epithermal mineralization is related to hydrothermal systems that form from the release of magmatic fluids during crystallization of intrusions at depth (Figure 8-1).

Epithermal gold-silver deposits are frequently classified by a scheme that separates them into low-, intermediate-, and high-sulphidation subtypes based on their alteration assemblages and mineral associations. All three deposit subtypes form under similar circumstances; however, intermediate- and high-sulphidation deposits form at greater depths, with larger magmatic fluid contributions, tending to be richer in sulphide minerals and often with links to underlying porphyry deposits. Low-sulphidation deposits, though, may form at some distance from an associated magmatic source.

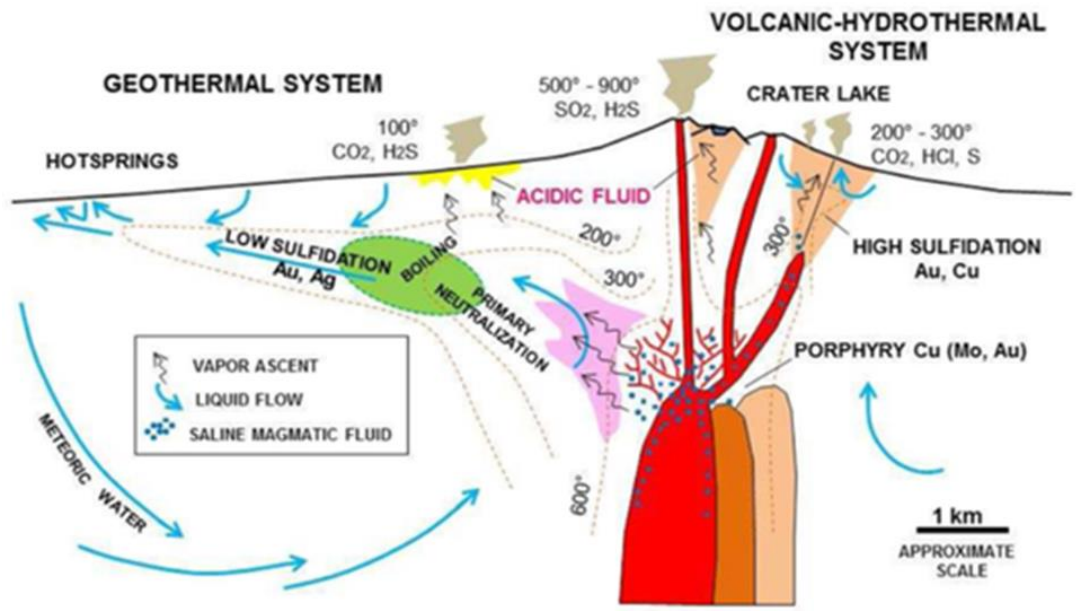



**Figure 8-1: Geologic Setting and Characteristics of High Sulphidation and Low Sulphidation Epithermal Deposits (after Hedenquist et al., 1998)**

Hydrothermal alteration associated with epithermal deposits varies considerably between deposit subtypes, as well as within individual deposits, due to differing sulphur fugacity related to paleowater mixing with magmatic fluids. High-sulphidation deposits formed from very low pH magmatic fluids that had little interaction with meteoric water and are characterized by a core zone of residual, commonly vuggy quartz, flanked by quartz-alunite and advanced argillic alteration containing kaolinite, dickite and/or pyrophyllite. In contrast, low- and intermediate-sulphidation deposits are cored by potassic alteration with quartz, adularia and/or carbonate minerals and/or illite, indicative of formation from near-neutral pH fluids. More distal argillic and propylitic alteration may surround all deposit subtypes. Silica sinter deposits may overlie and locally host some low-sulphidation deposits but are absent in high-sulphidation deposits.

Distinct ore and gangue mineral assemblages characterize each of the deposit subtypes. Low- and intermediate- types commonly have a higher Ag:Au ratio than high-sulphidation types. Ore minerals in low-sulphidation deposits include electrum, silver sulphides, selenides, and sulfosalts, and/or gold and silver tellurides (Figure 8-2). Intermediate-sulphidation deposits have similar mineralogy but may also include silver-bearing tetrahedrite-tennantite, chalcopyrite, galena, and sphalerite. Gangue minerals in these deposits include quartz, adularia, illite/sericite, and carbonate minerals. High-sulphidation deposits are characterized by gold and/or electrum, gold tellurides, acanthite, enargite, luzonite, and other copper sulphide and sulfosalt minerals, hosted by quartz gangue. Pyrite and/or marcasite are common in all deposit subtypes.

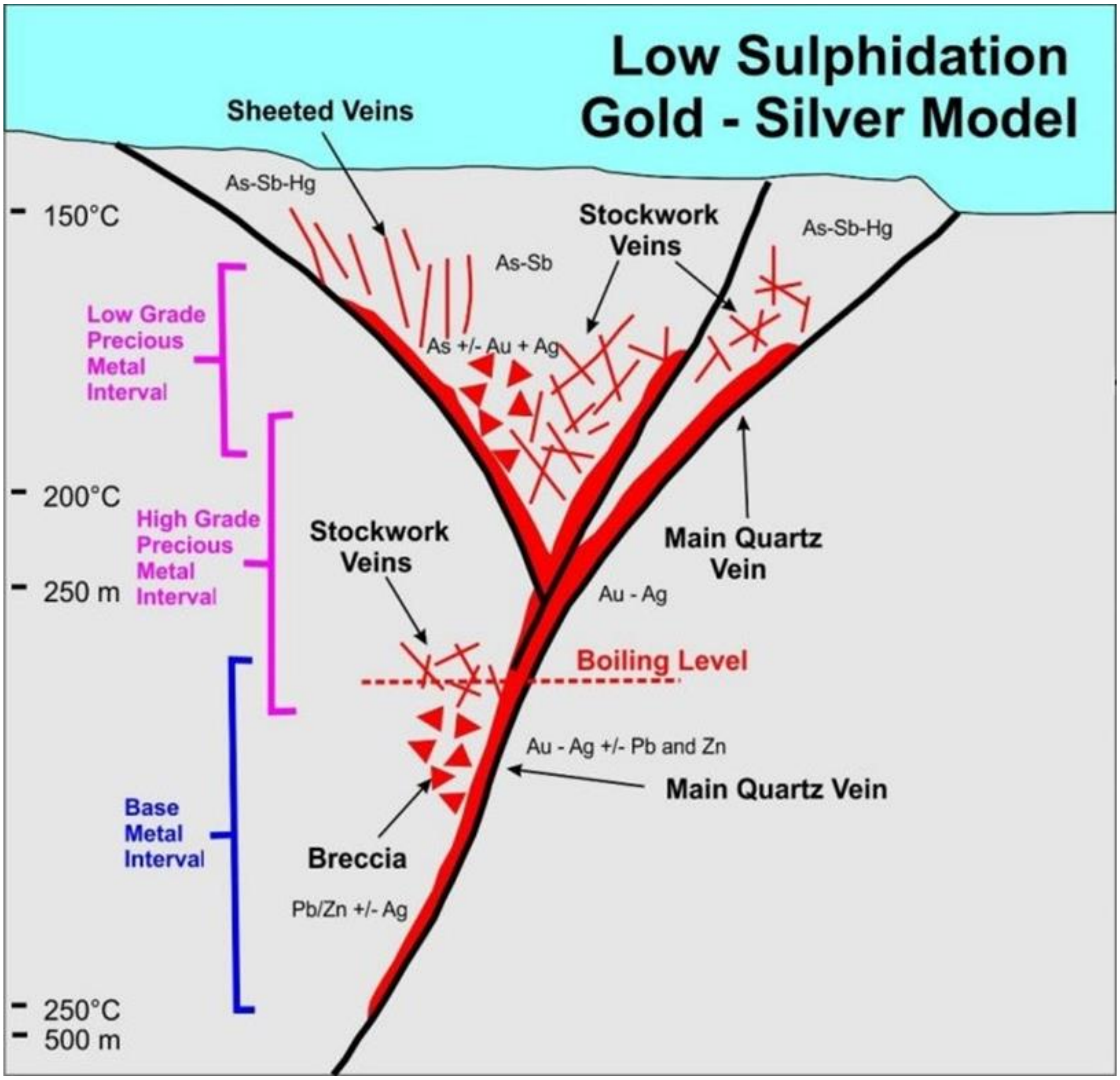



**Figure 8-2: Conceptual Low Sulphidation Epithermal Model (after Buchanan, 1981)**

Epithermal gold-silver deposits commonly contain elevated values of As, Sb, Hg, Se, Te, Tl, and/or W; some deposits also are enriched in Pb, Zn, Cu, and Mo. Concentrations of these elements may be zoned within individual deposits, sometimes providing useful pathfinders to help vector toward higher grade zones.

The Tres Cruces deposit, as well as fitting a low-sulphidation classification, is also considered to have intermediate-sulphidation characteristics, such as alteration consisting of vuggy silica and illite at depth in the system. Rocks resembling silica sinter have been observed in surface exposures that may post-date and overprint the underlying mineralization and alteration assemblages.

Banded and veined mineralization and adularia-type alteration common in intermediate-sulphidation types is not developed at Tres Cruces but may exist at greater depth in areas not well tested to date. The presence of high mercury content at relative depth in some drill holes also suggests that there may be further underlying gold potential, as mercury normally occurs in the upper portions of epithermal systems. As well, a favorable host rock with potential for structural control such as the Chimu Group sandstones that underlie the Calipuy volcanic assemblage on the Property provides a good target at depth.

# 9 EXPLORATION

The Property was originally acquired and explored by Anacortes' predecessor company, New Oroperu Resources Inc. (previously Oroperu Resources Inc.), with additional work completed under option agreements by Battle Mountain Canada Ltd. (BMC) and Barrick's MBM. Anacortes undertook diamond drilling and metallurgical testwork in 2022 and was subsequently acquired by Steppe in June 2023.

## 9.1 OROPERU (1996 – 1998)

The Property was acquired by Oroperu in 1996, and initial exploration consisted of geological mapping and rock geochemical sampling (Heyl et al, 1998). Oroperu collected 515 rock samples for geochemical analyses and at the same time evaluated the alteration mineral assemblages of the samples using a portable short-wave infrared spectrometer (PIMA). An area of strong illite and weak alunite alteration was identified and followed up by drilling four reverse circulation (RC) holes in December 1996. Additionally, Oroperu collected 188 soil geochemical samples from soil grids spaced at 100 m by 200 m and 200 m by 400 m.

In 1997 Oroperu drilled 46 RC and 11 diamond core holes and collected 229 rock geochemical samples. Drilling results are discussed in Section 10.0. Exploration to the end of 1997 had outlined a large mineralized system in three zones, named the North, South, and Southwest Zones, for which an estimated mineral resource of 30 Mt grading 2.0 g/t Au was established, containing 1.9 Moz of gold (Heyl et al, 1998; BMC, 1999). This resource estimate, which is considered historical, was defined by 13,580 m of RC and diamond core drilling in 61 holes.

An induced polarization (IP) survey was conducted by Oroperu over the northern and central parts of the Property in June of 1998, collecting 89 line-km of induced polarization and resistivity data. During the same program, 12 km of magnetometer and 8 km of electromagnetic (TDEM) test lines were also completed over the main mineralized area. Results were reported in a private Company report by Val D'Or Geofisica (Peru) S.A. in November 1998 and a summary map of chargeability and resistivity trends superimposed on colour contoured IP effect is shown on Figure 9-1.

The IP survey was first tested over known geological structures to check the polarization and resistivity response, then extended to the north and south. A chargeability response is typically expected where significant amounts of sulphide minerals occur. The quality of chargeability measurements was affected in some areas by the presence of strongly conductive Quaternary overburden resulting in poor depth penetration of electrical signal, and numerous erratic IP measurements. Some chargeability highs were found to be associated with andesitic rocks that commonly contain 2-5% disseminated pyrite, but no gold values. Epithermal mineralization is commonly associated with silicification, which usually produces high resistivity values. Some areas of flatter topography on the Property have swampy water-saturated ground which produced high resistivity contrasts and, secondly, some of the rock types, such as the rhyolite unit and capping sinter deposits, are highly siliceous, which also produced broad areas of high resistivity that are not necessarily associated with mineralization.

Val D'Or Geofisica (1998) selected several targets based primarily on the responses observed over the South Zone, namely, high resistivity as first priority, and chargeability lows (possible sulphide oxidation) as second priority. A few holes were proposed to test the potential of very high chargeability values coincident with high resistivity. Due to the IP-controlling factors described above (primarily, abundant siliceous rock types, pervasive disseminated pyrite, and conductive overburden), the IP results were found to be of little use in predicting locations of epithermal mineralization. The test magnetic and TDEM surveys also were of limited use due to magnetic and conductive post-mineral rocks and overburden that affected their results.

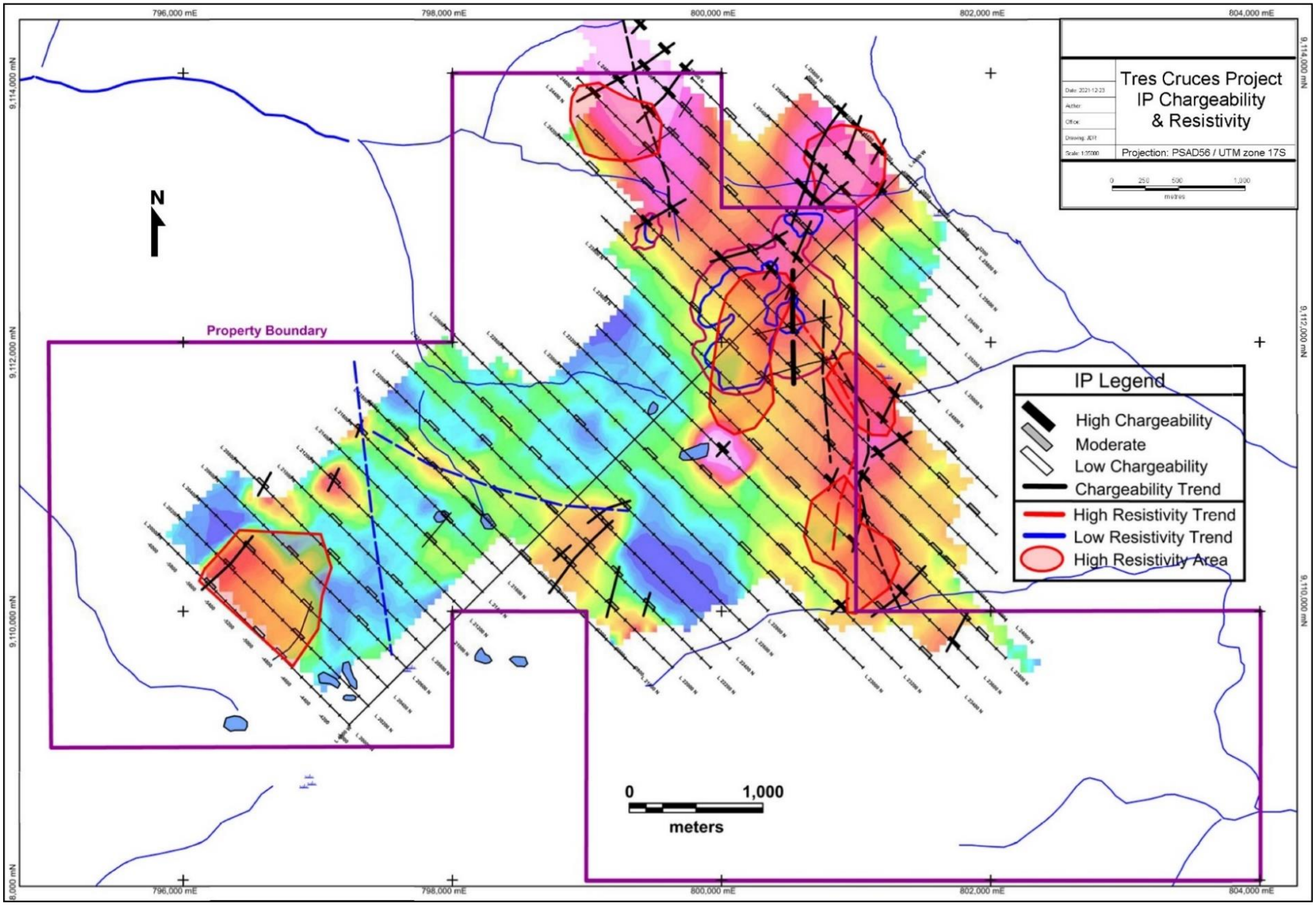



**Figure 9-1: Colour Contoured IP Effect with Chargeability and Resistivity Trends & Proposed Pits**

## 9.2 GOLD FIELDS LTD. (1998)

Gold Fields Ltd. conducted a limited evaluation of the Property in 1998, which included collection and analysis of 102 rock geochemical samples and 350 Mobile Metal Ions (MMI) soil geochemical samples. Information about the exploration results was unavailable for the authors to review; however, Gold Fields did no further work.

## 9.3 BATTLE MOUNTAIN CANADA (BMC) (1998 TO 1999)

BMC optioned the Tres Cruces Property from Oroperu in November 1998. Three drill programs were undertaken from November 1998 to September 1999 for a total of 21,017 m in 80 core holes and 28 RC holes. The initial drilling consisted of 11 twinned core holes that confirmed the Au mineralization in the North, South and Southwest Zones. BMC also collected 51 rock chip samples in 1998 and 158 rock chip samples in 1999 that helped identify certain areas for drill testing. The 1999 diamond core drilling more fully defined the limits of the gold mineralization in the South Zone, provided better control and understanding of the North Zone, and improved definition of the mineralization in the Southwest Zone. The results from this program also led to the discovery of the South Extension Zone. The RC drill holes tested targets away from the known mineralization, and although many of these exploration holes were unsuccessful in identifying new mineralization there were some significant intercepts in the Cardoso area and mineralization was extended to the north of the North Zone. Alteration and silica cap rocks were intersected south of the Southwest and South Extension Zones; however, no significant mineralization was encountered in those holes.

A soil sampling program, consisting of 1,383 C-horizon samples, was conducted in 1998 by BMC. The samples were collected on an established UTM grid using hand augers capable of reaching 2 m depths. BMC also collected 376, 3-m-long, rock channel samples from the North Zone, with sample locations determined by compass and chain measurements referenced from GPS-located UTM grid points. Information from this surface work was incorporated into BMC drill targeting.

Figure 9-2 shows anomalous gold values for the BMC soils plus the soil samples collected earlier by Oroperu. The anomalous gold values correspond to the surface showings in the North Zone and the Cardoso Zone, as well as an area just to the east of the Property boundary. Much of the area overlying the proposed open pit is not anomalous because the gold mineralization lies more than 50 m below surface and was discovered by grid drilling.

The Mercury (Hg) plot on Figure 9-3 shows a wider distribution than the anomalous gold. Mercury is typically deposited at higher elevations in an epithermal system than gold. Anomalous mercury values lie over part of the proposed pit, especially in areas of rhyolitic rock. Areas of anomalous mercury to the southeast of the pit suggests possible gold potential at depth. This area has received some drilling with limited success, such as 1.282 g/t Au over 7.5 m (0.0-7.5 m) in hole DTC-099. Note that large areas of the Property have not been tested by soil geochemistry.

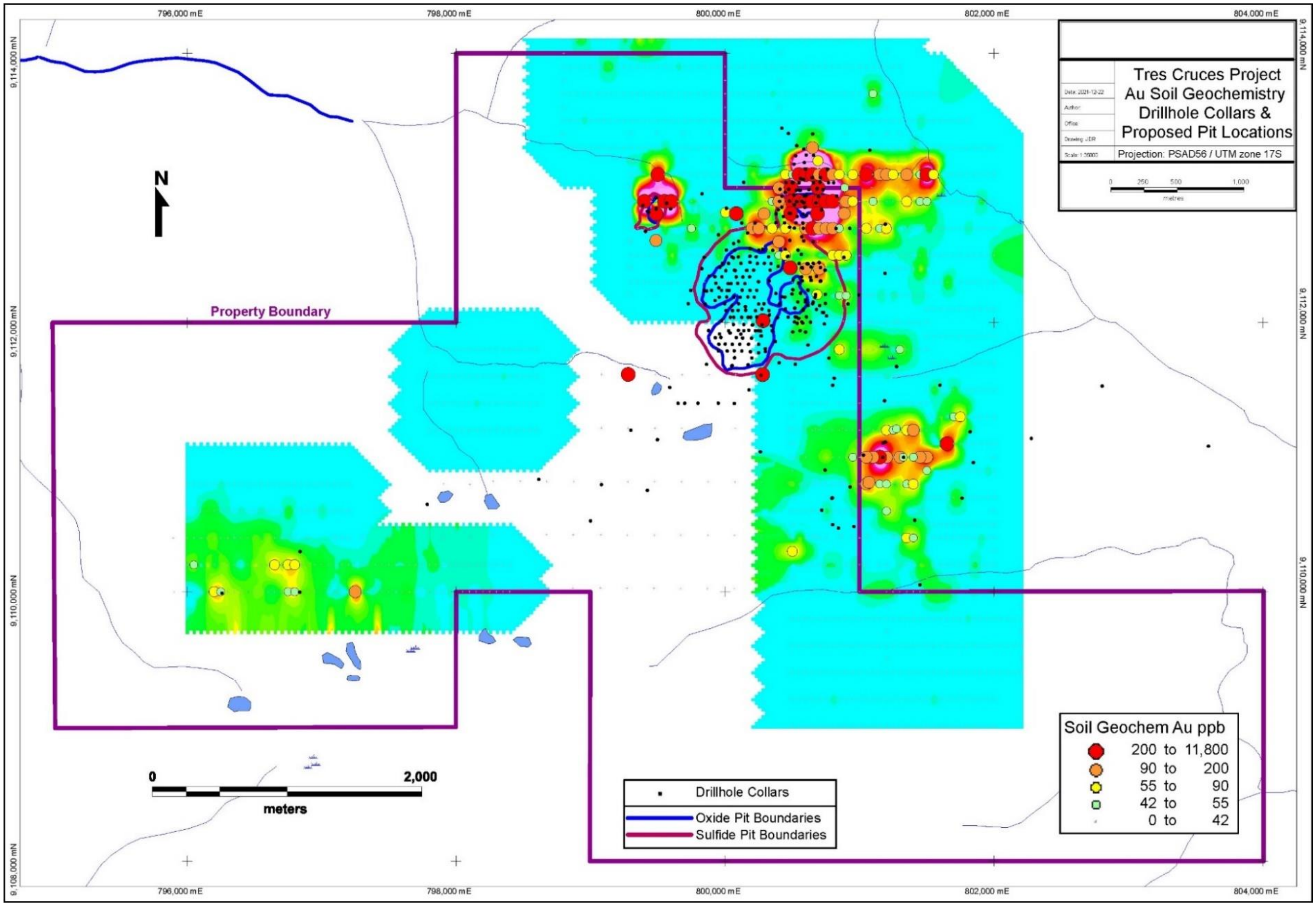



**Figure 9-2: Gold Soil Geochemistry & Proposed Pits**

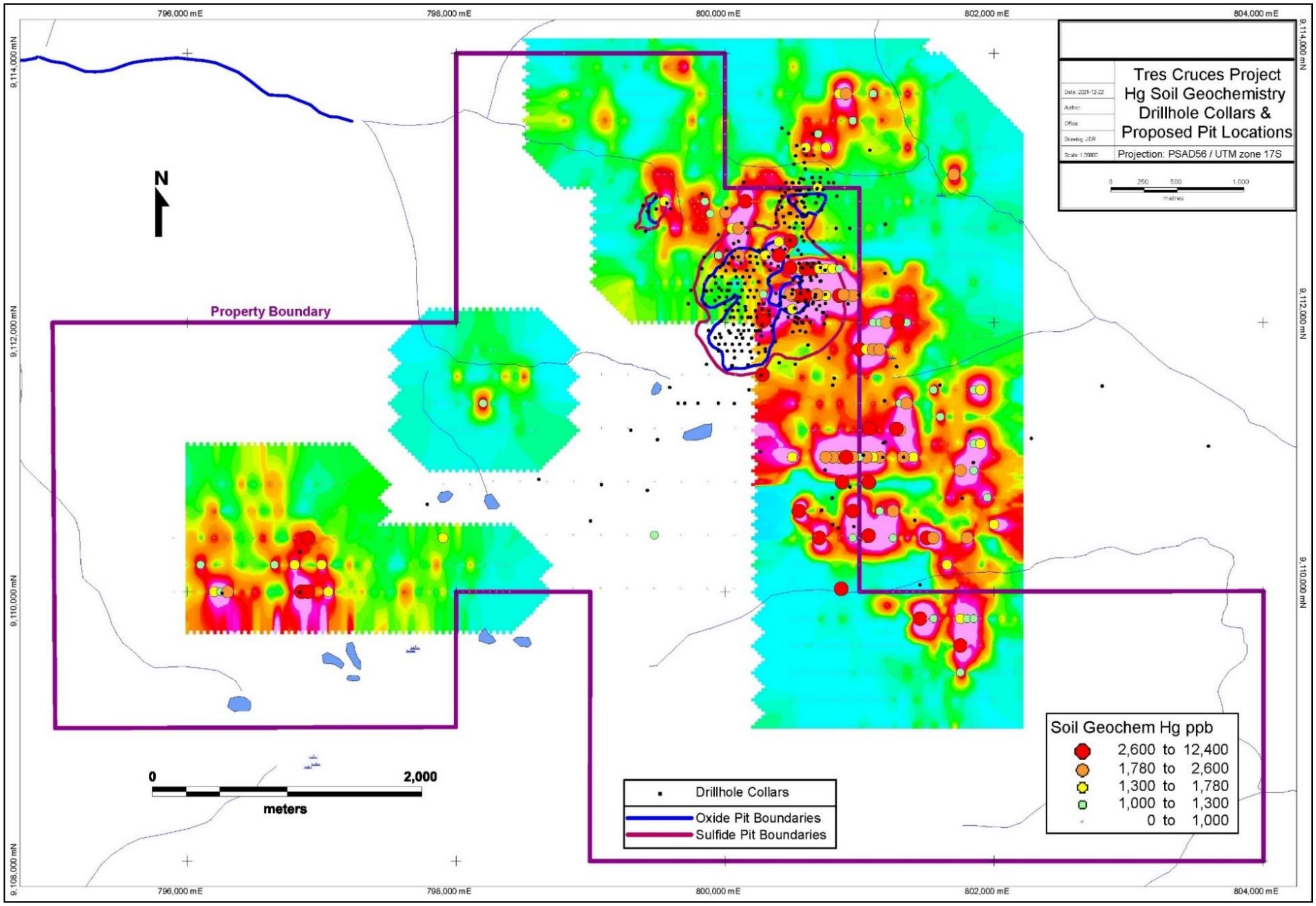



**Figure 9-3: Mercury Soil Geochemistry & Proposed Pits**

In 1999, 182 line-km of ground magnetometer surveying was completed. Magnetic results showed strong high and low responses associated with post-mineral volcanic rocks, which tended to mask the results of the underlying favourable host rocks. The host volcaniclastic rocks, where not masked, exhibited a more moderate magnetic signature, however responses were somewhat erratic due to variations in contained clasts. The magnetic response from porphyry intrusive rocks was low. Altered rocks of all styles, including volcaniclastics, returned low magnetic values. BMC concluded that the magnetic values are useful for mapping structures, but do not effectively discern the targeted porphyry/ volcaniclastic contact (Battle Mountain Canada Ltd., Tres Cruces Staff, 1999b).

In 1999, BMC also conducted IP modeling to determine which array was best suited for mapping applications at Tres Cruces. Part of this study involved testing 54 core samples of various lithologies for chargeability and resistivity. The results indicated that the rocks of the silica cap were two orders of magnitude more resistive than the other rocks, but those that contain no sulphide minerals were not chargeable. BMC concluded that there is a resistivity contrast of 3:1 between porphyry intrusive rocks and volcaniclastic rocks, which is insufficient to produce a mappable signature at depth. The 3:1 contrast is also maintained in areas where these rock types are altered; however, the contrast between altered and unaltered rocks was approximately 8:1, which could be useful for mapping areas of alteration. The work also indicated that chargeability signatures, although generally higher in the porphyry, would similarly not be enough to map intrusions at depth. In June 1999, a proposal was made to attempt IP mapping of alteration around the porphyry/volcaniclastic contact under the silica cap, however this work did not proceed because drill results at that time showed the contact to be "more complex than originally anticipated." BMC terminated its exploration programs at Tres Cruces in September 1999.

## 9.4 BARRICK (2002-2020)

### 9.4.1 2002-2003

Minera Barrick Misquichilca S.A. (MBM, owned by Barrick) optioned the Property from Oroperu in 2002 and Initial work consisted of geological mapping, re-logging of existing drill core, IP and gravity geophysical studies and the drilling of 14 diamond core holes for a total of 4,029 m. Barrick also drilled six diamond core holes adjacent to the east boundary of Oroperu's concessions on Barrick claims. Excluding these holes, the total of all drilling on the Project to the end of 2003 was 38,662 m.

Barrick's main thrust for their first phase of work was to evaluate lateral extensions of known mineralization as defined by prior drilling and IP targets immediately outside the known resource to the west and, to a lesser degree, the east, however this met with limited success. Drilling in the Southwest Zone extended the mineralization and it remained open to the south. As well, Barrick hole DTC202 returned a significant intersection of 186 m averaging 1.252 g/t Au (160.9-346.9 m) on the east margin of the South Zone deposit, indicating additional potential to the east.

### 9.4.2 2004

In 2004, Barrick drilled five wide-spaced exploration diamond core holes southeast of the main resources without encountering significant mineralization. An additional four diamond core holes were drilled within the boundaries of known mineralization, providing further information about the mineral continuity. In total, nine holes totaling 1,836 m were completed during 2004.

### 9.4.3 2006

Barrick drilled 29 diamond core holes in the Tres Cruces area in 2006, totaling 5,508 m. Five of these holes were drilled on Barrick's concession, which hosts a portion of the North Zone. Several other areas of mineralization that remained open were explored with further drilling and some encountered extensions to the mineralization. The area adjacent to, and between the South Zone, Southwest Zone and the SW Extension Zone is covered by a relatively thin layer of sedimentary rocks and chalcedonic sinter which overlies the mineralized Calipuy volcanics. This area had not been well explored in the past; therefore, some of the 2006 drilling tested parts of this target. Overall, this drilling was successful but did not completely delimit the mineralization, consequently additional drilling was planned for 2007. Some of the mineralized definition holes drilled in the 2006 program provided samples that were used for metallurgical testwork.

### 9.4.4 2007-2008

In 2007, Barrick drilled 44 diamond core and 87 RC holes for a total of 24,662 m. One of the diamond drill holes and 12 of the RC holes were drilled on Barrick's adjacent claim to test for northerly extensions of the North Zone. The 2007 program was focused primarily on upgrading the confidence of the known resource through infill drilling. Of the holes drilled, 27 RC holes were for condemnation at the edges of known mineralization, three RC holes twinned diamond core holes, 13 RC were piezometer holes, and seven diamond core holes were for geotechnical purposes. Samples were also collected from the mineralized intervals of several of the core holes for metallurgical testing. Generally, these test samples were taken from the remaining split after samples were collected for assay purposes. In 2008, three RC holes and three diamond core holes were drilled, although two of the core holes and two of the RC holes were on Barrick's concession, and the core holes were used for geotechnical purposes.

The only other field activity reported by Barrick for 2007/2008 was an IP survey which was undertaken to assist in the planning for exploration and condemnation drilling. Since much of the mineralization is associated with disseminated and stockwork pyrite, chargeability is an important indicator of potential mineralization. High resistivity is also relevant since it may be an indicator of silicification, which is commonly associated with mineralization. High resistivity can also be related to underlying quartzose sandstones that are known regionally to host mineralization, as well as some of the unaltered, but resistive, volcanic rocks (Minera Barrick Misquichilca S.A, 2007). An evaluation of the IP results was not available to the author.

The Barrick year end 2007 report suggested that the mineralization at Tres Cruces overprints a previous alteration assemblage, indicating possible multi-phase mineralizing events. Barrick noted that, currently, there is an absence of banded and veined mineralization with adularia-type and potassic alteration, but its possible existence at depth should not be discounted. Hedenquist, Izawa, Arribas and White (1996) have described the characteristics of other epithermal deposits that display evidence of multi-phase pulses of overprinting mineralization. The presence of high mercury values at depth in some of the holes also suggests underlying gold potential since mercury normally occurs in the upper levels of hydrothermal systems. In addition, a favorable host rock for structurally controlled mineralization such as the underlying Cretaceous Chimu sandstone provides a good exploration target at depth. The Barrick report proposed to test deep targets in the following year; however, this program was never completed.

Since 2008 the only work undertaken by Barrick on the Project was metallurgical testwork on some of the existing drill core. In January 2021 Barrick returned the Property to New Oroperu Resources Inc. Anacortes merged with New Oroperu in October 2021 and undertook work on the Property in 2022.

## 9.5 ANACORTES (2021-2023)

New Oroperu merged with First Light Capital Corp. in October 2021, which then formed the new company, Anacortes Mining Corp. ("Anacortes"). In June and July 2022, Anacortes undertook diamond drilling on the Property to check results of previous holes and to test the mineralized system at depth.

Eight holes were attempted, however, two of the holes (ATC-506 and 507) could not be completed to their target depths and were abandoned. Two holes (ATC-503 and 505) were drilled in areas of known mineralization to provide PQ-size core for metallurgical testwork. The entire core from these holes was used for testing; therefore, it was not assayed. The remaining four holes were drilled as confirmation of mineralization, testing areas between previous holes, or twinning holes with known strong mineralization. Confirmation holes were cored at HQ size, and reduced to NQ, if required. A total of 1376.9 m of drilling was completed.

The four confirmation holes were successful in determining limits of mineralization and corroborating gold grades as expected. Results of the drilling program are discussed below in Section 10. Results of metallurgical testwork conducted on the core from two of the drill holes are discussed below in Section 13.

# 10 DRILLING

A summary of drilling statistics for the Tres Cruces Project is provided in Table 10-1, broken down by year and type of drilling (diamond and reverse circulation). Drilling was initially undertaken by Oroperu, followed by programs carried out under option agreements by BMC and Barrick. After a 14-year hiatus, Anacortes drilled several confirmation and metallurgical holes. A few of the holes were started with RC to drill through the unmineralized upper lithologies and then switched to diamond coring to sample the underlying mineralized rocks. The data in Table 10-1 are based primarily on the collar and assay files provided by Barrick. Forty-four of the 379 holes were collared on Barrick claims, but some of these may have extended onto the Tres Cruces claims. Figure 10-1 shows drill hole collar locations and horizontal projections of the holes. They were predominantly collared on east-west fences spaced approximately 50 m apart in the main mineralized areas. Most holes were oriented east or west, but some holes in the South and South Extension Zones were drilled to the northwest or southeast to attempt to intersect the andesite porphyry contact zone. Exploration results for the drilling are discussed in Section 10.1 while equipment and sampling procedures are described in Section 12.

Oroperu undertook the first drilling at Tres Cruces with four RC holes in December of 1996 in the North and South Zones. All four holes intersected significant gold mineralization. In 1997, Oroperu drilled 46 additional RC holes and 11 diamond core holes (DC) for a total of 61 by the end of 1997.

**Table 10-1: Drilling Statistics Tres Cruces Project**

| Diamond Core | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Year** | **By** | **# DH's** | **ID** | **Length (m)** | **# Samples** | **Purpose** | **Type** |
| 1997 | Oroperu | 11 | DTC-53,54+RTC-051 to 061 | 2,106.75 | 1,320 | Expl/Infill | RC/DC |
| 1998 | BMC | 11 | DTC-062 to 072 | 3,057.40 | 2,023 | Twins | DC |
| 1999 | BMC | 69 | DTC-073 to 141 | 14,636.60 | 9,445 | Expl/Infill | DC |
| 2002 | Barrick | 11 | DTC-200 to 210 | 3,458.10 | 2,256 | Exploration | DC |
| 2003 | Barrick | 9 | DTC-211 to 219 | 1,668.70 | 977 | Exploration | DC |
| 2004 | Barrick | 9 | DTC-220 to 228 | 1,836.00 | 557 | Exploration | DC |
| 2006 | Barrick | 29 | DTC-229 to 257 | 5,508.10 | 3,657 | Exploration | DC |
| 2007 | Barrick | 37 | DTC-258 to 294 | 5,772.95 | 3,835 | Infill | DC |
| 2007 | Barrick | 7 | TCG-01 to 07 | 1,385.20 | 915 | Geotechnical | DC |
| 2008 | Barrick | 4 | TWDTC-203,206,208,213 | 740.00 | #N/A | Twins | DC |
| 2008 | Barrick | 3 | TCE-01 to 03 | 700.00 | #N/A | Geotechnical | DC |
| 2022 | Anacortes | 8 | ATC-500 to 507 | 1376.90 | 1,043 | Infill/Twins | DC |
| **Total DC** | **-** | **208** | **-** | **42,246.70** | **26,028** | **-** | **DC** |
| **Reverse Circulation** | | | | | | | |
| **Year** | **By** | **# DH's** | **ID** | **Length (m)** | **# Samples** | **Purpose** | **Type** |
| 1996 | Oroperu | 4 | RTC-001 to 004 | 811.15 | 537 | Exploration | RC |
| 1997 | Oroperu | 46 | RTC-005-to 050 | 10,135.00 | 6,753 | Expl/Infill | RC |
| 1999 | BMC | 28 | RTC-142 to 166 | 3,322.50 | 2,037 | Expl/Infill | RC |
| 2007 | Barrick | 70 | RTC-200 to 269 | 14,217.00 | 14,210 | Infill | RC |
| 2007 | Barrick | 14 | TCP-01 to 13 | 2,740.00 | 2,740 | Piezometers | RC |
| 2007 | Barrick | 3 | TWINTC-266,278,288 | 547.00 | 542 | Twins | RC |
| 2008 | Barrick | 3 | TCP-14 to 16 | 600.00 | 600 | Piezometers | RC |
| 2008 | Barrick | 3 | RTC-270 to 272 | 465.00 | 465 | Exploration | RC |
| **Total RC** | **-** | **171** | **-** | **32,837.65** | **27,884** | **-** | **RC** |
| **Total DC+RC** | **-** | **379** | **-** | **75,084.35** | **53,912** | **-** | **DC+RC** |

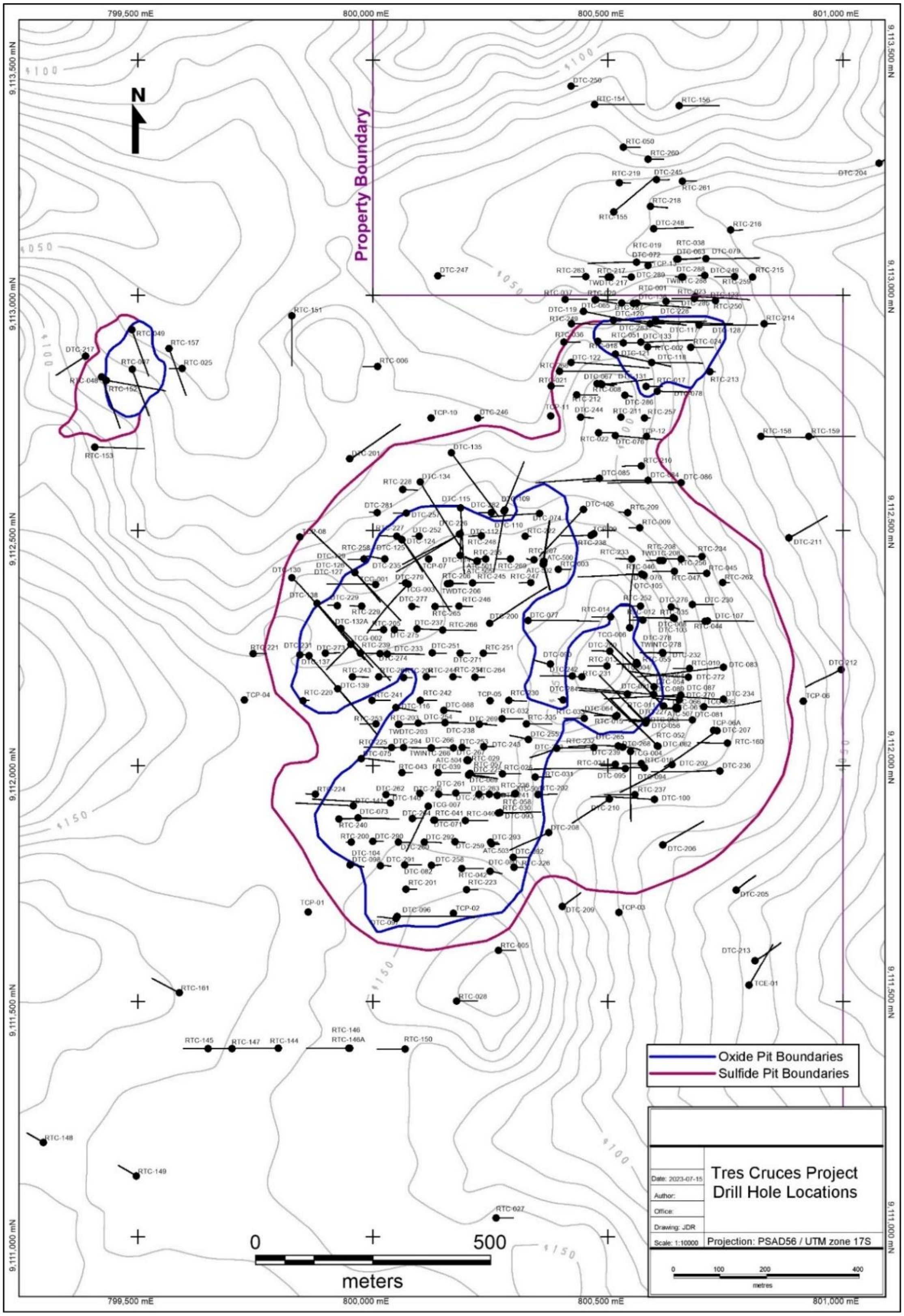



**Figure 10-1: Drill Hole Locations and Proposed Pit Outlines**

BMC started their first drill program in November 1998. By the end of year, BMC completed 3,057 m of drilling in 11 DC holes. The objective of the first phase was to confirm Oroperu's results by twinning 10 of their drill holes. The second phase of drilling started in January 1999, and added 69 DC holes, totalling 14,637 m by July 1999. The objective of this second phase of drilling was to expand and better define the known mineralization, as well as to explore for new mineralized areas. Drilling continued from July to September 1999 with 26 RC holes totalling 3,323 m that were designed to test geological, geochemical and geophysical targets. The drilling statistics in Table 10-1 summarize the three BMC drill programs.

Barrick subsequently took over the exploration of the Property and from 2002 to 2008 drilled 109 DC holes and 93 RC holes, for a total of 39,638 m. Twenty-seven of the holes were drilled for geotechnical or piezometer testing.

Relatively close-spaced drilling in the main mineralized areas has basically delineated five known zones at Tres Cruces; North, South, South Extension, Southwest and Cardoso Zones. Further drilling is required to fully delineate resources in some of the zones and to explore other targets on the Property. Resources are discussed in Section 14.

## 10.1 DRILL RESULTS

All drill core and RC chip sample analytical results up to the end of 2008 were compiled into a master analytical table. These results have been used in the resource estimate presented in Section 14 of this report. Analytical results from the four confirmation holes drilled in 2022 were not included in the estimate, although they did confirm the results for some of the holes that were used in the estimate. The results from these confirmation holes are discussed below. All samples collected by the various operators have been analyzed for gold using similar fire assay procedures and are therefore comparable (see Section 11).

From the master analytical table, the author manually selected composite intervals of relatively continuous anomalous gold values from each mineralized drill hole and averaged the values for each interval. Approximate cut-off values used were 0.3 g/t Au for oxide mineralization and 0.5 g/t Au for sulphides, although each interval may contain short sections of below cut-off grade. The objective was to determine the approximate gold grades and widths that may be expected in oxide and sulphide mineralized intervals and to plot those intervals graphically on vertical drill sections to view the extent of lateral continuity between holes. A listing of selected significant composite intervals from 98 holes (both DC and RC) is shown in Table 10-2 to illustrate the range of lengths of some of the better mineralized intervals, many of which include a section of oxide directly underlain by sulphide mineralization. The results also demonstrate that most of the intervals average between 0.8 and 3.0 g/t Au, although there are some enriched sections, such as 16.17 g/t Au over 13.0 m in hole RTC-255. Gold values are represented graphically on drill sections, along with some of the composite intervals, and are discussed below.

**Table 10-2: Selected Drill Hole Composite Gold Intervals – Oxides and Sulphides**

| Hole Num | From (m) | To (m) | Intvl (m) | Au (g/t) | Ox/Su | AuxL | East PSAD56 | North PSAD56 | Elev | Az | Dip | Dep (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DTC-053 | 51.00 | 131.10 | 80.10 | 1.933 | Sulf | 154.8 | 800580.1 | 9112091.5 | 4128.1 | 315 | -60 | 131.1 |
| DTC-054 | 97.50 | 156.00 | 58.50 | **2.387** | Sulf | 139.6 | 800597.9 | 9112168.0 | 4130.4 | 315 | -60 | 281.5 |
| DTC-056 | 49.50 | 276.00 | **226.50** | **3.003** | Sulf | 680.2 | 800580.9 | 9112092.9 | 4128.1 | 315 | -60 | 280.6 |
| DTC-062 | 69.00 | 318.00 | **249.00** | **2.310** | Sulf | 575.2 | 800606.5 | 9112041.7 | 4114.8 | 315 | -60 | 327.9 |
| DTC-063 | 0.00 | 48.00 | 48.00 | 0.838 | Ox? | 40.2 | 800646.4 | 9113076.8 | 4034.5 | 90 | -80 | 270.5 |
| DTC-064 | 37.50 | 168.00 | **130.50** | 1.079 | Sulf | 140.8 | 800517.0 | 9112105.8 | 4138.0 | 270 | -80 | 352.5 |
| DTC-065 | 13.50 | 96.00 | 82.50 | **2.134** | Ox&Sulf | 176.1 | 800472.4 | 9112990.9 | 4054.9 | 90 | -80 | 224.8 |
| DTC-066 | 103.50 | 195.00 | 91.50 | 1.626 | Sulf | 148.8 | 800618.0 | 9112127.8 | 4125.1 | 315 | -60 | 303.4 |
| DTC-067 | 63.00 | 157.50 | 94.50 | 1.152 | Sulf | 108.9 | 800476.7 | 9112812.0 | 4107.5 | 90 | -80 | 199.7 |
| DTC-069 | 42.00 | 81.00 | 39.00 | **3.413** | Ox | 133.1 | 800203.3 | 9111981.7 | 4135.5 | 94 | -79 | 352.9 |
| and | 81.00 | 130.50 | 49.50 | 1.923 | Sulf | 95.2 | 800203.3 | 9111981.7 | 4135.5 | 94 | -79 | 352.9 |

| Hole Num | From (m) | To (m) | Intvl (m) | Au (g/t) | Ox/Su | AuxL | East PSAD56 | North PSAD56 | Elev | Az | Dip | Dep (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DTC-070 | 115.50 | 174.00 | 58.50 | 0.944 | Sulf | 55.2 | 800577.0 | 9112405.4 | 4129.5 | 270 | -80 | 212.6 |
| DTC-071 | 78.00 | 94.50 | 16.50 | 0.710 | Ox | 11.7 | 800129.5 | 9111885.1 | 4137.9 | 90 | -80 | 306.0 |
| and | 94.50 | 123.00 | 28.50 | 1.168 | Sulf | 33.3 | 800129.5 | 9111885.1 | 4137.9 | 90 | -80 | 306.0 |
| DTC-081 | 184.50 | 226.50 | 42.00 | 1.750 | Sulf | 73.5 | 800679.9 | 9112098.1 | 4110.3 | 270 | -68 | 349.8 |
| and | 253.50 | 286.50 | 33.00 | 1.785 | Sulf | 58.9 | 800679.9 | 9112098.1 | 4110.3 | 270 | -68 | 349.8 |
| DTC-082 | 67.50 | 87.00 | 19.50 | 1.167 | Ox | 22.8 | 800068.1 | 9111789.9 | 4142.8 | 90 | -80 | 172.6 |
| and | 87.00 | 114.00 | 27.00 | 1.066 | Sulf | 28.8 | 800068.1 | 9111789.9 | 4142.8 | 90 | -80 | 172.6 |
| DTC-087 | 156.00 | 294.00 | **138.00** | 1.838 | Sulf | 253.7 | 800655.2 | 9112150.9 | 4119.5 | 270 | -50 | 294.9 |
| DTC-089 | 66.00 | 147.00 | 81.00 | **2.219** | Sulf | 179.8 | 800596.9 | 9112152.4 | 4129.8 | 270 | -50 | 255.3 |
| DTC-091 | 49.50 | 111.00 | 61.50 | 1.402 | Sulf | 86.2 | 800540.8 | 9112153.4 | 4142.0 | 270 | -50 | 165.1 |
| DTC-093 | 34.50 | 51.00 | 16.50 | **2.974** | Ox | 49.1 | 800270.9 | 9111901.4 | 4135.8 | 90 | -55 | 149.8 |
| DTC-103 | 81.00 | 103.50 | 22.50 | 0.955 | Sulf | 21.5 | 800641.2 | 9112313.3 | 4123.0 | 270 | -60 | 166.8 |
| DTC-112 | 49.50 | 75.00 | 25.50 | 0.807 | Ox | 20.6 | 800184.0 | 9112492.2 | 4117.1 | 240 | -50 | 206.2 |
| and | 75.00 | 206.20 | **131.20** | 1.179 | Sulf | 154.7 | 800184.0 | 9112492.2 | 4117.1 | 240 | -50 | 206.2 |
| DTC-115 | 121.50 | 199.50 | 78.00 | 0.872 | Sulf | 68.0 | 800186.9 | 9112548.1 | 4111.3 | 180 | -50 | 218.4 |
| DTC-117 | 0.00 | 130.50 | **130.50** | **2.092** | Ox&Sulf | 273.1 | 800601.6 | 9112946.9 | 4082.5 | 90 | -45 | 242.8 |
| DTC-118 | 6.00 | 70.50 | 64.50 | 0.773 | Ox&Sulf | 49.9 | 800593.2 | 9112857.0 | 4088.3 | 90 | -45 | 160.3 |
| DTC-119 | 42.00 | 60.00 | 18.00 | **2.076** | Sulf | 37.4 | 800448.2 | 9112966.2 | 4061.4 | 102 | -45 | 245.8 |
| DTC-120 | 3.00 | 27.00 | 24.00 | **2.928** | Ox? | 70.3 | 800511.8 | 9112947.3 | 4064.0 | 90 | -45 | 221.4 |
| DTC-121 | 7.50 | 25.50 | 18.00 | 1.281 | Ox? | 23.1 | 800515.8 | 9112874.8 | 4087.0 | 105 | -45 | 181.8 |
| and | 64.50 | 112.50 | 48.00 | 1.048 | Sulf | 50.3 | 800515.8 | 9112874.8 | 4087.0 | 105 | -45 | 181.8 |
| DTC-124 | 57.00 | 82.50 | 25.50 | **2.531** | Ox | 64.5 | 800061.7 | 9112480.9 | 4108.9 | 145 | -45 | 258.0 |
| and | 82.50 | 217.50 | **135.00** | 1.220 | Sulf | 164.6 | 800061.7 | 9112480.9 | 4108.9 | 145 | -45 | 258.0 |
| DTC-125 | 49.50 | 60.00 | 10.50 | 0.791 | Ox | 8.3 | 800061.2 | 9112481.5 | 4108.9 | 145 | -70 | 242.8 |
| and | 60.00 | 201.00 | **141.00** | **2.168** | Sulf | 305.7 | 800061.2 | 9112481.5 | 4108.9 | 145 | -70 | 242.8 |
| incl. | 85.50 | 172.50 | 87.00 | **3.152** |  | 274.2 | 800061.2 | 9112481.5 | 4108.9 | 145 | -70 | 242.8 |
| DTC-126 | 54.00 | 172.50 | **118.50** | 1.454 | Ox&Sulf | 172.3 | 799961.9 | 9112411.1 | 4115.7 | 135 | -45 | 209.2 |
| DTC-131 | 67.50 | 133.50 | 66.00 | 1.378 | Sulf | 90.9 | 800484.5 | 9112812.1 | 4107.0 | 90 | -45 | 160.4 |
| DTC-132A | 49.50 | 78.00 | 28.50 | **2.013** | Ox&Sulf | 57.4 | 799932.3 | 9112292.1 | 4125.5 | 135 | -45 | 230.6 |
| DTC-133 | 21.00 | 72.00 | 51.00 | 1.247 | Ox&Sulf | 63.6 | 800570.1 | 9112901.0 | 4086.6 | 90 | -45 | 160.4 |
| DTC-136 | 0.00 | 37.50 | 37.50 | **2.194** | Ox? | 82.3 | 800553.8 | 9112982.7 | 4065.0 | 90 | -49 | 190.9 |
| and | 76.50 | 150.00 | 73.50 | 1.286 | Sulf | 94.5 | 800553.8 | 9112982.7 | 4065.0 | 90 | -49 | 190.9 |
| DTC-137 | 78.00 | 91.50 | 13.50 | **2.556** | Ox | 34.5 | 799863.9 | 9112234.6 | 4136.2 | 135 | -45 | 276.3 |
| DTC-140 | 87.00 | 108.00 | 21.00 | **3.269** | Ox&Sulf | 68.6 | 800037.5 | 9111921.7 | 4136.3 | 272 | -46 | 236.7 |
| DTC-202 | 160.85 | 346.90 | **186.05** | 1.252 | Sulf | 232.9 | 800636.0 | 9112003.1 | 4104.5 | 238 | -70 | 346.9 |
| DTC-225 | 49.50 | 82.50 | 33.00 | **2.489** | Sulf | 82.1 | 800203.3 | 9111981.0 | 4135.1 | 98 | -80 | 250.4 |
| DTC-235 | 42.50 | 86.00 | 43.50 | 1.258 | Sulf | 54.7 | 800025.6 | 9112439.5 | 4112.1 | 280 | -77 | 210.1 |
| DTC-238 | 46.70 | 72.50 | 25.80 | **2.309** | Ox | 59.6 | 800153.8 | 9112092.1 | 4130.3 | 92 | -64 | 209.8 |
| and | 104.00 | 149.00 | 45.00 | 1.180 | Sulf | 53.1 | 800153.8 | 9112092.1 | 4130.3 | 92 | -64 | 209.8 |
| DTC-239 | 117.00 | 238.50 | **121.50** | 1.236 | Sulf | 150.2 | 800521.6 | 9112042.4 | 4121.9 | 272 | -72 | 310.3 |
| DTC-240 | 79.50 | 126.00 | 46.50 | **3.760** | Sulf | 174.8 | 800176.2 | 9111942.7 | 4134.5 | 91 | -78 | 175.8 |
| DTC-241 | 37.50 | 49.50 | 12.00 | **3.185** | Ox | 38.2 | 800264.8 | 9111937.2 | 4139.1 | 90 | -81 | 179.4 |
| and | 49.50 | 55.50 | 6.00 | 1.145 | Sulf | 6.9 | 800264.8 | 9111937.2 | 4139.1 | 90 | -81 | 179.4 |
| DTC-243 | 30.50 | 65.00 | 34.50 | **2.357** | Ox | 81.3 | 800235.4 | 9112041.0 | 4128.0 | 91 | -82 | 182.3 |
| and | 72.50 | 95.00 | 22.50 | 1.029 | Sulf | 23.2 | 800235.4 | 9112041.0 | 4128.0 | 91 | -82 | 182.3 |

| Hole Num | From (m) | To (m) | Intvl (m) | Au (g/t) | Ox/Su | AuxL | East PSAD56 | North PSAD56 | Elev | Az | Dip | Dep (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DTC-244 | 94.50 | 129.00 | 34.50 | 1.456 | Sulf | 50.2 | 800442.1 | 9112740.9 | 4100.9 | 94 | -81 | 175.4 |
| DTC-252 | 34.00 | 77.50 | 43.50 | **6.330** | Sulf | 275.4 | 800098.5 | 9112487.9 | 4112.6 | 270 | -85 | 170.3 |
| DTC-253 | 47.00 | 81.50 | 34.50 | **3.516** | Ox | 121.3 | 800170.9 | 9112038.8 | 4130.9 | 271 | -79 | 194.5 |
| and | 81.50 | 174.50 | 93.00 | 1.087 | Sulf | 101.1 | 800170.9 | 9112038.8 | 4130.9 | 271 | -79 | 194.5 |
| DTC-254 | 90.50 | 95.00 | 4.50 | 1.072 | Ox | 4.8 | 800096.7 | 9112091.2 | 4131.1 | 89 | -65 | 200.3 |
| and | 117.50 | 164.00 | 46.50 | 1.404 | Sulf | 65.3 | 800096.7 | 9112091.2 | 4131.1 | 89 | -65 | 200.3 |
| DTC-255 | 45.00 | 73.00 | 28.00 | **2.425** | Ox | 67.9 | 800330.6 | 9112056.7 | 4133.1 | 283 | -76 | 155.0 |
| DTC-256 | 68.00 | 78.50 | 10.50 | 1.077 | Ox | 11.3 | 800099.6 | 9111942.1 | 4136.6 | 89 | -89 | 170.1 |
| and | 78.50 | 99.50 | 21.00 | 1.572 | Sulf | 33.0 | 800099.6 | 9111942.1 | 4136.6 | 89 | -89 | 170.1 |
| DTC-258 | 78.50 | 99.50 | 21.00 | **2.984** | Ox&Sulf | 62.7 | 800124.4 | 9111789.2 | 4141.6 | 90 | -79 | 125.3 |
| DTC-259 | 66.00 | 100.50 | 34.50 | **3.101** | Ox | 107.0 | 800174.3 | 9111838.8 | 4136.2 | 89 | -79 | 120.0 |
| DTC-260 | 66.00 | 81.00 | 15.00 | **4.273** | Ox | 64.1 | 800054.0 | 9111838.7 | 4137.9 | 90 | -80 | 150.4 |
| and | 81.00 | 112.50 | 31.50 | **2.731** | Sulf | 86.0 | 800054.0 | 9111838.7 | 4137.9 | 90 | -80 | 150.4 |
| DTC-261 | 41.00 | 92.00 | 51.00 | 1.428 | Ox | 72.8 | 800139.6 | 9111940.0 | 4135.5 | 90 | -80 | 160.0 |
| and | 92.00 | 126.00 | 34.00 | 1.563 | Sulf | 53.1 | 800139.6 | 9111940.0 | 4135.5 | 90 | -80 | 160.0 |
| DTC-263 | 43.50 | 70.50 | 27.00 | 1.293 | Ox | 34.9 | 800225.4 | 9111939.8 | 4135.7 | 90 | -85 | 173.4 |
| and | 70.50 | 79.00 | 8.50 | **13.233** | Sulf | 112.5 | 800225.4 | 9111939.8 | 4135.7 | 90 | -85 | 173.4 |
| DTC-264 | 69.50 | 77.00 | 7.50 | 1.521 | Ox | 11.4 | 800083.7 | 9111888.6 | 4136.4 | 90 | -80 | 131.5 |
| and | 77.00 | 95.50 | 18.50 | 1.204 | Sulf | 22.3 | 800083.7 | 9111888.6 | 4136.4 | 90 | -80 | 131.5 |
| DTC-266 | 39.50 | 71.00 | 31.50 | 0.864 | Ox | 27.2 | 800124.1 | 9112038.9 | 4132.4 | 270 | -75 | 164.3 |
| and | 71.00 | 132.50 | 61.50 | 1.119 | Sulf | 68.8 | 800124.1 | 9112038.9 | 4132.4 | 270 | -75 | 164.3 |
| TWINTC-266 | 41.00 | 71.00 | 30.00 | 0.594 | Ox | 17.8 | 800124.6 | 9112038.8 | 4131.7 | 270 | -73 | 165.0 |
| and | 71.00 | 154.00 | 83.00 | 1.057 | Sulf | 87.7 | 800124.6 | 9112038.8 | 4131.7 | 270 | -73 | 165.0 |
| DTC-267 | 66.00 | 151.50 | 85.50 | 0.976 | Sulf | 83.4 | 800190.3 | 9112039.4 | 4130.3 | 90 | -85 | 164.2 |
| DTC-268 | 199.50 | 230.00 | 30.50 | **2.081** | Sulf | 63.5 | 800531.8 | 9112040.4 | 4120.8 | 90 | -80 | 230.0 |
| DTC-269 | 37.50 | 61.50 | 24.00 | **2.301** | Ox | 55.2 | 800226.5 | 9112088.6 | 4129.1 | 90 | -75 | 150.0 |
| and | 75.00 | 127.50 | 52.50 | 0.886 | Sulf | 46.5 | 800226.5 | 9112088.6 | 4129.1 | 90 | -75 | 150.0 |
| DTC-270 | 170.00 | 188.00 | 18.00 | **2.443** | Sulf | 44.0 | 800651.9 | 9112140.3 | 4117.9 | 270 | -75 | 225.3 |
| DTC-272 | 137.00 | 258.50 | **121.50** | 1.970 | Sulf | 239.4 | 800670.6 | 9112189.0 | 4115.9 | 270 | -65 | 305.3 |
| DTC-273 | 51.00 | 57.00 | 6.00 | 0.771 | Ox | 4.6 | 799899.3 | 9112239.3 | 4133.3 | 90 | -75 | 125.3 |
| and | 57.00 | 81.00 | 24.00 | **2.391** | Sulf | 57.4 | 799899.3 | 9112239.3 | 4133.3 | 90 | -75 | 125.3 |
| DTC-275 | 55.50 | 63.00 | 7.50 | 0.897 | Ox | 6.7 | 800045.3 | 9112289.6 | 4126.2 | 90 | -80 | 125.0 |
| DTC-277 | 60.50 | 84.50 | 24.00 | 1.020 | Ox | 24.5 | 800083.0 | 9112338.9 | 4123.0 | 90 | -85 | 180.0 |
| DTC-278 | 132.00 | 210.00 | 78.00 | **3.727** | Sulf | 290.7 | 800616.5 | 9112240.3 | 4130.3 | 270 | -80 | 210.0 |
| incl. | 190.50 | 210.00 | 19.50 | **11.012** | Sulf | 214.7 | 800616.5 | 9112240.3 | 4130.3 | 270 | -80 | 210.0 |
| TWINTC-278 | 154.00 | 276.00 | **122.00** | **3.054** | Sulf | 372.6 | 800616.7 | 9112240.0 | 4129.9 | 271 | -80 | 280.0 |
| incl. | 179.00 | 206.00 | 27.00 | **5.071** | Sulf | 136.9 | 800616.7 | 9112240.0 | 4129.9 | 271 | -80 | 280.0 |
| and | 229.00 | 255.00 | 26.00 | **5.884** | Sulf | 153.0 | 800616.7 | 9112240.0 | 4129.9 | 271 | -80 | 280.0 |
| DTC-279 | 57.00 | 85.50 | 28.50 | 1.430 | Ox | 40.8 | 800069.6 | 9112388.6 | 4122.3 | 270 | -85 | 150.0 |
| and | 85.50 | 144.00 | 58.50 | **4.385** | Sulf | 256.5 | 800069.6 | 9112388.6 | 4122.3 | 270 | -85 | 150.0 |
| DTC-283 | 6.00 | 141.00 | **135.00** | 1.499 | Ox&Sulf | 202.4 | 800589.3 | 9112939.6 | 4080.9 | 90 | -65 | 155.1 |
| DTC-285 | 0.00 | 130.00 | **130.00** | 1.843 | Ox&Sulf | 239.6 | 800623.6 | 9112986.8 | 4075.5 | 90 | -75 | 130.0 |
| DTC-286 | 55.50 | 87.00 | 31.50 | **4.793** | Sulf | 151.0 | 800535.8 | 9112787.9 | 4104.6 | 90 | -83 | 145.0 |
| DTC-288 | 0.00 | 73.50 | 73.50 | 0.995 | Ox&Sulf | 73.1 | 800659.0 | 9113038.8 | 4048.7 | 270 | -80 | 101.2 |
| TWINTC-288 | 0.00 | 72.00 | 72.00 | 1.293 | Ox&Sulf | 93.1 | 800656.6 | 9113038.8 | 4048.6 | 270 | -80 | 102.0 |

| Hole Num | From (m) | To (m) | Intvl (m) | Au (g/t) | Ox/Su | AuxL | East PSAD56 | North PSAD56 | Elev | Az | Dip | Dep (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DTC-289 | 0.00 | 13.50 | 13.50 | 1.017 | Ox? | 13.7 | 800549.8 | 9113038.6 | 4037.8 | 270 | -80 | 107.3 |
| DTC-290 | 56.00 | 64.30 | 8.30 | 0.730 | Ox | 6.1 | 800000.3 | 9111840.1 | 4137.0 | 90 | -80 | 120.0 |
| and | 75.00 | 114.00 | 39.00 | 1.657 | Sulf | 64.6 | 800000.3 | 9111840.1 | 4137.0 | 90 | -80 | 120.0 |
| DTC-292 | 73.00 | 97.00 | 24.00 | 0.907 | Ox | 21.8 | 800109.0 | 9111838.4 | 4140.1 | 90 | -75 | 140.0 |
| and | 97.00 | 108.50 | 11.50 | **2.086** | Sulf | 24.0 | 800109.0 | 9111838.4 | 4140.1 | 90 | -75 | 140.0 |
| DTC-293 | 37.50 | 58.80 | 21.30 | **3.591** | Ox | 76.5 | 800249.9 | 9111838.2 | 4131.1 | 90 | -80 | 91.0 |
| and | 58.80 | 72.50 | 13.70 | 0.919 | Sulf | 12.6 | 800249.9 | 9111838.2 | 4131.1 | 90 | -80 | 91.0 |
| RTC-001 | 1.50 | 30.00 | 28.50 | 1.084 | Ox? | 30.9 | 800561.7 | 9112983.4 | 4065.5 | 90 | -80 | 262.5 |
| RTC-026 | 42.00 | 61.50 | 19.50 | **2.295** | Ox | 44.8 | 800275.5 | 9111983.4 | 4137.6 | 90 | -80 | 225.0 |
| and | 61.50 | 150.00 | 88.50 | 0.939 | Sulf | 83.1 | 800275.5 | 9111983.4 | 4137.6 | 90 | -80 | 225.0 |
| RTC-029 | 43.50 | 79.50 | 36.00 | **5.973** | Ox | 215.0 | 800207.1 | 9111983.9 | 4135.5 | 90 | -80 | 255.0 |
| and | 79.50 | 255.00 | **175.50** | **2.129** | Sulf | 373.7 | 800207.1 | 9111983.9 | 4135.5 | 90 | -80 | 255.0 |
| RTC-030 | 16.50 | 60.00 | 43.50 | **3.571** | Ox | 155.3 | 800267.0 | 9111900.7 | 4136.1 | 90 | -80 | 210.0 |
| RTC-039 | 46.50 | 69.00 | 22.50 | 1.315 | Ox | 29.6 | 800139.1 | 9111986.0 | 4134.0 | 90 | -80 | 270.0 |
| and | 69.00 | 133.50 | 64.50 | 1.064 | Sulf | 68.6 | 800139.1 | 9111986.0 | 4134.0 | 90 | -80 | 270.0 |
| RTC-040 | 48.00 | 67.50 | 19.50 | 1.198 | Ox | 23.4 | 800197.1 | 9111884.3 | 4134.6 | 90 | -80 | 270.0 |
| RTC-041 | 81.00 | 97.50 | 16.50 | 1.166 | Ox | 19.2 | 800131.6 | 9111885.0 | 4137.8 | 90 | -80 | 201.0 |
| RTC-043 | 61.50 | 76.50 | 15.00 | **3.749** | Ox | 56.2 | 800062.2 | 9111985.6 | 4134.7 | 90 | -80 | 123.0 |
| RTC-054 | 97.50 | 156.00 | 58.50 | **2.366** | Sulf | 138.4 | 800597.9 | 9112168.0 | 4130.4 | 315 | -60 | 283.5 |
| RTC-205 | 61.00 | 165.00 | **104.00** | 1.210 | Sulf | 125.8 | 800023.0 | 9112289.6 | 4125.6 | 269 | -79 | 175.0 |
| RTC-207 | 8.00 | 68.00 | 60.00 | 0.924 | Ox | 55.4 | 800342.4 | 9112438.1 | 4127.8 | 271 | -84 | 210.0 |
| RTC-236 | 39.00 | 66.00 | 27.00 | **2.060** | Ox | 55.6 | 800247.9 | 9111939.8 | 4137.1 | 90 | -84 | 350.0 |
| and | 165.00 | 232.00 | 67.00 | 0.907 | Sulf | 60.8 | 800247.9 | 9111939.8 | 4137.1 | 90 | -84 | 350.0 |
| RTC-239 | 48.00 | 56.00 | 8.00 | **4.632** | Ox | 37.1 | 799973.5 | 9112239.8 | 4129.5 | 91 | -75 | 260.0 |
| and | 56.00 | 183.00 | **127.00** | 1.017 | Sulf | 129.1 | 799973.5 | 9112239.8 | 4129.5 | 91 | -75 | 260.0 |
| RTC-240 | 64.00 | 83.00 | 19.00 | 1.879 | Ox&Sulf | 35.7 | 799927.7 | 9111887.9 | 4134.0 | 89 | -66 | 250.0 |
| RTC-251 | 41.00 | 62.00 | 21.00 | 0.762 | Ox | 16.0 | 800235.0 | 9112239.5 | 4134.4 | 90 | -81 | 181.0 |
| RTC-254 | 50.00 | 61.00 | 11.00 | 0.845 | Ox | 9.3 | 800170.1 | 9112189.5 | 4131.3 | 91 | -85 | 200.0 |
| and | 64.00 | 95.00 | 31.00 | 1.580 | Sulf | 49.0 | 800170.1 | 9112189.5 | 4131.3 | 91 | -85 | 200.0 |
| RTC-255 | 29.00 | 92.00 | 63.00 | **2.174** | Ox | 137.0 | 800240.1 | 9112439.6 | 4127.5 | 270 | -85 | 265.0 |
| and | 92.00 | 265.00 | **173.00** | **3.118** | Sulf | 539.4 | 800240.1 | 9112439.6 | 4127.5 | 270 | -85 | 265.0 |
| incl. | 197.00 | 210.00 | **13.00** | **16.170** | Sulf | 210.2 | 800240.1 | 9112439.6 | 4127.5 | 270 | -85 | 265.0 |
| RTC-269 | 29.00 | 82.00 | 53.00 | 1.427 | Ox | 75.6 | 800292.7 | 9112439.7 | 4126.2 | 270 | -85 | 324.0 |
| TCG-003 | 59.50 | 87.50 | 28.00 | **2.037** | Ox | 57.0 | 800075.5 | 9112386.5 | 4122.3 | 225 | -52 | 225.2 |
| and | 87.50 | 165.50 | 78.00 | **2.445** | Sulf | 190.7 | 800075.5 | 9112386.5 | 4122.3 | 225 | -52 | 225.2 |
| TCP-07 | 49.00 | 68.00 | 19.00 | **2.385** | Ox | 45.3 | 800118.5 | 9112440.1 | 4120.8 | 0 | -90 | 200.0 |
| and | 68.00 | 200.00 | **132.00** | 1.026 | Sulf | 135.5 | 800118.5 | 9112440.1 | 4120.8 | 0 | -90 | 200.0 |
| TCP-09 | 155.00 | 184.00 | 29.00 | **4.252** | Sulf | 123.3 | 800469.9 | 9112493.0 | 4123.7 | 0 | -90 | 200.0 |

*Note: Intervals are drilled length and may overstate the true length of mineralization, particularly in flatter dipping holes.*

*Cut-off grades: for oxides 0.3 g/t Au, for sulphides 0.5 g/t Au*

*Au x L = Au grade (g/t) x Interval (m)*

Vertical drill sections were plotted along east-west section lines drawn across the proposed Main Oxide and Sulphide Pit areas at 50-m intervals, from 1740 N to 2490 N. Figure 10-2 is a geological plan map showing five of the selected sections that are presented below on Figure 10-3 to Figure 10-7. Vertical drill sections use the same colours for lithologic units as the geology plan map. Figure 10-2 also illustrates drill hole collar locations for most of the 379 RC and diamond drill holes that have been drilled in and near the Project area.

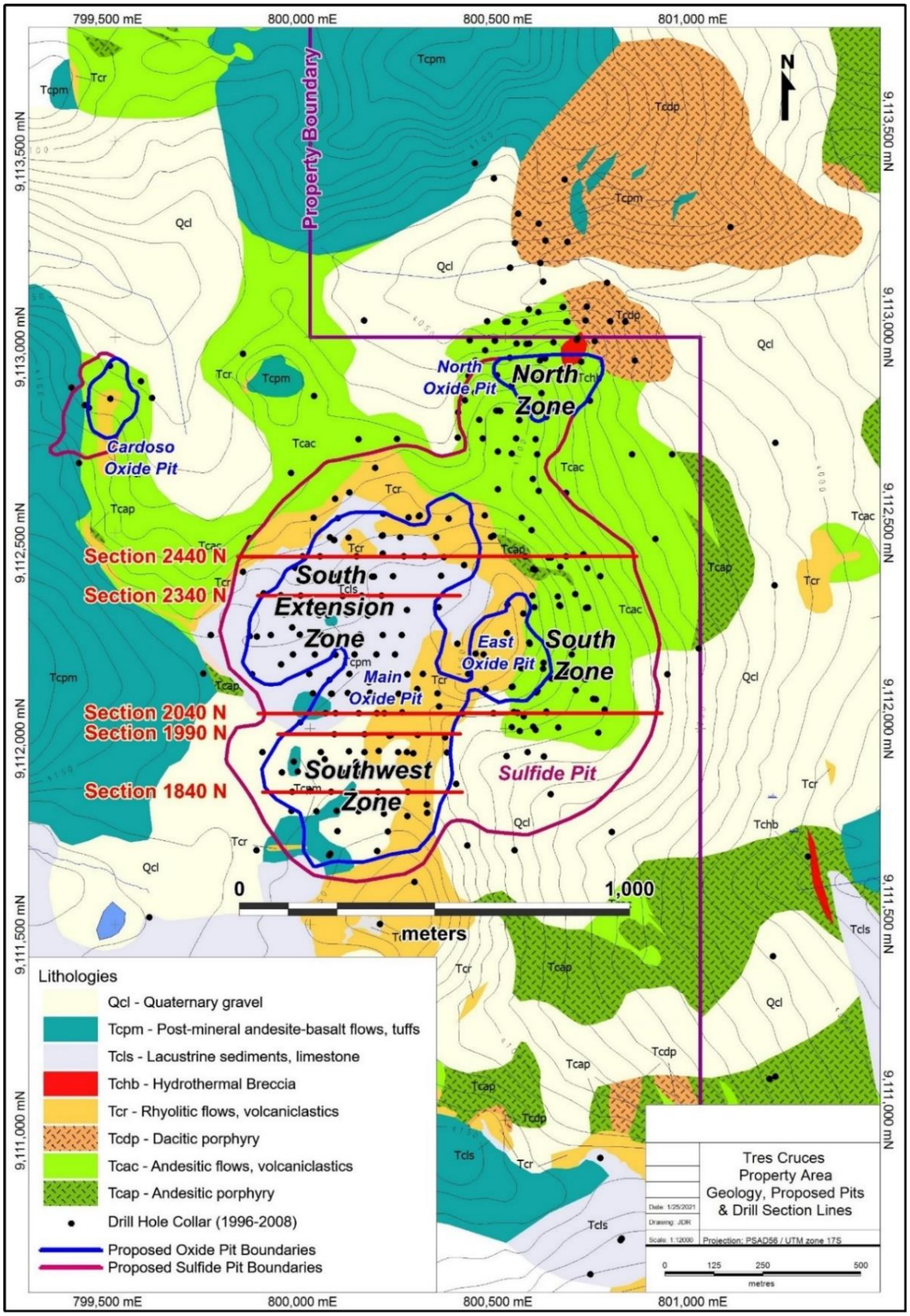



**Figure 10-2: Geology, Proposed Pits, Drill Collars and Drill Section Lines**

The objective of generating the drill sections was to plot areas of gold-bearing mineralization on the drill hole traces, together with basic geologic units and graphical depiction of gold grades over selected composite intervals, to allow a visual determination of the continuity of mineralized zones, as well as the variability in thicknesses and grades. Plots for selected section lines that display some of the thicker oxide and sulphide intervals from the north and south parts of the proposed main pits are shown below on Figure 10-3 to Figure 10-7. Sections also show the profile of a proposed oxide pit (blue line) that could extract Au-bearing oxide mineralization, which testwork indicates is amenable to heap leach gold extraction (see Section 13). On two of the sections (Figure 10-5 and Figure 10-7) a deeper pit profile (brown line) corresponds to the sulphide pit design used in Section 14 to estimate the amount of Au-bearing sulphide mineralization that could potentially be extracted by deepening the oxide pits. Beneficiation of sulphide mineralization would require more expensive processing techniques; however, the phase 1 proposed heap leach operation could potentially finance that phase 2 development.

Drill holes on the Tres Cruces Property are spread out over an area measuring about 2,500 m north-south, by 2,000 m east-west, with the density of drilling greatest in the five zones identified to date. Most holes were drilled at -70 degrees dip or steeper, although a few were drilled as shallow as -45 degrees. Holes ranged in length from 27 m to 496 m with the majority between 100 m and 300 m. For the most part, mineralization at Tres Cruces forms sub-horizontal lenses paralleling the flat-lying volcanic units. While drilling programs have been designed to intersect the mineralization at near right angles where possible, most intersections are somewhat larger than true thickness. Since the bulk of the mineralization consists of broad disseminated masses with irregular boundaries, the calculation of true thickness is sometimes not possible.

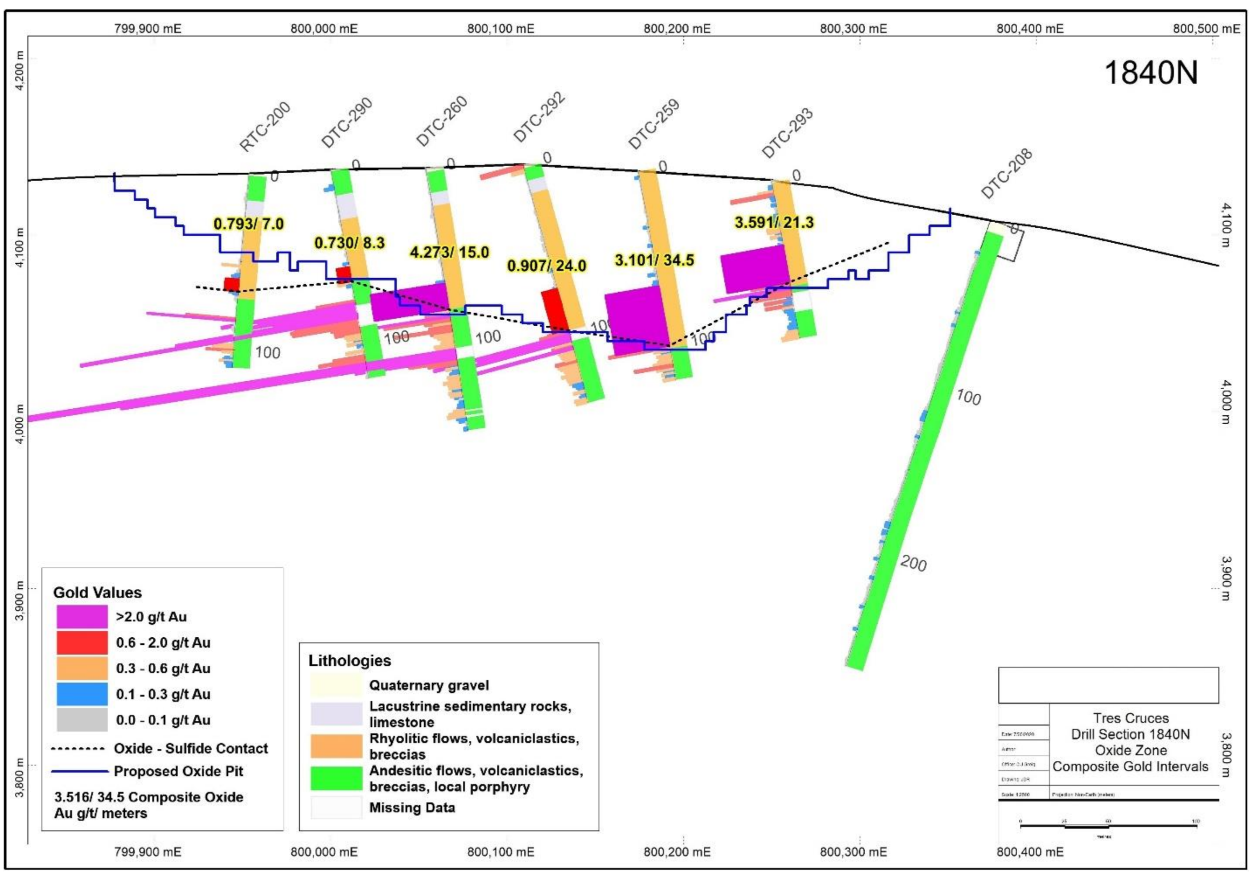



**Figure 10-3: Vertical Drill Section 1840N – Viewed at 360°**

Drill logs contain detailed descriptions of the lithologic intervals encountered in the holes, however, for the purpose of these plots the lithologies have been merged into three main categories: andesitic, rhyolitic and post-mineral lacustrine sedimentary rocks. The sections also show graphical representation of gold analyses, with ranges of Au grades depicted by different colours and lengths of bars: 0.1-0.3 g/t (blue), 0.3-0.6 g/t (orange), 0.6-2.0 g/t (red), and >2.0 g/t Au (violet). The oxide-sulphide boundary is shown by a dotted black line and it largely coincides with the base of the proposed oxide pit, which is described in Section 14. Gold values for oxide mineralization above the oxidation line have been averaged over composite intervals and the grade (g/t Au) / length (m) values for these intervals are shown for each hole. These composite intervals are approximately the same as those used for the oxide resource calculations in Section 14 and the drill sections can be correlated with the resource block sections shown in Section 14. Below the oxide boundary the gold values are graphically represented by coloured bars for each of the individual diamond drill core or RC rock chip samples, which are typically 1.5 m in length. These samples comprise andesite hosted sulphide mineralization that extends to considerable depth, with many of the holes ending in mineralization, such as some of those shown on Figure 10-4.

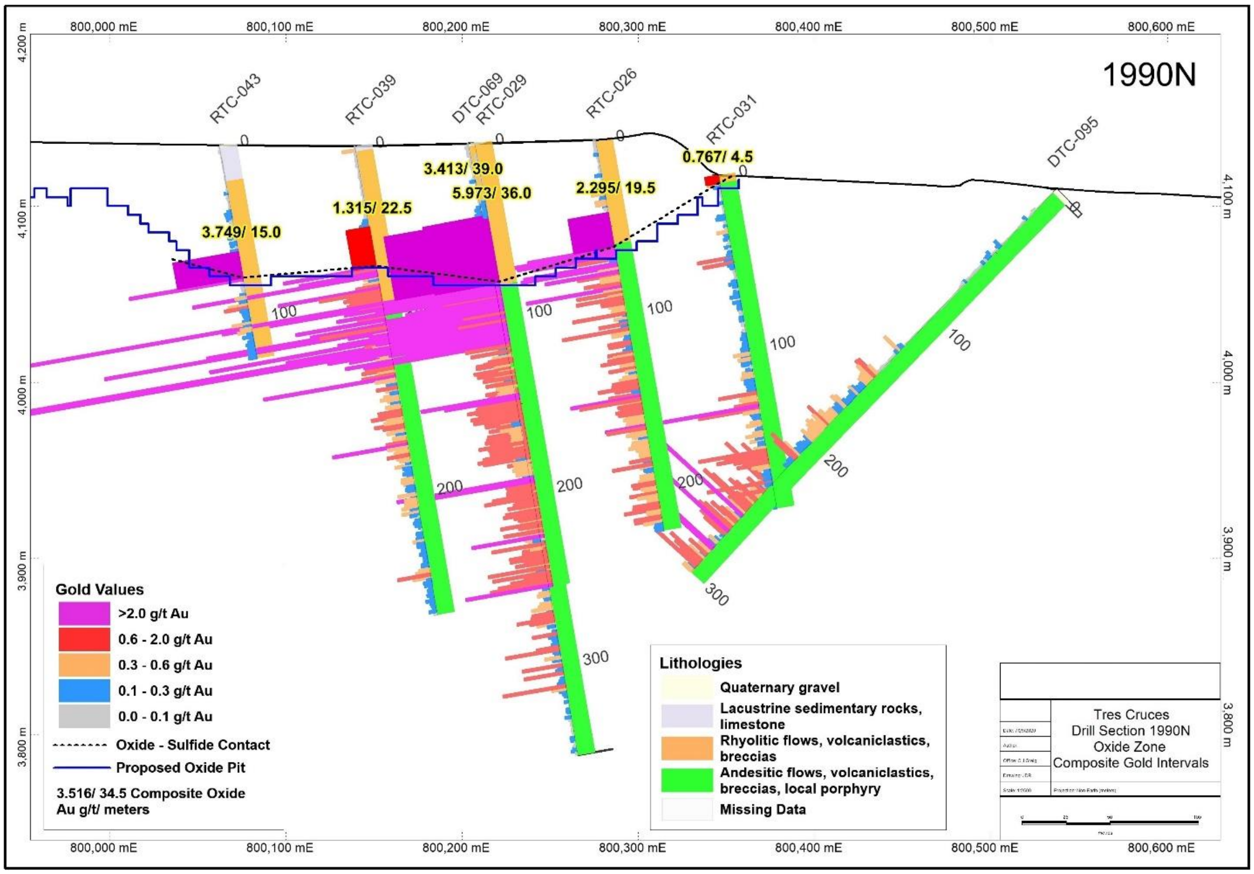



**Figure 10-4: Vertical Drill Section 1990N – Viewed at 360° and Proposed Oxide Pit Profile**

Oxide mineralization is present in varying thickness in most of the drill holes, lying above areas of sulphide mineralization. The distinction of the oxide-sulphide boundary in the holes was determined from core or rock chip log descriptions, as well as by the $\%S^{2-}$ content from sample analytical results for those samples that were analyzed for sulphur. Mineralized samples having $S^{2-}$ values less than 0.40% were generally considered to be oxide. For the drill sections, composite intervals of mineralized oxide were selected using 0.3 g/t Au cut-off, which can include some internal intervals grading less than 0.3 g/t.

The drill sections illustrate that the oxide mineralization occurs in the basal section of the rhyolitic unit, directly above the andesitic rocks that typically contain unoxidized pyritic mineralization. It is also apparent that the rhyolite-andesite contact is relatively flat and undulating. This agrees with the premise that the rhyolite unit was deposited on a relatively flat erosion surface.

In the Southwest Zone the thickest oxide intercepts define a zone extending over about 300 m north-south by 200 to 300 m east-west (Figure 10-2, Section lines 1790N through 2090N), and in the South Extension Zone a northeast-trending oxide area measures about 400 m long by 200 m wide (Section lines 2190N to 2490N). Some of the thicker and higher-grade oxide intercepts include RTC-029 with 36.0 m @ 5.973 g/t Au on Section 1990N (Figure 10-4), DTC-253 with 34.5 m @ 3.516 g/t Au on Section 2040N (Figure 10-5) and RTC-255 with 63.0 m @ 2.174 g/t Au on Section 2440N (Figure 10-7). Each of these oxide zones is underlain by significant sulphide mineralization.

The oxide zones show relatively good continuity from hole to hole, with mineralization occurring in anywhere from 5 to 9 holes per drill section. The longer stretches typically tail out into narrow bands, with the thicker part of the zone usually about 200 m in east-west dimension and having thicknesses in the 15 to 40 m range.

Section 2040N (Figure 10-5) extends across the entire width of the proposed Oxide and potential future Sulphide Pits and depicts the oxide mineralization of the Southwest Zone underlain by strong sulphide mineralization to a depth of up to 200 m below surface. This section also shows the sulphide mineralization of the South Zone in the east part of a potential future Sulphide Pit, with extensive intervals such as 2.298 g/t Au over 250.5 m in hole DTC-062.

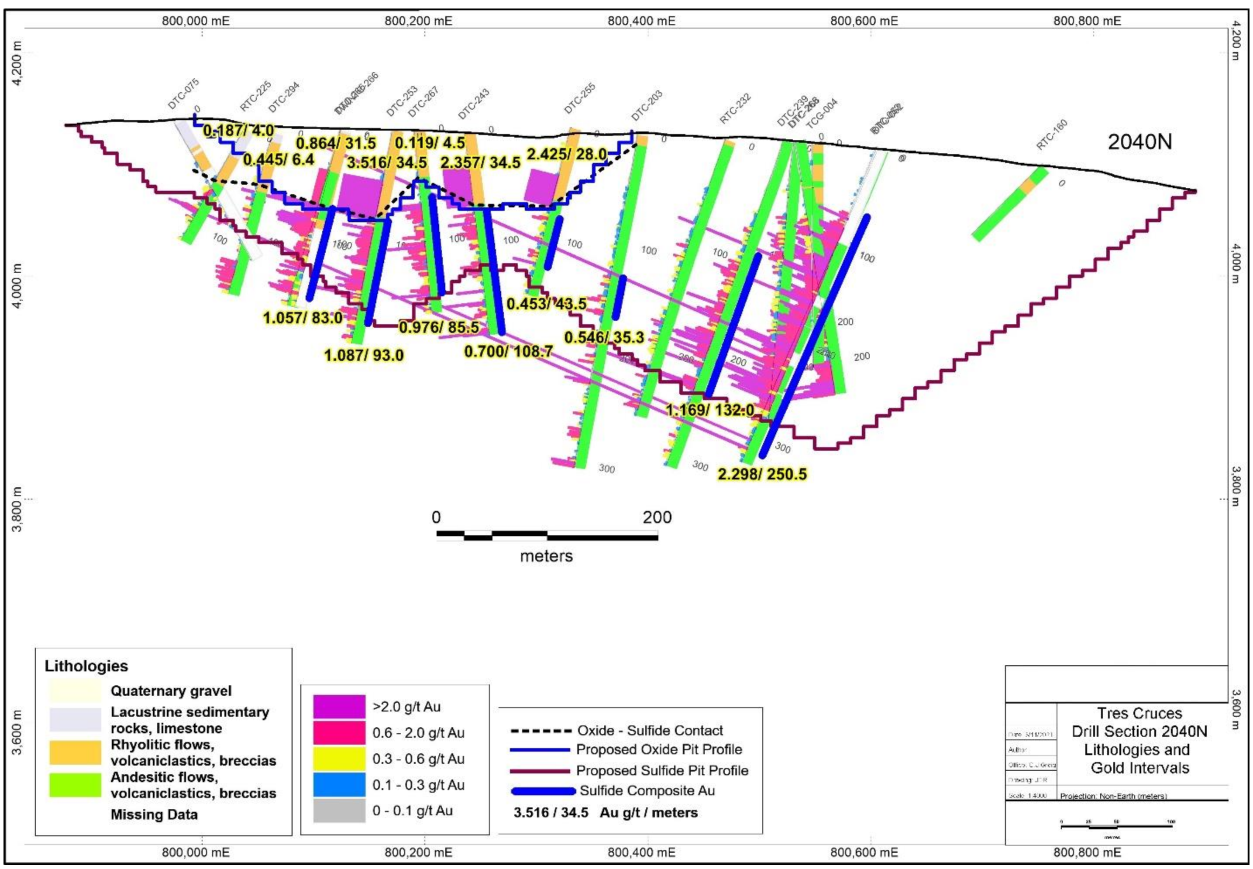



**Figure 10-5: Vertical Drill Section 2040N – Viewed at 360° and Proposed Pit Profiles**

In the eastern part of the cross-section, the rhyolite unit is largely eroded away, exposing andesitic volcanic rocks at surface, and consequently there is little oxide mineralization. In this area, sulphides are found from about 50 m below surface to a depth of over 250 m.

Section 2040N (Figure 10-5) shows an abnormality in the oxide zone continuity, with a thin, low-grade intercept located between two holes with strong oxide mineralization over significant thicknesses. The reason for this low-grade hole is not known, but it is clear from the drill section that the rhyolite-andesite contact is much higher in elevation in hole DTC-267 than in the two adjacent holes, so may have been subject to fault offset. Also, there does not appear to be good correlation of As and Hg geochemistry between the sulphide mineralization in the deeper part of hole DTC-267 and the adjacent holes to the east and west, as well as those immediately north and south of the section. Additional drilling in this area may help to understand this discrepancy, but for the most part the drill sections have shown good lateral continuity of mineralization.

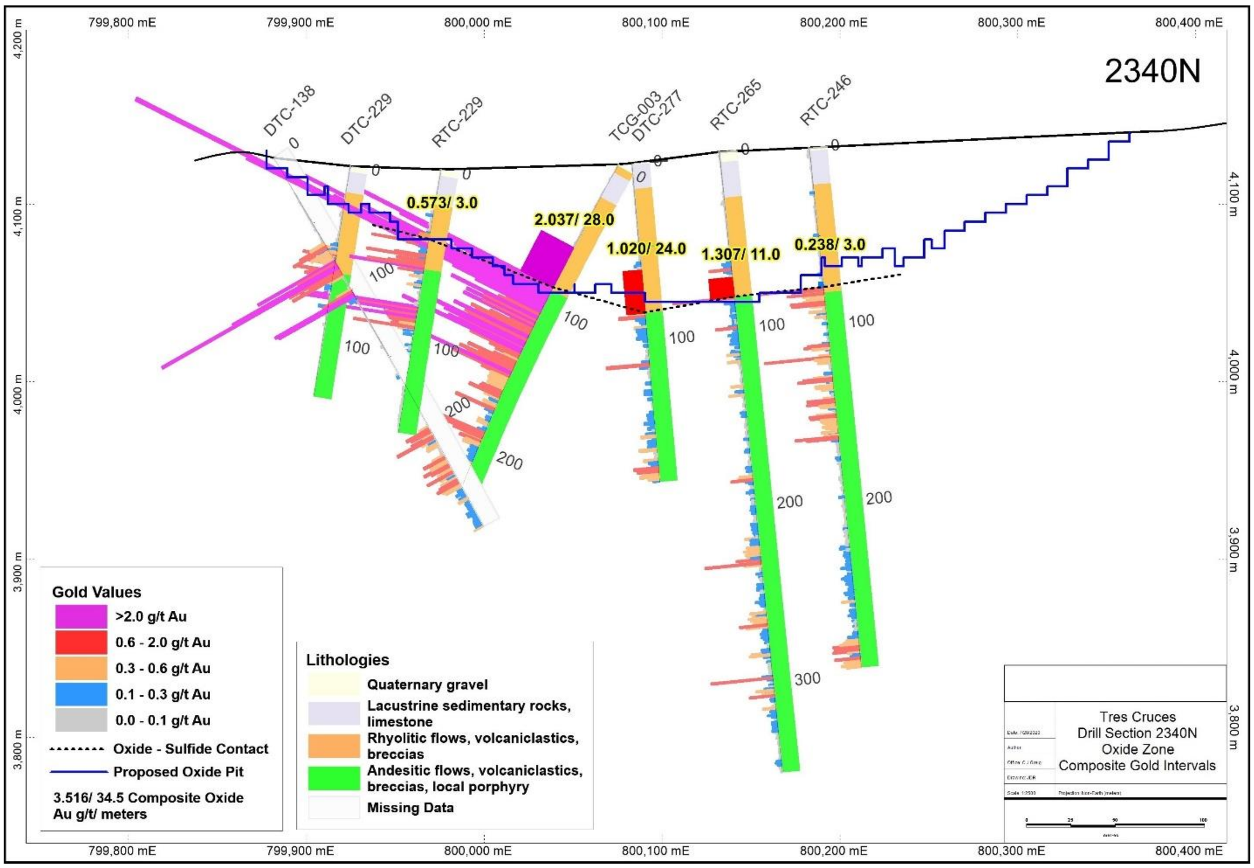



**Figure 10-6: Vertical Drill Section 2340N - Viewed at 360° and Proposed Oxide Pit Profile**

It can be observed on several of the drill sections that the thickest and highest-grade oxide intercepts commonly overlie strong sulphide mineralization that extends over considerable drilled lengths (>100m) within the underlying andesitic rocks. This would suggest steeply dipping components to the mineralizing system that may extend to considerable depths, with lateral spreading in the upper reaches, perhaps controlled by permeability of various lithologic units.

Figure 10-7 shows Section 2440N, spanning the width of a possible future Sulphide Pit, with composite intervals calculated for oxide mineralization and also for the underlying sulphide mineralization. It is clear that, in the core of the zone, the Au-bearing sulphides continue down hole for over 170 m (RTC-255) and are strong and open to depth. Gold grades in the oxides are typically somewhat higher than those in the sulphide mineralization, possibly due to concentration of gold caused by the oxidation processes affecting the sulphide minerals. Gold distribution, however, within the sulphides is relatively consistent over long intervals, such as 1.026 g/t Au over 132.0 m in hole TCP-07 and 3.118 g/t Au over 173.0 m in hole RTC-255. On this section, the sulphide mineralization of the South Extension Zone measures approximately 300 m laterally in an east-west direction and extends to over 250 m below surface. Sulphide mineralization shown in the east part of the drill section represents the South Zone, near its northern extent.

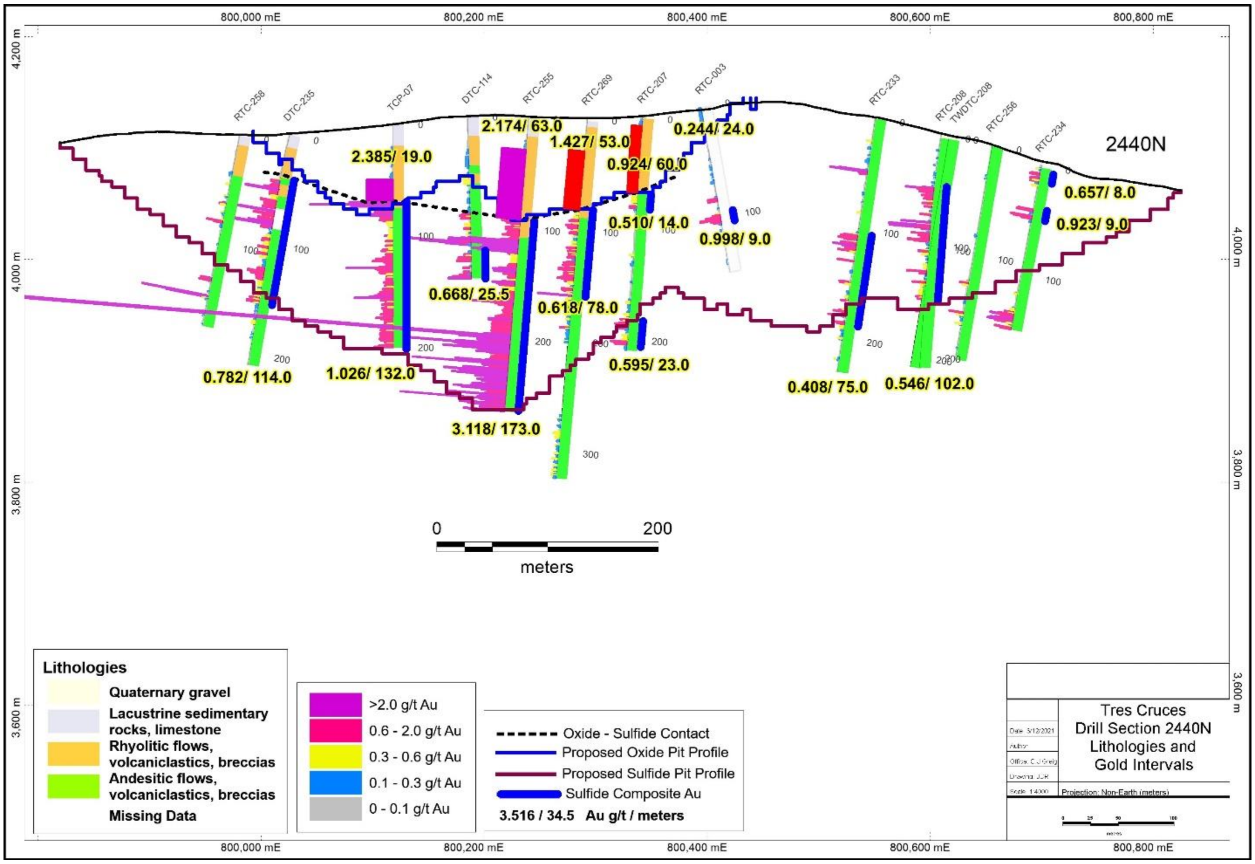



**Figure 10-7: Vertical Drill Section 2440N – Viewed at 360° and Proposed Pit Profiles**

Strong potential exists for the discovery of high-grade feeder zones based on previously encountered high-grade drill intercepts at depth that included visible gold, alteration patterns and breccias indicative of an extensive vertical range. Some of the deep holes completed by Barrick encountered gold and silver mineralization as deep as 350 m, with associated strong geochemical indications for continuing mineralization.

Mineralization encountered by relatively shallow drilling to date is completely within the Tertiary Calipuy volcanics. Breccias within parts of the deposit contain fragments from the underlying Cretaceous sedimentary formations, suggesting that hydrothermal fluids have passed through them and carried pieces of the older rocks upward. At the nearby Lagunas Norte deposit, mineralization is commonly hosted by quartz sandstone of the Cretaceous Chimu Formation, which unconformably underlies the Calipuy volcanics.

Worldwide, there are many examples of volcanic hosted deposits with high-grade mineralization concentrated near an unconformity, such as at Hishikari, Japan (Faure et al., 2002) where bonanza grades (>100 g/t Au) lie within a 50 m vertical extent above and below the unconformity surface. Therefore, the unconformity at the base of Calipuy, as well as the underlying Chimu lithologies at Tres Cruces provide excellent exploration targets for further drilling.

### 10.1.1 2022 Confirmation Drilling Program

In 2022 eight diamond drill holes were attempted, however, two of the holes could not be completed to their target depths, and were abandoned, two holes were drilled in areas of known mineralization to provide core for metallurgical testwork (that was not assayed), and the remaining four holes were drilled as confirmation of mineralization. The confirmation holes twinned mineralized holes or were drilled between areas of known mineralization. Figure 10-8 shows the locations of the 2022 drill collars (ATC-500 to 507) and hole projections, as well as section lines, which are the locations of vertical cross sections displayed below on Figure 10-9 to Figure 10-11.

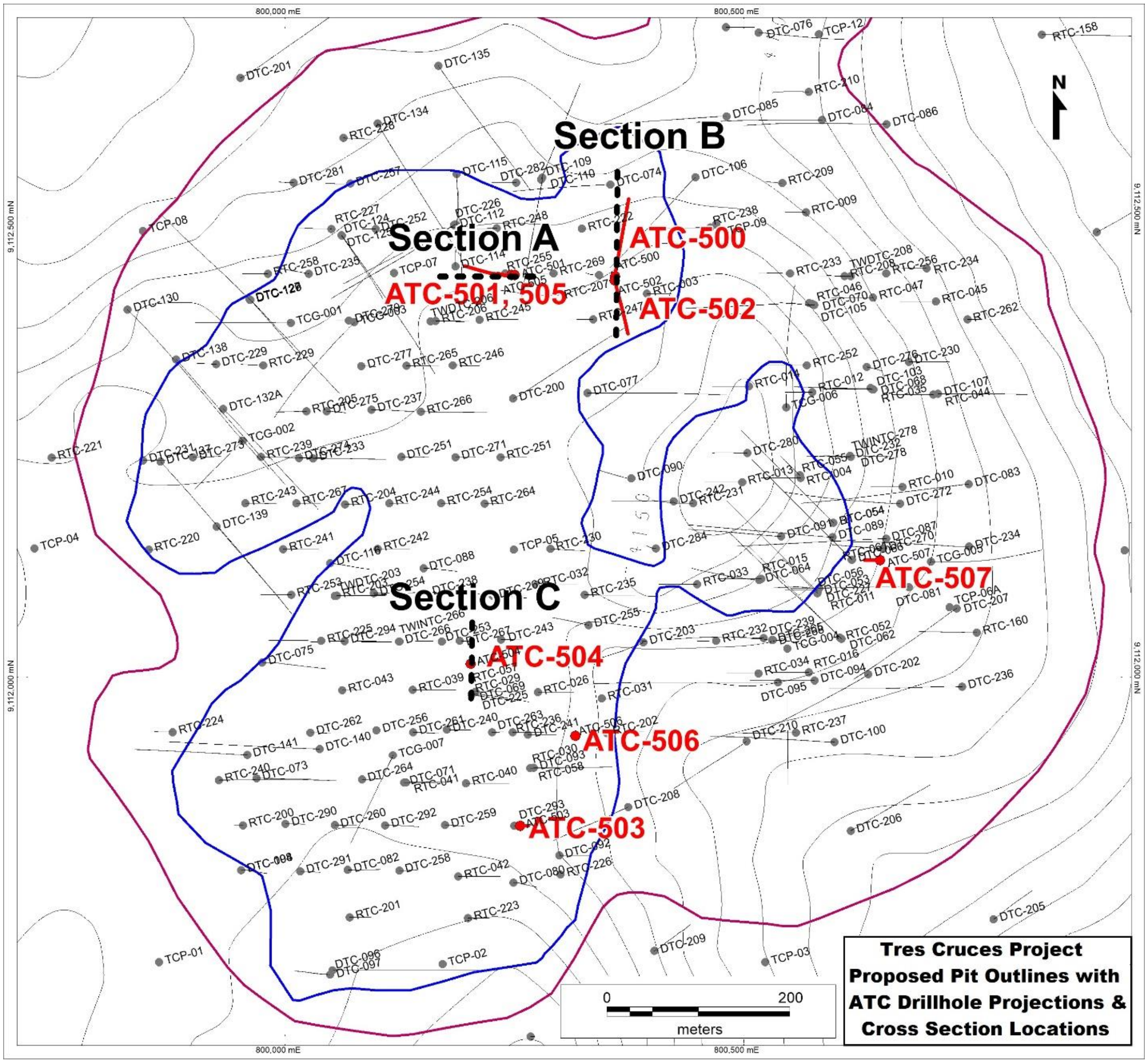



**Figure 10-8: ATC Drillholes (2022) & Cross Section Line Locations Within Areas of Proposed Pits**

Section A (Figure 10-9) is a vertical side-by-side comparison of gold assay results from RC hole RTC-255, that was drilled in 2007, with DC hole ATC-501 that was drilled in 2022, 10 meters to the east of RTC-255. Coloured bars graphically illustrate the gold values for samples collected down the holes, with longer and “warmer” coloured bars depicting higher grades. The RC samples were all 1 m in length, the DC samples ranged generally from about 0.5 m to 1.5 m in length.

The two holes show relatively good correlation of bands of mineralization, based on comparison of intervals of higher gold grades. There appear to be two higher grade zones, in the upper and lower parts of the holes, separated by an interval of medium to low gold grades. There is a sharp spike of high grade in RTC-255 at about 200 m that averages 79.7 g/t Au over 2 m, which is not unusual since there are known to be narrow veins in the deposit that contain coarse gold. This high-grade spike could partially account for the higher composite grade of 2.866 g/t Au over 236.0 m in RTC-255 compared to 1.876 g/t Au over 210.25 m in ATC-501. For resource calculation purposes, very high gold grades were cut to 60.0 g/t Au.

The longer mineralized interval in RTC-255 could possibly be due to thickening of the mineralized band to the west of ATC-501. Although there was no downhole surveying done in hole RTC-255, the distance between the two holes at the bottom of RTC-255 is less than 10 m. Mineralized bands are generally fairly flat lying, but undulations can cause localized thickening or thinning of gold-bearing horizons over short distances. Alternatively, the apparent deeper mineralization in reverse circulation hole RTC-255 could have been caused by downhole contamination, whereby mineralized material from the sides of the RC hole could have fallen downhole and been included with the rock cuttings from deeper in the hole. There is no evidence that this happened, however, further comparisons of twinned RC holes and diamond core holes may help resolve this question.

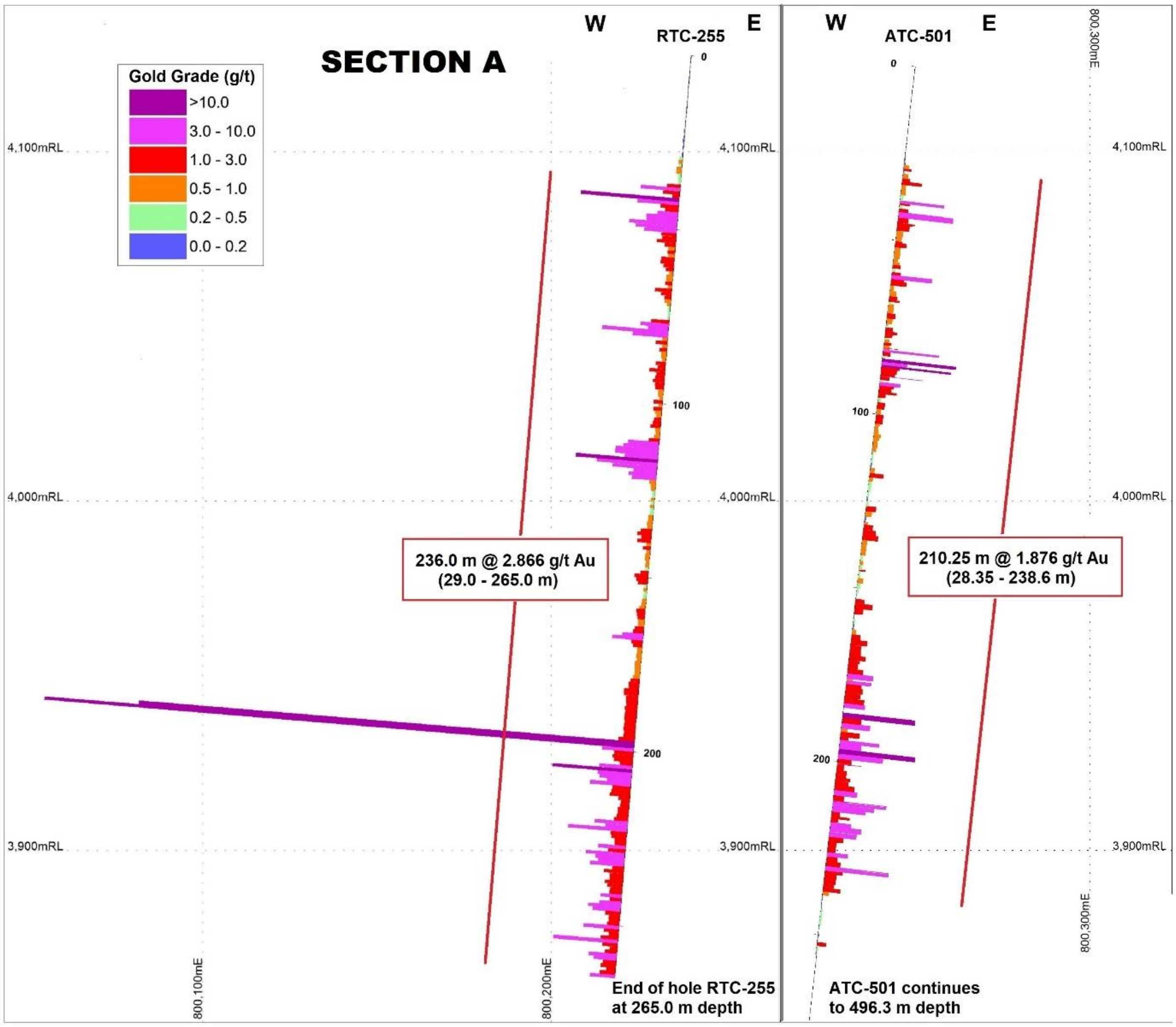



**Figure 10-9: Vertical Cross Section A, Viewed to the North**

Section B (Figure 10-10) is a vertical cross section through infill holes ATC-500 and ATC-502 and some adjacent historical holes. Hole ATC-500 tested the area between two previous holes that are about 50 m apart. The composite interval of mineralization in ATC-500 returned very similar results to the adjacent holes, with 64.4 m averaging 1.020 g/t Au, compared to 60.0 m at 0.943 g/t Au in RTC-207 and 50.0 m at 0.806 g/t Au in RTC-222. Since ATC-500 is an inclined hole, the comparable vertical thickness would be approximately 53 m. Deeper in ATC-500, more sporadic, moderate-grade mineralized bands correlate well with similar intervals in RTC-222. The results from this infill hole indicate very good continuity of mineralization at relatively consistent gold grade over at least a 50 m horizontal distance.

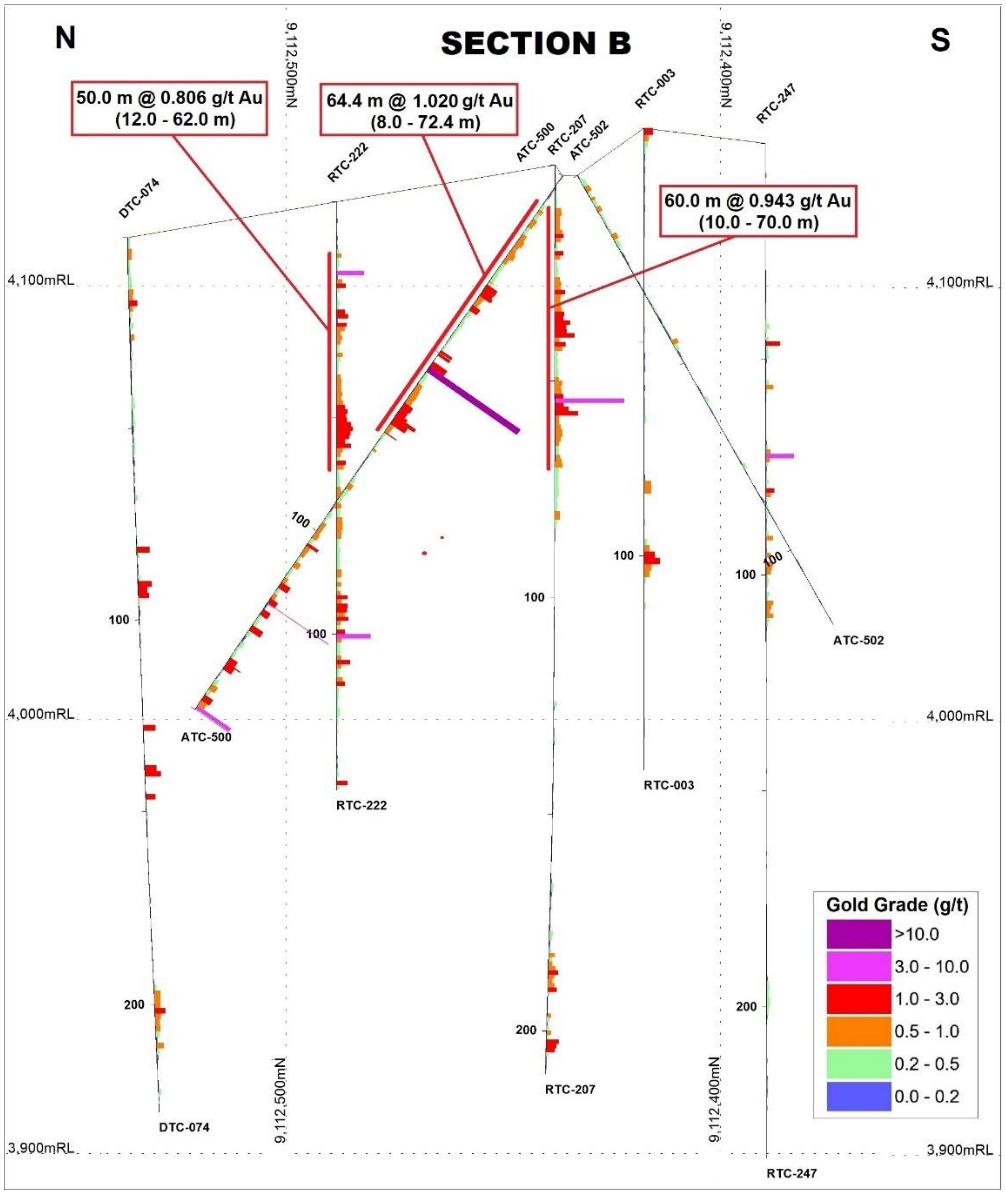



**Figure 10-10: Vertical Cross Section B, Viewed to the East**

Infill hole ATC-502, drilled to the south, confirmed a very abrupt end to the higher-grade mineralization in that direction, and to the east, as was seen previously in holes RTC-003 and RTC-247. Scattered short mineralized intervals are seen in all these holes, but the reason for the diminished mineralization is not clear; it could be due to a fault offset, or possible facies change to less permissive host rock for gold mineralization. Configuration of the underlying andesite porphyry intrusion in this area may also play a role in gold distribution. This infill hole confirmed the results of previous drilling.

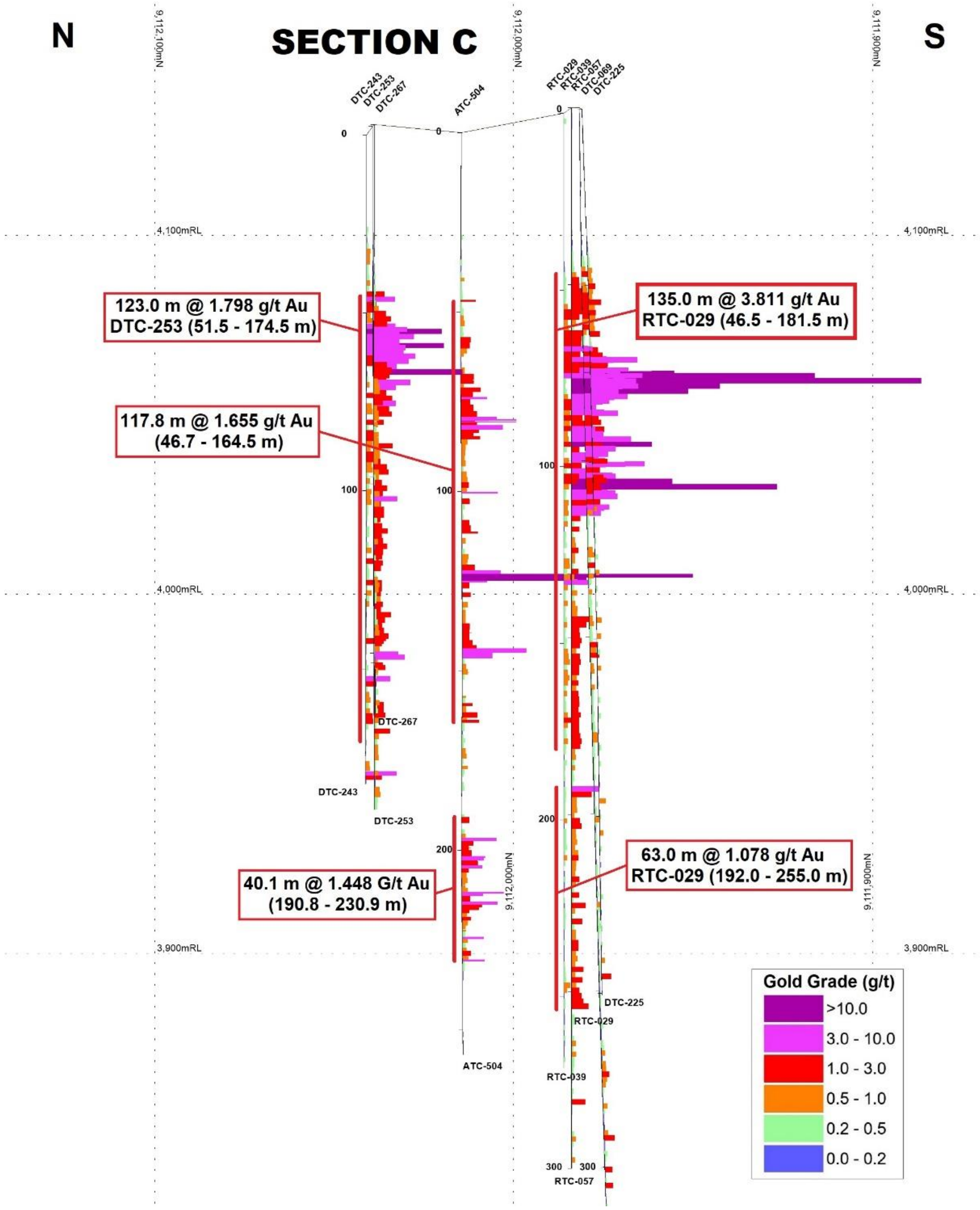



**Figure 10-11: Vertical Cross Section C, Viewed to the East**

Section C (Figure 10-11) is a vertical cross section through infill hole ATC-504 and some adjacent historical holes. Hole ATC-504 tested the area between clusters of holes that had returned significantly long intervals of gold mineralization on E-W drill fences spaced 50 m apart. The objective of the infill hole was to check the area of hole DTC-267 because it had returned lesser mineralization than surrounding holes, with a composite interval of 85.5 m averaging 0.976 g/t Au. Unfortunately, the drill could only be positioned 28 m southeast from DTC-267, so it was not a very effective test of that hole. This infill hole did, however, provide strong confirmation of results from other holes located about 25 m to the north and south. For instance, a composite interval of 117.8 m averaging 1.655 g/t Au in hole ATC-504 very closely resembles the composite in DTC-253 that comprises 123.0 m at 1.798 g/t Au. To the south, the composite interval length is similar, but grade is increasing, especially in RTC-029 which returned 135.0 m at 3.811 g/t

Au. A deeper mineralized interval in ATC-504, (40.1 m at 1.448 g/t Au), also correlates moderately well with an interval in RTC-029 (63.0 m at 1.078 g/t Au). The infill hole, ATC-504, was successful in confirming thickness and grade of mineralization in this area.

In summary, the results of the four confirmation holes completed in 2022 were very comparable with those of nearby historical holes. Because they are all infill holes it is probable that if they were added to the database used previously to estimate the current resource, the resulting change to the resource would be insignificant. The greatest benefit of the confirmation holes is that they increase the confidence level in the results of the previous drilling.

# 11 SAMPLE PREPARATION, ANALYSES AND SECURITY

## 11.1 SAMPLING METHOD AND APPROACH

Data used for mineral resource estimation in this report includes samples from 159 reverse circulation (RC) holes and 168 diamond core (DC) holes that were collected from 1996 to 2008. Data from 4 confirmation holes drilled in 2022 was not used to update the resource because it is believed that the change in the resource would be insignificant and is not material to this report. Information regarding the sampling method and approach for pre-2002 drilling that was available for the authors to review had limited detail provided, such as Cooper's 1999 report on resource modeling (Cooper, 1999). Reports by Reeder and McCrea (2002) and Smee and Associates Consulting Ltd. (Smee, 2008) provided more information. Smee audited quality control methods, data, field measurements and sampling protocol for work done up to 2008. Further work on the Property should continue to include documented sample procedures and assessment of any factors that may materially impact on the accuracy and reliability of the data.

Discussions of sampling methods and approach contained in this report are based on written descriptions by Barrick project staff and their consultant, Smee and Associates Consulting Ltd. (Smee, 2008).

The most common sample interval for diamond drill core was 1.5 m, although shorter and longer intervals exist, primarily reflecting changes in lithology and mineralization. The variation in sample length is particularly high in the first 25 holes that were drilled by Barrick (DTC-200 to 224) when they took over the Project in 2002. Barrick subsequently reverted to a more consistent 1.5-m sample length for the remainder of the DC holes. For RC drilling, the sample length was 1.5 m for the pre-2002 drilling (Oroperu & BMC) and 1.0 m for sampling in 2002 and onward (Barrick).

### 11.1.1 Diamond Core Procedures

No record of core size was found for the Oroperu diamond drilling but is recounted to be NQ (private communication, Oroperu management). BMC drilled core holes using HQ (63.5 mm diameter) equipment, reducing to NQ (47.67 mm diameter) when ground conditions prevented hole continuation with the HQ. Besides geological logging, other data collected included core recovery, magnetic susceptibility, rock quality designation (RQD), PIMA (portable infrared mineral analyzer) readings, and specific gravity. All the core was photographed. At least three downhole orientation readings were taken for each hole, usually near the top, middle and bottom of the hole (Battle Mountain Canada Ltd., 1999b).

All core from the 1996 and 1999 programs is stored at ATC's warehouse in Trujillo. Each box is labelled with the drill hole name and from-to meterage and contains metre blocks and sample interval tags. All core was sorted and catalogued by Barrick, after they assumed the Project, and the previous core logging was checked or re-logged. Smee (2008) reported that the pre-2002 drill core had been catalogued properly, was stacked in order, and was in good condition, apart from the sample number tags on some of the 1999 drill holes. Sampling tags, when found, were in the correct meterage positions. The geological logging terminologies were somewhat different to that used by Barrick but were acceptable to the Barrick geologists (Smee, 2008). All of BMC's core had been sawn for sampling, except for highly siliceous rock, which was split (Battle Mountain Canada Ltd., 1999b).

During 2007, it was reported that diamond drilling was done with a standard wire-line skid-mounted LF-70 Longyear rig using HQ rods, or if ground conditions dictated, smaller NQ rods. It is believed that similar equipment and rod sizes were used in the earlier Barrick drilling as well.

Core from the Barrick drilling programs (2002-2008) is also stored at ATC's warehouse in Trujillo. The following procedures are paraphrased from Smee's report (Smee, 2008).

The core from the field was received in a sorting facility at the Barrick storage yard. Initially the core was placed in wood boxes with lids, but after 2002, metal trays were used. The core trays were numbered with the drill hole number, the box number and the "from-to" meterage, and core recovery was estimated by measuring the core between the driller's blocks. A "quick log" was done by the logging geologist in paper form. Core was then subjected to density measurements and photography. It was then marked for sampling by the geologists and taken to the cutting shed where it was cut along the axis with a diamond saw. One-half was placed in the sample bag and the remainder returned to the tray. Sample bags were pre-numbered with sample tickets already attached to the bag. Quality Control (QC) positions (blanks, standards) were pre-determined from a template. The trays were then taken to a shed where the remaining half core was logged in more detail. Although the 2022 drilling results are not included in the resource estimate, the drill core procedures were very similar to those described above, and the 2022 core is also stored in Trujillo.

Smee (2008) had reservations regarding the method used for density measurements. Entire core trays were immersed to measure densities for each tray; therefore, the measurements may not have been lithology specific. Smee compared 51 measurements of core by (more commonly used) wax coating and water immersion with the submerged tray measurements and concluded that while there is less than one percent difference overall, considerable scatter exists within the paired data. Secondly, sampling accuracy may have been compromised because samples were collected and analyzed after immersion, which may have resulted in loss and omission of fine materials from samples, which may or may not contain gold. Smee recommended that a selection of samples representing each lithology be submitted for standard wax coating/water immersion measurements.

### 11.1.2 Reverse Circulation Procedures

The Oroperu phase of RC drilling used a large-wheeled 4x4 buggy tandem drill, model W-750 Prospector, and drill support vehicle manufactured by Foremost Industries in Canada. Oroperu assisted in the importation of this equipment for its drilling requirements. This drill was also used by Barrick. BMC used a track-mounted DWR reverse circulation drill. Center return hammers were used when possible in the Oroperu and BMC RC programs and samples were collected in 1.5-m intervals by a geo-technician and two helpers. A Gilson splitter was used for all samples and was continually adjusted to yield 5 to 8 kg of sample. Percent recovery, water produced, drilling rate, sample color, and basic lithology data were collected for each interval. Small splits were collected from each sample interval for geological logging (Battle Mountain Canada Ltd., 1999b) and stored in chip trays with the similar Oroperu trays.

The following description pertains specifically to the 2007 RC drilling undertaken by Barrick, which represents a large component of the overall RC drilling. In 2007, RC drilling utilized the same W-750 Prospector drill as earlier programs. Face-sampling center-return hammers were used exclusively, which ensures high quality samples and high advance rates. As well, the inner tube is of large bore diameter, minimizing back pressure and maximizing return of fines.

For dry drilling, a pre-labelled microporous sample bag was attached to the cyclone of the RC rig. The cyclone valve was used to control sample discharge in the appropriate interval, which was one metre for the Barrick drilling in 2007. Samples were taken in their entirety back to Lagunas Norte, where a Gilson splitter (#SP-1) was used to reduce the sample weight to about 8 kg from 35 kg. The splitter was cleaned with compressed air after each sample. Smee (2008) noted that during his observation the splitting area was not enclosed, and considerable dust was generated. For wet drilling, a hydraulic splitter was attached below the cyclone and sampled material discharged into two clean buckets, each representing a one-half split of the drilled interval. The sample was collected from the buckets once it had time to settle. The halves were bagged separately, using the second bag as a field duplicate when necessary. The labelled bags were then shipped back to Lagunas Norte for drying and further processing. Buckets were washed between sample intervals and the cyclone/splitter assembly washed every six metres. No description of logging procedures for RC drill cuttings was available for the authors to review. Tables containing summarized intervals listing lithologies, alteration and mineralization for each hole were provided to the authors; however, they contained little detail and a legend of lithology symbols was not available.

#### 11.1.3 Drilling Recovery

No diamond drilling recovery data for pre-2006 drilling was available to the authors; however, core recovery for the 2006 and 2007 programs (73 holes, 5,658 intervals) was very good, with the first 50 to 75 m of each hole generally lower, likely a result of deep weathering and oxidation. Overall recovery was calculated at 96% based on measurements taken by Project geologists. No data for RC drilling recovery was provided.

### 11.2 SAMPLE PREPARATION, TRANSPORTATION AND SECURITY

Samples collected during the pre-2002 drilling programs were shipped to analytical laboratories without any additional preparation. Barrick, however, maintained its own sample preparation laboratory at Lagunas Norte where, normally, drill samples from Tres Cruces were processed prior to shipment to independent offsite laboratories. During backlogs, samples were sometimes shipped without processing, although the proportion of samples is not known.

The normal sample preparation procedure, whether at Barrick's facility or at an independent lab, is as follows. Sample quantities and codes are verified, and the physical state of the sample is noted. Samples are emptied into trays and dried in an oven at 105°, then crushed to 90% passing 0.25 inches. The crusher is cleaned with compressed air after each sample and blank material inserted after every tenth sample to minimize contamination. The crushed sample is reduced in size from an average of 8 kg down to about 500 g using a Jones splitter. The reject is returned to the original sample bag and stored for future reference. The reduced sample is pulverized to 90% passing 200 mesh using a Lab Tech LM-2 pulveriser and split into two envelopes. The bowl of the pulveriser is cleaned with compressed air after each sample. One envelope is sent to an outside lab for analysis and the other is retained for further reference and testing as required.

Prepared samples are packaged at the prep laboratory and returned to the geology department in boxes where QC samples (standards and blanks) are inserted with the samples from the laboratory. These boxes are sealed with a laboratory order inside and shipped to the outside assay laboratory using a contracted trucking company.

### 11.3 ANALYTICAL PROCEDURES AND LABORATORIES

During the Oroperu phase of exploration, samples were shipped to SGS Labs in Lima, Peru for a 1-assay tonne gold fire assay with an Atomic Absorption (AA) finish reported in parts per billion (ppb). A second pulp was shipped to Acme Analytical Labs in Vancouver for any sample with an initial assay of 300 ppb Au or greater, and duplicate pulps were checked at random. Additionally, those samples less than 300 ppb Au were included if the sample was part of a continuous mineralized interval. Acme Analytical results were used in the final database for resource modeling.

BMC sent their samples to ALS Laboratories in Lima for gold analysis, which included fire assay-gravimetric analysis for high values, and an ICP 33-element package. A cyanide shaker solubility determination was also carried out on selected samples with assays of greater than 500 ppb Au in earlier holes and 1,500 ppb in later holes.

Barrick sent their samples from Tres Cruces to ALS Chemex in Lima for gold analysis by fire assay and atomic absorption finish (ALS procedure Au-AA24) using 50-gram pulp samples. All samples reporting assays greater than 10 g/t Au were re-analyzed by fire assay with a gravimetric finish (ALS procedure Au-GRA22). As of February 2008, all samples greater than 5 g/t Au were re-analyzed using the gravimetric finish. Samples were also analyzed for 34 element ICP (inductive coupled plasma) – AES (atomic emission spectroscopy) after decomposition by nitric aqua regia digestion (ALS procedure ME-ICP41).

Although the 2022 drilling results are not included in the resource estimate, the 2022 drill core analyses were performed by ALS using analytical procedures very similar to those described above for the Barrick samples, thereby providing consistency between drilling campaigns.

SGS and ALS laboratories in Peru both have ISO/IEC 17025:2017 accreditations for the analytical techniques that were employed for the Tres Cruces samples.

## 11.4 DUPLICATES, STANDARDS AND BLANKS

In Smee's (2008) report, it was indicated that the pre-2002 data generated by Oroperu and BMC did not contain any known quality control (QC) data, and therefore cannot be confirmed directly as being accurate, precise, or non-contaminated. However, Reeder and McCrea (2002) reported that Oroperu inserted duplicates for about 10% of the samples, although the results of this QC program were not available for the authors to review. Oroperu drilled 11 DC and 50 RC holes during 1996 and 1997. BMC also maintained a QC program, with a gold standard sample inserted for every fifty drill samples as quality checks on the lab (Cooper, 1999). ALS also performed duplicate analyses for their own internal quality checks. Between 1998 and 1999, BMC drilled 82 DC and 26 RC holes, with a total of 13,570 samples submitted for assay. Cooper (1999) provided a summary of QC results for BMC's sampling in his 1999 report, indicating that there were no significant failures or discrepancies in the results.

The insertion of QC samples to monitor accuracy, precision and possible contamination was undertaken by Barrick for the Tres Cruces drilling samples since 2002. In their 2002 - 2004 programs Barrick drilled 29 diamond core holes and took 4,170 samples. Barrick inserted a QC sample in the form of a duplicate, standard, or blank in the sample stream at an approximate frequency of one for every 28 samples. During the 2006/2007 program, Barrick drilled 86 DC and 73 RC holes and took 25,899 samples, with the frequency increasing to about one QC insertion for every 12 samples. The authors have not reviewed this data, although most aspects of the QA/QC program employed by Barrick for Tres Cruces drilling results are described in Smee's (2008) report, and the authors have reviewed Smee's report, which is summarized below.

### 11.4.1 Standards and Blanks

A total of 169 gold standards were inserted with drill samples collected by BMC. The most commonly submitted standard generally assayed within a 50 ppb range straddling an accepted value of 637 ppb. (+/- 4%). The second most commonly submitted standard, of a comparable grade, generally assayed within a much broader range (up to 100 ppb), although lab accuracy appeared to have been improving over time and the nominal range for the latter half of these data is acceptable. Standard R4 had the highest value of those used (1,077 ppb), and although only representative of 12% of the data, an unexplained trend of reduction in accuracy over time can be noted (Cooper, 1999).

Barrick used two standards during the 2002 to 2004 program: one averaging approximately 8.9 g/t Au, and the other approximately 1.24 g/t Au. A total of 50 standard samples were inserted at an average frequency of one in 83 samples. Batch failures for accuracy and bias were defined as any assay result for a standard that was more than three standard deviations from the stated mean (accuracy) or any two consecutive values that were more than two standard deviations on the same side of the mean (bias). The latter did not have to be from the same standard. There were no failures in the standards, and no significant bias in analyses. According to Smee (2008), this analytical data can be considered to be accurate within the limits of industry best practice. A total of 49 blanks were inserted with the samples (about the same frequency as standards) to monitor contamination. Only one sample exceeded the warning threshold of 0.025 g/t Au.

During the 2006/2007 Barrick program, 897 standards and 756 field blanks were inserted. Eight different standards, ranging from approximately 0.5 g/t Au to 4.9 g/t Au, were used, with no failures noted in the 2006 drilling and ten failures in the 2007 drilling, all of which were addressed and corrected. For blanks inserted during the 2006 program, there was one failure that was a probable mix-up in samples and four low-level failures that exceeded the 0.025 g/t Au threshold. There were seven low-level failures for blank insertions in the 2007 drill samples. None of the 2006/2007 failures exceeded the previously established threshold of 0.04 g/t Au. No action was taken on these failures; however, if the insertions lie within a mineralized interval, re-assay of the intervals may be warranted.

Smee (2008) recalculated the means and limits for the standards and, under the new limits, several failures were noted in the 2006 data and a large number of failures in one of the low-grade standards in the 2007 data. Smee concluded that the 2006 program may have a low bias for low grade samples but is accurate within industry best practice. For 2007, Smee concludes that the high bias and failure rate for the lowest grade standard is most likely a problem with the standard since the next standard shows a slightly low bias of -0.9%. There is also a rising, but acceptable, trend in positive bias (from 1 to 3.5%) as the grade of the standard increases, except for the highest-grade standard, which has results that are biased low. This may indicate a problem in the range where the finish is switched from AA to a gravimetric and Smee (2008) recommended that a new high-grade standard should be made to monitor those assays using a gravimetric finish. Table 11-1 summarizes the comparison of the average of lab analyses to the certified value for each standard sample used in 2007, in order of increasing grade (Smee, 2008).

**Table 11-1: Barrick 2007 Standards Lab Results**

| Standard | Certified Mean g/t Au | ALS Chemex g/t Au (Avg) | Average Difference % |
|---|---|---|---|
| M3B06 | 0.499 | 0.524 | 5.114 |
| SPD-9 | 0.553 | 0.548 | -0.943 |
| STD 12 | 1.223 | 1.218 | -0.373 |
| M2AH07 | 2.202 | 2.234 | 1.450 |
| SPD-8 | 2.824 | 2.853 | 1.015 |
| M1A06 | 3.978 | 4.117 | 3.496 |
| M307 | 4.969 | 4.654 | -6.340 |

Source: Smee, 2008

### 11.4.2 Duplicates

No reports or data are available for duplicate samples taken during the Oroperu phase of exploration. For BMC drilling, comparisons were made on 689 samples between original ALS assays and SGS check-assays from pulps. An internal report by BMC (Battle Mountain Canada Ltd., 1999b), stated that there were no obvious problems encountered with reproducing assay results during the BMC drilling. Cooper (1999) indicated there was reasonable agreement (within 10%) between the two laboratories for samples greater than 0.3 g/t Au, with original assays from ALS tending to be lower than SGS for samples in the 0.5 to 1.0 g/t Au range but higher for samples above 1.0 g/t Au. A summary table of check assay statistics for the BMC data produced by Cooper is provided in Table 11-2.

**Table 11-2: BMC 1998/1999 Pulp Duplicate Assay Statistics**

| ALS Grade Range g/t Au | Original (ALS) g/t Au (Avg) | Duplicates (SGS) g/t Au (Avg) | Difference % |
|---|---|---|---|
| <0.3 | 0.070 | 0.087 | 25 |
| 0.3-0.5 | 0.388 | 0.389 | 0 |
| 0.5-1.0 | 0.710 | 0.762 | 7 |
| 1.0-2.0 | 1.378 | 1.282 | -7 |
| 2.0-5.0 | 2.854 | 2.770 | -3 |

Source: Cooper, 1999

A program of re-analyses of some of the pre-2002 drill samples was undertaken by Barrick in 2002/2003. A total of 2,274 samples from 14 DC holes and one RC hole were selected. Standards, blanks, and duplicates were submitted with the samples, with no serious QC issues arising. The results of the re-assay program indicated a small positive bias for the original assays for grades between 1 and 3 g/t Au, while for grades above 5 g/t Au, the original data was biased low. The latter may be due to the fact that Barrick used a gravimetric finish for higher-grade results. The overall conclusion was that the original assay data from Oroperu and BMC drill samples may be conservative if used in a resource calculation (Smee, 2008). Table 11-3 summarizes these findings.

**Table 11-3: New Oroperu Pre-2002 Sample Re-Assay Results**

| Type | Original g/t Au (Avg) | Duplicates g/t Au (Avg) | Difference % |
|---|---|---|---|
| RC (1 hole) | 0.889 | 0.830 | -6.6 |
| Diamond (14 holes) | 0.499 | 0.522 | 4.6 |
| Diamond < 5 g/t Au | 0.481 | 0.477 | -0.8 |

Source: Smee, 2008

Fifty duplicates were also taken from Barrick's own drill samples during the 2002-2004 campaign. Smee (2008) concluded that although there is insufficient data to estimate precision accurately the calculated difference of 13% is better than most deposits of this type.

There were 376 RC and 175 core duplicates taken during Barrick's 2006/2007 program. Analyses of scatter graphs by regression (Smee, 2008) indicated a positive bias in the original RC results for values above 1 g/t Au while data for core drilling shows no bias.

Lacroix (2012) observed that the bias and scatter observed in 2006/2007 RC data is not evident in the 2007/2008 RC data although regression shows a small positive bias in favour of the duplicates. This may well be the result of mislabeling. If the two most obvious deviations are removed from the data set, no discernable bias is indicated. For the 2007/2008 program, the differences in the means between original and duplicate analytical results for both the RC and core drilling were not found to be statistically significant at a 95% confidence interval.

### 11.5 EVALUATION OF SAMPLE PREPARATION, SECURITY AND ANALYSIS

Samples collected during the pre-2002 programs were shipped directly to accredited labs, whereas Barrick samples were prepared in their own laboratory at Lagunas Norte. Based on Smee's comparison of results for Barrick's prepared samples, Barrick's laboratory has performed sample preparation to industry standards (Smee, 2008). As no detail regarding chain-of-custody from the Project to the assay laboratories was available for the authors to review, no assessment can be made regarding security. It can however be said that there would be very little incentive for sample tampering in a company with the stature of Barrick.

Little is known about the results of Oroperu's QC programs. BMC inserted QC samples and monitored results, as can be evidenced from Cooper's report (Cooper, 1999); however, it is not known what failure criteria and corrective action was employed, if any. The authors note that according to Cooper's Table 11-2, the differences are well within expected ranges for deposits of this type. The results of Barrick's re-sampling program in 2002 and 2003 suggest that the data is accurate within industry standard although biased low for samples over 5 g/t Au (Smee, 2008).

Barrick maintained a comprehensive QA/QC program for the Tres Cruces sample preparation, security, and analysis, which, in the authors' opinions, meets or exceeds industry standards. There were no failures in the 2002-2004 standards analyses, and no significant bias in values. No failures were noted in the 2006 drilling and the ten failures in the 2007 drilling were all addressed and corrected. There were no 2006/2007 blank sample differences that exceeded the previously established threshold of 0.04 g/t Au.

With respect to duplicate data, Smee (2008) concluded that precision is within normal limits expected from similar gold deposits. Overall, the authors conclude that the Tres Cruces data is suitable for use in mineral resource estimates.

# 12 DATA VERIFICATION

## 12.1 DATABASE

Barrick's database of Tres Cruces drill data and assays has undergone an external review by Smee (2008). The deficiencies in the database noted in Smee's review primarily pertain to the pre-2002 data, including rounding issues with some of the BMC data, and the lack of certificates to corroborate assay results. As part of the review, Smee also compared data for 14 drill holes in the database with the certificates on file. Since no certificates were available for the pre-2002 drilling, Smee used digital printouts of the earlier databases created by BMC and Oroperu. Other than the rounding issues, no serious discrepancies were noted.

Lacroix (2012) also independently verified a portion of the database by selecting some of the more recent diamond core holes in the South, Southwest and South Extension Zones and comparing the gold assay values in the provided data with the signed assay certificates from the laboratory. In total, assay results for the mineralized portions of 12 of the 239 holes that intersect the mineralized envelope modeled by Barrick were selected and verified. No errors, inconsistencies, or discrepancies were noted, other than six values that had been rounded from 2 decimals to one, which has minimal effect on calculated resources.

## 12.2 INDEPENDENT VERIFICATION

A Site visit and examination of the Tres Cruces Oxide Project area was carried out by Mr. John Woodson, of M3 Engineering and Technology Corporation, P.E., Mr. Steven Botts, of Santa Barbara Consultants, and Mr. Julio Rodas, of ATC, on August 15, 2023. During this visit the group was able to view and confirm 7 of the 8 2022 drill site locations as well as some locations from prior drilling programs. The group also viewed property access and general topographic layout at the site and then proceeded to a warehouse outside of Trujillo, Peru, to confirm the security of the core storage and availability of the historical core and RC chips along with 2022 core.

The authors were unable to view or sample drill core from the Project but are confident in the work done by Lacroix (2012) who independently sampled core from three mineralized holes and confirmed the presence of significant gold mineralization from intervals with grades ranging from low to high. Additionally, Barrick twinned holes of previous operators, or resampled intervals from historical holes, to verify mineralized areas, with good duplication of results.

Several reclaimed drill pads (Figure 12-1) prepared for diamond core holes in earlier drill programs were observed by Mr. Castro Ocampo during a property evaluation for New Oroperu in October 2020. Unfortunately, drill collars are often destroyed or covered by site reclamation shortly after drilling and the exact location of the collars could not be found. The locations of the pads appear to place the drill sites approximately at the stated coordinates in the database. In an earlier field check using differential GPS, Smee (2008) located 16 holes and compared coordinates with the database; the deviations were less than one metre in all cases. Smee also noted that many drill collars had been reclaimed.

**Figure 12-1: Tres Cruces drill roads and drill pads in the distance, looking southeast.**

Mr. Castro Ocampo also visited several sites of bedrock exposures that have been mapped by previous operators as altered rocks with local hydrothermal breccias and pyritic mineralization. He collected nine samples from various outcrops that he visited on October 6 and 7, 2020 in the North, South and South Extension Zones. Locations of the samples are shown on Figure 12-2. Results for some of the more pertinent elements analyzed are presented in Table 12-1, as well as descriptions of the alteration and mineralization noted in the samples. Photographs from some of the sites are shown in Figure 12-3 to Figure 12-8.

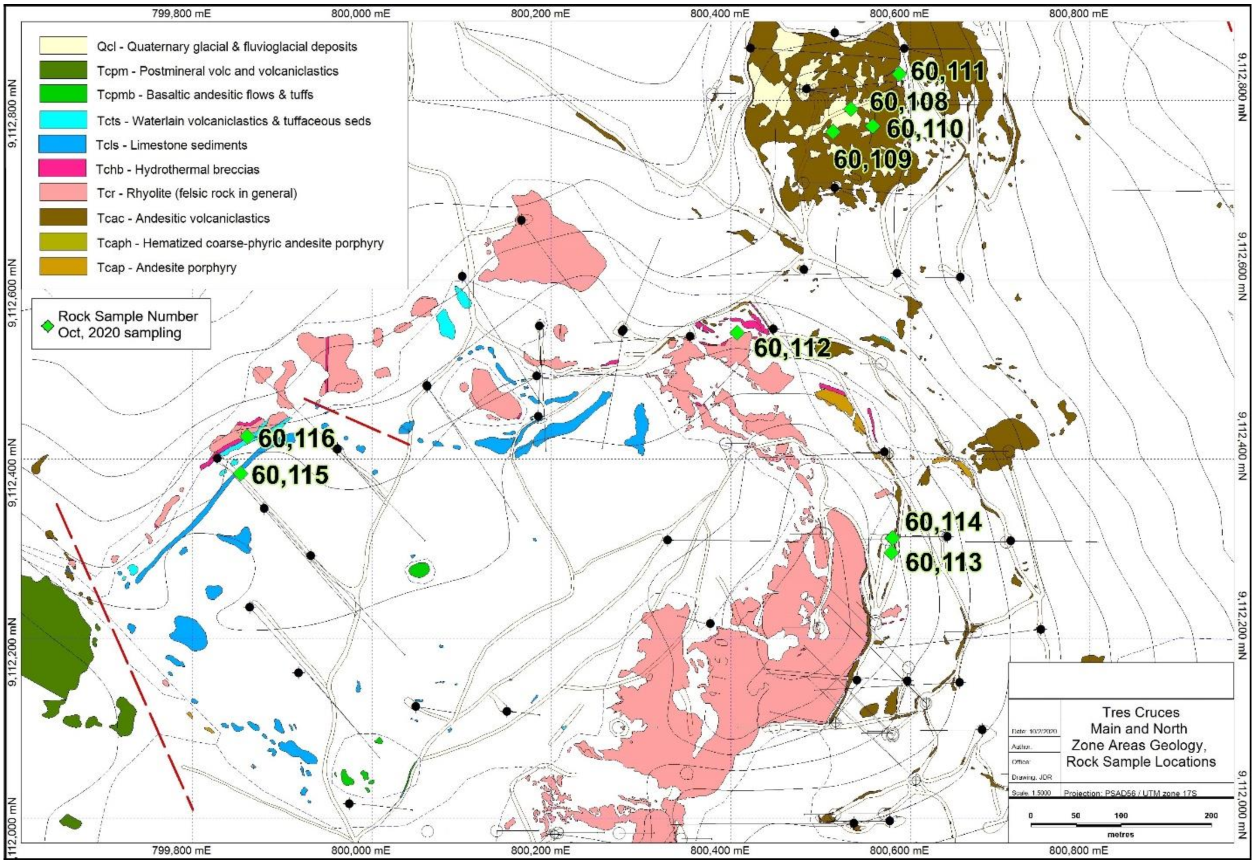



**Figure 12-2: Reconnaissance Samples and Geology, Main and North Zone Areas**

### Table 12-1: Verification Samples

| Sample | East | North | Au | Ag | As | Ba | Ca | Cu | Fe | Hg | K | Mg | Mn | Pb | S | Sb | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60108 | 800534 | 9112790 | 0.066 | <0.2 | 14 | 40 | 0.01 | 5 | 1.14 | 2 | <0.01 | <0.01 | 125 | 12 | <0.01 | 11 | 10 |
| 60109 | 800514 | 9112765 | 0.662 | <0.2 | 188 | 100 | 0.01 | 18 | 3.18 | 1 | 0.18 | 0.01 | 37 | 9 | 0.14 | 306 | 6 |
| 60110 | 800558 | 9112771 | 0.080 | <0.2 | 175 | 190 | 0.02 | 12 | 3.76 | 1 | 0.37 | 0.02 | 61 | 11 | 0.84 | 105 | 9 |
| 60111 | 800588 | 9112829 | 0.644 | <0.2 | 129 | 110 | 0.01 | 15 | 3.06 | <1 | 0.32 | 0.01 | 56 | 10 | 1.27 | 44 | 7 |
| 60112 | 800407 | 9112541 | 0.010 | <0.2 | 13 | 40 | <0.01 | 5 | 1.08 | <1 | <0.01 | <0.01 | 109 | 4 | <0.01 | 8 | 9 |
| 60113 | 800579 | 9112296 | 0.016 | <0.2 | 26 | 250 | 0.02 | 2 | 0.22 | 1 | 0.07 | 0.01 | 5 | 23 | 0.10 | 13 | 2 |
| 60114 | 800580 | 9112312 | 0.034 | <0.2 | 19 | 60 | <0.01 | 5 | 1.14 | 3 | 0.01 | <0.01 | 100 | 9 | 0.01 | 13 | 4 |
| 60115 | 799854 | 9112384 | <0.005 | <0.2 | 8 | 920 | 12.4 | 6 | 0.51 | <1 | 0.02 | 7.49 | 612 | 5 | 0.13 | <2 | 7 |
| 60116 | 799861 | 9112425 | <0.005 | <0.2 | 70 | 310 | 0.12 | 22 | 4.65 | <1 | 0.09 | 0.08 | 10 | 8 | 0.11 | 3 | 7 |

| Sample | Geology | Date | Alteration | Sample Method |
|---|---|---|---|---|
| 60108 | Intense silicification, jasperoidal matrix hydrothermal breccia, vuggy quartz texture, clasts from Chimu Formation - float material probably from rock units uphill. | 10/6/2020 | Silicification | Chip – panel 10m x 10m |
| 60109 | Light grey, intensely silicified, argillically altered autoclastic andesite breccia and porphyritic andesite of the Calipuy group, cut by oxidized north-south trending structures. | 10/6/2020 | Silicification | Chip – panel 10m x 10m |
| 60110 | Light grey, intensely silicified and argillically altered porphyritic and brecciated andesite, with creamish coloured silicification containing smoky silica patches with fine disseminated pyrite, and minor arsenopyrite, alunite, jarosite, with local vuggy quartz. | 10/6/2020 | Silicification | Chip - panel 10m x 10m |
| 60111 | Similar to Sample 60110. | 10/6/2020 | Silicification | Chip – panel 10m x 10m |
| 60112 | Grey creamish, intense jasperoidal siliceous hydrothermal breccia, subangular to sub rounded clasts from the Chimu Formation with quartz, alunite, quartz with creamish silica halos and vuggy textures. | 10/7/2020 | Silicification | Chip-panel 10m x 3m |
| 60113 | White colored clay alteration, intense argillization with kaolinite, possible montmorillonite? | 10/7/2020 | Argillic | Chip – panel 5m x 5m |
| 60114 | Grey creamish, intense jasperoidal siliceous hydrothermal breccia, subangular to subrounded clasts of Chimu Formation quartzite with quartz, alunite, hosted in a creamish silica matrix with vuggy textures. | 10/7/2020 | Silicification | Chip – panel 10m x 10m |
| 60115 | Light grey, thin interbedded siliceous unit, 3.5 metres thick, gently dipping, striking N60E dipping 10°SE. Beds ranges from 2 to 10 cm. in thickness. Silicification ranges from weak in the bottom to intense at the top of the outcrop. The top 1.20 m. contains beds of laminated silicious sediment. | 10/7/2020 | Silicification | Chip 3.5m |
| 60116 | Hydrothermally altered andesitic tuffaceous breccia with a network of oxidized, siliceous subvertical structures, trending N40E-S40W. This represents an altered mineralized unit in the andesitic breccia of the Calipuy group which underlies the post mineral sedimentary basin units described in Sample 60115. The sample is of the oxidized and silicified structures. | 10/7/2020 | Silicification | Chip panel 10m x 3m |

**Figure 12-3: Sample 60109, 0.662 g/t Au in siliceous andesite breccia**

The three samples 60109-60111, collected in the North Zone area returned anomalous Au values of up to 0.662 g/t (Figure 12-3 and Figure 12-4), with associated anomalous values for As, Sb, Fe, S and K. The samples are described as intensely silicified and argillically altered andesite breccia, with vuggy quartz, fine disseminated pyrite and minor arsenopyrite. The elevated K values are perhaps due to argillic alteration of feldspar minerals that formed potassium-bearing clay minerals. This style of mineralization and alteration is similar to that described in drill core in some of the gold-bearing intercepts.

**Figure 12-4: Sample 60110, very fine dark sulphides in siliceous breccia**

Sample 60115 (Figure 12-5) was collected from a narrow linear northeast-trending ridge of hard resistant rock. It returned 12.4% Ca with associated elevated Mg, Mn, and Ba. This outcrop has been mapped as part of a limestone unit that overlies the mineralized volcanic units. It appears to have formed within a shallow depression on top of the volcanics that may have been the site of hot spring activity that created travertine deposits. The sample returned very low precious metal values and no pathfinder elements such as Hg, As, Sb, Mo or Te that might suggest that it is part of the mineralizing system.

**Figure 12-5: Site of sample 60115, Well-bedded post-mineral calcareous unit**

The South Zone mineralization is essentially all buried beneath a cap of rhyolitic rocks and younger sedimentary units. At the eastern edge of the South Zone, however, there are scattered outcrops and road cut exposures of andesitic volcaniclastics and hydrothermal breccias that underlie the rhyolite and are reported to contain gold mineralization near the contact zone. Mr. Castro Ocampo visited this area and observed strongly silicified hydrothermal breccias that contain clasts of andesite as well as Chimu Formation quartzite. The matrix material is creamy, vuggy silica with alunite and local clay minerals. Samples 60112 through 60114 (Figure 12-6 and Figure 12-7) were collected from breccia zones, but sulphide and oxide minerals were sparse in these samples and metal values were all low, with the highest gold value of 0.034 g/t.

**Figure 12-6: Sample 60112, siliceous, vuggy breccia with fragments of Chimu quartzite**

**Figure 12-7: Site of sample 60113, intense kaolinite alteration**

Sample 60116 (Figure 12-8) was collected from oxidized siliceous veins cutting andesitic volcanic breccia that are iron oxide stained, presumably after pyrite. The Fe value of 4.65% is anomalous, however, precious, and base metal values are low.

**Figure 12-8: Sample 60116, Oxidized siliceous veins in altered andesitic volcanics**

The site visit and sample results have satisfied the authors that the descriptions of geological units and mineral showings on the Property are accurate, and that substantial drilling has been undertaken in the past. Drilling data has been reviewed by the authors and is discussed within this report.

The authors have had access to reports that describe the results of previous geophysical and geochemical programs on the Property but have not had access to some of the raw data from that work, so must rely on the evaluations made by writers of the reports. The authors have no reason to question these evaluations.

The authors have offered interpretations for some of the exploration results in Sections 10 and 11 of this report. The authors have also reviewed the sampling and analytical procedures implemented by operators for the drilling work and are satisfied that the quality of the work was satisfactory, and the results are valid.

Detailed drill logs for some of the historical drill holes are not available, or contain only limited descriptions; however, the summarized logs of drill hole lithologies, alteration and mineralization have been sufficient for a geological evaluation and resource calculations in this report.

Reports of historical work by Barrick that were available to the authors commonly did not have verifying analytical certificates, however, other independent authors (Smee, 2008; Lacroix, 2012) have had access to the certificates and have verified results, stating that they are satisfied that results are valid and reproducible within acceptable limits.

# 13 MINERAL PROCESSING AND METALLURGICAL TESTING

Metallurgical testing programs have been undertaken during various exploration stages of the Tres Cruces Oxide Project by each of the three operators since 1998. These tests included both oxidized and primary sulphide mineralization. Much of the testwork focussed on improving recoveries for sulphide mineralization rather than the oxide resource that is the subject of this report.

The process proposed in this report is a conventional gold cyanide heap leach, with gold recovered from solution through carbon adsorption/desorption, EW, and smelting to produce gold ingots for refining.

Gold from the oxide mineralization was found to be readily extracted by cyanidation (>85% Au); however, extraction rates were found to be low (<35% Au) for the underlying sulphides.

Detailed mineralogy on sulphides samples shows that the gold is present as free gold, micro-inclusions in pyrite, and micro-inclusions in quartz. Since pyrite and quartz are impermeable to cyanide solutions, gold trapped within pyrite or quartz are not recovered by simple cyanidation. Over time, pyrite in the layer near the surface has undergone oxidation, liberating the gold for cyanidation.

Delineation between the oxides and sulphides is key to gold cyanidation recovery by heap leaching at Tres Cruces. This PEA considers only the processing of oxide and transition mineralization.

## 13.1 TESTWORK PHASES

The following phases of testwork have been conducted on the oxide resource at Tres Cruces:

1. In 1998, Process Research Associates Ltd. (PRA) under Battle Mountain Gold (BMG) completed bottle roll tests on two oxide composites and CIL cyanidation on four oxide composites.
2. In 1998 BMG completed 58 bottle roll leach tests and short column leach tests on three composites at their Golden Giant Mine laboratory.
3. In 2006, G & T Metallurgical laboratory under the direction of Barrick subjected 113 samples to flotation and tailings cyanidation.
4. In 2008 Subsequently, McClelland Laboratories Inc. under the direction of Barrick subjected 105 samples and 10 composites to CIL cyanidation tests.
5. In 2008 MBM (Barrick) completed some 227 quick leach tests (QLT) at their adjacent Lagunas Norte mine laboratory.
6. In 2011 AuTec laboratory under Barrick tested five composites to bottle-roll cyanidation and CIL cyanidation tests.
7. In 2022 Plenge Laboratory performed a metallurgical program of comminution, flotation and cyanidation tests using samples from five drill holes.

## 13.2 SAMPLE ORIGIN

The locations of the samples tested are shown in the figure below against the entire deposit resource with a MinType category.

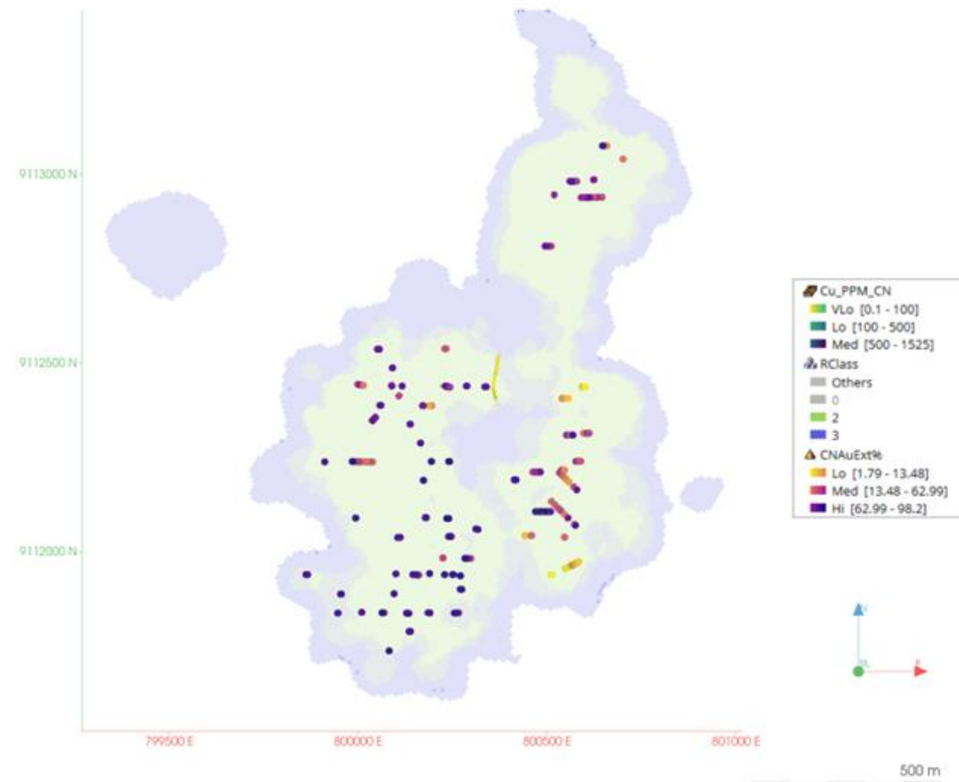



**Figure 13-1: Bottle roll test sample locations against the indicated and inferred resource**

The additional five samples in 2022 did not materially change the representivity of the testwork data to date. There was however geoanalytical assays of cyanide soluble gold in four drill holes, which can be used to better observe the transition from oxides to sulfides.

Furthermore, this data validated the earlier hypothesis that cobalt grades could be used as proxy for oxidation, as shown in Figure 13-2.

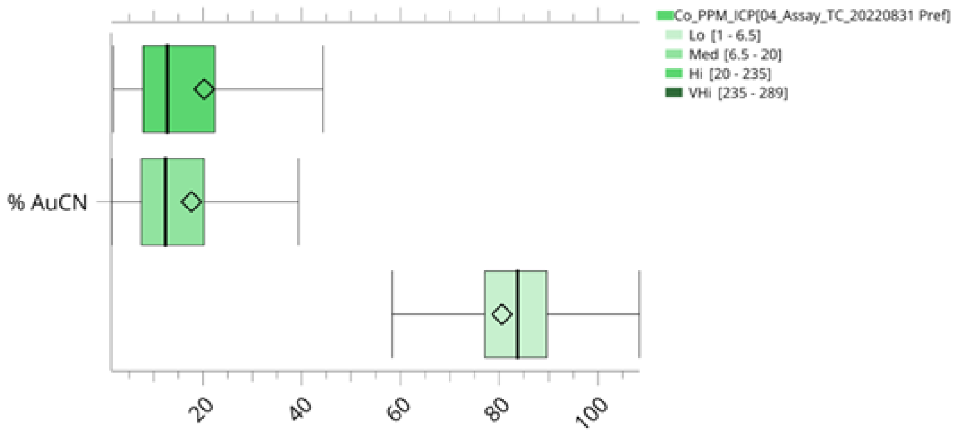



**Figure 13-2: A box plot showing that low cobalt grades in drilling coincide with high gold leachability**

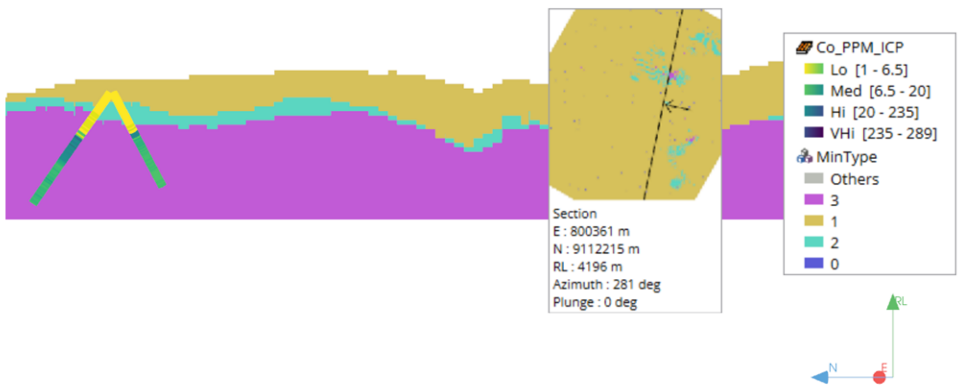



**Figure 13-3: A section showing that cobalt grade as an indicator of oxidation depth**

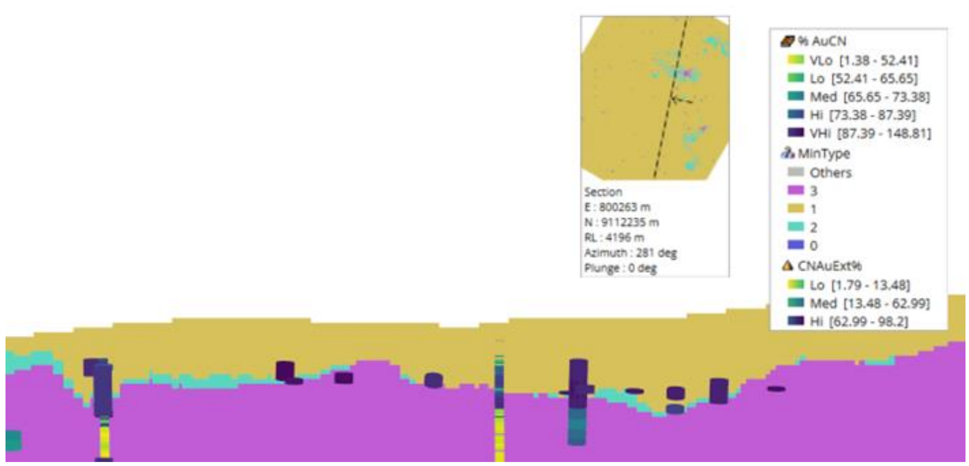



**Figure 13-4: Section (800263E) showing gold extraction rates by MinType and oxide pit shape**

Figure 13-4 shows the percentage of gold that was soluble in the geoanalytical procedure vs the gold head grade for the sample (AuCN/Au x 100). It can be seen that the drop from >85% Au extraction in the oxides, to extractions of <50% Au in the primary zone extends below the current boundary from oxide to sulfide. This indicates that there is an opportunity to treat more of the resource by conventional heap leaching.

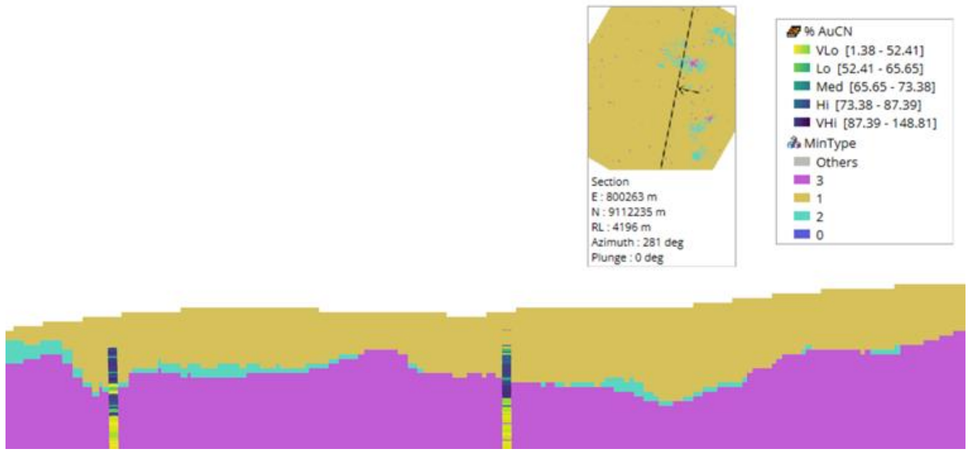



**Figure 13-5: Percent cyanide soluble gold assays from drill intervals looking East against MinType in the block model.**

Spatially the samples have good coverage over the area and depth of the proposed oxide pit. However, there are still insufficient samples along the oxide-sulfide transition boundary to validate the exact transition surface.

The following figure shows how the sample types were distributed spatially.

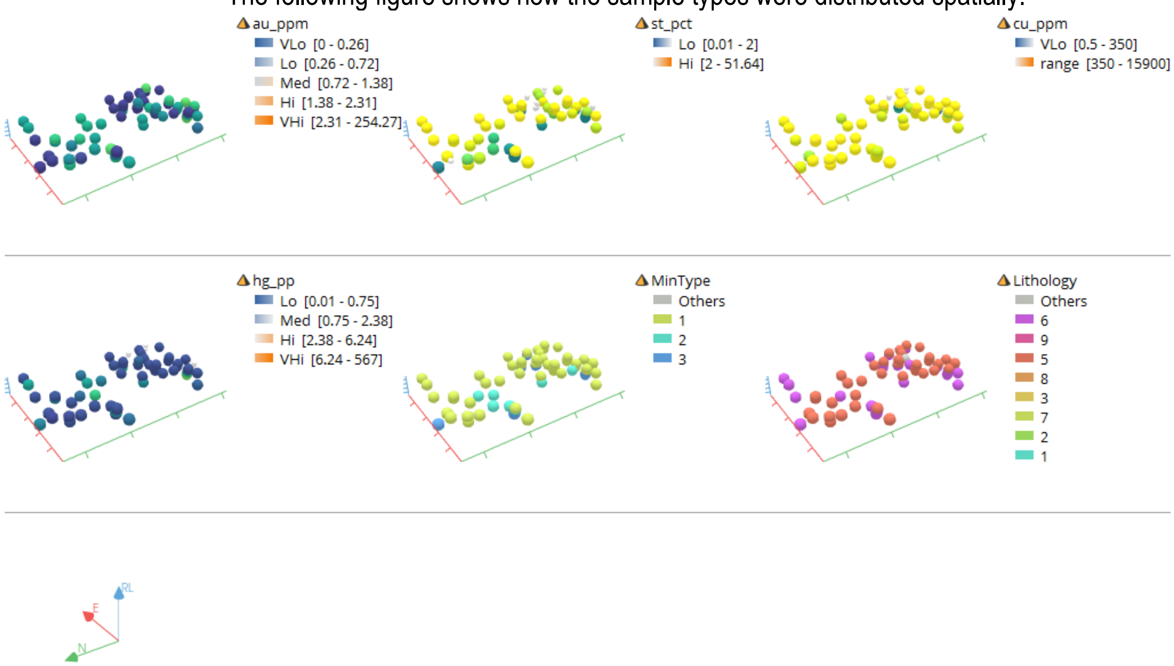



**Figure 13-6: Spatial distribution of principal features affecting direct cyanidation**

The samples from within the oxide pit, in blocks of >0.2 g/t Au were tested for representivity against spatial distribution (E, N, RL), grades (Au, S, Cu and, Hg), MinType (oxide, transition, sulphide), and lithology (3, 5, 6, and 9).

The following figures show how the distribution of the samples tested compares to the distribution of the drilling in the same blocks. In each figure the line represents the probability plot of the drilling, and the dots represent the samples tested.

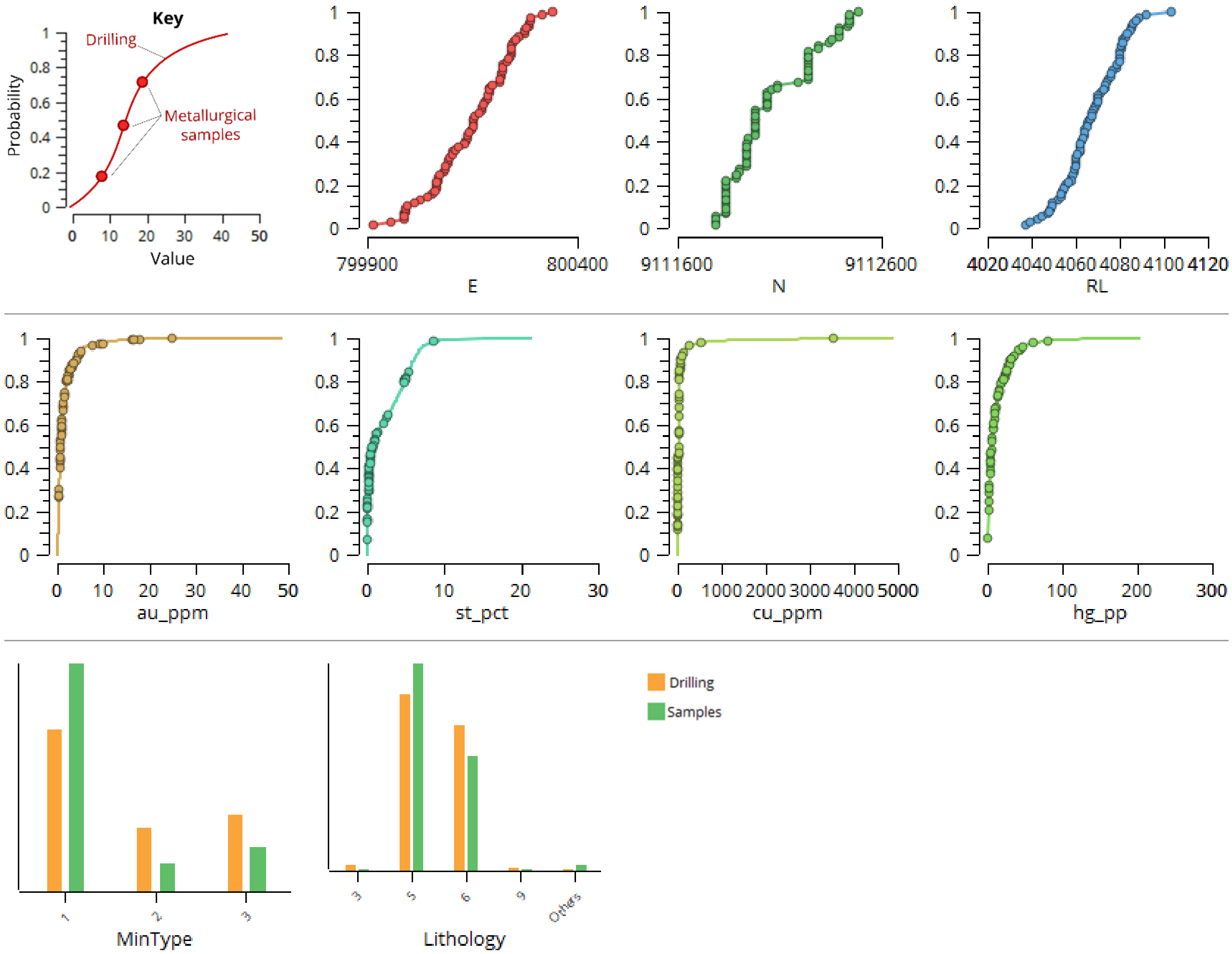



**Figure 13-7: Representivity analysis of oxide cyanidation bottle roll samples**

The representivity of the samples has been assessed against the principal features that will likely affect metallurgical performance. Since the metallurgical samples have similar distributions of grades and rock types to the drilling in the oxide area, it is believed that the samples are suitably representative for a PEA level study.

The samples have a good coverage over the ranges of grades and mineral types for this stage of study. Future studies should include samples with higher sulphur grades (see Section 26).

## 13.3 TESTWORK RESULTS

### 13.3.1 Chemical Characterization Plenge 2022

Table 13-1 shows the chemical characterization for the five samples. The grade was between 0.49 and 4 g/t Au, and between 0.2 and 7.9 g/t Ag.

While the cyanide soluble copper grade of the samples tested were low, it is noted that the mercury head grades were elevated (1-22 g/t Hg), and the cyanide solubility of the mercury was about 50%. This would yield a high mercury load on a metal recovery circuit downstream of leaching.

**Table 13-1: Chemical Characterization – Plenge 2022**

| Elements | 503-4100 | | 503-4070 | | 505-4100 | | 505-4050 | | 505-4000 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Fine | Coarse | Fine | Coarse | Fine | Coarse | Fine |
| Au | 0.54 | 0.55 | 0.45 | 0.48 | 1.03 | 0.99 | 3.62 | 3.82 | 0.75 | 0.88 |
| Cu, % | 0.001 | 0.001 | 0.003 | 0.003 | 0.001 | 0.001 | 0.009 | 0.008 | 0.003 | 0.004 |
| CuCN, % | 0.001 | 0.001 | 0.003 | 0.003 | 0.001 | 0.001 | 0.005 | 0.005 | 0.003 | 0.004 |
| Fe, % | 0.26 | 0.34 | 3.83 | 4.01 | 0.34 | 0.32 | 2.93 | 2.78 | 3.9 | 3.8 |
| FeCN, % | 0.01 | 0.01 | 0.14 | 0.15 | 0.01 | 0.01 | 0.02 | 0.02 | 0.04 | 0.05 |
| Hg. ppm | 10.4 | 10 | 1 | 1 | 6.2 | 10.6 | 22 | 21.5 | 2.1 | 2 |
| HgCN, ppm | 7.5 | 3.2 | 0.2 | 0.3 | 2 | 2.9 | 11.1 | 10.1 | 0.9 | 1.1 |
| As, % | 0.003 | 0.003 | 0.822 | 0.819 | 0.005 | 0.004 | 0.039 | 0.034 | 0.109 | 0.1 |
| $S_{total}$, % | 0.03 | 0.02 | 6.11 | 6.51 | 0.01 | 0.01 | 0.8 | 0.61 | 5.56 | 5.53 |
| $S^{0}$, % | <0.005 | 0.01 | 0.7 | 0.86 | <0.005 | 0.01 | 0.03 | 0.04 | 0.2 | 0.25 |
| $S^{+2}$, % | 0.02 | 0.01 | 4.97 | 5.22 | 0 | 0 | 0.55 | 0.4 | 4.71 | 5.48 |
| $C_{total}$, % | 0.03 | 0.04 | 0.02 | 0.03 | 0.03 | 0.03 | 0.05 | 0.05 | 0.13 | 0.14 |
| $C_{org.}$, % | 0.02 | 0.03 | 0.01 | 0.02 | 0.02 | 0.02 | 0.04 | 0.04 | 0.07 | 0.07 |
| pH natural | 7.5 | 7.6 | 2.2 | 2.1 | 7.4 | 7.2 | 6.8 | 6.6 | 6.8 | 6.3 |

## 13.4 MINERALOGY

Each of the samples was subjected to semi-quantative mineralogy by XRD. While the oxide samples contained mainly silicates, the sulfide samples also contained micas, clays, and pyrite.

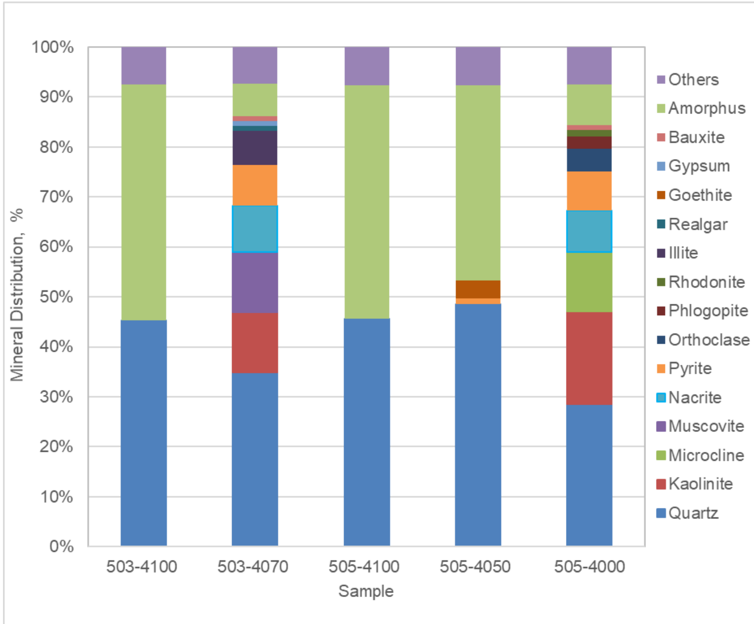



**Figure 13-8: XRD analysis for samples**

*Plenge 2022*

## 13.5 COMMINUTION

The SAG mill comminution test (SMC) is used to determine the extent to which a sample fractures. The SMC tests can be used to forecast the variability of a comminution circuit yield. DWi, which together with other parameters reported in this test and the Bond ball mill work index (BWi), are used to estimate the specific energy consumption of the comminution circuit which includes AG or SAG mills.

Table 13-2 shows the results of the SMC Test (SMC) on the 5 comminution samples. DWi values were between 0.86 kW-h/m$^3$ and 6.48 kW-h/m$^3$, with an average value of 4.3 kW-h/m$^3$, which describes a soft rock hardness.

Table 13-2 also shows the results of the Axb (SMC) on the 5 comminution samples. Axb values were between 31 and 289.4, with an average value of 122.3, which describes a soft rock.

It is surprising that the oxide samples were found to be harder and more competent than the heavily altered sulfide samples.

**Table 13-2: Comminution SMC Test Results**

| Sample | DWi kWh/m$^3$ | DWi % | Mi a kWh/t | Mi h kWh/t | Mi c kWh/t | A | b | SG g/cm$^3$ | ta | SCSE* kWh/t | Axb |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 503 4070 | 1.17 | 2 | 5.5 | 2.9 | 1.5 | 51.1 | 3.96 | 2.37 | 2.21 | 5.81 | 202.4 |
| 503 4100 | 8.1 | 69 | 24.2 | 18.6 | 9.6 | 100 | 0.31 | 2.53 | 0.32 | 10.85 | 31.0 |
| 505 4000 | 0.86 | 1 | 4.1 | 2 | 1 | 61.7 | 4.69 | 2.5 | 3 | 5.27 | 289.4 |
| 505 4050 | 6.48 | 48 | 21 | 15.4 | 8 | 89.3 | 0.42 | 2.44 | 0.4 | 9.91 | 37.5 |
| 505 4100 | 5.03 | 29 | 16.2 | 11.3 | 5.8 | 69 | 0.74 | 2.59 | 0.51 | 8.74 | 51.1 |

### 13.5.1 Bottle roll leaching

The samples used and testwork results were all extracted from historical reports and raw data files developed by others. Most of the work was done on sulphide and oxide samples, and so grind sizes, cyanide concentrations, and sample selection were more relevant to the sulphide area rather than to the oxide resource presented in this report. While this data was suitable for a preliminary resource estimate, it is recommended that a focused oxide sampling and testwork program would be required to be used to support a reserve estimate.

Since all of the testwork conducted used finer particle sizes (15 to 75 µm), and stronger cyanide concentrations (1 g/L) than would be expected to be used for a conventional oxide heap leaching operation, there is little that can be learned from the data in terms of process optimization. However, the testwork gives consistent and valid results on the amenability of the samples to direct cyanidation.

**Table 13-3: A summary of all cyanidation test results by phase**

| | Cyanidation extraction, Au % | | | | | |
|---|---|---|---|---|---|---|
| **Phase** | **1. PRA** | **2. BMG** | **4. MCC** | **5. QLT** | **6. AuTec** | **7. Plenge** |
| Test | 9 | 58 | 103 | 34 | 20 | 5 |
| Minimum | 13.5 | 6.56 | 1.8 | 76.2 | 21.4 | 65.9 |
| Maximum | 96.6 | 97.8 | 96.4 | 98.2 | 93.8 | 91.1 |
| Mean | 61.6 | 54.4 | 43.27 | 88.7 | 70.8 | 79.2 |

**Table 13-4: Summary of all cyanidation test results by sample type**

| | Cyanidation extraction, Au % | |
|---|---|---|
| **Sample type** | **Oxide** | **Sulphide** |
| Count numeric | 71 | 158 |
| Minimum | 57.3 | 1.8 |
| Maximum | 98.2 | 96.6 |
| Mean | 86.7 | 42.7 |

**Table 13-5: A summary of oxide sample cyanidation test results by phase**

| | Cyanidation extraction, Au % | | | | | |
|---|---|---|---|---|---|---|
| **Phase** | **1. PRA** | **2. BMG** | **4. MCC** | **5. QLT** | **6. AuTec** | **7. PL** |
| Test | 2 | 3 | 21 | 30 | 7 | 3 |
| Minimum | 93.2 | 83.5 | 27.93 | 76.2 | 73.3 | 84.2 |
| Maximum | 95.3 | 97.8 | 96.44 | 98.2 | 93.6 | 91.1 |
| Mean | 94.25 | 92.13 | 75.65 | 88.62 | 85.33 | 87.8 |

Results of Figure 13-9 show that gold extraction increases with a decreasing particle size. It appears that extraction is robust up to high particle sizes, indicating that conventional heap leaching is likely a suitable technology.

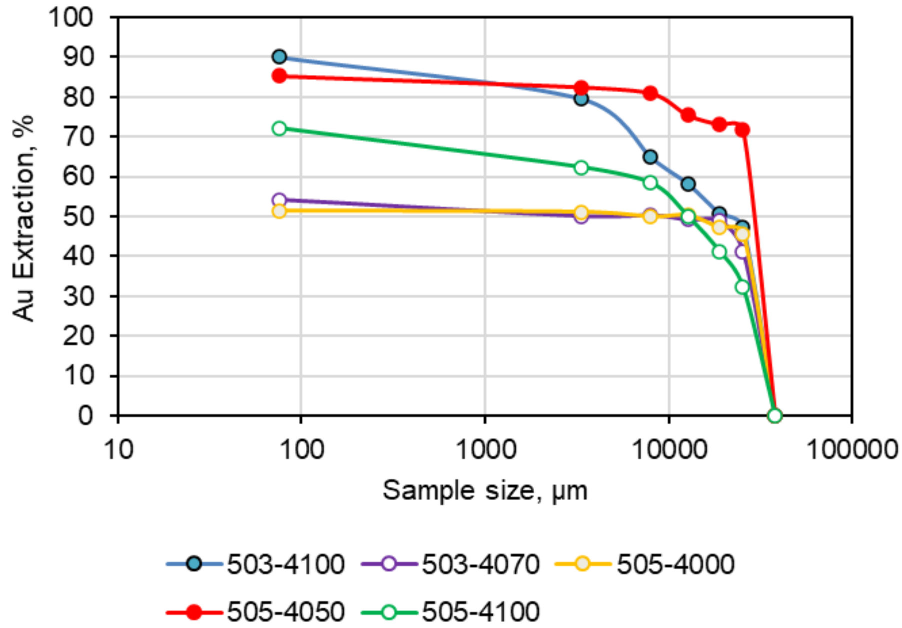



**Figure 13-9: Cyanidation test for different particle size**

Plenge 2022

## 13.6 FLOTATION TESTWORK

Plenge also conducted bulk flotation tests on each sample, at a grind size of P80 75 µm.

The results of flotation testwork are present in the Table 13-6.

**Table 13-6: Flotation Results** - *Plenge 2022*

| Sample | Conc | Mass, % | Grade, % | | | | Recovery, % | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ag, g/t | Au, g/t | Fe, % | S, % | Ag | Au | Fe | S |
| 503-4070 | Conc Bulk 1 | 11.4 | 1 | 3.4 | 33.7 | 51.3 | 73.7 | 77.6 | 89 | 94.3 |
| | Conc Bulk 2 | 1.3 | 0.2 | 0.41 | 2 | 2.2 | 1.6 | 1 | 0.6 | 0.4 |
| 503-4100 | Conc Bulk 1 | 0.7 | 42.4 | 3.95 | 2.5 | 0.7 | 69.5 | 5.8 | 5.2 | 19 |
| | Conc Bulk 2 | 0.8 | 1.5 | 2.05 | 2 | 0.1 | 2.7 | 3.3 | 4.6 | 3.2 |
| 505-4000 | Conc Bulk 1 | 9.6 | 3.2 | 6.07 | 38.4 | 51.5 | 95.2 | 66.6 | 85.3 | 90.9 |
| | Conc Bulk 2 | 1 | 1.5 | 3.58 | 10.6 | 11.9 | 4.8 | 4.3 | 2.6 | 2.3 |
| 505-4050 | Conc Bulk 1 | 1.4 | 60 | 25.7 | 16.6 | 15.5 | 10.4 | 10.4 | 6.7 | 32.3 |
| | Conc Bulk 2 | 0.7 | 19.7 | 10.6 | 7.1 | 2.9 | 1.7 | 2.1 | 1.4 | 2.9 |

It can be seen in Table 13-6 that the highest recovery of precious metal to a flotation concentrate was in the sulfide samples. However, gold and silver were found to not be strongly associated with pyrite, and overall flotation recoveries were low. Further investigations in the future could consider leaching the flotation tailing, and testing gravity recovery of gold.

### 13.6.1 Column leaching

BMG in 1999 conducted seven short column cyanidation leaching tests on two samples from sulphides and five samples from the oxide resource. The sample 69C from the sulphide zone (as defined by MinType 3) gave the highest direct cyanide leaching gold extraction result of the set, so it has been included in the oxide sample database.

Sample 87A (yellow cylinder in the figure below) on the other hand was a sulphide sample from outside the oxide resource, and the oxide pit shell, and gave poor gold extraction results, and so was excluded from the oxide data set.

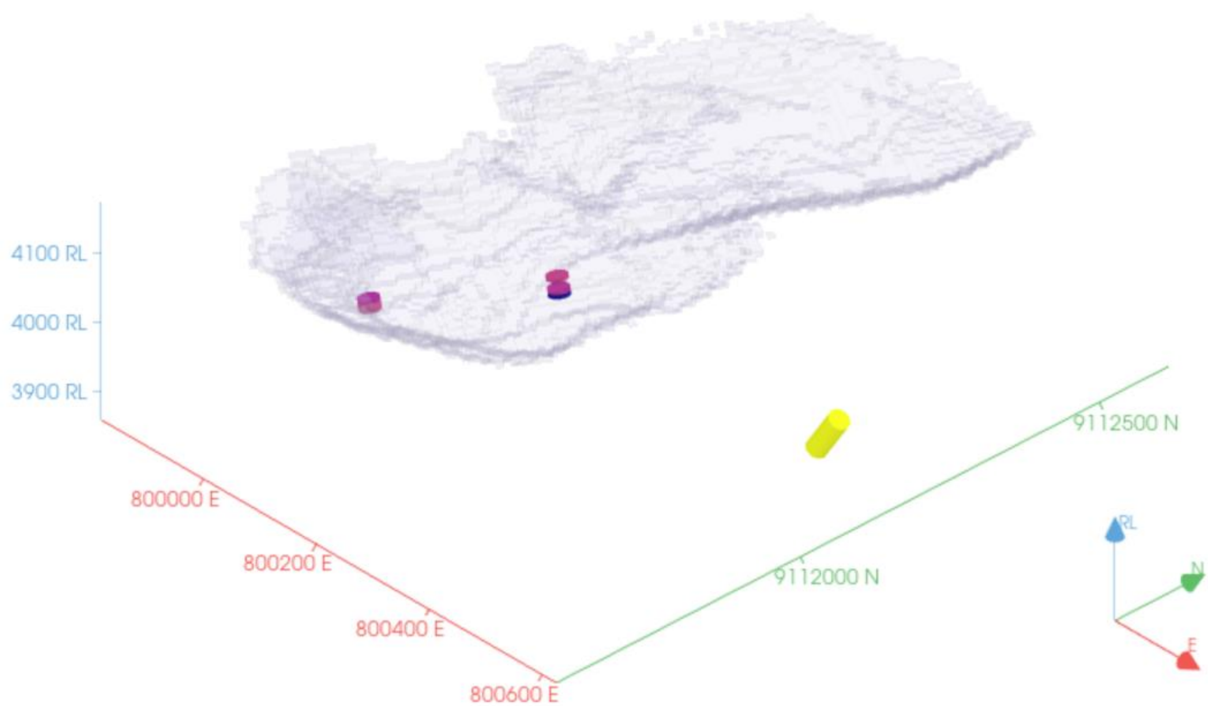



**Figure 13-10: Spatial distribution of column leaching test samples**

Each column leaching test was conducted with the following conditions:

- 3.1 kg charge
- 16 mm crush size
- 0.41 m tall
- 0.0925 m diameter
- 1 g/L NaCN
- pH 11
- 0.2 L/m²/h irrigation
- 16 to 17 days of leaching

**Table 13-7: Summary of the gold extractions by short column leaching**

| COMPOSITE | Head Assay Au g/t | Calc Head Assay Au g/t | Tail Assay Au g/t | Extraction % Au |
|---|---|---|---|---|
| **Oxide composites** | | | | |
| 69A | 1.51 | 1.83 | 0.42 | 76.8 |
| 69B | 3.39 | 4.39 | 0.77 | 82.5 |
| 69C | 9.89 | 9.95 | 0.50 | 94.9 |
| 82A | 1.08 | 1.45 | 0.23 | 84.3 |
| 82B | 2.70 | 2.97 | 0.79 | 73.4 |
| 82C | 1.69 | 1.88 | 0.41 | 78.0 |
| Average | | | | 81.7 |
| **Sulphide composite** | | | | |
| 87A | 3.01 | 2.87 | 1.73 | 39.8 |

## 13.7 PROCESS DEVELOPMENT

No process alternatives were evaluated at this stage. It was assumed that gold would be extracted by heap leach cyanidation, followed by recovery by an ADR plant (adsorption, desorption, recovery). None of the testwork to date had evaluated heap leach particle size, cyanide concentration, leach time, leach irrigation arrangement, operating strategy, or other optimization parameters.

The water management strategy also requires process development in the next stage. Cyanide destruction and metal precipitation requirements, strategy, and engineering design criteria need to be developed.

## 13.8 DELETERIOUS COMPONENTS

As is the case with many gold deposits in northern Peru, there are some elevated levels of mercury, sulphur, and copper in the deposit that could affect metallurgical performance and process design. As these levels are variable in the samples, more review is required to determine specific levels of deleterious components.

Mercury was not tracked through the metallurgical testwork to date, but the drilling intercepts in the oxide resource show mercury grades to be higher than gold grades on average. Geoanalytical analysis of cyanide soluble mercury (Hg_CN) No prediction has been made about mercury leaching at this stage; however, the process design assumptions have taken a high mercury load on the ADR circuit into account. It is not expected that the mercury will affect gold recovery; however, it could have deleterious effects in the process, and may result in a cost increase due to:

1. Health and safety in all areas
2. Environmental containment in all areas
3. Carbon management to ensure gold recovery from solution
4. Suitable water treatment for effluent discharges
5. Long term mercury byproduct management strategy

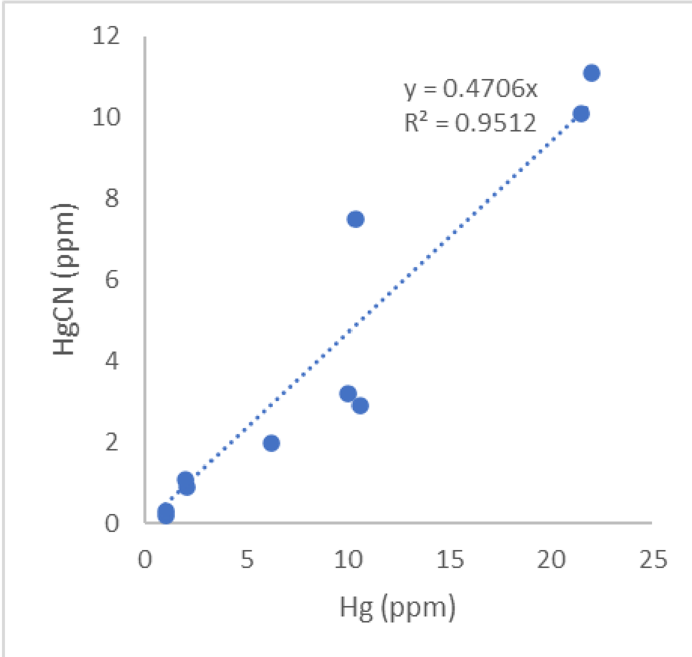



**Figure 13-11: Cyanide soluble mercury vs total mercury by Plenge 2022**

Copper was also not tracked adequately in previous testwork, and so it is unclear whether it would affect cyanide management systems. High copper or mercury accumulation in the process water could result in any of the following issues that would have to be addressed:

1. Reduced gold recovery due to reduced free cyanide activity
2. Increase cyanide consumption operating cost
3. Increased ADR and EW requirements
4. Dilution of the final doré, increasing issues with smelting and refining
5. Increased cyanide detoxification and water treatment scope requirements Section 1.9 and 25

Sulphur, sulphide, and sulphide degradation products can affect the process, and the following risks may impact the project:

1. Reduced gold recovery due to pyrite encapsulation of gold
2. Increased cyanide consumption due to cyanide reacting with sulphur species
3. Potential acid generation on the heap leach, causing issues with heap closure, gold recovery, and long-term water management requirements

It is recommended that the next stage of testwork assess the risks associated with mercury, copper, and sulphide in the oxide resource, and develop solutions to control any risks found.

### 13.8.1 Preg Robbing

AuTec conducted parallel carbon in leach (CIL) tests and direct cyanidation leach tests on the same samples. The comparison of the results is shown in the figure below.

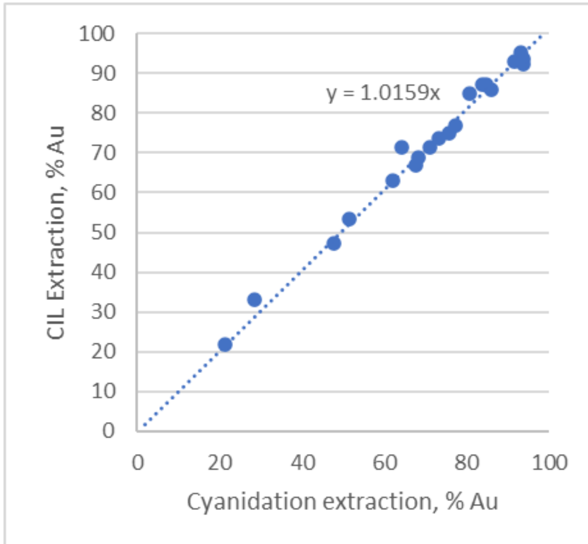



**Figure 13-12: CIL extraction vs direct cyanidation extraction by AuTec**

The minor difference of 1.6% higher extraction by CIL vs cyanidation is leveraged on a small number of samples. While these results indicate that preg robbing is not likely an issue at Tres Cruces, it has been an issue on neighboring properties, and should be monitored throughout future phases of testing.

## 13.9 RECOVERY PREDICTIONS

A database of 229 valid cyanide gold extraction leach results was compiled from all phases of testwork. The head grade of gold and sulphur for 159 of the samples was interpolated from the drilling sample geochemistry. The remaining samples did not have sulphur values available for interpretation. It was found that 54 of the 157 samples were from oxides (low S) and 103 of the 157 samples were from sulphide (high S).

Oxide recovery prediction was originally 82% Au in oxide heap leach, taken by rounding 81.7% which was the arithmetic average of 6 column tests by BMG.

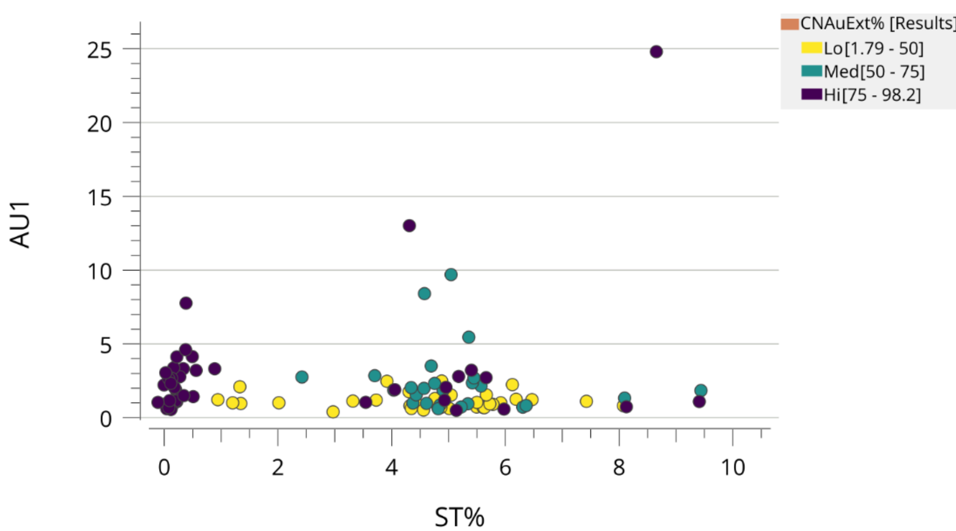



**Figure 13-13: Binned gold extraction by direct cyanidation (CNAuExt%) by gold and sulphur grade**

It was observed that at low sulphur values (<2% S total) that cyanide leaching overwhelmingly gave high gold extraction rates. At high sulphur total grades, there was a mixture of high to low gold extraction by cyanidation leaching. In Figure 13-14, the colour coding represents the results of different test programs that may have used different test conditions.

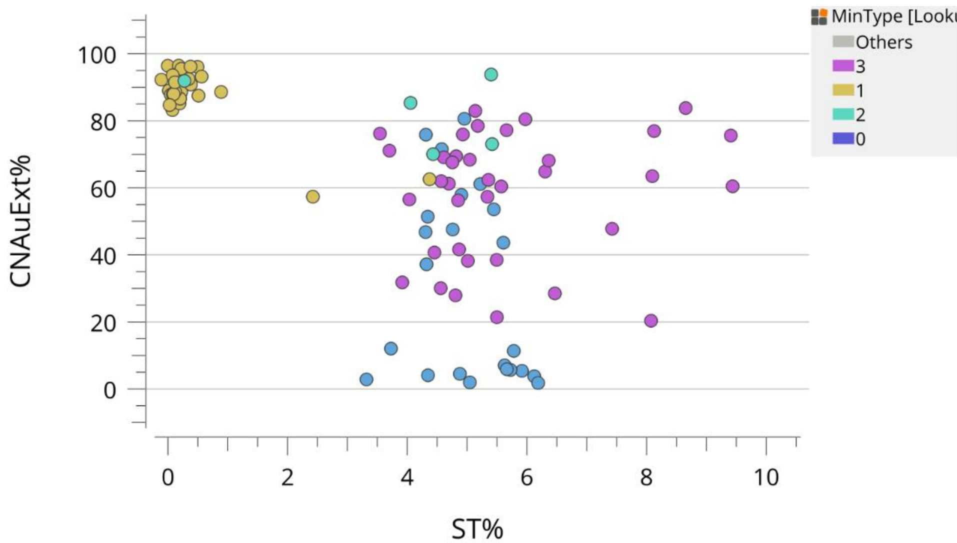



**Figure 13-14: Gold extraction domained by direct cyanidation (CNAuExt%) by sulphur grade**

It was noted the sulphide domain (MinType 3) contained some low sulphur drilling intercepts, and some high gold extraction metallurgical samples. These could not be captured as oxide resource in this study, and so presents an opportunity to increase the oxide resource in the future.

Similarly, many samples with more than 4% S grade also achieved greater than 60% Au extraction via direct cyanidation, which also presents an opportunity to recover gold from material considered to be refractory at this stage without the need for preoxidation.

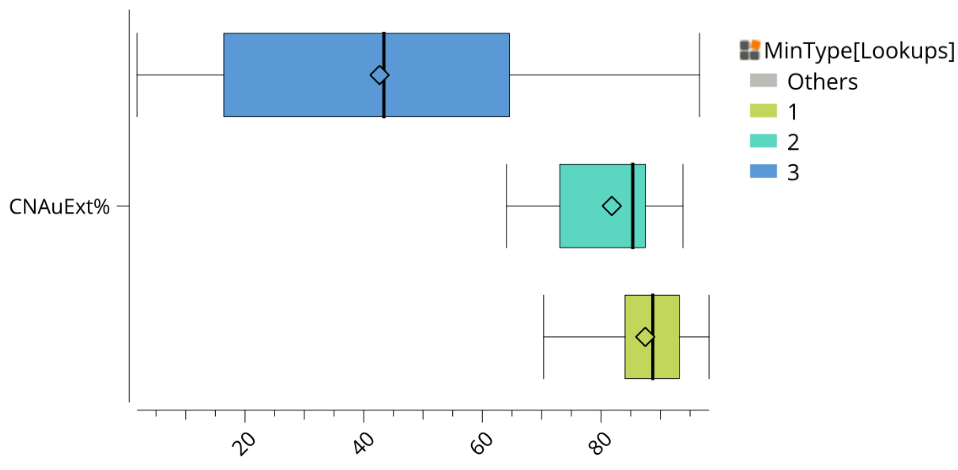



**Figure 13-15: Gold extraction by direct cyanidation (CNAuExt%) by MinType**

The average oxide domain gold extraction by cyanidation bottle roll test was 87.1% Au, whereas the average from the column tests was 81.7% Au extraction. By predicting the gold extraction based on the column tests, there is an implicit scale-up factor of 5.4% Au from the bottle roll tests to the industrial prediction. Therefore, no other scale up factors have been included in the predictions at this stage.

There are opportunities for optimization based on crush size, cyanide dose, irrigation rate, and irrigation time that should be captured in the next phase of testing.

## 13.10 GEOMETALLURGICAL MAPPING

There is an oxide resource at Tres Cruces that could be treated via direct cyanidation, but the interface between oxide and sulphide zones requires more study and development.

In the case of Tres Cruces, the Au/S ratio does not appear to be a good indicator of the oxidation boundary. The Co grade instead appears to be a useful tool to map pyrite that has been leached (low Co, as the Co leached away with S), and high Co (trace Co trapped in the structure of the fresh pyrite).

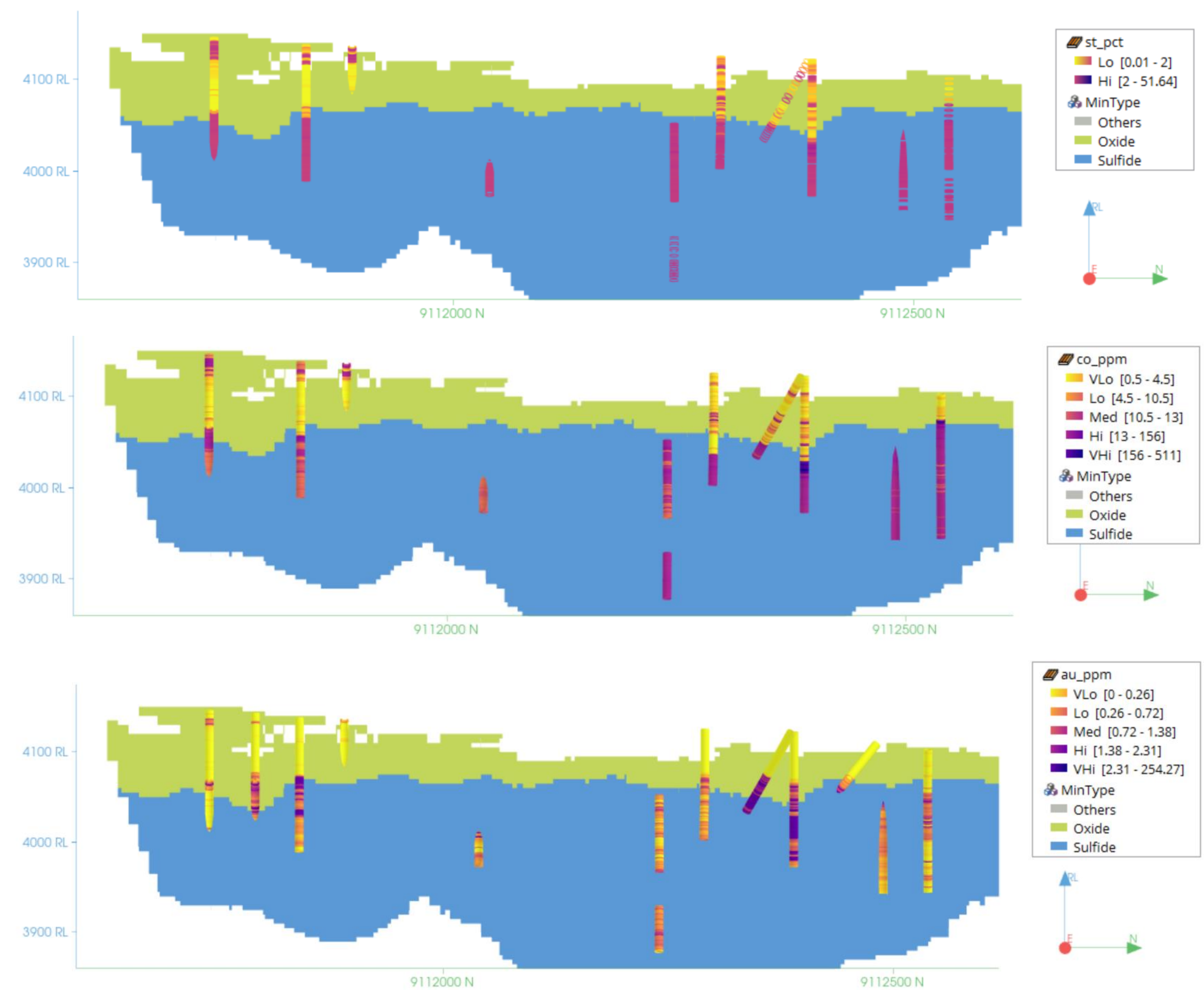



**Figure 13-16: A typical cross section of sulphur, cobalt and gold grades against the MinType sulphide and oxide designations**

The yellow, low cobalt (oxidized) material extends below the bottom of the pit in some areas. This could be an opportunity for increasing the oxide resource (See Section 26 for recommendations for additional drilling and testing).

The high-grade gold intercepts in this example are near the interface, which highlights the importance of an accurate model of the oxide-sulphide transition.

### 13.10.1 Reagent consumption

All previous testwork has been conducted with a 1 g/L NaCN leaching solution, which is a stronger cyanide concentration than is typically used for oxide heap leaching. When leaching sulphides it is common to use a 1 g/L NaCN solution to ensure that free cyanide is available for gold leaching, despite cyanide being consumed by the sulphides.

For oxides it is more common to start with 0.25 g/L NaCN, and continually add more cyanide to the solution during the test, as it is consumed. The first day or so of leaching may result in a pregnant leach solution with little free cyanide, but towards the end of the leaching cycle, cyanide consumption practically stops, as the cyanide consuming components of the material are spent.

The quick leach tests on Tres Cruces material were conducted with ground material, which liberated large amounts of sulphide and copper, maximizing the cyanide consumption potential. Consequently, the quick leach tests resulted in typical cyanide consumptions of 4.6 kg/t NaCN.

The seven column leaching tests as part of the BMG program were conducted with a suitably coarse crush size (-16 mm), minimizing liberation of cyanide consuming components, but they were also conducted with 1 g/L NaCN solutions, which meant that more cyanide was added than necessary to leach the gold.

Further testing with lower cyanide addition rates are required to demonstrate a lower cyanide consumption, however suitable predictions can be made by taking the cyanide consumption when most of the gold leaching had been completed. The cyanide consumption at the moment when 90% of final gold extraction was achieved was used for this prediction.

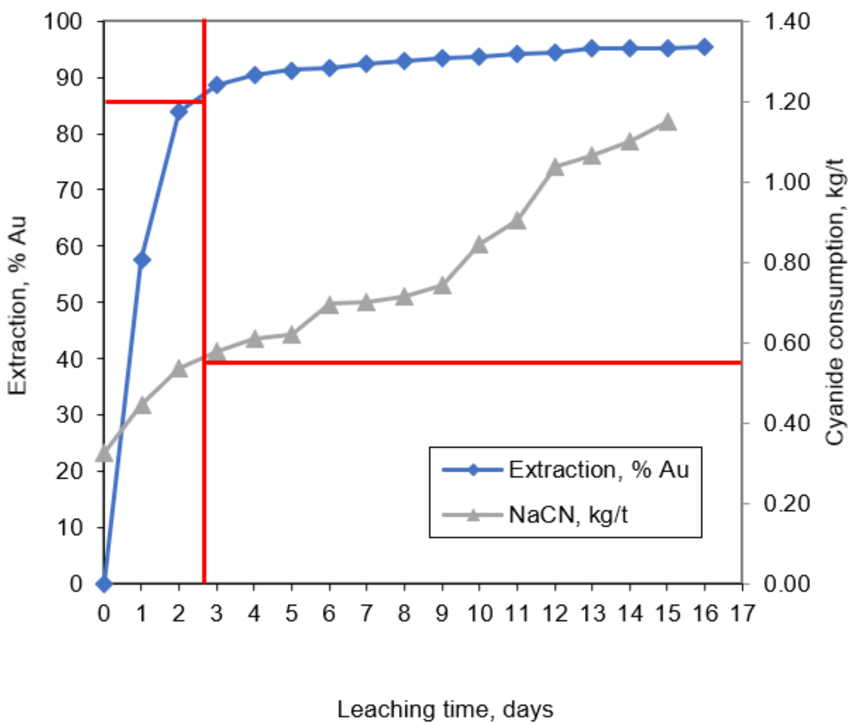



**Figure 13-17: Example LC3, BMG short column gold extraction vs cyanide consumption, 1999.**

The summary of the cyanide consumptions at the 90% final Au extraction time for each of the tests from the BMG column leaching program is shown in the following table.

**Table 13-8: BMG short column results (1999)**

| Composite | NaCN at 90% final Au extraction (kg/t NaCN) |
|---|---|
| 69A | 0.39 |
| 69B | 0.96 |
| 69C | 0.5 |
| 82A | 0.75 |
| 82B | 0.48 |
| 82C | 0.69 |
| 87A | 0.41 |
| **Average** | **0.60** |

The average of 0.6 kg/t NaCN value is recommended to be used for the current study.

There is an opportunity to reduce cyanide consumption further by reducing the cyanide concentration in the leach solution in the next round of metallurgical testwork.

## 13.11 CONCLUSIONS REGARDING SULPHIDE MATERIAL

The gold recovery predictions for a heap leach operation are:

**Table 13-9: Gold extraction prediction by Geomet unit**

| Geomet Unit | Recovery, % Au | Block model | Source |
|---|---|---|---|
| Oxide | 81.7 | MinType = 1 or 2 | BMG 1999 |
| Sulphide | 35 | Remainder | Barrick 2010 QLT |

The cyanide consumption predictions for a heap leach operation are shown in Table 13-10.

**Table 13-10: Cyanide consumption prediction by Geomet unit**

| Geomet Unit | Recovery, % Au | Block model | Source |
|---|---|---|---|
| Oxide | 0.6 | MinType = 1 or 2 | BMG 1999 |

# 14 MINERAL RESOURCE ESTIMATES

## 14.1 INTRODUCTION

This resource estimate was prepared as an update of the resource reported by Lacroix and Associates (L&A), dated September 2012. The resource is unchanged from that documented in the Technical Report dated March 16, 2021.

The Tres Cruces resource is subdivided by mineralization type: Oxide, Transition and Sulphide. The resource is constrained by an optimized pit shell and uses all available drill results.

Only gold is included in this resource estimate; silver assays are also available for a portion of the drill holes; however, the integrity of the silver database is less certain than for gold and therefore silver is not currently included.

The resource estimate was completed using Geovia GEMS® software using industry standard techniques. The resource has been classified in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (CIM, 2014).

## 14.2 AVAILABLE DRILL DATA AND MODEL SETUP

The preceding L&A estimate was based on assays in 316 holes inside the block model volume; this update used 327 holes: 168 core and 159 RC holes. The extra 11 holes included four that had been omitted because they were RC holes that had been twinned by core holes; in the author's opinion there is no reason to omit the RC samples. One hole had previously been judged to suffer downhole contamination; however, upon subsequent review this concern has since been deemed unjustified. Two previously unused holes were drilled for geotechnical purposes and four were incompletely sampled twin holes; composites over sampled intervals were included for this estimate.

Figure 14-1 shows drillhole locations in plan view along with the extents of the resource block model and the limits of the optimized resource pit shell. The block model setup information is listed in Table 14-1. Coverage of the block model matches that of the L&A estimate, the only difference being a change in block height from 10 m to 5 m.

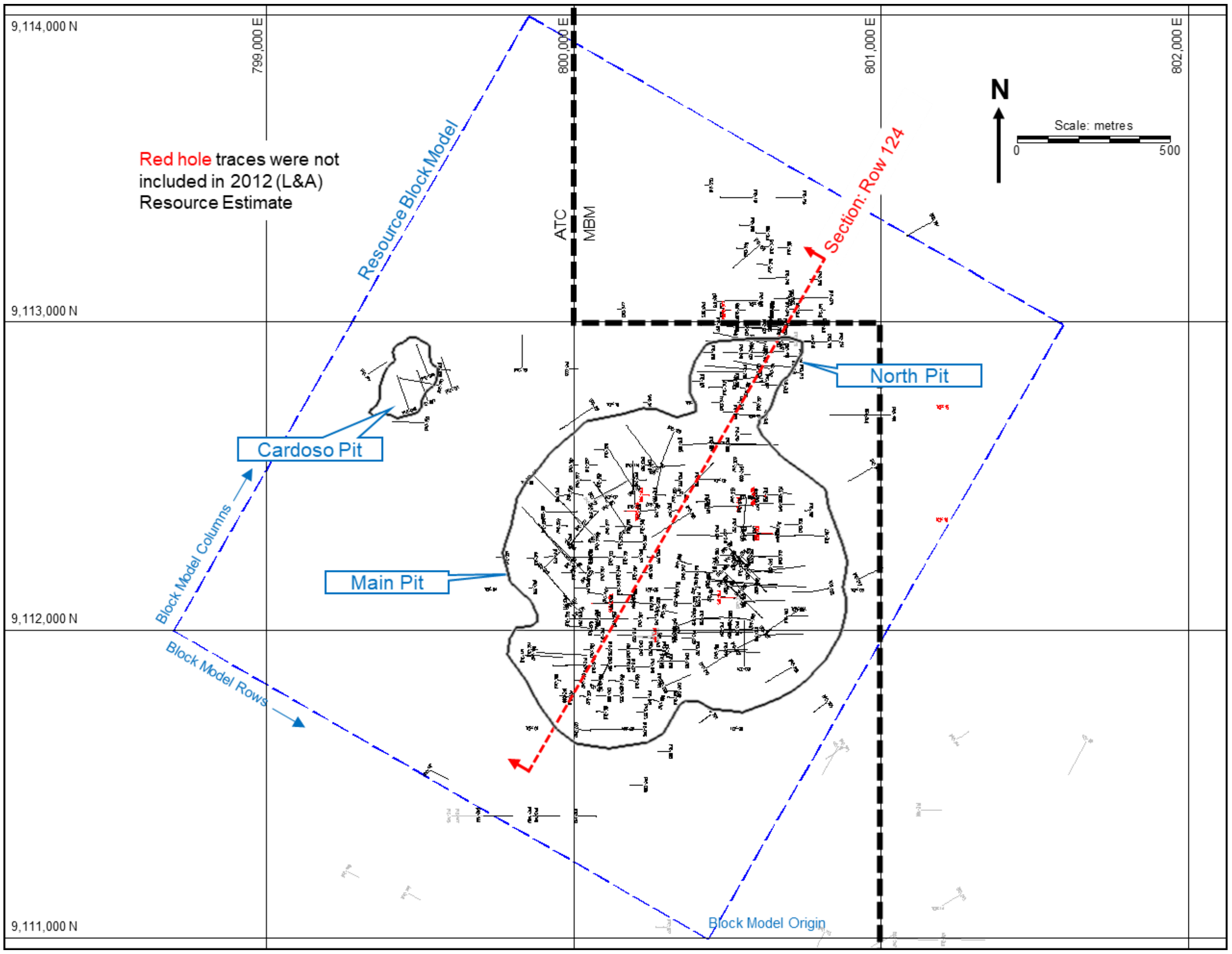



**Figure 14-1: Available Drilling, Block Model Limits and Resource Pit Crest**

**Table 14-1: Block Model Setup**

| Block: | X (columns) | Y (row s) | Z (levels) |
|---|---|---|---|
| origin (1) | 800,432 | 9,111,000 | 4,200 |
| size (m) | 10 | 10 | 5 |
| no blocks | 230 | 200 | 100 |
| 60° counter – clockwise rotation about origin; 4,600,000 blocks<br>(1) SW model top, block edge | | | |

## 14.3 GEOLOGIC MODEL

Block models of lithology and alteration used for the 2012 estimate by Lacroix and Associates were also used for this resource update. The only change in block model geometry was from a ten- to a five-metre block height for the current estimate.

Mineralization type was defined for this resource update through the generation of two surfaces. The bottom of oxide and the bottom of a zone of transition material was determined from drill information, based on a mix of analytical (sulphide sulphur values, noted as $S^{2-}$) and logged redox observations – depending on the vintage of drilling. In general, $S^{2-}$ values <0.4% denoted oxide and values between 0.4 and 3.4% $S^{2-}$ indicated a narrow zone transition mineralization above the lower sulphide zone. These redox zones do not correlate with gold grade, but rather are used to assign metallurgical properties for pit optimization.

The 3D location of down-hole points marking the bottom of the two surfaces were used to interpolate an inverse distance cubed (ID3) estimate of the vertical depth of oxide and transition material into a 2D grid covering the XY extents, and at the same 10 m XY resolution, as the resource block model. A total of 286 points were used for the oxide surface estimate and 139 points for the depth of transition material. In order to estimate all blocks in the grid, a 1,200 m isotropic search was used, and blocks were estimated by a minimum of one and a maximum of 12 points. The interpolated and actual points were then used to create the lower bounding surface(s). An example plot of the oxide surface depth and supporting drill locations is shown in Figure 14-2.

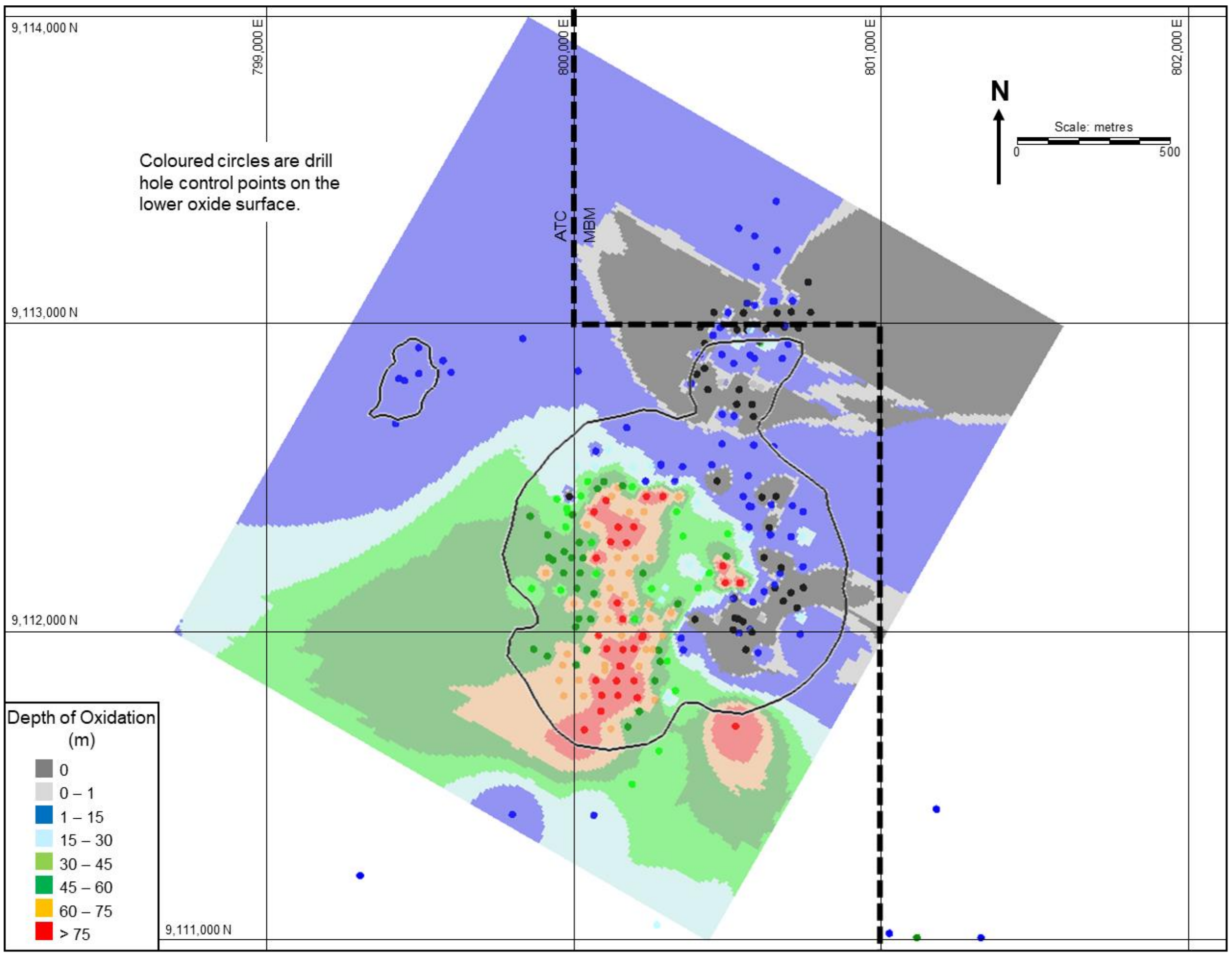



**Figure 14-2: Interpolated Depth of Oxidation**

## 14.4 EXPLORATORY DATA ANALYSIS

A process of examination of gold assay statistics and statistical plots, grouped by modeled geologic attributes, was undertaken with the goal of determining the most suitable approach to domaining the deposit as control for grade estimation. Lithology and alteration, as well as combinations of those two geologic variables, were reviewed.

Gold grade statistics by L&A (2012) modeled lithology are presented in Table 14-2. The table includes quartile grades to impart an understanding of the distribution as well as the coefficient of variation (CV=standard deviation ÷ mean) as a measure of grade variability. As a rule-of-thumb, CVs of composited samples should be ≤2 for typical linear estimation techniques. While CVs will be reduced slightly by compositing, grouping of samples by lithology failed to adequately separate populations for estimation.

**Table 14-2: Gold Grade Statistics by Modeled Lithology**

| Lithology | Count | Assay Grade (Au g/t) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Mean | Max | $Q_1$ | $Q_2$ | $Q_3$ | CV |
| 1 Andesite Tuff | 21 | 0.91 | 2.60 | 0.60 | 0.72 | 0.98 | 0.7 |
| 2 Dacite Tuff | 39 | 0.12 | 0.63 | 0.01 | 0.03 | 0.25 | 1.3 |
| 3 Indeterminate Tuff | 75 | 0.14 | 1.25 | 0.01 | 0.02 | 0.12 | 2.0 |
| 4 Pyroclastic Sequence | 11 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.5 |
| 5 Pyroclastic/Dacite Sequence | 5,634 | 0.33 | 101.50 | 0.01 | 0.04 | 0.17 | 5.3 |
| 6 Pyroclastic/Andesite Flow Seq. | 34,662 | 0.46 | 254.27 | 0.01 | 0.10 | 0.44 | 4.4 |
| 7 Volcanic Sediments | 1,111 | 0.01 | 0.46 | 0.00 | 0.01 | 0.01 | 2.3 |
| 8 Andesite Flow | 125 | 0.10 | 1.16 | 0.01 | 0.04 | 0.12 | 1.8 |
| 9 Andesite | 6,719 | 0.36 | 86.60 | 0.04 | 0.13 | 0.34 | 5.5 |
| 10 Outstanding lithology model (not determined) | 53 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | 0.3 |
| **Total:** | **48,450** | **0.42** | | | | | |

Statistics by modeled alteration are listed in Table 14-3. Again, groupings are not suited for use as estimation control. High maximum values are found in most alteration types and CVs are generally high.

**Table 14-3: Gold Grade Statistics by Modeled Alteration**

| Alteration | Count | Assay Grade (Au g/t) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Mean | Max | $Q_1$ | $Q_2$ | $Q_3$ | CV |
| 1 Overburden – Sedimentary Volcanics | 1,201 | 0.02 | 1.25 | 0.01 | 0.01 | 0.01 | 3.5 |
| 2 Illite, Smectite, Kaolinite | 33,888 | 0.44 | 254.27 | 0.02 | 0.11 | 0.44 | 4.5 |
| 3 Quartz, Alunite, Dickite | 374 | 2.21 | 49.82 | 0.36 | 0.92 | 2.30 | 2.0 |
| 4 Quartz, Illite, Smectite | 983 | 1.15 | 34.67 | 0.12 | 0.42 | 1.13 | 2.0 |
| 5 Quartz, Kaolinite | 821 | 0.04 | 1.99 | 0.00 | 0.01 | 0.02 | 3.5 |
| 6 Quartz, Opaline | 3,578 | 0.22 | 101.50 | 0.01 | 0.04 | 0.14 | 8.4 |
| 8 Below Illite, Smectite, Kaolinite | 5,919 | 0.35 | 86.60 | 0.04 | 0.12 | 0.32 | 5.8 |
| 10 Outside alteration model (not determined) | 1,686 | 0.20 | 12.90 | 0.01 | 0.02 | 0.12 | 3.5 |
| **Total:** | **48,450** | **0.42** | | | | | |

As a third step in the EDA process, assay statistics and plots were examined by grouped lithology and alteration (LithAlt = 10 x lithology code + alteration code) - see Table 14-4. The division into three groupings has been made based on similarity of statistics. The third group contains the most significant portion of total mineralization, however the high maximum values outside that group, indicate that some other means of population domaining is warranted.

**Table 14-4: Gold Grade Statistics by Lithology/Alteration**

| LithAlt (10xLith+Alt) | LthAlt Group | Count | Assay Grade (Au g/t) | Mean | Max | $Q_1$ | $Q_2$ | $Q_3$ | CV |
|---|---|---|---|---|---|---|---|---|---|
| 31 | 1 | 75 | 0.14 | 1.25 | 0.01 | 0.02 | 0.12 | | 2.0 |
| 42 | | 11 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | | 0.5 |
| 51 | | 66 | 0.04 | 0.83 | 0.01 | 0.02 | 0.04 | | 2.6 |
| 55 | | 821 | 0.04 | 1.99 | 0.00 | 0.01 | 0.02 | | 3.5 |
| 60 | | 297 | 0.09 | 4.68 | 0.01 | 0.01 | 0.02 | | 3.9 |
| 71 | | 1,060 | 0.01 | 0.46 | 0.00 | 0.01 | 0.01 | | 2.3 |
| 76 | | 7 | 0.02 | 0.09 | 0.01 | 0.01 | 0.02 | | 1.3 |
| 80 | | 44 | 0.01 | 0.07 | 0.01 | 0.01 | 0.01 | | 0.9 |
| 88 | | 1 | 0.01 | 0.01 | | | | | |
| 90 | | 121 | 0.10 | 1.16 | 0.01 | 0.04 | 0.12 | | 1.7 |
| 100 | | 102 | 0.04 | 0.89 | 0.01 | 0.01 | 0.01 | | 0.3 |
| 110 | | 53 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | | 0.3 |
| | *Subtotal:* | *2,661* | *0.04* | | | | | | |
| 22 | 2 | 39 | 0.12 | 0.63 | 0.01 | 0.03 | 0.25 | | 1.3 |
| 52 | | 87 | 0.36 | 6.33 | 0.01 | 0.06 | 0.31 | | 2.3 |
| 56 | | 3,481 | 0.22 | 101.50 | 0.01 | 0.04 | 0.13 | | 8.5 |
| 62 | | 32,465 | 0.45 | 254.27 | 0.01 | 0.11 | 0.44 | | 4.5 |
| 66 | | 90 | 0.21 | 2.58 | 0.04 | 0.12 | 0.28 | | 1.5 |
| 68 | | 563 | 0.18 | 2.42 | 0.01 | 0.04 | 0.22 | | 1.7 |
| 70 | | 1,069 | 0.27 | 12.90 | 0.01 | 0.04 | 0.22 | | 3.1 |
| 92 | | 1,262 | 0.33 | 10.70 | 0.05 | 0.13 | 0.398 | | 1.8 |
| 98 | | 5,355 | 0.37 | 86.60 | 0.04 | 0.13 | 0.33 | | 5.8 |
| | *Subtotal:* | *44,411* | *0.41* | | | | | | *4.8* |
| 12 | 3 | 21 | 0.91 | 2.60 | 0.60 | 0.72 | 0.98 | | 0.7 |
| 53 | | 129 | 1.52 | 12.70 | 0.37 | 0.75 | 1.68 | | 1.3 |
| 54 | | 753 | 1.10 | 34.67 | 0.10 | 0.37 | 1.05 | | 2.1 |
| 63 | | 245 | 2.57 | 49.82 | 0.35 | 1.00 | 2.92 | | 2.0 |
| 64 | | 230 | 1.32 | 14.32 | 0.26 | 0.57 | 1.60 | | 1.6 |
| | *Subtotal:* | *1,378* | *1.43* | | | | | | *2.1* |
| | **Total:** | **48,450** | **0.42** | | | | | | |

It was concluded that gold grade domaining based on modeled geologic variables, and groupings thereof, failed to adequately capture all contiguous mineralization or reduce grade variability to levels suitable for conventional grade estimation techniques. Based on the imprecision of any of the above approaches, the decision was made to domain the deposit using indicator derived grade shells.

The cumulative frequency plot of all assays within the block model volume, shows a slight inflection at a grade of 0.2 g/t. That grade threshold was used as the division between low, background grade, and mineralized material.

## 14.5 ASSAY COMPOSITING

A composite length of 3 m was chosen as most appropriate based on the fact that 59% of sample intervals were 1.5 m in length and another 34% were 1 m in length. Rather than compositing to a constant downhole length, holes were composited to a target 3 m length but allowed to vary such that lengths per hole were equal, and as close to 3.0 m as possible. In this way short intervals that may have occurred at the ends of holes, that are typically discarded prior to estimation, were not an issue and all samples were included for the estimation of grade.

## 14.6 INDICATOR GRADE SHELL INTERPOLATION

All three-metre composites within the block model volume were coded as indicators at the 0.2 g/t threshold value; indicator variograms were calculated and modeled using Supervisor® software. Indicators were interpolated by ordinary kriging (OK) to generate values ranging between zero and one – effectively, the probability that blocks are inside or outside the 0.2 g/t grade domain. Indicator interpolation used a minimum of three composites and a maximum of 32 composites, with a maximum of five composites per hole. The search distances were based on the indicator variogram ranges. The indicator variogram model and indicator estimation search parameters are listed in Table 14-5.

**Table 14-5: Indicator Estimation Parameters**

| 0.2 g/t Au Indicator Variogram Model | | | | | | |
|---|---|---|---|---|---|---|
| Axis | Direction (dip/azimuth) | Nugget Effect | Spherical Component 1 | | Spherical Component 2 | |
| | | | Sill | Range(m) | Sill | Range(m) |
| X | 00/030 | | | 50 | | 175 |
| Y | 00/300 | 0.24 | 0.33 | 55 | 0.43 | 155 |
| Z | 90/000 | | | 30 | | 180 |

| 0.2 g/t Au Indicator Estimation | | |
|---|---|---|
| Axis | Direction (dip/azimuth) | Estimation Range (m) |
| X | 00/030 | 175 |
| Y | 00/300 | 155 |
| Z | 90/000 | 180 |

In order to designate blocks as inside or outside the targeted volume, a probability threshold must be chosen to separate blocks into the two groups. The threshold was determined by back-tagging composite data with the estimated indicator probabilities and then selecting the probability level that resulted in the fewest composites being assigned to the wrong grade bin (above and below the indicator threshold); in this case the selected probability threshold was 0.47. An example section through the resultant indicator shell is shown in Figure 14-3.

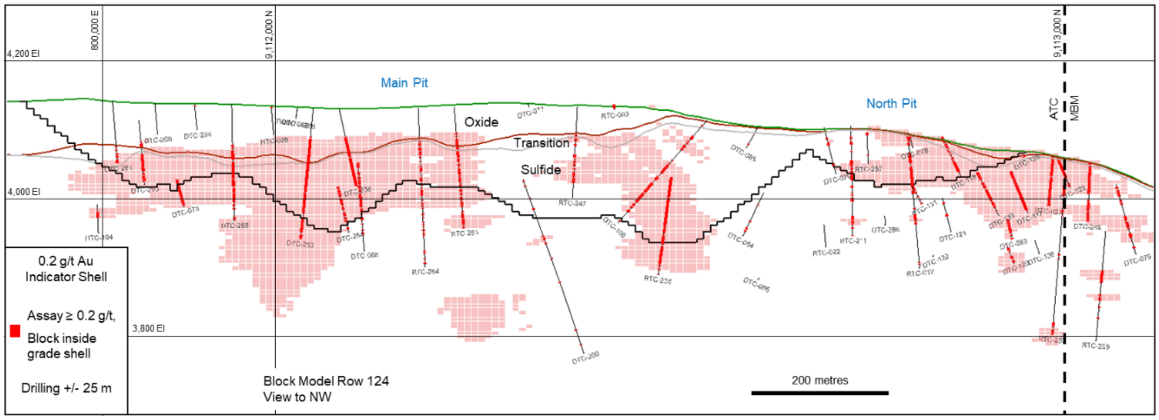



**Figure 14-3: Example Section - Indicator Grade Shell Interpolation**

## 14.7 GRADE CAPPING

Grade capping is used to control the impact of extreme, outlier high-grade samples on the overall resource estimate. Assay data was back-tagged by the grade shell variable prior to assessing capping requirements. Histograms and probability plots were examined to determine levels at which values are deemed outliers to grade populations inside and outside the 0.2 g/t grade shell. Inside the indicator shell, assays were capped at 60 g/t, outside at 2.3 g/t. Assay statistics are presented in Table 14-6 and composite statistics in Table 14-7.

**Table 14-6: Uncapped and Capped Assay Statistics by Grade Shell**

| Indicator | Au (g/t) | | | | AuCap (g/t) | | | |
|---|---|---|---|---|---|---|---|---|
| Shell | count | mean | max | CV | *n* Cap | mean | max | CV |
| Outside | 29,814 | 0.08 | 7.84 | 2.7 | 41 | 0.07 | 2.30 | 2.2 |
| Inside | 18,636 | 0.96 | 254.27 | 3.2 | 6 | 0.94 | 60.00 | 2.3 |
| Total: | 48,450 | 0.42 | | | 47 | 0.41 | | |

**Table 14-7: Uncapped and Capped Composite Statistics by Grade Shell**

| Indicator | Au (g/t) | | | | AuCap (g/t) | | | |
|---|---|---|---|---|---|---|---|---|
| Shell | count | mean | max | CV | *n* Cap | mean | max | CV |
| Outside | 13,470 | 0.06 | 4.09 | 1.9 | 24 | 0.06 | 2.11 | 1.7 |
| Inside | 8,529 | 0.96 | 109.01 | 2.3 | 13 | 0.95 | 56.82 | 1.9 |
| Total: | 21,999 | 0.41 | | | 37 | 0.41 | | |

The impact of grade capping on the estimation of grades can be measured by comparing uncapped and capped estimated block grades above a zero cut-off. At the levels listed above, grade capping lowered the average grade by 1.3%.

## 14.8 GRADE VARIOGRAPHY

Analysis of spatial continuity, of 3 m composited data, was carried out using Supervisor® software. Directions of continuity were determined from variogram maps. The nugget effect and sill contributions were derived from down-hole experimental variograms followed by final model fitting on directional variogram plots.

Initially all composites were used to generate variogram models of 0.2 g/t gold grade indicators. A second round of variography evaluated gold grade continuity inside and outside the interpolated indicator grade shells using capped composite data. Gold variogram models used in this estimate are included in Table 14-8.

**Table 14-8: Gold Grade Variogram Models**

| Ind Shell | Axis | Direction (dip/azimuth) | Nugget Effect | Spherical Component 1 | | Spherical Component 2 | |
|---|---|---|---|---|---|---|---|
| | | | | Sill | Range(m) | Sill | Range(m) |
| Outside 0.2 g/t Shell | X | 00/000 | 0.27 | 0.38 | 75 | 0.35 | 215 |
| | Y | 00/270 | | | 90 | | 280 |
| | Z | 90/000 | | | 20 | | 165 |
| Intside 0.2 g/t Shell | X | 00/345 | 0.49 | 0.38 | 40 | 0.13 | 150 |
| | Y | 00/255 | | | 50 | | 170 |
| | Z | 90/000 | | | 20 | | 175 |

## 14.9 GRADE INTERPOLATION

Gold grades were estimated by OK using Geovia GEMS® software. A 100 m spherical search was used for sample selection in the estimation of blocks inside and outside the 0.2 g/t shell; sample selection was hard bounded by the shell designation. A minimum of three and maximum of 16, with a maximum of four samples per hole, were included for estimation. Estimated in this way, virtually all blocks included in the tabled Mineral Resource, were estimated using three or more holes.

## 14.10 DENSITY ASSIGNMENT

Block density values were assigned based on L&A (2012) modeled lithology. As described in the L&A technical report, more than 2,700 density measurements were made on core samples by various Project operators. After filtering erroneous values from the list, Table 14-9 summarizes average density by lithology; these values were assigned to blocks based on modeled block lithology.

Blocks outside the originally interpreted geology were assigned the average density value; all of these blocks were outside areas reported as part of the mineral resource.

**Table 14-9: Density Measurements**

| Lithology | # Samples | SG mean | # Blocks |
|---|---|---|---|
| 1 Andesite Tuff | 3 | 2.31 | 178 |
| 2 Dacite Tuff | 1 | 2.31 | 1,053 |
| 3 Indeterminate Tuff | 5 | 2.00 | 1,287 |
| 4 Pyroclastic Sequence | | 2.13 | 4,071 |
| 5 Pyroclastic/Dacite Sequence | 572 | 2.27 | 85,194 |
| 6 Pyroclastic/Andesite Flow Seq. | 1,920 | 2.37 | 982,960 |
| 7 Volcanic Sediments | 81 | 2.13 | 21,829 |
| 8 Andesite Flow | | 2.37 | 62,086 |
| 9 Andesite | 131 | 2.45 | 1,325,400 |
| 10 Outside lithology model (not determined) | | 2.41 | 1,176,349 |
| Total: | 2,713 | | 3,660,407 |

Assigned in this manner, the average density of blocks contained in the oxide resource is 2.25 t/m$^3$. As a check back to the density measurements, samples were separated above the interpolated oxide surface. The average of those 624 measurements was 2.24 t/m$^3$; removing the 81 samples modeled as volcanic sediments, which are post-mineral cover rocks, yields an average density of 2.26 t/m$^3$ in the oxide zone. Likewise, the average density of resource blocks below the interpolated oxide surface is 2.37 t/m$^3$ and the average of the 2,090 density measurements below that surface is 2.37 t/m$^3$. The conclusion is that average density, assigned by modeled lithology, has provided a reasonable basis for the establishment of tonnage.

## 14.11 MODEL VALIDATION

Estimated grades were validated using a variety of approaches. Block grades were compared visually to supporting drill data on section and plan maps. Results compared well; an example section of block grades and assay data is included as Figure 14-4.

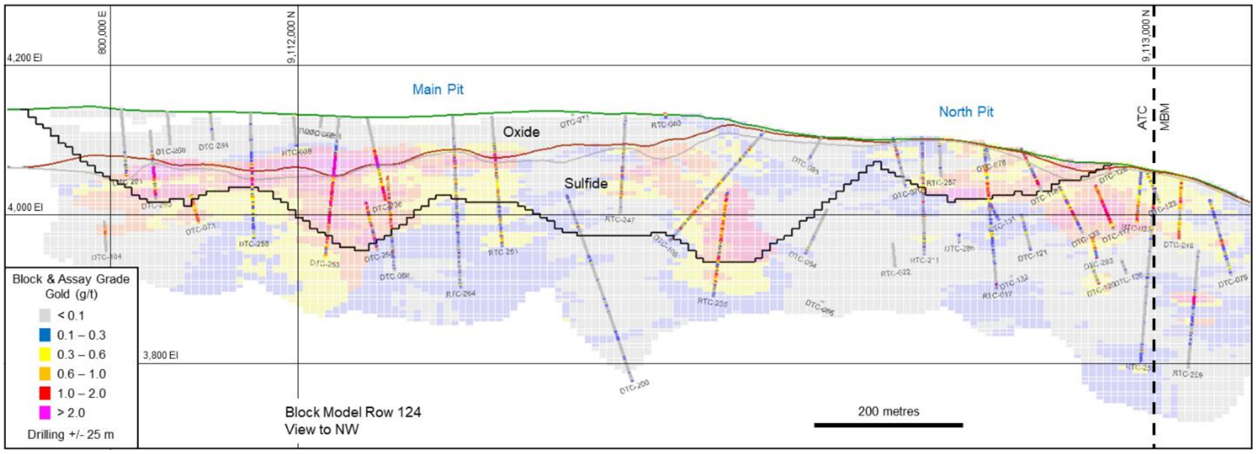



**Figure 14-4: Example Section - Drill Hole Assay and Block Grades**

Grades were also estimated by two other methods and results were compared globally and spatially by generating swath plots along rows, columns, and levels of the block model. A nearest neighbour (NN) model was estimated using the same search strategy as the OK interpolation and a set of 5-metre composites to appropriately match the block height. An inverse distance cubed model (ID3) was also estimated using sample selection and search parameters consistent with the OK estimation. All check model average grades agreed closely at zero cut-off indicating no bias. Example swath plot comparing the kriged gold estimate to NN and ID3 results along block model columns, rows and by elevation are included as Figure 14-5. Grades by OK estimation is appropriately smooth as compared to the NN estimate.

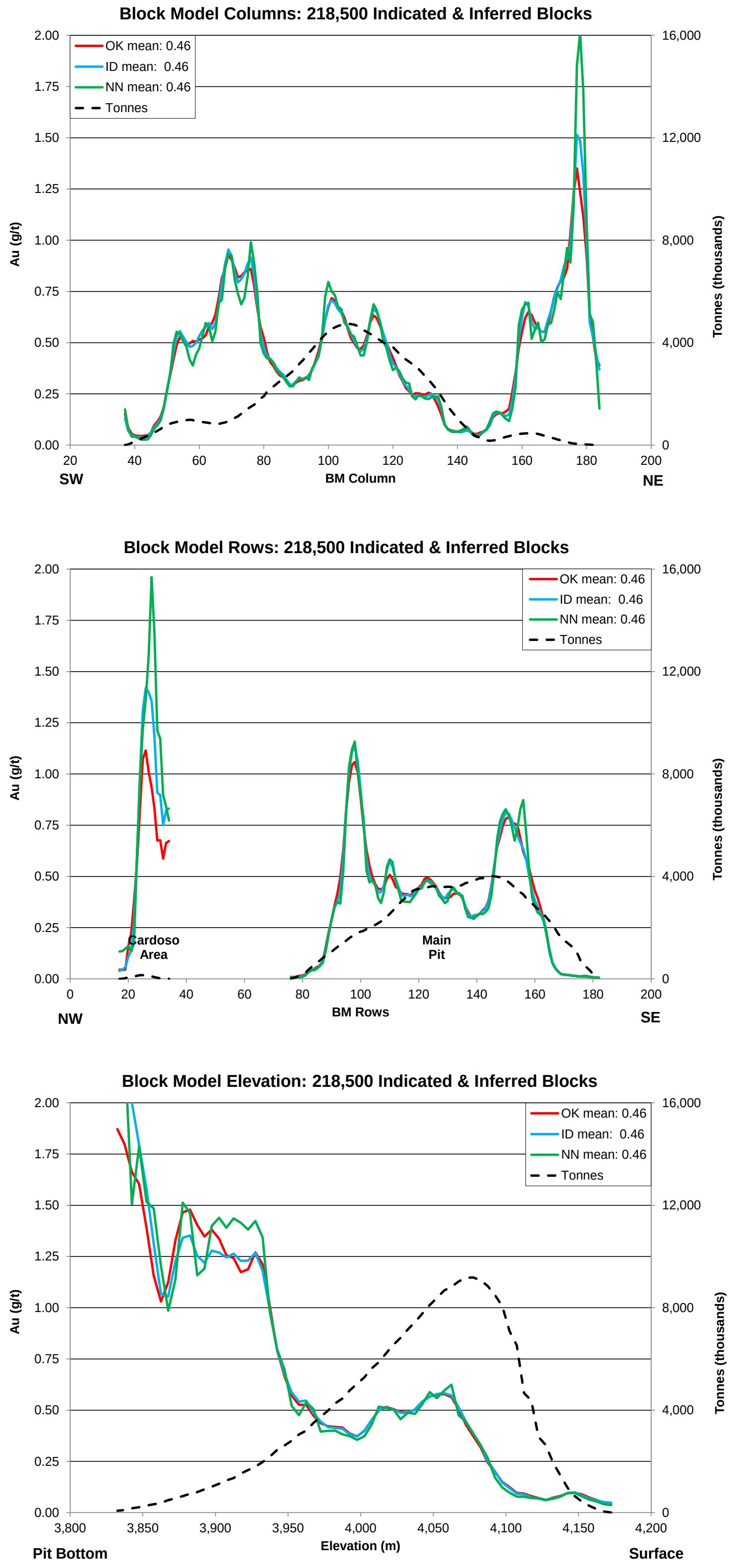



**Figure 14-5: Swath Plots Comparing OK, ID and NN Estimates**

## 14.12 RESOURCE CLASSIFICATION AND TABULATION

The mineral resource is classified based on spatial parameters related to drill density and configuration and the generation of an optimised pit. Block models were run to record various parameters including:

1) Distance to the 1st, 2nd, and 3rd closest hole;
2) Average distance to the two closest and three closest holes;
3) Number of holes within a 50 m spherical search;
4) Number of holes and samples used to estimate grade.

After visual inspection of these models, blocks were classified as:

- Inferred, where the average distance to the closest three holes is within 80 m;
- Indicated, where the average distance to the closest three holes is within 50 m.

Measures were taken to ensure the resource meets the condition of "reasonable prospects of eventual economic extraction". Pit optimization was carried out by SRK consulting of Vancouver. An optimised resource pit shell was generated using Whittle® software, based on the Indicated and Inferred Mineral Resource. Pit optimization parameters are listed in Table 14-10. A section showing drilling, relative to block classification, is included as Figure 14-6.

**Table 14-10: Pit Optimization Parameters**

| Parameter | Value |
|---|---|
| Au Price | USD 1,500/oz |
| Pit Slope | 45˚ overall |
| Mining Cost | USD 1.90/t mined |
| Dilution | 0% |
| Mining Loss | 0% |
| Royalty | 1.5% |
| Oxide Heap Leach Cost | $2.37/t |
| Oxide Heap Recovery | 81.7% |
| Sulphide Leach Cost | $3.30/t |
| Sulphide Leach Recovery | 65% |
| Sulphide Cost | $28.49/t |
| Sulphide Recovery | 88% |

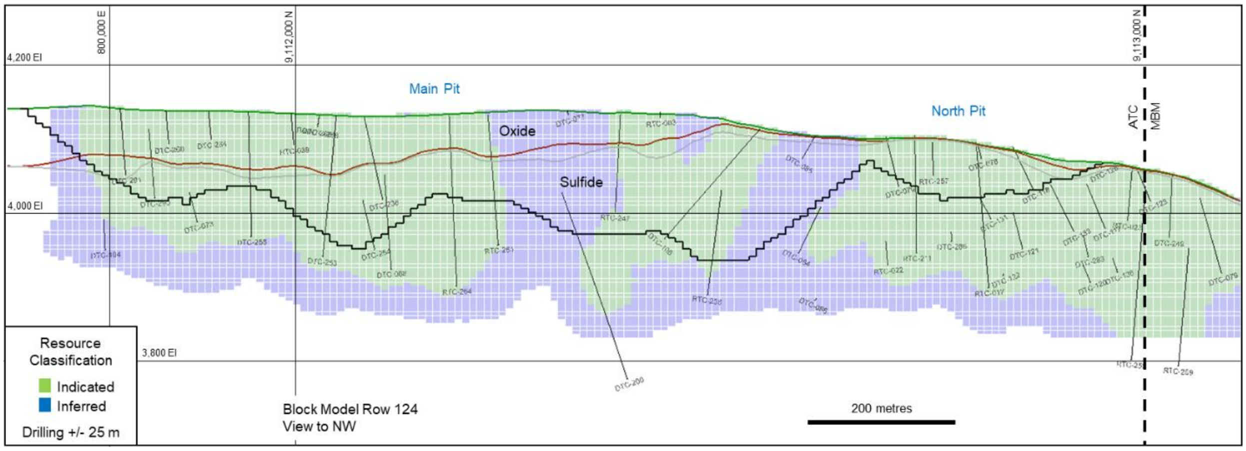



**Figure 14-6: Example Section - Resource Classification**

The Tres Cruces Mineral Resource is tabled at different cut-off grades depending on the mineralization type. Based on values used for pit optimization and available metallurgical test results, cut-off grades were determined for the oxide, transition and sulphide volumes of the deposit; these are summarized in Table 14-11. The 2021 Tres Cruces Mineral Resource Estimate is listed in Table 14-12. A range of cut-off grades are shown in Table 14-13 to quantify sensitivity to grade; the highlighted Mineral Resource Estimates in the table indicate the currently chosen cut-off grades for each mineralization type. No values are tabled for sulphides at 0.6 g/t Au cut-off and lower, due to limited economic viability based on the operating parameters used in this estimate.

**Table 14-11: Cut-off Grade by Mineralization Type**

| Min. Type | Cost ($/t) (including mining) | Recovery Factored Cost ($/t) | Cut-off Au (g/t) | Revenue ($/t) |
|---|---|---|---|---|
| Oxide | 4.27 | $5.23 | 0.3 | $14.83 |
| Transition | 5.20 | $8.00 | 0.3 | $14.83 |
| Sulphide | 30.39 | $34.53 | 0.9 | $44.50 |

**Table 14-12: Tres Cruces 2021 Mineral Resource Estimate**

| Resource Classification | Oxide (0.3 g/t Au Cut-off) | | | Transition (0.3 g/t Au Cut-off) | | | Sulphide (0.9 g/t Au Cut-off) | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tonnes (1,000s) | Au (g/t) | Oz Au (1,000s) | Tonnes (1,000s) | Au (g/t) | Oz Au (1,000s) | Tonnes (1,000s) | Au (g/t) | Oz Au (1,000s) | Tonnes (1,000s) | Au (g/t) | Oz Au (1,000s) |
| Indicated | 9,636 | 1.37 | 425 | 5,707 | 1.12 | 205 | 31,132 | 1.84 | 1,844 | 46,475 | 1.65 | 2,474 |
| Inferred | 487 | 0.75 | 12 | 361 | 0.60 | 7 | 1,713 | 1.55 | 85 | 2,561 | 1.26 | 104 |

**Table 14-13: Mineral Resource at Range of Gold Cutoff Grades**

| Cut-off (g/t Au) | Resource Classification | Oxide | | | Transition | | | Sulphide | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Tonnes (1,000s) | Au (g/t) | Oz Au (1,000s) | Tonnes (1,000s) | Au (g/t) | Oz Au (1,000s) | Tonnes (1,000s) | Au (g/t) | Oz Au (1,000s) | Tonnes (1,000s) | Au (g/t) | Oz Au (1,000s) |
| 0.2 | Indicated: | 9,941 | 1.34 | 427 | 5,830 | 1.10 | 206 | | | | 15,771 | 1.25 | 633 |
| | Inferred: | 568 | 0.68 | 12 | 376 | 0.59 | 7 | | | | 944 | 0.64 | 19 |
| 0.3 | Indicated: | 9,640 | 1.37 | 425 | 5,707 | 1.12 | 205 | | | | 15,347 | 1.28 | 630 |
| | Inferred: | 487 | 0.75 | 12 | 361 | 0.60 | 7 | | | | 848 | 0.69 | 19 |
| 0.4 | Indicated: | 9,297 | 1.41 | 421 | 5,432 | 1.15 | 201 | | | | 14,729 | 1.31 | 622 |
| | Inferred: | 397 | 0.84 | 11 | 262 | 0.69 | 6 | | | | 659 | 0.78 | 17 |
| 0.5 | Indicated: | 8,720 | 1.47 | 413 | 4,842 | 1.24 | 193 | | | | 13,562 | 1.39 | 606 |
| | Inferred: | 332 | 0.92 | 10 | 170 | 0.83 | 5 | | | | 502 | 0.89 | 15 |
| 0.6 | Indicated: | 7,856 | 1.57 | 397 | 4,273 | 1.33 | 183 | | | | 12,129 | 1.49 | 580 |
| | Inferred: | 247 | 1.04 | 8 | 139 | 0.89 | 4 | | | | 386 | 0.99 | 12 |
| 0.7 | Indicated: | 6,963 | 1.69 | 379 | 3,652 | 1.45 | 170 | 42,692 | 1.56 | 2,139 | 53,307 | 1.57 | 2,688 |
| | Inferred: | 169 | 1.23 | 7 | 88 | 1.03 | 3 | 2,185 | 1.38 | 97 | 2,442 | 1.36 | 107 |
| 0.8 | Indicated: | 6,178 | 1.81 | 360 | 3,098 | 1.57 | 157 | 36,292 | 1.70 | 1,985 | 45,568 | 1.71 | 2,502 |
| | Inferred: | 140 | 1.33 | 6 | 65 | 1.14 | 2 | 1,962 | 1.46 | 92 | 2,167 | 1.44 | 100 |
| 0.9 | Indicated: | 5,563 | 1.92 | 343 | 2,662 | 1.69 | 145 | 31,132 | 1.84 | 1,844 | 39,357 | 1.84 | 2,332 |
| | Inferred: | 118 | 1.41 | 5 | 56 | 1.18 | 2 | 1,713 | 1.55 | 85 | 1,888 | 1.53 | 92 |
| 1.0 | Indicated: | 5,088 | 2.01 | 329 | 2,295 | 1.81 | 133 | 26,844 | 1.99 | 1,714 | 34,228 | 1.98 | 2,176 |
| | Inferred: | 104 | 1.48 | 5 | 36 | 1.30 | 2 | 1,476 | 1.64 | 78 | 1,616 | 1.62 | 85 |

## 14.13 2022 DRILLING

As discussed in Section 10, six core holes have been completed since this resource estimate; two of these holes were for metallurgical purposes and were not assayed. Results of the other four holes were reviewed in the context of the existing mineral resource estimate. The fact that results were both negative and positive relative to interpolated grades and because there are so few new holes scattered among earlier drilling, the new drilling is deemed immaterial in terms of its potential impact on grade estimation.

## 14.14 COMMENTS REGARDING SILVER

As stated earlier, silver is not included in this Mineral Resource Estimate; however, there are silver assays available from some of the Project's drill campaigns, which generally show low correlation with gold values.

In order to gain an impression of a potential contribution by silver, grades were interpolated using a similar technique to that documented for the gold resource. Specifically, a zone of ≥0.5 g/t Ag was generated using indicators and Ag grades were interpolated inside and outside that volume.

Indications are that silver grades are generally low and concentrated mainly in the deeper, sulphide portion of the gold deposit. Based on this gold resource scenario, overall silver grades would be expected to range between 1.5 and 2.5 g/t, potentially containing 2.5 to 3.5 Moz of silver.

# 15 MINERAL RESERVE ESTIMATES

No mineral reserves have been declared in this Preliminary Economic Assessment.

# 16 MINING METHODS

## 16.1 SUMMARY

Preliminary mine designs have been developed for mining oxide and transition mineralization for heap leach processing at the Tres Cruces Oxide Project. The designs and production schedule have been based upon Indicated and Inferred Mineral Resources. The resource model described in Section 14 was imported to Hexagon Mining - Mineplan 3D software where a Lerchs Grossmann algorithm was applied to an NSR model to determine possible pit limits.

The mine plan was developed to mine the oxide and transition mineralization from four phases. The assumed processing rate was nominally 6,000 t/d over seven years. The overall mining rate ramps up from 6 Mt/a to 9 Mt/a in Year 2 of the plan after two years of pre-production stripping. The total mine life is nine years with an overall life of mine strip ratio of 2.89:1.

The mine will be a conventional diesel equipment truck and excavator/wheel loader operation. Waste rock will be placed in a storage facility immediately south of the open pit. A small stockpile will be located immediately adjacent to the primary crusher and used as required to ensure a steady supply of mineralized material to the processing facility.

The total resources processed in the conceptual mine plan are shown in Table 16-1.

**Table 16-1: Mineral Resources Included in the Mine Plan**

| Indicated Resources | ROM (t x 1000) | Au (g/t) |
|---|---|---|
| Phase 1 | 4,305.0 | 1.71 |
| Phase 2 | 3,965.0 | 1.12 |
| Phase 3 | 4,943.0 | 0.97 |
| Phase 4 | 1,141.0 | 1.20 |
| Total | 14,354.0 | 1.25 |
| **Inferred Resources** | **ROM (t x 1000)** | **Au (g/t)** |
| Phase 1 | 13.0 | 2.37 |
| Phase 2 | 368.0 | 0.48 |
| Phase 3 | 166.0 | 0.70 |
| Phase 4 | 5.0 | 1.33 |
| Total | 552.0 | 0.60 |

## 16.2 PIT OPTIMIZATION

Pit optimization was undertaken to locate feasible pit limits for design purposes. A series of 30 nested pits were developed using a Lerchs Grossmann algorithm. Revenue factors ranged from 0.2 to 1.0.

### 16.2.1 Metal Price

Metal price used for pit optimization was set by Anacortes. Gold price applied was USD 1,500/oz. This is a more conservative gold price than applied in the financial model in Section 22.

#### 16.2.2 Gold Sales and Royalty

The offsite cost applied was USD 3.31/oz. A royalty of 1.5% is payable to MMI which represents USD 25.50/oz.

#### 16.2.3 Metallurgy

The metallurgical mineralization styles recognized at Tres Cruces have been described as oxide, transition, and sulphide. These mineralization types have been coded into the resource block model based upon surfaces interpreted from drilling information.

Oxide and transition material are amenable to heap leaching with an estimated recovery of 81.7%. Sulphide mineralization would require processing by pressure oxidation and CIL methods with an estimated recovery of 88.0%. While this preliminary economic assessment considers only heap leaching of oxide and transition material, a pit limit analysis was also undertaken for processing of sulphide mineralization in order to provide an indication of potential future pit limits as a guide for location of current required infrastructure and waste dumps.

#### 16.2.4 Onsite Operating Costs

The onsite operating costs used for the initial pit limit analyses were based upon preliminary estimates for general & administration, mining, and processing. The G&A cost was estimated to be USD 3.00/t.

Based upon relatively small mining equipment process material mining costs were estimated to be USD 3.00/t. Waste mining costs were estimated to be USD 2.50/t with an additional cost of USD 0.43/t for closure and reclamation.

Processing costs for oxide were estimated to be USD 2.37/t with additional costs for leach pad and closure of USD 0.73/t and USD 0.19/t respectively for a total of USD 3.29/t. Processing costs for transition material was estimated to be USD 4.30/t with similar additional costs for leach pad and closure for a total of USD 5.22/t.

#### 16.2.5 Block Model

The resource estimate was completed by Jeffrey Rowe P.Geo, Ruperto Castro Ocampo P.Geo. and James N. Gray P.Geo, using Geovia GEMS® software and industry standard techniques as described in Section 14.

The block model and surfaces for topography, base of oxide and base of transition were imported to Hexagon Mineplan 3D software. The block model was rotated 60° counterclockwise about the origin with dimensions as shown in Table 16-2.

Resource model items imported for use in mine planning included lithology, density, gold grade, mineralization type, proportion below topography on concession and resource class. Resource model items imported are summarized in Table 16-3.

**Table 16-2: Block Model Limits**

| Mine Model Limits | | Minimum | Maximum | Length |
|---|---|---|---|---|
| Limits X | metres | 800,432 | 802,732 | 2,300 |
| Limits Y | metres | 9,111,000 | 9,113,000 | 2,000 |
| Limits Z | metres | 3,700 | 4,200 | 500 |
| **Block Dimensions** | | | | |
| blockx | metres | 10.0 | | |
| blocky | metres | 10.0 | | |
| blockz | metres | 5.0 | | |
| **Number of Blocks** | | | | |
| nblockx | blocks | 230 | | |
| nblocky | blocks | 200 | Total Blocks | |
| nblockz | blocks | 100 | 4,600,000 | |

**Table 16-3: Resource Model Items**

| Variable | Description |
|---|---|
| X, Y, Z | - block centre coordinate |
| Lithology | 1 = Andesite Tuff (0%) |
| | 2 = Dacite Tuff (0%) |
| | 3 = Indeterminate Tuff (0%) |
| | 4 = Pyroclastic Sequence (0%) |
| | 5 = Pyroclastic/Dacite Sequence (2%) |
| | 6 = Pyroclastic/Andesite Flow Seq. (27%) |
| | 7 = Volcanic Sediments (1%) |
| | 8 = Andesite Flow (2%) |
| | 9 = Andesite (36%) |
| | 10 = Outside lithology model (not determined) (32%) |
| Density | - rock density (t/m$^3$) |
| Topo | - percent block below topography (0-100) |
| Au | - block gold grade (g/t) |
| MinType | 1 = Oxide |
| | 2 = Transition |
| | 3 = Sulphide |
| PropOroperu | - percent block below on Oroperu ground (0-100) |
| RClass | 2 = Indicated (314,242 blocks) |
| | 3 = Inferred (244,494 blocks) |

### 16.2.6 Resource Classification

#### 16.2.6.1 Resource Class

The resource model includes Indicated and Inferred mineral resources. Indicated and Inferred resources of MinType code 1 Oxide and code 2 Transition have been used for heap leach mine planning.

#### 16.2.6.2 Mining Dilution and Losses

Internal dilution is incorporated in the resource model by virtue of the compositing and interpolation method used to obtain block grade estimates. The resources considered for processing in this study occur in roughly tabular shapes with a gradational hanging wall and footwall limits defined by grade and the transition/sulphide surface. Most of the mining related dilution and loses will occur at these interfaces. It has been assumed that there will be an overall 5% grade reduction due to dilution and the dilution volume equals mining losses.

### 16.2.7 Wall Slope Geotechnical

Golder Associates have reviewed geotechnical information collected and summarized in the Tres Cruces Oxide Project SPS100 Scoping Study (Barrick 2018). It was noted that Rock Mass Ratings (RMR), in a majority of the drillholes reviewed increase with depth and correlate with alteration. Rock strength also varied with alteration. Argillic alteration samples average RMR 32 with UCS of 19 Mpa and silicified samples average RMR 56 and UCS of 75 Mpa.

Slope stability analyses were undertaken by Barrick on two sections through the deposit in 2006. Barrick considered Lower Boundary, Upper Boundary and Average conditions to analyze for static conditions considering both high ground water table and dry conditions using the Limit Equilibrium software XTABL 5.0. These analyses resulted in the following conclusions:

- "*Rock appears to be very degradable throughout time and it is expected that rock might be affected by blasting and mining practices, For this reason 100% of disturbance for the materials has been used in all calculations;*
- *Hydrology conditions are unknown at this time and safety factors drop about 20% with respect to dry conditions;*
- *Safety factors obtained with the lower and upper boundaries of the strength parameters are considered not realistic. Poor conditions observed in the core sheet might be associated with handling (mechanical broken). On the other hand, it is unknown how much rock deteriorates with time;*
- *At this stage there is not enough information to evaluate adequately the stability of the Open Pit, however safety factors obtained in the idealized average condition appears to be reasonable. In order to reduce the uncertainty between lower and upper boundaries of the strength parameters it is necessary to collect good data from in-situ and laboratory testing;*
- *The 37° of inter ramp angles (IRA) used by planning in the preliminary slope design sounds reasonable at this time and it can be used at this time for reserves estimation purposes until a better definition in the strength parameters has been completed*;"

**Table 16-4: Stability Analyses Input**

| Hoek & Brown Criterion | RMR | UCS | constant $m_i$ |
|---|---|---|---|
| Lower Boundary | 32 | 19 | 12 |
| Upper Boundary | 56 | 75 | 17 |
| Average | 45 | 55 | 14 |

For the purposes of this Preliminary Economic analysis Golder has provided guidance for overall slope angles of 37° and inter-ramp slopes of 40° up to 100 m stack height. A double 5 m bench configuration to 10 m between berms with 65° bench face angles was applied in final designs. Pit optimization was carried out with fixed 37° slope input to allow for location of ramps.

### 16.2.8 Pit Limit Analyses

Unsmoothed pit limits were developed using a fixed slope Lerchs Grossmann algorithm. The preliminary net mine gate revenue and operating costs were used to estimate the value of each regular block in the model. A series of 30 nested pit limits was defined using revenue factors between 0.10 and 1.00. A constraint was applied to limit the optimization to Tres Cruces concession.

The mineral resources and waste rock for the 30 nested pits are summarized below in Table 16-5. The operating surplus, material, average grade, contained gold and cumulative discounted percent value are shown graphically in Figure 16-1 through Figure 16-5.

A very high proportion of the maximum shell value is realized by Shell 17 with a revenue factor of 0.60. Pit Shell 17 captures 98.0% of the mineralized material, above cut-off grade, representing 99.6% of the value at a 10% discount rate. This reflects the relatively high grade of a resource limited by the interface between heap leachable oxide/transition and sulphide mineralization requiring a mill for beneficiation.

**Table 16-5: Lerchs Grossmann Nested Pit Summary**

| SHELL | Revenue Factor | OXIDE - Cutoff NSR2 $6.36/t | | | TRANSITION - Cutoff NSR2 $8.29/t | | | HEAP LEACH TOTAL | | | Gold | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | RUN OF MINE | Diluted AU | Diluted NSR | RUN OF MINE | Diluted AU | Diluted NSR | RUN OF MINE | Diluted AU | Diluted NSR | Contained | Oxide Recovered | Transition Recovered | Total Recovered |
| | | kTonnes | g/t | $/tonne | kTonnes | g/t | $/tonne | kTonnes | g/t | $/tonne | oz x 1000 | oz x 1000 | oz x 1000 | oz x 1000 |
| 1 | 0.200 | 5,356 | 1.55 | 60.05 | 1,303.0 | 1.34 | 51.79 | 6,659 | 1.51 | 58.43 | 323.0 | 218.2 | 45.77 | 263.9 |
| 2 | 0.228 | 7,044 | 1.45 | 56.25 | 2,116.0 | 1.37 | 53.00 | 9,160 | 1.43 | 55.50 | 422.1 | 268.8 | 76.06 | 344.8 |
| 3 | 0.255 | 7,370 | 1.44 | 55.92 | 2,444.0 | 1.35 | 52.34 | 9,814 | 1.42 | 55.03 | 448.4 | 279.5 | 86.77 | 366.3 |
| 4 | 0.283 | 7,566 | 1.43 | 55.54 | 2,601.0 | 1.33 | 51.61 | 10,167 | 1.41 | 54.53 | 460.3 | 285.0 | 91.04 | 376.1 |
| 5 | 0.310 | 8,110 | 1.41 | 54.55 | 2,798.0 | 1.33 | 51.68 | 10,908 | 1.39 | 53.81 | 487.4 | 300.1 | 98.07 | 398.2 |
| 6 | 0.338 | 8,267 | 1.40 | 54.25 | 2,944.0 | 1.33 | 51.45 | 11,211 | 1.38 | 53.52 | 498.1 | 304.2 | 102.75 | 406.9 |
| 7 | 0.366 | 8,778 | 1.38 | 53.46 | 3,099.0 | 1.32 | 51.23 | 11,877 | 1.37 | 52.88 | 521.4 | 318.3 | 107.68 | 426.0 |
| 8 | 0.393 | 8,886 | 1.37 | 53.23 | 3,165.0 | 1.32 | 51.12 | 12,051 | 1.36 | 52.67 | 527.0 | 320.8 | 109.74 | 430.6 |
| 9 | 0.421 | 8,950 | 1.37 | 53.07 | 3,255.0 | 1.32 | 51.01 | 12,205 | 1.36 | 52.52 | 532.2 | 322.2 | 112.62 | 434.8 |
| 10 | 0.448 | 9,065 | 1.36 | 52.79 | 3,397.0 | 1.30 | 50.37 | 12,462 | 1.35 | 52.13 | 539.4 | 324.6 | 116.05 | 440.7 |
| 11 | 0.476 | 9,133 | 1.36 | 52.61 | 3,520.0 | 1.29 | 49.80 | 12,653 | 1.34 | 51.83 | 544.4 | 325.9 | 118.89 | 444.8 |
| 12 | 0.503 | 9,676 | 1.32 | 51.08 | 4,188.0 | 1.22 | 47.12 | 13,864 | 1.29 | 49.88 | 574.1 | 335.2 | 133.84 | 469.1 |
| 13 | 0.531 | 9,915 | 1.30 | 50.39 | 4,369.0 | 1.20 | 46.36 | 14,284 | 1.27 | 49.16 | 583.0 | 338.9 | 137.40 | 476.3 |
| 14 | 0.559 | 9,981 | 1.30 | 50.19 | 4,509.0 | 1.18 | 45.74 | 14,490 | 1.26 | 48.81 | 587.2 | 339.8 | 139.90 | 479.7 |
| 15 | 0.586 | 9,993 | 1.30 | 50.17 | 4,605.0 | 1.17 | 45.35 | 14,598 | 1.26 | 48.65 | 589.6 | 340.1 | 141.65 | 481.7 |
| 16 | 0.614 | 10,047 | 1.29 | 50.05 | 4,741.0 | 1.16 | 44.99 | 14,788 | 1.25 | 48.43 | 594.5 | 341.0 | 144.69 | 485.7 |
| 17 | 0.641 | 10,160 | 1.29 | 50.05 | 4,903.0 | 1.16 | 44.93 | 15,063 | 1.25 | 48.38 | 605.0 | 344.9 | 149.41 | 494.3 |
| 18 | 0.669 | 10,161 | 1.29 | 50.04 | 4,922.0 | 1.16 | 44.89 | 15,083 | 1.25 | 48.36 | 605.6 | 344.9 | 149.87 | 494.8 |
| 19 | 0.697 | 10,171 | 1.29 | 50.02 | 5,059.0 | 1.14 | 44.29 | 15,230 | 1.24 | 48.11 | 608.3 | 345.0 | 151.96 | 497.0 |
| 20 | 0.724 | 10,185 | 1.29 | 49.99 | 5,149.0 | 1.13 | 43.95 | 15,334 | 1.24 | 47.96 | 610.5 | 345.3 | 153.49 | 498.8 |
| 21 | 0.752 | 10,198 | 1.29 | 49.94 | 5,196.0 | 1.13 | 43.82 | 15,394 | 1.24 | 47.87 | 611.9 | 345.5 | 154.44 | 499.9 |
| 22 | 0.779 | 10,212 | 1.29 | 49.90 | 5,233.0 | 1.13 | 43.82 | 15,445 | 1.24 | 47.84 | 613.5 | 345.6 | 155.55 | 501.2 |
| 23 | 0.807 | 10,249 | 1.29 | 49.78 | 5,332.0 | 1.12 | 43.47 | 15,581 | 1.23 | 47.62 | 616.0 | 346.1 | 157.22 | 503.3 |
| 24 | 0.834 | 10,263 | 1.28 | 49.76 | 5,344.0 | 1.12 | 43.48 | 15,607 | 1.23 | 47.61 | 616.9 | 346.4 | 157.61 | 504.0 |
| 25 | 0.862 | 10,264 | 1.28 | 49.75 | 5,386.0 | 1.12 | 43.29 | 15,650 | 1.23 | 47.53 | 617.5 | 346.4 | 158.14 | 504.5 |
| 26 | 0.890 | 10,279 | 1.28 | 49.73 | 5,445.0 | 1.11 | 43.10 | 15,724 | 1.22 | 47.43 | 619.2 | 346.7 | 159.18 | 505.9 |
| 27 | 0.917 | 10,318 | 1.28 | 49.64 | 5,487.0 | 1.11 | 43.03 | 15,805 | 1.22 | 47.35 | 621.3 | 347.4 | 160.16 | 507.6 |
| 28 | 0.945 | 10,354 | 1.28 | 49.59 | 5,553.0 | 1.11 | 42.84 | 15,907 | 1.22 | 47.23 | 623.8 | 348.3 | 161.35 | 509.6 |
| 29 | 0.972 | 10,363 | 1.28 | 49.56 | 5,571.0 | 1.10 | 42.77 | 15,934 | 1.22 | 47.19 | 624.2 | 348.4 | 161.62 | 510.0 |
| 30 | 1.000 | 10,364 | 1.28 | 49.56 | 5,585.0 | 1.10 | 42.72 | 15,949 | 1.22 | 47.16 | 624.5 | 348.4 | 161.83 | 510.2 |

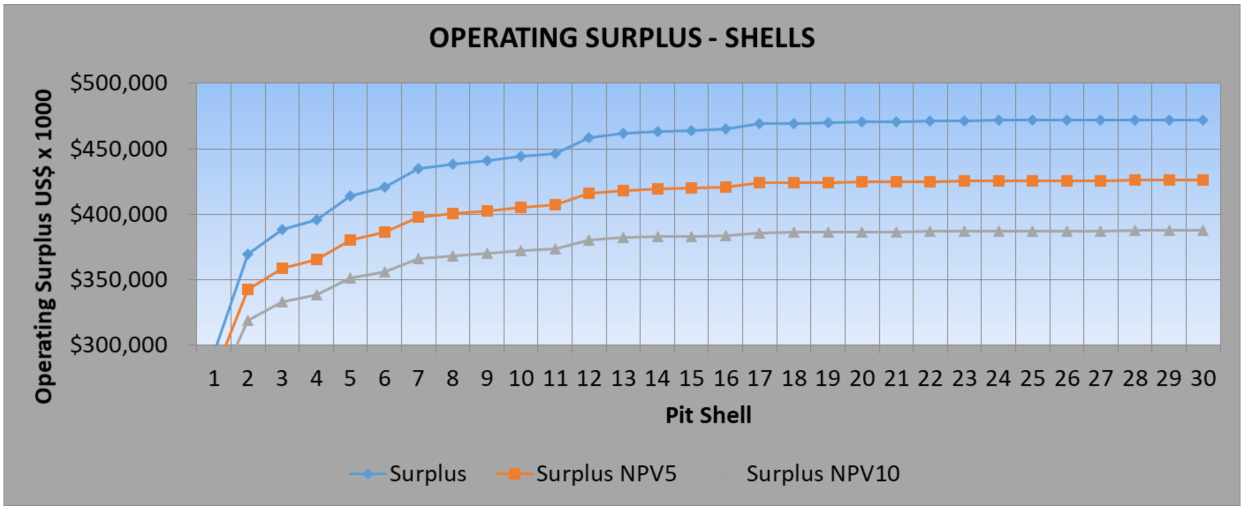



**Figure 16-1: Operating Surplus – Shells**

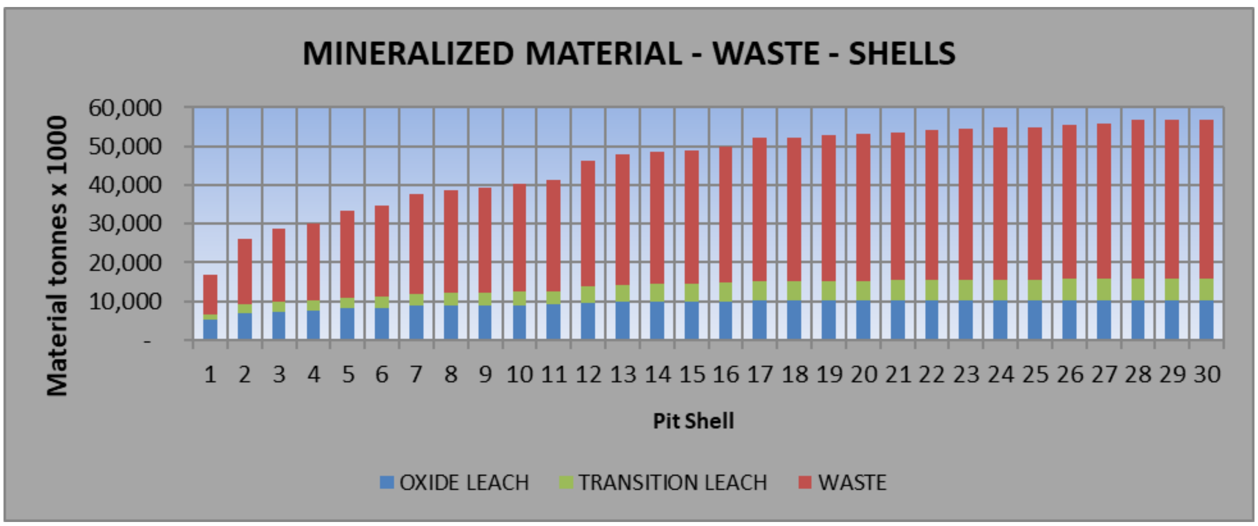



**Figure 16-2: Material Distribution – Shells**

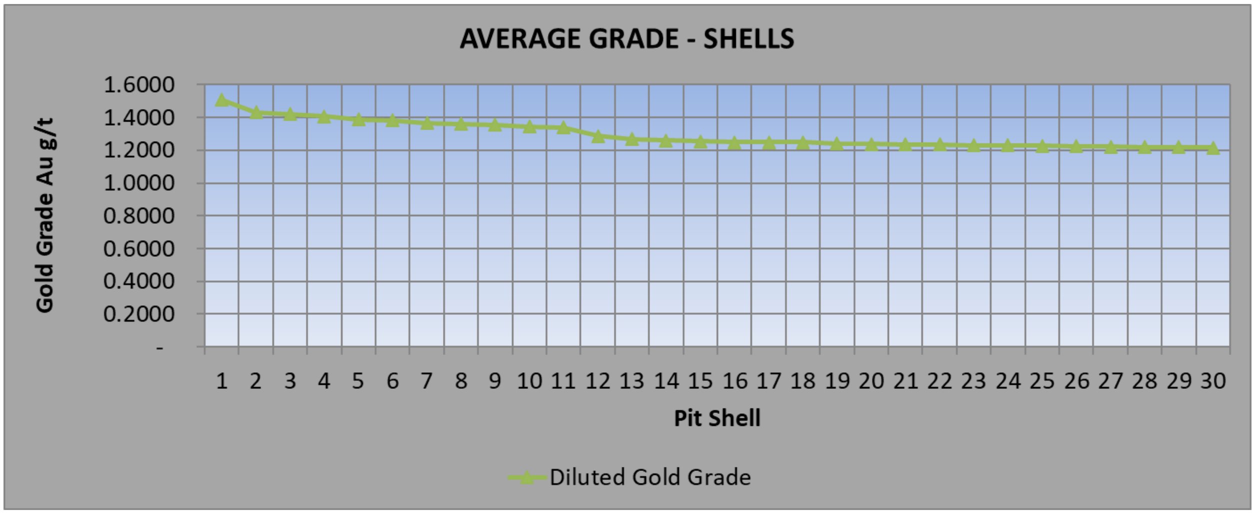



**Figure 16-3: Average Grade – Shells**

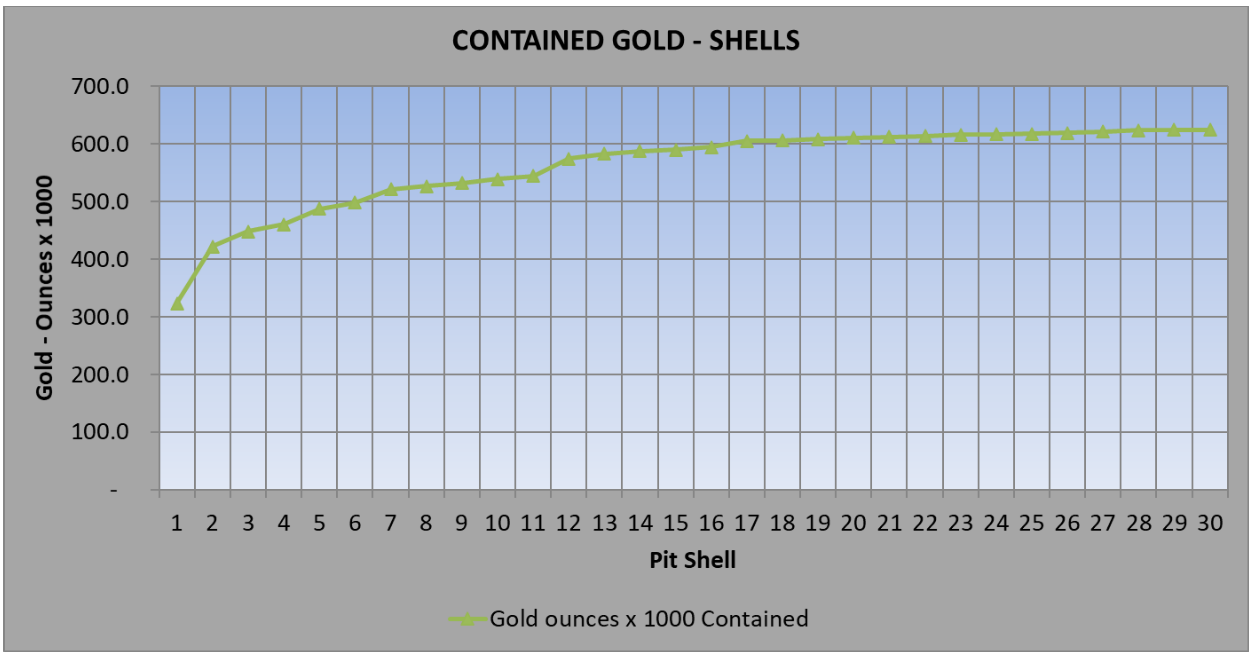



**Figure 16-4: Contained Gold – Shells**

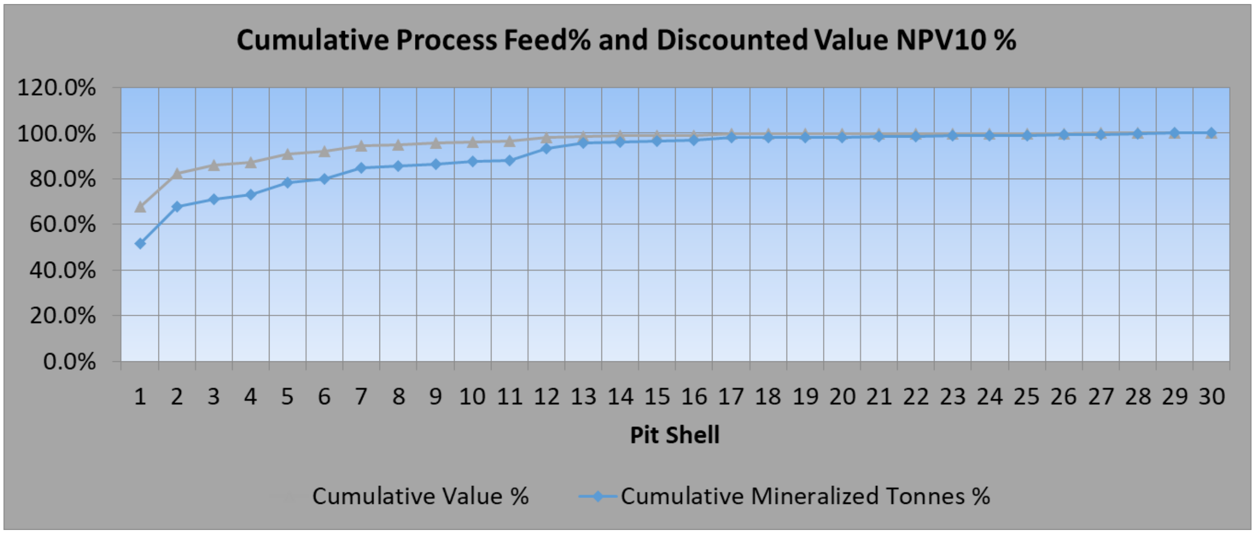
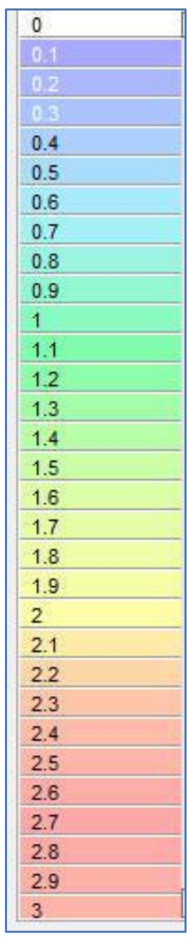



**Figure 16-5: Cumulative Percent Mineralized Material and Discounted Value**

A plan view of the nested pits is shown in Figure 16-6. A north-south section looking west is shown in Figure 16-7.

Gold block grades in grams per tonne are coloured as follows:



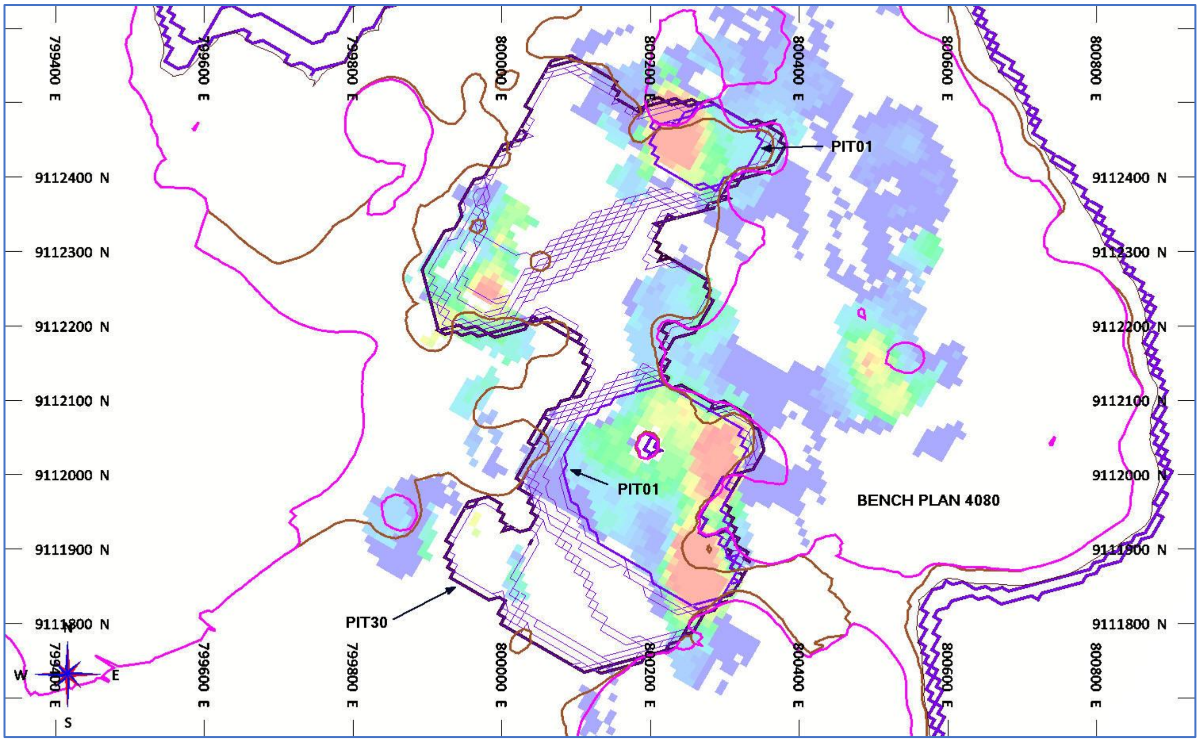



Figure 16-6: Lerchs Grossmann Pit Shells Bench Plan 4080

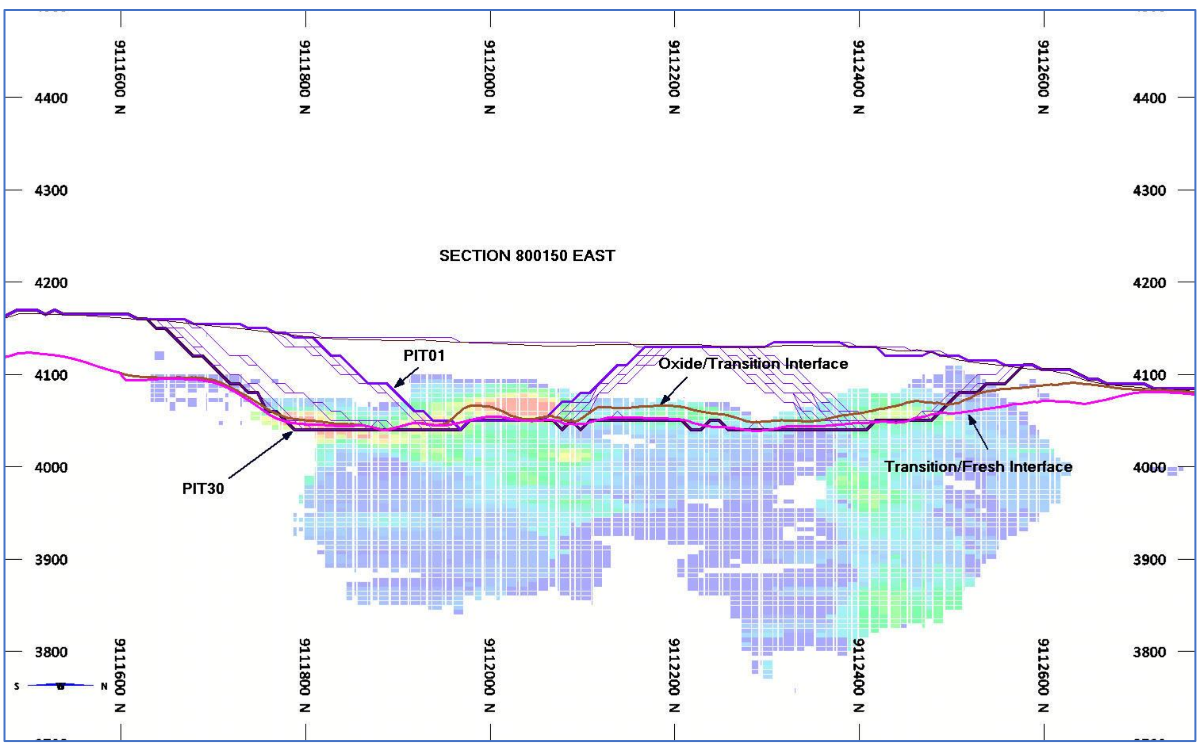



Figure 16-7: Lerchs Grossmann Pit Section 800150 East

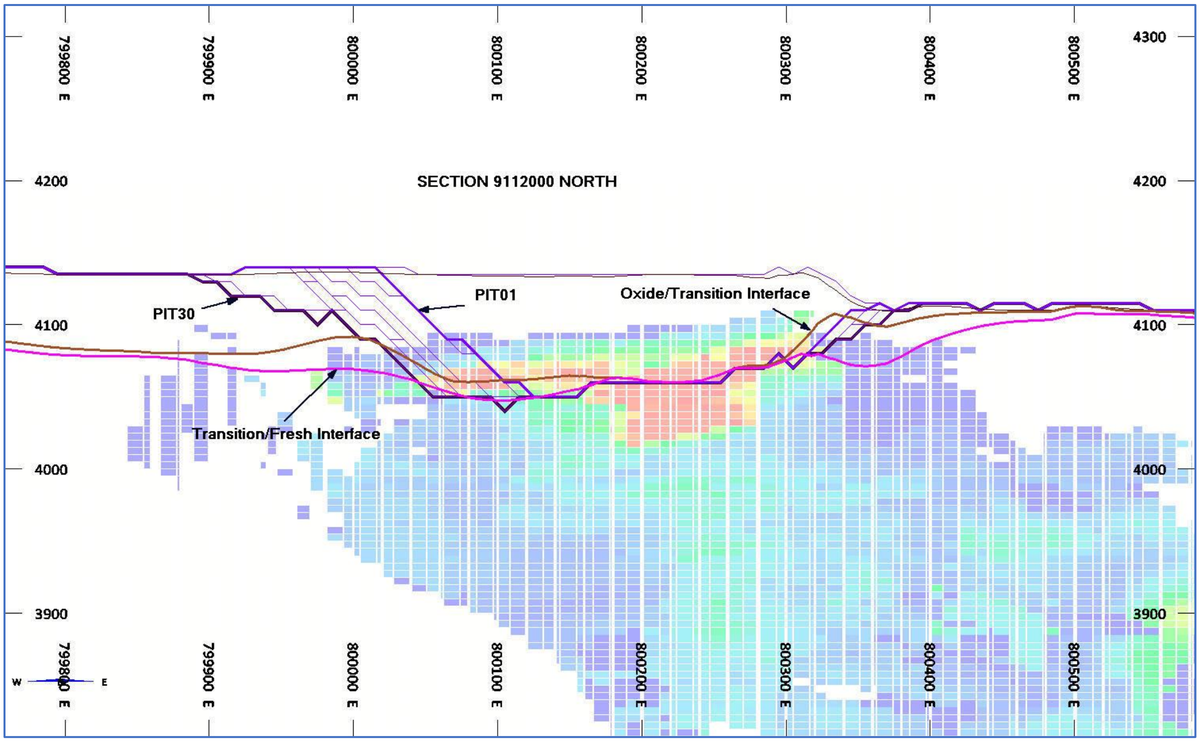



Figure 16-8: Lerchs Grossmann Pit Section 9112000 North

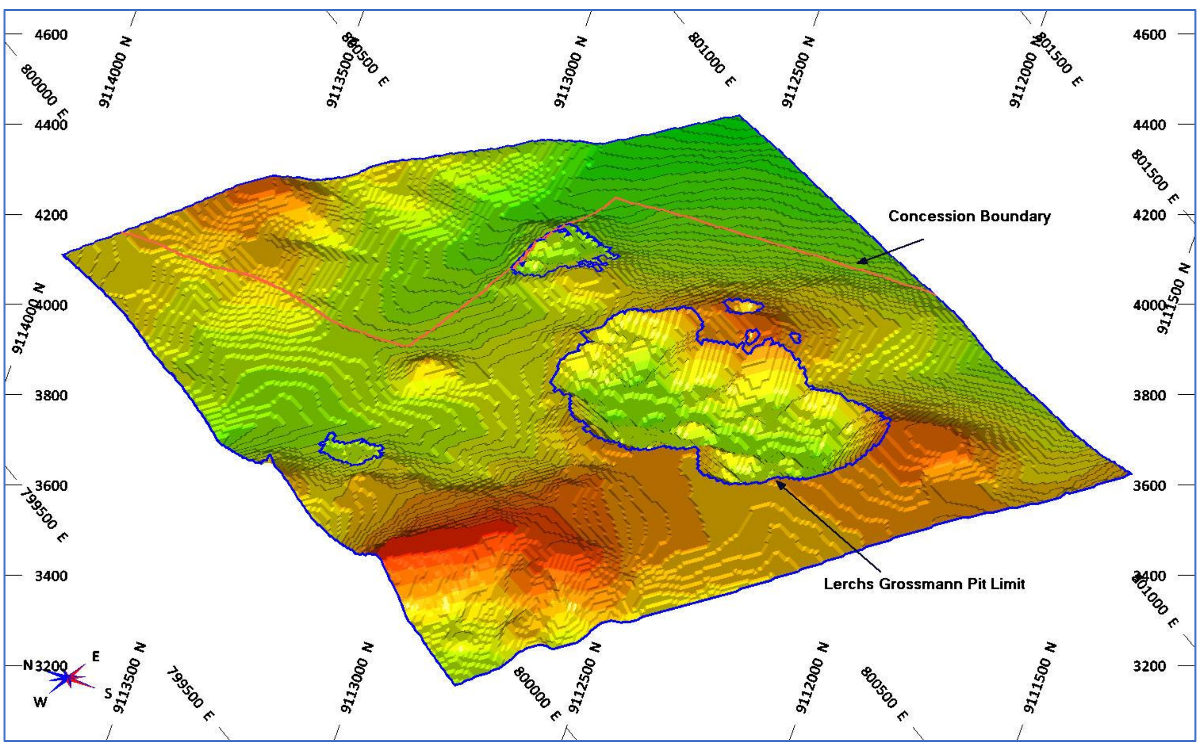



Figure 16-9: Lerchs Grossmann Pit Limit Perspective

## 16.3 MINE DESIGN

### 16.3.1 General Design Criteria

The Tres Cruces mine will be a conventional excavator/wheel loader operation using 50 t capacity offroad trucks. The bench height will be variable 5 m in mineralized material and 10 m in waste. Designs have been prepared for 10 m single bench between berms. Road allowances have been made for 25 m width. The final design is shown in Figure 16-10. The pit will be 990 m long and 620 m wide with a total depth of approximately 130 m.

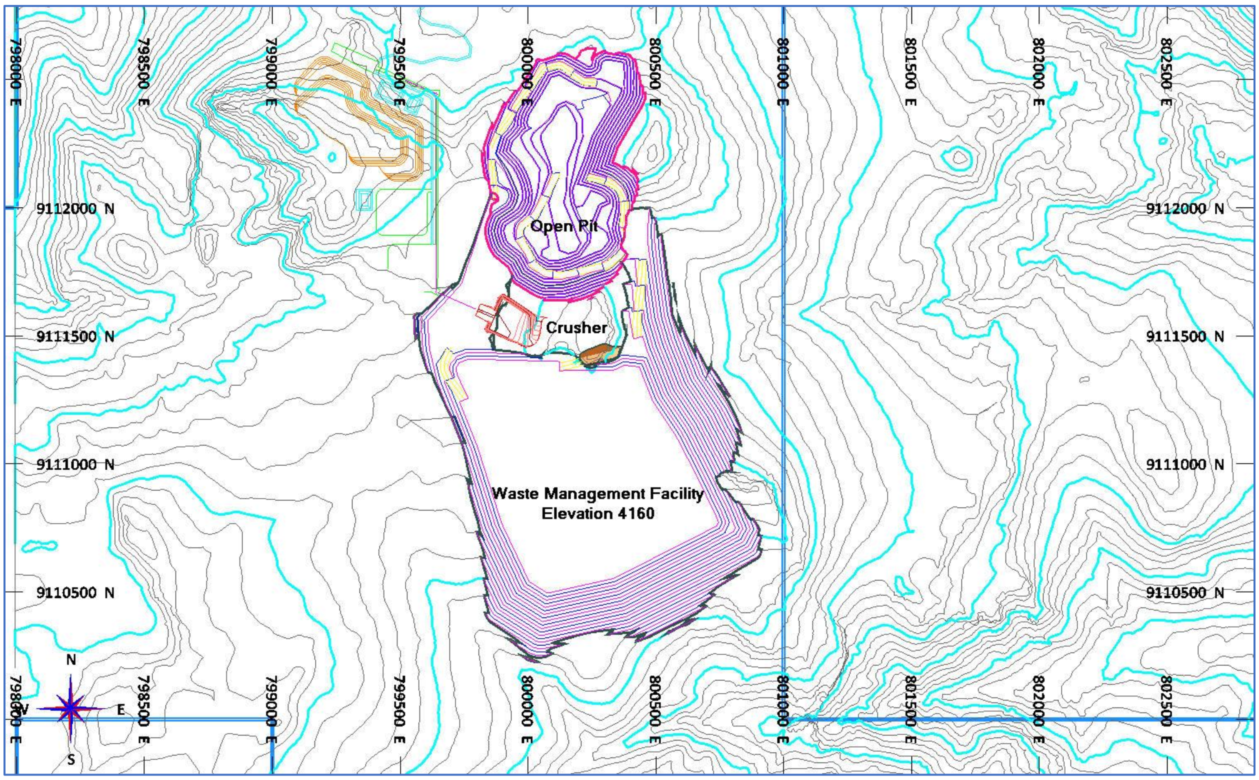



**Figure 16-10: Final Pit and Waste Management Facility**

### 16.3.2 Phase Development

The main pit at Tres Cruces will be developed in 3 phases. The Phase 1 starter pit will be developed to the southeast limit as shown in Figure 16-11. The bottom bench elevation of this pit will be 4050 masl. Also shown in this figure are the Lerchs Grossmann pit limits for the heap leach mine plan and the approximate resources. The Phase 1 pit is also shown in the cross section Figure 16-12. This illustration shows oxide and transition mineralization distribution. The pre-stripping requirement on this section is approximately 40 m.

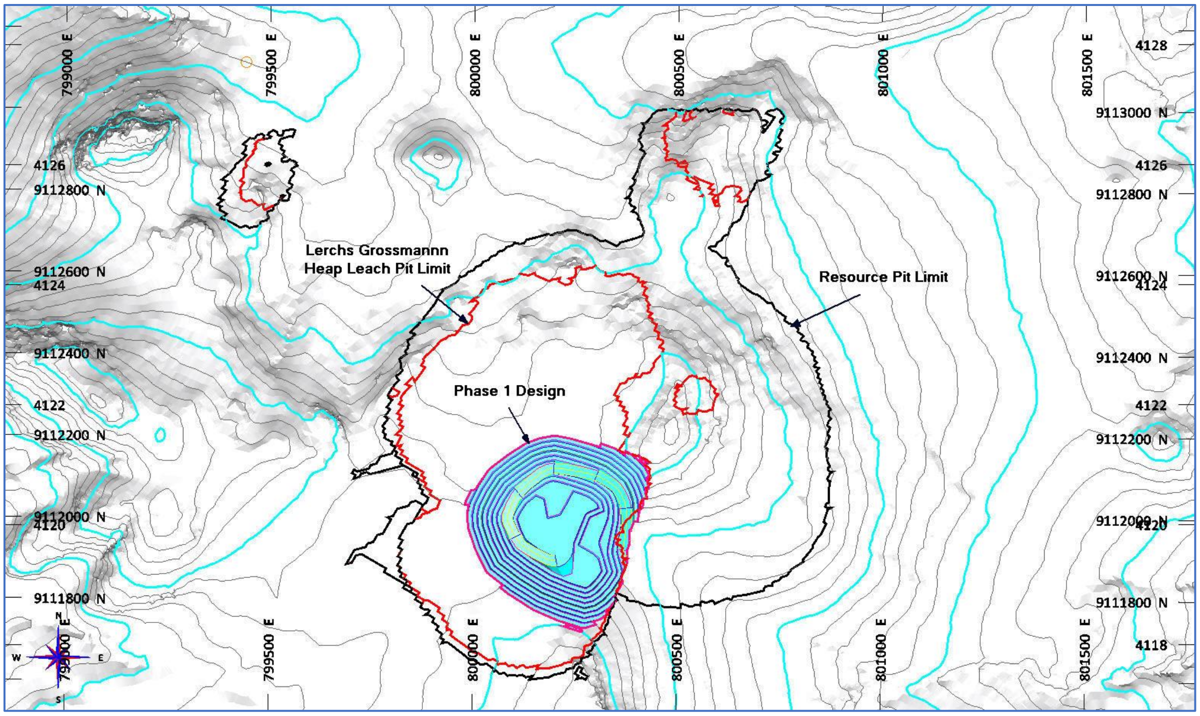



Figure 16-11: Phase 1 Pit Design

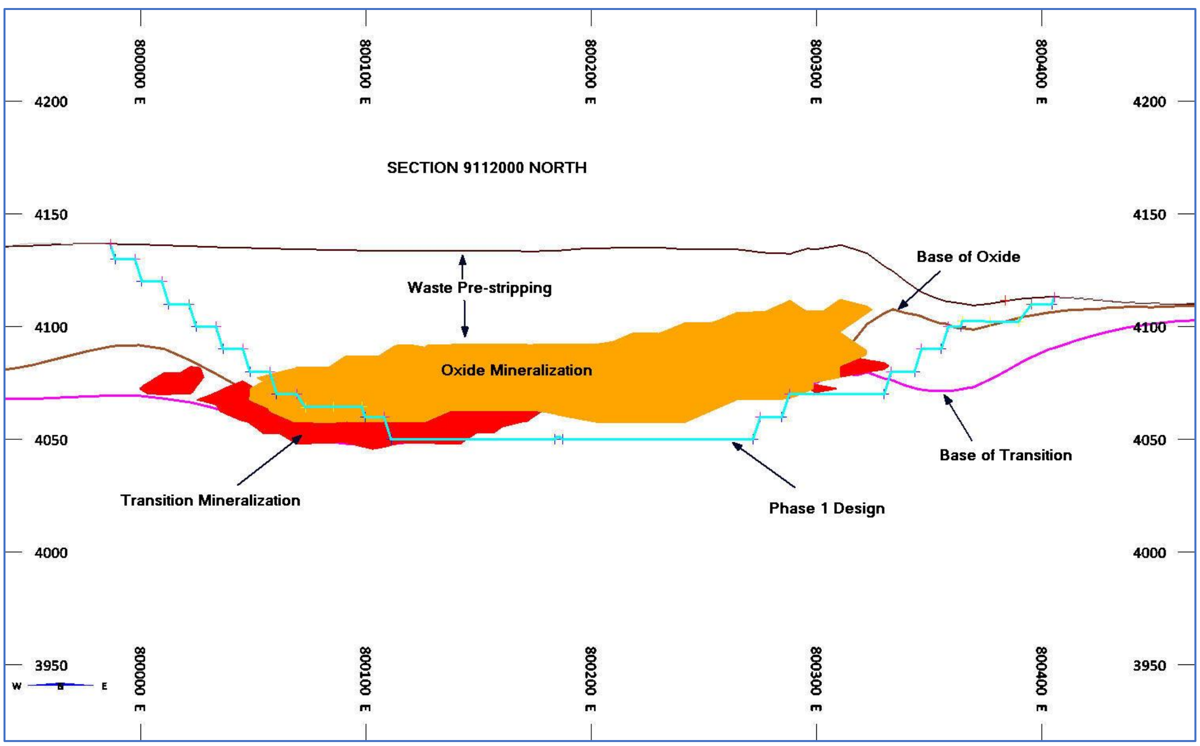



Figure 16-12: Phase 1 Design Section 9112000 North

The Phase 2 pit will be developed to the northern limit of the main pit. A slot will be driven along the final northwest wall down to the pit bottom at 4035 bench. The Phase 2 design is shown in Figure 16-13.

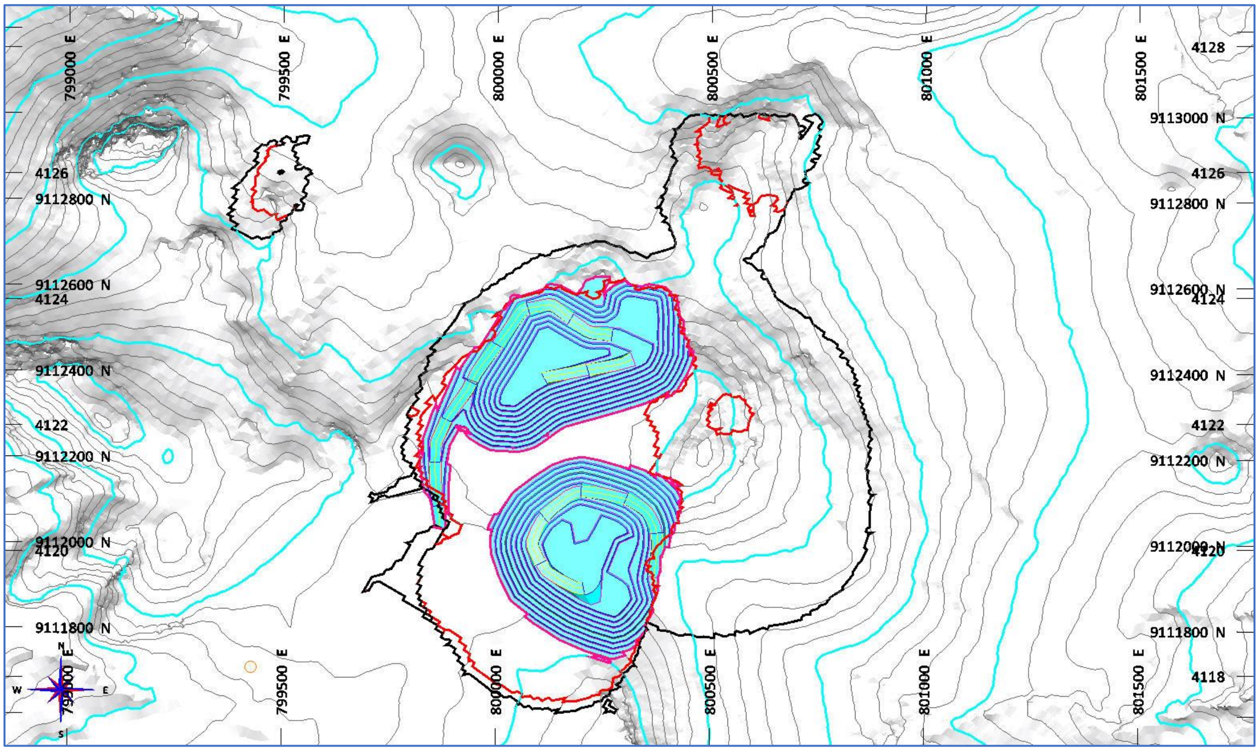



**Figure 16-13: Phase 2 Pit Design**

The Phase 3 design will join the Phase 1 and Phase 2 pits removing oxide and transition resources to the base of the transition zone and leaving fresh rock in place. Access to Phase 3 will be a ramp located on the south and west walls of the final pit.

## 16.4 WASTE ROCK AND STOCKPILE FACILITIES

Waste rock will be placed in a storage facility located within the Anacortes property immediately south of the open pit and primary crusher. Waste rock will also be used for external road construction from the Phase 1 and Phase 3 exit point at 4110 m elevation up to the surface of the waste storage facility and across to the crusher and shop facilities. The waste storage facility will be constructed with final slopes of 2.5:1 H:V. The conceptual waste storage facility is shown in Figure 16-14.

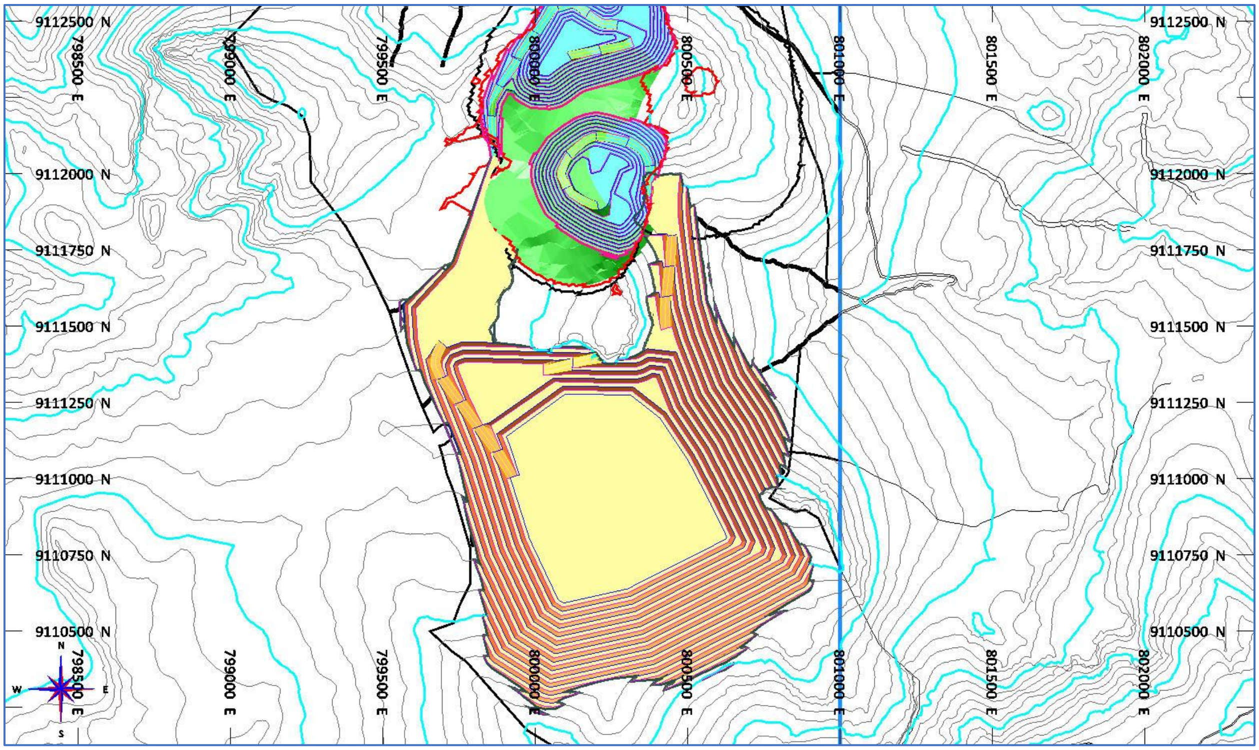



**Figure 16-14: Waste Storage Facility**

### 16.4.1 Production Schedule

The mine production schedule is summarized in Table 16-6 and Figure 16-15 and Figure 16-16.

The processing target was set at 6,000 t/d with a Year 1 ramp up period resulting in a total throughput of 90% of capacity. The oxide resources were reported at an NSR cut-off of USD $6.36/t and the transition resources were reported at NSR cut-off of USD $8.29/t. A total of 14.91 Mt will be processed, of which 66% will be oxide material.

Pre-production stripping was scheduled in Year -2 and Year -1. A total of 7.9 mt will be moved during this period including 281 kt of mineralized leach material placed in a stockpile. The strip during operations in Year 1 through 7 will average 2.4:1. The average mining rate in Year 2 through 5 will be 25,000 t/d.

## Table 16-6: Production Schedule

| | | Year -2 | Year-1 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Days | | 365 | 365 | 365 | 365 | 365 | 365 | 365 | 365 | 365 | |
| **Total Resource** | t x 1000 | 2.6 | 278.0 | 1,707.1 | 2,190.0 | 2,190.0 | 2,190.0 | 2,190.0 | 2,190.0 | 1,971.6 | 14,909.3 |
| Diluted Block Grade | g/t | 0.59 | 1.81 | 1.37 | 1.42 | 1.38 | 1.22 | 1.00 | 1.10 | 1.05 | 1.23 |
| **Oxide** | t x 1000 | 2.6 | 270.0 | 1,586.0 | 1,907.4 | 1,390.6 | 1,511.5 | 1,473.6 | 1,056.2 | 627.3 | 9,825.3 |
| Diluted Block Grade | g/t | 0.59 | 1.84 | 1.37 | 1.43 | 1.56 | 1.19 | 0.99 | 1.14 | 1.20 | 1.30 |
| **Transition** | t x 1000 | - | 8.0 | 121.1 | 282.6 | 799.4 | 678.5 | 716.4 | 1,133.8 | 1,344.3 | 5,084.0 |
| Diluted Block Grade | g/t | - | 0.70 | 1.33 | 1.35 | 1.05 | 1.30 | 1.01 | 1.06 | 0.98 | 1.08 |
| **Sulphide** | t x 1000 | - | - | - | - | - | - | - | - | - | - |
| Diluted Block Grade | g/t | - | - | - | - | - | - | - | - | - | - |
| Waste | t x 1000 | 2,817.0 | 4,810.0 | 4,338.8 | 6,825.5 | 6,929.5 | 7,323.2 | 6,680.2 | 2,335.2 | 960.6 | 43,020.0 |
| Total | t x 1000 | 2,819.6 | 5,088.0 | 6,045.9 | 9,015.5 | 9,119.5 | 9,513.2 | 8,870.2 | 4,525.2 | 2,932.2 | 57,929.3 |
| Strip Ratio | - | 1,083.46 | 17.30 | 2.54 | 3.12 | 3.16 | 3.34 | 3.05 | 1.07 | 0.49 | 2.89 |
| | | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Leach Ore Daily Production | tonnes/day | 7 | 762 | 4,677 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 5,402 | |
| Waste Daily Production | tonnes/day | 7,718 | 13,178 | 11,887 | 18,700 | 18,985 | 20,064 | 18,302 | 6,398 | 2,632 | |
| Total Daily Production | tonnes/day | 7,725 | 13,940 | 16,564 | 24,700 | 24,985 | 26,064 | 24,302 | 12,398 | 8,033 | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Leach Ore Direct Feed** | | | | | | | | | | | |
| **Leach Resource** | t x 1000 | - | - | 1,707.1 | 2,190.0 | 2,190.0 | 2,190.0 | 2,190.0 | 2,190.0 | 1,971.6 | 14,628.7 |
| Diluted Block Grade | g/t | - | - | 1.37 | 1.42 | 1.38 | 1.22 | 1.00 | 1.10 | 1.05 | 1.22 |
| **Stockpile Opening Balance** | | | | | | | | | | | |
| **Leach Resource** | t x 1000 | | 2.6 | 280.6 | 16.7 | 16.7 | 16.7 | 16.7 | 16.7 | 16.7 | 384.7 |
| Diluted Block Grade | g/t | | 0.59 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.79 |
| **Stockpile Addition** | | | | | | | | | | | |
| **Leach Resource** | t x 1000 | 2.6 | 278.0 | - | - | - | - | - | - | - | 280.6 |
| Diluted Block Grade | g/t | 0.59 | 1.81 | - | - | - | - | - | - | - | 1.80 |
| **Stockpile Recovery** | | | | | | | | | | | |
| **Leach Resource** | t x 1000 | - | - | 263.9 | - | - | - | - | - | 16.6 | 280.5 |
| Diluted Block Grade | g/t | - | - | 1.80 | - | - | - | - | - | 1.80 | 1.80 |
| **Stockpile Closing Balance** | | | | | | | | | | | |
| **Leach Resource** | t x 1000 | 2.6 | 280.6 | 16.7 | 16.7 | 16.7 | 16.7 | 16.7 | 16.7 | 0.1 | |
| Diluted Block Grade | g/t | 0.59 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | |
| **Leach Resource Processed** | | | | | | | | | | | |
| **Leach Resource** | t x 1000 | - | - | 1,971.0 | 2,190.0 | 2,190.0 | 2,190.0 | 2,190.0 | 2,190.0 | 1,988.2 | 14,909.2 |
| Diluted Block Grade | g/t | - | - | 1.43 | 1.42 | 1.38 | 1.22 | 1.00 | 1.10 | 1.05 | 1.23 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Heap Leach Metal Recoverable** | | | | | | | | | | | |
| Gold | ounces | - | - | 73,814 | 81,483 | 79,151 | 70,217 | 57,489 | 63,111 | 55,077 | 480,343 |

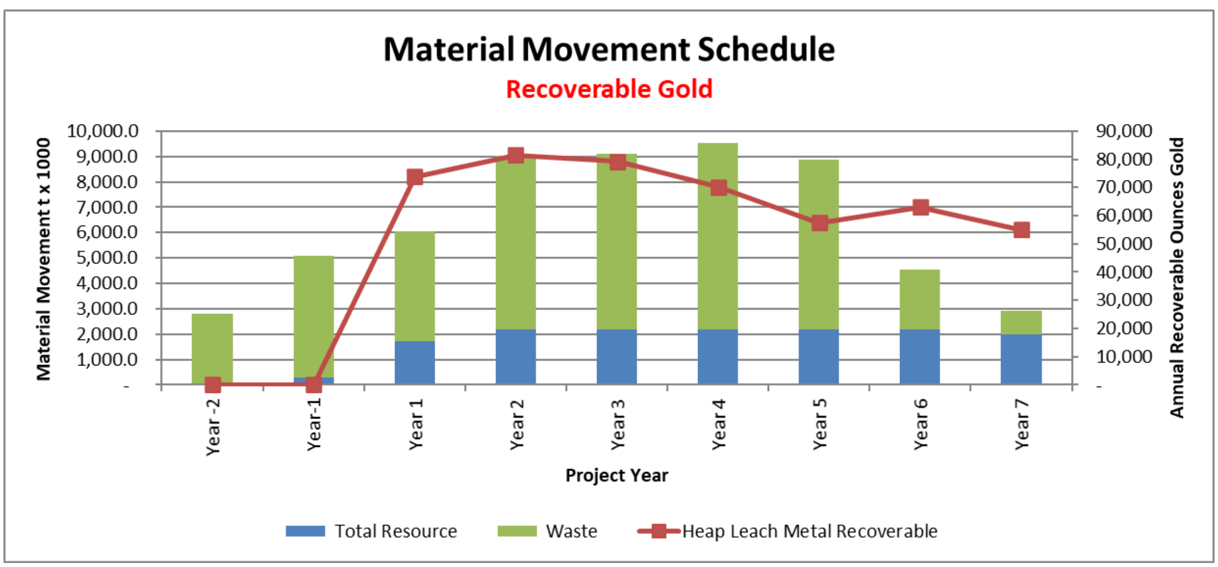



**Figure 16-15: Material Movement and Recoverable Metal**

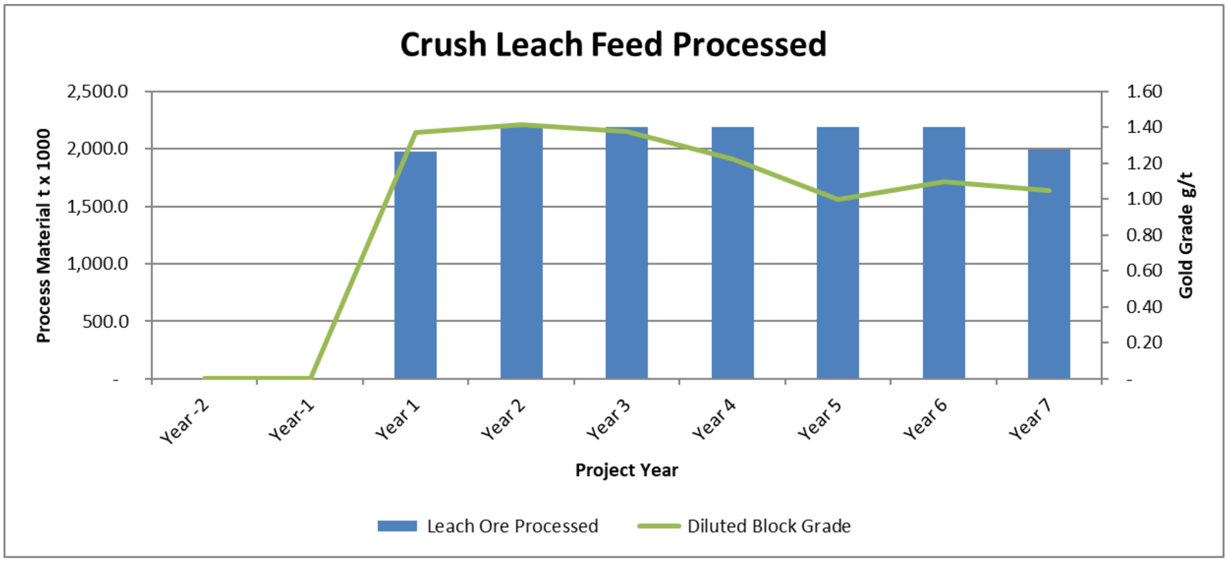



Figure 16-16: Crush Leach Material Processed

Conceptual development for the mine based upon the schedule described above is shown in the figures below.

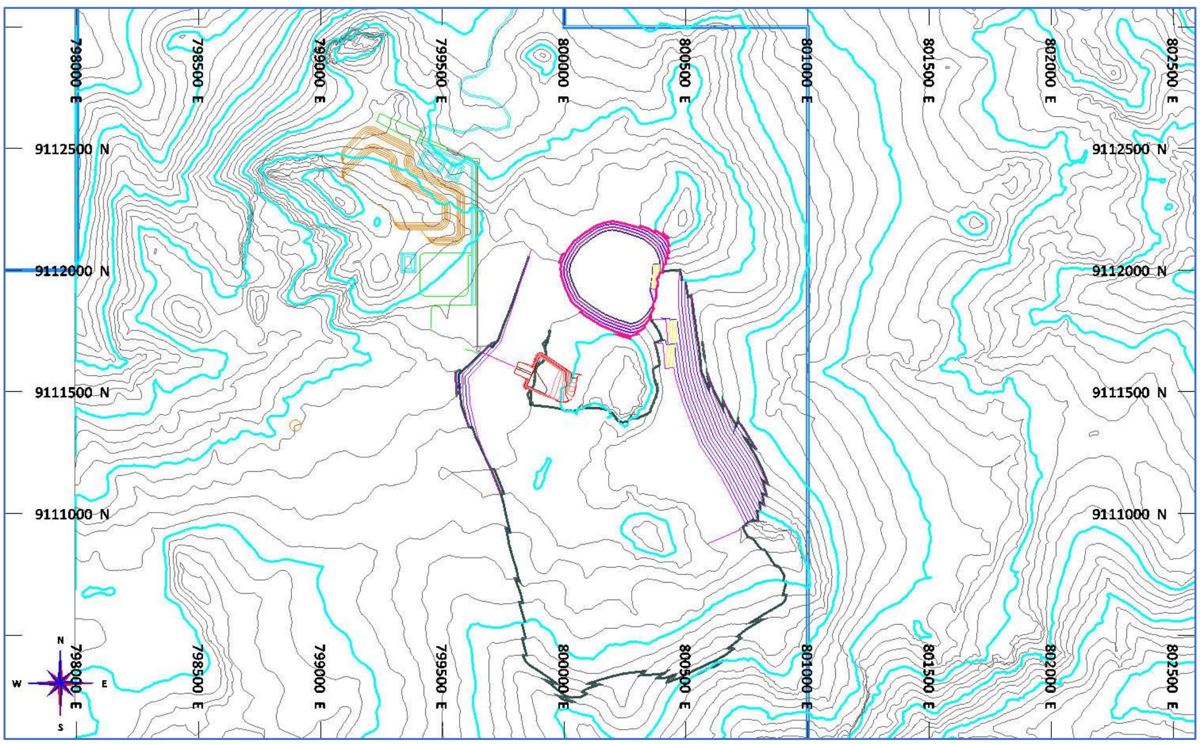



Figure 16-17: End of Year -1

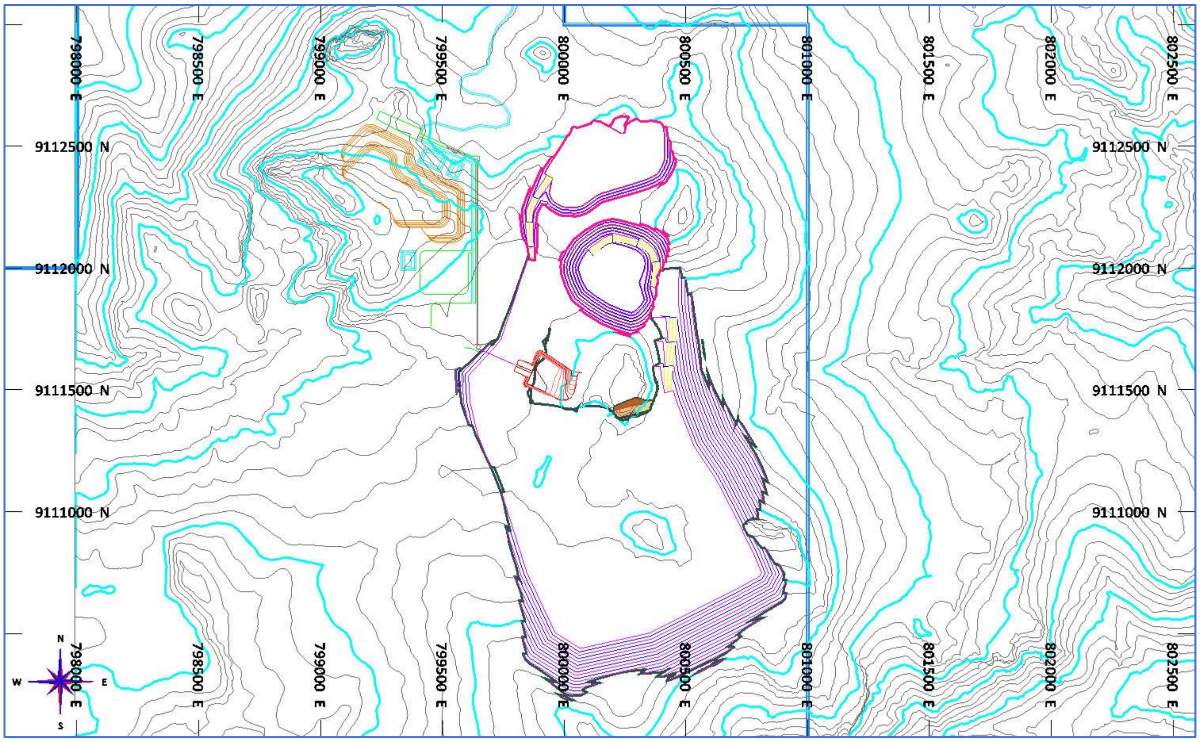



Figure 16-18: End of Year 2

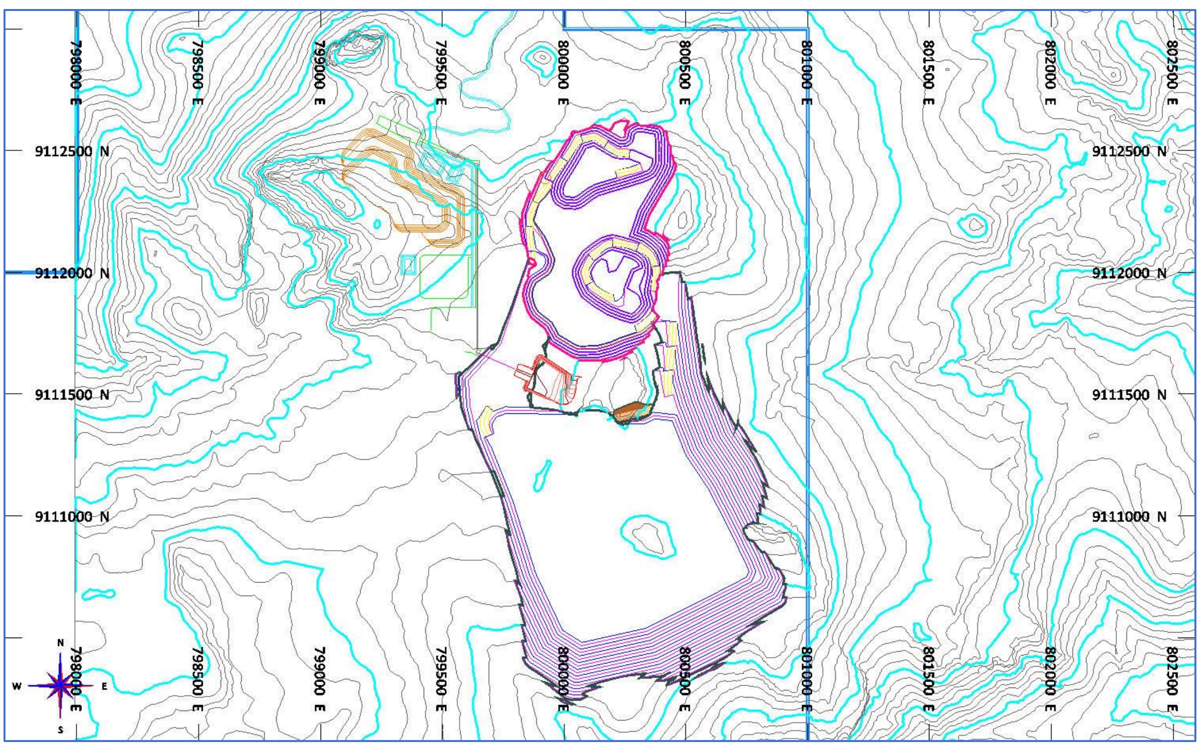



Figure 16-19: End of Year Year 4

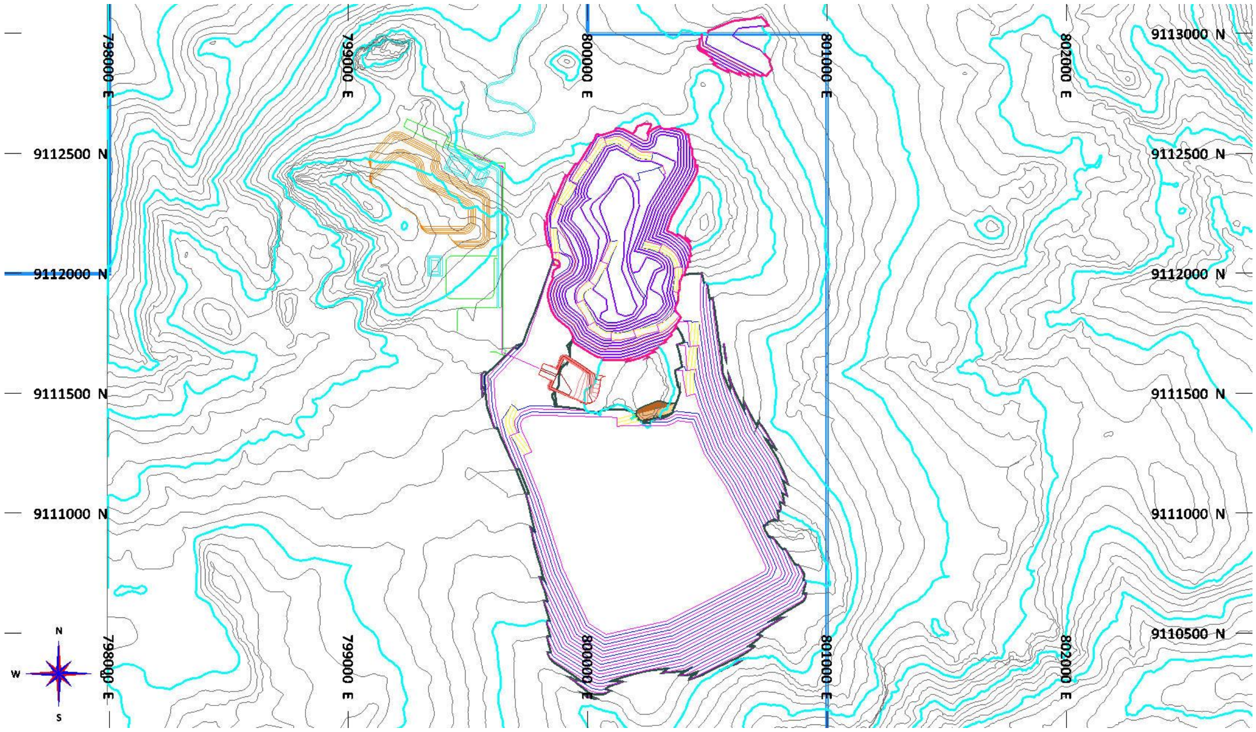



**Figure 16-20: End of Year 7**

## 16.5 MATERIAL HANDLING

The primary jaw crusher will be located at approximately 4,150 m elevation between the Phase 1 pit and the waste storage facility. A small stockpile will be located adjacent to the crusher to contain leach material mined during pre-production and to contain run of mine over-flow material during normal operations. Stockpile material will be re-handled with a wheel loader.

## 16.6 MINING EQUIPMENT

### 16.6.1 Drilling and Blasting

The resource model has been developed on a 5 m vertical block height. Mining will be carried out on a 5 m bench when mineral resources are available for processing. In areas that are predominantly waste drilling and blasting may be undertaken on a full 10 m bench with split bench excavation by backhoe configured machines or dozer/wheel loader combination. Production blast patterns will be implemented for 152 mm production holes with 114 mm wall control pre-shear lines. Overall emulsion powder factor of 0.22 kg/t has been assumed for oxide and transition material. Wet conditions are anticipated between October and March. Emulsion explosives will be delivered to the borehole by a contractor. Initiation of blast patterns will be undertaken by mine employees supervised by the engineering department.

### 16.6.2 Loading and Hauling

The loading fleet contemplated for Tres Cruces includes 2 diesel powered 6.5 $m^3$ excavators, 1 - 11.6 $m^3$ and 1 - 6.9 $m^3$ wheel loaders. The excavators and 11.6 $m^3$ loader will be the primary loading tools and the 6.9 $m^3$ loader will be a back-up unit capable of loading trucks and tramming crusher feed from the stockpile to the crusher when required.

The larger wheel loader will be capable of loading 50 t off-road end dump trucks in three passes and have the flexibility to move between pit phases as required to meet overall production targets. The excavators will load 50 t trucks in six passes in mineralized material and waste and will allow selective mining at material contacts separating crusher feed and waste.

The truck fleet will initially be comprised of 6 units in pre-production working on short hauls to the waste dump from large near surface open benches. As additional phases of pit expansion are developed the fleet will increase to 11 units. Fleet availability is expected to commence at 92% with an assumption that this will decline approximately 1%/year/unit to a minimum of 86% over the life of mine.

#### 16.6.3 Support Equipment

The support equipment fleet will include track dozers for road construction, waste dump maintenance, post blast cleanup, bench floor maintenance and other routine pit operations such as pushing to wheel loaders. Three track dozers have been included to cover multiple pit phases operating simultaneously and constant dump activity.

Provisions have also been made to include a grader, water truck, a ditching excavator, and a rock breaker. A low bed has been included in the fleet for moving drills and dozers between pit phases and a tire handler has been included for wheel loader and truck tires. A fuel truck and miscellaneous service vehicles have been included for the maintenance crew. A provision has been made for a small used portable crushing plant to produce road surfacing materials and crushed aggregate blasthole stemming.

The heap leach pad will also require a track dozer for leveling stacker placed crushed rock prior to leaching. A small loader may also be required for clean up around the crusher and stockpile areas. These will be included in the processing capital for mobile equipment.

#### 16.6.4 Mine Dewatering

The Tres Cruces site is subject to a significant amount of precipitation on an annual basis with the rainy season occurring between October and March. Mine de-watering will be required by pumping from in-pit sumps and de-pressurization horizontal drain holes will be required on operating benches. Collected water will be pumped to the processing plant as make-up water.

Perimeter ditching will also be required to control surface contact water in and around waste dumps and pit perimeters. This topic is discussed further under site plan.

## Table 16-7: Mine Equipment

| Fleet Componenet | MAKE | MODEL | SIZE | Year -2 | Year -1 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Drilling** | | | | | | | | | | | | |
| Blasthole Drill | Epiroc | FlexiRoc D65 | 152 mm | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Wall Control Drill | Epiroc | FlexiRoc D60 | 114 mm | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | | | | | | | | | | | |
| **Loading** | | | | | | | | | | | | |
| Excavator | Caterpillar | 395 -ME | 6.5 m3 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Wheel Loader | Caterpillar | 992K | 11.6 m3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wheel Loader - Stockpile | Caterpillar | 988K | 6.9 m3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Hauling** | | | | | | | | | | | | |
| Haul Truck | Caterpillar | 773G | 50 t | 4 | 6 | 6 | 10 | 11 | 11 | 11 | 6 | 6 |
| **Roads & Dumps** | | | | | | | | | | | | |
| Track Dozer | Caterpillar | D9T | 346 kW | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Track Dozer | Caterpillar | D8T | 264 kW | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 |
| Motor Grader | Caterpillar | 14M | 177 kW | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Water Truck | Caterpillar | 745 | 20,000 l | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Excavator | Caterpillar | 326 | 128 kW | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Rock Breaker | Caterpillar | 323 | 200 kW | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | | | | | | | | | | | |
| **Support Equipment** | | | | | | | | | | | | |
| Low Bed Transporter | Scania | | 60 tonne | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Truck Crane/Telehandler | Tadano/Caterpillar | ATF 70G-4TL1255D | 70t/5.4t | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Tire Handler/Forklift | IMT | TH3565 | 25t | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Fuel/Lube Truck | Scania | | 20,000L | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| HD Mechanic's Field Truck | Scania | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Mechanic's Service Truck | Scania | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Welding Truck | Scania | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Service/Operations Pickup | | 4x4 | 3/4 tonne | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Light Plant | | | | 4 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Crushing Plant | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Mine Bus | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

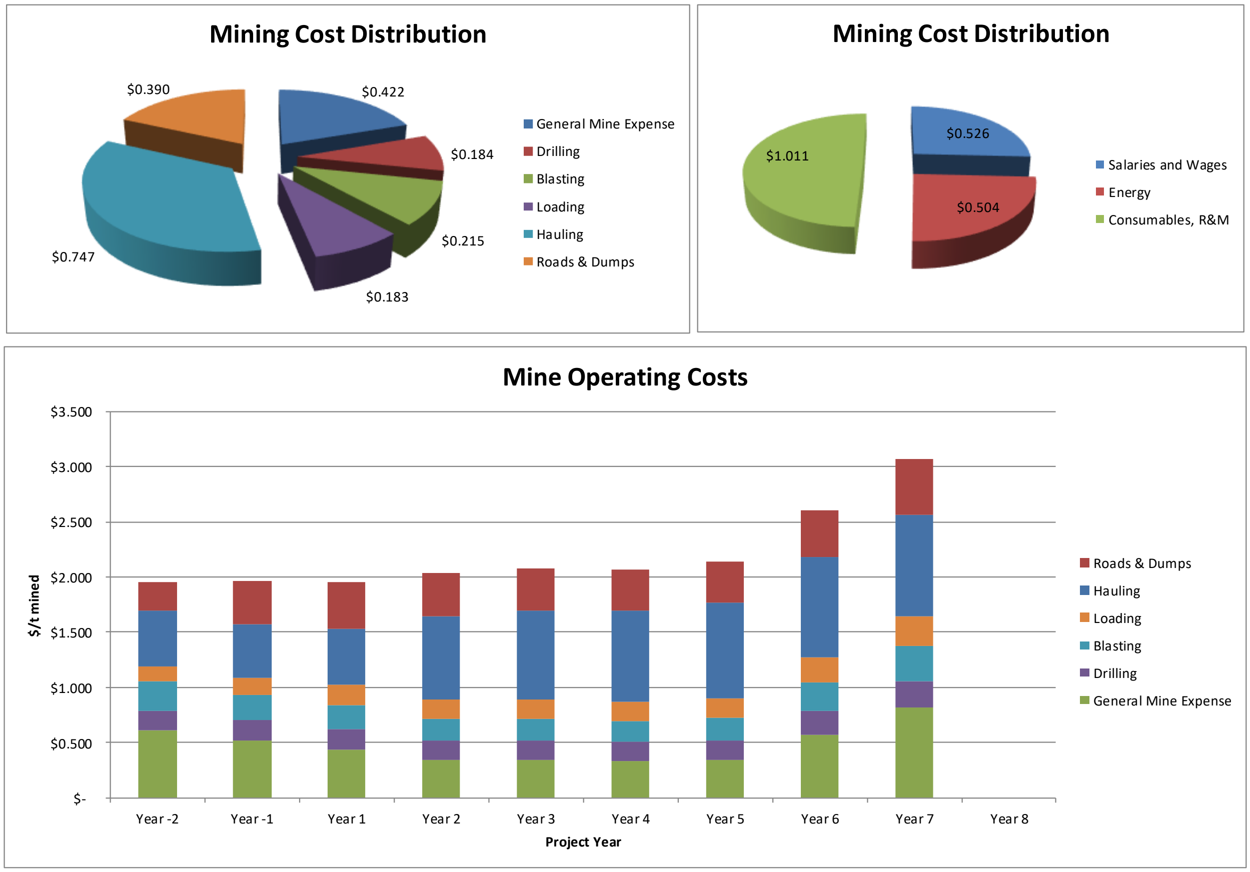



**Figure 16-21: Mining Cost Distribution**

**Table 16-8: Equipment Capital Summary**

| Cost Center | | Year -2 & Year -1 | | Year 1 to Year 7 | |
|---|---|---|---|---|---|
| Drilling | USD x 1000 | $ | 2,419.00 | $ | 1,003.00 |
| Blasting | USD x 1000 | $ | - | $ | - |
| Loading | USD x 1000 | $ | 2,997.20 | $ | - |
| Hauling | USD x 1000 | $ | 9,558.00 | $ | 7,965.00 |
| Roads & Dumps | USD x 1000 | $ | 5,347.80 | $ | 938.10 |
| Support Equipment | USD x 1000 | $ | 6,131.80 | $ | 600.00 |
| **Subtotal** | USD x 1000 | $ | 31,633.90 | $ | 10,506.10 |
| Spares & Tools | USD x 1000 | $ | 1,581.70 | $ | 525.30 |
| **Total** | USD x 1000 | $ | 33,215.60 | $ | 11,031.40 |

# 17 RECOVERY METHODS

## 17.1 SUMMARY

Preliminary testwork results have indicated that the Tres Cruces mineralized material is amenable to heap leaching for the recovery of gold. This PEA considers only the processing of oxide and transition mineralization.

The total leach cycle of 60 days has been assumed for the heap leach system. The cyanide leach solution may be applied to the pad at an average application rate of 12 L/h/m$^2$. After the 60-day leach cycle, irrigation would be discontinued and advanced to the next cell. No rinse phase is included because of the multiple lift system employed. Subsequent lifts will be placed on top of the previous lift, up to a total of 10 to 11 lifts. Rinsing will be conducted as part of the final closure. The leach solution may have an approximate concentration of 0.3 g/L sodium cyanide when applied to the heap. A vertical submersible pump at the barren tank will be used for the barren solution application to the heap. The average flow to the heap will be 327 m$^3$/h.

## 17.2 PROCESS DESCRIPTION

The mineralized material will be mined by standard open-pit mining methods. The recovery process used at Tres Cruces will be a conventional three stage crushing circuit followed by heap leaching, and a carbon adsorption, desorption, regeneration (ADR) recovery plant. Pebble lime for pH control will be added to the crusher product and will be conveyor stacked on a heap leach pad in 8 m lifts.

A preliminary design of the heap leach pad area was used for this study. The pad will be constructed in phases and will hold approximately 15 Mt.

Gold will be leached from mineralized material with a dilute cyanide solution for a leach cycle of 60 days. Other metals such as silver, copper, iron, and mercury will also be leached by the cyanide, and a suitable cyanide management system will be in place to control the leach solution and effluent solution chemistry. The gold bearing pregnant solution will flow by gravity to the adsorption circuit (CIC column) to recover gold but may be bypassed to the pregnant solution pond in the event of a precipitation event. Further upset can be stored in the Overflow Pond. Make-up cyanide, pH level and water from the barren solution pond may be added to the ADR barren solution tank, before recirculating the solution back to the heap by pumping. Use of raincoats on the heap, backup power supply for pumps, and containment surge volume within the process water ponds are some of the means to address storm upset in the system. The gold will be periodically stripped from the carbon using a desorption process. The gold will be plated on stainless steel cathodes, removed by washing, filtered, dried (retorted) and then smelted to produce a doré bar. Doré will be sent to a third-party refinery for sale. The major unit operations of the process are:

1. Primary crushing
2. Secondary crushing
3. Tertiary crushing
4. Heap leaching
5. Recovery plant
6. Refinery
7. Water discharge treatment plant

The overall process flow diagram is provided in Figure 17-1.

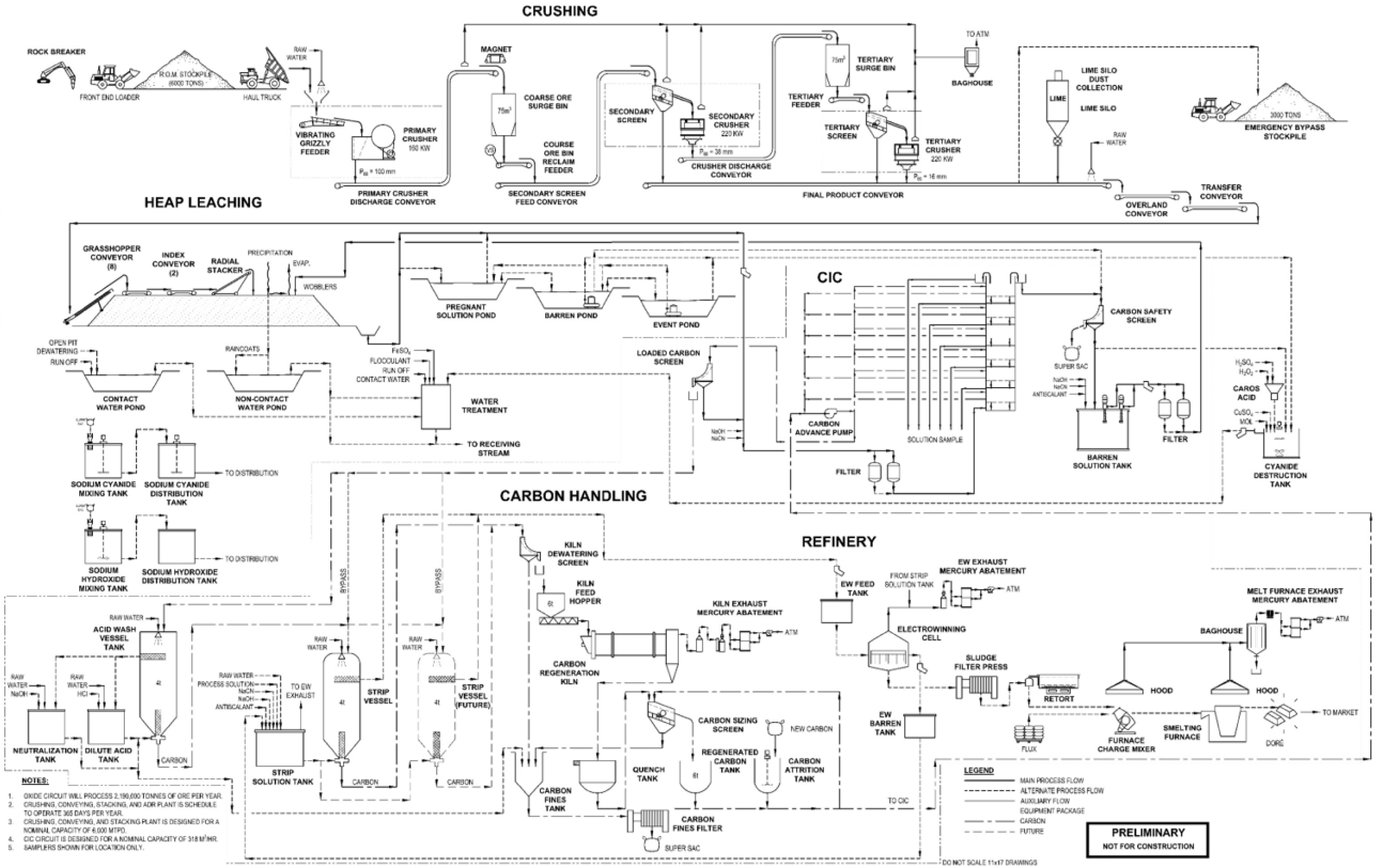



Figure 17-1: Tres Cruces Simplified Overall Flow Diagram

Preliminary engineering and design of the processing plant was undertaken for complete crushing, leaching, and recovery systems. The criteria for the design of the processing circuit are summarized in Table 17-1.

**Table 17-1: Tres Cruces Process Design Criteria Summary**

| Item | Units | Design Criteria |
|---|---|---|
| Annual Tonnage Processed | t/a | 2,317,750 |
| Crushing Production Rate | t/d | 6,000 |
| Crushing Operation | - | 12 hours/shift, 2 shift/day, 7 days/week |
| Crusher Availability | | |
| Primary | % | 75 |
| Fine Crushing | % | 75 |
| Crushing Product Size, 80% passing | mm | 16 |
| **Mineralized material Characteristics** | | |
| Mineralized material specific gravity | $t/m^3$ | 2.25 |
| Mineralized material bulk density | $t/m^3$ | 1.6 |
| ROM (based on Bruno 700mm Quartzite) | | |
| $P_{90}$ | mm | 539 |
| $P_{80}$ | mm | 434 |
| $P_{50}$ | mm | 209 |
| Mineralized material moisture | % | 2 |
| LOM Head Grade, average | | |
| Au | g/t | 1.37 |
| Ag | g/t | 1.0 |
| Cu | % | 0.005 |
| Hg | % | 0.0060 |
| **Heap Leach** | | |
| Primary Leaching Cycle | Days | 60 |
| Average Sodium Cyanide Consumption | kg/t | 0.6 |
| Average Lime (CaO) Consumption | kg/t | 2.6 |
| **Solution Application Rate** | | |
| Barren Application Rate | $m^3/hr/m^2$ | 0.012 |
| Barren Solution Pumping Flow | $m^3/hr$ | 327 |
| Average Sodium Cyanide Consumption | kg/t | 1.2 |
| Average Lime (CaO) Consumption | kg/t | 2.6 |

Figure 17-2 presents the general arrangement of the mine site.

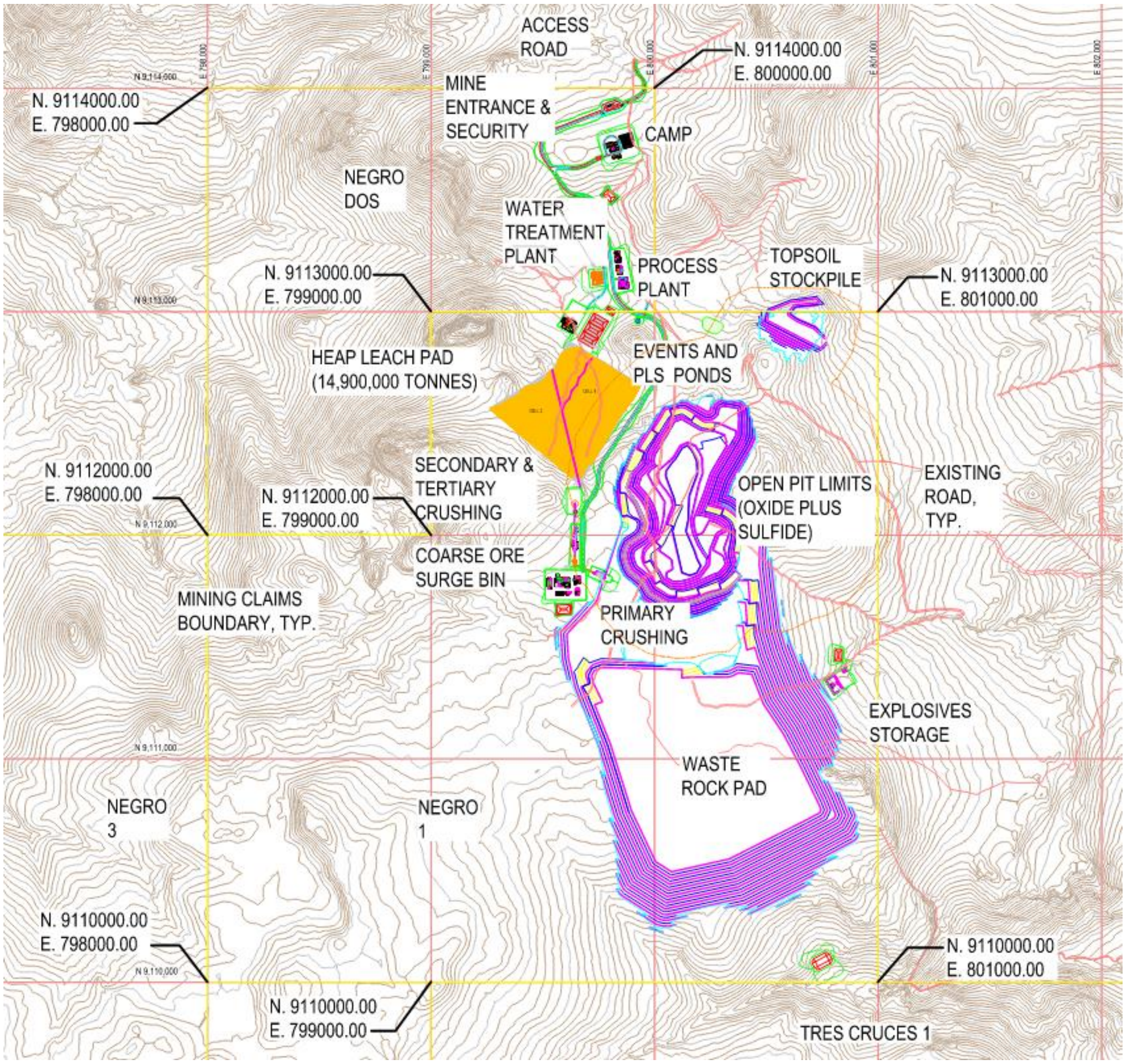



**Figure 17-2: Mine Site General Arrangement**

## 17.3 PROCESSING

### 17.3.1 Crushing

Crushing for the Tres Cruces Oxide Project will be accomplished by a portable three-stage crushing system with an open primary, secondary, and tertiary crushing circuit operating seven days per week, 24 hours per day based on 75% availability. Run of mine (ROM) material will be delivered and direct dumped, as much as possible, by haul truck from the mine into the ROM dump pocket. A rock breaker will be available to break any oversized material at the primary crusher. ROM material from the dump pocket will be delivered to the crushing circuit. Material will be crushed using a primary jaw crusher. The primary jaw crusher will be operated in open circuit and designed to crush the material to 80% passing 100 mm. The primary crushing product is conveyed to a surge bin ahead of the secondary crushing circuit.

Material from the surge bin will be reclaimed using a reclaim feeder and discharged onto the secondary screen feed conveyor. The secondary crushing circuit will include a single double deck vibrating screen and one standard cone crusher. The secondary crushing circuit will be operated in open circuit with a product size of 80% passing 38 mm.

Primary crushed material will be fed to the secondary screen. The secondary screen oversize discharges to the secondary cone. The secondary cone crusher discharge will be conveyed to the tertiary crushing circuit. The secondary screen undersize discharged to the final product conveyor. The tertiary crushing circuit consists of a single double deck vibrating screen and one shorthead cone crusher operated in open circuit. The final crushed product will have 80% passing 16 mm.

Secondary crusher discharge will be conveyed to a surge bin ahead of the tertiary screen. Material from the tertiary crusher surge bin will be reclaimed using a reclaim feeder and conveyed to the tertiary screen. The tertiary screen oversize discharges to the tertiary cone crusher. The tertiary cone crusher discharge will be combined with the tertiary screen undersize and the secondary screen undersize on the final product conveyor. Pebble lime will be added to the crushed material on the final product conveyor. The lime addition rate will be controlled by a weightometer mounted on the final product conveyor. The final product conveyor discharges to the heap leach conveying/stacking system. Mineralized material may be diverted to an emergency stockpile if needed. Mineralized material can be reclaimed using a front-end loader and fed to the conveying stacking system.

### 17.3.2 Heap Conveying and Stacking

The heap leach will be constructed in eight-metre lifts using a mobile conveyor stacking system. It is expected that the leach pad conveying and stacking system will consist of an overland conveyor, mobile grasshopper conveyors, and index feed conveyor, a horizontal index conveyor and a radial stacker. The overland conveyor transfers the material from the heap leach feed conveyor to the mobile grasshopper conveyors, which feed the conveyor stacking system. As the radial stacker progresses, the system is periodically stopped to add or remove grasshopper conveyors as needed. No additional equipment is expected to increase the leach area over the life of the mine. Stacked material will consist of crushed mineralized material. Once a lift has finished leaching, and is sufficiently drained, a new lift can be stacked over the top of the old lift. The old lift will be cross-ripped with a dozer prior to stacking the new lift to break up any compacted mineralized material and to redistribute material that may have been winnowed by the irrigation solution or rainfall. Stacked lifts will progress in a stair-step manner.

### 17.3.3 Heap Leaching

Following stacking, the material is irrigated with a dilute sodium cyanide barren leach solution and the resulting gold bearing solution flows by gravity to the ADR plant. The Tres Cruces Oxide Project has been designed as a single pass system with no intermediate solution used for heap application. The heap will be irrigated using a wobbler or drip-tube irrigation system for solution application. PVC pipes are used to distribute the solution to the wobblers or drip-tubes on top of the heap. Antiscalant agent is added to the suction of the barren and pregnant solution pumps to reduce the potential for scaling problems within the system.

The total leach cycle of 60 days has been assumed for the heap leach system. The cyanide leach solution may be applied to the pad at an average application rate of 12 L/h/$m^2$. After the 60-day leach cycle, irrigation would be discontinued and advanced to the next cell. No rinse phase is included because of the multiple lift system employed. Subsequent lifts will be placed on top of the previous lift, up to a total of 10 to 11 lifts. Rinsing will be conducted as part of the final closure. The leach solution may have an approximate concentration of 0.3 g/L sodium cyanide when applied to the heap. A vertical submersible pump at the barren tank will be used for the barren solution application to the heap. The average flow to the heap will be 327 $m^3$/h.

Due to the expected net positive water balance, raincoats are likely to be used to reduce the amount of water entering the processing circuit. After passing through the pad, pregnant solution is collected from under the raincoats by a network of perforated drainage pipes that are directed to the pregnant solution (PLS) pond. The solution from the PLS pond will be pumped by submersible pump to the carbon-in-column (CIC) plant.

Water that flows from the surface of the raincoats is directed to the storm water management system.

#### 17.3.4 Heap Leach Facility Design

Gold will be extracted from the mineralized material from the Tres Cruces deposit by cyanide heap leaching. A single conventional heap leach facility design is assumed for the site for this study. The Heap Leach Facility (HLF) has an area of approximately 210,000 $m^2$ and a capacity of approximately 15 Mt using a dry bulk density of 1.6 $t/m^3$.

The design of the leach pad assumed for this study will meet applicable standards for the lining system design and for the stability of the HLF, which are intended to lessen the risk of environmental impact to the local soils, surface water, and ground water. These construction standards are intended to mitigate environmental impacts to surface and subsurface water sources. Actual standards used in subsequent stages should be carefully considered and implemented to ensure that environmental impacts are mitigated to the extent required under prevailing laws, regulations and international standards.

Mineralized material is designed to be stacked at a nominal rate of 6,000 tonnes per day (t/d). Once production crushers are operational, mineralized material will be crushed and placed on the leach pad using portable conveyors feeding a conveyor-stacker. The mineralized material is intended to be stacked in lifts with benches provided between lifts to create an average overall mineralized material slope of 3H:1V (horizontal to vertical), which is typical to provide geotechnical stability and help reduce grading during reclamation.

The foundation of the HLF may consist of an underdrain system within the natural drainages to capture spring water and transport it to the toe of the process pond. The leach pad is a geomembrane lined pad that is divided into two separate construction phases. Each phase is constructed with a solution collection system that drains by gravity to the ADR plant. During upset conditions, pregnant solution may be bypassed to the Pregnant Pond. The Pregnant Pond will overflow into a Barren Pond located downstream of the Pregnant Pond and the Barren Pond will overflow into an Event Pond located downstream of the Barren Pond. Excess seasonal solution accumulation will be directed to the storm water management system.

Construction of the leach pad will include a perimeter access road, underdrain system, pad geomembrane lining system, leak detection system, solution collection system, permanent and temporary stormwater diversion facilities, the Pregnant Solution Pond, Barren Pond, and the Event Pond.

The leach pad will be a dual lined system designed with a composite liner system consisting of (from top to bottom):

1. A drainage layer overliner containing a network of solution collection pipes above a system described below;
2. A single-sided textured, high-density polyethylene (HDPE) geomembrane
3. Geonet
4. A Geosynthetic Clay Liner (GCL)
5. Prepared subgrade.

The Pregnant, Barren, and Event Ponds will utilize a similar composite lining system as the HLF. The layers provide a synthetic dual-containment and leak detection system.

The pipe type and size are selected based on the expected amount of leachate solution and the expected maximum mineralized material height that the pipe will experience.

The leach pad design considers a maximum internal slope of no steeper than 2.5H:1V so typical construction equipment can be safely employed without additional controls.

Storm water diversion channels are sized to contain the runoff from upstream basins resulting from the 1 in 100-year, 24-hour storm event that is a typical industry practice. The diversion channels around the HLF and process ponds will be designed to convey this runoff in riprap-lined diversion channels. Sediment control structures are designed in drainages downstream of the facility to control sediment from runoff conveyed in diversion channels and underdrain flows.

### 17.3.5 Metal Recovery

The recovery plant is designed to recover gold and any silver by an adsorption-desorption-recovery (ADR) process. Precious metals in the heap leach pregnant solution will be adsorbed on to activated carbon in the carbon adsorption circuit (adsorption). Loaded carbon from the carbon adsorption circuit is then desorbed in a high-temperature elution process coupled to an electrowinning circuit (desorption), followed by drying and smelting of the resulting sludge to produce doré bullion (recovery). Prior to elution, each batch of carbon will be acid washed to remove any scale and other inorganic contaminants that might inhibit gold adsorption on carbon.

#### 17.3.5.1 Adsorption

The adsorption section of the ADR will consist of a six-stage vertical CIC tank. Pregnant solution will flow by gravity to the CIC columns. Antiscalant agent is added at the pump suction to prevent scaling of the carbon that can affect carbon loading. The PLS will be directed through the beds of carbon in an up-flow manner. Each stage of CIC will have a capacity of 2-tonnes of activated carbon. Barren solution exiting the last carbon column stage flows through a screen to separate and capture any floating carbon from the solution.

Periodically, the carbon contained in the lead column in the series will become loaded with gold and will be transferred to the acid wash and desorption circuit as a batch using carbon pumps. On average, two batches of carbon (2 x 2-tonne batches) per day are expected to be loaded and treated.

Carbon in the remaining columns will then be advanced, one at a time, and a batch of new (or stripped/regenerated) carbon is transferred into the final empty column from the regenerated carbon storage tank.

#### 17.3.5.2 Carbon Acid Wash

Acid washing consists of circulating a dilute hydrochloric acid (HCl) solution through the bed of carbon to dissolve and remove scale from the carbon. Acid washing is performed on a batch basis.

After carbon is transferred into the acid wash column, but before any acid is introduced, fresh water is circulated through the bed of carbon to remove any entrained cyanide solution. This rinse solution will be transferred to the barren tank. A dilute acid solution will be prepared in the mix tank, and circulation will be established between the acid wash vessel and the acid mix tank. Concentrated acid will be injected into the recycle stream to achieve and maintain a pH ranging from 1.0 to 2.0. Completion of the cycle is indicated when the pH stabilizes around 2.0 without acid addition for a minimum of one full hour of circulation.

After acid washing has been completed, the spent acid solution will be returned to the dilute acid tank where it may be reused, or it may be sent to the neutralization tank for disposal. The carbon will then be rinsed with raw water followed by rinsing with dilute caustic solution to neutralize any residual acid. Total time required for acid washing a four-tonne batch of carbon is four to six hours. After acid washing is complete, the carbon will be transferred to the desorption circuit.

#### 17.3.5.3 Desorption

A Zadra pressure elution, hot caustic desorption circuit has been selected for the Tres Cruces Oxide Project. This type of circuit requires 18 hours or less to complete a cycle and, for this reason, each strip batch is sized for four tonnes of carbon. Each desorption cycle requires the transfer of a four-tonne batch from the acid wash circuit to the strip vessel.

The desorption circuit is sized to elute, or "strip," the gold from a four-tonne batch of carbon into pregnant eluate solution. The Zadra strip utilizes 10-12 bed volumes of a circulated 140°C (300°F) solution of 1.0% caustic (NaOH) and 0-0.2% sodium cyanide (NaCN) concentration to strip the carbon. During the elution cycle, gold will be continuously extracted by electrowinning from the pregnant eluate concurrently with desorption.

Pregnant eluant solution leaving the elution column passes through external stainless-steel screens before passing the cooling heat exchanger to reduce the eluate temperature to about 75°C (to prevent boiling). The cooled pregnant eluate solution will be sent to the electrowinning cells.

After desorption is complete, the stripped carbon will be pumped to carbon reactivation dewatering screens to remove water and carbon fines ahead of carbon regeneration.

#### 17.3.5.4 Electrowinning and Refining

The electrowinning circuit will be operated in series with the elution circuit. Solution will be pumped continuously from the strip solution tank through the elution vessel, then through the electrowinning cell where the gold is removed from solution as soft, precious metal sludge, and back to the strip solution tank in a continuous closed loop process.

The gold-laden solution exiting the elution column will be filtered to trap any carbon escaping from the column; will pass through the heat recovery exchanger and the cooling exchanger to reduce the solution temperature to 75ºC and then will flow to the electrowinning circuit. Gold will be won from the eluant in the electrowinning cells using stainless steel cathodes and a current density of approximately 50 amperes per square meter of anode surface.

Caustic soda (sodium hydroxide) in the eluate solution will act as an electrolyte to encourage free flow of electrons and promote precious metal winning from solution. To keep the electrical resistance of the solution low during desorption and the electrowinning cycle, make-up caustic soda will be intermittently added to the strip solution tank. Strip solution leaving the electrolytic cells will discharge to the EW cell discharge pump box where it is pumped back to the strip solution tank for recycle through the elution column.

Periodically, all or part of the barren eluant will be dumped to the barren tank and new solution will be added to the strip solution tank. Typically, about one-third of the barren eluant will be discarded after each elution or strip cycle. Sodium hydroxide and sodium cyanide will be added as required from the reagent handling systems to the strip solution tank during fresh solution make-up.

During the strip, the pregnant strip solution will run through the electrowinning circuit where the gold will be removed from solution as soft, precious metal sludge. The precious metal-sludge in the electrolytic cell will be removed about once or twice per week and processed to produce the final doré product. The sludge will be washed from the cell cathodes through a filter to remove most of the water. Any fumes generated will be removed via the electrowinning exhaust fan.

Filtered cake will be collected in pans. The pans will be placed in a mercury retort system for several hours. The retort will heat the filtered cake to 650˚C to vaporize mercury. Retort vapor will be withdrawn from the retort by a vacuum pump, which will pull the vapor through a condenser where the mercury will condense and flow into a mercury collection compartment. Mercury will be removed as required.

After cooling, the dried cake will be mixed with fluxes and charged to an induction furnace. Slag, containing fused fluxes and impurities, will be poured first into conical pots. Once slag has been removed, the melted gold will be poured into molds to form doré bars.

Bars will be cooled, cleaned, weighed, and stamped with an identification number and weight. Doré bars will be the final product of the plant. Armored, secure vehicles will be scheduled to be on site for safe and expeditious off-site transfer of the bars.

Fumes from the melting furnace will be collected through ductwork and cleaned in a high temperature bag house dust collector system, followed by a vessel with sulphur impregnated carbon, before discharging to atmosphere. The system will be designed to remove over 99.5% of the particulates present in the exhaust fumes.

#### 17.3.5.5 Mercury storage

Mercury will be securely stored in mercury storage flasks on site in the short term and will be either sold or disposed of in the long term.

#### 17.3.5.6 Carbon Handling and Regeneration

Thermal regeneration consists of drying the carbon thoroughly and heating it to approximately 750ºC for ten minutes. It is expected that thermal reactivation will be performed after the elution cycle to maintain carbon activity levels.

The four-tonne carbon batch to be thermally reactivated will be dewatered on a static screen, transferred to the regeneration kiln feed hopper and fed to the regeneration kiln by a screw feeder. Hot, regenerated carbon leaving the kiln will fall into a water-filled quench tank for cooling and storage. Carbon in the carbon quench tank will be pumped to a vibrating screen; screen oversize will be sent to the carbon storage tank and the screen undersize will be collected in in the carbon fines tank, where periodically the carbon fines will be dewatered using a filter press and stored in bulk bags. Ultimately, quenched regenerated carbon will be pumped to the adsorption circuit dewatering screen to remove any fines and the coarse carbon will be added to the adsorption circuit. Exhaust gases from the carbon regeneration kiln will be collected through ductwork, and will pass through sulphur impregnated carbon, before discharging at atmosphere.

New carbon will be added to the carbon attrition tank which will be equipped with an agitator and used for conditioning new carbon. After attrition, the new carbon will be transferred to the carbon storage tank from which it will be transferred to the adsorption circuit by a carbon transfer pump.

## 17.4 CYANIDE DETOX

The design of the heap leach facility is such that excess solution collected during the wet season will be used in the process whenever possible or may be treated and released. In the event that a surplus of solution exists, the excess solution will be routed to cyanide destruction and metal precipitation prior to discharge.

Destruction of cyanide in solution by Caro's acid has been assumed for this study. This is a process commonly used by precious metals operations to meet regulatory and international cyanide management code compliance for weak acid dissociable (WAD) cyanide concentration in discharge water if needed. Alternate methods of cyanide destruction are recommended to be evaluated during the next stage of the project.

Caro's acid (peroxymonosulphuric acid, or $H_2SO_5$) used in this process must be produced on-site using sulphuric acid and hydrogen peroxide, since Caro's acid decomposes quickly. The theoretical usage of $H_2SO_5$ in the process is 4.39 grams $H_2SO_5$ per gram of cyanide oxidized, but in practice 5.0 to 15.0 grams $H_2SO_5$ per gram of cyanide oxidized is required. Acid produced in the reaction (H+) is typically neutralized with lime.

## 17.5 REAGENTS

### 17.5.1 Cyanide

Sodium cyanide will be delivered as briquettes in 1,000 kg bulk bags and stored in a covered storage area with approximately 30 days of storage. The briquettes will be mixed with pH adjusted water or barren solution in the cyanide mix tank and subsequently transferred to a cyanide solution storage tank. Sodium cyanide will be used to leach gold from the mineralized material on the heap.

### 17.5.2 Lime

Pebble lime will be delivered and stored in a lime silo. Pebble lime will be conveyed from the silo to the heap leach feed conveyor. Hydrated lime will be delivered in 1 tonne supersacks and will be mixed and stored in an agitated tank with 12 hours residence time at a solids density of 20 wt%. Hydrated lime will be pumped to the cyanide detox circuit as needed.

### 17.5.3 Caustic Soda

Sodium hydroxide (caustic) will be supplied to site in 25 kg bags. The caustic will be mixed and stored for distribution to the cyanide mixing, acid wash, and strip circuits. The caustic may be used to adjust pH of the solution prior to mixing cyanide. It will be used to neutralize the acid in the acid wash circuit. A solution of 1.0% caustic will be mixed with barren solution in the carbon strip circuit for elution.

### 17.5.4 Hydrochloric Acid

Hydrochloric acid will be supplied to site in 208 L drums or plastic 1 t totes. Hydrochloric acid will be metered directly from the drums and totes for distribution in the plant.

### 17.5.5 Antiscalant

Antiscalant will be supplied to the site in 1 t totes. Antiscalant agent will be added by metering pumps at the barren solution and pregnant solution pump suction inlets. Antiscalant agents will be used to prevent carbonate scaling in pumps, piping and on the carbon.

### 17.5.6 Hydrogen Peroxide

Hydrogen peroxide, 50 or 70 wt.%, will be delivered to the site in plastic totes and will be added by metering pumps to the Caro's Acid mix system.

### 17.5.7 Sulphuric acid

Sulphuric acid will be delivered to the site in plastic totes and will be added by metering pumps to the Caro's acid mix system.

## 17.6 LABORATORY

A contract assay laboratory will be located at site and will be equipped to perform sample preparation and assays by AAS, fire assay, and cyanide (CN) soluble gold production and solution analyses. The laboratory facility will support ore control assaying, environmental controls, total suspended solids (TSS) monitoring, and process operations.

## 17.7 AIR SUPPLY

An air distribution system will be included to supply required process air to the plant – primarily the crusher. Instrument air will be included for required instrumentation and controls. Air requirements for the Caro's acid plant will be fed from the main compressor/dyer system.

## 17.8 PROCESS MAKE-UP WATER REQUIREMENTS

For this study, it is assumed that mine dewatering and surface water runoff management will provide all water required for process operations.

## 17.9 QUALITY CONTROL

Automatic samplers will also be provided on selected streams in order to calculate the plant material balance and for control of the process. Routine samples of intermediate products and final products will be collected and analyzed in an assay laboratory where standard assays will be performed. The data obtained will be used for product quality control and routine process optimization. Feed, doré and solution samples will also be collected and subjected to routine assay.

## 17.10 AUXILIARY SYSTEMS

Auxiliary systems such as reagent mixing and storage, maintenance and office requirements, laboratory, etc. are listed but not necessarily detailed for this study. Estimates for such items were based on other similar projects. The reagent consumption was estimated from the minimal historical tests and data from other properties. The crushing wear consumption was estimated from data from other properties.

## 17.11 PROCESS CONTROL PHILOSOPHY

The key design criteria for the instrumentation and control are to provide and implement enough supervisory and control to achieve design production rates, to enable stable process operations within design limits and to facilitate safe operation of all process and equipment.

The plant control system will consist of a distributed control system (DCS) with PC-based operator interface stations (OIS) located at the central control room. The DCS, in conjunction with the OIS, will perform all equipment and process interlocking, control, alarming, trending, event logging, and report generations. The plant central control room will be staffed by trained personnel 24 hours per day. The control room operator will be able to input set points, open/close valves, start/stop motors/pumps/ conveyors/equipment and visualize all alarms and interlocks via the process control systems human machine interface system.

Equipment and process parameters will be monitored and automated when it is deemed critical for process productivity and quality or is required to support human, equipment, or environmental safety functions. Equipment will be field operated, where it is only required for infrequent actuation or activation with no significant impact on process, equipment, or safety.

The process control will be enhanced with the installation of an automatic metallurgical sampling system. The system will collect samples from various streams and the daily metallurgical balance. Vendors' instrumentation packages will be integrated with the central control system.

A closed-circuit television (CCTV) system will monitor various facilities and conveyors discharge points. The cameras will be monitored from the central control room.

The site-wide process communication system will provide communication between the process controllers, the motor control centers, remote input and output modules, vendor supplied skids, and the control room(s) operator's workstations and graphical interface consoles.

The flowing areas and associated process will be monitored and controlled:

- Comminution and conveying,
- Absorption, desorption, regeneration,
- Cyanide detox,
- Reagents,
- Process and fire water, and
- Process and instrument air.

## 17.12 PROCESS ALTERNATIVES AND SELECTION

No alternatives were evaluated at this stage. The process proposed was assumed based on common industry practice in similar circumstances.

## 17.13 POWER

The Tres Cruces process facility has an estimated 6.5 megawatt (MW) total connected load and 5.0 MW total demand load, as outlined in in Section 21. Power costs are also discussed in Section 21 of this study.

# 18 PROJECT INFRASTRUCTURE

## 18.1 MINE ACCESS

The Tres Cruces Oxide Project is a Greenfield Project without any existing infrastructure on site. Currently the project site has only reclaimed drill hole pads and unpaved gravel roads. The existing LI-931 route bisects the property and future pit, and will require relocation should the project proceed. The National Highway 3N is a paved road that passes north of the mine by approximately 2 km. This highway leads to the National Highway 10A that accesses Trujillo on the coast and the port of Salaverry.

The district of Quiruvilca (at around 13,500 residents according to the 2017 census) is the closest community. There is a public airport in the city of Trujillo, approximately 3.5 hours away by highway. There is a private airstrip at Boroo's Lagunas Norte operation, one half hour away by paved road. The closest port to the project site is the port of Salaverry, which is approximately 4 hours away by highway.

## 18.2 WATER SUPPLY

### 18.2.1 Potable Water

Potable water will be supplied for the camp and facilities from three wells on the property. Water will be pumped to one of two Fresh/Fire water tanks on the property.

### 18.2.2 Raw Water

For this study, it is assumed that mine dewatering and surface water runoff management will provide all water required for process operations.

### 18.2.3 Effluents

Effluents will be treated by Wastewater Treatment plants at the Camp and at the Process Plant. The sludge from the plants will be disposed of according to the Peruvian environmental regulations.

## 18.3 POWER SUPPLY

The mechanical equipment list load shows approximately 5 MW of demand. The site will connect to the Peruvian national power grid at a new switching substation approximately 4 km from site. The 4 km transmission line will be constructed and connect to a new substation at the Project site and will distribute power to the camp, mine and process facilities.

## 18.4 MINE SITE STRUCTURES

The Mine site has the following structures (with the corresponding WBS number):

| WBS | Description |
|---|---|
| 000 | General |
| 050 | Mine |
| 100 | Primary Crushing and Ore Storage |
| 200 | Fine Ore Crushing and Conveying |
| 300 | Leach Pad Stacking |
| 310 | Heap Leach Pad and Ponds |
| 400 | ADR (Adsorption, Desorption, Regeneration) |
| 500 | Refinery |

| | |
|---|---|
| 610 | Cyanide Destruct Facility |
| 650 | Heap Leach and Gold Recovery Water System |
| 660 | Water Treatment Plant |
| 700 | Main Sub Station |
| 800 | Reagents |
| 901 | Guard House |
| 902 | Truck Scale |
| 903 | Admin Building |
| 904 | Laboratory |
| 905 | Change House |
| 906 | Truck Shop |
| 907 | Truck Wash |
| 908 | Fuel Storage |
| 909 | Warehouse |
| 910 | Fuel/Oil/Gas Stations |
| 911 | Security/Training/First Aid |
| 912 | Dining Facilities |
| 913 | Explosives Storage |
| 914 | Core Storage |
| 915 | Permanent Camp |
| 920 | Maintenance Shop |

Where possible, the structures will have a minimal footprint. Mobile or temporary structures will be used where possible.

## 18.5 TEMPORARY CONSTRUCTION HOUSING

It is estimated that during construction that there will be a maximum of approximately 200 workers on site. The temporary construction camp will house about 150 personnel. The remainder of the Construction personnel will come from communities in the area.

## 18.6 OPERATIONS WORKFORCE HOUSING

The operations Permanent Workforce Housing will house 48 workers, 8 supervisors, and 6 management personnel, plus an additional 28 rooms for general and administrative supervision personnel. In addition, there will be quarters for six additional vendors. The accommodations will be modular dormitories and sleeping quarters There will also be shower units within the worker dormitories and toilets and showers in the supervisor and management units. Additionally, there will be kitchen and dining units for the entire staff.

Given the company's strategy to maximize local workers, the camp facilities have only been designed for management personnel, supervisors, and any workers whose function requires them to be on site beyond their shift. Local workers will travel to and from site on a daily basis from their homes in the surrounding communities.

## 18.7 LEACH PAD

The leach pad will be developed in two phases and is designed to contain approximately 14,900,000 tonnes of leached material. The lifts are assumed to be 8 m. A system of conventional overland conveyor to tripper conveyor to mobile conveyors to stacker will be utilized.

# 19 MARKET STUDIES AND CONTRACTS

Gold produced by the Tres Cruces Oxide Project will be sold as doré bars to refineries or mints. No market studies were performed and no sales contracts are in place. Doré is commonly sold to refineries or mints, either under contract or on an open market basis.

# 20 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

## 20.1 ENVIRONMENTAL STUDIES

This section was prepared based on a review of several reports and studies, including the following:

1. Evaluación Ambiental Proyecto de Exploración Minera Tres Cruces (Battle Mountain Canada Ltd., 1999).
2. Sexta modificación del Estudio de Impacto Ambiental Semidetallado (antes evaluación ambiental categoría "C") Proyecto de Exploración "Tres Cruces" (Minera Barrick Misquichilca S.A., 2008).
3. Determinación de los tipos de vegetación. Proyecto Tres Cruces (Golder Associates Perú S.A., 2008a).
4. Línea Base Ambiental de Suelos. Proyecto Tres Cruces Santiago de Chuco – La Libertad (Golder Associates Perú S.A., 2008b).
5. Tres Cruces Scope Study (Barrick Gold Corporation, 2018).
6. Tercer ITS de la segunda modificación de EIA de la Unidad Minera Lagunas Norte (Minera Barrick Misquichilca S.A., 2020).
7. Ficha Técnica Ambiental (FTA) - R.D. N° 065-2022/MINEM-DGAAM
8. Autorización de Inicio de Actividades Mineras - R.D. N° 0450-2022-MINEM/DGM

### 20.1.1 Climate

Based on data from Lagunas Norte's meteorological station (2009-2019) located approximately 9.5 km from the Tres Cruces Oxide Project, the temperature in the area of the Project ranges from 5.1º C to 7.3º C and the annual mean temperature is 5.5°C (Minera Barrick Misquichilca S.A., 2020).

The total annual precipitation in the Project area ranges from 700.7 to 3,715.8 mm per year with a mean value of 1,528.9 mm per year according to the historical data (1977-2017) from the nearest government meteorological station located in Quiruvilca, approximately 4 km to the northwest from the Project (Minera Barrick Misquichilca S.A., 2020).

The rainy season generally occurs from October to March, while the dry season runs from May to August. April and September are considered transition months (Minera Barrick Misquichilca S.A., 2008).

The wind is mainly from the North and East at site.

### 20.1.2 Hydrology

The project is located on the watershed divide of the Moche and Santa rivers. The west side of the project drains into the Moche River, while the east side drains into the Cashanga River, a tributary of the Rio Santa (Minera Barrick Misquichilca S.A., 2008).

### 20.1.3 Soils

Reports show incipient genetic soil development with A-C and A-B-C horizon sequences. In addition, some soils present surface organic layers (O) less than 20 cm thick (Golder Associates Perú S.A., 2008b).

The very coarse fragments, mostly present in the soils of slopes and foothills, represent the limiting factor for root development in these areas, while in the hydromorphic zones, groundwater and internal saturated layers are recognized as limitations in these soils (Golder Associates Perú S.A., 2008b).

### 20.1.4 Vegetation

The vegetation in the project area includes puna grasslands (pajonales), Andean wetlands (locally known as bofedales) and rocky areas called roquedales (Golder Associates Perú S.A., 2008a):

Pajonales type of vegetation is dominant in the area, meaning that it occupies a great part of the project area. Shrubs or trees are not usually found in pajonales.

Bofedales (wetlands) appear in the bottoms of streams, edges of lagoons and water bodies, and present swampy soils. It is noteworthy that bofedales are considered fragile ecosystems by the Peruvian Government (Law N° 28611).

Roquedales present a wide variety of plants due to the different microhabitats it offers. The vegetation within these areas is considered high in diversity for encompassing some species from pajonales in addition to species specific to these areas.

## 20.2 ENVIRONMENTAL REQUIREMENTS AND PLANS

### 20.2.1 Environmental site monitoring

Environmental site monitoring will be implemented in order to establish the environmental baseline, and to track any changes in the environment and to ensure that the mitigation and control measures work as planned. Environmental monitoring will be carried out before, during, and after the life of the project to ensure compliance with all permit commitments and current best practices. The environmental monitoring program will include:

1. Surface and groundwater monitoring,
2. Soil quality monitoring,
3. Air quality, and
4. Biological monitoring.

### 20.2.2 Water management

An Environmental Management Plan will be developed to prevent and mitigate adverse effects during construction, operation, closure, and post-closure. This Plan will be reviewed and revised during the life of the project. Some key measures for water management are described below.

Surface water diversion structures will be constructed to keep water from flowing into operational areas. Surface drainage from disturbed areas which have no potential to produce chemical or metal contamination will be directed into small ponds to allow sediments to settle before discharge to the environment.

Contact water will be collected and used in the process or will be discharged to authorized points in compliance with the Permissible Maximum Limits (LMP) for mining-metallurgical effluents and with the applicable Environmental Quality Standards (ECA) for the receiving body.

Testwork will be conducted to determine the potential for Acid Rock Drainage (ARD) and metal leaching potential. Based on the results of this investigation, a Mine Waste Management Plan will be developed before mining commences.

The heap leach pad and waste rock stockpiles will be monitored to determine if any impacts from the operation on groundwater are detected and appropriate mitigation measures are implemented.

### 20.2.3 Air Quality

The ambient air quality in the area around the Tres Cruces Oxide Project is of good quality and is typical of the central Andes of Peru. Other than the adjacent Lagunas Norte mining operation, and the town of Quiruvilca, there are no other known pollution sources near the proposed project.

The only anticipated impacts on air quality on the project will come from dust generated by mining and crushing activities. Dust will be controlled through a program of road watering on the haul roads, and water sprays and baghouses on the crushing circuit. In addition, the refinery will be equipped with pollution control equipment to control any emissions from the processing circuit. These control measures will ensure compliance with Peruvian air quality standards for mining operations.

A program of air quality monitoring for particulates will be established as part of the upcoming environmental baseline studies.

### 20.2.4 Industrial solid waste disposal

The industrial solid wastes (hazardous or non-hazardous) generated by the project will be disposed of in authorized and licenced landfills. The transportation and disposal of solid wastes outside the limits of the project site will be done exclusively through specialized companies registered with the Peruvian competent authority (DIGESA).

## 20.3 PERMITTING

The main permits and authorizations required for both the exploration and operations phases are described in the following subsections.

### 20.3.1 Exploration Phase

#### 20.3.1.1 Environmental Impact Assessment

The Environmental Instruments applicable to the exploration phase are:

i. Ficha técnica ambiental (FTA),
ii. Declaración de impacto ambiental (DIA), and
iii. Estudio de Impacto Ambiental semidetallado (EIA-sd).

For exploration activities that involve the execution of activities with low impacts, the FTA and DIA environmental instruments apply. For projects with moderate impacts, the EIA-sd is applicable.

Once these environmental instruments are approved by the Energy and Mines Ministry (MINEM), the environmental certification is granted, and the activity is considered approved.

The Tres Cruces Project has obtained 11 environmental permits and licenses related to the Phase I Drilling Program, demonstrating a good track record of permitting success. Recent permitting milestones include obtaining biodiversity and hydrobiology baseline study permits in April and May 2022.

The FTA for the Phase I Drilling program was approved by MINEM on March 10, 2022. Authorization to initiate exploration activities was received on May 10, 2022. Subsequent drilling programs will require additional authorizations, the type of which will be determined by the size of the program.

The Phase I Drilling Program was initiated in May 2022 under approved permits but was suspended in July 2022 due to community concerns. As a result, three of the environmental permits and licenses related to the Phase I Drilling Program were suspended at ATC's request. Specifically, ATC requested two suspensions of the FTA exploration permit, from August 2022 to February 2023, and February 2023 to August 2023. Initiation of Exploration Activities, and the underground water use permits were also suspended for the same reasons. In summary, permits to continue the Phase I Drilling Program are in place, but have been suspended. Resolving community concerns will be critical path items for further exploration and project development activities to move forward.

#### 20.3.1.2 Construction permit for Piezometers

Execution of piezometers and hydrogeological studies during exploration activities must be approved by the Administrative Water Authority (AAA) and the Local Water Authority (ALA).

#### 20.3.1.3 Water Use Authorization

Use of groundwater or surface water during exploration activities requires the approval of an Environmental Impact Assessment and the accreditation of the water availability for the catchment point. This process will require social participation with irrigation committees before it is issued. This authorization is granted by the Administrative Water Authority (AAA) and the Local Water Authority (ALA). The Phase I Drilling Program utilized water provided from offsite in cisterns to address concerns from the downstream communities.

#### 20.3.1.4 Commencement of Exploration Activities Authorization

This authorization is granted after the mining company has obtained the most relevant authorizations, such as water use authorization and environmental certification. The Energy and Mines Ministry (MINEM) issues this authorization. As mentioned previously, authorization to initiate exploration activities was received on May 10, 2022, and subsequently suspended at the request of the company. Drilling can be reactivated at any time with the current permits in place,

### 20.3.2 Prior to Construction

#### 20.3.2.1 Certificate of Non-Existence of Archaeological Remains (CIRA) and Archaeological Monitoring Plan

The Certificate of Non-Existence of Archaeological Remains (CIRA) is an official document issued by the Ministry of Culture, which certifies that the surface of a specific area does not contain archaeological remains. It must be obtained prior to the commencement of construction activities.

Currently, there is an approved CIRA that covers a majority of the project area.

After the CIRA approval, an Archaeological Monitoring Plan prepared by a professional registered in the National Register of Professional Archaeologists (Ministry of Culture), must be presented. This plan must be approved by the Directorate of Archaeology or the Regional Directorates of Culture prior to the commencement of construction activities.

### 20.3.3 Exploitation Phase

#### 20.3.3.1 Environmental Impact Assessment

This environmental instrument applies to projects planning the execution of activities with significant impacts (e.g., exploitation or beneficiation activities). These types of projects require the approval of an Estudio de Impacto Ambiental Detallado, (EIA-d) by the National Service of Environmental Certification for Sustainable Investments (SENACE). The approval process involves workshops and public hearings near a location where the project will be developed.

#### 20.3.3.2 Commencement of Exploitation Activities

This authorization is granted after the project has obtained the relevant authorizations such as water rights, surface land access authorization and environmental certification.

#### 20.3.3.3 Beneficiation Concession (Construction and operating authorization)

Construction authorization and operating authorization must be approved by MINEM. Key requirements include:

1. Detailed engineering design of the project
2. Water balance and metallurgical balance obtained from the Environmental Certification
3. Project specifications obtained from the Environmental Certification
4. Quality Assurance Control (QAC) procedures.

20.3.3.4 Licence for the Use of Surface Water

Use of groundwater or surface water during exploitation requires hydrogeological and hydrological studies based on the water source (ground or superficial water). This process will also require social participation with irrigation committees before it is issued. This authorization is granted by the Administrative Water Authority (AAA).

20.3.3.5 Authorization for Industrial Wastewater Discharge

This authorization applies if the project will generate domestic or industrial wastewater that will be discharged into natural sources or soil after treatment. The authorization procedure requires an evaluation of the discharge effects on the receiving body and the fulfillment of quality standards. Additionally, it requires that the treatment systems be described, and a registration form submitted to the authority for recording in their database. The permit is granted for an annual volume on the basis of water quality by the National Water Authority (ANA).

The discharged effluent must be in compliance with the Maximum Permissible Limits (LMP) for mining-metallurgical effluents and with the applicable Environmental Quality Standards (ECA) for the receiving body.

20.3.3.6 Global Authorization for the Use of Explosives (AGUE)

Mining companies are required to obtain specific authorizations to purchase, use, transport, store, and handle explosives for the execution of their activities. This authorization is granted by the National Superintendence for the Control of Security Services, Arms, Ammunition and Explosives for Civilian (SUCAMEC) attached to the Ministry of the Interior.

### 20.3.4 Permitting Summary

Table 20-1 summarizes the permits required for the operations and exploitation phase of the Project.

**Table 20-1: Potential Permits Required for the Tres Cruces Mine**

| Permit/Approval | Issuing Authority | Permit Purpose | Renewal/Term |
|---|---|---|---|
| **Environmental and Mining** | | | |
| Environmental Impact Assessment | The Agency of Environmental Certification for Sustainable Investment - SENACE | Evaluation of the Project's environmental and social impacts and management measures. | Life of Mine unless changes to the project are required. |
| Mine closure plan | Ministry of Energy and Mines - MINEM | Evaluation of the closure measures of the Project components and the guarantees for their execution. | Life of Mine unless changes to the project are required. |
| Exploitation activities authorization | Ministry of Energy and Mines - MINEM | Authorizes the execution of the components for mining exploitation. | Life of Mine unless changes to the mine plan are required. |
| Beneficiation concession | Ministry of Energy and Mines - MINEM | Authorizes the construction and operation of the processing facilities. | Life of Mine unless changes to the |

| Permit/Approval | Issuing Authority | Permit Purpose | Renewal/Term |
|---|---|---|---|
| | | | processing plan are required. |
| **Water** | | | |
| Authorizations for the execution of water works in order to obtain the license for the use of water | Local Authority of Water | Execution of works for water collection. | According to the schedule of water works. |
| Licenses for the use of water | Local Authority of Water | Use of surface water for mining operations and complementary activities. | Life of Mine |
| Authorization for wastewater discharge | National Authority of Water | Discharge of treated water from the mining operation into a body of water. | Up to renewal every 6 years. |
| **Archaeology** | | | |
| Archaeological Evaluation Project Authorization | Ministry of Culture - MINCU | Execution of the project for the evaluation of the archaeological remains found in the Project area. | According to the evaluation project schedule. |
| Authorization of archaeological recovery project | Ministry of Culture - MINCU | Execution of the project to recover the archaeological remains found in the Project area. | According to the recovery project schedule. |
| Certificate of nonexistence of archaeological remains | Ministry of Culture - MINCU | Nonexistence of archaeological remains. | Indefinite term |
| Archaeological monitoring plan | Ministry of Culture - MINCU | Archaeological monitoring during construction of the Project components. | According to the Project construction schedule. |
| **Various** | | | |
| Registry for fuel direct consumer | The Supervisory Organism of Investment in Energy and Mines - OSINERGMIN | Storage and purchase of fuel. | One time registration |
| Registry for restricted chemicals/ products | National Tax Administration Management of Peru - SUNAT | Storage, use and purchase of restricted chemicals and products. | Biannual renewal |
| Explosives Permits | National Superintendence for the Control of Security Services, Arms, Ammunition and Explosives for Civilian Use - SUCAMEC | Storage, handling, transportation, acquisition and use of explosives and related material. | Annual renewal |
| Upgrade of public access road | Ministry of Transportation and Communications - MTC or Local Municipality | Authorization grant to use a specific piece of public land for a certain project. | Indefinite term |
| Potable water system authorizations | General Health Directorate - DIGESA | Water system for drinking water and other domestic uses, including treatment, water quality and registry. | Four-year term |
| Medical facilities categorization | Regional Health Directorate | Operation of the Medical Center. | Biannual renewal |

## 20.4 SOCIAL CONTEXT

The Tres Cruces Oxide Project is located in the highlands of the district of Quiruvilca in the Province of Santiago de Chuco in the Department of La Libertad on rural property owned by ATC.

The Project sits on the boundary between the Upper Moche and Tablachaca watersheds. These two watersheds present the Project with two distinct social contexts.

The upper Moche basin includes the district's urban settlements and their long history with mining. The district capital of Quiruvilca (pop. 5,634), and the adjacent urban areas of Shorey Grande (pop. 1,319) and Shorey Chico (pop. 394) are approximately 2 to 5 km to the northwest of the Tres Cruces property.

On the other hand, the Tablachaca basin includes rural land users dedicated primarily to grazing and, at lower altitudes, agriculture. Smaller dispersed rural settlements can be found in this basin to the south and east of the Project. Most of these settlements begin as the altitude drops to 3,600 m above sea level or below. The closest of these settlements include Chachamudal/Tres Cruces (Pop. 10), El Bado (161), Llaray (260), Jose Carlos Mariátegui (261), El Hospital (304), Las Pajillas (240), and Tupac Amaru (139). Although some of the dispersed households of Chachamudal/Tres Cruces are within a 1 km of the Tres Cruces Oxide Project, the other rural settlements are generally at least 6 km away.

The Lagunas Norte mine is 9 km to the northeast of the Project. Lagunas Norte is also in the district of Quiruvilca, but it does not share a watershed with the Tres Cruces Oxide Project.

The social context can be seen in Figure 20-1.

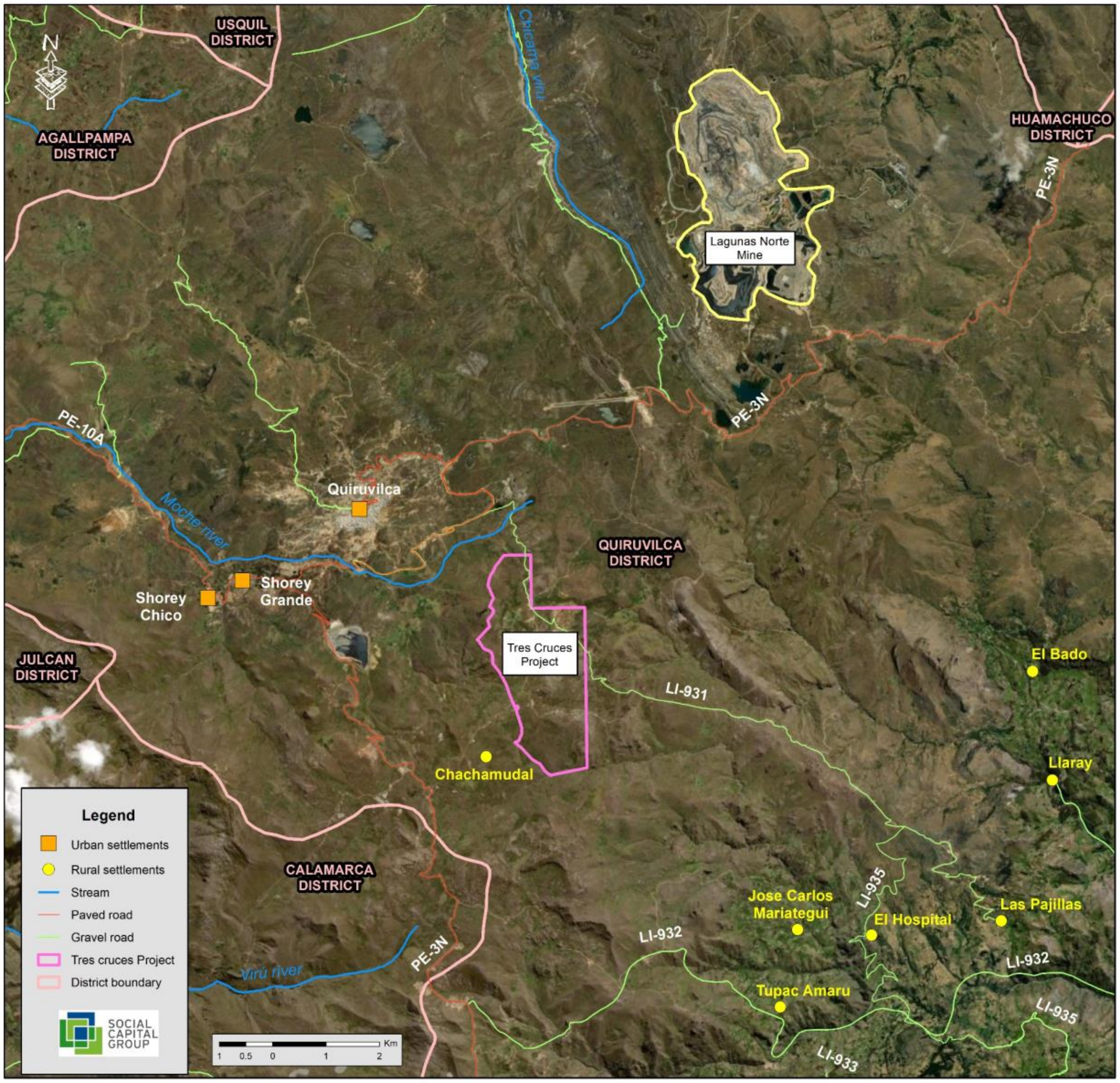



**Figure 20-1: Social Context**

The total population of Quiruvilca district declined slightly to 13,517 people from 2007 to 2017 according to the national census. The urban population (residing almost entirely in Quiruvilca, Shorey Grande, and Shorey Chico) increased by 13% in the decade, while the rural population of the district declined by almost 19%. Similar changes occurred at a national level, although Peru's larger urban areas received a greater share of its rural immigrants. The district population detail can be seen in Table 20-2. There are indications that the urban population of Quiruvilca has increased since 2018 due to an increase in informal mining. This change will be better identified in the next census.

**Table 20-2: Quiruvilca District Population**

| Total Population | Urban | | Rural | | Total |
|---|---|---|---|---|---|
| | N | % | N | % | |
| 2007 Census | 6,575 | 47% | 7,485 | 53% | 14,060 |
| 2017 Census | 7,421 | 55% | 6,096 | 45% | 13,517 |

### 20.4.1 Mining in Quiruvilca

Two experiences with mining have shaped the overall context of Quiruvilca district: first, the 100-year-old underground operations of the Quiruvilca Mining Company, and second, the modern Lagunas Norte open-pit mine, originally developed and operated by Barrick (and now owned and operated by Boroo).

### 20.4.2 Quiruvilca Mining Company

The town of Quiruvilca has depended on mining since it was a mining camp in at least the late 1700s. In the early 1900s, its different underground operations were consolidated into the Quiruvilca Mining Company. Since then, the company has been the main driver of the local economy. However, the lack of regulatory requirements and management also allowed the company to accumulate tremendous environmental and social liabilities, impacts and risks for the neighboring urban settlements and the downstream users in the Moche River basin.

The last owner of the Quiruvilca Mining Company declared bankruptcy at the end of 2017, two years after acquiring it. The company abandoned the operation without implementing a closure plan or paying debts to workers or suppliers.

According to the mayor of Quiruvilca, the formal operations of the Quiruvilca Mining Company have been replaced by an estimated several hundred informal operators utilizing large numbers of informal miners. The transformation of the local economy from a formal mining economy to one based on informal mining has generated new impacts and potential for conflict within the urban settlements. The government is unable to regulate informal mining and the impacts and risks that it continues to generate.

### 20.4.3 Lagunas Norte Mine

In 2005, Barrick began mining its resource at the Lagunas Norte mine, about 7 km away from the district capital of Quiruvilca. The mine was developed following the preparation of an EIA completed using newly established national environmental and social requirements. Lagunas Norte has had a major positive economic impact on the district through taxes, supply chain, social investment, and some local employment. The mine generated over 10 million ounces of gold between 2005 and 2019. In 2019, mining operations were suspended, but the recovery plant continued to produce gold from ore previously stacked on the leach pad. In 2021, Boroo acquired Lagunas Norte, and publicly stated that they intended to extend the life of the operation. Although Lagunas Norte generated limited environmental and social concerns among stakeholders, the few conflicts attributed to the operations were generally related to the demand that the operation share more benefits with the neighboring population.

### 20.4.4 Municipal budget

In parallel to the collapse of the Quiruvilca Mining Company, the district's budget has also fallen 70% over the last decade to 18 million soles (about US$4.5 million) which has made it even more difficult for the local government to address its current environmental and social issues.

Much of this reduction may be attributed to the decline in formal mining activity in the area. Since 2015 Quiruvilca's receipt of mining taxes dropped from just under 15 million soles (US$3.8 million) to a little over 3 million soles (US$800,000).

Furthermore, according to the Ministry of Finance, virtually all of the capital investment projects in the district (primarily infrastructure for roads, schools, recreation, and health services) have been funded with significant support from the mining taxes.

It is important to note that this reduction in the district budget also affects the rural area (and the Tablachaca basin) that had also received significant infrastructure investments and support to rural development from the budget in the past.

In addition to its declining budget, over the last five years, the district has only managed to spend about 75% of the budget it has been assigned.

In order to respond to the limited institutional capacity of the local government to execute its entire budget, the Ministry of Economy and Finance has created a Public Works for Taxes Program (known in Spanish as Obras por Impuestos). This program enables private companies to directly implement public works and receive a tax deduction for the amount invested.

#### 20.4.5 Description of the Social Area of Influence

The key socioeconomic aspects of the settlements in the social area of influence include:

1. **Roadways**: There is a paved highway (10A) from the city of Trujillo through Shorey Chica to Shorey Grande where it changes designation to (3N) and continues to Quiruvilca and on to the city of Huamachuco. Lagunas Norte announced a commitment to support the improvement of this route during the Public Audience for its EIA in 2005. The improvement was done over several years and cut travel times by half from Huamachuco to Trujillo. It generated a significant economic boost to these highlands.

   Access to the Tres Cruces Oxide Project takes the same route from Trujillo but branches off 3N just prior to arriving to Quiruvilca and takes the regional road LI-931 through the Tres Cruces property. LI-931 becomes a gravel road about 2 km before arriving to the Project. Project development would require a minor reroute of LI-931 around the Project area. The other rural settlements in the Tablachaca watershed are also reached by LI-931 and other regional roads or local dirt roads. Access is sufficient for these rural settlements to keep Quiruvilca as a principle urban area rather than the provincial capital of Santiago de Chucho further down the valley.

2. **Land ownership**: ATC owns all the surface rights required to develop the Tres Cruces Oxide Project (in Peru surface rights are acquired separately from the mining concessions). The property was acquired between 2007 and 2008. ATC also owns additional lands neighboring the property for the Tres Cruces Oxide Project. The land around ATC property is also private property and does not belong to a campesino community.

   When the land was acquired for the Project, several of the former landowners were allowed to temporarily remain on the land until requested by the company to vacate. Many of the former landowners lived in the settlement area of Chachamudal (Tres Cruces). At this time, most of the former landowners have left the area.

3. **Indigenous peoples**: Peru has ratified ILO 169 and recognizes the right for Indigenous Peoples to be consulted prior to authorizing developments such as mining projects that could impact them. There are no

communities within the project area of influence that have been identified by the National Institute of Statistics (INEI) as indigenous communities.

4. **Basic services**: The urban areas of Quiruvilca, Shorey Grande and Shorey Chica all have water, electricity and sewage, street lighting, telephone service. Shorey Grande and Quiruvilca also have police stations.

   All the neighboring rural settlements except for Tres Cruces-Chachamudal have water connections and electricity, but no sewage. Llaray also has street lighting.

   The settlements of Shorey Chico, El Bado, Llaray, Las Pajillas and Túpac Amarú have both initial and primary education. Only Shorey Grande, El Hospital and José Carlos Mariategui have secondary level educational institutions.

   Only Quiruvilca has more than one educational institution of each level (2 initial, 3 primary level and 2 secondary). It also has a Productive Technical Institution (CETPRO).

   Health centers are located in José Carlos Mariátegui, Shorey Chico and Quiruvilca. Quiruvilca has the only health center with beds.

5. **Rural economy and structure**: The rural economy in the immediate area of the Project is primarily limited to grazing. However, the rural settlements lower in the Tablachaca basin are also involved in small-scale farming. The leadership of the local settlements may have a local board or be led by a municipal agent (appointed by the mayor) and lieutenant governor (also appointed). They also generally have a Ronda Campesino. The *Rondas Campesinos* are community-based civil defense organizations that were first established as a local response to the Shining Path. They are a fundamental stakeholder in ensuring local safety and in addressing perceived threats to the settlement. *Rondas Campesinos* can also take positions in support or opposition to mining in or near a community. Local settlements may also have local organizations dedicated to specific local needs or development objectives.

6. **Religious Organizations**: The local population is predominantly Catholic.

7. **Stakeholder Perceptions towards the Project**: ATC restarted field activities with the initiation of the Phase I Drilling Program in May of 2022. As part of these activities, the company continued stakeholder engagement with a focus on ex-property owners and stakeholders linked to the neighboring rural settlements in the Tablachaca watershed, including authorities and representatives of the *Rondas Campesinos* of these settlements. The objective of the engagement was to introduce the new owner of the Project and explain the upcoming exploration activities. It is important that the *Rondas Campesinos* understand that it is the new owner conducting the field activities rather than a potential incursion of informal miners into the area. The Rondas Campesinos have helped prevent illegal mining from initiating activities in the general area during the last decade.

   ATC will need to continue to work closely with the *Rondas Campesinos* as the Project advances in order to ensure that they have clear information regarding activities, impacts, risks, management, and schedules.

   ATC has signed 16 agreements with local communities that cover employment opportunities, infrastructure improvements, healthcare services, education support, and donations. While a number of these commitments have been fulfilled, such as contracting medical services, building school infrastructure, and providing community donations, 6 agreements remain in progress and 4 are still pending, including critical issues like land delimitation. Initial employment opportunities related to the Phase I Drilling Program were provided in 2022, however current hiring agreements are on hold due to the suspension of drilling activities. Restarting drilling activities will reactivate employment commitments.

ATC will also restart engagement with Quiruvilca as the Project continues its exploration activities. The interest of stakeholders in Quiruvilca and the neighboring urban areas will also grow as the Project begins to advance past exploration.

ATC will also need to establish relations and effective engagement with stakeholders linked to the water users of the Moche watershed well before the Project enters feasibility. Although the exploration activities create no risk for the Moche basin, those stakeholders should be expected to have significant concerns with developing another mining project near the current mining legacies.

### 20.4.6 Social Risks, Impacts and Mitigation Measures

Table 20-3 presents an initial summary of the primary sources of social impacts (both positive and negative) and risks anticipated for the Project based on field visits, stakeholder engagement and prior experience. Management and mitigation strategies are also provided for each general category.

**Table 20-3: Social Management / Mitigation Strategies According to Sources of Impacts and Risks**

| Sources of Social Impacts and Risks | Potential Management/ Mitigation Strategies |
|---|---|
| Generation of direct employment | The Project will create modest work opportunities at a local, district, province, regional or national level. It will:<br>1. Identify positions where preference will be given to local residents meeting job requirements and salary considerations before advancing to consider candidates from the district, province, regional and national levels.<br>2. Monitor the effectiveness of these measures and, when necessary, taking corrective action to ensure a positive impact in the social area of influence.<br>3. Communicate clearly with local stakeholders regarding the results of these efforts and seeking feedback on how to improve performance. |
| Generation of supply chain opportunities | The Project will create modest supply chain opportunities at a local, district, province, regional or national level. It will:<br>1. Identify regional and local providers capable of providing necessary goods and services.<br>2. Engage to increase local businesses' ability to understand and meet Project requirements.<br>3. Monitor the effectiveness of these measures and, when necessary, taking corrective action to ensure a positive impact within the social area of influence.<br>4. Communicate clearly with local stakeholders regarding the results of these efforts and seeking feedback on how to improve performance. |
| Impact of workforce accommodation | 1. Workforce from the immediate social area may be allowed to reside in their homes, but the workforce from outside this area will reside in a camp established inside the Project boundary.<br>2. Contractors will transport workers out of the social area of influence when they have finished their work rotations.<br>3. Codes of conduct will regulate social behavior of Project workers staying at camp to minimize the potential for negative social interactions with local residents.<br>4. Participatory monitoring, stakeholder engagement and the Project Grievance Mechanism will help ensure proper behavior and early detection of any incidents that require legal intervention or corrective action. |

| Sources of Social Impacts and Risks | Potential Management/ Mitigation Strategies |
|---|---|
| In-migration of job seekers | The Project will avoid significant in-migration of job seekers into the social area of influence by not creating incentives:<br>1. Non-local residents will only be able to apply for work in recruitment sites outside of the social area of influence.<br>2. Only existing local residents will be eligible for hiring within the social area of influence.<br>3. The Project will seek to generate a modest level of local employment but avoid a level of activity in the social area of influence that would stimulate in-migration. |
| Impact on traffic and access | The Project has excellent existing access to the national highway network with minimal required construction between the national highway and Project property.<br>1. Implementation of safety measures and controls in coordination with stakeholders to promote safety around its logistics. |
| Land acquisition | The Project already owns the property required for mine construction and operation. However, it could consider acquisition of additional property if neighboring owners would like to sell:<br>1. Any land acquisition would be done in a manner to comply with IFC Performance Standard 5 for Land Acquisition and Resettlement. Given the current context, future land acquisition may not require resettlement.<br>2. Immediate families of future (and past) ex-landowners will be considered as local residents for the purpose of work and supply chain opportunities even if they no longer live in the Project area. |
| Vulnerable Groups | The Project will begin to identify vulnerable groups within the social area of influence prior to starting the development of the EIA. It will:<br>1. Identify how the Project might adversely or positively impact them and establishment of management actions to address impacts and monitor results. |
| Tension or conflict due to real or perceived impact on water or other environmental receptors. | The Project design will minimize and manage water and other environmental impacts. It will:<br>1. Take measures to focus water management within one basin.<br>2. Share information on water and environmental management in public meetings, engagement with stakeholders and local authorities, and ongoing communications.<br>3. Invite stakeholders to make field visits to see water and environmental management measures and include local stakeholders in monitoring activities. |
| Improvements in living conditions or quality of life due to social investment | The Project will provide modest social investments within the social area of influence to promote collaborative local development. In order to improve the impact of this investment, it will:<br>1. Seek to promote leadership and participation from within the directly affected populations in the management of the social investments. |
| Increase in public budget and investment from mining taxes | The Project will pay significant taxes and royalties. It will consider:<br>1. Evaluate targeting its tax payments towards clear local development priorities by participating in state's Works for Taxes program. |

#### 20.4.7 Social Management

ATC considers that effective social management is a fundamental requirement for mining exploration and development. It understands that mining must not only manage its risks and impacts, but also be done in a manner to enable lasting benefits for both the country and the local stakeholders.

In order to achieve this objective, it has developed a social management system that will grow as the Project advances. It is currently focused on social management during exploration, but it will be revised prior to entering pre-feasibility in anticipation of evolving requirements.

The social management system has been developed based on the previously described social context, impacts and risks. It includes the following programs:

1. **Stakeholder Engagement**. ATC considers stakeholder engagement as the fundamental building block for effective social management. During exploration, engagement is focused on a limited area around Project property, but engagement will grow in anticipation of the advancing the Project. Prior to initiating or expanding external engagement, ATC works to ensure initial internal alignment on Project activities, schedule, key stakeholders, social issues and risks, potential management measures and messages. With this foundation ATC manages stakeholder engagement as an iterative process of engagement and dialogue that follows the Plan-Do-Check-Act. As engagement advances, ATC updates its identification and assessment of stakeholders, issues, risks, and implements opportunities for improvement. Throughout the process, ATC will seek to identify potentially marginalized or vulnerable groups that could be affected by the Project advance and then identify means to ensure that they are also engaged. ATC documents stakeholder engagement and monitors key indicators.

2. **Community Relations Onboarding**. ATC ensures that new employees and contractors understand social management objectives and requirements prior to conducting fieldwork or any remote engagement with local stakeholders.

3. **Local Employment**. ATC will ensure that stakeholders within the social area of influence share in the most immediate opportunities for Project benefits linked to temporary or full-time employment. ATC and its main contractors recruit from among the residents of the social area of influence when they possess the necessary skills and are available to meet the Project work requirements. ATC and its contractors have already engaged local stakeholders in its preliminary field activities. Additional measures will be established as the Project advances past explorations.

4. **Local Purchasing**. ATC seeks to create opportunities for acquiring goods and services from existing businesses of local stakeholders. It will continue to actively engage local businesses to ensure that they understand both Project requirements (and standards) and market prices. It will give preference to the local businesses when they meet the requirements and are competitive in prices. Opportunities will grow as the Project advances. ATC will maintain and expand a local supplier database as the Project advances. ATC also shares local supplier information with its outside contractors who will work at site.

5. **Participatory Monitoring**. As the Project advances, ATC will implement increasing measures to ensure that stakeholders understand project design and management of environmental and social performance. This begins with site visits and visual inspections, but eventually it will grow to ensure stakeholder involvement in the collection of information, the review of results and, in some cases, the design of monitoring activities.

6. **Grievance Management**. ATC understands that effective grievance management is a key to maintaining positive relations with stakeholders. ATC has established a procedure for managing stakeholder grievances and tracking performance. It also shares information with stakeholders on channels for making a grievance.

7. **Grants, donations, and social investment**. ATC expects to provide modest, but meaningful social support within the social area of influence. However, as the Project is still in exploration activities, this area of influence remains fairly narrow. It has established a set of guiding principles to orient its decisions regarding potential support.

8. **Land Acquisition**. ATC already owns the property required to develop the Tres Cruces Oxide Project. However, if neighboring or nearby property owners are interested in selling land, Tres Cruces may consider additional acquisitions. It will follow a clear process to assess available land, including collecting appropriate baseline information on land use, existing infrastructure and stakeholder households who own, possess or use land on a full time or seasonal basis. This will include identification of any vulnerable people associated with stakeholder households. It will work to identify any conflicts linked to land ownership or use. It will also monitor market prices for local land. This information will be used to evaluate potential acquisitions and, if viable, set appropriate terms. ATC will comply with IFC Performance Standard 5 for Land Acquisition and Resettlement for any potential future land acquisition.

#### 20.4.8 Team

Effective social management depends on alignment and coordination among the entire ATC team beginning with the President working under the guidance of corporate policy. In addition, ATC has team members dedicated to stakeholder engagement and also to advancing the different social management programs. ATC has also involved external expertise in ensuring its social management activities meet international standards and good practice.

## 20.5 MINE CLOSURE

Where appropriate, reclamation will be carried out concurrently during the last three years of mining activities where possible; with final closure occurring after the completion of mining and final gold recovery. The reclamation objective will be to return the land to a suitable state for grazing and wildlife habitat.

Closure objectives include securing the site to assure physical safety of people, protecting wildlife, protecting surface and groundwater quality and quantity, minimizing erosion and controlling fugitive dust.

The reclamation plan will include the main following aspects:

1. Chemical stabilization; accomplished through:
   a. Rinsing and neutralizing the heap leach,
   b. Revegetation of the waste rock pad, and
   c. Monitoring formation of the pit lakes, including water levels and chemistry.
2. Physical stabilization, accomplished through slope grooming, and the application of topsoil and revegetation.
3. Control of surface waters.
4. Monitoring effluent chemistry from the heap leach, seepage from the waste rock dump, water draining the pit areas, and pit lake water chemistry. Water management may include treating drain down and seepage flows when necessary.

The key aspects of the reclamation and closure plan is described in this section. Further detailing of these components will be required before construction commences. During operation, the reclamation plan will be revised in further detail.

### 20.5.1 Soil Handling

The topsoil harvested during construction will be stockpiled for future use. However, the site is expected to be deficient of organic matter volume to support revegetation. Therefore, during operations growth media will be created. This will be done by combining compostable materials with suitable native soils and natural topsoil.

### 20.5.2 Camp

All camp buildings will be removed upon completion of the operation and the area will be revegetated.

### 20.5.3 Operating Areas

Prior to final reclamation, all hazardous material will be removed from site. All equipment and building in the central operating area, including the office, generators and fuel handling facility will be dismantled, removed and revegetated.

### 20.5.4 Mine Open Pits

Water diversion structures around the open pit will be upgraded if required to ensure long-term operation. Material around the top of pits will be stabilized and fenced off. Closure of the pits will include allowing pit lakes to form naturally.

### 20.5.5 Waste Rock Pad

The Waste Rock Pad and roads will be reclaimed concurrently during the last three years of mining. Mine roads and waste dumps will be re-sloped, re-contoured, placement of growth media, and revegetation.

### 20.5.6 Roads

During reclamation, roads will be stabilized. Except for the access road, surfaces will be scarified and revegetated.

## 20.6 CLOSURE ACTIVITIES – HEAP LEACH FACILITIES (HLF)

Closure costs are calculated at $1.68 per tonne of mineralized material, or approximately US$25,030,000.

The following activities will be completed during and after the operating life of the project.

### 20.6.1 Modeling and Monitoring Systems

In the first years of operation detailed closure and monitoring plans will be developed with sufficient detail to allow the start of concurrent closure activities as well as planning for final closure.

Laboratory and field data will be collected to support geochemical and heap neutralization modeling and to allow accurate prediction of both the neutralization process and effluent chemistry following closure. Laboratory testing will include leach columns and kinetic testing to simulate long-term geochemistry. Field testing will include testing either pilot heaps or cells created inside the commercial heap to verify the laboratory data. Geochemical modeling will allow predictive modeling of effluent quality from the closed heap.

### 20.6.2 Permanent Surface Water Diversion Works and Erosion Controls

Diversion systems will be upgraded to meet permanent standards for erosion and storm size. This will also apply to the outlet structures and any associated erosion works.

### 20.6.3 Permanent Slope Stabilization

Once heap slopes are in their permanent configuration and leaching has ceased, final grooming, capping and revegetation of these slopes, along with associated surface water and erosion controls, will be implemented.

### 20.6.4 Final Engineering and Monitoring Plans

The plans developed during concurrent closure will require final revisions to accommodate both lessons learned and the final configuration of the heap and roads.

### 20.6.5 Heap Rinsing, Neutralization and Solution Management of HLF Seepage

The heap rinsing process consists primarily of recirculating clean water through the heap.

Initially the recirculated solutions will be process solutions, diluted by normal rainfall, with pH buffered to normal leaching levels to allow complete extraction of gold, silver and other metals.

Individual areas of the heap, simulating approximately the normal leach areas, will be rinsed so that the capacity of the drainage system and plant are properly utilized. Once the target levels for the controlled constituents (pH, metals and CN) are reached, the heap will be allowed to sit idle through at least one wet season and the effluent chemistry monitored to ensure the targets are maintained. If any of the constituents exceed the targets, then rinsing will be repeated.

Following the rinsing process, the leach pad may be regraded as needed and a cover will be placed on the leach pad to reduce infiltration and subsequent seepage that may require management.

### 20.6.6 Topsoil Placement and Revegetation of the Heap and Surrounding Areas

Any disturbed ground in the vicinity of the heap (except roads and diversions) will be covered with topsoil and revegetated. The revegetation plan will emphasize the use of locally harvested native species.

### 20.6.7 Ponds

The solution and emergency ponds will remain in place and in service for the first few years to allow management of heap effluents.

### 20.6.8 Physical and Mobile Equipment

Except for the light mobile equipment to remain on-site during the post-closure care and monitoring period, all equipment will be removed. Most of this equipment will be in serviceable condition and thus will probably be sold. Equipment not saleable as functioning equipment will be recycled, sold for scrap, or suitably disposed of.

### 20.6.9 Fencing

All fencing around the pad and pond areas will be removed as the land is intended to return to grazing and wildlife habitat. Fencing will be maintained around the pit area.

## 20.7 POST CLOSURE ACTIVITIES

### 20.7.1 Physical Monitoring and Maintenance

After the completion of final closure, the site will require regular maintenance for the first several years post-closure or until there is no further signs of changing conditions. The purpose of this is to ensure the drainage and erosion control measures are working as planned, and to allow the recently revegetated areas to mature and properly take hold. Maintenance work will consist of light manual labor, and light equipment work to regrade or groom any areas showing signs of distress or erosion.

### 20.7.2 Geochemical Monitoring and Maintenance

The quality of the water draining from the heap will require monitoring and comparison to the predicted chemistry. If the measured water quality significantly varies from that predicted, in an unfavorable manner, then the geochemical model will be revised and new forecasts prepared. In the extreme case, additional rinsing and neutralization of the heap may be required.

### 20.7.3 Biological Monitoring and Maintenance

Regular environmental monitoring will include inspections of revegetated areas at the end of the dry season and the germination success rate of the vegetative cover will be evaluated. Biological monitoring will continue until all habitat and vegetative areas have been stable for multiple years and through extreme wet and dry seasons.

### 20.7.4 Surplus Water Management

Surplus water will be monitored and managed post closure as needed. The strategy is to minimize contact water flow rates as effectively as possible over the mine life and in post closure, including diverting non-contact water, minimizing the mixing of contact and non-contact water and timing closure to take advantage of the dry season.

# 21 CAPITAL AND OPERATING COSTS

## 21.1 OPERATING COSTS

### 21.1.1 Currency

All values are expressed in US dollars.

### 21.1.2 Overall Operating Cost

Table 21-1 represents the life of mine operating cost which includes mining, process plant, water treatment plant, site & services, G&A, and treatment & refining charges.

**Table 21-1: Overall Operating Cost**

| Area | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | LoM |
|---|---|---|---|---|---|---|---|---|---|
| Mine Operating Cost | $16,675 | $23,961 | $24,849 | $25,674 | $24,905 | $16,843 | $13,439 | $0 | $146,345 |
| Process Plant Operating Cost | $8,647 | $9,267 | $9,267 | $9,267 | $9,267 | $9,267 | $8,598 | $0 | $63,582 |
| Water Treatment Plant | $424 | $424 | $424 | $424 | $424 | $424 | $424 | $0 | $2,970 |
| Site & Services | $1,237 | $1,242 | $1,242 | $1,242 | $1,242 | $1,242 | $1,236 | $0 | $8,685 |
| G & A | $5,019 | $5,079 | $5,138 | $5,108 | $5,078 | $5,118 | $5,078 | $0 | $35,618 |
| Treatment & Refining Charges | $246 | $270 | $261 | $232 | $189 | $209 | $179 | $0 | $1,586 |
| Royalties | $1,891 | $2,072 | $2,005 | $1,787 | $1,455 | $1,603 | $1,380 | $0 | $12,193 |
| Closure | $0 | $0 | $0 | $0 | $6,539 | $6,539 | $6,539 | $6,539 | $26,157 |
| **Total ($000)** | **$34,139** | **$42,316** | **$43,187** | **$43,735** | **$49,100** | **$41,246** | **$36,874** | **$6,539** | **$297,136** |
| **$/t processed (US$)** | **$17.18** | **$19.32** | **$19.72** | **$19.97** | **$22.42** | **$18.83** | **$18.70** | **-** | **$19.93** |

### 21.1.3 Mining Operating Cost

Nilsson Mine Services Ltd. (NMS) prepared an estimate of mine operating costs based on owner mining. This estimate was used to prepare a contractor cost estimate for conducting the mine operations for the Tres Cruces Oxide Project.

The following points outline how the contractor mining case costs were developed.

- The equipment costs for the activities associated with drilling, loading, hauling and support for roads & dumps were developed using the process outlined in Section 21.1.3 of this document.
- The General Mine and Engineering (including geology) Expense estimate provided by NMS was used without modification based on the assumption that these activities will be done in-house and will thus be the same as in the Owner Operating case.
- The outside services activities identified in the General Mine and Engineering Expense estimate provided by NMS was also used without modification as it is based on contract work.
- The Blasting Cost estimate prepared by NMS was also used without modification as it is based on the use of a third party to conduct the activity and thus it is already allocated to a contractor/supplier.
- Labor costs associated with Drilling, Loading, Hauling, and Roads & Dumps activities is based on the NMS cost estimate plus a 15% contractor profit.
- Energy costs are based on the NMS estimate and were not modified as energy is contracted through the supplier and this would be handled in the same way even if a mining contractor is used.

- Material costs associated with the Drilling, Loading, Hauling, and Roads & Dumps activities are based on the NMS cost estimates plus a 10% contractor profit. A smaller profit on materials, including consumables is common.

Table 21-2 shows the estimated operating costs for contractor operation during the life of the project.

**Table 21-2: Estimated Mine Operating Costs Using a Mining Contractor (US$ x 1,000)**

| Period | Year -2 | Year -1 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| **GENERAL MINE EXPENSE AND ENGINEERING** | | | | | | | | | | |
| **Salaries and Wages** | $835 | $1,562 | $1,562 | $1,562 | $1,562 | $1,562 | $1,562 | $1,562 | $1,238 | $13,005 |
| **Energy – Dewatering** | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **Consumables and R&M - Engineering** | $659 | $683 | $696 | $724 | $725 | $729 | $722 | $677 | $660 | $6,275 |
| **Outside Services - Drains/Drilling** | $295 | $532 | $632 | $942 | $953 | $994 | $927 | $473 | $306 | $6,053 |
| **Subtotal** | **$1,789** | **$2,776** | **$2,889** | **$3,228** | **$3,240** | **$3,285** | **$3,211** | **$2,711** | **$2,204** | **$25,333** |
| **DRILLING** | | | | | | | | | | |
| **Salaries and Wages** | $104 | $191 | $227 | $236 | $234 | $234 | $233 | $215 | $178 | $1,850 |
| **Energy** | $98 | $173 | $219 | $315 | $319 | $331 | $311 | $177 | $124 | $2,067 |
| **Consumables, R&M** | $352 | $623 | $791 | $1,143 | $1,155 | $1,199 | $1,127 | $639 | $447 | $7,476 |
| **Contractor Equipment Cost** | $191 | $191 | $280 | $280 | $280 | $280 | $280 | $280 | $280 | $2,343 |
| **Subtotal** | **$745** | **$1,177** | **$1,516** | **$1,975** | **$1,988** | **$2,043** | **$1,951** | **$1,310** | **$1,029** | **$13,736** |
| **BLASTING** | | | | | | | | | | |
| **Wages** | $71 | $186 | $186 | $186 | $186 | $186 | $186 | $186 | $186 | $1,558 |
| **Energy** | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **Consumables, R&M** | $798 | $1,170 | $1,378 | $1,865 | $1,881 | $1,943 | $1,842 | $1,156 | $894 | $12,927 |
| **Subtotal** | **$870** | **$1,355** | **$1,563** | **$2,051** | **$2,067** | **$2,129** | **$2,028** | **$1,342** | **$1,080** | **$14,485** |
| **LOADING** | | | | | | | | | | |
| **Wages** | $55 | $147 | $238 | $240 | $236 | $235 | $234 | $180 | $147 | $1,711 |
| **Energy** | $135 | $263 | $410 | $587 | $592 | $610 | $580 | $373 | $281 | $3,830 |
| **Consumables, R&M** | $139 | $271 | $424 | $606 | $611 | $630 | $598 | $384 | $290 | $3,953 |
| **Contractor Equipment Cost** | $833 | $1,138 | $1,138 | $1,138 | $1,138 | $1,138 | $1,138 | $1,138 | $1,138 | $9,938 |
| **Subtotal** | **$1,162** | **$1,818** | **$2,210** | **$2,570** | **$2,577** | **$2,613** | **$2,550** | **$2,075** | **$1,856** | **$19,431** |
| **HAULING** | | | | | | | | | | |
| **Wages** | $176 | $461 | $651 | $1,063 | $1,130 | $1,168 | $1,163 | $808 | $658 | $7,277 |
| **Energy** | $552 | $906 | $1,156 | $2,558 | $2,781 | $2,953 | $2,899 | $1,488 | $935 | $16,228 |
| **Consumables, R&M** | $974 | $1,600 | $2,041 | $4,515 | $4,908 | $5,212 | $5,116 | $2,625 | $1,651 | $28,641 |
| **Contractor Equipment Cost** | $541 | $811 | $811 | $1,352 | $1,487 | $1,487 | $1,487 | $1,487 | $1,487 | $10,951 |
| **Subtotal** | **$2,242** | **$3,779** | **$4,659** | **$9,487** | **$10,306** | **$10,820** | **$10,665** | **$6,408** | **$4,731** | **$63,097** |
| **ROADS, DUMPS & SUPPORT** | | | | | | | | | | |

| Period | Year -2 | Year -1 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| Wages | $289 | $985 | $1,117 | $1,064 | $1,053 | $1,051 | $956 | $902 | $893 | $8,309 |
| Energy | $360 | $565 | $821 | $1,225 | $1,239 | $1,292 | $1,205 | $527 | $342 | $7,576 |
| Consumables, R&M | $409 | $640 | $936 | $1,396 | $1,412 | $1,473 | $1,374 | $605 | $392 | $8,639 |
| Contractor Equipment Cost | $564 | $564 | $659 | $659 | $659 | $659 | $659 | $659 | $659 | $5,744 |
| **Subtotal** | **$1,622** | **$2,754** | **$3,534** | **$4,344** | **$4,364** | **$4,476** | **$4,194** | **$2,694** | **$2,286** | **$30,268** |
| SUMMARY | | | | | | | | | | |
| Wages | $1,655 | $3,765 | $4,213 | $4,584 | $4,636 | $4,669 | $4,567 | $4,086 | $3,485 | $35,660 |
| Energy | $1,145 | $1,906 | $2,607 | $4,685 | $4,930 | $5,187 | $4,994 | $2,564 | $1,682 | $29,700 |
| Consumables, R&M | $3,397 | $5,054 | $6,334 | $10,321 | $10,765 | $11,260 | $10,852 | $6,155 | $4,401 | $68,538 |
| Outside Services - Drains/Drilling | $295 | $532 | $632 | $942 | $953 | $994 | $927 | $473 | $306 | $6,053 |
| Contractor Equipment Cost | $2,129 | $2,704 | $2,889 | $3,430 | $3,565 | $3,565 | $3,565 | $3,565 | $3,565 | $28,976 |
| **Subtotal** | **$8,621** | **$13,962** | **$16,675** | **$23,961** | **$24,849** | **$25,674** | **$24,905** | **$16,843** | **$13,439** | **$168,928** |

Total mine operating cost (including capitalized preproduction costs) during the project life is US$168.9 million. This amounts to US$2.52/t, based on the total tonnes mined over the life of the project. Total mining unit cost for leach tonnes mined over the life of the project is estimated at US$9.81 per leach tonne mined. A 4.5% escalation factor was applied to approximate mine operating cost increases from March-2022.

### 21.1.4 Process Plant Operating Cost

Table 21-3 below represents the life of mine operating cost for the process plant. The annual production of the crushing system is 2,090,000 tonnes (57 ktpd) on average with a mine life of 7 years.

**Table 21-3: Life of Mine Process Plant Operating Cost ($000)**

| Operating & Maintenance | Average Annual Cost ($000) | $/t processed (US$) | LoM Operating Cost ($000) | % |
|---|---|---|---|---|
| Labor | $1,470 | $0.69 | $10,290 | 13.7% |
| Electrical Power | $1,703 | $0.80 | $11,922 | 15.8% |
| Reagents & Wear parts | $5,486 | $2.58 | $38,405 | 51.0% |
| Maintenance Parts | $987 | $0.46 | $6,911 | 9.2% |
| Supplies and Services | $1,101 | $0.52 | $7,709 | 10.2% |
| **Total (US$)** | **$10,748** | **$5.05** | **$75,238** | **100.0%** |

#### 21.1.4.1 Labor

The process plants' staffing has been estimated to have 60 employees (operations 35 employees and maintenance 25 employees). The laboratory staffing is included in the process plants' staffing. There is an average annual wage of $24,500 which includes fringe benefits. Annual plant labor costs are estimated to be $1. 5 million, which is 14.0% of the process plant operating cost. A 5.0% escalation factor was applied to approximate labor salary increases from March-2022. Table 21-4 represents a typical year. See Appendix L for details.

**Table 21-4: Labor Summary**

| | Staff | Salary / Person | Annual Cost ($000) |
|---|---|---|---|
| Administration | 5 | $109,189 | $546 |
| Operations | 30 | $14,783 | $443 |
| Maintenance | 25 | $19,222 | $481 |
| **Total** | **60** | **$24,500** | **$1,470** |

#### 21.1.4.2 Electrical Power

The electrical power consumption was based on an equipment list with connected kW, discounted for operating time per day and anticipated operating load level. Power costs were estimated at a unit price of $0.07 per kWh based on recent mining power contracts in Peru. Annual plant power costs are estimated to be approximately $1.7 million. Table 21-5 shows connected loads.

Table 21-6 shows a typical year of consumption, which includes sustaining capital in the later years.

**Table 21-5: Electric Power Load Summary**

| Area | Connected Load (kW) |
|---|---|
| Primary Crushing | 224 |
| Fine Ore Crushing and Conveying | 979 |
| Leach Pad Stacking | 682 |
| Heap Leach Pad & Ponds | 139 |
| ADR (Adsorption, Desorption, Regeneration) | 2,100 |
| Electrowinning and Smelting | 245 |
| Cyanide Destruct Facility | 24 |
| Heap Leach and Gold Recovery Water System | 157 |
| Water Treatment Plant | 898 |
| Fresh/Fire/Wastewater Systems | 227 |
| Reagents | 47 |
| Laboratory | 202 |
| Guard House/Administration Office/Ancillary Facilities | 5 |
| Change House/Truck Shop/Truck Scale/Warehouse | 108 |
| Fuel/Oil/Gas Storage and Stations | 33 |
| Security/Training/First Aid/Explosives/Core Storage/Camp/Dining/Maintenance Shop | 405 |
| **Total** | **6,475** |

**Table 21-6: Power Consumption Summary (Year 1)**

| Area | Annual kWh |
|---|---:|
| Primary Crushing | 1,175,820 |
| Fine Ore Crushing and Conveying | 5,079,489 |
| Leach Pad Stacking | 2,390,834 |
| Heap Leach Pad & Ponds | 330,484 |
| ADR (Adsorption, Desorption, Regeneration) | 8,096,755 |
| Electrowinning and Smelting | 1,110,319 |
| Cyanide Destruct Facility | 43,479 |
| Heap Leach and Gold Recovery Water System | 720,311 |
| Water Treatment Plant | 3,066,742 |
| Fresh/Fire/Wastewater Systems | 732,144 |
| Reagents | 120,882 |
| Laboratory | 707,808 |
| Guard House/Administration Office/Ancillary Facilities | 21,820 |
| Change House/Truck Shop/Truck Scale/Warehouse | 561,408 |
| Fuel/Oil/Gas Storage and Stations | 172,922 |
| Security/Training/First Aid/Explosives/Core Storage/Camp/Dining/Maintenance Shop | 2,724,710 |
| **Total** | **27,055,927** |

21.1.4.2.1 Emergency Backup Power

There is (1) 1,250 kW emergency generator located near the site substation that ties into the main bus; therefore, emergency power is effectively distributed to the areas that need power. It will be up to operations to prioritize how it is used. A major portion of the emergency power will be used to keep camp operations up and running.

21.1.4.3 Consumables

Consumables for the process plant include sulphuric acid, lime, sodium cyanide, caustic soda, hydrochloric acid, hydrogen peroxide, sulphuric acid, antiscalant, and carbon. Consumption rates were determined from the metallurgical test data or industry practice. Budget quotations were obtained for reagents where available or from other M3 projects with an allowance for freight to site. A 4.7% escalation factor was applied to approximate reagent cost increases from March-2022. A summary of reagents is shown in Table 21-7.

**Table 21-7: Reagent Costs**

| | kg/tonne | LoM Consumption (000's) | US$/kg | LoM Cost (US$000) |
|---|---|---|---|---|
| Sodium Cyanide | 0.600 | 8,946 | $2.60 | $23,228 |
| Sulphuric Acid | 0.496 | 7,395 | $0.16 | $1,161 |
| Lime | 2.798 | 41,716 | $0.23 | $9,609 |
| Caustic Soda | 0.030 | 447 | $1.47 | $656 |
| Hydrogen Peroxide | 0.099 | 1,476 | $0.18 | $259 |
| Activated Carbon | 0.004 | 60 | $3.14 | $187 |
| Antiscalant | 0.001 | 15 | $3.59 | $54 |
| Hydrochloric Acid (HCL) | 0.031 | 462 | $0.09 | $40 |
| Flux | 0.002 | 30 | $0.52 | $16 |
| **Total** | | | | **$35,209** |

21.1.4.4 Crusher Liners

Liner consumption was based on industry practice or other M3 projects. Budget quotations were obtained for liners where available or from other M3 projects with an allowance for freight to site. A 4.7% escalation factor was applied to approximate liner unit cost increases from March-2022. A summary of wear items is shown in Table 21-8.

**Table 21-8: Wear Item Costs**

| Wear Items | kg/t | LoM Consumption | US$/kg | LoM Cost (US$000) |
|---|---|---|---|---|
| Liners | | | | |
| Primary Crusher | 0.015 | 223,640 | $4.76 | $1,065,385 |
| Secondary Crusher | 0.015 | 223,640 | $4.76 | $1,065,385 |
| Tertiary Crusher | 0.015 | 223,640 | $4.76 | $1,065,385 |

21.1.4.5 Maintenance Parts and Supplies

An allowance was made to cover the cost of maintenance parts based on the capital cost of equipment using a factor of 5%. A 4.7% escalation factor was applied to approximate maintenance cost increases from March-2022. The annual allowance for maintenance parts is estimated to be $1.0 million.

21.1.4.6 Supplies and Services

An allowance for operating supplies such as water, safety items, tools, lubricants, and office supplies were made using data from other M3 projects. The estimated average annual cost for plant supplies and services is $1.1 million.

21.1.4.7 Main Office General and Administrative Costs

The average annual Main Office General and Administrative costs are estimated to be $5.0 million with an estimated staff of 35 employees. A 5.0% escalation factor was applied to approximate labor salary increases from March-2022.

#### 21.1.4.8 Water Treatment Plant

The Water Treatment Plant is estimated at $2.94M for LOM cost, which is $0.20/t mineralized material processed.

## 21.2 CAPITAL COSTS

The estimated capital expenditure or capital costs (CAPEX) for the Tres Cruces Oxide Project consists of four components: (1) the initial CAPEX to design, permit, pre-strip, construct, and commission the mine, plant facilities, ancillary facilities, utilities, and operations camp; (2) the sustaining CAPEX for facilities expansions, expected replacements of process equipment and ongoing environmental mitigation activities; (3) the closure and reclamation CAPEX to close and rehabilitate components of the Project; and (4) working capital to cover delays in the receipts from sales and payments for accounts payable and financial resources tied up in inventory.

Table 21-9 summarizes the initial CAPEX for the Project. Table 21-11 summarizes sustaining costs. It includes process plant costs, on-site infrastructure such as on-site roads, the leach pads, the operations camp, and off-site infrastructure such as the power transmission line, the mine access road, and reclamation and closure costs. DMO and DMI facilities are in the Direct Costs. It does not include direct mining equipment costs as the project is based on use of contract mining services. The initial CAPEX also includes indirect costs for engineering, procurement, construction management, vendor support during construction, spares and other costs.

Initial CAPEX also includes an estimate of contingency based on the accuracy and level of detail of the cost estimate. The purpose of the contingency provision is to make allowance for uncertain cost elements which are predicted to occur but are not included in the cost estimate. These cost elements include uncertainties concerning completeness and accuracy of material takeoffs, accuracy of labor and material rates, accuracy of labor productivity expectations, and accuracy of equipment pricing. The CAPEX for the Tres Cruces Prefeasibility Study is considered by M3 to be a Class 4 estimate used for development of a preliminary capital budget and the viability of this project. The CAPEX has an accuracy range of +20% to -20%. Contingency used is 20%.

**Table 21-9: Tres Cruces Capital Cost Estimate Summary**

| Item | Base Cost (US$) |
|---|---|
| **Subtotal Direct Cost, without Mining** | **$56,572,660** |
| Mobilization | $1,114,143 |
| Camp Administration, Bussing & Meals | $683,687 |
| Temporary Construction Power | $56,573 |
| Fee - Contractor | In Direct Cost |
| **Total Constructed Cost** | **$58,427,062** |
| Management & Accounting | $424,300 |
| Engineering | $3,094,400 |
| Project Services | $565,700 |
| Project Control | $424,300 |
| Construction Management | $3,677,200 |
| EPCM Fee | $848,590 |
| EPCM Construction Trailers | $169,718 |
| Vendor Supervision of Specialty Const. | $296,180 |
| Vendor Pre-commissioning | $98,727 |
| Vendor Commissioning | $98,727 |
| Capital and Commissioning Spares | $493,634 |
| Freight | $4,711,978 |
| **Total Contracted Cost** | **$73,330,516** |
| Contingency | $18,332,629 |
| **Total Contracted Cost with Contingency** | **$91,663,145** |
| Mining | $22,207,173 |
| Mining Contingency | $1,665,538 |
| Owner's Cost | $13,666,668 |
| First Fills | $523,500 |
| Peruvian IGV | $0 |
| Escalation | $767,526 |
| **Total Contracted and Owner's Cost** | **$130,493,550** |

**Table 21-10: Initial Direct Costs by WBS Area**

| WBS | Area Name | Costs (US$) |
|---|---|---|
| 000 | General | $3,506,920 |
| 050 | Mine | $22,207,173 |
| 100 | Primary Crushing & Ore Storage | $2,501,403 |
| 200 | Fine Ore Crushing & Conveying | $5,627,687 |
| 300 | Leach Pad Stacking | $4,288,486 |
| 310 | Heap Leach Pad | $7,567,540 |
| 320 | Ponds | $3,432,155 |
| 400 | ADR (Adsorption, Desorption, Regeneration) Plant | $9,699,196 |
| 500 | Electrowinning and Smelting | $362,176 |
| 600 | Water Treatment Plant | $866,236 |
| 610 | Cyanide Destruct Facility | $1,440,518 |
| 650 | Heap Leach and Gold Recovery Water System | $2,093,994 |
| 660 | Fresh / Fire Water | $1,165,938 |
| 670 | Wastewater Systems | $141,169 |
| 700 | Power | $6,223,225 |
| 800 | Reagents | $1,428,035 |
| 900 | Ancillary Facilities | $0 |
| 901 | Guard House | $25,518 |
| 903 | Administration Building | $520,924 |
| 904 | Laboratory | $914,703 |
| 905 | Change House | $223,185 |
| 906 | Truck Shop | $470,501 |
| 907 | Truck Wash | $507,490 |
| 909 | Warehouse | $619,313 |
| 910 | Fuel/Oil/Gas Storage Stations | $0 |
| 911 | Security/Training/First Aid | $324,709 |
| 915 | Permanent Camp & Construction Camp | $2,380,974 |
| 920 | Maintenance Shop | $240,666 |
| | **Total Direct Cost with Mining** | **$78,779,834** |
| | | |
| | **Total Direct Cost without Mining** | **$56,572,660** |

The primary assumptions used to develop the CAPEX are provided below:

- The estimate is based on 4th quarter 2021 costs escalated by 4.7% to approximate capital item cost increases from 2021.
- All cost estimates were developed and are reported in United States of America (US) dollars.

- Qualified and experienced construction contractors will be available at the time of Project execution.
- Borrow sources are available within the Project boundary or nearby.
- Weather-related delays in construction are not accounted for in the estimate.
- No provision has been made for currency fluctuations.

### 21.2.1 Owner's Capital Cost

The owner's capital cost includes Owner's Team, direct purchase mobile equipment and recommended studies.

### 21.2.2 Sustaining Capital

The following components are expected to be constructed after initial plant start-up and are included as sustaining capital projects. Closure costs are estimated to be $25.0 million and are planned to commence in year 7, at the close of operations. A 4.5% escalation factor was applied to approximate sustaining capital and closure cost increases from March-2022.

**Table 21-11: Sustaining Capital**

| Item | Cost (US$) |
|---|---:|
| Sitework | $4,367,488 |
| Plant Equipment | $1,035,267 |
| Electrical | $1,599 |
| Total Sustaining Capital | $5,404,354 |

### 21.2.3 Mining Capital Cost

NMS developed an estimate of mine capital costs based on mining with new equipment to be purchased by Anacortes Mining Corporation for use at the Tres Cruces Oxide Project in the La Libertad region of Peru. This estimate is based on quotes for major equipment obtained from various equipment providers including Ferreyros, Epiroc, Scania and MATCO. The estimated costs for the minor equipment were provided by NMS based on prior work done. The estimated amount of equipment required was then developed based on the life-of-mine plan prepared by NMS for the project. NMS then provided an estimate of when the equipment would be required at the project site to enable the mine plan to be realized.

The contractor cost of equipment was then developed based on the schedule of the equipment requirements and estimated equipment costs provided by NMS. The estimate is based on using straight-line depreciation of the equipment over the expected equipment life and using the estimated new equipment cost. The expected equipment life for the various pieces of equipment was assumed as shown in Table 21-12. There was no salvage value assumed for the equipment; so, a fully depreciated piece of equipment represents full recovery of the capital outlay plus profit. However, not all of the equipment is fully depreciated during the life of the project and that implies remaining value will be realized by the contractor by using the equipment for another project or in the sale of that equipment.

**Table 21-12: Expected Mine Equipment Life**

| Equipment Type | Depreciation Life in Years |
|---|---|
| Drills | 10 |
| Production Excavators | 5 |
| Wheel Loaders | 10 |
| Haul Trucks | 12 |
| Track Dozers | 10 |
| Motor Grader | 9 |
| Water Truck | 10 |
| Support Excavator | 9 |
| Rock Breaker | 9 |
| Light Plants | 9 |
| Crushing Plant | 12 |
| All other support equipment | 10 |

The mine equipment contractor costs by mining activity are shown in Table 21-13. A contractor profit of 15% was applied to the equipment charges calculated for estimating the equipment cost portion of the contractor costs for the project.

**Table 21-13: Estimated Contractor Equipment Charges by Year (USD)**

| | Year -2 | Year -1 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| **DRILLING** | | | | | | | | | | |
| Total Drill Capital Invested | 1,745 | 1,745 | 2,633 | 2,633 | 2,633 | 2,633 | 2,633 | 2,633 | 2,633 | |
| Drilling Equipment charges / year | 175 | 175 | 263 | 263 | 263 | 263 | 263 | 263 | 263 | 2,192 |
| **LOADING** | | | | | | | | | | |
| Total Excavator Capital Invested | 1,327 | 2,654 | 2,654 | 2,654 | 2,654 | 2,654 | 2,654 | 2,654 | 2,654 | |
| Total Loader Capital Invested | 4,588 | 4,588 | 4,588 | 4,588 | 4,588 | 4,588 | 4,588 | 4,588 | 4,588 | |
| Loading Equipment Charges / year | 724 | 990 | 990 | 990 | 990 | 990 | 990 | 990 | 990 | 8,641 |
| **HAULING** | | | | | | | | | | |
| Total Truck Capital Invested | 5,643 | 8,465 | 8,465 | 14,108 | 15,518 | 15,518 | 15,518 | 15,518 | 15,518 | |
| Haul Truck Charges / year | 470 | 705 | 705 | 1,176 | 1,293 | 1,293 | 1,293 | 1,293 | 1,293 | 9,523 |
| **ROADS & DUMPS** | | | | | | | | | | |
| Total 10-year depr. Items | 3,642 | 3,642 | 4,473 | 4,473 | 4,473 | 4,473 | 4,473 | 4,473 | 4,473 | |
| Total 9-year depr. Items | 1,136 | 1,136 | 1,136 | 1,136 | 1,136 | 1,136 | 1,136 | 1,136 | 1,136 | |
| Road & Dumps Eqmt Charges / year | 490 | 490 | 573 | 573 | 573 | 573 | 573 | 573 | 573 | 4,995 |
| **SUPPORT EQUIPMENT** | | | | | | | | | | |
| Total 10-year depr. Items | 2,770 | 2,922 | 2,922 | 2,922 | 2,922 | 2,922 | 2,922 | 2,922 | 2,922 | |
| Total 6-year depr. Items | 418 | 418 | 418 | 836 | 920 | 502 | 502 | 502 | 502 | |
| Total 9-year depr. Items | 125 | 188 | 188 | 251 | 314 | 314 | 314 | 314 | 314 | |
| Total 12-year depr. Items | 0 | 2,613 | 2,613 | 2,613 | 2,613 | 2,613 | 2,613 | 2,613 | 2,613 | |
| Support Equipment Charges / year | 361 | 600 | 383 | 459 | 480 | 411 | 411 | 411 | 411 | 3,926 |

# 22 ECONOMIC ANALYSIS

## 22.1 INTRODUCTION

The financial evaluation presents the determination of the Net Present Value (NPV) and sensitivities for the project. Annual cash flow projections were estimated over the life of the mine based on the estimates of capital expenditures, production cost and sales revenue. The sales revenue is based on the production of gold doré bars. The estimates of capital expenditures and site production costs have been developed specifically for this project and have been presented in earlier sections of this report.

## 22.2 PLANT CAPACITY ANALYSIS

Mining production will average 6,000 t/d over the 7-year Life of Mine (LOM). Further studies will seek solutions to increase production and lower the OPEX, but at this stage the range described is considered the optimal.

## 22.3 MINE PRODUCTION STATISTICS

Mine production is reported as Mineral Resource and ROM from the mining operation. The annual production figures were obtained from the mine plan as reported earlier in this report.

The life of mine Mineral Resource and ROM quantities and Au grade processed in the conceptual mine plan are presented in Table 21-1.

**Table 22-1: Mineral Resources Included in the Mine Plan**

| Indicated Resources | ROM (t x 1000) | Au (g/t) |
|---|---|---|
| Phase 1 | 4,305.0 | 1.71 |
| Phase 2 | 3,965.0 | 1.12 |
| Phase 3 | 4,943.0 | 0.97 |
| Phase 4 | 1,141.0 | 1.20 |
| Total | 14,354.0 | 1.25 |
| **Inferred Resources** | **ROM (t x 1000)** | **Au (g/t)** |
| Phase 1 | 13.0 | 2.37 |
| Phase 2 | 368.0 | 0.48 |
| Phase 3 | 166.0 | 0.70 |
| Phase 4 | 5.0 | 1.33 |
| Total | 552.0 | 0.60 |

## 22.4 PLANT PRODUCTION STATISTICS

The estimated metal recoveries are 81.7%.

## 22.5 CAPITAL EXPENDITURE

### 22.5.1 Initial and Sustaining Capital

The financial indicators have been determined with 100% equity financing.

**Table 22-2: Initial and Sustaining Capital Summary**

| Period | Initial Capital ($000) | Sustaining Capital ($000) |
|---|---|---|
| Year -2 | $62,424 | |
| Year -1 | $68,070 | |
| Year 1 | | $0 |
| Year 2 | | $1,892 |
| Year 3 | | $0 |
| Year 4 | | $3,513 |
| Year 5 | | |
| Year 6 | | |
| Year 7 | | |
| **Total** | **$130,494** | **$5,405** |

### 22.5.2 Working Capital

A 15-day delay of receipt of revenue from sales is used for accounts receivable. A delay of payment for accounts payable of 30 days is also incorporated into the financial model. All the working capital is recaptured at the end of the mine life and the final value of these accounts is zero.

### 22.5.3 Salvage Value

No salvage value has been included in the cash flow analysis.

## 22.6 REVENUE

Annual revenue is determined by applying estimated metal prices to the annual payable metal estimated for each operating year. Sales prices have been applied to all life of mine production without escalation or hedging. The revenue is the gross value of payable metals sold before treatment and transportation charges.

## 22.7 OPERATING AND CASH COST

Life of mine cash operating costs include mine operations, process plant operations, site support and main office overhead costs, treatment, and refining charges. Table 22-3 shows the estimated operating cost by area per metric tonne of mineralized material processed. Total cash cost is the total cash operating cost in addition to reclamation and closure.

**Table 22-3: Operating and Cash Cost**

| **Operating Cost** | **$/tonne of mineralized material** |
|---|---|
| Mine | $9.82 |
| Process Plant | $4.85 |
| Water Treatment | $0.20 |
| General Administration | $2.39 |
| Treatment / Refining Charge | $0.11 |
| Royalties | $0.82 |
| Closure | $1.75 |
| **Total Operating and Cash Cost** | **$19.93** |

### 22.7.1 Reclamation & Closure

An allowance for the cost of concurrent and final reclamation and closure of the property has been estimated at $25.0 million spread evenly across years 5 through 8. A 4.5% escalation factor was applied to approximate reclamation and closure cost increases from March-2022.

### 22.7.2 Depreciation

Depreciation is calculated taking the capital expenditure and dividing it by the operating years starting with first year of production for the initial capital. In the year that the sustaining capital is expended, this amount is divided by the remaining operating years to calculate the depreciation for the sustaining capital expenditures.

## 22.8 TAXATION

The Tres Cruces Oxide Project is evaluated with the following taxes:

- Special Tax which is based on net income after depreciation at the average rate of 3.23%.
- Mining Royalty which is based on net income after depreciation at the average rate of 3.3%.
- Other Taxes which are based on net income after depreciation less the special tax and mining royalty at a rate of 8.0%.
- Income Taxes which are based on net income after depreciation less the excise tax, mining royalty and other taxes at a rate of 29.5%.

Total income taxes are estimated to be $97.4 million for the life of the mine.

## 22.9 PROJECT FINANCING

For the purposes of this PEA, it is assumed that investment in the Tres Cruces Oxide Project will be financed with equity.

## 22.10 NET INCOME AFTER-TAX

Net Income after-tax is approximately $226.2 million for the life of the mine; this value is shown in the detailed financial model shown in Table 22-4.

## Table 22-4: Discounted Cash Flow Financial Model

| | Operating Year>> | | PP | -2 | -1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Calendar Year>> | Total | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 |
| **Mining Summary** | | | | | | | | | | | | | |
| **TOTAL DIRECT FEED from MINE** | kt | 14,909 | 0 | 3 | 278 | 1,707 | 2,190 | 2,190 | 2,190 | 2,190 | 2,190 | 1,972 | 0 |
| **TOTAL FROM STOCKPILE** | kt | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL ORE TO PROCESS PLANT** | **kt** | **14,909** | | **3** | **278** | **1,707** | **2,190** | **2,190** | **2,190** | **2,190** | **2,190** | **1,972** | **0** |
| *Contained Metal - **Direct Feed*** | | | | | | | | | | | | | |
| Gold-Oxide | koz | 411 | | 0 | 16 | 70 | 88 | 70 | 58 | 47 | 39 | 24 | 0 |
| Gold-Transitional | koz | 177 | | 0 | 0 | 5 | 12 | 27 | 28 | 23 | 39 | 42 | 0 |
| **Waste** | kt | 43,301 | | 2,817 | 4,810 | 4,603 | 6,825 | 6,929 | 7,323 | 6,680 | 2,335 | 977 | 0 |
| **Total Material Mined** | kt | **58,210** | | 2,820 | 5,088 | 6,310 | 9,015 | 9,119 | 9,513 | 8,870 | 4,525 | 2,949 | 0 |
| **Process Plant Summary** | | | | | | | | | | | | | |
| **Total Ore Processed** | **kt** | **14,909** | | 0 | 0 | 1,988 | 2,190 | 2,190 | 2,190 | 2,190 | 2,190 | 1,972 | 0 |
| *Recovery* | | | | | | | | | | | | | |
| Gold | % | 81.7% | | 81.7% | 81.7% | 81.7% | 81.7% | 81.7% | 81.7% | 81.7% | 81.7% | 81.7% | 81.7% |
| *Recovered Metal* | | | | | | | | | | | | | |
| Gold (Oxide + Transitional) | koz | 480.554 | | 0 | 0 | 75 | 82 | 79 | 70 | 57 | 63 | 54 | 0 |
| **Revenues** | | | | | | | | | | | | | |
| **Payable Metals** | | | | | | | | | | | | | |
| Gold (Oxide + Transitional) | koz | 478 | | 0 | 0 | 74 | 81 | 79 | 70 | 57 | 63 | 54 | 0 |
| **Metal Prices** | | | | | | | | | | | | | |
| Gold | $/oz | $1,700 | | $1,700 | $1,700 | $1,700 | $1,700 | $1,700 | $1,700 | $1,700 | $1,700 | $1,700 | $0 |
| **Revenues** | | | | | | | | | | | | | |
| Gold | US $000 | $812,856 | | $0 | $0 | $126,087 | $138,140 | $133,680 | $119,107 | $96,967 | $106,896 | $91,980 | $0 |
| **Total Revenues (Gross)** | **US $000** | **$812,856** | **$0** | **$0** | **$0** | **$126,087** | **$138,140** | **$133,680** | **$119,107** | **$96,967** | **$106,896** | **$91,980** | **$0** |
| **Operating Cost (US$ 000)** | | | | | | | | | | | | | |
| Mining | US $000 | $140,043 | | $0 | $0 | $15,956 | $22,930 | $23,779 | $24,569 | $23,833 | $16,117 | $12,860 | $0 |
| Process Plant | US $000 | $72,742 | | $0 | $0 | $9,968 | $10,571 | $10,571 | $10,571 | $10,571 | $10,571 | $9,920 | $0 |
| General Administration | US $000 | $35,177 | | $0 | $0 | $4,956 | $5,016 | $5,075 | $5,045 | $5,015 | $5,055 | $5,015 | $0 |
| Treatment & Refining Charges | | | | | | | | | | | | | |
| Gold Refining Charges | US $000 | $625 | | $0 | $0 | $97 | $106 | $103 | $92 | $75 | $82 | $71 | $0 |
| Transportation | US $000 | $961 | | $0 | $0 | $149 | $163 | $158 | $141 | $115 | $126 | $109 | $0 |
| **Total Cash Operating Cost** | US $000 | **$249,549** | **$0** | **$0** | **$0** | **$31,127** | **$38,786** | **$39,685** | **$40,417** | **$39,608** | **$31,952** | **$27,975** | **$0** |
| Royalty - 1.5% | US $000 | $12,193 | | $0 | $0 | $1,891 | $2,072 | $2,005 | $1,787 | $1,455 | $1,603 | $1,380 | $0 |
| Salvage Value | US $000 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Reclamation & Closure | US $000 | $25,030 | | $0 | $0 | $0 | $0 | $0 | $0 | $6,258 | $6,258 | $6,258 | $6,258 |
| **Total Production Cost** | US $000 | **$286,772** | **$0** | **$0** | **$0** | **$33,018** | **$40,858** | **$41,690** | **$42,203** | **$47,320** | **$39,813** | **$35,612** | **$6,258** |
| **Operating Income** | US $000 | **$526,085** | **$0** | **$0** | **$0** | **$93,069** | **$97,282** | **$91,989** | **$76,904** | **$49,647** | **$67,083** | **$56,367** | **-$6,258** |
| Initial Capital Depreciation | US $000 | $125,154 | | $0 | $0 | $37,792 | $14,560 | $14,560 | $14,560 | $14,560 | $14,560 | $14,560 | $0 |
| Sustaining Capital Depreciation | US $000 | $5,172 | | $0 | $0 | $0 | $302 | $302 | $1,142 | $1,142 | $1,142 | $1,142 | $0 |
| Total Depreciation | US $000 | $130,326 | $0 | $0 | $0 | $37,792 | $14,862 | $14,862 | $15,703 | $15,703 | $15,703 | $15,703 | $0 |
| **Net Income after Depreciation** | US $000 | **$395,759** | **$0** | **$0** | **$0** | **$55,277** | **$82,420** | **$77,127** | **$61,202** | **$33,945** | **$51,381** | **$40,665** | **-$6,258** |
| Regulatory (OSINERGMIN & OEFA Fees) | US $000 | $1,947 | $0 | $0 | $0 | $302 | $331 | $320 | $285 | $232 | $256 | $220 | $0 |
| Modified Mining Royalty (MMR) | US $000 | $12,923 | $0 | $0 | $0 | $1,505 | $3,062 | $2,774 | $1,959 | $968 | $1,537 | $1,118 | $0 |
| Special Mining Tax (SMT) | US $000 | $12,174 | $0 | $0 | $0 | $1,544 | $2,742 | $2,517 | $1,867 | $852 | $1,510 | $1,142 | $0 |
| **Net Income before NOL** | **US $000** | **$368,715** | **$0** | **$0** | **$0** | **$51,925** | **$76,285** | **$71,516** | **$57,090** | **$31,893** | **$48,078** | **$38,185** | **-$6,258** |

| | Operating Year>> | | PP | -2 | -1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Calendar Year>> | Total | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 |
| Net-Operating Loss applied | US $000 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Net-Operating Loss balance | US $000 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $6,258 |
| **Net Income after NOL** | **US $000** | **$368,715** | **$0** | **$0** | **$0** | **$51,925** | **$76,285** | **$71,516** | **$57,090** | **$31,893** | **$48,078** | **$38,185** | **-$6,258** |
| Profit Sharing | US $000 | $29,998 | $0 | $0 | $0 | $4,154 | $6,103 | $5,721 | $4,567 | $2,551 | $3,846 | $3,055 | $0 |
| Miner's Retirement Fund (MRF) | US $000 | $1,875 | $0 | $0 | $0 | $260 | $381 | $358 | $285 | $159 | $240 | $191 | $0 |
| **Net Income before Taxes** | **US $000** | **$336,842** | **$0** | **$0** | **$0** | **$47,512** | **$69,801** | **$65,437** | **$52,237** | **$29,182** | **$43,992** | **$34,939** | **-$6,258** |
| Income Taxes | US $000 | $101,214 | $0 | $0 | $0 | $14,016 | $20,591 | $19,304 | $15,410 | $8,609 | $12,978 | $10,307 | $0 |
| **Net Income after Taxes** | **US $000** | **$235,628** | **$0** | **$0** | **$0** | **$33,496** | **$49,210** | **$46,133** | **$36,827** | **$20,573** | **$31,014** | **$24,632** | **-$6,258** |
| **Cash Flow (US$ 000)** | | | | | | | | | | | | | |
| **Operating Income before Depreciation** | **US $000** | **$526,085** | **$0** | **$0** | **$0** | **$93,069** | **$97,282** | **$91,989** | **$76,904** | **$49,647** | **$67,083** | **$56,367** | **-$6,258** |
| Working Capital | | | | | | | | | | | | | |
| Accounts Receivable | US $000 | $0 | $0 | $0 | $0 | -$5,182 | -$495 | $183 | $599 | $910 | -$408 | $613 | $3,780 |
| Accounts Payable | US $000 | $0 | $0 | $0 | $0 | -$2,558 | -$629 | -$74 | -$60 | $66 | $629 | $327 | $2,299 |
| Supplies Inventory | US $000 | $0 | $0 | $0 | $0 | -$1,279 | -$395 | -$43 | -$40 | $37 | $391 | $210 | $1,119 |
| IGV - Output | US $000 | -$34,788 | $0 | -$10,769 | -$11,758 | -$1,542 | -$1,977 | -$1,651 | -$2,256 | -$1,651 | -$1,651 | -$1,534 | $0 |
| IGV | US $000 | $34,788 | $0 | $8,974 | $11,594 | $3,245 | $1,904 | $1,705 | $2,155 | $1,752 | $1,651 | $1,553 | $256 |
| **Total Working Capital** | **US $000** | **$0** | $0 | -$1,795 | -$165 | -$7,316 | -$1,592 | $121 | $398 | $1,114 | $612 | $1,169 | $7,454 |
| Capital Expenditures | | | | | | | | | | | | | |
| Mine | US $000 | $23,231 | | $8,868 | $14,363 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Plant | US $000 | $88,385 | | $44,192 | $44,192 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Owner's Cost | US $000 | $13,539 | | $6,769 | $6,769 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Sustaining Capital | | | | | | | | | | | | | |
| Mine | US $000 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Plant | US $000 | $5,172 | | $0 | $0 | $0 | $1,810 | $0 | $3,362 | $0 | $0 | $0 | $0 |
| **Total Capital Expenditures** | **US $000** | **$130,326** | $0 | $59,830 | $65,325 | $0 | $1,810 | $0 | $3,362 | $0 | $0 | $0 | $0 |
| **Cash Flow before Taxes** | **US $000** | **$395,759** | **$0** | **-$61,625** | **-$65,489** | **$85,752** | **$93,880** | **$92,110** | **$73,941** | **$50,762** | **$67,696** | **$57,536** | **$1,196** |
| Cumulative Cash Flow before Taxes | US $000 | | $0 | -$61,625 | -$127,114 | -$41,362 | $52,518 | $144,628 | $218,569 | $269,331 | $337,026 | $394,563 | $395,759 |
| Taxes / Profit Sharing/Fees/MMR/SMT/MRF | US $000 | $160,131 | $0 | $0 | $0 | $21,781 | $33,210 | $30,994 | $24,374 | $13,372 | $20,367 | $16,033 | $0 |
| **Cash Flow after Taxes** | **US $000** | **$235,628** | $0 | -$61,625 | -$65,489 | $63,971 | $60,670 | $61,116 | $49,566 | $37,390 | $47,329 | $41,504 | $1,196 |
| Cumulative Cash Flow after Taxes | US $000 | | $0 | -$61,625 | -$127,114 | -$63,143 | -$2,473 | $58,642 | $108,209 | $145,599 | $192,928 | $234,432 | $235,628 |

| NPV - Year-End Cash Flow | | |
|---|---|---|
| **Economic Indicators before Taxes - End of Year** | | |
| NPV @ 0% | 0% | $395,759 |
| NPV @ 5% | 5% | $294,298 |
| NPV @ 10% | 10% | $219,807 |
| IRR | | 49.6% |
| **Economic Indicators after Taxes - End of Year** | | |
| NPV @ 0% | 0% | $235,628 |
| NPV @ 5% | 5% | $165,953 |
| NPV @ 10% | 10% | $115,072 |
| IRR | | 33.02% |

## 22.11 NPV, IRR AND PAYBACK (YEARS)

The base case economic analysis indicates that the project has an after tax NPV at 5% discount rate of $157.6 million, IRR of 33.0% and a payback of 2.1 years. This assumes a gold price of $1,700/oz.

## 22.12 SENSITIVITY

Sensitivity analyses are presented in Table 22-5 to Table 22-9.

**Table 22-5: Gold Price Sensitivity**

| Percent Change | Au Price | Revenue | NPV, after tax @ 0% | NPV, after tax @ 5% | IRR, after Tax |
|---|---|---|---|---|---|
| Base Case | $1,700 | $812,856 | $226,221 | $157,572 | 31.0% |
| 20% | $2,040 | $975,428 | $320,587 | $232,466 | 40.5% |
| 10% | $1,870 | $894,142 | $273,565 | $195,144 | 35.9% |
| -10% | $1,530 | $731,571 | $178,383 | $119,604 | 25.6% |
| -20% | $1,360 | $650,285 | $129,895 | $81,135 | 19.8% |

**Table 22-6: Gold Recovery Sensitivity**

| Percent Change | Au Recovery % | NPV, after tax @ 0% | NPV, after tax @ 5% | IRR, after Tax |
|---|---|---|---|---|
| Base Case | 81.7% | $226,221 | $157,572 | 31.0% |
| 5.0% | 85.8% | $249,877 | $176,346 | 33.4% |
| 2.5% | 83.7% | $238,057 | $166,966 | 32.2% |
| -2.5% | 79.7% | $214,375 | $148,172 | 29.7% |
| -5.0% | 77.6% | $202,449 | $138,706 | 28.4% |

**Table 22-7: Capital Cost Sensitivity**

| Percent Change | $000 | NPV, after tax @ 0% | NPV, after tax @ 5% | IRR, after Tax |
|---|---|---|---|---|
| Base Case | $135,898 | $226,221 | $157,572 | 31.0% |
| 20% | $163,077 | $199,041 | $131,207 | 24.0% |
| 10% | $149,488 | $212,631 | $144,390 | 27.2% |
| -10% | $122,308 | $239,811 | $170,755 | 35.3% |
| -20% | $108,718 | $253,401 | $183,938 | 40.5% |

**Table 22-8: Operating Cost Sensitivity**

| Percent Change | $000 | NPV, after tax @ 0% | NPV, after tax @ 5% | IRR, after Tax |
|---|---|---|---|---|
| Base Case | $258,786 | $226,221 | $157,572 | 31.0% |
| 20% | $310,226 | $195,822 | $133,356 | 27.6% |
| 10% | $284,506 | $211,135 | $145,555 | 29.3% |
| -10% | $233,066 | $241,168 | $169,481 | 32.5% |
| -20% | $207,346 | $255,977 | $181,281 | 34.1% |

**Table 22-9: Cyanide Consumption Sensitivity**

| Percent Change | Consumption (kg/t) | NPV, after tax @ 0% | NPV, after tax @ 5% | IRR, after Tax |
|---|---|---|---|---|
| Base Case | 0.6 | $226,221 | $157,572 | 31.0% |
| 100% | 1.2 | $188,593 | $128,030 | 27.1% |
| 50% | 0.9 | $210,549 | $145,241 | 29.4% |
| -50% | 0.3 | $235,905 | $165,246 | 32.0% |
| -100% | 0 | $239,722 | $168,347 | 32.4% |

# 23 ADJACENT PROPERTIES

Over the past 40 years a renewed focus by exploration companies on the younger volcanic rocks of the Pacific Rim area has resulted in several new discoveries of gold-rich epithermal deposits, within a belt extending over a length of more than 1,000 km in the Andes mountains of Peru. Notable successes in this belt include the four deposits at Yanacocha that began production in 1993 and, by the end of 2005, had outlined Proven plus Probable Reserves of 1,142 Mt grading 0.9 g/t gold, for a total gold content of 32.6 Moz. As of 2019, the remaining Proven plus Probable Reserves were 113.7 Mt @ 0.98 g/t Au (Newmont website, reserve and resource report, December 31, 2019). The Pierina deposit, as of December 1997, had pre-mining Proven plus Probable oxide reserves totalling 112.5 Mt @ 1.96 g/t Au. Barrick's Lagunas Norte deposit started production in March 2005, and through December 31, 2014 had recovered 8.4 Moz of gold and 7.8 Moz of silver from approximately 201 Mt of ore averaging 1.59 g/t Au and 3.6 g/t Ag. Remaining Proven plus Probable Reserves at Lagunas Norte in 2015 were 63.6 Mt @ 1.82 g/t Au, 5.17 g/t Ag (Barrick Gold Annual Report 2015). The mine is currently on care and maintenance and quoted resources as of December 31, 2020 total 4.3 Moz gold in the Measured plus Indicated categories (Barrick Annual Report 2020). Significant mineral deposits in the region surrounding the Tres Cruces property are shown on Figure 23-1.

The authors have been unable to verify the resources information quoted above, and the information is not necessarily indicative of the mineralization on the Tres Cruces property that is the subject of this technical report.

According to generally available data, there are four important epithermal gold, silver deposits within close proximity to the Tres Cruces property. These are mainly high-sulphidation epithermal systems hosted in Cenozoic volcanics or in the underlying Chimu quartzites, or in both. These deposits are Lagunas Norte, La Virgen, La Arena and Santa Rosa (Figure 23-1). The Tres Cruces concessions adjoin the Quiruvilca property to the northwest, which is the site of mining operations that have processed polymetallic veins, rich in Ag, Zn, Pb and Cu, but generally low gold. Other nearby gold mining operations are the Parcoy and the Retamas mines that are each processing about 2,000 tonnes per day from narrow vein systems in Precambrian age rocks, producing up to 250,000 ounces of gold annually.

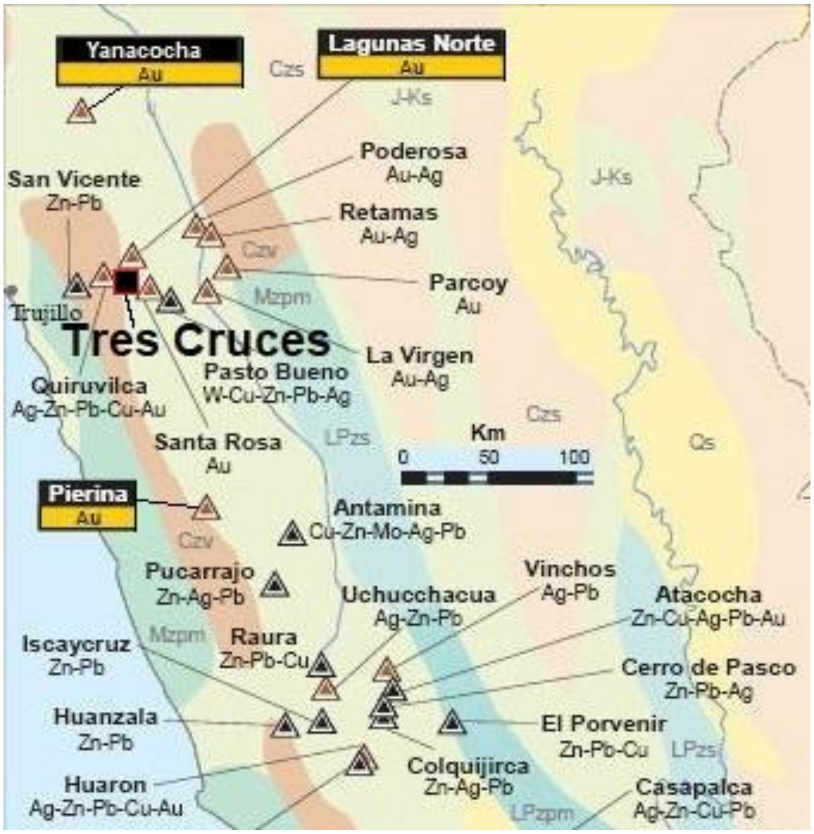



**Figure 23-1: Mineral Deposits of Northern Peru**

Boroo's Lagunas Norte deposit, adjacent to Tres Cruces to the north-northeast, is the most pertinent with respect to similarities of mineralization and availability of mining infrastructure that could process mineralization from the Property, therefore it is described in more detail below.

Barrick acquired the Alto Chicama property which hosts the Lagunas Norte deposit in 2001 and invested $40 million in a comprehensive exploration program, which became one of the gold industry's largest greenfield discoveries of the decade. Within two years, the Company had advanced a promising discovery into a multi-million-ounce resource. At the end of 2002, on the basis of 120,000 m of diamond drilling in 445 diamond drill holes, on 50 m centres, the declared resource at Lagunas Norte was: 123.5 Mt @ 1.83 g/t Au, for 7.3 M oz of gold, which included 6.2 Moz in oxides.

The deposit was fast-tracked into production and the US$340 million project was completed in June 2005 ahead of schedule and within its original budget. Open pit mining and heap leaching of the near-surface oxide portion of the deposit had, up to December 2015, produced 9.0 Moz of gold and 9.0 Moz of silver from approximately 222 Mt of ore averaging 1.53 g/t Au and 3.7 g/t Ag (Evans et al., 2016). The ultimate pit area is approximately 2.5 km long by 1.0 km across with a maximum depth of 250 m to exploit four mineralized areas.

The 2015 year-end Measured plus Indicated Mineral Resources totalled 37.6 Mt averaging 1.36 g/t Au and 3.75 g/t Ag and contain 1,645,000 oz of gold and 4,527,000 oz of silver (Evans et al., 2016). These resources were mostly oxide mineralization that have since been processed using the existing heap leaching facility. The heap leach operation was shut down and put on care and maintenance in 2019. Barrick investigated the feasibility of deepening the pit to extract sulphide mineralization with the construction of facilities that could recover gold from the sulphides. Resources as of December 3, 2020 are reported as 4.3 Moz gold in the Measured plus Indicated categories (Barrick Annual Report 2020).

Geologically the Lagunas Norte deposit has many similarities to Tres Cruces. Basement rocks at Lagunas Norte are predominantly Mesozoic pelitic and siliciclastic rocks of the Chicama and Chimu Formations respectively (Reyes, 1980), which have been thrusted and folded into NW striking, east-verging folds of the Marañon Fold and Thrust Belt. These rocks are weakly metamorphosed to slate and quartzite. The Lower Miocene volcanic rocks of the Calipuy Group were unconformably deposited over the folded Mesozoic basement. Gold mineralization is hosted by rocks of both the Chimu Formation and the overlying Calipuy volcanic strata.

Upper Jurassic to Lower Cretaceous Chimu Formation - which is the main host to mineralization at Lagunas Norte, comprises a compositionally mature quartz sandstone, with occasional coal beds, and scarce siltstone and shale. It has undergone weak metamorphism, with some recrystallization and cementation of quartz grains to form quartzite. The thickness of the formation is estimated to be between 450 and 600 m in the Lagunas Norte area (Benavides-Cáceres 1956). Miocene Calipuy Group, which is separated from the Mesozoic basement by an angular unconformity, is composed of a sequence of volcanic and volcaniclastic rocks and hosts some of the known mineralization.

Descriptions of alteration and mineralization at Lagunas Norte are summarized below from deposit descriptions given in www.portergeo.com (2020). Hydrothermal alteration at Lagunas Norte varies according to the host rock compositions and textures. The upper volcanic-hosted section of the deposit is characterised by zonation patterns typical of high-sulphidation systems, where a nucleus of vuggy quartz is surrounded by quartz-alunite and dickite-kaolinite±alunite zones, indicating acidic fluids that were progressively neutralised during reaction with the host rock. In contrast, alteration of the quartzite is subtle and difficult to recognize, although kaolinite and, in more silty units, pyrophyllite have been identified by spectral instruments. Four hydrothermal stages have been defined, with the majority of the gold introduced during stage 3. The bulk of the gold deposited during stage 3 is not optically visible and is contained within pyrite. This mineralization and the associated alteration are difficult to detect in the host quartzite, although coarse alunite fracture filling with associated pyrite and enargite is observable at depths of greater than 80 m below surface. In addition, spectral sensors can detect disseminated kaolinite in quartzite hosts. In the core of Lagunas Norte, pyrophyllite is found within the siltier beds of the Chimu Formation, whereas kaolinite occurs on the periphery of the deposit. Where coal is present, sulphide assemblages that include pyrite, stibnite and arsenopyrite are locally observed (Cerpa et al., 2013).

Networks of pre-existing fractures in Chimu Formation quartzite contain fine-grained quartz-pyrite aggregates with minor rutile and, locally, chalcopyrite and digenite (Cerpa et al., 2013). Although gold is not visible to SEM or optical microscopy, mineralogical studies show it to be associated with pyrite, probably as solid solution or as nanoparticles in the pyrite. The presence of veined Chimu clasts in diatreme breccias, suggest the first mineralization stage preceded diatreme emplacement (Montgomery, 2012).

Diatreme breccias that appear to have formed by phreatomagmatic activity, generated ground preparation for subsequent mineralization by fracturing the adjacent rock, and they also host some of the mineralization. Mineralization within the diatremes is controlled by the permeability, which in turn is controlled by matrix type and abundance, type, shape and size of clasts. Within the breccias, dickite-kaolinite alteration and fracture controlled silicification is locally present, while the margins are intensely silicified, with minor alunite. Where the matrix is predominantly volcanic, quartz-alunite is the dominant alteration assemblage (Cerpa et al., 2013). A minimum age of 17.0 Ma for the brecciation events is indicated by the oldest alunite within the overlying volcanic sequence (Montgomery, 2012).

Oxidation of the gold-bearing sulphide minerals to depths of up to 80 m below the current surface made the upper parts of the deposit amenable to heap leach extraction (Cerpa et al., 2013).

The authors have been unable to verify the Lagunas Norte information, and the information is not necessarily indicative of the mineralization on the Property that is the subject of this technical report.

# 24 OTHER RELEVANT DATA AND INFORMATION

Below is the Table of Contents for the Project Execution Plan. The Project execution Plan will be further developed in subsequent viability studies and will become a "Stand Alone" document going into design and construction. This document will provide the template for moving forward.

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# 25 INTERPRETATION AND CONCLUSIONS

The mineral resource for the Tres Cruces Oxide Project was estimated by Mr. James N. Gray of Advantage Geoservices Limited, and reported in an Oroperu Company news release on February 1, 2021, replacing the 2012 Lacroix estimate. The resource estimate includes data from 327 drill holes (159 RC and 168 diamond core holes) of 371 drill holes that were completed between 1996 and 2008 by Oroperu, BMC and Barrick.

The following interpretations and conclusions are made by the authors:

- Indicated Mineral Resources are estimated to contain 46.5 Mt grading 1.65 g/t Au for a total of 2.5 million ounces of contained gold metal. Inferred Mineral Resources are estimated at 2.6 Mt grading 1.26 g/t Au for 0.1 million contained ounces gold. These estimates are reported at a 0.3 g/t Au cut-off, for oxide and transition material, and at a 0.9 g/t cut-off for sulphide mineralization. These cut-off grades are considered appropriate based on currently available metallurgical testwork and the assumed mining parameters and gold price. This PEA considers only the processing of oxide and transition mineralization.

- The near surface Indicated Mineral Resource comprised of 9.64 M tonnes of oxide mineralization grading 1.37 g/t Au for 425,000 contained ounces of gold, and the immediately underlying leachable transition material of 5.71 M tonnes grading 1.12 g/t Au for 205,000 contained ounces, form the basis for a heap leach operation.

- Near-surface oxide mineralization expansion opportunities are present in areas covered by shallow post-mineral rocks.

- Potential exists to increase the size of, and the confidence in, the resource through further drilling. Drilling areas presently classified as Inferred Mineral Resource, particularly in areas where holes ended in mineralization, could add, or upgrade significant resource tonnage.

- No estimate has been made by the authors for silver although significant potential for value exists at current silver prices. Indications are that silver grades are generally low and concentrated mainly in the deeper, sulphide portion of the gold deposit. Based on this updated gold resource scenario, overall silver grades would be expected to range between 1.5 and 2.5 g/t, potentially containing 2.5 to 3.5 million ounces of silver. Any silver recovered with the gold would enhance overall project economics.

- A mine plan has been developed to process 14.9 Mt of oxide and transition resources by heap leaching. The proportion of Indicated resources in the mine plan is 96% with the balance Inferred. Approximately 66% of the material processed will be oxide and the balance will be transition material. The life of mine strip ratio will be 2.4:1 after pre-production stripping of 7.9 Mt.

- A mine equipment fleet has been sized to move 25 kt/day including 5.5 kt/day of mineralized material for processing. Optimization of this fleet will be undertaken during pre-feasibility study.

- While metallurgical testing still requires further detailed work, a baseline estimate of 81.7% gold recovery has been established for heap leaching of oxide and transitional mineralized material.

- Gold recoveries do not necessarily depend on sulphur content. Those samples with both high gold recovery and sulphur content are primarily derived from shallower depths while those with high sulphur and lower recoveries are from deeper intervals. Some MinType 3 (sulphide) mineralization may be treatable by heap leaching or other low-cost recovery techniques.

- Significant mineralization exists at depth below the currently optimized pit and beyond the northern property boundary, extending onto adjacent claims.

The Tres Cruces resource estimate has been carried out to industry standard techniques and classified in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (CIM, 2014).

## 25.1 EXPLORATION POTENTIAL

Outside the five known gold zones on the Property, exploration potential generally exists for "blind" zones that may occur at depth or in areas covered by post-mineralization rocks. Four of the five known gold zones are spatially associated with rhyolite and these rhyolite exposures are considered an important targeting tool at Tres Cruces. The rhyolite is siliceous and forms topographic highs, however, down dip to the west a thin cap of post-mineral sedimentary rocks and flows typically covers the rhyolite. Exploration beneath the post-mineral flows and lacustrine sediments away from the rhyolite is difficult because of the absence of reliable targeting methods. IP-Resistivity methods are unable to differentiate between "background" propylitic alteration and more advanced alteration assemblages, although siliceous lithologies or silica alteration are detected as high resistivity readings. Magnetic methods are not capable of detecting subtle alteration-related effects below areas covered by the highly magnetic post-mineral flows. Geochemical methods also are not effective in areas of the post-mineral cover.

The geological model suggests that exploration should focus on the contact areas of the andesitic and dacitic intrusive bodies, especially where they are cut by (commonly) northeast-trending, pre-mineral fault zones. As well, areas of rhyolite outside the currently drilled areas could be tested further for laterally deposited mineralization by drilling down through the base of the unit. Detailed geological mapping and modelling may help define favorable structures and intrusive contacts at depth that may warrant drill testing.

Modelling of certain structures that may have controlled the emplacement of mineralization in the Calipuy volcanic units could identify favourable mineral targets where the projection of these structures would intersect the unconformable contact with underlying Chimu sedimentary units. The Chimu Formation is host to significant amounts of gold mineralization in many nearby deposits and prospects, including the Lagunas Norte mine.

Alteration logging of drill core using PIMA, or other similar technology, can help to model the deposit, allowing prediction of areas of greater potential, where exploration drilling should be targeted. Similarly, multi-element geochemical analyses of drill core samples can help determine mineralogical zonation, pointing to areas of greater gold potential.

# 26 RECOMMENDATIONS

M3 recommends that ATC advance the Tres Cruces Oxide Project toward the completion of a pre-feasibility study, while embarking on a program of metallurgical testwork in parallel. The preferred process option presented in the PEA of three stage crushing and heap leaching of oxide and transition mineralized materials, requires validation and further optimization.

In addition to the metallurgical testwork, a number of other programs and studies are required to further optimize the project and maximize value. The estimated cost for the studies listed below is USD 5.3 million.

## 26.1 EXPLORATION, GEOLOGY AND DRILLING

- Exploration drilling should test favorable targets defined by geological modelling, or geophysical surveying outside of the known areas of mineralization.
- Geological mapping and modelling should be directed toward evaluating the potential for higher-grade zones of mineralization, as well as possible mineralization hidden beneath thin layers of post-mineral rock units.
- Geological mapping of mercury, copper, sulphur, silver, and any other parameters that are required for metallurgical predictions and environmental management.
- Alteration mapping and geochemical analyses of drill samples should be compiled and augmented with additional analyses from samples in storage to help further develop geological modelling of the deposit.
- Drilling should be undertaken to better define mineralization in areas of the drill grid where holes are greater than 50 meters apart, where there are unexplained discrepancies in zone continuity or grades between holes, or in areas where holes end in mineralized material.
- Drilling should be undertaken to define the edges of mineralized zones to better define resources and allow for detailed pit planning, and condemnation drilling is required in the areas of the proposed facilities.
- As a number of the previous drill holes ended in mineralization, selected areas should be drilled at depth to determine the ultimate limits of mineralization, especially within or close to current expected pit limits.
- It is estimated that about 40 holes and 10,000 meters of drilling will be required to address the aforementioned drilling programs.
- It is recommended that the next stage of testwork assess the risks associated with mercury, copper and sulphide in the oxide resource, and develop solutions to control any risks found
- Low cobalt (oxidized) material extends below the bottom of the pit in some areas. This could be an opportunity for increasing the oxide resource
- The costs for the aforementioned drilling programs are approximately $3.0 M.

## 26.2 RESOURCE MODEL UPDATE

Given the potential economic contribution from silver recovered in the metallurgical processes, future mineral resource estimates should include silver. The existing drill database silver assays should be vetted. This may require additional assaying, as not all samples were analyzed for silver. Pulps and rejects from previous drilling campaigns may be available to aid in this process.

- Improve the accuracy of the boundary between directly leachable gold mineralization and refractory gold mineralization using metallurgical testwork, geometallurgical interpretation, and geological mapping.

- Costs for updating the resource model to include the new drilling and address the aforementioned comments is approximately $50,000.

## 26.3 METALLURGY

Additional metallurgical testwork is recommended to better quantify recoveries for the different mineralization types as well as to refine the processing scope going forward:

- Heap leach development tests to determine crush size and leaching conditions required.

- Balances of mercury, copper, silver, cyanide, and acid generating potential to mitigate risks and generate data for process engineering.

- Water treatment options such as cyanide destruction and metal precipitation, to achieve effluent quality discharge requirements.

- Soluble gold extraction tests should be integrated with exploration sample analysis workflow as a tool to map and characterize oxidation state structure within the deposit and to differentiate refractory sulphide from leachable resources, as well as to better characterize the leach impact of base metals.

- Given the potential economic contribution by silver whether by heap leaching or other processing strategies, future mineral resource estimates should include silver. Models for mercury and copper that may impact the leach and plant recovery strategy should be developed.
- The sulphur grade should be populated into the mining block model.

- Additional metallurgical testwork is recommended to better quantify recoveries for the different rock types considering lithology and alteration, oxidation state, and mine schedule (zonation) as well as to refine the processing methodology going forward. Additional recommendations for metallurgical testing include:

  - Cyanide destruction testing to select best method and reagent consumptions

  - Column and bottle testing should include analysis of solution for mercury and copper to help determine carbon loading levels expected

  - Column tests should optimize the leach cycle

  - Water treatment – parameters for water treatment should be identified

- Further column and bottle roll testing will allow for optimization of the crusher product sizing and does not preclude the possible future selection of run-of-mine dump leaching.

- The optimization of cyanide and lime consumption for each type of mineralized material. This should include cyanide concentration in the application solution.

- Testing to confirm geotechnical loading parameters with and without agglomeration of crusher products should be undertaken.

Costs for the metallurgical test program as described are approximately $750,000.

## 26.4 PROCESS FACILITIES

### 26.4.1 Geotechnical Investigations

Geotechnical drilling and analysis are required to support detailed design of the processing facilities including the ADR, Crushing circuit, and heap leach pad. Estimated costs for the geotechnical program are $250,000.

#### 26.4.1.1 Capital and Operating Cost Estimates

To bring the Project to pre-feasibility level, the following studies are recommended:

- Additional vendor quotations.
- Development of a detailed operating cost estimate, taking into consideration information gained from the metallurgical testwork program.
- Better earthworks estimate based on balancing the cut and fill for the heap leach pad.

Optimization of the construction plan for the various project facilities to minimize initial capital including the construction and lining of the heap leach pad, pond locations, conveyor configurations, solution pumping requirements, etc., all of which could result in lower capital and operating costs.

## 26.5 INFRASTRUCTURE

### 26.5.1 Electric Power

Advance design of electrical power supply connection and distribution across the site. Electric power is expected to be supplied by a connection to the existing national power grid. Further refinement of the capital equipment necessary to connect to the national grid should be investigated to improve the estimate to a pre-feasibility level.

### 26.5.2 Water

Develop a comprehensive site-wide water balance that integrates the various process facilities with their water demands, rainfall/runoff relationships, contact versus non-contact waters, etc. Water sourcing demands and availability from both groundwater and surface water sources on a seasonal and life of mine basis needs to be estimated.

## 26.6 OTHER

### 26.6.1 Preferred Development Option

The PEA describes a low capital, oxide heap leaching project. The preferred process option presented in the PEA of three stage crushing and heap leaching of oxide and transition mineralized materials, requires validation and further optimization. The cost to complete engineering and trade-off studies at a pre-feasibility level, including mine planning is approximately $750,000.

### 26.6.2 Environmental Baseline

Continued collection of environmental baseline data should be continued. Studies on acid/base accounting for the waste rock should be included in an updated reclamation and closure plan. This plan will evaluate the opportunity for concurrent reclamation and the mitigation and possible treatment of any acid drainage. Estimated cost for the collection of environmental baseline data is $500,000 over two years.

### 26.6.3 Stakeholder Engagement

Define a comprehensive strategy for the engagement of local, regional and national stakeholders. Evaluate the social and economic impacts to the communities surrounding the project that might accompany project development. Study the availability of skilled and unskilled labor for project construction and operation.

It is recommended that the next stage of testwork assess the risks associated with mercury, copper and sulphide in the oxide resource, and develop solutions to control any risks found low cobalt (oxidized) material extends below the bottom of the pit in some areas. This could be an opportunity for increasing the oxide resource.

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# APPENDIX A - PEA CONTRIBUTORS AND PROFESSIONAL QUALIFICATIONS

## CERTIFICATE OF QUALIFIED PERSON

I, John W. Woodson, P.E., do hereby certify that:

1. I am employed as Chief Financial Officer, Senior Vice President, Project Manager and Project Sponsor of:

   M3 Engineering and Technology Corporation
   2051 W. Sunset Rd., Ste. 101
   Tucson, AZ 85704
   U.S.A.

2. I graduated with a Bachelor of Science in Civil Engineering from the University of Arizona in 2003 and a Master of Science in Civil Engineering from the University of Arizona in 2008.

3. I am a registered professional engineer in good standing in the State of Arizona in the area of Structural Engineering (No. 47714). I am also registered as a professional engineer in the states of California (No. 73405), Nevada (No. 029163) and Michigan (No. 6201057625).

4. I have worked as an engineer for a total of 18 years. My experience includes 16 years at M3 Engineering and Technology Corporation working on all aspects of mine plant development for base and precious metals projects with a specific focus on plant layout, infrastructure, estimating and scheduling. As Project Manager and Sponsor, I have been involved with studies as well as full engineering, procurement, and construction management (EPCM) 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 a contributing author for the preparation of the technical report titled "Tres Cruces Oxide Project, Form 43-101F1 Technical Report, Preliminary Economic Assessment, Northern Peru" (the "Technical Report"), dated effective August 17, 2023, prepared for Steppe Gold Ltd., and am responsible for Sections 1, 2, 3, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26 and 27. I visited the project site on August 15, 2023, for one day, for an in-person inspection.

7. I have had prior involvement with the subject property; I co-authored the technical report titled "Tres Cruces Oxide Project, Form 43-101F1 Technical Report, Preliminary Economic Assessment, Norther Peru" dated effective March 14, 2022.

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

9. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101.

10. I have read NI 43-101 and Form 43-101F1, and the sections of the Technical Report for which I was responsible for have been prepared in compliance with that instrument and form.

Signed and dated this 21st day of August 2023.

"Signed"
Signature of Qualified Person

John W. Woodson
Print Name of Qualified Person

**CERTIFICATE OF QUALIFIED PERSON**

This certificate applies to the technical report entitled: “Tres Cruces Oxide Project, Form 43-101F1 Technical Report, Preliminary Economic Assessment, Northern Peru” (the “Technical Report”), dated effective August 17, 2023, prepared for Steppe Gold Ltd.

I, Laurie Tahija, MMSA-QP, Principal Consultant (Processing), do hereby certify that:

1. I am currently employed as Senior Vice President by M3 Engineering & Technology Corporation, 2051 W. Sunset Road, Ste. 101, Tucson, Arizona 85704, USA.
2. I am a graduate of Montana College of Mineral Science and Technology, in Butte, Montana and received a Bachelor of Science degree in Mineral Processing Engineering in 1981.
3. I am recognized as a Qualified Professional (QP) member (#01399QP) with special expertise in Metallurgy/Processing by the Mining and Metallurgical Society of America (MMSA).
4. I have not visited the Tres Cruces project site.
5. I have practiced mineral processing for 40 years. I have over twenty (20) years of plant operations and project management experience at a variety of mines including both precious metals and base metals. I have worked both in the United States (Nevada, Idaho, California) and overseas (Papua New Guinea, China, Chile, Mexico) at existing operations and at new operations during construction and startup. My operating experience in precious metals processing includes heap leaching, agitation leaching, gravity, flotation, Merrill-Crowe, and ADR (CIC & CIL). My operating experience in base metal processing includes copper heap leaching with SX/EW and zinc recovery using ion exchange, SX/EW, and casting. I have been responsible for process design for new plants and the retrofitting of existing operations. I have been involved in projects from construction to startup and continuing into operation. I have worked on scoping, pre-feasibility and feasibility studies for mining projects in the United States and Latin America, as well as worked on the design and construction phases of some of these projects.
6. I have read the definition of “qualified person” set out in National Instrument 43-101 Standards of Disclosure for Mineral Projects (“NI 43-101”) and certify that by virtue of my education, affiliation with a professional association and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
7. I am independent of Steppe Gold Ltd. as defined by Section 1.5 of NI 43-101.
8. I accept professional responsibility for Sections 17, 21.2.1, 21.2.2 and relevant information pertaining to metallurgy and process in Sections 1, 25, 26, and 27 of the Technical Report.
9. I have had prior involvement with the subject property; I co-authored the technical report titled “Tres Cruces Oxide Project, Form 43-101F1 Technical Report, Preliminary Economic Assessment, Norther Peru” dated effective March 14, 2022.
10. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I was responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
11. I have read NI 43-101 and Form 43-101F1. The sections of the Technical Report that I am responsible for have been prepared in compliance with that instrument and form.

Dated this 21st day of August 2023.

“Signed”
Signature of Qualified Person

Laurie M. Tahija
Print Name of Qualified Person

**Certificate of Qualified Person**

I, Jeffrey D. Rowe, am a professional geologist residing at 111-6109 Boundary Drive W, Surrey, British Columbia, Canada and do hereby certify that:

1. I am an author of "Tres Cruces Oxide Project, Form 43-101F1 Technical Report, Preliminary Economic Assessment, Northern Peru" (the "Technical Report"), dated effective August 17, 2023, prepared for Steppe Gold Ltd. (the "Issuer").
2. I am a Registered Professional Geoscientist (P. Geo.), Practising, with the Engineers and Geoscientists, British Columbia (License # 19950).
3. I graduated from the University of British Columbia, Canada, with a B.Sc. (Geological Sciences, 1975).
4. I have worked as a geoscientist in the minerals industry for over 35 years I have been directly involved in the exploration, evaluation, and mining of mineral properties, mainly in Canada and Mexico, for gold, silver, tungsten, molybdenum, and base metals.
5. I have not visited the Tres Cruces property.
6. I have had prior involvement with the subject property; I co-authored the technical report dated titled "Tres Cruces Oxide Project, Form 43-101F1 Technical Report, Preliminary Economic Assessment, Norther Peru" dated effective March 14, 2022 and the technical report titled "NI 43-101, Technical Report & Resource Update for the Tres Cruces Project, North-Central Peru" dated effective March 16, 2021.
7. I am responsible as a co-author for Sections 4 through 12 and 23 of the Technical Report.
8. I am independent of the Issuer, as independence is described in Section 1.5 of NI 43-101.
9. I have read National Instrument 43-101 and Form 43-101F1 and, by reason of my education and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101, and the sections of the Technical Report for which I am responsible have been prepared in compliance with National Instrument 43-101 and Form 43-101F1.
10. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Effective Date: August 17, 2023

Signed this 21st day of August 2023 in Surrey, British Columbia:

*"original signed & sealed"*

Jeffrey D. Rowe, B.Sc., P.Geo. (PGBC license no. 19950)

## CERTIFICATE OF QUALIFIED PERSON

Adam Johnston, FAusIMM (CP Met)
Chief Metallurgist
Transmin Metallurgical Consultants
10 Cavendish Gardens, Fleet, UK

I, Adam Johnston, FAusIMM (CP), am employed as a Chief Metallurgist with Transmin Metallurgical Consultants, with an office address at 10 Cavendish Gardens, Fleet, UK.

This certificate applies to the technical report titled "Tres Cruces Oxide Project, Form 43-101F1 Technical Report, Preliminary Economic Assessment, Northern Peru" that has an effective date of August 17, 2023 (the "Technical Report").

I am a Chartered Professional (CP) in Metallurgy and a Fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM). I graduated from the Western Australian School of Mines with a BEng Minerals in 1995.

I have worked as a precious and base metal metallurgist since my graduation. My relevant experience for the purpose of the Technical Report is:

- As a metallurgical consultant on numerous precious metal mining and exploration projects around the world; and
- 25 years experience in metallurgical flowsheet development, testwork and engineering, principally in Australia, Canada, and Peru.

As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43–101 *Standards of Disclosure for Mineral Projects* (NI 43–101) for those sections of the Technical Report that I am responsible for preparing.

I visited the Tres Cruces Project on March 3, 2022, for one day, for an in-person inspection.

I am responsible for Section 13 of the Technical Report and I have contributed to Sections 1, 25, and 26 of the Technical Report.

I am independent of Steppe Gold Ltd., as independence is described by Section 1.5 of NI 43–101.

I have been involved with the Tres Cruces project since 2020. Specifically, I co-authored the technical report titled "Tres Cruces Oxide Project, Form 43-101F1 Technical Report, Preliminary Economic Assessment, Northern Peru" dated effective March 14, 2022.

I have read NI 43–101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with that Instrument.

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

Dated: August 21, 2023

"signed"

Adam Johnston, FAusIMM (CP Met)

## CERTIFICATE OF QUALIFIED PERSON

I, James N. Gray, P.Geo, do hereby certify that:

- I am President of Advantage Geoservices Limited with an office at 46717 Sylvan Drive, Chilliwack, BC, Canada.
- I am a graduate of the University of Waterloo in 1985 where I obtained a B.Sc in Geology. I have practiced my profession continuously since 1985. My relevant experience includes resource estimation work at operating mines as well as base and precious metal projects in North and South America, Europe, Asia, and Africa.
- I am a Professional Geoscientist registered with the Engineers and Geoscientists British Columbia, license # 27022.
- I have not visited the Tres Cruces property.
- I have read the definition of "qualified person" set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
- As a qualified person, I am independent of Steppe Gold Ltd. as defined in Section 1.5 of NI 43-101.
- I am a co-author of the technical report entitled "Tres Cruces Oxide Project, Form 43-101F1 Technical Report, Preliminary Economic Assessment, Northern Peru" (the "Technical Report"), dated effective August 17, 2023, prepared for Steppe Gold Ltd. and am responsible for Section 14 as well as contributions to Sections 1, 25 and 26, and I accept professional responsibility for those Sections of the Technical Report.
- I have had prior involvement with the subject property; I co-authored the technical report titled "NI 43-101, Technical Report & Resource update for the Tres Cruces Project, North-Central Peru" dated effective March 16, 2021, and the technical report titled "Tres Cruces Oxide Project, Form 43-101F1 Technical Report, Preliminary Economic Assessment, Norther Peru" dated effective March 14, 2022, having carried out the resource estimations documented therein.
- As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the portion of the Technical Report for which I am responsible contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
- I have read NI 43-101 and Form 43-101F1, and the sections of the Technical Report for which I was responsible have been prepared in compliance with NI 43-101 and Form 43-101F1.

Dated this 21st day of August 2023 in Chilliwack, BC, Canada.

*"original signed"*

James N. Gray, P.Geo
President
Advantage Geoservices Limited

**CERTIFICATE OF QUALIFIED PERSON**

I, John Nilsson, MSc., P.Eng., do hereby certify that:

1. I am a Professional Engineer, President of:

    Nilsson Mine Services Ltd.
    20263 Mountain Place
    Pitt Meadows, B.C.
    Canada

2. I graduated from Queen's University with a Bachelor of Science degree Geology in 1977 and subsequently a Master of Science degree through the Department of Mine Engineering in 1990.
3. I am a member in good standing of the Engineers & Geoscientists British Columbia (License #20697).
4. I have worked as a geologist and then a mining engineer for a total of 43 years on mining related precious and base metal projects in North America, Central America, South America, Africa, Europe, and Asia.
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 a contributing author for the preparation of the technical report titled "Tres Cruces Oxide Project, Form 43-101F1 Technical Report, Preliminary Economic Assessment, Northern Peru" (the "Technical Report"), dated effective August 17, 2023, prepared for Aurífera Tres Cruces; and am responsible for Sections 16, 21.1.3, 21.2.3, and corresponding sections of 1 and 26. I have not visited the project.
7. I have not had prior involvement with the property that is the subject of the Technical Report.
8. As of the effective date of the Technical Report, 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.
9. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101.
10. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Signed and dated this 21st day of August 2023.

"Signed"
Signature of Qualified Person

John W. Nilsson, MSc., P.Eng
Print Name of Qualified Person