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MORUMBI RESOURCES INC.

NI 43-101 TECHNICAL REPORT
ON THE
EL MOCHITO ZINC-LEAD-SILVER MINE,
HONDURAS

Report Date: September 9, 2016
Effective Date: December 31, 2015

Report By:

Bogdan Damjanović, P.Eng.
B. Terrence Hennessey, P.Geo.
Christopher R. Lattanzi, P.Eng.
David Makepeace, M.Eng., P.Eng.
Jane Spooner, P.Geo.

900 - 390 BAY STREET, TORONTO ONTARIO, CANADA M5H 2Y2
Telephone +1 416 362 5135   Fax +1 416 362 5763

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Table of Abbreviations

Abbreviation	Acronym
AA	Atomic Absorption
ADR	Adsorption, Desorption, Recovery
Ag	Silver
AGP	Acid Generation Potential
ANFO	Ammonium Nitrate and Fuel Oil explosive
ARD	Acid Rock Drainage
As	Arsenic
Au	Gold
AuEq	Gold equivalent
B.O.O.	Build/own/operate
CAPEX	Capital Expenditure
CCA	Capital cost allowances
CEA	Cumulative Expenditure Account
CIC	Carbon in column
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
CO	Carbon monoxide
CO_2	Carbon dioxide
COG	Cut-off grade
CSMAT	Controlled Source Audio-Magnetotelluric Tensor
Cu	Copper
CuEq	Copper equivalent
DDIP	Dipole-Dipole Induced Polarisation
DFS	Definitive Feasibility Study
EIA	Environmental Impact Assessment
EM (VLF)	Electromagnetic, very low frequency
EPC	Engineer, procure, construct
EPCM	Engineer, procure, construction management
ESIA	Environmental and Social Impact Assessment
EW	Electrowinning
FOB	Free on board
FOREX	Foreign Exchange
GA	General Arrangement
GDP	Gross Domestic Product
HDPE	High Density Polyethylene
HG	Hypogene
HSEC	Health, Safety, Environment & Community
HV	High voltage
HVAC	Heating, ventilation and air conditioning
ICP	Inductively Coupled Plasma
ID^2	Inverse Distance Squared
IDH	Human Development Index
IFC	International Finance Committee
IFS	Initial Feasibility Study
IP	Induced polarization
IRR	Internal Rate of Return
kWh	Kilowatt hour
LME	London Metal Exchange
LOM	Life of mine
MCE	Maximum credible earthquake

Abbreviation	Acronym
MISC	Miscellaneous
Mo	Molybdenum
MW	Megawatt
NAG	Net Acid Generation
NOx	Nitrous oxides
NPC	Net Present Cost
NPV	Net Present Value
NSR	Net smelter return
OK	Ordinary Kriging
OPEX	Operating Expenditure
Pb	Lead
PEA	Preliminary Economic Assessment
PFS	Prefeasibility Study
PGM	Platinum group minerals
QA/QC	Quality assurance/Quality control
QP	Qualified Person
RL	Relative Level
RMR	Rock mass rating
ROM	Run of mine
RQD	Rock Quality Designation
SG	Specific Gravity
SOx	Sulphur oxides
SXEW	Solvent extraction electrowinning
TBD	To be determined
UPS	Uninterruptible power supplies
UTM	Universal Transverse Mercator (coordinate system)
XRD	Mineralogical characterization
XRF	X-ray fusion

Units of Measure

Unit	Abbreviation
American Dollar	USD
Bond Ball Mill Work Index (metric)	kWh/t
Canadian Dollar	CAD
Centimetre	cm
Cubic metre	m^3
Cubic metres per second	m^3/s
Day	d
Dry metric tonne	Dmt
Degrees centigrade	°C
Foot/feet	ft
Gram	g
Gram/litre	g/L
Gram/tonne	g/t
hectare	ha
Hour	h
Kilogram	kg
Kilogram per tonne	kg/t
Kilometre(s)	km

Unit	Abbreviation
Kilopascal	kPa
Kilovolt	kV
Kilovolt amp	kVA
Kilowatt	kW
Kilowatt hour	kWh
Litre	L
Litre per second	L/s
Megawatt	MW
Metre(s)	m
Metres per second	m/s
Metric tonne(s)	t
Metric tonnes per hour	t/h
Metric tonnes per day	t/d
Milligram(s)	mg
Milligram per litre	mg/l
Millimetre	mm
Million	M
Million ounces	Moz
Million tonnes	Mt
Million tonnes per annum	Mt/a
Ounces	oz
Parts per billion	ppb
Parts per million	ppm
Percent	%
Second	s
Square metres	m^2
Tonnes per Annum	t/a
Tonnes per Day	t/d
Troy ounce	oz
Troy ounce per tonne	oz/t
Wet metric tonne	Wmt
Work index	WI
Year	yr

The conclusions and recommendations in this report reflect the authors' best judgment in light of the information available to them at the time of writing. The authors reserve the right, but will not be obliged, to revise this report and conclusions if additional information becomes known to them subsequent to the date of this report. Use of this report acknowledges acceptance of the foregoing conditions.

This report is intended to be used by Morumbi Resources Inc. (Morumbi) subject to the terms and conditions of its agreement with Micon International Limited. That agreement permits Morumbi to file this report as a National Instrument 43-101 Technical Report with the Canadian Securities Regulatory Authorities pursuant to provincial securities legislation. Except for the purposes legislated under provincial securities laws, any other use of this report, by any third party, is at that party's sole risk.

1.0 SUMMARY

Morumbi Resources Inc. (Morumbi) is in the process of purchasing the El Mochito Mine in Honduras from Nyrstar Group/Nyrstar NV (Nyrstar). El Mochito is operated through a subsidiary company of Nyrstar, American Pacific Honduras SA de CV (AMPAC). Morumbi is acquiring El Mochito through the acquisition of AMPAC.

The El Mochito property is located in northwest Honduras, near the town of Las Vegas, approximately 88 km southwest of San Pedro Sula and 220 km northwest of the capital city, Tegucigalpa. The property consists of an underground zinc-lead-silver mine and a nominal 2,300 t/d concentrator producing zinc and lead concentrates. The nameplate capacity of the concentrator is reported to be 2,300 t/d, although it is understood that it normally operates at approximately 2,250 t/d.

Production began in 1948 and has continued for 68 years almost continuously. The Nyrstar Group took control of the mine in August, 2011.

The economic mineralization at the El Mochito mine occurs as both manto and chimney skarn deposits in Lower Cretaceous limestones. In 2015, the mine produced approximately 766,000 t of ore grading 3.52 % zinc, 1.70 % lead and 51.79 g/t silver. The mill recoveries were 86.4 % zinc, 76.6 % lead and 87.8 % silver.

The manto deposits are typically flat dipping, following the bedding of the host rock, and are generally relatively extensive in horizontal dimension, rendering them suitable for room and pillar stoping methods. Rooms are backfilled following extraction.

Chimney deposits are typically steeply dipping and cut across the host rocks over a significant vertical distance. In general, the chimneys are of higher grade than the mantos. The chimneys are mined principally by longhole stoping methods, with backfilling of mined stopes.

Nyrstar published mineral resources and mineral reserves for El Mochito as at the end of 2015 in a news release dated 27 April, 2016 and published on the website, www.nyrstar.com. The estimates are provided in Table 6.1.

Table 1.1
2015 Historical Mineral Resource Statement

Metal	Unit	Measured Resources	Indicated Resources	Measured Plus Indicated Resources	Inferred Resources
	Mt	1.38	4.03	5.40	3.86
Zinc	%	5.22	4.72	4.85	5.11
Lead	%	1.93	1.65	1.72	1.38
Silver	g/t	62.10	38.80	44.70	35.00

Nyrstar, 2016b, 2015 Mineral Resource and Mineral Reserve Statement 27 April, 2016.

Table 1.2
2015 Historic Mineral Reserve Statement

Metal	Unit	Proven Reserves	Probable Reserves	Total Mineral Reserves
	Mt	0.57	1.34	1.91
Zinc	%	4.59	4.94	4.84
Lead	%	2.63	2.27	2.38
Silver	g/t	77.40	47.60	56.50

Nyrstar, 2016b, 2015 Mineral Resource and Mineral Reserve Statement 27 April, 2016.

The mineral resources and mineral reserves presented in Tables 1.1 and 1.2 are historical in nature, as described in National Instrument 43-101 - Standards of Disclosure for Mineral Projects (NI 43-101). They were prepared prior to the agreement to acquire the property by Morumbi and a Qualified Person has not yet verified them as current. At this time, the relevance and reliability of the estimates are not known. The estimates are classified using the categories set out in the Canadian Institute of Mining, Metallurgy and Petroleum's CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines as required by NI 43-101. However, Morumbi is not treating the mineral resources or mineral reserves as current.

The mineral resources in Tables 1.1 and 1.2 are reported inclusive of mineral reserves. Mineral resources which are not mineral reserves do not have demonstrated economic viability.

The 2015 mineral resources and mineral reserves are not supported by a recent NI 43-101 Technical Report. The most recent NI 43-101 report was filed by Breakwater Resources Ltd. in March, 2010.

Morumbi will need to audit the procedures used to acquire the data supporting the estimates and the methodology used to prepare them, in order to disclose them as compliant mineral resources and mineral reserves.

Historical data show that, between 2000 and 2015, reserves at El Mochito have ranged from a high of 5.25 million tonnes in 2011 (sufficient for seven years of production), to a low of 1.75 million tonnes in 2013 (sufficient for slightly more than two years of production).

The El Mochito mine ore is processed in a conventional, differential sulphide flotation mill, normally processing about 2,250 tonnes per day. This facility produces separate zinc and lead concentrates. The process consists of crushing, grinding, flotation, concentrate dewatering and tailings disposal. Flotation recoveries are reported to be typically in the range of 74 to 78% lead, 86 to 90% zinc, and 86 to 93% silver.

All environmental permits are in good standing and there is a good relationship between the government and AMPAC. The mine has a strong social program and has won numerous corporate social responsibility awards in Honduras.

There are several projects (i.e. mill efficiencies, magnetite concentrate sales, explosives manufacturing, etc.), including infrastructure developments (i.e. new power connections), that would provide better efficiencies at the mine complex and lower operating costs in the long-term. The majority of the capital costs for these projects have already been paid for, so the new capital layout would be minimal.

The operation has relied heavily on continued exploration to replace reserves on an on-going basis. It is clear that a major commitment to continued exploration is required. The potential for discovery of additional reserves is considered to be high, at least in the near term.

1.1 RECOMMENDATIONS

Micon recommends that a new, NI 43-101-compliant mineral resource and mineral reserve estimate be undertaken. This compliant resource and reserve will provide the basis for future budgets and financial forecasts. The estimate should make use of all the recommendations highlighted in the Arseneau audit report (2015) described elsewhere in this report.

The updating of the historical resources and reserves will need to be supported by an independent Technical Report. It is anticipated that this will involve re-sampling some (~10%) of the available core in unmined areas for analyses by an independent certified laboratory in order to validate the database. The re-sampling will include reference samples, blanks and duplicates inserted in the batches. The database should be re-modeled using best practises to construct a new block model which will form the basis for the new compliant reserves and resources.

Micon recommends that a Certified Reference Material (CRM) and a certified blank be used as part of the QA/QC protocol.

Micon also recommends that Leapfrog be used to create a new geological model of the mine for future NI 43-101-compliant mineral resource and mineral reserve estimates.

Micon recommends that the budget for exploration (underground development and diamond drilling programs) be increased to compensate for the mineral reserves that have being mined out in the last couple of years. It is also recommended that this drilling program be focused on upgrading the historical resources with some attention paid to new exploration. These new resources will be used to expand the mineral reserves at El Mochito and extend the mine life.

Micon recommends that the capital project initiatives developed by Nyrstar should be critically examined and if warranted, be enacted. It is recommended that the proposed upgrade of the underground ventilation be examined as a matter of priority, and that it be approved, with or without modification to the current design.

Micon also recommends that Morumbi spend the necessary time and money to continue the good relations with the Honduran government, its agencies, communities and the union that Nyrstar has nurtured in the past

Morumbi estimates that a suitable initial definition/exploration drilling program would comprise 7,500 m of underground drilling followed by modelling and report preparation, as summarized in Table 1.3.

Table 1.3
El Mochito Property Proposed Resource and Reserve Review and Definition Drilling Budget

Activity	Amount	Unit Cost (US$)	Costs (US$)
Underground diamond drilling	7,500 m	52.50/m	393,750
Underground drill stations			100,000
Certified reference material			10,250
Analytical costs	3,500 samples	60/sample	210,000
Freight			50,000
Field expenses			15,000
Resampling and analyses			90,000
Modelling			61,000
QP Reserve and Resource Report			260,000
Total Drilling Budget			**1,190,000**

This budget does not include the cost of exploration drifting. Those amounts will be in the mine budget.

Micon has reviewed the program and finds it to be justified and appropriate for the circumstances.

2.0 INTRODUCTION

2.1 Terms of Reference

At the request of Chris Buncic, President and Chief Executive Officer of Morumbi Resources Inc. (Morumbi), Micon International Limited (Micon) has undertaken an independent technical review of the mining and processing operations of the El Mochito zinc-lead-silver property owned by Nyrstar Group/Nyrstar NV (Nyrstar) in Honduras. El Mochito is operated through a subsidiary company, American Pacific Honduras SA de CV (AMPAC). This Technical Report under Canadian National Instrument 43-101 (NI 43-101) has been prepared in connection with the purchase of the El Mochito property by Morumbi. It is understood that it will be used as a qualifying report to support the transaction.

Micon and the subconsultants retained to prepare this report do not have, nor have they previously had, any material interest in Morumbi or any related entities. The relationship between Micon and Morumbi is solely a professional association between the client and the independent consultant. This report is prepared in return for fees based upon agreed commercial rates and the payment of these fees is in no way contingent on the results of this report.

The requirements of electronic document filing on SEDAR necessitate the submission of this report as an unlocked, editable pdf (portable document format) file. Micon accepts no responsibility for any changes made to the file after it leaves its control.

2.2 Information Sources

Micon was given access to the electronic data room compiled by Nyrstar for the purpose of the transaction between Morumbi and Nyrstar. Most of the illustrations in this report are reproduced from documents in the data room.

The most recent NI 43-101 Technical Report was prepared by Breakwater Resources Ltd. (Breakwater) and dated 31 March, 2010: "American Pacific Honduras S.A. de C.V., Mochito Mine, Las Vegas, Honduras, NI 43-101 Technical Report, prepared by Torben Jensen, P.Eng., and Daniel Goffaux, P.Eng."

Breakwater was acquired by Nyrstar effective 31 August, 2011.

2.3 Qualified Persons, Site Visits, and Areas of Responsibility

The primary authors of this report and Qualified Persons are:

- David Makepeace, M.Eng., P.Eng., Senior Geologist and Environmental Engineer.
- Bogdan Damjanović, P.Eng., FEC, associate metallurgist.
- Christopher Lattanzi, P.Eng., associate mining engineer and former President of Micon.

- Jane Spooner, P.Geo., Vice President.
- B. Terrence Hennessey, P.Geo., Vice President and Senior Geologist.

Micon's site visit to the El Mochito operation was conducted between 8 and 13 August, 2016 by David Makepeace.

2.4 UNITS AND ABBREVIATIONS

All currency amounts are stated in US dollars (US$). Quantities are generally stated in metric units, the standard Canadian and international practice, including metric tons (tonnes, t) and kilograms (kg) for weight, kilometres (km) or metres (m) for distance, hectares (ha) for area. Wherever applicable, Imperial units have been converted to Système International d'Unités (SI) units for reporting consistency. Precious metal grades may be expressed in grams (g) or grams per tonne (g/t), parts per million (ppm) or parts per billion (ppb) and their quantities may also be reported in troy ounces (ounces, oz), a common practice in the mining industry. A list of abbreviations is provided in the Table of Contents section.

3.0 RELIANCE ON OTHER EXPERTS

Micon has reviewed and analyzed data provided by Morumbi and has drawn its own conclusions therefrom, augmented by its direct field examination. Micon has not carried out any independent exploration work, drilled any holes or carried out an extensive program of sampling and assaying on the property. Micon has not taken any samples to independently verify the mineralization, since the El Mochito property has been in operation for many years and production records are publicly available.

While exercising all reasonable diligence in checking, confirming and testing it, Micon has relied upon Nyrstar's and Morumbi's presentation of the data relating to the El Mochito property, including data from previous operators, in presenting the information in this report.

Micon and has not reviewed any of the documents or agreements under which Nyrstar holds title to the El Mochito operation or the underlying mineral concessions and offers no opinion as to the validity of the mineral titles claimed. A description of the properties, and ownership thereof, is provided for general information purposes only.

The existing environmental conditions, liabilities and remediation are described herein as required by NI 43-101 regulations, and are also provided for general information purposes.

Micon has relied on information regarding taxation and royalties provided by Morumbi and/or Nyrstar.

The descriptions of geology, mineralization and exploration are taken from the 2010 Technical Report prepared by Breakwater (Jensen et al., 2010), and from material provided by Nyrstar. Based upon its review, Micon has no reason to doubt the validity of such data.

Micon is pleased to acknowledge the helpful cooperation of Morumbi and Nyrstar personnel, all of whom made any and all data requested available and responded openly to all questions, queries and requests for material.

4.0 PROPERTY DESCRIPTION AND LOCATION

Nyrstar owns the El Mochito mine and processing facilities (El Mochito or the property) which are operated through AMPAC.

The El Mochito property is located in northwest Honduras, near the town of Las Vegas, approximately 88 km southwest of San Pedro Sula and 220 km northwest of the capital city, Tegucigalpa, as shown in Figure 4.1. The property consists of an underground zinc-lead-silver mine and a concentrator producing separate zinc and lead concentrates.

Figure 4.1
El Mochito General Location Map

Source: Nyrstar, 2016. True north is at top of the figure as shown by grid.

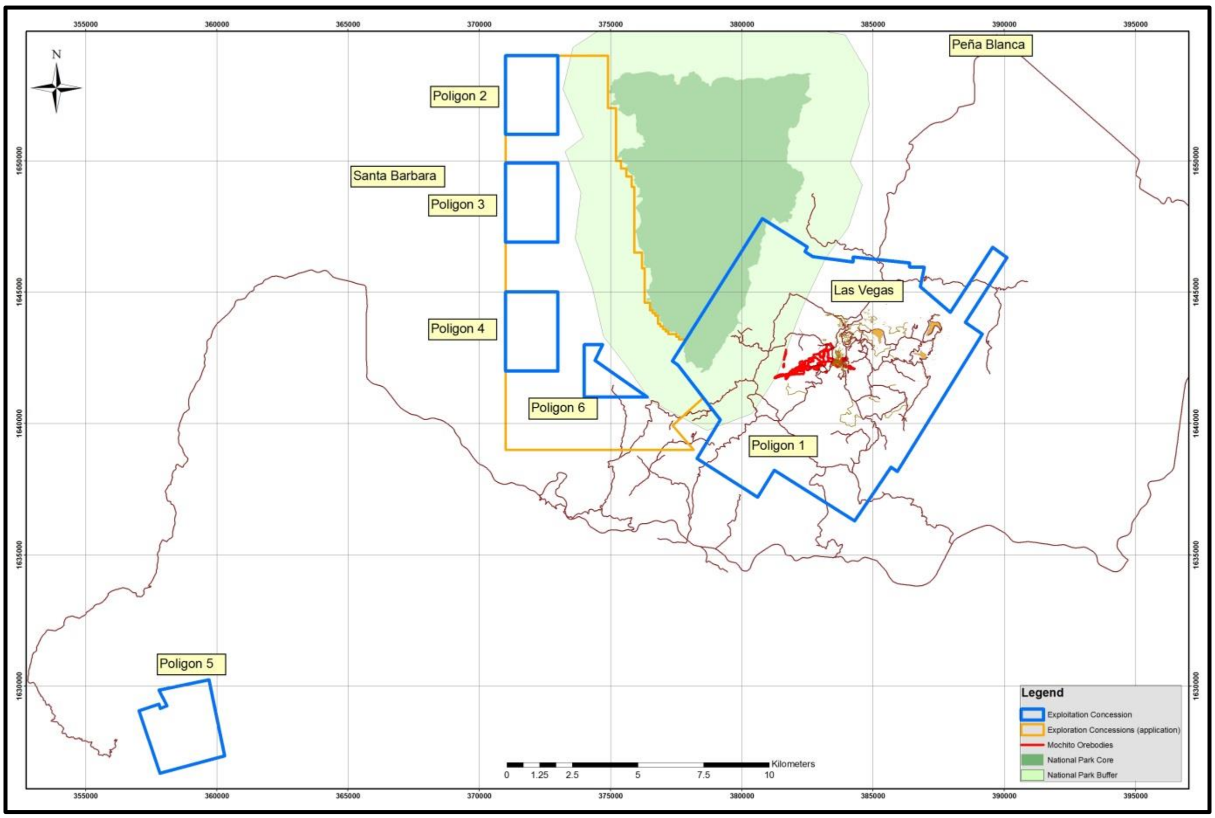
The El Mochito property comprises six mining concessions totaling approximately 11,000 ha, as shown in Table 4.1. These were confirmed in 2014 by the Instituto Hondureño de Geología y Minas (INGHEOMIN) and are illustrated in Figure 4.2.

Table 4.1
List of Polygonal Mining Concessions

Concession	Longitude	Latitude	Area (ha)
El Mochito 1			8,199.56
Corner 1	382704	1646346	
Corner 2	384241	1646143	
Corner 3	384247	1646333	
Corner 4	386400	1646111	
Corner 5	386393	1645952	
Corner 6	386952	1645940	
Corner 7	386800	1645203	
Corner 8	387949	1644225	
Corner 9	389556	1646702	
Corner 10	390108	1646308	
Corner 11	388514	1643850	
Corner 12	389162	1643399	
Corner 13	385923	1638173	
Corner 14	385688	1638332	
Corner 15	384302	1636298	
Corner 16	381244	1638223	
Corner 17	380600	1637198	
Corner 18	378297	1638665	
Corner 19	379180	1640142	
Corner 20	377573	1642225	
Corner 21	377351	1642377	
Corner 22	380780	1647800	
Corner 23	382501	1646714	
Corner 24	382405	1646543	
Corner 25	382704	1646346	
El Mochito 2			600
Corner 1	373000	1654000	
Corner 2	373001	1650999	
Corner 3	371000	1651000	
Corner 4	371000	1654000	
El Mochito 3			600
Corner 1	373000	1649900	
Corner 2	373000	1646900	
Corner 3	371000	1646900	
Corner 4	371000	1649900	
El Mochito 4			600
Corner 1	373000	1645000	
Corner 2	373000	1641999	
Corner 3	371000	1642000	
Corner 4	371000	1645000	

Concession	Longitude	Latitude	Area (ha)
El Mochito 5			770.18
Corner 1	359700	1630250	
Corner 2	360300	1627350	
Corner 3	357829	1626692	
Corner 4	357035	1629066	
Corner 5	357791	1629324	
Corner 6	357847	1629155	
Corner 7	358100	1629250	
Corner 8	357800	1629850	
El Mochito 6			229
Corner 1	376400	1641000	
Corner 2	374000	1641000	
Corner 3	374000	1643000	
Corner 4	374700	1643000	
Corner 5	374400	1642400	
Total			**10,998.74**

Figure 4.2
El Mochito Concessions



Source: Nyrstar GIS, 2016.

AMPAC has sole title to the concessions, which expire in 2027. In addition, AMPAC has title to extensive surface lands covering a portion of the claim concessions (Polygon1); these surface lands are necessary for service facilities, surface mine and mill facilities, present and future tailings dams, exploration activities and water springs.

Mineralized material is mined by underground methods from the Nacional, Santo Niño, Lower San Juan, Salva Vida, Yojoa, La Leona, Imperial and Canoe orebodies and is treated in a centralized processing plant. Zinc and lead concentrates are produced by differential flotation and shipped to a warehouse at the port of Puerto Cortés, 35 km north of San Pedro Sula on the Gulf of Honduras.

Approximately 30% of process tailings are used as backfill for the mined stopes.

4.1 ROYALTIES AND TAXES

It is understood that a mining royalty is payable to the government of Honduras, at a rate of 6% of the annual net smelter return. It is also understood that income taxes are levied at a rate of 25% of taxable income.

4.2 ENVIRONMENTAL LIABILITIES

Micon has found no environmental liabilities for the mine, in the data provided by Nyrstar or during the site visit, other than those normally associated with reclamation and closure.

4.3 PERMITS

Environmental permits are a combination of the official certificate and the government approved contract (mitigation requirements). Due to Honduran government bureaucracy and workloads, the mine does not have many of the current official certificates. However, all contracts for every permit have been approved by the government agencies and are complied with by AMPAC.

Micon is not aware of any significant factors and risks other than those discussed in this technical report that may affect access, title, or the right or ability to perform work on the property.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

Located in the Department of Santa Barbara, the El Mochito mine and processing facilities are situated on the slopes of Santa Barbara mountain (second highest, in Honduras), overlooking the town of Las Vegas, a rural community of approximately 25,000 people.

Access to the property is from San Pedro Sula with a population of approximately 700,000. San Pedro Sula has an international airport (Ramon Villeda Morales - SAP) that provides access to Mexico and the United States with service by Aeromexico, United Airlines and Delta Airlines.

The road access from the airport is via the main paved road (CA5) to Tegucigalpa. CA5 is a toll road and is partially a four-lane divided highway. At the town of La Guama and Lake Yojoa, a two-lane paved road (N-54) leads to Peña Blancha. A secondary two-lane paved road (N-72) then leads to the town of Las Vegas and to El Mochito. The journey takes approximately two to three hours, depending on the traffic. All roads within the El Mochito complex are well maintained gravel roads.

The mine is located at an elevation of 900 m in a mild, semi-tropical climate. Maximum daily temperatures range from 23°C to 29°C and average rainfall per annum is 2,300 mm. Operations continue year-round.

Electrical power at El Mochito is supplied by the national grid belonging to Empresa Nacional de Energía Eléctrica (ENEE) which was created and is owned by the Honduran government. Presently, the mine is fed by an electric distribution powerline (34.5 kV) from hydroelectric power dams near Peña Blancha. Electric power is not reliable, especially during the rainy season. Nyrstar has an emergency backup diesel generating station and is working toward a more dependable power supply (see Section 18.7).

Water requirements are met by local surface creeks and springs which are covered by an environmental permit and an annual tax.

Explosives are currently sourced from the Honduran military in accordance with regulatory requirements. Nyrstar is working on an initiative to achieve less expensive and better quality explosives with the government (see Section 18.9).

The underground mine is approximately 1.5 km from the mill. An old company-type town was established in the 1960s and is located beside the mill. There are three tailings storage facilities (TSF) at the El Mochito complex. The El Bosque and Pozo Azul TSFs are in the process of being reclaimed. La Soledad TSF is the current active tailings pond. Seventy percent of the tailings produced at the mill go into La Soledad. The remaining 30% are returned underground as backfill. A new tailings pond (Douglas) is in the design and permitting stage and is expected to be online in 2019 (see Section 18.6).

6.0 HISTORY

El Mochito was originally discovered in 1938. In 1943, a New York and Honduras company (Rosario Mining Company) purchased the property and, in 1946, construction commenced on a small mill.

Production began in 1948, with the initial zinc products being a jig concentrate containing native silver, a bulk flotation concentrate and a silver product. The operation rapidly became the largest producer of precious and base metals in Central America. In 1960, increased volumes of sulphide material produced from deeper levels in the mine allowed economic preparation of separate zinc and lead concentrates.

In 1973, the company was renamed Rosario Mining Corporation (Rosario). It was acquired by Amax Inc. (Amax) in 1980 and operated as a subsidiary of Amax. For a period in 1987, the El Mochito operation was closed due to high taxes, labour problems and high operating costs.

In September 1987, AMPAC purchased the El Mochito mine, a concentrate warehouse located at Puerto Cortés and the San Juancito property. The mine was re-opened in October, 1987.

In March, 1990, Breakwater Resources Ltd. (Breakwater) acquired AMPAC by way of an amalgamation of AMPAC and a wholly-owned subsidiary of Santa Barbara Mining Company, Inc.

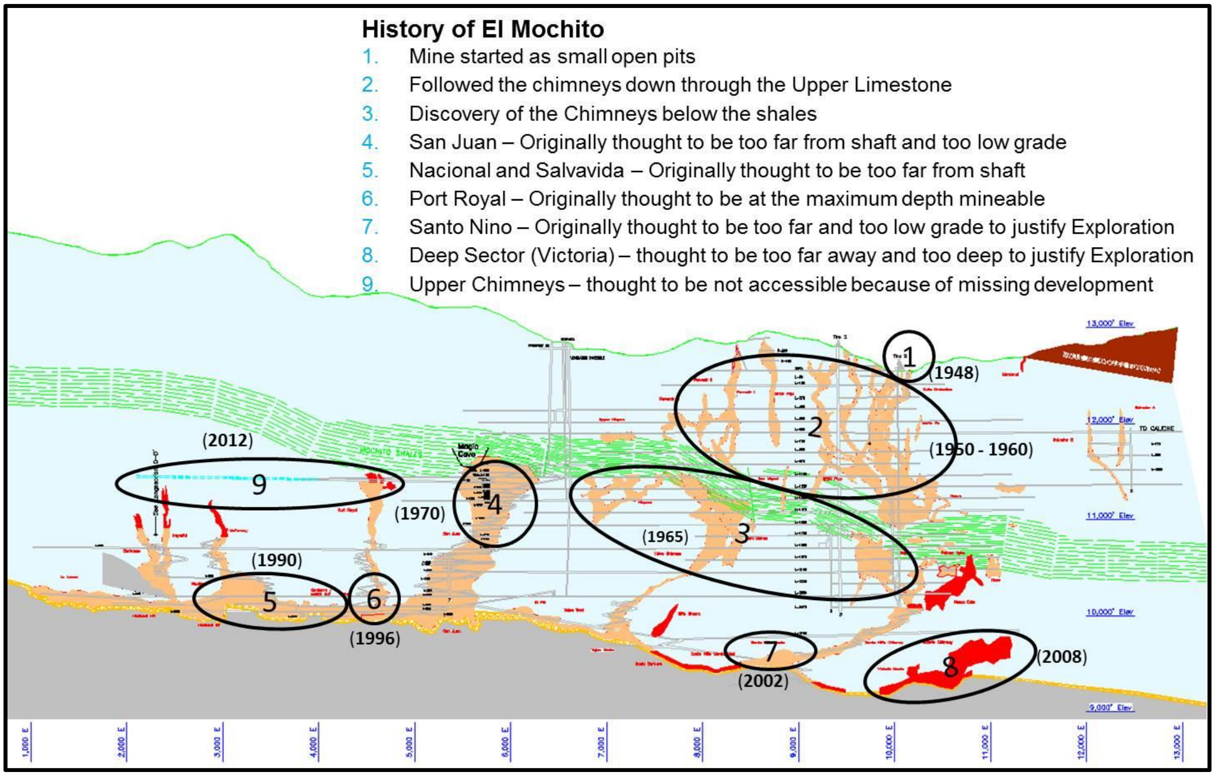
Effective August 31, 2011, Nyrstar Group acquired Breakwater and, thereby, acquired the El Mochito operation. Nyrstar owns the El Mochito mine and processing and port facilities which are operated through AMPAC.

Except for a short period in 1987, the mine has been in production for 68 years. The mill has been expanded several times and has a nameplate capacity of 2,300 t/d.

6.1 EXPLORATION AND DEVELOPMENT

As noted above, El Mochito has been in continuous operation since 1948 except for a period in 1987. The mine's historical development is illustrated in Figure 6.1.

Figure 6.1
Historical Mining Cross-Section of El Mochito



Source: Nyrstar, 2016, Morumbi Data Room 1.6.9.11.5, Slide 3

Exploration has been conducted by Nyrstar since 2011, and by Breakwater over the preceding 20 years, with the objectives of improving the overall understanding of the geology and mineralization, replacing mined material and upgrading inferred mineral resources into higher confidence resource and reserve categories.

Nyrstar's statement of mineral resources and mineral reserves dated 27 April, 2016 described work undertaken in 2015 as follows:

> "During 2015, total ore mined at El Mochito mine was approximately 754 thousand tonnes. During the year focus was laid on improving details in the geological models to take into account local structures as dykes and faults, which have influence on the location of the mineralization. A review was also undertaken of the specific gravity (SG) or density of the rock-types at El Mochito, and the review resulted in a decrease of 5% that will impact metal content. This, together with detailed definition drilling, resulted in adjustment in the geological models. In the case of the manto style mineralization, there was an increase the volume. Regardless of all the changes made, gains were achieved in all planned drilling target areas. In Santa Barbara and Victoria Inferred Mineral Resources were upgraded to Measured and Indicated categories, and in Santa Elena new Inferred Mineral Resources were added. In addition a new chimney style orebody, known as Esperanza, was discovered and added to the Inferred Mineral Resources.

"The El Mochito mine has a long history of Mineral Resource and Mineral Reserve replacement and promising exploration mineral potential, but more exploration drilling is required in order to upgrade Mineral Resources into Mineral Reserves and define additional Mineral Resources. In 2015, the primary focus was on the definition of already known ore bodies and upgrading, where possible, Inferred Mineral Resources into Mineral Reserves. In 2016, exploration drilling will be focused on the extension of high grade ore bodies and the continuation of the known mineral trends."

6.2 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

Nyrstar published mineral resources and mineral reserves for El Mochito as at the end of 2014 and 2015 in a news release dated 27 April, 2016 and published on the website, www.nyrstar.com. The estimates are provided in Table 6.1 and Table 6.2.

Table 6.1
Mineral Resource Statement

Metal	Unit	Measured Mineral Resources		Indicated Mineral Resources		Measured plus Indicated Mineral Resources		Inferred Mineral Resources	
		2015	2014	2015	2014	2015	2014	2015	2014
	Mt	1.38	1.53	4.03	5.90	5.40	7.44	3.86	4.15
Zinc	%	5.22	4.91	4.72	4.43	4.85	4.53	5.11	5.13
Lead	%	1.93	1.97	1.65	1.48	1.72	1.58	1.38	1.37
Silver	g/t	62.10	66.40	38.80	37.40	44.70	43.40	35.00	34.30

Nyrstar, 2016b, 2015 Mineral Resource and Mineral Reserve Statement 27 April, 2016.

Table 6.2
Mineral Reserve Statement

Metal	Unit	Proven Mineral Reserves		Probable Mineral Reserves		Total Mineral Reserves	
		2015	2014	2015	2014	2015	2014
	Mt	0.57	0.72	1.34	2.31	1.91	3.03
Zinc	%	4.59	4.93	4.94	4.96	4.84	4.95
Lead	%	2.63	2.61	2.27	1.93	2.38	2.10
Silver	g/t	77.40	89.40	47.60	45.30	56.50	55.80

Nyrstar, 2016b, 2015 Mineral Resource and Mineral Reserve Statement 27 April, 2016.

The mineral resources and mineral reserves presented in Tables 6.1 and 6.2 above are historical in nature as described in NI 43-101. They were prepared prior to the agreement to acquire the property by Morumbi and a Qualified Person has not yet verified them as current. At this time, the relevance and reliability of the estimates are not known. The estimates are classified using the categories set out in the Canadian Institute of Mining, Metallurgy and Petroleum's CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines, as required by NI 43-101. However, Morumbi is not treating the mineral resources or mineral reserves as current.

The mineral resources in Tables 6.1 and 6.2 are reported inclusive of mineral reserves. Mineral resources which are not mineral reserves do not have demonstrated economic viability.

The 2015 mineral resources and mineral reserves are not supported by a recent NI 43-101 Technical Report. The most recent NI 43-101 report was filed by Breakwater in March, 2010.

Morumbi will need to audit the procedures used to acquire the data supporting the estimates and the methodology used to prepare them, in order to disclose them as compliant mineral resources and mineral reserves.

In the 2015 mineral resource and mineral reserve statement dated 27 April, 2016, Nyrstar states:

> "The Mineral Resource and Mineral Reserve estimates for the El Mochito mine are developed using Geovia GEMS modelling software utilizing a zinc equivalent cut-off grade based off NSR calculation models. The cut-off grade for Mineral Resources was 3.3% zinc equivalent and for Mineral Reserves it was 7.1% zinc. Block models have been created for the various zones using an inverse distance squared interpolation. The Mineral Reserves have been estimated by applying dilution and recovery factors to the Mineral Resources in laterally and vertically continuous zones with economic metal grades. The drill hole databases, which is the basis for both geological and Mineral Resource modelling, are constantly reviewed and updated. There is an active quality assurance/quality control program in place at El Mochito which is in line with industry standards."

> "This statement is reported in accordance with the NI 43-101 Guideline for disclosure and based on information from a Mineral Resource and Mineral Reserve statement prepared under the supervision of Isidro Aguirre, Manager Geology & Exploration; Olaf Scholtysek, Senior Geologist; and non-independent QP Jason K. Dunning, P.Geo. (APGO & APEGBC), Mining Group Manager - Geology & Exploration in accordance with the CIM Definition Standards."

General statements regarding estimation of mineral resources and mineral reserves were provided in the same news releases as follows:

> "Commodity prices and exchange rates used to estimate the economic viability of Mineral Reserves are based on long term forecasts applied at the time the estimate was calculated. Nyrstar's internal metal price assumptions for estimation of year-end 2015 Mineral Resources and Mineral Reserves are as follows: Zinc USD 2,100/t, Lead USD 2,000/t, Copper USD 5,500/t, Silver USD 18.00/oz., and Gold USD1,200/oz. The exchange rate for USD to EUR for the purpose of estimating year end 2015 Mineral Resource and Mineral Reserves is 1.30."

6.3 PRODUCTION

Recent production at El Mochito is summarized in Table 6.3.

Table 6.3
Recent Production History

	Unit	2011 First Half Breakwater[1]	2011 Fourth Quarter Nyrstar[2]	2012[3]	2013[3]	2014[4]	2015[4]
Ore milled	kt	333		748	775	756	766
Head grades							
Zinc	%	4.6		4.07	3.82	4.56	3.52
Lead	%	2.3		2.08	1.90	2.61	1.70
Silver	g/t	86		77.72	76.17	85.86	51.79
Recovery							
Zinc	%	85.3		84.1	85.2	85.6	86.4
Lead	%	84.1		78.9	78.6	78.6	76.6
Silver	%	60.6		86.5	86.2	87.5	87.8
Concentrate tonnes							
Zinc	kt	24.4		50	49	60	45
Lead	kt	10.5		20.4	18.0	24.3	15.2
Metal in concentrate							
Zinc	kt	12.9	10	26	25	29.5	23.0
Lead	kt	6.4	4.9	12.4	11.6	15.5	9.8
Silver	Moz	0.804	0.6	1.627	1.637	1.827	1.105

[1] Breakwater, 2011, Second Quarter Report (MD&A), 28 July, 2011.
[2] Nyrstar 2012 Annual report - production under Nyrstar ownership.
[3] Nyrstar, 2014, news release 6 February, 2014, 2013 Full Year Results.
[4] Nyrstar, 2016a, news release, 4 February, 2016, 2015 Full Year Results.

Historical production reported by Breakwater for the five-year period between 2006 and 2010 is shown in Table 6.4.

Table 6.4
Historical Production

	Unit	2006	2007	2008	2009	2010[1]
Ore milled	t	690,243	607,583	646,845	726,818	714,168
Head grade						
Zinc	%	6.0	5.4	5.0	5.7	5.6
Lead	%	2.1	2.1	2.4	2.4	2.9
Silver	g/t	92	102	103	93	96
Recovery						
Zinc	%	90.4	88.9	88.6	87.8	85.0
Lead	%	81.0	78.6	82.4	83.6	82.6
Silver	%	87.1	86.9	88.2	85.5	n.a.
Concentrate grade						
Zinc	%	52.0	52.0	53.0	53.0	52.6
Lead	%	68.2	66.0	66.5	65.5	64.4
Concentrate tonnes						
Zinc	t	72,413	56,205	53,757	68,552	64,401
Lead	t	17,263	15,470	18,865	21,110	26,311
Metal in concentrate						
Zinc	t	37,646	29,211	28,462	36,370	33,839
Lead	t	11,775	10,215	12,545	14,471	16,954
Silver	oz	1,769,456	1,732,755	1,894,835	1,855,018	1,869,833

[1] Canadian and American Mines Handbook, 2011-12.
Source: Jensen et al., 2010

7.0 GEOLOGICAL SETTING AND MINERALIZATION

The following description of the regional and local geology, and mineralization is based on Jensen et al., 2010.

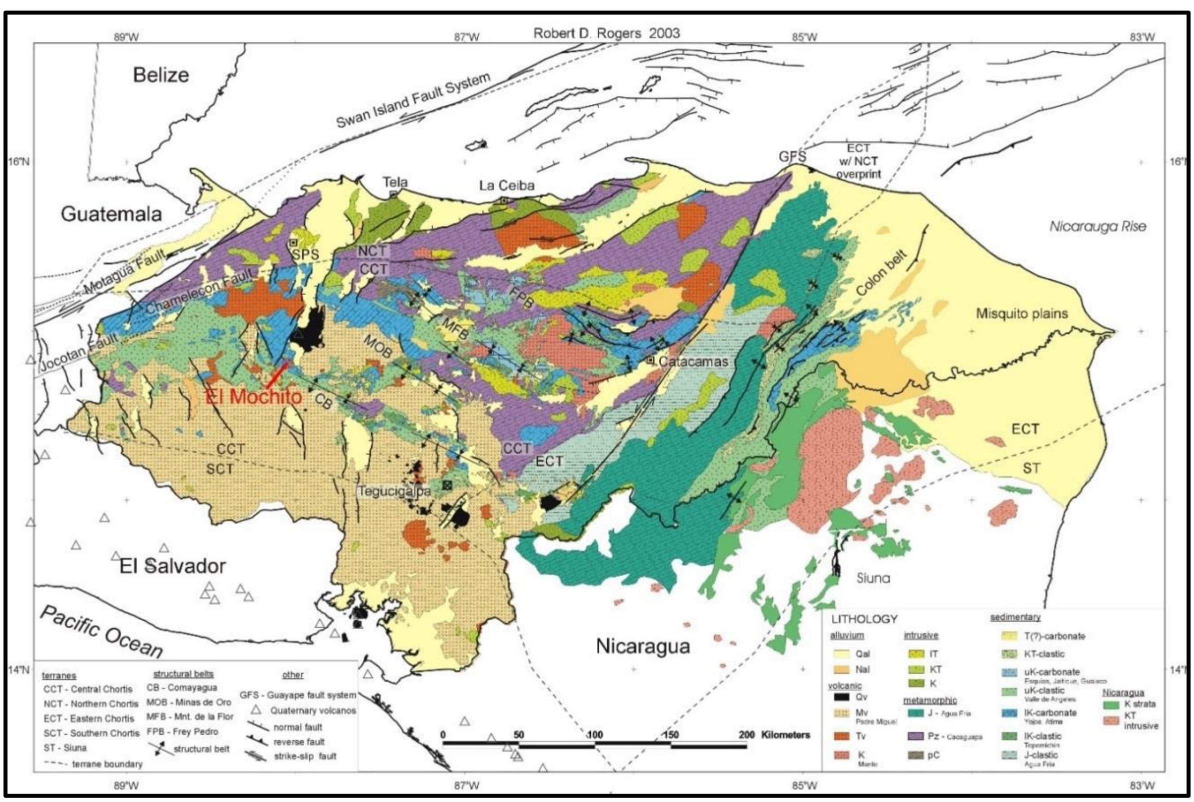
7.1 GEOLOGICAL SETTING

7.1.1 Regional Geology

The El Mochito mine is located in west-central Honduras, a short distance to the south of the Motagua Fault or suture zone that separates the North America Plate to the north from the Caribbean Plate to the south (see Figure 7.1). El Mochito is located at the southern end of the approximately north-south trending Sula graben, which may be related to a left-lateral offset along the Motagua suture zone during the Late Tertiary period.

Much of central and southern Honduras is covered by volcanic rocks of the Tertiary Matagalpa Formation related to subduction along the Middle America trench which lies off the western coast of Central America. Northwards, these volcanics become thinner and the underlying sediments of the Mesozoic shelf and metamorphosed basement rocks of Paleozoic age are exposed.

Figure 7.1
Regional Geological Map



Source: Rogers et al., 2007.

The stratigraphic succession of the El Mochito area and surrounding parts of Honduras is summarized in Table 7.1, based on Vázquez et al., 1998.

Table 7.1
Stratigraphy of Central Honduras

Period	Epoch	Formation	Description	Thickness (m)	Mineralization at El Mochito
Quaternary	Pleistocene	Gracias			
Tertiary	Pliocene	Padre Miguel	Felsic tuffs		
	Miocene				
	Oligocene	Matagalpa	Andesite and basalt	Several hundred	
	Eocene				
	Paleocene	Valle de Angeles	Red beds, minor limestone and marl	Several hundred	
Upper Cretaceous	Cenomanian to Maastrichtian				
Lower Cretaceous	Albian	Upper Atima	Micritic limestone	>500	Host for upper chimneys
		Mochito Shale	Mainly limey siltstone	150	Ponding mantos at lower contact
		Lower Atima	Micritic limestone	500	Host for lower chimneys
	Aptian	Cantarranas	Limey siltstone and silty limestone	25-35	Host for basal manto
	Berriasian to Barremian	Todos Santos	Siltstone, sandstone, conglomerate	Several hundred	Local skarn formation
Upper Jurassic					

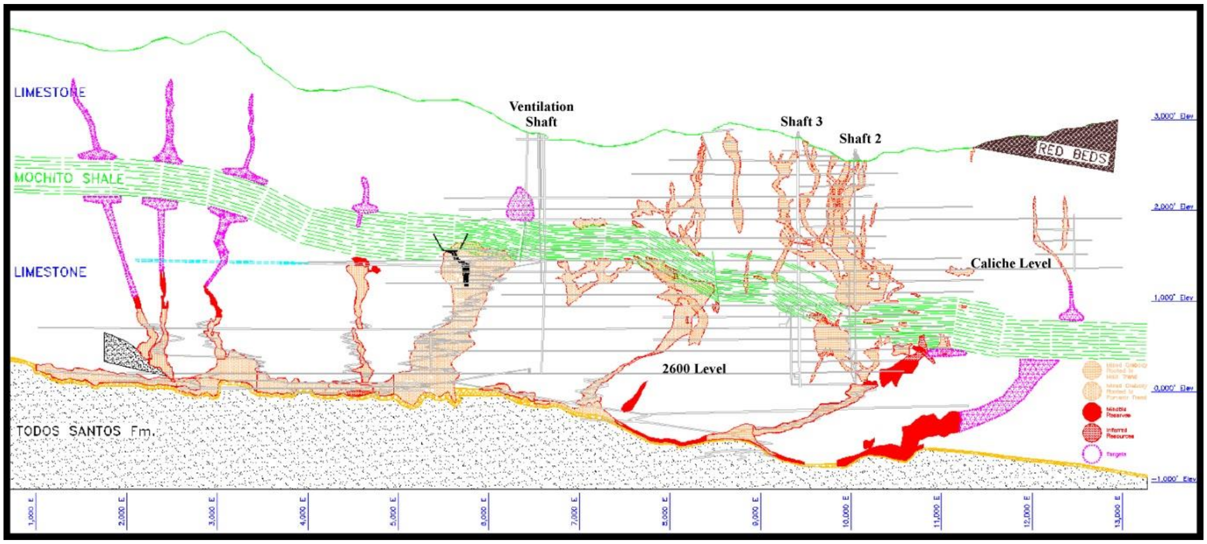
Source: Jensen et al., 2010.

7.1.2 Local Geology

In the El Mochito mine area, the oldest exposed sediments are the clastic sediments of the Todos Santos Formation. The Cantarranas Formation is a 30-m thick sequence that is gradational between the Todos Santos Formation and the overlying Atima limestone.

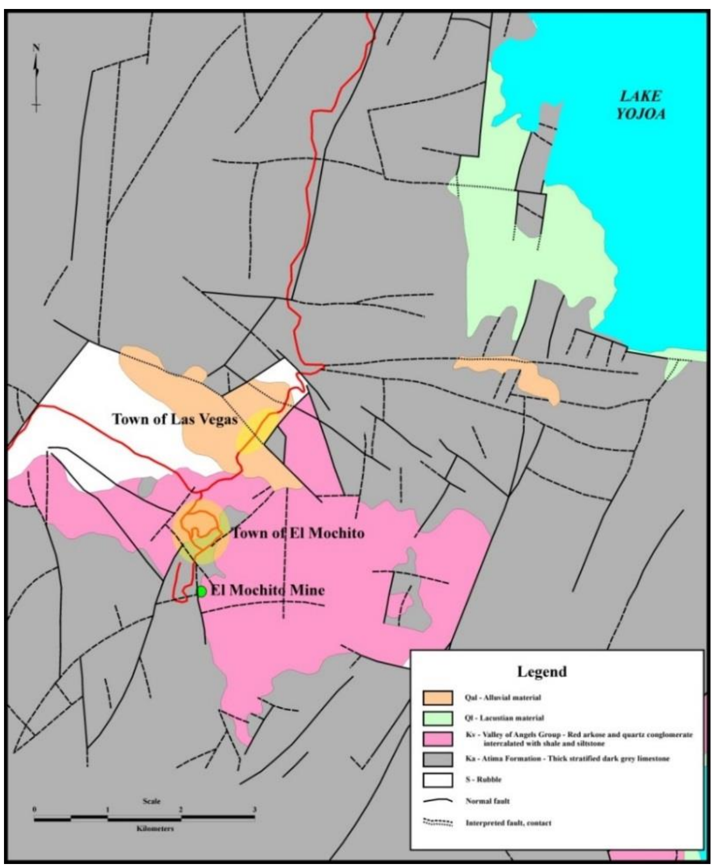
The Atima Formation, a dark grey, massive micritic to biomicritic limestone with shale partings, is subdivided into a lower and an upper part, separated by the Mochito Shale, a 150-m thick sequence of limey shales with intercalated limestone beds. The entire package is over 1,200 m thick. The red bed sequence of the Valle de Angeles Formation unconformably overlies the Atima limestone. See Figure 7.2 and Figure 7.3.

Figure 7.2
Cross-Section of Local Geology



Source: Nyrstar 2016, 1.6.9.11.5 modified, looking approximately north.

Figure 7.3
Local Geological Map



Source: Santa Bárbara - Geología Honduras, 1:50,000 CA-4-1979, HOJA 2560 I G.

As shown in Table 7.1, the Cantarranas and Atima Formations host the mineralization of the El Mochito mine in “mantos” and “chimneys” or “pipes”. The manto deposits follow the essentially flat bedding of the host sediments, while the chimney or pipe deposits cut across the bedding. At El Mochito, mantos formed at the lower contact of the Atima limestone, where upwelling solutions emerged from the underlying Todos Santos siltstone package. Mantos also formed at the lower contact of the Mochito shale, a 150-m thick limey siltstone unit some 550 m above the base of Atima limestone. There is also a tendency for the formation of manto-like bodies immediately above the Mochito shale, from which a number of individual pipes rise into the 450 m of overlying upper Atima limestone.

It is generally accepted that a set of pre-existing faults guided the ascent of the mineralizing fluids. Of particular importance are the sub-parallel, generally east-northeast trending Porvenir, Main and Nacional/Salva Vida faults. All of the major mineralized bodies discovered to date at El Mochito are localized by the intersection of these faults with north-northeast trending “N” style faults.

Post-mineralization faulting is ubiquitous. A prominent set strikes northeasterly and has steep dips, with the hanging-wall side moving down.

7.2 MINERALIZATION

The known mineralization at El Mochito occurs within a rock volume measuring some 2.5 km east-west and 600 m north-south, with a vertical (stratigraphic) extent of more than 1,000 m. Within these dimensions, the known mineralized bodies occupy 0.3% of the overall volume.

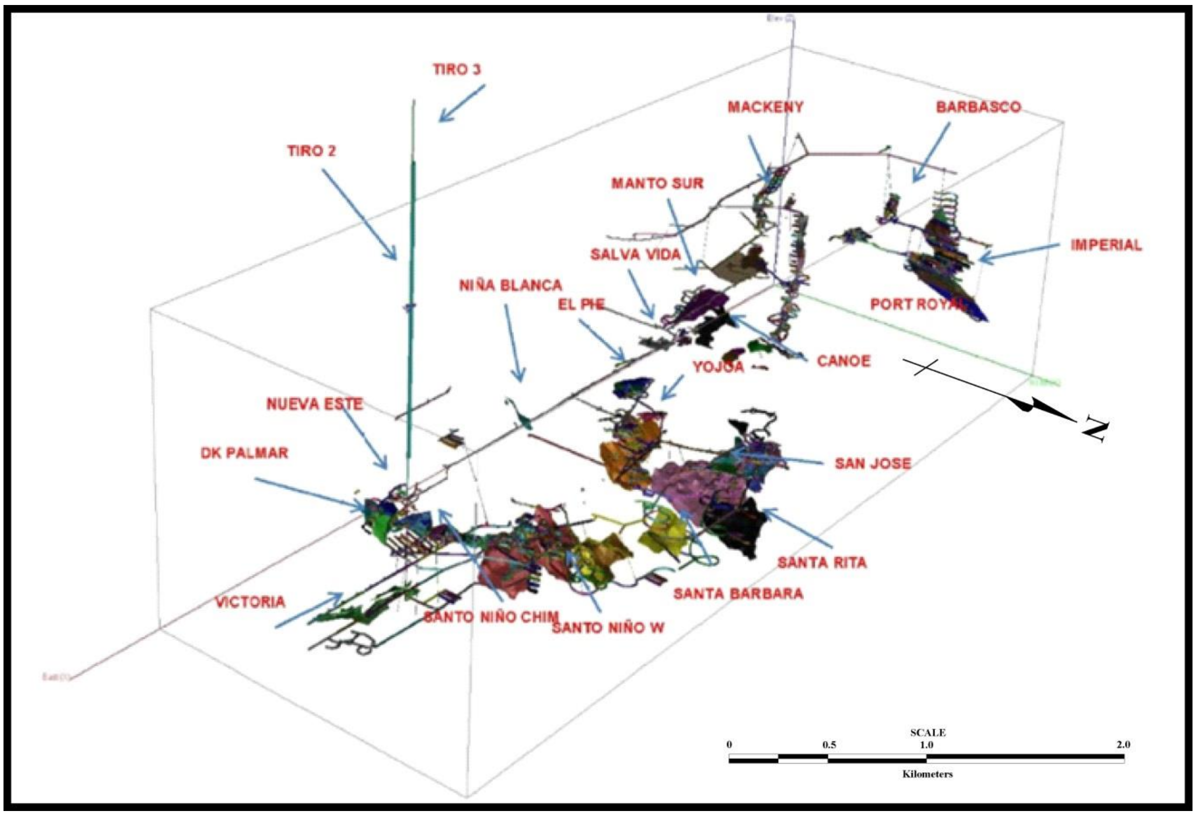
In many cases, a chimney-type connection between the lower and upper mantos is present, the largest of which is the San Juan pipe, now largely mined out. Others are the Nacional, Salva Vida, Yojoa, Niña Blanca and Nueva pipes. Overall, some 70% of the total known tonnage at El Mochito occurs in the chimney/pipe setting.

The high-grade Port Royal zone and the Barbasco zone are similar to smaller high-grade zones mined decades ago; however, they occur more than 770 m west of similar structures previously mined and confirm the continuing exploration potential of these structures. Since the discovery of Barbasco in 2001, the alteration and mineralized footprint of El Mochito has nearly doubled, with the discovery and delineation of deposits at Santo Niño, San Jose, Salva Vida NE, Palmer Dyke and most recently, Imperial. See Figure 7.4.

The deposits exhibit typical zinc skarn mineralogy, consisting of pyroxene and garnet with sphalerite, argentiferous galena, magnetite, pyrrhotite, pyrite, chalcopyrite and arsenopyrite. Deposits along the fault-controlled Salva Vida-Nacional trend grade outward and upward from zinc-iron rich cores to lead-rich and marginal silver-rich zones. Garnet/pyroxene ratios progressively decrease away from fault zones toward unaltered limestone and along the trend of the deposits (northeast to southwest). Changes in zinc/lead, zinc/copper, lead/copper and copper/silver ratios along trend appears to reflect the direction of hydrothermal fluid flow (northeast to southwest) and increased distance from a potential source region.

Generally, sulphide mineralization consists of sphalerite and galena with minor chalcopyrite. Sphalerite may have inclusions of the last two minerals and is preceded by magnetite, pyrrhotite and pyrite, generally followed by galena and may be contemporaneous with chalcopyrite. Chimneys developed in the lower Atima Formation tend to have a general mineralogical zoning, with zinc increasing at depth and lead-silver in the upper levels.

Figure 7.4
Principal Mineralized Zones at El Mochito



Source: Nyrstar, 2016.

Silicate mineralization at El Mochito is typical of skarn deposits and generally consists of an assemblage of medium to coarse grained primary silicates, such as grossular to andradite garnet, hedenbergitic pyroxene in addition to quartz, calcite, minor vesuvianite and rhodochrosite, as well as a common assemblage of epidote-quartz-calcite-chlorite- iron oxide.

Locally, retrograde minerals after pyroxene (predominantly hedenbergite) are found, including epidote, quartz-calcite-chlorite-manganese-actinolite-iron oxide. Some clay minerals have also been identified, including smectite-nontronite and iron/saponite.

In the eastern part of the mine, a number of thin, partly altered olivine-diabase dikes occur and appear to have channeled some of the mineralizing solutions. The possible age of these dikes indicates that the mineralization is post mid-Tertiary in age.

8.0 DEPOSIT TYPES

The following description is based on Jensen et al., 2010.

Zinc-lead-silver mineralization at El Mochito is an example of high-temperature carbonate replacement (skarn) mineralization, which includes the following deposits located along the Cordillera of the Americas:

- Sa Dena Hes, Yukon Canada
- Midway, British Columbia, Canada
- Gilman, Colorado, United States
- Leadville, Colorado, United States
- Tintic, Utah, United States
- Park City, Utah, United States
- Eureka, Nevada, United States
- Pioche, Nevada, United States
- Santa Eulalia, Chiahuahua, Mexico
- Naica, Chiahuahua, Mexico
- Zimapán, Hidaldo, Mexico
- Santander, Peru
- Cerro de Pasco, Peru

Carbonates are particularly susceptible to replacement by acid hydrothermal solutions which, in the case of El Mochito, have deposited skarn minerals such as garnet, epidote and pyroxene, together with sulphides of iron, zinc and lead. Mineralization occurs in two forms - “mantos” which follow the bedding of the host rock, and “chimneys” or “pipes” which cut across the bedding. Both forms occur at El Mochito.

Mineralization at El Mochito is of the distal skarn type in that it is not spatially related to an igneous body.

9.0 EXPLORATION

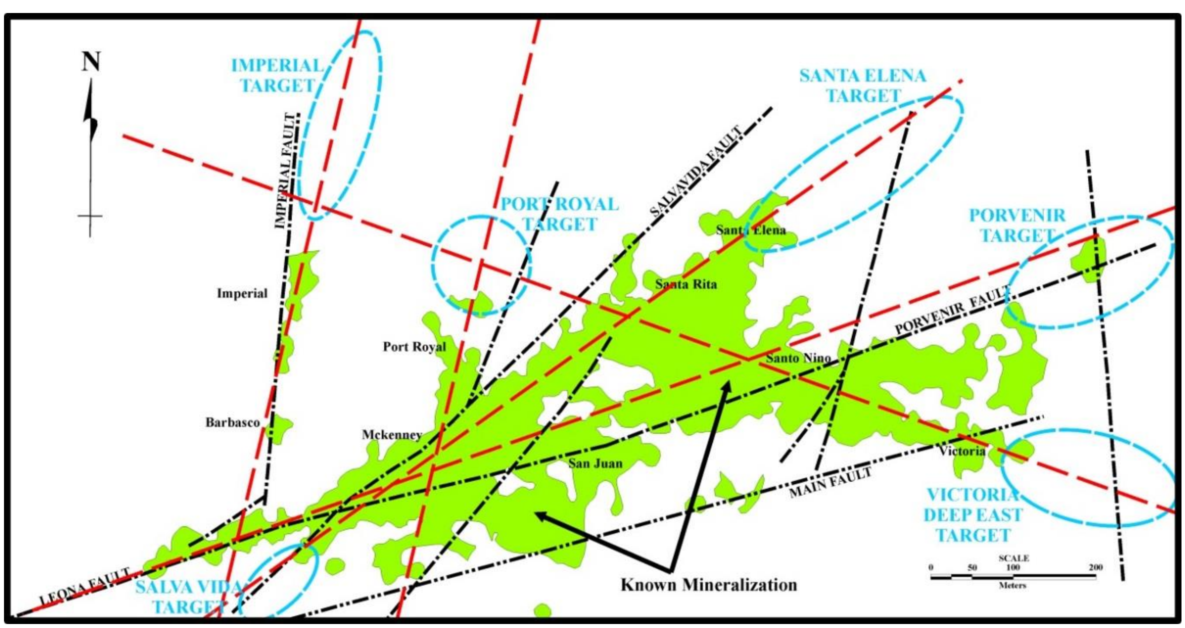
The El Mochito area has been explored since the early 20th century using reconnaissance prospecting, reconnaissance geology and soil geochemistry. There were few surface exposures of economic mineralization, due to the relative flat lying nature of the limestone lithology.

The mine started operation in 1948, based on exposures of surface chimney economic mineralization. Over the next several decades, economic mineralization was identified by surface and underground diamond drilling. As the mine progressively developed below the Mochito Shale unit (see Figure 7.2), underground development and underground drilling became the most important exploration tool for the mine.

The mine continues to be successful in finding new manto and chimney deposits along the prominent fault and mineralized trend systems, suggesting that the geological model is operating well and continues to serve as a guide for finding future resources. These trends, along with long surface drill holes, have provided good exploration targets to find addition mineralization. They include the following areas which are illustrated in Figure 9.1:

- Porvenir Trend.
- Victoria Deep East Trend.
- Santa Elena Trend.
- Imperial Trend.
- Salva Vida Trend.
- Port Royal.

Figure 9.1
Underground Exploration Targets



Source: Nyrstar, 2016, 1.6.9.11.5, Slide 9

Potential near surface chimney deposits may exist under the thick surface oxide layer and above the Mochito Shale. This is based on historic chimney deposits that have been mined out. These historic deposits continued above the shale unit and terminated in the oxide layer. It is suspected that chimneys exist above the following deposits:

- Port Royal.
- McKenney.
- Imperial.
- Barbasco.

These areas will require underground track development, slashed out drill stations and the necessary diamond drilling to explore this potential mineralization.

Several surface drill holes have intersected mineralization at depth outside the mine workings, including the Caliche, Soledad and Big Fuzzy areas. These areas have not been followed up but may lead to the discovery of future deposits.

Numerous geochemical anomalies, outcrops and limited drilling have identified potential mineralization in the western buffer zone of the new Santa Barbara National Park (see Figure 4.2). Nyrstar is presently negotiating with the Honduran government to give it an exploitation concession for this area. If this concession is granted and if economic mineralization is identified, it is understood that Nyrstar will agree to mine the deposit(s) from underground.

The mine has accumulated a large number of old geological maps and reports of the area and throughout Honduras. The geological staff is presently cataloguing and scanning maps into a digital format. It is hoped that these documents will lead to discovery of new deposits.

Nyrstar has purchased a Leapfrog geological software licence. Geological staff should be trained on this software so that they can better model the deposits, lithology and faults of the mine. This software can effectively and quickly model structures and deposits in 3D, without the need of creating complicated wireframes that most mining software packages presently use. The drill database can be used in both Leapfrog and GEMS™.

Micon recommends that Leapfrog be used to create a new geological model of the mine. The GEMS™ software can then be used for future internal mineral resource estimations. National Instrument (NI) 43-101 Qualified Persons can utilize the Leapfrog digital terrain models (DTM) created by the mine geological staff to assist in their compliant NI 43-101 mineral resource and mineral reserve estimates.

10.0 DRILLING

Drilling has been carried out on the property since 1949. Table 10.1 lists the historical drilling that has been completed up to the end of 2015.

Table 10.1
El Mochito Historic Drilling

Date		Drilling (m)
From	**To**	
1949	1959	25,352
1960	1969	96,980
1970	1979	111,715
1980	1989	84,414
1990	1999	204,927
2000	2009	338,322
2010	2015	307,177
Total		**1,168,887**

Initially drilling was completed from surface, although the near-surface karst topography made drilling deep holes from surface challenging. This was overcome with larger more powerful drill rigs and modern drilling additives.

The majority of the drilling is now carried out from underground drill stations. Nyrstar has experienced drillers and helpers and therefore requires no contract drilling companies on site. Nyrstar has several BQ core (36.4 mm) drill rigs on the property, as listed in Table 10.2.

Table 10.2
Nyrstar Drilling Equipment

Type	Manufacturer	Model	Date	Condition	Maximum Depth (m)
Underground	Boart Longyear	LM-90	2011	new	1,060
		LM-75	2011	new	910
		LM-75	1998	new	910
		LM-55	2008	used	760
	Atlas Copco	Diamec 262	1996	new	450
		Diamec 262	2001	used	450
		Diamec 262	2001	used	450
	Tec Drill	Muky FB-100	2015	new	90
Surface		YS-1500	2006	used	1,790
		YS-1500	2007	used	1,790

Historically, drill holes were only surveyed at their collars. Presently, each drill hole is also downhole surveyed using a Reflex EZT tool. Magnetite and pyrrhotite occurring in the skarn deposits can affect this downhole survey instrument. It has been recommended that either a Reflex Gyro or Maxibore instrument be purchased that is not affected by magnetism in the rock (Arseneau, 2015).

The mine presently examines the Reflex results with respect to the drill logs. If there is an abnormal deviation of specific Reflex survey points within the skarns, those survey points are eliminated from the database. If there are enough survey points above and below the skarn deposits, then an interpolation of those points is made. Only when the mine personnel are satisfied with the survey points, are they added into the main drill hole database.

Micon agrees with the Arseneau report and recommends that a non-magnetic downhole survey instrument be acquired and used for every future drill hole.

11.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 UNDERGROUND CORE SAMPLING

The core is extracted from the drill core tube and placed into wooden boxes by the drilling staff at the rigs. The core boxes are labeled with sequential box numbers and include the drill run footage. Wooden or plastic lids are nailed onto the top of each box to prevent core spillage during transport. The boxes are transported to a core shack located on the surface, at the mine site. Core shack employees arrange the core boxes for logging, take measurements of the core recovery in each box and record it. Core intervals are measured and their lengths recorded. A percentage recovery is calculated by comparing actual core lengths to reported drilling lengths. Measurements of RQD and rock hardness began in late-2008 and continue to the present. Geotechnical data were maintained in paper format until late-2008 but are now entered into a geological database (Dassault Systemes, Geovia, GEMS™ software).

The core is logged by the geology staff using a standardized system of rock codes which note lithology, alteration and structure. A detailed description of the rock unit is also recorded. Each core box is photographed digitally for future reference. Sampling is normally done on 1.5-m intervals, restricting samples to within geological boundaries. Core logging was traditionally done on paper and manually entered into the geological database maintained in GEMS™ database. Presently, data are collected and entered directly into the GEMS™ database at the core logging facility.

The geological technician skeletonizes the core by moving one representative piece per identified lithological unit (geologist) and all sample intervals to wooden core boxes. The flagged intervals are split into two equal halves using a diamond saw. Half of the core is replaced into the wooden core box and stored within a secure core storage area for future examination. A specific density water test is undertaken on the other half of the core and recorded. It is then placed into a 5 mil plastic bag and labeled with a sequential sample number on the bag and an assay tag inside. The sample numbers are checked and recorded into a database.

11.2 SURFACE CORE SAMPLING

The surface sampling method follows the underground method, but the secure core storage facility is at the exploration building facility.

11.3 QUALITY ASSURANCE AND QUALITY CONTROL

As of December, 2008, the mine has adopted a formal quality assurance and quality control (QA/QC) program. It includes the insertion of blank samples and assay duplication analysis in a second laboratory. Presently, there are no Standard or Certified Reference Materials (CRM) inserted in the assay sample stream. Micon recommends that a CRM be used as part of the QA/QC protocol.

The blank samples are composed of hand-washed, un-mineralized and unaltered limestone. They are inserted into the sample stream on a regular basis to check for contamination in the assay laboratories. Micon recommends that a certified blank sample be used in the future.

The samples are collected in batches and recorded. Customs declarations and shipping documents are prepared.

11.4 SAMPLE PREPARATION AND ANALYSIS

The sample batches are sent by courier to Acme Analytical Laboratories' sample preparation laboratory in Guatemala City, Guatemala. Acme is part of Bureau Veritas Mineral Laboratories and is an internationally certified laboratory. ACME's Quality Management System is accredited with ISO/IEC 17025:2005 as well as ISO 9001 for its facilities. Nyrstar, Morumbi and Micon are totally independent of ACME laboratories.

Each sample is crushed to 70% minus 10 mesh to produce a reject. Some of the reject is pulverized to 85% minus 200 mesh to produce a pulp. A small portion of the pulp is sent by courier to Acme Analytical Laboratory in Vancouver, British Columbia for analysis of silver, lead, zinc and iron. This internationally certified laboratory runs its own QA/QC protocols as part of its standard procedures.

The rejects and pulps are sent back from Guatemala to the mine. Re-assays are done on 5% of the returning sample rejects.

The mill assay laboratory pulverizes the rejects in a rotary Bico pulverizer or an old dual wheel pulverizer. Approximately 100 g of crushed material are poured from the pan into a labeled paper bag. Bagged samples are then taken from the sample preparation area to the analytical laboratory, organized on a counter and weighed with a precision triple beam balance. A 1-g portion of the sample is filtered into 100 mL flasks and then bulked up to 100 mL with de-ionized water. Flasks are covered and inverted approximately 10 times to ensure mixing. Samples are then moved from the flasks to test tubes for assaying. Cobalt, copper, iron, silver, lead and zinc are analyzed by atomic absorption (AA). If gold is suspected to occur in the sample, it is analyzed by fire assay (FA). If AA sample results fall outside of a specific range, then they are re-analyzed by titration. The AA is calibrated to accurately measure up to 20% zinc. The AA is calibrated every week with certified liquid standards and is serviced every six months. The mill also has an XRF instrument (Oxford Instrument, X-Supreme model) that can analyze for lead, zinc and iron. The duplicate assay results are then compared to the corresponding Acme samples to assess the reliability of the assay data as part of the QA/QC program.

Although the mill laboratory runs its own QA/QC controls, Micon recommends that the mill assay laboratory be routinely audited by an internationally certified laboratory to identify any irregularities in instrument accuracy and precision, as well as updating assay methodology and protocols.

Geological staff accesses the Acme and mine laboratory database on a read-only basis to extract the assay results and merge them with the geological database. The Excel files are maintained and the checked and approved files are imported into the main Geovia GEMS™ database.

11.5 OTHER SAMPLES

Two types of samples are routinely taken underground at El Mochito: grab samples and chip samples for ore grade control.

Grab samples of ore piles are taken from each blast area to control production. Continuous chip samples for production control are taken, rather than true channel samples, due to the hardness of the rock, practicality, personnel limitations, and custom.

After each blasting round, grab samples are taken and a composite average of tonnage and grade is calculated and provided to the mine department for haulage, blending, planning and grade control.

These samples follow the sample assay procedures as reported in Section 11.4, above

12.0 DATA VERIFICATION

Since mineral resources and mineral reserves for El Mochito are presented as historical estimates, Micon has not conducted any independent verification of the supporting data. Micon has not undertaken any independent sampling or analysis of mineralized material.

The El Mochito mine has been in almost continuous operation, since 1948. Historical data demonstrate that the mine has been able to add additional economic mineralization to keep pace with the mining of its mineral reserves.

Nyrstar contracted Arseneau Consulting Services to undertake an internal mineral resource audit (Arseneau, 2015). The Arseneau report indicated that the mine generally follows industry standard practices, including data verification. Micon agrees with the Arseneau report's findings and recommendations. Several of the report's recommendations have already been incorporated into the mine's procedures.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

El Mochito has not yet conducted metallurgical test work for future planned ore bodies. Testwork is planned to commence once the mine development has reached the two new ore bodies, Victoria and Esperanza. However, the timeline for obtaining samples from these new ore bodies is not available. Occasional metallurgical testwork is conducted whenever samples from a new deposit are made available.

In March, 2014, Mineral Liberation Analysis (MLA) was conducted on samples from the Port Royal ore body. Five samples of feed, lead concentrate, zinc concentrate, lead tailings, and final tailings, were analyzed. The samples were wet sized in the following size fractions: +150 mesh, -150/+200 mesh, -200/+325 mesh, and -325 mesh.

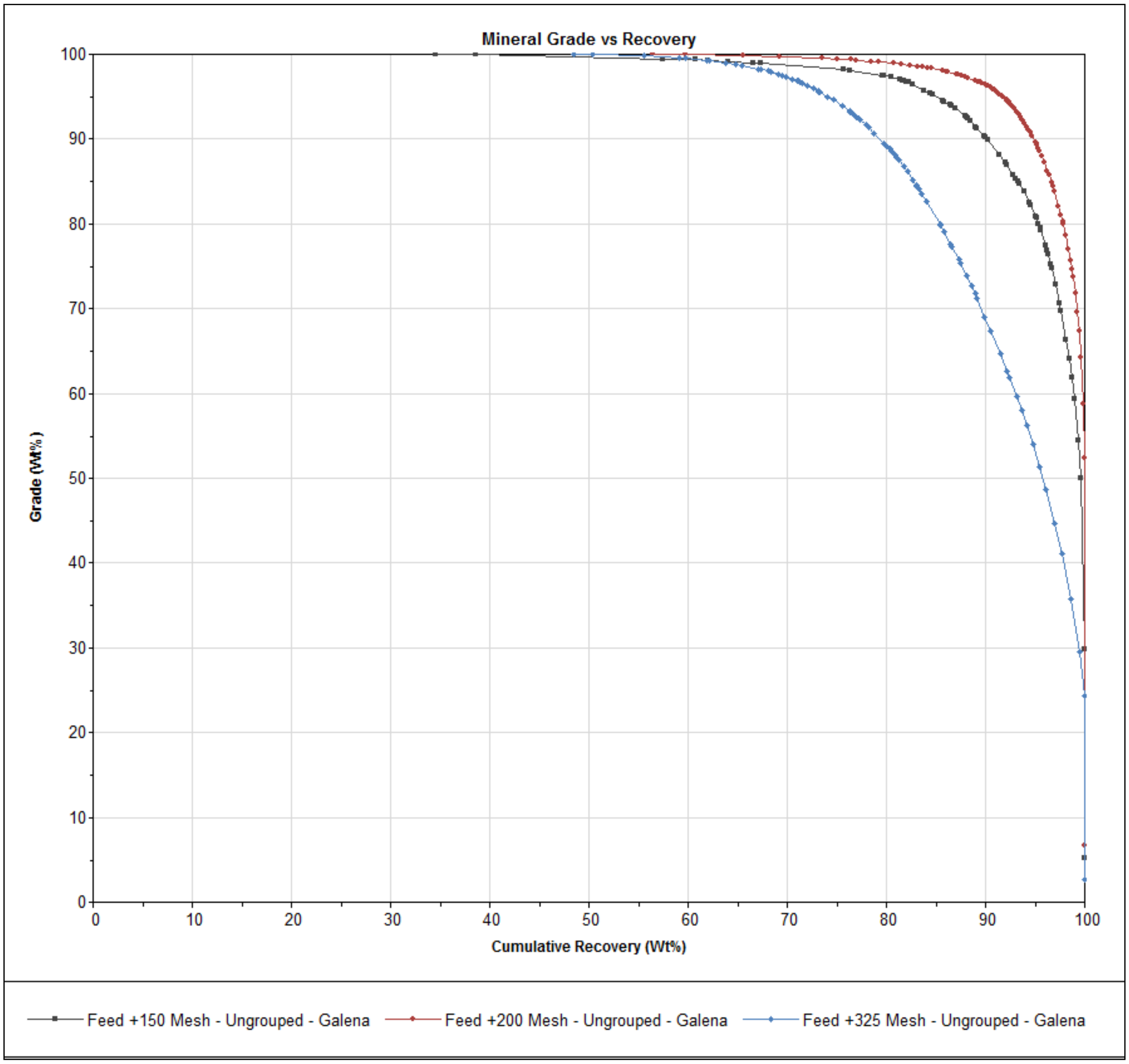
From MLA data, overall mineralogy was determined for each sample. After analysis, minerals were identified, particularly, lead-, and silver-containing minerals. The zinc- and lead-containing minerals were then evaluated for liberation and association. From the MLA data, liberation by free surface was analyzed, to determine floatability of galena and sphalerite with respect to mesh sizes. If 50% or more of the free surface of the galena and sphalerite is exposed, it is interpreted that the minerals can be recovered using flotation techniques. Using these MLA data, theoretical grade-recovery curves were generated according to mesh sizes.

For galena (see Figure 13.1), the +150 mesh fraction at 90% grade will produce a theoretical 90% recovery. For the -150/+200 mesh grind size, the curve showed that at a recovery of 95%, a theoretical concentrate grade of 95% was achievable.

For sphalerite (see Figure 13.2), the +150 mesh grind size curve demonstrated that at a recovery of 92 %, the theoretical concentrate grade produced will be 92%. At -150/+200 mesh grind size, a recovery rate of 95% will theoretically produce a 95% concentrate grade.

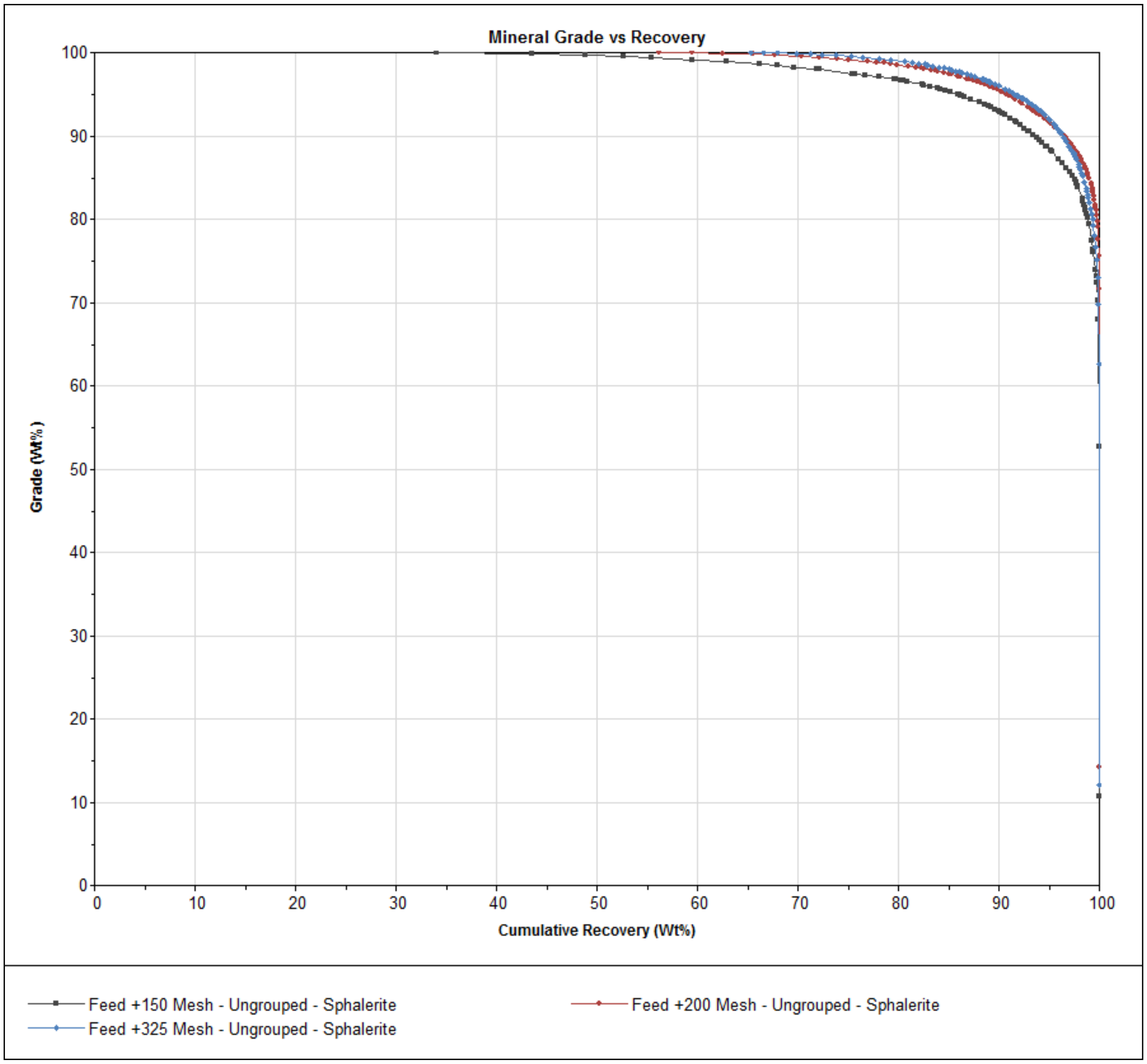
However, Paul Miranda commented that the equipment cost to achieve this finer grind outweighs the recovery benefit from the circuit; therefore, the study concluded that the current flotation feed grind size was appropriate for El Mochito's galena and sphalerite concentration.

Figure 13.1
Grade-Recovery Curve for Galena



Source: Mineral Liberation Analysis, Nyrstar El Mochito Concentrator, March 3, 2014.

Figure 13.2
Grade-Recovery Curve for Sphalerite.



Source: Mineral Liberation Analysis, Nyrstar El Mochito Concentrator, March 3, 2014

14.0 MINERAL RESOURCE ESTIMATES

The mineral resource estimate for El Mochito as at 31 December, 2015, as prepared by Nyrstar, is presented in Section 6.0.

The mineral resources and mineral reserves at El Mochito, presented in Tables 6.1 and 6.2 above, are historical in nature as described in NI 43-101. They were prepared prior to the agreement to acquire the property by Morumbi and a Qualified Person has not yet verified them as current. At this time, the relevance and reliability of the estimates are not known. The estimates are classified using the categories set out in the Canadian Institute of Mining, Metallurgy and Petroleum's CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines, as required by NI 43-101. However, Morumbi is not treating the mineral resources or mineral reserves as current.

The mineral resource estimation procedure is outlined as follows (Nyrstar, 2010):

> "Mineral resource solids have been interpreted by the mine geologists, Isidro Aguirre and Olaf Scholtysek who are responsible for the database administration, modeling and resource estimation.
>
> "Geological Interpretations:
>
> "Parameters are based on the long mining experience at El Mochito and the production of the last three years is in accordance with the reserve numbers. Each solid is given a rock type that corresponds to the type of mineralization (manto or chimney) as well as the maximum resource category that can be assigned to blocks within the solid.
>
> "The geological interpretation is recognized as the most fundamental part of the reserve-resource estimation process. As such, a great deal of attention has been placed in this step of the estimation process. Interpretations that qualify as measured and indicated resources are kept separate from interpretations that qualify as inferred resources. Several guidelines have been used in the interpretation of the orebody:
>
> - Geological interpretations must demonstrate lateral continuity over at least 3 sections in order to be considered a measured or indicated resource.
>
> - Drill hole spacing should be on the order of 50 ft by 50 ft spacing in order for a solid to be considered a candidate for measured and indicated resources. Hole spacing may be wider in some areas where good lateral continuity of the orebody is demonstrated on both sides of the section(s) with a lesser drill hole spacing. The ability to demonstrate lateral continuity of multiple sections is the most important variable.
>
> - Geological interpretations (solids) that qualify for measured and indicated resources are labeled as "Manto", "Chimney", or "Low Grade". Geological interpretations (solids) that do not demonstrate good lateral continuity of grade are labeled as "Inferred".

- High grade patches within Low Grade solids are taken as part of the overall grade since they have not demonstrated the lateral continuity to be interpreted as “Manto” or “Chimney” solids. High grade patches within low grade areas are unlikely to be sufficiently continuous for mining.

- Identification of measured, indicated, and inferred resources within the Manto, Chimney, and Low Grade solids is done using the search ellipse parameters in the block modeling procedure.

“Mineral resource assumptions considered:

- Manto and chimney orebodies should be extended to the skarn-limestone contact unless there is extremely good evidence that the mineralization does not extend to the contact (very tight drill spacing over multiple sections). Mining at Mochito almost always extends to the skarn-limestone.

- Barren or low grade skarn intersections within the mineralized envelope are included in the solid as internal dilution since they will be part of the mined block.

- Barren or low grade units such as dykes within the mineralized body are included in the geological solid since they too represent unavoidable internal dilution.

- Geological interpretations are based predominantly upon diamond drill hole intersections. Geological mapping, percussion test holes, and the like are used to augment the interpretation from diamond drill holes where practical. In Chimneys geological mapping receives greater attention as drill hole spacing cannot provide sufficient accuracy for modeling the limits of the orebody.

- Where possible the polylines used to make the interpreted geological solid are snapped to diamond drill hole intersections. Where there is a conflict in the position of the diamond drill hole intersections and it is not possible to make an interpretation, preference is given to shorter diamond drill holes drilled on-section when making the geological interpretation.

- The geological intersection upon which the interpretation is based is labeled as the rock code in GEMS software. This step is taken in order to give the geologist full control of which holes and which part of the hole is used for the grade interpolation

- Current geological solids (interpretations) of the original in-situ orebody are stored in the GEMS Triangulation directory. The polylines used to create the solid are stored in the GEMS Polyline directory. Solids are named by the zone followed by the rock type (chimney, manto, inferred, inferred chimney, or low grade) followed by the effective date. A backup of all polylines and solids used to create the reserve estimate is maintained in the Reserves directory.

“Solids in mined areas have been made of the mined part of the orebodies according to the following guidelines:

- Solids include all mine workings that intersect the orebodies interpreted in GEMS Triangulation directory.

- Solids of the mined part of the orebody extend past the limit of mineralization where mining has been completed on a level. This prevents the formation of an interpreted skin of ore on orebodies where mining has been completed.

- Solids of the mined part of the orebody extend 6 ft below mine workings where stoping commences in the middle of an orebody. This anticipates partial recovery of a sill pillar by retreat mining techniques such as leaving a saw-tooth back.

- Solids include non-recoverable pillars around principal accesses and the like.

- Solids are stored in the GEMS Triangulation directory. They are named “Mined” followed by the name of the zone followed by the date.

“Solids representing the remaining resource that are potentially mineable are created by intersecting the interpreted orebody with the solid of the mined orebody. The resulting solid may be sub-divided to reflect significant mining differences within the zone (e.g. resources above and below a principal access.

“Block models have been created for the various zones using an inverse distance squared interpolation with block that are 3 meters by 3 meters x 3.7 meters. Ellipsoid sizes and shapes are determined by the style of mineralization (i.e. manto or chimney style mineralization). The block model is constrained by geological solids of the various deposits that limit the reserve category (i.e. one rock code is used for areas interpreted to be predominantly measured and indicated whereas other rock codes are used to limit the resource category to inferred where the degree of confidence in the geological interpretation is lower).

“Sample points, or 3 meter composites from diamond drill holes, are used to calculate the grade of blocks within the model. A maximum of 3 sample points are allowed from any single diamond drill hole. The maximum number of sample points used to calculate the grade of a block is set as 12. The minimum number of sample points used to calculate the grade of a block is set as 7 for measured and 4 for indicated resources and 2 for inferred resources. Therefore at least 3 holes are required within the search radius to create a measured resource and 2 drill holes are required within the search radius to create a indicated resource whereas the results from a single drill hole are sufficient to calculate an inferred resource so long as the intersection is greater than 3.8 meters long (to create 2 samples). Partial composites less than 0.8 meters long are not used in the resource calculation.

“The block model is constructed on the basis of the original in-situ shape of the orebody. All material within the resource solid is taken as part of the mineral resource regardless of the grade of individual blocks (blocks below cut-off grade are accepted as internal dilution). The geological resource is taken as that part of the block model within resource solids.

> "All grade estimates are based upon diamond drill hole intersections. Results from channel samples and percussion test holes are not included in the interpolation. Drill hole intersections selected by the geologist are composited into 3.0 meter composites with implicit and explicit missing values taken as zero grades. The composites are converted into 3D points that are used for the grade calculation of individual blocks according to the interpolation parameters and search ellipses discussed above. Each 3D point has an associated rock code. The rock code of the block and the 3D point must be the same for the grade to be calculated (i.e. only chimney intersections can be used to calculate the grade of chimney orebodies and only manto intersections are used to calculate the grade of manto orebodies). Blocks identified as inferred resources are allowed to draw upon points defined as having a higher degree of confidence."

This protocol has not changed, although some of the recommendations from the Arseneau report, for example, search radii and grade capping, will be used in the internal mineral resource estimate for 2016.

15.0 MINERAL RESERVE ESTIMATES

The mineral reserve estimate for El Mochito as at 31 December, 2015, and prepared by Nyrstar, is presented in Section 6.0.

The mineral resources and mineral reserves at El Mochito, and presented in Tables 6.1 and 6.2 above, are historical in nature as described in NI 43-101. They were prepared prior to the agreement to acquire the property by Morumbi and a Qualified Person has not yet verified them as current. At this time, the relevance and reliability of the estimates are not known. The estimates are classified using the categories set out in the Canadian Institute of Mining, Metallurgy and Petroleum's CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines, as required by NI 43-101. However, Morumbi is not treating the mineral resources or mineral reserves as current.

The mineral reserve procedure is outlined as follows (Nyrstar, 2010):

> "The geological solids of the measured and indicated resources are reviewed by the Engineering group to determine which can be economically extracted. Those solids that are identified as profitable are converted to mineral reserves by diluting the block grades to account for sand fill and wall rock dilution. Sand fill dilution is taken as 1' in a 12' high cut (e.g. 8%). Wall rock dilution is taken as 8% for manto orebodies and 15% for chimney orebodies unless specified as other. Mining losses are taken as 15% for manto orebodies and 8% for chimney orebodies unless otherwise specified. Geological losses are applied where there is concern that part of the resource will not be recovered. The diluted grade for the solid must be greater than 4.0% zinc equivalent based upon the long term metal prices established by the Corporate Office. Blocks within the solid that are below the cut-off grade are considered to be internal dilution."
>
> "Reconciliation between mill results and underground ore control is good. Underground tonnage is estimated for each working place by engineering and is adjusted proportionally based on final mill results. Geology estimates the grade primarily from jumbo cuttings and the final number is arrived at after dilution is averaged in. Each grade is adjusted by the same factor to agree with the mill results.
>
> "The undiluted grade estimate from geology is typically higher than mill results and additional dilution may have to be introduced to achieve agreement. It is believed that the higher grade is the result of concentration of the heavier, mineralized, jumbo cuttings by the winnowing of lighter particles by drill water."

The Arseneau report notes that the wireframes contoured by the geological staff, based on a fixed cut-off, are provided to the mine engineering staff, to be used for mine planning. The Arseneau report recommends that, instead, the resource block model be used as the basis for mine planning. Micon agrees with that recommendation.

16.0 MINING METHODS

16.1 EXISTING UNDERGROUND WORKINGS

The existing underground workings at the El Mochito mine are shown in plan view in Figure 16.1, and in longitudinal section in Figure 16.2. The workings are extensive, measuring 2,700 metres in the east-west direction, 1,200 metres north-south and vertically from surface to a depth of approximately 1,000 metres. The widespread nature of the workings poses constant challenges in maintaining adequate ventilation.

Access to the underground workings is provided by two vertical shafts. The No. 2 shaft, which extends from surface to the 2475 level, is used for ore hoisting. The No. 3 shaft, which bottoms at the 2535 level, is used for waste hoisting, personnel transport and general servicing. The main haulageway for delivering ore to the No. 2 shaft is at the 2350 level. Access to workings below the 2350 level is provided by declines. Level numbers in the underground mine refer to vertical distances in feet below the collar of the No. 2 shaft.

16.2 STOPING METHODS

As described previously, economic mineralization at the El Mochito mine occurs as both mantos and chimneys. The mantos are typically flat dipping, following the bedding of the host rock, and are generally relatively extensive in horizontal dimension, rendering them suitable for room and pillar stoping methods. Rooms are backfilled following extraction.

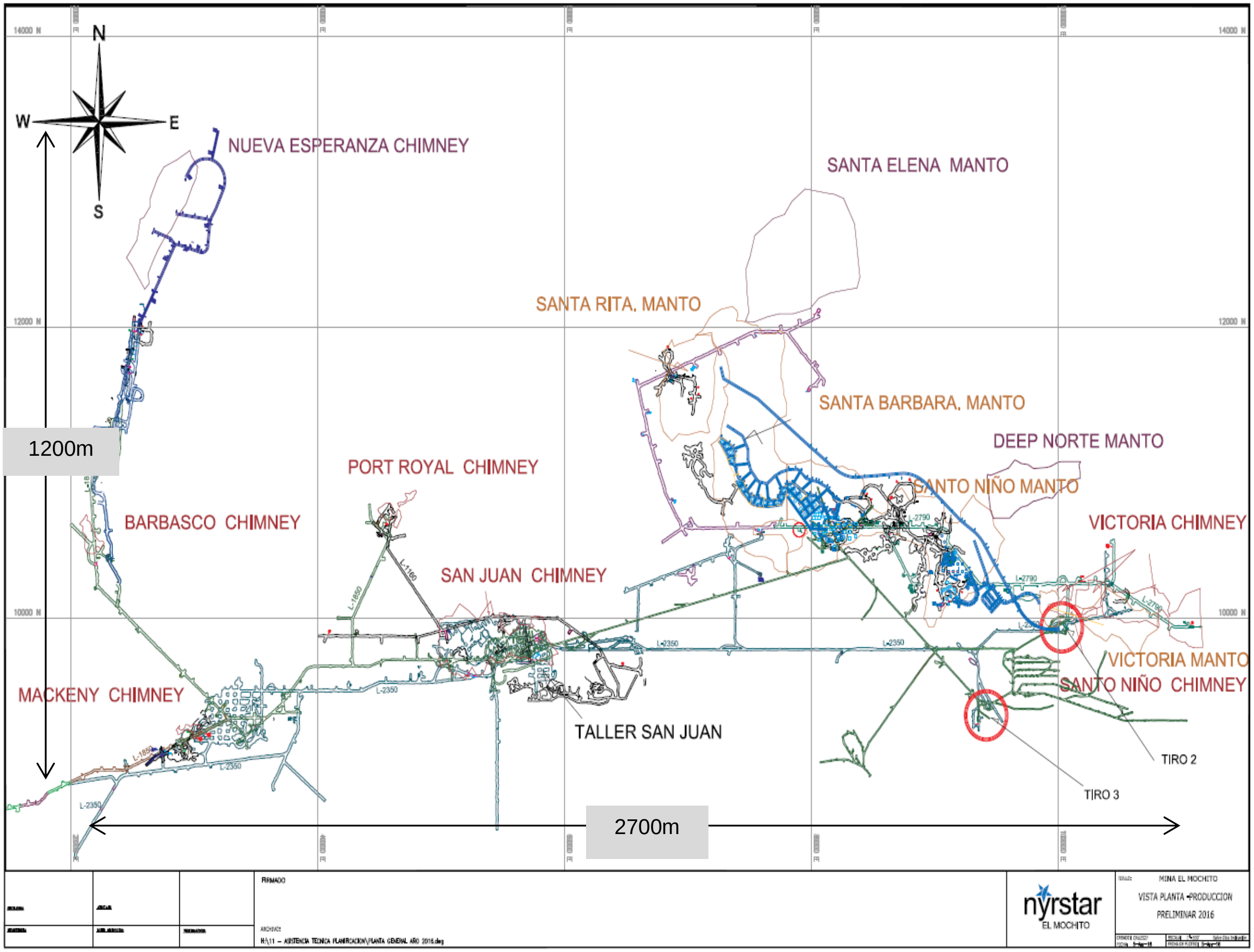
Chimneys are typically steeply dipping and cut across the host rocks over a significant vertical distance. In general, the chimneys are of higher grade than the mantos. The chimneys are mined principally by longhole stoping methods, with backfilling of mined stopes.

The stoping methods used at El Mochito, while well suited to the geometry of the economic deposits, are development intensive. Nyrstar reports that, in 2015, horizontal development totalled approximately 10,000 feet (about 3,000 m), at an average cost of about $1,200 per foot. Vertical development in 2015 totalled approximately 1,500 feet (about 450 m). It is to be anticipated that this general level of development will continue into the future.

16.3 GEOTECHNICAL CONSIDERATIONS

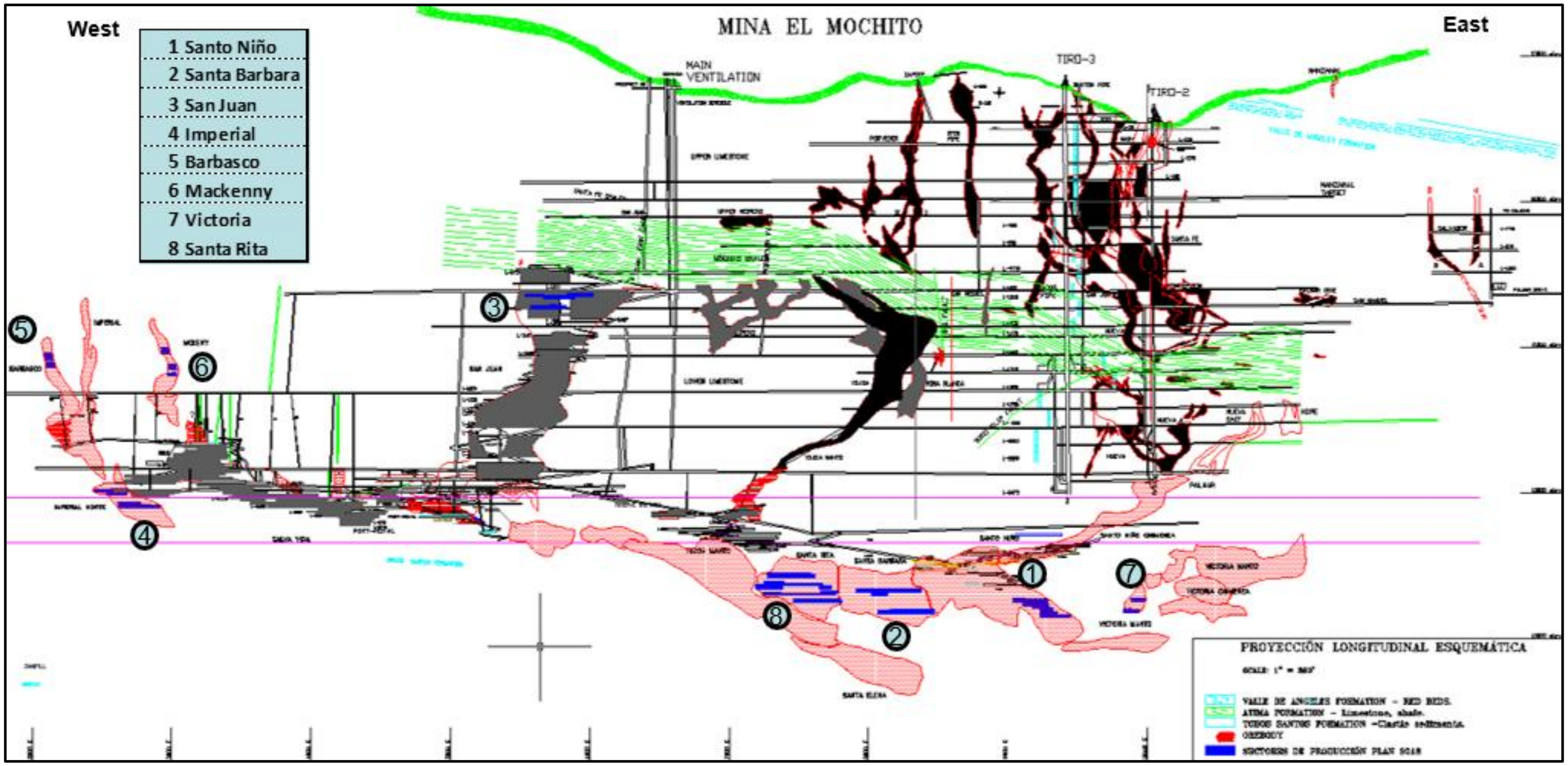
Rock mass quality in the underground workings at El Mochito is described as being generally fair to poor, under the influence of systems of faults and joints. A prominent system of faults strikes northeasterly and is steeply dipping, with the hanging wall displaced downward. While offsets along these faults are generally small, they result in poor ground conditions. Relatively large inflows of groundwater also influence the stability of underground excavations. Rock quality mapping of the underground workings is illustrated in Figure 16.3.

Figure 16.1
El Mochito Mine, Plan View of Underground Workings



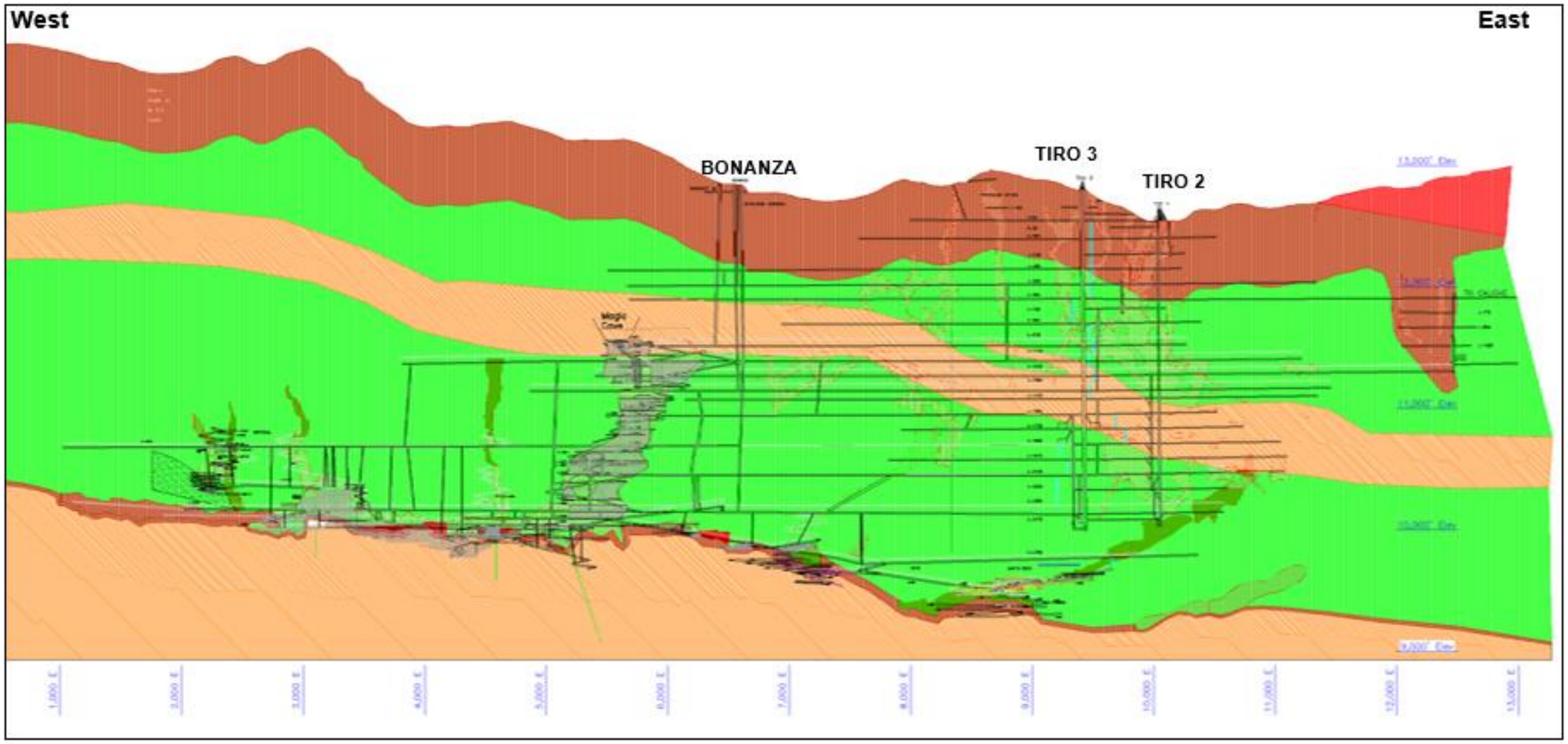
Source: Nyrstar, 2016.

Figure 16.2
El Mochito Mine, Longitudinal Section of Underground Workings



Source: Nyrstar, 2016.

Figure 16.3
Rock Quality Mapping



- REGULAR - IIIB – Caliza (Limestone)
- MALA - IVA – Mochito Shale / Todos Santos
- MALA - IVB – Surface Limestone (Oxidized)
- MUY MALA - V - Skarn

Source: Nyrstar, 2016.

A geotechnical report entitled "Estudio Geomecanico y Caracterizacion del Macizo Rocoso," prepared by, or on behalf of, Nyrstar in 2015, provides a comprehensive discussion of the properties of the rock mass and identifies preferred directions of advance and appropriate ground support regimes for temporary and permanent excavations in rocks of differing quality. The recommended ground support utilizes various combinations rock bolts, principally Swellex bolts, at intervals of one to two metres, steel mesh and shotcrete, with cable bolting at intersections of drifts.

16.4 VENTILATION

Historical reports make continuous reference to inadequate ventilation at the El Mochito mine. The most recent report of December, 2015, entitled "Proyecto de Mejora Ventilación con Chimenea Ventilación Santa Rita - Año 2017", notes that the current ventilation system can supply 313,000 cubic feet per minute (cfm) of intake air to the underground workings. The report also notes that, in order to meet the Peruvian standard of three cubic metres of air per minute, per brake horsepower of operating diesel equipment, an intake volume of 781,000 cfm would be required.

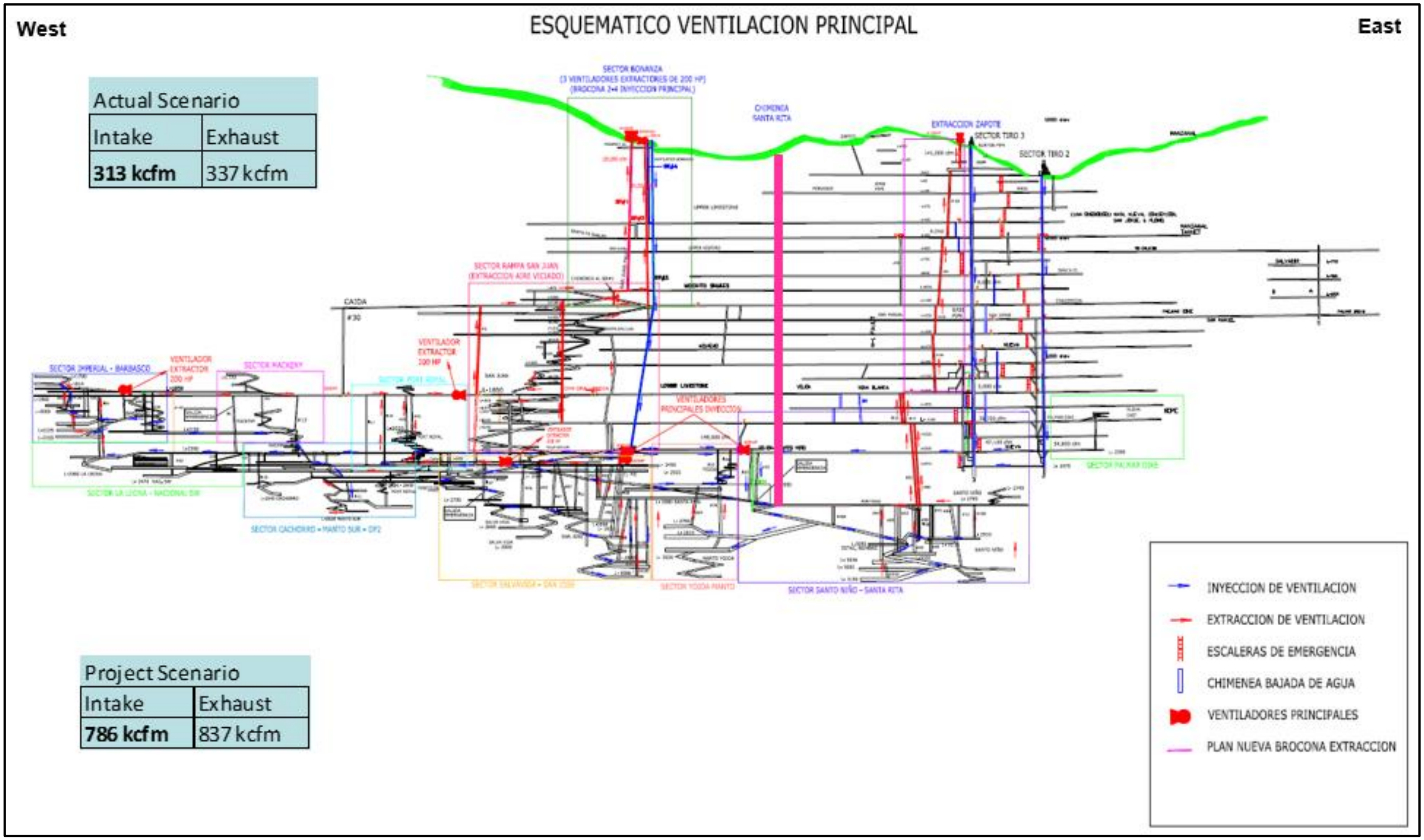
The report then recommends upgrading of the ventilation system to a capacity of approximately 785,000 cfm, by installing four new exhaust fans in existing airways, and a new 200,000 cfm intake fan on a new ventilation raise to be bored in the Santa Rita area. The total cost of the proposed ventilation upgrade is estimated at approximately $5 million. The upgraded ventilation system is illustrated in Figure 16.4. An isometric view of the proposed system is provided in Figure 16.5.

16.5 DRAINAGE

Significant groundwater inflows are encountered in the underground workings at El Mochito. The existing pumping system, which is illustrated in Figure 16.6, is somewhat cumbersome, with seven principal pumping stations, six secondary stations and 35 temporary sumps. The total capacity of the system is reported to be 8,000 gallons per minute.

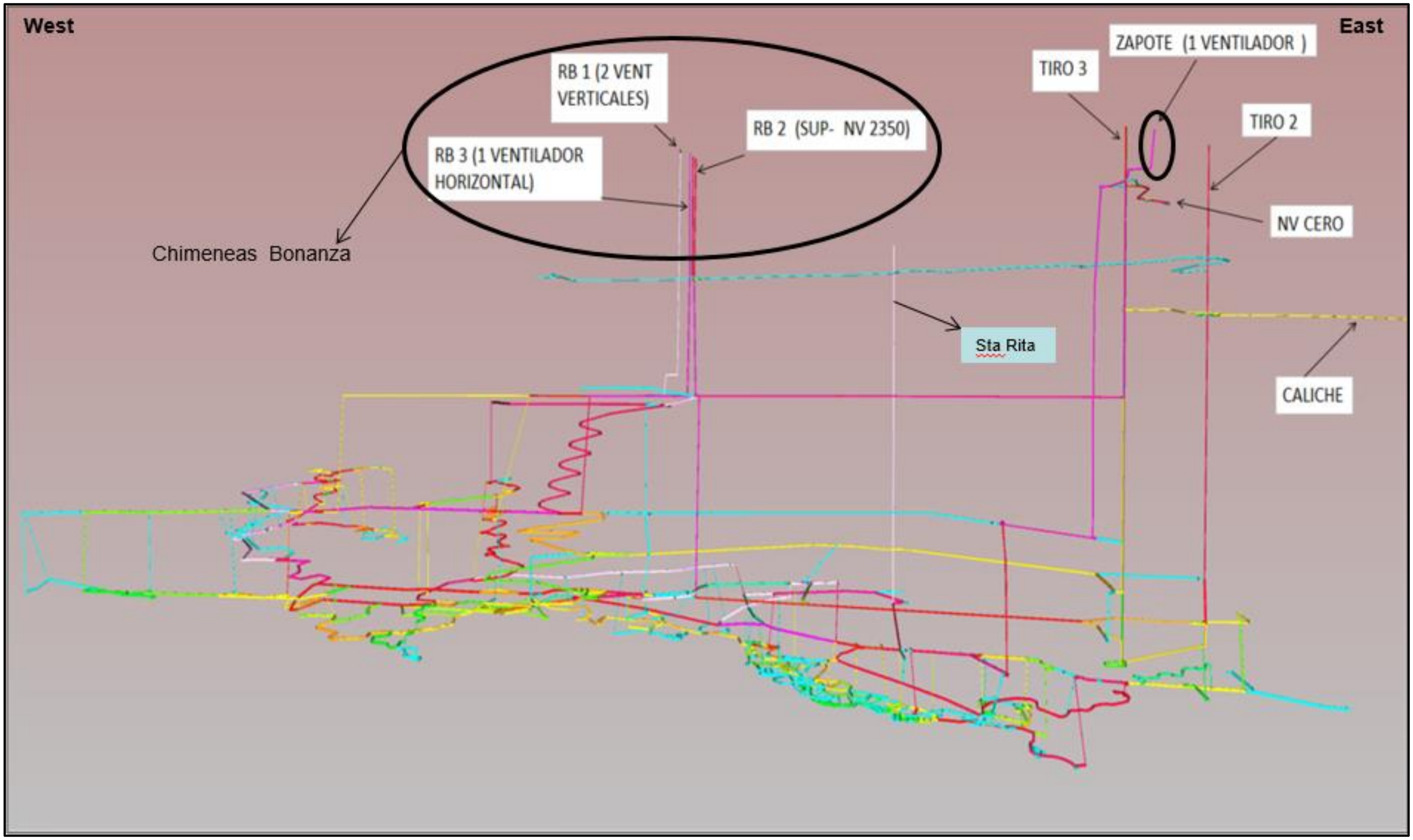
Several alternatives for rationalizing the pumping system have been evaluated, with the objective of reducing the number of pumping stations and increasing the efficiency of the system. The most promising of these alternatives estimates that an annual saving of about $1.3 million in pumping cost could be achieved for a capital investment of approximately $5 million. In Micon's opinion, this matter is worthy of more detailed study.

Figure 16.4
Proposed Ventilation Upgrade



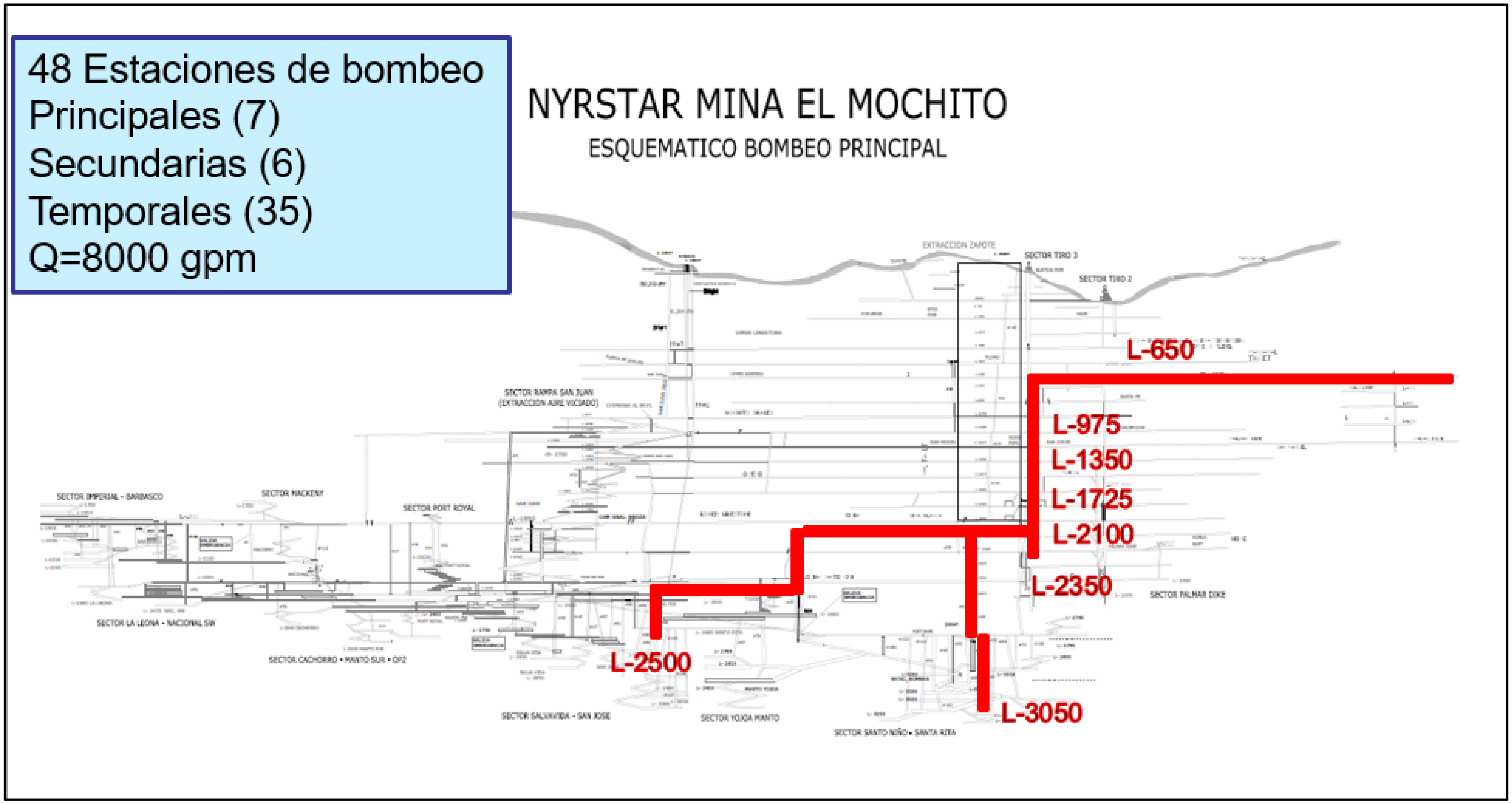
Source: Nyrstar, 2016.

Figure 16.5
Isometric View of Upgraded Ventilation System



Source: Nyrstar, 2016.

Figure 16.6
Existing Pumping System



Source: Nyrstar, 2016.

16.6 UNDERGROUND HAULAGE

The existing underground ore haulage system at El Mochito is illustrated in Figure 16.7. All ore is hoisted to surface through the No. 2 shaft and is transported to the shaft on the 2350 haulage level. Ore mined from the upper workings is delivered to the 2350 level through a system of ore passes and is hauled to the No. 2 shaft by rail. Ore mined from below the 2350 level is accessed by declines and is delivered by trackless equipment to a primary crusher on the 2450 level. Crushed ore is then conveyed to ore chutes on the 2350 level, where it is loaded into rail cars for haulage to the No. 2 shaft.

It is understood that consideration is being given to deepening No. 2 shaft by an additional 1,100 feet, and establishing a new main haulage system at the 3400 level, which is below most of the known economic mineralization. No cost-benefit analysis of this proposal has been presented, however. Nor have work schedules been developed to evaluate the extent of hoisting delays during deepening of the No. 2 shaft, through which all ore is presently hoisted.

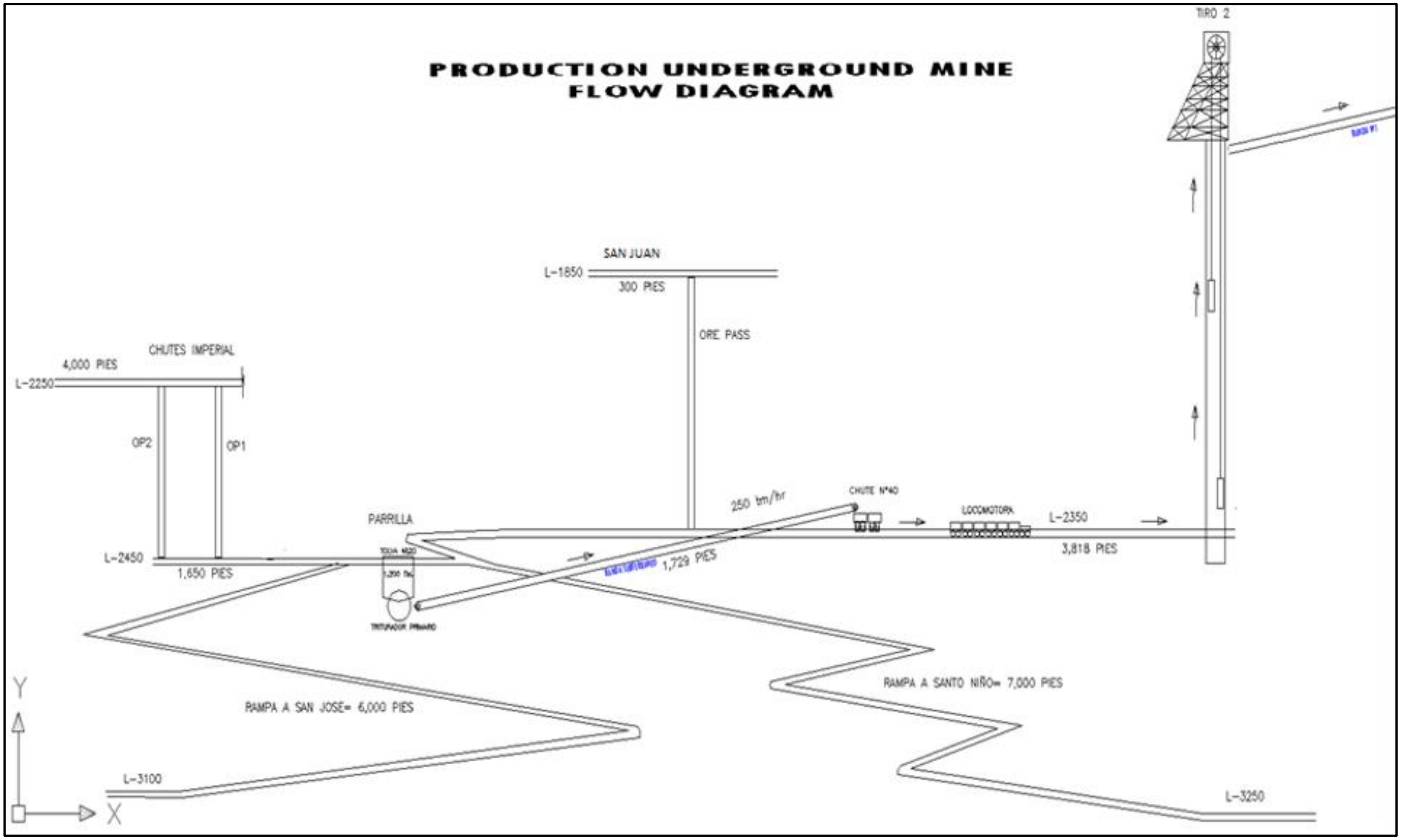
16.7 MINE EQUIPMENT FLEET AND PRODUCTION

With the exception of rail haulage of ore to shaft No. 2, all mining operations at El Mochito are carried out with trackless equipment. Listings of the current underground and surface mobile equipment fleets, together with information on the principal fixed equipment, are provided in Figure 16.8. On average, the mobile equipment units have been employed at El Mochito for more than seven years, suggesting that significant replacement of equipment may be required within, say, five years.

Annual ore production from underground over the past three years, 2013 to 2015, has ranged between 747,000 and 776,000 tonnes. The existing equipment fleet, therefore, has demonstrated the capability of producing more than 750,000 tonnes of ore per year. Hoisting capacity is stated to be 4,800 tonnes per day or, say, 1.5 million tonnes per year, and is not a limiting factor.

It is understood that Nyrstar plans to mine 795,000 tonnes of ore in 2016, increasing to 812,000 tonnes per year in each of 2017 and 2018. There is, however, no provision in the capital expenditure budget for the purchase of new equipment and the ability of the El Mochito mine to produce at elevated levels remains to be demonstrated. In its press release of August 8, 2016, reporting on results for the first half of 2016, Nyrstar stated that: "Production of zinc in concentrate at El Mochito in HI 2016 was reduced by 17% compared to HI 2015. The reduced production was due to lower ore throughput (down 20% and reduced mill head grades). The reduced ore throughput was primarily due to production suspensions linked to the two mining fatalities at the mine during the first quarter." It is likely, therefore, that the production target for 2016 will not be met.

Figure 16.7
Underground Haulage System



Source: Nyrstar, 2016.

Figure 16.8
Mobile and Fixed Equipment

El Mochito Mine - Current Underground Equipment Fleet

	OEM	Model	Hourmeter	Year	Arrival Condition	On Site Years of Service
Trucks	Wagner	MT416-30, 16 Ton	35373	10/10/2004	Used	12
	Wagner (aramine	MT426-30, 26 Ton	25235	02/05/2008	Used	8
	Wagner (aramine	MT426-30, 26 Ton	24890	02/06/2008	Used	8
	Atlas Copco	MT-2010, 20 Ton	29099	17/06/2008	New	8
	Atlas Copco	MT-2010, 20 Ton	28748	17/08/2008	New	8
	Atlas Copco	MT-2010, 20 Ton	27600	01/09/2008	New	8
	Atlas Copco	MT-2010, 20 Ton	17646	01/12/2012	New	4
	Atlas Copco	MT-2010, 20 Ton	16939	01/12/2012	New	4
	Sandvik	TH-320, 20 Ton	3520	10/04/2015	New	1
	Sandvik	TH-320, 20 Ton	1778	16/09/2015	New	1
Loaders (LHD)	Atlas Copco	ST2D, (2 Yd3)	11794	14/04/2008	New	8
	Wagner	ST3.5, 3.5 y3	56237	28/02/1996	Used	20
	Wagner	ST3.5, 3.5 y3	48760	12/06/2001	Used	15
	Wagner	ST3.5, 3.5 y3	34497	03/03/2005	Used	11
	Atlas Copco	ST3.5, 3.5 y3	31507	02/10/2008	New	8
	Atlas Copco	ST3.5, 3.5 y3	31726	02/10/2008	New	8
	Atlas Copco	ST3.5, 3.5 y3	28405	16/10/2008	New	8
	Atlas Copco	ST3.5, 3.5 y3	16598	01/01/2011	New	5
	Caterpillar	R1300G, 6.8 MT	4433	19/02/2015	New	1
	Caterpillar	R1300G, 6.8 MT	4130	19/02/2015	New	1
Rock Drill	Atlas Copco	RB-281 SB	42636	01/08/2008	New	8
	Atlas Copco	RB-281 SB	42265	22/08/2008	New	8
	Atlas Copco	RB-281 SB	22448	15/06/2014	Used	2
	Atlas Copco	S1D SB	23325	19/04/2012	New	4
	Jarvis Clark	MJM 20B	43112	01/01/2000	Used	16
Long-Hole	Boart Longyear	Stopemates	2691	03/06/2008	Used	8
	Boart Longyear	Stopemates	2720	03/06/2013	New	3
	Sandvik	DL-311	40	01/12/2015	New	1
Bolter	RDH	150HD	1783	20/07/2013	New	3
Support	M 40 MODIFIED	J-1000-HS	25899	01/08/2007	New	9
	M 40 MODIFIED	J-1000-HS	27306	01/08/2007	New	9
	M 40 MODIFIED	J-1000-HS	22292	01/08/2008	New	8
	M 40 MODIFIED	J-1000-HS	17329	01/06/2008	New	8
	M 40 MODIFIED	J-1000-HS	14283	01/08/2008	New	8
	M 40 MODIFIED	J-1000-HS	10513	01/07/2010	New	6

Cantidad	Tipo
10	TRUCKS
10	SCOOPS
5	JUMBOS
6	SCISSOR

Fleet age since arrival average

7.6 Years

Main Fixed Assets

Assets	Description and Specifications
Malacate Tiro 2 Production Hoist	Double Drum 10' Nordberg Hoist 2 ea 160 cu/feet Skips 2 Load Pockets 2450, 3 ea 10" x 64" pneumatic cylinders Dump Tank in surface, 2 ea 6" x 54" pneumatic cylinders Main Frame and 10' Head Sheaves 1-1/2" x 3400' Wire Ropes
Malacate Zapote Tiro 3 Service Hoist	Double Drum 8' Nordberg Hoist 2 ea 120 cu/feet Skips 2 Load Pockets 2450, 6 ea 6" x 48" pneumatic cylinders Dump Pockets in Level 0, 2 ea 6" x 34" neumatic cylinders Main Frame and 8' Head Sheaves 1-1/4" x 3400' Wire Ropes
Malacate Jaulona Tiro 3 Man Cage Hoist	Double Drum 5' IR Mancage Hoist 5' Head Sheaves Cage and Counterweight 7/8" x 2850' Wire Ropes
Primary Crusher	Brown Lenox 27 x 42 Jaw Crusher
Conveyor Belt	5/8" x 36" x 3520' main conveyor belt 1 ea Tail Pulley and Load Pocket 4 ea Secundary Head Pulleys 1 ea primary Head Pulley 1 ea Falk 405 Gear Reducer 1 ea FALK 420 HFD Coupling 1 ea Triple Sproket and Chain
(3) Power Generator	EMD 2 MVA
(8) Power Generator	CAT 2MVA 3516B
(4) Compresor Ingersoll Rand	2000 CFM 350 HP
(2) Compresor Joy	3700 CFM 900 HP

Surface Equipment

#	equipment	brand	model	year	Hourmeter
1	Wheel Loader Caterpillar	CATERPILLAR	930	1978	22344
2	Wheel Loader Caterpillar	CATERPILLAR	930	1983	2132
3	Wheel Loader Caterpillar	CATERPILLAR	950B	1983	69466
4	Wheel Loader Caterpillar	CATERPILLAR	950B	1988	2367
5	Wheel Loader Caterpillar	CATERPILLAR	966F2	1996	23135
6	Wheel Loader Caterpillar	CATERPILLAR	966F2	1994	10197
7	Wheel Loader CASE	CASE	821F	2012	
8	Track Loader Cat	CATERPILLAR	977L	1981	
9	Compactador BOMAG	BOMAG	BW177-D3		6496
10	Camion Cisterna Internacional	INTERNACIONAL	4200SBA	2005	
11	Excavadora John Deere	John Deere	200DLC	2007	5415
12	Tele Hander Cat 3-4	CATERPILLAR	TH460B	2004	
13	Volqueta Dux 1-5	Dux	DT- 30	1997	54992
14	Volqueta Dux 1-6	Dux	DT- 30	1997	10226
15	Motor Grader	John Deere	670G		6976
16	Volqueta Mack	Mack	GRANITE	2006	7190
17	Volqueta Mack	Mack	GRANITE	2006	3286
18	Camion Cisterna Mack	Mack	RD 6885	1992	5612
19	Camion Internacional	INTERNACIONAL	4300	2001	

Source: Nyrstar, 2016.

16.8 POTENTIAL FOR EXPANSION

Nyrstar has developed plans to expand both underground production and mill throughput to approximately 3,000 tonnes of ore per day, or 988,400 tonnes per year, by 2019. From the data provided, it appears that the increase in underground production is predicated principally on upgrading of the ventilation system, coupled with the deepening of shaft No. 2 and the establishment of the 3400 haulage level.

There is no question that the existing ventilation system at El Mochito is inadequate and, in Micon's opinion, completion of the proposed upgrade should be regarded as mandatory. On the basis of the available information, however, it is also Micon's opinion that the economic benefits, if any, associated with the deepening of No. 2 shaft have yet to be demonstrated.

In a draft report of October, 2007, Pincock Allen & Holt, independent mining consultants, evaluated a series of options for the development of the deep areas at the El Mochito mine, at a scoping study level of accuracy. One of the options considered was deepening of No. 2 shaft to the 3430 level. The capital cost of that option was estimated, in 2007, at $24 million. Micon estimates, grossly, that the cost, today, of deepening No. 2 shaft and establishing haulage on the 3400 level would be of the order of $50 million, spent over a period of approximately two years.

16.9 RESERVES

The mineral resources and mineral reserves at El Mochito, and presented in Tables 6.1 and 6.2 above, are historical in nature as described in NI 43-101. They were prepared prior to the agreement to acquire the property by Morumbi and a Qualified Person has not yet verified them as current. At this time, the relevance and reliability of the estimates are not known. The estimates are classified using the categories set out in the Canadian Institute of Mining, Metallurgy and Petroleum's CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines, as required by NI 43-101. However, Morumbi is not treating the mineral resources or mineral reserves as current.

As shown previously in Table 6.2 the mineral reserves at El Mochito at the end of 2015 were 1.91 million tonnes. These reserves are sufficient to sustain production for less than three years.

Historical data show that, between 2000 and 2015, reserves at El Mochito have ranged from a high of 5.25 million tonnes in 2011 (sufficient for seven years of production), to a low of 1.75 million tonnes in 2013 (sufficient for slightly more than two years of production). In the recent past, the mine life at El Mochito, based on known reserves, has rarely exceeded five years, and the operation has relied heavily on continued exploration to replace reserves on an on-going basis. Reserves at the end of 2015 were at their second lowest level in more than forty years and it is clear that a major commitment to continued exploration is required. The potential for discovery of additional reserves, however, is considered to be high, at least in the near term.

16.10 CONCEPTUAL LIFE OF MINE PLANS

Nyrstar has provided a conceptual life of mine plan, which appears to be based on resources estimated as of mid-2015. In developing the conceptual plan, all measured, indicated and inferred resources have been factored by 90% for mine extraction and then by 8% for dilution, to determine a conceptual "mineable resource". Assuming the mining of resources in all categories, and assuming that production is increased to 988,400 tonnes of ore per year in 2019, the Nyrstar plan shows production potentially continuing until 2027.

Micon has re-evaluated the conceptual life-of-mine plan, based on the estimated resources at the end of 2015, using the same factors of 90% for mine extraction and 8% for dilution.

Measured and indicated resources at the end of 2015 totalled 5.4 million tonnes. As shown in Table 16.1, application of the extraction and dilution factors results in a measured and indicated "mineable resource" of approximately 5.2 million tonnes. If production is expanded to 988,400 tonnes per year in 2019, this "minable resource" would be fully mined out in 2021. If production is held at 800,000 tonnes per year, the measured and indicated "mineable resource" is fully depleted in 2022.

Table 16.1
Measured and Indicated "Minable Resource" at End-2015

Item	Units	Value
Measured and Indicated Resources	thousand tonnes	5,400
Zinc Grade	%	4.85
Lead Grade	%	1.72
Silver Grade	grams/tonne	44.70
Contained Zinc	thousand tonnes	261.90
Contained Lead	thousand tonnes	92.88
Contained Silver	thousand ounces	7,760.54
Mine Recovery	%	90.00
Total Mined Resources	thousand tonnes	4,860.00
Zinc Grade Before Dilution	%	4.85
Lead Grade Before Dilution	%	1.72
Silver Grade Before Dilution	grams/tonne	44.70
Contained Zinc	thousand tonnes	235.71
Contained Lead	thousand tonnes	83.59
Contained Silver	thousand ounces	6,984.49
Dilution	%	8.00

Total Diluted Resources	thousand tonnes	5,248.80
Zinc Grade After Dilution	%	4.49
Lead Grade After Dilution	%	1.59
Silver Grade After Dilution	grams/tonne	41.39
Contained Zinc	thousand tonnes	235.71
Contained Lead	thousand tonnes	83.59
Contained Silver	thousand ounces	6,984.49

Measured, indicated and inferred resources at the end of 2015 totalled 9.26 million tonnes. As shown in Table 16.2, this converts to a measured, indicated, and inferred "mineable resource" of 9.0 million tonnes. If production is expanded to 988,400 tonnes per year, this "mineable resource" is fully exhausted in 2025. If production is maintained at 300,000 tonnes per year, the measured, indicated and inferred "mineable resource" would support operations until 2027.

Table 16.2
Measured, Indicated and Inferred "Mineable Resource" at End-2015

Item	Units	Value
Measured and Indicated Resources	thousand tonnes	5,400
Zinc Grade	%	4.85
Lead Grade	%	1.72
Silver Grade	grams/tonne	44.70
Contained Zinc	thousand tonnes	261.90
Contained Lead	thousand tonnes	92.88
Contained Silver	thousand ounces	7,760.54
Inferred Resources	thousand tonnes	3,860.00
Zinc Grade	%	5.11
Lead- Grade	%	1.38
Silver Grade	grams/tonne	35.00
Contained Zinc	thousand tonnes	197.25
Contained Lead	thousand tonnes	53.27
Contained Silver	thousand ounces	4,343.56
Total In-Situ Resources	thousand tonnes	9,260.00
Zinc Grade	%	4.96
Lead- Grade	%	1.58
Silver Grade	grams/tonne	40.66
Contained Zinc	thousand tonnes	459.15
Contained Lead	thousand tonnes	146.15
Contained Silver	thousand ounces	12,104.10

Item	Units	Value
Mine Recovery	%	90.00
Total Mined Resources	thousand tonnes	8,334.00
Zinc Grade Before Dilution	%	4.96
Lead Grade Before Dilution	%	1.58
Silver Grade Before Dilution	grams/tonne	40.66
Contained Zinc	thousand tonnes	413.23
Contained Lead	thousand tonnes	131.53
Contained Silver	thousand ounces	10,893.69
Dilution	%	8.00
Total Diluted Resources	thousand tonnes	9,000.72
Zinc Grade After Dilution	%	4.59
Lead Grade After Dilution	%	1.46
Silver Grade After Dilution	grams/tonne	37.64
Contained Zinc	thousand tonnes	413.23
Contained Lead	thousand tonnes	131.53
Contained Silver	thousand ounces	10,893.69

It is emphasized that their life-of schedules are conceptual in nature and wholly reliant on the success of future exploration in either converting existing resources to reserves, or finding additional reserves.

17.0 RECOVERY METHODS

17.1 PROCESS OVERVIEW:

17.1.1 Introduction

Ore mined in the El Mochito deposits is hauled by trucks to the concentrator plant. The ore is weighed, and delivered to the crushing circuit.

The concentrator circuit comprises crushing, grinding, sequential lead and zinc flotation circuits, concentrate dewatering circuits and loadout facilities. The existing El Mochito concentrator flowsheet is shown in Figure 17.1.

El Mochito ore is processed in a conventional, differential sulphide flotation mill, with a reported nameplate capacity of 2,300 t/d, but normally processing 2,250 t/d. This concentrator produces separate zinc and lead concentrates. Flotation recoveries are reported to be typically in the range of 74 to 78% lead, 86 to 90% zinc, and 86 to 93% silver. During the Micon site visit, the concentrator was not in operation due to a recent mine fatality.

17.1.2 Crushing Circuit

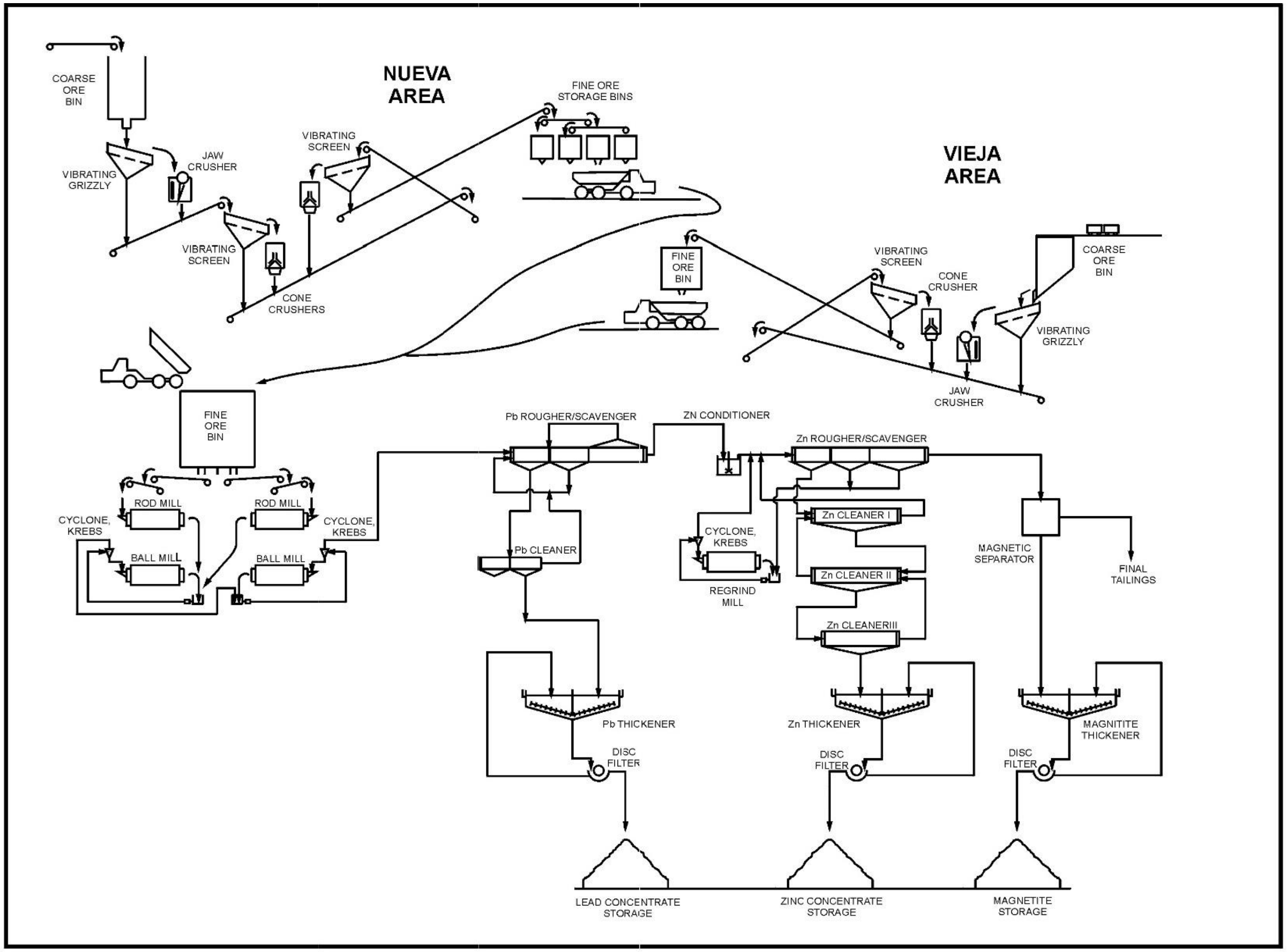
Run-of-mine ore undergoes primary crushing using a jaw crusher operating in open circuit to reduce rock size from approximately 6 inches to 2 inches. Crushed ore from the jaw crusher reports to a double deck screen. Oversize material retained by the screen reports to two cone crushers, operating in closed circuit, to reduce the ore size to 5/8 inches. Fine ore is stored in fine ore bins at the crushing area, and is transferred to the primary mill ore storage bin by two 30-tonne capacity low-profile Dux trucks. Operating criteria for the crushing circuit are summarized in Table 17.1.

Table 17.1
El Mochito Crushing Circuit

Crusher Design Criteria	Units	Value
Crushing Circuit Operating Time	h/d	11
Average Throughput	t/h	154
Type of Primary Crusher	Jaw	
Ore Feed Size to Primary Crusher, 80% Passing (estimated)	in	6
Type of Screen	Vibrating Double Deck	
Ore Feed Size to Secondary Crusher, 80% Passing (estimated)	in	2
Type of Secondary Crusher	2 Cone Crushers	
Secondary Crusher Discharge Size, 80% Passing (estimated)	in	5/8

Source: June 2016 Metallurgical Summary Report

Figure 17.1
El Mochito Milling Circuit Flowsheet



Source: Breakwater Resources Ltd., American Pacific Honduras S.A. de C.V, Mochito Mine, Las Vegas, Honduras, NI 43-101 Technical Report.

17.1.3 Grinding Circuit

Fine ore is transported from the fine ore bins and weighed by passing over conveyor belts. Ore is reduced from 5/8" to 80% passing 212 microns through the grinding circuit. The grinding circuit consists of two parallel open circuit rod mills, the discharges from which are combined and passed through two stages of ball milling. Each stage of ball milling is in closed circuit with cyclones.

17.1.4 Flotation and Regrinding:

Typical feed grades and recoveries of the flotation circuit are summarized in Table 17.2. The circuit is designed to float the lead-silver minerals first, depressing the zinc. The tailings from the lead-silver circuit are then sent to zinc flotation. The lead-silver flotation circuit consists of seven rougher/scavenger cells and four cleaner cells. The scavenger tails report to the regrinding mill, prior to reporting to the zinc flotation circuit. The zinc flotation circuit consists of ten rougher/scavenger cells and eighteen first, second and third stage (six cells per stage) cleaner cells. Tailings from the zinc circuit are sent to the mine backfill facility.

Table 17.2
El Mochito Flotation Circuit

	Units	Value
Head Grade	Zinc (%)	3.53
	Lead (%)	1.45
	Silver (g/t)	54.0
Lead Concentrate	DMT/a	10,898
	Contained t - Pb	7,131
	Contained ounces - Ag	632,536
Grades	Silver (g/t)	1,805
	Lead (%)	65.43
	Zinc (%)	9.33
Recovery	Pb in Pb con.	76.44
	Zn in Pb con.	9.33
	Ag in Pb con.	56.60
Zn Concentrate	DMT/a	39,917
	Contained t - Zn	20,216
	Contained ounces - Ag	277,045
Grades	Silver (g/t)	216
	Lead (%)	2.65
	Zinc (%)	50.65
Recovery	Zn in Zn con.	88.85
	Pb in Zn con.	11.34
	Ag in Zn con.	24.79

Source: Production Forecast 2016 Report

17.1.5 Thickening and Dewatering

Conventional thickeners and vacuum disc filters are used for dewatering the concentrates at El Mochito. There are two thickeners for zinc concentrate, with the underflow being pumped to two Eimco 5-disc filters, and there is one thickener for lead concentrate connected to one 5-disc filter.

The final zinc and lead flotation concentrates are transported by gravity to their respective thickeners, where liquid/solid separation occurs assisted by flocculants. Recovered water is pumped back to the grinding and flotation processes, while thickened pulp reports to the disc filters, where more water is removed in order to produce concentrates with acceptable moisture for transportation. Typical concentrate moisture levels are:

- lead concentrate 9.5% and
- zinc concentrate 10.5%

There are two small warehouses for storing the daily production, prior to transportation to the Puerto Cortes main warehouse.

The flotation tailings are pumped to the mine backfill facility where, upon demand, they are pumped to a hydrocyclone to produce hydraulic backfill for the mine or by-passed to the tailings impoundment area. No tailings effluent is recycled to the mill, but it is treated and discharged.

Water in the final tails is detoxified and pH adjusted, and then pumped to the tailings impoundment area. The tailings are stored there and water quality is tested to ensure that it meets permit conditions prior to being pumped into the creek.

El Mochito personnel have prepared plans to redeploy an older thickener, and also to use two new small cone clarifiers, with the objective of introducing water recirculation from the tailings impoundment pond to the mill process water circuit. This new design will reduce reliance on pumping fresh water from the local streams during the dry season. It will also result in reduction of water being discharged from the impoundment area.

17.1.6 Magnetite Production Circuit

El Mochito has identified an opportunity to produce a magnetite concentrate from the zinc circuit final tails and has installed two magnetic drum rollers for this application. Initial estimates by El Mochito mill personnel indicate that the tailings volume could be reduced by 10 to 15% through this process.

A buyer for this magnetite concentrate has not yet been identified, and so this circuit is currently being by-passed. During the site visit, Micon suggested that the local cement producers may be interested in utilizing the magnetite concentrate as a feedstock for colouring their cement product, (similar to the reddish colouration when hematite is added as a decorative option to cement.

17.1.7 Ancillary Equipment

Copper Sulphate Reagent Distribution - There is one 8' diameter, 8' high copper sulphate storage tank. The distribution is operated by gravity, using Karlson feeders. The operators control the flow manually. Weekly reconciliation is performed to compare reported consumption with inventory updates.

Lime Preparation - The limestone feedstock is delivered in 50 pound bags. Micon noted that the recent efficiency improvements made by the mill supervisor to the lime preparation circuit have reduced lime consumption costs from a high of $0.81/DMT in January, 2015, to a low of $0.21 in February, 2016.

Process Water Pumps - Future development plans include the installation of pumps to move water from the tailings containment pond to the mill.

17.1.8 Mill Concentrate Storage

Concentrates are trucked from the mill warehouse 6 days per week. There is a need for this high transportation frequency because there is limited concentrate storage space at the mill.

The concentrate hauling trucks are loaded with an average 24.5 tonnes of concentrate using a Caterpillar front-end loader. The loaded trucks weigh about 38 tonnes, to ensure that they are within the legal limit of 39 tonnes. All trucks are sampled and cleaned before leaving the warehouse, to avoid any environmental problems. After cleaning, the trucks are sealed and weighed once again before the material is released to the port.

17.2 CONCENTRATOR EXPANSION PLANS

El Mochito personnel have developed plans to increase mill throughput to 3,000 t/d. The costs for this expansion have been estimated approximately $1 million (including contingency). The details of this design were not verified as part of this report.

Operations personnel determined that the run-of-mine ore has more than 30% material finer than 3/8". As part of the expansion plans, a screen with ¼" openings will be installed in front of the crushing circuit to remove 25% of this naturally fine material. This operation will result in increased crusher plant capacity.

The grinding circuit will also be reconfigured. The two primary grinding rod mills will be converted into two ball mills, operating in parallel.

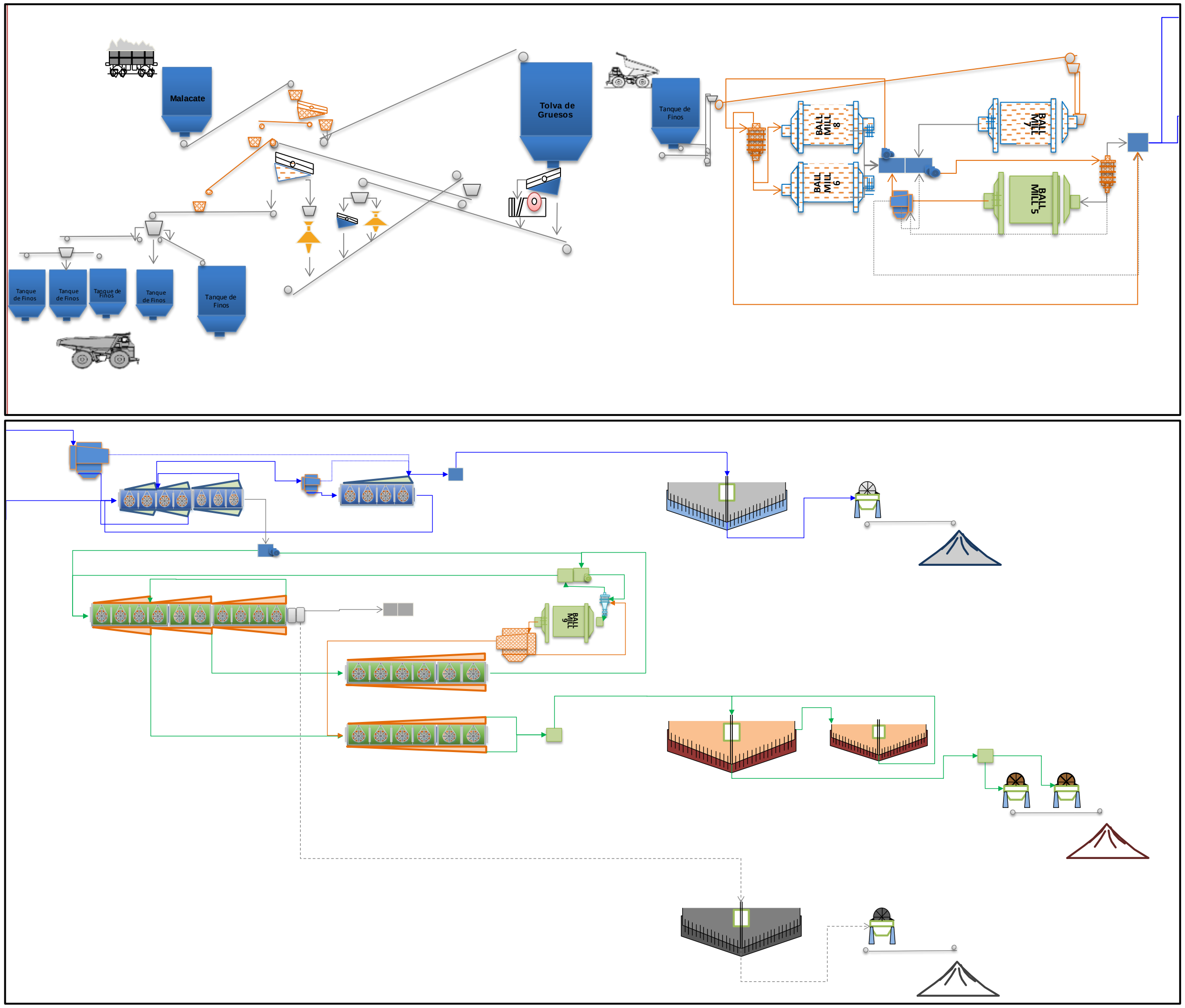
The tails from lead flotation circuit will be pumped to a new tank cell for additional treatment, prior being pumped to be regrind mill. The remainder of the lead flotation circuit, zinc flotation circuit, and thickeners will not be modified.

A new filter press will be required to handle the additional concentrate production.

The expansion plan also includes improvement to the current water management system. Two small cone clarifiers and an older thickener will be redeployed as part of the program to recycle water from the tailings impoundment.

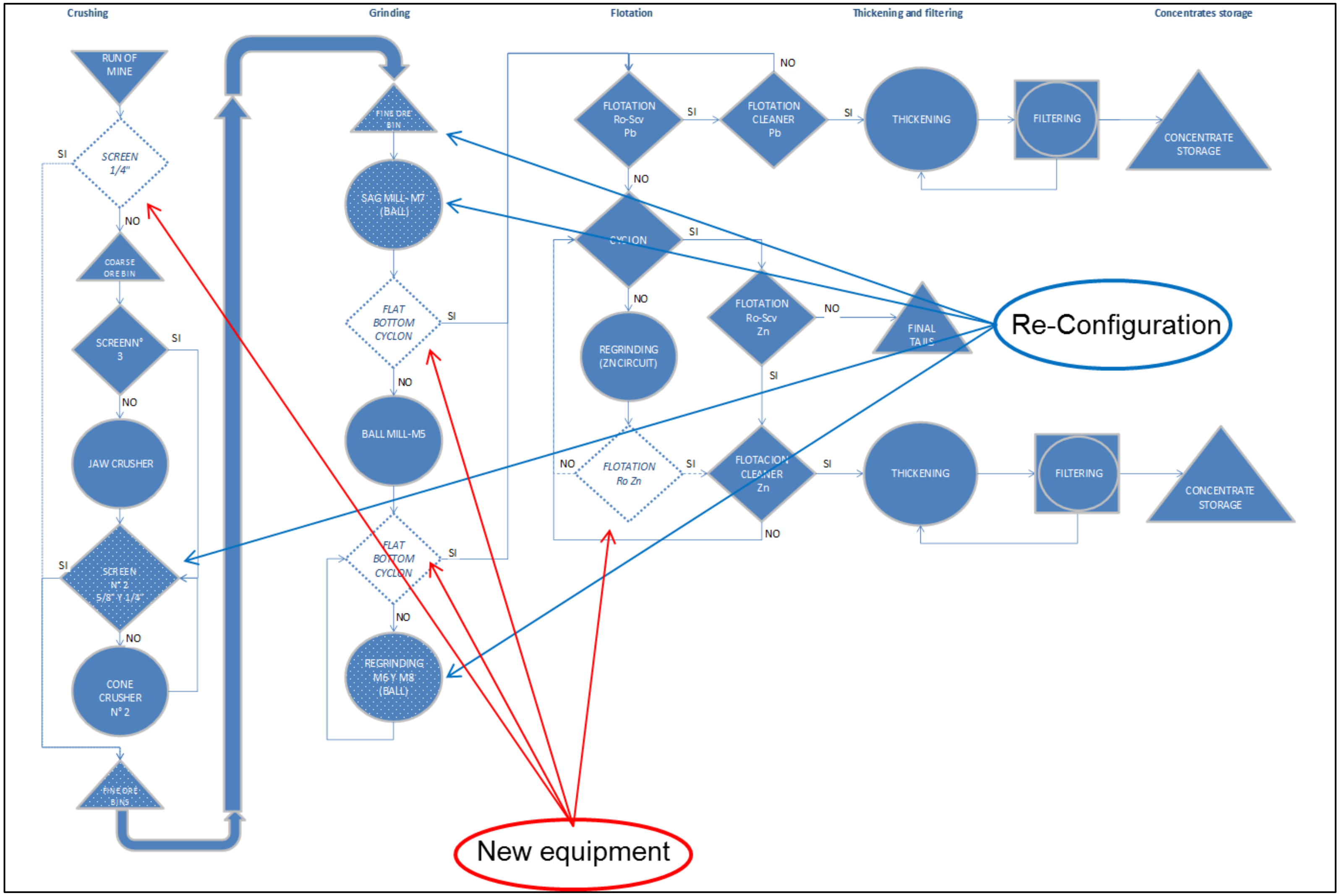
The proposed revised concentrator flowsheet and process flow diagram are shown in Figures 17.2 and 17.3 respectively. Approval for implementation of the expansion has not yet been given.

Figure 17.2
Proposed Concentrator Expansion Flowsheet



Source: Process Plant PowerPoint presentation, Nyrstar, March 2016.

Figure 17.3
Proposed Concentrator Expansion New Process Diagram

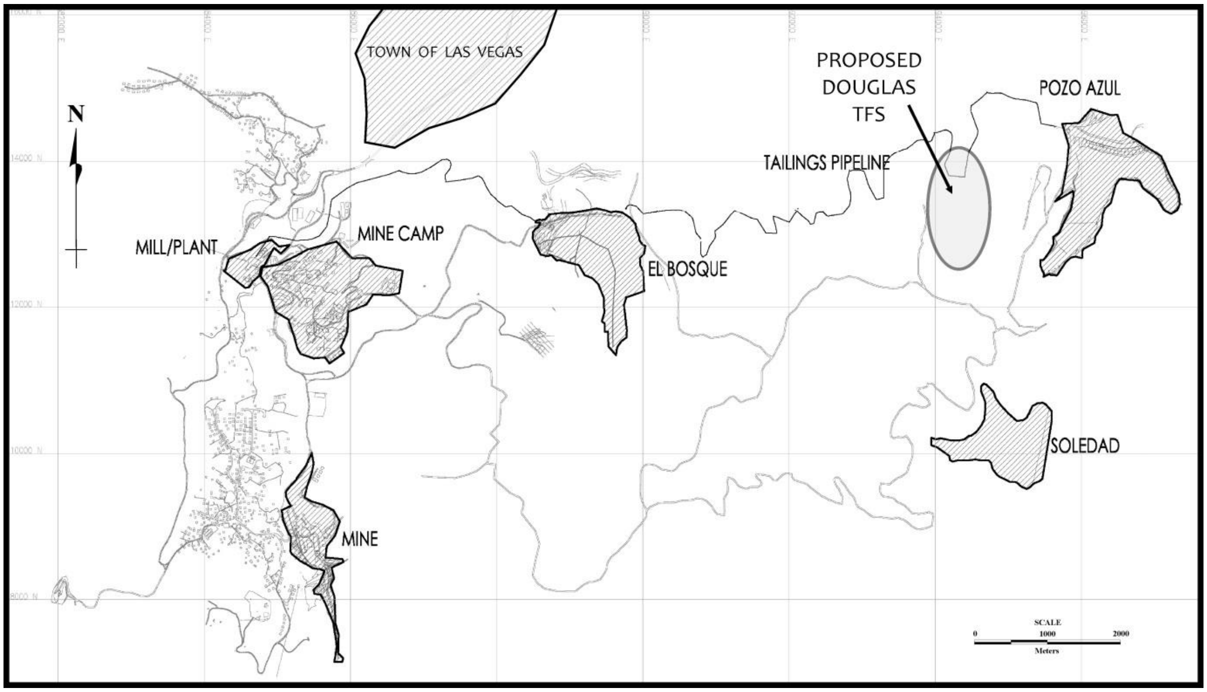


Source: Process Plant PowerPoint presentation, Nyrstar, March 2016.

18.0 PROJECT INFRASTRUCTURE

The general layout of the El Mochito mine site complex is shown in Figure 18.1.

Figure 18.1
El Mochito General Site Layout



Source: Nyrstar, 2016.

The El Mochito mine complex covers a large area but can be separated into distinct zones (i.e., mine camp, mill, mine and tailings storage facilities. The mine complex includes a warehouse at Puerto Cortez where zinc and lead concentrate are stored before being shipped to an overseas refinery/smelter

18.1 MINE CAMP INFRASTRUCTURE

The mine camp is a typical old mining company, self-sufficient, town. It was originally built by Rosario Resources Corp in the 1960s, and is separated from the town of Las Vegas by the Quebrada Raices river.

The mine camp area includes the general offices, accommodation for staff and visitors, the company restaurant, a carpentry shop, a surface mechanical and transportation shop, a twenty-bed hospital and clinic, a bilingual school (up to grade 9), a vocational school, a privately-run gas station and supermarket. The camp also has a swimming pool, basketball and tennis courts and playgrounds for families.

Armed security guards are present at every entrance to the mine, mill, mine camp and tailings ponds. Each person entering these areas is required to use a breathalyzer before they are allowed entry to these sites.

The hospital itself has a day clinic, several wards including a pediatric ward, private rooms, a fully-equipped operating room and a delivery room. It is staffed with one to three doctors and five nurses.

18.2 MINE SURFACE INFRASTRUCTURE

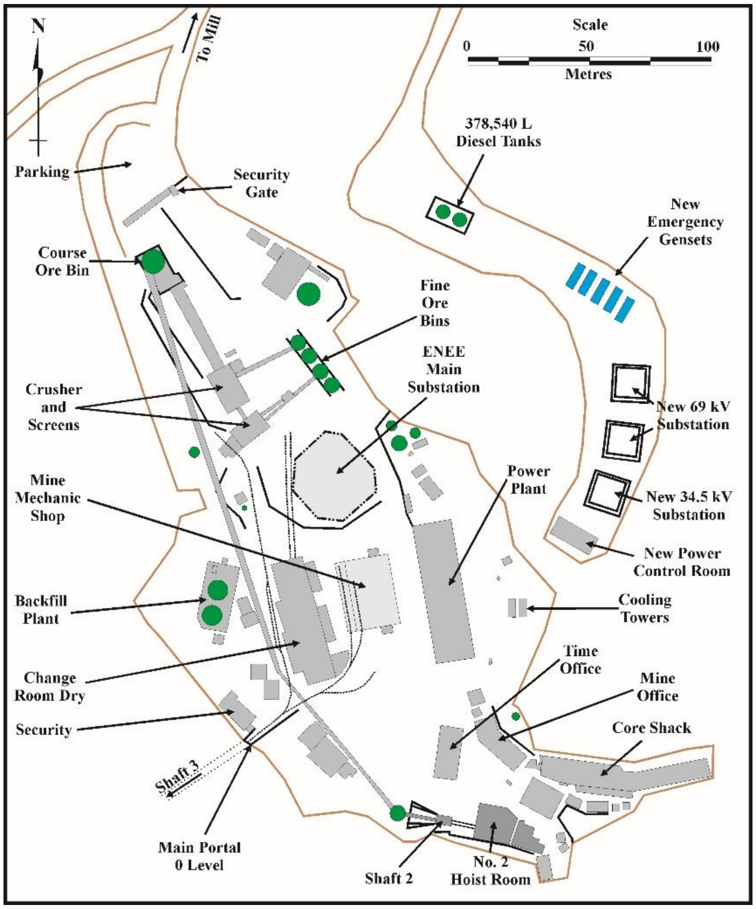
The surface infrastructure at the mine is illustrated in Figure 18.2. The site is dominated by the No. 2 shaft headframe. All personnel and equipment entering the underground mine must use the main portal (0 Level), which leads to the internal No. 3 shaft (see Figure 18.3).

The run-of-mine material is dumped from No. 2 shaft into a grizzly and a series of conveyor belts leading to the coarse ore bin. Another series of conveyor belts delivers the ore through the primary and secondary crushers to the fine ore bins. The crushed ore is transported by trucks to the mill, which is 1.5 km away.

The on-site diesel power plant provides emergency backup power to the mine when there is a power outage of the electrical grid. The power plant also provides compressed air for underground operations.

The surface mechanical shop repairs underground equipment that cannot be serviced by the underground shops. The mine and time offices plan and coordinate the operations of the underground mine and workforce. The change room or dry also houses the lamp room and safety office. The mine security office provides communication coordination of the underground workforce. All personnel entering the mine must pass a second breathalyzer test at the underground mine security office.

Figure 18.2
Mine Yard Infrastructure



Source: Nyrstar, 2016.

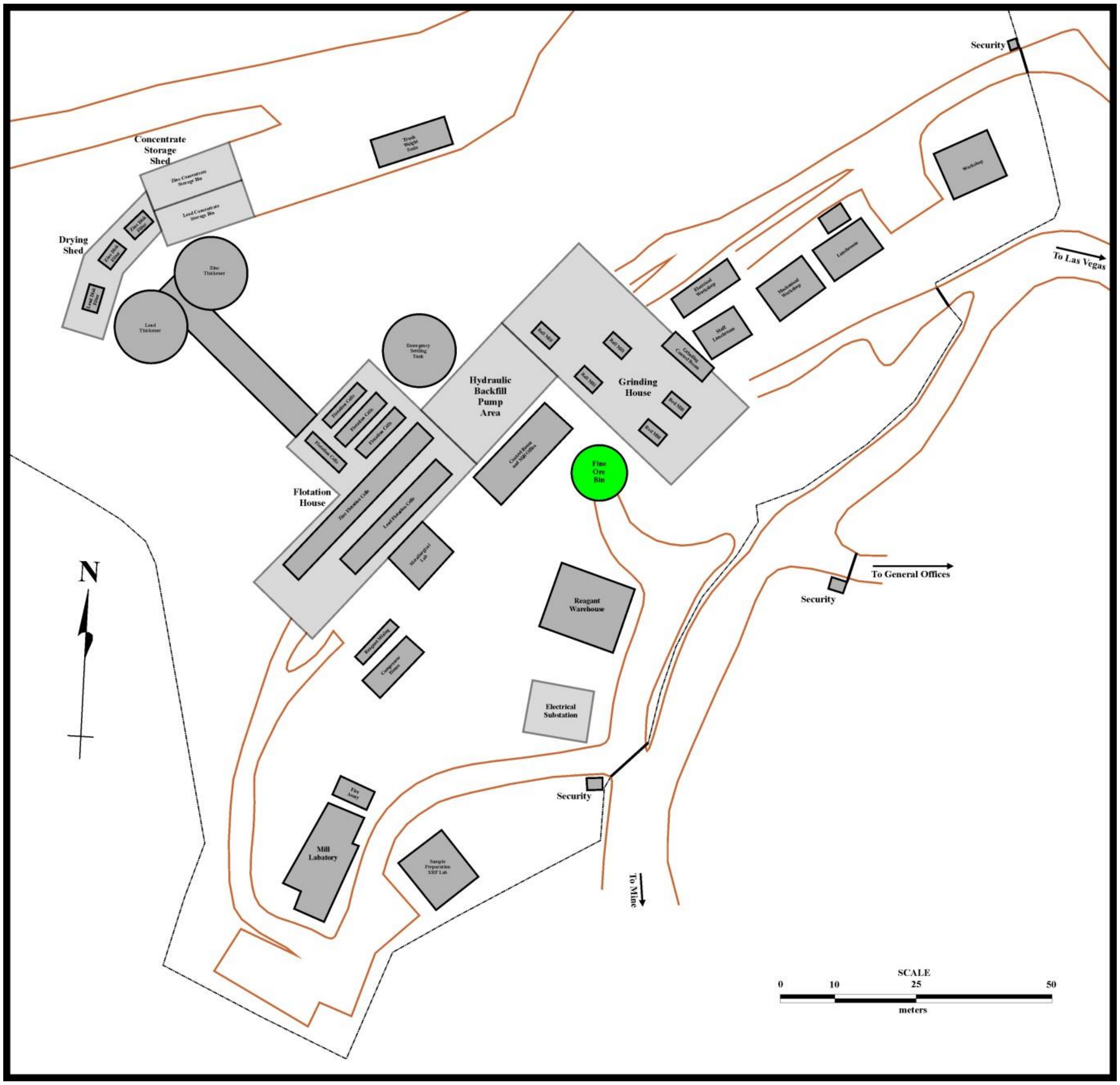
Figure 18.3
Main Mine Portal

Source: D. Makepeace Site Visit, August 11, 2016.

18.3 MILL INFRASTRUCTURE

The general mill layout and essential mill equipment are illustrated in Figure 18.4. The complex includes the mill itself, mine/mill assay laboratory, concentrate storage and truck weigh scale.

Figure 18.4
Mill Layout



Source: Nyrstar, 2016.

18.4 TRANSPORT OF CONCENTRATE

The lead and zinc concentrates are loaded into specially designed bins that are attached to flatbed trucks. There are two bins per truck. The bins are a steel cage that is lined with used conveyor belts (see Figure 18.5). Trucks are loaded by a front-end loader, with lead concentrate being loaded first, followed by the zinc concentrate. The average truck carries approximately 24.5 tonnes, which is below the legal national law of 39 tonne when the weight of the truck is included. Each truck is weighed before and after loading. Each bin is statistically sampled and homogenized with the other bins to obtain an average grade of each of the concentrates. Each bin is then covered and tied down for transport to the Puerto

Cortez warehouse. There are usually 10 trucks per day, 6 days per week. All drivers sign off on their loads and no driver is allowed to transport concentrate two days in a row, for safety reasons.

Figure 18.5
Steel Bins for Transportation of Concentrates

Source: D. Makepeace Site Visit, August 12, 2016.

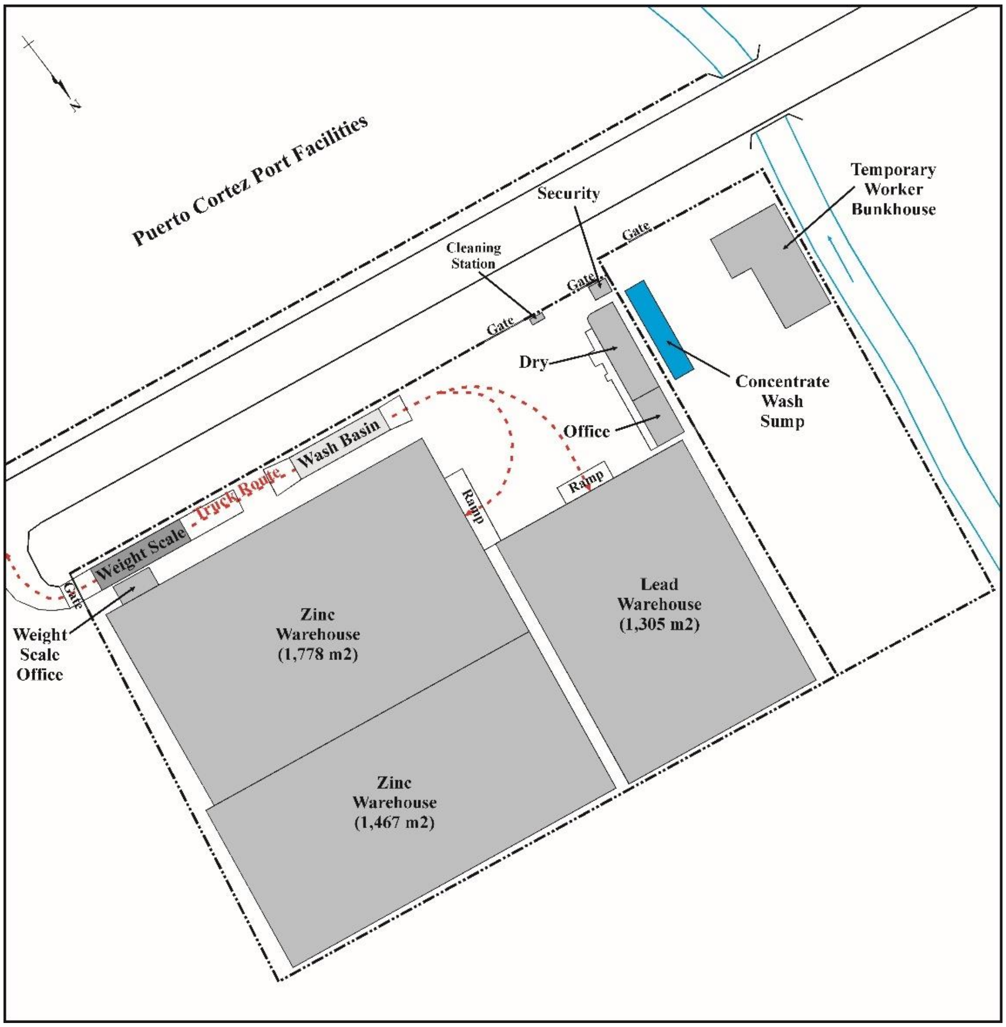
18.5 PUERTO CORTEZ CONCENTRATE WAREHOUSE

When the trucks arrive at the concentrate warehouse in Puerto Cortez, each truck is signed in and weighed on a truck scale. The trucks are then sent to either the lead concentrate warehouse or the zinc concentrate warehouse. The warehouses have a concrete floor and approximately 2- to 3-m concrete sides. The zinc warehouses are connected to each other, due to the amount of zinc concentrate that is produced at the mine. The lead warehouse is approximately 1,305 m^2 in area, and the combined zinc warehouse is approximately 3,345 m^2. Figure 18.6 shows the layout of the Puerto Cortez concentrate warehouses.

The concentrate is hand-shoveled out of each truck bin onto the concrete floor. Once each truck is empty, it is moved to a wash basin where any loose concentrate is washed into a sump. The sump solids are pumped back into their respective warehouses to dry. The truck is then weighed and returns to the mine for the next trip.

Once the trucks have left the warehouses, a front-end loader combines the concentrate into one large pile against one concrete wall. An industrial-sized vacuum is then used to pick up the remaining concentrate each day. The resulting filtered concentrate is then added to the pile. If the vacuum is not operational, workers sweep the floors into the large piles, each day. At the time of Micon's site visit, Nyrstar was not using the vacuum because negotiations were in hand with the manufacturer to get a turnkey contract to provide full maintenance, including spare parts.

Figure 18.6
Puerto Cortez Concentrate Warehouse Layout



Source: Nyrstar, 2016.

When there is enough concentrate to transport to a smelter, the mine staff contact one of two shipping agents at the Puerto Cortez facility. The agent arranges all the port export permits and bills of lading and contracts an appropriate size ship to pick up the concentrate.

A series of flatbed trucks are contracted when the ship arrives at port. Large steel bins (approximately 2 m wide by 3 m long and 2 m deep), with shackles on all four sides, are used to load out the concentrate (see Figure 18.7). The bins have a lower lip at one end to facilitate efficient unloading of the concentrate in the ship's hold. Each truck can carry two steel bins. The bins are loaded by the front-end loader from each of the large piles of lead and zinc concentrate. The trucks are weighed with empty bins and then with full bins. The trucks are washed before being re-weighed. A representative sample is taken of each bin and combined with the other samples to get an average grade of the concentrate. The trucks are signed out and leave the compound. They enter Gate Number 3 of the Puerto Cortez port facility, which is approximately 50 m east of the Nyrstar warehouse.

In the port, each bin is lifted off of the truck by a crane and swung over the ship's holds. Two of the crane's cables release the front end of the bin and the concentrate is dumped into the hold. The empty bin is then placed back on the truck. Once both bins are empty, the truck returns to the warehouse compound for another load and the process repeats itself until the warehouses are empty.

Figure 18.7
Concentrate Loadout Bins at Puerto Cortez

Source: D. Makepeace Site Visit, August 12, 2016.

Nyrstar is negotiating with the Honduran government and the Puerto Cortez Port Authority to reduce the port shipping tariffs for the mine's concentrate.

18.6 Tailings Storage Facilities

There are three tailings storage facilities on the property, El Bosque, Pozo Azul and La Soledad. Their locations are illustrated in Figure 18.1, above. Each TSF is inspected by Tierra Group International Ltd. every three months. Tierra Group is an independent geotechnical firm based in the United States that has designed all of the present and future TSFs at El Mochito.

18.6.1 El Bosque TSF

The El Bosque TSF is the oldest (1970s to 1980s) and holds approximately 5 Mt of tailings. The surface of this TSF has revegetated naturally. The TSF has an underground decant system and settling pond at the toe of the dam. The reclamation of this TSF includes the installation a new spillway and the capping and re-contouring of the tailings surface, so that future surface water will flow toward the spillway and away from the dam. Nyrstar is also constructing a 175-m long retaining wall downstream of the toe of the dam to prevent possible soil erosion from flooding of the Quebrada Raices river. It will also strengthen the embankment against a possible breach of the dam during a major seismic event. The top end of an historic landslide on the west abutment of the dam will be removed and a new upstream dyke will be installed. The complete closure of the El Bosque TSF is scheduled for 2018.

18.6.2 Pozo Azul TSF

The Pozo Azul TSF dam was started in the early 1980s. The TSF was initially used in the early 2000s but a failure in the lining of the La Soledad TSF in 2007 necessitated reactivation of the Pozo Azul TSF and increasing its original capacity. It finally ceased receiving tailings in 2013, and now holds approximately 10 Mt of tailings. The dam was engineered to the seismic conditions in the region. There are several piezometers strategically located to measure the subsurface water environment. A spillway has been constructed and reclamation will continue by capping and contouring the tailings area, so that future surface water will be diverted toward the spillway and away from the dam. The final reclamation of the Pozo Azul TSF is scheduled to be completed by 2017.

18.6.3 La Soledad TSF

The La Soledad is the active TSF for the El Mochito operation. It was initially constructed in 2004 and, as of the end of 2015, it covered and area 18 ha. The TSF is lined with a 60 mil LLDPE plastic geomembrane liner. There is an underdrain and a chimney drain that discharge into a settling pond and weir box. There are north and south diversion channels to capture surface runoff before it enters the TSF. There are also several piezometers installed in and around the TSF structure to measure the subsurface water conditions.

In 2006, a storm damaged the seam of the geomembrane liner of the TSF. The seam was repaired but, in 2007, water was discovered discharging from the TSF. Excess water was discharged by a 61 cm diameter HDPE pipe to a settling pond near the Quebrada Raices river. As noted above, tailings were diverted to the Pozo Azul TSF until repairs and testing of the liner could be made. The La Soledad TSF was recommissioned in 2009.

The dam was designed in four stages. Presently, La Soledad is at Stage 3 (802 m elevation), as shown in Figure 18.8. At the end of Stage 4 (807 m elevation), the maximum capacity of

La Soledad will be 6 Mt. Preventative measures are being carried out at the Guard Shack Slide area and to mitigate the possible erosion of the downstream dam face identified by Tierra Group's audits. The end of life for La Soledad is in 2021.

Figure 18.8
La Soledad TSF and Stage 3 Dam, Looking East

Source: D. Makepeace Site Visit, August 11, 2016.

18.6.4 Douglas TSF

The Douglas TSF (Site 4) was a result of a trade-off evaluation of 22 different potential tailings pond sites. The chosen site is between the El Bosque and Pozo Azul TFSs. It has a potential life of 6.3 years, based on Tierra Group's trade-off studies report (Tierra, 2014). It is estimated to cost approximately $17.5 million to construct. The Douglas dam will be built in two stages and the basin will have an underdrain system and be lined with a 60 mil LLDPE plastic geomembrane liner. Geotechnical investigation has already been undertaken at the site and several piezometers have been installed. The final studies and the environmental permitting will commence in 2016. The schedule is to start construct in 2018 and have the first stage of the dam completed by 2019, which would be give a two-year overlap before La Soledad TFS is filled.

18.7 POWER

El Mochito has a peak demand of 10.5 MW of electrical power. The main source for the mine and the surrounding area is from a hydroelectric dam on the Rio Lindo (80 MW), north of the town of Peñe Blanca. The powerhouse uses a 34.5 kV distribution powerline run by Empresa Nacional de Energía Eléctrica (ENEE) of Honduras. It provides electricity to the surrounding towns and villages as well as the mine. The main ENEE substation for El Mochito is within the mine compound (see Figure 18.2, above). This old distribution powerline system and the frequent lightning storms in the area have caused unreliable power at the mine site. To compensate for this, the mine has an emergency backup power station which can be manually switched on during a power failure. The three V-20 diesel generator sets were purchased by Rusario Resources Corp. in the 1960s and produce 6 MW of electricity for the mine and mill. The cost of running these units is approximately $0.45/KW/h.

Nyrstar has been in negotiations with the government and ENEE to provide the mine with more reliable and less costly power. The negotiations include connecting to the Cañaveral 69 kV transmission powerline that roughly runs parallel to the original 34.5 kV distribution powerline. The 69 kV powerline runs from a second powerhouse dam (Cañaveral - 28.5 MW) below the Rio Lindo dam and terminates at the village of El Nispero. At El Nispero, the 69 kV powerline will be connected to Sistema de Interconexión Eléctrica de los Paises de América Central (SIEPAC) by March, 2017. SIEPAC is an interconnection of the power grids of six Central American nations.

When the connection is made, and if the mine budget allows, the mine will connect to this transmission line. In anticipation of this, the mine has already partially built a new 69 kV substation, purchased the required equipment and built a new control room beside the mine compound (see Figure 18.2). A new 34.5 kV substation is also partially built, with the intention that both lines can be utilized, if necessary. The mine has purchased five new backup CAT SR4B HV generators to replace the aging backup generators which, when installed, will reduce the running costs to approximately $0.22 per KW/h. Nyrstar has already invested approximately 60% of the total cost of the project and estimates that it will cost approximately $1.5 million to complete.

Part of the negotiations with the government and ENEE is to have the government credit at least 50%, and possibly 100%, of the power upgrade to the mine. The negotiations also include a rate reduction for electricity from $0.15/kW/h to $0.12 per kW/h.

18.8 WATER / WASTEWATER

There is a water distribution system throughout the mine complex. The water is obtained from the local creeks and has only rudimentary water treatment (i.e., sedimentation and filtration). The mine provides bottled water to all its personnel.

The mine complex does not have a wastewater treatment plant. Domestic effluent is treated in a series of septic tanks throughout the complex. These tanks are periodically cleaned out and the solids disposed of in a nearby wastewater treatment plant in the town of Las Vegas.

Mine water is pumped up to the 650 Level (Caliche Level) and out to the Caliche portal. This portal is used as the main drainage for the mine, as well as being an integral part of the ventilation system of the mine and an emergency escape way. Water exits the portal and is funneled through a trash screen and into a 61 cm diameter HDPE discharge pipe. A concrete spillway has been constructed beside the trash screens to handle water volumes that may exceed the discharge pipe capacity. The excess water would then be discharged directly into the environment without treatment. The end of the discharge pipe flows into a settling pond. A concrete diffuser bank is used to decrease the velocity of the discharged water. Suspended solids have time to settle before the water is discharged through a concrete spillway and into the environment. A second identical and parallel settling pond is being built, along with a concrete channel splitter, to handle the volume of water from Caliche. The two ponds will allow more time for suspended solids to settle before being discharged the environment.

18.9 EXPLOSIVES

The mine uses approximately 900,000 kg of ammonium nitrate/fuel oil (ANFO) explosives each year. It has the equipment to produce and bag ANFO explosives. It used to produce ANFO several decades ago, until the Honduran military assumed the control of all explosives in the country. The military now imports explosives from Costa Rica and re-sells them to end-users, including the El Mochito mine, at $1.40/kg. The Costa Rican explosives are apparently of poor quality compared to the ANFO originally produced at the mine.

Nyrstar is in negotiations with the Honduran government and the military to restart the production of ANFO, utilizing the explosive production equipment at the mine. The mine would produce the ANFO and bag it for its own use, selling any surplus to the military, which would re-sell it to other end-users. The mine would get a higher quality and less expensive product ($0.80/kg). The military would add their costs ($0.20/kg) and the other end-users would also get a cost reduction ($1.00/kg). The negotiations should be completed within 2016.

19.0 MARKET STUDIES AND CONTRACTS

AMPAC ships its lead and zinc concentrates to smelters owned by Nyrstar and located outside of Honduras, under contracted prices for smelting and refining. Typically, such contracts or arrangements are not transferable to a new owner of the El Mochito operation. Any new owner, therefore, is likely to have to negotiate its own smelting and refining contracts.

Micon understands that the retainer by Nyrstar of an industry standard off-take agreement on concentrates produced from El Mochito is a condition of completion of the transaction by Morumbi.

20.0 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

20.1 ENVIRONMENTAL ISSUES

No recent environmental baseline studies have been completed at El Mochito, due to the mine's long operating history. Over time, the mine has recognized specific issues that may lead to environmental degradation and has been a leader in mitigation and reclamation in Honduras. As an example, El Mochito was the first to install a LLDPE plastic geomembrane liner in constructing its TSFs without government requirements. It is now a government requirement to line all tailings ponds in the country.

Air quality is not monitored on an annual basis, although an audit on emissions was carried out by an independent firm in 2015.

20.1.1 Water Quality and Management

The most important environmental issue at the mine is the quality of the surface and groundwater. Water sampling is carried out on a daily basis from the mine and mill discharge points, the TSF discharge locations and the receiving creeks. On a daily basis, water quality samples and groundwater elevations are also measured at numerous piezometer wells on the property. All samples are sent to the mill assay laboratory, which contains a section devoted to water chemistry. Sample results are reported weekly, monthly and semi-annually to the mine environmental department. Regular reports are sent to the Honduras Environment Ministry and the Municipality of Las Vegas.

The mine has not received any water quality violation notices from the Honduran Ministry of Environment. In the 1990s, it was assumed by some local groups that the mine was polluting Lake Yojoa, because there was an annual fish kill in the lake. The tilapia fishing industry on the lake and the Honduran government have identified that the fish kill is due to natural eutrophication of Lake Yojoa.

The two largest water quality concerns are the total suspended solids (TSS) and the total lead (Pb_T) concentrations in the water. Due to the limestone lithology and mineralization, there is no concern of acid rock drainage (ARD) or metal leaching (ML) caused by ARD. The water is naturally alkaline due to the geology of the region. The Pb_T is associated with high TSS.

To mitigate these issues, the mine has constructed several settling ponds at all mine, mill and TSF discharge points. The settling ponds are sized to meet the retention time required to adequately decrease the TSS and, hence, the Pb_T to surface water quality standards. The mine is presently constructing a second, parallel settling pond to handle excess mine water from the Caliche portal. Water from every settling pond discharge point is sampled on a daily basis. This mitigation strategy has reduced the TSS from 100 ppm to less than 10 ppm on average. The water turbidity for the first half of 2016 was 51.5 NTU, which is within the Canadian Water Quality Guidelines for the Protection of Aquatic Life.

20.1.2 Waste Management

Non-hazardous waste is recycled wherever possible. The mine camp has a recycling program for plastic and other saleable products, which are sent to a recycling company near San Pedro Sula. Normal rubbish is disposed of in the La Vegas municipal landfill site.

Hazardous and industrial wastes are temporarily stored on site at a secure location. Third party licenced operators then dispose of the waste. Depending on the type of waste, it is either sent to the local cement production facility and used as fuel or removed to a certified landfill site. Nyrstar has procedures for handling hazardous wastes, including hydrocarbon spills and remediation.

Wastewater solid waste is pumped out of the septic tanks on the property and removed to a certified landfill site.

20.1.3 Flora and Fauna Management

The Forest Management Plan is intended to protect the water, flora and fauna of the Manantiales river basin. Both the mine and Las Vegas municipality jointly work on this plan. Nyrstar itself controls approximately 700 ha of forest and has two forest and plant nurseries. Nyrstar intends to plant up to 20,000 plants in 2016.

The pine trees in Honduras have been hit hard by the Pine Beatle infestation. Approximately 2 to 3 ha of Nyrstar's land is lost each year to this pest.

Nyrstar has a coffee plantation that is run independently from the mine. The plantation serves several purposes. It provides additional income for residents in the area as part of the mine's community social responsibility program. It helps to reduce soil erosion on the mine property, and also prevents illegal squatters from establishing residence there.

Nyrstar does not allow hunting or fishing anywhere within the mine complex area. Workers are educated to preserve nature and report any violations of these rules.

20.1.4 TSF Management

The TSFs are inspected every three months by Tierra Group International Ltd. and an audit report is issued after each visit. The Honduras Ministry of Mines also inspects the TSFs annually.

Water quality samples are taken at each decant discharge location. The analytical results are reported to the mine, the Honduran government and the Las Vegas municipality.

The proposed Douglas TFS is in the process of geotechnical analysis and initial dam design by Tierra Group International Ltd. This information will be part of the documentation sent to the Honduran government for permitting of the TSF.

20.1.5 Environmental Education Initiatives

The mine staff educates its employees, their families and the population of Las Vegas on environmental issues at the mine, on a regular basis. Environmental concerns raised by citizens are answered as quickly and accurately as possible. The environmental department visits schools in the area to educate the children on environmental and conservation issues. Tours are given of the mine's nurseries, to groups, the most popular being the orchid nursery.

20.1.6 Inspections

The Honduran government inspects the mine on a regular basis. The Secretary of Energy, Natural Resources, Environment and Mines (SENREM) environmental branch has a general inspection every 2 to 3 years. The Honduran Institute of Geology and Mines has a bi-monthly inspection. The Municipality of Las Vegas, environmental unit has a monthly inspection. The National Institute for Conservation and Forest Development has a yearly inspection.

20.1.7 Environmental Legislation

The mine has been in operation for almost 70 years, commencing well before environmental regulations came into being in Honduras. The mining industry in Honduras is still small in comparison to other countries and, therefore, the legislation that governs it is not as comprehensive either. The environmental laws tend to be vague and do not properly address mining issues. As such, few environmental issues are regulated or require a licence.

To compound this problem, many of the government agencies are understaffed and lack the technical knowledge to adequately regulate and approve new mine development projects. Changes in agency personnel make it difficult for mining companies to meet the appropriate individuals to discuss issues and get timely approvals. Nyrstar, however, has a good working relationship with the Honduran government and its different agencies.

20.1.8 Environmental Permits

There are several environmental permits covering different areas of the mine complex. Permits are a combination of a certificate and a contract. The contract outlines the requirements that the permit holder must comply with to adhere to the certificate.

20.1.8.1 Water Use Permit

The General Directorate of Water Resources (DGRH) is charged with the responsibility of the utilization and management of water resources. It is a former division of the Energy, Natural Resources, Environment and Mines (SERNA) authority. DGRH has given a resolution approving the issuance of the permit for the mine. The mine, however, is still waiting for the official document from the government.

The main reason for the delay is that the DGRH is being replaced by a decentralized National Water Authority created under the new Water Framework Law of 2009, which replaced the previous law of 1927. The mine has tried to obtain the official permit but has been unsuccessful so far, due to government bureaucracy and excessive workload.

The mine is following the contract of the permit even though the certificate is not available.

20.1.8.2 Mining Operations Environmental Permit

This certificate covers the mine, mill, El Bosque TSF and Pozo Azul TSF. The Energy, Natural Resources, Environment and Mines (SERNA) issues this permit. The application process for the permit commenced, in 2003. The contract has been signed by the government but the official certificate of the approval has not been received, pending agreement on water quality of discharge sites. The contract outlines the inspections, monitoring and reporting of the environmental conditions of this area, and is primarily focused on water quality which is part of the formal mitigation plan approved by the government. The contract has no expiry date. The mine has continued to follow the plan and submit reports to the government. No formal letter from the agency has been received by the mine. Nyrstar’s lawyers are required to periodically check with SERNA to see if the mine is in compliance.

20.1.8.3 Environmental Licences for La Soledad TFS

This certificate covers only the La Soledad TSF. SERNA also issues this permit. The permit originally expired in 2006 and a renewal request was filed and received by SERNA before the expiry date. The contract has been agreed to by the government agency but no official certificate or new expiry date has yet been received by the mine. The TSF follows the formal mitigation plan agreed to by the government, which includes inspections, monitoring and reporting of the environmental conditions. The mine has continued to follow the plan and submit reports to the government. No formal letter from the agency has been received by the mine. Nyrstar’s lawyers are required to periodically check with SERNA to see if the mine is in compliance.

20.1.8.4 Concentrate Storage Building Permit

Nyrstar owns a concentrate warehouse in Puerto Cortez (see Section 18.5). It has a current environmental licence with the Municipal Environmental Department of Puerto Cortez, which was issued in 2014 and is valid for 5 years.

20.1.8.5 Forest Management Pan

The Honduran forestry industry is primarily regulated through the Forest Law, created in 2008 as an attempt to better regulate forestry activities. The National Institute for Conservation and Forest Development, Protected Areas, and Wildlife (ICF) was also created by this law. ICF has approved Nyrstar's Forest Management Plan which was issued in 2015. It is valid for 30 years.

20.1.8.6 Closure

The El Bosque and Pozo Azul TSFs are being progressively reclaimed and are expected to be complete in 2018 at a cost of $4.5 million. The water quality of the underground mine discharge (Caliche portal) and from the La Soledad TSF are the most significant environmental issues. With the present mitigation measures and the accumulated water quality data, there do not appear to be any environmental impacts with regard to regulatory compliance or environmental risks in the future or at the final closure of the operation.

The undiscounted closure cost for the operation was estimated in 2015 to be approximately $19 million.

20.2 SOCIAL ISSUES

20.2.1 Community Workforce

The El Mochito mine and community are located in the Municipality of Las Vegas, which is in the Santa Barbara Department. The Municipality of Las Vegas had a population of 24,788 in 2015 and covers an area of 106 km^2.

El Mochito is a typical old, self-sufficient, mining company town. In 2015, 32% of the mine workforce lived in El Mochito. Many of the individual houses away from the main centre are now owned by company workers on the proviso that, if a deposit is located under their houses, Nyrstar has the right to buy the houses back and relocate the family away from the future mine site.

The town of Las Vegas is on the opposite side of the river from El Mochito. It has a population of approximately 7,487. Although the mine is the largest employer, other businesses include farming and fishing (Lake Yojoa). Approximately 45% of the mine workforce live in Las Vegas.

Other smaller communities within the Municipality of Las Vegas contribute to the mine's workforce, including El Carreto (7%), Carrizal and Descombro (6%) and Nuevo Lempira (3%). Other Honduran towns make up approximately 4% of the workforce. Expatriates make up the remainder of the workforce. The majority of the expatriates are from Peru (31%), Chile (22%), United States (13%), Mexico (9%) and Nicaragua (9%).

The vast majority of supervisory staff (90%) have a high school education or less. Only 6% of the supervisors have a university education.

As of November, 2015, there were 652 employees and 367 contractors working for AMPAC. These figures have been reduced over the last year due to voluntary retirement and other initiatives which have been supported by the union.

20.2.2 Unions

After a collective bargain agreement expired in 1987, the mine workers established a union (SITRAPACIH) in 1991. Serious labour disruption occurred when 48 SITRAPACIH workers were illegally fired for their participation in a strike. The union occupied the mine offices in protest, which led to the military getting involved. This disturbance resulted in one death and ten persons wounded.

Since then, SITRAPACIH and AMPAC have worked diligently to build a close relationship with each other. Daily issues are discussed and are managed jointly. Both parties have also created a good working relationship with the Honduran Ministry of Labour.

The present collective agreement between the union and AMPAC is due to expire in September, 2016. At the time of the site visit, AMPAC was in pre-negotiations with the union. It is anticipated that this process will take between 2 to 3 months to complete.

The main negotiation issues are:

- Hospital care - Presently, employees, their immediate family members and their fathers and mothers are cared for by AMPAC's health care program. AMPAC would like to restrict health benefits to employees and their immediate dependants, to reduce hospital costs.

- Bonus Pay System - Presently there are 18 different bonuses. AMPAC would like to have only one bonus system for all employees.

- Pay Scale - The minimum wages for employees at the mine have had to be raised due to a sudden presidential decree.

In the present collective bargaining agreement, AMPAC provides school supplies, uniforms and some high school level studies, at a cost of approximately $30,000 per year.

20.2.3 Contractors

There are a large contingent of employees at El Mochito that are contract workers. They work for SERVISA, which is an outsourcing company that provides temporary workers to the mine, providing support in development and mine related services. SERVISA provides compliance with legal and working conditions. SERVISA employees only have health care benefits themselves. The goal of many workers is to switch from SERVISA to become an AMPAC employee.

20.2.4 Health Care

The health care program is centred around the AMPAC hospital, ambulance, clinic and pharmacy. Unless an injury is significant, the majority of health care issues are handled by this facility. Specialist physicians are brought in when needed to assess specific medical conditions. Although it is not up-to-date with North American standards, this facility is probably one of the better medical facilities, compared to those in San Pedro Sula.

The majority (65%) of the cost of running the hospital is incurred in the treatment of employees, their dependants and parents.

The hospital has been reducing its operating costs by a series of initiatives that improve its efficiency. A new initiative is to use generic drugs, rather than name brand drugs, which could drastically reduce operating costs in the future.

20.2.5 Safety Programs

The safety program at the mine is thorough:

- Safety orientation programs - No one is allowed to enter the mine without participating in the underground safety program. No one is allowed to enter the mill without participating in a separate program geared toward dangers in the mill. Instructors, employees and visitors must sign off after the orientation programs.

- Safety meetings - Daily for all employees.

- Safety Re-training - All employees undergo re-training of safety protocols periodically.

- Safety Signs - Large warning signs in Spanish are located at every hazard.

- Hazards - Brightly coloured areas identify hazards and dangerous areas. There are warning lights in noisy areas or underground to identify hazards.

- MSDS - Material Safety Data Sheets are available in strategic areas where chemicals are located.

- PPE - Personal protective equipment is provided to all employees and visitors. Extra safety equipment is provided in dangerous areas. Training is given to employees in the proper use of PPE.

- Breathalyzer - No one is allowed anywhere within the mine complex or underground without passing a breathalyzer test. After the second failure, the employee is dismissed.

Although the safety procedures are extensive and the normal safety record for the mine complex has improved in the last two years, there have been four fatalities at the mine in the last year. The latest fatality occurred in August, 2016, just before the Micon site visit. There have been official investigations for each fatality. Nyrstar brings management from other Nyrstar operations to assist and peer review the investigation. The Honduran government does not get involved in the investigation but requires a final report which includes findings and recommendations. After each investigation, it was found that all four fatalities were due to employee error and not to unsafe working conditions.

As a result of the latest fatality, both the mine and mill were shut down for approximately one week. After the investigation was completed, all employees and contractors underwent additional safety training to re-enforce safety awareness in the operation.

20.2.6 Security

AMPAC has 81 security guards, stationed at each gate and at other strategic locations. Each guard is armed with either a pistol or shotgun, and is in communications with the central security control room. Guards at the entrance to the mine, mill and administration offices carry breathalyzers and require all personnel and visitors to use them before gaining entrance to those facilities.

20.3 Education Initiatives

El Mochito has been recognized for seven years as a socially responsible company by the Honduran Foundation for Corporate Social Responsibility.

20.3.1 Education and Training

The mine has a bilingual school for the families of staff and employees of the mine. The school handles from grade 1 to grade 9. It is recognized as one of the top five primary schools in Honduras.

AMPAC sponsors 75% of the cost ($80,000 per year) of the El Mochito Vocational Education Centre (CEVEM). CEVEM programs include training in welding, heavy duty mechanics, basic mining, basic geology, sampling techniques, industrial sewing, maintenance of light vehicles and cell phone repairs. Students receive a recognized diploma upon completion of their courses. It is hoped that many of the graduates from CEVEM will become future mine employees. Qualified students can also transfer to IPC in San Pedro Sula, which is a higher level of vocational training establishment. Graduates from IPC obtain a US-certified diploma.

AMPAC provides some assistance in the form of clothes, books and other accessories to student children of employees that are getting advanced education, but does not include financial assistance.

AMPAC also gives donations to the local primary schools (Grade 1 to 6) in the municipality in the form of furniture, plumbing and electrical services, and assists in some high school projects from time to time.

AMPAC covers the cost of snack food in the rural areas of the Municipality of Las Vegas.

20.3.2 Community Projects

AMPAC contributes $1,200 per month to the local community radio and TV networks in Las Vegas. The stations air mine related advertising, announcements, upcoming events, health alerts and cover issues such as preventative programs.

AMPAC also provides a vehicle and fuel for vaccination campaigns within the community, with different NGOs such as Doctors Without Borders. It also assists in provision of fuel for the emergency ambulance service for the community.

AMPAC has partnered with the Municipality of Las Vegas to build a new Fire Department Headquarters and supply equipment. The $40,000 contribution was in the form of material supplies.

AMPAC also covers some of the cost of food for the nursing homes in the area.

20.3.3 Community Benefits

The Municipality obtains financial benefits from the mine on a yearly basis in the form of municipal taxes (2% NSR), real estate taxes ($23,000), operating permit licence ($ 68,000), water use tax ($19,000) and mine water levy ($19,000).

AMPAC also assists in the maintenance of access roads and other local needs when they arise.

21.0 CAPITAL AND OPERATING COSTS

Capital and operating costs reported by Nyrstar, as forecast for 2015 as of the end of October, and as budgeted for 2016, are summarized in Table 21.1.

Table 21.1
Operating and Capital Costs

Item	Units	Operating Costs	
		2015 - October Forecast	2016 - Budget
Total Operating Cost			
Mining	US$ thousand	19,682.60	24,115.04
Processing	US$ thousand	6,075	6,870.64
General and Administration	US$ thousand	7,179	8,400.82
Total	US$ thousand	**32,937.07**	**39,386.50**
Ore Milled	thousand tonnes	765.94	795.50
Unit Operating Cost			
Mining	US$/tonne milled	25.70	30.31
Processing	US$/tonne milled	7.93	8.64
General and Administration	US$/tonne milled	9.37	10.56
Total	US$/tonne milled	**43.00**	**49.51**
		Capital Expenditure	
Total Capital Expenditure	**US$ thousand**	**21,603.03**	**13,255.27**

22.0 ECONOMIC ANALYSIS

The mineral resources and mineral reserves for El Mochito have been presented in this report as historical estimates to be confirmed by Morumbi at a later date. As such, it is not appropriate to present any forward looking analysis of cash flows.

23.0 ADJACENT PROPERTIES

There are no other mines in the vicinity of El Mochito. Nyrstar/AMPAC holds control of all the mineral properties surrounding the mine. There are no other exploration properties or companies active in the area.

24.0 OTHER RELEVANT DATA AND INFORMATION

All relevant data and information has been presented elsewhere in this report.

25.0 INTERPRETATION AND CONCLUSIONS

El Mochito has been in continuous operation since 1948. Over this time, mine personnel have developed a geological model that has led to continuously discovering new economic mineralization to replace mined out reserves. As long as the management continues to provide the budget for underground mine development and drilling, the probability of discovering additional mineral resources near the present workings is considered to be very good.

The mineral resources and mineral reserves reported by the mine have been presented herein as historical resources as described in NI 43-101. They were prepared prior to the agreement to acquire the property by Morumbi and a Qualified Person has not yet verified them as current. At this time, the relevance and reliability of the estimates are not known. The estimates are classified using the categories set out in the Canadian Institute of Mining, Metallurgy and Petroleum's CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines, as required by NI 43-101. However, Morumbi is not treating the mineral resources or mineral reserves as current.

The mineral resources in Tables 6.1 and 6.2 are reported inclusive of mineral reserves. Mineral resources which are not mineral reserves do not have demonstrated economic viability.

Morumbi will need to audit the procedures used to acquire the data supporting the estimates and the methodology used to prepare them, in order to disclose them as compliant mineral resources and mineral reserves.

The infrastructure and equipment throughout the mine, mill and camp tend to be older but are well maintained and should continue to provide reliable service for the foreseeable future.

There are several projects (i.e. mill efficiencies, magnetite concentrate sales, explosives manufacturing, etc.), including infrastructure developments (i.e. new power connections), that would provide better efficiencies at the mine complex and lower operating costs in the long-term. The majority of the capital costs for these projects have already been paid for, so the new capital layout would be minimal. Upgrades to the underground ventilation system have been proposed, at an estimated cost of approximately $5 million.

Nyrstar/AMPAC already has a good relationship with the Honduran government and its mine-related ministries. It also has the support of the union (SITRAPACIH), the Municipality of Las Vegas and other communities and industries in the area. This bodes well for the future of the mine operations.

Morumbi will have to negotiate a new concentrate off-take contract with a smelter as soon as possible, to prevent temporary revenue shortfalls at the operation. It is understood that the retainer by Nyrstar of an industry standard off-take agreement on concentrates produced from El Mochito is a condition of completion of the transaction by Morumbi.

26.0 RECOMMENDATIONS

Micon recommends that a new NI 43-101 compliant mineral resource and mineral reserve estimate be undertaken. There is a lot of known and compiled information regarding underground mining, metallurgy and processing and surface and underground drilling. There is also a large digital database compiled by previous owners, including Breakwater and Nyrstar. This compliant resource and reserve will provide the basis for future budgets and financial forecasts. The estimate should make use of all the recommendations highlighted in the Arseneau report (2015).

The updating of the historical resources and reserves will need to be supported by an independent Technical Report. It is anticipated that this will involve re-sampling some (~10%) of the available core in unmined areas for analyses by an independent certified laboratory in order to validate the database. The re-sampling will include reference samples, blanks and duplicates inserted in the batches. The database will be re-modeled using best practises to construct a new block model which will form the basis for the new compliant reserves and resources.

Micon recommends that a Certified Reference Material (CRM) and a certified blank be used as part of the QA/QC protocol.

Micon recommends that Leapfrog software be used to create a new geological model of the mine for future NI 43-101-compliant mineral resource and mineral reserve estimates.

Micon recommends that the budget for exploration (underground development and diamond drilling programs) be increased to compensate for the mineral reserves that have being mined out in the last couple of years. It is also recommended that this drilling program be focused on upgrading the historical resources with some attention paid to new exploration. These will be used to expand the mineral reserves at El Mochito and extend the mine life. This will be a follow up of favourable past results from an earlier underground exploration program.

Micon recommends that the capital project initiatives developed by Nyrstar should be critically examined and if warranted, be enacted. It is recommended that the proposed upgrade of the underground ventilation be examined as a matter of priority, and that it be approved, with or without modification to the current design.

Micon also recommends that Morumbi spend the necessary time and money to continue the good relations with the Honduran government, its agencies, communities and the union that Nyrstar has nurtured in the past

Morumbi estimates that a suitable initial definition/exploration drilling program would comprise 7,500 m of underground drilling followed by modelling and report preparation, as summarized in Table 26.1.

Table 26.1
El Mochito Property Proposed Resource and Reserve Review and Definition Drilling Budget

Activity	Amount	Unit Cost (US$)	Costs (US$)
Underground diamond drilling	7,500 m	52.50/m	393,750
Underground drill stations			100,000
Certified reference material			10,250
Analytical costs	3,500 samples	60/sample	210,000
Freight			50,000
Field expenses			15,000
Resampling and analyses			90,000
Modelling			61,000
QP Reserve and Resource Report			260,000
Total Drilling Budget			**1,190,000**

This budget does not include the cost of exploration drifting. Those amounts will be in the mine budget.

Micon has reviewed the program and finds it to be justified and appropriate for the circumstances.

27.0 DATE AND SIGNATURE PAGE

The majority of the data used in the preparation of this report are current as of December 31, 2015.

MICON INTERNATIONAL LIMITED

"David K. Makepeace" {signed and sealed}

David K. Makepeace, M.Eng., P.Eng.
Micon International Limited

November 25, 2016

"Christopher R. Lattanzi" {signed and sealed}

Christopher R. Lattanzi, P.Eng.
Micon International Limited

November 25, 2016

"Jane Spooner" {signed and sealed}

Jane Spooner, MSc., P.Geo.
Micon International Limited

November 25, 2016

B. Terrence Hennessey {signed and sealed}

B. Terrence Hennessey, P.Geo.
Micon International Limited

November 25, 2016

"*Bogdan Damjanovic" (signed and Sealed)*

Bogdan Damjanovic, PEng, FEC
Senior Associate Metallurgical Engineer
Micon International Limited,

November 25, 2016

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29.0 CERTIFICATES

David K. Makepeace

As an author of this report entitled "NI 43-101 Technical Report on the El Mochito Zinc-Lead-Silver Mine, Honduras" (the "Technical Report"), dated September 9, 2016, I, David Makepeace, M.Eng., P.Eng., do hereby certify that:

1. I am employed by and carried out this assignment for:

   Micon International Limited, Suite 205 - 700 West Pender Street, Vancouver, British Columbia, V6C 1G8, Canada.
   Telephone : (604) 647-6463
   Fax : (604) 647-6455.

2. I hold the following academic qualifications:
   - Bachelor of Applied Science - Geological Engineering, Queen's University at Kingston, Ontario, 1976,
   - Master of Engineering - Environmental Engineering, University of Alberta, 1994.

3. I am a registered member of the:
   - Association of Professional Engineers and Geoscientists of British Columbia, licence - 14912.
   - Association of Professional Engineers, Geologists and Geophysicists of Alberta, licence - 29367.

4. I have worked as a geological engineer for a total of 34 years since my graduation from university.

5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with professional associations (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for this report for the purposes of NI 43-101. My relevant zinc-lead-silver experience includes 3 years as a mine geologist at United Keno Hill Mines, Elsa, Yukon Territory, 6 years as chief geologist at the Silvana Mine, New Denver, BC and several years exploration for Ag-Pb-Zn deposits in North and South America.

6. I am responsible for sections 4.2, 4.3, 5, 6, 7, 8, 9, 10, 11, 12, 14, 18, 20, 23, 24, 26, 27 and any summaries therefrom in sections 1, 25 and 26 of the "Technical Report", dated September 9, 2016.

7. I visited the property on August 8 to the 13, 2016 and inspected the main mine complex and the Puerto Cortez facility.

8. I have had no prior involvement with the property which is the subject of this Technical Report.

9. As of the date of this certificate, I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading.

10. I am independent of the issuer applying all the tests in section 1.5 of NI 43-101 other than providing consulting services.

11. I have read NI 43-101, Companion Policy 43-101CP and Form 43-101FI, and the Technical Report has been prepared in compliance with that instrument, companion policy and form.

Dated at Vancouver, B.C. this 25th day of November, 2016.

(signed by) "*David K. Makepeace*" *(Sealed)*

David K. Makepeace, M.Eng., P.Eng. Professional Engineering Stamp

Senior Geologist - Environmental Engineer
Micon International Limited,

CERTIFICATE OF AUTHOR
Christopher R. Lattanzi, P.Eng.

As a co-author of this report entitled "NI 43-101 Technical Report on the El Mochito Zinc-Lead-Silver Mine, Honduras", dated 9 September, 2016, I, Christopher R. Lattanzi, P.Eng., do hereby certify that:

1. I am an Associate of, and carried out this assignment for
   Micon International Limited
   Suite 900, 390 Bay Street
   Toronto, Ontario, M5H 2Y2
   tel. (416) 362-5135   fax (416) 362-5763
   e-mail: clattanzi@micon-international.com

2. I hold the following academic qualifications:
   B.Eng. (Mining), University of Melbourne, Australia, 1959

3. I am a member a registered Professional Engineer with the Association of Professional Engineers of Ontario (membership number 25705013); as well, I am a member in good standing of the Canadian Institute of Mining, Metallurgy and Petroleum.

4. I have worked as a mining engineer within the mineral industry for more than 55 years.

5. I do, by reason of education, experience and professional registration, fulfill the requirements of a Qualified Person as defined in NI 43-101. My work experience includes the planning and direct supervision of open pit mining operations and 45 years as a consultant in the mineral industry.

6. I have not visited the project site.

7. I am responsible for Sections 4.1, 15, 16, 21, 22, 27 and any summaries therefrom in Sections 1, 25 and 26 of this report entitled "NI 43-101 Technical Report on the El Mochito Zinc-Lead-Silver Mine, Honduras", dated 9 September, 2016.

8. I am independent of Morumbi Resources Inc., as described in Section 1.5 of NI 43-101.

9. I have had no prior involvement with the mineral property in question.

10. I have read NI 43-101 and the portions of this report for which I am responsible have been prepared in compliance with the instrument.

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

Signing Date: November 25, 2016

"Christopher R. Lattanzi" {signed and sealed}

Christopher R. Lattanzi, P.Eng.

CERTIFICATE OF AUTHOR
Jane Spooner

As a co-author of this report entitled "NI 43-101 Technical Report on the El Mochito Zinc-Lead-Silver Mine, Honduras", dated 9 September, 2016, I, Jane Spooner, P.Geo., do hereby certify that:

1. I am employed by, and carried out this assignment for
   Micon International Limited
   Suite 900, 390 Bay Street
   Toronto, Ontario, M5H 2Y2
   tel. (416) 362-5135 fax (416) 362-5763
   e-mail: jspooner@micon-international.com

2. I hold the following academic qualifications:
   B.Sc. (Hons) Geology, University of Manchester, U.K. 1972
   M.Sc. Environmental Resources, University of Salford, U.K. 1973

3. I am a member of the Association of Professional Geoscientists of Ontario (membership number 0990); as well, I am a member in good standing of the Canadian Institute of Mining, Metallurgy and Petroleum.

4. I have worked as a specialist in mineral market analysis for over 30 years. I have managed consulting assignments on behalf of Micon, including those requiring independent Technical Reports under NI 43-101.

5. I do, by reason of education, experience and professional registration, fulfill the requirements of a Qualified Person as defined in NI 43-101. My work experience includes the analysis of markets for base and precious metals, industrial and specialty minerals (including rare earth elements), coal and uranium.

6. I have not visited the project site.

7. I am responsible for Sections 2, 3, 19, 27 and any summaries therefrom in Sections 1, 25 and 26 of this report entitled "NI 43-101 Technical Report on the El Mochito Zinc-Lead-Silver Mine, Honduras", dated 9 September, 2016.

8. I am independent of Morumbi Resources Inc., as described in Section 1.5 of NI 43-101.

9. I have had no prior involvement with the mineral property in question.

10. I have read NI 43-101 and the portions of this report for which I am responsible have been prepared in compliance with the instrument.

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

Signing Date: November 25, 2016

"Jane Spooner" {signed and sealed}

Jane Spooner, M.Sc., P.Geo.

CERTIFICATE OF QUALIFIED PERSON
B. T. Hennessey

As the supervising author of this report entitled "NI 43-101 Technical Report on the El Mochito Zinc-Lead-Silver Mine, Honduras", with an effective date of 31 December, 2015 (the "Technical Report"), I, B. Terrence Hennessey, P.Geo., do hereby certify that:

1. I am employed by, and carried out this assignment for:

Micon International Limited
Suite 900, 390 Bay Street
Toronto, Ontario
M5H 2Y2

tel. (416) 362-5135
fax (416) 362-5763
e-mail: thennessey@micon-international.com

2. I hold the following academic qualifications:
B.Sc. (Geology) McMaster University 1978

3. I am a registered Professional Geoscientist with the Association of Professional Geoscientists of Ontario (membership # 0038); as well, I am a member in good standing of several other technical associations and societies, including:

The Canadian Institute of Mining, Metallurgy and Petroleum (Member).

4. I have worked as a geologist in the minerals industry for over 35 years.

5. I do, by reason of education, experience and professional registration, fulfill the requirements of a Qualified Person as defined in NI 43-101. My work experience includes 7 years as an exploration geologist looking for iron ore, gold, base metal and tin deposits, more than 11 years as a mine geologist in both open pit and underground mines and 20 years as a consulting geologist working in precious, ferrous and base metals as well as industrial minerals.

6. I have not visited the El Mochito Mine.

7. I am responsible for editing and supervision of the preparation of the Technical Report.

8. I am independent of the parties involved in the transaction for which this report is required, as defined in Section 1.5 of NI 43-101.

9. I have had no prior involvement with the mineral properties in question.

10. I have read NI 43-101 and the portions of this report for which I am responsible have been prepared in compliance with the instrument.

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

Effective date: December 31, 2015

Dated this 25th day of November, 2016

"B. Terrence Hennessey" {signed and sealed}

B. Terrence Hennessey, P.Geo.

CERTIFICATE OF QUALIFIED PERSON
Bogdan Damjanovic, PEng, FEC

As an author of this report entitled "NI 43-101 Technical Report on the El Mochito Zinc-Lead-Silver Mine, Honduras" (the "Technical Report"), dated September 9, 2016, I, Bogdan Damjanovic, P.Eng., do hereby certify that:

1. I am independently employed and carried out this assignment for:

Micon International Limited
390 Bay St, Suite 900,
Toronto, ON M5H 2Y2, Canada.
Telephone: (416) 362-5135
Fax: (416) 362-5763.

My office address is:

518-1110 Finch Ave. West, Toronto, ON, M3J 2T2, Canada.
Telephone: (416) 590-9948
Fax: (416) 667-2677
Email: Bogdan@sympatico.ca

2. I hold the following academic qualifications:

- Bachelor of Applied Science - Geological and Mineral Engineering, University of Toronto, at Toronto, Ontario, 1992.

3. I am a registered member of the:
   a. Professional Engineers Ontario, licence - 90420456.

4. I have worked as a metallurgical engineer for a total of 24 years since my graduation from university.

5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with professional associations (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for this report for the purposes of NI 43-101. My work experience includes the management of technical studies and design of numerous metallurgical testwork programs and metallurgical processing plants.

6. I am responsible for sections 13, 17 and 27, and any summaries therefrom in Section 1, of the "Technical Report", dated September 9, 2016.

7. I did not visit the property.

8. I have had no prior involvement with the property which is the subject of this Technical Report.

9. As of the date of this certificate, I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading.

10. I am independent of the issuers applying all the tests in the report other than providing consulting services.

11. I have read NI 43-101, Companion Policy 43-101CP and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument, companion policy and form.

Dated at Toronto, ON this 25th day of November, 2016.

(signed by) "*Bogdan Damjanovic*" *(Sealed)*

Bogdan Damjanovic, PEng, FEC

Senior Associate Metallurgical Engineer
Micon International Limited,