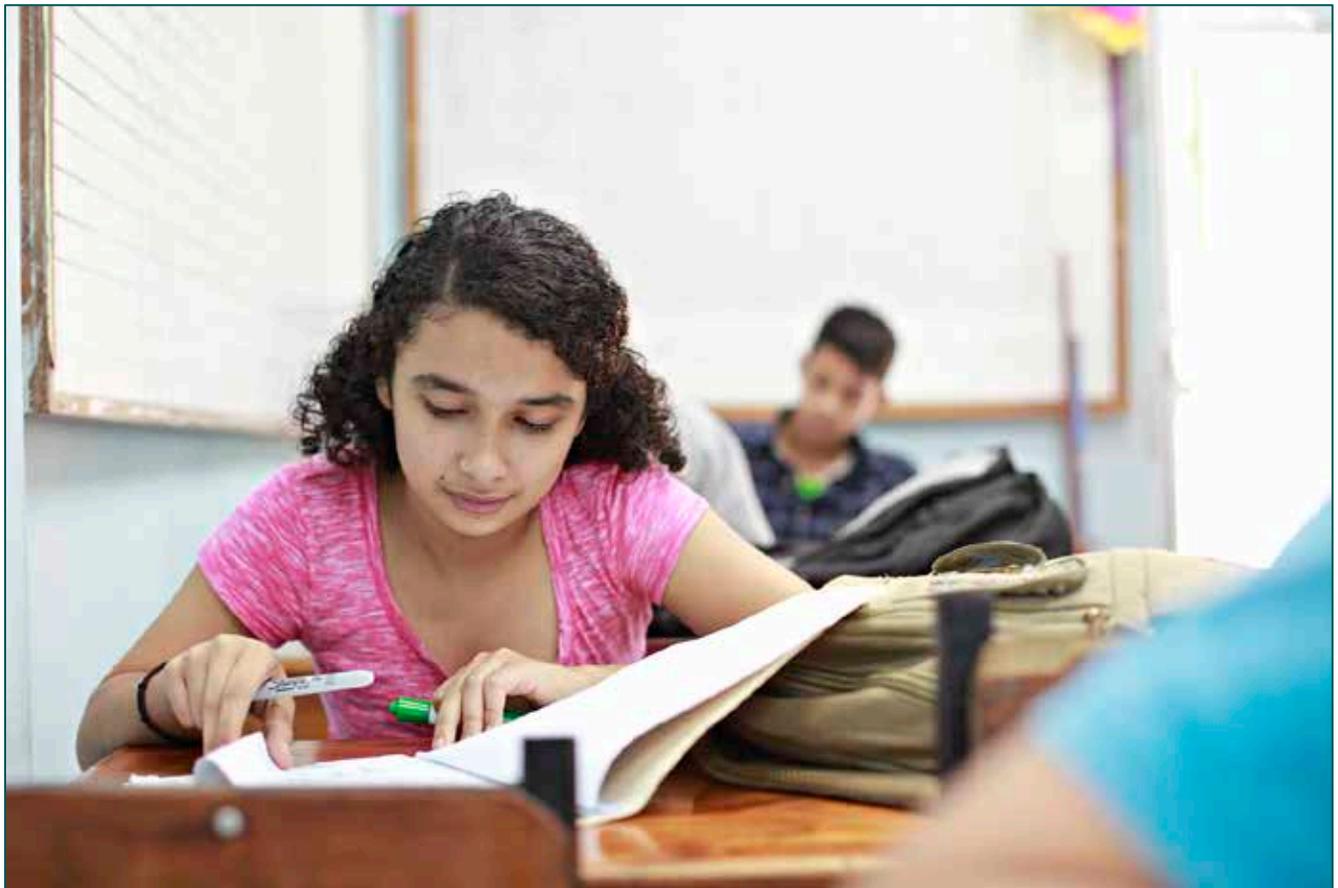




Environmental & Social Impact Assessment (ESIA) El Mochito Optimization Project, Las Vegas, Honduras



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EXECUTIVE SUMMARY

Current Operations

The El Mochito mine (El Mochito) is located in north-western Honduras, near the town of Las Vegas, approximately 88 km southwest of San Pedro Sula and 220 km northwest of the capital city, Tegucigalpa. Production at El Mochito began in 1948 and has continued for 70 years almost continuously. The Property consists in an underground zinc-lead-silver mine, as well as a concentrator producing separate zinc and lead concentrates. Concentrates are trucked daily to Puerto Cortés for storage and shipping. The mine is wholly owned and controlled by the local Honduran business entity called American Pacific Honduras S.A. (AMPAC), which is in turn wholly controlled by Ascendant Resources Limited (“Ascendant”) the parent and publically listed company in Canada under the symbol CVE:ASND.

El Mochito is in its 70th year of operation with extensive underground mining infrastructure and limited surface impact. The existing underground workings at El Mochito cover approximately 3,000 m in the east-west direction, 1,200 m north-south and vertically from surface to a depth of up to 1,300 m (-1,000 m below the shaft collar).

El Mochito mining methodology employs a combination of long hole, cut & fill and conventional mining methods to exploit the mineral from mineralized zones of different shapes and sizes. A predominately trackless mining fleet is used in mining and hauling the mineral to the vertical shafts through multiple ramp systems that are essentially a result of a series of stope access developments that have been linked together, creating a complicated, inefficient and tight transport network of tunnels.

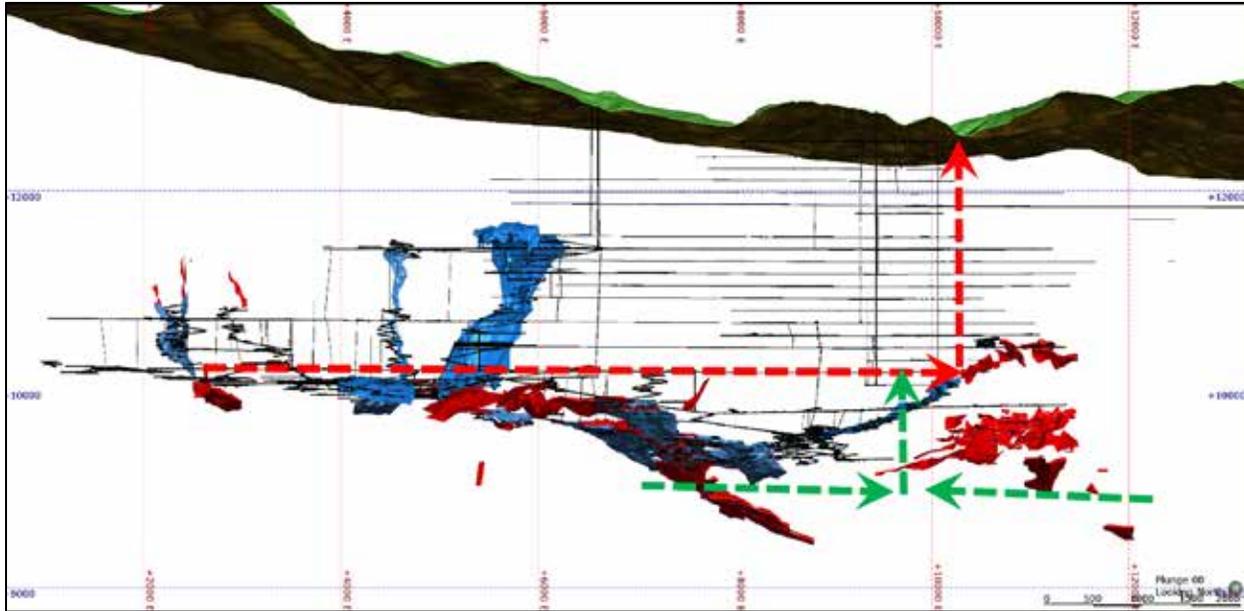
Mining operational costs are relatively high reflecting this deep mining environment with long hauling distances, coupled with high pumping and pump maintenance costs. As the mine develops to depth, transport distances will further increase. As expected, this would result in increasing the size of the trucking fleet and manpower and increasing fuel and maintenance costs. Without change, there would also be a greater requirement for underground ventilation and water pumping systems which are already old and somewhat extended and inefficient.

Optimization /Expansion Project

The Optimization or Expansion Project (the “Project”) proposes to address these challenges through the upgrade of infrastructure and mining and mineral processing systems across the mine which will result in the following:

- Improvements to underground mineral transportation;
- Improvements to the underground pumping and water management system,
- Improvements to the crushing circuit, processing plant and tailings handling capacity that can meet the increased production from the mine.

The following figure (**Figure E.1**) illustrates the proposed internal No. 8 shaft, mineral resource under the current No. 2 shaft, the current horizontal haulage route and the proposed route.



Note New horizontal and vertical haulage routes via the No. 8 Shaft are shown in green, original haulage routes in red

Figure E.1 Long section looking north of the El Mochito mine showing the impact of the proposed No. 8 subvertical shaft on haulage routes.

El Mochito management has determined that the upgrade of the underground pumping and water management system would materially reduce overhead costs, resource usage, and power usage by changing and reducing the number of pumps, rationalizing pumping columns and installing an effective water clarification system to pump clean water. Clean water arriving at surface could then be discharged after monitoring obviating the need for additional treatment on the surface. The water would no longer require surface settling ponds and artificial wetlands to remove solids, such solids now being removed and stowed safely underground.

This Project represents a significant opportunity to bring the All-In Sustaining Costs (“AISC”) down to less than 0.97 \$/lb zinc equivalent per pound payable approximately two years after the construction period is complete. This cost figure would support the longevity of the operation and robust free cash flow even in an environment of sustained depressed metal prices, increase the number of workers (both direct and indirect employees) and contribute towards the sustainable development of Santa Barbara and the country for a lot longer.

The Project also considers an increase in mining and processing capacity to approximately 2,800 tpd (1 million tpy) from 2,200 tpd (750,000 tpy) without significantly interfering with ongoing operations. In addition to increased revenues, the major benefit of the program is an expected reduction in operating costs of 17.76 \$/t processed below the anticipated LOM average without the proposed infrastructure changes as the mine gets deeper.

Apart from the cost benefits, the Project would provide improved and safer conditions underground as well as better ventilation. There are expected positive interactions with human health and safety as a result of the modernization in the expansion and removing of older equipment; safety will be significantly improved per unit of production. During construction there will be more people, which correlates with higher health

and safety risk during construction; but El Mochito will be applying orientation, training, and other systems in place to contractors to mitigate these risks.

In the conduct of its business, Ascendant strives to contribute to a healthier, safer, and more prosperous community in the areas where it operates. Continued mine operations have substantial local and regional benefits in terms of continued employment and contracting opportunities. The personnel required for the Project at the El Mochito mine is expected to increase from 1,258 in 2018 to over 1,580 in 2020 and 2021 during construction and stabilize at 1,367 for at least ten years of operation. Every employee working supports directly and indirectly approximately 8 other people in the local community, so the impact of the Project will positively affect the economic well-being of between 900 and 2,400 additional people. Much of the labour for the mine is sourced locally so improvement in labour market are linked to the local economy. Currently the local region has high unemployment and the creation of new jobs with benefit the local community.

Project Interactions and Effects Assessment Methodology

The overall objectives of the ESIA study were mainly to identify and analyze environmental and social components and their probable impacts from the Project, identify and recommend practical and cost effective mitigation measures, including those required by regulatory authorities, provide a framework for an environmental and social management for the Project which integrates new measures and monitoring requirements, and ensure that all stakeholders deemed to be influenced by the Project are fully considered going forward during construction and operations.

Hemmera Envirochem Ltd. was engaged in Q1 2019 to provide Ascendant with assistance in compiling materials for the ESIA report. Ascendant provided access to both current and historical hard copy and digital records and reports from both public and internal sources that pertain to the El Mochito mining operation. A site visit was conducted by Hemera on March 13 to 16, 2019 to view the existing operation, interview management and staff, and compile relevant materials for this report

The following table presents the activities associated with the Project and their potential to interact with environmental and social components at or near El Mochito. Valued Ecosystem Components (VECs) are typically defined as “Any part of the environment that is considered important by the proponent, public, scientists and government involved in the assessment process. Importance may be determined based on cultural values or scientific concern.” (Canadian Environmental Assessment Agency, “Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012”, March 2018).

Project Activities (Changes relative to existing operations)	Valued Components															
	Environment									Economic		Social			Heritage	Health and Safety
	Terrain and Soils	Groundwater	Surface Water	Aquatic Resources (Fish)	Air Quality	Noise and Vibration	Ecosystems (Wetlands, other)	Vegetation (Flora)	Wildlife (Fauna)	Labour Market	Local Economy	Indigenous People	Local Economy	Infrastructure and Services	Land and Resource Use	Heritage Resources
Activities																
Installation of Mine Shaft																
Upgrading of the Underground Pumping and Water Management System																
Upgrading the Process Plant																
Increasing Tailings Dam Capacity																
Increased Employment and Contracting																
Increased Transportation of Equipment, Materials, Personnel and Concentrate																

Based on the interactions of the Project activities with environmental and social components, potential effects could be identified. The positive and negative impacts were considered.

The initial assessment of the relative significance of the Project's environmental and social impacts was based on an analysis using four criteria:

- Component value - The "component value" criterion measures the component's importance in the functioning of the ecosystem and/or the socioeconomic system in the study area.
- Magnitude of disturbance - This criterion measures the severity of the disturbance to the quality of the VEC or sub-component in question. The disturbance caused by an impact can be low, medium or high.
- Geographical scope - This criterion addresses the potential geographical extent of the impact.
- Duration - This criterion addresses the potential temporal extent of an impact.

For all the impacts identified, measures are proposed for optimizing the Project's positive impacts and minimizing the negative ones. These mitigation measures are based on technical solutions envisaged by El Mochito in its project planning, on the one hand, and on team members' expertise and suggestions from the stakeholders consulted, on the other hand.

Summary of Effects

The ESIA evaluated the impacts of the Project which included upgrading of infrastructure and mining and mineral processing systems across the El Mochito mine.

Due to the region's demographics, long history of mine operations, and limited change in the mine footprint as a result of the Project, there are either no or minimal interactions or effects anticipated from the Project on the following:

- No change in surface or subsurface rights
- Minimal interactions with terrain and soils, ecosystems, flora or fauna
- No interaction with archaeological or heritage resources
- No indigenous peoples for consideration
- No interactions with visual quality
- No Project specific effect on the reclamation and closure plan
- The main effects of the Project are described hereafter.

Physical Environment – Air Quality

It is estimated that there will be a net positive impact on air quality caused by dust suppression (laboratory dust collector and crusher wash plant) and the reduction in particulate matter in the air versus the slight increase in truck traffic and potential GHG emissions. It is also believed that the latter will be offset by the upgrading of process plant equipment.

The following air quality measures are proposed for optimizing the positive impacts and minimizing the negative ones. These mitigation measures are based on technical solutions envisaged by El Mochito in its project planning, on the one hand, and on team members' expertise and suggestions from the stakeholders

consulted, on the other hand. The measures listed in the IFC EHS Mining Guideline (2012) will also be applied.

1. During the detailed engineering and construction phases, engineering controls for atmospheric emissions as identified in the deliverables from the feasibility study will be developed and implemented in order to meet the first intermediate targets or IFC guidelines.
2. Ensure that electrical generators meet IFC criteria are built and operated so as not to increase gas and particle emissions to levels exceeding the first intermediate targets or IFC guidelines. These also need to conform to the Honduran Regulation for the control of emissions by stationary sources, Executive Agreement No. 1566-2010.
3. Atmospheric emissions (SO₂, NO_x, NO₂) and particle emissions (PM₁₀, PM_{2.5}) will be measured during construction and operations by means of a station incorporating continuous weather data and installed at one of the locations previously used for air quality monitoring, namely the closest point in the town to the crusher, as well as a new station located close to the process plant and the ore storage sheds.
4. Passive samplers will be used near mining areas to confirm the NO_x/NO₂ results.
5. The Honduran Governmental agencies also requested that a Monitoring Plan be carried out in the crusher area to monitor the following environmental variables: generation of noise, emission of particulates and emission of gases.
6. The Honduran Governmental Agencies also requested that monitoring of gas emissions to the atmosphere and particulates be performed in the Bonanza area and near the mine entrance.
7. Additional mitigation measures will be applied as necessary:
 - increasing the use of water-spray dust control;
 - increasing maintenance and cleaning around dust-producing areas;
 - enclosing emissions sources;
 - wind shielding when possible;
 - storage and handling of dust generating materials inside.
8. In addition to this, and specific to GHS emissions:
 - El Mochito will produce an annual GHG emissions report based on its report of fuel consumption in the previous year.
 - The mine will ensure implementation of an efficient preventive maintenance program including period calibration of dryers and scrubbers.
 - El Mochito will make sure that all equipment and vehicles are kept in good working order.
 - The mine will optimize vehicle and equipment movement to minimize travel and idling time.
 - Fuel consumption and performance will be taken into account when new equipment and vehicles are purchased.

Physical Environment - Noise

The Project will see an increase in underground blasting, which is controlled and occurs at set times when no-one is underground. There is no measurable impact on surface from noise or vibrations in this respect. The project will also see an upgrading/optimizing of plant equipment as well as an increase in ore production and therefore truck traffic. Moreover, the increase in workforce and employees will thereby indirectly increase the need for transport via cars or motorcycle taxis.

It is estimated that there will be a net low negative impact on noise caused by a slight increase in traffic (trucks, cars, taxis).

The following noise mitigation measures are proposed for minimizing negative impacts. These mitigation measures are based on technical solutions envisaged by El Mochito in its project planning, on the one hand, and on team members' expertise and suggestions from the stakeholders consulted, on the other hand. Many of the measures listed in the IFC EHS Mining Guideline (2012) will also be applied.

1. El Mochito will continue to ensure that all equipment and vehicles are kept in good working order along with their noise reduction systems.
2. El Mochito will continue to maintain all its roads so that they are free of potholes and other irregularities.

Physical Environment - Water Resources

The existing effect of the mining project on water resources is deemed to be high, particularly because of the volume of water discharged to the environment. As these are existing conditions, there is a high probability that the receiving environment has entirely adapted and evolved into these conditions, in which case a closure surface water and aquatics management plan will be necessary to account for when the discharges would end.

The Project's effects on water resources are deemed to be of a medium significance. Because of the Project, approximately 484 gallons / minute of freshwater sourced from the spring would no longer be needed. This water would therefore not be in contact with the project and ultimately end up in the Raices creek above the discharge point. The Project would also reclaim 772gal / minute of water from dewatering and the Soledad TSF to eliminate the need for make-up freshwater in so far as possible.

The discharge volumes to Raices creek could however increase to 13,000 gal/min (depending on local conditions and/or above average rainfall such as a hurricane event), but the Caliche discharge will have less TSS because of the clarifier installed underground to clean up this volume of mine water.

The following water quality measures are proposed to optimize the positive impacts and minimize the negative ones. These mitigation measures are based on technical solutions envisaged by both El Mochito in its project planning, and from team members' expertise and suggestions from the stakeholders consulted. Many of the measures listed in the IFC EHS Mining Guideline (2012) will also be applied.

The Honduran Governmental Agencies have requested that the following measures related to water be implemented:

1. To the greatest extent possible, reuse the treated water for mine activities to reduce the amount of water discharge to receiving bodies and leverage natural sources.
2. Execute an updated Soil Erosion Control Plan that contains a description of the sensitive areas, the design of mitigation and control measures, and their construction.
3. Areas susceptible to water erosion and where the suspension of sediments can be generated that affect stream beds and winter channels, or infrastructures, should be protected with sediment traps (gabions, stone walls, dams and others).
4. The company must have a sediment retention system in the lower part of the mine, in order to prevent the brush residues that fall from the conveyor belt or transport vehicles, from being dragged into the Raices creek during heavy rains; the company must provide periodic maintenance to this system (system is the sedimentation ponds at the outlet of Caliche tunnel).
5. Oily residues should be collected and confined safely, in order to prevent them from coming into contact with filtered water inside the mine.
6. All waters that are in contact with the mining process must comply with the National Technical Standard for the Discharge of Residual Waters to Receptor Bodies and Sanitary Sewerage (Agreement 058, published in the Official Journal La Gaceta on December 13, 1997), at the moment of release into the environment; specifically, the El Caliche Tunnel sampling point.
7. Update the Surface and Underground Water Monitoring Plan for "El Mochito Mining Operations" including the following monitoring points and others that are considered for total heavy metals (Manganese, Zinc, Copper, Iron, Nickel, Chrome, Aluminum, Silver, Cadmium):
 - Upstream of the mine site
 - Downstream of the mine site
 - Upstream of the concentrator
 - Waters below the concentrator
 - Zona El Rincón in the Raices creek (200 meters from the confluence of Yojoa Lake).
 - Yojoa lake
 - Raices creek above the El Caliche Tunnel
 - El Caliche tunnel
 - Raices creek under El Caliche Tunnel
 - El Nacimiento
8. The company must carry out surface and groundwater quality monitoring immediately in case of spillage of tailings, immediately inform the DECA, CESSCO and the Mining Authority.
9. It is strictly forbidden to accumulate solid waste of any characteristic, within and close to the facilities that may cause contamination of soil, air and water bodies or damage to infrastructure.
10. If sterile rock or brushwood is found and not used in the process, it must be placed in an area where it does not affect the water sources near communities. That storage area must be conditioned for that purpose or look for other alternatives.
11. The contamination of water and soil sources with construction wastes is prohibited. Oils and fats from machinery, vehicles and trash in general, must be placed in containers with sufficient capacity for temporary disposal.

12. To avoid contamination of surface sources E. Coli, in the construction phase (extensions) of the project temporary sanitary facilities should be established, once the work has been built in its entirety, portable latrines should be installed with adequate sanitary measures in a proportion of one (1) for every ten (10) employees.
13. Prepare a Surface and Groundwater Monitoring Plan, the purpose of this plan is to determine the quality and quantity the water that is affected by the La Soledad TSF discharge. Therefore, a scale map 1: 10,000 should be presented where the sampling points are located, with their respective UTM WGS 84 coordinates. The following physical parameters must be analyzed as a minimum: Temperature, Turbidity and Capacity of the sampling point, Chemical Parameters: Conductivity, Ph, Hardness, Color, Dissolved Oxygen, Chemical Oxygen Demand, Biological Oxygen Demand, Heavy Metals (Zinc, Cyanide, Copper, Lead, Cadmium and Mercury), Suspended Solids, Sedimentable Solids. These parameters must comply with the National Technical Standard for Discharge of Residual Waters to Receptor Bodies and Sanitary Sewerage, published in the Official Journal La Gaceta on December 13, 1997 under agreement No. 0058.

These additional mitigation measures, including in compliance with IFC EHS Mining Guidelines, also apply:

14. Perform a Groundwater Study and Management Plan for the mine area as well as locally to understand the resource and better plan for its management.
15. El Mochito will continue its surface water quality monitoring program, which is designed to assess the impact of its activities on the surrounding areas. A groundwater monitoring section will be added to this program.
16. El Mochito will continue to apply its wastewater monitoring program, designed to characterize wastewater and to identify sources of contamination and ways of reducing it.
17. A green buffer of at least 50 meters, where possible, will be maintained between watercourses and operation zones to prevent soil erosion, alternatively, proper measures/ techniques will be implemented to protect the watercourse
18. Divert run-off from undisturbed areas around disturbed areas where possible.
19. Divert sediment laden water to water treatment plant or other sediment management structures including sediment ponds, infiltration trenches or silt fencing.
20. Armour water management structures to prevent erosion and improve longevity.
21. Design water management structures for appropriate return periods (e.g., 1 in 200 year rainfall event) where needed
22. Design roads with appropriate drainage and grades to minimize gradients where possible.
23. Keep revegetating disturbed areas as soon as possible.
24. Continue with the tailings dam management plan.
25. Perform regular inspections and performance audits against the plan.

With the implementation of all the mitigation measures described above, the residual impacts of the Project on the physical components are related to the volume of the water discharged on the integrity of the stream downstream for which the probability of occurrence of this effect is certain; however, it is very likely that the receiving environment in Raices Creek has adapted to these conditions over the past 70 years, and therefore, the change to the nature and integrity of the receiving environment will be felt at one time at closure when discharges will end.

In the meantime, the following ongoing studies, management plans and monitoring programs will ensure that the effects of the Project remain as low as possible, and that guidelines, including IFC EHS Guidelines and Performance Standards are followed, in so far as is practicable.

- Implement a Groundwater Study and Management Plan for the mine area as well as locally to understand the resource and better plan for its management;
- Add groundwater sampling stations to the Water Quality Monitoring programs, where possible;
- Add the following water quality parameters to the Water Quality Monitoring programs: oil and greases.
- Implement an Aquatic Habitat Study and Management Plan to understand the resource within Raices creek as well as the downstream Habitat resulting from the discharges (Note: initiated April 2019).
- Update mass water balances for the project overall and identify as many opportunities for re-use of water as possible. A study dedicated to the use of mine water will be implemented.
- Consolidate a Water Management Plan to include reference to Water Diversions, monitoring, and sedimentation and temperature control measures.

Biological Environment

The footprint of the project will not alter the area, except for a small section in the La Soledad dam. Therefore, interaction between activities associated with Project and the main biological components (i.e., Ecosystems, Fauna, and Flora) will be negligible as per the project matrix. However, in order to preserve the area, it is necessary to continue with the existing programs of reforestation, protection of non-disturbed areas, such as El Manantial, and to stay engaged with the community and work personnel to increase awareness on the protection of natural habitats, wildlife and vegetation.

The Project will make sure:

- to clearly demarcate work areas by means of signs, barriers and fences,
- to clearly demarcate the areas to be stripped and the areas where machinery may circulate, and to keep these to a minimum,
- to prohibit workers and vehicles from circulating outside the work areas and access roads,
- to avoid work in lakes, rivers and streams or on shores and banks except where necessary, and
- that an environment advisor is present during any work in or near a watercourse.

Illuminated areas and night traffic may interact with wildlife during the different phases of the project. The following measures will continue to be applied in order to minimize interaction with the local fauna and control light levels:

- reduce lighting to the minimum needed for safety,
- whenever possible, use directional lighting to avoid lighting up non-essential areas such as the sky and outside the work area,
- use baffles to limit the lit area in highly sensitive zones,
- wherever possible, use light towers that are low to the ground to reduce unnecessary lighting, and
- do not over-illuminate indoor areas.

The footprint of the Project will not change significantly, and will have minimal interaction with the local vegetation, however measures to ensure that all activities associated with vegetation clearing and soil stripping will continue to be followed. These measures include:

- educating the personnel doing the stripping operations about the importance of protecting the removed soil,
- establishing a permit system for soil stripping,
- making sure an environmental advisor is present during soil stripping,
- taking steps to prevent accidental fires in the vegetation,
- prohibiting vegetation burning as part of the clearing operations,
- setting aside topsoil to be reused during site restoration,
- letting plants grow in the soil stockpiles to stabilize them and protect them against the wind,
- avoiding the destruction of riverbank vegetation,
- minimizing impacts on mangroves as much as possible, and
- taking the necessary steps to prevent erosion and stream contamination.

Community engagement and training of personal on environmental and biodiversity topics are critical for the preservation of the area. The biodiversity of the area will be protected by prohibiting hunting and harvesting of natural products outside the work area within its concessions by its employees and contractors. Additionally, wildlife encounters should keep being reported to keep a record of the biodiversity in the area. All personnel should report to the Superintendent of any harm caused to wildlife (e.g., collisions).

A Record of Flora and Fauna Sighting will continue to be kept in the area of influence of the project. Additionally, during the operation stage of the dam, any harm to wildlife should be avoided. The maintenance of the perimeter fence surrounding the dam will prevent birds and mammals from entering the dam, as well as public access.

At the end of the construction activities, the intervened areas are restored and rehabilitated to their natural conditions, (e.g., camps, storage facilities and parking lots). The reforestation plan equivalent to three times the intervened area is implemented.

During the construction and operation stage of the Project, employees will follow the current procedures which include:

- a. Do not hunt,
- b. do not kill, injure, maim, chase or catch any animal,
- c. do not destroy nests, caves or galleries,
- d. do not feed the wildlife,
- e. do not dispose of non-biodegradable waste (plastic bags, cans, etc.),
- f. do not perform any physiological needs outside the latrines,
- g. the cutting of trees, extraction of firewood or other plant products is not allowed

Social and Community Aspects

The following residual impacts have been carried forward for further consideration:

- *Increased use of community infrastructure and services:* The extent of impacts, and therefore effectiveness of mitigation measures, is uncertain and could not be determined on the basis of existing documentation. The Project will engage with the City of Las Vegas to understand what services are at or near capacity and therefore have the potential to be affected by the addition of 300 Construction-phase workers to the community.
- *Less economic benefit for vulnerable groups:* Mitigation measures such as on-site daycare and company-funded transportation provide some additional access for vulnerable groups to the Project workforce. Given the short time period of Construction – and therefore the difficulties in mounting programs directed at vulnerable groups’ access to the Construction workforce – Ascendant has opted as part of its Corporate Social Responsibility (CSR) activities to develop programming for vulnerable groups. As such, the Project is replacing the constraints to economic benefit through work with additional economic benefit through CSR programming. Some of the activities dedicated to vulnerable groups under the CSR plan are:
 - The mine operates a free bus service from many different communities to transport those workers to the mine, if they require it. Ascendant salaries are high enough relative to average gross domestic produce (GDP) per capita that most workers buy their own transport within a year of starting work
 - The company attempts, to the extent possible, to reflect the demographics of vulnerable people in its educational CSR programming. Young vulnerable people are given the opportunity to study the local technical school fully funded by the mine and then on their successful graduation, are given first consideration for new roles at the mine. There is a focus on increasing the female hire rates through this with 22% of the students passing last year being female, an improvement on previous years.
 - Every Friday the company conducts a feeding program for the elderly and vulnerable ones. Separately, the mine provides food to approximately 700 kids in their school centers every month, as well as school uniforms and study materials to approximately 300 kids each year.
 - Individual hires of several individuals with physical handicaps.
 - The topic of vulnerability will remain a subject of additional study through ongoing community engagement.

Several topics have been identified throughout this socioeconomic analysis as requiring additional data collection. This data will be collected as part of the Project’s ongoing engagement with communities.

- Increased use of community infrastructure and services in City of Las Vegas (existing capacity, potential impacts, effective mitigation measures)
- Community health, safety and security (tailings dam safety, water storage dam safety, land subsidence, emergency preparedness and response)

Consultation and Stakeholder Engagement

As such, Ascendant’s Stakeholder Engagement is designed to:

- Ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately.

- Promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them, and to ensure that relevant environmental and social information is disclosed and disseminated.
- Ensure the risks and impacts identification takes account of the outcome of the engagement process with Affected Communities as appropriate.
- Identify individuals and groups that may be directly and differentially or disproportionately affected by the project because of their disadvantaged or vulnerable status, and propose and implement differentiated measures so that adverse impacts do not fall disproportionately on them and they are not disadvantaged in sharing development benefits and opportunities.
- Inform the development of collective management programs and describe mitigation and performance improvement measures and actions.

As part of the ESIA, Ascendant will undertake three rounds of engagement with Affected Communities:

1. Pre-engagement to validate the Stakeholder Engagement Plan related to this ESIA;
2. Engagement on the various aspects of the Project and this ESIA (including health and safety hazards and engagement with vulnerable groups) to refine understanding of impacts, and develop mitigation measures, as needed; and
3. Engagement during construction (post-ESIA).

Health and Safety

The Project would provide improved and safer conditions underground as well as better ventilation in the mine. The expected positive interactions with human health and safety area a result of the modernization in the Project and removing older equipment; safety will be significantly improved per unit of production. During construction, there will be more people, which correlates with higher health and safety risk during construction; but El Mochito will be applying orientation, training, and other systems in place to contractors to mitigate these risks.

Mitigation measures specific to health and safety are as follows:

- El Mochito will maintain their OHS program through the Project and periodically review and update procedures.
- Regular gas monitoring will continue to be carried out and executed inside the mine per Company procedures in order to avoid occupational accidents and environmental contamination.
- The mine will perform biannual measurements of noise in all workshops and in the following areas where decibels are found on levels greater than 60, and apply the necessary Hygiene and Safety Measures such as: Use of plugs and rotation of employees: Mill area, Central workshop, Industrial mine workshop, Carpentry shop
- All El Mochito personnel and subcontractors' personnel operating vehicles will be trained in road safety, and will ensure that the whole area of the project and the exits of the machinery to the road be signed for road safety.

ESMP

The results of the effects assessment on water quality and quantity revealed the need for additional management plans to enhance ongoing activities and enhance overall knowledge and use regarding this resource.

The following Water related Management Plans will be implemented:

- Groundwater Study and Management Plan for the mine area as well as locally to understand the resource and better plan for its management;
- Aquatic Habitat Study and Management Plan to understand the resource within Raices creek as well as the downstream Habitat resulting from the discharges (Note: initiated April 2019).
- Updating mass water balances for the project overall and identify as many opportunities for re-use of water as possible. A study dedicated to the reuse of mine water will be implemented.

This existing Water Monitoring Programs will be updated to include:

- IFC EHS Mining Effluent Guidelines parameters - oils and grease;
- Breakdown of results for dry and rainy seasons, particularly to account for the difference in flows within the receiving environment;
- As much as possible, include monitoring at Aquatic Habitat stations.

ESIA Conclusions

The ESIA of the Project enables the integration of new mitigation and monitoring measures specific to the Project into existing plans in place at El Mochito. Based on the proposed additions to the Environmental and Social management and monitoring plans and programs, Ascendant is confident that the Project's effects can be minimized to an acceptable level in order to enable optimized operations of El Mochito with continued and increased local and regional economic opportunities. Up to 2,800 people local to the area will benefit economically from employment opportunities during and on completion of the project. This would have a significant positive impact on local and regional economy. Additional opportunities benefits such as continued education, the development of new opportunities for vulnerable people and women in particular would be supported, feeding programs, provisional of medical and hospital services, income from taxes generated would further support the community for at least another ten years as a result of the project. Almost 500 additional gallons per minute of fresh, potable water would become available for community use after implementation of this Project. This ESIA document can be used for public disclosure and consultation purposes.

The Ascendant management team states their ongoing commitment to being evaluated by third party engineers and scientists to reaffirm the management team's ability to safely and efficiently execute this project with the benefits of an overall positive impact on the both the environment and affects communities and people.

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
µg	microgram
µm	micrometres
AISC	All-In Sustaining Costs
AMPAC	American Pacific Honduras S.A. de C.V.
ANFO	ammonium nitrate fuel oil
AOI	Area of Influence
ATS	Analysis of Safe Work
Breakwater	Breakwater Resources Ltd
CADERH	Advisory Center for the Development of Resources Human from Honduras
CEAA	<i>Canadian Environmental Assessment Act</i>
CEVEM	Centro Educacional Vocacional El Mochito
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
Concessions	Exploitation Concessions
CSR	Corporate Social Responsibility
d/y	day per year
dB(A)	decibel A
DGRH	General Directorate of Water Resources
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
ENE	east-northeast
ENEE	Empresa Nacional de Energía Eléctrica (National Electric Power Company)
EPFI	Equator Principles Financial Institution
ESA	Environmental Site Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
Expansion	expansion of the EI Mochito mine
FFW	Fitness for Work
ft	feet
gal	US gallon
GDP	gross domestic produce
GHG	greenhouse gas
gpm	gallon per minute
ha	hectare
hr	hour
ICF	National Institute for Conservation and Forest Development, Protected Areas, and Wildlife

Acronym / Abbreviation	Definition
IFC	International Finance Corporation
in	inch
INHGEOMIN	Instituto Hondureño de Geología y Minas (Honduran Institute of Geology and Mining)
IUCN	International Union for Conservation of Nature
kg	kilogram
kl	kilolitre
km	kilometre
km ²	square kilometre
kV	kilovolt
KWh	kilowatt hour
L	litre
L/s	litre per second
lb	pound
LLDPE	linear low-density polyethylene
LOM	life of mine
M	million
m	metre
masl	Metres above sea level
MBS	sodium metabisulphite
min	minute
ml	millilitres
mm	millimetre
Morumbi	Morumbi Resources Inc.
MW	megawatt
M/y	million per year
m ²	square metre
m ³ /min	cubic metre per minute
m ³ /t	cubic metre per tonne
NGO	non-governmental organization
NNE	north-northeast
NO _x	nitrogen oxides
NO ₂	nitrogen dioxide
Nyrstar	Nyrstar Group
OHS	Occupational Health and Safety
OHSP	Occupational Health and Safety Plan
OPIC	Overseas Private Investment Corporation
Pb	galena

Acronym / Abbreviation	Definition
PET	polyethylene terephthalate
PM	particulate matter
Property	The El Mochito Property
QA/QC	quality assurance/quality control
Qty	quantity
ROM	Run of mine
SERNA	Ministry of Natural Resources and Environment
SESR	Ascendant's Health, Safety, Environment and Social Responsibility
SIEPAC	Electrical Interconnection System of the Central American Countries
SINEIA	National Environmental Impact Assessment System
SME	Small and Medium Enterprises
SO ₂	sulfur dioxide
t	tonne
TDS	total dissolved solids
TGI	Tierra Group International
tpd	tonne per day
tpy	tonne per year
TSF	tailings storage facilities
t/m ³	tonne per cubic metre
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	International Agency for Development of the United States
UTM	Universal Transverse Mercator
VEC	valued ecosystem components
WGS	World Geodetic System
Zn	sphalerite

1.0 INTRODUCTION

The El Mochito mine (“El Mochito”) is located in north-western Honduras, near the town of Las Vegas, approximately 88 km southwest of San Pedro Sula and 220 km northwest of the capital city, Tegucigalpa. Production began in 1948 and has continued for 70 years almost continuously. The Property consists of an underground zinc-lead-silver mine and a concentrator producing separate zinc and lead concentrates. Concentrates are trucked daily to Puerto Cortés for storage and then shipped once sufficient material is stockpiled.

El Mochito, along with its six Exploitation Concessions (the “Concessions”) and related surface titles (collectively, the “Property”), are located adjacent to the town of Las Vegas, Santa Barbara Department, in the west-central area of Honduras, Central America. The Property is held by Ascendant’s wholly-owned Honduran subsidiary, AMPAC, and covers approximately 8,000 Ha of surface area. Titles to all six Concessions were confirmed in 2018 by the Honduran Institute of Geology and Mining (INHGEOMIN, or Instituto Hondureño de Geología y Minas). In Honduras, concessions are held under the terms of the Mining General Law (2013) that is administered by INHGEOMIN. The Concessions grant AMPAC the exclusive right to explore for and produce metals from included areas, subject to acquisition of requisite environmental and operating permits. AMPAC separately holds surface rights over a substantial portion of the area covered by the Concessions, including all of the mine’s operational and infrastructure areas.

The mineral resource is expected to increase in the eastern part of the mine and these new horizons are lower than the current shaft bottom of shaft No. 2 and shaft No. 3.

The Optimization and Expansion Project of El Mochito mine (the “Expansion” or the “Project”) is proposed to enable continued operations. The Project includes:

- Installation of internal underground mine shaft - Installation of a new 442-m subvertical (or internal, vertical) rock-only hoisting shaft; modification to the ventilation system; and extension of the communication system further into the mine as it progresses.
- Upgrading of the underground pumping and water management system - Reducing the number of pumps; rationalizing pumping columns; Installing an effective water clarification system to pump clean water.
- Upgrading the Process Plant - Replace flotation cells and filters; upgrading the crushing circuit, crusher feed wash plant, installing rotating screens; new vertical access to feed power to the crushing and loading system.
- Increasing Tailings Dam Capacity – Tailings dam raise and installing a new, larger diameter, tailings line on current pathway, higher volume/pressure pumping system.

Continued mine operations has substantial local and regional benefits in terms of continued employment and contracting opportunities.

This report provides an overview of the proposed Expansion activities and their interaction with environmental and social components, and provides information on existing and new measures to be employed to avoid, minimize or rehabilitate to mitigate effects as a result of the project. The report content is provided as follows:

- Section 2 – Environmental, Social and Human Rights Policies
- Section 3 – Project Description
- Section 4 – Regulatory and Legal Framework
- Section 5 – Physical Aspects
- Section 6 – Biological Aspects
- Section 7 – Social Aspects (including Consultation and Corporate Responsibility Plan)
- Section 8 – Environment and Social Management Plan and Monitoring
- Section 9 – Occupational Health and Safety
- Section 10 – Reclamation and Closure



Figure 1-1 Map of Honduras showing the location of the El Mochito Property and Mine (red star)

ESIA Reporting Process

Ascendant has been working on the design, engineering and in consultation with local communities for this proposed expansion since early 2018 using internal resources. Hemmera Envirochem Ltd. was engaged in Q1 2019 to provide Ascendant with assistance in compiling materials for this report. Ascendant provided access to both current and historical hard copy and digital records and reports from both public and internal sources that pertain to the El Mochito mining operation. A site visit was conducted by Hemera on March 13 and 14 to view the existing operation, interview management and staff, and compile relevant materials for this report.

Industry standards and good practice

Ascendant acknowledges and strives to constantly adhere to the Performance Standards on Environmental and Social Sustainability (January 1, 2012) of the International Finance Corporation (IFC), as well as with the Equator Principles for managing the environmental and social impacts of international investment projects.

The IFC Performance Standards establish essential criteria, in terms of social and environmental sustainability, for accessing international capital. The set of eight operational standards requires that environmental and social management systems be developed, implemented and followed in order to ensure that risks and impacts related to the basic themes of sustainable development are effectively and systematically managed throughout the life of a project. For each theme, particular methodology criteria, essential subjects and support principles are established to guide the process. The themes are as follows:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
- Performance Standard 2: Labor and Working Conditions;
- Performance Standard 3: Resource Efficiency and Pollution Prevention;
- Performance Standard 4: Community Health, Safety, and Security;
- Performance Standard 5: Land Acquisition and Involuntary Resettlement;
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- Performance Standard 7: Indigenous Peoples; and
- Performance Standard 8: Cultural Heritage.

Ascendant further acknowledges that the Project will also be developed in compliance with the Equator Principles III (2011), a financial industry benchmark for taking social responsibilities and environmental management into account. The 10 basic principles are:

- Principle 1 – Review and categorization: The Equator Principles Financial Institution (EPFI) must categorize the project based on the magnitude of its potential risks and impacts. Such screening is based on the environmental and social criteria of the IFC;
- Principle 2 – Environmental and social assessment: The EPFI must require the client to conduct an assessment of the environmental and social impacts and to propose relevant management and mitigation measures for reducing the impacts to an acceptable level;

- Principle 3 – Applicable environmental and social standards: Social and environmental performance must be evaluated according to the IFC Performance Standards and the IFC/World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines), as well as the host country laws;
- Principle 4 – Environmental and Social Management System and Action Plan: The client must develop a plan for implementing the mitigation, remedial and follow-up measures needed to address the impacts and risks identified in the assessment process;
- Principle 5 – Stakeholder engagement: For projects with potentially significant adverse impacts on host communities, the client must conduct an informed consultation and participation process beforehand, facilitate the communities' informed participation, and make the assessment documents and action plan publicly available in a culturally appropriate manner;
- Principle 6 – Grievance mechanism: As part of the ESMS, the client must establish a grievance mechanism and inform the affected communities about it;
- Principle 7 – Independent review: An independent environmental and social consultant must carry out a review of the assessment, action plan and stakeholder engagement process in order to assess Equator Principles compliance;
- Principle 8 – Covenants: The client must covenant, in the financing documentation, to comply with the host country requirements, to implement the action plan, to provide periodic reports on the project's social and environmental performance, and to decommission and dismantle the facilities where applicable;
- Principle 9 – Independent monitoring and reporting: Reports and monitoring information must be checked by an independent environmental and social consultant; and
- Principle 10 – Reporting and transparency: EPFIs must report annually on their Equator Principles implementation processes and experience.

Effective management of the Project risks and impacts requires a complete ESIA covering and assessing the potential risks and impacts of all operations and phases of the Project. According to the IFC Performance Standards, this process must use the best available tools and practices, and must encompass the Project's entire area of influence, including indirect effects and effects associated with the supply chain. The process must be documented and based on solid quantitative and qualitative scientific data; any gaps in important information must be identified and justified in collaboration with local and regional stakeholders, through stakeholder engagement and an informed consultation and participation process. The nature and methods of stakeholder engagement must be established at the planning stage, through a stakeholder engagement plan that must include a mechanism allowing participants to submit grievances.

The identification and assessment of risks and impacts must include the identification of possible mitigation measures in a specific hierarchy favoring the avoidance of impacts over minimization or compensation. The scope of the risks or impacts must also be defined in terms of the cumulative impacts of all projects— past, present and future—that could have combined effects on the natural, physical or human environment at an international or regional level. Once the risks and impacts have been assessed, disclosed and documented in a formal process, the ESIA must also provide information on the impacts or risks that will remain after implementation of the provisional mitigation measures.

2.0 ENVIRONMENTAL AND SOCIAL POLICY

The Board of Directors of Ascendant Resources Inc. has formalized its policy on matters relating to Safety, Environmental and Social Responsibility.

The objective of the Safety, Environmental and Social Responsibility Policy (the "**Policy**") is to outline how Ascendant, together with its directors, officers, employees, consultants and contractors, will conduct its business in a safe and environmentally friendly manner and to the highest standards of corporate social responsibility.

The Policy is applicable to all directors, officers, employees, consultants and contractors of Ascendant. Each such person or entity will agree to be bound by the provisions of this Policy upon notification of the most recent copy.

To ensure that all directors, officers, employees, consultants and contractors of Ascendant are aware of the Policy, a copy of the Policy will be provided to each of them or, alternatively, they will be advised that the Policy is available on Ascendant's website for their review. All directors, officers, employees, consultants and contractors will be informed whenever significant changes are made. New directors, officers, employees, consultants and contractors will be provided with a copy of this Policy and will be educated about its importance.

At least once per year, all employees, consultants and, as appropriate, contractors verify their acceptance and compliance to this policy to ensure they understand the terms of this and all corporate policies of Ascendant. All directors, officers, employees, contractors (and their sub-contractors) and consultants, in discharging their duties on behalf of Ascendant, will comply with the laws, rules and regulations of the location in which Ascendant is performing business activities and with respect to safety and environmental laws, rules and regulations. Where uncertainty or ambiguity exists, competent legal advice is obtained.

Ascendant aims at sustainable development through:

- ingraining our vision for a safe, environmentally friendly and socially responsible culture into our organisation;
- effective management of our activity to minimize the impact on the environment;
- support for local employment and entrepreneurship; and
- support for the development of infrastructure, health, education, training and cultural activities in collaboration with the community.

In the conduct of its business, Ascendant will strive to contribute to a healthier, safer, and more prosperous community in the areas where it operates.

Under this umbrella Policy, five additional policies are described in sections below:

- 2.1 Sustainable Development Policy
- 2.2 Environmental Policy
- 2.3 Human Rights Policy
- 2.4 Occupational Health and Safety Policy
- 2.5 Alcohol and Drugs Policy

El Mochito's Environment and Social Management Plan and related monitoring plans are described in Sections 8 and 9, respectively. El Mochito's Occupational Health and Safety system and Performance Monitoring is described in section 10 of this report.

2.1 Sustainable Development Policy

Ascendant is committed to responsible mining and sustainable development in the communities in which it operates.

The Company strives to achieve or exceed leading industry practice in line with US and Canadian legislation as well as the legislation of the countries in which it operates, and international standards in all aspects of the Company's business: social, environment and economic.

Every effort will be made to make this policy a reality, embraced by each employee and every contractor working with the Company.

To achieve this, Ascendant commits to:

- (a) transparency, honesty, accountability, integrity and legality in all aspects of the Company's corporate governance and in the Company's dealings with all stakeholders, including government, the community, employees, contractors, service providers and shareholders;
- (b) adherence to best practices including taking responsibility for the impact of the Company's activities on society and the environment, and behaving in a responsible and ethical manner at all times;
- (c) respect for the human rights, culture, customs and values of the Company's host community;
- (d) identify, assess, manage and mitigate risks to the Company's host community and the environment;
- (e) continually seek to improve the Company's environmental performance beyond legal requirements;
- (f) take due care to prevent, manage and mitigate the impact of the Company's operations on surrounding habitat, taking particular care to minimize the impact on endangered species;
- (g) implement an environmental and social management system to integrate environmental and social criteria into planning, processes and operational decisions;
- (h) conduct comprehensive monitoring and audits to ensure compliance with all relevant legislation, guidelines, and standards, and to produce regular reports;

- (i) promote and implement the efficient use of resources, and practice waste minimization, reuse and recycling;
- (j) emphasize employment opportunities for the local workforce by the provision of education and training consistent with the needs of the Company;
- (k) facilitate capacity building of local Small and Medium Enterprises (SMEs) for the provision of goods and services to the Company's projects;
- (l) allocate sufficient financial resources to meet all the Company's commitments, including those extending into and beyond mine closure; and
- (m) participate proactively with local authorities and the host community for post-mining planning.

2.2 Environment Policy

Ascendant acknowledges that long term sustainability of its activity depends on good management in terms of environmental protection.

The Company will:

- (a) integrate environmental considerations into all aspects of the Company's activity;
- (b) establish and maintain a management system that can identify, monitor, control and improve the environment protection performance of the Company;
- (c) implement periodic independent evaluation of its environmental performance compared to the Company's objectives and goals;
- (d) draft a yearly report on environment performance;
- (e) observe all the laws and applicable regulations in Canada, the U.S., as well as the laws and regulations of any other jurisdiction in which the Company operates;
- (f) seek to use the best available practices in all the Company's activities;
- (g) ensure the existence of sufficient financial resources to fulfill all of the Company's environmental obligations and commitments, including rehabilitation;
- (h) ensure that all employees, consultants and contractors understand the Company's policy and fulfill their responsibilities for environment protection;
- (i) implement an efficient and transparent communication strategy in order to encourage dialogue with interested and involved parties regarding the environmental aspects of the Company's activity; and
- (j) collaborate with local, national and international institutions and organizations on measures to protect the environment.

2.3 Human Rights Policy

Ascendant acknowledges that in accordance with the United Nations Guiding Principles on Business and Human Rights it has a responsibility to respect human rights at every level of its operations.

The Company does and will continue to:

- (a) integrate human rights considerations into all aspects of the Company's activity;
- (b) establish and maintain a system that can identify, monitor, control and improve the performance of the Company with respect to human rights;
- (c) implement periodic evaluation of its human rights performance compared to the Company's objectives and goals;
- (d) observe all the applicable laws and regulations in Canada and US, as well as the laws and regulations of any other jurisdiction in which the Company operates;
- (e) seek to use the best available practices in all the Company's activities;
- (f) ensure the existence of sufficient financial resources to fulfill all of the Company's human rights obligations and commitments, including remediation;
- (g) ensure that all employees, consultants and contractors understand the Company's policy and fulfill their responsibilities for the protection of human rights;
- (h) implement an efficient and transparent communication strategy in order to encourage dialogue with interested and involved parties regarding the impact of the Company's activities on human rights; and
- (i) collaborate with local, national and international institutions and organizations on measures to protect human rights.

2.4 Occupational Health and Safety Policy

Ascendant is committed to providing and maintaining a safe and healthy working environment where all employees and contractors conduct themselves in a responsible and safe manner.

The Company is committed to achieving a high standard of Occupational Health and Safety ("OHS") through implementation of all related policies, procedures, standards and continuous improvement of management systems, setting targets and monitoring performance.

It is the Company's belief that all accidents and injuries are preventable. To achieve a zero accident culture the Company does and will continue to:

- (a) Identify and manage the Company's key health and safety risks and establish realistic annual objectives and targets;
- (b) Comply with all applicable laws and regulations as well as aim to achieve best practice in OHS that meet international standards;
- (c) Integrate management of health and safety strategies into the Company's key business and planning processes;
- (d) Provide employees with the training and resources required to minimize the risks of their work activities;
- (e) Require that contractors (and their sub-contractors) provide their employees and service providers with the training and resources required to minimize the risks of their work activities;

- (f) Encourage and support employees and contractors to promote initiatives to continuously reduce OHS risks associated with the Company's activities;
- (g) Provide adequate emergency response resources, emergency exercises and related training;
- (h) Ensure that work / access permit systems are diligently and correctly used by all staff and contractors;
- (i) Ensure that all new employees, contractors and their sub-contractors, and visitors are appropriately informed of the Company's OHS policies, procedures and requirements through induction prior to access to the Company's sites;
- (j) Achieve and maintain high levels of workplace hygiene at all times;
- (k) Communicate and enforce the Company's OHS standards with all contractors; and
- (l) Review and audit the Company's health and safety management systems and performance.

2.5 Alcohol and Drugs Policy

Ascendant has an obligation to ensure a safe workplace and safe systems of work for people on all the Company's sites. Employees, contractors and visitors on the Company's sites have an obligation to perform their duties in a manner that provides for their own safety and to comply with policies and procedures put in place by the Company.

A person's Fitness for Work ("**FFW**") may be compromised as a result of:

- The consumption of alcohol; and/or
- The use of drugs (prescription, non-prescription or illicit).

As permitted by law, testing for use of alcohol and other drugs will be conducted by trained and competent Company employees or external service providers in the following circumstances:

- Post incident (if required);
- For cause (as an investigation tool where an employee or contractor's FFW is questioned);
- Random testing; and
- Follow-up testing of an employee or contractor as a part of a return to work plan.

Any employee should contact the human resources team immediately if he or she suspects that an employee or contractor's underperformance, misconduct or illness is a result of alcohol or drug abuse. Every effort will then be made to correct problems through offering support and assistance (including medical advice, if appropriate). However, where such support is not effective, the individual concerned does not follow medical advice, or in cases of gross misconduct, the Company reserves the right to initiate a formal disciplinary procedure, which may lead to dismissal.

3.0 **PROJECT DESCRIPTION**

3.1 **Introduction**

The El Mochito facility is a mature zinc, lead and silver producing underground mine and surface processing plant 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 processing plant nameplate capacity is 2,300 tpd. Production began in 1948 and has continued almost continuously for 70 years. The principle property infrastructure consists of a shaft-accessed underground mine and a concentrator producing separate zinc and lead concentrates. Concentrates are trucked daily to Puerto Cortés for storage and are shipped by ocean freighters once sufficient material has been stockpiled at the port.

El Mochito, along with six Exploitation Concessions (the “Concessions”) and related surface titles (collectively, the “Property”), are located adjacent to the town of Las Vegas, Santa Barbara Department, in the west-central area of Honduras, Central America. The Property is held by Ascendant’s wholly-owned Honduran subsidiary, AMPAC, and covers approximately 10,000 ha of surface area. Titles to all six Concessions were confirmed in 2018 by the Honduran Institute of Geology and Mining (INHGEOMIN, or Instituto Hondureño de Geología y Minas).

The Property is located adjacent to the town of Las Vegas, Santa Barbara Department and has a population of approximately 35,000 people. The capital city of Honduras, Tegucigalpa (population ~1.2 million), is situated 220 km to the southeast and the regional center of San Pedro Sula (population ~1.2 million) is located 88 km to the northeast. Both are accessible from the mine site via paved highway CV-5 and associated secondary highways that connect the site with highway CV-5. Las Vegas (population ~25,000) is the residential community for most of the mine’s work force.

3.2 **El Mochito History**

The El Mochito underground mine has operated on an essentially continuous basis since 1948 and an extensive system of underground workings has been established during that time. At the time of acquisition by Morumbi (Ascendant) in 2016, mining had reached a depth of 1,067 m below surface, with most production coming from mine levels below 800 m from surface.

Silver-rich, chimney-style mineralization was mined in the early years of mine operation and, with increasing depth of exploitation, was followed by the mining of mineral with increased zinc and lead levels and decreased levels of silver. All metal concentrations of economic interest are associated with calc-silicate skarns. Chimney-style mineralization predominates from surface to the top of the Mochito Shale. Stratabound (manto) mineralization along the margins of large chimney deposits such as San Juan, Port Royal and McKenny below the Mochito Shale have contributed locally to historical production, but the extensive, lower grade manto deposits that occur in association with the Cantarannas Formation–Atamia Formation contact have predominated in Mineral Resource and Mineral Reserve Estimates since completion of mining in the large high-grade chimneys.

Significant events in the history of the El Mochito mining operation are summarized below:

- The El Mochito Deposit was originally discovered in 1938.
- In 1946, the New York & Honduras Mining Company (later Rosario Resources Corporation) purchased the property and began construction of a processing plant.

- Underground production began in 1948, with the initial zinc products being a jig concentrate containing native silver, a bulk flotation concentrate and a silver product.
- In 1960, increased volumes of sulphide material produced from deeper levels in the mine allowed the economic preparation of separate zinc and lead concentrates.
- In 1973, the company was renamed Rosario Mining Corporation, which was acquired by Amax Inc. in 1980 and operated as a subsidiary.
- The mine ceased production for several months in 1987 due to higher than acceptable costs related to taxation, labour and operations.
- AMPAC purchased the El Mochito mine, concentrator and Concessions from Amax in 1987, along with a concentrate storage facility warehouse in Puerto Cortés and the San Juancito exploration property.
- Breakwater Resources Ltd (“Breakwater”) acquired AMPAC in 1990 by way of an amalgamation of AMPAC with a wholly-owned subsidiary, Santa Barbara Mining Company, Inc.
- Nyrstar Group (“Nyrstar”) acquired Breakwater in August of 2011, inclusive of the El Mochito mine and concentrator and the port facilities at Puerto Cortés.
- Morumbi Resources Inc. (“Morumbi”) acquired the El Mochito mine, concentrator and port facilities from Nyrstar in December of 2016 and then changed the company name to Ascendant Resources Inc.
- The concentrator has been expanded several times during the operational project life and had a nominal nameplate capacity of 2,300 tpd at the time of acquisition by Morumbi (Ascendant).

3.3 Access and Supply Routes

Within the El Mochito operating site, access to all facilities is gained through an extensive system of good quality gravel roads that are maintained by the mine. Access to Concession areas located away from the mine site is more limited and typically takes the form of single lane roads or farm trails. The El Mochito mine and related exploration holdings are adjacent to the town of Las Vegas, Santa Barbara Department, in the west-central area of Honduras (see Figure 3.2). The capital city of Honduras, Tegucigalpa (population ~1.2 M), is situated 220 km to the southeast, and the city of San Pedro Sula (population 1.2 M) is located 88 km to the northeast. Both are accessible from the mine site via paved highway CV-5 and associated secondary highways that connect the mine site with CV-5. Approximate coordinates for the mine site are latitude 14°49'59" North and longitude 88°4'59" West (WGS 84). The community of Las Vegas (population ~35,000) is the residential community for most of the mine's work force.

Access to all facilities on at El Mochito is afforded by an extensive system of good quality gravel roads that are maintained by the company. These include large haul roads for transporting mineralized material from the main shaft area to the mill, as well as smaller two-lane roads that serve all the other facilities.

Access to the other concessions is more limited, typically restricted to single lane roads that are not regularly maintained. Certain parts of the concessions can only be accessed via small farm trails that require the use of four-wheel drive vehicles or are not passable to motorized vehicles without upgrading.

Access to ocean-going commercial vessels is primarily through port facilities at Puerto Cortés on the Atlantic coast, a distance of approximately 55 km north by highway north from San Pedro Sula or 155 km from El Mochito. Concentrate from El Mochito is shipped by truck to Puerto Cortés where it is stored for later shipment via ocean-going vessels.

The El Mochito operation currently employs approximately 1,200 people, most of whom reside in either the nearby community of Las Vegas or in smaller outlying communities. Las Vegas provides access to basic goods and services, but specialized mechanical or professional services must be accessed from further afield in such locations as San Pedro Sula or Tegucigalpa. International and domestic airline services are available at both locations and paved highway access exists northwestward through Guatemala to Mexico and the United States. Access to ocean-going commercial vessels is primarily through port facilities at Puerto Cortés on the Atlantic coast, approximately 55 highway km to the north of San Pedro Sula or 155 km from El Mochito, however another smaller port is available on the southern, Pacific coast at San Lorenzo at a distance of 289 km by paved road from the mine.

Electrical power for El Mochito is provided through connection to a 34.5 kV line from the national electrical grid operated by government-owned National Electric Power Company (“ENEE”, or Empresa Nacional de Energía Eléctrica). Backup electrical generation capacity owned by AMPAC is required due to frequent power outages.

3.4 Land Tenure

In Honduras, mining concessions are held under the terms of the Mining General Law (2013) that is administered by INHGEOMIN. The Concessions grant AMPAC the exclusive right to explore for and produce metals from included areas, subject to acquisition of requisite environmental and operating permits. AMPAC separately holds surface rights over a substantial portion of the area covered by the Concessions, including all of the mine’s operational and infrastructure areas

The El Mochito Property (the “Property”) consists of six associated mining concessions and related surface titles (collectively, the “Concessions”) in the west-central area of Honduras, Central America (Figure 3.1). The largest concession is adjacent to the town of Las Vegas (Santa Barbara Department), four others lie several kilometres to the west, and the fifth is roughly 25 km to the southwest. The Property and mine are held by American Pacific Honduras S.A. de C.V (“AMPAC”), the wholly owned Honduran subsidiary of Ascendant. The Concessions have a total surface area of approximately 11,000 ha. **Table 3-1** presents details of the Concessions, the titles to which were confirmed in 2018 by the Honduran Institute of Geology and Mining (“INHGEOMIN”, or Instituto Hondureño de Geología y Minas). In Honduras, concessions are held under terms of the *Mining General Law* (2013) that is administered by INHGEOMIN.

Ascendant provided an independent Corporate and Real Property legal opinion dated March 6, 2017 regarding the currency of their holdings in Honduras, inclusive of the Exploitation Concessions. Figure 3-1 provides an outline of this area covered by surface rights, along with the constituent holdings of each concession.

According to Ascendant, the El Mochito Concessions and related titles were in good standing at the effective date of this report and that they will remain in effect until 2027, at which time they will expire or be subject to renewal.

Table 3-1 Concessions held by Ascendant

Concession Name	Polygon (Figure 1.2)	Area (ha)
El Mochito 1	1	8,199
El Mochito 2	2	600
El Mochito 3	3	600
El Mochito 4	4	600
El Mochito 5	5	770
El Mochito 6	6	229
	Total	10,998

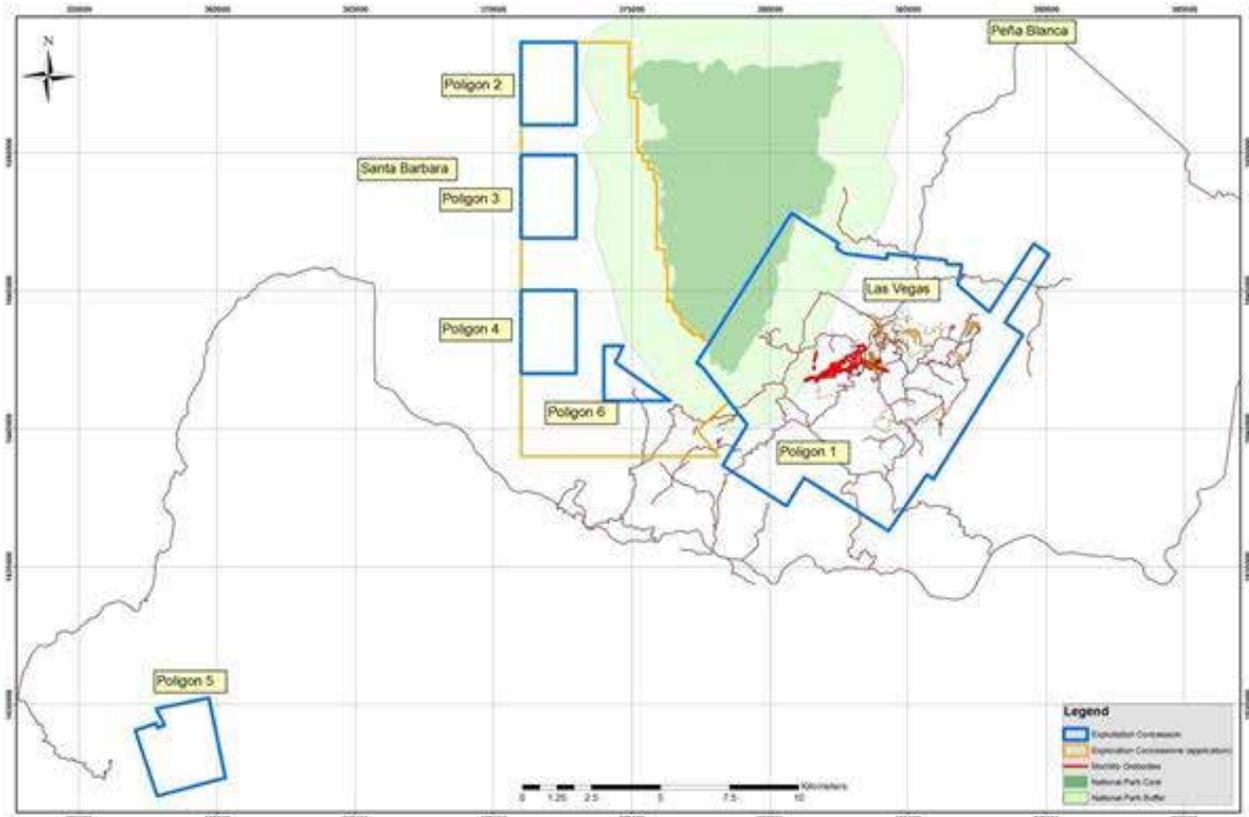


Figure 3-1 Map of the six El Mochito Mining Concessions

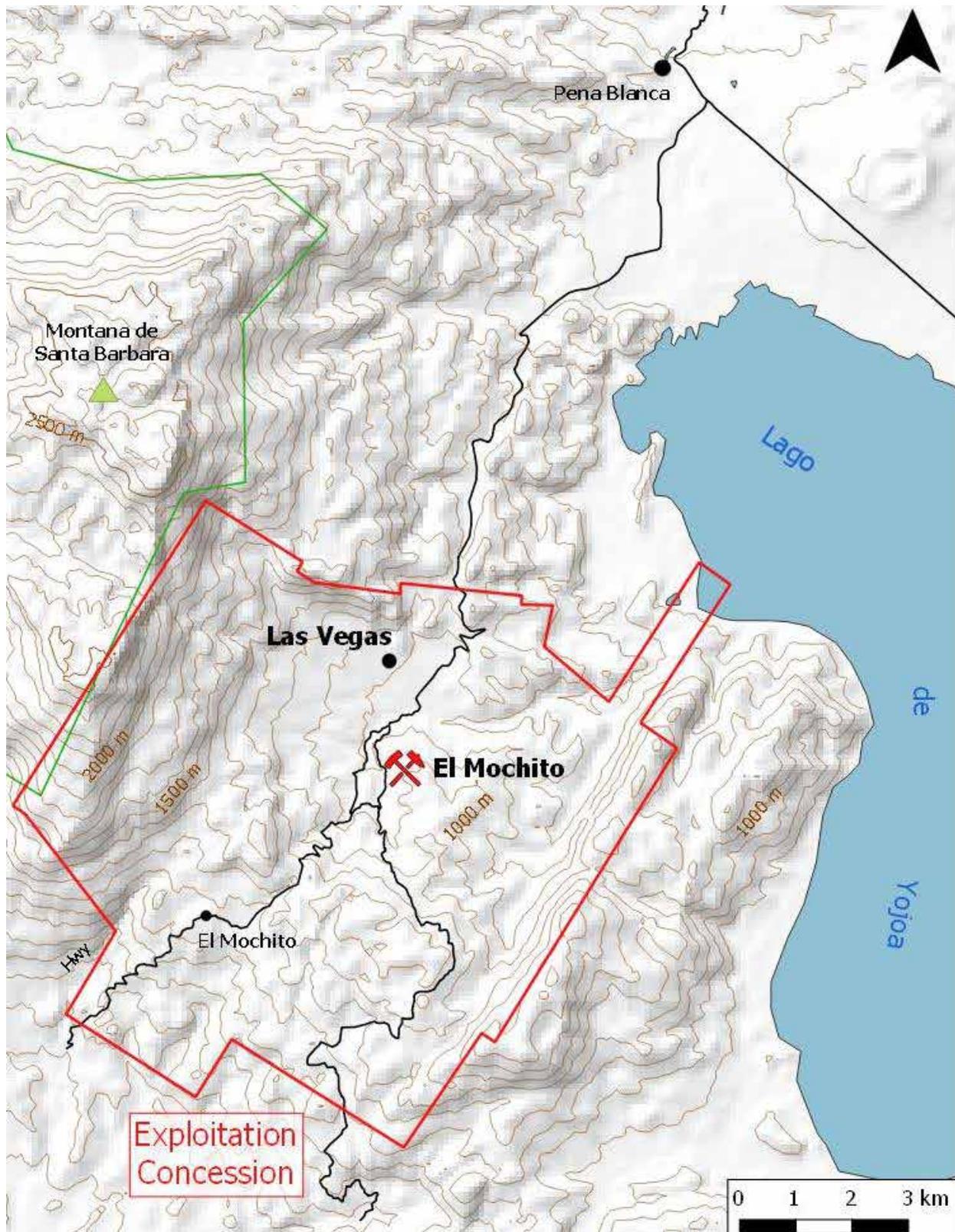


Figure 3-2 Topographic map of the main El Mochito mining (Exploitation) concession and its immediate vicinity

3.5 Description of Current Operations and Facilities

3.5.1 Mining

El Mochito is in its 70th year of operation and the mining infrastructure is expansive. The existing underground workings at the El Mochito mine covers approximately 3,000 m in the east-west direction, 1,200 m north-south and vertically from surface to a depth of up to 1,300 m (1,000 m below the shaft collar).

The mine employs a combination of long hole, cut & fill and conventional mining methods to exploit the mineral from mineralized zones of different shapes and sizes. A predominately trackless mining fleet is used in mining and hauling the mineral to the vertical shafts through multiple ramp systems that are essentially a result of a series of stope access development that have been linked together, creating a complicated, inefficient and tight transport network of tunnels.

The mine site has two shafts: the No. 2 vertical shaft which is 747 m (2450 ft) deep and has a production capacity of 3,500 tpd, and the No. 3 shaft of the same depth, used for hoisting personnel and materials. Mineralized material is mined by trackless and conventional underground mining methods, transported, partially crushed underground and then hoisted largely through the No. 2 shaft. Waste is largely repacked underground as waste-fill to augment cycloned tailings backfill and minimize hoisting costs.

No rocks in the mine are acid generating. All Mine waste is managed and repacked underground and is non-acid generating. Thus, this WB-IFC EHS guideline is not applicable to El Mochito.

The El Mochito's Geotechnical Department's objective is to provide a safe and secure environment. To success, the Geotechnical Department at El Mochito Mine practice sound geotechnical engineering techniques in the following areas:

- Ground condition monitoring, rock mass characterization/classification (Q-Barton), and ground control;
- Ground support auditing, testing and quality control;
- Support and excavation design, layout, review, monitoring, modelling and
- Recommendations regarding support and excavation type, location, size, shape, orientation and rehabilitation where necessary.

Doing this hazard identification and risk assessment provides for safe, practical and economical excavation in the rock mass.

In achieving these objectives, the Safety, Geotechnical & Geological Departments work together and perform weekly inspections, monitoring and testing. Observations are recorded, immediate instructions given where necessary and reporting done formally through a process of commitment to execute recommendations, following up and signing off completion on the Ground Control Report. External consultants also conduct regular Geotechnical reviews and provide recommendations concerning industry best practice and continuous improvement. Suppliers of support products regularly provide additional expert training and ensure that their products used as given in the product risk assessment.

New projects and expansion of the mine are Geotechnically reviewed and risk assessed. Geotechnical and Geological data provides the necessary insight into the technical challenges through which a systematic design process followed to achieve the intended objectives as described above.

In addition to El Mochito's internal resources, a geotechnical report entitled "*Technical Note – NI Report for the El Mochito mine*" was prepared and submitted on October 19, 2018. This report was prepared by Ingeroc SpA based in Las Condes Santiago de Chile (www.ingeroc.com). This document has been prepared mainly from information provided by the El Mochito staff and the impressions of the author during a field visit in September 2018.

Looking at the future, more use will be made of rock sample and in-situ testing, ground motion instrumentation and numerical modelling software to monitor and assess the empirical methods as applied in the design process. This analytical approach to design, together with the observational approach provides for a thorough and complete design methodology.

3.5.2 Mineral Processing

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, 168 km by paved road from the mine. Approximately 30% of process tailings are used as backfill for the mined stopes.

Run of mine ("ROM") material is delivered to a crushing facility adjacent to the main No. 2 El Mochito shaft and minus ¾ in (19 mm) crushed material is then transported to the process plant 1.3 km away where it is ground to a fine size in rod and ball mills. Separate lead and zinc concentrates are produced by froth flotation. These are dewatered and bulk transported by truck as moist concentrates 175 km to the coastal port of Puerto Cortés. Process plant tailings are normally processed in a mine backfill plant located near the crusher plant and the remaining fines are returned to the process plant for pumping 4.5 km to a lined tailings management facility.

The overall process plant facilities have a nameplate capacity of 2,300 tpd, but a normal process throughput of 2,450 tpd or more is frequently achieved. The primary grind is performed in open circuit by two rod mills in parallel followed by a secondary ball mill in open circuit and a tertiary ball mill in closed circuit. The overflows from the cyclones in the milling circuit report to the differential lead and zinc flotation circuits. The separate zinc and lead concentrates are thickened, then filtered using vacuum disc filters with the concentrates being stored in a shed before being trucked to the concentrate warehouse in Puerto Cortés.

Metallurgical recoveries have recently improved and are typically in the range of 74% to 78% Pb, 86% to over 90% Zn, and 75% to 79% Ag (payable silver content is in both Pb and Zn concentrates). The process plant and crushing facilities (including laboratory) have a staff of 124 people and operate on a 3-shift daily basis. A one day per month maintenance shutdown is scheduled. Unscheduled interruptions are mainly due to power shortages from the Honduras power grind. Site standby power is dedicated to mine needs.

Significant operational challenges include very wet ROM material, uncontrollable flotation cells, concentrate moisture exceeding transport criteria and a tailings line that 'sands out' on power interruption.

3.5.3 Tailings Storage

The mine has built three tailings storage facilities (“TSFs”) over the years. The Soledad is the active TSF for the El Mochito operation. It was initially constructed in 2004 and four stages have been complete as of July 2018. The TSF is lined with a 6.0 mm LLDPE plastic geomembrane liner. There is an under-drain and a chimney drain that discharge into a 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. Two additional stages for TSF dam raises are planned to enable capacity for life of mine (LOM). A tailings storage is designed and monitored according to world best practice safety and geotechnical guidelines and subject to regular independent monitoring and signoff.

Tailings pumped to the TSF are free from chemicals harmful to the environment and contains only suspended solids. Cyanide is used in the flotation process to depress the zinc in the lead flotation step but is destroyed in tailings before leaving the plant. Once in the pond, the solids settle in the tailings and the excess clean water is discharged into the environment as provided for in the operating permit and Environmental Impact Assessment.

3.5.4 Fuel Delivery and Storage

Diesel fuel is delivered to the site regularly using a third-party vendor. The issuer has storage capacity for 265 kl (70,000 US gal) near the surface generators and at the surface mobile equipment workshop and typically maintains it at 75%-95% capacity. Diesel is primarily used for the mobile equipment on surface and underground, but also for the standby generators when necessary. The site capacity is sufficient to allow the diesel generators to operate continuously for up to four days. Diesel and lubricants are dispensed underground from surface by means of special pipelines connecting with special tanks installed in the underground workshops on 2350L and 3300L, improving dispensing safety and reducing logistics challenges and costs of lowering diesel through the shaft hoisting system

3.5.5 Security

The El Mochito mine complex has several entry points to cover the property. Security is insured by professionals working for an independent security company. Control of personnel and vehicle entry takes place at all access gates. Armed security guards are present at every entrance to the mine, mill, mine camp, tailings ponds, warehouse and port facilities. Access control to the working areas includes the obligatory use of a breathalyzer before entry is permitted. All personnel and equipment entering the underground mine must use the main portal (0 Level), which leads to the internal No. 3 shaft

3.5.6 Surface Ventilation Facility

Mine ventilation raises exit on surface at Bonanza, about 1.5 km to the west of the shafts. Four raise-bore holes have been excavated here with the issuer’s raise boring machines; two of the holes are used to down-cast fresh air and two have surface ventilation fans installed for the upcasting return airways. A central freshwater supply and sewage collection systems serve the mine, the offices and the accommodation sites. These systems are operated and maintained by the company under the terms of applicable government permitting.

3.5.7 Surface Electrical Installation and Distribution

Electrical power is provided by a connection to a 34.5 kV line in the national electrical grid that is operated by government-owned Empresa Nacional de Energía Eléctrica (ENEE). Backup electricity, provided by generators owned by AMPAC, is frequently required during periods of grid power loss. The on-site diesel power plant provides emergency backup power to the mine when there is a power outage on the electrical grid. The power plant also provides compressed air for underground operations.

El Mochito currently has a maximum demand of approximately 14 MW of electric power. The hydroelectric dam near the town of Cañaveral (26 MW) is the main source of power for the mine and the surrounding area. The mine is connected to the national grid through a 34.5 kV power distribution line run by the National Electric Power Company (“ENEE”) of Honduras. It provides electricity to the surrounding cities and towns, as well as to the mine and is part of a ring system. ENEE has a substation for El Mochito within the mine compound. The 34.5 kV distribution line has become increasingly overloaded due to the increase of retail consumers and complicated by the frequent electrical storms in the area which reduces the reliability of energy distribution to the mine. As a result, the mine suffers from approximately three to five power cuts per month. To compensate for this, the mine has seven diesel generator sets which are operated when a loss in power is experienced. The generators produce 4.5 MW of electricity for the mine, which is sufficient to keep the main mine water pumps and one hoist running. The cost of running these units is approximately \$0.40/KWh.

The issuer has been in negotiations with the government and ENEE to provide the mine with more reliable and less expensive power. Negotiations include the connection to 69 kV with the 429-transmission line from Cañaveral which is installed in parallel to the original 34.5 kV distribution line. The 69 kV power line is connected to the Electrical Interconnection System of the Central American Countries (SIEPAC) as well as several new national generation plants including a 40 MW geothermal power station in the west of the country.

The mine has already partially built a new 69 kV substation, purchased the required equipment and built a new control room next to the mine. The mine has eight CAT 3516B backup generators to replace the old backup generators. The operation costs approximately \$ 0.22 per kW/h. Ascendant has already invested approximately 60% of the total substation project cost and estimates that it will cost approximately \$1.5M to complete it.

3.5.8 Maintenance Workshops and Warehouses

Different types of workshops are located on surface (electrical, machine tool, mine, carpentry, mobile equipment). These workshops provide services to mine operations, the concentrator plant, the camp and other departments. 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 (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 entrance to the mine.

3.5.9 Laboratory facilities

Laboratory facilities are located within the plant site area. The laboratory analyzes mineral and water samples from the following departments:

- Geology (mine production and exploration)
- Concentrator Plant
- Environment (water samples)

The facilities are equipped to conduct mechanical preparation processes for mineral samples including drying, grinding and pulverizing. The facilities also contain equipment enabling atomic absorption, volumetric, fire test (for silver) and X-Ray fluorescence analyses. The waste from the ore and water samples is managed through the Concentrator Plant.

3.5.10 First Aid / Emergency Services

Mine site has a safety department working closely with mine and processing operations. Regular inspections are done in the mine and around the surface installations. Two mine ambulances are in use, one stationed at the mine, the other at the hospital. Trained personnel with first aid training are amongst the workforce and ready to respond in case of an emergency, as are qualified paramedics in an underground first aid station, 24 hr a day, throughout the year. The site also trains personnel for mine rescue and voluntary surface firefighters.

3.5.11 Inactive Explosives Plant and Storage

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 years 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 \$1.58/kg. The Costa Rican explosives are apparently of poor quality compared to the ANFO originally produced at the mine.

Ascendant 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 and bag the ANFO for its own use, selling any surplus to the military, which would re-sell it to other end-users.

3.5.12 Mine Camp, Administration and Hospital

The El Mochito infrastructure includes administration buildings as well as a well established, traditional mine village. The mine camp or village 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 Raices river.

The Administration building contains a small bank and the following departments: General Manager, Finance, Human Resources, Environment and IT. The mine camp area includes the general offices, over eighty houses and apartments for accommodation for staff and visitors, the company restaurant, a carpentry shop, a surface mechanical and transportation shop, hospital, pharmacy, a bilingual school (up to grade 9), a vocational school, and a privately-run gas station, bank and supermarket. The site has both landline and satellite communications with full telephone, fax and internet services. Recreational facilities include tennis and basketball courts, a soccer pitch, a fully equipped exercise centre and a swimming pool. The company

operates an on-site school for children of employees and also operates a private hospital. The hospital itself has 31 beds, a day clinic, several wards including a pediatric ward, private rooms, a fully-equipped operating room and a delivery room. It is run by the Health Director and is staffed with three doctors and five nurses and operates 24 hr per day. Three specialists (Internist, Gynecologist and Pediatrician) visit the hospital on a weekly basis.

3.5.13 Waste Management Facilities

Non-hazardous waste such as wood, roofing sheets and empty drums are 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. Rubbish that cannot be recycled is disposed of in the Las Vegas municipal landfill site.

There are two landfills at El Mochito. One, has been decommissioned and reclaimed, showing a mature vegetation cover on the recontoured slopes. This landfill was located on the southeast side of the road to El Bosque. The other landfill is located along the road to Pozo Azul east of the mine. These landfills were used to dispose of municipal type waste from the mine and staff housing facilities only and consist of natural topographic depressions where waste was deposited and allowed to compost. The landfill will remain open to dispose of trash and miscellaneous closure debris generated during the closure process. The landfill will be closed at the cessation of all other closure activities. The landfill will be capped with impermeable material, contoured and covered with topsoil and vegetated. During the ESA, a monitoring program will be initiated to determine whether surface or ground waters are affected by any potential leachate from the landfills.

Hazardous and industrial wastes are temporarily stored on site at a secure location. Third party licensed operators remove and dispose of the waste. Liquid organic waste is either sent to the local cement production facility and used as fuel or removed to a certified landfill site, depending on the type of waste. El Mochito has procedures for the handling and remediation of hazardous waste spills of substances such as used oil, diesel fuel and mill chemicals. Hydrocarbons and spent hydrocarbons are collected and disposed through the use of suitably qualified and certified 3rd party contractors.

3.6 Proposed Expansion

Mining operational costs are consequently relatively high and reflect the deep mining environment with long hauling distances, coupled with high pumping and pump maintenance costs. As the mine grows deeper, transport distances will further increase. As expected, this would result in increasing the size of the trucking fleet and manpower and increasing maintenance cost and mechanical parts inventory. There would also be negative impact on the ventilation circuit, and the water pumping system is old, very extended and inefficient.

El Mochito has developed a plan to increase the process plant capacity to 2,800 tpd. Several components of the process plant will be upgraded – the most significant being the installation a crusher feed washing facility, replacement of grinding cyclones with screens, the installation of modern flotation cells and the replacement of disc concentrate filters with plate-and-frame pressure filters. The buried tailings line and pumping system will be upgraded, and the existing tailings line converted to tailings water reclaim for process plant water supply. Existing, idle, magnetic separators and thickener will be redeployed to remove the gangue mineral magnetite from either the lead or the zinc flotation circuit. The isolation and sale of magnetite will improve concentrate grade and will reduce tailings storage requirement.

The plant capacity and process improvement plan will cost \$6.3 million and will take 21 months to complete. Process plant operations will not be disrupted during the proposed changes. The schedule for upgrades is from Q1 2019 through 2020.

The El Mochito mine is in its 70th year of operation and the mining infrastructure is expansive.

The Expansion Project represents a significant opportunity to bring the all-in sustaining costs (“AISC”) below 0.97 \$/lb per zinc equivalent payable approximately two years after the construction period is complete. This cost figure would support the longevity of the operation and a robust free cash flow even in a sustained lower metals price environment.

The Project will enable the El Mochito mine to increase the mining and milling capacity to approximately 2,800 tpd (1,000,000 tpy) from 2,200 tpd (750,000 tpy) without significantly interfering with ongoing operations. In addition to increased revenues, another major benefit of the Project would be a reduction in operating costs from the current 78 \$/t milled to an average of 62 \$/t milled as a LOM average after project commissioning. The annual contained zinc equivalent (“ZnEq”) metal production would average 120M lbs over the life-of-mine (“LOM”). Capital costs to complete the development program have been estimated at \$32.8 million with a construction period of approximately two years and an expected payback of less than two years.

The Project proposes to address these challenges through the upgrade of infrastructure and mining and mineral processing systems across the mine which will result in the following:

3.6.1 Improvements to underground ore transportation – including the installation a new 442-m subvertical (or internal, vertical) rock-only hoisting shaft; modification to the ventilation system; and extension of the communication system further into the mine as it progresses and new vertical access to feed power to the underground crushing and loading system.

3.6.2 Improvements to the underground pumping and water management system – including reducing the number of pumps; rationalizing pumping columns; Installing an effective water clarification system to pump clean water.

3.6.3 Upgrading the process plant includes installing a crusher feed wash plant, installing rotating screens as classifiers in the milling circuit, installing a magnetite removal circuit, replacing the flotation cells, replacing the filters and upgrading the tailings pumping system.

3.6.4 Increasing tailings handling capacity that can meet the increased production from the mine – including tailings dam raises and installing a new, larger diameter, tailings line on current pathway, higher volume/pressure pumping system.

This Expansion Project represents a significant opportunity to bring the All-In Sustaining Costs (“AISC”) down to less than 0.97 \$/lb zinc equivalent per pound payable approximately two years after the construction period is complete. This cost figure would support the longevity of the operation and robust free cash flow even in an environment of sustained depressed metal prices.

The major impact on production from this new No. 8 shaft will be the shortening of average underground truck hauling distances by 26%. The shorter distances will translate into additional trucking capacity. By moving mineralized material and waste more rapidly, the operation will react positively by reducing the underutilized equipment especially in drilling, blasting and support. With the shorter haul distances, it becomes possible to increase production by 26% without the need for additional mining equipment

3.6.1 Improving Underground Mineral Transportation

Installing a new subvertical shaft dedicated to rock hoisting will reduce the average underground truck hauling distances by 26%, and thus increase additional trucking capacity and production by 26% without the need for additional mining equipment. The new winze (the No. 8 shaft) would connect the deeper portions of the mine to the surface more efficiently. The increase in hauling capacity can be met by the drilling, blasting, ground support and hoisting resources as they are all underutilized due to the bottleneck caused by truck hauling and related congestion in the very extensive and meandering ramps that were originally designed as short-term accesses, not principal hauling routes.

Additional benefits would include shortening the installed services, such as pump lines, compressed air lines, service water lines, power cables, sandfill pipes, and so on, as well as significantly improving the regional ventilation network of the mine. The subvertical shaft would be dedicated to rock hoisting operations only; the existing ramp system would be used to move personnel, materials and machines.

The proposed No. 8 shaft is planned to be situated 120 m (390 ft) from the existing No. 2 rock-hoisting shaft. It would be excavated between levels 2100L and 3250L to a diameter of 5.1 m using a raise borer for a length of 442 m. The final portion of the shaft between levels 3250L and 3530L (approximately 94 m) would be raise-bored or drop-raised by long hole methods. The two shafts would overlap vertically over two levels, allowing mineralized material to be transported from the bottom of the mine via the new No. 8 shaft to the current No. 2 shaft, considerably shortening the current hauling route from the deeper sections of the mine where most of the mineral resources lie.

The setup of a new grizzly on 3250L with a crusher below on 3360L would have a nameplate capacity of 2,800 tpd. The subvertical (No. 8) shaft would be equipped with two 6.5 t skips running on rope guides, as well as power cables, backfill piping, compressed air piping, dewatering columns and a service water column.

The diameter of the shaft design was based on the analysis of the rope guide oscillations to ensure adequate spacing between the two skips, including a safety factor. Other design considerations for the shaft diameter included ventilation, geotechnical and installation criteria, requirements and constraints. The position of the various pipes and cables and future access for their maintenance was also considered.

3.6.2 Upgrading the Underground Pumping and Water Management System

An upgrade in the underground pumping and water management system will lower overhead costs by reducing the number of pumps in operation at the mine, rationalizing pumping columns and installing an effective underground water clarification system to pump clean water, which further reduces abrasion and operational and capital costs related to pumping.

3.6.2.1 Upgrade in Pumping and Water Management System

The other main focus of the PEA Project is an upgrade in pumping capacity and water management. The mine currently pumps 750 L/s (12,000 gpm) through a series of pumps to a 3.9 km long drainage tunnel on 650L before being treated and released into the environment. The objectives of these upgrades are the following:

- Increase the pumping capacity from 750 L/s (12,000 gpm) to over 1,100 L/s (18,000 gpm), thereby reducing the risk of flooding a portion of the mine should it arise.
- Rationalize the number of pumps in use and simplify the existing system to reduce costs and improve efficiencies and reduce power consumption & costs. The new system would run from the very bottom of the mine (3350L and 2100L) to the discharge elevation on 650L (Caliche Drainage Tunnel), thereby freeing up the historical system by pumping cleaner water.
- Provide a new, completely independent pumping system from the existing system so that both can run in parallel at maximum capacity if needed
- Provide a level of redundancy with the two independent pumping lines to make future pumping increases possible. Additional pumps could be installed to run on a standby basis to cover maintenance needs without affecting the water volumes being pumped.

Figure 3.3 is a representation of the new pumping system with the two pumps and clarifier installed at levels 2,100 feet and 3,250 feet. This will allow the clarification of 9,890 gallons per minute of water coming from levels below 2,100 feet. This water will be 98% free from suspended solid, which will mean that the mine dewatering discharge at caliche will be >90% clear of suspended solids.

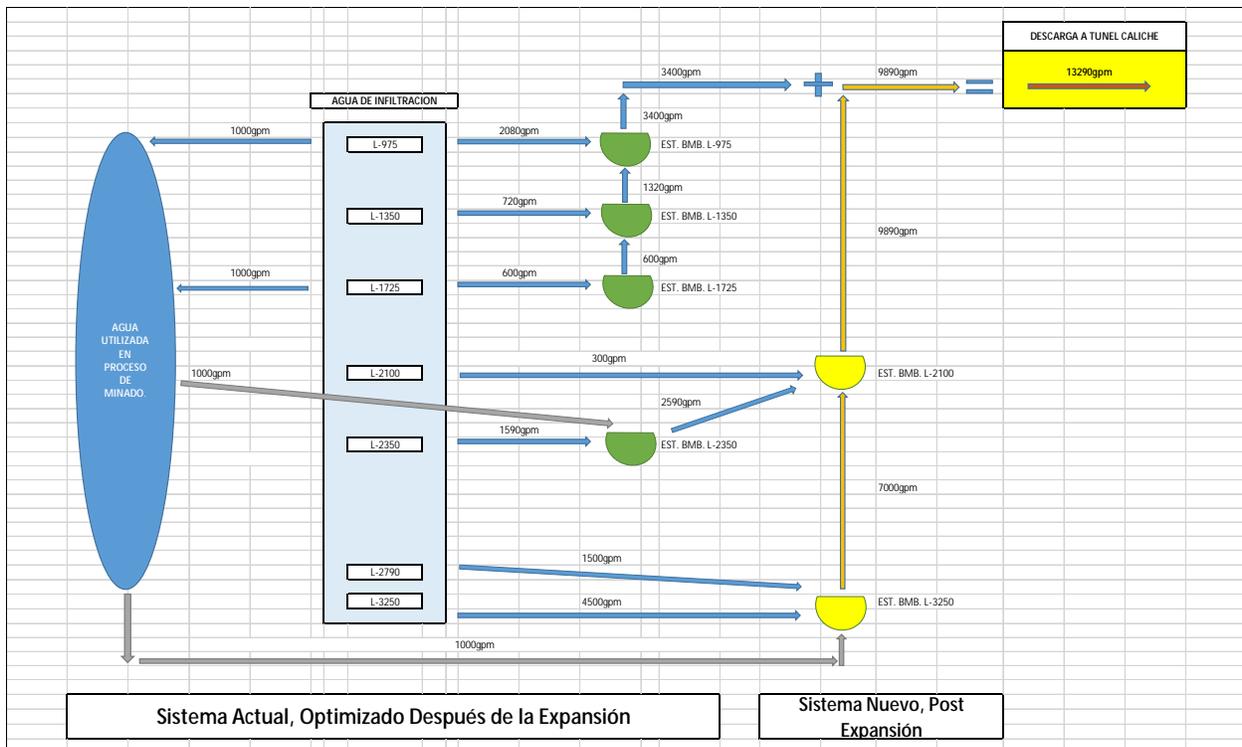


Figure 3-3 Pumping System Schematic

3.6.2.2 New pump station – 3350L

Install a new main pump station on 3350L, with an independent 18" line leading directly to 2100L, 291 m (954 ft) above, bypassing the pump stations on 3050L, 2680L and 2500L/2450L. This would be the new deepest pump station, situated 55 m (180 ft) above the No. 8 subvertical shaft bottom. This pump station would have a designed capacity of 221 L/s (3,500 gpm), with a spare 221 L/s (3,500 gpm) standby capacity for a total of 441 L/s (7,000 gpm).

3.6.2.3 New pump station – 2100L

A new high-lift pump station on 2100L would bypass the pumps of 1725L, 1350L, 975L. A new, independent 457 mm (18") steel line would bypass the line of pump stations and discharge directly into the Caliche Drainage Tunnel on 650L, a vertical distance of 442 m (1,450 ft). Later, a second 457 mm (18") line would be installed, bringing up the potential capacity and used as a spare.

3.6.2.4 Water clarifiers

It is proposed that large, industrial water clarifiers be installed in two main areas of the mine. The first and largest clarifier tank would be positioned at the proposed new pump station near the bottom of the No. 8 shaft with a 221 L/s (3,500 gpm) capacity. Excavations would be planned and mined to allow the capacity to double to 441 L/s (7,000 gpm) in the future.

The second clarifier tank would be installed at or near the new 2100 L pumping station near the top of the No. 8 shaft with a capacity to treat 221 L/s (3,500 gpm) of dirty water coming in from the intermediate depths of the mine.

A common rule of thumb is that a pump running water with 30 ppm solids will have a service life in excess of over 30,000 hours, while a pump running over 150 ppm of solids has a service life of only 3,000 hours due to abrasion. The El Mochito mine typically spends between \$2M/y and \$3M/y on refurbishing and replacing its pumps. This cost could be significantly reduced if the pumped water is clean.

Additional benefits of underground clarifiers, apart from pumping clean water, would likely be the decommissioning of the environmental settling ponds at the Caliche Drainage Tunnel before the water discharges into the receiving environment. The positive impact of having clean water arrive at surface from underground would be significant from an environmental and social perspective.

3.6.3 Water Consumption and Balance

The expansion project will require an average of 1,234 gpm available at the mills, from the pre-expansion 847 gpm in use, sourced from Montevideo dam. This includes fresh water from the Montevideo dam required to provide clear water (211 gpm) to the spray nozzles in the ore washing section ahead of the crusher plant and to provide clear water (250 gpm) for the gland seals for the process slurry pumps and for reagent mixing in the Process Plant. A new pumping system is being installed to pump 772 gallons per minute of reclaim water from the Soledad TSF to the Process Plant.

This will result in reducing the freshwater make up requirement, thereby freeing 772 gallons per minute of fresh water for other uses by the company and communities.

After the expansion, it will still be necessary to pump up to 461 gallons per minute from the TSF into the Raices creek, this being the balance of the water from the Process Plant into the TSF. This represents 386 gallons per minute less water discharged in the Raices creek than during the Pre-expansion period. The treatment of the tailings from the Process Plant water will continue as normal to comply with the legal discharge requirements. **Table 3-2** summarizes the projected water balance.

Table 3-2 Mill Water Balance Post-Expansion

Maximum Design Day @ 2850 dmt	Water Flow	Unit	Water Flow	Unit	Water Flow	Unit
Water from Montevideo Dam	945	USGPM	3.68	m ³ /min	1.75	m ³ /t
TSF Reclaimed Water	772	USGPM	2.92	m ³ /min	1.40	m ³ /t
Mill Water Consumption	1234	USGPM	4.67	m ³ /min	2.24	m ³ /t
Ore Washing (Fresh Water from Montevideo)	211	USGPM	0.80	m ³ /min	0.38	m ³ /t
Mill pumps & reagents (Fresh Water from Montevideo)	250	USGPM	0.95	m ³ /min	0.45	m ³ /t
Plant (TSF Reclaimed Water)	772	USGPM	2.92	m ³ /min	2.65	m ³ /t
Water from Plant to TSF	461	USGPM	1.75	m ³ /min	0.84	m ³ /t
TSF Water into Raices creek	461	USGPM	1.75	m ³ /min	0.84	m ³ /t
Delta (Δ) Fresh Water Available	484	USGPM	1.83	m³/min	0.00	m³/t

Following the expansion, 8,600 gallons per minute of underground (dewatering) mine water will be separately clarified and pumped to the 650L before release into the environment via the Caliche drainage tunnel. At a cost of approximately \$1 million per year (in 2019 terms) 461 gpm of make up water required for the plant could be reduced to zero by pumping some of this underground clean water another 650 vertical feet to the elevation of the plant. This would result in reducing the need for make up freshwater to (close to) 0, thereby freeing up to 1,500 gallons per minute of freshwater for other uses by the company. The company then would make this water available to community.

3.6.4 Energy requirements and consumption

The mine's electrical department has planned some improvements to the power distribution. These consist of removing cable #13 from the Bonanza ventilation raise (from surface to 2350L) and replacing it with a new cable passing through the No. 2 shaft and the nearby No. 3 shaft, which is also used for hoisting personnel and material.

This work also makes it possible for the mine to supply the extra power required by the addition of the new internal shaft (No. 8). An estimated additional 3 MVA will be required in the mine to operate the following:

- The double drum winder and Hepburn winches for the No. 8 shaft on 2100L
- The new pump station and settlers on 3350L close to the new shaft
- The crusher on 3360L
- Belt level, surge bins and loading flasks on 3460L
- shaft bottom pumps on 3530L
- The cable must be removed so that the Bonanza raise-bored hole can then be used to lower the winder and other large material and equipment for the No. 8 shaft.

The energy savings in the concentrator plant by installing the new flotation cells and the new filter presses is estimated to be approximately 250 kW (**Table 3-3**). This energy saving has no material impact on the total power consumed by the mine of approximately 14 MW. With the Expansion, the power consumption for the mine is expected to increase by 1 MWh during the raise boring of the No. 8. Shaft, and this additional power draw would continue once the new hoist is operational. This is offset by the reduced power consumption of just over 1 MWh gained from the implementation of the proposed water clarification and management system, which would partially kick in during 2020 and takes full effect the year after. The reason for this delay is to account for time required for the completion of clearing of settled solids throughout the system. Net power costs and consumption at the mine would therefore be neutral assuming no new underground water is encountered.

Table 3-3 Energy Savings in the process plant

Energy consumed by the existing flotation plant and disc filters					
	Qty	Motor HP	Motor kW	Efficiency	kW
Agitair Flotation Cells	18	30	22.5	70	283.5
Denver Cleaner Cells	20	20	15	70	210
Spence Blower	1	100	75	70	52.5
Energy consumed by Vacuum Pumps	3	100	75	70	157.5
Energy consumed by Compressors	2	75	56.25	70	78.75
Total					782.25
Energy consumed by the new flotation plant and filter presses					
	Qty		Motor kW	Efficiency	kW
Ultimate flotation Cleaners	7		75	70	367.5
Ultimate flotation Roughers	6		30	70	126
Energy consumed by Filter Press	2		5	70	7
Energy consumed by Filter Press feed pumps	2		20	70	28
Total					529

In conformity with the spirit of Performance Standard 3, Ascendant demonstrates that this project represents the implementation of technically and financially feasible and cost effective measures for improving efficiency in its consumption of energy, water, as well as other resources and material inputs, with a focus on areas that are considered core business activities. Such measures integrate the principles of cleaner production into product design and production processes with the objective of conserving raw materials, energy, and water.

3.6.5 Ventilation

Ventilating the El Mochito mine remains a challenge and top priority. The new No. 8 shaft will enable the ventilation areas to be completely reconfigured to allow more fresh air down the No. 2 and No. 3 shafts and up the Bonanza shaft. This will have the effect of increasing ventilation volumes throughout the mine by approximately 20% and providing better environmental conditions underground.

3.6.6 Mine Access

El Mochito is an underground mining operation with primary access to the underground workings via the No. 2 and No. 3 vertical shafts. The No. 2 shaft, from surface to the 2475L (754 m below the shaft collar), is used for mineral hoisting. The No. 3 shaft, which also bottoms at 2475L, is used for waste hoisting and for personnel and material transport. Primary access to the main San Juan underground workshop is via the railed 2350L haulage (-716 m). A series of ramps connects the San Juan workshop to the lowermost workings. A historical ramp from 1100L to 2350L is maintained as a secondary access and airway. A system of ladderways and platforms in raises through the historical part of the mine, separate from the shafts, serves as an emergency escapeway from 2350L to surface.

Services, including power, compressed air and water, run through a network of raises and boreholes formed by the combination of the two shafts. Horizontal development is trackless with several ramps systems for each working area. Raise bore holes with diameters ranging from 2.4 m to 2.8 m extend from surface to the underground workings. In the mine, smaller raise bore holes are developed for ventilation purposes. A sandfill system used for backfilling open stopes is connected at a batch plant on surface and the fill is distributed via a piping system and ranges to where it is required to be placed.

The Expansion Project covered by this PEA does not change the principal accesses to the mine, but provides two additional escape ways, namely the Bonanza shaft and the No. 8 shaft. The surface infrastructure layout remains the same apart from a few changes to the surface crushing and process milling arrangements. The changes apply to the underground operation only.

3.6.7 Upgrades to Mineral Processing

Proposed plant Infrastructure changes and improvements are designed to increase plant capacity from 2,300 tpd to at least 2,800 tpd. Seven major improvements and upgrades are proposed for the El Mochito processing plant and associated facilities. All of these will improve process efficiencies and are needed to facilitate a significant increase in processing capacity. These upgrades can be achieved with minimal disruption to the plant processes and are expected to be completed at reasonable cost in the third quarter of 2019. The use of in-house engineering and fabrication capabilities will be maximized. Suppliers are expected to provide assistance in engineering and start-up of the crusher feed wash plant, flotation cells and the pressure plate filters.

The present processing facilities have a nameplate capacity of 2,300 tpd, however a normal process throughput of 2,450 tpd or more is frequently attained, and short-term milling rates of 2,700 tpd have been achieved.

El Mochito proposes expanding the rate of mineral production and ROM delivery to the crusher facility. Several process bottlenecks and efficiency restrictions encountered in the El Mochito processing facilities will be addressed to provide a 20% expansion in capacity to 2,800 tpd over 355 operating days per year. An expanded throughput capacity of 3,000 tpd can be anticipated on an incidental basis. The important existing process bottlenecks and efficiency restrictions are as follows:

- Water saturated crusher plant feed – 10% moisture which restricts the operation of the crusher circuit and creates excess spillage;
- Oversize rocks (oversize rocks as they are called by El Mochito personnel) damage primary conveyors and plug the jaw crusher feed;
- Rod and ball mill grinding is at capacity and circulating loads are high;
- Flotation cells lack capacity and are performing poorly;
- Concentrate filtration capacity is limited and moisture content is sometimes above safe shipping transport limits;
- Tailings pumping lacks reliability due to frequent power interruptions and the pipeline is at capacity; and
- No capacity to recycle tailings pond water.

Additional process plant operational restrictions include frequent power outages, plastic debris in the feed, and a shortage of fresh water during the dry season. Other than implementing a remedy for power outages, El Mochito proposes to eliminate the process plant bottlenecks and restrictions by implementing process and facility changes that will ensure a reliable and efficient operating plant with daily capacity of 2,800 tpd or more over 355 d/y. Short term throughputs of 3,000 t will be anticipated.

3.6.7.1 Proposed washing circuit

The El Mochito mine is a very wet mine, collecting and discharging 8,000 gpm (1,800 m³/h) of water. The ROM moisture content is typically at maximum – often greater than 10%. Wet feed slows crusher plant operation and contributes to conveyor spillage, reduction in bin capacity (wet packing of ROM feed and crushed material) and packing screens and transfer points. Wet feed is expected to be an ongoing condition.

Counterintuitively, the solution to handling wet feed in a crusher plant is to apply more water. In a typical fully saturated wet feed situation, fresh water sprays are used to flush out the finest wet fraction and transport these fines as a dilute slurry directly to the process plant circuits. The coarser fractions proceed to the normal crushing circuits where, following the first crushing step, as a result of expanded surface area, the crushed material becomes significantly below moisture saturation levels and is much freer flowing.

The installation and operation of the ROM washing circuit is considered essential for the smooth operation of the crushing plant as well as to increase the crushing rate. Specific benefits that can be reasonably expected are:

- Hourly crushing plant throughput will be increased, for example to 180 t/h², allowing sufficient daily downtime for maintenance;
- Final crushed process plant feed size can be reduced from current 19 mm (¾ in) size to 16 mm (5/8 in) or even 13 mm (1/2 in). This will facilitate a significant increase in daily grinding capacity; and
- Conveyor spillage, chute and screen blockage will be significantly reduced.

El Mochito has considered the design, engineering and installation of a ROM crusher feed washing system, and in consideration of site limitations has chosen a design that will wash the ROM feed in two stages. Normally a wash plant would be installed following the primary jaw crusher but this choice is logistically restrictive at the El Mochito crushing facility. A summary of the proposed El Mochito crusher feed washing circuit is outlined below.

ROM material would be pressure-washed on a two-level vibrating finger grizzly positioned at the discharge point of conveyor #1. Conveyor #1 will be raised to permit the installation of a 'trouser leg' diversion chute. Washed plus 80 mm and 30 mm material will proceed to conveyor #2 and feed to the jaw crusher. Minus 30 mm solids will be washed on a 2 mm screen with the plus 2 mm also being transferred to conveyor #2. Slurry containing minus 2 mm particles will be cycloned and the cyclone underflow solids screened at 200 mesh with the plus 200 mesh transferred to conveyor #6, which feeds the fine process plant feed bins. Minus 200 mesh material will be pumped as a dilute slurry directly to the milling circuits.

A South African equipment supplier (Bond Equipment) has been identified to design, engineer and facilitate the washing installations as well as commission the facility. Local contractors will supply the civil works. The estimated cost is \$2.1 million and it will take 35 weeks to complete.

3.6.7.2 Grinding circuit modifications

The simplification and streamlining of the El Mochito primary grinding circuit are proposed. Two parallel grinding configurations will be arranged with rod mills in open circuit (as currently), each feeding a ball mill in closed circuit with spiral screens which are intended to replace the Krebs cyclones. The screens will offer a much sharper cut and at a designated particle size. A slotted screen size – 200 by 600 microns, is proposed with the additional capacity to screen out plus 3mm mine-sourced trash (plastics) that interferes with flotation. The feed to flotation will be finer than the current grind – 100% minus vs 80% minus 212 microns.

The cost of these modifications is estimated to be \$0.4 million and the time from equipment order to operation is expected to be 38 weeks.

El Mochito has provided calculations, based on recognized empirical models, that indicate each revised grinding circuit can readily process 1,400 dry tpd, or a total of 2,800 tpd. Adjusting the model inputs to 3,000 tpd indicate the capacity limit may be approached in the ball mills. However, with the circulating load decreased by the use of rotating screens, and the removal of fines at the washing plant, an increased grinding capacity of at least 3,000 tpd can be anticipated.

The screening out of mine-sourced plastic debris using rotary screens is an essential improvement. Stationary screens are an option for debris removal but are susceptible to plugging by the debris.

The current hydro-cyclones will remain in place and these can be used as a screen substitute when required.

3.6.7.3 Flotation cell replacement

Conventional differential flotation is practiced at El Mochito with galena (Pb) being floated first following the depression of sphalerite (Zn) with a mixture of sodium cyanide and zinc sulphate. Zinc flotation from lead flotation tails follows by activating the zinc with copper provided by the addition of copper sulphate. The currently installed flotation cells represent poorer earlier technology and the cell units are known to be difficult to control. The sustainability of the process plant operation suggests either major repair and upgrading of the existing flotation equipment or replacement. El Mochito prefers replacement.

Modern, advanced-design flotation cells have been identified as replacement for all of the existing flotation cells. These new cells would be manufactured and supplied by Ultimate Flotation Ltd of South Africa. P&E has reviewed the features and operating experience of these cells and has noted the following:

- Each cell has two agitators on each shaft: one for slurry suspension, one for air intake and dispersion;
- Each cell has a circular froth discharge perimeter that is enhanced by V-notch intrusions from the perimeter;
- Air blowers are not required;
- Drives are variable speed, assisting in the optimization of each cell's operation;
- Cells can be restarted without slurry pre-agitation (such as with an air lance) or without draining after shut-down (an important feature for El Mochito with the frequent power outages); and
- Cell units would be delivered complete and are reasonably priced.

A small number of large 30 m³ cells is proposed for rougher-scavengers, 3 for Pb and 4 for Zn). Smaller (6 m³) cells are proposed for cleaners (2 for Pb and 4 for Zn). New froth-compatible pumps will be acquired and two-stage slurry samplers will be built on site and installed. These samplers will increase the precision of metallurgical accounting.

The large cells would be situated in currently empty plant space and the lead cleaners placed where the spare bank of flotation cells is located. Adequate overhead crane hoisting capacity exists for installation of the large cells. The zinc cleaners will be installed where the current zinc roughers are located. The installations will be sequential and are intended to not disrupt plant operations. The estimated total cost is \$1.8 million and will take 9 months to complete.

3.6.7.4 Vacuum disc filters with pressure plate filters

Conventional thickeners and vacuum disc filters are used for dewatering the concentrates at El Mochito. There is one thickener for lead concentrate with the underflow pumped to the single 5-disc filter. The filtered cake from the lead disc filter is transported by conveyor belt to the lead concentrate shed. The overflow from the lead thickener is pumped to the milling circuit and is used as process water.

There are two thickeners for zinc concentrate, a primary thickener and a secondary thickener for the overflow from the primary thickener. The underflow from the primary thickener is pumped to two Eimco 5-disc filters. The filtered cake from the zinc disc filters is transported by conveyor belt to the zinc concentrate shed. The overflow from the zinc thickener is pumped to the zinc flotation circuit and is used as launder spray water in the zinc circuit.

Flocculant is added to both thickeners. Typical filtered concentrate cake moisture levels are: lead concentrate 9.5% to 12.0%, zinc concentrate up to 11.5%. Moisture levels between 8% and 9% are preferred to ensure that concentrate fluidization in truck transport and in a ship's hold does not occur.

The disc filters are essentially worn out, requiring constant maintenance and are operating at capacity. The use of "hand-held beaters" is currently needed to remove filter cake from the cloth.

El Mochito proposes to replace the disc filters with pressure plate filters, a commonly accepted method for filtration of sulphide flotation concentrate. Consistently lower cake moisture contents are realized using pressure filters than obtained using vacuum disc filters. High moisture El Mochito concentrate has recently resulted in spills during truck transport to the port and efforts to dry wet concentrate at the port facility by moving it around with a front-end loader have only been partially successful.

A low-cost proposal has been received from a Chinese manufacturer, Yuzhou Sino Filtration: \$54,000 for two filters (one for Pb and one for Zn), FOB, China.

The total estimated cost for the pressure filter installation is \$0.4 million and would take 6 months to complete.

3.6.7.5 Magnetite removal

Magnetite is a significant gangue mineral in the El Mochito mineralized resources which contributes the largest proportion of the 15% Fe content in the mineral. Magnetite typically contaminates both lead and zinc concentrates, reducing concentrate grade. In the past, magnetite concentrate was recovered from zinc

flotation tails for sale, but markets have vanished. About 4,000 tpy @ 50% iron is estimated to have been produced. Idle magnetite recovery (magnetic drum separators) and handling facilities (thickening and filtration) remain in place in the process plant.

Consideration is being given to reviving the magnetic circuit, but this time removing magnetite in advance of lead flotation. The magnetic separators would be refurbished and installed along with an upgraded two-stage flotation feed sampler.

The magnetite concentrate could be stockpiled for sale or re-introduced into the flotation tailings that are pumped to the mine backfill plant. If magnetite buyers are found, it is anticipated that concentrate production and shipment would be revenue neutral.

The advantages of magnetite removal would be:

- Improved lead and zinc concentrate grade;
- Reduced flotation reagent consumption;
- Increased flotation cell retention time; and
- If a market is found for the magnetite, reduced strain on tailings pumping and tailings storage.

The estimated cost of this plant modification is \$0.2 million and would take 4 months to complete.

3.6.8 Tailings Dam Raise, Pipeline Upgrade and Water Recycling

Tailings dam raises are required for ongoing operations. Alternatives to a tailings dam raise are discussed in Section 3.9. A summary of the Soledad TSF history, technical assumptions, risk assessments, the expansions from stage 1 through 4, and schedule for stage 5 design and construction are provided in Appendix 3.A.

The current 4.5 km tailings pipeline between the processing plant and the Soledad TSF tailings facility has been operating at or close to capacity. The line is buried, 1 m below surface to protect against vandalism and follows the access roads. The line profile includes a significant low zone that “sands out” on each extended power failure.

A new, larger diameter, tailings line sized to handle up to the equivalent of 3,000 tpd of process plant feed is proposed. This line would follow the current pathway and require a higher volume and pressure capable pumping system.

The current tailings line would be used for recycling tailings pond water to the plant for process use. The use of tailings recycled water in the plant would alleviate fresh water shortages during the dry season.

The estimated total cost for these two changes is \$0.9 million and both modifications could be completed simultaneously and would take 6 months to complete. No interruption of current operations is anticipated to facilitate these changes.

The fine tailings from the mine backfill plant near No. 2 Shaft are pumped back to the concentrator where sodium metabisulfite is added to detoxify the residual cyanide and lime is added to maintain an alkaline pH. The tails are then pumped to the Soledad tailings storage facility. The tailings are discharged from the edge

of the lined facility. Pond water is decanted from a floating barge and is tested at the El Mochito laboratory to ensure compliance with permit water quality conditions before discharge to the environment.

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The Soledad TSF Stage 5 detailed engineering is in the process of being finalized. The designer defined a geotechnical campaign in order to assess the current conditions of the ground, dam structure and potential quarries. This study was developed in 2018 and the information used for the detailed engineering.

For this expansion, an updated Seismic Risk Assessment was included in the scope of work of the designer, same as an updated Hydraulic and Hydrological Study (both were uploaded to OPIC folder in Egnyte).

In order to keep the same parameters of the previous stages, AMPAC decided to raise the dam wall with a downstream fill, the safest way to increase storage capacity. The selected increase is 7m on top of the current elevation of the dam crest 807.

The design criteria for this stage keeps the same safety factors of the previous stages, also same as the standard factors of the "Dam Safety Guidelines" of the Canadian Dam Association:

- Minimum Safety Factor Static Condition (during operation) ≥ 1.5
- Minimum Safety Factor Static Condition (during construction) ≥ 1.3
- Minimum Safety Factor Pseudo-static Condition ≥ 1.0

A Stability Analysis is also in progress in order to verify its current operation and condition.

Consistent with the IFC Environmental, Health, and Safety Guidelines for Mining, Ascendant will ensure that the Stage 5 of the Soledad TSF is designed, operated, maintained, monitored, and audited with independent reviews, that consider:

- Ascendant's Risk Assessment Strategy;
- Seismic considerations, including the potential for liquefaction risk;
- Seepage management and related stability analyses;
- Specific risks/ geotechnical or hydraulic hazards associated with the site;
- Flood event recurrence intervals in diversion drains, ditches and stream channels;
- Probable maximum flood event and the required freeboard; and
- Continue and optimize the use of tailings for underground backfill.

Further, Ascendant will ensure emergency preparedness and response planning and containment/mitigation measures in case of catastrophic release of tailings or supernatant water are in place. Consideration, if practical, will be given to zero discharge for the tailings facility in addition to the continued use of a synthetic liner. Finally, closure options, including dewatering and capping, will be evaluated in 2019 during an update of the El Mochito Reclamation and Closure Plan.

The company has also started developing a scope of work to select an Engineer of Records for all the tailings storage facilities. The bidding process will start in April 2019. During the life of the facility several piezometers were installed and are currently monitored under the Operations, Maintenance and Surveillance manual.

Soledad TSF Stage 6 is at basic design and only one option has been analyzed mainly for geometric purposes and footprint definition.

3.7 Alternatives to the Proposed Expansion

No alternative to installation of a new mine shaft was conducted as the only alternative is mine closure; a new mine shaft is required for continued operations. Changes to water management and water treatment were considered as improved alternatives over the current system.

For managing tailings from continued operations, an alternatives analysis was conducted to evaluate continued dam raises on the current tailings storage facility versus an alternative of a new facility. Soledad is the tailings storage facility (TSF) currently under operation, with its construction beginning in 2004 and operations starting in 2006. Its 4th stage construction was completed in Jun 2018, achieving an elevation of 807 masl. enabling storage capacity until 2021.

In 2014, Tierra Group International (TGI) developed a decision matrix to qualitatively and quantitatively evaluate various TSF location options. The key parameters used in the decision matrix include:

- Capital expenses
- Annual operating expenses
- Reclamation cost
- Land acquisition cost
- Facility expandability
- Storage efficiency
- Property ownership
- Relative geotechnical risk
- Relative environmental risk
- Relative operational risk
- Relative complexity and engineering requirement
- Constructability
- Relative social effect
- Effect on current and future mining operation.

The outcome of the evaluation selected site the Douglas TSF site against seven others. A first meeting to present the project was organized with the Las Vegas Municipality.

The Douglas TSF was compared against additional dam raises to the Soledad TSF. The alternative analysis considered the following:

- Time required to complete design & permitting of a Stage 5 lift at Soledad vs. constructing an entirely new Douglas TSF.
- High cost for a new Douglas TSF
- Fill volume / storage volume ratio in Douglas project not optimal
- More time is required to better evaluate sites for a new TSF
- More environmental impacts are associated with a new TSF compared to Stage 5 and 6 in Soledad

As a result of the evaluation, activities for Douglas TSF were put on hold. A Stage 5 Soledad Dam Raise would be to 814 masl. This Stage 5 is being developed and the detailed engineering will be finished in April 2019, completed in May 2021, providing storage capacity of 2.4 Mt, or until February 2025. It is also considered that the tailings reclaim water project, and the magnetite recovery (part of the Expansion) will provide extra capacity for tailings.

The Soledad Stage 5 Dam Rise would require some changes on:

- New construction of South diversion channel
- Modification on the North diversion channel (last portion)
- Offices and shops relocation
- Perimeter road modification

A Stage 6 is expected to cover the storage capacity for the current LOM. A gabion wall rise with armed soil was identified as a suitable option to increase the storage capacity of Soledad.

This will be Soledad Stage 6 and the plan is to reach the elevation 824 m on the dam crest with a final tailings elevation of 822m and a storage capacity of 4.4 Mt or until September 2031.

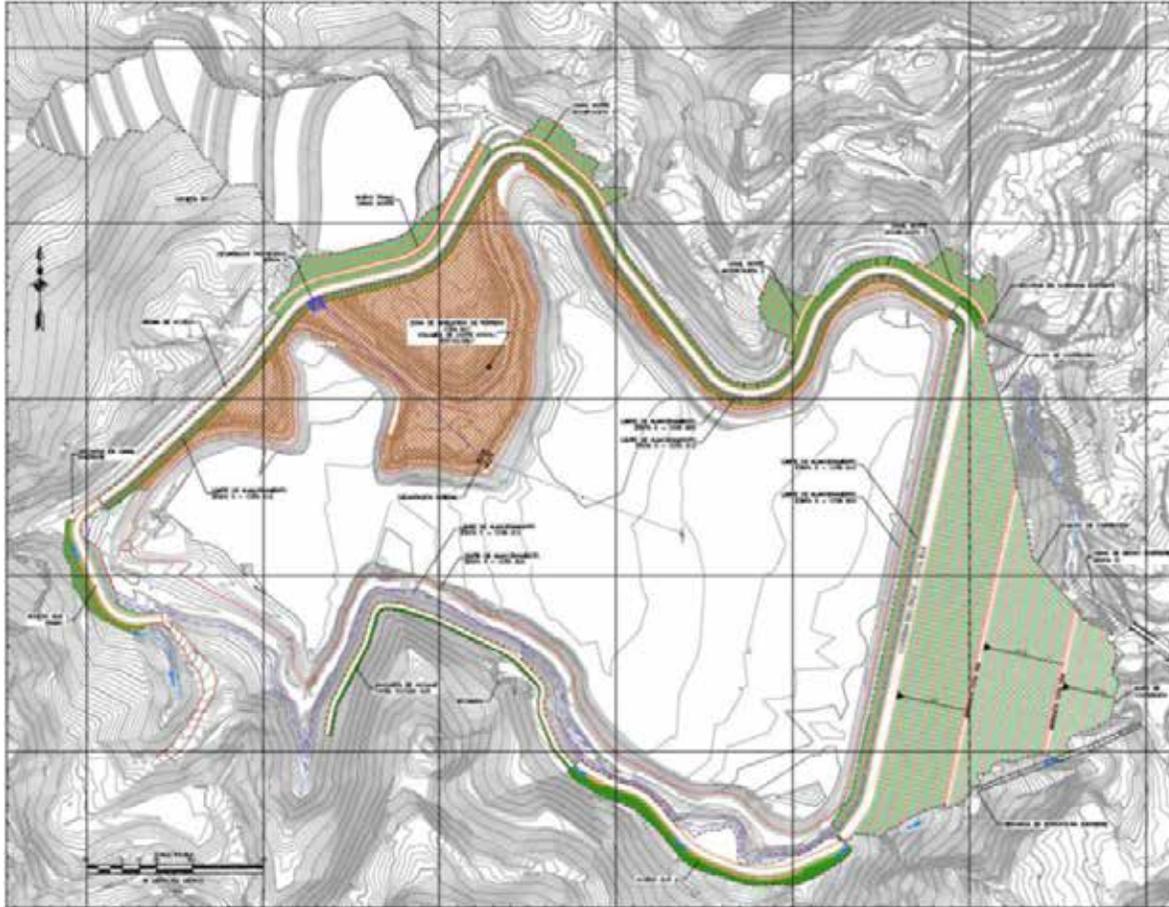


Figure 3-4 Proposed Changes to the Soledad TSF

3.8 Assessment of Interaction of Proposed Expansion with Valued Environmental and Social Components

The **Table 3-4** presents the activities associated with the Expansion and their potential to interact with environmental and social components at or near El Mochito. Valued ecosystem components (VECs) are typically defined as “Any part of the environment that is considered important by the proponent, public, scientists and government involved in the assessment process. Importance may be determined on the basis of cultural values or scientific concern.” (Canadian Environmental Assessment Agency, “Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012” March 2018)

Table 3-4 Expansion Project Interaction Matrix

Expansion Activities (Changes relative to existing operations)	Valued Components															
	Environment								Economic		Social			Heritage	Health and Safety	
	Terrain and Soils	Groundwater	Surface Water	Aquatic Resources (Fish)	Air Quality	Noise and Vibration	Ecosystems (Wetlands, other)	Vegetation (Flora)	Wildlife (Fauna)	Labour Market	Local Economy	Indigenous People	Local Economy	Infrastructure and Services	Land and Resource Use	Heritage Resources
Activities																
Installation of Mine Shaft																
Upgrading of the Underground Pumping and Water Management System																
Upgrading the Process Plant																
Increasing Tailings Dam Capacity																
Increased Employment and Contracting																
Increased Transportation of Equipment, Materials, Personnel and Concentrate																

There are no indigenous peoples for consideration in this Project.

Due to limited or no change in the mine footprint as a result of the Expansion, there are no interactions or effects anticipated on the following:

- no change in surface or subsurface rights
- No interactions with terrain and soils, ecosystems, flora or fauna
- No interaction with archaeological or heritage resources

Planned improvements in mine water pumping and handling will not affect the groundwater level because the improvements are designed to make removal of water that has already entered the mine more efficient. The depth of the mine will not change as a result of the planned shaft installation so additional draw down is not expected as a result of the upgrades.

Changes to surface water quality as a result of the planned expansion are linked to the improvements in the water treatment system underground and on surface. The result will be better recycling of industrial water in the surface process plant and discharge of a better-quality water from underground. Water quality benefits of the upgrades include:

- Settling suspended sediment and solids in the underground workings before reaching the surface
- Improvement in the milling process and in mill treatment
- 62% Less fresh water use in milling process

Demand on surface fresh water is expected to decrease as a result of decreased water demand in the process plant due to improved water recycling.

Minimal effects on surface air quality are expected as a result of the proposed upgrades. The majority of the development work will be contained underground, but as the hauling distances will be shorter, diesel consumption and emissions to surface will be positively affected in the same proportion. The new shaft infrastructure will mean better flow rates underground and approximately 20% better circulation underground. Due to the wet underground the ore is very wet when reaching the surface so very little dust is generated. Ore arriving at the crushers is already very broken and requires minimal additional crushing, which further limits dust generation.

Minimal effects are expected with noise and vibration valued components because all development and mining is underground. Crushing is expected to be less than the current total volume and will not contribute to local noise. There is the potential for some increased/additional machinery noise with the upgraded washing system but noise dB levels overall from plant processing will not change.

There are expected to be positive interactions with the social and labour market valued components. Employment requirements will be for 200 to 300 additional employees during construction. During operations, approximately 100 additional underground employees and 10 additional workers in crushing circuit employees will be required. Note that these numbers exclude indirect labour opportunities, for example increase supplies and stores consumption will increase the number of 3rd party-related service and contracting jobs. Every employee working supports directly and indirectly approximately 8 other people in the local community, so the impact will positively affect the economic well being of between 900 and 2,400 people. Much of the labour for the mine is sources locally so improvement in labour market are linked

to the local economy. Currently, the local region has high unemployment and the creation of new jobs with benefit the local community.

The personnel required for the Expansion Project at the El Mochito mine is expected to increase from 1,258 in 2018 to over 1,580 in 2020 and 2021 during construction, and stabilize at 1,367 for at least ten years of operation.

No interactions are expected to infrastructure and services as a result of the expansion. Additional concentrate will be shipped, but this has a minor impact on commercial routes and existing paved roads relative to the current shipping volumes. Currently, trucking of concentrate to the port requires between 10 to 15 truck loads per day, and with the expansion this is expected to increase to 20.

The reclamation and closure plan will be updated, but given the nature and impact of the the Project, no change to the reclamation and closure plan is expected.

Positive interactions with human health and safety are expected as a result of the modernization of the expansion, and removing of older equipment; safety will be significantly improved per unit of production. During construction, there will be more people, which correlates with higher risk to health and safety during construction; however, El Mochito will be applying orientation, training, and other systems in place to contractors to mitigate these risks.

No interactions with visual quality are expected because upgrades are largely underground and surface developments are within the already developed footprint.

3.9 General methodology for impact assessment

Based on the interactions of the Expansion Activities with environmental and social components, potential effects could be identified. The positive and negative impacts were considered.

The initial assessment of the relative significance of the Expansion's environmental and social impacts was based on an analysis using four criteria:

- Component value - The "component value" criterion measures the component's importance in the functioning of the ecosystem and/or the socioeconomic system in the study area.
- Magnitude of disturbance - This criterion measures the severity of the disturbance to the quality of the VEC or sub-component in question. The disturbance caused by an impact can be low, medium or high.
- Geographical scope - This criterion addresses the potential geographical extent of the impact.
- Duration - This criterion addresses the potential temporal extent of an impact.

3.9.1 Mitigation measures

For all the impacts identified, measures are proposed for optimizing the Expansion's positive impacts and minimizing the negative ones. These mitigation measures are based on technical solutions envisaged by El Mochito in its project planning, on the one hand, and on team members' expertise and suggestions from the stakeholders consulted, on the other hand.

The following order of priority was followed:

1. Avoidance measures – Ways of preventing the impact are given top priority.
Example: changing the design of a facility or the choice of equipment, such as substituting a type of machine that does not produce atmospheric contaminants.
2. Reduction measures – If the impact cannot be avoided, ways of reducing its significance are considered.
Example: modifying equipment or implementing a mechanism such as a system for controlling contaminated runoff.
3. Restoration measures – If the impact cannot be avoided or reduced, ways of repairing the damage are considered.
Example: After the mine is shut down, restoring an ecosystem that was destroyed during construction or operation.
4. Compensation measures – If an impact cannot be avoided or reduced and it causes irreversible degradation of a VEC that cannot be restored, ways of substituting other resources or services with a similar use or function are considered.

3.9.2 Residual impacts

Based on the technical studies of the physical, biological and social environments in the Study Area, as well as consultation of El Mochito stakeholders, a preliminary assessment was made of the Expansion's impacts on the host environment and potential mitigation and optimization measures were identified.

The residual impact assessment used the same methodology as the one used in the preliminary assessment of potential impacts. The mitigation measures identification process was repeated until the residual impacts were reduced to the lowest level possible. In assessing the residual impact levels, it was assumed that all the mitigation measures proposed for each discipline (summarized in the ESMP, Section 8) would be implemented steadily, according to an aggressive schedule and with the appropriate resources.

A fourth criterion was also applied to the assessment of residual impacts: their probability of occurrence. Although this criterion was not applied in the numerical weighting of impacts, it allows more effective prioritization of the actions in the environmental and social management plans to be developed later.

Each impact was assigned a probability rating:

1. certain: occurrence of the impact is inevitable and confirmed;
2. probable: occurrence is not certain, but its stochastic probability can be scientifically determined; or
3. uncertain: based on the data gathered and team's expertise, it is not possible to state the impact's probability of occurrence. For example, impacts created by natural disasters or accidents not directly related to El Mochito's facilities would be in this category.

3.9.2.1 Cumulative impact assessment

The ESIA team analyzed the direct and indirect social and environmental impacts of the Expansion. It then compiled a list of past, present and planned developments or activities in the Study Area in order to assess the cumulative impacts caused by interaction between the Expansion and other activities in the region. These impacts were assessed according to the CEEA guidelines (“Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act”, 2012, March 2018) as well as other directives and regulations applicable to cumulative impact assessment.

The IFC standards (International Financial Corporation, “Good Practice Note – Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets”, 2012) standards require the cumulative impact assessment to take into account all data available from impact studies on other projects and all environmental and social baseline data for the defined study area. A process similar to the ESIA methodology must be applied to the cumulative impact analysis and must incorporate the risks and impacts left over from past projects as well as those arising from any probable or potential regional project. As in the ESIA, as much quantitative data as possible must be provided, and gaps in data must be understood and justified. Regional mitigation measures must be identified and developed in conjunction with regional stakeholders, government representatives and representatives of other projects located within the cumulative impact study area.

One of the main tasks in a cumulative impact assessment is to determine if any development activities near the study areas should be taken into account. Currently, there are no other projects underway or proposed to our knowledge where effects would act cumulatively with this Expansion, other than the current operations underway at El Mochito.

4.0 LEGAL AND POLICY FRAMEWORK

The El Mochito mine has been in operation for 70 years, commencing well before environmental regulations and requirements for Environmental Impact Assessments came into effect in Honduras. The mining industry in Honduras is still small in comparison to other countries and for this reason the legislation that governs it is not as comprehensive. The environmental laws tend to be vague and do not specifically address mining issues. Consequently, few environmental issues are regulated or require permits. Nevertheless, the issuer prides itself on its low environmental impact over many years and continues to manage its environmental obligations to international standards.

Honduran government agencies are often understaffed and may lack the specific experience related to mining projects. Despite these challenges to exchange information on mine-related projects and to obtain official approvals, El Mochito has a good working relationship with the Government of Honduras and its many agencies.

4.1 Laws and Regulations

Among the legal instruments that are related to social and environmental protection are the following:

- General Law of the Environment and its Regulation;
- Law of the Public Ministry;
- Municipalities Law and its Regulation;
- General Mining Law;
- Forestry Law;
- Law of Incentives for Reforestation,
- Forestation and Forest Protection;
- Labor Code;
- Health Code;
- Regulation of the National Environmental Impact Assessment System;
- Environmental Health Regulation;
- Technical Standards for Wastewater Discharge to Receptor Bodies and Sewage System; and the
- General Regulation of Preventive Measures of Work Accidents and Professional Illness.

For the specific purposes of this ESIA, within what is the Legal Framework for the development of the Project, the different legal instruments and their respective articles that are related to the protection of the environment and that should be considered by the proponent of the Project and the subcontractors.

4.1.1 General Law of the Environment

On June 30, 1993, the General Law of the Environment came into force, with principles and objectives that will govern the activity in environmental matters of all public and private projects. Below the most important articles are presented.

Article 1- Thus, the Law of the Environment among its general principles defines what is of public interest, the integral organizing of the national territory considering the environmental, economic, demographic and social aspects.

Article 4- Public and private projects that affect the environment, will be designed and will be implemented taking into account the interrelation of all natural resources and the interdependence of man with his environment.

Article 5 - Projects, industrial facilities or any other public or private activity, susceptible to pollute or degrade the environment, natural resources or the nation's historical and cultural heritage, will be preceded by an Environmental Impact Assessment (EIA), which will allow for the prevention of possible negative effects.

As such, the measures to protect the environment or natural resources that result from such evaluations will be mandatory for all parties, in the execution phase and during the life of the works and facilities. For this purpose, the Secretary of State in the Environment Office will create the National Environmental Impact Assessment System.

Article 29-The following attributions correspond to the Municipalities in application of this Law, of the Law of Municipalities and of the respective sectorial laws:

- a) The management of urban development through regulatory plans for cities, including land use, roads, construction regulation, municipal public services, basic sanitation and similar;
- b) Protection and conservation of sources of water supply to the populations, including the prevention and control of their contamination and the execution of reforestation work;
- c) The preservation and restoration of ecological balance and environmental protection in population centers, in relation to the effects derived from sewage services, cleaning, garbage collection and disposal, markets, slaughterhouses, cemeteries, vehicular transits and local transportation;
- ch) The creation and maintenance of urban parks and municipal areas subject to conservation;
- e) The control of activities that are not highly risky, but that affect in a particular way the existing ecosystem in the Municipality;
- g) The preservation of historical, cultural and artistic values in the municipality, as well as historical monuments and typical places of special scenic beauty and their participation in the management of protected natural areas.
- h) And others that this and other laws reserve to the Municipalities.

Article 30.- The management, protection and conservation of natural water basins and reservoirs, including the preservation of natural elements that intervene in the hydrological process, corresponds to the State and the municipalities in their respective jurisdictions. Water users, whatever the end to which they are intended, are obliged to use it rationally, preventing waste and seeking reuse whenever possible.

Article 31- The following water categories shall be subject to special protection and control:

- a) Those destined to the water supply to the populations or to the human consumption in general;
- ch) Those that are in protected areas, and;
- d) Any other source of general importance.

Article 52-Industries to be established, susceptible to pollute the environment, will be located in areas that do not harm the ecosystem and the health of the inhabitants. The municipality of the corresponding jurisdiction will grant permission for its construction and installation, after obtaining the opinion of the Secretary of State in the Environment Office.

Article 59- Public activity is declared to prevent air pollution by the presence of harmful gases, smoke, dust, solid particles, radioactive materials or other discharges that are harmful to human health, public or private goods, flora and fauna and the ecosystem in general.

Article 60- With the purpose of preventing the negative physiological effects on people, flora and fauna, the Executive Power through the Secretary of State in the Office of Public Health, in consultation with the National Council of the Environment and others competent agencies, will determine the technical standards that establish the permissible levels of emission and emission of pollutants, for which purpose it will issue the regulations that may be necessary.

Article 61 - The Executive Power through the Ministry of Public Health, regulate the indices of tolerance of noise, vibration, as well as the emission of smoke and dust.

Article 63.- The mineral resources of the nation, including hydrocarbons, are declared of public utility; their use, exploration and exploitation must be subject to the special regimes established in the Mining Code and the Hydrocarbons Law, as well as in their regulations, and in all cases, the provisions of this Law and the laws must be observed, in relation to the prevention of environmental pollution or the degradation of natural resources.

Article 64.- The concession holders of mining operations or operations related to hydrocarbons are prohibited from dumping into soils, rivers, lakes, lagoons and any other course and source of water, toxic and non-toxic waste without their proper treatment that may harms human health or the environment in general.

Article 78.- Individuals or legal entities, public or private, who wish to carry out any work or activity likely to seriously alter or deteriorate the environment, including natural resources, are obliged to inform the competent authority as such, and Prepare an environmental impact assessment (EIA) in accordance with the provisions of Article No. 5 of this Law. Included in these activities: the chemical industry, petrochemical, steel, oil, tannery, paper, sugar, cement, brewer, shrimp, liquor, coffee and agribusiness in general; generation and transmission of electricity, mining; construction and administration of oil and gas pipelines; transport; final disposal, treatment or disposal of waste and toxic and dangerous substances, projects in the tourism sectors, recreation, urbanization, forestry, human settlements and any other activities capable of causing severe damage to the ecological balance.

Article 79- The work or activity referred to in the previous Article may not be executed without the evaluation being approved and the corresponding authorization granted.

Article 83.- State agencies that have competence in environmental matters shall carry out inspection and surveillance actions, and to that end, their officials and employees are vested with sufficient authority to inspect premises, establishments or specific areas or to demand from the corresponding party, the information that allows verifying compliance with the corresponding legal provisions.

The municipalities will carry out inspection and surveillance actions in the areas of their competency and jurisdiction. The Regulation will develop this provision.

4.1.2 Law of the Public Ministry

Due to the insufficient and inadequate norms with respect to the penal system, this law was enacted on December 20, 1993, with the objective of imparting justice with independence, impartiality and legality, in a practical and efficient manner. Below, the most relevant articles are mentioned.

Article 1-The Public Prosecutor's Office is a specialized professional body, free of all sectarian political interference, functionally independent of the powers and entities of the State, which shall be in charge of fulfilling the following aims and objectives:

- 1) Represent, defend and protect the general interests of society.
- 3) Ensure respect and compliance with constitutional rights and guarantees and by the very rule of the Constitution and the laws.
- 6) Collaborate in the protection of the environment, the ecosystem, ethnic minorities, preservation of archaeological and cultural heritage and other collective interests.
- 8) In collaboration with other public or private organizations, ensure respect for human rights.

Article 16-The powers of the Public Ministry are:

- 2) Exercising ex officio the criminal actions that proceed in accordance with the law.
- 16) Exercise the actions provided for in the laws of defense and protection of the environment and the ecosystem and preservation of the archaeological and cultural heritage.

Article 56-The attributions related to the defense of the ecosystem, environment, consumer, ethnic groups, national assets, archaeological, cultural and other interests public and social, will be exercised by the Attorney General of the Republic directly or through the special administrative units or officials designated for that purpose through duly motivated agreement.

All of the above and according to the powers conferred on it by article 16, second paragraph; exercise ex officio the criminal actions that proceed in accordance with the Law.

4.1.3 Municipalities Law

On November 7, 1990, the new Municipalities Law was created with the purpose of developing the constitutional principles concerning each Department, as well as the autonomous creation of the Municipalities allowing a better governance of their corresponding territory. Next, the articles of law with greater relevance for said project are announced, as well as those of its regulations.

Article 13- The municipalities have the following attributions:

7. Protection of the ecology, the environment and promotion of reforestation;
11. Signing of agreements with the Central Government and with other decentralized entities with which it participates in the exploitation of resources, which include the areas of exploitation, reforestation systems, environmental protection and payments that correspond to them. The entities with which the municipalities agree on the aforementioned agreements, will grant permits or contracts, observing the provisions of the agreements.

Article 14-The Municipality is the governing and administrative body of the Municipality and exists to achieve the welfare of the inhabitants, promote their integral development and the preservation of the environment, with the powers granted by the Constitution of the Republic and other laws; The following will be objectives:

6. Protect the municipal ecosystem and the environment;
8. Rationalize the use and exploitation of municipal resources in accordance with established priorities and national development programs.

Article 18-The municipalities are obliged to raise the urban and rural cadastre of its municipal district and prepare the city's Regulatory Plan. Regulatory Plan is understood as the local planning instrument that defines in a set of plans, maps, regulations and any other graphic document or of another nature, the development policy and the plans for the distribution of the population, land uses, roads, public services, communal facilities, sanitation and environmental protection, as well as the construction, conservation and rehabilitation of urban areas.

Article 118- The execution of urban development plans and the constitution of reserves for future extensions of the cities, or for the protection of the ecological system, are reasons of public utility or social interest.

The Secretary of State in the Offices of the Interior and Justice, through the General Directorate of Municipal Technical Assistance, will collaborate with the municipalities to comply with the provisions of this Article and for the delimitation of the urban perimeter. The plans related to the future expansions of the cities will be subject to the approval of the Executive Power.

4.1.4 Regulation for the Municipalities Law

Article 127- The Extraction or Exploitation of Resources Tax, is the one paid by natural or legal persons for the exploitation or extraction of natural, renewable and non-renewable resources, within the limits of the territory of their municipality, whether the exploitation is temporary or permanent. Accordingly, they will be taxed with this Tax, regardless of the location of their transformation, storage, processing or stocking center or any other provision agreed by the State, the following operations:

- a) The extraction or exploitation of quarries, minerals, hydrocarbons, forests and their derivatives

Article 128 establishes the percentages and/or amounts to be paid as taxes for the extraction or exploitation of resources referred to in the previous Article.

Article 130- Natural or legal persons engaged in the extraction or exploitation of natural resources in a municipal area must comply with the following obligations:

- a) Apply to the Municipal Corporation for a License for the Extraction or Exploitation of Resources, before starting the exploitation operations;
- c) In the month of January of each year, present a Sworn Statement indicating the quantities and classes of products extracted and operated in the municipality, as well as the amount of this Tax paid during the previous calendar year, and; for which the Municipality will supply the corresponding form free of charge.
- d) Pay for the Extraction or Exploitation of Resources Tax, within the ten following days of the month in which the respective mining or exploitation operations were carried out.

The foregoing is complemented by Article 29 of the General Environmental Law.

Article 132- The institutions that have had the responsibility of controlling and managing the natural resources of the country, such as ICF (Forestry Agency of Honduras), the Ministry of Natural Resources, etc., must establish mutual cooperation and responsibility agreements with the Municipalities in whose jurisdiction these natural resources are located, whether in private, ejidal (government owned, but for public use, it cannot be sold), national land, etc., in order to obtain optimal benefits for the Municipality in the application of this Law and its Regulations. For these purposes, the Municipal Corporation may grant permission to exploit renewable and non-renewable natural resources, prior to the preparation of a technical study approved by the corresponding ministry or institution.

Article 133- For a better control of the metallic mining operations, the Municipalities will be able to carry out and adopt the most convenient measures to verify by their own means the qualities and quantities of the products reported by the companies dedicated to these activities. Therefore, the public offices that directly or indirectly intervene in these operations, such as the General Directorate of Mines and Hydrocarbons, the Central Bank of Honduras, the General Directorate of Customs, etc., must supply the personnel authorized by the Municipalities with the corresponding information that contributes to the control of the exploitation and extraction of these resources and the payment of the respective tax.

4.1.5 General Mining Law

Being the obligation of the State to promote, encourage and regulate the activities related to the exploitation of the mining resources of the country, this law was born on December 24, 1998, allowing in a rational manner the exploration and exploitation of said resources. Below the most relevant articles are mentioned.

Article 1- The present Law aims to regulate the mining and metallurgical activities in the country; therefore, it is of public order, general interest and of obligatory application.

Article 2- The State of Honduras exercises eminent, inalienable and imprescriptible dominion over all mines and quarries found in the national territory, maritime platform, exclusive economic zone and contiguous zone. In exercise of its right of ownership, the State regulates mining and metallurgical activities and oversees the technical and rational use of mineral resources.

Article 40 - Every holder of mining rights is obliged to perform the tasks proper to its activity, in accordance with systems, methods and techniques that tend to the efficient development of the activity and subject to the safety and health and environmental standards applicable to the mining industry, according to internationally accepted standards. If in the development of such activities damage is caused to third parties, the holder of the concession is obliged to indemnify them for the damage caused to them.

Article 42 - Every holder of mining rights is obliged to present annually and within the first three months of the following year, before the authority, a technical, economic and environmental report of the mining operations developed in the immediately preceding year, which is called Annual Consolidated Declaration, whose content must be approved by the Mining Authority. The information contained in the Annual Consolidated Declaration will be provided by the Mining Authority to other State Bodies, ex officio or at their request, so that any information contained in the Annual Consolidated Declaration can only be provided by the Mining Authority.

Article 79 - Holders of concessions that plan the start of exploitation or benefit activities, must submit to the Mining Authority a schedule of proposed activities that define in time stages to be developed in the phase of exploitation or benefit of minerals, the holders of The concessions will have a term of eighteen months counted from the end of the feasibility stage to submit an Environmental Impact Assessment (EIA) prepared by environmental professionals and approved by the Mining Authority, establishing clear, coherent and possible, measures of prevention and mitigation of the ecosystem affected by the exploitation or the benefit of minerals.

The concessionaire must comply fully with the environmental regulations and those contained in the Approved Environmental Impact Assessment.

The environmental impact assessment must contain at least:

- 1) Executive Summary, will be the sum of the content of the Environmental Impact Assessment (EIA);
- 2) Background, it will be the summary description of the legal aspects of the activity to be carried out;
- 3) Introduction; it will contain the description of the project and its estimated cost;
- 4) Description of the project area;
- 5) Description of the activities to be carried out;
- 6) Foreseeable effects of the activity in relation to human health, flora and fauna, ecosystem, water resources, communication routes and other environmental aspects of the project area;
- 7) Control of the effects; and,
- 8) Environmental evaluation and control.

Article 80 - The holder of a mining concession that performs exploitation work is required to comply with the prevention and mitigation measures established by the Mining Authority in conjunction with the General Directorate of Environmental Assessment and Control.

Article 81 - The holder of a mining concession that performs exploitation activities is obliged to comply with the prevention and mitigation measures established in Executive Agreement No. 070-95 dated July 1, one thousand nine hundred and ninety-five, in relation to Executive Agreement No. 015-96 dated November 22, one thousand nine hundred and ninety-six. Until the mining authority puts in force the Manual of Environmental Mining Policy.

Article 82 - In case of contravention of the previous Article, the mining authority will require in writing the holder of the mining right to comply with the environmental regulations imposed or, where appropriate, to refrain from using inappropriate means or practices in the process miner, giving him a prudential time to make the necessary changes; if it does not do so, the mining authority, after investigation, may establish the corresponding sanction.

Article 83 - The mining authority will determine for the mining processes, the factors that it considers cause negative impacts on the environment, the provisions for the prevention of pollution of the environment or the degradation of natural resources, will set environmental standards in mining activity and the minimum contents of the Environmental Impact Assessment. With these elements, it will create the Mining Environmental Policy Manual, as part of the National Environmental Policy.

Article 84 - Any complaint against owners of mining rights for non-compliance with environmental standards, will require for its processing the prior evaluation of the same by the mining authority.

Article 85 - The companies may agree with their workers work days that mean the accumulation of several continuous days of work for several continuous days of rest.

Likewise, they may establish operation and contracting systems related to housing, educational, health and social services, different from the traditional concept of a mining camp.

Article 86 - Natural or legal persons dedicated to the activities of the mining industry, have the obligation to provide safe conditions, and a healthy work environment, coordinated by a competent professional.

Article 87 - Workers are obliged to strictly comply with the preventive measures and provisions agreed by the competent authorities and those established by employers on safety.

Article 88 - Every year, employees shall submit to the Executive Directorate of Mining Promotion (DEFOMIN), the Annual Health and Safety Program for the following year. Likewise, the employers will present with the Consolidated Annual Declaration referred to in the Article of this Law, a report of the activities carried out in this field during the previous year.

Article 90 - Employees have the responsibility to attend Education and Training Programs for work in the different areas of mining activity.

Article 91 - Failure to comply with the obligations of companies that exercise mining activity in the aspects of occupational health, safety and the environment, will be sanctioned according to the seriousness of the offence, with reprimand, fine or suspension of activities according to the criteria established by the Regulations of this Law without prejudice to amend the fault or repair the damage.

4.1.6 Forestry Law

The Honduran forestry industry is primarily regulated through the *Forest Law*, which was amended 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 AMPAC’s Forest Management Plans and revisions are made every five years. One of the approved plans is valid through 2045 while the other two are being renewed.

Article 1 - The present Law aims to:

- a) Achieve and perpetuate the maximum direct and indirect benefits that may accrue to the Nation from the flora, fauna, waters and soils existing in the forest areas that are defined and classified in this Law.
- b) Ensure the protection and improvement of the same
- c) Rationalize the use, industrialization and commercialization of forest products

Article 2 - To achieve the purposes stated in the previous Article, this Law proposes:

- a) Establish the adequate conservation, restoration and propagation of forest resources
- b) Achieve the maximum sustained use in the production areas determined according to physical, economic and social factors
- c) Promote the multiple use of forest areas, including recreation and the environment conducive to certain species of flora, wildlife, regulation of grazing, hydrological regimes and conservation, restoration and filiation of soils

- d) Establish the rational use and utilization of resources through an adequate ordering and development of the forestry sector, in its phases of production, industrialization, commercialization and consumption.

Article 65 - The State's Forestry Administration will participate in the study and execution of hydrological ordering projects, regulation of flows, restoration of forests, conservation of forest soils, correction of torrential regimes and fixation of unstable soils, in order to regularize the regime of the waters, avoid solid slides and help protect dams, dikes, communication routes, wetlands and populated areas.

Article 70 – There will be no exploitation or utilization of forest in public forest areas, without prior authorization from the State. Said authorization shall take any of the following forms:

- a) Award
- b) Contract for the supply of forest products
- c) Large-scale exploitation permit
- d) Licenses of use.

4.1.7 Law of Incentives for Reforestation, Forestation and Forest Protection

Due to inadequate silvicultural practices, the irrational exploitation of wood extraction, forest fires, overgrazing and deforestation caused by shifting cultivation, the Law of Incentives for Reforestation, Forestation and Forest Protection was created.

March 29, 1994, thus promoting a regeneration of the forest resource in areas of the nation that have been affected by these phenomena mentioned above. Below are mentioned the articles that are most relevant to this study.

Article 1-This Act has as its general objective to establish incentives to promote the incorporation of the private sector in the execution of forestation, reforestation and forest protection activities, with the purpose of achieving its broadest participation in the reversal of the process of deforestation suffered by the country, in the proper management of natural forests and in the establishment of forest plantations.

Article 2 - In accordance with the provisions of the preceding Article, the following are specific objectives of this Law:

- a. Promote afforestation and reforestation of forest land;
- b. Encourage the participation of natural and legal persons who are beneficiaries of this Law, in the proper management of natural forest resources, mainly in terms of their protection against fires, forest pests, and damage to forests and soils. inadequate change in their use, especially those caused by shifting cultivation and traditional agriculture and livestock;
- d. Promote and encourage citizens to protect watersheds in order to ensure adequate water supply to the respective populations and to contribute to the protection of reservoirs built for public utility purposes;
- c. Establish an appropriate mechanism to channel internal and external resources destined to the protection of the natural forest and to afforestation and reforestation;

Article 4-For the above purposes, ICF will elaborate with the participation of forest land owners, cooperatives or other farming associations with legal personality, timber industry, professional forestry colleges and other involved sectors; a Program of Incentives for Forestation, Reforestation and the Protection of Forests that encompasses the stated objectives, taking into account, among others, management plans and ongoing projects approved by ICF. This program will last ten years from its start-up and will be carried out in two stages of five years each, at the end of this term, it will continue if the conditions of the country require it.

Article 12-Beneficiaries who have an interest in the execution of reforestation projects or protection of the natural forest against fires, pests or other damages, shall be entitled, where appropriate; to the following incentives:

a. Free development of the project, considering the plow or reforestation or protection, so that it is compatible, among other aspects, with the size of the available work force, the needs of the beneficiaries and the conditions of the forest resource. These projects may have agricultural or livestock components depending on the case; The area to be reforested or protected can not be less than five hectares, although its execution is done gradually during the respective five-year period;

c. Harvest free of charge and according to the fulfillment of the Management Plan or Protection Plan and other conditions agreed with ICF, forest products for domestic purposes such as: Firewood, wood for rural buildings and poles, as well, and free of charge the commercial use of resins, oils, latex and forest seeds; they will also have the right to share the final commercial harvest of the wood in fifty percent (50%) of the volume harvested, when they carry out forest protection activities in public forest areas;

ch. Annual return of one hundred percent (100%) of the investment made in the protection of public forests that are in a period of regeneration or young forest that are not subject to a management plan, according to the investment program of the protection plan correspondent;

F. Annual return of fifty percent (50%) of the investment made in the reforestation of deforested public areas, according to the respective investment program; total usufruct indefinitely, of the forest products that are extracted provided that the obligations set forth in the Management Plan or Reforestation Plan and other conditions agreed with ICF have been met.

Article 15- The beneficiaries who take part in the Program to carry out projects to protect against deforestation caused by shifting agriculture or the protection of watersheds, shall be entitled, where appropriate, to the following incentives:

to. Free elaboration of the project. These projects will include areas of no less than five hectares, although their execution will be done gradually during the respective five-year period;

b. Free technical assistance as indicated in letter b) of Article 12 of this Law;

c. Harvest freely and in full the agricultural products obtained in the project area, as well as harvest without payment the trees that were necessary for their own use, as provided by the corresponding management plan;

d. Obtain seeds, seedlings of fruit and timber trees, hand tools and other similar inputs for reforestation, agroforestry, soil and forest protection. Its value may be paid with work and shall not exceed ten percent (10%) of the total cost of each specific project, except in the case of the protection of the buffer areas of protected forest areas defined in Article 11, subsection a) of Decree

No. 85 of the Forestry Law of November 18, 1971, in which case the percentage will be greater as established in the Regulations. For the protection of these buffer areas, ICF will sign long-term contracts considering the determined area, the density of the existing population, the access roads and the nature, importance and urgency of the protection activities;

4.1.8 Labor Code

The Labor Code was created in order to regulate the relations between capital and work, guaranteeing the worker the right conditions for a normal life and an equitable compensation of his investment.

Article 305 - The mining companies have as a special obligation to provide their workers free of charge medical, pharmaceutical, surgical and hospital care in case of non-professional illness, for up to six (6) months, and must have a Honduran Doctor and Surgeon, in exercise legal profession, for every two hundred (200) workers, or fraction not less than fifty (50).

Article 306 - Once the term of medical assistance established in the previous article has elapsed, the companies dealt with in this Chapter (Mining Work) can not dismiss the worker who is still incapacitated without first fulfilling it later in Articles 104 and 105, plus transportation costs to the next town center where there is a doctor and an official hospital.

Article 307 - Every mining company must provide, in the judgment of the doctor, preventive and curative measures for malaria and special treatment to workers attacked by tropical endemic diseases.

Article 308 - The mining companies have the obligations to comply with the measures of hygiene of the personnel and of the camps and safety of the workers prescribe the Ministries of Labor and Social Security and of Public Health and Social Assistance.

The protections to the workers during the exercise of the work referring to Health and Safety must be implemented with the purpose of guaranteeing their health considering the stipulations on Article 395, which reads as follows:

Article 321 - Day work is the one that runs between five hours (5:00 a.m.) and nineteen (7:00 p.m.); nightly, which takes place between nineteen hours (7:00 p.m.) and five (5:00 a.m.).

In a mixed day, which corresponds to time periods of the day and night, as long as the night period covers less than three (3) hours, otherwise it will be considered a night shift. The maximum duration of the mixed day will be seven (7) hours a day and forty-two hours a week.

Article 322 - The ordinary work day may not exceed eight (8) hours per day and forty-four (44) per week, equivalent to forty-eight (48) of salary. The ordinary day of night work may not exceed six (6) hours per day and thirty-six (36) per week.

These provisions will not apply in cases of exception, highly qualified, determined by this Code.

The worker who fails on any of the days of the week will not complete the work week of forty-four (44) hours, will only be entitled to receive a salary proportional to the time worked, based on the salary of forty-eight (48) weekly hours.

This principle will also apply to the ordinary work night at night and the mixed one.

Article 329 - Night work, by the mere fact of being nocturnal, is remunerated with a surcharge of twenty-five percent (25%) on the value of day work. With the same surcharge the hours worked during the night period in the mixed day will be paid.

Article 391- Every employer or company is obliged to supply and have the appropriate conditions the premises and work equipment that guarantee the safety and health of workers.

For this purpose, it must proceed, within the period determined by the General Labor Inspectorate and in accordance with the regulations or regulations issued by the Executive, to implement on their own all measures of health and safety in workplaces that serve to prevent, reduce or eliminate professional risks.

Article 395 - Unhealthy facilities or industries are the ones that by their nature can cause conditions that threaten or harm the health of workers, due to materials used, processed or discharged, or waste, solid, liquid or gaseous. Hazardous facilities or industries are the ones that damage and can immediately and seriously damage the lives of workers either by their own nature or by the materials used, processed, discharged or waste (solid, liquid or gaseous); or for the storage of toxic, corrosive, flammable or explosive substances, in whatever form.

Article 396 - All workers engaged in the handling, manufacture or sale of food products for public consumption, must be provided each month with a medical certificate that proves that they do not suffer from infectious or contagious diseases capable of disabling them for the performance of their duties.

Article 398 - This Health and Safety regulation must contain at least:

- 1.- Protection and personal hygiene of the workers;
- 2.- Accident and disease prevention;
- 3.- Medical service, sanitary conditions of the establishment, and daycare when appropriate;
- 4.- Prohibition to facilitate accommodation in buildings of hazardous or unhealthy industries;
- 7.- Special rules, in the case of mining and oil companies.

4.1.9 Health Code

Health is a priority in any work environment which must be protected, recovered and rehabilitated by the State as well as natural or legal persons; thus, providing an environment of integral, biological, psychological, social and ecological well-being for the people who work in said company. Below are the most relevant articles for this assessment.

Article 8 - Everyone has the right to assistance, rehabilitation and benefits necessary for the conservation, promotion, recovery of their personal and family well being; and the correlative duty to contribute to the health of the community, avoiding damaging actions and omissions and strictly complying with the provisions of this Code and other health regulations.

Article 9 - Everyone has the right to live in a healthy environment, in the way that this code and other health standards determine it, and the correlative duty to protect and improve the environment that surrounds them.

THE SECRETARIAT has under its responsibilities to ensure that the environmental conditions are met, for compliance with the provisions of this Article.

Article 25 - For the purposes of the application of this Code and other health standards, means the environment, the set of natural resources whose preservation and renewal by the State and all inhabitants, are necessary to ensure the health and general well-being.

Article 30 - THE SECRETARIAT will monitor compliance with the hygienic measures ordered to avoid contamination of groundwater.

Article 34 - It is prohibited to use continental waters as a site for the final disposal of solid waste, and it must be strictly adjusted to the regulations that are established.

Article 35 - All liquid waste discharges into continental waters shall be subject to the requirements and conditions established by the regulations taking into account the characteristics of the sewer system and the corresponding receiving source.

Article 36 - The industrial establishment that intends to use the rivers, creeks, streams and springs, to spill liquid waste, must provide treatment systems designed and constructed according to the rules of the regulations that are established and be previously authorized by the competent authority.

Article 38 - The water for human consumption must be potable. Drinking water will be understood as the one that meets the physical, chemical and biological characteristics that are established on the regulations.

Article 41 - Excreta, greywater, sewage and rainwater should be disposed of properly and sanitarly, in order to avoid contamination of soil, air and water sources for human consumption, as well as the proliferation of vectors of diseases.

Article 42 - The owner of real estate is obliged to connect his sewage disposal system, greywater, to the public sanitary sewer network, and in the absence of this, he will construct on his own those facilities that will allow the excreta to be disposed of in a sanitary manner without causing harm to neighbors or the environment.

Article 46 - The contamination of the atmosphere is understood as the deterioration of its purity due to the presence in concentrations higher than those allowed, of agents such as: solid particles, dust, smoke, radioactive materials, sound waves in diffusion and others that the Secretariat define as contaminants, as well as the presence or emanation of odors that undermine the well-being of people.

Article 48 - When the emissions into the atmosphere of a fixed or mobile source of pollutants, pass or may exceed the limits established in the standards will proceed to apply the treatment systems established by the Secretariat.

Article 51 - It is defined with the generic name of garbage:

- a) The putrescible waste that results from the cooking, handling, preparation and consumption of food.
- b) Non-putrescible waste formed by combustible and non-combustible substances:
- g) The use and final disposal of non-putrescible or non-biodegradable solids will be the object of special consideration in the established regulations.

Article 52 - Garbage of any kind must be sanitized. It is up to the Municipalities to organize, contract and assume the responsibility for the services of cleaning, collection, treatment and disposal of garbage, complying with the regulations.

Article 57 - By the location or volume of garbage produced, the entity responsible for the cleanliness can not make the collection, this will correspond to the person or establishment producer, as well as its transport and final disposal to the places authorized by the municipalities in accordance with the provisions of Article 53 of this code.

Article 101 - The health of workers is an indispensable condition for the socio-economic development of the country. Its preservation, conservation and restoration are declared as activities of social and health interest, in which the government, public sector, workers and the community in general must participate.

Article 104 - All employers are responsible for:

- a) Provide and maintain within the production process, a work environment in adequate conditions of health and safety and establish work systems with minimal health risk.
- b) Adopt effective measures to protect and preserve the health of workers, through the installation, operation and maintenance of systems and protective equipment necessary for the prevention of occupational accidents and diseases.

Article 105 - All workers and their organizations are obliged to observe the provisions of this Code and its regulations, the standards of occupational health programs that are established, as well as to collaborate and participate in the implementation and enforcement of prevention measures and protection against the risks of workers.

Article 114 - In all workplaces the necessary measures will be adopted to avoid the presence of chemical, physical and biological agents in the air, in concentrations and levels that represent risks for the health and well-being of the workers or the General population.

Article 117 - In all workplaces there will be sufficient lighting and ventilation in quantity and quality, to prevent harmful effects to the health of workers and ensure adequate conditions of visibility and safety.

Article 120 - In all workplaces must have trained personnel, equipment and devices for fire fighting, which can be used immediately and with maximum efficiency.

Such equipment and devices will be subject to inspection by the specialized governmental entity.

Article 121 - The regulations on the manufacture, storage, handling, transportation and trade of flammable or explosive substances shall be regulated.

Article 123 - In the activities whose nature expose the worker to risk, the company will have the obligation to provide the personal protective equipment to reduce the risk of workers in their work environment.

4.1.10 Environmental Health Regulation

For a better understanding of the Health Code, this regulation was created on December 29,1998. The articles mentioned below are the most relevant with respect to said study.

Article 2 - It is the responsibility of the State and all natural and legal persons to promote, protect and rehabilitate health.

Article 6 - For this purpose, as stated in Article 9 of the Health Code, the Ministry of Health is responsible for monitoring environmental sanitation conditions throughout the national territory.

Article 10 - Water according to its use in accordance with the provisions of the Code, is classified in water for human consumption, for domestic use, for the preservation of flora and fauna, for agricultural and livestock use and for industrial use.

Article 12 - Water for human consumption, for domestic use and for the preparation of food products must meet the physical, chemical and biological characteristics, according to the National Technical Standard for the Quality of Drinking Water, established by the Secretary of State in the Health Office.

Failure to comply with this obligation constitutes a very serious offence.

Article 13 - Water for the preservation of flora and fauna must meet the physical and biological characteristics, according to the National Technical Standard for Basic Water Quality, established by the Secretary of State in the Health Office and the Secretary of State in the Dispatch of Natural Resources and Environment.

Article 24 - Drainage basins, infiltration areas and training sites and extraction of any water supply for human consumption, domestic use or the preparation of food products, whose source is superficial, underground or deep, should have some protection system that avoids its contamination and exhaustion.

Article 25 - Discharge of sewage, waste and excreta from rubbish, waste from: Sawmills, hospitals, agricultural, mines, factories and industry of any type and size, on the banks of rivers, streams, lakes, lagoons, is prohibited. reservoirs, winter streams and nearby water wells for human consumption, as well as on the beaches of the seas and estuaries near cities or fishing sites or fish and shrimp industry without permission from the Regional Authority or Health Area.

The contravention of this provision, according to the magnitude of the damage caused, may be qualified from serious to very serious offence and incur criminal liability in accordance with the provisions of the Penal Code in force.

Article 28 - The authority of Region or Area of Health, will only be able to authorize to the domestic, industrial, agricultural and mining establishments the dumping of liquid waste to rivers, lakes, lagoons, dams, streams, streams, streams of winter, currents of winter, as well as the beaches of the seas and estuaries or fishing sites or the fish and shrimp industry, when the treatment system to which said liquid waste must be subjected, guarantees that the discharge complies with the Rules to regulate the Discharges of Residual Waters to Receiving Bodies and Sanitary Sewers.

The Contravention of this provision will be sanctioned from a serious to a very serious offence.

Article 33 - Any natural or legal person, public or private, who intends to build any public or private, national, municipal, local or family system of family disposition of rainwater, black water, sewage and excreta, must obtain the respective Environmental License and approval of the authority of the Region or Area of Health, or other delegated authority, in order to avoid contamination of soil, air, and water as well as the formation of breeding sites for disease vectors and deterioration by filtering wastewater in housing walls, and on public roads and public and private buildings.

Article 44 - The discharge of sewage, discharges and excreta into rivers, streams, lakes, lagoons and winter streams is prohibited, as well as in seas, estuaries, reservoirs, aquifers or any other body of water that does not comply the Norms to regulate the discharges of residual water to receiving bodies and sanitary sewers.

Article 51 - Air pollution means the presence in the air of harmful agents; such as solid particles, dust, smoke, radioactive matter, gases, ashes, sound waves of diffusion, emanation of odors and any other that directly or indirectly damage the environment, and consequently the health of all living beings; and whose concentrations are higher than those allowed by the technical standards issued by the Ministry of Health through the competent Directorate General of Health.

Article 53 - Any natural or juridical, public or private person that intends to create any industrial activity or any other nature whose processes of operation and handling of substances generate atmospheric pollutants or constitute health hazards, must obtain the approval of the General Directorate of competent Health, of the Secretary of Health, Municipal Mayor's Office, presented for that purpose the corresponding Environmental License issued by the Secretary of State in the Dispatch of Natural Resources and Environment.

Article 54 - The installation within the urban perimeter, industries, educational, military, recreational or other establishments that produce fumes, gases, dust or other emanations that by their composition or nature may affect the health of people is strictly prohibited.

Article 60 - Industrial establishments or any other, that use fixed and mobile engines, it is strictly forbidden to use fuels containing substances or additives in a degree of concentration higher than that established by the technical standards issued by the competent General Directorate of Health. the Secretary of Health, City Hall, Secretary of Natural Resources and Environment and Secretary of Labor and Social Security.

Article 78 - It is strictly forbidden to throw garbage of any kind, in places other than those previously indicated by the municipal authority.

Article 117 - To regulate compliance with the provisions of Title III of the Health Code, the Technical Standards and the Special Occupational Health Regulations will be issued, taking into consideration international conventions and treaties on this matter.

Article 118 - Without prejudice to the impositions contained in the Labor Code and other Laws of Social Security and Welfare, it is the responsibility of the Health Authority to dictate the technical norms related to occupational health, as well as the qualification of unhealthiness or dangerousness and sanction the fouts in accordance with Articles 178, 203 and 204 of this Regulation.

Article 125 - Without prejudice to the provisions of this Regulation, all industrial establishments must comply with the provisions listed below:

n) Industrialists must take the measures indicated to reduce or eliminate occupational hazards in situations where workers are exposed to:

- 1) Fumes, dust and toxic gases that can result in acute or chronic diseases.
- 2) Existence of vibrations and excessive noise.
- 3) Inadequate lighting due to poor lighting or glare and flash.
- 4) Excessive humidity, heat or cold conditions.
- 5) Contact with chemical reagents or other substances that can potentially cause illness or disease.
- 6) Operations that may cause accidental injuries, burns, injuries or crushing, etc.
- 7) Human congestion in the workplace.
- 8) Poor ventilation in work sites.
- 9) Lack of order and cleanliness.
- 10) Others determined by the Health Authority.

r) The quality and intensity of lighting in any work area must be adequate for the work to be carried out without risk to the eye and at the same time facilitate work and avoid accidents. The lighting levels will be those established in the technical standards promulgated by the Health Authority.

s) In all work areas, natural or mechanical ventilation must be available to ensure a healthy and comfortable environment, in terms of temperature, humidity, heat radiation and air displacement.

Article 129 - In relation to Article 127 and 128 of the Health Code, and Article 182 of the Criminal Code, inter-institutional coordination is essential in order to ensure the prevention of the environment and protection of human health with respect to importation, manufacture, storage, transportation, handling, trade and disposal in general of dangerous substances such as pesticides, insecticides, herbicides, rodenticides, explosives, corrosives, radioactive, flammable substances and others. For this purpose, a Special Regulation of Registration, Import, Manufacture, Storage, Transportation, Handling, Trade and General Provisions of Hazardous Substances will be issued.

4.1.11 Regulation of the National Environmental Impact Assessment System

In 1993, when the General Law of the Environment was decreed, it was considered necessary to provide this law with a regulatory norm that defined, framing and put into operation the National System of Environmental Impact Assessment (published on March 5, 1994), the Evaluations being of Environmental Impact, the technical instrument that will allow the harmonious development of public and private activities without harming the quality of the environment. Below are the most important articles in relation to this study.

Article 1 - In compliance with Articles 5, 9, letter ch and 11 d, of the General Environmental Law that orders the creation and development of the "National Environmental Impact Assessment System", this Regulation is issued.

Article 2 - The objectives of this Regulation are:

- a) Organize, coordinate and regulate the National Environmental Impact Assessment System (SINEIA), establishing links between the Ministry of the Environment; the entities of the public, private and international sectors.
- b) Ensure that the plans, policies, programs and projects, industrial facilities or any other public or private activity susceptible to pollute or degrade the environment, are subject to an environmental impact assessment in order to avoid damage to the environment.
- d) Apply the policies, rules and procedures that update SINEIA in line with the economic, political, social, legal, cultural and environmental situation of the country, always seeking the compatibility of development and the environment.

Article 33 - Every public or private project must have an environmental license before starting operations. The steps to follow to obtain an Environmental License are detailed in the "Flow Chart and the Chart of Procedures for Obtaining an Environmental License", and are the following:

1. Registration and application for Environmental License
2. Project categorization and preparation of terms of reference
3. Preparation of the EIA Study.
4. Review of the EIA Study
5. Granting of Environmental License

Article 67- Once the Environmental Impact Assessment Report has been approved and the Contract for compliance with the litigation, monitoring and control measures has been signed, the Ministry of SEDA will grant the Environmental License to the Proponent.

Article 76 - Serious offenses against SINEIA will be considered:

- Start a project without having the corresponding Environmental License.
- Failure to comply with the mitigation measures, and what is established in the Monitoring Plan and Control.⁷
- Alter, falsify, modify, change, hide or lose data, facts, figures, numbers, analysis, results, reports and any oral and / or written information that allows an incorrect environmental evaluation of a project.

The SEDA will deduct the corresponding responsibility in such cases, in accordance with the Law General of the Environment, its Regulations and other applicable laws.

4.1.12 Modification of the General Environmental Law and the New Licensing Process Environmental

The amendment made in Document No. DECA-05-2002, has as its main objective the simplification and decentralization of environmental management processes and particularly with regard to the subject of environmental assessment and control.

Important modifications were made to the General Environmental Law with additions to articles 5 and 78 through the Financial Equilibrium Law and the Administrative Simplification Law.

In addition to this, we added to article 78 of the Law, three main groups of projects which are described below:

Category 1: These projects are those with the lowest environmental impact, as well as those that are part of the national rural development program and that improve the community's socioeconomic and environmental wellbeing, responding normally to activities that can be carried out without including specific environmental measures. Basically, they should be framed within the existing general regulations and comply with the regulations relevant to the processes implicit in their type of operation, generally under a municipal regulation or by the competent authorities in their area.

In order to comply with environmental legislation, these projects must report their activities to be entered in an environmental register with the fundamental objective of knowing their location and the turn of their operations, which may be subject to environmental control at any time.

The result of its registration will be an ENVIRONMENTAL REGISTRATION RECORD, without prejudice that at the request of the competent authority it must comply with some special measures.

Category 2: Projects of medium impact or with some major impacts, but fully predictable, which according to the characteristics of a type of project can be mitigated or compensated through standardized measures, as long as they are located in areas previously intervened or duly identified as appropriate for that type of activity.

These projects must present an environmental diagnosis of their project in their application for authorization, clearly identifying their location and the characteristics of their environment, with the objective

to be able to decide on its authorization to start operations, without prejudice to be subject to a subsequent evaluation, when it is deemed necessary.

The result of its management will be an ENVIRONMENTAL AUTHORIZATION accompanied by a contract of mitigation measures containing standard regulations and possibly some particular measures, according to the criteria of the competent authority.

Category 3: The projects identified as Category 3 are those with the greatest impact and which must be subject to an Environmental Impact assessment in accordance with the provisions of the SINEIA regulations, basically following the same process used to date.

In adherence to the current methodology, two subcategories are revealed, these being: Category 3-I, being those that do not require an EIA Study; and Category 3-II, which must submit an EIA Study, all of the above in accordance with the provisions of the current regulations of the National Environmental Impact Assessment System.

The result of this management is the granting of the ENVIRONMENTAL LICENSE, and the contract of corresponding mitigation measures.

Category 4: Projects that cannot be developed in our country and that basically must respond to the national development policies, legal system and existing territorial planning.

In order to identify the category to which a particular project corresponds, a double entry table has been drawn up, listing the main projects with environmental impact grouped by economic sector.

4.1.13 Technical Norms of Wastewater Discharges to Receptor Bodies and Sanitary sewer

To ensure health, improve the quality of life and water pollution, the Technical Standards for Discharges of Residual Waters to Receptor Bodies and Sanitary Sewer System were created on April 9, 1996. Below are the articles related to this study.

Article 1-The present norms are intended to:

- a) Regulate wastewater discharges to receiving bodies and sewage
- b) Encourage the creation of waste minimization programs, the installation of wastewater treatment and disposal systems, to reduce the production and concentration of pollutants discharged into the environment.

Article 3 - The present norms are of COMPULSORY OBSERVANCE in ALL THE NATIONAL TERRITORY of the REPUBLIC OF HONDURAS.

Article 4 - Any natural or legal person, public or private that carries out activities that generate discharges must comply with the provisions described in the regulations. When the discharges do not comply with the standards, the corrective measures that are necessary must be incorporated within a period of no more than 18 months, from the effective date of this Agreement.

Article 6 - Each discharge to a receiving body in direct or indirect form must comply with the general physical, chemical and bacteriological characteristics whose ranges and maximum permissible concentrations are specified in Table # 1.

Article 7 - The use of surface and / or underground water, public networks and rainwater for the purpose of diluting the discharge to the receiving body is prohibited.

Article 8 - When the users, even complying with the discharge regulations, produce concentrations in the receiving body that exceed the quality criteria for assigned use, the Regulatory Entities may demand more restrictive values on the discharge.

Article 9 - The quality parameters of the discharge to the sanitary sewer must not be greater than the maximum permissible concentrations, which are specified in Table # 2.

Article 14 - The use of surface and / or underground water, of public networks and rainwater for the purpose of diluting the discharge to the sanitary sewer is prohibited.

Article 15 - Users who discharge to the sanitary sewer will be responsible for the deterioration caused to the system.

Article 16 - The taking, storage, transport and preservation of samples must be done based on the regulations of the Secretary of State in the Office of Public Health, and in the absence of these, as established in the standard methods for the Water test and Sewage prepared by the APHA, AWWA and WEF of the United States of America, latest version.

The water samples used to determine the quality of the discharge or to verify compliance with the standards themselves, should be taken at the points and analyzed according to the parameters specified by the Regulatory Entities, so that they are representative.

Article 17 - With the purpose that the results are repetitive and comparable, the analysis of residual waters for the determination of the different parameters will be carried out in the laboratories authorized by the Secretary of State in the Public Health Offices and in accordance with the standardized methodology described in Table # 3.

Article 19 - The Secretary of State in the Office of Public Health shall exercise oversight and indicate corrective and preventive measures to comply with the provisions of these Rules and their respective regulations. The aforementioned body may request the collaboration of other public and private entities to effectively exercise surveillance. Process control to comply with the training will be the duty and attribution of natural or legal users who perform actions that contaminate the receiving bodies and in general the environment.

4.2 Site Permits and Licenses

There are specific environmental permits covering different areas of the mine complex (**Table 4-1**). 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.

Table 4-1 Environmental Permits and Licences

Environmental Permits and Licences			
Project Area / Theme	Permit	Expiration Date	Notes / Comments
Mining concession	Exploitation (mine operation) permit	2027	11,000 hectares, exploration / exploitation (operation)
Mining operations – El Mochito mine	Environmental license	Indefinite	
La Soledad TSF	Environmental license	2006	Prior to the expiration date, a renewal request was sent. In this moment, the request is still under review. The Environmental Authority has sent AMPAC a resolution accepting / receiving the request, which is being reviewed. It is expected to receive the renewal of the Environmental license in Q2-2019.
Lead and zinc concentrate storage areas	Environmental license	Jun-19	The request for renewal of this license will be presented this month. All of the mitigation measures comprised in this permit have been implemented. The renewal of the permit is expected in Q3-2019.
Water source – springs	National waters use permit	2017	Prior to the expiry of the permit, its renewal was requested through the submission of the hydrological study update. AMPAC is currently waiting for the renewal.

4.2.1 Mining Concession

Is the permit that allows exploitation/ exploration activities, it includes 10,998.74 hectares. This permit is granted by the mining authority INHGEOMIN, and is valid through 2027.

4.2.2 Mining Operations Environmental Permit

This permit, issued by SERNA, covers the mine, mill, workshops, El Bosque TSF and Pozo Azul TSF. The application process for the permit commenced in 2003. The contract between the government and AMPAC, the subsidiary of Ascendant, was signed off in 2006 and the environmental agency carries out inspections to verify the compliance of every mitigation measure. 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 biannual reports to the government, as required.

SERNA issued the *Environmental Certificate for Mining Operations* on May 8, 2018. This permit was granted for an indefinite period. El Mochito checks with SERNA on a regular basis to confirm compliance.

4.2.3 Environmental Licence for La Soledad TSF

An environmental licence for the La Soledad TSF was issued by SERNA in 2004. The licence expired in 2006 and a renewal request was filed and received by SERNA before the expiry date. The renewal was approved in 2016 and the mitigations measures were also updated with no major changes. 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. The formal renewal certificate will likely be issued in Q2-2019.

4.2.4 Concentrate Storage Building Permit

El Mochito owns a concentrate warehouse in Puerto Cortés. This facility has an environmental licence granted by the Municipal Environmental Department of the Port, which was issued in 2014 and is valid for five years. The renewal request was already submitted and it is expected to receive the renewal certificate in Q3-2019.

4.2.5 Water Use Permit

The General Directorate of Water Resources (“DGRH”, a division of SERNA) is charged with the responsibility of the utilization and management of water resources. DGRH has given a resolution approving the issuance of the permit for the mine. This permit is currently being renewed.

5.0 PHYSICAL ASPECTS

The current operating TSF, La Soledad, was built in 2007. Prior to its construction, an Environmental Impact Assessment was performed in 2006. Since the construction of the La Soledad TSF, there has been no significant land disturbance. Most of the existing setting conditions described hereafter have been extracted from the La Soledad TSF EIA, baseline sections, unless otherwise indicated.

5.1 Geology and geomorphology

In the overall project area, one can find two geological groups: the Valle de Ángeles Group and the Yojoa Group. The geological group Valle de Ángeles includes the Río Chiquito (Krc) formation, which comprises red layers of fine texture, consisting in shales, limonites, sandstones and some layers of quartz conglomerates of quartz. The depth of occurrence of this formation varies approximately from 400 to 800 masl, but faults and erosion can increase its exposure.

The second identified geological unit was the Yojoa Group (Ky), which comprises of the Atima formation consisting in a sequence of massive limestone rocks of dark gray color with thin shale between the layers. The depth of occurrence of this group is greater than 500 meters above sea level.

The geomorphology of the area is characterized by valleys and hills with a depression point at Lake Yojoa.

5.2 Soils

Two series of soils were identified in the project area: the Naranjito soils and the Chandala soils.

The Naranjitos soils are the most extensively distributed in the area, located in both the higher and lower altitudes. They are moderately deep, with predominantly fine textures, moderately well drained with a slope greater than 30%. Their color is reddish to reddish brown, with moderate content of angular gravel and larger size rocks. They originate in shales and red sandstones as well as yellowish limonites.

The Chandala soils identified in the area are moderately deep soils, moderately well drained, of medium and fine textures, moderately eroded. They present slopes greater than 30%. These soils originate in sedimentary rocks comprised of red yellow shales with calcareous rocks and limestones.

5.3 Hydrology

The La Soledad TSF is located in a small drainage basin spanning 123 ha. The drainage basin is comprised within the watershed of the Raices and El Palmar creeks. The watershed outlet is at a site known as El Rincon which discharges into Lake Yojoa, approximately 5 km downstream of the TSF, following the junction of the Raices Creek and the El Palmar creek. The head of the catchment area is located at Piedras de Afilas at 1150 meters above sea level and its lowest point is El Rincon at 680 masl, for a difference in elevation of 470 m. The drainage pattern is to the Northeast.

Due to its small area, the drainage basin of the TSF runs dry in the summertime. El Palmar creek in the project area is only intermittent. The main permanent watercourse within the project area is Raices creek. It receives the mine and TSF discharges. This will be discussed in greater detail in the water quality and quantity section.

5.4 Air Quality

As no formal air quality baseline studies had been conducted for the mine, a specific air quality monitoring campaign was carried out between November 26 and 28, 2018, under normal mine operation, to establish a baseline of emissions generated by the operations, and for the expansion project.

Two sites were selected based on meteorological conditions and proximity to potential emission sources. For each selected site, the following parameters were measured:

- PM10 concentration;
- PM2.5 concentration;
- Sulphur dioxide concentration;
- Nitrogen oxides concentration.

Meteorological conditions at the time of the sampling were recorded: ambient temperature, barometric pressure, wind direction and speed.

The two sampling points selected are the following:

- Bonanza, which is located 30 meters to the North-Northeast (NNE) of the mine tunnel ventilation duct outlet;
- ESEM, which is located at an approximate distance of 970 meters east-northeast (ENE) of crushing operations.

The selection criteria for these two sampling points were:

1. Located near potential emission sources;
2. Located outside of the El Mochito mine limits;
3. Located near communities;
4. Subject to security surveillance and electric connections.

Results were compared to the *Regulation for the Control of Emissions Generated by Fixed Sources* in Honduras (specifically related to ambient air quality in sensitive areas) as well as the IFC EHS Air Quality Guideline.

Table 5-1 IFC General EHS Guidelines- Air Quality (2012)

	Averaging Period	Guideline value in $\mu\text{g}/\text{m}^3$
Sulfur dioxide (SO ₂)	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)
	10 minute	500 (guideline)
Nitrogen dioxide (NO ₂)	1-year	40 (guideline)
	1-hour	200 (guideline)
Particulate Matter PM ₁₀	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)
Particulate Matter PM _{2.5}	1-year	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)
	24-hour	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)

Table 5-2 Results of Ambient Air Quality Monitoring – El Mochito Mine

Parameters	BONANZA	ESEM	Honduras	IFC
Particulate material (PM10) $\mu\text{g}/\text{m}^3$	4.15	33.4	150 ¹	150 ¹
Particulate Material (PM 2.5) $\mu\text{g}/\text{m}^3$	14.0	20.0	65	50 ¹
Sulfur dioxide (SO ₂) $\mu\text{g}/\text{m}^3$	4.81	4.89	125 ¹	125 ¹
Nitrogen oxides (NO _x) $\mu\text{g}/\text{m}^3$	4.53	2.88	200 ²	200 ²

Notes:

1. Average 24 hours
2. Average 1 hour

All ambient air quality parameters are found below applicable Honduran and IFC Guidelines. An ambient air quality monitoring program will be put in place as a result of this ESIA.

5.5 Noise and Vibration

Noise surveys were conducted in March and April of 2014 and February of 2015 at El Zapote part of town; and in October 2015 at El Mocho town. The noise measurements were conducted during day time at El Zapote and during daytime and night time at El Mocho. Seven monitoring points were sampled at El Zapote (corresponding to the substation, some houses and the border with El Mocho); and thirty-three monitoring points were sampled at El Mocho (including near houses and streets).

The noise survey provided the following observations:

- Daytime noise levels on average at El Zapote vary between 56.8 and 73.7 dB(A). The latter measurement was taken in April and the author of the study mentions that it is naturally occurring cicada beetles (in season) and that their choirs are very noisy are the main contributor to the rise in noise levels;
- Daytime noise levels at El Mocho varied between 40.1 and 73.1 dB(A). Nighttime noise levels varied between 37.1 and 82.1 dB(A). The higher levels of noise were recorded on the street and caused by motorcycles and motorcycle-taxis used by the general public.

A site visit by Hemmera’s team dated March 13 to 16, 2019 could confirm the results of the noise monitoring study: namely, high levels of noise were observed in the towns, mainly caused by local motorcycle taxis.

The results of the noise monitoring study were compared with the IFC EHS Noise Level Guideline (2012).

Table 5-3 IFC EHS General Guidelines – Noise (2012)

Table 1.7.1- Noise Level Guidelines ⁵⁴		
Receptor	One Hour L _{Aeq} (dBA)	
	Daytime	Nighttime
	07:00 - 22:00	22:00 - 07:00
Residential; institutional; educational ⁵⁵	55	45
Industrial; commercial	70	70

Based on the comparison with the IFC noise guidelines, some ambient noise levels in the town are beyond the commercial guidelines. For the most part however, the ambient noise levels in the nearby towns are between residential and commercial levels irrespective of contribution from the mine. In order to better understand the levels of noise, a noise monitoring program will be put in place as a result of this ESIA.

5.6 Water Supply and Use

5.6.1 Water supply

AMPAC has three sources of water supply located within the same watershed. One of them is used for the process plant and to feed the city of Las Vegas and the other two are for domestic uses in the camp and populations near the mine. The water sources are located in a wooded property owned by AMPAC. The forest and land comprising the watershed of the water source are permanently protected to avoid deforestation and water pollution. This area is known as El Manantial. The first source is superficial and is called "Montevideo" (see **Photo 5-1**), the rest are springs sourcing in the aquifer where collector piles have been installed, these sources are called tomb 1 and tomb 2 (see **Photo 5-2**) The way the supply works is that the springs are located at the head of the watershed at a higher altitude where some water is sourced, the surface overflow then descends down to a lower altitude into a storage basin, where the remaining water is sourced.



Photo 5-1 Montevideo Storage Basin

During the month of October in the rainy season, the quantity of water sourced averages 3,060 gal/min at Montevideo, 750 gal/min Tomb 1, and 750 gal/min Tomb 2.

A 12" diameter pipe connects the Montevideo storage basin to a storage tank at the mine (called the "Hotel" supply tank). Another 8" diameter pipe connects the storage basin to the City of Las Vegas, Santa Barbara.

A 12" diameter pipe connects Tomb 1 to the Chimbo overflow where two pipes split in different directions: one towards the community of San Juan (3" diameter pipe) and the other 8" diameter pipe towards the storage tank that supplies the mine camp.

A 6" diameter pipe connects Tomb 2 to the storage tank for community of upper El Mocho. From there a 4" diameter pipe connects it to storage tanks 1 and 2 that supply the community of lower El Mocho, the community Colonia 21 Octubre and the sand fill plant.



Photo 5-2 Collector Piles in the Tombs Area and Pipes

There are several storage tanks used for water supply within the AMPAC fresh water supply system, including:

- I.4.1 Hotel Tank: Provides water to the concentrator plant and has a capacity of approximately 26,000 gallons;
- I.4.2 Tank located near the residence of the Company Manager: Supplies water to the entire employee mine camp, with a capacity of approximately 25,000 gallons;
- I.4.3 upper El Mocho Tank: Provides water to the community of upper El Mocho with a capacity of approximately 10,000 gallons;
- I.4.4 Tank No.1: Provides water to the community of lower El Mocho with a capacity of approximately 5,000;
- I.4.5 Tank No.2: Supplies water to the community of Colonia 21 de Octubre and to the sand fill plant and security office, with a capacity of approximately 5,000 gallons.

5.6.2 Water Consumption

Water is used for two purposes at El Mochito: industrial for its various production processes and domestic in the mine camp facilities. In addition to this, El Mochito provides fresh water for domestic use in the communities of San Juan, El Mocho (upper and lower), Colonia 21 de Octubre and the town of Las Vegas. This water is provided at no charge to the communities.

It is estimated that on average, the domestic water use by the mine is on average 217 gallons/minute, whereas the current process plant water use is on average 900 gallons/minute. Following the expansion project, a lot more of the mine dewatering water will be reclaimed for process because of the installation of the new pumps and water clarifier, and some of the tailings dam water will be reclaimed. The objective is not to need any make up water from the fresh water supply, unless reclaimed and recycled water loses its electrolytes, in which case, some make up freshwater will be needed.

The community freshwater use is estimated at 500 gallons/minute.

5.7 Water Quality, Quantity and Aquatic Habitat

5.7.1 Introduction

The spatial boundaries for the water quality and aquatic resources assessment will encompass the watercourses expected to receive direct and indirect mining-related drainage in this area while reference sites will be placed at least 1 km upstream from any potentially related impacts. Care will be given to ensure limited or no anthropogenic activity is near any reference site. Multiple reference sites may be required to account for the different morphologies in the watercourses.

5.7.2 Raices and El Palmar Creeks

The Raices creek is the main collector of several streams that descend from the Mountain La Leona, at an altitude of 2,400 meters above sea level, collecting the waters of several streams such as the del Macho creek and Piedras Amarillas creek before taking the name Raices creek and joining with El Palmar creek. The El Palmar creek is limited in its eastern side by a depression which makes its catchment somewhat rectangular in shape, and is only an intermittent creek, flowing in rainy season.

The hypsometric curve characteristics of the watershed of Raíces creek is shown in **Figure 5-1**, where it can be seen that 50% of the area is above 2,000 masl.

The Palmar creek is totally linear and goes from 1,200 to 700 masl where it joins the Raices creek.

The differences of elevations within the Raices watershed vary between 2,000 and 2,500 masl and between 980 - 800 masl for El Palmar.

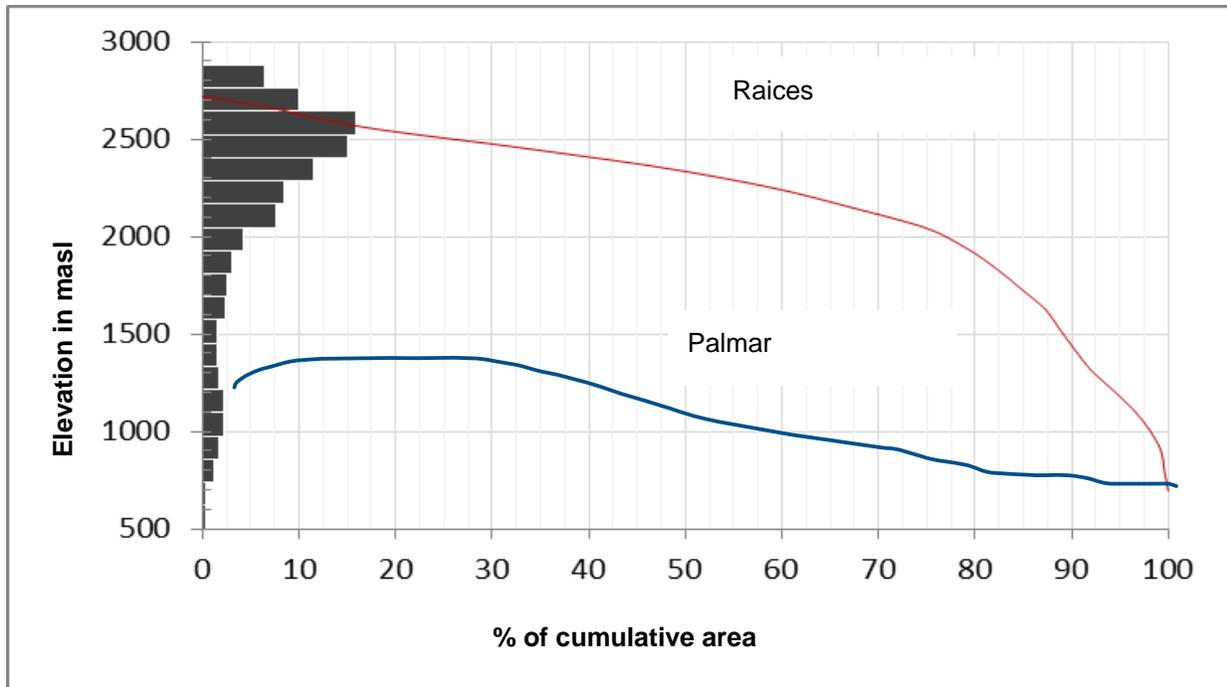


Figure 5-1 Elevation and Hypsometric Curves of Raices creek and Palmar Creek

5.7.3 Water Quantity

FLOW - EL MOCHITO L/S													
STATIONS	LOCATION	January	February	March	April	May	June	July	August	September	October	November	December
1	Upstream Mine	7.0	8.8	8.8	4.4		6.6	7.2	8.8	19.5	21.0	11.2	8.8
2	Downstream Mine	15.6	10.4	12.8	12.0	2.8	5.5	25.0	32.5	40.0	42.5	24.0	19.5
3	Upstream Concentrator	32.0	24.0	25.5	27.0	16.5	26.0	32.0	30.0	45.0	48.0	24.0	12.0
4	Downstream Concentrator	54.0	34.0	38.0	36.0	17.0	63.0	60.0	28.0	32.0	36.0	36.0	44.0
12 LS	Caliche discharge – sedimentation basins	667.9	674.0	701.8	680.3	665.6	645.7	686.1	721.5	747.2	732.1	734.2	740.8
14	Upstream Caliche and Soledad discharges	33.6	31.1	24.2	21.6	15.2	136.0	109.7	381.0	318.4	455.1	217.9	77.6
16	Downstream Caliche and Soledad Discharges Raíces	118.3	42.5	24.5	42.5	70.0	111.0	123.0	261.3	342.0	306.0	166.0	189.0
17	Upstream Lago de Yojoa	348.8	482.4	513.0	413.4	400.0	973.0	63453.0	70830.0	40064.5	41959.5	41218.8	679.4
18	Downstream Caliche	309.3	260.0	330.0	320.0	464.8	501.7	552.0	760.0	793.0	721.5	864.3	828.0
103	Upstream Soledad discharge Palmar	10.0	12.5	1.8	dry	dry	44.8	21.7	58.1	66.0	98.6	27.9	10.7
104	Downstream Soledad discharge Palmar	19.1	22.9	2.2	dry	dry	100.6	33.7	78.8	134.8	183.2	96.6	17.8
105	Discharge Soledad - Palmar	0.8	dry	dry	1.7	0.8	8.2	40.5	156.1	423.23	680.8	1067.3	0.0
105R	Discharge Soledad - Raíces	51.5	82.3	85.0	46.3	47.2	63.0	1963.7	2166.8	1510.5	1168.7	1715.5	1517.3

Figure 5-2 Flow Data within Area of Influence

5.7.4 Water Quality

El Mochito has been sampling surface water since the year 2000 to monitor any changes in water quality that may be caused by the mining operations and TSF discharges. The following parameters have been sampled:

- **Physiochemical, including metals** - pH, oxygen, conductivity, temperature, salinity and alkalinity, Silver (Ag), Cadmium (Cd), Chromium (Cr), Copper (Cu), Mercury (Hg), Lead (Pb), Manganese (Mn), Tin (Sn), Tellurium (Te), Wolfran (W), Zinc (Zn), Arsenic (As), Cadmium (Cd), Cobalt (Co), Mercury (Hg), Nickel (Ni) and Selenium (Se);
- **Ecotoxicology**, *Daphnia magna*.

The objective of the water quality sampling program has been to assess what conditions are upstream of the area of influence of the project (upstream of mine and TSF discharges); compare with the conditions throughout the area of influence caused by the mine and TSF discharges (currently the La Soledad TSF discharges); as well as downstream conditions.

The results of eight sampling stations covering the Raices Creek and the El Palmar Creek are described in this section. **Figure 5-3** and **Figure 5-4** show photos and location for the stations.

- Station 1: Upstream of Mine
- Station 2: Raices Creek, closed Bosque TSF area
- Station 3: La Soledad TSF discharge
- Station 4: Caliche discharge
- Station 5: Raices union with El Palmar creek
- Station 6: El Palmar creek upstream of the La Soledad TSF discharge
- Station 7: El Palmar La Soledad TSF discharge (rainy season)
- Station 8: El Palmar downstream of the La Soledad TSF discharge.



Figure 5-3 Water Quality sampling stations photos

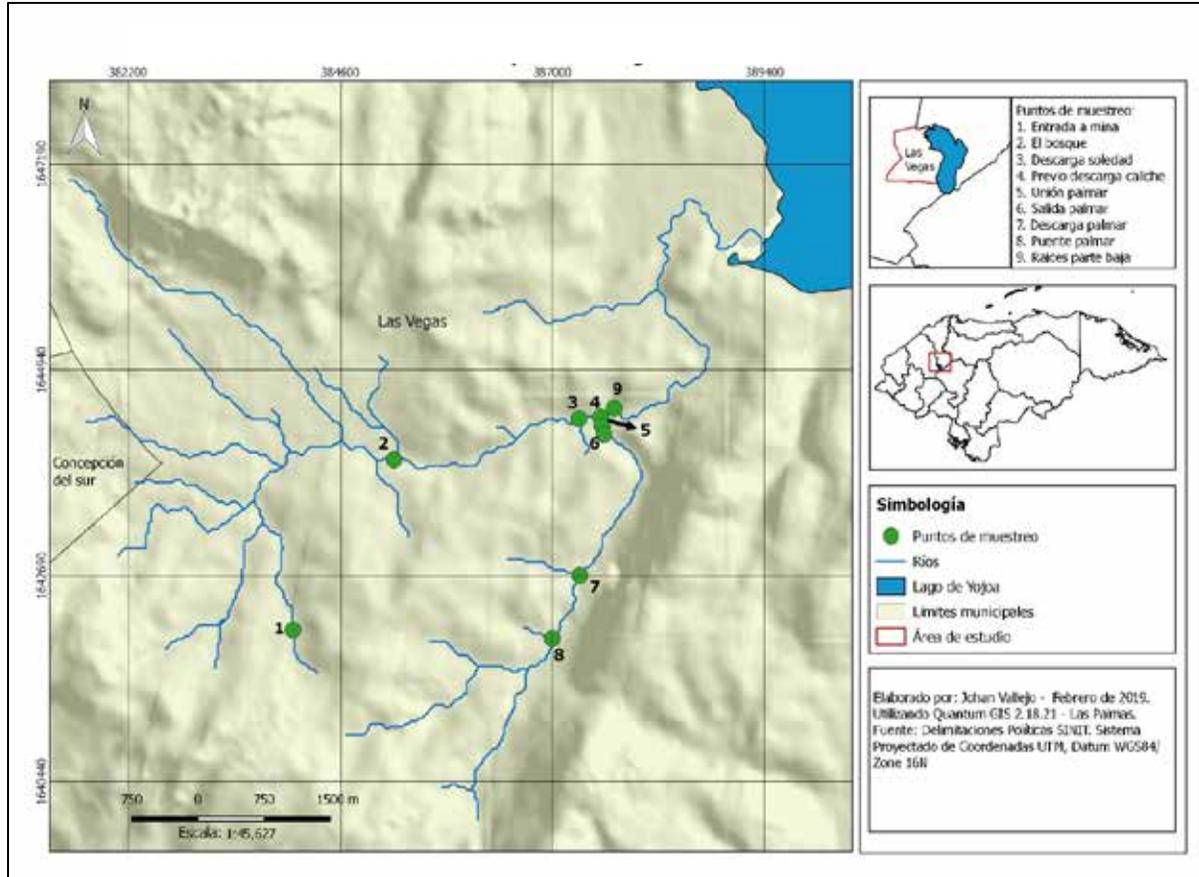


Figure 5-4 Water Quality Sampling Stations Location

5.7.4.1 Physicochemical Parameters

Parameters such as dissolved oxygen decreased from upstream to downstream of the mine and TSF discharges. In general, the values are above 60% and 7.4 mg / L, except for the mine water discharge Caliche, where it drops below 7mg / L.

Temperature records indicate that temperature increases from upstream of the mine towards the discharges. Conductivity is greater at the La Soledad TSF discharge point, as well as the salinity and the total dissolved solids (TDS). The pH is slightly alkaline, showing a higher value at the El Bosque TSF as well as in the La Soledad TSF where values vary between 7 and 9.

The chemical oxygen demand at the five points is below 2 mg / L.

All parameters measured with the exception of the temperature differential between discharge and creek are below Honduran and IFC Mining Effluent guidelines. The temperature differential recommended by IFC EHS Mining Effluent guideline is less than 3 degrees C.

Grease and oil have been monitored for internal purposes only to-date, but will be added formally to the monitoring program going forward.

The following figures and table present the results for the physicochemical parameters.

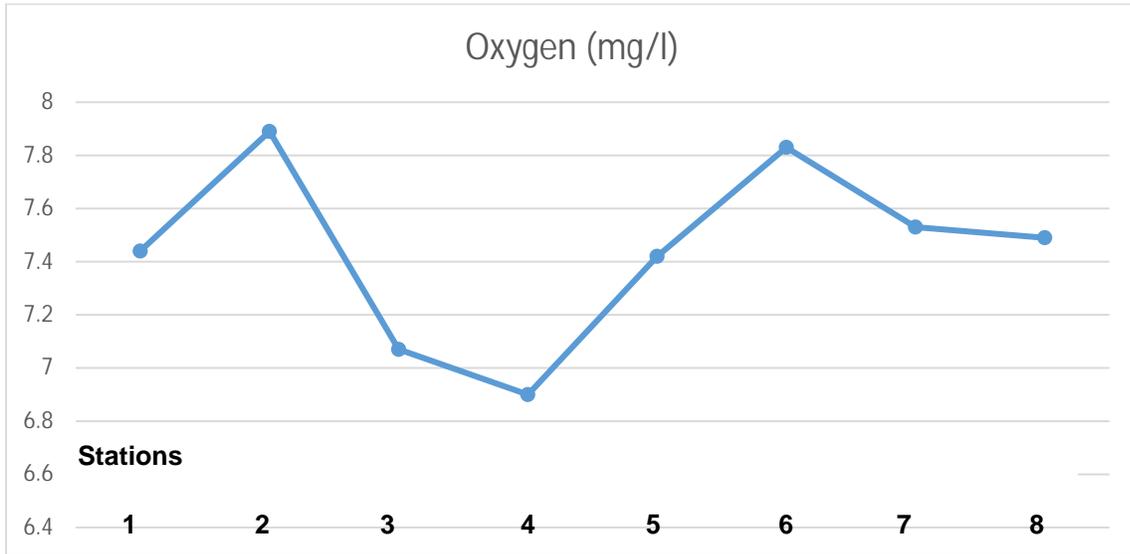


Figure 5-5 Dissolved Oxygen

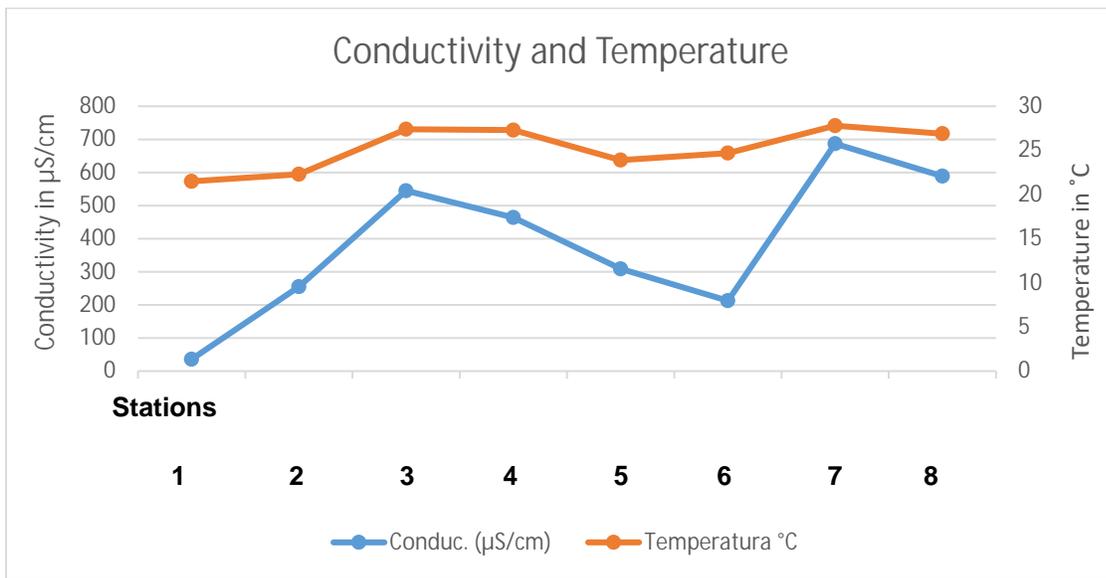


Figure 5-6 Conductivity and Temperature

Table 1. Effluent Guidelines		
Pollutants	Units	Guideline Value
Total Suspended Solids	mg/L	50
pH	S.U.	6 – 9
COD	mg/L	150
BOD ₅	mg/L	50
Oil and Grease	mg/L	10
Arsenic	mg/L	0.1
Cadmium	mg/L	0.05
Chromium (VI)	mg/L	0.1
Copper	mg/L	0.3
Cyanide	mg/L	1
Cyanide Free	mg/L	0.1
Cyanide WAD	mg/L	0.5
Iron (total)	mg/L	2.0
Lead	mg/L	0.2
Mercury	mg/L	0.002
Nickel	mg/L	0.5
Phenols	mg/l	0.5
Zinc	mg/L	0.5
Temperature	°C	<3 degree differential
Note: Metals concentrations represent total metals.		

Figure 5-7 IFC Mining Guideline - Effluent

Monitoring Stations	COD mg/L
Station 1	< 1
Station 2	2
Station 3	2
Station 4	< 1
Station 5	< 1
Station 6	< 5
Station 8	< 5

Figure 5-8 Chemical Oxygen Demand

Table 5-4 Physicochemical Parameters – Water Quality

Stations	Temperature °C	Oxygen (mg/l)	pH	Conduc. (µS/cm)
Station 1	21.5	7.44	8.2	35.9
Station 2	22.3	7.89	8.3	255
Station 3	27.4	7.07	8.5	545
Station 4	27.3	6.9	8.4	464
Station 5	23.9	7.42	8.4	309
Station 6	24.7	7.83	8.38	212.5
Station 7	27.8	7.53	8.2	687
Station 8	26.9	7.49	8.19	589

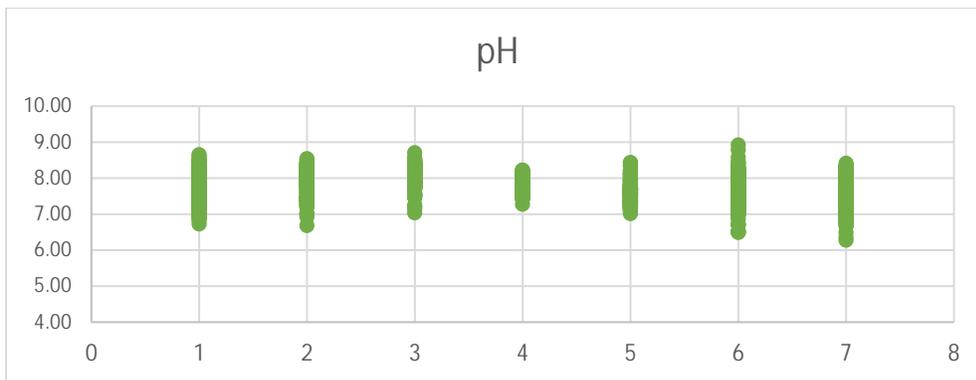


Figure 5-9 pH results for the La Soledad TSF discharge

5.7.4.2 Metals

In order to comply with the guidelines for compliance with the Honduran standards as well as the IFC EHS Mining Effluent Guidelines, metal contents in the discharges as well as within the receiving environment are monitored.

Given the nature of the mine, the priority metals monitored are: Lead, Zinc, Iron and Copper (**Figure 5-10**).

It is important to note that the values of iron in general within the country exceed the values shown in these results, especially during the rainy season, since they are associated with the type of soils, which are predominantly composed of clays and ferrous minerals.

All of the metal concentrations are below the Honduran and IFC EHS Mining Effluent Guidelines. Note that arsenic, chromium (VI), and phenols are not monitored as they are not related to the processing at El Mochito nor required by permit.

Meses	pH (6.0 - 9.0)	Solidos (ppm) < 100	Pb (ppm) < 0.500	Zn (ppm) < 2.000	Cu (ppm) < 0.500	Fe (ppm) < 1.000
1	7.63	14.99	0.09	0.12	0.21	1.14
2	7.93	17.09	0.10	0.13	0.16	1.26
3	8.04	14.63	0.09	0.12	0.18	0.99
4	7.88	11.39	0.09	0.11	0.10	0.89
5	7.58	11.90	0.10	0.13	0.18	0.92
6	7.56	14.31	0.10	0.12	0.08	1.14
7	7.48	18.31	0.09	0.16	0.11	1.41
Total General	7.73	14.68	0.09	0.13	0.15	1.10

Figure 5-10 Metal Concentrations at the Stations

5.7.5 Water Quality Summary

The following table shows the average annual results for the year 2018.

Table 5-5 2018 Water Quality Parameters Averages

PARAMETERS (ppm)	Station 1	Station 2	Station 3	Station 4	Station 5
TEMPERATURE	19.7	21.9	26.2	26.3	25.1
PH	7.7	8.1	7.6	8.0	8.0
ARSENIC	<0.030	<0.030	<0.030	<0.030	<0.030
CADMIUM	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
COPPER	<0.020	<0.020	0.21	<0.020	<0.020
CYANIDE	NA	NA	<0.0050	<0.0050	NA
IRON	0.52	0.09	0.22	0.42	0.51
LEAD	<0.030	<0.030	<0.030	0.162	0.15866
MERCURY (ug/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.020
NICKEL	<0.020	<0.020	<0.020	<0.020	<0.020
ZINC	0.01	0.02	0.04	0.17	0.17
TSS	27.76	NA	4.68	41.36	6.80
COD	<5	NA	< 5	<5	<5
BOD	3	NA	4	4.8	5

The temperature differential between the Caliche and La Soledad discharges and the Raices creek (receiving environment) is above 3 degrees.

5.7.5.1 Ecotoxicology

Ecotoxicology was evaluated with the objective of studying the effect of the water quality on living organisms. The methodology was based on *Water Quality – Determination of the inhibition of the Mobility of Daphnia Magna*, International Standardization Organization, 1992 and was carried out by CESSCO laboratory.

The results obtained for the five sampling stations show that at an EC50-24hours, 0% of individuals were inhibited. The samples therefore do not present toxicity to *Daphnia Magna*.

5.8 Identification and Evaluation of the Main Physical Impacts and Prevention, Improvement and Mitigation Measures

Based on the Expansion Project’s interaction matrix with VECs, there are three VECs that will be impacted by the Expansion Project:

- Air quality
- Noise
- Water (quality and quantity)

The following table summarizes the impact assessment of the Expansion Project on these VECs.

Table 5-6 Physical VECs Impact Assessment

VEC	Value	Magnitude	Scope	Duration	Significance
Air quality	Medium	Low	Site	Medium	Low
Noise	Low	Low	Site	Medium	Low
Water (quality and quantity) for mining operations in general	High	Medium	Local	Medium	High
Water (quality and quantity) for expansion	Low	Medium	Local	Medium	Medium

5.8.1 Air Quality Effects Assessment

The “component value” for air quality measures the component’s importance in the functioning of the ecosystem and/or the socioeconomic system in the study area.

Based on documented judgments by national and international organizations and experts, and the results of field studies conducted during the assessment, the component value for air quality is deemed to be medium, in that it plays an important role both in the health of people and that of wildlife.

The Expansion Project will see the installation of a new dust collection system in the laboratory, the installation of a wash plant at the crusher as well as a potential increase in ore production and therefore truck traffic.

It is estimated that there will be a net positive impact on air quality caused by dust suppression (laboratory dust collector and crusher wash plant) and the reduction in particulate matter in the air versus the slight increase in truck traffic and potential GHG emissions. It is also believed that the latter will be offset by the upgrading of process plant equipment.

The effect on air quality is deemed to be either low positive or low negative. The following air quality measures are proposed for optimizing the positive impacts and minimizing the negative ones. These mitigation measures are based on technical solutions envisaged by El Mochito in its project planning, on

the one hand, and on team members' expertise and suggestions from the stakeholders consulted, on the other hand. Many of the measures listed in the IFC EHS Mining Guideline (2012) will also be applied.

1. During the detailed engineering and construction phases, engineering controls for atmospheric emissions as identified in the deliverables from the feasibility study will be developed and implemented in order to meet the first intermediate targets or IFC guidelines.
2. Ensure that electrical generators meet IFC criteria are built and operated so as not to increase gas and particle emissions to levels exceeding the first intermediate targets or IFC guidelines. These also need to conform to the Honduran Regulation for the control of emissions by stationary sources, Executive Agreement No. 1566-2010.
3. Atmospheric emissions (SO₂, NO_x, NO₂) and particle emissions (PM₁₀, PM_{2.5}) will be measured during construction and operations by means of a station incorporating continuous weather data and installed at one of the locations previously used for air quality monitoring, namely the closest point in the town to the crusher, as well as a new station located close to the process plant and the ore storage sheds.
4. Passive samplers will be used near mining areas to confirm the NO_x/NO₂ results.
5. The Honduran Governmental agencies also requested that a Monitoring Plan be carried out in the crusher area to monitor the following environmental variables: generation of noise, emission of particulates and emission of gases.
6. The Honduran Governmental Agencies also requested that monitoring of gas emissions to the atmosphere and particulates be performed in the Bonanza area and near the mine entrance.
7. Additional mitigation measures will be applied as necessary:
 - increasing the use of water-spray dust control;
 - increasing maintenance and cleaning around dust-producing areas;
 - enclosing emissions sources;
 - wind shielding when possible;
 - storage and handling of dust generating materials inside.
8. In addition to this, and specific to GHS emissions:
 - El Mochito will produce an annual GHG emissions report based on its report of fuel consumption in the previous year.
 - The mine will ensure implementation of an efficient preventive maintenance program including period calibration of dryers and scrubbers.
 - El Mochito will make sure that all equipment and vehicles are kept in good working order.
 - The mine will optimize vehicle and equipment movement to minimize travel and idling time.
 - Fuel consumption and performance will be taken into account when new equipment and vehicles are purchased.

5.8.2 Noise Effects Assessment

The “component value” for noise measures the component’s importance in the functioning of the ecosystem and/or the socioeconomic system in the study area.

Based on documented judgments by national and international organizations and experts, and the results of field studies conducted during the assessment, the component value for air quality is deemed to be low, in that it plays marginal role in the functioning or the nearby towns as these already exhibit an intrinsically high level of noise whether caused by anthropogenic sources such as the motorcycle taxis, or even by the presence of seasonal wildlife in such abundance that they contribute to the high levels of noise (insects, birds, amphibians).

The Expansion Project will see an increase in underground blasting, particularly during the construction period, but also an upgrading/optimizing of plant equipment as well as an increase in ore production and therefore truck traffic. Moreover, the increase in workforce and employees will thereby indirectly increase the need for transport via cars or motorcycle taxis.

It is estimated that there will be a net low negative impact on noise caused by a slight increase in traffic (trucks, cars, taxis).

The effect on noise is deemed to be low negative. The following noise mitigation measures are proposed for minimizing negative impacts. These mitigation measures are based on technical solutions envisaged by El Mochito in its project planning, on the one hand, and on team members' expertise and suggestions from the stakeholders consulted, on the other hand. Many of the measures listed in the IFC EHS Mining Guideline (2012) will also be applied.

1. El Mochito will continue to ensure that all equipment and vehicles are kept in good working order along with their noise reduction systems.
2. El Mochito will continue to maintain all its roads so that they are free of potholes and other irregularities.
3. The Honduran Governmental agencies also requested that a Monitoring Plan be carried out in the crusher area to monitor the following environmental variables: generation of noise, emission of particulates and emission of gases.
4. El Mochito undertakes to implement mitigation measures when the noise levels produced by operations increase the baseline ambient sound level by more than 3 dBA or exceed the IFC guidelines; such measures include:
 - Implement a noise management and monitoring plan to better understand inherent noise levels and the project contributions;
 - ordering studies to ensure at-source noise reductions on mining equipment.

5.8.3 Water Effects Assessment

The "component value" for the water component measures the component's importance in the functioning of the ecosystem and/or the socioeconomic system in the study area.

Based on documented judgments by national and international organizations and experts, and the results of field studies conducted during the assessment, the component value for water is deemed to be high, in that it could not be impacted without compromising the functioning of the ecosystem and the socioeconomic system. In fact, the local towns' and process plant water supplies originate from the same spring (in fact both an aquifer and surface headwater source), moreover, the municipal water sewage plant along with the project mine water and La Soledad TSF discharge in the Raices creek. In addition to this, groundwater seeps into the mine underground structures and is pumped to surface,

feeding portions of the process. Water is necessary to both people and to the mining process and process plant activities. Finally, the Raices creek is habitat to various aquatic resources and provides a multitude of ecosystem services which will be confirmed through further ecological and consultation studies.

In order to better understand the nature of impacts on water and aquatic resources, it is necessary to take a step back and look at the overall way that water is managed by the mine. Existing operating conditions see approximately 900 gal / minute of freshwater feeding the process, whilst approximately 9,000 gal / minute of dewatering mine water is discharged through the Caliche tunnel to the Raices creek and approximately 900 gal / minute is discharged from the La Soledad TSF to the same creek. In addition to this, there is also a rainy season discharge from the TSF to El Palmar creek (period when it is flowing). The latter creek does converge with the Raices creek downstream of these discharges. As could be seen through the water quality description, the water quality of the discharge does not appear to pose a significant impact to the receiving environment water quality, but the volume of water discharged is considered a significant effect. Raices creek flows at a rate of approximately 500 gal / minute on average in the dry season and 4200 gal / minute on average in the rainy season upstream of the project discharges. Its volume is therefore augmented many fold by the project discharges and transformed into a river during the dry season. During the wet season this impact is of lower magnitude against a higher flow rate in the river, in essence the volume is doubled. To be clear, these are the existing operating conditions and not pertaining to the expansion which anticipates a reduced discharge from the tailings dam and the same discharge volume from the mine. Through this assessment, some mitigation measures will be proposed in order to better understand this effect and in order to mitigate it, in so far as possible. In terms of water quality, the project's existing monitoring program is sufficient to follow up on potential changes. This monitoring program will be modified to add IFC Mining EHS Effluent Guidelines parameters.

An aquatic habitat assessment will be performed in Raices creek to map the type of creek and habitat present upstream and downstream of the discharges. The results of this assessment will help prepare an aquatic habitat management plan.

The existing effect of the mining project on water resources is deemed to be high particularly because of the volume of water discharged to the environment. As these are existing conditions, there is a high probability that the receiving environment has entirely adapted and evolved into these conditions, in which case a closure surface water and aquatics management plan will be necessary to account for when the discharges will end.

In term of the Expansion Project's effects on water resources, these are deemed to be of a medium significance. Because of the Expansion project approximately 500 gallons / minute of freshwater sourced from the spring will not be needed. This water will therefore not be in contact with the project and ultimately end up in the Raices creek above the discharge point. The Expansion project will also reclaim 800 gal / minute of water from the Soledad TSF to eliminate the need for make-up freshwater as much as possible.

The discharge volumes to Raices creek could however increase to 10,000 gal/min, but the Caliche discharge will have less TSS because of the clarifier installed underground to clean up mine water.

The following water quality measures are proposed to optimize the positive impacts and minimize the negative ones. These mitigation measures are based on technical solutions envisaged by El Mochito in its project planning, on the one hand, and on team members' expertise and suggestions from the stakeholders consulted, on the other hand. Many of the measures listed in the IFC EHS Mining Guideline (2012) will also be applied.

The Honduran Governmental Agencies have requested that the following measures related to water be implemented:

1. To the greatest extent possible, reuse the treated water for mine activities to reduce the amount of water discharge to receiving bodies and leverage natural sources.
2. Execute an updated Soil Erosion Control Plan that contains a description of the sensitive areas, the design of mitigation and control measures and their construction.
3. Areas susceptible to water erosion and where the suspension of sediments can be generated that affect stream beds and winter channels, or infrastructures, should be protected with sediment traps (gabions, stone walls, dams and others).
4. The company must have a sediment retention system in the lower part of the mine, in order to prevent the brush residues that fall from the conveyor belt or transport vehicles, from being dragged into the Raices creek during heavy rains; the company must provide periodic maintenance to this system (system is the sedimentation ponds at the outlet of Caliche tunnel).
5. Oily residues should be collected and confined safely, in order to prevent them from coming into contact with filtered water inside the mine.
6. All waters that are in contact with the mining process must comply with the National Technical Standard for the Discharge of Residual Waters to Receptor Bodies and Sanitary Sewerage (Agreement 058, published in the Official Journal La Gaceta on December 13, 1997), at the moment of release into the environment; specifically, the El Caliche Tunnel sampling point.
7. Update the Surface and Underground Water Monitoring Plan for "El Mochito Mining Operations" including the following monitoring points and others that are considered for total heavy metals (Manganese, Zinc, Copper, Iron, Nickel, Chrome, Aluminum, Silver, Cadmium):
 - Upstream of the mine site
 - Downstream of the mine site
 - Upstream of the concentrator
 - Waters below the concentrator
 - Zona El Rincón in the Raices creek (200 meters from the confluence of Yojoa Lake).
 - Yojoa lake
 - Raices creek above the El Caliche Tunnel
 - El Caliche tunnel
 - Raices creek under El Caliche Tunnel
 - El Nacimiento
8. The company must carry out surface and groundwater quality monitoring immediately in case of spillage of tailings, immediately inform the DECA, CESCO and the Mining Authority.
9. It is strictly forbidden to accumulate solid waste of any characteristic, within and close to the facilities that may cause contamination of soil, air and water bodies or damage to infrastructure.

10. If sterile rock or brushwood is found and not used in the process, it must be placed in an area where it does not affect the water sources near communities. That storage area must be conditioned for that purpose or look for other alternatives.
11. The contamination of water and soil sources with construction wastes is prohibited. Oils and fats from machinery, vehicles and trash in general, must be placed in containers with sufficient capacity for temporary disposal.
12. To avoid contamination of surface sources E. Coli, in the construction phase (extensions) of the project temporary sanitary facilities should be established, once the work has been built in its entirety, portable latrines should be installed with adequate sanitary measures in a proportion of one (1) for every ten (10) employees.
13. Prepare a Surface and Groundwater Monitoring Plan, the purpose of this plan is to determine the quality and quantity the water that is affected by the La Soledad TSF discharge. Therefore, a scale map 1: 10,000 should be presented where the sampling points are located, with their respective UTM WGS 84 coordinates. The following physical parameters must be analyzed as a minimum: Temperature, Turbidity and Capacity of the sampling point, Chemical Parameters: Conductivity, Ph, Hardness, Color, Dissolved Oxygen, Chemical Oxygen Demand, Biological Oxygen Demand, Heavy Metals (Zinc, Cyanide, Copper, Lead, Cadmium and Mercury), Suspended Solids, Sedimentable Solids. These parameters must comply with the National Technical Standard for Discharge of Residual Waters to Receptor Bodies and Sanitary Sewerage, published in the Official Journal La Gaceta on December 13, 1997 under agreement No. 0058.

These additional mitigation measures, including to comply with IFC EHS Mining Guidelines, also apply:

14. Perform a Groundwater Study and Management Plan for the mine area as well as locally to understand the resource and better plan for its management.
15. El Mochito will continue its surface water quality monitoring program, which is designed to assess the impact of its activities on the surrounding areas. A groundwater monitoring section will be added to this program.
16. El Mochito will continue to apply its wastewater monitoring program, designed to characterize wastewater and to identify sources of contamination and ways of reducing it.
17. A green buffer of at least 50 meters, where possible, will be maintained between watercourses and operation zones to prevent soil erosion, alternatively, proper measures/ techniques will be implemented to protect the watercourse
18. Divert run-off from undisturbed areas around disturbed areas where possible.
19. Divert sediment laden water to water treatment plant or other sediment management structures including sediment ponds, infiltration trenches or silt fencing.
20. Armour water management structures to prevent erosion and improve longevity.
21. Design water management structures for appropriate return periods (e.g., 1 in 200 year rainfall event) where needed
22. Design roads with appropriate drainage and grades to minimize gradients where possible.
23. Keep revegetating disturbed areas as soon as possible.
24. Continue with the tailings dam management plan.
25. Perform regular inspections and performance audits against the plan.

5.9 Summary Presentation of the Potential and Residual Impacts

Based on the technical studies of the physical, biological and social environments in the Study Area, as well as consultation of El Mochito stakeholders, a preliminary assessment was made of the Expansion's impacts on the host environment and potential mitigation and optimization measures were identified.

The residual impact assessment used the same methodology as the one used in the preliminary assessment of potential impacts. The mitigation measures identification process was repeated until the residual impacts were reduced to the lowest level possible. In assessing the residual impact levels, it was assumed that all the mitigation measures proposed for each discipline (summarized in the ESMP) would be implemented steadily, according to an aggressive schedule and with the appropriate resources.

A fourth criterion was also applied to the assessment of residual impacts: their probability of occurrence. Although this criterion was not applied in the numerical weighting of impacts, it allows more effective prioritization of the actions in the environmental and social management plans to be developed later.

Based on the implementation of all the mitigation measures described above, the residual impacts of the Expansion Project on the physical components are deemed to be the water related effects caused by the volume of the discharges, the probability of occurrence of this effect, certainly in the nature and integrity of the stream upstream and downstream of the discharges, is certain. However, it is very likely that the receiving environment has adapted to these conditions, and therefore, another change to the nature and integrity of the receiving environment will be felt one time at Expansion but mostly at closure, when discharges will end.

In the meantime, the following ongoing studies, management plans and monitoring programs will ensure that the effects of the Expansion remain as low as possible, and that guidelines, including IFC EHS Guidelines and Performance Standards are followed, in so far as practicable.

- Implement a Groundwater Study and Management Plan for the mine area as well as locally to understand the resource and better plan for its management;
- Add groundwater sampling stations to the Water Quality Monitoring programs, where possible;
- Add the following water quality parameters to the Water Quality Monitoring programs: oil and greases.
- Implement an Aquatic Habitat Study and Management Plan to understand the resource within Raices creek as well as the downstream Habitat resulting from the discharges (note: initiated April 2019).
- Update mass water balances for the project overall and identify as many opportunities for re-use of water as possible. A study dedicated to the use of mine water will be implemented.
- Consolidate a Water Management Plan to include reference to Water Diversions, monitoring, and sedimentation and temperature control measures.

6.0 **BIOLOGICAL ASPECTS**

6.1 **Habitats and Ecosystems Including Ecosystem Services**

The following biological existing conditions description has been produced through a desktop study as well as sourcing information from the La Soledad TSF EIA and the (potential future) Douglas Area biodiversity report. The study area is located in the east-central site of Honduras, east from the National Park Santa Barbara. The project area is located to the drainage system of La Soledad, winter runoff, tributary of the Jutal Creek (also called El Palmar Creek). It is located approximately 3 Km east of the mine and 1 Km south of the Colas de Pozo Azul dam with elevations between 750 and 900 mamsl, with slope gradients of 30 to 50 percent.

The Project area, based on Holdridge Life Zone classification system, is classified as a super-humid subtropical rain forest, characterized by having an average annual precipitation of 2,000 to 4,000 mm and temperatures ranging from 18 to 24 °C. This life zone covers most of the watersheds feeding the lake Yojoa until reaching an altitude of 1,500 mamsl. The remnant forested areas that can still be observed in the project area is stratified with three to four layers of vegetation, limiting almost completely the incidence of sun light. Additionally, the low evaporation rate and low temperatures in this zone results in high humidity favouring the growth of epiphytes such as lichens and bromeliad plants. The taller trees in the area can reach from 30 to 60 m in height.

Small patches of broadleaf forest can also be found in the project area containing few large trees associated with epiphytic species, and minimal undergrowth, composed of small woody species and the majority are coffee crops. However, livestock, agriculture and deforestation has increased the forest fires modifying and even destroying the primary forest that characterize this ecosystem. Some of the most common species in this live zone are breadnut (*Brossimum alicastrum*), Brazil beauty-leaf (*Calophyllum Brasiliense*), laurel (*Cordia alliodora*), ironwood (*Dialium guianense*). Pine forest can also be found in this life zone with Caribbean pine (*Pinus caribaeae var. hondurensis*) the most common conifer in the area, distributed in lowlands. Thinleaf pine (*Pinus maximinoi*) can also be found in slopes and the top of hills and mountains. Pure pine forests can be seen in the area, but mixed forests are not uncommon.

The footprint of the Project will not change; therefore, it is expected that the activities associated with the Project will not interact or will have minimal impact on the vegetated areas.

6.2 **Flora**

A total of 90 species distributed in 48 families were identified within the Project area, distributed in four different plant communities: i) broad-leaved forest with coffee crops and riparian forest, ii) broad-leaved forest with brush and grasses iii) pine forest, and iv) brush.

From the 48 families presented in the Project area, the Fabaceae family represents the most common one, representing the 8.8% of the species identified with a total of 8 genera, followed by the Rubiaceae and Asteraceae families, each representing 6.66% with a total of 12 genera within both families. The Areaceae family constitute the 5.55% of the sampled species, and it is followed by the Pteridaceae family with 4.44% of the total plant species. Species representing less than 4% are Poaceae, Piperaceae, Orchidaceae and Acanthaceae were the most representative and most diverse within the Project area. Two species are listed within the red list by the International Union for Conservation of Nature as species Least Concern

Chamaedorea pinnatifrons from the Areaceae family and the bromeliad *Catopsis sp.* Six of the species identified within the project area are included in the Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (**Table 6-1**).

Table 6-1 List of plant species previously identified within the Project area

Familia	Species	CITES	IUCN
Acanthaceae	<i>Aphelandra scabra (Vahl) Sm.</i>		
Acanthaceae	<i>Justicia sp</i>		
Acanthaceae	<i>Justicia caudata A. Gray</i>		LC
Amaranthaceae	<i>Iresine diffusa Humb. & Bonpl. ex Willd.</i>		
Apocynaceae	<i>Thevetia ahouai (L.) A. DC.</i>		
Araceae	<i>Monstera adansonii Schott</i>		
Araceae	<i>Philodendron anisotomum Schott</i>		
Areaceae	<i>Chamaedorea pinnatifrons (Jacq.) Oerst.</i>		
Areaceae	<i>Cryosophila williamsii P.H. Allen</i>		
Areaceae	<i>Astrocaryum mexicanum Liebm. Ex Mart.</i>		
Aristolochiaceae	<i>Aristolochia maxima Jacq.</i>		
Aristolochiaceae	<i>Aristolochia pilosa Kunth</i>		
Asteraceae	<i>Baccharis trinervis Pers.</i>		
Asteraceae	<i>Ageratum conyzoides var. mexicanum (Sims) DC.</i>		
Asteraceae	<i>Emilia sonchifolia (L.) DC.</i>		
Asteraceae	<i>Tagetes filifolia Lag.</i>		
Asteraceae	<i>Cosmos crithmifolius Kunth</i>		
Asteraceae	<i>Vernonia tortuosa (L.) S.F. Blake</i>		
Begoniaceae	<i>Begonia sp</i>		
Blechnaceae	<i>Blechnum sp</i>		LC
Boraginaceae	<i>Heliotropium indicum L.</i>		
Bromeliaceae	<i>Tillandsia sp</i>		
Bromeliaceae	<i>Catopsis sp</i>		
Burseraceae	<i>Bursera simaruba (L.) Sarg.</i>	Appendix II	
Cactaceae	<i>Deamia testudo (Karw. ex Zucc.) Britton & Rose</i>		
Cactaceae	<i>Rhipsalis baccifera (Sol.) Stearn</i>		
Clusiaceae	<i>Clusia flava Jacq.</i>		
Commelinaceae	<i>Tradescantia zanonii (L.) Sw.</i>		
Convolvulaceae	<i>Ipomoea purpurea (L.) Roth</i>		
Convolvulaceae	<i>Ipomoea alba L.</i>		
Costaceae	<i>Costus pulverulentus C. Presl</i>	Appendix II	
Cucurbitaceae	<i>Momordica charantia L.</i>		

Familia	Species	CITES	IUCN
Cyatheaceae	<i>Cyathea sp</i>	Apendix II	
Cyperaceae	<i>Cyperus sp</i>		
Dennstaedtiaceae	<i>Pteridium aquilinum var. arachnoideum (Kaulf.) Brade</i>		
Dioscoreaceae	<i>Dioscorea sp.</i>		
Euphorbiaceae	<i>Acalypha diversifolia Jacq.</i>		
Euphorbiaceae	<i>Acalypha macrostachya Jacq.</i>		
Fabaceae	<i>Calliandra houstoniana (Mill.) Standl.</i>		
Fabaceae	<i>Mimosa sp</i>		
Fabaceae	<i>Inga spectabilis (Vahl) Willd.</i>		
Fabaceae	<i>Crotalaria longirostrata Hook. & Arn.</i>		
Fabaceae	<i>Acacia collinsii Saff.</i>		
Fabaceae	<i>Tamarindus indica L.</i>		
Fabaceae	<i>Erythrina berteroana Urb.</i>		
Fabaceae	<i>Delonix regia (Bojer ex Hook.) Raf.</i>		
Gleicheniaceae	<i>Dicranopteris pectinata (Willd.) Underw.</i>		
Haemodoraceae	<i>Xiphidium caeruleum Aubl.</i>		
Heliconiaceae	<i>Heliconia psittacorum L. f.</i>		
Heliconiaceae	<i>Heliconia vaginalis Benth.</i>		
Lycopodiaceae	<i>Lycopodiella cernua (L.) Pic. Serm.</i>		
Lygodiaceae	<i>lygodium sp</i>		
Malvaceae	<i>Guazuma ulmifolia Lam.</i>		
Melastomataceae	<i>Conostegia xalapensis (Bonpl.) D. Don ex DC.</i>		
Melastomataceae	<i>Clidemia setosa (Triana) Gleason</i>		
Muntingiaceae	<i>Muntingia calabura L.</i>		
Musaceae	<i>Musa coccinea Andrews</i>		
Onagraceae	<i>Ludwigia octovalvis (Jacq.) P.H. Raven</i>		
Orchidaceae	<i>Cyrtopodium macrobulbon (La Llave & Lex.) G.A. Romero & Carnevali</i>	Apendix II	
Orchidaceae	<i>Prescottia stachyodes (Sw.) Lindl.</i>	Apendix II	
Orchidaceae	<i>Trichocentrum cebolleta (Jacq.) M.W. Chase & N.H. Williams</i>	Apendix II	
Piperaceae	<i>Piper aduncum L.</i>		
Piperaceae	<i>Peperomia obtusifolia (L.) A. Dietr.</i>		
Piperaceae	<i>Piper auritum Kunth</i>		
Poaceae	<i>Chusquea coronalis Soderstr. & C.E. Calderón</i>		
Poaceae	<i>Paspalum sp</i>		
Poaceae	<i>Lasiacis sp</i>		
Polypodiaceae	<i>Polypodium aureum L.</i>		
Primulaceae	<i>Ardisia compressa Kunth</i>		

Familia	Species	CITES	IUCN
Pteridaceae	<i>Pityrogramma adiantoides (H. Karst.) Domin</i>		
Pteridaceae	<i>Antrophyum sp</i>		
Pteridaceae	<i>Vittaria sp</i>		
Pteridaceae	<i>Adiantum sp</i>		
Rubiaceae	<i>Hamelia patens Jacq.</i>		
Rubiaceae	<i>Psychotria erythrocarpa Schltl.</i>		
Rubiaceae	<i>Psychotria poeppigiana Müll. Arg.</i>		
Rubiaceae	<i>Psychotria tenuifolia Sw.</i>		
Rubiaceae	<i>Psychotria sp</i>		
Rubiaceae	<i>Coccocypselum herbaceum Aubl.</i>		
Sapindaceae	<i>Matayba oppositifolia (A. Rich.) Britton</i>		
Sapindaceae	<i>Dodonaea viscosa Jacq.</i>		
Siparunaceae	<i>Siparuna thecaphora (Poepp. & Endl.) A. DC.</i>		
Smilacaceae	<i>Smilax domingensis Willd.</i>		
Solanaceae	<i>Solanum erianthum D. Don</i>		
Solanaceae	<i>Solanum torvum Sw.</i>		
Urticacea	<i>Urera caracasana (Jacq.) Gaudich. Ex Griseb.</i>		
Urticacea	<i>Cecropia peltata L.</i>		
Verbenaceae	<i>Lantana camara var. mista (L.) L.H. Bailey</i>		
Verbenaceae	<i>Stachytarpheta jamaicensis (L.) Vahl</i>		
Vitaceae	<i>Vitis tiliifolia Humb. & Bonpl. ex Schult.</i>		

Most of the species identified within the Project area are trees (55 %), followed by shrubs (17 %) cactus (12 %), herbaceous plants (9 %), orchids (5 %), and lianas (2 %). Additionally, one parasitic species was registered.

6.2.1 Broad-leaved forest

This type of ecosystem is also known as tropical evergreen seasonal montane lowland forest according to the international classification and mapping of vegetation from UNESCO (UNESCO 1973). Most of the species of this plant community are broadleaved species.

The Project footprint do not interact with this ecosystem. Broad-leaved forest can be found within the lowlands, high elevation and steep slopes of the study area. Most of the stands of this type of forest have disappeared and are restricted to higher elevation zones outside the Project area. Species diversity of broad-leaved forest relies on the physical conditions and specially on the quality and abundance of nutrients in the soil.

Currently, the undergrowth of the Project area is made up of coffee crops and species primary forest. This ecosystem can be found within the area of the construction of the dam and the reservoir. Within this plant community is common to find shimbillo (*Inga sp.*). These species represent 35.7% of the total species found in the area. This abundance could be the result of locals cultivating this species to provide shade to the coffee crops. The most abundant tree in the area is the ironwood (*Dialium guianense*).

6.2.2 Pine forest

This ecosystem is also known as tropical evergreen seasonal needle-leaved submontane forest. this type of vegetation can be found within the basin what would be the dam, but it will not be intervened. Thinleaf pine (*Pinus maximinoi*) is the representative and species with the highest ecological value of this plant community. The species within the undergrowth of this ecosystem are mainly shrubs and natural grass. Sweetgum (*Liquidambar styraciflua*) can be found in certain areas, which is indicative of a transition from pine forest to mixed forest.

6.2.3 Riparian forest

The riparian forest can be found at the shore of the ravine and winter corridors with broad-leaved trees as the most common species. These ecosystems are usually not impacted, usually remaining without alterations due to their slope (>15%) or they are protected as sources of water. From the ecological point of view, riparian forests provide suitable, nesting, foraging and mating habitat for several species of animals.

6.2.4 Brush

This plant community is common after soils have been impacted and abandoned. It is composed by indicator shrubs and herbaceous species such as trumpet tree (*Cecropia peltate*), which is an opportunistic species, that will take advantage of light penetrating the forest by gaps left from the absence of other major tree species. This species can be broadly found within the project area, indicating abandon of productive plots by the locals.

Despite the different anthropogenic impacts to the area, currently, several areas showed high density of young trees or of medium height, which comprises the canopy of the forest, this feature suggests the existence of adaptation of the vegetation to a regeneration process (**Figure 6-1**). Additionally, the reforestation and forest management plans (**section 8.0**) and the protected area of El Manantial (**Figure 6-2**), appear to be helping with the protection, conservation and regeneration of the natural forest in the area.



Figure 6-1 **Examples of reforested areas**

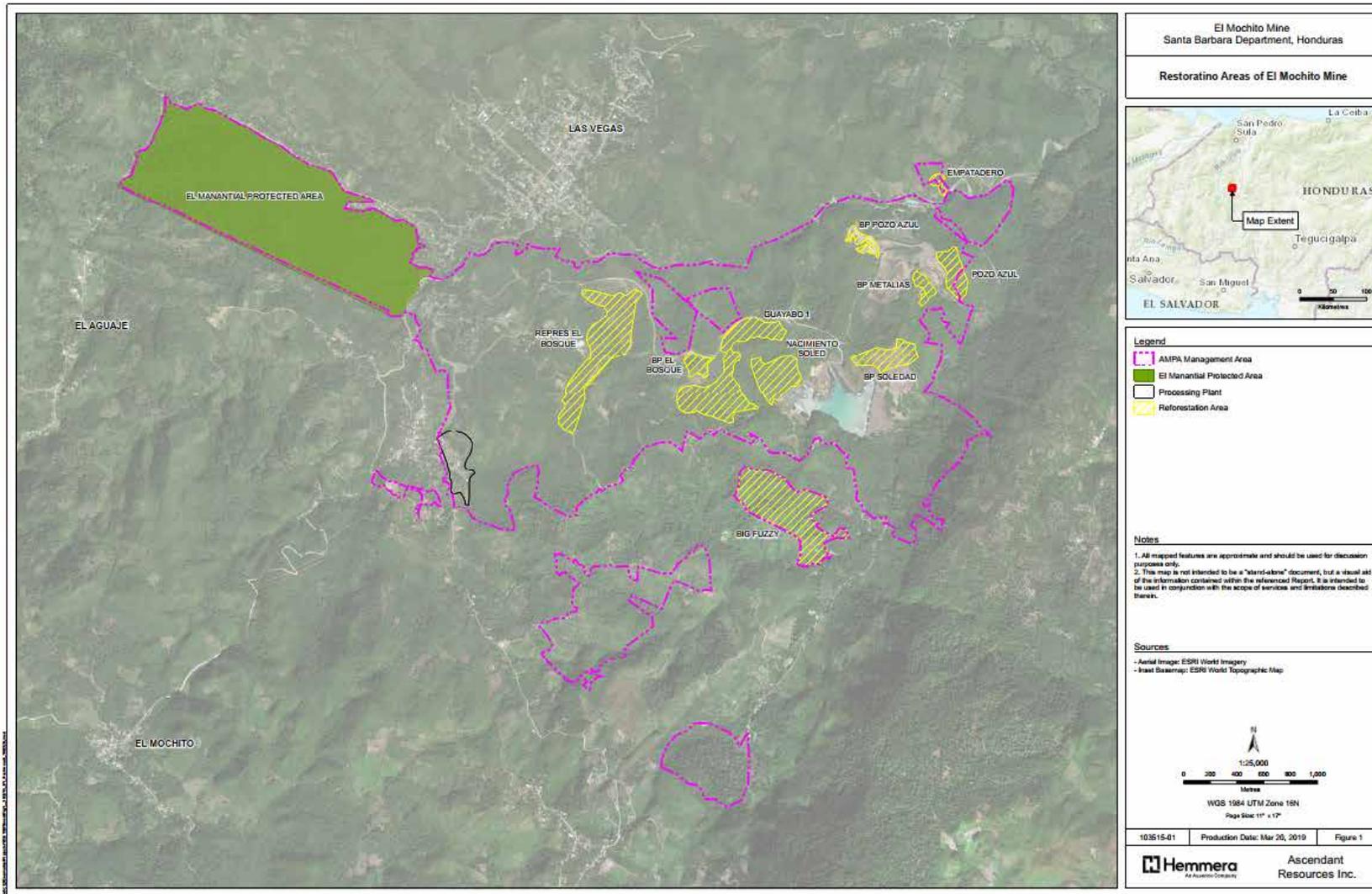


Figure 6-2 Areas of special management, including reforestation areas and El Manantial Management Area

The footprint of the Expansion Project will not change significantly. A small vegetated section, composed of small shrubs and a few young trees, on the La Soledad dam will be removed to increase water capacity (**Figure 6-3**).



Figure 6-3 Vegetation area of the Soledad dam that will be removed during the expansion of the reservoir

6.3 Fauna

Most of the wildlife can normally be found outside the direct area of impact of the Project, especially in the mountain area at the east and southeast area of the Project. Most of the wildlife will use the project area for occasional feeding and as movement corridor. However, it has been reported that the wildlife populations in the area are in critical conditions. Poaching is the most common threat, additionally, wildlife trafficking and the reduction and fragmentation of the habitat are also major factors affecting the local fauna.

Birds are the most common group in the area (52.5%) and mammals (26.66%) followed by reptiles (16.66%) and amphibians (2.51%) and finally fish (1.67%).

Guppies (*Poecilia*) and sardines (*Astyanax fasciatus*) are the two fish that can be found within the study area, more specifically in the creek El Palmar. None of this species are of commercial use due to their size.

Three species of amphibians can be found in the area, cane toad (*Bufo marinus*), gulf coast toad (*Bufo valliceps*), and highland frog (*rana maculata*). Twenty species of reptiles have been identified previously within the area (EIA SOLEDAD).

6.3.1 Arthropods

6.3.1.1 Insects

Previous reports and biodiversity assessments in the area (reference Douglas Dam BioDiv report) have reported 61 species of insects within the project area (**Table 6-2**), distributed in 36 families of eight orders. The orders with the higher number of species belong to the order Lepidoptera, which includes butterflies and moth, representing 45.9 %, followed by the order Coleoptera covering 29.5 % of the species of insects identified within the Project area.

Table 6-2 Species of insects identified within the project area

Family	Genus	Species
Acrididae	Acrotylus	sp
Gryllotalpidae	Gryllotalpa	sp
Gryllidae	Gryllus	
Elateridae	Pyrophorus	sp
Zopheridae	Zopherus	sp
Pasalidae	Passalus	sp
Tipulidae	Spp	
Asilidae	Spp	-----
Coreidae	Acanthocephala	sp
Cerambycidae	Callipogon	sp
Lampyridae	Photinus	sp
Pompilidae	Pepsi	sp
Lycidae	Sp	
Tabanidae	Scaptia	sp
Mutillidae	Ronisia	sp
Nymphalidae	Caligo	memnon
Morphinae	Morpho	peleides
Ithominae	Greta	otto
Nymphalidae	Siproeta	epaphus
Nymphalidae	Siproeta	stelenes
Hesperiidae	Urbanus	sp
Papilionidae	Parides	sp
Papilionidae	Protographium	sp
Papilionidae	Heraclides	androgeus
Papilionidae	Heraclides	thoas

Family	Genus	Species
Pieridae	Eurema	daira
Pieridae	Phoebis	sp
Heliconiinae	Dione	juno
Heliconiinae	Dryas	iulia
Heliconiinae	Heliconius	ismenius
Heliconiinae	Heliconius	erato
Heliconiinae	Heliconius	charithonia
Heliconiinae	Euedes	sp
Heliconiinae	Actinote	anteas
Nymphalinae	Colobura	sp
Nymphalinae	Anartia	fatima
Limenitidinae	Adelfa	spp
Biblidinae	sp	
Biblidinae	Hamadryas	sp
Danainae	Danaus	gilippus
Danainae	Danaus	plexippus
Biblidinae	Catonephele	numilia
Libellulidae	Libellula	sp
Acrididae	Tropidacris	sp
Tridactylidae	Sp	
Coleoptera	Scarabaeidae	sp
Chrysomelidae	Asphaera	sp
Carabidae	Sericoda	sp
Mantidae	Mantis	sp
Curculionidae	Spp	
Tenebrionidae	Spp	
Gryllotalpidae	Gryllotalpa	sp
Cerambycidae	Spp	
Curculionidae	Spp	
Elateridae	Spp	
Staphilinidae	Spp	
Coccinelidae	Spp	
Carabidae	Spp	
Corydalidae	Coridallus	sp
Tetigonidae	Spp	
Cicadelidae	Spp	

6.3.2 Amphibians

Eight species of amphibians belonging to five families have been reported within the project area (**Table 6-3**). Four of this species have been identified within the Red List of the IUCN as Species of Least Concern listed. Two species of special concern occur within the Project area. The *Craugastor laticeps* is red listed as Near Threatened and the *Craugastor charadra* as Endangered.

Table 6-3 Species of amphibians previously identified within the project area

Family	Scientific name	IUCN
Bufoidea	<i>Incilius valliceps</i>	LC
Bufoidea	<i>Chaunus marinus</i>	
Hylidae	<i>Smilisca baudinii</i>	LC
Craugastoridae	<i>Craugastor laticeps</i>	NT
Craugastoridae	<i>Craugastor charadra</i>	EN
Ranidae	<i>Lithobates vaillanti</i>	LC
Ranidae	<i>Lithobates brownorum</i>	
Plethodontidae	<i>Bolitoglossa mexicana</i>	LC

*LC: Least Concern, NT: Near Threatened, EN: Endangered

6.3.3 Reptiles

There are three families representing the reptile abundance in the area, Iguanidae, Scincidae and Colubridae. The reptile species more commonly found in the area are the brown basilisk (*Basiliscus vittatus*), black iguana (*Ctenosaura similis*) and the common iguana (*Iguana iguana*). The Anolis (*Anolis tropidonotus*) is one of the most abundant species in the area and it can be found primarily in the lower parts of logs and branches in broad-leaved forest and the basin. The rose-bellied lizard (*Sceloporus variabilis*) is distributed in the open zones of the project and it is generally observed over rocks and at the edge of the roads. Sumichrast's Skink (*Eumeces sumichrasti*) inhabits wet zones, especially at the edge of bodies of water while the Central American mabuya (*Mabuya unimarginata*) can be found in logs and under bark of trees. The brown forest skink (*Spenomorphus cherriei*) can also be found within the project area within broad-leaved forest. The rainbow ameiva (*Ameiva undulata*), although rare, can also be found within the wet zones of the project area.

The boa (*Boa constrictor*) and the mussurana (*Clelia clelia*) are two of the most common snake species within the study area, and they can be found within riparian areas and broad-leaved forest as well as in non-forested areas and agricultural fields. The road guarder (*Conopsis lineatus*) is easily observed in the area and it is widely distributed in the country. The false coral (*Lampropeltis Triangulum*) and the speckled racer (*drymobius margaritiferus*) are two species usually killed by the inhabitants of the area due to their similarity to venomous snakes. The northern cat-eyed snake (*Leptodeira septentrionalis*) is another snake that can be found in the Project area and inhabits plains, shrubs and agricultural fields. The Guatemala neckband snake (*Scaphiodontophis annulatus*) has been reported in the construction zone of the Project. The coral snake (*Micrurus nigrocinctus*) has also been reported in the are, with at least one reported accident. The Honduran palm pit viper (*Bothriechis marchi*) and the fer-de-lance (*Bothrops asper*) are also common and abundant. The fer-de-lance is the responsible for most of the snake bites in the area and in the country. Both snakes can be found in forests and disturbed areas. Finally, the rattle snake (*Crotalus durissus*) can be found occasionally in the area and its presence is associated with coniferous forests, but it is a highly vagile species and it can be found in other areas.

6.3.4 Birds

Sixty-four species of birds from 32 families and 12 orders have been reported previously within the study area (**Table 6-4**). The most common families reported within the Project area were Tyrannidae, Icteridae and Columbidae are the most diverse families within the study area while most of the relative abundance is represented by families Turdidae, Cuculidae and Passeridae. Species from this families are the most common to observe and to hear. Most of the birds observed or reported in the Project area inhabit the periphery of the footprint of the project, or the indirect zone of influence of the project. The project area is only used as a transition zone.

Table 6-4 List of bird species with the potential to occur with in the project area

Family	Scientific name	Common name	State	IUCN
Accipitridae	<i>Rostrhamus sociabilis</i>	Snail kite	R	LC
Accipitridae	<i>Elanoides forficatus</i>	Swallow-tailed kite	R y M	LC
Anatidae	<i>Anas cyanoptera</i>	Cinnamon teal	M	LC
Apodidae	<i>Chaetura vauxi</i>	Vauxs swift	R	LC
Ardeidae	<i>Ardea alba</i>	Great egret	R	LC
Ardeidae	<i>Bubulcus ibis</i>	Cattle egret	R	LC
Caprimulgidae	<i>Nyctidromus albicollis</i>	Common pauraque	R	LC
Cardinalidae	<i>Saltator atriceps</i>	Black headed Saltator	R	LC
Cardinalidae	<i>Piranga flava</i>	Hepatic tanager	R	LC
Cardinalidae	<i>Cyanocompsa parellina</i>	Blue bunting	R	LC
Cathartidae	<i>Cathartes aura</i>	Turkey vulture	R	LC
Cathartidae	<i>Coragyps atratus</i>	Black vulture	R	LC
Cerylidae	<i>Chloroceryle amazona</i>	Amazon kingfisher	R	LC
Cerylidae	<i>Chloroceryle americana</i>	Green kingfisher	R	LC
Columbidae	<i>Patagioeneas flavirostris</i>	Red-billed pigeon	R	LC
Columbidae	<i>Leptotila verreauxi</i>	White-tipped dove	R	LC
Corvidae	<i>Psilorhinus morio</i>	Brown jay	R	LC
Cotingidae	<i>Tityra semifasciata</i>	Masked tityra	R	LC
Cracidae	<i>Ortalis vetula</i>	Plain chachalaca	R	LC
Cuculidae	<i>Piaya cayana</i>	Squirrel cuckoo	R	LC
Cuculidae	<i>Crotophaga sulcirostris</i>	Groove-billed ani	R	LC
Fringillidae	<i>Euphonia hirundinacea</i>	Yellow-throated euphonia	R	LC
Furnariidae	<i>Lepidocolaptes affinis</i>	Spot-crowned woodcreeper	R	LC
Furnariidae	<i>Sittasomus griseicapillus</i>	Olivaceous woodcreeper	R	LC
Furnariidae	<i>Glyphorhynchus spirurus</i>	Wedge-billed woodcreeper	R	LC
Furnariidae	<i>Dendrocolaptes sanctithomae</i>	Northern barred-woodcreeper	R	LC
Hirundinidae	<i>Stelgidopteryx serripennis</i>	Northern rough-winged swallow	R	LC
Icteridae	<i>Psarocolius montezuma</i>	Montezuma Oropendola	R	LC

Family	Scientific name	Common name	State	IUCN
Icteridae	<i>Icterus pectoralis</i>	Spot-breasted oriole	R	LC
Icteridae	<i>Dives dives</i>	Melodious blackbird	R	LC
Icteridae	<i>Quiscalus mexicanus</i>	Great-tailed grackle	R	LC
Icteridae	<i>Psarocolius wagleri</i>	Chestnut-headed oropendola	R	LC
Mimidae	<i>Dumetella carolinensis</i>	Gray catbird	M	LC
Momotidae	<i>Momotus lessonii</i>	Lessona motmot	R	LC
Momotidae	<i>Eumomota superciliosa</i>	Turquoise-browed motmot	R	LC
Parulidae	<i>Cardellina canadensis</i>	Canada warbler	T	LC
Parulidae	<i>Setophaga castanea</i>	Bay-breasted warbler	T	LC
Parulidae	<i>Basileuterus culicivorus</i>	Golden-crowned warbler	R	LC
Parulidae	<i>Setophaga petechia</i>	Yellow warbler	R y M	LC
Picidae	<i>Melanerpes aurifrons</i>	Golden-fronted woodpecker	R	LC
Picidae	<i>Campephilus guatemalensis</i>	Pale-billed woodpecker	R	LC
Pipridae	<i>Ceratopira mentalis</i>	Red-capped Manakin	R	LC
Psittacidae	<i>Eupsittula nana</i>	Olive-throated parakeet	R	LC
Ramphastidae	<i>Ramphastos sulfuratus</i>	Keel-billed toucan	R	LC
Ramphastidae	<i>Pteroglossus torquatus</i>	Collared aracari	R	LC
Strigidae	<i>Glaucidium brasilianum</i>	Ferruginous Pygmy-Owl	R	LC
Strigidae	<i>Ciccaba virgata</i>	Mottled owl	R	LC
Strigidae	<i>Megascops sp.</i>	Owl	R	LC
Thamnophilidae	<i>Thamnophilus doliatus</i>	Barred antshrike	R	LC
Thraupidae	<i>Cyanerpes cyaneus</i>	Red-legged honeycreeper	R	LC
Thraupidae	<i>Ramphocelus sanguinolentus</i>	Crimson-collared tanager	R	LC
Tinamidae	<i>Crypturellus soui</i>	Litte Tinamou	R	LC
Troglodytidae	<i>Henicorhina leucosticta</i>	White-breasted wood-wren	R	LC
Troglodytidae	<i>Thryophilus rufalbus</i>	Rufous-and-white wren	R	LC
Trogonidae	<i>Trogon caligatus</i>	Gartered trogon	R	LC
Trogonidae	<i>Trogon mexicanus</i>	Mountain mexicanus	R	LC
Turdidae	<i>Catharus ustulatus</i>	Swainsons thrush	M	LC
Turdidae	<i>Turdus grayi</i>	Clay-colored thrush	R	LC
Tyrannidae	<i>Sayornis nigricans</i>	Black phoebe	R	LC
Tyrannidae	<i>Myiodynastes luteiventris</i>	Sulphur-bellied Flycatcher	R y M	LC
Tyrannidae	<i>Myiozetetes similis</i>	Social flycatcher	R	LC
Tyrannidae	<i>Tolmomyias sulphurescens</i>	Yellow-olive flycatcher	R	LC
Tyrannidae	<i>Attila spadiceus</i>	Bright-rumped attila	R	LC
Tyrannidae	<i>Mionectes oleagineus</i>	Ochre-bellied flycatcher	R	LC

State: A: Accidental, M: Migratory, T: Transient, V: Vagrant, R: Resident

IUCN: LC: Least Concern

6.3.5 Mammals

Thirty-two species of mammals have been reported within the study area (**Table 6-5**). Mustelids and Procyonids are the most common groups in the Project, with four species each. Opossums, Leporids and large rodents from the family Dasypodidae are the easiest species to observe. However, not many records have been reported within the Project area due to the level of disturbance associated with agriculture, poaching, and deforestation. No nests, dens, or signs of mammals such as fur, bones, nails, etc were found on previous surveys (La Soledad TSF EIA and the (potential future) Douglas Area biodiversity report). Most of the diversity of species can be found in habitats outside the footprint of the Project. Additionally, most of the wildlife use pristine forested zones, difficult to access by hunters and these areas are not found within the Project area.

Table 6-5 List of mammal species with the potential to occur within the Project area

Order	Family	Scientific name	Common name
MARSUPIALIA	DIDELPHIDAE	<i>Didelphis marsupialis</i>	Common opossum
		<i>Didelphis virginiana</i>	Virginia opossum
CHIROPTERA	PHYLLOSTOMIDAE	<i>Artibeus jamaicensis</i>	Jamaican fruit bat
		<i>Desmodus rotundus</i>	Common vampire bat
	EMBALLONURIDAE	<i>Saccopteryx bilineata</i>	Greater sac-winged bat
PRIMATES	CEBIDAE	<i>Cebus capucinus</i>	Panamanian White-faced Capuchin
XENARTHRA	MYRMECOPHAGIDAE	<i>Tamandua mexicana</i>	Northern tamandua
	DASYPODIDAE	<i>Cabassous centralis</i>	Northern naked-tailed armadillo
		<i>Dasyus novemcinctus</i>	Nine-banded armadillo
LAGOMORPHA	LEPORIDAE	<i>Sylvilagus floridanus</i>	Eastern cottontail
	MURINAE	<i>Mus musculus</i>	House mouse
		<i>Rattus rattus</i>	Black rat
		<i>Oryzomys couesi</i>	Coues' rice rat
RODENTIA	HETEROMYIDAE	<i>Heteromys desmarestianus</i>	Desmarest's spiny pocket mouse
	SCIURIDAE	<i>Sciurus variegatoides</i>	Variegated squirrel
		<i>Sciurus deppei</i>	Deppe's squirrel
	ERETHIZONTIDAE	<i>Coendou mexicanus</i>	Mexican hairy dwarf porcupine
	DASYPROCTIDAE	<i>Dasyprocta punctata</i>	Central American agouti
AGOUTIDAE	<i>Agouti paca</i>	Lowland paca	
CARNIVORA	PROCYONIDAE	<i>Bassariscus sumichrasti</i>	Cacomistle
		<i>Nasua narica</i>	White-nosed coati
		<i>Potos flavus</i>	Kinkajou
		<i>Procyon lotor</i>	Raccoon
	MUSTELIDAE	<i>Conepatus semistriatus</i>	Striped hog-nosed skunk
		<i>Eira barbara</i>	Tayra
		<i>Galictis vittata</i>	Greater grison

Order	Family	Scientific name	Common name
	FELIDAE	<i>Mustela frenata</i>	Long-tailed weasel
		<i>Herpailurus yagouaroundi</i>	Jaguarundi
		<i>Leopardus pardalis</i>	Ocelot
		<i>Leopardus wiedii</i>	Margay
ARTIODACTYLA	TAYASSUIDAE	<i>Pecari tajacu</i>	Collared peccary
	CERVIDAE	<i>Odocoileus virginia</i>	White-tailed deer

6.4 Species of special concern and fragile and protected areas

A review from background information available to date on the Project area (La Soledad TSF EIA) did not find plant species of special concern within the Project area. However, five species of reptiles, nine species of birds and 15 species of mammals identified within the *List of Wildlife Species of Special Concern in Honduras* (Official Listing) have been reported in the project area (**Table 6-6**). Additionally, four species of reptiles, two species of birds and two mammals in the Project area are included in CITES. Two species of birds, the Swallow-tailed kite and the keel-billed motmot are listed as Near Threatened and Vulnerable under the *International Union for Conservation of Nature's Red List of Threatened Species* (IUCN). The mine will take the proper measures to keep preserving their habitat and additional measures if needed.

Table 6-6 Species of management concern with the potential to occur within the project area

Class	Species	Common name	Official listing	CITES	IUCN
Reptiles	<i>Bothrops asper</i>	Fer-de-lance		III	
	<i>Crotalus durissus</i>	Rattlesnake		III	
	<i>Iguana iguana</i>	Common iguana		II	
	<i>Micrurus nigrocinctus</i>	Coral		III	
	<i>Scaphiodontophis annulatus</i>	Guatemala neckband snake	RaCoPA		
Birds	<i>Herpetotheres cachinnans</i>	Laughing falcon	ApII RaEtPA		
	<i>Amazona farinosa</i>	Southern mealy amazon	AmCoEtPA		
	<i>Elanoides forficatus</i>	Swallow-tailed kite	ApII EtPA		Near threatened
	<i>Electron carinatum</i>	Keel-billed motmot			Vulnerable
	<i>Falco sparverius</i>	American kestrel	ApII RaEt		
	<i>Glaucidium brasilianum</i>	Ferruginous pygmy-owl	ApII Et		
	<i>Ortalis vetula</i>	Plain chachalaca		III	
	<i>Ramphastos sulfuratus</i>	Keel-billed toucan		III	
Mammals	<i>Agouti paca</i>	Agouti	CoEt		
	<i>Bassariscus sumichrasti</i>	Cacomistle	RaEtPA		
	<i>Cabassous centralis</i>	Northern naked-tailed armadillo	Cu		
	<i>Cebus capucinus</i>	White-faced capuchin	AmApII CoEtPA		
	<i>Coendou mexicanus</i>	Mexican hairy dwarf porcupine			
	<i>Dasyprocta punctata</i>	Central american agouti	CoEt		
	<i>Eira barbara</i>	Tayra	AnII RaPA		
	<i>Galictis vittata</i>	Greater grison	AnII RaPA		
	<i>Herpailurus yagouaroundi</i>	Jaguarundi		I	
	<i>Leopardus pardalis</i>	Ocelot	EPApII CoPA		
	<i>Leopardus wiedii</i>	Margay	EPApI CoPA		
	<i>Mustela frenata</i>	Long-tailed weasel	RaPA		
	<i>Odocoileus virginianus</i>	White tailed deer	AmEt CopA		
	<i>Pecari tajacu</i>	Collared peccary	Am CopA		
	<i>Potos flavus</i>	Kinkajou	Et		
	<i>Sciurus deppei</i>	Deppe's squirrel		III	
<i>Tamandua mexicana</i>	Northern tamandua	AmEt			

CO: Of commercial interest or consumption, **PA:** priority of areas, **Ap:** appendices I, II, III (CITES), **Ra:** rare, **Et:** important for ecotourism, **Am:** threatened, **EP:** endangered

The Project area, including tailing facilities is located between two protected areas; the national park Santa Barbara Mountain and the Multipurpose Area of Yojoa Lake.

The Santa Barbara Mountain was declared national park through the 87-87 decree of the Cloud Forest Law. The core area of the park is located above 1,800 mamsl, and includes a buffer zone of 6,700 ha and a core area of 5370 ha with a total extension of 12,130 ha. Most of the park is dominated by limestone with water filtering through the rocks forming cracks and caves. The most common areas within the Yojoa Lake region are the Multipurpose Zone of the Lake Yojoa and the Lake Yojoa Basin. Both areas include sections of the Santa Barbara National park and the Cerro Azul Meambar National Park. The lake Yojoa was declared as protected area in 1971 through the decree 71, which established the Tributary Basin of the Lake Yojoa as Protected area No.5. In 1975, the Minister of Natural Resources through the National Directorate of Renewable Natural Resources developed a Multipurpose Plan. Since then, the area is known as Lake Yojoa Multipurpose Area, with a total area of 358 Km², however, this designation does not have a legal support. Currently, there is not a clear internal delineation zone, nor a protected core zone. In 1993 through the Environmental Assessment of the lake recommended the area of Punta Gorda as the terrestrial core of the Lake Yojoa Multipurpose Zone.

There will be minimal or no interaction with protected areas during the Expansion Project.

6.5 Identification and Evaluation of the Main Biological Impacts and Prevention, Improvement and Mitigation Measures

The footprint of the project will not alter the area, except for a small section in the La Soledad dam. Therefore, interaction between activities associated with Expansion Project and the main biological components (i.e., Ecosystems, Fauna, and Flora) will be negligible as per the project matrix. However, in order to preserve the area, it is necessary to continue with the existing programs of reforestation, protection of non-disturbed areas, such as El Manantial, and to stay engaged with the community and work personnel to increase awareness on the protection of natural habitats, wildlife and vegetation.

6.6 Summary Presentation of the Potential and Residual Impacts

The vegetation in the region has been under constant pressure from agriculture, logging, and fire. The effects of these activities are reflected in the lack of primary forest without disturbance within the development area. An undergrowth of coffee crops dominates the areas with more forest cover. Additionally, pastures and bushes, of no commercial or ecological value, commonly present after agricultural activities are stopped, are abundant within the project area. There is currently an environmental management program in place within the Project area to manage and monitor forests and biology. The Forest Management Plan was developed to protect the water, flora and fauna of the Manantiales river Basin and other areas affected by Pine Beetle, agricultural activities and deforestation (**Section 8.0**).

As part of the planning and operations, access to important biodiversity areas will continue to be controlled and care continue to be taken, during land clearing, to leave natural corridors to avoid isolating patches of habitat. To reduce any potential effect on important biodiversity areas, the Project will continue to ensure:

- To clearly demarcate work areas by means of signs, barriers and fences,
- to clearly demarcate the areas to be stripped and the areas where machinery may circulate, and to keep these to a minimum,
- to prohibit workers and vehicles from circulating outside the work areas and access roads,
- to avoid work in lakes, rivers and streams or on shores and banks except where necessary, and
- that an environment advisor is present during any work in or near a watercourse.

Illuminated areas and night traffic may interact with wildlife during the different phases of the project. The following measures will continue to be taken in order to minimize interaction with the local fauna and control light levels:

- Reduce lighting to the minimum needed for safety,
- whenever possible, use directional lighting to avoid lighting up non-essential areas such as the sky and outside the work area,
- use baffles to limit the lit area in highly sensitive zones,
-
- wherever possible, use light towers that are low to the ground to reduce unnecessary lighting, and
- do not over-illuminate indoor areas.

The footprint of the Expansion Project will not change significantly, and will have minimal interaction with the local vegetation, however measures to ensure that all activities associated with vegetation clearing and soil stripping will continue to be followed. These measures include:

- Educating the personnel doing the stripping operations about the importance of protecting the removed soil,
- establishing a permit system for soil stripping,
- making sure an environmental advisor is present during soil stripping,
- taking steps to prevent accidental fires in the vegetation,
- prohibiting vegetation burning as part of the clearing operations,
- setting aside topsoil to be reused during site restoration,

- letting plants grow in the soil stockpiles to stabilize them and protect them against the wind,
- avoiding the destruction of riverbank vegetation,
- minimizing impacts on mangroves as much as possible, and
- taking the necessary steps to prevent erosion and stream contamination.

Project, in conjunction with the Environment Department, will review the mine site rehabilitation approach and will apply the following actions:

- zones no longer needed for operations will be rehabilitated as soon as possible in accordance with the closure plan for mined areas,
- find local species during rehabilitation and use species that can contribute to the ecosystem value of the habitat and avoid using foreign species.

Community engagement and training of personal on environmental and biodiversity topics are critical for the preservation of the area. The biodiversity of the area will continue to be protected by prohibiting hunting and harvesting of natural products outside the work area within concessions by its employees and contractors. Additionally, wildlife encounters will continue to be reported to keep a record of the biodiversity in the area. All personnel will continue to report to the Superintendent any harm caused to wildlife (e.g., collisions).

A Record of Flora and Fauna Sighting will continue to be kept in the area of influence of the project. Additionally, during the operation stage of the dam, any harm to wildlife should be avoided. The maintenance of the perimeter fence surrounding the dam will prevent birds and mammals from entering the dam, as well as public access.

At the end of the construction activities, the intervened areas are restored and rehabilitated to their natural conditions, (e.g., camps, storage facilities and parking lots). The reforestation plan equivalent to three times the intervened area is implemented.

During the construction and operation stage of the project, employees will continue to follow the current procedures which include:

- a. Do not hunt,
- b. do not kill, injure, maim, chase or catch any animal,
- c. do not destroy nests, caves or galleries,
- d. do not feed the wildlife,
- e. do not dispose of non-biodegradable waste (plastic bags, cans, etc.),
- f. do not perform any physiological needs outside the latrines,
- g. the cutting of trees, extraction of firewood or other plant products is not allowed

7.0 SOCIAL ASPECTS

7.1 Study Methodology

This study was conducted in February and March of 2019 on the basis of existing documentation, including the 2007 ESIA for the expansion of the La Soledad Tailings Storage Facility, which identified El Mochito's Affected Communities and provided some initial characterization. Given that census data for the La Soledad ESIA dated from 2001, this document has drawn on 2013 census data from the Honduran Instituto Nacional Estadística (INE) to update the understanding of populations.

This study also identifies the need to validate these findings and make adjustments, as needed, to the understanding of impacts and development of mitigation measures. This engagement on impacts and mitigation measures will take place as part of the proponent's ongoing communications with Affected Communities and other stakeholders.

7.2 Area of Influence (AOI)

The Area of Influence (AOI) for the socioeconomic aspects of the Project is confined to the existing footprint of the mine and relevant transport corridors, given that Project-related construction and operation will take place within the geographic boundaries of the Project as defined in the ESIA for La Soledad in 2007. The 2007 ESIA defines the Project's AOI as:

- Santa Barbara Department (indirect AOI), the department in which the Project is located;
- Municipality of Las Vegas (indirect AOI), the municipality in which the Project is located;
- El Palmar Hamlet, the community closest to the tailings storage facility that is slated for expansion;
- City of Las Vegas (direct AOI), the community where the Project's workers are expected to choose to live; and
- El Mochito Village and San Juan Hamlet, neighbouring communities to the mine.

The subheadings below provide an overview of the general context surrounding the Project, and a brief characterization of the communities within the socioeconomic AOI.

7.3 Socioeconomic Baseline

Existing conditions for the Project have been defined as those before the expansion Project began in 2019.

Subheadings below describe the various communities surrounding the Project in terms of the socioeconomic context.

Santa Barbara Department

El Mochito is located in the municipality of Las Vegas, Santa Barbara Department, a mineral-rich area of center-west Honduras. The region also produces cattle, sugar, fruit, tobacco, grain, coffee, and the country's second largest production of tobacco. Manufacturing is limited.¹

¹ Estudio de Impacto Ambiental, Ampliación y Mejoramiento para el Almacenamiento y Tratamiento de Colas La Soledad, 2007.

The 2013 census² reported the department had a population of 421,337, of which 214,132 were men and 207,205 were women. Approximately 75% of the population in the department resided in villages and hamlets. In 2013, 20% of homes lacked access to waste disposal and 34% lacked access to drinking water. Slightly more than half of the population has a formal power connection³. Many people in Santa Barbara travel to Tegucigalpa, the capital, or San Pedro Sula for medical care.⁴

7.3.1 Municipality of Las Vegas

The municipality of Las Vegas has a population of 23,980; of which 12,005 were men and 11,976 were women.⁵ Significant mining and production activities take place in this municipality, including a number of small commercial and artisanal activities (i.e. slab and mosaic production, bakeries, stores, etc.)⁶. The rural areas in Las Vegas municipality produce a mixture of subsistence and cash crops, as well as some livestock. Farm productivity in the area is low, reflecting a weak skills base.⁷

7.3.1.1 El Palmar Hamlet

El Palmar is a hamlet (*caserio*) of approximately 174 people as of the 2001 census; of which 57 are women and 66 are men. Updated population information was not included in the 2013 Census. Informal population estimates received by AMPAR from the El Palmar *patronato* suggests that the community has grown since the 2001 census: the population estimate was 47 households, each with an average of 6 people. El Palmar is the closest community to the project; located approximately 500 meters from the tailings storage facility (TSF) dam wall. Residents are originally from the southern region of the country and from the municipality of La Esperanza. Most families in El Palmar worked in agriculture on land owned by Ascendant as of 2007. The area is poor and lacks basic services aside from potable water.⁸ There are no development organizations or health centres in the hamlet. Dwellings are typically made of mudbrick and wood. Students need to transfer to El Mochito village to continue their education past the primary level. The hamlet is not equipped with sewerage, but as of 2007 the community had planned a latrine project. The hamlet is a mix of residential areas and businesses, with private subsistence farming plots. Residents are organized in a *patronato*, and a Water Council. There are no health centres in the hamlet. Most residents rely on cycling or walking. Agriculture and mining (in the form of temporary work) are the main sources of employment.

7.3.1.2 City of Las Vegas

Las Vegas is a city in Las Vegas municipality, 600 m from the site boundary. The city was founded in 1987, almost 40 years after mining began at El Mochito. Many of the city's inhabitants are internal migrants from southern Honduras who relocated to the area to work at the mine.⁹ According to the 2013 census, 9,663 people lived in the city, 48.2% of them men and 51.7% women. Residents have access to private medical centres, schools and centres for adult learning, cable TV, Internet, radio, banking, municipal stadium, public transit, recreation areas and commercial activities. Land use is residential (66.28 ha, 41.45%), commercial

² Instituto Nacional de Estadística (INE). 2013. Censo de Población y de Vivienda. Retrieved from <https://www.ine.gob.hn/index.php/component/content/article?id=81>

³ According to the 2013 Honduran census, 57.57% of people in the Department get public electricity, 1.76% get private electricity, and 0.59% get electricity from their own generator. The rest use kerosene lamps, candles, solar panels or *ocote* (Montezuma pine)

⁴ EIA, op. cit.

⁵ INE, op. cit.

⁶ Ibid.

⁷ EIA, op. cit.

⁸ Estudio de Impacto Ambiental, Ampliación y Mejoramiento para el Almacenamiento y Tratamiento de Colas La Soledad, 2007.

⁹ Ibid.

and industrial. There are 19 neighborhoods, of which the Barrio El Centro contains 2.48 ha for commercial use including banking, gas stations, accommodations, food and individual businesses.¹⁰ There is one health centre (*centro de salud*) and one private hospital owned by the mine and dedicated to the mine workers and their dependants at no charge. The hospital also tends to emergencies in coordination with the Red Cross.

7.3.1.3 El Mochito Village

El Mochito village (*aldea*)¹¹ began as a mining camp in 1948, with a population of 5,319 people as of the 2013 census. According to AMPAR, the village remains primarily a staff camp. Women, many of which are single mothers, constitute 50.2% of the population, and men 49.8%. The village is located approximately 300 m away from the site and is a mix of residential areas and businesses, with some subsistence farming plots. Residents have access to a basketball court, and convenience stores and other types of commercial activities. After the transfer of lands from AMPAC to the municipality, land owners have begun to rebuild their homes using cement slab. The main community groups are the Patronato Central, water management committee, community development committees, and the school's parent family society. Residents have access to electricity and water services (provided by AMPAC) and public transit. Manufacturing and mining are the main sources of employment. There are no health services in the village.¹²

7.3.1.4 San Juan Hamlet

San Juan hamlet (*caserio*), population 801 as of the 2001 census, also began as a mining camp in 1948. There are approximately 403 women and 398 men. Many of the families in San Juan are immigrants from elsewhere in Honduras.¹³ San Juan hamlet is approximately 200 metres from El Mochito village. Residents are characterized as progressive, cleanly and organized¹⁴. Dwelling types are similar to El Mochito village's, and the hamlet also has basketball courts, convenience stores and the Club San Juan recreation centre. Students attend the Franklin de Lano Roosevelt school, and the Centro Educacional Vocacional El Mochito (CEVEM). The main community groups are the Patronato Central, community development committees (Habitat), a school government, a sport committee, the school's parent family society and churches. Residents have access to electricity and water services (provided by AMPAC) and public transit. Manufacturing and mining are the main sources of employment. There are no health centres in the hamlet.¹⁵

7.4 Anticipated Project Interactions and Pathways

The Project's potential interactions with the socioeconomic context in the area surrounding the Project are described in in the subheadings below. Where no interaction is expected to occur, this distinction is made below as well. Interactions, whether they are expected to result in positive or negative effects, are carried forward for assessment. Interactions have been described according to various components of the socioeconomic context, which for the Project are:

- Demographics and Society,
- Local Economy and Labour,
- Infrastructure and Services,

¹⁰ Ibid.

¹¹ The community is sometimes referred to as El Mocho Arriba.

¹² Estudio de Impacto Ambiental, Ampliacion y Mejoramiento para el Almacenamiento y Tratamiento de Colas La Soledad, 2007.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Ibid.

- Community Health and Safety,
- Indigenous People,
- Vulnerable People, and
- Heritage and Archaeological Resources.

Project-related interactions are in some cases interrelated with one another. Figure 7-1 below shows the pathways through which the various components of the socioeconomic context are anticipated to connect to one another.

7.4.1 Demographics and Society

The Project is expected to interact with demographics and society as follows:

- *Temporary increase in population size as the Project increases demand for workers during Construction and Operation phases:* Based on the experience of previous optimization projects at El Mochito, the Project workforce during Construction phase is likely to choose to live in the Project's AOI, specifically the City of Las Vegas. A population increase in and of itself can be both positive and negative, but the knock-on effects of a population increase to other aspects of the socioeconomic context can be more accurately characterized as positive and negative and assessed in terms of their magnitude and duration. As such, interactions as a result of population increases have been referred to the Infrastructure and Services component, in terms of the population's demand for Infrastructure and Services, and the Local Economy and Labour component, in terms of workers' indirect effects on local spending.
- *Temporary change in the gender balance of the population during Construction phase:* The Project workforce is likely to be predominantly single men. This change in gender balance has the potential to affect the Community Health and Safety through an increase in social friction. Predominantly male, single, transient workforces have been associated with increases in drug and alcohol use and associated increases in crime and therefore demand for police services in a variety of jurisdictions worldwide. This interaction is described under Infrastructure and Services in terms of the potential for increased demand for police services.

The Project's presence is unlikely to constitute an interaction with the societal fabric in directly affected communities. The Project's Affected Communities have been dominated by mining activities, to some degree or another, since 1948. During that time period, the mine has undergone numerous optimization projects that have increased, and then decreased, the demand for workers (most recently, an expansion of the mining operations in 2017 which increased the number of workers by approximately 200). Workers on previous mine optimization projects stayed temporarily in various of the Project-affected communities, as they are expected to do during the Project. As such, the Project's Construction and Operation phase is unlikely to disturb the unique character of society in the Project's directly affected communities.

7.4.2 Local Economy and Labour

The Project is expected to interact with local economy and labour as follows:

- *Economic displacement as a result of the Project:* The Project will require relocation of Pulperia Berlin, a convenience store. The proprietor will be compensated for relocation of the business, as per Ascendant's standard policy. This economic relocation activity will be documented separately

in a Livelihood Restoration Plan, as is a requirement of IFC Performance Standard 5's various requirements for Projects that displace other economic activity. As such, this interaction has not been carried forward for assessment in this document. All topics related to the relocation of Pulperia Berlin will be found in the Livelihood Restoration Plan, which was under development as of March 2019.

- *Increased demand for local goods and services, benefitting direct and indirect suppliers and their employees through increased income:* The Project is expected to contribute \$10 million in contracting opportunities to the Honduran economy.¹⁶ This interaction has been carried forward for assessment.
- *Increased demand for labour, benefitting employees, contractors, and their families through increased income:* The Project is expected to contribute 300 direct jobs to the local economy during the Construction phase.¹⁷ This interaction has been carried forward for assessment.
- *Voluntary economic benefit to local governments:* The company has made a commitment to contribute \$1.5 million (2% of gross revenue) to the municipality of Las Vegas in lieu of tax and royalty payments. As a result of these voluntary investments by the company, local governments would spend less from their existing revenue sources on local needs. Because these commitments to the Municipality of Las Vegas are related to the operation of the mine and not specifically linked to the Project, this interaction has not been carried forward for assessment.

7.4.3 Infrastructure and Services

The Project is expected to interact with infrastructure and services as follows:

- *Increased demand for housing:* The 300 Construction-phase workers are expected to choose to live in the City of Las Vegas, while the 100 Operation-phase workers are expected to live in Las Vegas or Mochito Arriba in rented or bought housing. The existing housing stock in the City of Las Vegas is believed to be sufficient to meet the increased demand as a result of the Project. This interaction was not carried forward in the assessment.
- *Increased use of community infrastructure and services (e.g. roads, hospitals, clinics, policing), contributing to reduced access for the public and/or increased cost to local government to replace infrastructure because of faster depreciation:* The additional 300 Construction-phase workers are expected to live in the City of Las Vegas and use the existing roads, hospitals, and clinics. This interaction has been carried forward in the assessment.
- *Improvements to community infrastructure as a result of voluntary company contributions:* The company has agreed to make \$1 million in contributions to health and medicine, and \$200,000 to education.¹⁸ The location and nature of these commitments was not immediately known. Because these commitments are related to the operation of the mine and not specifically linked to the Project, this interaction has not been carried forward for assessment.

¹⁶ Propuesta para la Operacion Sostenible de la Mina El Mochito, September 17, 2018, Ascendant Resources.

¹⁷ Propuesta para la Operacion Sostenible de la Mina El Mochito, September 17, 2018, Ascendant Resources.

¹⁸ Ascendant Resources, op. cit.

7.4.4 Community Health, Safety and Security

The Project is expected to interact with community health and safety as follows:

- **Tailings dam safety:** Tailings dam safety identified as a potential interaction through information exchanged between Ascendant and OPIC in early 2019. The hamlet of El Palmar has been identified as the community closest to the tailings storage facility (TSF). El Palmar lacks a number of basic services,¹⁹ and as such may be constrained in its capacity to respond to a potential breach of the TSF. Not enough information was available at the time this assessment was conducted to understand the extent of potential effects to El Palmar or other Affected Communities and/or mitigation measures, although it is understood that the position of El Palmar is upstream from the TSF, it is located at a higher altitude and there is a mountain between the community and the TSF. Further study will be required as part of Ascendant's ongoing relationships with communities.
- **Water storage dams:** Water storage dams were identified as a potential interaction through information exchanged between Ascendant and OPIC in early 2019. At the moment, there are two main water storage tanks that supply the plant, workshops, staff canteen, general offices, hospital, etc. there are more tanks for emergency purposes located at the mine yard. As per Montevideo, this is a dam built in the 40's – 50's, which is filled up with the overflows of the 'tombs', and it is used to collect water for the process, it mainly supplies the concentrator plant, as well as some communities in Las Vegas. Not enough information was available at the time this assessment was conducted to evaluate if or how water storage dams have the potential to positively or negatively affect local communities; however, Ascendant predicts that the result is positive based on the water balance and the fact that the communities are not impacted by any of the water storage.
- **Land subsidence:** Land subsidence was identified as a potential interaction through information exchanged between Ascendant and OPIC in early 2019. Given the great depth and scattered nature of the underground mining operations, no land subsidence risk exists.
- **Emergency preparedness and response:** The presence of Project has the potential to increase demand for emergency preparedness and response through changes to the nature of potential hazards at sight. Ascendant has a fully integrated emergency response plan with two manned 24-7 control centres, equipped with radios, and cameras. An underground clinic, two ambulances and a hospital is available for support. A fully equipped mine rescue team of 7 members is permanently on standby and receives regular training. Every person going underground is registered and provided with emergency rescue breathing apparatus. Emergency rescue stations, equipped with medical facilities, food air and potable water for large groups have been built across the mine and are within 15-20 minutes walking distance from any point in the operating mine. Ascendant's health and safety program will serve as the foundation for Project-specific modifications.
- **Communicable and vector-borne diseases:** The Project has the potential to increase the spread of communicable and vector-borne diseases through the presence of workers (communicable diseases) and by attracting pests that have the potential to spread disease (vector-borne diseases). This interaction has been carried forward for assessment.

¹⁹ Estudio de Impacto Ambiental, Ampliacion y Mejoramiento para el Almacenamiento y Tratamiento de Colas La Soledad, 2007.

7.4.5 Indigenous People

The Project will not interact with the lands or resources of Indigenous people. Construction and Operation will take place within the existing mine footprint on lands owned by the Proponent. This interaction has not been carried forward into the assessment.

7.4.6 Vulnerable People

The Project has the potential to interact with vulnerable people as follows:

- *Less access for vulnerable people (e.g. women, seniors, single parents, etc.) to Project's Construction- and Operation-phase jobs when compared to non-vulnerable people:* The Project's economic benefits in the form of jobs are most likely to go to working-age males, as the Project has no specific measures in place attract or retain women or other "non-traditional" applicants to the Construction-phase workforce. This interaction has been carried forward into the assessment.

7.4.7 Heritage / Archaeological / Cultural Resources

The Project is not expected to interact with heritage or archaeological resources, as Construction and Operation activities are expected to take place within the existing mine footprint in historically disturbed areas.

7.5 Identification and Evaluation of the Main Social Impacts and Prevention, Improvement and Mitigation Measures

The interactions carried forward for assessment are:

- Increased demand for local goods and services, benefitting direct and indirect suppliers and their employees through increased income;
- Increased demand for labour, benefitting employees, contractors, and their families through increased income;
- Increased use of community infrastructure and services (e.g. roads, hospitals, clinics, policing), contributing to reduced access for the public and/or increased cost to local government to replace infrastructure because of faster depreciation;
- Potential increase in communicable and vector-borne diseases; and
- Less access for vulnerable people (e.g. women, seniors) to Project's Construction- and Operation-phase jobs when compared to non-vulnerable people.

Subheadings 7.5.1 through 7.5.5 below provide a brief description of how these interactions may potentially be experienced as impacts in the Project's area of influence.

7.5.1 Increased Demand for Goods and Services

The Project is expected to contribute \$10 million in purchases of goods and services to the Honduran economy during the Construction phase.²⁰ Through these purchases, Honduran businesses and their employees and families will benefit from increased income. The impact of this increased income is a positive impact at the national level. This positive impact will be enhanced through a local procurement policy, which attempts to concentrate the positive economic impact in the communities closest to the mine.

²⁰ Propuesta para la Operacion Sostenible de la Mina El Mochito, September 17, 2018, Ascendant Resources.

7.5.2 Increased Demand for Labour

The Project's Construction phase will require 300 workers, who together with their families will experience increased income as a result of the Project. These families will in turn spend their additional income at local businesses, contributing indirectly to stimulating the economy. This increased income translates into a positive impact at the national level, as workers have the potential to migrate to the Project area for work from elsewhere in Honduras. This positive impact will be enhanced through a local employment policy, which attempts to concentrate the positive economic impact in the communities closest to the mine.

As described under section 7.5.5, increased demand for labour (and therefore increased income) is expected to primarily benefit working-age males (and their dependents).

7.5.3 Increased Use of Community Infrastructure and Services

The Project's 300 Construction-phase workers are anticipated to settle temporarily in the City of Las Vegas. The presence of 300 additional people increases demand for public infrastructure and services, potentially increasing wait times to seek medical care, and increased demand for police services, among other things, during the Construction period. This increased demand for infrastructure and services translates into a negative impact on the communities where workers are expected to settle, particularly in the City of Las Vegas. More people attempting to use existing infrastructure and services translates into reduced access to services for the public and/or increased cost to local government to replace infrastructure because of faster depreciation. Current capacity in the City of Las Vegas for infrastructure and services could not be ascertained through existing documentation, and as such the potential effects and mitigation measures are the subject of further study, through the course of Ascendant's ongoing engagement with Affected Communities. While Ascendant has made a number of voluntary financial commitments to the Municipality of Las Vegas, it is not clear from existing documentation how these donations will directly offset Project-related demand, and as such may not be considered mitigation measures. Further study is required to establish potential Project effects and mitigations.

Other mitigation measures will be developed and refined through the course of engagement with Affected Communities, particularly city planners and other local government officials with the City of Las Vegas.

7.5.4 Potential Increase in Communicable and Vector-Borne Diseases

Project activities and the presence of workers have the potential to increase communicable and vector-borne diseases. Additional presence of 300 Construction-phase workers bring the potential for increased person-to-person spread of diseases, while Project activities have the potential to attract rats, mosquitos, and other vectors that can spread diseases to humans. These impacts would be negative, and primarily confined to locations where workers and Project activities are present. The company's existing health and safety program includes a variety of mitigation measures that would address the potentially negative impact of Project activities on the spread of communicable and vector-borne diseases. These activities are expected to reduce the risk of increased spread of communicable and vector-borne diseases.

7.5.5 Economic Benefit for Vulnerable Groups

The IFC Performance Standards define “vulnerable groups” as individuals who may disproportionately experience a Project’s negative impacts, or who may require consideration to access a Project benefits.²¹

The Project’s 300 Construction-phase jobs are most likely to go to able-bodied working age men, as the worker required requires a healthy physiology accustomed to hard, manual work. Women however will be invited and encouraged to apply as per standard procedure. Ascendant has systematic efforts in place to attract or retain “non-traditional” candidates such as physically disabled persons, women, orphans above the minimum legal age to conduct work at a mine (18 yrs), or those who do not have access to transportation. The positive economic effects of the Project arising from employment are expected to flow primarily to those who do not experience vulnerability on an ongoing basis and therefore experience no barriers to traditional employment, although given the previous successes in hiring physically handicapped and previously disadvantaged persons it can be reasonably expected that economic benefit will closely reflect the demographics in term of employment equity and will by all means be management’s objective. The exception is women, who traditionally do not as frequently apply for these positions even though the trend is slowly improving.

There are measures in place to provide access to Construction-related employment opportunities for vulnerable groups, such as provision of on-site daycare (beneficial to female applicants) and company-provided transport (beneficial to low-income applicants). As such, efforts are in place to provide access to the Project’s positive employment-related effects to vulnerable groups.

Table 7-1 below summarizes impacts, characterizes them, and provides a list of mitigation measures to avoid or reduce potentially negative impacts and enhance potentially positive impacts.

²¹ IFC Performance Standards 2012 Guidance Note 48 reads: “Vulnerable or disadvantaged individuals and groups should be able to benefit from project opportunities equally with the rest of the Affected Communities; this may require that differentiated benefit-sharing processes and levels (such as ensuring that compensation for a house taken during resettlement is provided equally to the woman and man of the household, providing training for individuals or groups who might lack the necessary skills to find a job with the project, ensuring access to medical treatments for medical conditions resulting from the projects, etc.) are available.”

Table 7-1 Summary of Socioeconomic impact and Mitigation or Enhancement Measures

Impact	Nature of Impact	Geography	Duration/ Frequency/ Time Period	Magnitude	Mitigation or Enhancement Measures	Residual Impact Carried Forward?
Increased demand for local goods and services, benefitting direct and indirect suppliers and their employees through increased income	Positive	National	Construction	\$10 million in goods and services	Local procurement policy	No
Increased demand for labour, benefitting employees, contractors, and their families through increased income	Positive	National	Construction	300 Construction-phase jobs	Local hiring policy	No
Increased use of community infrastructure and services (e.g. roads, hospitals, clinics, policing), contributing to reduced access for the public and/or increased cost to local government to replace infrastructure because of faster depreciation	Negative	City of Las Vegas and other host communities for workers.	Construction	Uncertain but unlikely. To be determined through engagement with the City of Las Vegas and other host communities for workers.	Additional mitigation measures to be determined after further engagement and development of mitigation measures.	No
Potential increase in communicable and vector-borne diseases	Negative	Immediate Project footprint, plus workforce host communities including City of Las Vegas	Construction	Uncertain. To be the subject of further study	Pre-employment medical checks for Construction workers – already standard Free ongoing medical care for Construction workers, including vaccinations Waste management plan reduces attractants to pests Draining of standing pools of water that incubate mosquitos	No
Less economic benefit for vulnerable groups	Positive effects	Potential applicants to join the Construction-phase workforce	Construction	Unknown % of the 300 Construction-phase workforce	Systematic efforts in place to attract or retain vulnerable groups in the Construction-phase workforce	Uncertain

7.6 Summary Presentation of the Potential and Residual Impacts

The following residual impacts have been carried forward for further consideration:

- *Increased use of community infrastructure and services:* The extent of impacts, and therefore effectiveness of mitigation measures, is uncertain and could not be determined on the basis of existing documentation. The Project will engage with the City of Las Vegas to understand what services are at or near capacity and therefore have the potential to be affected by the addition of 300 Construction-phase workers to the community.
- *Less economic benefit for vulnerable groups:* Mitigation measures such as on-site daycare and company-funded transportation provide some additional access for vulnerable groups to the Project workforce. Given the short time period of Construction – and therefore the difficulties in mounting programs directed at vulnerable groups' access to the Construction workforce -- Ascendant has opted as part of its Corporate Social Responsibility (CSR) activities to develop programming for vulnerable groups. As such, the Project is replacing the constraints to economic benefit through work with additional economic benefit through CSR programming. Some of the activities dedicated to vulnerable groups under the CSR plan are:
 - § The mine operates a free bus service from many different communities to transport those workers to the mine, if they require it. Ascendant salaries are high enough relative to average gross domestic produce (GDP) per capita that most workers buy their own transport within a year of starting work
 - § The company attempts, to the extent possible, to reflect the demographics of vulnerable people in its educational CSR programming. Young vulnerable people are given the opportunity to study the local technical school fully funded by the mine and then on their successful graduation, are given first consideration for new roles at the mine. There is a focus on increasing the female hire rates through this with 22% of the students passing last year being female, an improvement on previous years.
 - § Every Friday the company conducts a feeding program for the elderly and vulnerable ones. Separately the mine provides food to approximately 700 kids in their school centers every month and, school uniforms and study materials to approximately 300 kids each year.
 - § Individual hires of several individuals with physical handicaps.
 - § The topic of vulnerability will remain a subject of additional study through ongoing community engagement.

Several topics have been identified throughout this socioeconomic analysis as requiring additional data collection. This data will be collected as part of the Project's ongoing engagement with communities.

- Increased use of community infrastructure and services in City of Las Vegas (existing capacity, potential impacts, effective mitigation measures)
- Community health, safety and security (tailings dam safety, water storage dam safety, land subsidence, emergency preparedness and response)

7.7 Consultation to Date

Paragraph 3 of IFC's Performance Standard 1 establishes the importance of effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them. As such, Ascendant's Stakeholder Engagement is designed to:

- Ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately.
- Promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.
- Ensure the risks and impacts identification takes account of the outcome of the engagement process with Affected Communities as appropriate.
- Identify individuals and groups that may be directly and differentially or disproportionately affected by the project because of their disadvantaged or vulnerable status,²² and propose and implement differentiated measures so that adverse impacts do not fall disproportionately on them and they are not disadvantaged in sharing development benefits and opportunities.
- Inform the development of collective management programs and describe mitigation and performance improvement measures and actions.

As part of the ESIA, Ascendant will undertake three rounds of engagement with Affected Communities:

1. Pre-engagement to validate the Stakeholder Engagement Plan related to this ESIA;
2. Engagement on the various aspects of the Project and this ESIA (including health and safety hazards and engagement with vulnerable groups) to refine understanding of impacts, and develop mitigation measures, as needed; and
3. Engagement during construction (post-ESIA).

See the ESIA Stakeholder Engagement Plan (**Table 7-2**) for more information regarding these phases, and the activities in them.

Additionally, Ascendant maintains ongoing contact with Affected Communities²³ and other stakeholders²⁴ in relation to the overall Operation at El Mochito. Engagement related to the Operation overall is understood to be ongoing, and is not documented here.

²² Footnote 18 (pg. 4) in IFC Standard 1 specifies "this disadvantaged or vulnerable status may stem from an individual's or group's race, color, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status. The client should also consider factors such as gender, age, ethnicity, culture, literacy, sickness, physical or mental disability, poverty or economic disadvantage, and dependence on unique natural resources."

²³ Affected Communities are "local communities directly affected by the Project", as per paragraph 1 (pg. 1) of IFC's Performance Standard 1.

²⁴ Other Stakeholders are "those not directly affected by the Project but that have an interest in it. These could include national and local authorities, neighboring projects, and/or nongovernmental organizations," as per footnote 1 (pg. 1) in IFC's Performance Standard 1.

Table 7-2 Stakeholder Engagement Plan

Category	Stakeholder	Vulnerability status (Yes/No/TBC)	Topics of Interest to Stakeholder	Stakeholder's preferred means of engagement	Frequency of engagement	Round 1: Pre-engagements <i>Timing for round 1: between document approval and Round 2</i>	Round 2: ESIA engagements <i>Timing for round 2: between round 1 and start of construction</i>	Round 3: Construction phase <i>Timing for round 3: throughout construction (2019-2020)</i>	Differentiated measures to allow the effective participation of those identified as disadvantaged or vulnerable
Stakeholders Affected by Econozvmic Displacement	Pulperia Berlin	Yes	Reason for relocation, design alternatives considered, plan for compensation, timeline for relocation, details about proposed new location (including new customer base), Resettlement Action Plan and Livelihood Restoration Plan (IFC P.S.5)	In-person meetings (Ascendant to confirm with the individual)	Throughout the process of relocation and as per the plans	Yes	Yes	As needed	Ascendant will likely need to mobilize to the individual's business to accommodate their schedule
Communities impacted by the project	El Palmar hamlet (<i>caserio</i>) respected leader as per EIA Soledad (2006) (Ascendant to confirm name of individual and contact information)	TBC	Engagement plan, grievance mechanism, impacts due to proximity to the TSF La Soledad, access route through company farm land, employment opportunities, support programs for the local school, possible land acquisitions, community health and safety and tailings safety	Mainly meetings at the local schools, phone, in person (Ascendant to confirm with the individual)	Once during Round 1 and monthly during round 2 (or as needed)	Yes	Yes	As needed	Pending confirmation on the individual's preferred method of contact, Ascendant may need to mobilize to the individual's community (possibly their home) to hold the engagement. Consider afternoons, Monday-Friday and plan for the meeting place, catering and necessary communication materials. (Translated and/or plain language materials may be required)
Communities impacted by the project	El Palmar mothers and single parents	Yes	Community health and safety, other topics as needed	In-person meetings at the local school	During Round 2, before workers arrive into town As needed, subsequently, depending on feedback	No	Yes	As needed	Childcare (for parents with infants), plan to meet at a convenient time (i.e. after parents drop off children at school)
Communities impacted by the project	El Palmar organized groups (<i>patronato</i> , Water Council)	TBC	Benefits and impacts of the project to their community, particularly due to being the most affected downstream community	In-person at a local centre	Once during Round 2 and then as needed	Yes	Yes	As needed	Consider afternoons, Monday-Friday and plan for the meeting place, catering and necessary communication materials. (Translated and/or plain language materials may be required)
Communities impacted by the project	Other El Palmar residents	TBC	Same as El Palmar leadership, + risks and health and safety plan	Same as El Palmar leadership	Same as El Palmar leadership	No	As needed	As needed	Consider afternoons, Monday-Friday and plan for the meeting place, catering and necessary communication materials. (Translated and/or plain language materials may be required)
Communities impacted by the project	El Mochito village (<i>aldeia</i>) representative (Individual to be determined)	TBC	Engagement plan, grievance mechanism, environmental and social impacts of the project (i.e. effects to drinking water, employment opportunities, support programs for the local school, etc.)	Mainly meetings at the local schools, phone, in person (Ascendant to confirm with the individual)	Once during Round 1 and monthly during Round 2 (or as needed)	Yes	Yes	As needed	Pending confirmation on the individual's preferred method of contact, Ascendant may need to mobilize to the individual's community (possibly their home) to hold the engagement. Consider afternoons, Monday-Friday and plan for the meeting place, catering and necessary communication materials. (Translated and/or plain language materials may be required)

Category	Stakeholder	Vulnerability status (Yes/No/TBC)	Topics of Interest to Stakeholder	Stakeholder's preferred means of engagement	Frequency of engagement	Round 1: Pre-engagements <i>Timing for round 1: between document approval and Round 2</i>	Round 2: ESIA engagements <i>Timing for round 2: between round 1 and start of construction</i>	Round 3: Construction phase <i>Timing for round 3: throughout construction (2019-2020)</i>	Differentiated measures to allow the effective participation of those identified as disadvantaged or vulnerable
Communities impacted by the project	El Mochito mothers and single parents	Yes	Impact of 300 new workers moving in (i.e. housing, demand for services, gender imbalance, safety measures, etc.)	In-person meetings at the local school	During Round 2, before workers arrive into town, and as needed thereafter	No	Yes	As needed	Childcare (for parents with infants), plan to meet at a convenient time (i.e. after parents drop off children at school)
Communities impacted by the project	El Mochito organized groups (Patronato Central, community development committees like AMUPROLAGO and Caritas, school's parent family society)	TBC	Benefits and impacts of the project to their community	In-person at a local centre	Once during Round 2 and then as needed	No	Yes	As needed	Consider afternoons, Monday-Friday and plan for the meeting place, catering and necessary communication materials. (Translated and/or plain language materials may be required)
Communities impacted by the project	Las Vegas city representative (Individual to be determined)	TBC	Engagement plan, grievance mechanism, impact of 300 new workers moving in (i.e. housing, existing capacity of infrastructure and services, gender imbalance, safety measures, etc.), environmental and social impacts of the project (i.e. effects to drinking water, employment opportunities, support programs for the local school, etc.), potential mitigation measures for demand for infrastructure and services.	Mainly meetings at the local schools, phone, in person (Ascendant to confirm with the individual)	Once each during Round 1 and Round 2. As needed thereafter.	Yes	Yes	As needed	Pending confirmation on the individual's preferred method of contact, Ascendant may need to mobilize to the individual's community (possibly their home) to hold the engagement. Consider afternoons, Monday-Friday and plan for the meeting place, catering and necessary communication materials. (Translated and/or plain language materials may be required)
Communities impacted by the project	Las Vegas mothers and single parents	Yes	Impact of 300 new workers moving in (i.e. housing, demand for services, gender imbalance, safety measures, etc.)	In-person meetings at the local school	During Round 2, before workers arrive into town, and as needed thereafter	No	Yes	As needed	Childcare (for parents with infants), plan to meet at a convenient time (i.e. after parents drop off children at school)
Communities impacted by the project	Las Vegas organized groups	TBC	Benefits and impacts of the project to their community	In-person at a local centre	Once during Round 2 and then as needed	No	Yes	As needed	Consider afternoons, Monday-Friday and plan for the meeting place, catering and necessary communication materials. (Translated and/or plain language materials may be required)
Communities impacted by the project	San Juan hamlet (caserio) representative (Individual to be determined)	TBC	Engagement plan, grievance mechanism, environmental and social impacts of the project (i.e. effects to drinking water, employment opportunities, support programs for the local school, etc.)	Mainly meetings at the local schools, phone, in person (Ascendant to confirm with the individual)	Once during Round 1 and as needed during Round 2 and beyond	Yes	Yes	As needed	Pending confirmation on the individual's preferred method of contact, Ascendant may need to mobilize to the individual's community (possibly their home) to hold the engagement. Consider afternoons, Monday-Friday and plan for the meeting place, catering and necessary communication materials. (Translated and/or plain language materials may be required)

Category	Stakeholder	Vulnerability status (Yes/No/TBC)	Topics of Interest to Stakeholder	Stakeholder's preferred means of engagement	Frequency of engagement	Round 1: Pre-engagements <i>Timing for round 1: between document approval and Round 2</i>	Round 2: ESIA engagements <i>Timing for round 2: between round 1 and start of construction</i>	Round 3: Construction phase <i>Timing for round 3: throughout construction (2019-2020)</i>	Differentiated measures to allow the effective participation of those identified as disadvantaged or vulnerable
Communities impacted by the project	San Juan mothers and single parents	Yes	Impact of 300 new workers moving in (i.e. housing, demand for services, gender imbalance, safety measures, etc.)	In-person meetings at the local school	During Round 2, before workers arrive into town, and monthly thereafter	No	Yes	As needed	Childcare (for parents with infants), plan to meet at a convenient time (i.e. after parents drop off children at school)
Communities impacted by the project	San Juan organized groups (Patronato Central, community development committees like HABITAT, school government, sports committee, school's parent family society, churches)	TBC	Benefits and impacts of the project to their community	In-person at a local centre	Once during Round 2 and then as needed	No	Yes	As needed	Consider afternoons, Monday-Friday and plan for the meeting place, catering and necessary communication materials. (Translated and/or plain language materials may be required)
Workers	Current/new direct and indirect employees and unions	TBC	Health and safety risks	In-person meetings	Incorporated as part of regular workforce talks	No	Yes	As needed	Plan for a meeting place and work around their shifts
Emergency Responders	Firefighters	No	Emergency Management Plan: risks, health and safety plan, emergency preparedness and response, including communication on risks, response procedures, responsibilities, communication during an emergency situation and documentation of activities	Phone and in person meetings	Once during Round 2 and whenever there's an update or emergency event	No	Yes	As needed	HASP will be shared during office hours. Incidents will be communicated as soon as possible. Plan for a meeting place and incidentals (transportation, food, medical supplies, etc.).
Emergency Responders	Red Cross	No	Emergency Management Plan: risks, health and safety plan, emergency preparedness and response, including communication on risks, response procedures, responsibilities, communication during an emergency situation and documentation of activities	Phone and in person meetings	Once during Round 2 and whenever there's an update or emergency event	No	Yes	As needed	HASP will be shared during office hours. Incidents will be communicated as soon as possible. Plan for a meeting place and incidentals (transportation, food, medical supplies, etc.).
Emergency Responders	National Police	No	Emergency Management Plan: risks, health and safety plan, emergency preparedness and response, including communication on risks, response procedures, responsibilities, communication during an emergency situation and documentation of activities	Phone and in person meetings	Once during Round 2 and whenever there's an update or emergency event	No	Yes	As needed	HASP will be shared during office hours. Incidents will be communicated as soon as possible. Plan for a meeting place and incidentals (transportation, food, medical supplies, etc.).

Category	Stakeholder	Vulnerability status (Yes/No/TBC)	Topics of Interest to Stakeholder	Stakeholder's preferred means of engagement	Frequency of engagement	Round 1: Pre-engagements <i>Timing for round 1: between document approval and Round 2</i>	Round 2: ESIA engagements <i>Timing for round 2: between round 1 and start of construction</i>	Round 3: Construction phase <i>Timing for round 3: throughout construction (2019-2020)</i>	Differentiated measures to allow the effective participation of those identified as disadvantaged or vulnerable
Authorities	Municipal governments	No	Profits from production and exports, employment opportunities, local development initiatives, regulatory requirements, risks and health and safety plan	On site, email, phone, at the government office	Once during Round 2 (before construction), then quarterly or twice per year	No	Yes	Yes	Consider weekdays during work hours (0800-1700). Plan for transportation, meeting place, catering and necessary communication materials.
Authorities	Central (federal) government (including Ministries)	No	Profits from production and exports, employment opportunities, local development initiatives, regulatory requirements, risks and health and safety plan	On site, email, phone, at the government office	Once during Round 2 (before construction), then quarterly or twice per year	No	Yes	Yes	Consider weekdays during work hours (0800-1700). Plan for transportation, meeting place, catering and necessary communication materials.
Authorities	Mining Authorities	No	Profits from production and exports, employment opportunities, local development initiatives, regulatory requirements, risks and health and safety plan	On site, email, phone, at the government office	Once during Round 2 (before construction), then quarterly or twice per year	No	Yes	Yes	Consider weekdays during work hours (0800-1700). Plan for transportation, meeting place, catering and necessary communication materials.
Communities impacted by the project	Other El Mochito residents	TBC	Engagement plan, grievance mechanism, environmental and social impacts of the project (i.e. effects to drinking water, employment opportunities, support programs for the local school, etc.) risks and health and safety plan	Mainly meetings at the local schools, phone, in person	Once during Round 1 and monthly during round 2 (or as needed)	No	As needed	As needed	Consider afternoons, Monday-Friday and plan for the meeting place, catering and necessary communication materials. (Translated and/or plain language materials may be required)
Communities impacted by the project	Other Las Vegas residents	TBC	Benefits and impacts of the project to their community, risks, and health and safety plan	In-person at a local centre	Once during Round 2 and then as needed	No	As needed	As needed	Consider afternoons, Monday-Friday and plan for the meeting place, catering and necessary communication materials. (Translated and/or plain language materials may be required)
Communities impacted by the project	Other San Juan residents	TBC	Benefits and impacts of the project to their community	In-person at a local centre	Once during Round 2 and then as needed	No	As needed	As needed	Consider afternoons, Monday-Friday and plan for the meeting place, catering and necessary communication materials. (Translated and/or plain language materials may be required)
Investors	TBC	No	Profit return at mid-short term, risks, health and safety performance	Phone, e-mail, in person meetings	Quarterly	No	No	Yes	Communication tools (e.g., videoconference) documentation to be discussed. Consider weekdays during work hours (0800-1700).
Suppliers	Contractors, commerce, (most of the supplies will be acquired locally)	TBC	Better income, increase in sales, employment opportunities	Phone, e-mail	Depending on the stage of the project	No	No	As needed	List of required materials, scope of the activity. Consider Mon.-Sat., 0800-1700
International Funding Bodies	OPIC and IFC	No	ESIA, adherence to performance standards	As per OPIC and IFC processes	As per OPIC and IFC processes	Ongoing/as needed			

Category	Stakeholder	Vulnerability status (Yes/No/TBC)	Topics of Interest to Stakeholder	Stakeholder's preferred means of engagement	Frequency of engagement	Round 1: Pre-engagements Timing for round 1: between document approval and Round 2	Round 2: ESIA engagements Timing for round 2: between round 1 and start of construction	Round 3: Construction phase Timing for round 3: throughout construction (2019-2020)	Differentiated measures to allow the effective participation of those identified as disadvantaged or vulnerable
Other stakeholders	El Ponciano	TBC	See Mapeo Partes Interesadas y Actores Sociales - Mina El Mochito (Engagement with these stakeholders will be updated based on further understanding of impacts through Ascendant's ongoing communication)	TBC	TBC	As needed			
Other stakeholders	Nuevo Lempira	TBC		TBC	TBC				
Other stakeholders	Campo Aurora y Nueva Jerusalen	TBC		TBC	TBC				
Other stakeholders	El Sauce	TBC		TBC	TBC				
Other stakeholders	Bonanza	TBC		TBC	TBC				
Other stakeholders	21 de octubre	TBC		TBC	TBC				
Other stakeholders	Los Coquitos	TBC		TBC	TBC				
Other stakeholders	El Carreto	TBC		TBC	TBC				
Other stakeholders	Campo Rojo	TBC		TBC	TBC				
Other stakeholders	El Aguaje	TBC		TBC	TBC				
Other stakeholders	Los Naranjos and Peña Blanca	TBC		TBC	TBC				
Other stakeholders	Health centres	TBC		TBC	TBC				
Other stakeholders	Distrital de Educación	TBC		TBC	TBC				
Other stakeholders	Educadores	TBC		TBC	TBC				
Other stakeholders	Education centres belonging to Red Brisas del Lago	TBC		TBC	TBC				
Other stakeholders	IOPTCA (Instituto de Formación Secundaria)	TBC		TBC	TBC				
Other stakeholders	CEVEM	TBC		TBC	TBC				
Other stakeholders	Hondulago	TBC		TBC	TBC				
Other stakeholders	Elders homes	TBC		TBC	TBC				
Other stakeholders	Cooperation agencies	TBC		TBC	TBC				
Other stakeholders	Public education centres	TBC	TBC	TBC					
Other stakeholders	School for children with special needs	TBC	TBC	TBC					

In alignment with IFC's Performance Standard 1,²⁵ Ascendant has a designated team responsible for engaging communities and their representatives, as well as a detailed process²⁶ and format for keeping engagement records²⁷ (See Appendix 7C). Engagement for the ESIA will make use of the existing team and recordkeeping process, supplemented with additional activities specific to this ESIA, where they are needed to align with the IFC Performance Standards.

For the purposes of this document, "engagement activities" refers to any meeting, phone call, email, informal conversation, focus group, workshop, open house, presentation, etc., both planned or emerging, that is coordinated and documented with the support of the Department of Communications and Corporate Social Responsibility (CSR), in which various topics for discussion are established, and agreements are written, to allow for effective follow up.

The mine overall follows a series of procedures related to engagement. These will apply to ESIA-related engagement, and are described under Headings 7.8.1.1 to 7.8.1.5 below.

7.7.1.1 Procedure to Receive and Register External Communications²⁸

The Department of Communications and CSR is the only group authorized by General Management to coordinate engagement with Affected Communities and other stakeholders, and to establish agreements and commitments of support on behalf of Ascendant. Other staff may carry out other forms of engagement, as directed by, and in coordination with or reporting to the Department of Communications and CSR.

All the areas of the company that have been contacted by Affected Communities or other stakeholders, or that need to establish contact with Affected Communities or other stakeholders, must inform the Department of Communications and CSR of the information received or the reason for the meeting, prior to the meeting, to receive support, background information and/or guidance from CSR.

Once an engagement activity is planned with an Affected Community, a CSR member should be present/involved to document the engagement. Alternatively, the manager of the department that requested the engagement activity will be responsible for ensuring the documentation of the engagement activity and providing all records to the Department of Communications and CSR, so it can ensure compliance and tracking of any follow up items and agreements contained within the record.

²⁵ Paragraph 34 (pg. 9) of IFC Performance Standard 1 dictates "clients will implement and maintain a procedure for external communications that includes methods to (i) receive and register external communications from the public; (ii) screen and assess the issues raised and determine how to address them; (iii) provide, track, and document responses, if any; and (iv) adjust the management program, as appropriate. In addition, clients are encouraged to make publicly available periodic reports on their environmental and social sustainability. Additionally, paragraph 35 entails that where there are Affected Communities, the client will establish a grievance mechanism to receive and facilitate resolution of Affected Communities' concerns and grievances about the client's environmental and social performance. The grievance mechanism should be scaled to the risks and adverse impacts of the project and have Affected Communities as its primary user. It should seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate and readily accessible, and at no cost and without retribution to the party that originated the issue or concern. The mechanism should not impede access to judicial or administrative remedies. The client will inform the Affected Communities about the mechanism in the course of the stakeholder engagement process."

²⁶ See Registro de Contacto con Partes Interesadas (2018), also included in the appendix for this ESIA.

²⁷ See RG-RS-01 Formato Reuniones con Partes Interesadas (2013), RG-RS-02 Formato Reuniones con Partes Interesadas (2013), RG-RS-02 Formato Reporte de Quejas (2013) and RG-RS-03 Formato Seguimiento de Quejas (2013), also included in the appendix for this ESIA.

²⁸ See Registro de Contacto con Partes Interesadas (2018), also included in the appendix for this ESIA.

Managers and Superintendents are responsible for the dissemination of, and compliance with, the external communications and grievance mechanisms. Compliance with this procedure will support the fulfillment of Ascendant's objectives to earn the trust and respect of the Affected Communities, show active leadership and participation at the community level, and help ensure compliance with this ESIA and IFC standards 1 and 4, and protecting and safeguarding Ascendant's brand and operation permits.

7.7.1.2 Procedure to Screen and Assess the Issues Raised and Determine How to Address Them

The Stakeholder Engagement Plan (See Stakeholder Engagement Plan section in this document, as well as Table 7-2 describes engagement activities, topics of interest for Affective Communities and other stakeholders, and engagement objectives and deliverables. Issues raised by Affected Communities should be documented, and responses should be aligned with the Stakeholder Engagement Plan, coordinated and approved by the Department of Communications and CSR.

7.7.1.3 Procedure to Provide, Track and Document Responses²⁹

As with the overall mine, information related to any engagement activity (i.e. phone calls, letters, informal conversations, formal meetings, emails, etc.) will be recorded in forms RF-RS-01 and RF-RS-02³⁰ (See Appendix 7A). All areas are responsible for delivering forms to the Department of Communications and CSR, to ensure the compliance with agreements and any additional commitments made. Ascendant will provide periodic reports (as described in Table 7-2) to the Affected Communities on progress of the implementation of proposed Action Plans in the management program.

7.7.1.4 Procedure to Adjust the Management Program

Future plans are being designed and will be implemented to outline how Ascendant intends on using input from the engagements to inform the management program.

7.7.1.5 Grievance Mechanism

ESIA-related engagement will publicize the existing grievance mechanism for the mine, and use any information obtained through the grievance mechanism to support Project planning and refine understanding of risks and impacts, and therefore adjustments to mitigation measures.

The designated contact for receiving and tracking all grievances is the Coordinator for Community Relations. The coordinator's contact information will be shared with stakeholders through Project materials and during engagement activities. Pending the scope of the engagement activity, the coordinator might be present at the meeting to capture any grievances. In the event the coordinator cannot attend, comment cards will be provided at certain meetings to effectively capture grievances and relay them to the coordinator. Grievances are tracked using formats RF-RS-02 (third tab) and RG-RS-03.³¹ The coordinator, in coordination with the CSR Department, determines the resolution and communication path forward. The Grievance Mechanism for the overall mine will be publicized during pre-engagement for the ESIA, with the following aspects particularly being noted for confirmation:

²⁹ See Registro de Contacto con Partes Interesadas (2018), also included in the appendix for this ESIA.

³⁰ See RG-RS-01 Formato Reuniones con Partes Interesadas (2013) and RG-RS-02 Formato Reuniones con Partes Interesadas (2013), also included in the appendix for this ESIA.

³¹ See RG-RS-02 Formato Reporte de Quejas (2013) and RG-RS-03 Formato Seguimiento de Quejas (2013), also included in the appendix for this ESIA.

- Preferred method to communicate a grievance (i.e. email, phone, in-person, comment card, etc.).
- Expected response turn-around (i.e. 48 hrs. to confirm receipt, 5 working days to provide response).
- Resolution timeline (i.e. within a month of the report, determined on a case-by-case basis).

7.7.2 Stakeholder Identification

Stakeholders were identified from a combination of sources, including the 2007 ESIA for the La Soledad³² tailings storage facility expansion and identification of socioeconomic and environmental impacts related to the Project, as well as documentation from the mine.

7.7.2.1 Stakeholder Population Context

The municipality of Las Vegas is a city considered young compared to the history of the country, since it was promoted as a municipality on September 1987. The municipality originated with small groups of farmers who came to the area for the quality of the lands. Once production at El Mochito began in 1948, population continued to increase in parallel to the mining operation. People arrived at the municipality due to the new source of employment the mine generated, and the new houses and camps that were constructed for the workers of the mine later became bigger villages and towns. The population of the municipality of Las Vegas is comprised of immigrants from different areas of the country.

- Indigenous peoples: Since the project will take place within the existing footprint of the mine, Indigenous Peoples' land and resources are not anticipated to be affected by the Project. Ascendant is therefore not required to seek Free, Prior, and Informed Consent (FPIC) from Indigenous Peoples, as would be required under IFC Performance Standard 7.³³

Based on further understanding of the Project's impacts through ongoing engagement with Affected Communities, it will be determined whether the project is anticipated to have potentially significant adverse impacts; and whether other requirements for engagement must be met; such as the need to conduct an Informed Consultation and Participation Process (ICP).³⁴

7.7.2.2 Potentially Affected Communities

The following communities has been identified as potentially affected by the Project:

- Pulperia Berlin – affected by economic displacement³⁵
- El Palmar hamlet – community of 100+ people closest to the tailings storage facility
- Las Vegas city – community

³² Estudio de Impacto Ambiental, Ampliacion y Mejoramiento para el Almacenamiento y Tratamiento de Colas La Soledad, 2007.

³³ Paragraph 32 (pg. 9) of IFC's Performance Standard 1 explains in that for projects with adverse impacts to Indigenous Peoples, the client is required to engage them in a process of ICP and in certain circumstances the client is required to obtain their Free, Prior, and Informed Consent (FPIC). The requirements related to Indigenous Peoples and the definition of the special circumstances requiring FPIC are described in Performance Standard 7.

³⁴ According to IFC's performance 1, paragraph 31 (pg. 8), for projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation (ICP) process that will build upon the steps outlined above in Consultation and will result in the Affected Communities' informed participation. ICP involves a more in-depth exchange of views and information, and an organized and iterative consultation, leading to the client's incorporating into their decision-making process the views of the Affected Communities on matters that affect them directly, such as the proposed mitigation measures, the sharing of development benefits and opportunities and implementation issues.

³⁵ As per IFC Performance Standard 5, the client will engage on the reason for relocation, design alternatives considered to avoid relocation, plan for compensation, timeline for relocation, details about proposed new location and develop a Resettlement Action Plan and Livelihood Restoration Plan.

- El Mochito village
- San Juan hamlet
- Current/new direct and indirect employees and unions
- Emergency respondents (including firefighters, the Red Cross and the National Police)
- Other communities potentially affected by the Project's environmental and social impacts that have yet to be identified (e.g. related to tailings dam safety, water storage dams, land subsidence, among other things).

7.7.2.3 Other Stakeholders with an Interest in the Project

The following groups have been identified as having an interest in the Project:

- Municipal governments
- Central (federal) government (including the Ministries of Economic Development, Finance and the Environment)
- Mining Authorities
- Investors
- Suppliers
- International Funding bodies (OPIC and IFC)
- Other stakeholders as determined by Ascendant's stakeholder mapping³⁶ (Appendix 7B).

7.7.3 ESIA Stakeholder Engagement Plan

The ESIA Stakeholder Engagement Plan responds to IFC's Performance Standards 1 and 4 requirements, and includes stakeholder analysis, disclosure and dissemination of information, consultation and participation, a grievance mechanism and ongoing reporting to Affected Communities.³⁷

7.7.3.1 Principles and Considerations for ESIA Engagement

The ESIA Stakeholder Engagement Plan is designed to address the following principles and considerations, as per IFC guidance:

- Project risks and impacts and development stage.
- Characteristics and interests of the Affected Communities.
- Differentiated measures to allow the effective participation of those identified as disadvantaged or vulnerable.
- Access to relevant information,³⁸ such as:

³⁶ As per Ascendant's Mapeo Partes Interadas y Actores Sociales – Mina El Mochito, other stakeholders (pending further assessment of impacts) may include: El Ponciano, Nuevo Lempira, Campo Aurora y Nueva Jerusalén, El Sauce, Bonanza, 21 de octubre, Los Coquitos, El Carreto, Campo Rojo, El Aguaje, Los Naranjos and Peña Blanca, Health centres, Distrital de Educación, Educadodos, Education centres belonging to Red Brisas del Lago, IOPTCA (Instituto de Formación Secundaria), CEVEM, Hondulago, Elders homes, Cooperation agencies, Public education centres, and School for children with special needs.

³⁷ Paragraph 25 (pg. 7) in IFC's Performance 1 entails "the nature, frequency, and level of effort of stakeholder engagement may vary considerably and will be commensurate with the project's risks and adverse impacts, and the project's phase of development."

³⁸ Footnote 26 (pg. 8) in IFC's Performance Standard 1 explains that "depending on the scale of the project and significance of the risks and impacts, relevant document(s) could range from full Environmental and Social Assessments and Action Plans (i.e. Stakeholder Engagement Plan, Resettlement Action Plans, Biodiversity Action Plans, Hazardous Materials Management Plans, Emergency Preparedness and Response Plans, Community Health and Safety Plans, Ecosystem Restoration Plans, and Indigenous Peoples Development Plans, etc.) to easy-to-understand summaries of key issues and commitments."

- § The purpose, nature and scale of the project.
- § The duration of proposed project activities.
- § Any risks to and potential impacts on Affected Communities and relevant mitigation measures.
- § The stakeholder engagement process.
- § The grievance mechanism.
- Principles of effective consultation.³⁹

7.7.3.2 Topics for Engagement

Topics for engagement will vary depending on the stakeholder group and engagement objectives for the particular phase of the project (i.e. ESIA development, construction, development of emergency management program, development of management program). Topics for engagement are included in Table 7-2. Some examples of topics include:

- Language preferences of the Affected Communities, their decision-making process, and the needs of disadvantaged or vulnerable groups.
- Risks and impacts to the health and safety of the Affected Communities, including mitigation measures (IFC's Performance Standard 4).
- Grievance Mechanism for Affected Communities.
- Emergency preparedness and response, including communication on risks, response procedures, responsibilities, communication during an emergency situation and documentation of activities⁴⁰.
- Monitoring of the management program to measure its effectiveness⁴¹.
- Resettlement Action Plan for stakeholder affected by economic displacement⁴².

7.7.3.3 Pre-engagement to Validate the ESIA Stakeholder Engagement Plan

The purpose of pre-engagement will be to validate the ESIA Stakeholder Engagement Plan and publicize the overall mine's grievance mechanism with representatives of the Affected Communities. Ascendant will verify that such persons represent the views of Affected Communities and that they can be relied upon to

³⁹ Paragraph 31 (pages 8-9) in IFC's Performance Standard 1 recommends Effective consultation is a two-way process that should "(i) begin early in the process of identification of environmental and social risks and impacts and continue on an ongoing basis as risks and impacts arise; (ii) be based on the prior disclosure and dissemination of relevant, transparent, objective, meaningful and easily accessible information which is in a culturally appropriate local language(s) and format and is understandable to Affected Communities; (iii) focus inclusive engagement on those directly affected as opposed to those not directly affected; (iv) be free of external manipulation, interference, coercion, or intimidation; (v) enable meaningful participation, where applicable; and (vi) be documented."

⁴⁰ Paragraph 20 (pg. 6) in IFC's Performance Standard 1 entails that "this preparation will include the identification of areas where accidents and emergency situations may occur, communities and individuals that may be impacted, response procedures, provision of equipment and resources, designation of responsibilities, communication, including that with potentially Affected Communities and periodic training to ensure effective response. The emergency preparedness and response activities will be periodically reviewed and revised, as necessary, to reflect changing conditions. Paragraph 11 in IFC's Performance Standard 4 further details that the client will also assist and collaborate with the Affected Communities, local government agencies, and other relevant parties, in their preparations to respond effectively to emergency situations, especially when their participation and collaboration are necessary to respond to such emergency situations."

⁴¹ Paragraph 22 (pg. 6) in IFC's Performance Standard 1 states "the client will establish procedures to monitor and measure the effectiveness of the management program, as well as compliance with any related legal and/or contractual obligations and regulatory requirements. Where appropriate, clients will consider involving representatives from Affected Communities to participate in monitoring activities such as participatory water monitoring."

⁴² As per IFC Performance Standard 5.

faithfully communicate the results of consultations to their constituents, as per paragraph 27 of the IFC Performance Standard 1.⁴³

Some of the topics for discussion will include planned engagement activities, topics for engagement, expectations for engagement, timelines and logistics for such activities (i.e. best time of day to execute the meeting, best way to engage, ways to promote the meeting, possible venues and considerations to make engagement accessible to more vulnerable groups such as childcare, catering, transportation, etc.). In addition, these pre-engagements will provide an opportunity for Affected Communities to be involved from the onset of the project and collaborate with Ascendant on how their communities will be engaged about the ESIA and throughout construction. It will also help clarify expectations, identify/validate impacts and provide preliminary information for the Management Plans.

7.7.3.4 Engagement on the Various Aspects of the Project and this ESIA

Once the ESIA Stakeholder Engagement Plan is consulted on implementation will start early and will focus on engagement relevant to the development of the ESIA; such as validating the findings of the socioeconomic baseline study, the social and environmental impacts, mitigation measures for negative impacts and enhancements for positive impacts, communication around health and safety hazards, training opportunities, emergency management plans, and monitoring activities, and the development of Social Action Plans (i.e. management program). This round of engagement will also account for separate engagement activities with disadvantaged or vulnerable, such as women, single parents, individuals in the poverty line, individuals who did not finish high school, etc. IFC guidance on vulnerability will be used to identify

7.7.3.5 Engagement During Construction (post-ESIA)

This round of engagement will be classified as ongoing in the sense that it will be both proactive (planned as per the engagement framework during key milestones of the project and important events or announcements), and reactive (in response to emerging questions, concerns, grievances, etc.).

The engagement will be aligned with the project's construction timeline, including key milestones, events, important announcements, etc.

7.7.4 Engagement Activities to Date

To-date, Ascendant has presented the project to:

- The Union and the Union Delegates
- The majority of employees
- The Mayor and Municipality representatives of Las Vegas
- The El Palmar Community

⁴³ Paragraph 27 (pg. 7) in IFC's Performance Standard 1 entails that "the client will develop and implement a Stakeholder Engagement Plan that is scaled to the project risks and impacts and development stage and be tailored to the characteristics and interests of the Affected Communities. Where applicable, the Stakeholder Engagement Plan will include differentiated measures to allow the effective participation of those identified as disadvantaged or vulnerable. When the stakeholder engagement process depends substantially on community representatives, the client will make every reasonable effort to verify that such persons do in fact represent the views of Affected Communities and that they can be relied upon to faithfully communicate the results of consultations to their constituents."

- The patronage / elders delegation of Las Vegas
- The patronage / elders delegation of El Mocho Arriba
- The Ministries of Economic Development, Finance, Environment
- The Mining Authorities

In addition, this project has been socialized to Ascendant employees with many in the local community over the past 18 months (when the concept originally went in design & engineering phase) by virtue of the fact the mine employees involved are integrated with and form part of the community.

The company has received overwhelming support for the project in response to these presentations. The presentation used for these meetings covered: the proposed action plan, capital costs for the expansion and infrastructure, technical information, economic aspects of the project, loan structure proposal and sustainable benefits. See Figure 7-1 for sample slide.



Figure 7-1 Presentation with project description used for investors and other stakeholders

7.8 Corporate Responsibility Plan

The El Mochito property is located near the town of Las Vegas, approximately 88 km southwest of San Pedro Sula and 220 km northwest of the capital city, Tegucigalpa. Production began in 1948 and has continued for 70 years almost continuously. To support Ascendant's Sustainability Policy, the following provides an overview of Ascendant's Corporate Responsibility Plan that is in place for El Mochito and which is applicable to the Expansion.

7.8.1 Vision

Ascendant Resources continues to make mining responsibility at El Mochito its top priority as it creates tangible benefits for all our stakeholders, including our employees, the local communities and the environment in which we operate in.

7.8.2 Corporate Responsibility Strategy

We integrate Corporate Responsibility into our core business in how we conduct our operations, how we attract and retain our workforce, and how we interact with our suppliers and our stakeholders. This approach is embodied in cross-discipline policies and systems that apply to everything we do.

7.8.3 Principles

Our Guiding Principles for Corporate Responsibility establish the structure and framework of our approach to corporate responsibility, setting actionable guidelines for decision-making that apply at our operations.

1. Community – through various community investments, El Mochito has contributed to local employment generation, infrastructure improvement and education advancement. El Mochito strives to play an active role in the strengthening of the surrounding community and will continue to remain a steward of responsibility going forward.
2. Environment – El Mochito’s multiple environmental sustainability programs seek to preserve the region’s natural resources and monitor the quality of soil, water, air, and the protection of local wildlife. Through various initiatives, we continue to make environmental protection a core pillar in our day-to-day operations.
3. Workforce – we believe our workforce and their well being are imperative to the success and sustainability of the El Mochito operation. The continuous commitment to our workforce is reaffirmed through the development of our employees in the area of workplace and education advancement and a strong commitment to the improvement of ongoing health and safety initiatives.
4. Community - We work with our community members to ensure we understand and account for their perspectives. We go beyond avoiding negative impacts and also make a positive contribution by creating opportunities for meaningful livelihoods for our employees, opportunities for our suppliers, and improvements in our communities. We seek to maximize employment, business and economic opportunities for local communities from our existing operations and projects. We provide lasting benefits to the communities where we work by supporting sustainable initiatives to develop their social, economic, and institutional fabric.
5. Engagement - We engage with stakeholders in the communities where we operate and maintain ongoing dialogue in a spirit of transparency, respect and good faith.
6. Acting ethically and transparently - We adhere to the highest standards of business conduct and ethics in all of our dealings and operate in compliance with the law; we expect those with whom we do business to do the same. We commit to transparency, honesty, accountability, integrity and legality in all aspects of the Company's corporate governance and in the Company's dealings with all stakeholders, including government, the community, employees, contractors, service providers and shareholders; adherence to best practices including taking responsibility for the impact of the Company's activities on society and the environment, and behaving in a responsible and ethical manner at all times; and respect for the human rights, culture, customs and values of the Company's host community.
7. Continuous Improvement - We strive to continuously improve our approach to corporate responsibility. We commit to continually seeking to improve the Company's environmental performance beyond legal requirements.

7.8.4 CSR at El Mochito

Since the end of 1987 when the mining operations of El Mochito resumed with American Pacific Honduras, S.A. (AMPAC), the communities surrounding it, including Municipality of Las Vegas, have benefited from mining operations as a result of job creation, trade, training, etc. In 2003, mining operations in El Mochito generated an average of 860 direct jobs, of which 620 were permanent and 140 contractors. At the time indirect employment was also generated for approximately 4,000 people taking into account the companies affiliated to the mine such as the Junta de Fomento, Mochito Agroindustrial, the explosives sales, concentrate transport, trade and suppliers. Permanent employment grew over the years to just over 1,000 full time employees and since Ascendant Resources took control of AMPAC in December 2016 the number of permanent employees has grown to 1,285 as of December 2018.

Undoubtedly, the Company is by far the biggest contributor to CSR initiatives in the region. Apart from the very numerous infrastructural improvements and developments made by the municipality of Las Vages who are the beneficiary of 2% of export revenues (or approximately \$2 million/yr) and being the biggest employer in the province of Santa Barbara, AMPAC has invested into areas of secondary and tertiary education for the poor, health initiatives, feeding programs, environmental initiatives, and maintenance of the road network in the area, potable water supply to the communities, orchid nursery's and orphanages. Investments made by the Company amounts to millions of dollars per year. The cost of the Company's fully-funded private hospital which treat patients off the street in addition to employees and their relatives, including employees' parents and the old, accounted for over US\$1 million in costs on its own during 2018.

Below is a brief description of the various sectors that the company has influenced:

Educational Sector

In the mid-90s, the Foundation for Promotion was organized in El Mochito Education in El Mochito "FUNDEMOCHITO" under the auspices of the Catholic Church and the Compañía Minera American Pacific Honduras, S.A., and the support of the Honduran Red Cross subsidiary Las Vegas, as well as the Municipal Office of Education. The futuristic vision and the spirit of service, led to the founding of the Educational Center Vocacional El Mochito (CEVEM), with the support of the International Agency for Development of the United States (USAID) and the Advisory Center for the Development of Resources Human from Honduras (CADERH); also counted with logistical support from the Municipality from Las Vegas.

The Center began its activities in 1998, after the Company constructed and donated the buildings and premises, offering technical specializations in the areas of cabinet making, mining, industrial sewing, dressmaking and welding. Nowadays the courses also include geology, survey and general mechanical maintenance. It the aim of the Company to further expand the school to include fitting & turning, sampling, agriculture and basics of supervision. Graduates are able to use their skills to find employments or more importantly start their own businesses, something which is actively encouraged.

The Company spends approximately \$80,000 per year college infrastructure, equipment, tools, maintenance, personnel payment, personnel training technical and administrative, teaching, communication and other materials, donations and land conditioning.

The construction of the Joinery Workshop is currently being finalized with the support of AMPAC; additionally, several of the graduates of this center have been hired to work inside the facilities AMPAC mining companies.

Health Component

AMPAC owns the only hospital in the area which has been in service since the 1950s. Currently has three general practitioners, a gynecologist, five nurses and three assistants dedicated to the medical care of workers and their dependents direct (parents, wives or companion of home and children), and community.

Within the facilities of the 38-bed hospital there is a waiting room, clinics for medical attention, emergency room, administrative offices, laboratory for clinical analysis, x-ray machine, wineries, labor and delivery room, operating room, two recovery wards, pediatrics room, private rooms, dentistry, pharmacy, kitchen and recreation areas. All the services of consultations, medications, x-rays and laboratory tests are free for workers and their dependents.

Community emergencies are treated in coordination with the Las Vegas Red Cross. Active collaboration in National Prevention Programs (as promoted by the Ministry of Health) is maintained; and support staff national and foreign medical brigades that need hospital facilities are allowed access to fulfill their social work. In 2018, 19,590 consultations and emergencies were attended to where medicines and clinical examinations provided or operations performed. It is expected that the hospital will increase its number of consultations to over 24,000 in 2019 and the Company is hiring additional doctors and nurses to deal with the anticipated workload.

Finally two ambulances are available free of charge, paid by the Company are available 24-7 for transport of patients. One is always kept on standby at the mine.

Sustainable Development Component

In order to protect AMPAC's surface right from invasion by informal settlers and/or farmers the Company has setup an agreement with a community cooperative to grow and harvest coffee beans in certain, designated parts of the company's surface rights. Not only does this provide work for over 100 people, but it also forms a informal security network preventing unauthorized access to and uncontrolled hunting/ tree felling by locals on Company land.

8.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 Background and Objectives

As part of the project to expand the operations of the El Mochito Mine an environmental and social impact assessment (ESIA) was constructed in order to communicate the environmental and social impacts, and potential benefits.

The data, impact analyses and mitigation measures provide a tool for identifying the main environmental and social issues associated with the Project and constitute the basis for the process of implementing the mitigation measures which were identified and are summarized in this Environmental and Social Management Plan (ESMP).

This ESMP supports Ascendant and its subsidiaries to implement with their objective of meeting the performance standards of the International Finance Corporation (IFC) regarding environmental and social sustainability. It is also a way of ensuring implementation of good industry practice to mitigate or improve the Project's impacts. In this way, the management plan becomes an integration tool for managing the environmental and socioeconomic aspects linked to the Project during its execution and for minimizing or mitigating its impacts.

The ESMP makes it possible to:

- apply measures for environmental protection;
- minimize the Project's impacts on the biological environment;
- minimize many socioeconomic impacts including the impact on community health;
- reduce nuisances during construction
- facilitate the involvement or participation of local populations and organizations in the Project;
- maximize opportunities for improving living conditions;
- reduce the risk of accidents;
- ensure mining operations that are in line with the undertakings made in the ESMP and that make it possible to protect or improve the living conditions in the riparian communities affected by the Project; and
- measure Ascendant's performance in terms of good environmental and social management.

8.2 Safety, Environmental and Social Responsibility Policy

According to Ascendant's SESR policy, the objective is to outline how Ascendant, together with its directors, officers, employees, consultants and contractors, will conduct its business in a safe and environmentally friendly manner and to the highest standards of corporate social responsibility. The Policy is applicable to all directors, officers, employees, consultants and contractors of Ascendant. Each such person or entity will agree to be bound by the provisions of this Policy upon notification of the most recent copy.

Ascendant aims at sustainable development through:

- ingraining our vision for a safe, environmentally friendly and socially responsible culture into our organisation;
- effective management of our activity to minimize the impact on the environment;

- support for local employment and entrepreneurship; and
- support for the development of infrastructure, health, education, training and cultural activities in collaboration with the community.

In the conduct of its business, Ascendant strives to contribute to a healthier, safer, and more prosperous community in the areas where it operates.

To achieve these objectives, Ascendant has sufficient resources to ensure that teams that are motivated, efficient and in line with Ascendant's values can disseminate and implement this policy and continuously improve the policy. It is noteworthy that El Mochito mine has received a nationally recognised award for good corporate social responsibility from the National Foundation for Corporate Social Responsibility (FUNDAHRSE) for ten consecutive years between 2008 and 2018 and is one of only 19 companies having made this achievement in Honduras.

The Expansion Project is supported by Ascendant's Health, Safety, Environment and Social Responsibility (SESR) Policy. In managing the Project, Ascendant undertakes to ensure the health and safety of all persons affected by its operations, and to ensure the respect of all nearby communities and the environment. Ascendant is confident that all its employees as well as affected communities will continue to remain in support of the Project because SESR is an integral part of the organization's daily management.

8.3 Roles and Responsibilities

The development & deployment of this Expansion Project ESMP is the direct responsibility of the Operations (project) team. It will be deployed in conjunction with El Mochito's Environment department and all other departments concerned before being integrated into their day-to-day activities. Its management will be the responsibility of the General (Project) Manager during detailed engineering, construction, commissioning, and operations phases.

The following responsibilities apply to the development, execution and maintenance of EHS systems and activities.

8.3.1 Administrator - Expansion Project

This role has administrative responsibility for EHS management throughout the El Mochito Expansion Project. Specifically, he/ she must:

- keep employees responsible for upholding Ascendant's SESR policy and directives during the Project;
- Investigate & report on any observed deviations from the SEHR and incidents reported, making any recommendations;
- pursue continuous improvement through a systematic approach in conjunction with all levels of management;
- take appropriate action, in line with standard operating practice, in the case of unacceptable performance or behavior;
- incorporate health, safety and environment into job descriptions and individual performance evaluations;

- ensure all personnel to share responsibility for meeting legal requirements and maintaining accountability in terms of HSE through the roles and responsibilities defined below;
- hold daily meetings with the project manager;
- ensure interfacing with partners, financial institutions and the authorities for any matter pertaining to health, safety, or the proper management of the environment and community relations.

8.3.2 Project Manager

The role reporting to the chief operating officer, is responsible for ensuring the development, execution and improvement of the SESR as an integral part of the Expansion Project.

More specifically, he/ she must:

- provide leadership and direction in HSE matters by taking initiatives and inspiring others;
- provide similar leadership in the Project's social performance, working closely with the HSE Manager;
- ensure achievement of the various targets set under the ESMP and agreed on with the regulator and the stakeholders;
- assign the human and financial resources needed to achieve the objectives;
- develop a personnel engagement plan to promote excellence and continuous improvement in HSE management in order to meet the objectives;
- comply with the legal, contractual and organizational obligations of Ascendant and the financial institutions;
- establish a clear chain of HSE responsibility throughout the Project;
- establish and achieve the general HSE objectives as part of the Project;
- include measurable HSE objectives in personnel performance plans;
- approve and implement HSE policies and procedures;
- make sure HSE and community relations accountability is allocated to the appropriate level of authority;
- identify needs and provide appropriate HSE training;
- respond rapidly and positively to any health, safety or environment problem reported;
- make sure competent professionals are hired and/or internally developed;
- encourage front-line managers to act in line with best practices at all Project sites;
- demonstrate firm commitment in terms of diligent reporting of HSE incidents and follow-up;
- participate in HSE audits and take all necessary steps to correct any shortcomings identified;
- formally recognize excellence in HSE activities or initiatives where appropriate;
- bring up unresolved HSE problems with the Project Administrator;
- hold weekly meetings with the Project Administrator and chief operating officer;
- ensure interfacing with the EPCM contractor (where applicable).

8.3.3 HSE Manager

The HSE Manager is responsible for writing and deploying the ESMP as part of the Expansion Project.

More specifically, he/ she must:

- act as the HSE contact for the employees & EPCM contractors (where applicable);
- ensure compliance HSE procedures and the targets and measures provided for in the ESMP;
- review and evaluate the HSE management plans of contractors working on the Project;
- provide special support by acting as advisor to the directors and other members of the Project team and Ascendant when necessary;
- act on HSE issues, in collaboration with Project manager and chief operating officer for the social and community component;
- conduct periodic internal HSE assessments and audits in collaboration with other senior executives;
- analyze assessment/audit results, trends and incident reports;
- advise management about new processes and equipment that could have an impact on health, safety or the environment;
- stay up to date on modifications to legislation, HSE regulations, etc.;
- provide strategic direction and supervision for all initiatives related to health, safety and the environment;
- liaise between the public, local organizations, government bodies and NGOs on HSE-related subjects;
- regularly report to Honduras authorities, partners and financial institutions on the Project's HSE performance and on the results obtained from mitigation and monitoring measures.

8.3.4 Ascendant Senior Management

Ascendant's senior management at the mine and corporately are responsible for carrying out their duties in accordance with the HSE and community relations objectives set out in the ESMP.

More specifically, operations management must:

- execute the risk management procedure in each work site under their control;
- take all necessary steps to ensure that all identified risks are eliminated, isolated or controlled;
- inform all personnel and subcontractors of all known risks involved in their work and how to control them;
- ensure that all personnel receive appropriate training and are involved in system improvement;
- ensure that dangerous acts and conditions are treated appropriately;
- conduct regular HSE inspections and social performance reviews;
- participate in HSE audits and take steps to correct any shortcomings identified;
- ensure that all accidents and incidents are recorded, thoroughly investigated and reported to the HSE Department for subsequent corrective measures;

- encourage good HSE and social performance from suppliers and subcontractors;
- take leadership in effective HSE management;
- encourage initiatives to deploy ESMP provisions correctly, including social provisions;
- respond rapidly and positively to the identification of problems related to HSE or the site's social performance;
- work with employees, supervisors, support personnel and directors;
- encourage supervisors to report HSE activities and problems;
- delegate responsibility to supervisors and hold them accountable for work done;
- evaluate HSE performance and encourage development and improvement;
- promote a positive HSE culture and encourage managers to think about how corporate decisions will impact their activities;
- submit unresolved HSE or social performance issues to Management;
- ensure implementation and efficient management of grievance mechanism.

8.3.5 Superintendents, Supervisors, Foremen

As front-line managers, supervisors are required to give a good example and participate fully in the ESMP. They are also responsible for communicating rules, regulations and performance expectations to employees and for ensuring that employees meet these requirements.

In particular, supervisors must:

- take charge of HSE initiatives by showing exemplary leadership;
- show initiative and authority in identifying and controlling workplace hazards;
- proactively resolve HSE problems;
- respond rapidly and positively to HSE problems;
- encourage workers to identify hazardous behaviors and conditions (near hits);
- identify training needs and ensure employee participation in the training program provided;
- maintain a training log and keep all worker's training certificates;
- assess skills and encourage professionalism on the job;
- promote an HSE culture;
- communicate HSE problems and initiatives to workers;
- plan work according to Ascendant's HSE rules;
- follow up with workers to make sure they are using safe work methods;
- submit unresolved HSE issues to Operations Management;
- delegate responsibility to workers and hold them accountable for their work;
- work with employees, supervisors, support personnel and directors;
- support the implementation and effective management of the grievance mechanism.
- make sure that the staff is fit for work at all times.

8.3.6 Employees (including contractors)

All employees must protect themselves, their co-workers and the environment surrounding the Project. They must also protect the health and safety of other companies' employees (including subcontractors and visitors) present on the jobsite, as well as the nearby communities liable to be affected by the Project.

More specifically, employees must:

- know and apply the HSE policies, procedures and directives;
- conduct risk assessments on the job before undertaking any task
- participate in job safety analyses with their supervisor;
- follow the safe work methods;
- report any unusual actions and conditions to the supervisor;
- show initiative in controlling worksite hazards and reducing risks;
- resolve problems in their work area;
- collaborate with colleagues, supervisors and other site personnel;
- report unresolved HSE issues to the supervisor first, then to Operations Management.

8.3.7 Visitors

All visitors to EI Mochito's facilities must cooperate with the company representative and observe the site rules and regulations.

Specifically, visitors must:

- obtain access authorization and always be escorted by a company representative while visiting the inside of a production facility;
- undertake the standard induction and safety briefing before visiting the mine or any works.
- follow the site rules and regulations as laid out by the company representative or during the HSE site orientation;
- always be in the company of a Company representative or guide whilst in the mine or any works.
- address all problems related to HSE rules and regulations to the company representative.

8.4 Mitigation Measures Register

This section of the ESMP describes the mitigation measures to which the EI Mochito Expansion Project has committed.

It is important to note that this ESMP was drawn up specifically for the Expansion Project and not for all EI Mochito activities. Nevertheless, many of the measures proposed in this ESMP will also apply to the environmental and social management plan for all operations. Others have already been implemented, in full or in part, as part of EI Mochito's daily operations. At an operational level, the actions identified in this document specific for the Expansion Project will be incorporated into the actions and procedures of EI Mochito's environmental and social management plan.

Table 8-1 provides a listing of measures that EI Mochito has in place for various aspects of the operation; new mitigation measures mentioned in the ESIA sections of this document specific for the Expansion are included in this listing.

Table 8-1 ESMP Mitigation Measures Register

El Mochito Mitigation Measures	
A. Management Framework, Programs and Plans	
1.	During the construction and operating phases of the Expansion Project, environment and social impacts will be managed according to the Policies described in Section 2. Within this management system, plans will be developed for specific activities, including all relevant measures identified
2.	Management plans must: <ul style="list-style-type: none"> · identify objectives and targets; · identify risks; · clearly identify management and/or risk mitigation measures; · state how the management measures will be implemented; · state when the management measures will be implemented; · assign the responsibilities and resources needed for implementation; · state the skills and training needed where applicable; · state the monitoring and control measures where applicable; and · state how the plan will be adapted to evolve over time according to changes and measurement results where applicable.
3.	All management plans will be prepared in consultation with the stakeholders, employees, the applicable community(s) and/or visitors.
4.	All management plans will be subject to regular review and updating during all Project phases, based on the results of the monitoring and control.
5.	The company will maintain a registry of inflows and consumption of chemical products used in the laboratory within the concentrator plant.
B. Air Quality	
1.	During the detailed engineering and construction phases, engineering controls for atmospheric emissions as identified in the deliverables from the feasibility study will be developed and implemented in order to meet the first intermediate targets or IFC guidelines.
2.	Ensure that electrical generators meet IFC criteria are built and operated so as not to increase gas and particle emissions to levels exceeding the first intermediate targets or IFC guidelines. These also need to conform to the Honduran Regulation for the control of emissions by stationary sources, Executive Agreement No. 1566-2010.
3.	Atmospheric emissions (SO ₂ , NO _x , NO ₂) and particle emissions (PM ₁₀ , PM _{2.5}) will be measured during construction and operations by means of a station incorporating continuous weather data and installed at one of the locations previously used for air quality monitoring, namely the closest point in the town to the crusher, as well as a new station located close to the process plant and the ore storage sheds.
4.	Passive samplers will be used near mining areas to confirm the NO _x /NO ₂ results.
5.	The Honduran Governmental agencies also requested that a Monitoring Plan be carried out in the crusher area to monitor the following environmental variables: generation of noise, emission of particulates and emission of gases.
6.	The Honduran Governmental Agencies also requested that monitoring of gas emissions to the atmosphere and particulates be performed in the Bonanza area and near the mine entrance.

EI Mochito Mitigation Measures

7. Additional mitigation measures will be applied as necessary:

- increasing the use of water-spray dust control;
- increased ventilation of the mine post-construction to dilute any potentially harmful gases to an acceptable level;
- increasing maintenance and cleaning around dust-producing areas;
- enclosing emissions sources;
- wind shielding when possible;
- storage and handling of dust generating materials inside.

8. In addition to this, and specific to GHS emissions:

- EI Mochito will produce an annual GHG emissions report based on its report of fuel consumption in the previous year.
- The mine will ensure implementation of an efficient preventive maintenance program including maintenance of exhaust of scrubbers that come standard in all underground equipment.
- EI Mochito will make sure that all equipment and vehicles are kept in good working order.
- The mine will optimize vehicle and equipment movement to minimize travel and idling time.
- Fuel consumption and performance will be taken into account when new equipment and vehicles are purchased.

C. Noise and Vibration

1. EI Mochito will continue to ensure that all equipment and vehicles are kept in good working order along with their noise reduction systems.

2. EI Mochito will continue to maintain all its roads so that they are free of potholes and other irregularities.

3. The Honduran Governmental agencies also requested that a Monitoring Plan be carried out in the crusher area to monitor the following environmental variables: generation of noise, emission of particulates and emission of gases.

4. EI Mochito undertakes to implement mitigation measures when the noise levels produced by operations increase the baseline ambient sound level by more than 3 dBA or exceed the IFC guidelines; such measures include:

- Implement a noise management and monitoring plan to better understand inherent noise levels and the project contributions;
- ordering studies to ensure at-source noise reductions on mining equipment.

El Mochito Mitigation Measures

D. Water and Sediment

The Honduran Governmental agencies requested (the majority of these measures are already implemented but also continue to apply):

1. To the greatest extent possible, reuse the treated water for mine activities to reduce the amount of water discharge to receiving bodies and leverage natural sources.
2. Execute a Soil Erosion Control Plan that contains a description of the sensitive areas, the design of mitigation and control measures and their construction.
3. Areas susceptible to water erosion and where the suspension of sediments can be generated that affect stream beds and winter channels, or infrastructures, should be protected with sediment traps (gabions, stone walls, dams and others).
4. The company must have a sediment retention system in the lower part of the mine, in order to prevent the brush residues that fall from the conveyor belt or transport vehicles, from being dragged into the Raices creek during heavy rains; the company must provide periodic maintenance to this system (system is the sedimentation ponds at the outlet of Caliche tunnel).
5. Oily residues should be collected and confined safely, in order to prevent them from coming into contact with filtered water inside the mine.
6. All waters that are in contact with the mining process must comply with the National Technical Standard for the Discharge of Residual Waters to Receptor Bodies and Sanitary Sewerage (Agreement 058, published in the Official Journal La Gaceta on December 13, 1997), at the moment of release into the environment; specifically, the El Caliche Tunnel sampling point.
7. Update the Surface and Underground Water Monitoring Plan for "El Mochito Mining Operations" including the following monitoring points and others that are considered for total heavy metals (Zinc, Cyanide, Copper, Lead, Cadmium and Mercury):
 - Upstream of the mine site
 - Downstream of the mine site
 - Upstream of the concentrator
 - Waters below the concentrator
 - Zona El Rincón in the Raices creek (200 meters from the confluence of Yojoa Lake).
 - Yojoa lake
 - Raices creek above the El Caliche Tunnel
 - El Caliche tunnel
 - Raices creek under El Caliche Tunnel
 - El Nacimiento
8. The company must carry out surface and groundwater quality / monitoring immediately in case of spillage of tailpipe spill, immediately inform the DECA, CESSCO and the Mining Authority.
9. To forbid accumulation solid waste of any characteristic, within and close to the facilities that may cause contamination of soil, air and water bodies or damage to infrastructure.
10. If sterile rock or brushwood is found and not used in the process, it must be placed in an area where it does not affect the water sources near communities. That storage area must be conditioned for that purpose or look for other alternatives.
11. The contamination of water and soil sources with construction wastes is prohibited. Oils and fats from machinery, vehicles and trash in general, must be placed in containers with sufficient capacity for temporary disposal.

El Mochito Mitigation Measures

12. To avoid contamination of surface sources *E. Coli*, in the construction phase (extensions) of the project temporary sanitary facilities should be established, once the work has been built in its entirety, portable latrines should be installed with adequate sanitary measures in a proportion of one (1) for every ten (10) employees.
13. Prepare a Surface and Groundwater Monitoring Plan, the purpose of this plan is to determine the quality and quantity the water that is affected by the La Soledad TSF discharge. Therefore, a scale map 1: 10,000 should be presented where the sampling points are located, with their respective UTM WGS 84 coordinates. The following physical parameters must be analyzed as a minimum: Temperature, Turbidity and Capacity of the sampling point, Chemical Parameters: Conductivity, Ph, Hardness, Color, Dissolved Oxygen, Chemical Oxygen Demand, Biological Oxygen Demand, Heavy Metals (Zinc, Cyanide, Copper, Lead, Cadmium and Mercury), Suspended Solids, Sedimentable Solids. These parameters must comply with the National Technical Standard for Discharge of Residual Waters to Receptor Bodies and Sanitary Sewerage, published in the Official Journal La Gaceta on December 13, 1997 under agreement No. 0058.

These additional mitigation measures will be implemented in the spirit of the IFC EHS Mining Guidelines and to follow best practice:

14. Perform a Groundwater Study and Management Plan for the mine area as well as locally to understand the resource and better plan for its management.
15. El Mochito will continue its surface water quality monitoring program, which is designed to assess the impact of its activities on the surrounding areas.
16. El Mochito will continue to apply its wastewater monitoring program, designed to characterize wastewater and to identify sources of contamination and ways of reducing it.
17. A green buffer of at least 50 meters, where possible, will be maintained between watercourses and operation zones to prevent soil erosion. Alternatively, proper measures will be taken to preserve/ protect the watercourse.
18. Divert run-off from undisturbed areas around disturbed areas where possible.
19. Divert industrial sediment laden water to water treatment plant or other sediment management structures including sediment ponds, infiltration trenches or silt fencing.
20. Armour water management structures to prevent erosion and improve longevity.
21. Design water management structures for appropriate return periods (e.g., 1 in 200 year rainfall event) where needed.
22. Design roads with appropriate drainage and grades to minimize gradients where possible.
23. Keep revegetating disturbed areas as soon as possible.
24. Continue with the tailings dam management and monitoring plan.
25. Perform regular inspections and performance audits against the plan.

El Mochito Mitigation Measures	
E. Soils	
1.	El Mochito will implement waste management practices designed to ensure safe handling and storage of all hazardous waste to ensure no contamination of soil, air and water bodies or damage to infrastructure partially or totally. The company will comply with the provisions of the Regulation for the Integrated Management of Solid Residuals Agreement No. 1567-2010 and its manual.
2.	The Project undertakes to comply with all the requirements in El Mochito's hazardous materials management procedure to ensure that all potential sources of contamination are managed and controlled. Among other things: <ul style="list-style-type: none"> · precautionary measures will be applied during the transport, handling and installation of equipment containing oil; · all hazardous materials (including oil and fuel) used in construction activities will be stored in tanks or in areas with effective retention systems (such as retention basins) to prevent environmentally harmful spills.
3.	Machinery will be inspected to avoid leaks and spills of hazardous materials (hydrocarbons, chemicals, etc.): <ul style="list-style-type: none"> · spill control kits (including absorbents) will be kept on hand in locations where hazardous substances (including petroleum products) are handled; · maintenance of machinery and equipment will be done in El Mochito shops or in the mine, using safe methods for recovering and disposing used machine oil. Used oil will be collected according to El Mochito's hazardous waste procedure.
4.	Unless technically impossible, surface equipment and machinery will be fueled at the fueling station, which has a concrete surface and a no-spill nozzle.
5.	Accumulation of waste of any type will be avoided; recycling of scrap metal and other recyclables will be continued.
6.	Soil contaminated by construction activities or by a hydrocarbon spill will be sent to El Mochito's bioremediation area and reused on site when sufficiently remediated.
7.	Non-contaminated excavated soil will be disposed of within the mine site.
8.	Materials and equipment will be stored in an area or areas set up for that purpose in an industrial zone. Such areas will be fenced in and guarded by security personnel to prevent vandalism and theft as far as possible, which could result in soil contamination.
9.	El Mochito will keep a log and produce an annual report on the hazardous waste produced and where it is being stored or how it was disposed of.
10.	El Mochito will maintain an updated tailings management plan including the assessment of geotechnical stability of tailings material.
11.	When opening new roads, slopes will have physical stabilization work such as retaining walls, gutters lined with masonry or concrete, sediment traps and plants for soil conservation and in case that cutting down trees is required, the corresponding permit must be obtained from the Forest Authority.
12.	El Mochito will update and implement a Soil Erosion Control Plan that contains a description of the susceptible areas, the designed work for its control, as well as its construction
13.	The maintenance station for washing vehicles and heavy equipment will have oil traps that will be cleaned periodically.
14.	Residues of used oil, hydraulic liquids and other machinery maintenance products will be collected in suitable containers such as barrels and other type of containers and disposed of through oil recycling companies; receipts will be maintained and recorded to that certify their delivery in the ICMA's.

El Mochito Mitigation Measures

15. El Mochito will maintain an updated Contaminated Soil Management Plan that contains:
 - Description of the procedure for handling contaminated soils according to the contaminant.
 - Location of the final disposal sites.
 - Treatment used in the decontamination of soils.
16. El Mochito will manage their scrap facility to avoid over-accumulation of scrap, equipment or machinery through sales or recycling.
17. El Mochito will maintain their waste management plan to ensure:
 - No contamination of water and soil sources with construction wastes
 - That empty containers be disposed of per applicable operating procedures, according to what they have contained.
 - Oils and fats from machinery, vehicles and trash are placed in containers with sufficient capacity for temporary disposal.
18. El Mochito will manage cyanide storage in accordance with all relevant safety measures against spills, accidents, product handling.

F. Biodiversity

1. El Mochito will maintain their Environmental and Social Management Plan and modify their mitigation measures or studies if monitoring indicates additional effects not previously identified.
2. As part of the planning and operations, access to important biodiversity areas will be controlled and care will be taken, during land clearing as far as is possible, to leave natural corridors so as to avoid isolating patches of habitat.
3. To reduce the impacts on important biodiversity areas, El Mochito will make sure:
 - to clearly demarcate work areas by means of signs, barriers and fences;
 - to clearly demarcate the areas to be stripped and the areas where machinery may circulate, and to keep these to a minimum;
 - to prohibit workers and vehicles from circulating outside the work areas and access roads;
 - to avoid work in lakes, rivers and streams or on shores and banks except where absolutely necessary;
 - that an environmental advisor is present during any work in or near a watercourse.
4. El Mochito undertakes to reduce and control lighting levels at its permanent and temporary facilities by taking the following steps:
 - ensure lighting to the minimum needed for safety;
 - whenever possible, use directional lighting to avoid lighting up non-essential areas such as the sky and outside the work area;
 - use baffles to limit the lit area in highly sensitive zones;
 - wherever possible, use light towers that are low to the ground to reduce unnecessary lighting;

El Mochito Mitigation Measures

5. El Mochito undertakes to implement measures to ensure the use of good practices in vegetation clearing and soil stripping. These measures include:
 - educating the personnel doing the stripping operations about the importance of protecting the removed soil;
 - establishing a permit system for soil stripping;
 - making sure an environmental advisor is present during soil stripping;
 - taking steps to prevent accidental fires in the vegetation;
 - prohibiting vegetation burning as part of the clearing operations;
 - setting aside topsoil to be reused during site restoration;
 - letting plants grow in the soil stockpiles to stabilize them and protect them against the wind;
 - avoiding the destruction of riverbank vegetation;
 - minimizing impacts on mangroves as much as possible;
 - taking the necessary steps to prevent erosion and stream contamination.
6. El Mochito will set up an annual program for controlling nuisance and invasive species.
7. The Project, in conjunction with the Environment Department, will review the mine site rehabilitation approach and will apply the following actions:
 - zones no longer needed for operations will be rehabilitated as soon as possible in accordance with the closure plan for mined areas;
 - find local species during rehabilitation, use species that can contribute to the ecosystemic value of the habitat and avoid using foreign species.
8. El Mochito will promote community use of biodiversity and other ecosystem services by prohibiting hunting and harvesting of natural products outside the work area within its concessions by its employees and contractors except where otherwise provided by CSR agreements (for example harvest from Co. supported coffee plantations)
9. El Mochito will undertake to commission additional studies which the ESIA identifies as necessary, specifically: hydrogeological monitoring and conducting an aquatic resources study.
10. During the construction and operation stage of the Expansion, employees and contractors and communities will be instructed as far as is possible on the obligation to comply with the following:
 - Do not hunt
 - Do not kill, injure, maim, chase or catch any animal.
 - Do not destroy nests, cave or galleries.
 - Do not feed the wildlife.
 - Do not dispose of non-biodegradable waste (plastic bags, cans, etc.).
 - Do not perform any physiological needs outside the latrines
 - The cutting of trees, extraction of firewood or other plant products is not allowed.
11. El Mochito will maintain a record of Flora and Fauna sightings in the area of influence of the project.
12. El Mochito will implement the Surface and Groundwater Quality sampling program and respond immediately to spills and inform appropriate Authorities.
13. All septic tanks used in all the facilities of the mine will be maintained with maintenance documented.

El Mochito Mitigation Measures	
14.	El Mochito will continue with the reforestation and recovery works in parallel to development in the Pozo Azul and El Bosque dams, to guarantee the establishment of the forest.
15.	El Mochito will maintain the nursery established for the permanent plantation and subsequent immediate reforestation (of the three existing tailings dams, El Bosque, Pozo Azul and La Soledad).
16.	Orchids species and bromeliads and other epiphytic species that are identified in the area will continue to be collected and inventoried and protected in a nursery to be cultivated for their multiplication and a percentage will be re-planted in the zone, another percentage in the Santa Bárbara Mountain National Park and others will be donated to the residents for environmental education activities; these activities AMPAC are currently coordinated with the UMA Las Vegas, AMUPROLAGO and other related local and regional organizations.
17.	During the operation stage of the dam, the death of wild animals will be avoided and prevention of access by public through the maintenance of the perimeter fence surrounding the dam.
18.	At the end of construction and operations, disturbed areas will be restored / rehabilitated with reforestation activities.
19.	El Mochito will continue to implement a reforestation plan in an area equivalent to three times the disturbed and impacted area. The area to be reforested will be agreed upon with the jurisdiction municipality (s) and the ICF, having as a first priority the water supply micro-basins of the communities located within the area of influence of the project.
20.	El Mochito will submit the updated Reclamation and Closure Plan of the Soledad Dam to the Environmental Municipal Unit of Las Vegas, INHGEOMIN and MIAMBIENTE.
G. Health and Safety	
1.	El Mochito will maintain their OHS program through the Expansion and periodically review and update procedures.
2.	Regular gas monitoring will continue to be carried out and executed inside the mine per Company procedures in order to avoid occupational accidents and environmental contamination.
3.	The mine will perform biannual measurements of noise in all workshops and in the following areas where decibels are found on levels greater than 60 and apply the necessary Hygiene and Safety Measures such as: Use of plugs and rotation of employees: <ul style="list-style-type: none"> · Mill area · Central workshop · Industrial mine workshop · Carpentry shop
4.	All El Mochito personnel and subcontractors' personnel operating vehicles will be trained in road safety and will ensure that the whole area of the project and the exits of the machinery to the road be signed for road safety.
5.	The Project will continue with its program for tracking the number and severity of accidents in the mine, road and port zones and
6.	the preventive, corrective and compensatory measures implemented. This program is already in place for El Mochito operations.
7.	With the increase in the number of truck transport to the Port, the Expansion undertakes to implement the following measures: <ul style="list-style-type: none"> · reinforce with the community cooperatives the importance of road and truck safety · reinforce safe driving culture including in around urban, rural settlements and road intersections

El Mochito Mitigation Measures	
8.	El Mochito will ensure the workers who work in the mine have all the necessary safety equipment according to the activity they carry out.
9.	El Mochito will maintain eye wash stations and showers in the departments where the activities require this type of facilities.
10.	El Mochito will maintain a register of hazardous materials used by the company, identifying the points of the process where they are used, volumes handled, containers and conditions of storage, labeling and identification (Data Sheet), risks, precautions, actions to take in case of emergency; likewise, this record must be made at CESCO through the General Department of Chemical Products.
11.	Areas for storage of chemicals will be maintained and conditioned with ventilation and impermeabilized floor to avoid spills to the ground.
12.	The magazine will be properly signalized following the most stringent safety regulations in the handling; likewise, have a inventory control record of the inflows and outflows of explosives, the types of explosives used, and other relevant details.
13.	The company will ensure personnel who handle explosives are properly trained.
14.	The company will comply with the "Regulation for the Management of Hazardous Waste Generated in Health Establishments" Agreement No. 7 of February 28, 2008.
15.	El Mochito will continue to use the incinerator for the final disposal of hazardous waste generated in the clinic.
16.	The electric power generating plant will continue to be confined to a strategic area within the appropriately waterproofed premises, so that in the event of a fire or explosion, the life of employees or visitors is not endangered, nor cause significant damage to the existing infrastructure
17.	El Mochito will maintain a log of the maintenance of the generator plants and fuel storage tank.
18.	The domestic wastewater generated in the camps and offices will be treated so that the effluent complies with the national regulations on discharges.
19.	The Project will continue implementation of their procedures and programs that promote the prevention of communicable diseases.
20.	The company will ensure compliance with the Labor Code and the Health Code and Regulations that are in force through a certificate that will be requested annually to the Ministry of Health and Labor and Social Security.
21.	The company will comply with the General Regulation of Preventive Measures of Occupational Accidents and Diseases No. STSS-053-04 of October 19, 2004.
22.	El Mochito will provide its employees with water for human consumption that complies with the National Technical Standard for the Quality of Drinking Water (Published in the newspaper La Gaceta on October 4, 1995).
23.	El Mochito will maintain records of the inflow and consumption of sodium cyanide from the cyanide storage area, with date, quantities, time and signature of the responsible personnel.
24.	To avoid contamination of surface sources with faeces, in the construction phase (extensions) of the project temporary sanitary facilities will be established, once the work has been built in its entirety, portable latrines should be installed with adequate sanitary measures in a proportion of one (1) for every ten (10) employees.
25.	The camp and offices will maintain their storm drainage network to avoid stagnation of rainwater and generation of vectors.

El Mochito Mitigation Measures	
H. Social	
1.	El Mochito will continue engagement with stakeholders prior to and during the Expansion, and where required, address issues/concerns that arise through additional mitigation measures.
2.	Prior to the start of the Expansion Project, the company will apply its recruitment and selection procedure to the project and, per procedure communicate locally and regionally in ever increasing concentric circles around the project center of gravity informing potential job-seekers about the job opportunities offered.
3.	El Mochito continues to undertake and support education and vocational training programs, with emphasis for those less advantaged, including females.
4.	The El Mochito Community Relations teams will track demographic changes in villages in the mining area, based on the ESIA socioeconomic baseline as far as is possible.
5.	El Mochito will continue to maintain a centralized database containing the resumés of job candidates and updated regularly for the recruitment and selection process.
6.	The Expansion will guarantee good working conditions for subcontractors and employees, incorporating labor standards as requirements in the Terms and Conditions and providing for remedies in the event of a breach of commitment by parties.
7.	For the Expansion, as per current operating procedures, pre-employment medical checks will be provided for Construction workers along with medical care, including applicable vaccinations.
8.	El Mochito will implement training plans on a permanent basis in the subject of industrial safety to all company personnel.
9.	El Mochito will maintain their grievance mechanism to meet the IFC requirements.

8.5 Management Plans

8.5.1 Waste Management Plan

AMPAC currently has an active Waste Management Plan which it implements. A copy of this Plan can be found in Appendix 8B.

The El Mochito mine generates approximately 0.95 kg/person/day of waste of relatively low density waste of 144.88 kg/m³. The mine currently recycles plastic packaging made of polyethylene terephthalate (PET), 57 tonnes per year of scrap metal, and 343 tonnes per year of used oil. Waste that is not recycled is disposed of at the nearby municipal landfill. AMPAC provides equipment to help operate and maintain the landfill which is located outside of the mine footprint, and in addition pays a monthly fee that is used for its continuous maintenance.

To improve the sites waste management the mine has undertaken a detailed inventory of wastes generated from the site, including surface and underground sources. Based on the results of the survey the following waste management and disposal options were recommended and implemented to improve the amount of recycling and divert waste away from the landfill:

- Food and organic waste should be separated of at source for composting and used as fertilizer by local farmers when possible.
- Construction of a waste collection centre (waste transfer station) to store waste for recycling or resale (done).
- Separation of recyclable containers, plastics and electrical goods for recycling offsite (done).
- Light bulbs and nickel cadmium batteries should be separated at source and disposed of underground encased in concrete as mine backfill whenever they are used and disposed. No recycling options currently exist in country for these items. Containment underground is the disposal option considered to have the lowest environmental impact.
- Identification and separation of biomedical waste from other waste streams. Biomedical waste is incinerated, and the ashes landfilled.
- Recycle tires and rubber items to divert them away from the landfill as they are non-biodegradable and occupy a significant amount of space in the landfill. Some types of tires are sent to the cement factory. The ones that cannot be crushed there are donated to be used for recreational, decoration purposes and also to build retaining walls.

More detail on the management of waste is found in the Waste Management Plan.

8.5.2 Erosion and Sedimentation Control Management Plan

AMPAC currently has an active Erosion and Sedimentation Control Management Plan, a copy of which can be found in Appendix 8A. A review and revision of this Plan will be completed to ensure that all erosion and sedimentation control mitigation measures found in **Table 8-1** are included.

The main objective of this Plan is to provide guidelines to avoid unnecessary exposure of unprotected soils, as well as to identify the materials and techniques required to reduce the accelerated loss of soils during the construction and operation stages.

Other objectives of this Plan are the following:

- Reduce the generation and dragging of sediments in the areas intervened during the construction stage.
- Establish maintenance and monitoring activities for the structures to reduce erosion and trap sediments during the construction phase.
- Establish a permanent supervision plan for the built infrastructure during the construction and operation stage, especially after significant rain events.

8.5.3 Biodiversity and Revegetation Management Plan

The El Mochito mine began operations in 1948 using underground mining techniques, which minimize the disturbance in the area. Most of the space used by the company is occupied by the storage facilities and transportation of debris from the entrance of the mine, mechanical shops and mills. The tailing dams in the property constitute the most important environmental areas.

AMPAC's objectives for the management and regeneration of impacted areas are

- To recover the health and fertility of the land to make it self-sufficient and return it to its original state,
- to provide suitable habitat for wildlife and a balanced ecosystem free from external management, and
- to create an aesthetically pleasant landscape compatible with the surrounding environment

Currently the mining project has three tailing dams, El Bosque, Pozo Azul which were already closed and reclaimed, and the currently active tailing dam of La Soledad, which replaced Pozo Azul.

AMPAC maintains a nursery established for the permanent plantation and subsequent immediate reforestation (of the three existing tailings dams, El Bosque, Pozo Azul and La Soledad). From here, species are used in replanting and reforestation. Plants are planted in the same proportion as they are in their natural state, according to the guidelines from forest inventory prepared in June of 2004.

Orchids, species and bromeliads and other epiphytic species are identified in the area designated for clearing. They are then collected, inventoried and protected in a nursery designated specifically for the purpose. In the nursery, they are cultivated and reproduced where a percentage is used for re-planting in designated reforestation areas, inside the property, but also a percentage is used in the Santa Bárbara Mountain National Park, while others are sometimes donated to local residents for environmental education activities. These activities by the company are coordinated with the UMA Las Vegas, AMUPROLAGO and other related local and regional organizations.

The currently mitigation and forest management plan focuses on the reclamation and reforestation of the three tailing dams and the borrow pits used in the construction of the dams. AMPAC is managing approximately 500 hectares under forest management plans (Figure 8-1) with ten locations selected for reforestation (96 ha) and one protected area of 167 hectares called Manantiales, which is an area of undisturbed natural forest protected by AMPAC. Additionally, this area has been used to provide environmental talks with the local schools, workers and the community. Manantiales also contains natural springs that supply the Project and the community with potable water (Section 5.6).

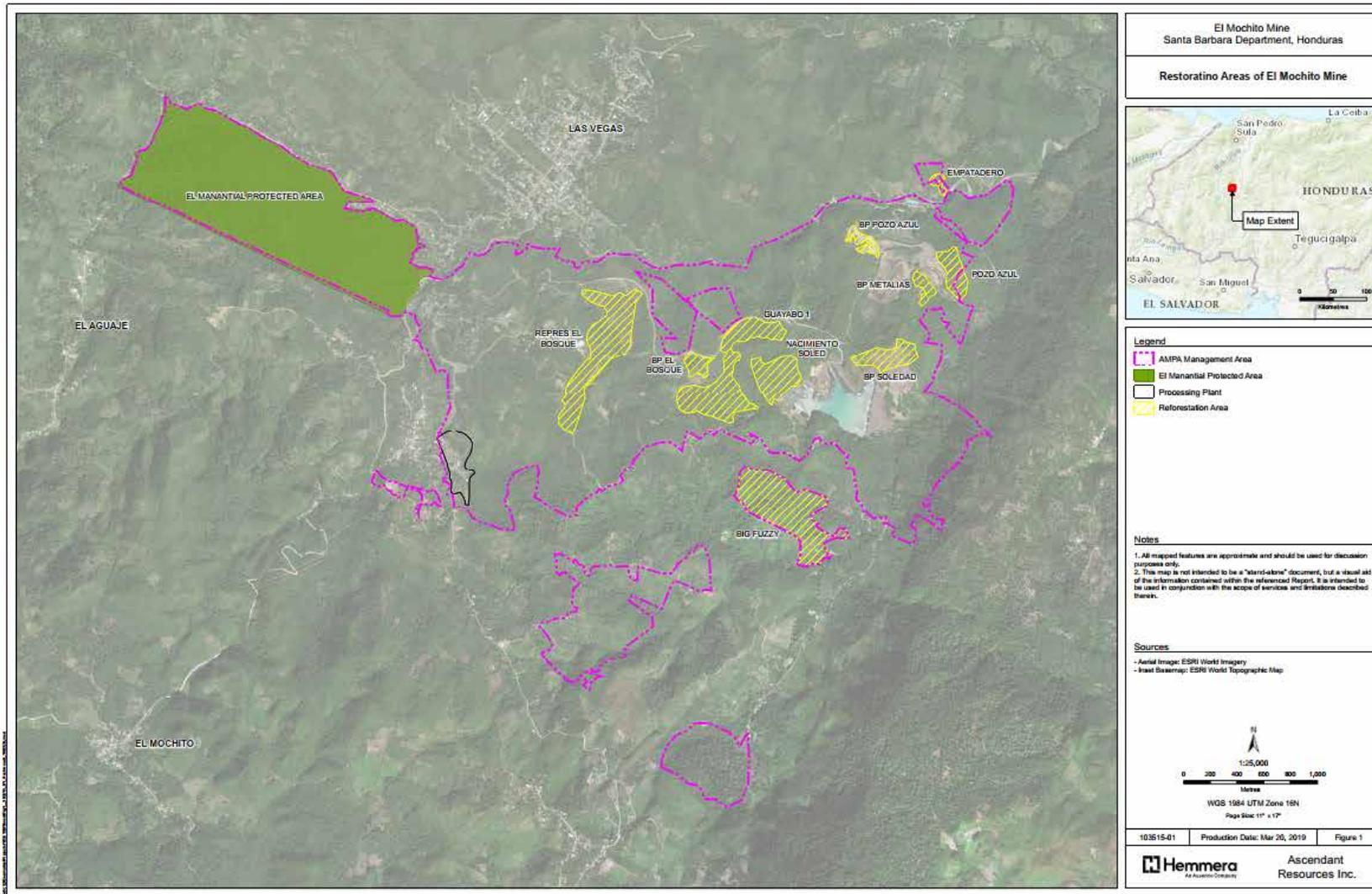


Figure 8-1 Reforestation and management areas of El Mochito mine

Several activities were carried out for the recovery of organic layers in the reforestation areas. These activities started with the dam of El Bosque, which was the first dam to be reclaimed for reforestation. The first step was to measure density of the tails. They showed results until 1.92 t/m^3 and provided good access to the surface for the closure activities.

Once the density of the tails was determined, the area was covered with a layer of clay and organic material which was used for the re-vegetation and reforestation process. The process of reforestation starts once the soil is stable. All seeds and seedlings used for the reforestation process are kept on a greenhouse located in the project area (**Figure 8-2**). The greenhouse has native species that are monitored constantly and will be transplanted to the reforestation areas once they are mature enough to survive on their own. Additionally, green house also counts with an area for the cultivation and preservation of local orchids (**Figure 8-3**).



Figure 8-2 Greenhouse with seedlings from native species used for the reforestation of management areas



Figure 8-3 Nursery for the cultivation of native orchid species

8.5.4 Water Related Management Plans

The results of the effects assessment on water quality and quantity revealed the need for additional management plans to enhance ongoing activities and enhance overall knowledge and use regarding this resource.

The following Water related Management Plans will be implemented:

- Groundwater Study and Management Plan for the mine area as well as locally to understand the resource and better plan for its management;
- Aquatic Habitat Study and Management Plan to understand the resource within Raices creek as well as the downstream Habitat resulting from the discharges (Note: initiated April 2019).
- Updating mass water balances for the project overall and identify as many opportunities for re-use of water as possible. A study dedicated to the reuse of mine water will be implemented.

8.5.4.1 Groundwater Study and Management Plan

There is a long history of dewatering at the mine (~70 years) and probably a quasi-steady-state situation exists in the local aquifers with respect to drawdown and dewatering. The effects to the environment are likely subtle because flow in local creeks may have increased from the underground discharge and high precipitation probably obscures visible effects.

With the expansion, an increased dewatering rate might be anticipated and this could increase the drawdown of the local aquifers. Predicting (modelling) inflows in a karst limestone terrain is challenging because the flow equations are no longer valid as groundwater can move in channels, therefore any modelling exercise would have a high level of uncertainty associated and is unlikely to help the project beyond what is already anticipates from deepening the mine: a 50% increase in inflows. Water management will be planned by cover drilling ahead of the mining to locate any major water-bearing structures and avoid the risk of flooding the mine.

The following activities will take place as part of the Groundwater Management Plan:

- Document existing monitoring system and database
- Update overall site water balance, including groundwater
- Update water monitoring program to meet requirements
- Equipment installation and monitoring plan
- Revise water balance with recommendations on data gaps and system improvements
- Integrate into mine / compliance reporting system

8.5.4.2 Aquatic Habitat Study and Management Plan

In order to better understand the current aquatic habitat present in the Raices creek upstream and downstream (resulting) of the discharges, an Aquatic Habitat Study and Management Plan needs to be implemented and this program was initiated in April 2019.

Aquatic habitat sampling sites will be set along the Raices creek. One reference site will be located at least 4 kms upstream of any Project discharge and approximately 1 km upstream of the town sewage plant. One aquatic habitat sampling site will be located 1 km upstream of the caliche discharge (mine water), one

sampling site will be located between the caliche and Soledad TSF discharges, and one sampling site will be located downstream of the discharges in Raices (but after its junction with Palmar creek).

Sediments

Sediment quality samples will be collected at four sites in March-April 2019. A list of physical and chemical sediment quality variables to be examined from the stream sites will be determined in accordance with applicable guidelines.

Sediment samples will be collected in triplicate at each stream station using appropriate sampling equipment. Sediment will be spooned from the top 5 cm in deposition zones at each station. It will be pooled (excess water drained off) and manually homogenized for one minute in a mixing bowl. Sediment will then be carefully spooned into clean, pre-labelled Whirl-Pak bags, sealed (no air bubbles), and kept cool and in the dark until shipment to an accredited laboratory. All sediment samples will be collected in areas that can be accessed safely.

Sediment description with photo-documentation will also be completed. Sediment analyses will be conducted by an accredited lab. For quality assurance/quality control (QA/QC) purposes, duplicates will be collected for 10% of all samples to assess field homogenization.

Primary Producers - Periphyton

Periphyton are a diverse group of algae that are attached to various submerged substrates in the aquatic environment. They are one of two photosynthetic groups in streams (macrophytes or rooted aquatic plants are the other) and provide the food energy and substrate for other organisms. Like benthic invertebrates, they are strongly associated with the stream substrates and are subject to the surrounding environmental conditions. Thus, changes to this community can reflect environmental change and initiate a cascading effect on the upper trophic levels.

Periphyton samples will be collected from four stream sites in Q2 – summer season 2019 (has to be early summer or productivity season), concurrent with sediment quality and benthic macroinvertebrate sampling. Periphyton samples will be scraped from three separate rocks found in the streams. For each rock, a fixed area (i.e., circular areas of known size) from three patches on the rock will be scraped and pooled together in order to accurately characterize periphyton coverage on each rock. Periphyton results for each rock will be normalized to the area sampled. Periphyton samples will be collected for community taxonomy and biomass (as μg chlorophyll a/cm^2).

Taxonomy samples will be retained in 250 ml plastic bottles, preserved with Lugol's solution, and shipped to the identified laboratory for identification and enumeration to at least the genus level. Periphyton density and various diversity indices (richness, Simpson's Diversity Index, and Evenness) will be calculated for each sample.

Biomass samples will be field filtered onto a $0.45 \mu\text{m}$ filter, frozen, and kept in the dark until analysis is conducted. The identified lab will process and analyze all chlorophyll a biomass samples.

Secondary Producers – Benthic Invertebrates

Benthic invertebrates constitute an important food source for fish, and are known to be effective bio-indicators of changes in environmental quality. Benthic invertebrates typically form a critical part of effects monitoring programs, and collecting quantitative baseline data will allow for a future environmental monitoring.

Benthic macroinvertebrates will be sampled in Q2 – summer season (has to be early summer or productivity season) 2019, at four sites, concurrent with the sediment quality and periphyton collection. Five replicate samples at each site will be collected using a Hess sampler with a surface area of 0.096 m² and a mesh size of 250 µm. Each replicate will be composed of three grabs and will be collected a minimum of 25 m apart or located in separate braids of the stream. The sampler will be driven 10 cm into the sediment of an undisturbed riffle zone, facing upstream with the cod-end facing downstream. The sediment will be disturbed for one minute allowing the stream current to rinse the suspended benthos into the cod-end. The collected material will then be rinsed through a 250 µm sieve bucket, with the remaining material being placed into a plastic jar and filled with a 10% buffered formalin solution. All samples will be sent to the identified laboratory] where they will be sorted, counted, and identified to the lowest taxonomic level. All samples will be transferred to 70% ethanol prior to analysis and storage. Benthos density and various diversity indices (richness, Simpson's Diversity Index, and Evenness) will be calculated for each sample.

Fish Habitat

Stream habitat assessments will be conducted at the four stream sampling sites described above. The first step in the detailed habitat assessment will be to identify habitat types (pools, glides, riffles and cascades) along the section. Pools are defined as areas of slow flow where water collects in a deeper section of channel that may be dammed by debris or scoured by high flows. The gradient of a pool is less than 1%. Glides are areas of smooth, laminar flow where the streambed is relatively flat (i.e., not scoured). Riffles are areas of turbulent flow with a gradient between 1 and 4%. Cascades are defined as areas of tumbling turbulent flow with a gradient exceeding 4%. The second step will be to measure and assess the physical features within each habitat unit, such as slope, mean depth, mean width, substrate composition, flow velocity, availability of cover for fish, potential barriers, bank stability and bank height. Measurements will be collected with a measuring tape, meter stick, clinometer (for slopes) or visually estimated. The physical attributes of surface water, such as temperature, conductivity and pH will also be recorded.

Fish Community

The four stream sites will be used to monitor fish populations and fish health throughout and beyond the life of the Project. The establishment of these sites and the collection of baseline data are essential for the future development of an Aquatics Management Plan. This future management and monitoring plan/program will track changes in fish communities and fish health throughout the Project area. These data may also be used to track the success of mitigation measures and proposed compensation projects.

At each site fish community composition and relative species abundance will be sampled using traps and backpack electrofishing gear to ensure that representative species and fish numbers are present. If the fish community and stream size is appropriate, three-pass multiple removal/depletion electrofishing methods will be conducted over a minimum 25 m-long stream section isolated with block nets. This is a common method used for enumerating fish in small streams. Fish density will be used as an index of abundance, not absolute abundance, for the multiple removal/depletion method (Johnson et al. 2007).

Data for a number of variables will also be collected to assess effects of the Project on fish in the receiving environment relative to those fish in the reference environment. Data will include fish community assemblage, fish species relative abundance, fishing effort, length, weight and external health (i.e., deformities, erosions, lesions and tumours or DELTs). Scales, otoliths or pelvic fin rays will be taken from fish for age determination. Fish aging structures will be sent to the identified laboratory for analysis.

Aquatic Ecosystem Services

During the consultation on the Expansion project, supplementary questions will be asked to members of the community to identify potential uses of the Raices creek and its aquatic resources.

8.5.4.3 Water Management Plan

A consolidated Water Management Plan will be produced that will comprise references to the mitigation measures described in **Table 8-1** and their inspection / performance, reference to the current but updated mine operations and tailings dams water quality monitoring programs (see Section 8.6) as well as to non-contact water diversion channels, as per **Figure 8-4**.



Figure 8-4: Water Diversion Channels

Finally, the consolidated Water Management Plan will reference the sediment control measures already established to deposit TSS contained in the Caliche discharge prior to it reaching the Raices creek (particularly of interest will be the changes, if any, to those structures given that there will be an underground water clarifier post-expansion). It will be important to design water temperature control measures to ensure the temperature differential between both the Caliche and La Soledad TSF discharges and the receiving waters is below 3 degrees C in so far as possible.

The Caliche tunnel mine water is diverted to surface sedimentation basins, where a new solid precipitation process takes place, prior to the discharge to the stream. The first basin started operations in 2013; the second basin in 2018. The latter functions in parallel to the first basin so that alternate use can take place during cleaning activities.



Photo 8-1 Caliche Sedimentation Basin 2013



Photo 8-2 Caliche Sedimentation Basin 2019



Photo 8-3 Satellite Image of Sedimentation Basins



Figure 8-5 Design of sedimentation basins

8.6 Monitoring Programs

8.6.1 Air Quality Monitoring Program

As part of ongoing work and post Expansion monitoring, an Air Quality Monitoring Program will be put in place to measure air quality parameters presented in Section 5.4 and any changes related to the Expansion.

8.6.2 Noise Monitoring Program

As part of ongoing work and post Expansion monitoring, a Noise Monitoring Program will be put in place to measure noise as presented in Section 5.5 and any changes related to the Expansion.

8.6.3 Mine Operations Water Quality Monitoring Program

The current Mine Operations Water Monitoring Program can be found in Appendix 8D. The monitoring program establishes the parameters for monitoring the quality of the receiving environment components (creeks) that could be affected during the operation of the mining project; in accordance with Honduran environmental standards. The monitoring started in the year 2000 and will continue to be carried out during the mining operation, through closure and post-closure.

This monitoring program will be updated to include:

- IFC EHS Mining Effluent Guidelines parameters - oils and grease;
- Breakdown of results for dry and rainy seasons, particularly to account for the difference in flows within the receiving environment;
- As much as possible, include monitoring at Aquatic Habitat stations.

8.6.4 Tailings Water Quality Monitoring Program

The La Soledad TSF Water Monitoring Program was produced to fulfill a requirement by the Honduran Governmental Agencies related specifically to the TSF. If possible, the two monitoring programs should be consolidated and should comprise the additional information listed above, plus groundwater monitoring stations and results as discussed in Section 8.5.4.1.

The current La Soledad TSF Water Monitoring Program can be found in Appendix 8C.

9.0 OCCUPATIONAL HEALTH AND SAFETY

9.1 Occupational Health and Safety Management System

The Annual Occupational Health and Safety Plan (OHSP) for El Mochito includes the planning, organization, direction, execution and control of activities aimed at identifying, evaluating and controlling all those sources, actions and situations that could affect the health or physical integrity of workers, facilities, work environments and productive processes.

The objective of the OHSP to reinforce and integrate the health and safety culture of El Mochito Mine through the dissemination of policies, standards, procedures and procedures, and the active participation of all members of the organization as leaders of the health system and security.

The OHSP is part of the OHM Management System of El Mochito Mine and is led by the General Management of the Unit through the Occupational Health and Safety Joint Committee which refers to national and international safety and health-at-work regulations as references (National legal standards: D.S. 055-2010-EM / D.S. 009-2005-TR / Law No. 29783 - Occupational Health and Safety Law. International Standard: OHSAS 18001: 2007).

9.1.1 Objectives

The OHSP covers all activities carried out by company employees and contractors, inside and outside industrial facilities, provided that they are carrying out activities required by AMPAC.

The general objectives in Health and Safety of Mina El Mochito for the year 2018 are:

- Eradicate incidents with fatality from our operations.
- Reduce the frequency and severity of incidents with injury.
- Strengthen the Safety and Health culture throughout the project and improve it continuously, sharing best practices with our collaborators and neighboring communities.
- Ensure compliance with the Internal Regulations on Occupational Health and Safety and the National Legislation applicable in an integral manner in all areas of El Mochito Mine.
- Demonstrate Leadership in Security through the visible commitment of the General Management, Managers and Superintendents so that through teamwork, the solutions focused on prevention are part of the daily work of supervision with advice and monitoring of the Health and Safety Management.
- Develop programs to monitor the health and welfare of the worker.

9.1.2 Goals

The Health and Safety goals of El Mochito mine are:

- Zero injuries with fatality.
- Reduce by 50% of lost time injuries over 2018.
- Reduce by 20% the restricted work injuries over 2018.
- 100% compliance with the legal requirements applicable to our processes.
- 80% compliance with the training programs of each department.

- 100% compliance with the training program in response to emergencies.
- 100% in compliance with the inspection programs.
- 100% in compliance with corrective actions for incidents and inspections.
- 100% of mine fronts meet ground control standards.
- 100% of mine fronts meet ventilation standards.
- One (01) planned task observation / Week report for each unit supervisor.

9.1.3 Program Elements

The Elements of the OHM system are described below:

- Element 1: Leadership and Responsibility
- Element 2: Legal Requirements and Commitments
- Element 3: Change and Risk Management
- Element 4: Planning, Objectives and Goals
- Element 5: Awareness, Competence and Behavior
- Element 6: Communication, Consultation and Participation.
- Element 7: Project Management
- Element 8: Operations and Maintenance
- Element 9: Contractors, Suppliers and Partners
- Element 10: Assistance for processes
- Element 11: Support for products
- Element 12: Crisis and Emergency Management
- Element 13: Incident Management
- Element 14: Supervision, Audit and Review

Leadership and Responsibility

Our managers, superintendents, supervisors and workers demonstrate effective leadership in line with national legislation, the code of conduct, AMPAC's "Safety comes first" standard, our policies and our "Towards Zero" vision, they know what They are responsible and account for their performance.

They demonstrate a commitment to constant and unwavering leadership with safety, health, the environment and communities through the integrity of leadership and a growing and visible participation in all matters concerning safety and health.

Effective leadership in safety, health and the environment is a prerequisite for promotion; Specific and quantifiable activities and objectives of safety, health and environment are included in the performance plans and valuations of all employees.

All employees are considered systematically responsible in a fair and effective manner for performance and individual and group behavior with respect to safety and health.

All employees and contractors understand their responsibility ought to effectively use their authority to interrupt any work that may cause damage or unacceptable risks, correct such situation or bring it to the attention of management.

In Mina El Mochito, "Visible Leadership" is prioritized in the workplace. Therefore, leaders (all supervisors) are expected to be clearly visible, leading and supporting good safety, health and environmental practices; being accessible to the workforce for feedback and reinforcement.

The priority of "Visible Leadership" is also evident in the deployment of the Leadership Development Program. The intention of this program is to develop leadership competencies in the company, training up local skills as much as possible. It will be offered to employees who formally lead or have to influence each other's understanding of the role and expectations of a leader, providing them with the basic skills of managing people in order to effectively fulfill their role.

The leadership and responsibility of the employees and leaders of Mina El Mochito are also demonstrated through the establishment and operation of the Occupational Safety and Health Joint Committee, which according to the legislation is the highest authority in matters of safety and health within The business' organization. In the unit, the Occupational Health and Safety Joint Committee is parity and will be constituted by 05 (five) representatives of the company and an equal number of representatives of the workers. Its hierarchy is respected by all in the unit and performs its functions without any obstacle

Legal Requirements and Commitments

We have systems and processes to ensure that we fully comply with our legal obligations and other commitments established with regulatory authorities or as members of the business community. There are effective systems to acquire and maintain a deep knowledge of all applicable health and safety laws and regulations.

Our organization complies with applicable health and safety laws and regulations and is able to demonstrate such compliance, including the maintenance of consent records. Systems will be implemented to solve problems of noncompliance with applicable health and safety laws and regulations as soon as reasonably possible. The unit has a system to document, implement and evaluate compliance with the voluntary agreements that we subscribe to as members of the business community.

When local legislation does not require an adequate level of safety and health, the activities are carried out in accordance with the values of the company, the management standards of the company and the relevant international standards and practices.

Change and Risk Management

We understand and manage our business risks to avoid damages and maximize value for our shareholders. We have specific processes to identify and manage our critical processes and risks. We are open to new ideas and constantly seek the best way to do things, while making sure to identify and respond to any new risks that arise from the changes.

The risks and opportunities for safety, health, the environment and the community arising from our operations are documented, evaluated, prioritized, managed and shared between work areas and with

workers in an appropriate manner to avoid damage. We have a risk register (Risk Profile), which provides interested parties with current information on risks in the work area. The registry covers all aspects of safety, health, environment and community, and guides decision making at the workplace level. The center's infrastructure, equipment, processes and human resources are included in the risk analysis program.

The hierarchy of controls is applied systematically to ensure the safety and health of our people, our environment, our community and our operations.

The critical aspects of the business are identified, which represent a risk with potentially catastrophic consequences. Subsequently, they are reviewed annually through a control methodology and a risk analysis based on the group. The implementation of rules, requirements and recommendations resulting from such studies reflects our philosophy of "Safety is First".

Effective management of the change program guarantees the continuous protection of safety, health, environment and community when changes are made to the center's infrastructure, equipment, products, operations, organizational structure or personnel. Therefore, all projects and major changes in the equipment, infrastructure, process, etc. they will be reviewed and approved by the Safety and Health Manager or his representative. Using formats of IPERC Base for Processes, 5 Security Points, Analysis of Safe Work (ATS) and Continuous IPERC.

Planning, Objectives and Goals

We develop the AMPAC strategy with effective planning processes, establishing objectives and defining demanding and realistic goals. The objectives of the center support strategies, objectives and corporate health and safety policy.

Every year, objectives and goals are defined that are demanding, quantifiable and achievable, as well as performance indicators that are proactive (in advance) and reactive (delayed); Progress is monitored, communicated and used to perform internal and external comparisons.

There are strategies and formal plans to achieve the objectives and goals of safety and health of the center. These plans will specify resources, deadlines and include programs and initiatives required by the group.

Management will allocate the necessary resources to implement health and safety plans and strategies to achieve the objectives and established goals.

The description of the objectives will always meet the following requirements:

- Be related to the main risks of the mining unit.
- Include the prevention of injuries and illnesses.
- Include compliance with legal requirements and other commitments acquired through contracts or agreements.
- Include aspects related to continuous improvement (raise the performance of the good).

Awareness, Competence and Behavior

Our people are aware of what they must contribute, have the skills, training and skills to competently perform their functions and systematically demonstrate positive behaviors that reflect in AMPAC.

Employees, temporary workers and contractors receive induction and continuous training on recognition, evaluation and control of risks to safety, health, the environment and the community, both in routine situations and in non-routine situations.

The competencies required for all personnel are identified and documented. Systems are available to meet these needs through training programs and constant verification of training and competence.

An effective process of management of safety and health behaviors commits all personnel, promotes safety leadership, builds a positive culture of safety and the environment, and leads to the systematic identification and correction of behaviors in situations of risk.

An effective training program can reduce the number of injuries and deaths, property damage, legal liabilities, illnesses, workers' compensation claims, and lost work time.

Safety training classes help establish a safety culture in which employees help to promote safety procedures during work. For us it is important that new employees have the training and accept the importance of safety at work, since it is easy for experienced workers to negatively influence new hires. This negative influence, however, can be nullified by the establishment of new forms of innovative and effective safety training that ultimately lead to an effective safety culture.

They have been considered as activities to raise awareness and improve the competence and behavior of our workers:

- Basic Induction for new workers (permanent and temporary): It consists of 16 hours of theoretical and practical training in aspects of safety, health, environment and communities.
- Training in the Work Area for new workers (permanent and temporary): Consists of theoretical and practical learning of safety aspects and work procedures. This training is equivalent to 32 hours of training given in 8 hours for 4 days and will be in charge of a supervisor assigned by the work area.
- General Safety Induction for visitors: Safety induction whose objective is to present to our company as well as its philosophy of work and safety.
- Internal and external training programs: These are programs based on topics related to safety and work according to the competence needs identified for the personnel. These programs will be developed in coordination with the Superintendent of Training and Development. The leaders of the work areas must maintain active participation in the development of these programs.
- Safety meetings with workers: These are formal meetings scheduled with all mine workers. Various topics will be discussed, although it is suggested that the meeting focus on one or two main themes. These meetings should be held in a meeting room and may involve a guest speaker, visual aids, training videos or rounds of questions and answers. These meetings can take from 30 minutes to 1 hour, and will be developed by each area leader (Superintendent or Area Chief).
- Reinforcement of offenders to safety standards: Safety training sessions with workers who violate safety standards. These trainings will be executed by the leaders of the work areas.

- 5-minute daily instructions: Safety and / or work talks given daily by the supervisors to the members of their teams at the beginning of each working day.
- Evaluation and training in rock support: Practical training in rock support in situ (in mine work) according to a daily program for crews of workers for labor.
- Planned observation of tasks: They are reviews of the operative practices, work methods and work procedures of the unit. Workers can be observed by individual or in work groups and will be executed by the supervisors of the work area.
- Training prior to the start of high-risk jobs: Every time a high-risk job is developed, the team of workers must be instructed by the responsible supervisor regarding the hazards, risks and controls identified and applicable in the activity to be developed.

Communication, Consultation and Participation

In the procedures established to encourage participation and consultation, the following will be sought:

- Involve workers in the identification and control of hazards, risk assessment and determination of controls.
- Involve workers appropriately in the investigation of incidents.
- Involve workers in the development and review of policies and objectives.
- Consult workers and contractors where there are any changes that affect their safety and health.
- Be represented in matters of safety and health.
- Inform workers about their forms of participation, including who their representative (s) are in SSO matters.
- Ensure that people exposed to the risk of any activity are consulted on relevant SSO issues.

Project Management

Our projects are planned, implemented and reviewed to ensure that we achieve the desired business results according to the plan. Our processes of design, construction, commissioning and withdrawal of service and mine closure planning will take into account the main practices.

The safety, health, environmental and community aspects of the projects are evaluated during the decision-making, design, construction and start-up / removal processes to ensure compliance with applicable laws and regulations, sound risk management principles and changes, and the company's standards, procedures and best practices.

Reviews and inspections are carried out before and after commissioning to ensure compliance with safety, health and environmental requirements; the learnings are documented, used in future projects and applied during the existing health and safety programs.

Operations and Maintenance

Our unit operates and is maintained in such a way that continuous improvement in productivity, reliability, safety and environmental performance is recorded.

The operating requirements in terms of safety, health and environment and the limitations for safe operation are documented and understood. Standardized procedures and practices are established and used to systematically control operational risks and to minimize environmental risks and impacts.

Hazards related to tasks are systematically identified and controlled through a work safety analysis process carried out in a team, which generates standard operating procedures or work instructions for routine tasks or through a system of work permits for non-routine tasks. .

The essential equipment is identified to guarantee compliance and the performance of safety, health and the environment. The effective systems of testing, inspection and monitoring ensure the presence and operation of safety devices and equipment, the structural integrity of tools, equipment and infrastructures, and compliance with emission or physical, chemical and biological exposure limits.

Effective systems of preventive maintenance and organization guarantee the continuous prevention of damage from the operation of plants, tools, equipment and infrastructure. Programs established include:

- Complete program of tests covering equipment for emergencies and thermal and electrical safety devices, processes, fire and combustion; specifying responsibilities, procedures and frequencies of tests and records required.
- Comprehensive inspection program that covers tools, electrical cables, ladders, hoists, lifting devices and equipment to work at heights; specifying responsibilities, procedures and frequencies of inspection and required records or as appropriate. The inspection program will be based on the requirements of the General Regulation of Preventive Measures of Work Accidents and Occupational Diseases.
- Monitoring program, which covers at least physical, chemical and biological exposure; specifies the responsibilities, procedures and monitoring frequencies and records required.
- Ergonomics studies, as specified in the corresponding procedures.
- Preventive maintenance programs for all tools, equipment and mobile units, as appropriate, and compliance with the programmed will be evaluated. These preventive maintenance will include all relevant aspects of safety, such as: condition of safety devices, vibration, overheating, safety of repairs and replacements, etc.

Contractors, Suppliers and Partners

We make sure that our suppliers of labor, services, resources and materials meet our requirements and standards. We guarantee that our interactions are ethical and contribute to mutually beneficial business.

The contractors, suppliers and partners and their products are selected based on criteria that include a risk assessment based on programs and performance in safety, health and the environment.

Formal contracts specify the requirements for contractors, suppliers and partners to comply with all applicable laws and regulations on safety, health and the environment, and to act in accordance with the values, standards, norms and policies of the company regarding safety, health and the environment.

A clear responsibility must be defined and maintained to manage the activities of contractors, suppliers and partners in the center.

There are effective programs based on safety, health and environmental risks for contractors, suppliers and partners that include training, communication, continuous supervision and comments, as well as responsibility for performance and behavior regarding safety, health and the environment.

When agreements with the community have been established for the supply of labor, services, resources and materials in order to support the development of the local community, they are documented, communicated and complied with.

Contributions to our contractors, suppliers, partners and communities will be measured and documented.

Assistance for Processes

The activities of our processes are carried out in such a way as to avoid damage and support the welfare of our people, our local communities and the environment that surrounds us.

There are programs that improve the safety, health and well-being of employees, their families, the local community and the physical environment.

There are programs to improve the efficiency of resource use by minimizing the consumption of energy, water and raw materials in process operations and supply chains, when appropriate.

Effective systems of environmental supervision and operational controls are established and maintained to ensure that all significant impacts of emission sources to the environment are identified, quantified and minimized.

Plans are put in place to manage the land and operations to minimize the footprint produced by the center and the impacts on biodiversity.

All centers will develop land management plans that include effective progressive remedies and the proper disposal of stored wastes in line with the intended use of the land after closure. All mining centers will develop closure plans.

The company's specialists in safety, health and the environment actively participate in industrial, professional or company networks, making significant contributions to safety, health and the environment throughout the industry.

Purchasing and Supplier Management

We work with our clients to understand their business. We encourage and facilitate the use of our products in a way that maximizes the efficiency of use of resources and benefits for society, while avoiding negative effects.

The risks to safety, health, the environment and the community related to transportation and the use that customers make of our products have been identified. Risks and controls have been identified and communicated to the relevant external parties.

Current safety sheets are available for all AMPAC materials transferred to third parties.

Crisis Management and Emergencies

We take into account and prepare ourselves for events that could interrupt our business. We have plans in place to effectively respond to the events that may arise and recover our normal commercial operations with the minimum loss of value for shareholders and minimal impact on our communities, customers and the environment.

Potential emergencies and crisis situations have been identified, and plans have been implemented to respond to such events.

All necessary resources are available to react effectively to emergencies and crisis situations, including equipment, supply and qualified personnel.

The activities of emergency drills and crisis management guarantee the effectiveness of the emergency response and crisis management plans.

Incident Management

All incidents are reported and investigated. We use the knowledge acquired from the incidents to minimize their reappearance in the future and we apply this knowledge throughout the unit.

There is a safety and health incident management protocol, which specifies functions and responsibilities in the event of an incident.

All safety and health incidents are reported, including quasi-incidents, properly investigated and analyzed for trends.

The investigation of incidents includes an adequate analysis of the root cause, a planning of actions and a follow-up when the corrective actions are completed.

The knowledge acquired from the safety and health incidents is immediately shared with the entire center when appropriate, to prevent the incident from recurring in other facilities.

Supervision, Audit and Review

We have processes in place to effectively monitor our business processes, check if we are fulfilling our commitments and review our performance to ensure that we can continue to improve.

Indicators are used for proactive and reactive to monitor the effectiveness and facilitate the continuous improvement of the safety and health program, and compare the performance with internal and external references.

There are ongoing review processes by management to assess the center's compliance with these management standards and the achievement of the center's objectives and goals.

Corrective actions derived from internal and external audits should be classified according to the risks and immediate priority actions should be implemented immediately.

In the case of unacceptable performance in health and safety matters, an "assessment of the intervention" of the management team is used to identify and eliminate the main obstacles to adequate performance.

9.2 Compliance with IFC Guidelines

AMPAC's operating procedures, designs, and standards are designed to fall within World Bank Group's International Finance Corporate ("IFC") Guidelines.

AMPAC recognizes that occupational health and safety issues occur during all phases of the mine cycle. To comply with aspects of the IFC EHS Guidelines, El Mochito has numerous standard operational procedures in place in the following categories:

- **General workplace health and safety** - Numerous procedures are in place, including safety indoctrination, training, emergency plans, hygiene and safety procedures, and use of personal protective equipment.
- **Communicable Diseases** - AMPAC recognizes that the nature of mining projects (e.g. location in remote areas with long material / product supply chains) requires proactive and sustained interventions to minimize the incidence and transmission of communicable diseases caused by the influx of migrant workers, associated extended family members and other service workers at the site. El Mochito has programs in place including brochure and video campaigns for education.
- **Specific Vector Control and Prevention Strategies** - AMPAC recognizes the need for specific vector control and prevention strategies and implements a fumigation program, donates insecticide for fumigation in the community, and delivers and educational campaign on Dengue prevention.
- **Non-Hazardous Waste Management** - AMPAC has established non-hazardous waste procedures at El Mochito including selling metal and non-metallic scrap materials, and recycling.
- **Hazardous Substances** - numerous hazardous substances practices and procedures are established at El Mochito including employee training on substance management and handling, ventilation and irrigation procedures for dust control, spill response, and reagent, asbestos and special waste management, and hydrocarbon-soil remediation. AMPAC makes use of cyanide in minute quantities as a depressant in the floatation process (not for the purposes of leaching as in gold plants); all cyanide is treated & destroyed in the cyanide destruction circuit before being pumped to the tailings dams. Sodium metabisulphite (MBS) is added to the tailings pump box which immediately destroy all cyanide radicals before leaving the plant.
- **Use of Explosives** - AMPAC has established numerous practices and procedures at El Mochito related to explosive transportation, handling, authorization.
- **Electrical Safety and Isolation** - electrical safety and isolation practices established at El Mochito include energy safety, critical energy isolation, power cuts, insulation, electrical maintenance procedures and emergency response to electrocution.
- **Geotechnical Safety** - AMPAC has established numerous geotechnical safety practices and procedures, including density procedures and reporting, tunnel and cavity scanning, confined space procedure, topographic surveys and dump designs.

- **Machine and Equipment Safety** - AMPAC has established machine and equipment safety practices and procedures at El Mochito including critical guards and protection, height restrictions, vehicle operation, loading and crane operations, procedures for vehicles and pedestrians inside the mine.
- **Fitness for Work** - Fitness for work practices at the mine include medical evaluations and testing, and the implementation of AMPAC's alcohol and other drugs policy.
- **Travel and Remote Site Health** - AMPAC has established travel and remote site health practices for the mine and operates a fully equipped 38 bed hospital at site, with 24hr doctor and nurse support, operating theatre, x-ray machine, two ambulances and other medical equipment.
- **Noise and Vibration** - AMPAC has established noise and vibration safety practices and procedures for El Mochito including management of explosives and blasting, personal protective equipment, noise monitoring and training.
- **Ventilation and Dust** - AMPAC has established ventilation and dust safety practices appropriate for underground mining at El Mochito including procedures for ventilation, irrigation for dust control, and training.
- **Fires and Explosions** - Fire and explosions safety practices and procedures are in place at the mine related to fire prevention, mine evacuation and emergency response, fire responses for a variety of scenarios, contingency planning, and fuel storage.
- **Refuge Bays and Self Rescuers** - El Mochito has established bay and self-rescuer safety practices. All refuge bays are within 30 minutes walking distance per Honduran mining regulations & self-rescuers provide 45 minute breathing capacity.
- **Illumination** - Illumination practices are established at El Mochito for within the underground mine, at the Soledad TSF, and at the Soledad Diversion Channel, as well as the plant and all those areas with night shifts.

9.3 Occupational Health and Safety Performance

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them.

The applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

9.3.1 Accident and Fatality Rates

AMPAC has succeeded in keeping the number of fatal accidents among project workers (whether directly employed or subcontracted) to a rate of zero since August 6, 2016. There have been 6 lost time incidents year to date and 59 events in total including minor events at the time of writing. This is materially lower than

previous year's performance. Since Ascendant resources took over the mine in December 2016 there have been zero fatal incidents. Facility rates may be benchmarked against the performance of facilities in this sector in developed countries through consultation with published sources (e.g. US Bureau of Labor Statistics and UK Health and Safety Executive).

9.3.2 Occupational Health and Safety Monitoring

The working environment should be monitored for occupational hazards relevant to the specific project. Monitoring should be designed and implemented by accredited professionals as part of an occupational health and safety monitoring program with recognition for post-closure long term health concerns.

AMPAC has established accident, fatality, occupational health, and safety monitoring practices for the Mine and related process plant circuit and use this to inform infrastructure design and daily practices. El Mochito maintains a record of occupational accidents and diseases and dangerous occurrences and accidents. Operating procedures are in place for incident investigations, recording statistics of incidents, and maintaining a safety incident reporting regime that is compulsory.

10.0 RECLAMATION AND CLOSURE

10.1 Introduction

El Mochito's reclamation and closure plan is conceptual in nature and is developed as an interim phase plan to coincide with mine operations. The plan will continue to be developed based on the results of additional technical studies and on-going reclamation planning.

The proposed upgrades to the mine and milling facilities as part of the Expansion are largely improvements to existing infrastructure. New development is restricted to the underground No. 8 shaft, which is entirely within the existing underground workings. Given the minimal footprint changes, the proposed upgrades and developments do not require any additions or changes to the 2002 Closure and Reclamation plan. The Closure and Reclamation Plan will be periodically reviewed and updated, and the next review will be completed by Q4 2019.

The following provides an overview of the current Reclamation and Closure Plan.

10.1.1 Objectives and Criteria

The reclamation and closure phased plan include the following components:

- Progressive reclamation activities;
- Cessation of mining and operations;
- Initial closure and reclamation, including an End-Land Use plan(capital phase);
- Post closure monitoring phase; and,
- Site abandonment.

The overall objectives of reclamation and closure of El Mochito mine site include:

- Develop a closure strategy, which meets or exceeds current Honduran environmental regulations where they exist. In the absence of specific guidelines and protocols for reclamation, follow best industry practice approach based on Canadian standards and AMPAC's corporate policy;
- End-Land Use plan to restore the land to a self-sustaining, natural state which is healthy, fertile, and astatically compatible with the surrounding terrain;
- Mitigation and control to within acceptable levels, the potential sources of pollution and public liability;
- Identify opportunities for transfer/annexation of acceptable facilities to the local community for continued use;
- Minimize post-closure monitoring/maintenance requirements following completion of reclamation activities; and,
- Following the completion of post-closure reclamation activities, implement required monitoring/maintenance requirements.

The principles of which the reclamation and closure plan have been based include the following:

- To ensure that key environmental indicators of the reclaimed mine site are not significantly different, in the long term, compared with adjacent undisturbed areas. Key environmental indicators for the site are:
 - Landform stability;
 - Surface water resource and quality;
 - Groundwater resource and quality; and,
 - Vegetation diversity and success.
- To ensure that the risks and hazards associated with damage to the physical integrity of key structures and facilities is not significantly greater than the risks and hazards associated with the region generally. Key long-term structures and facilities are:
 - Tailings disposal facilities;
 - Underground mine;
 - Mine surface support facilities;
 - Mill facilities; and,
 - Landfill and quarry areas.
- To ensure that the amenity values of the site are consistent in the long-term with the amenity values of the area. The amenity values of the area are:
 - Visual (landscape);
 - Economic (farming, ranching, downstream fishing and forestry); and,
 - Environmental (wildlife).
- To ensure that there are no public safety hazards associated with the property after closure;
- To ensure that post-closure maintenance needs for the site are minimized so that they are not significantly greater than that for adjacent land, and clearly identified so that a post-closure management regime can be planned; and,
- To ensure that all regulatory requirements are complied with by the company at closure of the mine and during the post closure period.

Surface facilities that are subject to the Plan are:

- Employee housing areas;
- Staff housing complex (includes a hospital, hotel, pool, bowling alley, club, commissary, gas station, septic systems and a cemetery);
- Hospital;
- Power Facilities;
- Minesite - Surface Facilities;
- Minesite - Underground;
- Mill and Ancillary Facilities;
- Auxiliary Shops (carpentry, mechanical, automotive);
- Aggregate quarry;
- Landfill(s); and,
- Tailings storage facilities.

10.2 Regulatory Requirements

The El Mochito mine is operating in compliance with the Ministry of Natural Resources and Environment (SERNA) and the Mining Authority (INHGEOMIN). Several environmental permits have been issued to cover mining and processing operations. Currently, operations are carried out under the terms of a Water Use Permit, a Mining Operations Environmental Permit and an Environmental Licence for the La Soledad TSF. The concrete storage facility located in Puerto Cortés is permitted through the Municipal Environmental Department. The company also has an authorized forestry management plan issued by The National Institute for Conservation and Forest Development, Protected Areas, and Wildlife (“ICF”).

10.2.1 Reclamation and Closure Plan

The Reclamation and Closure Plan describes:

- Environmental setting of the mine site;
- Current environmental conditions at the mine site;
- Mine facilities and mine operations;
- Conceptual reclamation measures and rationale for their selection;
- Post-closure monitoring plan; and,
- A reclamation schedule.

The Reclamation and Closure Plan document is used to inform the local residents, the regulatory agencies having an interest in the property and other stakeholders, about the plans and schedule for closure and reclamation of the El Mochito mine.

10.2.2 Implementation of Reclamation and Closure Plan

Implementation of the Plan is planned according to the following progressive stages:

1. Closure and Reclamation Plan;
2. Environmental Site Assessment;
3. Ecological and Human Health Risk Assessment;
4. Community and Regulatory Feedback; and,
5. Contracts, Detailed Schedules and Reclamation Work.

Where feasible, project components and disturbed areas will be left in place or rehabilitated for a value-added end use, as identified through consultation with local communities and Honduran authorities.

Non-hazardous waste such as wood, roofing sheets and empty drums are recycled wherever possible. The mine camp has a recycling program for plastic and other saleable products, which are sent to recycling companies near San Pedro Sula. Rubbish that cannot be recycled is disposed of in the Las Vegas municipal landfill site.

Hazardous and industrial wastes are temporarily stored on site at a secure location. Third party licensed operators remove and dispose of the waste. Liquid organic waste is either sent to the local cement production facility and used as fuel or removed to a certified landfill site, depending on the type of waste. El Mochito has procedures for the handling and remediation of hazardous waste spills of substances such as used oil, diesel fuel and mill chemicals.

10.3 Mine Facility and Operation Reclamation and Closure Actions

10.3.1 Employee Housing

There are three areas, Mocho Arriba, Mocho Abajo and Barrio San Juan, proximate to the mine that serve as the principle residence of the local miners and their families. The homes are generally constructed of wood frame or concrete block exterior wall with wood or metal roofs and are equipped with electricity, running water and septic systems. More information on these communities below:

- Mocho Arriba - consists of over 600 dwellings, a school, commissary, park, ball field, and church.
- Mocho Abajo - 16 dwellings.
- Barrio San Juan - Over 160 homes, a store, school, playground, football field and a church.

The employee housing areas were annexed to the town of Las Vegas at cessation of mining activities; and therefore are not included in closure planning.

10.3.2 Staff Housing

Staff housing consists of 53 buildings, of which, 49 are homes for the permanent staff living at the mine or guest housing for visitors. In addition to the homes the housing complex includes the following facilities:

- Hospital with 24 beds and basic medical facilities;
- 15-room hotel with kitchen, laundry, and dining area;
- 15 m by 5 swimming pool
- Tennis court;
- Ball field;
- 2-lane bowling alley;
- El Mochito Club that includes a kitchen, dining area, bar, deck, parking area and playground;
- Commissary;
- Gas station with two tanks, one for gasoline and one for diesel;
- Cemetery; and,
- Staff school.

All of the buildings and facilities will be annexed to the local community after mine closure is completed. These facilities will remain as is and therefore no significant closure or reclamation activities are envisaged for these facilities.

10.3.3 Power Facilities

The main power supply for the mine and facilities is provided by the Honduran National Electric power authority (ENEE). There are several ENEE substations at the mine and mill. Diesel powered generators located at the mine surface facilities supply auxiliary power during general power failures. The ENEE substations will not be removed during the mine closure process, as they are the property of the Honduran electrical utility. The diesel generating plant will be dismantled and removed.

10.3.4 Mine Site – Surface Facilities

Surface facilities for the mine are located on 64 hectares (16 acres) of land and include:

- Mine portal (13 square meters) entrance;
- Security office - wood, one story;
- Shaft track;
- Mine office - wood, one story;
- Medical/first aid building - wood, one story;
- Core shack - corrugated metal, one story;
- Explosives storage - concrete block;
- Warehousing (two 2-story buildings) - corrugated metal and concrete block;
- Diesel plant (2 buildings) - corrugated metal;
- Mechanical building - cement;
- Change house - corrugated metal;
- Electrical substation - open and fenced in with 2.5 m high wire mesh;
- 4 Diesel tanks (ranging in capacity from 18 to 48,000 gallon capacity);
- One 5,000-gallon oil tank;
- Old crusher system consisting of cone crusher, vibrating screen, vibrating grizzly, coarse and fine ore bins, and four 9 m by 9 m storage tanks;
- Crusher system consisting of coarse ore bin (9 m by 6 m) cone crushers, vibrating screens (2), jaw crusher, and vibrating grizzly;
- Pipeline to mill - 2.5 km, with corrugated cover;
- Old and new water cooling towers (old tower is no longer in use); and,
- Approximately 8 km of roads.

The majority of the surface facilities will be decommissioned, closed and reclaimed after the underground facilities are closed. Major components of the mine surface facilities closure and reclamation are:

- Material and equipment removal and salvage;
- Building decommissioning/dismantling;
- Concrete removal;
- Concrete slab fracturing/removal of foundations/tracks and steel beams;
- Debris disposal;
- Soil removal (spills and contaminated soil only); and,
- Topsoil capping and re-vegetation over soil removal and other disturbed areas.

Following decommissioning of all project facilities, building structures and equipment will be removed from the site. All scrap iron, equipment tools, piping, and general debris will be removed, properly scrapped, recycled, or disposed of in an appropriate manner. Underground utilities will be disconnected from services and left in place to avoid unnecessary surface disturbance.

Contaminated soils identified during the Environmental Site Assessment (ESA) will be removed. Disturbed areas will then be covered with fill material, re-contoured to provide positive drainage and minimize erosion, re-vegetated.

Mine access roads will remain in place to provide access to Mocho Arriba and other local housing and communities.

10.3.5 Mine – Underground

Major components of the underground mine are, the mine portal, mine shafts, and the underground workings, which include the Caliche Tunnel, the main drainage adit for the mine.

The existing underground workings at the El Mochito mine covers approximately 3,000 m in the east-west direction, 1,200 m north-south and vertically from surface to a depth of up to 1,300 m (-1,000 m below the shaft collar). The ore is transported up vertical shafts through a multiple ramp system that are a series of stope access development that have been linked together.

The proposed closure and reclamation approach for the underground mine includes:

- Remove salvageable equipment, power transformers, petroleum products and any engines;
- Seal the shafts and ventilation boreholes at the surface;
- Backfill the outfall of the Caliche Tunnel that will prevent human access while simultaneously allowing the adit to continue to drain; and,
- Allow the mine workings to flood with ground water. The Caliche Tunnel will remain as a drainage conduit for the mine at the 650-level.

Underground workings will be the first of the mine site facilities to be closed. Initially all of the salvageable equipment and petrochemical components will be removed. Shaft openings will be sealed using a reinforced concrete cap positioned at or below grade on bedrock or a secure base. Caps located below grade will be covered with soil and re-vegetated. The soil will be graded to prevent accumulation of surface water over the caps. Monuments will be placed over the backfilled shafts to allow relocation and survey inspections.

A free-draining plug will be constructed at the Caliche Tunnel outfall and the mine will be allowed to flood through the natural infiltration of ground water. A thorough hydrogeology investigation will be performed prior to flooding the mine in order to assure that the ground water regime of the region is not adversely impacted.

10.3.6 Mill and Ancillary Facilities

The mill is located north of the mine and includes encompasses an area of approximately 1.94 hectares. Specifically, the mill and ancillary facilities consist of the following:

- Flotation area;
- Grinding area;
- Sample preparation area;
- Metallurgical laboratory;

- Chemical laboratory;
- Reagent building with mixing tanks and storage containers;
- 4 thickener and clarifier tanks (copper and lead);
- ENEE electrical substation and switch yard;
- 2000-tonne capacity fine-grained ore bin;
- 3 storage buildings;
- Copper filter building;
- Storage building for zinc and lead concentrate;
- Dryer; and,
- Truck load out area.

In accordance with the proposed reclamation schedule, the buildings, equipment, and material associated with the milling facilities will be decommissioned, consolidated, or reduced in capacity, after cessation of mining and milling activities, and prior to final closure.

The proposed closure and reclamation for the mill and ancillary facilities includes the following activities:

- Material and equipment removal and salvage;
- Building decommissioning/dismantling (with the exception of the mill office building);
- Concrete slab fracturing/removal of foundations/tracks and steel beams;
- Debris disposal;
- Soil removal (spills and contaminated soil only); and,
- Topsoil replacement and re-vegetation.

Following decommissioning of all mill and associated facilities, building structures (with the exception of the mill/grinding building) and equipment will be removed from the site. All scrap iron, equipment tools, piping, and general debris will be removed, properly scrapped, recycled, or disposed of in an appropriate manner. The pipework associated with tailings transport will be disconnected, cleaned of tailings, and disposed of following appropriate guidelines. The mill office building will be annexed to the local community after removal of all milling equipment, chemicals, vats, tanks, and other material, which may pose a hazard.

An analysis of surface soils quality in the vicinity of the mill, the concentrates storage areas and the roadways will be conducted during the ESA. Contaminated soils identified will be excavated, during the foundation demolition and removal, and disposed of following appropriate guidelines.

Finally, facilities areas will be re-contoured, grubbed, covered with topsoil as needed, and revegetated.

10.3.7 Auxiliary Shops

The carpentry, mechanical, metal and automotive shops associated with mine maintenance will not be decommissioned and will be gifted to a Technical College. Prior to turning them over to the college, however, the shops will be cleared of all salvageable materials and cleaned. Contaminated soils identified during the ESA will be excavated and disposed in accordance with appropriate protocols. Ground areas disturbed by contaminated soil removal will be reclaimed as previously described.

10.3.8 Quarry

Located on the crest of a hill northeast of the staff housing complex is the limestone aggregate quarry. The quarry was used for generating aggregates for general construction around El Mochito. Total surface area of the quarry is approximately 0.8 hectares (2 acres). The quarry will remain open through mine closure to ensure that there is a sufficient supply of rock available during the reclamation phase. Contouring the final quarry surface to facilitate offsite drainage of surface water, placing a topsoil cover and establishing a vegetative cover are the final steps to completing the reclamation phase.

10.3.9 Landfill

There are two landfills at El Mochito. One, has been decommissioned and reclaimed, showing a mature vegetation cover on the recontoured slopes. This landfill was located on the southeast side of the road to El Bosque.

The other landfill is located along the road to Pozo Azul east of the mine and is still operations.

These landfills were/are used to dispose of municipal type waste from the mine and staff housing facilities only and consist of natural topographic depressions where waste was deposited and allowed to compost.

The landfill will remain open to dispose of trash and miscellaneous closure debris generated during the closure process. The landfill will be closed at the cessation of all other closure activities. The landfill will be capped with impermeable material, contoured and covered with topsoil and vegetated. During the ESA, a monitoring program will be initiated to determine whether surface or ground waters are affected by any potential leachate from the landfills.

10.3.10 Tailings Disposal Facilities

The mine has built three tailings storage facilities (TSF) over the years:

- El Bosque (Closed) – Built in 1970 and is slated to be officially closed in 2019
- Pozo Azul (Closed) – Built in 1980s and ceased operation in 2013
- Soledad (Active) – Constructed in 2004

Only the Soledad facility is currently in use and is anticipated to be adequate for the next 8 years of operation. Tailings pumped to the TSF are free from reagents that may affect the environment and contains only suspended solids. Once in the pond, the solids settle in the tailings and the excess clean water is discharged into the environment as provided for in the operating permit and Environmental Impact Assessment. Regular monitoring of the treated water is carried out by the Mining Authority as well as the municipality. The different effluents are constantly monitored, with the objective of preventing environmental impact to the natural resources and the communities in the area of influence, through the improvement of the processes of the operation.

The El Bosque and Pozo Azul TSFs have their own closure plans and closure activities are essentially complete, with minor reclamation activities planned for 2019-2020. Seepage and runoff water qualities are continuously monitored.

10.4 Environmental Management

10.5 Progressive Reclamation

Progressive reclamation will be conducted over the remaining life of the mine, as operations permit. These on-going reclamation activities may include; continued vegetation and stabilization of embankment slopes, reclamation of the borrow pits and quarries developed for construction material, and demolition or removal of non-essential building and reclaiming the disturbed site.

Progressive reclamation activities will be scheduled concurrent with mine operations, where practical. Along with returning disturbed surface areas to a stable and/or productive state as soon as possible, this will also serve to enhance the effectiveness and efficiency of the overall closure program as well as reducing the total closure cost.

10.6 Post-Closure Monitoring

10.6.1 Approach

The post-closure monitoring program will include methods by which the site is regularly monitored for a given period of time after closure. Monitoring will ensure there are no unacceptable environmental impacts that would prevent the site from fulfilling the designed End-Land Use plan. The successes of the plan are also measured by the results from the monitoring program. In addition, a Contingency Plan is to be included that would ensure that appropriate response measures are ready to be put in place should they be required.

This proposed monitoring program provides for post-closure monitoring for 5 years. The program is broken down to reflect monitoring that would occur during the initial 18-month closure and reclamation period and during the subsequent 42-month "abandonment" period.

10.6.2 Reclamation and Closure Reporting

Ascendant will continue to maintain a presence in Honduras during this reclamation and closure period. Office staff will maintain on-going site records of programs involving such activities as construction and monitoring.

The results will be reviewed and compiled by the Ascendant staff and reporting of the findings would be carried out to the appropriate government authority. The government agency and authority having jurisdiction, as well as the time schedule and format for reporting would be established prior to the commencement of the closure activities.

10.6.3 Closure Monitoring Objectives

Post-closure monitoring of re-vegetated areas will be conducted to ensure that re-vegetation measures are rich in diversity and successful. If required, problems with growth on newly vegetated areas may be addressed by re-seeding and/or replanting of the affected areas, or through the application of soil amendments designed to address problems of acidity, low fertility, or drainage.

Monitoring of residual environmental effects, such as groundwater will continue after mine closure in compliance with applicable mining and environmental legislation. Specific post-closure environmental effects monitoring will also continue through this time period and will be ongoing in compliance with the

stated closure objectives. The monitoring program will be continued for a minimum of 42 months following the reclamation activities, at which time the residual effects and any requirements for an additional monitoring period will be evaluated.

10.6.4 Reclamation Monitoring

This work would be carried out on a regularly scheduled basis by the site operational staff and would include data collection as necessary and continued monitoring. Monitoring will include the groundwater piezometric stations, water chemistry analysis, geotechnical monitoring of the dams, dust and climate data monitoring, re-vegetation observations, and any other monitoring to address specific issues as they became identified.

Specific locations, schedules, and parameter lists for the various environmental monitoring programs will be proposed for approval from the defined government agency having authority but generally, the elements of the reclamation period monitoring programs will be a continuation of analogous programs carried out for the operational monitoring.

The post reclamation period monitoring includes environmental monitoring to evaluate residual environmental effects and monitoring of re-vegetated areas to ensure that re-vegetation measures have been successful.

Specific locations, schedules, and parameter lists for the various environmental monitoring programs will be proposed for approval from the defined government agency having authority but generally, the elements of the abandonment monitoring programs would be a reduced schedule of the reclamation period monitoring discussed above.

11.0 CONCLUSION

The ESIA evaluated the impacts of the Project which included upgrading of infrastructure and mining and mineral processing systems across the El Mochito mine.

Due to the region's demographics, long history of mine operations, and limited change in the mine footprint as a result of the Project, there are either no or minimal interactions or effects anticipated from the Project on the following:

- No change in surface or subsurface rights
- Minimal interactions with terrain and soils, ecosystems, flora or fauna
- No interaction with archaeological or heritage resources
- No indigenous peoples for consideration
- No interactions with visual quality
- No Project specific effect on the reclamation and closure plan

With regard to the Project's interactions with the physical environment, planned improvements in mine water pumping and handling will mean that more but cleaner water (less TSS) would be pumped to the surface of the mine as a result of the Project. The result will be better recycling of industrial water in the surface process plant and discharge of a better-quality water from underground. Water quality benefits of the upgrades include:

- Settling suspended sediment and solids in the underground workings before reaching the surface
- Improvement in the milling process and in mill treatment
- 62% less fresh water use in milling process

The volume of water discharged to the Raices creek currently and post Project will have a negative impact of the integrity of the creek and its aquatic habitat. A series of mitigation and management measures are proposed herein to limit this effect, which may, in turn be felt more aggressively at mine closure. Demand on surface water is expected to decrease as a result of decreased water demand in the process plant due to improved mine and TSF water recycling.

Minimal effects on surface air quality are expected as a result of the proposed upgrades. The majority of the development work will be contained underground, but as the hauling distances will be shorter, diesel consumption and emissions to surface will be positively affected in the same proportion. The new shaft infrastructure will mean better flow rates underground and approximately 20% better circulation underground. Due to the wet underground the ore is wet when reaching the surface so very little dust is generated. Ore arriving at the crushers is already broken and requires minimal additional crushing, which further limits dust generation. The addition of a wash plant at the crusher will further reduce the possibility of dust generation.

Minimal effects are expected with noise and vibration valued components because all development and mining is underground. Crushing is expected to be less than the current total volume and will not contribute to local noise. There is the potential for some increased/additional machinery noise with the upgraded washing system but noise dBA levels overall from plant processing will not change.

In the conduct of its business, Ascendant strives to contribute to a healthier, safer, and more prosperous community in the areas where it operates. Continued mine operations have substantial local and regional benefits in terms of continued employment and contracting opportunities. The personnel required for the Project at the El Mochito mine is expected to increase from 1,258 in 2018 to over 1,580 in 2020 and 2021 during construction and stabilize at 1,367 for at least ten years of operation. Every employee working supports directly and indirectly approximately 8 other people in the local community, so the impact of the Project will positively affect the economic well-being of between 900 and 2,400 people. Much of the labour for the mine is sourced locally so improvement in labour market are linked to the local economy. Currently the local region has high unemployment and the creation of new jobs with benefit the local community.

The ESIA was compiled to enable the integration of new mitigation and monitoring measures specific for the Project, as required by the Honduras authorities and as outlined by the IFC guidelines, into existing management plans. The ESIA further outlines new studies to be initiated and engagement activities planned for continued stakeholder consultation related to the Project.

The main effects of the Project are described hereafter.

11.1 Physical Environment

11.1.1 Air Quality

It is estimated that there will be a net positive impact on air quality caused by dust suppression (laboratory dust collector and crusher wash plant) and the reduction in particulate matter in the air versus the slight increase in truck traffic and potential GHG emissions. It is also believed that the latter will be offset by the upgrading of process plant equipment.

The following air quality measures are proposed for optimizing the positive impacts and minimizing the negative ones. These mitigation measures are based on technical solutions envisaged by El Mochito in its project planning, on the one hand, and on team members' expertise and suggestions from the stakeholders consulted, on the other hand. Many of the measures listed in the IFC EHS Mining Guideline (2012) will also be applied.

1. During the detailed engineering and construction phases, engineering controls for atmospheric emissions as identified in the deliverables from the feasibility study will be developed and implemented in order to meet the first intermediate targets or IFC guidelines.
2. Ensure that electrical generators meet IFC criteria are built and operated so as not to increase gas and particle emissions to levels exceeding the first intermediate targets or IFC guidelines. These also need to conform to the Honduran Regulation for the control of emissions by stationary sources, Executive Agreement No. 1566-2010.
3. Atmospheric emissions (SO₂, NO_x, NO₂) and particle emissions (PM₁₀, PM_{2.5}) will be measured during construction and operations by means of a station incorporating continuous weather data and installed at one of the locations previously used for air quality monitoring, namely the closest point in the town to the crusher, as well as a new station located close to the process plant and the ore storage sheds.
4. Passive samplers will be used near mining areas to confirm the NO_x/NO₂ results.

5. The Honduran Governmental agencies also requested that a Monitoring Plan be carried out in the crusher area to monitor the following environmental variables: generation of noise, emission of particulates and emission of gases.
6. The Honduran Governmental Agencies also requested that monitoring of gas emissions to the atmosphere and particulates be performed in the Bonanza area and near the mine entrance.
7. Additional mitigation measures will be applied as necessary:
 - increasing the use of water-spray dust control;
 - increasing maintenance and cleaning around dust-producing areas;
 - enclosing emissions sources;
 - wind shielding when possible;
 - storage and handling of dust generating materials inside.
8. In addition to this, and specific to GHG emissions:
 - El Mochito will produce an annual GHG emissions report based on its report of fuel consumption in the previous year.
 - The mine will ensure implementation of an efficient preventive maintenance program including period calibration of dryers and scrubbers.
 - El Mochito will make sure that all equipment and vehicles are kept in good working order.
 - The mine will optimize vehicle and equipment movement to minimize travel and idling time.
 - Fuel consumption and performance will be taken into account when new equipment and vehicles are purchased.

11.1.2 Noise

The Project will see an increase in underground blasting, particularly during the construction period, but also an upgrading/optimizing of plant equipment as well as an increase in ore production and therefore truck traffic. Moreover, the increase in workforce and employees will thereby indirectly increase the need for transport via cars or motorcycle taxis.

It is estimated that there will be a net low negative impact on noise caused by a slight increase in traffic (trucks, cars, taxis).

The following noise mitigation measures are proposed for minimizing negative impacts. These mitigation measures are based on technical solutions envisaged by El Mochito in its project planning, on the one hand, and on team members' expertise and suggestions from the stakeholders consulted, on the other hand. Many of the measures listed in the IFC EHS Mining Guideline (2012) will also be applied.

1. El Mochito will continue to ensure that all equipment and vehicles are kept in good working order along with their noise reduction systems.
2. El Mochito will continue to maintain all its roads so that they are free of potholes and other irregularities.
3. The Honduran Governmental agencies also requested that a Monitoring Plan be carried out in the crusher area to monitor the following environmental variables: generation of noise, emission of particulates and emission of gases.

4. El Mochito undertakes to implement mitigation measures when the noise levels produced by operations increase the baseline ambient sound level by more than 3 dBA or exceed the IFC guidelines; such measures include:
 - Implement a noise management and monitoring plan to better understand inherent noise levels and the project contributions;
 - ordering studies to ensure at-source noise reductions on mining equipment.

11.1.3 Water Resources

The existing effect of the mining project on water resources is deemed to be high particularly because of the volume of water discharged to the environment. As these are existing conditions, there is a high probability that the receiving environment has entirely adapted and evolved into these conditions, in which case a closure surface water and aquatics management plan will be necessary to account for when the discharges will end.

In term of the Project's effects on water resources, these are deemed to be of a medium significance. Because of the Project approximately 900 gallons / minute of freshwater sourced from the spring will not be needed. This water will therefore not be in contact with the project and ultimately end up in the Raices creek above the discharge point. The Project will also reclaim 1,500 gal / minute of water from dewatering and the Soledad TSF to eliminate the need for make-up freshwater in so far as possible.

The discharge volumes to Raices creek could however increase to 13,000 gal/min, but the Caliche discharge will have less TSS because of the clarifier installed underground to clean up mine water.

The following water quality measures are proposed to optimize the positive impacts and minimize the negative ones. These mitigation measures are based on technical solutions envisaged by El Mochito in its project planning, on the one hand, and on team members' expertise and suggestions from the stakeholders consulted, on the other hand. Many of the measures listed in the IFC EHS Mining Guideline (2012) will also be applied.

The Honduran Governmental Agencies have requested that the following measures related to water be implemented:

1. To the greatest extent possible, reuse the treated water for mine activities to reduce the amount of water discharge to receiving bodies and leverage natural sources.
2. Execute an updated Soil Erosion Control Plan that contains a description of the sensitive areas, the design of mitigation and control measures and their construction.
3. Areas susceptible to water erosion and where the suspension of sediments can be generated that affect stream beds and winter channels, or infrastructures, should be protected with sediment traps (gabions, stone walls, dams and others).
4. The company must have a sediment retention system in the lower part of the mine, in order to prevent the brush residues that fall from the conveyor belt or transport vehicles, from being dragged into the Raices creek during heavy rains; the company must provide periodic maintenance to this system (system is the sedimentation ponds at the outlet of Caliche tunnel).
5. Oily residues should be collected and confined safely, in order to prevent them from coming into contact with filtered water inside the mine.

6. All waters that are in contact with the mining process must comply with the National Technical Standard for the Discharge of Residual Waters to Receptor Bodies and Sanitary Sewerage (Agreement 058, published in the Official Journal La Gaceta on December 13, 1997), at the moment of release into the environment; specifically, the El Caliche Tunnel sampling point.
7. Update the Surface and Underground Water Monitoring Plan for "El Mochito Mining Operations" including the following monitoring points and others that are considered for total heavy metals (Manganese, Zinc, Copper, Iron, Nickel, Chrome, Aluminum, Silver, Cadmium):
 - Upstream of the mine site
 - Downstream of the mine site
 - Upstream of the concentrator
 - Waters below the concentrator
 - Zona El Rincón in the Raices creek (200 meters from the confluence of Yojoa Lake).
 - Yojoa lake
 - Raices creek above the El Caliche Tunnel
 - El Caliche tunnel
 - Raices creek under El Caliche Tunnel
 - El Nacimiento
8. The company must carry out surface and groundwater quality monitoring immediately in case of spillage of tailings, immediately inform the DECA, CESSCO and the Mining Authority.
9. It is strictly forbidden to accumulate solid waste of any characteristic, within and close to the facilities that may cause contamination of soil, air and water bodies or damage to infrastructure.
10. If sterile rock or brushwood is found and not used in the process, it must be placed in an area where it does not affect the water sources near communities. That storage area must be conditioned for that purpose or look for other alternatives.
11. The contamination of water and soil sources with construction wastes is prohibited. Oils and fats from machinery, vehicles and trash in general, must be placed in containers with sufficient capacity for temporary disposal.
12. To avoid contamination of surface sources E. Coli, in the construction phase (extensions) of the project temporary sanitary facilities should be established, once the work has been built in its entirety, portable latrines should be installed with adequate sanitary measures in a proportion of one (1) for every ten (10) employees.
13. Prepare a Surface and Groundwater Monitoring Plan, the purpose of this plan is to determine the quality and quantity the water that is affected by the La Soledad TSF discharge. Therefore, a scale map 1: 10,000 should be presented where the sampling points are located, with their respective UTM WGS 84 coordinates. The following physical parameters must be analyzed as a minimum: Temperature, Turbidity and Capacity of the sampling point, Chemical Parameters: Conductivity, Ph, Hardness, Color, Dissolved Oxygen, Chemical Oxygen Demand, Biological Oxygen Demand, Heavy Metals (Zinc, Cyanide, Copper, Lead, Cadmium and Mercury), Suspended Solids, Sedimentable Solids. These parameters must comply with the National Technical Standard for Discharge of Residual Waters to Receptor Bodies and Sanitary Sewerage, published in the Official Journal La Gaceta on December 13, 1997 under agreement No. 0058.

These additional mitigation measures, including to comply with IFC EHS Mining Guidelines, also apply:

14. Perform a Groundwater Study and Management Plan for the mine area as well as locally to understand the resource and better plan for its management.
15. El Mochito will continue its surface water quality monitoring program, which is designed to assess the impact of its activities on the surrounding areas. A groundwater monitoring section will be added to this program.
16. El Mochito will continue to apply its wastewater monitoring program, designed to characterize wastewater and to identify sources of contamination and ways of reducing it.
17. A green buffer of at least 50 meters, where possible, will be maintained between watercourses and operation zones to prevent soil erosion, alternatively, proper measures/ techniques will be implemented to protect the watercourse
18. Divert run-off from undisturbed areas around disturbed areas where possible.
19. Divert sediment laden water to water treatment plant or other sediment management structures including sediment ponds, infiltration trenches or silt fencing.
20. Armour water management structures to prevent erosion and improve longevity.
21. Design water management structures for appropriate return periods (e.g., 1 in 200 year rainfall event) where needed
22. Design roads with appropriate drainage and grades to minimize gradients where possible.
23. Keep revegetating disturbed areas as soon as possible.
24. Continue with the tailings dam management plan.
25. Perform regular inspections and performance audits against the plan.

Based on the implementation of all the mitigation measures described above, the residual impacts of the Project on the physical components are deemed to be the water related effects caused by the volume of the discharges, the probability of occurrence of this effect, certainly in the nature and integrity of the stream upstream and downstream of the discharges, is certain. However, it is very likely that the receiving environment has adapted to these conditions, and therefore, another change to the nature and integrity of the receiving environment will be felt at one time but mostly at closure, when discharges will end.

In the meantime, the following ongoing studies, management plans and monitoring programs will ensure that the effects of the Project remain as low as possible, and that guidelines, including IFC EHS Guidelines and Performance Standards are followed, in so far as practicable.

- Implement a Groundwater Study and Management Plan for the mine area as well as locally to understand the resource and better plan for its management;
- Add groundwater sampling stations to the Water Quality Monitoring programs, where possible;
- Add the following water quality parameters to the Water Quality Monitoring programs: oil and greases.
- Implement an Aquatic Habitat Study and Management Plan to understand the resource within Raices creek as well as the downstream Habitat resulting from the discharges (note: initiated April 2019).
- Update mass water balances for the project overall and identify as many opportunities for re-use of water as possible. A study dedicated to the use of mine water will be implemented.

- Consolidate a Water Management Plan to include reference to Water Diversions, monitoring, and sedimentation and temperature control measures.

11.2 Biological Environment

The footprint of the project will not alter the area, except for a small section in the La Soledad dam. Therefore, interaction between activities associated with Project and the main biological components (i.e., Ecosystems, Fauna, and Flora) will be negligible as per the project matrix. However, in order to preserve the area, it is necessary to continue with the existing programs of reforestation, protection of non-disturbed areas, such as El Manantial, and to stay engaged with the community and work personnel to increase awareness on the protection of natural habitats, wildlife and vegetation.

The Project will make sure:

- to clearly demarcate work areas by means of signs, barriers and fences,
- to clearly demarcate the areas to be stripped and the areas where machinery may circulate, and to keep these to a minimum,
- to prohibit workers and vehicles from circulating outside the work areas and access roads,
- to avoid work in lakes, rivers and streams or on shores and banks except where necessary, and
- that an environment advisor is present during any work in or near a watercourse.

Illuminated areas and night traffic may interact with wildlife during the different phases of the project. The following measures will continue to be applied in order to minimize interaction with the local fauna and control light levels:

- reduce lighting to the minimum needed for safety,
- whenever possible, use directional lighting to avoid lighting up non-essential areas such as the sky and outside the work area,
- use baffles to limit the lit area in highly sensitive zones,
- wherever possible, use light towers that are low to the ground to reduce unnecessary lighting, and
- do not over-illuminate indoor areas.

The footprint of the Project will not change significantly, and will have minimal interaction with the local vegetation, however measures to ensure that all activities associated with vegetation clearing and soil stripping will continue to be followed. These measures include:

- educating the personnel doing the stripping operations about the importance of protecting the removed soil,
- establishing a permit system for soil stripping,
- making sure an environmental advisor is present during soil stripping,
- taking steps to prevent accidental fires in the vegetation,
- prohibiting vegetation burning as part of the clearing operations,
- setting aside topsoil to be reused during site restoration,
- letting plants grow in the soil stockpiles to stabilize them and protect them against the wind,
- avoiding the destruction of riverbank vegetation,

- minimizing impacts on mangroves as much as possible, and
- taking the necessary steps to prevent erosion and stream contamination.

Community engagement and training of personnel on environmental and biodiversity topics are critical for the preservation of the area. The biodiversity of the area will be protected by prohibiting hunting and harvesting of natural products outside the work area within its concessions by its employees and contractors. Additionally, wildlife encounters should keep being reported to keep a record of the biodiversity in the area. All personnel should report to the Superintendent of any harm caused to wildlife (e.g., collisions).

A Record of Flora and Fauna Sighting will continue to be kept in the area of influence of the project. Additionally, during the operation stage of the dam, any harm to wildlife should be avoided. The maintenance of the perimeter fence surrounding the dam will prevent birds and mammals from entering the dam, as well as public access.

At the end of the construction activities, the intervened areas are restored and rehabilitated to their natural conditions, (e.g., camps, storage facilities and parking lots). The reforestation plan equivalent to three times the intervened area is implemented.

During the construction and operation stage of the Project, employees will follow the current procedures which include:

- a. Do not hunt,
- b. do not kill, injure, maim, chase or catch any animal,
- c. do not destroy nests, caves or galleries,
- d. do not feed the wildlife,
- e. do not dispose of non-biodegradable waste (plastic bags, cans, etc.),
- f. do not perform any physiological needs outside the latrines,
- g. the cutting of trees, extraction of firewood or other plant products is not allowed

11.3 Social and Community Aspects

The following residual impacts have been carried forward for further consideration:

- *Increased use of community infrastructure and services:* The extent of impacts, and therefore effectiveness of mitigation measures, is uncertain and could not be determined on the basis of existing documentation. The Project will engage with the City of Las Vegas to understand what services are at or near capacity and therefore have the potential to be affected by the addition of 300 Construction-phase workers to the community.
- *Less economic benefit for vulnerable groups:* Mitigation measures such as on-site daycare and company-funded transportation provide some additional access for vulnerable groups to the Project workforce. Given the short time period of Construction – and therefore the difficulties in mounting programs directed at vulnerable groups' access to the Construction workforce -- Ascendant has opted as part of its Corporate Social Responsibility (CSR) activities to develop programming for vulnerable groups. As such, the Project is replacing the constraints to economic benefit through work with additional economic benefit through CSR programming. Some of the activities dedicated to vulnerable groups under the CSR plan are:

- The mine operates a free bus service from many different communities to transport those workers to the mine, if they require it. Ascendant salaries are high enough relative to average gross domestic produce (GDP) per capita that most workers buy their own transport within a year of starting work
- The company attempts, to the extent possible, to reflect the demographics of vulnerable people in its educational CSR programming. Young vulnerable people are given the opportunity to study the local technical school fully funded by the mine and then on their successful graduation, are given first consideration for new roles at the mine. There is a focus on increasing the female hire rates through this with 22% of the students passing last year being female, an improvement on previous years.
- Every Friday the company conducts a feeding program for the elderly and vulnerable ones. Separately the mine provides food to approximately 700 kids in their school centers every month and, school uniforms and study materials to approximately 300 kids each year.
- Individual hires of several individuals with physical handicaps.
- The topic of vulnerability will remain a subject of additional study through ongoing community engagement.

Several topics have been identified throughout this socioeconomic analysis as requiring additional data collection. This data will be collected as part of the Project's ongoing engagement with communities.

- Increased use of community infrastructure and services in City of Las Vegas (existing capacity, potential impacts, effective mitigation measures)
- Community health, safety and security (tailings dam safety, water storage dam safety, land subsidence, emergency preparedness and response)

11.4 Consultation and Stakeholder Engagement

As such, Ascendant's Stakeholder Engagement is designed to:

- Ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately.
- Promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.
- Ensure the risks and impacts identification takes account of the outcome of the engagement process with Affected Communities as appropriate.
- Identify individuals and groups that may be directly and differentially or disproportionately affected by the project because of their disadvantaged or vulnerable status,⁴⁴ and propose and implement differentiated measures so that adverse impacts do not fall disproportionately on them and they are not disadvantaged in sharing development benefits and opportunities.
- Inform the development of collective management programs and describe mitigation and performance improvement measures and actions.

⁴⁴ Footnote 18 (pg. 4) in IFC Standard 1 specifies "this disadvantaged or vulnerable status may stem from an individual's or group's race, color, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status. The client should also consider factors such as gender, age, ethnicity, culture, literacy, sickness, physical or mental disability, poverty or economic disadvantage, and dependence on unique natural resources."

As part of the ESIA, Ascendant will undertake three rounds of engagement with Affected Communities:

1. Pre-engagement to validate the Stakeholder Engagement Plan related to this ESIA;
2. Engagement on the various aspects of the Project and this ESIA (including health and safety hazards and engagement with vulnerable groups) to refine understanding of impacts, and develop mitigation measures, as needed; and
3. Engagement during construction (post-ESIA).

11.5 Health and Safety

The Project would provide improved and safer conditions underground as well as better ventilation. The expected positive interactions with human health and safety area a result of the modernization in the Project and removing older equipment; safety will be significantly improved per unit of production. During construction there will be more people, which correlates with higher health and safety risk during construction; but El Mochito will be applying orientation, training, and other systems in place to contractors to mitigate these risks.

Mitigation measures specific to health and safety are as follows:

- El Mochito will maintain their OHS program through the Project and periodically review and update procedures.
- Regular gas monitoring will continue to be carried out and executed inside the mine per Company procedures in order to avoid occupational accidents and environmental contamination.
- The mine will perform biannual measurements of noise in all workshops and in the following areas where decibels are found on levels greater than 60 and apply the necessary Hygiene and Safety Measures such as: Use of plugs and rotation of employees: Mill area, Central workshop, Industrial mine workshop, Carpentry shop
- All El Mochito personnel and subcontractors' personnel operating vehicles will be trained in road safety and will ensure that the whole area of the project and the exits of the machinery to the road be signed for road safety.

11.6 ESMP

The results of the effects assessment on water quality and quantity revealed the need for additional management plans to enhance ongoing activities and enhance overall knowledge and use regarding this resource.

- The following Water related Management Plans will be implemented:
- Groundwater Study and Management Plan for the mine area as well as locally to understand the resource and better plan for its management;
- Aquatic Habitat Study and Management Plan to understand the resource within Raices creek as well as the downstream Habitat resulting from the discharges (Note: initiated April 2019).
- Updating mass water balances for the project overall and identify as many opportunities for re-use of water as possible. A study dedicated to the reuse of mine water will be implemented.

This existing Water Monitoring Programs will be updated to include:

- IFC EHS Mining Effluent Guidelines parameters to include oils and grease;
- Breakdown of results for dry and rainy seasons, particularly to account for the difference in flows within the receiving environment;
- As much as possible, include monitoring at Aquatic Habitat stations.

11.7 ESIA Conclusions

The ESIA of the Project enables the integration of new mitigation and monitoring measures specific to the Project into existing plans in place at El Mochito. Based on the proposed additions to the Environmental and Social management and monitoring plans and programs, Ascendant is confident that the Project's effects can be minimized to an acceptable level in order to enable optimized operations of El Mochito with continued and increased local and regional economic opportunities. This ESIA document can be used for public disclosure and consultation purposes.

The Ascendant management team states their ongoing commitment to being evaluated by third party engineers and scientists to reaffirm the management team's ability to safely and efficiently execute this project with the benefits of an overall positive impact on the both the environment and affects communities and people.

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PHOTOGRAPHS



Photo 1 Future mine shaft location



Photo 2 Mine entrance



Photo 3 Mine entrance



Photo 4 Crusher (future wash plant)



Photo 5 Conveyor belt



Photo 6 La Soledad TSF



Photo 7 La Soledad TSF dam (dyke)



Photo 8 La Soledad TSF rainy season discharge channel



Photo 9 El Palmar creek, rainy season La Soledad TSF discharge location



Photo 10 Mine water discharge Caliche



Photo 11 Mine water discharge Caliche, post sedimentation basins, towards Raices creek



Photo 12 La Soledad TSF discharge in Raices creek



Photo 13 Raices creek at La Soledad TSF discharge location



Photo 14 Las tombas, groundwater spring uptake location in El Manantial (water supply)



Photo 15 Montevideo water supply basin in El Manantial



Photo 16 Laboratory



Photo 17 Laboratory



Photo 18 Process plant overall view



Photo 19 Conveyor belt system



Photo 20 Mill area



Photo 21 Magnetite storage (no longer in use)



Photo 22 Floation cell



Photo 23 View towards concentrate storage tanks



Photo 24 Location of future conveyor line (one can see La Pulperia Berlin in background, to be relocated)

APPENDIX 3A

Soledad TSF Summary

APPENDIX 3.A - SOLEDAD TSF SUMMARY

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1.0 INTRODUCTION AND HISTORY

El Mochito Mine has been operating since the 1940's and has utilized two impoundments for disposal of tailings. The El Bosque tailings impoundment provided about 20 years of storage and remained in operation between the late 1960's to the late 1980's. Pozo Azul is the second contemporary TSF for Mochito mine and was in operation from the 1980's to 2013. Construction of the Soledad tailings facility was planned to provide up to 20 years of tailings storage based on yearly production rates.

A comprehensive study was developed in 2002 for the evaluation of the new tailings storage facility for El Mochito mine. As an outcome of this study, 23 sites were evaluated and site #5 (Soledad) was selected as the best option based on the LOM. The detailed engineering for this new facility was developed during 2004 by Vector Colorado.

The dam construction was planned in four stages; the initial dam was raised up to elevation 782 m.a.s.l., followed by three dam raises constructed by downstream method (the safest of the industry) with an ultimate crest elevation of 807 m.a.s.l.

Prior to proceed with the TSF construction, the Environmental Permit was granted by the Environmental National Agency, in 2004.

In 2005 the construction started and the next stages have been raised over time until present period.

In 2018 the option to increase the Soledad TSF capacity was evaluated, and two additional stages were defined (five and six), being the first one currently under its last stages of design.

2.0 SOLEDAD TSF DESIGN CRITERIA

The design considers a rate of mine production of approximately 60,000 ton/month, with a backfilling rate of 217,000 ton/year (35% of tailings production).

A design criteria summary for the first four stages is presented in the table #1, and was developed based on the following agencies guidelines:

- World Bank Standard Guidelines
- International Committee on Large Dams (ICOLD)
- Canadian Dam Association- Dam Safety Guidelines
- The Mining Association of Canada
- Honduran Industrial Water Discharge Regulation

Table 1 Design Criteria Summary for Stages 1 through 4

1.0 Basic data	
1.1	Tailings produced at 244,000 tonnes per year
1.2	Storage requirement is maximum achievable at the site.
2.0 Stability	
2.1 Static	
2.1.1	Minimum factor of safety (FS) of 1.5 for operational condition
2.1.2	Minimum factor of safety (FS) of 1.3 for end of construction condition
2.1.3	Use peak shear strength properties
2.2 Dynamic (earthquake)	
2.2.1	Use MCE of 0.46g in design
2.2.2	Factor by 50 percent for reduction of peak acceleration
2.2.3	Ignore vertical acceleration component
2.2.4	Use deformation methods of analysis
2.2.5	Use peak shear strength properties
2.2.6	Maximum allowable deformation at the dam crest is 1m
2.2.7	Assume tailings fully liquefy under earthquake conditions
3.0 Stormwater containment	
3.1	During operations, contain pond levels resulting from the ½ PMP event, in addition to the normal operating level under wet year conditions
3.2	Discharge 95% of the ½ PMP volume within 10 days of the event
3.3	Discharge flows from the full PMP at post-closure
4.0 Water balance	
4.1	Use normal average conditions to evaluate monthly fluid levels throughout the life of the tailings impoundment
4.2	Assume 100% water reclaim to mill
5.0 Seepage control	
5.1	Design tailings facility and seepage control systems (e.g. liners, barriers, pumpback systems) such that the downstream flow immediately below the dam, in terms of quantity and quality (pH and metals) does not exceed applicable regulatory limits, over the active life of the facility
5.2	Geomembrane lining of the entire impoundment is required
5.3	Design liner system to minimize head on liner
6.0 Tailings Deposition	
6.1	Subareal deposition technique
6.2	Average tailings in-place density is 1.68 t/m ³ (105pcf) based upon historical data

Result on the seismicity and seepage analyses carried out by Vector, were used as input to the slope stability analyses performed for the proposed embankment configuration, the static slope stability analyses of the stage 1 and Stage 4 Soledad embankment indicates adequate factor of safety against slope instability under loading condition criteria.

Table 2 Static Stability Safety Factors for Stage 4

Location	Static FOS
<i>Minimum Acceptable FOS</i>	1.5
Upstream Slope (end of construction)	1.9
Downstream Slope (operations, steady state) – Entire Slope	1.5
Downstream Slope (operations, steady state) – Upper Slope Section (2.0H:1V)	1.7
Downstream Slope (operations, steady state) – Mid-Slope Section (2.3H:1V)	2.0
Downstream Slope (operations, steady state) – Mid-Slope Section (2.4H:1V)	2.1
Downstream Slope (operations, steady state) – Lower Slope Section (2.9H:1V)	2.3

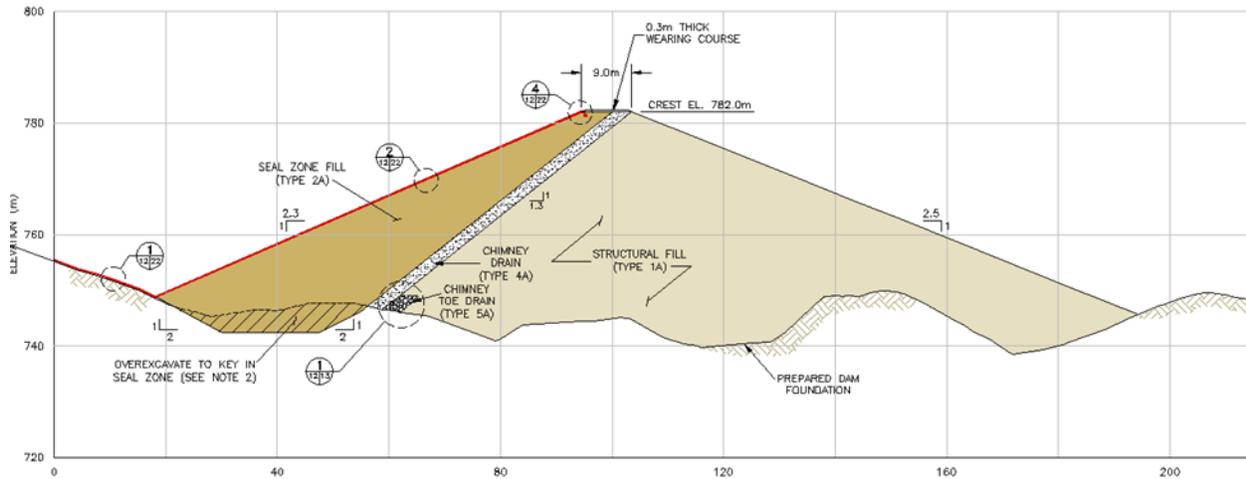
Table 3 Pseudo-static Stability Safety Factors for Stage 4

Location	Pseudo-Static FOS
<i>Minimum Acceptable FOS</i>	1.0
Upstream Slope (end of construction)	1.2
Downstream Slope (operations, steady state) – Entire Slope	1.2
Downstream Slope (operations, steady state) – Upper Slope Section (2.0H:1V)	1.0
Downstream Slope (operations, steady state) – Mid-Slope Section (2.3H:1V)	1.2
Downstream Slope (operations, steady state) – Mid-Slope Section (2.4H:1V)	1.3
Downstream Slope (operations, steady state) – Lower Slope Section (2.9H:1V)	1.3

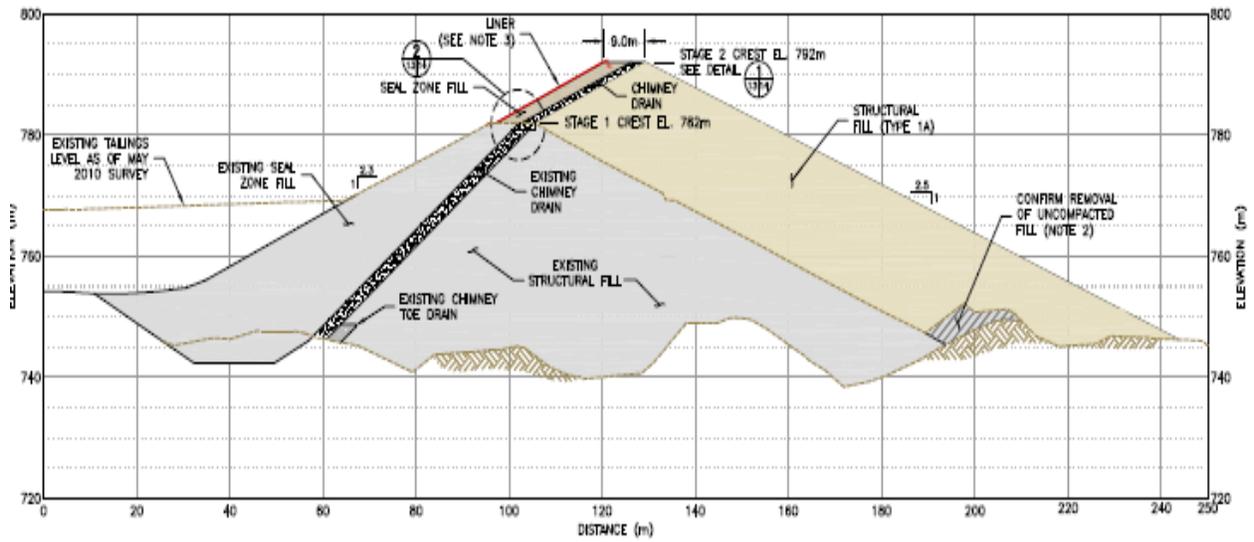
For stage 5, an update of the seismic risk study was carried out by GRAMSA, in order to update the design criteria.

The sections of the dam for each of the stages is shown below:

Stage 1 Profile:

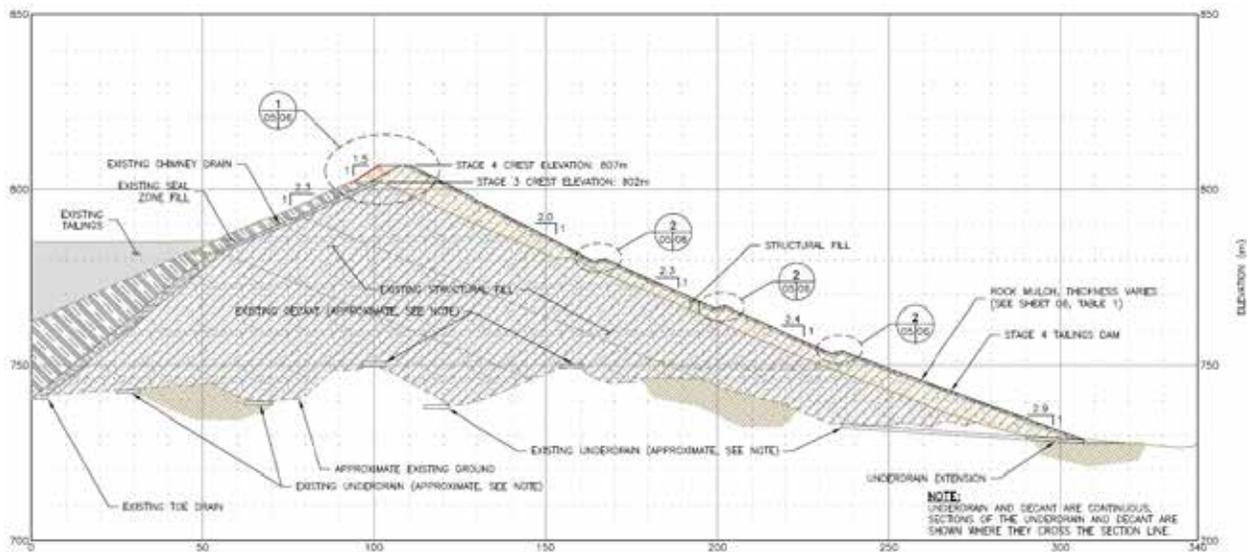


Stage 2 Profile:



Stage 3 Profile:

Stage 4 Profile:



2.1 Design Criteria – Stage 4

There was a revision of the design criteria on this stage, and was basically focused on the storm water storage parameter. See table # 5.

Table 4 Pseudo-static Stability Safety Factors for Stage 4

	Element	Criteria	Basis	Source
<i>Dam</i>				
Dam Hazard Classification	Hazard Classification	High Hazard	Dam hazard rating based on the population at risk, potential loss of life, environmental effects, infrastructure effects, and economic consequences.	CDA, 2007 (§2.5.4)
Slope Stability	Static FOS during Construction	≥ 1.3	Dam should provide sufficient strength to withstand anticipated static loading conditions (i.e., no additional external forces).	CDA, 2007 (§6.6)
	Static FOS during Operations	≥ 1.5		
	Pseudo-Static (Earthquake) FOS	≥ 1.0	Dam should withstand anticipated loading conditions (i.e. seepage, liquefaction, seismic, etc.). If the pseudo-static FOS is less than 1.0, a deformation analysis is required to ensure potential dynamic deformation is acceptable.	CDA, 2007 (§6.6)
	Dynamic Deformation	≤ 1.0 m	Maximum allowable vertical settlement of dam crest due to earthquake.	Hynes-Griffen and Franklin, 1984
	Design Earthquake Event	Maximum Credible Earthquake (MCE)	Dam should withstand anticipated seismic loading conditions.	CDA, 2007 (§6.5); IFC, 2007 (§1.1); ICOLD, 1995 (§2.2)
	Design Earthquake Magnitude	8.2 & 6.1 ^[1]	Data from site-specific seismic hazard analysis (VCL, 2004).	
	Peak Ground Acceleration (PGA)	0.15g & 0.46g ^[1]	Data from site-specific seismic hazard analysis (VCL, 2004).	
<i>Impoundment Water Management and Stormwater Diversion</i>				
Fluid Containment	Storm Storage Requirement	Runoff volume from a storm event 1/3 between the 1,000-year, 24-hour event and the 24-hour Probable Maximum Precipitation (PMP)	TSF designed to store inflow design flood (IDF), in addition to normal operating pool, without encroaching on residual freeboard.	CDA, 2007 (§6.4 & 6.6); CDA, 2014 (§3.5.2); ICOLD, 1996a (§6.3); USBR, 1987 (§6.21)
	Minimum TSF Residual Freeboard	1.0 m	Residual freeboard while storing the IDF.	CDA, 2007 (§6.4 & 6.6); USBR, 1987 (§6.21)

	Element	Criteria	Basis	Source
Mitch Quebrada Intake Structure	Storm Conveyance	Peak flow resulting from the 100-year, 24-hour storm event.	Structures designed to convey specified storm event without failure (erosion or bank overtopping).	IFC, 2007 (§1.1); ICOLD, 1996a (§5.4.2); ICOLD, 1996b (§6.5)
	Channel Freeboard – Channel Located Outside TSF	0.3 m	Minimum freeboard from design water surface upstream of road overflow section to elevation of adjacent section of road. Freeboard provided to minimize risk of road washout during the design storm event.	Simons, Li & Associates, Inc., 1982
	Channel Depth – Channel Located Within TSF	Sufficient to contain wave height or computed superelevation at bends. ^[2]	Minimum flow depth in geoweb-lined channels within TSF to ensure design flow remains within channel.	U.S. Army Corps of Engineers, 1994; Kilgore and Cotton, 2005
Dam Face Drainage & Erosion Control	Storm Conveyance / Erosion Control (during operations)	Peak flow resulting from the 100-year, 24-hour storm event.	Temporary channels (those to be removed at closure) to be designed to pass the 100-year peak flow without eroding.	IFC, 2007 (§1.1); ICOLD, 1996a (§5.4.2); ICOLD, 1996b (§6.5)
	Storm Conveyance / Erosion Control (closure channels)	Peak flow resulting from the 500-year, 24-hour storm event ^[2]	Channels that will be retained at closure will be designed for closure to minimize re-work. New criteria added for Stage 4.	ICOLD, 1996a (§5.3.3 & 5.4.2); ICOLD, 1996b (§6.5); USBR, 1987 (§6.23 & 6.24)

Note: ^[1] Two design earthquakes were identified in the seismic hazard analysis (SHA) for the final design of the Soledad TSF (VCL, 2004): an MCE occurring along a plate boundary (8.2 magnitude with a 0.15g PGA) that produces a very high severity index (8.2) and a near-field earthquake (6.1 magnitude with a 0.46g PGA) that results in a higher PGA. The duration of the plate boundary earthquake (approx. 32 seconds) results in a higher damage potential than the near-field earthquake (approx. 5 seconds). The SHA recommends evaluating stability and deformation using both events.

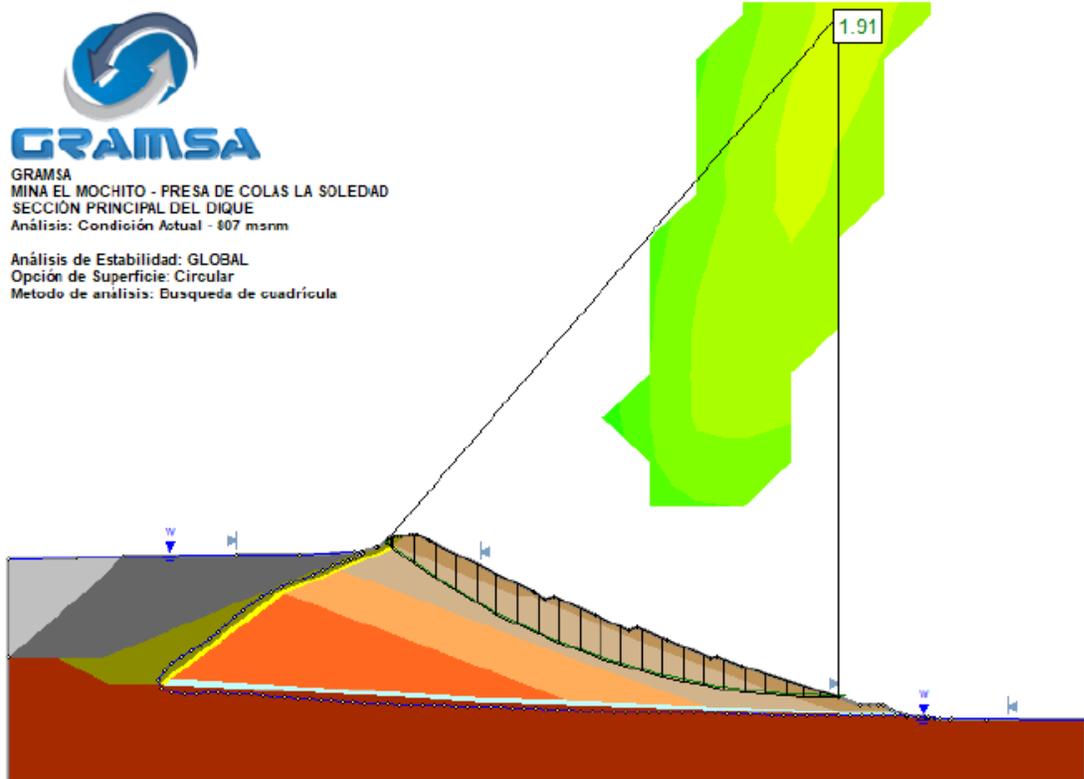
^[2] Items in "red" signify design criteria that have been added/ revised since previous design iterations. Specifically, the stormwater storage requirement was modified to conform to updated requirements published by the CDA (2007).

2.2 Stability Analyst

As part of the design for Stage 5, the designer developed a stability analysis for the existing Soledad Stage 4, the conclusion on the evaluation indicates that the stability in the upstream and downstream faces of the dam complies with the design parameters, this based on the current configuration at 807 m.a.s.l. See table # 5 for the stability safety factors results.

Table 5 Soledad Stage 4 As-built Stability Analysis Result

CASOS DE ANÁLISIS PRESA LA SOLEDAD	FACTOR DE SEGURIDAD (ESTÁTICO)	FACTOR DE SEGURIDAD (PSEUDO-ESTÁTICO)
Dique, Aguas Abajo (ANÁLISIS GLOBAL)	1.9	1.1
Dique, Aguas abajo - Talud superior (Análisis Local 1)	1.8	1.2
Dique, Aguas abajo - Talud intermedio (Análisis Local 2)	2.2	1.4
Dique, Aguas abajo - Talud intermedio (Análisis Local 3)	2.5	1.5
Dique, Aguas abajo - Talud inferior (Análisis Local 4)	2.6	1.4
Dique, Aguas arriba – Lado de relaves (Análisis Local 5)	2.0	1.2



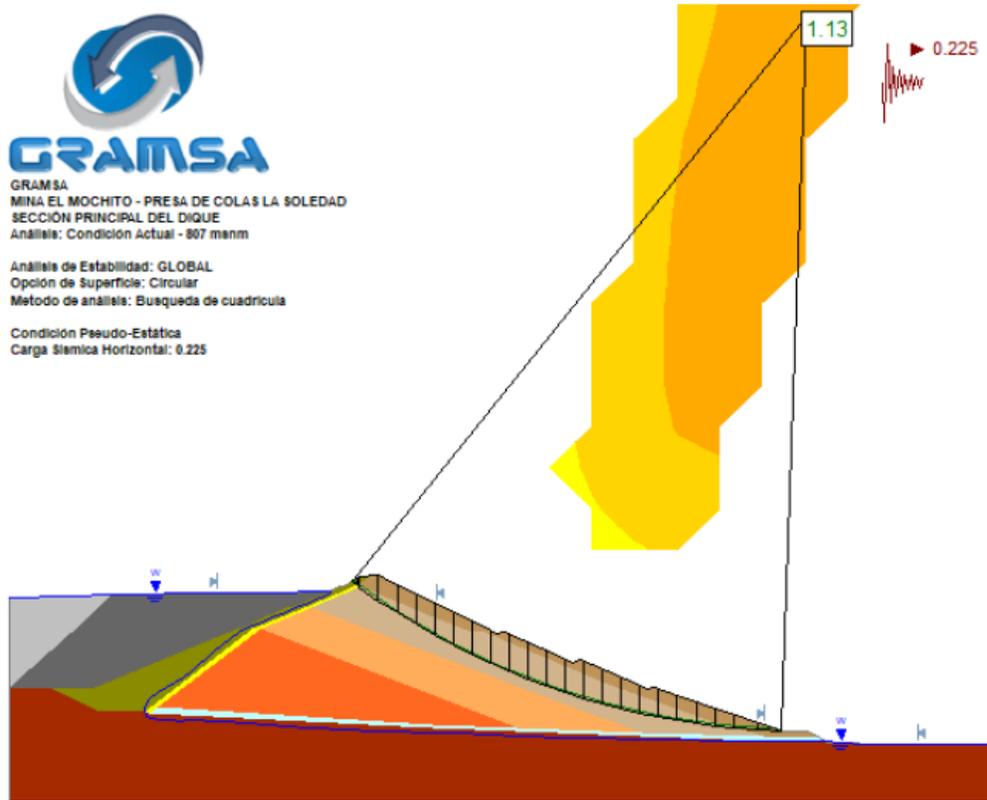
Global Stability Graph



GRAMSA
MINA EL MOCHITO - PRESA DE COLAS LA SOLEDAD
SECCIÓN PRINCIPAL DEL DIQUE
Análisis: Condición Actual - 807 manm

Análisis de Estabilidad: GLOBAL
Opción de Superficie: Circular
Método de análisis: Búsqueda de cuadrícula

Condición Pseudo-Estática
Carga Sísmica Horizontal: 0.225



Pseudo-Static Stability Graph

2.3 Design Criteria Stage 5

The design criteria for Stage 5 was updated by GRAMSA. See table #7.

For this purpose an updated Seismic Risk Hazard Assessment was developed and also a Hydrological and Hydraulic Study for the new conditions of the facility.

The main parameters defined are detailed in Table # 6 below:

Table 6 Soledad Stage 4 As-built Stability Analysis Result

Descripción	Valor	Fuente	Comentarios
PRESA LA SOLEDAD			
A. Clasificación de Peligro de Presas	Alto a Muy Alto	CDA, 2014	Clasificación de riesgo de presas basada en la población en riesgo, posible pérdida de vidas, efectos ambientales, efectos de infraestructura y consecuencias económicas.
B. Movimiento de Tierras		Gramsa	
Ubicación / Topografía			
Coordenadas del lugar	E386294, N1643256; E387296, N1642538	Gramsa	
Elevación del lugar	Varía entre 725 y 870 msnm	Gramsa	
Levantamiento topográfico	-	AMPAC	Última actualización recibida de AMPAC el 13 de diciembre de 2018.
Precipitación y datos climatológicos			
Tormenta diseño 24 Hr - PMP	619.16 mm	Gramsa	Manual for Estimation of Probable Maximum Precipitation (WMO, 2009)
Tormenta diseño 24 Hr - 1000 años	303,8 mm	Gramsa	
Tormenta diseño 24 Hr - 500 años	283,0 mm	Gramsa	
Tormenta diseño 24 Hr - 100 años	234,7 mm	Gramsa	
Tormenta diseño 24 Hr - 50 años	213,8 mm	Gramsa	
Intensidad	SCS Tipo III	Gramsa	Natural Resources Conservation Service (NRCS)
Temperatura promedio anual	21.3 Celsius	Gramsa	
Depósito para Relaves			
Producción de relaves	1,067.6 TMSD	AMPAC	Basado en data obtenida del diseño de la etapa 4
Densidad seca de los relaves	1,68 t/m3	AMPAC	Basado en data proporcionada por AMPAC
Sistema de revestimiento	Geotextil no tejido 12- oz Liner LLDPE 60 - mil	Gramsa	
Sismicidad y Estabilidad de Taludes			
Período retorno sismo de diseño	2475 años	Gramsa/Ferloza	De acuerdo a las "Pautas de Seguridad de Diques de Contención" ("Dam Safety Guidelines") de la Asociación Canadiense de Diques de Contención (Canadian Dam Association, 2014).

Aceleración pico en el basamento rocoso (periodo de retorno de 2475 años)	0.45g	Gramsa/Ferloza	De acuerdo a las "Pautas de Seguridad de Diques de Contención" ("Dam Safety Guidelines") de la Asociación Canadiense de Diques de Contención (Canadian Dam Association, 2014).
Magnitud del evento sísmico (periodo retorno de 2475 años)	M = 6.1	Gramsa/Ferloza	Estudio de Peligro Sísmico método probabilístico determinístico, 2018
Factor seguridad mínimo en condición estática (FOS) - periodo activo de la construcción	≥ 1,3	Gramsa	De acuerdo a las "Pautas de Seguridad de Diques de Contención" ("Dam Safety Guidelines") de la Asociación Canadiense de Diques de Contención (Canadian Dam Association, DSG-CDA, 2007).
Factor seguridad mínimo en condición estática (FOS) - periodo activo de la operación	≥ 1,5	Gramsa	
Factor de seguridad mínimo en condición pseudoestática	≥ 1,0	Gramsa	
Análisis de Deformación	≤ 1.0 m	Hynes-Griffen y Franklin, 1984	Máximo asentamiento vertical permisible de la cresta de la presa debido a un terremoto.

C. Movimiento de Tierras			
Criterio de taludes del Dique			
Talud de Dique (aguas abajo)	2H:1V, 2.3H:1V y 2.5H:1V	Gramsa	Enumerados desde la corona hasta los pies
Talud de Dique (aguas arriba)	1.5H:1V	Gramsa	Aguas arriba del dique (cortina), Etapa 5
Criterio de taludes Naturales para Berma y Canales			
Talud de Pared Rocosa Sur	1H:3V	Gramsa	Se ha considerado más pernos de anclaje para bloques sueltos. En los tramos disturbados, muy meteorizados y/o suelo el tratamiento se detalla en el informe final.
Talud Canal de Coronación Sur 2	1H:1V y 1H:2V	Gramsa	Para el tramo de Lutita el talud de corte es 1H:1V; y para el tramo de roca caliza es 1H:2V
D. Balance de Aguas			
Presa de Relaves			
Porcentaje de sólidos en pulpa (en peso)	35%	AMPAC	Basado en data obtenida del diseño de la etapa 4

3.0 TAILINGS

Based on tailings composition, these require a containment area, so the sediments can settle (and consequently confined) and the water can be reused or discharged to the environment once its quality meets the regulatory standards. Additionally, it was determined to install a liner system on the internal basin to prevent any infiltration due to the presence of limestone bedrock along the area of the impoundment.

A 60 mil (1.5 mm) low density polyethylene (LLDPE) geomembrane is used to proof the facility. Geomembrane is the current state-of-the-art practice for tailings impoundment containments due to its resistance and efficiency. The LLDPE liner is corrugated, in order to provide additional stability on the steeper slopes for stable conditions during construction and subsequent tailings operations.

A 60 mil LLDPE liner was selected for design because LLDPE is a chemically inert liner compatible with long term tailings seepage containment and ultra-violet light (sunlight) exposure conditions. LLDPE liner also exhibits excellent elongation properties to accommodate differential movement in the supporting subgrade and is therefore suitable for installation on subgrade with non-uniform compaction such as anticipated on the steep valley slopes in the impoundment area. The 60 mil minimum liner thickness was selected, based on past experience with the difficulty in extrusion welding of thinner seams and liner puncture resistance upon loading with tailings. With proper installation, the LLDPE liner permeability will be less than 1×10^{-12} cm/s, based on published estimates for geomembrane permeability (U.S. Federal Register, 1987).

A steady state seepage analysis was performed to review through computer modeling the location of the phreatic surface through the embankment at Stage 1 and Stage 4 configurations. Result of the model indicate that the embankment chimney drain will effectively cut off seepage through the clay seal zone and limit phreatic water in the dam's structural shell.

On Soledad TSF, piezometers were installed on the embankment, this instrumentation helps determining the phreatic water level at the dam area, and in the same time survey monuments were installed to detect potential movement on the dam. Readings are taken on a weekly and monthly basis.

Currently, and since the beginning of the TSF, a water monitoring system was implemented to measure the level and quality of underground water. Soledad has an underdrain system to capture water from different canyons on the impoundment and is connected with the chimney drain on the dam face, this monitoring point is located at the toe of the downstream dam face and is the first point to detect any infiltration from the water impoundment in case of such event.

The OMS (Operations, Maintenance and Surveillance) Manual sets the guidelines for the safe and efficient operation of the facility and will be reviewed once the Stage 5 design is complete.

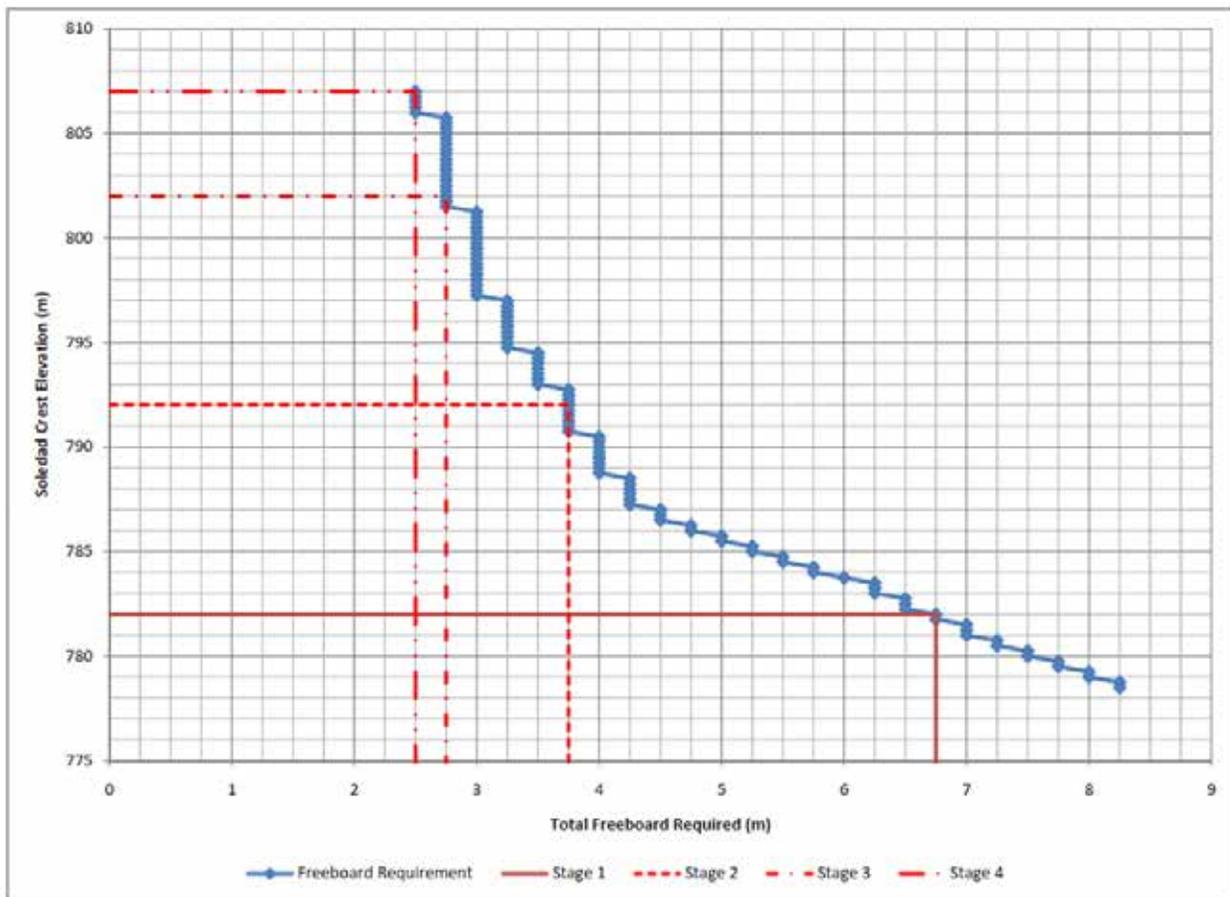
A risk matrix is also in place for compliance by all the incumbents in the operation of Soledad. A specific one will be developed for the construction of the new Stage 5, once the design is complete and in order to define the best and less risky execution strategy.

3.1 Freeboard

Statistical analyses were carried out to determine the 24-hour storm depths for various recurrence intervals up to the 500-year event as well as the Probable Maximum Precipitation (PMP) event. The log-Pearson III method was used for recurrence intervals up to 500-years, while the Hershfield statistical method was used to determine the 24-hour PMP.

For water management a storm water analysis was designed and the analysis is shown in the table below, for better understanding of water management during dam construction and operation.

Table 7 Freeboard



For Soledad expansion project (stages 5 y 6), a freeboard evaluation is underway. Preliminary calculations show a 2 m freeboard as a secure number.

3.2 Process Water Consumption / TSF Water Discharge

Currently the amount of fresh water available from Montevideo dam (at Manantiales forest In AMPAC's property, where the water source is located) for the process is 975 GPM, and the use corresponds to 847 GPM.

These 847 GPM are sent to the TSF (as part of the tailings) after the mineral has been processed, and the same amount of water is discharged to Creek Raices.

It is important to emphasize that the TSF discharge is in compliance with the Honduran guidelines for water quality of industrial water discharges, and it is continuously monitored internally and externally (by the government) and physicochemical parameters are analyzed by different external, certified laboratories.

Even when the Honduran regulation allows industrial water discharges to the environment, and considers the recycling of effluents just as an alternative, El Mochito mine is currently in the process of implementing a water reuse project, with the aim to reduce the use of fresh water in the concentration process, and reduce the amount of water that is discharged to the natural water body.

The expansion project will require an average of 1,234 GPM available at the mills, from the pre-expansion 847 GPM in use and sourced from Montevideo dam; therefore a new pumping system is being installed to pump 772 gallons per minute of reclaim water from the Soledad TSF to the Process Plant and only 461 will be used from Montevideo dam.

This will result in reducing the freshwater make up requirement, thereby freeing 772 gallons per minute of fresh water for other uses by the company and communities.

After the expansion, it will still be necessary to pump up to 461 gallons per minute from the TSF into the Raices creek, this being the balance of the water from the Process Plant into the TSF. This represents 386 gallons per minute less water discharged in the Raices creek than during the Pre-expansion period.

The treatment of the tailings from the Process Plant water will continue as normal to keep complying with the legal discharge requirements.

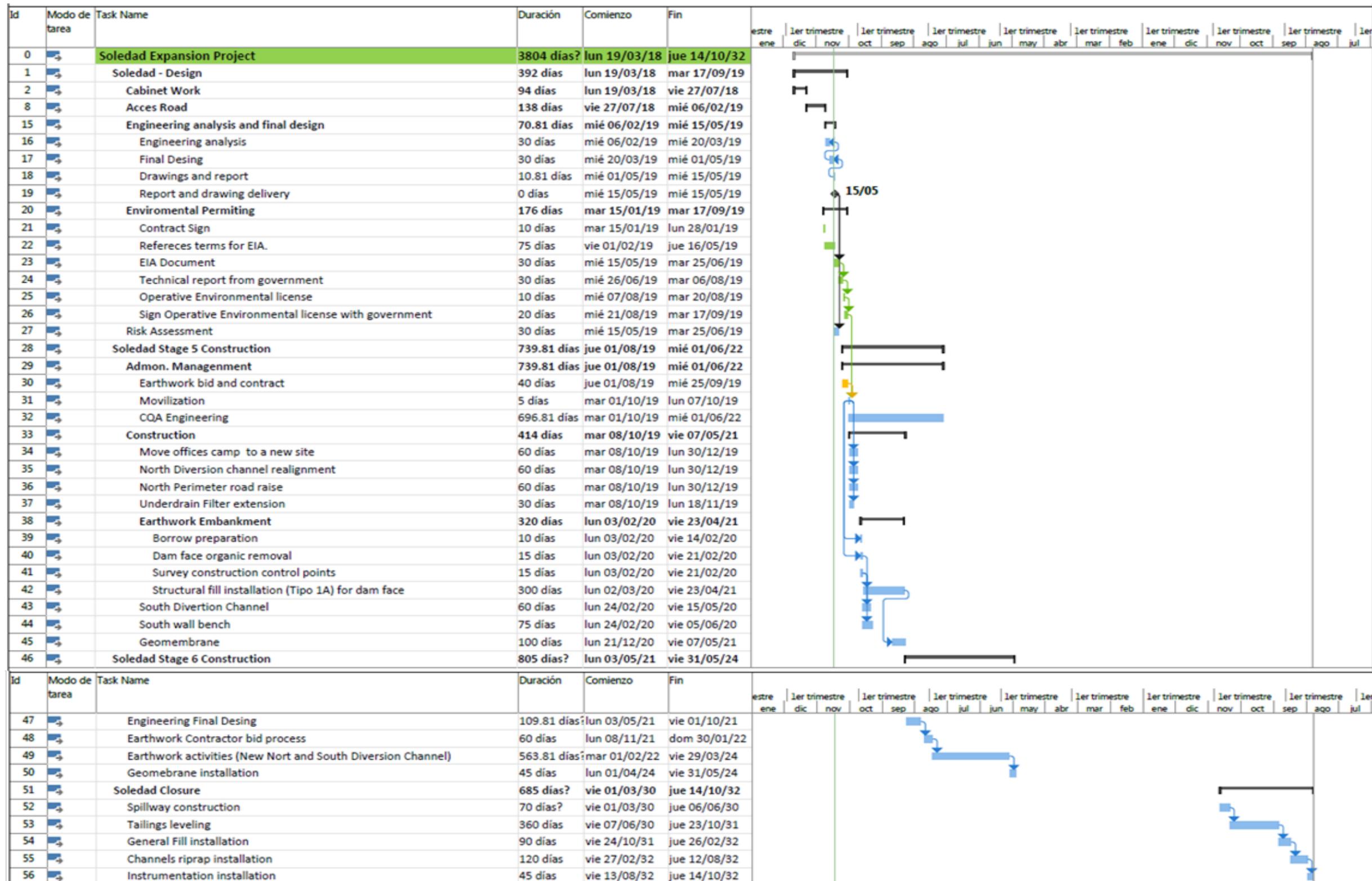
4.0 PERMITS SUMMARY

An environmental licence for the La Soledad TSF (stages 1 to 4) was issued by SERNA (Environmental Government Agency) in 2004. The licence expired in 2006 and a renewal request was filed by AMPAC before the expiry date. The renewal was approved in 2016 and the mitigations measures were also updated with no major changes. 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.

For stages 5 and 6, an expansion of the current environmental license is required, so it is necessary to submit an Environmental Impact Assessment. Such study is underway with a progress of 80%.

Once finalized, it will be presented before the authorities for evaluation. It is expected that the license will be approved and issued within the first 3 months after the EIA's submission.

Pseudo-Static Stability Graph





IDENTIFICACION DE PELIGROS Y EVALUACION DE RIESGOS

Gerencia de Salud y Seguridad

CLASIFICACIÓN	CLASE
Muy alto	A
Alto	B
Medio	B
Bajo	C

CONSECUENCIA						F	E	D	C	B	A	PROBABILIDAD
1	2	3	4	5	6							
MEDIO	MEDIO	ALTO	MUY ALTO	MUY ALTO	MUY ALTO							
BAJA	MEDIO	ALTO	ALTO	MUY ALTO	MUY ALTO							
BAJA	MEDIO	MEDIO	ALTO	MUY ALTO	MUY ALTO							
BAJA	BAJA	MEDIO	ALTO	ALTO	MUY ALTO							
BAJA	BAJA	MEDIO	MEDIO	ALTO	MUY ALTO							
BAJA	BAJA	BAJA	MEDIO	ALTO	ALTO							

PROCESO:	OPERACION DE REPRESAS	GERENCIA	CONCENTRADORA	PREPARADO POR:	CESAR FIGUEROA	REVISADO POR:	JOHN GREWAR	APROBADO POR:	MARTIN CABRERA											
DESCRIPCION			GESTION DEL RIESGO ACTUAL					EVALUACION DEL RIESGO			GESTION DEL RIESGO RESIDUAL					EVALUACION DEL RIESGO				
SUB PROCESO:	ACTIVIDAD, INSTALACION, SERVICIO	PELIGRO (FUENTE DE RIESGO)	RIESGO (DAÑO, ENFERMEDAD O IMPACTO AMBIENTAL)	ELIMINACION DE LA FUENTE DE RIESGO	SUSTITUCION DE MATERIALES O REDUCIR ENERGIA	CONTROL DE INGENIERIA	CONTROL ADMINISTRATIVO	EPP	PROBABILIDAD	CONSECUENCIA	RIESGO ACTUAL	ELIMINACION DE LA FUENTE DE RIESGO	SUSTITUCION DE MATERIALES O REDUCIR ENERGIA	CONTROL DE INGENIERIA	CONTROL ADMINISTRATIVO	EPP	PROBABILIDAD	CONSECUENCIA	RIESGO RESIDUAL	
Recorrido del área	Equipos estacionarios en movimiento		Atrapamiento			Barreras y protecciones / evitar uso de ropa holgada.	Aplicar Regla de Oro No. 4, GISL 08.		B	2	BAJA						A	1	BAJA	
	Vehículos en movimiento		Atropeamiento / Colisión / Choque			Segregación vehicular y peatonal.	Aplicar Regla de Oro No. 4, GISL 08.		B	2	BAJA						A	1	BAJA	
	Barrera Blanda		Transgredir la barrera blanda			Barrera Blanda	Aplicar Regla de Oro No. 4, GISL 11.		B	3	MEDIO						A	1	BAJA	
	Altura		Caida a distinto nivel			Cerco perimetral sobre banquetas 807	Gradas libres de obstáculos / orden y limpieza / uso de pasamanos.		B	2	BAJA						A	1	BAJA	
	Gradas		Caida a distinto nivel			Pasamanos en gradas y torre de decantación	Gradas libres de obstáculos / orden y limpieza / uso de pasamanos.		B	2	BAJA						A	1	BAJA	
	Calles de ripio		Volcadura			Uso de doble tracción obligatorio.	Vías despejadas / Señalización de advertencia, Uso de doble tracción obligatorio.		C	2	BAJA						A	1	BAJA	
	Clima (UV)		Lesiones y/o enfermedades de la piel			Bloqueador solar.	Uso de EPP específico obligatorio.	Visor tapasol para casco / cubrenucas.		B	2	BAJA						A	1	BAJA
	Clima (Calor & Humedad)		Deshidratación			Bebida hidratante.	Tomar bebida hidratante durante la exposición solar.		B	2	BAJA							A	1	BAJA
	Clima (Lluvias)		Enfermedades respiratorias			Chumpa impermeable.	Uso de chumpa impermeable durante la lluvia.		B	2	BAJA							A	1	BAJA
	Clima (Tormentas Eléctricas)		Descargas Eléctricas			Protección a tierra de transformadores.	Apagar siempre las bombas antes de ingresar al embalse.		B	5	ALTO							A	1	BAJA
	Clima (Vientos Huracanados)		Golpeado por			Refugios.	Mantenerse dentro de lugares seguros.		B	2	BAJA							A	1	BAJA
	Pisos Resbalosos		Caida al mismo nivel			Uso de pasamanos / Arnés y línea de sujeción.	Rotulación de advertencia.		A	1	BAJA							A	1	BAJA
	Iluminación		Golpe Contra / Fatiga Visual			Sistema de iluminación / Linternas de mano.	Gradas libres de obstáculos, orden y limpieza, posicionamiento ergonómico.		B	1	BAJA							A	1	BAJA
	Energía Eléctrica		Electrocución			Barrera dura	Regla de Oro No. 6, GISL 05.	Uso de guantes de cuero y/o dielécticos.		B	2	BAJA						A	1	BAJA
	Material Particulado		Inhalación de partículas			Protección respiratoria y/o riesgo por aspersión.	Uso obligatorio de mascarilla en áreas requeridas, GISL 12.	Mascarilla con filtro P100		B	3	MEDIO						A	1	BAJA
Sustancias químicas en pulpa		Contaminación por proyección y manipulación			Protección de manos y/o cara.	Uso obligatorio de guantes en áreas requeridas, GISL 12.	Guantes de nitrilo		B	3	MEDIO						A	1	BAJA	

PROCESO:	OPERACION DE REPRESAS			GIRENCIA	CONCENTRADORA	PREPARADO POR:			CESAR FIGUEROA			REVISADO POR:	JOHN GREWAR			APROBADO POR:			MARTIN CABRERA		
DESCRIPCION				GESTION DEL RIESGO ACTUAL					EVALUACION DEL RIESGO			GESTION DEL RIESGO RESIDUAL					EVALUACION DEL RIESGO				
SUB PROCESO:	ACTIVIDAD, INSTALACION, SERVICIO	PELIGRO (FUENTE DE RIESGO)	RIESGO (DAÑO, ENFERMEDAD O IMPACTO AMBIENTAL)	ELIMINACION DE LA FUENTE DE RIESGO	SUSTITUCION DE MATERIALES O REDUCIR ENERGIA	CONTROL DE INGENIERIA	CONTROL ADMINISTRATIVO	EPP	PROBABILIDAD	CONSECUENCIA	RIESGO ACTUAL	ELIMINACION DE LA FUENTE DE RIESGO	SUSTITUCION DE MATERIALES O REDUCIR ENERGIA	CONTROL DE INGENIERIA	CONTROL ADMINISTRATIVO	EPP	PROBABILIDAD	CONSECUENCIA	RIESGO RESIDUAL		
Operación de Represas		Seguridad Física	Lesion, daño o perdida real.			Personal de vigilancia permanente y/o camaras de seguridad.	Rondas de seguridad física alrededor del embalse.	Arma de fuego asignada por ESEM.									A	1	BAJA		
		Rotación de spigot	Altura	Caida a distinto nivel			Uso de arnés y línea de vida	Aplicar Regla de Oro No. 5 / GISL 06.	Guantes nitreflex	A	2	BAJA						A	1	BAJA	
		Sellado de torre de decantación	Torre de decantación	Calda a distinto nivel / Golpeado contra / Atrapamiento.			Uso de pasamanos / Arnés y línea de sujeción.	Aplicar Regla de Oro No. 5 / GISL 06.	Guantes nitreflex	A	1	BAJA							A	1	BAJA
			Espacios Confinados	Atrapamiento / Asfixia / Golpeado por / Golpeado Contra / Aplastamiento.			Barrera dura	Aplicar Regla de Oro No. 9 / GISL 01.	Uso de tyvek y/o overol de tela / Guantes nitreflex.	A	3	BAJA							A	1	BAJA
		Medición de profundidad del embalse	Espejo de agua	Calda a distinto nivel / Ahogamiento / Electrocuación / Calda al mismo nivel / Golpe contra objeto.			Uso de chaleco salvavidas / Lancha.	Aplicar Regla de Oro No. 5 / GISL 06.	Guantes nitreflex.	A	5	ALTO							A	1	BAJA
		Operación de hidroclonones	Sustancias químicas en pulpa	Contaminación por proyección y manipulación.			Protección de manos y/o cara.	Uso obligatorio de guantes en áreas requeridas, GISL 12.	Guantes de nitrilo	B	3	MEDIO							A	1	BAJA
		Inspección de geomembrana	Espejo de agua	Ahogamiento / Electrocuación.			Uso de chaleco salvavidas / Lancha.	Aplicar Regla de Oro No. 5 / GISL 06.	Guantes de nitreflex	A	2	BAJA							A	1	BAJA
		Toma de muestras de agua industrial	Gradas	Calda a distinto nivel			Pasamanos en gradas y torre de decantación	Gradas libres de obstáculos / orden y limpieza / uso de pasamanos.	Guantes de nitreflex	B	2	BAJA							A	1	BAJA
			Sustancias químicas en solución	Contaminación por proyección y manipulación			Muestreador manual / Botellas plásticas de 500 ml.	Uso obligatorio de guantes de nitrilo.	Guantes de nitrilo.	A	2	BAJA							A	1	BAJA
		Recambio de bombas sumergibles	Energías peligrosas almacenadas	Electrocuación / Golpeado por objeto			Aislamiento de energías.	Aplicar Regla de Oro No. 6 / GISL 05.	Guantes de nitreflex y/o dialecticos.	A	4	MEDIO							A	1	BAJA
			Herramientas manuales	Golpeado contra objeto			Herramientas certificadas.	Aplicar Regla de Oro No. 1 / GISL 10.	Guantes nitreflex.	A	4	MEDIO							A	1	BAJA
			Carga suspendida	Aplastamiento			Uso de retroexcavadora / Uso de techos.	Aplicar Regla de Oro No. 8 / GISL 09.	Guantes de cuero.	A	4	MEDIO							A	1	BAJA
		Marcha de bombas	Energía Eléctrica	Electrocuación			Barrera dura	Regla de Oro No. 6, GISL 05.	Uso de guantes de cuero y/o dialecticos.	B	2	BAJA							A	1	BAJA
			Válvulas	Golpeado contra			Posicionamiento ergonómico.	Aplicación de PETS	Guantes nitreflex.	B	2	BAJA							A	1	BAJA
		Detención de bombas	Energía Eléctrica	Electrocuación			Barrera dura	Regla de Oro No. 6, GISL 05.	Uso de guantes de cuero y/o dialecticos.	B	2	BAJA							A	1	BAJA
			Válvulas	Golpeado contra			Posicionamiento ergonómico.	Aplicación de PETS	Guantes nitreflex.	B	2	BAJA							A	1	BAJA
			Energías peligrosas almacenadas	Electrocuación / Golpeado por objeto			Aislamiento de energías.	Aplicar Regla de Oro No. 6 / GISL 05.	Guantes de nitreflex y/o dialecticos.	A	4	MEDIO							A	1	BAJA
		Actividades de limpieza & Mantenimiento	Desbrozadora de maleza	Atrapamiento / Golpeado por objeto			Guarda de protección de la desbrozadora / Equipo de protección personal para uso de desbrozadora.	Aplicación de PETS	Guantes de nitreflex	A	3	BAJA							A	1	BAJA
	Mantenimiento de Válvulas para Spigots & Techos.		Golpeado contra objeto / Atrapamiento / Machucon			Herramientas certificadas.	Aplicación de PETS	Guantes de nitreflex	A	3	BAJA							A	1	BAJA	

APPENDIX 7A
Stakeholder Contract Form
and Complaint Form



Form for Recording Meetings with Stakeholders

Document: RG-RS-01
Revision: 01
Effective date: November 2013
Page: 1 of 2

Date

Hour

1. Type of Contact

- Contact from the stakeholder
 Contact to the stakeholder

2. Method of Contact

- Telephone Other
 Letter
 E-mail

Other: _____

3. Contact information

Name

Organization

Position held

Telephone

E-mail

4. Place of Meeting

- Internal External
Place: _____

5. Reason for Contact

- Delivery of request Presentation of project
 Information request Acknowledgement
 Submit complaint Other

6. Topics Discussed

7. Agreements and Commitments

8. Observations and Comments



Form for Recording Meetings with Stakeholders

Document: RG-RS-02

Revision: 01

Effective Date: November 2013

Page: 2 of 2

Attendance Sign-In Sheet

No.	Names	Position	Organization	Identification number	Signature	Telephone number
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

Signature and name of AMPAC representative



Complaint Report Form

Document: RG-RS-02
Revision: 01
Effective Date: September 2013
Page: 1 of 1

Date

Place:

Name of the person filing the complaint:

Institution and position (optional):

Address and telephone (of person filing the complaint):

Description of the complaint

Topics addressed at the time of receiving of the complaint:

Name of the person who received the complaint:

Signature of the person presenting the complaint:

Name

Signature of member of CSR staff:

Name

Followup contact with person presenting the complaint

Date	Name	Topic discussed	Telephone



Complaint Follow-up Form

Document: RG-RS-03
Revision: 01
Effective date : September 2013
Page: 1 of 2

Date:

Name of the department or person related to the complaint

Derived from Complaint Report No.

Follow up Actions

Date	Action taken	Participants	Proposed measures	Responsible	Term	Observations

Note: Indicate if annexes were added

Follow up of the realisation of the solution (at the end of the determined term)

Status of resolution of complaint:

Unresolved

Partially resolved

Resolved

What is needed to resolve the complaint:

Timeframe to carry out the solution



Complaint Follow-up Form

Document: RG-GS-03
Revision: 01
Effective Date : September 2013
Page: 2 of 2

Effectiveness control

Delivery date of response to the complainant:

Place where response was delivered to complainant:

Satisfaction of the person who submitted the complaint:

Totally satisfied

Partially satisfied

Not satisfied

Final resolution or measures to take, if complainant is not satisfied:

Observations and comments:

Signature of complainant, indicating satisfaction with complaint resolution

Name

Signature of CSR staff member who followed up on the complaint

Name

APPENDIX 7B

Stakeholder Map

STAKEHOLDER MAP - EL MOCHITO MINE

No.	Communities	Interests	Activity to which they are dedicated	Primary or Secondary	Level of Collaboration	Range of Influence (1 - 5)	Range of Interest (1 - 5)	Range of Risk and Level of Priority E - A - M - B
1	El Palmar	Proximity to La Soledad tailings dam, access route through the company's premises. It is their main and closest source of work, support programs at school (snacks). Possible acquisition of land for expansion of projects.	Agriculture, surface field work in the mining company	Primary	Medium	4	5	E
2	El Ponciano	Access to the company farms, possible acquisition of land, agreement for use of community resources (water), projects with school (snacks).	Agriculture	Primary	Medium	3	4	A
3	El Mochito	The mine has its name, the development and growth occurred from the start of these operations. The proximity to the mine site, number of workers, have the only C.E.B. from the urban area, access route to different industrial areas. AMPAC provides clean water to the community	Work in the mining activity, commerce	Primary	Medium	3	4	A
4	San Juan	Its beginnings are linked to the operations of the mine. Located next to the company's water production area. AMPAC provides workers with drinking water.	Mining, commerce	Primary	Medium	3	3	A
5	Nuevo Lempira	school programs (snacks), community continues to the water production area. Here, workers live in the countryside for the most part.	Agriculture, mining	Primary	Medium	3	4	A
6	Campo Aurora y Nueva Jerusalem	Next to the old tailings dam, accesses company premises near the dam.		Primary	Low	3	2	M
7	El Sauce	Continues to the bed of the Quebrada Raíces.	Agriculture	Secondary	Low	2	2	B
8	Bonanza	Internal ventilation system of mine, passage of high voltage lines. Main transportation route for workers in the El Carreto community.	Agriculture, commerce	Primary	Low	3	2	M
9	Oct-21	Community where the waste dump of the municipality is located. Receives water from the Manatiales area.	Agriulture, commerce	Primary	High	3	3	A
10	Los Coquitos	Community drinking water source is on company property. Community water system route crosses the company property.	Agriculture	Secondary	Low	2	2	B
11	El Carreto	A large number of employees of the mine are from this area.	Mining, agriculture	Primary	Medium	3	3	A
12	Campo Rojo	Location where concentrate storage warehouses are located in Puerto Cortés.	Commerce, various activities	Primary	Medium	2	3	M
13	El Aguaje	Village limit of the municipality next to the municipality of Las Vegas, eventual exploration projects on the surface.	Agriculture (coffee and vegetables)	Secondary	Medium	2	2	B
14	Los Naranjos y Peña Blanca	Access route for transporting concentrates to Port, and and road connections to the most important cities of the country.	Commerce, Turism	Primary	Low	3	2	M
15	Casco Urbano de Las Vegas	The main source of work is mining and related commercial activity.	Commerce and mining activity	Primary	Medium	3	4	A

SOCIAL LEADERS OF THE ZONE

No.	Communities	Interests	Primary or Secondary	Level of Colaboration	Range of Influence (1 - 5)	Range of Interest (1 - 5)	Range of risk and level of priority E - A - M - B
1	Municipality	Local authority	Primary	High	5	5	E
2	Firefighters	Emergency corps for firefighting, training received by them, institutional support.	Secondary	High	2	3	M
3	Red Cross	Emergency corps in the area, representation of an international organization.	Secondary	Medium	2	3	M
4	Police	National security authority, security taxes are paid at the central government level.	Secondary	Medium	2	3	M
5	Health centre	Municipal Representation of Public Health.	Primary	High	3	3	A
6	District of Education	This is the highest authority that governs schools at the municipal level.	Primary	Medium	2	3	M
7	Educatodos	Organization dedicated to the education of adults.	Secondary	Low	2	2	B
8	Educational centers belonging to Red Brisas del Lago	Made up of 6 educational centers from different communities, 4 of them are part of the school snack program and one is one of the centers with the largest number of children of miners.	Primary	High	3	4	A
9	IOPTCA (Institute of Secondary Education)	The only middle level educational center in the area, has technical training workshops, have the "trade" to implement formal education in mining.	Primary	Low	2	3	M
10	CEVEM	Ruled by a foundation, of which AMPAC is a member; approximately 80% of its operating costs are covered by AMPAC.	Primary	High	4	5	E
11	Amuprolago	Association of Municipalities in the area of Lake Yojoa.	Primary	Medium	2	3	M
12	Hondulago	Authority that governs Lake Yojoa.	Secondary	Low	2	3	M
13	Nursing home	Only assistance center for older adults in the town, is managed with contributions. AMPAC is the largest contributor.	Primary	Low	2	3	M
14	Cooperation agencies	USAID and GIZ work in the area, in education and productive projects	Primary	High	3	3	A
15	Public schools in the area	Most are rural, lacking infrastructure, basic services and furniture.	Secondary	Medium	2	3	M
16	Special needs children's school	Only assistance center for children and adults with special needs. Does not have funds. Works with personal and voluntary contributions	Primary	High	3	3	A
17	"Patronatos"	Social organizations that govern the communities, with the power to manage and execute projects for the common good of the populations.	Primary	Medium	3	3	A
18	Water boards	Social organizations that govern community water systems.	Secondary	Medium	2	3	M

APPENDIX 7C

Stakeholder Contact Record

	Stakeholder Contact Record		
	Produced by Paola Rosales, Corporate Social Responsibility (CSR) coordinator Saúl Hernández, CSR auxiliary	Date: 12/11/2013	VERSION: 01
	Approved by Ricardo Sierra, CSR Manager	Date latest version: 12/11/2018	Page 1 de 2

1.0 PURPOSE

The objective of this procedure is to document meetings with external stakeholders in which issues of community interest are addressed, keeping a record of topics discussed -- especially agreements, commitments and expectations -- so that community relations personnel can follow-up, build relationships of trust, and maintain our social license, allowing us adequate performance and productivity.

2.0 SCOPE

The contact record should be used in any formal meeting with external stakeholders, coordinated by AMPAC in response to a request or initiated by the company. Records must be kept of meetings undertaken by all AMPAC employees.

3.0 TERMS AND DEFINITIONS

Stakeholders or Stakeholder groups: any individual, group or organization that has interaction in the normal course of the development of business activities. Being able to influence the project, either directly or indirectly.

Topics of community interest: all topics related to a particular community, which include all those activities and jobs that a person, group, or association perform based on the common good of a particular area or group, such as:

- Presentation of projects.
- Support requests for activities.
- Information request.
- Filing of complaints or nonconformity, related to the production process.
- Acknowledgements.

Social License: Acceptance of mining companies and their projects within local communities. This social acceptance is granted by all the parties that are affected or that could suffer some impact by mining projects and by other stakeholder groups. Stakeholders grant Social License based on the credibility of a mining company and the type of relationship it creates with the communities.

Formal meeting with stakeholders: any meeting reported and coordinated with the support of the department of Communications and Corporate Social Responsibility (CSR), in which the different discussed topics and written agreements are established, in order to be able to follow up effectively.

4.0 RESPONSIBILITIES

The Communications and CSR department is the only one authorized by the General Management to coordinate meetings with the necessary stakeholders and establish agreements and support commitments on behalf of AMPAC.

All areas of the company that for different community reasons have been contacted or need to contact external stakeholders must inform those in charge of CSR prior to meeting with them. They must also indicate the reason for the meeting or information request, so that they can provide support, background and/or appropriate advice.

It is the responsibility of the Managers and Superintendents to disclose and comply with this procedure. The Superintendent of Communications and CSR will be responsible for ensuring the effective implementation and monitoring.

5.0 REQUIREMENTS

Once the meeting with the representatives of the stakeholder group is established, it is preferable that a member of the CSR team is present at the meeting to fill out the contact form with stakeholders. If this is not possible, the manager of the department that requested the meeting will fill it out, validate it, and will deliver the form to the Communications and CSR Department, which responsible for the follow-up of the information and agreements contained in it.

The implementation of this procedure will allow compliance to the commitments with the stakeholders, incorporating them within the stakeholder participation and commitment program.

This procedure fulfils the objectives of gaining trust from, and respect for, external stakeholders, demonstrating active leadership and participation at the community level, protecting our brand and safeguarding our operating permits.

6.0 DOCUMENTATION AND REGISTRATION

The information related to the meetings with external stakeholders will be registered in forms RG-RS-01 and RG-RS-02. All areas are responsible for delivering completed forms to the department of Communications and CSR, to ensure compliance with the registered agreements and commitments.

APPENDIX 8A
Erosion and Sediment Control Plan

**EROSION AND SEDIMENTATION CONTROL
MANAGEMENT PLAN**

1.0 INTRODUCTION

The construction and earthmoving works, as well as the operation in aggressive conditions such as strong rainfall, highly erodible soils and rugged topography, substantially increase the potential erosion of soils and the generation of sediments in the intervened areas. Various types of strategies for the control of erosion and sediments must be considered to avoid unnecessarily increasing the exposure of areas and accelerated loss of useful soils for revegetation and final closure. Likewise, an adequate planning of the construction activities must be taken into account, as is the case of the programming of earthmoving works, during periods of low rainfall.

The present Erosion and Sediment Control Plan has been carried out with the purpose of showing adequate techniques and procedures to reduce the erosion and sediment drag in the facilities, and accelerated loss of soils that have been implemented since the beginning of construction and operation.

2.0 OBJECTIVES

The main objective of this plan is to provide guidelines to avoid unnecessary exposure of unprotected soils, as well as to identify the materials and techniques required to reduce the accelerated loss of soils during the construction and operation stages of the facilities.

Other objectives of this plan are the following:

- Reduce the generation and dragging of sediments in the areas intervened during the construction stage.
- Establish a maintenance and monitoring plan for the structures implemented to reduce erosion and trap sediments during the construction phase.
- Establish a permanent supervision plan for the infrastructure implemented during the construction and operation stage, especially after significant rain events.

3.0 PLANNING OF EROSION CONTROL WORKS

Prior to the construction work, specific stabilization works must be planned and implemented for each type of erosion; therefore, the sequential programming of the construction works and the handling of surface water must be considered.

Many of the engineering works will involve the intervention of hillsides and slopes, which will require an erosion control program during construction and definitive control measures in the medium and long term. In the same way, sediment production, caused by erosion, requires sediment control works. The American Association of State Roads and Transportation (AASHTO) recommends following these general procedures:

- Determine the limits of the areas to be intervened: define which areas should be intervened to build the works, and give special attention to the critical areas of erosion that must be intervened.
- Divide the area of the work in drainage areas: determine the passage of runoff and how erosion and sedimentation can be controlled in each small drainage area.

- Select the systems to be used for erosion control, sediment generation and perform an adequate management of the works from the planning stage.

Likewise, the Good Work Practices of the International Association of Erosion and Sediment Control (BMP) should be considered.

3.1 Erosion mechanisms during the construction stage

The activities for the construction of the access and service roads could cause slope sliding problems.

3.2 Erosion mechanisms during the construction and operation stage

The construction of the access roads could cause problems of sediment generation due to erosion in vehicular circulation.

3.3 Erosion and sediment control structures

The following list of structures are used and can be used to avoid excessive erosion and the generation of sediments. All areas of the company and contractors involved in the construction of the facilities and accesses must comply with the following plan of control of erosion and sediments for each work area.

3.3.1 Design of the shape of the slope, and berms

For the slope design, the lithology, structure and weather conditions of the constituent materials of the slope must be analyzed in detail. If forming slopes of combined slope is necessary, the design of intermediate berms should be taken into account in order to guarantee an adequate safety factor against landslides. Next, the criteria for the design of the berms are presented:

3.3.2 Intermediate Berms

The construction of intermediate berms can serve two purposes: to manage runoff water and control erosion; and to increase the safety factor against possible landslides. For the construction of said structure, the following recommendations should be considered:

Recommendations

- In erodible soils, the berm must have a slope of 5 to 10% towards the inside of the slope and must have a re-vegetated gutter in its interior for the control and management of the runoff waters.
- In granular soils, constructing berms that may be unstable is preferred to reduce the slope.
- The longitudinal slope of the berm must be over 3% to guarantee the efficient and rapid exit of the collected water.

Maintenance

- These facilities should be inspected periodically to remove materials that obstruct the free flow of water.
- After each major rain event, the behavior of the berm should be inspected.
- The deposited sediments must be removed to be transported only to authorized tanks when they occupy 50% of the capacity of the berms.

3.3.3 Design of run-off water management works

For the design of runoff control works, the characteristics of the climate, geology, infiltration and erosion of the soil must be taken into account. During the construction of the works, the water control structures are commonly left for the operation stage, which will require the maintenance of the same.

The surface drainage structures that may be used to derive the runoff will be the channels. For the design of the surface drainage works, a complete study of the existing hydrological information was carried out because insufficient works accelerate the erosion processes due to lack of capacity to manage flows.

The types of channels that can be used are the following:

Divert channels of the flow above the slope

They are channels that are built above the cut of the road or structure, in order to completely divert the runoff and away as much as possible of the structure or slope.

Recommendations

- The channel should not be built too close to the upper edge of the slope to avoid landslides.
- The diversion channels should be coated at the points where erodible material is detected, as well as providing a sufficient slope to guarantee a rapid drainage of the captured water.

Maintenance

- These facilities should be periodically inspected to remove materials that obstruct the free flow of water.
- After each major rain event an inspection should be made to evaluate the behavior of the channel.
- The deposited sediments must be removed to be transported only to authorized tanks when they are occupying 50% of the channel capacity.

Circuit breakers or interceptor channels

The cutoffs are channels transverse to the slope that have the function of collecting the runoff and lead it to a collector channel or bleachers of energy dissipation, avoiding the formation of currents along the main slope.

Recommendations

- The circuit breakers must be protected against erosion by using coatings in cement, rock or other soil sacks.
- Interceptors must be built in all the intermediate berms of the slope.
- According to the recommendations of the AASHTO, lateral slopes should not have slopes greater than 2H: 1V and the minimum width should be 1.2 m.

Maintenance

- These facilities should be periodically inspected to remove materials that obstruct the free flow of water.
- After each major rain event the behavior of each gutter or channel should be inspected.
- When they are occupying 50% of the maximum capacity of the channel, the sediments deposited in the channels must be removed to be transported to authorized tanks.

Power dissipators

The water collected by the channels is delivered to high speed channels (see Photo 1); therefore, bleachers must be built to reduce the speed of runoff or discharge flows. They can be covered with concrete, loose rocks, rip-rap or other material (Figure 1).

Recommendations

- The energy dissipaters are used when the soil is erodible and receives the flow of a discharge.
- The installation must be carried out as soon as possible, if possible, before the water supply system is finished.

Maintenance

- They should be inspected periodically and especially after a major rain event.
- They should be maintained and repaired as required to ensure proper functioning of the erosion protection system and sediment transport.
- Maintenance will be carried out in accordance with an appropriate manual, developed before construction.

Small control dams ("check dams")

They serve to reduce the speed of runoff and water energy and trap sediments during the passage of them with suspended solids (see Photo 2).

They can be temporary or permanent according to the construction or operation program respectively.

These erosion control structures will be arranged according to the slope gradient of the terrain or channel, as shown in the following table:

Table 1 Maximum distance depending on the terrain or channel slope

Channel Slope Spacing (%)	Spacing (m)
2	30
3	25
4	20
5	17
6	15
8	12
10	7

Recommendations

- They should be spaced according to the slope of the terrain or channel.
- They can be built with rock, weeds (bales), wood trunks or with the use of geosynthetics, as long as the design criteria shown in Figures 1 to 3 are met.
- The shoulder of the lower dock should be at the same level as the foot of the next upper levee (Figures 2 and 3).

Maintenance

- Regularly review the operation of these structures, especially after a major rain event.
- Verify the operation and repair the structures whenever necessary.
- Remove the trapped sediments and deposit them in their place of final disposal.
- Regularly review the operation of this structure, especially after a major rain event.
- Check the operation and repair the pipes whenever necessary.
- In cases of little precipitation, the system will not be used.

3.3.4 Design of works to protect the surface of the slope

In some cases, building barriers for the control of furrows and gullies on slopes with high concentrations of runoff water will guarantee slope stability (see Photo 3). Among the works to protect the surface of slopes, the following can be described:

Stone barriers

In order to achieve sedimentation in channels, stone barriers can be placed in the bed of the channels, which will allow the passage of water, but will prevent the passage of coarse sediments. For this purpose, the barriers can be covered with geotextile (Figure 4).

Recommendations

- If necessary, a mixture of cement and sand (or soil) will be used to fix the rocks in situ.
- It can be used as a temporary or definitive measure, according to the location of the structure.
- The size of each barrier will depend on the width of the channel, the flow of water and the type of coarse sediments that are transported in the channel.

Maintenance

- Like any structure to control erosion, it should be inspected periodically, depending on the season of the year. In the wet season months (June-November) the inspection should be biweekly.
- If the walls are covered with geotextile and serve to retain sediments, the behavior of these will be inspected after each rainy event.
- Repair the structures whenever they present failures or when necessary.

Sedimentation ponds

Sedimentation ponds are structures that serve to capture and store sediments from the intervened zones (Figures 6 and 7). These pools prevent the transport of sediments carried in the work area, and may be temporary or permanent. These will be built at the outlets of the runoff water flow channels, if necessary.

Recommendations

- Sedimentation ponds have an estimated 70-80% effectiveness, so they must be accompanied by other measures to trap sediments.
- They should be designed with a series of chambers that to keep water longer with and with greater collection of sediments.
- They will be built by excavating the land or with polyethylene sacks filled with cement floor, in the case of temporary and/or gabion walls in the case of permanent pools.

Maintenance

- After each major rain event an inspection will be conducted to evaluate the behavior of each pool.
- Sediments deposited in ponds should be removed to be transported only to authorized tanks when they are occupying 50% of the maximum channel capacity.

3.4 Erosion control during the construction of accesses

The criteria proposed by the American Association of State Highway and Transportation Officials (AASHTO) must be considered in the construction of accesses, which are detailed below.

- A definitive cover must be placed to protect the exposed surfaces of the slopes. Generally, star grass, which is the most effective forage plant in the area, will be used.
- The deposits of material must be provided by traps to collect sediments in places where trawling may occur.
- The areas adjacent to the sites of the works should be protected using barriers for sediments. These barriers must be built before the earth movement begins.
- Provisional pipelines should be built to carry the waters from the highlands to the lowlands. The movement of flows over unprotected slopes should not be allowed.
- All drainages from areas greater than two hectares must be deviated from the work area, using provisional or permanent channels.
- If the intervened zone covers very large areas, dikes should be constructed to control sediments.

Taking into account the criteria proposed, the following structures have been identified that will allow the control of erosion and sediments in the access areas.

3.4.1 Perimeter bypass channels

Perimeter bypass channels are those designed to capture most of the surface waters of the microbasins, these were designed and constructed to support 50% of the PMP (Maximum Probable Precipitation).

The erosion control structures are arranged according to the gradient of lateral slope at a minimum distance from the body of water (Table 2).

Table 2 Minimum distance from the curved gutter to the body of water

Access pending (%)	Spacing (m)
<7	100
7-25	75
25-40	50
>40	25

Recommendations

- According to the field manual for the management of watersheds of the FAO, they should have a slope of 3 to 8%, with a section of 0.4 to 0.5 m wide and a depth of 0.2 to 0.5m.
- The side faces must not have slopes greater than 2H:1V.

Maintenance

- These facilities should be inspected periodically to remove materials that obstruct the free flow of water.
- After each rain event greater than 2 inches, the behavior of each ditch or channel should be inspected.
- When they are occupying 50% of the maximum capacity of the channel, the sediments deposited in the channels must be removed to be transported to authorized tanks.

3.4.2 Side gutters

The side ditches are developed parallel to the axis of the road and its function is to collect the runoff that runs along the platform of the access road and part of the flow that comes from the cut slope.

Recommendations

- According to the field manual for the management of watersheds of the FAO, the minimum speed for a flow to maximum capacity should be from 0.76 to 0.91 m/s to facilitate the transport of sediments.
- A wide and shallow cross section will make the water velocity and erosion potential smaller.
- The hydraulic design criteria for the site should be reviewed.

Maintenance

- Each of these facilities should be periodically inspected to remove materials that obstruct the free flow of water.
- After each major rain event an inspection should be made to evaluate the behavior of each gutter.
- When they are occupying 50% of the maximum capacity of the channel, the sediments deposited in the channels must be removed to be transported to authorized tanks.

FIGURES

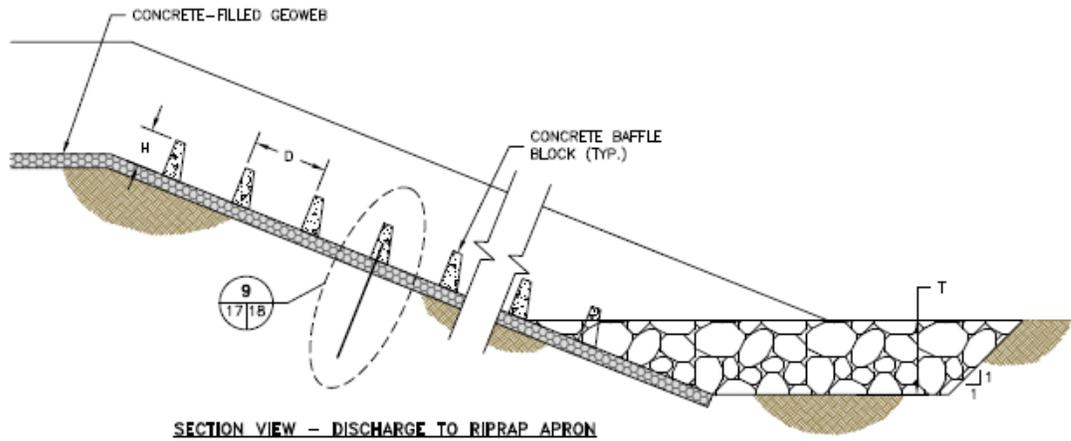


Figure 1 Energy dissipator diagram

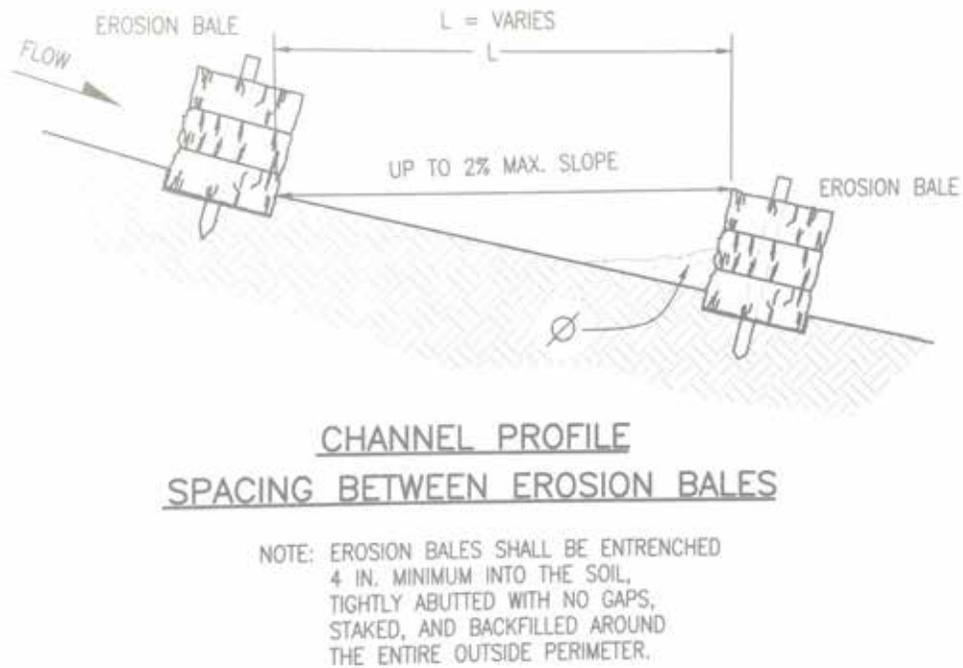


Figure 2 Location of control structures for channel stability

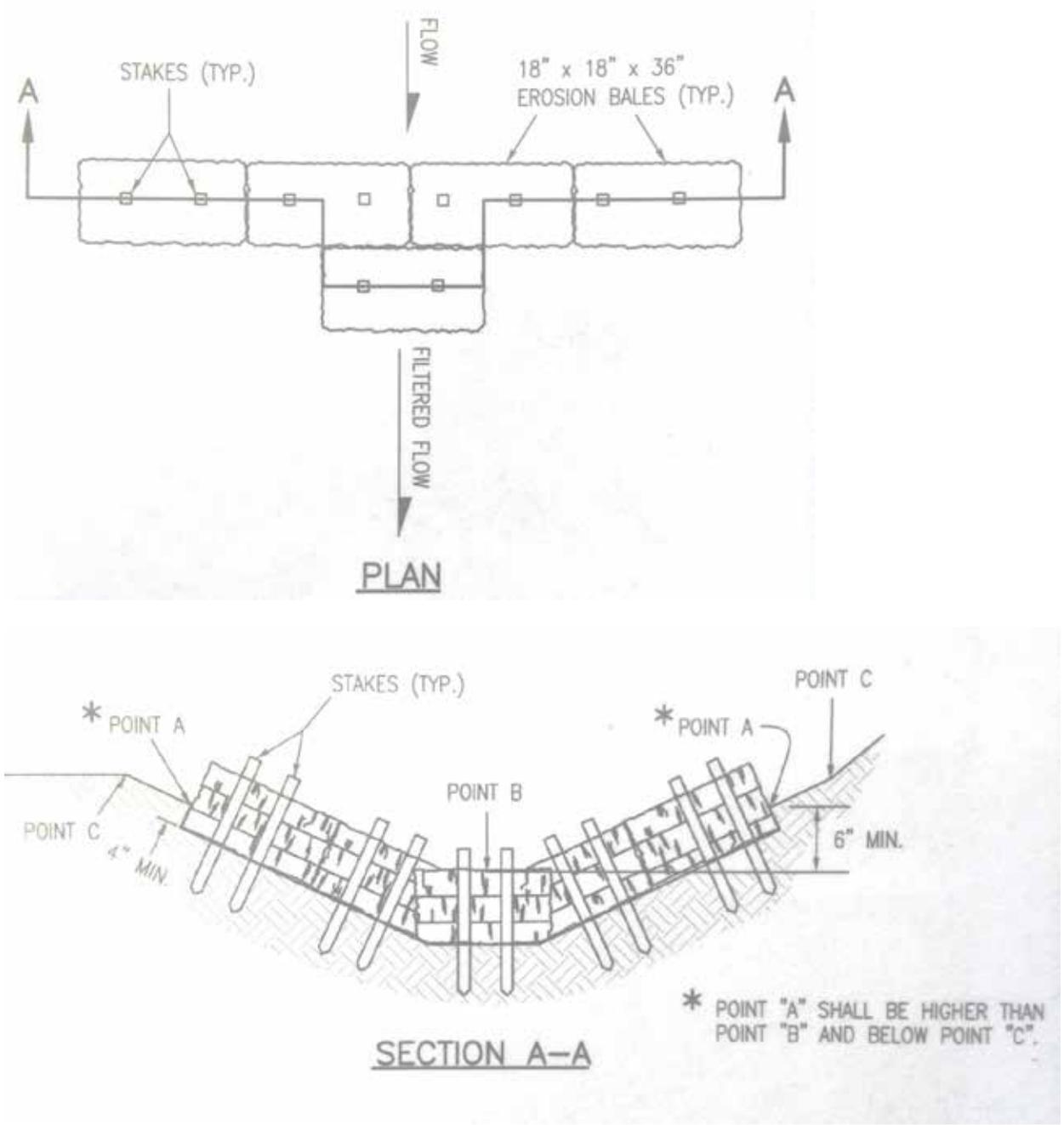


Figure 3 Control dike diagram

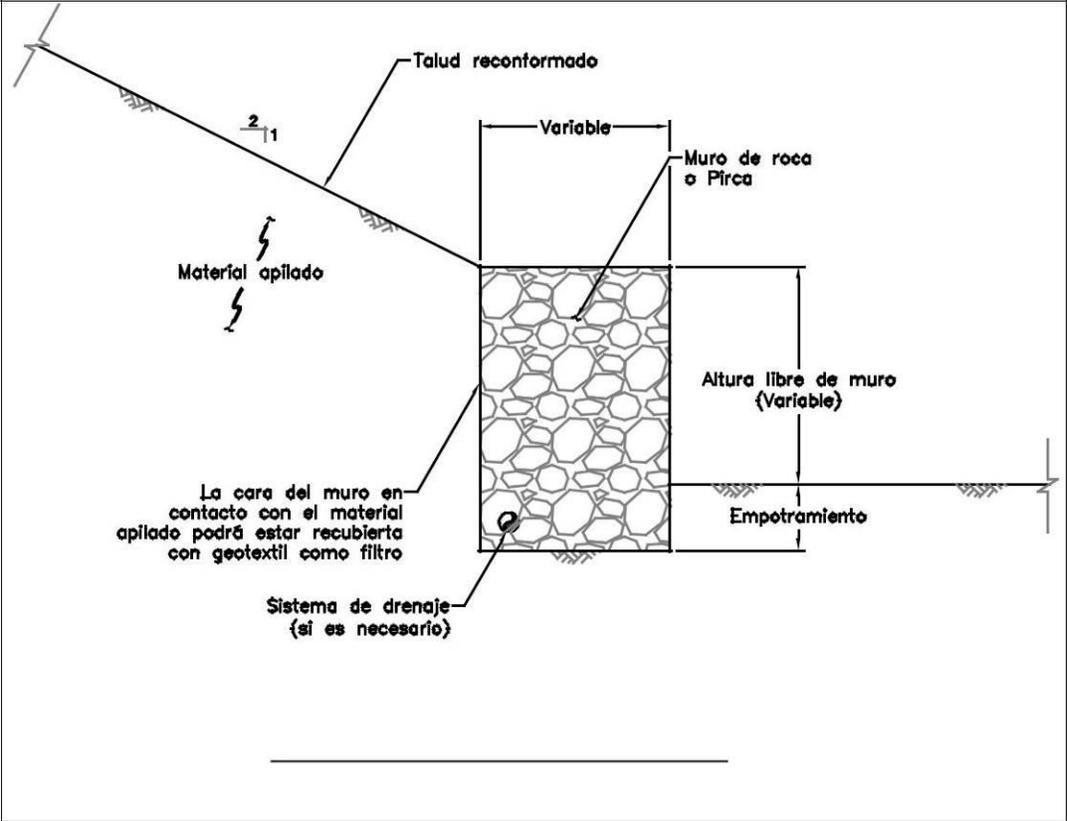


Figure 4 Containment wall diagram

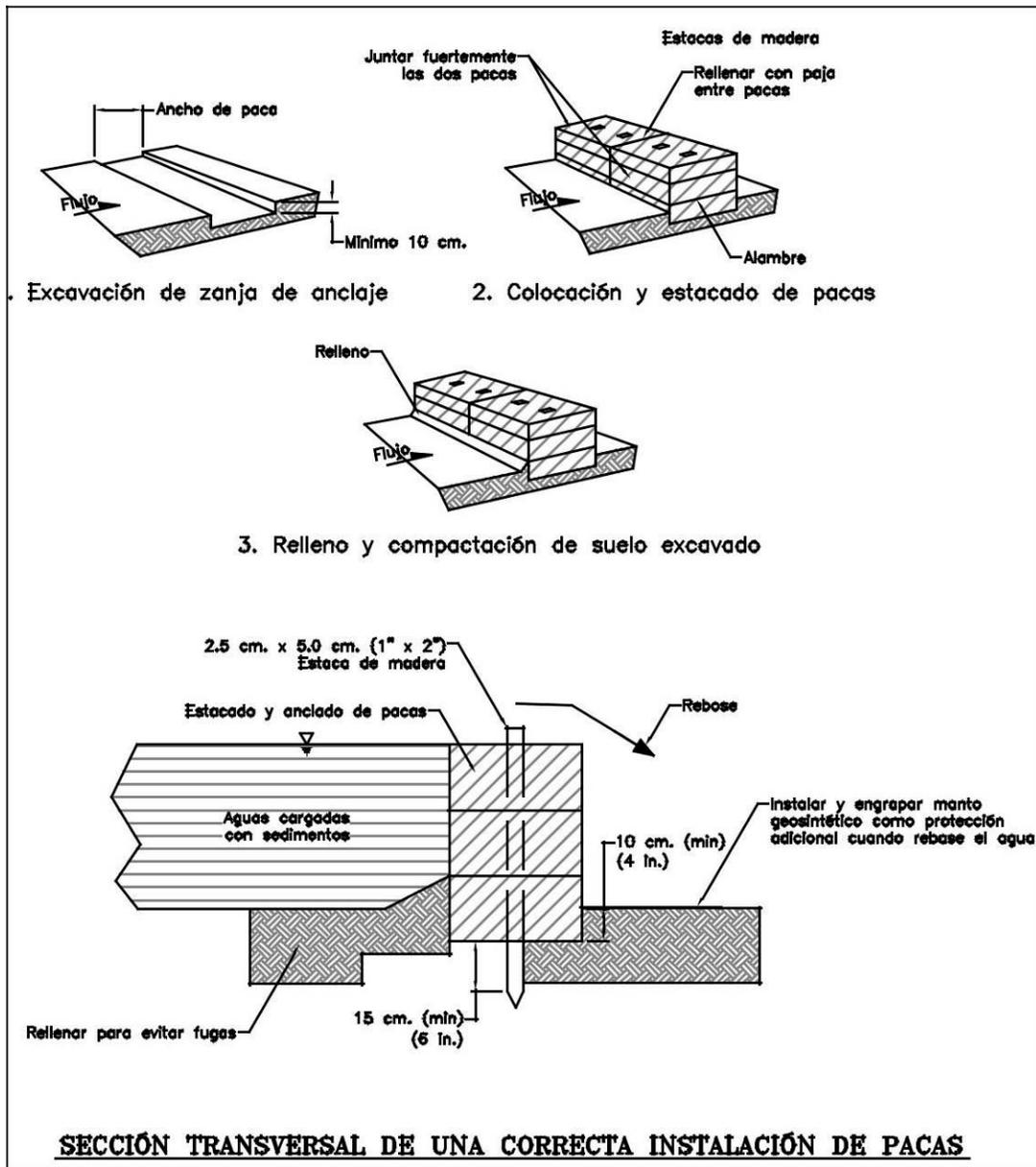


Figure 5 Barriers of bale or grass

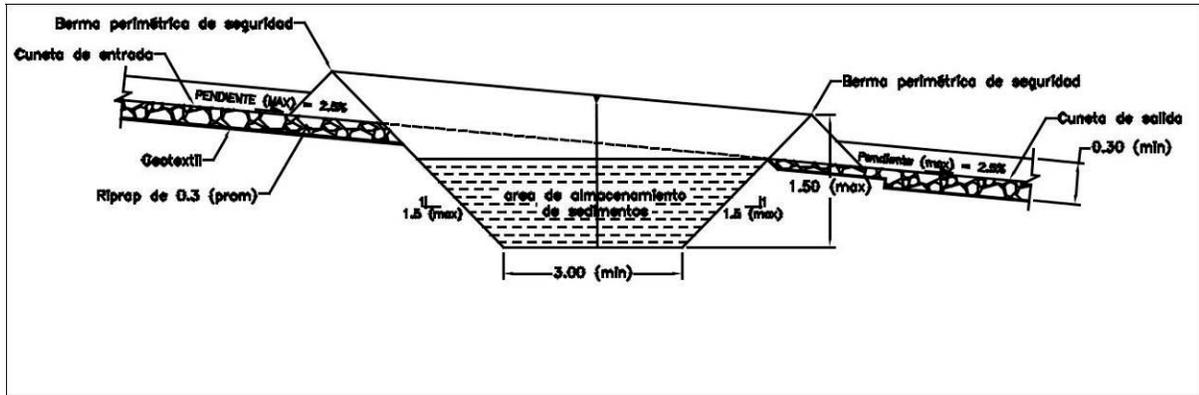


Figure 6 Sedimentation Pond Profile

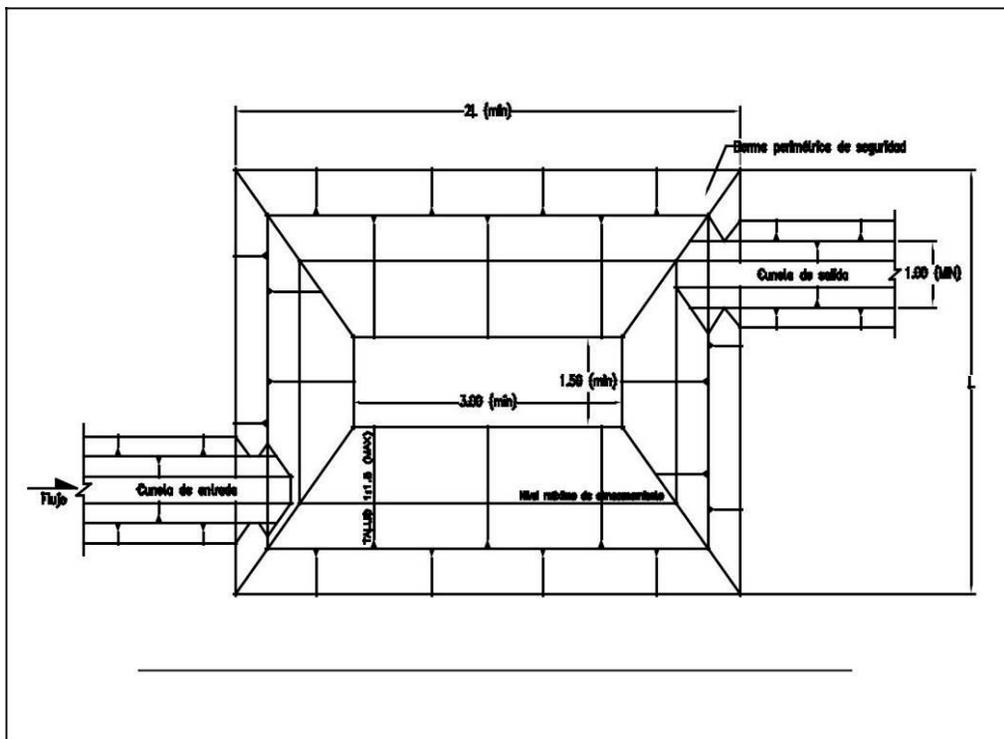


Figure 7 View of sedimentation pond plant

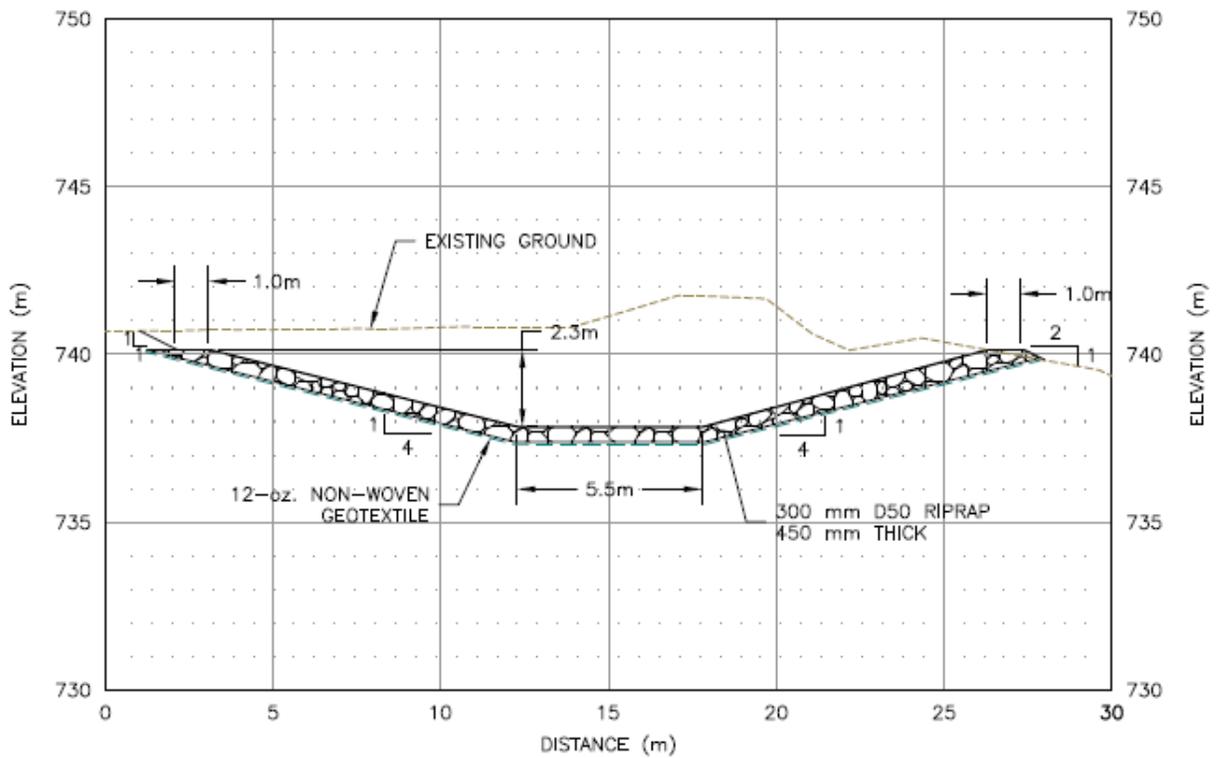
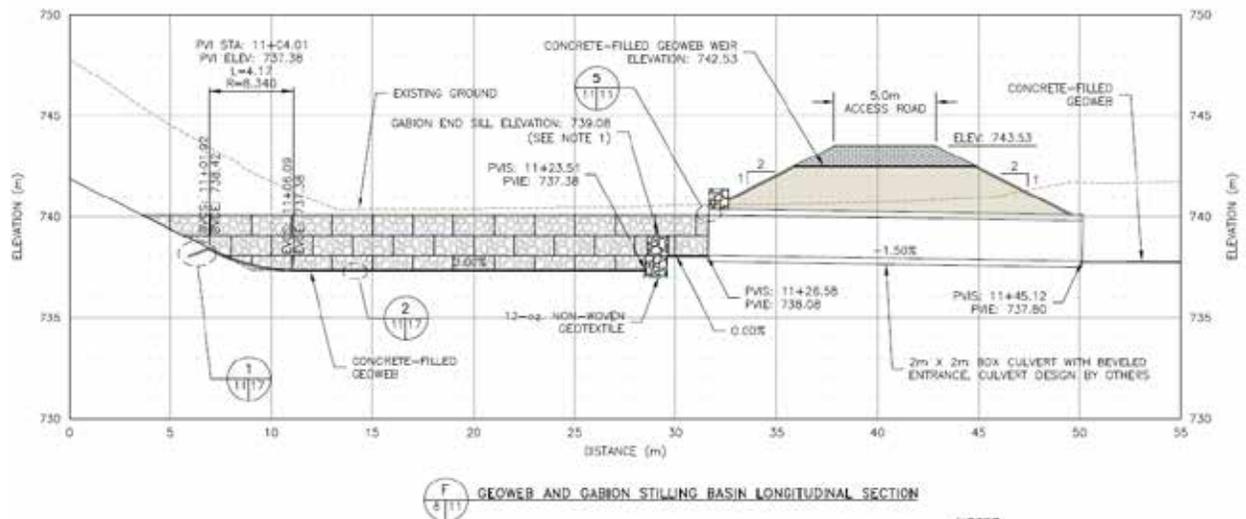


Figure 8 Erosion control of erodible soil channels



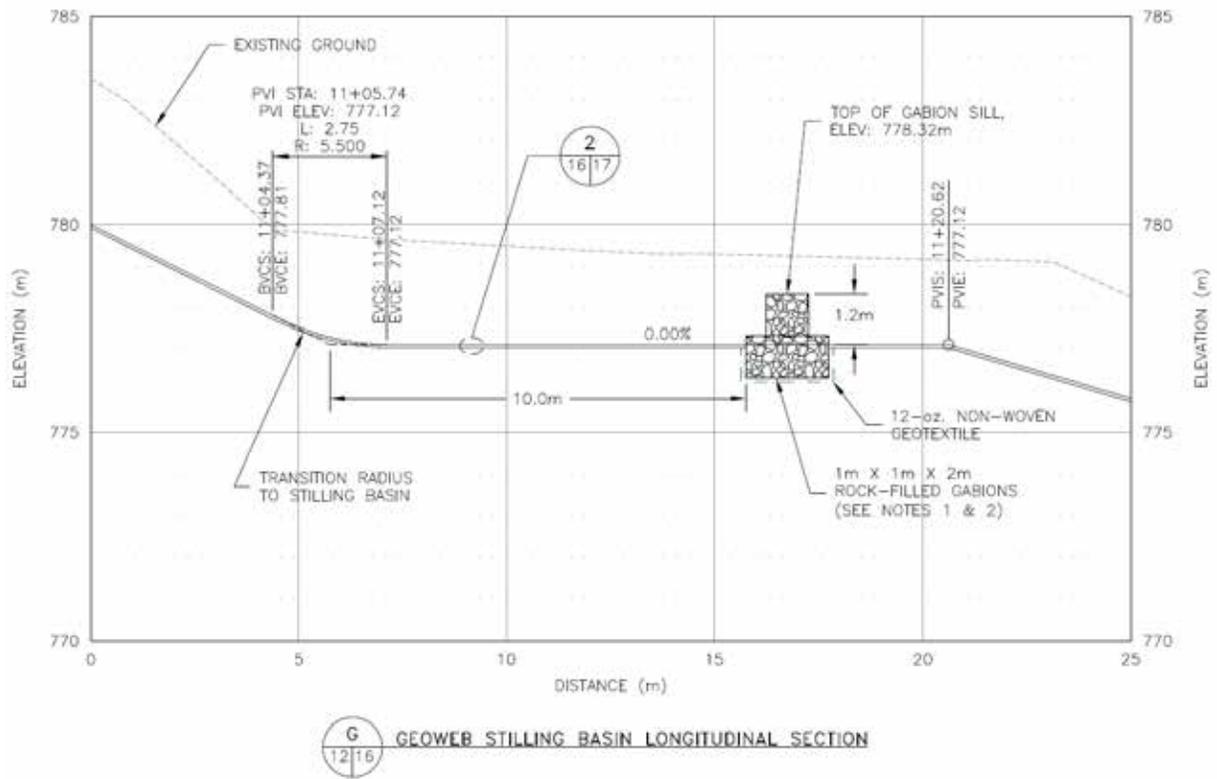


Figure 9 Sand dealers on channels

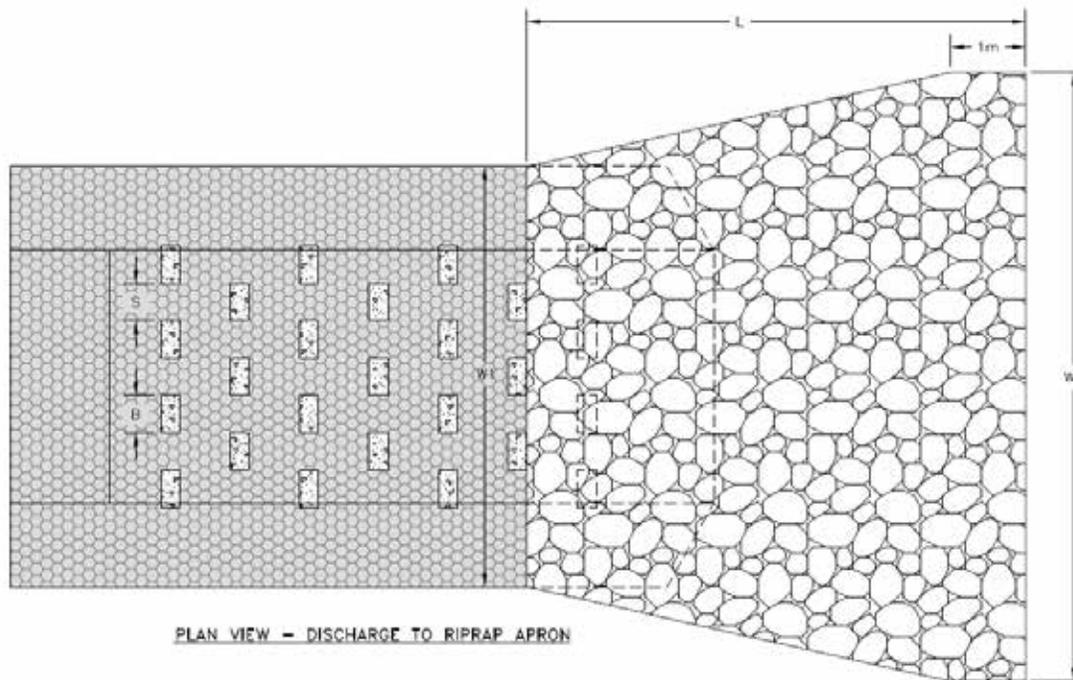
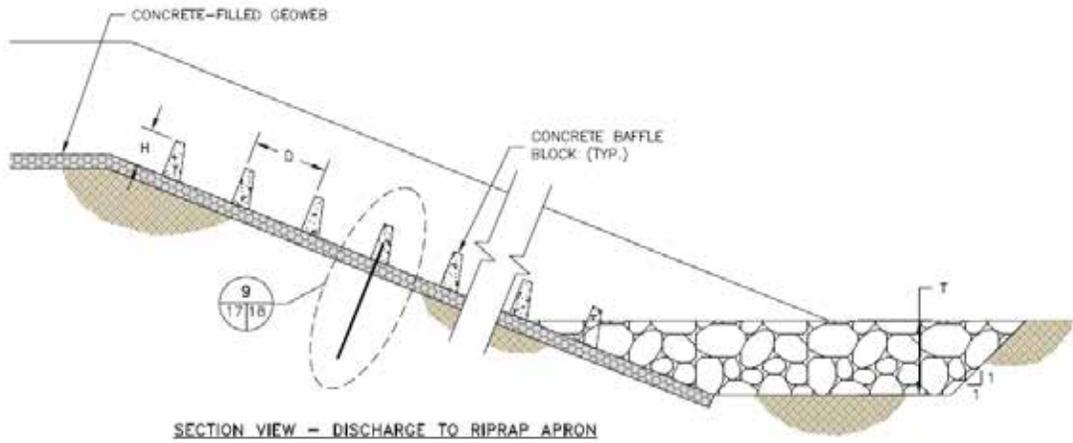


Figure 10 Detail of energy dissipators

PHOTOGRAPHS



Photo 1 Sedimentation piles-Construction process-sediment containment dikes.



Photo 2 Sedimentation piles-Construction process-sediment containment dikes.



Photo 3 Coating Channels - Construction process of channel coating and construction of energy dissipaters.



Photo 4 Erosion control berm - Live erosion control barriers on slopes - sediment control channel in the lower part.

APPENDIX 8B
Waste Management Plan

WASTE MANAGEMENT PLAN

EXECUTIVE SUMMARY

The AMPAC mine generates approximately 0.95 kg/person/day of waste of relatively low density waste of 144.88 kg/m³. The mine currently recycles plastic packaging made of polyethylene terephthalate (PET), 57 tonnes per year of scrap metal, and 343 tonnes per year of used oil. Waste that is not recycled is disposed of at the nearby municipal landfill. AMPAC provides equipment to help operate and maintain the landfill which is located outside of the mine footprint.

To improve the sites waste management the mine has undertaken a detailed inventory of wastes generated from the site, including surface and underground sources. Based on the results of the survey the following waste management and disposal options are recommended to improve the amount of recycling and divert waste away from the landfill:

- Food and organic waste should be separated of at source for composting and used as fertilizer by local farmers
- Construction of a waste collection centre (waste transfer station) to store waste for recycling or resale
- Separation of recyclable containers, plastics and electrical goods for recycling offsite
- Light bulbs and nickel cadmium batteries should be separated at source and disposed of underground encased in concrete as mine backfill. No recycling options currently exist in country for these items. Containment underground is the disposal option considered to have the lowest environmental impact.
- Identification and separation of biomedical waste from other waste streams. It is recommended that biomedical waste be incinerated, and the ashes landfilled.
- Recycle tires and rubber items to divert them away from the landfill as they are non biodegradable and occupy a significant amount of space in the landfill. There are limited recycling options in the area for tires. An alternate means of disposal has been identified to use them as fuel for cement kilns.

This Executive Summary is not intended to be a stand-alone document, but a summary of findings as described in the following Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

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AMPAC is committed to the environment, and executes programs and actions that go beyond those required by national legislation. AMPAC has developed an innovative program that will greatly benefit the environment and is expected to be an example to follow other institutions.

Nomenclature

Several nomenclatures concern the classification of Solid Waste. In our case, we use the one that establishes the Regulation for the Management of Solid Waste, Agreement 378-2001¹, of the Secretary of Natural Resources and Environment SERNA. In this Regulation the following definitions are described:

<p>Desechos Sólidos: Son aquellos materiales no peligrosos, que son descartados por la actividad del ser humano o generados por la naturaleza y que no teniendo una utilidad inmediata para su actual poseedor se transforma en indeseables.</p> <p>Disposición Final: Última etapa en el manejo de los residuos sólidos. Es la operación final controlada y ambientalmente adecuada de los desechos sólidos, según su naturaleza.</p> <p>Desechos sólidos con características especiales: Son sólidos, gases, líquidos fluidos y pastosos contenidos en recipientes, que por su reactividad química, característica tóxica, explosiva, corrosiva, radiactiva u otro, o por su cantidad, causan daños a la salud o al ambiente.</p> <p>Estos desechos necesitan de un manejo y vigilancia especial, desde su generación hasta su disposición final. Según su tipo y procedencia, se agrupan de la siguiente forma:</p> <p>Agroindustriales: Son los restos de agroquímicos, fertilizantes y materiales de empaque contaminados por ellos.</p> <p>Cuerpos de animales: Restos o cuerpos enteros de animales que deben recibir una adecuada disposición sanitaria.</p> <p>De establecimiento de salud: Son los que requieren de un manejo especial dentro y fuera de la institución de salud donde se generan. Estos provienen de áreas de aislamiento de enfermos infectocontagiosos, laboratorios microbiológicos, cirugía, parto, servicios de hemodiálisis y otros. Incluye también los restos orgánicos humanos provenientes de las áreas de cirugía, parto, morgue y anatomía patológica, así como restos de animales de prueba de diagnóstico o experimentales, y la generación de fármacos vencidos.</p> <p>Domésticos peligrosos: Son desechos domiciliarias, comerciales y administrativos de alta toxicidad, tales como bacterias con metales pesados, termómetros, cosméticos, medicamentos, recipientes con restos de halogenados, plaguicidas, restos de pintura y otros que tendrán que ser analizadas y evaluadas.</p> <p>Radiactivos: Es aquel que emite radiaciones electromagnéticas en niveles superiores a las radiaciones naturales de fonda.</p> <p>Industriales ordinarios: Son aquellos generados en cualquier actividad industrial, que por sus características y cantidad, no pueden recogerse o depositarse junto con los de origen doméstico.</p> <p>Desechos industriales peligrosos: Es el material generado en actividades propias de este sector del desarrollo, como resultado de los procesos de extracción, beneficio y transformación de materia prima. Son desechos de las actividades industriales básicamente, de la industria química, metalúrgica, papelera, textiles, curtiembres, etc., incluyen también los lodos provenientes del tratamiento de las aguas residuales, industriales, si por su composición y efectos, son considerados peligrosos.</p>
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Figure 1.1 Definitions of the Regulation for Solid Waste

For purposes of this Plan two basic nomenclatures will be used: Solid Non-Special Residues (RSNE) and Solid Waste with Special Characteristics (RSE).

¹ See annex 8.

1.0 BACKGROUND ON WASTE MANAGEMENT IN AMPAC

As part of its environmental policy, AMPAC has been carrying out the following actions related to solid waste management:

1.1 Recycling Programs

- Plastic packaging made of polyethylene terephthalate (PET): Since 2005, AMPAC has established specific collectors for disposable soft drink and bottled water containers made of PET. These containers are sold to recyclers in the area, and the funds are used to benefit the community.
- Scrap metals: Annually, approximately 57 tons of scrap metal of different species are produced in AMPAC, all of this is deposited in a temporary storage yard and later sold to recyclers for subsequent recycling.
- Used oil: AMPAC generates 343 ton/year of used oil from the mining process. Oil changes are carried out in maintenance workshops inside and outside the mine. The oil is deposited in temporary storage tanks before collected by recycling companies.

1.2 Procedure for the Management of Hazardous and Non-Hazardous Industrial Solid Wastes

The Procedure for the Management of Hazardous and Non-Hazardous Industrial Solid Wastes, which was created in April 2006, emphasized the industrial waste generated in the mine and its facilities, and detailed the origin and quantities of the generated waste. This document served as the basis for the present Waste Management Plan.

1.3 Municipal Sanitary Landfill

The solid waste generated by AMPAC is deposited in a semi-controlled landfill on the outskirts of the city of Las Vegas, away from the population.

This landfill uses a combined area / trench system. Waste deposited there is regularly covered with cover material from the same area. AMPAC provides the machinery used to open the trenches and cover the waste.

The landfill does not have a soil waterproofing system, but, because the cover material has a high clay content, and because there are no nearby bodies of water, infiltration is relatively low and the possibility of surface or ground water contamination is negligible.

2.0 WASTE INVENTORY

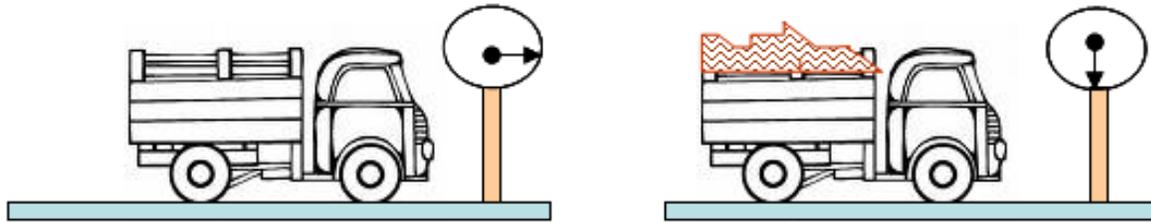
A waste inventory using desktop and field surveys was undertaken to determine the quantities and types of wastes generated by the mine. Using this information the recommendations for good waste management are presented below.

2.1 Domestic Solid Waste (RSNE²)

Determining the type, quantity, and density of the domestic solid waste was necessary prior to the creation of a waste management plan. A study was made of the waste that collected by the private cleaning contractor. The steps in this study included the following:

1. Determination of the daily generation of solid waste

Daily generation of solid waste was determined by weighing the collection truck before it was loaded, calculating the volumetric capacity of the truck to determine the weight and volume, and estimate the density of the waste.



Peso vacío = 12,000 Lbs. Peso lleno = 14,000 Lbs.
Peso de los residuos = 2,000 Lbs. = 1 Ton. = 907 Kg.

Figure 2.1 Estimation of the weight of solid waste

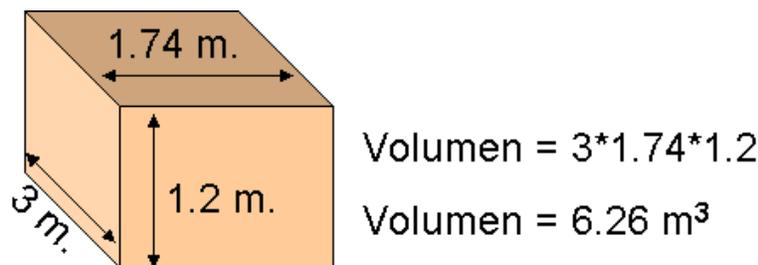


Figure 2.2 Estimation of the volumetric capacity of the truck

Density = mass / volume

$$D = 907 \text{ kg} / 6.26 \text{ m}^3$$

$$D = 144.88 \text{ kg} / \text{m}^3$$

² Non-Special Solid Waste, Regulation for the Management of Solid Residues

2. Determination of the type of waste.

After estimating the density of the solid waste generated by AMPAC, the type and quantity of the residues are evaluated. A composite sample weighing 25,595 Lb. (11.6 Kg.) was taken from the truck, and sorted by waste category. Each waste type was weighed, and its percentage contribution to the total calculated.

Table 2.1 Results of the waste study

Study to Determine the Type and Quantity of Waste		
Type of Residue	Weight (Lb.)	Percentage of the total %
Plastic	1.6	6.25
PET (Polyethylene Terephthalate)	1.25	4.88
Cardboard	1.25	4.88
Metal (iron)	1.0	3.91
Food waste (vegetable and animal)	5.7	22.27
Glass	0.25	0.98
Wood	0.5	1.95
Metallized packaging	0.125	0.49
Rubber (synthetic polymer)	2.45	9.57
Aluminum	0.6	2.34
Cloth	8.75	34.91
Paper	0.12	0.47
Garden waste	2.0	7.81
TOTAL	25,595 Lb.	100 %

3. Determination of the annual amount of waste

The cleaning crew make a daily tour, from Monday to Saturday, through the facilities of the camp and mine collecting the RSNE. The collection capacity of the collector truck was calculated as follows:

$$\begin{aligned}
 \text{Amount (Ton / day)} &= \text{Daily travel frequency} * \text{Truck capacity} \\
 &= 1 * 1 \text{ Ton} \\
 &= 1 \text{ Ton / day} = 6.26 \text{ m}^3 / \text{day}
 \end{aligned}$$

$$\begin{aligned}
 \text{Quantity (Ton / month)} &= 1 \text{ Ton / day} * 27 \text{ days} \\
 &= 27 \text{ Ton / month} = 169.02 \text{ m}^3 / \text{month}
 \end{aligned}$$

$$\begin{aligned}
 \text{Quantity (Ton / year)} &= 27 \text{ Ton / month} * 12 \text{ months} \\
 &= 324 \text{ Ton / year} = 2028.24 \text{ m}^3 / \text{year}
 \end{aligned}$$

Tipo y Cantidad de Residuos

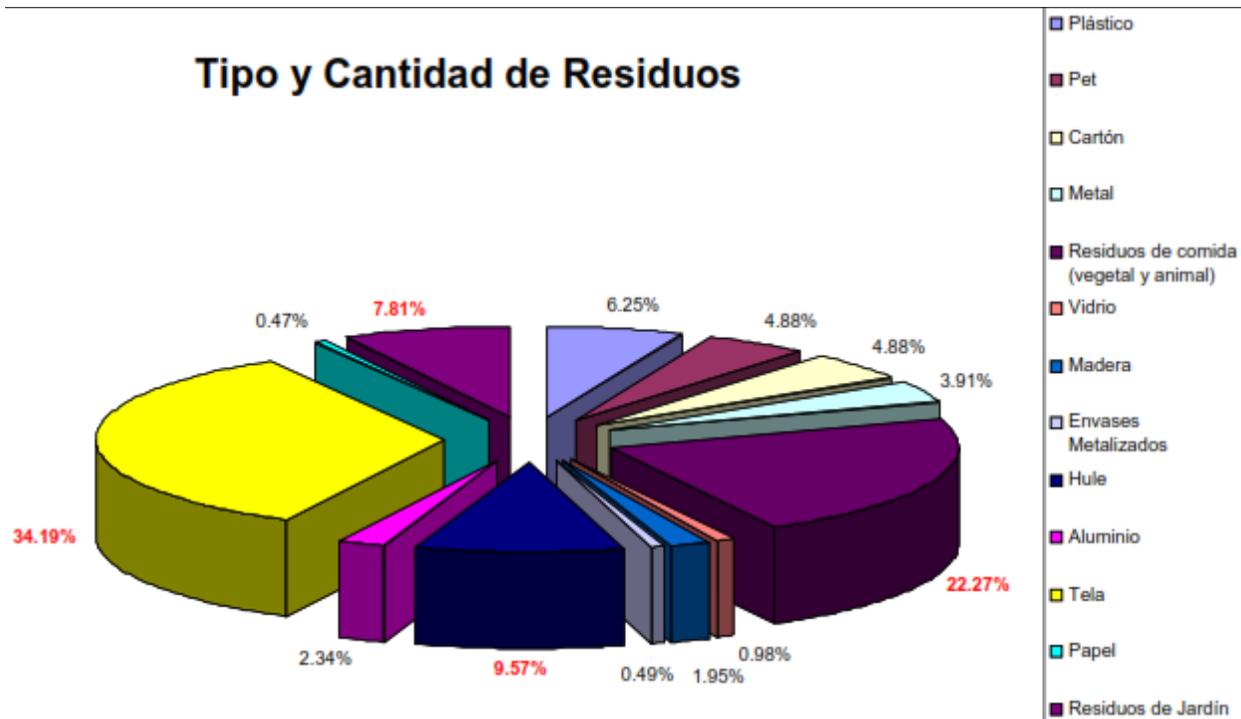


Figure 2.3 Waste composition

Tipo y Cantidad de Residuos

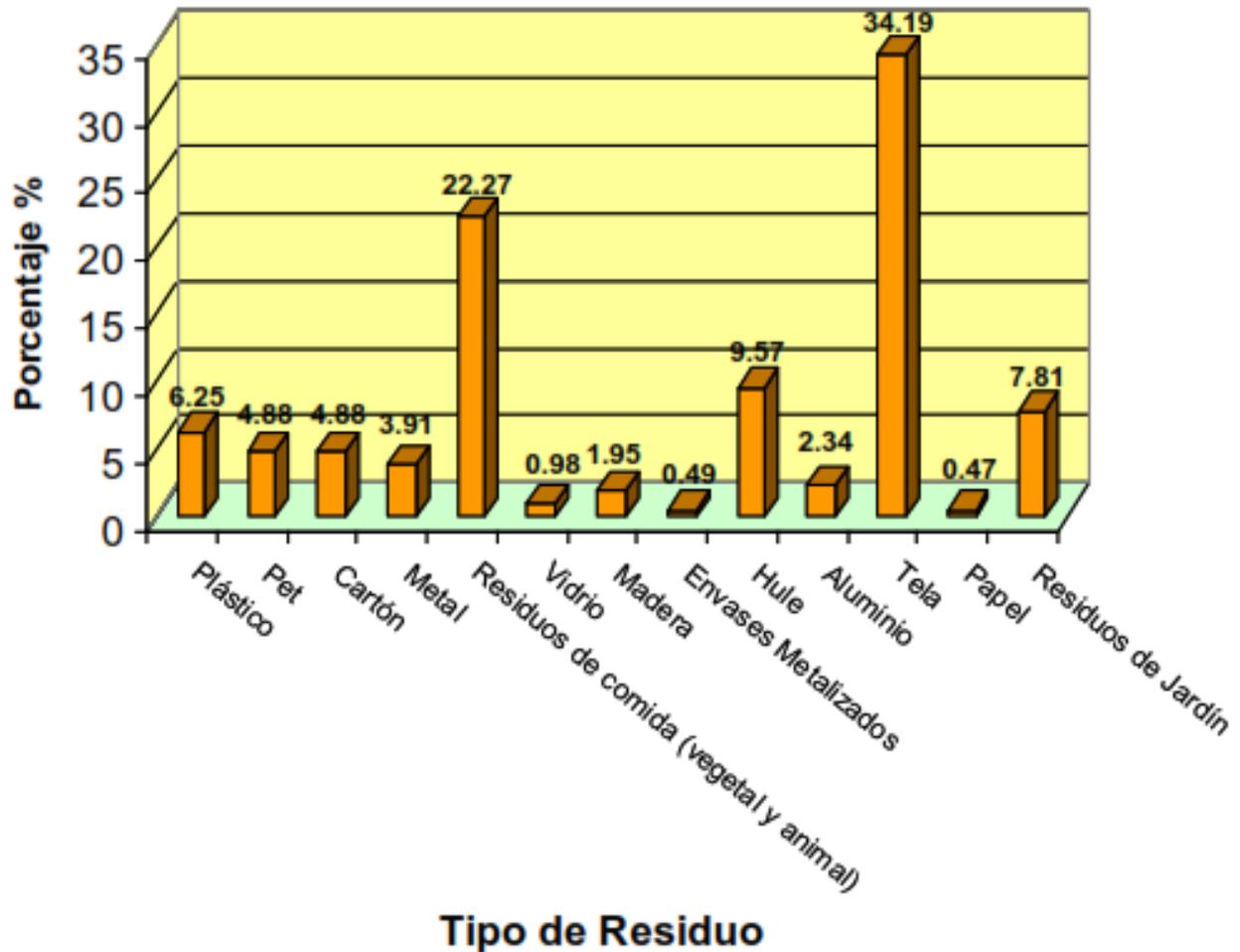


Figure 2.4 Type and Quantity of Waste

4. Interpretation of results
 - a. Quantity of waste

According to the study carried out by Acurio, G., Rossin, A., Teixeira, P.F., and Zepeda, F³, the expected generation rates are the following:

³ Diagnosis of the Management of Municipal Solid Waste in Latin America and the Caribbean, Pan American Health Organization

Table 2.2 Pan American Health Organization waste generation criteria

Cuadro 3-2: Generación de Residuos Sólidos Municipales en Ciudades de América Latina y El Caribe

Población	Generación per cápita (kg/persona-día)	
	Rango	Promedio
> 2,000,000 ¹	0.54—1.35	0.97
500,000—2,000,000 ¹	0.50—1.20	0.74
< 500,000 ²	0.22—1.20	0.55

1. Muestra de 16 ciudades.

2. Muestra de 24 ciudades.

Fuente: Acurio, *et al.*, 1998.

In AMPAC, 907 kg / day are generated, the population of the camp, both permanent and floating, oscillates around 950 people, according to this:

$$\begin{aligned} \text{Generation per capita} &= 907 \text{ kg / day} / 950 \text{ people} \\ &= 0.95 \text{ kg / Person-day} \end{aligned}$$

Although the result is higher than the average (0.55 kg/person/day), it is still within the estimated range (0.22-1.2 kg/person/day), therefore, the level of waste generation can be considered acceptable. However, measure to reduce waste generation should still be implemented.

b. Waste Density

A study conducted by the Japanese Agency for International Cooperation JICA in 1998, in the cities of La Ceiba and Tegucigalpa obtained the following results in relation to the density of waste in Honduras

Table 2.3 Residue density in Honduras

Característica Física	La Ceiba (Año 1996)	Tegucigalpa (Año 1998)
Humedad, % en peso	---	46.7
Densidad, kg/m ³ (Desechos sueltos)	222	200

Fuentes: Instituto de Promoción de la Economía Social (IPES), 1996; Japan International Cooperation Agency (JICA), 1998.

The results of the study in AMPAC result in an approximate density of 144.88 Kg / m³, this value is lower than the values in **Table 2.3** and suggests that there can and should be a compaction of the waste at the time of its final disposal.

c. Type of waste

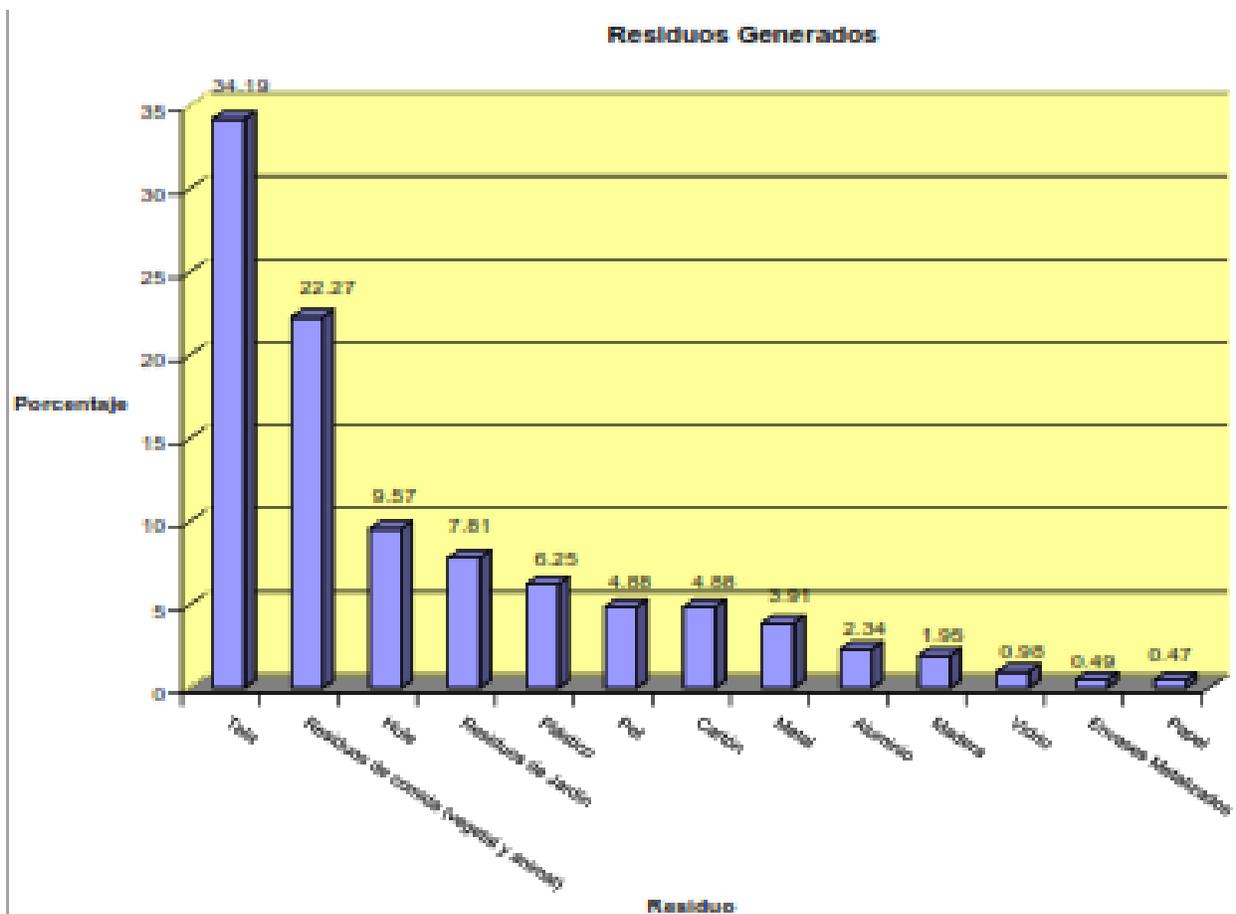


Figure 2.5 Waste generated (descending order)

As shown in **Figure 2.5**, the highest percentage of waste generated is cloth (34.19%), which mostly comes from used uniforms (coveralls) from the workshop staff. The uniforms are cotton, which easily degrades, and there is no problem depositing them in the municipal landfill; however, the fabric can be reused, thus lengthening life and reducing its generation.

The second largest waste category generated by the site is food (22.27%). The company could implement a composting project to divert waste from the landfill. Food waste could be combined with gardening waste (7.81%) to further improve the recycling.

Recycling of rubber molding (synthetic polymer) should be considered due to its relatively high percentage contribution (9.57%). The current options for disposal are deposition in the municipal landfill (it is chemical and physically stable), incineration (only recommended in ovens with temperatures above 1000°C), or deposition in a special waste landfill.

The amount of plastic generated (6.25%, or approximately 125 pounds per day) and PET (4.88%, or approximately 97 pounds per day) are important and show that the recycling plan previously executed by AMPAC must be continued and expanded.

Sorting at the origin is necessary to avoid landfill disposals of recyclables (such as iron, aluminum, and glass).

2.2 Solid Waste with Special Characteristics (RSE)

According to the Regulation for the Management of Solid Waste (RMRS), this category includes solids, gases, fluid, which need special handling and surveillance due to their chemical reactivity, toxic, explosive, corrosive, radioactive or other characteristic, or their quantity.

The types, quantities⁴ and origin of these residues are listed below

⁴ Data extracted from the "Procedure for the Management of Hazardous Industrial Solid Waste and Non-Hazardous, Version 2006", by AMPAC

Table 2.4 Ordinary Industrial Waste

a. Ordinary Industrial			
Residue	Quantity (ton/year)	Origin	Observation
Sawdust	1.25	Carpentry	Assimilable to RSNE
Brush paper bag	0.028	Laboratory	Assimilable to RSNE
Scrap	57	Industrial and mechanical workshops	
Polyethylene packaging	0.021	Laboratory	Assimilable to RSNE
White glue containers	0.002	Carpentry	Assimilable to RSNE
Tires	33.48	Surface and underground maintenance workshops	
Wood trimmings	14.7	Carpentry and cellar	Assimilable to RSNE
Scrap residue	3.6	Laboratory	
Rubber and thread bands	1.2	Crushing plant	Assimilable to RSNE
Plastic barrels	0.132	Crushing plant	
Rubber boots	7.74	Industrial security	Assimilable to RSNE
Cardboard	1.5	Cellar	Assimilable to RSNE
PVC glue container	0.012	Concentrator plant maintenance	Assimilable to RSNE
Spotlights of 100 and 500 watts	0.072	Mima electric workshop	Assimilable to RSNE
Gloves	0.21	Industrial security	Assimilable to RSNE
Rubber pants and jacket	0.84	Industrial security	Assimilable to RSNE
Office paper	0.038	All offices	Assimilable to RSNE
Auditive protectors	0.12	Industrial security	Assimilable to RSNE
PVC Pipe	2.34	Concentrator plant maintenance	Assimilable to RSNE
Worn out shoes	1.28	Cellar	Assimilable to RSNE
Organic oil	1.15	Diesel plant	
Beard caps	0.01	Industrial security	Assimilable to RSNE
Caps	0.027	Industrial security	Assimilable to RSNE
Copper	0.54	Electrical workshop	
Sashes (cloth and rubber)	0.045	Industrial security	Assimilable to RSNE
Protective glasses	0.02	Industrial security	Assimilable to RSNE
Fire extinguisher sleeves	0.014	Industrial security	Assimilable to RSNE
Computer screens	0.05	Industrial security	Assimilable to RSNE
Cardstock	0.01	Industrial security	Assimilable to RSNE
Rescuers	0.03	Industrial security	Assimilable to RSNE

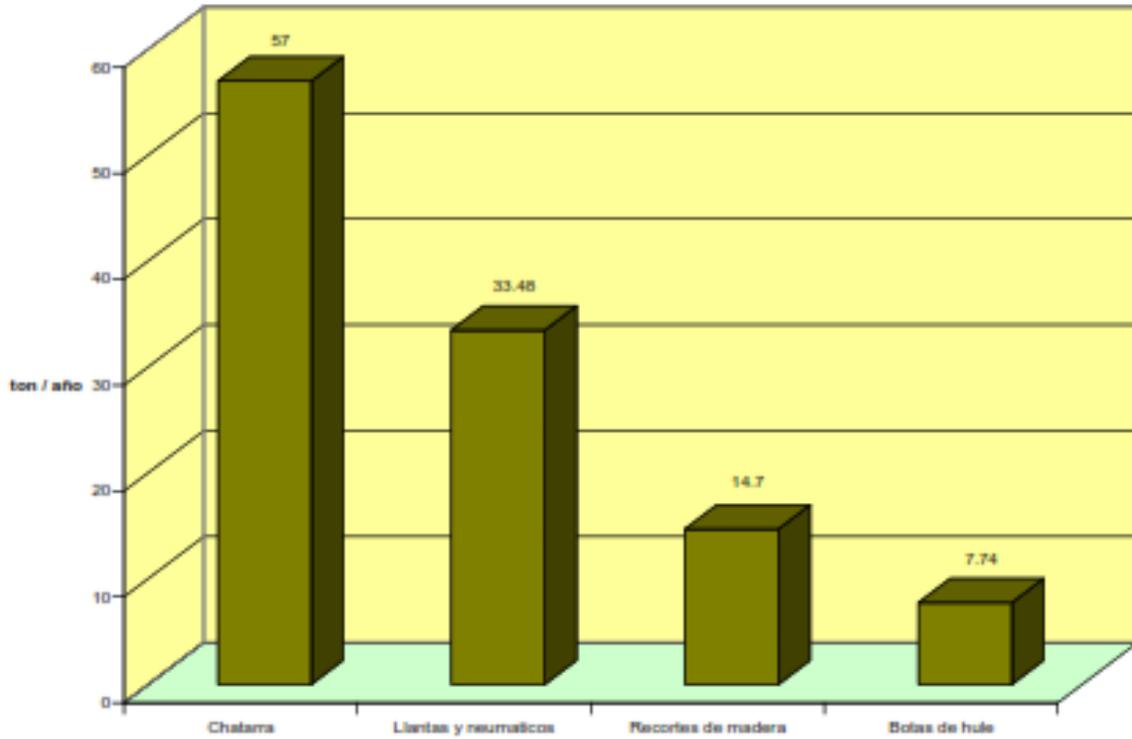


Figure 2.6 Type and amount of waste (descending order)

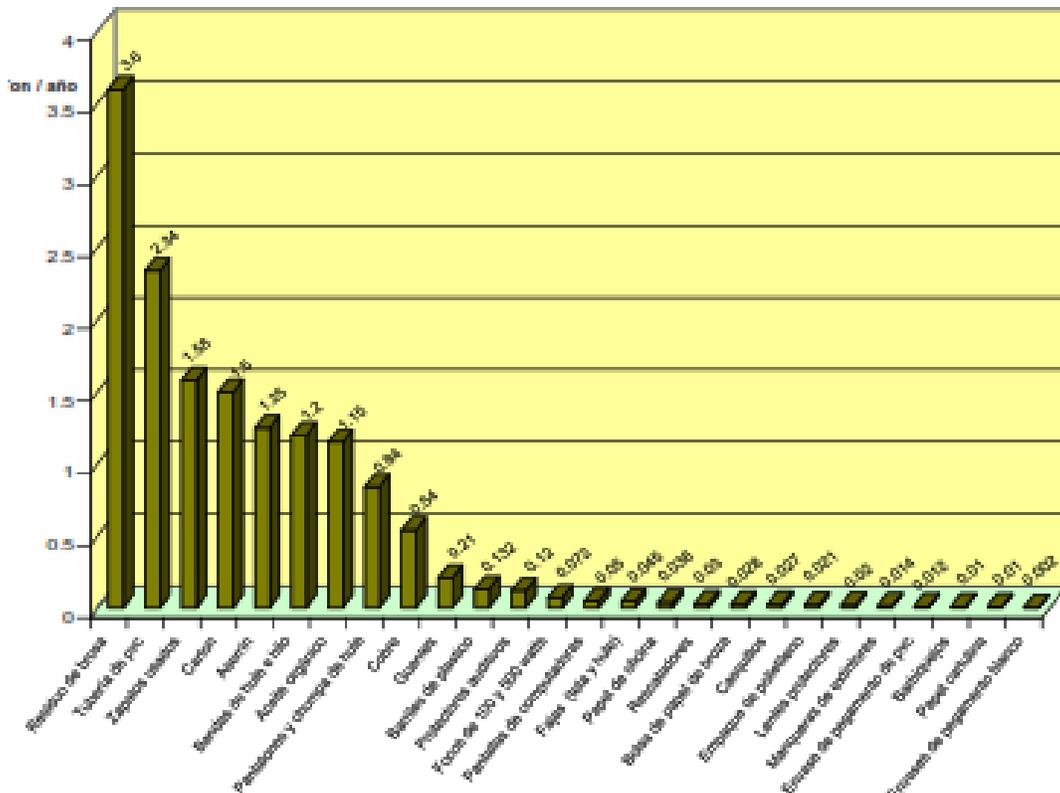


Figure 2.7 Type and quantity of waste (descending order) cont...

d. Interpretation of results

Figure 2.7 shows the 4 main wastes generated: scrap metals, tires and tires, wood trimmings and rubber boots. Although the amount of scrap metals is considerable, it does not generate any management problems as it is stored temporarily and then sold for recycling.

The quantity and volume of space that tires occupy rapidly decrease the storage capacity of the landfill, making it difficult to dispose. In the country, there are no companies dedicated to recycling tires for retreading or to serve as raw material in the asphalt road mix. Cement companies accept tires as fuel in their kilns. Using the tires in the kilns will be viable only if these ovens reach temperatures higher than 850° C and there is an emission control system.

Wood cuts are easily recyclable or reusable, and can be used as fuel in furnaces, boilers or stoves. They are also easily degradable which makes them similar to RSNE.

Figure 2.7 shows the rest of the residues that are generated in smaller quantities. The rest of waste, either by its type or quantity, do not represent a management problem, since most of them are recyclable or assimilable to RSNE; therefore, they can be deposited in the municipal landfill.

Table 2.5 Hazardous Industrial Residues

b. Dangerous Industrial			
Residue	Quantity (ton/year)	Origin	Observation
Used oils	343	Workshops for mechanical and industrial surface and underground maintenance, concentrator plant, crushing plant and electricity generating plant	Recycling feasibility
Barrels with crater (fat)	5.51	Concentrator plant and maintenance	Recycling or reuse is not feasible
Barrels with grease	0.416	Maintenance workshops	Recycling feasibility
Lead batteries	5.51	Motor pool, general warehouse, electrical workshop and mine	Recycling feasibility
Chemical products bags	0.003	Laboratory	Requires special provision Requires special provision
Clay pots and magnesia cups	0.64	Laboratory	Recycling feasible
Container of mercaptan gas with waste gas	0.0052	Industrial security	Reuse feasible
Glass container of non-toxic chemicals	0.235	Laboratory	Feasibility of reuse or recycling Feasibility of reuse
Hydrocarbon filters	1.1	Maintenance workshops	Requires special provision
Computer waste (printer cartridges)	0.02	Technical and administrative offices	Feasibility of assimilation to RSNE

b. Dangerous Industrial			
Residue	Quantity (ton/year)	Origin	Observation
Paint cans, brushes and rollers	0.09	Maintenance of facilities	Assimilable to RSNE and feasibility of recycling
Hydraulic hoses with hydrocarbons	2.79	Interior workshop mine	Requires special provision
Rags impregnated with oils, greases and paints	3.88	Maintenance, surface and underground workshops	Requires special provision
Containers that pool cleaning chemicals	0.365	Pool maintenance	Feasibility of reuse
Wood healers packaging	0.132	Carpentry	Feasibility of reuse
Nickel-cadmium batteries and batteries	0.022	All operations	Requires special provision
Hospital waste	15	Hospital	Require collection and special arrangement
Solvents	2.94	Automotive and electrical maintenance workshops	
Mercury bulbs	0.027	Cellar	Require special provision
Fluorescent tubes	0.12	Facilities	Require special provision

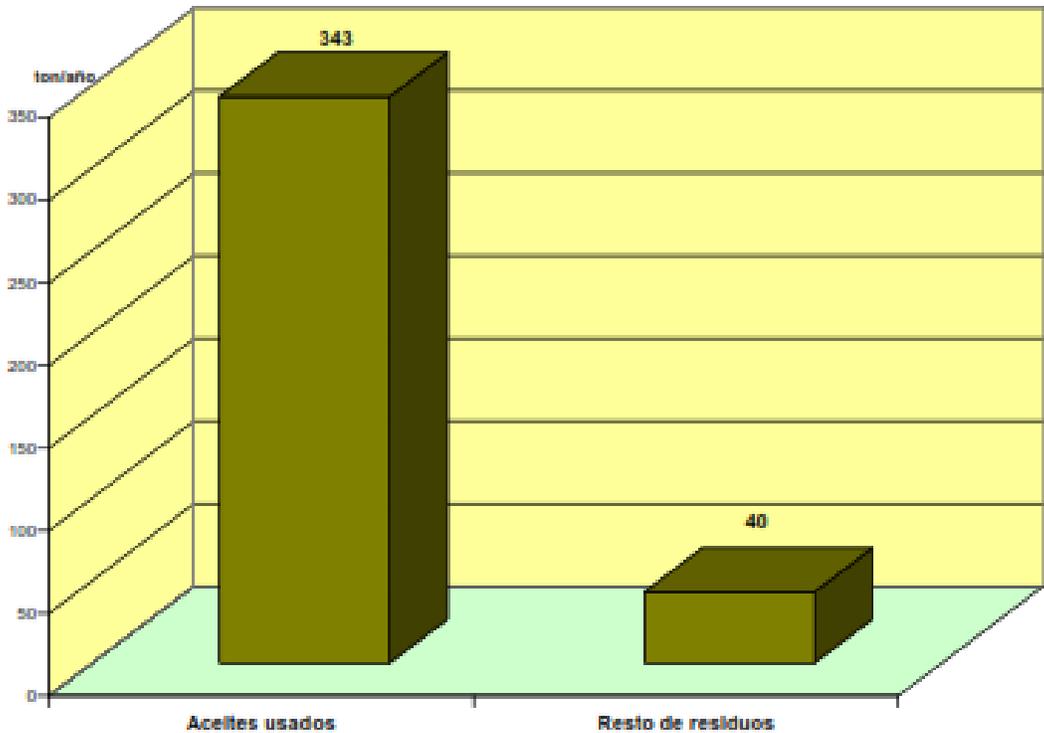


Figure 2.8 Type and quantity of hazardous industrial waste

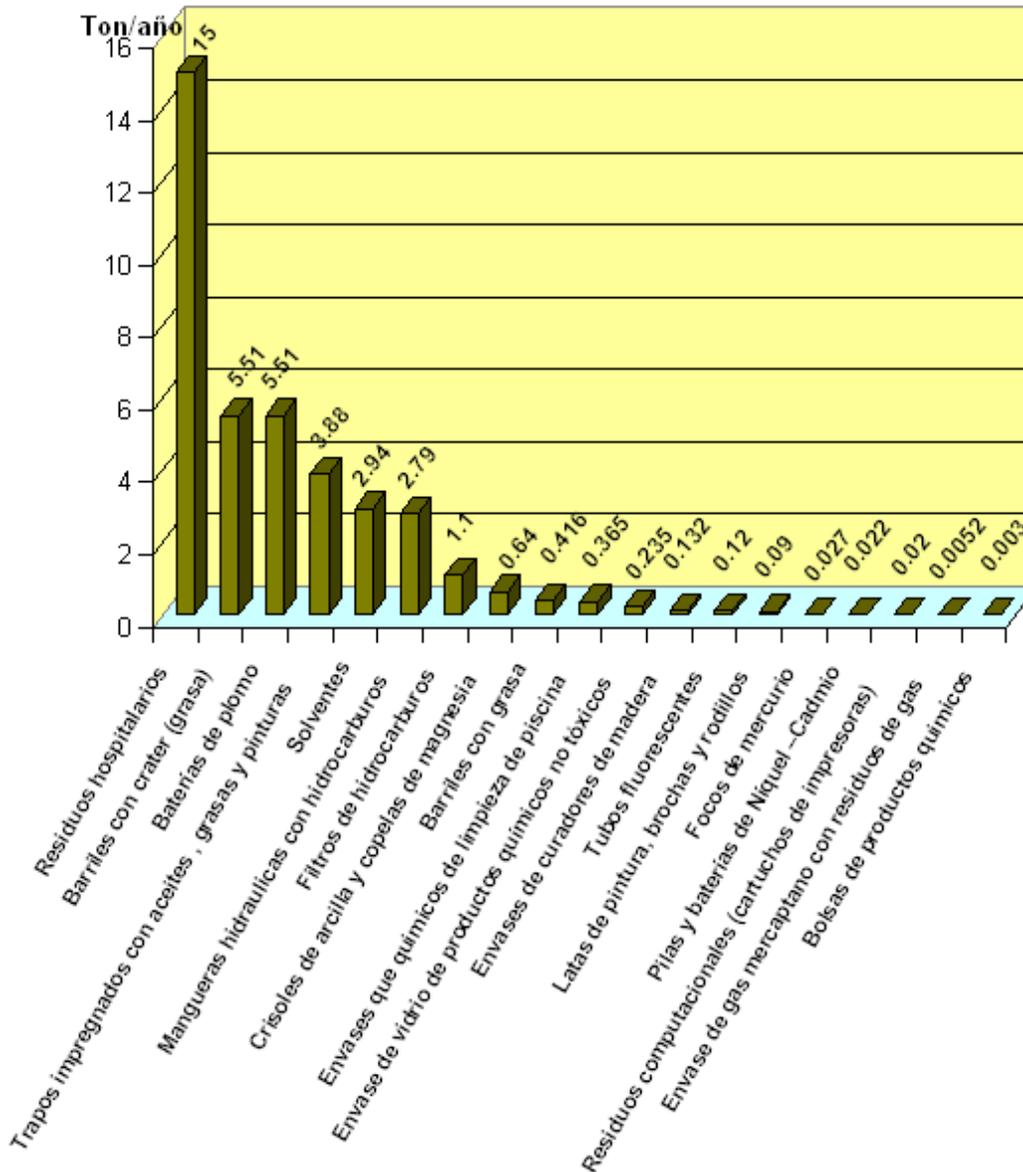


Figure 2.9 Type and Quantity of Hazardous Industrial Residues (continued)

5. Interpretation of results

Figure 2.8 shows the difference between used oil (343 tons / year), and the rest of the waste (40 tons / year). This could be problematic for AMPAC, if it was not temporarily stored and then picked for recycling.

Figure 2.9 shows that hospital waste requires special attention, since it is generated in an relatively large amount and it requires special management. Lead batteries may be sold to lead recyclers. Other residues, through physical or chemical processes, can become assimilable to RSNE or be commercially valued; however, some waste, such as mercury bulbs, fluorescent tubes, and Ni-Cd batteries, require highly-specialized decontamination treatment, which is not available in the country and so AMPAC has opted for stabilization prior to final disposal.

3.0 WASTE MANAGEMENT

Considering the type and quantity of waste generated, the recycling and/or reuse techniques available in the country and the socio-economic environment in which the AMPAC company operates, the following are the most viable alternatives for efficient management:

Table 3.1 Non-Special Waste Management Alternatives RSNE

Domestic Solid Waste (RSNE)					
	Decrease			Treatment	Final disposition
	Reduction of consumption	Reuse	Recycling		
Aluminum		Segregation at source and storage for sale to smelters			
Carton					Municipal landfill
Metallized Containers					Municipal landfill
Wood		Segregation at source for future energy recovery			
Metal (iron)		Segregation at source, storage and sale to smelters			
Paper			Studies to determine the feasibility of the recycling program		Municipal landfill
PET (Polyethylene terephthalate)		Segregation at source, storage and sale to recyclers			
Plastic					Municipal landfill
Food waste (vegetable and animal)		Segregation at source and manufacture of compost			
Garden waste					Municipal landfill
Cloth	Use of more durable uniforms	Segregation at source and use as cleaning cloths in maintenance workshops			
Glass		Segregation at source, storage and search for buyers		Decrease in volume	Municipal landfill

Table 3.2 Special waste management alternatives RSE

Solid Waste with Special Characteristics ((RSE))					
a. Ordinary Industries	Decrease			Treatment	Final disposition
	Reduction of consumption	Reuse	Recycling		
Organic oil			Stored in barrels and delivered to TEXACO		
Sawdust		Collection and sale to producers of lime and as organic matter			
Rubber and thread bands					Municipal landfill
Beard caps					Municipal landfill
Plastic barrels		Used as garbage dumps		Triple wash	
Brush paper bag					Municipal landfill
Rubber boots	Use of more durable boots			Volume reduction	Municipal landfill
Cardboard			Paper and cardboard recycling program		Municipal landfill
Caps					Municipal landfill
Scrap		Segregation at source and sale to smelters			
Copper		Segregation at source and sale to smelters			
Polyethylene packaging					Municipal landfill
PVC glue packaging		Segregation at source and sale to smelters			
Packaging for white glue				Compaction to reduce the volume	Municipal landfill
Sashes (cloth and rubber)	Use of more durable girdles				Municipal landfill
Spotlights of 100 and 500 watts	Use of bulbs with longer life			Volume reduction	Municipal landfill

	Solid Waste with Special Characteristics ((RSE))				
	Decrease			Treatment	Final disposition
a. Ordinary Industries	Reduction of consumption	Reuse	Recycling		
Gloves	Use of more durable gloves				Municipal landfill
Protective glasses	Use of more durable lenses			Volume reduction	Municipal landfill
Tires	Use of more durable tires (when feasible)	<ul style="list-style-type: none"> * Use to stabilize soils: fill of embankments, construction of dams, embankments, etc. * Energy valuation through cement factories (if feasible) * Elaboration of planters 	Retread when viable	Cutting for volume reduction	<ul style="list-style-type: none"> * Municipal landfill * As filling in mine interior
Fire extinguisher sleeves					Municipal landfill
Computer screens	Use of more durable screens		<ul style="list-style-type: none"> * Repair and donation to schools * Donation to electronics workshops 		Municipal landfill
Rubber pants and jackets	Use of more durable pants and chumpas			Cut	Municipal landfill
Cardstock	Control in the assignment of materials	Reuse of cardboard in the manufacture of letter molds			Municipal landfill
Office paper	Control in the assignment of materials	Reuse of paper on both sides			Municipal landfill
Auditive protectors	Use of more durable protectors				Municipal landfill
Wood trimmings	Efficiency in the use of wood: Accurate measurements, precise cuts, inventory control, etc.	<ul style="list-style-type: none"> * Collection and sale or donation to lime. * Donation for energy recovery as firewood in poor homes 	<ul style="list-style-type: none"> * Elaboration of stakes for nurseries or forest plantations * Development of studs for mechanical or 		

Solid Waste with Special Characteristics ((RSE))					
a. Ordinary Industries	Decrease			Treatment	Final disposition
	Reduction of consumption	Reuse	Recycling		
			industrial workshops		
Rescue equipment	Use of more durable rescuers (if viable)	* Valorisation of metallic components (future sale to smelters) * Preparation of pens, office ornaments	* use for demonstrative talks to the general public * Use in rescue equipment classes	Dismemberment	Municipal landfill (non-metallic parts)
Scrap residue			Deposited in the hopper of mills for its process		
PVC pipe	Change through HPDE pipes		Store pieces in good condition for use in repairs		Municipal landfill and tails dams
Worn out shoes	Wear more durable shoes				Municipal landfill

Solid Waste with Special Characteristics (RSE)					
b. Dangerous industrial	Decrease			Treatment	Final disposition
	Consumption reduction	Reuse	Recycling		
<i>Used oils</i>	Use of oils with longer duration		Tank storage and subsequent collection by TEXACO		
Crater (used grease)		* Determination of viability to incinerate in cement factories * Determination of viability to use in asphalt mixture. Return to supplier	Return to provider		
Barrels with grease residues	Use of returnable containers	* Use as garbage dumps (once cleaned) * Sold as scrap for casting	* Reuse of collected fat	Extraction of grease residues, which will be reused	

Solid Waste with Special Characteristics (RSE)					
b. Dangerous industrial	Decrease			Treatment	Final disposition
	Consumption reduction	Reuse	Recycling		
Lead batteries			Collection at origin, temporary storage and sale to recyclers of Lead		
Chemical products bags	Use of returnable containers (if viable)	* They are stored and in case of spills are filled with sand to serve as containment * Energy recovery as boiler fuel		Decontamination with Sodium Hypochlorite	
Clay pots and magnesia cups			Deposited in the hopper of mills for their process		
Container of mercaptan gas (methyl mercaptan) with gas residues	Product with longer life	Temporary storage and sale as scrap for foundry		Emptying of containers and compaction of them (ventilation and use of masks is required)	Municipal landfill
Glass container of non-toxic chemicals	Use of returnable containers			* Neutralization of substances by washing with oxidizing or reducing agents * Compaction to decrease the volume	Municipal landfill
Wood heaters packaging				Triple wash	Municipal landfill
Containers of chemicals for pool cleaning		Use as containers for solid waste or as buckets for cleaning			
Filters with fuel residues or lubricants				Extraction of oil residues (runoff), the collected oil is stored for later collection by TEXACO	Municipal landfill
Mercury bulbs	Use of more durable bulbs				As filling in mine

Solid Waste with Special Characteristics (RSE)					
b. Dangerous industrial	Decrease			Treatment	Final disposition
	Consumption reduction	Reuse	Recycling		
Paint cans, brushes and rollers		Temporary storage and sale to metal smelters	Use of collected paint residues	* Paint run-off and compaction * Removal of metal roller parts	Municipal landfill (non-metallic parts)
Hydraulic hoses with hydrocarbons	Uses of more durable parts			Runoff and fluid collection	Municipal landfill
Nickel-Cadmium batteries and batteries				Storage in barrels and stabilization (encapsulation) with concrete	As filling in mine
Hospital waste				* segregation of household waste * Incineration in boiler	Ashes are taken municipal landfill
Solvents		Use for cleaning machinery	Will be investigated viability of return to suppliers		
Rags impregnated with oils, greases and paints	Avoid spills	Energy rating as fuel in boiler			
Fluorescent tubes	Use of more durable bulbs				As filling in mine

4.0 LANDFILL DIVERSION OPPORTUNITIES

4.1 Manufacture of Compost with Food Waste

Food waste is the second largest RSNE generated by AMPAC. Currently, it is deposited in the municipal landfill, occupying valuable space and decreasing its useful life. These residues, with the appropriate treatment, can be converted into organic fertilizer, used in nursery projects or donated to farmers in the area. Doing so will reduce the consumption of chemical fertilizers and the potential contamination of the soil and water bodies nearby. In addition, the farmers' standard of living will improve, since they could have better yields on their crops.

The main activities of this program are summarized below:

1. Segregation of waste: Collaborate with the AMPAC employees who live in the camp and/or work in existing canteens and restaurants to separate food waste from other wastes.
2. Compost manufacture: Take food waste to a composting facility, where inorganic contaminants are removed until the desired texture and granularity is obtained.

4.2 Collection Program (Segregation) of Waste at Its Origin

The most important factor when implementing a solid waste program, is to avoid mixing reusables or recyclables with common waste. To achieve this, a segregation program will be established at the source. This can be done several ways:

1. Install differentiated waste receptors in each office, home or work center.
2. Install larger containers in strategic generation areas.
3. Install a waste collection center, where people come by themselves to deposit the waste

The above alternatives have their advantages and disadvantages, in our case we will make a combination of the 3 to achieve better and greater collection of waste and thus prevent them from going to the municipal landfill.

The segregation program will focus on wastes generated in greater quantities, as well as those that are technically reusable or recyclable, and also those considered dangerous and that require a special provision.

4.2.1 Construction of a Waste Collection Center

The waste collection center will have 3 objectives:

1. To temporarily store all those waste that can be reused or recycled
2. To capture those waste that cannot be collected in the origin due to their size, quantity or condition, and that will require special treatment prior to its disposal.
3. To allow people to go on their own to deposit waste that meets the appropriate criteria.

Chatarra (hierro)	Sección Residuos No especiales y Especiales Ordinarios				
Llantas					
Hule (botas, chumpas, pantalones)	Madera (Aserrín, cortes, muebles)	Papel	Latas de aluminio	Envases de PET	Televisores, pantallas de PC, otro equipo electrónico
Cráter	Baterías de carro	Trapos con hidrocarburos	Sección de envases retornables	Focos de mercurio y lámparas fluorescentes	Pilas y baterías
Envases de vidrio productos químicos	Sección de Residuos Especiales (peligrosos)				
Bolsas de productos químicos					

Figure 4.1 Scheme of the Waste Collection Center (CRR)

4.2.2 Food Waste Collection

Food waste could be collected in dedicated containers the dining room, the club, and the camp. The waste will be collected periodically and taken to the composting yard. Waste should not be deposited in bags or other types of containers.

4.2.3 Collection of Aluminum Cans

Aluminum cans are in demand by recyclers. Containers will be installed in the places of greater generation, such as the club, the dining room and the residential area of the camp. The waste will be taken to a collection center that will be built to house the waste while they are given their use or final disposal. Cans may also be personally deposited at the Waste Collection Center.

4.2.4 Collection of Non-returnable Containers of Soft Drinks and Water

For better understanding of employees and generators, the packaging of PET material will be used in the containers labelled "Plastic refreshment and water containers," with the understanding that an information campaign will specify that only the aforementioned containers and not other types will be deposited there.

Containers will be installed in the main generation centre. In addition, anyone will be allowed to deposit them at the Waste Collection Center (CRR).

4.2.5 Collection of Wood Waste

Specific containers will be installed to collect sawdust and wood trimmings from the workshops. Furniture, doors or other used items will also be collected, and may be deposited directly in the CRR.

4.2.6 Collection of Mercury and Fluorescent Bulbs

The country has no recycling centres for mercury and fluorescent bulbs. Mercury is toxic, and may contaminate the atmosphere when a lamp breaks and releases the gas. A collection system will be made in the CRR and will require electrical maintenance personnel. The entire population of the camp will be informed to deposit such bulbs in the CRR, and to take great care not to break them.

Once deposited in the CRR, the bulbs will be sent to the mine to be deposited in the fillings, where they will be encapsulated in a cement cell. Contamination will not be eliminated, but it will be confined and prevented from dispersing in the environment. During the encapsulation process, care must be taken to leave the waste in the center of the matrix and to avoid exposing any remaining residues to the environment.

4.2.7 Collection and Encapsulation of Batteries

Batteries (those used in portable devices, e.g., AA, AAA, C, D, etc.), as well as button cell batteries, require special treatment for their use. Since most batteries contain heavy metals and other harmful components in the environment, recycling is only available in some of the most industrialized countries. The only management option is encapsulation, as proposed in the previous section with mercury bulbs.

The batteries will be collected through specially-designed deposits, located in strategic places and then they will be taken to the RSE section of the Waste Collection Center to be later encapsulated. Batteries may also be brought directly to the CRR. The collection container will be small in order to place it in places such as desks, shelves, tables, etc. So that they are visible, these containers will be located in the commissary, club, administrative offices, electrical workshop, and a side of the entrance to the bank,

4.2.8 Collection of Hospital Waste

Hospital waste requires special handling and disposal since they may be biohazardous. Hospital waste that has been in contact with or contains body fluids will be separated from that that have not been.

The waste will be separated as follows:

4.2.8.1 Biomedical Waste

Dangerous residues come from areas of isolation of infectious patients, microbiological laboratories, surgery, births, hemodialysis services and others, and also includes the human organic remains from surgery, delivery, morgue and expired pharmaceuticals.

Lidded containers for this waste must be easy to clean, and labelled "Hazardous hospital waste" and with a sign corresponding to hospital waste. Double bags will be placed inside each collector. The bags will be black to indicate hazardous waste. (Red bags, which denote hospital waste by international nomenclature, are not available on site). Full bags be sealed and taken to a temporary storage yard waiting to be incinerated. The resulting ashes will be taken to the municipal landfill in bags of the same color (black).

The personnel who handle this type of waste, including ashes, will use the following protection equipment:

- Rubber gloves that are thick enough to protect from punctures by needles, and must be of exact sizes and reach the elbow
- Glasses (in case of handling fluids)
- Masks (in case of handling volatile substances or ashes)
- Work clothes, this will be changed every day
- Soap or gel disinfectant for hand cleaning after each collection
- Use of closed shoes that should not be made of cloth to prevent any cut or puncture by glass or needles.

4.2.8.2 Waste suitable for domestic disposal

Waste suitable for domestic disposal are derived from the hospital's administrative activities, such as office paper, food waste, soft drink containers (PET and aluminum), water containers (PET), plastic containers, glass containers, cleaning waste from green areas, etc.

The containers used for common waste will be used, and labelled "Domestic hospital waste" and with the corresponding logo. Green bags, indicating hospital waste similar to domestic waste, will be placed in each container. Once full, the bags will be removed and taken to the larger container located outside the hospital, waiting to be picked up by the collection truck. (Refer to **Figure 4.2.**)

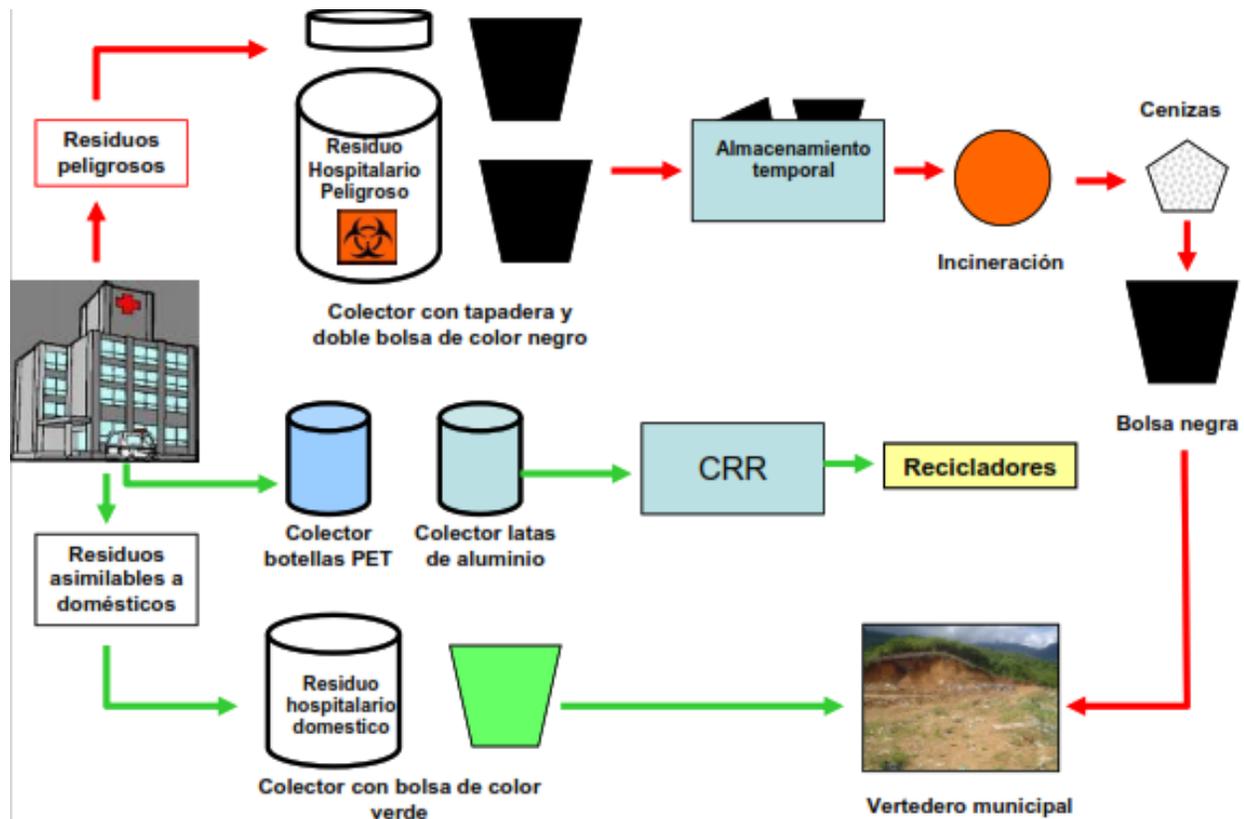


Figure 4.2 Hospital waste management process

4.2.9 Tire Collection

Tires are one of the most generated waste in AMPAC; therefore, its management is of great importance for the company.

One challenge in designing a tire reuse or recycling plan is the fact there are no recyclers or managers for this type of waste in Honduras. In industrialized countries, the tires are recycled into raw material to manufacture new tires, road asphalt, or pallets. Instead, AMPAC will extend the life of the tires and also give uses that come to help in the reduction of natural risks.

The tires of the heavy equipment from inside the mine constitute the largest percentage of the total tires generated. However, their size makes it difficult to ship abroad and there are also no options for retreading them. AMPAC has decided to encapsulate them in concrete in the places that require filling in the mine.

Tires on equipment operating outside are still at the disadvantages of being unable to be retread or recycled. In the absence of recycling options, AMPAC will seek to recycle tires, including as materials for soil stabilization, such as playground equipment, pots, etc. The alternative of being used as fuel in kilns of cement factories will also be sought, since these are the only ones that reach temperatures that eliminate the toxic by-products of combustion.

The tires will be taken from the maintenance workshops to the CRR, where the most appropriate management actions will be directed. In cases in which reusing the tires is not possible, they will be cut into pieces in order to reduce their volume and then be deposited in the municipal landfill. (Refer to **Figure 4.3.**)

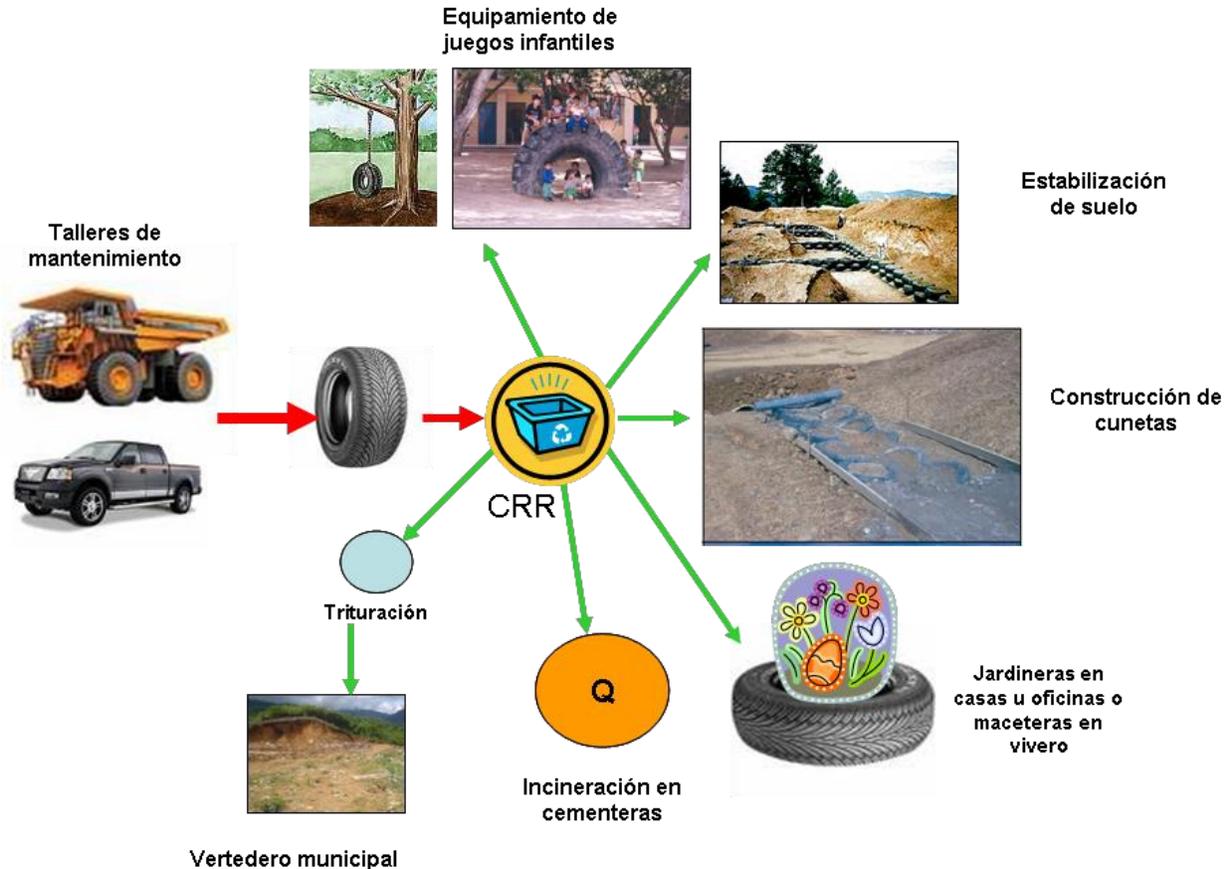


Figure 4.3 Management of the tires generated on the surface

4.2.10 Collection of Car Batteries

Car batteries require special management due to the high lead content. Fortunately, this material is in high demand locally by recyclers, and AMPAC will collect used batteries and store them for later sale to recyclers. Due to their size and weight, the batteries should be brought directly to the CRR by maintenance shop personnel or vehicle owners.

4.2.11 Collection of Rubber (Boots and Uniforms) and Rags with Hydrocarbons

Rubber waste will be collected and its volume reduced before being deposited in the municipal landfill with the expectation that it can be valued energetically by a cement company. Rags can also be burnt by cement factories given the energy content. These residues will be deposited directly in the CRR, where they will be stored for their respective treatment and final disposal.

4.2.12 Collection of Televisions, PC Screens, Toners or Any Electronic Equipment

Most of the electronic equipment that is deposited in the landfill has some component that can be recycled. To avoid depositing them in the landfill. Due to the low generation of this waste, containers will not be installed in the company's facilities. Instead, a place has been allocated in the CRR where electronics can be deposited and stored until they will be taken to the recyclers that exist in San Pedro Sula or Tegucigalpa.

4.2.13 Location of Recycling Containers

The containers that will be located in various sites of the company are listed below:

Table 4.1 Container Distribution

Place	Organic waste	PET	Aluminum Cans	Batteries	Wood
Camp	X	X	X	X	
Hotel / dining room	X	X	X		
Club	X	X	X		
Offices		X	X	X	
Carpentry workshop					X
Store		X	X	X	
Hospital		X	X		

4.2.14 Support Program for the Operation of the Municipal Landfill

AMPAC has provided machinery for the coverage of the waste once they are deposited, which has allowed the landfill to be considered as a "semi-controlled sanitary landfill." Since it prevents the proliferation of disease vectors and the generation of odors. AMPAC will continue to provide the required support.

APPENDIX 8C

La Soledad TSF Water Monitoring Plan

LA SOLEDAD TSF WATER MONITORING PROGRAM

1.0 BACKGROUND

The project "Expansion and Improvement for Storage and Treatment of Tails" has a Mitigation Measures Contract since 2004; which were updated through Resolution 0749-2016, issued in the month of August 2016.

One of its measures establishes:

"To have a Surface and Groundwater Monitoring Plan; this purpose is to determine the quality and quantity of all the water that will be affected by the processes of discharge of the wastewater from the tailings dam in operation, for which a scale map of 1: 10,000 should be presented where the sampling points are located, with their respective coordinates UTM WGS 84. At least the following physical parameters must be analyzed: Temperature, Turbidity and Capacity of the sampling point; Chemical Parameters: Conductivity, pH, Hardness, Color, Dissolved Oxygen, Chemical Oxygen Demand, Biological Oxygen Demand, Heavy Metals (Zinc, Cyanide, Copper, Lead, Cadmium and Mercury), Suspended Solids, Sedimentable Solids. These parameters must comply with the National Technical Standard for Discharge of Wastewater to Receptor Bodies and Sanitary Sewer, published in the Official Journal La Gaceta on 13 December 1997 under agreement No. 0058. "In the Contract for Compliance with Measures of Mitigation for the Development of the Project 'Expansion and Improvement for the Storage and Treatment of Tails.'"

The monitoring plan, in its first version (approved by the Authorities), is being executing permanently since 2006, prior to the start of operations of the tail dam La Soledad.

The protection of natural resources is a priority for AMPAC along with to guarantee the optimal performance of the reservoir, designed for storage and treatment of tails; the relation of the volume of water generated by the operations and the annual rainfall average (72,017 inches of rain¹); the discharges of the dam must be semi continuous and controlled. For these reasons and to improve the presentation and interpretation of the information generated, the Effluent and Surface Water Monitoring Plan has been adapted to the current situation of La Soledad Dam.

¹Rainfall register general offices 2016, Department of Environment, American Pacific Honduras S.A. of C.V.

2.0 OBJECTIVES

2.1 Overall Objective

Define minimum requirements to guarantee the representativeness of the water sample in the sampling, preservation and transport.

2.2 Specific

1. Follow up on baseline results established in 2006².
2. Evaluate the long-term tendencies of the concentrations of elements in the bodies of water.
3. Control internal processes

² See Annex 10.4 Baseline Study on the Surface Water Quality and Subterranean in the Area of Influence of the Soledad Tails Dam El Mochito, Las Vegas Santa Barbara

3.0 SELECTION CRITERIA FOR MONITORING POINTS

1. Monitor the bodies of water in the area of influence of the construction and operation of the dam.
2. Physical limitations such as: accessibility, occupational safety and properties outside of the company.
3. Point of discharge of the tailings dam and its influence (upstream and downstream).

3.1 Bodies of water³

1. The streams and creeks, located in the area of influence of the Soledad dam.
2. Industrial effluent from the Soledad dam.

3.2 Monitoring parameters

The parameters to be monitored and reported will be those required by SERNA in the contract of Mitigation Measures of September 29, 2004 (numeral 25 of said Contract), since it was not required to update these.

Temperature	Biochemical Oxygen Demand (BOD)
Turbidity	Suspected solids
Flow capacity	Sedimentable solids
Conductivity	Cyanide
pH	Zinc
Hardness	Copper
Colour	Lead
Dissolved oxygen	Cadmium
Chemical Oxygen Demand (COD)	Mercury

Relative to the IFC guidelines for mining, there are a few parameters that have not been included in the plan to-date:

- Arsenic, chromium (VI), and phenols are not included in the monitoring program as they are not related to the El Mochito mining process and monitoring of these parameters is not required by permit.

³Technical standards of wastewater discharges to receiving bodies and sewage health, secretariat of health, agreement No. 058, 1997.

4.0 MONITORING POINTS

Established on the basis of the criteria mentioned in 3.1 and 3.2, the following are established scenarios:

4.1 Monitoring scenarios

Since there are two discharge points for the tailings dam, one towards the creek Raices (105-R) and another one towards the El Palmar creek (105), different scenarios are established to guarantee the relevance of the information generated, as well as to avoid sending additional samples. Below are the points considered relevant for each scenario

4.1.1 Raices 105-R (E1) scenario

1. Point 14 (upstream)
2. Point 105-R (discharge - Raices)
3. Point 16 (downstream)
4. Point 17 (El Rincon, Raices creek)

4.1.2 El Palmar scenario (E2)

1. Point 17 (El Rincon, Raices creek)
2. Point 103 (upstream)
3. Item 105 (discharge)
4. Point 104 (downstream)

4.1.3 Permanent points scenario (E3)

These points will be taken independently if there is discharge or not

1. Point 17 (El Rincon, Raices creek)
2. Point 102 (sub-drainage filter of the first stage in the outer base of the membrane)
3. Point 103 (upstream)
4. Point 104 (downstream)

4.2 Table 1 Monitoring points area of influence of the Soledad dam.⁴

Description	Stage	ID	X	Y	Height
Upstream discharge Soledad Raices creek	E1	14	387146	1644379	700
Discharge of the Soledad dam towards the Raices creek	E1	105-R	387167	1643963	764
Downstream discharge Soledad Raíces creek	E1	16	387446	1644402	686
El Rincon (Raíces creek)	P	17	388468	1646647	640

⁴ See Annex 10.3 Geographic location map of monitoring points.

Description	Stage	ID	X	Y	Height
Sub-drainage filter of the first stage in the base outside of the membrane	P	102	387254	1642702	725
Upstream of the Soledad discharge towards the El Palmar creek	E2, E3, P	103	387307	1642676	740
Discharge of the Soledad dam towards the El Palmar creek	E2	105	387300	1642680	754
Waters below the Soledad discharge towards the El Palmar creek	E2, E3, P	104	387351	1642703	748

E1: scenario download 1

E2: scenario download 2

E3: scenario of permanent points

P: independent permanent points of the scenario

Coordinates in WGS84

4.3 Identification of monitoring points

In order to ensure that the sampling takes place in the same places identified in table number one, a label will be placed at each monitoring point, the information that will contain this label will be the following:

1. Point number according to the nomenclature shown in the table
2. Coordinates
3. Height (msnm)
4. Reference to the monitoring plan version

This labeling will allow non-AMPAC institutions to easily find and identify the monitoring points.

4.4 Table 2, monitoring frequency

This frequency considers the monitoring that has been carried out by the Mining Authority INHGEOMIN until the date of preparation of this plan.

Parameter	AMPAC	External Laboratory
Temperature	D / M	
By turbidity	M	
Flow rate	D / M	
Conductivity	M	
pH	D / M	
Hardness		T
Color		T
Dissolved oxygen	D / M	
COD		T
BOD		T
Zinc	D / M	M

Parameter	AMPAC	External Laboratory
Cyanide		M
Copper	D / M	M
Lead	D / M	M
Cadmium		M
Mercury		M
Suspended solids		T
Sedimentable solids		T
D = Daily M = Monthly T = Every three (3) months		

5.0 FIELD PARAMETERS

5.1 Apparatus

The measurement of parameters in the field (pH, dissolved oxygen, conductivity, turbidity, temperature and flow) will be carried out by portable equipment, such as multi-parametric probes, pH meters, turbidimeters, conductivity meters and colorimetric paper and current meters.

All the parameters taken in the field will be recorded in the format⁵ of data registration established in the monitoring plan immediately after the corresponding measurements are taken. The in-situ parameters will be taken from the point samples since the representativeness of these is lost if they are taken from composite or integrated samples.

5.2 Flow measurement⁶

5.2.1 Volumetric capacity

This method is applied when the stream or slope presents a water fall in which a container can be interposed; a stopwatch and a graduated container, plastic bottles 500ml or 1l and large containers (barrels) of known capacity are required when large flows must be handled.

The container must be placed under the current or discharge in such a way that it receives all the flow; simultaneously, the stopwatch is activated. Once the measurement is completed, the container must be removed and stopwatch stopped to mark the time it traveled.

This process starts at the precise moment in which the container is introduced to the current or discharge and stops the moment it leaves.

This method has the advantage of being the simplest and most reliable, as long as the place where the gauging takes place guarantees that the vessel reaches all the volume of water that flows through the current or discharge; the loss of sample should be avoided when gauging.

⁵ See Annex 10.1, information consignment formats PM01 and PM02

⁶ EPA, Wastewater Flow Measurement, SESDPROC-109-R4

The flow is calculated as follows:

$$Q = v / t$$

Where

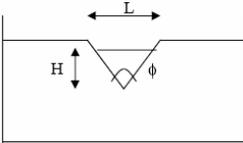
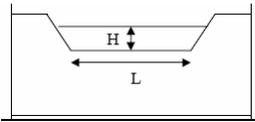
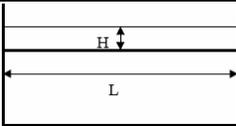
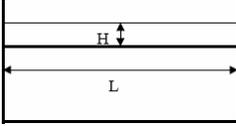
Q = Flow rate in liters per second, **l/s**.

V = Volume in liters of the graduated container.

T = Time in seconds it takes to fill the container.

5.2.2 Capacity in weirs

This method will be used in works that have the necessary physical characteristics to perform the calculation, these can be temporary or permanent works as necessary. Additionally, this method must be used if the influent / effluent presents a laminar flow, free of objects that could obstruct the work, causing an inadequate measurement.

Type of weir	Diagram	Equation
Triangular		$\Phi = 90^\circ$ $Q = 1.4 * H^{2.5}$ Q = Flow in m ³ /sec H = Head in m $\Phi = 60^\circ$ $Q = 0.775 * H^{2.47}$ Q = Flow in m ³ / sec H = Head in m
Trapezoidal		If the slope of the sides has a 4/1 ratio, it applies: $Q = 1.859 * L * H^{1.5}$ Q = Flow in m ³ /sec L = Crest length in m H = Head in m
Rectangular without shrinkage		$Q = 3.3 * L * H^{1.5}$ Q = Flow in m ³ / sec L = Crest length in m H = Head in m
Rectangular with contraction		$Q = 1.83 * L * H^{1.5}$ Q = flow in m ³ /sec L = Crest length in m H = Head in m

5.2.3 Capacity per float or current meter

To perform a float, you must have a light weight object, choose a section straight; The longer the section in the creek to be measured, the less deviation in the results of the calculations. This method will be used when there is no equipment or work for the flow measurement, since possibilities of erroneous calculations is great due to the number of factors involved: object weight, water density, temperature, roughness factor and irregular sections with objects that obstruct the flow.

In this method, the object should be thrown smoothly, and the stopwatch should start where the selected straight section begins.

The water speed is calculated as follows:

$$V = x / t$$

Where

V = Surface **speed**, m / s

x = **Length** traveled by the floating element in meters

t = **Travel time** of the floating element in seconds

The flow is calculated as follows:

$$Q = n \times V \times A$$

Where

Q = Flow, m³/ s

V = Surface speed in m / s

A = Average transversal area in m²

n = Roughness factor that depends on the material of the channel bottom:

0.4 - 0.52 slightly rough	0.46 - 0.75 gravel with grass and cane
0.58 - 0.7 coarse gravel and stones	0.7 - 0.9 wood, concrete or pavement
0.62 - 0.75 gravel	0.65 - 0.83 clay and sand

In this equation, the speed can also be calculated by means of a current meter for greater accuracy in measurements. There are different types of devices that calculate the speed by means of rotating propeller, ultrasound, as well as stationary and portable, as needed.

6.0 SAMPLE TYPOLOGY^{7,8}

Considering the parameters and the adequate measurement of these, the types of samples to be taken will be based on the regulatory requirements that exist, in the current national legislation, it does not specify what type of sample to take; considering that, the following sample types are suggested as required:

1. Point samples: It is the sample taken at an exact reference point or in the point established by the Monitoring Plan. This type of sample will be used when:
 - a. It is required to characterize a body of water in a determined time.
 - b. Corroborate the values of composite samples
 - c. The chemical characteristics of the body of water are constant
 - d. When trying to measure parameters that will be affected by storage such as: pH, oil and fats, residual chlorine, dissolved gases, organic and microbiological
2. Composite samples: It is the mixture of several point samples from the same source, taken at scheduled intervals and for certain periods, which may have equal volumes or be proportional to the flow during the period of samples. This type sample will be used when:
 - a. It is required to determine average chemical concentrations.
 - b. Calculate contributions of mass in a determined time.
3. Integrated samples: The integrated sample is one that is formed by the mixture of point samples taken from different points simultaneously, or as close as possible.
4. Control samples: for quality control of the results provided by the laboratories, the following will be considered:
 - Control: is a solution of known concentration of the chemical element to be analyzed, prepared with laboratory grade reagents; the function of this is to guarantee and monitor preservation conditions, storage of samples taken.
 - White: it is a solution that does not contain a real sample and, therefore, should not contain the analyte of interest, but should contain all the reagents and treatments for preservation, since it will be subject to the same conditions and/or procedures as the normal samples; the function of the white sample is to demonstrate that the samples did not undergo cross-contamination processes, nor alterations in the course of sampling, preservation and storage, in addition to verifying the state of cleanliness of the containers.
 - Added: is a sample to which a known quantity of the analyte of interest has been added. This addition must be made in the manner provided in the design of the standardization conditions so that it is reproducible. The function of added is to demonstrate that there are no matrix interferences, or that if they exist, they are quantifiable and that the analyte is not degraded or significantly altered during the sampling and transport.
 - Duplicate: is a sample of which two containers will be filled from the same source, with in order to perform quality control to the analyzes made by the laboratories for guarantee representativeness of the sampling process.

⁷EPA, Handbook for Sampling and Sample Preservation of Water and Wastewater, EPA-600 / 4-82-029

⁸See Annex 10.2 for proper sampling with boats.

7.0 PREPARATION AND PRESERVATION⁹

7.1 Containers

- Heavy metals: polyethylene containers will be used, ensuring that they do not have coating that may interfere with the acid used to preserve.
- Cyanide: polyethylene containers will be used, ensuring that they do not have a coating that may interfere with the base used to preserve.
- After sampling, it must be stored temporarily in a cooler with artificial ice as the first option. If natural ice is used, it should go in two bags with seal (zip lock).
- Various parameters: all those other parameters that, for particular events are required to monitor, will be packed as required to guarantee the stability of the physical or chemical compound to be analyzed.
- For all cases in the sampling, the amount required will be established by the laboratory that will carry out the analysis of said samples.
- For final shipment, the samples should be packed in plastic bags, with the purpose of serving as a containment barrier in case of leakage of one of the containers.
- If they are used in glass, they must be amber, to ensure that there is no penetration of UVB/UVA rays that alter the composition of the sample.

7.1.1 Cleaning

To guarantee that there is no interference in the analyzes of previous samples, reused containers should be washed as follows:

1. Wash the container with a phosphate-free detergent, use a rubber bristle brush (only in extreme cases for removal of encrustations).
1. Rinse the container 3 times with tap water (prior to chemical analysis of the same, to rule out any interference in the analysis matrix resulting from this wash).
2. Rinse the container 3 times with distilled or de-ionized water.

As an additional preparation and to ensure the cleaning of the containers, a washing with nitric acid with a concentration of 10% prior to rinsing with distilled water can be conducted.

7.2 Preservation^{10,11}

- Heavy metals; nitric acid: when acid is used for the preservation of samples, the ratio must be 1% of acid per 100 ml of sample, because the pH is less than two and in order to have a minimum dilution for the elements of interest.
- Cyanide: Sodium hydroxide will be used, solid, with a degree of purity greater than 90%, at a ratio of 1% per 100 ml of sample, because the pH is greater than 12 and in order to have a minimum dilution for the elements of interest.
- Various parameters: all those other parameters that, for particular events are required to monitor, will be preserved as required by the analyst laboratory.
- After the preservation, the samples must be refrigerated in a container that guarantees a temperature lower than 4 degrees Celsius. In the same way, at the moment of being sent for

⁹ EPA, Handbook for Sampling and Sample Preservation of Water and Wastewater, EPA-600/4-82-029

¹⁰ EPA, Handbook for Sampling and Sample Preservation of Water and Wastewater, EPA-600/4-82-029

¹¹ ASTM Standard D7365-09, "Standard Practice for Sampling Preservation and Mitigating Interferences in Water Samples for Analysis of Cyanide"

analysis, the container must have enough artificial ice to guarantee this temperature until the final delivery from the same.

- The preservation must be done at the time the sample is taken. If it is not possible, they should be placed in a container that guarantees a temperature less than 4 degrees Celsius and be preserved in the shortest possible time.

7.2.1 Table # 1 Maximum sample retention time¹²¹³¹⁴

Below is the maximum time of retention of preserved samples, prior to analysis in laboratory, generalized to the applicable parameters for the operation of American Pacific, S.A. C.V.; however, the analytical laboratory can determine a lower retention time than the established standards, according to its procedures.

Parameters	Weather
Metals	6 months ¹⁵
Physicochemicals	Immediately
Cyanide	14 days

8.0 TRANSPORTATION

1. Samples must be sent for analysis to the laboratory after the last sampling or coordinate the shipment as soon as possible to avoid unnecessary storage of samples.
2. A cooler with sufficient capacity must be used to store temporary samples with enough ice to maintain the temperature below 4 degrees Celsius.
3. The documentation required for the shipment will be determined by the laboratory and country of reception: chain of custody, commercial invoice, declaration of toxic substances, and others.

9.0 GENERAL CONSIDERATIONS

1. This plan does not detail specific standards for taking water samples, measuring flows and related topics; therefore, references are provided for further monitoring.
2. The selected techniques are the most frequently used and applicable to the site.
3. Personal integrity and the environment must be a priority over carrying out monitoring programs, always considering less invasive alternatives and sustainable, as well as occupational health and safety forecasts prior to any activity.

¹²EPA, Handbook for Sampling and Sample Preservation of Water and Wastewater, EPA-600 / 4-82-029.

¹³ASTM Standard D7365-09, "Standard Practice for Sampling Preservation and Mitigation Interferences in Water Samples for Analysis of Cyanide.

¹⁴Methods for Chemical Analysis of Water and Wastes, EPA-600 / 4-79-020. U.S.E.P.A

¹⁵With the exception of chromium and mercury that have a retention time of 24 hours and 28 days respectively.

APPENDIX 8D

Water Monitoring Plan for Mining Operations

MINE OPERATIONS WATER MONITORING PROGRAM

1.0 INTRODUCTION

The present monitoring plan was elaborated to determine the most suitable methods for the generation and compilation of necessary information; such as the parameters and sites to be monitored, which will serve as an indicator of the possible effects that the structures and the effluent of the El Mochito mining operations could generate on water bodies and its influence. Below several methods are presented to establish chemical relationships between the concentration of an element and the flow of a body of water in motion.

2.0 BACKGROUND

The monitoring and environmental control plan establishes the parameters for monitoring the quality of the different environmental components of the effluents that could be affected during the operation of the mining project; therefore, for AMPAC, it has been a primary priority maintaining environmental conservation in accordance with environmental standards.

Our environmental commitment has been beyond incorporating a monitoring and environmental control plan for the concentrations of the elements that we are required to comply with - the contract for compliance with standardization measures for the continuation of the project "mining operations of the El Mochito mine" by the company AMPAC S.A. of C.V.

In the year 2000, jointly with the authorities of INGHEOMIN (before DEFOMIN), a water bodies monitoring process formally begun. This will continue to be carried out during the mining operation, the service life of the tail dams and the time that the authorities deem convenient post-closing operations.

2.1 Mine interior operation

Due to the hydrogeological composition and precipitation in the area, in order to guarantee the operation in the interior of the mine, the bodies of water in the interior of the mine are derived by a system of pumps to the surface, crossing the L-650 level and finally ending in the Raíces with an average flow of 8,000 GPM continuously. This guarantees the optimal operation of the mining activities.

3.0 WATER BODIES

3.1 Surface water bodies

The streams and creeks, located in the area of influence of the mining operation, will serve as an indicator of the possible effects that the effluents of the operation could generate in them. In addition to this, with the chemical results, the following can be estimated:

- Determine the possible impact of water quality by natural processes.
- The capacity of the body of water to assimilate the increase of chemical elements produced by point/source discharges.
- Predictions of variations in water quality.
- Observe changes in water quality as a result of human activities in the area.
- Control measures that must be implemented to ensure that the quality of the water complies with the technical standard of wastewater discharges to receiving bodies.

3.2 Underground water bodies

The aquifers that may exist in the different levels in the interior of the mine.

4.0 SELECTION CRITERIA FOR MONITORING POINTS

- Monitor the bodies of water in the area of influence of the mining operation.
- Accumulation of elements: determine the effect on receiving bodies of water in the short and long term.
- Specific limitations of the monitoring points such as: accessibility by location, occupational safety, properties outside the company.

5.0 MONITORING PARAMETERS

Given that AMPAC already has an approved monitoring plan for SERNA, for monitoring the effluent of the La Soledad dam and the water bodies within its operation, this monitoring plan for the Pozo Azul, El Bosque and mining operations, will use the same scheme in order to have only one execution criterion and information about it.

The parameters to be monitored and reported will be those required by SERNA in the update made to the Mitigation Measures contract of September 29, 2004. This update was made in 2018.

1. Temperature
2. Turbidity
3. Flow capacity
4. Conductivity
5. pH
6. Hardness
7. Color
8. Dissolved oxygen
9. Chemical oxygen demand (COD)
10. Biochemical oxygen demand (BOD)
11. Suspended solids
12. Sedimentable solids
13. Cyanide
14. Zinc
15. Copper
16. Lead
17. Cadmium
18. Mercury
19. Manganese

20. Iron
21. Nickel
22. Chrome
23. Aluminum
24. Silver

One of the inconveniences in monitoring the quality of surface and natural underground water in the area is the fact that the existing regulations are only for effluents. As a result, it will be important to not make the mistake of comparing the results obtained in these bodies of water with the effluent regulations.

Relative to the IFC guidelines for mining, there are a few parameters that have not been included in the plan to-date:

- Arsenic, chromium (VI), and phenols are not included in the monitoring program as they are not related to the El Mochito mining process and monitoring of these parameters is not required by permit.
- Grease and oil has been monitored for internal purposes only, but will be formally included in the monitoring plan going forward to comply with IFC guidelines.

6.0 FREQUENCY OF MONITORING

The monitoring plan, in its first version, is being implemented permanently since 2006 in conjunction with the contracts for standardization measures. This monitoring will continue to be executed during the service life of the operation, at all monitoring points. For closing, it will continue to be executed as required by the Authority.

6.1 Laboratories

The analysis will be carried out in the INHGEOMIN laboratory, external laboratories (certified) and the internal laboratory that AMPAC has.

For reference, the external laboratories used by AMPAC, are Maxxam A Bureau Veritas Group Company, located in Canada, and Laboratorios Agropindustriales de Centroamérica, due to the reliability of the results provided (guaranteed by the laboratory certification). However, if another laboratory will be used, these changes would be notified in the compliance report of environmental measures.

6.1.1 Table 1. Frequency of monitoring

The analysis will be executed by the INHGEOMIN (the times they are on site for inspection and the parameters they are able to perform), one or more external laboratories (national and/or international) and by AMPAC (in its laboratory).

Parameter	AMPAC	INHGEOMIN	Outside laboratory
Temperature	D / M	B	
Turbidity	M	B	
Flow	D / M	B	
Conductivity	M		
pH	D / M	B	
Hardness			T
Colour			T
Dissolved oxygen	D / M	B	
COD			T
BOD			T
Manganese			
Zinc	D / M	B	M
Copper	D / M	B	M
Iron	D / M	B	M
Nickel		B	M
Chrome		B	M
Aluminum		B	M
Silver		B	M
Lead	D / M	B	M
Cadmium		B	M
Cyanide		B	M
Mercury			M
Suspended solids			T
Solids sedimentables			T
D = Daily M = Monthly T = Every three (3) months			

The results of the monitoring will be delivered quarterly to SERNA and other authorities, in the format shown in annex 2.

6.1.2 Table 2. Monitoring points area of influence AMPAC mining operations.

Description	Identification	X	Y	Height
Mine Plant and Concentrator				
Upstream of Plantel Mina	1	384054	1642333	920
Downstream of Plantel Mina	2	383866	1642641	914
Upstream of Concentrator	3	383668	1643534	874
Downstream of Concentrator	4	383857	1643838	860
Caliche				
Upstream discharge Caliche sedimentation lagoon	16	387446	1644402	686
Caliche sedimentation lagoon exit	12-LS	387497	1644341	710
Downstream unloads Caliche sedimentation lagoon and downstream Confluencia Palmar and Raíces	18	387633	1644390	686
Headwaters				
Headwaters	21	387578	1644225	687
El Rincon				
El Rincon	17	388468	1646647	640
Yojoa lake				
Yojoa lake	"Lake" (Lake composite sample)			650
· Punta Gorda		392633	1643908	
· Las Marías		390575	1645919	
· River mouth Quebrada Raices		389609	1646088	
· Las Balas		388420	1648774	
· River Mouth Rio Helado		388934	1650723	
· Canal ENNE in front of the orange trees		388956	1652379	

6.2 Identification of sampling points

In order to ensure that samplings are always carried out in the same places identified in Table 2, a sign will be placed at each monitoring point, the information that will contain this label will be the following:

1. Point number according to the nomenclature shown in table 2
2. Coordinates

3. Height (msnm)
4. Reference to the monitoring plan version

This labeling will allow non-AMPAC institutions (such as Government Secretariats, Local Authority, etc.) to easily find and identify the monitoring points.

7.0 FLOW MEASUREMENT.

The capacity or flow measurement is an inherent activity in the sampling of effluents or bodies of water, necessary to determine the relationship between the quality and quantity of the flow. In the present Monitoring Plan, the gauging methods, unless otherwise indicated, will be the following:

7.1 Volumetric capacity¹

This method is applied when the stream or slope presents a water fall in which a container can be interposed; a stopwatch and a graduated container, plastic bottles 500ml or 1L and large containers (barrels) of known capacity are required when large flows must be handled. The container must be placed under the current or discharge in such a way that it receives all the flow; simultaneously the chronometer is activated. Once the measurement is complete, the container should be removed, and the stopwatch stopped to mark the time it traveled. This process begins at the precise moment in which the container is introduced to the current or discharge and stops at the moment when it is removed from it.

This method has the advantage of being the simplest and most reliable, as long as the place where the gauging takes place guarantees that the vessel reaches all the volume of water that flows through the current or discharge; the loss of sample should be avoided when gauging.

The flow is calculated as follows:

$$Q = v / t$$

Where

Q = Flow rate in liters per second, **l/s**.

V = Volume in liters of the graduated container.

T = Time in seconds it takes to fill the container.

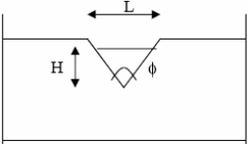
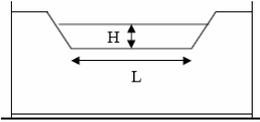
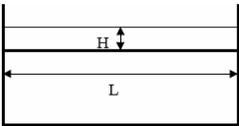
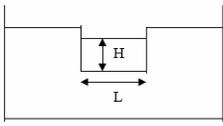
7.2 Capacity in Weirs²

This method will be used in works that have the physical characteristics necessary to perform the calculation, these can be temporary or permanent works as necessary. Additionally this method must be used if the influent / effluent presents a laminar flow, free of objects that could obstruct the work, causing an inadequate measurement.

¹Briones, Sánchez Gregorio. Capacity of water in channels and pipes. Editorial TRILLAS Mexico 1997. Measurement of Soil Erosion and Runoff. (FAO Soil Bulletin - 68)

²Briones, Sánchez Gregorio. Capacity of water in channels and pipes. Editorial TRILLAS Mexico 1997. Measurement on the Ground of Soil Erosion and Runoff. (FAO Soil Bulletin - 68)

7.2.1 Table #3 Types of weirs.

Type of weir	Diagram	Equation
Triangular		$\Phi = 90^\circ$ $Q = 1.4 * H^{2.5}$ Q = Flow in m ³ /sec. H = Head in m $\Phi = 60^\circ$ $Q = 0.775 * H^{2.47}$ Q = Flow in m ³ /sec. H = Head in m
Trapezoidal		If the slope of the sides has a relation 4/1, it applies: $Q = 1.859 * L * H^{1.5}$ Q = Flow in m ³ /sec. L = Crest length in m H = Head in m
Rectangular without shrinkage		$Q = 3.3 * L * H^{1.5}$ Q = Flow in m ³ /sec. L = Crest length in m H = Head in m
Rectangular with shrinkage		$Q = 1.83 * L * H^{1.5}$ Q = flow rate in m ³ /sec. L = Crest length in m H = Head in m

7.3 Capacity per float or current meter.

To perform a float, you must have a lightweight object, and choose a straight section. The longer the section in the creek to be measured, the less deviation in the results of the calculations. This method will be used when there is no equipment or structure for the flow measurement, since the possibility of erroneous calculations is great due to the number of factors involved: Object weight, water density, temperature and irregular sections with objects that obstruct the flow.

In this method, the object should be thrown smoothly and the stopwatch should start where the selected straight section begins.

The water speed is calculated as follows:

$$V = x / t$$

Where

V = Surface speed, m/s

x = **Length** traveled by the floating element in meters
t = Travel **time** of the floating element in seconds

The flow is calculated as follows:

$$Q = n \times V \times A$$

Where

Q = **Flow rate**, m/s

V = Surface **speed** in m/s

A = Average cross-sectional **area** in m²

n = **Roughness factor** that depends on the material of the channel bottom:

Table # 4: roughness coefficient³

0.4 - 0.52 slightly rough	0.46 - 0.75 gravel with grass and cane
0.58 - 0.7 coarse gravel and stones	0.7 - 0.9 wood, concrete or pavement
0.62 - 0.75 Gravel	0.65 - 0.83 clay and sand

In this equation the speed can also be calculated by means of a current meter for greater accuracy in the measurements. There are different types of devices that calculate the speed by means of rotating propeller, ultrasound, as well as stationary and portable as necessary.

³Briones, Sánchez Gregorio. Capacity of water in channels and pipes. Editorial TRILLASMexico 1997. Measurement of Soil Erosion and Runoff on the Ground. (FAO Soil Bulletin - 68)

8.0 SAMPLE TYPOLOGY⁴

Considering the parameters and the measurement of these, the types of samples to be taken will be based on the regulatory requirements that exist, in the current national legislation, it does not specify what type of sample to take; considering that, the following sample types are suggested as required:

1. **Point samples:** is the sample taken at an exact reference point or at the point established by the Monitoring Plan, a methodology that has been used by AMPAC and INHGEOMIN.
2. **Composite samples:** It is the mixture of several point samples from the same source, taken at scheduled intervals and for specific periods, which may have equal volumes or be proportional to the flow during the period of sampling.
3. **Integrated samples:** The integrated sample is one that is formed by the mixture of point samples taken from different points simultaneously, or as close as possible.
4. **Control samples:** For quality control of the results provided by the laboratories, the following will be considered:
 - **Control:** it is a solution of known concentration of the chemical element to be analyzed, prepared with laboratory grade reagents; the function of this is to guarantee and monitor the conditions of preservation, storage of the samples taken.
 - **White:** it is a solution that does not contain a real sample and, therefore, should not contain the analyte of interest, but should contain all the reagents and treatments for preservation, since it will be subject to the same conditions and/or procedures as the normal samples; the function of the white sample is to demonstrate that the samples did not undergo cross-contamination processes, nor alterations in the course of sampling, preservation and storage, in addition to verifying the state of cleanliness of the containers.
 - **Added:** it is a sample to which a known quantity of the analyte of interest has been added. This addition must be made in the manner provided in the design of the standardization conditions so that it is reproducible. The function of the additives is to demonstrate that there are no matrix interferences, or that, if they exist, they are quantifiable and that the analyte is not degraded or significantly altered during sampling and transport.
 - **Duplicate:** this is a sample of which two containers from the same source will be filled, in order to perform quality control on the analyzes made by the laboratories to guarantee the representativeness of the sampling process.

For all points, the internal AMPAC standard for water quality monitoring GGAP-05 should be followed.

⁴EPA handbook for sampling and sample preservation of water and wastewater

9.0 FIELD PARAMETERS

The measurement of parameters in the field (pH, Dissolved Oxygen, Conductivity, Turbidity and Temperature) will be carried out by portable equipment, such as multiparameter probes, ph meters, turbidimeters, conductivity meters and colorimetric paper.

All the parameters taken in the field will be recorded in the data capture format established in the monitoring plan immediately after the corresponding measurements are taken. The in-situ parameters will be taken from the point samples since the representativeness of these is lost if they are taken from composite or integrated samples.

9.1 Measurement

Creeks, rivers or superficial bodies. In creeks, the equipment (multiparameter probes, ph meters and conductivity meters) will be immersed directly in the middle of the cross section, at a depth of between 20 and 30 cm from the surface, in an area of little turbulence and the readings will be taken. If this is not possible, either due to turbulence or the length of the cable, a sample of the body of water will be taken in a container and in this, the measurement will be made. This same procedure will be carried out for the effluents.

10.0 PREPARATION AND PRESERVATION⁵

10.1 The samples taken in the field should be stored as follows

- Heavy metals: polyethylene containers that do not have any type of metal in their composition and in the amount required by the laboratory to carry out the respective analysis will be used.
- Cyanide: dark/opaque polyethylene containers will be used, in order to guarantee that there is no penetration of UVB/UVA rays that alter the composition of the sample.
- After taking the sample, it should be temporarily stored in a cooler with artificial ice as the first option. If natural ice is used, it should go in two bags with a seal (Ziploc).
- Various parameters: All other parameters that, due to particular events, are required to be monitored, will be packaged as required to guarantee the stability of the physical or chemical compound to be analyzed.
- For all cases in the sample collection, the required amount will be established by the laboratory that will carry out the analysis of said samples.
- For final shipment, the samples must be packed in plastic bags, in order to serve as a containment barrier in case of leakage of one of the containers.

10.2 Preservation of the sample will be done as follows:

- Heavy metals: nitric acid (HNO_3) in concentrations of 70% or less will be used, until the pH of the sample is below 2 (a sample of 200ml needs approximately 2ml of 70% HNO_3).
- Cyanide: Sodium hydroxide with a degree of purity greater than 90% will be used, until the pH of the sample is above 12.
- Various parameters: All those other parameters that, for particular events, are required to monitor, will be preserved as required by the analyst laboratory.
- After the preservation, the samples must be refrigerated in a container that guarantees a temperature lower than 4 degrees Celsius. In the same way, at the moment of being sent for analysis, the container must have enough artificial ice to guarantee this temperature until their end delivery.

10.3 Cleaning of containers⁶

To guarantee that there is no interference in the analyzes of previous samples, reused containers should be washed as follows:

1. Wash the container with a phosphate-free detergent, use a rubber bristle brush (only in extreme cases for removal of encrustations).
2. Rinse the container 3 times with tap water (prior to chemical analysis of the same, to rule out any interference resulting from this washing).

⁵ALS recommended holding times and preservations for water, version 2, January 2013

⁶Volunteer Stream Monitoring: A Methods Manual, EPA 841-B-97-003 November 1997

3. Rinse the container 3 times with distilled or de-ionized water.
As an additional preparation and to ensure the cleaning of the containers, a 10% acid wash (nitric, sulfuric or hydrochloric) can be made prior to rinsing with distilled water.

10.3.1 Apparatus

For cleaning and storage of devices for measuring field parameters, it is recommended to follow the manufacturer's specifications.

11.0 FORMAT FOR THE REGISTRATION AND PRESENTATION OF DATA

In each sampling, it will be necessary to fill out a form (format PM 01) with the information of the parameters that are measured in situ. (see annex 1)

The basic information that this format will carry will be the following:

1. Name of the sample collector
2. Date and time
3. Monitoring point
4. Type of sample (point, composite, integrated and control)
5. Analysis to be performed
6. Flow
7. Field parameters: pH, temperature, conductivity, turbidity and dissolved oxygen.
8. Date and time of shipment to the laboratory
9. Number of samples sent to the laboratory

The format to report to the competent Authorities (PM02), will contain information compiled in the PM01 chemical and physico-chemical results as required in the Contract for the Compliance of Standardization Measures for Development Project "Mining Operations of the El Mochito Mine." The information collected in these formats will be presented to the competent Authorities in the time and manner that the Contract establishes.

12.0 EXCEPTIONS

1. The primary purpose of this monitoring plan is to carry out the collection of samples for the generation of chemical analysis reports; however, the security of the personnel in the different monitoring points is fundamental. To access point 18, it is necessary to cross the creek Raices; in winter, this point may not be taken by the aforementioned circumstance, so other points should be used as a reference.
2. Since the objective of this monitoring is to establish a relationship between the chemical concentration of an element and the flow of a body of water, the measurement of flow and sampling must be carried out simultaneously. To perform these activities in a separate manner is not recommended.
3. The monitoring for the points of the El Bosque dam (8,9 and 10) will be carried out only when there is water coming from the decanter (point 9). Otherwise, it is not considered representative to take the other associated monitoring points to this area.