CONTENTS

TABLES

ILLUSTRATIONS

8 ENVIRONMENTAL MANAGEMENT PLAN

In this chapter, there are described the management measures required to minimize, prevent, control and/or compensate the negative effects from the activities related to the mining exploitation developed in the area, as well as the specifications allow sustainable use of natural resources and socioeconomic environment in the local and specific context of the influence area defined in Chapter 3.

Bearing in mind that this Environmental Management Plan (PMA by its initials in Spanish) covers a series of stages and operational activities associated with the exploitation project "El Pescado" under the Mining Concession 5969, each one of the management files responds to the impacts identified in the environmental evaluation. (Chapter 6). However, there are cases in which it is essential to make a representative distinction of environmental management for each activity, and consecutively in each management sheet is described the specific action to be developed.

The development of PMA is framed in the following main criteria and approaches:

- The PMA is planned for all stages of the project (Exploration, Construction and Assembly, Exploitation, Closure and Post-closure), in compliance with the terms of reference established by the Regional Autonomous Corporation of Antioquia – Corantioquia

- Prevention is emphasized as the most effective instance of environmental management, which is achieved by incorporating environmental criteria from the feasibility stage, that subsequently and through adjustments in the design stage allows the appropriate development of the project with compatible environmental parameters

- Suggest different procedures for previous management of construction (information and participation related communities).

- It is elaborate in accordance with the PBOT of the municipality of Segovia, in order that it respects the regional and local development guidelines, and also the territorial environmental set of laws.

- The design of the project includes alternative systems and technologies, which allow the adoption of the latest technological advances that are environmentally and economically viable.

- The sheets of each one management programs, projects and environmental actions include the design characteristics that indicate: technologies, technical specifications, staff requirements, logistics necessities, costs, activities schedule and the responsibility of the people involved in the project.

- Compensation projects are proposed for those impacts that cannot be avoided, corrected or satisfactorily mitigated in the area.

- Description of the environmental and technical actions necessary to prevent, mitigate, avoid, correct and compensate for the possible impacts generated by the project, in the area of direct influence of the project called "El Pescado" under the Mining Concession 5969.

The table 8-1 presents the general structure of the environmental management plan to be implemented in the mining project "El Pescado" under concession 5969.

Table 8-1 General structure of the environmental management plan.

ENVIRONMENT	PROGRAM	NAME OF THE SHEET
ENVIRONMENTAL LIABILITIES	Environmental liabilities management plan	
ABIOTIC	Soil management program	Soil resources management program
	Water management of dry and sterile tails program	Water management of dry and sterile tails
	Programs of management of water resources and works for erosion control	Management of domestic wastewater from camps and mining areas
		Management and control of industrial waters from the access tunnel
		Management of wastewater from drilling (water sludge)
		Water management of dry and sterile tails tank
		Runoff water management (rains)
		Handling of crosses to bodies of water
		Management of water abstraction (domestic and industrial)
	Air resource management program	Handling and control of gases and particles
		Noise Control and Management
		Management of vibrations and noise derived from the use of explosives in mining production process
		Program of alarm and prevention system for the use of explosives in the exploitation
	Solid waste management program	Management plan for solid waste (domestic and industrial)
	Fuel and chemical substances management program	Fuel and chemical substances management
	Explosives and blasting management program	Explosives and blasting management

BIOTIC	Flora management programs	Management of flora, forestry land use and re-vegetation of intervened areas
		Flora management
	Plant species conservation program	Program for the conservation of plant species with some level of threat: endemic or banned, not registered or not identified.
	Wildlife and plant species conservation program	Conservation program for wildlife species with some level of threat: endemic or banned, not registered or not identified - Phase I.
		Conservation program for wildlife species Phase II- Conservation program for emblematic species, flag and / or umbrella.
	Program and protocols for the management and rescue of wildlife species	Program and protocols for the management and rescue of wildlife species
	Program for the development and promotion of ecosystems with species of flora and fauna affected by the project.	Program for the development and promotion of ecosystems with species of flora and fauna affected by the project.
	Education and training program for the people linked to the project	Education and training program for people linked to the project, with emphasis on ecosystems and flora species of special interest.
	Compensation program	Taking advantage of woody vegetation cover
		Compensation program for the using of vegetation cover that does not involve the arboreal component.
		Compensation Program for the affectation of species with some level of vulnerability and / or endemics
		Wildlife species protection program
SOCIOECONÓMIC	Data management and community participation program	Data management and community participation
	Education and training program for people linked to the project.	Education and training of people linked to the project.
	Support program for institutional management capacity.	Support program for institutional management and economic strengthening
	Employment program and recruitment of local labor	Employment program, recruitment of local labor, goods, products and services

	Management program of training, education and awareness to the community surrounding the project.	Management program of training, education and awareness to the community surrounding the project.
	Program of affectation to third parties	Management program for social risks and affectations
	Social compensation program	Social compensation
	Preventive archeology program	Archeology rescue
		Archeology monitoring
		Spreading and dissemination

8.1 ENVIRONMENTAL MANAGEMENT PROGRAMS

8.1.1 Abiotic environment

8.1.1.1 Land management programs

LAND MANAGEMENT PROGRAM								
OBJECTIVES								
Propose the protection measures of this resource, including: the control of erosion works, loss of the organic layer, prevention of pollution and the instability of it.								
GOALS								
Describe the quality of the removed soil and propose the protection measures for the resource, including erosion control, management of organic layer, and prevention of pollution and instability of it.								
Stages of the project	*Exploration*		*Construction and Assemble*	x	*Exploitation*	x	*Final Closing and Post Closing*	x
IMPACT (S) TO BE CONTROLLED:								
Change the use of land								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								

Erosion control, management of the organic layer and prevention of contamination and instability.

The actions to develop for soil management in the project are those described below:

ADAPTATION OF ACCESS ROUTES:

- Review, carry out maintenance and / or adequate and / or the drainage works necessary for the evacuation of rainwater and runoff management as a result of the erosion, instability and pollution, as described below:
- The gutters of rainwater of the access roads will be outlined with moto-leveler but guaranteeing its correct conformation in such a way that it complies with the required capacity and without interruptions along its way to the delivery sites (culverts). The profile gutters may be L-shaped, and their total width may be 0.75 m, with a depth of 20 cm
- Avoid high slopes in the location of the gutters, so, that the delivery site does not reach the water with high speed and generate erosion and rain gullies in the surrounding areas
- It is necessary to carry out periodic maintenance on the gutters of the tracks, because, over time, sediment material will accumulate, these elements will be partially or totally obstructed, and an efficient work will not be allowed. This maintenance consists of cleaning and, if it is necessary,

LAND MANAGEMENT PROGRAM

re-shaping the gutters with the motor grader in the sections that require this process. In the same way it should be done with the berms.

- It is recommended to build canalization works where the lines can intercept natural drainages.

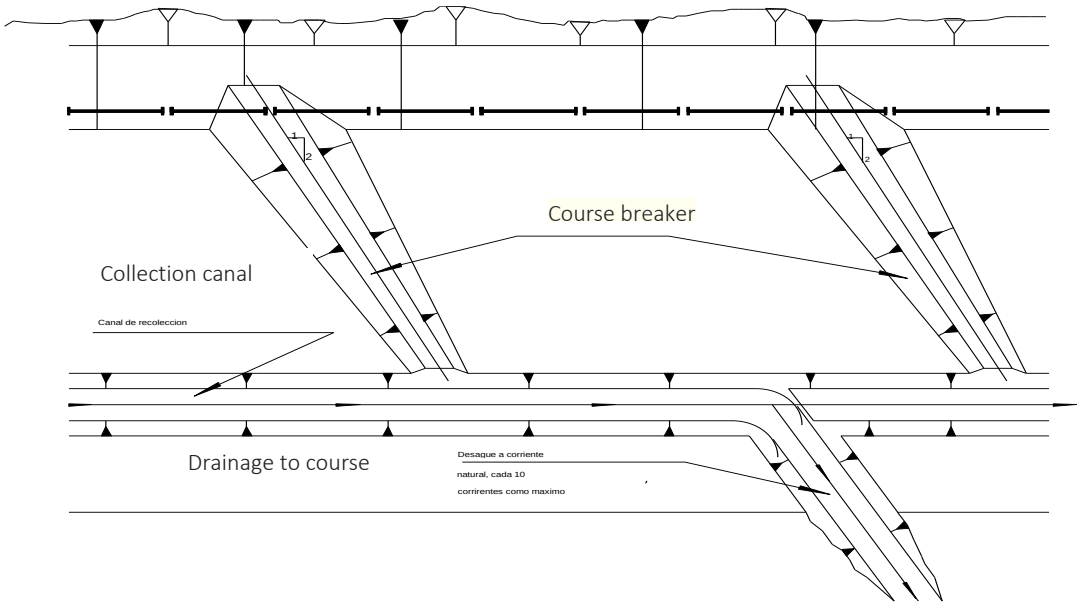


Illustration 8-1 Single scheme for reconfiguration of slopes in roads (plant view)
Source: TETRA TECH, 2013

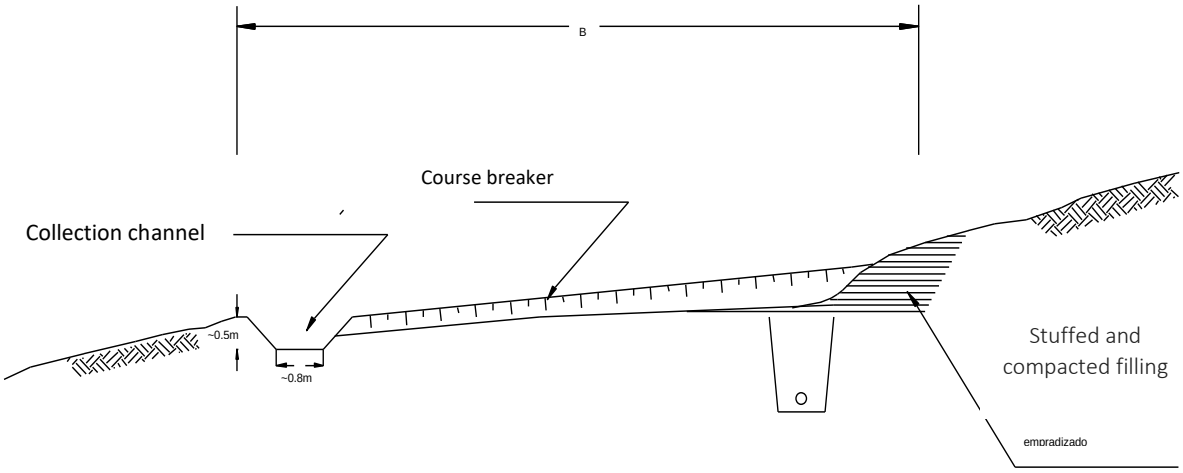


Illustration 8-2 Single scheme for reconfiguration of slopes in roads (profile view)
Source: TETRA TECH, 2013

LAND MANAGEMENT PROGRAM

PLANT OF PROCESSING, DEPOSIT OF TAILS AND PLATFORM OF THE PORTAL

The main works for the management of runoff and erosion control with loss of the organic layer from surrounding soils to be built will be related below with the explanation of its main characteristics.

- Perimeter gutters in the area to be adapted, with trapezoidal, rectangular or triangular shape, covered in simple concrete with dilatations or reinforced concrete with thicknesses that can vary between 0.075 and 0.12 m according to design.
- The gutters must present a slope between 1% and 3% to prevent the soil particles from settling. The speed inside the gutters, in order to avoid abrasion of the coating material, should be limited to 4 m / s. When the gutters handle higher speeds, the delivery of these flows will be done on energy dissipation structures.
- Grit chambers in the lowest vertices of the specific area, where the sedimentary material that possesses the water prior to dumping is removed to the areas arranged for that purpose, with dimensions and characteristics according to the specific design, but may be constructed in concrete or concrete block with waterproofed recovering.
- Grease traps should be built prior to shedding to the slopes or near bodies of water, where the fats and oils present in the water will be removed, and also the ones that this has acquired during its journey by the contact with surfaces where any oily fluid has been spilled on it. This structure can be built in concrete or block of concrete with waterproofed sheet and with a determined dimension that guarantees the storage of the volume generated, and the efficient and opportune evacuation of the flow that arrives at the structure.
- Debris or energy dissipates that will guide the water to the slopes of final discharge or nearby bodies of water, these can be constructed in simple concrete, reinforced or cyclopean according to the specific design that must be developed.

COURSE BREAKER

The course breakers are drainage works that are built transversely based on the rights of way, in order to capture and evacuate the runoff water out of it, in order to prevent that it can make a long route over the surface of the unprotected land, concentrating and generating runoff and water erosion in soils.

The course breakers will be built in specific sites where their need will be evident, based on the detailed engineering designs and / or the parameters established by the Project Supervision in accordance with the following scheme:

- The course breakers can be types I to III, according to the longitudinal slop, the rights of way and their characteristics are shown in the following graphs

LAND MANAGEMENT PROGRAM

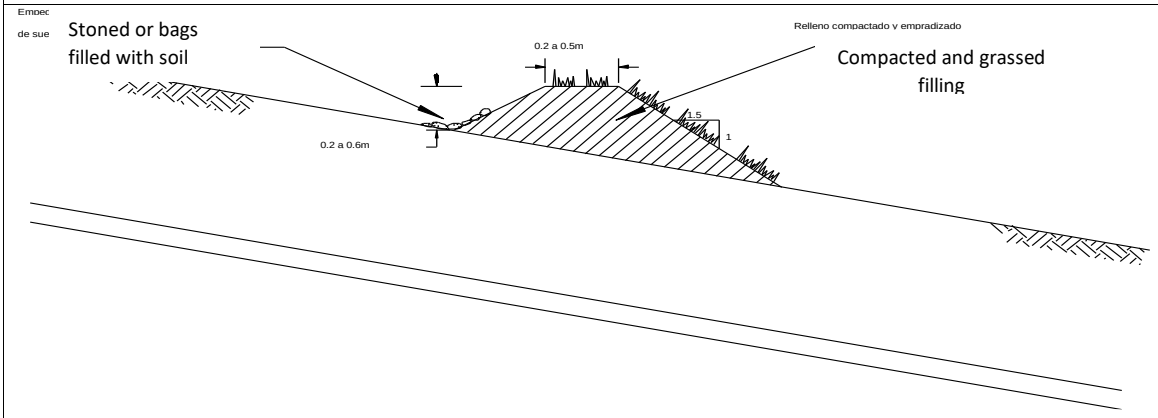


Illustration 8-3 Type I Course Breakers
Source: TETRA TECH, 2013

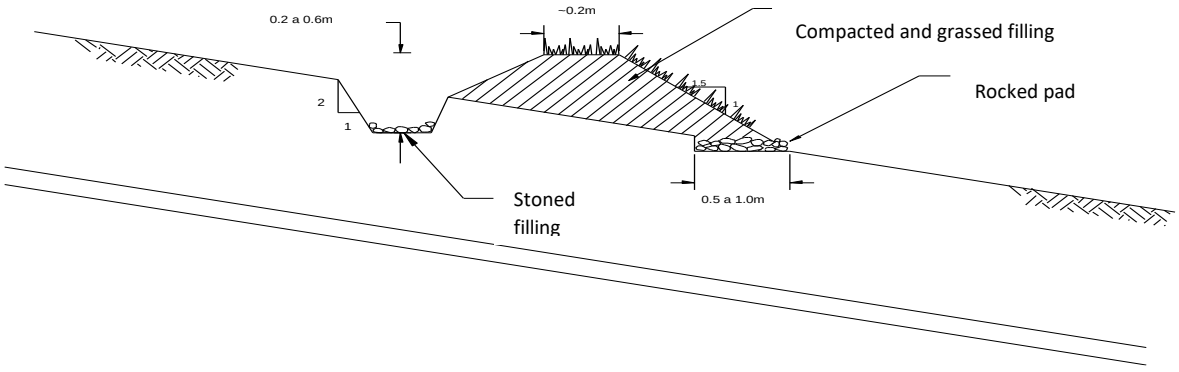


Illustration 8-4 Type II Course Breakers
Source: TETRA TECH, 2013

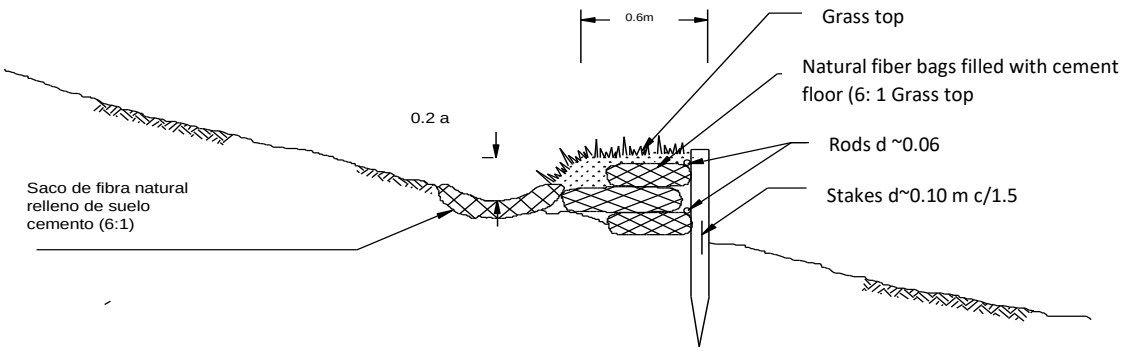


Illustration 8-5 Course Breakers Type I and II with bags
Source: TETRA

Compacted and grassed filling

LAND MANAGEMENT PROGRAM

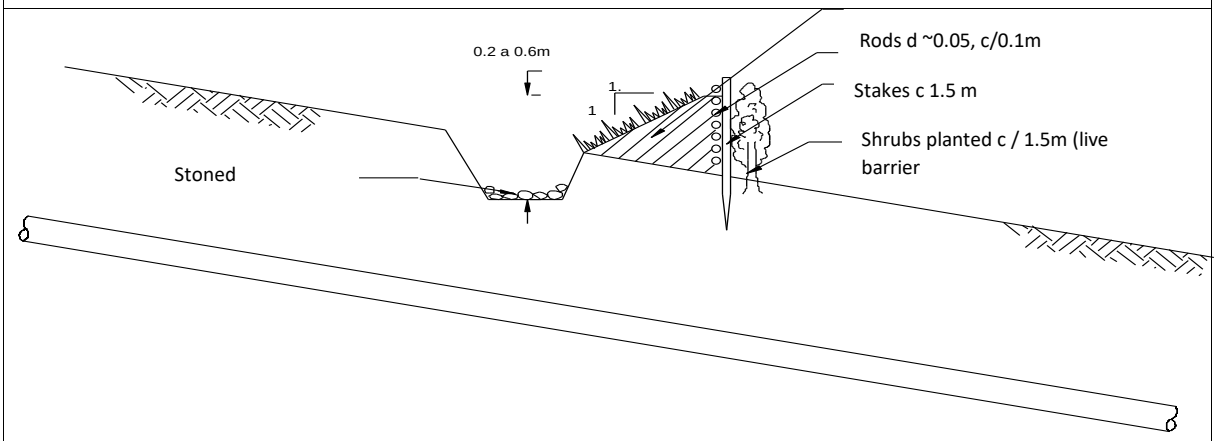


Illustration 8-6 Type III Course Breakers
Source: TETRA TECH, 2013

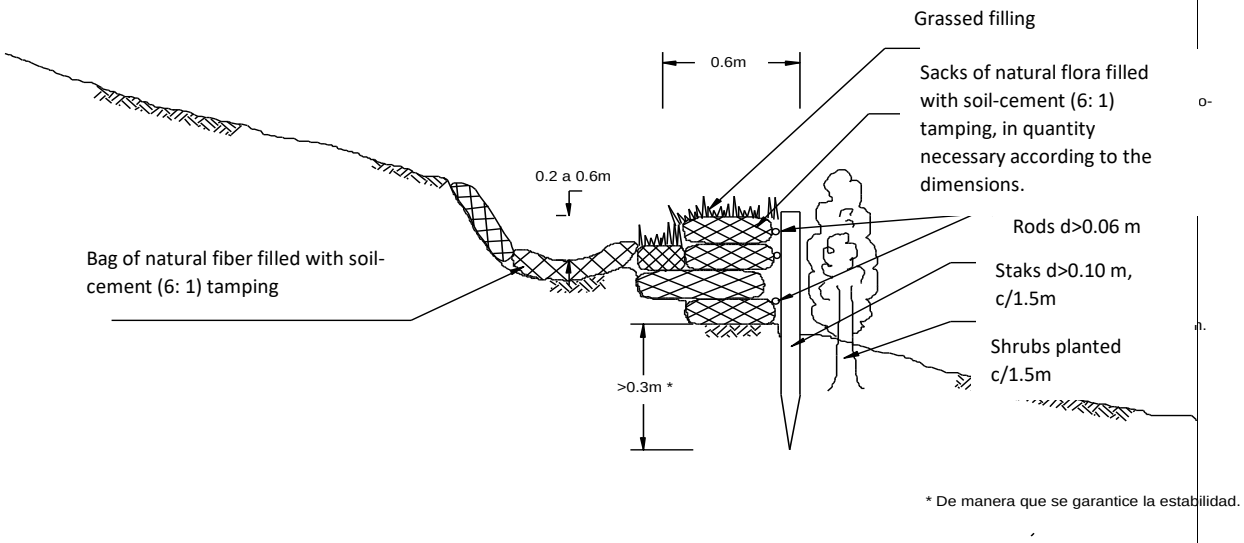


Illustration 8-7 Course Breakers Type II with bags
Source: TETRA TECH, 2013

The separation between the course breakers is defined according to the slope of the land, the type of soil and the characteristics of the precipitation, among others, and according to the criteria defined in the Detailed Engineering stage.

- The course breakers should be constructed with a longitudinal slope of 3 to 5%; the bottom should be protected with erosion resistant materials; In addition, it will have grass in the top and in the outer face. It should be harvested with fast growing grasses and adapted to the area, such as the Kikuyu grass.

LAND MANAGEMENT PROGRAM

COLLECTION CHANNELS

- The water captured by the course breakers should be conducted by means of collection channels until they are delivered in a controlled way in the neighboring natural channels, thus is avoiding the erosion of the organic layer of the soils.
- The following illustration shows the typical dimensions and the construction specifications for these channels, according to the longitudinal slope of the channel bottom.

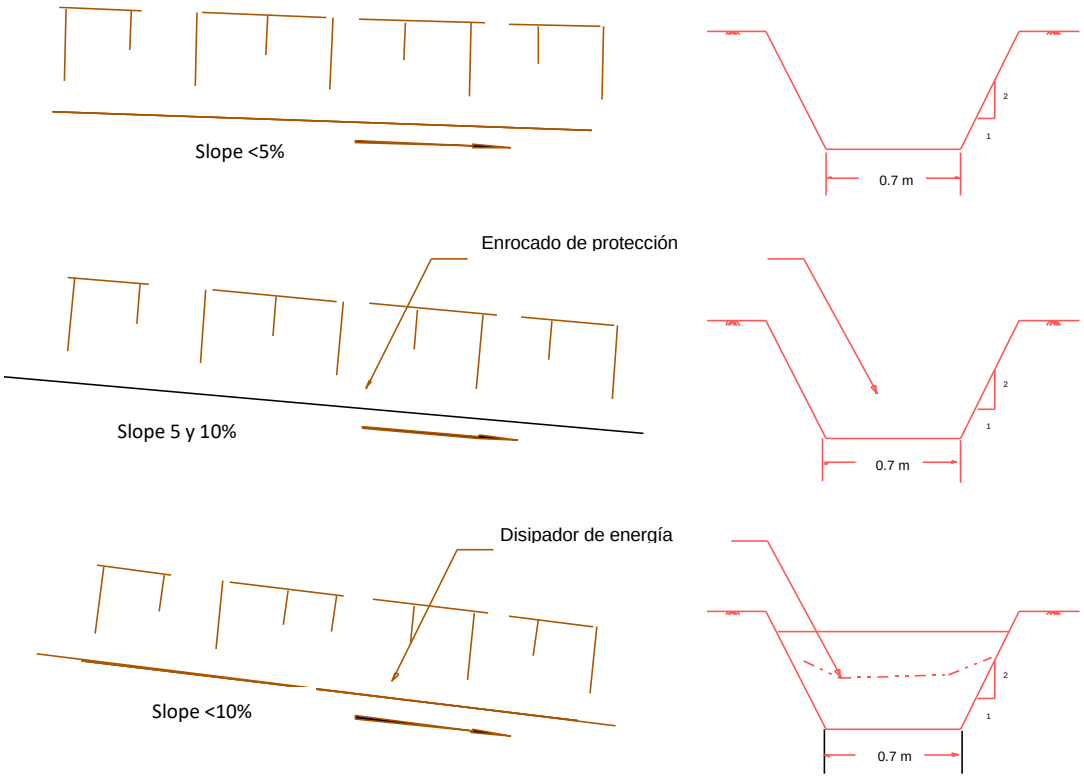


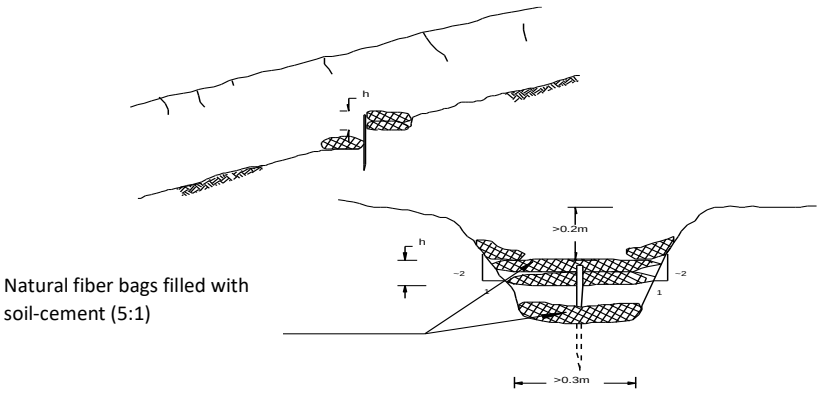
Illustration 8-8 Lateral collection channels
Source: TETRA TECH, 2013

ENERGY DISSIPATORS

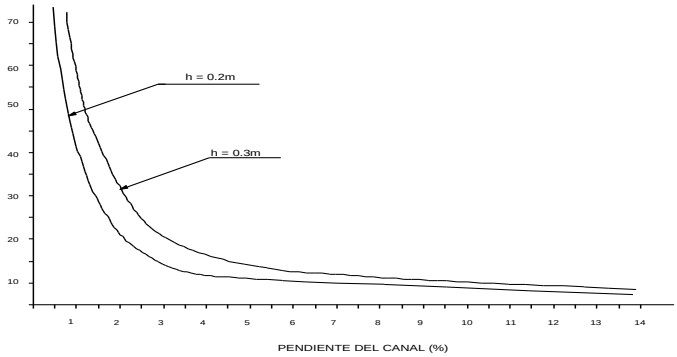
- When the longitudinal slope of the collection channel is greater than 10%, the construction of energy dissipaters in the bottom is required, its separation can be determined in Illustration 8-9 as a function of the slope from channel bottom and the effective height of dissipation structure.

LAND MANAGEMENT PROGRAM

- The dissipators should preferably be constructed out of stone. In case of not having materials for this in a specific area, gabions or bags of natural fiber can be used; Because the natural fibers can be deteriorate with sunlight, it is necessary to fill those bags with a cement floor mixture in a 5: 1 percentage (rich mixture), in order that when the natural fibers become deteriorate, the filling blocks remain in the place without this they can crumble in a short time



Natural fiber bags filled with soil-cement (5:1)



Separation between dissipators (m)

Illustration 8-9 Energy Dissipators
Source: TETRA TECH, 2013

TAILINGS AND ADAPTATION OF COURCES

- Collection channels must drain to nearby natural streams and their delivery must be carried out by means of tailings structures constructed with gabions (norm NIO-0805), cement floor bags (norm NIO-0808), glued stone or concrete.
- Once the project has been finalized and the final cleaning process has been completed, the water courses must be restored to their original condition and their channels protected by stone lines.
- In courses that have big slopes and that has the possibility of deepening the land because undermining; different structures must be installed in order to fix the bottom and prevent deepening.

LAND MANAGEMENT PROGRAM
In any case, for all the projects to be built, the works for the runoff management, must obey specific designs according to the particular conditions of each area, for this it will be develop the design mentioned by a consultant with knowledge and experience in this kind of work. Measures for soil protection. In general, different solid and liquid waste management measures, and also soil management measures are proposed along the project in order to optimize their protection. The proper management of solid waste is included in the Management Plan for solid domestic and industrial waste. The liquid waste management is considered in the Management of domestic and industrial water waste. For soil management, it is proposed taking into account the following aspects for each of the stages mentioned: Cleared material • Recognize the different soil qualities before its removal in order to foresee storage according to its characteristics. • The removal of the soil layer should be done carefully to avoid mixing with dangerous substances and minimize the contamination with sterile soil, avoid its compaction and loss by water erosion. To reduce compaction: • The floor must be handled with the lowest possible content • Prevent the machinery passing on the stone floor. • The soil should only be stacked when an immediate recovery of the intervened areas is impossible
QUANTIFICATION OF THE MEASURE
Number of works built/Number of works required m2 of intervened soil/m2 of recovered soil m3 of disposed solid waste/m3 of solid waste generated
PLACE OF APPLICATION
Project AID
BENEFITED POPULATION
The communities of the villages in the area of direct influence (AID).
MECHANISMS AND PARTICIPATORY STRATEGIES
Hiring of AI staff
REQUIRED STAFF
1 civil works contractor

LAND MANAGEMENT PROGRAM	
1 environmental expert	
SUPERVISING AND MONITORING INDICATOR(S)	
Characterization of the soil before clearing material: (No areas to remove soil described/No areas where there were removal) * 100> 99 meets. Soil pollution: (No sites where there was soil contamination in the removal process / No areas where there was removal) * 100. If> 99 complies. Soil compaction: No of areas in which the soil was subjected to compaction / No areas where there was removal) * 100. If> 99 complies. Recovered soil (M2 of intervened soil / m2 of recovered soil) * 100. If> 99 complies.	
RESPONSIBLE(S) OF THE EXECUTION	
ENTITY/INSTITUTION	Roles*
TOUCHSTONE	Execution OP
CORANTIOQUIA	Supervision SP
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE	
See annex 8-1	
BUDGET	
See annex 8-2	

8.1.1.2 Management program for dry and sterile tails

MANAGEMENT PROGRAM FOR DRY AND STERILE TAILS								
OBJECTIVES								
• Appropriately establish the byproducts generated by exploration activities (sterile material) and benefit (deposit of tails) protected from dispersion and trawling, allowing proper drainage of runoff waters.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	
IMPACT(S) TO BE CONTROLLED								
✓ Change in land use ✓ Geotechnical instability or alterations ✓ Alterations in the physicochemical properties of the soil ✓ Loss of soil ✓ Variations in the physicochemical and microbiological properties of water. ✓ Sedimentation in bodies of water.								
Type of measure	*Prevention*		*Mitigation*		*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								

➢ **Sterile Material**

During mining exploration, the sterile material can be used in various ways depending on the different work fronts:

- As material for the construction of the stability dam of tails tank.
- The sterile material would be used as a filtering medium for the tails sub-system of the tails tank (see Water Management).
- The sterile material serves as a surface base in the full of cavities in the road for the transit of machinery.

In the sterile disposal sectors, no type of waste or substances such as fats and oils will be allowed.
It is necessary to have signaling to guarantee the safety of employees and visitors.

➢ **Tails Deposit**

The tails generated (100%) in the beneficiation processes will be filtered to take them to the 18% of humidity and store it temporarily.

As for 50% of the tails will be filtered (dried), they should be dispose in the cavities generated from the underground exploitation as a basis to continue with the exploitation of higher levels, taking into account the design of the exploitation, under cutting-filling methodologies or long cut.
It is recommended that the tails should be disposed of on a suitable slope to avoid ground movements and / or collapses. Then the entrances to the cavities will be sealed with concrete.

MANAGEMENT PROGRAM FOR DRY AND STERILE TAILS
The other 50% of the filtered (dry) tails will be disposed in a dry and sterile tails deposit, which will be located within the project (see tails Deposits). The deposit will have a drainage system in its base in order to collect the water infiltration and be guide to a storage tank (pool) for reuse it in water process of the plant. The dry tails will be disposed of by successively increasing the height with the contour lines which has a slope of 3:1. The generation of mounds should be avoided in order to reduce the landscape impact with a berm on the main slope, thus will pretend a more homogeneous and superficial visualization. It is recommended for layers of dry tails that are interspersed with layers of granodiorite rock, which is rich in calcite content. Each layer should be sealed with saprolite from the area. For the prevention of erosion and acid water in the place disposed for the tails and sterile material, the Saprolite should be used in the layers as a way of sealing the prepared material. The granodiorite calcite-rich has a natural neutralizing effect, which indicates the possible acid drainages associated with the exposure of mineralization or atmospheric phenomena such as oxidation will reduce this impact. It is expected that the volume of extracted rock neutralizes any type of acidity potentially generated by mining. It is suggested that any material that can generate acids must be isolated to protect the weather effects. The sequence for the way to dispose different materials is: Granodiorite rock (neutralizer), saprolite (sealant) and tails, in order to prevent erosion and acid drainages. ➢ General Considerations ✓ The organic soil removed will be sent to an organic layer storage tank for later use it in the environmental recovery of the affected areas. This coverage will have a special management according to the actions to be developed in the flora management program file. ✓ The perimeter gutters will be cleaned constantly, especially after an episode of constant rain, that is, it must be done weekly.
QUANTIFICATION OF THE MEASURE
100% of the sterile disposed of adequately. 100% of the tails arranged in an adequate manner.
PLACE OF APPLICATION
Project AID
BENEFITED POPULATION
Does not apply
MECHANISMS AND PARTICIPATORY STRATEGIES
o Non-trained labor will be hired from the streets belonging to the AID for the construction of bioengineering or civil works, as well as for the cleaning and maintenance of the same. o An informative, explanatory and complete workshop will be implement for the environmental impact that may be caused by the development of the project activities.

MANAGEMENT PROGRAM FOR DRY AND STERILE TAILS	
o For the efficiency of the program, it is important to monitor its quality and results, by evaluating the people who receive it, the trainer who guide it and their contribution to improve compliance and the environmental performance.	
REQUIRED STAFF	
o Geotechnical o Environmental Coordinator o Auxiliaries or machinery operators.	
SUPERVISING AND MONITORING INDICATOR(S)	
✓ (Tons of generated tails / tons of filtered and brought tails to 18% humidity) * 100. If> 99, comply. ✓ (Tons of filtered tails/ Tons of tails used for landfill) * 100. If ≥50, comply. ✓ (Tons of filtered tails/ Tons located between the plant and access to the mine) * 100. If≥50, meets	
RESPONSIBLE(S) OF THE EXECUTION	
ENTITY/INSTITUTION	**ROLES***
TOUCHSTONE	PL / OP / SM / In
Contractor	Sg
Mining company	Sg
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See annex 8-1	
BUDGET (APPROXIMATE COSTS)	
Conservation and restoration of geotechnical stability	
See annex 8-2	

8.1.1.3 Management of slopes and runoff water.

MANAGEMENT OF SLOPES AND RUNOFF WATER.								
OBJECTIVES								
• Implement and define the management measures for the stabilization and protection of slopes that are generated during the construction activities, in the construction sites, roads and material extraction areas. • Execute an adequate soil management and erosion control • Carry out and implement necessary actions to prevent, control and mitigate the possible impacts that may occur from erosion processes, and destabilization of slopes that may affect the infrastructure and roads. • Conserve, protect and dispose in a proper way the cleared material and soil that will be removed with the construction of the project works. • Establish the necessary measures to guarantee the management, treatment and delivery to natural drainages of runoff water in the project's infrastructure								
Stages of the project	*Exploration*		*Construction and Assemble*	x	*Exploitation*	x	*Final Closing and Post Closing*	x
IMPACT(S) TO BE CONTROLLED								
✓ Generate instability on the slopes ✓ Erosive process ✓ Mass removal process ✓ Loss of soil ✓ Alteration in water availability								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								

Construction and inspection of stabilization works

At the moment of instability or reactivation processes, it is suggested to build necessary works for the restoration of the slopes stability, such as filters, drains, remove unstable material, walls, etc. These works will be the result of a detailed geotechnical study in each of the areas where instability on the slopes occurs.

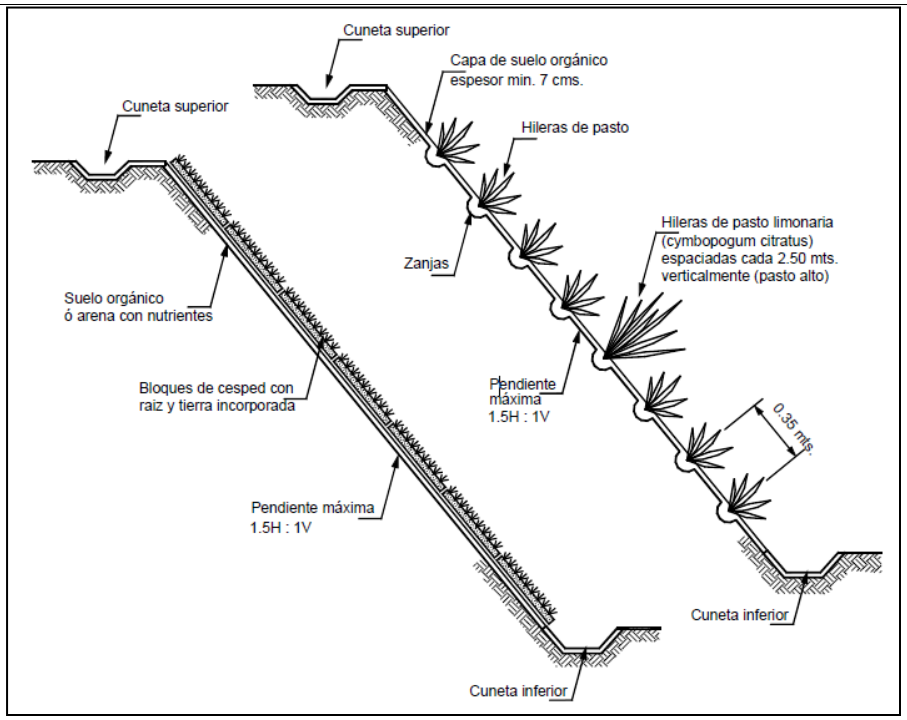
In the assembly construction stages, and especially in extraction, periodic inspections of the stabilization works must be carried out in order to identify their operation, otherwise corrective measures will be taken to improve their operation.

Dismantle and cleared material

Before to the intervention, in the sectors where cuts are required, we recommend measures specified in the compensation management program file for the usage of vegetation cover that do not involve

MANAGEMENT OF SLOPES AND RUNOFF WATER.
the arboreal component, in order to properly manage the activities and the material to be dismantled and cleared material Stabilization of cut and fill slopes We must take into account the nature and homogeneity of the materials for the slopes management, which are basic to raise and specify the problem of the stability of a slope in any of its many aspects. For a better stability in the slopes, it is suggested to carry out studies, designs and structural calculations if they are necessary to apply the preventive measures, in order that these slopes will be geotechnically established. Within these studies and designs there is the construction of stabilization works such as walls of gabions, drains and filters, which are designed based on specific and detailed studies depending on each slope, preferably using bioengineering techniques, such as grass and relegalization and if it is a requirement engineering method will be applied. After the conformation of the cut and fill slopes, the necessary bioengineering techniques can be applied, so that, the materials that compose it are compacted and there is no erosion by other physical agents. For this, organic soil, bio - stratum, seeds, and stolon (grasses) and/or groyning (tall grasses), among others, it would be used to guarantee the apprehension of the species during germination and growth. These species to use and also the techniques must be in accordance with the topographic and geometric characteristics of the slopes, soil types and especially the properties in terms of adaptation and growth habits, tolerance to factors such as trampling, burning or drought

MANAGEMENT OF SLOPES AND RUNOFF WATER.



Planting design by matting or grass.

Source: Suárez Díaz, J. 2001.

It must be taken into account that during the planting season the humidity and temperature are favorable for growth, for this reason it is recommended to plant at the beginning of the rainy season. Being the vegetation a preventive measure because it eliminates the excess of humidity of the rain impact in the land, preventing that exists the erosion.

- Run-off control works

Regarding to the management and control of runoff, there are different works, of which we should create different designs for the construction, depending on the factors such as the amount of runoff water, soil kind, soil geometry, susceptibility of the environment to erosion, etc.; taking into account that its execution does not generate instability in the future.

Works are suggested in areas where the initiation of erosive processes is detected (terraces, furrows or water concentrations), considering coronation ditches (Illustration 8-10), collector channels and debris with energy dissipaters (Illustration 8-11), as well with drainages and sealing of areas that have water saturation to avoid pounding.

MANAGEMENT OF SLOPES AND RUNOFF WATER.

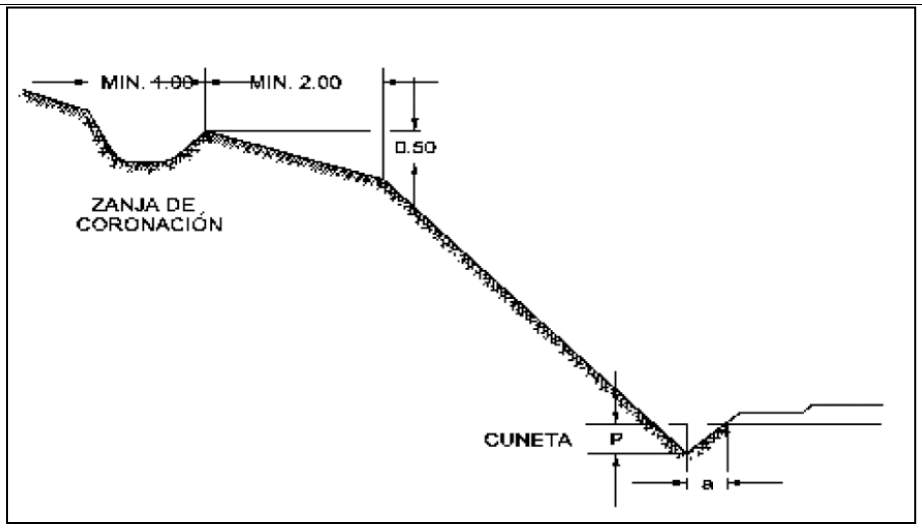


Illustration 8-10. Design of coronation ditches
Source: Ministry of Transport and Communication. Lima, Perú, 2008.

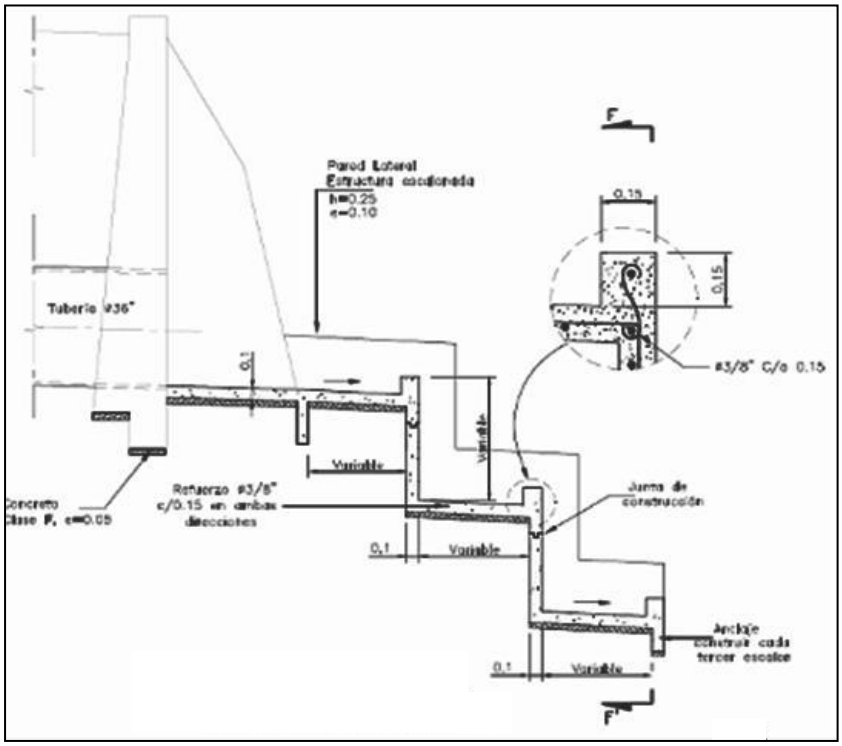


Illustration 8-11. Tailings design with energy dissipators.
Source: Environmental Impact Study Ruta del Sol, 2012.

MANAGEMENT OF SLOPES AND RUNOFF WATER.

Other options to conduct and control runoff water are through the construction of shallow canals protected by thin layers of sand-cement mixtures. Likewise, energy dissipaters can be built using canvas bags filled with sand-cement, placing them in a staggered way.

Drainage works on existing roads

Along the road, the construction of such drains, ditches and tailings are suggested, in order to have a proper management of the runoff waters and avoid destabilization of the slopes. In addition, the proper functioning of the drainage must be guaranteed, by means of adequate maintenance, it is necessary to carry out a periodic maintenance to the gutters of the roads, because, over time, sediment material will be accumulated, that partially or totally will obstruct these elements and does not allow efficient work of them.

The ditches are longitudinal drainages that capture surface water from the road, runoff water from the slopes and water sources from the hillside, which must be route to the place of tailings that can be built on the natural area that can have a lining in particular or from other materials (Illustration 8-12 and Illustration 8-13)

Illustration 8-12. Uncoated ditch
Source: Guide for routine maintenance of unpaved roads, 2013.

MANAGEMENT OF SLOPES AND RUNOFF WATER.
 **Illustration 8-13.** Ditch covered with concrete *Source: Guide for routine maintenance of unpaved roads, 2013.*
QUANTIFICATION OF THE MEASURE
Number of works built / Number of works required. m2 of intervened soil / m2 of recovered soil.
PLACE OF APPLICATION
Project AID
BENEFITED POPULATION
Does not apply
MECHANISMS AND PARTICIPATORY STRATEGIES
o Non-trained labor will be hired from the sidewalks belonging to the AID for the construction of bioengineering or civil works, as well as for the cleaning and maintenance of the same. o An informative, explanatory and complete workshop will be held on the environmental impact that may be caused by the development of the project activities. o For the efficiency of the program, it is important to monitor its quality and results, by evaluating the people who receive it, the trainer who guide it and their contribution to improve compliance and the environmental performance.
REQUIRED STAFF
o Geotechnical o Auxiliaries
SUPERVISING AND MONITORING INDICATOR(S)
Disassembled area and cleared material handled properly / Total area of dismantling and discarding X 100 # of sites with stable slopes / # of sites where slopes exist X 100 # of sites with stabilization works built / # of sites that require stabilization works X 100

MANAGEMENT OF SLOPES AND RUNOFF WATER.	
RESPONSIBLE (S) OF THE EXECUTION	
ENTITY/INSTITUTION	ROLES*
Contractor	Execution
Mining company	Supervision
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See annex 8-1	
BUDGET (APPROXIMATE COSTS)	
Conservation and restoration of geotechnical stability	
See annex 8-2	

8.1.1.4 Water resource management programs and erosion control works

8.1.1.4.1 Management of domestic wastewater from camps and mining areas

MANAGEMENT OF DOMESTIC WASTEWATER FROM CAMPS AND MINING AREAS								
OBJECTIVES								
✓ Mitigate the pollution of the stream surrounding the project ✓ Conserve the quality of the streams								
GOALS								
✓ Prevent pollution in the streams adjacent to the project due to the effects of domestic wastewater ✓ Increase the percentages of removal of contaminating variables by domestic waste water.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	
IMPACT(S) TO BE CONTROLLED								
Alteration of the physicochemical and microbiological quality of water Sedimentation in bodies of water Change in the available resource flow (water supply)								
Type of measure	*Prevention*		*Mitigation*	x	*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								
Domestic Wastewater (called ARD) is generated by the hydro-sanitary unities corresponding to the camp, the portal or the mining area and the benefit area. ARD management of the camp In the camp area, ARDs that come from the accommodation house, geology and environmental offices, and cutting and logging room are treated independently and discharged according to the current environmental regulations. The ARD of each camp is conducted to the Domestic Residual Water Treatment System (called STARD) according to the scheme of the following illustration, consisting of a grease trap and an Upward Flow Anaerobic Filter (called FAFA).								

MANAGEMENT OF DOMESTIC WASTEWATER FROM CAMPS AND MINING AREAS

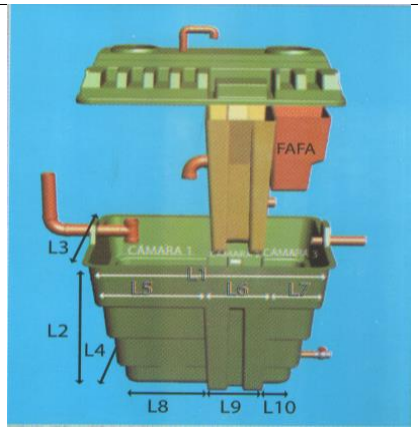


Illustration 8-14 Anaerobic filter (FAFA).

The FAFA is in charge of treating the particles of the fluid that pass through the tank and comes out with the same rate that it enters, remaining in it during the hydraulic retention time. In this unit chemical and biological reactions occur, producing 3 phases (cream, liquid phase and sludge).

The liquid phase enters and occurs the anaerobic digestion by forming a biofilm adhered to the filter material, in the lack of oxygen and in the liquid phase. The design of the FAFA is prefabricated and the longitudinal proportions correspond to Table 8-2.

Table 8-2 Design measures FAFA

VARIABLE	DESCRIPTION	LENGTH
L1	Total length	170
L2	Total height	120
L3	total width	144
L4	lower width	116
L5	Length upper camera1	83
L6	Length upper camera2	44
L7	Length upper camera3	43
L8	Length lower camera1	63
L9	Length lower camera2	35
L10	Length lower camera3	22
VOLUME		CAPACITY (L)
	Camera 1	1070
	Camera 2	551
	Camera 3	511
	Total volume	2141

Source: START TECH

MANAGEMENT OF DOMESTIC WASTEWATER FROM CAMPS AND MINING AREAS

Management of ARD of geology and DGA

The ARD generated by the bathrooms of the geology and the DGA offices (now referred as the Department of Environmental Management) will be conduce to the corresponding STARD in the flow diagram of Illustration 8 15, consisting of a septic tank, inspection boxes and an FAFA.

The emissions of domestic water that are submitted to the treatment in this system correspond to the ones generated in two sanitary units and a sink installed for the people working in the geology offices. The system is made up of:

- A register box that allows the evaluation of the polluting load at the entrance of the system.
- A septic tank with two cameras for the clarification, sedimentation and anaerobic decomposition of the dumping.
- A FAFA filter.
- Dumping pipeline channeling for discharge in the nearest course.

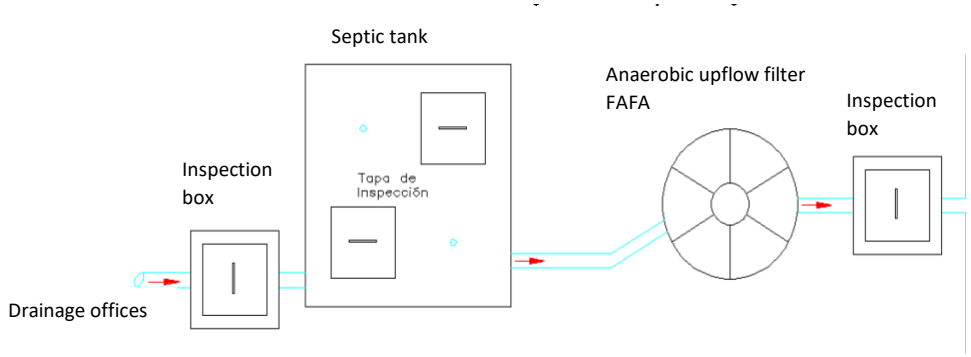


Illustration 8-15 Flow diagram ARD.

Management of ARD in the TOUCHSTONE Camp - Washing machines

The system corresponds to a grease and cream trap of 0.50 m3 generated by soaps and detergents and subsequently a tank of 1800 L for the clarification and sedimentation of 4-inch pipe with direct discharge to the nearest water course. The STARD corresponds to the one illustrated in illustration 8-16, which is composed by a grease and settler trap.

MANAGEMENT OF DOMESTIC WASTEWATER FROM CAMPS AND MINING AREAS

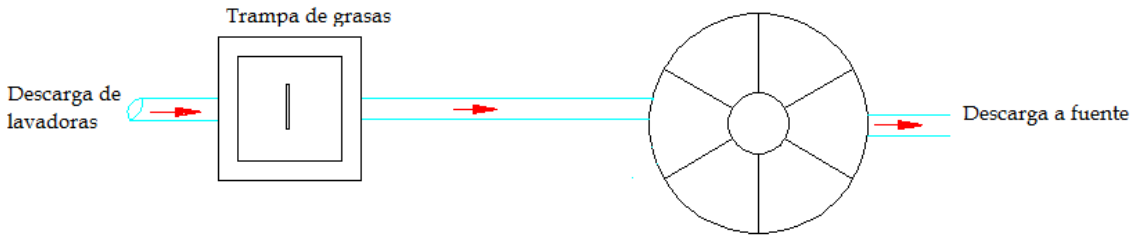


Illustration 8-16 STARD: Grease and settler trap, washing machines

STARD in Camp. Nucleus cutting room.

To carry out a previous treatment to the sediment-laden waters coming from the cutting room, two boxes will be installed with dimensions each 1 m wide, 1 m long and 1 m deep. The emission of residual water comes from the water generated in the cut of the drilling cores; this water is used for lubrication of the blade and the effluent only contains fine sediments.

The core cutting room was formed with four cutting areas, each one with connection to the water and sludge discharge channel, located in the outside that leads to two sedimentation boxes connected in series. Each box is 1 m3 in order to allow the retention of sludge generated in the cut.

To make the management of the sediments produced in the cutting room, a specific channel will be built in the egress door of each room, and in the external part two sedimentation boxes are located in series. The decanting generated is channeled through a channel lined built in concrete to the first sediment box, where by overflowing through a PVC pipe, and then, the water passes to the second sedimentation box. Subsequently, the waters are delivered to a stone filter that retains a large part of the fines sediment that have not been retained in the sediment boxes and the final effluent is piped to the nearest water course.

The sediments that are accumulate in the system will be remove every 8 days and will be packed in bags which are subject to a dehydration time and posterior weighed. Later, the bags are placed in the ditches built on the roads of the camp for the rainwater control. The STARD corresponds to the one illustrated in Illustration 8-16.

MANAGEMENT OF DOMESTIC WASTEWATER FROM CAMPS AND MINING AREAS

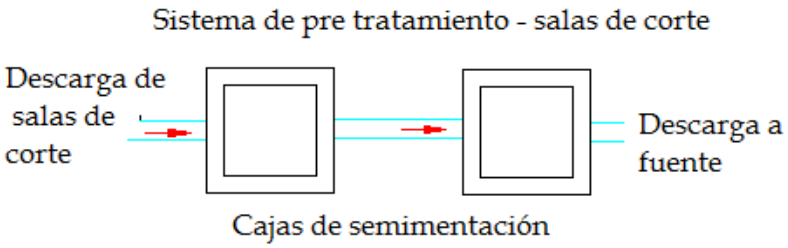
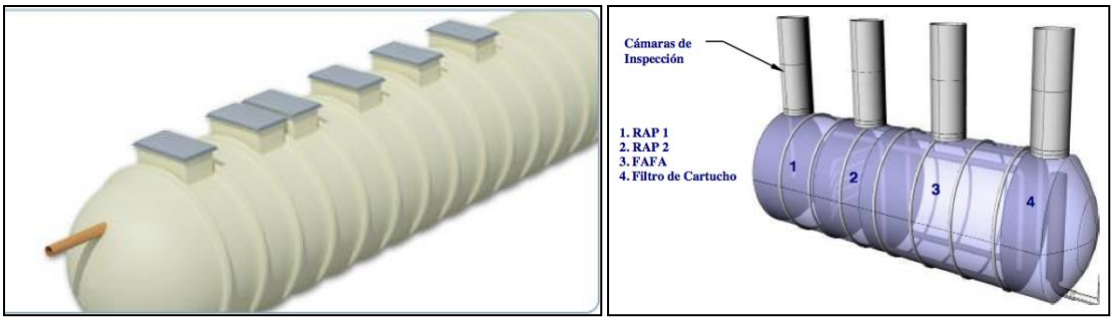


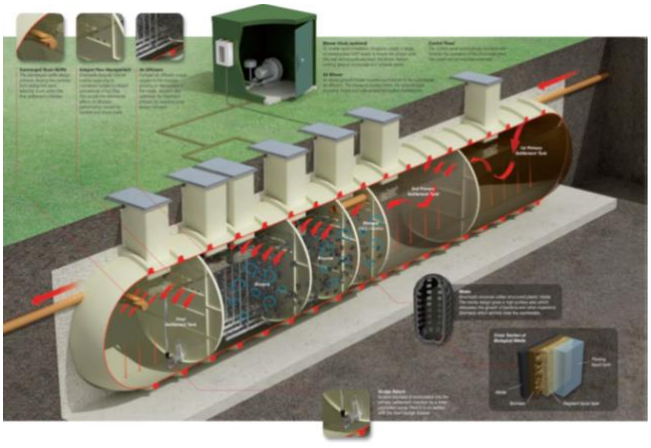
Illustration 8-17 Scheme of the treatment system. CUTTING ROOM.

Mining area and benefit area (domestic systems)

Baths or hydro-sanitary units will be located in the mining and beneficiary areas, and the effluents will be conducted to the Domestic Residual Water Treatment Systems (now called STARD) modular with treatment capacity for wastewater generated for fifty (50) people in each treatment unit (see Illustration 8-18).



Treatment tank



Transversal section of STARD

Illustration 8-18 Schematic design of STARD Mining areas

MANAGEMENT OF DOMESTIC WASTEWATER FROM CAMPS AND MINING AREAS

This STARD is constituted by 4 compartments or chambers where different treatments are given, as described in the Table 8-3

Table 8-3 Compartment functions

SISTEM	COMPONENTS	BASICS FUNCTIONS
PRELIMINARY STRUCTURS	SIFTING GRILL	Catch thick and solid materials
PRIMARY TREATMENT	FLOW REACTOR PISTON (RAP) (CHAMBER Nº 1)	The particles of the fluid pass through the tank and get out with the same sequence in which they enter, they remain in it during the hydraulic retention time. In these units chemical and biological reactions occur, producing the stabilization of the substrate
	FLOW REACTOR PISTON (RAP) (CHAMBER Nº 2)	
SECUNDARY TREATMENT	ASCENDING FLOW ANAEROBIA FILTRATION (FAFA)	Anaerobic digestion occurs by forming a biofilm adhered to the filter material, in the lack of oxygen and in the liquid phase.
	CARTRIDGE FILTER	The secondary treatment effluent is passed through the polishing filter composed of carbon and zeolite, which has odor absorption capacity.
	TRIANGULAR DUMP	It determines the effluent flows of the treatment system and is used in the flow gauging of the physical-chemical characterization.

QUANTIFICATION OF THE MEASURE

- ✓ Flow effluent and effluent in STARD (l/s).
- ✓ % Removal of affluent and effluent parameters in STARD.

PLACE OF APPLICATION

- ✓ Modular of STARD

BENEFITED POPULATION

Maintain a good quality of water in the nearby water sources
Sicknesses resulting from discharges under polluting conditions will be prevented.

MECHANISMS AND PARTICIPATORY STRATEGIES

Through conferences, the management of domestic discharges will be presented to the communities in order to prevent the pollution of the streams surrounding the project. This space will also be used to raise awareness, education and debate. It will also be developed for the workers.

REQUIRED STAFF

Environmental technician
Processing plant Boss

SUPERVISING AND MONITORING INDICATOR(S)

(M3 of wastewater produced in the month/m3 of treated wastewater in the month) 100; yes > 99 Comply

RESPONSIBLE (S) OF THE EXECUTION

ENTITY/ INSTITUTION	ROLES*
TOUCHSTONE	PL, OP, Sp, Sg e In
CORANTIOQUIA	Sg e In
Communities of influence	Sp y Sg

Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)

MANAGEMENT OF DOMESTIC WASTEWATER FROM CAMPS AND MINING AREAS
SCHEDULE (PERIOD OF EXECUTION)
See annex 8-1
BUDGET (APPROXIMATE COSTS)
See annex 8-2

8.1.1.4.2 Management and control of industrial water from access tunnel

MANAGEMENT AND CONTROL OF INDUSTRIAL WATER FROM ACCESS TUNNEL								
OBJECTIVES								
Reduce the environmental impacts generated by the potential depletion of groundwater levels in the exploitation area and provide safety and operation conditions in mining fronts								
GOALS								
✓ Minimize the risk of abatement of phreatic level that can affect water sources ✓ Reduce the risk of flooding of exploitation area. ✓ Ensure a correct dewatering of the mine.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	
IMPACT(S) TO BE CONTROLED								
✓ Alteration of the physicochemical and microbiological quality of water								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								
✓ In order to reduce the entry of water during the opening of the main ramp while cutting the saprolite, shotcrete (concrete) will be used to waterproof the walls and reduce the flow of water, with the use of a concrete injection equipment.								

Illustration 8-19. Shotcrete example
Source: Taken from internet, 2013

✓ Lateral channels will be used to direct the infiltrated water to tanks equipped with submerged pumps that will redirect the water to the surface. ✓ Ensure that groundwater channels are free of obstacles that can impede the free flow of water in them.

MANAGEMENT AND CONTROL OF INDUSTRIAL WATER FROM ACCESS TUNNEL	
✓ The groundwater will be pumped to a clarifier located in the area of the portal adjacent to the tails filtration system and the water will be recirculated to be used again in mining operations and in underground works such as internal exploratory drilling, blasting drilling, among other. ✓ If excesses are generated in the clarifier, the water will be poured in optimum quality conditions to an evacuation channel that will direct the water to the sedimentation well located downstream from the tails tank, for its subsequent release to the environment.	
QUANTIFICATION OF THE MEASURE	
100 % of the groundwater present in the operation will be channeled and pumped properly.	
PLACE OF APPLICATION	
El Pescado project under concession 5969	
BENEFITED POPULATION	
Population in the area of direct influence Mine staff	
MECHANISMS AND PARTICIPATORY STRATEGIES	
Information and dissemination programs, Community participation in socialization about the progress of the project, mechanism of complaints and claims. Participation in environmental education events	
REQUIRED STAFF	
✓ Environmental supervisor ✓ Boss mine ✓ Pump operator	
SUPERVISING AND MONITORING INDICATOR (S)	
((M3 water/month in mine) / (m3 water/month) pumped) * 100 if > 99. Comply	
RESPONSIBLE(S) OF THE EXECUTION	
ENTITY/ INSTITUTION	ROLES*
TOUCHSTONE	PL / OP / Sp
CORANTIOQUIA	Sg / In
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See annex 8-2	

8.1.1.4.3 Management of drilling wastewater

MANAGEMENT OF DRILLING WASTEWATER (WATER SLUDGE)								
OBJECTIVES								
Prevent and mitigate pollution from drilling muds in the surrounding steams and in the water that emerges from the mine. To conserve the quality of the nearby streams and the water that emerges from the mine.								
GOALS								
Prevent pollution in the surrounding steams and the water that emerges from the mine by the drilling mud generated. Increase the percentages of removal variables from contaminating dumping of the drilling muds generated.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	
IMPACT(S) TO BE CONTROLED								
Alteration of the physicochemical and microbiological quality of water Sedimentation in bodies of water Change in the available resource flow (water supply)								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								
Considering that it is proposed to make the recirculation of the water result from the drilling, a STAR will be implemented, in which is searching remove about the 80% of the solid elements in the water. The AR coming from the drilling will be delivered to an Industrial Wastewater Treatment System (STARI) composed of three tanks of 2,000, 2,000 and 5,000 liters capacity, to carry out the process of successive sedimentation by overflow in each tank and neutralization of pH if required (see following illustration).								

MANAGEMENT OF DRILLING WASTEWATER (WATER SLUDGE)

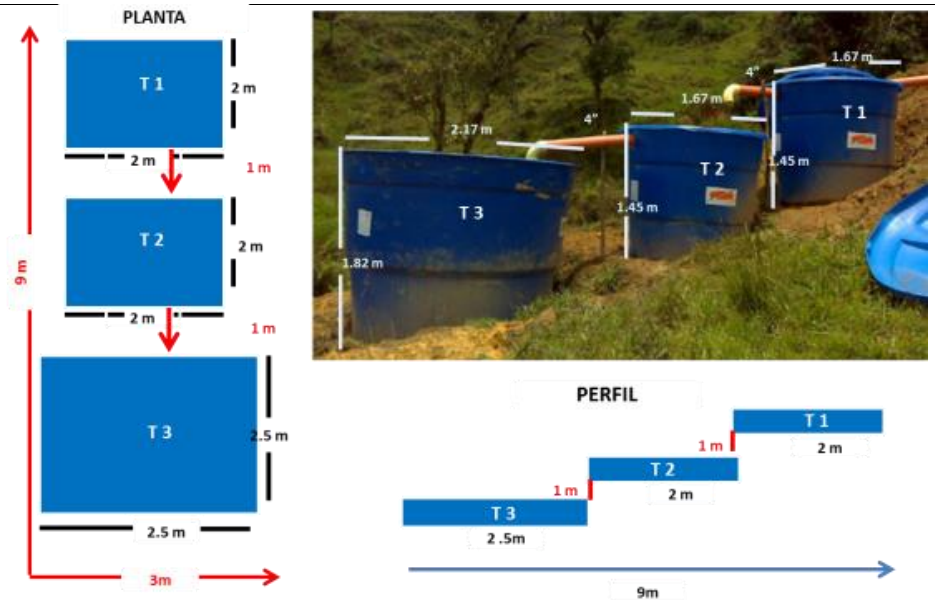



Illustration 8-20 STARI drilling process *Source: TOUCHSTONE, 2012*
The finally effluent treated in the last tank is characterized and gauging before the pumped recirculation and passing it back to a storage tank that supplies cyclically, the drilling equipment. The chemical products used for the perforations are biodegradable chemical products and in general they are called CELUTROL MIX PLUS, GEO - PLUS, SM 2000, SUPERVIS AND GUM GEL which are composed of totally biodegradable substances.
QUANTIFICATION OF THE MEASURE
Influent and effluent flow (l / s). % Removal of affluent and effluent parameters.
PLACE OF APPLICATION
Sludge treatment units Drying bed
BENEFITED POPULATION
Maintaining a good quality of water that can offer different uses such as recreational, agricultural, livestock and even domestic but with restrictions, all of this in order to avoid a polluting discharge in the surrounding streams Sicknesses resulting from discharges under polluting conditions will be prevented.
MECHANISMS AND PARTICIPATORY STRATEGIES
Through the Community Information and Participation Program, will be presented to the communities the management of emissions and the treatments that are necessary to treat the

MANAGEMENT OF DRILLING WASTEWATER (WATER SLUDGE)	
aqueous sludge in order not to contaminate the surrounding streams and the soil. This space will also be used to raise awareness, education and debate. It will also be developed for the workers.	
REQUIRED STAFF	
Environmental technician	
SUPERVISING AND MONITORING INDICATOR(S)	
(% sediment in water after drilling / % water sediment before drilling) * 100. yes > 80 Comply (m3 of water coming out of the drilling / m3 entering the drilling through the tank) * 100. yes > 99 Comply	
RESPONSIBLE(S) OF THE EXECUTION: ENVIRONMENTAL PROFESSIONAL/TOUCHSTONE	
ENTITY/INSTITUTION	**ROLES***
TOUCHSTONE	PL, OP, Sp, Sg e In
CORANTIOQUIA	Sg e In
Communities of influence	Sp y Sg
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See annex 8-2	

8.1.1.4.4 Water management of dry and sterile tails tank

WATER MANAGEMENT OF DRY AND STERILE TAILS TANK								
OBJECTIVES								
Prevent and mitigate the pollution of the surrounding streams by industrial discharges. Conserve the quality of the surrounding streams								
GOALS								
Prevent the pollution in the surrounding streams due to the effects of industrial discharges. Increase the percentages of removal of contaminating variables by industrial discharges.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	x
IMPACT(S) TO BE CONTROLED								
Alteration of the physicochemical and microbiological quality of water Sedimentation in bodies of water Change in the available resource flow (water supply)								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								
Sub-drainage of the tank of dry and sterile tails. The deposit of tails will require an adequate sub-drainage to maintain a low phreatic surface inside the tank to guarantee its stability. For the prevention of erosion, as well as the acid waters, the disposal site for the tails and sterile material (granodiorite) should use the saprolite in layers as a sealant of the disposed material (see Illustration 8-20). Any material that can potentially generate acid can be permanently isolated to protect it from weather effects (Illustration 8-21). The set of illustrations in reference shows schematically the way to dispose the different materials such as granodiorite, saprolite and tails, in order to prevent erosion and acid drainages.								

WATER MANAGEMENT OF DRY AND STERILE TAILS TANK

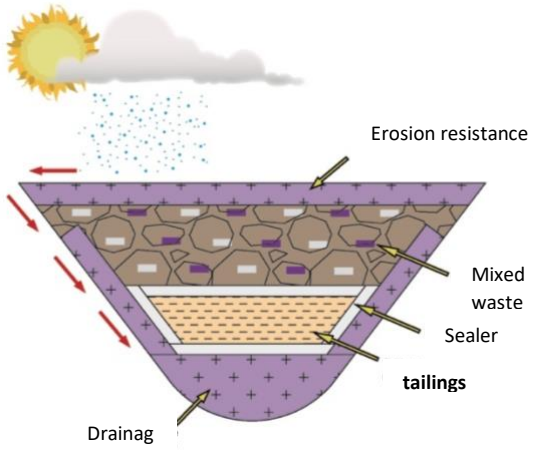


Illustration 8-21 Arrangement of dry and sterile tails

The designed system will collect the emergent base flow of channels that will be covered by the deposit and any direct precipitation on the surface of the deposit.

The highest runoff value to the tails deposit was selected to make an estimation of the required drain capacity. The design flow was calculated from this capacity and using a safety factor of 15 (Saliba et al., 2010). The traverse section of the drain was designed considering turbulent flow conditions using the Wilkins equation (in LEPS, 1973). The average slope of the channels in the basin occupied by the tails deposit is 3 %, varying between 2.8 and 4.5 %. The design parameters are shown in Table 8-4.

Table 8-4 Design parameters for subdrain in stone

Description	Units	Values
Design flow	L / s	3.3
Porosity	-	0.35
Hydraulic radio	m	0.007
Particle surface efficiency rate	-	1.3
Dominant particle diameter	m	0.10
Empirical constant of Wilkins	-	6.69
Hydraulic gradient	M / m	0.03
Relation of voids	-	0.54
Security factor	-	15

Source: Golder, 2013

The theory used to estimate flow through a stone material is the Wilkins equation (Ferris, 2009). The theory is valid for a wide range of particle sizes and hydraulic gradients. This equation is applicable to turbulent flow conditions and is described below:

$$Q = n\ A\ W\ m^{0.5}\ i^{0.54}$$

Represented by:
Q : flow (m^3/s);

WATER MANAGEMENT OF DRY AND STERILE TAILS TANK

n : porosity (dimensionless);
A : transverse flow area (m^2);
W : empirical constant of Wilkins;
m : hydraulic radius (m)
i : hydraulic gradient (dimensionless).

The hydraulic radius is estimated according to Hansen's theory:

$$m = \frac{e\ d}{6\ r_e}$$

Represented by:
e : Relation of voids (dimensionless);
d : "dominant" grain size (m); y
r_e : Particle surface efficiency rate, typically 1.3

Table 8-5 shows the characteristics of the designed drain, and Illustration 8-22 shows the designed cross section.

Table 8-5 Results – subdrain in stone

Flow (l /s)	Design flow (l /s)	Height (m)	Width in the background (m)	Minimum area (m^2)
3.3	46.2	0.7	2.0	1.56

Source: Golder, 2013

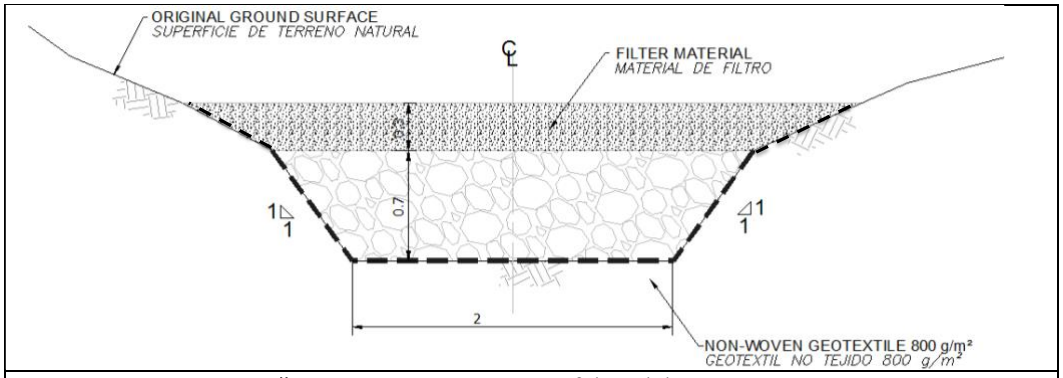


Illustration 8-22 Cross section of the subdrain in stone
Source: Golder, 2013

The drain will be built along the bottom of the natural depressions that generate streams or creeks, and the migration of natural soil to the stone material will be prevented using a non-woven geo textile material of 800 g / m2 in the bottom and drain slopes. The migration of tails to the stone material will be avoided by using a filter layer on the under-drainage.

WATER MANAGEMENT OF DRY AND STERILE TAILS TANK

The infiltration waters from the tailings tank will be collected in an infiltration pond (well) located at the main slope base of the deposit, said waters may contain some traces of cyanide, therefore the water will be pumped back to the process pool to be used in the plant.

Wells or sedimentation

Two wells will be constructed downstream from the tailings deposit to handle contact and runoff water. The flows in contact (coming from the sub drain system under the tailings tank will flow out of the subdrain to a water infiltration well, which comprises of an excavation of approximately 300 m3 whose walls will be waterproofed with an HDPE membrane or specific concrete. The volume requirement for this well was estimated assuming 24 hours of storage capacity of the flow coming from the sub dilation system. The entrance of sediment to this well must be minimized by the progressive closing of the tailings deposit face or installing geotextile and stone in the slope face.

Downstream of the infiltration from collection well, a sediment control well is required to minimize the sediment burden that can potentially be discharged into the environment. This well will be separated from the water well in contact by a small dam in compacted soil, the required volume (2,200 m3) will be controlled by another dam located approximately 100 m downstream, which will have two landfills: an operational landfill composed of one "Low output" to allow the output of the base flow at all times; and an emergency landfill that will allow the evacuation of flows from a storm circumstance with a determined return period. This emergency landfill can be a trapezoidal excavation on one of the dam abutments or a reinforced concrete channel on the slope downstream of the dam.

The infiltrated water collection pool will be located just below the foot of the tailings tank, which will capture the flow of the sub drain system under the tailings tank and its stored volume will be pumped to the processing plant. Table 8 6 shows the volume requirements for each well.

Table 8-6 Wells downstream from the Tales tank

Well	Design flow (l /s)	Required volume (m^3)
Infiltrations	3.3	285
Sediment control	25.5	2,200

Source: Golder, 2013

QUANTIFICATION OF THE MEASURE

Influent and effluent flow (l/s).

% Removal of affluent and effluent parameters.

Periodic determination of sodium metabisulfite (Na 2S2O5) and copper sulfate solutions to obtain maximum final cyanide concentration of less than 1 ppm (WAD CN) in the solution with tails.

Add Cal to obtain pH between 7 and 8 in solution with tails.

PLACE OF APPLICATION

Tails in treatment tanks

WATER MANAGEMENT OF DRY AND STERILE TAILS TANK	
Drying bed	
BENEFITED POPULATION	
Inhabitants of the mining area. Maintaining a good quality of water in order to offer different uses such as recreational, agricultural, livestock and even domestic resource with restrictions, thus avoiding a polluting discharge in the surrounding streams Diseases resulting from discharges under polluting conditions will be prevented.	
MECHANISMS AND PARTICIPATORY STRATEGIES	
Through the Community Information and Participation Program, the communities will know and learn about the management of discharges and the treatment that is carried out to treat cyanide in the tailings solutions in order not to contaminate the surrounding streams and the ground. This space will also be used to raise awareness, educate and debate. It will also be developed for the workers.	
REQUIRED STAFF	
Environmental technician Boss of processing plant	
SUPERVISING AND MONITORING INDICATOR(S)	
Number of streams polluted by industrial dumped as a result of industrial activity. Yes > 1 No. Fails.	
RESPONSIBLE(S) OF THE EXECUTION: ENVIRONMENTAL PROFESSIONAL/TOUCHSTONE	
ENTITY/ INSTITUTION	**ROLES***
TOUCHSTONE	PL, OP, Sp, Sg e In
CORANTIOQUIA	Sg e In
influenced community	Sp y Sg
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See annex 8-2	

8.1.1.4.5 Runoff water management

RUNOFF WATER MANAGEMENT (RAINS)								
OBJECTIVES								
✓ Establish the necessary measures to guarantee the management, treatment and delivery to natural drains of runoff water in the project's infrastructure. ✓ Avoid the erosive processes development, the contribution of sediments to natural drainages, pollution and alteration of fluvial dynamics.								
GOALS								
✓ Totally accomplish of the construction and maintenance activities of natural drainage works and rainwater management systems in the infrastructure required by the project. ✓ Execute 100% environmental works and actions for the management of runoff water. ✓ Guarantee 100% the operation of the rainwater and industrial drainage system.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	
IMPACT(S) TO BE CONTROLLED								
✓ Alteration of the physicochemical and microbiological quality of water ✓ Sedimentation in bodies of water ✓ Changes in the available flow resource (water supply)								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								
Water management for the project considers the management of water in contact and runoff within the project The channels for the runoff water management will be made up of: • Open channels parallel to the deposit of tails to divert runoff flows and prevent that them come into the deposit. These channels would discharge to a sediment control pool or a well downstream from the tailings deposit. • A surface water diversion system upstream of the access portal and platform to divert the upper part of the basin and avoid water impoundment in the southern slope of the platform. This system would consist of a dike in compacted soil and a channel that connects to the diversion channels discharging into the sediment control well • A sediment control well downstream of the infiltration water collection well to handle runoff flows and reduce the sediment load to be discharged into the environment. Drainage management at the project headwaters of basins The head of the basin will not be directly impacted by the project. It is necessary to divert the runoff to avoid water impoundment on the southern slope of the platform, which can generate processes								

RUNOFF WATER MANAGEMENT (RAINS)

of instability in this landfill. A small dam is proposed upstream of the platform, with an outlet to an open channel that will connect to the system of open channels in the processing plant, which will be discharge to the sediment control well.

Torrential water management

For diversion of runoff water, open channels excavated in natural soil were designed in order to have a uniform flow using the Manning equation. A roughness coefficient of 0.020 was used in the analyzes. All channels have trapezoidal sections with slopes 1H: 1V. The characteristics of the channels are summarized in the Table 8-7.

Table 8-7 Characteristics of diversion channels.

Flow (l/s)	Design flow (m^3/ s)	Covering	Longitudinal slope (m/m)	Width (m)	Height (m)
25.5	0.8	Excavation in soil	0.005	0.5	0.5

Source: Golder 2013

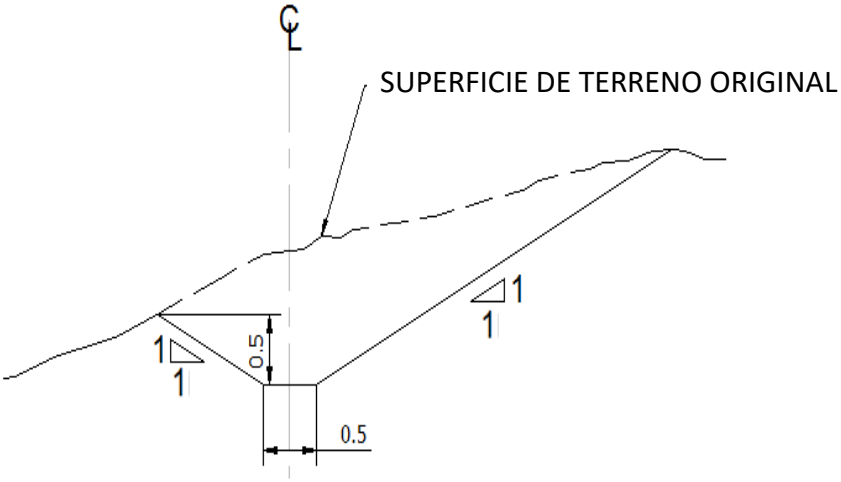


Illustration 8-1 Cross section of the diversion channel.
Source: Golder 2013

Prior activities to runoff management

With earthworks, some tailings and energy dissipating structures of the drainage system that belongs to the area of the location and to the ways must be built.

During the construction activities, prior to the conclusion of the general drainage system, temporary ditches must be formed in order to channel the rainwater and runoff to the drains.

Within the temporary ditches for the collection and conduction of rainwater, it should be placed sediment control systems.

RUNOFF WATER MANAGEMENT (RAINS)
During the activities of mobilization and assembly of the equipment and machinery corresponding to the operation activities, it will be necessary to build passage structures on the gutters that allow the safe circulation of the vehicles. Structures and places susceptible to damage caused by erosion or the ones that may generate hazards in mobilization and assembly activities such as sand traps, excavations, among others, should be adequately signaled. Periodic monitoring of runoff waters that are delivered to natural drainages will be carried out. In periods of occurrence of heavy rains, the delivery points in the sedimentation wells will be inspected, which the proper functioning of the runoff water evacuation system will be verified, it will be guaranteed that all of its components are free of obstructions and in a good condition, also that the delivery is being carried out properly in the receiving bodies tank. This will be carried out in order to establish the effectiveness of the control measures established in this case. The material corresponding to the accomplishment of the gutters perimeter of rainwater will depend about the characteristics of the foundation soils, the stability of the land, the estimated time of operation and the facility for the dismantling of them, these may be in any of the following options: • Natural terrain (for slopes less than 3 %) • Covering in soil - cement. • Bags filled with soil or soil - cement installed on the natural terrain • Geo membranes or geotextiles installed on the natural terrain. • Portable panels laminated, joined by welding or bolts with waterproof joints. • Prefabricated concrete panels with waterproofing of construction joints. • Cast concrete on site, to form a monolithic structure without joints. • Any other material considered relevant and that can be used to fulfill its functions and prevent the impact of the medium. • Periodically sediments remove placed in the ditches. The periodicity will be established according to the conditions of impact observed at the site and at of the season of year (high or low rainfall). • Perform weekly inspections of integrity conditions in ditches and graders, retention structures and in general in the management systems to detect timely damage to materials, cracks or leaks, which should be corrected immediately. • Remove the solids from the bottom of the grit chambers, as well as from the sedimentation zones for the system of permeable or retention barriers. The realization of this maintenance will be scheduled according to the conditions of sediment supply observed at the site and at the end of the drilling stage. The solids removed may be sent to the treatment area and / or disposal them of drilling cuts. • Construct the necessary drainage works on the access roads and avoid the storage of material or stacking of leftovers in places where the rainwater can drag them. • At sites where the rainwater system is delivered to the natural environment, energy dissipation works will be built if it is necessary in order to avoid problems of scour or erosion.

RUNOFF WATER MANAGEMENT (RAINS)
• The Water should be monitored from the delivery points during high rainfall periods to establish the effectiveness of the proposed measures. Additional management measures With the movement of the land, the tailings and dissipating energy structures of the drainage system that belong to the area of the location and roads must be built. During construction activities, before completing the general drainage system, temporary ditches must be formed that channel rainwater and runoff to the drains. Inside the temporary ditches for the collection and conduction of rainwater should be placed sediment control systems. During the activities of mobilization and assembly of the equipment and machinery corresponding to the operation activities, it will be necessary to build passage structures on the gutters that allow the safe circulation of the vehicles. Structures and places susceptible to damage caused by erosion or that may generate hazards in mobilization and assembly activities such as sand traps, excavations, among others, should be adequately signaled. Periodic monitoring of the runoff waters that are delivered to the natural drainages and also inspections at the delivery points of the location, after the occurrence of heavy rains; in which the proper functioning of the runoff water evacuation system is verified, it is guaranteed that all of its components are free of obstructions and in a good condition in order that the delivery is being carried out properly in the receiving bodies. This will be carried out in order to establish the effectiveness of the proposed measures
QUANTIFICATION OF THE MEASURE
Directed drainage flow at the head of the surrounding streams Directed flow corresponding to torrential waters. Flow conducted in queue deposit sub drainage. Flow conducted in wells or settlers
PLACE OF APPLICATION
Drains of the project conducted in channels.
BENEFITED POPULATION
Communities nearest the project area.
MECHANISMS AND PARTICIPATORY STRATEGIES
o Non-trained labor will be hired from the sidewalks belonging to the AID for the construction of civil works, as well as for the cleaning and maintenance of the structures. o An informative, comprehensive and explanatory workshop will be held about the environmental impact that may be caused by the development of the project activities.

RUNOFF WATER MANAGEMENT (RAINS)	
o For the efficiency of the program, it is important to monitor its quality and results, by evaluating the people who receive it, the trainer who develops it and their contribution to improving the accomplishment and environmental performance.	
REQUIRED STAFF	
o Environmental Engineer o Civil Engineer o Master builder o Helpers	
SUPERVISING AND MONITORING INDICATOR(S)	
Number of erosive processes developed as a result of runoff water. Yes > 1. Does not comply. (Amount of sediments present in water sources before the work / amount of sediments in water sources after the work). Yes = 1. Comply	
RESPONSIBLE (S) FOR THE EXECUTION	
ENTITY/ INSTITUTION	**ROLES***
TOUCHSTONE	Follow policies and guidelines established within the project planning. Carry out control and monitoring compliance with the environmental management measures established in this file.
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See annex 8-2	

8.1.1.4.6 Handling of crossings to water bodies

HANDLING OF CROSSINGS TO WATER BODIES								
OBJECTIVES								
Establish technical and environmental management measures for the adequate control of the crossed drains by the existing access roads and the sections to be built in order to access to the different areas where exploration prospects may be located and for other infrastructure works required in the project.								
GOALS								
✓ 100 % accomplishment of the technical and environmental measures proposed for the intervention of water bodies. ✓ Implement and fulfill the 100 % of the appropriate building procedures that accomplish with the appropriate environmental management. ✓ Replace and / or adapt drainage works to be used on pipes or bodies of water in the project area.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*		*Final Closing and Post Closing*	
IMPACT (S) TO BE CONTROLLED								
✓ Alteration of the physicochemical and microbiological quality of water ✓ Sedimentation in bodies of water ✓ Changes in the available resource flow (water supply)								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								
During the adaptation of the existing roads it is possible that the bodies of water that are present in the route will be intervened. This intervention refers to the adequacy and maintenance of existing hydraulic structures such as: culverts (double and single), rafts; that allow the passage of new corridors over the water currents, in order to conserve the drainage pattern of the micro-basins, and thus ensure the functionality of the roads. The general measures for the development of activities on water bodies are the following: ✓ For the crossings adapting work, efforts will be made to build them in the period of low rainfall, in order to avoid or minimize the use of temporary structures to channel the water. ✓ The restructuring of the margins will be done by replacing the cutting material extracted from the access ramps and previously accumulated in the margins of the channel, trying to re-establish the initial conditions of that margins. ✓ Install the necessary machinery and equipment in a previously defined area, to avoid interventions that compromise the stability and environmental quality of the currents. ✓ Delimit the area to be intervened by the works on the water current.								

HANDLING OF CROSSINGS TO WATER BODIES
✓ The material excavated from the stream or from its edge will be removed from the site as soon as possible, avoiding its subsequent dragging to the stream. This material will be taken to the authorized and properly disposed sites.
✓ It will be verified that the developed works do not alter the stability of the water margins intervened.
✓ All the material that is used for the construction of works of art will be acquired in the sources of materials that have environmental authorization for their extraction.
✓ Adapt pedestrian walkways with boards to avoid or restrict the passage of workers along the river course.
✓ Construction of lateral protection works (sacks - floors, fences, etc.).
✓ From the works of art downstream of the construction, transverse barriers will be adapted in order to retain the sediments and material that can escape from the work; the barriers that can be temporarily constructed are dams with a permissible height of the water passage, barriers of sacks or fences, meshes, etc.
✓ The streams will be reshaped and restored, returning them to their original course, the cleaning of the margins and the channel will be advanced, if it is necessary, the banks will be stabilized with bags of sand and cement.
✓ Once all the works have been completed at the crossing site, all types of rubble or excess material (forms, wood, iron scraps, cement bags, plastics, etc.) will be removed.
✓ During the carrying out of works from crosses o water bodies with widths greater than 3 meters, the current will be divided so that the total flow of the current circulates on one side of the watery bed, while the opposite side is intervened.
✓ During the construction of the works, fine material retention structures (sedimentation) will be installed downstream of the crossing site, which will be removed during the final reconfiguration of the crossing, after cleaning and adequate disposal of the fine material retained in them.
✓ Avoid the storage of material or stacking of waste in places where the rainwater can drag them.
✓ The use of concrete is required for the construction of works of art. This for its manufacture must have all preventive measures to generate leaks and watering, for which it is expected that it will be handled on a waterproof surface or in closed tanks.

HANDLING OF CROSSINGS TO WATER BODIES
✓ Regarding to the road infrastructure to be adapted, the structures to be implemented will be located according to the accesses that have been defined for each location; However, given the drainage characteristics of the area and the presence of minor bodies of water, it will be required, according to the case may be: Batting, circular culverts or pontoons. Deposit of dry and sterile tails The deposit of tails will require an adequate sub-drainage to maintain a low phreatic surface inside the tank to guarantee its stability. The designed system will collect the emergent base flow of channels that will be covered by the deposit and any direct precipitation on the surface of the deposit. (see sheet 8.2.1.3.4 Water management of the dry and sterile tailings tank) For the construction of the deposit, it has been considered the consolidation of a dam from which the full deposit will start under the methodology upstream, that is to say that the conformation of the deposit increases to higher levels, with a negative slope of 1%, which allows the infiltrated water to flow towards the posterior zone of the full, allowing to be captured by the sub drainage system. The main slope of the deposit was designed with slopes of 3: 1 in order to obtain an optimum stability of the main slope, with an intermediate berm of 10 meters of width.
QUANTIFICATION OF THE MEASURE
The goal is accomplished the 100%
PLACE OF APPLICATION
In the sites of occupation of water course
BENEFITED POPULATION
Communities near to the area of the location and of the bodies of water where the occupation takes place.
MECHANISMS AND PARTICIPATORY STRATEGIES
✓ The non-trained labor force will be hired from the sidewalks belonging to the AID for the construction of civil works, as well as for the cleaning and maintenance of the structures.
REQUIRED STAFF
✓ Environmental Engineer ✓ Civil Engineer ✓ Master builder ✓ Helpers
SUPERVISING AND MONITORING INDICATOR(S)
(Number of built works / Number of works built effective) * 100. If < 99. Fails.
RESPONSIBLE(S) OF THE EXECUTION

ENTITY/ INSTITUTION	ROLES*
TOUCHSTONE	PL, OP, Sp, Sg e In
CORANTIOQUIA	Sg e In
Communities of influence	Sp y Sg

Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)
SCHEDULE (PERIOD OF EXECUTION)

HANDLING OF CROSSINGS TO WATER BODIES
See Annex 8 1
BUDGET (APPROXIMATE COSTS)
See Annex 8 2

8.1.1.4.7 Data gathering of water abstraction management (domestic and industrial)

DATA GATHERING OF WATER ABSTRACTION MANAGEMENT (DOMESTIC AND INDUSTRIAL)								
OBJECTIVES								
Establish management measures aimed at preventing and mitigating the impact of water resources during water harvesting activities, promoting actions aimed at the proper use and management of water resources.								
GOALS								
Make the water resource abstraction under the 100% compliance with the proposed management measures, causing minimal impact on the environment.								
Stages of the project	*Exploration*		*Construction and Assemble*	***x***	*Exploitation*	***x***	*Final Closing and Post Closing*	***x***
IMPACT (S) TO BE CONTROLLED								
✓ Alteration of the physicochemical and microbiological quality of water ✓ Alteration in water supply ✓ Change in the physicochemical and microbiological properties of water ✓ Sedimentation in bodies of water ✓ Change in the surface drainage network ✓ Change in the available resource flow (water supply)								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								

For the different stages of the mining project, the environmental license will include the concession of surface and underground water, abstraction from different points.

The water for human consumption that is required during the activities of Construction and Assembly, exploitation in the mining area, will be supplied by the contractor in charge, who will acquire it in bottles of local or regional commerce.

To quantify the water consumption required during the assembly and operation of the project, the flow of water was considered to meet the industrial and domestic needs, these values correspond to an estimated maximum according to personnel and activities developed:

Management measures:

1. Give an adequate management of the solid waste generated on the location
2. Build or implement a storage tank that has the capacity to meet the requirements of maximum daily flow, in addition that it is provided with floats in a way that allows efficient use and saving water.
3. Provide floats to storage tanks
4. Proceed to adopt also the following measures for the efficient use and saving of water:

    a. Place two full plastic bottles of a drink inside the toilet tank and save 2 to 4 liters each time it is use.

DATA GATHERING OF WATER ABSTRACTION MANAGEMENT (DOMESTIC AND INDUSTRIAL)

b. Do not use the toilet as a wastebasket. If you buy a new toilet, consider the dual model to empty the tank since it uses approximately 4 liters for the low drain level and 6 for the high drain.
c. Close the tap when brushing your teeth or shaving, you can save up to 10 liters.
d. Showering instead of bathing, you will save 150 liters.
e. Fix urgent faucets and pipes faults. A dripping tap loses 30 liters per day.
f. Do not abuse the bleach, it breaks the bacterial balance of the purifiers, making it difficult to work. It uses ecological detergents, without phosphate.
g. The adjustable nozzles on the faucets reduce the flow of water without compromising its use.
h. Consider the use of buckets instead of irrigation hoses. In this way, you can water more accurately.
i. Place the diffusers and other saving mechanisms in the faucets, you will take better advantage of the water, reducing its consumption.

➢ Abstraction or Collection alternatives:

✓ Abstraction by means of intake
✓ Collection by means of pump from tank truck
✓ Direct collection with fixed pump
✓ Abstraction of surface water with fixed pump and conduction with flow lines

✓ You only collect or buy the amount of water that is needed and, as much as possible, generate no surplus. The flow must register by installing flow meters.

✓ For the adaptation and / or construction of routes that may be required, in order to collect surface water, it is suggested not to use the forest, and to look for the existing footprints and areas of savanna and pastures.

✓ The implementation of the abstraction by fixed motor pump is necessary especially in those points of catchment that have a considerable difference in height from the sheet of water to the area adjacent to the channel, like is the case of the bodies of water requested in low season precipitations, which present a slope of considerable height. Due to this situation, the installation of the infrastructure is required, the speed of the motor pump is small, and it does not have the power required to drive the water from the collection point to the tank when the height difference between each point is considerable.

✓ The exact location of the fixed motor pump will be specified at the start of the activities based on the detailed design criteria for the project, its needs and requirements, and anthropic and natural conditions that arise at the specific start time of the project activities.

✓ The motor pump will be installed inside a shed in order to isolate it mainly from the rain, which will allow the runoff of the water directly on the ground preventing its entry and contamination

DATA GATHERING OF WATER ABSTRACTION MANAGEMENT (DOMESTIC AND INDUSTRIAL)

in the area of the motor pump. The shed may have approximate dimensions of 3.5m x 3.5m and should be located in areas of pastures or savannahs in order to avoid forest exploitation for this activity. A hose (flexible pipe) will be used from the motor pump to the body of water where the capture is made which cannot remain permanently extended. Each time the collection is made the hose should be extended and picked up, in order to minimize the presence of foreign elements in the ecosystem.

- ✓ The shed of the motor pump must be installed above the flood level in order to avoid possible damage to the equipment and water contamination. If there are a place where is required, a temporary structure may be installed to achieve this objective. The floor of the shed should be built on a cement plate in order to avoid affecting the floor due to possible spills or drips of fuels and oils. Likewise, for the collection of oily waste that may be generated, the booth must have perimeter gutters that receive these residues and lead them to a temporary storage box, from where they will be removed periodically and disposed in 55-gallon containers that are used in the location for the storage of this type of oily waste.
- ✓ A flow meter will be installed in the motor pump that allows to establish the volume of water collected, which must be verified by the person in charge of the control.
- ✓ In case of using a tank truck as a means of transport for the water, if this option is implemented, its access will be to the point where the motor pump shed is located, and from this place will be transport the water to the location.
- ✓ The area where the abstraction was made will be sign conveniently to prevent accidents. Prohibitive signs of vehicle washing, and fuel supply must be posted.
- ✓ For about the case of collection with fixed pump and transport with line flow, the pumping station that must be located on firm ground, with adequate foundation soil, will be located in accessible sites for maintenance and protected against flooding.

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- ➢ Conduction or transport with tank truck and flow lines

For the laying of the pipeline, the existing road corridors will be used without carrying out forestry exploitation as much as possible; It can be taken to a tank truck or to a storage and distribution tank located either in the temporary camps for civil works or in the locations. The driving system will be composed mainly of PVC accessories and steel pipes and fittings, anchors and supports.

For the collection, it must be guaranteed that:

- ✓ Prior to the initiation of collection activities, the tank must be cleaned, once it has been cleaned, it will be filled to make transportation to the locations or the work fronts.
- ✓ No sewage or any other product that could cause deterioration in water quality should be loaded.
- ✓ The tanks will be in optimal cleaning conditions and it should be used only for the transport and storage of water.

DATA GATHERING OF WATER ABSTRACTION MANAGEMENT (DOMESTIC AND INDUSTRIAL)
✓ Suction hoses must remain clean and used exclusively for the management of uncontaminated water. ✓ The end of the suction hose is not immersed too much in order to prevent sediment suction. ➢ Use of rain water The use of rainwater is proposed, taking into consideration the provisions of Article 9 of Law 373 of 1997, which establishes that new projects must include the supply of rainwater in the study of sources of supply. Depending on the distribution of the collecting areas in the mining areas, storage tanks can be installed by continuous units, decreasing the filling time of each tank, but after each rainfall, there would be a greater volume stored. Regarding the possible request of rainwater, the value was estimated based on the management for about to 100 people in a location, taking into account an allocation of 150 l/habitant/day, the demand on the resource would be 15 m3/day. However, the use of rainwater is considered for the supply of sanitary units and cleaning in general, this corresponds to 25% of the total demand, thus requiring 3.75 m3/day of the resource for this. Finally, for the collections areas (roof or cover) it is suggested that they have a superior slope of 5%, of resistant material, and preferably non-porous. Likewise, the systems or channels of conduction, must be light, of resistant material, with dimensions between 75 and 150mm of width and a height superior to 60mm. Depending on the location of the system, the channels must be provided with meshes to avoid clogging of the driving area. For about storage systems, they must be constructed of resistant material, do not have a height greater than 2 meters if they are not buried to minimize overpressure, waterproof (no leaks), with lid or access hatch with lid (for buried units) for the maintenance of the system, and meshes of control of rodents and insects in the entrances and exits of the same.
QUANTIFICATION OF THE MEASURE
% Flow effectively collected
PLACE OF APPLICATION
In each of the authorized sites for abstraction
BENEFITED POPULATION
Communities bordering the area of the location and the bodies of water where the water abstraction is made.
MECHANISMS AND PARTICIPATORY STRATEGIES
In order to make an efficient use of natural resources, environmental talks must be held, aimed at project personnel, in order to prevent alterations to the local environment; in the specific case of water, these talks should focus on the efficient use and saving of water, thus preventing the excessive use of water, by using the flow strictly necessary, whether in the case of domestic water (showers, sinks, bathrooms, laundry) or for industrial use (civil works and sludge preparation etc.)

DATA GATHERING OF WATER ABSTRACTION MANAGEMENT (DOMESTIC AND INDUSTRIAL)	
REQUIRED STAFF	
✓ Environmental Engineer ✓ Heavy machinery operator	
SUPERVISING AND MONITORING INDICATOR(S)	
✓ Installation of flow meters in the collecting areas ✓ Guarantee the proper functioning of the drainage works to be used in the project ✓ Complete the 100% of the monitoring downstream of the abstraction to assess the trend of water quality and comparison with current environmental regulations	
RESPONSIBLE (S) OF THE EXECUTION	
ENTITY/ INSTITUTION	ROLES*
TOUCHSTONE	Follow laws and guidelines established within the project planning. Carry out control and monitoring compliance with the environmental management measures established in this file.
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8 1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8 2	

8.1.1.5 Air resource management program

8.1.1.5.1 Handling and control of gases and particles

HANDLING AND CONTROL OF GASES AND PARTICLES								
OBJECTIVES								
✓ Mitigate the increase in the concentration of gases (CO, O3, NOx and SOx) in the atmosphere. ✓ Mitigate the increase in the concentration of particulate material in the atmosphere.								
GOALS								
Prevent the contamination of gases and particulate material in the atmosphere.								
Stages of the project	*Exploration*		*Construction and Assemble*	x	*Exploitation*	x	*Final Closing and Post Closing*	x
IMPACT (S) TO BE CONTROLLED								
✓ Changes in the concentration of particulate matter and gases in the air								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								

➢ Roads and transportation

The different access roads, loading and unloading sites and other unpaved areas should remain humid by manual type or techniques that control and reduce the level of dust emissions. In summer periods, humidification will be carried out twice a day, preferably in the hours when the solar radiation is highest.

Transport vehicles must have protective devices such as tents or covers, which can be secured to the container or body car, in order to avoid, as much as possible, the escape of such substances into the air. The material that covers the load must be resistant, in such a way that it does not break or tear. It must be firmly attached to the outer walls of the container in such a way that it extends at least 30 cm beyond the edge of the container.

Vehicles for the transport of materials must have the appropriate containers or plates attached to their bodywork, so that the cargo deposited in them is contained in its entirety, avoiding spillage and loss of material. The structure of the plate must be continuous, in perfect condition (no breaks, holes, slots or spaces). Vehicle unloading doors shall be secured and hermetically sealed during transport.

Every vehicle that is used in the work of the project must have the techno mechanic certification of Emission of Gases, in order to control gas emissions and ensure the good performance of the vehicle.

Periodic maintenance and cleaning of all exit ducts such as automobile exhaust pipes, machinery, etc. will be carried out.

HANDLING AND CONTROL OF GASES AND PARTICLES

- Mining operations

The deposits of materials for the construction works will be kept covered with plastic materials in order to avoid the re suspension and dispersion of particulate material. Only the materials for the construction that will be used in the working day will be collected without covering to be consumed. At the end of the day they will be covered again with plastic. Complementarily the construction works, will be closed by a perimeter way with mesh or saran.

An extractor hood will collect the gases from the furnace, which will pass through a bag filter to trap the particles, and then through an induced draft fan. The system will be designed to trap more than 99.5 % of the particles present in the exhaust gases (see Illustration 8-24).

Illustration 8-24 Conceptual scheme of bag filter.
Source: MAVDT 2010.

The height of the furnace chimney will have a height applying based on the protocol for the "Control and Monitoring of Atmospheric Pollution generated by Fixed Sources", based on additional variables such as the presence of nearby structures, the dimensions of said structures and the predominant direction of the wind.

Within the underground exploitation will have installed an aspiration ventilation system in order to supply oxygen where clean air enters one (or several) of the entrances of the mine and stale air after touring the mine is extracted by the main fan.

HANDLING AND CONTROL OF GASES AND PARTICLES

The output of this ventilation will be about 5 meters high from the surface and will have bag filters that have a particle control efficiency of up to 99 %. The output filters will be maintained during the period established in the design of the same.

- Equipment and machinery

The owners or operators of equipment and machinery used in the works of the project will attend the following recommendations, in order to control the factors that contribute to the generation of air pollutant emissions:

- Conserve original efficiency, using equipment or machinery without exceeding its maximum efficiency.
- Place and transport, in them, the materials for which they were designed.
- Load them according to the manufacturing specifications, do not exceed the weight limit.
- Implement regular maintenance practices.

To the comminution equipment comprised by the crushing and milling, periodic preventive and corrective maintenance will be carried out, in order to conserve the efficiency and avoid the increase of emissions of particulate material, these processes will be carried out in wet to avoid the re-suspension of material particulate. Additionally, an air leakage control will be carried out to avoid the dispersion of particulate material outside of it.

Given that in the nearby region there are no buildings but characteristics of the terrain such as elevations or depressions, no nearby structures are taken, but rather the dispersion model (see Annex 4, Pollutant Dispersion Model), in which at this distance the dispersion of contaminants was modeled, guaranteeing an adequate mixing zone.

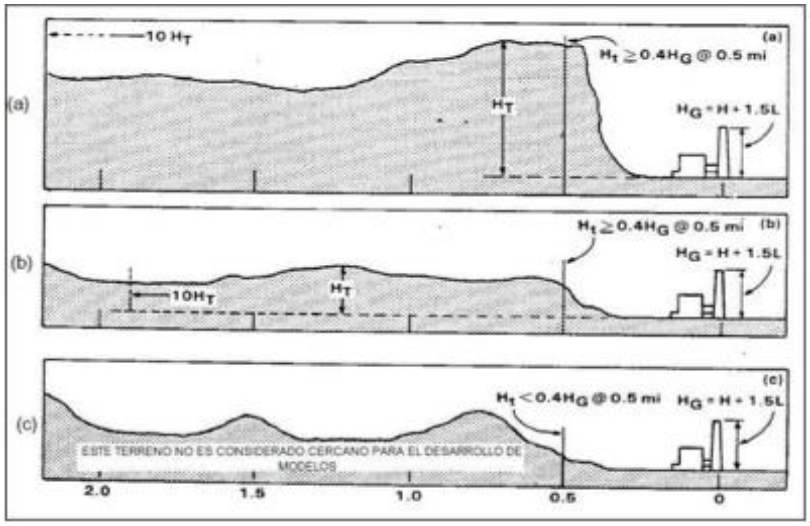

Illustration 8-25 Determination of the region near the source of emission.
Source: MAVDT 2010.

HANDLING AND CONTROL OF GASES AND PARTICLES	
QUANTIFICATION OF THE MEASURE	
✓ % Trucks with overturned covered per month. ✓ % Fenced works with mesh. ✓ % Humidification achievement ✓ % Transports with mechanical and gas technical revision. ✓ % Preventive and corrective maintenance performed ✓ % Filter efficiency of sleeves and other treatment devices. ✓ Height of the chimney according to current regulations.	
PLACE OF APPLICATION	
✓ Mobile sources. ✓ Routes. ✓ Works or constructions. ✓ Refinery furnace	
BENEFITED POPULATION	
Maintaining a good quality of air offers good health to the inhabitants of all the paths that surround the project, even the most remote ones, such as the San Felipe path, and diseases resulting from the emission of the furnace will be prevented.	
MECHANISMS AND PARTICIPATORY STRATEGIES	
Community information and participation program Through direct visits to the project, the management of gases and particulate matter and their treatments will be presented to the communities. This space will also be used to raise awareness, education and debate. It will also be developed for workers	
REQUIRED STAFF	
Environmental technician	
SUPERVISING AND MONITORING INDICATOR(S)	
((No truck in the project / month) / No truck covered)) * 100. Yes <100. Fails. Air quality within the permissible (permanent) range.	
RESPONSIBLE(S) OF THE EXECUTION: ENVIRONMENTAL PROFESSIONAL /TOUCHSTONE	
ENTITY/ INSTITUTION	ROLES*
TOUCHSTONE	PL, OP, Sp, Sg e In
CORANTIOQUIA	Sg e In
Communities of influence	Sp y Sg
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8 1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8 2	

8.1.1.5.2 Noise Control and Management

NOISE CONTROL AND MANAGEMENT								
OBJECTIVES								
Mitigate changes in sound pressure levels								
GOALS								
Prevent the contamination of gases and particulate material in the atmosphere.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	x
IMPACT (S) TO BE CONTROLLED								
Alteration of sound pressure								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								

The works that require the use of sound emission sources will be carried out during the day and for short periods of time.

In order to minimize noise levels, you will have special control in following:

- Perform proper preventive maintenance (lubrication of moving parts, permanent cleaning, replacement of damaged parts, etc.)
- Use electrically powered equipment.
- Construction of forest curtains that will serve as acoustic barriers, preferably perimeter walls that entrench the locations that can have a loud noise.

The management measures necessary to minimize the impacts caused by noise emissions will be closely related to the vegetation component, since this is an essential instrument to prevent the dispersion of noise.

The use of loudspeakers and amplifiers should be restricted, this should be implemented only as a measure for disaster prevention, emergency care, dissemination of health campaigns and environmental information of the project.

The personnel transport vehicles linked to the project will not be able to keep radio transmission equipment turned on, which transcends the passenger area, at volumes that exceed the level of speech intelligibility.

Sound pressure levels for ambient noise and noise emission shall not exceed the maximum permissible limits for Sector D "Suburban or Rural Zone of Tranquility and Moderate Noise", established by articles 9 and 17 of resolution 627 of 2008.

NOISE CONTROL AND MANAGEMENT

Table 8-8. Maximum permissible standards of ambient noise levels, expressed in decibels dB (A).

SECTOR	SUB SECTOR	MAXIMUM PERMISSIBLE STANDARDS OF ENVIRONMENTAL NOISE LEVELS	
		DAY	NIGHT
Sector D. Suburban or Rural Zone of Tranquility and Moderate Noise	Rural inhabited destined to agricultural exploitation.	55	45

Table 8-9 Maximum permissible standards of noise levels, expressed in decibels dB (A)

SECTOR	SUBSECTOR	MAXIMUM PERMISSIBLE STANDARDS OF ENVIRONMENTAL NOISE LEVELS	
		DAY	DAY
Sector D. Suburban or Rural Zone of Tranquility and Moderate Noise	Rural inhabited destined to agricultural exploitation.	55	45

Source: Resolution 627, 2008.

QUANTIFICATION OF THE MEASURE

Environmental Noise, Sound pressure Levels.

PLACE OF APPLICATION

The environmental management measures defined in this file will be carried out in the entire project area, as well as in the access roads, from the main road.

BENEFITED POPULATION

Maintaining a good quality of sound pressure offers good health to the inhabitants of the zone El Pescado and the environment

MECHANISMS AND PARTICIPATORY STRATEGIES

Information program participation and community conformation
Through direct visits to the project, noise management will be presented to the communities. This space will also be used to raise awareness, educate and debate. It will also be developed for workers.

REQUIRED STAFF

Environmental technician

SUPERVISING AND MONITORING INDICATOR(S)

Sound pressure levels for ambient noise and noise emission according to the law.

RESPONSIBLE(S) OF THE EXECUTION: ENVIRONMENTAL PROFESSIONAL /TOUCHSTONE

ENTITY / INSTITUTION	ROLES*
TOUCHSTONE	PL, OP, Sp, Sg e In
CORANTIOQUIA	Sg e In
Community of influence	Sp y Sg

NOISE CONTROL AND MANAGEMENT
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)
SCHEDULE (PERIOD OF EXECUTION)
See Annex 8-1
BUDGET (APPROXIMATE COSTS)
See Annex 8-2

8.1.1.5.3 Management of vibrations and noise derived from the use of explosives in mining production process

MANAGEMENT OF VIBRATIONS AND NOISE DERIVED FROM THE USE OF EXPLOSIVES IN MINING PRODUCTION PROCESS								
OBJECTIVES								
Prevent potential effects due to vibrations and surface noise to the communities in the area of direct influence								
GOALS								
✓ Prevent damage to infrastructure due to vibrations generated by the use of explosives. ✓ Comply with the permissible limits of environmental noise in the area of direct influence of the project.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	
IMPACT(S) TO BE CONTROLLED								
Alteration of sound pressure								
Type of measure	*Prevention*		*Mitigation*	x	*Correction*		*Compensation*	x
ACTIONS TO BE DEVELOPED								
✓ Reduce the weight of explosives by delay. Any decrease in the amount of explosive through smaller drill diameters, reduced bank heights and / or separation of explosive charges will reduce the likelihood of damage. ✓ In the area of direct influence of the project there are no buildings or nearby buildings. However, in the event of any damage to infrastructure around the area of influence caused by the blasting, the corresponding investigation will be made, and the damages generated will be compensated. ✓ Maintain, if possible, the total time of the entire blast below one second of duration. ✓ Blasting will be done once per day and will be at the end of the daily shift, with this the noise generated by the use of explosives will be controlled by schedule. It is estimated that the highest sources of noise are at surface level such as the crusher and ball mill, it is expected that the noise generated by the use of explosives is minimal and with daytime blasting, it is avoided to interfere with the nighttime rest hours of the population. ✓ All employees in the blasting area will have to wear hearing protection								
QUANTIFICATION OF THE MEASURE								
✓ Comply with the Colombia standard for permissible levels of noise 55 dB (A) during the day generated by the use of explosives. (The maximum allowable for the day is taken because the blasting will take place during the day shift, at the end of the afternoon). ✓ Zero (0) damage to infrastructure due to blasting. Vibration monitoring system.								

MANAGEMENT OF VIBRATIONS AND NOISE DERIVED FROM THE USE OF EXPLOSIVES IN MINING PRODUCTION PROCESS	
✓ 100% of compensation of damages generated.	
PLACE OF APPLICATION	
Inside the El Pescado Project under concession 5969 Area of direct influence of the project.	
BENEFITED POPULATION	
✓ Population of the area of direct influence, especially the recipients located in a range of 400 meters around the blasting area ✓ Mine personnel	
MECHANISMS AND PARTICIPATORY STRATEGIES	
✓ Project operational and information programs. ✓ Broadcasting in the area of direct influence before starting the blasting program ✓ Blasting alarm system	
REQUIRED STAFF	
✓ Environmental supervisor ✓ Mine boss ✓ Blasting workers ✓ Social manager	
SUPERVISING AND MONITORING INDICATOR(S)	
✓ ((Not blasting/month)/No damage caused to infrastructure by vibrations). Yes> 0. Fails.	
RESPONSIBLE(S) OF THE EXECUTION	
ENTITY / INSTITUTION	**ROLES***
TOUCHSTONE	PL/OP/Sp/In
CORANTIOQUIA	Sg
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8-2	

8.1.1.5.4 Program of alarm and prevention system for the use of explosives in the exploitation

PROGRAM OF ALARM AND PREVENTION SYSTEM FOR THE USE OF EXPLOSIVES IN THE EXPLOITATION								
OBJECTIVES								
✓ Prevent accidents by blasting inside the mine and provide adequate information to the communities for their peace of mind.								
GOALS								
✓ Zero work accidents due to the use of explosives ✓ The entire AID community will be informed about the alarm and prevention system								
Stages of the project	*Exploration*		*Construction and Assemble*		*Exploitation*		*Final Closing and Post Closing*	
IMPACT(S) TO BE CONTROLLED								
✓ Alteration of sound pressure								
Type of measure	*Prevention*		*Mitigation*		*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								
✓ An alarm system will be used inside the mine to give notice of evacuation prior to the detonation of blasting explosives. This will sound only once. ✓ In case of an accident with explosives, the alarm will be activated twice with intervals of 15 seconds between each alarm. ✓ To ensure that 100% of the workers and employees of the mine have evacuated prior to the blast, there will be an electronic location system that will determine where each one is located.								
QUANTIFICATION OF THE MEASURE								
✓ Number of accidents generated by blasting = 0 ✓ 100% of the AID population surveyed and informed								
PLACE OF APPLICATION								
✓ El Pescado project under concession 5969 ✓ AID								
BENEFITED POPULATION								
✓ Population of the AID ✓ Mine personnel.								
MECHANISMS AND PARTICIPATORY STRATEGIES								
✓ Community information and participation program ✓ Education and training programs for personnel linked to the project ✓ Broadcasting in the area of direct influence before starting the blasting program								
REQUIRED STAFF								
✓ Social Manager ✓ Environmental Manager								

PROGRAM OF ALARM AND PREVENTION SYSTEM FOR THE USE OF EXPLOSIVES IN THE EXPLOITATION	
SUPERVISING AND MONITORING INDICATOR(S)	
✓ (No blasting carried out / accidents caused by blasting). Yes> 0. Fails.	
RESPONSIBLE(S) OF THE EXECUTION	
ENTITY / INSTITUTION	ROLES*
TOUCHSTONE	PL/OP/Sp/In
CORANTIOQUIA	Sg
SECRETARY OF MINES IN ANTIOQUIA	Sg/In
NATIONAL ARMY	Sp/In
MUNICIPALITY MAYOR	Sg
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8 1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8 2	

8.1.1.6 Solid waste management program

DOMESTIC AND INDUSTRIAL SOLID WASTE MANAGEMENT PLAN.								
OBJECTIVES								
Control the generation of domestic and industrial solid waste in the project.								
GOALS								
Decrease and classify the domestic and industrial solid waste generated in the project.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	x
IMPACT(S) TO BE CONTROLLED								
Change in the physicochemical and microbiological properties of water Change in Land Use Fragmentation of ecosystems								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	
DESCRIPTION								

➢ SOLID WASTE

In compliance with regulatory decree 1713 of 2002 and resolution 526 of 2004 related to the Integrated Solid Waste Management Plan (now called PMIRS) and its amending regulations in the decree 1505 of 2003, resolution 1045 of 2003, resolution 0477 of 2004 and decree 838 of 2005, the processes and activities necessary for an adequate management of solid waste are established, guaranteeing strategic planning and efficient administration.

Following, the generation and separation, storage and disposal are detailed.

Generation and separation of domestic waste

It is estimated a generation of waste of 40 Kg/day or 280 Kg/week, calculated on the basis of the total of workers by the contribution of average domestic per capita production (PPC: 0.4Kg/day/pers).

The separation in the source contributes to the reduction of the volume of the solid waste that arrives at the sanitary landfills or sites of final disposal, therefore, the useful life of these is extended, besides it diminishes the costs of collection and final disposition of the residues. For this, four (4) containers will be located on the work front (See the following illustration) to make the proper separation at the source of the waste classified as follows:

- ✓ Garbage can Gray: Paper, cardboard, cans and glass
- ✓ Blue garbage can: Plastic, cans and glass
- ✓ Green garbage can: wrappers, napkins, sweepings, or anything that cannot be reused.
- ✓ Red garbage can: Hazardous waste (greases, tow, oils, contaminated containers)

DOMESTIC AND INDUSTRIAL SOLID WASTE MANAGEMENT PLAN.

Illustration 8-26. Solid waste classification containers.
Source: image taken from the internet

On each work front, waste with different characteristics and quantities is generated, depending on this, the type and quantity of containers may vary.

- **Generation and separation of industrial waste**

The Hazardous and Special Waste category (from now referred to as RESPEL) is made up of dangerous products impregnated with chemicals for the benefit, tow, oil residues and fuels generated in workshops, storage areas for raw materials for maintenance and mechanical repairs, and/ or sterile tails as a special waste of the mining benefit. The following RESPEL is the initial identification:

- ✓ Packaging, tow, garments and containers impregnated with fats, oils and fuels
- ✓ Vehicle batteries
- ✓ Batteries
- ✓ Luminaires - fluorescent lamps
- ✓ Packaging impregnated with raw materials: HCl, NaOH, NaCN
- ✓ Hydraulic motor oil
- ✓ Hydraulic oil for machinery
- ✓ Engine lubricant
- ✓ Oils for vehicular transmission
- ✓ Oils for pump transmission
- ✓ Tails of mineral benefit.

Final disposition

- ✓ Organic waste is given to workers to be used as composting.
- ✓ Ordinary waste was managed with the municipal collection and installation services company, INTERASEO S.A., to carry out the final correction in the La Pradera sanitary landfill.

DOMESTIC AND INDUSTRIAL SOLID WASTE MANAGEMENT PLAN.

- ✓ The recycled waste will be commercialized in the municipal capital of Segovia
- ✓ The RESPALES remain in the temporary zones avoiding the contamination of the soil and the bodies of water, and then deliver them to the companies that provide collection, handling, treatment and final disposal services, certified by the environmental authority.
- ✓ Dry and sterile tailings waste can be handled in a deposit located to the east of the processing plant facilities, it can contain a minimum of 1.7 million tons of tails and 1.0 million tons of waste. The final volume for the deposit of tails is $ 85,000 m2, according to the description of chapter II.

Safe handling of Cyanide

The handling of cyanide insurance is governed by the international code for handling cyanide for each of the stages of handling:

- ✓ During the import, the cyanide is properly packaged in hermetically sealed and water-resistant bags and boxes, using the best industry standards and suitable for transport to its final destination.
- ✓ The boxes will be appropriately marked and labeled with diamonds, signs, safety sheet and safety panels that indicate the danger.
- ✓ Upon arrival in Colombia, they will be loaded onto trucks, in the original container in which they arrived and transported in convoys with permanent supervision and escorted by vehicles provided with the response equipment for primary incidents.
- ✓ In the place of storage, large aisles will be left for the forklift to circulate internally in comfort. The unloading and storage of boxes containing sodium cyanide will be done exclusively by trained personnel.
- ✓ The boxes will be placed in a specially conditioned tank for this purpose, following all internationally accepted safety and control regulations.
- ✓ The floor of the building is made of reinforced concrete. This will help keep the bags free of dust, mud or other foreign material, so they can be inspected before being transported to ensure that there is no sodium cyanide on the outside of the box. The concrete floor, in addition to facilitating the detection of spills, will facilitate cleaning procedures in the event of a rupture of the bag or box and to prevent soil contamination with cyanide.
- ✓ When the product arrives at the mine, it is unloaded from the containers using a mechanized or manual hoist.
- ✓ In the warehouse the boxes will be stacked in a maximum of three, paying close attention to the alignment of the same.
- ✓ Operators will move the boxes containing sodium cyanide to the preparation area and place them in a place where the box hoisting crane can reach them. It should be verified that the pH of the solution is equal to 12.
- ✓ At the end of the task, the preparation area of sodium cyanide with sterile solution will be cleaned.
- ✓ All bags or empty boxes of cyanide in the facilities will be collected by the company transporting the compound and deposited in a safe place.

DOMESTIC AND INDUSTRIAL SOLID WASTE MANAGEMENT PLAN.
Safe handling of hydrocarbon residues It must be taken into account that in the distribution of fuels such as: A.C.P.M. and gasoline there should not be spills; To avoid this, it is necessary to implement preventive measures such as: ✓ A suitable driving and pumping system must be used for the transfer of fuel. ✓ The fuel transfer area must be waterproofed; in case of spills of some liquid product, avoid its runoff by making gutters around and collecting it with sawdust, sand or earth. ✓ Oil changes should preferably be made in the camp, thus avoiding spills on land. A manually operated pump must be used. ✓ Used oil waste must be collected and returned to the supplier or give an adequate disposition according to the current regulations.
QUANTIFICATION OF THE MEASURE
✓ Kilograms Biodegradable waste collected. ✓ Kilograms. Recyclable waste collected. ✓ Kilograms of RESPEL delivered for disposal. ✓ % Empty Cyanide gaskets delivered to supplier. ✓ Kilograms of used oils delivered.
PLACE OF APPLICATION
✓ Classification containers. ✓ Cyanide and RESPEL storage areas.
BENEFITED POPULATION
Maintaining a good disposition of solid waste offers good health to the inhabitants of all the villages of the area of influence of the project and will prevent illnesses.
MECHANISMS AND PARTICIPATORY STRATEGIES
Education and training program for personnel linked to the project. Through direct visits to the project, the management of domestic and industrial solid waste will be presented to the communities. This space will also be used to raise awareness, educate and debate. It will also be developed for workers.
REQUIRED STAFF
Environmental technician
SUPERVISING AND MONITORING INDICATOR(S)
(Kilograms of waste produced / Kilograms of waste separated at the source) * 100. Yes> 99 Comply (No cyanide packaging received / No cyanide packaging delivered) * 100. Yes = 100% complies. No fuel spills that compromise that may cause damage to water or ecosystems. Yes> 1. Fails.

RESPONSIBLE(S) OF THE EXECUTION: ENVIRONMENTAL PROFESIONAL /TOUCHSTONE	
ENTITY/ INSTITUTION	ROLES*
TOUCHSTONE	PL, OP, Sp, Sg e In

DOMESTIC AND INDUSTRIAL SOLID WASTE MANAGEMENT PLAN.	
CORANTIOQUIA	Sg e In
Communities of influence	Sp y Sg
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8-2	

8.1.1.7 Fuel and chemical substances management program

FUEL AND CHEMICAL SUBSTANCES MANAGEMENT								
OBJECTIVES								
Prevent and correct any accidental spillage of fuels or chemical substances, controlling in-situ reducing the risk of affecting the environment and communities.								
GOALS								
Zero accidental spills with escape to the environment								
Stages of the project	*Exploration*	x	*Construction and Assemble*	x	*Exploitation*	x	*Final Closing and Post Closing*	x
IMPACT (S) TO BE CONTROLLED								
Alteration of the physicochemical and microbiological quality of water Change in the available resource flow (water supply) Change in Land Use								
Type of measure	*Prevention*		*Mitigation*		*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								

➢ Fuels

The fuel will be stored in metallic tanks, hermetic and resistant to internal and external pressures. The stationary fuel tanks will have a secondary containment system with a storage volume equivalent to 110% of the capacity, will have a waterproof cover in the bottom and on the sides will be located outdoors.

Tanks where combustible or flammable materials are stored, in addition to complying with the standards established by the competent authority, shall:

a. Being designed to withstand the internal pressures resulting from its own function;
b. Be constructed of materials resistant to fire and corrosion;
c. Be located at a prudent distance (greater than 40 meters) from camps, magazines, workshops and other facilities;
d. Be protected by a closed impermeable dam. The dike will have a capacity not less than 110% of the tank, and the distance between the dike and the outer wall of the tank should not be less than the height of it, it must have a system of oily water drains to a water separator and oils (Grease trap), to avoid contamination of surface and groundwater. The fuel storage tanks must be placed on non-combustible material bases, electrically connected to the ground, indicate their content and capacity and identified with the word "FLAMMABLE" written in a visible place.

➢ Chemical Substances

FUEL AND CHEMICAL SUBSTANCES MANAGEMENT
✓ All chemical substances (reagents, including cyanide) will be stored indoors, away from the ground in a way that minimizes the possibility of solid cyanide contacts with water. ✓ Do not store Sodium Cyanide with oxidizing agents such as perchlorates, peroxides, permanganates, chlorates, nitrates, chlorine, bromine and fluorine, acid salts, alcohols. ✓ Containment systems secondary to cyanide storage and mixing tanks will be constructed with materials that provide an effective barrier against leaks ✓ All chemical substances must be properly labeled according to their level of danger, flammability and reactivity.
QUANTIFICATION OF THE MEASURE
✓ Control 100% fuel leaks and leaks from the storage area or use in machinery and equipment. Preventive maintenance weekly, monthly, semi-annual and annual. a) Weekly: Pumps - Fuel pump b) Monthly: Main storage station and operation team (heavy machinery) c) biannual: Spill containment dykes d) Annual: technical-mechanical revision of machinery and vehicles
PLACE OF APPLICATION
✓ Interior of mine - El Pescado project under concession 5969 ✓ Fuel Storage. Portal down Hill zone ✓ Processing plant
BENEFITED POPULATION
✓ Mine personnel ✓ Population of the village El Pescado
MECHANISMS AND PARTICIPATORY STRATEGIES
✓ Information and dissemination programs, community participation in socializations to advance the project, complaints and grievances mechanism. ✓ Participation in environmental education events
REQUIRED STAFF
✓ Storekeeper ✓ Pump operator ✓ Brigades ✓ Environmental manager ✓ Social manager
SUPERVISING AND MONITORING INDICATOR(S)
✓ No spills of fuels or chemical substances that affect the environment or communities, if> 1, does not comply
RESPONSIBLE (S) OF THE EXECUTION

ENTITY / INSTITUTION	Roles*

FUEL AND CHEMICAL SUBSTANCES MANAGEMENT	
TOUCHSTONE	PL/OP/Sp/Sg/In
CORANTIOQUIA	Sg
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8-2	

8.1.1.8 Explosives and blasting management program

EXPLOSIVES AND BLASTING MANAGEMENT PROGRAM								
OBJECTIVES								
Ensure the health and safety of workers and the population in transportation, storage, handling during the use of explosives								
GOALS								
✓ Zero accidents due to blasting inside the mine								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	x
IMPACT(S) TO BE CONTROLLED								
✓ Alteration in sound pressure levels								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								
✓ The explosives will be stored properly in the powder keg that will be built according to the established norms. ✓ Explosives cannot be stored with electrical equipment or sources of ignition ✓ Only authorized personnel will have access to the explosives ✓ The electrical system of the transport equipment must be spark-proof and its body must be grounded by using drag chains or any other approved system. ✓ As far as possible, the route should not include crossing with high-voltage installations or running with the risk of an electric storm. ✓ Pedestrian transport of explosives and accessories must be carried out at different times and not together. If it is necessary to do it at the same time by two people, they must maintain a minimum safety distance of fifteen (15) meters between them. ✓ Blasting design will be developed and approved by a blasting supervisor ✓ A design of 0.50 Kg / t will be used for the felling and of 0.6 Kg / t for development and will be adjusted according to the conditions of the land. ✓ Once the explosives are placed in the mesh, the mine must be evacuated for which there is an evacuation alarm and a personnel tracking system that ensures that 100% of the personnel in the area is outside the blasting area. ✓ Blasting will be carried out once a day, at the end of the day shift ✓ Well controlled blasting should generate little dust. ✓ After the blasting, the mine will be ventilated (average velocity of 2.0 m / s) in order to oxygenate the area and reduce the gases and particulate material produced in the mine, allowing the continuation of the loading and transport operations of the mine ✓ Access and transit through the area can be resumed when a supervisor indicates the absence of hazards such as imminent landslides or unexploded charges.								
QUANTIFICATION OF THE MEASURE								
✓ One blast per day in the afternoon. ✓ Consumption of explosives (ANFO)								

EXPLOSIVES AND BLASTING MANAGEMENT PROGRAM	
PLACE OF APPLICATION	
✓ El Pescado project under concession 5969 ✓ Area of Direct Influence	
BENEFITED POPULATION	
✓ Population from the area of direct influence ✓ Mine personnel	
MECHANISMS AND PARTICIPATORY STRATEGIES	
✓ Notifications (Community Talk): Prior to blasting, the operator must notify all residents and homeowners, or other structures located near the mining project (500 meters around the blasting area), about the time and place proposed for blasting operations. The notifications must have a weekly periodicity.	
REQUIRED STAFF	
✓ Explosives retailers ✓ Blasting supervisor ✓ Social manager	
SUPERVISING AND MONITORING INDICATOR(S)	
✓ ((# Blasting carried out / month) / # of accidents caused by blasting / month)). Yes> 0. Fails	
RESPONSIBLE (S) OF THE EXECUTION	
ENTITY / INSTITUTION	ROLES*
TOUCHSTONE	PL/OP/Sp
NATIONAL ARMY	OP/Sp/In
CORANTIOQUIA	Sg
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8-2	

8.1.2 Biotic environment

8.1.2.1 Flora management programs

8.1.2.1.1 Program for the management of flora, forest exploitation and re vegetation of intervened areas

PROGRAM FOR THE MANAGEMENT OF FLORA, FOREST EXPLOITATION AND RE VEGETATION OF INTERVENED AREAS CONCESION 5969								
OBJECTIVES								
✓ Reduce the impact and effect on the different flora species derived from the project's own activities. ✓ Mitigate and / or compensate the impact generated in the areas in which vegetation cover was removed during the development of the project works, according to the guidelines indicated by the environmental authority and the plan for forest use. ✓ Minimize the impact produced by the removal activity of the vegetal cover, implementing in an appropriate way the forest exploitation in the intervention areas. ✓ Reduce the underutilization of forest resources, maximizing productivity in harvesting activities. ✓ Minimize solid waste product of the use of plant material. ✓ Intervene only authorized areas, fully demarcated and signaled.								
GOALS								
✓ Avoid affecting the flora of natural areas that do not need to be exploited by the project's infrastructure. ✓ Training of construction personnel on issues related to the protection, management and conservation of the flora. ✓ Ensure that forestry activities are executed and based on the physical and exclusive scope of the areas to be intervened and with respect to what is authorized by the environmental authority. ✓ Proper disposal or reuse of woody plant material removed during the construction and project assembly stage. ✓ Training of all the personnel in charge of the work of removal of the vegetal cover and the general forestry use. ✓ Create a grassland and / or reforest the areas without vegetation cover during the development of the project works. ✓ Training of the personnel in charge of the work of reforestation and / or creation of grassland for the good management of the vegetal material and sowing. ✓ Implement environmental management and control measures to avoid affecting other forestry areas and individuals outside the project.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	x
IMPACT(S) TO BE CONTROLLED								
✓ Changes in the composition and structure of the flora communities.								

- ✓ Modification of habitats.
- ✓ Modification of biological corridors.
- ✓ Fragmentation and affectation in the dynamics of ecosystems.
- ✓ Alteration of the distribution, structure and floristic composition of the natural vegetable coverings.
- ✓ Fragmentation of natural plant cover.
- ✓ Alteration of forest reserve areas.
- ✓ Changes in the micro habitat and other characteristics of the forest.
- ✓ Decrease in the incorporation of biomass into the soil.

Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	

ACTIONS TO BE DEVELOPED

➢ Management of flora

Within the program of soil management, the actions that are carried out for the protection of vegetation cover are fundamental, especially those found in natural ecosystems such as secondary low vegetation.

The technical aspects include some activities that can be developed by the executing agency and that allow for a management that is increasingly adjusted to the particular characteristics of each of the areas to be intervened through the project activities. These activities include:

- ✓ Carry out a detailed delimitation of the areas to be intervened, differentiating them clearly from the areas considered to be of high environmental interest, in order to avoid affecting the vegetation surrounding the sector.
- ✓ Identify in the field the opportunities to mitigate the effects with slight variations in the design of roads, locations and infrastructure in general, whenever possible, from the technical point of view.
- ✓ Carry out construction activities in accordance with the management sheets proposed in the Environmental Management Plan for each of the project's intervention areas, strategically organizing the infrastructure.
- ✓ Carry out the characterization of forest species of commercial interest present in the site.
- ✓ The use or logging of individuals that are not within the area to be intervened and the development of the activities of the project will be prohibited.
- ✓ The possibility of modifying routes and locations of internal road corridors and initially planned locations is proposed, as long as it is technically possible, to reduce the vegetation affectation of the different coverage of the study area.
- ✓ In the abandonment phase, the implementation of replanting activities must comply with the specific recommendations of the replantation / reforestation activities, in order to avoid adverse effects related to the introduction of exotic or exogenous botanical species that alter the natural conditions and the normal functioning of ecosystems.

- ✓ Planning of forest use and silvicultural treatments that will be applied, taking into account the appropriate techniques for sustainable development and conservation of natural resources.
- ✓ In the development of the different activities included in the construction phase and civil works that imply the intervention of the vegetation, all the management strategies proposed in the present study will be taken into account, within which the methods of felling, felling or cutting of trees, the demarcation of areas of intervention and the marking of individuals to be removed.
- ✓ Bearing in mind that the activities that most impact the vegetation of the area are the removal of vegetation cover, this activity must be done under all the measures proposed in this same record, referring to the realization of forest use.

➢ Management of forest use

The forestry exploitation will be done in advance to the constructive and operative activities by means of total cutting or clear cutting (single use), consisting of the extraction of the forest mass and clearing of the shrub and herbaceous vegetation of the areas with direct intervention by the project (mine entrance, dumps, roads, benefit plant, camps, administrative infrastructure, among others), which will be properly unlimited and marked to avoid the unnecessary affectation of nearby vegetation.

Prior to forest harvesting, recognition of the site and an inventory of 100% of the species of flora to be extracted must be carried out, in addition to the possible associated wildlife in the area and take appropriate measures for their relocation and adequate management (rescue of epiphytes and fauna). The coverage in which harvesting work will be carried out, if required, corresponds to the coverage of clean pastures, where the main economic activity is extensive livestock.

➢ Previous environmental management measures to be taken into account before carrying out forest harvesting activities.

- ✓ As a general rule, in this kind of projects where land is required to build infrastructure, the permit for the single forest use issued by the respective Environmental Authority must be processed and verified; it should be compared and related its agreement with what is proposed in the forest inventory and what is approved by the entity for each individual to be removed, in order to identify possible inconsistencies that differ from the initially requested and be able to correct them. Also plan the requirements requested in the permits by the authority to fully comply with it.

- ✓ Before the start of work, the demarcation of the individuals to be logging will be carried out, where it is recommended to demarcate in the following way: they will be marked with a T (in red) all the trees to be felled and with B/T (in white) the trees that merit transfer.

- ✓ Define beforehand whether the resulting wood material and the technique of wood mobilization (mechanized and / or as provided in the environmental license, dump trucks)

require the obtaining of permits required for the mobilization of wood and timber species, as well as establishing a guideline that facilitates the definition of criteria and the calculation of costs, according to the classification of wood.

- ✓ Clearly define the transfer sites of the plant material resulting from the harvesting process according to what is defined in the specific management plans for each of the locations and the provisions of the forestry professional, in addition to estimating the cost of transportation and the distance of mobilization (important factor to determine the value).

- ✓ Project the sites for the final disposal of wood residues such as sawdust, wood shavings, among others; clearly define the specific areas for their management and the possible constructive activities required by the project, production of inputs, propagation or other activities of the trees, as well as the generation of compost to be used in the work of reforestation and slope management.

- ✓ Contact community leaders for the donation of plant material that is not used within the project, to be delivered to the community only for domestic use. Making the respective delivery by signing the minutes according to the parties defining the volume and type of material delivered. The burning of plant material and the sale of leftovers are absolutely prohibited, and all the material resulting from forest harvesting must be reused in the project activities, appropriately disposed of or donated to the community.

- ✓ Review the design of the project before work. This revision must be hand in hand with the record information of design of physical areas and roads in order not to damage or affect more vegetation than necessary.

➢ Procedures to be implemented in the felling

✓ Clearing

This activity consists of cleaning the natural land in the areas where the project works will be built, and which are covered with stubble, pastures, crops, forests, etc., and which can be classified according to the characteristics of the area:

Forest logging and clearing: includes felling of trees, removal of stumps, rootlessness and clearing of areas where vegetation appears in the form of continuous forest.

Disassembly and cleaning in non-forested areas: includes clear cutting and cleaning in areas covered with grass, stubble, debris, crops and shrubs. It also includes the total removal of isolated trees or a group of trees that do not have the characteristics of a continuous forest.

As management measures, the following actions must be taken into account:

a. The works of clearing should be limited only in the areas required for the works of the project and should be approved previously by the auditing.

b. The clearing should preferably be carried out manually to avoid damage to structures or properties whose destruction or deterioration are not foreseen or necessary for the construction of the works. If the activity is done with a backhoe, loader or a bulldozer, the operator must perform this activity under strict control of the resident or environmental inspector. The contractor will be responsible for any resulting damage.

c. The contractor must not allow the clearing process by burning, even if controlled, or the use of herbicides, without prior notice to the environmental authority.

d. The depth at which trunks, roots and other materials must be removed depends on the activity that will be carried out in the area, be it excavations, construction of dumps, beneficiation plants, among others, this depth must be agreed with the supervision.

e. The vegetal layer must be stored and protected to reuse it later in the recovery of the areas intervened by the project. For storage, the following measures should be followed: The storage site should be located together with the supervisor, taking care that it is not mixed with hazardous substances and that it is not contaminated with sterile soil. The clearing material should be stacked grass on grass, earth on earth. The height cannot exceed 1.5 meters and must be placed on a flat surface that prevents its compaction. The soil must be handled with the lowest possible moisture content. The passage of machinery and / or vehicles on the stored floor cannot be allowed.

f. The stored soil must be protected against the erosive action of water and wind; and against the direct action of the Sun. Temporary irrigation should be done to maintain humidity and periodically turn it over.

g. In areas of slopes or average hillside to temporarily conserve the vegetal layer it can be done by means of the utilization of lateral trench, to avoid that by action of rain waters this material is lost.

✓ Clearing or pruning (in cases that are required)

The first step consists of the total clearing or removal of the crown and root of the tree (branches, crown and roots), which will be carried out according to the structures to be removed in the following manner (Illustration 8-27):

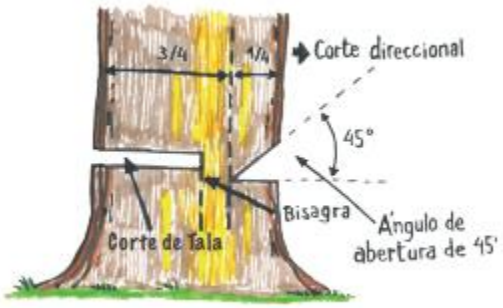

Illustration 8-27. Procedures for felling trees
Source: Bértoa, Barrasa & Maciñeiras, 2012.

- Branch pruning:

A first cut, approximately one third of the diameter of the branch at a distance of 10 cm from the main stem and at an angle equal to that created by the neck of the branch, the second cut, must be made above the branch about 20 cm from the shaft, with which, the branch is detached.

Most of the main branch should be removed leaving a stump of approximately 10 cm.

The last cut for the termination of the stump must be made from above.

The stumps left by the pruning are different for the dead and living branches. Special care must be taken not to cut the living part when a dead branch is pruned, and not to cut the neck of the branch when it is a live branch.

Small branches and regrowth -1 cm or less in basal diameter- are always cut by hand from the main shaft with pruning shears.

It should be taken into account the pruning of enhancement, made to strengthen the conformation of a single shaft and define the height of the cup for visual safety, especially in the areas of right of way. Hormonal healing should be applied in the pruning cuts to avoid disintegration or stem rot and guarantee the stability of the individual.

- Cup pruning:

It should be taken into account to cut a maximum of one third of the upper part of the cup.

An initial cut should be made on a central vertical branch, at the height that you want to leave the foliage. The procedure for branch pruning must be followed.

Subsequently, we proceed by cutting the rest of the foliage, following the established sample and checking that the new crown of the tree is not deformed.

In some cases, it is advisable to select branches, it must be done carefully so as not to mistreat the foliage that will remain.

The cuts should be treated with hormonal healing.

- Root pruning

It consists of cutting the main and secondary roots of trees and adult shrubs that are interfering with infrastructure networks or civil works. In case the environmental authority determines the possibility of conserving a tree by means of root confinement, the following procedure must be carried out:

Aerial pruning of the third outer part of the cup, to avoid dehydration and death of the tree.

Clean around the tree at a radius equal to or greater than 3 times the diameter of the shaft.

Make a vertical cut, of varying depth according to the type of root system that each species presents and according to the shape of the land. Pruning should be done with scissors, saw or chainsaw, never with a machete.

Apply hormonal healing in the cuts of pruning, to avoid disintegration or root rot and imbalance between the aerial systems and radicular.

The excavation made with 6-gauge polyethylene should be covered. The transplants are joined with two-inch adhesive plastic tape, without leaving open spaces, to ensure that no type of root is passed and finally proceed to make the filling of the excavation.

At the end of the working day, the area should be completely clean and, once the treatments to the affected vegetation have been completed, a report should be submitted to the auditing authority and to the environmental authority where each of the treatments and the applied management are established.

-Shaft pruning

You can only make logging for authorized individuals through the administrative act issued by the Environmental Authority, for this purpose, the forest inventory, to obtain such permission must be made as required by each authority. Once the permit has been obtained, logging must be carried out technically, following the parameters established and approved by the environmental authority, and considering at least the following preventive measures (see Illustration 8-28):

- Follow safety standards in terms of signaling and occupational health.
- Have the Forest Engineer, who will direct this activity.
- Cut only the trees approved and marked, so as not to affect more vegetation than required for the execution of the works and avoid future impacts, leaving unstable soils, since the roots of the trees are responsible for keeping the soil in place and prevent it from eroding.
- The felling should start from the cup -clearing- to the base of the shaft, using handlebar to tie and guide the fall of the tree to the area with less risk and avoid damage to the surrounding infrastructure or third parties.

- During logging it will be necessary to temporarily stop pedestrian and vehicular traffic in order to prevent any type of injury to bystanders or damage to project vehicles and other community.

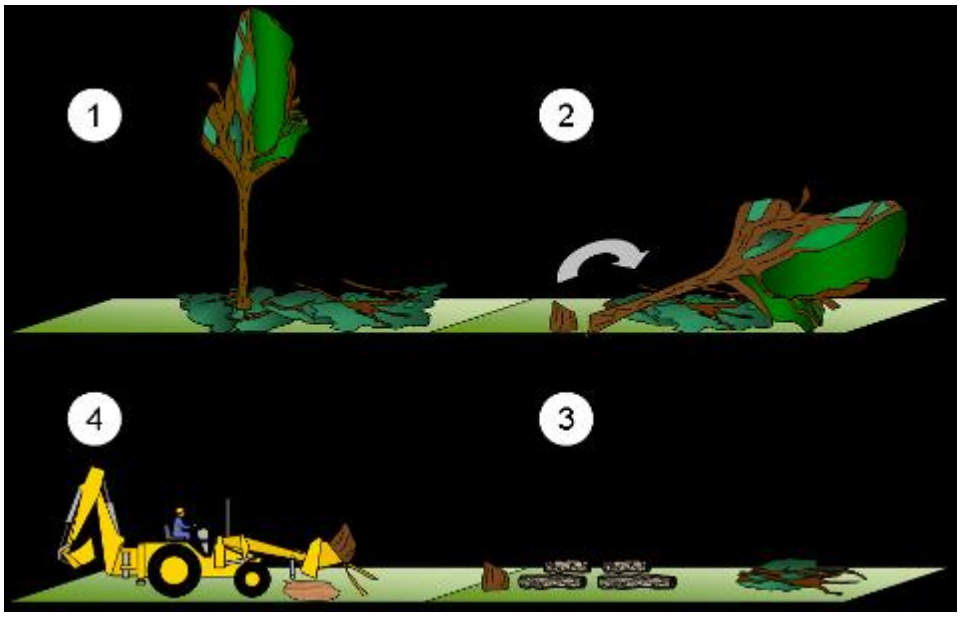

Illustration 8-28. General scheme of forest use.
Source*: Universidad del Tolima, 2011.*

In the same way, the following activities will be carried out:

Upon entering a cutting area, the hazards of the area will be evaluated. The slope of the terrain, soil conditions, wind conditions, and signs of loose bark, broken branches or other damage to the trees will be observed. Exit areas will be planned in case of emergency. Each tree and its fall step will be evaluated to identify potential hazards and problems before beginning to fell.

Orient the fall of the tree and cut it in two stages. For the cut of fall a wedge is made on the shaft, up to 1/5 or 1/4 of the diameter; Subsequently, a second cut is made transversely from the opposite side to the first and slightly downward, reaching a few centimeters above the fall cut. Once the tree has been felled, the first of the thicker branches is removed, and then the tree is cut according to the dimensions of the material for stacking of stepladders or trench for slope stabilization (see Illustration 8-29).

To do this, chainsaw suitable for size and weight will be used; If required, handlebar will be used to tie down and guide the fall of the material to an area with lower risks or that may affect other individuals considered as transfer or endangered species. When individuals do not have a considerable diameter, they can use a saw and a knife to carry out this activity.
As the felling is done, the team will select the wood according to the size and the species. It will place it in the temporary deposit site, until having volumes that merit the process of the safe-conduct mobilization; The location and duration of the collection will be agreed with the Audit

Department from the date of felling. Prior to logging, the Contractor will coordinate with the Supervisor, the destination of the resulting material.

- ✓ Uprooted (in the cases that are required)

Stumps and roots should be removed to the level of the subgrade. All the cavities caused by the stumps and roots extraction will be filled, shaped and compacted until the surface adjusts to that of the adjacent land. Once the work is finished.

Illustration 8-29. Cut in wedge to direct the fall of the tree.
Source: Universidad del Tolima, 2011.

- o Cleaning and maintenance of order

The logging work areas should be left clean daily at the end of the day, free of objects such as paper bags, plastics, food waste, etc.

- o Final disposal of wood and plant residues.

This activity refers to the loading, transport and final disposal of the waste generated by the work of felling, pruning and clearing, in which a high amount of wood, foliage, branches that may or not have a later use in the work or in the community.

In the first instance, the waste material generated by the activity of pruning, harvesting or felling should be used, as far as possible, for the different construction activities that require wood, for the production of organic fertilizers, inputs for planting, propagation or other own activities of the tree planting.

In the second instance, it can be donated to the community, upon written request, for which a donation certificate must be drawn up specifying the final use that the resource will have, and if applicable, the environmental authority will be requested and direct its use. In accordance with current regulations, the sale of wood is prohibited.

The branches and foliage should be arranged in the final disposal area of excess material, interspersing a layer of 10 cm to 15 cm of vegetable waste, every 40 cm of sterile material and debris disposed, compacting the filling according to the procedure for the conformation of the final disposal site of materials. Finally, the layer of soil obtained from the cleaning will be reused to finish the area of final disposal of surplus material, extending it on the surface to proceed, in case of previous agreement with the owner of the property, to carry out the work of reforestation or planting

This material must be adequately stockpiled to avoid its decomposition, for which purpose it will proceed to irrigate and periodically turn it over. In the event of areas devoid of organic soil, prior concept of the supervision, you can reuse the material in the restoration of these sites, in order to promote the reforestation of the area and to achieve the recovery of plant cover altered during development of the works. When it is required to transport the felling residues, one must have the mobilization permit granted by the environmental authority.

- ✓ Destination of wood derived from felling.

With the authorization of the Environmental Audit of the Project, the Contractor may use the logging products (wood) for the following purposes, in order:

- Use in the project. Signs, wooden forms, pallets, boards, boards, wooden props, barriers for delimitation of works, scaffolding, poles, tool handles, beams, piles, tool boxes, among others. For this purpose, the Contractor will use material in perfect conditions, free from defects and adapted to the required use.

- Mayoralties or local authorities. We will proceed to contact the mayors or local authorities in the area of influence of the project, in order to evaluate the possibility of donating the wood to the community.

- o Transfer to the authorized waste site

Wood that does not meet the requirements required to be used by the project, should be cut into small pieces (maximum 1 m in length) and transferred to the site authorized by the Supervisor. The plant residues resulting from the felling will be disposed of in places authorized for this purpose and approved by the Audit Office; the contractor will keep records of volumes and disposal of waste given by authorized sites.

- ✓ The material from felling or that which cannot be reused, will be transported to the dumps authorized by the authority in charge; the contractor will have the supports and the respective registers of disposition and volume, which must be attached in the periodic reports.

- ✓ However, there is the option that the material can be incorporated as organic material to the soil, for this the material must be chopped or proceed to its production of compost, it may also be donated to the community through a signed act between the parties clearly stating the type of product delivered and its volume, the foregoing will be implemented prior approval of the Supervision and monitoring.

➢ Management of reforestation

The reforestation and / or replanting program includes different measures aimed at the recovery of both the landscape and the vegetation cover of the areas intervened by the execution of the project, which will be carried out during the stages of the project that intervene in areas and become destitute of vegetation. In any case, the following general criteria for reforestation and / or replanting will be taken into account:

- ✓ To facilitate the recovery of the affected areas, the surface layer of removed soil, previously stored or disposed in fresh places, which is an excellent edaphic material, should be reused. Subsequently, a vegetative cover must be established by planting a fast-growing grass or legume, which will be sown and / or planted at the beginning of the rainy season, preferably.

- ✓ For the areas to be harvested, in addition to the herbaceous species or species to be planted, the most appropriate sowing system will be defined, according to the type of soil, environmental conditions, slope and stability; the possible options can be: solons, sods or seed seeding.

- ✓ Once the work of forming slopes has been completed, they will be replanting grass.

To carry out the grass replanting the area of work will be adapted by means of the following actions:

- The status of engineering works will be evaluated to manage and control unstable areas. Likewise, situations that put the work of grass replanting at risk will be reported.
- The terrain will be outlined, eliminating large lumps or blocks by disaggregation, and removing bumps or sharp depressions. The practices of profiling and physical adaptation of the land will be carried out manually or mechanically, depending on its extension.
- Bearing in mind that grasses and herbaceous cover diminish the energy of the runoff waters, retain the soil through their root system and improve the infiltration properties, the slopes will be harvested with these species.

- ✓ Replacement of sods that have not developed roots or that have fallen or collapsed leaving the slope uncovered. 100 g of organic fertilizer per m2 will be used during its maintenance, which will be done up to the total capture of the material.
- ✓ In flat areas, depending on the substrate material chosen, the compaction factor must be taken into account, so that the final thickness of the substrate in the areas to be recovered is at least 5 cm by natural compaction after sowing grass.
- ✓ It is recommended to preferably use native herbaceous species for reforestation, although these can be combined with others that have special properties for the retention and mooring

of the organic layer of the soil or the formation of live barriers to avoid the genesis of erosive processes.

- Methods of grass planting

Planting by stolon is a system of vegetative reproduction (the seeds do not intervene), that is to say, they are a type of creeping stem that is born from the base of the main stems; it can develop on the surface of the ground (epigeous solons) or under it (underground solons). The solons to be selected will have at least one section that has at least foliage (to assimilate light) and a knot or bud. These sections will be planted using the triangle or quincunx system. Three stems or pieces will be placed per site in a continuous manner, and then covered, so that two or three lower internodes are covered, and the foliage is discovered. This system is feasible to apply if the material is obtained from areas surrounding the project area of approximately 1 ton per hectare.

The hole in the ground will be 5 cm deep and 5 cm in diameter using sharp elements and will be 15 cm apart from each other; In each hole organic material will be placed to guarantee the seizure. The solons will be protected to prevent dehydration with a size not exceeding 10 cm which will ensure better rooting. Bio stimulant will be applied to encourage the development of the root system. The replanting of the solons that have not been satisfactorily started will be done in its entirety.

The sowing by sods will consist of the placement on the ground of blocks of lawn of uniform thickness, taken from a developed meadow or herbaceous vegetal cover, coming only from the areas intervened initially by the project, cutting in the form of a square, with a small portion of the soil that supports them, later they will be placed on the surface of the areas to reforestation, holding them by means of wooden stakes to prevent them from moving while the roots are fixed to the ground. The sods will extend on the surface, making them marry in the best way, avoiding overlaps and gaps in order to leave a smooth and even surface of grass planting

It is required to have personnel that have experience in the management of this type of work.

To proceed to place the sods, it is necessary to have an organic layer or, in its absence, improved sand with organic fertilizers in a ratio of 500 grams per m2. The material will be provided during the activities of the well-protected clearing; only one kind of grass will be used on the slope. The sods will extend over the surface of the slope beginning at the top and descending to the extent that the process advances; this activity will be carried out in an orderly manner avoiding overlaps or empty spaces, guaranteeing a uniform surface. The replacement of the stems that had not developed roots or that had fallen or collapsed leaving the slope uncovered was performed. 100 grams of organic fertilizer per m2 are produced during its maintenance, which is done until the total material capture.

Once planted on the surface it will be watered daily for a week and then according to your need to achieve its full establishment. The first pruning, having to do the 45 days of planted the meadow, to avoid the displacement of the sods.

In the case of sowing grass on slopes of less than 45 degrees, wood stakes (approximately 4) per square meter are used. For people over 45 °, it is advisable to use synthetic mesh, so that it does not move the earth.

Broadcasting seeded is a simple and common method that can be done manually or mechanically and consists of throwing the seeds evenly on a predetermined surface. Its arrangement must be done in a uniform manner, for this it is necessary to take into account the variables such as the direction and speed of the wind, in such a way that its uniform distribution is guaranteed. To improve the distribution, you can also use the combination with material such as sawdust or fertilizers that do not contain nitrogen to prevent the seed from burning; Once the seed is made, the seed should be covered with earth.

- Abandonment and final restoration

For the phase of abandonment and restoration of infrastructure associated with the project, the sites to be harvested and / or reforested will be visually verified and the original vegetation will be recovered or failing to promote the establishment of a pioneer vegetal cover that protects the soil and facilitate the regeneration of the vegetation of the intervened zone.

It should be noted that the reforestation or establishment of a pioneer vegetation cover will be carried out only in specific areas and not as a guideline for the reforestation of all the areas for which the application of replanting is applied through the methods described above.

- Maintenance works

After reforestation, a maintenance program must be carried out. For the execution of the maintenance program, it is recommended to include the following tasks, as minimum measures in order to maximize the percentage of survival of the plantation and guarantee an adequate establishment and subsequent development of the vegetation.

- Watering: the frequency of irrigation in the reforested areas will be defined taking into account the climatic conditions. The application of a hydro-retainer is proposed at the time of sowing. In addition, it is necessary to contemplate the application of irrigation according to the conditions of precipitation and the state of the vegetation, according to what the forester professional plans.

- Reseeding: Plant material in very good condition should be used for planting. However, replanting of dead or poorly developed material should be considered.

- Brush and weed control.

- Fertilization: For this work, prior to sowing, soil analysis should be carried out at each site in order to establish the real requirements of the vegetation in terms of nutrients. The diagnosis and formulation of doses and periodicity for the application of fertilizers should be determined by the forestry professional.

- Phytosanitary control. A monitoring program should be formulated to detect the appearance of phytosanitary problems in time and have the possibility of applying the necessary corrective measures according to the type of problem and the technical concept of the forestry professional.

The execution of the maintenance tasks must be carried out with the planning, coordination and supervision of a forestry professional, who will determine the periodicity, relevance and form of execution of these, according to the conditions of each site, the species used and the state general vegetation.

- Training, outreach and environmental education seminars

The measures proposed for the proper management of the flora, the forest use and the reforestation of intervened areas require the active and joint participation of all the personnel that work in the project, taking into account that they are the active part and they are the ones who will be in front of the interventions that are going to be carried out in the area.

That is why the accomplishment of all the training activities and the participation of the staff is essential to sponsor the care of the vegetation. The most relevant actions that are proposed to achieve this purpose are described in the Program of education and training for personnel linked to the project with emphasis on ecosystems and species of flora and fauna of interest.

QUANTIFICATION OF THE MEASURE

It is proposed that with the execution of the measures proposed in this sheet for the exploitation and reforestation, an adequate level of effectiveness is obtained for each of the subprograms contemplated, as follows:

- ✓ Management of the flora with a 100% effectiveness in the non-affectation of the flora not contemplated inside the areas of interest.
- ✓ Management of forest exploitation with an effectiveness of 90% in relation to the disposal or reuse of products and 100% or less in relation to the volume of harvested wood with respect to what is authorized by the environmental authority.
- ✓ Management of reforestation with a 100% effectiveness of replanting of the areas proposed for this purpose and 90% with respect to the success of said activity in these areas.

PLACE OF APPLICATION

The management measures proposed in this file must be applied in the following sites:

- ✓ Management of the flora in all the location areas of the infrastructure related to the project that have vegetal cover or species of isolated flora.

- ✓ Management of forest exploitation in intervention areas for underground mining, where isolated individuals were identified in the FUSTAL state.
- ✓ Management of reforestation in all areas that have been affected in their vegetation cover and that should be subject to the activity such as slopes, abandonment areas, among others.

BENEFITED POPULATION

The population benefiting from this management program will be the community surrounding the project's intervention areas.

MECHANISMS AND PARTICIPATORY STRATEGIES

The participatory mechanisms and strategies that will be implemented for the activities covered in this file: flora management, forest exploitation and reforestation are the following:

- ✓ Socialization of the community near to the area of direct social influence of the project, including general aspects of the project and particulars of the activities of the card.
- ✓ Hiring of labor from the sidewalks surrounding the area of direct social influence of the project.
- ✓ Staff training in relation to general aspects of the project and specifics of the activities of the file.
- ✓ Seminars or workshops to socialize the results of the project and environmental education to the inhabitants of the villages located within the area of direct social influence of the project.

REQUIRED STAFF

For the development of the management activities proposed in this file, the following personnel profile is required:

- ➢ Professionals.
  - ✓ Professional in forest sciences with experience in the development of this type of projects, forest exploitation and reforestation
  - ✓ Social professional with experience in community management.
- ➢ Technicians.
  - ✓ Personnel such as drivers, machinery operators, chainsaw operators, etc.
  - ✓ Controller or environmental manager in charge of monitoring and monitoring activities.
- ➢ Unskilled labor hand.

✓ Work assistants.
SUPERVISING AND MONITORING INDICATOR(S)
✓ Number of species inventoried / Number of species authorized to take advantage * 100. ✓ Intervened area (m2) / Expected area of intervention (m2) * 100. ✓ Material quantity (m3) clearing used / material quantity (m3) total clearing * 100. ✓ Area (m2) used for reforestation of the areas intervened by the project / Intervened area (m2) * 100. ✓ Number of trees felled / Number of trees projected for logging * 100. ✓ # workshops held / # workshops proposed * 100. ✓ Number of protection and security measures implemented / Number of protection and security measures proposed * 100.

RESPONSIBLE (S) FOR THE EXECUTION	
ENTITY / INSTITUTION	**ROLES***
TOUCHSTONE	PL – OP – SP – SG - IN
Contractor companies (if it is necessary)	IN
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE	
See Annex 8-1	
BUDGET	
See Annex 8-2	

8.1.2.1.2 Flora management program.

FLORA MANAGEMENT PROGRAM								
OBJECTIVES								
✓ Apply the measures to carry out the appropriate management of atmospheric emissions, in order to prevent, mitigate and control the potential impacts to occur on the stomata of the plant, because they are those that allow gas exchange for respiration and adequate photosynthesis.								
GOALS								
✓ Maintain air quality standards within the parameters allowed by the standard. ✓ Execute at 100% the measures foreseen in this program and that apply to the project.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	*x*
IMPACT (S) TO BE CONTROLLED								
✓ Alteration in the procedure of the stomata of the plant.								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								

➢ Atmospheric Emissions Management

The activities generated for the emissions produced by fixed sources, obtain the corresponding permission of atmospheric emissions for the mobilization of material, benefit plant, pits, among others. The permit must comply with the provisions established in Article 73 and following of Decree 948 of 1995 and Resolution 619 of 1997, in which there are establish the factors from this environmental permit is required. The levels of emission to the atmosphere of the fixed sources must comply with the levels established by resolution 909 of 2008 and 1309 of 2010, and as a consequence must meet the emission levels established in Resolution 601 of 2006 and 610 of 2010.

The granular materials, cutting and excavation will be permanently covered with canvas or plastic in its temporary storage site, for its later reuse in the work; those materials stored for transport to the ZODMES must also be covered (with geotextile mesh or canvas), in order to prevent them from dispersing due to wind effects.

In order to prevent, mitigate and control the emission of gases into the atmosphere by the combustion of engines of machinery and vehicles, and emissions of particulate material from unpaved roads or transported materials, the following measures will be considered:

- An adequate informative and preventive signage will be implemented, in order not to exceed the established speed of vehicle displacement. Within the project facilities the speed will not be greater than 20 km/h and in the access, roads will not exceed 30 km/h.

- Periodic maintenance will be carried out on the machinery and light and heavy vehicles operating at the service of the El Pescado Project, guaranteeing proper operation.

- It will be verified that the vehicles linked to the project have the gas emission certificate and the mechanical technical revision, as established by law 769 of 2002.

- The vehicles that will transport material (aggregates, tails, sterile, etc.) and that generate dust (particulate matter), have to transit covered with resistant tarps, in order to avoid fugitive emissions of a particular material. The cover must be made of resistant material to prevent it from breaking or tearing and must be firmly attached to the outer walls of the container; In addition, the structure of the container will be continuous (without breaks, perforations, grooves or spaces) and the load will be accommodated flush with the lower edges of it. Machinery that is not in operation must be turned off in order to avoid the emission of gases and particles.

- The use of certified quality fuels and / or the modification in order to use cleaner fuels such as gas will be promoted.

- If there is possible, equipment with injection engines and equipped with catalysts will be used.

- Different methods will be implemented to control the speed of vehicles such as the installation of speed reducers, in addition to the correct signaling in the project areas.

- Environmental education programs will be developed for all people involved in the project.

- The access roads will be moistened (unpaved), to avoid the removal of particulate material.

- The excavation material that can be reused, which will be temporarily installed in a site, must be permanently covered, preventing that can being washed away by the wind.

- In the beneficiation and dump plants, the management measures included in the compensation program record will be adopted for the use of the woody and non-woody cover. For these, the monitoring will be carried out in accordance with the administrative act that authorizes that plants, by contracting of a certified firm; The auditing must know the requirements and enforce them.

Another one of the actions to avoid dispersion of particulate material during the construction activities, position of both sterile and tails, through the use of filters in the dumps and / or places of storage and disposal.

As a complement to these activities, live barriers will be used in the boundaries of each of the properties close to the project infrastructure, which will not allow the particulate material to reach the closest flora species, making it difficult for photosynthesis and additionally it will reinforce the isolation of noise and complies with a function of landscape reconfiguration.

QUANTIFICATION OF THE MEASURE

It is expected that, with the execution of the measures proposed in this record, an adequate level of effectiveness will be obtained for the program contemplated here, as follows:

✓ Flora management program, due to changes in air quality that are 100% successful with respect to the diminishing scope of the direct impact on plant species.
PLACE OF APPLICATION
Management measures proposed in this file must be applied in the following sites: ✓ Points where agreement was reached with the environmental authority and the owners of the properties, the implementation of the actions to develop proposals and which are located within the area of direct or indirect influence of the project or the sites where the greatest impact was presented.
BENEFITED POPULATION
The population benefiting from this management program will be the community surrounding the project's intervention areas.
MECHANISMS AND PARTICIPATORY STRATEGIES
The following are the mechanisms and participatory strategies that will be implemented for the activities covered in this file: flora management program: ✓ Socialization of the community settle down in the area of direct social influence of the project, including general aspects of the project and particular activities of the card. ✓ Hiring of labor from the sidewalks located near to the area of direct social influence in the project. ✓ Training of the staff in relation to general aspects of the project and individual activities of the file. ✓ Workshops or talks in order to socialize the results of the project and environmental education to the inhabitants of the villages located within the area of direct social influence of the project.
REQUIRED STAFF
For the development of the management activities proposed in this file, the following personnel profile is required: ✓ Professionals: ✓ Professional in forestry with experience in environmental restoration. ✓ Civil professional. ✓ Unskilled labor. ✓ Non-professional personnel such as drivers, low-level workers, etc.
SUPERVISING AND MONITORING INDICATOR(S)
✓ # of areas with protection barriers / # of total project intervention areas * 100 ✓ Polluting charge removal / regulatory removal of particulate materials generating parameters.

RESPONSIBLE(S) OF THE EXECUTION	
ENTITY/INSTITUTION	**ROLES***
TOCHSTONE	PL – OP – SP – SG - IN

Contractor companies (if it is necessary)	IN
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8-2	

8.1.2.2 Plant conservation program

8.1.2.2.1 Program for the conservation of plant species with some degree of threat, endemic or prohibited or not registered or not identified.

PROGRAM FOR THE CONSERVATION OF PLANT SPECIES WITH SOME DEGREE OF THREAT, ENDEMIC OR PROHIBITED OR NOT REGISTERED OR NOT IDENTIFIED								
OBJECTIVES								
✓ Protect the native species of wild flora prioritizing the endemic species, or which are cataloged in danger and closed, located in the area of intervention of El Pescado project. ✓ Rescue and locate the stand of trees and the saplings of threatened or critically endangered species of flora that are located in the areas to be intervened, for the construction of El Pescado project. ✓ Relocate and rescue the epiphytes that are found in the area that will occupy the mine's infrastructure ✓ Reduce the impact and impact on plant species in critical danger, closed, unregistered or unidentified derived from the activities of the project.								
GOALS								
✓ Protect 100% of flora species that are closed or in critical danger located in the area under intervention for the construction of the project. ✓ Rescue and relocate 100% of the stand of trees and saplings of the species of threatened flora found in the area under study and intervention for the construction of the project. ✓ Rescue and relocate 100% of the epiphytes located in the area under study for the construction of the El Pescado project infrastructure.								
Stages of the project	*Exploration*		*Construction and Assemble*	***x***	*Exploitation*	***x***	*Final Closing and Post Closing*	**x**
IMPACT(S) TO BE CONTROLLED								
✓ Changes in the composition and structure of wildlife communities ✓ Modification of habitats ✓ Interruption of biological corridors ✓ Changes in the continuity of coverage / fragmentation ✓ Alteration of the structure and floristic composition ✓ Alteration of the distribution, structure and floristic composition of the natural vegetable coverings ✓ Fragmentation of natural plant cover. ✓ Loss of Biodiversity.								
Type of measure	*Prevention*	**x**	*Mitigation*	**x**	*Correction*		*Compensation*	

ACTIONS TO BE DEVELOPED

1. Environmental training program.

A training program should be carried out for all the personnel involved in the project, focused on protecting and conserving floristic resources; 3 training workshops will be held, with an intensity of 6 hours each.

The program must involve at least:

Identification of species with some type of threat: The personnel involved in the project will be informed about the species that are threatened in the study area, such as: Abarco (Cariniana pyriformes Myers., LECYTHIDACEAE), Black soul (Magnolia spinali) , MAGNOLIACEAE), Gualanday (Jacaranda mimosifolia, BIGNONIACEAE), Anime (Dacuaydes colombiana Cuatrec, BURSERACEAE), Almond tree (Caryocar amygdaliferum, CARYOCACEAE), Yambé (Caryodaphnopsis cogolloi, LAURACEAE), Coco agave (Couratari guianensis, LECYTHIDACEAE), Mule dead (Gustavia longifuniculata and Guatavia gentryi, LECYTHIDACEAE), Coconut crystal (Lecythis mesophylla, LECYTHIDACEAE), Monkey pot (Lecythis tuyrana, LECYTHIDACEAE), Volador (Huberodendron patinoi Cuatrec, CARYOCACEAE), Cirpo (Pourouma hirsutipetiolata, CECROPIACEAE),

All personnel will be trained on the methods that must be followed to carry out the rescue, blocking and transfer of the different threatened species.

- ✓ Contractors and workers will be informed that burning is prohibited.
- ✓ Disclosure of the legislation that applies to the protection of wild flora.

2. Management of plant species in critical danger, closed, unregistered or unidentified

The existing natural resources in the area of direct influence of the project, represented mainly by ecosystems of low secondary vegetation, low dense forest of the mainland and clean ducks, are the habitat of twenty-one closed species at a national and regional level.

A thorough inspection must be carried out in all the area to be intervened, in order to verify and identify floristic species of ecological importance or of another category that were not included in the inventories (realized through a stratified sampling and random) of forest areas that need to be removed, such as bryophytes and threatened species. In case they are found, said identified species will be protected or moved to another site that presents the same or similar environmental conditions to those of their origin. The following table shows the relationship of the species identified with some type of risk.

As a result of the forest inventory in the area of direct influence of the project, 19 categorized species were identified as related in Table 8-10 and Table 8-11:

Table 8-10. Wild flora species threatened, banned, endemic or with some degree of threat in the area of direct influence for the biotic component.

N	FAMILY	SPECIES	COMMON NAME	THREATENED
1	BIGNONIACEAE	*Jacaranda mimosifolia***	Gualanday	VU

2	BIXACEAE	*Cochlospermum sp***		EN
3	BOMBACACEAE	*Phragmotheca rubriflora***		VU
4	BURSERACEAE	*Dacryodes colombiana* Cuatrec**	Anime	EN
5	CARYOCACEAE	*Caryocar amygdaliferum***	Almendrón	VU
6	LAURACEAE	Caryodaphnopsis cogolloi**	Yambé	CR
7	LECYTHIDACEAE	*Cariniana pyriformis**	Abarco	CR-Veda
8	LECYTHIDACEAE	*Couratari guianensis***	Coco cabuyo	VU
9	LECYTHIDACEAE	*Gustavia gentryi***	Mula muerta	VU
10	LECYTHIDACEAE	*Gustavia longifuniculata**	Mula muerta	EN
11	LECYTHIDACEAE	*Lecythis mesophylla***	Coco cristal	VU
12	LECYTHIDACEAE	*Lecythis tuyrana***	Olla de mono	VU
13	MAGNOLIACEAE	*Magnolia espinalii***	Alma negra	CR
14	MALVACEAE	*Huberodendron patinoi* Cuatrec**	Volador	VU
15	CECROPIACEAE	*Pourouma hirsutipetiolata***	Cirpo	Nativa - VU

* Individuals identified in the intervention areas (project footprint).

** Individuals identified in the area of direct influence of the project.

Table 8-11. Species with restriction and prohibition in the study area.

COMMON NAME	SCIENTIFIC NAME	FAMILY	CONDITION
Canelo	*Aniba sp*	LAURACEAE	Prohibition
Alma negra	*Magnolia espinalii*	MAGNOLIACEAE	Prohibition
Macana	*Wettinia kalbreyeri, W. hirsuta*	ARECACEAE	Restriction
Guayacan	*Tabebuia chrysanta*	BIGNONIACEAE	Restriction
Algarrobo	*Hymenaeae coubaril*	CAESALPINACEAE	Restriction
Caguí	*Caryocar amygdaliferum*	CARYOCACEAE	Restriction
Sapan	*Clathrotropis brunnea* Amshoff	FABACEAE	Restriction
Aceituno	*Humiriastrum colombianum*	HUMIRIACEAE	Restriction

Source: INGEX, 2016.

One of the most important strategies that are implemented to guarantee the conservation and protection of an endangered, endemic or forbidden species, corresponds to its use in the ecological restoration programs that are carried out as compensation measures against intervention actions on resources natural There, it is also important to take into account the existing technological packages of these species, so that their silvicultural management and propagation in the nursery is carried out in an appropriate manner to result in the success of the repopulation programs.

Likewise, the ecological temperament of the species must be taken into account in order to carry out an adequate implementation according to the different successional states where they will be used and that comply with the ecological functions proper to ecosystems in general.

In cases where it is necessary to intervene in areas where endemic, endangered, or new species are naturally established, it will be necessary to take into account the following guidelines for their management, guarantee their protection and conservation:

Depending on the area that is susceptible to intervention, protocols should be established for the development of operational activities that require the removal, blocking, transfer and establishment of

the species covered in this management sheet. These operative activities are subject to the characteristics of the soil, the land, the topography, slope, drainages, accessibility, among others, as well as the particular characteristics of the species that must be handled.

In the first instance, it will be necessary to establish the existence of these species and assess the logistical aspects for their management, whether for the management of high forest, stand of trees, saplings, and offshoot, an activity that should be valued by Forest Engineers, Botanists and Dendrologists experts in the determination of species in the field, to guarantee that the treatments will be carried out on the mentioned species.

3. Rescue and transfer of Stand of trees and Saplings.

In this program, only the stand of trees and saplings of the threatened species that IUCN reports for the study area will be rescued and moved.

Sapling is defined as timber species with a total height of less than 5 cm DBH and less than 1.5 m and Stand of trees as individuals with a diameter of between 5 cm and 10 cm DBH and heights of between 1.5 m and 3 m.

Recommendations to consider for the collection of saplings and blocking and transfer of stand of trees.

This activity must be carried out before starting the logging itself.

- ✓ According to the description of the vegetation and forest inventories, the species to be rescued and moved must be determined. It must include all species of scientific interest, protected, banned or with some type of risk or threat.

- ✓ At least the following tools and materials must be available: pike, shovel, pigeon, hoe, pruning shears, trowel, plastic bags (different sizes of coarse gauge), fique sacks, plastic boxes type fruit or vegetable packaging, Hormonal healing, newspaper, water and fique for mooring.

- ✓ The saplings of timber and/or woody species should be made to block the roots. This procedure consists of making a cut of the soil that sustains them in such a way that a ground bread is left in each individual that is rescued.

- ✓ To the stand of trees, same as saplings, the roots must be blocked (see Illustration 8-30).

Illustration 8-2. Technical way to block a tree for later transfer.
Source: Universidad del Tolima, 2011.

Later the root is wrapped in fique fabric and tied with fique. This is how the tree is ready to be moved.

- ✓ Once the rescue of the species to be protected has been carried out, they are immediately relocated to a place similar to their place of origin, where no intervention is present, or they are moved to a shady place with abundant humidity for their subsequent relocation.

- ✓ Once the species are relocated, they must be hydrated with abundant irrigation.

- ✓ If cutting of roots or branches is required for the rescue, pruning shears or a good cutting tool should be used to obtain a smooth cut. Later a scar product is applied.

3.1 Selection of areas for transfer

Make the selection of areas to move the rescued species, having as support the thematic cartography of the EIA scale 1: 25,000, ocular inspection and knowledge of the residents and the community.

3.2 Data record

Carry out a control of the characteristics of the individuals transferred by registering size characteristics (total height and WTP -diameter at chest height), Magna Sirgas coordinates and location in relation to the abscissa where the rescue was performed.

3.3 Inventory and location of transfer individuals

The inventory of transfer individuals will be made, identifying total height and DAP. The total number per section and the transfer categories (stand of trees and saplings).

4. Saplings and stand of trees

For the case of the saplings and stand of trees that are under any of the classification parameters of this type of species, it will be necessary to advance the following silvicultural treatments:

- Stability pruning

Pruning is a silvicultural management practice that allows you to configure the crown of trees to prepare them against the following treatments that are required for their establishment in the final destination site. The stability pruning gives balance to the tree that will be object of intervention and will facilitate its transfer; It should be done especially in the dead branches with the appropriate techniques that avoid mechanical and phytosanitary damages to the individual, for which tools must be used in perfect condition, as well as the use of disinfectants and healing.

- Blocking

Once the pruning treatment has been carried out, it will be necessary to evaluate the size and shape of the block or bread from the earth to make the blockade, as well as the evaluation to establish the use of certain tools, depending on the degree of difficulty that this treatment demands for each individual. For the blockade as such, the excavation of the earth surface that is around the individual to intervene is carried out and in this way form the root ball or portion of earth that will move, and which contains the root system of the tree. Depending on the limitations or operational facilities, excavations can be carried out through the use of a backhoe or with the use of hand tools.

- Lifting

Prior to the lifting operation, the characteristics of the environment of the individual to be intervened must be evaluated, taking into account the anchorage points of the chains and / or handles that are required for this operation; For this purpose, expert arboriculture professionals must be in place to guarantee both the appropriate safety measures and the proper use of materials and tools that resist the loads to which they will be subjected; there it is important to take into account the density of the wood, the diameter and the height of the individual to perform the resistance calculations

- Transport

It is about mobilizing the blocked tree from its place of origin to the final destination; said final destination must be previously prepared in order to avoid delays in the reseeding operation and possible physiological and mechanical damage of the individuals to intervene. During the transport operation, the individual must be properly anchored to the transport vehicle and held with tools that do not mistreat its outer or inner bark, with the cup properly protected by burlap (textile mesh used as a cover to protect the cup in a manner of packaging and which is immunized to prevent the attack of insects).

Preferably the transport of the tree by crane or low bed is recommended, depending on the size of the individual; When the tree is too tall it must be transported horizontally in order to avoid accidents, but if it is medium-sized trees, it can be transported vertically and optimize the space in the vehicle to carry several individuals at a time. As a safety measure, it is also recommended that the transport vehicle be

accompanied by at least two escort vehicles with their respective signaling devices. For all these operations it is required that all the linked personnel have all the security elements that guarantee their protection against possible accidents and they must follow the letter of the security protocols applicable for each phase of the process.

- Planting and maintenance

As mentioned above, the final planting site must be previously prepared and properly selected to reduce the chances of mortality of the individuals to intervene. It should be noted the stability in the structure of the root ball to avoid possible accidents in the final handling and disposal of ground bread at the time of planting, but first of all it is important that the handling of the tree is carried out with complete caution and following the directions technicians of the team of expert professionals in charge of this operation. All the maintenance and management activities of the individuals blocked and moved to the final planting site should be guided by the respective management plans that are formulated for each case and taking into account the characteristics of the species, sizes, quality of site and spatial arrangements or designs that will be previously established.

5. Non-tree species - Rescue of Epiphytes.

This category includes endemic, threatened, endangered plant species or new vascular and non-vascular bryophyte species. Those species that are established in the natural areas subject to intervention by the project's own activities, should be relocated following the guidelines presented below:

Creeping or creeping species such as bryophytes are harvested with all the substrate and bark from which they are attached; For example, in the case of orchids, these are taken with the whole tuber and a good part of the solid substrate where it is fixed, it is recommended to tie it with fique strings to maintain said substrate and bark.

All bryophytes found in the forest with a basal cover greater than 10 cm will be rescued from the ground level (ground) to the upper part of the same at a maximum height of 5 m.

The material should be moved in plastic baskets that facilitate transport. Bromeliads rescued and moved will be established in the shaft and branches of mature trees with heights greater than 5 m, the number of bromeliads to be moved per tree should be established by the professional in charge.

The recommendations and safety guidelines for work at height should be followed, such as having a safety helmet, safety belt with harness, and an eye protector against particles. As much as possible, safety shoes should have non-slip soles and steel tips.

- Determination of material

For epiphytic species, it will be necessary to have botanists, dendrologist and forestry in charge of determining the presence of individuals of the species dealt that are in this management sheet, not only present in the areas to be intervened but also in the areas of influence direct and that may be affected by project activities. Specifically, for the bryophytes, it will be necessary to determine the type, size,

shape and access to the phorophytes, establishing in turn the orientation in which the epiphytes are concentrated.

- Initial recognition of the clearing strip

Take a preliminary tour of the strip where the hosts of the epiphytes are to be rescued, to identify the characteristics of relief and access conditions, by the work team in each section and thus take the appropriate safety and logistics measures.

- Selection of transfer areas

Identify the transfer sites that correspond to the fragments of forest adjacent to the rescue point and that involve a displacement no greater than 1 km outside the clearing strip of the right of way and infrastructure.

Carry out the selection of areas of transfer by the professional in charge, having as support of recognizers of the area (baquianos: guides), direct observation and the thematic cartography of vegetal coverage of the EIA scale 1: 25.000.

- Data record

Carry out a control of the characteristics of the transferred individuals, by registering size (basal coverage), forest stratum (height) where the rescue was performed, coordinates (Magna Sirgas) and location in relation to the abscissa of the road.

Conduct count with consecutive number and photographic record of each individual to facilitate follow-up. A minimum survival of 80% must be guaranteed, otherwise the causes will be sought, and the necessary corrective measures will be taken.

- Extraction

Having established the presence of these sensitive species, we will proceed to the manual extraction of them. In the case of bryophytes, the plant material will be removed as much as possible with part of the bark or branch of the host through the use of sharp elements for clean cuts, where it will try not to affect the inner bark of the tree or the external more of what is necessary. The specimens will be extracted by cutting the branch of the host if it is possible according to its size, otherwise part of the support crust can be extracted where the specimen is located.

The vegetal material object of extraction will be properly prepared by means of the elimination of the leaves, dry branches and all decomposing material, to later be arranged in plastic bags of suitable size and very ben stacked, maintaining at the same time optimum conditions of humidity.

Likewise, humidity conditions must be permanently controlled by expert professionals to ensure their conservation and survival in the subsequent stages of transport and final disposal.

- Disposal and storage

All plant material that is already properly disposed in plastic bags and trays, will be systematically accommodated in crates to prevent spoilage or abuse; it should be avoided, as far as possible, to stack the bags (one on top of the other) inside the crates.

- Transport

The transportation operations of the vegetal material must be previously programmed by the planners and expert advisers, where vehicles, supplies and adequate materials will be available to guarantee their conservation; Likewise, all stages of the transportation process must be controlled, so that there is no possibility of exchanging the type of material or its final destination. The programming of the routes and transport will also be conditioned to the quantity of material mobilized, so as to avoid the transfer of large quantities that can put at risk, both the operation itself, and the survival of the individual's subject to transportation due to the effects of climate, dehydration and confinement, among others.

- Monitoring

The monitoring of the activities aimed at facilitating the adequate compliance with the activities dealt with in this management sheet will be carried out by an auditor team led by the executing company, with the advice of experts in each of the disciplines addressed, where They include Forest Engineers, Botanists, Biologists, Dendrologists and Forestry Technologists, who will be responsible for controlling, supervising and advising all the stages of the processes, as well as monitoring and adjusting the technical and methodological aspects that are required for the improvement of the implemented procedures and to be implemented.

- Replacements

In case the executed procedures do not lead to the capture and survival of the transferred plant material, and even more so when the latter are considered in some category of threat, the supervisor will be obliged to evaluate technically such actions and determine the corrective actions to be executed by the contractor. From the result of this action, the supervision will require or not to the executor of the compensation resource according to the current normativity.

- Training sessions, outreach and environmental education

The proposed measures for the adequate management of plant species in critical danger, closed, unregistered or unidentified, require the active participation of all personnel working on the project, taking into account that they are the ones who will be at the forefront of the interventions that are going to be carried out in the area.

That is why the fulfillment of all the training activities and the participation of the staff is essential to sponsor the care of the vegetation. The most relevant actions that are proposed to achieve this purpose are described in the Program of education and training for personnel linked to the project with emphasis on ecosystems and species of flora and fauna of interest.

QUANTIFICATION OF THE MEASURE
It is expected that, with the execution of the measures proposed in this sheet, an adequate level of effectiveness will be obtained for the program contemplated here, as follows: ✓ Number of workers without a workshop. ✓ (Number of lanes in the area of influence/number of workshops) * 100%. ✓ Management of plant species that are critically endangered, closed, unregistered or not identified with a 100% effectiveness in terms of not affecting, transferring or compensating
PLACE OF APPLICATION
The management measures proposed in this file must be applied in the following sites: ✓ Management of plant species in critical danger, closed, unregistered or unidentified, on all areas of intervention of the project where these types of species are identified and in general on all of the intervention areas of the project. ✓ These measures will also be applied to the areas subject to compensation for the affectation or areas where the individuals of these species are transferred. ✓ Foster Home intended
BENEFITED POPULATION
The population benefiting from this management program will be the surrounding community in the areas of intervention of the project.
MECHANISMS AND PARTICIPATORY STRATEGIES
The mechanisms and participatory strategies that will be implemented for the activities covered in this file: ✓ Workshops or workshops to socialize the results of the project and environmental education to the inhabitants of the villages located within the area of direct social influence of the project. ✓ Planning and structuring of all environmental education workshops, prior to the start of activities. ✓ Management of the topic, in the information and training workshops, in a playful and participatory manner, seeking to facilitate the reception of the message by the community. ✓ Photographic record, minutes and attendance lists of each one of the workshops given for follow-up on the fulfillment of the proposed objectives. ✓ Implementation of information signals about species that present some degree of threat according to national categories such as resolution 0192 of 2014 and the red books of the Alexander von Humboldt Institute, as well as the international categories of the IUCN.

✓ Socialization of the community based on the area of direct social influence of the project, including general aspects of the project and particulars of the activities of the card. ✓ Hiring of labor from the sidewalks located within the area of direct social influence of the project. ✓ Staff training in relation to general aspects of the project and individuals of the activities of the file.
REQUIRED STAFF
For the development of the management activities proposed in this file, the following personnel profile is required: Professionals. ✓ A biologist ✓ A veterinarian. ✓ Professional in forestry. ✓ Social professional with experience in community management. ✓ Unskilled labor. ✓ Non-professional personnel such as drivers, machinery operators, low-level operators, etc. ✓ Two guides from the area of influence of the project. ✓ Controller or environmental manager in charge of monitoring and monitoring activities.
SUPERVISING AND MONITORING INDICATOR(S)
✓ # of forests intervened / # of forests authorized to intervene * 100. ✓ # of saplings and stand of trees rescued and transfers / # total of saplings and stand of trees of the area under intervention * 100 ✓ # of epiphytes rescued and relocated / # total of epiphytes present in the area subject to exploitation * 100. ✓ # of workshops held / # of scheduled workshops * 100.

RESPONSIBLE (S) OF THE EXECUTION: TOUCHSTONE	
ENTITY/ INSTITUTION	**ROLES***
TOUCHSTONE	PL, Sg, Sp
Contractor company	OP, In
CORANTIOQUIA	Sp
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8-1	
BUDGET	
See Annex 8-2	

8.1.2.3 Wildlife conservation program

8.1.2.3.1 Conservation program for wildlife species with threat status, endemic or banned or unregistered or unidentified - Phase I.

CONSERVATION PROGRAM FOR WILDLIFE SPECIES WITH THREAT STATUS, ENDEMIC OR BANNED OR UNREGISTERED OR UNIDENTIFIED - PHASE I.								
OBJECTIVES								
✓ Identify endangered wildlife species threatened by the loss of their habitat (IUCN), threatened by illegal trade (CITES), species restricted to a single habitat, migratory birds and endemic wildlife species that are within the IIA of the project. ✓ Choose emblematic species, umbrella or flag. ✓ Propose methodologies that allow obtaining information about the natural history and the population status of the endemic and threatened species present in the Project area, within the implementation of the conservation program of the emblematic species, umbrella or flag.								
Stages of the project	*Exploration*	*x*	*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	x
IMPACT(S) TO BE CONTROLLED								
✓ Loss of diversity ✓ Local species extinction ✓ Fauna repelling. ✓ Displacement of fauna. ✓ Alteration of the behavioral parameters ✓ Alterations in the habitat and microhabitats where fauna coexists								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								
As a first step, a review of the species found in the baseline of the project should be done, to determine if they are closed or categorized in the IUCN network list or CITES, or are endemic, specialists and migrants. **1. Identification of threatened species IUCN network list.** The IUCN Red List of Threatened Species has a proven track record as the most comprehensive source of information about the global conservation status of plant and animal species. It is based on an objective system for evaluating the risk of extinction of a species. Critically Endangered, Endangered or Vulnerable species are collectively described as threatened. **2. Identification of CITES Species** The Convention on International Trade in Endangered Species of Wild Flora and Fauna CITES is a treaty governed by the rules of international law to regulate that the international trade of wild plants and animals, their parts and products is not detrimental to the survival of the species. The content of the treaty establishes different trade restrictions and operates through the issuance and control of import,								

CONSERVATION PROGRAM FOR WILDLIFE SPECIES WITH THREAT STATUS, ENDEMIC OR BANNED OR UNREGISTERED OR UNIDENTIFIED - PHASE I.

export and re-export certificates for a group of species registered in three Appendices I, II and III according to the degree of threat due to international trade.

3. Identification of Species in the MADS

The most current resolution of the Ministry of Environment and sustainable development MADS is 0192 of 2014, where the list of threatened wild species of Colombian biological diversity is established.

4. National endemic species

When the distribution area of a plant or animal is less than 50,000 km, it is said that the species has a localized or restricted distribution (endemic species), which means that it is only found in that area, since, for reasons of habitat, or others, cannot grow anywhere else (Hernández et al., 1992).

The species proposed for each group are shown below, although it should be noted that in case of confirming the presence of other endemic species or at risk of extinction different from those reported in the characterization, they should be included in the management, monitoring and tracing.

Table 8-12. Conservation of threatened species

TYPE	SPECIES	CATEGORY
BIRDS	*Crax alberti* Fraser, 1852	CR
	Sipia palliata Todd, 1917	NT
	Tinamus major (Gmelin, JF, 1789)	
	Pyrilia pyrilia (Bonaparte, 1853)	
	Agamia agami (Gmelin, JF, 1789)	VU
MAMMALS	*Ateles hybridus brunneus* (Geoffroy, 1829)	CR
	Saguinus leucopus (Günther, 1877)	EN
	Panthera onca (Linnaeus, 1758)	NT
	Aotus griseimembra Elliot, 1912	VU

Table 8-13. Conservation of species threatened by illegal trade

TYPE	SPECIES	FOCAL CATEGORY
BIRDS	*Ramphastos citrolaemus* (Gould, 1844)	annex II
	Ramphastos swainsonii Gould, 1833	
	Crax alberti Fraser, 1852	annex III
	Penelope cf purpurascens	
	Sarcoramphus papa (Linnaeus, 1758)	
MAMMALS	*Leopardus pardalis* (Linnaeus, 1758)	annex I
	Panthera onca (Linnaeus, 1758)	
	Saguinus leucopus (Günther, 1877)	
	Aotus griseimembra Elliot, 1912	annex II
	Cerdocyon thous (Linnaeus, 1766)	
	Potos flavus (Schreber, 1774)	annex III
	Cuniculus paca (Linnaeus, 1766)	
	Odocoileus virginianus (Zimmermann, 1780)	
AMPHIBIANS	*Dendrobates truncatus Cope (1861)*	annex II

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Table 8-14 Conservation of species included in Resolution 0192 of 2014 by the MADS

TYPE	SPECIES	CATEGORY MADS
BIRDS	*Crax alberti* Fraser, 1852	CR
MAMMALS	*Ateles hybridus brunneus* (Geoffroy, 1829)	
	Saguinus leucopus (Günther, 1877)	VU
	Panthera onca (Linnaeus, 1758)	
	Odocoileus virginianus (Zimmermann, 1780)	

Table 8-15 Conservation of endemic species.

TYPE	SPECIES
BIRDS	*Crax alberti* Fraser, 1852
	Ortalis columbiana Hellmayr, 1906
MAMMALS	*Saguinus leucopus* (Günther, 1877)
AMPHIBIANS	*Dendrobates truncatus Cope (1861)*
	Colostethus cf. Inguinalis Cope (1868)
REPTILES	*Helicops danieli Amaral (1938)*

QUANTIFICATION OF THE MEASURE

- ✓ Censuses made / proposed censuses x 100
- ✓ Transects / proposed transects x 100
- ✓ Area covered by field activities vs area to be intervened x 100
- ✓ Sampling effort performed vs proposed sampling effort x 100

PLACE OF APPLICATION

The activities will be carried out in the area of direct influence of the Pescado project, of the Municipality of Segovia, Department of Antioquia. Or areas assigned by CORANTIOQUIA for the release of the specimens

BENEFITED POPULATION

N. A

MECHANISMS AND PARTICIPATORY STRATEGIES

- ✓ Dissemination of the plans formulated to the communities in the area of influence of the project.

REQUIRED STAFF

- 3 Biologists specialized in different fields of biology (birds, mammals, herpetofauna,) with experience in wildlife management
- 10 qualified field assistants and area guides

MONITORING AND SUPERVISING INDICATOR(S)

- o Semi-annual and annual population abundance indices
- o Semi-annual and annual relative density

RESPONSIBLE (S) OF THE EXECUTION

ENTITY/ INSTITUTION	ROLES*
TGC	PL, Sg, Sp
CORANTIOQUIA	Sp
Contractor company	OP, In

CONSERVATION PROGRAM FOR WILDLIFE SPECIES WITH THREAT STATUS, ENDEMIC OR BANNED OR UNREGISTERED OR UNIDENTIFIED - PHASE I.
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)
SCHEDULE (PERIOD OF EXECUTION)
See Annex 8-1
BUDGET (APPROXIMATE COSTS)
See Annex 8-2

8.1.2.3.2 Fauna conservation program Phase II- Conservation program for emblematic species, flag and/or umbrella.

PROGRAM OF CONSERVATION OF FAUNISTIC SPECIES PHASE II- PROGRAM OF CONSERVATION OF EMBLEMATIC SPECIES, FLAG AND / OR UMBRELLA								
OBJECTIVES								
✓ Implement conservation actions that benefit the populations and habitat of cracidae Crax Alberti Fraser, 1852, as an umbrella specie and the other species that are sheltered under their distribution range within the AID of the mining project in question, mitigating the threats they face with the execution of the project.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	x
IMPACT(S) TO BE CONTROLLED								
✓ Loss of diversity ✓ Local species extinction ✓ Fauna repelling. ✓ Displacement of fauna. ✓ Alteration of the behavioral parameters ✓ Alterations in the habitat and microhabitats where fauna coexists								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								

Background-Justification.

During the field exploration phase of the biotic component fauna in the AID of the "El Pescado" mining project, a set of species of birds, mammals and herpes were identified, with some degree of threat or with some level of endemism (Table 8-12; Table 8-13; Table 8-14; Table 8-15). Therefore, in these species the conservation program will be addressed within the framework of the Environmental Management Plan (EMP) and the Monitoring and Monitoring Plan (PSM). In order to prioritize the conservation and execution efforts, we consider then to establish a focal species, which will be the blue-billed curassow Crax alberti Fraser, 1852; which meets sufficient criteria to be considered as an emblematic species (Wlicox, 1984) and flag (Noss, 1990, Kattan et al 2008):

The blue-billed curassow Crax alberti Fraser, 1852, is a bird endemic to Colombia, critically threatened with extinction due mainly to the destruction and fragmentation of its habitat and hunting (Bird Life International, 2007). Historically, this species inhabited the northern part of Colombia in the lowlands of the Magdalena river valley and the lower Cauca, including the Serranía de San Lucas and the upper reaches of the Sinú and San Jorge rivers. It is currently estimated that this species has lost about 88% of its habitat in the original distribution area (Renjifo et al 2002).

It should be noted that within its range of distribution and despite the loss of habitat already mentioned, C. Alberti is sympatric with other species such as Saguinus leucopus, Panthera onca,

PROGRAM OF CONSERVATION OF FAUNISTIC SPECIES PHASE II- PROGRAM OF CONSERVATION OF EMBLEMATIC SPECIES, FLAG AND / OR UMBRELLA

Ateles hybridus brunneus, among others; which are in a high degree of threat of extinction and that were additionally registered within the AID.

During the exploration phase within the AID, a pair of Blue-winged Curassow C. Alberti Fraser was recorded, 1852 in low dense forest cover (3.1.1.2.1) in foraging activity, presumably in search of berries, seeds and / or some arthropods

- Action plan.

Next, we present the Action plan that will be carried out for the Emblematic Species Conservation Program-Phase II

Table 8-16. Action plan for the conservation program of the focal species *Crax alberti* Fraser, 1852.

Goal	Actions	Results/Products	Responsible
1. Knowledge de *Crax alberti* Fraser, 1852 and its habit			
1.1 Knowledge of the species distribution	Compilation of historical records	Database of historical and current records of the species	Consulting firm
	Modeling distribution of the species	Map of historical, current and potential distribution of the species	
	Corroboration of the current presence of the species in the area	Map of distribution of the species in the area of influence of the project.	
1. 2 Evaluation of blue-billed curassow Crax alberti Fraser populations, 1852	Population estimation.	Indices of abundance, density, population size, population flow rates (birth, mortality, immigration, emigration)	
	Population monitoring	Capture and recapture values, population growth	
1.3. Characterization and use of species habitat	Habitat assessment and characterization (use of standard methodologies)	Habitat assessment and characterization of blue-billed curassow	
1.4 Knowledge of the ecology of the species	Registration of reproductive aspects	Database of video about the general biology of the species. Disclosure of results	
	Diet register		
	Records of behavior and intra and inter specific relationships		
2. Protection, conservation and management of blue-billed curassow populations and its habit			
2.1 Determination and quantification of threats to the blue-billed curassow populations	Identify, quantify and prioritize threats in the area	Identified threats quantified and prioritized. Technical report.	Consulting firm
2.2 Establishment of important areas for the	Identification and establishment of priority zones for the	Map with priority conservation areas	

PROGRAM OF CONSERVATION OF FAUNISTIC SPECIES PHASE II- PROGRAM OF CONSERVATION OF EMBLEMATIC SPECIES, FLAG AND / OR UMBRELLA			
conservation of the blue-billed curassow	conservation of blue-billed curassow		
3. Participation and awareness of the community			
3.1 Development and execution of environmental education programs for wildlife conservation	Identification of interest groups	Public defined and characterized	Consulting firm
	Development of education and awareness programs	Educative programs	
3.2 Divulgation	Exchange of information with investigative entities	Workshops, talks at Universities, scientific societies and interested institutions	Consulting firm
	Results divulgations	Discussion papers	
	Establish curassow Festival and wildlife with the community	Academic and recreational festival of conservation	
	Elaboration of informative material	Posters, t-shirts, brochure	

- Methodologies

Below are the methodologies for the different strategies within the action plan for the conservation of the emblematic species Crax Alberti Fraser, 1852.

Knowledge of Crax Alberti Fraser, 1852 and its habitat
Knowledge of the distribution of the species.

- Collection of historical records: The collection of historical data on the distribution of this species will be done through bibliographic search, filtering those data that correspond to areas near the AID and AII and its surroundings. Additionally, a visit will be made to each of the different and main rural settlements present within the AID and the IIA to carry out some surveys with local inhabitants to establish possible distribution sites. These surveys will be aimed mainly at artisanal hunters or those people who presumably have had occasional contact with the species. For the recognition of the species by the respondents, photographs and color illustrations will be used. Although a standard format for the survey will not be used if some data will be taken, which will be consigned in an Excel table, as follows:

Table 8-17. Data tabulation model for historical distribution of Crax alberti in the AID, AII and surrounding areas.

Department	Municipality	side walk	Registry coordinates		height	Type of register		Observations
			X	Y		poll	Publication	

Source: INGEX, 2016

The information will be collected by two professionals; a sociologist (or related) and a biologist.

PROGRAM OF CONSERVATION OF FAUNISTIC SPECIES PHASE II- PROGRAM OF CONSERVATION OF EMBLEMATIC SPECIES, FLAG AND / OR UMBRELLA

- Distribution modeling of the species: Once the available information has been collected and the total number of surveys has been made in all the rural settlements, a professional in Geographic Information Systems (GIS) will proceed with the elaboration in ArcGIS of the historical distribution map of the species in AID, AII and nearby areas.
- Corroboration of the current presence of the species in the area: For the corroboration of the presence and current distribution of the species, the first phase of sampling will proceed within the conservation plan of the curassow.

In a range of between 15 and 20 days of sampling, a first field trip will be made, in which the forest covers or with some degree of vegetation will be covered; as low dense forest and secondary vegetation (sites where the species was registered in the characterization and exploration phase in the AID), in search of direct (visual or auditory) or indirect records (traces, plumage, etc.).

Additionally, an average of 70 trap cameras will be installed in semi-permanent sampling stations to collect data on behavior and ecology of the species. Each trap camera will be reviewed every 60 days on average and the data obtained should be recorded in an Excel database (Table 8 17).

Later, once the total field phase has been completed (see chronogram), the distribution data will be used to prepare the current distribution map of the species, which must be overlaid with the historical distribution map and estimate the range of presence that has been present lost the species within the AID and the AII punctually.

Evaluation of the blue-billed curassow Crax alberti Fraser populations, 1852.

The evaluation of the blue-billed curassow Crax alberti Fraser populations present in the area will be carried out in order to estimate the size and population dynamics of the species and the monitoring of population growth values. To achieve this, the following methodology will be implemented in the field:

The field phase will be carried out between the months of October and March, which coincides with the breeding season of blue-billed curassow, which lasts approximately 6 months (Bird Life International, 2007); during which scheduled field trips will be made every two months, where data will be taken for the evaluation of the population dynamics of the curassow.

At the first field trip (approximately October), in addition to the installation of the trap cameras, tomahawk traps will be installed to capture live curassow specimens, which will be marked with coded rings on the hind legs. Each individual will be registered the following data:

Table 8-18. Database for the registration of curassow captured in the field.

Labeling code	Sampling station	number of traps	Cover age	Coordinates		Height (masl)	Sex	Observations
				X	Y			

All captured individuals must be released at the place of capture.

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Each sampling station will have an average of 20 tomahawk traps, which must be sequential and previously georeferenced. Each Tomahawk trap will be primed and checked every day during each field trip.

The animals captured in the traps, different from the curassow will be registered to enrich the list of species in the area and to characterize the curassow habitat; once registered, they will be released at the place of capture.

In the second field campaign, 60 days later (in mid-January), it will proceed similarly to the first exit, activating the tomahawk traps and checking the trap cameras. The individuals that are captured will be marked in the same way. The recapture data are recorded in the following table:

Table 8-19. Table for data capture and recapture data.

T	nt	at	rt
1			
2			
3			

T: sampling period; nt: total of captures; at: Number of released individuals; rt: N ° recaptured individuals.

In the third field campaign, the second campaign will proceed in the same way at the end of March. The previous field methodology must be repeated annually for an average of 5 years.

Finally, the indices of density, abundance, population size, birth, mortality and migration will be calculated using the Jolly-Seber method (1965).

Characterization and use of habitat of the species.

For the characterization of habitats, proceed as follows:
Within the semi-permanent sampling stations where captures or records of the species are made, plots of one hectare will be established; subdivided into 10 overlapping transects of 10 X 100, with registration units (subplots of 10 X 10 m), which will be unlimited with stakes or piles where they will crosslink with polypropylene yarn. Within each plot, all trees with a diameter (measured at 130 cm above the ground) DAP greater than or equal to 10 cm will be marked. A botanical collection of at least two specimens per species will be made; which will be dried, identified and stored in a recognized herbarium.

In this way, a characterization and detailed description of the habitat used by the blue-billed curassow will be obtained in the AID, AII and surrounding areas.

The duration of each characterization will depend on the number of parcels and the number of captures of specimens.

PROGRAM OF CONSERVATION OF FAUNISTIC SPECIES PHASE II- PROGRAM OF CONSERVATION OF EMBLEMATIC SPECIES, FLAG AND / OR UMBRELLA
Knowledge of the species ecology For the knowledge of the ecology of the species, published data and the records obtained in the trap chambers will be used in each of the semi-permanent sampling stations. **Protection, conservation and management of the populations of the blue-billed curassow and its habitat.** For the knowledge of the ecology of the species, published data and the records obtained in the trap chambers will be used in each of the semi-permanent sampling stations. **Protection, conservation and management of the populations of the blue-billed curassow and its habitat.** For this purpose, the joint work of the professional staff is required: biologists, environmental engineers, forestry engineers and SIGS for the preparation of technical reports with the results of the field. Within these reports should be prioritized in the quantification of threats and maps with priority conservation areas. **Participation and awareness of the community.** The participation and awareness of the community will be carried out as follows: ✓ Identification of interest groups ✓ Development of education and awareness programs, through which the community is approached to the care and conservation of the curassow; Each workshop must be held at least two or three times a year in which it is proposed to establish: a. A group of wildlife and flora lookouts b. A group of student birdwatchers c. Workshops for the creation of slogans and logos of the conservation program. d. Creation of the curassow and Fauna Festival to be held annually e. Elaboration of informative material f. Conferences.
QUANTIFICATION OF THE MEASURE
✓ Estimators of abundance, density, population size, birth, mortality, migration ✓ Semi-permanent sampling stations ✓ Traps installed / effective traps X 100 ✓ Area covered by field activities vs area to intervene x 100 ✓ Sampling efforts ✓ Current distribution areas vs historical distribution areas of Crax Alberti curassow ✓ Participants in participation and awareness strategies.
PLACE OF APPLICATION

PROGRAM OF CONSERVATION OF FAUNISTIC SPECIES PHASE II- PROGRAM OF CONSERVATION OF EMBLEMATIC SPECIES, FLAG AND / OR UMBRELLA	
The activities will be carried out in the area of direct and indirect influence of El Pescado project, in the Municipality of Segovia, Department of Antioquia.	
BENEFITED POPULATION	
N. A	
MECHANISMS AND PARTICIPATORY STRATEGIES	
• Workshops, talks • Academic festivals • Informative material	
REQUIRED STAFF	
• 2 Biologists ornithologists • 2 Sociologists, social workers, anthropologists or related • 1 professional in geographic information systems (GIS) • 2 Forestry engineers • 1 Environmental Engineer • 6 field assistants. • 2 social assistants	
SUPERVISING AND MONITORING INDICATOR(S)	
o Indices of semi-annual and annual population abundance o Semi-annual and annual relative density	
RESPONSIBLE (S) OF THE EXECUTION	
ENTITY/ INSTITUTION	**ROLES***
TGC	PL, Sg, Sp
CORANTIOQUIA	Sp
Contractor Company	OP, In, Sg
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8-2	

8.1.2.4 Program and protocols for the management and rescue of wildlife species

REFUGEE PROGRAM, RESCUE SALVAMENTO AND RELOCATION OF THE WILD FAUNA								
OBJECTIVES								
• Minimize the environmental impacts identified on the fauna that the execution of El Pescado mining project can bring, by means of the repelling, capture, storage, transfer and relocation of the affected individuals from their original habitat to a relocation area. • Evaluation of the appropriate relocation areas for the release of terrestrial fauna. • Carry out the ecological study in the compensation areas provided for the relocation of terrestrial fauna to determine the supply of resources.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	*x*
IMPACT(S) TO BE CONTROLLED								
• Fauna repelling. • Displacement of fauna. • Handling of wildlife. • Alteration of the behavioral parameters.								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								

Due to the harmful effects that the development of the mining activities of the Fish Project can bring to wildlife, it will be necessary to scare, rescue, and relocate the animals that may be affected. This process must be carried out by trained professionals in the management of wildlife, following the methodologies established for each taxonomic group and approved by the environmental authority.

STEPS FOR THE EXECUTION OF THE PROGRAM OF RESTRUCTURING, RESCUE AND RELOCATION

1. Characterization of the rescue area.

Regardless of what is registered in the Baseline, a characterization of the rescue area must be carried out to identify, quantify or estimate the individuals that are relocated, and the type of habitat and vegetation cover must be taken into account in order to subsequently establish the sites of Relocation

2. Selection and Evaluation of wildlife relocation areas

The selection of areas for the release must consider:

The release areas should be similar to the environment of origin of the captured individuals, since it has been reported that the relocated individuals may suffer malnutrition, dehydration and immunosuppression and survive better when they are in an environment with resources with which they are familiar (Massei et al. 2010).

According to Bustamante et al. (2009), the characterization of the natural habitat of the species to be relocated should consider the description of at least the following environmental attributes:

- ✓ Coverage, structure and physiognomy of vegetation
- ✓ Exposure and geographical height

REFUGEE PROGRAM, RESCUE SALVAMENTO AND RELOCATION OF THE WILD FAUNA

- ✓ Type of substrate
- ✓ Availability of bodies of water
- ✓ Moisture of the environment (for amphibians)
- ✓ Distance to constructions, projects or anthropic activities such as roads, routes, highways, land extraction, human settlements, etc.

Additionally, it is suggested to evaluate:

- ✓ Connectivity with the areas of avoidance that allows establishing the quality and quantity of natural corridors that act as escape routes.
- ✓ Connectivity with other similar forest coverings that allow gene flow with areas outside the area of influence.
- ✓ The carrying capacity of the receptor sites: For the calculation of the carrying capacity of the receptor sites for the captured fauna, a modification of the biomass regression method (K) K = Y / P (Coe et al., 1996) is suggested.), Where: K= carrying capacity

  Y= 〖"log" 〗_"10" "of biomass; if the biomass=" "Kg"／〖"Km" 〗^"2"

  P= average weight of an adult within the population.
- ✓ A characterization of arthropod fauna is suggested as a fundamental element of the diet for a large number of vertebrate species; since insects are one of the most diverse groups of organisms in ecosystems and occupy a wide variety of habitats (Grimaldi & Engels, 2005). Therefore, assess the richness and abundance of the insect community and other arthropods in the areas of wildlife relocation, it is very useful to know the availability of this group as a food resource. For the data collection, the methodology consigned in the manual of methods for the development of inventories of biodiversity of the Alexander Von Humboldt Institute (Villareal et al., 2006) is suggested. For the analysis of the data the methodologies are proposed by Colwell & Coddington, 1994 and Colwell, 1997.

3. Drive off and rescue of terrestrial fauna

Once the future relocation zones have been identified, work will be systematized with the adaptation activities of the different infrastructure works that demand loss of vegetation cover.

The idea is to reduce or avoid the death, injury and isolation of the individuals located in the exploitation sites and infrastructure associated with the project.

❖ Phase of drive off

This is a preventive phase that suggests focusing efforts towards the establishment of corridors and mechanisms that allow guiding the organisms towards the areas of relocation.

This phase is applied above all for highly mobile species such as birds, mammals and some reptiles.

In a fauna repelling are used different methods and techniques such as visual stimuli (silhouettes or balloons), auditory stimuli (reproduction of sounds that warn of danger), mechanical and hormonal

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stimuli of predatory animals or stink bombs), which generate a certain degree of stress in animals that encourage the displacement of the place.

During the drive off of the vegetation cover, the different habitats of the fauna (burrows, caves, hollows, inactive nests, etc.) will be destroyed in a controlled manner so that they are not occupied again.

Once the vegetal discard begins, it must ensure that the animals move towards the parts that are not affected, so that they go through different fragments and preventing them from being isolated.

This technique is recommended because by inducing the movement of the animals by their own means, their capture is avoided, a procedure that usually causes stress and different injuries to the animals and can endanger the people who carry out the drive off because the animals can react violently trying to defend themselves. It is worth mentioning that it is essential that the drive off be carried out in all strata of the forest so that it is more effective and meaningful.

- ✓ Birds: in general, respond positively to visual, Auditory, Chemical and Mechanical stimuli. It is recommended to implement the following techniques: Silhouettes of raptors or owls, smoke, sounds of raptors or sirens, destruction of nests.
- ✓ Mammals: in general, respond positively to Visual, Auditory, Chemical and Mechanical stimuli. It is recommended to implement the following techniques: Silhouettes of raptors and owls, Smoke, Sounds of raptors or sirens, Hormones of predators or stink bombs, Well traps.
- ✓ Reptiles: respond positively to stimuli, Hearing, Chemical and Mechanical. It is recommended to implement the following techniques: Silhouettes of raptors and owls, move vegetation, sounds of raptors or sirens.

❖ Rescue phase

This phase consists of the capture or rescue of those individuals that require transfer, as well as the attention of the individuals that are injured during the logging activities, for this, several working groups must be formed trained in the handling of specific implements and application of safe methodologies for the capture of individuals.

This phase is applied mostly for low mobility species such as small mammals, amphibians and some Reptiles.

- ✓ Mammals: It is suggested to use sampling and capture techniques such as those proposed by Voss et al., 1996, Voss et al., 2001, Corriale et al., 2008 and Thomas et al., 1990. It is recommended to implement the use of Sherman traps. and Tomahawk traps.
- ✓ Amphibians and Reptiles: It is suggested to use sampling and capture techniques such as those proposed by Manzanilla et al: 2000 and Angulo et al.; 2006. It is recommended to implement the following techniques: Manual capture and fall traps.
- ✓ Birds: Many bird species are highly mobile, so the rescue of birds is suggested for a few species whose general habits are low displacement; case of some Galliformes species and some understory Passeriformes (house Ren, anthills, etc.). For the rescue of understory Passeriformes, it is suggested, the implementation of mist networks with auditory attractants (Playbacks) in sites of possible capture. On the other hand, for the case of species of birds of

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the order Galliformes, due to its size, the use is recommended. of Tomahawk type traps with attractant.

4. Transport

The captured individuals are transported in cloth bags or in crates, according to the biological characteristics of the animal, which will be protected from solar radiation, with sacks or vegetation, to avoid dehydration and reduce stress.

Table 8-20. Conditions and time of transfer of the rescued individuals taken from Bustamante et al. 2009

Group	Conditions	Maximum transport time
Amphibians	Plastic containers with water, air and litter	Maximum 2 hours (try not to get a lot of sun directly)
Reptiles	Plastic container, cloth bags or fiber sacks, one per copy.	Maximum 10 hours
Small mammals	In the same trap or in cages, with food (water / fruit during maintenance)	Before sunset
Birds	Cloth bags (for individuals caught in fog nets) or in the catch trap or cages with food (For Galliformes species) Maximum 1 hour	Maximum 1 hour

It is important that adequate use be made of the sampling techniques to avoid to the maximum that the fauna suffers injuries or are subjected to situations of great stress in the process of repelling and manipulation. It is recommended that the rescue phase be accompanied by the constant assistance of the veterinarian in the event of an accident.

In the event that the animals that are injured, they should be provided with relevant veterinary attention in a veterinary care center, which should be a space close to the rescue areas and should be prepared for this purpose, always fulfilling the required conditions in the protocols for the valuation and attention of the wild fauna.

5. Veterinary medical care

The centers of veterinary attention will have the specifications and protocols according to the Ministry of Environment proposed in the document: Regional Centers for the management of specimens of wild fauna confiscated (2001) or the General Management Protocol for the Center for Reception and Rehabilitation of Fauna Wild CRRFS (Nassar et al., 1998).

This will receive fauna that has been injured during the activities of repelling, rescue and the activities of felling and clearing of the Project to be treated for traumas, facilitating the relocation process that should be in the shortest possible time.

The individuals found dead, or who perish in the process, should be prepared following the specific methodologies for each group (Angulo et al., 2006; Winker, 2000; Mesa et al., 2005) for their preservation and be deposited in the collections Zoos of Antioquia endorsed by the Humboldt Institute.

REFUGEE PROGRAM, RESCUE SALVAMENTO AND RELOCATION OF THE WILD FAUNA

6. Marking and data collection

In order to carry out the monitoring program it is suggested to mark all the individuals following the standardized marking techniques for each group to be released later:

- ✓ Birds: Aluminum rings are placed with an identification number or colors with different combinations on the legs, adjusting the dimensions of the rings to the size of the leg.
- ✓ Mammals: depending on the species to be marked different lines, stories such as the tincture of a hair area with a bright color, the cut of the fur in a specific area, holes in the ear or in the extremities, plastic or metal rings are incorporated part of the body, among others.
- ✓ Amphibians: Phalangeal cut and ventral color pattern will be used (in the case of poison dart frog) (Donnelly et al., 1994; Bradfield, 2004) and visible technique, VIE implant elastomer or visible elastomer implants (Anholt et al., 1998)
- ✓ Reptiles: a cut of distal phalanges of the fingers has been made following the system proposed by Hero, 1989 in the case of saurian. In the case of tortures plaques will be implemented and the snakes will be amputated scales (Brown and Parker., 1976).

7. Wildlife Rescue

Patrols will be carried out in order to rescue the fauna that is present during the exploitation phase. For this, several working groups will be organized, each one made up of a biologist with experience in the management of wild fauna and two field assistants. It will have the participation of veterinarians at wildlife crossing sites to care for rescued animals.

The captured fauna will be transported to the passage site where the respective revision will be made by the veterinarian, finally the individuals will be marked following the standardized marking techniques for each group and then they will be released in the relocation and compensation sites.

8. Training in wildlife management

With respect to the Project personnel, a group of at least 10 people must be trained to give an adequate management to the fauna that, due to different circumstances, is affected or for different reasons requires being captured, attended or transferred. This requires knowledge in the different methods and techniques of immobilization, capture, handling, and first aid of wildlife, this in order to make an adequate management of fauna, where you must ensure the welfare of animals and the safety of the staff that manipulates it. This group will be trained by the professional staff hired for the drive off, rescue and relocation which consists of biologists and a veterinarian specialist or experienced in the handling and handling of wildlife.

QUANTIFICATION OF THE MEASURE (INDICATORS)

- ✓ Potential areas for wildlife relocation / total compensation area x 100
- ✓ Area where drive off was carried out vs total area to intervene x 100
- ✓ Number of individuals affected (injured or deceased) / number of individuals rescued x 100
- ✓ Number of relocated individuals' vs total number of rescued individuals x 100
- ✓ Number of individuals marked vs. total number of individuals captured x 100
- ✓ 100% of the personnel chosen trained in the management of wildlife

REFUGEE PROGRAM, RESCUE SALVAMENTO AND RELOCATION OF THE WILD FAUNA	
PLACE OF APPLICATION	
The activities will be carried out in the area of direct influence of El Pescado project, of the Municipality of Segovia, Department of Antioquia. Or areas assigned by CORANTIOQUIA for the release of the copies.	
BENEFITED POPULATION	
The communities of the municipalities that are directly related within the area of influence of the Project	
MECHANISMS AND PARTICIPATORY STRATEGIES	
o For the management of wild fauna, environmental education workshops will be held with topics of dissemination of the importance of wildlife conservation, hunting control and preventive management of wildlife accidents contemplated in the social PMA (Information and participation program). o For the efficiency of the program, it is important to monitor its quality and results, by evaluating the personnel who receive it, the trainer who provides them and their contribution to improving compliance and environmental performance.	
REQUIRED STAFF	
o 4 Biologists specializing in different fields of biology (birds, mammals, herpetofauna, insects) with experience in wildlife management o 1 Wildlife veterinarian o 10 qualified field assistants and area guides.	
SUPERVISING AND MONITORING INDICATOR(S)	
o Marked individuals recaptured vs captured individuals * 100 o Estimated population size (Seber, 1982) $N = \left[\frac{(M+1)(C+1)}{R+1}\right] - 1$ o Birth rates, mortality, migration and emigration.	
RESPONSIBLE(S) OF THE EXECUTION	
ENTITY/ INSTITUTION	ROLES*
TGC	PL, Sg, Sp
CORANTIOQUIA	Sp
Company or personnel hired	P, In, Sg
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8-2	

8.1.2.5 Program for the development and promotion of ecosystems and species of flora and fauna affected by the project.

PROGRAM OF PROTECTION AND CONSERVATION OF HABITATS								
OBJECTIVES								
✓ Reduce the impact on the species of fauna and flora potentially affected by the project, as well as the possible impact on natural ecosystems located within the area of direct and indirect biotic influence. ✓ Establish measures for the conservation and protection of habitats through permanent parameters of biodiversity assessment that are comparable, replicable, controlling and measurable over time and between geographical areas. ✓ To assure the conditions of the habitats and the dynamics between the ecosystems present in the area of influence, for the wild fauna and to maintain them in the time.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	x
IMPACT(S) TO BE CONTROLLED								
✓ Fragmentation of ecosystems ✓ Affectation in the floristic composition. ✓ Alterations in the growth of floristic communities and phytosanitary deterioration. ✓ Decrease in the richness of the species. ✓ Impact on the dynamics of ecosystems. ✓ Fragmentation of ecosystems. ✓ Removal or changes in vegetation cover. ✓ Changes in the characteristics of the forest and alterations in the habitat and microhabitat where fauna coexists ✓ Displacement of fauna ✓ Fauna repelling ✓ Alteration in the behavioral parameters of fauna ✓ Recovery of the dynamic biotic community								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								
1. Guidelines for the recovery and conservation of habitats. The actions directed to the conservation and protection of habitats will also be directed to the conservation of the flora and fauna resource, given the close relationship that exists between the different groups or guilds and their presence in a determined habitat. In the Area of Direct Influence there is presence of important ecosystems that are necessary and vital to protect, among which are the lotic ecosystems and the vegetation associated with this, as well as dense forests and secondary and / or transitional vegetation. It is necessary that the works that will be undertaken on the bodies of water, are developed with the greatest possible environmental awareness. For this, the appropriate management will be taken into account, avoiding altering the physicochemical quality of the water through proper management of the								

PROGRAM OF PROTECTION AND CONSERVATION OF HABITATS

bodies of water associated with the area of direct influence of the project, as well as not intervening sectors where there is no permission to use unique forest.

In this way, alteration processes on water sources will be avoided. This will help to maintain the balance of the aquatic ecosystems in which both hydro biological communities and wild fauna with dependence on the aquatic environment, such as aquatic birds, amphibians and some species of mammals and reptiles.

The areas in which the soil is going to be intervened will be clearly marked and their activities defined, according to the guidelines of this Environmental Management Plan (See tab FOR USE OF VEGETABLE COVERAGES THAT DO NOT INVOLVE THE ARBOREAL COMPONENT and FLORA MANAGEMENT PROGRAM, FOREST USE AND REVEGETATION OF INTERVENED AREAS). Said areas will be unlimited, avoiding unnecessary affectations of soils and vegetation that are outside of the area. All sectors in which the planned works and activities will be carried out will be reforested and monitored, seeking to incorporate them into the surrounding conditions and avoiding generation of erosion and deterioration of the landscape.

The activities of hunting, capture, fishing, commercialization or retirement of wild fauna will be prohibited and duly controlled by the environmental supervision (Environmental auditing). This in order to protect and conserve natural habitats.

In order to verify that the original conditions and the quality of natural habitats are maintained over time during the development of the project and that the management measures implemented are efficient for the preservation and recovery of terrestrial and aquatic habitats, it will schedule periodic monitoring of species or groups of wildlife that indicate the quality of the habitat, such as birds or bats, among others, that are sensitive to changes in the ecosystem and habitat disturbance.

For the realization of the different activities, the following will be taken into account:

- ✓ The development of wildlife monitoring will be carried out at the sites closest to where there is intervention and at places with little or no intervention, which will allow comparisons to be made.

2. Identification of the main factors of disturbance

Identify the different disturbance factors that directly affect the ecosystems under intervention, in addition to assess the anthropic impacts and their consequent effects such as the disposal of solid and liquid waste, the expansion of the agricultural frontier, as well as the pressure on resources forestry such as the extraction of wood for the purpose of domestic use for firewood, construction, among others.

Other factors to be considered are the exogenous disturbances that should be taken into account, such as natural phenomena, floods, climate change, etc., on which it will be necessary to identify their incidence, intensity and magnitude, in view of the expected results related to the recovery of ecosystems as shelter or refuge of threatened flora.

PROGRAM OF PROTECTION AND CONSERVATION OF HABITATS

3. Establishment of biological corridors

The use of corridors in conservation seeks to provide a practical and effective solution to the problem of maintaining biodiversity and ecological processes on a large scale. To increase the permeability of the project infrastructure and roads, it is necessary to establish wildlife structures to facilitate the movement of animals. This includes the construction of faunas by means of the adaptation of structures already planned by the work such as culverts, coulvert box, viaducts and bridges.

The entrances of the fauna pass have to be reforested with native species, maintaining a high coverage that provides refuge to the animals that cross. In addition, woven wire (1.5 m high and 20 m long on each side) must be installed on both sides of the entrance to lead the animals to the fauna and prevent them from crossing the road and being run over.

As a measure of compensation, biological corridors will be established, through reforestation with native species, which will connect the surrounding forests with the areas where the project infrastructure is to be established, as well as new roads and improvements in them, culverts and box coulvert, using species native Table 8-21 presents a list of species that can be used for reforestation.

Table 8-21 List of proposed species for the establishment of biological corridors.

COMMON NAME	SCIENTIFIC NAME	FAMILY
Algarrobo	*Hymenaea courbaril*	CAESALPINACEAE
Abarco	*Cariniana pyriformis*	LECYTHIDACEAE
Gualanday	*Jacaranda mimosifolia*	BIGNONIACEAE
Ceiba	*Ceiba pentandra*	BOMBACACEAE
Guamo de monte	*Inga sp*	MIMOSACEAE
Pomarrosa	*Eugenia jambos*	MYRTACEAE
Laurel	*Myrcia pubescens* Willd	LAURACEAE
Caracolí	*Anacardium excelsum*	ANACARDIACEAE
Guayacán	*Tabebuia chrysanta*	BIGNONIACEAE
Cedro	*Cedrela odorata*	MELIACEAE
Hobo	*Spondias mombin*	ANACARDIACEAE
Teca	*Tectona grandis*	VERBENACEAE
Tuno o niguito	*Miconia sp*	MELASTOMATACEAE
Punta de lanza	*Vismia baccifera*	HYPERICACEAE
Balso	*Ochroma lagopus*	BOMBACACEAE
Sagino	Caesalpinia eriostachys	CAESALPINACEAE
Chingale	*Jacaranda copaia* (Aubl.) D. Don	BIGNONIACEAE
Laurel mierda	*Nectandra sp*	LAURACEAE
Higueron	*Ficus sp*	MORACEAE
Dormilón	*Vochysia ferruginea* Mart.	VOCHYSIACEAE
Soto	*Virola sebifera* Aubl.	MYRISTICACEAE

Source: INGEX, 2016.

In total, 1.57 hectares of forest will be reforested, which will be established as biological corridors as a measure of compensation for affecting the landscape.

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4. Establishment of Permanent Sampling Plots (PMP by its initials in Spanish).

A PMP is a land area properly unlimited and located geographically, where ecological and dasometric data will be recorded in order to obtain results on increase, mortality, recruitment (income), or other previously determined information, for this purpose mark conspicuously, in such a way that the exact location is facilitated when returning to make periodic measurements (Hutchinson 1995a).

For the project El Pescado, as a management measure for the protection and conservation of habitats, is the implementation of 3 Permanent Monitoring Plots in the AID. In these the most outstanding events of the forest dynamics are recorded, and can be used as Witness Plots, which allow to control the increments in tree growth (basal area and volume) of the species, if they are used in managed forests, where different silvicultural treatments have been applied (selective cutting, release, etc.).

The permanent plots will be established once the environmental license is obtained in areas surrounding the project, in order to monitor during the construction time of the same, this will allow:

- ✓ Monitor changes and forecast trends in structures and vegetation composition.
- ✓ Obtain accurate and reliable information on growth, mortality, recruitment, abundance of regeneration, silvicultural treatments, yields, costs of proven forestry activities.
- ✓ Determine the relationship between the increase and some tree variables such as vigor, crown exposure, existence of lianas.
- ✓ Determine the effects of canopy opening and elimination of competing trees per site on mortality, recruitment and abundance of regeneration.
- ✓ Develop growth models
- ✓ Determine the long-term quality index of the site.
- ✓ These plots will have an area of 1 ha, as recommended by Synnott (1991) and Alder (1980), in order to cover the greatest possible variability, and facilitate the statistical analysis of the information. In addition, to control the edge effect and facilitate its installation in the field.
- ✓ Permanent demarcations must be installed for which it is suggested to indicate the four corners of the plots with iron rods painted with striking color and oil paint. Each plot will be subdivided into subplots of 20 * 20 m, the corners, cardinal points and center of the subplots will be marked with iron rods and their corners will be a metal plate with the coordinates (X, Y,), which will allow to locate each tree in the field and on paper, determine the degree of competition between them and have the geographic and topographical location of these.

5. Gathering information.

- ✓ Demarcation and signaling.

The demarcation of the PMP is done by opening a pike and trying to minimize the effects of cutting vegetation. In order to perform the precise surveys, it is convenient to use a tape measure and a stake that reaches the height of the technician's eye (tamanua), on which the compass is placed with an internal level and the compass is leveled. Every 10 m a PVC pipe or an iron rod is placed, so that the plot is perfectly located for future measurements. The corners should be marked with iron rods or with

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permanent poles or with "L" -shaped trenches that are 20 cm wide, 25 cm deep and one meter long (Synnott, 1991, Ugalde, 1995).

- ✓ Description of the plot

Once the plots are established, it is essential to describe the initial state of the plot and the place where they are established. During the following periodic measurements, it is recommended to summarize the different events that occurred between the consecutive measurements. According to Synnott (1991), the initial description should include the following aspects:

- ➢ The greater degree of detail of the location and survey of the plot and the access line to ensure its location in the following measurements.
- ➢ Description of some stable features of the site, such as soil type, appearance, slope, geology and history.
- ➢ Description of the initial state of the flora and if possible of the fauna, especially the flora of the undergrowth in order to obtain basic information to estimate the changes that may occur in the future with the construction of the infrastructure that is part of the installation of the mine. The more detailed the description, the more effective it will be to detect changes in the site in the long term. Therefore, it is proposed to perform 2 measurements per year, which is 1 every 6 months.

- ✓ Measurements and markings of trees.

In the plot, smaller sampling units will be established where juvenile individuals of smaller diameters are measured than the minimum established for the total of the sampling plot. Regeneration at the seedling level is sampled through randomly established transects within the subplots of measurement, where all saplings with a height of less than 1 m are recorded.

For the natural regeneration, plots of 5 m x 5 m and 2 m x 2 m for stands of trees and saplings respectively will be established. For the stand of trees individuals will be marked consecutively, for which painting will be placed on the stem of each stand of tree or an aluminum label, the common or vernacular name will be registered, it must be specified if it is regrowth or plant, register the code of exposition of the cup of the stand of tree DAP in cm. For the saplings the illumination that penetrates and a count is scored, noting the following information: Common name, number of saplings and/or sprouts of the subplot.

Data on species, family, and diameter at 1.30 m are recorded for each individual at 2.5 m., stem quality, total height, commercial height, cup exposure, cup shape and other qualitative variables that can be registered.

6. Training sessions, outreach and environmental education.

The measures proposed for the adequate management of plant and animal species in the project area, training activities and the participation of the staff is essential to sponsor the care of them. The most

PROGRAM OF PROTECTION AND CONSERVATION OF HABITATS
relevant actions that are proposed to achieve this purpose are described in the Program of education and training for personnel linked to the project with emphasis on ecosystems and species of flora and fauna of interest and in the Action Plan for the conservation of the blue billed curassow Crax alberti Fraser, 1852. In addition, the following activities will be carried out: ✓ Identify the best conserved areas surrounding the project, in which it is certain that they inhabit species of biological interest. ✓ Install information fences, with the most representative species of the place. ✓ Informative folding will take place with the species of fauna and flora characteristic of the area, which will be delivered to the inhabitants in the awareness workshops and to the direct and indirect workers of the project. ✓ Dissemination and enforcement of prohibitions to the capture, hunting and trade of species of fauna or their derivatives and products of the forest, between workers and the neighboring community. ✓ If you find a worker attacking the ecosystem or commercializing any species of wild fauna or native flora, you must be sanctioned and removed from the project. Make posters, with species in danger of extinction, or of biological interest, in order to disseminate them to the community and workers of the study area, especially in the areas of greatest interest
QUANTIFICATION OF THE MEASURE
o Promotion and development of receiving ecosystems of wild fauna and flora with a 100% effectiveness with respect to the areas proposed for that purpose. o Workers sanctioned for attacking the ecosystem o Affected species of fauna and flora in areas surrounding the project o % of ecosystem interest areas marked and protected by workers
PLACE OF APPLICATION
Area of direct and indirect influence of the mining project.
BENEFITED POPULATION
N/A
MECHANISMS AND PARTICIPATORY STRATEGIES
o Workshops for the personnel involved in the project. There will be talks, workshops to all the personnel that have some interest in the project. o Staff participation in the different topics to be discussed. o Participation of some members of the community in the development of monitoring activities. Conferences or workshops will be held to socialize the results of the project and environmental education to the inhabitants of the villages located within the area of direct social influence of the project o Posters will be installed with emblematic species in the areas of greater attendance of personnel, such as workers.

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o Realization of a foldable or brochure to disseminate the most representative species of fauna and flora that inhabit the area o Signaling fences of the areas with the highest concentration of species of biological interest.	
REQUIRED STAFF	
o Biologists, Ecologists, Forest Engineers, Environmental Engineers o Social professional o Non-professional personnel such as Workers, Operators among others. o Unskilled labor	
SUPERVISING AND MONITORING INDICATOR(S)	
✓ (# of talks made / # of scheduled talks) * 100 ✓ (# of guidelines met / # of established guidelines) * 100 ✓ (# of has reforested / # has proposed to reforest) * 100 ✓ (# of established permanent plots / # of proposed permanent plots.) * 100	
RESPONSIBLE (S) OF THE EXECUTION	
ENTITY / INSTITUTION	**ROLES***
TGC	PL – OP – SP – SG - IN
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8-2	

8.1.2.6 Education and training program for personnel linked to the project

8.1.2.6.1 Education and training program for personnel linked to the project, with emphasis on ecosystems and flora species of special interest.

EDUCATION AND TRAINING PROGRAM FOR PERSONNEL LINKED TO THE PROJECT, WITH EMPHASIS ON ECOSYSTEMS AND FLORA SPECIES OF SPECIAL INTEREST.								
OBJECTIVES								
✓ Promote an appreciation of the natural environment, the technical aspects and the project in general by the community of the area of direct social influence of the project and of the personnel hired for its development. ✓ Facilitate the understanding of the environment realities and generate an awareness of belonging to the environment to the project staff.								
GOALS								
✓ Direct environmental education workshops to 100% of the project's personnel. ✓ Training of personnel linked to the project in the management of the biotic component during the development of project activities. ✓ Socialization of the management plan and the activities of the project in general to the community of the area of direct social influence of the study. ✓ Raise awareness among the community and the personnel linked to the project about the importance of proper management, conservation and recovery of natural resources as a source of ecosystem services.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	*x*
IMPACT(S) TO BE CONTROLLED								
✓ Modification of habitats. ✓ Interruption of biological corridors. ✓ Alteration of the distribution, structure and floristic composition of the natural vegetal coverings ✓ Fragmentation of natural plant cover								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								
➢ Education and training for personnel linked to the project with emphasis on ecosystems and species of flora and fauna of special interest. As a way of proposing and executing participatory strategies that promote the preservation of the environment in which the project is developed, certain actions and guidelines must be executed so that the linked personnel and the community have a clear conscience about the care of the environment and natural resources. Within the area of direct and indirect influence of the project, the following actions are proposed for this:								

- Staff training

Carry out workshops and periodic talks in which the following topics are developed, among others:

- ✓ HSE policy
- ✓ Relationship and dealings with the surrounding community
- ✓ Environmental regulations and environmental commitments of the license related to the activities to be developed.
- ✓ Before, during and in the closing of the project of each one of the exploratory wells, it will be necessary to carry out activities of sensitization, training and environmental education on the importance and sensitivity of the vegetable units present in the area, as well as to prevent possible damages to the fauna local, which can be present in the different work fronts:
  - Preservation of natural resources, with emphasis on endemic and endangered species of flora.
  - Protection of vegetation and prohibition of felling and burning.
  - Exposure of protection, prevention and mitigation measures, to minimize the impact of ecosystems.
  - Dissemination of laws that exist on the protection of flora.
  - Sanctions for non-compliance with environmental regulations and environmental commitments of the license related to the activities to be developed. And the sanctions that exist for those who infringe them.
- ✓ Environmentally friendly work practices (motivation and reinforcement of behaviors for the implementation and adoption of the activities that are carried out within the project).
- ✓ Talks in which emphasis is placed on the efficient use of natural resources, focusing on the management and use of the resource, thus preventing its inappropriate use. These talks will be carried out with playful dynamics of reflection on the efficient use of natural resources.

Apply techniques and dynamics tending to an active and committed participation, on the part of the contractors and subcontractors, in the fulfillment of this normativity.

The training meetings will be carried out during all the phases of the project, from the exploration to the closing, as well as with all the personnel that are linked, in order to execute any activity related to the project.

In the same way, the environmental and social coordination of the project will establish mechanisms or strategies for monitoring the training and the achievements made in this regard.

Special care will be taken with the relations between the community and the personnel linked to the project, for which purpose it will be in function to inform any irregularity to avoid possible alterations in the correct functioning of the works.

The community of the area of direct social influence of the project must be included in the talks and workshops to ensure compliance with the participation and information guidelines and as a mechanism and participatory strategy. This is aimed at achieving a harmonious relationship between the community and the project's stakeholders and, in turn, as a form of social compensation by disseminating knowledge of the natural wealth of the region and promoting its proper use and management.
QUANTIFICATION OF THE MEASURE
It is expected that, with the execution of the measures proposed in this record, an adequate level of effectiveness will be obtained for the program contemplated here, as follows: Fulfillment of the totality of trainings, talks and programmed workshops directed to the community and the personnel linked to the project.
PLACE OF APPLICATION
The management measures proposed in this file must be applied in the following sites: ✓ Areas of intervention where the project activities are developed ✓ Area of direct influence of the mining project, El Pescado
BENEFITED POPULATION
Population of the area of direct influence of the project and workers.
MECHANISMS AND PARTICIPATORY STRATEGIES
The mechanisms and participatory strategies that will be implemented for the activities covered in this file are the following: ✓ Call to the inhabitants of all the villages of the area of direct social influence of the project. ✓ Hiring of labor from the sidewalks located within the area of direct social influence of the project. ✓ Training of personnel in relation to general aspects of the project and particulars of the activities of the card. ✓ Workshops or workshops to socialize project results and environmental education to the inhabitants of the villages located within the area of direct social influence of the project. ✓ Talks, workshops to all the personnel that have some interest in the project. ✓ Posters with emblematic species in the areas of greater attendance of personnel. ✓ Foldable with the most representative flora species that inhabit the area. ✓ Signaling fences of the areas with the highest concentration of species of biological interest.
REQUIRED STAFF
For the development of the management activities proposed in this file, the following personnel profile is required: ✓ Social professional with experience in community management.

✓ Professionals in forestry, biologists and ecologists. ✓ Non-Professional personnel such as drivers, auxiliaries, etc.
SUPERVISING AND MONITORING INDICATOR(S)
✓ Planning and structuring number of the awareness talks / Start number of activities * 100. ✓ (No. of Assistances workshops / No. of records in the attendance lists of each of the talks given for follow-up on compliance with the proposed objectives) * 100 ✓ Compliance with internal and national environmental regulations regarding sanctions for inadequate management of biological resources / No sanctions against workers) * 100
RESPONSIBLE (S) OF TOUCHSTONE EXECUTION

ENTITY/ INSTITUTION	**ROLES***
TOUCHSTONE	PL, OP, Sp, Sg, In
Professional in charge	OP, In, Sg

Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)
SCHEDULE (PERIOD OF EXECUTION)
See Annex 8-1
BUDGET (APPROXIMATE COSTS)
See Annex 8-2

8.1.2.6.2 Education and training program for personnel linked to the project, with emphasis on ecosystems and species of fauna of special interest.

EDUCATION AND TRAINING PROGRAM FOR PERSONNEL LINKED TO THE PROJECT, WITH EMPHASIS ON ECOSYSTEMS AND SPECIES OF FAUNA OF SPECIAL INTEREST.								
OBJECTIVES								
✓ Sensitize and generate an awareness of belonging to the environment to the project staff. ✓ Train personnel linked to the project in the basic management of the biotic component during the development of project activities. ✓ Form a community aware of the importance of the natural environments with which it co-exists ✓ Understand how human activity causes various impacts on the environment. ✓ Promote the care and conservation of wildlife species by the community that lives within the area of influence of the mining project. ✓ Reduce the selective and indiscriminate hunting of species within the area of influence of the project.								
Stages of the project	*Exploration*		*Construction and Assemble*	***x***	*Exploitation*	***x***	*Final Closing and Post Closing*	
IMPACT(S) TO BE CONTROLLED								
✓ Fauna repelling. ✓ Displacement of fauna. ✓ Wild fauna manipulation. ✓ Selective hunting of animal species ✓ Alteration of the behavioral parameters ✓ Ignorance of the ecological importance of ecosystems.								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								
During the sampling phase for the characterization of the terrestrial fauna within the project, it was possible to identify a series of anthropic impact and pressures on the terrestrial fauna, which with this program they seek to mitigate, through the de-stimulation of the selective hunting of certain species of animals and the domestication and captivity of wild species. The species with the greatest anthropic pressure in the area are mainly some species of mammals, snakes and some species of birds; mainly those considered as ornamental. ❖ Selective hunting For the specific case of the mastofauna, the selective hunting of certain species has been a risk factor for the populations of some large and medium mammals; it is the Paca species case pursued within the AID for its consumption; Because their hunting in the area can be classified as survival hunting, this phenomenon does not significantly alter the sizes and population states of this species. It is therefore necessary to establish several workshops with the community in general within the AID to address this issue, which will be included in the development framework of the environmental educational workshops proposed within the Plan of Action for the Conservation of curassow Crax Alberti Fraser, 1852.								

EDUCATION AND TRAINING PROGRAM FOR PERSONNEL LINKED TO THE PROJECT, WITH EMPHASIS ON ECOSYSTEMS AND SPECIES OF FAUNA OF SPECIAL INTEREST.
❖ The perception towards snakes Snakes, on the other hand, have historically been persecuted in all cultures, because they have been associated with something negative, and people generally confuse an aggressive snake (with a tendency to bite) with a poisonous snake. Aggressive snakes include both poisonous and non-poisonous snakes and they also occur with snakes considered non-aggressive. This problem was very marked within the experiences expressed by the community and the workers of the project, which affirm that these individuals are dangerous or not, must be sacrificed. It is therefore necessary to implement an education and training program educating people about snakes to mitigate this type of eventuality. ✓ Training ✓ Prohibition of capture, manipulation and unnecessary disturbance to wildlife. ✓ Censing the populations of species with greater anthropic affectation in the area, both those wild populations and individuals kept in captivity (in the case of birds and mammals). Once the censuses of these species are taken, a cycle of talks and workshops with the community will be held, where the conservation and care of the fauna resources within the region will be encouraged. For each talk or workshop there will be teaching material such as species cards, photographs, games, videos, among others. (These workshops will be developed within the Action Plan for the conservation of Blue-billed Curassow.) ✓ Finally, we will proceed with the preparation of results reports and at the same time some population censuses will be carried out for terrestrial fauna within the AID and AII of the project in order to estimate the effectiveness of the education and training program in question.
QUANTIFICATION OF THE MEASURE
✓ Planning and structuring number of the awareness talks / Start number of activities. ✓ (No. of Assistances workshops / No. of records in the attendance lists of each of the talks given for follow-up on compliance with the proposed objectives) * 100 ✓ Compliance with internal and national environmental regulations regarding sanctions for inadequate management of biological resources / No sanctions against workers) * 100 ✓ Census of richness of fauna species with some affectation of those described in the actions to be developed.
PLACE OF APPLICATION
Areas of intervention where the project activities and the area of direct and indirect influence of the mining project are developed.
BENEFITED POPULATION
MECHANISMS AND PARTICIPATORY STRATEGIES
o Training of project personnel and individuals of activities on the protection of wildlife. o Implementation of didactic material within each workshop or talk, such as videos, photographs, tokens of species, games, among others. o Posters with emblematic species in the areas of greater attendance of personnel and folding with the representative fauna species that inhabit the area.

EDUCATION AND TRAINING PROGRAM FOR PERSONNEL LINKED TO THE PROJECT, WITH EMPHASIS ON ECOSYSTEMS AND SPECIES OF FAUNA OF SPECIAL INTEREST.	
o Talks, workshops to all the personnel that have some interest in the project.	
REQUIRED STAFF	
• 2 Biologists • 2 Social workers • 4 Auxiliaries	
SUPERVISING AND MONITORING INDICATOR(S)	
N/A	
RESPONSIBLE (S) OF THE EXECUTION	
ENTITY/ INSTITUTION	**ROLES***
TGC	PL, OP, Sp, Sg, In
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8-2	

8.1.2.7 Compensation program

8.1.2.7.1 By taking advantage of woody vegetation cover that involves the arboreal component.

COMPENSATION PROGRAM FOR THE USE OF WOODY VEGETATION COVER. MINING CONCESIÓN 5969
OBJECTIVE(S)
✓ Establish forest compensation for the El Pescado project, for the forest use required for the construction of the necessary infrastructure (roads, camp, beneficiation plant, mine entrance, among others) and the additional areas that will be intervened for the construction of the same. ✓ Carry out the compensation for the forest use that is carried out on the intervention areas of the project. ✓ Establish the actions to be followed for the compensation of the areas proposed for reforestation as a measure of compensation for the impact of forest cover existing in the AID of the project. ✓ Carry out a reforestation as a compensation measure, through timely reforestation with native species, in degraded or deforested areas adjacent to the area to be intervened or in the protection zones of the water sources supplying the aqueducts of the sidewalk and / or municipalities, or those areas defined by the MADS (formerly MAVDT) and CORANTIOQUIA.
GOALS
✓ Estimate the scope in number of trees and areas to compensate for the effect of the forest use that is made on the intervention areas of the project. ✓ Identification and location of potential areas for the implementation of this compensation program. ✓ Training of project field personnel and the community of the area of direct social influence on the compensation program to be carried out. ✓ Establish 100% compensation in the areas intervened by the project, through the implementation of silvopastoral systems and reforestation with native species. ✓ Implement and establish 100% of the proposed actions for the compensation of the areas subject to reforestation. Estimate the scope in number of trees and areas to compensate for the effect of the forest use that is made on the intervention areas of the project. ✓ Identification and location of potential areas for the implementation of this compensation program. ✓ Training of project field personnel and the community of the area of direct social influence on the compensation program to be carried out. ✓ Establish 100% compensation in the areas intervened by the project, through the implementation of silvopastoral systems and reforestation with native species.

- ✓ Implement and establish 100% of the proposed actions for the compensation of the areas subject to reforestation.

Stages of the project	*Exploration*		*Construction and Assemble*		*Exploitation*	*x*	*Final Closing and Post Closing*	*x*

IMPACT (S) TO BE CONTROLLED

- ✓ Alteration of the distribution, structure and floristic composition of the natural vegetation cover.
- ✓ Fragmentation of natural plant cover.
- ✓ Fragmentation of biological habitats and corridors.
- ✓ Biodiversity loss

Type of measure	*Prevention*		*Mitigation*		*Correction*		*Compensation*	x

ACTIONS TO BE DEVELOPED

➢ Compensation program for use of woody vegetation cover

The compensation will be advanced, including activities necessary to achieve acceptable conditions of compensation for the areas affected by the project. The minimum ecological and environmental references correspond to those reported by the baseline of this EIA, in terms of the composition, structure and function of each type of coverage.

For the stage of construction and assembly of roads, camps, heliport, dumps, offices and benefit plant, it is required to remove the existing woody vegetation in the areas to intervene in the coverage of clean pastures (Pl), discontinuous urban fabric (Tud), Low dense forest of the mainland (Bdbtf) and low secondary vegetation (Vsb); for this reason as a compensation measure for the use of these coverage units the compensation program for the biotic environment for affectation of the flora, will be oriented to the following activities: recover the natural vegetation coverage in areas currently identified as in process of succession , mainly covered by low secondary vegetation, implementation of silvopastoral systems and reforestations in strategic areas with native species.

In order to compensate for forest exploitation, a compensation factor of 1:10 is proposed, that is to say that for the 17 isolated individuals included in the inventory at 100% of the trees to be harvested in the intervention areas, it is proposed to plant 170 trees of native species, which will be chosen according to the results of the forest inventory.

➢ Identification of potential sites to be recovered

The potential areas for the implementation of this program are located on the areas of direct and indirect influence of the project and coincide with the areas proposed in the Program file for the development and promotion of ecosystems and species of fauna and flora affected by the project, since it was considered that these same areas should be taken into account for the development of compensation programs.

- Project operational plan

For the compensation project for the exploitation of woody vegetation cover, the following phases are proposed:

- Exploration Stage

Agreement of the project with the environmental authority. The first step for the start of the project is to coordinate its scope and methodology with the competent environmental authority, which in this case is the Regional Autonomous Corporation of the Center of Antioquia (CORANTIOQUIA). In this agreement, the objectives and goals of the project must be formally supported, as well as its agreement with the environmental development plans for the region and the legal framework.

Agreement and socialization of the project to the community. Once the specific area and the scope of the project have been defined, the socialization and agreement of the same will be carried out with the community of the road(s) where it will be executed.

Project execution site. After the agreement, it will be necessary to evaluate the best alternative regarding the prioritization of the site in which it will be executed, taking into account the degree of deterioration of the protective vegetal cover and the facilities for its execution, as well as the receptivity of the community and the possibility of acceptance by the owners of the properties among other factors.

This phase also includes awareness-raising workshops aimed at achieving community ownership of the project and ensuring its continuity over time, as well as compliance with the objectives and goals set. The topics to be addressed in the awareness workshops should be directed basically to the care of water resources and the importance of adequate plant cover as an element of protection and recovery of sources, water currents and lentic bodies. Other environmental issues can also be included, such as the effects of pollution on the quality and availability of water, protection and conservation of wildlife, proper management of agricultural and livestock production, etc.

Negotiation with owners. The areas in which the project will be executed will be private and must be arranged with the owners, reaching an agreement for the recovery of the proposed areas and a commitment to their conservation.

- Technical planning

Planting design For the project, the methodology of sowing of inducing species will be adopted, which consists of choosing species belonging to the ephemeral or early heliophytes' guild, in combination with others of the durable or late heliophyte type that, under isolation conditions, have the capacity Naturally propitiate the establishment of partial and total sciophyte species giving rise to a cover that presents a structure and floristic composition very similar to those of a natural forest.

This technique is based on the concept of "scheme will be basic" that defines the basic stages necessary for natural plant succession: the establishment of an herbaceous plant cover, followed by woody type precursor species, preclimax inducing species and finally the emergence of species of plant formations that have reached their climax.

The basis of the use of the scheme consists of identifying the stage in which the land is and use for the recovery of natural vegetation, the species that correspond to the immediately subsequent stage. In the case of the area of influence of the project, it is estimated that most of the areas to be intervened are covered by high and low secondary vegetation. The project will then seek to take these areas to the next stage by planting woody-type precursor species.

This whole process is consolidated in three stages that are the initial colonization of the land with pioneer species, mainly ephemeral or early heliophytes; aggregation where late or durable heliophytes begin to appear and consolidation when the structure and floristic composition of the vegetation becomes much more complex and partial and total sciophyte species are established.

Recommended species: For the present project, some of the species identified in the forest inventory were considered, as a part of floristic composition of the hedges characterized in the study area. These species are characterized by a very good response to the conditions of the region and are those found in most of the areas in which natural regeneration processes were identified.

- Operational stage

Determination of the areas to recover. After having defined the priority areas for the execution of the project and the final specific site, a planning of the effective areas for the project must be carried out, reflected in a cartographic map in which the following are determined:

- Land boundaries to recover.
- Current land use and land cover map.
- Areas suitable for the planting of inducing species.
- Roads and access roads, rivers, firewalls, live fences, etc.)
- Protected areas.
- Rocky outcroppings and areas with risk or erosion problems.
- Zoning of risks and vulnerabilities.
- Power lines
- Altimetric study for the determination of slopes.
- Species and existing vegetation cover.

✓ *Enclosure and isolation of areas*

The areas to be recovered must be isolated through the installation of a barbed wire fence to prevent the entry of livestock and other animals. For the installation of the fence the following steps must be followed:

- Preparation of the fence line or gap
- Excavation of holes for the seeding of poles
- Stacking the posts on the line, placing and affirming
- Installation of retaining or retained posts
- Laying and tensioning the wire by using staples
- Construction of gates, water passages, etc.

✓ Sowing of inducing species

The sowing of inducing species should be planned, coordinated and supervised in all activities by a forestry professional. This sowing will be done according to the following methodology:

- Determination of the species. It is advisable to make a combination of some of the species listed in the aforementioned table, in order to reproduce conditions similar to those of natural plant succession or similar conditions of a natural forest. To determine the most suitable species, the forestry engineer must identify the most frequent in the areas surrounding the project in the spots of low secondary vegetation and in strategic points where relicts of forest and / or native species are still conserved.

- Layout the sowing should be done with a low density to enable the rapid growth of the seedlings and leave enough space to allow the natural establishment of other species that will consolidate the process of vegetation regeneration, in addition to diminishing as much as possible the competition between these. For this purpose, it is recommended to use the method of drawing three bobbins because they are terrains with steep slopes.

  For the 170 trees proposed for planting, it is recommended to plant a total of 196 trees with a maximum mortality of 15%, which would cover the compensation goal.

- Sowing. For the sowing of the inducing species, the following basic recommendations should be followed:

  - A zone will be adapted before the plantation to locate the seedlings, avoiding its direct exposure to the sun, with dry palm roofs or canvas in wood structure, giving an opportune irrigation to avoid loss of the vegetal material.

  - The plant material must be in good conditions of vigor and development, for this purpose it must be moved to the field one week before to achieve a better adaptation to the conditions of the environment before its definitive planting. You must also apply irrigation before planting to promote its capture.

  - To ensure a survival and acceptable growth, it is convenient to carry out the sowing during the rainy season. The purpose is for individuals to find moisture conditions conducive to

the development of their roots. Domo general rule the sow should be done as much as 30 days before the normal end of the rains.

- The size of the hole, should be double the width and depth with respect to the bag used, for example, if the bag has dimensions of 15 centimeters in diameter by 20 in length, then you should dig hole 30 centimeters wide by 40 centimeters deep.

It is recommended to use a digger in this work to achieve a more homogeneous and regular gap, in addition this tool reduces the loss of substrate and offers the possibility of better disposing the earth that is extracted.

- Before sowing, an operator must distribute the seedlings in the field, placing them one by one next to each hole.

- For sowing, the bags should be removed by carefully cutting them to prevent the ground bread from disintegrating. This step is very important because experience shows that planting the seedlings with your bag or cutting only the bottom of it is one of the most frequent mistakes.

- It is recommended to mix the extracted earth very well, adding half a kilo of organic matter (humus, compost, etc.), one hundred (100) grams of hydro-retainer and correctors for the acidity if necessary.

- Part of the previously prepared substrate, should be placed in the bottom of the hole in an amount that allows to place the seedling with its ground bread without it standing out from the ground level or too deep (about three to five centimeters).

- When the substrate has rocky material or gravel, these elements must be removed. Similarly, when the material extracted is too sandy, it must be replaced by organic soil or add a much larger amount of this type of humus, compost or black soil.

- Place the seedling straight and finish adding the substrate around the ground loaf and covering it lightly, applying a gentle pressure to firm the soil. If required, more substrate must be added to reach ground level.

- Excavation of the holes for planting. The size of the holes cannot be defined in advance because this depends on the dimensions of the bag used in the nursery or the sowing system used, since it is very different for the direct sowing or bare root that for the transplant with bag. In any case, the specifications for the hole must be defined by the forestry professional, after studying the conditions of the site and the plant material that will be used.

  - Plating: a plate of 80 cm in diameter will be made, ringing the surface of the ground.

  - Hole: it will be 30 cm wide and 30 cm deep.

- Fertilization: in each hole approximately 200 g of chicken manure or composting will be applied before sowing or fertilizers applicable simultaneously with planting will be used.

- Plantation: cut the bag with a knife and avoid undoing the bread from the ground; The neck of the root should be at ground level and firm. The roots will be oriented vertically to avoid curling. The bags from the seedlings should be collected.

- Reseeding: a mortality of 10% should be considered; This will be done after the plantation supports its first summer.

A replant will be carried out if required, since there are usually seedlings that die. When the losses are greater than 5% it is convenient to replace them in a timely manner in order to obtain a homogenous mass.

Here are some actions that contribute to the protection of seedlings:

- The best defense against pests and diseases is the vigor and diversity of species
- One way to prevent the appearance or proliferation of a pest or disease is to eliminate dead seedlings.
- To protect seedlings from livestock, the area should be fenced.
- Establish reforestation in areas of low flooding.
- Sowing of plant material. The programming of the sowing season must be carried out in such a way that it coincides with the rainy season to minimize the mortality due to water stress. Seeding of the seedlings should be done under the strict supervision of the forestry professional and following among others the following recommendations:

✓ Maintenance works

After sowing, you must have a maintenance program for a period of eighteen months, with a frequency of one month, to use them for rapid growth and adaptation to environmental and buildable conditions of the area, which guarantees a much faster establishment in comparison with introduced species or of sciophyte character. Keep in mind that maintenance should not be extended for a long time to allow natural regeneration of other species that appear naturally.

In this process, fertilization, cleaning and hoeing will be carried out with hoe every three months, during the first year and the last clean with hilling every six months. At the end of this time, the plantation must have a minimum pretreatment of 90% and a minimum height of 1.5 meters.

Once the maintenance period of the plantation is finished (means at the third year), it will be officially accepted by a CORANTIOQUIA, and a copy sent to the MADS.

In the same way, the recommendations have been taken into account

- For the execution of the maintenance program, it is recommended to include the following tasks, as minimum measures in order to maximize the percentage of survival of the plantation and guarantee an adequate establishment and subsequent development of the protective vegetal cover:
- Irrigation. Although the application of hydro-retention was included at the time of sowing, it is necessary to contemplate the application of irrigation according to the conditions of precipitation and the state of the plantation, according to what the forestry professional plans and taking into account the conditions of area.
- Reseeding. Seedlings should be used in very good condition for planting. However, replanting of dead or poorly developed material should be considered one or two months after sowing.
- Weed control. This work will be done only in the form of silver, with a radius of fifty (50) centimeters around the seedlings (silver). On the rest of the land, this work will not be carried out to favor the establishment of other pioneer species, which is one of the main objectives of the plantation and the stabilization of the slopes.
- Fertilization. For this work, prior to sowing, soil analysis should be carried out at each site in order to establish the actual requirements of the plantation in terms of nutrients. The diagnosis and formulation of doses and periodicity for the application of fertilizers should be determined by the forestry professional.
- Phytosanitary control. A monitoring program should be formulated in order to detect the appearance of phytosanitary problems in time and to be able to apply in time the necessary corrective measures according to the type of problem and the technical concept of the forestry professional.
- Pruning and suckering. These tasks must be carried out with the objective of properly directing the development and growth of the plantation, in accordance with what the forestry professional determines and always bearing in mind the general objective that is to reach protection coverage, rather than production.

The execution of the maintenance works must be carried out with the planning, coordination and supervision of a forestry professional, who will determine the periodicity, relevance and form of execution of these, according to the conditions of each site, the species used and the state general of the plantation.

- ✓ Plant nursery establishment.

In the area where the El Pescado mining project will be carried out, there is no nursery with the capacity to supply the plant material required for the reforestation of the hectares to be reforested, and in the existing nurseries there are no native species of great importance for the zone and national level (Example Abarco, Algarrobo, Caguí, among others) and the displacements that should be made from the plant material of the existing nurseries to the sites where the reforestations will be made, will cause damage to it and increase costs.

On the other hand, the existing germplasm in the approximately 200 hectares that will be intervened for the construction of the El Pescado mining project, should be used to obtain as many native species as possible and not waste this great resource.

Therefore, it is necessary to build temporary nurseries in order to produce all the necessary plant material and take advantage of the seeds produced constantly in the area by each of the species that live there.

To obtain the plant material, 1 relatively small nurseries will be implemented, where native species will be produced, which will be used for the proposed reforestation; The material that cannot be produced in the nursery will be obtained from accredited nurseries. In addition to the natural regeneration rescued.

The nurseries should be located in a central area to the areas that are going to be reforested, within the project facilities. The nurseries are proposed to be established during the construction phase, through an agreement with the presidents of the Community Action Boards of the different AID and TOUCHSTONE districts.

Each nursery will be composed of:

- ❖ Multi-shade mesh shed for piles and plots of forest floor removed from the construction corridor.
- ❖ Germinators in wooden bed.
- ❖ Wooden and zinc shed for wooden storage.
- ❖ Promotion era (terraced land).
- ❖ Near three wires of barbed wire.

In the same way, the necessary recycling of the soil removed in each of the stages for the construction activity will be done, this will be arranged in multi shade, with constant irrigation, in order to use it in germination plots; the one that is not used in this activity, will be piled up without any type of irrigation, so that it does not ferment.

Other waste such as branches, selvedges and others will be stacked and disposed for project uses.

- ✓ Delivery of the project

After two years, once the maintenance program and previous concept of the competent environmental authority has been finalized, the plantation will be handed over to the officials of the same, the owners of the properties involved and the community of the sidewalks in which the project was developed.

This delivery will be made in accordance with the signature of a receipt that specifies the termination of the responsibility of the operator on the project.

- ➢ Training, outreach and environmental education seminars

The proposed measures for the adequate management of plant species in critical danger, closed, unregistered or unidentified, require the active participation of all personnel working on the

project, taking into account that they are the ones who will be at the forefront of the interventions that are going to be carried out in the area.

That is why the fulfillment of all the training activities and the participation of the staff is essential to sponsor the care of the vegetation. The most relevant actions that are proposed to achieve this purpose are described in the Program of education and training for personnel linked to the project with emphasis on ecosystems and species of flora and fauna of interest.

QUANTIFICATION OF THE MEASURE
It is expected that, with the execution of the measures proposed in this record, an adequate level of effectiveness will be obtained for the program contemplated here, as follows: ✓ Compensation program for the use of 100% successful woody vegetation coverage with respect to the scope in number of trees and areas raised.
PLACE OF APPLICATION
The management measures proposed in this file must be applied in the following sites: ✓ Points where agreement was reached with the environmental authority and the owners of the properties, the implementation of the actions to develop proposals and which are located within the area of direct or indirect influence of the project or the sites where it was most affected.
BENEFITED POPULATION
The population benefiting from this management program will be the community surrounding the project's intervention areas.
MECHANISMS AND PARTICIPATORY STRATEGIES
The mechanisms and participatory strategies that will be implemented for the activities covered in this file: compensation program for the use of woody vegetation cover are the following: ✓ Socialization to the community based on the area of direct social influence of the project, including general aspects of the project and particular aspects of the activities of the card. ✓ Hiring of labor from the sidewalks located within the area of direct social influence of the project. ✓ Training of personnel in relation to general aspects of the project and particulars of the activities of the card. ✓ Workshops or workshops to socialize project results and environmental education to the inhabitants of the villages located within the area of direct social influence of the project.
REQUIRED STAFF
For the development of the management activities proposed in this file, the following personnel profile is required: Professionals: ✓ Forestry professional with experience in environmental restoration.

✓ Social professional with experience in community management. ✓ Unskilled labor. ✓ Non-professional personnel such as drivers, low-level workers, drivers, etc.
SUPERVISING AND MONITORING INDICATOR(S)
✓ Area (ha) reforested / Area (ha) intervened by the project * 100. ✓ # of trees lit / # of trees planted * 100 ✓ # of maintenance carried out / # of proposed maintenance * 100
RESPONSIBLE (S) OF THE EXECUTION

ENTITY/ INSTITUTION	ROLES*
TOCHSTONE	PL – OP – SP – SG - IN
Contractor companies (if there are any)	IN

Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)
SCHEDULE (PERIOD OF EXECUTION)
See Annex 8-1
BUDGET (APPROXIMATE COSTS)
See Annex 8-2

8.1.2.7.2 Compensation program for use of vegetation cover that does not involve the arboreal component.

FOR THE USE OF VEGETAL COVERAGE THAT DOES NOT IMPLY THE ARBOREAL COMPONENT (Shrubs and herbaceous vegetation/change in land use) MINING CONCESSION 5969.								
OBJECTIVES								
✓ Make compensation for the use of plant cover that does not involve the tree component, which is carried out on the project's intervention areas. ✓ Handle the vegetable layer and the organic soil, with the minimum alterations of its properties and tend to improve them.								
GOALS								
✓ Estimate the scope in area to compensate for the effect of the use of the non-woody vegetative cover that is made on the intervention areas of the project. ✓ Identification and location of potential areas for the implementation of this compensation program. ✓ Training of project field personnel and the community of the area of direct social influence on the compensation program to be carried out. ✓ Avoid 100% the affectation or unnecessary cutting of plant material. ✓ Take advantage of 100% of the organic material for the subsequent restoration of areas intervened by the project.								
Stages of the project	*Exploration*		*Construction and Assemble*		*Exploitation*	x	*Final Closing and Post Closing*	x
IMPACT (S) TO BE CONTROLLED								
✓ Alteration of the distribution, structure and floristic composition of the natural vegetation cover. ✓ Fragmentation of natural plant cover. ✓ Landscape modification. ✓ Decrease in plant cover. ✓ Affectation of terrestrial habitat quality. ✓ Erosion of the soil.								
Type of measure	*Prevention*		*Mitigation*		*Correction*		*Compensation*	x
ACTIONS TO BE DEVELOPED								
➢ Compensation program for use of plant cover that does not involve the tree component.								

Bearing in mind that, for the Construction and Assembly of roads, adaptation of tailings deposits, dumps, heliport, camps, offices and adaptation of processing plants for the project, it is required to remove the non-woody vegetation existing in the areas to be intervened, Next, a series of measures are proposed to compensate this affectation. A program is proposed to recover the natural vegetation cover in areas currently identified as being in succession, covered mainly by low secondary vegetation or clean pastures with isolated trees.

- Scope of the project

Within the intervention area of the project there are seven (6) types of land cover, of which the most significant are the clean ducks with approximately 12.19 ha, discontinuous urban fabric (Tud) with 2.20 ha, Forest dense lowland (Bdbtf) with approximately 1 ha and low secondary vegetation (Vsb) with 0.88 ha, for concession 5969. This distribution of cover is shown in Illustration 8-31.

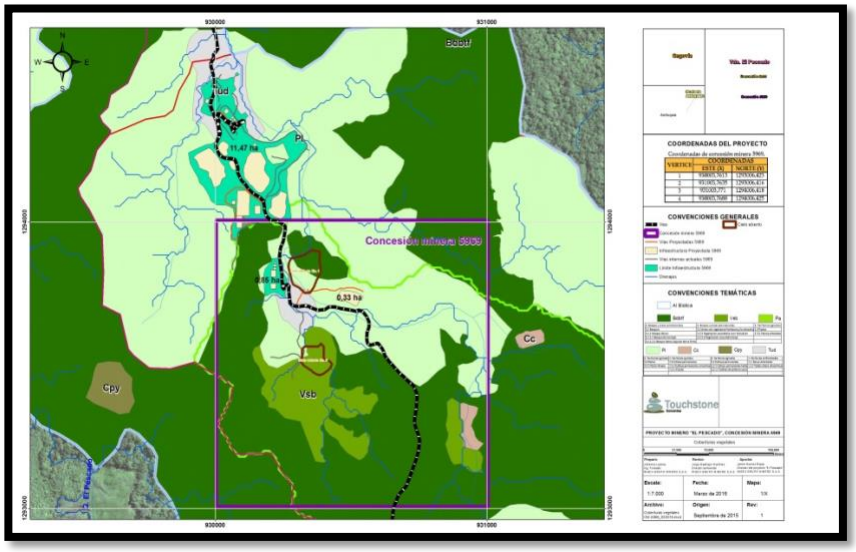

Illustration 8-31. Land cover present in the project's intervention areas.
Source: INGEX, 2016

To make compensation for forest harvesting, different compensation factors are proposed, according to the methodology proposed in the Manual for the allocation of compensation for biodiversity loss of the Ministry of Environment and Sustainable Development (MADS), 2012. The total of area to intervene is 0.44 ha, which when extrapolated to the estimated factors gives a total area to be offset of 21.15 ha. Table 8-22 details the estimated area to be intervened for coverage, the estimated compensation factors and the areas to be compensated.

Table 8-22. Estimated areas for compensation for use of the non-woody vegetative cover.

COVERAGE	COMPENSATION DATA		
	Area to Affect (ha)	Compensation Factor	Area to compensate (ha)
Clean pastures	12,19	1	12,19
Discontinuous urban fabric	2,20	1	2,20

Low dense forest of the mainland	1,00	5	5,0
Low secondary vegetation	0,88	2	1,76
Total	16,27		21,15

** The compensation factor was determined by the guidelines established in the MANUAL FOR THE ASSIGNMENT OF COMPENSATION FOR LOSS OF BIODIVERSITY, MADS 2012.*

- ***Identification of potential sites to be recovered***

It should be borne in mind that each of the compensation programs are exclusive and, therefore, each of them must be carried out on different areas that may be agreed upon or chosen from the points raised.

QUANTIFICATION OF THE MEASURE

It is expected that, with the execution of the measures proposed in this record, an adequate level of effectiveness will be obtained for the program contemplated here, as follows:

- ✓ Compensation program for the use of plant cover that does not involve the successful tree component in 100% with respect to the scope in the proposed areas.

PLACE OF APPLICATION

The management measures proposed in this file must be applied in the following sites:

- ✓ Points where we agreed with the environmental authority and the owners of the properties, the implementation of the actions to develop proposals and that are located within the area of direct or indirect influence of the project.

BENEFITED POPULATION

The population benefiting from this management program will be the community surrounding the project's intervention areas.

MECHANISMS AND PARTICIPATORY STRATEGIES

The mechanisms and participatory strategies that will be implemented for the activities covered in this file: compensation program for the use of plant cover that does not involve the tree component are the following:

- ✓ Socialization to the community based on the area of direct social influence of the project, including general aspects of the project and particular aspects of the activities of the card.
- ✓ Hiring of labor from the sidewalks located within the area of direct social influence of the project.
- ✓ Training of personnel in relation to general aspects of the project and particulars of the activities of the card.
- ✓ Workshops to socialize project results and environmental education to the inhabitants of the villages located within the area of direct social influence of the project.

REQUIRED STAFF	
For the development of the management activities proposed in this file, the following personnel profile is required: Professionals: ✓ Forestry professional with experience in environmental restoration. ✓ Social professional with experience in community management. Workforce ✓ Non-professional personnel such as drivers, low-level workers, drivers, etc.	
MONITORING AND SUPERVISING INDICATOR(S)	
✓ Area (m²) intervened / Area (m²) planned for intervention (design plans) * 100. ✓ Area (m²) intervened / Area (m²) planned for intervention (design plans) * 100. ✓ Quantity (m3) used material of tailings / quantity (m3) material of total tailings * 100.	
RESPONSIBLE (S) OF THE EXECUTION	
ENTITY / INSTITUTION	ROLES*
TOCHSTONE	PL – OP – SP – SG - IN
Contractor companies (if there are any)	IN
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8-2	

8.1.2.7.3 Compensation Program for the affectation of species with some degree of vulnerability and/or endemics.

PROGRAM OF COMPENSATION FOR AFFECTION OF SPECIES WITH SOME DEGREE OF VULNERABILITY AND/OR ENDEMIC AND AFFECTION TO THE SOIL.								
OBJECTIVES								
✓ Establish the measures to be implemented for the conservation and protection of highly sensitive areas and sensitive areas of the Area of Direct Influence of the El Pescado project. ✓ Establish management measures for the protection of the native flora that will not be used for the construction of the El Pescado project.								
GOALS								
✓ Implement 100% of the measures established for the conservation and protection of the sensitive areas of the AID of the El Pescado project. ✓ Protect 100% the native flora that does not need to be exploited by the construction of the El Pescado project.								
Stages of the project	*Exploration*		*Construction and Assemble*	x	*Exploitation*	x	*Final Closing and Post Closing*	x
IMPACT(S) TO BE CONTROLLED								
✓ Changes in the composition and structure of wildlife communities ✓ Modification of habitats ✓ Interruption of biological corridors ✓ Changes in the continuity of coverage / fragmentation ✓ Alteration of the structure and floristic composition ✓ Alteration of the distribution, structure and floristic composition of the natural vegetal coverings ✓ Fragmentation of natural plant cover ✓ Decrease in plant cover. ✓ Affectation to the properties of the soil. ✓ Changes in the use of land and its physical properties. ✓ Depletion of nutrients for nearby species. ✓ Affectation of the soil and development of the vegetation. ✓ Deterioration of the vegetal layer and physical characteristics of the soil.								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								
1. Guidelines for the conservation of highly sensitive areas: The environmentally sensitive areas are those that provide vital ecological services to the soil, water, air and energy and act as regulators of biophysical elements of the ecosystem to maintain balance in ecological processes, in addition to water regulation, serve as the basis for the conservation of the biological diversity, protection of wildlife, the balance of ecosystems, natural water, air and soil scrubbers, fulfilling a fundamental function for the habitability of the planet and social welfare.								

The areas considered to be highly sensitive to the area of influence of the project are the dense forests of the mainland. These areas must be given special management and therefore the contractor must follow the following guidelines: 1) When the Magdalena Forest Reserve issued by Law 2 of 1959 has to be intervened, approval must be obtained. part of the Environmental Authority competent for the removal of the forest reserve, taking into account the Management Plans with which the environmental authorities have for this reserve and the environmental management plan that is formulated for it. In addition, the contractor must take into account the following recommendations:

- ✓ Train workers beforehand about the importance, the vulnerability of the ecosystem and the environmental regulations that govern the subject. For this, two (2) training workshops will be developed.
- ✓ Avoid to the maximum the intervention of areas that do not require to be intervened in the forest reserve, for which it will be unlimited properly.
- ✓ Signal with enclosure and / or demarcation the areas that may be affected by construction works, in order to avoid the unnecessary passage of personnel to these areas, isolating them with security tapes or meshes.
- ✓ Where possible, the installation of any infrastructure, machinery or materials within the area will be prohibited.
- ✓ To prevent litter from being thrown or temporary materials to be disposed of temporarily, good management of the liquid waste that may affect water drainage systems must be maintained.
- ✓ Perimeter canals must be built to the works in order to avoid sediment contributions by surface runoff to these ecosystems and to build rainwater interceptors and sedimentation systems before starting excavations on the road.
- ✓ Make a photographic record, prior to the start of construction activities, in order to establish the local conditions of the area and assess the final environmental conditions of the project or delivery by the contractor.
- ✓ Workers will be prohibited from extracting plant specimens and hunting animals from these ecosystems.
- ✓ In dense, riparian, fragmented and flood-prone forests, although not all of them are in areas declared as reserves, because they are very sensitive, we will try to intervene as strictly necessary and not beyond what is required to build the roads and complementary and / or temporary works; once the works are completed, these areas must be restored to reestablish the connectivity of the ecosystems.
- ✓ The activities described above will be carried out by the contractor and for this TOUCHSTONE, will have 2 Forestry Engineers, who will be permanently during the construction of all the required infrastructure, in order to verify that the aforementioned guidelines are met, also in these same workshops and the engineers themselves will be responsible for ensuring that the guidelines established in numeral 3 - Protection of native flora of this record are met.

2. Measures for the conservation of highly sensitive areas.

The opening of the mine and related infrastructure will allow the fragmentation of the different types of forests that exist in the AID, facilitating the extraction of wood by the inhabitants or by people who arrive to the area. the zone, for which there will be 4 foresters. These will be initially during a period of 3 years, this in order that the settlers and the sawyers who can arrive from other parts do not intervene these forests, during the constructive stage of the project. Later in the operation phase of the project, an agreement is proposed between the municipal mayors of the municipalities of Segovia, Remedios and Touchstone, through which resources are allocated together to have two (2) permanent forest rangers in each of the highly-defined areas. sensitive; These forest rangers will also carry out monitoring and monitoring functions of the silvopastoral systems and forest plantations implemented in the compensation program for the biotic environment and compensation for landscaping, of this PMA.

Four environmental education 4 workshops will be held for the communities settled in the highly sensitive areas and in their buffer areas. Special emphasis will be placed on environmental work with the children of the AID schools. The training of the 4 foresters will be carried out by an expert in the subject, for which the community will be summoned, and the interested parties will be trained. It is worth clarifying that the MADS and/or CORANTIOQUIA may establish complementary actions in relation to the intervention of highly sensitive areas.

3. Protection of native flora for the conservation of the native flora of the areas considered as sensitive

Magdalena reserve (Law 2 ° of 1959), in general the following measures will be taken into account:

The edge areas of the marginal forests of the channel, as far as possible, will not be intervened at less than 30 m with respect to the axis of the bed of the water body, in case of requiring the intervention of these areas it will be the minimum possible.

When a closed species has to be intervened, the closure of the closure shall be requested before the competent Environmental Authority for the use of said species.

Do not intervene in areas of water recharge, water supply and margins of water currents, among others.

Disassembly not authorized by the competent environmental authority (MADS) will not be carried out.

The legislation that applies to the protection of the native flora will be disclosed, in order that the contractors do not violate the legislation.

The clearing with heavy machinery will not be carried out, to avoid the affectation of the vegetal species that do not require to be intervened and the deterioration of the superficial layer of the ground.

In order to comply with the activities described above, 2 training workshops will be held in order to inform contractors and the community of the protection measures that must be taken into

account during the construction of the El Pescado mining project; also, for the implementation of these measures will have 2 forest engineers who will be full time.
QUANTIFICATION OF THE MEASURE
It is expected that, with the execution of the measures proposed in this record, an adequate level of effectiveness will be obtained for the program contemplated here, as follows: ✓ Specimens of fauna threatened with extinction affected during the execution of civil works and cleaning ✓ Number of workers without workshop ✓ Management of plant species in critical danger, closed, unregistered or not identified with a 100% effectiveness in terms of not affecting, transfer or compensation.
PLACE OF APPLICATION
The management measures proposed in this file must be applied in the following sites: ✓ Management of critically endangered plant species, closed, unregistered or unidentified, on all project intervention areas where this type of species is identified and, in general, on all the intervention areas of the project. ✓ These measures will also be applied to the areas subject to compensation for the affectation or areas where the individuals of these species are transferred.
BENEFITED POPULATION
The population benefiting from this management program will be the community surrounding the project's intervention areas.
MECHANISMS AND PARTICIPATORY STRATEGIES
The mechanisms and participatory strategies that will be implemented for the activities covered in this file: ✓ Journey or workshops to socialize project results and environmental education to the inhabitants of the villages located within the area of direct social influence of the project. ✓ Planning and structuring of all environmental education workshops, prior to the start of activities. ✓ Management of the subject, in the information and training workshops, in a playful and participatory manner, seeking to facilitate the reception of the message by the community. ✓ Photographic record, minutes and attendance lists of each one of the workshops given for follow-up in the fulfillment of the proposed objectives. ✓ Implementation of information signals about species that present some degree of threat according to national categories such as resolution 0192 of 2014 (MADS) and the red books of the Alexander von Humboldt Institute, as well as the international categories of the IUCN.

- ✓ Socialization to the community based on the area of direct social influence of the project, including general aspects of the project and particular aspects of the activities of the card.
- ✓ Hiring of labor from the sidewalks located within the area of direct social influence of the project.
- ✓ Training of personnel in relation to general aspects of the project and particulars of the activities of the card.

REQUIRED STAFF

For the development of the management activities proposed in this file, the following personnel profile is required:

Professionals.

- ✓ A biologist.
- ✓ A veterinarian.
- ✓ Two guides from the area of influence of the project.
- ✓ Professional in forestry.
- ✓ Social professional with experience in community management.

Unskilled labor.

- ✓ Non-professional personnel such as drivers, machinery operators, low-level operators, etc.
- ✓ Controller or environmental manager in charge of follow up and monitoring activities.

SUPERVISING AND MONITORING INDICATOR(S)

- ✓ # of highly sensitive areas intervened / # of highly sensitive areas total * 100.
- ✓ # of guidelines implemented / # of established guidelines * 100.
- ✓ # workshops held / # workshops proposed * 100.
- ✓ # contracted rangers / # ranger rangers * 100.
- ✓ Time (years) of stay of the forester in the construction stage / time (years) of stay of forest rangers in the proposed construction stage * 100.
- ✓ # of guidelines implemented / # of established guidelines * 100.

RESPONSIBLE(S) OF THE EXECUTION: TOUCHSTONE

ENTITY / INSTITUTION	ROLES*
TOCHSTONE	PL, Sg, Sp
Contractor company	OP, In
Corantioquia	Sp

Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)

SCHEDULE (PERIOD OF EXECUTION)

See Annex 8-1

BUDGET (APPROXIMATE COSTS)

See Annex 8-2

8.1.2.7.4 Protection program for wildlife species

PROTECTION PROGRAM FOR WILDLIFE SPECIES								
OBJECTIVES								
✓ Establish preventive measures to minimize the risk of run over and death of wildlife along the access roads to the project. ✓ Place a preventive signaling system in accordance with the regulations of the Ministry of Transport and communications regarding the eventual crossing of wild animals in the project area.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	
IMPACT(S) TO BE CONTROLLED								
✓ Run over wildlife ✓ Fauna repelling. ✓ Displacement of fauna. ✓ Wild fauna manipulation. ✓ Alteration of the behavioral parameters ✓ Changes in the characteristics of the forest and alterations in the habitat and microhabitat where fauna coexists								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	
ACTIONS TO BE DEVELOPED								
1. Road Signs It is suggested the installation of vertical traffic signs using the preventive signal Sp-49 Animals on the road, it can be modified with previous authorization from INVIAS, with the silhouettes of the fauna. It is suggested the installation of vertical traffic signs on the maximum speed limit (SR-30), in order that the different drivers of vehicles traveling on the routes of the Project are kept constantly informed and do not exceed the speed of 30 km/h. This signal is regulatory and is intended to indicate limitations, prohibitions or restrictions, a signal must be located at the entrance of each of the sections of the tracks, one at the entrance of each populated center and one every 5 km from each signal installed These signals will be installed based on the above criteria in both directions of vehicular flow of the roads and their specifications of size, colors, drawing and installation must be according to the standards defined by the Ministry of Transportation in the road marking manual and current legislation. Additionally, it is suggested that speed humps be installed at the sites where the wildlife crossing is identified because ecosystems or niches of faunal species have been fragmented, or in places where they occur during the construction of the project which will reduce the accident and death of the fauna present. These speed reducers must be accompanied by regulatory speed signals (SR-30) and their presence will be warned with the preventive signal SP-25.								

PROTECTION PROGRAM FOR WILDLIFE SPECIES

Illustration 8-32. Signs of wildlife passage in the Escobero road, Municipality of Envigado,
Source: Photograph: Manuel Saldarriaga. http://www.elcolombiano.com/tendencias/las-lomas-un-zoologico-abierto-para-todos-DB3210137.

2. Implementation of wildlife passages

The construction and operation of the highway will produce a series of impacts on the natural vegetation cover and on the fauna associated with them. The roads divide the natural habitats into small isolated fragments and create barriers between the other fragments, a situation that has two main effects on the species: 1) it can reduce the size of the habitat fragment so much that it ceases to be a viable support for the populations of the most sensitive species. 2) The rest of the fragments may be so isolated that it is impossible for the animals to move from one to the other. Unable to move between fragments, certain species are in danger of extinction. Through these processes, the fragmentation of the habitat produced by the roads and secondary works that these entail, has become one of the most important global dangers for biological diversity. Among the main effects are:

- ✓ Loss of habitat: The direct impact of the construction of the road is the physical change of the land along a path, replacing or altering the natural habitat.
- ✓ Barrier effect: Affects the dispersal capacity of living organisms which is one of the key factors for the survival of species for their search for food, shelter or to reproduce. The impacts on the animals affect the dynamics of the population and endanger the survival of the species.
- ✓ Mortality caused by run over: Mortality is probably the best-known impact of traffic on animals. Many animals of a wide variety of species die on the roads and many more suffer serious injuries.

To avoid the negative effects of habitat fragmentation, efforts should be based on three basic principles: Prevention, Correction and Mitigation.

- ✓ Prevention: Preventing ecological impacts by not building the proposed infrastructure may be the only solution to avoid fragmenting the most vulnerable habitats (illustration 8 33).

PROTECTION PROGRAM FOR WILDLIFE SPECIES

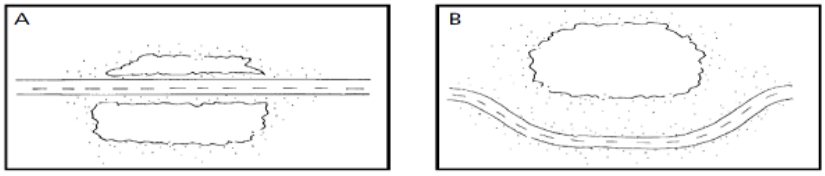

Illustration 8-33. Schematic representation of A) fragmentation, B) preventive measure. Source: Taken from Luell et al.; 2003

✓ Correction: The barrier effect of the road can be mitigated using different types of measures, such as the construction of upper or lower passages in order to maintain the connectivity of the landscape, building specific passages for the fauna, or adapting the transversal structures (drainage or works destined to restitution of roads and cattle routes) so that they serve as routes of dispersal of fauna and flora.

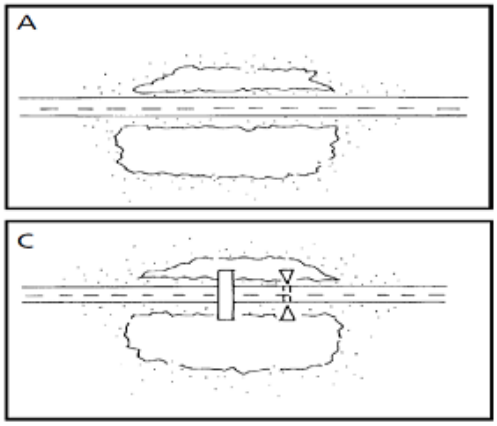

Illustration 8-34. Schematic representation of A) fragmentation, C) Corrective action. Taken from Luell et al.; 2003

✓ Compensation: In the case that road infrastructures must be built even when fragmentation is inevitable and preventive and corrective measures cannot reduce the loss, damage or degradation of the habitat. In these cases, the only alternative is compensatory measures, through the creation of new surface habitats and equivalent quality to those affected. Mitigation measures should be applied whenever the road infrastructure divides important parts of a habitat or creates a barrier for wildlife migration routes, and it is not possible to prevent this situation by varying the route of the road.

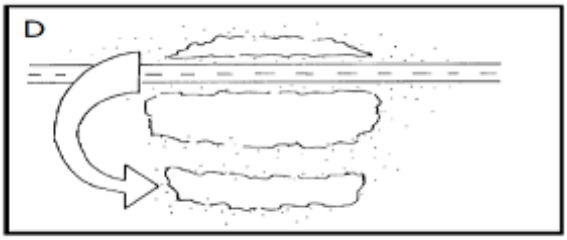

Illustration 8-35. Compensatory measure. Taken from Luell et al.; 2003

QUANTIFICATION OF THE MEASURE

✓ Number of signals installed / Number of signals programmed. * 100

PROTECTION PROGRAM FOR WILDLIFE SPECIES	
✓ Number of structures suitable for wildlife passage / number of structures programmed as wildlife passage * 100	
PLACE OF APPLICATION	
The activities will be carried out in the area of direct influence of the Pescado project, of the Municipality of Segovia, Department of Antioquia.	
BENEFITED POPULATION	
The communities of the municipalities that are directly related within the area of influence of the Project	
MECHANISMS AND PARTICIPATORY STRATEGIES	
✓ Training for personnel to recognize and respect traffic signals, to avoid road accidents	
REQUIRED STAFF	
✓ Biologists specializing in different fields of biology (birds, mammals, herpetofauna,) with experience in wildlife management ✓ Civil Engineers	
SUPERVISING AND MONITORING INDICATOR(S)	
RESPONSIBLE (S) OF THE EXECUTION	
ENTITY / INSTITUTION	**ROLES***
TGC	PL, Sg, Sp
CORANTIOQUIA	sp
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See Annex 8-1	
BUDGET (APPROXIMATE COSTS)	
See Annex 8-2	

8.1.3 Socioeconomic environment

8.1.3.1 Information management and community participation program

PROGRAM OF INFORMATION MANAGEMENT AND COMMUNITY PARTICIPATION								
OBJECTIVES								
✓ Provide local authorities and the community of the areas of direct and indirect influence, clear and timely information on the technical aspects of El Pescado project 5969, which may be of interest to the community, and on socio-environmental impacts with its respective management by the company. ✓ Clarify in a timely manner, misrepresented or misleading information related to the project. ✓ Minimize the expectations of the community, facing the real demands of unskilled labor to occupy in the project. ✓ Maintain adequate communication spaces and optimal neighborhood relations between the company, the community, other social actors and local authorities. ✓ Attend adequately and in a timely manner the information demands expressed by the community with instruments such as the PQR format (Questions, complaints and claims) and make their respective follow-up. ✓ Consolidate and maintain an adequate business reputation that generates recognition and trust in the community and institutions in the areas of influence of the project.								
GOALS								
✓ Comply with 100% of the information and dissemination activities proposed in this file for institutional actors, social organizations, their representatives and communities in the area of direct and indirect influence. ✓ Develop 100% of the planned activities in compliance with current legal standards that refer to community participation. ✓ Process and respond to 100% of concerns, complaints and claims presented during the development of the project.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	
IMPACT(S) TO BE CONTROLLED								
✓ Increase in institutional and community relations. ✓ Increase in community integration, locally and regionally ✓ Alteration in sectorial participation ✓ Increase in the demand for relationships with institutions, organizations and the community in general. ✓ Strengthening of organizations and associations. ✓ Modifications in the organizational structures of the region. ✓ Alterations in the dynamics of settlement ✓ Increase in the supply and demand of public and social services ✓ Generation of expectations due to labor and commercial demand ✓ Alterations in the dynamics of settlement.								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	

ACTIONS TO BE DEVELOPED

1. Informative meetings prior to the project starting

Before starting constructive works, meetings will be held with the authorities of the municipality of Segovia (Antioquia), in order to provide information on the project. In these interlocution spaces, the proposals and joint work activities that are foreseen in the management measures will be informed and the opinions and demands of the interlocutors will be collected.

Likewise, the communities of the area of indirect influence and the main authorities and associations of the direct one will be held to expose the chronograms, methodologies, expected impacts and socio-environmental management measures to be implemented during the development of the project. In this way, it is expected to favor the participation of the community and gather the valid opinions and suggestions to establish the pertinent adjustments and actions. The meetings with the population of the villages should ensure the greatest possible participation and leave the greatest clarity about what is established for the normal development of the mining project.

At the meetings, the attendees will be informed about the mechanisms provided by the Touchstone Colombia S.A.S. for the direct and timely reception of questions, complaints and claims that may arise during the execution of the works. The situations that may generate difficulties between the company and the contractors if they are detected in time, may prevent the occurrence or escalation of conflicts that deteriorate the relationships between the actors related to the project and the community.

The topics to be discussed in the informative meetings will be:

- Presentation of the company Touchstone Colombia S.A.S. and companies and contractors that provide services to the project.
- Benefits for the region with the execution of the project.
- Presentation of the works schedule (Infrastructure and mining planning)
- Measures foreseen in the Environmental Management Plan and the scope of the Social Management Program.
- The demands and local hiring processes of unskilled personnel.
- The general requirements of goods and services by the project.
- The presentation of the care system and the procedures to receive, attend and process complaints, requests and requests that are presented in a timely and effective manner. It includes the location of the community service office and the contact details of the professionals in the social area.
- The project's social focus, where compliance with current regulations and respect for the rights of the population and natural resources will prevail.

Questions will be answered and, if required, agreements, scope, responsibilities and time will be established for compliance with the commitments established with the community and local authorities. The success of these meetings or workshops and exhibitions will depend on the

effectiveness of the call of the stakeholders and interested institutions, the quality of the information provided, and the follow-up to the established agreements.

2. Informative process during the construction stage

Informative meetings will be held periodically, according to the execution schedule of this stage or the need thereof, under a similar methodology and, in any case, at least one every six months. The different social actors (Institutions with local authority, local organizations, institutions and neighbors) will be included, defining in advance the issues, scope, date and place, according to the case or the expectations identified during the construction stage of the project.

Two pieces of visual communication will be installed for dissemination (fences of 2.5 m x 1.5 m) located in the village of Laureles (AIDL) and in the sector of Las Pepas (AIDP), in accordance with current regulations.

Law 140 of 1994, "Which regulates Visual Outdoor Advertising in the national territory" and whose "objectives" defined in Article 2, consist of "improving the quality of life of the inhabitants of the country, through visual decontamination and of the landscape, the protection of public space and the integrity of the environment, road safety and the simplification of administrative action in relation to Outdoor Visual Advertising ".

The information may include environmental education topics in accordance with the education and training sheet for personnel linked to the project, training program, education, and awareness to the community surrounding the project.

Attached plan of location of the billboards
Laureles fence coordinates: (N 1291213 OR 919794)
Coordinates fence sector Las Pepas: (N 1295565 O 929410)

3. Community service office

The office is the space to receive, attend and process the complaints, requests, requests and suggestions that are presented, in a timely and efficient manner. In accordance with the commitment of the company Touchstone Colombia S.A.S. the communications, requests, complaints, suggestions, suggestions will be taken care of as petition rights and will be processed within the period provided by law.

The staff of the community service office will be responsible for the social management and community service system and therefore for carrying out the necessary actions for the reception, processing, notification and verification of compliance by the company.

Office of attention to the community:
It will be located in the area of indirect influence of the project or in an area adjacent to the El Pescado project, and will be installed from the beginning of the project, according to the provisions of the Social Management and Environmental Responsibility Policies of the Touchstone Colombia S.A.S.

The Community Service Office will be open to the public, to receive, attend and process complaints, requests, requests and suggestions that are submitted, personally or by telephone, on Saturdays with a schedule of (8:00 a.m. to 1:00 p.m.). This activity will be complementary and additional to the tours made by the technical staff at the service of the project where they will be able to receive, and process issues related to its development and of relevance to the relationship between the company and the community.

It will be an adequate space in lighting, ventilation and accessibility for people's access; endowed with the necessary furniture for the attention to the public: minimum meeting table for 8 people, computer, telefax, chairs, board or flipchart, digital camera, video beam, file, desk, stationery and a telephone line of attention to the user.

It will have a notice visible to the exterior with the name of the project and the number of the concession, "Office of Attention to the Community", with dimensions of (100 cm x 50 cm) and the logo of the company Touchstone Colombia S.A.S.
The office will be attended by a professional from the social area, with experience in community work.

4. System of attention to the community

The Company Touchstone Colombia S.A.S. It will implement the procedure defined to apply the Social Management policy of the El Pescado 5969 project, with its rules and procedures of mandatory compliance, to address and resolve complaints, requests, suggestions, requests and claims of the community during the execution of the project.

Any complaint, request or complaint that is submitted must be registered, attended and the response notified.

For each complaint, the pertinent information will be reported:

- Format completed (FS01) Which must have the following fields to fill out: Reference data of the person or institution that submits the complaint, request, suggestion, petition and claim (PQR).
- Field to describe the most relevant aspects of the facts that generated the complaint, request or complaint.
- The object of the communication.
- Signatures of support of the interested parties.
- Number of filing and stamp of the company Touchstone Colombia S.A.S.
- Annexes to the petition, completed form (FS02) Which must contain the list of media that the communication must contain (photographic records, videos related to the subject, supporting documents and physical evidence)

If the communication is telephone, fill in the form (FS03) which must contain:

- First and last names of the person who made the call
- Identity document, time of the call and telephone number where the call was made
- Name of the person who received the call and a number of the call
- Answer letter if applicable.

For any request, related to the physical development of the work will be attached photographic record prior to the request and after the solution. The Company Touchstone Colombia S.A.S. and the delegated controllership, will periodically review the fulfillment of the requirements in the system of attention to the community.

The Company Touchstone Colombia S.A.S. will have an email account to receive requests that users and the community in general formulate about the project and will install a mailbox in the office so that the people of the community deposit the requests in it. The community will be informed so that they make use of this attention mechanism.

In order to establish a general term to address and resolve the complaints, concerns, requests and claims presented and in general any request from a third party, a term of 15 business days counted from the receipt of the document will be established as maximum term for its resolution. In the file of the Office of Attention to the community, a copy of each of the petitions presented and of the process carried out must rest.

The system of attention to the community is the responsibility of the Touchstone Colombia S.A.S. and may not delegate to its sub-contractor's compliance with this obligation. The bimonthly reports on social management presented by Touchstone Colombia S.A.S. will include a report on the activities carried out during the period through the community service system, completing the monitoring format established by the company for this purpose.

5. Communication program during the operation.

This activity is part of the "Comunicar" program of the Touchstone Colombia S.A.S. which is included in its Social Management policy. It is a strategy that allows to strengthen communication

channels with the community, regionally position the El Pescado Concession 5969 project and communicate the activities developed in the area of influence of the project, in particular, by increasing the transit of vehicles with personnel and machinery. The routes and also to disseminate the successful experiences of agreement and collaboration between the company and the community.

Advanced information is proposed to institutions and organizations, local and regional, prior to the start of operations, in order to report on the scope of the project, its generalities, benefits and benefits for the community with the application Social Management policy.

Secondly, through the use of communication media (radio programs, communiqués, television programs) and publications (leaflets, parades, publications, brochures, internet), the aim is to clearly and permanently inform the community about the project, its potentialities and all those activities that are of interest to the community.

Definitions

Complaint or Claim: is the oral or written manifestation of disgust or dissatisfaction against a person or entity for acts or acts related to the fulfillment of the purpose of the project.

Request: document in which a formal request is made regarding facts, actions and information generated by the development of the project. Applications can be classified into: request for particular or general information, request for queries and concepts related to the functions carried out by Touchstone Colombia S.A.S. and request to consult documents.

Suggestion: Recommendation or insinuation that is made, with the aim of contributing to improve a service, rationalize the use of available resources and make more participative the management Touchstone Colombia S.A.S.

QUANTIFICATION OF THE MEASURE

- ✓ 100% fulfillment of goals.

PLACE OF APPLICATION

Sidewalks: El Pescado, Cuturu Bajo (Spot Cuturú Medio), Laureles, populated center of the Fraguas jurisdiction (Machuca) and town center of the municipality of Segovia Antioquia.

BENEFITED POPULATION

Population of the Area of Direct Influence (AIDP, AIDL and AII).

MECHANISMS AND PARTICIPATORY STRATEGIES

Workshops, talks and interviews with the use of aids such as: Video Beam; camera, printer, laptop, folding, primers or audiovisual material required during each phase of the project.

REQUIRED STAFF

For the development of the activities proposed in this file, the following personnel profile is required:

- ✓ Professionals from the social area delegated by Touchstone Colombia S.A.S.
- ✓ Technical and social support staff

✓ Environmental professional responsible for monitoring.
SUPERVISING AND MONITORING INDICATOR(S)
✓ (Number of attendees at meetings / Number of summoned) * 100. ✓ (Number of meetings held / Number of meetings scheduled) * 100. ✓ (Number of topics exposed / Number of topics proposed) * 100. ✓ (Number of PQR attended / Number of PQR received) * 100
RESPONSIBLE (S) OF THE EXECUTION

ENTITY/INSTITUTION	ROLES*
TOUCHSTONE	PL – OP – SP – SG -

Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)
SCHEDULE
See Annex 8-1
BUDGET
The costs of this card in what corresponds to the application of the Social Management policy, as the assembly of the office are: $ 94'250,000 (NINETY-FOUR MILLION TWO HUNDRED AND HUNDRED THOUSAND) M/CTE. Are implicit in the total project costs. (The budget and the schedule for the initial year are described and this is repeated for all the remaining years of the operation)

8.1.3.2 Education and training program for personnel linked to the project.

EDUCATION AND TRAINING PROGRAM FOR PERSONNEL LINKED TO THE PROJECT.								
OBJECTIVES								
✓ Provide environmental information and basic knowledge to the employees of the different contractors, as well as the personnel linked to the project, in order to generate an awareness of environmental sensitivity that results in actions of prevention, control and mitigation of impacts that actions or omissions by part of the employees at the service of the project or contractors may cause the biophysical and social environment. ✓ Avoid events that cause conflicts in the work groups and with the local community, or affect the environment generated by inappropriate practices or improper actions of the employees or contractors of the project.								
GOALS								
✓ Sensitize 100% of the employees or contractors of the project in matters of industrial safety, occupational health, environment and coexistence. ✓ Through the implementation of 100% of the training program proposed in this file, the aim is to reduce the psycho-occupational risk and avoid environmental damage caused by the action or omission of responsibilities on the part of the employees or contractors of the project.								
Stages of the project	*Exploration*		*Construction and Assemble*	x	*Exploitation*	x	*Final Closing and Post Closing*	x
IMPACT (S) TO BE CONTROLLED								
✓ Increase of harmonious coexistence within the work groups. ✓ Insertion of technological processes ✓ Alteration in the practices, customs and idioms of the mining activity. ✓ Modifications in landscape structures. ✓ Greater generation of employment. ✓ Increase in the supply and demand of public and social services ✓ Generation of expectations due to labor and commercial demand								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								
1. Induction to workers prior to the start of work on the project Each worker, in correspondence with the assigned tasks, will receive training and previous training, which will allow him to understand the expected scope of his work, to know the expected safety standards and to know the results that are expected from his task. This will allow you to develop skills and enhance the skills to reduce the risks of accidents at work. And it will also favor the control and prevention of actions of workers that may have an impact on the environment. Each worker must receive their induction process as a requirement for their entry to work on the project. Likewise, an induction will be made in Industrial Safety, Occupational Health, Social and								

Environmental Responsibility, in accordance with the policies of the Company Touchstone Colombia S.A.S. and in compliance with the guidelines of your HSEQ department.

The operation of the project generates various risk factors of incidents and accidents for workers, particularly for the handling of tools, the manipulation of equipment, the transport of materials, work at heights, handling of explosives and the operation of machinery, for which It is necessary to implement an appropriate and permanent training program aimed at all the personnel working on the project, which encourages employees and contractors the culture of self-care and prevention of occupational risks.

For this, the different risk factors must be taken into account by sector or front of work, identified in the risk factors scenario, which should be socialized to the employees and contractors of the project through the process of induction by area. The training will be carried out in appropriate sites with the support of audiovisual aids that illustrate in a pedagogical way the employees and contractors of the project, with the support of the company Occupational Risk Manager ARL.

In addition, in the induction that all employees and contractors that are linked to the project receive, there will be a special chapter for the environmental issue, where the commitments that Touchstone Colombia S.A.S. has acquired will be announced. in the process of environmental licensing and those established in the EMP for each activity, in addition to the role and responsibility of each employee or contractor linked to the project in the performance of their work.

Among the subjects of induction will include the contingency plan, which will be known to all staff. The measures will be explained in detail and the procedures to be followed against the occurrence of probable events, in order to minimize the damage to personnel, facilities and the environment during the stages of the project. Methodologically, the induction will be developed in groups, taking advantage of the simultaneous process of linking direct employees and contractors.

2. Daily lectures on education and awareness

To guarantee the appropriation of the most relevant aspects of the environmental issue, the initial induction will be fed back with 10-minute daily talks held at the work fronts. The talks will have general environmental issues and will also tend to environmental actions that apply specifically to the activities that will be developed in the workday. These talks will be dictated at the beginning of each working day.

Among the specific environmental actions, objectives of the daily talks are:

- ✓ Avoid behaviors, actions and procedures that may be contrary to the objectives expected by the WFP and that may generate negative impacts that may endanger the environment
- ✓ Subjects focused on health and personal self-care (smoking, consumption of psychoactive substances, alcoholism, drug dependence and responsible sexuality).
- ✓ Avoid physical or biotic alterations of the environment.
- ✓ Identification of risks, prevention of accidents, injuries or damage to property.
- ✓ Avoid affecting the bodies of water during the execution of field activities.

- ✓ Make known the social, economic, cultural and political characteristics of the region to avoid discomfort to the community due to ignorance of customs or disrespect for people
- ✓ Illustrate the importance of the preservation and recovery of the archaeological, paleontological and architectural heritage of the region and the significance it represents for the culture of the region. Preventive actions to follow before an archaeological find
- ✓ Identify the environment of the flora and fauna present in the region
- ✓ First aid training
- ✓ Use of individual protection elements (PPE)
- ✓ Waste management and disposal (liquids, debris, recyclable waste, garbage and hazardous waste
- ✓ Recognition and signaling
- ✓ Information on emergency lines and implementation actions in the contingency plan project

3. Days of recreational leisure integration

A recreational day will be developed every two months where the employees linked to the project will be integrated, which will last 4 hours, equivalent to half a working day. These activities will be prepared and directed by the social team with the support of the different support areas of the project and according to the purpose or approach projected for each one of them.

The objective of these integrations is to strengthen the overall well-being of employees, in order to minimize psycho-occupational risk factors, caused by stress or the deterioration of coexistence in the work team. For the development of the conference, audiovisual and didactic aids will be available, with the participation of external people and entities hired to carry out cultural events aimed at employees linked to the project.

The issues to be addressed during the integrations:

- Birthday celebration.
- Topics of general interest (special dates of the month)
- Follow-up evaluation.
- Physical maintenance activity (sporting event)
- Update of the progress of the project.
- Social politics.

QUANTIFICATION OF THE MEASURE
✓ 100% fulfillment of goals.
PLACE OF APPLICATION
✓ Camp, sites where the works and community equipment surrounding the project is being executed.
BENEFITED POPULATION
Labor-related population hired by the project

MECHANISMS AND PARTICIPATORY STRATEGIES
Workshops: Video Beam, digital camera, printer, laptop, materials for billboards or other means of dissemination of information in environmental education, folding, primers or audiovisual material, sports elements and musical instruments required during each phase of the project.
REQUIRED STAFF
For the development of the management activities proposed in this file, the following personnel profile is required: ➢ Professionals from the Social, HSEQ, Environmental and Human Resources areas delegated by Touchstone Colombia S.A.S. ➢ Technical staff from the Social Support, HSEQ, Environmental and Human Resources areas delegated by Touchstone Colombia S.A.S.
SUPERVISING AND MONITORING INDICATOR(S)
✓ Activities 1 a) Number of employees and contractors who receive the induction / Number of people employed or hired. ✓ Activity 2 a) Number of talks given / Number of talks scheduled. ✓ Activity 2 b) Number of attendees at the talks / Number of employees and contractors ✓ Activity 2 c) Number of topics exposed / Number of topics proposed. ✓ Activity 3 a) Number of days held / Number of days scheduled. ✓ Activity 3 b) Number of attendees at the conference / Number of employees and contractors ✓ Activity 3 c) Number of topics exposed / Number of topics proposed.
RESPONSIBLE(S) OF THE EXECUTION

ENTITY/INSTITUTION	ROLES*
TOUCHSTONE	PL – OP – SP – SG - IN

Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)
SCHEDULE
See Annex 8 1
BUDGET
The costs of this file regarding the inductions to the personnel cannot be determined with certainty, the number of inductions is given according to the personnel hiring processes that are carried out by the company during the execution of the project. The cost of the professionals who dictate the induction talks is implicit in the costs of the salaries of the professionals of the areas that intervene in these. The budget of this activity is detailed in the table of costs and schedule. The costs of the activities in this record are appended to the schedule and budget tables. The total cost of this file for the period of the initial year is. $ 59'000,000 (FIFTY-NINE MILLION PESOS) M/CTE

8.1.3.3 Support program for institutional management and economic strengthening

SUPPORT PROGRAM FOR INSTITUTIONAL MANAGEMENT AND ECONOMIC STRENGTHENING								
OBJECTIVES								
✓ Formulate, articulate, support and develop projects that strengthen, in coordination with the authorities and state entities, local development and community strengthening in the areas of influence of the El Pescado project. ✓ Support the exercise of citizen participation mechanisms and the strengthening of grassroots organizations.								
GOALS								
✓ Different initiatives of community initiative are formulated and articulated that are identified in the paths of the AIDP, the AIDL with the AII. ✓ The connection and integration between the AID and the AII is promoted. ✓ Training and advisory strategies are implemented to ensure that the necessary tools are provided to guarantee communities the right and effective exercise of community participation.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	x
IMPACT (S) TO BE CONTROLLED								
✓ Alteration in sectoral participation ✓ Increase in the demand for relationships with institutions, organizations and the community in general. ✓ Strengthening of organizations and associations. ✓ Modifications in the organizational structures of the region. ✓ Alterations in the dynamics of settlement ✓ Increase in the supply and demand of public and social services ✓ Generation of expectations for labor and commercial demand ✓ Alterations in the dynamics of settlement.								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								
<u>1. Support for community projects and initiatives</u> For the development of this activity must take into account the social and economic conditions of the area, projects underway and projected, the current Local Development Plan and the PBOT (Basic Plan of Territorial Planning of the municipality of Segovia, the experiences of community and private projects previously executed in the region, regional practices and customs, and the institutional offer.								

The company Touchstone Colombia S.A.S. make a diagnosis to verify the regional vocation, the type of economic activities at the local and regional level, the demand and supply of services and the opportunities to create, expand or strengthen markets. Based on this diagnosis, the small and medium projects that may be linked to the El Pescado project (concession 5969) and define the levels of intervention and support thereof will be evaluated.

Support for initiatives seeks to take advantage of existing social networks, local and regional institutions, the human capital of the region, the experience of companies and ongoing or consolidated projects in the municipality of Segovia, especially in the areas of influence of the project.

This activity will be developed in three stages or phases that will last for three months:

- Stage of institutional approach and assessment of the local context, for this four (4) institutional meetings will be held, with the local authorities.
- Stage of specific and direct approach with the communities (AIDP AIDL) through the realization of three (3) participative workshops focused on the identification of the initiatives
- Stage of agreement and alignment of expectations, 5 meetings will be held in each of the AIDP, AIDL and AII areas.

2. Organization for community participation and development.

The company Touchstone Colombia SAS will develop a series of activities and projects aimed at guaranteeing the exercise of citizen participation mechanisms and the strengthening of grassroots social organizations, for which advice and training will be provided for the effective participation of the community in the implementation of this social management program, social control of its execution and the application of legal instruments of participation related to the request for information and community participation.

The Company Touchstone Colombia S.A.S. In compliance with the provisions of Law 850 of 2003 (regulation of citizen oversight) will encourage the participation of the community through the creation of citizen oversight and community participation committee, which will have among its functions the accompaniment to the project, supervision and proper management of information.

The entities in charge of the direct link between the company and the communities in the area of (AIDP AIDL) for the execution of the Social Management Program, will be the Community Action Boards and for the IIA the ASOCOMUNAL. Article 100 of Law 134 of 1994 "On citizen oversight. Civil organizations may establish citizen oversight offices or monitoring boards at the national level and at all territorial levels, in order to monitor public management, the results thereof and the provision of public services.

The following is the process of conformation of the community participation program:

a) The participation committee will be elected at the initial meeting and will have functions of accompaniment to the project and be the multiplier of the information to the community.
b) The committee must be made up of representatives of the community, representatives of the institutions of the IIA and members of the communities of the districts that make up the AID, in their capacity as direct impacts during the stages and also recipients of the different benefits that will reach the communities.
c) This committee should meet in the third week of each month, during this meeting the following topics should be discussed:
   - Reading of the previous act.
   - Verification of compliance with commitments agreed upon by the parties.
   - Company Information Touchstone Colombia S.A.S. on the execution and progress of the mining project.
   - Participation of the different members of the committee.
   - Propositions and several.
   - Commitments and agreements for the following month.
d) It must be recorded by means of a signed document by the assistants.
e) Touchstone Colombia S.A.S. must ensure the participation of the representatives of the institutions present in the areas of influence of the project
f) The compliance record must be accompanied by:
   - Photographic and / or film record
   - Minutes of the monthly committee meetings.
   - Registration of attendance signed by the assistants.
   - Act of conformation of the committee of community participation and citizen oversight.
   - - Registration of applications.

QUANTIFICATION OF THE MEASURE
✓ 100% fulfillment of goals.
PLACE OF APPLICATION
Sidewalk El Pescado (AIDP), sidewalks Laureles and Cuturú Bajo, including the place known as Cuturú Medio (AIDP), the town center of the Fraguas jurisdiction (Machuca) and the urban area of the municipality of Segovia (AII).
BENEFITED POPULATION
Population of the AII (local institutions) and the villages of AIDP and AIDL, as a population close to the project
MECHANISMS AND PARTICIPATORY STRATEGIES
Call processes, meetings and agreements with the municipal authorities, organizations and grassroots organizations, such as the Community Action Boards and ASOCOMUNAL, citizen oversight committees, community participation committees and Laureles rice farmers association.

REQUIRED STAFF
For the development of the management activities proposed in this file, the following personnel profile is required: ➢ Professionals of the social and environmental area delegated by Touchstone Colombia S.A.S. ➢ Technical and support staff of the social and environmental area delegated by Touchstone Colombia S.A.S.
SUPERVISING AND MONITORING INDICATOR(S)
✓ Activities 1 a) Number of initiatives supported/ Number of initiatives identified. ✓ Activity 1 b) Number of meetings and participatory workshops held/ Number of meetings and participatory workshops scheduled. ✓ Activity 2 a) Number of activities to support citizen participation mechanisms carried out/ Number of support for the mechanisms for citizen participation projected. ✓ Activity 2 b) Number of community participation supports made/ Number of community participation support activities planned ✓ Activity 2 c) Number of meetings held by the citizen participation committee/ Number of meetings of the citizen participation committee scheduled. ✓ Activity 2 d) Number of agreements and compliance commitments addressed in the meetings/ Number of agreements and compliance commitments expressed.
RESPONSIBLE(S) OF THE EXECUTION

ENTITY/INSTITUTIONS	ROLES*
TOUCHSTONE	PL – OP – SP – SG - IN

Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)
SCHEDULE
See Annex 8-1
BUDGET
The costs contemplated for the support activity of community-type initiatives correspond to the process of institutional approach, identification and assessment of the local context, the construction of the diagnosis and inventory of existing initiatives, alignment of expectations and the projection of new initiatives to be developed. The costs of the contributions that the company will allocate to each of the initiatives its cost cannot be determined in advance and will be determined during the execution of the project, at the moment that its cost and scope is known. The amounts contemplated for this file in the initial year of the project is $ 39'730,000 (THIRTY-NINE MILLION SEVEN HUNDRED THIRTY THOUSAND PESOS ML) M/CTE

8.1.3.4 Employment program, recruitment of local labor, goods, products and services.

EMPLOYMENT PROGRAM, RECRUITMENT OF LOCAL LABOR, GOODS, PRODUCTS AND SERVICES								
OBJECTIVES								
✓ Prioritize the linkage of unskilled labor to the population of the areas of direct influence of the project. In the second instance, if a greater number of people are required to be linked, people from the neighboring villages will be linked to the AIDs, from the town center of Fraguas jurisdiction and from the urban area of the municipality of Segovia. ✓ Discourage the overflow of foreign population into the project area due to job expectations. ✓ Minimize the occurrence of conflicts with the population in the area of influence of the project related to job expectations. ✓ Maintain adequate neighborly ties and good relations with the AID and IIA communities. ✓ Perform, as far as possible, the processes of contracting goods and services in the AIDP and AIDL and the others in the IIA, according to their availability.								
GOALS								
✓ Comply with the preferential hiring policy for unskilled labor available in the AIDP, AIDL and AII. ✓ By fulfilling 100% of the proposed activities, maintain adequate neighborhood ties with the communities and prevent conflicts with the population associated with work expectations to the maximum. ✓ Counteract possible migration processes and overflow of floating population, by labor expectations, through the fulfillment of 100% of the proposed activities. ✓ Carry out the processes of contracting goods, products and services in the AIDP, AIDL and AII.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	*x*
IMPACT(S) TO BE CONTROLLED								
✓ Modification in the population dynamics ✓ Increase in demand for the occupation of infrastructure, public and social services. ✓ Greater generation of employment. ✓ Increase in the supply and demand of products, goods and services. ✓ Economic strengthening ✓ Generation of expectations for labor and commercial demand								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								

1. Diffusion of the hiring program

The hiring program will define the amount and type of personnel to be linked, the necessary requirements to access the employment and the process of connection. In addition, the communities should be informed about the criteria, mechanisms, timing and procedures to be followed for the personnel selection and hiring processes. Salaries must be set in accordance with the salary provisions that correspond to the trade to be performed, in order to avoid inflationary processes.

The personnel to be hired must meet the following minimum conditions

1) Be over 18 years old.
2) Have a citizenship card
3) Be focused on the database of resumes that is in the company.
4) Have a good state of health, in accordance with the established by a medical examination of income.

For the hiring of personnel, the unskilled labor of the districts of the areas of influence AIDP, AIDL, AII shall be used mainly according to the following order of preference for the selection and rotation.

1) Resident persons in the sidewalks that make up the AIDP and AIDL areas, in their order by proximity to the project location.
2) Residents of neighboring villages, which have the endorsement of the contracting department of the company.
3) Residents of the IIA or from other sources, guaranteed by the contracting department of the company.

The general criterion is to prefer hiring people who live near the project; but if the demand is not met, personnel from other areas will be hired in the order indicated.
The recruitment policy for unskilled labor during the different stages of El Pescado project, concession 5969, will be established with a staff rotation system; that is the mechanism of periodic relief of shifts and groups of people hired that ensures greater labor access to the population. For rotation it is recommended

1) Verify the database and do the linking processes according to the order of date of filing of the resumes.
2) Support classification of resumes by suitability and performance taking into account the profile of the applicant.
3) Establish the time periods for each working group without these times going to interfere with the development of the project and not violate the rights of people, both the applicants and the employees hired.

The hiring program must be adjusted periodically according to the experience acquired during the development of the different stages of the project, with the feedback and the contributions made by the hiring committee.

2. Meetings of specific consultation and information

The management of the defined contract will be exposed within the framework of the community information meetings (FS1 - Community information and participation program). If necessary, new meetings will be convened in the interested districts of the AIDP and AIDL. In these meetings, the hiring policy defined for the El Pescado 5969 concession project will be announced, the contracting and monitoring committee will be formed, salary policies will be clarified, doubts and concerns will be clarified, and the hiring management will be defined.

The process of employment policy socialization will be developed under the following general scheme:

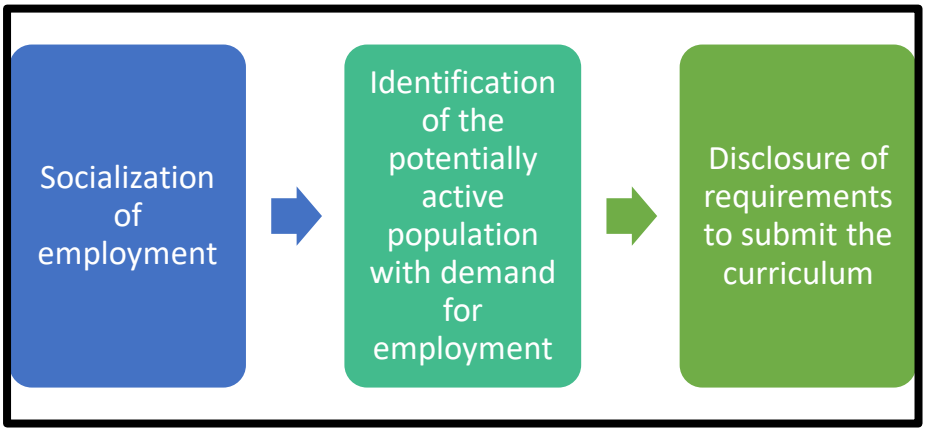

Image of the socialization process of the local employment policy.
Source Ingex Grupo Minero S.A.S.

3. Conformation and functions of the hiring and follow-up committee

The hiring and monitoring committee will be an advisory body whose objective is to make recommendations and achieve greater transparency and equal opportunities for all the inhabitants of the area of influence and favor the coverage of the labor demand of the project. This committee will be made up of:

1) Three representatives of the company Touchstone Colombia S.A.S.
2) Representatives of the AIDP communities, AIDL (a representative of each of the villages).

The main function of the committee is to receive the resumes and make the respective verification of the bank of resumes that the company has arranged for the project. Another function is to agree on the labor participation percentage of the AIDP, AIDL and IIA communities, according to

what is established in the employment policies agreed between the company and the communities. It will also be the function of the committee to ensure that this participation is equitable for each of the territorial units of the IAs.
The company and its contractors do not lose their level of autonomy in hiring staff, but they should take into account local recommendations.

4. Functions of the social team and the document management system of the company

The social team and the documentary management department of the company have as main functions to be the fundamental support of the hiring processes, by means of the classification of the documents of the applicants that have been delivered to the company (Sheets of Life).

1) Internal process of receipt of curriculum

In the office of attention to the public the reception of the curriculum and the respective supports is made. There is systematically recorded the number of pages delivered, is assigned a file which must be consecutive global and classified by date of receipt. It proceeds to the formation of the bank of resumes, plus a database with the background of the population that requires employment, according to the profile.

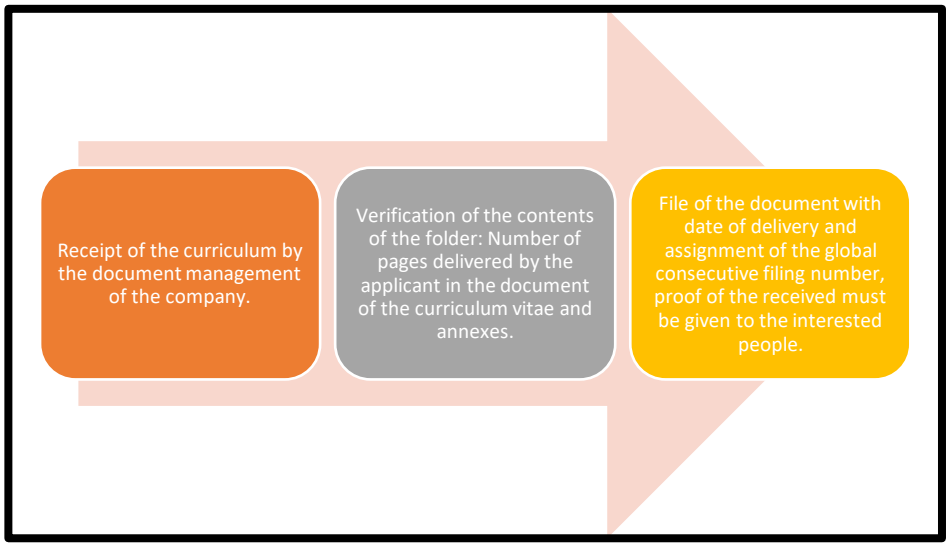

Image of the internal process of receipt of the curriculum. Source Ingex Grupo Minero S.A.S.

2) Internal selection process:

The curriculum for each area are classified according to the profile of each of the applicants, the respective processes of the call are generated, according to the needs of the operation. In this stage the offer of the jobs is generated by referencing the people who presented a curriculum and those identified for the position and the position required are filtered. Then, the interviews or tests of competences that the company estimates in order to make a filter that sustains the income of the people who have been selected. With the selection of the persons to occupy the

positions, the orders or requisitions of income and the respective inductions of the position are generated.

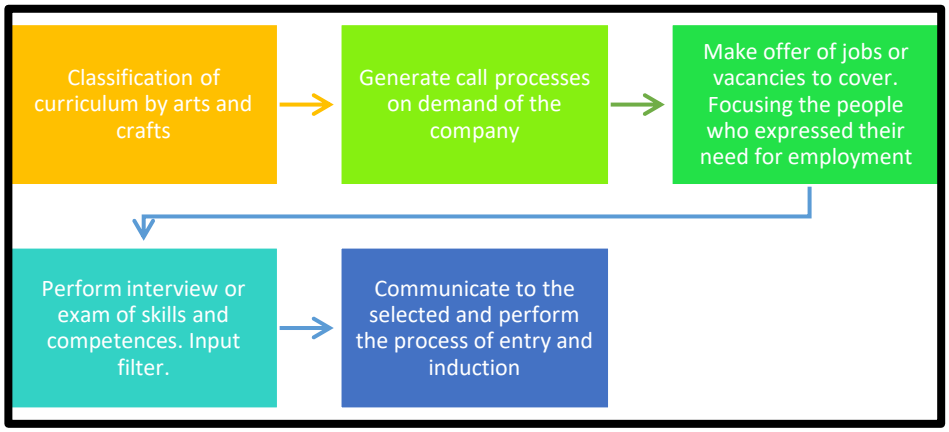

Image of the internal selection process. Source Ingex Grupo Minero S.A.S.

5. Hiring process.

The company responsible for the hiring of personnel must verify the concept of occupational medical aptitude for the performance of the position to which the candidate aspires. Once this concept is approved, compliance with the requirements of law such as:

1) Affiliation with the Social Security and Occupational Hazards system.
2) Supply of equipment and other corresponding elements.
3) All personnel hired by the company Touchstone Colombia S.A.S. as much as its contractors will have the rights, benefits, responsibilities and obligations that the Law requires.

6. Procurement of products, goods and services for the operation of the project.

The project in its different stages will demand the use of logistics spaces and the provision of goods, services and the acquisition of local products. For this, the company will adopt the local purchasing policy, which will be designed in a concerted manner with the community, local authorities, Community Action Boards, Citizen Oversight and Community Participation Committee. This is so that there is no indiscriminate increase in prices or unfair competition. It will be done in compliance with the following phases:

1) Identification of existing providers and the services they offer.
2) Validation of legality in the possession of their business and compliance with Human Rights in their activity.
3) Inventory of services and products and the ability to be a supplier of the project.
4) Agreement of negotiation modalities, prices, forms and payment times.

QUANTIFICATION OF THE MEASURE
✓ 100% fulfillment of goals.

PLACE OF APPLICATION
The AIDP El Pescado sidewalk, Cuturu Bajo Paths, including the place known as Cuturu Medio and Laureles that make up the AIDL, town center of the jurisdiction of Fraguas Machuca and the urban area of the municipality of Segovia Antioquia.
BENEFITED POPULATION
Residents of the direct and indirect influence area (AIDP, AIDL and AII) of the project with capacity to work and to provide products, goods and services. People from other backgrounds who access the hiring of unskilled labor.
MECHANISMS AND PARTICIPATORY STRATEGIES
✓ Meetings with the Community Action Boards of the districts that make up the AIDP, AIDL, merchants, businessmen and the authorities of local institutions, to inform about the policy of hiring unskilled labor and the policy of purchase and provision of goods and local services. ✓ Flow of information between the Communal Action Boards, local institutions and the company. ✓ Committees for hiring, monitoring and community participation. Reception, attention and response to complaints and claims from the communities, sent to the community service office, related to procurement and provision of goods, products and services. ✓ Records of the contracting processes of the company, its contractors and subcontractors. ✓ Minutes of meetings held with the monitoring committees, community participation, the Community Action Boards and the Institutions.
REQUIRED STAFF
For the development of the management activities proposed in this file, the following personnel profile is required: ➢ Professionals from the areas of engineering, social, HSEQ, environmental, administrative and human resources delegated by Touchstone Colombia S.A.S. ➢ Technical and support staff in the areas of engineering, social, HSEQ, environmental, administrative and human resources delegated by Touchstone Colombia S.A.S.
SUPERVISING AND MONITORING INDICATOR(S)
✓ Activities 1 a) Number of villages and population centers reported / Number of trails and population centers that make up the areas of direct and indirect influence AIDP, AIDL, AII. ✓ Activity 2 a) Number of workshops dictated by labor information / Number of scheduled job information workshops. ✓ Activity 3 a) Number of villages and population centers participating / Number of trails and population centers convened ✓ Activity 3 b) Number of meetings held / Number of meetings scheduled. ✓ Activity 4 a) Number of internal meetings held / Number of internal meetings scheduled ✓ Activity 4 b) Number of applications attended in relation to the demand for local employment/ Number of applications received.

RESPONSIBLE(S) OF THE EXECUTION	
ENTITY/INSTITUTION	ROLES*
TOUCHSTONE	PL – OP – SP – SG - IN
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE	
See Annex 8 1	
BUDGET	
For this file, the costs contemplated correspond to the salaries of the professionals involved in the processes and logistics expenses of the meetings held and the total cost is $ 65.930.000 (SIXTY-FIVE MILLION NINE HUNDRED THIRTY THOUSAND) M/ CTE.	

8.1.3.5 Management program to the affectations and social compensation.

<table>
<tr><td colspan="9">MANAGEMENT PROGRAM TO THE AFFECTATIONS AND SOCIAL COMPENSATION</td></tr>
<tr><td colspan="9">OBJECTIVES</td></tr>
<tr><td colspan="9">✓ Compensate the damages that can be caused to the roads, the different works of public and private infrastructure of access to the area of operation due to the effects produced by the transit and transport in vehicles and the occupation of spaces for the execution of the project.</td></tr>
<tr><td colspan="9">GOALS</td></tr>
<tr><td colspan="9">✓ Ensure that the transit of vehicles and the occupation of infrastructure spaces by vehicles or machinery of the company does not represent a risk factor for the integrity of people.
✓ Attend 100% of the complaints and claims filed by the communities that are related to some type of affectation due to the operation of the project and provide the appropriate, pertinent and respective solution, if this is competence and responsibility of the company Touchstone Colombia S.A.S.</td></tr>
<tr><td>Stages of the project</td><td>Exploration</td><td></td><td>Construction and Assemble</td><td>x</td><td>Exploitation</td><td>x</td><td>Final Closing and Post Closing</td><td>x</td></tr>
<tr><td colspan="9">IMPACT (S) TO BE CONTROLLED</td></tr>
<tr><td colspan="9">✓ Modifications to landscape structure
✓ Increase in demand for the occupation of infrastructure, public and social services.
✓ Greater generation of employment.
✓ Increase in the supply and demand of goods and services.
✓ Economic strengthening
✓ Generation of expectations
✓ Greater level of association, association and institutional and community management.</td></tr>
<tr><td>Type of measure</td><td>Prevention</td><td></td><td>Mitigation</td><td></td><td>Correction</td><td>x</td><td>Compensation</td><td>x</td></tr>
<tr><td colspan="9">ACTIONS TO BE DEVELOPED</td></tr>
<tr><td colspan="9"><u>1) Maintenance of roads and civil infrastructure works in the section Laureles - El Pescado.</u>

The Company Touchstone Colombia S.A.S. periodically, in consultation with the community, the maintenance of 21 km of the access road to the project in the section Laureles - El Pescado, located in the direct and local area of direct influence of the project, which will present deterioration due to the transit of vehicles and machinery. This preventive and corrective maintenance will be carried out at least every 6 months with the following activities:

1) Channeling of rainwater
2) Drainage maintenance
3) Cleaning of slopes
4) Affirmed of the base
5) Deficient steps intervention
6) Monitoring of the bridge located in the area of Cuturu Medio</td></tr>
</table>

7) Intervention and maintenance of four (4) wooden bridges that are on the track in the sector Cuturu Medio
8) Adaptation of the crossing of the river with the track in the lower part of the village El Pescado

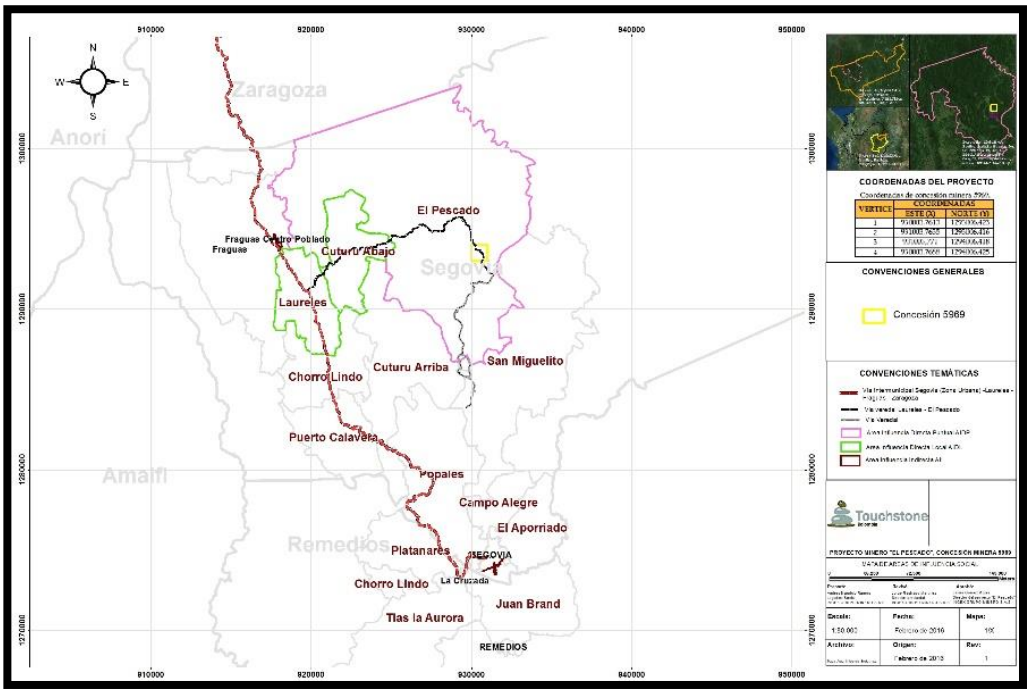

Image of the map showing the route El Pescado - Laureles. Source INGEX Mining Group S.A.S.

2. Agreement with the communities and information on the maintenance date.

To program the maintenance of the road, a concertation and planning process will be carried out between the community and the company, in which the following will be defined:

1) Dates for carrying out the works
2) Activities to be developed between the company and the communities
3) Most vulnerable sections
4) The sections to be intervened will be prioritized in order of importance.
5) Work groups will be designated
6) Those responsible for each task will be awarded

QUANTIFICATION OF THE MEASURE
✓ 100% fulfillment of goals.
PLACE OF APPLICATION
The AIDP Fish Trail, Cuturu Bajo Paths, including the place known as Cuturu Medio and Laureles that make up the AIDL.

BENEFITED POPULATION
Residents of the AIDP and AIDL village El Pescado and trails Cuturú Bajo, including the place known as Cuturu Medio and Laureles that make up the AIDL.
MECHANISMS AND PARTICIPATORY STRATEGIES
✓ Meetings with the Community Action Boards of the villages that make up the AIDP and AIDL. ✓ Community Participation Committees, Community Action Boards and Citizen Inspectorship. ✓ Reception, attention and response to complaints and claims from the communities close to the Office of attention to the community, related to damages or damages presented in an unexpected manner during the stages of the project. ✓ Minutes of meetings held with the Community Participation Committees, the Community Action Boards and the Citizen Oversight Offices. ✓ Photographic and / or filmic records of activities
REQUIRED STAFF
For the development of the management activities proposed in this file, the following personnel profile is required: ➢ Professionals from the areas of engineering, social, HSEQ, environmental, administrative and legal delegates by Touchstone Colombia S.A.S. ➢ Technical staff from the areas of engineering, social support, HSEQ, environmental, administrative and legal delegates by Touchstone Colombia S.A.S.
SUPERVISING AND MONITORING INDICATOR(S)
✓ (No of damages caused by damages caused by construction of the project's infrastructure / No of compensated damages). If> 1 does not comply. ✓ (No Requests received by the community on issues of non-conformities / No requests with a response in accordance). Yes = 1. Comply
RESPONSIBLE (S) OF THE EXECUTION

ENTITY/INSTITUTION	ROLES*
TOUCHSTONE	PL – OP – SP – SG - IN

Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)
SCHEDULE (PERIOD OF EXECUTION)
See Annex 8 1
BUDGET (APPROXIMATE COSTS)
For this file, the costs contemplated correspond to the salaries of the professionals involved in the processes and logistics costs of the meetings held and the total cost is $ 65,930,000 (SIXTY YORK MILLION NINE HUNDRED THIRTY THOUSAND) M/CTE.

8.1.3.5.1 Management program of training, education and awareness to the community surrounding the project.

MANAGEMENT PROGRAM OF TRAINING, EDUCATION AND AWARENESS TO THE COMMUNITY SURROUNDING THE PROJECT								
OBJECTIVES								
✓ Provide the community of the areas of influence of the direct and indirect AIDP, AIDL and AII project, timely information on the technical conditions of the mining project, situations of risk, scope, constructive activities, duration, positive and negative effects caused on the natural environment and social. ✓ Sensitize the population of the area of direct and indirect influence AIDP, AIDL and AII, qualifying the activities and generating values in front of the management of the natural environment, ✓ Provide training and environmental education so that the communities are an active part of the solution of the environmental problems existing in the region. ✓ Promote an environmental ethic through the strengthening of values such as respect, tolerance, responsibility and commitment to oneself, to others and to the environment.								
GOALS								
✓ Through environmental education workshops with 100% of the community surrounding the project on the characteristics of the construction activities and the possible impacts that may be caused on the natural and social environment and management measures. ✓ Reach 100% of the territorial units that make up AIDP and AIDL with environmental education processes, aimed at generating individual (in each population group) and collective (path) attitude changes as opposed to the management of natural resources. In the IIA, environmental awareness and education activities will be programmed in consultation with the relevant authorities and organizations. ✓ To achieve the fulfillment of 100% of the actions foreseen in this program, an active participation of the communities of the areas of direct and indirect influence in the vigilance and care of their natural and social environment and of responsibility for their own activities.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	x
IMPACT (S) TO BE CONTROLLED								
✓ Strengthening of institutions, associations and associations ✓ Insertion of technological processes								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								
<u>1. Workshops on environmental education with the communities in the areas of influence</u> Every six months, environmental education workshops will be held with the communities in the area of direct and indirect influence of the project, with respect to biodiversity and the ecological importance of conserving vegetation relicts, not only from the physical point of view (regulation								

of microclimate regulation of water and control of torrentially, rationalization of water supply systems among others), but also of the protection of wildlife and care with flora species.
The following are the target population groups: School-age children, young people, older population of productive age and older adults.
10 workshops have been scheduled for each year of the project. There will be 5 workshops in the initial year of the project. This workshop will involve students, independent workers, people from the mining sector, sawyers, farmers, ranchers, housewives, community leaders and people from different productive sectors and from commerce in general.

The proposal is to address in a participatory manner, issues related to the interaction of man and his environment, reinforcing it with experiences that the neighboring communities of the project have in environmental matters in aspects such as: environmental legislation, social responsibility, duties and environmental rights of the communities. In addition, it seeks to analyze the effects caused on the natural environment by the daily activities of the inhabitants of the area (burning, logging, water pollution and soil etc.) and by project activities and the determination of actions tending to minimize the effects about the social, cultural and natural environment.

The workshops will be dictated by population groups, gathering neighboring communities and seeking integration among the peasants. They will be held in an appropriate place (schools or community halls). The call will be made several days in advance and through the use of letters addressed to the community (teachers, community leaders, etc.), setting the date, time, purpose and place of the meeting. Didactic material will be used (veneers, folding, billboards and audiovisual media among others), the topics will be presented with the participation of each of the attendees. At the end of the workshops and talks, work groups and follow-up will be organized that will be responsible for the execution of the tasks that are generated from the workshops.

2. Promotion activities to the AIDP and AIDL communities.

The dissemination of information to the communities will be carried out every six months, related to the promotion of healthy life habits and prevention of diseases, the management and adequate disposal of liquid and solid domestic waste. Topics will be included, such as:

1) Talks on good practices in food handling, body hygiene, proper handling of waste, care and prevention of children's diseases, among others.
2) Design and construction of septic tanks.
3) Savings in domestic water consumption.
4) The importance of septic tanks in homes and educational centers.
5) Separation and use of solid waste, management of composting programs.
6) Other pertinent issues that arise from the initiative of the communities.

The promotion actions may be linked to the environmental education workshops taking advantage of the calls and the target population groups of each activity. 15 activities will be developed during the year distributed in the villages and towns that make up the areas of direct and indirect influence.

3. Non-formal environmental education to the AIDP AIDL All community

In addition to education through workshops, other non-formal activities will be developed to reach a greater number of people: 1) Educational primer on the integral water cycle, with the purpose of awakening attitudes and promoting values in the members of the communities, in the face of the improvement of their living conditions, which favors the awareness of the multiple damages caused by the evil management and neglect of natural resources. 2) Development of activities that favor the generation of a participatory culture in the community from the environmental point of view, in topics such as management, oversight of the administration of water resources and promotion of the protection and care of the same. The idea is to hold workshops, meetings, field trips and cultural, recreational and sports events with the representatives of the villages with the aim of promoting an environmental ethic through the generation of values and commitments to the environment. Its definition should be born from the initiative of the communities. Two campaigns per year will be scheduled covering (5) territorial units that make up the areas of direct and indirect influence AIDP, AIDL AII. 3) Consolidation of agreements with communities regarding the protection and sustainable management of water resources in the AIDP and the AIDL, which starts simultaneously with the operation of the mining project.
QUANTIFICATION OF THE MEASURE
✓ 100% fulfillment of goals.
PLACE OF APPLICATION
Sidewalks and populated centers that make up the areas of direct and indirect influence AIDP, AIDL, AII.
BENEFITED POPULATION
Population of the villages and population centers that make up the areas of direct and indirect influence.
MECHANISMS AND PARTICIPATORY STRATEGIES
The workshops will be spaces for participation and reflection where adjustments of the themes or methodologies can be made according to the interests and recommendations of the community. ✓ Participation of communities in the formulation of environmental projects. ✓ Community agreements on the protection of the environment. ✓ Meetings with the Community Action Boards of the villages that make up the AIDP and AIDL. ✓ Minutes of meetings held with the Community Participation Committees, the Community Action Boards and the Citizen Oversight Offices. ✓ Photographic and / or filmic records of activities
REQUIRED STAFF

For the development of the management activities proposed in this file, the following personnel profile is required:

- ✓ Professionals from the social, environmental area delegated by Touchstone Colombia S.A.S.
- ✓ Technical staff of the social support area, environmental delegated by Touchstone Colombia S.A.S.

SUPERVISING AND MONITORING INDICATOR(S)

Number of people in the community (AID) capable of receiving environmental training / Not of people who receive training in environmental issues. If <1. Fails.

Number of meetings held / Number of meetings scheduled. If <1. Fails.

Number of community environmental projects formulated in one year / Number of communities that received environmental training. If <1. Fails.

No of communities (present in the IIA) capable of receiving environmental training / No of communities that received training in environmental issues (in the IIA).

RESPONSIBLE(S) OF THE EXECUTION

ENTITY / INSTITUTION	ROLES*
TOUCHSTONE	PL – OP – SP – SG - IN

Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)

SCHEDULE

See Annex 8-1

BUDGET

The costs of this record are calculated for the initial year, executing a single round of activities covering the villages and population centers that make up the areas of direct and indirect influence. The costs of community projects of environmental type are not detailed in this budget since these costs are not known in advance and corresponds to an annual allocation of the budget of the social management of the project that will cover in a percentage manner the total amount of the initiative proposal. The costs contemplated are: $ 18,525,000 (EIGHTEEN MILLION FIVE HUNDRED TWENTY-FIVE THOUSAND) M/CTE.

8.1.3.6 Conflict of interest management program for land acquisition and easement payment.

CONFLICT OF INTEREST MANAGEMENT PROGRAM FOR LAND ACQUISITION AND EASEMENT PAYMENT								
OBJECTIVES								
✓ To develop the property management oriented to the purchase or rent of properties or areas of land that are required for the operation of the project and to compensate economically to the owners for the affectations and the mining easements. ✓ Identify risks and possible impacts that may occur in a foreseen or unforeseen manner during the different stages of the Fish Concession 5969 project, by means of the removal of neighborhood certificates or agreements for the areas where the project infrastructure will operate and other areas of occupation of the project associated activities or auxiliary operations of mining or logistic type. ✓ Minimize social conflicts and social expectations that could occur in the area of direct and indirect influence of the project during the different stages in relation to easements for the construction of accesses, land lease for infrastructure works of the project and mining bondage or with the payment of property damage caused by the project during its different stages.								
GOALS								
✓ Compliance with 100% of the commitments acquired in the constitution of easements and the purchase of land or land with the respective owners. ✓ Replace or compensate 100% of the effects on infrastructure, property, goods, improvements or crops that may be caused in the area of direct influence during the different stages of the project.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	x
IMPACT(S) TO BE CONTROLLED								
✓ Increase in the per capita income of the owners of the easements ✓ Increase in economic events with legal support and compliance guarantees ✓ Modifications in landscape structures ✓ Generation of expectations								
Type of measure	*Prevention*	x	*Mitigation*	x	*Correction*	x	*Compensation*	x
ACTIONS TO BE DEVELOPED								
1. Survey of neighborhood records.								

Minutes of neighborhood are drawn up by the roads, buildings and infrastructure surrounding the area of direct influence of the project, to verify the initial state of the same, identify risks and control possible effects not foreseen during the different stages of the project.
Additionally, the minutes will make it possible to determine the responsibility of the company in case of claims made by the residents, owners or managers of the properties. The procedure for the lifting of the neighborhood acts is as follows:

1) Prior to the start of constructive activities, at least fifteen days before, the owners, tenants or holders and representatives of the community will be informed of the lifting of the neighborhood records, explaining the purpose thereof by visit or written correspondence.

2) The minutes of neighborhood will be lifted by a civil or cadastral engineer, accompanied by the social professional and with the presence of the head of the property. The record shall be accompanied by a photographic record of the properties, buildings, infrastructure and crops adjacent to the area of direct influence that, depending on the technical concept, may be affected and / or modified by the work activities. Once the minutes have been drawn up and signed by the participating parties, a copy will be given to the owner.

3) If the owners or occupants of a property for the lifting of the neighborhood act are not found, a façade survey will be carried out and it will be filed with the corresponding City Hall, in order to record the work done. The process of tracking and locating the owner will be done.

4) In the case of neighborhood records of public infrastructure, the survey will be made with the representative of the Community Action Board, who will sign as witnesses of the information collected, giving a copy to the representatives after signing of the document.

5) A closing act will be made to the neighborhood records made at the beginning of the project.

6) Representatives of the company Touchstone Colombia S.A.S. they will possess a card that accredits them as such in front of the owners and will present a letter that justifies their action when requesting permission to enter a property.

2 Constitution of the private property right

The Company Touchstone Colombia S.A.S. will be in charge of the acquisition of the properties required for the execution of the works and will perform the corresponding tasks before the different control entities (municipal finance department, cadastral, notarial registry and public instruments of the corresponding jurisdiction) in compliance with the established in article 58 of the political constitution of Colombia that enshrines the right to guarantees of private property.

The property management procedure to be followed is as follows:

1) For each property required for the execution of the project and defined according to the folio of real estate registration and corresponding cadastral certificate, a property record will be drawn up. In the record will be recognition of the property, owner verification, boundaries, property nomenclature, confirmation of legal data and the inventory of areas and improvements affected. The result is the property file and the property tax plan, which will be prepared based on the formats provided by Touchstone Colombia S.A.S.

2) The Inventory of buildings, improvements and crops will include the following activities and conditions: for rural properties and protection soils measured in hectares (ha); Measurements of lengths and areas will be given in whole number and two decimals. The total area is related to the extension of the property, according to information from the IGAC, study of titles or topographic survey. The area required is that affected by public works, according to the definitive designs including the reserve area legally contemplated. The remaining area (surplus), whose survey will also be included in the corresponding to the difference between the total area of the property and the area required for the project. (When the required area is greater than or equal to sixty percent (60%) of the total area according to information from the IGAC, the topographic survey of the entire property will be carried out to determine the remaining area). The areas occupied by permanent crops, semi-permanent crops and plantations will be measured and quantified, indicating type, density, average diameter of the trees, state and the end of it. Only transient crops will be included in the case that due to the effects of the work cannot be harvested. Plans and property plans will be prepared for the areas that are intended to be used for a long time, such as the areas where the camps are located, and for that reason, their acquisition is potentially necessary. Transitory type crops will not be taken into account in the inventory.

3) Review, update and validation of the technical, physical, socio-economic and legal information of each and every one of the property files of the properties. It will be verified that the cadastral identification of the property corresponds with the folio of real estate registration on which the acquisition is carried out.

4) The cadastral investigation requires that in the Cadastral Sectionals of the Agustín Codazzi Geographical Institute corresponding to the area under study, the company Touchstone Colombia S.A.S. the following is carried out: Review the plates superimposing the properties that are affected by the project and request a copy of the cadastral blocks and sectors involved. To investigate the status of updating the cadastral and registry information for those affected properties, according to the design. Consult and analyze the registers 1 and 2 of the IGAC, as well as possible changes that could occur due to the dynamics of the area (group and divide). Define in a preliminary way the number of property files to be elaborated and establish the existence or not of the necessary information regarding the properties affected by the design. Determine the type of land tenure according to legal documents. For the properties awarded by INCORA, today INCODER, the award Resolution will be obtained.

5) The Basic Plan of Land Use Planning - PBOT in force will be consulted in the Municipal Planning Office, in order to determine the land uses, allowed and potential of the properties

required, and the restrictions of the lands contemplated in said Plan. Consult and request in the Planning Office the basic information on approved Building Licenses.

6) The area to be acquired will be established, comparing in all cases the technical information (areas raised in the field, cadastral information, etc.) with that obtained in the study of titles (registration number, public deed, etc.), in such a way There is a correlation between the documents presented (plans and property records and studies of titles).

7) Contract or elaborate directly the social files, previous socio-economic diagnosis of the properties required.

8) Prepare a study of titles for each property, which will cover, the analysis and contribution of the titles of at least a period of 20 years, or greater if necessary to establish the sanitation of real right of domain within the tract successive in the tradition of the property.

9) Each property record will have the following annexes: Cadastral Certificate (issued by the IGAC Cadastral section office, corresponding to the property, which includes the cadastral number, identity document of the owner, areas and legal data of the property); Certificate of Tradition (issued by the Registry Office of Public Instruments of the jurisdiction in which the property is located, with an age of less than three (3) months); Public Deed (simple copy of the Public Deed of ownership of the property; Adjudication Resolution for the lands awarded by the INCORA, today INCODER; Certificate of Existence and Legal Representation (photocopy of the citizenship card of the person who appears as the legal representative of the proprietary company of the property and certificate of the Chamber of Commerce with less than three (3) months old); Current regulations (consult the Municipal Planning Office the Basic Territorial Planning Plan - PBOT in force, in order to determine the uses of the ground, permitted and potential of the properties required and the restrictions of the lands contemplated in said Plan, consult the Office of Planning on Licenses of construction in process, or approved with respect to properties required by the project, when appropriate); (Proof of request for documents: in the event they are not submitted, the application will be attached to the competent entities and the respective response; copy of the cadastral blocks where the properties required for the project are located (it will be delivered independently to the folders, but at the same time); photographs of the property (one will be of the facade); capacity and property line certifications issued by the competent cadastral authority, when there is a difference in areas between property records and titles.

10) Preparation and obtaining of commercial appraisals. In accordance with the provisions of Decree 1420 of 1998 and the regulatory resolution 0762 of 1998 issued by the Geographical Institute Agustín Codazzi (IGAC). Touchstone Colombia S.A.S Company will guarantee that the appraisals will be delivered in a timely manner by the contracted securities market, in order to guarantee its eventual review or challenge by the company Touchstone Colombia S.A.S. go ahead with the verifications to that place.

The Appraisal Process is developed through the following activities:

1) Technical visit to each of the properties subject to the appraisal, where photographs will be taken that identify the property and the improvements object of the appraisal, the conditions of each property will be evaluated according to the property profile and plan and the methodology established by the IGAC, the corresponding concept of expert testimony (certificate of appraisal) is produced, within the term established in decree 1420/98, the final appraisal is made for each property with the observations that may have occurred and in accordance with the prioritization schedule of purchase for construction.

2) All the applications will be attended, and their delivery will be made in original and a copy, signed by the legal representative of the appraiser and the appraiser, incorporating a photocopy of the property card with its plan

3) When it is more than one appraisal, these will be delivered with their corresponding "sheet" summary, duly totalized in all its items (number of properties, owners, land to acquire, buildings, improvements, total value of the appraisals, etc.).

4) The information obtained and known on the occasion and development of the contract will be kept confidential, an obligation extended to the persons who intervene on its behalf in its execution.

5) The appraisals will be presented individually, fully identified, keeping the numbering of the file, in original and a copy, accompanied by their respective minutes, Technical Appraisal (commercial value of the land, construction and improvements) the appraisal It will be accompanied by a photographic report, at least one photo for each item valued and the annexes supporting it. They will contain the date of their presentation and will be endorsed by the respective association that supports them.

The Company Touchstone Colombia S.A.S. advance each and every one of the activities described below, until finalizing the process of acquisition of land and improvements, with the subscription of the corresponding purchase offers, deeds and other support documents and obtain the real and material delivery of the properties, applying the current regulations on the subject.

The Company Touchstone Colombia S.A.S. perform all necessary activities to ensure the objectives indicated above, such as: individual visits to each of the properties subject to the contract, and / or the owners, collection of real estate, development of real estate valuation concepts, preparation of reports and reports for monitoring of the process, among others.

Advance the process of voluntary alienation of the properties necessary to execute the works and acquire them. In accordance with the current regulations, management that The Company Touchstone Colombia S.A.S. It will develop with the purpose of ensuring, according to the scope of its competence, it will ensure the availability of the properties with sufficient time, in order to comply with the work program.

In development of this obligation, the following actions will be taken:

1) Delivery of formal offers of purchase and its corresponding notice to owners as established by articles 44 and 45 of the Contentious Administrative Code
2) Office of registration of the offer in the Registry Office.
3) Edicts when there is a need.
4) Signing of sales promises.
5) Approval of operating orders for the payment of accounts related to the acquisition of the properties required for the project.
6) Prepared the inputs for the start of the property acquisition procedure, the file will contain at least the following documents:

   - File, property plan and supporting documents of these.

   - Cadastral nomenclature bulletin

   - Land registry of the property

   - Certification of space and boundaries issued by the competent cadastral authority when there is a difference in areas between property records and titles.

   - Titles that establish the tradition of the property in a period of twenty (20) years and in general all the documents necessary for the study of titles.

   - Photocopy of the Certificate of citizenship of the owner of the domain or certificate of existence and legal representation not exceeding three months in case it is a legal entity.

   - Folio of real estate registration (dated no more than 3 months)

   - Resolutions of adjudication of vacant lands issued by the INCODER

   - Sentences containing declarative declarations of ownership, probate proceedings and other judicial decisions related to the titling of real estate.

3. Payment of damages

In the event that damage to property or improvements of a private nature is generated, once its magnitude is established in accordance with an inspection (which demonstrates a relationship with the activities of the project) and based on a commercial appraisal, the Company will proceed to the payment from the same. The inspection visit will count as an endorsement an inspection certificate signed by the affected party and by the company Touchstone Colombia S.A.S.

For proof of the agreement reached by the payment of the damages, a document or record will be signed with each affected party, stating the full acceptance of the agreed value.

The effects may occur at any time from the start of the different stages of the project until the closure.

QUANTIFICATION OF THE MEASURE
✓ 100% fulfillment of goals.
PLACE OF APPLICATION

Sidewalks and populated centers that make up the areas of direct and indirect influence AIDP, AIDL.
BENEFITED POPULATION
Population of the villages and population centers that make up the areas of direct influence AIDP, AIDL.
MECHANISMS AND PARTICIPATORY STRATEGIES
✓ Office for public attention ✓ Receipt of complaints and claims ✓ As for the constitution of rights of way as for compensation for property damage and improvements, the mechanisms and clear channels of valuation, agreement and payment that favor the harmonious relations between the company and the people affected will be sought ✓ It will always opt for free and voluntary negotiation as a mechanism to be used, as opposed to tax actions ✓ Photographic and / or filmic records of activities
REQUIRED STAFF
For the development of the management activities proposed in this file, the following personnel profile is required: ➢ Professionals from the social, administrative and environmental areas, delegated by Touchstone Colombia S.A.S. ➢ Technical staff of the social, administrative and environmental support area, delegated by Touchstone Colombia S.A.S.
SUPERVISING AND MONITORING INDICATOR(S)
✓ Number of conflicts between company and community (included in the project's baseline) caused by the mining project. Yes> 1. Fails.
RESPONSIBLE (S) OF THE EXECUTION

ENTITY / INSTITUTION	ROLES*
TOUCHSTONE	PL – OP – SP – SG - IN

Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)
SCHEDULE
See Annex 8 1
BUDGET
The estimated costs for payment of salaries to the professionals delegated by the company Touchstone Colombia S.A.S. that take part in the processes of lifting neighborhood records, the right of constitution of private property and the payment of damages, a cost of $ 24,600,000 is

estimated for the initial year of the project (TWENTY-FOUR MILLION SIX HUNDRED THOUSAND) M/CTE.

The costs corresponding to the payments for easements, effects or purchase of properties are not included in this file, for this the Touchstone Colombia S.A.S. it will have a heading destined for that purpose and the amounts will be set according to what was agreed in the negotiations or agreements made with the owners, or in its effect those ordered by the Law

8.1.3.7 Preventive archeology program

8.1.3.7.1 Archaeological rescue

PREVENTIVE ARCHEOLOGY - ARCHAEOLOGICAL RESCUE								
OBJECTIVES								
✓ Characterize the mining footprints; Prehispanic settlements (from central configurations and scattered settlements); Agri-ridges; Channels; Cultivation areas; mining configurations from its planimetry (length of the channels, typology of the main and secondary channels, direction, operating logic, difference of elevation or slopes, width, start, tailings, etc.); and perform the comparative analysis of settlements. ✓ Evaluate the archaeological heritage in danger of alteration or destruction caused by the different works of the project that require the removal of vegetation and cleared material, construction of works and accesses, and disposal of excavation leftovers. ✓ Contribute to the knowledge of the processes of historical cultural settlement in the different areas of influence of the project and the identification and characterization of the human groups that populated the region in reference.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	x
IMPACT(S) TO BE CONTROLLED								
Alteration of Archaeological cultural heritage								
Type of measure	*Prevention*	x	*Mitigation*		*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								
1. Characterize the mining footprints; Prehispanic settlements (from central configurations and scattered settlements); Agri-ridges; Channels; Cultivation areas; mining configurations from its planimetry (length of the channels, typology of the main and secondary channels, direction, operating logic, slopes or slopes, width, start, tailings, etc.); and perform the comparative analysis of settlements. 2. Retrieve information that allows spatially and temporally locate the human groups that gave rise to the archaeological record in the study area. 3. Contribute to the identification of the environmental context in which the cultural developments of the area took place. 4. To evaluate the affectation of the archaeological heritage in danger of being affected by the works of the project. 5. Define monitoring strategies and dissemination of the results obtained, as a measure of compensation to local and regional communities. As prevention measures it is proposed:								

PREVENTIVE ARCHEOLOGY - ARCHAEOLOGICAL RESCUE

1. Before beginning the construction works of the mining project, carry out rescue work in those places that will be subject to vegetation removal and discarding for the mining project taking into account the archaeological potential proposed in this report that is, bearing in mind the degree of affectation to the archaeological heritage.

2. The starting point to perform the rescue should be intensive prospecting activities in the areas that will be intervened by the project (object of vegetation removal and cleaning). That is to say that once the owner of the project defines which areas will be intervened and the activities that will be carried out, an intensive prospecting must be done at each defined point.

The following actions are proposed as rescue work:

1. Carry out a detailed description of the mining traces and agricultural sites looking for their configuration from the planimetry (length of the channels, typology of the main and secondary channels, direction, operating logic, slopes or slopes, cleaning etc.), seeking additionally an interpretation from the point of view of the use and management of these works. Additionally, these traces must be described and drawn.

2. Carry out test probes: With them we seek to obtain information on the characteristics of the soils and the dispersion, of the cultural materials at the vertical and horizontal levels, information that will be used to understand the process of site formation, the differentiation of areas of activity, and also to define the place where the excavation will take place in the area.

3. Carry out excavations in the area: With which it seeks to recover archaeological information on aspects such as the vertical (stratigraphic) and spatial location of archaeological cultural material, which will enable the recognition of areas of activity within the same or the differential use that is gave spaces in ancient times. Information will also be sought to identify the components of the site in terms of the number of occupations, in correlation with the order in the stratigraphic and depositional sequence of materials.

With the excavations in area you should also:

3.1 Acquire soil samples for chemical analysis of organic, chemical physical, palynological, starch, phytoliths and carbon content for dating.

3.2 Carry a vertical and spatial record of the materials, which includes, for each excavation level of 5 cm, the exact location of each identified archaeological element (ceramic, lithic, coal and seed remains, among others), traits (traces of post).

PREVENTIVE ARCHEOLOGY - ARCHAEOLOGICAL RESCUE
During the excavation process, other observations will also be recorded, such as natural alterations (produced by roots, animals and erosion processes, among others) and by recent anthropic processes (plows for crops, fences, salting), and other elements that help identify processes of site training. 4 Carry out the analysis of the archaeological evidence, which implies a cleaning and marking of the recovered material that facilitates its handling, followed by the classification of the same, as well as the separation and sending of samples for specialized analysis if necessary: radiocarbon to date the archaeological strata, palynological analysis, physical-chemical analysis of soils and studies of micro and macro-remains. 5 Carry out a study of pollen and phytoliths, in addition to a soil analysis, in agricultural sites that will elucidate the type of crops and vegetation present over time. 6 Carry out the comparative analysis of the archaeological sites and relate them to the other evidences found in the study area. In addition to the location of the three sites mentioned in the previous table, the terraces of cultivation, the ridges and the traces of mining activity are the object of archaeological rescue as they are observed in the Archaeological Report, which will be intervened bearing in mind the works to realize and the archaeological potential of the area to intervene.
PLACE OF APPLICATION
Agreement and AID of the mining project
BENEFITED POPULATION
Population settled in the area of direct influence of the project.
MECHANISMS AND PARTICIPATORY STRATEGIES
Although for archaeological work little local staff is required; it is suggested as a mechanism of direct participation, to link the work team in the field, local workers who will act as assistants, who will also act as transmitters of both the work performed and the importance of the recovery of this part of the regional history, for local communities. An exhibition that contributes to the local culture should be prepared, based on the information obtained during the excavations.
REQUIRED STAFF
✓ The ideal personnel to hire ✓ An anthropologist or a director archaeologist ✓ Two archaeologist's assistants ✓ Three Archeology Auxiliaries ✓ Four Workers of the region.
SUPERVISING AND MONITORING INDICATOR(S)
✓ Disappearance or destruction of archaeological sites or archaeological evidence ✓ Cultural evidences and archaeological sites

PREVENTIVE ARCHEOLOGY - ARCHAEOLOGICAL RESCUE	
RESPONSIBLE(S) OF THE EXECUTION	
ENTITY/INSTITUTION	ROLES*
TOUCHSTONE	(PL), (OP), (Sp), (Sg), (In)
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	
SCHEDULE (PERIOD OF EXECUTION)	
See detailed schedule in the Prospecting report and Archaeological Management Plan	

8.1.3.7.2 Archaeological Monitoring

PREVENTIVE ARCHEOLOGY - ARCHAEOLOGICAL MONITORING								
OBJECTIVES								
✓ Evaluate the archaeological heritage in danger of alteration or destruction caused by the different works of the project that require the removal of vegetation and cleared material, construction of works and accesses, and disposal of excavation leftovers. ✓ Contribute to the knowledge of the processes of historical cultural settlement in the different areas of influence of the project and the identification and characterization of the human groups that populated the region in reference.								
Stages of the project	*Exploration*		*Construction and Assemble*	*x*	*Exploitation*	*x*	*Final Closing and Post Closing*	
IMPACT(S) TO BE CONTROLLED								
Alteration of Archaeological cultural heritage								
Type of measure	*Prevention*	x	*Mitigation*		*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								
During the work of vegetation removal and cleaning, construction of works and access, requires the presence of an anthropologist (with emphasis on archeology) along with a worker, who will record and complement the information of the cultural and historical processes of the region, In case of finding archaeological evidence, this information will be added to that provided in the previous stage. In order to minimize the risk of loss of archaeological information, for the monitoring phase an induction must be made to operators and to different fronts of activity to define the protocols to be followed in case of an archaeological finding. (Stop the machinery, do not touch the find, and report it to the archaeologist and the supervisor).								
PLACE OF APPLICATION								
Area of influence of works or activities, especially on roads, human settlements, excavations and others.								
BENEFITED POPULATION								
Population settled in the AID								
MECHANISMS AND PARTICIPATORY STRATEGIES								
Link to the work team in the field, local workers who will act as assistants.								
REQUIRED STAFF								
Anthropologist or Archaeologist, a worker.								
SUPERVISING AND MONITORING INDICATOR(S)								
✓ ((No works executed / month) / (No works described by a staff trained in archeology)) * 100. Yes = 100, Complies								
RESPONSIBLE (S) OF THE EXECUTION								
ENTITY / INSTITUTION			ROLES*					

PREVENTIVE ARCHEOLOGY - ARCHAEOLOGICAL MONITORING	
TOUCHSTONE	Hire qualified personnel, that is, an Anthropologist or an Archeologist who will act as "the contractor", who will be responsible for carrying out the program and the project auditor will give the approval.
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)	

8.1.3.7.3 Preventive Archeology – Disclosure

PREVENTIVE ARCHEOLOGY – DISCLOSURE								
OBJECTIVES								
Disseminate and publicize the results of the preventive archeology work carried out, to the different communities of interest (students, Community Action Boards, Senior Citizens Groups, municipal mayor's office), belonging to the community of El Pescado village.								
Stages of the project	*Exploration*		*Construction and Assemble*	***x***	*Exploitation*	***x***	*Final Closing and Post Closing*	
IMPACT(S) TO BE CONTROLLED								
Alteration of Archaeological cultural heritage								
Type of measure	*Prevention*	x	*Mitigation*		*Correction*		*Compensation*	
ACTIONS TO BE DEVELOPED								
1. Make brochures for each phase of the project, designed for students, organized community and others, with the information obtained from the work of preventive archeology. 2. Make presentations to the public of interest. And didactic workshops about the management of the archaeological heritage found in the area. 3. Divulgate the information obtained about the archaeological study carried out in the area. 4.Incorporate the community in making decisions regarding cultural heritage								
PLACE OF APPLICATION								
Area of influence of the works or activities, especially on the roads, human settlements, excavations and others, El Pescado village.								
MECHANISMS AND STRATEGIES OF PARTICIPATION								
Present the brochure (s) and the exhibits to the community of the study area.								
REQUIRED PERSONNEL								
Anthropologist or Archaeologist, Graphic designer.								
MONITORING AND SUPERVISING INDICATOR(S)								
Number of interest groups affected by archaeological processes / No of groups in which the results of the archaeological studies were disclosed								
RESPONSIBLE (S) OF THE EXECUTION								
ENTITY/INSTITUTION	ROLES							
TOUCHSTONE	Hire qualified staff, that is, an Anthropologist or an Archaeologist who will act as "the contractor", who will be responsible for carrying out the program and the project auditor will give the go-ahead							
Roles types: Planning or design (PL), Production/Operation/Intervention/Execution (OP), Supervision/Control (Sp), Follow up and monitoring (Sg), Research (In)								