CONTENTS

TABLES

9 FOLLOW-UP AND MONITORING PROGRAM

This chapter describes the follow-up and Monitoring Program establishing actions that must be developed to verify and constantly ensure the implementation of management measures defined in the chapter 8 of this study. In pursuit of the conservation of existing abiotic, biotic, socio-economic resources within the influence area of El Pescado Project in the Mining concession 5969.

The specific actions of monitoring and follow-up are developed in programs, kept in file cards, applicable to designed measures for prevention, control, correction, recovery, mitigation and compensation of the impacts caused by the development of activities proposed. In the same way, Touchstone shall prepare reports during the implementation of each phase of the project and shall generate the respective Environmental Compliance Reports (ICA) to be delivered to the local environmental authority the local environmental authority CORANTIOQUIA - Corporación Autónoma Regional de Antioquia Corantioquia.

The general structure of the follow-up and monitoring Program is presented in the table 9-1.

Table 9-1 General Structure of the Follow-up and Monitoring Program

ENVIRONMENT	FOLLOW-UP AND MONITORING
ABIOTIC	Follow-up on erosion processes and sediment production
	Morphological restoration of exploitation areas
	Monitoring program of domestic wastewater from camps and mining areas
	Monitoring program, Management and control of industrial waters from access tunnel waters (Groundwater)
	Monitoring program – Management of drilling wastewater (Aqueous sludges)
	Monitoring program- Management of runoff water and tailings deposit and sterile
	Monitoring program, management of crossing of water bodies
	Monitoring program of training management
	Monitoring program de gases and particles
	Monitoring program of sound pressure levels
	Monitoring program of domestic solid and industrial waste monitoring
BIOTIC	Follow-up and monitoring of forest utilization
	Follow-up and monitoring for compensation and sensitive areas program
	Follow-up and monitoring for management of vegetal coverage removal and stripping program
	Follow-up and monitoring program of management and rescue of fauna species
	Fauna conservation program
	Education and training for project personnel

	Program for the development and promotion of ecosystems and flora and fauna affected by the project
SOCIO-ECONOMIC	Attention to requests and claims about the participation and appropriate information of communities
	Effectiveness of social management program
	Management of impacts y conflicts project generated during the different phases
	Social conflicts generated during the different phases of the project

9.1 ABIOTIC ENVIRONMENT

9.1.1 Follow-up on erosion processes and sediment production

Name of Monitoring Program	**Follow-up on erosion processes and sediment production**							
Environment	Abiotic							
Phases of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final Closure and Post Closure*	
Management Program to be monitored	Management program of soil resources							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*		*Correction*	*X*	*Compensation*	
Objectives of monitoring	To define the soil follow-up and monitoring practices to avoid, prevent or redress erosion processes and sediment production.							
Impact(s) to be monitored	Alteration of physicochemical and biological properties of soil							
Parameter(s) to be monitored	State of civil works Vigor and development of vegetal cover Location and measurement of stripped areas of vegetation where erosion processes may occur.							
Sampling and analysis methodology	Soil follow-up and monitoring practices, specifically related to the dynamics of erosion processes and sediment production, shall be carried out in all intervened areas throughout the life cycle of the entire project, and shall be evaluated through civil works designed for this purpose; the vigor and development of the vegetation cover and the location and measurement of stripped areas of vegetation where erosive processes may occur. The area shall be evaluated erosion control works and appearance of erosion processes through a visual inspection, annually. It is expected that the type of erosion that may occur in water-related. The indicators to assess erosion are related to the development of vegetation and directly by the thinning of surface soil horizon. With the criteria mentioned above, the whole area shall be evaluated by georeferencing and photographing sites affected every year. In addition to a soil observation with Dutch auger, which will allow to measure the thickness of the surface soil horizon. In the areas affected by erosion, mechanical tillage (deep sub-soiling to minimum depth of 50cm) must be carried out to reduce soil compaction, increase oxygen flow to the roots of plants and							

	decrease density. Mix and apply fertilizers rich in organic matter (poultry manure or humus) with dolomite lime and then apply triple fertilizer; subsequently, pastures adapted to the area affected will be replanted. In areas where the development of vegetation is not as expected, an agronomist will be hired, who must perform a morphological, chemical and physical analysis of the soil affected, taking samples for laboratory analysis. In the fieldwork, at least a kind of map unit (association, consociation or complexes) must be identified, taxonomic identification of components and a trial pit per soil will be carried out. The laboratory analysis should consider: Organic carbon, cation exchange capacity, calcium, magnesium, potassium, sodium, aluminum, electric conductivity, sodium adsorption ratio, bulk density, true density; if necessary, asses heavy metal. The results of the field work and the laboratory analysis will allow a written report to be delivered, where recommendations for amendments, fertilization and tillage are found.
Measuring sites	AID
Follow-up indicators	**Indicators** If there is no loss of soil by surface dragging and the vegetation covers more than 90% of the area, there is no erosion. Water erosion is slight, if the surface horizon has thinned by 25% and the coverage of vegetation is 75% and 90%. Erosion is moderate, if the surface horizon has thinned by 50%, there are guttering, and vegetation covers between 25% and 75% of lot area. Water erosion is severe, if the surface soil horizon has been completely lost, the horizon B surfacing, and the vegetation covers less than 25% of lot.
Frequency of measurement	Annually
Responsible for implementation of the project	Contractor and controller
Observations	
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.1.2 Morphological restoration of exploitation areas

Name of Monitoring Program	Morphological restoration of exploitation areas							
Environment	Abiotic							
Phases of the project	*Exploration*		*Construction and Assembly*		*Exploitation*	*X*	*Final closure and Post Closure*	X
Management program to be monitored	Handling of tailings deposit and sterile							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*		*Mitigation*		*Correction*	*X*	*Compensation*	X
Objectives of monitoring	To make a morphological restoration of exploitation areas by ensuring stability and impacts on the landscape.							
Impact(s) to be monitored	Land use change, Alteration of physicochemical and biological properties of the resource							
Parameter(s) to be monitored	Reclaimed area per year							
Sampling and analysis methodology	Piezometric network of fillings and deposits Geotechnical Modeling of deposits and fillings restored morphologically							
Measurement sites	Exploitation area, deposits and fillings							
Follow-up Indicators	**Indicator***	**Type***	**Description of indicator**	**Formulas/Expression**				
	Monitoring	CU	Slope < 45°	100 x Horizontal / Vertical				
	Monitoring	CU	Security factor for fillings and deposits stability: 1.0 static conditions y 1.3 pseudo-static conditions					
	Monitoring	CU	Total area restored = 85 Ha.					
Indicator: Set whether the indicator is Follow-up or Monitoring **Types of indicator:** Quantifiable (CU), Qualifiable (CA)								
Frequency of measurement	Semiannual							
Responsible for implementation of the project	**TOUCHSTONE**							
Observations								
Timeline	See Appendix 9-1							
Budget	See Appendix 9-2							

9.1.3 Monitoring program of domestic wastewater from camps and mining areas

Name of Monitoring Program	Monitoring program of domestic wastewater from camps and mining areas							
Environment	Abiotic							
Phase(s) of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	X
Management Program to be monitored	Monitoring program of domestic wastewater from camps and mining areas							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*		*Compensation*	
Objectives of monitoring	To determine the efficiency of STARD							
Impact(s) to be monitored	Sedimentation in water bodies Change in the available resource flow (water supply).							

	Indicator*	**Type***	**Description of indicator**	**Formulas/Expression**
Follow-up and Monitoring Indicator(s)	Monitoring	CU	Inflow and Outflow	L /s
	Monitoring	CU	ΔpH STARD	$\%\Delta_{pH} = pH_{af} - pH_{ef}$
	Monitoring	CU	ΔTemperature (°C)	$\%\Delta_{Temp} = Temp_{af} - Temp_{ef}$
	Monitoring	CU	% Removal of chemical oxygen demand (mgO_2/L)	$\%Rem_{DBO5} = \frac{DQO_{Efluente}}{DQO_{Afluente}} x100$
	Monitoring	CU	%Removal of biochemical oxygen demand (mgO_2/L)	$\%Rem_{DBO5} = \frac{DBO5_{Efluente}}{DBO5_{Afluente}} x100$
	Monitoring	CU	% Removal of Total suspended solids(mg/L)	$\%Rem_{SST} = \frac{SST_{Efluente}}{SST_{Afluente}} x100$
	Monitoring	CU	% Removal settleable solid (mL/L)	$\%Rem_{SSed} = \frac{SSed_{Efluente}}{SSed_{Afluente}} x100$
	Monitoring	CU	% Fats and oils Removal (mg/L)	$\%Rem_{GyA} = \frac{GyA_{Efluente}}{GyA_{Afluente}} x100$

Indicator: Set whether the indicator is Follow-up or Monitoring
Types of indicators: Quantifiable (CU), Qualifiable (CA)

Parameter(s) to be monitored	Inflow and Outflow, ΔpH, % Removal of biochemical oxygen demand (mgO_2/L), % Removal of chemical oxygen demand ($mgO_2/L\%$), % Removal E. Coli, % Removal of total suspended solids(mg/L), % Removal of settleable solid (mL/L), % Fats and oils removal (mg/L)
Sampling and analysis methodology	Manual of water sampling, taken from Standard Methods for the examination of water and wastewater (21st Edition).
Measuring sites	STARDs.
Follow-up Indicators	Removal efficiencies for STARDs. Concentration below the limits.
Frequency of measurement	Frequency of ex situ parameters measurement in accordance with environmental regulation. Removal efficiencies for STARDs will be determined in accordance with environmental regulation.
Responsible for implementation	Environmental technician. TOUCHSTONE
Observations	
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.1.4 Monitoring program, Management and control of industrial waters from access tunnel waters (Groundwater)

Name of Monitoring Program	Monitoring program, Management and control of industrial waters from access tunnel waters (Groundwater)							
Environment	Abiotic							
Phase(s) of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	X
Management Program to be monitored	Monitoring program and control of industrial waters from access tunnel							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*		*Compensation*	
Objectives of monitoring	To reduce environmental impacts generated by the potential depletion of groundwater levels in the exploitation area and provide operating and safety conditions on the mining industry.							
Impact(s) to be monitored	Alteration of physicochemical and microbiological properties of water							

Follow-up and Monitoring Indicator(s)	**Indicator***	**Type***	**Description of indicator**	**Formulas/Expression**
	Follow-up	CA	Appropriate channels	Free channels of waste and barriers
	Follow-up	CA	Filtrations or lakes inside the tunnel	Number of sites with filtrations or lakes
	Monitoring	CU	100% Functional pumps	Pumps working $_x$100/Total Pumps
	Monitoring	CU	Pump Flow	L/s
	Monitoring	CU	pH 5 9	PH Units
	Monitoring	CU	Temperature	°C
	Monitoring	CU	Suspended solids	mgSST/L
	Monitoring	CU	DBO	mgO_2/L
	Monitoring	CU	Pumping flow.	L /s

Indicator: Set whether the indicator is Follow-up or Monitoring
Types of indicators: Quantifiable (CU), Qualifiable (CA)

Parameter(s) to be monitored	Pumping flow, pH, Temperature, Suspended solids, DBO

Sampling and analysis methodology	Manual of water sampling, taken from Standard Methods for the examination of water and wastewater (21st Edition).
Measuring sites	Pumping
Follow-up Indicators	Appropriate channels Filtrations or lakes inside the tunnel
Frequency of measurement	Daily in situ monitoring, semiannual ex situ monitoring
Responsible for implementation	Environmental technician
Observations	
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.1.5 Monitoring program – Management of drilling wastewater (Aqueous sludge)

<table>
<tr><td>Name of Monitoring Program</td><td colspan="8">Monitoring program – Management of drilling wastewater (Aqueous sludge)</td></tr>
<tr><td>Environment</td><td colspan="8">Abiotic</td></tr>
<tr><td>Phase(s) of the project</td><td>Exploration</td><td></td><td>Construction and Assembly</td><td>X</td><td>Exploitation</td><td>X</td><td>Final closure and Post Closure</td><td>X</td></tr>
<tr><td>Management Program to be monitored</td><td colspan="8">Monitoring program of drilling wastewater (Aqueous sludge)</td></tr>
<tr><td>Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)</td><td>Prevention</td><td>X</td><td>Mitigation</td><td>X</td><td>Correction</td><td></td><td>Compensation</td><td></td></tr>
<tr><td>Objectives of monitoring</td><td colspan="8">To determine efficiency of STAR</td></tr>
<tr><td>Impact(s) to be monitored</td><td colspan="8">Sedimentation in water bodies
Change in the available resource flow (water supply).</td></tr>
<tr><td rowspan="9">Follow-up and Monitoring Indicator(s)</td><td colspan="2">Indicator*</td><td colspan="2">Type*</td><td>Description of indicator</td><td colspan="3">Formulas/Expression</td></tr>
<tr><td colspan="2">Monitoring</td><td colspan="2">CU</td><td>Inflow and Outflow</td><td colspan="3"></td></tr>
<tr><td colspan="2">Monitoring</td><td colspan="2">CU</td><td>ΔpH STARD</td><td colspan="3">$\%\Delta_{pH} = pH_{af} - pH_{ef}$</td></tr>
<tr><td colspan="2">Monitoring</td><td colspan="2">CU</td><td>ΔTemperature (°C)</td><td colspan="3">$\%\Delta_{Temp} = Temp_{af} - Temp_{ef}$</td></tr>
<tr><td colspan="2">Monitoring</td><td colspan="2">CU</td><td>% Removal of chemical oxygen demand (mgO_2/L)</td><td colspan="3">$\%Rem_{DBO5} = \frac{DQO_{Efluente}}{DQO_{Afluente}} x100$</td></tr>
<tr><td colspan="2">Monitoring</td><td colspan="2">CU</td><td>% Removal of biochemical oxygen demand (mgO_2/L)</td><td colspan="3">$\%Rem_{DBO5} = \frac{DBO5_{Efluente}}{DBO5_{Afluente}} x100$</td></tr>
<tr><td colspan="2">Monitoring</td><td colspan="2">CU</td><td>% Removal of Total suspended solids(mg/L)</td><td colspan="3">$\%Rem_{SST} = \frac{SST_{Efluente}}{SST_{Afluente}} x100$</td></tr>
<tr><td colspan="2">Monitoring</td><td colspan="2">CU</td><td>% Removal Settleable solid (mL/L)</td><td colspan="3">$\%Rem_{SSed} = \frac{SSed_{Efluente}}{SSed_{Afluente}} x100$</td></tr>
<tr><td colspan="2">Monitoring</td><td colspan="2">CU</td><td>% Removal of fats and oils (mg/L)</td><td colspan="3">$\%Rem_{GyA} = \frac{GyA_{Efluente}}{GyA_{Afluente}} x100$</td></tr>
<tr><td>Parameter(s) to be monitored</td><td colspan="8">Inflow and Outflow, ΔpH, % Removal of biochemical oxygen demand (mgO_2/L), % Removal of chemical oxygen demand ($mgO_2/L\%$), % Removal E. Coli, % Removal of Total suspended solids(mg/L), % Removal of settleable solid (mL/L), % Removal of fats and oils (mg/L)</td></tr>
</table>

Sampling and analysis methodology	Manual of water sampling, taken from Standard Methods for the examination of water and wastewater (21st Edition).
Measuring sites	STARI
Follow-up Indicators	Removal efficiencies for STARI. Concentration below the limits.
Frequency of measurement	Removal efficiencies for STARDI are determined in accordance with environmental regulation. Frequency of ex situ parameters measurement in accordance with environmental regulation.
Responsible for implementation	Environmental technician
Observations	
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.1.6 Monitoring program, Management of runoff water and tailings deposit and sterile

Name of Monitoring Program	Monitoring program, Management of runoff water and tailings deposit and sterile							
Environment	Abiotic							
Phase(s) of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	X
Management Program to be monitored	Management Program of runoff water and tailings deposit and sterile							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*		*Compensation*	
Objectives of monitoring	To prevent and reduce the pollution of the streams surrounding the project by industrial waste discharge To preserve the quality surrounding the project							
Impact(s) to be monitored	Sedimentation in water bodies Alteration of physicochemical and microbiological properties of water							

Follow-up and Monitoring Indicator(s)	**Indicator***	**Type***	**Description of indicator**	**Formulas/Expression**
	Monitoring	CU	Sediment Outflow	L /s
	Monitoring	CU	Outflow of perimeter channels	L /s
	Monitoring	CU	Outflow of organic matter deposit	L /s
	Monitoring	CU	Outflow of tailings deposit	L /s
	Monitoring	CU	CN in tailing solution	mg CN^-/L
	Monitoring	CU	CN in tailings	mg CN^-/L
	Monitoring	CU	pH in solution of tailings	PH Units
	Monitoring	CU	pH in tailings	PH Units
	Monitoring	CU	Tailing Humidity	%
	Monitoring	CU	ΔpH STAR	$\%\Delta_{pH} = pH_{af} - pH_{ef}$
	Monitoring	CU	ΔTemperature (°C)	$\%\Delta_{Temp} = Temp_{af} - Temp_{ef}$
	Monitoring	CU	Δ Electric conductivity(µS/cm)	$\%\Delta_{C.E} = C.E_{af} - C.E_{ef}$

	Monitoring	CU	Δ Total acidity (mg $CaCO_3$/L)	$\%\Delta_{Ac.\ Total} = Ac.\ Total_{af} - Ac.\ Total_{ef}$
	Monitoring	CU	Δ Total alkalinity (mg $CaCO_3$/L)	$\%\Delta_{A.\ Total} = A.\ Total_{af} - A.\ Total_{e}$
	Monitoring	CU	Δ Calcium hardness (mg $CaCO_3$/L)	$\%\Delta_{D.\ Cal} = D.Cal_{af} - D.Cal_{ef}$
	Monitoring	CU	Δ Total hardness (mg $CaCO_3$/L)	$\%\Delta_{D.\ Total} = D.Total_{af} - D.Total_{ef}$
	Monitoring	CU	% Floating Material removal (mg/L)	$\%Rem_{Matflo} = \frac{Mat.flo_{Efluente}}{Mat.flo_{Afluente}} x100$
	Monitoring	CU	Δ True color (m-1)	$\%\Delta_{Color} = Color_{af} - Color_{ef}$
	Monitoring	CU	% Removal E. Coli	$\%Rem_{E.\ Coli} = \frac{E.\ Coli_{Efluente}}{E.\ Coli_{Afluente}} x100$
	Monitoring	CU	% Removal of chemical oxygen demand (mgO_2/L)	$\%Rem_{DBO5} = \frac{DQO_{Efluente}}{DQO_{Afluente}} x100$
	Monitoring	CU	%Removal of biochemical oxygen demand (mgO_2/L)	$\%Rem_{DBO5} = \frac{DBO5_{Efluente}}{DBO5_{Afluente}} x100$
	Monitoring	CU	% Removal of Total suspended solids(mg/L)	$\%Rem_{SST} = \frac{SST_{Efluente}}{SST_{Afluente}} x100$
	Monitoring	CU	% Removal Settleable solid (mL/L)	$\%Rem_{SSed} = \frac{SSed_{Efluente}}{SSed_{Afluente}} x100$
	Monitoring	CU	% Fats and oils removal (mg/L)	$\%Rem_{GyA} = \frac{GyA_{Efluente}}{GyA_{Afluente}} x100$
	Monitoring	CU	% Aluminum (mg/L)	$\%Rem_{Aluminio} = \frac{ALuminio_{Efluente}}{Aluminio_{Afluente}}$
	Monitoring	CU	% Arsenic (mg/L)	$\%Rem_{Arsenico} = \frac{Arsenico}{Arsenico_{Afluente}} x$
	Monitoring	CU	% Cadmium (mg/L)	$\%Rem_{Cadmio} = \frac{Cadmio_{Efluente}}{Cadmio_{Afluente}} x10$
	Monitoring	CU	% Barium (mg/L)	$\%Rem_{Bario} = \frac{Bario_{Efluente}}{Bario_{Afluente}} x100$
	Monitoring	CU	% Zinc (mg/L)	$\%Rem_{Zinc} = \frac{Zinc_{Efluente}}{Zinc_{Afluente}} x100$
	Monitoring	CU	% Cooper (mg/L)	$\%Rem_{Cobre} = \frac{Cobre_{Efluente}}{Cobre_{Afluente}} x100$
	Monitoring	CU	% Chromium (mg/L)	$\%Rem_{Cromoa} = \frac{Cromo_{Efluente}}{Cromo_{Afluente}} x10$
	Monitoring	CU	% Tin (mg/L)	$\%Rem_{Estaño} = \frac{Estaño_{Efluente}}{Estaño_{Afluente}} x100$
	Monitoring	CU	% Iron (mg/L)	$\%Rem_{Hierro} = \frac{Hierro_{Efluente}}{Hierro_{Afluente}} x100$

	Monitoring	CU	% Manganese (mg/L)	$\%Rem_{Manganeso} = \frac{Manganeso_{Efluente}}{Manganeso_{Afluente}}$
	Monitoring	CU	% Mercury (mg/L)	$\%Rem_{Mercurio} = \frac{Mercurio_{Efluente}}{Mercurio_{Afluente}}$
	Monitoring	CU	% Molybdenum (mg/L)	$\%Rem_{Molibdeno} = \frac{Molibdeno_{Efluente}}{Molibdeno_{Afluente}}$
	Monitoring	CU	% Nickel (mg/L)	$\%Rem_{Niquel} = \frac{Niquel_{Efluente}}{Niquel_{Afluente}} x100$
	Monitoring	CU	% Silver (mg/L)	$\%Rem_{Plata} = \frac{Plata_{Efluente}}{Plata_{Afluente}} x100$
	Monitoring	CU	% Lead (mg/L)	$\%Rem_{Plomo} = \frac{Plomo_{Efluente}}{Plomo_{Afluente}} x100$
	Monitoring	CU	% Sulphates (mg/L)	$\%Rem_{Sulfatos} = \frac{Sulfatos_{Efluente}}{Sulfatos_{Afluente}}$
	Monitoring	CU	% Sulphides (mg/L)	$\%Rem_{Sulfuros} = \frac{Sulfuros_{Efluente}}{Sulfuros_{Afluente}}$
	Monitoring	CU	% Chlorides (mg/L)	$\%Rem_{Cloruros} = \frac{Cloruros_{Efluente}}{Cloruros_{Afluente}}$
	Monitoring	CU	% Phenols (mg/L)	$\%Rem_{Fenoles} = \frac{Fenoles_{Efluente}}{Fenoles_{Afluente}} x10$
	Monitoring	CU	% Cyanide (mg/L)	$\%Rem_{Cianuro} = \frac{Cianuro_{Efluente}}{Fenoles_{Afluente}} x1$
	Monitoring	CU	% HTP (mg/L)	$\%Rem_{HTP} = \frac{HTP_{Efluente}}{HTP_{Afluente}} x100$
	Monitoring	CU	% Removal of Methylene Blue Active Substances (mg/L)	$\%Rem_{SAAM} = \frac{SAAM_{Efluente}}{SAAM_{Afluente}} x100$
Indicator: Set whether the indicator is Follow-up or Monitoring **Types of indicators:** Quantifiable (CU), Qualifiable (CA)				
Parameter(s) to be monitored	Runoff rate CN in tailing solution, CN in tailings, pH in solution and in tailings, % Tailing humidity, ΔpH, STARDs, ΔTemperature (°C), Δ Electric conductivity(µS/cm), Δ Total acidity (mg $CaCO_3$/L), Δ Total alkalinity (mg $CaCO_3$/L), Δ Calcium hardness (mg $CaCO_3$/L), Δ Total hardness (mg $CaCO_3$/L), % Flotsam removal (mg/L), Δ True color (m-1), % Removal E. Coli, % Removal of biochemical oxygen demand (mgO_2/L), % Removal of Total suspended solids(mg/L), % Removal of settleable solid (mL/L), % Removal of chemical demand, of Oxygen (mgO2/L), % Removal of fats and oils (mg/L), % Aluminum (mg/L), % Arsenic (mg/L), % Cadmium (mg/L), % Barium (mg/L), % Zinc (mg/L), % Cooper (mg/L), % Chromium (mg/L), % Tin (mg/L), % Iron (mg/L), % Manganese (mg/L), % Mercury (mg/L), % Molybdenum (mg/L), % Nickel (mg/L), % Silver (mg/L), % Lead (mg/L), % Sulphates (mg/L), %Sulphides (mg/L), %Chlorides (mg/L), % Phenols (mg/L), % Cyanide (mg/L), % HTP (mg/L), % Removal of Methylene Blue Active Substances (mg/L).			

Sampling and analysis methodology	Manual of water sampling, taken from Standard Methods for the examination of water and wastewater (21st Edition).
Measuring sites	Runoff drainage
Follow-up Indicators	Appropriate channels
Frequency of measurement	Annually
Responsible for implementation	Environmental technician
Observations	
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.1.6 Monitoring Program, Management of crossing of water bodies

Name of Monitoring Program	Monitoring program, Management of crossing of water bodies							
Environment	Abiotic							
Phase(s) of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	X
Management Program to be monitored	Management program of runoff waters							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*		*Compensation*	
Objectives of monitoring	To prevent and reduce the pollution of the streams surrounding the project by industrial waste discharge To preserve the quality surrounding the project							
Impact(s) to be monitored	Change of physicochemical and microbiological properties of water Sedimentation in water bodies Change in the available resource flow (water supply).							

Follow-up and Monitoring Indicator(s)	**Indicator***	**Type***	**Description of indicator**	**Formulas/Expression**
	Follow-up	CU	Directed drainage flow at the head of gullies surrounding the project	L /s
	Follow-up	CU	Conducted Flow corresponding to torrential waters.	L /s
	Follow-up	CU	Conducted Flow in subdrainage of tailings deposit	L /s
	Follow-up	CU	Conducted Flow in pits	L /s
	Follow-up	CU	Effective workday completed during the month	%
	Follow-up	CU	Effective inspection days in the period	%

Indicator: Set whether the indicator is Follow-up or Monitoring **Types of indicators:** Quantifiable (CU), Qualifiable (CA)	
Parameter(s) to be monitored	Runoff rate

Sampling and analysis methodology	Manual of water sampling, taken from Standard Methods for the examination of water and wastewater (21st Edition).
Measuring sites	Tailings prior to deposit. Runoff channels
Follow-up Indicators	Directed drainage flow at the head of the streams surrounding the project. Directed flow for torrential waters. Flow conducted in tailings deposit sub-drainage. Flow rate conducted in wells or settler % Effective workdays monthly % Effective inspection days in the period % Effective built works
Frequency of measurement	Daily and monthly
Responsible for implementation	Environmental technician
Observations	
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.1.7 Monitoring Program of training

Name of Monitoring Program	Monitoring Program of training Management							
Environment	Abiotic							
Phase(s) of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	X
Management Program to be monitored	Program of training Management							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*	*X*	*Compensation*	
Objectives of monitoring	To carry out the collection of water resource under 100% management measures proposed compliance, with minimal degradation on the environment.							
Impact(s) to be monitored	Alteration of physicochemical and microbiological properties of water Sedimentation in water bodies Change in the available resource flow (water supply).							

	Indicator*	**Type***	**Description of indicator**	**Formulas/Expression**
Follow-up and Monitoring Indicator(s)	Follow-up	CU	%Flow captured effectively	L /s
	CU	CU	Volume of water per unit of time from the mine	$Caudal\left[\frac{L}{s}\right] = \frac{Volumen_{Efluente\ mina}}{tiempo}$
	Monitoring	CU	Temperature (°C)	°C
	Monitoring	CU	Electric conductivity(µS/cm)	µS/cm
	Monitoring	CU	Total acidity (mg $CaCO_3$/L)	mg $CaCO_3$/L
	Monitoring	CU	Total alkalinity (mg $CaCO_3$/L)	mg $CaCO_3$/L
	Monitoring	CU	Calcium hardness (mg $CaCO_3$/L)	mg $CaCO_3$/L
	Monitoring	CU	Total hardness (mg $CaCO_3$/L)	mg $CaCO_3$/L

	Monitoring	CU	Removal of chemical oxygen demand (mgO_2/L)	mgO_2/L
	Monitoring	CU	Removal of biochemical oxygen demand (mgO_2/L)	mgO_2/L
	Monitoring	CU	Total suspended solids(mg/L)	mgSST/L
	Monitoring	CU	Settleable solid (mL/L)	mLSSed/L
	Monitoring	CU	Fats and oils (mg/L)	mgGyA/L
Indicator: Set whether the indicator is Follow-up or Monitoring **Types of indicators:** Quantifiable (CU), Qualifiable (CA)				
Parameter(s) to be monitored	% Flow captured effectively, Temperature (°C), Electric conductivity(µS/cm), Total acidity (mg CaCO3/L), Total alkalinity (mg $CaCO_3/L$), Calcium hardness (mg $CaCO_3/L$), Removal of chemical oxygen demand (mgO_2/L), Removal of biochemical oxygen demand (mgO_2/L), Total suspended solids(mg/L), Settleable solid (mL/L), Fats and oils.			
Sampling and analysis methodology	Manual of water sampling, taken from Standard Methods for the examination of water and wastewater (21st Edition).			
Measuring sites	Collection			
Frequency of measurement	Annually			
Responsible for implementation	Environmental technician			
Observations				
Timeline	See Appendix 9-1			
Budget	See Appendix 9-2			

9.1.8 Program of gases and particles

Name of Monitoring Program	Monitoring program of gases and particles							
Environment	Abiotic							
Phase(s) of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	X
Management Program to be monitored	Monitoring program of gases and particles							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*		*Compensation*	
Objectives of monitoring	To prevent contamination of gases and particulate material in the atmosphere.							
Impact(s) to be monitored	Change in the concentration of particulate material, gases and vapors in the air							
Parameter(s) to be monitored	Dump trucks covered per month, Works fenced with shade net, Wetting completed, Vehicles with Car Inspection, Preventive and Corrective Maintenance completed, Efficiency of bag filters and other treatment devices							
Sampling and analysis methodology	Air Quality Monitoring Protocol							
Measuring sites	Mobile sources Roads Works or constructions Refinery furnace Drying bed Mine outflow							

	Indicator*	**Type***	**Description of indicator**	**Formulas/Expression**
Follow-up Indicators	Monitoring	CU	% Dump trucks covered	Dump trucks covered / Total trucks
	Follow-up	CU	%Works fenced with shade net	Works fenced with shade net / Total Works
	Follow-up	CU	% Wetting completed	Wetting completed / Scheduled wetting

	Follow-up	CU	% Vehicles with car Inspection in force.	Vehicles with car Inspection in force / Total transports
	Follow-up	CU	% Preventive and corrective maintenance completed.	Preventive and corrective maintenance completed / Total scheduled maintenance
	Monitoring	CU	% Efficiency of bag filters and other treatment devices	$\%Rem_{PST} = \frac{mp_{Efluente}}{mp_{Afluente}} x100$
	Follow-up	CU	Air Quality Monitoring	
Indicator: Set whether the indicator is Follow-up or Monitoring **Types of indicators:** Quantifiable (CU), Qualifiable (CA)				
Frequency of measurement	% Dump trucks covered: Monthly %Works fenced with shade net: Daily %Wetting completed: Daily % Vehicles with Car Inspection: Annually % Preventive and corrective maintenance completed: Quarterly % Efficiency of bag filters and other treatment devices: Quarterly.			
Responsible for implementation	Environmental technician			
Observations				
Timeline	See Appendix 9-1			
Budget	See Appendix 9-2			

9.1.9 Monitoring program of sound pressure levels

Name of Monitoring Program	Monitoring program of sound pressure levels							
Environment	Abiotic							
Phase(s) of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	X
Management Program to be monitored	Noise Management and Control Managing vibrations and noise from explosives used in mining production process Alarm and Prevention System from explosives used in exploitation Preventing blasting accidents inside the mine and providing the right information to communities for peace of mind.							
Type of measurement to be monitored (PMA)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*		*Compensation*	
Objectives of monitoring	To monitor sound pressure levels in the environment regularly. To prevent the effects of vibrations on infrastructure by using explosives. To comply with permissible limits for environmental noise in the area directly affected by the project.							
Impact(s) to be monitored	Changes in the sound pressure levels Change in accident rate							
Parameter(s) to be monitored	Environmental noise emission							
Sampling and analysis methodology	As determined by resolution approving the Environmental License							
Measuring sites	Mobile sources Roads Benefit areas Mining area Inside the mine Area directly affected by the project							

	Indicator*	**Type***	**Description of indicator**	**Formulas/Expression**
Follow-up Indicators	Monitoring	CU	Sound pressure level of environmental noise and sound emission	$Leq_{Emisión} = 10\log(10^{\frac{LRAeq,T}{10}} - 10^{\frac{LRAeq,T,residual}{10}})$ Where: $Leq_{Emisión}$: Emission Sound Pressure Level, or contribution to sound source (s), A-weighted,

				$LRAeq, TLRAeq, T$: A-weighted continuous sound pressure level corrected, measured within one hour. $LRAeq, T, ResidualLRAeq, T, Residual$. Residual-weighted equivalent continuous sound pressure level corrected, measured within one hour. $Leq_{Ambiental} = 10 \log 10^{(LRAeq,T)/10}$ Where: $Leq_{Ambiental}Leq_{Ambiental}$: Environmental noise $LRA_{eq,T}$:$LRA_{eq,T}$: Weighted equivalent continuous sound pressure Level
	Monitoring	CU	Regular increase in Sound pressure level of environmental noise and sound emission	ΔdB (A)
	Monitoring	CU	Sound level per day	
	Monitoring	CU	Evidence damage caused by vibrations	
	Monitoring	CU	100% Accelerators working	
	Follow-up	CU	Number of accidents caused by blasting= 0	
	Follow-up	CU	% census and informed population from AID	Number of census and informed population from AID / Total population
Indicator: Set whether the indicator is Follow-up or Monitoring **Types of indicators:** Quantifiable (CU), Qualifiable (CA)				
Frequency of measurement	Sound pressure level of environmental noise and sound emission: Annually			
Responsible for implementation	Environmental technician			
Observations				
Timeline	See Appendix 9-1			
Budget	See Appendix 9-2			

9.1.10 Monitoring program of domestic solid and industrial waste monitoring

Name of Monitoring Program	Monitoring program of domestic solid and industrial waste monitoring							
Environment	Abiotic							
Phase(s) of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	X
Management Program to be monitored	Domestic and industrial solid waste management Chemical substances and fuels management Handling of explosives and blasting							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*		*Compensation*	
Objectives of monitoring	To quantify the efficiency of management program							
Impact(s) to be monitored	Domestic solid and industrial waste Production							
Parameter(s) to be monitored	Kilograms biodegradable waste collected. Kilograms recyclable waste collected. Kilograms RESPEL delivered for disposal. %Empty Cyanide packages delivered to supplier. Kilograms of waste oils delivered.							
Sampling and analysis methodology	Classification of containers Cyanide and RESPEL storage area							
Measuring sites	Classification of containers Cyanide and RESPEL storage area							

	Indicator*	**Type***	**Description of indicator**	**Formulas/Expression**
Follow-up Indicators	Follow-up	CU	Kilograms biodegradable waste collected.	
	Follow-up	CU	Kilograms recyclable waste collected.	
	Follow-up	CU	Kilograms RESPEL delivered for disposal.	

	Follow-up	CU	%Empty Cyanide packages delivered to supplier.	
	Follow-up	CU	Kilograms of waste oils delivered.	
Indicator: Set whether the indicator is Follow-up or Monitoring **Types of indicators:** Quantifiable (CU), Qualifiable (CA)				
Frequency of measurement	The weight or percentages of the waste will be determined once it is delivered to disposal suppliers. (waste disposal provider)			
Responsible for implementation	Environmental technician			
Observations				
Timeline	See Appendix 9-1			
Budget	See Appendix 9-2			

9.2 BIOTIC ENVIRONMENT

9.2.1 Follow-up and monitoring of forest utilization

Name of Monitoring Program	**Follow-up and monitoring of forest utilization and monitoring revegetation and/or reforestation programs**							
Environment	**Biotic**							
Phase(s) of the project	**Exploration**		**Construction and Assembly**	**X**	**Exploitation**	**X**	**Final closure and Post Closure**	**X**
Management Program to be monitored	✓ Flora management, forest utilization and revegetation of areas affected. ✓ Education program and training program for project personnel with emphasis on ecosystems and flora and fauna of special interest.							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	**Prevention**	**X**	**Mitigation**	**X**	**Correction**	**X**	**Compensation**	
Objectives of monitoring	✓ To establish necessary environmental measures needed to follow-up and monitor forest utilization activities for the construction of El Pescado Project							
Impact(s) to be monitored	✓ Loss of vegetation cover ✓ Loss of biodiversity ✓ Change in structure and flora composition							

Follow-up and Monitoring Indicator(s)	**Indicator***	**Type***	**Description of indicator**	**Formulas/Expression**
	Monitoring	**CU**	Awareness-raising Workshops: Training Workshops completed/ Scheduled Workshops) *100	
	Monitoring	**CU**	(Trained Personnel/ Project Personnel) *100	
	Monitoring	**CU**	(Trained Personnel in Fauna and Flora Protection / Total Number of workers) *100	
	Monitoring	**CU**	Delimitation of intervention areas / Number of approved areas for the forest utilization * 100	
	Monitoring	**CU**	Number of critically endangered, preserve, unregistered or unidentified plant species located or	

			marked / Number of critically endangered, preserve, unregistered or unidentified plant species present in the intervention areas of the project*100	
	Monitoring	**CU**	Number of critically endangered, preserve, unregistered or unidentified plant species harvested/ Number of critically endangered, preserve, unregistered or unidentified plant species present in the intervention areas of the project *100	
	Monitoring	**CU**	Number of critically endangered, preserve, unregistered or unidentified plant species relocated/ Number of critically endangered, preserve, unregistered or unidentified plant species present in the intervention areas of the project *100	
	Monitoring	**CU**	Number of cut trees properly / Number of cut trees * 100.	
	Monitoring	**CU**	Number of logs swan properly / Number of logs swan *100.	
	Monitoring	**CU**	Quantity (m^3) of wood used properly / Quantity (m^3) of wood harvested in the project + 100.	
	Monitoring	**CU**	area (m^2) used / area (m^2) approved to use *100.	
Indicator: Set whether the indicator **is Follow-up or Monitoring** **Types of indicators: Quantifiable (CU), Qualifiable (CA)**				
Parameter(s) to be monitored	✓ Location and signaling, before the beginning of activities, of critically endangered species, preserve, unregistered or unidentified plant species in the intervention area. ✓ Classification of critically endangered species, preserve, unregistered or unidentified plant species in the intervention area.			

	✓ Recording number and volumes of critically endangered species, preserve, unregistered or unidentified plant species relocated and epiphyte.
Sampling and analysis methodology	Follow-up and monitoring of all activities related to the forest utilization will done. In any case, the main purpose is to minimize impacts on flora resources, avoid losses or unnecessary interventions that affect any element of the environment. **1) Follow-up and monitoring of the felling of trees** A visual observation will verify the felling of trees as specified in the ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH) Forest Utilization Program of this study. It shall be verified that the trees have been manually cleaned in the contour of the tree before trimming to free them from stubble, vines or other elements that make worker's task difficult; Also, it shall be verified that trimming will be carried out with power chainsaws and sword size according to the trunk size; It shall be verified that escape zones are free of any obstructing element and that the direction of fall of the tree is the most appropriate, so that it does not damage the surrounding vegetation. In addition, it shall be verified that cutting is made properly. **2) Follow-up and monitoring of the cutting of logs** It shall be verified visually that the cutting is carried out in commercial length of 3,4,5 & 6 meters or in its multiples, as specified in Forest Utilization Program. **3) Follow-up and monitoring of logs transportation task** When there is a significant volume of logs and sticks, it shall be loaded onto trucks or other means of transport and shall be taken to temporary disposal site, as specified in Forest Utilization Program. Keeping records of loaded trucks and photographic records. **4) Follow-up and monitoring of the sawmill operation of large logs** The large logs sawmill shall be followed-up by a direct inspection shall verify that the bark is removed from the logs and that trunks required as construction elements for the project are divided. The procedure should be carried out as specified in Forest Utilization Program. Keeping records of loaded trucks and by photographic records. **5) Follow-up and monitoring in the arrangement of wood** It shall verify that logs, sticks and trunks are arranged in piles and shall verify the use of material; such material could be used in construction and revegetation works of the project or could be donated to the community, as specified in the Forest Utilization Program. It shall verify by visits to the area and records shall be kept on forms as well as photographic records. **6) Follow-up of areas non-intervention required** It is also a task of Environmental Audit to verify that no wild flora species are removed from the Direct Influence Area of the project by contractors or sub-contractors. If any of the project member is found carrying out this activity, appropriate measures shall be taken.

	Forest Utilization should be constantly monitored to prevent unnecessary tree felling for the construction of the project and therefore unnecessary damage to the habitat of species. It shall verify that Forest Utilization is carried out strictly in the areas defined for the project intervention, this shall be verified through the construction plans. There shall be a photographic record (before and after) of the work. Reports on forest utilization activities shall be submitted to the Environmental Audit of the project, specifying the number of logged trees and their volume, how to carry out the logging and sawmilling process for tree species and the material from utilization. The report shall also report on the harvesting of species that have not been included in the inventory (if required).
Measuring sites	The monitoring and follow-up must be carried out on all intervention areas of the project, among which are: -Camps, laboratories, offices. -Construction and improvement of roads - Adaptation of processing plant - Areas where surface mining will be stablished. -Dumps. -Tailings arrangement and storage.
Frequency of measurement	Weekly, during the development of revegetation and/or reforestation activities, and in a punctual form for training and education activities in each day that is carried out.
Responsible for implementation	TOUCHSTONE. Environmental auditors (2). Environmental Authority (CORANTIOQUIA).
Observations	Because most of the areas to be involved are currently covered by discontinuous urban area and clean pastures, the follow-up and monitoring program for revegetation and/or reforestation activity should focus on a careful identification of areas where it is necessary to revegetate with tree or shrub species, rather than only herbaceous; in the same way, the successful adaptation and capture of vegetation. This view to ensuring the return of these areas to the processes of succession of vegetation that were identified, and to avoid the genesis of erosion processes due to the high slopes that present the intervention areas.
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.2.2 Follow-up and monitoring for compensation and sensitive areas program

Name of Monitoring Program	**Follow-up and monitoring for compensation and sensitive areas program**							
Environment	**Biotic**							
Phase(s) of the project	**Exploration**		**Construction and Assembly**	**X**	**Exploitation**	**X**	**Final closure and Post Closure**	**X**
Management Program to be monitored	Program for the conservation of plant and fauna species with some threat level, endemic or preserve or unregistered or unidentified. Compensation Program							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	**Prevention**	**X**	**Mitigation**	**X**	**Correction**	**X**	**Compensation**	
Objectives of monitoring	✓ To maintain a continuous follow-up of revegetation processes and reforestation implemented in the areas to be compensated for the construction of El Pescado Project. ✓ To implement follow-up and monitoring of the intervened areas. ✓ To carry out follow-up and monitoring of the sensitive areas.							
Impact(s) to be monitored	✓ Loss of vegetation cover. ✓ Loss of biodiversity. ✓ Change in the structure and flora composition							

Follow-up and Monitoring Indicator(s)	**Indicator***	**Type***	**Description of indicator**	**Formulas/Expression**
	Monitoring	**CU**	Revegetated area (m2) / Required area of vegetation (m2) *100	
	Monitoring	**CU**	Total ha reforested / Total ha Intervened by the project * 100.	
	Monitoring	**CU**	Number of trees growing / Number of planted trees * 100.	
	Monitoring	**CU**	Number of talks about environment / Number of talks proposed about environment.	
	Monitoring	**CU**	Number of forest rangers training workshops completed / Number of workshops proposed for forest rangers training * 100.	

	Monitoring	**CU**	Number of activities proposed in the compensation program / Number of activities proposed in the compensation program * 100.	
Indicator: Set whether the indicator **is Follow-up or Monitoring** **Types of indicators: Quantifiable (CU), Qualifiable (CA)**				
Parameter(s) to be monitored	✓ Use of critically endangered species, preserve, unregistered or unidentified plant species in programs of ecological restoration. ✓ Identification and quantification of intervened areas to revegetate and/or reforest ✓ Revegetated and/or intervened area as compensation for the utilization made of the woody and non-woody vegetation cover. ✓ Adaptation and capture of revegetation and / or reforestation ✓ Education and training for the project personnel with emphasis on revegetation and / or reforestation management, both to the community and to the staff.			
Sampling and analysis methodology	**1. Follow-up and monitoring for Compensation program** The Environmental Audit shall inspect the activities to verify compliance with the measures stipulated in the "Compensation Program for the Biotic Environment" of the ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH) of this study and will make a photographic and/or filmic record of the reforestation and ecological restoration activities, established in such file card. Once the construction activities have been completed, it shall be verified visually that the areas affected are properly restored, mainly in the camps, temporary roads, work platforms and those that have been required to carry out the project. In addition, open spaces for access or industrial roads. Follow-up and monitoring of ecological restoration and revegetation activities will also be carried out on slopes and embankment areas, as well as on all the different exposed surfaces that require this activity and, on the areas, to be compensated for forest utilization. The activities that will be monitored are the following: - Direct planting of grasses by the seed system. - Direct planting of grasses by the stolon system. - meadow sowing of exposed soils. - Repopulation of degraded areas and that are part of ecological restoration. - Reforestation in the exploited areas, which must be established as compensation for the construction of the mine. This reforestation will be carried out in the basins to intervene in highly degraded areas with low tree density, especially on the streams to recover its buffer-strip and in those basins that supply municipal aqueducts and / or that are of great importance to the community, these areas will be established with the community, CORANTIOQUIA, MADS and TOUCHSTONE. Revegetation activities will be immediately developed after the slopes are completed. For this purpose, stripping material will be used, protecting the slopes are being built, avoiding their exposure to erosion factor.			

	For the monitoring and control of revegetation and compensation processes, the following actions are considered: - After reforestation with native species, phytosanitary control will be maintained to prevent pests and/or diseases. Also, in reforestation there will be a control of invasive species (ill weeds) to avoid competition with trees, until they are self-sufficient. This could be done with a hoe, machete or scythe without harming the individual. Plantation maintenance should include necessary replanting. - It is also necessary to monitor the growth success of each native species, measuring some variables such as: mortality. Those species that do not survive should be replanted. - Identify new species to be established in the reclaimed area. In case of trouble, define the corrective or preventative actions to follow them up. Actions will be subject to monitoring and will determine implementation of program are as follows: - Compliance with requirements to define the areas to be reforested, compensation rates, environmental conditions that ensure the establishment of reforestation (not affected by burning, proximity to water bodies, intensity of solar radiation according to the species to be planted), land, georeferencing and demarcation of the area, etc., attaching photographic records. - Species and source of material. Species, number of seedlings, source of seeds and phytosanitary control. - Density and sowing system. Considerations for distribution of seedlings (outdistance sowing), sowing procedures (adaption of planting side, use of fertilizers and soil dressing, climatic zone, etc.) - Compensated areas are marked with stakes or tapes, and a number to identify them. - Seedlings rescued from the areas under intervention and growing. Monitoring of reforestation aims to collect information to assess the success of the program by capturing seedlings, as well: -A first evaluation of the seedlings will be made one month before the transplant. They will then be evaluated every six months for three years thereafter. The assessment and the maintenance of reforestation will be carried out simultaneously. - The records to be entered in the corresponding monitoring form are: date, number of seedlings, capturing (living or dead), general condition (good, regular or bad), phytosanitary status (fungi, insects, mechanical damage, etc.) and observations. These last ones shall include recommendations to ensure the best development of material, tutors, fertilization, irrigation, etc.) -The Follow-up and monitoring of the Compensation program will be visually done. Each site will be checked for sowing of meadow, reforestation and ecological restoration, ensuring the implementation of the "Compensation Program for Biotic Environment". This activity will be carried out by 3 forestry engineers, one on each working face or section. A photographic and/or filmic (before and after) record of the activities must be made. **2. Follow-up and monitoring of sensitive areas** A follow-up will be carried out on awareness-raising talks about environment to the staff to verify that it includes disclosure of actions aimed at the conservation and protection of sensitive areas

	present in the area, especially the existing forest reserves (Magdalena Reserve). Furthermore, there will be follow-up on the training workshops for forest rangers, proposed in the ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH) of this study. It shall be verified that the prohibition of logging of trees for commercial purposes or for consumption by workers is complied with, and that the information about species with some threat level is provided; it should also emphasize the importance of not hunting wildlife, and how this activity affects flora of the region. Verification of compliance with the ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH) requirements of this study will be carried out by a visual inspection. The monitoring and verification of these activities shall be done by attending awareness- raising training workshops for forest rangers and directly observing different activities. Reports of activities conducted during the ism, awareness-raising workshops and forest ranger training workshops, will be submitted to Environmental Audit of the project.
Measuring sites	The monitoring and follow-up must be carried out on all intervention areas of the project, among which are: -Camps, laboratories, offices. -Construction and improvement of roads - Adaptation of processing plant - Areas where surface mining will be stablished. -Dumps. -Tailings arrangement and storage.
Frequency of measurement	Weekly, during the development of revegetation and/or reforestation activities, and in a punctual form for training and education activities in each day that is carried out.
Responsible for implementation	TOUCHSTONE. Environmental auditor (2). Environmental authority (CORANTIOQUIA).
Observations	Because most of the areas to be involved are currently covered by discontinuous urban area and clean pastures, the follow-up and monitoring program for revegetation and/or reforestation activity should focus on a careful identification of areas where is necessary to revegetate with tree or shrub species, rather than only herbaceous; in the same way, the successful adaptation and capture of vegetation. This with a view to ensuring the return of these areas to the processes of succession of vegetation that were identified, and to avoid the genesis of erosion processes due to the high slopes that present the intervention areas.
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.2.3 Follow-up and monitoring for management of vegetal coverage removal and stripping program

Name of Monitoring Program	**Follow-up and monitoring for management of vegetal coverage removal and stripping program**							
Environment	**Biotic**							
Phase(s) of the project	**Exploration**		**Construction and Assembly**	**X**	**Exploitation**	**X**	**Final closure and Post Closure**	**X**
Management Program to be monitored	✓ Flora management, forest utilization and revegetation of areas intervened							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	**Prevention**	**X**	**Mitigation**	**X**	**Correction**	**X**	**Compensation**	
Objectives of monitoring	✓ To verify the implementation of all measures of environmental management related to activities involving the intervention of biotic environment. In this case, removal of vegetation cover and stripping and to ensure the most appropriate direct disposal. ✓ To ensure removal of spontaneous and anthropic "vegetation cover" in the areas to be intervened for the construction of the Project.							
Impact(s) to be monitored	✓ Loss of vegetation cover. ✓ Loss of biodiversity. ✓ Change in the structure and flora composition.							
Follow-up and Monitoring Indicator(s)	**Indicator***		**Type***		**Description of indicator**		**Formulas/Expression**	
	Follow-up		**CA**		Records by Environmental Audit of the stripping and its disposal and storage.			
	Follow-up		**CA**		Record template for material volumes (removal, reuse, disposal in storage area.			
	Follow-up		**CA**		Photographic recording			
	Monitoring		**CU**		Stripped area (m^2) / Area required to be stripped (m^2) * 100.			
	Monitoring		**CU**		Number of measures taken / Number of measures proposed * 100.			
Indicator: Set whether the indicator **is Follow-up or Monitoring** **Types of indicators: Quantifiable (CU), Qualifiable (CA)**								
Parameter(s) to be monitored								

	✓ Location and signaling before the utilization of the woody and non-woody vegetation cover, and beginning activities proposed. ✓ Intervened and/or exploited area for both woody and non-woody vegetation cover ✓ Keeping a full record of Forest Utilization activities and removal of vegetation cover with emphasis on the parameters previously described for monitoring and follow-up.
Sampling and analysis methodology	Verification of the "stripping" without mixing vegetal cover of the soil, mixing or contaminating with sterile material coming from the other "soil" profiles that is adapted to the intervention passage. According to the total volume that is generated and as mentioned in the corresponding file card of Environmental Management, it is stored, protected and reused at the necessary times and places. It shall be verified that during the "clearing" and removal of vegetation cover and other coverings as well as individuals of bushy size found in the area subject to intervention, are carried out by applying all environmental measures to mitigate its effect and exercise the cuts and other activities in the most appropriate environmental way and developing all silvicultural practices indicated in the ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH). The isolation of the working face shall be verified, and all work shall be carried out under the guidance of a forester, using adequate tools, all ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH) and mechanisms required by the gang. It shall be verified that all surplus and non-reusable materials are disposed of in accordance with their nature by the contractor, contracted for the collection of solid waste.
Measuring sites	Verifications mentioned above shall be applied daily and along the intervention corridor of the Project, during stripping activities, clearing and removal of vegetation cover.
Frequency of measurement	Weekly, during the development of the utilization of the woody and non-woody vegetation cover utilization of revegetation and/or reforestation activities and in a punctual form for training and education activities in each day that is carried out.
Responsible for implementation	TOUCHSTONE. Environmental auditor (2). Environmental Authority(CORANTIOQUIA).
Observations	
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.2.4 Follow-up and monitoring for sowing of meadow and Prevention damage to tree species

Name of Monitoring Program	**Follow-up and monitoring for sowing of meadow and Prevention damage to tree species**							
Environment	**Biotic**							
Phase(s) of the project	**Exploration**		**Construction and Assembly**	**X**	**Exploitation**	**X**	**Final closure and Post Closure**	**X**
Management Program to be monitored	✓ Flora management, forest utilization and revegetation of areas intervened. ✓ Program for the conservation of plant and fauna species with some threat level, endemic or preserve or unregistered or unidentified.							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	**Prevention**	**X**	**Mitigation**	**X**	**Correction**	**X**	**Compensation**	
Objectives of monitoring	✓ To carry out follow-up and monitoring of sowing of meadow activities, and preventive measures of tree species with some threat level, endemic, preserve or unregistered or unidentified, found in the influence area of the construction processes and operative.							
Impact(s) to be monitored	✓ Loss of vegetation cover. ✓ Loss of biodiversity. ✓ Change in the structure and flora composition.							
Follow-up and Monitoring Indicator(s)	**Indicator***	**Type***	**Description of indicator**	**Formulas/Expression**				
	Monitoring	**CU**	Areas turned into meadow in good condition and adapted/Total area converted into meadow * 100.					
	Monitoring	**CU**	Area converted into meadow/Total area to be converted into meadow defined in landscape design * 100.					
	Monitoring	**CU**	Number of protected trees/ Total number of trees of permanence, blocked and transfer * 100.					
Indicator: Set whether the indicator **is Follow-up or Monitoring** **Types of indicators: Quantifiable (CU), Qualifiable (CA)**								
Parameter(s) to be monitored	✓ Location and signaling before the utilization of the woody and non-woody vegetation cover, and the beginning of activities proposed.							

	✓ Intervened and/or exploited area for both woody and non-woody vegetation cover ✓ Keeping a full record of Forest Utilization activities and removal of vegetation cover with emphasis on the parameters previously described for monitoring and follow-up.
Sampling and analysis methodology	The contractor shall conduct a weekly inspection of the insulation provided to each of the protection areas to keep them in good condition. During this inspection, it shall also verify that the trees have not been treated differently from the treatment stipulated in the forest inventory update. The contractor shall perform the inspection of the areas converted into meadow, the stability of the grasses on the slopes and the compliance with the management plan measures in all discovered areas requiring treatment. The contractor shall keep a regular record of activities of the programs for sowing of meadow and preventing damage to tree species. Follow-up and monitoring of sowing of meadow and preventing damage to tree species will be carried out for the construction and maintenance phases.
Measuring sites	These measures shall be implemented in areas defined for sowing of meadow and in areas where vegetation isolations are being carried out for their protection.
Frequency of measurement	This monitoring shall be carried out on a weekly to ensure protection of tree species that will not be affected and the adaptation of grasses in treated soils.
Responsible for implementation	TOUCHSTONE. Environmental auditor (2). Environmental Authority(CORANTIOQUIA).
Observations	
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.2.5 Follow-up and monitoring program of run over, management and preservation of fauna

Name of Monitoring Program	**Follow-up and monitoring program of run over, rescue, preservation and relocation of wild fauna**							
Environment	Biotic							
Phase(s) of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	
Management Program to be monitored	**Program of run over, rescue, preservation and relocation of wild fauna**							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*		*Compensation*	
Objectives of monitoring	✓ Assess the effectiveness of the run over, rescue and relocation program for wildlife ✓ Assess fauna population living in the compensation zones							
Impact(s) to be monitored	✓ Run over fauna ✓ Fauna displacement. ✓ Manipulation of wild fauna. ✓ Alteration of behavioral parameters							
Follow-up and Monitoring Indicator(s)	MONITORING ✓ Individuals marked captured/ Individuals captured *100							
Parameter(s) to be monitored	✓ Fauna present in the relocation areas							
Sampling and analysis methodology	**Relocated and resident fauna in the compensation area** As the rescued fauna will be marked with different techniques (see Management Plan, run over, rescue and relocation Program for wildlife fauna) the same methodologies proposed for baseline, should be implemented in order to standardize the methodologies and make comparisons over time and evaluate the permanence of the relocated species. This methodology is based on random day-night tours in all areas where terrestrial fauna was driven away and released, where it will try to locate animals and identify, if they are marked, also mist net will be us for the capture of birds to assess their health status of these individuals with ringing marks. For the specific case of small non-flying mammals, Sherman and Tomahawk type traps will be used in different places to capture them. Additionally, for this group, camera traps will be installed to monitor population of medium and large mammals. Also, there will be free search tours during the day and night to see the individuals.							

	For herpetofauna, free searches will be carried out both day and night in all available microhabitats. Based on the data collected, effectiveness of rescue activities should be evaluated.
Measuring sites	Relocation area and compensation
Frequency of measurement	During Project operation, with an initial duration of 30 day of sampling. Later 15-day field trips during rainy season and again at six months, 15 days in dry season.
Responsible for implementation	✓ Contractor and owner
Observations	
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.2.6 Fauna conservation program

Name of Monitoring Program	**Follow-up and monitoring program for conservation of for fauna species with some degree of threat, endemic or offset or unregistered or unidentified**								
Environment	Biotic								
Phase(s) of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	X	
Management Program to be monitored	**Program for the conservation of plant and fauna species with some threat level, endemic or preserve or unregistered or unidentified**								
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*		*Compensation*		
Objectives of monitoring	Follow-up on endemic and threatened species to detect changes in populations in order to understand their spatio-temporal dynamics and their causes.								
Impact(s) to be monitored	✓ Run over fauna ✓ Fauna displacement ✓ Manipulation of fauna ✓ Alteration in behavioral parameters ✓ Alterations in the habitat and microhabitat where fauna coexists								
Follow-up and Monitoring Indicator(s)	MONITORING Population parameters ✓ Abundance rate and relative density FOLLOW-UP ✓ Reports with all population information collected through monitoring								
Parameter(s) to be monitored	✓ Population and ecological issues of threatened fauna								
Sampling and analysis methodology	**BIRDS** **Sampling through visual and auditory encounters (REV)** The general monitoring of birds shall be carried out based on the project's baseline to standardize methodologies; Therefore, a visual and auditory identification in free and random tours, within the different AID plant coverages, where methodologies and interventions of the project have been made.								

Tours shall be made from 6:00 to 12:00 and from 14:00 to 18:00, this is the busiest time for birdlife. Once an individual is seen, its taxonomic determination will be made up to the species level, and if it is possible its photographic record will be kept.

Sample with mist net

To complement the list of birds registered from direct observation, mist net type AXT 12 will be used; that is, 12 meters long and 5 meters wide; with extended mesh from 30 to 36 mm, which shall be in strategic places and transects for the passage of birds during the sampling days.

MAMMALS

Sample of large and small mammals

As with the baseline of "El Pescado" project for sampling of this type of mammals, an average of 150 Sherman traps with sweet bait shall be used (peanut butter, oat flakes and essence of vanilla) in each sampling season (45 traps for each season), within the vegetation cover corresponding to low dense forest of the mainland (3.1.1.2.1). These traps shall be checked in morning hours and primed in the afternoon hours.

Sample of medium and large mammals

To follow-up and monitor these mammal species, records captured by trap cameras installed in the semipermanent sampling stations of the blue-billed curassow *Crax alberti* Fraser, 1852; methodology included in the blue-billed curassow conservation Action Plan. It should be noted that abundance and density data will not be used, only presence / absence data.

Sample of flying mammals

For sampling of this type of mammals, mist nets type AXT shall be used; that is, 12 meters long and 5 meters wide and 36 mm; these were in strategic sites for the passage of bats in places where direct and indirect intervention is made.

AMPHIBIANS

Population study

The proposal is to make field trips to find individuals or population of these species and making a detailed description about habitat and microhabitat where they are.

After identifying the places where they are, systematic sampling shall be conducted in rain and dry season, for 3 years approximately.

The methodology used shall be fixed line transect (100 m x 2 m) near water sources because the species in study prefer this type of habitat; searches shall be carried out both in the day and in the night and in each transect data will be taken as: Temperature, relative humidity, cloudiness, lunar phase. Every individual found will be registered meeting time, height and type of perch, distance to the water, activity, if there is presence of tadpoles, distance between individuals should be noted in the case of finding more than one individual in a single transect. Specimens will be collected to make diet analysis, take reproductive and morphometric data. Those that are not collected will be marked by using phalangeal cut and ventral color pattern (Donnelly et al.,

	1994, Bradfield., 2004) for the case of the D. truncates specie and the visible technique elastomer VIE implant or visible elastomer implants (Anholt et al., 1998).
Measuring sites	The study area must be destined for compensation, especially where population studies of endemics and threatened species were conducted.
Frequency of measurement	Al least 5 years of monitoring shall be done (during each year of monitoring, two 15-day field trips, during dry and rain season)
Responsible for implementation	✓ Contractor, owner.
Observations	✓ Dramatic changes in the population size of species. ✓ High mortality rates
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

- Conservation Program of the blue-billed curassow *Crax alberti* Fraser, 1852

Name of Monitoring Program	**Phase II-Program of conservation of emblematic species, flag and / or umbrella**							
Environment	Biotic							
Phase(s) of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	X
Management Program to be monitored	**Phase II-Program of conservation of emblematic species, flag and / or umbrella**							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*		*Compensation*	
Objectives of monitoring	To monitor populations of the Crax alberti Fraser species, 1852, to detect changes to understand their spatio-temporal dynamics and causes.							
Impact(s) to be monitored	✓ Run over fauna. ✓ Fauna displacement. ✓ Manipulation of fauna. ✓ Alteration in behavioral parameters of fauna							
Follow-up and Monitoring Indicator(s)	MONITORING Population parameters ✓ Presence/absence of the species							

	✓ Abundance rate and relative density FOLLOW-UP ✓ Seasonal and regular sampling
Parameter(s) to be monitored	✓ Population and ecological issues from population
Sampling and analysis methodology	The Follow-up and monitoring methodologies are specified in the Action Plan for Conservation of Blue-billed Curassow Crax Alberti, within the current ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH). These methodologies are particularly about marking, capture and recapture of individuals and the subsequent calculation of population size rate (Growth, decrease, abundance, density).
Measuring sites	The study area must be destined for compensation, where population studies of species concerned.
Frequency of measurement	Al least 10 years of monitoring shall be done (during each year of monitoring, 3 field trips shall be made from 15 to 20 days, during reproductive season, October-March)
Responsible for implementation	✓ Contractor, owner.
Observations	✓ Dramatic changes in the population size of species. ✓ High mortality rates

9.2.7 Education and training for project personnel program

Name of Monitoring Program	Follow-up and monitoring program of education and training for project personnel with emphasis on ecosystems and fauna of special interest							
Environment	Socio-economic							
Phase(s) of the project	*Exploration*	*x*	*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	X
Management Program to be monitored	Follow-up and monitoring program of education and training for project personnel with emphasis on ecosystems and fauna of special interest							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*		*Compensation*	
Objectives of monitoring	To assess the effectiveness of workshops and talks involved in the education and training program established in the environmental management plan (PMA by its initials in Spanish) for knowledge and conservation of fauna within ADI and All.							
Impact(s) to be monitored	✓ Run over fauna. ✓ Fauna displacement. ✓ Manipulation of fauna. ✓ Alteration in behavioral parameters of fauna							
Follow-up Indicators y MONITORING	MONITORING ✓ People trained on environmental education / Number of people of direct influence area *100 ✓ Number of copies of bibliographical material delivered to educational institutions in the area / Total number of educational institutions present in area of influence*100							
Parameter(s) to be monitored	✓ Training for project personnel and individuals on ecosystems protection ✓ Implementation of dynamic material for each workshop or talk, such as: videos, photos, cards, games, among others. ✓ Information talks and meetings with interest groups							

Sampling and analysis methodology	Census and fauna monitoring Quantitative sampling of the fauna richness and diversity within the AID and AII of the project. The sampling shall be conducted through active and passive search, using traps and specific methods for each group specially. This sampling shall focus on fauna that have suffered any type of negative anthropic pressure in the study area. Intervention ✓ Keeping a record of training and talks on environmental education to staff involved in the project, as well as number of attendees each day ✓ All these records must be kept in written signed attendance lists, etc., also a detailed photographic record showing initial state of the area, intervention process and actions development established until the end of each of the activities.
Measuring sites	✓ The study area must be destined for compensation. ✓ Monitoring and follow-up actions must be carried out in places where training, socialization and education session for the community and staff involved in the Project.
Frequency of measurement	✓ Weekly or during training or talks ✓ The censuses shall be made twice a year. The first one made in dry season and the second one in the rainy season. The results and advances shall be delivered once each field trip has been completed. ✓ Knowledge level and appropriation of Environmental Management Plan by social organization and communities.
Responsible for implementation	✓ Contractor, owner.
Observations	
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

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

Name of Monitoring Program	**FOLLOW-UP AND MONITORING FOR HABITAT CONSERVATION**							
Environment	Biotic							
Phase(s) of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	X
Management Program to be monitored	**Habitat conservation Program**							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*	*X*	*Compensation*	
Objectives of monitoring	✓ To follow-up on the implementation of management measures proposed for the development and promotion of ecosystems and species of fauna and flora affected by the project. ✓ To verify the effectiveness of the measures implemented, tending to the management of flora and fauna in intervened areas for the construction of El Pescado project. ✓ To monitor the implementation of management measures proposed for revegetation and reforestation for establishment of biological corridors							
Impact(s) to be monitored	✓ Fragmentation of ecosystems ✓ Impact on floristic composition. ✓ Alterations in the growth of floristic communities and phytosanitary degradation. ✓ Decrease in species richness. ✓ Impact on the dynamics of ecosystems. ✓ Removal or changes in the vegetation cover ✓ Changes in the characteristics of forest and alterations in the habitat and microhabitat where the fauna coexists ✓ Fauna displacement ✓ Run over fauna ✓ Alteration in the behavioral parameters of fauna ✓ Recovery of the dynamic biotic community							
Follow-up Indicators y MONITORING	MONITORING ✓ Number of plant species adapted with successful capture / Total number of species used in ecological restoration programs and biological corridors ✓ Number of flora and fauna species critically endangered, preserve, unregistered or unidentified moved used in the execution of biological corridors / Total number of species used in the implementation of biological corridors.							

	✓ Number of fauna species registered during monitoring / Number of fauna species registered before intervention of the project. ✓ Number of flora and fauna species critically endangered, preserve, unregistered or unidentified moved / Number of flora and fauna species critically endangered, preserve, unregistered or unidentified moved in areas of intervention of the project ✓ Number of awareness-raising workshops on environmental education / Number of workshops scheduled in area of influence of the project * 100 ✓ Number of copies of bibliographical material delivered to educational institutions in the area / Total number of educational institutions existing in influenced area
Parameter(s) to be monitored	✓ Identification and quantification of areas intervened to revegetate and reforest. ✓ Adaptation and capture of revegetation and reforestation. ✓ Revegetated area and/or intervened ✓ Use of endemic plant species critically endangered, preserve in ecological restoration programs and biological corridors. ✓ Training for project personnel and individuals on ecosystems protection
Sampling and analysis methodology	✓ Execution and compliance with measures established in the Environmental Management Plan, to prevent impact on sensitive ecosystem and areas of interest due to high diversity during the Project. ✓ Keeping a record of training and talks on environmental education to staff involved in the project, as well as number of attendees each day ✓ All these records must be kept in written signed attendance lists, etc., also a detailed photographic record showing initial state of the area, intervention process and actions development established until the end of each of the activities.
Measuring sites	✓ Direct and indirect influence area of the mining project.
Frequency of measurement	✓ Weekly or during training or talks ✓ The censuses shall be made twice a year. The first one made in dry season and the second one in the rainy season. The results and advances shall be delivered once each field trip has been completed.
Responsible for implementation	✓ Contractor, owner.
Observations	
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.2.9 Compensation Program

Name of Monitoring Program	**Follow-up and monitoring program for protection of fauna**							
Environment	Biotic							
Phase(s) of the project	*Exploration*		*Construction and Assembly*	*X*	*Exploitation*	*X*	*Final closure and Post Closure*	X
Management Program to be monitored	**Program for protection of fauna**							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	*X*	*Mitigation*	*X*	*Correction*	*X*	*Compensation*	
Objectives of monitoring	✓ To monitor the implementation of management measures proposed for prevention measures to minimize damaging and death risks wild fauna along the access roads to the project. ✓ To follow up on the execution of management measures proposed for the preventive signaling system in accordance with the regulations of the Ministry of Transport and communications regarding the eventual movement of wild animals in the project area.							
Impact(s) to be monitored	✓ Run over fauna ✓ Changes in the characteristics of forest and alterations in the habitat and microhabitat where the fauna coexists							
Follow-up and Monitoring Indicator(s)	FOLLOW-UP ✓ Monthly reports recording the fauna species hurt during the project activities, to evaluate the mortality rate. ✓ Auditing to monitor proper placement of signaling in the project's roads. ✓ Auditing to monitor the construction of structure for passing wild fauna in roads							
Parameter(s) to be monitored	✓ Number of signals installed / Number of signals scheduled. ✓ Number of structures suitable for passing wild fauna / number of structures for passing wild fauna							
Sampling and analysis methodology	**Road signs** The idea is to follow the methodology proposed in the Management Plan file card: Fauna species protection program, where the installation of vertical traffic signs is intended using the preventive signal Sp-49 Animals on the road, and the installation of signals vertical traffic on the maximum speed limit (SR-30). This with the purpose of keeping different drivers of vehicles traveling on the routes constantly informed, and they do not exceed the speed of 30 km / h. **Implementation of the passage for wild fauna** Compensation and Prevention measures will be implemented with methods that allow wildlife to move safely, reducing the risk of being hurt. ✓ **Tunnels:** Tunnels can be one of the best solutions to protect environments of high ecological value and avoid fragmentation, although construction costs are high, the advantages for environment can be very remarkable.							

	However, the importance of these advantages depends on the method used for the construction of tunnel, they allow to preserve the natural value of the environment intact and cause a minimum environmental impact. ✓ **Lower passages**: Lower passages of fauna include all kind of structures located below the platform through which traffic flows. They include from passages destined specifically to fauna to those projected with other functions such as drainage, passage of roads and cattle trails, etc., but with slight adaptations can also be widely used by animals. ✓ **Drains (box coulver) adapted for terrestrial animals:** Drains are structures designed for water flow and, sometimes, small permanent flow through them, requiring additional facilities to enable the passage of terrestrial animals. In other cases, however, water flow is temporal, and occurs only in rainy season, while kept dry. Land animals can use them without requiring many adaptations
Measuring sites	✓ Direct Influence area of the project.
Frequency of measurement	✓ To evaluate how many species of wild fauna are run over weekly. ✓ To check if fauna is using the passages. The first exit made in the dry season and the second in the rainy season twice a year. The results and advances will be delivered once each field trip has been made.
Responsible for implementation	✓ Contractor, owner.
Observations	
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.3 SOCIO-ECONOMIC ENVIRONMENT

9.3.1 Attention to requests, claims related to the participation and appropriate information of communities

Name of Monitoring Program	**Attention to requests, claims related to the participation and appropriate information of communities**							
Environment	Socio-economic							
Phase(s) of the project	*Exploration*	***X***	*Construction and Assembly*	***X***	*Exploitation*	***X***	*Final closure and Post Closure*	**X**
Management Program to be monitored	Information and community participation Program Management program to the pretensions and social compensation. Conflict of interest program for property acquisition and payment of easements							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	***X***	*Mitigation*	***X***	*Correction*	***X***	*Compensation*	
Objectives of monitoring	To establish an efficient process to recognize the forms of local participation regarding the sustainability of the project and the social responsibility of the Touchstone Colombia S.A.S. company							
	To provide efficient attention to requests, complaints, concerns from both the community and the local institutions.							
	To establish the appropriate follow-up of the requests, complaints, concerns and solutions determined by the Touchstone Colombia S.A.S. company.							
	Feedback to the communities of the area of direct and indirect influence the procedures for filing requests, complaints and claims stipulated by the Touchstone Colombia S.A.S							
Impact(s) to be monitored	✓ Increase in institutional and community relations. ✓ Increase in community integration, locally and regionally ✓ Alteration in sectoral participation ✓ Increase in the demand for relations with institutions, organizations and the community in general. ✓ Strengthening of organizations and associations. ✓ Modifications in the organizational structures of the region. ✓ Generation of expectations due to labor and commercial demand ✓ Alterations in the population dynamics							
Parameter(s) to be monitored	Average number of information meetings and participation established with the local authority, quarterly. Average number of information meetings and participation established with the AIDP community AIDL AII, quarterly. Rate of requests, complaints and claims received. Rate of requests, complaints and claims attended.							

<table>
<tr><td></td><td colspan="4">Conformity index of response to requests, complaints and claims.</td></tr>
<tr><td>Sampling and analysis methodology</td><td colspan="4">Guidelines, instruments and actions determined in the principles of social responsibility of the Touchstone Colombia S. A. S. company.</td></tr>
<tr><td>Measuring sites</td><td colspan="4">Jurisdictions limited to the Direct Influence Area (AIDP, AIDL AII), and local institutions</td></tr>
<tr><td rowspan="4">Follow-up Indicators</td><td>Indicator*</td><td>Type*</td><td>Description of indicator</td><td>Formulas/Expression</td></tr>
<tr><td>Follow-up</td><td>CU</td><td>Number of meetings completed*100/ Number of meetings scheduled per stage</td><td></td></tr>
<tr><td>Follow-up</td><td>CU</td><td>Number of requests, complaints and claims attended / Number of requests, complaints and claims attended received *100</td><td></td></tr>
<tr><td>Follow-up</td><td>CU</td><td>Number of requests, complaints and claims satisfactory attended / Number of requests, complaints and claims received *100</td><td></td></tr>
<tr><td colspan="5">Indicator: Set whether the indicator is Follow-up or Monitoring
Types of indicators: Quantifiable (CU), Qualifiable (CA)</td></tr>
<tr><td>Frequency of measurement</td><td colspan="4">Quarterly</td></tr>
<tr><td>Responsible for implementation</td><td colspan="4">Touchstone Colombia S.A.S. company responsible for Social and Environmental Audit</td></tr>
<tr><td>Observations</td><td colspan="4">The results of monitoring shall be kept in the ECR (Environmental Compliance Report), and shall be part of the social management report of the company Touchstone Colombia S. A. S.
Benchmarks for monitoring are proposed:
Las Pepas Sector: In this sector the camp is located and is the main place to support the operation of El Pescado project, Mining concession 5969. (AIDP)
Laureles Village: This point is proposed for being strategically located on the road that connects the areas of influence of the project, being the meeting point of the sidewalks and mandatory passage to the population. (AIDL)
Machuca: This point is located for part of the area of indirect influence and is taken as the nearest population center to the area where El Pescado project is located. (AII)
Urban area of Segovia: This point is proposed as the place where the closest institutional presence to El Pescado project is located.</td></tr>
<tr><td>Timeline</td><td colspan="4">See Appendix 9-1</td></tr>
<tr><td>Budget</td><td colspan="4">See Appendix 9-2</td></tr>
</table>

9.3.2 Effectiveness of social management plan

Name of Monitoring Program	**Effectiveness of social management plan**							
Environment	Socio-economic							
Phase(s) of the project	*Exploration*	***X***	*Construction and Assembly*	***X***	*Exploitation*	***X***	*Final closure and Post Closure*	**X**
Management Program to be monitored	Information and community participation Program Education and training program for project Program to support the capacity of institutional management and economic strengthening Employment program, recruitment of labor, goods, local products and services. Management program to the pretensions and social compensation. Training program, education and awareness-raising to the community surrounding the project Conflict of interest program for property acquisition and payment of easements							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	***X***	*Mitigation*	***X***	*Correction*	***X***	*Compensation*	**X**
Objectives of monitoring	To assess the effectiveness of each of social management programs established in this PSM. To comply with the social responsibility guidelines stipulated for the project. To strengthen the image of El Pescado project, Mining concession 5969, meeting commitments and requirements established in the entire relationship with the environment							
Impact(s) to be monitored	✓ Increase in institutional and community relations. ✓ Increase in community integration, locally and regionally ✓ Alteration in sectoral participation ✓ Increase in the demand for relations with institutions, organizations and the community in general. ✓ Strengthening of organizations and associations. ✓ Modifications in the organizational structures of the region. ✓ Generation of expectations due to labor and commercial demand ✓ Alterations in the population dynamics ✓ Modifications in landscape structures ✓ Economic strengthening ✓ High level of association and institutional and community management. ✓ Alteration of ecosystemic services ✓ Alteration of water quality ✓ Increase in the transmission of knowledge ✓ Change in vegetation cover ✓ Fragmentation of ecosystems ✓ Alteration of the drainage channel ✓ Increase in the per capita income of the owners of the easements ✓ Increase in economic facts with legal support and compliance guarantees							

Parameter(s) to be monitored	Average number of workshops completed on environmental regulation. Rate of pre-operational talks completed Average number of workshops completed on industrial safety and occupational health. Average number training workshops in the formulation of projects and entrepreneurship. Social projects designed and completed by the community. Voluntary social programs by Touchstone Colombia S.A.S. completed Index of personnel hired from the AIDP AIDL.			
Sampling and analysis methodology	Guidelines, instruments and actions determined in the principles of social responsibility of the Touchstone Colombia S. A. S. company. Review participatory mechanisms and strategies to identify and solve impacts, social conflicts, limited to the corresponding programs.			
Measuring sites	Jurisdictions limited to the Direct Influence Area (AID)			
Follow-up Indicators	**Indicator***	**Type***	**Description of indicator**	**Formulas/Expression**
	Follow-up	CU	Number of workshops on environmental issues to workers completed /Number of workshops on environmental issues to workers proposed*100%	
	Follow-up	CU	Number of workshops on environmental issues to the surrounding population completed / Number of workshops on environmental issues to the surrounding population proposed *100%	
	Follow-up	CU	Number of workshops on environmental regulation completed / Number of workshops on environmental regulation proposed*100%	
	Follow-up	CU	Number of pre-operation talks completed /Number of pre-operation talks proposed *100%	
	Follow-up	CU	Number of workshops on industrial safety completed /Number of workshops on industrial safety proposed *100%	
	Follow-up	CU	Number of social projects conducted by community / Total number of social projects designed *100%	
	Follow-up	CU	Number of voluntary social for the community and institutions completed /Number of voluntary social program established*100%	
	Follow-up	CU	Number of hired personnel AID/Total number of personnel *100%	
Indicator: Set whether the indicator is Follow-up or Monitoring **Types of indicators:** Quantifiable (CU), Qualifiable (CA)				
Frequency of measurement	Quarterly			
Responsible for implementation	Touchstone Colombia S.A.S. company responsible for Social and Environmental Audit			

Observations	The results of monitoring shall be kept in the ECR (Environmental Compliance Report), and shall be part of the social management report of the company Touchstone Colombia S. A. S. Benchmarks for monitoring are proposed: Las Pepas Sector: In this sector the camp is located and is the main place to support the operation of El Pescado project, Mining concession 5969. (AIDP) Laureles Village: This point is proposed for being strategically located on the road that connects the areas of influence of the project, being the meeting point of the sidewalks and mandatory passage to the population. (AIDL) Machuca: This point is located for part of the area of indirect influence and is taken as the nearest population center to the area where El Pescado project is located. (AII) Urban area of Segovia: This point is proposed as the place where the closest institutional presence to El Pescado project is located.
Timeline	See Appendix 9-1
Budget	See Appendix 9-2

9.3.3 Management of impacts and social conflicts of the project generated during different phases

Name of Monitoring Program	**Management of impacts and social conflicts of the project generated during different phases**							
Environment	Socio-economic							
Phase(s) of the project	*Exploration*	***X***	*Construction and Assembly*	***X***	*Exploitation*	***X***	*Final closure and Post Closure*	**X**
Management Program to be monitored	Information and community participation Program Education and training program for project Program to support the capacity of institutional management and economic strengthening Employment program, recruitment of labor, goods, local products and services. Management program to the pretensions and social compensation. Training program, education and awareness-raising to the community surrounding the project Conflict of interest program for property acquisition and payment of easements							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	***X***	*Mitigation*	***X***	*Correction*	***X***	*Compensation*	**X**
Objectives of monitoring	Adequate management of social impacts produced by the project through Prevention, Mitigation or control of them. To verify the proper management of the Touchstone Colombia S.A.S. company, face the possible social conflicts that may arise in the development of the project. Proactively establish criteria and guidelines for management of conflict situations arising from project activities.							
Impact(s) to be monitored	✓ Increase in institutional and community relations. ✓ Increase in community integration, locally and regionally ✓ Alteration in sectoral participation ✓ Increase in the demand for relations with institutions, organizations and the community in general. ✓ Strengthening of organizations and associations. ✓ Modifications in the organizational structures of the region. ✓ Generation of expectations due to labor and commercial demand ✓ Alterations in the population dynamics ✓ Modifications in landscape structures ✓ Economic strengthening ✓ High level of association and institutional and community management. ✓ Alteration of ecosystemic services ✓ Alteration of water quality ✓ Increase in the transmission of knowledge ✓ Change in vegetation cover ✓ Fragmentation of ecosystems ✓ Alteration of the drainage channel							

<table>
<tr><td></td><td colspan="4">✓ Increase in the per capita income of the owners of the easements
✓ Increase in economic facts with legal support and compliance guarantees</td></tr>
<tr><td>Parameter(s) to be monitored</td><td colspan="4">Impacts occurred index
Impacts solved index
Conformity index of impacts solved
Conflicts presented index
Conflicts solved index
Conformity index of conflicts solved</td></tr>
<tr><td>Sampling and analysis methodology</td><td colspan="4">Guidelines, instruments and actions determined in the principles of social responsibility of the Touchstone Colombia S. A. S. company.
Review participatory mechanisms and strategies to identify and solve impacts, social conflicts, limited to the corresponding programs.</td></tr>
<tr><td>Measuring sites</td><td colspan="4">Jurisdictions limited to the Direct Influence Area (AID)</td></tr>
<tr><td rowspan="5">Follow-up Indicators</td><td>Indicator*</td><td>Type*</td><td>Description of indicator</td><td>Formulas/Expression</td></tr>
<tr><td>Follow-up</td><td>CU</td><td>Number of social impacts managed per stage / Number of social impacts presented *100%.</td><td></td></tr>
<tr><td>Follow-up</td><td>CU</td><td>Number of satisfactory impacts taken per stage/ Number of impacts presented *100%</td><td></td></tr>
<tr><td>Follow-up</td><td>CU</td><td>Number of social conflicts solved per stage / Number of social conflicts identified and justified *100%</td><td></td></tr>
<tr><td>Follow-up</td><td>CU</td><td>Number of satisfactory social conflicts taken per stage / Number of social conflicts presented*100%</td><td></td></tr>
<tr><td colspan="5">Indicator: Set whether the indicator is Follow-up or Monitoring
Types of indicators: Quantifiable (CU), Qualifiable (CA)</td></tr>
<tr><td>Frequency of measurement</td><td colspan="4">Quarterly</td></tr>
<tr><td>Responsible for implementation</td><td colspan="4">Touchstone Colombia S.A.S. company responsible for Social and Environmental Audit</td></tr>
<tr><td>Observations</td><td colspan="4">The results of monitoring shall be kept in the ECR (Environmental Compliance Report), and shall be part of the social management report of the company Touchstone Colombia S. A. S.
Benchmarks for monitoring are proposed:
Las Pepas Sector: In this sector the camp is located and is the main place to support the operation of El Pescado project, Mining concession 5969. (AIDP)
Laureles Village: This point is proposed for being strategically located on the road that connects the areas of influence of the project, being the meeting point of the sidewalks and mandatory passage to the population. (AIDL)
Machuca: This point is located for part of the area of indirect influence and is taken as the nearest population center to the area where El Pescado project is located. (AII)
Urban area of Segovia: This point is proposed as the place where the closest institutional presence to El Pescado project is located.</td></tr>
<tr><td>Timeline</td><td colspan="4">See Appendix 9-1</td></tr>
<tr><td>Budget</td><td colspan="4">See Appendix 9-2</td></tr>
</table>

9.3.4 Social conflicts generated during different phases of the project

Name of Monitoring Program	Management of impacts and social conflicts of the project generated during different phases							
Environment	Socio-economic							
Phase(s) of the project	*Exploration*	***X***	*Construction and Assembly*	***X***	*Exploitation*	***X***	*Final closure and Post Closure*	**X**
Management Program to be monitored	Management program for pretensions and social compensation Management program of conflicts of interest related to the land acquisition and payment of easements							
Type of measurement to be monitored (ENVIRONMENTAL MANAGEMENT PLAN (PMA BY ITS INITIALS IN SPANISH)	*Prevention*	***X***	*Mitigation*	***X***	*Correction*	***X***	*Compensation*	**X**
Objectives of monitoring	Adequate management of social impacts produced by the project through Prevention, Mitigation or control of them. To verify the proper management of the Touchstone Colombia S.A.S. company, face the possible social conflicts that may arise in the development of the project. Proactively establish criteria and guidelines for management of conflict situations arising from project activities.							
Impact(s) to be monitored	✓ Increase in institutional and community relations. ✓ Increase in community integration, locally and regionally ✓ Alteration in sectoral participation ✓ Increase in the demand for relations with institutions, organizations and the community in general. ✓ Strengthening of organizations and associations. ✓ Modifications in the organizational structures of the region. ✓ Generation of expectations due to labor and commercial demand ✓ Alterations in the population dynamics ✓ Modifications in landscape structures ✓ Economic strengthening ✓ High level of association and institutional and community management. ✓ Alteration of ecosystemic services ✓ Alteration of water quality							
Parameter(s) to be monitored	Impacts occurred index Impacts solved index Conformity index of impacts solved							

<table>
<tr><td></td><td colspan="4">Rate of conflicts presented
Conflicts solved index
Conformity index of conflicts solved</td></tr>
<tr><td>Sampling and analysis methodology</td><td colspan="4">Guidelines, instruments and actions determined in the principles of social responsibility of the Touchstone Colombia S. A. S. company.
Review participatory mechanisms and strategies to identify and solve impacts, social conflicts, limited to the corresponding programs.</td></tr>
<tr><td>Measuring sites</td><td colspan="4">Jurisdictions limited to the Area of Direct Influence (AIDP AIDL)</td></tr>
<tr><td rowspan="5">Follow-up Indicators</td><td>Indicator*</td><td>Type*</td><td>Description of indicator</td><td>Formulas/Expression</td></tr>
<tr><td>Follow-up</td><td>CU</td><td>Number of social impacts managed per stage / Number of social impacts presented *100%.</td><td></td></tr>
<tr><td>Follow-up</td><td>CU</td><td>Number of satisfactory impacts taken per stage/ Number of impacts presented *100%</td><td></td></tr>
<tr><td>Follow-up</td><td>CU</td><td>Number of social conflicts solved per stage / Number of social conflicts identified and justified*100%</td><td></td></tr>
<tr><td>Follow-up</td><td>CU</td><td>Number of satisfactory social conflicts taken per stage / Number of social conflicts presented*100%</td><td></td></tr>
<tr><td colspan="5">Indicator: Set whether the indicator is Follow-up or Monitoring
Types of indicators: Quantifiable (CU), Qualifiable (CA)</td></tr>
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<tr><td>Timeline</td><td colspan="4">See Appendix 9-1</td></tr>
<tr><td>Budget</td><td colspan="4">See Appendix 9-2</td></tr>
</table>