ENVIRONMENTAL IMPACT STUDY FOR RUMICHACA THE DUAL CARRIAGEWAY ROAD PROJECT– PASTO PEDREGAL – CATAMBUCO SECTION, UF. 4 AND UF 5.1, CONSSESION CONTRACT UNDER SQUEME APP NO. 15 OF 2015

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Chapter 11.1.4. Decommissioning and Abandonment Plan

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11.1.4. DECOMMISSIONING AND ABANDONMENT PLAN

Closure and abandonment activities include the set of activities to be implemented from the project planning stages, to the activities execution of post construction in order to be compliant with the applicable legal requirements, to protect the health and safety of neighboring communities, to eliminate or mitigate adverse environmental effects and to minimize environmental and socioeconomic impacts in the area of influence for the dual carriageway road project Rumichaca - Pasto Pedregal Catambuco section.

This chapter shows the Decommissioning and Abandonment Plan proposal for the areas and infrastructure directly intervened by the project after the pre-operational stage – construction phase and during the operation and maintenance stage. It is important to note that after 25 to 30 years of project operation by the Concesionaria Vial Unión de Sur, it is expected to change the operator, not to dismantle the project infrastructure.

Being a road concession project awarded by the Agencia Nacional de Infraestructura – ANI, the concept of "abandonment" does not explicitly apply after the execution the the civil works, taking into account that by delegation the Concesionaria Vial Unión del Sur S.A.S. will be in charge afterwards of the project administration, maintenance and operation.
During that period it will be ensured under an environmental monitoring scheme for good behavior with the road corridor and vice versa. If any abnormality is detected during the subsequent post-construction phase leading to negative environmental impacts, the management system defined by the Concessionary will be implemented for the sustainable management thereof.

This Plan incorporates measures to prevent environmental impacts and risks during the closing step of the construction phase. It also includes activities like: hard surfaces demolition, land closure and reshape, surface revegetation, plowing, waste collection and disposal, signal removal, camps and temporary structures dismantle.

It is important to clarify that the closure plan does not involve additional costs to the Environmental Management Plan as the professionals in charge of close-out at completion will be the ones accompanying and supervising during this stage.

Regarding direct costs are intrinsic to the construction Project activity.

Objective

Prevent, minimize and / or control the risks and adverse effects that may overcome once the Rumichaca Pasto dual carriageway road project activities are finished, to reach as far as possible the original conditions of the environment and avoid creating new environmental problems.

11.1.4.1. Infrastructure and equipment decommissioning activities

The scope of the Plan at this stage mainly includes the removal of all temporary facilities (warehouses, contractor's temporary offices, machinery yards, plants, camps, described in previous chapters) used in the project, as well as generated waste: ordinary, recyclable, special and hazardous. Assembled locations dismantling or removal ought to follow a decision-making process, considering that it is possible that facilities may be relevant for other activities. The different facilities dismantling must take into account the initial conditions of the area in which they were implanted under the premise: "the final characteristics of each one of the places that were used ought to be the same or superior to the ones they initially had".

The measures reported here have been formulated to be implemented when the project construction ends (5 years), specifically for surface roads, Material Disposal Areas Excavation (ZODME), camps and process plants. This phase is executed progressively and ends once the road section and associated infrastructure is fully executed and technical and environmentally received to satisfaction. Infrastructures required closure prior to the abandonment and final restoration phase (5 years), the corresponding decommissioning activities will be immediately implemented.

11.1.4.2 List of activities and works needed for the decommissioning abandonment and restoration

At the end of the project activities that involved the mobilization of machinery, workshops installation, operation and treatment plants, these infrastructures must be

removed from the area and recover the site intervened; these activities imply that service networks and other camps are also entirely removed so that:

- Means minimal risk to human health and safety.
- Means minimal or no impact to the environment.
- Comply with established programs, environmental regulations, guidelines and best practices and the municipal and/or governmental authorities land use requirements.
- Does not represent an unacceptable liability for present or future land owners.
- Be aesthetically acceptable and does not mean landscape deterioration.

Activities

It refers to the removal obligation of all traces of temporary facilities and locations associated with construction activities on the surface, which comprises in addition to the benches and walkways works of art as walls, culverts, curbs, metal bumpers. No residues shall remain of the following:

- Construction machinery and equipment in general
- Tools
- Objectionable materials of various kinds
- Solid and liquid waste in general (hazardous and nonhazardous)
- Temporary signaling elements
- Metallic elements as scrap, rods, wires, etc.
- Unnecessary electrical wirings
- Tarpaulins, geotextiles, shade meshes, etc.
- Plastic elements
- Form work of diverse nature and condition
- Wooden components and elements
- Packing and packaging such as cement bags
- Pipes, tubes and similar devices

Driving

Materials from each of the specific decommissioning tasks will be withdrawn according to the solid waste management plan, so that the resulting surface no residuals will

remain such as construction materials, machinery and chemicals. During the construction and dismantling ordinary and hazardous recyclable waste will remain adequately separated and areas that were compacted will be mechanically or manually disrupted before restarting the reshaping of the intervened project areas. For established locations the "environmental good standing certificate" must be generated ensuring that the Concessionaire complied with the proposed management charts, and that there are pending commitments for lease payments, utilities, compensations.

Summing up, facilities defined in the rights of way will be dismantled and temporary buildings will be demolished, areas will be left clean and acceptable appearance based on the Auditors before works definitive handover and receipt or at any other moment defined by the Auditors. Ideally the elements and supplies will be given to the local community, ensuring that their use is practical and effective; otherwise they will be sold to formally established recyclers in the region. For facilities decided to be left in situ, including industrial water treatment units, an inventory will be done like neighborhood minutes where the components status, operating condition and structural description will be clearly noted. This inventory will be made jointly with the Auditors like the Neighborhood Minutes.

With regards to the care and precautions that must be implemented by socioenvironmental team, based on this Environmental Impact Study Chapter 11.1.1; especially in the following aspects:

- Do not throw objects to the surrounding streams
- Temporary enclosures with shade mesh usage
- PPE permanent and proper usage
- Adjacent vegetation cover not impacted
- Removal of all intervention traces, not only at the right of way but even outside, if the presence of objectionable elements originating from the works

Cleaning

After completing the installations decommissioning it will be verified that they have been properly carried out, in accordance with the requirements or agreements made with the competent authority and the area community.

All materials that can be recycled as containers, packaging, scrap reels, cans, cables, etc., will be completely collected. The material that can be recycled or reused should be removed from the project area by an external or internal personnel manager process for later use.

Hazardous waste will be delivered to an authorized use and/or disposal security cell external manager. The generator must verify the proper handling of the latter and the respective authorizations of the responsible company. In particular ensure that produced ordinary waste disposal is transferred to and authorized environmental landfills and that the cleaning of the area is complete, avoiding environmental liabilities. In this regard it will be of great interest excavation and removal, if any, of contaminated soil due to fuel storage or during abandonment potential accidents when operating these areas, so the surface will be in similar conditions than near environment and ready to be used for any foreseen use.

The signage plan and the traffic implemented management plan must be checked in order to withdraw from the project area each of the signals and other signaling devices installed, which may be transferred to different stores contractors to be reused in another project.

As stipulated in the mentioned regulation, the final conditions will be absolute tidiness. Once this is guaranteed, minutes or record will ensure that the respective dismantling is received to satisfaction, recording commitments or subsequent handling actions concerning restoration or sanitation.

Surfaces and end components

Unless expressly decided otherwise, they will not remain hard floors, walls and temporary infrastructure in the respective right of way.

Paved surfaces will be completely free of any foreign material, dirt and dust.

All temporary signs shall be removed and transit detours implemented during the construction will be canceled so that prior existence of these will not be noticed.

Destination

Prior to withdrawal, the Concesionaria Vial Unión del Sur will define the site or final destination of the materials in general. As a premise, using any storage areas for project surplus materials will not be allowed, because these latter are intended only to receive surplus soil inert materials from excavations.

11.1.4.3. Proposed final land use

With the dismantling of temporary facilities associated with the activities in camps, land shall be left in the initial conditions of the intervened areas or at least as close to it as possible.

Right of way

Applies to the roadside margins between the chamfers and respective fences.

- Final land use:

Essentially, to look for a place without obstacles free that does not obstruct the visibility and surface runoff and that is harmonious with the landscape tempered by the dual carriageway and the immediate environment.

- Management measures and morphologic reshaping:

For spans in total or partial embankment, a general surfaces profile must be provided, especially at slopes levels and transitions between them and the natural land to avoid concentrations or rainwater puddles, and rather ensuring the external or existing hydraulic solution runoff by gravity. Therefore, Concesionaria Vial Unión del Sur will verify that necessary restorations are indeed connected, which may include small actions of nonstructural filler, materials adjustments including creeping vegetal cover induction.

ZODME

Applies to ZODMEs to be used in the Project

- Final land use:

These areas suffer irreversible alterations related to the intervention, however, the decommissioning plan seeks to recover the used land and its initial coverage, that generally corresponds to livestock grazing, which will be managed through revegetation or biomantle use according to measures set in Chapter 11.1.1. However, the owner can change this use. The overall process will have continuous follow up and monitoring by the Socio-Environmental Group, in order to ensure the activities restoration proper implementation.

- Management measures and morphologic reshaping:

In accordance with the above, ancillary works might be required, like retaining walls, in addition to the existing vegetation cover, or a combination of these or other measures, in accordance with the Environmental Management Plan, specifically revegetation programs, and affected areas technical management (PM-1) and removal of vegetation and top soil removal (MRSF-1). Land will be shaped based on the topography of each property, for ZODME's this shaping will depend on each area design. The bottom line is that that Socioenvironmental Group can decide at an early stage to implement these activities through its monitoring activities.

Camp

The project will have workshops, camps, plants and residential containers.

- Final land use:

The entire project intervened site ought to be cleaned, properly arranging the debris and/or solid waste outside the area. The final entire area shaping will be performed on the camp property.

11.1.4.4. Management measures and morphologic reshaping

During the surfaces refurbishing, the topography reconditioning to a similar condition to its original one will be interesting: restoring surfaces, filling the trenches, surfaces re-profiling, and removing compacted areas, among others.

Restoration and reshaping according to the final plan will be done where allowed, which must provide the final land use. This use requirement will comply with local zoning laws that exist at close out phase. Agricultural soils that have been intervened by necessity, will be reshaped as far as possible to its original state. The restoration will be done considering the initial topographic and environmental conditions of the area. Habitat restoration will take place in the areas directly affected by construction activities during closing out phase.

The definition of intervened areas subsequent use will be in accordance with the municipalities land use plans where the restored land will be located, taking into account resource conservation and sustainability criteria.

Plants

It is planned to install two (2) concrete plants, two (2) asphalt plant and two (2) crushers, in order to provide the necessary project execution material.

- Final land use:

The properties of the process plants will receive overall area shaping. Based on the final land use, these areas will be recovered.

- Management measures and morphologic reshaping:

Reshaping the area landscape will be done looking for consistency with adjacent areas in order to reduce potential landscape modification.

Also, the morphological and landscape reshaping will be done in intervened areas as road embankments terraces and intervened ZODMES during the project activities development.

11.1.4.5. Community and authorities communication strategy

In order to present information regarding the project completion to the communities and authorities in the area of influence the social management plan closure will be developed. This plan is part of the monitoring and social management follow up program including pre and post evaluation, in compliance with MADS requirements and valid regulation, focusing on community participation in decisions involving their environment and wellness.

A communication process will be defined for all the social and institutional entities with relevant and accurate information, in order to communicate on partial or completed dismantling phase specifically temporary activities according to infrastructure and service life thereof.

- *Municipal and local administrations communication*

Given that this kind of infrastructure lasts long time and probably its functionality will be extended beyond the expected 25 to 30 years operation phase, a communication cycle will be done at the end of this period to explain who is competent over municipal jurisdictions, destination, use, changes or project restructuring based on conditions, technical changes and needs of the moment. This information must be detailed in writing and georeferencing changes that may take place so that the municipal administration is able to update the information and decide about the land use in land management plans.

It is essential to make a formal presentation to the municipal administrations of balance and performance operations and project completion, where information will be provided on the positive and negative aspects for municipalities, impacts management during operations phase and social management performed. A delegate of the municipal administration will be nominated, ideally coming from the ombudsman, to accompany

the process of dismantling and restitution of soil conditions and other environmental assets that apply when the partial total project abandonment will happen.

- *Community action boards and communications to property owners*

A written report is required and will be massively distributed to owners explaining in detail and in a didactic manner the variations that lead to the abandonment project and the favorable and unfavorable implications for the community and the restitution commitments.

Meetings will be held in each of the smaller territorial units, to explain to the community what impacts were managed during operation and under what conditions the affected areas are left in the biotic and physical aspects. Additionally, a social management balance will be done and all actions performed and developed in community, the complaints and claims addressed and the type of resolved concerns will be part of the report, so that communities will have their questions or new concerns about the project answered.

It is necessary that the interdisciplinary professional group, designs when necessary a communication strategy to the communities and authorities in the area of influence through leaflets or simple and didactic fold-outs, explaining project completion and social management actions. Key topics to be included, as already mentioned is better to be designed in the terminal phase when it is possible to observe and evaluate the actual conditions of the project social environment:

- Show the "Environmental certificate of good standing" of works, so that there are no environmental liabilities insofar as possible, avoid having future issues.
- Understand and solve community concerns or final requirements; although it is known that there is a permanent attention service, at the end, 100% of conflict resolution or concerns should be checked.
- Check strict and satisfactory commitments compliance with the community.
- Prepare an environmental closure document under the responsibility of socio-environmental and auditor project teams, which besides being delivered to the Concesionaria Vial Unión del Sur S.A.S., will formally acknowledge ANLA, the MADS, CORPONARIÑO. This document will clearly contain environmental monitoring

actions that the Concessionaire shall exercise over the project operation stage, when there will no longer be contractors', constructors' and / or auditors' presence.
- Final delivery of environmental indicators statistics, traceability, results and trends applied to all construction processes.

11.1.4.6. Proposed indicators for cumulative impacts

Cumulative impacts refer to health and environment exposures to pollutants emitted from the project, thus the following must be taken into account:

- Considering the socio-environmental vulnerability stressors in neighborhoods
- Promote community involvement: cumulative impact assessments should have the community residents' contribution and commitment.

The objective with this evaluation is to analyze the potential environmental risks and impacts of a long term project and cumulatively with other activities generating changes. See Table 11.1.4.1.

Table 11.1.4. 1 Cumulative impacts indicators

COMPONENT	INCREMENTAL IMPACT INDICATOR	INDICATOR VALUATION	CUMULATIVE IMPACT INDICATOR	INDICATOR VALUATION
Air and water	• Concentration of pollutant emission and / or discharge	25	• Concentration of the pollutant in the environment of the receptor	24
	• Concentration with reference to standard discharge	23	• Concentration relative to the environmental standard	23
	• Load contributed by the project	25	• Total load of the pollutant (from all sources)	24
	• Characterization of spatial emissions	24	• Characterization of the spatial pattern of the concentration of contaminants in the environment downstream	24
Social	• incremental number of employed and unemployed, participation rates of affected population	25	• Number, size, levels of skills of the regional workforce	25

COMPONENT	INCREMENTAL IMPACT INDICATOR	INDICATOR VALUATION	CUMULATIVE IMPACT INDICATOR	INDICATOR VALUATION
	• incremental value of subsistence income, wages and other incomes	23	• Change in livelihoods and their sustainability measures	23
Ground	• Surface and / or proportion of land lost, damaged or inaccessible due to the project	24	• Total area of land available, value of the benefits of land use • Total population affected	24
	• Incremental change in the benefits of affected land users (e.g., lost agricultural production, subsistence use)	25	• Sustainable livelihoods and poverty measures	25
Natural habitat	• Surface and / or proportion of natural and critical habitat converted and / or degraded due to the project	25	• Total area of habitat lost	25
	• incremental change in the quality and / or habitat status	24	• Change in rates of habitat loss	24
		23	• Habitat fragmentation measures	23
Flow regulation downstream	• Percentage of reduction in flow downstream compared with average annual flows	25	• Ecological integrity of the river, including natural flow regimes (e.g., quantity, quality, seasonal variability and predictability)	24
	• Percentage of reduction wetted perimeter or usable habitat in impacted river sections	24	• Viability of populations of migratory fish	25
	• Connectivity of river sections upstream and downstream of the dam or levee	24		
Fauna	• Direct mortality caused by project operations over time • Percentage of	23	• Change in overall decline and / or regional population rates	23

COMPONENT	INCREMENTAL IMPACT INDICATOR	INDICATOR VALUATION	CUMULATIVE IMPACT INDICATOR	INDICATOR VALUATION
	local population (or range) lost in relation to population numbers (or ranges) globally and / or regionally	24	• Population fragmentation (or ranges) measures	24

Source: Taken and modified (International Finance Corporation IFC, 2015)

The weighting for assessing the indicator was made using as reference a numerical value according to the impact, as follows:

	Compatible-manageable: <24
	Severe: 25 to 65
	Critical: between 65 and 100

In this regard, valuation of the indicator allowed determining that both the incremental and the cumulative impacts are within a compatible and manageable range. This is mainly due to management measures established in the environmental management plans.

11.1.4.7. Monitoring and follow-up of the dismantling and abandonment Plan

In order to confirm the effectiveness of measures taken, particularly those concerning the recovery of the environment (considering revegetation where feasible), follow-up and monitor the plan. Monitoring will consist of quarterly visits to representative areas of the areas intervened by the project, to evaluate the effectiveness of the measures implemented.

To ensure compliance with the recommendations contained in the Plan, a team composed of a civil engineer, a sociologist, a geologist, an environmentalist and a biologist with extensive experience in implementing environmental management plans will be formed to conduct the final close-out of the works, as well as the sites for temporary facilities. These individuals may be some of the professionals who participated in other PMA projects of the project, who will make photographic records

and design the necessary applications to verify and certify the final conditions of the process of dismantling and abandonment of work sites in terms of the actions described above.

This team will submit a report or certificated equivalent to an "environmental certificate of good standing" that serves to prove the successful completion of the works.

Finally, a consolidation of information in a document must be prepared and submit a complete report to the community. The following indicators will be monitored during the close-out stage:

- ü Area susceptible to treatment vs. area effectively treated (%)
- ü Compliance with the solid waste management plan during dismantling (%)

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