

CHAPTER 10 ENVIRONMENTAL INDEX CARDS

10.1 CHAPTER 2: WORKS AND PROYECT ACTIVITIES INDEX CARDS

Project Phase	Works and Actions	Working Method	Place	Opportunity	EIA		
					CHAP.	SECC.	PP.
Construction of Surface Works	Collection works	They will consist of a fixed barricade to bank the level of water and allow entry into the headrace flume, and gates that will allow clearing the flume from gravel and sand built up at the entrance. The construction of these works begins with the temporary diversion of the respective flume, and the excavation of the support platform of the structure, Then, mat and concrete jobs will be carried out, and finally the implementation of structural fills and protection rock-fill dam. Finally, hydro-mechanical equipment will be mounted.	In the upper water basin of Volcán River (La Engorda, Colina, Las Placas y El Morado Streams), in the Yeso River, discharge Alfalfal I, headrace Maitenes and Colorado River.	Construction	2	2.2.2 literal A	24-31
						2.3.2.1, literal A	48

Project Phase	Works and Actions	Working Method	Place	Opportunity	EIA		
					CHAP.	SECC.	PP.
Construction of Surface Works	Water pipe works	It begins with the excavation of ditches varying from 3 to 4 m wide, depending on the size of the ducts. Excavation will be made towards the slope direction; in such cases where it is required due to ground conditions, ditch slopes will be cased. In case of water accumulation in the ditch, it will be "depleted" by gravity or mechanical means (pumping). In areas where streams or ravines run through them, pipes reinforced with concrete blocks will be installed. Finally, backfills will be made as described in the drawings and specifications of the detailed engineering of the project.	From La Engorda water intake to Colina water intake; from Yeso River water intake to exit of El Volcán tunnel; from evacuation flume of Alfalfal power station to forebay of Las Lajas; from Los Maitenes water intake to Las Lajas forebay.	Construction	2	2.2.2 literal A 2.3.2.1, literal A	28-29 46
	Forebay	Works will begin escarping the ground to remove topsoil. Then, earth movement will be carried out using material from the excavation in the embankments that will make up the perimeter walls of the pond. Once excavations have been made, and prior to the construction of embankments, all related works of reinforced concrete (discharge, excavation and clearing) shall be constructed. Finally, the impermeable slab will be installed. The forebay of Alfalfal II power station will be fully excavated in rock from the inside the tunnel. The excavation material will be transported through the tunnel and deposited in the disposal located at Aucayes Alto.	They will be located at the pipe header of Las Lajas power station (North bank of Colorado River) and in the town El Alfalfal and Aucayes Alto.	Construction	2	2.3.2.1, literal B 2.2.2 literal C	48-49 33-36

Project Phase	Works and Actions	Working Method	Place	Opportunity	EIA		
					CHAP.	SECC.	PP.
Construction of Surface Works	Electrical substation	Construction will begin with the clearing of the area and the construction of the external safety fence and another one inside the field. Then, earth movement and the construction of foundations, structure supports (metallic and of equipment) will be carried out .Finally, the assembly of yard structure and electrical equipment will be completed, and installation of protection and safety systems.	El Sauce area, East bank of Colorado River.	Construction	2	2.3.2.1, literal C	49
	Bridges	They will consist essentially of a reinforced concrete slab on steel beams, which will be supported in abutments on both sides of the river. The completion of abutments will be scheduled during low flow period following by the launching of beams which is made from outside of the waterway. For adequate protection of the bridge, against floods and undermining, a rock-fill dam against abutment will be placed, which is the only intervention that is performed directly into the river, without diversion and bottleneck.	In the Colorado and Yeso Rivers, and Manzanito and Aucayes streams, all they placed on private roads.	Construction	2	2.2.2 literal D	36
						2.2.2 literal E	33-34

Project Phase	Works and Actions	Working Method	Place	Opportunity	EIA		
					CHAP.	SECC.	PP.
Construction of Surface Works	Siphons	The waterway will be temporarily deflected to proceed with the works according to designs and specifications of the Project. Installation of protective rock-fill dam is considered, through all the tranche of the crosscut, in case of possible undermining due to river floods	At the confluence of Colorado and Yeso Rivers, and El Morado stream.	Construction	2	2.2.2 literal F	38
	Discharge works	<p><i>The discharge work to the Colorado River</i> is realized by two separate concrete weirs, considering hydropower dissipators to allow the delivery of water to the river without producing hydraulic alteration.</p> <p><i>Discharge into the Yeso River</i> is a bypass chamber of 3.6 m wide and 5 m long, where there is a steel pipe with a diameter of 2.5 m that supports two telecommanded butterfly valves, located in series. From the bypass point to the discharge to the river, the work has a length of 60 m.</p> <p><i>Discharge to the Maipo River</i> is projected as channel excavated in rock, with a basal width of 7 m and parallel to the course of the stream. Upstream of the discharge, the installation of protection rock-fill dam is considered.</p>	In the Colorado, Yeso and Maipo Rivers (Las Lajas area).	Construction	2	2.2.2 literal G	34-38

Project Phase	Works and Actions	Working Method	Place	Opportunity	EIA		
					CHAP.	SECC.	PP.
Construction of Underground Works	Construction of Tunnels	<p><i>Material from excavation</i> will be transported to the marine muck disposal. <i>Construction method and drilling system.</i> The “drill and blast” method will be used for drilling. Alternatively, tunnel boring machine (TBM) will be used to drill the rock.</p> <p>To optimize terms of completion of the Works, different work fronts will be used, distributed both in the gates and in the construction shafts.</p> <p><i>Loading and haulage of excavation material.</i> With the exception of works in access tunnels, shuttle cars will be used, which will be conducted from inside the tunnel by a locomotive to the marine muck disposal. The marine muck disposal sites will be located adjacent to the gates of tunnel shafts.</p> <p>For the construction of access tunnels the use of dump truck is considered. .</p>	<ul style="list-style-type: none"> - El Volcán Tunnel: Two (2) working faces; entry and exit gates. - Alfalfal Tunnel: Three (3) working faces; one facet through shaft 1, and 2 faces through shaft 2, located over the Aucayes stream. - Discharge tunnel from Alfalfal II: 1 working face from the exit gate - Access tunnel to powerhouse cavern of Alfalfal II: 1 working face from the entry gate. - Las Lajas tunnel: Seven (6) working faces; 2 faces in each shaft (3) and 1 face by the entry gate of the tunnel, all of them in Río Colorado Valley - Discharge tunnel of Las Lajas: 2 working faces from the exit gate. - Access tunnel to powerhouse cavern of Las Lajas: 2 working faces from the entry gate. - El Yeso tunnel: Two (2) working faces, 1 from the entry gate, and 1 from the exist gate of El Volcán tunnel. - 	Construction	2	2.2.3 Literal A	39-40

Project Phase	Works and Actions	Working Method	Place	Opportunity	EIA		
					CHAP.	SECC.	PP.
Construction of Underground Works	Surge shafts	<p>They are vertical shafts connected to the corresponding headrace tunnels. The <i>shaft of Las Lajas</i> will consist of a shaft for communication between the field and the body of the shaft, which will have a diameter of 5 m and 152.7 m high; the shaft's body will be a cylindrical section of 10 m in diameter with a height of 28.8 m, and the vertical shaft for communication between the surge shaft and Las Lajas tunnel will have 295.25 high.</p> <p>The body of the shafts and the vertical shafts will be excavated in rock. Finally, for purposes of safety of the plant, a protection work of the shaft will be constructed at ground level, in order to prevent foreign bodies entering into the system.</p>	The shaft of Alfalfal II will be located at coordinates E: 385.920 N: 6.284.170 and the shaft of Las Lajas in coordinates E: 380.380 N: 6.286.850.	Construction	2	2.2.3 Literal B	40-43
	Powerhouse caverns	<p>They will be installed in caverns dug in the rock mass. Their structure will be of reinforced concrete and their access will be made through the tunnels just described.</p> <p>Inside the powerhouse caverns, the electromechanical equipment will be placed, which consists of Pelton type turbines and synchronic generators, as well as ancillary services and cooling systems.</p>	In Alfalfal y Las Lajas areas.	Construction	2	2.2.3 Literal C	44

Project Phase	Works and Actions	Working Method	Place	Opportunity	EIA		
					CHAP.	SECC.	PP.
Construction of Surface Works	Assemblies of equipment, testing and commissioning	This equipment will be manufactured in accordance with design specifications and will be supplied through contracts with international companies. Equipment will be transported from the port of arrival to the work, designating a site for storage.	In each particular system and inside the cavern.	Construction	2	2.3.2.3	50
	Establishment of temporary facilities and camps	The installation of 5 camps and 7 facilities is considered. Facilities will include office spaces, machinery park warehouses, storerooms, service shop, basic services, parking lots, temporary disposal of material, etc. They will be constructed of prefabricated panels and sheds of metal structure. The location and operating conditions of camps will have the greatest safeguard to prevent effects on biotic resources, soil, surface water and landscape.	In El Volcán, El Yeso, Aucayes Alto y Bajo, En sector El Volcán, El Yeso, Aucayes Alto y Bajo, in Km 10 of G-345 Road, Potrero Bellavista sector and discharge in Maipo (see details in Annex 11).	Construction	2	2.3.2.4	50-55
	Establishment of service roads.	31 km of service paths will be implemented. The design of layout and slope, slope and speed limits will be made according to the provisions of Manual de Carreteras (Manual for Roads). Construction begins with site preparation (clearing the area). Then the necessary cuts of slope will be made according to the defined layouts, and surfaces will be stabilized using granular pavement and/or bischofite. Finally, the signage installation will follow, and also replacement and restoration of those areas temporarily occupied by the machinery.	El Yeso road and Road G-25, Alto Volcán and Colorado area.	Construction	2	2.3.2.5	57

Project Phase	Works and Actions	Working Method	Place	Opportunity	EIA		
					CHAP.	SECC.	PP.
Construction of Surface Works	Improvements of existing roads	It will be coordinated with Regional Department of Roads. It will consist of a clearing and shape of the routes, repair and construction of sewers, application of dust suppressor (bischofite), signage installation, and clearing of roads during winter period, installation of roadside defenses, and construction of engineering and replacement of rolled pavements.	Road G-25 (El Volcán area) and road G-455 sector Camino to the El Yeso reservoir.	Construction	2	2.3.2.5	57
	Maintenance of roads	This activity will be carried out using equipment, machinery and a crew of workers. Annual reapplication of bischofite is considered.	Sector of Aucayes ravine, Lo Encañado and Colorado. In addition to Road G-25 (El Volcán area) and Road G-455 Camino sector to El Yeso	Construction	2	2.3.2.5	57-58
	Establishment of muck disposal sites	The muck disposal sites will be located near the shafts of tunnels and other working faces in surface. Public roads that will be used to access to muck disposal sites will be implemented with road and signage solutions proposed by the study of road capacity in the area of PHAM. Priority will be given to the height of marine material and its final morphology at closing so as to match with the characteristics of relief where it is placed. A controlled access to the storage area will be maintained. The use of green barriers with existing species in the environment will be evaluated, particularly in the case of disposal sites in banks of Maipo and Colorado Rivers. Appropriate signage will be installed in order to protect safety of workers and visitors.	Shaft 1 sector El Volcán tunnel V1, El Yeso, Lo Encañado, Alfalfa II tunnel VA4, Aucayes Alto, Camino Aucayes, VL7 and VL8, Los Maitenes lagoon, shaft VL5, El Sauce tunnel Gate delivery to Maipo River and Km 8 Road G-345.	Construction	2	2.3.2.6, literal B	60

Project Phase	Works and Actions	Working Method	Place	Opportunity	EIA		
					CHAP.	SECC.	PP.
Construction of Surface Works	Operation of muck disposal sites	Muck disposals shall be made in an orderly fashion, forming even and safety platforms, with natural slopes that fare formed by the same material, ensuring their stability. To get organic soil from other areas not related with the Project is not considered. The area surrounding muck disposal site and access roads thereto shall be kept clean from excavation material and in good conditions of trafficability. The transit of machinery and vehicles will only be performed by authorized access and paths defined for the project works. In the muck disposal sites there will not be organic debris, scrap metal, wood or paper, sludge or other materials.	Shaft 1 sector El Volcán tunnel V1, El Yeso, Lo Encañado, VA4, Aucayes, Alto, Camino Aucayes, Alfalfal II Tunnel VI7 and VL8, Los Maitenes lagoon, shaft VL5, El Sauce, Gate delivery tunnel to Maipo River and Km 8 Road G-345.	Construction	2	2.3.2.6, literal C	60-61
	Abandonment of disposal sites	The final form of each reservoir will be conditioned to the topography of the place. All kind of structures and temporary premises of Contractor as well as the signage will be removed. Sterile materials will be covered with scarified soils. Revegetation Plan will accelerate and promote the natural ecological succession process.	Shaft 1 sector El Volcán tunnel V1, El Yeso, Lo Encañado, Alfalfal II Tunnel VA4, Aucayes, Alto, Camino Aucayes, Alfalfal II Tunnel VI7 and VL8, Los Maitenes lagoon, shaft VL5, El Sauce, Gate delivery tunnel to Maipo River, Las Lajas Plant and Km 8 Road G-345.	Construction	2	2.3.2.6, literal D	61

Construction of Surface Works	Extraction, Use and Management of Borrow Areas	In the work sectors of El Volcán and El Yeso, requirements of these materials will be covered with the surplus of excavation of the existing works in the waterways of the rivers involved in the Project. Namely, water intake, siphons, bridge abutment, and protection rock-fill dam. Material from excavations for the foundations of these works will be reused for the aggregates required by the construction of the Project. As for those works located on the Colorado River Basin, aggregates will be provided by authorized third parties located in the area of the Work.	The Project does not include special areas for the extraction of material from borrows areas or aggregates.	Construction	2	2.3.2.7	62
Operation	Operation of power plants	The project will generate waters from Engorda, Colina, Las Placas and El Morado streams, all of them tributaries of the Volcán River, Yeso River, Colorado River and its tributary Aucayes stream. After passing through the turbines of both plants, flows generated will be returned to Maipo River through the discharge tunnel of Las Lajas plant. In the event that Las Lajas plant is out of service, waters from Alfalfal II plant will be discharged to Colorado River.	Points of interest for hydrological assessments are defined by the collection basins in the streams; Colina, La Engorda, Las Placas and Morado, in the upper sub-water basin of Volcán River, El Yeso reservoir, basin of Aucayes stream and Colorado River (collection Maitenes and discharge Alfalfal I).	Operation	2	2.3.3, 2.3.3.1 literal A	62-68

Project Phase	Works and Actions	Working Method	Place	Opportunity	EIA		
					CHAP.	SECC.	PP.
Operation	Power generation process	It involves the operation of a hydraulic turbine which converts the potential energy of water into mechanical energy of rotation. This mechanical energy is transformed into electrical energy by a generator physically coupled to the same shaft as the turbine, into the powerhouse cavern. Plants will generate about 2350 Gwh/ year. The calculation of power generation of the project considered the head losses in the hydraulic system and the overall efficiency of power generation equipment.	Alfalfal II and Las Lajas hydroelectric power house.	Operation	2	2.3.3.1, literal B	70

Project Phase	Works and Actions	Working Method	Place	Opportunity	EIA		
					CHAP.	SECC.	PP.
Operation	Maintenance of installations	<p>Civil Works: For water intake and Hydraulic Road, works are considered in excavation periods of headrace tunnels, every 6 to 8 years. Inspections, cleanings, clearings and minor repairs are considered. The mechanical equipment maintenance considers replacement of gate seals, removal of leaks in hydraulic circuits, lightening, etc. For roads and road infrastructure there will be a work crew who are performing tasks of clearing, cleaning, and signage maintenance and engineering structures to the whole road network of the project. Clearances will be intensified during the winter.</p> <p>With regard to equipment of High Voltage Yard, it is considered a preventive maintenance to switches, cleaning of insulators, among others. This maintenance includes the review using thermovision test for the detection of hot spots, due to bad connections.</p> <p>Maintenance of electromechanical equipment will be annual for a period no longer than 25 days, mainly during winter. The major maintenance of this equipment is carried out every 6 to 8 years, which coincides with the excavation process. This may take 30 to 35 days.</p>	In the case of civil works, the place of maintenance is the area of water intake, hydraulics routes, roads and road infrastructure. The maintenance of electric and electromechanical equipment will be made inside the powerhouse cavern.	Operation	2	2.3.3.1, literal A	70-75
	Maintenance of roads	This activity will be carried out once a year using machinery and a crew of workers. For minor maintenances, there will be a permanent crew.	Sector of Aucayes Lo Encañado and Colorado ravines.	Operation	2	2.3.3.1, literal B	75

10.2 CHAPTER 3 INDEX CARD OF COMPLIANCE PLAN OF ENVIRONMENTAL LAW APPLICABLE TO THE PROJECT

10.2.1 General Environmental Rules Applicable to the Project

Project Phase	Applicable Environmental Rules	Environmental Component Involved – Regulated Element	Form of Compliance of Rules	Competent Enforcement Agency
Construction and Operation	<i>Law N° 20.245/08, Constitution of the Republic of Chile</i>	General Environment		
Construction and Operation	<i>Law N° 19.300/94, Law on General Bases of Environment Ministry General Secretariat of Government (MINSEGPRES).</i>	General Environment	The Project is submitted to the Environmental Impact Assessment System through this Environmental Impact Assessment.	CONAMA Metropolitan Region and State Bodies
Construction and Operation	<i>Executive Order Law D.S. N° 95/01, Reg.. Environmental Impact Assessment System of MINSEGPRES.</i>	General Environment	The Project is submitted to the Environmental Impact Assessment System through this Environmental Impact Assessment.	CONAMA Metropolitan Region and State Bodies
Construction and Operation	<i>Supreme Decree D.S. N° 47/92, General Ordinance of Urbanism and Constructions, Ministry Department of Housing and Urban Planning MINVU.</i>	General Environment	Infrastructure networks involved in this project are considered accepted by the Territorial Planning Instruments.	Regional Secretariat of the Ministry of Housing and Urban Planning, Metropolitan Region
Construction	<i>Res. N° 20, of Santiago Metropolitan Region Government</i>	General Environment	Infrastructure networks involved in this project are considered accepted by the Territorial Planning Instruments.	Regional Secretariat of the Ministry of Housing and Urban Planning, Metropolitan Region
Operation	<i>Statutory Decree D.F.L. N°4/07, General Law of Electrical Services, of Ministry of Economy MINECOM</i>	General Environment	GENER has the rights of water management of non-consumptive use and exercise both permanent and temporary and continuous and discontinuous use that will be used for its use in the Project.	Regional Secretariat of the Ministry of Economy

Project Phase	Applicable Environmental Rules	Environmental Component Involved – Regulated Element	Form of Compliance of Rules	Competent Enforcement Agency
Construction and Operation	<i>Supreme Decree D.S. N° 327/97, Regulation of General Law of Electrical Services, of Ministry of Mining.</i>	General Environment	GENER will process the definitive concession for the construction and operation of hydroelectric plants to the Ministry of Economy.	Regional Secretariat of the Ministry of Economy

10.2.2 Specific Environmental Rules Applicable to the Project

Project Phase	Applicable Environmental Rules	Environmental Component Involved – Regulated Element	Form of Compliance of Rules	Competent Enforcement Agency
Construction	<i>Supreme Decree N° 144</i>	Air	Mitigation of emissions is done through: improving existing roads used by mining trucks, new roads will be stabilized by granular pavement and bischofite, use of tarps on hoppers, surface wetting, washing of vehicle wheels on the Colorado Rivera area, etc. Details of the estimated emissions are presented in Annex 4 and 5. In Section 2.5.3 of Chapter 2 and Section 6.4.1.1 of Chapter 6 outlines the measures to be implemented to minimize the emission of particulate matter that may cause discomfort mainly to workers.	National Health Service
Construction	<i>Supreme Decree N° 58</i>	Air	According to estimates, emissions of NOx, HC and CO of the Project are considered irrelevant. For emissions of PM-10, the Project considers as a compensation proposal improving a tranche of Routes G-455 and G-25, with which current emissions will be reduced at 502 tons/year, allowing fully compensate 150% of the estimated emissions of the project (277 tons/year).	Health Authority, COREMA Metropolitan Region..
Construction	<i>Supreme Decree N° 59</i>	Air	Idem measures Supreme Decree <i>N° 144</i> .	Regional Health Authority
Construction	<i>Supreme Decree N° 75</i>	Air	Idem measures Supreme Decree <i>N° 144</i> .	Chilean Police and Municipal Inspectors
Construction	<i>Supreme Decree N° 4</i>	Air	Idem measures Supreme Decree <i>N° 144</i> . As an additional measure, motor vehicles, trucks and heavy machinery will be subject to periodic maintenance to comply with emission standards set by the Ministry of Transport and Telecommunications, controlled through the Certificate of Technical Review.	Chilean Police and Municipal Inspectors.
Construction	<i>Supreme Decree N° 55</i>	Air	Idem measures Supreme Decree <i>N° 144</i> . As an additional measure, motor vehicles, trucks and heavy machinery will be subject to periodic maintenance to comply with emission standards set by the Ministry of Transport and Telecommunications, controlled through the Certificate of Technical Review.	Chilean Police and Municipal Inspectors.

Project Phase	Applicable Environmental Rules	Environmental Component Involved – Regulated Element	Form of Compliance of Rules	Competent Enforcement Agency
Construction	N° 146	Noise	In the Alfafal area noise barriers will be implemented at the work sites, and the use of semi-confinement in noisy machinery, prioritizing tasks on the surface during daylight hours; for the 8 points sensitive to noise an information task to the population that might be affected will be established, and to verify the effectiveness of mitigation measures a noise monitoring will be carried out at the 8 sensitive- to- noise points according to the procedure stated by Supreme Decree N° 146/97 of MINSEGPRES.	Regional Health Authority
Construction and Operation	Supreme Decree N° 735	Drinking Water	Water that will be provided to workers shall comply with NCH 409m (Chilean Norm), which establishes the condition for drinking water qualities. Water from ravines located near the camps will be drawn, which then will be made drinkable before distribution. This is made through the procedures outlined in Chapter 2, section 2.3.2.4 “establishment of camps and work sites installations”.	Metropolitan Secretariat of the Ministry of Health
Construction and Operation	Supreme Decree N° 594, as amended by D.S. N° 57	Drinking Water	A supply of drinking water will be maintained with a minimum amount of 200 liters of water per person per day, which will meet the parameters of NCH 409 on water quality for drinking. These treatment systems shall be authorized by the relevant Public Services. Internally, compliance with quality requirements of drinking water used in camps and work site installations will be checked.	Regional Health Authority
Construction	Decree N° 446	Drinking Water	A supply of drinking water will be maintained with a minimum amount of 200 liters of water per person per day, which will meet the physical, chemical, radioactive and bacteriological requirements established in NCh 409, “Requirements for Drinking Water,” as set out in Art. 11, 12, 13 and 14 of D.S. N° 594/99 Ministry of Health.	Regional Health Authority
Construction	Decree N° 90 Statutory Decree N° 725	Sewage and Waste Waters	Sewage will be treated at the Plants of Modular Treatments, which will have the approval of the respective health authority. As to waste waters, they will be treated in a sequential deposition system that will approved by the respective health authority. In periods without rain, they will be reused for activities typical of construction.	Regional Health Authority

Project Phase	Applicable Environmental Rules	Environmental Component Involved – Regulated Element	Form of Compliance of Rules	Competent Enforcement Agency
Construction	<i>Supreme Decree N° 594, as amended by D.S. N° 57</i>	Sewage	Toilet facilities shall comply with the provisions of D.S. 594/99 of Ministry of Health (MINSAL), especially in terms of quantity and other specifications (hot water, showers, etc.). The Contractor shall ensure the proper maintenance and operation of these services. In workface with temporary presence of workers, chemical toilets will be implemented, managed by a company authorized by the Health Authority, and the disposal of these residues shall be made according current regulations.	Regional Health Authority
Construction	<i>Supreme Decree N° 90</i>	Sewage and Waste Waters	Treated water to be discharged to surface water courses shall comply at all times with the maximum limits specified in Table N°1 of D.S. N° 90/2001. To supervise such compliance, a monitoring shall be made in each discharge.	Regional Health Authority
Construction	<i>Supreme Decree N° 876, amended by Dec.105</i>	Sewage and Waste Waters	During the phase of construction, treated sewage and residues will be discharge to surface watercourses in strict compliance with the maximum limits established by D.S. N° 90/2001 in Table N° 1 that set out “Maximum permissible limits for discharge of liquid waste into river water body.” Additionally, operational control of discharges shall have as reference NCh 1.333 “Quality requirements of water for different uses.”	Regional Health Authority
Construction	<i>Statutory Decree N°1.122</i>	Hydraulic Works	The construction of siphons and headraces of the Project shall comply with the provisions of this Decree.	General Directorate of Water

Project Phase	Applicable Environmental Rules	Environmental Component Involved – Regulated Element	Form of Compliance of Rules	Competent Enforcement Agency
Construction and Operation	<i>Statutory Decree N°725</i>	Solid Waste	<p>To comply with this regulation, GENER will set out rigorous contractual requirements to Contractors designed to ensure the proper management and disposal of solid waste. In this regard, here are some considerations for the management of solid waste generated during the construction phase of the project:</p> <ul style="list-style-type: none"> — Muck: The disposal of this material will be in disposal of the Project timely authorized by the appropriate authority (See Annex6 “Management Plan for Management of Muck Disposal”). — Construction waste: It is expected a low rate of generation of such wastes, as they will be reused and/or those with commercial value will be offered for sale. Notwithstanding this, surplus will be transported by the Contractor to authorized dumps (See Annex 18 “Waste Management Plan”). — Industrial waste: Reusing of these materials in the same working faces and/or selling them to third parties will be a priority. Those residues that cannot be reused or sold, shall be collected on a temporary basis in a specially authorized court in each of the work facilities, and then are removed and disposed of at authorized landfills by companies authorized for transportation of hazardous waste (See Annex 18 “Waste Management Plan”). — Household waste or treated as household waste: This waste will be stored in special containers located at each facility, which will be regularly removed by the Contractor to be disposed eventually in an authorized landfill (See Annex 18 “Waste Management Plan”). — Vegetable waste: Given the characteristics of the vegetation coverage in the area, a smaller volume of generation is estimated, which occurs particularly during the opening of roads and surface flumes, and removal of vegetation in tunnel windows, regulating reservoirs and installation of other minor Works (water intakes and electrical substation). 	Regional Health Authority I

Project Phase	Applicable Environmental Rules	Environmental Component Involved – Regulated Element	Form of Compliance of Rules	Competent Enforcement Agency
Construction and Operation	<i>Resolution N° 5.081</i>	Solid Waste	Those residues that cannot be reused or sold will be collected on a temporary basis in an especially authorized court in each of the camps or facilities and then are removed and disposed of at authorized landfills by companies authorized for transportation of hazardous. For this, the personnel responsible for transportation of hazardous and nonhazardous waste, industrial or generated during construction outside of the project facilities will have at all times a document of Declaration and Monitoring Waste as described in Supreme Decree N°148/03 and Resolution N° 5.081/93, both of Ministry of Health (MINSAL). A copy of each of those documents will be forwarded to the relevant Health Authority at the time of starting transportation (See Annex 18).	Regional Health Authority I
Construction	<i>Supreme Decree N° 366</i>	Flora	In case of cutting down any specimen mentioned in this Decree, the contractor shall do it as provided in this body, and also he will ask the relevant authorizations.	Ministry of Agriculture and Chilean Police
Construction and Operation	<i>Supreme Decree N° 4.363 and Decree Law D. L N° 701</i>	Flora	If the Project involves the cutting of forest formations, the building contractor shall obtain permits from National Forestry Service (CONAF). In Annex 7 of EIA a Cutting and Reforestation of Forests Management Plan is attached to carry out civil Works. While Annex 9 describes the measures of reposition of species that form the forest.	National Forestry Service
Construction and Operation	<i>Decree N° 82</i>	Flora	Except for areas of site works, and previous authorization of National Forestry Service (CONAF), during the construction phase cutting of trees and shrubs is completely prohibited. For this, a regulatory procedure will be prepared, based on this body of law, which will be instructed to each of the Contractors and workers as a contract clause required by Gener.	Chilean Police, Agriculture and Livestock Service and National Forestry Service
Construction and Operation	<i>Law N° 4.601 (text replaced by Law N° 19.473/96)</i>	Terrestrial Fauna	During the construction of the Project, the hunting of amphibians, reptiles, birds and wild mammals is prohibited, understanding it as the action or set of actions aimed at seizing wild animals, killing them. On the other hand, capture of any specie shall be prohibited, relative to the seizure of live wild animals This, through the preparation of a regulatory procedure, based on this body of law, which shall be fulfilled by each of the Contractors and workers as a contract clause required by Gener.	Agriculture and Livestock Service

Project Phase	Applicable Environmental Rules	Environmental Component Involved – Regulated Element	Form of Compliance of Rules	Competent Enforcement Agency
Construction	<i>Law N° 17.288, amended by Law N° 20.021</i>	Archaeological Heritage	<p>The Project will not affect the sites identified in the Baseline (See Chapter 5). Notwithstanding the foregoing, and as a protection, GENER will contractually require the Contractor the implementation of the following measures;</p> <ul style="list-style-type: none"> - Fencing of the areas at least 5 m from the perimeter of the site found. - Expert supervision by a permanent archeologist, in the construction Works of the Project. - Archaeological rescue plan for archaeological findings that might be detected during the expert supervision, in the area of direct influence of the project works. - Training of workers regarding the possible presence of archaeological sites. <p>Details of these measures of risk prevention that affects archeological and paleontological heritage are described in Chapter 7 of EIA.</p>	National Monuments Council and Chilean Police
Construction	<i>Supreme Decree N° 484</i>	Archaeological Heritage	<p>The Project does not include the intervention of the sites recorded in the sector of Lo Encañado. For its part, the canal and El Volcán tunnel will cross the area of Lo Encañado in a sector where the imprint of the Inca trail is not hold. This is mainly due to the fact that its design has been previously interfered with other preexisting works (private road to Lo Encañado lagoon and Andean aqueduct Laguna Negra),</p> <p>However, giving the proximity of the sites to one of the working faces, Gener has established a number of measures to control environmental risks, to ensure the protection of these elements of Cultural Heritage, indicated in the previous index card (See Chapter 7 of EIA).</p> <p>If as a result of excavations in a working face pieces with archaeological value are accidentally found, the procedure established by Law N°17.288 and this Regulation will be applied. If with the implementation of the project works will be necessary the rescue of pieces of archaeological value, the background to attest compliance with the Sectorial Environmental Permits of Article 76 of EIAS Regulation. Other preventive measures regarding paleontological resources are listed in Chapter 7.</p>	National Monuments Council and Chilean Police

Project Phase	Applicable Environmental Rules	Environmental Component Involved – Regulated Element	Form of Compliance of Rules	Competent Enforcement Agency
Construction and Operation	<i>Supreme Decree N° 298</i>	Transportation of Hazardous Substances	Fuel supply shall be made by tanker trucks from distribution companies established in the Metropolitan Region. Transport conditions: type of vehicle, loading, conditioning, stowage, unloading and handling, as well as the standards to be met by the staff involved in transport operations will be carried out ensuring compliance with current legislation on the subject. Control of this aspect will be contractually required to Contractor, being a permanent condition that the transportation of hazardous substances into or from works facilities of PHAM is made only by authorized companies.	Chilean Police, Public Works Inspectors and Municipal Inspectors
Construction and Operation	<i>Supreme Decree N° 400</i>	Explosives	Prior to the use of explosives, the Contractor shall process the corresponding permits to the Ministry of Defense or other relevant agencies. The purchase of explosives will only be possible having the registration with the supervisory authority.	General Mobilization Directorate of Ministry of Defense
Construction and Operation	<i>Supreme Decree N° 77</i>	Explosives	Each Contractor shall process the necessary permits for transport and storage in a powder magazine of explosives that are required in different working faces. The processing of such permits will be required at contractual level.	General Mobilization Directorate.
Construction and Operation	<i>Supreme Decree N° 379</i>	Liquid Fuels	The storage of fuels shall be made in storage tanks/drums, located in enclosures specially implemented, which will have containment dikes. Tanks will be tight, pressure and shock resistant and they will be stock up in an orderly manner, according to the provisions of this body of law. Signage indicating the presence of flammable products and the prohibition in and around the premises will be implemented.	Superintendence of Electricity and Fuels
Construction and Operation	<i>Statutory Decree N° 850</i>	Roads and Transport	Projects of crossings and joints with public roads shall comply fully with the requirements established by the Department of Roads, especially in regard to regulation of intersections, regulatory, preventive and , informative signs, and geometrical aspects such as radii of gyration and canalization. As for the temporary electrical installation, this will be made prior to authorization of Department of Roads.	Public Works Inspectors and Department of Roads

Project Phase	Applicable Environmental Rules	Environmental Component Involved – Regulated Element	Form of Compliance of Rules	Competent Enforcement Agency
Construction	<i>Supreme Decree N° 158, amended by Decree. N° 1910</i>	Roads and Transport	The Incumbent of the Project will monitor weight control permanently, to ensure compliance as stated in Supreme Decree N° 158 of January 1980, which sets the maximum gross weights on roads, and in decree N°200 of July 1993 and N° 396 of November 1993 establishing the maximum gross weights on urban roads. In both cases, they cannot exceed 45 tons.	Chilean Police and Public Works Inspector of Department of Roads of Ministry of Public Works (MOP)
Construction	<i>Resolution N° 1</i>	Roads and Transport	Trucks to be used shall conform to the dimensional limit set forth in this regulation, and cannot exceed the dimensions indicated on it, excluding the exterior mirrors and their supports. In the unlikely case of transport of equipment for the construction phase, whose size and/or weight involve an excess of the measurements given, an authorization will be requested for the Department of Roads and security measures to be adopted in each case will be agreed.	Chilean Police and Public Works Inspector of Department of Roads of Ministry of Public Works (MOP)
Construction and Operation	<i>Resolution N°19. Modified by Decree N°1.665</i>	Roads and Transport	In the unlikely case of transportation of supplies and equipment for the construction phase, whose size and/or weight involve an excess of the measurements given, an authorization will be requested for the Department of Roads and security measures to be adopted in each case will be agreed.	Public Works Inspector of Department of Roads of Ministry of Public Works (MOP)
Construction and Operation	<i>Exempt Decree N° 130</i>	Roads and Transport	The trucks to be used shall comply with the restrictions issued by this body of law, concerning the suspension of truck traffic greater than four tons on route G-25.	Chilean Police
Construction and Operation	<i>Exempt Resolution N°1.138</i>	Tourism Zone	Article 10 of Supreme Decree 95 states that the incumbent of a project shall submit an Environmental Impact Study, if his project or activity generates a significant alteration of scenic or tourist value of an area declared as such by the Law N° 1224. In this sense, the project enters the EIAS using this EIA, which states the prediction and assessment of the impact associated with tourist and environmental management measures that must be carried out to mitigate the intervention.	No enforcement
Construction and Operation	<i>Exempt Decree N°693</i>	Areas of Environmental Value	During the construction of the Project, the hunting of amphibians, reptiles, birds and wild mammals is prohibited, understanding it as the action or set of actions aimed at seizing wild animals, killing them. On the other hand, capture of any specie shall be prohibited, relative to the seizure of live wild animals. This, through the preparation of a regulatory procedure, based on this body of law, which shall be fulfilled by each of the Contractors and workers as a contract clause required by Gener.	Agriculture and Livestock Service

10.2.3 Sectorial Environmental Permits

PERMIT	Permit for the transport of radioactive materials in all modes of transportation by land, water or air, while such radioactive materials are not integral part of the jeans of transport.	
REGULATION	EIAS Regulation	Article 83
	Sectorial of Reference	Article 1 DS 12/ 85, Ministry of Mining.
AUTHORITY	Regional Secretariat of the Ministry of Health	
Relation with the Project		
<p>During the construction of PHAM, equipment of radioactive material will be used, which consists of nuclear density meter to track densities in the construction of roads. These devices are commonly used in these activities since many years, and are designed so as to work with them without causing negative effects on people. This equipment is not an integral part of the means of transport. Therefore, SEA 83 is applicable</p>		
Conditions for granting and technical and formal contents necessary to prove compliance		
<p>In the Environmental Impact Study or Statement, as applicable, the measures to avoid contamination by radioactive material during transport shall be indicated.</p> <p>The ordinary stewardships to be considered in its operation are:</p> <ul style="list-style-type: none"> - Transport of this equipment shall be conducted by appropriately qualified and authorized staff. - In its transfer there is an element fixed to the bodywork of the transport vehicle. - The operator will use the dosimeter that will indicate at what point he should stop operating the equipment (for the number of hours that has been operating). - The dosimeter shall be saved in a special place in the Laboratory of Control to prevent theft. - The truck carrying the equipment shall comply with the parameters set by the regulation to ensure or avoid contamination by radioactive materials. - The truck will have the corresponding maintenances as established by the manufacturer. <p>For those general aspects not covered by Supreme Decree N° 12/85, the provisions of security listed in Annex 32 "Prevention Plan of Risks and Contingencies" referred to prevention measures, including requirements on subcontractors, among them those responsible for the transport of hazardous substances to carrier's obligations and measures for vehicle and equipment.</p>		

PERMIT	Construction, alteration and extension of any public or private work aimed at the removal, treatment or disposal of sewage and wastewater of any kind.	
REGULATION	EIAS Regulation	Article 91
	Sectorial of Reference	Article 71 letter b) of D.F.L. 725/67, Health Code.
AUTHORITY	Health Service	

Relation with the Project

During the implementation of the project, wastewater from workers who work during the construction and operation phase of PHAM will generate. In the construction phase, these waters will be cleaned by a primary and secondary treatment in modular water treatment plants of the activated sludge type installed in each of the camps. Waters generated in working faces (chemical toilets) will be carried by the contractor through pit clearing trucks to the camps for further treatment. During the operation phase, the Project will use the existing facilities of Alfalfa and Maitenes plant.

Parallel to the generation of wastewater, during the construction phase liquid residues will be generated, which will be treated in each work facility using a sequential deposition system consisting of a settling pool that will allow the separation of liquid industrial residues in clear water and settleable sludge (see Annex 18).

Handling of both sewage and liquid industrial residues discharge will allow the fulfillment of parameters set out in the Supreme Decree 90, which establishes water quality requirements for different uses.

Conditions for granting and technical and formal contents necessary to prove compliance

c) In cases of sewage treatment plants:

c.1 Physicochemical and microbiological description of the flow to be treated:

The typical description of waste water generated both in the construction phase and in the operation phase is shown in the following table:

Physical and chemical characteristics of waste water

Parameter	Expected value
pH.	6 – 8
Temperature	20 °C
Total suspended solids	220 mg/l
Oils and fats	60 mg/l
OBD ₅	250 mg O ₂ /l
Total Phosphorous	10 mg/l
Dissolved iron	1 mg/l typical
Total Kjeldahl nitrogen	50 mg/l
Fecal coliforms or thermotolerant	107 NMP/100ml

c.2 The flow to be treated:

During the construction phase, an average of 65 m³/day will be generated per camp, considering a maximum quota of 400 workers¹ with an average generation of 150 L/day/worker².

The liquid residue generated during the construction phase of PHAM will basically consist of water with suspended solids, including sand, clay and concrete debris and cement residues.

The approximate coordinates and waterways where discharges of treated water at the various facilities will be carried out are listed below::

Coordinates and Waterways of Treated Water Discharges

Treatment Plant/ Sedimentation System	Type of treated water	Discharge waterway	Coordinates		Approximate distance to the waterway (m)
			East	North	
Nº 1 El Volcán area	Sewage and	El Morado stream	406.318	6.260.237	904

¹ An average number of 2500 workers is estimated in each camp.

² A reduction of 25% compared to that consumed.

	RILES				
Nº 2, El Yeso area	Sewage and RILES	Yeso River	398.485	6.273.314	551
Nº 3, Aucayes Alto area	Sewage and RILES	Aucayes stream*	368.115	6.284.027	3.300
Nº 4, Aucayes Bajo area	Sewage and RILES	Colorado River	384.754	6.289.884	423
Nº 5, substation area (or Las Lajas tunnel)	Sewage and RILES	Colorado River	379.801	6.287.377	20
Nº 6 - Caballo Muerto area	RILES	Colorado River	387.580	6.291.532	20
Nº 7 – Maipo River discharge area	RILES	Maipo River	368.110	6.284.026	22

* Downstream of water collection for human consumption.

All discharges included in the Project will have a record of parameters and frequency of measurement, in accordance with the provisions of Supreme Decree Nº 90/2000. Monitoring reports will be submitted to the Authority on a regular basis.

It should be noted that there is no housing or population that is supplied with the waterways, downstream from where discharges of treated water are planned. The following Table shows the localities nearer to the point of discharge of treated water and its source of supply as expressed in section 5.5.2.5 of the Baseline.

Localities Nearer to the Discharge Waterways of Treated Water and Source of Water Supply

Treatment Plant/ Sedimentation System	Discharge Waterway	Nearer Locality	Source of water supply to the locality
Nº 1	El Morado stream	Baños Morales	Springs**
Nº 2	Yeso River	Without nearer localities	-
Nº3	Aucayes stream*	Los Maitenes	Aucayes stream
Nº 4	Colorado River	Los Maitenes	Aucayes stream
Nº 5	Colorado River	El Alfalfal	Hualtatas ravine**
Nº 6	Colorado River	El Alfalfal	Hualtatas ravine**
Nº 7	Maipo River	El Manzano	El Manzano stream**

* Downstream of water collection for human consumption

** Without intervention by PHAM.

In Annex 15 a drawing is attached, which individualizes the areas where discharges of previously treated process water will be carried out.

c.3 Physicochemical and bacteriological description of the treated effluent when discharges to the receiving water body:

The physicochemical and microbiological characteristics of the treated water are shown in the following table:

Characteristics of the Treated Waste Water	
Parameter	Expected value
Ph	6 – 8
Temperature	25 to 29°C
Total suspended solids	80 mg/l
Oils and fats	20 mg/l
OBD ₅	35 mg O ₂ /l
Total Phosphorous	10 mg/l
Dissolved iron	5 mg/l
Total Kjeldahl nitrogen	50 mg/l
Fecal coliforms or thermotolerant	103 NMP/100ml

During the construction phase, waste water and liquid industrial residues will be discharged to surface watercourses in strict compliance with maximum limits set by the Supreme Decree N° 90/2001 that in its Table N° 1 sets "Maximum permissible limits for discharge of liquid residues into river water body." Additionally, the operational control of discharges will refer to Nch 1333 "Quality requirements of water for different uses." Although strictly speaking this rule does not apply to the use intended by the Project, its parameters will be considered as referent values for environmental monitoring, in addition to those established by the Supreme Decree 90/01.

c.4 The hydrological characteristics and quality of the receiving waterway, its current and planned uses:

- a. El Morado stream
 - Hydrological characteristics and quality

El Morado stream is one of the main contributors to El Volcán River. It has a hydrological regime of snow and glacial origin, and a mean annual flow of 1.71 m³/seg. The higher flows are generated between the months of November and March due to the rising of temperatures and the subsequent thaw (section 5.3.5.2 of EIA).

El Morado stream has high availability of dissolved oxygen (> 8,2 mg/l), high-speed runoff (0.66 – 0.96 m/s), high load of silt in transport and a substrate containing stones and boulders. The substrate has limited development of epilithic plants. In field campaigns, littoral macrophyte development in the waterway or the presence of fish was not observed (see details in section 5.3.5.2 of EIA).

- Current and planned uses

Currently there are no recreational activities associated with the waterway that may be impacted by the discharge of treated water in the area. Nor is there in such tranches infrastructure or tourism facilities likely to be affected.

This area highlights the presence of summer grazing area and pasture zones of seasonal use.

- b. Yeso River
 - Hydrological characteristics and quality

The hydrology of Yeso River, as mentioned in section 5.3.5.1 of EIA, indicates that in general the sub basin of the Yeso River has a water basin that provides 637 km² and consists of the main waterway of the same name and the secondary waterways related to ravines and streams that rise from the high peaks. The basin is regulated by El Yeso reservoir and has as major bodies Laguna Negra and Lo Encañado lagoon.

The annual average flow in natural regime of the sub basin of Yeso River is 10.99 m³/s. Of these, the water basin affluent to the reservoir provides an annual average flow of 8,1 m³/s.

From the point of view of the quality of water, Yeso River in the area of influence of the Project has a temperature of 12.5°C, under high availability of dissolved oxygen (8,7 mg/l), high-speed runoff (0,93 ± 0,16 m/s) and low load of silt in transport. The substrate is very heterogeneous, consisting of sand, gravel, pebbles and stone with abundant epilithic flora. In field campaigns, littoral macrophyte development was not observed (see details in section 5.3.5.2 of EIA).

- Current and planned uses

As indicated in Annex 10, on Yeso River there are some isolated houses (sporadic) whose main economic activity is livestock and grazing goats. Supply of drinking water in this area derives from the water collection from ravines. Also, there is no tourist infrastructure or equipment associated with the waterway likely to be affected by the development of PHAM.

Importantly, in the lower section of Yeso river, i.e., close to its confluence with Maipo River and particularly in summer, it is common to see visitors who engage in informal activities of picnic, adjacent to the waterway, which in this tranche occupies a broad box and has a very rocky substrate,

- c. Aucayes Stream
 - Hydrological characteristics and quality

The Aucayes stream corresponds to one of the main affluents of the Colorado River, its water is collected for the

generation of Maitenes Plant. Its mean average flow is of 0,81 m³/seg.

In terms of water quality, in Aucayes stream dominates the substrate of stones and boulders, without ephilitic flora development during the inspection campaigns. In addition, littoral macrophyte development was not observed. It has less flow than Colorado River and low load of suspended solids, which together with high availability of dissolved oxygen represents favorable habitat conditions for aquatic biota. Despite this, there is a low presence of fish. (See details sin section 5.3.5.2 of EIA).

- Current and planned uses

Currently, Aucayes stream waters are used to supply water for irrigation and human consumption for Los Maitenes town. Discharge of treated water in this area will be located downstream of the collection point so an alteration of the quality of water in such area is not expected.

Moreover the area has a low physical accessibility which determines the current uses of the waterway, with no infrastructure and tourism or recreational equipment associated with the waterway of Aucayes stream (see Annex 10).

d. Colorado River

- Hydrological characteristics and quality

As stated in section 5.3.5.1 of EIA, Colorado River arises in the high peaks of the Tupingato volcano (6.570 m.a.s.l.), receiving lately as main affluent Olivares River, which in turn arises from the glacial of the same name and from El Plomo hill (6.050 m.a.s.l.). After the confluence of the two rivers, Colorado River discharges eventually in Maipo River at an elevation of 890 m.a.s.l. This basin along with the basin of Yeso River represents the system that has more relevant as tributary of the Maipo River in the Andean.

The Colorado River Basin prior to the confluence with Maipo River is more flat with an approximate height of 1.000 m.a.s.l. At this point, the basin has received contributions from the streams of the upper Colorado River, Olivares River and Cabeza de León, Temblor and Aucayes streams.

The flow behavior in this tranche shows the maximum in the month of January with 64.17 m³/sec, while the minimum flow is in the month of July with 16.87 m³/sec. The annual average flow is 32.75 m³/sec. which transforms the Colorado River in one of the main feeders to the Maipo Basin.

Regarding water quality, Colorado River in the area of influence of the Project has high availability of dissolved oxygen (8.2 – 8.4 mg/l), high-speed runoff (0.70 – 0.72 m/s) and high load of silt in transport, which represents an unfavorable habitat conditions for the development of ichthyofauna . (See details in section 5.3.5.2 of EIA).

- Current and planned uses

As indicated in Annex 10, along the tranche of Colorado River there is no infrastructure and tourism and recreational equipment associated with the river. In the waterway, seasonal informal activities are not recorded that are likely to be affected by PHAM. Water supply for the towns of Los Maitenes and El Alfalfal is made from the Aucayes streams and Hualtatas ravine, which will not be intervened by the Project (see Chapter 2)

c.5 The characterization and method of handling and disposal of sludge generated by the plant:

Typical characterization of the effluent of the wastewater treatment plant in modular treatment plants is shown in the following table.

Characteristics of the sludge originated from the wastewater treatment plants

Características de los lodos			
	Lodos Primarios	Secundarios (F.A.)	Digeridos (mezcla)
S.S g/hab. d	30-36	18-29	31-40
Contenido de agua (%)	92-96	97,5-98	94-97
S.S.V (% S.S)	70-80	80-90	55-65
Grasas (% S.S)	12-16	3-5	4-12
Proteínas (% S.S)	4-14	20-30	10-20
Carbohidratos (% S.S)	8-10	6-8	5-8
pH	5,5-6,5	6,5-7,5	6,8-7,6
Fósforo (P) (% S.S)	0,5-1,5	1,5-2,5	0,5-1,5
Nitrógeno (N) (%S.S)	2-5	1-6	3-7
Bacterias patógenas (N° por 100 ml)	10 ³ -10 ⁵	100-100	10-100
Organismos parásitos (N° por 100 ml)	8-12	1-3	1-3
Metales pesados (% S.S) (Zn, Pb, Cu)	0,2-2	0,2-2	0,2-2

During the construction stage, handling of sludge from wastewater treatment plants considers the temporary collection of them in containers specially made for this purpose, and provided by the same treatment plant. Subsequently, these receptacles will be removed periodically by the contractor for transportation and disposal in approved sites. Because municipality does not currently have a dump or authorized landfill, the sludge will be transferred to one of the authorized sites listed in Annex 18. Furthermore, the Contractor shall have a control record of the volume of the sludge disposed of. The documents related with this record will be available to the authority at his request.

In turn, in the operation stage, sludge from the wastewater treatment plants will not be generated.

Settleable sludge, from settling ponds, will be removed from the bottom of the pools through mechanical means and transported in trucks of 8 m³ capacity, throughout the construction phase. It is estimated that the frequency of settleable solids removal will be every 15 days. This frequency will be confirmed once there is an engineering design of facilities. During the operation phase, settleable solids will not be generated.

PERMIT	Permit for the construction, modification and extension of any treatment plant of garbage and waste of any kind; or for the installation of any place intended for the accumulation, selection, industrialization, trade or disposal of garbage and waste of any kind.	
REGULATION	EIAS Regulation	Article 93
	Sectorial of Reference	Articles 79 and 80, Health Code
AUTHORITY	Health Service	
Relation with the project		
During the construction phase of the project, solid residues typical of this activity will be generated and household waste generated in the camps. For this, the Project will enable sites for temporarily accumulation of these residues according to what is shown below.		
In the Environmental Impact Study or Statement, as applicable, the appropriate measures to control those factors, elements or agents of the environment that may affect the health of inhabitants, according to		
a)	General Aspects:	
a.1.	Waste and Type of Treatment. In Annex 18, "Waste Management Plan for work sites, tasks and camps" the types of treatment for each waste generated during project implementation are described in detail.	
a.2.	Location and terrain features. The location of the sites of temporary accumulation of waste is indicated in Annex 18 "Waste Management Plan for work sites, tasks and camps."	
a.3.	Qualitative and quantitative characterization of waste. Qualitative and quantitative characterization of the waste is described in Annex 18 "Waste Management Plan for work sites, tasks and camps."	
a.4.	Existing and planned civil works. Design and technical specifications of premises for garbage and salvage yards projected by PHAM are listed in Annex 18 "Waste Management Plan for work sites, tasks and camps."	
a.5.	Prevailing winds. In Chapter 5 of the Baseline, the meteorological component of the sector of the camp sites.	
a.6.	Methods of control and management of particulate matter, gaseous emissions, particles of the access and internal roads that are intended to implement, and odors, noise, liquid emissions and vectors. The methods of environmental management to be carried out both in salvage yards and temporary accumulation premises of household wastes are described in Annex 18 "Waste Management Plan for work sites, tasks and camps." Notwithstanding the foregoing, a general description of the control measures to be implemented is provided below:	
	<ul style="list-style-type: none"> - <u>Control measures to odors, sanitary vectors:</u> Mainly in the temporary accumulation premises of household wastes in which residues will be temporarily accumulated in specially built containers, with lids to prevent the arrival of rodents and odor emissions in camps facilities. These containers will be removed and exchanged for clean ones by the contractor every 3 days to be transferred to an approved landfill. Moreover in the premises (of container type) where the containers will be arranged, it is necessary to keep them closed at all times, with permanent cleanliness. Finally, in the salvage yards, the generation of bad odors and sanitary vectors are not expected because the material is inert. - <u>Noise Emissions:</u> Associated with management of solid residues of the construction. One point worth noting is the absence of inhabited areas near the camp site location, where the salvage yards will be located. Modeling of the sound pressure levels makes possible to say that the project will fully comply with current standards (Supreme Decree 146/97 MINGSEGPRES. However, to avoid emissions of noise, trucks and machinery close to the salvage yards will travel at restricted speeds (30 km/h) and will have their technical review in effect. 	

a.7. Hydrological and hydrogeological characteristics.

In Chapter 5 of baseline, the hydrological and hydrogeological component of the fields defined for enabling camps. Note that in Chapter 2 the location criteria of both sites and the security and environmental measures are indicated.

a.8. Risk prevention plans and accident control plans, emphasizing the security and control measures of fires, spills and leaks of compounds and residues.

A complete Health and Safety Management Plan of PHAM is attached in Annex 32 of EIA:

a.9. Management of residues generated inside the plant.

Management of waste generated during the construction phase of PHAM is indicated in Annex 18 "Waste Management Plan for work sites, tasks and camps."

In the case of storage of waste, in addition to that mentioned in setter a):

f.1. Characteristics of the premise.

Please refer to Annex 18 "Waste Management Plan for work sites, tasks and camps."

f.2. Establishing methods of storage, such as in bulk or in containers.

Please refer to Annex 18 "Waste Management Plan for work sites, tasks and camps."

PERMIT	To conduct fisheries research needed to monitor the conditions of hydrobiological species populations in implementing the Environmental Monitoring Plan.			
REGULATION	EIAS Regulation	Article 95, DS N°95/02, EIAS Regulation		
	Sectorial of Reference	Title VII Law N° 18.892, General Law of Fisheries and Aquaculture		
Relation with the Project				
During the operation phase of the project, an Environmental Monitoring Plan will be implemented, which will require fishing of some specimens, according to what has been described in section 8.3.4 of Chapter 8, of this EIA.				
Conditions for granting and technical and formal contents necessary to prove compliance				
In the Environmental Impact Study or Statement, as the case may be, the characteristics of the establishment shall be identified, in consideration of:				
a) Hydrobiological species that are expected to catch, indicating specifically whether they are introduced or native, and conservation status.				
Hydrobiological species that will be monitored are those recorded in the baseline campaign (see section 5.4.3, chapter 5, where conservation category is indicated). Notwithstanding the foregoing, it is possible to detect new species, resulting from sampling of rivers and streams due to the implementation of the Environmental Monitoring Program indicated in Chapter 8 of EIA. Of these new species, the main species that are expected to detect in those areas defined for monitoring are shown in the following table:				
Identification of the Species that are Expected to Catch				
	Species	Common Name	Conservation Status, national level	Regional Distribution
	<i>Trichomycterus areolatus</i>	Pencil catfish	Vulnerable	II to X
	<i>Nematogenys inermis</i>	Catfish	Endangered	IV to X
	<i>Galaxias maculatus</i>	Puye	Vulnerable	III to XII
	<i>Cauque mauleanum</i>	Cauque	Vulnerable	IV to X
	<i>Cheirodon pisciculus</i>	Pocha	Vulnerable	III to VIII
	<i>Diplomystes chilensis</i>	Tollo de agua dulce	Endangered	IV to X
	<i>Basilichthys australis</i>	Southern silverside	Vulnerable	V to X
	<i>Percichthys trucha</i>	Creole perch	Vulnerable	IV to XII
	<i>Percichthys melanops</i>	Perch-like fish	Endangered	IV to VIII
	<i>Percilia gillisi</i>	Carmelita	Vulnerable	IV to X
b) Identification of fishing areas, including letter IGM 1:50.000.				
Fishing will be done in the following areas: <u>Waterways</u> : Downstream of the planned Works of Colorado and Yeso Rivers, and Aucayes Stream				
c) Identification of the art, fishing tackle or system, and its characteristics.				
Generally for these activities, the collection of fish will be made with electrofishing equipment. The equipment consists of a 3-A and 220 Volts AC generator that allows the extraction of simples without damage and consequently their return to the environment. The generator is connected to a pair of electrodes that are introduced to produce the discharge, and with the help of nets or seine nets are drawn for in situ measurements and laboratory analysis.				
d) Catch methodology and analysis to be applied.				
A description of the fish assemblage and a characterization of the physical and chemical conditions relevant to the presence and development of the ichthyofauna will be made. A sample of fish will be taken in the sampling areas above mentioned.				
For the description of the fish assemblage, at each sampling site a tranche of about 50 and 100 linear meters will be covered, in the bank area of each river and stream, where an effort to search for fish during 20 minutes with electrical fishing will be made. With this effort, a maximum number of 10 specimens of each taxon would be collected in each sampling site, being returned to their environment surplus specimens. Samples will be taken to the laboratory for taxonomic identification and measurement of morphological pattern. Sexual ratio (males N° / females N°) by specie and Condition Factor (K) and Condition Factor (Lagler 1956) will be determined.				

For the description of fish habitat, measurements in situ of physical, chemical and biological patterns will be made. There will also be a description of the accompanying aquatic flora and of the presence of benthic fauna as a food source for fish.

e) Expected results.

The purpose is to verify that the measures outlined in the Environmental Management Plan are appropriate and sufficient; to show that the condition of the environment elements will evolve as set out in the respective assessment, and to certify compliance with the environmental standards that were applicable.

f) Schedule of activities related to fisheries research, indicating the delivery dates of reports to Secretariat of Fisheries and National Fisheries Service.

According to the provision of section 8.3.4 of chapter 8 of this EIA. In this regard, monitoring reports and/or results will be submitted to the competent body.

PERMIT	Permit for the construction of hydropower Works referred to in Article 294 of the Water Code	
REGULATION	EIAS Regulation	Article 101
	Sectorial of Reference	Article 294, DFL N°1.122, Water Code
Authority	General Directorate of Water	
Conditions for granting and technical and formal contents necessary to prove compliance		
<i>In the Environmental Impact Study or Statement, as applicable, measurements, conditions and background shall be identified so as to verify that the work will not produce water pollution.</i>		
<p>The works referred to in the permit and that are considered in the development of PHAM are:</p> <ul style="list-style-type: none"> - Forebay of Las Lajas power station, with a capacity of 300,000 m3 (letter a, Article 294, DFL N°1.122). This work is described in section 2.2.2 “surface works” of chapter 2, and is designed to regulate water from discharge of Alfalfa II power plant and from Maitenes collection for the operation of Las Lajas power plant. - Works for driving water resources to tunnels and flumes (letter b, Article 294, DFL N°1.122). - Siphons crossing Colorado and El Yeso Rivers (letter d, Article 294, DFL N°1.122). 		
<p>Constructability characteristics</p> <p>Construction of the works will be made as described in section 2.3.2 “Construction Phase”. In relation with measures of environmental safety and safeguards during the construction phase, those described in chapters 6, 7 and 8 of this EIA are applicable.</p>		
<p>Measures of environmental stewardship</p> <p>In general, measures of environmental stewardships for these Works shall be those described in chapters 2, 6 and 7 of EIA and in Annex 32 “Risk Management and Contingency Planning for contractors”. These environmental protective measures include, among others:</p> <ul style="list-style-type: none"> - While carrying out Works in waterways special precautions to prevent accidental spills, such as: to avoid storing of lubricant drums in the waterway or close to it, and prohibit parking of machinery in the waterway. - The Contractor shall be absolutely forbidden to throw any item and/or waste to the water of pond. - Use of water for washing that could produce carrying of solids or contaminant. 		
<p>In case of accidental spillage of fuel or hazardous substances (as listed in D.S. 382/2004), on natural resources as water and soil, or on private property (oils, lubricant and paints), PHAM will take the following measures:</p> <ul style="list-style-type: none"> - Communication Plan will be activated - Evacuation procedure (if applicable) will be activated - The emergency will be sized up, magnifying the spill event (mild, serious, severe) - Promptly cleaning and removal of affected soil shall be done (in case of spillage on the shore). For this, there will be a necessary implementation for removal of spilled material, such as shovels, machinery, pumps, and temporary storage tanks, as required. Also, procedures set forth in the MSDS for the spilled substance shall be followed. 		
<p>While it is anticipated that any accidental spill will have a low or mild magnitude, considering the type and quantity of hazardous material, planned response procedures will allow the occurrence of a significant impact.</p>		

PERMIT	Permit to cut or exploit native forest, in any type of soils, or plantations located on land suitable for forestry	
REGULATION	EIAS Regulation	Article 102
	Sectorial of Reference	Article 21 Law Decree N° 701, on Forest Development
Authority	National Forestry Commission	
Relation with the Project		
The implementation of PHAM will require an area of 31.26 ha of sclerofyllous forest, for works and work areas located on the Colorado Basin (see Figures 5.4.1.3.21 a la 5.4.1.3.31, Chapter 5).		
Conditions for granting and technical and formal contents necessary to prove compliance		
<i>In the Environmental Impact Study or Statement, as applicable, reforestation of an area equal to, at least, the cut or exploited area.</i>		
<p>According to the measures proposed by the project, the vegetation restoration of the areas to be cleared for the installation of works and of the site works areas under elevation 1,500. This through the implementation of a Forest Management Plan for reforestation of areas which are sclerofyllous forest, ensuring the regeneration capacity and biological diversity of the area.</p> <p>Such Management Plan is attached in Annex 7 of this EIA, and contains all the technical requirements for the environmental authority in this matter.</p>		

PERMIT	Permit for regularization and defense works of natural waterways	
REGULATION	EIAS Regulation	Article 106
	Sectorial of Reference	Article 171 of Statutory Decree N° 1.122, Water Code
Authority	General Directorate of Water	
Conditions for granting and technical and formal contents necessary to prove compliance		
The Project includes the construction of river defenses associated with the construction of the following works::		
Detail of Works requiring Sectorial Environmental Permit (PAS 106) and its localization coordinates		
	Work	Localization in UTM coordinates
	El Yeso Bridge (access VA4 Encañado)	397265,40 6271895,80
	Manzanito Bridge N°1 (access VA4)	395863,90 6271993,50
	Colorado River Bridge- Las Puertas Area	376630,11 6285519,89
	Aucayes Bridge	385015,00 6287297,00
	Discharge work into Maipo River and muck disposal 12	368147,00 6284072,00
	Discharge into Yeso River	399446,50 6273667,70
	Waterway rectification in Colorado River- Forebay Area	388858,50 6292371,10
	La Engorda Stream Water Intake	407468, 20 6259751,10
	Colina Stream Water Intake	407180,20 6260084,70
	Las Placas Stream Water Intake	406797,00 6260792,00
	Morado Stream Water Intake	405788,50 6261175,50
	Yeso River Water Intake	399669,40 6274117,00
According to the permit requirements of this EIA, appropriate environmental measures for this works shall be identified, in consideration of:		
a) The submission of a sketch of general location..		
In Annex 1 "Layout of Project and detail of Works" and Annex 8, "Technical Background relating to Sectorial Environmental Permit 106" of EIA, general and specific location of the works are included.		
b) The submission of a floor layout of the modified area, comprising at least one hundred meters (100 m) before and one hundred meters (100 m) after of the modified area.		
In Annex 8, Technical Background relating to Sectorial Environmental Permit 106" of EIA, floor layouts of the modified areas is included.		
c) The submission of a longitudinal profile of all the tranche above mentioned.		
In Annex 8, Technical Background relating to Sectorial Environmental Permit 106" of EIA, longitudinal profiles of the modified areas is included.		
d) The submission of a transversal profile of the typical section and the critical section of the waterway to be modified.		
In Annex 8, Technical Background relating to Sectorial Environmental Permit 106" of EIA, transversal profiles of the typical section and the critical section of the waterways to be modified.		
e) The submission of a transversal profile of the typical section and the critical section of the waterway projected.		
The only work that requires permanent deflect of the waterway is the Forebay of Alfalfal, located in the Colorado River Basin. In this regard, the submission of a transversal profile of the typical section and the critical section of the projected waterway are attached in Annex 8, Technical Background relating to Sectorial Environmental Permit 106" of EIA,		
f) The indication of engineering structures, if any, in the tranche to be modified.		
In the tranche where river defenses will be located, there are no engineering structures.		

g) The description of the planned works:

Please refer to section 2.2.2 of Chapter 2 and Annexes 1 and 8, attached to this EIA.

h) And technical specification report containing the necessary hydraulic calculations, including, at least, the calculation of maximum capacity of the waterway without modification and the calculation of maximum capacity of the waterway modified.

Please refer to Annex 8, attached to this EIA.

10.3 CHAPTER 7 ENVIRONMENTAL MANAGEMENT MEASURES INDEX CARDS

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Construction Phase						
Alteration of air quality	Table 7.1.1, section, Chapter 7	Air quality	Transit of trucks and light vehicles.	COMPENSATION Improving of the existing access routes to the Project area through the reconstitution of the platform (with a leveled granular pavement), plus magnesium chloride irrigation (Bischofite) and installation of roadside signs and defenses.	In the current paths to the project area, corresponding to 22 km the tranche of Road G-455, between Road G-25 and El Yeso Reservoir, and 21 km of the tranche of Road G-25.	Environmental Survey Reports
			Transportation of material	MITIGATION The trucks moving material out of the work sites shall be covered with tarps to prevent the release of material	During the construction phase/ In all working faces/ Contractual requirements to the contractor.	Environmental Survey Reports, terms of reference of contracts.
			Earthmoving and transit of trucks and light vehicles	MITIGATION Inner surfaces of the work, platforms and working faces will be moisten, particularly in dry season.	During the construction phase/ In all working faces/ Contractual requirements to the contractor.	Environmental Survey Reports, terms of reference of contracts.
			Transit of trucks and light vehicles.	MITIGATION The contractor will be instructed to keep the engines off in case of trucks parked for a long time in the work.	During the construction phase/ In all working faces/ Contractual requirements to the contractor.	Environmental Survey Reports, terms of reference of contracts.
			Management of waste from the construction tasks.	MITIGATION Burning of waste and combustible material is forbidden (wood, excess of vegetation material, paper, leaves or debris o any other waste origination in the construction phase) in the open air during execution of the Works. Food must be heated with gas or electrical appliances.	During the construction phase/ inside of camps and working faces/ Contractual requirements to the contractor.	Environmental Survey Reports, terms of reference of contracts.

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Increased sound pressure level	Table 7.1.1, section, Chapter 7	Noise	During the construction tasks of Alfalfal waterway and access gate to the powerhouse cavern of Las Lajas Power Plant	MITIGATION Acoustic barriers will be implemented, with which an attenuation between 10 and 15 dB(A) is expected. This screen will be built in opaque panel and without acoustic leaks, with a 15 kg/m ² of density, OSB wood, Plywood.	During the construction phase/ In sites of tasks in Alfalfal area/ Contractual requirements to the contractor.	Environmental Survey Reports, terms of reference of contracts.
			During construction tasks where noisier machinery is used (cranes, generator set, compressors, jack hammers)	MITIGATION To generate specific semi-enclosures for noisier machinery. These screens consist of side enclosures of plywood panel, panel boards or boards	During the construction phase/ In sites of tasks in Alfalfal area/ Contractual requirements to the contractor.	Environmental Survey Reports
			During construction tasks of Alfalfal flume and works of Las Lajas Power Plant	MITIGATION Prioritize the development of tasks in surface during daytime (8:00 – 21:00 h).	During the construction phase/ In sites of tasks in Alfalfal area/ Contractual requirements to the contractor.	Environmental Survey Reports, terms of reference of contracts
			During construction tasks of Alfalfal flume and works of Las Lajas Power Plant	MITIGATION Machinery used will be reviewed and tested by contractor in order to detect mechanical flaws that could alter stated noise levels. This will be established in the contracts.	During the construction phase/ In sites of tasks in Alfalfal area/ Contractual requirements to the contractor.	Environmental Survey Reports/ Technical Review

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Increased sound pressure level	Table 7.1.1, section, Chapter 7	Noise	Construction tasks at sites near populated areas	MITIGATION Before commencement of works, eight sensitive points of the project "Work Program of Execution of Works" will be shown to the nearby community, to reduce impacts and minimize the trouble that the Project activities could cause to the community. This program will also be distributed through informational brochures.	During construction phase/ At task sites near the 8 sensitive points identified by the Project/ Contractual requirements to the contractor.	Environmental Survey Reports, terms of reference of contracts/ Copies of notifications/ Registration of complains from the community.
			Construction tasks at sites near populated areas	MITIGATION A noise monitoring will be conducted according to the procedure set forth by Supreme Decree N° 146/97 of MINSEGPRES, in order to verify compliance with maximum permissible sound pressure level.	During construction phase/ At task sites near the 8 sensitive points identified by the Project/ Contractual requirements to the contractor.	Environmental Survey Reports
			Blasting activities	MITIGATION Contractor of works will instruct about the sensitivity to be shown on the attitude of the recipients. In this regard, owners shall be notified in writing about the need to conduct such tasks, duration of them and time of execution.	Prior to the implementation of these activities / At nearby populated areas to the work sites/ Contractual requirements to the contractor.	Copies of notifications/ Registration of complains from the community/ Environmental Survey Reports
				MITIGATION A monitoring program of sound and vibration associated with blasting described in section 8.2.2 of Chapter 8.	During construction phase/ At task sites near the 8 sensitive points identified by the Project/ Contractual requirements to the contractor.	Environmental Survey Reports

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Temporary modification of waterways and/or water quality	Table 7.1.1, section, Chapter 7	Water quality	Construction of bridges	MITIGATION The location of bridges will be made minimizing the intervention of the waterway. The Project has defined the optimal cross-section relative to the width of the bridge.	During the construction phase/ Areas of bridge constructions in Yeso and Colorado Rivers/ Contractual requirements to the contractor.	Environmental Survey Reports, terms of reference of contracts
			Discharge of treated water	MITIGATION Treated sewage and waste water will be discharged to the waterways indicated in section 3.3.2, pursuant to DS 90/2001. This provision shall be made exclusively in winter, because it is anticipated that the rest of the year, such water will be reused in construction process or used for surface irrigation.	During the construction phase/ waterways near camps and temporary facilities/ Contractual requirements to the contractor.	Environmental Survey Reports, terms of reference of contracts
			Construction works in waterways	MITIGATION Priority will be given to the construction works in waterways at the end of summer and early fall.	During the construction phase of works/ In waterways / Contractual requirements to contractor	Environmental Survey Reports, terms of reference of contracts.
			Construction works in rivers and streams	MITIGATION Tasks on the bank of rivers and streams will be restricted to the minimum possible, ensuring also that the stocking of construction materials (pipes, concrete, others), machineries and temporary parking of trucks is not conducted on the bank of the river.	During the construction phase of works/ In rivers and streams / Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Temporary modification of waterways and/or water quality	Table 7.1.1, section, Chapter 7	Water quality	Construction works in waterways	MITIGACIÓN The contractor's schedule shall ensure that works in waterways have a short duration and limited spatial expression.	During the construction phase of works/ In waterways / Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.
			Construction works in waterways	MITIGACIÓN While carrying out the works in waterways, special precautions will be required to prevent accidental spills, such as: to avoid the stocking of lubricant drums in the waterway or close to it, and prohibit parking of machineries in the waterway.	During the construction phase of works/ In waterways / Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.
			Construction works in waterways	MITIGACIÓN The execution of tasks in waterways will be minimized, ensuring that the pieces that shall made up the crosscut are assembled in other authorized sites and later transferred when carrying out the construction task.	During the construction phase of works/ In waterways / Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.
			Construction works in waterways	MITIGACIÓN While carrying out the works in waterways, special precautions will be required to prevent accidental spills, such as: to avoid the stocking of lubricant drums in the waterway or close to it, and prohibit parking of machineries in the waterway.	During the construction phase of works/ In waterways / Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.
			Construction works in Lo Encañado Lagoon area.	MITIGACIÓN La Negra Lagoon as a "restricted zone" for PHA, shall have restriction of access for workers.	During the construction phase of works/ Lo Encañado Lagoon area/ Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Intervention of Vegetation	Table 7.1.1, section, Chapter 7	Flora and Vegetation	Construction works of the project	MITIGACIÓN Almost all permanent civil works of PHAM will be underground, thereby reducing surface requirements and consequently minimizing the removal of vegetation.	During the construction phase of works / In tasks areas / Contractual requirements to contractor	Environmental Survey Reports, terms of reference of contracts.
			Construction works of the project	MITIGACIÓN Special training for contractor personnel focused on the identification, preservation value, associated legislation, protective actions and sanctions will be conducted.	Before and during the construction phase of works/ associated with the entire Project area where sclerofyllous and Andean vegetation/ Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts, register of attendance at training.
			Preparation of environmental studies and project pre-feasibility	MITIGACIÓN The location of temporary facilities and camps has considered the environmental sensitivities of the area..	Before the construction phase of works / Areas of localization of temporary facilities and camps/ Contractual requirements of the contractor.	Environmental Survey Reports, terms of reference of contracts.
			Establishment of construction work sites	MITIGACIÓN Recuperation of sector using a surface scarification, and maintenance of stubbles or plant residues in situ. In low areas, where appropriate, these areas will be reforested in accordance with the respective management plans.	During establishment of work sites and/or camps. / In areas affected by the temporary facilities and camps/ Contractual requirements to contractor	Environmental Survey Reports, terms of reference of contracts.

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Intervention of Vegetation	Table 7.1.1, section, Chapter 7	Flora and Vegetation	Construction works in alto Volcán area	MITIGACIÓN Water intakes of the "high range" type will be used. This will avoid interruption of drainage or runoff in those anastomosed courses, providing irrigation to points downstream of the projected collections. Moreover, the underground conduction flume will have drains above and below it to facilitate surface drainage.	During the construction phase of works / in collection of alto Volcán area/ Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.
			Construction works in alto Volcán area	MITIGACIÓN The location of water intakes is projected to the lower elevation as possible, thus avoiding intervention of grassland environment that develops more fully in the area where water courses form a dispersed runoff.	During the construction phase of works / Colina, La Engorda and Las Placas streams, in summer grazing area/ Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.
			Execution of construction works	COMPENSATION The Project Owner shall make the respective management plants to qualify for the permit for cutting and reforestation.	Before and during the construction phase of works/ in those units that are woods and where the project works are located/ Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts, degree of progress in management plans.
			Preparation of Management Plan	COMPENSATION The management Plan considers a total area of reforestation of 36 HA (see details in section 6.4.1.5 y Annex 7).	Before the construction phase of works/ in those units that are woods and where the projects works are located/ Contractual requirements to contractor	Environmental Survey Reports, terms of reference of contracts

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Intervention of Vegetation	Table 7.1.1, section, Chapter 7	Flora and Vegetation	Execution of construction works	COMPENSACIÓN It is agreed within the management plans, to take measures that ensure its success, such as: periodic irrigation, installation of individual protections, control of lagomorphs (hares and rabbits), fertilization, etc.	During the construction phase / in those areas defined for reforestation / Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts
			Execution of construction works of the project	COMPENSATION Species in conservation category <i>Porlieria chilensis</i> and <i>Kageneckia angustifolia</i> , shall be compensated with a ratio of 10 specimens for each intervened specimen.	During the construction phase / in those areas defined for reforestation / Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts
			Execution of construction works of the project	COMPENSATION The specie <i>Eriosyce (Neoporteria) curvispina</i> shall be compensated with a ratio of 10 specimens for 1 and all affected individuals will be transplanted.	During the construction phase / in those areas defined for reforestation / Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts
			Execution of construction works of the project	COMPENSATION The incumbent will formulate a Restoration Plan of vegetation to stabilize soils after the works and restore as far as possible the existing vegetation for purposes of erosion control, visual mitigation and wildlife habitat restoration.	Before the construction phase of works/ in those units that are not woods and where the projects works are located/ Contractual requirements to contractor	Environmental Survey Reports, terms of reference of contracts
			Execution of construction works of the project	The restoration Plan shall provide for the implementation of Micro-routings in which a visual inspection of the species in conservation category and other individuals that can be rescued will be conducted. The outcomes will be presented later to Agriculture and Livestock Service (SAG) and National Forestry Commission (CONAF). During micro routing, areas where it is possible to implement measures to restore vegetation will be defined.	Before the commencement of works / in working faces and transit areas close to the works located in units where these species can be found/ Contractual requirements to contractor through the inspection of the area with a specialist.	Environmental Survey Reports, terms of reference of contracts, specialist reports

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Intervention of Vegetation	Table 7.1.1, section, Chapter 7	Flora and Vegetation	Execution of construction works of the project	MITIGACIÓN/COMPENSACIÓN For the success of the restoration of vegetation, a Nursery Plan for species is considered. Annex 29 includes details of this measure and the list of species subject to nursery techniques.	At the beginning of the construction phase / Location defined in conjunction with the Authority / Contractual requirements to contractor through the inspection of the area with a specialist.	Environmental Survey Reports, terms of reference of contracts, specialist reports
			Execution of construction works of the project	MITIGACIÓN/COMPENSACIÓN The Restoration Plan considers incorporating revegetation Plans of muck disposal and camps, embankments and platforms for accessing to the tunnels.	During the construction phase/ In muck disposal, camps, embankments and platforms for accessing to the tunnels/ Contractual requirements to contractor through the inspection of the area with a specialist.	Environmental Survey Reports, terms of reference of contracts, specialist reports
			Execution of construction works of the project	MITIGACIÓN/COMPENSACIÓN Removal, reserve and restoration of the surface layer.	Before the commencement of works / In La Engorda summer grazing area / Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.
			Execution of construction works of the project	MITIGACIÓN/COMPENSACIÓN The use of drains on the raceway that will be located in La Engorda summer grazing area, will avoid interruption of drainage or runoff of water in those anastomosed courses..	During the construction phase/ In La Engorda summer grazing area / Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.
			Execution of construction works of the project	MITIGACIÓN/COMPENSACIÓN The verification of the expected effects will be done through a monitoring of vegetation.	During the construction phase/ In La Engorda summer grazing area / Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Intervention of Vegetation	Table 7.1.1, section, Chapter 7	Flora and Vegetation	Execution of construction works of the project	MITIGACIÓN/COMPENSACIÓN The Contractor will be instructed to use unrestrictedly or exclusively circulation routes of personnel that will be implemented.	Before the commencement of works / In alto Volcán summer grazing area / Contractual requirements to contractor and trainings.	Environmental Survey Reports/ Register of Training/ terms of reference of contracts.
			Execution of construction works of the project	MITIGACIÓN Regarding the harvested timber due to cutting and grubbing-up, trunks and main branches of trees and shrubs will be cut and disposed of as firewood for community use.	Before the commencement of works / in areas of direct intervention of works/ Contractual requirements to contractor and trainings.	Environmental Survey Reports, terms of reference of contracts.
			Execution of construction works of the project	MITIGACIÓN Thinner branches, twigs, leaves and other plant debris will be chipped and scattered in the areas of soil stocking together with the organic layer of soil, to increase organic matter with the purpose of improving the development of plants in restoring vegetation.	Before the commencement of works / in areas of direct intervention of works and areas of soil stockpile/ Contractual requirements to contractor and trainings.	Environmental Survey Reports, terms of reference of contracts.
			Execution of construction works of the project	MITIGACIÓN PHAM will establish restriction zones in La Engorda summer grazing area offsite location of physical works.	Before the commencement of works / In La Engorda summer grazing area / Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts, restriction area warning signs.

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Intervention of Vegetation	Table 7.1.1, section, Chapter 7	Flora and Vegetation	Execution of construction works of the project	MITIGACIÓN Vegetation removed from works and facilities areas (clearing), i.e. stubbles and branches will be disposed in surrounding areas that have from zero to very low vegetation cover, thus preventing their transport and disposal into a dump.	During works construction/ areas of installation temporary facilities carried out over 2,000 m.a.s.l. Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.
			Execution of construction works of the project	MITIGACIÓN / COMPENSATION For sites affected by the installation of temporary facilities and camps, at an early stage a recovery in such sectors by scarifying the surface, and maintenance of stubbles or plant remains <i>in situ</i> are considered.	During works construction/ in temporary facilities or camps / Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.
			Execution of construction works of the project	PREVENCIÓN The specie <i>Austrocedrus chilensis</i> (Andean Cypress), has not been considered as an impacted specie because it is not present in the area directly affected by the project. Notwithstanding the foregoing, the Contractor who participates in the works of Yeso River sub-watershed will include information about this specie and its restricted location in the municipality, in the planned environmental training.	Before the commencement of works / in works of Yeso River sub-watershed/ Contractual requirements to contractor and training.	Environmental Survey Reports/ Register of Training/ terms of reference of contracts
			Execution of construction works of the project	COMPENSATION All individuals belonging to species in conservation category will be replaced with a ratio of 10 specimens for each intervened individual, including individuals of tree species that are not in the area covered by the Forest Management Plan.	Before the commencement of works / in areas of direct intervention of Project/ Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts.

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Intervention of Vegetation	Table 7.1.1, section, Chapter 7	Flora and Vegetation	Execution of construction works of the project	MITIGATION / COMPENSATION 30% of individuals of Guayacan (approx. 170 individuals) higher than 1 m, which must be removed due to works of the project, will be transplanted, as an experimental measure. A record of transplanted individuals will be made, indicating date, size of the individuals and relocation sites.	At the beginning of the construction phase/ in those areas defined for reforestation/ Contractual requirements to contractor.	Environmental Survey Reports, terms of reference of contracts
Local movement of fauna species	Table 7.1.1, section, Chapter 7	Fauna	Design of works and location of temporary facilities, camps and muck disposal sites.	MITIGATION Redesign of works and location of temporary facilities and camps, and muck disposal sites, according to environmental criteria, so as to minimize disturbance of habitats of greatest concentration of fauna.	During the construction phase of works/ In temporary facilities and camps, and muck disposal site/ Contractual requirements to contractor.	Environmental Survey Reports
			Works near restriction areas	MITIGATION Restriction zones will be defined for Contractors. This is based on the principle that the maintenance of vegetation in an undisturbed state as possible, or its recovery, will ensure the maintenance of habitats and, consequently, the survival of local fauna.	During the construction phase of works/ In all working sites/ Contractual requirements to contractor	Environmental Survey Reports
			Construction works in streams intervened by the Project	MITIGATION Maintenance of an ecological flow (Qe) as a multipurpose measure aimed at both sustainability of aquatic life, and maintenance of the biotic environment associated with watercourses. A Qe will be established for each streams, including those that do not harbor fish populations due to the altitude at which they are located (e.g. Colina, La Engorda streams, etc.). Maintaining a Qe will allow the maintenance of local habitats amphibians, avifauna, etc	During the construction phase of works/ In all streams that will be intervened by the Project/ Contractual requirements to contractor.	Environmental Survey Reports

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Local movement of fauna species	Table 7.1.1, section, Chapter 7	Fauna	Construction works in summer grazing areas	MITIGATION Disruption of water drainage and runoff will be avoided in those anastomosed water courses, avoiding a habitat fragmentation effect in summer pastures area. For this, the flume that connects water intakes will be buried at least 1 m deep and will have drains.	During the construction phase of works/ In summer grazing area / Contractual requirements to contractor.	Environmental Survey Reports
			Works of establishment of service roads.	MITIGATION The Contractor will be instructed to avoid interruption of ravines or intermittent water courses that drain to grassland and high-Andean steppe areas, having, if required, an engineering structure that allows runoff under or on platforms	During establishment of service roads in the construction phase of works/ Contractual requirements to contractor.	Environmental Survey Reports
			Construction works in summer grazing areas	MITIGATION Restriction zones for Contractors will be defined. Summer pastures are composed mainly of Andean scrubland, although it is not significant from a botanical point of view, its ecological importance as habitat for terrestrial vertebrates is recognized.	During construction phase of works/ In riparian and Andean scrubland zones (summer grazing area) / Contractual requirements to contractor.	Environmental Survey Reports
			Construction works of crosscuts	MITIGATION Part of crosscuts of watercourses and/or ravines shall be done by works with minimal intervention (sewer-type crosscuts).	During construction phase/ construction sectors of crosscuts/ Contractual requirements to contractor.	Environmental Survey Reports

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Local movement of fauna species	Table 7.1.1, section, Chapter 7	Fauna	Execution of works in working faces	MITIGATION Cururo colonies (<i>Spalacopus cyanus</i>) will be monitored by tracking the movements of colonies over time. The study will be done before the beginning of works, and will complement the baseline generated by EIA: There will be no rescue, but conditions will be created to encourage spontaneous migration of individuals that may exist in the areas involved, through the supervision of a specialist in the field. At the completion of the surface works in the area, a field campaign will be carried out to verify the re-establishment of populations.	During construction phase of works/ In work sector of Yeso River, area where this species has been recorded / Contractual requirement to contractor	Environmental Survey Reports, specialist reports
			Execution of works in working faces	MITIGATION Project workers will be trained (through brochures and lectures) in order to raise awareness and create protection procedures for terrestrial and aquatic fauna, and restrictions on chase, scaring, hunting and fishing.	During construction phase of works / In all working faces/ Contractual requirement to contractor	Environmental Survey Reports/ Registry of training and participants by camp our working face/
			Entry of domestic animals	MITIGATION Entry of domestic animals that may prey on native species, or induce unhealthy conditions is prohibited.	During construction phase of works / In temporary facilities and camps zones/ Contractual requirement to contractor	Environmental Survey Reports
			Works near restriction areas	MITIGATION Requirement to Contractors about respect for restriction areas set for the PHAM.	During construction phase of works / In all working faces/ Contractual requirement to contractor	Environmental Survey Reports

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Local movement of fauna species	Table 7.1.1, section, Chapter 7	Fauna	Burning of vegetation for site preparation	MITIGATION The use of fire during the construction works to remove vegetation is prohibited, as a task to prepare land for the subsidence of works.	During construction phase of works / In all working faces/ Contractual requirement to contractor	Environmental Survey Reports
			Installation of informative signage for local wildlife conservation	MITIGATION / COMPENSATION Installation of signposts with images of species of conservation concern in the area and information on hunting ban and its biological significance.	During construction phase of works / In all roads of areas with influx of tourists or visitors/ Contractual requirement to contractor	I Environmental Survey Reports / Registry of tourist or visitor influx
			Final disposal of vegetable waste	MITIGATION Stubble and branches will be arranged in adjacent areas that have from zero to very low vegetation cover, thus preventing their transport and disposal into a dump. Their arrangement will be done manually by a crew of workers, ensuring an even distribution and low altitude. Every effort shall be made to ensure that the selected sites are located next to the works sectors, and that they will not be intervened. Thus, plant material will be refuge for local wildlife	During construction phase of works / In areas of works and facilities over 2,000m.a.s.l./ Contractual requirement to contractor	Environmental Survey Reports
			Restitution of land temporarily occupied during the construction phase	RESTORATION Restitution of temporarily occupied land will take into account the replacement of the rocky habitats normally used by reptiles. To this end, small dry-stone walls will be arranged in open areas near the construction sites.	During construction phase of works / In areas of Andean scrubland and in basin of Yeso and El Volcán Rivers/ Contractual requirement to contractor	Environmental Survey Reports

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Local movement of fauna species	Table 7.1.1, section, Chapter 7	Fauna	Implementation of population studies and habitat conditions	MITIGATION Before the beginning of works, the Project Owner agrees to conduct a population study and habitat conditions of the toad <i>Alsodes nodosus</i> ; <i>Spalacopus cyanus</i> (cururo) and <i>Merganetta armata</i> (torrent duck).	During construction phase of works / Within the areas of direct influence of the Project works/ Contractual requirement to contractor	Environmental Survey Reports
			Implementation of population studies and habitat conditions	MITIGATION The Project Owner agrees to undertake a campaign to search in the areas of influence of the Project in El Volcan sector, the species <i>Pristidactylus volcanensis</i> , and, if it is found, it will be considered in the population study and habitat conditions. The methodology and scope of this study will be defined in conjunction with Agriculture and Livestock Service..	During construction phase of works / In El Volcán area/ Contractual requirement to contractor	Environmental Survey Reports
			Expert supervision of execution of works in working faces	MITIGATION The execution of works will be supervised on by a specialist in wildlife, both at the beginning of these and during their development, on a quarterly basis. The expert monitoring reports will be sent to the relevant Authorities. If necessary, special reports will be issued to obtain permits. The species of interest considered in the expert supervision are: four-eye toad, blackish-green lizard (<i>Lilolaemus nigroviridis</i>), Cururo (<i>Spalacopus cyanus</i>), toad <i>aldodes nododus</i> , Andean spiny toad (<i>bufo spinolosus</i>), mountain lizard (<i>Liolaemus monticola</i>), thin tree lizard (<i>Liolaemus tenuis</i>), elegant tree iguana (<i>Calopistes palluma</i>) and y short-tailed snake (<i>Phyllodria camissonis</i>).	During construction phase of works / In Colorado River area, near Lo Encañado Lagoon, La Engorda and Yeso River summer grazing area, Aucayes area and service road Aucayes-Maitenes area / Contractual requirement to contractor	Environmental Survey Reports, specialist reports

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Local movement of fauna species	Table 7.1.1, section, Chapter 7	Fauna	Monitoring, Rescue and Relocation Plan	MITIGATION A Monitoring, Rescue and Relocation Plan will be implemented of those specimens of species of conservation concern that have low mobility, plus other ecological criteria outlined in chapter 6 and other criteria and characteristics of the Project and the area of location of the specie. The program includes a proposal of the rescue method and timing (date/period) to carry out. Species and sites involved in this measure are listed below: lizard of El Morado, lizard of Lo Valdés and blackish-green lizard (Alto Volcán), iguana <i>Callopistes palluma</i> (Colorado River area and Aucayes-Maitenes Road), four-eye toad (<i>Pleurodema thaul</i>) and Andean spiny toad (<i>Bufo spinolosus</i>) in Colorado River, Aucayes stream and La Engorda in summer grazing area.	During construction phase of works / In La Engorda, Colorado River summer grazing area, service road in Aucayes-Maitenes area / Contractual requirement to contractor	Environmental Survey Reports, specialist reports
			Relocation of species	MITIGATION For blackish-green lizard (<i>Liolaemus nigroviridis</i>) and Cururo (<i>Spalacopus cyanus</i>), rescue itself will not be carried out, but rather conditions to encourage spontaneous migration of individuals that may exist in the area to be intervened will be generated, by monitoring of specialist personnel in the field. For the particular case of cururo, the controlled perturbation method will be used which has proved most effective for this specie	During construction phase of works/ In works area of Yeso River, area where this specie has been registered/ Contractual requirement to contractor	Environmental Survey Reports, specialist reports

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Local movement of fauna species	Table 7.1.1, section, Chapter 7	Fauna	Implementation of the Monitoring, Rescue and Relocation Plan	MITIGATION The Project Owner shall maintain ongoing coordination with Agriculture and Livestock Service (SAG) given the need of rescue catch and relocation of wildlife, providing resources for care and maintenance of rescued species.	During construction phase of works / In Colorado River area, La Engorda summer grazing area, service road in Aucayes-Maitenes area / Contractual requirement to contractor	Environmental Survey Reports, specialist reports
			Rescue of fauna	MITIGATION Rescue tasks of wildlife through catch will be made before the use of explosives, execution of penetration footprints, and lasting change in flows, for amphibians and reptiles.	During construction phase / In Colorado River area, La Engorda summer grazing area, service road in Aucayes-Maitenes area and Aucayes stream / Contractual requirement to contractor	Environmental Survey Reports, specialist reports
			Rescue and relocation of species	MITIGATION The rescue and relocation will be coordinated jointly with the Project works, in order to prevent recolonization in the areas to be intervened.	During construction phase/ In areas of rescue and relocation of species/ Contractual requirement to contractor	Environmental Survey Reports, specialist reports
			Rescue and relocation of species	MITIGATION Prior to the rescue activities of species of conservation concern, it will be analyzed together with National Forestry Commission (CONAF) feasibility of moving and establish individuals whose survival probability is high, in El Morado National Monument, if the species is present in the protected area.	During construction phase/ In areas of rescue and relocation of species/ Contractual requirement to contractor	Environmental Survey Reports, specialist reports

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Local movement of fauna species	Table 7.1.1, section, Chapter 7	Fauna	Relocation of species	MITIGATION The areas where wildlife species will be relocated will be agreed between the Project Owner and Agriculture and Livestock Service (SAG). In this regard, release environment will be as close as possible to the capture site, outside the direct influence of the Project and will provide adequate resources for food, shelter and reproduction of species.	During construction phase of works / In Colorado River, La Engorda summer grazing area, service road in Aucayes-Maitenes area and Aucayes stream / Contractual requirement to contractor	Environmental Survey Reports, specialist reports
			Monitoring of the Rescue and Relocation Plan	MITIGATION A specific monitoring will be implemented to evaluate the effectiveness of the rescue and relocation program, to evaluate the success of survival and eventual relocation of relocated specimens. This analysis will also make possible to perceive seasonal variations and natural migrations of species.	During construction phase / In Colorado River area, La Engorda summer grazing area, service road in Aucayes-Maitenes area and Aucayes stream / Contractual requirement to contractor	Environmental Survey Reports, specialist reports
Project Effects on Ictic Fauna	Table 7.1.1, section, Chapter 7	Ictic Fauna	Collection of water resources in intervened waterways	MITIGATION For this impact, the same measures indicated in section 6.4.1.4 "Temporary Modification of Waterways and/or Water Quality" are applied.	During operation phase/ In intervened water courses/ ante la Contractual requirement to contractor	Environmental Survey Reports, terms of reference of contracts
Employment Generation and New Personnel	Table 7.1.1, section, Chapter 7	Human Environment	Hiring local workforce	ACTIONS TO MAXIMIZE Hiring of local workforce will be prioritized. To this end, the Project Owner will coordinate with the job placement office of San José de Maipo Municipality, offer or search for local workers, according to the requirements of the Contractor.	During construction phase of works / In all working faces/ Contractual requirement to contractor	Nº of hired persons in San José de Maipo municipality versus total staffing

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Employment Generation and New Personnel	Table 7.1.1, section, Chapter 7	Human Environment	Hiring local workforce	ACTIONS TO MAXIMIZE To facilitate that contractors have adequate information on the existing labor supply in the commune, meetings has been held with San José de Maipo Municipality to update their lists of personnel available with their specialties. Moreover, AES Gener will have a webpage (www.aesgener.cl) which will receive input from parties interested in working on the project.	During construction phase of works / In all working faces/ Contractual requirement to contractor	Nº of hired persons in San José de Maipo municipality versus total staffing
Interference with Tourist Activity	Table 7.1.1, section, Chapter 7	Human Environment	Execution of construction works of the project	MITIGATION PHAM will fully assume the restrictions of Municipal Ordinance Exempt Decree Nº 130, June 12 th , 1997.	During construction phase of works / In areas where this legal body is applied/ Contractual requirement to contractor	Terms of reference of contracts, Records of complains
			Execution of construction works of the project	MITIGATION Measures to minimize impact on the roads will have a multipurpose outcome, avoiding inconveniences to visitor to the areas and, therefore, minimizing any kind of interference with tourist activity in the sector (see section 6.4.1.11).	During construction phase of works / On routes where mitigation measures of traffic impact are applied/ Contractual requirement to contractor.	Environmental Survey Reports, contractual requirements.
			Tourism Development	COMPENSATION The Project Owner will promote the development of a Tourist Development Program and particularly to Ecotourism, through Maitenes Foundation, training and financing entrepreneurship of local managers. It is considered also the possibility to make infrastructure such as trails, shelters, signage, etc.	During construction phase/ In San José de la Mariquina Municipality by Maitenes Foundation / AES GENER commitment.	Results for the Tourism Development Program.

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Interference with Tourist Activity	Table 7.1.1, section, Chapter 7	Human Environment	Execution of construction works of the project	COMPENSATION Training of tourism monitors.	From year 2 of the construction period, for a period of 3 years / San José de Maipo commune/ Through cooperation with local educational establishments, or other institutions related with the topic (e.g. Tourism Chamber, National Tourism Service (SERNATUR), etc.).	Environmental Survey Reports/ Reports and Registers of attendance to Training.
			Execution of construction works of the project	COMPENSATION Design and edition of 5000 copies of a Guide of Tourism Promotion of the commune.	From year 2 of the construction period/ San José de Maipo commune together with Municipality	Environmental Survey Reports/ Copy of Municipality Guide of Tourism Promotion
			Execution of construction works of the project	COMPENSATION Preparation and design of a web page that concentrates all the attractions and tourist offer of the commune. This page will be the responsibility of local tourism agencies or related bodies, which may update the information of this digital tool.	This material will be available from year 2 of the construction phase/ San José de Maipo commune / through cooperation with local tourism agencies or related.	Environmental Survey Reports, N° of visits to the Website.
			Execution of construction works of the project	PREVENTION The Project considers a priori corrective measures if at the date of works construction a tranche of Sendero de Chile (Path of Chile) is in operation; in this case, the Project Owner agrees to avoid, where possible, that his works or activities affect the layout or, failing that, to carry out a restructure and/ or restoration of the Path.	During the construction phase/ /In works sector adjoining the tranche Sendero de Chile/ Contractual requirement to contractor	Environmental Survey Reports, contractual requirements.

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Alteration of Landscape	Table 7.1.1, section, Chapter 7	Landscape	Installation of temporary works	MITIGATION Works and facilities will be located in areas without presence of High Andean scrubland and mature forests of sclerophyllous flora.	During construction phase of works / In areas without presence of High Andean scrubland and mature forests of sclerophyllous flora / Contractual requirement to contractor	Environmental Survey Reports
			Construction of service roads	MITIGATION Both for technical and cost reasons, and for environmental and security considerations, the extent of service roads required for the movement of Contractors has been minimized. Also, the opening of new roads on slopes has been reduced.	During construction phase of works / In all working faces/ Contractual requirement to contractor	Environmental Survey Reports
			Location and height of stockpiles of materials	MITIGATION PHAM will meet the minimum requirements set forth by Regional Directorate of Roads of Metropolitan Region in terms of location and height of stockpiles of materials on public roads.	During construction phase of works / In areas of material stockpiles /Contractual requirement to contractor	Environmental Survey Reports, contractual requirements
			Execution of construction works of the project	MITIGATION The project engineering includes stabilization slopes for embankments produced by cuts or spills of materials on roads or other works. The layout and embankment design, slope and speed limits will be made according to the provisions of the Manual for Roads.	During construction phase of works / In areas of stabilization of embankments /Contractual requirement to contractor	Environmental Survey Reports, contractual requirements

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Alteration of Landscape	Table 7.1.1, section, Chapter 7	Landscape	Construction of power substation	MITIGATION In the case of the power substation of the project (encapsulated type), there will be a 25% of wooded area with native species. This shall meet the technical and security requirements imposed by the sectoral Authority for such facilities.	During construction phase of works / In El Sauce area /Contractual requirement to contractor	Environmental Survey Reports, contractual requirements
			Dismantling of temporary facilities and camps	MITIGATION / RESTORATION GENER will instruct Contractors regarding proper dismantling of temporary facilities and camps, developing, besides cleaning or sanitation of the occupied sites, landscape restoration works consisting of topographic recovery and revegetation of the intervened areas, using shrubs and herbaceous species of the area (in case that forestry management plans are not applicable).	During construction phase of works / In all working faces/ Contractual requirement to contractor	Environmental Survey Reports
			Execution of road mitigation measures	MITIGATION While the final road mitigation measures shall be approved by the Regional Directorate of Roads in the Metropolitan Region, it is considered a priori, without neglecting the aspects of road safety, the use of mixed defenses to minimize a local effect on the landscape of the area.	During construction phase of works / I On routes where mitigation measures of impact of roads are implemented/ Contractual requirement to contractor	Environmental Survey Reports, contractual requirements

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Alteration of Landscape	Table 7.1.1, section, Chapter 7	Landscape	Execution of construction works of the project	MITIGATION For the case of Alto Volcán area, due to the presence of summer grazing areas, PHAM has assumed special considerations to minimize the intervention of the vegetation. These measures tend to minimize the effect of works on the landscape of the area, characterized by a high degree of naturalness.	During construction phase of works / In works or facilities located in Alto Volcán area/ Contractual requirement to contractor	Environmental Survey Reports, contractual requirements

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Road Impact	Table 7.1.1, section, Chapter 7	Public Roads	Transit of trucks and light vehicles.	COMPENSATION The implementation of the project considers the improvement of Route G-25 (El Volcán area) and Route G-455 roads to El Yeso reservoir.	Before starting the construction phase of works/ In the main access routes/ Contractual requirement to contractor.	Environmental Survey Reports
			Transit of trucks and light vehicles.	COMPENSATION Road improvement activities involve: Clear and profiling of roads, sewer repair and construction, Application of binder (bischofite), Implementation of Signage, Clearing roads during winter period, Installing roadside defenses, Construction of Engineering Structures Replacement of paving.	Before and during the construction phase of works/ In the main access routes/ Contractual requirement to contractor	Environmental Survey Reports
			Transit of trucks and light vehicles	MITIGATION Construction of 31 km of service roads.	Before starting the construction phase of works/ In the project area as defined in the environmental studies/ Contractual requirement to contractor	Environmental Survey Reports
			Transit of trucks and light vehicles	COMPENSATION Project crossings and junctions with public roads, shall comply fully with the requirements established by the Directorate of Roads.	Before starting the construction phase of works/ At intersections generated by crossroads between public roads and service roads of the project/ Contractual requirement to contractor.	Environmental Survey Reports/ Paving projects required by Road Authority
			Transit of trucks and light vehicles	MITIGATION A truck weight control shall be applied by controlling the filling of trucks accessing the public road	During construction phase of works / In public roads / Contractual requirement to contractor	Environmental Survey Reports, certificates of weight control

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Road Impact	Table 7.1.1, section, Chapter 7	Public Roads	Transit of trucks and light vehicle	MITIGATION For the transport of supplies and materials, the Project Owner shall require the carrier responsible for transportation the implementation of a monitoring procedure of axle load in accordance with the procedures established by the Directorate of Roads of Ministry of Public Works (MOP).	During construction phase of works / In public roads / Contractual requirement to contractor	Environmental Survey Report, transport certificates of supplies and materials
			Transit of trucks and light vehicle	MITIGATION In the case of muck transport to the muck disposal site 14, the contractor shall have a vehicle weighing system previously approved by the Directorate of Roads and in accordance with the general rules of calibration provided by the Ministry of Public Works	During construction phase of works / In working faces of construction of Access Gate to Las Lajas Power plant (VL4) and for Access Gate to Las Lajas Tunnel (VL2) / Contractual requirement to contractor	Environmental Survey Reports, certificates of weight control
			Transit of trucks and light vehicle	MITIGATION Transports will be made in suitable, well maintained and signposted trucks. In addition, the drivers will be instructed on the road conflicts existing in the area of influence (see Chapter 5), to take precautions to provide a smooth an safety transportation.	During construction phase of works / both in service roads and public roads of the area of influence of the project/ Contractual requirement to contractor. Training	Environmental Survey Reports, terms of reference of contracts, register of attendance at training.
			Transit of trucks and light vehicle	MITIGATION Any new installation of the project, whose location has not been defined a priori or any change of layout and junction of service roads to public roads will include the works of equipment established by the highway department of the I. City of San José de Maipo or the Directorate of Roads of the MOP.	Before and during the construction phase of works/ In the service roads and projected crossings / Contractual requirement to contractor	Environmental Survey Reports/ Paving projects required by Road Authority.

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Road Impact	Table 7.1.1, section, Chapter 7	Public Roads	Transit of trucks and light vehicle	MITIGATION Truck traffic of more than four tons from 14:00 h of the day Saturday until 24:00 the day Sunday, as indicated by the Exempt Decree N ° 130 of the I. City of San José de Maipo. In this regard, Gener through the Inspection will monitor this situation using a systematic record of compliance with that provision, verifying the date and transit route.	During construction phase of works / On roads G-25 Alto El Volcán Bridge and G-421 San Juan de Pirque El Toyo / Contractual requirement to contractor	Environmental Survey Reports, contractual requirements
			Transit of trucks and light vehicle	MITIGATION The transport of materials and supplies by trucks shall be made in suitable trucks, perfectly canvassed to prevent spills on the road, as well as to educate drivers about road conflicts identified in this report, to take precautions for a smooth and safe transport.	During the construction phase of works/ In the main access routes/ Contractual requirement to contractor	Environmental Survey Reports, contractual requirements
			Transit of trucks and light vehicle	MITIGATION Service roads will be restricted to the use of vehicles outside the project	During the construction and operation phases of the Project/ in El Yeso-Lo Encañado area/ Contractual requirement to contractor	Environmental Survey Reports / Paving projects required by road authority
Effect on traditional activities	Table 7.1.1, section, Chapter 7	Cultural Heritage	Execution of construction works of the project	MITIGATION The project considers instructing its works supervisors to minimize any interference with the passage of the shepherds to the top of these summer pastures. This shall be established in the Agreement of each contractor Company and its fulfillment shall be verified in the field.	During the construction phase of the works/ In summer grazing area (Alto Volcán)/ Contractual requirement to contractor	Environmental Survey Reports, contractual requirements

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Effect on traditional activities	Table 7.1.1, section, Chapter 7	Cultural Heritage	Execution of construction works of the project	MITIGATION During construction, the use of protective fencing to prevent animals falling to the excavation sites is considered.	During the construction phase of the works/ In the area of works of La Engorda summer grazing area./ Contractual requirement to contractor	Environmental Survey Reports, contractual requirements
			Execution of construction works of the project	MITIGATION Coordination with farmers is proposed.	During the construction phase of the works/ In the area of works of summer grazing area./ Contractual requirement to contractor	Environmental Survey Reports, Records of Travel System Compatibility, contractual requirements
			Execution of construction works of the project	MITIGATION To verify the expected impact, the PHAM includes the development of Monitoring Social Indicators.	During the construction phase of the works/ In the area Project works/ Contractual requirement to contractor	Environmental Survey Reports, contractual requirements

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Operation Phase						
Temporary modification of flumes and / or water quality	Table 7.1.1, section, Chapter 7	Water Resource	Changing flows in rivers and streams and discharges of the project	ACTIONS TO MAXIMIZE The Project Owner does not include environmental management measures for this purpose. However, GENER aims to support the development of global studies determined by the relevant Authority and that is required to conduct for a comprehensive management of the sedimentological resources of Maipo River and erosion-sedimentation equilibrium as long as they are done in conjunction with all users of Maipo River water	During the construction phase of the works/ In the Maipo River/ Contractual requirement to contractor	Environmental Survey Reports/ Generation of global studies.
Intervention of Vegetation	Table 7.1.1, section, Chapter 7	Vegetation	Changing flows in rivers and streams and discharges of the project.	MITIGATION The project includes the establishment of an ecological flow in each watercourse in which collection of flows is carried out. Rainfall stations will be established on Yeso River, Colorado River and the confluence of Colina Stream and La Engorda Stream (Estero La Colina and Fattening (northern area of Volcán River, downstream from the water intakes of the sector). The environmental flow will be defined by the respective authority.	During operation phase/ in Yeso River, Colorado River and in the confluence of Colina Stream and La Engorda stream (northern area of Volcán River, downstream of the water intakes of the area/ Contractual requirement to contractor	Environmental Survey Reports/ Monthly Monitoring Reports

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Intervention of Vegetation	Table 7.1.1, section, Chapter 7	Vegetation	Operation of the Project works	MITIGATION The verification of the expected impact on vegetation will be determined by monitoring the first 5 years of operation.	During the operation phase/ in areas of vegetation intervened during construction/ Through monitoring of vegetation	Reports of Monitoring Campaigns.
			Maintenance of facilities in La Engorda grazing summer area	MITIGATION Workers will be instructed to take special preventive measures for maintenance tasks of facilities carried out in La Engorda summer grazing area, to minimize disturbance of vegetation and / or avoid any interference with users of the area (low grazing). GENER workers regularly receive training on environmental issues, aimed at raising the issue and raise awareness, and educate staff on the set of requirements or commitments entered into by the Project during its environmental assessment.	During the operation phase / in La Engorda summer grazing area/ Contractual requirements to contractor and training.	Annual Report of Environmental Inspections/ Registration of Training, terms of reference of contracts.

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Project Effects in Ictic Fauna	Table 7.1.1, section, Chapter 7	Ictic Fauna	Collection of water resource.	MITIGATION In the waterways operated by the PHAM the ecological flow will be maintained and monitored (see Chapter 2).	During the operation phase / Colina stream, Engorda, Las Placas, El Morado and Aucayes/ Through the monitoring in those water way.	Reports of Monitoring Campaigns.
			Collection of water resource	MITIGATION For the maintenance of the ecological flow, water intakes will consider a work of delivery to discharge the ecological flow. This work will consist of a hole located at a depth such that when the water level reaches the threshold of the intake, the hole collects the ecological flow.	During the operation phase of the project/ in collection of water area (in water intakes Colina stream, Engorda, Las Placas, El Morado and Aucayes/ Contractual requirements to contractor	Environmental Survey Report, reference terms of contracts.
			Collection of water resource	MITIGATION To ensure the ecological flow Gener proposes the installation of gauging stations	During operation phase of the project/ in La Engorda stream in its confluence with El Volcán River and in Yeso River up to the projected bridge/ Contractual requirement to contractor	Environmental Survey Report, Reports of station/ reference terms of contracts.

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Project Effects in Ictic Fauna	Table 7.1.1, section, Chapter 7	Ictic Fauna	Collection of water resource	MITIGATION To verify the conditions of the waterway in the analyzed tranche of Yeso River, defined as sensitive area, the Project Owner intends to make monthly gauging for one year before and after the operation of the project.	During the operation phase / in Yeso River/ Limnological monitoring	Environmental Survey Report
Employment Generation and New Personnel	Table 7.1.1, section, Chapter 7	Human and Social Environment	Training of local work force	COMPENSATION GENER through Maitenes Foundation (Annex 26), is committed to make a contribution to education for local employability of tourism entrepreneurship projects and social projects included in the plans of the Municipality of San José de Maipo, through the Training Program for Employability.	During the operation stage/ In the municipality San José de Maipo through Maitenes Foundation which will provide U.S. \$ 200,000 from 2010, for a period of 10 years / AES GENER Commitment.	Nº of people favored by Maitenes Foundation versus total population of the commune.
			Initiatives implemented by Maitenes Foundation	COMPENSATION Initiatives implemented by Maitenes Foundation may be linked to those projects or entrepreneurships that are being developed by Public Services or institutions operating in the commune in this matter.	During the operation stage/ In the municipality San José de Maipo/ AES GENER Commitment	Nº of initiatives linked to Projects being developed by Public Services or institutions operating in the commune
Alteration of Landscape	Table 7.1.1, section, Chapter 7	Landscape	Road flow associated with the operation of power plants and auxiliary facilities	MITIGATION For technical, cost, environmental and security reasons, the extent of service roads required for the movement of Contractors has been minimized. Also, the opening of new roads on slopes has been reduced.	During the operation phase of the project / In all areas that will have service roads/ Contractual requirement to building contractor.	Environmental Survey Report, reference terms of contracts

POTENTIAL IMPACT	SECTION	COMPONENT	ACTIVITY	CORRESPONDING MEASURE	OPPORTUNITY, PLACE AND IMPLEMENTATION METHOD	INDICATOR
Alteration of Landscape	Table 7.1.1, section, Chapter 7	Landscape	Changing of flows in rivers and streams and discharges of the project	MITIGATION An ecological flow in rivers and streams that keep to date their flow in natural regime and in those with regulated flow will be maintained, as long as there is availability of resources.	During the operation phase of the project / In all waterways intervened by the Project/ Contractual requirement to building contractor.	Monthly monitoring Report of ecological flow for a period of 12 months after the beginning of the project operation.
Effects of flow reduction on tourism	Table 7.1.1, section, Chapter 7	Tourism	Promotion of Tourism	COMPENSATION The Project Owner shall encourage the development of a Tourism Promotion Program and particularly to Ecotourism, through Maitenes Foundation, training and financing partially entrepreneurships of local managers. This also includes the possibility of improving infrastructure such as trails, shelters, signage, etc.	During the operation stage/ In the municipality San José de Maipo through Maitenes Foundation/ AES GENER Commitment.	Outcomes of the Tourism Promotion Program..
			Initiatives implemented by Maitenes Foundation	COMPENSATION Initiatives implemented by Maitenes Foundation may be linked to those projects or entrepreneurships that are being developed by Public Services or institutions operating in the commune in this matter.	During the operation stage/ In the municipality San José de Maipo / AES GENER Commitment.	Nº of initiatives linked to Projects being developed by Public Services or institutions operating in the commune

10.4 CHAPTER 8 INDEX CARD OF MONITORING PLAN SUMMARY

Description of Monitoring	Component/Potential Impact	Frequency and Duration/ Place	Compare With	Method	Frequency Delivery Reports/ Authority that Receives Report
1. Monitoring Program of the construction phase of the project					
Air Quality PM10	Population health	Weekly, throughout the construction phase. In all working faces.	Contractual requirements	Pursuant to the Resolution of Environmental Qualification.	Quarterly reports submitted to National Commission for the Environment (CONAMA) Metropolitan Region and Health Service.
Noise Emission	Population health	During 4 consecutive days, the first 2 months of from the beginning of works in each of the sectors involved. Subsequently, every 6 months throughout the construction phase of the works located in the Alfalfa sector and housing of El Sauce sector and defined points in roads G-25 and G-455 (see Annex 30 and Annex 2).	Limits set forth in D.S. No. 146/97 of MINSEGPRES and regulations established for mobile sources (FHWA).	As set out in D.S. No. 146/97 of MINSEGPRES and reference standard FHWA.	Semi-annual reports submitted to the Environmental Health Service of the Metropolitan Region
Blasting noise emission	Population health	Every two weeks, during the first 100 m of progress of initial works for opening of tunnels. Monitoring will be carried out in 8 points sensitive to noise by blasting identified and outlined in section 6.4.1.3. Any dwelling located within 300 m of the blasting site shall be inventoried prior to the test blasting.	Reference Standard ("Title 30: Mineral Resources, Part 816-Permanent Program Performance Standards-Surface Mining Activities, § 816.67 Use of explosives: Control of adverse effects.")	As set out in Standard Reference	Semi-annual reports submitted to the Environmental Health Service of the Metropolitan Region
Blasting vibrations	Population health	Every two weeks, during the first 100 m of progress of initial works for opening of tunnels. Monitoring will be carried out in 8 points sensitive to noise by blasting identified and outlined in section 6.4.1.3	Reference Standard ("Title 30: Mineral Resources; Part 816—Permanent Program Performance Standards—Surface Mining Activities; § 816.67 Use of explosives: Control of adverse effects").	As set out in Standard Reference	Semi-annual reports submitted to the Environmental Health Service of the Metropolitan Region

Description of Monitoring	Component/ Potential Impact	Frequency and Duration/ Place	Compare With	Method	Frequency Delivery Reports/ Authority that Receives Report
1. Monitoring Program of the construction phase of the project					
Water quality (temperature, pH, specific conductivity, dissolved oxygen, nitrite, nitrate, ammonium, nitrogen, orthophosphate, phosphorus, total dissolved and suspended solids, alkalinity, sulfate, BOD5)	Water from intervened waterways	Measurements will be made, 100 m upstream and 100 m downstream of the areas of construction works, in Colina, La Engorda, El Morado and Las Placas streams in Yeso River and Las Lajas discharge, on a monthly basis.	Information available in the Baseline	Similar to that used in the Baseline study (see section 5.3.5.2).	Semi-annual reports submitted to the General Directorate of Water and National Commission for the Environment (CONAMA) Metropolitan Region

Description of Monitoring	Component/ Potential Impact	Frequency and Duration/ Place	Compare With	Method	Frequency Delivery Reports/ Authority that Receives Report
Water discharge	Water from intervened waterways	Areas: El Volcán (El Morado Stream), El Yeso (Yeso River), Aucayes Alto (Aucayes Stream, downstream of existing collection of potable water in Maitenes locality), Aucayes Bajo (Flume 1 Maitenes, Colorado River), Km 10 of the Road G-345 (Colorado River), Caballo Muerto (Colorado River), and Maipo River discharge (Maipo River). Monitoring will be permanent in winter season only, as the rest of the year water will be used as part of the construction process.	Standard DS No. 90/2001 (in winter) and NCh 1333 (in summer period).	As set out in Standard DS No. 90/2001ma DS N°90/2001.	Semi-annual reports submitted to the Health Authority of the Metropolitan Region
Road system	Road component	During the first 3 working days, consecutive of each month, for a period of 6 months. Subsequently, every 4 months in an equal period, during the first three years of project construction. The measurement points will be located on Road G-25, Road G-345, G-421 and Road G-455 and will be consistent with those determined by the National Census.	Information available in the Baseline (see section 5.6.1.3)	According to the methodologies used by the Department of Roads in the National Census	Semi-annual reports submitted to the Department of Roads of Ministry of Public Works (MOP) and National Commission for the Environment (CONAMA).
Monitoring of Social Indicators	Human Environment	Biannual campaigns throughout the construction phase. In localities: Alfalfal, Los Maitenes, El Manzano, El Canelo, Baños Morales, Lo Valdés, El Volcán, El Romeral, road Yeso River and San Gabriel area. In the operation phase, an annual monitoring will be conducted for the first five years of the operation phase, in the same locations listed above.	Information available in the Baseline	The procedure will be to monitor the defined variables and parameters of geographical, demographic, anthropological, socio-economic and basic social welfare dimensions (see Annex 39).	Semi-annual reports submitted to CONAMA.

Description of Monitoring	Component/ Potential Impact	Frequency and Duration/ Place	Compare With	Method	Frequency Delivery Reports/ Authority that Receives Report
1. Monitoring Program of the construction phase of the project					
Vegetation Monitoring in La Engorda summer grazing area	Vegetation	It will be conducted once a year during the summer, preferably between December and February for five years. In meadows and scrubland sector on both sides of the raceway, taking as control the vegetation found upstream of the flume.	Information available in the Baseline	Similar to that used in the Baseline study	Annual reports submitted to the relevant authority.

Description of Monitoring	Component/ Potential Impact	Frequency and Duration/ Place	Compare With	Method	Frequency Delivery Reports/ Authority that Receives Report
2. Monitoring Program of the operation phase of the project					
Limnological Monitoring	Aquatic Biota	Bimonthly during the first 6 months of full operation of the Project. Then quarterly for one year. Downstream of the planned works of Colorado, and Yeso Rivers, and Aucayes stream.	Information available in the Baseline	As set out in Article 95, DS N°95/02 of MINSEGPRES	Semi-annual reports submitted to the Undersecretary for Fisheries and National Fisheries Service and National Commission for the Environment (CONAMA).
Monitoring of Ecological Flow	Aquatic Flora and Fauna	Monthly for a period of 12 months once the rainfall station has been commissioned, on Yeso River, Colorado River and the confluence of Colina Stream and La Engorda Steam (northern sector of Volcán River, downstream from the water intakes of the area).	Information available in Annex 10.	Similar to that used in Annex 10	Bimonthly reports submitted to General Directorate of Water and National Commission for Environment (CONAMA) during the first 6 months of full operation of the Project. Then, this will continue for a year with quarterly monitoring.