
CHAPTER 7 ENVIRONMENTAL MANAGEMENT PLAN

7.1 ENVIRONMENTAL MANAGEMENT MEASURES

As indicated in Chapter 6, this section synthesizes the Environmental Management Plan in a table organized to permit identifying in a systematized manner and in accordance with the impact associated with the different stages of the Project, all the measures that will be incorporated in its execution. The table's organization is aimed at giving a complete view of the impacts, their global environmental effect and the management measures to be carried out.

It is worth noting that Chapter 6 provides an analysis of the environmental management measures related to the environmental assessment.

Table 7.1.1 below indicates the specific measures for each of the impacts identified.

Table 7.1.1
Synthesis of Environmental Management Measures

| Environmental Impact | Environmental Management Measures | Purpose of the Measure |
|---------------------------|---|------------------------|
| Alteration of air quality | Improvement of the current routes of access to the Project area corresponding to the stretches of route G-455, between route G -25 end the El Yeso Reservoir and the stretch of route G-25 between Baños Morales and the area of the Project's works, through the reconstruction of the platform (through leveled granular pavement) and watering with Magnesium Chloride (Bischofite); | Compensation |
| | Trucks with material moving outside the work fronts will be covered with a canvas to prevent material from falling; | Mitigation |
| | The surfaces of the works, platforms and work fronts will be watered, particularly in the dry season; | Mitigation |
| | Service roads and roads of access to the works will be maintained clean (free of rubble, mud, earth and construction materials); | Mitigation |
| | The contractor will be required to keep trucks parked for a long period at the work site with their motors off; | Mitigation |
| | Burning residues and combustible material (wood, excess of <u>vegetal</u> material, paper, leaves or waste and any other residue that may be generated in the construction stage) will be banned in the camps and work fronts. Food must be heated using gas or electric appliances; | Mitigation |
| | Muck will be carried in shuttle cars; | Mitigation |
| | Minimize the distance of the service roads between the muck disposal sites and the work fronts, thereby reducing the traffic of vehicles carrying personnel and muck. | Mitigation |

| Environmental Impact | Environmental Management Measures | Purpose of the Measure |
|---|---|------------------------|
| Increase in the level of sound pressure | To minimize the effect of noise emissions on homes located near the work site, acoustic barriers will be installed around the work sites. This is expected to reduce noise levels between 10 and 15 dB(A). The acoustic protection will be built with an opaque panel made with OSB plywood with 15 kg/m ² density and a minimum height of 3 m. | Mitigation |
| | Generate specific partial enclosures for noisier machinery like cranes, electrical generation systems, compressors, pneumatic hammers and hopper trucks. These protection screens consist of lateral enclosure plywood panels. | Mitigation |
| | Priority will be given to works on the surface during the day time (8:00 a.m. – 9:00 p.m.). | Mitigation |
| | The machinery used will be checked and tested by the contractor company to detect any mechanical problems that could exceed the established noise levels. This will be stipulated in the work contracts. | Mitigation |
| | <p>A “Works Execution Work Program” will be submitted for the Project’s 8 sensitive points with the purpose of reducing impacts and minimizing the nuisance that the Project activities may cause the community. The intention is to integrate this Work Program to the development of the Project, communicating the occurrence of sporadic noise sources (e.g. in the case of blasting in the tunnel portal).</p> <p>The “Works Execution Work Program” will be maintained in the project site and will be available to supervising personnel and the community. This program contemplates at least the following topics:</p> <ul style="list-style-type: none"> - Contractor in charge of the works and identification of Project Owner - Professional responsible for the work and in charge of receiving complaints from the community - Establishment of a contact telephone at the work site to provide information, receive questions, suggestions and complaints from the community - Starting date and total duration of the works - Type of works to be carried out and description of the stages, machinery, processes and execution of activities - Date and time at which greatest noise emissions will be generated - List of environmental control measures to be adopted <p>Finally, the “Works Execution Work Program” will be informed to the community in prior meetings at the beginning of the works and through information leaflets to be distributed.</p> | Mitigation |

| Environmental Impact | Environmental Management Measures | Purpose of the Measure |
|---|--|------------------------|
| | To verify the effectiveness of the mitigation measures adopted, noise levels will be monitored in accordance with the procedure established in D.S. No. 146/97 of the MINSEGPRES, with the purpose of confirming that the maximum permissible sound pressure levels are being complied with (see details in section 8.2.2 of Chapter 8). | |
| Increase in the level of vibrations | The works contractor will give instructions on the sensitivity to be shown with respect to the receptors' attitude. In this regard and before the execution of these works, the residents will be notified in writing about the need of carrying out the works, their duration and times at which they will be carried out. | Mitigation |
| | A program to monitor noise and vibrations associated with blasting described in 8.2.2 of Chapter 8 will be established. The information generated by this program will be submitted to the Environmental Authority together with the rest of Project follow-up data. | Mitigation |
| Temporary modification of waterways and/or water quality | The bridges over the Yeso and Colorado rivers will be located minimizing intervention of the waterways. The Project has defined the optimum crossing section in relation to bridge width. | Mitigation |
| | Works on the waterways will be carried out preferably at the end of the summer and beginning of autumn; a time of the year when river flows are small, leaving greater flooding zone exposed on "dry ground" and not on the "wet section", thereby avoiding the impact of the construction of the water body. | Mitigation |
| | The execution of works on the banks of rivers and streams will be as little as possible, trying to maintain stocking of construction materials (tubes, concrete and others), machinery and temporary truck parking outside the banks. | Mitigation |
| | The Contractor will plan the work trying to get jobs on waterways to be as short as possible and occupying the minimum space possible. | Mitigation |
| | While the works on waterways are being executed, special precautions will be required to prevent accidental spills, like avoiding keeping lubricant drums in or near the waterway and prohibiting parking machinery on the waterway. | Mitigation |
| | Workers will be restricted access to the Negra and Lo Encañado lakes, in their capacities of "restriction zones" for the PHAM. | Mitigation |
| | The execution of works will be minimized, trying to assemble the pieces that form the bridge on other places and subsequently transferring them to the work site at the time of executing the construction work. | Mitigation |
| Treated wastewater from each of the 4 work camps will be reused in the construction processes or used to water surfaces. In the event that this water should be discharged to the waterways, it must comply with the standards established in D.S. 90/2001. | Mitigation | |

| Environmental Impact | Environmental Management Measures | Purpose of the Measure |
|----------------------------|--|------------------------|
| Intervention of vegetation | <p><u>Actions contemplated by Project engineering</u></p> <ul style="list-style-type: none"> - Most PHAM civil works will be carried out underground. - Special training activities will be organized for contractor personnel, which will be focused on flora and fauna conservation. - The temporary work facilities and camps were adapted to the environmental sensitivities of the Project area. - The Project contemplates restoring the vegetation of the zones that must be cleared for temporary work facilities. | Mitigation |
| | <p><u>Compensation through the Forestry Management Plan (Appendix 7)</u></p> <ul style="list-style-type: none"> - 36 hectares will be reforested, five hectares in excess than the ones cleared. - The species in a conservation category, <i>Porlieria chilensis</i> and <i>Kageneckia angustifolia</i>, will be compensated in a ratio of 10 specimens for each specimen intervened. - The species <i>Eriosyce (Neoporteria) curvispina</i> shall be compensated in a 10 to 1 ratio; in addition all the affected individuals will be transplanted. - The management plan includes management measures that ensure the plan's success, like periodical irrigation, individual protections, control of hares and rabbits, fertilization, etc. | Compensation |
| | <p><u>Vegetation Restoration Plan (Appendix 29)</u></p> <ul style="list-style-type: none"> - This is a compensation measure contemplated for all areas affected other than forests. - The purpose is stabilizing the soil after the works and restoring preexisting vegetation in the extent possible with the goal of controlling erosion, visual mitigation and restoring the fauna habitat. - This plan considers micro routing of vegetation in the areas to be intervened. - Plan to create a nursery of species to restore vegetation. - Plans to recover the vegetation in muck disposal sites and camps, slopes and platforms of access to the tunnels. | Compensation |

| Environmental Impact | Environmental Management Measures | Purpose of the Measure |
|----------------------|--|---------------------------|
| | <p><u>Specific management measures for the La Engorda summer-grazing sector</u></p> <ul style="list-style-type: none"> - In sectors with works, extracting and reserving the original topsoil is contemplated. - The use of drains over and under the conveyance canal that will be located in the La Engorda summer-grazing sector will prevent interrupting water drainage or runoff of the connected watercourses. - Verification of the effects foreseen will be done by monitoring the vegetation during the construction stage and during the first 5 years of Project operation. - The Contractor will be instructed to exclusively, unrestrictedly use circulation roads that have been established for personnel use. - In the sections extending between the Colina and La Engorda streams, the road will be built through the Andean scrubland area, upstream of the wet prairie zone. | Mitigation / Compensation |
| | <p>The wood resulting from tree felling and uprooting, and the trunks and main branches of trees and bushes will be cut and disposed of as wood for community use. The thinner branches, twigs, leaves and other vegetal residues will be made into chips and scattered over the soil disposal sectors.</p> | Mitigation |
| | <p>The PHAM will establish restriction zones in the summer-grazing sector of La Engorda, outside the site of the location of the physical works.</p> | Mitigation |
| | <p>Vegetation cleared from the works and facilities sectors, namely, stubble and branches, will be disposed of in nearby areas with no or very little topsoil, avoiding carrying and disposal it in a dumpsite.</p> | Mitigation |
| | <p>In the case of sites affected by the temporary facilities or camps, the recovery of those sectors will be initially done through surface scarification and maintenance of stubble or rests of plants <i>in situ</i>.</p> | Mitigation/ Compensation |

| Environmental Impact | Environmental Management Measures | Purpose of the Measure |
|----------------------------|---|-----------------------------|
| Intervention of vegetation | The <i>Austrocedrus chilensis</i> has not been considered an affected species because it is not found in the Project's direct area of influence. | Mitigation |
| | All specimens that belong to species in a conservation category will be replaced in a 1:10 ratio, in other words, 10 specimens for each specimen intervened. | Compensation |
| | 30% of specimens of <i>Porlieria chilensis</i> will be transplanted to nearby places. | Mitigation/ Compensation |
| | <p><u>Actions contemplated by Project engineering</u></p> <ul style="list-style-type: none"> - High-mountain intakes will be used in the Upper Volcan sector. - The location of the intakes at the Colina, La Engorda and Las Placas streams in the summer-grazing zone is planned to be made at the lowest elevation possible. - The Project contemplates establishing an ecological flow in each watercourse, which water is extracted from. | Mitigation |
| | Workers will be given instructions on special preventive measures when carrying out facility maintenance work in the La Engorda summer-grazing sector. | Mitigation |

| Environmental Impact | Environmental Management Measures | Purpose of the Measure |
|--|--|------------------------|
| Local Displacement of Fauna Species | The temporary facilities and camps, and muck disposal sites will be located according to environmental criteria in order to minimize the alteration of habitats with higher concentration of fauna. | Mitigation |
| | The PHAM will try to minimize the effects on vegetation by establishing restriction zones, controlling the traffic of Contractor vehicles, replacing cleared vegetation, rescuing plants and maintaining soil, etc. All this is based on the principle of keeping vegetation as unaltered as possible or permitting its recovery to ensure maintaining the habitats and the subsistence of the local fauna. | Mitigation |
| | Maintenance of an ecological flow (Qe) in the streams that will be intervened by the Project has multiple purposes including sustaining aquatic life and maintaining the biotic environment associated with watercourses. In the case of the PHAM, it has been decided to establish a Qe for each of the streams, including those that do not have fish populations because of the altitude at which they are found (e.g. Colina, La Engorda streams, etc.). Maintenance of an ecological flow will permit maintaining the local habitats of amphibians, birds, etc. | Mitigation |
| | The PHAM will avoid interrupting drainage or runoff of waters in anastomosed courses, thereby preventing the fragmentation of habitats in the summer-grazing areas. To that end, the channel connecting the intakes will be buried at least one meter deep and it will have drains. | Mitigation |
| | The contractor will be instructed so that during the construction of service roads, interrupting ravines or intermittent watercourses that drain to zones of prairies or high-Andean areas is avoided, and in those cases in which works are required they must permit runoff under or over the platforms. | Mitigation |
| | The intervention of riverbanks and Andean scrubland will be minimized in the summer-grazing area, by defining restriction areas for Contractors. Summer grazing-areas are principally made up of Andean scrubland, which although it is not relevant from a botanical point of view, it has ecological importance as the habitat of terrestrial vertebrates. | Mitigation |
| | Part of the crossings of watercourses and/or ravines will be carried with minimum intervention (drain-type crossings). | Mitigation |
| | Project workers will be trained through brochures and talks to create awareness, as well as on procedures to protect land and aquatic fauna. Persecuting and scaring away animals, and hunting and fishing will be restricted. Contractors will maintain an updated record of the training activities and participants per camp or work front. | Mitigation |
| | Entry of domestic animals to camps or temporary facilities will be banned as they may be predators of native species or create unhealthy conditions in those sites. | Mitigation |
| | Contractors will be required to respect the areas restricted for the PHAM as part of a correct environmental conduct. | Mitigation |
| The use of fire during construction works to eliminate vegetation, as part of the preparation of the ground to establish the works, is banned. | Mitigation | |

| Environmental Impact | Environmental Management Measures | Purpose of the Measure |
|-------------------------------------|--|--------------------------|
| Local Displacement of Fauna Species | Restriction zones for Contractors will be defined to minimize the intervention of riverbanks and Andean scrubland in summer-grazing areas (see Figures 6.4.1.1 and 6.4.1.2). The summer-grazing zones are principally made up of Andean scrubland, which although it is not relevant from a botanical point of view, it has ecological importance because it is the habitat of land vertebrates. | Mitigation |
| | To disseminate the environmental protection actions undertaken by the Project, the Contractor will put up road signs with pictures of the species of conservation interest in the area, indicating their biological importance and the prohibition to hunt them. These signs will be placed in sectors frequented by tourists or visitors. | Mitigation/ Compensation |
| | Any vegetation cleared from temporary facility sectors like stubble and branches will be disposed of in nearby zones that have no or very little topsoil, avoiding their transportation and disposal on a dump site. Its disposal will be carried out manually by a group of workers, who will try to distribute it evenly without forming a layer that is too high. The selected sites will be sectors that will not be intervened and will be located near the works sectors. This will permit vegetal material to constitute a refuge for local fauna. This measure will be applied to works executed over 2000 m.a.s.l. | Mitigation |
| | The recovery of the land temporarily occupied will contemplate recovering the rocky habitats normally used by reptiles. Therefore, dry low stone walls will be built in open sectors near the work sites, especially in the high-Andean scrubland zones of the Yeso and El Volcan river basins. | Restoration |
| | In particularly sensitive sectors for fauna, on-site supervision by a fauna specialist will be conducted as a specific measure. This person will supervise the works on site during the beginning and throughout their development, every three months. If during this supervision, species of conservation interest should be detected, complementary measures will be applied consisting of transferring the species or any other appropriate measure depending on the vulnerability of the specimens detected and the type of works involved. The reports of the expert supervision will be sent to the relevant authorities. If necessary, special reports will be issued to obtain the relevant permits. Expert supervision will be carried out in the following sectors: <ol style="list-style-type: none"> 1. Given the presence of the four-eyed frog in the Colorado River sector (found in puddles or tanks in the area where a muck disposal site, a camp and a syphon are planned to be located near the Alfalfa I Plant and the Quempo Stream). 2. The area surrounding the Lo Encañado Lake because of the presence of the <i>Lilolaemus nigroviridis</i> lizard and the <i>Spalacopus cyanus</i> rodent. 3. La Engorda summer-grazing sector and Yeso River because of the presence of the <i>Lilolaemus nigroviridis</i> lizard. 4. Aucayes sector in the work site near the waterway because of the presence of the <i>aldodes nododus</i> and the <i>bufo spinolosus</i> frogs. 5. Service road sector in Aucayes-Maitenes area because of the presence of the <i>Liolaemus monticola</i> mountain lizard, the <i>Liolaemus tenuis</i> slim lizard, the Chilean iguana, <i>Calopistes palluma</i> and the short-tailed snake <i>Phyllodria camissonis</i> (vulnerable). | Mitigation |

| Environmental Impact | Environmental Management Measures | Purpose of the Measure |
|-------------------------------------|---|------------------------|
| Local Displacement of Fauna Species | <p>A Monitoring and Relocation Plan will be implemented for specimens of conservation interest showing low mobility, plus other ecological criteria indicated in Chapter 6 and other characteristics of the Project and the area where the species are located. The program indicated in the abovementioned table includes a rescue method proposal and the time (date/period) to carry it out. The species and the sites involved in these measures are as follows:</p> <ol style="list-style-type: none"> 1. Rescue and transfer of reptile specimens in the summer-grazing sector of La Engorda (Upper Volcan River) for the following species: El Morado lizard, Lo Valdés lizard, and <i>Lilolaemus nigroviridis</i> lizard, all classified in a conservation category, which are endemic and have restricted distribution. 2. Rescue and transfer of <i>Callopistes palluma</i> (Iguana) reptile specimens in the Colorado River sector and Aucayes-Maitenes Road sector, a Vulnerable species with reduced populations. 3. Rescue and transfer of amphibious specimens of <i>Pleurodema thaul</i> frog, <i>Bufo spinolosus</i> frog, in the Colorado River, Aucayes stream and La Engorda summer-grazing sectors, respectively. | Mitigation |
| | <p>The Monitoring, Rescue and Relocation Plan of wild fauna takes into account the following aspects:</p> <ol style="list-style-type: none"> 1. The Project Owner will maintain permanent coordination with the Agricultural and Livestock Service (SAG) because of the need to carry out rescue catches of wild fauna with a view to contributing the funds for the care and maintenance of the rescued species. 2. For groups of amphibians and reptiles, the task of capturing fauna to rescue it, will be carried out before using explosives, executing penetration tracks, and making permanent modifications to water flows. 3. The Fauna Rescue Monitoring and Relocation Plan will be coordinated together with the other Project works to prevent re-colonization in areas to be intervened. 4. Prior to rescuing species with conservation problems, the feasibility of transferring and establishing flora individuals with high survival probabilities in the El Morado Natural Monument will be analyzed together with CONAF, if that species is present in the protected area | Mitigation |
| | <p>No rescue activities will be carried out for the <i>Lilolaemus nigroviridis</i> lizard and the <i>Spalacopus cyanus</i> rodent species, but rather, the conditions will be created to favor the spontaneous migration of the individuals that may be found in the areas to be intervened, with supervision of specialist personnel on site. The controlled disturbance method will be used in the specific case of the <i>Spalacopus cyanus</i> as it has been found to be more effective for that species.</p> | Mitigation |
| | <p>The areas where the animal species will be relocated will be agreed upon between the Project Owner and the SAG. The environment where the animals will be released will be as similar as possible to the one where the animals were captured, outside the Project's direct area of influence and appropriate resources will be provided for feeding, reproduction and refuge of the species.</p> | Mitigation |
| | <p>The Project Owner will contemplate management measures that will reduce the risk of poachers in the hunting protected area, like: signs, training of Contractor personnel, contract requirements and on-site supervision.</p> | Mitigation |
| | <p>Prior to starting the works, the Project Owner undertakes to carry out a study of the population and habitat of the <i>Alsodes nodosus</i> frog, <i>Spalacopus cyanus</i> rodent and <i>Merganetta armata</i> duck, in the areas of direct influence of the Project works. When starting the works, the Project Owner undertakes to conduct a campaign to look for the <i>Pristidactylus volcanensis</i> lizard in the area of influence of the Project in the El Volcan sector, and if it is found, it will be considered an</p> | Mitigation |

| Environmental Impact | Environmental Management Measures | Purpose of the Measure |
|-----------------------------------|---|---------------------------|
| | impacted species and it will be included in the Environmental Management Plan described in the EIA and in the study on population and habitat conditions. The methodology and scope of the study will be defined together with the SAG. | |
| | A specific follow up will be implemented to assess the effectiveness of the rescue and relocation program in order to evaluate survival success and eventually the reproduction of the relocated specimens. This analysis will also permit observing the seasonal variations and natural migrations of the species, data that will increase the little knowledge available on some species due to the lack of long-term studies. | |
| Effects of the Project on fishes | The same environmental management measures indicated for the "Project effect on water quality" applies to this impact. Priority will be given to hiring local labor. To that end, the Project Owner will coordinate with the labor intermediation office of the San José de Maipo Municipality, the supply and search of local labor, in accordance with Contractor requirements. | Mitigation Advancement |
| Generation of Jobs and New Income | Through Fundación Maitenes (Appendix 26), Gener undertakes to make a specific contribution to education to improve local employment possibilities, assuming that this is a determinant factor for the municipal district's growth and the improvement of the quality of life of its inhabitants in the medium and long terms. To that end, and so that those projects are focused on improving local employment possibilities and/or projects of social interest of the municipal district contemplated in the Municipality's programs, AES Gener will contribute as from 2010 with USD 200,000 to Fundación Maitenes for a period of 10 years to attain this goal. | Advancement |

| Environmental Impact | Environmental Management Measures | Purpose of the measure |
|---------------------------|--|------------------------|
| Interference with Tourism | The PHAM will fully comply with vehicle restriction measures for trucks of over 4 Tons, established in the Municipal Ordinance Exempt Decree No. 130 of June 12, 1997. These restrictions specifically refer to the suspension of the traffic of this type of vehicles on holidays and weekends. | Mitigation |
| | AES Gener, through its Fundación Maitenes (Appendix 26), undertakes to make a specific contribution to promote tourism. The company will promote a Tourism Development Program and particularly Ecotourism, which takes advantage of the experience of small tourism operators and especially train, support and partially fund local undertakings in this area. | Compensation |
| | Other measures aimed at minimizing impacts on roads will have a multipurpose result, preventing inconveniences to visitors to the zone, and thereby minimizing any kind of interference with tourism in the sector (see section 6.4.1.11 "Project road impact", Chapter 6). | |
| | Training of tourism monitors in local education establishments or in other institutions related to tourism like the Chamber of Tourism, Sernatur, etc. for a period of 3 years as of 2010. | Compensation |
| | Design and issue a Tourism Promotion Guide of the Municipal District. This will consist of printed material prepared together with the Municipality, providing information on the areas of interest to tourism in the area, territorially demarcated. It will include information on landscape, handicrafts, gastronomy, traditional or heritage sites, among others. GENER will finance the design and edition of this material and the printing of 5000 issues which will available in 2010. | Compensation |
| | Preparation and design of the web page including all tourism attractions and offer in the area. This page will be kept by local tourism organizations or similar entities, which may constantly update the information contained in the page. This material will be available as of 2010. | Compensation |
| | The Project contemplates the <i>a priori</i> adoption of corrective measures in the event that on the date of construction of the works a stretch of the "Sendero de Chile" should be operating in the area. In that case, the Project Owner undertakes to prevent that its works or activities may affect the route, or to execute an adaptation or restoration of the route. | Mitigation |

| Environmental Impact | Environmental Management Measures | Purpose of the measure |
|--|---|----------------------------|
| Alteration of the Landscape | The works and temporary facilities of the PHAM will be located in areas without high-Andean scrubland and mature forest of sclerophyllous flora formations because of the significant esthetical value of these units. | Mitigation |
| | Due to technical and cost reasons and environmental and security considerations, the length of the service roads necessary for Contractor circulation has been minimized. Also, the opening of new roads on the hillsides has been reduced. | Mitigation |
| | Project engineering contemplates stabilization gradients for slopes generated by cuts or dumping of material on roads or other works. The design of the road and maximum slope, inclination and speeds will be in accordance with the provisions in the Road Systems Manual. | Mitigation |
| | The PHAM will comply with the minimum requirements established by the Regional Road Authority of the Metropolitan Region in relation to the location and height of material piling with respect to public roads. | Mitigation |
| | Project engineering considers stabilization gradients for slopes generated by cuts or dumping of material on roads or other works. | Mitigation |
| | In the case of the Project's electrical substation (of the encapsulated type), there will be an area with 25% of native species trees. | Mitigation |
| | GENER will instruct Contractors with regard to the adequate dismantling of the temporary facilities and camps, with appropriate clearing and cleaning of the sites occupied, landscape recovery work consisting of topographic recovery and re-vegetation of the sectors intervened, using shrub and herbaceous species of the area (in the event that the application of the forest management plans are not applicable). This recovery contemplates giving shape, minimizing straight angles and heights according to the local landscape, in the cases where the plan is applicable (see Appendix 29). | Mitigation/ Restoration |
| | Although definitive road mitigation measures will be approved by the Regional Road Authority of the Metropolitan Region, the use of mixed road protections will be contemplated without neglecting road safety aspects in order to minimize the local effect on the sector's landscape. | Mitigation |
| | In the case of the Alto Volcan sector, because of the existence of summer-grazing sites, the PHAM has contemplated special considerations to minimize the intervention of vegetation. These measures must be understood to have multiple purposes as they tend to minimize the impact of the works on the area's natural landscape. | Mitigation |
| An ecological flow will be maintained both in rivers and streams, which at present maintain a natural flow regime and in those with a regulated flow. The Qe assured by the Project Owner will be maintained provided that the water available in the waterway permits. In the first case the streams where fishes were found were included, as well as those that do not have fishes because of their altitude (e.g. Colina, La Engorda streams, etc.). This measure has multiple purposes; it will minimize the impact on the landscape, which would also be associated with flow reduction, mainly in those sectors with greater visual access. | Mitigation | |

| Environmental Impact | Environmental Management Measures | Purpose of the measure |
|----------------------|---|------------------------|
| Alteration of Roads | Implementation of service roads: To minimize the use of public roads, the Project contemplates building a total of 31 km of service roads as described in Chapter 2, "Project Description." These roads will be used to transfer muck, earthwork in general, movement of personnel, machinery, equipment and inputs and supplies that the Contractor needs in the camps, temporary facilities and work fronts. | Mitigation |
| | Improvement of current access roads: Improving the current access routes to the Project area is contemplated (see Road Improvement Program, Appendix 19), which will basically consist of: <ul style="list-style-type: none"> - Improvement of platform (through leveled granular pavement); - Setting up vertical signals; - Cleaning and replacement of sewers; - Road protections; - Clearing of road during the winter period; - Among others The roads that will be improved are described in Chapter 2 "Project Description." | Compensation |
| | Crossroads of Project service roads with public roads will be paved. Prior to that, crossroads and junctions with public roads must fully comply with the requirements established by the Roads System Authority, especially with regard to regulations on intersections, obligatory, preventive and information signals, and geometrical aspects, like minimum turning radius and channeling. | Compensation |
| | Contractors will be instructed that all carriers of construction materials and supplies circulating through the public roads must have a weight certificate provided at the origin by the supplier or any other duly accredited institution. | Mitigation |
| | The weight of trucks will be controlled when trucks that will use the public roads are loaded. In the case of transportation of supplies and materials, the Project Owner will require the carrier in charge to implement a weight control procedure per axis, in accordance with the methodologies established by the Roads System Authority of the Ministry of Public Works (MOP). In the case of the movement of muck to muck disposal site 14; in other words, in the construction work site of the Access Portal to the Las Lajas Plant (VL2), the works Contractor will implement a vehicle weighing system previously approved by the Roads System Authority in accordance with the MOP's general calibration rules. | Mitigation |
| | Traffic on routes G-25 Puente Alto – Volcan and G-421 San Juan de Pirque – El Toyo, of trucks over four tons will be suspended between Saturdays at 2:00 p.m. and Sundays midnight. Gener will control the compliance of this provision through a systematic record, verifying traffic date and route. | Mitigation |
| | Transportation of materials and supplies on trucks will be carried out in appropriate trucks covered with a canvas to prevent spills on the road. Drivers will be instructed about the road conflicts indicated in this report so that they can take the precautions necessary for smooth, safe transportation. | Mitigation |

7.2 ENVIRONMENTAL RISKS PREVENTION AND CONTROL PLAN

This section presents a Risks Prevention Plan that will be carried out to prevent accidents and environmental emergencies from occurring, minimizing the potential harm to workers, neighboring communities, surrounding environment and the company's own facilities.

7.2.1 Identification of Environmental Risks

The anticipated risks per Project stage are indicated in the following table:

**Table 7.2.1
Environmental Risks Identified per Project Stage**

| Risk | | Stage | |
|------------------|---|--------------|-----------|
| | | Construction | Operation |
| Natural | Avalanche | X | X |
| | Landslide and rock fall | X | X |
| | Lahars | X | X |
| | Flooding | X | |
| | Earthquakes | X | X |
| Anthropic | Fire in the work site areas | X | |
| | Traffic accidents | X | X |
| | Hazardous substance spills | X | |
| | Accidental interference of sites of cultural interest | X | |
| | Drainage from piling sites and tunnels | X | |
| | Effect on water table | | X |

7.2.1.1 Description of natural risks

A natural risk is the probability of the occurrence of a catastrophic natural event with consequences for the population, constructions and/or natural resources, whose cause or triggering factor is related to the meteorological, geomorphological, hydrological, seismic and/or volcanic structure and dynamics (flooding, mass wasting, etc.).

Considering that the mountain grounds where the Project works will be carried out, are subject to geologic risks or dangers that are typical of nature, the facilities and surface works have been laid out seeking to minimize the impact of such risks in the event of the occurrence of any catastrophic. Therefore, to face the construction period, personnel camps have been located in safe places, and alarm systems have been implemented to permit timely evacuation and safe traffic of personnel in the case of any emergency of this kind. On the other hand, the necessary safeguards have been contemplated in the design of the works and operation routines to prevent causing damage to third parties in the event of any natural catastrophe (mass wasting, volcanism).

The basis for these considerations have been obtained from multiple site inspections carried out by Gener during the development of the project, particularly the “Geological Study and Volcanic Risk and Mass Wasting of Alfalfa II – Las Lajas Hydroelectric Project” prepared by the Executing Unit of the Geology and Geophysics Department of the University of Chile for CHILGENER in 1991, which was conducted with the specific purpose of having an assessment and zoning of the risks associated with natural phenomena of this type.

Given the physical conformation of the area where the PHAM is located, and in accordance with the description indicated in Chapter 5 “Baseline”, the geomorphological and hydrological risk conditions have been identified in those sectors where the works will be located, as indicated in the following table:

**Table 7.2.1.1.1
Natural Risks Identified In the PHAM in the Area Location**

| Risk | Location |
|-------------------------|---|
| Avalanches | Slopes oriented to the north, east and south, which make up the valley between the La Engorda and Colina streams. |
| | Northwest side of Lo Encañado Lake. |
| Landslide and rock fall | North side of Colina, Las Placas, El Morado intake and middle section of the conveyance canal. |
| | El Yeso River intake, El Yeso River syphon, conveyance canal, temporary facilities, dump site, and service roads. |
| Lahars | Intakes of the Colina and La Engorda streams and downstream of the Volcan River. |
| Flooding | Las Lajas forebay and Colorado River syphon. |
| | Temporary facilities and service roads located in the area adjacent to the Colorado riverbank. |
| Seismic Risk | The entire area where the Project will be located. |

The description of each of these risks is made in section 5.10 of Chapter 5 – Baseline of this EIA.

None of the works planned are located in an area of critical risk. This has been assessed by the engineering studies conducted to date. Consideration of the natural risks in the area has permitted locating Project principal and complementary works in sectors that are not exposed to foreseeable natural phenomena.

The prevention and control of other risks inherent to the Project’s typology and magnitude, and to the characteristics of the area of insertion, like the use of explosives, deep excavations, high degree of isolation and climatic harshness, etc., have also been addressed from the engineering point of view. These aspects have been included in the design considerations and planning of the works described in Chapter 2.

Particularly, no risks are foreseen for the 14 muck disposal sites contemplated by the Project. The drawings attached in Appendix 6 show the map of each site, at least two cross-sections and the contemplated pits and counter pits. One of these cross-sections indicates the level that would be reached by the river's waters (Colorado or Maipo) in a flood with a return period of 100 years. The following table shows the estimated distance between the maximum water level and the lowest point of the foot of the muck pile, in each case, for the indicated event. The muck disposal sites of Alto Aucayes, Alto Volcán and Yeso are not exposed to floods. With regard to mass wasting processes, it is worth clarifying that in these cases, muck disposal sites do not represent a situation different from the one existing all along the Colorado riverbank. Because of the characteristics of the project, the Project Owner has developed extensive geological and risk studies, which have served as a basis to define the layout of all the Project works, including muck disposal piles whose slopes, in addition of having an inclination smaller than the material's angle of repose do not show a risk condition different from the one of the terraces on which they are planned to be located.

Table 7.2.1.1.2
Location of Muck Disposal Sites in Relation to the Maximum Flooding in the Colorado River

| No. | Name | E | N | Maximum elevation of the Colorado River in 100 years | Lowest elevation of the land where the muck disposal site will be located |
|-----|--|--------|---------|--|---|
| 7 | Muck Disposal Site No. 7 - Alfalfal VL7 | 386045 | 6290828 | 1237 | 1260 |
| 8 | Muck Disposal Site No. 8 – Alfalfal VL9 | 387447 | 6291425 | 1272 | 1275 |
| 10 | Muck Disposal Site No. 10 – Window VL5 | 380352 | 6287495 | 1067 | 1074 |
| 11 | Muck Disposal Site No. 11 – Substation | 379982 | 6287413 | 1061 | 1066 |
| 13 | Muck Disposal Site No. 13 - Las Lajas Plant | 379273 | 6287238 | 1045 | 1058 |
| 14 | Muck Disposal Site No. 14 – Km. 8, Route G-345 | 378307 | 6286479 | 1045 | 1050 |

As we can see in the above table, the muck disposal sites are located at a higher elevation than the maximum flooding elevation during a flood with a period of return of 100 years. Therefore, the lowest points of these disposal sites are located between 3 and 5 m above the flooding elevation with a period of return of 100 years¹.

The muck disposal sites located at Alto Aucayes, Alto Volcán and the Yeso River are not located near natural waterways; therefore they are not in flooding areas. Muck disposal site No. 12 located adjacent to the northern bank of the Maipo River in the Las Lajas sector is the only muck disposal site that could eventually be affected by river flooding. Therefore, a rock retaining wall has been laid out as shown on drawing 630-CI-PLA-049 Rev A, attached in Appendix 1. This rock retaining wall, which serves as a support to an 11-m wide road surrounding the foot of the muck disposal pile, has a freeboard of 6m with respect to the river and this diminishes to 1 m in the case of a flood with a return period of 100 years.

7.2.1.2 Description of Anthropic Risks

An anthropic risk refers to an accidental event whose origin or triggering factor is related to human activities. In the case of the works considered by the PHAM, these risks are principally related to the construction activities of the works.

No environmental risks induced by the PHAM are contemplated for the operation phase because of the technological or design considerations of the Project's engineering.

i) Risk of fire

The risk of fire refers to a condition that may contribute to start or propagate fire and that may represent a danger to the life of the people and/or public or private property. In the case of the PHAM, this type risk may be found in the construction phase in the fuel storage sites in the temporary facilities or storage of other substances used. This risk will not exist in the operation phase.

ii) Risk of traffic accidents associated with the Project

This risk implies the occurrence of collisions against fixed obstacles or between two vehicles, running over or turning over. This risk is affected by incorrect driving maneuvers, unfavorable climate conditions, road conditions and vehicle maintenance. This risk will be present in both stages of development of the Project (construction and operation), considering that there will be a permanent flow of vehicles.

¹ It is worth noting that the engineering works are designed for phenomena with a period of occurrence determined by the standards or experience of the planners. In this case, a return period of 100 years has been used, a value recommended by the Roads Manual of the MOP to design bridges and other works. It must be pointed out that the catastrophe occurred in the Colorado River in 1987 was not caused by flooding of hydrologic origin but rather it was a natural catastrophe. It is impossible to design an engineering work to withstand a catastrophic event because that would make any construction unfeasible.

iii) Risk of hazardous substance spills

This type of risk is generated by transportation, storage and handling of some potentially hazardous materials like gasoline, diesel, oil for machinery and solvents. The immediate consequences of hazardous substance spills go from injuries, burns, and asphyxia, among others. This type of risk, will be present during the construction, particularly associated with transportation of materials for the execution of the works and their temporary storage at the temporary facilities.

The occurrence of hazardous substance spills is highly improbable during the operation stage.

iv) Risk of accidental interference of sites of cultural value

According to the baseline studies, in the area of influence of the PHAM (see section 5.8, Chapter 4) three particularly sensitive areas were identified, which are of archeological interest: The Lo Encañado Lake sector where two (2) sites were recorded (Las Morrenas and Camino del Inka); and the Colorado River sector – Aucayes Stream, where a site called Aucayes 1 was recorded. For these sites, the Project contemplates protection measures whose approval will be obtained according to the procedures specified by the Council for National Monuments.

Likewise, the existence of paleontological resources has been acknowledged in the Alto Volcan Sector, which although found near the location of some surface works, they will not be affected by them. This was rectified in the meeting of the Project Owner with the Chilean Paleontological Society.

According to the above, it is likely that there may be other sites with archeological and paleontological value in sectors near the works; therefore, we assume that this risk will be present during the construction phase.

This risk will not be present in the operation phase.

v) Effect on water table

According to the information available, the existence of aquifers with some degree of water production potential has been identified in the Maipo River Valley, in the stretch extending between the confluence of the Maipo River with the Volcan River and with the El Manzano Stream. These aquifers are directly connected with the surface flow, and they show a very permeable combination of materials. The analysis of the conveyance capacities of each aquifer and the surface flows that will be maintained in a Project situation (Appendix 25), concludes that the reduction of flows in the PHAM's operation phase will not negatively affect the aquifers existing in the area; therefore, no impacts have been anticipated on the extraction from private wells operating in the area. This is due to the fact that the groundwater conveyance capacity of each aquifer sector associated with the Maipo River is much smaller than the minimum flows that will run in each stretch of the river; therefore, aquifers will by no means lose their saturation condition.

With regard to the physical interference of the works of the construction phase with the aquifers, the design contemplates waterproofing the sectors where water leakage could occur from the surroundings towards the tunnel through rock fractures. This will protect the wet prairies and native vegetation, and also, any reservoir supplying groundwater for human consumption.

7.2.2 General Risk Prevention Strategy

The Project Owner has a general risk prevention strategy that includes some measures to the Project in its different development stages. This strategy comprises the following components:

a) Environmental measures included in the Project's engineering design

On the basis of the engineering studies carried out, measures have been included aimed at preventing and/or minimizing the risks associated with this kind of project. These measures will be ratified by the future basic engineering studies and other considerations that the Contractor may carry out with the authorization of Gener and the Works Technical Inspection Office (ITO, for its acronym in Spanish).

b) Systematic verification of compliance with applicable regulations

Both the engineering design and the construction programs will consider full compliance with the current regulations. These regulations are referred to aspects related to the sanitary and environmental conditions at the work sites, accidents and diseases, risk prevention, health and safety. In this context, Gener will make sure that every requirement and condition established by law is complied with.

c) Establishment of restricted areas

The protection of the areas identified to be particularly sensitive in the baseline studies will be of particular interest. This protection has been addressed by the Project by means of restrictive zoning for any temporary or permanent work that the contractor needs to set up. The restricted areas include elements that must be protected because of their natural or archeological value, or because they are currently protected by some regulatory instrument. These areas are.

c.1) Restriction area due to archeological or heritage value:

- Sites of archeological value in the Lo Encañado Lake, Colorado River.
- Inka road, identified in the Lo Encañado sector.

c.2) Areas of natural value that require to be protected by the Project.

- Wet prairie vegetation of the Lo Encañado-Yeso River sector.
- Wet prairie vegetation used as summer grazing sites in sectors upstream of the intakes of the upper basin of the Volcan River.
- Sites with species of flora and vegetation classified in a conservation category.

c.3) Official Protection Zone

- Laguna Negra is considered a restricted zone because it is one of the principal drinking water reservoirs of the Metropolitan Area of Santiago.
- El Morado. This zone is a Natural Monument characterized by the presence of native flora and fauna. The objective is preserving the natural, cultural and landscape environment.

d) Supervision by experts during construction

Gener will have an archeologist as part of the team in charge of the Technical Supervision of the Works, who will supervise the development of the works, especially in those sectors where there is the risk of affecting any item of archeological value, like the Lo Encañado sector.

In especially sensitive sectors for fauna in a conservation category, where there is the risk of destroying their habitats, on-site supervision by a fauna specialist will be implemented as a preventive measure. This specialist will supervise the works on site, both at the beginning and on a quarterly basis during their entire development of the works. In the event that during this supervision the presence of species of conservation interest should be detected, complementary measures will be adopted, like transferring such species or any other measure that may be necessary according to the vulnerability of the samples detected and the type of works in question.

The reports of the expert supervision will be sent to the relevant Authorities.

e) Training in sensitive environmental aspects.

GENER will see that heads of areas, on site supervisors and foremen get technical training on the type of archeological remains that may be found during excavations or earthwork in the sectors where there is greater risk of finding items of anthropological and archeological value (due to their nearness to the works, like Morrenas 2). Training will be focused on the identification and preservation of the items and the associated legislation, protection actions and sanctions.

Training in matters related to land and water fauna, through brochures and talks, is also considered with the purpose of creating awareness and informing about the procedures to protect land and water fauna, and the restrictions regarding their chasing and frightening away, hunting and fishing.

f) Internal Risk Control and Accident Prevention Programs

Gener will require all contractors to have in place Internal Order, Health and Safety Regulations, and to adhere to these regulations throughout the development of the Project. The content, scope and supervision of these regulations should be consistent with existing legislation.

Contractors are required to have an Emergency Plan in place at each of the work sites and camps, to be coordinated with the Project Owner's General Risk Prevention Plan

(see Appendix 32). Additionally, Gener will ensure that all camps and work sites have the equipment and infrastructure needed to address eventual emergencies that may occur during the development of the Project.

All work sites and camps will be assigned safety zones, as evacuation areas in the case of seismic events, avalanches, landslides or fire. Work sites and camps will also have medical staff.

The Emergency Plan should address maintaining work sites and camps permanently communicated with public health services, fire services, the police, ONEMI (National Office of Emergency of the Interior Ministry), etc.

g) **Camp Self-Sufficiency**

Camps will be appropriately equipped with all the comforts and resources needed to be self-sufficient in the event that bad weather renders them inaccessible for days or even weeks (see Appendix 33). Contractors will also be required to have machinery available to clear access roads that could eventually be closed due to snow, landslides or rocks.

7.2.3 Prevention Measures for Identified Risks

Table 7.2.1.5.1 summarizes the general safety measures to be adopted according to the risks identified.

Appendix 32 presents a Prevention and Contingency Plan for contractors.

**Table 7.2.3.1
Safety Measures for Counteracting Identified Risks**

| NATURAL RISKS | |
|------------------------|--|
| Risk | Prevention Measures |
| Avalanches & Lahars | <p>During the construction phase:</p> <ul style="list-style-type: none"> ▪ Job camps will be located outside the avalanche and lahar risk areas. Particularly in the upper part of the Volcan River, the engineering design and construction of water intakes will follow the technical standards for high-mountain construction works. ▪ Contractors will have high-mountain safety gear available at all camps and work sites. Staff will be trained in rescue and emergency activities, in accordance with the responsibilities of the respective Joint Committees. ▪ All provisional job camps and facilities will be built using specially-made material that resists extreme temperatures and heavy rainfall. ▪ All workers' camps will have safety zones and emergency evacuation plans. ▪ The Communication Plan will remain active at all times. <p>During the operation phase, the plants will have in place a Risk Prevention and Communications Plan, in line with Gener's General Risk Prevention Plan.</p> |
| Landslides & Rockfalls | <p>During the construction phase:</p> <ul style="list-style-type: none"> ▪ All facilities will be located outside the areas exposed to gravitational phenomena. ▪ Without prejudice to the above, cut slopes will adapt to soil stability characteristics where work sites, access roads and provisional job camps and facilities are located. ▪ Countermeasures will be taken in areas that are particularly sensitive to the risk of landslides. Several measures are being considered, including landslide-contention barriers, revegetation and slope terracing. ▪ Removal of vegetation will be kept to a minimum for cut slopes to avoid erosion processes (debris flow). ▪ The construction of temporary access roads will be avoided in sections where gradients are steep or unstable. ▪ All cuts will undergo inspections in order to identify management weaknesses that could create situations of risk. ▪ All muck disposals, whether located near surface waters or elsewhere, will be designed to serve as stable deposits over time. Disposal methods based on layers, with slopes adapted to the type of material, and the drainage mechanisms are aimed at fully meeting this objective. Part of the technical and environmental criteria used to locate muck disposal sites are included in the Manual on Environmental Management Plans for Works under Concession of the Chilean Ministry of Public Works, and the Environmental Considerations for Contractors: Dumps section of the Roads Manual issued by the Roads System Authority (see the Muck Disposal Site Management Plan in Appendix 6). The aim is to find locations where (i) permanent surface water flows or streams are not cut off, (ii) wet plains or summer-grazing zones are not compromised, and (iii) there is no risk of flooding with return periods of less than 100 years. <p>During the operation phase, the plants will have in place a Risk Prevention and Communication Plan, in line with Gener's General Risk Prevention Plan.</p> |

| NATURAL RISKS | |
|----------------------|---|
| Risk | Prevention Measures |
| Flooding | <p>During the construction phase:</p> <ul style="list-style-type: none"> ▪ No camps or temporary facilities will be established near or adjacent to riverbeds and fluvial waterways in flood-prone areas. ▪ Where necessary, temporary facilities near riverbeds will be located on high ground, sufficiently above the river level. ▪ Barriers will be built to prevent water from flooding work sites and construction works. <p>During the operation phase: Given the type of works, no flooding risks are foreseen during this phase of the project.</p> |
| Earthquakes | <ul style="list-style-type: none"> ▪ All PHAM plants and equipment will follow national and international seismic resistant design and engineering standards. |
| Work Site Fires | <p>During the construction phase:</p> <ul style="list-style-type: none"> ▪ Contractors will adopt the measures and fulfill the obligations established by the company to minimize fire risks. ▪ All work sites will be equipped with storage areas for fuel and other flammable materials. Flammable materials will be kept in an orderly and classified manner in these storage areas. Staff in charge of risk prevention will carry out inspections on a regular basis to identify possible non-compliance with flammable material management procedures (see Chapter 2, section 2.3.2.4). ▪ Contractors will have at their disposal at the work sites and temporary facilities, the basic elements (e.g. fire extinguishers, hoses, sacks of sand, etc.) needed to fight fires, in accordance with existing rules on this matter. ▪ Contractors will form a trained brigade that will be operational throughout the construction phase. Fuel handling will be carried out in keeping with procedures established by the Superintendency of Electricity and Fuels (SEC). ▪ The risk prevention expert at the work site will determine an area around the fuel storage areas where open flames, smoking and spark-producing elements are prohibited (see Chapter 2, section 2.3.2.4). <p>Fire risks are not foreseen during the operation phase.</p> |
| Traffic Accidents | <p>During the construction phase:</p> <ul style="list-style-type: none"> ▪ Contractors will put in place a formal procedure for dealing with traffic accidents. ▪ All trucks, buses and other motor vehicles will be driven by qualified staff holding the proper driver's licenses required by law (Traffic Law No. 18.290). ▪ All machinery and materials transportation vehicles will comply with existing signaling rules, and their age will not exceed five years. ▪ All vehicles will comply with applicable traffic legislation (technical inspection, insurance, transportation permits, staff transportation regulations, etc.). ▪ Signaling regulations will be applied at all construction sites, particularly as concerns: <ul style="list-style-type: none"> ▪ The weight of trucks carrying equipment or materials will not exceed maximum permissible weights for roads/bridges used, unless authorization has been granted by the relevant authorities on a case-by-case basis. ▪ Transportation of fuel and other materials will be carried out according to existing legislation. ▪ When necessary, road transportation of oversize loads will be coordinated with police and other relevant local authorities. ▪ An effective communications system (radio, cellular phones) will be set up to ensure communication with working faces. ▪ Pedestrian crossings will be usable throughout the construction works. ▪ Access to work sites will be duly marked using signs, barriers, flashing lights, and other means. ▪ All machinery and vehicles used at the work sites will be kept in optimum working conditions. |

| NATURAL RISKS | |
|-----------------------------------|---|
| Risk | Prevention Measures |
| <p>Hazardous Substance Spills</p> | <p>Safety measures associated with transportation:</p> <ul style="list-style-type: none"> ▪ Transportation of liquids, such as fuels, needed for the works, will be carried out according to relevant legislation in force. ▪ Transporters or drivers will possess the required license and training needed to respond to accidents involving the release of transported materials. ▪ Drivers will be trained to manage and handle the substances transported, including first-aid practices and spill control procedures. <p>Safety measures associated with storage and handling:</p> <ul style="list-style-type: none"> ▪ Staff responsible for handling and storing hazardous materials at the temporary facilities will receive proper training. ▪ Storage areas will be determined for all hazardous materials kept in the temporary facilities. Storage areas will be duly marked and fitted according to the requirements set forth by relevant authorities (see Chapter 2, Section 2.3.2.4). ▪ Fuel and oil drums will be placed on wooden pallets or other devices to facilitate transportation and protect them from moisture and corrosion due to direct contact with the ground. ▪ These areas will have elements to contain medium-sized spills. ▪ Safety Sheets containing data on the hazardous materials stored, including characteristics, risks and emergency procedures, will be available in the storage areas. ▪ Machine and equipment fueling operations will be done in previously determined and properly marked areas. ▪ Used oil and other oily waste will be appropriately stored in closed drums for subsequent sale, disposal in authorized locations or return to providers. ▪ Diesel oil and gasoline needed to operate machinery and motor vehicles to be used in construction works will be provided by distributing companies through the installation of tanks and pumps at the work sites. ▪ Pursuant to the Ministry of Economy's Supreme Decree 379/86, regulating the storage of liquid petroleum-derived fuels for own use, contractors will be required to register fuel tanks of more than 1.1 cubic meters with the Superintendency of Electricity and Fuels (SEC). <p>Appendix 18 (section 6) presents other risk control considerations.</p> <p>This type of risk is not foreseen during the operation phase.</p> |

| NATURAL RISKS | |
|---------------------------------------|---|
| Risk | Prevention Measures |
| Damage to Places of Cultural Interest | <p>During the construction phase:</p> <ul style="list-style-type: none"> □ Upon initiation of the works, instructions will be given to supervisors on the type of archaeological remains that could be found during digging or earthwork operations. The instructions will be issued by an archaeologist and will include photos of the objects that could be found (pottery remains, bone tools, arrow heads, etc.) and the corresponding actions to be taken (notifying police or the National Monuments Council). Probable archaeological sites will also be pointed out as part of the information provided (see Chapter 6, Figure 6.4.1.5). □ An archaeologist will be permanently present when earthwork, including road improvement activities, is carried out at Lo Encañado sector. A trained archaeologist will determine buffer zones around the sites to ensure protection during construction works (see Chapter 5, Section 5.8). □ Sites located near working faces will be separated by fences to avoid any accidental disturbances and ensure they are effectively protected. The fences, which will be located at least 5 meters from the site perimeter, will have impregnated posts and barbed wire, and will be removed upon conclusion of the construction phase. This measure is necessary as the existence of an archaeological site is not obvious to a layman, who can unknowingly cause damage. The measure, applicable to sites identified at Lo Encañado (Las Morrenas and Camino del Inka) and Estero Aucayes, will be implemented before works begin and will be supervised by an archaeologist, prior authorization by the National Monuments Council. <ul style="list-style-type: none"> ▪ Before initiating works at the Alto Volcan sector, a paleontological survey will be carried out to accurately determine restriction areas applicable to contractors' works and activities. ▪ Interference between the working faces and the archaeological sites will be avoided by partially modifying the layout of certain points, when possible, or by modifying construction activities to reduce the space needed to carry out tasks. ▪ During the opening of the temporary facilities and muck disposal sites, and when as a result of progress made in the construction phase the working face comes close to the sites identified, an archaeologist will supervise works on the ground, to ensure sites are adequately protected. ▪ Should there be an actual risk of damaging the archaeological sites, Gener will draw up a Rescue Plan for the items at risk. The plan will be presented to the National Monuments Council for authorization to rescue the archaeological resources and move them to a location determined by the Council. ▪ Contractor will pay particular attention to detecting the existence of archaeological remains at each of the working faces, and will be informed on the legal obligations such findings entail (immediate suspension of works and notification of the National Monuments Council and/or the police). <p>This type of risk is not foreseen during the operation phase.</p> |

| NATURAL RISKS | |
|--|--|
| Risk | Prevention Measures |
| Drainage from Muck Disposal Sites or Tunnels | <p>None of the land surveys, test drillings or surface geological mappings carried out to date in the tunnel areas has revealed any evidence of the existence of water at high temperatures or mineral or acid contamination. Nevertheless, contractors will be required to perform exploratory drilling (25 to 30 m) so as to anticipate possible filtrations and carry out waterproofing activities, if necessary.</p> <p>Contractors will be instructed to pay special attention to the quality and conditions of water that could eventually come out through access windows. Construction contract specifications will include a description of the measurements to be made and the treatment to be given to these waters for subsequent disposal, so as to comply with quality standards when discharging to natural surface water, in accordance with existing legislation.</p> <p>With regard to muck disposal sites, the Project Owner will submit the ABA and TCLP test results to the relevant Authority confirming whether or not the material extracted from the tunnels (muck disposal sites) has acid drainage potential.</p> |
| Damage to Groundwater | <p>Communication flows between the tunnel's advance front and project management will be continuous during construction; therefore, if an underground aquifer with the potential of damaging the tunnel is found, immediate action can be taken to waterproof the area and resume works.</p> |

7.2.4 Accident Control Measures

The Accident Control Plan includes specific measures for each of the identified risks. These measures will be adopted if the prevention actions specified in the previous section fail.

Table 7.2.4.1
Accident Control Measures for Identified Risks

| Risk | Contingency Measures |
|--|---|
| Lahars, avalanches, landslides & rockfalls | <p>During the construction phase:</p> <ul style="list-style-type: none"> ▪ The site manager will be immediately notified. He or she will in turn notify risk prevention staff and the emergency brigade. ▪ Depending on the extent of the avalanche or lahar, works will be stopped immediately and, if needed, personnel evacuated to safe areas. Works will resume when ONEMI or police authorities inform the Technical Director that the area is no longer dangerous. ▪ The Communications Plan will be activated. This plan specifies who should be notified, depending on the extent of the accident. ▪ A restricted area, to which only trained staff will have access, will be immediately determined. ▪ Trained staff will inspect the site of the accident and determine whether people were injured. ▪ Any injured people will be taken to a health care center. ▪ A risk prevention expert will inspect the area, demarcating the risk areas and will determine whether relocating the facilities is advisable. If this is the case, the relevant authorities will be informed. <p>During the operation phase, the plants will have in place a Risk Prevention and Communications Plan, in line with Gener's General Risk Prevention Plan.</p> |
| Flooding | <ul style="list-style-type: none"> ▪ The site manager will be immediately notified. He or she will in turn notify risk prevention staff and the emergency brigade. ▪ The Communications Plan will be activated. This plan specifies who should be notified, depending on the extent of the accident. ▪ Depending on the extent of the flooding, works will be stopped immediately and, if needed, personnel evacuated to safe areas. ▪ Flood water will be extracted, using a pump or manually. <p>Sand bags or other means will be used to control further flooding.</p> |

| Risk | Contingency Measures |
|----------------------------|--|
| Earthquakes | <ul style="list-style-type: none"> ▪ Depending on the extent of the earthquake, the alarm will be activated and, if necessary, people evacuated to safety zones. ▪ The workers will remain in the safety zones, awaiting further instructions from trained staff in charge. ▪ Gener will carry out an assessment of the damages to the physical structures of water collection, conveyance and storage systems, and designate repair teams. ▪ Should the damages suffered hinder the normal operation of the plants, the relevant authorities will be notified. <p>During the operation phase, the plants will have in place a Risk Prevention and Communications Plan, in line with Gener's General Risk Prevention Plan.</p> |
| Work Site Fires | <p>During the construction phase:</p> <ul style="list-style-type: none"> ▪ The fire alarm will be activated. ▪ The site manager will be immediately notified. He or she will in turn notify risk prevention staff and the emergency brigade. ▪ The fire emergency procedure will be activated, and the Emergency Brigade, trained in the use of fire extinguishers, will try to control the fire. ▪ If the fire cannot be controlled, the fire-fighting services will be notified and workers evacuated to safety zones. ▪ Trained staff will inspect the site of the accident and determine whether people were injured. If this is the case, they will be taken to a health care center. ▪ The causes of the fire will be investigated. ▪ Activities will resume once the fire has been controlled. <p>This type of risk is not foreseen during the operation phase.</p> |
| Traffic Accidents | <ul style="list-style-type: none"> ▪ The site supervisor will be informed of the accident. He or she will then take the following actions: ▪ Ensure that injured people are taken to a health care center. ▪ Verify that the police have been informed of the accident. ▪ Have equipment available to help clear the road as soon as possible (prior approval by relevant authorities). ▪ Ensure that the insurance companies involved are duly notified. ▪ Provide timely information to responsible company staff. ▪ Fill in the corresponding accident report form. |
| Hazardous Substance Spills | <p>During the construction phase:</p> <ul style="list-style-type: none"> ▪ In case of an accidental spill of chemicals or products hazardous to the environment, Gener will have the surface cleaned and the affected parts removed. For this, each work site will be provided with the necessary equipment, including shovels, pumps, machines, temporary storage tanks, and others. The procedures included in the Safety Sheet will also be followed. ▪ Adequate care will be provided to the people possibly affected by the spill. ▪ Even though no major spills are foreseen given the amount of hazardous materials used at the work sites, in case of contamination of any surface water during the construction phase, the following actions will be taken: <ul style="list-style-type: none"> — Identification and location of the contaminated place to proceed to its immediate neutralization or control. — In case of an accidental spill of solid materials, oils, lubricants or other products to waterways, the need to clean up and remove the affected part of the river bed or |

| Risk | Contingency Measures |
|--|---|
| | <p>banks will be assessed.</p> <ul style="list-style-type: none"> — Written and/or graphic documentation of the occurrence and the immediate actions taken will be made. — Notification of the Water and Sewerage Authority if, given its extent, the occurrence could impact third parties downstream of the point of contamination. — Internal investigation of the causes of the accident, including an assessment of the effectiveness and adequacy of the preventive or corrective actions taken, so as to improve procedures, if needed to prevent the situation from occurring again. <p>This type of risk is not foreseen during the operation phase.</p> |
| Damage to Places of Cultural Interest | <p>Although no archaeological findings are evident in project areas during the construction phase, there will be ongoing monitoring in order to take appropriate action if necessary.</p> <ul style="list-style-type: none"> ▪ Should new archaeological remains be found during the construction works, activities will be suspended and the National Monuments Council and/or police authorities will be notified. ▪ An archaeological rescue plan will be implemented for the items at risk. The plan will be presented to the National Monuments Council for authorization to rescue the archaeological resources and move them to a location determined by the Council. ▪ The rescue plan will consider at least the following: an area of adequate size to undertake excavations and record archaeological evidence without damage; the collection of samples to be sent to a specialized lab for cleaning, classification and packaging; and, the transfer of archaeological remains to locations determined by the competent authorities. All these activities will be carried out by a qualified professional. <p>No damage to sites of cultural interest is foreseen during the operation phase.</p> |
| Damage to Groundwater | <p>In case of accidental damage to the groundwater, Gener will notify competent agencies, in writing, as set forth in the Communication and Coordination Plan (see Appendix 32).</p> <p>Although it is unlikely that project activities will cause damage to the groundwater during the operation phase, if an unforeseen accident does occur, the Project Owner commits to taking on responsibility for the necessary mitigation or correction efforts, after confirming, on the basis of a technical report, that the causes of the damage are directly or indirectly related to the Project.</p> |
| Drainage from Muck Disposal Sites or Tunnels | <p>Should ABA and TCLP test results reveal the existence of acid or base water (using the pH values established by Chilean water quality standard No. 1333 as the reference point), the Project Owner undertakes to implement, as a contingency measure, a system of soil waterproofing, drainage recovery and neutralization of waters prior to their discharge. These or other contingency measures will be agreed upon with the Environmental Authority, and all the necessary permits and authorizations will be obtained.</p> |

7.2.5 Specific Risk Control Measures for Drinking Water Reservoirs

The Alto Maipo Hydroelectric Power Project (PHAM) will not affect the Laguna Negra-Lo Encañado system or the El Yeso reservoir, all of which are drinking water reservoirs for Santiago and administered by the concession-holder, Aguas Andinas S.A., nor will it

intervene in the operation of the drinking water supply system. This means that the PHAM is not expected to impact drinking water availability or use.

The water will be returned to the Maipo River at approximately some 5 km upstream of the water intake of Aguas Andinas S.A., which extracts water to supply the city of Santiago with drinking water; therefore, the PHAM will not impact on its normal operation.

The PHAM will only modify the delivery point of the tributary waters to the Maipo River, i.e. no water that is not naturally flowing into the Maipo River at present will be added by the Project.

Notwithstanding the above, should an accident occur during the construction phase, such as an accidental fall of inert material or spills, in addition to the general measures already described, the following actions will be taken:

- i) The Project Owner will set up communication channels to report any eventual contamination of drinking water supply sources during the construction phase.

The PHAM will develop a Communications Plan (Appendix 32), aimed at ensuring continued communication with all public services involved in emergency control, throughout the construction phase.

In case of an emergency related to the possible contamination of the drinking water, the PHAM will notify:

- Aguas Andinas S.A.
- Water and Sewerage Authority of the Metropolitan Region
- General Water Authority
- CONAMA RM
- Police and local authorities

- ii) Coordination with the Water Utility

Before and during the execution of works inside the property administered by the local water utility, Aguas Andinas S.A., the following actions will be taken:

- Gener will coordinate with Aguas Andinas a detailed schedule of access to the property.
- The civil works contractor will have a record of all the facilities and special works for the conveyance of existing water around the lake and access road, in order to avoid any type of obstruction or interference during operations involving the PHAM.
- Staff will receive specific instructions regarding the precautions to be taken when working in the Lo Encañado y El Yeso reservoir zone.

- iii) Measures to be adopted in case of a contamination event affecting the drinking water supply during the construction and operation phases

Although given the location and nature of the works in this area, the contamination of the Lo Encañado lake and El Yeso reservoir due to Project activities is highly unlikely, in addition to what is established by the relevant environmental and water authorities, the Project Owner will:

- Identify and locate the source of contamination, and immediately neutralize or control it.
- Inform Aguas Andinas and the Water and Sewerage Authority on the location and extent of the event.
- Document the occurrence and the immediate actions taken, in writing or graphic.
- Conduct an internal investigation of the causes of the accident, and assess the effectiveness and adequacy of the preventive or corrective actions taken, so as to improve procedures, if needed.

7.2.6 Specific Risk Control Measures for Paleontological Sites (Valle del Arenas)

According to preliminary information from the Chilean Paleontological Society, no damage to existing paleontological sites as a result of the works envisioned by the PHAM is expected. However, the existence of other sites or paleontological resources that could be found during works at Alto Volcan needs to be determined, in order to avoid any potential damage.

A complementary paleontological survey will be undertaken in the Alto Volcan area before construction works begin. Upon conclusion of the survey, measures will be determined for the preservation of all paleontological resources.

The above proposals will be presented to the National Monuments Council for approval.

The activities to be carried out include:

i) Paleontological Survey

With the authorization of the National Monuments Council, the first phase of the survey will consist of the identification of blocks of paleontological and sedimentological value² by means of land mapping. This will result in the demarcation of the areas of significant concentration, as well as those of lower impact as regards the installment of base camps for the PHAM. Should these areas coincide with the work sites contemplated by the PHAM, the possibility of relocating the material will be considered.

² Refers specifically to fossils rarely described in scientific papers of the area, unique specimens, new to science or samples of unusual preservation.

The survey will be carried out in an area of approximately 6 km², between the coordinates UTM N6262000 - N6259000 and E405000 - E407000.

Field work will be conducted in October/November 2008, depending on weather conditions, and in parallel with the initiation of works in the area.

ii) Rescue and/or Relocation of Paleontological Evidence

Based on the paleontological survey results and with the authorization of the National Monuments Council (NMC), the PHAM will transfer the material that could be affected by the works to a safer location, museum or other institution, depending on the nature of the material and the decision of the NMC.

iii) Monitoring of Excavated Material

Excavated material containing fossils of scientific value will be monitored on a regular basis. The monitoring will be conducted in line with the timing of works, at a frequency to be determined according to the construction schedule and the volume of the material.

The monitoring will apply to the waste rock from the excavations at El Volcan, which will be disposed of in authorized sites.

Blocks containing fossils will be transported to a safe location, be this the National Museum of Natural History or another location designated by the NMC.

The permits needed to develop the above activities will be obtained from the NMC.

iv) Instructions to Contractors

Contractors will be duly informed of the type of paleontological evidence existing in the Alto Volcan area or that could be found during excavations and land movements.

Based on the paleontological survey results, a buffer zone will be determined around each site to avoid any accidental disturbances and ensure adequate protection.