

# ADDENDUM

## EIA Espejo de Tarapacá

### Region of Tarapacá Chile

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## INTRODUCTION

The present document contains clarifications, corrections and/or additions relating to the project "Espejo de Tarapacá" energy Valhalla SpA, services that are participating in the evaluation of the project have made the study of impact Environmental project.

To do so, searched answer fully the observations, requirements and questions to the project, following the same order contained in the consolidated report of clarifications, corrections and/or additions (ICSARA) N ° 1.

In addition, is evident that this instance has exploited to update the contents presented in chapter 14 ("*Negotiations with interested parties*") of the EIA, in form which then is designated."

### 1. Advances in the process of community relationship with San Marcos

In chapter 14 ("*Negotiations with interested parties*") the EIA was described the process of relationship of the holder with the Caleta San Marcos. There he realized the existence of two Work plans held by the holder. Efirst I of them, with the Board of neighbors of the Caleta San Marcos, the Housing Committee of the San Marcos Creek and the Club Deportivo de la Caleta San Marcos; and the second, with the Union of independent workers, fishermen, divers Mariscadores and Caleta San Marcos seaweed fields)the"Union fishing").

The objective of both documents era sit the basis for a relationship between the owner and the community of San Marcos, which serve as way to achieve, in short, a long partnership agreement term.

From the entry of the EIA to date has been achieved in the fulfillment of the commitments in both plans of work, what you can see in the TAbLa N ° I-1XX then.

Table I-1: State of commitments.

Commitment	State or situation
Permanent and effective dialogue	From 2012 to date they have been various instances that promote a permanent and effective dialogue with the community of San Marcos, such as the celebration of mthose of work, meetings with leaders, visits House to House, etc.
Technical support	Two were hired (2) consultores marinos for support and advice to the community with marine studies that were performed to assess the feasibility of the project.
Legal support	Was the contratacion one (1) toBogado for the neighborhood Council and the Trade Union, who have the responsibility to support and advise them in the process to reach a partnership agreement.
Experiences of similar projects	In togosto de 2014, a group of leaders and representativela Caleta s San Marcos visited the commune of San José de Maipo, Región Metropolitana with the aim of the experience that this community had with the project Hydroelectric Alto

	Maipo. The company financed the costs of travel and stay for all these people.
<b>Job opportunities</b>	A survey was conducted to determine how many people of the Creek would be interested in working on the project and know their level of study and profession. Currently training sessions are being organized in different areas, according to the needs of the project and defining programs and dates for the leveling of studies that allow residents eligible for works in the work through the application to contractors.
<b>Participatory monitoring</b>	As outlined in the EIA (chap. 15), the project considered by way of voluntary commitment the entregaRA information timely and accessible to the community, with respect to environmental surveillance plans required by the RCA.
<b>Monitoring Social</b>	They were 6 instances of social dialogue where it participated different neighbours and children of la Caleta. The object was to raise their concerns about social issues that could have the construction and operation of the project and generate joint mechanisms for dealing with them.

## 2. Partnership agreements with la Caleta San Marcos

The EIA indicated that holder had presented a proposal of partnership long term with the Cove Community San Marcos (p. 14.3). These proposals were inspired by the fact that one of the fundamental axes of power Valhalla is in economic, environmental and social sustainability of their projects. It has meritorious in that the company has worked - from the preparation of the EIA - to build a relationship early, transparent, and inclusive with the neighbouring community to the same area.

In this regard, we are pleased to announce that recently have become such proposals through the signing of two agreements of partnership: one with the Union of fishermen of San Marcos (date of March 10, 2015) and the other with the Junta de Vecinos of San Marcos (d e date of February 28, 2015).

As already noted, these agreements are inspired by that company not only aspires to make your project compatible with the activities that are currently performed at the Cove, but it also seeks to be a contribution and to collaborate in the improvement in the quality of life of I You inhabitants of this. This is how under these agreements, the project has voluntarily committed to to these organizations provide various contributions economic intended to finance productive, social projects and the realization of infrastructure for the service of the community.

## 3. Contents of partnership agreements

In particular, the agreements contain a series of agreements and benefits to the community of San Marcos:

a) Contributions for the community of San Marcos

On this subject, the main contents of the agreement with the Junta de Vecinos they can be summarized as the following:

- Contributions during the run-up to the construction of the project, aimed at the implementation of infrastructure in the school San Marcos, to the execution of a leveling program of studies and training for the inhabitants of San Marcos.
- Contributions during the construction phase of the project to be invested in community infrastructure and the creation of a sinking fund to finance projects implemented by the inhabitants of San Marcos.
- Contributions during the operation of the project, intended to create a competitive Social Fund for projects of social benefit and interest, and to implement a Fund of support to the students of San Marcos.

Moreover, the agreement with the Union of fishermen is intended provide a differentPortes economic intended to finance productive activities of the Union and that they will be delivered during the run-up to the construction of the project, during the construction and duduring the operation of the project.

b) Delivery of water desalinated for the community

In addition, both agreements contain a commitment on the part of the holder to provide desalinated water from the desalination plant of the project, for the Union of fishermen and the community of San Marcos.

c) Arbitral proceedings

The project, as it has already been pointed out in the EIA and reiterated in the present addendum, not generated under any so-called significant impacts on the marine environment and biological resources. However, the owner understands the concern that activities such as the of this project generate for communities such as San Marcos, that get their economic livelihood from sea.

This, coupled with the intention of generating a permanent partnership with San Marcos, holder has allowed accommodate their concerns and agree with them an arbitration procedure for determination and subsequent payment of compensation for economic damages that These may

occur, because of possible environmental damage derived from a violation of the RCA of the project, provided that so it has been sanctioned by the Superintendence of the environment.<sup>1</sup>

Is widely known the difficulty which means for communities to access to the courts for compensation for damages against large projects of investment in our country. For this reason, and despite the fact that the project does not generate significant impacts on the marine environment, the procedure laid down in the agreements of AsociatiVIDad seeks to ensure community access to compensation for damages in the event that the project breaches its RCA and that it will derive environmental damage which impact economically for the community.

Finally, are accompanied to the present addendum as annexes to the agreements with these communities.

Waiting for a good reception, and being at your disposal for any additional information required, he says goodbye sincerely,

Juan Andrés Camus Valdés  
Espejo de Tarapacá SpA

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<sup>1</sup> Técnicamente este acuerdo recibe el nombre de “cláusula compromisoria”, conforme a la cual las partes libre y voluntariamente deciden sustraer del conocimiento de los tribunales de justicia un determinado asunto (actual o eventual) para que sea resuelto por un tercero experto e imparcial.

De este modo, las partes –en este caso, la Empresa y las organizaciones de San Marcos–, en lugar de demandar ante los tribunales ordinarios, acuerdan previamente a encargar a un experto en el área en cuestión la resolución de un determinado asunto, cuya ocurrencia incluso puede ser incierta o improbable, como es el caso del daño ambiental. En este caso, el asunto está dado por la procedencia y pago de indemnizaciones que se deriven a causa de un eventual e improbable daño ambiental que pudiere generar el Proyecto con su operación.

Finalmente, se hace presente lo siguiente. De acuerdo al Código Orgánico de Tribunales, pueden someterse a decisión de un árbitro toda clase de asuntos con el fin de resolver un asunto litigioso salvo que se encuentre expresamente prohibido por Ley, cual no es el caso.

## 1. DESCRIPTION OF PROJECT

**1.1. The holder it is clarified that the commune of Pozo Almonte is located in del Tamarugal province, and not in the Iquique province, as indicated in table 1.1 Region, province and commune where the project the EIA will be developed. Therefore, it must correct the information.**

### **Reposed:**

The holder welcomes observation, the works of the project are located in the provinces of Iquique and the tamarugal, in the latter part of the high-voltage line is installed.

Table 1-1 point 1.3.1 of the chapter 1 description of the project is then corrected.

**Table 1-1: Region, province and Commune where it develops the Pproject.**

Region	Province	Commune
Tarapacá	Iquique	Iquique
	The tamarugal	Pozo Almonte

Source: eLabown action.

**1.2. With regard to the generation of power, the holder must clarify the fact that the EIA reported that the plant will consume 2.28 GWhday, annual average, up sea water to the plateau, to produce 1.75 GWhday, annual average.**

### **Reposed:**

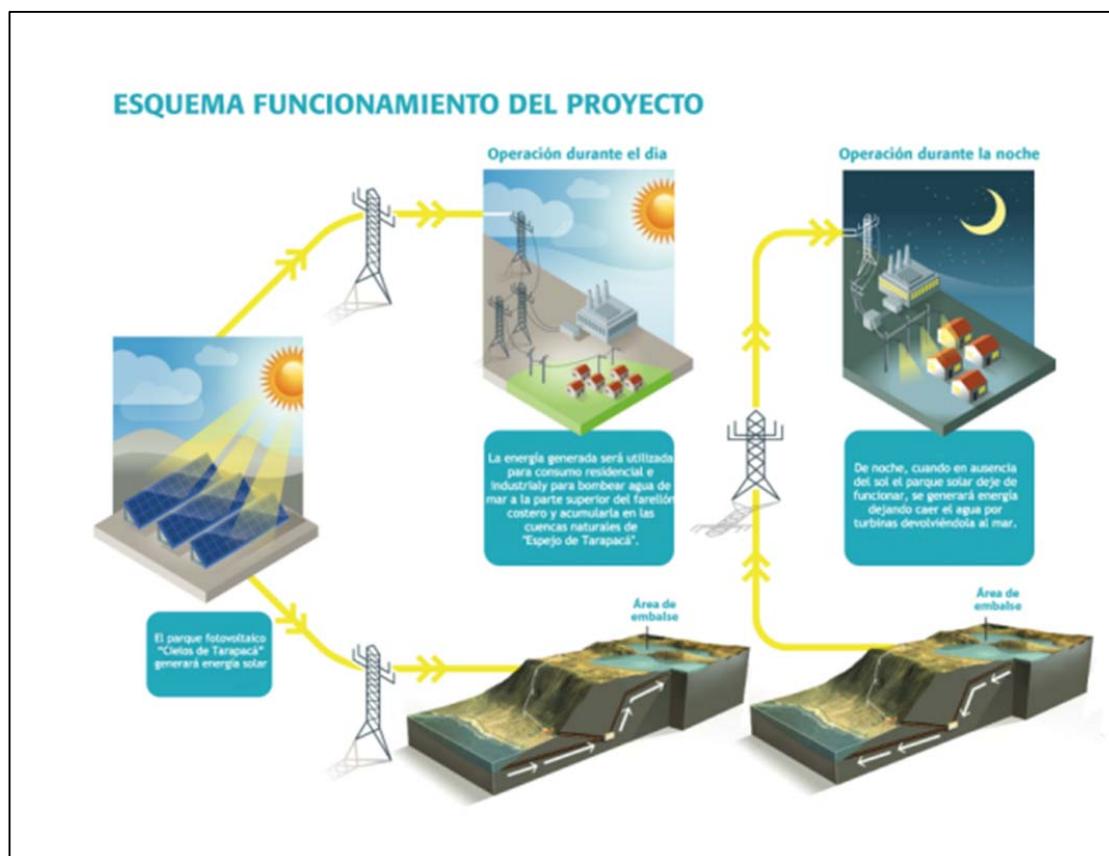
The owner explains that el main objective of the project is storing energy on a large scale, efficiently and cost-effectively (Chapter 1, Section 1.2.3), by connecting to the System locationth of the Norte Grande ("SING") and the operation is coordinated by the respective economic dispatch of load ("COC") Center.

As indicated in section 1.2.4.2 ("indication of the development of the project by stages") of the Chapter 1, referred to the development of a photovoltaic Park of 600MW. For this the heavens photovoltaic Park project was entered from Tarapacá to the Eval systemutotion of environmental impact through environmental impact assessment dated 07 January 2015. The function of the Park, in relation to the Tarapacá mirror project, It will be to deliver

power to the pumping equipment to grasp during the day the sea water necessary for the generation of the provided energy. However, the realization of photovoltaic Park will be defined based on your factibilidad technical and economic. In this way, may have recourse to an alternative project connected to SING in the event that the conditions do not prove favorable.

The relationship between the project's central pumping with seawater, Espejo de Tarapacá and the photovoltaic Park, shown in the following figure:

**Figure 1-1: Operation of the project outline.**



Source: Espejo de Tarapacá.

As was pointed out in the EIA, the relationship between energy generated by the unit v/s the energy consumption will be 2.28/1.75 GWh/day. It responds to an approximate value of 0,7676 which is explained in the following way:

1. During the pumping phase, of a **100%** the energy consumed by the plant, about 11.62% will be lost in the use of the pump and motor, while the **88.38%** remaining will be stored in the reservoir to be used in power generation.
2. Then during the phase of generation, this **88.38%** shall be used throughout the work. Thus, in general terms a **76,76%** power will be effectively generated by the Central.

These values are presented in the Table 1-2 below:

**Table 1-2. Relationship between energy generated by the unit v/s the energy consumed.**

Consumed power	Generated energy
2.28 GWhday	1.75 GWhday
100%	76,76%

Source: Own elaboration

As mentioned previously, el project will be connected to the interconnected system of the Norte Grande ("SING"), whose operation is coordinated by the respective economic dispatch of load ("COC") Center. Accordance with the General Law of electrical services (D.F.L. No. 4/20.018) and in the regulation on the structure, functioning and financing of the economic load dispatch centres (D.S. N ° 291/2008, Ministry of economy, development and) Reconstruction) this organism may order the owner of the project to generate particular power at any given time to meet demand, according to the reqSING erimientos. This means that the project will operate within the range of 0 to 300 MW MW, according to the instructions for the coordination of the operation issued by the COC addresses.

The energy generated will be transmitted by a Lline of High Tension that arises in the substation Underground (GIS) Espejo de Tarapacá and ends in lagoons substation (existing), which will connect to SING.

**1.3. Considering that the present project will depend on for their operation from its connection with a photovoltaic Park that provides the energy for its operation, must clarify the relationship between figure 1-8 and the present EIA figure 1-41.**

**You must also point out if he is considered a distinct alternative to the already designated, for the supply of electrical power for the operation of the project.**

**Rexposed:**

The owner explains that the mentioned figures correspond to the schedules of the projects corresponding to the stage of pumping station and the photovoltaic Park stage presented in Chapter 1 of the EIA of the project Espejo de Tarapacá.

As mentioned in that chapter, corresponding to the description of the project, in the title 1.2.4.1 indication of the project development stage, this takes place in two stages, one is the Espejo de Tarapacá central object of ongoing environmental assessment and the other stage is a photovoltaic Park Skies of Tarapacá. It would be developed depending on their technical and economic feasibility. Said Park He joined the SEIA 07 January, 2015 and it corresponds to PF skies of Tarapacá of 600 MW project. The function of this park, on Espejo de Tarapacá, it will be to deliver power to the pumping equipment to grasp necessary seawater for the referred power generation during the day. However, the realization of photovoltaic Park will be defined based on your factibilidad technical and economic.

In both timelines, dates from the construction and operation phases are an estimate based on the information available at the time of the preparation of the EIA of the project Espejo de Tarapacá.

According to the information of schedules, stages Development considers that photovoltaic Park is built faster than sea water pumping station and can deliver energy in growing form, to the extent that its high line is ready tension and connection to SING, reaching full capacity of 600 MW. Moreover, the Tarapacá mirror project considers tests and power delivery from the 3.5 years of the construction phase.

For the supply of energy, the project will connect to SING. In addition, as designated 1.2.4.2 of Chapter 1 of the EIA, the project includes the supply from a photovoltaic Park. However, the realization of photovoltaic Park will be defined based on your factibilidad technical and economic. In this way, it may have recourse to an alternative project connected to SING in the event that the conditions are not Pro.

**1.4. Holder must clarify what time of the day referred to in time or relevant at the time of start of daily operation. The above, in order to have clarity regarding the operation of the plant and will be like the fluctuation of the reservoir dimension.**

**Exposed:**

The holder receives the request and clarifies that at time 0 is the start of the calendar day. I.e., once fulfilled the 23:59 h day n-1, start time 0: 00 h day average n.

Information of which arises the observation, corresponds to the Table 1-33: flow average hours of Normal operation (m<sup>3</sup>/s) Chapter 1 Description of project in which the average flow is delivered for every hour of the day by month of the year 24 hours a day and 12 months a year and that shown below.

**Table 1-3. Average hours of Normal operation flow (m<sup>3</sup> / s).**

Time	Jan	Feb	Sea	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Prom.
0	28	28	28	28	28	28	28	28	28	28	28	28	28
1	28	28	28	28	28	28	28	28	28	28	28	28	28
2	28	28	28	28	28	28	28	28	28	28	28	28	28
3	28	28	28	28	28	28	28	28	28	28	28	28	28
4	28	28	28	28	28	28	28	28	28	28	28	28	28
5	28	28	28	28	28	28	28	28	28	28	28	28	28
6	14	14	14	14	14	14	14	14	14	14	14	14	14
7	0	0	0	0	-15	-15	-15	-15	-15	-15	-15	-15	-10
8	-15	-15	-15	-15	-30	-30	-30	-30	-30	-30	-30	-30	-25
9	-30	-30	-30	-30	-30	-30	-30	-30	-45	-45	-45	-45	-35
10	-45	-30	-30	-30	-30	-30	-30	-30	-45	-45	-45	-45	-36
11	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45
12	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45
13	-45	-45	-45	-30	-30	-30	-30	-30	-45	-45	-45	-45	-39
14	-45	-45	-30	-30	-30	-30	-30	-30	-45	-45	-45	-45	-38
15	-45	-30	-30	-30	-30	-30	-30	-30	-45	-45	-45	-45	-36
16	-30	-15	-15	-15	-15	-15	-15	-15	-30	-30	-30	-30	-21
17	-15	0	0	0	0	0	0	0	-15	-15	-15	-15	-6
18	14	14	14	14	14	14	14	14	14	14	14	18	14
19	28	28	28	28	28	28	28	28	28	28	28	28	28
20	28	28	28	28	28	28	28	28	28	28	28	28	28
21	28	28	28	28	28	28	28	28	28	28	28	28	28
22	28	28	28	28	28	28	28	28	28	28	28	28	28
23	28	28	28	28	28	28	28	28	28	28	28	28	28

Source: Own elaboration.

From another perspective, with respect to the operation of the plant, so that the tabthe sample, For example, for the month of February ES on average during the night, between

18: 00 hours h and 6:00 h the project generates energy hydraulically discharging water into the sea. At 18:00 h download on average 14 m<sup>3</sup>/s, and at 19:00 h download on average 28 m<sup>3</sup>/s. In regards to the pumping is done during the day in the hours with enough sun, the table indicates that the flow to be carried from the sea the reservoir at 12:00 o'clock would be of 45 m<sup>3</sup>/s.

With regard to the levels of the reservoir, in the Figure 1-42: dimensions of the reservoir (altitude vs m<sup>3</sup>), Chapter 1 the EIA, You can see the curve of volume accumulated by dimension.

With respect to the behavior of the dimensions of the reservoir during the year, It should be noted that the project gets its energy for pumping of a park photovoltaic so that supply is directly related to the amount of hours a day with useful solar light. Tto the as shown in the Figure 1-43: curve of reservoir, Chapter 1 the EIAthe highest peak is reached in the months of January to April and minimum dimensions correspond to the months of July, August and September. This decline in the dimension coincides with the greatest number of hours that are It has generated energy discharging water during the months of autumn and winter in which there are fewer hours of sunlight to pump seawater to the reservoir. Another way to see it is that you there is a time of the year of filling of the reservoir and another time of emptying, although daily is pumped to accumulate water and is Download for generAR.

**1.5. The holder must complement the presented background, with the following:**

- **Plane georeferenciado location of the project, which realises the vertices that make up each of the compromised sites.**
- **Plane geo-referenced location of the plants of the architecture of all buildings and facilities that materialize in the project.**
- **Each plane must contain a box of surface where identifies the construction, proposed, adequately dimensioned destiny and surface.**
- **All of the above, must be presented in KMZ file, allowing you to view all the components of the project, indicating the premises covering permanent as temporary constructions, outlined in annex 1.3 and 1.4 of Chapter 1 of the EIA.**
- **The georreferenciacion must be designed in Datum WGS 84**

**Reposed:**

The holder receives the request and presented in Annex 1-1 the requested drawings. Occurs also in digital annex 1-1.1 the requested drawings in KMZ.

**1.6. Without limiting the foregoing, the owner must submit digital files in CAD format Datum WGS 84 and KMZ, corresponding to levels of general plant, plant reservoirs East and West, plant adduction and downloading and drawing of medium and high voltage lines.**

**Answer:**

The holder receives the request and presents in annex Digital 1-1.2 the planes in the formats requested.

**1.7. With respect to facilities of slaughter for the construction phase, the holder points out the existence of a concrete plant. In this regard, the holder must indicate**

- **Environmental technical backgrounds and characteristics which will present this plant**
- **Plan of emission control that will be counted for this activity**

**Reposed:**

THE owner explains that it includes two floors of concrete for the construction phase of the project, the first clinches the installation of tasks of the coast sector, while the second will be in the installation of the plateau sector operations.

In the annex 1-2, Concrete plants, This addendum, is describedn the characteristics of the concrete plants referred to the phase of project constructionincluding the emission control plan for this activity.

**1.8. The holder must submit a detailed description how linear works of the project, roads and transmission line, they will be crossing the natural channels that are intercepted.**

**Likewise, and if appropriate, it should pointed out if there will be works of protection or modification on these runways for the works of the project. For this, one must be presented Cartography on a proper scale where its location is displayed in detail with their respective geo-referencing.**

**Reposed:**

The owner welcomes the observation and all the background of the 156 PAS are attached, for the permission for modifications of cauces, in 1-3 of the present annex Addendum.

**1.9. The holder shall incorporate all the geological, geomorphological background and analysis of establishing stability Physics the underground infrastructure works such as access tunnels, chop gate, cavern of machines, cavern of transformers, among others.**

**Exposed:**

The owner explains that IYou geological and geomorphological backgrounds were incorporated in the studies of LiNEA of BASE and they constitute the basis of the analyses underpinning the design of works Tarapacá mirror project. Es as well as, en Chapter 3 of the EIA, Section 3.2.2 lithosphere are geolo historymagical in the sector of the project, Section 3.2.2.1 and the geomorphologic, in section 3.2.2.2 location of the project area.

With respect to such history and its analysis for the definitions of the engineering and construction of the project, in Annex 1-9 of the present Addendum, attached is the document Design criteria of works underground"", in which are the bases of design used for each of the underground works of the Pproject. Result of the analysis of the information raised, knowledge of engineering and construction methods pARA the stability of these works is definió construction method of Tunneling Norway, known as the "observational method". It is worth mentioning that this method has been used in the construction of other projects in Chile.

The document Design criteria is presented in the Appendix 1-9 of this addendum and is organized in nine chapters. In this respect the main contents are presented in the following sections:

- Chapter 4, presented the foundations and basic design criteria considering the mode of operation on the central, standards and relevant publications. Addressed also the matter them, possible solutions, geology and geotechnical.
- Chapter 5 is address the criteria of Deere Norwegian and hydraulic gradient for the shield.
- Chapter 6 deals with the design of the cavern of machines.
- Chapter 7. is presented the design of Tjoin them.

**1.10. The holder must explain in detail and submit all the technical background related to the functionality of the "trap of stones" indicated in the tunnel near the cavern of machines download. You should also point out where these stones will be obtained.**

**Reposed:**

The holder receives the request and clarifies that the traps of stones will be located before and After the cavern of machines, at the end of the pique in pressure and in tunnels with balance flue connection. It should be noted that during the construction of the project, specifically for the opening of the intake, referred to the implementation of a trap of stones that will receive the material product of the Norwegian shot.

The trap of stones strictly corresponds to a trap for stones, it is a work similar to a box that has by objective resguardar pump system existing /turbinas. The bottom of the trap is deeper than the tunnel therefore before the eventual passage of stones are go to the bottom of the box being trapped in it, preventing its entry into pump/turbines.

As Pproject has water flows in opposite directions as if it is operating in mode pumping up seawater into the reservoir or generation mode, downloading from el reservoir towards the sea, there are Stone traps to protect the pump/turbines.

In the TONexus 1-1 planes Tarapacá mirror project of the present Addendum, You can see in the location of the traps of stone works underground.

**1.11. The owner must clarify whether sea water to be used for the system of generation of power proposed by the project, will be added with some kind of anti-fouling, or chemical agent to prevent adhering bodies hydrobiological in transport system of water, generation of energy and/or water accumulation, or any other additional additives.**

- **If the holder report that these elements will be incorporated, shall submit the following background:**
- **Features**
- **Safety data sheet**
- **Stage and place of incorporation of these elements to the system**
- **Clarify whether these elements will have contact with the marine environment once used**
- **Treatment, where appropriate, that the sea water, prior to its disposal in the marine environment shall be submitted**

- **Present, in the event that appropriate, all environmental technical backgrounds which allow to assess the possible effects associated with its use.**

**Rexposed:**

The holder clarifies that shall not apply any kind of anti-fouling or chemical to the seawater used for power generation to avoid What aquatic organisms to adhere, the works of Fr.project.

**1.12. The holder must designate, notwithstanding the antecedents presented in the EIA, the geographic coordinates)Datum WGS 84) the location of the point of suction and discharge of seawater and the diameter of the area of the seabed that would be removed by the action of connecting the sea with tunnels of the work.**

**Rexposed:**

The owner explains that in the Chapter 1 of the EIA were presented the coordinates reference in Datum WSG84 U19 the works of the project and in the planes of the annex 1-1 of this Addendum the plans of the works of the project that includes the work of Jack and download underwater are. These plans specify the coordinates reference in Datum WGS84 U19 of all the works of the project. The coordinates of the reference of the opening in the bottom of the sea which will be covered by the work of Jack and underwater discharge is: **7.665.687 n and 383.105 E.**

In relation to the area of seabed will be removed to connect tunnel INFerior Download with the seabed, the opening tunnel at the bottom of the sea will have a diameter of approximately 5 m, being East single connection point of the tunnel system of the project with the marine environment During its operation. Environment to this opening will be installed a work of 16 m in diameter.

**1.13. The holder must declare clearly and accurately the speed of suction of sea water, for the operation of the project. Also, must present average speed, and maximum use during operation. The above in consideration to the need to reduce mortality of organisms biological subject to any maximum measured fisheries management or protected by conservation measures, in terms of the possible risk of drag and damage by collision in the area is suction.**

**Rexposed:**

The owner says it, according to the designated in the EIA, Annex 4.3 modeling hydrodynamics and quality of the water Espejo de Tarapacá, protection grating design the work of intake and discharge submarine has been focused on allowing suction speeds, so as to prevent the entry of foreign objects and living organisms inside reservoir. It should be borne in mind that the plant pumps water during the hour of the day and then, during the night, discharge water into the sea. By Therefore, the suction is flashing have you at the daily level.

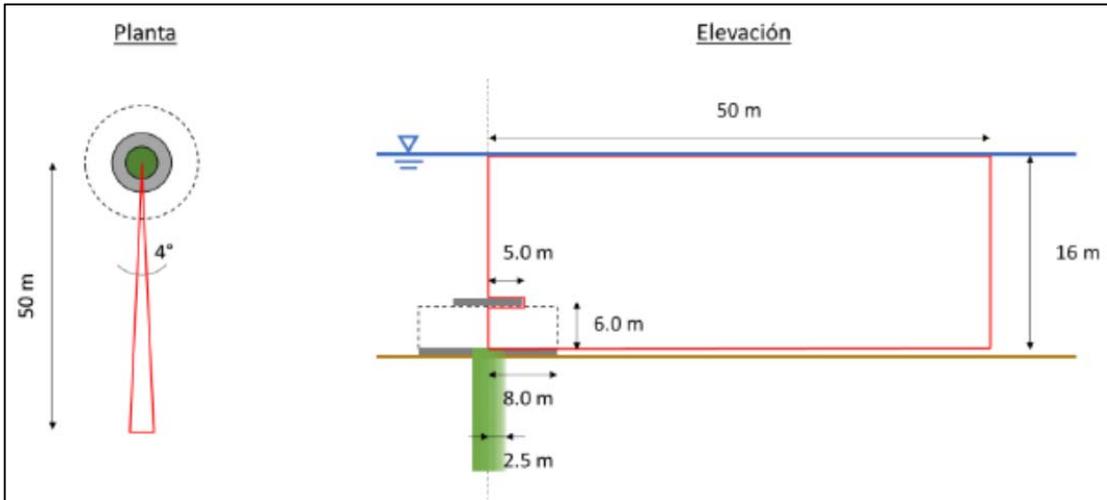
In this Addendum intends to reduce the apertura, gate, from a distance of 5 cm between balusters to a 1.9 cm between the threads. The goal is to reduce the possibility of capture of organisms. The improved design of the cage, with a maximum flow rate of 45 m<sup>3</sup>/s, allows keep an average speed of suction of 0.15 m/s.

It should be noted that they will be different speeds according to the point of the work where it is measured. In the immediate to cover environment located at the top cage, the higher speeds will be which according to the performed modelling could become a maximum of 0.26 m/s setting the top and lower speeds in the rest of the work.

The software was used for the analysis of suction speeds OpenFoam®. OpenFoam® (*Open Field Operation and Manipulation*) is a computer program for fluid dynamics (CFD) of open source, widely used in engineering and science with academic and commercial purposes. Specifically, this model solves the equations of Navier-Stokes averaged according to Reynolds (*RANS equations*), incorporating a model of close of turbulence for the representation of the oscillations of the subscale used for this. In this case, the turbulence k - model adopted is Epsilon ( $k-\epsilon$ ), which represents the turbulence through two transport equations describing the variation of the kinetic energy turbulent ( $k$ ) and the variation of turbulent dissipation ( $\epsilon$ ), respectively.

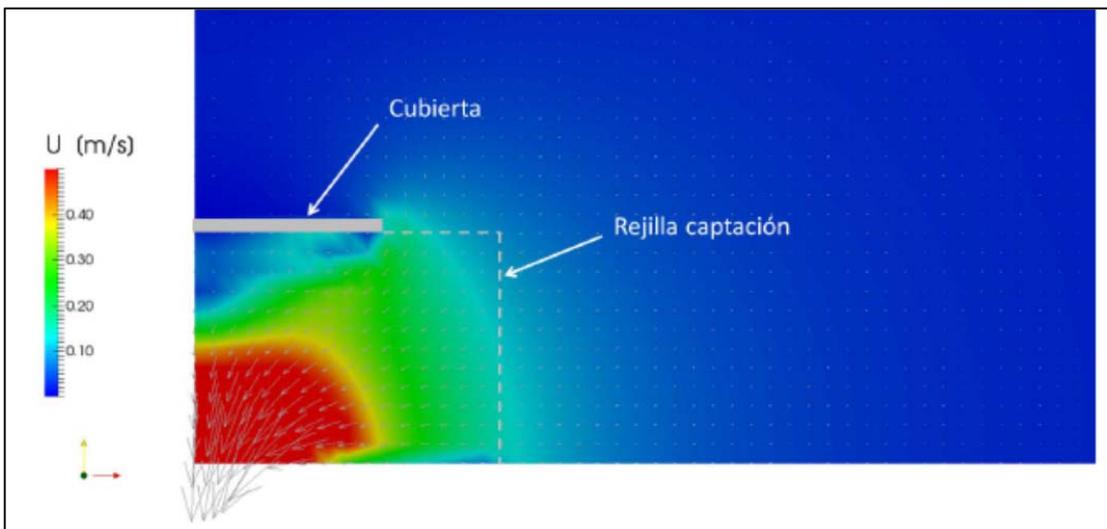
The model is implemented in scheme of finite volumes (FVM), with capacity for implement flexible polyhedral grids. For modeling the symmetry of the structure took advantage and is modeled an arc of 4 °, the following figure presents the modeling domain.

**Figure 1-2. Esquema on floor and elevation of the modelling domain.**



The following figure presents an image of the distribution of speeds around the grid of catchment. For speeds analysis considered the percentage of blockage of the grid (91.3% of opening), obstruction by marine growth (blocking 10%) and of obstruction by elements structural structure of CyD (14% of blocking).

**Figure 1-3. CAmPo's speed calculated in the environment of the structure of the catchment.**



Shown that the magnitude of rate calculated in the location of capture grid lies mostly between the 0.1 m/s and 0.15 m/s. The maximum magnitudes are developed around the

opaque cover, though not over the 0.3 m/s. The following table is a summary of the results obtained with the numerical model for analysis of suction speeds.

**Table 1-4. Msuction speed agnitud through grid uptake.**

Type	Magnitude of speed (m/s)
Average through grid	0.15
Maximum of any point of the grid	0.26

In ANexus 1-4 Speed of Suction work of Catchment of the present Addendum, attached the modeling about the speeds expected for uptake of the project work, and in annex 1-1 of the Addendum, Flat mirror project de Tarapacá is incl.Uyen levels associated with the corresponding work.

**1.14. The owner must declare the download speed of sea water during operation of the project.**

**Reposed:**

The owner explains that, tto the as he is designated in the EIA Annex 4.3 "Study of modeling of discharge", carried out section by Eridanus ("Hydrodynamic modelling and water quality: Espejo de Tarapacá"), page 13, table 3.6. Expected speeds of Jet discharged through the tunnel)VT) and the resulting boom through the gate of submarine discharge protection)VR), Download speeds for possible flows are:

**Table 1-5. Download speeds.**

Q (m <sup>3</sup> /s).	VT (m/s)	VR (m/s)
14	0.71	0.04
28	1.43	0.09
42	2.14	0.13
56	2.85	0.18

CAbe mentioning that flow expected to download in normal operation corresponds to 28 m3/sand can download the other flows also, being the maximum 56 m3/s.

**1.15. Regarding the pen of dispersion of the discharge of seawater in the operation stage, the holder must submit clear and accurately the following background:**

- **Central point, in geographic coordinate)Datum WGS 84) pen**
- **Radial dimension, in meters.**

**Reopened:**

The holder receives the request and clarifies that the feather of dispersing has a irregular shape, so that it is not possible to determine a symmetrical focal point with its edges. Therefore, and for the purposes of To give answer to the question of the authority, is has defined as the focal point dispersion pen the intake where the project sucks and discharge seawater.

The y-coordinate reference of the area taking and underwater discharge is as follows, in accordance with lyou presented in annex 1 - plans1, Project Tara mirror planestoCA, This Addendum.

**Table 1-6. Coordinates Take and download underwater in Datum WGS84 H19.**

Sector	Works	North	This
Submarine	Take and download underwater	7.665.687	383.105

In the annex 4.3 of Chapter 4 of the EIA, in "EStudio the behavior of feather termosalina and solid by hydrodynamic modeling" the info was deliveredDownload pen rmation graphics and tables with the information of the area covering differential range thermal. It is as well as, in the annex, are figures to represent cases with favorable wind to the upwellingand relaxation to the sinking fund and surface and a vertical cut of the maximum area of influence. The tables are supplied figures for maximum areas and average of influence of the pen on the bottom and surface by differential range.

Not orssjkakarot the above, for this Addendum carried out a complementary modeling of feather discharge, whose results are presented in Annex 1-6 Study of dynamic modeling of thermal plume and Salina. Tables are presented below, for every season of the year at bottom and surface with the information from the areas of excess heat and the radial dimension maximum for each isotherm up to 0,3 ° C. The maximum radial dimension corresponds to the distance from the edge farthest from the pen of dispersion with respect to the point of discharge.

**Table 1-7. Total area with excess heat and maximum for each isotherm radial dimension, recorded in each seasonal period.**

Isotherm]° C] Autumn	Background		Surface	
	Area [km <sup>2</sup> ]	Maximum RADIUS [m]	Area [km <sup>2</sup> ]	Maximum RADIUS [m]
0.3	0.25	578	0.40	573
0.4	0.13	418	0.20	415
0.5	0.06	255	0.07	233
0.6	0.03	195	0.03	193
0.7	0.02	146	0.02	159
0.8	0.01	128	0.01	129
0.9	0.01	105	0.003	71
> 1	0.008	87		

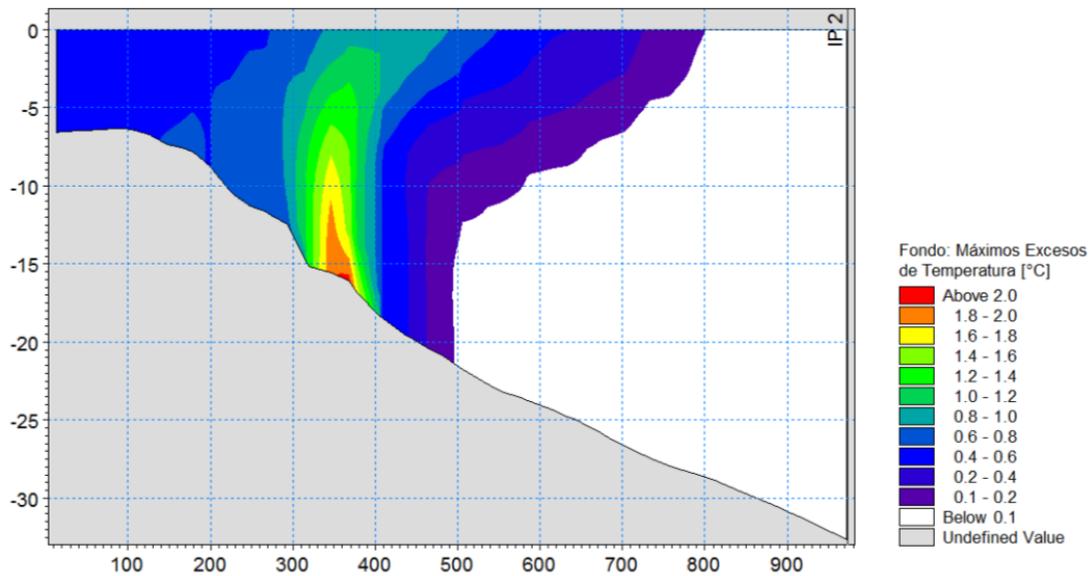
Isotherm]° C] Winter	Background		Surface	
	Area [km <sup>2</sup> ]	Maximum RADIUS [m]	Area [km <sup>2</sup> ]	Maximum RADIUS [m]
0.3	0.03	180	0.02	212
0.4	0.01	84	0.001	28
> 0.5	0.002	43		

Isotherm]° C] Spring	Background		Surface	
	Area [km <sup>2</sup> ]	Maximum RADIUS [m]	Area [km <sup>2</sup> ]	Maximum RADIUS [m]
0.3	0.17	458	0.22	396
0.4	0.07	240	0.005	60
0.5	0.04	176		
0.6	0.02	153		
0.7	0.01	118		
0.8	0.01	93		
0.9	0.008	88		
> 1	0.005	75		

Isotherm]° C] Summer	Background		Surface	
	Area [km <sup>2</sup> ]	Maximum RADIUS [m]	Area [km <sup>2</sup> ]	Maximum RADIUS [m]
0.3	0.05	300	0.06	466
0.4	0.02	170	0.003	88
0.5	0.01	124		
0.6	0.006	103		
0.7	0.003	71		
0.8	0.001	48		
0.9	0.0005	23		
> 1	0.0001	10		

Fuente: Annex 1-6 report feather teathermal and desalination plant, table 14. (Areas without rounding)

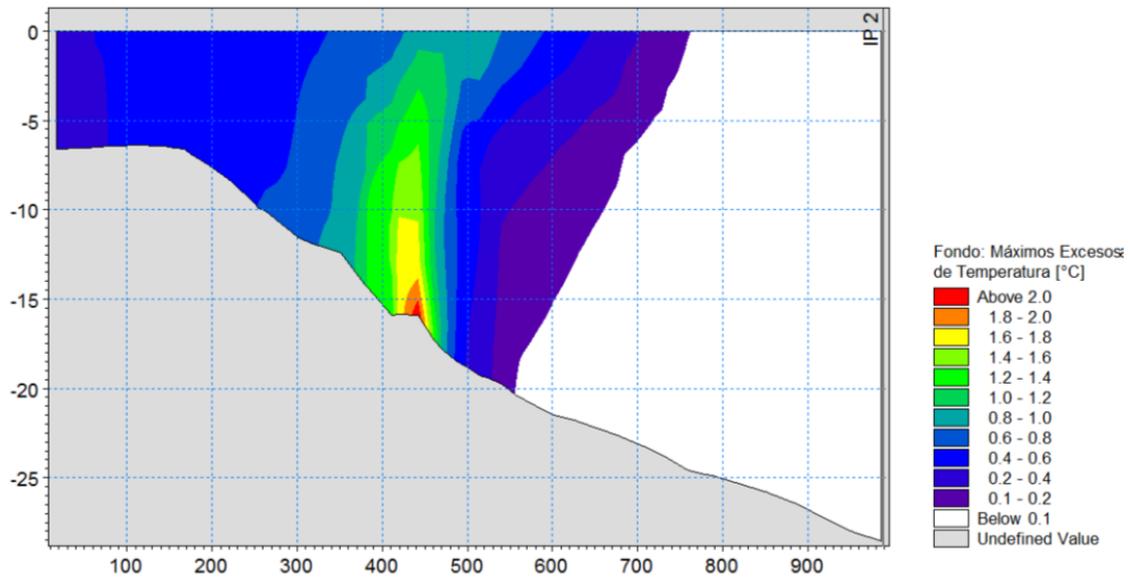
### Consideration technical annexes 1-5 and 1-6 of the addendum 1



The work of Jack and underwater discharge is located 343 m from the coast and 15.5 m deep approximately.

However, in vertical cut figures representing the results of the modeling is possible to appreciate distances more than 343 m, this is because the forms of feathers represented

but not symmetrical, so to represent the cuts from different points of the coast towards the work of intake and discharge are made as shown in the following figures.



**1.16. With respect to the desalination plant, the holder must, both for the stage of construction and operation of the project:**

- **Indicate the coordinates of location**

**Answer:**

The desalination plant It will be located at the coordinates listed in the following table, According to the submitted plans in annex 1-1, Plans project Espejo de Tarapacá, This Addendum

**Table 1-8. Coordinates in Datum WGS84 H19.**

Sector	Works	North	This
Costa	Desalination plant	7665721	383786

The site of the desalination plant is detailed in AneXO 1-1 planes, this Addendum.

- **Describe the stage of construction and operation, including a detailed activities, operation system, water rejection characteristics.**

**Answer:**

The holder receives observation and advises that desalination plant It is a plant of Reverse Osmosis capacity of production is 500 m<sup>3</sup>/day (around 6 l/ s), which It is considered a chemical injection-free process.

The water supply for the process will be captured from the sea through a pipe type HDPE (high density polyethylene) or material equivalent, approximately 200 mm and led to a pump system that will boost seawater desalination plant through a HDPE pipe of approximately 160 mm.

The following describes the phases of construction and operation of the plant, that complement the information provided in the Captitle the EIA 1.

**Description of the construction phase.**

The first activity consists of cleaning and leveling the site where the plant will be located.

With the level ground and compacted soil, is provide on a radier concrete on which will be later mounted the container that hosts the desalination plant equipment, auxiliary desalinated water storage ponds and pumping system of desalinated water to the Control

building and a delivery for the connection of one main (by others) to lead water to the system water Potable Rural (APR) of the Caleta San Marcos.

Finally, a fence will be installed along the perimeter of the radier to prevent access by unauthorized third parties to the site of the plant.

#### Adduction and rejection lines

To conduct seawater to the plant and return rejection of sea water, will be installed in parallel pipes of adduction and rejection. Be distinguished four stages with different solutions of installation and construction sequence:

1. Buried section: it bore a ditch with depth indicated on the drawings of the project, a sand bed will be installed in the bottom of the trench for pipelines. Then the pipe will be covered with successive layers of compacted sand and finally with compacted soil to restore the original ground level.
2. Cross under way: the cross under the road will be in ditch, changing the pipe of high density polyethylene (HDPE) by a galvanized steel pipe. To make a material change to the other, to be used fittings transition located next to two buttresses of concrete anchor *in-situ*. Under the axis of the road will also provide a concrete buttress *in-situ* to set the galvanized steel pipe. Once completed the crossing and compacted material-filled ditch, rolled in the path folder is reset.
3. Rocks area: in the area close to the high tide line, terrain is Rocky making impracticable a disposal ditch. In this case, the HDPE pipes will be placed on the ground, but separated from it by crosspieces of wood does not affect the existing fauna.
4. Underwater area: from the high tide line tubing up to capture and download, points will be installed on the ground using concrete buttresses to keep it submerged.

#### Wheelhouse of bombs

In the vicinity of the crossing under the road, the pump system will be installed to carry seawater to the desalination plant.

For this it bore a well of circular section, in which a camera bilge will be to capture leaks.

On the bottom of this well, concrete foundations will be installed to mount two bombs on them.

The pumps will be connected to the pipe coming from the sea and the piping to the desalination plant, through pipes of HDPE with a system of valves that allow you to isolate a pump failure, while keeping the operating system with other pump is they perform repairs or replacement.

On the well a House will be built to control access to the pumps and to prevent accidents.

#### Drive to Control building

A buried in trench HDPE pipe will be installed to carry the treated water to the Control building.

The above will run similarly to the stretch of adduction/rejection that is buried, i.e. It bore a ditch with depth indicated on the drawings of the project, a sand bed will be installed in the bottom of the trench for pipelines. Then the pipe will be covered with successive layers of compacted sand and finally soil of loam compacted up to restore the original ground level.

#### **Description of the operation phase.**

Desalination by Reverse Osmosis plant projected, considered a free process of chemical injection which process and described below.

After the pretreatment of raw water through a process of natural filtration, filtered water is collected and driven to lto pump of high pressure entering The water membranes Reverse Osmosis. As a measure of protection to the high pressure pump is considered a late stage of filtration micronica. A series of housings that store disposable filter cartridge, Poli Propylene or similar that they will be replaced on average every two months. Used filters will be arranged as non-hazardous solid waste, that represents a volume of around 0.1 cubic meters per month.

Las membranes wash through a process Reverse Osmosis consisting of a process de process cleaning in Situ (CIP, for its acronym in English).

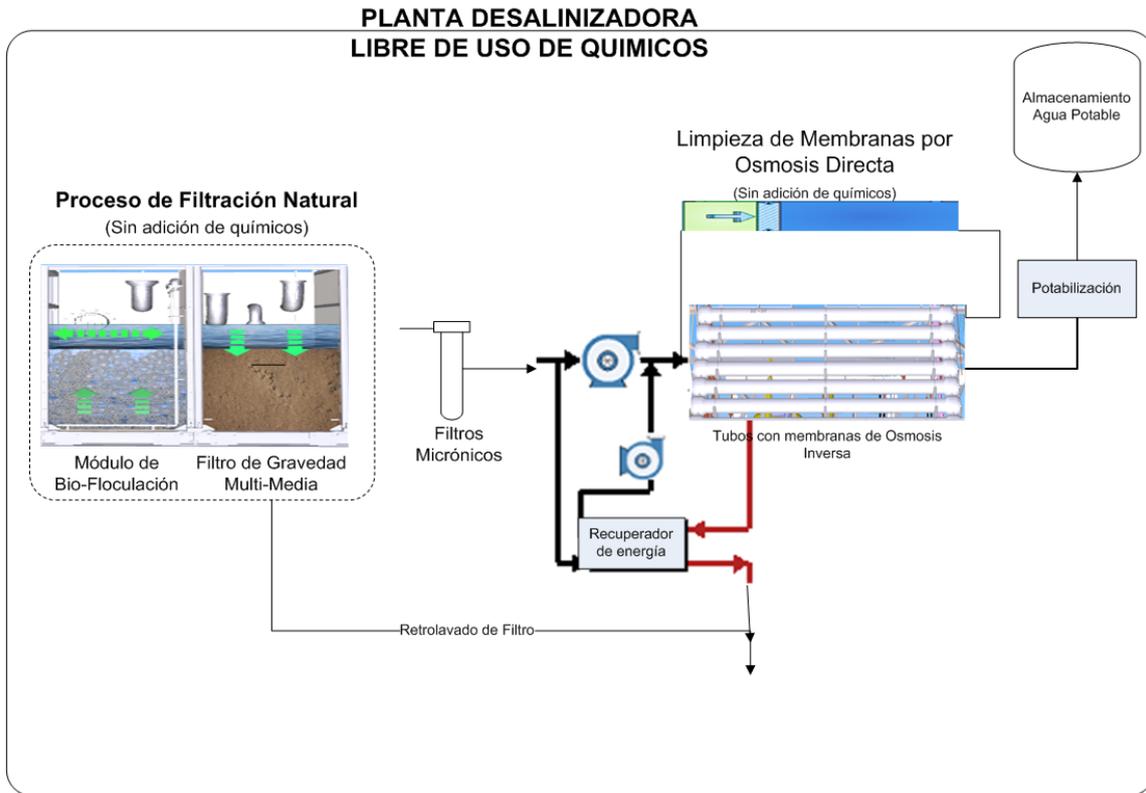
To avoid What the membranes dirty, is the installation of a process of Cleaning by direct Osmosis (LOD) which consists in increase the pressure on the side of the permeate of Reverse Osmosis membranes at a level higher than the net operating pressure. As a result, the permeate flows in the direction of direct osmosis while system and high pressure pumps are in operation. This flow lifts the dirt on the side of the power of the membranes. Therefore the source of contamination can be retro wash the surface of the membrane feed side and removed with the flow part of the concentrate. Direct Osmosis cleaning allows cleaning of the membranes of Reverse Osmosis s results effective in the use of chemicals such as It requires the CIP process in conventional Reverse Osmosis systems. Cleaning by forward Osmosis process can be operated frequently changed according to the specific soiling.

**Figure 1-4. Osmosis direct, using chemical-free cleaning system.**

SISTEMA DE LIMPIEZA POR OSMOSIS DIRECTA (LOD), LIBRE DE USO DE QUIMICOS



**Figure 1-5. Process plant using chemical-free desalination plant.**



Once produced the desalination process, rejection or brine water will be returned to the sea at a point of coordinates UTM Datum WGS84 U19S next 383345 E; 7665680 N, through a pipeline also HDPE 160 mm type which develops parallel to the collection piping.

The operation of the desalination plant was modeled and analyzed for near-field, i.e. at the point of exit from the duct and far-field, when is dispersed in the Sea (see A)Nexus 1-6 This addendum). Below the point of discharge of brine is located and as a reference also appears the point of intake and discharge of Tarapacá mirror project.

**Figure 1-6. Discharge of brine**

The results of the modeling of the discharge of brine during construction, indicate that greater saline differential occurs in autumn, with an increase in the salinity of 1.1% and a monthly average of 0.13%. On surface, in all the periods modeled, not be superior the 0.16%

According to the results of the modeling of the brine to the stage of construction, the pen was not moved to sensitive areas, such as the AMERB, and the fisherman's Cove.

Finally, during the construction of the desalination plant, the supply of water for the project will be done through trucks wells and authorized providers.

During the Operation phase of the Project seawater desalination plant will be captured from drive/discharge tunnel, from the Gallery to the discharge tunnel and the brine will be discharged to this tunnel through floodgates pique. It is noteworthy that the relationship of flow brine /caudal plant discharge is 7.9 l/s versus 28,000 l/s in normal operation and 56,000 l/s as flow maximum.

- **Geographical location of the adduction, indicating Datum (construction phase of the project)**

**Answer:**

Location of reference of the area adduction during the construction phase will be approximately on the coordinates UTM Datum WGS84 U19S next E 383.360 and N 7.665.681, as you can be seen in plane included in TOLink 1.1 Planes, of present Addendum

- **Geographical location of the place of unloading, indicating Datum (construction phase of the project)**

**Answer:**

Location reference of the area of Download during the construction phase will be approximately on the coordinates and 383.345 and: N 7.665.680, as you can be seen in the drawing included in TOLink 1.1 accompanied this Addendum.

- **Flow of seawater to the plant entry**

**Answer:**

The flow of income from agudo mar the plant will be 13 l/s.

- **Clarify whether they will be incorporated treatments and/or chemical and/or biological additives in the process, which must present the properties, enclosing sheets techniques and safety of these products**

**Answer:**

The owner explains that the plant desalination plant It will be up to a Reverse Osmosis plant considered a free injection process of additives o chemical products.

- **Point out clearly and present all the environmental technical background with respect to the final disposition of the effluent generated, for the construction and operation stages. For the above, should be considered, among others, the following background to introduce, for each of the stages of the project:**
  - **Clarification of the final destination of the effluent generated in the desalination plant**
  - **Volume and frequency of the provision**

- **Modeling of the behaviour of the effluent**
- **Description and evaluation of the potential impacts associated with the disposal of this waste**
- **Description and evaluation of the potential impacts associated with uptake of marine biota (by water catchment)**
- **Measures to be implemented if appropriate**

**Answer:**

The holder welcomes the request and clarifies that the final destination of the effluent from the plant during the construction and operation of the project, is the sea, at a ratio of 7.9 l/s there will be a difference at the point of discharge, the that in during the construction project It will be shown in the plane VALH-0001-000-SAN-PL-100 and has with a modeling of download presented in TONexus 1-6 of the present Addendum, and during the operation, the effluent will be discharged through the same tunnel that will download from sea water from the reservoir, so you will need a high dilution (7.9 l/s versus 28,000 l/s in normal operation and 56,000 l/s maximum download). In this regard, vER further detail in response to question 5.1, first point)bullet).

The results of the modeling of the discharge of brine during construction, indicate that greater saline differential occurs in autumn, with an increase in salinity of a 1.1% and a monthly average of 0.13%. On surface, in all periods modeled, they did not exceed the 0.16%

According to the results of the modeling of the brine for construction, the pen was not moved to sensitive areas, such as the AMERB, and the fisherman's Cove.

The approximate maximum volume of brine for both construction and operation is 79 l/s.

- **Submit an estimate of the volumes of waste liquids to generate, filters and membranes washing product. In addition, you must indicate if you will have storage for the brine tank. If so, indicate the ability and waterproofing that will have this pond**

**Answer:**

The owner explains that, tto the as indicated in the answer to the previous question, there will be no chemical cleaning of reverse osmosis membranes. In addition, reporting that once produced the desalination process, brine will be returned to the sea directly, which will not have a pool of storage to that effect.

- **Deliver the design and describe the stage of construction and operation of the flexible hoses that will be installed at the coastal edge, for the operation of the desalination plant. The latter in order to assess the affection to the components of coastal fauna associated with this installation and operating.**

**Answer:**

The owner explains that, to the as indicated in the answer to the preceding question to conduct seawater to the plant and return rejection of sea water, will be installed in parallel pipes of adduction and rejection. Be distinguished four stages with different solutions of installation and construction sequence:

- i) Buried section: it bore a ditch with depth indicated on the drawings of the project, a sand bed will be installed in the bottom of the trench for pipelines. Then the pipe will be covered with successive layers of compacted sand and finally with compacted soil to restore the original ground level.
- ii) Cross under way: the cross under the road will be in ditch, changing the pipe of high density polyethylene (HDPE) by a galvanized steel pipe. To make a material change to the other, to be used fittings transition located next to two buttresses of concrete anchor *in-situ*. Under the axis of the road will also provide a concrete buttress *in-situ* to set the galvanized steel pipe. Once completed the crossing and compacted material-filled ditch, rolled in the path folder is reset.
- iii) Rocks area: in the area close to the high tide line, terrain is Rocky making impracticable a disposal ditch. In this case, the HDPE pipes will be placed on the ground, but separated from it by crosspieces of wood does not affect the existing fauna.
- iv) Underwater area: from the high tide line tubing up to capture and download, points will be installed on the ground using concrete buttresses to keep it submerged.

For the operation phase will be no ducts of the construction phase since the effluent will be discharged through the same tunnel that will download from sea water from the reservoir, so you will need a high dilution.

- **Indicate, for the construction phase of the project, if during this process, will be implemented mitigation systems associated with the uptake of marine biota**

**Reposed:**

The holder clarifies that desalination plant It is considered an installation of specific recruitment and temporary character only for the construction phase. For the operation phase, suction and discharge is take place through the same tunnel that will download from sea water from the reservoir.

Vent intake during construction includes a rack at the point of collection to prevent the entry of marine biota. It should be noted that the catchment water, during the phase of construction, It will be by a vent 7 "about and with a flow of water entering the plant of 13 l /SECWhat is rather less to the flow rate that captures the tunnel that will take water to the reservoir. Lto water intake will be made from up to 5 m in depth.

For all of the above, estimated that the abstraction of water for the desalination plant will not generate significant impacts on marine biota.

**1.17. While the owner informs a theoretical chemical characterization of the brine to be downloaded, perform analysis associated with the compliance of emission D.S. No 90/00, which, you must stick by the guidelines set out in the resolution exempted from the Superintendency of environment no. 117 of 2013, modified by the exempt resolution N ° 93 year 2014 "dictates and instructed general procedural rules Characterization, measurement and Control of liquid industrial waste", available on the web page background [www.sma.gob.cl](http://www.sma.gob.cl).**

**Reposed:**

The holder receives the request and the analysis of the discharge of brine is presented in this addendum. In the Annex 1-6 study of modeling dynamics of thermal pen and Salina for the construction phase and for the phase of operation, see details in answer to question 5.1 the present addendum, first point)bullet).

On the subject of the question, andl holder is subject to the guidelines established in the beef. N ° 117/2013 SMA amended by resolution Former (SMA) N ° 93/14 that "teaches and instructs rules of a General nature on procedure of characterization, measurement and Control of" Liquid industrial waste" with regard to the discharge of brine. For more information about the form of compliance with regulations, please refer to the answer 4.1 and 4.3 in this Addendum.

CABe noted What during the construction phase, the discharge from the plant will be within the area of coastline protection (ZPL) which has been determined by the maritime authority, and shall comply with the standards of the table N ° 4 of the Supreme Decree N ° 90/2000, light. During the operation, meanwhile, the effluent of the plant will add to download from the reservoir, making the joint discharge of these waters outside the ZPL. At this stage, therefore, meeta. with table N ° 5 the light DS 90/00.

In this regard note that s becomesand Deputy Annex 1-10 Maritime information bulletin N ° 10/2014, which includes the of. D.G.T.M. AND ORDINARY M.M. N ° 1078 12.600/05/ VRSwhere resolves a width of 254 m of ZPL, and the discharge of the project outside of this area and therefore subject to the table N ° 5 of the Supreme Decree 90/00 of the As light is detailed in 4.1 and 4.3 of the present responses Addendum.

**1.18. The holder must indicate, describe and detail if you referred to perform underwater detonations in the area, in consideration of the possible presence of mammals, reptiles and birds that could be affected by the development of the same. If you require the use of underwater detonations the holder must detail the protocols to be followed before the blasts, in order to avoid adverse effects on protected species that are under conservation measures and describe the actions to be taken in the case of some protected species be wound asmammals, reptiles and birds.**

**Exposed:**

In this respect is clarifies that at the opening of the mouth bottom discharge tunnel in the background of the Sea will be made by "Norwegian shot". For the construction of the work (cage) surrounding the mouth may be necessary to prepare and carry out controlled detonations low intensity.

For determine a security area was a analysis of vibration and expansion wave of underwater detonations mariNAs the Which one is presented in Annex 1-7, Estimation of safety distances in lathe to marine blasting, this addendum.

The Plan of measures to be considered in the marine environment with respect to blasting in recruitment sector described in the response to the present observation 7.11 Addendum, e includes a safety distance and disruption of the sector to scare away wildlife.

**1.19. The holder shall describe the characteristics of the electric transmission line, including the measures to be implemented to avoid possible collisions of birds.**

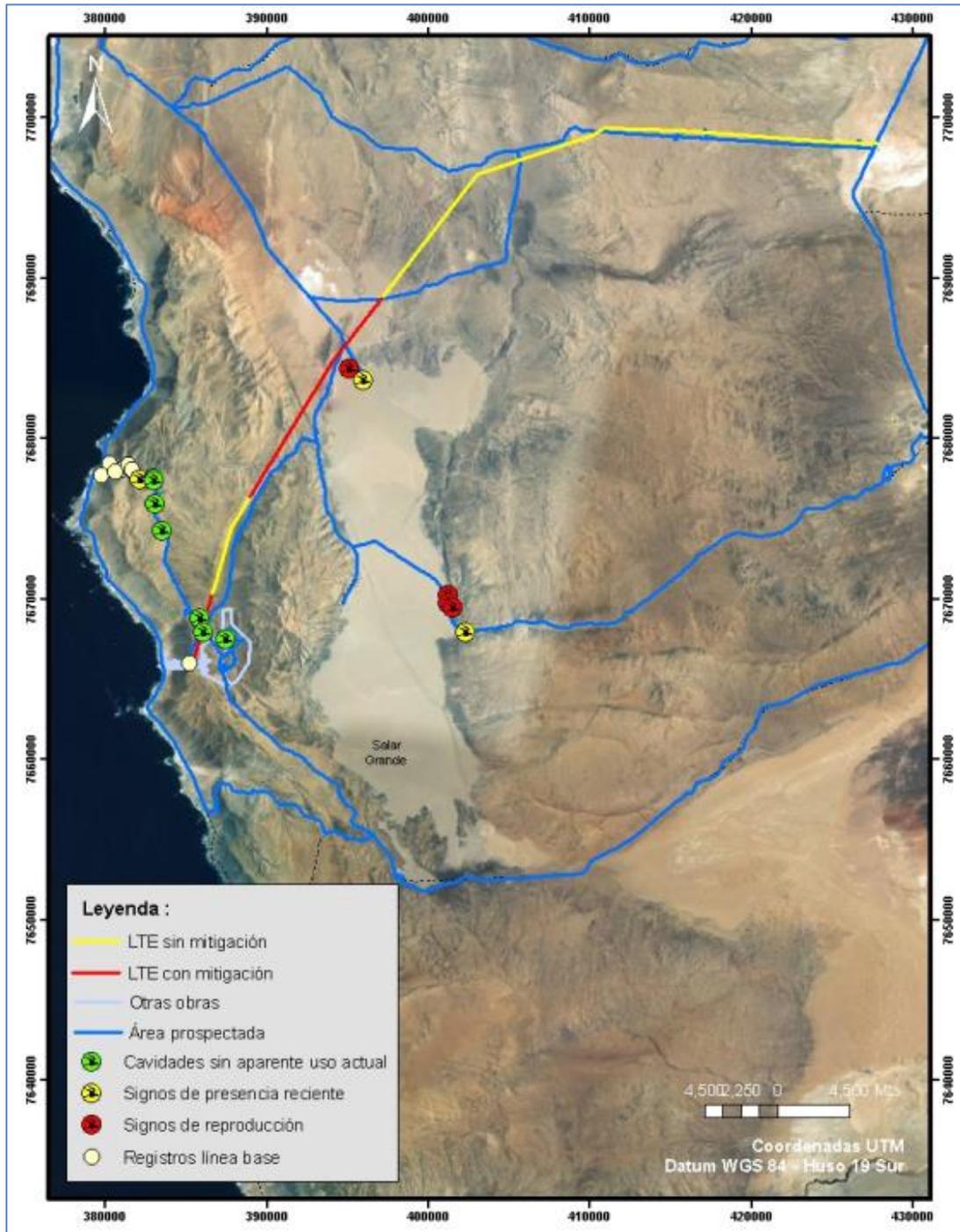
**Reposed:**

The holder clarifies that the Power line from High voltage was described in the Sections 1.4.4.5 (Power lines, sector plateau) and 1.4.5.1 (High voltage power line, section pampa sector) Chapter 1 of the EIA, in its quality of work of the project. In the sections given coordinates, power, quantity of towers and characteristics of their components, such as, driver, cable guard, shock absorbers, numbering, danger of death, insulators, plates plates structures according to the function of the Tower: suspension, anchor, or special with its geometry and dimensions. In annex 1.2 of Chapter 1 of the EIA was attached a drawing of the high voltage line with its road construction and maintenance.

In relationship to the eventual collision with the high voltage power line, on the basis of a follow-up study on species of swallow requested by the authority, they were identified the Gull species *Garuma* and black tern, which made night flights that could intersect the axis of transmission line that connects to the project with substation lagoons. To reduce the probability of occurrence of collision, the project includes the installation of bollards visible flight even in conditions of darkness (eg. FireFly or BirdMark), which shall be the cable guard laying in the sections identified as most at risk of collision, which are detailed in the Figure 1-7 of the present addendum. According to international experience, the adequate implementation of this measure should be sufficient to decrease significantly the risk of the occurrence of collision. However, the project considered to evaluate the efficacy of this using the component monitor fauna during the first 3 years of operation (see answer 10.4 of this addendum).

It should be noted that the project also includes the installation of aeronautical beacon, especially in the section of the line identified as higher risk of collision which have been presented in red in Figure 1-7 of this addendum.

Figure 1-7. Line of high voltage - implementation of anti-collision devices.



According to the above, it is possible to provide for that the collision impact associated with the laying of medium voltage project has a low magnitude.

**1.20. With respect to the treatment plant of waters served, the holder must point out clearly and submit all the environmental technical background with respect to managing both the effluent generated sludge, prior to his retirement party authorized. It should be noted that responsibility for final disposition in authorized place of these residues is the owner of the project.**

**Reposed:**

Titular advises that detail of the treatment referred to the domestic liquid waste generated, both in construction and operation of the project, is described in the answer 5-3 of the present addendum. The holder It shall keep a record of the generation, transportation and disposal of sludge (solid waste) in authorized deposit.

Rspectrum of the management of the effluent generated from the treatment plants of water served, as noted in the chapter 1 description of project, section 1.5.12 Construction phase wastethe liquid waste generateds at this stage will ben Treatys so meetn with the quality established in the NCh 1333 of. 1978 and stored in a pool of 40 m<sup>3</sup> to be useds on humidification of roads and also in sectors of works or stockpiles. Every six months, will be sent a report of monitoring of effluent from treatment plants the Superintendency of environmental corresponding to the Region of Tarapacá.

During the operation phase is estimates that are they will generate 7.5 m<sup>3</sup>day of sewage (see answer 5-3 of the present Addendum), which will be stored temporarily on the own PTAS, systems willing to do so, to then be removed periodically by a third party authorized, and arranged in the corresponding authorized sites, as indicated by the health service.

In relation to the sludge generated, these They recirculate between the fountainse of sedimentation and aeration. To the Aging, going to the tank of sludge, where they will be collected in bags or plastic containers, properly labeled; collected inside the PTAS, in a specially enabled industry to do so. and finally withdrawn by a company duly authorized, to be brought to a place authorized for disposal.

It should be noted that the sludge generated in the PTAS, shall comply with that established in the D.S. N ° 4/2009 and will be available on a website that has the appropriate environmental permits, According to the regulations on sanitary conditions and basic security in landfills, D.S. N° 189/2007 of the Ministry of health.

**1.21. The holder must present in detail the volumes of water resources for the project evaluation in their stages of construction and operation, indicating its source.**

**In this regard, it should be noted that inland waters are national assets for public use and extends to individuals the right to use them in accordance to the water code. The right of use of water has three elements that are essential for setting, these are; ((a) a particular natural source, b) an endowment or determined to remove flow and e) a point or defined catchment place. All these elements are common to all rights, whether they fall into surface water or groundwater.**

**Por\_lo\_tanto, removal of surface water or groundwater a) Untitled, b) into one Endowment greater than the authorized or e) at a point other than the authorized; It did matter a contravention of the provisions laying down the water code.**

**It should be noted also that the project owner should be aware that the exercise of a right of use, within the framework of a project with resolution of favourable environmental qualification, must be harmoniously with provisions in the regulations environmental force.**

**Reposed:**

It should be noted in this regard that the current evaluation project does not consider the use of water resources Continental surface or underground or, in consactivates, obtaining of rights of use of water.

Eeffect n, de agreement as indicated in point 1.5.9.2 Chapter 01, description of the project, the EIA, the supply of water for the construction and operation phases, will be obtained through truck tanks, the use of water from the Wastewater treatment plants and the collection and treatment of sea water.

With respect to the desalinated water, this will be treated to human consumption is obtained in the following way:

- **Phase construction:**  
The installation of a desalinization plant capable of supplying is planned 5 6 l/s during 24 hOras a day, enough water for a prize of 500 people (105 l/day per person). This will be complemented with storage which will allow a range of one day in the drinking water supply. The first storage will be located in the outskirts of Caleta San Marcos and will be powered by a pipeline from the plant desalination plant/potabilizadora, while the second storage sector It will be located in the area of the camp and is operated by cistern trucks.

While is not operating the desalination plant, will be obtained water for human consumption or from authorized providers.

In terms of industrial water, to be used in underground works equipment and preparation of concretes, it has been estimated a requirement of 18 l/s, which will be supplied from the same desalination plant or will be purchased from authorized suppliers. To decrease the consumption of industrial water, also referred to the possibility of reusing it in operations that allow it.

Finally, also has been considered for industrial use the treated water in the Plants treatment of wastewater.

- Phase of Operation.  
During the operation stage drinking water will be supplied by the desalination plant for an Endowment for up to 50 people. Water from the hydro-power plant will be seawater pumped into the reservoir.

It should be noted that the desalination plant takes sea water to transform it in desalinated water, without using this continental waters. Moreover, as noted in the section 1.6.13 of Chapter 1 of the EIA, for the operation of the hydroelectric power pumping required a 45 m maximum adduction<sup>3</sup>/s of seawater (8 hours a day average), to be pumped only during the hours of the day, and subsequently shall be released to the sea. According to the above, the provisions of the water code do not apply in this case as regards inland water rights.

**1.22. In relation to the storage and waste management areas identified for camp staff to the construction stage, the holder must present all the history associated with the treatment, storage, transportation and disposal of waste generated in different facilities.**

**Exposed:**

The owner explains that the camp will be located to the East of route 1, between the villages of Rio Seco and San Marcos, it will have a capacity for 500 people, among other facilities, it will feature a casino. At a general level, and the project is committed to maintaining good condition of cleanliness and tidiness in workplaces of generation and temporary storage of waste, especially in sectors where containers for disposal must be placed temporary household waste, to prevent entry or eliminate the presence of health vector.

Also, for the handling of non-hazardous industrial waste, workers will be provided of equipment and clothing suitable for mechanical work and work of stacking, contemplating training for cada worker to enter to work.

The project envisages, for both the phase construction and operation, the temporary storage of domestic waste and non-hazardous industrial generated, as well as, transport and disposal at authorized sites, not considering the treatment of these in any of its phases.

For the construction phase, as described in the chapter 1 project description, section 1.5.12.3 Solid waste domestic waste generated shall be aggregated in slaughter facilities and from there they will be moved to places authorized for disposal.

In all installations of It operates, there will be an area for temporary hoarding in properly labeled and covered plastic or metal containers. These wastes will be transported to sites authorized by the SEREMI of health respective, with a frequency of once a week in normal and 2 times per week in conditions of maximum generation, so as to prevent the accumulation of garbage in slaughter. In addition, non-hazardous industrial waste they will be stored in bulk, neatly in the courtyard of non-hazardous waste collection to shipment to final destination, which will depend on their potential recycling. The detail of these waste storage containers, as well as handling referred to them, described in the following Table 1-9.

**Table 1-9. Temporary storage sector costa - camp. Construction phase.**

Type of waste	Treatment	Storage		Transport	Final disposition
		Place	Description		
Domestic or comparable domestic waste	Do not provide treatment.	Courtyard of domestic and industrial non-hazardous waste.	Waste generated in the fronts of work will be collected in garbage bags, preferably "biodegradable" or in containers closed, to then be transported from its origin places of on-site tasks collection. In all slaughter facilities, there will be an area for temporary hoarding in properly labeled and covered plastic or metal containers.	These wastes will be transported to authorized places, with a frequency of once a week in normal and 2 times per week in conditions of maximum generation.	Authorized by the SEREMI of health places.

Type of waste	Treatment	Storage		Transport	Final disposition
		Place	Description		
Non-hazardous industrial waste	Do not provide treatment.	Courtyard of domestic and industrial non-hazardous waste.	Non-hazardous industrial waste, will be stored in bulk, neatly in the courtyard of non-hazardous waste collection to shipment to final destination, which will depend on their potential recycling. Waste will be classified and subsequently sold through various authorized companies to recycle or recover the different types of waste. The irons will be deposited in containers and selected those that are recyclable to be handed over to authorized and certified enterprise engaged in the recycling of iron. With respect to land-generated wood, this will be selected according to their ability to reuse, gathered in an orderly and packed for later use in the work. If possible, and prior authorization by the SEREMI of health, the scrap wood can be donated to the inhabitants of the sector either, to employees of the project.	These wastes will be transported to authorized places, with a frequency of once a week in normal and 2 times per week in conditions of maximum generation.	Authorized by the SEREMI of health places.

Chapter 10 Plan of compliance with legislation and PASsection 10.11 arises from the history associated with the permit environmental sectoral joint 140, associated with the installation of the place ES intended for the accumulation of the waste generated by the project in its various activities. In regards to the construction phase, specifically in the coast sector - camp, is designated waste storage will take place in a patio of domestic and industrial waste non-hazardous, with one surface of 260 m<sup>2</sup>, and whose location is indicated in the Figure 1-8 later.

The courtyard domestic and industrial waste non-hazardous, will count with a perimeter closing of at least 1.80 meters of height, that impede way free access of animals; electric star installed on compacted soil and will feature separations (mobile barriers) for sorting various waste, depending on type, with their respective signal ethical; and you will have a maximum capacity of waste storage greater than 120% of the total generated during the period of storage temporary.

**Figure 1-8. Patio non-hazardous household and industrial waste. Sector Costa-camp.**



Source: EIA Espejo de Tarapacá, Chapter 10 Plan of compliance with legislation and PAS, section 10.11, PASM 140.

Finally, it should be noted that the holder undertakes to achieve a health and safe handling of different areas of accumulation of waste within the project, avoiding the formation of pockets of insanitary conditions affecting their environment and allowing to protect the health and well-being of the workers.

**1.23. The proprietor says in point 1.4 offices, courtyards and cellars of the EIA, a collection of household and industrial waste that will be properly fenced sector. In this regard, must present a management plan where takes track and estimate (at least annual) of waste generation. Also, is designated the holder that it is the duty of establishments that generate more than 12 tonnes of such waste, to declare them in the window only RET-C according to article 26 of the Decree 1/2013 of the Ministry of the environment.**

**Exposed:**

As designated by D.S. N ° 148/2004 of the Ministry of health, which approves the sanitary regulation on management of hazardous waste, in its article 25, "installations, establishments or activities annually giving origin to more than 12 kilograms of waste "acute toxic or more than 12 tons of hazardous waste showing any other dangerous features must have a hazardous waste management Plan filed with the health authority".

On the basis of the above and considering that as stated in Chapter 1 ("description of project"), section 1.5.12.3 ("Solid waste"), it is estimated a generation of" 0.95 ton/month of hazardous waste during construction, and 0.2 ton/month in operation, the limit set in the item described will not be achieved. Therefore, the development of a hazardous waste management Plan is not necessary.

With respect to the management of non-hazardous household and industrial waste, the detail of this is described in the answer 1-22 of the present Addendum. In accordance with article 26 of the DS 1/2013 of the Ministry of the environment "*Settlements generating annually more than 12 tone Ladas of waste not subject to specific regulations, will be required to declare their waste generated last year through the only window of registration of releases and transfers of pollutants (PRTR) system to March 30 of each year*". According to presented in Chapter 10 of the EIA, point 10.11, with respect to non-hazardous household and industrial waste, is accomodated the request to declare them in the PRTR during the construction phase as it is estimated that the annual production of of each type shall exceed 12 tonnes.

**1.24. Table 1-8 in accordance with list of works Sector coast, the EIA, in the Area of operations located in San Marcos, there will be a courtyard of industrial waste. In this regard, all the environmental technical background associated with the winery of temporary storage must be submitted.**

**Exposed:**

The owner explains that in relation to the winery Temporary storage of hazardous waste, corresponding to Chapter 10 Compliance plan Legislacion and PASsection 10.13. Permit environmental sector mixed 142, permission to all site intended for the storage of hazardous waste, the project envisages the temporary storage of hazardous waste generated in the different activities associated with its implementation, to which referred to the installation of two warehouses of temporary storage During its construction.

During the operation phase is considered a wine cellar for the same purpose in the sector of management and Control in the sector costa San Marcos.

The cellars of the construction phase will be follows: a in the Plateau sector, in the installation of slaughter, so-called "Warehouses of temporary storage of hazardous waste reservoir" Figure 1-9 of this addendum; "and the other corresponding to the "Temporary storage of hazardous waste San Marcos Winery" located on the coast Sector, in the installation of tasks.

During operation, the installation of a small courtyard of 2 m by 2 m in order to have a space ready to receive those wastes in the case where a maintenance requires it and the contractor does not have waste directly at an authorized site is considered. This playground will be located close to the Tapre-orders of E maintenancel sector of Operations, on its eastern side.

The bWinery of temporary storage of hazardous waste area of operations San Marcos, will be located on the coast Sector, according to the detail shown in the Figure 1-9 This addendum and you will have a total surface area of 4 m<sup>2</sup>

All the wineries will be closed, with roof, impermeable soil and will be with the safety data sheets to the entrance, fulfilling all requirements established by D.S. N ° 148. In terms of the maximum storage capacity, this will be greater than 120% of capacity presented in the PAS 142 and the maximum period of storage shall not exceed 6 months.

Waste generated, for each phase of the project, shall be classified as dangerous According to the Supreme Decree No. 148/2003 of the Ministry of health, whose type, quantity and place of storage is presented in the following table:

**Table 1-10. Type, quantity and hazardous industrial waste storage place**

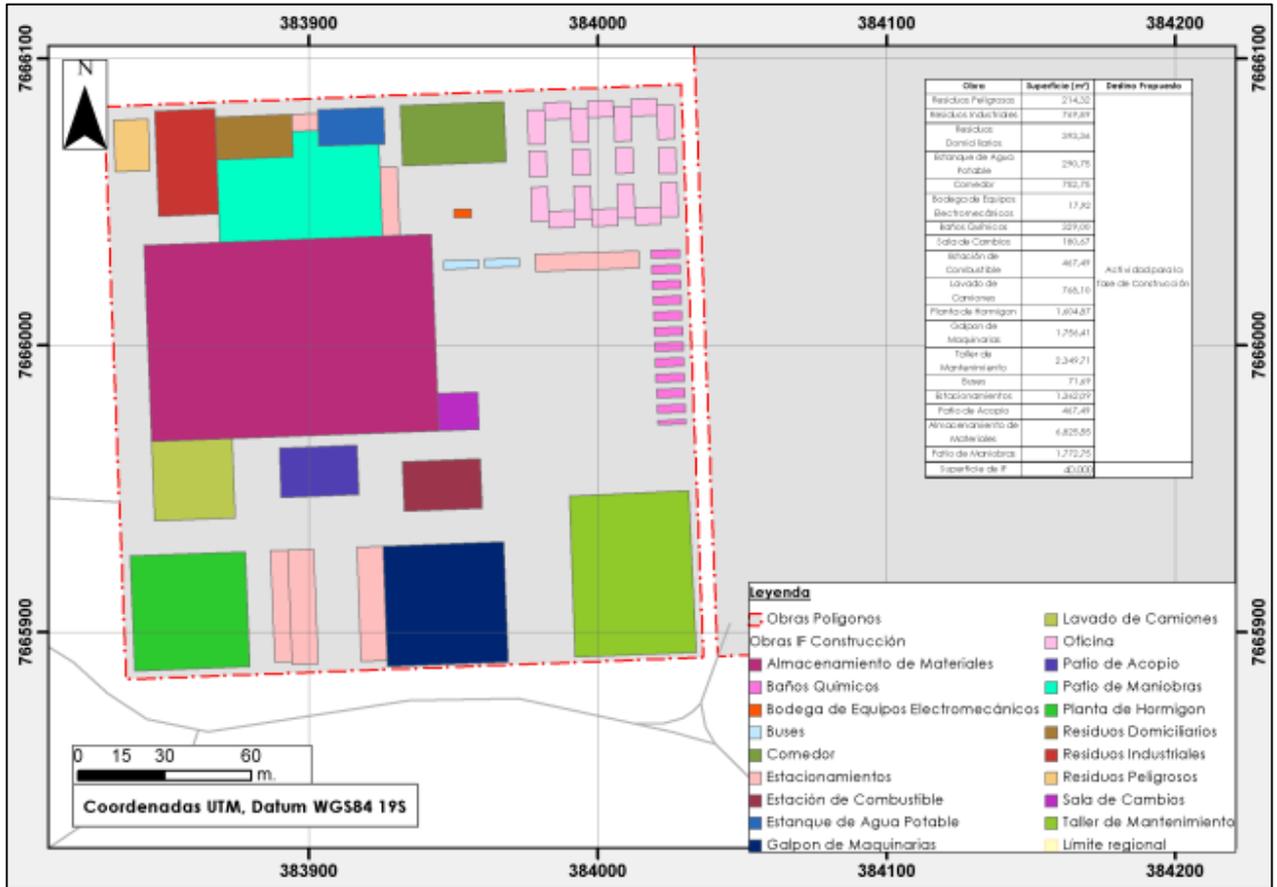
Stage of project	Type of waste	Quantity (tons/month)	Place of storage
Construction	Oils, lubricants, greases, batteries, empty drums of paint, toner printer, brushes, batteries, filters oil, contaminated gloves, etc..	0.95	Temporary storage of hazardous waste sector Winery coastline and plateau sector
Operation	Oils and lubricants used, oiled rags, used fluorescent tubes, etc..	0.2	Storage of hazardous waste sector coast Winery

The following considerations will be taken for the proper collection of hazardous waste:

- There will be a place specially built for the temporary storage of hazardous waste, which will be designed and located in such a way that at the prospect of an emergency not put at risk to persons, the environment and facilities own.
- This place will be a site with frames and steel mesh of 2,20 m, which will have a floor of radier cement sampler moated spill for oils. The roof will be covered with zinc plates, which will cover all the grounds and that it should protrude at least 30 cm, in all its sides.
- The sectors of temporary storage of hazardous waste shall be marked according to type of wastes, namely: batteries, oils, lubricants and greases.
- You will be installed at least a multipurpose fire extinguisher ABC 10 kg more of a bucket of sand. (Kit Non-spillable)
- The entrance to the area will remain closed and controlled by authorized personnel.
- It will take control of inventory for income as discharges of hazardous waste.
- It will be the corresponding safety data sheets.

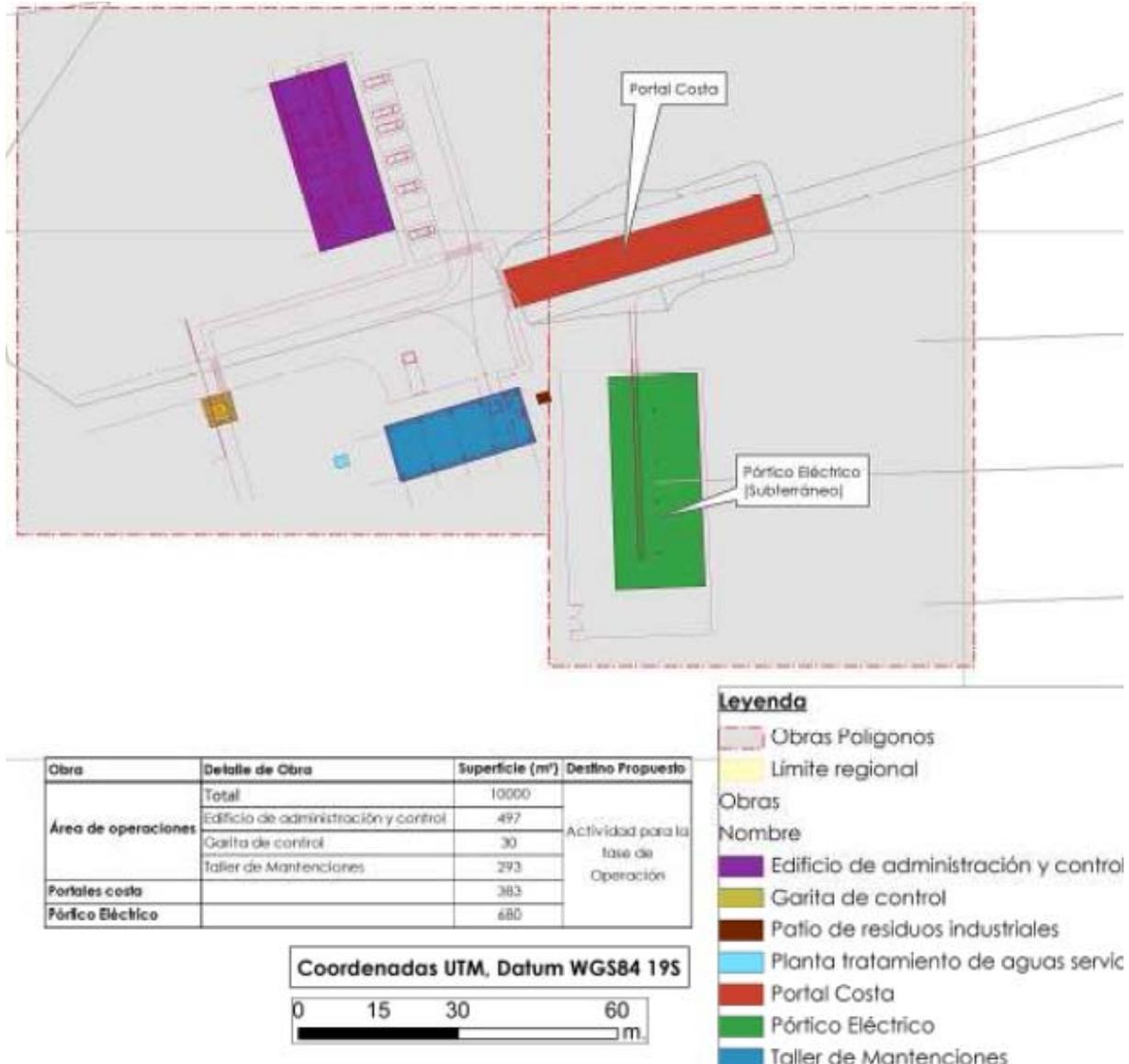
The frequency of removal of hazardous wastes will depend on the amount generated and the issuance of permits to remove the waste to its final destination not exceeding 6 months of temporary storage. Hazardous wastes will be finally disposed by some authorized company who will be the transfer and disposal service. To maintain control over the transport and disposal of hazardous waste will be a chain of custody, demanding proof of disposal of the waste in licensed facilities.

Figure 1-9. Wineries of hazardous waste. In installation tasks San Marcos. Coast sector.



Source: EIA Espejo de Tarapacá, Chapter 10 Plan of compliance with legislation and PAS, section 10.13, 14 PASM2.

Figure 1-10. Wineries of hazardous waste. Sector operations San Marcos. Coast sector.



Source: elaboration GAC.

1.25. In relation to waste liquids domestic phase of construction, the holder indicates that "sanitary effluent will be treated so that they meet quality of" NCh 1333 of 1978 and stored in a pool of 40m<sup>3</sup> for use in humidifying of roads. "Every six months will be sent a report of monitoring of effluents from the treatment to the Seremi of health plants and SEA in the Region of Tarapacá"; in this case reuse irrigation, reported that the decision of the health authority is regarding health conditions that must be met, without prejudice to the views of other competent bodies.

**Reposed:**

The owner welcomes observation and will proceed accordingly.

1.26. In relation to the scenic and tourist value, and photographic images, it is important to identify in each picture the date that was taken and indicate what part or work of the project would be located in that view.

**Ranswer:**

The holder receives the request and presented to then the photographs that they accompanied the description of units of landscape with the requested information:

**Table 1-11: Photography coastal edge drive**

	Landscape unit	Coastal edge
	Landmark	This Caleta North San Marcos
	Date	10-12-2013
	This	383971,67
	West	7665954,61
	Work on the project	Point taken from the collection with a view to building control and portal machines cavern
	Landscape unit	Coastal edge
	Landmark	North of Caleta San marcos
	Date	10-12-2013
	This	383860,51

	West	7666594,25
	Work on the project	Powder keg

	Landscape unit	Coastal edge
	Landmark	Beach IKE IKE
	Date	10-12-2013
	This	384150,86
	West	7661221,94
	Work on the project	No
	Landscape unit	Coastal edge
	Landmark	Dry river Cove
	Date	10-12-2013
	This	379361,05
	West	7677518,38
	Work on the project	No

**Table 1-12: Pictures unit coastal cliff**

	Landscape unit	Coastal cliff
	Landmark	This Caleta North San Marcos
	Date	10-12-2013
	This	383979,21
	West	7665932,70
	Work on the project	Collection
	Landscape unit	Coastal cliff
	Landmark	This Caleta North San Marcos
	Date	10-12-2013
	This	383971,67
	West	7665954,61
	Work on the project	Collection

	Landscape unit	Coastal cliff
	Landmark	This Caleta North San Marcos
	Date	10-12-2013
	This	383979,21
	West	7665932,70
	Work on the project	Collection and LTE
	Landscape unit	Coastal cliff
	Landmark	Dry river Cove
	Date	10-12-2013
	This	379361,05
	West	7677518,38
	Work on the project	Access road

**Table 1-13: Pictures unit mountain range**

	Landscape unit	Mountain range
	Landmark	Substation lagoons
	Date	12-12-20013
	This	427531,20
	West	7698107,35
	Work on the project	No.
	Landscape unit	Mountain range
	Landmark	Substation lagoons
	Date	12-12-20013
	This	427531,20
	West	7698107,35
	Work on the project	No

	Landscape unit	Mountain range
	Landmark	Substation lagoons
	Date	12-12-20013
	This	427531,20
	West	7698107,35
	Work on the project	No
	Landscape unit	Mountain range
	Landmark	New victory
	Date	12-12-2013
	This	431427,33
	West	7706142,45
	Work on the project	No

**Table 1-14: Photographs unit Pampa del Tamarugal**

	Landscape unit	Pampa del tamarugal
	Landmark	Route A-760 West of new victory
	Date	12-12-2013
	This	423927,02
	West	7705387,09
	Work on the project	No
	Landscape unit	Pampa del tamarugal
	Landmark	New victory
	Date	12-12-2013
	This	431427,33
	West	7706142,45
	Work on the project	No

	Landscape unit	Pampa del tamarugal
	Landmark	
	Date	12-12-2013
	This	427531,20
	West	7698107,35
	Work on the project	LTE and substation lagoons
	Landscape unit	Pampa del tamarugal
	Landmark	South of the cemetery of the former Office Victoria.
	Date	12-12-2013
	This	425247,62
	West	7698278,37
	Work on the project	LTE

**Table 1-15: Unit coastal photographs**

	Landscape unit	Coastal mountain range
	Landmark	Route A-750
	Date	11-12-2013
	This	387256,11
	West	7665842,40
	Work on the project	Reservoir
	Landscape unit	Coastal mountain range
	Landmark	
	Date	11-12-2013
	This	392890,73
	West	7680815,77
	Work on the project	No

	Landscape unit	Coastal mountain range
	Landmark	
	Date	11-12-2013
	This	38725,11
	West	7665842,40
	Work on the project	Reservoir
	Landscape unit	Coastal mountain range
	Landmark	Route
	Date	11-12-2013
	This	394852,78
	West	7685749,31
	Work on the project	LTE

**1.27. Connection of the electrical transmission line. the owner must consider and present in detail measures aimed at marring the landscape as little as possible (Art. 90.,) NSeg. 5. regulations of Electroinstallations of strong currents) in the sector where the aim is to incorporate the structures of the new line that considers the project, above, in order to reduce the visual impact caused by this.**

**Also, and in particular for sectors "Caleta San Marcos" and "Río Seco", the holder must point out and submit all environmental technical backgrounds that allow you to build the why did not consider underground transmission line, considering that from the landscape point of view, such alternative would benefit directly to the quality of life residents villagers in the coastal edge.**

**Exposed:**

The owner clarifies that, as for the LAT high voltage electric transmission line, this will not be visible for the sector of Caleta Río Seco, being visible only in the sector of Caleta San Marcos and in the sector of the electric substation. As medium or low voltage lines, both bays now have electricity distribution network so it is an element that is already present in the landscape of the place.

Before analyzing the LAT, it is worth mentioning the project defined the installation of an encapsulated or electric type GIS substation in the cavern of machines, i.e. underground, instead of a substation of air as it is the lagoons substation, to avoid the installation a new element that can have an impact in terms of landscape in the coastal area of Caleta San Marcos. Taking into account the standards set by the NSEG 5. E.n. 71 regulation of electrical installations of strong currents (article 90) and as set out in the "environmental impact assessment guide. Landscape in the SEIA value"(2013) the service of environmental assessment, the portion of the located on the coastal Cliff LAT, which comes to the surface by the portal of the access tunnel to the cave of machines specifically by a portico, is supported by two towers from where rises the coastal cliff and continues across the plateau and the pampa to substation lagoons of the system interconnected the Norte Grande (SING), generates less impCTO visual taking into consideration the environmental and technical possibilities in terms of component landscape there.

In the photomontage, which is incorporated in this Addendum in the annex 7-4 You can see the works related to the high-voltage line.

The coastal cliff in Caleta San Marcos in the sector that is projected to the high voltage line of Tarapacá mirror project to raise in aerial way, has a slope of between 40% and 58%, ascending about 700 m in a little more than 1 km. To build the alternative of high line

voltage buried would have to open a path in the cliff to do the excavation, carrying building materials, as well as install work fronts and subsequently perform the maintenance. In order to be as limited as possible, would have to bury the line in the same way that is enabled for your installation. If circulation is to be safe, descent should be a maximum of 13%, which translates into one or more diagonals on the cliff in the place of the location of the project. This work would have more than 6 km long, would be permanent and for safety should be maintained as a private road.

In this sense, the solution of rise of the cliff to the power line, responds to an analysis of the abundance of the resource in the environment, as well as the aesthetic and structural characteristics thereof, taking into account the characteristics and interests of the observers present in the study area. Thus, is must take into account the type of landscape formed by the cliff covers much of the coastline of the town of Iquique, being considered as an attribute of the common and abundant landscape situation that recurs in the sector of the Pampa del Tamarugal , point of connection of the LAT to SING through the lagoons substation, where shapes and structures are abundant and constant.

On the other hand, the holder considered that intervention generated by power line will be integrated into the landscape because it's a linear intervention of low impact that can merge with structures, shapes and colors present in the area of the cliff coastal. For the sector of la pampa, environment to route 5, this type of intervention is part of the existing landscape, reason by which a significant disruption of the landscape will not be generated.

As to the status of observers of the sector of la Caleta San Marcos, it should be noted that the visual object toward which the views of these observers are oriented, or the focal point of the landscape, is located in the sea, and this is the visual element of ma Yor product of his aesthetic visual quality, which makes it stand out above the predominance of the abiotic elements of the terrestrial landscape.

Therefore, for the sector of the coastal cliff and specifically for the observer identified as Caleta San Marcos is dismissed a significant impact the installation of power line product since this visual element (the cliff) is abundant in the environment, and because it does not represent the visual element of major importance in the area, coupled with the capacity of integration into the landscape of the elements that make up the power line, especially the driver that will be air way over the cliff.

**1.28. Stated in the study, respect the life of the project's indefinite, notwithstanding the holder and must describe the actions that would implement in the event of a possible closure of the project. This must incorporate potential impacts that would occur in the matrices water, sediment and biological, as well as communities in the removal of infrastructure, and detail the actions to be implemented in the reservoir.**

**Reposed:**

The owner explains that, even When a how indefinite useful life of the project is estimated to the extent carried out necessary maintenance equipment presented las actions for closure or abandonment of the project in section 1.7.1 of study of environmental impact, Chapter 1 description of project.

These actions correspond to:

**Dismantle infrastructure of the project**

Project facilities and temporary facilities required for its closure will be dismantled, will be cleaned up the areas directly affected and surrounding areas, will be returned the areas taken over most resembling the original condition as possible.

Containers shall be removed and will disarman workshops, yards of salvage, wineries of collection, etc. All phase waste materials removed from operation and closure to transport them and disput them in authorized places. In addition, checks out the equipment and machinery used in the work.

Work fronts, will be closed and environmentally abandoned at the end of the phase of closing of the project. To do this:

- It will withdraw any element and residue remaining in work fronts.
- Removal shall be made of access controls installed in roads.
- The removal of surplus materials, residues and wastes of the areas that have been intervened by the tasks, which will be sent to different places of collection of waste disposed in temporary facilities will be verified.
- The surfaces where they were fronts mobile work and temporary facilities, the closest possible to the original state prior to the beginning of the works, as appropriate will be returned to.
- Access to underground works will deliver.

**Land restoration**

Once the installations have been removed, the activities will be held to restore the original surface. These activities involve the removal or covering of concrete structures such as foundations of temporary constructions.

There will be a thorough cleaning of the entire path of the works, making sure there are no traces of any type of waste in the areas of work.

### **Prevention of emissions**

During the closure, will be used machinery and vehicles with maintenance and revisions to the day, as well as moisturize paths that eventually will be used and which is necessary for the conditions of the terrain.

### **Maintenance, conservation and supervision necessary**

Since they are not considered measures of closure that may require monitoring post-closure since there are no component environmental that they could be affected, will be no maintenance, conservation and/or monitoring activities.

### **Other activities**

Considering that the project includes other facilities of the activity, such as tunnels underground during the closing phase other addition activities as to those already indicated in sections previous with the purpose to prevent the access of persons or animals to such works.

With regard to the closure of upper tunnel, the only identified risk is associated with the uncontrolled entry of people inland from the tunnels. Therefore, during the closing phase will be the closing of entries from the tunnels, through a fence, mesh or gate, with appropriate signage, in such a way to prevent access.

In the case of the reservoir shall be to indicate the danger that can mean crossing the limits of contour profiles by means of signage.

Note, that the regulation of the SEIA indicates in its Article 18 paragraph c.7 closing due to describe "if any", situation that the headline estimates will not be generated. Without limiting the foregoing, in the event of a possible closure of the facilities, the holder shall submit to the system of Evaluation Environmental impact the actions referred to in the closing and the corresponding environmental assessments advance.

**1.29. He is drawn to the holder that it must rectify the role of the public road shown in the EIS as "CH-1". The foregoing, since according to the Res. D. V. No. 6804 dated 04 December 2012, is route 1, which runs from junction route 5 (Las Breas) - Taltal - Loa River - Iquique, Sector: Rio Loa - Iquique.**

**Reposed:**

The holder welcomes the observation. It is rectified in annex 1-1 Planes Tarapacá mirror project of the present Addendum, the public path indicated in the EIS as CH-1 corresponds to the Route 1.

**1.30. Inform about the access required for the realization of your project, both for the dry river Sector, installation of operations, Sector Caleta San Marcos and start and end points of the By Pass designed the route A-752, UTM WGS84 coordinates more mileage, to supplement as described in table 1-3 total areas of work surface, since in these sites there will be facilities and access to temporary and permanent, the which must comply with the D.V. 232/02 MOP that establishes the conditions of access to public roads under tutelage of the Dirección de Vialidad.**

**Reposed:**

The holder receives the request, in Annex 1-1 Planes Project Espejo de Tarapacá, they are attached the plans for roads and surfaces to use. With regard to the starting point and term the bypass, the coordinates are as follows:

Starting point: **387.499,645 e; 7.664.935,079 N**

End point: **386.562,891 e; 7.667.392,442 N**

It is estimated that the surfaces of each joint during construction will be 3,000 m<sup>2</sup> maximum.

With regard to the access to permanent use surfaces, are subject to the process the owner is currently doing with the Dirección de Vialidad (Annex 1-8, Ordinary office N ° 173 2015 Address Road), in order to reach an agreement with respect to the ways of the project, especially regarding the bypass of route A-752. The requirements raised to date by the Dirección de Vialidad holder within the framework of the process of the Convention were incorporated to the works of the project road in this Addendum.

1.31. The holder must clearly indicate the distance of the public roads to the four posts considered to run *atrasviesos*, such as route 1, A-750, A-752, enclosing also alienation from both the shaft and edge of the road and the location of the coordinates UTM WGS84 posts. Also indicated that the *atrasvieso* should be considered less air intervention of the road section, being in better condition a perpendicular *atrasvieso*.

**Answer:**

The owner welcomes observation and then presents chosen distances:

**Table 1-16. Distances from towers to public roads in areas of intersections**

Public road	Tower	Distance (m)
A 750	S3-1.127	139
A 750	S3-1.126	210
ROUTE 5	AE-1A	17

1.32. Informing the holder that the Regional Directorate of roads is currently developing a study of Preinvestment in the area of influence of the project, called "improving route 1, Sector costs" Guanillos "-Costs Pabellón de Pica, región de Tarapacá", in order to consider the information that this study as improvements to the current route.

**Exposed:**

The owner takes note of the observation.

1.33. Finally instructs the owner that all interventions considered public roads must have with the approval of the Regional Directorate of roads and for the specific case of route 1, of national character, the pronouncement of the National Directorate of Roads.

**Exposed:**

The owner welcomes observation and will proceed accordingly. It is noteworthy that you according to the information provided in section 1.4.4.6 of Chapter 1 of the EIA, the holder is currently pending proceedings before the Dirección de Vialidad in order to reach an agreement with respect to the ways of the project, especially with regard to the bypass of route A-752. Part of the requirements raised to date by the Dirección de Vialidad holder

within the framework of the process of the new layout of the route to 752 they were incorporated to the works of the project road in this addendum. TOI respect, is attached in the Annex 1-8 the Ordinary office N ° 173 2015 Dirección de Vialidad, Tarapacá Region.

**1.34. Holder must identify the movements of vehicular transport for the project, pointing to types of vehicles and generated monthly trips, both in the stage of construction and operation.**

**Rexposed:**

The owner explains that during the construction phase internal travel during the construction phase take place within each sector of construction, among the sectors where jobs are developing, as well as between the camp and the work places.

The location of las operations facilities are has designed to reduce travel outside the sector of work and concentrate the movement of people in the workplace close to the works in development. Therefore internal travel correspond mainly to the movement of staff, distribution of food and water, wetting of roads, provision of material from excavations in stockpiles, transportation of materialis and equipment to the fronts work, waste removal. Roads in use will be wetted either apply a dust suppressant.

Tto the as indicated in the section 1.5.9.7 transportation of personnel, Chapter 1 of the EIA, the daily transport of personnel to fronts work and installation of slaughter will take place by means of buses, minibuses and vans whose frequency of travel will be associated with the beginning and end of each working day. The tables below presentsn detail transport for the construction phase.

**Table 1-17. Transport average Personal construction phase on Buses.**

Year	Bus 40 passengers Iquique camp (mensualizado)	Bus 40 passengers camp Cove (mensualizado)	Bus 40 passengers camp reservoir (mensualizado)
<b>Total travel per year</b>			
2015	54 ° (12)	-	840 (80)
2016	536 (45)	480 (40)	2760 (230)
2017	912 (76)	1380 (115)	5220 (435)
2018	360 (30)	660 (55)	1980 (165)
2019	40 (4)	-	300 (25)

**Table 1-18. Transport average of Staff Construction phase in Minibuses.**

Year	Iquique camp 12-passenger minibuses (mensualizado)	Camp Cove 12-passenger minibuses (mensualizado)	Camp reservoir 12-passenger minibuses (mensualizado)	12 passenger road access minibuses (mensualizado)
<b>Total travel per year</b>				
2015	72 (6)	780 (65)	60 (5)	480 (40)
2016	184 (16)	1140 (95)	960 (80)	540 (45)
2017	160 (14)	600 (50)	1260 (105)	-
2018	136 (12)	180 (15)	540 (45)	-
2019	16 (2)	240 (20)	180 (15)	-

The tables presented below for travel by vehicles were presented in TONexus 1.5 the EIA, Estimation of emissions:

**Table 1-19. Distances and number of trips average for transport of Labor under construction.**

Journey	Type of vehicle	Travel (monthly)
Iquique-camp	Buses	1992 (167)
	Minibuses	568 (48)
Campamento-Reservorio	Buses	11,100 (925)
	Minibuses	3,000 (250)
Campamento-Caleta	Buses	2.520 (210)
	Minibuses	2.940 (245)
Campamento-Camino access	Minibuses	1020 (85)

For the construction of the power line is considered the following trips by vehicle.

**Table 1-20. Distance and number of trips average for the power line construction.**

Journey	Type of vehicle	Travel (mensualizado)
Iquique-camp	Buses	1992 (167)
	Minibuses	568 (45)

For the transport of inputs, is considered the following:

**Table 1-21. Transport of inputs under construction.**

Type of vehicle	Total hours worked	Monthly average hours
Heavy vehicles	2.084.640	43.430

Moreover, for the operation phase, internal vehicular transport movements correspond to monitoring technique and maintenance of the works of the project, as well as, to monitoring. Shall be responsible for the external transportation transport of materials, equipment and personnel to the project will be as shown in the following table.

**Table 1-22. Flow average transportation internal phase of operation**

Vehicle	Frequency average
Trucks	1 Veh/ month
Light vehicles	5 Veh/day (155 Veh/ month)

**1.35. Road signs or other safety measures that will have the secondary path internal to the project must present.**

**Reposed:**

The holder receives the request and advises that for internal secondary road of the project, is install all road signs where appropriate, which is regulated and detailed in Volume 6. Road safety, the roads manual of the Ministry of public works, to ensure the safety of users. Security measures which will have the mentioned way are also included in annex 1-6 of this addendum.

In all cases, the project considered build, improve and complement the roads of access, according to the current legislation. Is worth mentioning that the titular is developing a process of coordination with the Directorate of Regional roads for the modification of the route to 752 (see Annex 1-8 of the Addendum, Ordinary office N ° 173 2015 Address Road), and processing of an agreement with the Dirección de Vialidad Regional, so that before the start of the construction of roads for the project be submitted to sectoral for his part.

**1.36. You should clarify if the project will have another alternative route to the one presented in the EIA, in order to ensure continuity of flows by the way, in case of accident or spill of hazardous products.**

**Reopened:**

Conforme to the issues raised in section 1.4.4.6, roads Sector plateau, Chapter 1 of the EIA, indicates that the project considers the use of roads and existing tracks for its construction and operation, notwithstanding which, to make processes more efficient the DistINTAS phases of the Pproject, is of sarrollaran new roads.

This means that you will use the r1 UTA access to works in the coastal sector and not has contemplated building a road parallel to the case of emergencies. The sector works plateau and pampa will be used for routes A750, A752, TO 760, Route 16 and RUTA 5 and existing tracks. The project includes the construction of an access road north which has a new section that part near Caleta Rio Seco and then joins an existing until you reach the road to 752 track. This road connects the coast with the plateau sector sector and will be which is mainly used during construction and operation, and cuaWhen it is notpassable e the aforementioned public roads and existing tracks will be used.

**1.37. The geometric design of the project access to public roads must be presented.**

**Ranswer:**

The holder receives the Sunicitud and presented in Annex 1-1 of this addendum the planes containing the requested geometric design. Is worth mentioning that the titular is developing a process of coordination with the Directorate of Regional roads for the modification of the route to 752 (see Annex 1-8 of the addendum, N ° 173 2015 Dirección de Vialidad regular trade) and processing of an agreement with the Dirección de Vialidad Regional, so that tobefore the start of the construction of roads for the projectbe submitted to sectoral for his part.

**1.38. In order to have greater background for the analysis of the project, is shall specify the formalities associated with the Secretary of the Ministry of national assets (leases and easements), with their respective surfaces that involve, different areas, works and facilities that includes the EIA.**

**Rexposed:**

The holder welcomes the request and clarifies that IEnergy company Valhalla SpA, RUT N ° 76.153.869-1, of which Espejo de Tarapacá SpA It is a subsidiary, has a lease on prosecutors property where you will find the main works of the project Espejo de Tarapacá. This was awarded by resolution exempt N ° 93 dated February 12, 2014, modified through exempt resolution No. 295 dated May 2, 2014, both of the Ministerial Regional Secretariat of national property of the Region of Tarapacá.

The property is individualized in flat No. 01101-1966-C-R. Lot 1 (574.4 has), ROLE NO. 2543-1), Lote 2 (343,46 has), ROLE NO. 2543-2). Total eSTOS estate Add a surface 917,86 ha. The main works Permanent that are located in these sectors are:

- Reservoirs
- Adducts
- Peak pressure
- Cavern of machines
- Cavern of transformers
- Electrical substation
- Access tunnel to the cave of machines
- Outlet/discharge tunnel and Pique Gates Gallery
- Building management and Control
- Building workshop and cellar
- Yard waste
- Desalination plan
- Wastewater treatment plant

In addition, the Espejo de Tarapacá project has 2 lease requests entered on June 27, 2014, corresponding to the land required for the installation of the camp (ROLE 2516-3), with a surface of 3.05 acres, and another for installation work and gathering near Río Seco (ROLE 2528-2), with a surface of 5.84 hectares, which are equipped with the 1AR903 and 1AR906 file number. Both nominations were approved without changes.

- Installation of slaughter and collection Rio Seco: 2528-2 role, is granted tenure at RES. EXE. N ° 717, February 11, 2015, of the national goods SEREMI, Tarapacá Region.
- Camp: Role 2516-3, is granted tenure at RES. EXE. N ° 718, 11 February 2015, of the national goods SEREMI, Tarapacá Region.

Without limiting the foregoing, if necessary, the leased premises shall comply with the properties that are required for the project. Respect of the line of high tension and the Northern access road, these will be processed by means of electric award giving rise to legal land easement.

## 2. DETERMINATION A.AREA OF INFLUENCE

**2.1. Considering the observations of this report, and where appropriate, the holder must submit a new definition and justification of the area of influence of the project, for each environmental component.**

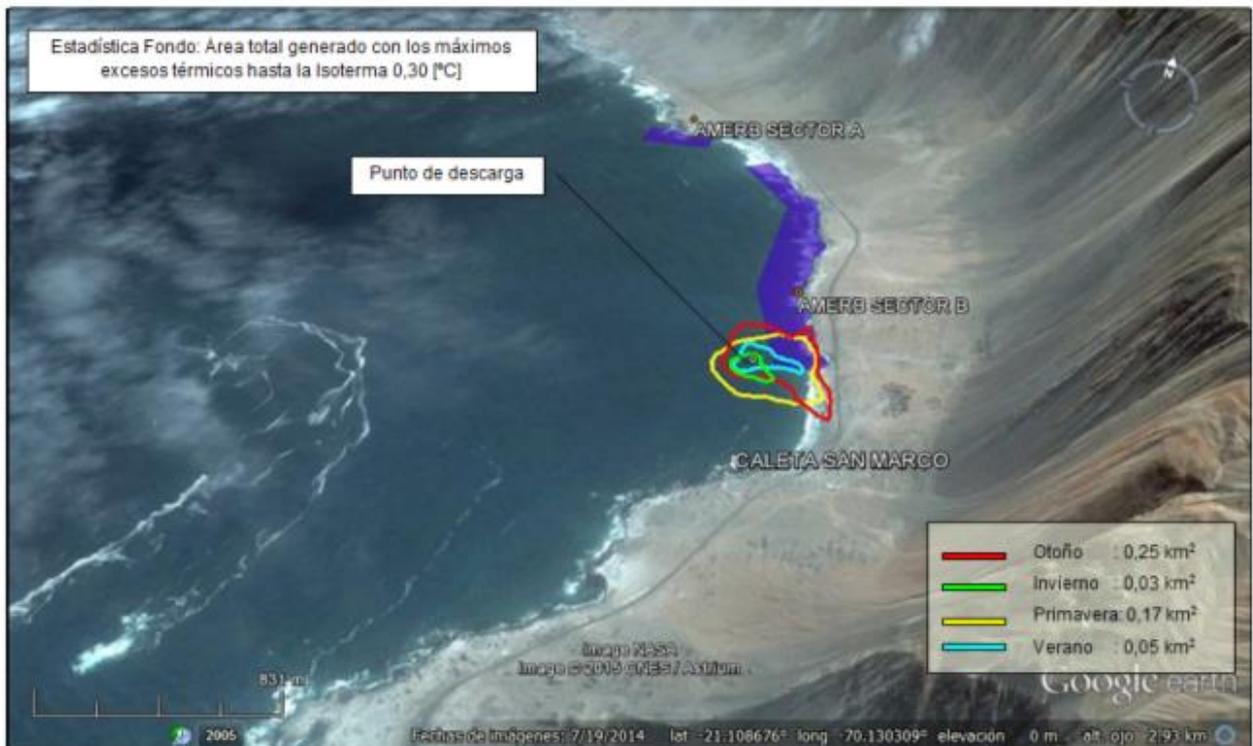
**Reopened:**

The holder receives the request and clarifies the area of influence presented in point 2.5 of the Chapter 2 of the EIA was defined for each environmental component, according to the definition (established in article 2 letter a) Supreme Decree 40/12 MMA, regulation of the system of environmental impact assessment, where it says that this corresponds to *"The area or geographical space, whose attributes, socio-cultural or natural elements should be considered in order to define whether the project or activity generates or has any of the effects, characteristics or circumstances of article 11 of the law, or" ' justify the absence of such effects, characteristics or circumstances '.*

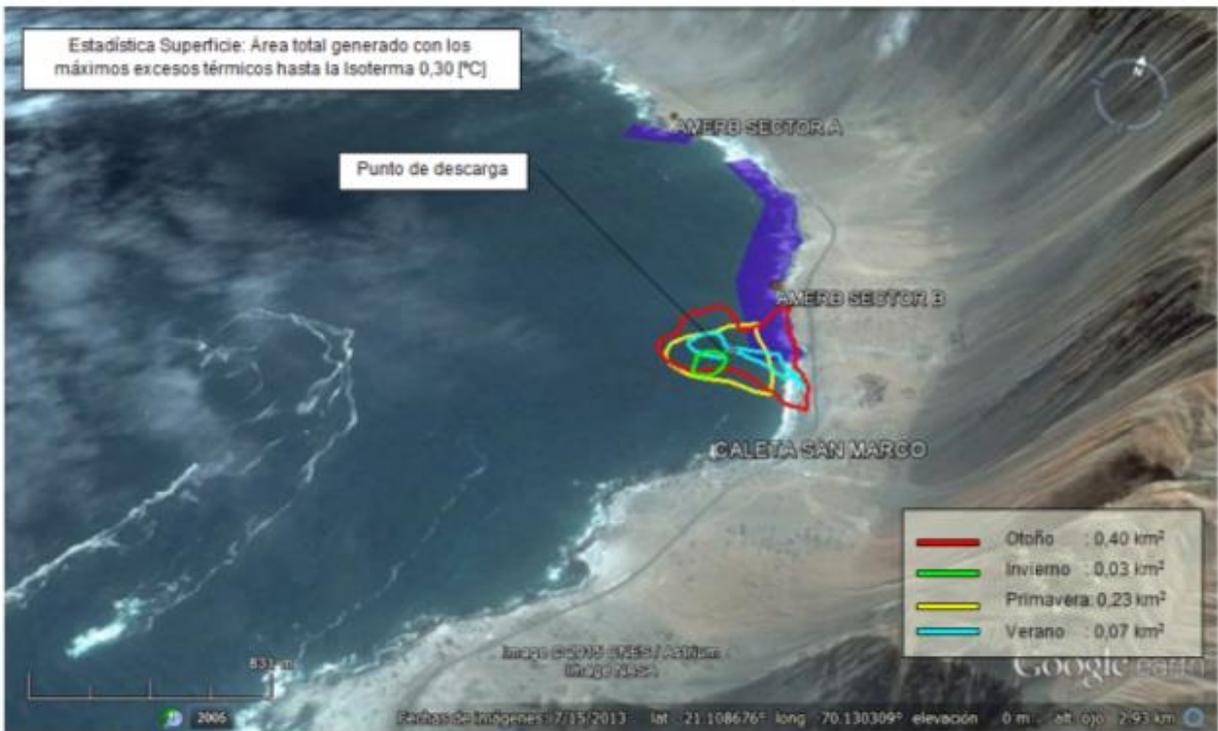
In addition, as mentioned in point 2.1 of Chapter 2 of the EIA, this definition considered as indicated in article 18 letter d) Supreme Decree 40/12 MMA, which speaks of the contents of environmental impact studies, points to the area of influence of the project or activity "... *It will be defined and justified for each affected item of the environment, taking into account the potentially significant environmental impacts on them, as well as the geographical space in which there are parties, works or actions of the project or activity*".

However, whereas that he was a complementation of the LB (annex 3-1.1.1 Baseline middle sea) and the modeling of the discharge (annex 1-6 study of Dynamics modeling of thermal and saline pen), It restated the area of influence maintaining the criterion used in the definition of initial influence area, It contemplates that area in which the thermal differential can reach 0,3° C or more. The following figures show the area of influence defined for the marine environment.

**Figure 2-1. Delimitation of the area total generated by the maximum thermal excesses and the different scopes and thermal pen for each seasonal period modeled extensions, Next on the seabed, represented to the isotherm 0, [30]° C).**



**Figure 2-2. Delimitation of the area total generated by the maximum thermal excesses and the different scopes and thermal pen for each seasonal period modeled extensions, on surface, represented to the isotherm 0, [30]° C).**



**2.2. Considering that the Pampa del Tamarugal national reserve is located within the area of influence, and considering that the owner designates in the EIA "that there will be a potential impairment to the Pampa del Tamarugal national reserve by the connection of the high voltage line to" the substation gaps (existing) which is located within the mentioned reserve", the holder shall identify and describe potential mentioned involvement, presenting the measures of mitigation, repair and/or compensation to be implemented in case appropriate. In this sense, must keep in mind that in the species is protected area Prosopis Mesquite is now in the category of conservation "in danger" (according to the 13/2013 D.S of the Ministry of the environment) and that there is an ecosystem associated with this species.**

**Exposed:**

The owner explains that the only work or installation Tarapacá mirror project that will be located on the inside of the RPampa del Tamarugal National Park ES the arrival of the transmission line to the Subestacion Electric Lagoons, of current existence and which is at the same time located within the mentioned reserve.

However, this shall be only (a) a stretch of 100 m air line wiring and; (b) a only high-voltage Tower required For what the line in question connect with the substation lagoons. In this regard, it is worth to keep in mind that the sector where happens in air form the cable and where the tower is located is not the presence of Tamarugos, or another species of flora. This is why this is not significant in the analysis of the impact assessment as it has already been accredited in Chapter 4 of the EIA.

The following Figure corresponding to the landscape analysis, sample sector of the substation, in it you can see the absence of flora and the existence of road infrastructure corresponding to Route 5 and an existing track, as well as the infrastructure of electric transmission corresponding to the lagoons substation and existing high-voltage lines.

**Figure 2-3. Substation lagoons.**

It is important to mention that, According to the classification of Gajardo<sup>2</sup>the project is located within the Region of the desert. Particularly in the area where it intersects with the national reserve It belongs to the subregion of the absolute wilderness, where plant life is absent in its entirety. Therefore, in the 100 meters of lline of the Pproject within the reserve, not be producwill gon impacts of flora and vegetation significant character and requiring the implementation of environmental measures mitigation and compensation.

In effect the present protected area is evaluated by the landscape component that considers the impacts as not significant in the phase of construction and closure and little meaningful in e.cover of operation. The above Since the 100 meters high voltage line the inserts in the reserve project are away from the areas of relevance, since they do not possess any vegetation. It corresponds a sector highly involved and even though it is a protected area of local, regional and national recognition, the sector study and possible

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<sup>2</sup> Gajardo, R. 1993. La Vegetación Natural de Chile. Clasificación y Distribución Geográfica. Editorial Universitaria. 165 p.

involvement of the project, covers a minimum area of the reserve. Review Chapter 4, impact assessment for details.

In relation to the above, in the EIA was defined that the environmental value of this particular area of the reserve of the Pampa del Tamarugal is moderate, due to the absence of the main object of protection of this, the Tamarugo, and high intervention of the product of the infrastructure area energy existing, namely the lagoons substation and lines of high and medium voltage sector. Impact determined on this protected area has to do with the potential effect on the object of protection of this reserve, the Tamarugo forests and ecosystem of oasis that generates these. In view of the absence of Tamarugos, as well as any other plant species and wildlife in the area, added to the impact is of local character, the impact is described as not significant in the construction and poco significant in the operation.

**2.3. The holder must present an analysis of the area of influence that incorporates Caleta San Marcos and Rio Seco, together with the entire Bay Chomache. All of the above, in order to visualize in an appropriate way the impacts and the movement of pollutants within the study area. In this same sense, must submit the area of influence through plans to appropriate scale allowing to visualize the sector, incorporating surface impact.**

**Reposed:**

The holder receives the request and clarifies the area of influence presented in point 2.5 of the Chapter 2 of the EIA was defined for each environmental component, as outlined in the answer to question 2.1 of this Addendum. Is for this reason that the composition of the different areas of influence differs among themselves, according to the environmental component He is parsed.

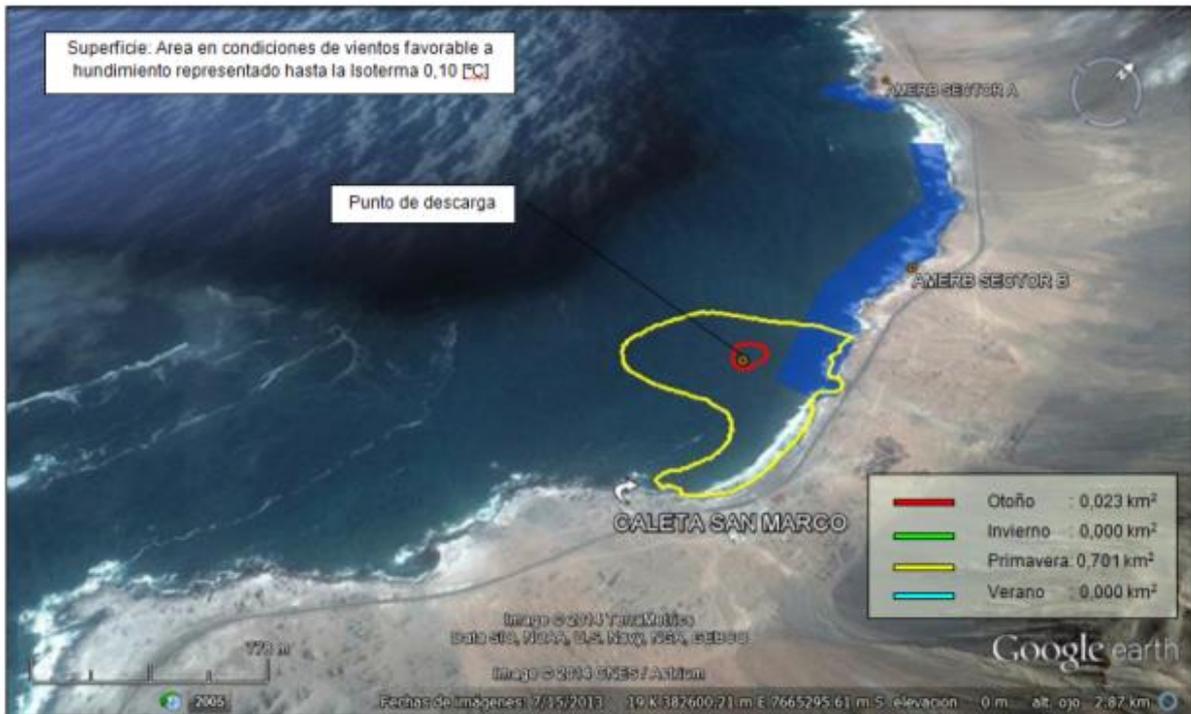
For the specific case of the component Marine environment, based on studies performed for the EIA and supplemented in this addendum, considering the differential in temperature, salinity, suspended solids, and speed, the main difference with the marine environment corresponds to the temperature of discharge water, by to define the area of influence were the results for that parameter and the limit established in the differential of 0.3 ° C.

En this addendum is She complemented both the baseline, by adding information for winter (Annex 3-1.1. Baseline marine environment) discharge modeling, delivering results for all stations in different tidal conditions and the bottom and surface layers, as (Annex 1-6 study of dynamic modeling of thermal and saline plume). In this way, maintaining the criterion used in the definition of initial influence area, It contemplates that area in that the

differential thermal can reach the 0.3 ° C you can see the area of influence in figures Figure 2-1 and 2-2.

On how to consider jointly Caleta Rio Seco and Caleta San Marcos for the analysis between marine, the models for the four seasons of the year confirm that even considering a differential up to 0.1 ° C, i.e. virtually no difference, the area would remain close only to Caleta San Marcos (see Figure 2-4 and Figure 2-5).

**Figure 2-4. Delimitation of the area of the thermal plume in favourable winds conditions to collapse for each seasonal period modeled, at the sea surface, represented searched Ta the isotherm 0.10 [°C].**



**Figure 2-5. Delimitation of the area of the thermal plume in favourable winds conditions to collapse for each seasonal period modeled, next to the sea bottom, represented to the isotherm [0.10]° C).**



With regard to River Seco Therefore, Cove located 14 km NOrte of Caleta San Marcos, the modeling of the thermal pen Download indicates that This fails to this sector, in other words, there is no effect in the environmental quality of the next marine environment Dry river, Dice that is was and distant the area of influence of the project Espejo de Tarapacá in the Middle Marino.

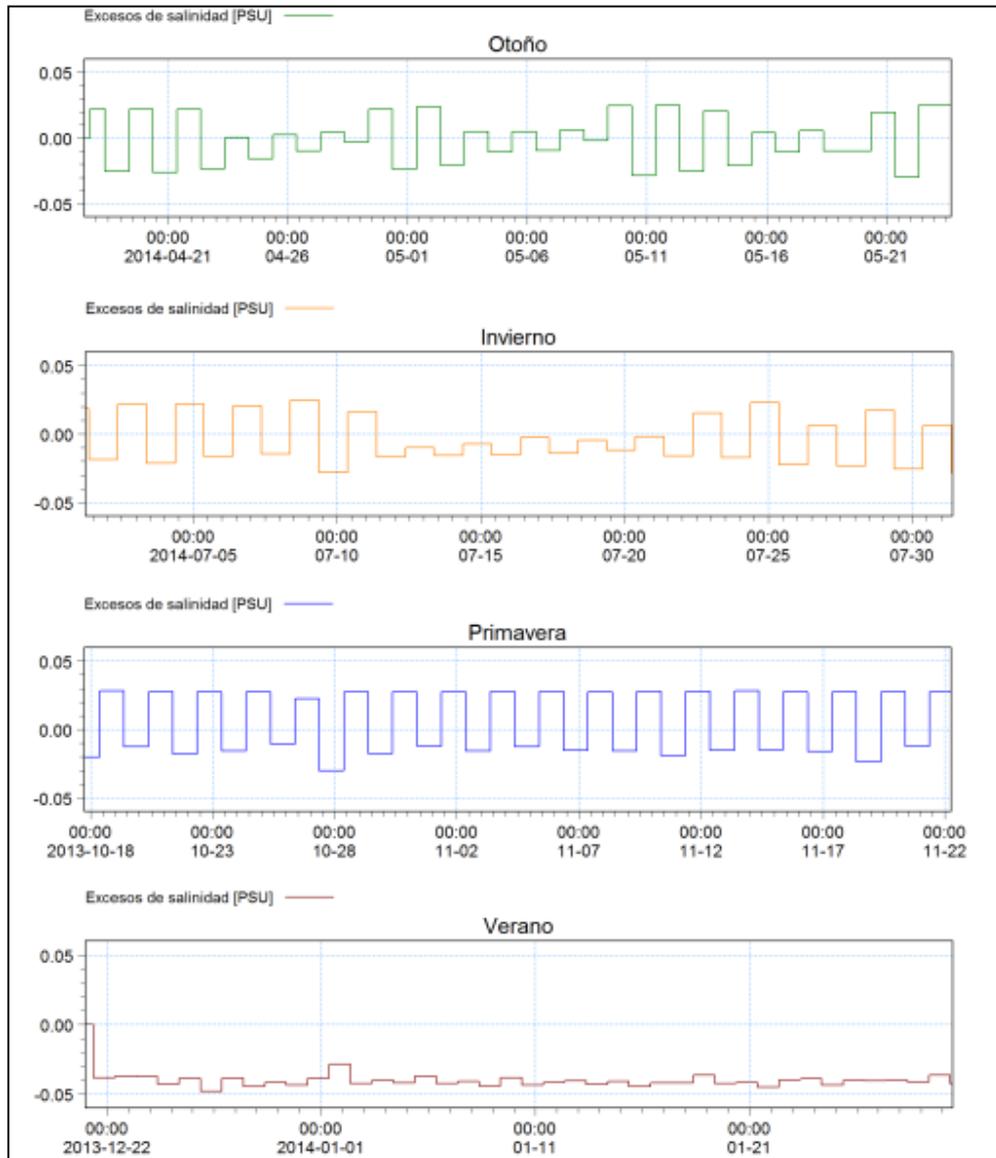
**2.4. In the report "study of the behavior of feather TermoSalina and solid through hydrodynamic modelling (report SterpsWater Solution EIRL) States that: "In accordance with the above, for purposes of this assessment will be considered area of influence that area where the salt concentration is greater than 5%". In this regard you must:**

- **Re-evaluate the proposed catchment area, whereas the different scenarios more unfavourable and so-called conservatives for the modeling of the pen of termica-salina dispersal and dissolved solids and M.OT, according to requested in paragraphs XXX of the Chapter prediction of impacts of the present report.**

**Answer:**

The holder receives the request and presented in the Annex 1-6 of this addendum to the Study of dynamic modeling of thermal and saline plumethe complementation of feather modeling report termosalina presented in the EIAWhereas now the four stations of the year. Below are the graphs of excess salt:

**Figure 2-6. Graphics of excess salt.**



In all cases it is observed that there is one differential of less than 5%.

- **Demonstrate with a geotechnical background and terrain, the location of the point of suction/discharge located 300 m from the coast, has no other alternatives of location within the sector comprised between Bay Chomache and beach IKE-Ike. The above in relation to stated in the methodological guide MEDVSA (Ministry of environment, rural and Marine Affairs of the Government of Spain), used by the owner and in where it is indicated that *"only the localization of the system of discharge under the following assumptions can be justified:"***
  - *There are no alternative*
  - *The project is related to relative to public safety or human health reasons*
  - *Of primary importance for the environment*
  - *"Other overriding reasons of public interest of the first order, after consultation, and establishing countervailing measures"*

Also be present for the above, as indicated in the technical report of management of discharges of brine waters coastal recommendations of a Scientific Advisory Panel (California Water Resources Control Board, Technical Report 694, March 2012), document in which it is recommended that: "should be avoided discharges close to areas of special biological significance," situation that would be due to the close location (155 m) in the Area of management and exploitation of benthic resources AMERB "Sector B", from the point of discharge of the EIA Espejo de Tarapacá.

#### **Reposed:**

The owner clarifies that it has used the methodological guide MEDVSA to determine parameters It will enable to make a proper discharge of saline plume modelingas referred to in point 3.6.2, analysis of alternatives for modeling, report modeling hydrodynamics and quality of the water Espejo de Tarapacá, of annex 4.3 of the EIA, and not for the definition of the location of the project, as you referenced in question.

The work of Jack and underwater discharge is located approximately 343 m from the coast and at 15 m depth. As explained in Chapter 1 of the EIA, the location of the project is justified by the following elements:

*The location of the project has direct relation with the combination of natural conditions that are essential for the development of this project, namely:*

- *A coastal cliff that provides the necessary elevation differential for hydroelectric generation.*
- *A natural depression in the Earth that allows the realization of a reservoir.*

- *Close to the sea which allows the water resource for the taking and discharge.*
- *Surface rock on the seabed allowing the underground construction.*

It should be borne in mind that it requires the howplimiento of all and every one of conditions for podER develop the project. I mean all these elements must match in a space limited to the feasibility technique project, and in Bay Chomache in the area where the project is located, these is fulfilledn.

### **3. BASELINE**

**3.1. By virtue of the above in the present report, the holder should update the chapter of baseline in the various environmental components, consistent with the requested background.**

**Ranswer:**

The holder receives the request and presents then documents that update baseline presented in the EIAAccording to the records requested by the authority for This Addendum:

- In ANexus 3-1.1 is presented baseline of marine environment updated 4 campaigns, in this way, looking at seasonal representativeness. In addition to the above, in annex 3 - 1.2 is delivered an intensive study of planktonic in Caleta area communities San Marcos, for didentifying the richness and specific abundance of plankton obtained in the study area, and in annex 3 - 1.3 is presented a report on larval supply in sector Caleta San Marcos.
- In annex 3-2 is presented a supplementary report to the Base line of fauna, with respect to the swallows of sea and its reproduction.
- Annex 3-6 presents line of updated base of terrestrial archaeology.
- Line is presented in annex 3-7 of updated base of underwater archaeology.
- Line is presented in annex 3-8 of updated base of Paleontology.

**3.2. Without prejudice to the information presented in the EIA, the holder must present at geographical coordinates, Datum WGS 84 geographic, all points of sampling (stations) in marine area of influence of the project, both as abiotic biotic parameters.**

**Ranswer:**

The owner explains that, en regards to baseline marina, in annex 3.2 of the EIA were presented cartographic figures or tables with coordinates in Datum WGS 84 U19, of points and stations of sampling used in three seasonal campaigns for spring 2013, 2014 summer and fall 2014 in the sector of the project and control to the North and South points.

**Table 3-1. Table of figures with set points for the baseline of marine environment.**

N ° image	Title	Page in annex 3.2
Table 1	Baseline marine study area project Espejo de Tarapacá	Chapter 1, introduction, p. 3
Figure 1	Outline study area and spatial localization of points or Oceanographic measurement stations. Campaign of spring 2013	Chapter 2, physical oceanography, p. 1
Figure 2	Outline study area and spatial localization of points or Oceanographic measurement stations. Summer 2014 campaign	Chapter 2, physical oceanography, p. 2
Figure 3	Outline study area and spatial localization of points or Oceanographic measurement stations. Fall 2014 campaign	Chapter 2, physical oceanography, p. 3
Table XLVIII	Instrument setup parameters <sup>3</sup> . Campaign spring 2013	Chapter 2, physical oceanography, p. 96
Table XLIX	Instrument setup parameters. Campaign summer 2014	Chapter 2, physical oceanography, p. 96
Table L	Instrument setup parameters. Campaign fall 2014	Chapter 2, physical oceanography, p. 96
Figure 79	Track Navigation done in condition of tidal llenante (blue line) and reflux (red line), opposite Caleta San Marcos and the areas of operation Sector A and B, on February 01, 2014.	
Figure 1	Spatial localization of CTDO measuring stations, removing samples of extraction of marine sediments and water. Spring 2013 campaign, 2104 summer and fall 2014.	Chapter 3, chemical oceanography, p. 9
Table III	UTM coordinates stations of sampling, valid for the structure of	Chapter 3, chemical

<sup>3</sup> Se refiere al ADCP modelo WHS 614,4 kHz – TRD Instruments.

N ° image	Title	Page in annex 3.2
	the column of water, water quality, sediment subtidal)Datum WGS - 84). Campaign of spring 2013, 2014 summer and fall 2014.	oceanography, p. 10
Table IX	UTM coordinates of the transects intertidal for physicochemical characterization)Datum WGS - 84).	Chapter 3, chemical oceanography, p. 78
Figure 40	Location of transects intertidal in the study area. Summer 2014 campaign and fall 2014.	Chapter 3, chemical oceanography, p. 79
Figure 49	Spatial location of stations (BV) extraction of wildlife for analysis of metals in tissue of the gastropod Concholepas concholepas. Summer 2014 campaign.	Chapter 3, chemical oceanography, p. 94
Table XIII	UTM coordinates)Datum WGS - 84) stations or points of extraction of wildlife for analysis of metals in tissue of hydrobiological resources, the size of each collected sample data. Summer 2014 campaign.	Chapter 3, chemical oceanography, p. 95
Table I	UTM coordinates)Datum WGS 84) of sampling stations of the intertidal Rocky and control sectors.	Chapter 4: Biological oceanography, p. 14
Figure I	Available transects intertidal for the evaluation of hard bottom communities.	Chapter 4: Biological oceanography, p. 15
Figure 30	Location of transects intertidal in the study area	Chapter 4: Biological oceanography, p. 67
Table XVIII	UTM coordinates of the transects intertidal (Datum WGS - 84).	Chapter 4: Biological oceanography, p. 68
Table XXIX	UTM coordinates)Datum WGS 84) of Park them sampling of the Rocky Submareal, Caleta San Marcos.	Chapter 4: Biological oceanography, p. 103
Figure 56	Location of the transects from the Rocky subtidal, Caleta San Marcos district of Iquique, Tarapacá region.	Chapter 4: Biological oceanography, p. 104
Table XXXIX	UTM coordinates)Datum WGS 84) from the beginning of the transects direct assessment of Ichthyofauna.	Chapter 4: Biological oceanography, p. 141
Table XL	UTM coordinates)Datum WGS 84) stations of installing the underwater camera in different communities. Fall 2014 campaign.	Chapter 4: Biological oceanography, p. 142
Figure 75	Outline of spatial localization of the transects (ES) and filming of the communities points: LT: community of Lessonia trabeculataCF: filtrants, FB community: community of soft bottoms.	Chapter 4: Biological oceanography, p. 142
Table XLVI	UTM coordinates sampling stations of the infauna subtidal)Datum WGS - 84).	Chapter 4: Biological oceanography, p. 156
Figure 84	Spatial location of measuring stations of marine sediments for biological analysis)infauna subtidal), valid also for the physical and chemical quality of water and sediment sampling.	Chapter 4: Biological oceanography, p. 157

N° image	Title	Page in annex 3.2
Table LXV	UTM coordinates)Datum WGS 84) of sampling points <sup>4</sup> .	Chapter 4: Biological oceanography, p. 226
Figure 116	Location of the sampling sites <sup>5</sup> . Green it lies in the area of influence of the project. Yellow is the site control (or without influence of the project).	Chapter 4: Biological oceanography, p. 228
Figure 139	Coastal areas prospected for birds and marine mammals (POF and Reptiles)Transect Blue).	Chapter 4: Biological oceanography, p. 282
Figure 140	Transects (T) offshore prospect for birds and marine mammals.	Chapter 4: Biological oceanography, p. 2

Welcoming the request of the authority, in the Annex 3-1.1 Baseline marine environment This Addendum 1, indulge in all the geographical coordinates of the points and sampling stations employees in the four seasonal campaigns, namely spring 2013, 2014 summer, fall 2014 and 2014 Winter.

**3.3. The holder must submit all the environmental technical background associated with the qualitative and quantitative specific information of benthic fauna present in the place of breakdown of the seabed area of suction and discharge underwater.**

**Reposed:**

The holder receives the request. In response to this request was made a further campaign between 9 and 10 December 2014 in order to characterize the benthic biological environment in a qualitative and quantitative way in the specific area requested by the authority. The results of this campaign are given in annex 3-1.1 Baseline marine environment This Addendum, and they are consistent with the information provided in the baseline of marine environment in the EIA. In addition, in annex 7 - 1 is sent a report of biological and chemical description of the area of the intake.

<sup>4</sup> Se refiere a muestreos planctónicos.

<sup>5</sup> Se refiere a muestreos planctónicos.

**3.4. The owner must supplement the baseline of fauna presented with a history associated with the Reserva Nacional Pampa del Tamarugal (potential affected area), which should make campaigns of monitoring to the inside of such a protected Area, in the place of direct and involvement in the area of influence, whereas the stages of construction and operation of the transmission line. In this sense, it designates the holder that the bells of monitoring to be carried out in the area protected should be informed and authorized by CONAF Tarapacá.**

**Exposed:**

The holder clarifies that, efectivamente, were not carried out sampling points of fauna to the interior of the Reservto Nacional Pampa del Tamarugal. In this regard, eholder I clarifies that the relationship of the project with the reservation Pampa del Tamarugal national corresponds only the arrival of transmission line to the substation located and existing lagoons in turn within the mencionada book, and the only work referred to within the limits of the reserve is the installation of a only Tower, which is the last work before the connection to the aforementioned substation.

It should be noted that in the area where this tower will be located, is a sector where is the predominant the absence of flora and the existence of road infrastructure corresponding to the rUTA 5 and an existing track, as well as, the electric transmission infrastructure corresponding to the lagoons substation and existing high-voltage lines, as you can see clearly in the Figure 2-3. I.e. it corresponds to a sector highly involved, and devoid of vegetation (there are no tamarugo trees in the area or any other species), so it is not constituted in a relevant sector of sampling for fauna.

**3.5. According to what was observed in the visit to the area of the project, it is possible to evidence the presence of cacti Columnar (*Eulychnia iquiquensis*), which is found at the top of the cliff in which will be the high voltage power line towers. This species is not described in the baseline of flora and vegetation in the EIA.**

**In relation to the above and considering that the project is located between Punta de Lobos fog oases, high Chipana and Pabellón de Pica, the holder must indicate if the construction of the electric, construction of reservoirs and the bypass to route A-752, consider removal or affectation of any Cactus or other species associated with these plant formations also, the holder shall identify the polygon in which is established this species, and generate a buffer of 50 m area, for its protection. The vector layer must be delivered in format shapeWhereas Datum WGS 84, spindle 19S, UTM coordinates.**

**Reposed:**

The licensee advises that this project was a rising of land with 68 more sampling points a total tour of areas of influence defined, included the top edge of the coastal cliff and it was not evidenced the presence of individuals of *Eulychnia iquiquensis*.

In what way with regard to the construction of electrical lines, reservoirs, access North and bypass to route A-752, is not removal or affectation of species associated with these formations vegetation.

With respect to the formations vegetathem of the fog, this oasis will not be affected, since they are enough away from the area of influence of the project. Eeffect n, el the project area is located 16 km from high Chipana, 1 km from Punta de Lobos and 17 km from the Pavilion of Pica, as shown in the following figure.

Figure 3-1. Oasis of fog



**3.6. According to the description of the component flora, the holder must identify formations vegetation corresponding to tillandsiales in the sector, and generate a polygon in which such training is located. The vector layer must be delivered in format shapeWhereas Datum WGS 84, spindle 19S, UTM coordinates.**

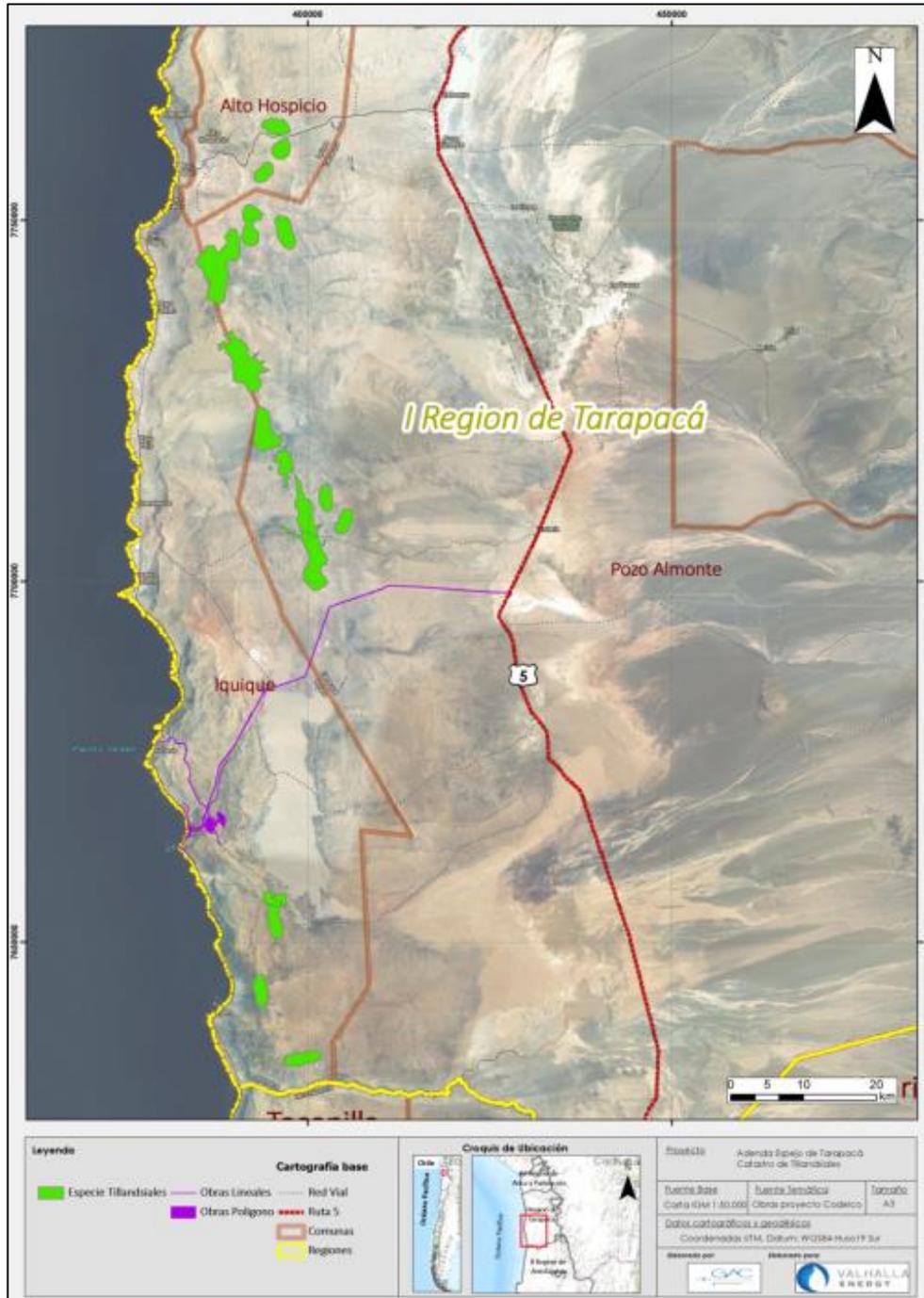
**Reposed:**

The licensee advises that for the present project was a rising of land with 68 more sampling points a total journey through the defined areas of influence, and they found no presence of Tillandsiales in the sectors that will be involved the project.

In addition, and as indicated in the Chapter the EIA, in Figure 3 3-127, they are not formations vegetation corresponding to tillandsiales in the area of the project. However, for this Addendum revised information provided by the Ministry of environment Ambientand, starting from which was generated in the figure below. This figure can be seen clearly that in the project area is not any training of tillandsiales.

In the figure below, is the location of the formations in the region.

Figure 3-2. Cadastre of tillandsiales



Source: Ministry of the environment.

**3.7. According to the background of the sampling effort presented in the baseline of wildlife, and given the different records that possesses the Tarapacá SAG of the species of terns) Storm petrel petrel, *Oceanodroma Hornby*, *Oceanites gracilis*) in the coastline of this region, taking into account also that all them are classified as inadequately known according to the Decree Supreme No 5, regulation of the hunting Act, the information presented by the holder is insufficient to determine any impacts that the project could generate in their different stages. By the abovementioned, the holder must complement gathering information regarding reproductive periods of the aforementioned species, which should be considered at least:**

- **Transects night listening between the months of December to March**
- **Determination of the nesting area**
- **Records of active and abandoned nests**
- **Records of eggs, chicks and adults**
- **Application of statistical methods for the determination of relative abundance, among others**
- **Main threats for the species.**

**This sampling effort should be done throughout the area of influence of the project, including internal roads, reservoirs, power transmission lines, as well as temporary and permanent structures.**

**Reposed:**

The holder welcomes the observation, because he made a specific study referred to the material whose detail is presented in the Annex 3-2 review sea swallows which provides a tonalysis of the reproduction of terns.

According to the request, this study considered the execution of field campaigns in the months of December and January, the implementation of transects night, the determination of the nesting area, registration of active and abandoned nests and evaluation of the main threats for the species of terns, understood as potential interactions between the project and the same. The scope of the study considered throughout the area of influence of the project, including internal roads, reservoirs, power transmission and temporary and permanent buildings.

With respect to the registration of eggs, chicks and adults and the application of statistical methods, it is worth mentioning that if well implemented techniques aimed at raising such information (e.g. use of micro inspection camera), the nature and magnitude of the findings did not allow to generate conclusive results in this regard.

The main results of the study are presented in the attached report, however, include the following:

- Confirmed the reproduction of *O. petrel* in the area of influence of the project, however, is limited to sectors with a salt crust of the Great Salt Lake, not occurring in areas covering the project intervention.
- Identified the stream Rio Seco, associate at which it is expected the construction of the Northern access to the project, seems to be used as marine birds inland transit route.
- It documented the existence of inactive apartemente belonging to the species cavities *O. gracilis*, in areas of rolling hills of the Gorge dry river and the reservoir of this.
- The play, at the local level, of *O. petrel* It would extend from November/December to March-May.

From these results the project considers the following preventive measures, the following:

- The implementation of devices to reduce the risk of collision of birds with the LTE, particularly in those sectors identified as transit of birds Marine inward (Figure in answer to the question 1.19).
- The reduction of the night lighting in all the works and activities associated with the project.
- The implementation of a monitoring, to consider the evolution of the potential impacts of collision with LTE and artificial light sources. Further information on the subject in response to question 10.2, 10.3 and 10.4.

**3.8. The holder must incorporate baseline information of bats susceptible to be affected by the project in its various phases.**

**Rexposed:**

The owner explains that, dand according to the available bibliographic references relating to bats in the country, identified 10 potential species for the area of the project)Table 3-2), of which only a)*Desmodus rotundus*) has conservation category.

**Table 3-2. Bats potentials for the Tarapacá mirror project**

Scientific name	Common name	RCE	Hunting law
<i>Smoky bat</i>	Bat's Schnabel	-	-

Scientific name	Common name	RCE	Hunting law
<i>Desmodus rotundus</i>	Piuchén	-	Rare
<i>Myotis atacamensis</i>	Bat ear mouse of Atacama	-	-
<i>Histiotus macrotus</i>	Greater long-eared bat	-	-
<i>Histiotus Montanus</i>	Lesser long-eared bat	-	-
<i>Histiotus long-eared bat</i>	-	-	-
<i>Lasiurus varius</i>	Colorado bat	-	-
<i>Lasiurus cinereus</i>	Gray bat	-	-
<i>Free Kalinowski's</i>	Thresher bat of Kalinowski	-	-
<i>Free-tailed brasiliensis</i> bat	Guanero thresher bat	-	-

Source: Own elaboration

The works considered by the project and their characteristics determine the potential interactions between the project and the species described above, are limited to the eventual construction of works on colonies of bats. Other interactions, for example, with lines electric would not have any impact to the species of bats present in Chile (González, 2014<sup>6</sup>).

During the campaigns of line base prospectó the project area and although not implemented specific techniques for the detection of specimens belonging to this group, it was possible to demonstrate the non-existence of environmental conditions (caves, shelters) that they could host colonies of bats. However, it is considered that it is not necessary to carry out the requested characterization.

**3.9. The holder must characterize the base line of the sector where the breaking of underground rock will take place and that will be the place of location of the intake, since the information provided by the holder does not verify the impact on the biota for this sector.**

**Rexposed:**

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<sup>6</sup> González, 2014. Medidas de mitigación de impacto en aves silvestres y murciélagos. Propuesta técnica. Encargado por el Servicio Agrícola y Ganadero, SAG.

It welcomes the requirement made by the authority. In response to this request was made a further campaign between 9 and 10 December 2014 in order to characterize the benthic biological environment in a qualitative and quantitative way in the specific area requested by the authority. The results of this campaign are given in annex 3-1.1 Average baseline MAriño This Addendum, and they are consistent with the information provided in the baseline of marine environment in the EIA.

ESte new information which included underwater footage to know the current status of this area of interest, allowed determining that breakdown for the establishment of the mouth of catchment is formed by sedimentary funds , according to which sediment samples were obtained to characterize the community structure of the macroinfauna subtidal there present. As main conclusion, nor there are natural beds of aquatic resources in the sector. In annex 7-1.1 made underwater filming are attached.

**3.10. The holder must include and submit a climate of extreme waves or design and the analysis of directional spectral transfer from deep water to the site of interest in the study of waves.**

**Answer:**

The owner explains that the work of underwater discharge and take is located 343 m of the coast and 15.5 m deep, so it consistent with the line of basis for the project, being away from the surf break (coastal) the wave doesn't impact mostly and at that depth, the effect of the waves on the sea bottom is very low.

El requested requirement relates to the implementation of article 13 of the regulation of maritime concessions. "In particular, article 13 of this regulatory body establishes that the beneficiaries of maritime concessions for the construction of certain works such as *terminals, docks, piers, shipyards for older ships or other marine works of similar size*" they must submit to the maritime authority study and illustrative drawings on winds, currents, tides, waves, amongst others, these effects in accordance with the instructions Oceanographic SHOA 3201/2005.

In this regard, it should be consider that the works of the project do not correspond to those described in that regulation because they are not listed previously or similar.

Without limiting the foregoing, the Licensee undertakes to presents engineering work and studies that apply if before coming to sectoral approval of the SHOAH and the direction of port projects in accordance with its powers, its construction.

Therefore, the information delivered in the baseline of marine environment allows you to properly characterize the sector from an environmental point of view.

The baseline rose information in three campaigns of physical, chemical and biological oceanography for spring 2013, 2014 summer and fall 2014. The information is in annex 3.2 of Chapter 3, pages 32 to the 616. To run the main regulatory bodies referred to were:

- Law on Bases of the environment 19,300, modified by the law No. 20.173.
- Regulation of the system of evaluation of environmental impact D.S. N ° 30/97 light, and its amendments, in what refers to gather information for the determination of the line base of the area of influence of the project (title III, paragraph 1 letter f), in the relevant.
- Methodological guide of sectoral technical review of environmental impact studies in the aquatic environment of national jurisdiction for projects covering " discharges of liquid waste, maritime ports and terminals or others".
- Corresponding to the D.S. N ° 711 DIRECTEMAR permits, and the tenure of current licences that credited the authorization for activities such as sailing, scuba diving, and others that are considered risk. Copy of authorizations provided by the SHOA for this work in the marine environment of the area of study is delivered in Appendix 1.1.
- Act 18.892/1989 and its amendments "General Law of fisheries and aquaculture".
- Supreme Decree No. 430 and no 461/95 of the Ministry of economy on research fishing permits. In Appendix 1.1 is delivered copy of the authorizations provided by the Subpesca (Research fishing).
- Instructions and publications SHOA, affable to this type of study. That is, SHOA Pub. 3201 (3rd Edition 2005), oceanographic N ° 1 instructions: technical specifications for Oceanographic analysis and measurements.

In addition, in annex 3-1.1 This Addendum N ° 1 is attached the baseline report revised and complemented by a campaign of winter 2014.

However, it should be noted that the variable waves has low influence on the reduction of the capacities of dilution of the temperature and salinity (conservative variables). The wave has a local effect on areas close to the zone breaker, through the modification of patterns of current coastal, where the tensor of radiation is a factor of major importance on the tidal currents.

It is important to note that you although the environmental base line was performed according to the standards referred to in instruction 3201 of oceanographic studies, the application of a study of waves, which incorporates the design wave conditions analysis and spectral transfer, is considered for the establishment of an environmental characterization in a line marine environmental base.

**3.11. Regard to modeling: Study of the behavior of the pen Termosalina and solid through modeling hydrodynamics, the following observations are:**

- **Stage 1: calibration of the coastal hydrodynamics:**  
In reference to the calibration of coastal hydrodynamics, the owner indicates that the model used represented adequately speeds in each of the stages of the considered layers, however, according to noted, the resulting time series of the calibration of the model, plays a cyclic periodicity in each series by layer of magnitude of current, which is not corresponding with the number recorded by the ADCP, so it must present the background allowing clarify this situation. Along with the foregoing and on the basis of the figure N ° 25, shall show the estimation of the error (RMS) of the model used in the spatial and temporal, for series described above form georeferenced.

**Exposed:**

The holder receives the request, for this Addendum complemented the modeling of the download, which is presented in TONexus 1-6 Study of dynamic modeling of thermal and saline plume.

On the other hand, it is reasonable to keep in mind that the performed modelling:

- a) Ublurb a model mathematician widely used for the purposes of this case, and
- b) Un model is one construction Mathematics something that exists outside of the field of mathematics.

In relation to the modelling carried out for the project Espejo de Tarapacá, this used data from the baseline was built on the site of the project.

Was the estimate of the error requested (RMS), yielding a maximum surface of 0.002 and 0.004 [m/s] for intermediate layers and background (generated file attached). While it is true that it is not possible to reproduce exactly the time series of the quantities since these have a high randomness (generated by micro-turbulencias, and micro-scale not contemplated in the numerical model variability), in statistical terms are He manages a good representation of the magnitude, with a minimum in each layer error and an

acceptable average for the purpose of this study. The statistical results were added in a new version of the corrected report, which corresponds to annex III of the Chapter 4 of the EIA.

**Table 3-3. Resulting statistical comparison.**

Statistical parameters [m/s]	Coat surface	Intermediate layer	Background layer
Mean square error (RMSE)	0.004	0.002	0.002
Mean absolute error (MAE)	0,052	0,032	0.031
Average normalized quadratic error (NRMSD)	0.017	0.009	0.012
Coefficient of variation mean square error (RMSE CV)	0,072	0.039	0,049
Average ADCP (ADCP mean)	0.082	0,047	0,049
Average model (Model mean)	0,061	0.042	0.035
Sub (over) estimate of the model to the average value (% estimate) [*]	25,328	10,685	28,693

[\*] Estimates of the average values are within the range expected for a simulation of this type, should be considered that measurements are able to detect the micro-turbulencias and variability to micro-scale which are not referred to in the numerical model.

- **Stage 2: modeling of the thermal pen - Salina and solids suspended in the Bay Comache:**
  - **In figures N ° 30 and 31 positive cyclical temperature differentials can be seen at the point of discharge, which maximize across all series over the periods simulated respect to so-called series "zero flow", above 15 ° C, toward the end of the series it is used. In this regard, you should clarify and present the technical backgrounds that enable to verify if this cumulative increase over time, was seen in the value of 1.54 ° C differential thermal point maximum indicated.**

**Reopened:**

In order to clarify information, the holder it then delivers figures that represent the same temperature of three differential information different ways.

The first figure shows the differential in degrees Celsius connection of the temperature of the marine environment. It is as well as represents the temperature, the temperature of the marine environment and the temperature differential in the download, red is represented in

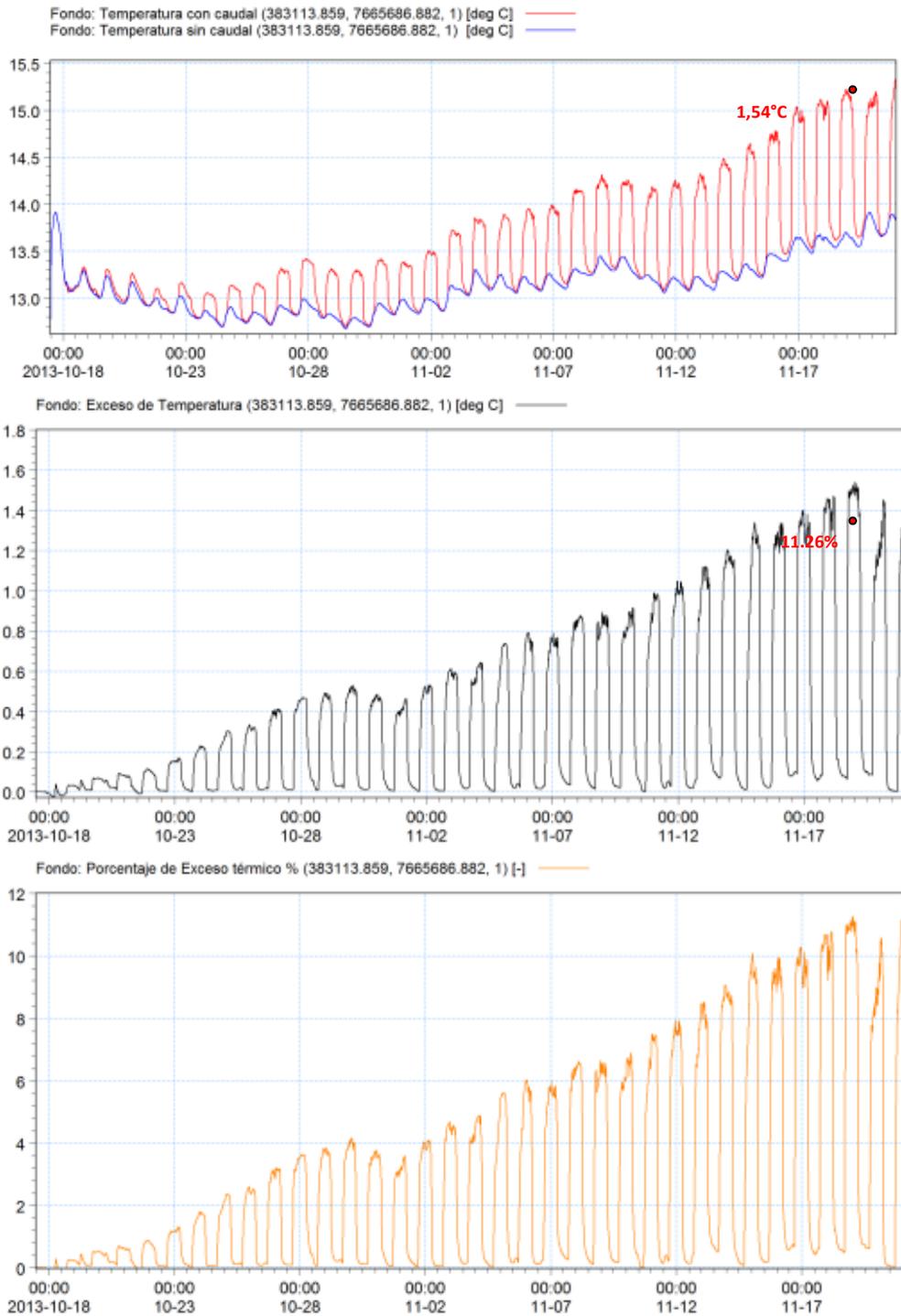
blue. Therefore the differential in temperature is given by the distance between these two lines, not the distance from the 0° C. Then, to deliver the information a zoom to the chart, became such that the vertical axis is not zero (0° C) but that at 12.5 ° C. Therefore, when the marine environment temperature is 14° C, the maximum differential is 1,4° C.

In the second figure Celsius is represented only the temperature differential, in degrees, is how you can see that it fluctuates between 0 ° C, in the hours of suction and a maximum of 1.54 ° C in the hours of discharge.

Finally, the third figure shows the differential as a percentage on the temperature of the marine environment, varying between 0% to 11.26%.

The thermal value was considered in the chart, however the scale of the axes made to be not well appreciated the point maxim of 1.54 ° C. For a better detail graphics is increased by:

**Figure 3-3. Time series of temperature, excess and percentages at the point of discharge.**

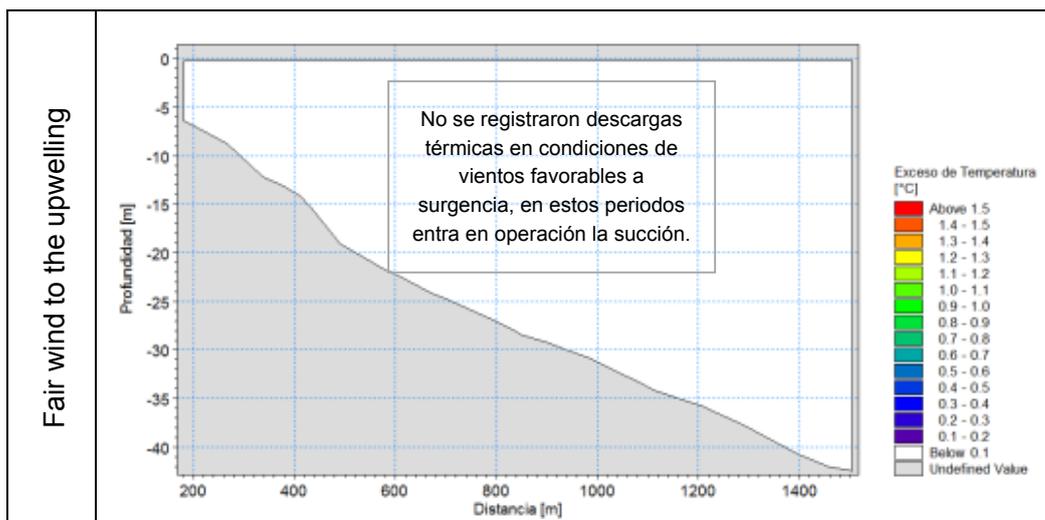


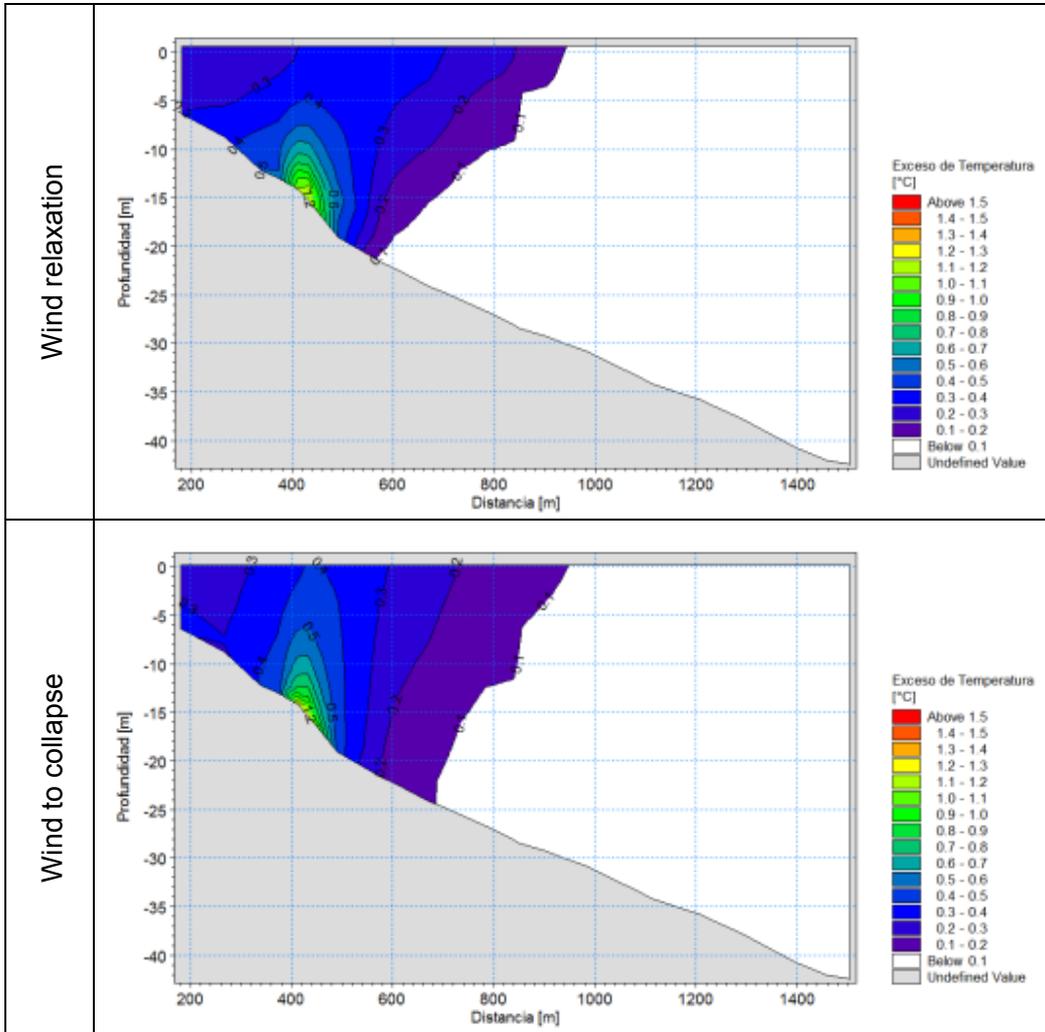
- According to the modeling of the thermal plume, it is observed that more favorable scenarios that are presented to the greater dispersion of thermal pen, in the surface layers and background, correspond to the conditions of relaxation and SAG, which fall directly on the so-called AMERB San Marcos. Therefore, the holder should establish and present, through a latitudinal cut deeply, as in Figure N ° 34, the degree of seasonal influence of the discharge on the management area mentioned.

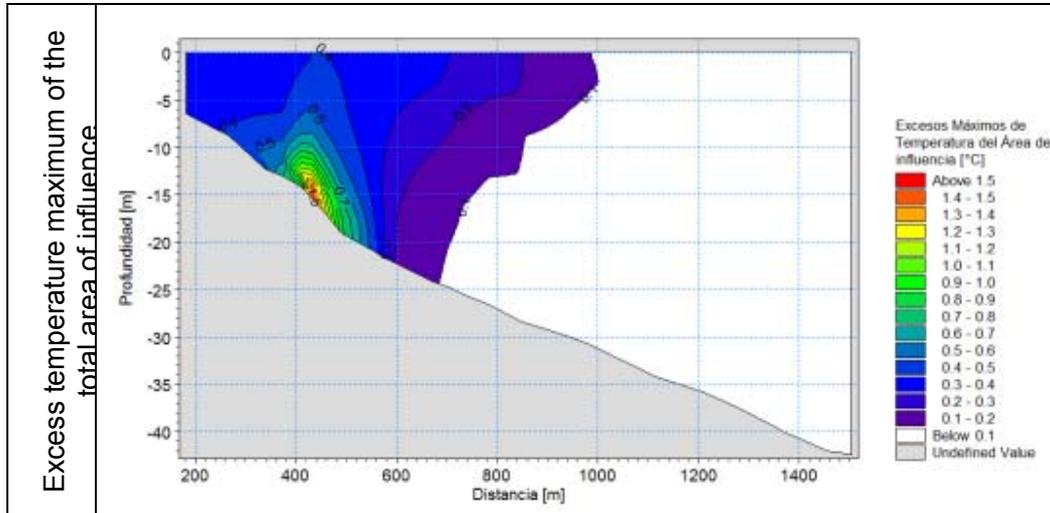
**Rexposed:**

The holder welcomes as requested, and below was the same cut of Figure N ° 34 cited in the question, for each condition of favorable wind to upwellingsinking and relaxation.

**Figure 3-4. Vertical profile of feather thermal for different conditions of winds, including the profile of the total area of influence.**







With regard to the AMERB B of San Marcos,

- In p. 3-3: table 3-2, shows that the minimum speed recorded was 0.4 m/s, however, there is a clarification for the percentage of calm where it is considered a less than 0.5 m/s wind speed. It should be noted that, in section 2.1.3 (Chapter 2 of annex 3), winds with less than 1 m/s medium magnitude, were regarded as calm. In this regard, the owner must clarify founded way, what are the criteria to define the magnitude as calm. You must also submit modeling whereas the corresponding criteria.

**Answer:**

The owner welcomes observation and corrected as requested in Annex 3-1.1 Baseline marine environment.

- On page 3-4: it is mentioned that the maximum hourly wind speed recorded is 11.9 m/s, however, there is no graphic of hourly distribution of winds. Therefore, you must submit this information.

**Answer:**

The owner welcomes observation and corrected as requested in Annex 3-1.1 Baseline marine environment.

- **3-4 page: mentioned that the wind has predominant directions S, SSE, SSW and SW components, that and WSW, however, in table 3-2 and Fig. 3-2, shows that the predominant directions are 3 (S, SSE, SSW). In this regard, it should be clarified founded way this incongruity.**

**Answer:**

The owner welcomes observation and corrected as requested in Annex 3-1.1 Baseline marine environment.

- **On page 3-95: where it says: "is presented in figure below a collection of notable tsunami that occurred in the I Región of Tarapacá coasts... ", you should say:"in table " 3-1.18, presents a collection of notable tsunami that occurred off the coast of the I Region of Tarapaca... "**

**Answer:**

The owner welcomes observation and corrected as requested in Annex 3-1.1 Baseline marine environment.

- **On page 3-1.127: Mention that the study was subjected to inspection and review by the SHOA. Therefore, it must present copy of the works Inspection Act and respective resolutions where "Oceanographic value" studies are approved.**

**Answer:**

The holder receives the request and presented in Annex 3-3 a copy of minutes of inspection staff SHOA generated during the summer (Act N ° 5/2014) e winter (Acta N ° 13/2014). It is noteworthy that the authorization of the work consists in the SHOA resolution N ° 24-13270-606 of the 30 of August of 2013.

- **On page 3-1.127: Refers to methodologies and analysis for the characterization of the dynamic coastal was carried out pursuant to**

**the publication of SHOA N ° 3201 (Oceanographic instructions N ° I, Technical specifications for measurements and oceanographic analysis, 3' Edition, 2005). However, this publication, States in section 3.3.1.6 than the monitoring of currents must be both in summer and in winter. Therefore, must be the campaign missing winter, or in their absence, the official document where the SHOA authorized changes in seasonal campaign (spring - fall instead of summer - winter).**

**Answer:**

The holder receives the request and eAnnex n 3-1.1 This Addendum N ° 1 surrenders to the baseline Marina on the physical oceanography that characterizes the environment of the project in a winter campaign, thus delivering background complementary to already reported in the baseline presented along with the EIA of the project at its annex 3.2 with the spring campaigns 2013, 2014 summer and fall 2014, realizing the maximum seasonal variability. In addition, in annex 3-1.1.2 surrenders to an intensive study of planktonic in Caleta area communities San Marcos, for identifying the richness and specific abundance of plankton in the study area.

However, stands out to the Pub. SHOA 3201 does not apply to the given evaluation project that this not related to article no. 13 of the regulation of maritime concessions.

- **On page 3-1.133: Should be added to table 3-24 a column with the direction of the currents to make it consistent with the title of the table. There is also an error in table 3-24, closed caption since says "Spring campaign" in all rows.**

**Answer:**

The owner welcomes observation and corrected as requested in Annex 3-1.1 Baseline marine environment.

- **On page 3-1.150: Correct last paragraph where it says 3-5, table it should say table 3-28.**

**Answer:**

The owner welcomes observation and corrected as requested in Annex 3-1.1 Baseline marine environment.



- **On page 3-1.152: Corrected the names of the chemical parameters that appear in the second part of table 3-28.**

**Answer:**

The owner welcomes observation and corrected as requested in Annex 3-1.1 Baseline marine environment.

- **In the PAG. 13-50: the owner makes, in the pagma cited and in several chapters of the EIA, reference to the guide of the CONAMA on marine waters; in this regard, clarifies that holder as indicated in article 11 or the 19,300 law, Foundation Law of the environment, and its amendment law 20.417, to assess adverse effects on the quantity and quality of renewable resources including soil water and air, shall be considered quality and emission regulations and in the absence of such standards, the current will be used as a reference in the States indicated in regulation of the system of environmental assessment (D.S)N ° 40/2013). Given this scenario, the owner not be used as a parameter of comparison guide CONAMA since it is not and does not represent a high standard of environmental quality. In this regard, must present a valid reference and comparison with this analysis.**

**Answer:**

Article 6 Letter "(d) of the rules of procedure of the SEIA expressly designates concerning the evaluation of significant adverse effects on natural resources, that:"*In the absence of such rules (secondary quality standards)standards in States that are designated in article 11 of this regulation will be used as reference. **Where it is not possible to evaluate the effect according to the above, shall be deemed the magnitude and duration of the effect generated by the project or activity and its relationship with the baseline condition on the biota.***"

In this sense, is considers that the period requested, i.e. use of referential way a high standard of environmental quality in another State, is not appropriate from a technical point of view for this case in particular, as such secondary rules aware of specific environmental conditions and, as such, are applicable to own part of territory of the natural resourcesthe States (listed in article 11 of the regulation) that sets themn and you want to protect.

Indeed, a high standard of environmental quality should give account of the specific conditions of the portion of territory regulated, whereas the characteristics of the medium,

the species of flora and fauna present in the portion of territory and their sensitivities, as also the existence of other productive activities which have impact on the environment, among others. As a result, a high standard of environmental quality is site-specific and, as such, could hardly be used as a reference in care of the different conditions prevailing in another portion of territory, as it is here, in the Bay Chomache.

This is consistent with environmental assessment approach employed by the owners of projects that include discharges to the marine environment in the Region of Tarapacá in recent years.

In this respect and important considering that the Tthe project itular has developed appropriate baseline studies marine environment for the four seasons of the year and specific to the area of influence Tarapacá mirror project. Then, in this respect it has considered the CONAMA guide as a reference parameter for the evaluation of impacts, and hasn carried out studies and modeling associated with discharges to the marine environment for the four seasons of the year considering the hydrodynamic characteristics and meteorological serviceown Bay as Chomache.

With the above noted that attended that (1) There is a high standard of environmental quality for the region of Tarapaca or less this coastal sector (Bay Chomache), or (2) the secondary rules in the States listed in article 11 of the regulation of the SEIA are not useful from a technical point of view environmental in assessing the significance of the impact, Tarapacá mirror has made all the necessary studies to identify and adequately assess the impacts of the project on the receiving environment, in compliance with provisions in Article 6 (letter d) the regulation of the SEIA. These studys they have been duly presented to the EIA and complemented with attachments to the present Addendum to the EIA of the project "Espejo de Tarapacá".

In this regard, it is relevant note that international guidelines of the financial International Corporation of the World Bank (IFC for its acronym in English) in the field of environmental impact assessment for downloads, in particular plants thermal power greater than 1. 200MW, recommended to evaluate impacts the use of mathematical or fisico-hidrodinamicos from the pen of dispersion models, such as took place in this case.

**3.12. With respect to the measured parameters to determine the quality of the water, sediments and biota in the study area (table 3-28, 3-30, 3-31 and 3-32), the owner must present the breakdown of the values recorded for each sampling station and certificates of the respective laboratory analyses Hydrolab to the (credited under the) NCh 17.025/of.2005) mentions that in the EIA.**

**Reposed:**

The holder receives the request and presents II reports testing and chemical analysis lab Hidrolab in Annex 3-4. In particular, as requested by the reviewer on the disaggregated data, all the data provided on the baseline presented along with the EIA (three years), the current corresponding to the baseline winter 2014, is broken down and accompanied by sampling, and in the case of broken down water quality station also by depth in the water column with their respective average and standard deviation. Despite the above, in this Addendum also provides in tabular way in electronic form all the data broken down by campaign, station and for the entire array of analytes informed by laboratory Hidrolab and evaluated in this baseline (see annex 3-1.1).

**3.13. In relation to the description and textural classification of subtidal marine sediments (table 3-29), shall submit the diameter information medium (medium CP) particle on scale of millimeters (mm).**

**Reposed:**

The holder receives observation and se abstracts, relative to the subtidal granulometry added as requested in the tables. Specifically in the table VIII of Chapter 3 that is attached in the annex 3-1.1, in that joined the diameter middle and phi unit selection and mm.

**3.14. Although the incumbent performs comparisons of the parameters measured in the column of water, sediments and biota of the area of study, with the maximum limits described in D. S. 90/2000 "Emisión Norma for the regulation of pollution associated with the discharge of" the liquid waste waters marine and continental surface", in the "Guide CONAMA for the establishment of the standards secondary of quality environmental for waters continental surface and marine", and with other national and international standards (i.e. Canada, Mexico, Australia, USA), the proprietor shall:**

- **Comparative analysis (tables summaries) where are incorporated, the maximum permissible limits of national and international standards used in the present EIA, such way to double-check each of the parameters described for the different analyzed matrices (water, sediments and Biota) with the rules used by the holder**

- Reasonably justify the use of these international standards of reference for each respective case
- Come with a complete and current copy of such standard.

**This, as indicated in article 11 ° of Supreme Decree 40/2012 "Regulation environmental assessment system", where notes that it must prioritize the referential rules of that State which has similarity in their environmental components, with the situation national or local, and that situation must be reasonably justified by the proponent, in addition to accompany a complete and current copy of such standard.**

**Answer:**

The owner explains that, as established in the D.S. N ° 90/00, liquid wastes are defined as "those waters that are downloaded from a source to a receiver body"<sup>7</sup>, at the same time defining a source as a settlement discharging liquid waste to one or more water bodies, as a result of its process, activity, or service, with a pollutant load average daily or higher in one characteristic value or more of the parameters presented in table "Establishment issuer" of article 3.7 of the aforementioned Decree<sup>8</sup>.

In relationship to the above, Download of the project has not been described even as source by resolution Former (SMA) N ° 117/13, as amended by resolution Former (SMA) N ° 93/14 that "teaches and instructs rules of a General nature on procedure of characterization, measurement and Control of" Industrial waste liquids". As soon as will qualify the download, will be met fully the parameters indicated.

In relation to international documents cited in the question, the owner clarifies they have different legal nature, corresponding mainly to guides and analysis methods for laboratory, used for the development of the baseline of the impact assessment. El detail below:

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<sup>7</sup> Título 3: Definiciones, Artículo 3.10 D.S. N°90/00.

<sup>8</sup> Título 3: Definiciones, Artículo 3.7 D.S. N°90/00.

**Table 3-4. Standards and guides related with parameters between marine.**

Documents	Type	Country	Comment
Interim Marine Sediment Quality Guidelines	Guide	Canada	"This guide is clear of the"Protocol for the Derivation of Canadian Sediment Quality Guidelines for the Protection of Aquatic Life", so the"Interim Marine Sediment Quality Guidelines"as such corresponds to table 2 of the" file"Sediment Summary Table".
Regulation 221/2002 of the Commission of European communities in Mexico	Standard	Mexico	This standard establishes a limit with respect to the lead 1.5 mg/kg of fresh meat of bivalve molluscs and in relation to the 0.5 cadmium mg/kg of fresh meat for crustaceans. Latest available version is attached. This standard was used to compare the laboratory results.
Guidelines for application of IUCN list criteria at regional and national levels	Guide	International	To verify if an animal is in condition or in the "red list" of the International Union for the conservation of nature (IUCN), the query It is directly from their website. They are attached the "guidelines for the application the criteria of the list of the IUCN regional and national" IUCN is an international organization of wide recognition in matters of nature conservation. These guidelines were used to strengthen the work of base line of the EIA.
Standard Methods for the Examination of Water and Wastewater, 21st Edition 2005	Test method for laboratory	USA	Since 1905, the document <i>Standard Methods for the Examination of Water and Wastewater</i> He has represented "the best current practice of analysis of water in United States" This reference document covers all the techniques of analysis of water and liquid waste. <i>Standard Methods</i> ES a publication Joint of American Public Health Association ( <a href="#">APHA</a> ), the American Water Works Association ( <a href="#">AWWA</a> ), and the Water Environment Federation ( <a href="#">WEF</a> ). <sup>9</sup>

<sup>9</sup> <http://www.standardmethods.org/>

Documents	Type	Country	Comment
EPA - Test methods for evaluating Solid Waste SW-846	Test method for laboratory	USA	It is a compendium of methods of analysis and sampling used for line base. Latest available version is attached.

In annex 3.9 accompanied the current copies of each one of international documents mentioned above.

**3.15. In relation to the study area planktonic component holder points out that: the abundances of organisms meroplanktonicos as holoplanktonic They showed signs of a State of progression of an event of upwelling at the time of sampling, where the flow of energy and biomass has been evidenced by low nutrient levels, indicating a greater biomass phytoplankton, which translates into high abundances of the various components of the zooplankton, leaving in evidence the Trophodynamics of the studied system".**

**In this regard, the holder must provide the information of biomass zooplankton (g/m<sup>3</sup>) registered for the catches in each campaign (day/night), both for the area of influence of the project site located to the South of the area. The above, given the important of this biological parameter as a natural contribution of the concentrations of M.O.T both the water column and sediments of the study area.**

**Reposed:**

The zooplankton data reported on the line of single base shows values of density expressed in number of individuals per m<sup>-3</sup> which corresponds to the usual format of delivery of this information. In These studies did not quantify the moist biomass of the community zooplankton due mainly to the effort in the baseline is She focused to determine distribution patterns of coastal of the density of individuals both in the horizontal component as well as the vertical. No However, the estimation of wet biomass zooplankton expressed in grams m<sup>-3</sup> will be incorporated in the PLAN vigilancia Environmental marine environment of the project. (See annex 5-1 of this Addendum).

**3.16. In relation to the annex 3.2: marine environment baseline, the holder shall submit the following background which are referred to in that annex, and which were not incorporated into the EIA:**

- **Appendix 1.1 permits and authorizations**
- **Appendix 2.1 Data Report Oceanography Physics**

- **Appendix 3.1 certificates of the analytical laboratory.**

**Reopened:**

The holder receives the request and advises that this information is available in the annex 3-1.1 Baseline Marine environment of the Project.

**3.17. In relation to the annex 3.2 - Chapter 2: line Base Marina - Oceanography Physically, the holder must:**

- **On p. 42: correct titles in results, campaign of spring, "condition Lunar Syzygy-18 October 20! 3 - reflux", should read "condition Lunar Syzygy-October 18, 2013 - Llenante"**
- **On p. 64: must demonstrate technical and founded the why the study of dispersion with chemical tracers (rhodamine WT), was carried out only under conditions of quadrature lunar, in three measurement campaigns (spring-summer - autumn).**

**Reopened:**

The owner explains that el study of dispersion was carried out effectively under the indicated condition, low that criterion in the lunar condition of quadrature is minimum amplitudes of the tide and, therefore, was to be expected that the dynamic of the place was also lower. This scenario is most unfavourable from an environmental point of view, because it reduces the product of a lower dynamic natural dispersion. Updated modeling report is presented in annex 1-6.

**3.18. In relation to the annex 3.2 - Chapter 3: line Base Marina - Oceanography Chemistry:**

- **The baseline of the project does not incorporate information matrices chemical, physical and biological (communities) of the outcrop of the sea water intake point. In this regard, the holder must present such information in detail**

**Answer:**

The holder receives the request and presents the information requested in Annex 3-1.1 Baseline marine environment of the present Addendum. Along with the above, is presents en Annex 7-1 the Report description biological and chemistry in the area of the intake.

- **The holder must submit all of the limit of analytical detection for chemical parameters monitored in the water column, sediment and biota matrices (*Concholepas concholepas*)**

**Answer:**

The holder receives the request and reports that in Annex 3-4 Chemical testing Hidrolab of the present Addendum N ° 1, chemical testing reports are delivered provided by laboratory Hidrolab on the environmental matrix requested, four seasonal campaigns carried out in the area of the marina in the project baseline. In the following table are delivered with regard to detection limits applied to different test matrices according to informed reference method in the certificates.

**Table 3-5. Ldetection imites.**

Parameter	Method	LD	Unit
<b>MATRIX: SEA WATER</b>			
Chlorides	Method Argentometrico	3.00	mg Cl/L
Sulfate dissolved	Gravimetric with ignition residue	5.0	mg SO4/L
Dissolved aluminum	ICP	0.010	mg to the / L
Dissolved arsenic	E.a.Atomica with continuous hydride generation	0.001	mg as/L
Calcium	ICP	0,200	mg Ca/L
Dissolved cadmium	ICP	0.001	mg Cd/L
Dissolved chromium	ICP	0.005	mg Cr/L
Dissolved copper	ICP	0.005	mg Cu/l.
Dissolved iron	ICP	0.002	mg fe/L
Dissolved mercury	E.a.Atomica with cold vapor generation	0.001	mg hg/L
Dissolved manganese	ICP	0.001	mg Mn/l.
Dissolved nickel	ICP	0.005	mg Ni/L
Dissolved lead	ICP	0.010	mg Pb/l.
Dissolved selenium	E.a.Atomica with continuous hydride	0.005	mg be / L

Parameter	Method	LD	Unit
	generation		
Vanadium dissolved	ICP	0.008	mg l
Dissolved zinc	ICP	0.002	mg Zn/L
BOD5	Membrane electrode	2	mg/L
Alkalinity	Titration method	1.0	mg CaCO3/L
Conductivity	Potentiometry	1.00	us/ cm
Organic matter	Gravimetric method with ignition at 550 ° C	5.0	mg/L
Settleable solids	Volumetric	0.1	ml/L
Total suspended solids	Gravimetric	5.0	mg/L
Turbidity	Nephelometric	0.20	UNT
Coliforms Fecal	Multiple tubes	1.8	MPN/100 ml
<b>MATRIX: MARINE SEDIMENTS</b>			
Sulfate	Gravimetric	1.00	mg SO4/Kg
Aluminum	ICP	0.010	mg to the / Kg
Arsenic	E.a.Atomica with continuous hydride generation	0.001	mg as/Kg
Cadmium	ICP	0.001	mg Cd/Kg
Chrome	ICP	0.005	mg Cr/Kg
Copper	ICP	0.005	mg Cu/Kg
Iron	ICP	0.002	mg fe/Kg
Mercury	E.a.Atomica with cold vapor generation	0.001	mg hg/Kg
Manganese	ICP	0.001	mg Mn/Kg
Nickel	ICP	0.005	mg Ni/Kg
Lead	ICP	0.010	mg Pb/Kg
Selenium	E.a.Atomica with continuous hydride generation	0.005	mg be / Kg

Parameter	Method	LD	Unit
Vanadium	ICP	0.008	mg w/Kg
Zinc	ICP	0.002	mg Zn/Kg
<b>MATRIX: FABRIC HYDROBIOLOGICAL RESOURCES</b>			
Arsenic	E.a.Atomica with continuous hydride generation	0.001	mg as/Kg
Cadmium	ICP	0.001	mg Cd/Kg
Chrome	ICP	0.005	mg Cr/Kg
Copper	ICP	0.005	mg Cu/Kg
Iron	ICP	0.002	mg fe/Kg
Mercury	E.a.Atomica with cold vapor generation	0.001	mg hg/Kg
Lead	ICP	0.010	mg Pb/Kg
Zinc	ICP	0.002	mg Zn/Kg

Source: elaboration of the consultant based on reported by lab Hidrolab those who do reach to the limits of detection of the matrices sediment and biota affect the weight taken for each sample.

- **The holder must enter the geographical coordinates of the points of sampling for parent water, sediment and marine communities in the area intertidal, and subtidal**

**Answer:**

The bicycletor welcomes observation and points out that the requested information was added in the coordinates of each section of the marina baseline tables. See Annex 3-1.1 Baseline marine environment.

- **In relation to stated at p. 56: always specify founded why copper (Cu) in subtidal sediments was measured only in two seasons (summer and fall) in contrast to the other selected metals, which were measured in three seasonal campaigns carried out**

**Answer:**

The owner explains that the element copper in marine sediments was actually measured in three seasonal campaigns informed by the EIA (2013 spring, summer and fall 2014), however, the condition of spring was not informed promptly by the analytical laboratory, condition that is corrected and integrate these results to the analysis carried out during winter on est complementary campaign biological matrix (see annex 3-1.1 Baseline marine environment) Chemical Oceanography winter 2014 campaign, which integrates the results requested, giving also the respective trials reports of the analytical laboratory.

- **In relation to stated at p. 56: must be corrected in the second paragraph the unit of measure used for copper (Cu), where it said 18.7 mgCu/ mg and 108 mgCumg, should say 18.7 mgCu/Kg and 108 mgCu/Kg**

**Answer:**

The holder receives the request and corrected as requested.

- **In relation to stated in p. 79: should be clarified so established the fact that in paragraph 3.5 methodology section, says that the chemical quality of the sediments was evaluated only during the summer campaign, given that in the results section the X table incorporates the basic statistics of the chemical quality of both campaigns (summer and fall).**

**Answer:**

The holder receives the request and the next item is corrected as requested. Clarifies that the quality of sediments intertidal We evaluated effectselectively in summer and fall 2014. This information was supplemented with the physical characterization and chemical of this matrix environmental condition of winter 2014 which is presented in the annex 3-1.1. Along with the above, in annex 3-4 reports of assay and chemical analyses are presented by Hidrolab.

**3.19. The hydrogeological characterization of the area where is located the project, in particular for the area of reservoirs and underground deeds, must present an analysis in depth in order to know exactly the behavior of water underground and to assess possible impacts or relationships with the works that considered the project.**

**Answer:**

The owner clarifies that, as was indicated in section 3.2.3.2 of the CChapter 3 of the Base line of the EIA, the sector corresponding to the area where the project is located is presented with impermeable formations, i.e. zero permeability and on the other hand, lack of groundwater sweets.

To confirm the above, has been made a hydrogeological characterization of the reservoir area, based on local, geophysics geology of refraction seismic, permeability in drilling and testing of infiltration pits.

According to the obtained results, it was found that in the area of reservoirs, sedimentary fills are presented as flooring laminates, compact, with contents of salts present in surface and depth, characteristic of the presence of an old salt, and that there is a napa of groundwater, which is shown because the witnesses of the perforated drilling not accused the presence of water. The detail of the hydrogeological characterization, with the information used, is recorded in the Annex 3-5 Characterization Hydrogeological This Addendum.

**3.20. In relation to atmospheric characterization, the holder must justify and technically prove the validity of the information generated by the weather station located in the central, distant 40 Km. North of facilities of the project. The above, also bearing in mind that this station would not be rated population representation.**

**Answer:**

The holder clarifies the fact that the Central Interior station is not rated as population representation, does not indicate that the meteorological data have no validity, since population representation corresponds to a term used in the stations of monitoring of air quality. Therefore, the use of these data is valid.

While the station called Central Interior is located 40 km from the project area, the reason which used data from this station is that corresponds to one of the stations closest to the project area with information available more recent and robust, it has more than two years of data.

Additionallythe licensee rectifies weather information previously provided through the use of the information generated by the Geophysics Department of the University of Chile for

the Ministry of energy, available through wind energy Explorer<sup>10</sup> which has weather data for the full year 2010. Wind power is a tool of analysis of resource wind, which delivered results of a numerical simulation of conditions of wind and air density, of graphics and convenient way for the user. These simulations were carried out by the WRF model (Weather Research and Forecasting), an advanced model, widely used to analyze the wind resource in the world.

### **Meteorological characterization of the project area**

#### Overview

Winds at all levels characterized show well-defined predominant direction: SW, in the case of the coast sector; W in the Sector Plateau and W in the Pampa Sector, in all cases with a frequency of about 25% of the time. The three sectors showed a similar, fluctuating between the 2.38 and 2.88 m/s average speed. In the sectors where most of the work on the project will concentrate, presented a good dispersal ability, since the percentage of calm is low (between 4.05 and 5.25% of the time).

#### Methodology

The characterization of the meteorology of the sector was carried out through the extraction of information generated by the Geophysics Department of the University of Chile for the Ministry of energy, available through the browser of wind energy, which has with meteorological data for the full year 2010. In the Table 3-6 indicates the points in which the meteorology is characterized.

**Table 3-6. Location of the marked points (UTM WGS84).**

Sector	Coord. UTM This	Coord. UTM North	Height (masl)
Coast (marina takes)	383.687	7.665.718	41
Plateau (reservoir)	386.806	7.666.302	600
Pampa (substation)	427.814	7.698.158	947

<sup>10</sup> <http://walker.dgf.uchile.cl/Explorador/Eolico2/>, vientos a 5.5 m, visitada por última vez el 1 de diciembre 2014.

**Figure 3-5. Location of the marked points**


## Results

### Sector Costa (takes marina)

In the Table 3-7 indulge in the meteorological variables obtained on the coast Sector by the year 2010.

**Table 3-7. Variable meteorological Sector Costa (year 2010)**

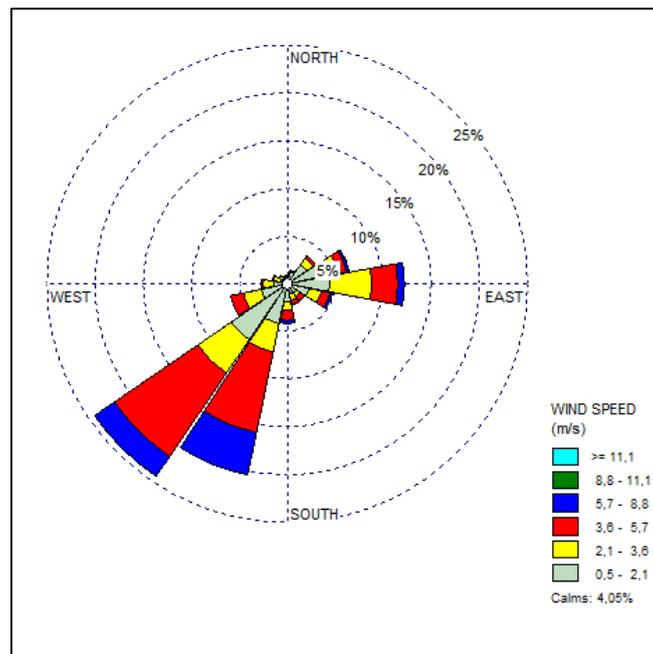
Variable	Value
<b>(M/s) wind speed</b>	
Average period	2.88
Maximum value	10.0
Minimum value	0.00
Percentage of calm <sup>11</sup>	4.05

<sup>11</sup> Porcentaje de calma: porcentaje del tiempo en que la velocidad del viento es menor a 0,5 m/s.

Variable	Value
<b>WIND DIRECTION</b>	
Predominant directions	SW (24.29%), SSW (20.40%), E (12.21%)

The Figure 3-6 It presents the wind rose accumulated for the period for the period corresponding to the year 2010.

**Figure 3-6. Rose of the winds Sector Costa**



Source: Own elaboration - Sector Costa.

The winds are predominantly well defined direction for the registration period, presenting average of 2.88 m/s speed and 4.05% of calm. The fact that the percentage of calm is low, indicates that the air in the area shows dispersion capacity. The maximum hourly wind speed recorded for this period is 10.0 m/s.

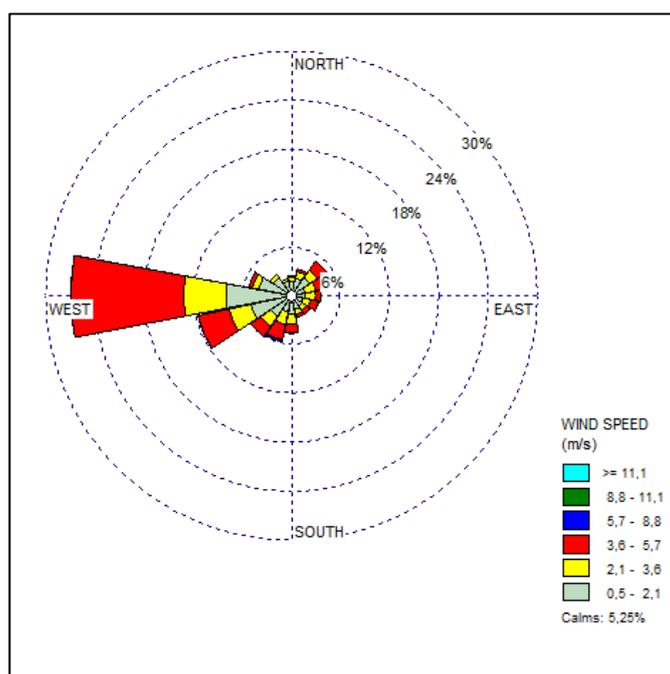
#### Sector plateau (reservoir)

In the Table 3-8 indulge in the meteorological variables obtained on the plateau Sector by the year 2010.

**Table 3-8. Variable meteorological Sector plateau (year 2010)**

Variable	Value
<b>(M/s) wind speed</b>	
Average period	2.38
Maximum value	8.0
Minimum value	0.00
Percentage of calm <sup>12</sup>	5.25
<b>WIND DIRECTION</b>	
Predominant directions	W (26.87%), WSW (11.71%), SW (6.15%)

The Figure 3-7 It presents the wind rose accumulated for the period for the period corresponding to the year 2010.

**Figure 3-7. Rose of the winds Sector plateau**


Source: Own elaboration - Sector plateau.

<sup>12</sup> Porcentaje de calma: porcentaje del tiempo en que la velocidad del viento es menor a 0,5 m/s.

The winds are predominantly well defined direction for the registration period, presenting average of 2.38 m/s speed and a 5.25% of calm. The fact that the percentage of calm is low, indicates that the air in the area shows dispersion capacity. The maximum hourly wind speed recorded for this period is 8.0 m/s.

Sector Pampa (substation)

In the Table 3-8 indulge in the meteorological variables obtained in the Pampa Sector by the year 2010.

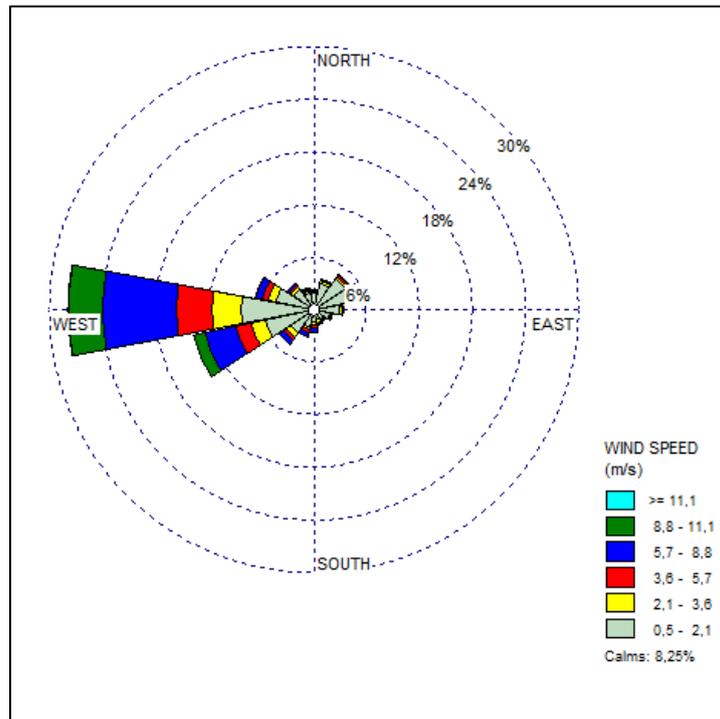
**Table 3-9. Variable meteorological Sector Pampa (year 2010).**

Variable	Value
<b>(M/s) wind speed</b>	
Average period	2.87
Maximum value	11.7
Minimum value	0.00
Percentage of calm <sup>13</sup>	8.25
<b>WIND DIRECTION</b>	
Predominant directions	W (27.82%), WSW (13.93%), WNW (6.84%)

The Figure 3-8 It presents the wind rose accumulated for the period for the period corresponding to the year 2010.

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<sup>13</sup> Porcentaje de calma: porcentaje del tiempo en que la velocidad del viento es menor a 0,5 m/s.

**Figure 3-8. Rose of the winds Sector Pampa**


Source: Own elaboration - Sector Pampa.

The winds are predominantly well defined direction for the registration period, presenting average 2.87 m/s speed and 8.25% of calm. This sector has one percentage of calm more than other sectors, while there are speed values higher (in the range of 8.8 and 11.1 m/s). The maximum hourly wind speed recorded for this period is 11.7 m/s.

**3.21. With respect to air quality, the owner has considered for the evaluation of the air quality records of monitoring the air quality of the network of the Central thermoelectric Tarapacá (Celtic), stations that do not have population representativeness and even one of them is located in industrial area, subject to agreement between private, whose purpose is to determine whether there are effects on the quality of salt. Therefore, only stations of maximum impact and landfill of ash, could be reference to the evaluation of the quality of the air of the present environmental impact assessment. Additionally, the representativeness of stations is 2 km to the round and the nearest point of the project is idyllic 30 km of**

**the network of Celtic. For all of the above, the holder must present the background allowing to justify its application for the evaluation of the quality of the air in this EIA.**

**Answer:**

The holder receives observation and rectifying previously presented, discarding the results of the station called "Saline Punta de Lobos", so only maximum Impac stationsto and dump of ashes will ben reference for the characterization of the quality of the air of the present environmental impact assessment.

On the other hand, the owner welcomes observation and recognizes that given the distance between stations considered and the area of the project, the information presented may not be representative of the current state of the quality of the air in the sector of the project. The use of this information is that the project area does not have other sources of information available and that the nearest corresponds to the registered in the network of the Central thermoelectric Tarapacá, so it should be considered in a referential manner , taking into account that it could correspond to the stage more withervador, given the lack of other sources in the environment of the project.

**3.22. The holder must submit both meteorology and material databases particulate that were used in the model. For the latter, the data must be submitted so that they can be easily visualized by station. Similarly you must submit the spatial patterns of wind in the geographical context of the modeling, using wind maps, where the wind must be presented in magnitude and direction.**

**Answer:**

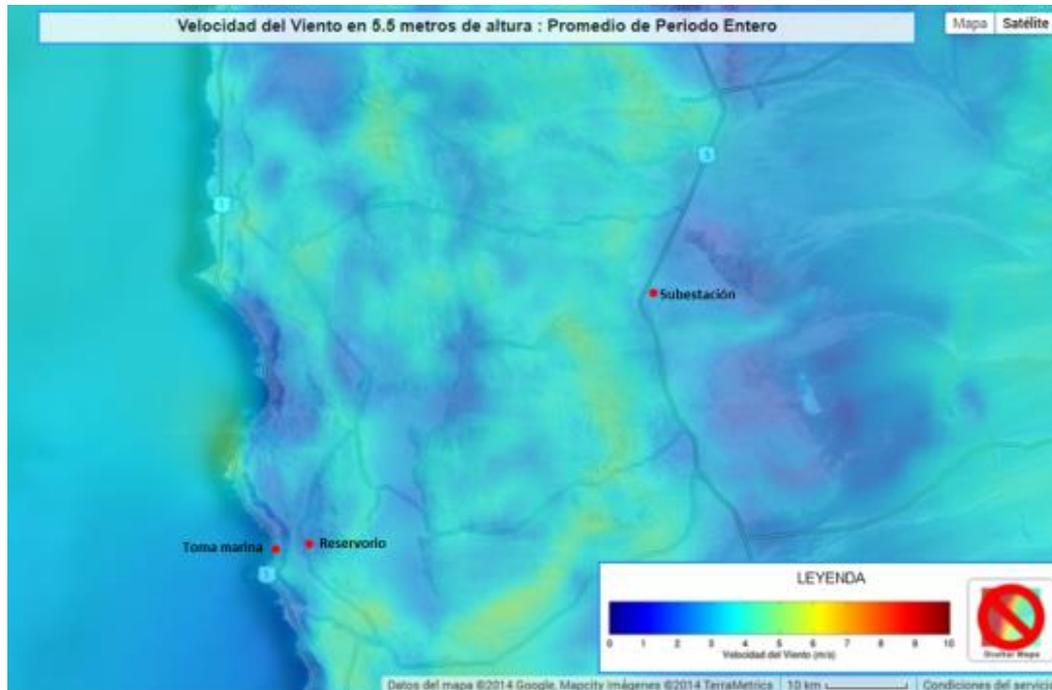
The holder clarifies that in relation to meteorological data, as indicated in the response 3-20 of this Addendumused data generated by the Geophysics Department of the University of Chile for the Ministry of energy, available through wind energy Explorer<sup>14</sup>which has weather data for the full year 2010.

In the Figure 3-9 shows the magnitude of the wind in the area of the project.

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<sup>14</sup> <http://walker.dgf.uchile.cl/Explorador/Eolico2/>, vientos a 5.5 m, visitada por última vez el 1 de diciembre 2014.

**Figure 3-9. Magnitude of the wind in the sector of the project**



In relation to the direction of the wind, please refer to the answer of the question 3.20.

For the evaluation of the effects of the project on air quality has been made an estimate of the emissions, based on the document "Guide for the estimation of atmospheric emissions of the real estate projects for the Metropolitan Region" developed by the itMinisterial Regional creteria ofl Environment RM)January, 2012). It should be noted that these emissions will be localized and its duration will be limited to the period of the rating of the work on the project.

**3.23. In relation to the measurement of noise, in the figure 3.6 identify location of noise measurement points, points 6,7 and 8 in the dry river Cove. In this regard, it must be noted in detail to what facilities belong.**

**Rexposed:**

The licensee advises that in the EIA, Annex 4.2, TAbLa 7, arose the location and description of the measuring points. In particular, the point 6 corresponds to the cemetery of Caleta Río Seco, while paragraphs 7 and 8 correspond to houses of Caleta

Río Seco. Then comes the detailed description, an image with the spatial location and a photo of each of the designated points of measurement record.

**Table 3-10: DeScription and spatial location, point 6.**

Location	Dry river Cove cemetery.	
Point	6	
Effective use	Cult	
UTM coordinates	Datum WGS84	Spindle 19 K
	This	North
	379784	7677750

**Expanded view of the point of measurement and photographic record.**



**Table 3-11: DeScription and spatial location, point 7.**

Location	Housing of a floor, high sector Caleta Río Seco.	
Point	7	
Effective use	Residential	
UTM coordinates	Datum WGS84	Spindle 19 K
	This	North
	379455	7677542

**Expanded view of the point of measurement and photographic record.**

**Table 3-12: DeScription and spatial location, point 8.**

Location	1 story dwelling, located in Caleta river dry low.	
Point	8	
Effective use	Residential	
UTM coordinates	Datum WGS84	Spindle 19 K
	This	North
	379295	7677568

**Expanded view of the point of measurement and photographic record.**


**3.24. The owner of the project, even though it includes information on the baseline of the human environment, this is not sufficient in relation to the average human indigenous, which without prejudice to not identify as complete, in its anthropological dimension of high voltage line , in the EIA reports "that there is room for indigenous people, but whose traces, could be used by human groups for the development of economic activities, extensive use of space as the goat livestock". This information is insufficient to determine the presence of current or historical protected population, proximity to the territories used or in use, sites of cultural significance, etc., in the area of influence of the project.**

**Foregoing, the holder must submit a detailed environmental technical background, associated with all the works of the project, including the access roads to the project, transmission line as well as the description of the commune of pit Almonte, in relation to the line of transmission, with regard to:**

- **Indigenous lands**
- **Areas of indigenous development**
- **Organizations and indigenous groups that are located within these areas, determining:**
  - a **location of the indigenous group of people in terms precise and geo-referenced**
  - b **number of indigenous and members of these human groups designated location**
  - c **type of activities carried out by the indigenous groups and indigenous organizations**
- **Natural resources and in particular water resources, determining:**
  - a. **rights of use of waters and the nature of the right**
  - b. **Description places of uptake of water, form and method of extraction, etc.**
  - c **background on scarcity and abundance of water resources.**
- **Sites of Cultural significance.**

**You must also submit an assessment of the effects, features and/or circumstances of article 11 of the 19,300 law, with its corresponding measures of mitigation, compensation or repair them, where appropriate.**

**Reposed:**

In this regard, it is important to indicate that the appointment referred to in the comment made by the authority does not appear in the chapter 3 of baseline of the EIA of the project

mirror of Tarapaca, the quotation corresponds to 2.4 title identification of those elements that might be affected, Chapter 2 definition and justification of the Area influence of the EIA (page 2-13), which is quoted below:

*""The project will be located close to human settlements, such as Caleta Rio Seco and Caleta San Marcos. On the other hand, there are sectors adjacent to areas of development of physical works of the project (high-voltage line) which do not have room for people, but that could be used by human groups for the development of economic activities in extensive use of space as the caprine livestock.*

*In addition the project considers the provision and use of a camp of workers of the project.*

*In the project area communities or Areas of indigenous development are not identified, indigenous groups were not identified.""*

In this regard, it should be noted that in the EIA was brought the information to prove that indigenous people groups to maintain traditions, customs, activities of their worldview or to maintain a relationship does not live within the project area ancient with the area's natural resources.

Yet, the owner welcomes observations and the necessary background to rule out the presence of indigenous population in the area of influence of the project, which complement the already provided in the EIA are then delivered. For these purposes, the answer is divided into each of the points required by the authority.

- **Indigenous lands**

Do not identify lands of this type in the area of development of the project or in its area of influence for half human, according to the data collected in field and secondarily.

The area of influence was presented in the EIA, ch. 2, Section Half human:

**Table 3-13. Area of influence, half human**

Sector AI	Inclusion criteria	Human groups	Works	Buffer
Pampa and plateau areas	Surrounding areas to works and activities of the project, and development of economic activities and infrastructure.	Did not identify the presence of human groups; Yes activities related to mining, specifically the transfer of trucks, and the improvement of the route A-750 by the	Reservoir	1 km to the limits of the flood
			New road	100 metres on each side of the road
			LAT	200 meters on each side of the line

Sector AI	Inclusion criteria	Human groups	Works	Buffer
		MOP.		
Sector Costa	Works of the project near human settlements.  Human settlements near places defined for the accommodation of workers and with the presence of services and basic infrastructure.	Caleta which brings together a large number of mariscadores, fishermen and other divers engaged in the extraction and drying of huiro. On the other hand, in the areas of free access surrounding the Cove and the AMERB the transit of boats is observed working in these areas.	New road	100 metres on each side of the road
			Accommodation and provision of basic services for the camp	Caleta de San Marcos and dry river
			Construction of works for the operation of the project (activities, Pique, valves, pipes, engine room)	1.5 km from the boundary of the works

Source: Own elaboration.

So, specifically in the path of the project to the commune of Pozo Almonte, and according to the information presented in the baseline means human, was ruled out the presence of indigenous groups in the Pampa and plateau sector, as "the area does not count with" human settlements, due to the desert climate, for which the only present population is formed by the workmanship used in mining operations present in the area, such as Punta de Lobos, Kainite, mines TenarditaKLA, hope, Bernadette." (Page 3-509). The location of the facilities of these mines is in the Table 3-14 Location of economic activities and of roads, Area of influence, which is located on page 3-517 Chapter 3: Base line.

**Table 3-14. Location of roads, Area of influence and economic activities**

Name	UTM coordinates Datum WGS 84, zone 19 South		Approximate distance from the project (in meters)
	E	N	
Punta de Lobos	391729	7690200	5938
Tenardita	396095	7683439	2062
Kainite	390885	7689591	5613
Installing MOP (to November 28, 2013)	391512	7679074	560

Source: GAC

According to the voluntary register of indigenous lands of CONADI for the commune of Pozo Almonte, reviewed between 1997 and 2013, the closest land is located in Cologne painted, 25 km from the connection of the line of high voltage project substation I some. These lands are the following:

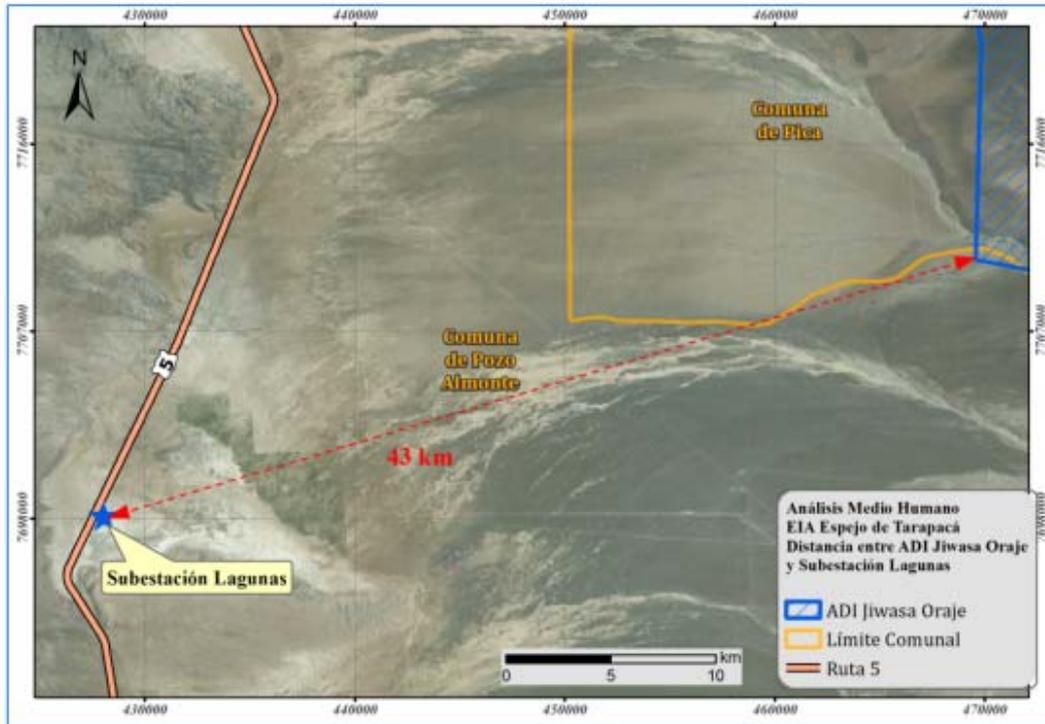
LOCALITY	BENEFICIARY NAME	ROLE	INSCRIPT CONSER. DOMAIN			INSCRIPT. REG. LAND	YEAR	AREA (m2)
			FJS	°	N YEAR			
Painted	Rosa Angela Cayo Esteban	4053-54	1490	1634	2004	222	2004	1,200
Painted	Patricia Yubitza Flowers bouquets	4053-56	1491	1636	2004	223	2004	1,200
Painted	Teofilo Toribio Ticuna Veras	4053-79	1492	1638	2004	224	2004	1,200
Painted	Orlando Silverio Ramos González	4053-63	1493	1620	2004	225	2004	1,200
Painted	Ana Elizabeth Esteban Gómez	4053-49	1494	1642	2004	226	2004	1,200
Painted	Yannet Yolanda Flores Ramos	4053-52	1495	1644	2004	227	2004	1,200
Painted	Zaida rose Lazarus Quispe	4053-53	1496	1646	2004	228	2004	1,200
Painted	Pink Angela Esteban Gómez	4053-60	1497	1648	2004	229	2004	1,200
Painted	Patricia Nora Cup Carlos	4053-66	1498	1650	2004	230	2004	1,200
Painted	Germán Mamani MAMANI	4053-62	1499	1632	2004	231	2004	1,200
Painted	Saint Gabriel Ramos Mamani	4053-58	1500	1654	2004	232	2004	1,200
Painted	Edwin Herculaneum Moscoso Challapa	4053-58	1501	1656	2004	233	2004	1,200
Painted	Framework Ruben Esteban Gómez	4053-72	1502	1658	2004	234	2004	1,200
Painted	Just Basilio Ramos Mamani	4053-77	1503	1660	2004	235	2004	1,200
Painted	Andres Fabian Esteban MAMANI	4053-55	1504	1662	2004	236	2004	1,200
Painted	Melanio Faustino Castro Vilches	4053-69	1505	1664	2004	237	2004	1,200

- **Areas of indigenous development**

In the area of influence of the component corresponding to the Project EIA mirror of Tarapacá human environment, identifies Areas of indigenous development, not so there is no affectation for this element of environmental susceptibility. The work or activity of the project closest to an Area of indigenous development corresponds to the connection of the electric transmission line with substation lagoons, commune of Pozo Almonte.

Therefore, it is possible to determine which Jiwasa Oraje is the indigenous development Area closest to works or activities of the project, finding distant 43.75 kilometers southwest of the polygon of the ADI Jiwasa Oraje on its closest to the project.

Figure 3-10. Distance ADI Jiwasa Oraje and Area of project development



For ease of reference, it is possible to point out that the aforementioned Indigenous Development Area is which "integrates part of the territory of the communes of" Colchane, Huara, Camiña Pica and Pozo Almonte in Iquique province, I Region of Tarapacá, between the following limits:

**North:** From the quebrada de Suca o NAMA, in the distance 1.266 meters above sea level, by the Sierra de Uscana, up to the border with Bolivia.

**This:** Limit with the Bolivian border.

**South:** Carcanol Diablo brand, by the streams of Sotcaya of caves and Noasa.

**West:** The path crosses by Office Mapocho, dimension 1130 and Río Seco".<sup>1516</sup>

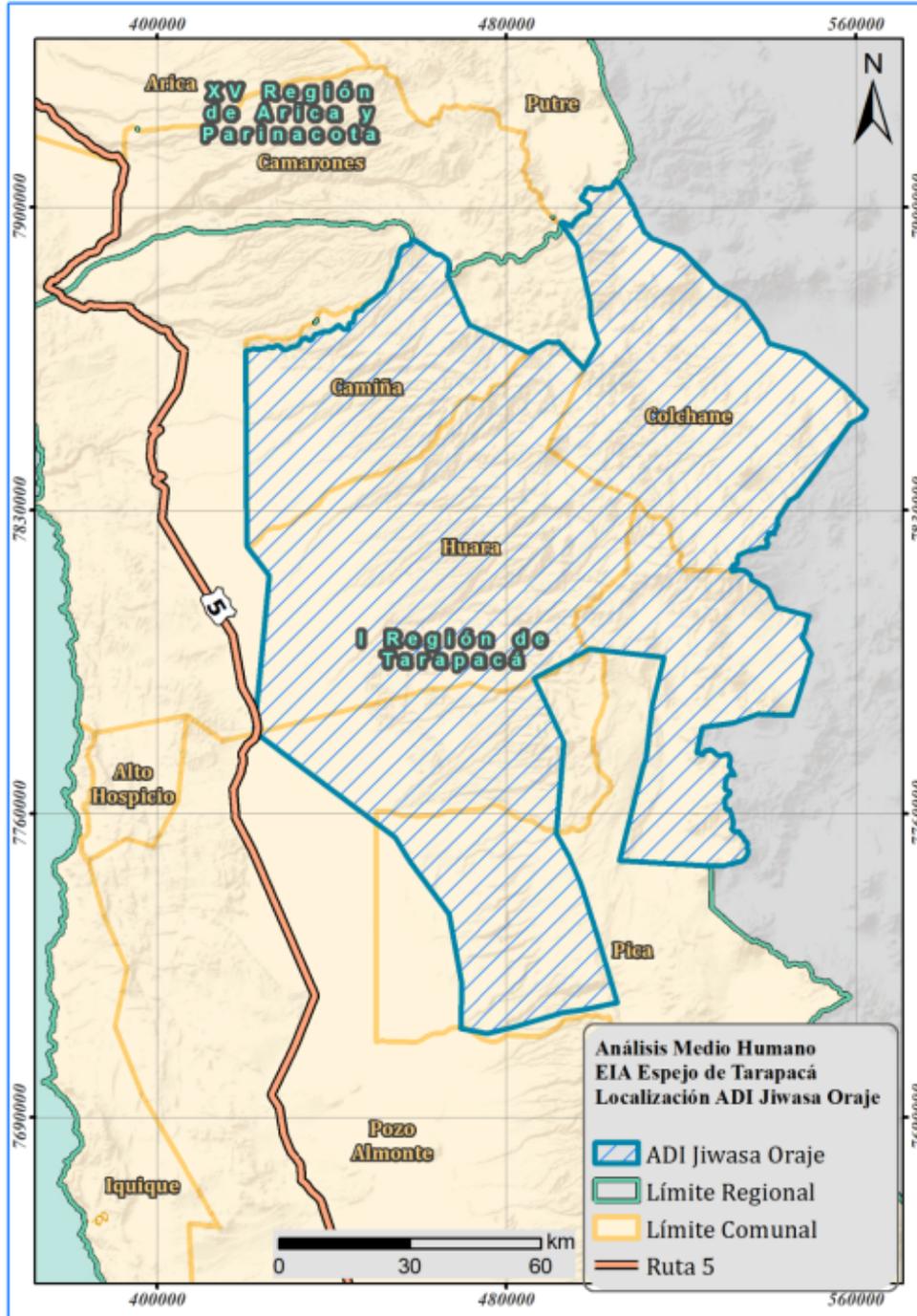
<sup>15</sup> CONADI (1993). "Ley Indígena 19.253". Corporación Nacional de Desarrollo Indígena, Ministerio de Planificación. Ed. 2006. Pp. 99.

<sup>16</sup> El sector Río Seco señalado como límite Oeste del ADI Jiwasa Oraje no tiene relación alguna con la localidad de Río Seco, parte del área de influencia del proyecto, esta última se ubica en

Figure 3-11. Location ADI Jiwasa Oraje

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comuna de Iquique la cual no tiene relación alguna con los límites del ADI, que comprende a las de Colchane, Huara, Camiña, Pica y Pozo Almonte.



- **Organizations and indigenous groups that are within these areas**

As already noted above, in the area of influence of the project to the component human environment there is no presence of indigenous groups and use of the territory by these. According to information contained in the record of communities and indigenous associations of CONADI, in addition to the tool "representation cartographic Digital of the population indigenous and points of interest for the facilitation of the evaluation environmental of projects, in the Region of Tarapacá" service environmental assessment (SEA), and the results of fieldwork developed by the eSystem consultant.

The sector with presence of indigenous human groups closer to the project, but outside any area of influence, is the agricultural colony of painted, about 25 kilometers northeast of the substation lagoons. In this locality are the indigenous associations Aymara Lands of Lord, Santa Cruz de Pintados and youth of the desert. All of them concentrated their activities in Pintados sector due to the availability of water described in the above quote and found the occupied farms in this area. Presence of indigenous communities is not identified.

- **Natural resources and especially of water resources**

By all of the foregoing, it is considered that they will have collected the necessary background to rule out the presence of indigenous lands, Areas of indigenous development and indigenous population present in the area of influence of the project in all its components, works and activities, including the line of High Tension, and therefore there would be no involvement of indigenous water resources.

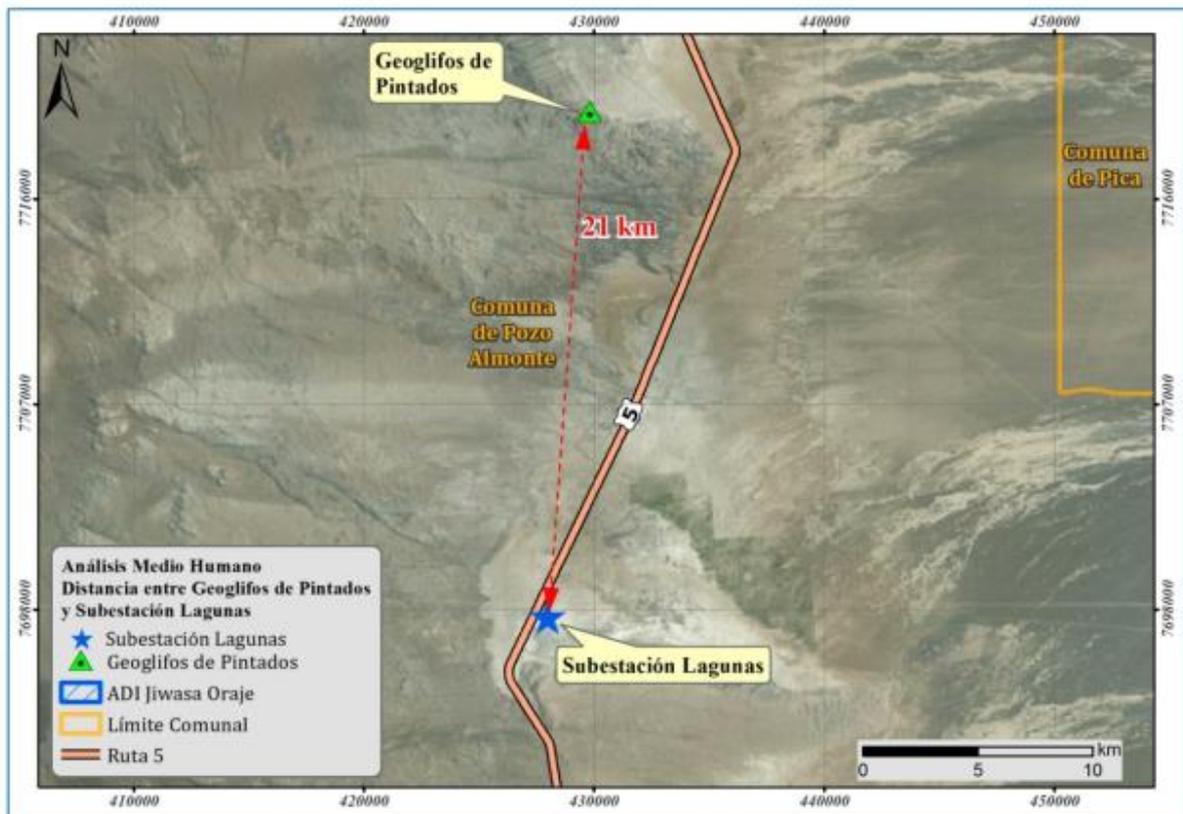
This is mainly due to the absence of human indigenous groups for each one of the sectors in which the project is divided, i.e. the coast Sector and the Sector Pampa-Meseta. For the latter it should be recorded that do not identify locations or settlements in a desert geographical space used by mining. The scarcity of water resources in the area is that there are no human settlements so that neither water nor places and modes of extraction of the resource rights shall not be affected. In addition water resources used by the project during the construction phase will be provided through a desalination plant, not affecting existing applications of any kind in relation to water resources.

- **Sites of cultural significance**

As for use passed by indigenous groups, is reiterated as already indicated in the baseline (chap. 3 of the EIS) with respect to the component terrestrial archaeology, because "not recorded in the database of the national monuments of tip Monuments Council or historical, anthropological or typical zones within the specific area of study or in immediate areas; "it should be noted that the archaeological monuments are all those known or identified, by the only operation of law, without your express cataloging requirement." (Page 3-330).

Does not register the existence of sites of cultural significance associated with the indigenous subject in the area of influence of the project, which reviewed the lists of the National Monuments Council and Additionally they toured both sides of the shaft the path of the electrical transmission line. In that sense, the closest site corresponds to the Geoglyphs pintados, located about 21 km north of the Lakes electric substation, found outside the area of influence of the project for this component.

**Figure 3-12. Distance between connection substation gaps and Geoglyphs pintados**



**3.25. In relation to terrestrial archaeology, the holder must:**

- **Point out the number of hectares covered by sector or project areas**

**Answer:**

The holder receives the request and informs the hectares by sector or areas:

- An area of reservorio, of approximately 587 ha - this reservoir is divided into two segments, W and E.
- Area of operations and Download tunnel, of approximately 2.5 km of extension (including an underground portion). (corresponding to about 75 ha).
- Driveway, about 16 km extension, with a total 30 m buffer (equivalent to 48 ha).
- Camp, of approximately 3 It has.
- Transmission, approximately 65 km line extension, with a buffer of 30 m per side (equivalent to 195 has approximate).
- Area of stockpiling, polygon of 100 x 100 mm (1 has).
- Road communication towards the area of collection, approximately 1 km in length, with a total 30 m buffer (equivalent to 3 ha).

Total estimated travel: 912 has.

This information was updated in the archaeology report updated and presented in annex 3-6 of the present Addendum.

- **Submit tabs of registration sites and archaeological finds**

**Answer:**

The holder receives the request and attached as requested in the Addendum, Annex 3-6, Appendix 2 This addendum.

- **Although images of prospected areas are delivered in the archaeological baseline, mapping to an appropriate scale and with good definition should be presented: the area of inspection of all works, travels buffers, the area of the reported sites, the extension of the linear features that are within the project, and its relationship with the works**

**Answer:**

The holder receives the request and attached as requested in annex 3-6 of the Addendum.

- **With regard to the sisternaticidad inspection, must be a new inspection, since it is considered that about 50 m of distance between each transect It is excessive, since the maximum visual range is estimated between 25 to 30 m on each side of the transect.**

**Answer:**

The owner clarifies that he has considered a buffer in the prospecting is 30 m. Updated archaeology report presented in annex 3-6 describes the specific distances between the transects assessed in each project area, justifying the conditions of visibility and obstrusividad local.

- **Deliver a table where point to the name of the site or archaeological find detected, indicating the following: what corresponds, area, coordinates of the vertices of the area of each site, the distance from the works, of which work, the percentage of the site impact or findings and measures to be implemented. This considering that Chapter 3 notes the existence of 23 heritage finds, while the annex 3.4 points 7 elements, which are not incorporated in the plans of mitigation and compensation proposed by the holder**

**Answer:**

The holder hosts the application and attached in This Addendum Annex 3-6, as requested.

- **Characterize in detail the archaeological sites (workshops, structures, etc.) that will be affected by the works of the project. It is clarified that this activity is part of the baseline, since its execution allows to understand surface and stratigraphic level extension sites and thereby determine the respective compensation measures.**

**Rexposed:**

The holder clarifies that detail is contained in annex 3-6 archaeology of this addendum.

The findings go 11; SEE 12 VE and 15 There are structures in the buffer of the high-voltage line, in the initial sector of the Northern access road in SEES 31, at a distance of between 20 m and 80 m there is a historical linear feature.

The impact direct more relieved by reports of archaeology in the EIA and in this addendum corresponds to the impact by the camp in the VE-19 site where the report is It identified lithic flakes of stone material. In this regard, as required by the authority in meeting of 05 February 2015, attached request from to carry out of wellprobe for the VE-19 site s and in this way carry out enlargement of baseline requested and stratigraphic level characterize the site.

**Fotografía: Material lytic VE-19 site 1 camp.**



It should be noted that the process is waiting for a response from the Regional Museum of Iquique, which is the institution which corresponds as deposit of archaeological materials. Not get a favorable response, are prompted to the National Monuments Council authorization for another deposit.

In addition to the above, it should be noted that the paleontological report (supplemented in annex 3-8 This Addendum) Describes a yearyouths that coincides with the mentioned archaeological site, of a level What corresponds to a coquina little compacted with remains of bivalve molluscs such as clams, oysters, mytilidos and Scallops; gastropods indeterminate with different States of preservation. Therefore, There is a greater likelihood that in the case of a site of palaeontological interest, as it was described in the EIA and in annex 3-8 of this addendum.

All of the abovementioned mind may be verified with the realization of the boreholes.

**3.26. In relation to underwater archaeology, while a Base line underwater, is incorporated into the environmental impact study this non-delivery survey information in the area that will be impacted by the project, in terms of the revised surface, the findings and their chips, methods and survey techniques (diving and**

through remote prospecting), photographs of the place, so Horn of the measures to implement. Therefore the holder must present in detail the above background.

**Reposed:**

The holder receives the request and attached the required by the authority in Annex 3-7 Underwater archaeology, this addendum.

**3.27. Related to paleontology, must be presented to the paleontological baseline analysis of potential fossil of the geological units present in the area of intervention of the project, according to its range of likely to contain fossils, sterile, susceptible to potential and fossiliferous and its corresponding description according to the classification of fossil potential for geological units)Mourgues and Contreras 2012). The above, as follows:**

- **Sterile (potential fossil very low to non-existent). In sectors corresponding to intrusive bodies and volcanic high temperature and energy products**
- **Susceptible (fossil potential low to medium). Sedimentary units with facies able to contain fossils, even though they lack the paleontological background; and volcanic sedimentary environment units and that they have been charted without distinguishing their facies fossil. From the point of view sedimentologicolt's facies of clay, silt and sand where, there are fossils, they would not suffer a big deterioration by traction, corno Yes does a sediment that contains gravel, ridges and blocks.**
- **Fossiliferous (fossil potential medium to high). They are volcanico-sedimentarias, or sedimentary units which have been reported or previously studied its fossil content. You must include a brief description of the type rock or sediment containing fossil.**

**Reposed:**

The owner welcomes observation and presents as requested in the Annex 3-8 Report paleontology This addendum.

**3.28. In addition, an analysis must be presented in detail, for the areas of the project to be determined as: a) units likely to contain fossils and b) units identified as fossil and that includes:**

- **Review on terrain of these areas of the project, in order to identify fossil outcrops and sensitive areas from the palaeontological point of view, that**

may be affected by the works. You must rearrange the information obtained on-site

- **Geographical location of points and areas of paleontological sensitivity, identified with coordinates UTM, DATUM WGS 84, spindle 19 S**
- **Potential impact of the implementation of the project in sectors with potential fossil, and proposal of prevention or mitigation. You must rearrange the information considering the following:**
  - **The schedule does not understand what sections or parts of the work and, approximately, between dates, are going to produce earth-moving, on the understanding that "earthmoving ~" includes cutting, excavation, removal or destruction of rock sedimentary or" geological layers more or less consolidated carried out before or during the execution of the work (include, the realization of roads access, installation of work fronts, camps, warehouses, etc. If they involve any excavation of the ground).**
  - **It should explain what those movements of land affect geological formations previously catalogued as "susceptible" and "fossil" and in what areas, within the different sectors of the work, are these conditions.**
  - **"With respect to earthmoving project which corresponds to the"upper tunnel"and"lower tunnel", which connect the reservoir with the sea sector, must detail whether such underground excavations will affect materials"sterile","susceptible"and" fossil", according to the classification mentioned above)Mourgues and Contreras 2012). This holder should be made available by the paleontologist existing previous studies that give background information on the geology of the subsurface, especially drilling. If there were polls they should be mapped and, taking into consideration the limitations of this method, try to establish whether the described geological materials are at least "susceptible" from the point of view of fossil or sedimentological, always taking into account the above-mentioned classification.**
  - **The documentation provided by the licensee and that has to do with the paleontological component of the project (including maps and cartographies geological and paleontological), must be signed by the professional paleontologist in charge.**
  - **The missing information is essential to determine with greater precision, the intervention of the project on the paleontological component and the type of measures to be implemented for their protection.**

**Answer:**

The owner welcomes observation and presents requested in Annex 3-8 Report paleontology This addendum.

**3.29.** It is described in the paragraph 3.7.3.2 tourism in the Area of study of the EIA, the owner States that: "within the study area are identified three important tourist attractions, the Caleta San Marcos and La Reserva Natural Pampa del Tamarugal", not being clear whether it two or three attractions. Then in the same section joins the table 3.95 "Tourist attractions in the area of study" which identifies seven without the corresponding description. By the above, the holder must correct the information contained in this section, caacterizando in a way more clear and precise local tourist attractions in the Bay Chomache, in order to complement the history and description of the local tourism sectors such as beaches, coves, archaeological sites, Museum, and others. Therefore the impacts should be evaluated partner and/or the degree of intervention in each these attractions with the degree of intervention for each of the stages of the project.

**Rexposed:**

The owner clarifies, en relation to the quoted text of the paragraph 3.7.3.2. ""*Within the area of studies has identified three important tourist attractions, La Caleta San Marcos and the Pampa del Tamarugal Natural Reserve*"" "it indicates that the correct phrase should be:"Within the area of studies has identified three important tourist attractions, La Caleta San Marcos, Caleta dry river and the Pampa del Tamarugal Natural Reserve", being effectively three most relevant attractions identified in the study area, according to the research field, as well as through information gathering which took place on the basis of different sources of information tourist.

Now, within the information presented in the Base line of tourism (Chapter 3 of the EIA) are named in the table 3.95 attractions registered by SERNATUR which are within the study area. To complement this table follows the description of such attractions, obtained in the cadastre of attractions of the year 2012.

**Table 3-15: Tourist attractive description in the study area**

Name	Description
Salar Grande	The salar Grande in the Cordillera de la Costa South of Iquique presents

Name	Description
	extensive deposits of 99% of NA CL, in a 50-km basin long n-s and 5-8 Km wide, perforations made in this salt indicate that saline deposits reaching 162 m power; the Great Salt Lake is the main source of salt for domestic consumption and for export to North America and Japan. Currently mining of Salina Punta de Lobos.
Beach Chomache	Located to the North of Caleta Playa San Marcos.
Beach IKE-Ike	A 7 Km beach is almost warm waters and a remarkable desert landscape. Beach IKE-Ike popularly known as beach Peruvian, is a vast space, and has virtually no roquerios which makes the place a very pleasant area to spend some days relaxation and fun with the family.
Caleta San Marcos	Fishers Cove, boasts restaurants that sell typical products of the sea, also received basic services, school, medical post, telephone, small trade and wide beaches suitable for sea and Sun bath, watching wildlife and fishing sports
Dry river Cove	The name of the river dry Creek comes from an aquifer stream that emptied the town, leaving a dry and Sandy testimony where hundreds of homes are now installed most of fishermen. In the Decade of the 80, RIO dry was again repopulated by about 115 fishing craft and collectors of marismos, coming mostly from Tongoy, located in the region of Coquimbo caleta. Currently, there are 40 fishermen who are still tied to the fishing craft and more than 25 dedicated to the collection of algae, large areas of development during the past years.
Salar de Bellavista	Located south of the Salar de painted, it is productr but in lesser magnitude of common salt.
Pampa del Tamarugal national book	It has 102,264 has an altitude of 970 meters above sea level. Created as a national reserve in 1987, pose a surface divided into three sectors: Zapiga 17,650 ha; The IRRtoNA, 5225 has and Pintados 79,289 has. A fairly homogeneous vegetation comprising 18,113 develops in them has plantations of Mesquite, 1950 has carob tree plantations, 420 has mixed and 2,500 plantations has native tamarugo forest.

Source: SERNATUR 2012

It should be mentioned that analysis carried out in the Base line of tourism focuses on the attractions of greater importance identified in the study area: Caleta San Marcos, Caleta Rio Seco and the Pampa del Tamarugal, grouping the other identified tourist attractions in function of the proximity to these nodes, such as for example the Comanche beaches e IKE IKE found environment to the Caleta San Marcos.

In relation to the request, the holder considered that it arises a proper gathering information, in the Base line of tourism being supplemented in the present Addendum about the attractions and tourist services present in the study area, as well as a proper impact assessment as presented in Chapter 4 for the tourism component. In this

sense the holder considers that you a greater complementarity the information I would not change the results already obtained and presented within the study of environmental impact of the project.

**3.30. In relation to the use of the territory, in paragraph 3.8.3.3. Results, the holder should complement and extend the information presented, with regard to present and potential marine species that are part of the resources that make use fishermen differentiated in seaweed fields, shipowners, divers and fishermen in every Cove of the area of influence of the project, associated with an analysis that can justify the absence of a significant change to the systems of life and customs of human groups in the sector.**

This, as in the EIA refers to economic activities in the area of influence of the project, where the owner delivered SERNAPESCA (2013) data pointing to Caleta San Marcos "... It has 27 vessels with 188 fishermen between seaweed fields (114), owners (28), divers (74) and fishermen (69)... ". Subsequently, designates species that make up the two existing benthic resource management areas, naming then benthic fishery species existing in the sector. On the other hand in regard to the dry river Cove, delivers data of SERNAPESCA pointing to the Cove " ... It has 133 seaweed fields, 9 owners, 17 divers and 15 fishermen... ", however, is not designated pelagic fishery species that are part of the economic activity of the Creek."

**Reposited:**

The owner explains that, in relation to the economic activities carried out in the villages San Marcos and Caleta Río Seco, within the information presented in the baseline of human environment (Chapter 3), in the analysis of the socio-economic dimension, the main economic activity is given by the collection of algae, specifically of huiro, which is processed in the existing processing plant North of la Caleta San Marcos. This activity is both dedicated collectors working in the coastal edge as divers which gather underwater shape. Another important part of the primary sector-related activities are carried out by divers mariscadores that removing octopuses and crazy (when not in veda), Locatel woolly shoe, crab and a hedgehog. Fishing is carried out on a smaller scale being main products extracted the cojinova, corvina, cabrilla, Golden and conger eel.

In terms of the potential marine species present in the study area these were analyzed within the study of biological oceanography (paragraph 3.2.4.4 of Chapter 3 of the EIA), however in terms of registered invertebrates, to include the picorocos, limpets, snails,

chotiros and jaivas and crabs, as well as the huiro and other types of algae, on how to weigh them. With regard to the ictofauna the results of the baseline of Oceanography biologica shows the presence of sea needle, baunco, bilagaytilefish, borrachilla, burrito, cabinza, cabrilla, castañeta, piggy, colorado Conger, jerquilla, DAB, plump, white bream, torito and trombollito.

In the impact assessment of biological oceanography (Chapter 4), within all the impacts analysed for different types of biological elements present in the marine environment within the area of study, the impacts were determined as little or not significant in terms of the changes that will be produced by the installation of the project. In this sense is established that an alteration in terms of marine resources that are or could be used by fishermen, fishermen, and gatherers of algae of the coves of San Marcos and Río Seco there is.

In accordance with the above, within the impact assessment of the human environment, in relation to the possible effects on resources and local economic activities and their dynamic Associates, the impacts to the Caleta San Marcos were little significant, while the Río Seco Caleta not warranted an assessment in this regard since there are no works that interfere with marine-related economic activities developed inside or next to the community as.

In relation to the above is that he is established that significant impacts on components of the marine environment which are used for the development of the main economic activities of the villages San Marcos and Rio Seco and therefore in this there are no sense is not identified as a significant life of these places systems change.

## 4. PLAW LAN

**4.1. For the operation stage, indicated that you riles them from turbine and desalination plant processes, they will be discharged jointly by the same pipeline, therefore, it is important to present that you must stick by the guidelines set out in the resolution Exempt from the Superintendency of environmental not 117 of 2013, modified by the exempt resolution N ° 93 year 2014 "dictates and instructs rules of a General nature concerning procedure of characterization, measurement and Control of liquid industrial waste", available on the web page background [www.sma.gob.cl](http://www.sma.gob.cl).**

**Rexposed:**

The holder receives observation and proceed according to the guidelines established in the beef. N ° 117/2013 of the SMA. For more information regarding compliance with this privacy policy, please refer to the response 4.3 of this addendum..

**4.2. Regarding waste liquids, and in relation to the Emisión Norma D.S. N ° 90/00, the holder must complement designated information, indicating that the discharge of wastewater into the sea will be from both the processes of desalination and turbines.**

**Reposed:**

The owner clarifies, rspectrum of associated with the process of turbine discharge, as outlined in Chapter 1 description of project and chapter 10 Plan of compliance of the legislation environmental and PAS, PAS 115, the effluent generated corresponds exclusively to used sea water as a means of power generation that it will be discharged outside the area of coastline protection, with no modification to its natural composition. Therefore the effluent is not toxic, will not have adverse effects, and will not cause adverse effects on the content and balance of oxygen. With respect to its temperature, the normal operation of the system shows that 96% of download events it will be a temperature differential between the discharge and the environment marine, less than 3° C approximately, allowing the dilution of the excess temperature modeling for the stage of normal operation, reducing the temperature difference of the pen below 3 ° C, at the time of that This touches the surface of the sea.

Download of the desalination plant and the reservoir will comply with the DS 90/00 of the light standards, which, first of all sources will undergo in the Res. Former (SMA) No. 117/13, modified by Res.Exe. (SMA) N° 93/14 that "Teaches and instructs rules of a General nature concerning procedure of characterization, measurement and Control of industrial waste liquid," by submitting to the SMA the necessary background for the classification of sources. Resulting issuer, the establishment will give compliance table of D.S. N° 90, determined by the SMA.

During the construction phase, the discharge of the desalination plant will be done within the zone of protection Litoral (ZPL) determined by the maritime authority. In the operation stage, the effluent of the desalination plant will be added to the discharge of water from the reservoir, making the joint discharge of these waters outside the zone of protection Litoral (ZPL) determined by the maritime authority. In both phases of the project, it shall comply with standards and the parameters indicated in the table of the DS 90/00 in the light that the SMA considers applicable.

Sand Deputy Annex 1-10 Maritime information bulletin N ° 10/2014, which includes the of. D.G.T.M. AND ORDINARY M.M. N ° 1078 12.600/05/ VRS where a width of 254 m of ZPL for this project is resolved.

Below is a comparison of the effluent with table N ° 5 of the DS 90/200 of the MINSEGRES.

**Table 4-1. Comparison with table 5 Supreme Decree 90/2000 effluent.**

Pollutant	Unit	Expression	Maximum allowable table 5 DS N ° 90	Adduction	Backwash	Desalinated water	Salt water	Download sea
								PTOI
Oils and fats	mg/L	A and G	150	0	0	0	0	0.00
Aluminum	mg/L	To the	10	< 0.5	< 0.5	0	< 1	< 0.5
Arsenic	mg/L	As	0.5	0.004	0.004	0	0,0066	0.007
Cadmium	mg/L	CD	0.5	0,046	0,046	0	0,0763	0.075
Cyanide	mg/L	CN-	1	<	<	0		< 0.05
Copper	mg/L	CU	3	0.03	0.03	0	0,0525	0.05
Index phenol	mg/L	Phenols	1	<	<	0		< 0.001
Hexavalent chromium	mg/L	CR + 6	0.5	< 0.006	< 0.006	0		< 0.006
Chrome	mg/L	CR	10	< 0.5	< 0.5	0		< 0.5
Tin	mg/L	SN	1	<	<	0		< 0.05
Fluoride	mg/L	F-	6	0.89	0.89	0.01	1,5575	1.55
Total hydrocarbons	mg/L	HCT	20	0	0	0	0	0.00
Hydrocarbons Volatiles	mg/L	HC	2	0	0	0	0	0.000
Manganese	mg/L	MN	4	0.03	0.03	0	0,0525	0.05
Mercury	mg/L	Hg	0.02	<	<	0		< 0.0001
Molybdenum	mg/L	MO	0.5	<	<	0		< 0.01
Nickel	mg/L	NI	4	<	<	0		< 0.05
pH			5.5 9.0	7.5-8.0	7.5-8.0	6.0 7.0	7.7 8.2	7.7 8.2
Lead	mg/L	PB	1	0.2	0.2	0	0.35	0.35

Pollutant	Unit	Expression	Maximum allowable table 5 DS N ° 90	Adduction	Backwash	Desalinated water	Salt water	Download sea
								PTOI
SAAM	mg/L	SAAM	15	0	0	0	0	0
Selenium	mg/L	Is	0.03	&lt;	&lt;	0	&lt;	&lt; 0.001
Settleable solids	mg/L /h	S.Sed	20	0	0	0	0	0
Total suspended solids	mg/L	S.S.	300	25	1500	0	1	75
Total solids Dissolved	mg/L	STD	NA	35154	35154	240	58369	58369
Conductivity	uS/	Cond	NA	51670	51670	495	79869	79869
Temperature	° C	T	NA	17	17	17	17	17
Sulfur	mg/L	S2-	5	&lt;	&lt;	0	&lt;	&lt; 0.05
Zinc	mg/L	Zn	5	&lt;	&lt;	0	&lt;	&lt; 0.01

**4.3. It must be included within the rules of general or associated with the rules of broadcast previously indicated, the fulfillment of the Res. Former (SMA) N ° 117/13, modified by Res.Ex (SMA) N ° 93/14 that "Teaches and instructs rules of a General nature concerning procedure of characterization, measurement and Control of industrial waste liquid".**

**Rexposed:**

The holder welcomes the observation. Holder will be compliance with the resolution Former (SMA) N ° 117/13, as amended by resolution Former (SMA) N ° 93/14 that "teaches and instructs rules of a General nature on procedure of characterization, measurement and Control of" Industrial waste liquids". Then Deputy the compliance tab corresponding.

<b>STANDARD</b>	Resolution N ° 117
<b>NAME</b>	He teaches and instructs rules of a general nature on procedure of characterization, measurement and control of liquid industrial waste
<b>OFFICIAL DAILY PUBLICATION DATE</b>	on February 11, 2013
<b>AUTHORITY THAT EMANATES</b>	Superintendency of environmental

<b>SCOPE OF APPLICATION</b>	National
<b>PHASE OF COMPLIANCE</b>	Download of the desalination plant will comply with this standard during the construction phase of the project that undertakes its implementation in operation Durantand this stage. Then, during operation of the project.
<b>MATTER</b>	Establishes general rules on procedure of characterization, measurement and control of Industrial liquid waste, mandatory for the facilities that discharge liquid industrial waste to marine, inland surface water or groundwater, or to the estuary Caren, as a result of its process, activity, or service.
<b>RELATIONSHIP WITH THE PROJECT</b>	The project, as he is stated in the EIA)Chapter 1, section 1.6.15.1), considered the salmuer downloada rejection of the plant checknizadora and discharge from reservoir.
<b>SHAPE AND INDICATOR COMPLIANCE</b>	<p>Firstly, in compliance with article 2 of this resolution, the holder shall submit to the SMA at least 90 calendar days prior to the Start Download brine: (i) a notice of start of download of this kind of Industrial liquid wasteAccording to the format established by the SMA; and (ii) a proposal of monthly monitoring of the parameters most relevant for the evaluation period.</p> <p>In addition, within a period of 30 working days following the date communicated by the holder for the start of the downloads, it informed about the SMA of analytical results each of the downloads so that it assess whether the property qualifies as a source.</p>

**4.4. Despite being mentioned in the EIA, it deemed relevant to highlight the stated in article N ° 136 of the General Law of fisheries and aquaculture, which provides that "where it introdujere or command insert into the sea, rivers, lakes or any other body of water chemical, biological or physical pollutants that cause harm to the hydrobiological resources, unless they have previously been neutralized to prevent such damage, it shall be punished by a fine of 50 to 3,000 monthly tax units. If appropriate with fraud, in addition to the fine, the penalty applied will be lower in s presidio minimum grade". Legal figure described in the referred article is considered as a fishery offence.**

**Rexposed:**

The holder welcomes the observation and ensures that the project does not apply to, in any of its phases shedding for any pollutant not neutralize the marine water body or other body of water under the jurisdiction of the maritime authority.

It should be noted that, as established in the D.S. N ° 90/00, liquid wastes are defined as "those waters that are downloaded from a source to a receiver body"<sup>17</sup> at the same time defining a source as a settlement discharging liquid waste to one or more bodies, as a result of its process, activity, or service, with a daily average contaminant load or characteristic value greater in one or more of the parameters presented in table 1 of this Decree<sup>18</sup>.

Based on the foregoing and considering the characteristics of the effluent associated with power generation, this is not a liquid waste, since it does not exceed the values of the parameters set out in table 1 of the Supreme Decree N ° 90/00.

However the foregoing, licensee shall comply with resolution Former (SMA) N ° 117/13, as amended by resolution Former (SMA) N ° 93/14 that "teaches and instructs rules of a General nature on procedure of characterization, measurement and Control of" Industrial waste liquids".

**4.5. The species common sea lion (*Otaria flavescens*), is a marine mammal that is currently in a period of veda, until 26 January 2016 (Ex D.. N ° Decree 112/2013); This matter should update the normative reference presented in the EIA.**

**In this respect is required to implement, spread among workers and inform the environmental authority, measures aimed at preventing potential negative interference between the shares of the project and copies of the aforementioned species, particularly at the stage of construction.**

**Reposed:**

The owner welcomes the effected clarification and updates the regulations relating to the extractive veda for *Sea-Lion flavescens*. Indeed, the No. 112 free Decree of January 2013 of Undersecretariat for fisheries and aquaculture, Ministry of economy, establishes extractive veda for the common sea lion *O. flavescens* along the coast of the Republic under the terms of 3 years from the publication of the decree in the official journal. In addition, in its article N ° 2 establishes the prohibition of holding, possession, transportation, unloading, processing or any form of transformation, and also marketing or

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<sup>17</sup> Título 3: Definiciones, Artículo 3.10 D.S. N°90/00.

<sup>18</sup> Título 3: Definiciones, Artículo 3.7 D.S. N°90/00.

storage is exemplary whole or parts of these coming from extractive activities. To prove compliance with this regulation, the holder highlights that this project does not develop any of these above actions. Without limiting the foregoing, the contractor reaches that subscribe at the time the owner of the project with the contractor in charge of the construction of the works, will be clearly specified such prohibitions so that it instruct and train its staff on timely and effective This condition. During construction and operation, the holder also agrees to train its staff in these same matters. The owner of the project It is known that at all times the responsibility of compliance with this regulation is its sole responsibility,

Should be noted that you pursuant to the planning and timetable of the project, before 26 January 2016 (date of entry into force of the legislation of reference), do not provide any work, activity or slaughter at sea, as construction on the marine environment and its associated activities are planned from 2017-2018. However, the commitment of the owner is take charge of this legislation and also that replace your subsequent to the effective date of the exempt D. N ° 112/2013; to do this, and prior to the start of the construction phase of the m worksritimas of the project, referred to the diffusion of these standards among workers and staff in order to avoid potential negative interference between works and activities of this phase and the aforementioned species. An efficient and effective way of broadcasting is through inductive talks where instructed to contractors and workers, professional or administrative and, in general, to each person who participates in operations of construction in the marine environment (and also during the) operation), on the importance that has for this project marin wildlife conservation in the area and the basic care that should be for their preservation and, in particular, as regards compliance with the current regulations governing their protection.

In the first instance, the talks will be led by a biologist with experience in these matters, and in the following opportunities in the area of prevention and risk manager may make it. The dates of the talks, attendees and the commitments of the latter on the affable compliance, will be recorded in logs which will be available for inspection by the competent authority, when this is required. Subject to the foregoing, Licensee agrees to comply the scope of this regulation and non-involvement or intervention of this resource in all phases of the project.

**4.6. The holder must have in mind that to perform surveys of living aquatic species, in the area of monitoring environmental for baseline monitoring corno, both must be obtained previously authorization of the Undersecretariat for fisheries and aquaculture, according to the recorded at D. S. No. 461/1995 decree.**

**Reposed:**

The holder welcomes the observation and it will act accordingly. Indeed, paRA uprisings of line bASE marina and subsequent follow-ups, was made a request in accordance with the D.S N° 461/1995 decree, application which complies as provided in articles 98 to 102 of the General Law of fisheries and aquaculture, because permission has no commercial purposes.

In this waywas authorized the applicant, namely Costasur Bravo & Mackenneythrough Exempt resolution No. 2566 September 11, 2013, for fishing of exploratory research, in accordance with the technical terms of reference of the project "*Characterization of baseline marina to Central Valhalla*", sector *Caleta San Marcos, región de Tarapacá*".

Furthermore, in the Annex 4-1 accompanied both full copy of this resolution to exempt No. 2566 of the under-Ministry of fishing; as well as the publication of the summary in the official journal, in accordance to the solve 3 of that resolution.

**4.7. The resolution of Undersecretary of fisheries shall identify and aquaculture that would have been issued in relation to the authorization for fishing research.**

**Reposed:**

The licensee advises that, previo it at the beginning of the works, personal Enterprise Costasur He attended the dependencies of the port captaincy of Punta Patache to inform and coordinate sampling activities, and get information about the security measures suggested by this distribution during navigation to and from the sector of sampling.

In general, the objective was describe the elements of the environment within the area of influence of the future project, and thus provide the necessary background allowing to evaluate their potential impacts on the marine environment; (e) identify the effects, characteristics or circumstances present in article 11 of the 19,300 law on Bases of the environment, which give origin to the need to present an environmental impact study. In particular, this study gives account also of all those features identified in the implementation of the project, that is, Bay area Chomache -Caleta San Marcos, in terms of its properties bio-Oceanographic.

All the information submitted to the authority, was evaluated technically and legally, concluding in the authorization to perform research fishing for the purpose of characterizing the baseline of the area of influence, authorization through resolution exempt No. 2566 of the under-Ministry of fishing. In this, is authorized to Costasur Limited to fishing from the 11 September until December 31, 2014, in the area corresponding to the maritime coastal sector of la Caleta San Marcos. Species, equipment and number of samples are listed in the meet 4 of the Res.ex No. 2566, resolution attached to the present Addendum in the Annex 4-1.

**4.8. The proponent shall take into consideration sectoral regulations (Ex D.. No 225/95 and its former D. modifications. W 135/05 and D. Ex. W Decree 434/07) which says concerning the protection of mammals, birds, and marine reptiles that indicates; in particular upon issues of Humboldt Penguin)Spheniscus Humboldt) and Chungungo (Lontra feline) that could interact with the execution of works or the project workers.**

**Rexposed:**

The holder receives the observation. In this regard, it is present that this regulatory body had already been incorporated into the environmental regulations applicable to the project in the EIA)Chapter 10, section 10.2.12), notwithstanding which, then accompanied the compliance tab updated, incorporating the comments of the authority:

<b>STANDARD</b>	<b>Decree Free NO. 225/1995</b>
<b>NAME</b>	<b>Veda to the hydrobiological resources indicator sets</b>
<b>OFFICIAL DAILY PUBLICATION DATE</b>	on November 11, 1995
<b>AUTHORITY THAT EMANATES</b>	Ministry of economy
<b>SCOPE OF APPLICATION</b>	National
<b>PHASE OF COMPLIANCE</b>	During all phases.

<b>STANDARD</b>	<b>Decree Free NO. 225/1995</b>
<b>NAME</b>	<b>Veda to the hydrobiological resources indicator sets</b>
<b>MATTER</b>	<p>Establishes a national extractive ban for a period of 30 years from the publication of the Decree, for a number of mammals, birds and reptiles listed in article 1 °, which is the Chungungo or cat (Mar)<i>Lontra feline</i>) and the Humboldt Penguin)<i>Spheniscus Humboldt</i>). This period shall be prohibited capture, ownership, possession, transport, landing, elaboration or any process of transformation and marketing or storage of any of the banned, either copies whole or parts of them) Article 3 °).</p> <p>Add, moreover, that only by resolution of the Undersecretariat of fisheries, SUBPESCA, the capture of exemplary living species previously referred, for its maintenance in captivity, exclusively within the national territory (art. 2) may be authorized.</p>
<b>RELATIONSHIP WITH THE PROJECT</b>	<p>The Base line of the project, identified the potential species described for the study area, sea cat and the Humboldt Penguin. Both, according to the table gives note 3-74 Chapter 3, are classified as Vulnerable according to the regulation of classification of species (RCE). However, neither the literature review and on-site sampling recorded for the areas of the project called "Sector Costa", "Underground works Sector" and "Sector plateau", realize the existence of the species in commented.</p> <p>There was only a Jack Mar and Humboldt Penguin, in sitemap priority 'Punta Patache", which is located 27 km to the Northwest of the area of influence of the project (page 449 of Chapter 3, baseline").</p>
<b>SHAPE AND INDICATOR COMPLIANCE</b>	<p>None of the activities and works of the project imports the capture or death of protected marine species.</p> <p>Despite not registering physical evidence of <i>Lontra feline</i> Neither <i>Spheniscus Humboldt</i>, the owner is aware the biological importance of eStas species. Therefore, and with the aim of ensure full respect of this regulatory body, will be held a talk staff with respect to the biological importance of marine species and their conservation, highlighting the prohibitions laid down in this Decree. Workers, will be also warned that failure to comply with the legislation in question is punishable by law, and that it will also import the immediate separation from the company. There will be a record of the realization of talk and assistance for workers.</p>

It should be noted that as indicated in Chapter 4 prediction and assessment of impacts, section 4.7.2.3. Biological oceanography the project does not consider works in environments frequented by these species, noting the presence of chungungos inhabiting the molo from the Caleta San Marcos, so the activities of construction and opening of the Norwegian shot and construction and assembly associated with the maritime works, could only affect these species if they swim close to the works.

During the operation phase are not considered new sources of impact, since given the low speeds of adduction and discharge, in average 0.15 m/s, it is estimated that approach some individual sea lion to the work of underwater discharge and take, this can overcome

easily the tide generated by adduction. In the closing phase nor will provide for activities that may cause impact

At last as noted in Chapter 10 Plan of compliance of the law environmental, in order to ensure that it will not generate negative interference between the implementation of the project and the common sea lion species, referred to the realization of training lectures, addressed to workers of the project, with respect to the biological importance of the espMarine ecies and its conservation, warning workers failure to comply with the regulations for the protection of the species is punishable by law and will not be tolerated by the Titular.

**4.9. In case made a finding archaeological or paleontological must proceed as set out in articles not 26 and 27 of the law No 17,288 of national monuments and articles N ° 20 and 23 of the regulation of the law No 17,288, on excavations and surveys archaeological, anthropological and paleontological, reporting immediately and in writing to the National Monuments Council, so that this body determines the procedures to follow, whose implementation must be carried out by the owner of the project.**

**Reposposed:**

The holder receives the request, reiterating in the EIA)Chapter 10, section 10.2.10) purpose of the law No. 17,288 as legislation applicable to the project.

Thus, in case that during construction activities there is the finding of some archaeological or paleontological element not previously detected, and which has been so described by the archaeologist in charge of the permanent monitoring during the phase construction -in accordance with stated in the EIA, table 7-6, Chapter 7, section 7.2.2 - complement by D.S No. 484/90 MINEDUC, regulations of the law N°17.288:

- Immediate arrest of operations or activities are carried out in the place of the finding,
- Rescue in the event of imminent loss,
- Report immediately to the Provincial Government,
- Communication in writing to the Council of national monuments,
- Development of a plan of action by an archaeologist, which will be presented to the National Monuments Council for review and approval.
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**4.10. Matters affable "safety of electrical installations, liquid fuels and gas", as also in the associated operations, the holder must comply with the following regulatory bodies:**

- **Facilities electrical, are the TASA as the construction tasks: D.F.L. No. 4-20018-2006; D.S. N ° 327/97; NChElec 4/2003; NSEG.5.E.n. 71; NSEG. 6 E.n.71.**

**Reposed:**

The holder receives the observation. Then attach the tabs of fulfilment for all these rules:

<b>STANDARD</b>	<b>Decree Law No. 4/20.018</b>
<b>NAME</b>	<b>Fixed text revised, coordinated and systematized the decree with force of law 1, mining, 1982, Ley General de electrical services, electrical energy.</b>
<b>OFFICIAL DAILY PUBLICATION DATE</b>	February 5, 2007
<b>AUTHORITY THAT EMANATES</b>	Ministry of economy, development and reconstruction
<b>SCOPE OF APPLICATION</b>	National
<b>PHASE</b>	Construction and operation
<b>MATTER</b>	<p>Article 2 N ° 6, establishes the conditions of security to facilities, machinery, instruments, apparatus, equipment, fixtures and electrical materials of any kind and quality conditions must be and security instruments intended for recording consumption or transfer of electric energy.</p> <p>En_virtud_de article 19 letter d) (temporary concessions), or 25 letter e) (final), of this law, it must be pointed out the location of the lines of transportation, distribution and substations, with indication of roads, streets and other national assets public use to be occupied, and tax, municipal and private properties which you will pass through. Adds article 55 that the lines of transport and distribution of electrical energy can cross rivers, canals, the railroads, bridges, aqueducts, cross streets, roads, and other power lines. This crosses will run in conformity with the requirements that establish the regulations, so that they ensure the safety of persons and property.</p> <p>By Meanwhile, article 223 provides that No will be requirement for commissioning new electrical installations, the approval, but must be reported to the Superintendency of electricity and fuels, accompanying besides the required background, according to the regulations establish it. Is the responsibility of the owners of all types of electrical installations comply with the technical rules and regulations established by virtue of this Act; non-compliance with these rules or regulations may be punished by the Superintendency with fines and/or disconnection of the relevant facilities,</p>

<b>STANDARD</b>	<b>Decree Law No. 4/20.018</b>
<b>NAME</b>	<b>Fixed text revised, coordinated and systematized the decree with force of law 1, mining, 1982, Ley General de electrical services, electrical energy.</b>
	inAccording to what established the respective regulations.
<b>RELATIONSHIP WITH THE PROJECT</b>	The project consists of a Central Reversible hydraulic, bombeo-generacion, in the coastal area of Caleta San Marcos, along with their respective power transmission line. The station considers an installed capacity of 300 MW pump and an installed capacity of up to 300 MW generation. The energy will be injected to the interconnected system of the large North (SING), in the substation, through a high-voltage (LTE) of 65 Km-long power transmission line.
<b>SHAPE AND INDICATOR COMPLIANCE</b>	The holder will timely present all the technical requirements of the electric project to the Superintendency of electricity and fuels (SEC). In addition, perform the connection of the electric transmission line, requesting the appropriate permissions.

<b>STANDARD</b>	<b>Supreme Decree No. 327/97</b>
<b>NAME</b>	<b>Regulation of the General Law of electrical services</b>
<b>OFFICIAL DAILY PUBLICATION DATE</b>	on September 10, 1998
<b>AUTHORITY THAT EMANATES</b>	Ministry of mining
<b>SCOPE OF APPLICATION</b>	National
<b>PHASE</b>	Construction and operation
<b>MATTER</b>	<p>This regulation establishes in article 114 that will not be a requirement for commissioning new electrical installations, the approval of these. However, the works of generation, transmission and distribution, or parts of them, may not be put into service without that its owner has communicated them to the Superintendent, at least 15 days in advance.</p> <p>In addition, it regulates sections 206, 217 and 218 requirements and obligations in obtaining the proper permits, and has both the technical specifications as the execution of any electrical project must conform to current legislation, preserving security and comfort of the movement in the streets, roads, and other public roads, and also the safety of persons, things, and the environment.</p>
<b>RELATIONSHIP WITH THE PROJECT</b>	The project includes the creation of a hydroelectric power plant and transmission of electrical energy by means of an electric transmission line of high tension that connect to SING in the substation.

<b>STANDARD</b>	<b>Supreme Decree No. 327/97</b>
<b>NAME</b>	<b>Regulation of the General Law of electrical services</b>
<b>SHAPE AND INDICATOR COMPLIANCE</b>	The owner shall notify the Superintendency of electricity and fuels, at least 15 days in advance, the commissioning of works of generation service as well as the transmission line.

<b>STANDARD</b>	<b>NSEG 5 E.n. 71</b>
<b>NAME</b>	<b>Regulation of electrical installations of strong currents</b>
<b>OFFICIAL DAILY PUBLICATION DATE</b>	on November 12, 1955
<b>AUTHORITY THAT EMANATES</b>	Superintendency of electricity and fuels
<b>SCOPE OF APPLICATION</b>	National
<b>PHASE</b>	Construction and operation
<b>MATTER</b>	<p>This standard defines provisions for the execution of electrical installations from strong currents and for improvement or changes to existing ones.</p> <p>According to his article 90, installing overhead lines should be marring the landscape as little as possible. When there are several more or less equivalent solutions from the economic and technical point of view, preference is given to those that least tarnish the landscape.</p> <p>Furthermore article 109, establishes that the separation between a building or construction and the next driver of an airline in any category shall be such that there is no danger for persons to contact with driver inadvertently. In normal cases the minimum separations established the same provision must be respected. In special cases it will solve the Superintendency.</p> <p>Thus also, the standard provides that on lines of category B, the distance between the conductors and the neighbouring trees shall be such that there is no danger of contact between these trees and the drivers. He adds that on rural lines of category B the distance between the conductors and the neighboring trees will be at least 5 meters, unless the height of trees requires one greater distance. In cases of differences will solve the Superintendency. With respect to the lines of the category C, this body of law establishes that the distance between the conductors and the neighboring trees area equal to the height of the trees, but less than 5 meters. Finally, sets allowing the existence of trees under category B or C lines, provided that the owner of such trees keep them fit his height not to exceed 4 meters above the ground.</p>
<b>RELATIONSHIP WITH THE PROJECT</b>	The holder is present at all times, been considered as part of the design of the line, the distance and conditions setting article 109 of the NSEG 5 E.N 71
<b>SHAPE AND INDICATOR COMPLIANCE</b>	The project includes a power transmission line. Its design and construction will comply with the indications which stipulates the cited standard, in relation to the voltage of the power line and the process of its facilities

<b>STANDARD</b>	<b>NSEG 6 E.n. 71</b>
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<b>NAME</b>	<b>Regulation of crosses and Parallels of power lines</b>
<b>OFFICIAL DAILY PUBLICATION DATE</b>	on April 25, 1957.
<b>AUTHORITY THAT EMANATES</b>	Superintendency of electricity and fuels
<b>SCOPE OF APPLICATION</b>	National
<b>PHASE</b>	Construction and operation
<b>MATTER</b>	<p>This standard aims to set standards for the execution of crosses and parallels that are established in the future, and for the improvement or modification of existing ones (art. 1.1).</p> <p>For these purposes, parallelism means "of neighbouring lines which follow more or less the same direction, even when their paths are not strictly parallel" (art. 1.2) and by crossing, "the point where the paths of different lines are cut." (art. (1.3).</p>
<b>RELATIONSHIP WITH THE PROJECT</b>	<p>The project considers the use of electrical interior installations for buildings, such as camps, casinos, offices, facilities work, etc., as outlined in Chapter 1 of the EIA.</p> <p>On the other hand, the project also considered a series of power lines. Thus, it is considered an electric power line (Sector Pampa) ranging from underground substation designed to mirror of Tarapacá, up to Lagunas de SING (EIA substation, Chapter 1, section 1.4.5.1). In addition, it considers four power lines of medium-voltage on the coast Sector (EIA, Chapter 1, section 1.4.3.9) and line of the same type on the plateau Sector (EIA, Chapter 1, section 1.4.4.5).</p>
<b>FORM AND COMPLIANCE INDICATOR</b>	<p>The holder shall declare all facilities and electrical equipment to the Superintendency of electricity and fuels in a way that establishes the free SEC resolution N ° 1.128/2006, or the regulation which will replace it.</p> <p>In addition, will carry out concessions or permissions for the installation and operation of electric power transmission lines as provided for in the applicable legislation.</p> <p>As a general principle, projected paths have avoided, if possible, the passage of the lines by high visibility and places of scenic beauty relative. On the crosses, these will be implemented in accordance with the requirements referred to in applicable regulations, in a way that will ensure the safety of persons, things and the environment, as ordered by the NSEG 6 E.n.71. Similarly, a minimum height of the line on the ground drivers, determined from NSEG 5 E.n.71 provisions has been considered in the design.</p>

- **Fuel facilities: D.S. N ° 160/2009 and its modification D.S. N ° 101/2013.**

**Reposed:**

In this regard, is made present that in the EIA)Chapter 10, section 10.2.7) is built-in the D.S. N ° 160/2009, of the Ministry of economy, development and reconstruction as legislation applicable to the project, delivering a history who certify their compliance during the execution of the project.

- **Gas installations: D.S. N ° 66/2007.**

**Reposed:**

Be welcomes the request of the authority. Then attached the respective tab of compliance with regulations.

<b>STANDARD</b>	<b>D.S. N ° 66/2007</b>
<b>NAME</b>	<b>Regulation indoor facilities and Gas meters</b>
<b>OFFICIAL DAILY PUBLICATION DATE</b>	February 2, 2007
<b>AUTHORITY THAT EMANATES</b>	Ministry of economy, development and reconstruction.
<b>SCOPE OF APPLICATION</b>	National
<b>PHASE</b>	Construction
<b>MATTER</b>	This regulation lays down the minimum safety requirements that must be meet the Interior gas installations, whether individual or collective, supplied through a network - network - or containers pressurized gas -cylinders - as also their gas meters, to be an integral part of collective buildings or houses, residential, commercial, industrial use and public. Gas types correspond specifically to the belonging the first, second or third family according to what is established in the numerals 10.63.2 to the 10.63.4 of this regulation.
<b>RELATIONSHIP WITH THE PROJECT</b>	The project includes the implementation of gas inside installations Sector coast camp during the construction phase, in the area of the Casino, intended for the preparation of food for workers.
<b>FORM AND COMPLIANCE INDICATOR</b>	The project will comply with the technical specifications laid down in the Regulation and promptly declare interior installations to the SEC. As an indicator of compliance will be the registration of the Declaration of gas installations, which will be available for the services of control as appropriate.

- **You must ensure that you will not use oils Polychlorinated Biphenyls PCV, like: Pyranol, Aroclor, Piralene", others called "Askarels" in electrical equipment or other applications; since they are strictly prohibited by the who and the Res. SEC N 610/82.**

**Rexposed:**

The owner welcomes the request made by the authority and undertakes not to use PCBs during the entire implementation of the project. In addition, attached below the tab of fulfillment of the Res. SEC N 610/82:

<b>STANDARD</b>	<b>Resolution No. 610</b>
<b>NAME</b>	<b>Prohibits the use of Polychlorinated Biphenyls (PCB) in electrical equipment.</b>
<b>OFFICIAL DAILY PUBLICATION DATE</b>	on September 22, 1982
<b>AUTHORITY THAT EMANATES</b>	Superintendency of electricity and fuels
<b>SCOPE OF APPLICATION</b>	National
<b>PHASE OF COMPLIANCE</b>	All phases
<b>MATTER</b>	Article 1 prohibits the use throughout the national territory of the Polychlorinated Biphenyls (PCB) commercially known as ascareles (Pyranol, Aroclor, Piralene and others), as dielectric fluid in transformers, capacitors and other electrical equipment, so as not to rule ultimately the competent authority on the subject.
<b>RELATIONSHIP WITH THE PROJECT</b>	The project considers the use of electrical facilities for some of its buildings, as noted in Chapter 1 of the EIA. In addition, during the construction phase is considered the use of generators as back-up for slaughter facilities equipment (EIA Chapter 1, section 1.5.9.1).
<b>SHAPE AND INDICATOR COMPLIANCE</b>	It is this that the project will not use in any way Polychlorinated biphenyls, regardless of the team or the electrical system that is used, in order to comply with the resolution No. 610/1982, of the Superintendency of electricity and fuels.

- **Duty to establish security strips associated easements of the electrical lines.**

**Answer:**

The owner reports that the safety of high-voltage power line strip is 30 m to 135 m wide, according to the section, which have been assessed environmentally.

Even though Security strips is establieron sEGUN the electrical sector regulations and considering that they correspond to one of the results once completed the procedure

associated with the power line, the holder makes present that in all time, been considered as part of the design of the line, the distance and conditions setting article 109 of the NSEG 5 E.N 71.

Finally, is clarifies the holder will provide sectorally this concession, given that the imposition of easements, constraints and financial agreements between the owner of the line and the owners of the premises servants, are not environmental aspects whose content exceeds the scope of competence and the purpose of the evaluation system of environmental impact (SEIA).

- **You must set the precautionary measures and contingency supply plan or trasvasije fuel for vehicles that work in the work.**

**Reposed:**

The owner explains that, during the construction phase, for the supply of fuel equipment, machinery and vehicles for transport of materials and movement of people, etc., will be to authorized distributors, which they will supply fuel ponds in slaughter plants, to then be distributed to the equipment and related machinery. To achieve a minimum range of 2 days in the work referred to have 6 metal tanks with a total capacity of 12,000 litres, installed in the following facilities of slaughter:

- Installation of slaughtering Sector Costa Caleta near San Marcos (2 tanks 2000 L each)
- Installation of slaughter close to Caleta Río Seco (2 ponds of 2000 L each)
- Installation of slaughtering Sector Plateau close to the reservoir (2 tanks 2000 L each)

Likewise, for the operation of the project includes the empowerment of a pond for the storage of fuels in the project facility for diesel engine starting in black in cases of emergency in SING.

The above ponds, both for the construction phase of the project, they will provide the daily fuel and will have a pool safety, to contain any spills, which will have a capacity that reaches 115% of the volume of each pond. In addition they will be located about a geotextile membrane of protection, in order to avoid contamination of the soil.

The described storage shall be declared and will run according to the legislation in force, and in accordance with standards of safety established by D.S. N ° 379, approving regulation on minimum safety requirements for the storage and handling of Liquid petroleum fuels, intended for own consumption.

Although the supply of fuel, as noted above, will be companies authorized distributors that will have proper procedures and plans of force contingency supply or trasvasije fuel, generally, the following shall be considered:

#### Description of the activity

- To execute work must be previously planned, considering all the steps and the risks inherent in it. (Fire, shock or collision)
- Prior checking of vehicle
- The driver of the truck will have your license a day according to the vehicle driving and will be authorized for this activity by the company in charge of the supply / trasvasije fuel.
- All corresponding elements of personal protection must be used during the development of the activity.

#### Procedure of supply / trasvasije

1. The driver must enter the sector of catering to low speed.
2. You park the truck of fuel in the fuel supply pump and the cones are placed.
3. It is parking (emergency brake) and fuel truck engine stops, the driver must turn off his cell phone and locate two wedges.
4. It is the lid of the fuel tank to fill.
5. Removed the fuel pump hose and is introduced into the supply tank.
6. The fuel pump is placed at zero.
7. The game mechanics of supplier is activated.
8. Put into operation the pump helper Gets the fuel truck for access stairs, to put the key to filling the pond.
9. Fill the pond will take caution fill up to 5 cm before their capacity, to avoid shall and pollution to the soil.
10. In the event a spills, you must remove the area contaminated bags and move them to a place designated by the company principal and give notice to the corresponding Department of this anomaly, as well as the head of present in the place field.
11. After filling the pond removed filling gun, moving it into the fuel pump, waiting about a minute waiting to spout stop disabling account.
12. Place the lid into the pond.

Throughout the development of the supply / fuel trasvasije and in order to minimize the probability of occurrence of fuel spills during refuelling of vehicles, equipment and machinery, it should seek to perform maintenance and recharging of fuels in the sector provided for the purpose, which as is described above, It will feature a pool safety, to

contain any spills, which will have a capacity to it reaches 115% of the volume of each pond and will be located on a geotextile or protective membrane, in order to avoid contamination of the soil.

Although the contingency plan associated with the supply / fuel trasvasije it is the responsibility of the company in charge of this task, the chapter 8 Plan of prevention of contingencies and emergencies, described in sections 8.6.2 the anthropic risks associated with the project, which includes the spill of fuels, fires, car accidents, among others. Likewise, in table 8-3. Contingency measures for the anthropic risks, identifies the measures for the control of these risks, indicating the implementation phase for each of them.

**Table 4-2. Contingency measures for the anthropic risks.**

Risk	Prevention measures of contingencies
Risk of spills of fuel, oil or hazardous substances in the sea	<p>Associated security measures:</p> <ul style="list-style-type: none"> <li>• This risk is associated with faults or tipping that can suffer the boats, marine crane and auxiliary vessels for the construction and installation of the intake in the sea</li> <li>• In each operation, the correct state of the tanks of fuel, housings, motors, seals lubrication and fuel the vessels and machinery as well as the proper state of the hoses and hydraulic oil of machinery shall be verified to use.</li> <li>• Boats and marine machinery drivers must have a day licences and permits granted by the maritime authority for the management of vessels and it machinery maritime, as well as in first aid procedures and control of possible spills (including the instruction of the procedures associated with the handling of dangerous substances).</li> <li>• Before a spill vessels or machinery operator must stop the main engine and the auxiliary engines if any and stop any source of ignition if possible.</li> <li>• If there is a spill will try stop it, without putting at risk your own safety.</li> <li>• Arrest of spill kit will be used so that the stain of fuel or oil</li> <li>• Once controlled the stain will be used will pick up the stain of fuel or lubricant through a skimmer or other manual method.</li> <li>• Safety measures associated with the storage and handling:               <ul style="list-style-type: none"> <li>• Storage or handling of these substances in the sea is not considered.</li> </ul> </li> </ul> <p>Operation phase:</p> <ul style="list-style-type: none"> <li>• The same precepts that in the construction phase shall be respected during inspections or maintenance of the intake.</li> </ul> <p>Closing phase:</p> <ul style="list-style-type: none"> <li>• Ditto the measures indicated for the construction phase.</li> </ul>
Risk of spills of fuel, oil or hazardous	<p>Safety measures associated with transport:</p> <ul style="list-style-type: none"> <li>• The transportation of fuel will be carried out by authorised companies.</li> <li>• The transport of liquids, such as fuel and others which may be required in</li> </ul>

Risk	Prevention measures of contingencies
substances in Earth	<p>the work, shall be governed by the provisions of the legislation in force.</p> <ul style="list-style-type: none"> <li>• The carrier or driver will possess the properly licensed, in conjunction to the training necessary to respond in the event of accidents, spillage of the transported substances.</li> <li>• Drivers of transport vehicles will have training in the handling and manipulation of the substances transported, as well as in first aid procedures and any spill control (includes the instruction of procedures associated with the handling of dangerous substances).</li> <li>• Safety measures associated with the storage and handling:</li> <li>• It will be trained to staff who handle and store this type of substances, on-site operations.</li> <li>• There will be a special storage area for these materials to the interior of the installation of tasks, which will be duly marked and conditioned as provided by the competent authorities.</li> <li>• Fuel and oil drums shall be on wooden pallets or other devices in order to facilitate its transportation and avoid moisture and corrosion of the same, due to the direct contact between the drum and the floor.</li> <li>• You will be available in this area of elements that allow the containment of spills of medium magnitude.</li> <li>• Collection of these substances enclosures, will count with the respective safety sheets, containing among other data, the characteristics of the substances, their risks and emergency procedures which must be activated in the event of the risk statement.</li> <li>• Fueling to machinery and equipment used during construction will be done in an area previously defined and clearly demarcated</li> <li>• Change oils and other oily wastes should be stored in appropriate places and empty and closed, drums for subsequent disposal in authorized places or return to suppliers.</li> <li>• It should be noted that you for the operation of machinery and motor vehicles to use in the construction of works, it will require petroleum diesel and gasoline, which will be supplied by companies, local distributors.</li> <li>• According to the DS No. 379/86 of the Ministry of economy, which regulates the storage of liquid fuels derived from oil intended for own consumption, will require contractors registration of ponds of fuels in the records of the Superintendency of electricity and fuels (SEC), provided that these have a capacity greater than 1.1 m<sup>3</sup>, otherwise, is not necessary your registration when registering.</li> </ul> <p>Operation phase:</p> <ul style="list-style-type: none"> <li>• Ditto the measures indicated for the construction phase.</li> </ul> <p>Closing phase:</p> <ul style="list-style-type: none"> <li>• Ditto the measures indicated for the construction phase.</li> </ul>
Fire in the Area of operations	<p>Stage of construction:</p> <ul style="list-style-type: none"> <li>• The contractor shall be governed by measures and obligations set out in Tarapacá mirror SpA to minimize the risk of fire.</li> <li>• In the installation of tasks will be built enclosures specifically enabled for</li> </ul>

Risk	Prevention measures of contingencies
	<p>the storage of fuel and other flammable substances. Flammable materials will be maintained in an orderly and classified to the inside of the enclosure. The Prevention risks will held a permanent inspection, detecting possible flaws in the procedures of handling of these substances.</p> <ul style="list-style-type: none"> <li>Contractors shall be provided in the areas of work and installation of tasks, from the basic elements required to combat any threat of fire or fire, as established by the current legislation on this (fire extinguishers, hoses, drums with sand, etc.).</li> <li>Will be a monitoring of the affected area to assess and report damage to the relevant authority, if There is a community or environmental damage.</li> </ul> <p>Operation phase:</p> <ul style="list-style-type: none"> <li>By the type of works, special events fire for actions not foreseen during this stage, except those which the law.</li> </ul> <p>Closing phase:</p> <ul style="list-style-type: none"> <li>Ditto the measures indicated for the construction phase.</li> </ul>
Traffic accidents	<p>Stage of construction:</p> <ul style="list-style-type: none"> <li>Road safety training will be all drivers involved in the construction and operation of the project.</li> <li>It will run a rules of good behaviour for driving safely in vehicles. Failure to comply with this Regulation shall be causal immediate dismissal.</li> <li>Staff to hire for handle trucks, buses and machinery, will be personal qualified, licensed drivers a day. He is required for license corresponding to the transit law (N° 18.290).</li> <li>The contractor will implement a formal procedure to deal with traffic accidents which address the emergency in a timely manner, which will remain inside of each vehicle's load.</li> <li>It will be trained drivers with regard to the actions to be followed before an accident on the route.</li> <li>Will be implemented in the construction area signs</li> <li>The weight of the trucks loaded with equipment or materials shall not exceed the maximum allowed according to the routes/bridges that are being used. Otherwise, receive the appropriate permissions of the Dirección de Vialidad in each case.</li> </ul> <p>Stage of operation and closure:</p> <ul style="list-style-type: none"> <li>Ditto the measures indicated for the construction phase.</li> </ul>

Source: Chapter 8 Prevention Plan for contingencies and emergencies

Finally, in case of an emergency, the procedure to be followed will be described in the chapter 8 Plan for prevention of contingencies and emergencies, section 8.7 Emergency Plan, which establishes the Organization facing an emergency and says the procedures, measures to be taken and necessary to implement necessary communication system.

**4.11. The holder must instruct all the project workers (own and contractors), strict compliance with the law on hunting 19.473 ° N, which includes the prohibition of disturb or affect any species of wildlife, as well as the prohibition of introduce and/or maintain pets, within the project area, in all stages of this.**

**Reposed:**

The holder receives the observation. In this regard, reiterates in the EIA)Chapter 10, section 10.2.11) in the sense that the holder will instruct all employees and contractors compliance with the law N ° 19.473 and its regulations (Supreme Decree N ° 05/1998, Ministry of agriculture), which includes the prohibition to disturb or affect any species of wildlife, as well as the prohibition of introduce and/or maintain pets, within the project area, in all the phases of this.

**4.12. Points to the holder that the above aspects by NCh No. 409/1 Of 2005 the Inn are not environmental, constitute health aspects.**

**Reposed:**

The owner welcomes the observation of the authority.

**4.13. In relation to the Supreme Decree N ° 735 regulation of the services of water intended for human consumption, points out that aspects of this regulation are health, not environmental.**

**Reposed:**

The owner welcomes the observation of the authority.

**4.14. It is pointed to the holder that the D.S N ° 78/09, does not apply as environmental legislation; as described in the EIA correspond to the application of the Supreme Decree No. 594, article 42.**

**Reposed:**

The holder ago mind that Letter express Article 1 of the rules of storage of hazardous substances (D.S. N ° 78/2008(, Ministry of health), the provisions of this regulatory body be governed preferably on the provisions of article 42 of the Supreme Decree No. 594/1999, Ministry of health. A result has been incorporated the regulatory body within the environmental regulations applicable to the project in the EIA.

**4.15. Holder must comply with the provisions of:**

- **NSEG 5. E.n.71. Regulation of electrical installations of strong currents, Ministry of economy, SEC, which sets the vertical distance, measured in meters for an airline of category C, at junction of roads and streets.**

**Answer:**

The holder receives the observation. In this regard, please refer to the answer 10 of this section, where the background that accredit the fulfillment of the NSEG 5 E.n.71, such as legislation applicable to the project are delivered.

- **Resolution D.V. 232/02 MOP, which establishes the conditions of access to public roads under tutelage of the Dirección de Vialidad.**

**Answer:**

The holder receives the observation. For more information regarding compliance with this privacy policy, please refer to the designated below with regard to compliance with the MOP D.F.L. No. 850/1997, fixed the revised text, coordinated and Sistematizado of the law No. 15.840, 1964 and the DFL N ° 206/1960.

- **DFL 1/2007 MINTRATEL that fixed the text revised, coordinated and Sistematizado of the law of the road N ° 18.290 in its article N ° 62, 63, 64 and 136.**

**Answer:**

The owner welcomes observation, then accompanying the tab's compliance with respect to the regulatory body concerned:

<b>STANDARD</b>	<b>D.F.L. No. 01 of 2007</b>
<b>NAME</b>	<b>Fixed text revised, coordinated and Sistematizado of the law of the road</b>
<b>OFFICIAL DAILY PUBLICATION DATE</b>	October 29, 2009
<b>AUTHORITY THAT EMANATES</b>	Ministry of transport and telecommunications, and Ministry of Justice
<b>SCOPE OF APPLICATION</b>	National
<b>PHASE OF COMPLIANCE</b>	All phases.

<b>MATTER</b>	<p>Article 62, paragraph 2, indicates that "may not transit vehicles that exceed the permitted maximum weights".</p> <p>Article 63, for its part, establishes that "in cases of emergency duly qualified, and case of indivisible loads, the Dirección de Vialidad may authorize the movement of vehicles exceeding the dimensions or weights established as a maximum, with the" precautions that are available in each case.</p> <p>This authorization must be communicated, promptly, to Carabineros de Chile in the order adopted the necessary security measures for the movement of vehicles."</p> <p>Article 64 States that "freight transport must be made in security conditions that determine the regulations and vehicles which meet the requirements covering those".</p> <p>Finally, article 136 provides that "the Dirección de Vialidad or municipalities, as appropriate, may authorize turns from second track, previous demarcation and signs."</p>
<b>RELATIONSHIP WITH THE PROJECT</b>	The project will require, in some cases, the transportation of loads that could exceed the maximum weights per axle or dimensions that designates the provision in question.
<b>FORM AND COMPLIANCE INDICATOR</b>	<p>In those cases where appropriate, the holder will provide prior authorization for transit with oversize or overweight before the competent authorities. For the control of the loading weight will be record of the waybills of the burden that will be transported, showing made journey, date and time and the associated truck indicating its patent plate. Require third-party transport, such authorization shall be required by the owner to this.</p> <p>Finally, in the transport of materials will be fulfilled the requirements, conditions and requirements established in the D.S. N ° 75/1987, Ministry of transport, as was already noted in the EIA)Chapter 10, section 10.2.8).</p>

- **Article N ° 30, 36, 39, 40 and 41 of the DFL MOP 850/97 that sets the text revised, coordinated and Sistematizado of the law 15.840, 1964 and the DFL. N ° 206 of 1960.**

**Answer:**

The owner welcomes observation, attaching the tab's compliance with the regulatory body in question:

<b>STANDARD</b>	<b>Decree Law N ° 850.</b>
<b>NAME</b>	<b>It sets the text revised, coordinated and systematized in the law No. 15.840 of 1964, organic of the Ministry of public works, and the DFL N° 206, 1960, law of roads.</b>
<b>OFFICIAL DAILY PUBLICATION DATE</b>	on February 25, 1998.
<b>AUTHORITY THAT EMANATES</b>	Ministry of public works
<b>SCOPE OF APPLICATION</b>	National

<b>STANDARD</b>	<b>Decree Law N ° 850.</b>
<b>NAME</b>	<b>It sets the text revised, coordinated and systematized in the law No. 15.840 of 1964, organic of the Ministry of public works, and the DFL N° 206, 1960, law of roads.</b>
<b>PHASE</b>	All phases.
<b>MATTER</b>	<p>In its article 30, it prohibits the circulation on public roads of vehicles of any kind which exceed the maximum weight limits laid down in the relevant statutory and regulatory provisions (in. 2 °). However, in certain cases, the Dirección de Vialidad may grant authorizations for the carriage of machinery or other indivisible objects, exceeding the weights permitted, upon payment of the corresponding rights (in. 4 °).</p> <p>In addition, article 36 provides that when a municipality, company or individual need to do works requiring their occupation or break on the roads, they must request clearance to the Dirección de Vialidad.</p> <p>On the other hand, article 39 prohibits the owners of the adjoining public roads national land, deal with strips of 35 metres measured on each side of the current closings or which running on alternatives or new national roads, with constructions definitive in the future they may impair its widening. In addition, article 40 indicates SpamKiller that "the owners of the land adjacent to national roads can only open access roads to these with express permission of the Dirección de Vialidad".</p> <p>Finally, the art 41 provides that the Dirección de Vialidad may authorize, on such terms and conditions which it shall determine, charged to their respective owners, and upon payment of the corresponding rights, placement of mains water and drainage; sanitary works; irrigation canals; pipes or ducts for the conduction of liquids, gases, or cables; the posts wired telephone, telegraph or power or fiber optic transmission, and in general, any installation which occupy public roads and their respective bands in the public domain or other road works governed by law.</p>
<b>RELATIONSHIP WITH THE PROJECT</b>	<p>The project will require, in some cases, the transportation of loads that could exceed the maximum weights per axle or dimensions that designates the provision in question.</p> <p>On the other hand, the project also provides an intersection of route 1 discharge tunnel, as outlined in the Chapter the EIA 1.</p> <p>Finally, according to given features in the Chapter 1 EIA, the project considers five joints: three on the coast Sector, accessing the route 1, and two on the plateau Sector that they are accessing the A752 route.</p>
<b>FORM OF COMPLIANCE</b>	<p>In those cases where appropriate, the holder will provide prior authorization for transit with oversize or overweight before the competent authorities.</p> <p>In addition, the holder will provide permission from article 41 to Dirección de Vialidad to the intersection of route 1 discharge tunnel. For these purposes, ensure the stability of the works, the traffic safety and the future development of the tract.</p> <p>With regard to access to public roads, the holder will provide previously corresponding to the Dirección de Vialidad permits, as required by article 40. For these purposes, the holder shall comply with the conditions of access to national public roads established in the beef. No 232/2002, of the Dirección de Vialidad.</p>
<b>CONTROL</b>	Carabineros de Chile, the inspectors prosecutors the direction of road of the Ministry of public works and the environment Superintendence, under the rules of the law 20.417 programmed control

- **D.S. MOP 1910/03 amending the D.S. N ° 158/80, setting weights max1mos of vehicles that can travel on public roads, establishing weights per axle, boulders and tonnes.**

**Answer:**

The owner welcomes observation, attaching the tab's compliance with the regulatory body in question:

<b>STANDARD</b>	<b>Supreme Decree No. 158/80</b>
<b>NAME</b>	<b>It sets the maximum weight of vehicles that can travel on public roads.</b>
<b>OFFICIAL DAILY PUBLICATION DATE</b>	on April 7, 1980.
<b>AUTHORITY THAT EMANATES</b>	Ministry of public works
<b>SCOPE OF APPLICATION</b>	National
<b>PHASE</b>	All phases.
<b>MATTER</b>	In order to prevent premature deterioration of the pavement of streets and roads, the road direction of the Ministry of public works through this Supreme Decree, established the boundaries of maximum weight per axis with which heavy goods vehicles can circulate on the roads of the country. It also establishes that to transport indivisible load with gross weight exceeding 45 tonnes must request permission in the Dirección de Vialidad. This same rule applies to urban routes, by express remission of Supreme Decree No. 200 of the Ministry of public works, in 1993, to set weights Max vehicles to circulate in the urban routes of the country.
<b>RELATIONSHIP WITH THE PROJECT</b>	The project will require, in some cases, the transport of loads that could exceed the maximum weights per axle which designates the provision in question.
<b>FORM OF COMPLIANCE</b>	The holder will require all its contractors compliance with maximum weights of vehicles that can travel on public roads.

- **75/87 D.S. MINTRATEL which establishes the conditions for the transport of solids loading on trucks.**

**Rexposed:**

The holder receives the observation. In this regard, is made present that in the EIA)Chapter 10, section 10.2.8) Figure D.S. N ° 75/1987, of the Ministry of transport, applicable rules and background allowing to certify their respective compliance are delivered.

**4.16. Points to the holder, which should apply to the Regional Directorate of roads, sectoral permission to enter on public roads, where must present the information provided for in section 7.301.5 enter in routes, the Manual of Volume 7, road maintenance and the instruction of traverse, Parallels and accesses of the direction of highway roads.**

**The presentation of the project of air Atravieso will consider the prior statement of the competent body, in this case the Superintendency of electricity and fuels, sec.**

**The feasibility of access and subsequent project application must comply with described in the highways Manual, Vol. 9, section 9.802.3 processing and approval of access to Roads Public. Therefore, the owner must formalize to the Regional Directorate of Roads, the access to its existing, prior to the construction of this project.**

**The Regional Directorate of roads considered the statement of the Regional Secretariat Ministerial of national assets with respect to the ownership of the ground for the application of access, Traverse and parallelisms required by the holder for the materialization of their project.**

**Rexposed:**

The holder receives the observation, and undertakes to deal promptly with the Regional Directorate of roads all their competition permits that are applicable to the project.

## 5. PLAN ENFORCEMENT PAS

5.1. In relation to the technical background associated with the application of the sectoral environmental permit (PAS) N ° 115 of the CUMPLIMIENTO:

- **With respect to section 10.2.3 "Characteristics and composition of the waste", indicated that discharge effluent corresponds to sea water, identical in composition to the suction; However, considering that Chapter 1 shows that in the operational phase, will they be downloaded Additionally you riles them associated with the desalination plant, must be considered and assess this situation download altogether or in an integrated way, presenting once again the associated background**

### **Reposed:**

The holder welcomes the request and clarifies that only discharge of brine will be held by the same (tunnel) via the discharge of seawater, since waste product of the maintenance and cleaning of the plant, will be removed from the process and stored for its removal and final disposal in authorized place.

So it was a modeling of joint discharge of water from the reservoir and the salmue seaRA of the desalination plant, the results are presented below.

Were the models for each seasonal period, joining the flow station and desalination plant at 15 m of depth. LUnion of the caudales) saline pen station (28,000 l/s) and the desalination plant)7,9 l/s approx.) was carried out at the point of discharge precedent. Therefore, the modeling scenario is already conservative in practice during the phase of operation these flows will be mixed before beingn downloadeds to the sea. The results can be said next:

The biggest contribution of saline during the modeling arose in the summer period (see Table 5-1). It can be seen that the union of the saline flow generates a maximum positive point differential at the bottom of a 1.36 percent with respect to the salinity of the receiving environment (i.e. 0.47]PSU[, approximately), and a monthly average of 0.09% with respect to the conditions of the marine environment.

In relation to saline excesses reported at the sea surface, variations in all modeled periods were not recorded.

**Table 5-1. Statistics of saline excesses reported during each period.**

Seasons of the year	Statistics: maximum		Statistics: average		Variation of the medium
	Excesses]PSU]	Percentage [%]	Excesses]PSU]	Percentage [%]	
Otone	0.2145	0.62	0.0342	0.099	Very low
Invierno	0.2489	0.72	0.0348	0.10	Very low
Primavera	0.3166	0.89	0.0435	0.12	Very low
Verano	0.4704	1.36	0.0315	0.09	Very low

Below are the saline excesses of the total area from a point of view of vertical profile and level saline pen for each period. You can see the salt excesses are diluted quickly, not generating any area of influence which alter the marine environment, since the largest reached 1.36% percentage is very down to the 5% that the Norma Australiana sets. In the Table 5-2 the total areas that included saline pen.

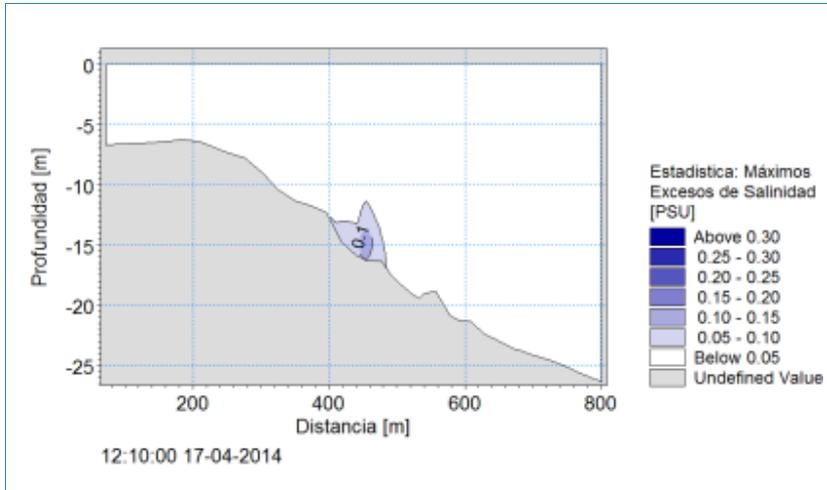
**Table 5-2. Total area with thermal differentials represented up to the isohaline [0.04]PSU] at the bottom, for each seasonal period.**

Dimension	Statistics: background			
	Autumn	Winter	Spring	Summer
Area Total [km <sup>2</sup> ]	0,0065	0,0097	0,0119	0,0161
Radio Max [m]	66	66	76	115

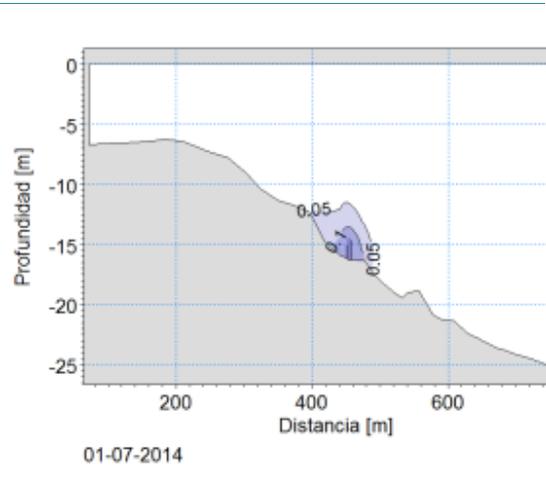
**Figure 5-1. Statistics with the maximum excesses of the total area (vertical profile) generated by the different scope and extensions of saline pen for each seasonal period modeled,**

Autumn	Statistics: Vertical profile of excesses mgenerated aximos the total living area	
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represented to the isohaline [0.05]PSU).



Spring



Summer

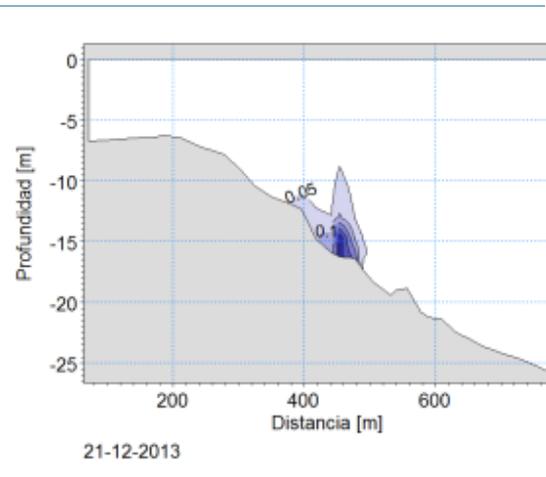
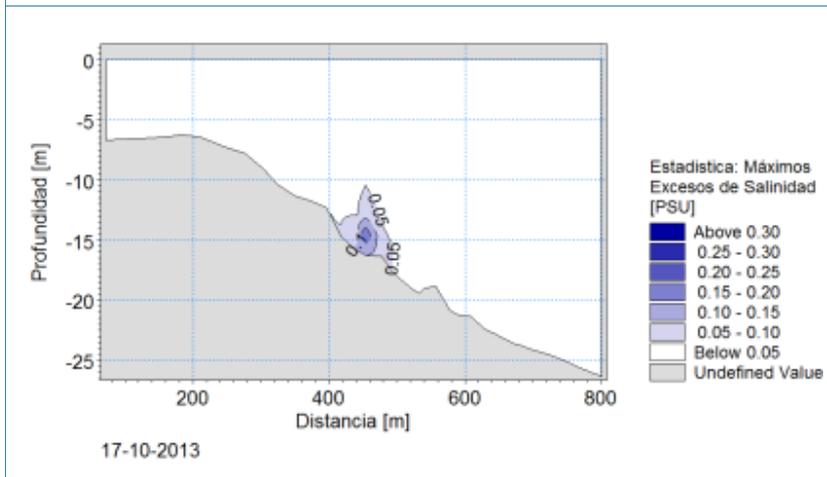


Figure 5-2. Download pen brine for fall, winter, spring and summer in background





- **The incumbent performs an analysis of baseline marina; However, should propose a Plan for marine environmental monitoring, that incorporate the environmental matrices water, sediment and biota, according to provisions of articles 141 to 143 of the D.S. (m) N ° 1/1992 "regulation for the Control of contamination Aquatic", in order to predict environmental risks in the short, medium and long term.**

**Exposed:**

The owner says it, according to the designated in the EIA Chapter 9 monitoring Plan as described in annex 9.1 marine environmental monitoring Plan, the project envisages the implementation of a Plan of marine monitoring, both during the construction phase, as from operation of the project, which incorporates all those aspects that are considered necessary to monitor, in order to ensure that the relevant environmental variables evolve as set out in the impact assessment.

This plan considers, for both the construction phase and operation, the monitoring of the following elements: sediments; Sea water; Benthic communities and communities planktonic, in addition, for the operational phase, incorporating coastal vertebrates. The frequency of the monitoring is established semi-annually for the construction phase and quarterly for the first 2 years of operation, and half for the rest of this phase. The detail of the methodology and sampling points, described in annex 9.1 marine environment monitoring, presented at EstIt gave environmental impact, which rectifying this product and other questions of authority and is appended to the present addendum for your analysis. And that is complemented with the Annex 5-1 marine environment environmental monitoring Plan of the present Addendum.

It should be noted that although said plan of poses as a volunteer in the EIA, in accordance with stated in question 10.7 of the present Addendum and as established in the D.S. (M.) No. 1/1992 regulation for the Control of water pollution, this is considered mandatory and its implementation shall be subject to the provisions of the environmental assessment, the maritime governance service of Iquique, the SERNAPESCA in the Region of Tarapacá and the Superintendent of environment, as appropriate.

**5.2. Without prejudice to this project not PAS de l'article N ° 126 of the CUMPLIMIENTO, is applicable since the treatment plants have a capacity less than 2,500 inhabitants or generates less than 100 kg. base matter mud dry a day sludge management must comply with the conditions of storage, transportation of sludge, elimination and control of vectors and smells.**

**Rexposed:**

The holder receives the observation. In this regard, is present which in the onlinor environmental legislation (chapter 10, section 10.2.3) is considered as legislation applicable to the project, the rules for the management of sludge from treatment plants of water served (D.S. N ° 04/2009, Ministerio Secretaría General de la Presidencia).

In this sense, each plant's treatment of the project will have an engineering project which will be previously approved by the health authority (as established in article 9 of that Regulation) and the management of sludge generated by the project you will comply with the provisions of this regulatory body.

**5.3. In respect of item N ° 138 of the CUMPLIMIENTO joint sectoral environmental permit:**

- **In relation to the description of the system of treatment of waters served, must incorporate the bases of design, flow rates (maximum, minimum and average), capacity & specifications of the treatment**

**Rexposed:**

The holder clarifies that ll liquid waste that will be generated both in the phase construction as operation, correspondsn domestic waste partners mainly the operation of camps and slaughter facilitiesduring construction, and administrative facilities and control throughout the operation. Treatment includes the implementation of water treatment plants Served (PTAS) modular, type Ecojet, which will be designed for a crew of 150 l per person per day, whereas maximum periods concentration of manpower, which allow abasto requirements of each phase of the project.

With respect to labour considered for the construction phase, but referred to a maximum of 750 people, this corresponds to the labor associated with all works and segments of the project as a whole, but given that the works of the project are not given simultaneously, raises the design of the PTAS according to the maximum of people who may be operating in a particular task. Based on the above, have been considered 3 pts for this stage, located in the control building, camp and the installation of localized in the sector work plateau, each one designed for the peak Labor, as described in the following table.

**Table 5-3: Labor and flow PESETAS for each phase of the project.**

Stage	PTAS	Max staff	Flow Max (m <sup>3</sup> / day)	Min. staff	Flow min (m <sup>3</sup> / day)	Average staff	Flow average (m <sup>3</sup> / day)
Construction	Building Control, area coast PTAS.	500	75	40	6	375	56.25
	Camp, area coast PTAS.	200	30	40	6	120	18
	PTAS installation of slaughter, plateau area.	200	30	40	6	120	18
Operation	Building Control, area coast PTAS.	50	7.5	10	1.5	30	4.5

Source: Homemade.

Based on as indicated in the table above, and whereas a prize of 150 l per person per day, referred to, input rates that reach a maximum of 75 m<sup>3</sup>day, for the construction phase; and 7.5 m<sup>3</sup>day throughout the operation of the project.

The treatment system will be designed based on the maximum of labor indicated in the Table 5-3, whereas an endowment of 150 L/persona-dia, and adopting a 100% recovery coefficient (this coefficient indicates the amount of sewage entering treatment, with respect to the provision considered by person), which will ensure the correct treatment and adequate capacity of the plant.

Based on the above, for the construction phase, are considered PTAS with maximum capacity of 80 m<sup>3</sup>day, all designed for an inflow of 75 m<sup>3</sup>day and watching a flow of output that corresponds to 100% of the designated as inflow. In the following table It is estimated the generation of wastewater from the project.

**Table 5-4. Generation wastewater, maximum workforce. Construction phase.**

PTAS	Max staff	Total consumption (m <sup>3</sup> / day)	Waste water inflow (m <sup>3</sup> / day)	Treated water Output flow (m <sup>3</sup> / day)	Treated water Output flow (m <sup>3</sup> / month)
Building Control, area coast PTAS.	500	75	75	75	2,250
Camp, area coast PTAS.	200	30	30	30	900
PTAS installation of slaughter, plateau area	200	30	30	30	900

Source: Homemade

As designated in the previous table, It will generate a maximum of 2,250 and 900 m<sup>3</sup>monthly stipend of sewage, whereas for each plant, the time of greater staffing in works. The rest of the time, expected a reduction in staff, so the treatment of wastewater will be insured during the entire construction phase.

It should be noted that for closing is expected a generation similar to that described for the construction of the project, reaching a maximum of generation of water served by 2,250 m<sup>3</sup>month.

As for the construction phase, for the operation of the project is considered a PTAS for maximum flow generated, accommodating up to 8 m<sup>3</sup>day, designed for a flow rate of 7.5 m input<sup>3</sup>day and watching a flow of output that corresponds to 100% of the designated as inflow. In the Table 5-5 It is estimated the generation of wastewater from the project to this stage.

**Table 5-5. Sewage generation, operation phase.**

PTAS	Max staff	Total consumption (m <sup>3</sup> / day)	Waste water inflow (m <sup>3</sup> / day)	Treated water Output flow (m <sup>3</sup> / day)	Treated water Output flow (m <sup>3</sup> / month)
Building Control, area coast PTAS.	50	7.5	7.5	7.5	225

As designated in the Table 5-5will generate a maximum of 225 m<sup>3</sup>monthly stipend of sewage, whereas the time of greater staffing in works. The rest of the time, expected a reduction in staff, so the treatment of wastewater will be secured throughout the period of operation.

Regarding the treatment of waters served, this will be determined primarily on the basis sludge ac systemtivados, technology of compact, efficient, and reliable character that guarantees the quality of the effluent treated sanitary safe, visually compatible, no side undesirable effects, such

as odors, noise, or attraction of biological vectors. It is a semi-automatic operation system, which does not demand specialized personnel for its operation and maintenance.

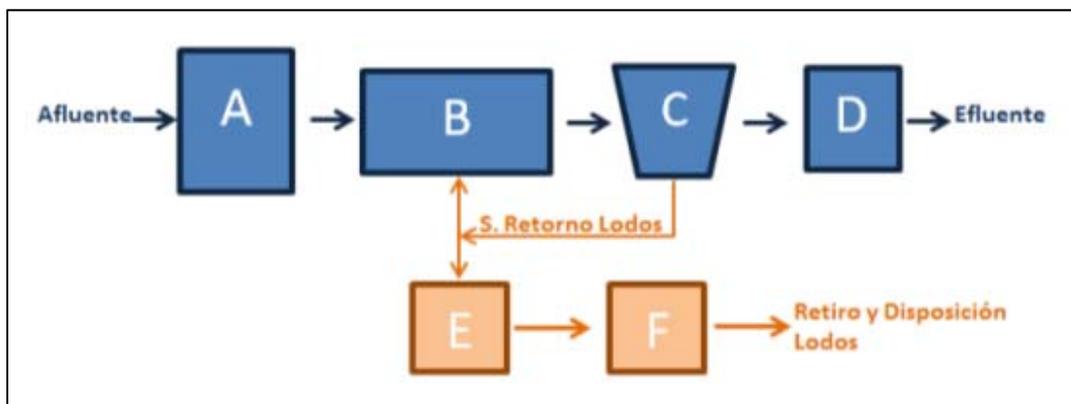
The activated sludge is a process by which the wastewater and sludge biological (microorganisms) are mixed and aired in a tank called reactor. The flocs biological formed in this process settle in a sedimentation tank, place which is recirculated back to the aerator tank or reactor

Basically, the PTAS consists of eight (8) base stages:

1. Pre-treatment)**T**O): it has as main objective condition the wastewater to the activated sludge process, for which separates degradable great size and no solids, prevents Ndo particles of high density to the area of aireacion.
2. Aeration)**B**): wastewater pre-treated they are mixed and airy with from sludge digester sludge, with a view to degrading the current organic material. Oxygenation is performed Air nozzles and diffusers arranged in the bottom of the ventilation Chamber. Broadcasters inject high pressure air bubbles, causing the homogenization of the waters, thus initiating a process of aerobic digestion.
3. Sedimentation / clarification)**C**): Il activated sludge are separated from the water from aeration tank, concentrating them by gravity. This process aims to achieve an effluent clarified with a minimum of suspended solids and ensure the return of the mud.
4. Return sludge system: the purpose of this system is to maintain a high concentration of microorganisms in the aeration tank.
5. Discharge of excess sludge: in order to maintain the concentration of the activated sludge in the tank aeration to a certain value, a part of the sludge are removed from the system, to subsequently provide the dried sludge as solid waste.
6. Disinfection (**D**): it aims at the Elimination of pathogenic elements normally consists of the incorporation of chlorine treated water, in which case should be subsequently performed a dechlorination which seeks to Remove residual chlorine. Finally from this stage of obtains an innocuous effluent to the environment, which will give fulfilment to the NCh 1333/78.
7. Digestion of sludge)**E**): includes the installation of a digester sludge, which is used to accumulate or deposit the sludge in excess to be formed in the aeration tanks. At this stage the sludge have a residence time greater than 25 days, thus achieving stabilization or safety of these, which ensures the generation of odor or attraction of insects. Here the bacteria do not receive food so it initially consume the remnants of contaminants and then begins the endogenous phase or cannibalism where is self consumed.
8. Collection/disposal of sludge)**F**): once deposited sludge in excess, this will be collected and deposited in sectors duly authorized to do so.

The following figure It shows the flow of the type activated sludge sewage treatment system.

Figure 5-3. Activated sludge treatment system.



Source: Homemade

In relation to the generated sludge, These They recirculate between the fountainse of sedimentation and aeration. To the Aging, going to the tank of sludge, where they will be collected in bags or plastic containers, properly labeled; collected inside the PTAS, in a specially enabled industry to do so. and finally they will be removed by a company duly authorized, to be brought to a place authorized for disposal. It should be noted that the sludge generated in the PTAS, they shall comply with that established in the D.S. N ° 4/2009 and will be available According to the regulations on sanitary conditions and basic security in landfills, D.S. N° 189/2007 of the Ministry of health. In addition, es important Note, that dado that sewage will correspond to domestic effluents, sludge generated by the treatment of these will not contain reactive or toxic substances, nor will present features of endangerment.

- **With respect to the description of the form of Final disposal of the effluent Treaty, in this case reuse under irrigation, the pronouncement of the health authority is only with regard to health conditions that must be met, notwithstanding the opinion of the Agency competent connection if it is possible to reuse.**

**Rexposed:**

The holder takes note of the observation.

**5.4. Regarding the mixed PAS de l'article N' 139 of the CUMPLIMIENTO, notes that: "the project for the construction of its works will require the installation of 2 concrete plants located in slaughter facilities referred to in the Sector Costa and the Sector plateau where the concrete into the work will be transported in trucks Mixer. After the pouring of the concrete will proceed to cleaning gutters and cement mixers the truck, which prompted environmental permit sectoral joint established in article 139 of the regulation system of environmental impact D.S N ° 40/2012, for the system of surrounding wash water to each plant treatment." This applies only to a preliminary treatment, whose goal is the separation of coarse solids, which does not apply the environmental permit.**

**Rexposed:**

The holder receives the observation. The sectoral 139 environmental permit, permit for the construction, repair, modification and extension of any public or private works aimed at the evacuation, treatment or disposal of industrial or mining waste will not be prompted.

**5.5. In relation to the mixed PAS de l'article No 146 of the CUMPLIMIENTO, information should complement with the following background:**

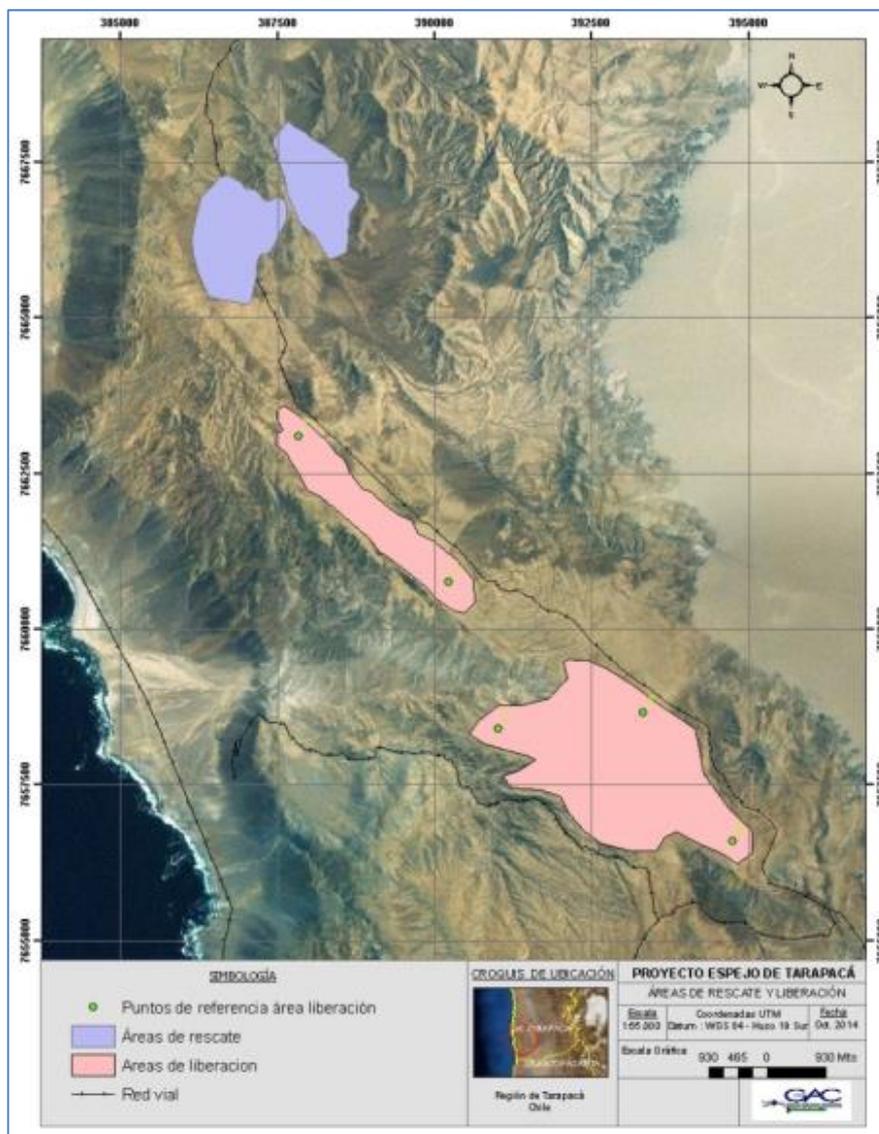
- **Relocation area (s) of *Liolaemus stolzmanni* and *Phyllodactylus gerrhopygus* properly identified and georeferenced (WGS 84, spindle I 9S, UTM).**
- **It should be noted if you will be marking individuals captured and relocated to the monitoring later.**
- **Present a characterization of the population of *L. stolzmanni* and *P. gerrhopygus* residents in areas of relocation.**
- **Presenting indicators of success associated with the measure of rescue and relocation**

**Rexposed:**

The holder receives observation, and indicates as requested:

The areas of relocation of *Liolaemus stolzmanni* and *Phyllodactylus gerrhopygus* are presented in the Figure 5-4. These correspond to two parks, 260 and 743 hectares, respectively. The definition of the outline of the polygons follow the local orography, because polygon has infinite vertices. It will inform previously the SAG specific sectors of relocation within the identified areas. However, as a reference, 5 points that allow spatially locate the proposed area ( ) are presented エラー! 参照元が見つかりません。 ). However, as a reference, 5 points that allow spatially locate the proposed area are presented.

Figure 5-4. Relocation of wildlife areas



Source: Own elaboration

Table 5-6. Reference coordinates of areas of relocation of fauna

Point N °	This	North
1	387832	7663100

Point N °	This	North
2	390226	7660760
3	391014	7658400
4	393323	7658650
5	394759	7656590

Source: Own elaboration

- Clarifies that marking of individuals will be made translocated and also be measured the abundance of the species subject to the measure in the area of release.
- Will be a characterization of the population residing in the area of relocation prior to the execution of the rescue.
- With regard to the indicator of the success of the rescue, the estimate of the number of copies shall be deemed to capture based on abundance obtained in the baseline of the species of interest rising. With respect to relocation success indicator, Shall be considered that the measure has been successful in increasing the population in the area of release if that abundance estimated for this sector increases by 20% or more, following the implementation of the measure.

**5.6. In relation to the PAS de l'article N ° 155 of the CUMPLIMIENTO observes the following:**

- **The object of protection of this PAS is the environmental protection to the quality of the waters, in the framework of the designated by the water code. Therefore, analysis of protection has relationship to terrestrial waters and not marine, for which the respective analyses should focus on this interrelation.**

**Answer:**

The holder receives the observation and then supplementing the information given in the Chapter 10B, point 1015 of the EIA:

With respect to topography, in TONexus 1-11 the topography of the reservoir sector is delivered and tunnels, as outlined in the EIA that he was going to make.

It should be noted with respect to pollution or alteration of the quality of the waters, does not affect surface water of any kind. The project considers the suction of seawater into the reservoir, and then from here, download the water towards the ocean. It does not consider the application of any chemical or similar to water. Therefore, the cquality of waters will not be altered.

Regard to the Plan of monitoring, in this Addendum in annex 5-2, presents the environmental monitoring Plan for the reservoir. This monitoring plan is important considering that it is the first example of a reservoir with seawater of this magnitude. This plan will serve as a tool to characterize, measure and control the various parameters the water quality thus making a preventive water management of this artificial water body. The purpose will be to maintain a quality of water under conditions similar to the marine environment.

In relation to possible risks of overruns, it should be noted that the volume of reservoirs, approximately 56 million m<sup>3</sup> total is obtained with a level of water at a maximum depth of operation that is the 608,5 m. above sea level. This volume is fully contained in the natural depression of the land whose surrounding dimension exceeds the level 610, so an overflow of the parapets It will not generate runoff of material. It should be noted that, within the operation, there is a system of controlling the levels of elevation of the reservoir and will also with redundant alarms that will be notified when the maximum operation level. The purpose of the above is to avoid overflow. In all cases, the reservoir has a capacity maximum of 56 m<sup>3</sup>/s discharge so, if hypothetical lower elevation level to avoid overflow, it is possible to download the necessary water.

In terms of possible infiltration, it should be noted that It was found that in the area of reservoirs, sedimentary fills are presented as flooring laminates, compact, with contents of salts present in surface and depth, characteristic of the presence of an old salt, and there is no a napa of groundwater, which is shown because the witnesses of the perforated drilling not accused the presence of water. The detail of the hydrogeological characterization, with the information used, is recorded in the Annex 3-5 Characterization Hydrogeological This Addendum.

With regard to the above-mentioned hydrogeological report, is relevant to highlight the following conclusions:

- According to the local geology, it can be concluded that in the area of study there is only one unit of soil, covering all the basin of the project mirror of Tarapacá. This unit is comprised of sand and gravel with some fine, and has sales levels interbedded cemented.
- The Geophysical study for its part, concluded that in the tray area the project would exist 2 kinds of sedimentary formations on the rock fundamental (PSSM-1 profile), in addition, to appreciate than the depth of the filling reaches 120 to 130 m comor maximum.
- At the same time, from the exploratory drilling information executed in presence of salt crust witnesses could detect clearly, it was concluded that there is no presence of water groundwater in the basin of the project. In particular, the S-2 probing, which It corresponds to the most profound, he was drilled to the depth of 145 m without finding a

napa of groundwater. This, is coincident with the findings of the baseline of Hydrogeology presented in the chapter 3 of the EIA.

- Finally, the digging of pits in the bucket was determined the presence of superficial layers of salt crust compact, interspersed with soil, which limit the infiltration and percolation deep of the water, which could demonstrate the results of trials of carried out infiltration.

In all cases, it should be mention that held an annual inspection of the membrane and it has a contingency plan for breaks in the membrane, which is described in the answer to the question 5.6 of this Addendum whose central objective is to prevent infiltrations.

By the above it is concluded that the project has considered these emergency situations in its design and has addressed them incorporating preventive measures to prevent its occurrence.

- **The local hydrogeological information in the sector of location of reservoirs and underground works, in order to be able to evaluate their interaction of this component with the operation of the waterworks must be submitted in detail.**

**Answer:**

In the Annex 3-5 Characterization Hydrogeological has been included the location of the reservoir sector hydrogeological information.

- **The owner designates in the study that "in order to prevent seepage of water, reservoirs will be coated with a bituminous membrane highly water-proof of a minimum thickness of 2.5 mm". In this regard, the holder must present in detail how verify tightness of the reservoirs, so that this can be corroborated in future audits, considering that the useful life of the project is indefinite.**

**Answer:**

The owner explains that lto waterproof reservoirs shall be verified during the installation of the membrane and throughout operation of the project. According to the information provided by the suppliers of this membrane, activities to review the conditions of impermeability are detailed in Annex 5-3 sheets techniques Bituminous membrane suppliers.

During the operation phase, will be comprehensive revisions to its State, taking advantage of a scheduled six-month detentions. In this instance, the State in which the membrane is located must be checked performing a visual inspection throughout the area.

In the event that there is a rupture of the membrane, which is of importance, volume that could infiltrate for this cause will be detected by daily water balances that will be made throughout the period of operation of the project. In that situation, and given the characteristics of the membrane, is will identify the place of the break through a work to be carried out by divers prepared to carry out this work.

Produce a minor break, infiltration will be extremely limited given the cementation of soil detected in the test pits carried out in previous studies, so half-yearly periodical revisions, in which will be reviewed in detail the State of the membrane, they will allow to detect them and make timely repairs that were necessary.

It should be noted that this membrane can be repaired without emptying the reservoir, i.e. it can be repaired even When is covered by water. The detail of the repair process is described in the next answer.

- **The holder must submit the contingency management plan or plan of action before a finding of the break of the waterproof membrane, in order to control the waters within the premises of the project.**

**Answer:**

In this regard sand reports in the event of breakage, lto repair membrane shall be effected by a vulcanization process, if it is dry and without water, or using a PuTTY Epoxy underwater, in the

case that the reservoir is with water. In both cases, it shall be verified that the auto repair has been effective.

Once fulfilled all stages of repair, will be issued a report which will be available to the authority.

In the case of breakage in membranes that is dry and without water, the plan includes the following:

(a) initial review

Prior to the actual repair activities are led out an inspection of areas when deemed likely the existence of defects in the system of waterproofing.

The task will be carried out by a team of operators It locates the defects, indicating location and approximately the same size.

Then be marked the location of the defect in the terrain and topographically, this way to locate each of the defects with precision.

Review distinguishes types of defects depending on their size and geometry.

b) service

For the repair of the defects found during the initial review will propose the following methodology:

Is delimitate the area leaving approximately 1m on each side of the axis in the which is the defect .

Se prepares the cloth membrane for repair and is It will clean the area bounded in a way suitable for the correct vulcanization. (see Figure 5-5)

Cloth membrane for repair will go by properly placing.

Figure 5-5 Vulcanizing of membrane process



(c) subsequent actions

After 5 weeks, it will be verified stamping and union of both materials behave as expected, and, secondly, check repaired defects not presenting any a failure that might lead to a poorly sealed defect.

In the case of breakage in membranes while the reservoir with water, the plan includes the following:

The stages of the plan are as follows:

a) Initial review

Prior to the actual repair activities are ledARA out an inspection of areas when deemed likely the existence of defects in the system of waterproofing.

The task will be carried out by a team of divers who locatedran the defects under the surface water, indicating the depth which is encuentraas well as the approximately the same size.

Mientflush to surface is marked llocation of the defect in the terrain and topographically, this way to locatea.n each of the defects with precision.

Revision distinguira types of defects depending on your size and geometry.

b) Repair

For the repair of the defects found during the initial review will propose the following methodology:

- It will delimit the area leaving approximately 1m on each side of the axis in the which is the defect, using two cables guide teachers.

While on surface, prepares the cloth membrane for repair

It will clean the area bounded in a way suitable for the correct application product.

A thick and abundant lace will be placed around the defect of product adhesive, so made sure to maximize the sealing of the defect.

On the perimeter of the cloth will apply a perimeter cord more fine with the intention of avoiding possible movement of the cloth.

The area will be cleaned and is apply adhesive.

Cloth membrane for repair slip and will go by properly placing.

Finally the workers placed a series of bags in a row, from way that a row matches shaft defect and one of the bags stay on top of this, while the others remain on the perimeter of the cloth.

This provision of sacks will be a minimum of 4 weeks, to ensure the correct fixing of the products.

The bindings as well as rows of sacks may vary in function of the width of the cloths and are at the discretion of the field engineer.

Figure 5-6 Process of preparation of the membrane with adhesive.



c) Subsequent actions

Once finished the repair work, after 5 weeks is carries out an inspection of the the State of repairs.

The objective of this review is to verify the sealing and union of both materials behave as expected, and, secondly, check repaired defects not presenting any a failure that might lead to a poorly sealed defect.

Criteria for the review:

- Check position of lock bags
- Verify the existence or not of roughness on the surface of the cloth placed.
- Check the seal, i.e., presents or not areas without adhesion.
- Verify whether or not there is lateral displacement.

- **Depending on the comments previously submitted must re-evaluate monitoring and contingency plans and complement them or modify them where appropriate.**

**Answer:**

The owner clarifies that he has responded adequately to previous consultations on the PAS 155, and specifically in the previous point has presented the contingency management plan or plan of action before a finding of waterproof membrane breakage.

**5.7. In relation to the information presented in the PAS de l'article N ° 157 the CUMPLIMIENTO, and the analysis of it, it is concluded that the works called atravieso gutters would correspond to works of art, therefore apply les PAS No. 156 of the CUMPLIMIENTO. Therefore, all the technical and formal background that are requirement for granting, for evaluation must be submitted.**

**Without limiting the foregoing, the plans that describe the works referred to above and which are detailed in table 10-40 must be submitted.**

**Rexposed:**

The holder receives the request and en the Annex 1-3 presents all the technical and formal background associated with the application of the PAS 156 for the works called atravieso gutters. Also, in annex 5-4 flat PAS 157 This Addendum, enclosed drawings that describe the works referred to above and which are detailed in table 10-40 chapter 10 plan of compliance with legislation and PAS, section 10.16. Joint sectoral environmental permit 157.

**5.8. Whereas the new background obtained product 1.8 observation of the present report, and where appropriate, the holder must present all the formal and technical background which are prerequisite for the granting of the PAS of N items ° 156 and 157 of the CUMPLIMIENTO.**

**Rexposed:**

The holder receives the request and presented in annex 1-3 the background to apply for the PAS 156 and in TOLink 5-4 presented plans for the PAS 157.

**5.9. Whereas as indicated in Chapter 10, point 10.17, the holder shall, in accordance to the PAS de l'article N ° 160 on the CUMPLIMIENTO, complement the antecedents of the annex 10.4 regarding flat envelope to:**

- **Location map, indicating the relative position of premises on the land adjacent and public space. Since this only has a PDF image, a KMZ in the area must be attached to intervene.**

**Answer:**

The owner explains that in the TOthe EIA, flat 1-1 link Floor general VALH-0001-000-AMB-PL-001-C, it indicates the position of the field of the project with respect to the land adjoining, corresponding to tax land. Also, attached to this presentation the level required in KMZ format.

- **Map of location of the buildings. Shall be delivered in a map polygons in KMZ format from all the facilities according to the coordinates shown in table 10-43.**

**Rexposed:**

The owner welcomes observation and presents in the Annex Digital 1-1.1flat where the buildings associated with the PASM160 project.

## **6. EARTICLE 11 FFECTS**

**6.1. In relation to Chapter 5 of the EIWhereas in the project presented and as detailed in the point indicated, you must inform the effects, characteristics or circumstances on the literal following of article 11 of the Law 19.300, a prediction and assessment of the environmental impact on these components, including any situations of risk, mitigation, repair or compensation and other aspects, if applicable, according to what sets the rules. These are:**

**Answer:**

The holder receives the observation.

**6.2. Literal b): significant adverse effects on the quantity and quality of renewable natural resources, including land, water and air;**

- **Given the possible impacts on the Local climate, product of the location and operation of the reservoir (according to literal b) and e), article 6 of the CUMPLIMIENTO), considering the issues raised in paragraph 8. 7 of Chapter 9 of this report.**

**Answer:**

The holder makes clear, first, that the location and operation of the reservoir does not will generate significant adverse effects on the quantity or quality of renewable natural resources in the light of the criteria contained in the (literal b) and e) of article 6 of the CUMPLIMIENTO. These will be addressed through mitigation measures that will make a sustainable environmental management of the project.

Regard to the literal b), in the current area where the reservoir will be located according to line base of fauna in the sector, is He identified the presence of 2 reptiles: *Addition gerrhopygus* and *Liolaemus stolzmanni* in category of conservation status vulnerable and insufficiently known, respectively. The involvement of these reptiles was considered by the evaluation of impacts as a significant impact, which was proposed in the EIA environmental measures to take care of this impact, which is complemented in this addendum in the response to question 5.5.

In relationship (to the literal e), is present which in the EIA, TONexus 4.2, presented an acoustic impact study. In this Addendum presented by is complemented measurements carried out unweighted frequencies and third octave for period day and night, in the sectors where According to the baseline of wildlife filed, they were identified species in some category of conservation. The results indicated that the noise generated by the project is located under the reference value indicated in the document *Effects of Noise on Wildlife and Others Animals* of U.S. EPA (1971), recommended by the Guide to environmental assessment: component Fauna Silvestre G-PR - GA-03 of the SAG (2012), by what the project does not generate impacting wildlife by noise. Complementary acoustic impact assessment that contains this information is presented in annex 7-3, which also includes a plan for environmental monitoring of noise.

On the other hand, it is estimated that the installation of the reservoir will not generate affectation to the local climate since the intervened area and volume of stored water is substantially less with respect to the sea, which corresponds to the main natural thermoregulator and determinant of the local climate, which is located less than 1 km from the indicated work.

In regards to the evapotranspiration water, measurements carried out in the area where the reservoir will be located shows a low formation of mist on the body of water and low generation of moisture in the immediate surroundings. By way of example, the daily average of evaporation

for the months of October, November and December was 3.46 mm (or L/m<sup>2</sup>) per day, 4.52 mm per day and 5.27 mm per day, respectively. As you can see, the expected evaporation is very low, so one is estimated very low formation of mist on the water body and low generation of moisture in the immediate surroundings.

Furthermore, a study that was carried out on the reservoir Puclaro<sup>19</sup> to verify the influence of this body of water on the local climate threw a change in wind systems, covering an area in environment to(l) reservoir of 4 km. It also concluded that the influence of the reservoir on the air temperature extends the same environment of 4 km in the direction of the wind during the day and during the night the influence reaches only the surface of the reservoir.

Finally, the study concluded that the climate impact of reservoir Puclaro It is very local and extending for just 4 km in its immediate surroundings, particularly in the West directions and this.

Based on the above, considering the magnitude and direction of saw themENTS in the area of Reservorio, its proximity to the ocean and the proportion of the size of the reservoir on the ocean, it is estimated that the impact associated with the instalacion and operation of the Reservorio on the plateau No is significant.

- **Given the possible impacts on the chemical quality of the water column in marine environment, chemical quality of sediments and marine subtidal biodiversity, considering the issues raised in paragraph 7 and 8 of Chapter 9 of this report.**

**Answer:**

The holder has evaluated the impact on the quality of the water, sediments and biota marina in CAPtitle 4 the submitted EIA. The results showed that potentials impacts to be generated by the project No will be significant.

Despite the above, in this Addendum the holder has completed the baseline of marine environment (see annex 3-1.1) and, based on that information, you have updated the download of sea water from the reservoir modeling (see annex 1-6). In addition, in annex 3 - 1.1.2 delivers an intensive study of planktonic in Caleta area communities San Marcos, for didentifying the richness and specific abundance of plankton in the study area.

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<sup>19</sup> **Los sistemas naturales de la cuenca del rio Elqui** (Región de Coquimbo, Chile): Vulnerabilidad y cambio del clima. CEPEDA PJ (ed): 41-62 (2008). Ediciones Universidad de La Serena, La Serena, Chile. Sección 2.4 Influencia del Embalse Puclaro sobre el clima del Valle del Elqui

This new modelling results confirm the results delivered in the CAPtitle 4 of the EIA, regarding the non-existence of significant impacts in the marine environment.

Adicionalmente, annex 5-1 of this addendum presents the Plan of environmental monitoring (PVA) update of Mtop MAriño and annex 5-2 Plan of environmental monitoring of reservoir, based on the information the evaluation of the quality of water, sediments and biotic components of the environment, during the phases of construction and operation of the project shall be verified.

**6.3. Literal c): resettlement of human communities, or significant life systems and customs of human groups alteration;**

- **In paragraph 5.4. 1.3 of the EIA, the licensee mentioned, regarding intervention, use or restriction of access to natural resources used as economic livelihood of the human group, holder points out that the quality of life of the resident human population in the Area of influence: "not you" It affected by obstruction and use of natural resources management Area of intervention and Exploitation of benthic resources (AMERB) "Caleta San Marcos". However, not referred to resources obtained outside these Areas of management, or extraction points near the Cove or the AMERB. (In this regard, the holder must deliver information allowing you to discard the generation or presence of effects, characteristics or circumstances of the letter to) article 07 CUMPLIMIENTO D.S. 40/2013 MMA, corresponding to the restriction of access to resources natural used as economic livelihood of the human group, and that could cause a significant systems of life and customs of the human groups change of thesector.**

**Answer:**

In this respect the owner clarifies that land traffic routes, as well as, access to the Cove San Marcos enabled will remain for the construction of the project, allowing the development of the activities of the community. The project will use the public roads and the paths of service project, avoiding the movement of machinery and vehicles older on the roads of the community of San Marcos. In the same way, during the construction phase, It shall ensure that the staff keep in place of work or in the camp, in order to not interfere with the activities of the community.

With regard to the marine environment during the construction phase will be required to perform certain activities for the connection of the tunnel with the sea, as well as for the installation of the work of underwater discharge and take, for a period I am mainr to one year. The realization of these activities, as well as the requirements of support and disposal of materials and supplies for the work not consideredn the interruption of the circulation by the Bay Chomache, by what they

can access, free areas as well as the AMERB. It is only necessary to maintain a security zone around the underwater work and exceptional for the occasion of the Norwegian shooting event that takes place only one time during the construction on this area will have a radius of 300 m.

It is noteworthy that the company will have offices and a house in Caleta San Marcos, so to access them, an average number of 25 people may access to the Cove and circular streets whereas the activities of the community.

During the operation, is present that is He has modeled the discharge and suction of the project in the EIA, the What Have been updated ACE and complemented in this Addendum (Annex 1-6 study of dynamic modeling of thermal and saline plume).

All this has given as a result that these activities of the project will not have significant impacts on the marine environment and the activities of the community. It should be noted that the effluent generated corresponds exclusively to seawater used as means of power generation, with no modification to its natural composition, what the effluent will not be toxic, will not have adverse effects, and will not cause effects unfavourable about the content and balance of oxygen. With respect to its temperature, the normal operation of the system shows that 96% of download events will have a temperature differential, between the discharge and the environment marine, less than 3 ° C approximately, what It allows the dilution of the excess temperature modeling for the normal operation scenario, reducing the temperature difference of the pen below 3 ° C, at the time that this touch the surface of the sea. The following figures showsn the area of influence defined paRA half dark, associated component to the discharge of the project

**Figure 6-1. Delimitation of the area total generated by the maximum thermal excesses and the different scopes and thermal pen for each seasonal period modeled extensions, Next on the seabed, represented to the isotherm 0, [30]° C).**

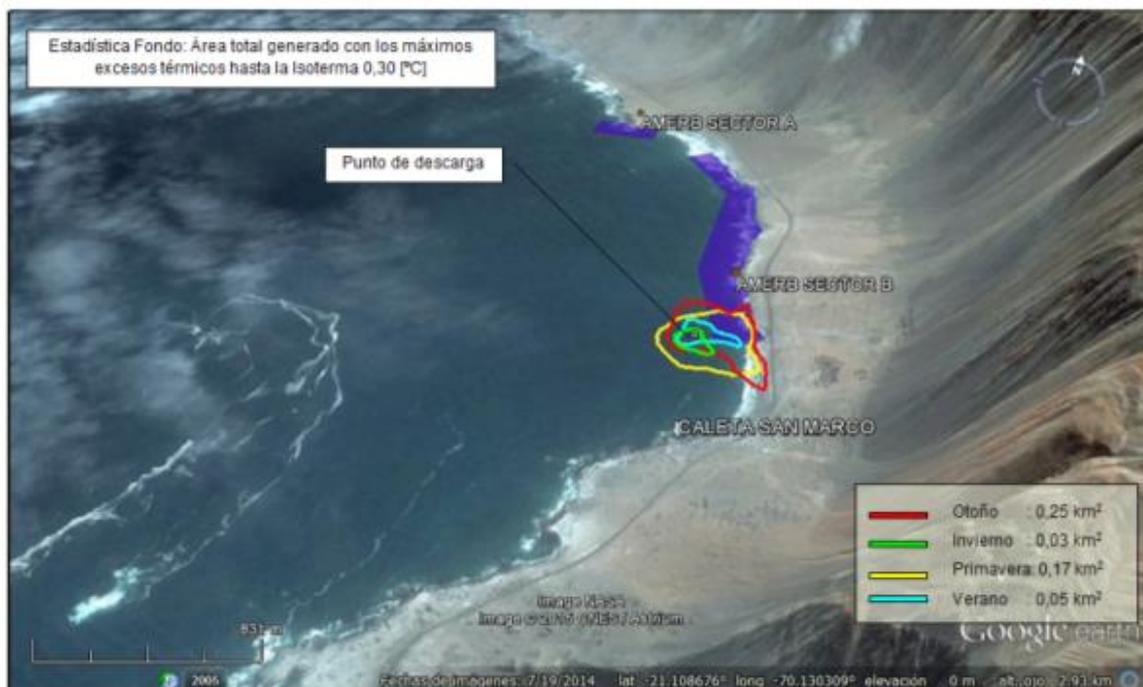
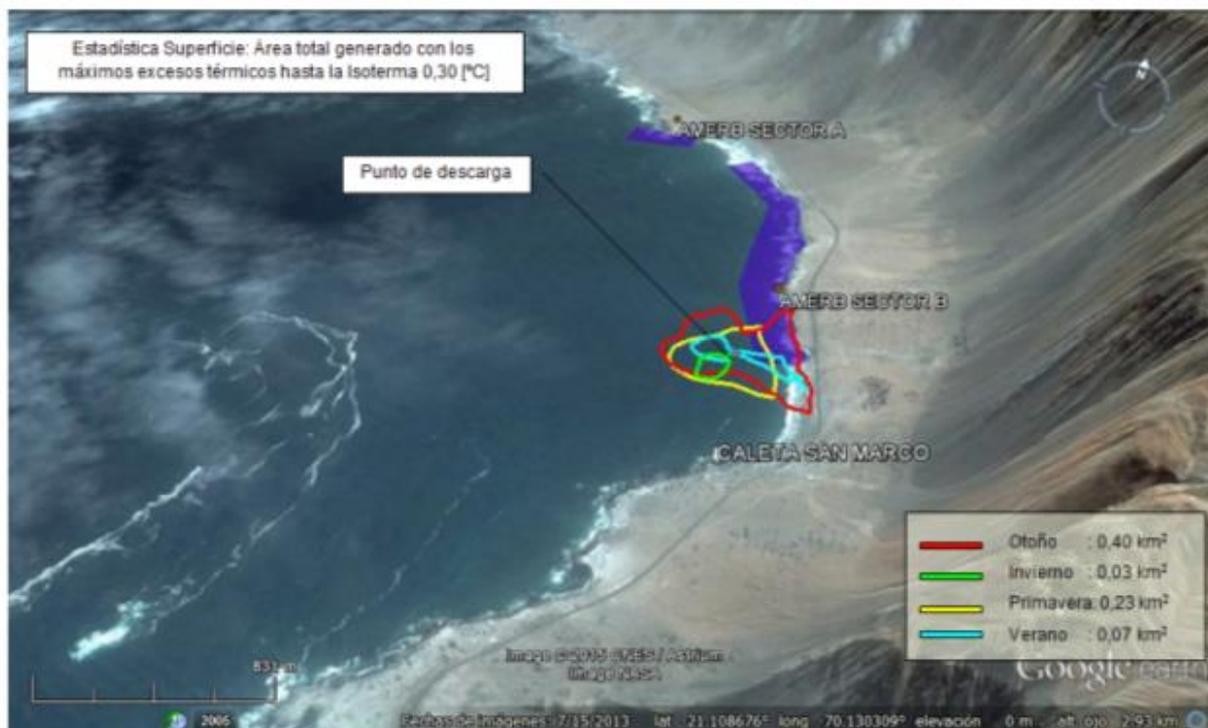


Figure 6-2. Delimitation of the area total generated by the maximum thermal excesses and the different scopes and thermal pen for each seasonal period modeled extensions, on surface, represented to the isotherm 0, [30]° C].



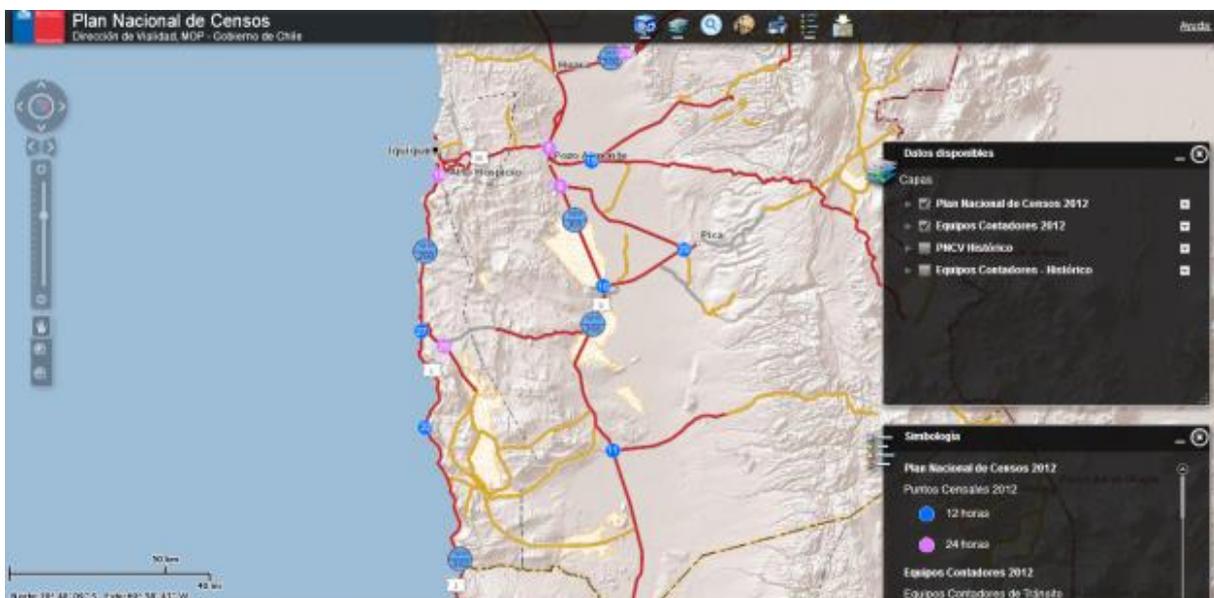
- Regarding the obstruction or restriction of free movement, connectivity or the significant increase in times of displacement, the owner points out that: "does not identify, during the construction and operation of the project, an affectation to the dynamics of" displacement which significantly alter the quality of life of the population, which require the submission of an environmental impact study". However, there is no background information on size, number of vehicles, frequency step or vehicular flow along the route to - 1, the main route for the connection to the Regional Capital, Iquique. (or the above, the holder shall submit information allowing you to discard the generation or presence of effects, characteristics or circumstances of the letter b) of article 07 CUMPLIMIENTO D.S. 40/2013 MMA, including estimated vehicle flow, types of vehicles to use, describing also the circulation by the Río Seco and San Marcos sector, all of which could result in a significant change of living systems and customs of human groups in the sector.

**Answer:**

The owner clarifies that, as described in section 3.5.4.2, Chapter 1 EIA, route 1 is currently a steady stream coming from the city of Iquique, the airport or from the South, from the city of Antofagasta, being the most common buses and private cars. Transit of trucks is also identified by this route.

The RUTA 1 currently has a vehicle under such flow as shown in the following image obtained from the national censuses of the direction of roads, MOP Plan.

**Figure 6-3. National censuses, MOP Highway plan. Vehicular flow.**



The following table gives the Census mentioned above. In it you can see as it decreases the flow to the extent that moves away from Iquique to the South, closer to the project data correspond to Punta de Lobos with an annual daily average flow of 1,005 vehicles,

ESTACION DE CONTROL	NOMBRE DEL CAMINO	ROL	AUTOS	CAMIONETAS	CAMIONES	CAMIONES MAS 2 EJES	SEMI REMOLQUES	REMOLQUES	LOCOMOCION COLECTIVA	
01-018-01-1	IQUIQUE TOCOPILLA		4.034	982	314	107	191	21	566	6.215
01-018-01-2	DIRECTO	RUTA 1	3.037	914	273	168	179	18	277	4.866
01-018-01-3	BAJO MOLLE	Salida de Iquique	3.071	1.152	371	230	235	33	770	5.862
<b>Transito Medio Diario Anual : 5.648</b>										<b>24.424</b>
01-022-01-1	IQUIQUE TOCOPILLA		543	230	95	63	285	14	99	1.329
01-022-01-2	DIRECTO	RUTA 1	230	166	50	53	181	13	77	770
01-022-01-3	PUNTA DE LOBOS 100 KM IQQUE	Río Seco	313	178	64	46	225	19	71	916
<b>Transito Medio Diario Anual : 1.005</b>										<b>3.015</b>
01-027-01-1	IQUIQUE - TOCOPILLA		919	795	158	35	339	15	164	2.425
01-027-01-2	DIRECTO	RUTA 1	598	660	129	23	272	39	237	1.958
01-027-01-3	BIF.PATILLO	Ruta de la Sal	659	697	165	45	242	12	363	2.183
<b>Transito Medio Diario Anual : 2.189</b>										<b>13.401</b>

The project considered to use the RUTA 1 for purposes of transportation of personnel, supplies and wastemainly between the project and Iquique. Note that most of the movement of vehicles and machinery during the construction phase, will be made by internal roads of the project, within the areas of work.

Whereas the works that will be located in the coastal sector, for the construction of the Northern access road, near Río Seco, circulation for its realization It will mainly be between the slaughter facility and work fronts. Both are located to the East side of the RUTA 1, so this use is not required. The duration of this task of construction is estimated for 8.5 months.

For the construction of the camp, will the supplies and personnel from Iquique by the R1 UTA. This route is also used for the removal of waste. It is estimated that this construction will last for 8 months. During the construction of the project, will be used the RUTA 1 between camp and rio Seco, as well as, between camp and San Marcos, for the mobilization of the personnel.

Be used for the construction of the works in the sector of San Marcos, the r1 UTA for transportation of personnel, supplies and waste. Circulation for its realization will be mainly between the slaughter facility and work fronts. They are to the East side of the r1 UTA, so use of this route is not required. The duration of this task of construction is estimated will be 3.5 years.

Workflows associated with the construction phase of the Pproject described in response to question 1.34 this Addendum.

It should be noted that the flow of transportation for the operation phase is, on average, 1 truck per month and 5 vehicles per day, which is a very low charge for the route. In this way, the project will not generate obstruction or restriction of free movement, connectivity, or significant increase in the times of travel on public roads.

- Regarding the alteration to the access or the quality of goods, facilities, services or basic infrastructure, the holder of notes that "with respect to this component not be foresee significant impacts that warrant the submission of an environmental impact study".  
However, does not make mention of use, required medical attention, the project of unique local office workers, could make which would be to the detriment of the inhabitants of the villages of Rio Seco and San Marcos, as well as tourists to regularly visit the sector in summer season. Therefore, the holder shall submit information allowing you to discard the generation or presence of effects, characteristics or circumstances of the letter e) article 07 CUMPLIMIENTO D. S. 40/2013 MMA, including first aid care protocol and medical emergenciesthe operators of the project, whose constant in welfare care, could result in a significant change of living systems and customs of human groups in the sector.

**Answer:**

The owner clarifies that, in the event that any operator requires medical care in camp on the coast sector there will be a room of first aid in charge of a paramedic, which will operate 24 hours a day, as indicated in the Chapter 1 EIA, point 1.4.3.5.

If you require one greater intervention, the operator will be transferred to the Mutual of Safety in the city of Iquique.

Therefore, the project will not use health infrastructure existing in Caleta San Marcos and Rio Seco and will not generate significant effects on this component in the light of article 7 of the rules of procedure of the SEIA.

**6.4. Literal e): significant alteration, in terms of magnitude or length, the landscape value or your particular in an area;**

The holder performs the analysis based on article 9 of the CUMPLIMIENTO D.S. 40/2013 MMA, and mentions: *"On the contrary, the uniqueness of the project has the potential to be a pole of attraction for tourists who want to see the project facility"*, Acknowledging the change in the landscape value of the sector. However, it concluded: *"(El Proyecto no requiere ser ingresado al sistema a través de un EIA de conformidad con lo dispuesto por la letra e) of the LBGMA in relation to article 10 of regulation from the SEIA, given that does not generate significant alteration on the scenic or tourist value of a zone" a*". (In this regard, the owner shall deliver all environmental technical backgrounds allowing you to

**discard the generation or presence of effects, characteristics or circumstances of the letter e) of section 11 of the Act 19,300, corresponding to the scenic value or tourist sector plateau due to the incorporation of the reservoir of 237 has. And the incorporation of viewpoints of tourist use in the area of influence.**

**Answer:**

The holder clarifies that according to the presented baseline of landscape in the Chapter 3 of the EIA, it was concluded that the sum of the bio-physical, aesthetic and structural features that give character to the landscape in the area of the project, determine the area of influence of the landscape presents a moderate landscape value or medium, determining that for the most part it is of a common landscape in the region, with few outstanding visual attractions.

On the other hand, en the Chapter 4 the EIA, indicated that impacts on landscape they were qualified as non-significant. In specifically, in the sector of the reservoir, although its installation means adding items that are not typical of the natural landscape, its impact is also not significant given that it is estimated that it will not generate changes in the local climate, or flora and fauna. It should be remembered that the only reservoir will contain seawater. In addition, it's a sector that presents a landscape that is very common in the region, as stated above, by what would be not affecting any attribute of special landscape value.

The viewpoints which includes installing the project, are minor works, projected to implement harmoniously with the environment, giving priority to the use of natural materials in the industry, so it is estimated not affecting the landscape value or tourist sector.

## **7. PREDICTION AND ASSESSMENT OF IMPACTS**

**7.1. In relation to the observations of baseline and the other chapters of this report, the holder must, in the event that appropriate, introduce a new evaluation of the significant adverse effects for each environmental component, including on the amount and quality of renewable natural resources.**

**Exposed:**

The holder It hosts the application, depending on the background presented in This Addendum advises the following:

- The considered significant impact on nesting Area of *Storm petrel petrel* It is not maintained. The above Since the supplementary report on terns, presented in this Addendum in annex 3-2, verifies that the aforementioned nesting area would correspond

to *Storm petrel garcili*, and currently is they are in total inactivity. However, as a voluntary commitment, the holder will keep the accomplishment of a course prior to the start of construction, a way to verify the information raised.

- Considered significant impact on intervention of archaeological sites is not maintained. The above due to the decision of the project of rethinking the polygon in San Marcos camp to avoid the intervention of the site identified at that point. However, as a voluntary commitment, the holder maintains the measures indicated in the Chapter 7, including considering carrying out surveys on this site specific wells, by way of expansion of Base line.

Should be noted that in relation to marine environment updated the base line (see annex 3-1.1 Baseline marine environment) and a new modeling of the shock, whose results have confirmed the evaluation of impacts on the marine environment component has been. (see Annex 1-6 study of modeling dynamics of thermal pen and Salina).

**7.2. In the same direction of the previous observation, must be the analysis particularly for water resources. The foregoing, in consideration of underground works and the works of storage, determining its impacts both in quantity and quality of water resources in the sector, including the ascents or descents of groundwater in its various levels stages.**

**Exposed:**

The holder reports that it has made drilling with which has confirmed the non-existence of aquifers in the area. For more details, is attached in the present Addendum, Annex 3-5 Characterization Hydrogeological. Therefore, do not identify impacts in this regard.

**7.3. The owner must describe the characteristics of medium-voltage poles and assess the possible effect that could cause to the avifauna of the area of influence of the project, considering the probability of collision or electrocution.**

**Exposed:**

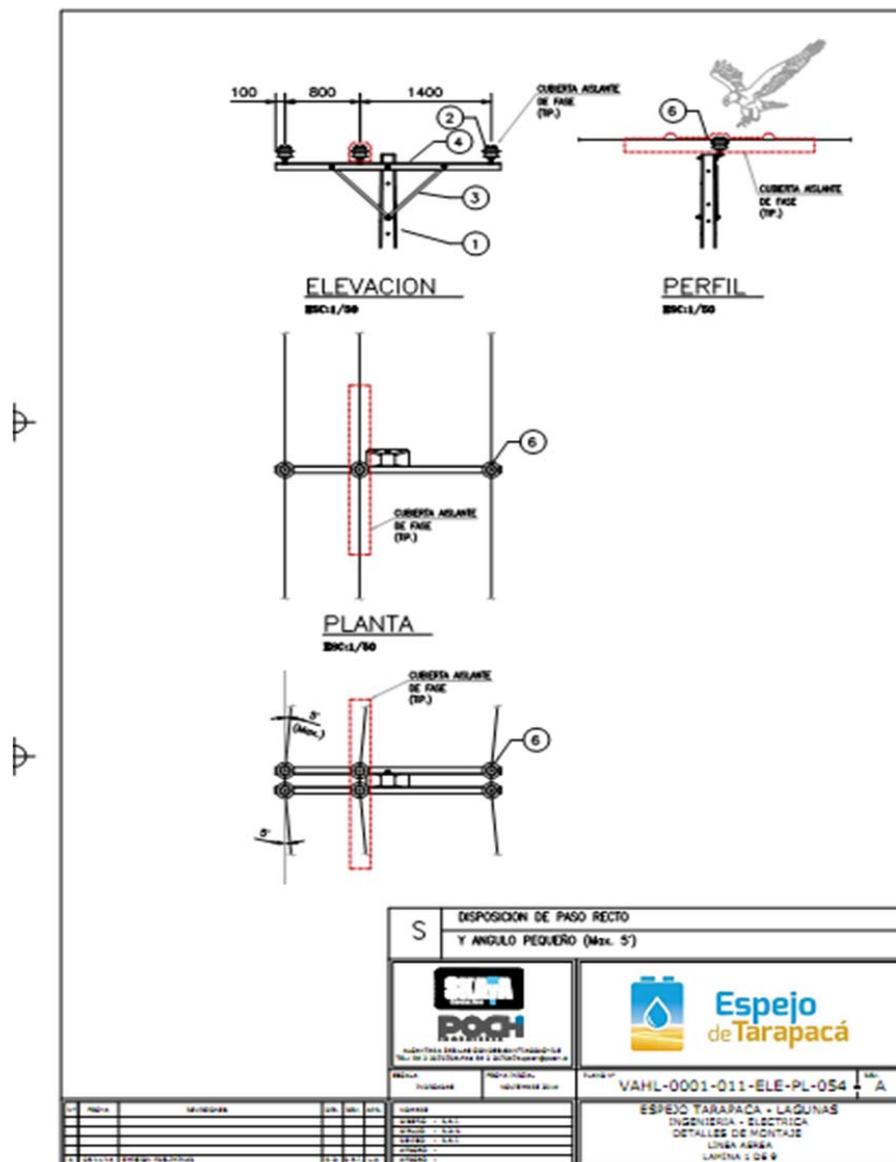
The holder receives the request and then presents the characteristics of medium-voltage poles:

For medium voltage lines, the project considers the use of 11 concrete pillars, 5 m de height 2.4 m cross long, with three conductors in a horizontal position, at a minimum distance of 80 cm between them.

To protect against electric shock to large birds WingHe is the installation of a sheath of insulation in the central phase of a sizing long conductor so that larger bird wings do not reach the part

active phase cover from another phase insulator. This solution protects against dangerous contact structures, the birds up to 220 cm in wingspan (with wings spread). In the following figure shows this proposed solution.

Figure 7-1. LTE insulation cover.



With regard to the possibility of collision of the avifauna of major wing He is considered the implementation of two preventive measures: (i) implementation of devices anti-collision in stretches of the high-voltage line identified as risky and (ii) reduction of the night lighting in works and activities associated with the project. The detail of such preventive measures is presented in the response of the questions 8.5 and 8.9 of the present addendum.

It should be noted that the project also includes the installation of aeronautical beacon, especially in the section of the LINEA High voltage identified as higher risk of collision (The answer to the question 1.19 figure This addendum).

**7.4. As described in Chapter 1 of the EIA the holder must submit an evaluation of the affectation to the components of reptiles and coastal birds)Microlophus quadravittatus), whereas the installation of the desalination plant.**

**Exposed:**

The location of the desalination plant and their water pipes, found in the surveyed area associated with the baseline of wildlife, in particular concerning the coast sector close San Marcos presented in Chapter 2 of the EIA. The desalination plant will be located next to the Pique's gates to the East of route 1 and then will leave two ducts sea to capture water and download the brine. Levaluation on the coastal birds and reptiles)Microlophus quadravittatus) this installation corresponds to their surface works and It was seen in Chapter 4 of the EIA, corresponding to a non-significant impact. The impact marine in the middle was also addressed.

It is noteworthy that the works associated with the desalination plant and they will be located in the coastal edge correspondsn the installation of tanks, pipelines, containers, office, electrical, circulation and closing roads in addition to 2 ducts (see answer to question 1.16 This addendum)What will happenn by the sector of coastal air way After crossing to o.East of route 1not generating any involvement significant to the habitats present in this sector. The facilities that support the ductsthey will be light wooden structures. EThis installation is temporary unavailable, only during the construction already during the operation, the discharge of brine will be done by the same tunnel to descargara seawater from the Reservorio through the give work of underwater discharge and take.

**7.5. Considering that in the area of influence of the project identified resource extraction hydrobiological (AMERB and aquaculture concessions) as one of the economic activities of the area, the owner must submit an evaluation that considers in**

**detail the impact by suction effect possible larval of fisheries resources species loss associated with the processes of water suction sea.**

Answer:

The holder It clarifies that in Chapter 4, annex 4.3 EIA presented an analysis of suction of the project through a box model. In a complementary manner, this addendum in the Annex 1-5 It includes the Report Suction work of Catchment. In this an update to the modelaci deliverythe effects of suction on.

In relation to the evaluation of impacts, to continuation is provided a technical and theoretical exercise which aims to facilitate the understanding of the possible impact of the activity of suction of sea water on the local abundance of the benthic species to the domestic sector of the Bay Chomache, opposite Caleta San Marcos. Specifically, trying to make a prediction that is founded in the area exclusively technician, the potential effect of the removal of individuals from the plankton through the suction of a given volume of seawater, due to the operation of the project in question, on the abundance of these species.

En first provides an overview of the main mechanisms through which the abundance of organisms in the plankton is related to the richness and relative abundance of species in the benthic community, then relates these factors with a simple Oceanographic model (box model) that directly quantified the magnitude of the maximum removal of plankton organisms in this system (baseline effected by) Costasur). Finally, will conclude qualitatively on the potential effect of the water intake in the richness and abundance of species of benthic communities in this town.

The area of interest features of composition, abundance and biological productivity of an ecosystem affected by events of upwelling permanent, and a dominance and taxonomic composition characteristic of a site with high productivity (Herrera & scribe, 2006). Inside the Bay Chomache two Marine Areas of management and exploitation of resources (benthic) are placedAMERBs(-), San Marcos sector A and San Marcos sector B, in which the existing management to date plan includes as main species to the following resources: to) mad) *Concholepas concholepas*(, b) Sea Urchin) *Loxechinus Albus*(, c) limpets) *Fissurella* SPP(., d) Octopus) *Octopus mimus*(, e) clam) *Leukoma thaca*(, f). Culengue (*Gari solid*(, g). Locate (*Thais chocolata*(, h) black Huiro) *Lessonia berteroa* (ex *nigrescens*()) and i) Huiro stick) *Lessonia trabeculata*).

The lifecycle of approximately 70% of the benthic invertebrates, including those identified in the preceding paragraph, includes the production of eggs and larvae that are then transported from the coast to offshore. Some studies of larval transport assume the existence of a larval pool available, that is an idealized condition in which it is assumed that larvae are accumulating in a region or body of water located offshore, which would be available to be transported to their

habitats near the coast, place where are the adult phase of their cycle of IDA (Pineda, 2000). all of these species have a common feature, namely: its lifecycle is characterized mainly by the differences in the environments in which the adults and larvae survive and develop. Adult individuals with little or no mobility release their larvae-friendly planktonic where multiple physical and biological processes determine the balance between mortality, dispersal and survival to complete its development (Tapia & Pineda, 2007) . Their larvae can be transported over long distances until they can establish themselves in the adult habitat. Therefore, the coastal populations of these species are considered open systems in terms of their reproductive performance and its local demographics.

Such is the case of the gastropod muricido *Concholepas concholepas* (Bruguiere 1789), commonly known as "Crazy", where adult individuals of this species live on rocky areas intertidal and subtidal to approximately 40 m of depth. Females of *C. concholepas* they lay eggs in capsules in the intertidal low and of the shallow subtidal Rocky surfaces during the months of autumn (Manriquez & Castilla 2001), and after about a month of development intracapsular Small larvae Veliger planktotrophic (260  $\mu\text{m}$  approx.) are released and spend at least 3 months in the water column)DiSalvo1988). Once the larvae become competent to live on the surface of the sea until they settle in habitats of the intertidal Rocky and subtidal shallow. Another example is the case of *Loxechinus Albus* (Molina, 1782) commonly called Sea Urchin edible red or white, one of the benthic herbivorous most important Chilean coasts (stew and Castilla 1987). Present from the area intertidal up to 340 m depth (Larrain, 1975), mainly lives on hard bottoms. *L. Albus* reaches its length at first sexual maturity between 3.5 to 5.0 cm in diameter of testa)Bay-Schmith & Silva, 1981; Arias *et to the.*, 1995), and its potential fertility is of 5-7.2 million oocytes in organisms between 52 - 72 mm (stewed *et al.*, 1998). The larval development of this equinodermo has been tested successfully in laboratory conditions, describing their stadiums development from fertilization until the settlement, lasting from 23 to 40 days. The larva equinopluteus It metamorphosing to a juvenile individual of approximately  $524 \pm 24$  Mm (Arrau1958; Bustos *et al.*, 1987; Stew & Castilla, 1987; Busts & Olave2001). However, the information posted on the larval development and settlement of *L. Albus* in Chile, it is still scarce.

#### On the coupling between the larval supply, wealth, and local abundance of benthic communities.

The relationship between the diversity of organisms in the plankton (larvae and eggs), and the composition of species and relative abundance of benthic communities is not obvious, in fact, most of the dominant ecological models between the 1950s and 70 were focused in the vision of the marine communities as closed systems, in which the action of the competition and other denso-dependientes factors were considered determining mechanisms of community structure (food Web, richness and relative abundance of) species). A series of influential experiments showed the effects of competition)Connell1961), predation)Paine1966) and disruption (Souza,

1979) on the structure of the communities. In the 80's is a challenge to this paradigm, the vision of the communities as a open systems, which led to rethink existing ecological and evolutionary models up to that time. This new vision based mainly in that the number of individuals who "come" or "recruit" a local population have the potential to determine its future wealth. Based on this premise, Lewin, (1986) coined the term "supply-side" or "ecology of supply" to refer to a series of studies that in the early 1980s challenged the more traditional models of local control by predation or competition, recognizing the importance of the available set of bodies in" stadiums early ontogeny (larvae) in the water column, on the determination of the structure of future marine benthic communities. This new vision of marine systems brought with it new ideas. A among the most important and influential, was that marine organisms have dispersion ability, and that their larvae have the potential to remain or not in the place of the adult population, as well as, the arrival of new individuals to a local population depends mainly on larval production (of all local populations that can potentially reach the site of observation), the rate of plankton larval mortality and the rate of arrival (settlement) in the population local those larvae that have survived life in the plankton.

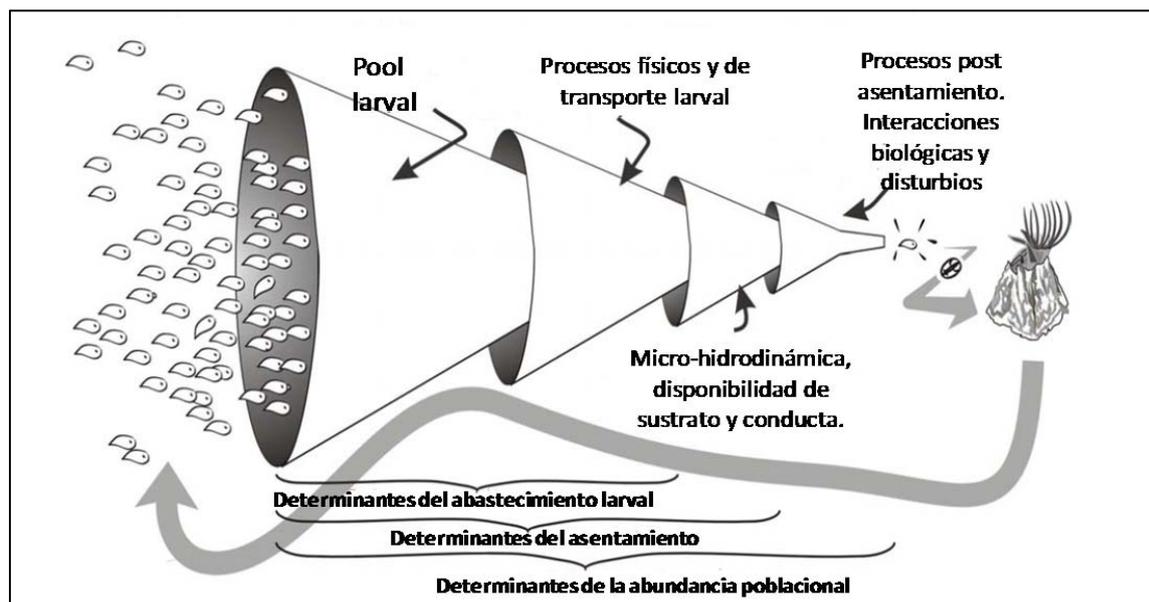
The settlement is the process through which a spore or larva makes contact with the benthic habitat)Keough & Downes 1982). Like most of the adults of the benthic organisms are sessile or limited movement, the settlement marks the end of the effective scattering phase while the recruitment reflects the input of new individuals to the benthic population, i.e., the number of seated individuals who survive after an arbitrary period per unit area)Thiel *et to the.*, 2007). in this respect stands out that within the scope of the present draft settlement experiences have been developed with larval collectors inside Bay Chomache. ESTA information available from April 2014, is analyzed monthly and in the Annex 7-1 report Description Biological and Chemistry Intake area the partial results of the first 6 campaigns are delivered. It also highlights that this activity will continue during the different phases of the project in the field of marine PVA, and the information generated with this study will allow effectively determine the spatial and temporal dynamics of recruitment of species Marine in general and not only associated with the AMERB benthic (which by the way represent the object of the study of recruitment), thus providing relevant information for evaluate the possible impact of the suction in the species of interest.

In benthic communities, the number of recruits in an adult population may not be correlated with the local reproductive effort because the pool of competent larvae to recruitment depends on the amount of larvae that are carried by currents from offshore to the final site of settlement (since all local populations that can potentially send propagules to the observation site). In addition, evidence suggests that larval supply and local settlement rate, since the survival of the larvae is determined by different physical and biological processes that sequentially decrease the number of individuals, are uncoupled Since the transport of larvae to the arrival and settlement in the

local community) Cowen (et al., 2009, Pineda Pineda 2003 et al., 2010). Consequently, larvae that are transported from the pool to waters close to the habitat of adults can not settle or settle disproportionately to the size of the available larval production, due to multiple factors of mortality, such as the effect direct from the physical phenomena responsible for transporting the larval pool in high seas, biological interactions, and the local availability of substrate (Roughgarden et al., 1988). These factors which determine rates of recruitment occur constantly, but present hierarchical differences in importance through the different stages of larval transport to final recruitment in the benthic community. To understand the complexities inherent in the non-linear relationship between larval production and the number of recruits in the local community, we will divide these factors into four categories:

- I) Processes that determine the pool of larvae;
- II) Physical transport;
- III) Micro-hidrodinámica, availability of substrate, and behavior;
- IV) Processes post-asentamiento.

**Figure 7-2. Representation of the processes that influence the rate of settlement and the density of a population. (Amended 2000 Pineda).**



Source: Pineda, 2000

The number of larvae is much greater than the number of adults, since each adult produces a large number of larvae. The larvae are often found on the high seas, and until they can settle successfully in the coast, several conditions must be met. In each case, the production of larvae

that passes to the next set of processes is smaller. Small changes in the proportion of larvae that pass from one stage to the next can produce large changes in the adult population.

In the first category are the processes that directly determine the survival of the larvae in the water column, among others are the physiological stress (temperature, salinity, oxygen, currents; Yannicelli & Castro, 2013), availability of food, predation, sinking and Advection sea outside or away from the habitat. For example, after which the larvae of species intertidal and subtidal are released to the plankton, they are initially directed by coastal currents and possibly the general ocean circulation, sometimes over distances very long) Poulin et al., 2002). This period can last from days to several months, and in that interval the massive loss of plankton individuals due to processes such as competition for food and predation is a common phenomenon) Poulin et al., 2002), and with action differential on different kinds of age (Allen, 2008).

The second category includes oceanographic elements of meso-scale like the wind (relevant for larvae epineustonicas), eddies (eddies), currents, internal waves and fronts relaxation of upwelling (coastal) Poulin (et al., 2002a). In a system off the coast of central Chile, Lakes et al. (2005) showed that recruitment of medium-scale (on the order of 30 Km), depends on the surface temperature of the ocean for some species, and the intensity of the upwelling for others. These authors also showed that these same variables are of little importance to explain the variance in the extent of recruitment when the spatial scale used is less than indicated above.

In the third category of importance is the interaction between larval behavior and the micro-hidrodinamica (that is, dynamic flow with scales of spatial variation of mm up to a few meters, and temporal variation from a few seconds up to a few hours), for example the swimming ability of larvae to stay afloat in the water column and opposing currents of small scale to successfully reach the substrate (Pineda et to the., 2010). Also located in this category the interaction between the availability of substrate for settlement and otrs biotic phenomena such as the intensification of the settlement (which is the increase in the number of individuals living per unit area when the substrate is limiting), as a result of the conduct of search Active substrate available by larvae) Pineda et to the. 2010). Finally, the presence of chemical signals emitted by the larvae settled successfully can stimulate the settlement of other larvae in the same place, determining gregarious settlement patterns (Pineda et al., 2010).

The fourth category includes biological factors that determine survival from the settlement to the recruitment, as well as interactions between the organisms incorporated into the benthic community. In this topic, Caro et al., (2010) showed that despite the large spatial variation in recruitment regimes, the structure of the metacommunity intertidal It seems to be determined by neutral processes such as larval supply. Since this phase is independent of the processes that affect the larval pool, can be considered of minor importance to the dynamics of settlement and

recruitment, but maximum relevance in determining species richness and abundance patterns relative in the local community. This result is important because it allows you to suggest that the local patterns of diversity and abundance of benthic communities can be considered broadly independent of larval supply to small esthe.

With respect to the relative importance of each of these categories of processes, the fact that the larval pool and physical transport processes in general possess spatial and temporal scales much larger than the micro-hydrodynamic processes in the site of settlement, has predictable consequences for the relationship between Larval supply and recruitment. Whereas, by way of example, the spatial scale occur the final determinants of the settlement, which we see in a given segment of coastline there are different environments of micro-currents separated by distNCES of mm from one another (due to structural factors such as the roughness of the surface of the substrate, groupings of sessile organisms, channels, horizontal and vertical substrates, etc.). Therefore, a place for settlement can settle separate from millimetres to a few meters from an unfavorable site. In addition, the scale of micro-hydrodynamic phenomena is very brief, for example, the tides have cycles semi-day of approximately 12 hours, while the scale of variation in the magnitude and frequency of trains of waves presents variability on the order of minutes to a few hours. Finally phenomena as the position of the breaking wave and wave of wind velocity can vary in scale from seconds to a few minutes. Therefore a larva in the settlement area experiences many microenvironments over very small distances, and a part of the substrate that is unsuitable for settlement at any given time could be ideal after a short time. In addition, a larva that has arrived to the area of contact with the bentos but unable to settle on a particular site, will have many opportunities to do it successfully at another point very near, or even in the same place in a short interval of time. For these reasons, there is consensus that the processes of large scale (categories I and II), responsible for carrying larvae near coastal bedrock, are comparatively more important processes of small scale to determine the magnitude of the settlement (category III).

This hierarchical analysis of the factors that determine the relationship between the larval pool available and the relative abundance of benthic communities, it can be concluded that:

- i) Whilst there is no quantification in the literature, it is clear that the proportion of larvae that settle are a tiny fraction of the available larval pool due to the successive action of the process summarized in Figure 7.2. For example, you know that species of high fertility, the fraction of survivors available for settlement, after the action of these 4 categories of processes, is not more than 1% of the original larval pool (Pineda et to the. 2009).
- ii) Given the large extent of expected overall mortality, and the superlative numerical importance of the first 2 categories, it is possible to consider the effect of the rest of how redundant mortality factors (categories III and IV); i.e., even though

- intensify processes of lower relative effect on larval survival, always will prevail the effects of large and meso-scale (categories I and II), on the overall mortality in the plankton.
- iii) Considering the high probability of successful settlement of a larva that reaches the vicinity of the substrate (category of micro-scale), and the high importance of processes post-asentamiento in patterns of relative abundance of benthic communities, it is possible to infer that marginal changes in the abundance of larvae in the vicinity of the substrate (near the coast) will not have significant influence on the abundance of organisms reaching the adult stage.

Considerations about the potential impact of the "Mirror of Tarapacá" project on the benthic communities of the San Marcos Creek.

The model of the effects of the water catchment on the flow of plankton to the interior of the Bay Chomache carried out by Costasur as part of the marina of the project baseline, concludes that the full plot of potentially impacted water volume is renewed every three hours approximately, and that the net average effect of taking water from the project would be, on average, a removal of 9.7% of the volume of water flowing in this system (app. 10%). Assuming that plankton is homogeneously distributed in the column, and the total mass of plankton is kept stationary (this is, the plankton that leaves the system is naturally replacement due to the horizontal Exchange), it is estimated that the water intake removería this same proportion of plankton from the system. These estimates must of course be understood as a gross theoretical approach to the dynamics of the system, but are, however, of enormous value to establish a qualitative estimation and quantitative turn from possible impact by the project. The hypothetical scenario therefore is that the larval pool locally available for settlement and recruitment in the benthos would be only 10% less than the larval pool available in natural conditions. However, and as stated above, the relationship between Larval supply and the composition of the benthic community is not in any linear case. In fact, it is expected that conditions at natural larvae that settle and recruit successfully are only a small fraction of the original pool due to processes such as predation, competition, and physiological stress in large scale currents. Conversely, larvae which reach the plots of water adjacent to the substrate have a very high probability of successfully settle.

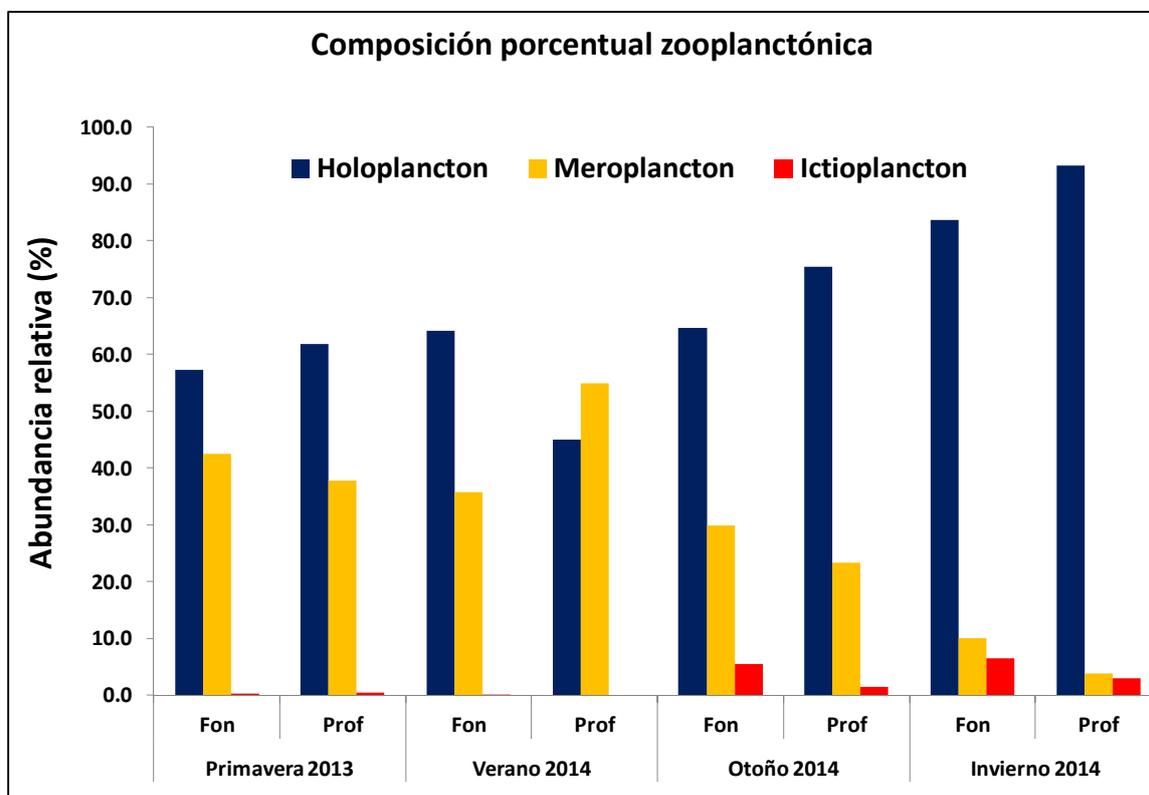
Now, in consideration of the inquiry carried out and attention to the concerns made to the project at various meetings with the regional, as well as in those meetings of citizen participation public services with the community of Caleta San Marcos It was considered appropriate to extend the exercise of analysis of the potential effect of suction, depending on the data collected on-site at the level of 4 campaigns of baseline providing this insight into the maximum seasonal variability as possible) 2013 spring, summer, autumn and winter 2014). Then and it presents an analysis based on a simple, straightforward exercise to determine proportionality on-site registered and

the number of loss of components meroplanktonicos specifically focused on those benthic commercial interest hydro-biological resources. For such purposes were used data from surveys carried out seasonally, planktonic specifically vertical hauls of zooplankton in the area of location of acquisition 2 strata laid down defined priori: to) in a deep stratum was from 40 to 20 meters of depth and, b) from 20 to 10 meters of depth, this last stratum represents the depth range where the uptake of the project will be located (16 m approximately)

#### Results of the evaluation exercise

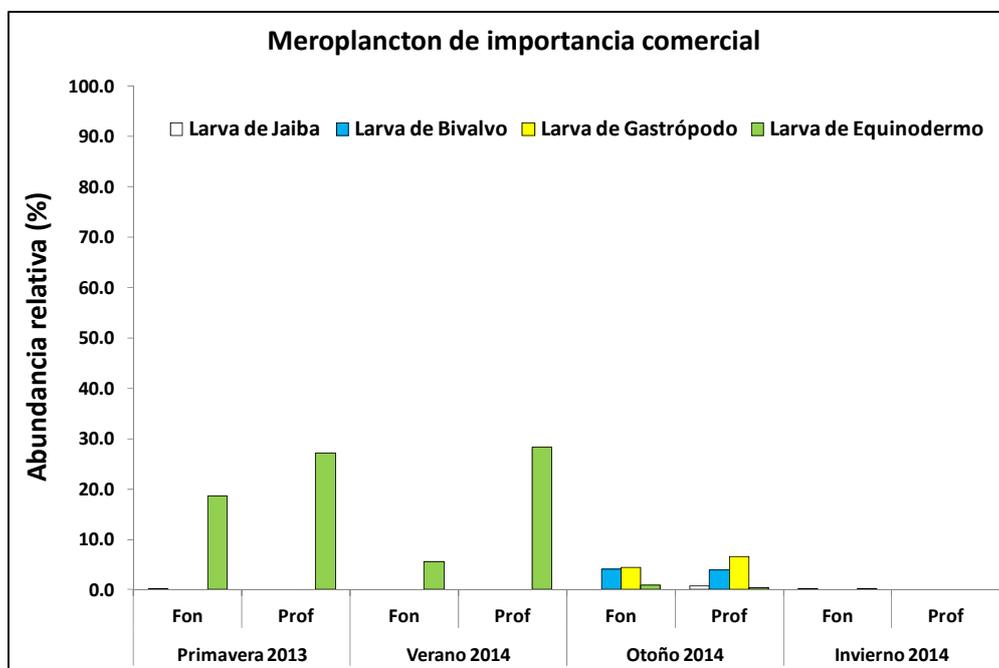
In the following figure the percentage composition is delivered zooplankton relative abundance whereas the sum total of individuals collected by seasonal campaign and depth stratum. In it you can verify that the component planktonic dominant and most conspicuous was the holoplancton, which shows a maximum during the autumn-winter of 2014 (as the) Ichthyoplankton), which is coincident with a percentage decrease of the relative abundance of the component Meroplanktonica. Comparatively, in the period spring - summer are recorded the largest were the meroplankton, and specifically the percentage maximum occurs in the deep strata of the 2014 summer campaign. During this period it was also represented the Ichthyoplankton but in smaller relative proportion.

Figure 7-3. Relative abundance (%) composition zooplankton seasonal and by stratum in the area of implementation of the project.



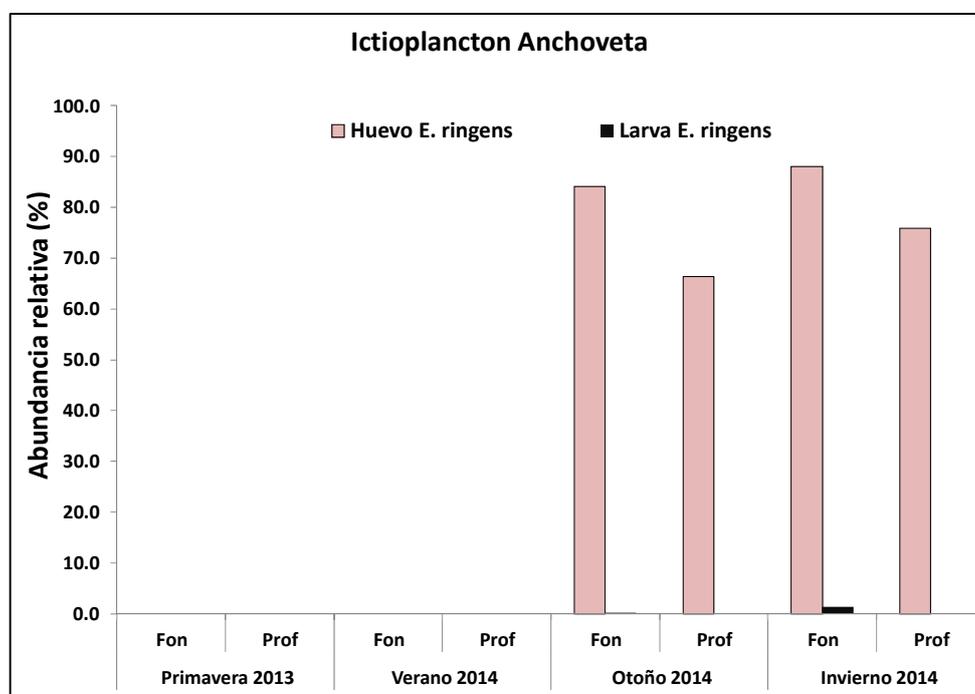
In Figure previous, a breakdown of the composition shown by taxa of the component Meroplanctonica, which represents a potential commercial importance (larvae of crabs, bivalve larvae, larvae of) gastropods and echinoderms), and it can be seen that the most relevant or conspicuous component larvae of echinoderms represent him specifically in the period spring - summer, and particularly in the layer deep. In this same period the representativeness of the other taxonomic groups is practically zero. In the autumn period, defined groups of commercial importance priori show a similar representation among strata both for the larvae of gastropods/bivalves and echinoderms, and crab larvae only are present in low proportionality in the deep stratum. Finally, in winter 2014 campaign was recorded the lowest representation of these groups and only limited to larvae of crabs and echinoderms (Sea Urchin).

**Figure 7-4. Relative abundance (%) seasonal composition and by stratum of the main groups of commercial importance in the area of implementation of the project.**



In Figure followingshows the seasonal variability of the relative abundance of eggs and larvae of the anchovy resource, the most representative inside the component ichthyoplankton. It can be seen that the occurrence of eggs only manifests in autumn and winter 2014, with a much greater proportionality campaigns to the larvae that only occurred in the stratum of bottom of both campaigns.

**Figure 7-5. Relative abundance (%) seasonal composition and by stratum of eggs and larvae of anchovies in the area of implementation of the project.**



### Discussion

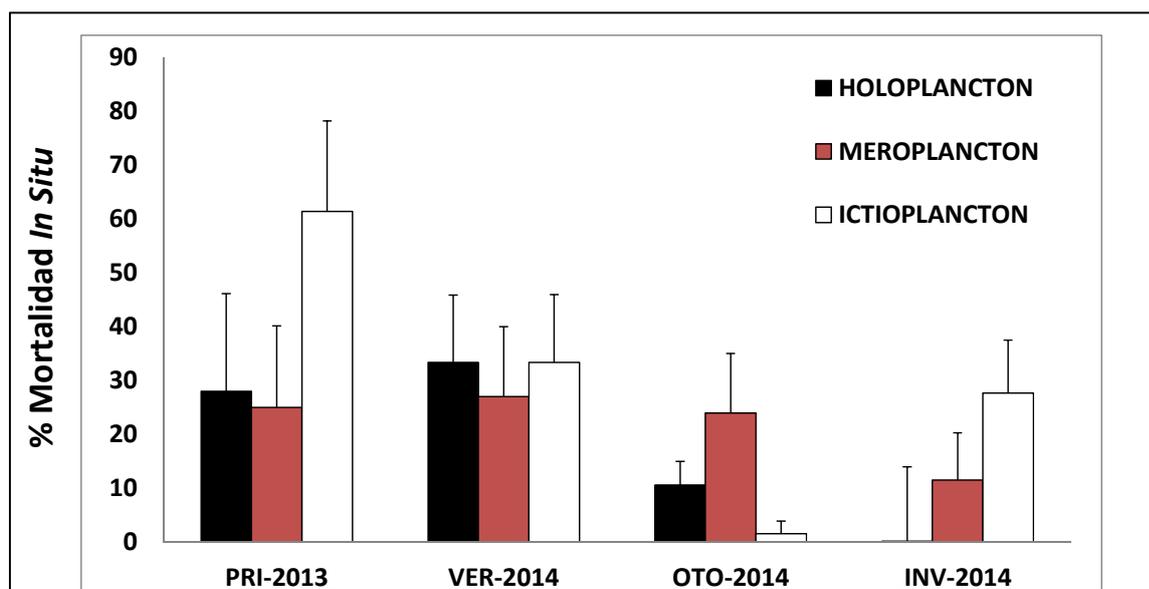
Information registered on-site and summarized in the preceding paragraphs, allow discriminating that the component holoplanctonica It is the most conspicuous and greater occurrence in the area.

On the other hand, with respect to the component Meroplanctonica This showed their greater representativity in the summer 2014 period; within the meroplancton groups related to benthic resources of interest to the sector (crustaceans [crab], molluscs gastropods (and Bivalves, and sea urchins), It was noted predominance of larvae of echinoderms above the rest, specifically in the spring period -summer.

To maintain the original premise of the activity of suction associated with the project, which involves the removal of 9.7% volume control (10%, app.) and, therefore, the same percentage of the component planktonic distributed in this volume, then it is possible indicate that only 10% of the total of relative abundance of resources of commercial importance to the local community informed on the previous figures It will be virtually eliminated from the system. To contextualize these losses, it is important to consider the natural zooplankton mortalities reported in the literature to reach on average 12.5%)Kimmerer & McKinnon 1987), value that is less than the

natural mortality recorded in the study area as shown in the following figure, where can you see a significant variability in seasonal, being in-situ mortality comparatively higher in the spring period -summer.

**Figure 7-6. Seasonal variation of natural mortality in the study area (using the neutral Red technique).**

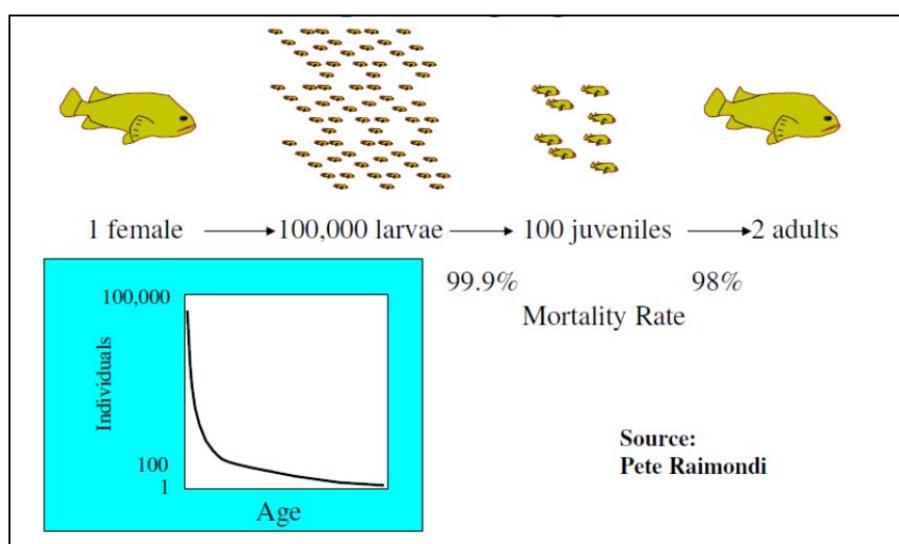


Therefore, we can infer the natural mortality of the system outperforms the effect that would exert the uptake by the operation of the project mirror of Tarapacá, so the effect of it is bounded. Still, the novelty of this type of project is that it contemplates returning to the coastal system a similar volume of water, which will be accumulated in the reservoir. Therefore this exercise can only be understood as the worst-case scenario, considering that all of the planktonic component will be removed from the system. But it should be noted that even you have no certainty or separate information that allows to know what will be the percentage of organisms living or dead in the return flow after passing through a system of turbines that will generate energy.

Any further consideration with respect to the significance of the larval losses estimated in the preceding paragraphs to the benthic resources of any importance to the local community, requires relevant information on several aspects of the history of life of these organisms or species and also of many benthic species present in the area, which are rather unknown in the light of the available scientific knowledge. For this last reason, which then shows an example using the results of eggs and larvae of anchovies (hydrobiological resources present in the samplings carried out planktonic by) Costasur *in-situ*), since global variables are associated with natural mortality of this resource to develop models that respond in quantitative terms the need

to understand the ecological effect on the communities that will lose larval components in said industrial process, and which would not become adults (equivalent loss of adults). An example of this is the scheme that is then extracted from the available scientific technical literature where the losses in natural conditions are extremely high because of approximately 100,000 from larvae of a female, generated 100 juveniles who will finally translate into 2 adult fish of anchovy.

**Figure 7-7. Loss of Larval components in natural conditions**



Source: Cailliet G.M., 2006. Entrainment and Impingement Studies: What you need to know about fishes and their life histories. In: SWRCB Training Session: Regulation and Impact Assessment of Once-Through cooling Systems of California Coastal Power Plants. August 2006.

At last in consideration of the information submitted, it is possible to suggest that suction flow (and the plankton including shower flow) in the water column due to the operation of the "Mirror of Tarapacá" project It should not have a significant adverse effect on the relative abundance of the benthic community since it is expected that the small fraction of plankton removed to be replaced with the horizontal exchange of dynamic renewal in the land of water, the suctioned fraction represents a marginal percentage of the total of the planktonic community.

Additionally, in the Annex 5-1 This addendum a Plan of environmental monitoring of the marine environment that incorporates surrenders a monitoring the comments made by the authority.

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#### 7.6. In relation to the annex 4.3: modeling study of discharge:

- The report called "Evaluation of thermal pen and behavior of the reservoir, hydraulic pumping station project", refers to figures and tables that are in annexes I, II and III. However, these annexes are not available. Therefore, should be clarified if the abovementioned annexes correspond to complementary reports of:
  - "Modelling hydrodynamic and water quality: Tarapacá mirror"
  - "Study of behavior of feather Termosalina and solid through modeling Hydrodynamics"
- If so, should be numbered figures and tables in accordance with these reports, since there is no match between them, and thus be able to assess how adequate the presented
- Otherwise, you must submit the corresponding annexes.

#### Exposed:

The holder receives the request and clarifies that in Annex 4.3 the documents were submitted but not be specified the title of annex. Therefore clarifies that the documents are:

-Annex I: **Technical considerations**

-Annex II: **Modeling hydrodynamics and water quality: mirror of Tarapacá** (Eridanus)

-Annex III: **Study of behavior of feather Termosalina and solid through modeling Hydrodynamics** (Stepswater)

With respect to appointments to the annexes in the body of the report Annex 4.3, only identified an error of typing page 23 of the report, where it says "Annex I" should read "Annex II" Title 6 results and analysis, subtitle **6.1 hydrodynamic modeling and quality of the water in the reservoir**, which corresponds to the study carried out by Eridanus. With respect to the numbering of tables and figures, clarifies that each reports account are renumbered.

7.7. Regarding the methodology used for the prediction and assessment of impacts, the holder delivers in Chapter 4 "Prediction and evaluation of environmental impacts" and its annex 4.1 "Methodology evaluation factors environmental project EIA mirror of Tarapacá", the detail of the methodology, formulas, scales and "criteria" to emphasize the magnitude of environmental impacts and the environmental aspects, pondering in

this way the environmental impact associated with the Project EIA mirror of Tarapacá. In this regard it notes that:

- **The owner must clarify what was the criterion used to determine the categories of environmental value to environmental factors (table 4-2). In this regard and considering that the calculations for the determination of the valuation of the environmental relevance (V.A) is an average of the relevance, the holder shall include standard deviations (+) of each calculated value.**

**Answer:**

The owner clarifies that the criteria considered to determine the environmental value of: rarity, naturalness, abundance, diversity, uniqueness, irreversibility, fragility, ecological interest, historical and cultural interest and significance. A scale of 1 to 10, is used to assign values from zero relevance to very high. The values for each criterion are then averaged and gets the environmental relevance.

It should be noted that this exercise is performed by experts in the various materias that assesses impacts, which exert their expert judgment to set values. Therefore, it is not considered to include standard deviations.

It should be noted that en the EIA was presented the broad list of professionals who participated in the various activities of the EIA, including the environmental impact assessment.

- **In relation to the estimation of the environmental impact calculated for the quality of the water of the sea)Section (4.7.1.5), quality of sediments in subtidal)Section (4.7.1.6) and Oceanography (Biological)Section (4.7.2.3), it must clarify and justify estimations concerning the quality of the resource (abundance), irreversibility, fragility and ecological interest. The above since it the scale used to weigh such variables, fluctuates between 3 and 2 values for the categories of moderate and high respectively, which translates to the assigned value could change the final assessment of the environmental impact.**

**Answer:**

The owner explains that impact assessment is carried out based on lto methodology described in section 4.2 of the Chapter 4 prediction and assessment of impacts of the EIA. The environmental impact is the product of environmental value and the magnitude of the impact.

Environmental value considers an average among the factors: rarity, naturalness, abundance, diversity, uniqueness, irreversibility, fragility, ecological interest, historical and cultural interest and significance. I mean:

$$VA = \frac{\sum (Ra, Na, Ab, Di, Si, Ir, Fr, IE, IHC, Sig)}{n^{\circ} \text{ criterios}}$$

The scale used to assign environmental value to each factor is as follows:

Relevance	Valuation
Null	0
Low	1 3
Moderate	4 6
High	7 8
Very high	9 10

Furthermore, the magnitude of the impact considers the criteria of nature of the impact, probability of occurrence, impact, intensity and duration of the impact expansion and reversibility, in the following formula:

$$M = Ca \cdot Po \cdot \sum (Ex, I, Du, Re)$$

So summarized, I measurement of each criterion is assigned as follows:

<b>Character</b>	Positive (+ 1):
	Negative (- 1):
	Neutral (0):
<b>Probability of occurrence</b>	Very low (< 0,1):
	Low (0.1 - < 0,3):
	Moderate (0.3 - < 0.6):
	High (0.6 - < 0.9):
	Some (0.9 - 1.0):
<b>Extension</b>	Reduced (0):

	Average (1):
	Broad (2):
<b>Intensity</b>	Very low (0):
	Low (1):
	Moderate (2):
	High (3):
<b>Duration</b>	Temporary (0):
	Medium-term (1):
	Long term (2):
<b>Reversibility</b>	Naturally reversible (0):
	Reversible (1):
	Partially reversible (2):
	Irreversible (3):

As is said above, the rating the impact on is obtained from the product between the environmental assessment and the magnitude of the impact, a result which is classified according to the following:

**Table 7-1: Classification of environmental impacts**

IA	Classification
0-20	Non-significant
21-40	Little meaningful
41-80	Significant
81-100	Highly significant

As you can see, the qualification of the impact depends on many factors which are combined to get the final value.

In particular, with regard to consultation, water quality for both quality of sediments, high environmental rating was assigned. Also for components of biological oceanography assigned environmental assessment of moderate to very High. In other words, the criteria Abundance, irreversibility, fragility and ecological interest consulting on this question, were graded high scores considering the sensitivity of all these components.

Despite this, the qualification of the impact for all of the above components varied among non-significant and little meaningful, considering all other factors influencing the rating.

- **In the same sense, and given that a bad calculation was found in the magnitude of environmental effect (M) "Alteration of the quality of the sea water" (table 4-21), which is weighted with a score of - 3.8 magnitude and must be from - 4.8, the holder must re estimate the rating of the impacts environmental (IA) of the components indicated in the previous point, whereas the standard deviation positive of the importance assigned to each environmental component.**

**Answer:**

The holder receives the request and corrects that the value of magnitude of environmental effect is of - 4.8, giving an impact of - 38.4 rating, which maintains the impact as little meaningful that had been identified in the EIA.

- **Considering that the EIA is valued environmental components mentioned in the previous point, the impacts as reversible (Re = 1) for the operation stage, and involving the implementation of corrective actions for their reversibility, this criterion is that the holder must submit all measures that will implement environmental associated with these, for evaluation for these purposes, and all technical backgrounds.**

**Answer:**

The owner clarifies that the evaluation of impacts during the operation on the marine environment, threw as a result that there are no significant impacts, therefore, does not require measures of mitigation, compensation or repair. Despite the foregoing, the owner will maintain a strict monitoreo, which is detailed in the Annex 5-1 This addendum, Environmental monitoring plan of Marine environmentto verify the conditions to environmental projected with the construction and operation of the project, are expected.

- **Finally prompted the holder deliver the theoretical framework of the methodology implemented for the prediction and assessment of the environmental impacts.**

**Reposited:**

The owner clarifies that the methodology that was applied to evaluate the environmental impacts of this project, is widely used in the context of the SEIA, which was detailed extensively in section 4.2 of the Captitle 4 of the EIA.

The origin of this methodology is based on the Matrix's Leopold It was developed in 1971, in the us, in response to the law National Environmental policy ("National Environmental Policy Act")

of 1970."<sup>20</sup> This matrix corresponds to a qualitative method of environmental impact assessment. In this way, the analysis does not produce a quantitative result, but rather a set of value judgements. The main objective is to ensure that the impacts of various actions are evaluated and properly considered at the project planning stage.

#### 7.8. Discharge/suction and reservoir modeling studies regarding:

7-8.1 the owner designates in the section "5.2 models (annex 4.3) the following input data: *Annual time series of meteorological variables were developed for the development of hydrodynamic model and water quality. For the weather were generated with time resolution and for the quality of water with daily resolution.*" Later in table no. 3, indicated that the source of the parameters measured temperature, salinity, conductivity, dissolved oxygen and turbidity, correspond to data *they were replicated during its corresponding station and, for autumn and winter, the measured were taken from reference in the spring campaign*", modality that remained for the rest of the chemical parameters such as total suspended solids, BOD5, sulfates, among others." In this regard, the holder must:

- Clarify the representativeness and validity of the data used for the preparation of the series of annual daily resolution times before mocionadas, any time that the information used for Oceanographic modeling and reservoir is practically based on data obtained for a day in the case of CTDO campaign and the average of three days in the case of the chemical parameters.

#### Answer:

The holder receives the request and clarifies that with regard to the use of data, meteorology, allowed to build one year type to model the situation with project. For purposes of modeling is the situation that there is no data available for long periods of time (years), it is possible to complete the information with data from other stations.

With respect to water quality data, the available data were used and had to replicate to other stations in order to build time of autumn and winter fashion series build a year type reasonably founded, so the results of modeling to deliver useful information.

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<sup>20</sup> Leopold, Luna B.; Clarke, Frank E.; Hanshaw, Bruce B.; Balsley, James R. (1971). [A Procedure for Evaluating Environmental Impact](#). Geological Survey Circular 645. Washington: U.S. Geological Survey.

- Clarify why did not use oceanographic data from the campaign in fall 2014 as an input for the Oceanographic modeling and reservoirs.

**Answer:**

The holder receives the request and clarifies that data used for modelling, you get results that are representative. However the foregoing, holder has complemented the modeling analysis and is presented in Annex 1-6 Study of dynamic modeling of thermal and saline plume the result of this modeling for summer, autumn, winter and spring, i.e. with baseline data for the 4 seasons of the year.

- Join the model time series considered at least seasonal variations full (summer, autumn, winter and spring) and interannual variations product of ENSO events, in such a way to represent the range of natural variability of the oceanographic conditions of the sector (Bay Chomache-Tip Huanillo). Bliss information can be complemented with lines available data bases of other nearby Bay projects Chomache, as well as with data available at the National Center of hydrographic data and oceanographic (CENDHOC), or other resources available on the web (<http://www.nodc.noaa.gov/OC5/SELECT/dbsearch/dbsearch.html>).

**Answer:**

The holder receives the request and clarifies that data used for modelling, you get results that are representative. However the foregoing, holder has complemented the modeling analysis and is presented in This Addendum, Annex 1-6 study of modeling dynamics of thermal pen and Salina the result of this modeling for summer, autumn, winter and spring, i.e. with baseline data for the 4 seasons of the year (See TONexus 3-1.1) .

It should be noted that the boy and girl, events are natural events that generate differential of temperature average much larger than the reported for the discharge of this project. Occurrence of such differentials, as well as their magnitudes, they are impossible to anticipate.

In this way, not to be under the control of the project and correspond to a magnitude far greater than the project There are no zeroesilidad of applying measures project that it can counteract its effects.

7-8.2 in the section 6.1 hydrographic modeling of the reservoir (annex 4.3), the holder points out that: *"Fluctuations in the values of pH in the reservoir would be in the range of 5.7-7.4 depending on time of year and stratum"*. In this regard, it is designated that the lower range before indicated, would escape the values of water quality of class 3

"Regular quality" (pH 6.0 to 9.5) of the "Guide CONAMA for the establishment of standards "Secondary to surface freshwaters and marine environmental quality", document which States that *"In the case that a marine water body is natural quality less than the class 3 (quality control), you should be protected up to the value of their natural quality, so this not worse"*." Therefore, you must incorporate monitoring this and other variables that are in these categories within the Plan of environmental monitoring to develop for this project.

**Answer:**

The holder receives the request and incorporates the monitoring of all variables in the Plan of Environmental monitoring of the Mtop MAriño, attached in annex 5-1 of the present Addendum and the Plan of environmental monitoring of reservoir in what corresponds attached in annex 5-2 of the present addendum.

**7-8.3 modeling hydrodynamics and water quality (report report Eridanus), in its Section "3.1.2." system reservoir: rule of operation", says that:***"It should be noted that rule of operation was initially provided by the team of energy engineering Valhalla "S.A., however, in assessing this rule operation proved that the level of the reservoir did not fit to the conditions for normal operation of the system, which led to adjustments to the rule of original operation (economically optimized)"*. In this regard the holder must explain in detail what are the adjustments that were made to the original operational rule and because of that the level of the reservoir did not fit to the conditions for the normal operation of the system.

**Answer:**

The holder receives observation and clarifies, that the rule of operation provided by energy Valhalla S.A. is based on the estimated solar energy generation that will take advantage of the solar surplus, thus to pump water to the reservoir. I.e., that rule is considered an ideal (economic) estimate of operation, but does not necessarily correspond to the rule of actual operation, which will have the (dependent on available real solar power, the final geometry of the reservoir of the equipment, etc.). Remember that the actual system will operate instantly, while the rules of operation discussed in the study are approaches to schema level, necessary because IAS that you cannot anticipate theoretically instant and actual operation of a complex system like this.

To perform modeling, it was necessary to estimate the level variations based on projected bombs capabilities and reservoir curves in section 3.1.1 of the EIA report, so respect the limits in section 3.1.2. This is due to the requirements of the model, which requires use of reservoir and

flow curves not allowing operating rules "external" not deemed a proper balance of volumes tributaries and effluents (physical approach).

Two paragraphs before paragraph quoted in this consultation indicated that you want to "find the variation of the free surface that allows operating simulation models, originating of trade flows that are required as a (series of) input to the model" hydrodynamic". These exchange flows correspond to flows which are exchanged between the 3 subunits of the reservoir, as indicated in the scheme of exchanges of water within the reservoir that is included in section 4.2.1. this scheme of exchanges was computationally, met through the development of a water balance algorithm, to obtain the rule of operation used in modeling. Edge of the system conditions are indicated in the report)section (3.1.2) and correspond to the minimum and maximum dimensions, as well as the maximum, and minimum flows in addition to free connect and continues between the 3 subunits.

The result corresponds to a rule of operation based on the design of the reservoir and its pumping system, regardless of the excess solar energy available for the operation of the reservoir (implicitly it has been assumed that there is always enough power Solar to operate at maximum capacity).

Without limiting the foregoing, both rules of operation were compared, obtaining similar results of volumetric variations in the long term, which respect the conditions of edge of functioning of the system and their seasonal variations.

In terms of flow, both operating rules are considered equivalent, as respected the same flow minimums and maximums, for which there are no differences between both rules regarding the effect of the project on the sea.

**7-8.4 according to figure 3.2. "Behavior of the level or dimension of filling for the reservoir over a year system" (report Eridanus), seen that the greater amount of water will be accumulated during the summer or warm, descending colder, behavior that is similar to that described for the index during the months of Upwelling Coastal and biomass Zooplankton during a year in waters off northern chile (R. Fuenzalida, 1992). Also, this behavior is consistent to a certain extent with that reported by the holder for the parameters of turbidity (table V, Figure 12) and M.O.T (table V, Figure 13), in the section 3 "Chemical Oceanography" (annex 3.2. Line Base marine environment), where higher concentrations of these parameters are indicated in Spring 2013 and 2014 summer. In this regard, it stated the following:**

- **With the values of biomass Zooplanktonic requested in Chapter 3 of the present ICSARA, and considering the assumption that destroyed all the larvae and eggs**

**contained in the community zooplankton (Report technical Costa Sur estimation of effect of the catchment water on the flow of plankton to inside Bay Chomache(, Front of San Marcos), the holder should model the behavior of biomass levels zooplankton which they accrue and sedimentarían in inside the reservoir seasonally product of the suction of the marine environment.**

**Answer:**

In relation to biomass zooplankton, it is necessary to clarify that the model used was considered this variable and its effect on the water quality of the reservoir, through the incorporation of the values of organic matter total (MOT) from both phytoplankton such as of the zooplankton, without differentiating them (starting from baseline data). Thus in the modelling carried out is considered the contribution of zooplankton from MOT.

With said contribution of MOT, the model showed that the existence of a massive development of phytoplankton, associated with the process is not expected of eutrophication and, consequent to this, also predicted a massive increase of zooplankton given that this is based on the phytoplankton. Por is both expected that in Reservorio is no sedimentation rates very different to what happens in the surrounding marine environment. MOT considered data for modeling were spring and summer, representing the highest average records (above 10.5 mg/L).

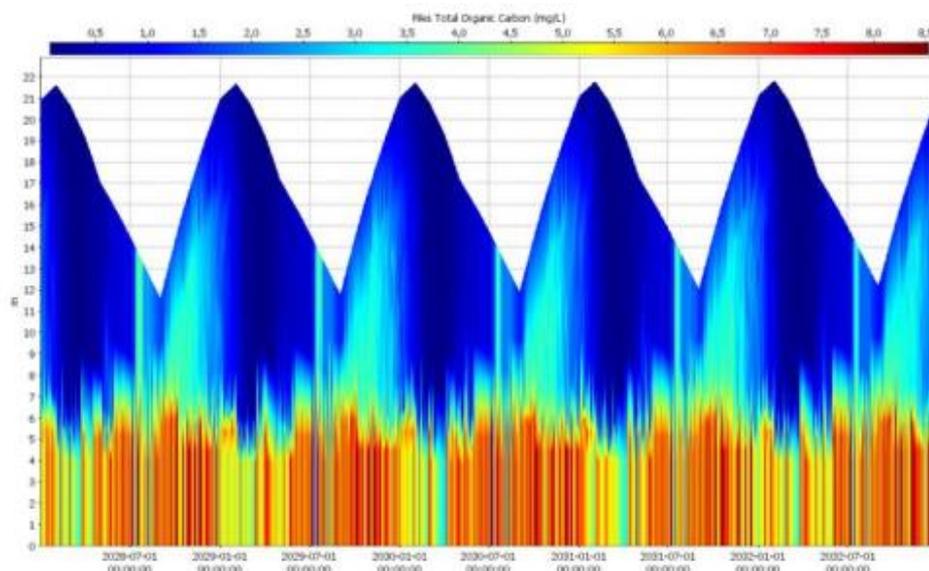
Under these conditions, the modeling indicated that there would be a risk of eutrophication. Moreover, the system was strongly governed by the conditions of hydrodynamic, presenting thermal stratification during most of the year, except for the winter months.

On the other hand, the organic matter is represented by the organic carbon in the modeling. Results of this showed that higher values were below 8.5 mg/L for a simulated long-term horizon. At elevations greater than 8 m concentrations in the reservoir does not exceed 3.5 mg/l in terms of mixing, and the greater part of the year levels are around 1 mg/L. (see Figure 7-8).

In addition a programme I saw will be maintainedgilancia environmental (PVA) in Reservorio, which will contain variables of eutrophicationHow nutrients MOT, concentration of oxygen, as well as biological components (phytoplankton, zooplankton and bacteria) among others, in the water column (see annex 5-2 of the addendum). Physical and chemical and biological changes in order to make a water reservoir management to proactively can be monitored with this PVA.

Below are profiles of concentration for the last 5 years of simulation, representative of the quality of the water in the reservoirs over a long-term horizon.

**Figure 7-8: Carbon organic Total [mg/l] for reservoir (North West).**



**Figure 7-9: Carbon organic Total [mg/l] for reservoir (South West).**

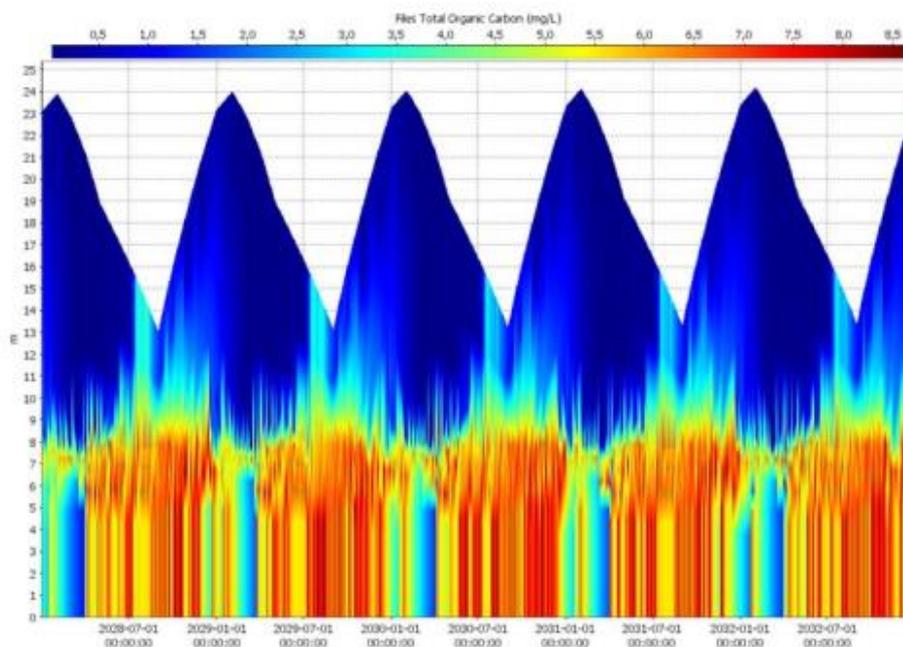
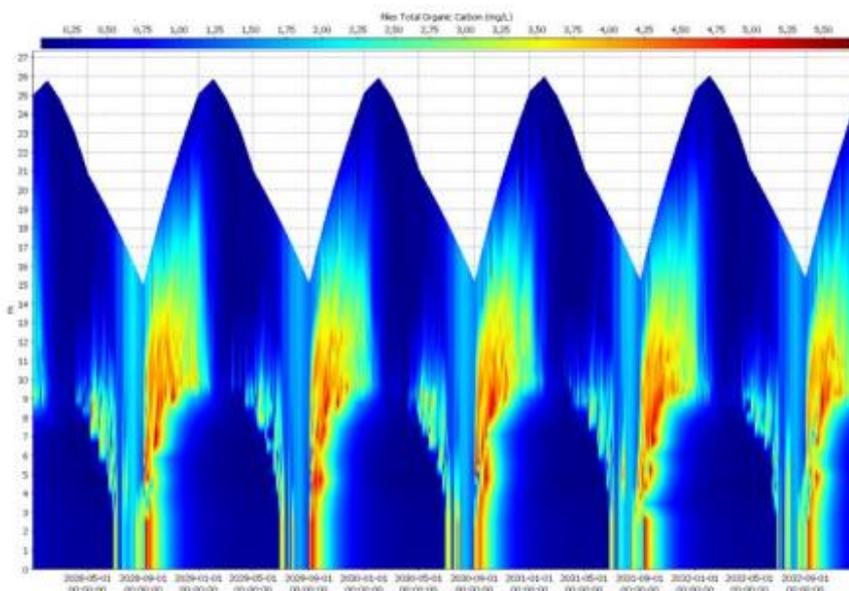


Figure 7-10: Carbon organic Total [mg/l] for reservoir (East).



- **Modelling the influence of biomass zooplankton destroyed and determine how is would influence the increase of the M.O.T of the water column and sediments of the sector, both in the near-field as far away from the point of discharge, the above, whereas the levels of natural concentration in water column and s M.O.T edimentos reported by the proprietor, indicate values over 10 mg/L for the water column and above 3% in sediments from the stations to the discharge point. (ASP-3 and ASP4), situation that already show an enrichment of M.O.T. of natural type in the sector.**

**Answer:**

The zooplankton biomass is considered in the modelling of the reservoir, in the total organic matter (MOT) data from baseline both spring and summer, where there are the highest values, in comparison with the other seasons of the year independent whether it is alive or inert biomass. With this total contribution from organic matter both of the Fito as of zooplankton, the model showed the existence of a massive development of phytoplankton, associated with the process is not expected of eutrophication and, consequently, also predicted a massive increase of zooplankton given that this is based on the phytoplankton. Therefore not expected that water from the reservoir made various contributions of organic matter to the already present in the

surrounding marine environment and with this there is a change in the water quality of the marine environment.

Although not planned an enrichment of MOT product of the return of the biomass of the reservoir, the holder shall maintain a Plan environmental monitoring of the Middle MAriño (in the) water column and sediments) and Plan Environmental monitoring in Reservorio. In these physical, chemical and biological variables that may realize an increase of MOT both in the reservoir as in the marine environment (see annexes 5-1 and 5-2 of the addendum) will be monitored. Water quality both the reservoir and the surrounding local marine environment can thus be checked.

**All of the above, shall be described in the sense of responding to the 4 questions identified by the owner in point 3.5. Modeling hydrodynamics and water quality. (Report Eridanus).**

**Answer:**

The owner explains that the reference indicating the question within this document refers to the following questions:

1. *What are the key hydrodynamic processes?*
2. *What are the concerns associated with water quality?*
3. *What are the appropriate spatial and temporal scales stop to resolve these processes?*
- 4 *How will be used the model to support the decision-making process??.*

The same report responds as follows:

*To answer the first question, the surface area of the system reservoir, estimated at 3.7 km<sup>2</sup>, and the (maximum depth of 27 m) should be considered. As you can be seen in the available records, are smaller, with a maximum length close to 3 Km, so it is do not expect relevant density variations in the transverse direction, being the mixture of system a process essentially one-dimensional, vertical structure. Therefore proposes that a one-dimensional model, averaged in the horizontal direction, is sufficient to estimate changes in caliAd of the water inside the reservoir in the medium and long term.*

*In terms of the quality of water (second question), parameters to monitor are nutrients and standard physical and chemical parameters, but also want to know whether the conditions of reservoir system generate problems associated with the production of algae. In general, the problem is oriented to meet What quality standards should be incorporated in the modeling, in order to study its evolution.*

With respect to the third question, the report raises modelling long term executing the daily scale model to better represent the process of filling and emptying of the reservoir. *Is It proposes the use of the one-dimensional model DYRESM (CWR, 2010), which can be attached to the model of quality CAEDYM (CWR, 2010), both developed by the Center of Water Research (CWR) of*

*the University of Western Australia. DYRESM-CAEDYM models have been used to model several lakes and reservoirs around the world, obtaining good results, including lakes and reservoirs in the country (De la Fuente, 2003;) Sandoval, 2009; Energy Austral, 2009).*

*Model DYRESM-CAEDYM presents comparative advantages with respect to other 2D and 3D models: minor times calculation and less need for information. The above allows development models of long-term in a short time, with the possibility of a increase in simply the number of scenarios and thus study different rules of operation and configuration of works that allow controlling limeity of waters and ES of the system under study.*

Finally, by having the results of this study and other reports, that you allow identify the likely behavior of the variables of the project, It's possible define a management model for the project. In the case of unloading, considering that the biggest difference turned out to be at the temperature of the water discharged, under certain conditions of operation and time of year, defined a Plan with Contingency measures for the Control of the increase of the temperature of discharge from the reservoir, which was adjusted according to the requirements of the authority and is presented in Annex 7-2-4 of this addendum.

In all cases, has been given answers to all the questions in the report and in the replies to the ICSARA made in this addendum.

**7-8.5 in the modeling hydrodynamics and water quality report)Eridanus), in its Section "4.1.1.3" Magnitude and direction of the wind,"the headline points out that: Figure 4.7 shows hourly winds at the weather station Cove address San Marcos, which shows a preferential direction of the wind to the South". In this regard, lightens the holder indicated in the graphic 4.7 the wind direction is from South.**

**Answer:**

The holder takes note of the observation.

**7-8.6 in the section 4.1.2.3 "data obtained from secondary sources" (report Eridanus), the holder said the case of silica that: "Finally, the silica was used a same value throughout the full year, which corresponds to the average delivered by" Burguera (2013) ". In this respect, says that the average used by such reference is  $7 \mu\text{M} \pm 12$ , for a stretch of coastal Spain, however the models made in the present EIA for that variable, expressed in units of mg/L, with a maximum value of 3 mg/L. In this sense, the holder must:**

- **Transform the respective units of that variable or indicate the equivalence of units, to have a better understanding and comparison of major variations that may have the system inside the reservoir.**

**Answer:**

Silica concentrations were calculated to form bioavailable. This corresponds to the species Chemistry of Si (OH) 4 (Burguera2013), where the registered averaged  $7.6 \mu\text{M} \pm 12$ , corresponding to 0, 73 mg/L.

However for the modeling was considered a concentration which will ensure that the Silica It was not a limiting nutrient. For which we calculated a value that was above the average registered, whereas the standard deviation, i.e.  $19.6 \mu\text{M}$  ( $7.6 \mu\text{M} + 12 \mu\text{M}$ ), and under the maximum value registered  $40,024 \mu\text{M}$  (Burguera, 2013).

This is equivalent to a concentration between 1.9 mg/l for the first case and 3.8 mg/L for the registered maximum. Hence, the value used for the modelling of 3 mg/L was determined.

- **Since there is reference information nationally about silica concentrations in systems of upwelling coastal (Silva & Valdenegro2003), the holder shall incorporate such background for the formulation of its model.**

**Answer:**

The holder receives observation and clarifies that lconcentration of silica used was by on concentrations indicated by Burguera (2013). This was to be able to model a system that files no limitation by silica, and in this way, they are fulfilled the conditions environmental for a potential probability of flowering algal. DADOs the results of the modeling presented in the EIA in annex 4.3, There was probability of occurrence of bloom algal wholesale.

The data published by Burguera they are among an average of  $7.6 \mu\text{M}$  to a maximum of  $40 \mu\text{M}$ , which you equivalentes to 0.42 mg/L 2.4 mg/l.

On the other hand the silica concentrations reported in the area of upwelling coast of Curaumilla (Valparaíso) posted by (Silva & Valdenegro2003), correspond to more concentration of 1.54 mg/L, whereas as greater depth 50 m, using reference to project sea water suction depth corresponds to 15 m.

Therefore, data of silica from Curaumilla they are lower than the range considered for modeling and the range used to model considers more favourable conditions for the development of a

flourishing algal. This allows a reasonable analysisfull mind what mayIA occur in the proproject evaluation.

7-8.7 accordance with in the section 4.4 analysis of the quality of water (report Eridanus), where it is indicated that: "the reservoir can be approached as an ecosystem, in such a way that their behavior can be studied by establishing hierarchies to understand drivers factors of its operation. So, is that their behavior is primarily governed by physical factors (meteorology), which will have repercussions on the chemical variables, which will eventually affect biota (O'Neill et al., 1987). In other words, the hydrodynamics of the system of reservoirs will be governed by factors such as radiation and wind, which in turn withrolarán the behavior of the water quality, which would be reflected in the biota. For example the capacity of the system can analyze to develop Proliferations massive phytoplankton, given certain nutrient concentrations, in the sense of present eutrophication or other relevant nutrient". In this regard it notes the following:

It is well known that the installation of a dam or reservoir of water in an arid environment carries a great change of the properties of the surface of the soil, which affects the balance of the components of the radiation and energy balance, and , therefore they can influence local weather, affecting the pattern of winds, temperature and relative humidity of the sector, both during the day as at night)Bischoff-Gauss et to the. 2006; Wittmaack et al., 2008). In this sense, the holder must:

- **Assess the potential impact both the local climate, the biota that could produce the incorporation of this new ecosystem in an arid climate as the coastal desert of the Tarapacá region.**

**Answer:**

Is considers that the installation of the Reservorio does not generate impacting local climate since the intervened area and volume of stored water is substantially less with regard to the Oceano Pacificwhich corresponds to the main natural thermoregulator and determinant of the local climate. The reservoir is located to the East of the sea and less than 1 km from the edge of the coastal cliff.

In regards to the evaportranspiracion water, measurements carried out in the area where the reservoir will be located showsn a low formation of mist on the body of water and low generation of moisture in the immediate surroundings. By way of example, the daily average of evaporation for the months of October, November and December was 3.46 mm (or L/m<sup>2</sup>) per day, 4.52 mm per day and 5.27 mm per day, respectively.

Furthermore, a study carried out to verify the influence of the reservoir Puclaro<sup>21</sup> about the local climate (located in the Coquimbo region), identified a change in the systems of wind within a 4 km area environment of the reservoir. It also indicates that the influence of the reservoir on the temperature of the air covers the same area. Finally, the study concludes that the climate impact of reservoir Puclaro It is very local and extending for just 4 km in its immediate surroundings, particularly in West directions and this.

On the basis of the previously exposed background, estimated that the environmental impacts associated with the creation of the reservoir on the coastal plateau is not significant.

- **Analyze how potential changes to the local climate may interfere with the performance of the quality of water in the reservoir, considering the inevitable terrigenous contribution of nutrients and other minerals that will have the reservoir throughout its existence.**

**Answer:**

As indicated in the answer to the previous question, it is estimated that the installation and operation of the reservoir does not generate involvement significant the local climate. On the other hand, it should be noted that the background the reservoir will be, in its entirety, with a waterproof membrane which will prevent the terrigenous contribution of nutrients and other minerals from the soil.

Despite the above, and in order to verify downloads carried out throughout the project, referred to the implementation of a Plan of Environmental monitoring for the reservoir, and an environmental monitoring Plan for marine environment, which includes a monitoring of the temperature; dissolved oxygen; direction of the current in the discharge point; nutrients such as nitrate, nitrite, phosphate; turbidity; settleable solids, among others. Update these plans described in Annex 5-2 Plan of environmental monitoring reservoir and Annex 5-1 marine environment environmental monitoring Plan the present addendum. These plans also include the addition of new components in a way of guiding the processes of decision-making on the basis of the results are getting, in relation to the management of the reservoir and the marine environment, according to the activities of the project.

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<sup>21</sup> **Los sistemas naturales de la cuenca del río Elqui** (Región de Coquimbo, Chile): Vulnerabilidad y cambio del clima. CEPEDA PJ (ed): 41-62 (2008). Ediciones Universidad de La Serena, La Serena, Chile. Acápite 2.4 Influencia del Embalse Puclaro sobre el clima del Valle del Elqui

- **Because the owner says that the model of the reservoir would have little mixing between the surface layer (epilimnion) and the deep (hypolimnion), due to the strong existing thermal stratification (Figure 5.4 report) Eridianus) Noting also that: In this way, high concentrations of silica in the deep layer (and from) from the sea are not transported to the surface layer (zone photic") during the period of stratification by temperature, limiting the growth of algae in this area." The holder should be considered a new analysis which includes the most unfavourable situation of mixing or layering in the reservoir, (product in item 7 above), and must consider a model that incorporates the possible succession between groups dominant diatoms and dinoflagellates of agreement these possible scenarios of mixture into the reservoir.**

**Answer:**

The owner explains that modeling includes a simulation to periods of 20 years and gives information about abundance among key groups of diatomaceous earth and dinoflagellates, in situations of mixing and stratification.

The column of water in the reservoir is tiered from November to June, and in mixture from August to October. According to the results of the modeling, the evolution of diatoms and dinoflagellate continues a regular cycle. Always observed a predominance of the diatom above the dinoflagellates, even tripling the difference in abundance. Location of mixture stimulates the growth of diatoms attributed to an increase of the bioavailability of silica from the deeper layers. On the other hand in the literature has been published that the dinoflagellates prefer warmer temperatures. Warmer temperatures occur in this case in the month of February when the body of water is stratified.

Independent It proposes a Plan for surveillance of the Reservoir (Annex 5-2) for the phase operation, which incorporates an integrated sampling station. In that document specifies that, among the variables to monitor is the composition of the phytoplankton, which you will notice changes in time.

**7-8.8 with regard to the background described in the different analyses of modeling of the underwater discharge.**

**According to the designated by the holder, analysis to evaluate the alternatives of modeling was dealt with according to the "methodological guide for the MEDVSA project, funded by the Ministry of environment, Rural and marine environment of the Government**

of Spain")Section 3.6.2 review Eridanus), document in where are the methodological steps for the design of discharge into the sea of desalination plants, and on the other hand, considering the information contained in the Base line and annex 4.3 modeling study of discharge and their various reports (report EridanusReview Poch, and report StepsWaters Solution EIRL), stated the following:

- The owner must clarify whether effluent from the desalination plant to evacuate through the tunnel of suction/discharge of the Tarapacá mirror project, or If these will be dumped in another discharge point to consider. In this regard, the effluent of the plant, whereas the characteristics of brine and water cleaning filters and membranes, and the incorporation of additives for the maintenance of the plant must be characterized physical-chemically.

**Answer:**

The holder to clear that, during the construction phase of the project, the brine will be discharged to the sea through a duct that will be installed from the plant to the point of discharge. During the operation, the brine will be downloaded to through (l) discharge tunnel.

It should be noted that only the brine will be discharged to the sea, Since the any effluents from cleaning and maintenance shall be aggregated in a pond for the back available in an authorized place.

Furthermore, the holder submitted in Chapter the EIA, table 1-40 1 a characterization of the brine. It is this that will be compliance with the resolution Former (SMA) N ° 117/13, as amended by resolution Former (SMA) N ° 93/14 that "teaches and instructs rules of a General nature on procedure of characterization, measurement and Control of" Industrial waste liquids".

- Of be evacuated the effluent from the desalination plant to the point of discharge into the sea, you should model again unloading in their near and far field respectively, incorporating the salinity, temperature, and total dissolved solids concentrations which are they are there to the effluent of the reservoir. Otherwise, you should characterize and describe the management of the effluent and the water from the desalination plant.

**Answer:**

The holder receives the request and delivery in the present Addendum the Annex 1-6 with lto modeling that includes the effluent from the desalination plant during the construction phase.

During the operation phase, the modelling was presented in the answer to question 5.1 of this addendum. It is as well as, was a modeling of joint discharge of water from the reservoir and the salmue seaRA of the desalination plant, the results are Overview then.

Were the models for each seasonal period, joining the flow station and desalination plant at 15 m of depth. LUnion of the caudales) saline pen station (28,000 l/s) and the desalination plant)7,9 l/s aprox.) was carried out at the point of discharge precedent. Therefore, the modeling scenario is conservative since in practice during the phase of operation these flows will be mixed until they are discharged to the sea. The results can be said next:

The biggest contribution of saline during the modeling arose in the summer period (see Table 5-1). It can be seen that the union of the saline flow generates a maximum positive point differential at the bottom of a 1.36 percent with respect to the salinity of the receiving environment (i.e. 0.47]PSU[, approximately), and a monthly average of 0.09% with respect to the conditions of the marine environment.

In relation to saline excesses reported at the sea surface, variations in all modeled periods were not recorded.

The salt excesses are diluted quickly, not generating any area of influence which alter the marine environment, since the largest reached 1.36% percentage is very down to the 5% that the Norma Australiana sets.

- **In the section 3.6.2 analysis modeling (report alternatives Eridanus) notes that: "Finally, the sensitivity analysis performed by MEDSVA for each model reveals that these models make important mistakes in the modeling of the behavior of the Jet in the presence of a current environmental. In many cases do not follow the trend obtained experimentally and their results are practically insensitive to the direction of the currents. In the present study, the currents vary between 2.5 and 0.5 cm/s, so it is not expected that its effect is relevant in modeling, regardless of the selected model", reiterating that:" to a receiving environment in movement, the validation shows that these " models generally follow the trend to increase the dilution with the intensity of current. As mentioned above, in the present study are expected that the currents do not exercise a relevant effect in shaping". To the respCTO, licensee must clarify this assertion, describing how the currents do not they will have a relevant effect on the modeling, whereas data of current Eulerian**

**they indicate magnitude of currents that would reach 21.6 and 26.6 cm/s maximum in the intermediate strata and background and to 38.6 in surface (table (3-25 Base line)).**

**Answer:**

The holder receives observation and clarifies that the analysis of the maximum and minimum values recorded every 10 minutes and effectively speeds as the indicated in the query.

In the presented study in the EIA It was appropriate to consider the values average speeds in the layers of interest, as a conservative measure of the receiving marine environment. This is due to a greater magnitude of the ocean current would tend to introduce greater turbulence to the system, thus accelerating the natural mixing of the discharge with the receiving environment. Therefore, he considered not appropriate to consider maximum speeds. Conversely, an even more conservative analysis could be considered minimum speeds, worst condition of discharge.

To complement the previous answer, the complete series of currents were reviewed Eulerian (5.468 instants of time, obtained every 10 min), where it was noted that high speeds correspond to specific events:

We calculated the percentage of times that the speed exceeded the 10 cm/s, resulting in an average of 3% of the time, in all layers (analysis of components U and V). At the surface level Gets the more likely to have speeds greater than 10 cm/s, getting up to a 15.5% of the time. At the bottom is not obtained more than 9% in the worst case and a 0.3% at the other end.

As you can be seen, high speeds, in the area of interest, they have very low occurrence, or a frequency which was not used for the purpose of determination of the dilution of the discharge in the nearby countryside.

- **In the Section 4.5.2 "Underwater discharge system" (report Eridanus) States that: "on the one hand, the environment receiver requires the same parameters indicated in" the section 4.5.1, unless VJ requires a unique address of current, valid for all layers defined. To resolve this dispute with VP, we have analyzed currents indicated in table 4.7, pointing to considering the most unfavourable condition. In this case, this condition is an address of 128°, which is observed in layers 18, 9 and 8. This direction implies that discharge will head for the area of la Caleta San Marcos (see Figure 4.12), which corresponds to the condition of most of the water column under which the gate of submarine discharge protection will be located. In the surface layer (35), the current has the highest speed and runs northward, away from the Caleta San Marcos, however, VJ considers all layers to pose"n 128° one-way, which represents the worst case, whereas the simplification**

**which requires VJ". To this respect, and considering in the MEDVSA Guide, as well as as indicated in the technical report of management of downloads of brine in waters coastal recommendations of a Scientific Advisory Panel (California Water Resources Control Board, Technical Report 694, March 2012), the holder must perform modelling of discharge in its different scenarios (Normal and emergency) whereas conservative assumptions that involve:**

- **Coastal currents do not increase the dilution,**
- **Bathymetry flat horizontal and**
- **"The possibility of"reentrainment"caused by a restricted flow that limits the initial dilution.**

**Answer:**

The owner explains that the cited report which was performed by Eridanus, It corresponds to the modeling for near-field, i.e. around the point of discharge, without leaving it significantly, so not related to the stated elements (coastal currents, bathymetry and re-entrainment).

That said, should reiterate that the report presents the study of dilution in the near-field, where the available models consider local currents and local bathymetry (depth to which the download is located). The influence of coastal currents and the complete bathymetry of the area of influence is incorporated through studies of far-field, which is not addressed by the consulted study.

Regarding the re-entrainment This phenomenon is expected in unstable conditions of discharge, which produce effects of recirculation. In general, only models allow address stable discharge conditions, as in the case study. Considering the depth of discharge and velocities average currents measured in the area, do not expect conditions for the re-entrainment.

Is It should be emphasized that the models used are valid in the nearby countryside, where the turbulent mix Download is more important. Sin however, through protection grating download speeds are low, so it is considered that the results are valid not beyond the vicinity of protection grating i.e. environment within a radius of 8 m environment to discharge point. To pen ascends towards the surface of the sea the turbulent effects disappear quickly, subtracting validity of near-field models. In this sense, it is considered that dilution of far-field would be more relevant to understand the effect of the discharge into the marine environment.

Finally, to represent the behavior when downloading the project moves away from the point of outlet to the sea and is integrated into the Bay and their dynamics, far-field is modelled. This is part of the Annex 4.3 of Chapter 4. This report was supplemented for the current Addendum and corresponds to the Annex 1-6 study of modeling dynamics of thermal pen and Salina. Results from these models show the behavior of the pen in the Bay.

- **Regard to the analysis made in the study of the behavior of feather TermoSalina and solid through hydrodynamic modelling (report Steps Water Solution), the proprietor says in the section 5.2 field far MIKE 3 MT FM model, as follows: to know the concentrations of solids suspended in the coastal zone, both the reservoir will be used a 3D sediment transport based on flexible mesh model, developed for within environments oceanographic, coastal and estuarine applications. "Allows you to simulate erosion, transport and deposition of silt or sand/silt mixtures under the action of currents". Subsequently, indicated that: can be applied to the problems of studies of engineering such as: study of transport of sedim"many for fine materials or mixed sand/silt in estuaries and coastal areas, sedimentation in ports, navigation paths, rivers and dams, dredging studies". Also, considering also stated in the conclusions of the study of the pattern of circulation)Section 2.2, annex line Base Marina) in which indicated that: "in terms of the magnitude observed in this Bay, these correspond to flows of medium intensity, which would explain the accumulation of sediments in the South of the Bay, around the spring of" fishermen". The holder must:**
  - **Define, what kind of natural movements of sediment dynamics (transport, erosion or deposition) would be generated for each size of sediment described in the sector to intervene.**

**Answer:**

To comment with respect to the natural dynamics of sediments of the Bay are considered relevant 2 factors; the trends and characteristics of marine sediments.

In terms of currents is the information in the baseline of the marine environment and results from the hydrodynamic models of the Bay. Both sources are consistent and indicate that in general terms prevailing currents are of low magnitude, with greater intensity in the surface layer, because the forcing of winds and tides.

The baseline (section 2.2 line of Base Marina the EIA and annex 3-1 of the addendum) must be, measurements of ocean currents carried out against Caleta San Marcos during campaigns of 2014, under conditions of tide llenante and reflux allowed to characterize the field of surface and subsurface currents in terms of magnitudes and predominant direction, vertically in the water column.

In condition of tide llenante is observed at surface level the presence of water intrusion by the southern sector of the Bay and flows out of the Bay in the North, noting also a background layer that would tend to flow away from the layers surface.

The movement could be determined not only by the field of wind and tide, but the effects of local, as the bathymetric and topographic, product of the orientation of the coastline.

In terms of the magnitude observed in this Bay, these correspond to flows of medium intensity, which would explain the accumulation of sediments in the South of the Bay, around the dock of fishermen.

Respect of the water column, in both conditions of tide was observed the balance of mass of a system of two layers, which in practical terms allowed to establish a scheme of movement where the surface layer, would tend to flow towards the coast in tide llenante and in the opposite direction during the reflux.

To compare the vertical structure with measurements Eulerian in condition of tidal llenante (Figure 3-72, section 2.2 of the EIA) and reflux in syzygy (Figure 3-73, section 2.2 of the EIA), is corroborated the presence of a two-layer structure. A surface that tends to enter the Bay at tide llenante by the southern sector, and a background layer, which tends to flow in the opposite direction exporting water to the outside of the Bay. In the case of tide reflux, behavior is inverse, where the waters would tend to leave for the southern sector.

With regard to the characteristics of the sediments, is that subtidal sedimentary matrix evaluated in this baseline with respect to its textural properties table 3-29 (section 2.2 of the EIA), showed an almost exclusive fraction predominance arena, with insufficient representativeness of the fraction silt clay (2.8% in ASP3 during autumn maximum), and no presence of the fraction gravel in three seasonal campaigns. Table 3-29 (section 2.2 of the EIA) shows that the average sediment condition is sandy to medium.

According to this the natural dynamics of sediments into the Bay which is generated, corresponds to the transport of sand, in the surface layers that present the greater magnitudes of velocities, and travelling in llenante toward the coast, and to fund the thinner material is mobilized out of the Bay, since in this layer the speed is lower. This dynamic is reversed in the case of tide reflux, where sediments in the marine environment, and more specifically, the Middle sands, are transported out of the Bay, and by the Fund mobilize sands more ends, towards the coast.

This natural Dynamics creates a situation of dynamic equilibrium, with certain areas of you siltation, which is estimated to have reached equilibrium.

Since large-scale speeds do not arise, and in addition are not generated large variations of speeds (velocity gradients) on the inside of the Bay, estimated that there are no likely sectors to erosions of importance.

- **Assess the potential impacts on the product of the tasks of construction (eg sediment transport. Blasting) download on the seabed tunnel, and as these activities could affect the AMERB sector B, located at 155 m from the point of discharge.**

**Answer:**

The owner explains that the only permanent work of the project that will be built in direct contact with the sea will be the work of taking and underwater discharge.

During its construction phase, main blasting on the seabed is Norwegian shot, which is done only once, in underground form, from the lower tunnel towards the bottom of the sea. This means that the blast will be covered by the seabed layer, composed of rock, shells and sand. Therefore, most of the energy will be absorbed by the Rocky massif and the direction of thrust of the flown rock, will be toward the inside of the tunnel. In the case of minor, low-intensity blasting, these will be covered with sand to reduce the range of expansion of noise and vibration.

The Norwegian shot, compared with underwater blast normal, not to be in direct contact with sea water, has in the majority of cases, less impact on the surroundings, because it generates a hydrodynamic shock wave significantly/mainr. (Annex 1-7 Estimation of safety distances in lathe to marine blasting).

After the opening of the mouth of the tunnel and possible blasting of low intensity on the circumference of the cage to allow the installation of your parts, this be built as modular, bringing parts from Earth to assemble under the water.

Given the above, it is not expected that construction generates a sediment plume shaped continuous, but which are specific milestones only during the period of this construction and possibly for the first tests of reservoir discharge.

In other words, no impacts are expected environmental significant generated by these activities that may affect the AMERB sector B.

However the above, Licensee agrees a Plan of environmental monitoring of marine environment that includes the monitoring of sediment, as indicated in annex 5-1 of this addendum.

- **Modeling the transport or the different fractions of sediment deposition, whereas the worst scenario of currents (maximum magnitude) and the location of 5m in diameter and 6 m of height to cage will it be incorporated into the seabed. Predict whether there will be accumulation of sediments in the discharge point product of this work.**

**Answer:**

The owner explains that according to the baseline of the EIA the seabed in the area of the underwater work corresponds mainly to rock and conchal, in addition to sediments. In the design of the project, considered a wall 1 m of height as the basis of the cage to prevent the entry of sediment into the tunnels. On the other hand, the characteristics of the suction (flow between 0 and 45 m<sup>3</sup>/s, average speed of 0.15 m/s) and discharge (flow rate from 0 to 56 m<sup>3</sup>/s, average rate of 0.18 m<sup>3</sup>/s and being considered one of 28 m<sup>3</sup>/s as the standard operating at an average speed of 0.1 m/s) will be as such which is not considered that the project may influence the dynamics of sedimentation of the sector.

In any case is modeled discharge pen Whereas suspended solids and the report is presented in annex 4.3 of the EIA. Carried out modeling was meant to assess the eventual Resuspension sediment generated from the point of discharge to the finer fraction (silts and clays) since they have the possibility of having a persistence time higher in the water column. The modeling results indicate that the differential of suspended solids in the discharge is not significant, 100 m from the discharge levels in surface would be 120 mg/l and at bottom less than 40 mg/l.

As was said above, spectrum characteristics of the sediments, should be, the subtidal sedimentary matrix evaluated in this baseline connection project textural properties table 3-29 (section 2.2 of the EIA), showed an almost exclusive predominance of fraction arena, with insufficient representativeness of the silt fraction clay (2.8% in ASP3 during autumn maximum), and no presence of the fraction gravel in the three seasonal campaigns. Table 3-29 (section 2.2 of the EIA) shows that the average sediment condition is sandy to medium.

According to this the natural dynamics of sediments into the Bay which is generated, corresponds to the transport of sand, in the surface layers that present the greater magnitudes of velocities, and travelling in llenante toward the coast, and to fund the thinner material is mobilized out of the Bay, since in this layer the speed is lower. This dynamic is reversed in the case of tide reflux, where sediments in the marine environment, and more specifically, the Middle sands, are transported out of the Bay, and by the Fund mobilize sands more ends, towards the coast.

This natural Dynamics creates a situation of dynamic equilibrium, with certain areas of you siltation, which is estimated to have reached equilibrium.

Since large-scale speeds do not arise, and in addition are not generated large variations of speeds (velocity gradients) on the inside of the Bay, estimated that there are no likely sectors to erosions of importance.

- The proprietor says in the section 6.2.2.3 "temperature and salinity" (report Steps Water Solution), as follows: "since the history of the line base environmental marine do not have an equivalent to the numerical domain spatial coverage, ( ) were used to average the general circulation HYCOM model outputs (Hybrid Coordinate Ocean Model), resolution 1/12 degree) (Wallcraft A.J., A.B. Kara and E.J. Metzger 2003), for the same dates on which instrumental records of forcing agents are available and tailored to the profiles in situ (CTDO) of the spring campaign of 2013, carried out by the company limited South Coast (see Figure 10). In Figure 11 is sampled the vertical profiles in situ used to calibrate the temperatures and salinities of HYCOM model". In this regard the holder must:
  - Clarify why salinity profiles spot shown in Figure 11, the HYCOM model was calibrated with which presented higher values ( $> 35.5$  PSU) to those reported for spring 2013 campaign by the South coast in Ltda. consultancy, in the Chapter 3. line Base (see Figure 3-78). In this sense, the holder must validate the model used, every time that the results of the initial conditions and the boundary conditions for the period of study (Figure 13) is not adjusted to the natural salinity variations reported in the baseline of the sector, which did not exceed the 35.2 PSU salinity in the campaigns carried out (spring, 2013, summer and fall 2014).

**Answer:**

The owner says it, si is there a difference between history reported in the HYCOM model and the measurements of the baseline of marine environment (supplemented in annex 3-1.1 This

Addendum), This difference is not significant within the hydrodynamic calculations and estimates of the associated salinity excesses. Also, the requested validation It is not appropriate Since it would compare a spot metering quasi-snapshot of the profiles obtained with the CTDO with those obtained using a general model to higher resolutions that previously were interpolated in space and its data are a daily scale.

- **Develop modeling of the behaviour of saline thermal pen and solid, with the corrected information, and given two discharge situations, with the incorporation of the effluent from the desalination plant and the other without such effluent plant.**

**Answer:**

The holder welcomes the observation and in Annex 1-6 study of modeling dynamics of thermal pen and Salina report of the modeling of the pen is delivered termosalina with the requested aspects for the four seasons of the year with data base of the four seasons of the year in the field of the project.

- **In the section 7.1 calibration of coastal hydrodynamics (report Steps Water Solution), is the validation of the directions of flow for the different layers of the water column (Figure 25), which show both similarities and differences between the percentages of incidence of the ADCP and the model. In this regard, you must occur if these differences or similarities were statistically significant to calibrate the model in terms of direction of the currents.**

**Answer:**

The holder receives the observation and clarifies that in the Annex 1-6 study of modeling dynamics of thermal pen and Salina This Addendum the results of a modelling comp are deliveredmentaria from the pen of discharge that includes statistical values of the validation of the direction of the currents. It is concluded that the calibration is within a range valid and reasonable for this type of modeling and model used.

- **With respect to results dthe section 7.3 stage 3: modeling of thermal saline pen and solids in Bay Chomache (Report Steps Waters Solutions), the holder must develop new models in the horizontal plane, as in the section perpendicular to the coast, whereas in point described 8.6.2.**

**Answer:**

The holder ACLARA in annex 4.3 of Chapter 4 of the EIA presented the results of the modeling of shock pen, both in figures in horizontal plane as perpendicular and the surfaces were delivered by differential contenido tables.

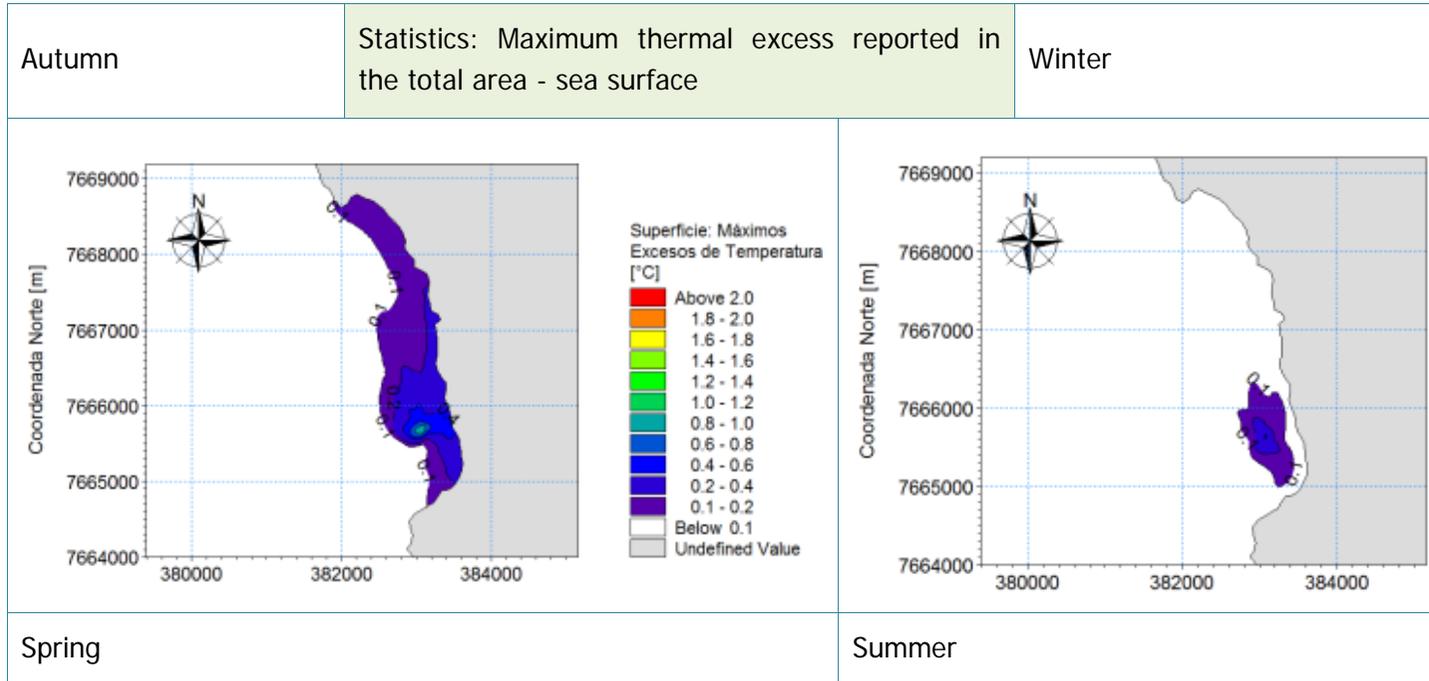
Additionally, for this Addendum and they were modeling complementary to study the seasonal behavior of the plthermal UMA in the four seasons of the year, the results are delivered in the Annex 1-6 Study of dynamic modeling of thermal and saline plumefigures in flat horizontal, vertical and the areas affected in tables by degree of differential.

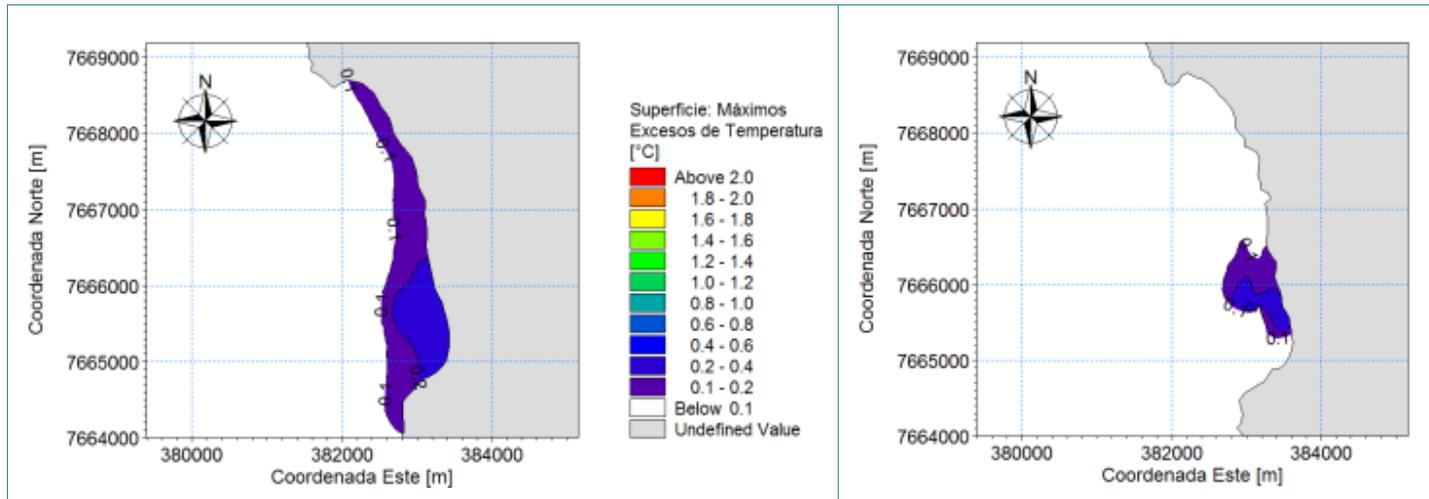
Considering the results obtained in the modeling of pen download presented in annex 4.3 of the EIA, which indicated in consistently and established that There are enough indicators that is not a relevant issue, was not seen as the realization of studies additional for downloads of salinity and solid. Maximum downloads from salinas of the reservoir would not reach to exceed  $\pm 0.05$  PSU (reference ""*Modeling hydrodynamics and water quality, project mirror*"). *With respect to solids, it is not an important variable according to the "study of the behavior of feather termo-salina and solid through modeling hydrodynamic, for the period of spring".*

We must also consider that suction speeds are low)average 0, 15 m/s)medium speeds are low and there is a concrete wall 1 m at the edge of the cage that will not allow lifting the bottom sediments.

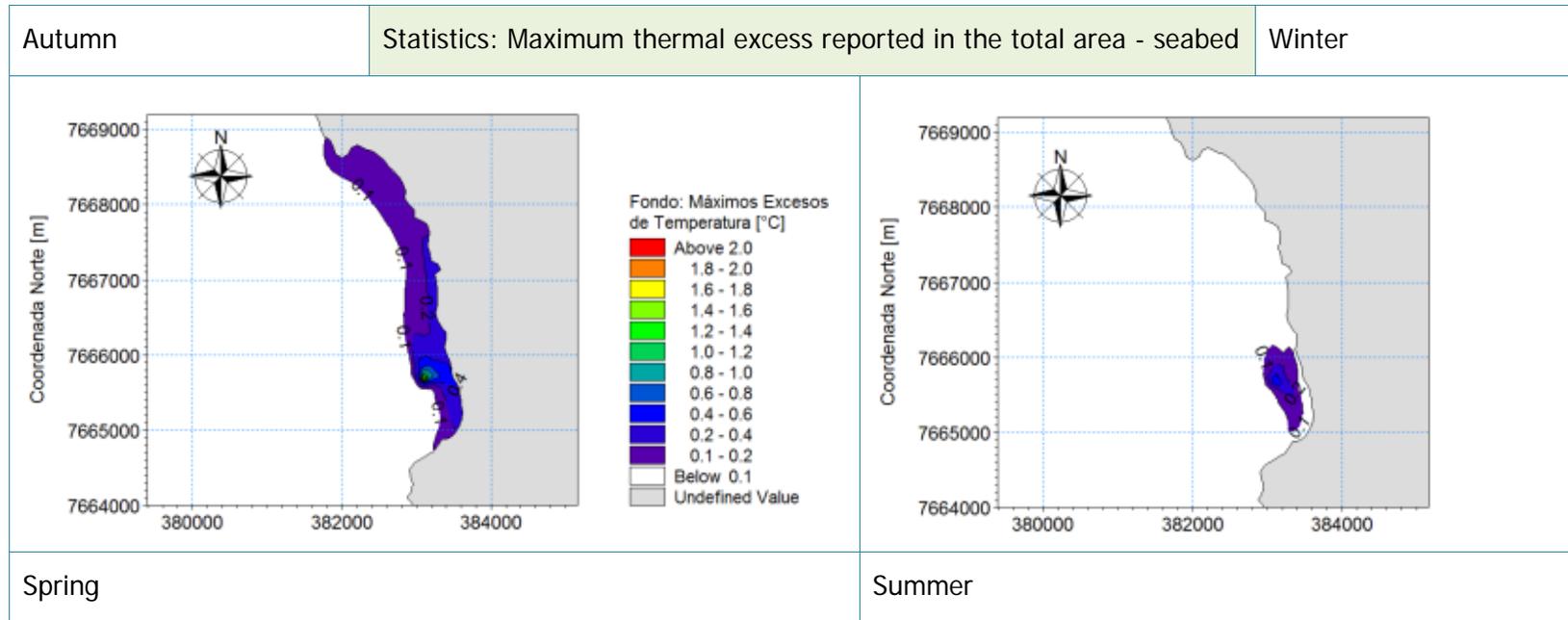
The chosen figures presented below is.

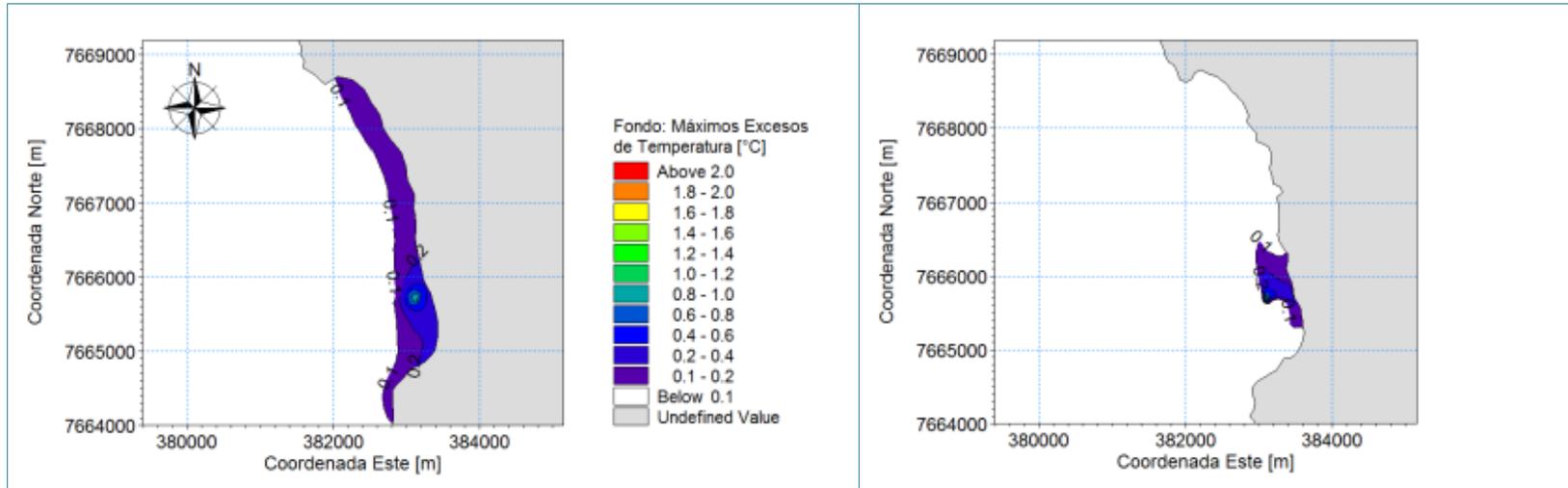
**Figure 7-11. Statistics with the maximum excesses of the generated total area by the different scope and extensions of the thermal pen for each seasonal period modeling, surface, represented to the isotherm  $[0.10]^{\circ}\text{C}$ .**



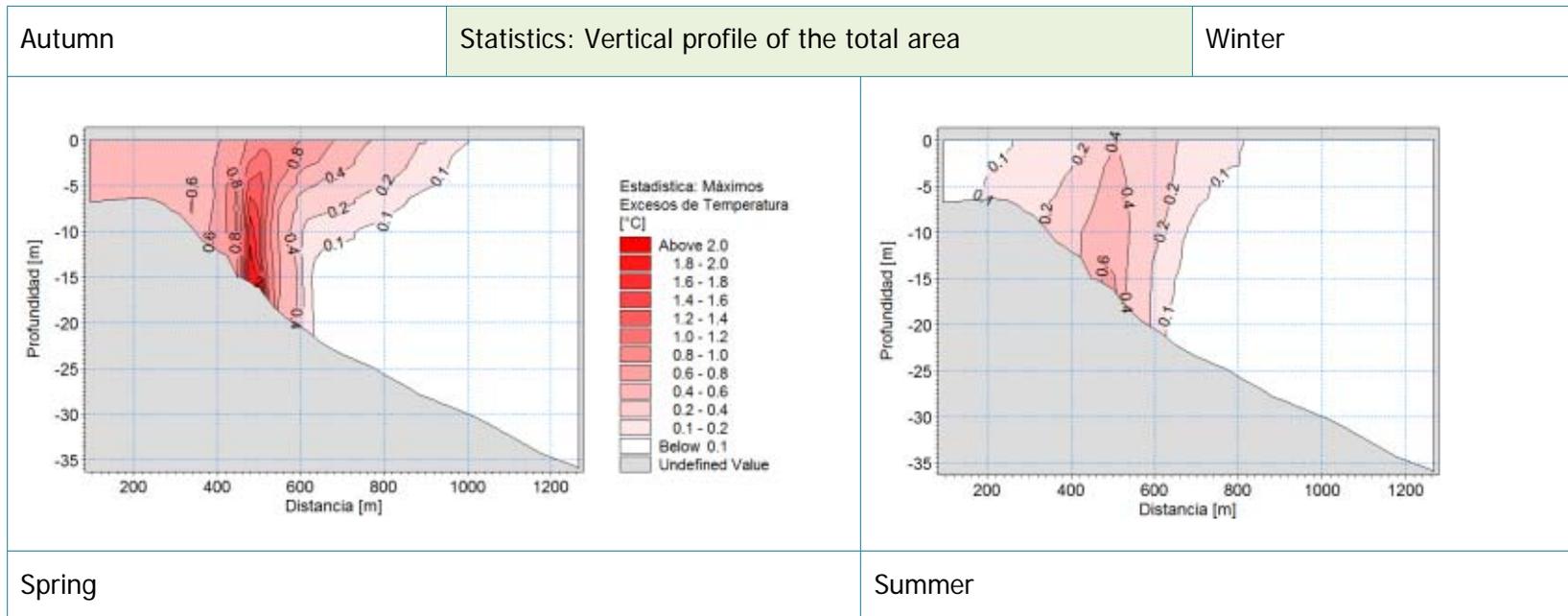


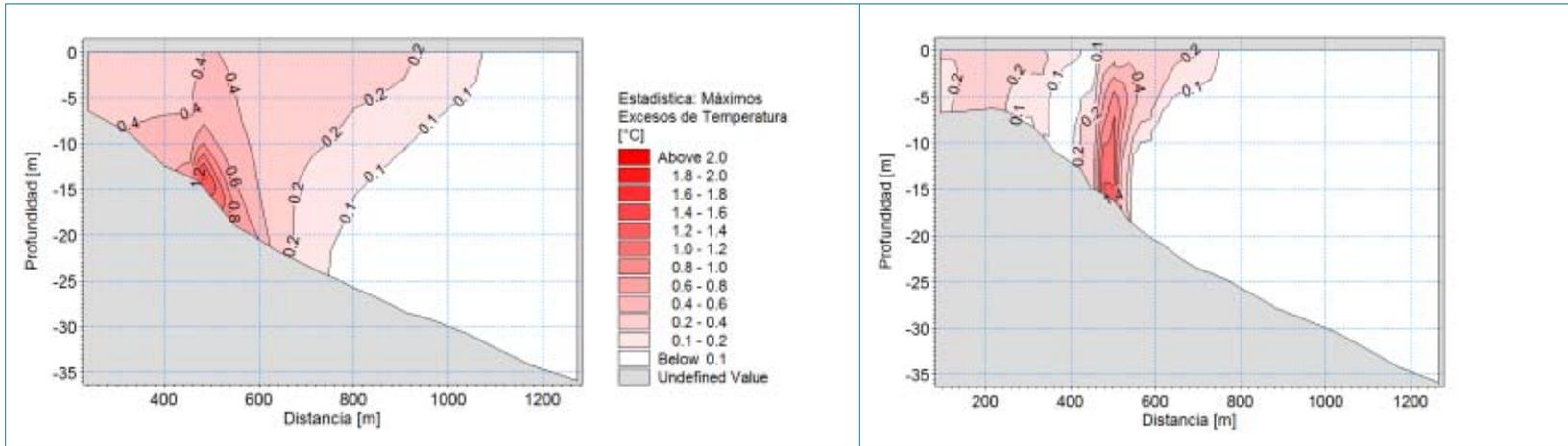
**Figure 7-12. Statistics with the maximum excesses of the generated total area by the different scope and extensions of the thermal pen for each seasonal period modeling, next to the bottom marine, represented to the isotherm [0.10]° C.**



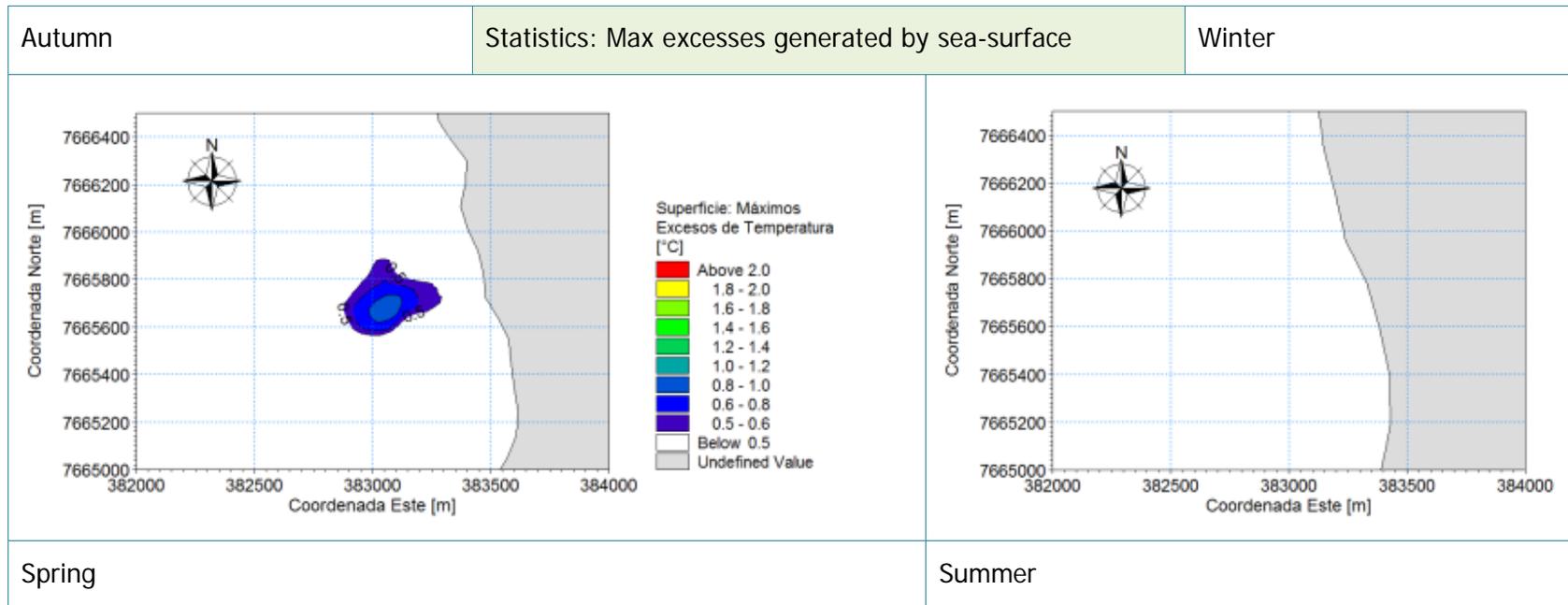


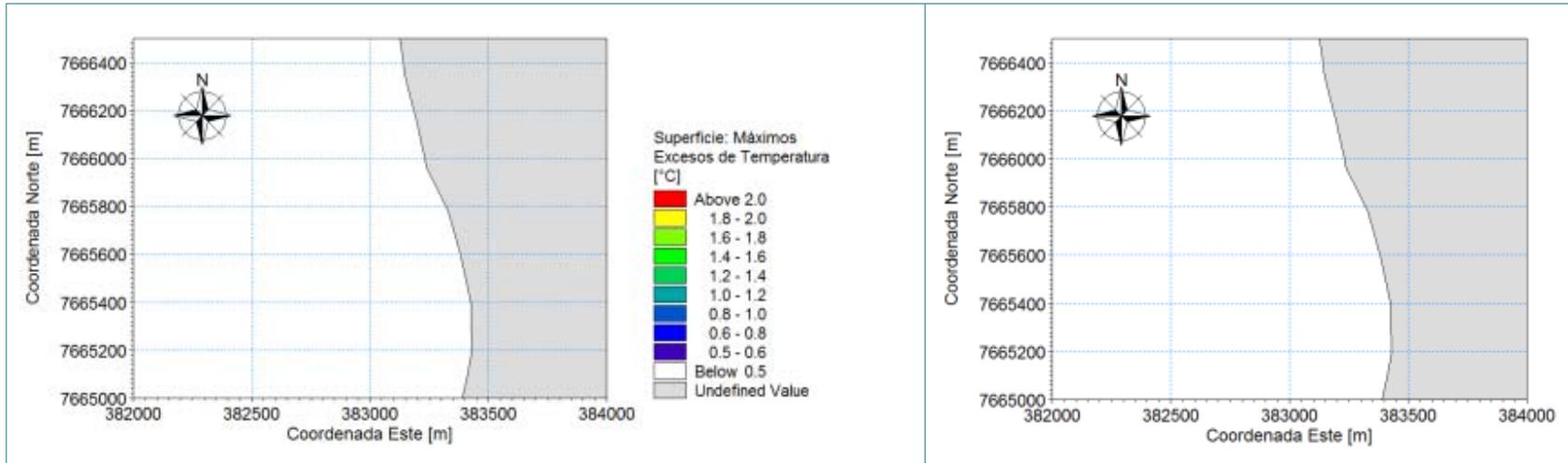
**Figure 7-13. Statistics with the maximum thermal excesses of the total area (vertical profile) generated by the different scope and extensions of the thermal pen for each seasonal period modeled, represented to the isotherm [0.10]° C.**



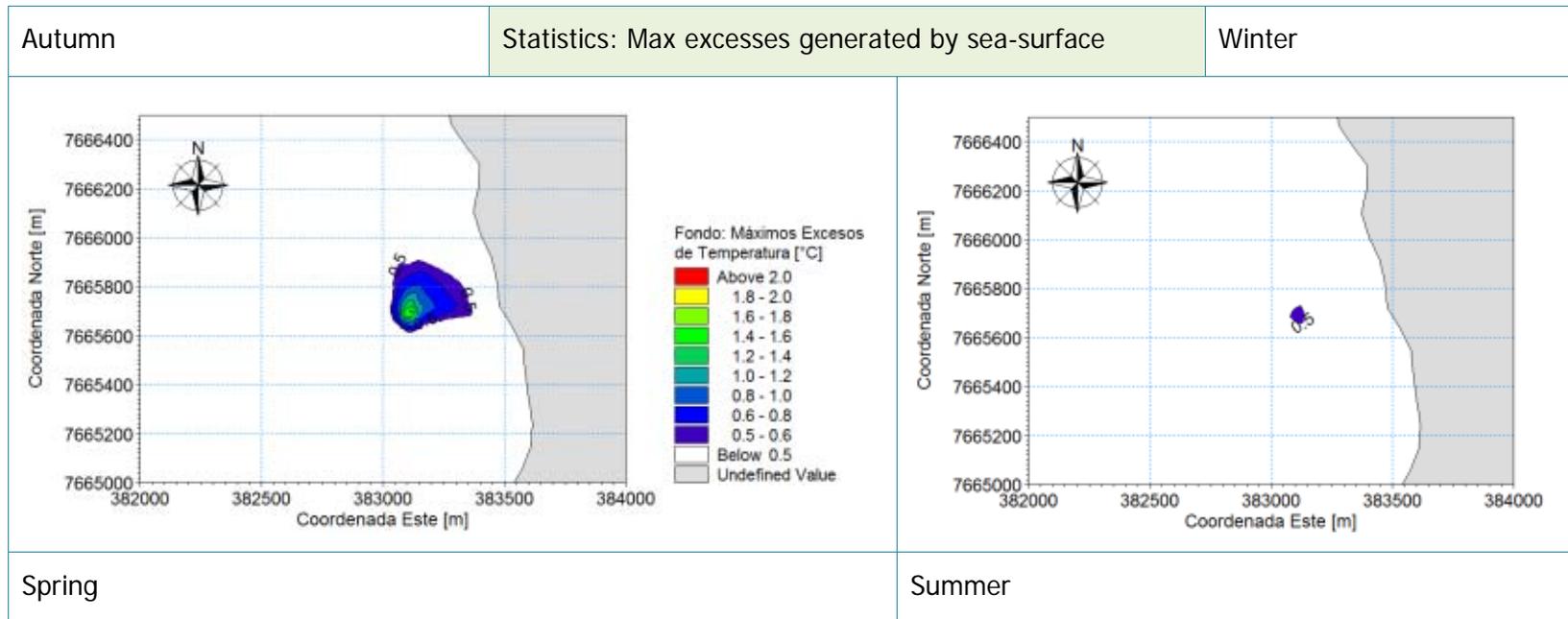


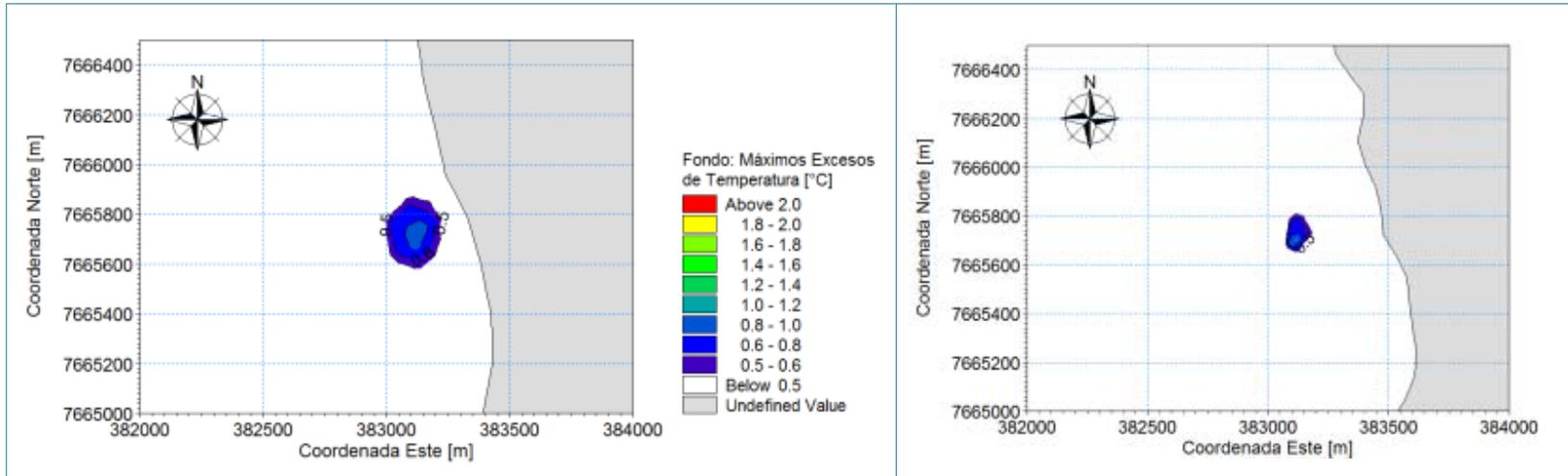
**Figure 7-14. Statistics with the maximum excesses of the generated total area by the different scope and extensions of the thermal pen for each seasonal period modeling, surface, represented to the isotherm [0.50]° C.**



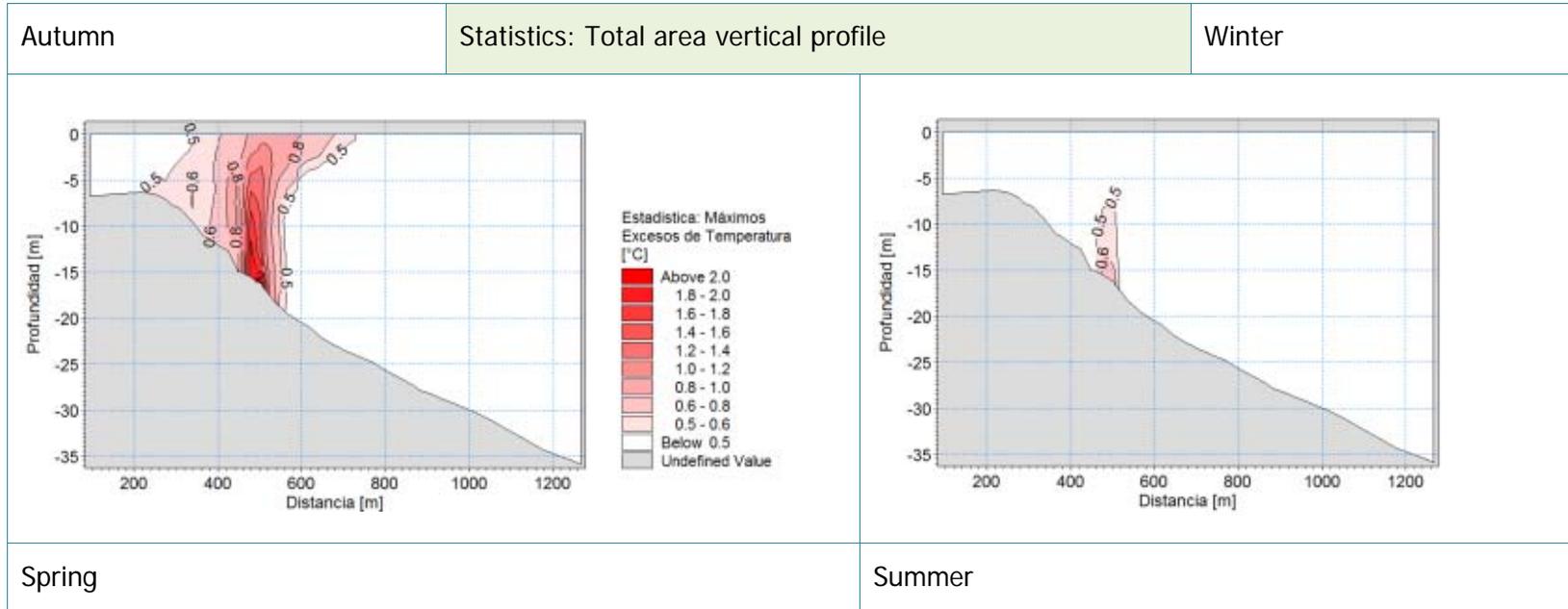


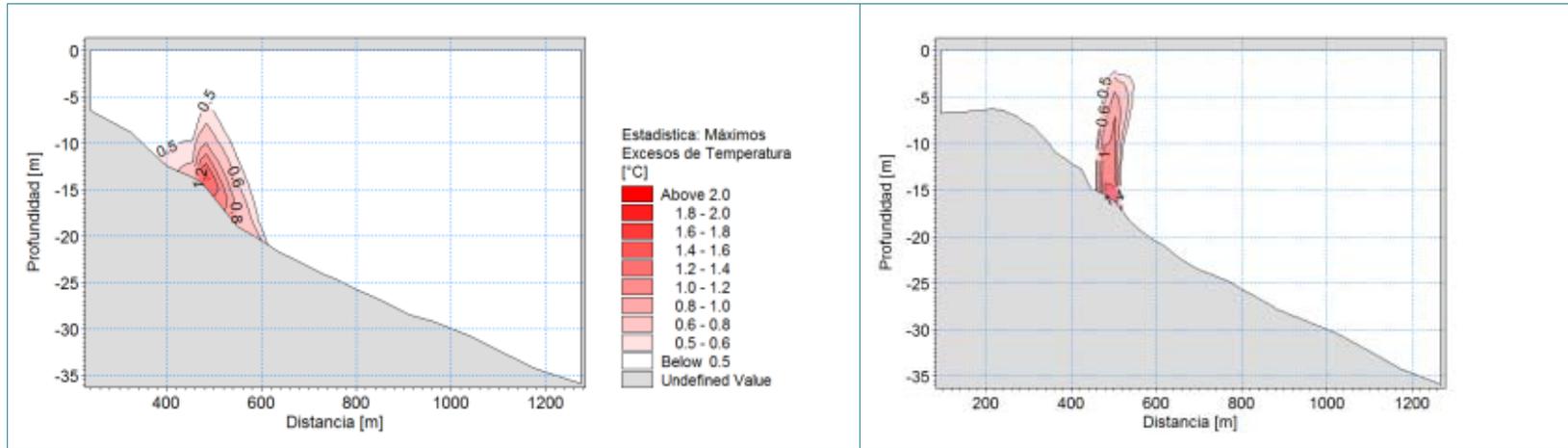
**Figure 7-15. Statistics with the maximum excesses of the generated total area by the different scope and extensions of the thermal pen for each seasonal period modeling, next to the bottom marine, represented to the isotherm [0.50]° C.**





**Figure 7-16. Statistics with the maximum thermal excesses of the total area (vertical profile) generated by the different scope and extensions of the thermal pen for each seasonal period modeled, represented to the isotherm [0.50]° C.**



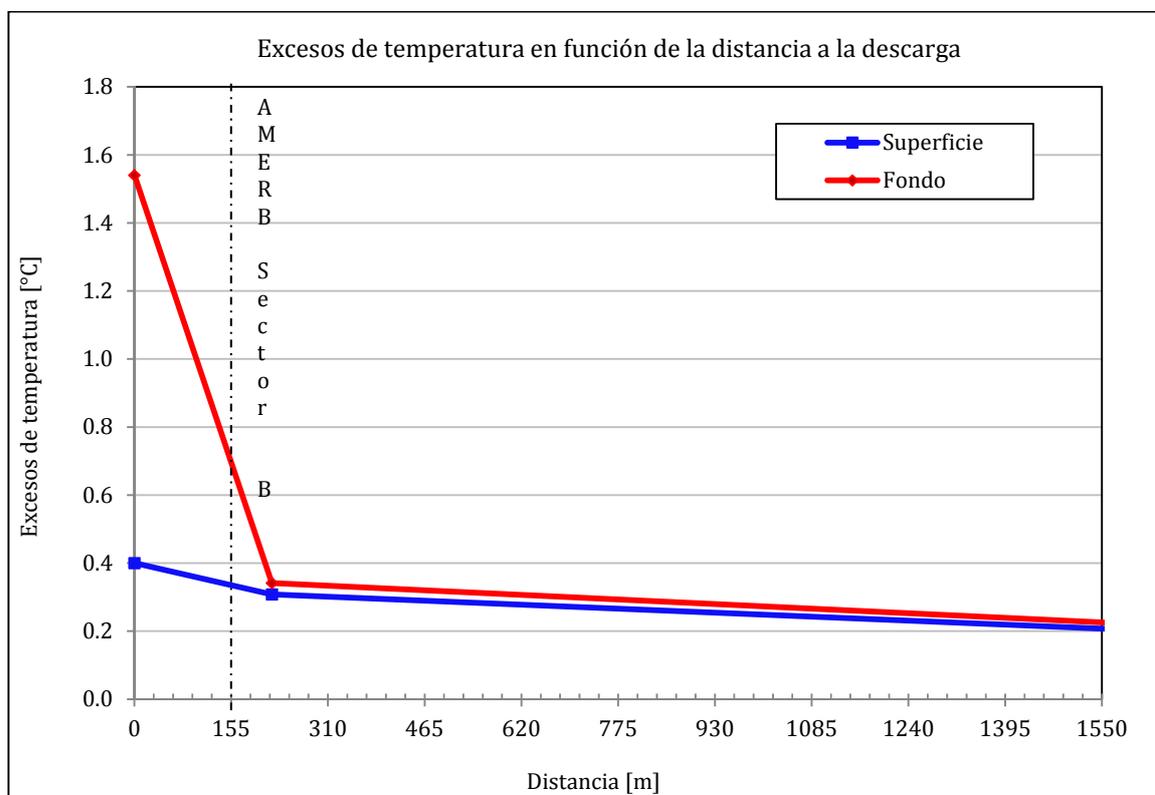


- In the conclusions of the study of the behavior of feather TermoSalina and solid through hydrodynamic modelling (report Steps Water Solution), the holder shall:
  - Correct information the legend in Figure 50, 51 & 52 lines, every time that the red line would indicate maximum excess thermal, saline, and solid surface level and the blue line of the background level.

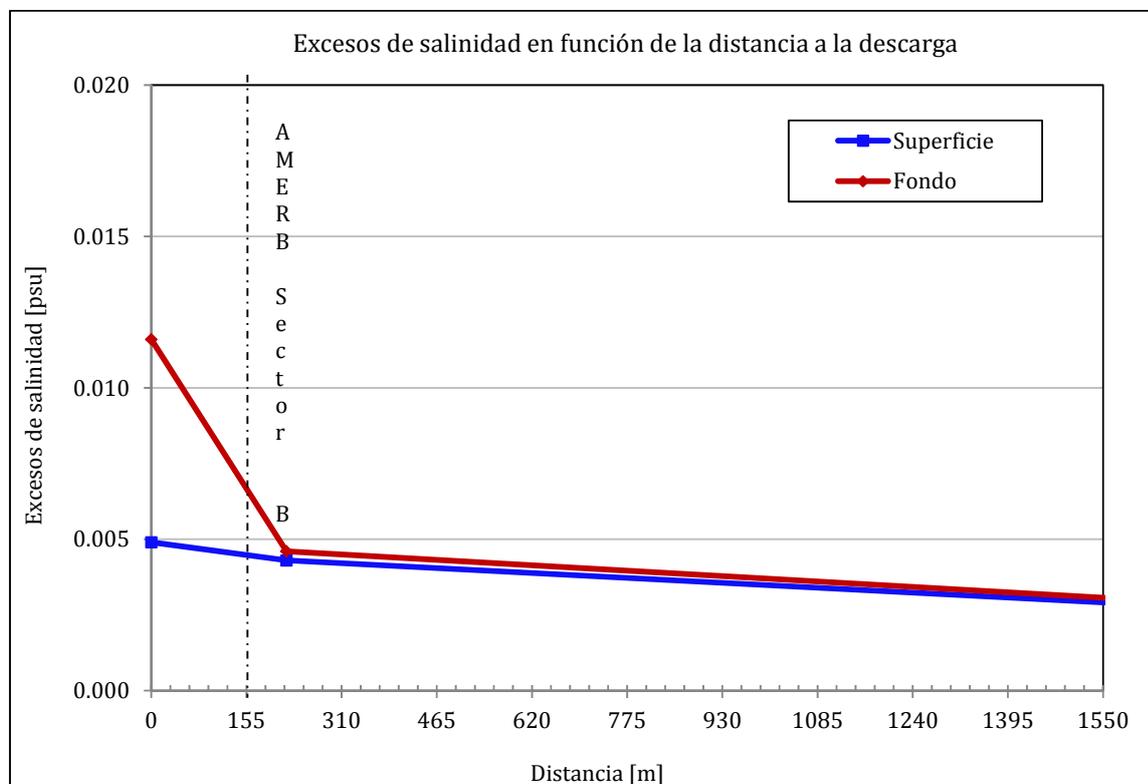
**Answer:**

The holder receives the request corrects as requested and presents the figures below:

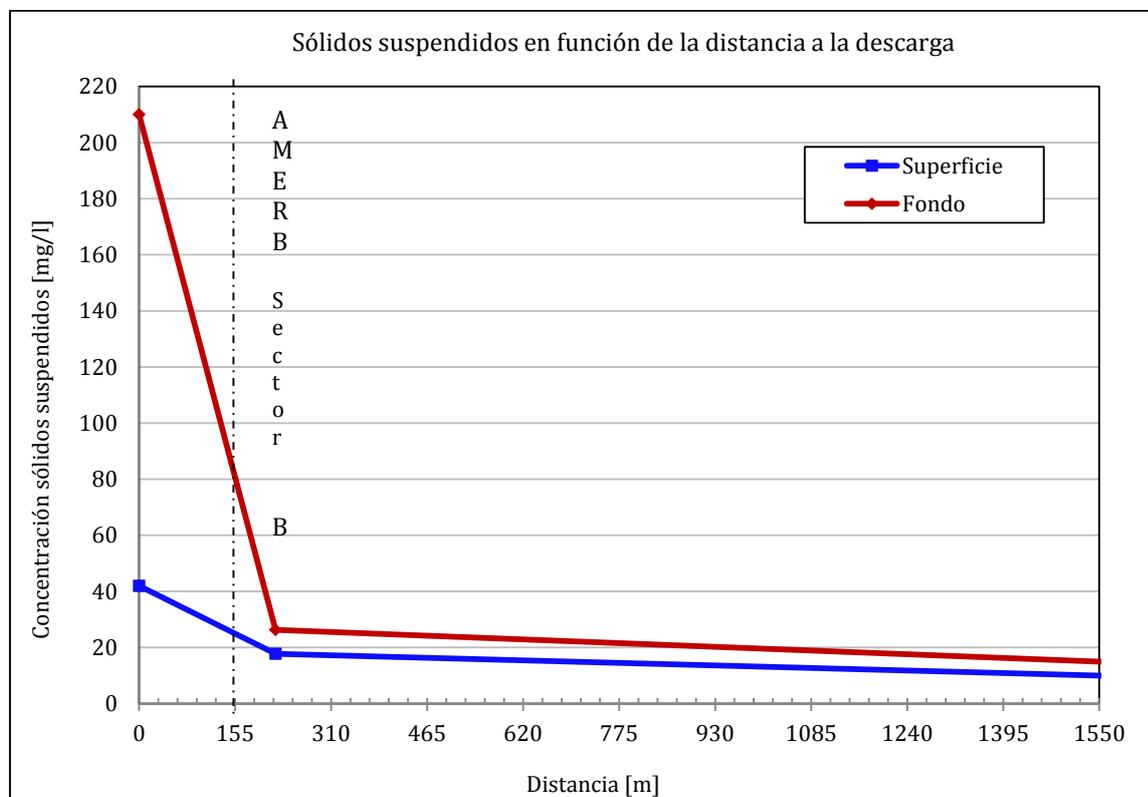
**Figure 7-17. Figure 50 corrected Annex 4.3 of the EIA. Report Stepswater.**



**Figure 7-18. Figure 51 corrected annex 4.3 of the EIA. Report Stepswater.**



**Figure 7-19. Figure 52 corrected annex 4.3 of the EIA. Report Stepswater.**



It should be noted that in this Addendum is presents a report complementary modeling of the pen of Download, Deputy in the Annex 1-6 study of modeling dynamics of thermal pen and Salina.

- **Clarify why the holder located in the line of location of the AMERB Sector B at a distance of 250 m depending on the distance from the source of discharge, figure the 50, 51 and 52 every time this would be located at a minimum distance of 155 m from the point of discharge. Concerning the holder must revalue such conclusions, correcting the position and considering all the scenarios outlined above.**

**Answer:**

The holder receives the observation, it corresponds to an error of the figure, the minimum distance between the discharge and the AMERB corresponds approximately to 155 m. In effect, the discharge modeling presented in annex 4.3 of the EIA, use the bathymetry of the sector, i.e. the correct distances, so the results and conclusions with respect to the extension and features Download they are suitable to represent the area of the pen dispersion of the project. It is

noteworthy that in figures 7-14; 7-15 and 7-16 of this addendum is the correction of the 50 figures; 51 and 52 referred to in question and indicating the distance from the AMERB curves away from the excesses with regard to the discharge point.

It should be noted that This Addendum, in the Annex 1-6 study of modeling dynamics of thermal pen and Salina supplementary report of modeling of thermal pen from the Download for the four seasons of the year.

**7-8.9 based on indicated by the holder in the section 6.4 "End Cometarios" (report Eridanus) where it says that: "it should be noted that the results presented in this study are highly sensitive to the input information, so it is recommended to continue the monitoring of variables in the sea and weather in the reservoir area", and in consideration to all observations addressed in the preceding points and Chapter 2 'Justification of the area of influence' of the present ICSARA, the owner must be a comparative analysis that considers the assessment and prediction of impacts on the water quality and marine sediments discharge operation product dl project in a different sector and that distance to a greater extent of the AMERB "Sector B" belonging to the Union of fishermen divers and fishermen's Cove St. mark.**

**The foregoing, due to the background of current delivered by the holder, would indicate a highly dynamic body of water with a circulation of background (&gt; 20 m) favorable to export water out of the Bay (annex line Base Marina, report Costa Sur Ltda.), conditions that they would favour the mixing and dispersing of thermal saline and pen in a column of water and solids in a direction contrary to the AMERB "Sector B"**

**Answer:**

The owner explains that carried out the assessment and prediction of impacts on the quality of water and marine sediments in the area of influence determined for these components, which is directly related with the location of the project.

In this Addendum, in annex 1-6 is accompanied a complementation of the modeling of seawater discharge from the reservoir, which has as a result that there is no significant involvement of marine resources, in the entire length of the feather of dispersing. By assessing, in a more remote area, it includes minor differences between the discharge and the natural conditions of the marine environment.

Despite the above, and in order to verify downloads carried out throughout the project, referred to the implementation of a Plan of Environmental monitoring for Reservoir, and a Plan of Environmental monitoring of marine environment, which include a monitoring of the temperature; dissolved oxygen; direction of the current in the discharge point; nutrients such as nitrate, nitrite,

phosphate; turbidity; settleable solids, among others. The update of these plans is described in the Annex 5-2 Plan of environmental monitoring reservoir and Annex 5-1 marine environment environmental monitoring Plan both presents in the present Addendum.

**7.9. Although the project points out that life useful project is indefinite, for impact assessment joins the stage of closing, pointing to water quality,)PAG. 39 point 4.7.1.5), quality of sediments)PAG. 43 point 4.7.1.6), and biological oceanography (point 4.7.2.3) that are not considered sources of impact, are not considered works underwater and have completed the suction and discharge of seawater. There is a pipeline or tunnel and existiendo the possibility that is to remove any part of these installations, the holder must incorporate and provide an assessment of the impacts which may result in the closing phase of the project, in the matrices water, sediment and biological communities**

**Reposed:**

The owner explains that, in the event of termination of the project, underwater works shall be kept, not having any activity of disassembly, demolition or removal. It should be noted that the structure of the intake is designed in such a way that does not alter the speeds and normal directions of the currents in the sector. Thus, any impact will not be generated significant associated with this phase, in the marine environment.

It should be noted that the regulation of the SEIA indicates in its article 18 paragraph c.7 closing should be described "if any". Also in case of a possible closure of the facilities, the holder shall submit to the environmental impact evaluation system actions referred to in the closing and the corresponding environmental assessments advance.

**7.10. The holder must submit a new modeling of the marine area considering scenarios that include natural variations product events child, Nina, among others. The above, in order to visualize the behavior of the species and the movement of mass in the area of involvement.**

**Reposed:**

Holder advises that he has supplemented the baseline of marine environment presented in the EIA and, based on these updated data, he has presented a new download from the reservoir modeling, which is presented in the Annex 3-1.1. Baseline marine environment and Annex 1-6 study of modeling dynamics of thermal pen and Salinarespectively in this Addendum. In addition to the above, annex 3 - 1.2 This addendum delivered an intensive study of planktonic in Caleta area communities San Marcos, for didentifying the richness and specific abundance of plankton obtained in the study area.

It should be noted that the boy and girl, events are natural events It generates temperature differentials average much larger than the reported for the discharge of this project from Ecuador, through the Peru coast, to Chile. Occurrence of such differentials, its duration, as well as, their magnitudes are impossible to anticipate. In this way, not being that phenomenon under the control of the project, there is no possibility to apply measures which can counteract its effects on the marine environment next to the project.

Additionally, Remember that the project is located outside the coastal zone protection and their operation considered to perform the download of sea water from the reservoir, during the night, therefore, Daytime temperature differentials are not generated between the project and the marine environment phenomenon of the child.

Without limiting the foregoing, the Pproject The same features measures of continemergency (CAP. 8, point 8.6.5 "Management of the contingency on differential measurement of" Temperature", page 8-25," the EIA) for control of the increase in the temperature of the discharge from the reservoir. According to the answer to this question 10.9 Addendum, the distances were adjusted for monitoring. Attached the measurement of contingency updated in the Annex 7-2-4 the present addendum.

**7.11. The holder must be included in the prediction and assessment of impact, effects associated with the blasting to be in underwater background, whereas noise and vibration associated with the marine ecosystem, referencing it with foreign regulations, given the non existence of a national standard.**

**Rexposed:**

The owner clarifies that the main blast on the seabed is Norwegian shot, which is done only once, in underground form, from the lower tunnel towards the bottom of the sea. This It means that the blast will be covered by the seabed layer, composed of rock and sand. Therefore, most of the energy will be absorbed by the Rocky massif and the direction of thrust of the flown rock, will be toward the inside of the tunnel. In the case of minor, low-intensity blasting, these will be covered with sand to reduce the range of expansion of noise and vibration.

Norwegian shot, compared with underwater blast normal, not to be in direct contact with sea water, has in the majority of cases, less impact on the surroundings, because it generates a hydrodynamic shock wave significantly minor. (Addendum, Annex 1-7 Estimation of safety distances in lathe to marine blasting).

The major consequences and safety distances to prevent impacts on fish, swimmers, divers, marine mammals and boats, are en theNexus 1-7which is based on studies and international safety

guidelines. Along with the above, have been established measures whose aim is to prevent or avoid unwanted effects of blasting, especially on the Sea Otter, species protected identified in the baseline that lives near the area of the project (Pier fishing sector), it is suggested the following protocol:

- a) **Adjustment to current regulations:** any blasting will take place according to the regulations of use of explosive force in Chile and always use the lowest possible volume, strictly adjusted to the specific needs of the project. With this sure of safeguard human integrity and wildlife in the construction zone and its immediate surroundings.
- b) **Blasting schedule:** develop the detonation of preference in a schedule between 13:00 and 15:00 hours, which corresponds to the period of the day where the otter or Chungungo (*L. felina*) shows lower activity in the sea. In fact, it increases its activity towards the sunset<sup>22</sup>.
- c) **Exclusion zone:** as a measure to minimize the chance of an incident, will come a safety zone for *L. felina*. When a copy is found within a radius of 300 m from the focal point of the blasting, this will be suspended until the issue leaves that area. To scare away the copy may be used sirens, as it is also known that otters shy away from immediately to human presence. The staff that delimits the zone of human exclusion during the use of explosives (commonly appealed "parrots"), or a marine biologist arranged for such purposes, will approach the specimen from the coast, creating the flight of this. After that the copy leaves the exclusion zone, you can perform only the blasting.
- d) **Increased disturbances:** in order to reduce the risk of incidents on the fauna marina (mammals, otters, birds, fish), prior to the detonation point to perform suggested developing strategy of increasing perturbations, also known as Repulsion and harassment, at least half an hour before the main event, for example, through the use of save shots either carry out two or three previous blasts of low intensity, this is expected to scare away the wildlife that may be present in the area of direct impact of the t ronadura.

The observation of the presence of otters by Manager starts 5 minutes before the shots saved and continuing for the next 10 minutes prior to authorizing the detonation. If within the area of security (300 meters RADIUS), are observed in the presence of an Otter, is suspendedRA the main blast and repeat the procedure until not observe otters in the security zone and only, at that moment, is authorizedRA the main event.

After carried out blasting with Norwegian shotyou will be an exhaustive search of otters hurt or dead within a radius of 300 m from the center point of the working area, or more than if visibility

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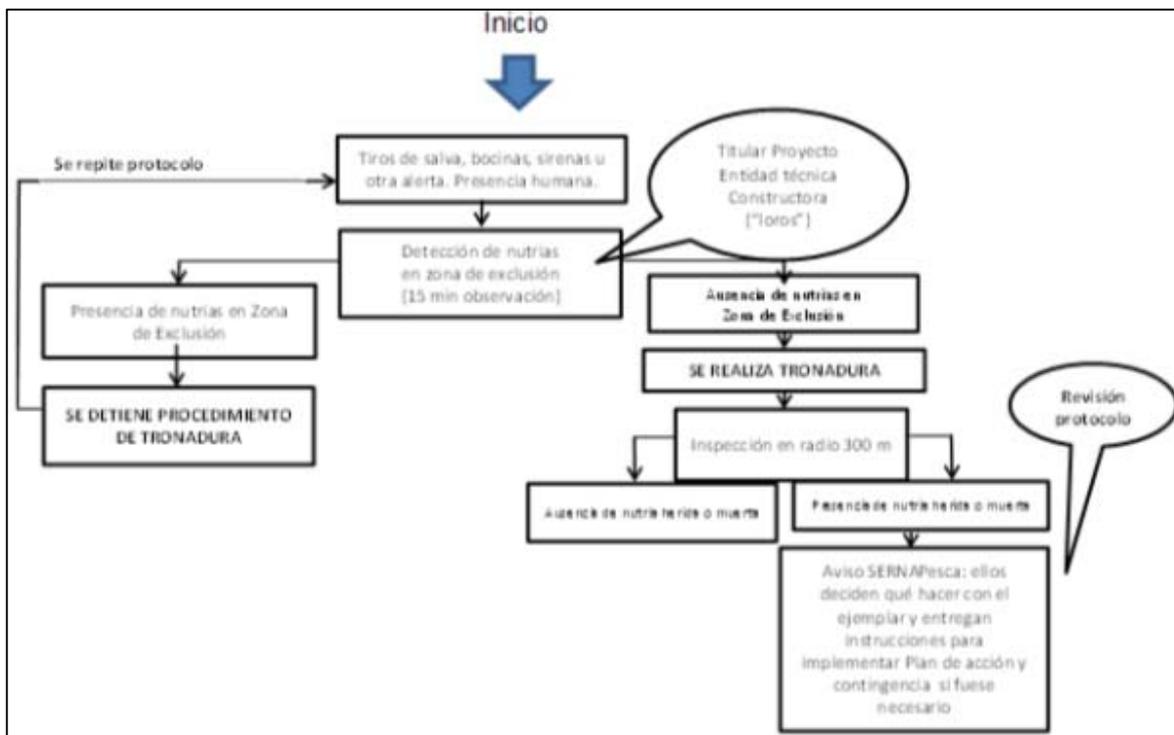
<sup>22</sup> Castilla, J., Bahamondes, I., 1977, Observaciones conductuales y ecológicas sobre *Lutra felina* (Molina) 1782 (Carnívora: Mustelidae) en las zonas Central y Centro-Norte de Chile.

permits. If you were an exemplary wounded or dead, the Contingency Plan will be applied that is shown in Figure 7-17. On occasion is must have, at least, two (2) marine biologists with the proper training in watching wildlife, one of them will travel through the coastal edge by land and the other by sea.

During the period que last blasting, it will remain a blog where recorded the relevant details of this activity: time for the use of explosives, name of the person responsible for monitoring the area of security, sightings of otters, name search Manager after detonations and novelties. The maintenance of this blog will be responsibility of the head of the area of prevention and safety, either by the holder or by the construction company responsible for the activity. Record that for any effect is the owner responsible for the correct application of this Protocol and its contingency Plan where necessary their implementation.

Are availabDRA a plan of action before contingencies on copies of Otter that may be affected by planned blasting. In this case, and always and when to verify the presence of affected individuals of this species, the contingency plan contemplates responsible for blasting either marine biologist in the sector during this procedure, take contact via telephone of immediate with local SERNAPESCA, who will decide the way forward and deliver the respective instructions in accordance with the nature of the verified affectation. In the event that this service determines that the animal should be rescued, the specimen will be transferred to a centre specializing in the care of wildlife and the costs of rescue, veterinary care, rehabilitation and reintroduction to the environment and monitoring they will be on the licensee of the project.

Figure 7-20. Action Protocol suggested for blasting in sector breakdown.



Finally, the annex 1-7 of this addendum presents other measures applicable to fish, marine mammals, swimmers, divers, and boats. This ensures protect human integrity and wildlife in the area of construction of the project and its immediate surroundings.

**7.12. The holder must submit all environmental technical backgrounds that allow to evaluate and considers the environmental impact associated with the creation of a body of water of marine origin of type lentic in the area of coastal plateau (reservoir).**

**Exposed:**

(The holder makes clear, firstly, the location and operation of the reservoir won't have impacts on indicated in literals b) and e) of article 6 of the CUMPLIMIENTO. Regarding the literal b), the actual area where the reservoir will be located according to line base of fauna in the sector, identified the presence of 2 reptiles: *Addition gerrhopygus* and *Liolaemus stolzmanni* in category of conservation status vulnerable and insufficiently known, respectively. Involvement of these reptiles was considered by the evaluation of impacts as a significant impact, it was established the extent of rescue and relocation, information that is complemented in this Addendum in response to question 5.5.

Respecto\_a the literal e), is made present that in the EIA, annex 4.2, presented an acoustic impact study. In this addendum, presented by means of measurements made unweighted frequencies and third octave for daytime and night-time period in sectors is complemented where, according to the baseline of presented wildlife species were identified in some category of conservation. The results indicated that the noise generated by the project is under the reference value indicated in the document *Effects of noise on Wildlife and others animals* of US EPA (1971), recommended by the Guide to environmental assessment: component Fauna Silvestre G-PR - GA-03 of the SAG (2013), for what project does not generate impacting wildlife by noise. The study of acoustic impact updated with this information is presented in annex 7-3 of this addendum.

On the other hand, it is estimated that the installation of the reservoir will not generate affectation to the local climate since the intervened area and volume of stored water is substantially less with respect to the sea, which corresponds to the main natural thermoregulator and determinant of the local climate, which is located less than 1 km from the indicated work.

In regards to the evapotranspiration water, measurements carried out in the area where the reservoir will be located shows a low formation of mist on the body of water and low generation of moisture in the immediate surroundings. By way of example, the daily average of evaporation for the months of October, November and December was 3.46 mm (or L/m<sup>2</sup>) per day, 4.52 mm per day and 5.27 mm per day, respectively.

Furthermore, a study carried out to verify the influence of the reservoir Puclaro<sup>23</sup> about the local climate (located in the Coquimbo region), identified a change in the systems of wind within an area of 4 km surrounding the reservoir. It also indicates that the influence of the reservoir on the temperature of the air covers the same area. Finally, the study concludes that the climate impact of reservoir Puclaro It is very local and extending for just 4 km in its immediate surroundings, particularly in West directions and this.

On the basis of the previously exposed background, estimated that the environmental impacts associated with the creation of the reservoir on the coastal plateau is not significant.

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<sup>23</sup> **Los sistemas naturales de la cuenca del río Elqui** (Región de Coquimbo, Chile): Vulnerabilidad y cambio del clima. CEPEDA PJ (ed): 41-62 (2008). Ediciones Universidad de La Serena, La Serena, Chile. Acápite 2.4 Influencia del Embalse Puclaro sobre el clima del Valle del Elqui

**7.13. In relation to the stage of operation of the reservoir, with regard to discharges of effluent from this, the holder must submit an evaluation of the impacts that this You can generate in relation to the proliferation of new biological communities (project only discusses the proliferation of diatoms), which can be transported through discharges to the sea and somehow affect the marine components. Also, pursuant to the above, There must be a plan of environmental monitoring within the reservoir that is oriented to identify and quantify biological communities, including microbiological. In addition the holder must indicate how it will take care of these potential impacts.**

**Exposed:**

The owner explains that is tested Aron Diatoms and dinoflagellates in the modeling, and there were no conditions that indicate massive proliferation of either of the two dominant groups. These organisms were relieved in the analysis as indicators of the health of the system base. Results showed that Diatoms are most abundant in the whole period of simulation modeling (20 years) above the dinoflagellates. Despite triple the difference of diatom above dinoflagellates, the concentration does not reach to constitute a proliferation algal. Nor are the conditions for proliferation of dinoflagellates, or in conditions of stratification of the water (November to June) or in situation of mixing column (August to October). Now, communities that may develop will correspond to which are available in the seawater that is pumped into the reservoir.

Along with the above, daily downloads of the reservoir imply instability for the development of massive proliferation of these communities, in particular, the dinoflagellates that require stable conditions for development.

For all the above, it is estimated that massive proliferation of biological communities will not be generated in the reservoir. However the above, in this Addendum presented in annex 5-2, a monitoring Plan of the reservoir for the stage of operation and STA based to evaluate the ecological integrity of this body of water.

This implies a kind of monitoring composed of variables physical, chemical and biological. Biological variables will be used to evaluate the integrity of the system, to reflect the physical and chemical changes that it contains. I mean This Plan of monitoring features to quantify biological and microbiological communities.

**7.14. The holder in Chapter 4, points out that "the analysis of the potential impact on noise levels will take place in the area of influence of the project determined by the closest to the works of the same sensitive receptors". In this respect, and in relation to the field visit to the area in question, where we checked new housing in the sector, the holder must submit actions that allow to check the estimated stage, before the execution of the project, in a way**

ensure minimum affectation to the area surrounding it, pointing out the measures to implement in each case.

**Reposed:**

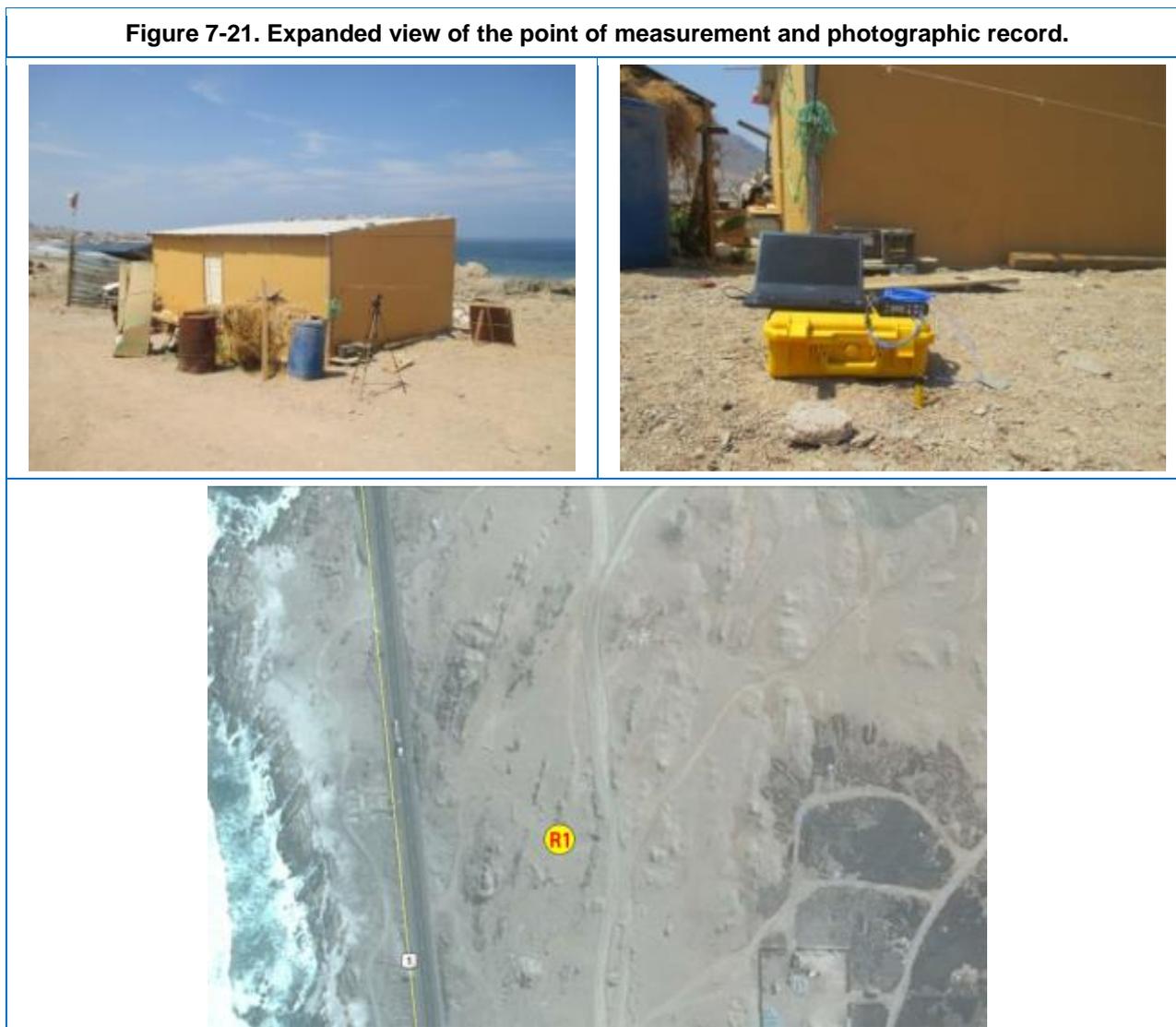
Holder advises that a ground campaign was carried out additional between the days 07 and 08 January 2015, with the aim of complement the information provided in the EIA and the determination of new buildings near the project area. As a result of this campaign It was proved the existence of a home that is just a shorter distance of the future works of the project, which was built after the date of the first field campaign. Thus also it was confirmed that other buildings there are no in the area, confirming in this way taken into consideration the closer and thus more sensitive receivers within the area of influence of the project.

Then comes the detailed description, an image with the spatial location and a photographic record

**Table 7-2: DeScription and spatial location, point R1.**

Location	1 floor dwelling located north of caleta San Marcos.					
Point	R1					
Effective use	Residential					
Zoning D.S N° 38/11	Rural area					
UTM coordinates	Datum WGS84			Spindle 19 K		
	This			North		
	383678			7665626		
<b>History of measurement</b>						
Period of measurement	Daytime			Night		
Date	07-01-2015			07-01-2015		
Schedule	11:35			21:10		
<b>Noise</b>						
NPS <sub>EQ</sub> 5 / 10 / 15 min [DB(a)]	50	50.7	--	44.2	44.7	--
NPS <sub>min</sub> /NPS <sub>Max</sub> [dB (A)]	42.5		64.7	39.1		55.6
Main sources	Waves, wild birds and vehicular traffic on route 1.			Waves and wild birds		
<b>Vibration</b>						
VVP [mm /]SEC] / L <sub>v</sub> [VdB]	2.02-08E		58.3	2. 54E-02		60.0

**Figure 7-21. Expanded view of the point of measurement and photographic record.**



The identified point, as the remaining of the study project, located outside city limits established by the instruments of spatial planning (IPT) of the nearby communes which is homologous to Rural area according to D.S N° 38/2011 for the MMA.

Below is the maximum allowed as defined in D.S N° 38/2011 MMA.

**Table 7-3: Zoning and maximum allowed in point R1.**

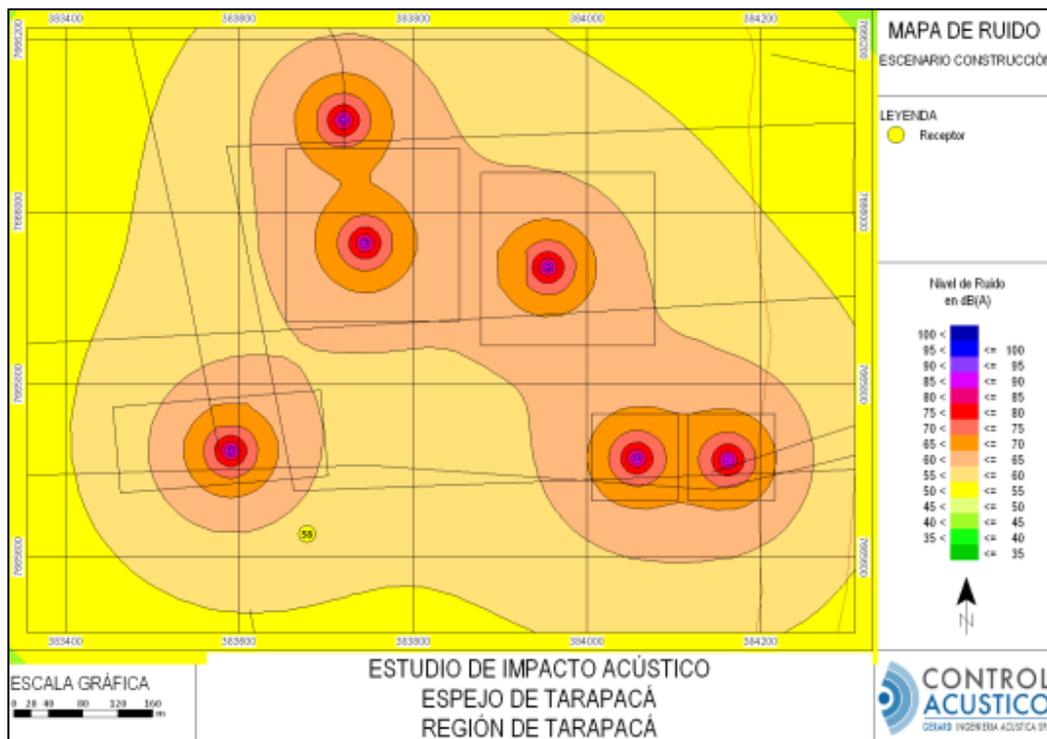
Point of	Zoning	Day period	Night time
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measurement	According to D.S. N° 38/2011 MMA	Baseline level $NPS_{Eq}$ [DB(a)] *	Permitted maximum NPC [DB(a)]	Baseline level $NPS_{Eq}$ [DB(a)] *	Permitted maximum NPC [DB(a)]
1	Rural area	51	61	45	50

Acoustic analysis was developed through a model of noise modeling software-assisted SoundPLAN whereas the terms of reference described in the acoustic impact study and that they were applied to the analysis of all points of evaluation there presented.

Through the following figure presents the map of sound exposure associated with the construction phase, where the coloration of propagation is referred to a height of 1.5 meters above the ground. Subsequently, requires sound immission level estimated on the item analysis and evaluates that value based on the maximum that establishes the rule (described in) Table 7-3). Evaluation of compliance is made to schedule execution of tasks, i.e., only during daytime.

**Figure 7-22. Map of sound propagation. Stage of construction. Point F2.**



Elaboration: Gerard acoustic engineering SpA 2015.

**Table 7-4: Evaluation according to Supreme Decree No. 38 of the MMA. Stage of construction. Day period.**

Point	Estimated noise level [DB(a)].	Permitted maximum NPC Day period (07:00-21:00) [DB(a)].	Evaluation according to Supreme Decree No. 38 of the MMA.
1	58	61	It complies

The results presented in the Table 7-4 They allow to verify that construction activities will not generate default on the maxima that establishes D.S. 38/11 MMA. The analysis of noise caused by blasting events is developed in response to the observation 7.19.

On the other hand, during the phase operation the noise source corresponds to the operation of the LTE, where the wide distance between the R1 and the route of the line imply a negligible variation in sound immission level. The latter is developed in the acoustic analysis presented in the study of acoustic impact, where it was verified compliance at points of greater closeness with the LTE.

**7.15. S(e) it must submit a file.KMZ containing the points of measurement and evaluation of noise and vibration, as well as the sources, covering the entire length of the project for each defined stage.**

**Rexposed:**

The holder welcomes the observation. In the Annex 7-3 Currentization Acoustic impact study, the requested information is delivered.

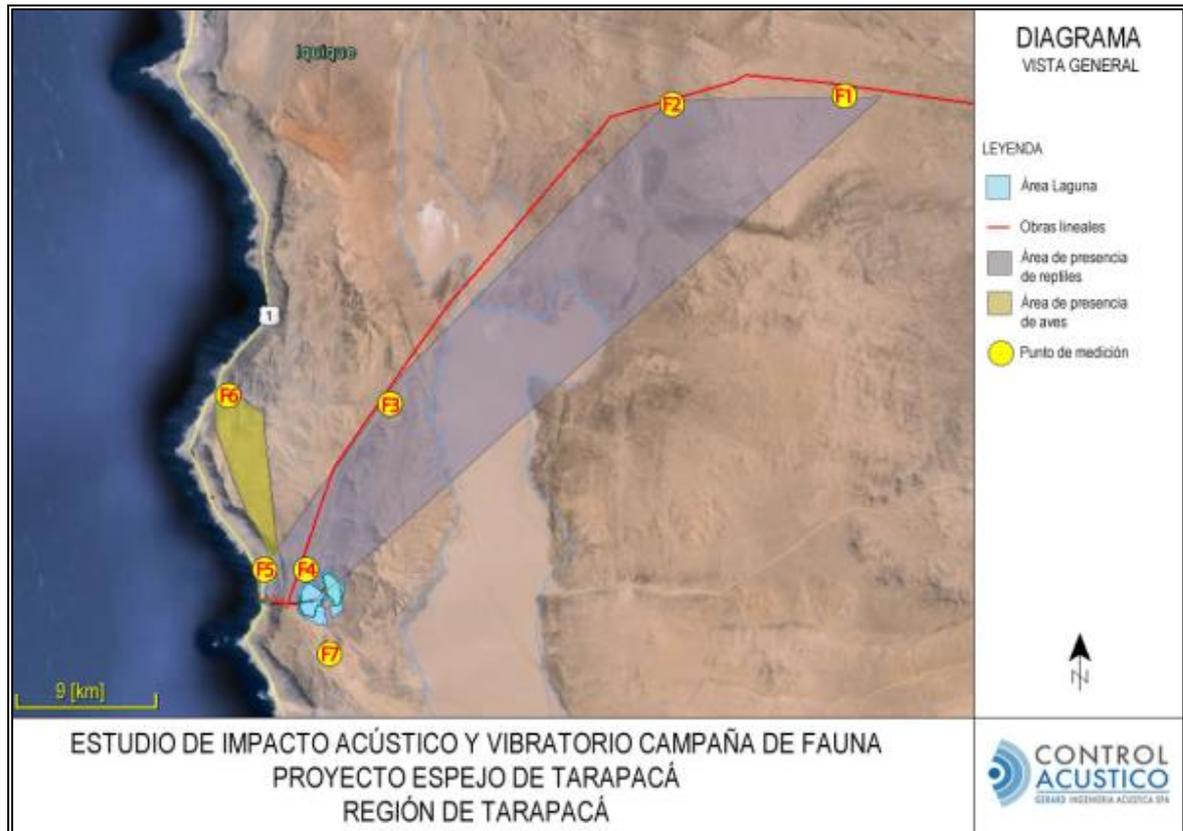
**7.16. The holder must characterize the levels present in the points where were identified the species identified in any category of conservation doing measurements unweighted frequencies and third octave for period day and night, detailing the procedure and criteria applied for the temporary characterization, and whereas for spatial characterization, relevance for reproduction or feeding habitats, as well as also the temporal characterization based on periods of courtship and reproduction, as appropriate. The above must refere with any foreign legislation.**

**Answer:**

The holder receives the observation. Measurements were made in 7 sectors where presence of fauna according to the EIA of the project, under the condition of shorter distance with the works, which are executed respecting the indications of this observation was detected. 3 points for the

Pampa area, 2 for the plateau area and 2 for the coast area were distributed. The following is the description of each measuring zone.

**Figure 7-23. Location of measuring points. General view.**



Elaboration: Gerard acoustic engineering SpA 2015.

**Table 7-5: Location and description of measuring points.**

Point	Description	Height [m]	Area	UTM coordinates	
				Datum WGS 84 spindle 19K	
				This	North
F1	Point located in the desert on the side of industrial road	1.5	Pampa	416217	7698342
F2	Point located in the desert on the side of industrial road	1.5	Pampa	406390	7697568
F3	Point located to the East side of route A-750, 10.1 Km	1.5	Pampa	390218	7677706

Point	Description	Height [m]	Area	UTM coordinates	
				Datum WGS 84 spindle 19K	
				This	North
	aprox.				
F4	The point is located at the East side of route A-750, approximately 21 Km.	1.5	Plateau	386524	7667589
F5	Point located to the East of route 1, Km 307,3 approx. Sector Caleta San Marcos	1.5	Costa surface	383604	7667164
F6	Point located to the East of route 1, Km 320 approx. Sector Caleta Río Seco	1.5	Costa surface	380174	7678276
F7	Point located to the West side of route A-750 Km 25 aprox.	1.5	Plateau	388173	7663271

Note: Coordinates obtained in field.

The measurements were carried out in accordance with the analysis and evaluation criteria presented in the document "EPA- Effects of Noise on Wildlife and Other Animals", recommended for agricultural and livestock service (SAG) in its environmental assessment guide: component Fauna Silvestre G-PR - GA-03 "in 2012, as well as studies of identification of fauna in the category of conservation of the present EIA and generated comments in" the process of environmental rating in relation to specific fauna.

The detail of the methodology, spatial and temporal justification, obtained records and its corresponding analysis, is located in the acoustic study of fauna presented in this Addendum, in Annex 7-3 update acoustic impact study.

**7.17. Along with the above, it is necessary to present an estimate of the emission of noise and vibration (unweighted frequencies and third octave) for each of the phases of the project in the places of original habitat of the species and relocation sites , as appropriate. In any case, scenarios types defined for each phase of the project, must represent the worst condition with respect to the emission levels of noise and vibration, as the closeness of such works to the receivers points (fauna), which must be accompanied of the technical background to respLden this condition.**

**Answer:**

The holder receives the request and This Addendum, Annex 7-3 update acoustic impact study attached as requested.

**7.18. The holder should complement assessment of the contaminant vibration for marine environment, clarifying and defining scenarios representative of the activities required for the implementation of the project. The above, always considering the most unfavourable scenario regarding emissions of noise and vibration generated by the execution of the project.**

**Rexposed:**

The holder receives the request (e) reports that activity in the marine environment that will generate noise emissions and vibrations are the underwater blasting.

Main blasting on the seabed is Norwegian shot, which is done only once, in underground form, from the lower tunnel towards the bottom of the sea. This means that the blast will be covered by the seabed layer, composed of rock and sand. Therefore, most of the energy will be absorbed by the Rocky massif and the direction of thrust of the flown rock, will be toward the inside of the tunnel. In the case of minor, low-intensity blasting, these will be covered with sand to reduce the range of expansion of noise and vibration.

Norwegian shot, compared with underwater blast normal, not to be in direct contact with sea water, has in the majority of cases, less impact on the surroundings, because it generates a hydrodynamic shock wave significantly minor (see Annex 1-7 Estimation of safety distances in lathe to marine blasting).

Safety distances to prevent impacts on fish, swimmers, divers, marine mammals and boats, are specified in the TONexus 1-7 Estimation of distances of safety around underwater blasting, which is based on studies and international safety guidelines.

**7.19. The holder must indicate the estimation model used to project the immission of noise levels generated by blasting, defining input variables which considers the model and the specific data used for this evaluation. It is worth reporting that technical standard ISO 9613-2:1996 - attenuation of sound during propagation outdoors, expressly indicates that this methodology is not applicable for noise levels generated by blasting. Is recommended the owner use consistent methodologies for blasting, as for example, provisions in the document Vibraciois and air wave of Lopez Jimeno (chapter 33), if applicable.**

**Rexposed:**

The licensee advises that, para effects of estimation of noise level and evaluation of compliance, used guidelines raised by the proposal of guidelines for the evaluation of acoustic and vibratory impact generated by blasting (Quezada R., Maulin S., Pesse R.; 2014). This document presents the method of calculation of vibration and air wave López Jimeno<sup>24</sup>, while the acoustic impact assessment suggests limits indicating the Australian standard AS-2817: Explosives-Storage, transport and use.

In the case of structures with the rules indicates a limit of 133 [dB (L)] peak] to avoid minor as glass break type of damage, however, the level of noise produced in most of the work involving the use of blasting are not sufficient to cause major on buildings damage (Quezada r. et al, 2014).

With respect to the effects of noise on people concerned standard indicates the following values:

**Table 7-6: Maximum sound pressure level generated by events of blasting according to standard ACE-2817.**

Allegedly affected site	Maximum sound pressure level [dB (Z) peak] generated by blasting events			
	More than one year duration of operations or involving more than 20 events of blasting		Less than one year duration of operations or involving more than 20 events of blasting	
	95% of the events	100% of the events	95% of the events	100% of the events
Sensitive sites (Residential buildings, schools, hospitals, etc.)	115	120	120	125
Not sensitive sites (Industrial, local venues of trade, etc.)	125			

As compliance threshold has been defined the most restrictive threshold for the category of sensitive sites, determining that the level of noise generated by an event of blasting should not exceed the [115]dB(L)].

However, for the purposes of impact assessment on species of fauna, reference is made to the Environmental assessment guide: component Fauna Silvestre G-PR - GA-03 posted by the service agricultural livestock (SAG) of the Ministry of agriculture in 2012; which recommends in paragraph

<sup>24</sup> López Jimeno, Manual de perforación de voladura de rocas, Segunda edición 1994.

5.2, letter (g), using as a reference the EPA criteria<sup>25</sup>, which sets as reference a maximum of 85 [dB] to not generate noise on wildlife-related effects. The [dB] scale does not imply weighting frequency so it is equivalent to the scale [dB(L)] (linear Decibel).

The noise level generated by the blasting associated with the project was calculated by the following expression:

$$NR = 20 \log \left( \frac{SP}{SP_0} \right) \text{ dBt} \quad \text{Equation 1}$$

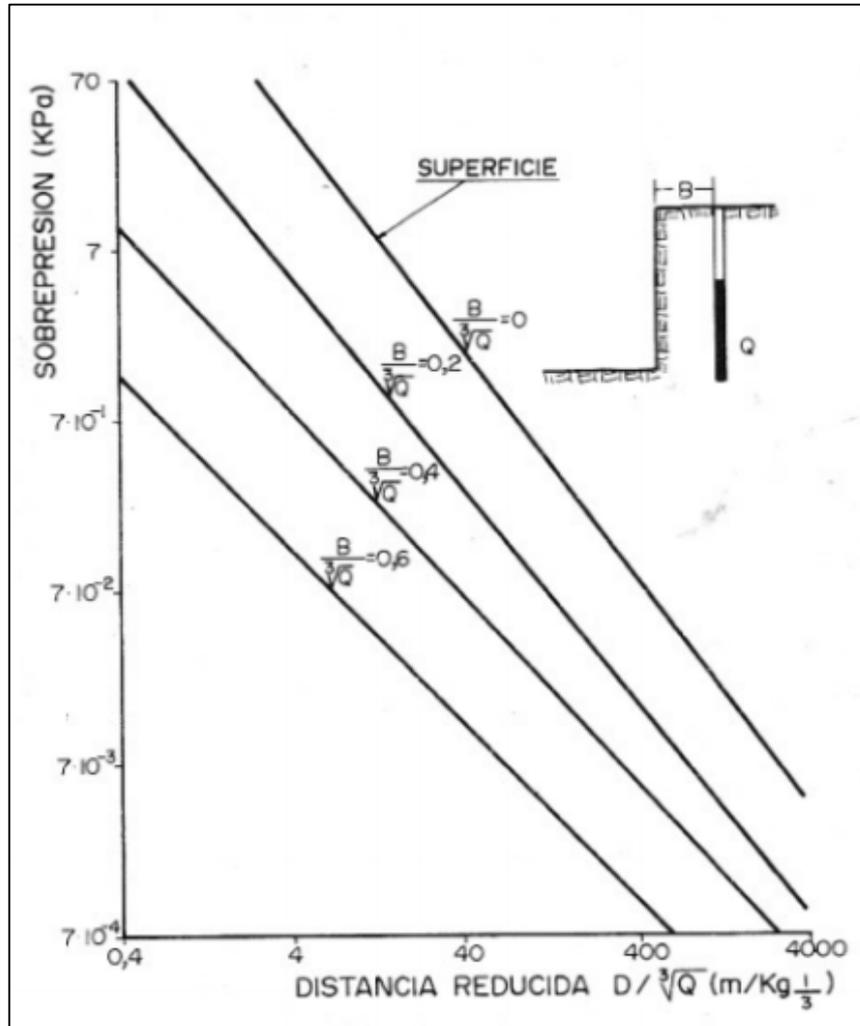
Where  $SP_0$  It is the equivalent to 20 [ ] reference pressure [MPa] and  $SP$  It corresponds to the pressure generated by a blast event. The abacus is used to determine this last value of Ladegaard-Pedersen and Dally (1975), obtained for blasting in Bank with a length of retacado of 30 d (30 times the diameter of the well or drilling). Knowing the distance to the receiver and the stone<sup>26</sup> reduced, determines the expected levels of air wave.

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<sup>25</sup> United States Environmental Protection Association (Agencia de Protección Ambiental de Estados Unidos.)

<sup>26</sup> Distancia mínima entre el pozo y el banco, representada mediante la letra B.

Figure 7-24. Abaco's Ladeegard-Pedersen and Dally.



The amount of explosive was taken from data provided by the owner, whereas a total charge Q 37 [kg]. As for stone, were typical values for tasks related to the project, which are defined according to the diameter of the well. Below are typical values extracted from specialized literature<sup>24</sup>:

Table 7-7: Maximum sound pressure level generated by events of blasting according to standard ACE-2817.

Context	Diameter of Wells [mm]		 ROCA BLANDA
---------	------------------------	-------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------

General	50 380	
PUBLIC WORKS	50 125	
Mining	165 310	
Underground	125 220	
Tunnels and galleries	32 64	
In bench blasting (Excavations of caves)	64 90	

The value of the stone B was determined from the diameter of wells for excavations on cavernas (64-90 mm), whereas the characteristics of the project. For the purposes of representing a conservative scenario, took the smaller diameter within the respective range, which implies a shorter length and, therefore, higher overpressure.

The calculation was performed for evaluation points associated with inhabited places and species of fauna located no more than 5,000 [m] away, whereas for lengths above the results lack significance (less than 39 values dB(L)). this analysis includes new housing identified in the sector, characterised by the R1 point described in the reply to observation 7.14.

Below are the values obtained from this procedure:

**Table 7-8: Estimation of noise and pressure for blasting events. Puntos associated inhabited sites.**

Envelope calculation pressure for load Q = 37 kg, diameter of wells d = 64 mm and stone B = 1.7 mm					
Point	Distance [m]	Distance reduced $\frac{D}{\sqrt[3]{Q}}$ [m/kg <sup>1/3</sup> ]	Reduced stone $\frac{B}{\sqrt[3]{Q}}$ [m/kg <sup>1/3</sup> ]	Overpressure [kPa]	Noise level [dB (L)]
1	366	110	0.5	0.0280	63
2	643	193	0.5	0.0140	57
3	762	229	0.5	0.0105	54
4	999	300	0.5	0.0070	51
R1	136	40	0.5	0.21000	80

**Table 7-9: Estimation of noise and pressure for blasting events. Points associated with wildlife.**

Envelope calculation pressure for load Q = 37 kg, diameter of wells d = 64 mm and stone B = 1.7 mm					
Point	Distance [m]	Distance reduced $\frac{D}{\sqrt[3]{Q}}$ [m/kg <sup>1/3</sup> ]	Reduced stone $\frac{B}{\sqrt[3]{Q}}$ [m/kg <sup>1/3</sup> ]	Overpressure [kPa]	Noise level [dB (L)]
F4	3435	1031	0.5	0.0035	45
F5	1414	424	0.5	0.0063	50
F7	4988	1497	0.5	0.0018	39

According to the above, assesses the results obtained from the maximum defined for inhabited places and sectors with the presence of wildlife:

**Table 7-10: Evaluation of compliance according to AS.2817. Evaluation of acoustic impact on inhabited sites.**

Point	Estimated noise level [dB (L)]	Maximum allowed [dB (L)]	Evaluation of compliance
1	63	115	It complies
2	57	115	It complies
3	54	115	It complies
4	51	115	It complies
R1	80	115	It complies

**Table 7-11: Evaluation of compliance according to EPA. Noise on wildlife impact assessment.**

Point	Noise level Dear [dB (L)]	Maximum allowed [dB (L)]	Evaluation of compliance
F4	45	85	It complies
F5	50	85	It complies
F7	39	85	It complies

**7.20. Activity of recreational fishing or spearfishing is materialized within the intervention area of the project on the waterfront (dry river to San Marcos sectors) (mode line of hand and rifle using launches harpoons), exercised this individually as also in the area of competitions organized by clubs or associations. In this regard, it should be noted that the concerned activity, authorized under the relevant fishing licence porting, limited cannot be seen by the constructive and operational activities of Tarapacá mirror SpA. Therefore, the holder must submit an evaluation of the possible impacts that would be generated on these activities product of the execution of any of the stages of the project.**

**Answer:**

Eholder I clarifies that in the baseline of human milieu, not rose information regarding the activity of sport fishing and competitive in the sector of coastal. However, the term of the construction of the works in the marine environment, is less than 1 year and the activities are concentrated in the area around the intake and cage, so there will be no interference with activities carried out in all the Bahi to Chomache.

In addition, it should be noted that, for the opening of the tunnel in the seabed, will be a blast, using the method of the Norwegian shot, that is performed only once, in underground form, since the lower tunnel towards the bottom of the sea. This means that the blast will be covered by the seabed layer, composed of rock and sand. Therefore, most of the energy will be absorbed by the Rocky massif and the direction of thrust of the flown rock, will be toward the inside of the tunnel. In the case of minor, low-intensity blasting, these will be covered with sand to reduce the range of expansion of noise and vibration.

The Norwegian shot, compared with underwater blast normal, not to be in direct contact with sea water, has in the majority of cases, less impact on the surroundings, because it generates a shock wave hydrodynamic significantly lower. (Annex 1-7 Estimation of distances from security environment to marine blasting)

Safety distances to prevent impacts on fish, swimmers, divers, mammals marines and boats, are in TheNexus 1-7 Estimation of distances of safety around underwater blasting, which is based on

studies and international safety guidelines. Further information in response to question 7.11 of the Addendum.

On the other hand, the desalination plant, during construction, includes the installation of 2 ducts that it will be on the seabed to the point of intake and discharge of water, so these works will not impede any activity that is carried out in the Bay Chomache.

**7.21. The holder shall incorporate Photomontages of various parties and work on the project, in its various stages, from different angles and points of observation. Also, must be included in the analysis of scenic or tourist value, area (sea) and its use in tourist activities, in order to determine the potential impacts for people who practice recreational activities in the area intervened.**

**Exposed:**

The holder receives the request and incorporates requested Photomontages in the Annex 7-4 photomontage project mirror of Tarapacá.

**7.22. As described in paragraphs 4.7.1.1 air quality, 4.7.1.2 noise and 4.7.4 landscape, half human 4.7.6 EIA, the owner says that the impacts are little significant, not detailing the rationale for some criteria. In this way, and in the case of the component 'air quality' and 'noise', described as little significant impact of particular material and noise emission increase, while both the blasting and excavation operations will be at least a kilometre a populated area, such as Caleta or San Marcos. By the foregoing, licensee shall describe in detail the methodology used in the assessment of already designated components, in such a way as to discard the undervaluation of the impact associated with each of them.**

**Answer:**

The holder receives the request and clarifies that the methodology used for the evaluation of the environmental impacts identified, corresponds to the one presented in Chapter 4 of the EIA "Prediction and evaluation of environmental impacts", which is widely used in the framework of the SEIA. In this, is they follow a series of steps that lead to qualify the environmental impacts generated to then rank them. In summary, the steps are as follows:

- Identification of activities likely to cause environmental effects
- Identification of components likely to be affected
- Identification of environmental effects caused by the activities of the project on each environmental factor
- Evaluation of environmental impacts

CABE noted that the blasting of the project will largely be underground, the main blast will take place on the seabed, which enhance media is Norwegian shot, which is done only once, in underground form, from the lower tunnel towards the bottom of the sea. This means that the blast will be covered by the seabed layer, composed of rock, shells and sand.

It should be noted that you for both air component as for noise was blasting to their corresponding estim activityation of emissions and evaluation.

## 8. PLAN ON MEASURES

**8.1. The holder shall consider the observations raised in this report, and if necessary, on the basis of the new background, mitigation measures, must be submitted repair and/or compensation that apply. Such measures shall establish an indicator of success clear.**

**Answer:**

The holder receives the observation, and based on additional studies to answer the queries of the competent services, we updated the measures.

Fauna:

- Las restriction of the beginning of the construction of the access road north in the area where remains of the black tern (*Océanodroma petrel*) species were found. It was established because we identified significant impact on the nesting area of the aforementioned species. However, in a follow-up study on terns, attached in annex 3-2, it was established that the nesting area identified in the North driveway in the sector of Rio Seco, would be to *Storm petrel garcili* and it is currently an inactive nesting area. However the above, licensee will maintain the accomplishment of a course prior to the start of construction, a way to verify the information in the reports referred to.
- As the species Rescue Plan *Liolaemus stolzmanni* and *Phyllodactylus gerrhopygus* complemented in this Addendum in response to question 5.5.

**8.2. Within the area of influence of the project there are productive fisheries important activities, which have been recognized in the EIA, as areas of commercial exploitation by fishers, divers mariscadores, collectors edge and seaweed fields; and by farmers who have approved projects and others pending for farming of marine species filter. In this regard, the holder must present measures to avoid or minimize negative impacts on the above-mentioned activities, product of a potential decline in food supply in the cowater umna**

**product, on the one hand, the suction component planktonic (8 hours per day) and on the other, according to the biotic and abiotic disturbance generated by the volume of discharge (16 continuous hours at night cycle).**

**Reposed:**

The owner explains that it has evaluated the environmental impact on the area hydrobiological resources, which are of commercial interest such as those who do not, with baseline information delivered in the Chapter 3 of the EIA and its annexes in which the quality of the water of the reservoir was modeled; Download to the sea near and far field and analysis of suction and the possible effect of the catchment on the plankton.

This was complemented for the present Addendum with a new campaign from baseline to winter, Annex 3-1.1 Baseline marine environment, so there is now data from the specific site for the four seasons of the year; with the modelaciones pen termosalina reservoir; Annex 1-6 study of modeling dynamics of thermal pen and Salina and the desalination plant and; with the speed of the suction in the work of underwater discharge and take; Annex 1-4 Suction speed and suction modeling; Annex 1-5 report of suction work collection.

The activities referred to in the question, It is noteworthy that although there are environmental rating resolutions of the years 2008; 2009 and 2010 It approved the development of aquaculture projects in Bay Chomachecurrently no activity of such in the sector.

In terms of fishing, According to the fishery statistics of SERNAPESCA in the period of 4 years from 2010 to 2013 in caleta San Marcos, landings are summarized as follows:

- North Cojinova: 700 total pounds caught the 2012 (0.7 ton);
- Colorado Conger: 12 kilos, captured the 2013 (0.012 ton);
- Guys eyes DAB: 10 kilos, captured the 2012 (0.01 tons);
- Frogfish: 30 kilos, captured the 2012 (0.03 tons);
- TOMOYO: 20 kilos, captured the 2012 (0.02 tons);

Other species are not recorded since 2010 to date, as well as beautiful the preliminary statistics for the year 241 °.

With regard tol landing craft, Statistics preliminary of SERNAPESCA for the year 2014 for Caleta San Marcos indicate the following:

- Huiro black: 905,6 ton
- Huiro: 126.1 ton
- Huiro stick: 147,6
- Tuna: 0.1 ton
- Usually: 0.9 ton

- Locate: 86.5 tons
- CHORO:45, 6 ton
- Culengue: 5.8 ton
- Lapa black: 0.2 ton
- Crazy: 14.9 ton
- Octopus: 24.8 tons
- Hairy crab: 0.5 ton
- Hedgehog: 96.2 tons

Specifically, with regard to commercial areas near the project area, it should be noted that during the phase of construction the intervention in the marine environment is not about any of them, the minimum distance of discharge with the nearest activity is 155 m with southern limit of the AMERB B.

Activities underwater construction they are limited in the use of space, being the most relevant Norwegian shot and the preparation of the seabed for the installation of the work of Jack and download underwater. Likewise, the duration Dear of these activities is 8 months, less than a year. On the other hand, in the breaking of rock in the intake area, there are no natural banks of hydrobiological resources that may be affected (see answer 3.9).

As for the suction, it is worth mentioning that the works of capture and download underwater engineering has been redesigned in a way that keeping the same dimensions that were presented in the EIA, allows you to further reduce the possible effects of *impringement* and *entrainment*. Account now with an improved protection grating, in which reduced the distance between threads of 5 cm to 1.9 cm and the average speed of suction is 0.15 m/s, in a way such that to prevent the entry of foreign objects and macro living inside the reservoir (see answer 1.13). During the operation phase, the results of these modelaciones carried out indicatesn What the project with the marine environment spreads to the considered parameters they will not be significant for the AMERBs.

Therefore, in the analysis of environmental impact all of the above was considerado and in accordance with the methodology applied the impacts are not significant. In accordance with the environmental legislation, in this case It does not propose environmental measures (of mitigation or compensation) with regard to these impacts.

Without prejudice of the foregoing, the owner has considered the implementation of a plan of environmental monitoring on the marine environment (see annex 5-1 Marine environment environmental monitoring plan escorted to the present addendum)both for the construction phase and operation, to monitor the different variables considered of relevance.

**8.3. Before a potential involvement in the specific, qualitative and quantitative composition of benthic resources recruiting within the area of management and exploitation of benthic resources (AMERB) of San Marcos B sector, the holder shall provide the measures of mitigation and/or compensation that the holder will implement.**

**Answer:**

The owner clarifies that it has evaluated the environmental impact on the area hydro-biological resources (see answer to question 8.2), with information on baseline and feather modeling termosalina supplemented in this installment of Addendum (see Annex 3-1.1 Baseline between Marino and annex 1-6 study of dynamic modeling of thermal pen and Salina). In addition to the above, annex 3 - 1.2 This addendum delivered an intensive study of planktonic in Caleta area communities San Marcos, for identifying the richness and specific abundance of plankton obtained in the study area, and in annex 3 - 1.3 is presented a report on larval supply in sector Caleta San Marcos.

The results indicate that the project will not generate significant impacts of those listed in article 11 of the law N° 19,300, in particular, on such AMERB San Marcos B benthic resources, so that, in accordance with the environmental legislation, not be It requires the application of mitigation and/or compensation measures. .

Still the above, licensee has considered the implementation of an environmental monitoring Plan on the medium dark (see annex 5-1 environmental marine environmental monitoring Plan), this addendum), with additional follow-up action for communities planktonic and larval settlement, in order to properly monitor the variables that affect the development of the species of commercial importance, both for the construction phase and operation, to monitor the different variables considered of relevance.

**8.4. In relation to the mitigation measure presented by the holder, associated with the significant impact identified for species Storm petrel petrel You can appreciate the proposal of this measure, is based on two references and not in an in-situ study of the reproductive behavior of the species. According to the records available to the competent authority, the season of reproduction of this species in the region, would be between the months of December to April each year. Therefore, it must be overridden, if necessary, such as, based on a study carried out in-situ.**

**Exposed:**

The owner welcomes observation, since the implementation of the aforementioned measurement has been adapted based on results, spatial, and temporal study in-situ complementary consisting in the Annex 3-2 ""Review sea swallows"" the present addendum.

According to what is established in the Chapter 4 of the EIA, the significant impact on black tern (*Storm petrel petrel*) was identified Sunamente for the construction phase the works in the sector of Río Seco, specifically for the empowerment of a section of the North, by establishing as an access road the restrict the start of construction the road in this area periods during the reproduction of this species and carry out supervision on site by a specialist in fauna in order to free up the area to intervene (all as a single measure of mitigation).

Consideration of the impact on *O. petrel* as meaningful presented in the evaluation of the EIA was based on the direct intervention of an area that, according to the information available at the time of the evaluation, corresponded to a site of reproduction of the species.

However, according to the results of the follow-up study about terns requested by the authority, presented in the Annex 3-2 This addendum, not be corroborated the above as in surveys in August and November 2013, December 2014 and January 2015, the area had no activity related to the presence of terns. Additional campaigns, in December and January, made in breeding season, they gave indications that This area It would be only for a transit of seabirds inland route, since the nesting sites are several kilometres to the ESte (large salt industry) of the sector of the road in question.

Based on the foregoing, the measure is rectified "**Restriction of the beginning of the construction of the access road north in the area where remains of the black tern (*Storm petrel petrel*) species were found**" given that it is not necessary to apply it in the terms originally established in table 7-2 of the EIS, as there is no valid reason to restrict construction in the area of Río Seco to a certain period of the year. However, is maintained as part of this measure, the previous tour to start of works in the field of the access road north, as verification of the information raised the supplementary report.

Therefore, table 7-2 of the EIS is modified in the sense not to restrict the start of the construction of that stretch of the Northern access road, however, will remain the condition perform a pre-trip inspection in order to ensure that there are no active nests before the construction of that section. Below is the original measure, adjusted in accordance with the results of additional campaigns conducted for this addendum.

**Table 8-1: Measure: home construction of the Northern access road (swallow's) Maer Black)**

<b>Measurement: Restriction of the beginning of the construction of the access road north in the area where remains of the black tern (<i>Storm petrel petrel</i>) species were found</b>	
Phase of the project	Construction

<b>Measurement: Restriction of the beginning of the construction of the access road north in the area where remains of the black tern () species were found Storm petrel petrel)</b>	
Environmental component	Fauna
Environmental impact	<p>Involvement of the area of possible nesting and transit of black tern) Storm petrel petrel).</p> <p>On the occasion of the construction of the project will develop a road whose work can have impact in the area of Río Seco, of possible nesting and transit to nesting sites of <i>O. petrel</i>.</p>
Objective	Avoid or minimize the involvement of the species <i>O. petrel</i> with respect to the works of the project.
Description and justification	<p>The measure consists of restricting the construction of the access road north in the sectors where were identified the remains of nests of <i>O. petrel</i> (bibliographic records) and transit routes of this species for nesting sites located in the Salar Grande sector.</p> <p>Therefore shaped prior to the construction of the road, a wildlife specialist will perform supervision on land by in order to free up the area to intervene.</p>
Place, form and timeliness of implementation	<p>En form prior to the construction of the Northern access road into segments corresponding to where the remains of nests were identified (bibliography)supervision will be on ground by a specialist in fauna in order to free up the area to intervene. The liberation of the area means that a professional travel sector pedestrian way and at low speed in search of nests of <i>O. petrel</i>.</p> <p>Depending on the result of such inspection, it will act in the following way:</p> <ul style="list-style-type: none"> <li>• In case of detected the presence of black tern nests will be postponed the start of the works and shall inform the competent authority.</li> <li>• If not detected the presence of black tern nests, will start the works. When the corresponding road sections are completed, will be used on a continuous basis for the development of the project.</li> </ul>
Compliance indicator	Report of release of the site for start of construction presented to the Superintendency of environmental (SMA) with a copy to the SAG, with field activities as a result of the monitoring report. This report shall be forwarded within one month after the release of the area.

Source: Own elaboration.

Given the modification of the mitigation measure, also amending the follow-up associated with this measure was proposed in table 9-1 of the EIS. Po therefore, the aforementioned table should be replaced by the following:

**Table 8-2: Measure follow-up: restriction of the start of the construction of access North Road in the Area where is found remains of the species swallow of Black Sea**

Phase of the project	Construction
Environmental component	Fauna: Black tern ( <i>O. petrel</i> ). FACEnvironmental Tor: site of interest
Associated environmental impact	Involvement of the area of possible nesting and transit route to nesting sites of <i>O. petrel</i>
Associated measure	A wildlife specialist will perform supervision on terrain of the Northern access road to the end section d(e) release the area to intervene.
Ubication of control points	The sites of monitoring will correspond to the access road north in the section next to caleta Río Seco.
Parameters to use to characterize the status or evolution of the environmental factor	The parameters to be monitored will be the presence of nests of <i>O. petrel</i> in the sector of access North near caleta dry river section. The information collected during the monitoring, it will be analyzed to avoid intervening in the activity of nidificación species in the sector.
Permit limitsgone or committed	The receipt of 100% of children identified in the path.
Duration and frequency of measurement	Monitoring will be annual during all the years of the construction period of the project, between the months of July and December.
Method to utilizar or follow-up actions	Tour the area of study in search of Active nests. Once identified, their occurrence shall be defined spatially and quadrants of sampling of 6 m x 6 m, which will be posted any nests, following the methodology used by Torres-Mura & Lemus (2013) will be carried out.
Term and fractivates of submission of reports	An annual report will be sent to the SMA with a copy to the SAG with the report of the monitoring after 30 dIAs's finished the tour.

Source: Own elaboration.

On the other hand, it should be noted that, following the results of annex 3-2, is considered the implementation of two additional preventive measures. These are: (i) implementation of devices anti-collision in stretches of the LTE identified as risky and (ii) reduction of the night lighting in works and activities associated with the project. The detail of such preventive measures is presented in response questions 8.5 and 8.9 in this addendum.

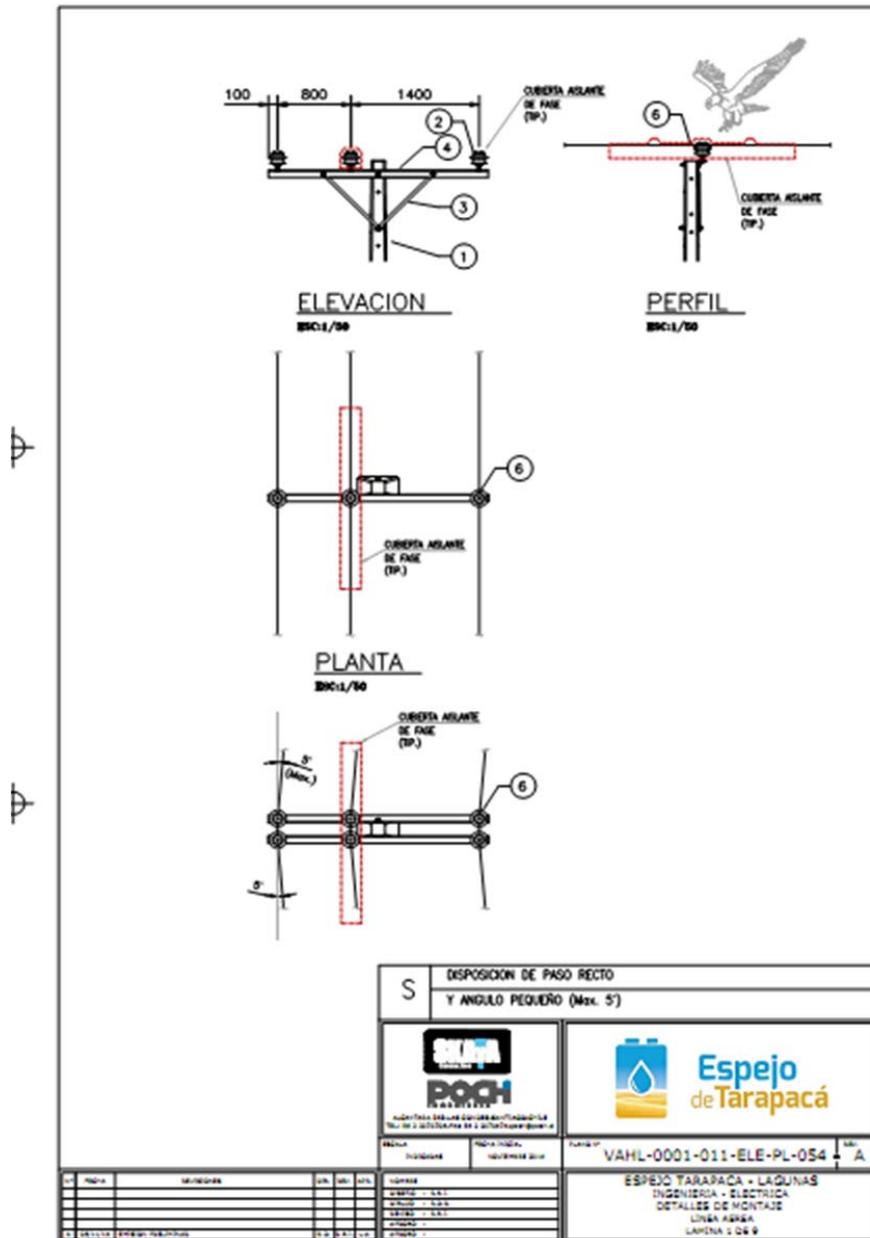
**8.5. Considering the installation of electrical transmission lines, the holder shall incorporate in the design of these works, and introduce measures that mitigate the possible involvement by collision and electrocution of birds (for example: phases available,) non-conductive material of construction, location of guard cables, bollards flight, etc.)**

**Ranswer:**

The holder receives the observation. The project includes the installation of madia in the coastal sector and into the reservoir pressure lines. The high-voltage line is located in areas of inner desert, where registered birds is limited to small groups of *Cathartes aura* (Red head Vulture) and the night passage of seabirds as *Leucophaeus modestus* (Gull Garuma) and *Storm petrel petrel* (Black sea swallow).

Serving the unique species that could use poles or towers as landlord is the vulture's red head, the implementation of this preventive measure will focus on this species. This is considered to implement a sheath of insulation in the phase conductor central, in order to increase the distance andetween phases energized to 220 cm (See Figure 8-1). This measure is impossible birds with wingspan less than this distance make simultaneous contact with energized phases, which far exceeds the 170 cm required for reduce the likelihood of electrocution of the vulture's red head. This measure will also apply in medium voltage lines considering the project. This can be seen in the scheme presented in the following figure.

Figure 8-1. Cover of insulation anti-electrocucion of birds



To reduce the probability of occurrence collision, the project includes the installation of bollards visible flight even in conditions of darkness (eg. FireFly o BirdMark), which shall be the cable guard

laying in the sections identified as most at risk of collision, which are detailed in the Figure the answer to the question 1.19. According to international experience, the adequate implementation of this measure should be sufficient to reduce the risk of the occurrence of collision. However, the project considered to evaluate the efficacy of this using the component monitor fauna during the first 3 years of operation. Further information regarding this in response of the question 10.2.

It should be noted that the project also includes the installation of aeronautical beacon, especially in the section of the line identified as higher risk of collision (The answer to the question 1.19 figure).

**8.6. Considering that the owner describes the impact on the population of the black tern species is significant during the phases of construction and operation of the project, should consider and present compensation measures, which will take charge of the impact on this component.**

**Answer:**

The holder clarifies that, according to what is established in the Chapter 4 of the EIA, the significant impact on black tern was only identified for the construction phase of the North driveway on the part close to Caleta Dry river.

According to the request of the authority, on the occasion of the present addendum a supplementary report to greater knowledge of the species of coastal swallows, has been that it can be found in the project area, the results indicate What the light of the new information, detailed in the Annex 3-2 ("Review sea swallows") of the present addendum," Río Seco Creek area would correspond only to a seabird inland transit route.

As regards the measures for birds, please see the answer to the question 8.4 of this addendum.

**8.7. The holder must submit the measures that ensure that you will prevent that bodies enter hydrobiological to the system. The above given that, according to the holder, the sea water suction system it would be a good filter to avoid such impact, what is considered insufficient.**

**Reposed:**

The holder receives the request and points out that it has reconsidered the cage design the work of underwater discharge and take that will go on the intake, which has decreased the distance between threads Marine bronze 5 cm to 1.9 cm, making it impossible to income exceeding this size agencies.

In addition, the speed of suction of the water intake, which on average is of 0.15 m/s, is similar to the marine environment and, therefore, the expected by sucking on the environment effect is not significant, due to the combination both measures of the project design.

**8.8. The holder shall provide the measures to be incorporated into case identify the marine ecosystem by noise and vibrations affecting, and indicate how to address this factor in the different phases of the project.**

**Answer:**

The holder receives the request and advises that is He made noise analysis in EIA and complemented in this addendum in accordance with required by the authority, see annex 7-3 acoustic impact study update.

Likewise, it they have considered the activities needed to minimize the risks and impacts associated with the blasting for the construction -described in the response to 7.11 observation of the present Addendum -, Like this as also in Annex 1-7 Estimation of safety distances in lathe to marine blasting Report security area is incorporated by underwater blasting. It is worth mentioning that he is not carrying out blasting during the operation phase.

**8.9. The holder must incorporate measures to mitigate for the possible involvement of birds in all of the layout of the electrical transmission line. The foregoing, given that major accidents of birds in wiring electric are due to electrocution on pole and the collision against cables)Haas 1980; Oledorff et to the. 1981; Ferrer et to the. 1991), being the electric shock especially prevalent in birds in medium and large scale usually perch on the supports.**

**In this sense, the holder must submit mitigation measures that consider the use of appropriate devices to prevent the electrocution of birds at structures used as props in the distribution lines.**

**Reposed:**

The owner welcomes observation and then proposes certain voluntary commitments aimed at minimizing the possible involvement of birds with the layout of the electrical transmission line.

Indeed, and as he has been credited during this environmental assessment (EIA and in the present addendum), the project does not consider the generation of significant impacts that warrant the proposition of environmental measures (mitigation or compensation) to the respect (art. 16, law N ° 19,300). However, as a result of the comments of the authority, it has estimated suitable from the

point of view of environmental sustainability development incorporating measures that seek to minimize any possible impact, however small in magnitude, with respect to the birds.

In the first place, and with regard to the adoption of measures that prevent the occurrence of electrocution, the holder Welcome observation, because online distribution will install a mechanical coating which hinders the electrocution of birds up to 220 cm wingspan. Further information in response to the Question 8.5 the present addendum.

In Second, in relation to the collision impact, were identified as susceptible species to the gull Garuma and the black tern, which made night flights that could intersect the axis of transmission line that connects to the project with substation lagoons. To reduce the probability of occurrence of collision, Pproject includes the installation of bollards visible flight even in conditions of darkness (eg. FireFly, BirdMark or similar), which shall be the cable guard laying in the sections identified as most at risk of collision, which are detailed in the Figure the answer to the question 1.19. According to international experience, the adequate implementation of this measure should be sufficient to reduce significantly the risk of the occurrence of collision. However, the project considered to evaluate the efficacy of this using the component monitor fauna during the first 3 years of operation. Further information regarding this in response of the question 10.2.

Finally, cAbe noted that the project also includes the installation of aeronautical beacon, especially in the section of the line high voltage identified as higher risk of collision (The answer to the question 1.19 figure).

## 9. PPREVENTING LAN

**9.1. Regarding stated on page 8-16, must be corrected in table 8-2, to the risk "marejada", the contingencies prevention measure adopted, since the official website of the SHOAH does not have information of sea conditions. It is present to the technical body responsible for the maritime general prognosis is the Meteorological Service of the Navy (SERVIMET).**

**Rexposed:**

The owner welcomes as requested by the authority, for This proposes the following faith of errata:

**a) Phase construction:**

**Where it says:** ""Be taken knowledge of the conditions of the sea every day on the official website of the SHOAH before the daily planning of works"

**It should say:** ""Be taken knowledge of the conditions of the sea every day on the official website of the Service weather of the Navy of Chile dependent DIRECTEMAR at the stage of planning activities. During activities is constantly verify actual sea conditions and a monitoring of the official website of the Meteorological Service of the Navy of Chile in order to anticipate any changes that may affect the works programmed in coastal area or in the Sea".

**b) Phase operation:**

**Where it says:** "Be taken knowledge of the conditions of the sea every day on the official website of the SHOAH before the planning of maintenance work.""

**It should say:** ""Be taken knowledge of the conditions of the sea every day on the official website of the Service weather of the Navy of Chile dependent DIRECTEMAR at the stage of planning activities. During maintenance activities or others that require work at sea, shall be held constantly this actual conditions as well as monitoring of the conditions laid down in the official website of the Meteorological Service of the Navy's Chile in order to anticipate any changes that may affect the works scheduled in the coastal area or sea".

**9.2. It must be noted in detail how and how often will be the maintenance and cleaning of suction and discharge of seawater duct (management of the) fouling). In addition, the holder should propose a maintenance and cleaning program detailing the procedure and and frequency with which will take place.**

**Rexposed:**

The owner clarifies that suction and discharge tunnel will be constructed in underground form, does not provide for the installation of a pipeline, but it will keep the natural conditions of the Rock, only reinforcing in sectors where structurally necessary, as it was described in the Chapter the EIA 1.

Therefore, does not provide a cleansing program but it considered a program maintenance of tunnels, which will be held once a year during the first two years and then periodically, as was indicated in the section 1.6.8 Schedule of phase of operation, of the Chapter the EIA 1.

In addition, it provides program of supervision from the mouths of the tunnels, to be held every 2 months during the first year and then every six months, as was indicated in point 1.6.10 of the Chapter the EIA 1.

### **9.3. The holder must present a contingency Plan, associated with eventual infiltrations or overflow of water reservoir, in order to avoid any kind of runoff in detail.**

#### **Answer:**

The holder It clarifies that, in relation to any overflow of the water reservoir, the volume of reservoirs, approximately 56 million m<sup>3</sup> total is obtained with a water level at the peak of operation that is 608,5 m. above sea level.; This volume is fully contained in the natural depression of the land whose surrounding dimension exceeds the level 610, so an overflow of the parapets It will not generate runoff of material. It should be noted that, within the operation, there is a system of controlling the levels of elevation of the reservoir and will also with redundant alarms that will be notified when the maximum operation level. The purpose of the above is to avoid overflow. In all cases, the reservoir has a capacity maximum of 56 m<sup>3</sup>/s discharge, so that, in case hypothetical require lowering the dimension level to avoid an overflow, it is possible to download the necessary water.

In terms of possible infiltration, it should be noted that It was found that in the area of reservoirs, sedimentary fills are presented as flooring laminates, compact, with contents of salts present in surface and depth, characteristic of the presence of an old salt, and there is no a napa of groundwater, which is shown because the witnesses of the perforated drilling not accused the presence of water. The detail of the hydrogeological characterization, with the information used, is recorded in the Annex 3-6 characterization Hidrogeológica This Addendum.

With regard to the above-mentioned hydrogeological report, is relevant to highlight the following conclusions:

- According to the local geology, it can be concluded that in the area of study there is only one unit of soil, covering all the basin of the project mirror of Tarapacá. This unit is comprised of sand and gravel with some fine, and has sales levels interbedded cemented.

- The Geophysical study for its part, concluded that in the tray area the project would exist 2 kinds of sedimentary formations on the rock fundamental (PSSM-1 profile), in addition, to appreciate than the depth of the filling reaches 120 to 130 m comor maximum.
- At the same time, from the exploratory drilling information executed in presence of salt crust witnesses could detect clearly, it was concluded that there is no presence of water groundwater in the basin of the project. In particular, the S-2 probing, which It corresponds to the most profound, he was drilled to the depth of 145 m without finding a napa of groundwater.
- Finally, the digging of pits in the bucket was determined the presence of superficial layers of salt crust compact, interspersed with soil, which limit the infiltration and percolation deep of the water, which could demonstrate the results of trials of carried out infiltration.

In all cases, it should be mention that held an annual inspection of the membrane and it has a contingency plan for breaks in the membrane, which is described in the answer to the question 5.6 of this Addendumwhose central objective is to prevent infiltrations.

At last It is concluded the project has considered these emergency situations in its design and has addressed them incorporating preventive measures to prevent its occurrence.

**9.4. Informing the holder that the Regional Directorate of hydraulic works has considered the construction of hydraulic infrastructure APR in Caleta San Marcos for the year 2015-2016, so it must have a plan of prevention, which aims to prevent damage to the infrastructure of the system, product of the transit of heavy machinery in the sector.**

**Answer:**

The owner takes note of the observation. As soon as the background of the APR project is available in caleta San Marcos, all necessary measures in the project mirror of Tarapacá will be incorporated to avoid damage to the infrastructure of the system.

However, it should be noted that the works of the project are distant from the town of San Marcos, so, it is estimated that any interference there will be between both projects. With relationship the transit of heavy machinery in the sector, this It shall be for the permanent and temporary roads referred to in the projectpresented in the EIA.

In addition, it should be noted the Pproject considered as voluntary commitment the delivery of water desalinated for the community, as indicated in the CAPtitle 15 ("")Commitments volunteers")", of the EIA.

**9.5. In relation to the risk of spills of fuel, oil or hazardous substances in Earth, the EIA noted that "drums of fuel and oil will have on wooden pallets or other devices in order to facilitate its transportation and avoid the" humidity and corrosion of them, due to the direct contact between the drum and the floor"; in this regard indicated drums may not be operated on wooden pallets, the device must be compatible with the substance that contains, or support. In this regard, all associated background information must be submitted to such a device.**

**Reposed:**

The holder welcome the observation of the authority, for this correction to transfers and storage of liquid fuels (CL) will be compliance as set forth in the DS N °1602008 the Ministry of economy, development and reconstruction, always transported in unitary form.

In this way, pallets or wood or other fuel element will not be utilized to produce the insulation of the floor; Indeed, steel platforms will be used or structured using metal profiles suitable and stored on shelves or shelves of type metal.

The place of storage of the CL will give compliance to as indicated in the aforementioned Decree and, among others, shall comply with the conditions attached to the building material (fireproof), have a parapet antidesbordes, a system of pavement with a protection scheme that prevents the contamination of the soil under the pavement, a spill containment, an electrical explosion and signage suitable for the volume to store among others.

**9.6. The holder shall incorporate the SEREMI of health of Tarapacá 572404661 emergency phone, the contingency plan.**

**Reposed:**

The holder receives the observation. Then the Table 9-1 It indicates the emergency phones and associated with the project which include that of the SEREMI of health of Tarapacá.

**Table 9-1. Emergency telephones.**

Entity	Address	Telephone no.
Hospital (131)	Heroes of the conception No. 502, Iquique	57-2395555
Fire (132)	Bolivar N ° 414, Iquique	57-2421212
Carabineros de Chile (133)	O'Higgins 427, Iquique	57-2557040
Navy of Chile	706 Avenida Arturo Prat, Iquique	57-2517100
Superintendence of the environment	Washington 2369, Antofagasta	55-2530385

Entity	Address	Telephone no.
Maritime governance of Iquique	Jorge Barrera 98, Iquique	57-2401900
Municipality of Iquique	Street Aníbal Pinto 50 building Ex - customs,	57-2514677
Municipality of Pozo Almonte	Calle Manuel Balmaceda 276, Pozo Almonte	57-2407200
Mutual security	Orella No. 769, Iquique	57-2408700
ACHS	Amunátegui No. 1517, Iquique	57-2402925
<b>GENERAL EMERGENCY PHONES</b>		
Agricultural and livestock service	Orella 440, Iquique	57-2470115
SERNAPESCA	Passage 470 Alessandri Dept. 110 Iquique	57-2368150
National Emergency Office	Salvador Allende former Pedro Prado 3420,	57-2374400
SERNAGEOMIN	Grumete Bolados 125 Iquique	57-2427462
Regional Directorate of roads	Tarapacá 130, 3rd floor, Iquique	57-2572036
Directorate-General for water	Tarapacá No. 130, Iquique	57-2572265
<b>SEREMI of health Tarapacá</b>	Emerald 475, Iquique	57-2404661
Secretary Ministry of environment	Bolívar 335, Iquique	57-2377100

**9.7. The owner designates in table 8-3. Contingency measures for anthropic risks, the risk of spills of fuel, lubricant or dangerous substances on Earth. Therefore, you must incorporate working methodology for the management of soils with the potential presence of contaminants, approved by the Res. Ex. 406/2013.**

**Rexposed:**

The holder receives the observation. In the Annex (7-2)Plan for contingencies and emergency, snap Chapter 8 Prevention Plan for contingencies and emergencies) this addendum outlined the steps to follow to the address designated anthropic risks (effusion of) fuels, lubricants or dangerous substances on Earth). If you generate any contingency related to the identified risks, is reported to be in conjunction with the methodology described in the Res. Ex. No. 406/2013 of the Ministry of the environment (methodological guide for the management of soils with the potential presence of contaminants). The said annex sets out the parameters and forms of sampling in the case of hazardous material spills and ways of evaluating them.

**9.8. The study points out in sections 8.7.2 and 8.7.4, procedures for environmental protection against spills and emergency communication system. In this context, the holder must incorporate in these points notice to the Seremi of Middle Since environment who chairs the task force # 3 of the Emergency Plan of the region of Tarapacá.**

**Answer:**

The holder receives the observation for this attached to this addendum the Annex 7-2-1 Complement to PLANES Contingency and emergency and 7-2-2 Complement Chapter 8 Prevention Plan for contingencies and emergencies, which lists the types and forms of communication in terms of the occurrence of contingencies and emergencies and procedures detailed communication of these to the Authorities.

In addition to this detailed actions to be followed during and after that occurred emergencies as well as proposals for follow-up to control potential impacts generated to cause or occasion of which the proposed control measures are insufficient and the emergency occurs.

At the end of the said annex lists phone numbers in case of reporting these to the relevant authorities, which include the Secretary of the Ministry of environment.

**9.9. 8.7.6 point record of incidents and emergencies, the holder shall submit a report after the incident that incorporate the actions implemented and which demonstrate the effectiveness of the remediation and/or plan of action, in the place of the incident or emergency, justifying that this area should not be incorporated in the list of sites with the potential presence of contaminants.**

**Answer:**

The owner welcomes observation, the owner attached annex 7-2 to this addendum for this (Plan for contingencies and emergency, complement Chapter 8 Plan of prevention of contingencies and emergencies), on which are listed the types and forms of communication with regard to the occurrence of contingencies and emergencies, and detailed procedures for the communication of this to authorities.

In addition to this detailed actions to be followed during and after that occurred emergencies as well as proposals for follow-up to control potential impacts generated to cause or occasion of which the proposed control measures are insufficient and the emergency occurs.

At the end of the said annex lists phone numbers in case of reporting these to the relevant authorities, which include the Secretary of the Ministry of environment.

As a complement to the previous annex, attached the sampling Plan which details the steps to be followed in the event of a spill which was performed in conjunction with the Res. Ex. N ° 406/2013 of the Ministry of the environment (methodological guide for the management of soils with the potential presence of contaminants). There are detailed obligations of reporting of emergencies that have occurred and who must be informed of these according to the services involved in the event.

Thus also, include the parameters and forms of sampling in the case of hazardous material spills, the ways to evaluate them.

With regard to remediation plans, these should be evaluated depending on the type of spill, as explained in both annexes. The plan will be proposed to the authority eliminated once the emergency, and its implementation in land shall be subject to the approval of the appropriate authority.

**9.10. In addition to Chapter 8, the holder must present a plan of management and prevention for the sectors of collection of non-hazardous industrial waste, including scenarios for possible landslides, fires, vector, among others. In this sense are informed holder that tires are considered non-hazardous waste, which in case of generating a collection of these, must be taken mentioned scenarios.**

**Exposed:**

The holder welcomes as requested by the authority, stating that, according to provisions in Chapter 10 Plan of compliance of the legislation environmental applicable to the project and specifically with respect to provisions in the section 10.11, Joint sectoral environmental permit 140, in relation to the salvage yards:

**Salvage yard:** This will consist of a section open enclosure, for the separation of waste according to feature, possibility of recycling or reuse.

For this shall be respected as provided in the respective sections to non-hazardous waste, regarding what types of waste are feasible to be re-used (recycling potential). The collection of this waste will be as described below:

- The irons, remnants of metal structures, nuts, pins or other metallic waste shall be deposited in metal containers dry and selected those that are recyclable to be handed over to authorized and certified company that is dedicated to the recycling of iron.
- Plastics and others will be stored in plastic containers with lid.

- Not classifiable industrial waste correspond mainly to remains of wood, debris, concrete, paper and paperboard, among others, which will be sorted and inspected for possible contamination, since if so it will be immediately to the category of hazardous waste.
- Other waste will be considered non-hazardous industrial waste and will be sent to final disposal according to provisions in the current regulations.

Given the types of materials to collect, the characteristics of these and their ways of gathering, storage of these may be carried out on ground matched and properly compacted so that it complies with a minimum of 95% of the Proctor modified on which is placed a bed of gravel of ¼ inch of crushing edge (angled) and a thickness of no more than 5 cm compacted on the basis, in order to send resistance characteristics adapted to the soil to resist the solicitations for this type of collection.

For all cases of stockpiles will opt to the insulation of the natural soil through the use of containers and/or pieces of wood or metal that isolate the overturning soil material in order to generate a layer of air between the ground and the residue and In addition, hinders the proliferation of health vectors of interest.

Given the characteristics of the materials to be stored and the short stay in the premises is the proliferation of sanitary interest vectors is not expected (organic matter is constituted by wood mainly), not yet and given that could nest some of these is to be established to within the premises pertaining to interest health vector control incorporation of the courtyard of salvage according to provisions in the D.S. N ° 594 of the Ministry of health which replace it.

There will be weekly reviews of volumes of materials collected in these courtyards of salvage having those who have more than 60 days without reuse.

"To verify the control of compliance of storage will be used the"Register journal generation of non-hazardous waste (salvage yard)"included in the procedure Guide sites for temporary storage of waste solid industrial not dangerous from the Ministry of health.

In order to comply as requested is included in the present Addendum, in the Annexes 7-2-1 Complement to pLANES Contingency and emergency7-2-2 Complement Chapter 8., Sectoral environmental permitting 126, 138, 139, 140 and 142 where according to the respective PAS contingencies are listed and the control measures in the event of the occurrence of a contingency and established measures where such measures are exceeded how react to emergencies.

**9.11. As described in the chapter 8 Security Plan for contingencies and emergencies, the holder shall describe the impacts generated by noise for the nearby town, incorporating communication schedules and coordination plans with the community and authorities relevant in the case of blasting and use of explosives.**

**Rexposed:**

The owner welcomes the observation of the authority and clarifies that the impacts generated by noise have been described and evaluated in Chapter 4 and annex 4.1 of the EIA. The results of the evaluation established that the project will not generate significant impacts by noise and vibrations identified recipients.

For its part, the holder informs that you for the execution of surface blasting, will be a specific coordination with the community of Caleta San Marcos which will consist in advance please carry out blasting, which will yield by:

- The daily display in the office of the incumbent on St. Mark's list of blasting, which could be consulted by the community. This listing will indicate the precise location and time that will be executed.
- Direct communication by the holder to the Presidents of the Union of fishermen, Union of seaweed fields, Junta de Vecinos, Sports Club and Carabineros of the days and times that the blasting will be developed. Such notification will be made prior to the start of the blasting in the sector.

For its part, will prevent the execution of surface blasting on the dates of the festivals which are held collectively in Caleta San Marcos, namely:

- San Marcos (25 April)
- San Pedro (29 June)
- Fiestas Patrias (18-19 September)
- Christmas (December 25)
- New year (January 1)

Finally, reported that the office of the holder will be open to the community to receive your inquiries or claims with respect to the construction phase activities in general.

## 10. PLAN MONITORING

**10.1. The holder shall consider the points raised in the present report, and if necessary, according to the new history, is shall complement the monitoring Plan of the environmental variables proposed, and introduce the same updated .**

Answer:

The holder receives the request and presents then the documents that they complement the chapter on follow-up Plan presented in the EIA, According to the records requested by the authority for This Addendum:

- In annex 5-1 is Plan of environmental monitoring of the marine environment for construction and operation.
- In annex 5-2 presents environmental monitoring of reservoir Plan
- IN annex 7-3 is the Plan of environmental noise monitoring

**10.2. Whereas the functioning at maximum capacity of sea water reservoirs (approximately 375 has) and that there is an assessment of possible impacts these may result in wildlife, the owner should consider and present a plan of quarterly monitoring for a period of 3 years, in a manner of to determine the possible effect that these artificial water reservoirs, would generate in the species that can be found within the area of influence of the project.**

**Monitoring should be considered at least, history of wealth and abundance, as well as indicators of diversity (Shannon-Wiener).**

**Rexposed:**

The holder receives the observation. Then a proposal is presented for monitoring wildlife

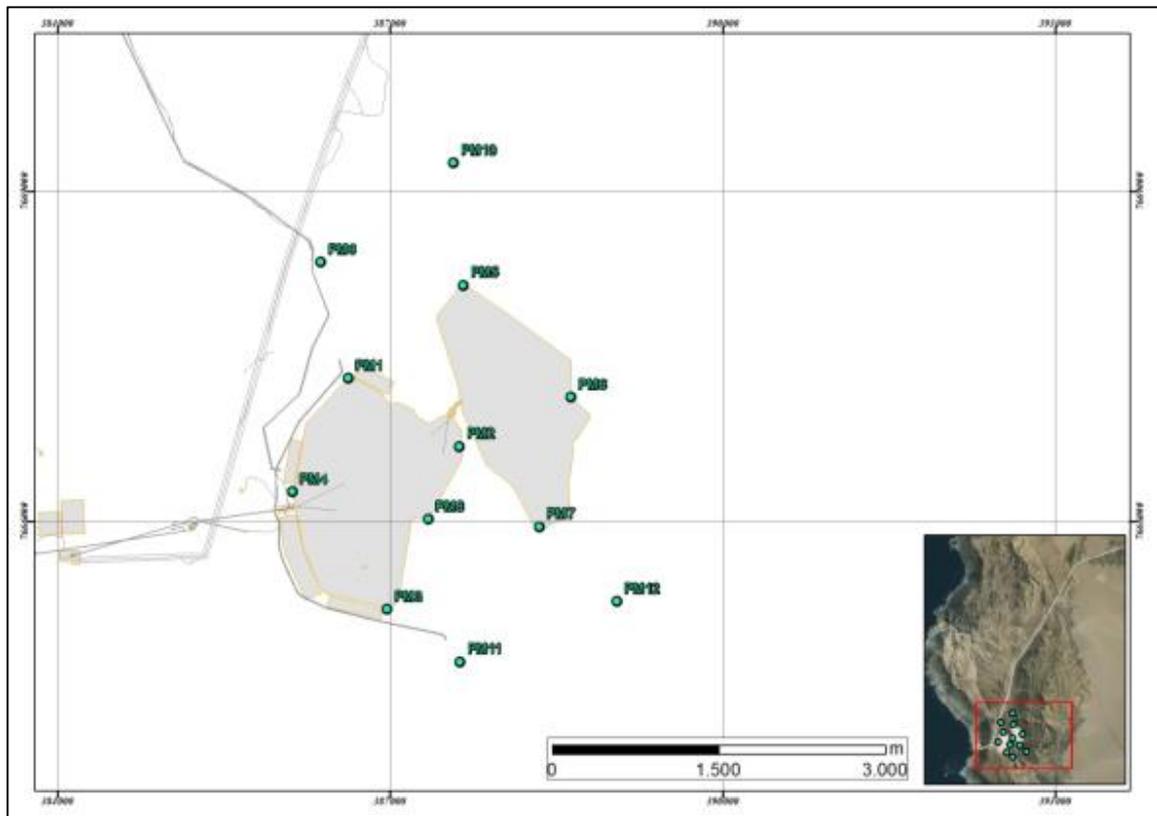
**Table 10-2. Monitoring for wildlife. Phase of operation.**

Content monitoring Plan	Description
Project phase	Phase of operation
Object of measurement and control	Wildlife: birds, reptiles and mammals.
Environmental impact	Possible involvement of wildlife due to the existence of the reservoir
Associated measure	It does not apply

Content monitoring Plan	Description																																																						
Location of control points	<p>Twelve points will be established for monitoring (PM))エラー! 参照元が見つかりません。 , Figure 10-2) in which all groups of vertebrates will be characterized. Include nearby points in a desert environment, to be used as control and comparisons of the parameters to be measured (KMZ points of monitoring wildlife, attached).</p> <p style="text-align: center;">Points of monitoring of fauna</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Estación</th> <th colspan="2">Coordenadas WGS 84 19 S</th> <th rowspan="2">Ambiente</th> </tr> <tr> <th>Este</th> <th>Norte</th> </tr> </thead> <tbody> <tr><td>PM1</td><td>386627</td><td>7667304</td><td>Cuerpo de Agua</td></tr> <tr><td>PM2</td><td>387628</td><td>7666685</td><td>Cuerpo de Agua</td></tr> <tr><td>PM3</td><td>386974</td><td>7665209</td><td>Cuerpo de Agua</td></tr> <tr><td>PM4</td><td>386122</td><td>7666274</td><td>Cuerpo de Agua</td></tr> <tr><td>PM5</td><td>387664</td><td>7668149</td><td>Cuerpo de Agua</td></tr> <tr><td>PM6</td><td>388632</td><td>7667133</td><td>Cuerpo de Agua</td></tr> <tr><td>PM7</td><td>388351</td><td>7665956</td><td>Cuerpo de Agua</td></tr> <tr><td>PM8</td><td>387347</td><td>7666025</td><td>Cuerpo de Agua</td></tr> <tr><td>PM9</td><td>386376</td><td>7668360</td><td>Desierto</td></tr> <tr><td>PM10</td><td>387571</td><td>7669259</td><td>Desierto</td></tr> <tr><td>PM11</td><td>387630</td><td>7664731</td><td>Desierto</td></tr> <tr><td>PM12</td><td>389048</td><td>7665278</td><td>Desierto</td></tr> </tbody> </table>	Estación	Coordenadas WGS 84 19 S		Ambiente	Este	Norte	PM1	386627	7667304	Cuerpo de Agua	PM2	387628	7666685	Cuerpo de Agua	PM3	386974	7665209	Cuerpo de Agua	PM4	386122	7666274	Cuerpo de Agua	PM5	387664	7668149	Cuerpo de Agua	PM6	388632	7667133	Cuerpo de Agua	PM7	388351	7665956	Cuerpo de Agua	PM8	387347	7666025	Cuerpo de Agua	PM9	386376	7668360	Desierto	PM10	387571	7669259	Desierto	PM11	387630	7664731	Desierto	PM12	389048	7665278	Desierto
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Parameters for characterization	<p>The parameters to be used will be wealth, abundance, density, indexes of diversity (Shannon-Wiener and dominance). In addition recorded the presence of species in category of conservation to the which will require a description of the territory, whose results must be given in a specific section within the reports, as well as deliver mapping georeferenced thereon to the SHP and KMZ format.</p> <p>The above parameters should be made by environment, body of water (reservoir) (PM1-8) and desert (PM9-12)</p>																																																						
Limits allowed or committed	It does not apply																																																						
Duration and frequency of the plan	Quarterly monitoring for a period of 3 years																																																						
Measurement procedure or method	<p><b>Reptiles:</b> Transects trails of at least 200 metres long, in which is recorded the presence of species of this group. During the realization of the transects be raised stones and other potential shelters, due to the biological characteristics of the species potentially present in the area of monitoring.</p>																																																						

Content monitoring Plan	Description
	<p><b>Birds:</b> Specific stations, where all the copies of the kind observed will be counted. Observations must be supported with a spotting scope (Swarovski Spotting Scope HD-STS 80, or similar). In addition will be the search for nests (<i>i.e. Oceanodroma SP.</i>) in the sectors projected to the reservoir have not been flooded.</p> <p><b>Mammals:</b> Transects trails of at least 200 metres long, in which is recorded the presence of species of this group. Also in the sector of the reservoir trap without bait (5) cameras which should ideally be active must be installed between each field campaign.</p>
Period and frequency of delivery of reports	<p>A report will be delivered whenever is carried out a campaign of monitoring, that is on a quarterly basis, for 3 years. These are to be sent to the Servicio Agrícola y Ganadero in the Region within a maximum period of 30 days after every campaign.</p> <p>Reports should be cumulative, meaning that they should include comparisons with previous campaigns of all characterized parameters.</p>

Figure 10-2. Points of monitoring of fauna.



10.3. The owner shall keep a record of incidents with wildlife within the area of influence of the project, during all stages of this, which must include at least the following information:

- Species involved
- Location geo-referenced (WGS 84, 19S, UTM Zone)
- Description of the incident
- Photographic record
- Measures applied

The information should be consolidated and sent annually to the environmental authority.

Reposed:

The holder receives the request. The information will be charged annually in environmental () tracking system (<http://www.sma.gob.cl>) of the Superintendence of the environment, or system that replaces it.

**10.4. The holder must submit a Plan for monitoring for component wildlife, for 3 years, in order to demonstrate some kind of affectation to the species present in the area of influence due to the implementation of the project, mainly associated to the installation of electric transmission lines.**

**The holder should propose the methodology and periodicity of the campaigns, as well as the preparation of annual reports, which shall be submitted to the environmental authority.**

**Exposed:**

The owner explains that the project does not impacts significant about any component of fauna with the exception of a group of reptiles for which proposed actions.

Despite the foregoing, the owner welcomes request and voluntarily will monitor the stretch of LAT that could eventually colliding birds, according to the answer to the question of this 1.19 Addendum.

The follow-up will be based on the rate of birds that collide with the line, assessing under two situations:

- Estimates of the number of individuals and species that collide with the line, in the section where you will find the anti-collision devices.
- Estimates of the number of birds and species that collide with the line, in a sector control, this is a sector of the line of electric transmission with similar characteristics to those of the project and where the measure was not applied.

En the sectors in which the devices are located bea.n transects fixed-width throughout the site, during 5 working days, from 9:00 to 13:00 and 14:00 to 18:30. The total amount of transects to undertake it will be subject to the discretion of the specialist, and they must be carried out at different times of the day.

In the sectors of control, to undertake transects wide fixed, during 5 working days, from 9:00 to 13:00 and 14:00 to 18:30. The total amount of transects to make it subject to the criterion of the specialist, however it must be comparable with work done in the transects made where applies measurement, being also made at different times of the day.

As part of gathering information in the field, recorded any finds of birds or species that could have been electrocuted. As you request the authority, monitoring will be done by 3 years of semi-annually, and will be delivered to the authority annual reports.

**10.5. Within the environmental monitoring plan holder should determine and estimate the value of the total losses in adult equivalent of at least those species of commercial interest with presence in zooplankton, with the purpose of dimensioning in the form empirical the possible impact of suction generated by the project in the first stages of the hydrobiological resources.**

**Answer:**

The owner explains that according to the models of the discharge and suction of the project analysis, conducted for the EIA (Appendix 4.3 and 4.4) and supplemented in this Addendum (Annex 1-6 study of modeling dynamics of thermal pen and Salina and Annex 1-5 report Suction work of Catchment both in this Addendum), as well as the issues raised in the response to question 7.5 of this Addendum, concerning the loss of Larval species of fisheries resources by suction, and answer to question 1.13 associated with suction speed, No significantly affects Medium dark, therefore, nor a hydrobiological resources, whether these or not of commercial importance.

However, the project has considered a Plan Vigilancia Environmental of the marine environment, complemented in this Addendum in Annex 5-1 and that replaces the one presented in the EIA.

This Plan specifically includes for the phases of construction and operation, the monitoring of the planktonic communities (point 4.4 PVA) the registration and quantification of the settlement of larval, especially of those species of commercial interest, exploited in the AMERB (point 4.5 PVA). In this way, you can count on the empirical information that is, based on experience, behavior of the studied hydrobiological resources, with respect to the operation of the project.

**10.6. The owner must be a monitoring plan which considers the behavior of abundances and capacity of recruitment of the natural banks of benthic resources in the AMERB San Marcos Sector B, in order to demonstrate a possible impoverishment biological area in terms of the resource that are subject to exploitation and management in the indicated area.**

**Answer:**

The owner explains that, according to the models of the discharge and suction of the project analysis, conducted for the EIA (Appendix 4.3 and 4.4) and supplemented in this Addendum (Annex 1-6 study of modeling dynamics of thermal pen and Salina and Annex 1-5 report Suction work of Catchment), as well as the issues raised in the response to question 7.5 of this Addendum There will be no significant impacts on the marine environment, therefore on hydrobiological resources, whether these or not of commercial importance.

However the foregoing, holder hosts the application. The project has considered a plan of surveillance of the marine environment, complemented in this Addendum in Annex 5-1, which specifically includes the phases of construction and operation, the monitoring of communities planktonic (point 4.4 the PVA) and the records and quantification of the larval settlement, especially species of commercial interest, exploited in the AMERB (point 4.5 the PVA).

**10.7. Holder noted in point 9(3) "Environmental monitoring measures", presenting a "voluntary tracking plan" on the marine environment. In this regard, is evident that this is not voluntary, but it is compulsory, considering its purpose, situation which should rectify the above assertion.**

The above is based, since it mentioned expressly in the founding regulation associated with the sectoral environmental permit no. 115: D.S. (M.) No. 1/1992 regulation for the Control of aquatic pollution, title IV "of land-based sources of pollution", Item No. 140, concerning the authorisation of discharges in waters subject to the jurisdiction of the maritime authority and articles 141 to 143, which reported that before the installation of tasks or activities with discharges to the above jurisdiction, must be carry out a study of environmental impact, with its PeelNTE "periodic monitoring of" self-monitoring and control".

**Reposed:**

The owner takes note of the observation and corrected as requested. Presents the updated marine environment monitoring plan in the Annex 5-1 marine environment environmental monitoring Plan.

**10.8. In the table 9.11 9.12, 9.13., notes that the results of surveys of the water column, will be compared with the parameters relevant to table 5 of the Supreme Decree 90/2000. The holder must inform founded the is comparison, by virtue that the table indicates the maximum concentration of the various analytes before downloading. Also consider that even the source has not been classified, according to the instructed by the Res. Former (SMA) No. 117/13, modified by Res.Ex (SMA) N° 93/14 that "Teaches and instructs rules of a General nature concerning procedure of characterization, measurement and Control of industrial waste liquid"**

**Answer:**

The holder receives the request and given that even the source has not been classified, It must be subjected to the regulation posed on observation, it will therefore be compared with as determined by the SMA.

The holder receives the precision made by the authority. In this regard, is present which in the table 9.11, 9.12 and 9.13 must understand removed the mention of the Supreme Decree N ° 90/2000 as comparative parameters for the monitoring (respective whenever they do not measure the parameters in the effluent of the emission source, but in other diverse points of the medium (article 2 letter or), law N ° 19,300).

' Therefore, in each of these tables, where it says "Limit allowed or committed" should read only the following: *'It will compare the results with those obtained during the baseline and the stage of construction in the same sampling stations. A range of variation as observed in the marine environment before the operation will be tolerated'.*"

On the other hand, and given that even the source has not been classified, It must be subjected to the regulation posed on observation, it will therefore be compared with as determined by the SMA.

**10.9. Presented in table 9.13 regarding monitoring water quality for verification model of Dispersion (T & OD). Stage of operation, and in terms of the limits allowed or committed, the holder must incorporate and present stations of monitoring in water at the point where the area of coastline protection (ZPL) was determined and in that same projection towards the coast; This, to verify that you downloads of the RIL in table 5, and at a distance of 90 metres, are not affecting this area of protection.**

**Answer:**

The holder makes clear, according to the answer to the question 10.8, the download must be qualified by the SMA, and depending on that, Yes It is qualified as source of liquid industrial waste shall be compared with the parameters determined by this. In which case, and unless the SMA decide otherwise, the requested verification points will be used by the authority in the ICSARA N ° 11 mean in the limit the ZPL and 90 metres towards the coast.

Based on the foregoing, the measure of contingency for the gain control of the temperature of the discharge from the reservoir, described in section 8.6.5, fits in the Chapter 8 of the EIA and attached to this addendum in the annex 7.2.4.

**10.10. The holder must define a plan for monitoring for the polluting noise during the execution of the project. Such history is essential to verify the presence of noise does not generate changes in local species, such as migration or population density, nesting, reproduction or power, among other areas.**

**Exposed:**

The holder receives the request and presented in This Addendum the Annex 7-3 the PLAN monitoring for noise.

**10.11. The owner of the project must present a plan of environmental monitoring for the reservoir that identify and characterize the ecosystem that can be generated. You must also indicate the procedures to avoid or mitigate potential impacts.**

**Answer:**

The holder receives the request and presented in Plan of monitoring for the reservoir in Annex 5-2 Plan of environmental monitoring reservoir.

The owner explains that, according to the models of the quality of water in the reservoir and biological indicators, made to the EIA (annex 4.3) are not identified significant impacts in the reservoir, therefore not proposed environmental measures, notwithstanding which, el project has considered a plan de monitoring of reservoir (point 9.5.2, Chapter 9 of the EIA), which is replaced by the Annex 5-2 Environmental monitoring plan reservoir, This addendum, especially in the biological components.

## **11. FICHA OVERVIEW**

**11.1. Considering the points raised in the present ICSARA, the holder must submit tabs, tables and pictures to facilitate control, up-to-date way.**

**Reposed:**

The bicycler welcomes the request and presents environmental tabs updated the information presented in this Addendum, in Annex 11-1 chips overview updated.

## **12. CVOLUNTARY ENVIRONMENTAL OMPROMISOS**

**12.1. As for the voluntary commitments proposed by the holder, build two tourist lookouts, the first from a point of high visibility in the Cordillera de la Costa, in order to enhance the new landscape generated by the reservoir of seawater and the second located on the Road North, close to caleta Río Seco, is requested to send design proposal to the respective**

**municipality and the Regional Directorate of tourism before proceeding with your installation.**

**Rexposed:**

The holder receives the request and present design proposal to the respective municipality and Regional Directorate of tourism, before proceeding with your installation. It should be noted that these facilities be considered tourist signage, access footprint, stabilization of the land for parking and circulation of people, safety barrier, benches. In addition, the mentioned equipment design, will favor the use of natural materials in the sector, in a way of incorporating it harmoniously to the environment.

**12.2. The same procedure is requested for the tourist and informational signage that will install in each one of the viewpoints and archaeological sites identified by the holder.**

**Rexposed:**

The holder receives the request and present design proposal, including Sentourist and information, aletica the respective municipality and Regional Directorate of tourism, before proceeding with your installation. With respect to the hallazArchaeological GOS, given its characteristics, intends to install signage on the following points:

- Site VE-10 historic cemetery, dating back to the nitrate era.
- Site VE-16 mark tropera
- Site VE-17 mark tropera
- Site VE-22 mark tropera
- Site VE-31 linear feature corresponding to tracks and platforms where was located the ancient lift miner/salinero Caleta Río Seco.
- Site VE-30 ruin of the former Saltworks of Caleta Río Seco

**12.3. The holder shall bind all workers inductions (own and contractors), associated with the protection of the wild flora and fauna, to avoid any kind of involvement to these species.**

**The agenda of the induction must be coordinated with the environmental authority.**

**Rexposed:**

The holder receives the request and perform inductions of protection of flora and fauna all workers. The objective will be to educate workers in the care of the environment, by applying it to the construction of the project. It is proposed the following agenda preliminary:

- Presentation of the identification of species of flora and fauna, according to information raised in baseline of flora and fauna of the project.
- Presentation of the species of flora and fauna protected, identified in the sector of the project.
- Induction with respect to the measures in the EIA for the fauna component and its impact in the construction work.
- Assessment with respect to the content covered in the induction.

These inductions can be taught by a professional in person or via video.

**12.4. With respect to the commitment of "deliver up to 50 m<sup>3</sup>/day of water desalinated in Caleta San Marcos, in the vicinity of the pool of accumulation of the system of Rural drinking water in the town (in current processing)." The costs of production, distribution and disinfection will be charge and responsibility for the community."and considering that such materials are not environmental, it is worth making this hand during the operation stage, the project must have a system of drinking water approved and authorized by the respective health SEREMI. It is the responsibility of the holder of the project, that this system maintains at all times adequate sanitary quality of drinking water, continuity of service, operation and establish a program of compliance of such quality, considerations applicable to this commitment of the owner, not being this instance of obligation, in this case, rural drinking water Committee.**

**Exposed:**

The holder receives the observation. The project will have drinking water for its approved and authorized by the respective Seremi of health facilities and will be independent of the system of Rural drinking water in Caleta San Marcos.

In this regard, andholder I clarifies that commitment to delivery of water desalinated in the Caleta San Marcos, as well described in the observation, is a matter of no environmental character, every time that (i) is not required by the legislation in force; (ii) is not run by a non-significant impact, nor much less (iii) is intended to verify that it does not generate a significant impact during the project.

In this sense, the voluntary commitment made by the holder meets the intention of supporting the Caleta San Marcos in order to allow the growth of its service area, add value to productive work and, ultimately, improve the quality of life of the community. For this reason, the commitment reaches only desalinated water from the desalination plant of the project delivery. Considering that to date the APR project is not defined, therefore, the location of the pond of buildup planned by the San Marcos APR system is not conocido, is It has been proposed deliver water desalinated at a point close to the desalination plant, in order to not interfere with the future project.

Given that will correspond to the future Committee or APR of San Marcos cooperative administration of the respective system of APR - under the supervision of the Directorate of hydraulic works in his capacity as administrator of the national program of Rural Potable water - the Committee It will be responsible for maintaining proper sanitary quality of water, the continuity of the service, its operation and, ultimately, get permissions that are applicable to the health authority.

### **13. PCITIZEN PARTICIPATION**

**13.1. As expressed by local communities in the area of influence of the project both during outreach activities in the formal activities of CAP, is designated as follows:**

- **Discontent by tenants of the San Marcos Creek, due to concern over marine resources, impacting on resources and economic activities there is local and their dynamics associated with pollution to the waters, the suction of the larvae of its resources, climatic events of the boy and the girl, the effects on their economic resources, associated floating population to the labour force contracted, the noise associated with the explosives and close to the community, the hiring of local professionals, and information collected from first source was insufficient.**

**Answer:**

The owner clarifies that, with regard to the concern of the community of San Marcos on the effect of the project on the marine environment, according to information raised on the baseline of human environment (Chapter 2 of the EIS), the main concern is related with the water quality that will be returned to the sea, an eventual increase of the temperature of the water, that they related to the event of the child.

In this sense, it becomes clear that there will be no significant impacts on the benthic and pelagic marine resources in Caleta San Marcos, according to the models of the discharge and analysis of suction of the project, carried out for the EIA (Appendix 4.3 and 4.4) and supplemented in this addendum (annex 1-6 study of Dynamics modeling of thermal pen and Salina and annex 1-5 report suction work catchment), as well as the issues raised in the replies to questions 7.5 and 7.8-8 of this addendum. According to the modeling of the discharge from the reservoir that is the activity of the phase of operation mestra a differential of temperature with respect to the sea, the bottom and surface temperatures fall between the point of discharge and the boundary South of the AMERB B approximately to 155 m from the work. This can be seen in table 14 of the annex 1-6 of the present addendum. In this table, the radius of the greater thermal differential of discharge turned out to be in autumn, reaching + 0, 7 ° C in the vicinity of the boundary of B AMERB, winter yielded less

excess temperature reaching the limit of the AMERB with a differential of + 0,3 ° C with regard to the marine environment.

Despite this, the project has considered a monitoring plan of the marine environment, complemented in this addendum in annex 5-1, which includes the construction and operation phases the planktonic (point 3.1.4 of the PVA) and registry monitoring communities and quantification of the settlement of larval, especially of those species of commercial interest, exploited in the AMERB (point 3.1.5 of the PVA). Supplementary shaped was proposed in the EIA - and complemented in this addendum (see annex 5-2)- an environmental monitoring Plan on the reservoir in order to know the quality of the water, confirm the results delivered by the modeling and prevent changes in their quality.

With respect to the concern that has manifested the community by economic activities related to the marine environment, is present according to the assessment in the EIA is considered not significant impact as a result of the construction phases and operation of the project.

Furthermore, with regard to the arrival of floating population, it is worth mentioning that the labour force contracted by the project will remain staying at camp, installed approximately 7 km north of Caleta San Marcos, i.e. away from the community to avoid any involvement by the increase of floating population. There you will receive accommodation and food services, as well as basic health care and will have recreational areas. During construction, the maximum labor will be around 750 people, of which 250 approx. will be on-site simultaneously, 250 in camp and 250 on days off, these last ones will be carried to Iquique, avoiding their circulation in the nearby coves (point 1.5.8, chap. 1 of the EIS). This camp will be dismantled at the end of the construction phase. During the operation, staffing will be much lower, are considered 30 people in 3 shifts and, eventually, for preventive maintenance can have a maximum of 50 employees (point 1.6.9, chap. 1 of the EIA)

On the subject of material particulate and noise, the contributions were presented in the EIA, annex 1.5 and 4.2 respectively, which were determined as not significant impacts according to the impact assessment. Particularly for noise by blasting, arose in annex 4.2 of the EIA analysis of the effect of the noise associated with the blasting information supplemented in response to the question of this addendum to 7.19. Based on the above, it was concluded that the values obtained for the project will be under the maximum levels permitted by the applicable legislation, therefore there are no associated significant impacts. In any case, the company will have a system of coordination with the community and authorities for the implementation of blasting on surface, for which it will favor a daytime and avoid making them during the festivities raised on the baseline of human milieu of the EIA for the San Marcos Creek.

Regarding the statement about an insufficient gathering baseline information, the EIA in its chapter 3 and annexes gave background enough according to the requirements and existing methodologies

which were supplemented in this addendum, in a way founded to analyze the impacts of the project and take appropriate actions.

However, the holder carries out a permanent relationship with the community of San Marcos through their social organizations, as well as through the office which the company opened in the Cove, which has allowed to keep in time a dialogue live, know the concerns and interests of the parties to be able to agree on how to work and find joint opportunities. In this way, as explained in chapter 15 of the EIA, the community chose two advisors you trust to technically support them in everything related to marine before the entry of EIA of the project to the evaluation system of environmental impact until after the RCA broadcast.

For more detail, in the PAC annex of the present addendum, it responds to all observations citizens made during the process of participation of the project.

Finally, is evident that from the entry of the EIA to date has been achieved in the fulfilment of the commitments made in the plans of work concluded with organizations of Caleta San Marcos (reported in chapter 14 "Negotiations with interested parties" the EIA). Thus, such proposals through the signing of two accords have been consolidated from Associativity: one with the Union of fishermen of San Marcos (date of March 10, 2015) and one with the Board of neighbors of San Marcos (date February 28, 2015).

Both agreements are inspired by that company not only aspires to make your project compatible with the activities that are currently performed at the Cove, but it also seeks to be a contribution and to collaborate in the improvement in the quality of life of the inhabitants of this. This is how under these agreements, the project has pledged voluntarily to make before concerned organizations available various economic contributions to finance productive, social projects and the realization of infrastructure for the service of the community.

- **In the case of Río Seco, there are doubts about activities associated in the construction phase, with the intervention of marine benthic and pelagic resources, impacting on resources and local economic activities and their associated dynamics, step truck at high speed or high tonnage material particulate issued by the passage of trucks and construction, disintegration and division of the town by the use of the road or building a new one, intervention in the cemetery of Rio Seco, requested labor, work with community tables to enhance the tourism or in the area and the economic activity of the sector. Concern about the reservoir and the coves, earthquake, earthquake or tsunami.**

**Rexposed:**

The owner explains that the case of Caleta Río Seco differs from the Caleta San Marcos since the works and activities that considers the project are different in both sectors, both in nature and in its magnitude and duration.

Indeed, the most relevant work of the project, which will take place in the sector of Río Seco corresponds to a section of the access road north, whose construction will last less than 12 months. These effects, in addition, will be with an installation of works and a collection. Then this path will be used during the construction phase for the movement of personnel and transportation of machinery, materials, supplies, and waste from operations in sectors plateau and pampa. In the phase of operation flows will fall significantly and the road will be used for the related circulation with monitoring works and environmental, as well as for maintenance activities. The speed of movement of vehicles and their characteristics shall be regulated in accordance with the design capacity of the road.

On this subject, cAbe mentioning that the titular is developing a process under the direction of Regional roads for the signing of an agreement aimed at the modification of the route A-752 (see Annex 1-8 of the addendum, Ordinary office N ° 173/2015 Dirección de Vialidad). In this way, all amendments incorporated in this route by the project will be approved previously by the sectoral authority.

On the other hand, and unlike Caleta San Marcos, which is located 14 km south of Caleta Río Seco, in the latter caleta no works or project activities that have direct or indirect relationship with the marine environment. The results of the modeling of the pen of dispersion of the discharge of the project (see annex 4.3 of the EIA and) Annex 1-6 study of modeling dynamics of thermal pen and Salina of the addendum) and impact assessment indicate that There will be no involvement of marin resourcesYou benthic and pelagic in Rior dry. This, because they indicate that the effects are contained in the Bay area Chomache. In consideration of the above, the impact assessment allows to conclude with certainty that not There will be significant impacts on the marine environment arising from the project in the sector of the Caleta Río Seco.

Likewise, in the EIA (Annexes 1.5 and 4.2, respectively) the contributions of material are presented particulate and noise for points with receivers in the area of the section of the North access road near Caleta Río Secowhich were determined as not significant impacts according to the impact assessment.

For its part, the cemetery of Río Seco was identified in Chapter 3 of the EIA Base line. According to this the works and activities of the project will be out of the cemetery and the holder undertakes to ensure respect and maintain its integrity.

On the other hand, lof labour hired by the project will remain in the campdistant of communities existing in the sector of the works of the project. This will be installed approximately 7 km south of

Caleta Río Seco, that is, away from the community to avoid any involvement by the increase of floating population. It is noteworthy that, during construction, maximum manpower will be around 750 people, of which 250 approx. will be on-site simultaneously, 250 in camp and 250 days of rest, which will be carried to Iquique, avoiding their circulation in the nearby coves (point 1.5.8, chap. 1 of the EIS). This camp will be dismantled at the end of the construction phase. During the operational phase, the endowment will be much lower, are considered 30 people in 3 shifts, and eventually, for preventive maintenance can have a maximum of 50 employees point 1.6.9, chap. 1 of the EIA)

Also, in Chapter 8 of the EIA (subparagraphs 8.6.1.1 and 8.6.1.2, respectively) the risk addressed by earthquake and flooding by tsunami. Annex 8.1 of the EIA was presented the evaluation of the seismic risk, seismic consultants specialists report coefficients and spectrum Saragoni and Sarrazin and in annex 8.2 ("study risk of flooding") were given the results of the specific report carried out by the Universidad de Concepción. All results were seen in the parameters of the engineering for the construction and operation of the project so that there is no risk by these natural events.

Finally, present to the PAC annex of the present addendum is made, it responds to all comments submitted by the community in the process of participation of the project.