ADDENDUM COMPLEMENTARY

EIA Espejo de Tarapacá

Region of Tarapacá Chile

July 2015

Prepared by:

Environmental management consultants S.A.
Father Mariano 103 Of. 307
7500499, providencia, Chile
Phone: + 56 2 719 5600
Fax: + 56 2 235 1100
www.gac.cl

INDEX

INDEX OF TABLES

INDEX OF FIGURES

INTRODUCTIONON

This document corresponds to the complementary project addendum "**Espejo de Tarapacá**" entered on August 11, 2014 before the service through a study of environmental impact assessment Environmental assessment of the region of Tarapacá.

The content has been prepared to respond to the observations generated by virtue of the addendum of project, date March 12, 2015, presented in the report consolidates request for clarifications, corrections or extensions add-on No. 98 dated May 22, 2015 issued by the Regional Director of the service's environmental assessment, Secretary of the Committee of environmental assessment in the Region of Tarapacá.

1. DESCRIPTION OF PROJECT

1.1. The holder shall submit the information geo-referenced with respect to point of suction and discharge, and environmental sampling stations, including those relating to plans of environmental monitoring of marine environment and those related to the reservoir, in sexagesimal coordinates (degrees, minutes, seconds).

Answer:

The owner clarifies that it has delivered the reference coordinate the works of the project, as well as line basis and the environmental monitoring of the marine environment in the EIA Plan in Datum WGS 84 as indicate the c.3 letter and the last paragraph of the article 18 of the regulation of the system of environmental impact assessment existing effects give the location of the project and cartography.

With respect to the baseline of the marine environment, the coordinates were presented in annex 3.2 from the EIA and in the annexes 3 - 1.1 of the addendum earlier, posted on March 12, 2015. Both cartographic figures were presented, in CAD, KMZ and SHP, formats as points and sampling stations employees, with coordinates in Datum WGS 84 H19S.

As for the Plan of PVA environmental monitoring of the marine environment, the location of points for its implementation was delivered in such addendum annex 5-1 previous.

The twelve areas reference coordinate are delivered in the present addendum complementary of identified PVA in reservoir monitoring and adds a point of water quality monitoring in the sector of the entrance to the upper tunnel.

To comply with the requirement of the authority and sin limiting the foregoing, are delivered then the same data in geographic coordinates of sexagesimal (degrees, minutes, seconds).[1]

[1] Estas coordenadas fueron obtenidas a partir de la conversión de los archivos a kmz y luego visualizados en Google Earth.

1. Adduction and unloading of sea water.

The Table 1-1 indicates the sexagesimal coordinates for adduction and unloading of sea water. It should be recalled that, as noted in Chapter 1 of the EIA, this point corresponds to the reference's mouth at the sea bottom tunnel which will take approximately 5 m in diameter and is surrounded by a corresponding to a cage work, as reference are delivered four) (4) vertices of the polygon that contains the cage.

Table 1-1: The u coordinates ocation of the adduction and unloading of sea water project.

Works	Latitude (S)	Length (W)
Adduction and discharge	21 ° 06' 22,30	70 ° 07' 31,50
Vertex Nor-West ofl site of cage	21 ° 06'21, 71 "	70 ° 07'32, 23 "
Vertex Nor-It'sl site of cage	21 ° 06'21, 72 "	70 ° 07'30, 84 "
South-East corner ofl site cage	21 ° 06'22, 96 "	70 ° 07'30, 85 "
South-West corner ofl site of cage	21 ° 06'22, 95 '	70 ° 07'32, 24 "

2. Coordinates environmental monitoring Plan monitoring marine environment.

The following tables indicate the sexagesimal coordinates for points and stations of monitoring associated with the environmental monitoring Plan associated with the marine environment.

Table 1-2: Coordinates of eresorts of monitoring, valid for the structure of the column of water, subtidal sediment and water quality.

Works	Latitude	Length
ASP1	21 ° 3'33,97 S	73 ° 48'18,02-"o"
ASP2	21 ° 2'44,96 "S"	73 ° 48'16,41 "o"
ASP3	21 ° 2'35,86 "S"	73 ° 48'16,15 "o"
ASP4	21 ° 2'31,32 "S"	73 ° 48'15,97 "o"
ASP5	21 ° 2'27,85 S	73 ° 48'15,86 "o"
ASP6	21 ° 2'14,04 "S"	73 ° 48'15,42 "o"
ASP7	21 ° 1'52,49 "S"	73 ° 48'14,76 "o"
ASP8	21 ° 1'23,44 S	73 ° 48'13,83 "o"
ASP9	21 ° 0'36,25 "S"	73 ° 48'12,35 "o"
ASP10	21 ° 4'27,71 S	73 ° 48'19,75 "o"

Table 1-3: Coordinates of ewalking from the Submareal of hard-bottom sampling.

Station	Latitude	Length
ES-1	21 ° 6'32, 60"	70 ° 7'33, 18 "
ES-2	21 ° 6'29, 70 "	70 ° 7'33, 62 "
ES-3	21 ° 6'24, 56 "	70 ° 7'28, 99 "
ES-4	21 ° 6'19, 35 "	70 ° 7'35, 52 "
EN-5	21 ° 6'14, 12 "	70 ° 7'33, 55 "
ES-6	21 ° 6'11, 18 "	70 ° 7'34, 09 '
ES-7	21 ° 6'7, 21 " '	70 ° 7'36, 62 "
ES-CN	21 ° 4'31, 9 "'	70 ° 8'37, 24 "
ES-CN	21 ° 7'9, 74 "	70 ° 7'57, 75 "

Table 1-4: Coordinates of stations of monitoring of the intertidal of funds hard.

Stations	Latitude	Length
ID-1	21 ° 6'25, 81 "'	70 ° 7'17, 35 "
ID-2	21 ° 6'22, 55 " '	70 ° 7'18, 68 "
ID-3	21 ° 6'18, 32 "'	70 ° 7'18, 65 "
ID-4	21 ° 6'7, 07 "'	70 ° 7'22, 83 "
ID-5	21 ° 5'39, 89 "'	70 ° 7'26, 78 "
ID-6	21 ° 5'20, 87 "'	70 ° 7'30, 35 "
ID-CN	21 ° 4'30, 23 "'	70 ° 8'18, 90 "
ID-CS	21 ° 8'9, 41 "'	70 ° 7'34, 67 "

Table 1-5: Coordinates of points of sampling of the communities planktonic.

Stations	Latitude	Length
Site with direct influence		
1	21 ° 6'22, 40 "'	70 ° 7'31, 02 "
2	21 ° 6'33, 90 "'	70 ° 7'42, 75 "
3	21 ° 6'11, 13 "'	70 ° 7'43, 45 "
4	21 ° 6'23, 96 "'	70 ° 7'55, 64 "
5	21 ° 5'37, 74 "'	70 ° 8'21, 11 "
6	21 ° 5'49, 53 "'	70 ° 8'33, 15 "
Site control or influence		
7	21 ° 8'16, 91 "'	70 ° 7'56, 95 '
8	21 ° 8'30, 66 " '	70 ° 7'48, 11 "
9	21 ° 8'25, 23 "'	70 ° 8'11, 85 "
10	21 ° 8'39, 15 "'	70 ° 8'3, 00 "
11	21 ° 8'50, 29 "'	70 ° 8'56, 48 "
12	21 ° 9'4, 18 "'	70 ° 8'47, 58 "

3. Coordinates environmental monitoring Plan monitoring reservoir.

The Table 1-6 is they indicate the sexagesimal coordinates for the sites and stations of monitoring associated with the environmental monitoring Plan associated with the reservoir.

Table 1-6: Coordinates points of monitoreo of the Environmental monitoring plan in the Reservoir.

Reservoir	Latitude	Length
TO	21 °5'41,11''	70 ° 5'29, 96''
B	21 ° 5'59,70''	70 ° 5'3478''
C	21 ° 5'5054''	70 ° 5'16,40''

Reservoir	Latitude	Length
D	21 ° 6'17,20''	70 ° 5'34,61''
E	21 ° 6'7, 57 ''	70 ° 5'13, 19 ''
F	21 ° 6'28,90''	70 ° 5'21,32''
G	21 ° 5'1324''	70 ° 4'52,34 ''
H	21 ° 5'23,47''	70 ° 4'43,49''
I	21 °5'37,99''	70 ° 4'43,80''
J	21 ° 5'39, 19 ''	70 ° 4'24, 93 '
K	21 °5'51,37 ''	70 ° 4'30,39''
L	21 ° 6'6,85''	70 ° 4'29,05''
Tunnel top	21 ° 6'8, 29 ''	70 ° 5'46, 45 ''

However, to be considered for this project coordinates the delivered in the format required by the CUMPLIMIENTO, reason by which will be which are used in all its activities and reports of the same.

1.2. The holder must describe the management that will give the sterile material product of the advance from the various underground works will result.

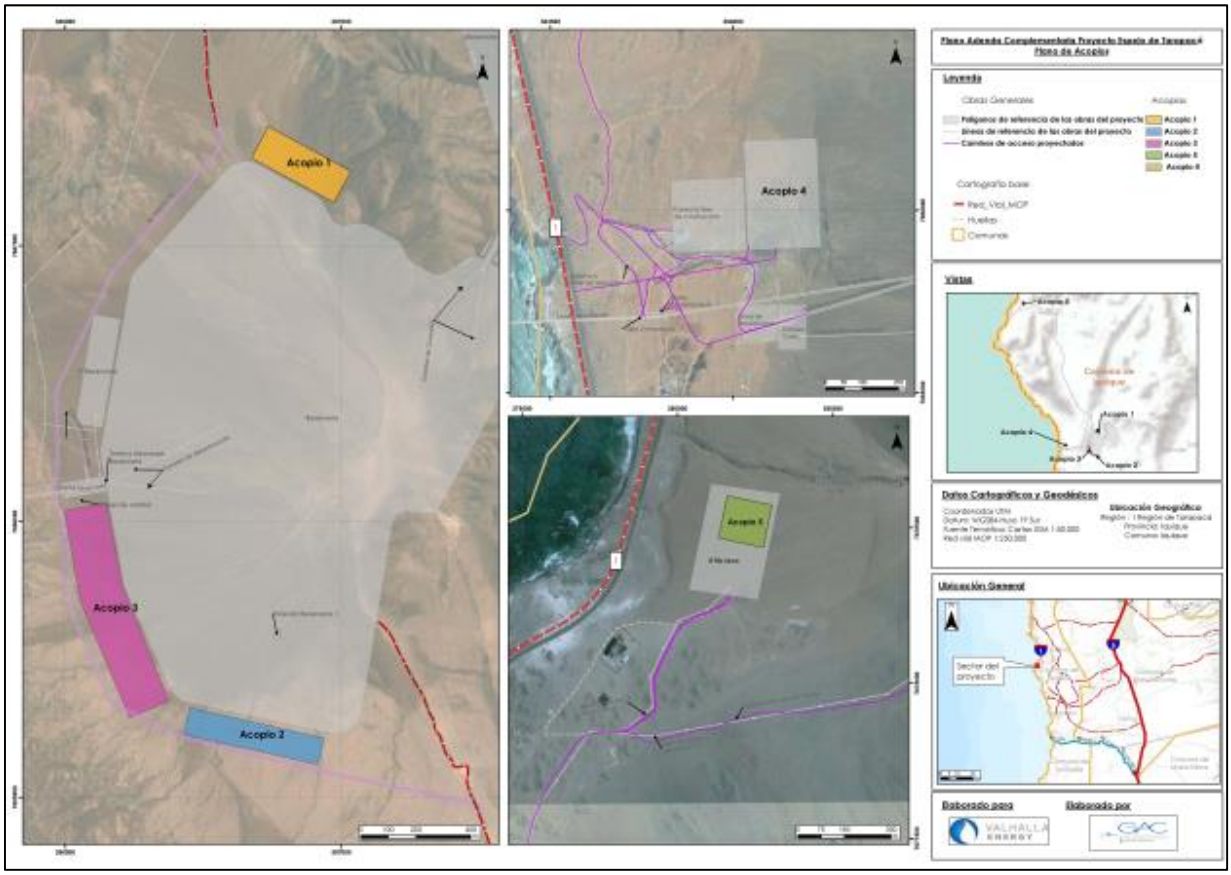
Answer:

The owner explains that as outlined in the EIA, Chapter 1 project description, numeral 1.5.3.8 the storage of excavation material sector will receive the material transported in trucks hopper that move ita.n from excavation to stockpiles points. Stocks will be regularly wetted. He is considered to build them in terraces 5 m high, with berm of 10 m and a slope of 1:1. Memory stability is presented in annex 1.4. of the EIA.

To complement this, in the Figure 1-1, there are 5 stocks destined for the project, which attached in amplified form in the Annex 1.2 Available sectors of collection for the project.

CABE Remember that material from the excavation of tunnels and other field work (sector plateau, to the extent that its quality is right, will be used for the construction of the parapets of the reservoir, as mentioned in Chapter 1, point 1.4.4.1 reservoir, letter ii), and the point 1.1.1.7 Areas of the collection, of the EIA.

Figure 1-1: Disposal of stockpiles in the draft general scheme.



Source: elaboration GAC.

1.3. The holder should clarify if the records referred to in point 3 of the annex 1-9 of the addendum N ° 1, refer to new studies conducted in the area. If so, the following must be attached:

- **Report, geological - geotechnical,**
- **Plant geotechnical,**
- **Geologico-geotecnico profile**

Answer:

The holder receives the request and attached in Annex 1.3 Reports and plans Geologicals and Geotechnicals, the following documents:

- "Geotechnical geological report",)VALH-0001-000-OOSS-INF-002)
- Plane "Geologica-geotecnica plant", (VALH-0001-000-OOSS-PL-001)
- Plane "Geologico-geotecnico profile",)VALH-0001-000-OOSS-PL-002)
- Plane ""Seabed geological plant", ()"VAHL-0001-000-OOSS-PL-006)
- Plane ""Interpretation of structural guidelines", ()"VAHL-0001-000-OOSS-PL-007)

1.4. The owner shall provide data specific to the terrain where appropriate scale, the project will be located that allow to have a preliminary characterization of the quality of the rock, in order to correctly apply the design criteria described in annex 1-9 of the addendum, since in said Annex just referred to the criteria descriptively.

Answer:

The holder receives the request and reportedly found the required data in reports attachments in Annex 1.3 reports and plans Geologicals and Geotechnicals This supplemental addendumthe which apply to:

- "Geotechnical geological report",)VALH-0001-000-OOSS-INF-002), points 4 and 5.
- Plane "Geologica-geotecnica plant", (VALH-0001-000-OOSS-PL-001)
- Plane "Geologico-geotecnico profile",)VALH-0001-000-OOSS-PL-002)
- Plane ""Seabed geological plant", ()"VAHL-0001-000-OOSS-PL-006)
- Plane ""Interpretation of structural guidelines", ()"VAHL-0001-000-OOSS-PL-007)

It should be recalled that building method considers the assessment of rock that actually is in each section of the tunnel, in order to apply the appropriate structural solution for applications that will have.

Drawings are to scale 1:10 000.

1.5. In relation to the proposed desalination plant by the holder, shall deliver all the background allowing to solve the following observations:

1.5.1. Is designated remineralizada to deliver desalinated water flow must be 100mt3day.

1.5.2. Clarify whether the water desalinated and remineralizada will be delivered by pipeline or other delivery (transfer). If the latter, you must submit for

evaluation, indicating how this system will give compliance to current regulations.

1.5.3. In the same direction of the previous observation, if that form of delivery of treated water through piping system, you must submit all the background allowing to evaluate the system, including layout and construction of the same.

1.5.4. It should be noted the holder that the costs associated with the production of drinking water, are part of the commitment made by the holder.

Answer:

The holder to then clarifies the background designated and reiterates the relevant information, under which, has been presented in this assessment process all own elementss the description of a voluntary commitment as provided for in the regulation of the SEIA (art. 18 letter m).

1.5.1. Is designated remineralizada to deliver desalinated water flow must be 100 m3day.

In accordance with Chapter 1 of the EIA and to the designated in the Previous addendum, the desalination plant is a work essential for operation of the project, and whose objective primary is providing water to the same. In addition to this, the desalination plant It will be used for deliver water desalinated community of San Marcos, of According to the commitment made with it in the agreements of Associativity. Such agreements are present in the previous addendum (Apeindex no. 1) and is reiterate in This addendum in your Annex 1.5 (Agreements of Associativity).

In accordance to this and According to It committed by the holder with the neighborhood Council and the Chairman of the Committee of Rural drinking water, San Marcos and the Union of fishermen, divers, fishermen and helpers of Caleta San Marcos, the commitment consists in provide desalinated water by a volume total of 65 m3/day.

The above on the basis of the following considerations:

- **The amount of committed desalinated water is adjusted to the needs of the community, and which were expressed in the agreements of Associativity that indicates**.

  As well, con the goal of building a relationship early, transparent, and inclusive with the community surrounding the area of the Project, the owner has entered into two agreements of Associativity with the community of Caleta San Marcos, What Search be a contribution effective the improvement in the quality of life of its inhabitants. In these agreements are they established conditions of collaboration, including the delivery of desalinated water, which are detailed below:

a.- Agreement of Associativity between Espection of Tarapacá SPA and V Boardecinos of la Caleta San Marcos.

This agreement was signed on February 28, 2015 by the holder, the directive of the neighborhood Council and the Chairman of the Committee of Rural drinking water, San Marcos. Under this agreement, the Company undertakes to supply the Committee of Rural drinking water in Caleta up to 50 m3/day (fifty cubic metres per day) of desalinated water, which will be delivered on the key output of the pond of the Pproject, located at one side of the desalination plant. This point will be installed, on behalf of the company, a water meter, verifying in using the latter the compliance commitment. In the framework of this agreement, the Committee of Rural drinking water in Caleta San Marcos, acquires the following commitments:

- The desalinated water purification.
- The construction and management of the pond of water accumulation in San Marcos.
- The distribution of water in homes.
- The payment to the company by the water consumed.
- Any other management relative to the administration of the different desalinated water to ensure the availability of the quantity agreed upon at the point of production.

b.- Agreement of Associativity Espejo de Tarapacá SPA and the Union of fishermen, divers, fishermen and helpers of Caleta San Marcos

This agreement was signed in Iquique on 10 March 2015 by the holder and the directors of the Trade Union mentioned above.

In this agreement the company has been voluntarily committed to disposition of this organization up to 15 m3/day of desalinated water coming from the desalination plant's project, which will be delivered on the key output of the pond of the project, located at one side of the desalination plant. This point will be installed, on behalf of the company, a water meterverifying implementation of the commitment in accordance with the same. The agreement specifies that it will be the responsibility of the Union mention the administration of desalinated water.

Should be noted that, in both cases, the volumes to deliver desalinated water were agreed with the signatories of the agreement, in order to meet the demand the population of la Caleta raised needs both by the Board of neighbors of Caleta San Marcos as by the Union of fishermen of Caleta San Marcos.

By virtue of the foregoing, prompted the authority to take into consideration the agreements concluded with the community in the terms expressed there and in total they involve the commitment of delivery of desalinated water up to 65 m3/day justified based on the needs of the community agreed with her and.

1.5.2. TO evaluative if water desalinated and remineralizada will be delivered by pipeline or other delivery (transfer). If the latter, you must submit for evaluation, indicating how this system will give compliance to current regulations.

The owner explains that, the as shown in the numeral previous of This response, in the Agreements of Associativity (concluded with the Junta de Vecinos of San Marcos, the Rural drinking water and the Trade Union Committee of) Fishermen and Independent workers of the Caleta de San Marcos), commitment assumed by the Holder corresponds to the delivery of desalinated water in the key output from the pond of the Pproject, located at one side of the desalination plant. In this regard, is made present that, in the previous addendum, the information was delivered to the works associated with this objective. In this way, and According to the above, It means presented in this process of environmental impact assessment information corresponding to the project Espejo de Tarapacá, which is related to the autonomous project of Rural drinking water in Caleta San Marcos.

Because of the above, and conforme realize the same Agreements of Associativity (attached in annex 1.5 of the present addendum), the commitment to building facilities for the transfer of water from the exit key and its purification -where appropriate - is to the aforementioned organizations. This, therefore, is not the responsibility of the owner and not part of this project.

In any casemust be present to Caleta San Marcos has a Committee of Rural drinking water with the corresponding legal powers to carry out activities that deliver drinking water to the community. Also, It is noteworthy What, in the present process of evaluation, the Directorate of hydraulic works of the Tarapacá Region, it was reported the *layout* General of a project of Rural drinking water (APR) for the Cove, through Ex officio ORD. D.O.H.T. N ° 101 of the 06 March 2015.

As a result, all this allows to prove that the necessary facilities for the delivery of the desalinated water, the commitment assumed by the holder, No they will interfere in any way with the project of Rural drinking water in Caleta San Marcos.

1.5.3. In the same direction of the previous observation, if that form of delivery of treated water through piping system, you must submit all the background allowing to evaluate the system, including layout and construction of the same.

The owner explains that, as it was stated in the addendum earlier, delivered on 12 March 2015 and on the agreements described in paragraphs 1 and 2 of this response, desalinated water delivery will be in the key of the pond of the project output that is located next to the desalination plant the fulfilment of the commitment at that point. In this way, and according to the mentioned above, it means presented in this process of environmental impact assessment information corresponding to the project Espejo de Tarapacá, which is related to the autonomous project of Rural drinking water in Caleta San Marcos.

Thus, from the point of delivery, It is the responsibility of the Committee of Rural drinking water Caleta San Marcos the purification and distribution of water for the Caleta.

The owner clarifies which, according to the plans of the project of Rural drinking water, APR, for Caleta San Marcos delivered by the Regional Bureau of waterworks of Tarapacá in OF. ORD. D.O.H.T. N ° 101 of the 06 March 2015, the location of the desalination plant of the evaluation project does not interfere with the facilities of the APR.

1.5.4. It should be noted the holder that the costs associated with the production of drinking water, are part of the commitment made by the holder.

The holder clarifies that the production of drinking water performthe associate, will be that requiere during all the phases project, for its domestic consumption. That is why corresponding to the land and infrastructure costs of investment of the desalination plant will be, Of course, supported by the holder.

However, and such as was agreed in the respective agreements of Associativity held with the Board of neighbors of the Caleta de San Marcos and the Union of independent workers of the Caleta de San Marcos, the water purification desalinate at the disposal of the community, It will be the responsibility of the Committee of the APR or the competent body according to Regulation and not of the owner. Therefore, the costs associated with the purification of the desalinated water delivered by the holder will be in charge of these organizations.

However, mind that is made, in the context of these agreements of Associativity, the owner is committed to making certain monetary contributions – before construction, during the same and during operation of the project - for organisations already referred to, which will be used freely by them, in order to support social projects that can serve to improve the lives of the members of the Caleta San Marcos.

1.6. In relation to annex 1. 2 plant, of the addendum N ° 1, regarding the Plan to control emissions, and without prejudice as provided, namely, moistening of the roads, trucks, installation of mesh windbreaker bodywork, seal installation of mesh Rachel and maintenance of machinery, the owner must present the measures of engineering or design for the case of arid mailbox and the conveyor belt, since they are the areas where emission of material occurs particulate by the shedding of material from the trucks to the mailbox and in the transport of material in belt conveyor and its later emptied into hopper.

Answer:

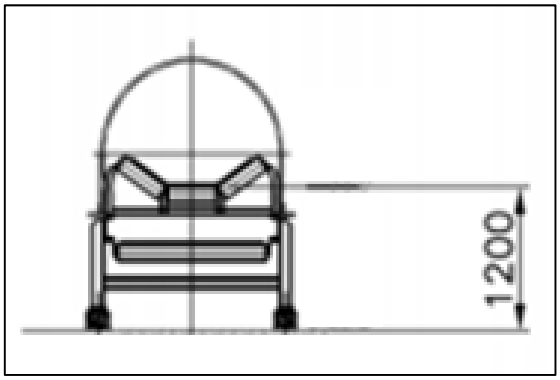
The owner explains that the emissions of the project were presented in the Annex 1-5 Chapter 1 EIA and the considered mobile plants will produce maximum 30 m3/h concrete during the construction phase of the project. These they will be located on-site operations for the construction((, that they have practically the same facilities to meet similar activities that will take place during the construction phase of the project and correspond to those located 1) the sector close to Caleta costa San Marcos and 2) in the plateau area close to the reservoir.

The concrete plants will be dismantled once already are not required for the construction of the project.

In consideration of the foregoing, it is proposed as commitment volunteer, the wetting of aggregates to reduce emissions by shedding material in containers of concrete plants. This moisture will take place through the water generated from the treatment plants of water served referred, whose flow, as described in the chapter 1 description of project, section 1.5.12 Construction phase waste, "will comply with the" quality established in the NCh 1333 of. 1978 and will be used in the humidification of roads and also in sectors of works or stockpiles"; and/or through the industrial water supply through companies that have the corresponding sanitary authorizations.

In regard to the load on the conveyor belt of aggregates for mixing with cement, is proposed as commitment to voluntary use of folding covers or equivalent that seal, to avoid the dispersion of dust to the atmosphere When you perform the. A cross-sectional design type It is shown in the following figure. This will be adapted to the standard measure of thes Plants of concrete and the needs of the project.

Figure 1-2: Cross-sectional diagram of belt conveyor type.



Source: elaboration GAC.

1.7. Considering the information provided with respect to the concrete plants to be implemented for the period of construction of 43 months, and revising the estimate of emissions from the project, the holder must present and incorporate in the analysis, the estimation of emissions for the construction phase of the concrete plants.

Answer:

The holder receives observation and clarifies that annex 1-5 of Chapter 1 of the EIA was presented the estimate of emissions from the project. Total emissions of PM10 information; MP2, 5; CO; NOx; SO2, estimated for the construction phase HC project 4-12 was presented in Chapter 4 of prediction and assessment of environmental impacts of the EIA, the table and concluded that it will comply with the air quality standards.

In addition, and civen the information provided in the addendum earlier, posted on March 12, 2015 to the SEIA Annex 1-2 floor of concrete, described, at the request of the authority incorporated the estimation of emissions for the phase construction of ato PLANTA of concrete as the proposals for this projectThese plants are modular.

Specificallythes plants requiresn construction of a platform to ensure the bracket of the corresponding structures and Assembly of these. The parties of such plants are Inbox of inputs, silo for cement, water supply and mixing system and delivery of concrete. Assembly of the different modules is quick, since all the elements of the installation are previously preloaded. Se designsn in different structural, easily transportable modules using standardized media)platforms, containers, flat racks and other).

You can see the structure of concrete production system at the following figures of reference:

Figure 1-3: Transport, loading and unloading module plant concrete mixer.

Source: Readymix Asland (Lafarge)

Figure 1-4: Transport module floor concrete mixer.

Source: Soueast Constructing Road Machine

Figure 1-5: Modular concrete mixer type plant.

Source: Soueast Constructing Road Machine

Based on described above, the construction product emissions of the platform and the installation of the plant will be marginal.

Then in the Table 1-7 presents the emissions associated with the construction of each placoncrete, to NTA It includes the activities of scarp, excavation, padding: ator and loading and unloading, activities associated with the movement of tierRA necessary for implementation de this. The detail of the estimation of emissions is described in the Annex 1.7 update estimate of emissions, Appendix I Calculation of emissions plant of concrete memory.

Table 1-7: Emissions of the construction of a mobile concrete plant

Activity	MP_{10}	$MP_{2.5}$	CO	NOx	HC
Earth moving	**0.07**	**0.01**	**0.08**	**0.4**	**0.04**

On the other hand, with regard to the emisions associated with the operation concrete plants, These include transfer of material, movement of machinery and the transit of trucks. It should be noted, that las related emissions to the transit of trucks were seen in the estimation of emissions presented in the EIA. The Table 1-8 It presents the emissions of the plant's concrete operations stage.

Table 1-8: Emissions operating concrete batching plants.

Activity	MP_{10}	$MP_{2.5}$	CO	No_X	HC
Transferencia of material and machinery movement	**2.11**	**0.037**	**5.11**	**24.45**	**2.30**

Based on the conducted estimation, it is possible to determine the emissions associated with the operation of the concrete plants, even though they are superior to those generated during the construction of these, are of low magnitude and narrow in time, so it will not have no significant effect on the quality of the air. The detail of the estimation of emissions is described in 1.7 Annex update estimate of emissions, Appendix I memory of calculation of emissions plant of concrete.

1.8. In relation to the implementation of tourist lookouts, and which would be validated by the respective municipality and the Regional Directorate of tourism, prior to installation, the holder must declare in detail the form that has been planned the movement of persons in the area of the reservoir, by specifying maximum daily load, type of movement (free or guided), security measures for visitors, In addition to all the background information allowing this measure to evaluate and verify the educational or tourist use posed by the holder.

Answer:

The owner explains that the project does not consider activities involving the movement of persons unrelated to the project or any type of tourism development in the same area of the reservoir.

Chapter 15 of the EIA "Commitments volunteers", in accordance with 15.2.3 point clarifies tourism in its table 15.5 installation of tourist lookouts that, Once approved by the entities that the authority has provided in this question, i.e., the municipality of Iquique and the Regional direction of SERNATUR, installed two observation points to be used as tourist lookouts (see

Table 1-9)one overlooking the reservoir and the other in the sector of the Northern access view road to the sea, as shown in the following figure.

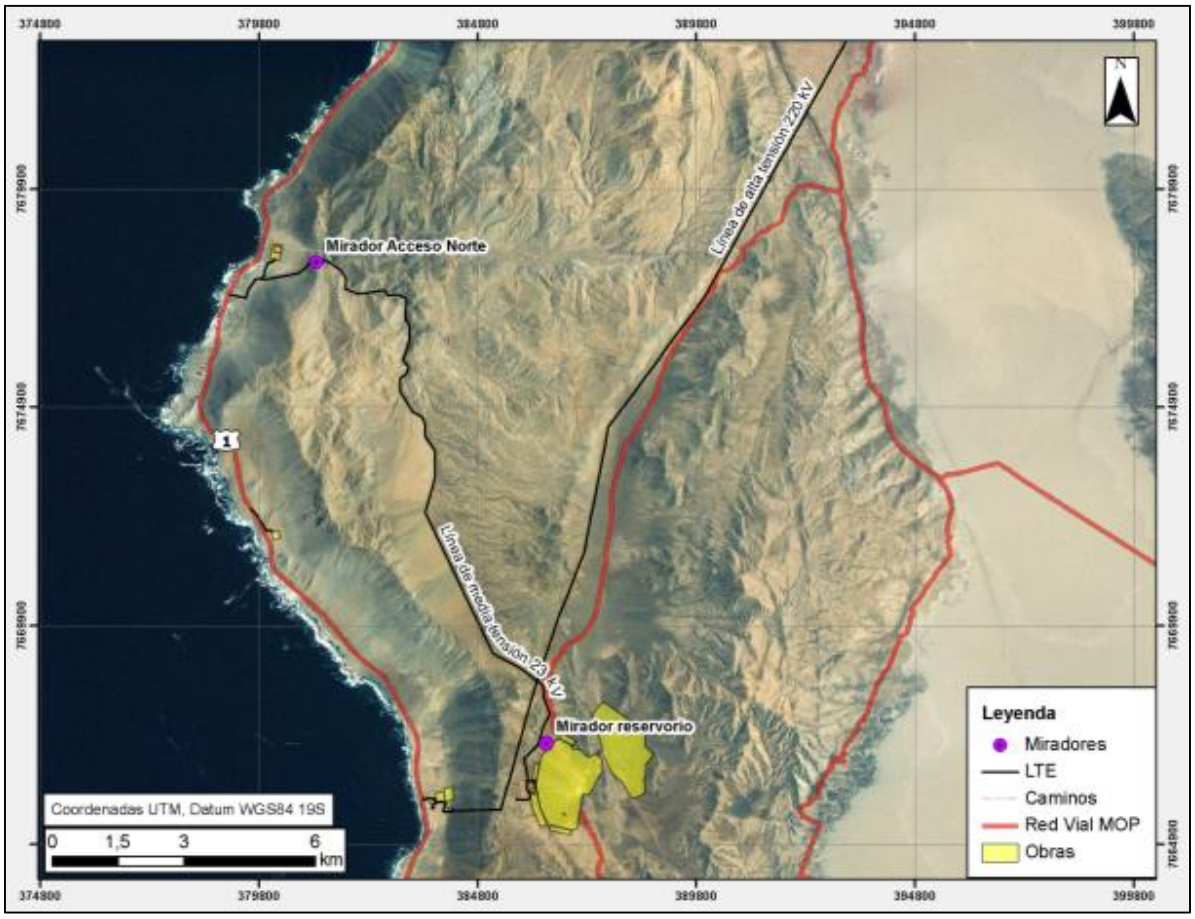
Table 1-9: Coordinates* Tourist viewpoints reference.

balcony	Coordinate UTM N	Coordinate UTM and
Mirador Norte access	7.678.230	381.120

balcony	Coordinate UTM N	Coordinate UTM and
Mirador reservoir	7.667.211	386.373

* Coordinates Datum WGS 84

Figure 1-6: Location Miradores tour.



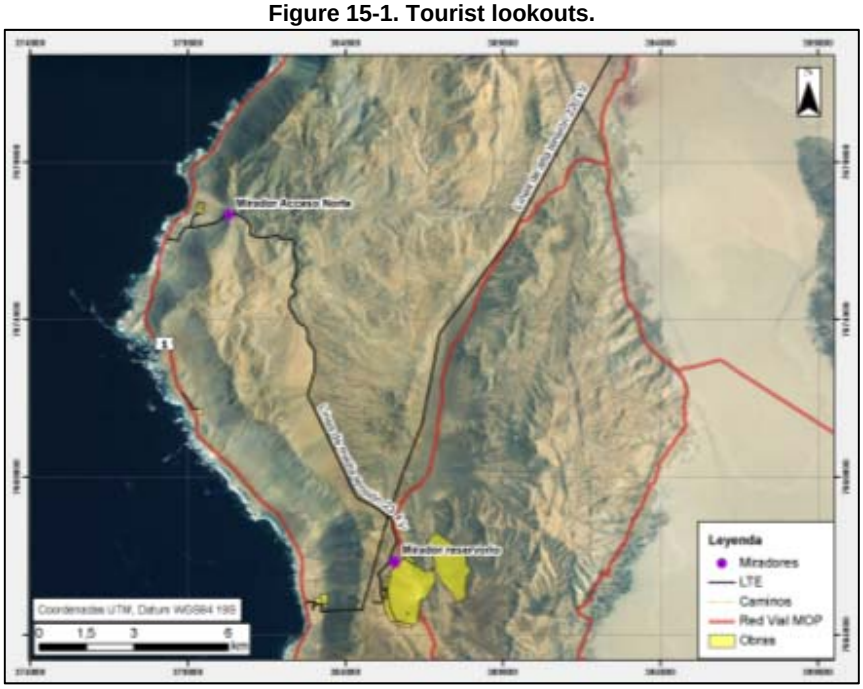
Source: elaboration GAC.

Each balcony includes the installation of Tourism signage, stabilization of land for parking of five light vehicles, access footprint pedestrian, barrier safety if applicable and benches at the point of observation, all of the above of the way more harmonious with the environment possible favoring the use of natural materials and shades sector.

With regard to the voluntary commitment associated with the implementation of these viewpoints, it should be noted that, as was said above, compliance will be subject to the authorization of the

municipality of Iquique and the Regional direction of SERNATUR as noted above, further to which, within the period of one year Since the authorization, is will implement these viewpoints. Then the Table 1-10 Describes This commitment well as its indicator of compliance.

Table 1-10: Installation of tourist lookouts.

Commitment: Installation of tourist lookouts	
Phase of the project	Operation
Environmental component	Landscape
Environmental factor	Visual quality
Objective	Install two tourist vantage points overlooking the reservoir and in the sector of Road North access with view to the sea.
Description and justification	Build a viewpoint from a point of high visibility in the Cordillera de la Costa, in order to enhance the new landscape geNorthwestern by the the project "Espejo de Tarapacá" sea water reservoir. This commitment seeks to assess the reservoir in a desert area as a new tourist attraction that can be visited. On the other hand, the second vantage point located on the driveway North, close to caleta Río Seco, will aim to facilitate the observation of the sea from a privileged sector on the coastal cliff to such effects. The location of these viewpoints is presented in the following figure: **Figure 15-1. Tourist lookouts.**  In addition considered the installation of the following signs: • Mirador reservoir: Informative signage of the project. • Mirador Norte access: Environmental Informational signage in the sector, based on the information raised at baseline. In addition, tourist type signage will be installed in the area of the cemetery for better

Commitment: Installation of tourist lookouts	
	identification of this area of heritage interest.
Place, form and timeliness of implementation	This commitment will be carried out, within a period of one year, once the appropriate permits from the municipality of Iquique and the Regional direction of SERNATUR have both viewpoints. Access and an Esplanade for parking lot and observation of the landscape will be enabled. Within 30 days counted from compliance with this commitment shall be informed to the SMA.
Compliance indicator	The municipality of Iquique and the Regional direction of SERNATUR authorizations. There will be a photographic record when it has finished the construction of the viewpoints.

As a reference, Photomontages are shown below with a view from every viewpoint and in the Annex 1.8 viewpoints photomontage EIA Tarapacá mirror This addendum Complementary enclosed the same images with better resolution.

Figure 1-7: Mirador photomontage North access road.

Comments: is a panoramic view from the lookout view towards the sector North access road.

Figure 1-8: Photomontage Mirador reservoir.

Comments: is to a panoramic viewpoint towards the sector of Reservorio.

1.9. In relation to the answer to question 1.28 of the addendum N ° 1, the holder does not incorporate actions associated with the impacts that would occur in the closing mainly for the reservoir. In this sense, the holder must submit a detailed actions to be implemented in this sector for the closing phase, every time that then time of operation and eventual closure and decommissioning, species existing they will be adapted to the sector and its conditions, so that the proposed measures could generate one greater impact on them and their habitat. You must also submit an analysis associated with these possible impacts, and where appropriate, introduce measures and monitoring plan to be implemented.

Answer:

The holder It reiterates already stated in the EIA and the previous addendum, in that the project considers an indefinite useful life. Therefore, given the closure of the project is an event future and uncertain both its occurrence and its specific features, is not consistent with the objective of the SEIA predict and currently assess the impacts that may result in an eventual stage like that. Based on the above, and in accordance with provisions in Article 18, lyric c.7) the regulation of

the SEIA (D.S. N ° 40/2012, Ministry of the environment), is not relevant for this project a detailed description of the closing phase.

Without prejudice of the above, is made present that the Titular has already present background associated to a possible phase of closing in Chapter 1, Section 1.7 the EIA. Las activities This phase likely to produce impacts were built-in in Chapter 4. For its part, This information was deepened with the occasion of the Addendum earlier, mainly in the answers to the questions 1.28; 2.2; 4.8: 4.10 table 4-2; 5.3 and 7.9. In addition, the summary sheets, annex 11-1 of the previous addendum addressed the closing phase.

On the other hand, the licensee agrees that, in the event of a possible closure of the facilities, submit to the SEIA advance actions referred to in this closure, as well as its assessment of impacts and measures applicable based on the rall existing control at the time of the eventual close.

Said PLAN closing will be consistent with already presented during this environmental assessment procedure and will contain, at the very least, the following:

- The *closing strategy* based on general criteria efficiency of the activities, compliance, as well as criteria of safety and environmental.
- The *compliance* will consist of mainly in update the commitments made to the authority in the permitting stage for the phase of operation of the facilities and the existing regulations at that time for the execution of the works and activities closing.
- The *safety criteria* they will be mainly the consideration of all aspects of security of the people who were able to access the project area, to minimize accidents by preventing the entry of persons to the premises remaining with seam Perimetral where evaluation risk otherwise it, the power failure prior to dismantling, among other activities.
- The *environmental criteria* It will be the environmental standards of the holder for a correct fulfilment of standards-related and avoid environmental impacts.

Said Closure plan eventually shall be deemed also:

- Una description of the environment considering the main features of the environmental components of the project area, including those components that could not be affected by the installations that will remain beyond the cessation of operations. Se will be a description of the facilities of the project. Considering that these have worked in its phase of operation in optimal conditions, deemed to be found with the same infrastructure and equipment projected, so that the project is not present relevant modifications during the operation.
- Based on the information collected in the preceding points, will take place an analysis and assessment of risks to prevent accidents to persons; and to prevent any impact on the environment.

- Finally, and on the basis of the above, will be designed and implemented closure measures that allow to achieve a correct and proper, closing in compliance with the relevant legislation.

1.10. In the same direction of the previous query, and considering what was said before, the holder must present all environmental technical backgrounds that justify the fact of not considering maintenance, conservation and/or supervision and monitoring post-closure of the reservoir and its environmental components.

Answer:

The holder It reiterates already stated in the answer to the previous question, as soon as the project has established its useful life as indefinite. By the same, and given that the closure of the project is an event future and uncertain both its occurrence and its specific features, is not consistent with the objective of the SEIA predict and assess impacts at present this scenario. Therefore(, and in accordance to the provisions of article 18, lyric c.7) Regulation of the SEIA (D.S. N ° 40/2012, Ministry of the environment), is not relevant to the present draft a description of the measures possible s which would be adopted after a so-called project closeout.

As already mentioned above, Licensee agrees that in the event of a possible closure of the facilities be put to the SEIA advance actions referred to in this closure, as well as its assessment of impacts and the measures applicable on the basis a the current regulation at the time of that so-called close. In this event, a monitoring program will be established and monitoring of the close to those environmental components that are considered most relevant If applicable, on the basis of the evaluation which will take place at that time.

It should be noted that you for the implementation of this PLAN, referred to work in conjunction with local authorities, which will be developed based on the monitoring developed during the operation of this project.

2. DETERMINATION A.AREA OF INFLUENCE

2.1. In consideration of the points raised in this report, and by virtue of the new background obtained, it is that the holder must again review the area of influence for the component hydrogeological., and in the event that appropriate, redefine it, by presenting the corresponding analyses in terms of impact assessment.

Rexposed:

The owner clarifies that the definition of the area of influence for each component was determined according to l(or established in article 18 letter d) of Supreme Decree 40/12, of the Ministry of the environment, regulation of the environmental impact assessment system. Sdo the contents of environmental impact studies, noted that the area of influence of the project or activity *"... 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"* carrying out a general description of the same.

On the hydrogeology component, it is clarified that development of the study of environmental impact, both in the addendum earlier, entered on 12 March 2015that component on the basis of the relevance that has for the environmental assessment of the project has been characterized.

With regard to the EIA, the hydrogeology component was described in Chapter 3 baseline, section 3.2.3.2 Hydrogeology and in the 155 sectoral environmental permit, Permission for the construction of certain works. Likewise, in the addendum previous and in order to answer the questions associated with this component, complemented the description through the completion of geophysical prospecting of seismic refraction, mechanical exploratory drilling and excavation of pits in the accumulation of generation water bucket, studies that described in annex 3-5 hydrogeological characterization of the addendum to previous, and which allowed complete characterization of the hydrogeology component.

In relation to the characterization made in the EIA, baseline of Chapter 3, section 3.2.3.2 Hydrogeology, this describes the hydrogeology, both regional and local, through the compilation of Reports, papers and specific research related to geology, hydrogeology and hydrology with regard to the sector study. Information collected is summarized for each of the sectors that make up the project, indicating primarily and as a factor common to the 4 sectors, low or null, permeability related hydrological characteristics of non-existent channels, and the climatic characteristics of high temperatures and low rainfall, making this sector be identified by being very arid and desert.

Similarly, in the EIA, chapter 10B sectoral environmental permits, section 10.15. Sectoral environmental permit 155, it indicates that the subsoil permeabilities are predominantly low So what within the study area aquifers, are not identified product of the geological conditions and the absence of recharge in areas with certain characteristics for the underground storage.

On the other hand and as noted above, the development of engineering conducted field studies, that allowed to deepen the description of the hydrogeology associated with the area of site, which included:

- Geophysical seismic refraction surveys, whose objective was to determine bedrock depth and the thickness of the sedimentary layers of trays;
- Drilling of 5 mechanical drilling exploratory, which allowed to know the hydrogeological characteristics of crossed fillings, since in them type permeability tests were carried out Mandel-Lefranc and Lugeon (for more information on the drilling see answer question 3.3 This addendum); and
- Excavaci9 on pits in the accumulation of generation water bucketin order to determine the characteristics and capacity of infiltration of the surface layer of the basin, and tests were performed which infiltration of depletion type, since in any calicata or mechanical probing was detected the presence of one Napa of groundwater.

Designated studies indicate that according to the local geology, it can be concluded that there is only one unit of soil, covered in the study area the entire reservoir of the project. This unit is composed of sand and gravel, with some fine, and has cemented sales levels interbedded.

The Geophysical study for its part, concluded that they exist in the basin of the project area 2 types of sedimentary formations on the fundamental rock (PSSM-1 profile), to appreciate, that the depth of the filling reaches 120 to 130 m maximum.

In turn, based on the information of the executed exploratory drilling, in which witnesses with presence of salt crust could detect clearly, it was concluded that there is no presence of groundwater in the basin of the project. In particular, probing S-2, which corresponds to the deepest, was drilled to the depth of 145 m without finding a napa of groundwater.

Finally, the excavation of test pits in the reservoir sector It was determined the presence of superficial layers of compact salt crust, interspersed with soil, which limit the infiltration and deep percolation of the water, which could demonstrate the infiltration tests results.

Without limiting the foregoing, should be recalled the project also considers the waterproofing of the 375 has reservoir, to avoid any possible filtration of seawater to the subsoil, and considered an adequate system of monitoring and control of contingencies (see in this respect the response 5.3 of the present addendum).

In sum, by virtue of stated in the EIA and the addenda submitted during the assessment procedure, the absence of a hydrogeological component for the area of influence of the given project than has been credited not be Show continental underground water bodies in the sector where there will be excavation works.

In the coastal sector, the groundwater level corresponds to influence marine. This information appears in the document "report of research geologicals"(VALH-0001-000-OOSS-INF-001), which is attached to this addendum in the Annex 1.3 Reports and plans Geologicos and geotechnical.

With respect to marine waters in the coast sector, is worth mentioning that the underground works of the project to be carried out, they have considered State the existence of the rock. In case of leaks, is considered to seal it to prevent the entry of the water. This water will be pumped and arranged in ponds of an authorized company that also thes checked out for final disposal. By therefore considered that marine waters will not be affected by the project. In this regard, during the construction of the underground works are located more than 80 m from the coastline will be a semi-annual report to the DGA with the registry of the water withdrawn underground marina.

During the operation, the tunnel will be filled with sea water they are not therefore expected contingencies.

Therefore, it is not from a redefinition of area of influence or an analysis of impact assessment.

3. BASELINE

3.1. In relation to the antecedents presented in annex 3-2 of the addendum N ° 1, the holder It must complement to submitting the following information:

3.1.1. Delimit the area of study using a polygon format SHP (WGS84, UTM, zone 19S) or KML, indicating the sites of nesting, findings, and transit of these birds.
3.1.2. Detailed methodology of the sampling with respect to the implementation effort of transects (dimensions, location, schedules)
3.1.3. Delimit play areas identified by one or more polygons in format SHP (WGS84, UTM, zone 19S)
3.1.4. Distance from the works of the project, in relation to the transit of these birds and nesting sites.
3.1.5. Estimated population of this species in the area.
3.1.6. Nesting period
3.1.7. Possible harm of the project on the reproductive cycle of this species.

Answer:

3.1.1. Delimit the area of study using a polygon format (WGS84, UTM, zone 19S) 0 SHP KML, indicating sites of nesting, findings, and transit of these birds.

The holder receives observation and supplied the requested information in a format SHP indicating the area of study and, SHP and KML nesting, finds and transit sites of These birds, (Annex 3.1-A Information sea swallow (SHP, KML format)).

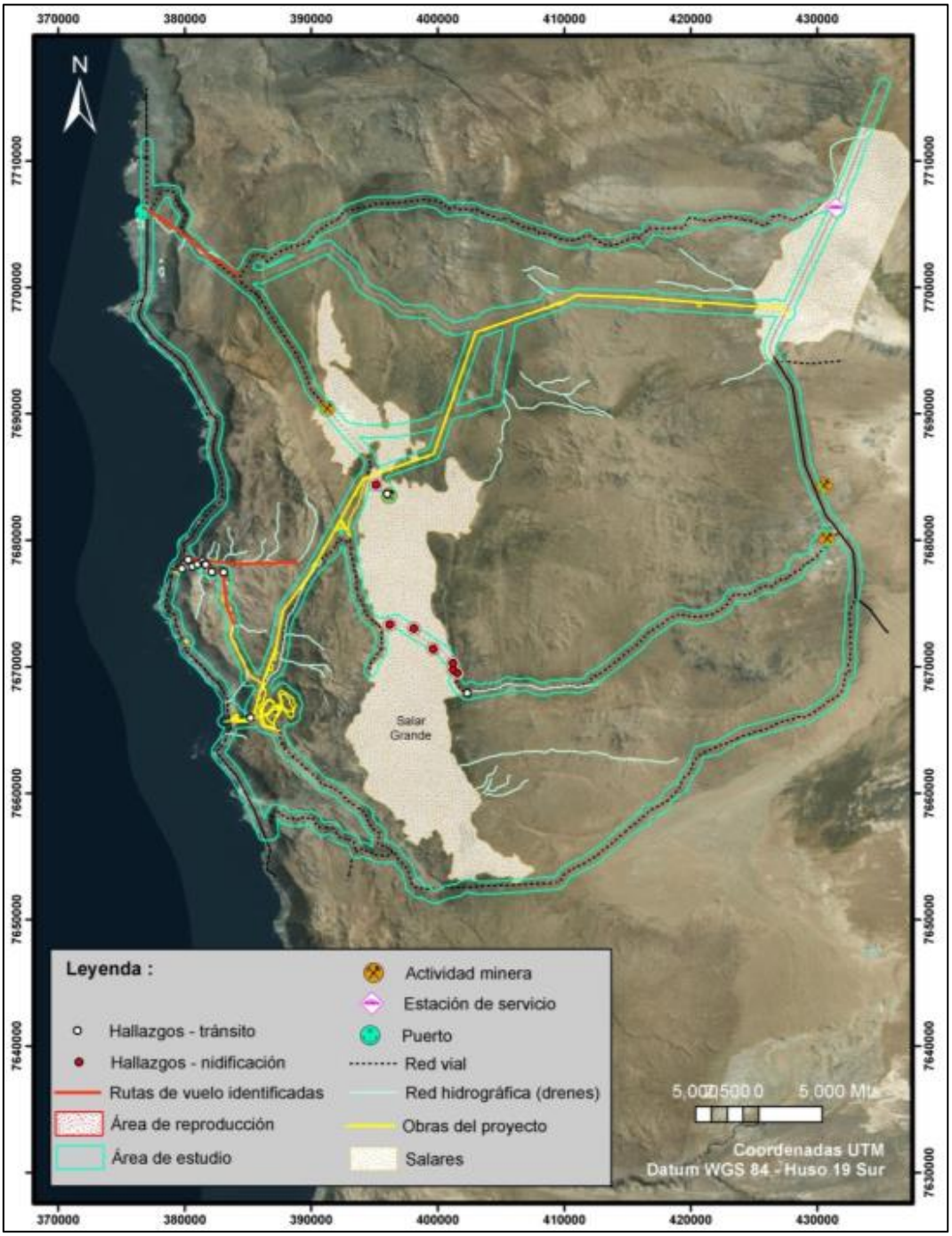
Are points where were findings, classified according to the nature of these two groups: those that are indicative of the presence or possible transit and those who are directly related to nesting in the immediate surroundings.

Finally, it provides information with regard to the possible transit routes Bird inland, which are based on findings made in land (remains of birds in places that do not meet the characteristics required for the nesting) and to the understanding of the general patterns that govern the movement and orientation of the birds.

Also below is as image above information.

Note that points that represent the findings are increased in size to allow viewing in cartography.

Figure 3-1: Birds identified transit routes.



Source: elaboration GAC.

3.1.2. Detailed methodology of the sampling with respect to the implementation effort of transects (dimensions, location, schedules)

According to the request, the owner explains that el field work carried out in the framework of the "complementary study. Analysis of the reproduction of terns in the area of the project Espejo de Tarapacá" consisted of 2 campaigns of land with dates 09-13 December 2014-05-09 January 2015.

In each campaign has toured all of a study area wide (see figure), which included all works referred to by the project and potential occupation sectors of *Storm petrel petrel*, according to preliminary background. In these diurnal surveys is pesquisó the existence of sectors with the presence of suitable substrate for nesting swallows sea, as well as casings, cavities with signs of occupation, feathers, feces u smell. Findings reported by this technique, settled the points in which was held the night exploration of the area, which was carried out by transects whose detail is presented below.

Table 3-1: Methodological detail of thes transects night performed.

ID	UTM This	UTM North	Date	Start time	Description
1	402421	7667960	09/12/14	22:00	Transect vehicle 9 approximate km, making stations listening to intervals of approximately 1 km.
2	383129	7677430	10/12/14	21:50	Transect pedestrian 1.5 km approximate, making stations listening at intervals of approx 500 m.
3	387560	7667570	11/12/14	21:50	Transect pedestrian 1.2 km approximate, making stations listening to intervals of approx. 400 m.
4	395117	7684370	12/12/14	22:00	Transect vehicular 1.8 km approximate, making stations listening at intervals of approx 600 m.
5	401229	7670280	05/01/15	22:05	Transect pedestrian 800 m approximate, making stations listening and inspection of nests at intervals of 100 m.
6	425779	7698370	06/01/15	22:00	Transect pedestrian 1 km approximately, making stations listening to intervals of 200 m.
7	383129	7677430	07/01/15	22:00	Transect pedestrian 1.5 km approximate, making stations listening at intervals of approx 500 m.
8	387560	7667570	08/01/15	21:50	Transect pedestrian 1.2 km approximate, making stations listening to intervals of approx. 400 m.

Source: elaboration GAC

3.1.3. Delimit play areas identified by one or more polygons in format SHP (WGS84, UTM, zone 19S)

The holder receives observation and attach the required information in Annex 3.1-A. En files SHP and KMZ they are named "play" identified areas using polygons.

2 nesting sites were identified in *Storm petrel petrel* at Salar Grande. The first site TO, It corresponds to an area near the mine Tenarditain which birds doing night deployments were observed. This sectorSite B, interacts with the line 220 kV and the access road to this, which cross the Salar 350 meters North of the identified breeding area. In response to that, this sector has been considered for the implementation of bird anti-collision devices, such as detailed in the answer 6.5 of this complementary addendum.

The second site corresponds to an area distributed on both sides of the road that crosses transversely (North-South) the Great Salt Lake, where were abundant night deployments and a bird singing from inside a cavity. This second sector not interact directly with any work project, being the line 220 kVlocated at least 5 km, the nearest to the project work.

3.1.4. Distance from the works of the project, in relation to the transit of these birds and nesting sites.

The holder receives the request. The detail of the distances of the nesting sites and transit routes to the nearest of the project works, is described in the Table 3-2.

Table 3-2: Distance to nesting sites and transit routes to nearby works.

Sites of relevance *O. Petrel*	Distance (km) works	
	LMT 23 kV	LEN 220 kV
Site nesting (A)	14	0.9
Site nesting (B)	12	7.5
Route of entry Patache	0.3	3.5
Route of entry River dry 1	0.9	1.5
Route of entry River dry 2	25	20

Source: elaboration own.

3.1.5. Estimated population of this species in the area.

The licensee advises that, a finished rebibliographic view)See annex 3.1-B references Bibliograficas), which included all published references relating to *Storm petrel petrel*11 publications on the basis of which it is possible to report that references that confirm the reproduction of the species in the Salar Grande there are no were identified.

"The only specific mention to the place gives it Tobias et al (2006) noting that "*There is strong evidence that additional colonies (from the well known in Paracas, Peru) exist in the region of Iquique, northern Chile, where several fledglings have been found. Researchers should listen*

adult flying near the colonies at night and check for cavities active during the day, especially around Salar grande, 100 km to the South of Iquique""[2].

There is information on studies in progress, which is carrying out the network of birdwatchers and wildlife (ROC), however, even No they are published their results.

Although the field work carried out in the framework of the present environmental assessment allows you to confirm the reproduction of the species in specific sectors of the Great Salt Lake, the availability and current scientific information It does not give an estimate of the size of population at the local level. However, as indicated in the answer to the question 10.4 of the addendum submitted previously, on a voluntary basis is will monitor in the stretch of the LAT could eventually, where colliding birds. You will take place this monitoring for 3 years semi-annually, delivering annual reports to the authority. The measured anti-collision arises in response to thes questions 7.1 and 7.2 This addendum.

3.1.6. Nesting period

According to the information obtained through field work (study line base and complementary study terns), compilation of bibliographic records and background provided by SAG Tarapaca, the nesting period of *Storm petrel petrel* at the local level is that described below.

The duration of the periods of incubation and development of the chicks in the nest is baSA in the results presented by Jahncke (1994), obtained from a study conducted in Paracas (Peru).

- **Night deployments:** It corresponds to the period of formation of couples, courtship and selection/location of which will be used as a nest cavity. It is characterized because the birds perform night flights and vocalizations that make them exceptionally conspicuous. Activity of this kind in December 2014 campaign was observed and to a lesser extent in the January 2015, history that they are ratified by local workers who identify the vocalization of *O. petrel* during the month of December. However, this activity would take place around December, extending slightly beyond the previous month and the subsequent (November-January).
- **Incubation:** It corresponds to the period in which adults protect and provide heat to a single egg in development. According to the provided background by Jahncke (1994) this period would have a length of 46.9 days and consist of visits not exceeding the 3-day, alternating with periods of temporary abandonment. From the observation of nocturnal deployments in the month of December, to find an adult inside a nest in the campaign for

[2] Lost and found: a gap analysis for the Neotropical avifauna. Neotropical Birding 4-22 (Tobias, Butchart & Collar, 2006).

January 2015 and the discovery of fledglings around March-April, incubation would take place in December-January.

- **Development of chicks in the nest:** It corresponds to the period in which the chicks gain weight and size, while they develop their plumage, in order to be able to nest abandonment at the end of this period. According to the provided background by Jahncke (1994) this period would have a duration of 79.9 days and should allow the squab of the 12.57 g which would have to be born, to the 70.70 g which would have at the time of leaving the nest. From the chronology described in the previous point, this stage would take place during the months of January, February and March.
- **Output of the chicks in the nest:** Corresponds to the period in which the offspring of the season make address abandonment of the nest to sea, moment in which these would be particularly prone to collide with artificial sources of light. According to the chronology described previously, this stage would take place between the months of March and may, which would be quite coincidental with dates which occurs in greater quantity of finds of birds at the foot of luminaires)Malinarich2010).

Table 3-3: Nesting period *Storm petrel petrel.*

Activities	Nov	Dec	Jan	Feb	Sea	Apr	May	Jun	Jul	Aug	Sep	Oct
Night deployments	x	x	x									
Incubation		x	x									
Development of chicks in the nest			x	x	x							
Output of the chicks in the nest					x	x	x					

Source: elaboration own.

However, as indicated in the answer to the question 10.4 of the addendum submitted previously, on a voluntary basis is will monitor in the stretch of the LAT could eventually, where colliding birds. You will take place this monitoring for 3 years semi-annually, delivering annual reports to the authority.

3.1.7. Possible harm of the project on the reproductive cycle of this species.

The owner clarifies that se provides that the reproductive cycle of *O. petrel* at the local level, detailed in the previous answer, it will be unmodified in any way by the execution of the project, since the timing of reproduction is usually explained by environmental conditions of large scale, such as the availability of food or the temperature of the water; variables that are causal relation

with the modifications that the project could be performed locally. According to the above, there is no intelligible reasons to suppose that a change will happen in the timing of reproduction product of the execution of the project.

With respect to the effect that the project may cause on the reproductive success of the local population of *Storm petrel petrel*, two mechanisms by which this could be affected are identified: direct disturbance of nesting and light attraction areas.

In relation to the direct disruption of nesting sites, clarifies that made 2 bells line base and 2 bells of a study complementary specific for Terns, it was found that terns nesting areas there are no in the areas that will be taken over by the project, being the closest interaction to the 350 m between one of the nesting sites and High voltage line of 220 kV. According to this, mitigation measures will be implemented to reduce the collision probability of birds with run in this sector, whose scope and description is detailed in the response to thes questions 7.1 and 7.2 the present addendum.

In relation to the light attraction, the project does not provide installation of luminaries in the high-voltage line or the North access road. However, for the phase of construction, and operation of the project will be fulfilled with the measures listed and detailed in the present response 7.1.

However, as indicated in the answer to the question 10.4 of the addendum submitted previously, on a voluntary basis is will monitor in the stretch of the LAT could eventually, where colliding birds. You will take place this monitoring for 3 years semi-annually, delivering annual reports to the authority.

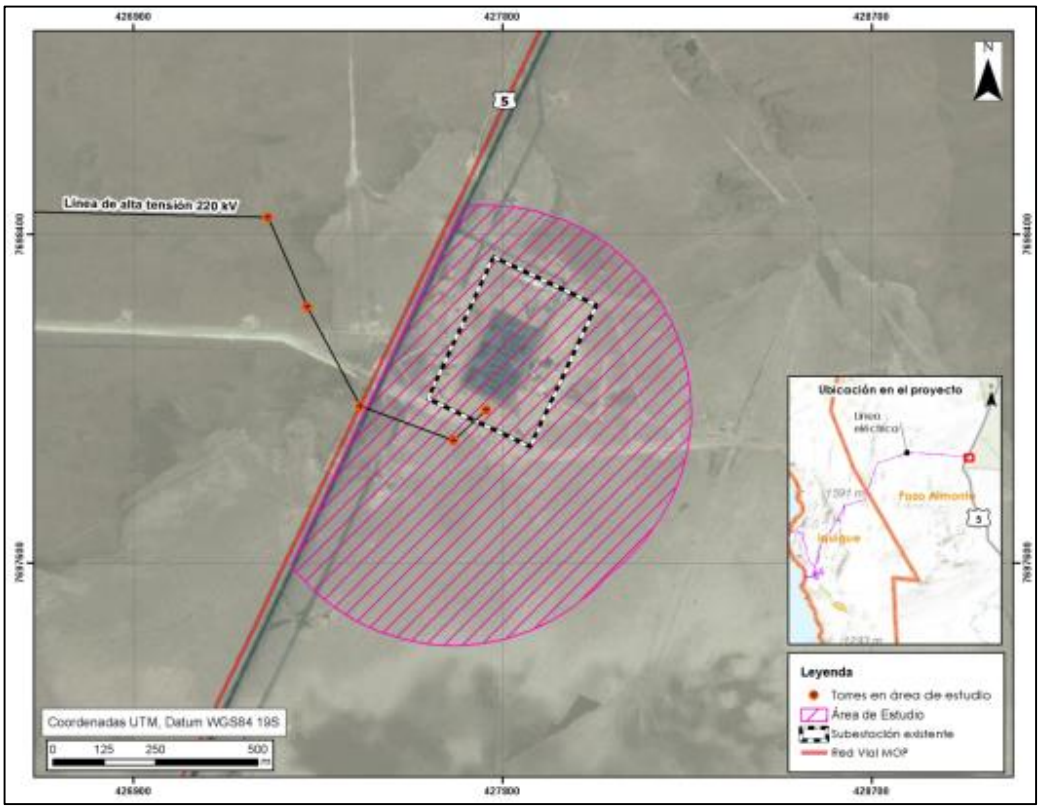
3.2. Holder mentioned the absence of fauna in the site of the project, specifically in the area of installation of the broadcast tower that sits within the boundaries of the Pampa del Tamarugal national reserve, justifying this statement in the high degree of intervention and the lack of vegetation in this area. In order to validate such claims, the holder must be a monitoring of Fauna in the sector of intervention (broadcast tower installation), which should be contrasted with a monitoring of wildlife within the area of forests of Tamarsector Bellavista of the Reserva Nacional Pampa del Tamarugal gOS. It should be noted that for the latter monitoring, it shall request authorization to CONAF Tarapacá.

Answer:

The holder receives the observation. He was a characterization of the area in which electrical transmission towers are located within the boundaries of the Pampa del Tamarugal national reserve.

Characterized study area comprised an area of 71, he and corresponds to the sector where the installation of two towers within the limits of Pampa del Tamarugal national reserve is projected (Figure 3-2).

Figure 3-2: Study area Torres RN Pampa del Tamarugal.



Source: Homemade.

Sector 9 stations were muestrealeswhere obtained the registration of an environment corresponding to desert absolute with a high degree of human intervention due to its proximity to the Panamericana Ruta 5 Norte.

Within the study area (71 has), was obtained the registration of two species of terrestrial native fauna which correspond to *Cathartes aura* (Vulture red head) and *Microlophus theresioides* (Teresa runner). Of these, only the latter is listed in category of conservation, corresponding to "Rare" according to the regulation of the hunting law (DS 5/1998 MINAGRI).

Because of this, this species was included in the impact assessment and its impact was evaluated as negative and insignificant. However, while the impact does not have a significant effect, proposes a voluntary commitment to avoid affectation of the species in question. This

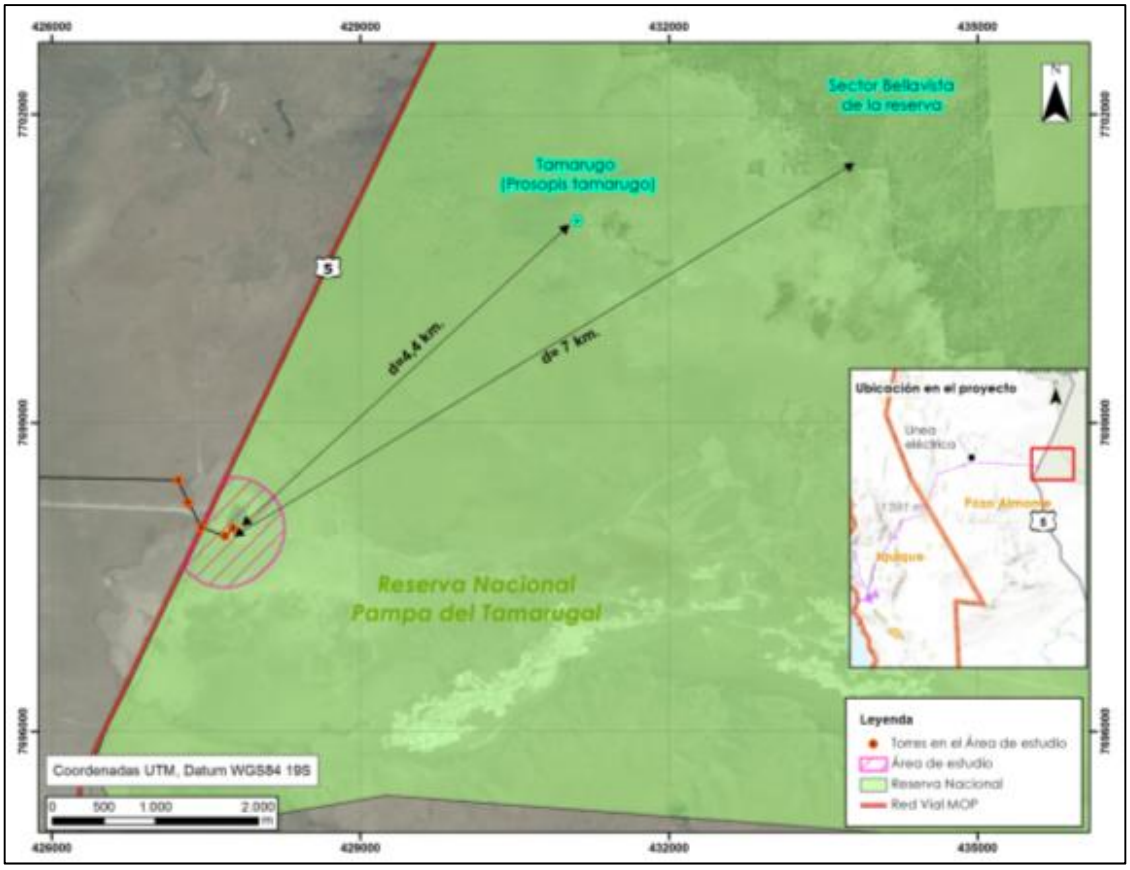
voluntary commitment is specific to *Microlophus theresioides*, in the area of the last 2 towers of the LAT before connecting with the substation lagoons, which correspond to the only facilities that are located in the Pampa del Tamarugal national reserve. The details given below.

Table 3-4: Voluntary commitment *Microlophus theresioides*.

Commitment: Perturbation-controlled for *Microlophus theresioides*	
Phase of the project	Construction
Environmental component	Fauna
Environmental factor	Species in category of conservation
Objective	Substantially reduce the death of individuals of *Microlophus theresioides* (Teresa runner).
Description and justification	The commitment consists in the progressive enabling the area to intervene where the species was recorded (sector of overlap of the project with the Pampa del Tamarugal Natural Reserve), through manual removal or tools (without heavy machinery) potential refuges of the species objective, in order to induce your movement toward neighboring sectors without intervention. Removed materials (stones, branches among others) during this activity, shall be provided in a nearby area (< 500 m) sectors to disrupt, with the aim of improving the habitat available for the frightened specimens. This commitment is justified in its ability to reduce the death of *Microlophus theresioides* (Teresa runner), a species not recognized with a significant impact, but classified as "Rare" according to the law on hunting. Likewise, this measure is presented in the "environmental assessment guide. "Component wildlife" (SAG, 2012) as "[the appropriate measure] to mitigate the impacts on reptiles and" small mammals generate linear projects and projects areal small size", which is consistent with the type of project under consideration.
Place, form and timeliness of implementation	Disturbance activities will be implemented in the sectors in which the presence of the species is associated with target and where will run any the following works or activities: i) driveways, ii) foundations construction, installation of ((towers and plazas of laying, iii) expansion and construction of substations and iv) installation of tasks. The implementation of This commitment It should be as close in time to the intervention of the area, establishing a maximum of 3 days from the end of the measure and the beginning of the phase construction. This in order to avoid an eventual recolonization of the area to intervene. Execution must be supervised by a professional with skills in the management of fauna silvestre and executed by a number of professionals or wages suitable for the surface that is cleared.
Compliance indicator	El indicator of compliance will be the delivery of a report specialist with the activities carried out to implement the activity of controlled disturbance of this species. This report will be submitted to the Superintendency of environmental and SAG.

With respect to perform a monitoring fauna in the inside area of the Tamarugo forests of Bellavista in the Reserva Nacional Pampa del Tamarugal sector, was an environmental and spatial analysis in order to assess whether it would be consistent to contrast the information relieved in the area to intervene with of Tamarugo forest of Bellavista in the reserve sector. This analysis was based on the identification field of the tamarugo copy)*Prosopis tamarugo*) closest to the area to intervene, and the environmental context in this that is. This analysis, determined that the nearest to the area to intervene tamarugo copy is located 4.4 km)Figure 3-3), exhibiting a different environment to the sector of intervention. Additionally, the Tamarugo forest of Bellavista in the reserve sector, is located approximately 7 km from the area of intervention, and presents conditions with greater similarity to the nearest tamarugo than to the area to intervene by the project. Based on the above, it was considered unnecessary comparison between the data in the sector to intervene and the Tamarugo forest of Bellavista in the reserve sector, due to differences related to environmental characteristics of both sectors and the distance it preseas both sectors.

Figure 3-3. Location of the study area in comparison with the Pampa del Tamarugal national reserve and the nearest Tamarugo.



Source: Own elaboration.

3.3. In relation to the hydrogeological characterization of the area where is located the project, in particular, the area of reservoirs and their underground works, and in response to the answer presented in Addendum N ° 1, the holder must submit all technical backgrounds environmental that will enable to solve the following observations:

3.3.1. Geology and structures: there is a description of the geology at the regional level. On the other hand, in point 2.2, local geology refers to the Deputy level "Geology Area priority South Patache – plant and profile Longitudinal", which is not attached.

3.3.2. Geotechnical studies: there is the lithological description of drilled wells, included only the permeability tests conducted on them. Also, the information presented shows discrepancies, as is concludes the study Geophysicist filling

depth reaching 120-130 meters maximum, however, under point 4.2 indicates that the probing S-2 is located in the West basin was drilled 145 metres without reaching the rock.

3.3.3. Hydrogeology: There is the depth of the groundwater, both in the coastal sector the sector plateau. The hydrogeological characterization presented only considers the sector West of the plateau, not so this sector nor the coastal.

3.3.4. On the exploratory drilling, the owner mentioned were two methods to determine the permeability of the sector in question, by means of 5 drilling, 4 in sector reservoirs. On this, the holder defined in table 4-2 and table 4-3 within the annex 3-5, the permeabilities estimated using two types of trials)Lugeon and Lefranc). The owner did not consider probing referred to as S-2 for type testing Lugeonunderstanding that it was the same owner which mentions that the results of these analyses are based on the S-1 and S-2 drilling.

Foregoing, we can point the hydrogeological characterization in the area of the project is incomplete, not allowing to assess the impacts of the project on this component, having great significance by its magnitude, large volumes of stored seawater, and the project life is indefinite. Therefore, the holder must submit the whole project-hydrogeological characterization in depth as part of the base to assess.

Answer:

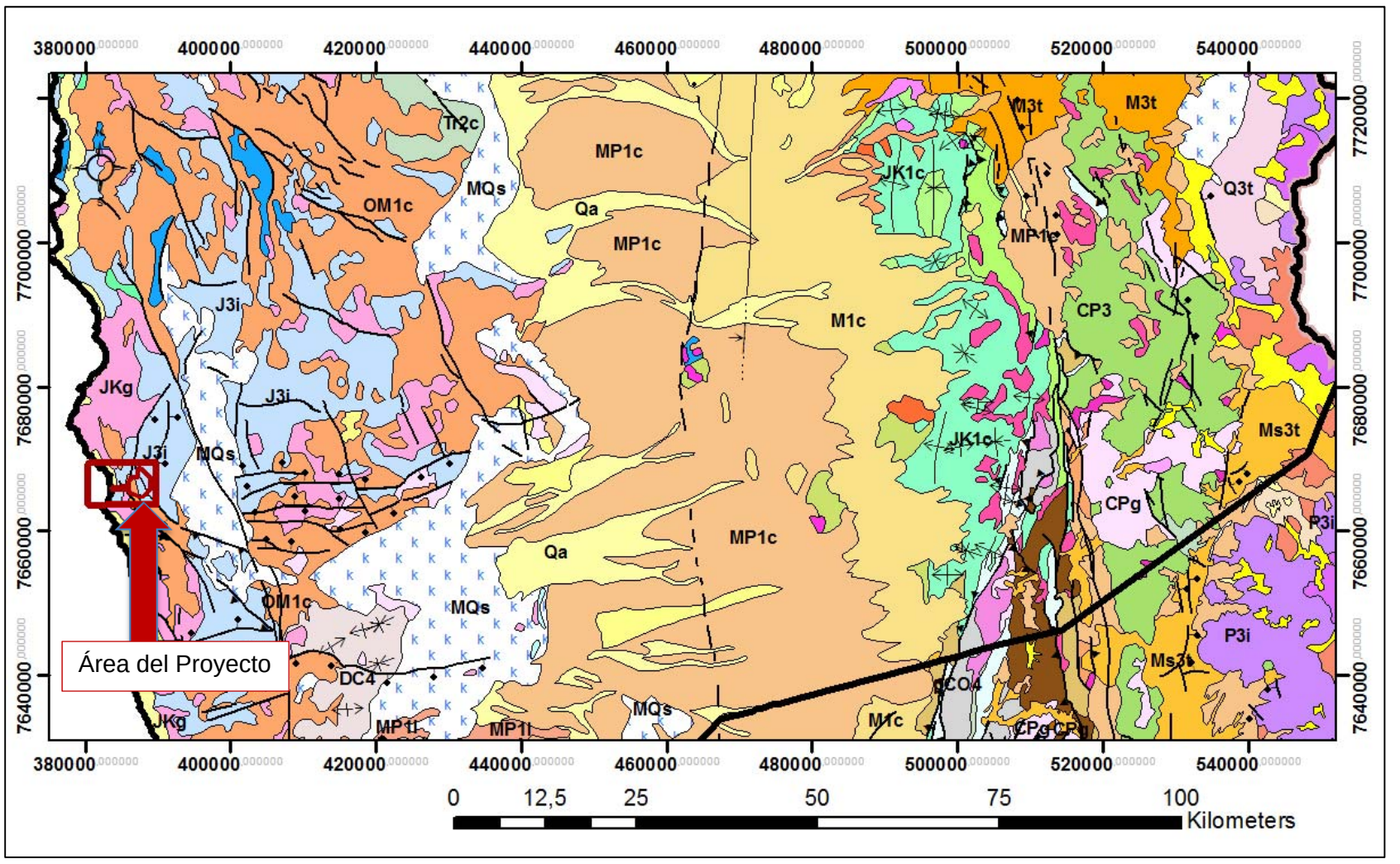
In relation to the hydrogeological characterization, in this addendum is attachedn studies that complement the hydrogeological characterization given in the EIA and addendum above, which are enclosed in the Annex 1.3 of presents it todenda Complementary. TO then it responds to queries specific regarding the hydrogeological characterization.

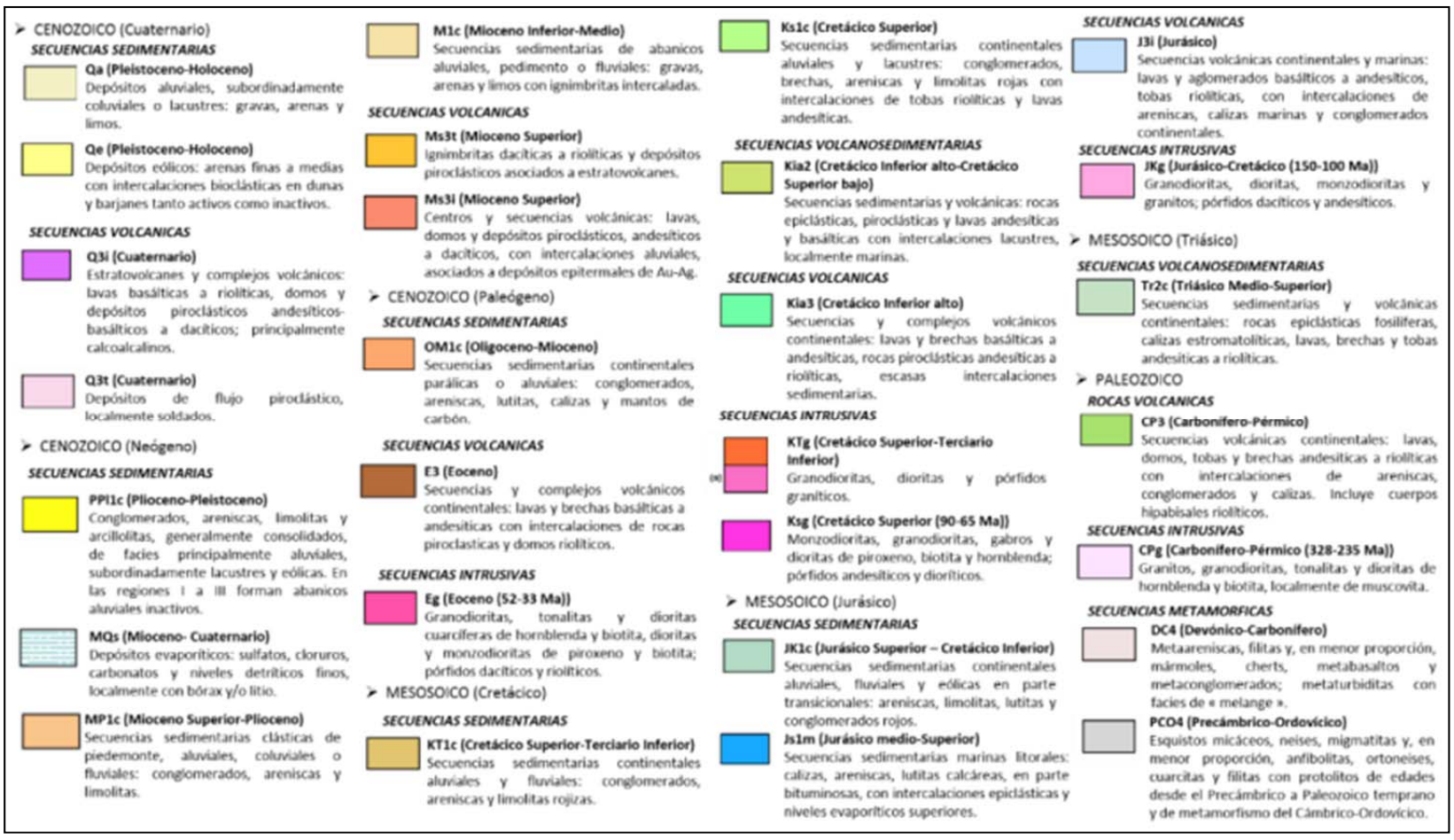
3.3.1. Geology and structures.

The owner clarifies that the EIA of the project Espejo de Tarapacá, specifically, in the chapter No. 3 "Line of Base", in" the paragraph 3.2.2 ""Lithosphere", sub" section ""Geology"" is a regional geological description, starting from the scale ""North of Chile"" to achieve a scale of geology regional "local in the Region of Tarapacá". The EIA deals with geology looking at characteristics of the North of Chile to the attributes specific to the sector of the project where the underground works and the reservoir will be installed.

In the concerning the regional geology above mentioned information is presented from p. 43 to 56 of Chapter 3 the EIA, including among others, Figure 3-30 with the regional geology according to the geological map of Chile scale 1: 1,000,000 SERNAGEOMIN between the parallel 7720000 and 7630000 approximately, which is reproduced below.

Figure 3-4: The project Area for Regional Geology.





➢ CENOZOICO (Cuaternario)

SECUENCIAS SEDIMENTARIAS

Qa (Pleistoceno-Holoceno)
Depósitos aluviales, subordinadamente coluviales o lacustres: gravas, arenas y limos.

Qe (Pleistoceno-Holoceno)
Depósitos eólicos: arenas finas a medias con intercalaciones bioclásticas en dunas y barjanes tanto activos como inactivos.

SECUENCIAS VOLCANICAS

Q3i (Cuaternario)
Estratovolcanes y complejos volcánicos: lavas basálticas a riolíticas, domos y depósitos piroclásticos andesíticos-basálticos a dacíticos; principalmente calcoalcalinos.

Q3t (Cuaternario)
Depósitos de flujo piroclástico, localmente soldados.

➢ CENOZOICO (Neógeno)

SECUENCIAS SEDIMENTARIAS

PPl1c (Plioceno-Pleistoceno)
Conglomerados, areniscas, limolitas y arcillolitas, generalmente consolidados, de facies principalmente aluviales, subordinadamente lacustres y eólicas. En las regiones I a III forman abanicos aluviales inactivos.

MQs (Mioceno- Cuaternario)
Depósitos evaporíticos: sulfatos, cloruros, carbonatos y niveles detríticos finos, localmente con bórax y/o litio.

MP1c (Mioceno Superior-Plioceno)
Secuencias sedimentarias clásticas de piedemonte, aluviales, coluviales o fluviales: conglomerados, areniscas y limolitas.

M1c (Mioceno Inferior-Medio)
Secuencias sedimentarias de abanicos aluviales, pedimento o fluviales: gravas, arenas y limos con ignimbritas intercaladas.

SECUENCIAS VOLCANICAS

Ms3t (Mioceno Superior)
Ignimbritas dacíticas a riolíticas y depósitos piroclásticos asociados a estratovolcanes.

Ms3i (Mioceno Superior)
Centros y secuencias volcánicas: lavas, domos y depósitos piroclásticos, andesíticos a dacíticos, con intercalaciones aluviales, asociados a depósitos epitermales de Au-Ag.

➢ CENOZOICO (Paleógeno)

SECUENCIAS SEDIMENTARIAS

OM1c (Oligoceno-Mioceno)
Secuencias sedimentarias continentales parálicas o aluviales: conglomerados, areniscas, lutitas, calizas y mantos de carbón.

SECUENCIAS VOLCANICAS

E3 (Eoceno)
Secuencias y complejos volcánicos continentales: lavas y brechas basálticas a andesíticas con intercalaciones de rocas piroclasticas y domos riolíticos.

SECUENCIAS INTRUSIVAS

Eg (Eoceno (52-33 Ma))
Granodioritas, tonalitas y dioritas cuarcíferas de hornblenda y biotita, dioritas y monzodioritas de piroxeno y biotita; pórfidos dacíticos y riolíticos.

➢ MESOSOICO (Cretácico)

SECUENCIAS SEDIMENTARIAS

KT1c (Cretácico Superior-Terciario Inferior)
Secuencias sedimentarias continentales aluviales y fluviales: conglomerados, areniscas y limolitas rojizas.

Ks1c (Cretácico Superior)
Secuencias sedimentarias continentales aluviales y lacustres: conglomerados, brechas, areniscas y limolitas rojas con intercalaciones de tobas riolíticas y lavas andesíticas.

SECUENCIAS VOLCANOSEDIMENTARIAS

Kia2 (Cretácico Inferior alto-Cretácico Superior bajo)
Secuencias sedimentarias y volcánicas: rocas epiclásticas, piroclásticas y lavas andesíticas y basálticas con intercalaciones lacustres, localmente marinas.

SECUENCIAS VOLCANICAS

Kia3 (Cretácico Inferior alto)
Secuencias y complejos volcánicos continentales: lavas y brechas basálticas a andesíticas, rocas piroclásticas andesíticas a riolíticas, escasas intercalaciones sedimentarias.

SECUENCIAS INTRUSIVAS

KTg (Cretácico Superior-Terciario Inferior)
Granodioritas, dioritas y pórfidos graníticos.

Ksg (Cretácico Superior (90-65 Ma))
Monzodioritas, granodioritas, gabros y dioritas de piroxeno, biotita y hornblenda; pórfidos andesíticos y dioríticos.

➢ MESOSOICO (Jurásico)

SECUENCIAS SEDIMENTARIAS

JK1c (Jurásico Superior – Cretácico Inferior)
Secuencias sedimentarias continentales aluviales, fluviales y eólicas en parte transicionales: areniscas, limolitas, lutitas y conglomerados rojos.

Js1m (Jurásico medio-Superior)
Secuencias sedimentarias marinas litorales: calizas, areniscas, lutitas calcáreas, en parte bituminosas, con intercalaciones epiclásticas y niveles evaporíticos superiores.

SECUENCIAS VOLCANICAS

J3i (Jurásico)
Secuencias volcánicas continentales y marinas: lavas y aglomerados basálticos a andesíticos, tobas riolíticas, con intercalaciones de areniscas, calizas marinas y conglomerados continentales.

SECUENCIAS INTRUSIVAS

JKg (Jurásico-Cretácico (150-100 Ma))
Granodioritas, dioritas, monzodioritas y granitos; pórfidos dacíticos y andesíticos.

➢ MESOSOICO (Triásico)

SECUENCIAS VOLCANOSEDIMENTARIAS

Tr2c (Triásico Medio-Superior)
Secuencias sedimentarias y volcánicas continentales: rocas epiclásticas fosilíferas, calizas estromatolíticas, lavas, brechas y tobas andesíticas a riolíticas.

➢ PALEOZOICO

ROCAS VOLCANICAS

CP3 (Carbonifero-Pérmico)
Secuencias volcánicas continentales: lavas, domos, tobas y brechas andesíticas a riolíticas con intercalaciones de areniscas, conglomerados y calizas. Incluye cuerpos hipabisales riolíticos.

SECUENCIAS INTRUSIVAS

CPg (Carbonifero-Pérmico (328-235 Ma))
Granitos, granodioritas, tonalitas y dioritas de hornblenda y biotita, localmente de muscovita.

SECUENCIAS METAMORFICAS

DC4 (Devónico-Carbonifero)
Metaareniscas, filitas y, en menor proporción, mármoles, cherts, metabasaltos y metaconglomerados; metaturbiditas con facies de « melange ».

PCO4 (Precámbrico-Ordovícico)
Esquistos micáceos, neises, migmatitas y, en menor proporción, anfibolitas, ortoneises, cuarcitas y filitas con protolitos de edades desde el Precámbrico a Paleozoico temprano y de metamorfismo del Cámbrico-Ordovícico.

Note: According to the geological map of Chile scale 1: 1,000,000 of the SERNAGEOMIN. Red square represents the location of the project.

After delivering such information, the EIA, the same chapter 3 of the baseline of the project, is presented detailed information regional geology on a smaller scale around the area of the project, all of this at the point of "geology Local"" (p. 57-68) from the study. All this is complemented with annex 3.5 Addendum 1, specifically earmarked for the sector of the reservoir and underground works.

In relation to the planes mentioned with particular geological information of the Project, "Geology southern priority Area of Patache - plant and Longitudinal profile" (VALH-0001-000-OOSS-PL-001 and VALH-0001-000-OOSS-PL-002 respectively) and "seabed and interpretation of structural guidelines" (VALH-0001-000-OOSS-PL-006 and VAHL-0001 -(000-OOSS-PL-007 respectively), Reports are attached in annex 1.3 and flat Geological and Geotechnical this complementary addendum.

3.3.2. Geotechnical studies

The owner explains that, as the observation, in addendum 1, says it only drilled wells are named and then delivery information.

The description of lithological each of the drilling of 1 to 5 (first campaign) is presented in Annex G of the "report of geological research", (VALH-0001-000-OOSS-INF-001), which is attached to this addendum in the Annex 1.3 Reports and flat Geological and Geotechnical.

A last drilling took place S-6 probing whose information is It is located in "report Final monitoring probing-6" (VALH-0001-000-OOSS-INF-0013) which is located in the Annex 1.3 Reports and flat Geological and Geotechnical This addendum.

After delivering such information, the EIA, the same chapter 3 of the baseline of the project, is presented detailed information regional geology on a smaller scale around the are of the project, all of this at the point of "geology Local"" (p. 57-68) from the study. All this is complemented with annex 3.5 Addendum 1, specifically earmarked for the sector of the reservoir and underground works.

In relation to the planes mentioned with particular geological information of the Project, "Geology southern priority Area of Patache - plant and Longitudinal profile" (VALH-0001-000-OOSS-PL-001 and VALH-0001-000-OOSS-PL-002 respectively) and "seabed and interpretation of structural guidelines" (VALH-0001-000-OOSS-PL-006 and VAHL-0001 -(000-OOSS-PL-007 respectively), Reports are attached in annex 1.3 and flat Geological and Geotechnical this complementary addendum.

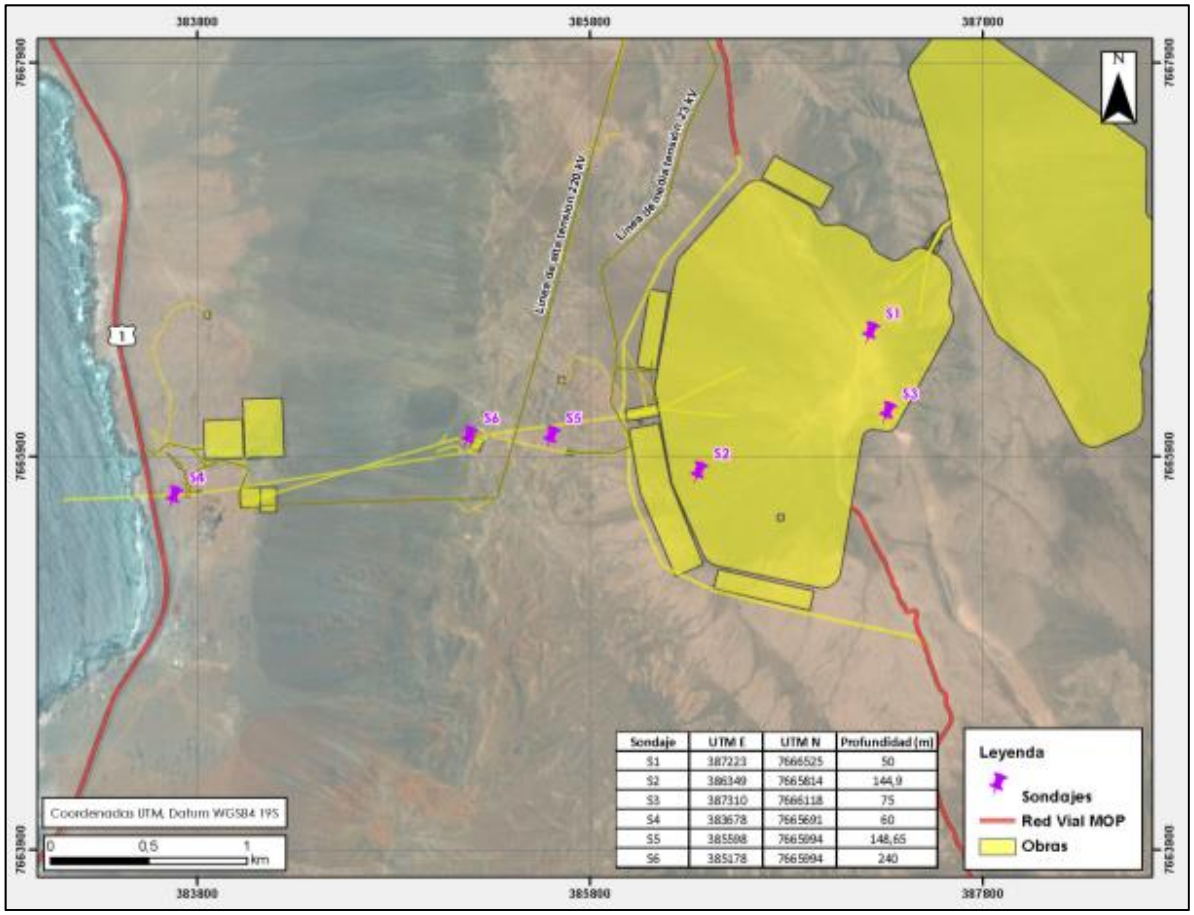
3.3.3. Geotechnical studies

The owner explains that, as the observation, in addendum 1, says it only drilled wells are named and then delivery information.

The description of lithological each of the drilling of 1 to 5 (first campaign) is presented in Annex G of the "report of geological research", (VALH-0001-000-OOSS-INF-001), which is attached to this addendum in the Annex 1.3 Reports and flat Geological and Geotechnical.

A last drilling took place S-6 probing whose information is It is located in "report Final monitoring probing-6" (VALH-0001-000-OOSS-INF-0013) which is located in the Annex 1.3 Reports and flat Geological and Geotechnical This addendum.

Figure 3-5: Ureferential drillhole locations.



Sondaje	UTM E	UTM N	Profundidad (m)
S1	387223	7666525	50
S2	386349	7665814	144,9
S3	387310	7666118	75
S4	383678	7665691	60
S5	385598	7665094	148,65
S6	385178	7665094	240

Source: elaboration GAC.

With regard to the discrepancies consulted by the authority, this is due to thes made interpretations about geophysical profiless, which they were made before being calibrated by the drilling dataas these were carried out at a later stage and the process of adjusting the geophysical models according to the information of the drilling was not performed.

You should be aware Whatmethodologically, geophysical studies delivered, in this case, the data of speed of waves, which must be interpreted as observed in surface and with the information of the available drilling in the areas of study, then, if necessary, re adjust the descriptive models generated based on data obtained from the geophysical campaign.

In the "Geologico-geotecnico report", (VALH-0001-000-OOSS-INF-002), included in the Annex 1.3 Reports and flat Geological and Geotechnical This addendum, specifically in the section 4.1.2.6, proposes a reinterpretacion geophysical taking into account profiles:

- Lor orbservado in the drilling.
- LI field work.
- El break at speeds of waves seen in lathe to the 1300m (PSS1 profile).

Profile PSS1 with a length of 4.610 m and ENE - WSW direction crosses the entire basin.

Profile without interpretation shows a great speed limit to 1300 m, in combination with aerial photo. This is interpreted as the fault Punta de Lobos with a mini scroll150 m (depth of S-2 mo; only sediment). East of the 1300 m speed is significantly less and could be interpreted as sediments strongly compacted to one greater depth, which is consistent with the tectonic environment.

Observation of field and S-5 probing the area between 1300 m and 800 m is reinterpreted the formation the black is highly fractured with a strong influence of tectonic movements which can be seen in the velocities below near the escarpment.

Between 1300 m and 2000 m lower refractor shows speed What they are interpreted as compact rock.

Given this background can set it limit as an area of sediment and the sediment is highly compacted, based on the field observations and background of the drilling.

3.3.4. Hydrogeology

The licensee advises that developed studies geological and geotechnical, attached in annex 1.3 of the present addendum to supplemental, which have allowed to identify in more detail the main system from the failure of the project area, as well as an intensive survey of based on a description of 28 information geoestaciones, 6 holes drilling, in the area of the plateau and the coastal zone, distributed in such a way to form an uprising with a large spatial coverage. To this are added 5 profiles of seismic renovation, carried out in 2 stages; 3 in the reservoir area and 1 in the coastal zone, with lengths from 300 m and up to 4600 m.

This wealth of information has allowed to characterize with sufficient detail the project area and its surroundings, from the point of view of the rock mechanics, soil mechanics, and hydrogeology, delivering product as adequate representation of these components in the entire area of the Studio, sector West, East and coastal sector. This information appears in the document "report of" Geological research"(VALH-0001-000-OOSS-INF-001), which is attached to this addendum in annex 1.3 Reports and maps, geological and geotechnical.

The owner explains that in the EIA, Chapter 3 baseline, point 3.2.3.2 surrenders hydrogeology information both at regional and local levels.

As for the hydrogeolocal lodge((, specifically in section 3.2.3.2, iii) b), information for each sector of the project, i.e., underground works, coast, plateau, and pampa.

Likewise, in the addendum posted on March 12Annex 3.5, arose a supplementary hydrogeological characterization, specifically for the sector of the reservoir and underground works.

In the coastal sector, the groundwater level corresponds to influence marine. This information appears in the document "report of research geologicals"(VALH-0001-000-OOSS-INF-001), which is attached to this addendum in the Annex 1.3 reports and geotechnical and geological maps.

3.3.5. Exploratory drilling

The owner explains that rspectrum at the first point where says that trials were not conducted in Lugeon in probing S-2, is clarifies the essay of which is injected water with varying pressures, it was designed methodologically to study the permeability in the rock, and as probing S-2 was drilled only in sediments (with varying degrees of compaction) this trial was not conducted, since it would not deliver information for sediments. The test is used to characterize the permeability of a soil as the identified with S-2 probing, Lefranc, as was done in this case. This test is generally used in soils permeable or semi-permeable, type granular and very fractured rocks.

Therefore, it is clarified that in accordance with the methodology to characterize the permeability tests of Lugeon they were only the drilling where rock was observed.

With respect to the analysis carried out, based on the S-1 and S-2 drilling, corresponds to the permeabilities in the area of the reservoir area where will be stored above sea water volumes in the environmental impact study, prior installation of a membrane bituminous you isolate from contact with the soil water.

With respect to the area of the plateau, corresponding to the formation of the black rocks (with varying degrees of) fracturing and weathering) and based on the trials of Lugeon made in the S-1, S-3 and S-5 drilling, these rock formations present coefficients of permeability values between $3.43 * 10^{-9}$ and $4.34 * 10^{-6}$ what corresponds to low and very low permeability.

In what regards the sector coastal of the "report geological and geotechnical" (VALH-0001-000-OOSS-INF-002) which corresponds to annex 1.3 Reports and flat Geological and Geotechnical This supplemental addendum, paragraph 4.2.2.4 interprets this sector as a sector with rocks of low permeability but not exclude the presence of areas that may present high permeability due to fracturamientos and/or weathering.

However all of the above, cAbe to remember that, for the accumulation of sea water in the reservoir, a membrane that will isolate water from the soil and prevent the filtration will be installed previously.

According to all the background information delivered in this process of evaluation has been made a complete and sufficient geological and hydrogeological characterization where it is relevant to the project.

3.4. Reiterates the observation that in page holder 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:"table 3-1.18, presents a collection of notable tsunami which took place on the shores of the I Tarapacá Region... " ", now that this topic was included initially in Chapter 3. Base line, point 3.2.2 lithosphere, point 3.2.2.3 risks, therefore, does not form part of the annex 3 - 1.1 baseline means marine.

Answer:

The owner welcomes observation and corrected as requested in Chapter 3. Base line, point 3.2.2 lithosphere, point 3.2.2.3 risks, which is attached to this Supplemental addendum in the annex 3.4 Corrections chapter baseline.

3.5. Reiterates the observation that 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 the subtitles of the table 3-24, since in all rows it says "Spring campaign", since this item was initially included in Chapter 3. Base line, point 3.2.4 hydrosphere Marina, point 3.2.4.2 physical oceanography, therefore, does not form part of the annex 3 - 1.1 baseline means marine.

Answer:

The owner welcomes observation and corrected as requested in Chapter 3. Base line, point 3.2.4 hydrosphere Marina, point 3.2.4.2 physical oceanography, modifying the table 3-24 in the terms described below:

Table3-24: Overview of magnitude with its standard deviation (SD) and address of current Eulerian by layer of depth and seasonal campaign.

Layer	Spring campaign

	Average magnitude	Standard deviation	Address
	(cm/s)	(cm/s)	
Surface	8.4	4.9	NE
Intermediate	4.9	2.6	IS
Background	5.1	3.1	SW
Layer	**Summer campaign**		
	Average magnitude	**Standard deviation**	**Address**
	(cm/s)	**(cm/s)**	
Surface	7.7	4.3	NE
Intermediate	4.9	2.7	E
Background	5.1	3.1	NW-N
Layer	Autumn campaign		
	Average magnitude	**Standard deviation**	**Address**
	(cm/s)	**(cm/s)**	
Surface	8.8	5.1	NE
Intermediate	4.9	2.6	NE-E
Background	5.5	3.2	W

Note: NE: Northeast; SE: Southeast; SW: Southwest (southwest); E: this; W: Weste (West); NW-N: norweste-North; NE-E: Northeast - this.

Source: Elaboration of the consultant Costasur Ltda.

3.6. Reiterates the observation that on page 3-1.150, should correct last paragraph where it says 3-5, table it should say table 3-28, since this item was initially included in Chapter 3. Base line, point 3.2.4 hydrosphere Marina, point 3.2.4.3 chemical oceanography, therefore, does not form part of the annex 3 - 1.1 baseline means marine.

Answer:

The owner welcomes observation and corrected as requested in Chapter 3. Base line, point 3.2.4 hydrosphere Marina, point 3.2.4.3 chemical oceanography, which is attached to this complementary addendum en the Annex 3.4 Corrections chapter baseline.

3.7. Reiterates the observation that on page 3-1152 to fix the names of the chemical parameters that appear in the second part of table 3-28, since this item was initially included in the chapter 3. Base line, point 3.2.4 hydrosphere Marina, point 3.2.4.3 chemical oceanography, therefore, does not form part of the annex 3 - 1.1 baseline means marine.

Answer:

The owner welcomes observation and corrected as requested in Chapter 3. Base line, point 3.2.4 hydrosphere Marina, point 3.2.4.3 chemical oceanography, which is attached to this Supplemental addendum in the Annex 3.4 Corrections chapter baseline.

3.8. Reiterates the observation in relation to page 3-1,127 mentions that the study was subjected to inspection and review by the SHOAH. Therefore, it must present copy of the works Inspection Act and respective resolutions where "Oceanographic value" studies are approved. This, as in annex 3-3, we included only inspection proceedings corresponding to the development of the work on ground (acts N ° 5/2014 and N ° 13/2014). However, must attach a copy of the SHOAH resolution approving courageously "Oceanography", studies of mareas, currents and waves, which were developed according to the Pub.SHOA N ° 3201/2005.

Answer:

The holder receives the request and the requested documentation will be presented to the maritime Governor of Iquique after which the process of validation by the SHOAH has concluded.

However, it is clarified that el information injunction requested by the maritime Governor of Iquique says relationship with technical information defined in the scope of the SHOA 3201 Oceanographic instruction. This instruction has by objective, lay down the rules that must undergo oceanographic activities that institutions and companies that need to comply with article 13 of the regulation of maritime concessions, legal regulations that It states that the beneficiaries of maritime concessions for the construction of terminals, docks, piers, largest shipyardor other maritime works of similar size, within the period that the effect is affixed to them, must submit to the maritime authority study and illustrative drawings on winds, tides, currents, waves, probing and quality of the bottom of the sea, the place in which it These works, which previously must have been reviewed and approved by the Navy's Oceanographic and hydrographic service installed. From there that, in general, these provisions are applicable to all oceanographic study, by its nature, require the approval of the SHOAH.

In this context, it is important to note that the baseline studies marine made for Tarapacá mirror project, by their nature not applies this instructive SHOA (the project not applied the Art. 13 of the reg. maritime concessions). De made the methodological scope that apply if you are content

in the sectoral technical review Guide for projects that include discharges to the marine water body by DIRECTEMAR, document that does not request such requirements discussed by the gob. TheItama Iquique.

The fact that the owner of the project (and by extension, the consultant responsible for oceanographic studies of baseline, the company Costasur Limited), has joined the SHOAH in the inspection field and analysis on Cabinet of oceanographic information raised in Caleta San Marcos, says relationship with the obligation to comply with this instruction manual, but it was rather due to the need to strengthen the dynamic analysis associated to the currents giving "Oceanographic value", since such data would also feed hydrodynamic models. In this context, the information already provided on the record of inspection realizes precisely the results of the visit field of SHOA staff for these effects. Anyway in the 3.8-A annex attached face of notice of the SHOAH that recognizes the research value of study Oceanographic baseline mentioned above.

On the other hand, met with mention that date April 24, 2015 was made formal entry of dynamic coastal studies carried out by Costasur for review and evaluation by the SHOAH (In ANexus 3.8-B is submit copy of the conductive admission letter).

Highlights that the internal deadlines of this body for the review of this type of studyyou, are independent of the management owner and consultant, the commitment of the proprietor is therefore to reach the local maritime authority approving resolution as soon as it is informed by the same Holocaust.

3.9. The holder must complement the core archaeological project according to the following:

- **Via ICSARA N ° 1, asked the holder all the archaeological sites that were affected by the works of the project is marked, to know its extension to surface and stratigraphic level, and thereby determine the measures of compensation and respective mitigation. Such characterization is not attached in the addendum, only indicated the commitment of 12 wells in an area of 3 hectares corresponding to lytic VE19 site concentrations. Therefore it is necessary to present the above for their environmental assessment information**
- **It is necessary to run a network of boreholes more intensive in areas corresponding to the concentrations and spaced between them, during this assessment to evaluate its continuity. Site VE15 is suitable the topographic survey and registration with tab ad hoc.**

Answer:

The holder receives the request. For this purpose, it requested the CMN permission to carry out surveys of April 10, 2015 wells, which was authorized on May 29, 2015 by means Of Ord. 1446/15 (enclosed in) Annex 3.9-A, TOpendice 1 Chart request NSC boreholes and Appendix 2 Letter authorization Drilling wells, Of Ord. (1446/15)

Drilling wells were performed as stated in the above CMN nursing, and sand attached the Report of Characterization of the Archaeological site VE-19related to the project camp, in the Annex 3.9-A Appendix 3. In order to achieve the surface and stratigraphic characterization of the site was implemented a grid of 20 Wells probe on the area of the ar sitepredefined queologico, achieving only circumscribe its surface area which showed deposition of cultural materials subsurface.

The results showed stratigraphic sequence with material subsurface in the U-12 and U-20 in the central sector of concentration 1 wells, only place where registered an anthropic occupation with deposit for Sitemap VE-19, likely pre-Hispanic adscription of chronology indeterminate.

Based on these results and given the location U-12 and U-20 wells with respect to the area of the camp, the owner has decided to move towards the South the camp in question, as shown in the figure 3 6 and Figure 3-7. This, with the objective of not intervening probing wells in reference belonging to the concentration 1 VE19 site.

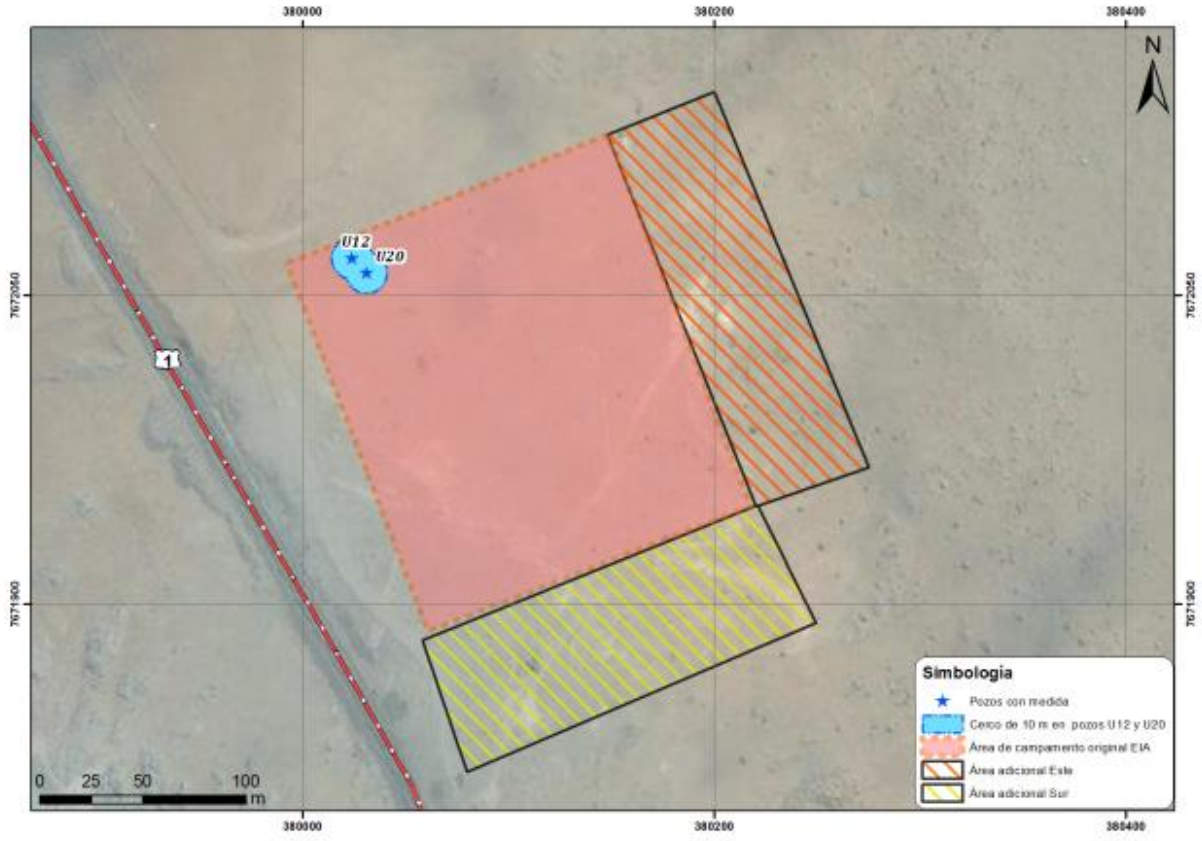
To ensure the environmental feasibility of the site of the camp in the sector where was displaced, was conducted an archaeological survey of the additional surface, of approximately 2 ha, which is attached in annex 3.9-B. The results indicate that these sectors not currently evident cultural elements in surface.

On the other hand, it is clarified that it will implement a 10 m buffer setting wells U-12 and U-20 of 1 concentration of room V-19, with the installation of a permanent fence and informational signage, thereby preventing access to and changes in the passage of vehicles and work d (e) machinery during the stage of construction and operation of the camp.

In addition, during the removal of the construction phase of the camp ground will be the permanent supervision of an archaeologist on site.

In addition, during the land of the construction phase of the camp clearance work is withTara under the permanent supervision of an archaeologist on site.

Figure 3-6: Location wells within the area of camp.



Source: own elaboration.

Figure 3-7: Displacement camp to the South

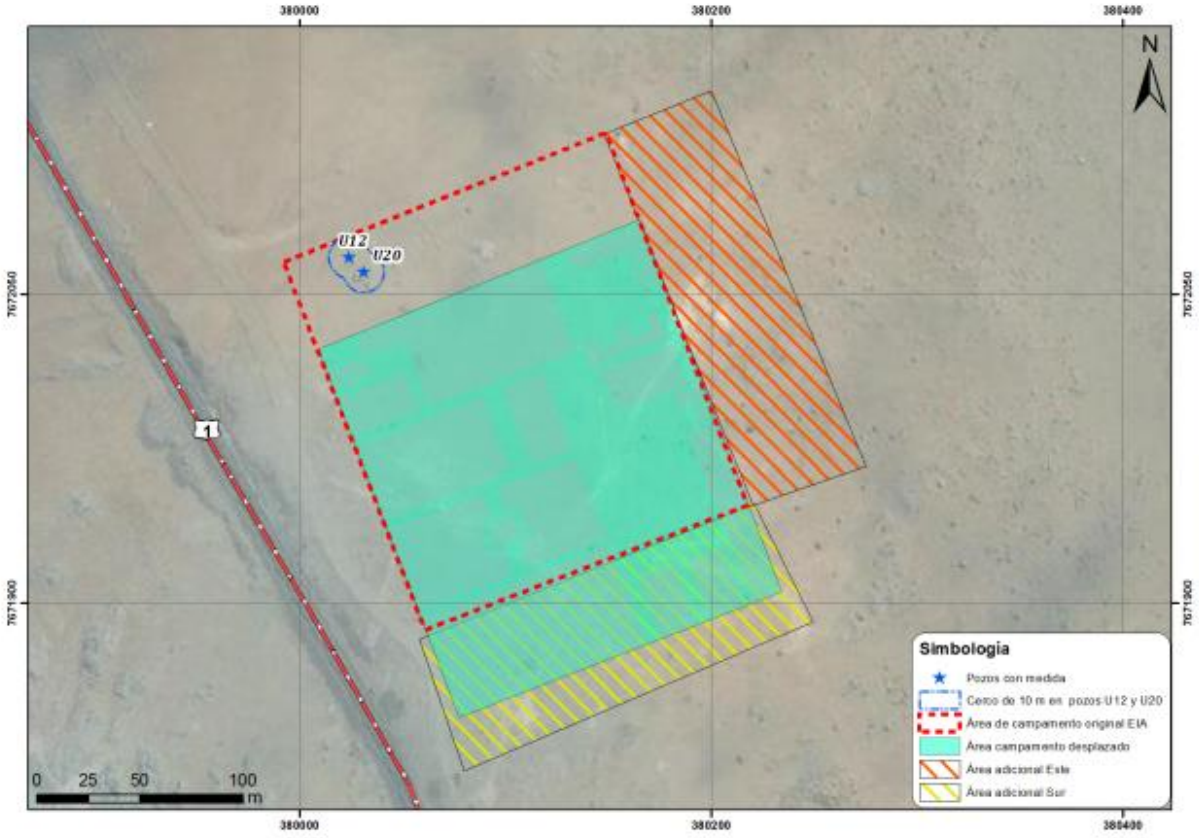


Table 3-5: Coordinates of the camp works.

Instalación	Obras	Vértices	Área (Há)	Coordenadas UTM (WGS84, Huso 19S)	
				Norte (m)	Este (m)
Campamento	87 Cuádruples	1	0,3389	7.671.847	380.078
		2		7.671.937	380.044
		3		7.671.949	380.076
		4		7.671.858	380.108
	42 Singles	5	0,1386	7.671.940	380.043
		6		7.671.977	380.029
		7		7.671.989	380.061
		8		7.671.953	380.074
	50 Dobles	9	0,3811	7.671.860	380.113
		10		7.671.991	380.064
		11		7.672.000	380.089
		12		7.671.869	380.138
	Casino	13	0,0600	7.672.013	380.146
		14		7.672.026	380.182
		15		7.672.006	380.187
		16		7.671.993	380.154
	Oficinas	17	0,0650	7.672.028	380.137
		18		7.672.042	380.174
		19		7.672.028	380.179
		20		7.672.014	380.142
	Bodega	21	0,0048	7.672.073	380.169
		22		7.672.068	380.171
		23		7.672.064	380.163
		24		7.672.070	380.161
	Enfermería	25	0,0136	7.672.005	380.018
		26		7.672.013	380.015
		27		7.672.019	380.032
		28		7.672.011	380.035

Finally, according to the request, se attach the tab's characterization Sitemap VE15 (milestone stone), related to the high voltage line, in Appendix 4 of annex 3.9-A.

3.10. With respect to the paleontological component (Annex 3-8 of the addendum 1 of the EIS), the holder must perform and present the analysis of the S2 and S3, drilling that do not appear in table 3-5 (p. 66) of paleontological baseline. This application is based on what was said in comment ICSARA 3.28 N ° 1, which specified the following: "If there were polls they should be mapped and, taking into consideration the limitations of this method, try to establish if the geological materials" described are at least "susceptible" from the point of view of the fossil and/or sedimentological, always taking into account the above-mentioned classification"

Ranswer:

The holder receives observation and It clarifies that to answer the supplementary ICSARA in the field of Paleontology is a study of additional baseline in order to deepen the characterization of the project area, and thus pinpoint the location and attributes of the fossil material actually present in the sector. For this was hired the consulting company Terra Ignota prepared reports (complementary to) baseline (Annex 3.10 of this complementary addendum) including the analysis of drilling and b) evaluation of impacts (This additional addendum annex 5.1-C).

The result of this work led to confirm certain archaeological sites fossilas well as, a discard some areas with ""potential"" fossil previously identified. EST and improvement It was considered to develop responses of the present addendum to supplemental allowing you to define the application of the rescue fossil material and the paleontological fossil areas existing monitoring and which relate to the works and activities of the project, descartando its application in areas where the data and the analyses conclude that there are no fossils.

In short, remains the spirit of protecting the heritage already exhibited in the evaluation process and required its practical application based on new land and geological data on the basis of which the fossil surfaces in the area were defined from the Project.

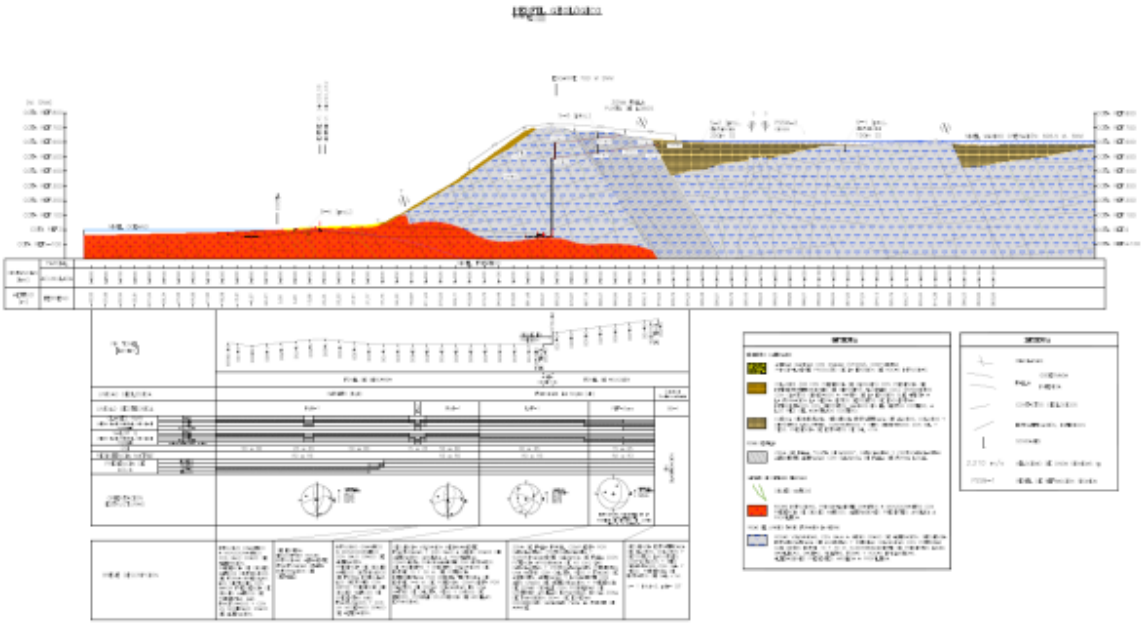
In regards to geology, is attached to this annex 1.3 in which supplemental addendum is delivery information and geological and geotechnical maps relating to the project. It should be noted that the information obtained as a result of these studies was used to define the final location of the underground works of the project submitted to environmental assessment.

Below is delivery the process of the analysis both in Geology and Paleontology and their results for the purpose of the present addendum to supplemental.

In as regards geology, in base to the reports and plans Annex 1.3 of the present addendum It is possible to know the geological profile of the underground site and the reservoir of the project. In the same annex 1.3, the six carried out drilling information is delivered. Of these, the probing 5 (S5), located at the top of the cliff is that delivers relevant information to the paleontological analysis related to the construction of the upper tunnel project.

Then presents the geological profile, flat VALH-0001-000-OOSS-PL-002 of annex 1.3 of this Supplemental addendum, for consideration of the TOuthority.

Figure 3-8: Geological profile



Source: own elaboration.

Now, in relation to the revision of the drilling, as requested in the question, for the update of the The paleontology component Base line, was conducted the review information about the drilling S1 a S6 made for the purposes of the project design. In this regard, and the Figure 3-5 This complementary addendum appears the ureferential ocation of the drilling carried out for the project studies, all located in line with the works corresponding to the reservoir and works undergroundaneas.

In accordance with the revised geological information, it was concluded as follows for purposes of Paleontology:

- Drillhole S1 to S3 are located in areas of the project that works will not develop or activities underground and therefore, it will not affect subsurface. His analysis is not relevant for the purposes of Paleontology of This project.

- According to the geological map)Skarmeta and Marinovic1981) and the Geotechnical study)Skava and Poch2015), S4 probing mostly drilled rocks plutonic, lack of interest from the palaeontological point of view.
- In relation to the probing S5, located in an area of the plateau where there will be underground works related to the upper tunnel, cas result of the direct observation of all of the witnesses, activity included in the update of the Base line of Paleontology, non carbonated levels susceptible host fossils were recognized. This Probing It was drilled during the Geotechnical study (with 150 m depth) and was located in the high part of the coastal cliff, cutting the black the training materials.
- S6 probing identified volcanic rocks from 6.8 m to 240 m of depth, without interest from the point of view of the potential fossil, which is ruled out also.

In annex 1.3 of this complementary addendum are photographs of the witnesses of the drilling of 1 to 5, in Annex A of the report of geological investigations (the witness of probing 5 photos found beginning on page 50). S6 probing information is in the same annex 1.3, the report end monitoring probing-6.

With regard to Description more detailed the fossil material in the project area, in the Appendix 3.10 This supplemental addendum, arises the update of the Paleontology than baseline considered baseline already carried out for this project (GAC, 2014), performs an identification of areas with potential fossil and a new survey of information in field, as well as analysis of drillingto define the areas of fossil.

The following figure sample areas with potential fossil based campaign was carried out to which the terrain This additional baseline.

Figure 3-9: Potentially Fossiliferous areas

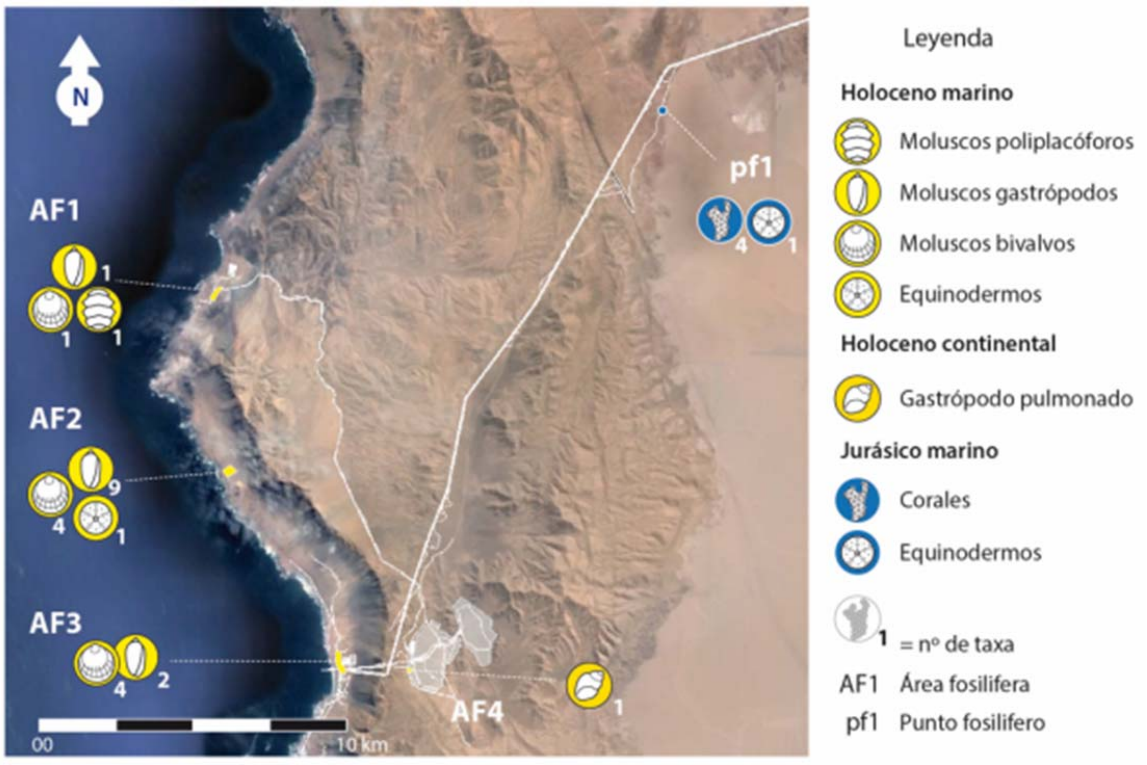
Source: elaboration Terra Ignota, 2015

ESTe work of integration and analysis of the information literature, specific studies of geology and Paleontology, as well as the observed direct information on land, it allowed to pass the previous identification of areas with potential fossil (GAC, 2014) raised in Annex 3-8 of the addendum posted on March 12, 2015, the definition of specific fossil areas in the area of the Pproject including, when this was the case, the identification of fossil material encountered in each. With respect to the areas "previously identified as"with potential fossil"" in the sector of the reservoir and upper tunnel, it was determined that no There is such potential fossil.

For the realization of estI complementary studies of Baseline paleontology and its Impact assessment OVRRe the component, it worked under the guidelines suggested in the guide of evaluation of impact the Heritage Cultural, SEA, whereas the location and characteristics fossil areas identified and the realization of earthworks or excavations for the construction and installation project.

Below is a figure with the fossiliferous areas and its contents According to the findings of the field work that were identified in the area of influence of the project. Also includes the fossil point (pf1) recognized in the vicinity)CA. 500 m) of the project, outside the area of influence.

Figure 3-10: Fossiliferous areas (AF1 to AF4) and its contents and fossil point outside the area of influence.



Source: created by Terra Ignota, 2015.

In the previous figure, you can see that they determined four fossil Areas in the area of the project, three of which are in the coastal sector and correspond to a site de not mineralized fossils of the present in all the coastal sector and the fourth oloceno is located in the area of the reservoir. Included fossil point "pf1" only for effects of contribute to the knowledge puestor that it will not be affected by the project.

As to the works of the project, these only will take part promptly the site of the coastal sector:

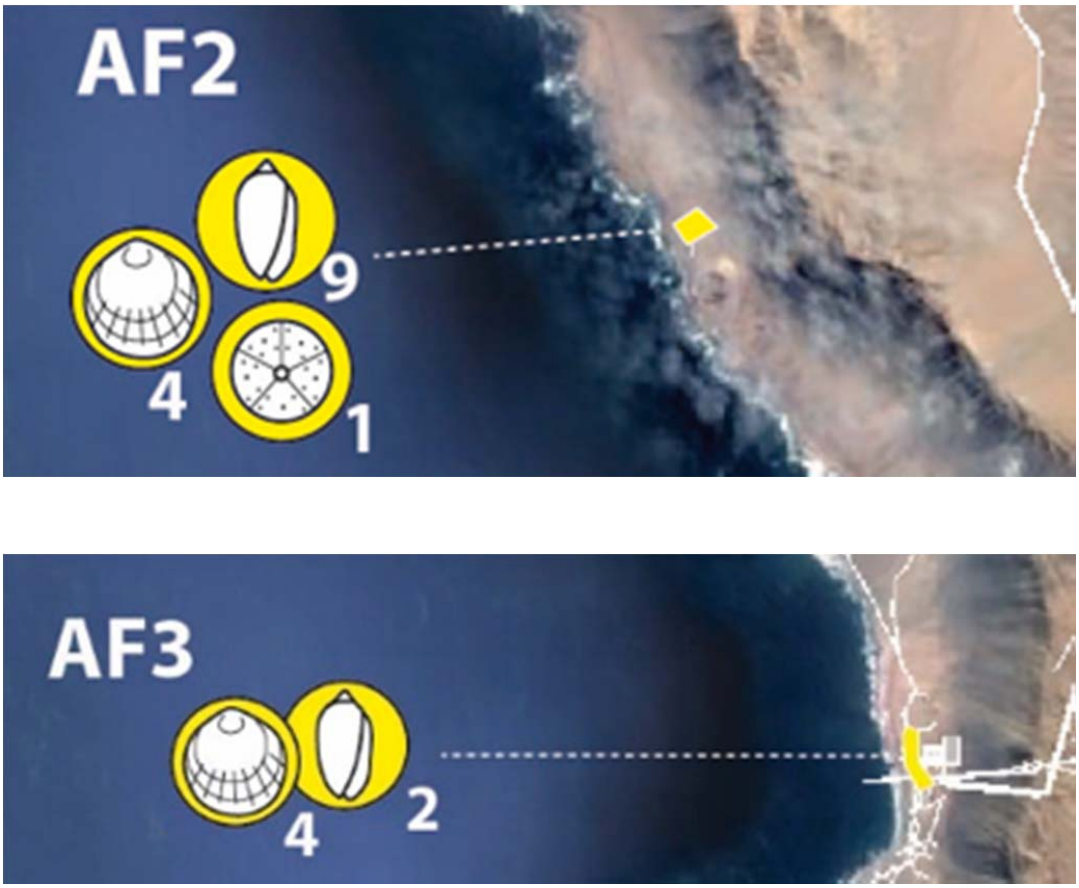
i. AF1, in the sector of Rio Seco, a stretch of the route of the North driveway, located on the plain matches the site.

ii. The camp will be installed in the AF2 and.
iii. in the AF3 located in the Cove of San Marcos, develop service roads and works of the project.

In the AF4located in the plateau area a collection of the project area is located. Is SoliHe cites the PAS 132 for all these interventions as outlined in the answer to the question 7.5.1 and whose antecedents are accompanied in Annex 5.1-B of this Adendto complementary.

The fossiliferous areas of the coastal sector respect of the works the project they represent with yellow areas in the following figure.

Figure 3-11: Approach to the Areas fossil AF1, AF2 and AF3.



Source: Terra Ignota, 2015

Therefore, the analysis to respond to the supplementary ICSARA, including the revision of the drillingit delves into the identification of the paleontological material and leads to the conclusion, First, What There is a large deposit in the coastal sector de not mineralized fossils of the Holoceno, material highly represented and known in Chile, which is related to some of the movements of Earth that will carry out the project and with respect to which prompted PAS 132 , and for which accompanied the background that accredit the fulfillment of the requirements of the same and, secondly, What in the sector where the upper tunnel was bore no fossil material underground.

Whereas the analysis presented, was an impact evaluation, whose results are delivered in the 5.1-C annex to this supplementary addendum. The works and activities of the project with effects on the paleontology component correspond to the construction of both surface and underground works. As result of the baseline was established that there are four you reviews

fossils in the project area and these coincide with works whose construction is the area of the land where was the site of non-mineralized fossils of the Holocene.

The analysis of impacts established the following:

- Lenvironmental relevance of the fossiliferous areas AF1, AF2 and AF3 is moderate.
- The magnitude of the impact is the same on the AF1, AF2 and AF3 fossiliferous areas It is moderate.
- The qualification of the impact in the fossiliferous areas AF1, AF2 and AF3 is "non-significant" or "insignificant".
- The environmental relevance of the fossiliferous area AF4 is low.
- The magnitude of the impact in el AF4 fossiliferous area equals Al las AF1, AF2 and AF3 fossiliferous areasI mean is moderate.
- The qualification of the impact in the fossiliferous area AF4 It is "not significant".

With regard to areas fossiliferous AF1, AF2, AF3, the findings made in these points they are well represented in the Holocene deposits related to marine deposits to the along the northern coast of Chile, so the project will impact a area very minor and bounded in relationship to the extent and territorial expansion training fossiliferous in question in the North of Chile. Therefore, sand attributed them significance amUIAA moderate and an impact no signification.

In relation to the fossiliferous area AF4 in the sector of the plateau, the findings of Bostryx SP., in this baseline correspond to gastropods current age attributed to the Holocene. Environmental relevance was low and not significant impact.

Therefore, even though the project intervenes paleontological findings, in accordance with the environmental impact assessment, such intervention It has no significant impact on Paleontology component. Now, according to the sectoral regulation established in the law 17,288 and the Decree 484/1990 Regulation about excavations or archaeological, anthropological and paleontological, surveys It is requesting PAS 132 for any type of intervention about in heritage. Accordingly, Annex 5.1-B isn history that allow to evidence compliance with the requirements of the above-mentioned permission.

4. PLAW LAN

4.1. The holder must arrange sectoral permission is necessary for fisheries research (D.S. N ° 461/1995), associated with studies of environmental monitoring that are derived from this assessment.

Rexposed:

The holder receives the observation. For studies associated with the follow-up Plan proposed for this project will carry out fishing sector permission to perform research (D.S. N ° 461/1995).

4.2. Is designated the holder that all activity for environmental monitoring for the marine environment, which is planned to be within the area of management and exploitation of benthic resources (AMERB), must have the knowledge and authorization of the corresponding fisherfolk organization that is responsible for the administration of the area.

Rexposed:

The owner clarifies in the respect that the PLAN's Vigilancia TOmbiental for the Mtop MAriño - Deputy in the Annex 9-1 of this Supplemental addendum- effectively covers the area of influence project as well as the control points located to the North and the South of the project in order to properly make environmental monitoring.

The project does not consider a follow-up to the inside of a since AMERB, which has pledged to contribute to the development of the activities of Caleta San Marcos without interfering with them and on the other hand, the holder can not commit themselves in this environmental assessment to obtain a permit from the Organization of Fishworkers in charge of the AMERB, San Marcos B, given that according to the legislation in force governing these areas, this organization is not obliged by law to grant access authorizations to third-party.

5. PLAN ENFORCEMENT PAS

5.1. In relation to the Permission sectoral environmental (PAS) as stipulated in article N ° 132 de CUMPLIMIENTO, the holder must present all the environmental technical background associated with the archaeological and paleontological, components requested through this report, for its grant.

Answer:

The holder receives the request. The 5.1-A annex to the present addendum presents the records requested for the article of sectoral environmental permit no. 132 of the archeology component CUMPLIMIENTO for the execution of the works of the project.

With regard to paleontology, as a result of the construction of certain works of the project It will intervene material paleontological It was identified in four sectors project, three areas fossilAF1, AF2 and AF3 in the coast sector corresponding to the site of not mineralized fossils of the Holocene and a fossil area if, BF4, in the area of the reservoir, all characteristicscurly in additional and up-to-date baseline studies a summary is represented in Figure 3.10 of this Supplemental addendum. In this respect, the findings made in paragraphs of the coastal sector are well represented in H depositsolocenos related to deposits sailors along the coast northe of Chile, by what the project will impact a area bounded and punctual in relation to the magnitude and extension training fossiliferous. Therefore, was attributed a moderate environmental relevance, and a non-significant impact.

In relation to the fossiliferous area AF4 in the sector of the plateau, the findings of Bostryx SP., made in this baseline correspond to gastropods current age attributed to the Holocene. Environmental relevance was low and not significant impact.

Without limiting the foregoing and Since is intervening fossiliferous areas as a result of the construction of certain works of the project requested the permit environmental sector of the Art. 132 of the CUMPLIMIENTO for These interventions, and whose backgrounds that allow evidence compliance with its contents and requirements are accompanied Annex 5.1-B of this Supplemental addendum, as described in response to question 7.5.1 This supplemental addendum. In this respect, shall be one surface collection of paleontological representative samples of the material in question in the fossiliferous areas AF1, AF2, AF3 and AF4 before the start of the works of motion of Earth and during its realization, as well as, a fortnightly monitoring during the intervention reservoir reporting the results of this on a quarterly basis to the Superintendence of the environment and the Council of national monuments.

5.2. Regarding indicated by the holder in paragraph 5.5 of the addendum N ° 1 in relation to mixed PAS de item No. 146 of the CUMPLIMIENTO, the holder shall:

- **Present the characterization of the resident populations in the area of release.**
- **Characterizing areas of relocation, in order to evaluate the feasibility of the establishment of the rescued individuals.**
- **Present information in detail regarding the type of marking that will be held at the rescued individuals.**

- **Change indicator of success, because the abundance of the population residing in the area of relocation, not known by which it is not possible to establish an increase of 20% after the implementation of the measure.**

Answer:

The owner welcomes observation, so it was the characterization of the resident populations and relocation area. For more information refer to the annex 5.2-A Characterization of areas relocation for wildlife, this Supplemental addendum.

Regarding the type of mark to be used to identify individuals rescued, holder points out that objective of marking individuals is subsequently track relocated individuals. In this sense should be considered, that the objectives of this measure is lower stress, lower the manipulation of individuals and preventing copies death. Because of this, which chose to mark individuals with a technique little invasive. Why was selected the mark with non-toxic indelible paint, which can be applied directly on the skin of individuals.

Since this implies that mark is low durability, are considered fundamentally measurements of abundance in the capture and relocation area for results based mainly at the level of populations, not precise and only at the level of relocate individual. However, in case of register copies marked, are these will be recorded and will be calculated the proportion of relocated copies reobservados.

In relation to the areas of relocation, it is important to mention that, thanks to the characterization of the two areas initially selected, opted for proposing the No. 1 area for these purposes (see annex 5.2-A), in which obtained the abundances of species objective, which is presented in the following tables.

Table 5-1: Abundances of species present in the area of relocation N ° 1.

Taxa	Species		Origin	Category of conservation		Abundance
	Scientific name	Common name		Hunting law	RCE	
Reptiles	*Liolaemus stolzmanni*	Dragon's Stolzmann	E	I *	-	181,13**
	Phyllodactylus gerrhopygus	Salamanqueja of the great North	N	V	-	90,56**

* Considering the category of *L. reichei*, currently synonymy of *L. stolzmanni*. Indirect records are not considered in the calculation of density. N: native; E: endemic; VU: Vulnerable; I: inadequately known. Source: elaboration GAC

At last with respect to indicators of success measurement rescue and relocation, tto the as suggested by the Guide technique to implement measures of rescue / relocation and controlled disturbance of the agricultural and livestock service (Torres-Mura *et to the*., 2014), intends to use the following parameters, which will be monitored for short and long term:

- *Abundance of species target:* It corresponds to the assessment of the establishment of the specimens marked in the new habitat on the basis of ecological attributes and history of life (long term), and is defined as the number of individuals present in the area. This variable will be measured both in the capture area of relocation, from estimates of abundance prior and subsequent to the rescue and relocation.
- *Percentage of individuals relocated reavistados:* It corresponds to the evaluation of the inclusion of the specimens marked in the new habitat (short term); and is defined as the proportion of copies marked reavistadosin relation to the total number of marked individuals relocated. This variable will be measured both in the area of capture and relocation from the rescue and relocation estimates.

In addition, intends to make an expert professional supervision during the time the activity of membrane installation developed in the reservoir, in order to ensure the rescue and relocation of those individuals who could not have been detected during the previous rescue.

Annex 5.2-B presents the 146 PAS updated according to information mentioned above.

5.3. In relation to the PAS de article N ° 155 of the CUMPLIMIENTO, and considering the new observations raised in this report with respect to the baseline of the project, is that he reiterates what was observed via ICSARA N ° 1, namely:

5.3.1. 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.

5.3.2. 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.

5.3.3. The owner designates in the study that "in order to prevent leakage 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 be presented in detail how will verify the impermeability of the reservoirs, so that this can be

corroborated in future audits, considering that the useful life of the project is indefinite.

5.3.4. 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.

5.3.5. Depending on the comments previously submitted must re-evaluate monitoring and contingency plans and complement them or modify them where appropriate.

It should be noted that you expected the holder to present a physical system that allows the environmental authority verification or control of the correct operation of the reservoirs and their works.

Rexposed:

The holder receives the request and togrounding, advises that dated 2 April 2015 has begun the sectoral process of authorization of hydraulic works, as enshrined in the ring letter enclosed in the Annex 5.3-A Letter request permission works hydraulic, This addendum.

The holder clarifies the following.

5.3.1. 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.

The holder receives the request and clarifies that according to information Bibliographic and terrain raised for the project major works such as the reservoir, the underwater and underground works are not listed with the existence of terrestrial water. Neither the temporary works located on surface.

Sector costa, in the case of the lower tunnel, as on probing N ° 4 done, found water underground corresposeparate the influence of the sea. CAbe mentioning that the underground works of the project to be carried out, have considered the existence of the rock in its design and for its construction. In case of leaksis considered to sealthe to prevent the entry of water. These waters will be pumped out and arranged in ponds of an authorized company which will also withdraw them for disposal. So it is considered that the sea waters will not be affected by the project. In this regard, during the construction of the underground works are located more than 80 m from the coastline will be a semi-annual report to the DGA with the registry of the water withdrawn underground marina.

During operation, the tunnel will be filled with sea water therefore no contingencies are expected.

5.3.2. 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.

The owner explains that, as noted in the response to question 2.1 This addendum coMPLementariathe component hydrogeology was characterized in the EIA and in the addendum, both through the compilation of reports, work and specific research related to geology, hydrogeology and hydrology on the sector study; as the implementation of field studies that allowed to deepen the description of the hydrogeology associated with the area of site. This information was supplemented in the present addendum reports with geological and geotechnical drawings enclosed in annex 1.3.

The aforementioned studies allowed to determine which not is they reveal underground water bodies in the sector where there will be excavation works nor where the reservoir is located.

Based on the foregoing and 5.3.1 response, There will be no interaction between the operation of the water works and groundwater.

5.3.3. The owner designates in the study that "in order to prevent leakage 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.

The owner explains that, as was answered in addendum earlier, posted on March 12, 20155.6, the question bullet 3, the impermeability of the reservoirs will be verified during the installation of the membrane and throughout the entire operation of the project.

During the operation phase, there will be in-depth reviews of their State, taking advantage of thes maintenance six-month scheduled. In that instance, the State in which the membrane is must be checked by performing a visual inspection throughout the area. Below are presenTa an overview of the repair process, presented in question 5.6 already mentioned.

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 throughout the period of operation of the project. In that situation, and given the characteristics of the membrane, the break through a work place shall be identified to be carried out by divers prepared to carry out this work in the sector, which is covered with water and by route and visual inspection of the section of membrane that is outdoors or submerged.

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 the rperiodic evisionesthat will be reviewed in detail the State of the membrane, they allow detect and make timely repairs that were needed.

It should be noted that this membrane can be repaired without emptying the reservoir, i.e. it can be repaired even if it is covered by water. The detail of the repair process is described in the next answer.

However, the physical system of monitoring the level of the reservoir and any infiltrations, described at the end of the answers to this question 5.3.

5.3.4. 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.

Holder reiterates information provided in addendum earlier, posted on March 12, 2015, in response to the question 5.6, bullet 3, in case of breakage of membrane repair shall be effected by a vulcanization process, if it is dry and without water, or via ato PuTTY Epoxy underwater, in case the membrane is covered with water. In both cases, it shall be verified that the 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 activities properly such repair will take place an inspection of areas where the existence of defects in the waterproofing system deemed likely.

The task will be carried out by a team of workers that locate defects, indicating the location and size of the same.

Then the location of the defect in the field will be marked and topographically, this way will be placed each of the defects with precision.

The review will distinguish types of defects according to their size and geometry.

b. Repair

The following methodology is proposed for the repair of the defects found during the initial review:

The area shall be defined leaving approximately 1m on each side of the shaft in which the defect is.

Prepares the cloth membrane to repair and clean the area bounded in a way suitable for the correct vulcanization. (See Figure 5-5)

Cloth membrane for repair will be placed properly.

c. Subsequent actions

After 5 weeks, it will be verified that sealing and union of both materials behave as expected, and, secondly, check that repaired defects do not present any faults 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 activities properly such repair will take place an inspection of areas where the existence of defects in the waterproofing system deemed likely.

The task will be carried out by a team of divers who locate defects under the surface of the water, indicating the depth which is located, as well as the size of the same.

While on surface to mark the location of the defect in the ground and topographically, this way will be placed each of the defects with precision.

The review will distinguish types of defects according to their size and geometry.

b. Repair

The following methodology is proposed for the repair of the defects found during the initial review:

-Delimit the area leaving approximately 1m on each side of the axis which is the default, using two cabos guide teachers.

While on the surface, prepares the cloth membrane for repair

The area bounded in a manner appropriate for the correct application of the product should be cleaned.

Around the defect will be placed a thick and abundant bead of adhesive product, so that ensured maximum seal defect.

On the perimeter of the cloth shall apply a cord thinner perimeter with the intention of avoiding possible movements of the cloth.

Clean the area and apply adhesive.

Cloth membrane repair slip and will be placed properly.

Finally the workers placed a series of bags in a row, so a row matches the defect axis and one of the bags is on top of it, while the others remain on the perimeter of the cloth.

This arrangement of bags will stay a minimum of 4 weeks, for the correct fixing of the products.

Fixings as well as the rows of bags may vary depending on the width of the cloths and are at the discretion of the field engineer.

c. Subsequent actions

Once completed repairs, after 5 weeks is carried out an inspection of the State of repairs.

The objective of this review is to check that sealing and union of both materials behave as expected, and, secondly, check that repaired defects do not present any faults 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 cloth attached.
- Check the seal, i.e., presents or not areas without adhesion.
- Verify whether or not there is lateral displacement.

Preparation of report.

5.3.5. Depending on the comments previously submitted must re-evaluate monitoring and contingency plans and complement them or modify them where appropriate.

The owner explains that on the occasion of the answers contained in the present addendum It has not specifiedfixed, or changed any appearance noun with respect to the content of the addendum earlier, March 12, 2015. Therefore not expected a reassessment or modification of traces and contingencies of project plans.

Only complements in this addendum, the system of monitoring physical incorporating piezometers and actions to be followed in case of infiltration of the reservoir, as seen in the response of the next item.

In consequence, this headline considers 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 rupture.

- **It should be noted that you expected the holder to present a physical system that allows the environmental authority verification or control of the correct operation of the reservoirs and their works.**

The owner welcomes observation and then presents the dfunctional eScription of the Ssystem of control and monitoring.

Consider that the description is made in the sense the flow of water When the project operates in the generation modeI mean, When is discharging water from the reservoir to the sea. For a better understanding included the flat VALH-0001-000-ELE-PL-003 in the annex 5.3-B, General diagram of Control devices, of the present supplemental addendum, corresponding to the general diagram of control devices for loading and operation implementation stages. Clarifies that nor there will be devices of control and/or monitoring reservoir during the construction phase.

a) Reservoirs

The reservoirs will benefit from level sensors, in order to safeguard their operation within the cother defined by the project, which were presented in Chapter 1 of the EIA and then replicate.

Figure 5-1: Dimensions of the reservoir (m v/s m3 accumulated)

Source: Espejo de Tarapacá.

Figure 5-2: Curve of average operation of the reservoir (m at the time).

Source: Espejo de Tarapacá.

In this respect it should be noted these level sensors have alarms to alert the operations team previously when the reservoir level is approaching levels limits. By way of example, during the normal operation for pumping, the capacity of the plant will represent increasing level approximately at a rate of 5 cm /HR on average, rate of change, which allows control of the operation of the reservoirs in loose form.

AlsoThere is redundant information measurement since in addition to the signal transmitted via optical fiber to the control room, there will be TV cameras that allow direct measurement from reglillas installed for these effects in reservoirs, and, on the other part in each pumping equipment/there will be pressure transducers that allow having the same information online.

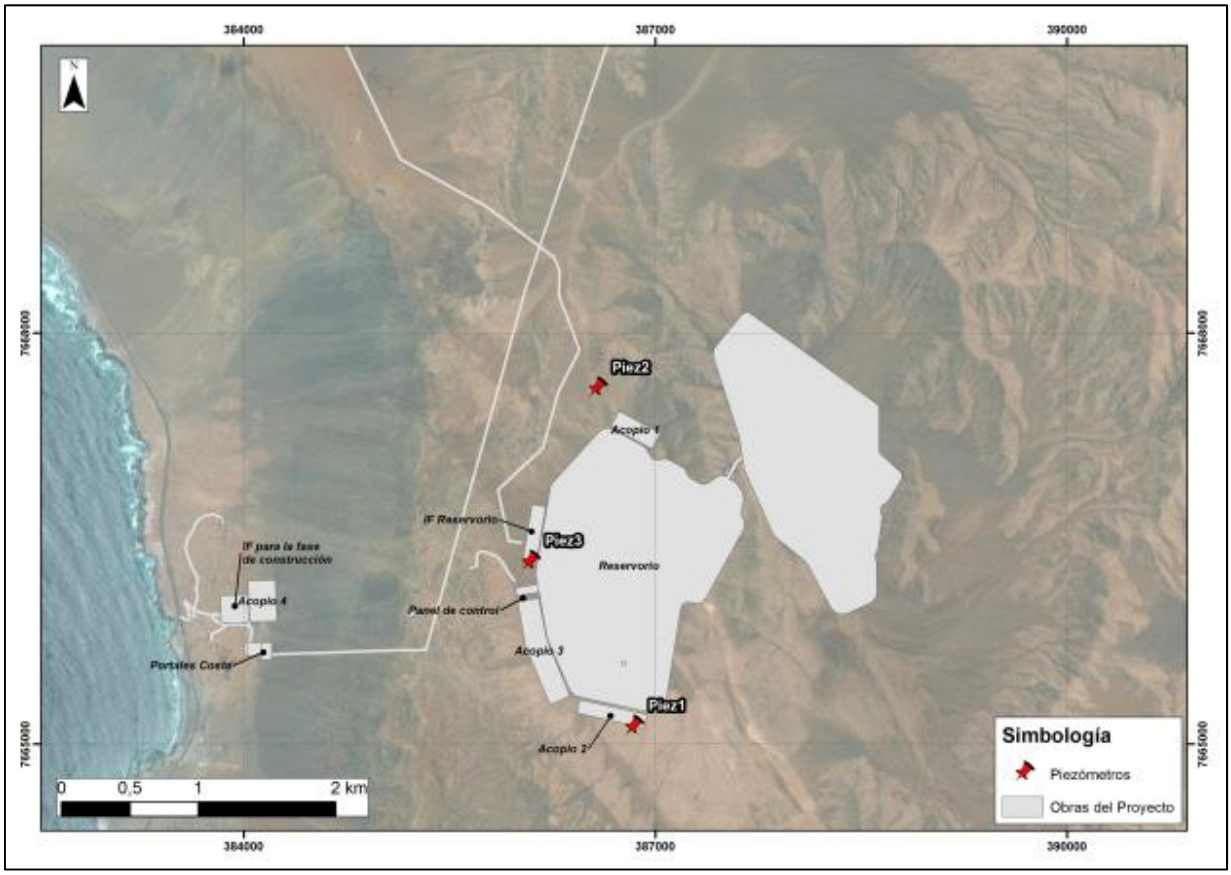
This information will be periodically recorded by the team's operation and control of the plant for his management and will be organized in monthly reports at the offices of the project.

On the other hand, with the information that will deliver this system and in regards to the membrane, in case dand identify some variation in the dimension at a specific time from the range of difference between: the level measurement and estimation of level expected on the basis of the pumped volume (with corrections, as for example the evaporation)you will be a diligent review of all parameters and measurement elements to determine the causes and make the necessary corrections. Depending on the background of each case will determine the relevance of revising the membrane according to the procedure already described for this project.

Additionally, in the reservoir, it has temperature sensors for environmental monitoring.

Finally, with regard to the monitoring of the reservoir membrane during operation, in addition to the annual review, piezometers to the outside of the reservoir will be installed to monitor the possible occurrence of leaks. The following figure shows the location of the piezometers in question.

Figure 5-3: Location of the piezometers reference.



Source: own elaboration.

Table 5-2: Proposed coordinates for the installation of the piezometers.

Piezometer	UTM E	UTM N
1	386832	7665131
2	386079	7666332
3	386567	7667597

Source: Espejo de Tarapacá.

The installation of the piezometers will be made before filling the reservoir. The piezometers will have a around 150 m depth. Once they are installed, the determination of basis for each piezometer water level, will be held in this case and in accordance with baseline information is expected there is no waterground s.

During the operation of the plant, will be a quarterly monitoring of the level of each piezometer and, shall keep a record of the measurements. Annually a report will be sent with these measurements to the General direction of waters, national service of geology and mining, and the Superintendence of the environment.

To the registry of a variation in the phreatic level proceed in the following way:

- You will communicate the variation in the water level the head of operation of the Central.
- Measurement will be repeated to rule out any error in the procedure or the variation of the groundwater level measurement equipment.
- If confirmed the variation of groundwater will be a complete review of the membrane according to the procedure of repair and maintenance described in the answer to the question 5.6 of the addendum to previous, whose abstract was presented above in this same response.
- In case if necessary will start reducing the level of the reservoir to check the membrane until the break.

After the repair be monitored groundwater every two months for a year at least to determine a trend in the phenomenon of the groundwater level variation. Considering the characteristics of the project and of its location, it is likely that measurement in the piezometers level not lower immediately, since water that had come out before the repair will continue moving and slowly according to the report presented in ANexus 10.2: ""Analysis of stability Slopes of the coastal cliff"of the EIA of the project.

The repair procedure is described in the answer to the question the previous addendum 5.6 and also higher in response to the same question.

In addition, it should be remembered by the normal operation of the reservoir, in the winter season will be to view a part of the membrane and such as discussed in the answer to the question the previous addendum 5.6, entered on 12 March 2015 a visual inspection of all the membrane will be held annually and meet any break will be patching it promptly in accordance with the procedure that was described in the addendum above and summarized in the response to point 4 of this same question.

It will a report of the occurrence of a break within the following month check that the patch to be repaired has been properly installed avoiding leaks and it will be sent to the SMA and DGA SERNAGEOMIN.

b) Roundhouse

In Roundhouse will be staying 3 units which services pumping and generation, equipped with their respective automatic control systems and remote control. Each unit will have their respective safety valves upstream and downstream.

For the operation of the units will be the automatisms of control standards for such facilities, which will allow starting and stopping operations, monitor its operation in both modalities, and change the operating mode, automatically According to the operator it resolved in coordination with the office of the interconnected system of the large North

Energy demanded or generated to the network will be conducted by a team of transformation to the transmission system.

c) Work of intake/discharge (underwater)

At the point of intake / discharge provides a temperature sensor, for the environmental monitoring.

6. IMPACT REDICTION AND EVALUATION

6.1. In view of the observations raised through this report, the holder shall submit a new analysis regarding the prediction and evaluation of the environmental impact of the project, for which he should have, in particular, in consideration that the Hydrogeological characterization of the area where the project is located is necessary for the evaluation of possible impacts on the continental waters.

Response:

As indicated in the answer to question 2.1, the hydrogeology component was characterized in the EIA and addendum, both through the collection of reports, works and Specific nvestigaciones related to geology, hydrogeology and hydrology regarding the sector under study; As through the implementation of field studies that allowed to deepen the description of the hydrogeology associated with the area of site of the works.

The aforementioned studies allowed Determine That is not Evidence of underground water bodies in the sector where the excavation works will be carried out Nor where will be located the reservoir that otherwise will be covered with a bituminous membrane that avoids contact with the soil and leaks, therefore Potentially significant environmental impacts on this component are not foreseen.

6.2. In relation to the answer 7.22 of addendum n ° 1, the holder is reiterated to describe in detail the methodology used in the valuation of noise and material components Particulate (describing the values for each aspect and the environmental component analyzed), and the steps that lead to qualify the impact "noise and material Particulate "As little significant, specifically at the stage in which the project blasting near the populated area (less than one km in San Marcos) will be carried out, so as to discard the undervaluation of the impacts associated with each one of them.

Response:

The Titu application and clarifies, as indicated in question 7.22 of the addendum Entered on March 12, 2015, That the methodology used for the evaluation of the environmental impacts identified, corresponds to that presented in chapter 4 of the EIA "prediction and evaluation of environmental impacts", which is widely used in the framework of the SEIA.

This methodology It follows a series of steps that allow to qualify the generated environmental impacts, and then to prioritize them. These steps include:

- Identification of activities likely to cause environmental effects
- Identification of components susceptible to impact

- Identification of environmental effects caused by project activities on each environmental factor
- Environmental impact Assessment

For the qualification of environmental impacts is used a methodology Had Multicriteria WHO considers The value of the environmental component, the character of the impact Ca, Your probability of occurrence Po, The extension Ex, its intensity I, the duration Du, reversibility Re, The typology and opportunity of Occurrence. In the case of the components Air quality and noise, The Environmental impact is assessed in Function of compliance with the regulations in a "project-based" scenario.

Air quality

The impact on this Environmental component lies in the direct effect it has on the health, well-being and quality of life of the population, which Is cautious through Standards, which is why your Rating is based on the fulfillment of these.

EL analysis of the potential impact is Realized In The area of influence of Project, corresponding To Geographic space comprising sensitive receptors, CaleTa San Marcos, Caleta Rio Seco and OOffices and workshop pErteneciente to Mina Ternadita (Km 33 approx. Route A-750), ie to the area comprising The Costa and Pampa sector of the project.

The Valuation Of this factor, was assessed in relation to the significance (Gis) or importance representing air quality for communities located within the project's area of influence, which, when associated with the coastal sector, is generally good. Because of the above, the significance is Considered HighGis= 8).

The identified impact corresponds to the "Increased material emissions Particulate and gases ", which will be generated in the construction, operation and closing phases of the project, mainly through the activities of Excavations, loading and unloading of material, and transportation of materials and personnel. The generation of S emissionse concentrates on the construction phase, within which the blasting envisaged will be developed.

Regarding the blasting, these will be Underground The most relevant being that associated with the Norwegian shot, which is carried out in the seabed, One-time, underground, from the lower tunnel to the bottom of the sea. This means that the Thunder will be covered by the layer of sea bottom, composed of rock, Shells and sand. Therefore, most of the energy will be absorbed by the Rocky massif and the thrust direction of the flown rock, will be in the tunnel. In the case of minor, low-intensity blasting, they will be covered with sand to reduce the range of noise and vibration expansion.

The Norwegian shot, compared to normal underwater blasting, not being in direct contact with seawater, has in most cases, less incidence in the vicinity, because it generates a hydrodynamic shock significantly lowerR. Likewise, and for Ensure safety during the development of this activity, an area was determined Security Through An analysis of the vibrations and wave expansion of marine submarine detonations, which is Presented In Addendum 1, Annex 1-7 Estimation of safety distances around marine blasting.

For those Emissions associated with Land movements and cons-related activitiesConstruction of the works and roads, we contemplate the mitigation measures such as the HUmectación of roads in mixing processesO and transfer of materials; The SSheDo Of Truck Bodies PARA avoid material dropping; The installation of Short-wind nets in the tasks; The KeepMachinery and vehicles, the COntrol of speed in tasks and the implementation As a commitment Voluntary for concrete plants considered, The moistening of aggregates to reduce emissions by shedding of material in the containers of concrete plants, and the use of conveyor belts with Folding Covers or equivalent, to avoid the Dust dispersion to the environment When the process is done. These measures are described in the Question 1.6 of this addendum.

With respect to the Magnitude of the impact "Increased material emissions Particulate and gases ", and on the basis of the above, Although a negative character was determined for this impact in all phases of the project, the magnitude is low considering that at all times the current regulations are complied with (see EIA Annex 1.5 Emission estimation), has a narrowed extension and is of reversible type, Given that once completed The activities or works that generated the impact, The quality of the air RecoverHer basal condition naturally. The summary is shown in the Table 6-1 Following:

Table 6-1: Magnitude Impact "Increased EMissions of MAterial QArticulated And GAces.

Sector	Phase	Ca	Po	Former	I	Du	Re	Magnitude
Costa and Pampa	Construction	-1	1	1	2	1	0	-4
	Operation	0	0.1	0	1	2	0	-0.3
	Closing	-1	1	1	2	1	0	-4

Source: Elaboration Gac

On the basis of the assessment of the environmental component, the mitigation measures contemplated and the magnitude described, this impact was rated as not significant for the construction and closing phases, and as non-significant For the Operation phase, which corresponds to the fact that it complies with legislation in force in this area. In the Table 6-2 The summary of The impact rating.

Table 6-2: Impact rating for air quality Factor

Sector	Phase	Relevance	Magnitude	Impact	Impact Rating
All of the Sectors	Construction	8	-4	Increase of the Material emissions Particulate and gases	-32 (little significant)
	Operation		-0.3		-2.4 (not significant)
	Closing		-4		-32 (little significant)

Source: Elaboration Gac

Noise

The impact on this Environmental component lies in the direct effect it has on the health, well-being and quality of life of the population, which Is cautious through The Regulations Existing (Emission standards), which is why your CAliFixing is Based on the fulfillment of this.

The analysis of the IM potentialPact in noise levels is RealiZa In The area of influence ofL Project DEterminada by Sensitive receptors CloserYou To the works of the same, CaleTa San Marcos, Caleta Rio Seco and OOffices and workshop pErteneciente to Mina Ternardita (Km 33 approx. Route A-750), ie to the area comprising The Costa and Pampa sector of the project

The Valuation Of this factor, was assessed in relation to its significance (Gis) or importance that it represents within aProject's influence area. It should be mentioned that rural areas generally have low levels of existing background noise, so they are highly sensitive to increases in noise levels, especially during the period Night. Consequently, the noise component has a very high relevance environmental assessment (9).

The identified impact corresponds to the "Increase of the noise level". The basal noise levels will be increased mainly during the construction phase of the project, since during the operation and closing phases Noise emissions are considered to be more limited, being associated with the operation of LAT and Personnel Transportation and maintenance, during the operation phase; and DArming and removal of land structures and transport of dismantled personnel and equipment during the closing of the project.

During The Construction phase Is Concentrates the Temporary increase in levels Basal of noise Mainly due to the construction of the different works Projected, Within which It is considered the development of the blasting contemplated.

Regarding the blasting, these will be Underground The most relevant being that associated with the Norwegian shot, which is carried out in the seabed, One-time, underground, from the lower tunnel to the bottom of the sea. This means that the Thunder will be covered by the layer of sea bottom, composed of rock, Shells and sand. Therefore, most of the energy will be absorbed by the Rocky massif and the thrust direction of the flown rock, will be in the tunnel. In the case of

minor, low-intensity blasting, they will be covered with sand to reduce the range of noise and vibration expansion.

The Norwegian shot, compared to normal underwater blasting, not being in direct contact with seawater, has in most cases, less incidence in the vicinity, because it generates a hydrodynamic shock significantly lowerR. Likewise, and for Ensure safety during the development of this activity, an area was determined Security Through An analysis of the vibrations and wave expansion of marine submarine detonations, which is Presented In Addendum 1, Annex 1-7 Estimation of safety distances around marine blasting.

About the magnitude of the impact "Increase of the noise level", and on the basis of the above, although a negative character was determined for this impact in all phases of the project, the magnitude is low considering What The Impact extension will be limited To the immediate environment of the Source That alteration, while involving significant changes to the baseline condition, will be within acceptable ranges and is an impact of type Reversible, since once finished The activities or works that generated the impact, Noise levels Recover'sN Their basal condition in a natural way.

In particular for the development of the blasting, the evaluation of the noise generated by them is Assessed on the basis To the American Standard *Measurement Procedures For The Enforcement, Chapter I: Illinois Pollution Control Board, Part 910, Title 35: Environmental Protection, Subtitle H: Noise Of 35 Ill. Adm. Code 900 & 901,* Determining That the levels are below the limits recommended by the American regulations at all the points of evaluation considered. The topography of the sector, together with the considerable distances presented by the tasks with the points, allows the acoustic energy to dissipate to a great extent.

In addition, projections were carried out for thundering events executed in the Costa Sector. The projected vibration levels were compared with the recommended values for buildings of normal construction as defined in German DIN 4150:1999, observing that they are below the range recommended by the regulation. The foregoing allows to conclude that the vibrations generated by blasting activities will not generate damage to the evaluated buildings.

The detail of the impact assessment associated with the noise and vibration component is described in the EIA Annex 4.2: Noise and vibration impact study.

The summary Impact assessment "noise level increase" is shown in the Table 6-3 Following:

Table 6-3: Magnitude impact "Increase of the noise level".

Sector	Phase	Ca	Po	Former	I	Du	Re	Magnitude
Costa and Pampa	**Construction**	-1	1	1	2	1	0	**-4**

	Operation	-1	0.1	0	1	2	0	**-0.3**
	Closing	-1	1	1	2	1	0	**-4**

Source: Elaboration Gac

On the basis of the assessment of the environmental component, the mitigation measures contemplated and the magnitude described, this impact was rated as not significant for the construction and closing phases, and as non-significant For the Operation phase, which corresponds to the fact that it complies with legislation in force in this area. In the Table 6-2 The summary of The impact rating.

Table 6-4: Impact rating for The noise and vibration component.

Sector	Phase	Relevance	Magnitude	Impact	Impact Rating
All sectors	**Construction**	9	-4	Increased noise level	-36 (Little significant)
	Operation		-0.3		-27 (not significant)
	Closing		-4		-36 (Little significant)

Source: Elaboration Gac

It is necessary to remember that the blasting that are made to open the portal of the tunnel of access to the cavern of machines Near Caleta San Marcos They will be made during the day and the community will be duly informed of these activities.

6.3. In relation to the electric transmission lines and the assertion of the proprietor, in the sense that these are a visual element abundant in the environment, the holder must present an illustrative image that allows to visualise all the electric transmission networks, Differentiating the projected ones from the existing ones, the medium voltage and the high voltage ones.

Response:

Se acoGE The observation and is delivered in the Annex 6.3-A, An image Illustrative of all electrical transmission networks near the project area, along with those projected, including the detail of the local distribution networks associated to the Caletas Rio Seco and San Marcos.

6.4. The visual quality and scale of the digital images of annex 7-4, in particular of the photomontages of the 6 defined observation points, should be improved, incorporating photomontages of the upper tunnel and extending the views to the reservoirs. Also, it should be presented the antecedents that allow to determine if the projected works and those existing in the area of influence of the project, can generate synergistic or

cumulative effects in the landscape. In this case, you must propose the appropriate measures.

Response:

The application is accepted and It is clarified that the upper tunnel is only observable from the surface the opening of access whose base is at a height of 592 M.a.s.l And when the level of the Reservoir exceeds 600 M.A.S.L. approximately no longer be seen.

As a reference to the following presents a computational image of the reservoir with water at a height of about 600 M.A.S.L. so as to show the works that will be immersed during the operation of the project, especially the sector of the tunnel Upper.

In addition, in annex 6.3-B, the photomontages delivered in annex 7-4 of the addendum entered on March 12, 2015, including the views of the upper tunnel and the reservoir, are appended.

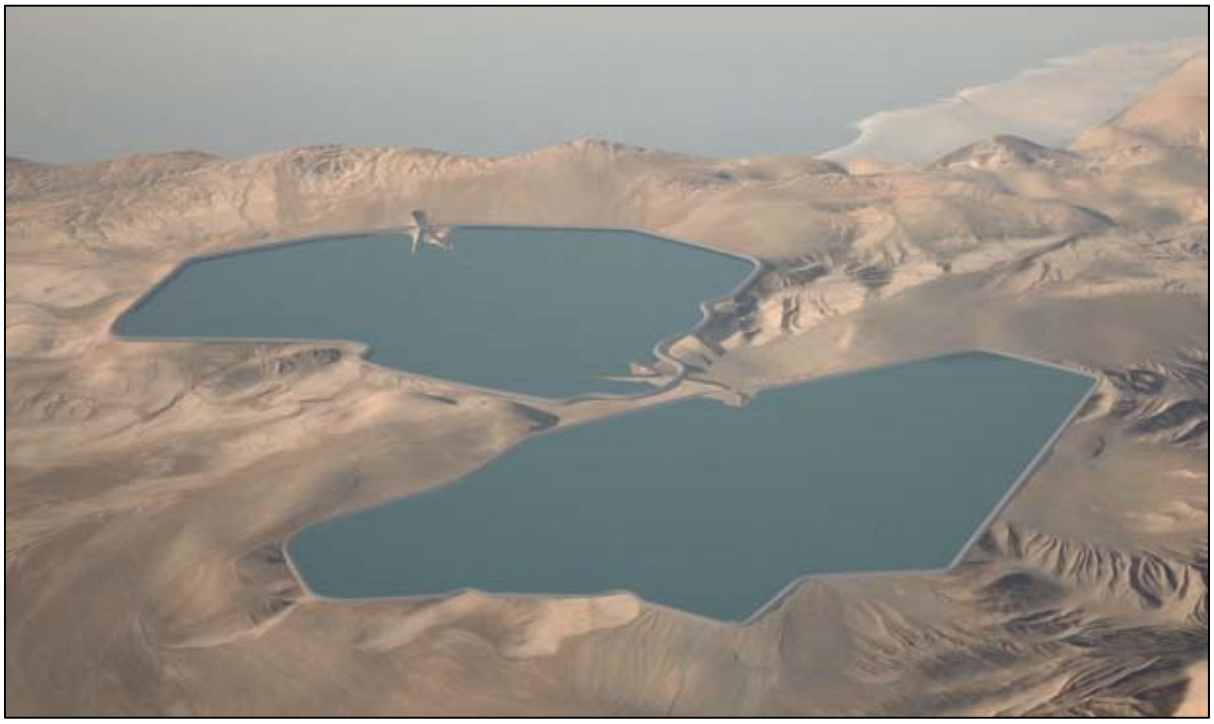
As for the evaluation of impacts for the landscape component, the headline clarifies that the process takes into account the effects on visual quality (and therefore the landscape value). The characterization and determination of the visual quality of the landscape takes into account all the visual elements existing within the area of influence of the project, which includes the existing works (such as the high and medium tension lines). In this sense, it was concluded that the sum of the biophysical, aesthetic and structural characteristics that give character to the landscape and The area of the project, determine that the area of influence of the landscape presents a visual average quality, where the linear elements are a common visual element.

In the impact assessment process, when determining the effects of the project on visual quality, the impact of "visual incompatibility and loss of biophysical attributes" was considered, where visual incompatibility determines the degree of visual integration of The parts and works of the project (synergistic effect on the landscape) and the loss of biophysical attributes determine the modification or disappearance of a biophysical attribute. In chapter 4 of the EIA, it was noted that landscape impacts were rated as non-significant because no loss of attributes occursBiophysical, and due to the existence of other objects with similar aesthetic and structural forms, the project manages to integrate into the landscape context, all this within landscapes that present mainly a moderate naturalness and fragility (according to the Environmental assessment).

For the specific case of the reservoir, as indicated in chapter 4 of the EIA, The impacts on landscape were described as non-significant. However its installation means to add elements that are not typical of the natural landscape, its impact is also not significant since it is estimated that it will not generate alterations in the local climate, neither in flora and fauna. It should be considered that the reservoir will only contain seawater. In addition, it is a sector that presents a very common landscape in the region, so that no attribute of special value in landscape terms would be affected.

In this sense, it is determined that in the case of the landscape component, no significant effects are generated on the landscape value of the area of influence and taking into consideration the Provided by the letter e) of Law no 19,300, and its subsequent amendments, in relation to article 10 of the Rules of the SEIA, the impacts on the landscape component are not reason for entry through an EIA, however due to the typology and magnitude of the project , as well as its impact on other components, this was presented as an EIA.

Figure 6-1: Reservoir Cota 600 meters m.



Source: Espejo de Tarapacá Spa.

7. MEASUREMENTS PLAN

7.1. With respect to the antecedents presented in paragraph 8.4 of addendum n ° 1, in relation to the mitigation measure presented by the holder, associated with the significant impact identified for the species *Oceanodroma Markhami*, the holder shall:

- **Indicate period in which the supervision will be carried out by a fauna expert, prior to the construction of the road.**
- **Whereas the holder withdraws the restriction of the period of reproduction of *Oceanodroma Markhami* For the beginning of the construction of the road and considering that even if active nests are not identified, it is reported that it corresponds to a sector of passage of swallows of Black Sea, the proprietor will have to present in detail the measures that will be implemented to avoid the affectation of this species, mainly by the light attraction and the subsequent attraction that can mean the seawater pools.**

Response:

The headline clarifies that From the sampling effort carried out in the baseline study and in the complementary study Presented in the addendum entered on March 12, 2015, it was determined that the "North access road", Whose journey was overlaps in Part with the Dry River Creek, it does not correspond to an active area of reproduction of swallows of sea.

Notwithstanding the foregoing, it was determined to supervise prior to the commencement of construction of the works in that sector, in order to verify that the conditions previously identified are maintained at the time of commencement of the works. This supervision will be carried out by a fauna expert 30 days before the beginning of the construction of the works in that sector, according to the timetable of the Project.

In relation to The commitments To be adopted In order to avoid the eventual affectation by light attraction, it is reported that the headline will implement the recommendations made by the "Fatal Light Awareness Program"(FLAP), which say relationship with using luminaires that:

i) Completely avoid the emission of light upwards,
ii) Reduce light scattering around areas that need to be illuminated and
iii) Optimize use of useful light (FLAP, 2007).

In relation to the possible attraction that the reservoirs could cause on the *Oceanodroma Markhami*, its occurrence is considered highly unlikely due to two factors that are detailed below:

- According to the current understanding of the movements that the species makes to the breeding sites, these are restricted to specific streams that act as Corridors from the coast inland. These routes would allow to optimize the time and the energy invested in the displacements, there being no intelligible reasons for the birds to deliberately deviate from their course. The reservoirs will be located in natural pools delimited by high hills, about 10 km from the ravine that would concentrate the transit of the birds inland, since it is considered unlikely that the birds explore the reservoirs.
- *Oceanodroma Markhami* It is a pelagic species associated with the Humboldt current whose diet is conformed by fish, cephalopods and crustaceans, finding the majority of its preys in the range 6-15 cm of total length (García-Goths, Goya & Jahncke, 2002). It is distributed from the continental shelf up to 360 km offshore, feeding commonly in conditions of strong winds. The expected conditions for the reservoirs are far from those described above, in response to the use of 1.9 cm filters in the intake and the absence of ocean winds, which is why it seems unlikely that the reservoirs constitute An attractive environment for feeding *Oceanodroma Markhami*.

Consequently, no significant impacts or particular mitigation measures are considered to reduce the likelihood of sea swallow attraction to reservoirs.

Moreover, as indicated in the answer to question 10.4 of the addendum given above, will voluntarily follow up on the section of LAT where, eventually, could collide birds. This follow-up will be carried out for 3 years During the nesting period at the beginning and at the end of it, Delivering annual reports to the authority.

7.2. The holder must present all the environmental technical antecedents that allow to justify the sections of the medium and high tension lines in which the mitigation measures will be implemented to avoid the collision and electrocution of birds, considering that they do not Birds ' passage areas and breeding sites are clear. In this sense, it is required the presentation of a new figure that includes these antecedents in a clear way, in addition to a file Shp (WGS84, UTM, spindle 19S) that includes these same antecedents. Like thisThe holder is required to indicate the distance between the Deterrents And the aeronautical beacons to be installed, as well as a characterization of these devices.

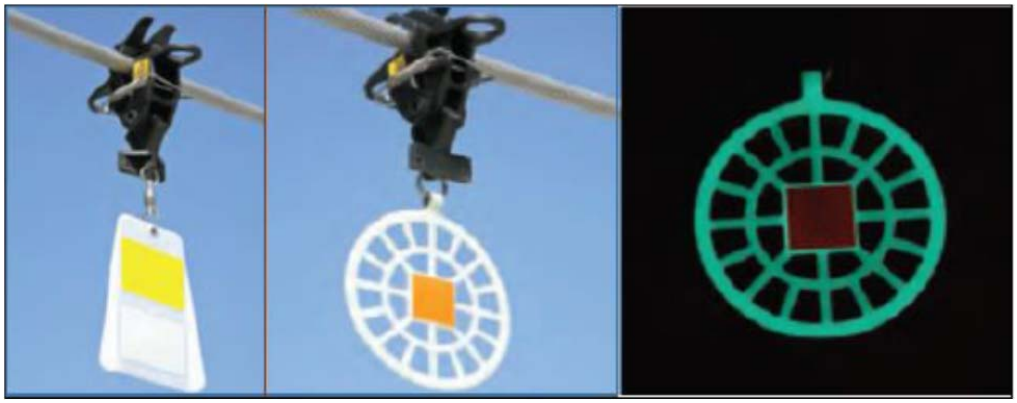
Response:

The headline welcomes the observation, and presents The required figure In the Figure 7-2 And Attached In ToNexus 7.2 of this complementary addendum The SHP files that contain this information.

Whereas it is dialledAron Campaigns in breeding season And there was no evidence of nesting sites in the area of direct influence of the works of the project, but only in areas close to the plot and in a very small number, and taking into account also the scarce scientific information about *Oceanodroma Markhami* (Black Sea Swallow) Is that it was proposed as a preventive measure The implementation of Deterrents Flight in a section of the path of the line of 220 KvWell The line could intersect the flight path that is presumed to useLaugh The *Or. Markhami* To the breeding sites located in the Salar Grande. The area By the way of the Swallow Corresponds to the area of the Quebrada Río Secho in the direction of SAlar Large. Therefore, the application of Deterrents In Two sections of the High voltage line. This section of the path covers part of these two geographical elements indicated Whereas The only nesting sites reported of the species, in Paracas (Peru) and Acha Chile (Jahncke, 1994; Torres-Mura & Lemus, 2013) are At 5 km and 15 km away from the coast.

In relation to the technical characteristics of the Deterrents Of flight to be used Be DIspositivos Type Firefly. These devices are approximately 15 cm long cards that are located on the guide cable And they have the advantage of turning around its axis and emit light during the night, thus favouring the probability of detection by the birds even in dark conditions.

Figure 7-1: Device Example Visible anti-collision In the Dark.

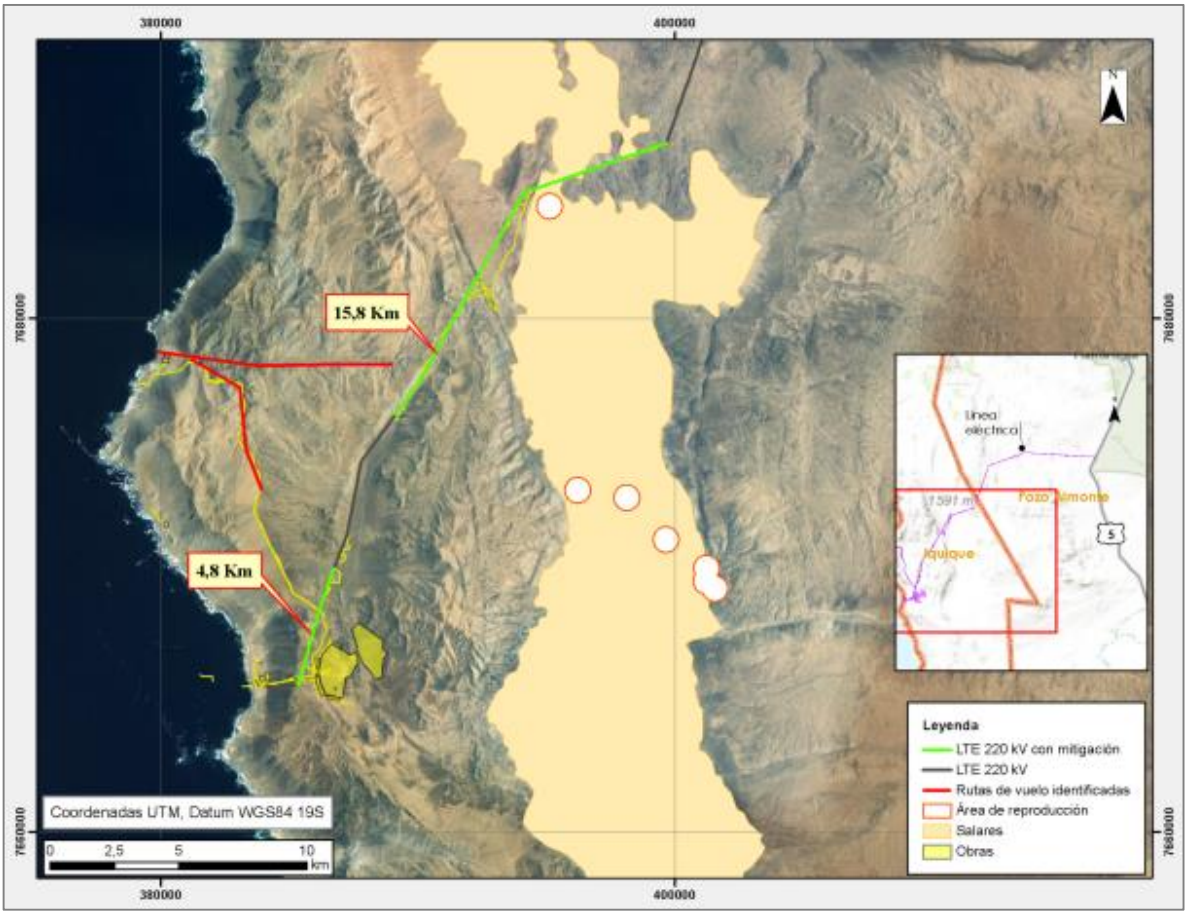


Source: "Measures of mitigation of impacts in wild birds and bats", technical proposal, Gonzalo Gonzalez for the SAG, August 2014.

Your installation will be done along the cable Guide of DOS Sectors of the high voltage line, of 4.8 and 15,8 km each, sections identified as of higher risk for the Eventually Collision, at an interval of 10 m between each device, covering all the spans existing in these sections.

Notwithstanding the foregoing, as indicated in the answer to question 10.4 of the addendum Of March 12, 2015, we will voluntarily follow up on the section of LAT Where, eventually, they could collide birds. This follow-up will be carried out for 3 years in a semi-annual manner, giving annual reports to the authority.

Figure 7-2: Medium and high tension line bouquets With implementation of Mitigation measures.

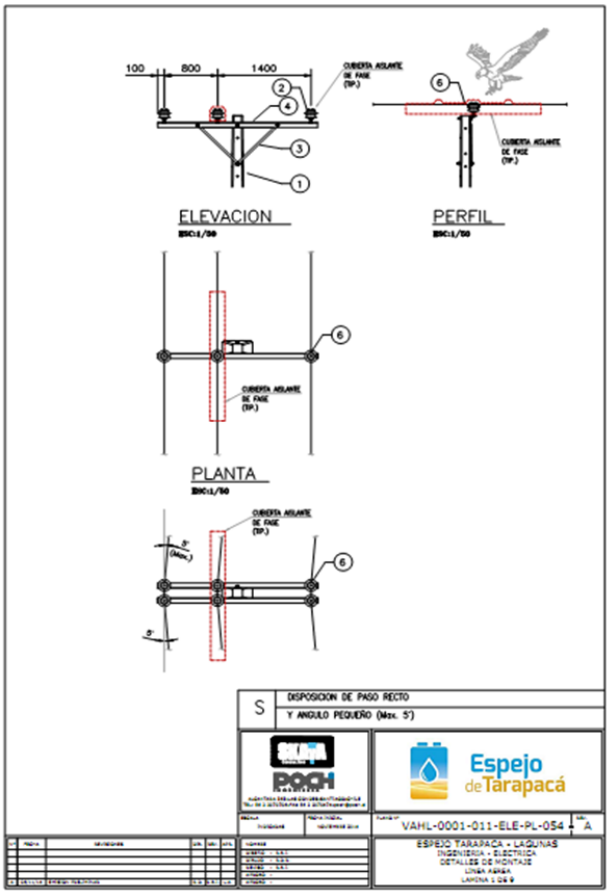


Source: Elaboration Gac.

In relation to the risk of electrocution, it is clarified that line 23 Kv Consider the implementation of devices to prevent electrocution along its entire length (17.7 km). This corresponds to the implementation of an insulating sheath in the conductor of the central phase, so as to increase the distance between energized phases to 220 cm, as can be seen in the following figure. This with the aim of Make it impossible for birds with a smaller wingspan Enter into Simultaneous contact with energized phases. This will protect all birds from electrocution that could potentially

use the poles of this laying as a perch, including the largest species in the area *Cathartes Aura* (Red-headed Jote).

Figure 7-3: Disposal of anti-electrocution devices.



Source: Espejo de Tarapacá.

7.3. The holder must present all the environmental technical antecedents that allow to respond to the following observations associated with the archaeological patrimony:

The owner welcomes the observation, and then presents a summary table with all the information about the archaeological sites identified by the project.

Table 7-1: Summary tab characterization of archaeological sites.

Site Find	Description	Utm E	UTM N	Adscription	Distance to Works	Measures REcomendadas for the construction phase

Site Find	Description	Utm E	UTM N	Adscription	Distance to Works	Measures REcomendadas for the construction phase
VE 01	Bottle	386470	7666591	Historical	IInterior Reservoir	RSuperficial Ecolesson
VE 02	Bottle	382152	7677526	Historical	20 M Road Works	RSuperficial Ecolesson
VE 03	Dump	411611	7699415	Historical	60 m LToT	NInguna
VE 04	Dump	411693	7699480	Historical	130 m LToT	NInguna
VE 05	Dump	411688	7699294	Historical	70m LToT	NInguna
VE 06	Dump	390665	767931	Historical	330 m LToT	NInguna
VE 07	Dump	411629	7699378	Historical	IL Buffer InteriorToT	NInguna
VE 08	Structure	390420	7678942	HistoricalSubcurrent	350 m LToT	NInguna
VE 09	Nail	427448	7698436	Historical	210 m LToT	NInguna
VE 10	Cemetery	425134	7698522	Historical	50 m de la LT	CArket Trends PerieOf the findings registered at less than 50 m of the works; With a fence of 1.2 m of minimum height and a buffer of 10 around the findings, as well as associated signage.
VE 11	Platform	424381	7698541	Historical	Inside the LAT buffer	Is Made Rising Topographic and registration of the structure, by means of a specialized form enclosed in annex 3.9 of this supplementary addendum. It is proposed fencing of brackets in order to direct the traffic during the construction together with informative signage, to avoid Affectation.

Site Find	Description	Utm E	UTM N	Adscription	Distance to Works	Measures REcomendadas for the construction phase
VE 12	Platform	423462	7698602	Historical	INtersecta La LT	Is Made Rising Topographic and registration of the structure, by means of a specialized form enclosed in annex 3.9 of this supplementary addendum. It is proposed fencing of brackets in order to direct the traffic during the construction together with informative signage, to avoid Affectation.
VE 13	Structure	404485	7697015	Indeterminate	50 m de la LT	CArket Trends Perimeter Of the findings registered at less than 50 m of the works; With a fence of 1.2 m of minimum height and a buffer of 10 around the findings, as well as associated signage.
VE 14	Milestone	404929	7697219	Subcurrent	100 m de la LT	NInguna
VE 15	Milestone	405762	7697424	Subcurrent	IInterior of the LT buffer	It was done characterization Using Spec tablalizada attached in annex 3.9 of this supplementary addendum. It is proposed fencing of brackets in order to direct the traffic during the construction together with informative signage, to avoid Affectation.
VE 16	Footprint	405732	7697419	Historical	Inside the LAT buffer	Is Made Rising Topographic and register the structure, using Speci tabEnclosed in annex 3.9 of this supplementary addendum. It is proposed fencing of brackets in order to direct the traffic during the construction together with informative signage, to avoid Affectation.

Site Find	Description	Utm E	UTM N	Adscription	Distance to Works	Measures REcomendadas for the construction phase
VE 17	Footprint	405946	7697479	Historical	Inside the LAT buffer	Is Made Rising Topographic and register the structure, using Speci tabEnclosed in annex 3.9 of this supplementary addendum. It is proposed fencing of brackets in order to direct the traffic during the construction together with informative signage, to avoid Affectation.
VE 18	Mineral	383158	7676859	Historical	20 m from the road On existing footprint	NInguna
VE 19	Site	380031	7672063	Prehispanic	ToDyacente to Camp Sector	Sand implemented archaeological characterization surveys, it is proposed to implement perimeter fencing and informative signage.
VE 20	Bottle	384168	7671305	Historical	ToDyacente Works Road	RSuperficial Ecolesson
VE 21	Dump	384754	7670123	Indeterminate	10 M Road Works	NInguna
VE 22	Footprint	387518	7665621	Historical	IInterior Reservoir	Is Made Rising Typographic and registration of the structure, by means of a specialized form enclosed in annex 3.9 of this supplementary addendum. It is proposed fencing of brackets in order to direct the traffic during the construction together with informative signage, to avoid Affectation.
VE 23	Structure	392606	7681227	Indeterminate	150 m de la LT	NInguna
VE 24	Fragments bottle	386675	7667201	Historical	IInterior Reservoir	RSuperficial Ecolesson
VE 25	Metal Fragments	386652	7667212	Historical	IInterior Reservoir	RSuperficial Ecolesson
VE 26	Fragments bottle	386617	7667211	Historical	IInterior Reservoir	RSuperficial Ecolesson

Site Find	Description	Utm E	UTM N	Adscription	Distance to Works	Measures REcomendadas for the construction phase
VE 27	Structure	387371	7669921	Historical	740 m de la LT	NInguna
VE 28	Structure	391006	7678860	Historical	220 m R of LT	NInguna
VE 29	Fragment bottle	390966	7678854	Historical	180 m de la LT	NInguna
VE 30	Isolated tomb	391929	7679413	Historical	760 m de la LT	NInguna
VE 31	Linear trait: Lift	380914	7677976	Historical	ToDyacente Works Road	It is proposed fencing of brackets in order to direct the traffic during the construction together with informative signage, to avoid Affectation.
		379877	7677745			
VE 32	Historic Salina, west of Route 1	379100	7677493	Historical	20 -600 m away with the junction of the North access road located east of Route 1	Fencing type bracket with respect to the closest work, corresponding to the junction with Route 1, informational signage is proposed and included in the historical study.

- **From table 7-1 of annex 3.6 It is proposed to collect the findings that will not be impacted by the works of the project, such as the VE3 or 9 findings that are more than 20 m from the works. In this regard, it is clarified that it should only be collected that which will be directly affected by the project (VE1, 20.24, 25 and 26), so it must reformulate and resubmit its proposal.**

Response:

Clarification is welcomed and it is proposed to collect only those findings that are directly affected by the works of the project, specifically considering VE1, 2, 20, 24, 25 And 26, as seen in The Table 7-1 of this complementary addendum.

- **As for the protection measures, not all are chords, because for finds that are more than 50 m the fencing is proposed, while for those who are less than that distance not. It is clarified that all the findings that are less than 50 m must be fenced. To do this, it is necessary to install visible fences at least 1.20 m high and an associated signage, leaving a buffer of 10 meters around the findings according to the superficial dispersion of archaeological material or the boundary of the structures, if applicable .**

Response:

The indication is welcomed and indicated that it will be implemented fencing of the registered findings to less than 50 m of the works, That are not rescued and require protective measures; With a fence of 1.2 m of minimum height and a buffer of 10 around the findings, as well as associated signage, As seen in the Table 7-1 of this complementary addendum.

- **These fences must be installed prior to the commencement of construction work (considering the habilitation of roads) and must last until the end. A report should be submitted for the implementation of these protection measures, which must include photographs for each of the sites. The state Of fences must be monitored at least once a month by delivering a quarterly report.**

Response:

The indication is welcomed. These fences will be installed before the start of the construction phase and StayUntil the end of the corresponding activities, delivering a report on the implementation of these measures, recording monthly monitoring activities through quarterly reports.

- **At the end of the construction stage, a report on the status of the archaeological sites should be submitted no later than two months after the end of this stage. It is emphasized that the objective of the report will be to make a comparison of the status of sites before and after the execution of the project, for which photographs of each of them must be delivered. The Council of National Monuments (CMN) must also be advised of the permanence of the fences for the operation phase.**

Response:

The holder receives the application and proceeds as a result as requested Presenting a report of the archaeology findings within two months of the completion of the construction of the project, Including On the one hand the Photographs relating to each finding in the state before and after the construction of such works Along with an analysis; On the other hand, the recommendation to the Council of National monuments on maintaining or removing fences.

7.4. Always with regard to the archaeological heritage, and in relation to the linear traits (see 11, 12, 16, 17, 22 and 31), although the topographic survey and the register with ad hoc token in the area of influence of the project is considered adequate, it is not sufficient as a measure of Compensation. In this sense the following is observed:

- **An exhaustive registration and survey of 1 km at each end of the footprints has not been incorporated outside the aforementioned area. Nor is there an adequate historical study of them, with review of the bibliography and historical cartography of the area, in order to give context to these traits. Both activities must be carried out: the first before the commencement of construction works, forwarding a report (to this body) for review and release of areas. The historical context study shall be forwarded no later than one year after the release of the area is granted.**

Response:

The holder receives the application and Attached In ToNexus 7.4 DE This supplementary addendum The tracking report of linear traits corresponding to VE 11, 12, 16, 17, 22 and 31. Is Clarifies that some Of these traits Have a length less than 1 km, QOr isThe lifting was carried out in a Stretch of up to 1 km as long as there is such a trait at that distance. It should be noted that during the tour The extension of the previously recorded linear traits, as in the supplementary extensions followed at this time, no structures or other associated cultural materials of an archaeological or patrimonial type are observed (isolated findings or sites Archaeological).

Therefore, in this evaluation process, the linear traits mentioned have been identified and characterized giving fulfillment to the first requirement of this observation, Referred To the delivery of information pToRa The liberation of the areas, As seen in the Table 7-1

Regarding the historical study of context Requested, the holder Welcomes the request and this report will be forwarded No later than one year after the release of the area is granted. This report will contain the Review of the bibliography and historical cartography of the area, to the extent that information is available, to analyze the existence or not of some historical relationship between these findings and the available information.

- **No measures are proposed for the segments of the linear traits that will not be intervened by the project. Therefore, these traits must be fenced by proposing the type of fence (mesh, banners, stakes, etc.).**

Response:

The holder receives the application and clarifies What It was considered a buffer of 50 metres Around the works, in order to implement the corresponding measures for each case. For the particular case of the Linear works, will be implemented Bracket type barrier in each of the intersections of land works of LAT with linear traits, in order to protect the segments that will not be intervened by the project.

- **Specifically for the sites VE31 and 32 corresponding to a lifeline and a saline, although the fencing with metal mesh during the construction phase, the implementation of signage, topographic surveying and complete registration with ad hoc tab is relevant , is not enough as a measure. Whereas linear traits may be associated with these sites, it is relevant to include them within the historical documentation mentioned above. It should be noted that both sites should be part of the requested historical documentation.**

Response:

The headline ToTake the Request, and clarifies that the project will not perform works in these two sitIWithout prejudice, will be included in Of Historical context study requested, report What It shall be forwarded no later than one year after the release of the area is granted. This report will contain the revision of the bibliography and historical cartography of the area, to the extent that information is available.

- **Finally, as a measure of mitigation it is pertinent to carry out a permanent monitoring during all the works that involve removal or escarpments of the soil**

and subsoil, however, this must be accompanied by lectures of induction to the workers of the project on the Archaeological component that could be Find in the area and the procedures to follow in case of discovery, before the beginning of each work.

Response:

The holder receives the application and proceeds as a result as requested As activities involving removal or escarpment of soil and subsoil are developed. The headline clarifies that training for workers is part of the proposed measure In Table 7-7 measure: Cultural Heritage Care Training, In Chapter 7, Title 7.2.2 archaeology of the EIA, In the Which one is incorporatedBa The presentation of the Procedure in Case of Discovery.

7.5. With regard to the paleontological component, after the analysis of the Paleontological report (annex 3-8 of Addendum 1 of the EIA), the holder must present all the antecedents that allow to respond to the following observations:

7.5.1 The indications made in the paleontological baseline are accepted with respect to the following:

- **Execution of the rescue plan (collection of paleontological samples representative of the fossil levels, as well as its geographical and geological context), to be carried out once the project has been approved, with the purpose of generating a reference collection that Consider the diversity variables of Taxa, as well as preservation, in each individual sector (including control points 17, 19, 23, 24, 25, 26, 53, 66, 67, 70, 71, 73 and 75, see table 3-6 page 70).**
- **Induction lectures should be made to all personnel of the work before the beginning of the earth movements. The first monitoring report should enclose the documentation relating to these lectures.**
- **Execution of a plan of paleontological monitoring of the works that include removal of land and or excavations in the areas mentioned in the preceding paragraph (table 3-6, p. 70 of the paleontological baseline). Monitoring should be performed at a minimum of 15 days.**

Response:

The holder requests the ToUtoridad take into consideration The Complementation and Update Of Baseline Paleontology (Annex 3.10 of this supplementary addendum) and Of The impact assessment on the component Paleontology (annex 5.1-C of the Present supplementary

Addendum), Carried out under the guidelines suggested in the evaluation guide for the impact of Cultural heritage, SEIA.

In these documents, four fossiliferous areas were identified in the project area, the fossil content was recognized and the impact on the factor was also assessed "Deposits and paleontological materials"Determining As **Non-significant** For all four areas.

The holder also notes that in Annex 5.3-B the technical and formal contents are delivered Accrediting compliance with the requirements Of PAS 132 to intervene paleontological material For the execution of the project. In addition, the authority is requested to, ConsideredR The Monitoring Proposed According to the findings of fossiliferous areas consisting of reservoir De non-mineralized H fossilsOloceno located in the coastal sector, in the areas fossiliferous Af1 Af2 and Af3, and the area Fosilífera Bf4 According to the Figure 3-10 of this complementary addendum.

7.5.1 the indications made in the paleontological baseline are accepted with respect to the following:

- **Execution of the rescue plan (collection of paleontological samples representative of the fossil levels, as well as its geographical and geological context), to be carried out once the project has been approved, with the purpose of generating a reference collection that Consider the diversity variables of Taxa, as well as preservation, in each individual sector (including control points 17, 19, 23, 24, 25, 26, 53, 66, 67, 70, 71, 73 and 75, see table 3-6 page 70).**
- **Induction lectures should be made to all personnel of the work before the beginning of the earth movements. The first monitoring report should enclose the documentation relating to these lectures.**
- **Execution of a plan of paleontological monitoring of the works that include removal of land and or excavations in the areas mentioned in the preceding paragraph (table 3-6, p. 70 of the paleontological baseline). Monitoring should be performed at a minimum of 15 days.**

Response:

The holder welcomes the observation and as indicated in the Precedent, requests the ToUtoridad to consider that from the results of the Updating the Baseline and Of The impact assessment on the Paleontology component (Annex 3.10 and 5.1-C), As detailed in the Response To Question number 3.10 of this Addendum Complementary, it was possible to rule out some areas with fossil potential and to determine four effective fossiliferous areas for which it is proposed Do the following With regard to field activities:

i. A Collection Surface of representative paleontological samples of the Material of the Site of non-mineralized Holocene fossils located in the coastal sector located in the AF1, AF 2 And AF3, prior to the beginning of the works in each sector.
ii. A Surface collection of Samples Paleontological representative of the material of the fossil site Located in the plateau sector And A Photographic register of the fossil material of the BF4 that will remain under the number 3 collection of the reservoir sector (see Figure 1.1 with the diagram of the billets, of this complementary addendum). It will be carried out before the intervention of the Fosilífera area in question.
iii. The MPaleontological Onitoreo Biweekly In AF1 areas (dry river sector), AF2 (Camp sector) and AF3 (Sector San Marcos) Located On the sea terrace on the coastal plain (de non-mineralized H fossilsOloceno in the work area and when Is Perform works involving Earth movements On those fronts. Planning this monitoring will form part of the First Report of monitoring To be presented to the authority.
iv. A Monitoring Report Quarterly And Eventually Complementary collection of samples of representative material from each Fosilífera area identified, AF1, AF2 and AF3, in the Costa which will be referred to the Superintendence of the Environment and the Council of National Monuments, within The Thirty Days after the end ofL Supervised Quarter and will comply with the provisions of the Res. Ex. 223/2015 SMA.

In a complementary way it proposes to carry out activities of broadcastKnowledge and care of the paleontological heritage in the project workers, as well as, In the school population Who attends municipal schools Of the communes where the project is developed, according to the following:

i. Training to the workers according to the measure proposed in the EIA in Chapter 7, table 7-9 measure: Talks of promotion of paleontological patrimony.
ii. Elaboration of material for the dissemination of fossils representative of the project. A compilation of the available bibliographic material will be carried out and a document with the following contents will be prepared:
    a. Conceptual framework on paleontology. It will deliver the basic concepts of paleontological discipline in Chile.
    b. Current regulatory framework. It will present the main elements of the norms that protect the paleontological properties (deposits and materials)
    c. Paleontological antecedents of the region of Tarapacá. The region's biggest milestones will be presented. For example: The Marine Jurassic of the Cordillera de la Costa, the dinosaur footprints of Quebrada Chacarillas (Pica).
    d. Paleontological Material of the project. The background compiled in the baseline and its results will be included in informative sheets with photos of each material, as well as a poster that summarizes the main characteristics of the findings.

e. This document will be drawn up during the first year of construction. 1,000 copies will be printed That sand distribute in the municipal schools of the communes of Iquique and Pozo Almonte, Preferably the same week of celebration of the day of the patrimony nearest to the date of impression of the copies.

To perform Project activities that intervene, with a non-significant impact, sectors of fossiliferous areas The PAS 132 is requested And whose antecedents that allow to certify the fulfillment of its content and requirements is present In Annex 5.1-B of this Complementary addendum. In relation to the material to be collected It will proceed as provided by the Article 21 of Regulation 484/1990 (Regulation on archaeological, anthropological and paleontological excavations and/or surveys), under which The materials that are rescued belong to the state and their holding will be assigned by the Council of National Monuments to the institution that it determines.

Finally and in additional form, the proprietor proposes to carry out a characterization of the Site where Jurassic corals were identified (Pf1 of the Figure 3-10 of this supplementary addendum) Located approximately 500 m from the work closest to the project and will not be intervened. The proposed characterization will be done without intervening the site, ie it does not require No extraction or digging, which is why I do not know Apply for PAS 132 for this. This report shall contain the description of what can be seen at first sight, as well as its superficial dimensions and shall be delivered To the Superintendence of the environment and ToL Council of National Monuments During the first Semester Of the construction phase of the project.

- **Induction lectures should be made to all personnel of the work before the beginning of the earth movements. The first monitoring report should enclose the documentation relating to these lectures.**

Response:

The proprietor welcomes the observation and clarifies that the training is part of The measure proposed in the EIA in Chapter 7, table 7-9 measure: talks promoting paleontological heritage.

- **Execution of a plan of paleontological monitoring of the works that include removal of land and or excavations in the areas mentioned in the preceding paragraph (table 3-6, p. 70 of the paleontological baseline). Monitoring should be performed at a minimum of 15 days.**

Response:

The Incumbent requests the authority to consider the results of the Updating the Baseline Paleontology and Of The impact assessment on the Paleontology component (Annexes 3.10 and 5.1-C In the Present supplementary addendum, respectively) Based on which were identified four fossiliferous areas (unlike the areas with potential fossil presented above In annex 3.8 to the previous addendum And that in light of the new work were dismissed, as is the case DE The volcanic rock of Sector Of Digging the Upper Tunnel, as well as the evaluation of impacts that Determined the impact as Non-significant.

fossiliferous areas is proposed Do what was raised in the first part of the answer to this question 7.5.1 Especially in literals I) to IV), for which se Apply for PAS 132 And whose antecedents that allow to certify the fulfillment of its content and requirements are presented In Annex 5.1-B of this complementary addendum.

7.5.2 In relation to the Paleontological monitoring, this must be carried out as follows:

- **Planning:**

  - **Paleontological monitoring should be planned in the parts of the project where land movements and/or excavations are carried out.**
  - **The professional in charge will have to make a methodological proposal for the execution of monitoring campaigns, duly justifying the frequency of the monitoring, during the whole process involving movement of land of the work.**
  - **The curriculum of the professional must be accompanied.**
  - **This methodological proposal should be presented in conjunction with the first monitoring report to be delivered to the CMN and the Superintendence of the environment.**

Response:

The proprietor welcomes the observation and requests the authority to consider the results of the Update Of The Baseline Paleontology and Of The impact assessment on the component Paleontological (annexes 3.10 and 5.1-C of this Supplementary addendum, respectively) that determined the impact as Non-significant, As well as, What was raised in the 7.5.1 response, especially in literals I) to IV), of this complementary addendum and, According to the above, Apply A Monitoring Paleontological to the earth moving works to be developed In The area of the coast where the existence and type were identified Fossil material specific corresponding to a

site of non-mineralized Holocene fossil material, instead of the sector where the presence of fossils in volcanic rock was ruled out In accordance with the background presented in the answer to question 3.10 of this supplementary addendum.

- **Implementation of paleontological monitoring:**

  - **Delivery of monthly reports, to the CMN and to the Superintendence of the environment, realizing the execution of monitoring campaigns carried out, with a maximum delivery time of 15 working days after the last monitoring of the month. Each one of the Monitoring It must be reflected in photographic record, and in a synthetic stratigraphic column of the materials that reveal.**
  - **In the case of fossil findings, these should be located in the stratigraphic column (climbing). The reports should include the projection of the work, on a geological basis, to the smallest scale available for the project area, in addition to containing the monitoring points in UTM coordinates. Datum WGS84. This projection will be updated with each monthly report where the new monitored points will be added.**
  - **The visits of the paleontologist will be recorded in the Book of works, which will be photocopied to be included in each monthly monitoring reports.**
  - **In the case of the monitoring of the materials excavated in the upper tunnel of the project, the holder must deposit the land extracted from that excavation (marinas or blocks) in a separate gathering. To facilitate the task of inspection of paleontology, the marinas must be classified by day and indicated in posters the date to which each pile of material corresponds. The paleontologist will make a description of the materials and photos of the same, to be attached to the monthly monitoring report.**
  - **In case of discovery in the visual inspection, it will be considered unforeseen discovery in the tunnel and the excavation should be paralyzed immediately, with visual inspection of the paleontologist of the excavation front in tunnel, and report to the CMN as soon as possible, with the most detail Possible.**

Response:

The holder requests the authority to consider the results of the Update Of The Baseline Paleontology and Of The impact assessment on the paleontological component (annexes 3.10

and 5.1-C of this supplementary addendum, respectively) which determined the impact as Non-significant, and according to the above:

- To Application of paleontological Monitoring, According to What was raised in the 7.5.1 response, especially in literals I) to IV, of this complementary addendum, (a) Land-movement work to be developed in the area of the coast where the existence and specific type of fossil material corresponding to a field of non-mineralized Holocene fossil material was identified, instead of the sector where it was The presence of fossils in volcanic rock has been ruled out, according to the background presented in the answer to question 3.10 of this supplementary addendum.
- To like, adjust the periodicity of the reports of paleontological monitoring A quarterly instead of monthly, presenting them within 15 business days after the superintendence of the Environment and the Council of National Monuments.

Finally, the holder agrees To To give full compliance to the provisions of article 26 of the law N ° 17.288 on national monuments. In case of identification Otr Findings during excavation activities the works will be immediately paralyzed and notice of discovery will be given to the authority in order to determine the measures of the case.

- **Authorship of the reports:**

    - **The professional in charge must stamp original sign in all documentation related to the paleontological heritage associated with this project, be it texts, maps or cartographies.**

Response:

The holder receives the application and proceeds as requested.

8. QPREVENTION LAN

8.1. In relation to the proposed protocol for detonations in the seabed (submarine duct connection with the sea), the holder must incorporate the previous notice of manoeuvre date and time to the SERNAPESCA of the region of Tarapacá, in order to coordinate the presence Opportune of this service, tending to minimize the reaction times to a potential affectation to specimens of protected marine fauna.

Response:

The request is accepted and included within the Protocol the necessary prior notice to Sernapesca Regional of any maneuver involving blasting underwater. Consequently, the proposed protocol is outlined as follows:

Measures have been established aimed at preventing and/or avoiding unwanted effects of thunder, especially on the sea otter, a protected species identified in the baseline that inhabits the vicinity of the project area (Muelle de Caleta de Fishermen), the following protocol is suggested:

a. **Adjustment to current regulations:** All Thunder will be carried out according to the regulations for the use of explosives in force in Chile and the lowest possible volume will always be used, adjusting strictly to the specific needs of the project. This ensures that human integrity and wildlife are protected in the construction area and its immediate surroundings.

b. **Regional Fisheries Authority Notice**: Any planning of activities involving blasting in the sea will have as a starting point the respective prior notice to the National Fisheries and Aquaculture Service (SERNAPESCA) of the region of Tarapacá, in order to coordinate the timely presence of Officials of the aforementioned institution and minimize reaction times to a potential impact on specimens of protected marine fauna.

c. **Thundering Hours:** To develop the detonation of preference in a timetable between 13:00 and 15:00 hours, which corresponds to the period of the day where the otter or Chungungo (*L. Feline*) shows less activity at sea. Indeed, it increases its activity towards the dusk.

d. **Exclusion zone:** As a measure to minimize the chances of an incident, a safety zone will be established to *L. Feline*. When a specimen is within a radius of 300 m away from the focal point of the blast, it will be suspended until the specimen leaves that area. To scare away the specimen, sirens can be used, as it is also known that the otters shy away from immediately to the human presence. Personnel delimiting The zone of human exclusion during the use of explosives (commonly appealed "parrots"), or a marine biologist willing for

such Ends, will approach the specimen from the coast, generating the flight of this. Only after the specimen leaves the exclusion zone can the Thunder be made.

e. **Increased disturbances:** In order to reduce the risk of incidents on marine fauna (mammals, otters, birds, fish), prior to the specific detonation to be carried out, it is suggested to develop the strategy of increasing disturbances, also known as repulsion and harassment, At least half an hour before the main event, for example, by using salvo shots or carrying out two or three low-intensity pre-detonations, this is expected to scare away the wildlife that may be present in the area of direct impact of the T The same.

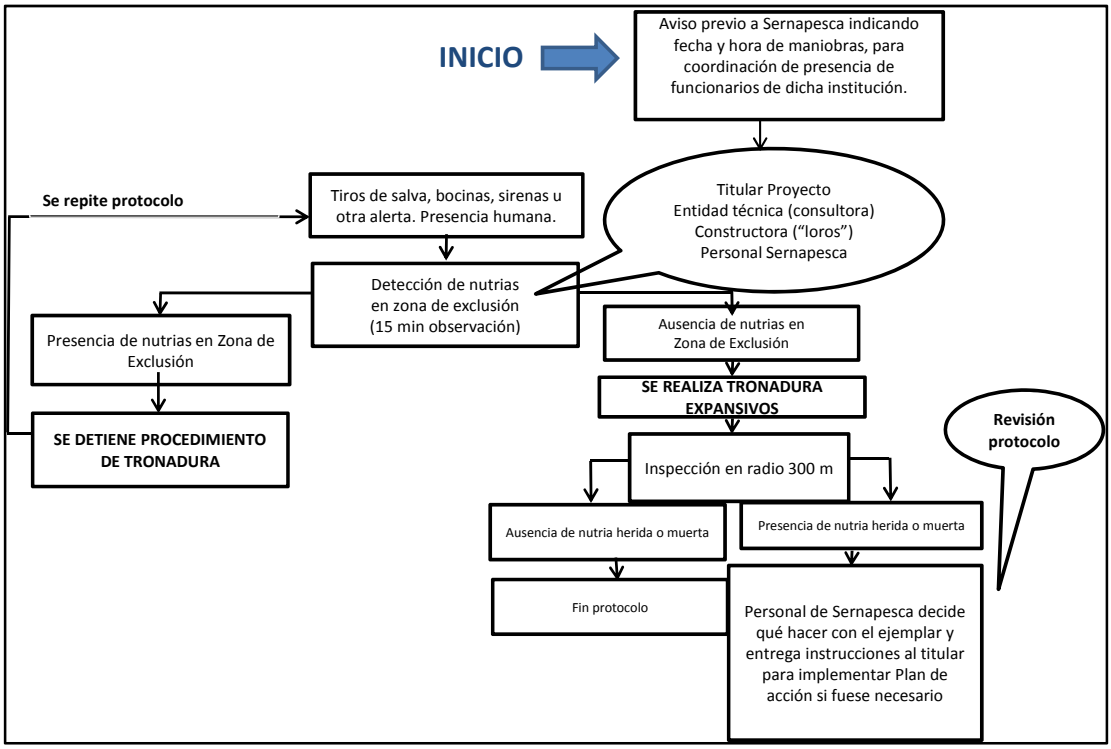
The observation of the presence of otters by the manager begins 5 minutes before the salvo and continuous shots for the next 10 minutes before authorizing the detonation. If within the safety zone (300 meters radius), the presence of a otter will be observed, the main thunder will be suspended and the procedure will be repeated until there are no otters observed in the safety zone and only at that moment the event will be authorized Main.

After the blasting with Norwegian draught, a thorough search of injured or dead otters will be carried out within a radius of 300 m from the central point of the work area, or beyond if visibility permits. If a wounded or dead specimen is found, the contingency Plan shown will be applied In Figure 10 .At least two (2) marine biologists should be counted on, with due training in fauna sighting, one of them will travel the coastal border by land and the other by sea.

During the whole period of the Thunder, a log will be kept where the relevant details of this activity will be recorded: time of use of explosives, name of the person responsible for monitoring the safety zone, sightings of otters, name of the manager Search after the detonations and novelties. The maintenance of this log will be the sole responsibility of the head of the area of prevention and security, either of the owner or the construction company responsible for the activity. It is recorded that for any effect is the holder responsible for the APLof this protocol and its contingency Plan if its application is necessary.

An action plan will be provided for contingencies on specimens of otter that may be affected by the planned blasting. In this case, and as long as the presence of affected individuals of this species is verified, the contingency plan contemplates that the Thunder officer or the marine biologist present in the sector during this procedure, immediately communicate to SERNAPESCA officials present in the manoeuvre, who shall decide the way forward and shall deliver the respective instructions in conformity with the nature of the verified affectation, myImizando the response time to a potential affectation involving wildlife. In the event that this service determines that the animal should be rescued, the specimen will be transferred to a center specializing in wildlife care and rescue costs, veterinary care, Rehabilitation, reintroduction to the medium and follow-up, will be the responsibility of the project holder.

Figure 8-1: Suggested action protocol for blasting in the breaking sector.



In addition, in annex 1-7 of the addendum Entered on March 12th Other measures were applied for fish, marine mammals, swimmers, divers, and vessels. This ensures the safeguarding of human integrity and wildlife in the project's construction area and its immediate environment.

8.2. The holder must update the contact details and address of the environmental information presented in annex 7.2.2 Table 4.3 General emergency telephones.

Response:

The holder receives the application And then update the table With the data AskYou.

Table 8-1: Phones of Emergency Regional.

General emergency Telephones		
Entity	**Address**	**Phone**

		number
Hospital (131)	Heroes of the conception N º 502, Iquique	57-2395555
Firefighters (132)	Bolivar N ° 414, Iquique	57-2421212
Carabineros de Chile (133)	O'Higgins 427, Iquique	57-2557040
Chilean Navy	Avenida Arturo Prat 706, Iquique	57-2517100
Environmental Superintendence	Washington 2369, Antofagasta	55-2530385
Maritime Governorate of Iquique	Jorge Barrera 98, Iquique	57-2401900
Municipality of Iquique	Calle Aníbal Pinto 50 Ex-Customs building, Iquique	57-2514677
Pozo Almonte Municipality	Calle Manuel Balmaceda 276, Pozo Almonte	57-2407200
Mutual Security	Orella n ° 769, Iquique	57-2408700
Achs	Amunátegui n ° 1517, Iquique	57-2402925
Phones Of Emergencies Services		
Entity	**Address**	**Phone number**
Agricultural and Livestock Service	Orella 440, Iquique	57-2470115
Sernapesca	Pasaje Alessandri 470 Dept. 110 Iquique	57-2368150
National Emergency Office	Salvador Allende ex Pedro Prado 3420, Iquique	57-2374400
Sernageomin	Prentice Bolas 125 Iquique	57-2427462
Regional Highway Management	Tarapacá 130, 3 ° piso, Iquique	57-2572036
Directorate General of Water	Tarapacá N º 130, Iquique	57-2572265
Salud Tarapacá	Esmeralda 475, Iquique	57-2404661
The environment	San Martín n ° 255, Oficina 151, Iquique	57-2377100

8.3. The holder mentions in the hydrogeological characterization that the superficial strata of compact saline crust interspersed with unbound soil would limit the deep infiltration. In this regard, these same low-permeability strata would facilitate the lateral runoff of the waters in case of infiltration. In this regard, the holder is pointed out that the lateral runoff is particularly problematic due to the proximity of the plateau with the coastal cliff. If appropriate conditions are given, runoff could moisten and saturate the walls of the slope, generating Inestabilidais and possible landslides. On the other hand,

the system of efforts generated in the sector of the cuvettes will be altered by the overload of saline water resulting from its accumulation.

For all the foregoing, the proprietor shall evaluate the aforementioned, together with the stability of the coastal cliff and the slopes of the plateau area, if appropriate, in front of the works of the project and its possible contingencies, indicating also the preventive measures To be implemented in this sense.

Response:

The headline clarifies that ANexus 10.2: "Stability analysis Slopes of the coastal cliff Project EIA Espejo de Tarapacá, 4 models were made for the analysis of stability of wedges and transient water flow For the coastal cliff In 2 stages: the phase of analysis of wedge with theoretical water pressure along the fault zone and the stage of modeling transient flow from filtration in the reservoir to the fault zone and the consequent generation of critical pore pressure.

For all the blocks analyzed in Stage 1 of the wedge analysis, a safety factor was obtained to glide greater than 2.2 in normal static case (without water pressure and without earthquake) and greater than 1.5 if possible (case water pressure more earthquake , case water pressure without earthquake and case of earthquake without water pressure).

In Stage 2 the influence of an infiltration of the waterproof membrane (case also included in the wedge analysis of Stage 1) is determined by an analysis of the saturation curve of the soil and the time assessed for a critical pressure of accumulated water in Z Fractured ona/fissure of the geological fault in finite element models.

Calculations show that if a permanent filtration occurs in the membrane of the reservoir of dimensions between 2 m and 4 m it would take a long time for it to reach saturate the soil and develop an active pore pressure in the fault zone (according to the results of the 4 analyzed cases would take the order of magnitude of years, for more information see annex 10.2 of the EIA). The Monitoring and the repair system of the membrane presented In the addendum entered on March 12, 2015 and also in this complementary addendum together with the physical system of monitoring the operation of the reservoir in response to question 5.3 of this supplementary addendum will allow detecting variations of level opportunely And Take action, Therefore, they are effective in preventing reservoir leaks.

Therefore, Dice The long PeriodOdOr Required To accumulate water pressure behind Potential key wedges (if any) and monitoring and management measures of the reservoir and membrane operation adopted by the holder are possible conclude that There is no A negative impact on the stability of the coastal slope.

9. QLAN TRACKING

9.1. In relation to the environmental monitoring Plan proposed for the marine environment, the following is considered necessary:

- **That it be implemented throughout the life of the project,**
- **Consider with special emphasis, monitoring of the species Chungungo *(Lontra Feline*, given its category of conservation and state of vulnerability, derived from its coastal habits, particularly associated with the presence of burrows in the wharf sector of Caleta San Marcos.**
- **To incorporate the Humboldt penguin species (*Spheniscus Humboldti*)**
- **In the PVA it must include a station located in the intake of seawater of the project for all the matrices to be monitored.**

Response:

The Environmental Monitoring Plan (PVA) of the marine environment of the present project It has been designed to be applied in most of its matrices during the construction phase and during the first two years of the operation phase. LThen of this period, It has been Provides Assess with the relevant authority and in a substantiated manner An adaptation of this PVA Either in the currently proposed form or getting changes or improvements necessary.

The above It has as practical purpose to consider an instance of early evaluation of the scope and The Representativeness of the results generated by the application of this programme and, where appropriate, to consider introducing the necessary and relevant changes in their content and frequency in such a way that such adjustment responds to the The nature of the information needed to properly and accurately evaluate the environmental performance of the project in the marine environment For the specific project submitted to this environmental assessment process. This is consistent with the requirement of the Authority presented in question 9.2 of this Addendum Complementary. Well, andN Case that The Review To PVA Of the medium mArino No Be materialized Within a year from the corresponding presentation of the Application of the holder To the competent authority, the PVA, Is will continue to execute With a half-yearly frequency for two more yearsReiterating The consideration of your ADECUACIto the authority.

On the other hand, the need to have a PVA of the marine environment Properly designed says relationship specifically with evaluating in time those matrices that could be affected by the impacts associated with the works and activities of the project whatever their phase of Development. In this area and in response to the request of the reviewer, it is possible to establish that the monitoring requested LGainst Feline is duly considered and incorporated in the

proposed design of PVA of the marine environment, employing for that the same methodological strategy used in the marine baseline. This follow-up will take place during the construction phase with a semiannual frequency and also in the operating stage, with the same frequency, but during the first two years for the reasons already mentioned in the preceding paragraph.

Regarding the incorporation of The Penguin species of Humboldt*Spheniscus Humboldti*), andL Holder welcomes the observation, incorporating in the Annex 9.1 Marine Environmental monitoring Plan, monitoring of the Humboldt penguin species (Sphenfscus Humboidtf), in accordance with the foregoing.

Finally the holder welcomes the application and It incorporates inside the PVA of the marine environment, a station on the underwater work of capture/discharge, which will aim to determine the physical and chemical quality of the water in the same methodological terms described for the rest of proposed stations.

It is estimated that the characterization of water quality in this point satisfies the need for environmental information to know the properties of water that is being captured and subsequently discharged at the same point, thus allowing to define Environmental gradients of Variation (E.g. of dispersion and dilution) from the source to the sensitive coastal sectors (e.g. AMERB).

It should be remembered that PVA Of MEdio MArino Consider other monitoring points so that you will have the necessary information to track the behavior of the media in relation to the project.

In the Annex 9.1 Updated version of PVA is delivered Of the medium mArino.

9.2. As indicated on page 7; Section 3.1.4; 3.2.4 and 4.1.4; 4.2.4, 4.3.4 duration and measuring frequency of annex 5-1 of addendum N ° 1, the holder proposes during the operation phase a quarterly frequency during the first two years of operation, then proposes Monitoring Semiannual. In this regard, the holder is pointed out that the competent authority shall evaluate according to the results obtained during the first two years of operation of the project, the desirability of carrying out Monitoring Semesters according to the proposal of the proprietor. This, without prejudice to the above-mentioned observation.

Response:

The proprietor welcomes the observation. The objective of the studies incorporated in the Environmental Monitoring Plan (PVA) of the marine environment is to generate useful information to have the necessary elements of judgement for the decision making that justify any

change or eventual modification to that PVA After the first two years of evaluation, in the sense outlined in the answer to question 9.1 in this supplementary addendum.

9.3. In relation to the proposal indicated in section 4.4.4 of the environmental monitoring Plan of the marine environment, where the owner points out for the construction phase and for the operation phase, a duration and frequency of the monitoring during one day and one night during the four Seasons (4 times a year) to be able to compare with baseline results. In this sense, the holder must indicate clearly how long the monitoring will take place in the operating stage.

Response:

The headline clarifies that EMonitoring has been proposed throughout the construction stage of the QProject and, as for the other matrices incorporated in the marine environment PVA, during the first two years of operation to then evaluate in conjunction with the environmental, fishing and maritime authority and depending on the results obtained during this period , the desirability of modifying the frequency for the following years of the Phase of operation. This is consistent with the requirement made by the authority in the Question 9.2 of this Addendum.

9.4. The holder must present and incorporate to the environmental noise monitoring Plan, the measuring frequency to be used for a possible closing phase, as presented for the construction and operation phases.

Response:

The observation is welcomed. Nor however EL Holder It reiterates the clarification that the project has defined its useful life as indefinite. In this context and Given the request of the authority, it has been defined that in an unlikely phase of closure, LAs measurements will be made between the first 15 and 30 days after the closing activities begin, where one of the declared receivers isN At a distance less than or equal to 1 Km Of that front or workstation. The periodicity will be 30 days between measurements since the monitoring plan is activated Environmental.

However, COnforme To The results obtained and in agreement with the authorities, Prior to the eventual closure of the project, will be defined If there is La handsetAD to make new measurements.

10. FICHA SUMMARY

10.1. In view of the observations raised in this ICSARA, the holder must present the cards, tables and charts to facilitate the auditing, in an updated manner.

The Set:

The title welcomes the application and presents the updated environmental records to the information Presented in this Addendum in Annex 10.1 Updated Summary tabs.