

PROJECT TO SUPPORT THE IMPLEMENTATION OF THE MAGALLANES H2V PROJECT: DEVELOPMENT OF ENABLING PORT INFRASTRUCTURE - CHILE - CH- L1191

CHAPTER 1 – INTRODUCTION

Report prepared by EPAustral

MP Report 929 – 2025

November 2025

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MEDIO AMBIENTE – ENERGÍA – AGUA
CAMBIO CLIMÁTICO – COMUNIDADES

CHAPTER 1 - INTRODUCTION

Prepared for
EPAustral

Prepared by
BEST PRACTICES
Cruz del Sur 251, Las Condes, Santiago

Version	Rev.1	
Date	November 7, 2025	
Status	Document for dissemination	
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The José de los Santos Mardones Port (hereinafter Puerto Mardones) is a maritime terminal located in the city of Punta Arenas, Magallanes Region, Chile, and its main activity is associated with cargo transfer and services to container ships. It also serves smaller ships and cargo ships, which carry lower levels of cargo but make more frequent calls, and during the tourist season it occasionally serves international passenger ships.

The J.S. Mardones terminal is managed by Empresa Portuaria Austral (EPAustral), a wholly state-owned company, which is currently developing the project known as "Magallanes H2V Project: development of enabling port infrastructure" (hereinafter "Project"). This project seeks to improve the operation of the Mardones dock, increasing its capacity by extending the berthing area to meet future demand and improve safety conditions in its maritime operations.

It should be noted that part of the activities and works of this project are part of an existing agreement between EPAustral and the Regional Government of the Magallanes Region (GORE Magallanes), whose objective is to *"Improve Public Port Infrastructure to optimize the competitiveness of the Magallanes Region in relation to the cruise industry, logistics services associated with Antarctic programs, intra- and extra-regional maritime connectivity, service capacity and efficiency for general cargo transfer, and enabling infrastructure associated with the installation of the green hydrogen industry."*

The project involves the modernization and expansion of the José de los Santos Mardones Port, which is the only port in the Magallanes region with the capacity to serve container ships. Indeed, the project has a privileged location in terms of connectivity to the Strait of Magellan, Tierra del Fuego, southern Chile and Argentina, and connectivity to the Antarctic continent. This enhances the municipality of Punta Arenas as an optimal location for implementation.

Additionally, this port facility complies with applicable national policies (National Policy on Coastal Use and Port and Coastal Infrastructure Policy to 2020) as well as the land use regulations where it is located.

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The infrastructure works mainly consist of extending the pier head 200 meters to the south and incorporating a new access bridge at the southern end of the planned pier head, as well as the respective abutment, reinforcing the existing slab, and implementing mobile cranes. and the creation of a new storage area covering approximately 13.7 hectares, mainly for cargo associated with green hydrogen projects. The total investment amounts to US\$86 million.

To finance this project, the current administration of EPAustral and the Regional Government of the Magallanes Region of Chile have decided to evaluate mixed financing for the project, in which case part of the required amount would be obtained through an operation with the Inter-American Development Bank Group (IADB), specifically with a sovereign guarantee, with the Inter-American Development Bank (IDB). The Regional Government, specifically, will make contributions for the acquisition of the new mobile cranes.

Considering that the project has a low potential for adverse environmental and social impacts, this operation has been classified as Category B (medium environmental and social risk) in accordance with the IDB's Environmental and Social Policy Framework (ESPF). These types of projects generate impacts that are generally limited to the project facilities and are generally reversible and can be mitigated with available measures. Therefore, as a preliminary step to the materialization of this possible financing, an Environmental and Social Impact Assessment (ESIA) must be prepared.

In order to support and strengthen EPAustral's environmental and social management, the IDB has contracted services to develop an EIAS and an Environmental and Social Management Plan (ESMP) for the project that: i) complies with the requirements of the MPAS and the PSAS; ii) adequately identifies the environmental and social risks and impacts of the Project, in accordance with its nature, scale, and level of potential risks and impacts; and iii) includes the implementation of good practices and international standards applicable to the port sector.

To this end, Mejores Prácticas reviewed various secondary sources of information, analyzing the aspects required to comply with the requirements of the MPAS and the PSAS.

This report, which constitutes the final product of this consultancy, consists of the following main elements:

- a) Analysis of the scope of the Project works;

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- b) Identification of potential environmental, social, occupational health and safety, and disaster risk impacts, addressing direct, indirect, and cumulative impacts during each phase of the Project, both negative and positive;
- c) Review of the legal and institutional instruments for the environmental and social assessment, approval, and control of the Project and its components;
- d) Identification of the environmental and social mitigation and control measures and occupational health and safety measures necessary for the Project in accordance with national legislation and IDB Policies;
- e) Analysis of gender-differentiated impacts and the relevance of the gender perspective adopted by the Project; and
- f) Identification of stakeholders and participation plans and consultation processes necessary for compliance with national legislation and IDB policies.

PROJECT TO SUPPORT THE IMPLEMENTATION OF THE MAGALLANES H2V PROJECT: DEVELOPMENT OF ENABLING PORT INFRASTRUCTURE - CHILE - CH- L1191

CHAPTER 2 – GENERAL BACKGROUND

Report prepared for Empresa Portuaria Austral

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2 GENERAL BACKGROUND

In order to analyze the project, it is important to contextualize it within the framework of the Regional Development Strategy for Magallanes and Chilean Antarctica, in order to understand its relevance, impact, and sustainability in the territory. By taking this approach, it is possible to link the project's actions to the social, economic, and environmental objectives defined for the region, thus ensuring greater consistency with public policies and an effective contribution to regional development.

2.1 Project Background

The "Magallanes H2V Project: development of enabling port infrastructure," hereinafter referred to as the "Project," is part of the Ministry of Energy's 2023-2030 Green Hydrogen Action Plan and is aligned with the Magallanes Regional Government's Magallanes Logistics Development Plan. In particular, there is an agreement between EPAUSTRAL and the Regional Government of the Magallanes Region (GORE Magallanes) that covers part of the Project's development.

The improvement of the infrastructure of the Port of José de los Santos Mardones will allow for better safety conditions in its maritime operations and make current and future operations more efficient.

2.2 Strategic Plans

2.2.1 Green Hydrogen Action Plan 2023-2030

The Green Hydrogen Action Plan seeks to lay the foundations for the development of a sustainable industry in Chile, promoting the transition to clean energy and the creation of quality jobs. The Chilean government is presenting a strategic approach to green hydrogen, aligned with the National Energy Policy and the National Green Hydrogen Strategy.

According to energy projections developed by the Ministry of Energy, by 2050 the incorporation of green hydrogen (H2V) and its derivatives will represent between 16% and 17% of national energy consumption.

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Through the Ministry of Energy, which plays a key role in strategic monitoring and the development of regional roadmaps, three key players in this development stand out. These are: Biobío, Magallanes, and Antofagasta. In order to strengthen environmental and regulatory management around the H2V industry, the ministry oversees the development of public environmental baselines in these prioritized regions, the consolidation of information in the Environmental Impact Assessment System, and the adoption of international standards for the environmental assessment of projects. These public baselines have been part of the documentary information reviewed for the preparation of this report.

The expansion of the capacity of the José de los Santos Mardones port is part of this plan's objective of developing enabling infrastructure, which highlights the need for adequate infrastructure for the H2V industry. The ministry defines as key points ensuring that infrastructure challenges are addressed through intersectoral coordination, participating in the planning of enabling infrastructure development for the industry, and tendering public land for the development of value chain infrastructure. In particular, the award of the tender for the reinforcement of the Mardones Pier in 2024 is defined as a milestone.

2.2.2 Magallanes and Chilean Antarctica Regional Development Strategy 2023-2030

The Regional Development Strategy for Magallanes and Chilean Antarctica seeks to establish a path to the future based on citizen participation and decentralization. Approved by the Regional Council in May 2023 and developed in collaboration with the University of Magallanes and the community, it focuses on decentralization and new regional governance. It defines four dimensions for development: social and human, economic and productive, integrated territorial, and science and environment.

In terms of energy, the goal is to move towards an energy matrix based on renewable energies and green hydrogen. Due to the regional potential for the production and massive use of H2V and its derivatives, the aim is to achieve an economy based on this resource, allowing inhabitants to access low-cost, low-carbon energy. Its applications extend to areas such as transportation, heating, and the commercial and industrial sectors, enabling the formation of productive chains and clusters, as well as the development of an ecosystem of applied science and innovation that allows all sectors to benefit.

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access the benefits of this new energy matrix. (Regional Development Strategy for Magallanes and Chilean Antarctica 2023-2030, GORE Magallanes).

In particular, Guideline 12.1 of the strategy refers to energy governance and green hydrogen and sets the following objectives:

- Objective 12.1.1: "Establish regional public-private governance through the creation of the Regional Public Energy Service, which promotes the common interest in developing the carbon-neutral energy industry, with multisectoral participation."
- Objective 12.1.2: "Seek mechanisms that gradually enable the local supply of renewable energy, including the community in the development and benefits of this industry, taking into account the interests and needs of its inhabitants."

2.2.3 Logistics Development Plan – Magallanes and Chilean Antarctica Region

Launched in December 2024, the Logistics Development Plan for the Magallanes Region and Chilean Antarctica addresses the infrastructure challenges necessary at the regional level for the growth of industry in general, and green hydrogen (H₂V) in particular.

The plan projects demand for the 2025-2050 horizon, considering the current loads of traditional economic sectors (livestock, oil, tourism, etc.) and also the new green hydrogen industry.

As part of the aforementioned plan, the composition and evolution of the region's economic sectors were characterized, and projection models were constructed for the analysis horizon based on historical behavior over the last 15 years. The resulting annual growth rates were 3.3% for passenger traffic and 2.8% for cargo traffic. At these rates, baseline port cargo transfers for 2050 could double compared to current traffic levels. As a reference, the requirements of the green hydrogen industry are up to 30 times this current demand.

Among the Plan's recommendations is to *prioritize the advancement of projects associated with the EPA and ENAP terminals in Mardones, Laredo, and Gregorio*, which is directly linked to this Project. The improvement of the infrastructure of the Port

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will enhance the existing infrastructure to accommodate projected future demand.

2.3 Environmental Impact Assessment System in Chile

Prior to the implementation of the Project, it is necessary to analyze and evaluate the potential impacts on the natural and social environment. In this context, the Environmental Impact Assessment System in Chile (SEIA) is a preventive environmental management tool that allows determining whether a project complies with current environmental legislation, as well as whether it addresses potential environmental impacts¹. Law 19.300 states that the Environmental Assessment Service (SEA) is the agency responsible for administering the SEIA, and in turn states in Article 8 that *"The projects or activities indicated in Article 10 may only be executed or modified after an assessment of their environmental impact, in accordance with the provisions of this law."* In turn, Article 10 of the same Law states that *"Projects or activities likely to cause environmental impact, in any of their phases, must be submitted to the SEIA,"* and provides a list of projects that must do so. The details of the characteristics of these projects are established in Article 3 of the RSEIA.

Once it has been determined that a project must undergo environmental assessment in the SEIA, in accordance with the projects listed in Article 10 of the Law and detailed in Article 3 of the RSEIA, it must be determined whether it should be assessed by means of an Environmental Impact Statement (EIS) or an Environmental Impact Assessment (EIA). An EIS must be submitted if the project generates significant environmental impacts on one or more environmental components, i.e., it generates any of the effects, characteristics, or circumstances indicated in Article 11 of the Law and detailed in Articles 5 to 10 of the RSEIA.

The analysis of whether a project or activity should be submitted to the SEIA is the responsibility of the project owner or proponent. Notwithstanding the foregoing, in accordance with Article 26 of Supreme Decree No. 40 of 2012, of the Ministry of the Environment, which establishes the Regulations of the Environmental Impact Assessment System (hereinafter, "SEIA Regulations"), owners may contact the SEA to make a "relevance inquiry" regarding whether a project or activity, or its modification, must be submitted to the SEIA prior to its

¹ Details of the laws and decrees that regulate the operation of the SEIA can be found in Chapter 4 of this report.

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Implementation. The SEA has a set of guidelines entitled "Consultations on the relevance of submitting projects or activities or modifications thereto to the Environmental Impact Assessment System," dated November 2024, which contains the information required to determine whether a given project needs to be submitted to the SEA.

2.4 Environmental Assessment Process Mardones Project

In the case of the Project, in 2020, EPAustral submitted a Consultation on Relevance for the implementation of a crane for the movement of containers and the structural reinforcement of the concrete slab. Then, in 2024, the owner submitted Relevance Consultations for Entry into the Environmental Impact Assessment System to the SEA of the Magallanes and Chilean Antarctica Region regarding the two alternatives that were considered for the extension of the pier head.

Regarding the installation of the crane and the reinforcement of the slab, the regional authority stated in its ruling: *"That, according to the information provided by the applicant, the activity does not involve the construction of a port, nor does it correspond to a land area intended for the entry, exit, docking, or undocking and stay of larger vessels intended for the provision of services, which is why it can be concluded that the hypothesis of entry into the Environmental Impact Assessment System provided for in paragraph f) of Article 10 of Law No. 19,300 and in paragraph f.1) of Article 3 of the Environmental Impact Assessment System Regulations, nor does it present characteristics that would allow for the establishment of any other type of entry into the Environmental Impact Assessment System contemplated in the aforementioned regulations."*

For the extension of the pier head, in both cases the regional SEA's ruling was *"...it can be concluded that the conditions for entry into the Environmental Impact Assessment System provided for in paragraph f) of Article 10 of Law No. 19,300 and in paragraph f.1) of Article 3 of the Environmental Impact Assessment System Regulations are not met, nor does it present characteristics that would allow for the establishment of any other type of entry into the Environmental Impact Assessment System contemplated in the aforementioned regulations."*

The documents for each relevance consultation and the resolutions containing the rulings can be found on the electronic platform "e-Pertinencia" system (<https://seia.sea.gob.cl/pertinencia/buscarPertinencia.php>) in the following files:

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- Alternative Relevance Consultation for the implementation of a crane and slab reinforcement: "J. S. Mardones Terminal Crane Operation" under ID PERTI-2020-556, Exempt Resolution No. 101/2020/556 of the SEA Magallanes and Chilean Antarctica Region, available at: <https://pertinencia.sea.gob.cl/api/public/expediente/PERTI-2020-556>
- Alternative Relevance Consultation 1 head extension: "Improvement of existing pier, Jose de los Santos Mardones port, Punta Arenas" under ID: PERTI-2024-6610, Exempt Resolution No. 20241210199 of the SEA Magallanes and Chilean Antarctica Region, available at: <https://pertinencia.sea.gob.cl/api/public/expediente/PERTI-2024-6610>
- Consultation on Relevance Alternative 2 extension: "Improvement of existing pier, Jose de los Santos Mardones port, Alternative II Punta Arenas," under ID: PERTI-2024-13670, Exempt Resolution No. 202412101175 of the SEA Magallanes and Chilean Antarctic Region, available at: <https://pertinencia.sea.gob.cl/api/public/expediente/PERTI-2024-13670>

Therefore, it is considered that the Project works evaluated do not require mandatory entry into the SEIA prior to their execution.

Notwithstanding the foregoing, it should be noted that in 1998, the project "Expansion of the New Port of Punta Arenas. XII Region, Stages II and III" was approved by RCA No. 13/1998 of COREMA of the XII Region of Magallanes and Chilean Antarctica. This project was evaluated through an Environmental Impact Study. However, this project was not executed and its RCA is now expired. The project file is available on the www.e-seia.cl/platform⁽²⁾ and some of the information is used in this document, given that part of the works described correspond to the project design.

2.5 Other Environmental Assessment Processes

Projects associated with H2V must be submitted for environmental processing as appropriate by their principals, in compliance with current national environmental regulations and in accordance with the standards established by the SEIA. During the environmental qualification process, conditions, voluntary commitments, and mitigation, compensation, and/or remediation measures are established, among other things, as required in accordance with the

² https://seia.sea.gob.cl/expediente/expedientesEvaluacion.php?id_expediente=1095&idExpediente=1095

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particular characteristics of each project. These subsequently constitute a legal obligation for the principals, which are supervised by another public body called the Superintendency of the Environment (SMA). Once the projects are environmentally approved, they can begin implementation.

The SEA continuously develops guidelines, criteria, and guides for different environmental components, impact assessments, and other issues related to the environmental qualification process for projects, which allows for the standardization of relevant aspects of their environmental assessment, as well as strengthening the aforementioned process. These documents are public and are published on the institutional website. In this regard, this agency has developed the guide "*Evaluation Criteria in the SEIA: Integrated Description of Projects for the Generation of Green Hydrogen in the SEIA*," available since 2023³. This document emphasizes the fact that the H2V generation industry is composed of different processes or sub-processes associated with different types of entry into the SEIA. The criteria establish a value chain for the H2V process, which are as follows:

1. Renewable energies
2. H2V production through water electrolysis
3. Conditioning and storage
4. Reconversion
5. Transport and distribution

Projects associated with H2V must identify their process within this value chain and analyze in each case whether they should be submitted to the SEIA and how they should be submitted (through a declaration or environmental impact study).

In this way, projects associated with the H2V industry that are required to enter the SEIA due to their size are submitted for environmental processing by the corresponding owner or principal, their environmental impacts are addressed and evaluated at this stage, and once the environmental qualification process is complete, they obtain their environmental license if the evaluation is favorable. In case of anticipated impacts

³ Available at: <https://www.sea.gob.cl/sites/default/files/imce/archivos/2023/03/29/DT-Hidrogeno-Verde.pdf>

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, the owners must propose measures for mitigation, remediation, and/or compensation.

To date, it is possible to indicate that some projects are already under evaluation in the SEIA, whose environmental impacts are being assessed in the corresponding process by the authority. Below is a list of projects associated with H2V that are under evaluation, according to the information available in the e-SEIA.

- Cabo Negro carbon-neutral fuel plant
- Faro del Sur Wind Farm
- Comprehensive project for the production and export of green ammonia - HNH ENERGY
- Green Hydrogen and Ammonia Production Project - H2 Magallanes

The following figure shows the location of these projects, which are distant from Puerto Mardones, the closest of which is 20 km away (Cabo Negro Carbon Neutral Fuel Plant), and are therefore located outside the study area and are not related to the project under analysis in this document. In this regard, it is important to note that Puerto Mardones is located in Catalina Bay, while the two green hydrogen projects that have a significant impact on fishermen are located more than 90 km away, one near the town of San Gregorio and the other in Posesión Bay.

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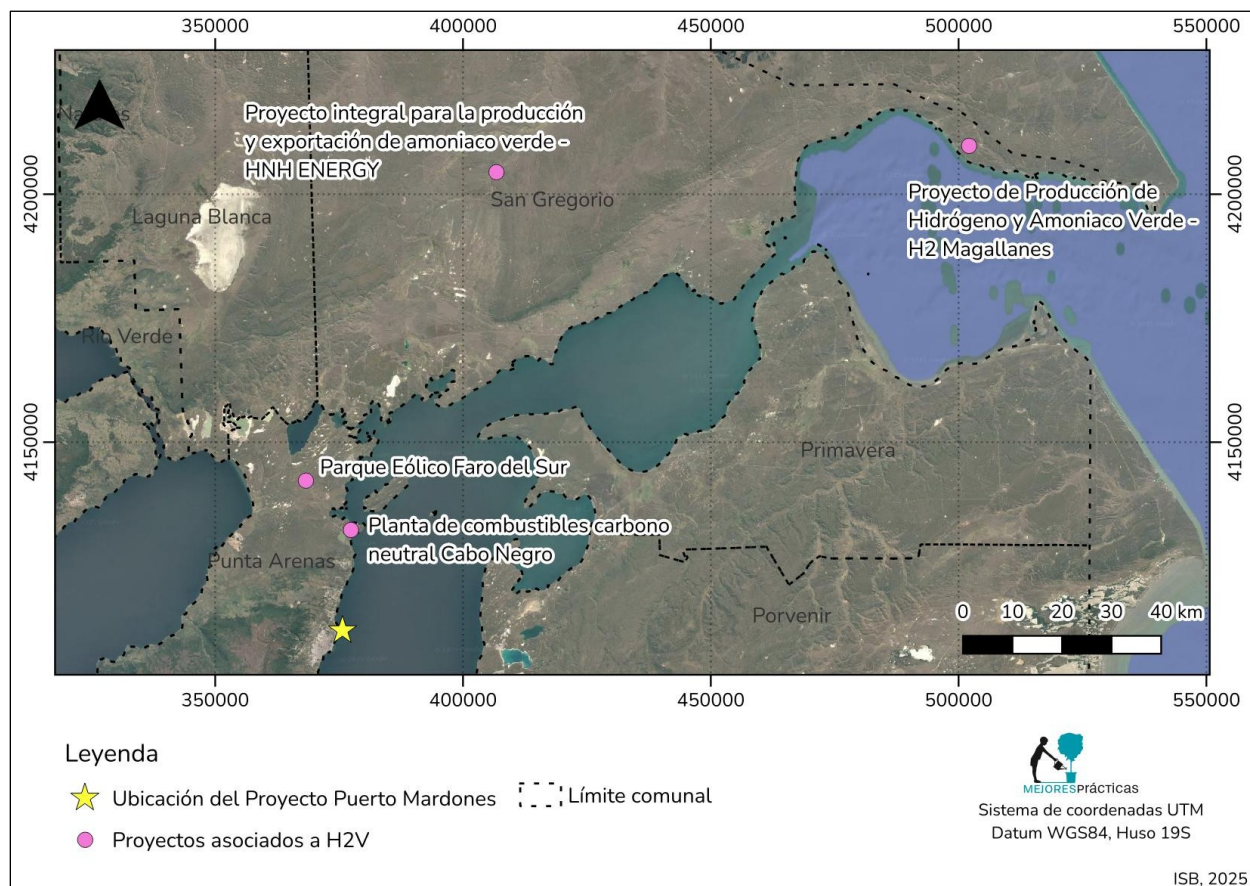


Figure 2-1: Location of H2V-related projects under evaluation in the SEIA

Source: own elaboration.

The following table shows the significant impacts and the measures to mitigate these impacts of the four green hydrogen projects mentioned above, which are currently undergoing environmental processing through an Environmental Impact Assessment. As can be seen from the table, each project is responsible for and manages its significant impacts.

Table 2-1: H2V projects undergoing environmental review in the region through an EIA

Project	Significant Impacts	Mitigation, compensation, and/or remediation measures
Fuel el	Increased travel times for human groups using Route 9 North	Transport Night of oversized and overweight cargo

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Project	Significant Impacts	Mitigation, compensation, and/or remediation measures
Carbon neutral Cabo Negro		• Communication Plan • Communication Plan • Road Management Plan • Mailbox for receiving citizen concerns • It should be noted that on October 21, 2025, the SEA issued the ICE recommending environmental approval of the project. On October 29, 2025, the COEVA granted environmental approval for the project.
Green Hydrogen and Ammonia Production Project - H2 Magallanes	Impact on the economic activity of shore fishing carried out by fishermen in the Bahía Posesión sector	Financial compensation for shore fishermen located in Bahía Posesión for the impact on their fishing activity
	Loss of individuals of unique fauna with low mobility	• Controlled disturbance of low-mobility fauna • Rescue and relocation of low-mobility fauna
	Loss of birds threatened by collision with wind turbines	• Anti-collision system using sound devices and lights • Painting of wind turbine blades • Reproduction of endangered birds (Canquén Colorado and Caiquén) affected by collisions with wind turbines
	Alteration of archaeological findings and sites located within the Project's Area of Influence	• Archaeological training plan • Permanent archaeological monitoring plan • Archaeological record and aerial photogrammetric and topographic survey of linear features • Archaeological rescue plan • Museum exhibiting the cultural and natural heritage of San Gregorio • Research on archaeological material recovered in the project area.

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Project	Significant impacts	Mitigation, compensation, and/or remediation measures
	- Loss of unique vegetation formations - Loss of unique flora specimens	- Plan for replanting of temporary and permanent works - Sustainable grazing - Biodiversity compensation - Rescue of germplasm from unique shrub species - Protocol for the reproduction of unique shrub species - Nursery cultivation of native species
Park Faro del Sur Wind Farm	Increased travel times on Route 9 North due to oversized and overweight cargo	- Transport Night of Oversized and Overweight Cargo - Communication Plan - Communication Plan - Mailbox for receiving citizen concerns - Road Management Plan
	- Loss due to collision of specimens of <i>Chloephaga picta</i> (caiquén) - Loss due to collision of specimens of <i>Chloephaga poliocephala</i> (canquén) - Loss due to collision of specimens of <i>Chloephaga rubidiceps</i> (red-necked caiquén) - Loss due to collision of specimens of <i>Vultur gryphus</i> (Andean condor)	Bird monitoring and wind turbine braking system
	Loss due to collision of individuals of <i>Tinamotis ingoufi</i> (Southern Partridge).	Increased visibility of wind turbine towers of wind turbines for birdlife.
Comprehensive project for the production and export of green ammonia - HNH ENERGY	Modification and/or alteration of and sites of interest to wildlife	Actions to reduce bird collisions with wind farms Breeding center for the ruddy-headed goose (<i>Chloephaga rubidiceps</i>) and cairó (<i>Chloephaga picta</i>)
	Loss of sensitive bird species due to collision	
	Decrease in the productive capacity of four groups of fishermen and shore gatherers who extract resources from the coastline of San Gregorio, west of the project site, due to interaction with the works, parts, and actions of the project	Compensation for potential impact on productive capacity
	Alteration of archaeological sites	Archaeological rescue (extended excavation, surface collection, and recording of features immovable features).

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As shown in the table, each project is responsible for its own environmental and social impacts, which are located outside the study area of the Puerto Mardones project.

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CHAPTER 3 – PROJECT DESCRIPTION

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Acronyms

CAPEX: *Capital expenditure*

DIRECTEMAR: General Directorate of Maritime Territory and Merchant Marine D.S.: Supreme Decree

ENAP: National Petroleum Company

EPAUSTRAL: Austral Port Company GORE:

Regional Government

GW: Giga Watts

KWA: Kilo Watt Amperes

J.S. Mardones: José de los Santos Mardones

MINAGRI: Ministry of Agriculture MINSAL: Ministry of Health

MMA: Ministry of the Environment NCh: Chilean Standard

RCD: Non-Hazardous Solid Waste from Construction and Demolition SAG: Agricultural and Livestock Service

US\$: US dollars

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3 PROJECT DESCRIPTION

3.1 Brief Project Description

The project consists of improving the facilities at the Port of José de los Santos Mardones to ensure better safety conditions for its maritime operations within the framework of the Ministry of Energy's Green Hydrogen Action Plan 2023–2030. In this regard, the project aims to make current and future operations more efficient.

The port currently consists of a wharf structured on the basis of an L-shaped reinforced concrete deck on piles and steel beams, which is connected to the land infrastructure by an access bridge and esplanade, with a total surface area of approximately

4,500 m² (48,265 ft²). The land infrastructure has a total area of 240,000 m² (24 ha), consisting of a paved area of approximately 9.4 ha and an unpaved area of 14.6 ha. The paved area has container storage areas on an esplanade with electricity supply for reefer containers (refrigerated containers), cargo storage in warehouses, a truck yard, areas for EPAustral and Customs administration offices, among others. The unpaved area is used for the storage of regular and oversized cargo.

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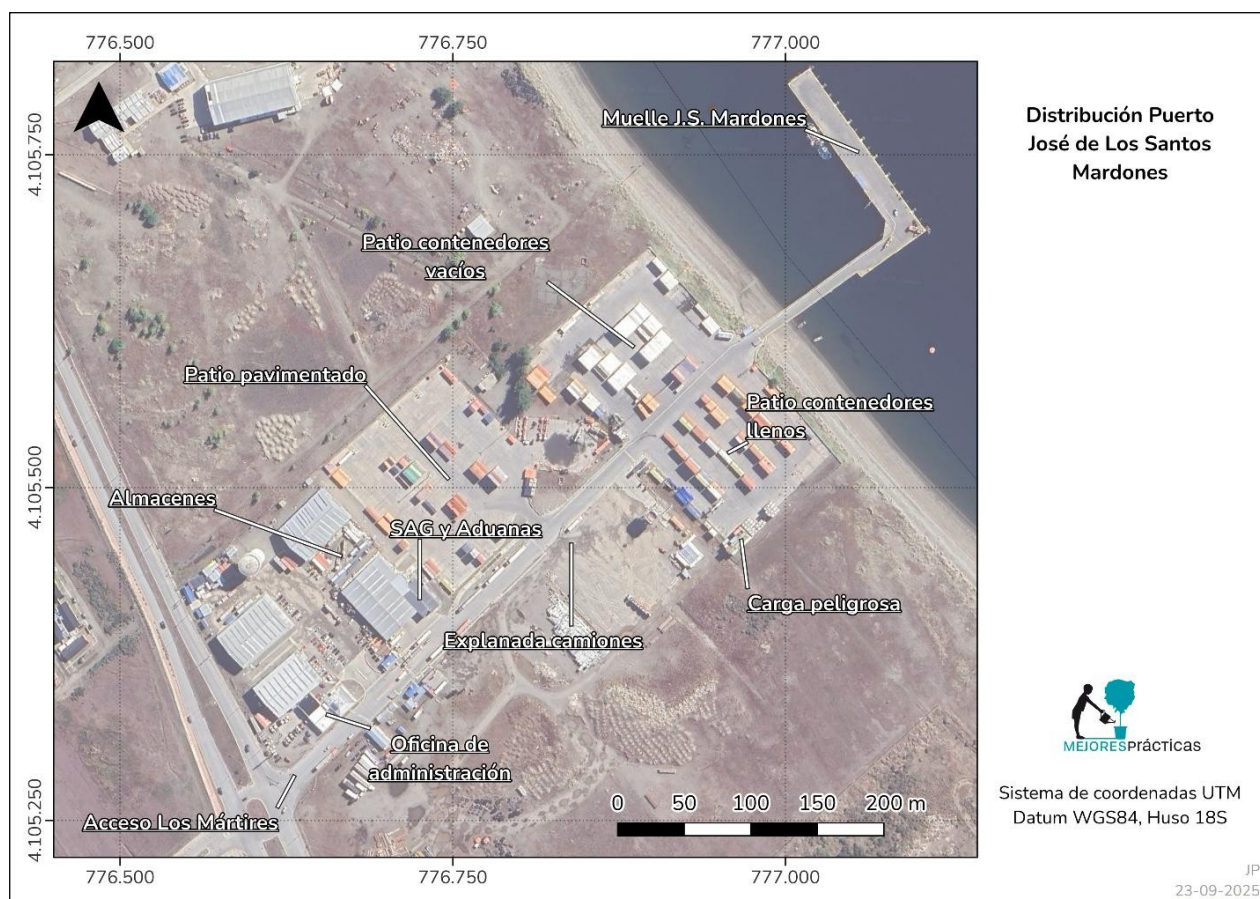


Figure 3-1: Distribution of the Port of José de Los Santos Mardones

Source: Own elaboration

With the aim of increasing efficiency in dock activities, EPAUSTRAL has considered the acquisition of two port cranes, which will increase loading and unloading speed, reducing ship layover times and, consequently, optimizing the terminal's operational capacity. To implement these cranes, work is being carried out to reinforce the slab, mainly with the installation of steel beams, whose main objective is to allow the operation of mobile cranes to optimize the transfer of bulk, containers, and break bulk cargo, as well as to facilitate the movement of heavy loads.

In addition, to improve the current conditions of the berthing front of its existing quay, the port company is considering extending the quay head by 200 linear meters and 25 meters in width, incorporating a new access bridge at the southern end of the projected quay head, 120 meters long.

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The improvement of the pier does not include new land facilities, nor the modification of the port's existing land facilities or infrastructure. In this regard, only the habilitation of the unpaved area for the temporary storage of cargo is being considered.

The construction phase of the project, specifically the expansion of the pier, will involve three main activities: site preparation and installation, pile driving, and structure construction, i.e., the installation of concrete slabs on the main structure.

The operational phase will involve increasing the port's capacity to handle large volumes of cargo and accommodate larger ships, without changing its main purpose.

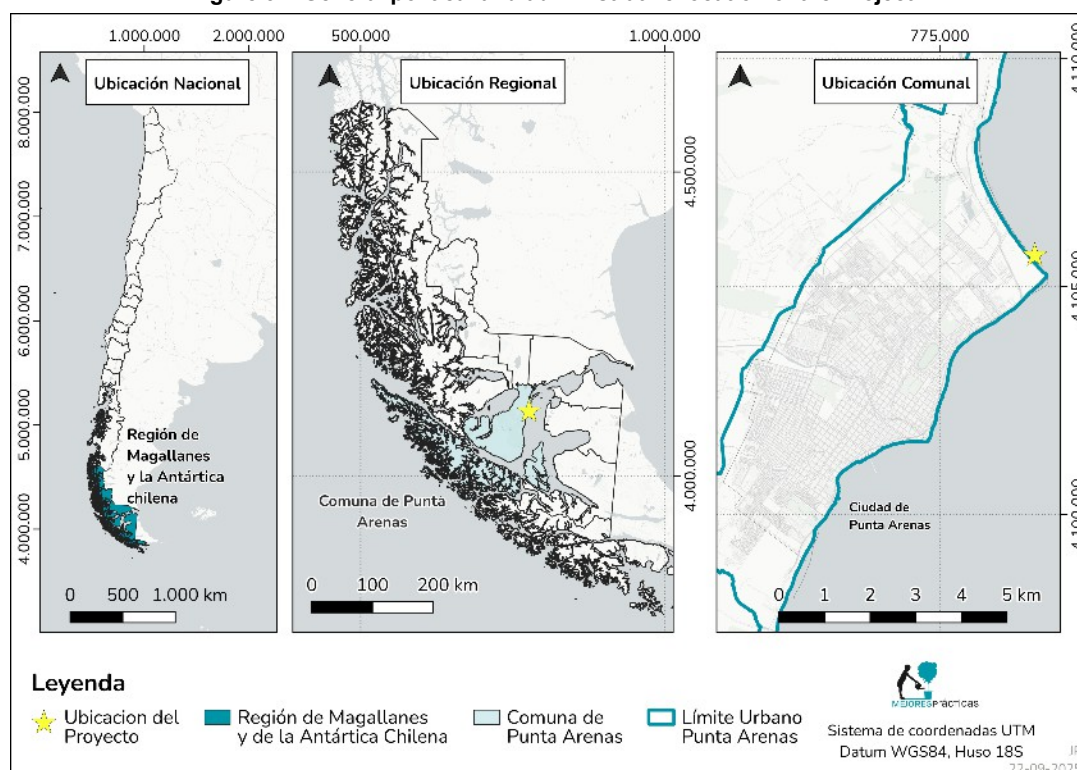
Finally, the project does not include a closure phase, as the infrastructure to be built can be maintained on a regular basis.

3.2 Project location

The parts, actions, and physical works covered by the Project will be located in the municipality of Punta Arenas, Magallanes Province, Magallanes Region. The following figure shows the general location of the Project. In terms of territorial planning, the Project is located within the urban limits of Punta Arenas, specifically in the ZAP-1 zone: Productive Activities Zone 1 (Port Sector Zone).

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Figure 3-2 General political and administrative location of the Project



Source: Prepared by the authors

3.3 Project areas

The total area involved in the development of the Project is approximately 147,880 m². The specific areas considered are detailed below.

Table 3-1 Total area required for the Project

Type of Project	Project	Work	Individual surface area of the work (m ²)
Permanent	Reinforcement of existing slab and acquisition of mobile cranes	Reinforcement of slab	4,500
	Expansion of the quay	Head	5,000
		Access bridge	1,380
	Enabling of backup cargo storage area	Cargo storage backup area	137,000

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Type of Work	Project	Work	Individual surface area of the work (m ²)
Total			147,880

Source: Relevance Consultation "Improvement of existing pier, Puerto José de Los Santos Mardones Alternative II, Punta Arenas" EPAUSTRAL S.A. and information provided by the owner.

With regard to temporary works, corresponding to the installation of work sites and related infrastructure, these will be located in areas that have already been developed, such as the pier and/or port platform, according to the requirements and surface areas requested by the contractors.

3.4 Description of the Parts, Actions, and Physical Works of the Project

3.4.1 Temporary works

The temporary works involved in the project mainly consist of a typical construction site installation, with temporary facilities and/or structures necessary for the proper functioning of administrative and personnel activities. These temporary facilities consist of:

- Temporary perimeter fencing to control access to the worksites.
- Installation of signage.
- Temporary portable toilets.
- Changing rooms and dining rooms for personnel.
- Administrative offices.
- Implementation of temporary tool storage.
- Other items deemed necessary by the contractor for regulatory compliance.

It should be noted that these facilities will comply with the provisions of Supreme Decree No. 594/2000 "Approves Regulations on Basic Health and Environmental Conditions in the Workplace" of the Ministry of Health.

The final location of the work site will be determined by the contractor awarded the contract, subject to the client's approval, within the current port facilities, taking into consideration both the dock and the land platform.

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3.4.2 Permanent works

The permanent works involve the creation of a new storage area, the reinforcement of the existing slab, the acquisition and implementation of mobile cranes, and the extension of the dock. Each of these works is described in detail in the following sections.

3.4.2.1 Establishment of a new storage area

The creation of a new cargo storage area mainly involves the improvement of 13.7 hectares of unpaved land on the site used by the port.

The preparation of the storage area consists of paving 1.95 ha in the area adjacent to the bridge involved in the pier expansion, asphalt paving 1.2 ha corresponding to new internal roads, and constructing a granular layer to allow for cargo storage on the remaining 10.5 ha.

Figure 3-3 below shows the area subject to modifications.

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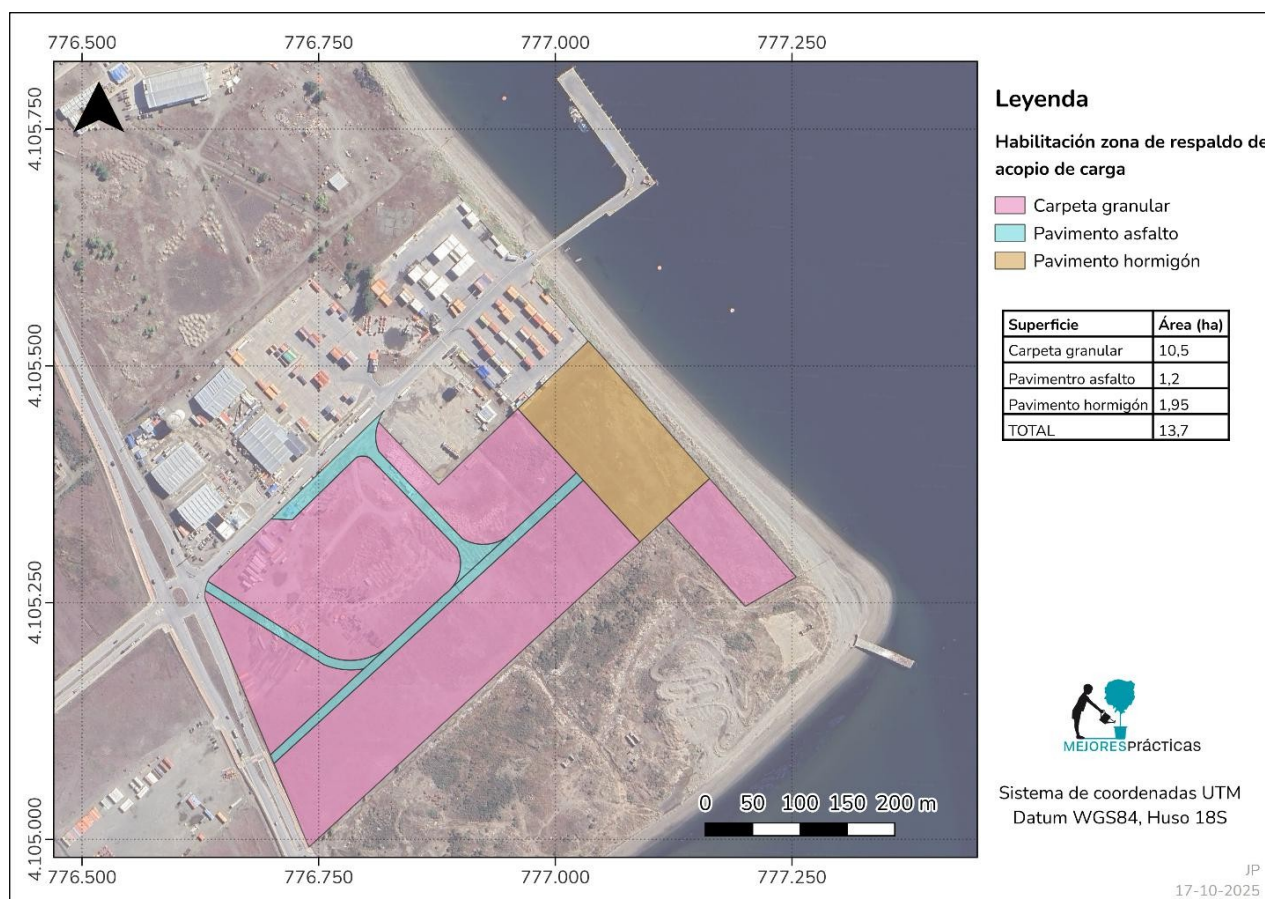


Figure 3-3: Storage area to be developed

Source: Own elaboration

3.4.2.2 Reinforcement of existing slab and acquisition of mobile cranes

The project consists of the construction and refurbishment of works to increase the structural capacity of the existing dock slab. This is currently being carried out by reinforcing the underside of the slab, mainly by installing additional steel beams. The main objective is to enable the operation of mobile cranes to improve the transfer of bulk, containers, and break bulk cargo, thereby reducing loading and unloading times and facilitating the movement of heavy loads. This project seeks to address the current infrastructure deficit and prepare for the expected increase in cargo, including bulk cargo from the new cement plant and cargo from wind power projects related to green hydrogen generation.

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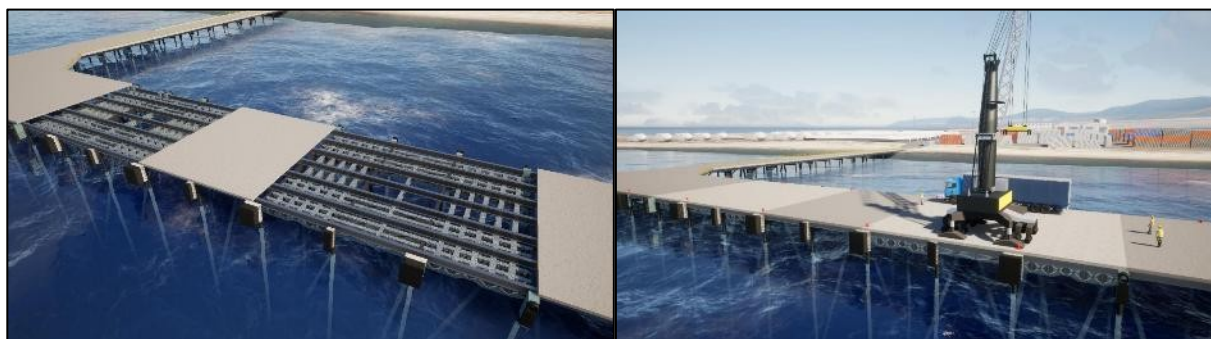


Figure 3-4: (Left) Representation of slab reinforcement. (Right) Representation of the new cranes in operation

Source: EPAUSTRAL (2024). Improvement of the port system to boost the development of Magallanes and Chilean Antarctica, 2023-2028. Proposed agreement with GORE Magallanes.

The cranes to be purchased will be Liebherr LHM 280 or similar, each with a capacity of 80 tons and a reach of 40 m. They are estimated to weigh between 170 and 240 tons.

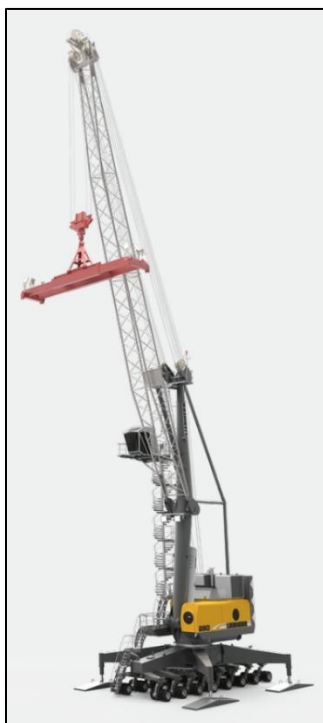


Figure 3-5: Reference diagram of the cranes to be purchased

Source: RFA Ingenieros (2024). Basic engineering for the expansion of the José de Los Santos Mardones pier, Punta Arenas.

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3.4.2.3 Pier expansion

Two configuration alternatives were considered for the pier extension, of which the final choice was to extend the pier head by 200 linear meters and incorporate a new access bridge at the southern end of the projected pier head, as well as the corresponding abutment. This corresponds to alternative 2 of the possible configurations analyzed, as described below in section 3.11.

Figure 3-6 below shows the dock extension to be carried out, corresponding to the chosen alternative.



Figure 3-6: Extension of the pier

Source: Prepared internally based on information provided by the owner

The modifications consist of expanding the existing dock, and therefore its characteristics will be similar to the current infrastructure. It will also double the dock's berthing capacity and allow for the reception of oversized cargo, such as wind turbine blades.

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The projected breakwater has a deck measuring 200 m in length and 25 m in width. It is supported by 94 tubular piles (outer diameter $\phi 24"$ to $\phi 28"$) and IE-type transverse and longitudinal beams. The deck is made of reinforced concrete and is 40 cm thick. It has fenders and mooring bollards on two sides: the front facing the sea and the side connecting to the access bridge.

Below is a schematic image showing the structure of the pier head, where the deck is shown in blue at the top, supported by the longitudinal beams in green, which in turn are supported by the transverse beams in pink. The piles, shown in blue and orange in the image, are attached to the transverse beams.

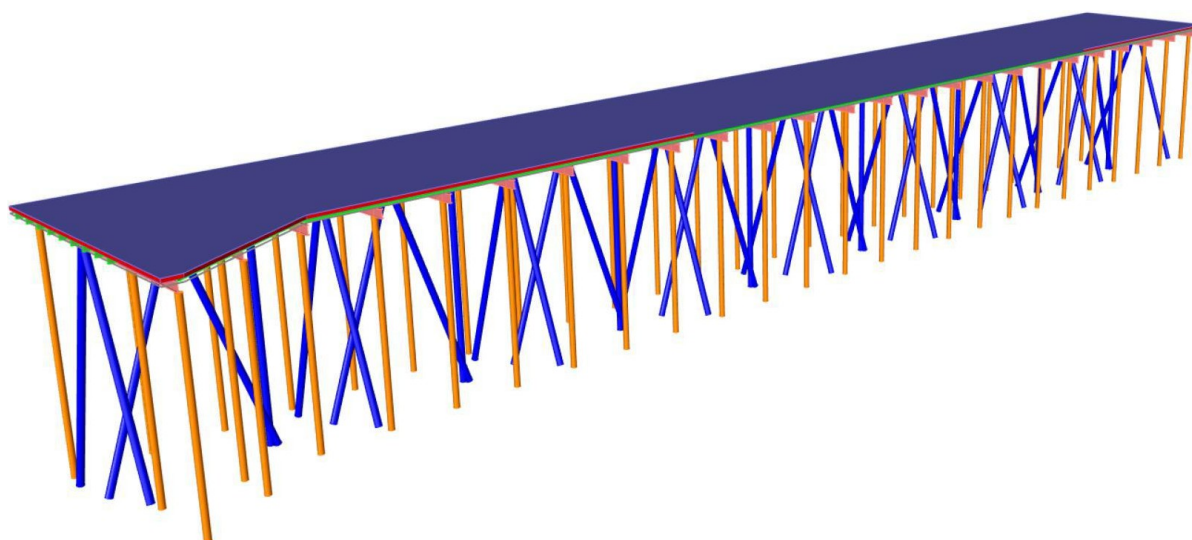


Figure 3-7: Proposed head structure model for pier expansion

Source: RFA Ingenieros (2024). *Basic engineering for the expansion of the José de Los Santos Mardones pier, Punta Arenas. Explanatory report.*

To protect the metal piles from saltwater corrosion and environmental stress, the installation of *jackets* is being considered. These are a corrosion protection system designed specifically to be a single-piece jacket, easy to install and

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upgrade to eliminate corrosion in pipelines, wharf piles in the splash zone, offshore platform structures, and subsea pipelines¹.

The aforementioned steel beams (transverse and longitudinal) will be placed on the piled metal structure, to which reinforced concrete slabs will be anchored. The slabs will be prefabricated and assembled on site. Prefabricated reinforced concrete slabs are considered, along with concrete road pavements, bollard elements, and elastomeric fenders. The fenders, which are rubber components designed to resist wear and tear, will be installed on the front and one of the sides of the projected head. In addition, to allow the mooring of boats and ships of different sizes, 25, 70, and 120-ton bollards will be added.

The construction of an access bridge from land to the head is also being considered. This will be built with the same materials and structures as the head, i.e., longitudinal beams, cross beams, piles, *jackets*, deck slab, fenders, and bollards.

The construction of an abutment is also being considered. An abutment is a structure that supports the vertical load of the bridge at ground level, as well as the loads of the vehicles that travel over it. In this case, the abutment consists of a retaining wall, piles, prefabricated slabs, and gabions, and an anchor block attached to the retaining wall by steel tie rods.

Below are schematic images showing the structure of the abutment.

¹ Definition by Tecnosagot. Available at: <https://tecnosagot.com/industria-2/servicios-construccion2/instalacion-de-chaquetas-para-proteccion-anti-corrosiva-de-pilotes-en-ambiente-marino/>

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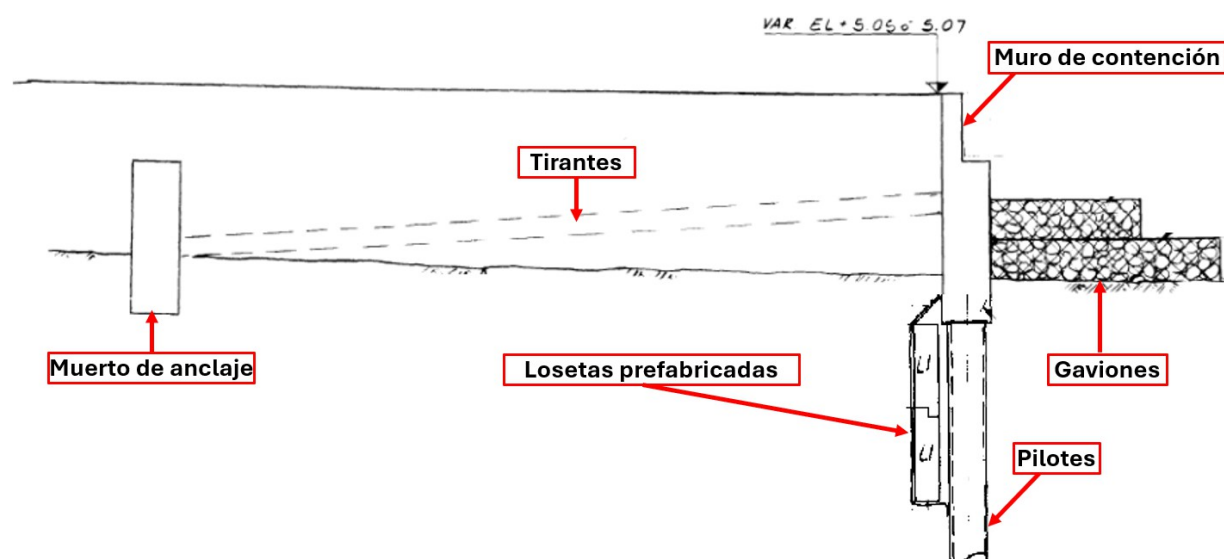


Figure 3-8: Schematic elevation of structural elements of the abutment

Source: RFA Ingenieros (2024). Basic engineering for the expansion of the José de Los Santos Mardones pier, Punta Arenas. Explanatory report.

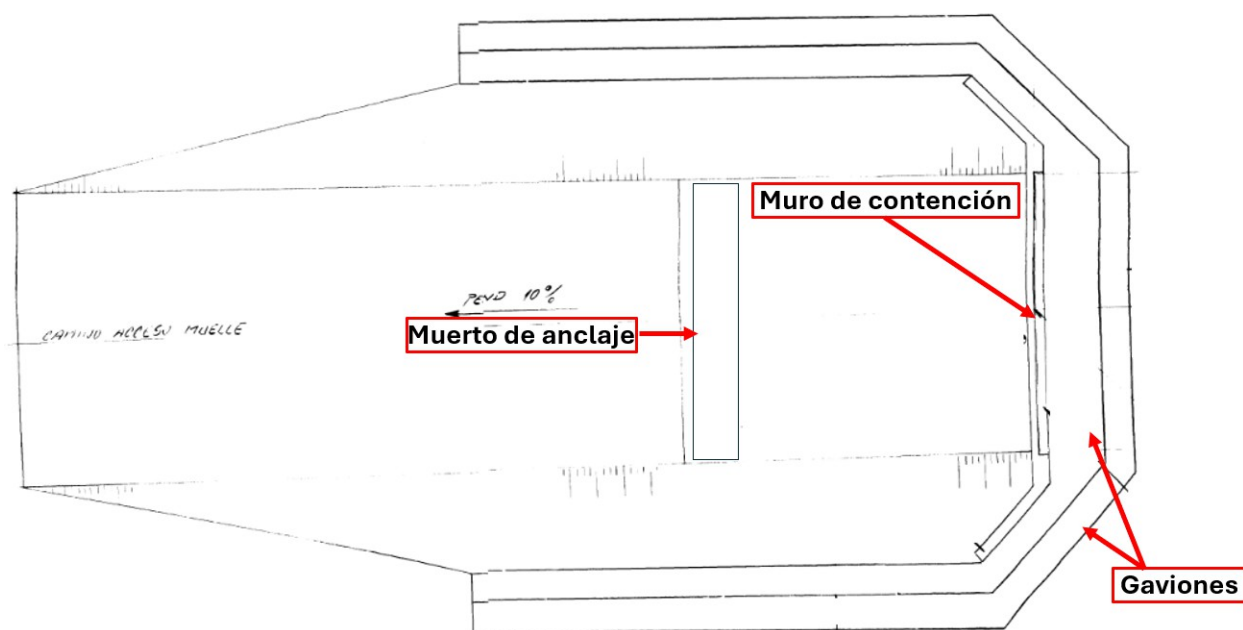


Figure 3-9: Schematic plan (right) of structural elements of the abutment

Source: RFA Ingenieros (2024). Basic engineering for the expansion of the José de Los Santos Mardones pier, Punta Arenas. Explanatory report.

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Figure 3-10: Representation of the pier with modifications

Source: EPAUSTRAL (2024). Annual Report 2023

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3.5 Description of the Construction Phase

3.5.1 Enabling of cargo storage backup area

A new storage area will be set up within the current port facilities, comprising a concrete-paved section (1.95 ha), an asphalt-paved section (1.2 ha), and a granular-paved section (10.5 ha).

3.5.2 Reinforcement of existing slab and acquisition of mobile cranes

The reinforcement of the existing slab is currently under construction. This began with the installation of work sites, which were partially set up on the port slab and the dock. On the dock there is a container office, a material storage area, chemical toilets, diesel generators, and waste storage.



Photograph 3-1: Installation of work equipment on the dock

Source: Own elaboration



Photograph 3-2: Temporary storage of waste on the dock
Source: Own elaboration

Reinforcing the existing slab to enable the use of mobile cranes requires the partial demolition of the existing dock. Subsequently, reinforcement is carried out by installing lower steel beams, and then restoring the concrete slab.

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Photograph 3-3: Partial demolition of slab

Source: Own elaboration



Photograph 3-4: Steel beams

Source: Own elaboration

As mentioned above, the purpose of the reinforcement is to enable the operation of two Liebherr LHM 280 cranes or similar. These will be installed after the existing slab has been reinforced.

3.5.3 Dock expansion

The construction process for expanding the pier requires the following main activities: preparation and installation of work sites, pile driving, and construction of the superstructure. Each of these is described in more detail below:

3.5.3.1 Preparation and installation of work sites

First, personnel must be hired for the project, differentiating the workforce according to the specific type of work they will perform.

Subsequently, the work site must be set up within the limits of the port and the pier. The final location of the work site will depend on the contractor awarded the contract, subject to the client's approval.

In order to begin construction activities, the materials must also be prepared. This activity consists of the following actions:

- External manufacture of the pier slab.
- Preparation of piles, including rust removal and application of epoxy anti-corrosion protection.
- Preparation of steel beams to join the piles on which the slab will be placed.
- Preparation of the dock defense system (for mooring boats) and railings.
- Preparation of reinforcement bars for the slabs.

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- On-site preparation of molds (usually metal, brass, or steel).
- Manufacture of buoys (mooring system).

3.5.3.2 Pile driving.

The pile driving process will be carried out using a diesel hammer. The activity will be carried out using a crane, starting from the northern section of the existing pier and moving southward until completing the 200 linear meters; boats or auxiliary piers may also be used. The process begins with the placement of the crane on the pier and the transport from the beam storage site to the driving site. A crane is used to place it in a vertical position (using plumb lines and topographic levels). Once the pile is in position, the head is placed on top (using wedges or plaster) to keep it rigid and attached to the crane boom, which is operated from the ground to begin striking the pile head, driving it into the ground. The pile is driven until it reaches the required depth. Once a row (row of piles, transverse to the pier) is completed, the beams that were initially mounted on the pier or on land (depending on the work front) are extended for hammering. Although the piles arrive at the driving site with protective coatings against moisture, due to the effect of welding on site, they are coated with anti-corrosion protection. It should be noted that there is no dredging and that, in addition to the vertical piles, inclined piles are also driven.

3.5.3.3 Construction of the superstructure

The superstructure, consisting of the metal framework and the covering slab, is constructed in the following steps:

1. Placement of metal framework on the pier (reinforcement): Prior to placing the slab, the surface of the beams on the piles is reinforced, creating a strong and compact metal mesh.

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Photograph 3-5: Metal framework

Source: Own work

2. Placement of slabs and covering: Prefabricated slab blocks are placed on the pile structure using a crane. Once assembled, formwork is placed under the slab joints, and then concrete is poured on site to fill the spaces between each slab block. High-strength concrete is poured over the prefabricated slabs to create a smooth road surface.
3. Installation of railings and dock protection: Steel fender panels are installed on the dock, and rubber fenders are installed on top of these. Railings and handrails are also attached to the dock.

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3.6 Description of the Operation Phase

The stages of the project described in this Environmental and Social Impact Study, as a whole, aim to reinforce the activities and services currently carried out at the J.S. Mardones Port in Punta Arenas. The activities currently carried out are briefly described below:

1. Mooring to buoys or bollards in the port: When a ship calls at a port, there are two ways to remain there. One is to moor to a port facility, using the mooring bollards distributed along the berthing front and the fenders that protect the dock. The other is, preferably, by position using mooring lines, whose length and tension are regulated from on board.
Another way is for the ship to remain unmoored to land facilities and its positioning is determined by its own anchors and chains, but it can also be supported by mooring lines to buoys.
2. Ranch work: This consists of tasks aimed at supplying food and provisions for the crew and passengers, which also includes replenishing drinking water (water supply) and supplies for navigation and fuel. The port has a water cup to make the task of supplying drinking water more efficient.

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Photograph 3-6: Water intake for supplying drinking water

Source: Own elaboration

3. Fumigation of warehouses or cargo therein: If required by the Agricultural and Livestock Service (SAG) and the Health Service, fumigation of an entire warehouse, part thereof, or a particular cargo may be carried out, including quarantine of the warehouse. The products to be used shall not be classified as "class Ia" (extremely hazardous) or "class Ib" (very hazardous), as detailed in the Pest and Pesticide Management Plan.
4. Receipt of ballast water: Since the port does not have facilities for the treatment and disposal of ballast, i.e., water used to improve the stability and navigability of ships, ships are required to discharge ballast at sea in accordance with the guidelines for ballast water exchange defined in DIRECTEMAR Resolution MEPC.124(53).
5. Receipt of stowage materials: The port receives the material used on board to lash and secure the cargo, as ships and shipowners are not interested in recovering it because it is difficult to recover.
6. Stowage and unloading on board: The stowage operation consists of arranging the cargo in the ship's holds so that it can be transported safely, and at the same time receiving the Stowage Plan, which guarantees the stability of the ship during navigation.

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On the contrary, unloading is the discharge from the holds to land, in an orderly and scheduled manner, so that the removal of goods follows the established sequence to be received and controlled by the port. It is then dispatched to the appropriate location, which may be by direct delivery to the consignee or to storage in the port area.

7. Transfer: This refers to the task of moving cargo from the ship to land or from land to the ship. Traditionally, ships used booms and winches for this maneuver, but nowadays it is common to find ships with their own cranes on the main deck, very similar to those used in ports, including those specialized for containers. Land cranes are mobile, generally relocatable to any location, and mounted on tires with their own propulsion and steering.



Photograph

Source: Own observation

8. Cargo movement: Once the cargo has been received on land, its documentary receipt is verified. Once the transfers have been signed and other checks have been carried out, and the corresponding accounts have been settled, it can be considered as ready for direct withdrawal and can be dispatched to its recipient.

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9. Transfer and dispatch outside the premises: The port receives and dispatches general cargo, aquaculture supplies, wood chips, refrigerated containers with fish and livestock products, infrastructure for projects, and supplies for the construction industry. It should be noted that in the case of projects that are evaluated in the Environmental Impact Assessment System, it is the project owner who ensures compliance with regulations and manages the road impacts and associated measures required during the environmental qualification process, which are specified in the Environmental Qualification Resolution for each project.
10. Receipt and storage: When cargo cannot be removed directly for any reason, the port must be responsible for its safekeeping until the paperwork is completed, outstanding payments are made, or any other urgent issues are resolved.



Photograph 3-8: Movement of stored cargo

Source: Own elaboration

11. Consolidation and deconsolidation of containers: When cargoes of different types, destinations, consignees, or requiring different procedures have been shipped in the same container, it is necessary to remove everything from inside, which is known as container deconsolidation. Once this has been done, each cargo follows its own route.

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12. Cargo fumigation at port: If required by the authorities, cargo must be fumigated on land. In this case, the port is normally responsible for the total cost of fumigation and the facilities required for it to take place. The products to be used shall not be classified as "Class Ia" (extremely hazardous) or "Class Ib" (very hazardous), as detailed in the Pest and Pesticide Management Plan.
13. Pest and disease control: Pest control, both on board and in port facilities, is supervised by the Agricultural and Livestock Service (SAG), while occupational and/or contagious disease control is carried out by the Health Service, in addition to assessing workplace conditions.
14. Customs clearance: This operation is usually carried out within port facilities, practically at the point of exit. The Customs service is responsible for this, and has its own procedures and tariffs. Customs may currently allow sealed containers or packaging to be taken out of the port to extra-port storage facilities or premises specially equipped for this purpose, where the goods are then cleared through customs.



Photo 3-9: SAG and Customs building

Source: Own elaboration

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15. Sweeping and cleaning: After loading or unloading, the area is left with debris, which must be cleaned up. This can be done manually with brooms or with vacuum sweepers.
16. Passengers and tourists: During the summer season, the port occasionally serves international cruise ships.

The following subsections describe how each of the stages modifies the port operations and actions mentioned above.

3.6.1 New cargo storage backup area

The new storage area will allow for the temporary storage of cargo from various industries, notably the cement industry and the green hydrogen industry. Demand for cement in Magallanes has been growing, driven by infrastructure and construction projects, although it is still below the maximum capacity of the Cementos Melón plant in Punta Arenas. There are currently housing initiatives in Puerto Williams, Porvenir, and Punta Arenas, along with public works such as the expansion of the airport, improvements to the Teniente Marsh airfield, and the development of port infrastructure. By 2024, it is estimated that Melón will require 65,000 tons of raw material, with projected growth of between 5,000 and 10,000 tons per year. Shipments of clinker and gypsum are expected to be

25,000 and 15,000 tons, respectively, with unloading rates of 5,000 tons/day.

According to figures from the trade association of Green Hydrogen developers in Magallanes, its members manage a portfolio of seven initiatives in various stages of development, with a total investment of US\$60 billion for 19 GW of wind power and a total of 8.5 million tons/year of exported product (liquid bulk).

For the J.S. Mardones terminal, the focus of the opportunity is not on the export of green hydrogen products, but on the reception of the inputs necessary for the construction of wind farms and roads, the maintenance of these works, and the entry of the inputs required for operation. In this regard, the opening of the new cargo storage area will allow the port to temporarily store these supplies, especially wind turbine blades, which can be more than 80 m long.

3.6.2 Reinforcement of existing slab and acquisition of mobile cranes

Dock capacity is determined by a function that depends, on the one hand, on transfer rates, which are influenced by the technology used (such as the presence or absence of cranes), and on the other hand, on uptime, which is conditioned by both climatic factors and shift structure. The composition of the ships served also has an impact: larger ships require more time to load and unload, and smaller ships require more frequent handling.

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cranes), and on the other hand, on operational availability time (*uptime*), which is conditioned by both climatic factors and shift structure. The composition of the ships served also has an impact: greater homogeneity and larger shipment sizes reduce downtime between calls.

Currently, cargo transfer at the Mardones terminal is carried out using the cranes of the warehouses themselves, which is complemented by the intensive use of labor, resulting in an inefficient way of operating given the low loading and unloading speeds achieved with this method. This has a negative impact on the available capacity of the dock for current and future operations at this terminal. The installation of cranes will increase the speed of handling bulk cargo, containers, and break bulk cargo.

It is estimated that the port currently has a transfer capacity of 580,000 tons of cargo per year, which is expected to increase to 803,500 tons per year with the implementation of the cranes.

3.6.3 Dock expansion

The estimated transfer capacity for this project, according to previous studies, indicates that it would be possible to mobilize an additional 1.1 million tons per year. With this, the J.S. Mardones terminal would reach a total capacity of close to 1.9 million tons per year. The transfer capacity at the dock depends both on the available length of the berthing front and on operational performance. In general terms, doubling the length of the front should allow for approximately double the capacity. In this case, a few meters of the side dock currently in use would be lost, which would explain why the projected increase is 1.1 million tons rather than 1.4 million tons. It is also assumed that there will be no significant improvements in crane technology compared to the current standard.

In this context, the J.S. Mardones terminal would become a strategic player, with its new capacity of 2.5 million tons per year, absorbing a significant part of this demand, together with the ENAP terminals and private ports linked to green hydrogen production projects.

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3.7 Description of the Closure Phase

The Project has an indefinite useful life, considering the performance of maintenance activities, equipment modernization, among others, aimed at prolonging the useful life of the Project. This is why the Project does not contemplate a Closure or Abandonment Phase.

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3.8 Project Flowchart

The following table shows the start and end dates and milestones for each of the project phases, associated with each of its stages.

Table 3-2 Start and end dates of the project phases

Phase	Stage		Estimated Date
Construction	Preparation of cargo storage backup area	Start	2026
		Completion	2027
	Reinforcement of existing slab and acquisition of mobile cranes	Start	Already started
		Completion	2026
	Dock expansion	Start	2026
		Completion	2027
Operation	Enabling cargo storage backup area	Start	2027
		End	Not applicable
	Reinforcement of existing slab and acquisition of mobile cranes	Start	2026
		End	Not applicable
	Pier expansion	Start	2027
		Completion	Not applicable

Source: Prepared internally based on RFA Ingenieros (2024). Basic engineering for the expansion of the José de Los Santos Mardones pier, Punta Arenas. Explanatory report.

With regard to the Closure Phase, the Project has an indefinite useful life, considering the performance of maintenance activities, equipment modernization, among others, aimed at prolonging the useful life of the Project. This is why the Project does not contemplate a Closure or Abandonment Phase.

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3.9 Basic Supplies

3.9.1 Construction Phase

During the construction phase, the Project considers the use of various basic supplies and inputs associated with each of its phases and the different work sites associated with the construction works being carried out in each of the Project's sectors.

3.9.1.1 Labor

The labor requirement for the construction phase of the Project is estimated at 140 workers, including local labor and skilled labor.

3.9.1.2 Electricity

A temporary connection will be made to the port's general power grid while the permanent installation is being carried out. During construction, diesel generators will be used if necessary.

3.9.1.3 Fuel

Diesel will be supplied directly from the city for the operation of the hammer. Fuel for light vehicles will be supplied directly from local service stations, while a tanker truck will be used for the cranes, with the fuel being stored in suitable drums.

In addition, liquefied gas is used for welding work.

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Photo 3-10: Use of liquefied gas in operations

Source: Own elaboration

3.9.1.4 Water

3.9.1.4.1 Drinking water

A temporary connection will be made to the existing drinking water system in the port, which is supplied by the public network.

3.9.1.4.2 Industrial water

Industrial water will only be required for basic cleaning tasks, as the concrete to be purchased will be pre-mixed. In addition, large-scale cleaning activities, such as washing mixer trucks, will be carried out off-site. The industrial water supply will be provided by the public network owned by the local water company.

3.9.1.5 Sanitary facilities

In order not to interfere with normal port operations, a temporary fence will be erected to separate the construction area from the rest of the port premises. For this reason, portable toilets will be used and located in the construction personnel area. The provision of sanitary facilities

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during the construction phase will comply at all times with the provisions of D.S. No. 594/1999 of the Ministry of Health.

3.9.1.6 Food

Food for the construction phase will be supplied by authorized third parties that have a Health Resolution.

3.9.1.7 Accommodation

The Project does not consider the establishment of camps or other types of accommodation during the construction activities of the Project.

3.9.1.8 Transport

The transport of supplies and waste associated with the construction phase will be carried out by duly authorized third parties.

3.9.1.9 Construction Materials and Supplies

The construction of the Project involves the use of various materials and supplies, mainly steel, aggregates, gabions, concrete, and piles, which will be purchased from third parties authorized by the contractors.

3.9.1.10 Equipment and Machinery

Given the characteristics of the project, the construction phase involves various types of major equipment and machinery. The most important machinery includes trucks, cranes, boats, and pile drivers.

3.9.1.11 Reagents and/or Hazardous Substances

3.9.1.11.1 Other Hazardous Substances

The works will require the use of paint and the application of flammable epoxy anti-corrosion protection.

3.9.2 Operational Phase

3.9.2.1 Labor

To maintain port operations, it is estimated that approximately 27 officials, 12 operators, and 20 external service personnel, such as Customs, Maritime Territory, SAG, and Health Service, will be required, totaling 59 workers.

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Maritime Territory, SAG, and Health Service, for a total of 59 workers. In addition, subcontractors are being considered for loading/unloading and transportation (truck drivers).

3.9.2.2 Electricity

Electricity will be obtained from the port's existing facilities.

3.9.2.3 Fuel

Fuel for port use will be supplied by tanker trucks, in the event that fuel needs to be provided to ships and drums (for diesel cranes) in accordance with standard procedures.

In the case of natural gas, the existing pipeline network will be used.

It is important to note that maritime agencies operating in the port may have other sources of fuel supply.



Photo 3-11: Gas tank at the Maritime Agency offices

Source: Own elaboration

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3.9.2.4 Water

3.9.2.4.1 Drinking water

This resource will be obtained from a connection to the port's existing system, which is currently provided by the local water company.

3.9.2.4.2 Industrial Water

Industrial water supply during the operational phase will be provided by the local public water utility network. This is mainly used for washing reefer containers.

3.9.2.5 Sanitary facilities

The existing sanitary facilities and wastewater management system in the port will be used. These are connected to the municipal wastewater conveyance and treatment system.

Notwithstanding the above, maritime agencies operating in the port may have other management systems, such as septic tanks.



Photo 3-12: Septic tank at the Maritime Agency offices

Source: Own elaboration

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3.9.2.6 Food

The existing facilities (dining room) will be used. Food will be prepared outside the port by companies in the sector that have health authorization.

3.9.2.7 Accommodation

The Project does not consider the establishment of camps or other types of accommodation during Project operations.

3.9.2.8 Transport

The project does not consider cargo transportation to and from the port.

As indicated above, in the case of projects that are evaluated in the Environmental Impact Assessment System, it is the owner of each project who estimates the vehicle flows associated with each project, ensures compliance with regulations, and manages the road impacts and associated measures required during the environmental qualification process for each specific project.

3.9.2.9 Equipment and Machinery

The equipment to be used during port operations is described below:

1. Mobile cranes will be used for the vertical transfer of cargo, which serve to hoist or lower cargo and transfer it from land to sea and vice versa, specialized Granty cranes for containers, multipurpose cranes, and yard cranes that are used for stacking containers in different positions and heights.
2. Trucks, forklifts, and yard stackers are used for the horizontal transfer of cargo.
3. Portable conveyor belts and vacuum suction devices are used for loading solid bulk cargo.
4. For unloading fish, heavy cargo handling systems are used, as they are packed in special boxes. Once on land, they are transferred to trucks that deliver the product to its destination (fishing cold storage facilities).
5. To aid navigation, landmarks are used to guide ships to their berthing locations. There are daytime, nighttime, and electronic signals.

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3.9.2.10 Reagents and/or Hazardous Substances

3.9.2.10.1 Other hazardous substances

The project considers the temporary storage of cargo containing hazardous substances, such as aerosols and paints. These are kept in a properly marked area for a maximum period of 20 days.



Photograph 3-13: Hazardous cargo area

Source: Own elaboration

3.9.3 Closure Phase

The project has an indefinite useful life, considering the performance of maintenance activities, equipment modernization, among others, aimed at prolonging the useful life of the project. This is why the project does not contemplate a closure or abandonment phase.

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3.10 Efficient use of resources and pollution prevention

3.10.1 Renewable Natural Resources to be Extracted or Exploited During the Project Phases

3.10.1.1 Construction Phase

The construction of the works to be carried out will involve cleaning, clearing areas, and earthworks in areas previously affected by the project, covering a maximum of 13.7 ha.

Drinking and industrial water will be obtained from the local water company. If necessary, industrial water will be obtained from authorized third parties.

3.10.1.2 Operation Phase

During the operational phase, drinking and industrial water will be obtained from the local water company through existing facilities. If necessary, industrial water will be obtained from authorized third parties.

3.10.1.3 Closure Phase

The Project has an indefinite useful life, considering the performance of maintenance activities, equipment modernization, among others, aimed at prolonging the useful life of the Project. This is why the Project does not contemplate a Closure or Abandonment Phase and, therefore, will not make use of renewable natural resources.

3.10.2 Project Emissions and Discharges during the Different Project Phases

3.10.2.1 Construction Phase

3.10.2.1.1 Emissions to the Atmosphere

Atmospheric emissions associated with the construction phase of the Project will mainly relate to particulate matter produced by material handling and vehicle traffic. These emissions will be sporadic in nature, mainly limited to the duration of the Project's construction phase.

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3.10.2.1.1.1 Atmospheric Emission Abatement and Control Measures

The following are among the measures for controlling and abating atmospheric emissions during the construction phase of the Project:

- Materials will be transported in covered trucks to prevent materials from falling and dust from being released during transport.
- The machinery used will have up-to-date technical inspections.
- In the port area, cranes and trucks will be regularly checked for abnormal emissions of pollutants, especially combustion gases.
- Vehicles parked with their engines running shall be avoided.
- Periodic maintenance shall be performed on machinery and equipment for the control of atmospheric emissions.

3.10.2.1.2 Noise and Vibrations

The project involves the use of machinery such as trucks, cranes, boats, and pile drivers, which will generate noise emissions.

The works to be constructed will be located in an urban area defined in the current Community Regulatory Plan for the municipality of Punta Arenas. The potential recipients are located approximately 200 meters southwest of the central point of the main planned works (PC), in an area defined as ZH-A "*Residential Zone A*," with permitted uses such as: *housing, foster homes; Facilities: commerce, worship and culture, sports, education, health, safety, services, social; Productive Activities: harmless workshops; Infrastructure: transportation, energy; Public Space*. Considering the distance of the Project from the nearest potential recipients, no impacts associated with noise are expected.

3.10.2.1.2.1 Atmospheric Emission Abatement and Control Measures

The methods for abatement and control of noise and vibration emissions during the construction of the Project include:

- Proper maintenance of vehicles.
- Preference will be given to avoiding the simultaneous use of machinery and/or tools that may generate high noise levels. Likewise, priority will be given to carrying out these tasks during

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daytime hours. Nighttime tasks that emit low noise levels may be considered.

- Trucks and equipment will be equipped with mufflers.

3.10.2.2 Operation Phase

3.10.2.2.1 Atmospheric Emissions

3.10.2.2.1.1 Abatement and Control Measures Atmospheric Emissions

The following are among the measures for controlling and abating atmospheric emissions during the project's operation phase:

- Trucks will be covered to prevent dust emissions.
- In the port area, cranes and trucks will be routinely checked for abnormal emissions of pollutants, especially combustion gases.
- Vehicles will not be allowed to remain stationary with their engines running.
- Periodic maintenance will be carried out on machinery and equipment to control atmospheric emissions.

3.10.2.2.2 Noise and Vibrations

Port operations involve the use of noise-generating machinery and vehicles such as trucks, cranes, and container lifters.

The port's operations are located in an urban area defined in the current Community Regulatory Plan for the municipality of Punta Arenas. Potential recipients are located approximately 200 meters southwest of the central point of the main planned works (PC), in an area defined as ZH-A "*Residential Zone A*," with permitted uses such as *housing, foster homes, Facilities: commerce, worship and culture, sports, education, health, safety, services, social; Productive Activities: harmless workshops; Infrastructure: transportation, energy; Public Space*. Considering the distance of the Project from the nearest potential receptors, no impacts associated with noise are expected to occur.

3.10.2.2.2.1 Noise and Vibration Reduction and Control Measures

The methods for reducing and controlling noise and vibration emissions during the operation of the Project include:

- Use of low-noise machinery.

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- Proper maintenance of mufflers on mobile and stationary engines.
- Proper maintenance of vehicles.
- Preference will be given to avoiding the simultaneous use of machinery and/or tools that may generate high noise levels. Likewise, priority will be given to carrying out these tasks during daylight hours. Night work that emits low noise levels will be considered.

3.10.2.3 Closure Phase

The Project has an indefinite useful life, considering the performance of maintenance activities, equipment modernization, among others, aimed at prolonging the useful life of the Project. This is why the Project does not contemplate a Closure or Abandonment Phase.

3.10.3 Quantity and Management of Waste, Chemicals, and Other Substances that May Affect the Environment during the Project Phases

3.10.3.1 Construction Phase

3.10.3.1.1 Liquid Effluents

3.10.3.1.1.1 Wastewater

During the construction phase, wastewater will be generated from the use of portable toilets. The necessary number of toilets will be installed in compliance with current regulations.

This wastewater will be removed and transported periodically by a company authorized by the Health Authority. The final destination of chemical toilet waste will be a wastewater treatment plant with health authorization or an authorized final disposal site.

The handling of chemical toilets will be carried out in compliance with the conditions established in D.S. No. 594/99 of MINSAL, text of the standard "Basic Sanitary and Environmental Conditions in the Workplace." In addition, as a control measure, a record will be kept of the chemical toilet contract and its respective cleanings.

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Photograph 3-14: Portable toilet cleaning system

Source: Own elaboration

3.10.3.1.1.2 Washing water

Liquid industrial waste will be generated by washing the tires of trucks that will travel on paved roads.

For this purpose, a platform will be installed where the truck will stop for wheel washing using a high-pressure water jet.

In addition, the facility will have a water tank to supply the demand for washing water. Along with this, there will be a sedimentation tank for solids.

The wheel washing area will have a collection tank for washing water with a hydrocarbon separator, and when the tank is full, the water will be collected and disposed of by a third party at a location authorized by the Health Authority.

The washing of mixer truck canoes will not be carried out at the port facilities, but rather at the facilities of the concrete supplier, so no liquid waste that could affect water quality is expected.

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3.10.3.1.2 Solid Waste

3.10.3.1.2.1 Domestic Waste

During the construction phase, household waste will be generated, mainly paper, cardboard, plastic packaging, and food scraps, which will be stored in sturdy, labeled containers with lids.

This waste will be removed by an authorized external service for final disposal at a site with health authorization. An estimated 0.6 kg/person/day will be generated.

3.10.3.1.2.2 Non-hazardous solid waste from construction and demolition (RCD)

This waste will mainly come from the construction activity of the maritime works to be implemented, essentially consisting of wood scraps, disused formwork, uncontaminated cardboard and packaging, metal scraps, concrete debris, etc. The CDW will be temporarily stored at the work site, in a duly authorized location.

To prevent spills of construction materials, such as concrete debris, during the slab concreting process, spill collection trays will be installed under the pier beams to minimize the fall of any debris.

Similarly, the Owner will require, through the Contract Terms and Conditions, that the Contractor comply with current environmental regulations. In general terms, these requirements include the proper segregation, labeling, accumulation, removal, and final disposal of all types of solid waste at sites authorized by the Regional Health and Environmental Authority.

In this regard, the contractor must submit a "Construction Waste Management Plan" for approval by the client, and must also comply with the provisions of NCh 3562 of 2019 "Waste management - Construction and demolition waste (CDW) - Classification and guidelines for the management plan."

3.10.3.1.2.3 Foreign Wood Packaging and Other

In the case of equipment and/or supplies contained in wooden packaging from other countries, suppliers will be required to comply with MINAGRI Exempt Resolution No. 133/2005.

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3.10.3.1.3 Hazardous Waste

If such waste is generated, it will be stored in a warehouse for temporary storage, in compliance with the requirements set forth in Article 33 of the Regulations (D.S. No. 148/04 of the MINSAL). Said warehouse must be located on the work site and have the respective health permit for the duration of the work.

It should be noted that the contractor in charge of the activities will not be allowed to perform maintenance on vehicles or equipment on site, which must be carried out in authorized workshops.

3.10.3.2 **Operation Phase**

3.10.3.2.1 Liquid Effluents

3.10.3.2.1.1 Wastewater

Wastewater is managed through the public sewer system, using existing facilities.

3.10.3.2.1.2 Washing Water

The operation of the port produces wash water from reefer containers. The installation of a parapet for the management of wash water is being considered.

3.10.3.2.2 Solid Waste

3.10.3.2.2.1 Household Waste

The project does not contemplate the reception of waste from ships, either domestic or hazardous.

Notwithstanding the above, the project includes the implementation of an internal management plan for solid waste generated by port activities, which is included in the PGAS. This plan considers the classification and identification of waste types, their separation, packaging, and storage under appropriate conditions according to their type and quantity.

Currently, household waste is stored in a hopper and removed by the municipal system.

In addition, the offices have a system for separating recyclable waste.

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Photo 3-15: Household waste hopper

Source: Own elaboration



Photo 3-16: Recycling containers

Source: Own elaboration

3.10.3.2.2.2 Non-hazardous industrial solid waste

The project produces solid decantings generated during reefer washing. These will be sent to an authorized final destination.

In addition, the reception and handling of stowage and unstowage waste is considered. This includes packaging material, ropes, packing, paper and cardboard, wood, plastics, and other non-hazardous materials. This waste is handled in a similar way to household waste. The company has front loaders and all the necessary equipment for the handling and internal transport of larger volume waste, in order to avoid efforts that endanger the health of workers.

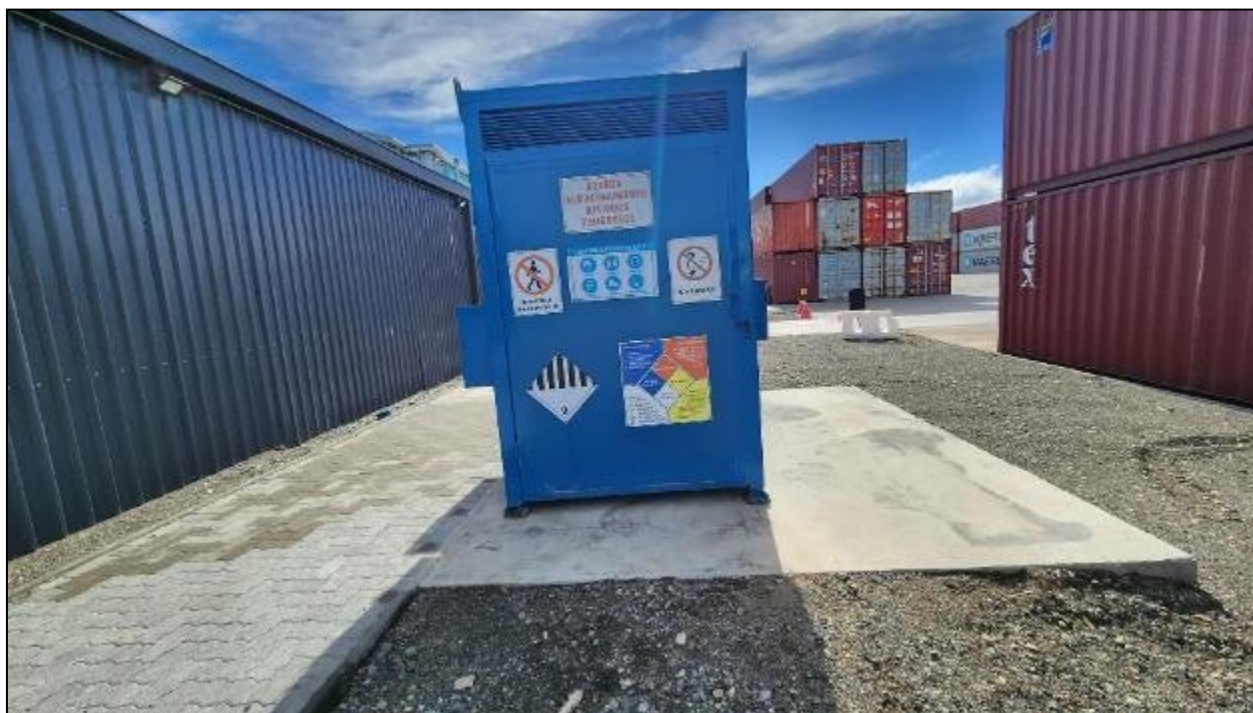
3.10.3.2.2.3 Hazardous Waste

Hazardous waste may be generated by the companies carrying out the loading and unloading work. The following is a list of the types of hazardous waste that could be generated during this phase of the project:

- Burnt oil
- Hydrocarbons
- Substances of unknown origin
- Packaging contaminated with hazardous substances
- Discarded reagents and laboratory materials
- Samples for scientific research.

This waste will be stored in hazardous waste warehouses, managed by the relevant maritime agency that generates this waste.

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Photograph 3-17: Hazardous waste storage facility present in the project

Source: Own elaboration

Waste will be transported to the final disposal site(s) in accordance with the regulations in force for each of the categories listed above.

3.10.3.3 Closure phase

The Project has an indefinite useful life, considering the performance of maintenance activities, equipment modernization, among others, aimed at prolonging the useful life of the Project. This is why the Project does not contemplate a Closure or Abandonment Phase.

3.11 Analysis of Alternatives

As mentioned in the previous sections, two mutually exclusive alternatives for the expansion of the pier were analyzed. The first involves extending the pier head by 200 linear meters, thereby transforming its current L-shape into a T-shape and also rectifying the width of its current access bridge by approximately 5 meters. The second alternative involves extending the head by 200 linear meters and

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incorporating a new access bridge at the southern end of the projected head, as well as the respective abutment.

The two alternatives are shown below.



Figure 3-11: Alternatives considered

Source: Prepared internally based on information provided by the owner

According to the document Explanatory Report – Basic Engineering for the Expansion of the José de los Santos Mardones Pier (8833-MEM-GE-001), EPAustral commissioned the company RFA Ingenieros to carry out the following tasks, among others:

- Develop the two alternatives proposed by EPAustral at the conceptual engineering level for the expansion of the Mardones Terminal, including at least an explanatory report, planimetry, design criteria, and capital cost estimates (CAPEX).
- Propose to EPAustral, through a multi-criteria analysis, the best infrastructure alternative, based on relevant parameters to be presented by the consultant.

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- Develop, at the basic engineering level, the selected alternative for the expansion of the Mardones Terminal, including at least an explanatory report, planimetry, design criteria, general structural modeling, capital cost estimates (CAPEX), estimated construction schedule, and graphic material.

After implementing the first two points mentioned above, EPAustral determined that the alternative to be developed would be layout alternative No. 2, which involves expanding the existing head and building a new access bridge.

There are no disaggregated estimates of cargo transfer capacity for the two implementation alternatives analyzed. However, it is reasonable to assume that the alternative with two access bridges could offer greater operational efficiency than the one with only one, especially considering that the terminal plans to handle oversized cargo such as wind turbine blades, whose unloading and transport operations within the port area are complex and slower.

PROJECT TO SUPPORT THE IMPLEMENTATION OF THE MAGALLANES H2V PROJECT: DEVELOPMENT OF ENABLING PORT INFRASTRUCTURE - CHILE - CH- L1191

CHAPTER 4 – CHILEAN AND IDB GROUP REGULATORY FRAMEWORK

Report prepared by EPAustral

MP Report 929 – 2025

November 2025

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Version	Rev.1	
Date	November 7, 2025	
Status	Document for dissemination	
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4 APPLICABLE REGULATORY ASPECTS

4.1 Applicable Chilean Legal Framework

4.1.1 Environmental Impact Assessment System in Chile

4.1.1.1 General Aspects

The Environmental Impact Assessment System in Chile (SEIA) is a preventive environmental management tool that determines whether a project complies with current environmental legislation and whether it addresses potential environmental impacts. It is established by Law 19,300 on General Environmental Principles, enacted on March 1, 1994, and amended by Law 20,417 of November 13, 2010. With regard to the SEIA, Law 19,300 is regulated by Supreme Decree 40/12, Regulations of the Environmental Impact Assessment System (RSEIA).

Law 19,300 states that the Environmental Assessment Service (SEA) is the agency responsible for administering the SEIA, and in turn states in Article 8 that *"The projects or activities referred to in Article 10 may only be executed or modified after an assessment of their environmental impact, in accordance with the provisions of this law."* In turn, Article 10 of the same Law states that *"Projects or activities likely to cause environmental impact, in any of their phases, must be submitted to the SEIA,"* and provides a list of projects that must do so. The details of the characteristics of these projects are established in Article 3 of the RSEIA.

Once it has been determined that a project must undergo environmental assessment in the SEIA, in accordance with the projects listed in Article 10 of the Law and detailed in Article 3 of the RSEIA, it must be determined whether it should be assessed by means of an Environmental Impact Statement (EIS) or an Environmental Impact Assessment (EIA). An EIS must be submitted if the project generates significant environmental impacts on one or more environmental components, i.e., it generates any of the effects, characteristics, or circumstances indicated in Article 11 of the Law and detailed in Articles 5 to 10 of the RSEIA. All other projects are submitted as EIAs. Article 11 of the law indicates that it must be analyzed whether the project generates the following:

- a) Risk to the health of the population due to the quantity and quality of effluents, emissions, or waste;

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- b) Significant adverse effects on the quantity and quality of renewable natural resources, including soil, water, and air;
- c) Resettlement of human communities, or significant alteration of the life systems and customs of human groups;
- d) Location in or near towns, resources, and protected areas, priority sites for conservation, protected wetlands, and glaciers that are likely to be affected, as well as the environmental value of the territory where the project is to be located;
- e) Significant alteration, in terms of magnitude or duration, of the landscape or tourist value of an area; and
- f) Alteration of monuments, sites of anthropological, archaeological, historical, and, in general, cultural heritage value.

Additionally, Articles 12 to 17 of the RSEIA establish the common content that EIAs and DIAs must contain, while Article 18 indicates the minimum content of EIAs, and Article 19 indicates the content of DIAs. Likewise, Title VII, Articles 111 to

161 of the RSEIA indicate the sectoral environmental permits and pronouncements that must be considered, if applicable to the Project.

It should be noted that projects that, according to Article 10 of Law No. 19,300, must be submitted to the SEIA, cannot be executed until they obtain a favorable RCA, and their execution constitutes an infraction that is sanctioned by the SMA.

On the other hand, with regard to citizen participation in the evaluation of investment projects submitted to the SEIA, in accordance with the provisions of Article 26 of Law 19,300 and Article 83 of the RSEIA, it is the responsibility of the Evaluation Commissions to establish mechanisms for informed community participation in the environmental evaluation process of a project. The community may obtain information through publications in the Official Gazette and in a regional newspaper. In the case of EIAs, it is the project owner who must publish an Extract of the Project, which must be previously approved by the SEA. In the case of DIAs, it is the SEA that must publish the list of projects submitted for processing. Within 60 days of the publication of the extract in the case of an EIA, any natural or legal person may submit comments on the EIA. If, during the environmental assessment process, the EIA has been subject to clarifications, corrections, or additions that substantially affect the project, the SEA must open a new stage of public participation, this time for a period of 30 days, during which the EIA processing period will be suspended.

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In the case of an EIS, a citizen participation process may be decreed for a period of twenty days for EISs of projects that generate environmental burdens for nearby communities. This is provided that at least two citizen organizations with legal status, through their representatives, or at least ten individuals directly affected, request it. This request must be made in writing and submitted within thirty days of the publication in the Official Gazette of the project subject to the Environmental Impact Statement in question.

All comments, whether in the EIA or DIA processes, will be considered by the SEA and incorporated into the ICSARA or RCA.

Within citizen participation, the Indigenous Peoples Consultation Process (PCPI) is mandatory when the project directly affects Human Groups Belonging to Indigenous Peoples (GHPPI) living in its area of influence. As established in Article 85 of the RSEIA, this procedure originates from the application of the provisions of Convention No. 169 of the International Labor Organization (ILO), ratified by the State of Chile and in force since 2009.

For its application, the SEA must *"design and develop a consultation process in good faith, which includes appropriate mechanisms according to the sociocultural characteristics of each community..."*, the purpose of which is to reach an agreement or obtain consent regarding measures that may directly affect them.

Furthermore, Article 26 of the RSEIA states that the owners may address the Regional Director or the Executive Director of the Service *"in order to request a ruling on whether, based on the information provided for this purpose, a project or activity, or its modification, should be submitted to the Environmental Impact Assessment System."* This mechanism is called the Consultation on Relevance of Entry, and it corresponds to the mechanism used by the Project to determine that it does not require mandatory entry into the SEIA.

4.1.1.2 Project Relevance Consultations

The Project submitted three Entry Relevance Consultations to the SEA, one for each pier extension alternative and one for the implementation of the crane and slab reinforcement. The inquiry submitted for alternative 1 of the pier head extension was filed on May 2, 2024, and was resolved by Res. Ex. No. 20241210199. The inquiry submitted for alternative 2 of

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The extension of the spring head was submitted on September 12, 2024, and was resolved by Res. Ext. No. 202412101175, while the consultation on the implementation of the crane and the reinforcement of the slab was submitted on February 5, 2020, and was resolved by Res. Ext. No. 101/2020/556. In all three resolutions, the authority concluded that the Project does not require mandatory entry into the SEIA.

4.1.1.3 Citizen Participation Process

As indicated above, the authority concluded that the project does not require mandatory entry into the SEIA and, therefore, does not require a citizen participation process, which is only carried out within the framework of the SEIA.

4.1.2 General Environmental Regulations Applicable to the Project

When referring to general legislation, we are referring to those legal bodies that constitute the institutional framework of the Project, insofar as they establish the general regulatory framework applicable to the activity being evaluated, directly or indirectly, as well as its location.

From this perspective, it is interesting to analyze, for the purposes of environmental assessment, the Political Constitution of the Republic and Law No. 19,300 on General Environmental Principles, supported by the relevant provisions of the SEIA Regulations, among others.

The following table presents the general environmental regulations that will be applicable to the Project.

Table 4-1: General Regulations Applicable to the Project

Regulation	Competent Authority	Description	Applicability to the Project
Supreme Decree No. 100 of 2005, of the Ministry General Secretariat of the Presidency, Political Constitution of the Republic of Chile	Ministry General Secretariat of the Presidency	This is the regulatory body that heads the national legal system, establishing the basis for environmental regulation by recognizing the right to live in an environment free of	The Project must be developed in full compliance with the applicable regulations, as well as the limitations and conditions imposed by the regulations for the execution of the and the

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Regulations	Competent Authority	Description	Applicability to the Project
		Pollution (Article 19 No. 8)	environmental protection.
Law 19,300 on General Environmental Principles, Ministry General Secretariat of the Presidency	Ministry General Secretariat of the Presidency	This law constitutes the fundamental legal framework for complying with the constitutional guarantee of Article 19 No. 8, as it determines and defines the right to live in an environment free of pollution, establishing the so-called "environmental management instruments," including the SEIA.	The project was evaluated through an Admission Relevance Consultation (CPI), in which the SEA of the Magallanes and Chilean Antarctica Region determined that the parties and works of the project did not require mandatory admission to the SEIA.

4.1.3 Specific Environmental Regulations Applicable to the Project

Given the characteristics of the project and its location, it is considered that the specific environmental regulations that would be applicable to it relate to the following components:

- Marine Environment,
- Air,
- Noise,
- Solid Waste,
- Liquid Waste,
- Drinking Water,
- Natural or Artificial Waterways,
- Hazardous Substances,
- Radioactive Substances,
- Explosives,

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- Fuel,
- Roads and Transportation,
- Electricity and Fuel,
- Flora and Vegetation,
- Fauna,
- Cultural Heritage and Landscape, and
- Land Use and Territorial Planning.

The following table presents the specific environmental regulations that will apply to the Project.

Table 4-2: Specific Regulations Applicable to the Project

Subject Matter to be Regulated	Regulation	Description	Applicability to the Project
Marine Environment	Decree Law No. 2,222, of 1978, of the Ministry of National Defense, Replaces Navigation Law	All activities concerning or related to navigation shall be governed by these regulations.	During construction, it is planned to extend the pier using tubular steel piles (pile driving) in the maritime areas of the Project. During operation, current activities and management will be maintained. Waste arriving at the port on ships will be handled using special procedures and facilities that comply with the MARPOL agreement, as is currently the case.
Marine Environment	D.S. No. 1, 1992, of the Ministry of National Defense, Regulations for the Control of	These regulations supplement the provisions stipulated in the Navigation Act. They establish the regime for the prevention, monitoring, and combating pollution	During construction, it is planned to extend the pier using tubular steel piles (pile driving) in the maritime areas of the Project.

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Subject Matter to be Regulated	Regulations	Description	Applicability to the Project
	Aquatic Pollution.	in sea waters, ports, rivers, and lakes under national jurisdiction.	Current activities and management will continue during the operation. During the operation, solid and liquid waste arriving at the port on ships will be handled using special procedures and facilities that comply with the MARPOL agreement.
Marine Environment	D.S. No. 476, of 1977, of the Ministry of Foreign Affairs, which promulgates the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, with its Annexes I, II, and III, of 1972.	This agreement regulates the control of sources of marine pollution and stipulates that the contracting parties must commit to taking all possible measures to prevent the dumping of waste and other materials that may constitute a danger to human health, damage biological resources and marine life, reduce recreational opportunities, or hinder other legitimate uses of the sea.	During construction, the pier will be extended using tubular steel piles (pile driving) in the maritime areas of the Project. During operation, current activities and management will continue. The handling of liquid and solid waste from ships arriving at the port is governed by the MARPOL agreement and is managed using special procedures and facilities.
Marine Environment	D.S. No. 295, of 1986, of the Ministry of Foreign Affairs, Promulgates the Protocol for the Protection of the Southeast Pacific from Pollution from	This protocol regulates the prevention, reduction, and control of marine pollution from land-based sources when it causes or may cause harmful effects, such as damage to living resources and marine life, dangers to human health,	During construction, the pier will be extended using tubular steel piles (pile driving) in the maritime areas of the Project. During operation, current activities and management will be maintained, including the handling of liquid and solid waste

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Subject to Regulation	Regulations	Description	Applicability to the Project
	Land-based Sources and their Annexes.	Obstruction of marine activities, including fishing and other legitimate uses of the sea, deterioration of seawater quality for use, and impairment of recreational areas.	Ships arriving at the port are covered by the MARPOL Convention and are handled using special procedures and facilities.
Marine Environment	D.S. No. 296, of 1986, of the Ministry of Foreign Affairs, Promulgates the Convention for the Protection of the Marine Environment and the Coastal Zone of the South-East Pacific.	The purpose of this Convention is to protect and preserve the marine environment and the coastal zone of the Southeast Pacific from all types and sources of pollution. Its scope of application shall be the maritime area and coastal zone of the Southeast Pacific within the maritime zone of sovereignty and jurisdiction up to 200 miles from the High Contracting Parties and, beyond that zone, the high seas up to a distance where pollution of the latter may affect the former.	During construction, it is planned to extend the pier using tubular steel piles (pile driving) in the maritime areas of the Project. During operation, current activities and management will be maintained. The handling of liquid and solid waste from ships arriving at the port is governed by the MARPOL agreement and is managed using special procedures and facilities.
Marine Environment	D.S. No. 1689, of 1995, of the Ministry of Foreign Affairs, establishing the International Convention for the Prevention of Pollution from Ships, 1973, as amended by the	The purpose of this Convention is to prevent marine pollution from ships caused by waste generated during their operation, maintenance, and cleaning, and by accidental causes, both during navigation and while in port ports. For this reason,	During construction, the pier will be extended using tubular steel piles (pile driving) in the maritime areas of the Project. During operation, current activities and management will be maintained, including the handling of liquid and solid waste from ships arriving at the

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Subject to Regulation	Regulations	Description	Applicability to the Project
	1978 Protocol (MARPOL).	This waste is referred to as "MARPOL waste." The aim is to preserve the marine environment by eliminating pollution from oil and other harmful substances, as well as minimizing accidental spills.	Port operations are covered by the MARPOL Convention and are managed using special procedures and facilities.
	D.S. No. 430, of 1991, of the Ministry of Economy, Development, and Tourism, establishes the revised, coordinated, and systematized text of Law No. 18,892, of 1989 and its amendments, General Law on Fisheries and Aquaculture.	It establishes provisions for the preservation of hydrobiological resources, and all extractive fishing, aquaculture, and research activities carried out in terrestrial waters, sea beaches, inland waters, territorial waters, or the exclusive economic zone of the Republic and in areas adjacent to the latter over which national jurisdiction exists or may exist in accordance with international laws and treaties.	During construction, the pier will be extended using tubular steel piles (pile driving) in the maritime areas of the Project. During operation, current activities and management will be maintained.
Air	D.S. No. 144, of 1961, of the Ministry of Health, establishes standards to prevent emissions or pollutants of any kind.	Article 1 of these Regulations states that <i>"gases, vapors, fumes, dust, emissions, or pollutants of any kind produced in any manufacturing facility or workplace must be captured or eliminated in such a way that they do not cause</i>	The Project will generate atmospheric emissions, corresponding to particulate matter and gases, during its Construction and Operation phases.

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Subject Matter to be Regulated	Regulations	Description	Applicability to the Project
		<i>hazards, damage, or nuisance to the neighborhood.</i>	
Air	D.S. No. 47, of 1992, of the Ministry of Housing and Urban Development, General Ordinance on Urban Planning and Construction.	This regulation, in Article 5.8.3, establishes that in any construction, repair, modification, alteration, reconstruction, or demolition project, the party responsible for executing said works must implement the measures indicated.	The Project will generate atmospheric emissions, corresponding to particulate matter and gases, during its Construction and Operation phases.
Air	D.S. No. 75, of 1987, of the Ministry of Transport and Telecommunications, establishes conditions for the transport of cargo.	This regulatory body states in Article 2 that, in urban areas, the transport of materials that produce dust, such as rubble, cement, plaster, among others, must always be carried out by completely and effectively covering the materials with tarpaulins or plastic sheets of adequate dimensions, or another system that prevents their dispersion into the air.	The project will generate particulate matter emissions during both its construction and operation phases.
Air	D.S. No. 54, of 1994, of the Ministry of Transport and Telecommunications, establishes standards for emissions from medium-sized motor vehicles.	This decree establishes emission standards for medium motor vehicles, i.e., those with a gross vehicle weight equal to or greater than 2,700 kilograms and less than 3,860 kilograms.	The project for the transport of supplies and materials, both during the construction phase and during operation, will use vehicles, which will emit gases.
Air	D.S. No. 211, of 1991, from the Ministry of Transportation and Telecommunications,	This standard states that light motor vehicles must meet certain technical requirements in order to be driven on public roads. meet technical requirements	The project for the transport of persons, both in its construction phase and in

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Subject to Regulation	Regulations	Description	Applicability to the Project
	Establishes Standards on Emissions from Light Motor Vehicles	that enable them to comply, under standard conditions, with the maximum emission levels of carbon monoxide (CO), total hydrocarbons (HC), nitrogen oxides (NOx), and particulates specified in this Decree.	Operation will use vehicles that emit gases.
Air	D.S. No. 4, of 1994, of the Ministry of Transport and Telecommunications, establishes pollutant emission standards applicable to motor vehicles and sets out the procedures for their control.	This standard establishes that pollutant emissions from the exhaust pipes of two- and four-stroke spark-ignition (Otto cycle) motor vehicles, for which no emission standards have been established, may not exceed the maximum concentrations indicated.	The project for the transport of supplies and materials, both during its construction phase and during operation, will use motor vehicles, which will emit gases.
Air	D.S. No. 138, of 2005, issued by the Ministry of Health, establishes the obligation to report emissions as indicated	Article 1 of this regulation states that all owners of fixed sources of atmospheric pollutant emissions established in this decree (PTS, MP10, CO, NOx, SOx, VOC, NH3, benzene, toluene) must submit the necessary information to the competent Regional Ministerial Health Secretariat of the place where they are located in order to estimate emissions	The project will generate atmospheric emissions, corresponding to particulate matter and gases, during its construction and operation phases.

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Matter to be Regulated	Regulations	Description	Applicability to the Project
		from each of its sources.	
Air	D.S. No. 279, of 1983, of the Ministry of Health, Regulations for the Control of Pollutant Emissions from Internal Combustion Motor Vehicles.	Article 3 of this regulation states that the emission of pollutants from the exhaust pipes of internal combustion motor vehicles in concentrations exceeding the maximums specified in that article is prohibited.	The project for the transport of supplies and materials, both in its construction phase and in operation, will use motor vehicles, which will emit gases.
Air	D.S. No. 1, of 2013, of the Ministry of the Environment, Approves Regulations for the Pollutant Release and Transfer Register (PRTR)	The Pollutant Release and Transfer Register (PRTR) is a publicly accessible database designed to capture, compile, systematize, store, analyze, and disseminate information on emissions, waste, and transfers of pollutants that are potentially harmful to health and the environment.	The Project will generate atmospheric emissions, corresponding to particulate matter and gases, during its Construction and Operation phases.
Noise	D.S. No. 38, of 2011, of the Ministry of the Environment, establishes the Standard for Noise Emissions Generated by Specified Sources, based on Decree No. 146, of 1997, of the Ministry General Secretariat of the Presidency.	The objective of this standard is to protect the health of the community by establishing maximum noise emission levels generated by the noise sources regulated by this standard.	The Project will generate noise emissions during its construction and operation phases. These emissions will be mainly associated with the operation of vehicles and machinery.

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Subject Matter to be Regulated	Regulations	Description	Applicability to the Project
Solid Waste	D.F.L. No. 725, of 1967, of the Ministry of Health, Health Code	Articles 79 and 80 establish that the storage, treatment, and disposal of any type of waste must be approved by the competent Health Authority.	The project, in its construction and operation phases, will generate household solid waste (HSW), non-hazardous industrial waste (NHWIW), and hazardous waste (HW).
Solid Waste	D.S. No. 594, of 1999, of the Ministry of Health, Regulation on basic sanitary and environmental conditions in the workplace.	Article 18 establishes that the accumulation, treatment, and final disposal of waste must have the respective health authorization, understanding for these purposes as industrial waste any solid or liquid waste, or combinations thereof, originating from industrial processes and which, due to their physical, chemical, or microbiological characteristics, cannot be assimilated to domestic waste.	The project, in its construction and operation phases, will generate solid domestic waste (SDW) and non-hazardous industrial waste (NHWIW).
Solid Waste	D.S. No. 1, of 2013, of the Ministry of the Environment, Approves Regulations on the Registration of Emissions and Transfers of Contaminants, RETC.	The Pollutant Release and Transfer Register, hereinafter PRTR, is a publicly accessible database designed to capture, compile, systematize, store, analyze, and disseminate information on emissions, waste, and transfers of pollutants that are potentially harmful to health and the environment	During the construction and operation phases, waste and emissions will be generated that must be reported by the Owner through the RETC electronic portal.

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Subject Matter to be Regulated	Regulations	Description	Applicability to the Project
		that are emitted into the environment, generated in industrial or non-industrial activities, or transferred for recovery or disposal.	
Solid Waste	D.S. No. 148, of 2003, of the Ministry of Health, Health Regulation on Hazardous Waste Management.	These regulations establish the minimum health and safety conditions that must be met for the generation, possession, storage, transport, treatment, reuse, recycling, final disposal, and other forms of elimination of hazardous waste.	The project, in its construction and operation phases, will generate waste (RESPEL).
Liquid Waste	D.F.L. No. 725, of 1967, of the Ministry of Health, Health Code.	It establishes that projects related to the construction, repair, modification, and expansion of any public or private works intended for the evaluation, treatment, or final disposal of sewage or wastewater of any kind must be authorized by the health authority.	The project, both in its construction phase and in operation, will generate liquid waste, which corresponds to wastewater and wash water.
Liquid Waste	D.S. No. 594, of 1999, of the Ministry of Health, Regulation on Basic Sanitary and Environmental Conditions in the Workplace	These Regulations establish standards for sanitary conditions in workplaces, regulating matters such as the provision of drinking water, waste disposal, sanitary facilities, changing rooms, and dining rooms. In particular, they expressly prohibit incorporating into the groundwater	The Project, both in its construction and operation phases, will generate liquid waste, which corresponds to sewage and wash water.

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Matter to be Regulated	Regulations	Description	Applicability to the Project
		groundwater from subsoil or discharge into irrigation canals, aqueducts, rivers, estuaries, streams, lakes, lagoons, reservoirs, or bodies or watercourses in general, industrial or mining tailings or water contaminated with toxic products of any kind, without first undergoing the neutralization or purification treatments prescribed in each case by the health authority.	
Liquid Waste	D.S. No. 236, of 1926, of the Ministry of Health, General Regulations for Private Sewers, Septic Tanks, Filter Chambers, Contact Chambers, Absorbent Chambers, and Domestic Latrines.	The regulation refers to the disposal of domestic wastewater in cities, villages, towns, hamlets, or other populated areas of the Republic.	The project, both in its construction phase and in operation, will generate wastewater.
Liquid Waste	D.S. No. 609, of 1998, of the Ministry General Secretariat of the Presidency, Emission Standard for the regulation of pollutants associated with	Establishes emission standards for the regulation of pollutants associated with the discharge of liquid industrial waste into sewer systems	The Project, both in its construction phase and in operation, will generate liquid waste, which corresponds to wastewater and wash water.

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Subject Matter to be Regulated	Regulations	Description	Applicability to the Project
	discharges of liquid industrial waste into sewerage systems.		
Drinking Water	D.S. No. 594, of 1999, from the Ministry of Health, Regulation on Basic Sanitary and Environmental Conditions in the Workplace	Establishes standards on sanitary conditions in workplaces, regulating matters such as drinking water supply, waste disposal, sanitary facilities, changing rooms, and dining rooms.	The Project will require drinking water for workers, both during the construction phase and during operation.
Drinking Water	D.S. No. 735 of 1969, of the Ministry of Health, Regulation of water services intended for human consumption.	It stipulates that all drinking water services must provide good quality water in sufficient quantity to satisfactorily supply the population they serve, and must also ensure continuity of supply against interruptions caused by failures in their facilities or operations.	The Project will require drinking water for workers, both during the construction phase and during operation.
Drinking Water	Decree No. 446 Exempt, of 2006, of the Ministry of Health, Declares Official Standards of the Republic of Chile, and Formalizes Chilean Standard No. 409/1. Of 2005, Water Quality for Drinking Use.	This standard establishes Chilean Standard 409/1. Of 2005, Water Quality for Drinking Use, as the official standard of the Republic of Chile, which in turn establishes the physical, chemical, radioactive, and bacteriological requirements that drinking water must meet for human consumption and for	The Project will require drinking water for workers, both during the construction phase and during operation.

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Subject Matter to be Regulated	Regulations	Description	Applicability to the Project
		Animal drinking water. The regulation applies to drinking water from any supply system.	
Drinking Water	Decree No. 41 of the Ministry of Health, Approves Regulations on Sanitary Conditions for the Provision of Drinking Water through the Use of Water Tankers	These regulations establish the basic sanitary conditions that must be met by any drinking water supply system using water trucks.	The Project will require drinking water for workers, both during the construction phase and during operation.
Hazardous Substances	Supreme Decree No. 594, dated 1999, of the Ministry of Health, approves Regulations on basic sanitary and environmental conditions in the workplace	Article 42 of these Regulations establishes that materials must be stored using procedures and in locations that are appropriate and safe for workers.	The Project will use reactive and hazardous substances during its construction and operation phases.
Hazardous Substances	D.S. No. 43, of 2015, of the Ministry of Health, approves the Regulation on the Storage of Hazardous Substances.	These regulations establish the safety conditions for hazardous substance storage facilities.	During its construction and operation phases, the Project will use reactive and hazardous substances.
Fuel	D.S. No. 160, of 2008, of the Ministry of Economy, Development, and Reconstruction, Safety Regulations for Facilities and	Establishes the minimum safety requirements that must be met by facilities for liquid fuels derived from petroleum and biofuels and operations associated with production, refining,	The project will use liquid fuels in both its construction and operation phases.

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Subject Matter to be Regulated	Regulations	Description	Applicability to the Project
	Production and refining, transportation, storage, distribution, and supply of liquid fuels.	Transportation, storage, distribution, and supply, as well as the obligations of the individuals and legal entities involved in these activities.	
Roads and Transportation	D.F.L. No. 1, of 2007, of the Ministry of Transport and Telecommunications, establishes the Consolidated, Coordinated, and Systematized Text of the Traffic Law.	In accordance with the provisions of Article 63 of this regulation, in duly qualified exceptional cases, and in the case of indivisible loads, the Road Authority may authorize the circulation of vehicles that exceed the maximum dimensions or weights established, with the precautions that are provided for in each case.	The possible circulation of vehicles that may exceed the maximum dimensions or weights established by this regulation is anticipated. This activity is not part of the activities that are the responsibility of the Port, as it is the responsibility of the recipients and carriers designated for this purpose, who manage the relevant control measures before the authority.
Roads and Transport	D.S. No. 158, of 1980, of the Ministry of Public Works, Sets the Maximum Weight of Vehicles that May Travel on Public Roads	Establishes the maximum weight limits per axle for cargo vehicles traveling on public roads in the country.	It provides for the possible circulation of vehicles that may exceed the dimensions or weights established as maximum by this standard. This activity is not part of the activities that are the responsibility of the Port, as it is the responsibility of the designated recipients and carriers, who manage the measures to

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Subject Matter to be Regulated	Regulations	Description	Applicability to the Project
			relevant controls before the authority.
Roads and Transportation	Supreme Decree No. 200, of 1993, of the Ministry of Public Works, establishes maximum weights for vehicles traveling on urban roads in the country.	Establishes maximum weights allowed for vehicles of any type to travel on urban roads in the country	The eventual circulation of vehicles that may exceed the dimensions or weights established as maximum by this standard is anticipated. This activity is not part of the activities that are the responsibility of the Port, as it is the responsibility of the recipients and carriers designated for this purpose, who manage the relevant control measures before the authority.
Roads and Transport	Exempt Resolution No. 1, 1995, of the Ministry of Transport and Telecommunications, establishes maximum dimensions for vehicles.	It establishes that vehicles traveling on public roads may not exceed the dimensions indicated in terms of maximum width, length, and height. The Road Authority may authorize, in qualified cases, the circulation of vehicles that exceed the established maximum dimensions, which authorization must be communicated to the Chilean police.	The eventual circulation of vehicles that may exceed the dimensions or weights established as maximum by this regulation is anticipated. This activity is not part of the activities that are the responsibility of the Port, as it is the responsibility of the recipients and carriers designated for this purpose, who manage the relevant control measures before the authority.
Roads and Transport	D.S. No. 19, 1984 Amended by Decree No. 1,665 of 2002, both of the Ministry of Public Works	It establishes that the Road Authority may authorize the circulation of vehicles that exceed the maximum weights when they meet the	Provides for the possible circulation of vehicles that may exceed the dimensions or weights established as maximum

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Subject to Regulation	Regulations	Description	Applicability to the Project
	Public, Repeals Decree No. 1,117 of 1981 of the Ministry of Public Works, on authorization for the circulation of vehicles that exceed maximum weights.	Requirements indicated in this regulation.	by this regulation. This activity is not part of the activities that are the responsibility of the Port, as it is the responsibility of the recipients and carriers designated for this purpose, who manage the relevant control measures before the authority.
Roads and Transportation	D.F.L. No. 850, of 1997, of the Ministry of Public Works, establishes the revised, coordinated, and systematized text of Law No. 15,840, of 1964, Organic Law of the Ministry of Public Works, and D.F.L No. 206 of 1960, of the same Ministry, on the construction and maintenance of roads.	Article 30 of this legal text prohibits the circulation on public roads of vehicles of any kind that exceed the maximum weight limits established in the relevant legal and regulatory provisions.	The eventual circulation of vehicles that may exceed the maximum dimensions or weights established by this regulation is anticipated. This activity is not part of the activities for which the Port is responsible, as it is the responsibility of the designated recipients and carriers, who manage the relevant control measures with the authorities.
Electricity and Fuel	Exempt Resolution No. 610/1985 PROHIBITS THE USE OF POLYCHLORINATED BIPHENYLS (PCBs) IN ELECTRICAL EQUIPMENT.	This resolution refers to the prohibition of the use of polychlorinated biphenyls (PCBs), commercially known as ascareles (Pyranol, Aroclor, Piralene, and others), as dielectric fluid in transformers, capacitors, and any other electrical equipment.	The bill includes the use of different types of electrical equipment.

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Subject to Regulation	Regulations	Description	Applicability to the Project
Flora and Vegetation	Decree Law No. 3,557, of 1981, of the Ministry of Agriculture, establishes provisions on agricultural protection.	Article 11 of this regulation establishes the protection of forestry and agricultural operations and renewable natural resources from contamination by liquid and solid waste and atmospheric pollutants.	The Project anticipates the possible entry of foreign wood, mainly associated with the packaging and protection of imported equipment to be used in the construction of the Project. The Project will eventually receive containers from ships that have called at ports declared dangerous by the authorities.
Flora and Vegetation	Exempt Resolution No. 133 of 2005, amended by Exempt Resolution No. 2,859 of 2007, both from the Ministry of Agriculture, establishes quarantine regulations for the entry of wooden packaging.	It establishes that wooden packaging used for the transport of any shipment, coming from abroad or in transit through the national territory, including cargo dunnage, must be made of debarked wood treated in its country of origin with one of the treatments specified in the aforementioned regulation and indicates the labeling or "marks" that must be displayed.	The Project provides for the possible entry of foreign wood, mainly associated with the packaging and protection of imported equipment to be used in the construction of the Project.
Cultural Heritage and Landscape	Law No. 17,288, of 1970, of the Ministry of Education, Law on National Monuments.	Establishes the basic tools for the protection of Chile's historical and cultural heritage.	In the event that any archaeological remains are found during the construction phase.
Cultural Heritage and Landscape	D.S. No. 484, of 1990, of the Ministry of Education, Regulations of Law No. 17,288, on	It provides that archaeological and anthropological surveys and/or excavations paleontological, on land	In the event that any archaeological remains are found during the construction phase.

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Matter to be regulated	Regulations	Description	Applicability to the Project
	National Monuments.	public and private, as well as the regulations governing the authorization of the National Monuments Council to carry them out and the destination of the objects or species found, shall be governed by the regulations contained in Law No. 17,288 and in these regulations.	
Cultural Heritage and Landscape	D.S. No. 311, of October 22 October 1999, issued by the Ministry of Education, declares any underwater heritage site that is more than 50 years old to be a Historical Monument.	It establishes that any trace of human existence found at the bottom of rivers and lakes and on the seabed under the Internal Waters and Territorial Sea of the Republic of Chile for more than fifty years shall be declared a Historical Monument, and includes what is indicated in said regulation.	In the event that any archaeological remains are found during the construction phase.
Land Use and Territorial Planning	D.F.L. No. 458, of 1975, of the Ministry of Housing and Urban Development, General Law on Urban Planning and Construction.	It regulates urban planning at four levels of action, corresponding to four types of areas: national, regional, inter-municipal, and municipal. It also specifies the scope of existing Territorial Planning Instruments (IPT), whose purpose is to guide and regulate the physical development of a corresponding area.	The project is located within areas regulated by the Punta Arenas Communal Regulatory Plan.
Land Use and Territorial Planning	Decree No. 2906, 2006, of the Municipality of San	Establishes regulations regarding urban boundaries, zoning, land use,	The Project considers the location of its parts, actions, and physical works in

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Matter to be Regulated	Regulations	Description	Applicability to the Project
	Antonio, amended by Decree No. 3099 of 2015, of the Municipality of San Antonio, which enacts amendments to the San Antonio Community Regulatory Plan in the South and North Port Sectors.	Property subdivision, construction, urbanization, and roadways; and the set of regulations on adequate hygiene and safety conditions in buildings and urban spaces, and comfort in the relationship between residential, work, equipment, and space areas, which must be observed within the territorial area regulated by the aforementioned Plan.	Areas regulated by the Punta Arenas Community Regulatory Plan, in the area known as Productive Activities Zone 1, Port Sector Zone (ZAP-1).
Land Use and Territorial Planning	Decree No. 30, January 12, 1965, by the Honorable Board of Planning and Coordination of Public Works, approves the Intercommunal Regulatory Plan of Valparaíso, modified by Resolution No. 31 Afecta, Regional Government of Valparaíso, published on April 24, 2006, approves the modification of the Intercommunal Regulatory Plan of Valparaíso, incorporating the Southern Coastal Satellite, corresponding to the territories of the	Regulates and guides the physical development process of the territory of a group of municipalities, including San Antonio.	The Project considers the location of its parts, actions, and physical works in areas regulated by the Punta Arenas Communal Regulatory Plan, in the area known as Productive Activities Zone 1, Port Sector Zone (ZAP-1).

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Subject Matter to be Regulated	Regulations	Description	Applicability to the Project
	Communes of Algarrobo, El Quisco, El Tabo, Cartagena, and San Antonio in the province of San Antonio.		

4.2 Applicable IDB Group Policies

4.2.1 Environmental and Social Policy Framework_ Inter-American Development Bank (IDB)¹

The IDB's Environmental and Social Policy Framework (hereinafter MPAS), in force since 2021, reinforces its commitment to managing environmental and social risks in the projects it supports, in line with international best practices and the principles and criteria that guide projects with socio-environmental impact, including those of the World Bank.

In the IDB's MPAS, respect for human rights as a central pillar of environmental and social risk management, the promotion of gender equality, attention to gender-related risks, and attention to non-discrimination and inclusion of vulnerable groups in the face of potential project risks and impacts are reinforced as key elements in evaluating the support provided by the IDB. It also specifies the cases in which the prior informed consent of indigenous peoples and other vulnerable groups is required. In the environmental area, the MPAS includes a section on natural hazards and climate change, as well as the minimization of greenhouse gases. The IDB has aligned its standards on biodiversity protection and conservation with international best practices.

¹ <https://www.iadb.org/es/quienes-somos/tematicas/soluciones-ambientales-y-sociales/marco-de-politica-ambiental-y-social>

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The MPAS establishes ten Environmental and Social Performance Standards, which seek to avoid, minimize, reduce, or mitigate the environmental and social risks and impacts of projects financed by the IDB. For the Magallanes H2V Project: development of enabling port infrastructure. It should be noted that only Performance Standards 1, 2, 3, 4, 6, 8, 9, and 10 are applicable, and are described below:

NDAS 1- Assessment and Management of Environmental and Social Risks and Impacts: this standard highlights the importance of managing environmental and social performance during a project through an effective Environmental and Social Management System (ESMS). It addresses requirements such as the identification and assessment of the environmental and social risks and impacts of the project and the adoption of a mitigation hierarchy. The standard promotes an effective grievance and communication mechanism and the adequate participation of people affected by the project and other stakeholders.

NDAS 2- Work and Working Conditions: this standard recognizes that the pursuit of economic growth through job creation and income generation must be accompanied by the protection of workers' fundamental rights. It addresses requirements such as: constructive relations between workers and employers, fair treatment, and safe and healthy working conditions.

NDAS 3- Resource Efficiency and Pollution Prevention: This Standard describes an approach to managing resources, preventing and controlling pollution, and avoiding and minimizing greenhouse gas emissions, based on the mitigation hierarchy. The Standard seeks to avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution generated by the project. At the same time, the Standard promotes a more sustainable use of resources, including energy and water. The Standard also seeks to avoid or minimize waste generation and to minimize and manage the risks and impacts associated with pesticide use.

NDAS 4- Community Health and Safety: This Standard seeks to anticipate and prevent adverse impacts on the health and safety of people affected by the project during its life cycle, arising from both normal and unusual circumstances, in accordance with human rights principles, in order to avoid or minimize risks to those affected by the project. The Standard seeks to anticipate and prevent adverse impacts arising from natural hazards and climate change during the life cycle of the operation.

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NDAS 6- Biodiversity Conservation and Sustainable Management of Living Natural Resources: ecosystem services benefit people and organizations through provisioning, regulating ecosystem processes, non-material benefits, and supporting benefits. This Standard addresses how borrowers can sustainably manage and mitigate impacts on biodiversity and ecosystem services during the project life cycle. It promotes this by protecting and conserving terrestrial, coastal, marine, and freshwater biodiversity and reserves, as well as maintaining ecosystem functions.

NDAS 8- Cultural Heritage: In accordance with the Convention Concerning the Protection of the World Cultural and Natural Heritage, the Standard seeks to ensure that borrowers protect cultural heritage in the context of their projects. The Standard seeks to protect cultural heritage from adverse impacts generated by investment projects, support its conservation, and promote an equitable distribution of the benefits derived from the use of cultural heritage.

NDAS 9- Gender Equality: This Standard is based on international commitments regarding gender equality and its complementarity with local legislation. The Standard seeks to anticipate, prevent, and mitigate gender-based risks and adverse impacts throughout the project life cycle. It seeks to promote safe and equitable participation and to include people of all genders in the benefits derived from the project, as well as to prevent and act swiftly in response to sexual and gender-based violence.

NDAS 10- Stakeholder Participation and Information Disclosure: This Standard seeks to establish a systematic approach to stakeholder participation for a constructive relationship with them. This requires promoting and facilitating the means for effective and inclusive interaction with the people affected by the project throughout its life cycle. This requires ensuring that stakeholders have access to adequate information on the environmental and social risks and impacts of the project in a timely, understandable, accessible, and appropriate manner, with accessible and inclusive means for asking questions, making proposals, raising concerns, and filing complaints.

The following MPAS Performance Standards are not applicable, as indicated below:

NDAS 5- Land Acquisition and Involuntary Resettlement: This Standard aims to prevent or minimize displacement. It seeks to prevent forced eviction and avoid or minimize adverse social and economic impacts resulting from land acquisition or land use restrictions through compensation and indemnification. This requires a resettlement process

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with appropriate disclosure of information, consultation, and informed participation. It aims to improve or restore the livelihoods and living standards of displaced persons. It is worth noting the important role of governments in the matters addressed in this Standard.

This performance standard is not applicable, as the Project will be implemented on land owned by EPAustral and does not involve resettlement.

NDAS 7- Indigenous Peoples: This Standard seeks to ensure that the development process promotes full respect for the human rights of indigenous peoples, as well as their collective rights, dignity, aspirations, culture, and livelihoods. The aim is to promote sustainable development benefits and opportunities for indigenous peoples in a manner consistent with their culture. To this end, a continuous relationship with these peoples must be maintained throughout the project life cycle, based on consultation and informed participation in a culturally appropriate manner.

This performance standard is not applicable, as the Project will be implemented on land owned by EPAustral and does not involve the intervention of land or natural resources owned, used, and/or customarily used by Indigenous Peoples.

4.2.2 IDB Invest Sustainability Policy²

IDB Invest's Environmental and Social Sustainability Policy enters into force on December 15, 2020, and applies to all activities carried out by IDB Invest and the operations it finances, including direct and indirect financing operations and technical assistance services. This Policy is aligned and integrated with the IDB's MPAS. The purpose of the IDB Invest Policy is to improve the environmental and social sustainability of the investment projects it finances by applying rigorous standards for environmental and social risk management. This Sustainability Policy and the Access to Information Policy are part of the IDB Invest Sustainability Framework, represented in the following figure:⁽³⁾

² <https://idbinvest.org/es/sostenibilidad>

⁽³⁾ IDB Invest Environmental and Social Sustainability Policy Document

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Figure 4-1 Flowchart of IDB Invest's Environmental and Social Sustainability Policy

IDB Invest's commitments under this Policy are:

1. Pollution prevention and resource efficiency, promoting good industrial practices and strategies to achieve resource efficiency, minimize waste and pollution, including greenhouse gases, in accordance with MPAS Performance Standard 3
2. Climate change mitigation and adaptation and low-carbon development: IDB Invest maintains strategic alignment with the Sustainable Development Goals⁴ and requires its clients to assess and manage natural hazards and risks associated with climate change, in accordance with MPAS Performance Standards 1, 3, and 4.
3. Biodiversity, ecosystem services, and protected areas: IDB Invest is committed to the protection, conservation, management, and sustainable use of biodiversity, natural resources, and ecosystem services, in accordance with Performance Standard 6 of the

⁴ United Nations, 2015

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MPAS, and requires its clients to include measures to safeguard essential habitats and, where possible, protect and enhance natural habitats, biodiversity, and ecosystem services.

4. Disaster risk management: IDB Invest requires its clients to carry out the relevant assessments in this area and adopt the necessary response measures.
5. Social aspects, especially with regard to:
 - a. Human rights:
 - b. Stakeholder participation, in accordance with Performance Standard 1.
 - c. Grievance and retaliation mechanisms, in accordance with Performance Standard 1.
 - d. Gender and equality risk management, in accordance with the Performance Standards addressing this issue.
 - e. Indigenous peoples and other vulnerable groups, in accordance with Performance Standards 1 and 7.
 - f. Persons with disabilities.
 - g. Labor, health, and safety aspects, in accordance with Performance Standard 2.
 - h. Land acquisition, involuntary resettlement, and cultural heritage, in accordance with Performance Standards 1 and 5 and Performance Standard 8.

With regard to client responsibilities, IDB Invest requires them to comply with the Sustainability Policy described herein, as well as with the following International Finance Corporation (IFC) standards and guidelines⁵, in force since January 2012, and the World Bank/IFC General and Sectoral Guidelines on Environment, Health, and Safety. The IFC Performance Standards are:

- PR 1: Assessment and management of environmental and social risks and impacts
- PL 2: Labor and employment conditions
- ND 3: Resource efficiency and pollution prevention
- ND 4: Community health and safety
- SDG 5: Land acquisition and involuntary resettlement
- SDG 6: Biodiversity conservation and sustainable management of living natural resources
- SDG 7: Indigenous peoples
- SDG 8: Cultural heritage

⁵ <https://www.ifc.org/content/dam/ifc/doc/mgrt/ifcperformancestandardsspanish.pdf>

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The IDB Invest Sustainability Policy also describes its functions and responsibilities during environmental and social assessment and monitoring in the following areas:

- Criteria for investment projects (direct and indirect)
- Criteria for technical assistance
- Categorization of the environmental and social risk of projects under evaluation
- Investments through financial intermediaries
- Supervision of investment projects and technical assistance activities
- Impact on development and evaluation mechanisms and tools
- Collaboration and communication with public and private organizations
- Corporate governance

As a guarantee of the role of the IDB and IDB Invest in terms of their own compliance with their Sustainability Policy, they have the Independent Consultation and Investigation Mechanism Policy (MICI, IDB Invest 2015, IDB 2021)⁶ to investigate complaints of harm caused by IDB Invest's failure to comply with its Sustainability or Access to Information Policies. Along with the IDB's Environmental and Social Policy Map and the standards and policies mentioned in this section, other criteria, policies, and documents relevant to the development and implementation of IDB Invest's Sustainability Policy are:

- Manual for Implementing the Environmental and Social Sustainability Policy - IDB Invest
- International Bill of Human Rights and the eight fundamental conventions of the International Labor Organization
- International Declaration of Human Rights and complementary treaties
- ILO Declaration on Fundamental Principles and Rights at Work
- UN Declaration on Indigenous Peoples
- Access to Information Policy - IDB Invest, 2019
- World Bank Group Environment, Health, and Safety (EHS) Guidelines
- Framework for Corporate Governance in the Field of Development
- IDB Invest Exclusion List

⁶ <https://mici.iadb.org/es>

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4.3 Agencies Involved in Project Development

4.3.1 Government Agencies Involved in the Evaluation Process

The main agency involved in the environmental assessment process for a project is the Environmental Assessment Service, whose main functions are:

- Administering the SEIA,
- Coordinating the government agencies involved in the SEIA, exercising exclusive and exclusive technical leadership in environmental impact assessment,
- Promoting and facilitating citizen participation, and
- Standardizing environmental criteria and procedures for environmental assessment (developing instructions, procedures, and guidelines).

As part of its duties, the SEA has issued a statement regarding the relevance of submitting the two alternatives for the project to extend the pier head, "Improvement of existing pier, Jose de los Santos Mardones port, Punta Arenas" (ID PERTI-2024-6610 and PERTI-2024-13670) and for the implementation of the crane and slab reinforcement (ID PERTI-2020-556), indicating that they are not required to undergo the SEIA prior to their execution.

Notwithstanding the above, it should be noted that in 1998, the project "Expansion of the New Port of Punta Arenas. XII Region, Stages II and III" was approved by RCA No. 13/1998 of COREMA of the XII Region of Magallanes and Chilean Antarctica. This project was evaluated through an Environmental Impact Study.

In this context, the State Agencies with Environmental Competence (OEACA) are the agencies that are requested to participate in the evaluation process and that must issue a ruling within the scope of their competence (Article 35 RSEIA) regarding the projects submitted to the SEIA. The following agencies participated in the evaluation of the aforementioned EIA:

- Magallanes Region Health Service,
- Magallanes Region Housing and Urban Development Secretariat,
- Superintendency of Sanitary Services (SISS),
- Magallanes Region Superintendency of Electricity and Fuels (SEC),

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- Agricultural and Livestock Service (SAG) Magallanes Region,
- National Tourism Service (SERNATUR) Magallanes Region,
- National Fisheries Service (SERNAPESCA) Punta Arenas
- Regional Road Administration

In addition, the Municipality of Punta Arenas, the Maritime Authority, and the Regional Government of Magallanes were asked to issue a statement regarding the territorial compatibility (Article 33 RSEIA) of the Project. In addition, the municipality and the Regional Government were asked to comment on the relationship between the Project and the current community and regional development plans (Article 34 RSEIA).

Although it obtained a favorable RCA, the aforementioned project did not begin construction or operation, and the RCA is currently expired.

4.3.2 Oversight Bodies

In Chile, environmental oversight is the responsibility of the Superintendency of the Environment (SMA). It is solely responsible for executing, organizing, and coordinating the monitoring of:

- Environmental Qualification Resolutions,
- Measures in Environmental Prevention and/or Decontamination Plans,
- The content of Environmental Quality Standards and Emission Standards,
- Management Plans, and
- All other environmental instruments established by law.

The National Environmental Oversight Network is composed of state agencies with environmental jurisdiction that can carry out oversight activities subject to the guidelines issued by the Superintendency of the Environment, under the terms set forth in Article 22 of the Organic Law of the SMA (LO-SMA). The agencies that form part of the oversight network are:

- Chilean Nuclear Energy Commission, CCHEN
- National Monuments Council (CMN)
- National Indigenous Development Corporation, CONADI

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- National Forestry Corporation, CONAF
- General Directorate of Maritime Territory and Merchant Marine, DIRECTEMAR
- Highways Directorate
- General Directorate of Water, DGA
- Agricultural and Livestock Service, SAG
- National Geology and Mining Service
- National Fisheries and Aquaculture Service, SERNAPESCA
- Undersecretary of Fisheries and Aquaculture, SUBPESCA
- Undersecretary of Public Health
- Undersecretary of Transportation, SUBTRANS
- Superintendency of Electricity and Fuel, SEC
- Superintendency of Sanitary Services, SISS
- Superintendency of the Environment, SMA

Given that the Project is not required to enter the SEIA and RCA No. 13/1998 is not in force, the role of the SMA for this project will be to monitor compliance with Emission Standards. In particular, according to information from the National Environmental Oversight Information System platform, the Noise Emission Standard⁽⁷⁾ established in Decree No. 38/2011 of the Ministry of the Environment is applicable to the Port of Punta Arenas.

4.4 Client's capacity to comply with the IDB Group's sustainability requirements

In accordance with Section 4.2.1 of this Chapter, the IDB's Environmental and Social Policy Framework establishes 10 performance standards as sustainability requirements, which seek to avoid, minimize, reduce, or mitigate the environmental and social risks and impacts of projects financed by the IDB. The following table presents the IDB Group's sustainability requirements and how the Project will comply with them.

⁷ Information available at: <https://snifa.sma.gob.cl/UnidadFiscalizable/Ficha/11297>

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Table 4-3: Indicators of Compliance with the IDB Group's Sustainability Requirements

Environmental and Social Performance Standard (ESPS)	Observation	Compliance Verifier
No. 1. Assessment and Management of Environmental and Social Risks and Impacts	EPAustral has defined roles within its organizational structure to identify, assess, and mitigate environmental and social impacts, as well as a function responsible for these management tasks. In addition, the Project conducted an environmental and social assessment of its operations, which is included in this EIAS.	• EPAustral organizational chart⁸ • Description of EPAustral's Functions and Competencies⁹ • EIA Documents
No. 2. Work and Working Conditions	Chilean labor regulations set forth a series of requirements to protect workers, the main ones being the following: • Maximum working week of 42 hours • Minimum wage of CLP 529,000 • Prohibition of work for minors under 18 years of age. It is worth noting that adolescents between 15 and 18 years of age may work, provided that certain requirements are met. • Freedom of association. • Prohibition of any type of discrimination. • Among others. EPAustral's organizational chart includes functions related to	• Internal Health and Safety Regulations EPSA - RIOHS (Art. 153 of the Labor Code); • Special Regulations for Contracting Companies - RE-EECC (Art. 11 DS 76/07 MTPS). • Positions and functions in the organizational chart related to work and working conditions: Head of Labor Relations, Administrative Manager of People Management, Risk Prevention Manager, Risk Prevention Supervisor, Industrial Protection Manager. • EIAS documents: Chapter 6.2 Risk Analysis, Chapter 6.3 Work and working conditions.

⁸ Available at: <https://www.epaustral.cl/informacion/ley-de-transparencia/organigrama/>

⁹ Available at: <https://www.epaustral.cl/informacion/ley-de-transparencia/funciones-y-competencias/>

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Environmental and Social Performance Standard (ESPS)	Observation	Compliance Verifier
	Human resources, occupational health, or labor relations.	
No. 3. Efficient use of resources and pollution prevention	The EPAustral organizational chart does not identify any technical functions responsible for energy efficiency, waste management, or emissions control, nor does it identify any competencies in sustainability or environmental innovation. However, as part of this EIAS, the Project has developed a series of measures to prevent pollution associated with atmospheric emissions and noise. Item 3.10 of the Project Description describes these pollution control and prevention measures, as well as the efficient use of natural resources, for the different stages of the project.	EIA Documents: Chapter 3 Project Description, Chapter 6. Assessment and Management of Environmental and Social Risks and Impacts
No. 4. Community Health and Safety	No roles related to public safety, emergency management, or community relations are identified in the EPAustral organizational chart, nor are there any competencies in community risk assessment. As part of this EIAS, the Project has assessed risks and potential impacts on community health and safety.	EIA Documents: Chapter 6.4 Community Health and Safety.
No. 5. Land Acquisition and Involuntary Resettlement	The Project does not require the acquisition of new land or the resettlement of human groups.	- NDAS does not apply. - EIA Documents: Chapter 6.1.10 Human Environment

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Environmental and Social Performance Standard (ESPS)	Observation	Compliance Verifier
Nº 6. Biodiversity Conservation and Sustainable Management of Living Natural Resources	The Project will carry out its works and activities in areas that have already been developed, so that natural environments and living natural resources will not be affected.	ESIA Documents: Chapter 6.1.1 Biodiversity and Alteration of Terrestrial and Aquatic Habitats
No. 7. Indigenous Peoples	No human groups belonging to Indigenous Peoples were found in the Project study area.	- Not applicable NDAS - EIAS Documents: Chapter 6.1.11 Groups belonging to Indigenous Peoples.
No. 8. Cultural Heritage	The Project will carry out its works and activities in areas that have already been developed, and therefore will not have an impact on cultural heritage.	EIA Documents: Chapter 6.1.9 Cultural Heritage
No. 9. Gender Equality	The assessment of potential negative impacts has concluded that no risks or impacts associated with the project have been identified on the basis of gender, sexual orientation, or gender identity. Notwithstanding the above, certain measures detailed in Chapter 7 will be implemented.	EIAS Documents: Chapter 6.1.12 Gender Equality, Chapter 7 Action Plan
No. 10. Stakeholder Participation and Information Disclosure	As part of the preparation of the Project's EIAS, stakeholder participation activities have been carried out and the results will be available for disclosure.	EIA Documents: Annex Stakeholder Participation and Information Disclosure

PROJECT TO SUPPORT THE IMPLEMENTATION OF THE MAGALLANES H2V PROJECT: DEVELOPMENT OF ENABLING PORT INFRASTRUCTURE - CHILE - CH- L1191

CHAPTER 5 - SOCIO- ENVIRONMENTAL DIAGNOSIS AND CHARACTERIZATION OF THE STUDY AREA – INTRODUCTION

Report prepared for Empresa Portuaria Austral

Report 929 – 2025

October 2025

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CHAPTER 5 - SOCIO-ENVIRONMENTAL CHARACTERIZATION

Prepared for
EPAustral

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Version	Rev.1	
Date	November 7, 2025	
Status	Document for dissemination	
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5 SOCIO-ENVIRONMENTAL DIAGNOSIS AND CHARACTERIZATION OF THE STUDY AREA

5.1 Introduction

In order to assess and manage the environmental and social risks and impacts of the Project, a socio-environmental diagnosis and characterization has been carried out in the Project's study area or zone. The study area is considered to be the portion of the territory surrounding the location of the Project's works and activities where both environmental and social impacts could occur.

The study area is defined considering the guidelines provided by the IDB's Environmental and Social Policy Framework (ESPF) and the IDB's Environmental and Social Performance Standards (ESPS) and includes:

- The area that may be directly or indirectly affected by the project and its activities. Indirect effects include unplanned but foreseeable impacts caused by the project, as well as indirect impacts on biodiversity or on the ecosystem services on which the people affected by the project depend for their livelihoods.
- The location of new or additional works and infrastructure that are essential to the operation of the project.
- The effect of cumulative impacts resulting from the interaction of the project and other relevant events.

The following sections of this chapter address the diagnosis and characterization of the study area in terms of the following components:

- Physical Environment
- Biotic Environment
- Human Environment and Indigenous Peoples
- Gender Equality
- Cultural Heritage

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5.2 Characterization of the Physical Environment

The characterization of the physical environment of the study area is based on secondary information from public sources, collected on the components of climate and meteorology, air quality, noise levels, geology, geomorphology, risks, vibration levels, hydrology, hydrogeology, surface water quality, groundwater quality, soils, and marine water resources. The main aspects of these components are described below.

5.2.1 Climate and Meteorology

Study area

Due to the nature of the project, there will be no adverse effects on this component; however, the municipality of Punta Arenas has been defined as the study area. A brief description of the component is provided below.

Methodology

Wladimir Köppen and Rudolf Geiger's climate classification (Riosco and Tesser, 2006) was used as the source of information for characterizing the climate component. In addition, information available from weather stations in the municipality of Punta Arenas was used, corresponding to the Alberto Hurtado School, Punta Arenas Air Police Unit, Patagonia Institute (Jorge Schytte) Punta Arenas Rural, and Carlos Ibáñez, Punta Arenas Ap., are used for the parameters of temperature, relative humidity, atmospheric pressure, precipitation, and solar radiation.

Results

The results of the characterization for the climate and meteorology components are presented below.

i. Climate

According to the Köppen classification, the Project is located within the climate zone corresponding to a cold Mediterranean climate with winter rainfall (Csc), characterized by dry, cold summers with minimal precipitation.

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This climate is characterized by less than four months per year with average temperatures above 10°C. Summers are dry and cold with minimal precipitation, while winters are rainy.

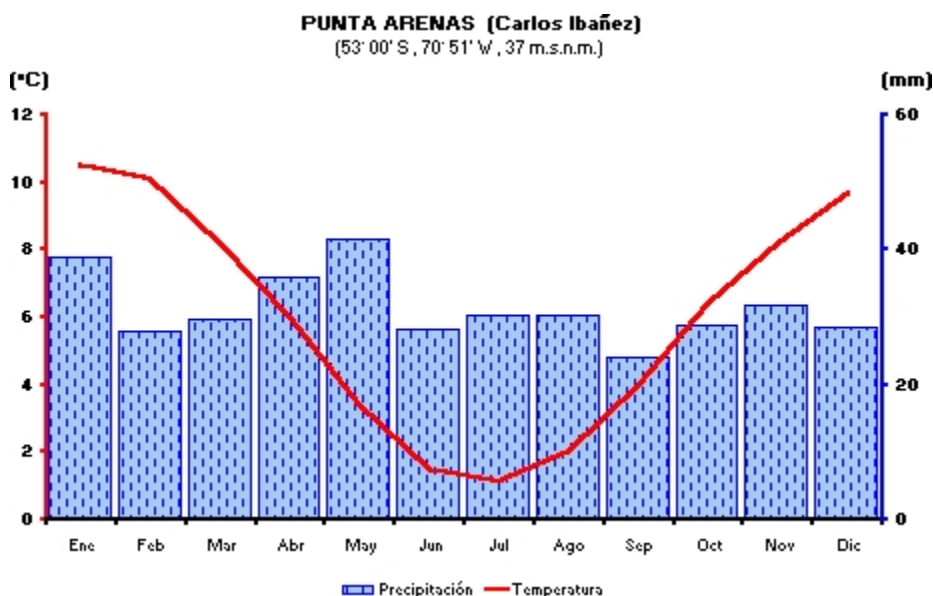


Figure 5-1: Climogram of Punta Arenas

Source: Rioseco, Reinaldo and Tesser, Claudio: *Interactive Cartography of Chile's Climates* [online]. Institute of Geography. Pontifical Catholic University of Chile. <www.uc.cl/sw_educ/geografia/cartografiainteractiva>

The following figure shows the Köppen-Geiger climate classification, as well as the location of the project and the weather stations considered in the following analyses.

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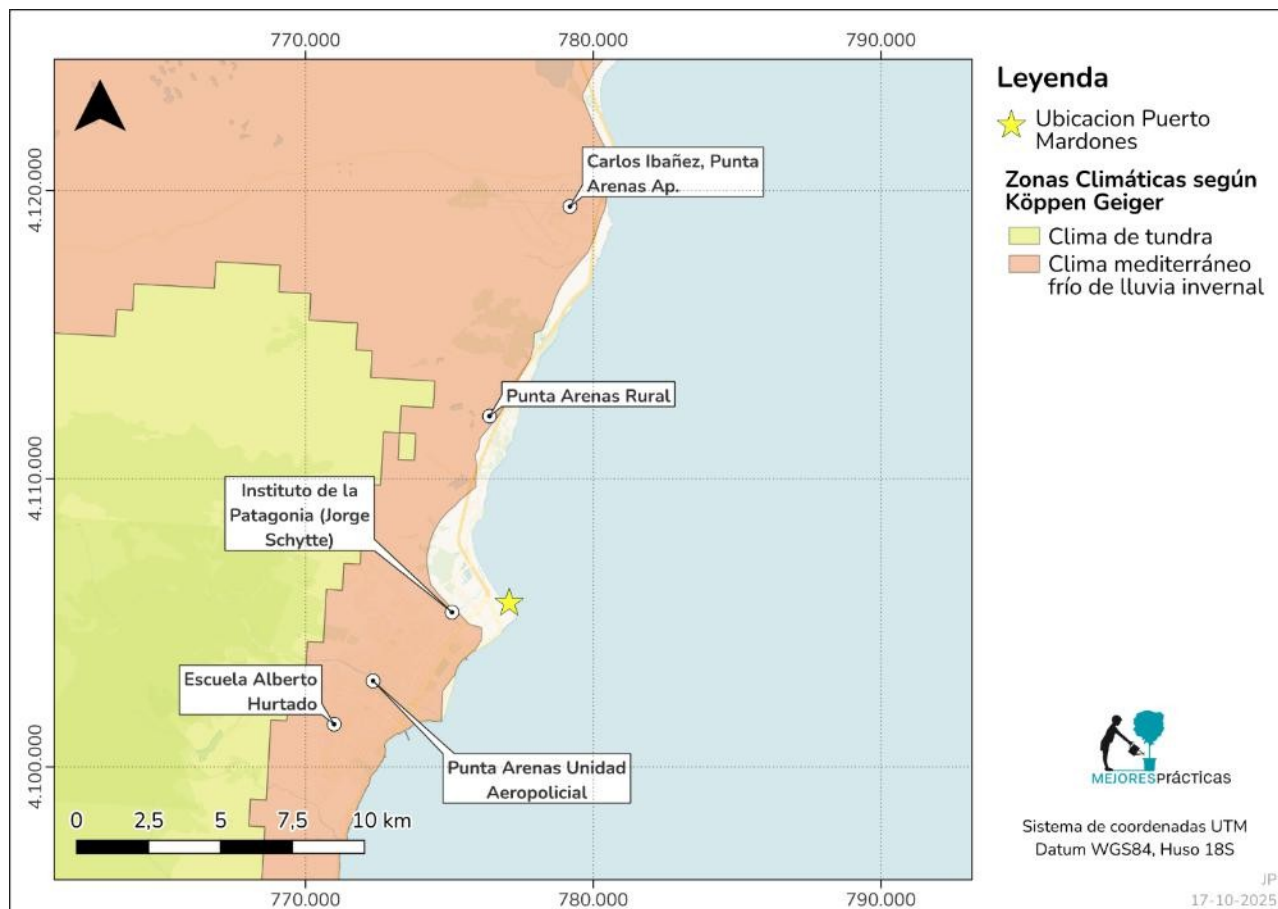


Figure 5-2: Location of Weather Stations and Köppen Climate Classification

Source: Prepared by the authors based on information available in the Ministry of the Environment's Public Baselines https://lineasdebasepublicas.mma.gob.cl/datos_abiertos/

ii. Meteorology

The results obtained for each of the meteorological variables analyzed are presented below: wind speed direction and magnitude, radiation, temperature, relative humidity, atmospheric pressure, and precipitation for each of the stations analyzed.

- Wind: The following tables show the results for wind speed and wind direction.

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Table 5-1: Basic statistics for wind speed magnitude

Station	Period	Average Period	Hourly Maximum [km/h]	Hourly minimum [km/h]
Alberto Hurtado School	2024	15.6	68.6	0
	2023	16.2	74.4	0.3
	2022	15.8	69.8	0.8
Punta Arenas Air Police Unit	2024	16.8	67.4	0
	2023	17.9	72.6	0.3
	2022	17.8	71.4	0.3
Patagonia Institute Patagonia (Jorge Schytte)	2024	13.2	57.8	0.1
	2023	14.4	63.5	0.2
	2022	13.8	55.8	0
Punta Arenas Rural	2024	10.2	46.0	0
	2023	10.7	45.7	0
	2022	10.5	47.4	0
Carlos Ibáñez, Punta Arenas Ap.	2024	24.9	92.4	1.3
	2023	26.2	88.5	0.5
	2022	23.9	83	1.5

Source: Data obtained from <https://climatologia.meteochile.gob.cl/application/informacion/catastroEstaciones>

Table 5-2 Wind direction frequency - 2024

Direction	Frequency (%)				Carlos Ibáñez Punta Arenas Ap
	School Alberto Hurtado	Punta Arenas Air Police Unit	Patagonia Institute	Punta Arenas Rural	
N	5	1	5	1	4
NNE	6	1	5	1	2
NE	5	2	3	2%	3%
JAN	2	2	1	2	2
E	1%	3	1	3	2
ESE	1	2	1	2	1
SE	1	3	2	3	1
SSE	1	3	3	3	2
S	2	3	4	3	3
SSW	3	3	5	3	2
SW	5	5	11	5	3
WSW	10	20	16	20	10

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Address	Frequency (%)				Carlos Ibañez Punta Arenas Ap
	School Alberto Hurtado	Punta Arenas Air Police Unit	Patagonia Institute	Punta Arenas Rural	
W	19	29	16	29	28
WNW	17	13	11	13	20
NW	11	4	8	4	12
NNW	7	2	6	2	6
Summary					
Subtotal (%)	98	96	98	96	100
Calm (%)	2	2	2	3	0.2
Incomplete data (%)	0.1	2	0.01	0.3	0.01%
Total	100	100	100	100	100%

Source: Prepared internally based on information available at <https://agrometeorologia.cl/#>

Below is the wind rose for the city of Punta Arenas, which indicates that the prevailing winds come from the west.

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Punta Arenas

53.16°S, 70.91°W (0 m snm).
Modelo: ERA5T.

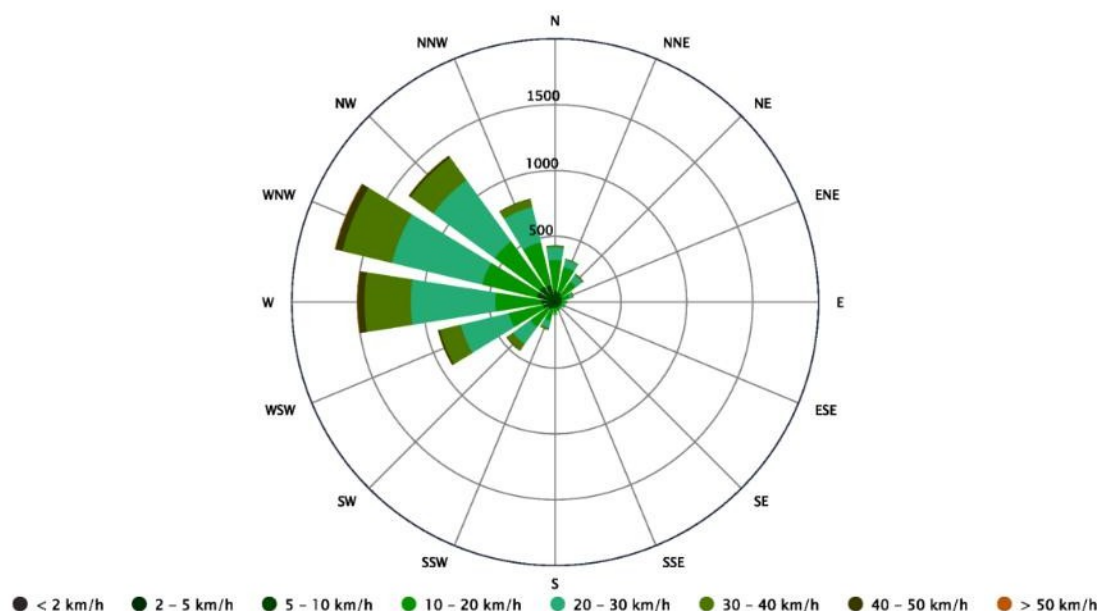


Figure 5-3: Wind rose for the city of Punta Arenas

Source: Meteoblue (2025). Simulated historical climate and meteorological data for Punta Arenas. Available at: https://www.meteoblue.com/es/tiempo/historyclimate/climatemodelled/punta-arenas_chile_3874787

- Temperature: the maximum daily average value is 16.5 °C and occurs at the Punta Arenas Air Police Unit and Carlos Ibáñez Punta Arenas Ap. stations, in both cases during 2023. As for the average value, the highest value is 7.2 °C at the Punta Arenas Aerospace Unit station during 2022. The following table shows this information.

Table 5-3 Basic temperature statistics

Station	Period	Average of the period [°C]	Average daily maximum [°C]	Average daily minimum [°C]	Days without record
School Alberto Hurtado	2024	6.6	15.6	-4.9	0
	2023	5.7	15.1	-1.9	32
	2022	4.6	12.2	-3.6	150
	2024	6.9	15.8	-17.4	0
	2023	6.6	16.5	-1.5	27

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Season	Period	Period average [°C]	Average daily maximum [°C]	Daily minimum average [°C]	Days without record
Punta Arenas Air Police Unit	2022	7.2	16.2	-3.2	0
Patagonia Institute Patagonia (Jorge Schytte)	2024	6.4	15.6	-6.9	0
	2023	6.4	16.1	-1.9	18
	2022	6.4	15.1	-3.9	12
Punta Arenas Rural	2024	6.5	15.8	-6.4	15
	2023	6.1	16	-2.0	0
	2022	6.6	15.7	-3.9	0
Carlos Ibáñez, Punta Arenas Ap.	2024	6.4	15.4	-10.5	0
	2023	6.2	16.5	-3.9	0
	2022	6.7	15.3	-4.6	0

Source: Data obtained from <https://climatologia.meteochile.gob.cl/application/informacion/catastroEstaciones>

- Relative humidity: the maximum hourly value is 100% and occurs at the Escuela Alberto Hurtado monitoring station in 2023. The highest average value was 74.6% at the Punta Arenas Rural station. The following table shows this information.

Table 5-4 Basic statistics for relative humidity

Station	Period	Period Average [%]	Hourly Maximum [%]	Hourly minimum [%]	Days without recording
Alberto School Hurtado	2024	68.2	95.0	44.5	0
	2023	69.0	100.0	0.4	33
	2022	73.5	99.6	38	148
Punta Arenas Air Police Unit	2024	68.9	95.9	43.2	0
	2023	66.7	95.6	41.3	27
	2022	66.9	96	38.2	4
Patagonia Institute (Jorge Schytte)	2024	70.3	95.7	47.7	0
	2023	67.1	94.5	42	21
	2022	68.7	96	43	10
Rural Punta Arenas	2024	74.6	97.1	48.2	62
	2023	70.6	96	41.1	0
	2022	70.5	97.7	41.9	4

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Season	Period	Period Average [%]	Hourly maximum [%]	Hourly minimum [%]	Days without recording
Carlos Ibáñez, Punta Arenas Apartment	2024	73.8	96.8	44.8	0
	2023	70.7	97.3	39.8	0
	2022	70.3	96.5	37.8	0

Source: Data obtained from <https://climatologia.meteochile.gob.cl/application/informacion/catastroEstaciones>

- Atmospheric pressure: the maximum hourly value is 1,032.4 hPa and occurs at the Patagonia Institute station in 2022. The highest average value was 1,002.7 atm, at the same station in 2024. The following table shows this information.

Table 5-5 Basic atmospheric pressure statistics

Station	Period	Average of the period [hPa]	Hourly maximum [hPa]	Hourly minimum [hPa]	Days without record
Alberto School Hurtado	2024	995.8	1,021.0	967.5	0
	2023	993.6	1,016.7	958.0	34
	2022	994.6	1,024.5	954.1	153
Punta Arenas Air Police Unit	2024	996.9	1,021.8	968.1	0
	2023	995.3	1,017.6	958.9	28
	2022	996.2	1,026.1	956.0	0
Patagonia Institute (Jorge Schytte)	2024	1,002.7	1,028.2	974.5	0
	2023	1,001.4	1,023.8	964.7	21
	2022	1,002.6	1,032.4	962.0	14
Punta Arenas Rural	2024	998.3	1,021.8	969.4	61
	2023	995.7	1,018.3	959.7	0
	2022	997.1	1,026.9	957.3	0
Carlos Ibáñez, Punta Arenas Apartment	2024	998.6	1,023.6	970.3	0
	2023	996.5	1,019.3	960.5	0
	2022	997.9	1,027.6	958.0	0

Source: Data obtained from <https://climatologia.meteochile.gob.cl/application/informacion/catastroEstaciones>

- Precipitation: The Escuela Alberto Hurtado station recorded rainfall totaling 33.9 millimeters in 24 hours, equivalent to 5.7% of the precipitation recorded during 2023. This same station recorded the annual maximum of 617.1

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mm in 2024. For all stations reviewed, the year with the highest rainfall was 2024. The following table shows this information.

Table 5-6 Basic precipitation statistics

Station	Period	Annual total [mm]	24-hour maximum [mm]	Days without record
Alberto Hurtado School	2024	617.1	26.3	0
	2023	595.4	33.9	31
	2022	313.8	18.9	132
Punta Arenas Air Police Unit	2024	524.5	30.9	1
	2023	423.1	32.4	23
	2022	320.9	15.2	0
Patagonia Institute (Jorge Schytte)	2024	506.9	30.7	0
	2023	454	28.7	16
	2022	344.2	16.8	0
Punta Arenas Rural	2024	479.2	23	4
	2023	474.2	27.2	0
	2022	175.2	11.1	0
Carlos Ibáñez, Punta Arenas Apartment	2024	363.6	21.8	0
	2023	289.2	15	0
	2022	193	11.2	0

Source: Data obtained from <https://climatologia.meteochile.gob.cl/application/informacion/catastroEstaciones>

- Solar Radiation: The following table shows that the recorded radiation is consistent with the latitude of the stations.

Table 5-7 Basic statistics for solar radiation

Station	Period	Average period [W/m ²]	Annual maximum [W/m ²]	Days without recording
Alberto Hurtado School	2024	825.8	1,323.3	0
	2023	562.6	1,266.1	31
	2022	413.1	1,123.1	125
Punta Arenas Air Police Unit	2024	870.3	1,377.7	0
	2023	845.8	1,316.7	0
	2022	883.7	1,444.8	0
	2024	854.3	1,327.1	0

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Season	Period	Average period [W/m ²]	Annual maximum [W/m ²]	Days without recording
Institute of Patagonia (Jorge Schytte)	2023	841.7	1305.1	0
	2022	868.4	1,392.1	0
Punta Arenas Rural	2024	943.4	1,454.0	0
	2023	937.4	1422.0	0
	2022	977.5	1473.0	0
Carlos Ibáñez, Punta Arenas Apartment	2024	864.6	1317.9	0
	2023	895.9	13,344.6	0
	2022	877.7	1,314.3	0

Source: Data obtained from <https://climatologia.meteochile.gob.cl/application/informacion/catastroEstaciones>

Conclusions

According to the Köppen classification, the Magallanes and Chilean Antarctica region has different types of climates: cold Mediterranean climate with winter rains, tundra climate, temperate rainy climate, and semi-arid climate. In particular, the Project is located within the climate zone corresponding to a cold Mediterranean climate with winter rains (Csc).

This climate is characterized by dry summers with minimal precipitation and cold winters, with less than four months per year with an average temperature above 10°C.

In relation to wind speed, it can be seen that of the five (5) stations monitored, the maximum hourly value is 92.4 km/h and occurs at the Carlos Ibáñez station in Punta Arenas Ap. As for the average value, the highest was 24.9 km/h at the same station.

With regard to temperature, it can be seen that of the five (5) stations monitored, the maximum daily value is 16.5 °C and occurs at the Punta Arenas Air Police Unit and Carlos Ibáñez Punta Arenas Ap. stations, in both cases during 2023. As for the average value, the highest value is 7.2 °C at the Punta Arenas Aerospace Unit station during 2022.

In relation to relative humidity, it can be seen that of the five (5) stations monitored, the maximum hourly value is 100.00% and occurs at the Escuela Alberto Hurtado monitoring station in 2023. As for the average value, the highest was 74.6% at the Punta Arenas Rural station.

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Regarding atmospheric pressure, it can be seen that of the five (5) stations monitored, the maximum hourly value is 1,032.4 hPa and occurs at the Instituto de la Patagonia station in 2022. The average value is 1,002.7 atm, at the same station in 2024.

In terms of precipitation, the Escuela Alberto Hurtado station recorded rainfall totaling 33.9 millimeters in 24 hours, equivalent to 5.7% of the precipitation recorded during 2023. This same station recorded the annual maximum of 617.1 mm in 2024.

Finally, in terms of solar radiation records, the average maximum for the five (5) stations fluctuates between 825 and 944 W/m^2 during 2024.

5.2.2 Air Quality

Study area

Due to the scale of the works to be implemented, there will be no adverse effects on this component. However, the municipality of Punta Arenas was defined as the study area. Nevertheless, a brief description of the component is presented below.

Methodology

To characterize air quality, information available from the Ministry of the Environment's air quality monitoring network was considered. In particular, the station closest to the Project is the Punta Arenas Station, which records the concentration of fine particulate matter PM2.5. This station monitors continuously and stores PM2.5 data at hourly intervals.

The data recorded by the aforementioned station during the period 2022-2024 was used for the analysis.

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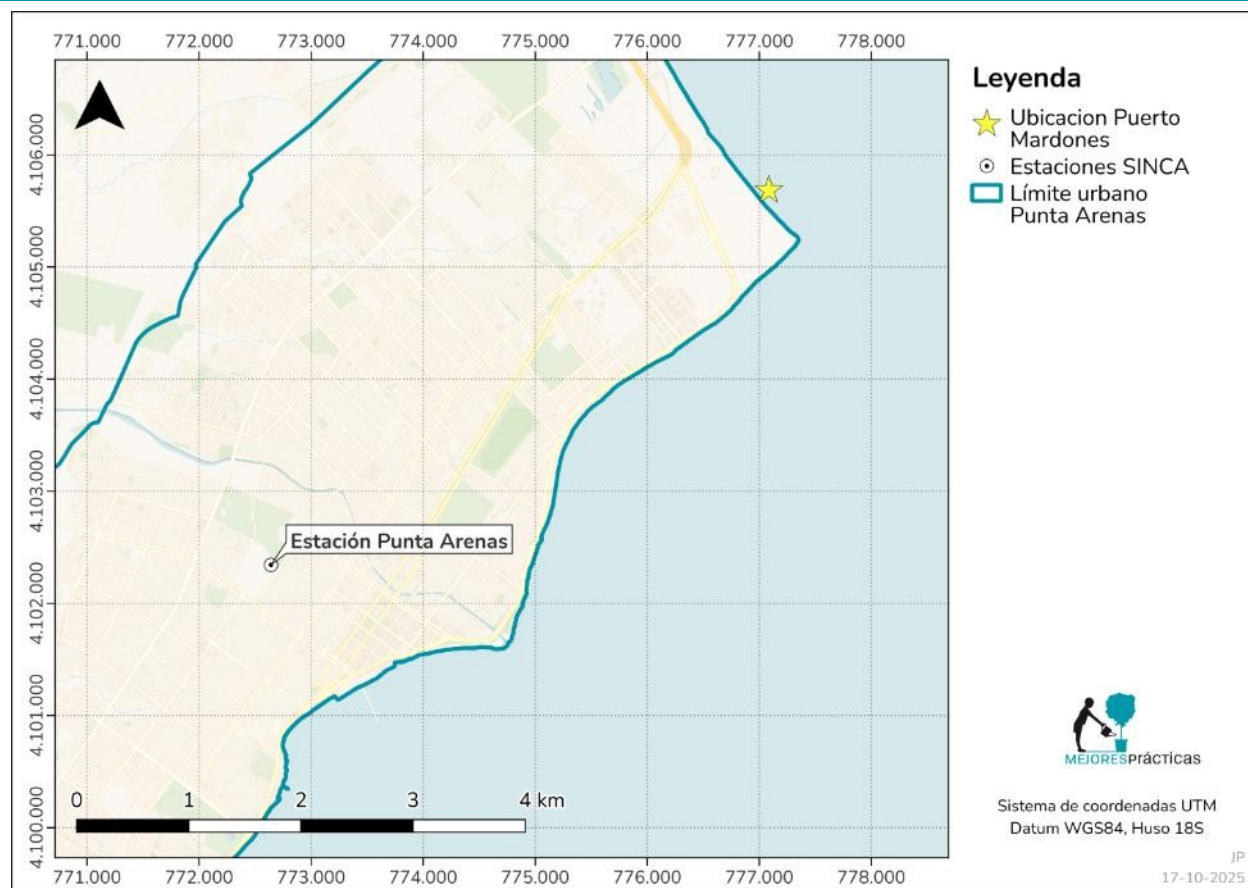


Figure 5-4: Punta Arenas air quality station

Source: Prepared by the authors based on information from the National Air Quality Information System. Available at: <https://sinca.mma.gob.cl/index.php/estacion/index/id/191>

The following table shows the air quality standards used to make comparisons with the measurements taken

Table 5-8 Air Quality Standards by Variable

Parameter	Type of Standard	Legal Entity	Limit	Calculation
PM2.5	Primary Standard	D.S. No. 12/2011 of the MMA	50 $\mu\text{g}/\text{m}^3\text{N}$	98th percentile of daily averages recorded during one year
			20 $\mu\text{g}/\text{m}^3\text{N}$	Tri-annual average of annual concentrations

Source: Own elaboration

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Results

With regard to the measurements taken in the period 2022-2024, the following can be observed:

- The highest concentrations of this parameter tend to occur during the fall and winter months, when ventilation conditions are lower (lower temperatures and wind speeds).
- In terms of the daily cycle, there is an increase in concentration levels from 6:00 p.m. onwards, which persists until the end of the day, and a smaller increase between 9:00 a.m. and 1:00 p.m., mainly in the winter months.
- During the monitoring period, the annual standard ($4.1 \mu\text{g}/\text{m}^3$) was not exceeded in the measurements of respirable fine particulate matter PM_{2.5}, so there is no latency or saturation situation for the annual average. Similarly, in the case of the 98th percentile of daily concentrations, concentrations did not exceed $9.38 \mu\text{g}/\text{m}^3$, meaning that neither saturation nor latency ranges were exceeded.

Conclusions

The measured PM_{2.5} levels comfortably comply with current national air quality standards for the period 2022-2024.

5.2.3 Geology

Study area

No study area is considered to be associated with this component, as the area where the project works will be carried out corresponds to an area that has already been developed and is in use by the port.

Notwithstanding the foregoing, below is a description of this component as complementary context to the Geological and Geomorphological Risks component. The detailed information below was obtained from the Environmental Impact Assessment (EIA) of the project "Expansion of the New Port of Punta Arenas. XII Region, Stages II and III" from 1998. The area analyzed in the aforementioned EIA corresponds to a 10 km buffer zone from the port's location.

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Methodology

To carry out this characterization, the baseline of the Environmental Impact Study "Expansion of the New Port of Punta Arenas. XII Region. Stages II and III" was consulted. This project was approved by RCA No. 13 on June 2, 1998, and subsequently declared expired on December 3, 2021, by R.E.202199101751 due to its non-implementation.

Results

The area analyzed corresponds to the Punta Arenosa sector, Catalina Bay, located north of the city of Punta Arenas, where Quaternary deposits emerge, which have been carved by glacial activity and remodeled by marine processes.

Two large macro-units outcrop in the analysis sector:

- Fundamental rock unit: This unit comprises the rock units corresponding to claystones and sandstones from the Leña Dura and Loreto formations, respectively.
- Quaternary deposits unit: This basically includes deposits of glacial origin, which have been subsequently shaped by marine action. The following types can be distinguished:
 - Marine terraces unit (T): These correspond to a Quaternary piedmont, which has been remodeled by marine action. They correspond to large flattened areas of different levels, with the lowest level being where the new pier will be located. They are composed of sediments (sand, clay, limestone, rounded and pebbly gravel, peat-like coal, etc.) that come from the weathering of the rock units that outcrop in the surrounding area, as well as from rocks that have been eroded and polished during glacial transport from more distant areas. They have been assigned a Pleistocene age.
 - Moraine deposits (Qm): Characterized by being polymictic with striated, subangular to rounded clasts. It occurs in the form of till in the Punta Arenas area, consisting of moraine clays in blocks, which are exposed on fluvioglacial materials such as well-stratified sand and gravel.
 - Coastal deposits: These include continuous strips elongated along the coastline, including the Cordones Litorales (Ql) units.

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and the unit corresponding to Beach Deposits (P). They have been assigned a Holocene age.

Conclusions

The project area is located on Quaternary deposits that have been carved out by glacial activity and remodeled by marine processes. These correspond to sediments that make up the marine terrace, moraine deposits, and coastal deposits.

5.2.4 Geomorphology

Study area

This is not considered an area of study associated with this component, as the area where the project works will be implemented corresponds to an area that has already been developed and is in use by the port.

Notwithstanding the above, a brief description of this component is provided below as complementary context to the Geological and Geomorphological Risks component. The detailed information below was obtained from the Environmental Impact Assessment (EIA) for the project "Expansion of the New Port of Punta Arenas. XII Region, Stages II and III" from 1998.

Methodology

To carry out this characterization, the baseline of the Environmental Impact Study "Expansion of the New Port of Punta Arenas. XII Region. Stages II and III."

Results

The project area corresponds to the Punta Arenas sector in Bahía Catalina, north of the city of Punta Arenas, on the western shore of the Strait of Magellan. It is located within a morphostructural domain where Quaternary deposits, mainly morainic sediments, overlap and have been remodeled by marine action. Accordingly, the port is located on a marine terrace, which is characterized as one of the lowest and most recent. This unit is less resistant and less compact than the higher terraces, since the substrate materials consist of glacial drift sediments.

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Only immediately inland from the current beach is there a more developed coastal ridge, which appears to have been heavily affected by human activity and is indicative of greater stabilization of the coastline at present.



Photograph 5-1: Aerial view of Puerto Mardones

Source: Information provided by the owner

Conclusions

The morphology of the project area corresponds to a marine terrace composed of glacial sediments.

5.2.5 Geological and Geomorphological Risks

Study area

The study area for the Geological and Geomorphological Risks Project corresponds to the location of the project works plus the surrounding marine area, the results of which are shown in the following figure.

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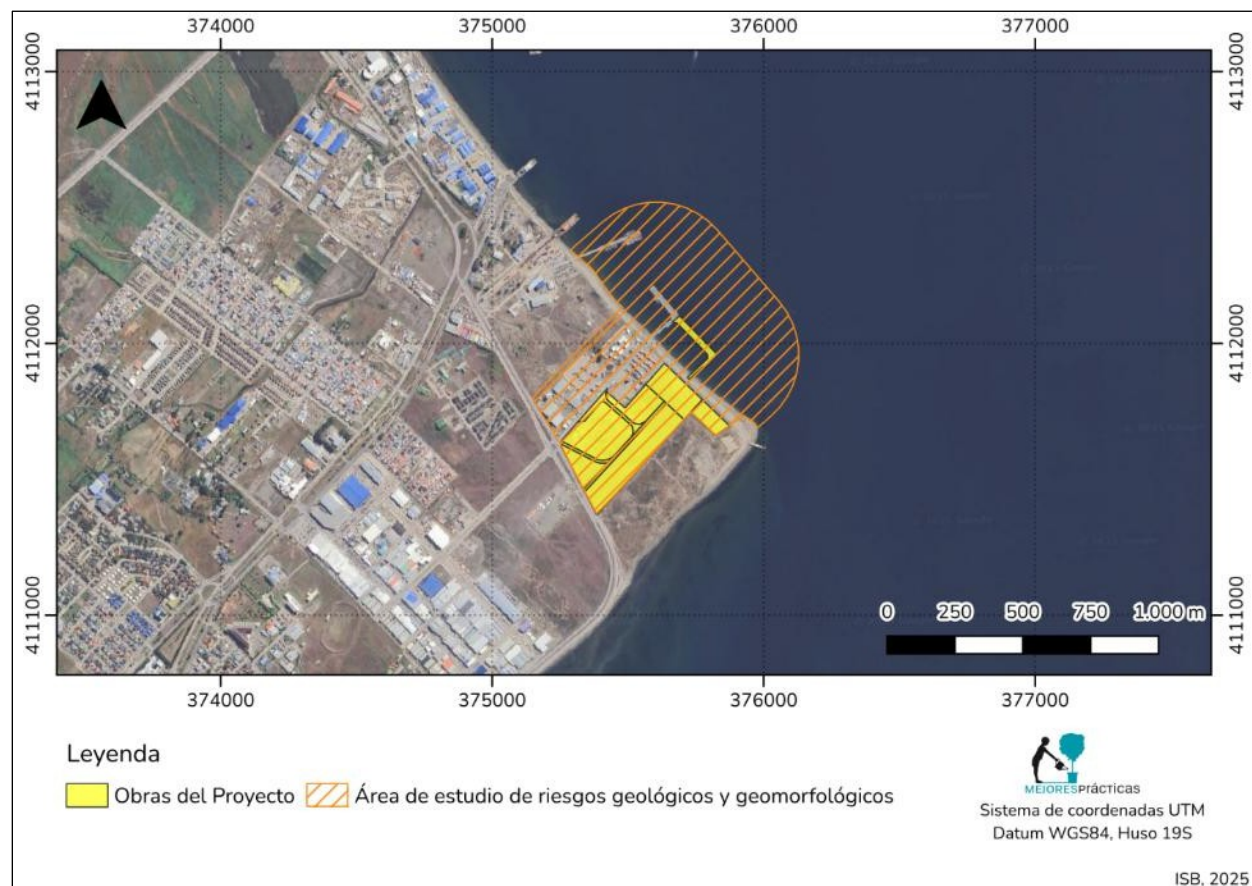


Figure 5-5: Study area components Geological and Geomorphological Risks

Source: own elaboration.

Methodology

The methodology used consists of reviewing publicly available information on the area. Information available on seismic risk maps from the National Seismological Center¹, information on regional emergency plans from SENAPRED², the Land Use Plan for the Magallanes Region and Chilean Antarctica, and risk zoning from the Punta Arenas Community Regulatory Plan were used.

¹ Available at: <https://www.csn.uchile.cl/>

² Available at: <https://bibliogrdsenapred.gob.cl/handle/1671/6775>

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Results

The following is the geological risk assessment for the Project, identifying and analyzing the following geological hazards in the study area: (i) volcanic risk, (ii) seismicity, (iii) tsunami, and (iv) river flooding. Mass movement is not considered because the project is located on flat terrain.

(i) Volcanic risk

The volcanoes closest to the Project are part of the Pali-Aike, Mount Burney, and Fuego or Cook volcanic system, located 85 miles, 119 miles, and 128 miles away, respectively.

One of the relevant geological and geographical characteristics of Magallanes is that there are volcanoes located to the west of populated areas, which is the case in much of Chile. This has a direct implication for volcanic risk, as the prevailing wind direction is usually towards the east, meaning that a possible eruption could cause ash to fall on populated and productive areas. Although the project is located in the volcanic ash deposition risk zone of the Burney and Reclus volcanoes, it is outside the volcanic hazard zone for lahars and lava.

³ Available at: <https://www.sernageomin.cl/profesionales-de-sernageomin-trabajan-en-el-levantamiento-de-informacion-geologica-en-la-region-de-magallanes/>

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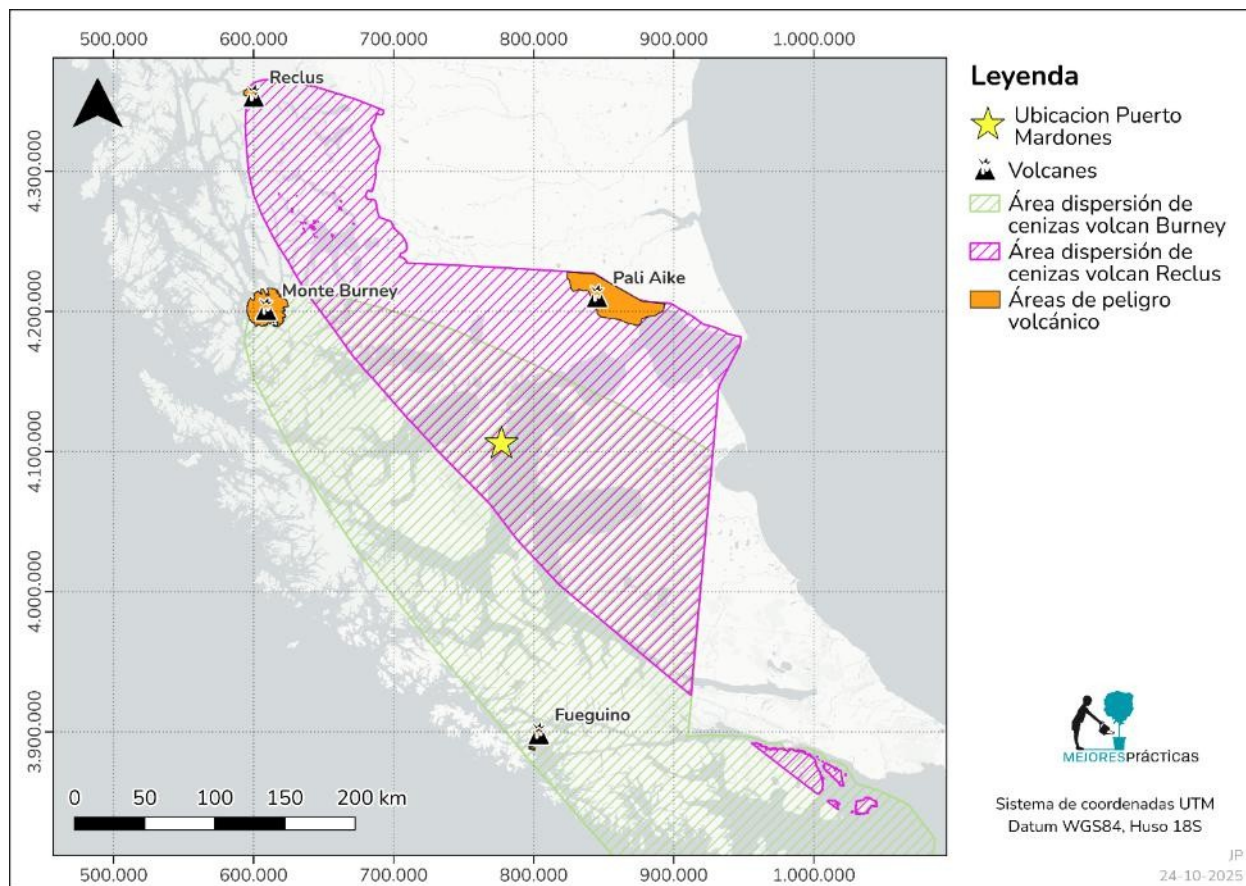


Figure 5-6: Volcanoes near the project

Source: Prepared by the authors based on information from the Land Use Plan for the Magallanes Region and Chilean Antarctica

(ii) Seismicity

According to the seismic risk map prepared by the University of Chile, the project area is located in a zone of medium seismic hazard. The earthquakes generated in this area are the result of contact between the Antarctic and Scotia plates and the Fagnano-Magallanes Fault.

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MAPA DE PELIGRO SÍSMICO

Los mapas de zonificación o peligro sísmico son una guía que indica qué lugares están más susceptibles a sufrir una mayor solicitud sísmica.

En Chile, en un lapso de 50 años, existe una alta probabilidad de que las estructuras se vean expuestas a mayores solicitudes sísmicas producto de un terremoto costero generado por la convergencia de las placas de Nazca y Sudamericana, que posee una gran productividad sísmica. Los sismos intraplaca de profundidad intermedia y corticales poseen mayor impacto en lapsos más prolongados.



Para evaluar el peligro sísmico se consideran tres factores:



Posición geográfica del sitio de interés, en relación a la fuente sísmica.

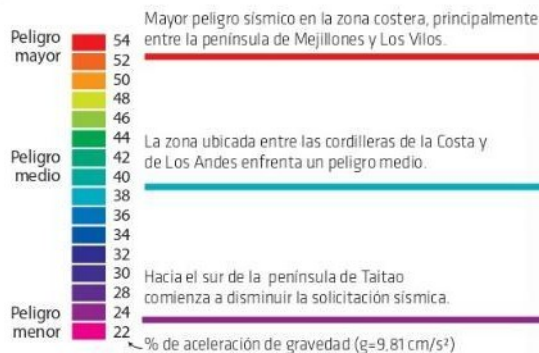


Productividad sísmica, es decir, cuál es la probabilidad de terremotos dañinos.



Niveles de aceleración a los que se vería expuesto el sitio en cuestión*.

*El mapa considera condiciones de suelo duro para todo Chile.



Los parámetros están orientados a estructuras con vida útil de alrededor de 50 años.



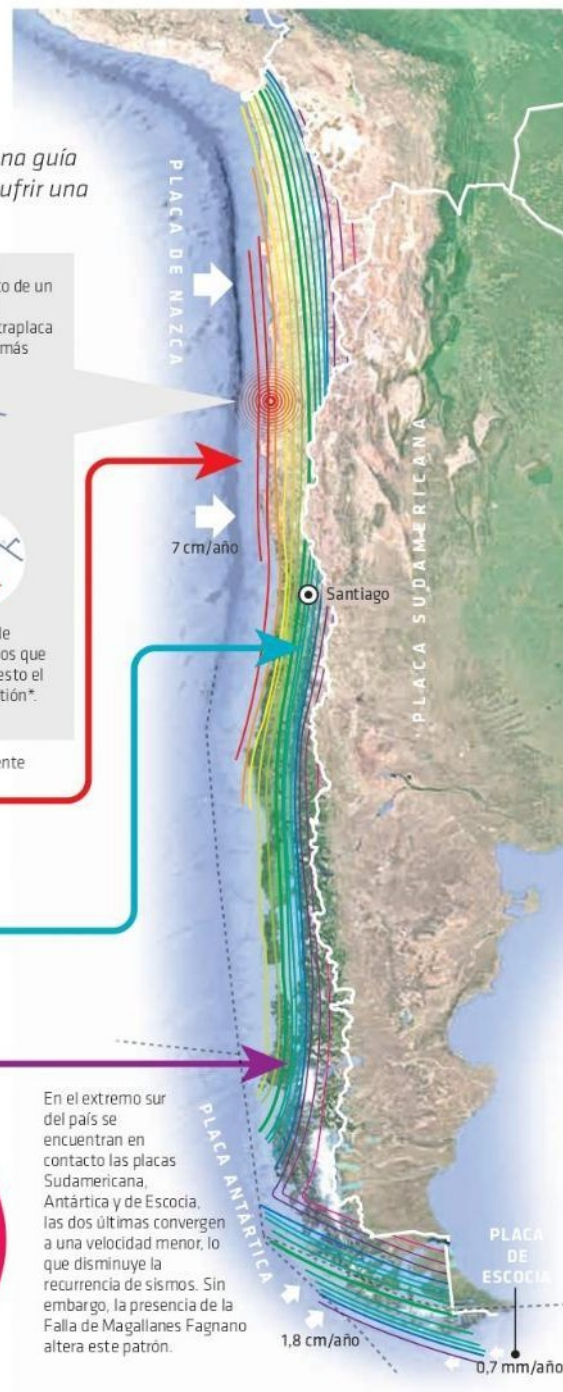
Viviendas

No son aptos para infraestructuras de obras civiles mayores, ya que su vida útil es mucho más larga y exige consideraciones de seguridad más exigentes.



Puentes

En el extremo sur del país se encuentran en contacto las placas Sudamericana, Antártica y de Escocia, las dos últimas convergen a una velocidad menor, lo que disminuye la recurrencia de sismos. Sin embargo, la presencia de la Falla de Magallanes Fagnano altera este patrón.



VINCULACIÓN PAÍS

Figure 5-7: Seismic Hazard Map

Source: National Seismological Center of the University of Chile. Available at: <https://revistasdex.uchile.cl>

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(iii) Tsunami

According to the information available in the Magallanes Region Emergency Plan, the project area is located within the defined evacuation zone. This is shown in the following figure.

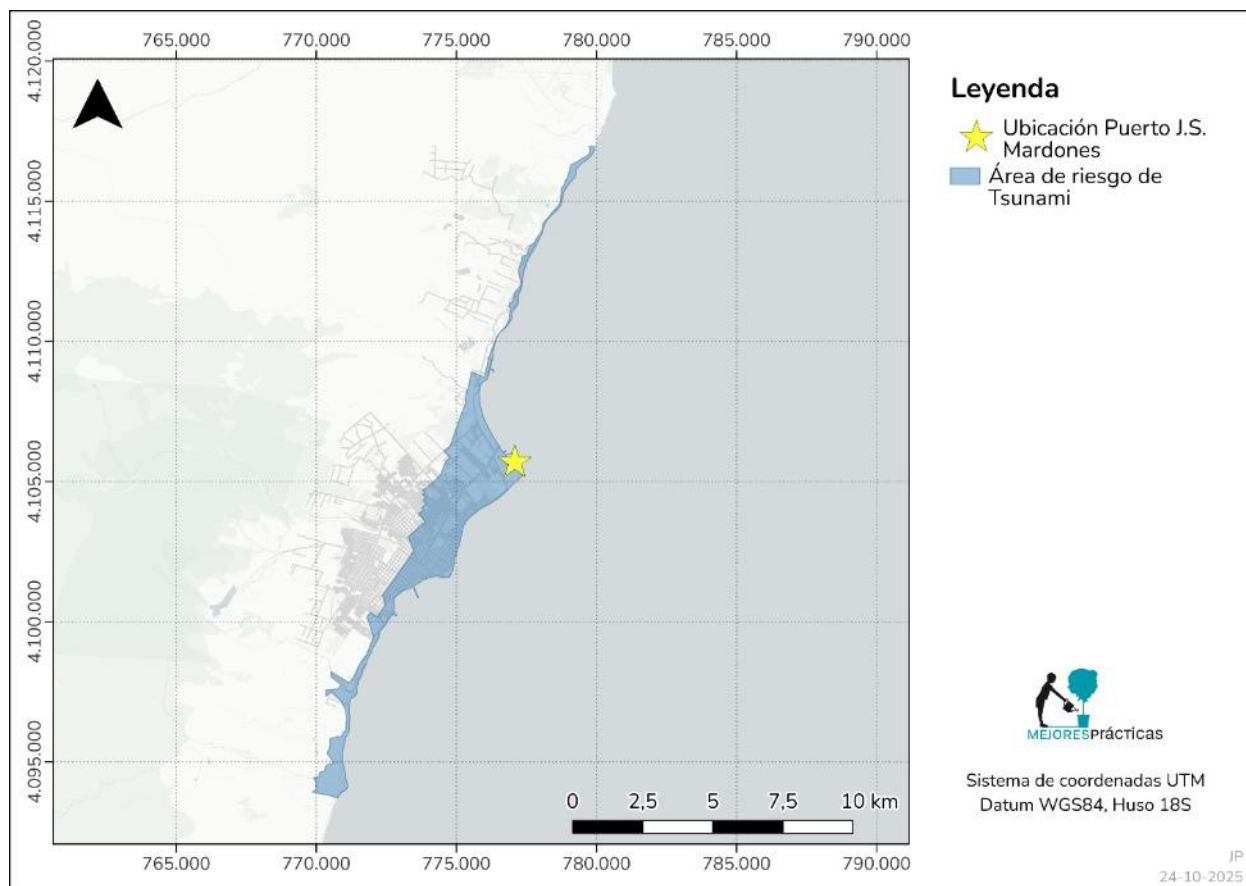


Figure 5-8: Evacuation plan for tsunami risk in Punta Arenas

Source: Prepared by the author based on the Regional Emergency Plan – Magallanes, Annex Plan for Tsunami Threat, available at: https://bibliogr.d.senapred.gob.cl/bitstream/handle/1671/6775/Anexo_Tsunami.pdf?sequence=2&isAllowed=y

(iv) River Flooding

According to information from the Punta Arenas Community Development Plan, the study area partially coincides with an area at risk of flooding from watercourses and overflowing watercourses, in this case, the Llau Llau estuary channel (Figure 5-9), although the Project works are located outside this area.

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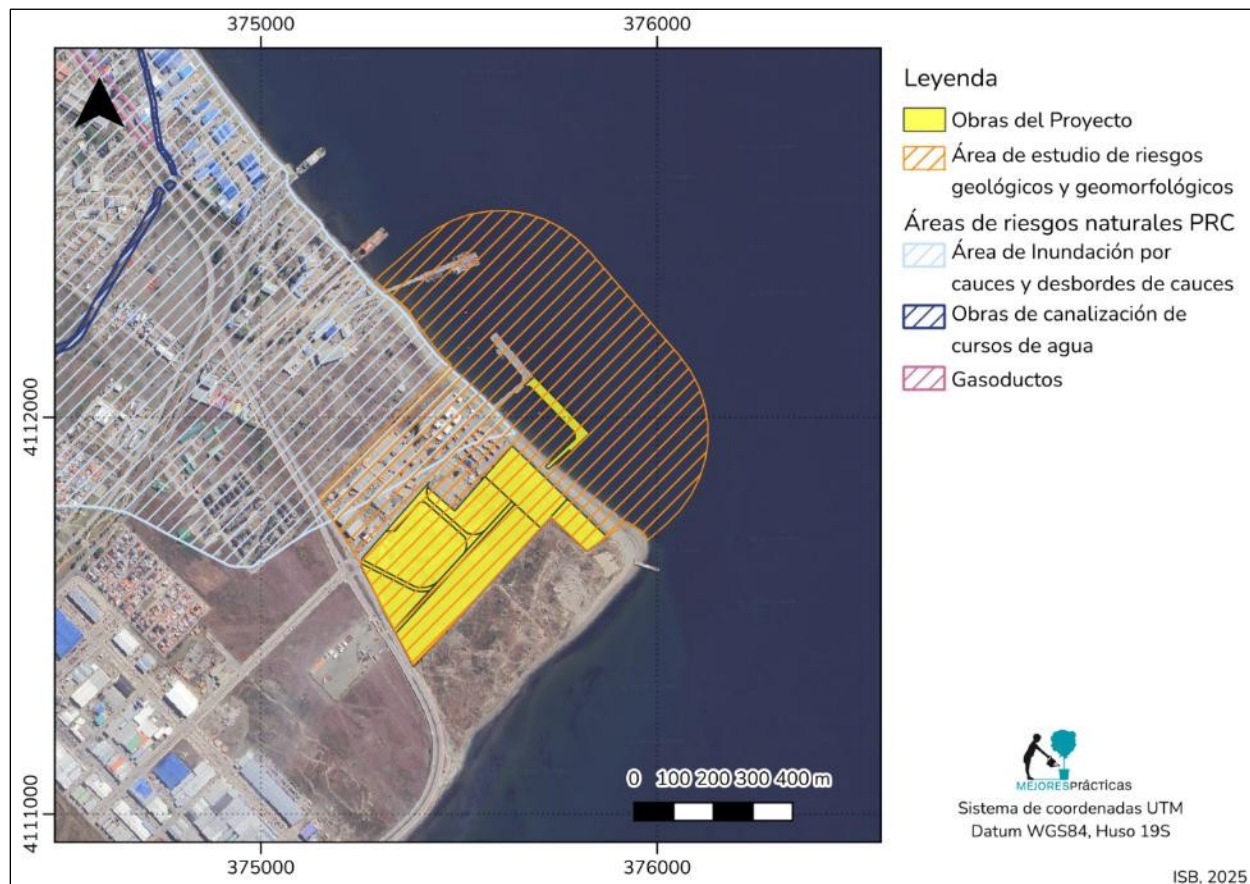


Figure 5-9: Flood risk areas

Source: own elaboration.

Conclusions

In general terms, the greatest risk is that of flooding due to tsunamis and the dispersion of volcanic ash.

In the study area, there is a risk of flooding due to river overflow, which is zoned in the Punta Arenas Community Regulatory Plan; however, the works of this Project are outside the risk zone.

The seismic risk is medium in the project area.

5.2.6 Noise and vibration levels

There are no recent noise measurements in the project area.

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Residents of Villa FACH, located approximately 200 meters west of the center point of the main planned works, have been identified as potential noise recipients. This would correspond to the closest residential area according to the zoning of the Punta Arenas Community Regulatory Plan.

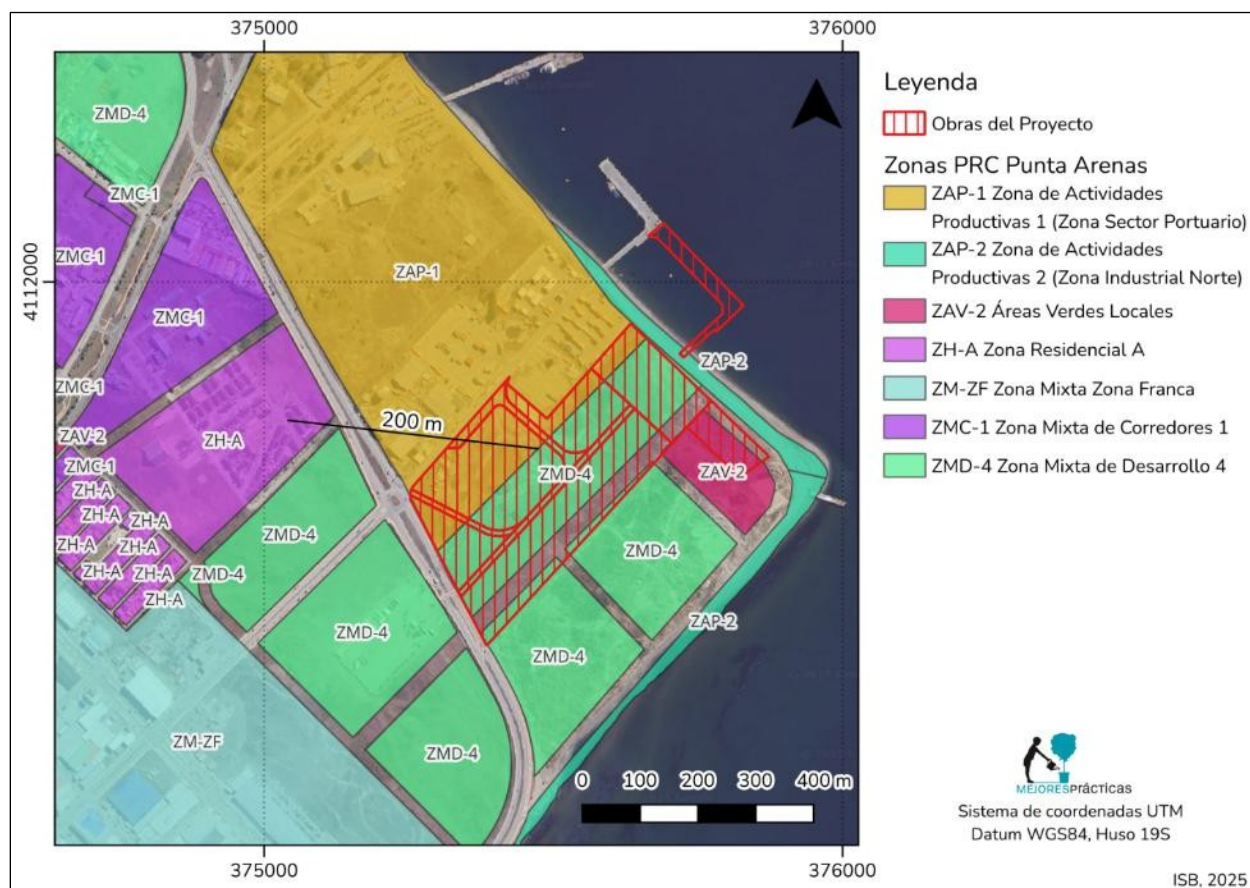


Figure 5-10: Location of potential noise receptors (residential area) near the Project

Source: Prepared by the authors.

5.2.7 Hydrology and Hydrogeology

Study area

The study area for this component corresponds to the urban boundary of the city of Punta Arenas, as shown in the following figure.

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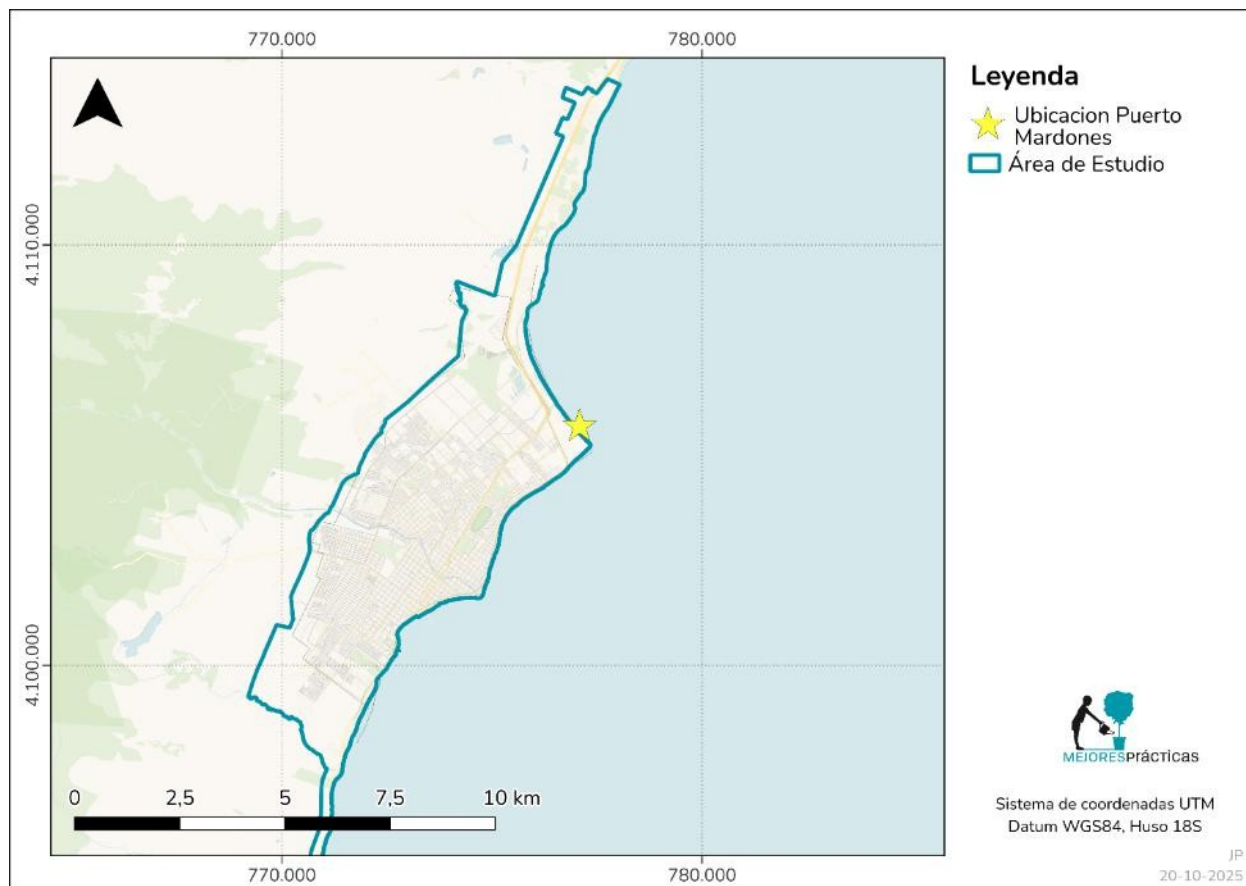


Figure 5-11: Study area associated with the hydrology and hydrogeology component

Source: Prepared by the authors

Methodology

To characterize surface water resources, public information was consulted, particularly the Punta Arenas Community Regulatory Plan. For groundwater, the study "Update of information and hydrogeological modeling of aquifers in Region XII, Magallanes and Antarctica" conducted in 2016 by Arcadis at the request of the General Water Directorate (DGA) was consulted.

Results

With regard to the hydrology of the study area, it should be noted that the watercourses closest to the Project are the Llau-Llau Estuary, which is channeled, and the Las Minas River, located at distances of 960 m and 4 km, respectively (see Figure 5-12). Although the flood risk area

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identified in the Punta Arenas PRC covers part of the study area, it does not intersect with the Project works.

In relation to the Minas River, the Project is located far from this watercourse and outside its flood area, as identified in the Punta Arenas PRC.



Figure 5-12: Hydrography in the area surrounding the Project

Source: Prepared by the authors based on public information from the Land Use Plan for the Magallanes Region and Chilean Antarctica, and the Punta Arenas Community Regulatory Plan.

With regard to groundwater, the Project is located in a Quaternary Hydrogeological Unit corresponding to a geological unit of fluvioglacial deposits. This unit contains water stored as a free unit, where shallow wells are drilled in the region. This unit has a thickness range of between 1 and 400 m, with an average of 80 m for

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Punta Arenas. This unit has a wide range of hydraulic conductivity, varying between 0.02 to 35 m/day⁴. The flow of the resource would be predominantly from west to east.

⁴ Arcadis, DGA (2016). Update of information and hydrogeological modeling of aquifers in Region XII, Magallanes and Antarctica. Available at: <https://bibliotecadigital.ciren.cl/items/3abfae51-3c19-4aaa-a9dc-bb0dddc15d74>

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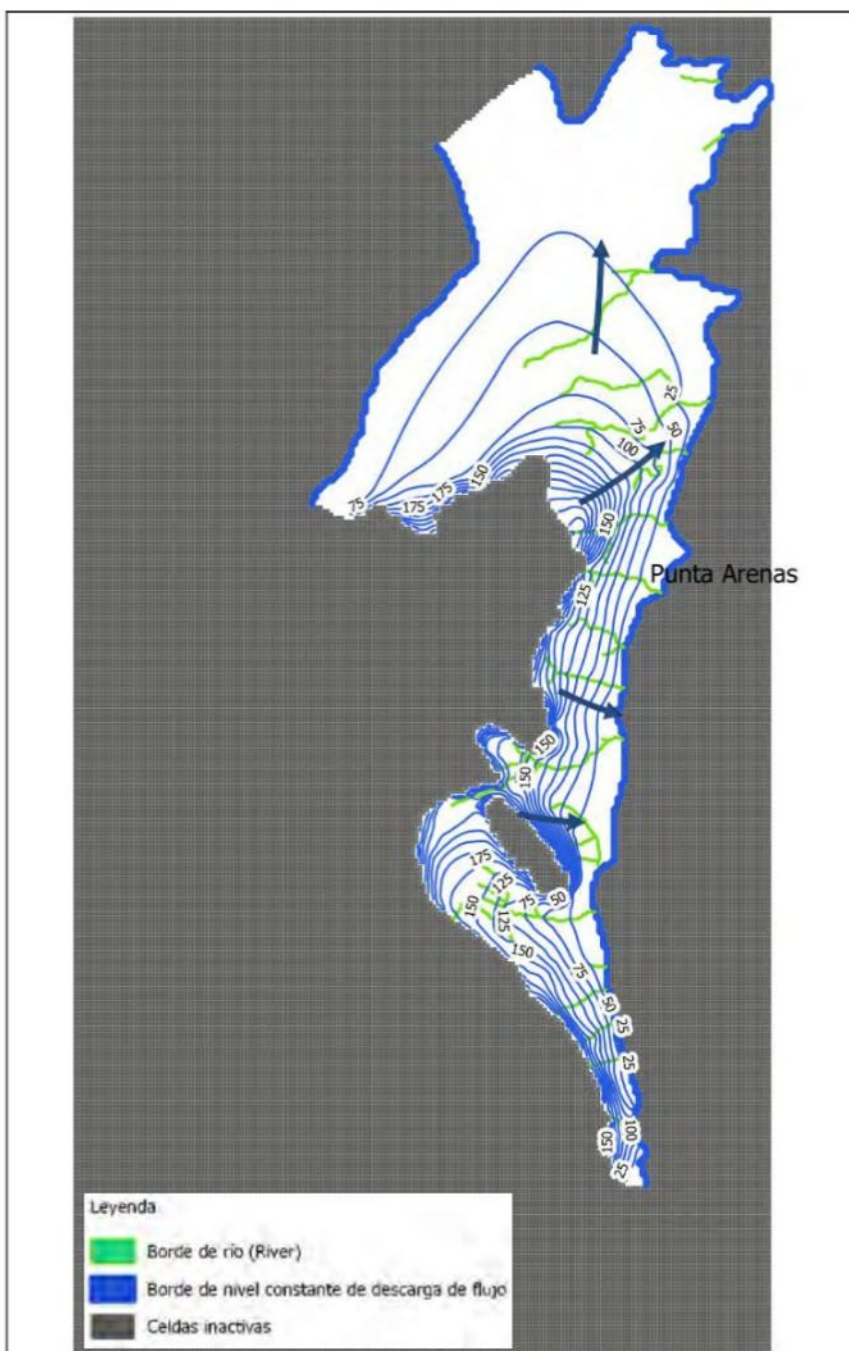


Figure 5-13: Piezometry of Punta Arenas

Source: Arcadis, DGA (2016). Update of information and hydrogeological modeling of aquifers in Region XII, Magallanes and Antarctica. Available at: <https://bibliotecadigital.ciren.cl/items/3abfae51-3c19-4aaa-a9dc-bb0dddc15d74>

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Conclusions

There are no surface watercourses in the project area, and although the study area intersects with the flood risk area associated with the Llau Llau estuary, the project works are outside this area. With regard to hydrogeology, there is an unconfined aquifer in the sector that flows from west to east.

5.2.8 Surface water quality

This is not considered a study area associated with this component, as the works to be carried out do not affect surface watercourses.

5.2.9 Groundwater Quality

This is not considered an area of study associated with this component, as the works to be carried out do not involve or affect groundwater courses. The works to be carried out on land correspond to the development of a new storage area, which does not involve excavation activities. In this regard, the only activity that will involve earthworks will be the scarification of topsoil.

5.2.10 Soils

This is not considered an area of study associated with this component, as the storage area to be developed, corresponding to the only land-based work, is an area that has already been developed.

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Photograph 5-2: Area to be developed for the storage area

Source: Own elaboration

5.2.11 Marine water resources

Study area

The study area for the characterization of the marine physical environment corresponds to Catalina Bay, and in particular to the port area defined by Directemar in the Resolution approving operations in this bay⁵.

The following figure shows the cartographic representation of the study area for this component.

⁵ C.P.A. ORD. No. 12.600/465Vrs. Resolution on operations in Catalina Bay, September 12, 2023, available at:

[120923_c_p_punta_arenas.pdf](#)

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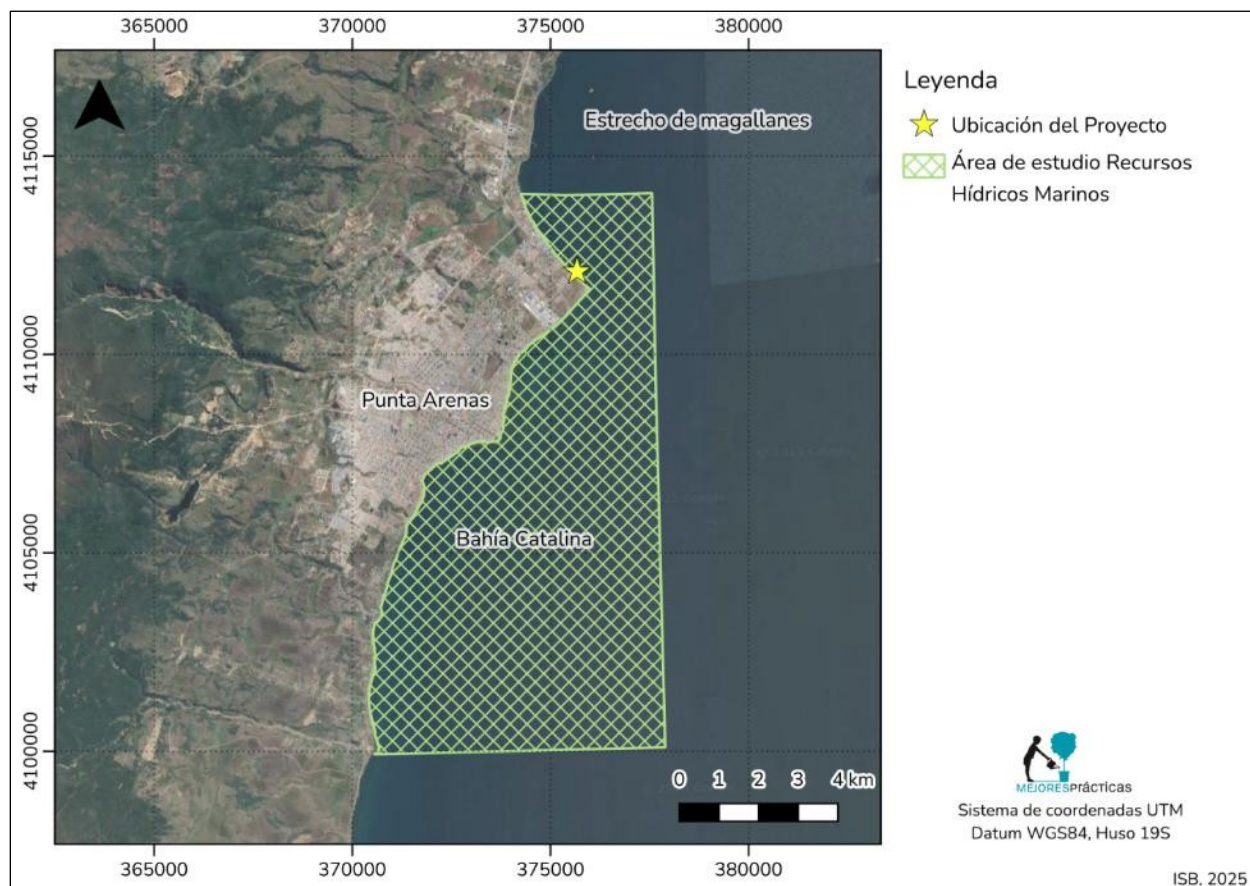


Figure 5-14: Marine Water Resources Study Area

Source: Prepared by the authors.

Methodology

The information on this component collected in the context of the Environmental Impact Assessment (EIA) for the project "Expansion of the New Port of Punta Arenas. XII Region, Stages II and III" in 1998 was reviewed. This survey was based on measurement campaigns carried out in the period August-September 1996.

In addition, more recent information available in DIRECTEMAR resolutions approving the operation of port infrastructure was reviewed:

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- C.P.P.A. ORD. No. 12,600/_35_Vrs. Authorizes the operation of the Asmar Shipyard's dry dock, January 13, 2022⁶.
- C.P.P.A. ORD. No. 12,600/465Vrs. Resolution on the operation of Catalina Bay, September 12, 2023⁷

The characterization of the marine aquatic environment is composed of the following variables:

- Winds
- Tides
- Waves
- Currents
- Bathymetry
- Water quality
- Sediments

Results Wind

The winds in Catalina Bay are from the west, which, combined with the low elevation of the surrounding land, means that when they blow with great intensity, they affect operations at the maritime terminals, even when they do not cause high waves. Winds from the east, although milder, generate high waves that affect port facilities.

During the spring and summer seasons, there is a considerable increase in wind intensity, which can exceed 50 knots.

⁶Resolution available at:

[120923_c_p_punta_arenas.pdf](#)

⁷ Resolution available at:

[120923_c_p_punta_arenas.pdf](#)

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Tide

There is a variation in tidal range between 0.13 and 2.41 meters, with an average sea level of +1.22 meters (Sound Reduction Level).

Waves

The presence of waves is very low, with wave heights not exceeding 0.2 meters.

Currents

Currents in the Catalina Bay area are generally parallel to the coast, i.e., in a northwest-southeast direction at a speed of 1 to 2 knots, with a preferential direction of movement towards the southeast, where the highest speeds are observed.

Bathymetry

The depths of the sector range from 22 to 45 meters. The seabed is soft and flat, with a steep slope, which can be simplified into three strata: the first consists of fine silty sands with low compactness, the second horizon consists of fine plastic soils with low consistency, and beneath these soils is a horizon of rigid clays with some gravel, a stratum that provides high compactness.

Water quality

The results of the analyses carried out during the aforementioned EIA evaluation process indicate that:

- Temperature: the average value is 6.3°C.
- Suspended solids, total and in sediment: the values of sedimentable solids were low, between 23 and 29.9 ppm. The highest values measured are related to the presence of plankton salts and not necessarily to contaminating particles. Sedimentable solids did not exceed 0.1 ppm.
- Dissolved oxygen: oxygen concentration ranged between 10.4 and 11.2 ppm, with an average of 10.9 ppm. This value is considered high and indicates good water ventilation.
- Salinity: The normal value for this parameter in Punta Arenas is 30.3 psu, corresponding to areas with abundant rainfall. Therefore, the reported value of 30.5 psu is normal for this area and consistent with the data presented above.

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- pH: An average value of 7.2 was obtained, which is within the normal range for seawater.
- COD: The average chemical oxygen demand was 111.7 ppm, which is low compared to polluted waters, which have values of 300 ppm or higher.
- Lead: all measurements are below 0.05 ppm.
- Copper: measurements ranged from 0.02 to 0.06 ppm
- Cadmium: measurements were low at all stations.
- Fats and oils: fat and oil levels were below 15 ppm, with an average of 17 ppm; these values reflect contamination problems for this parameter.
- Total hydrocarbons: all measured values are below 0.003 ppm except for one spot measurement that yielded 0.004 ppm.
- Water turbidity: measurements indicate that the water is transparent, with an average value of 6.4 i-n.
- Total and fecal coliforms: microbiological analyses of the water indicated absence

Sediments

The results obtained in the characterization carried out in the EIA evaluation process for the project "Expansion of the New Port of Punta Arenas. XII Region, Stages II and III" in 1998 indicate that the granulometric composition of sediments found at the measuring stations was as follows: very fine silt, moderately classified medium sand with symmetrical distribution, poorly classified medium sand with excess coarse particles, moderately classified fine sand with symmetrical distribution, and finally, probably classified coarse sand with symmetrical distribution.

The tests carried out on the sediments indicate the following:

- The tests indicated that 50% of the sediment precipitates in 3 minutes and 95% of the sediment does so in 1.2 days.
- High hydrocarbon content (average value of 248 ppm)
- Sediments are contaminated by heavy metals such as copper, lead, and zinc, attributable to industrial processes in the area and shipyards.

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Conclusions

Studies conducted for the preparation of the EIA for the project "Expansion of the New Port of Punta Arenas. XII Region, Stages II and III" in 1998 indicate that Catalina Bay showed no signs of water quality contamination except for the parameter of oils and fats. As for sediments, the analyses indicated that they were contaminated by heavy metals, a situation attributable to industrial processes and shipyards in the area.

Regarding the characteristics of the bay, more recent information from DIRECTEMAR indicates that Catalina Bay has low waves, currents that are parallel to the coast and do not usually exceed 2 knots with a preferential direction towards the southeast, and a tidal range that varies between 0.13 and 2.41 meters.

5.3 Characterization of the Biotic Environment

Figure 5-15 shows the location of the Project, which includes works both in the marine environment and on the mainland. All the works are located within the port facilities currently in operation, an area that has been altered, with only pioneer flora and vegetation communities associated with this type of environment (see Photograph 5-3 and Photograph 5-4).

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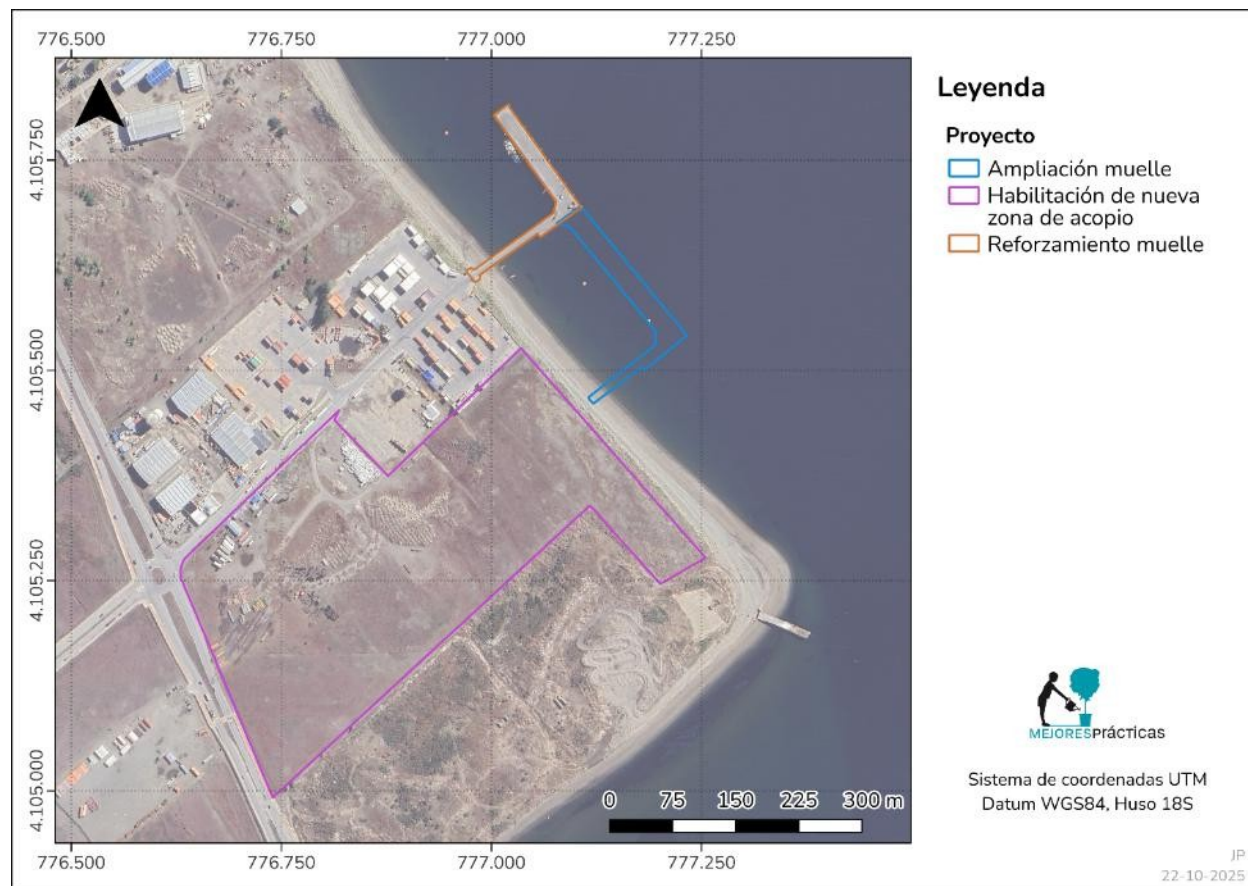


Figure 5-15: Project works

Source: Prepared by the authors

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Photograph 5-3: Built-up area in the port

Source: Prepared by the authors

Photograph 5-4: Developed area not built on

Source: Own elaboration

Based on the above, the following table addresses each of the biotic components and the need for analysis according to the characteristics of the project.

Table 5-9: Relevance of the analysis of each of the subcomponents of the biotic environment

Subcomponent	Analysis
Terrestrial flora and vegetation	The project does not affect native natural vegetation formations, since the area to be improved is highly disturbed, and the existing flora consists of exotic species and weeds of no major relevance to conservation. Consequently, this component is not analyzed.
Terrestrial fauna	The project could affect wildlife communities living both in the area to be improved and on the beach near the pier, therefore it is relevant to analyze this subcomponent. Both vertebrate and invertebrate fauna are considered.
Continental aquatic biota	There are no continental water bodies in the project area, so it is not necessary to analyze this component.
Marine aquatic biota	The project involves actions in the marine environment, so it is relevant to analyze the marine fauna subcomponent.

Source: Own elaboration

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5.3.1 Study area

The study area is defined based on the spatial extent of the potential effects that the project may have on biotic components, whether during the construction, operation, and/or closure phases of the project.

To determine the study area, the definition of the area of influence from the Environmental Impact Study "Expansion of the New Port of Punta Arenas. XII Region. Stages II and III" was taken into account. This project was approved by RCA No. 13 on June 2, 1998, and subsequently declared expired on December 3, 2021, by R.E.202199101751 due to its non-implementation. This indicates that the area of influence corresponds to the port site plus the surrounding marine area, which was estimated to be a *buffer zone* of 300 m from the marine works. Thus, the study area considered for the Biotic Environment components has a total area of 62.6 ha, which includes the land part of the port, including the future cargo storage area, the beach area, and the marine environment surrounding the dock.

Figure 5-16 below shows the study area mentioned above.

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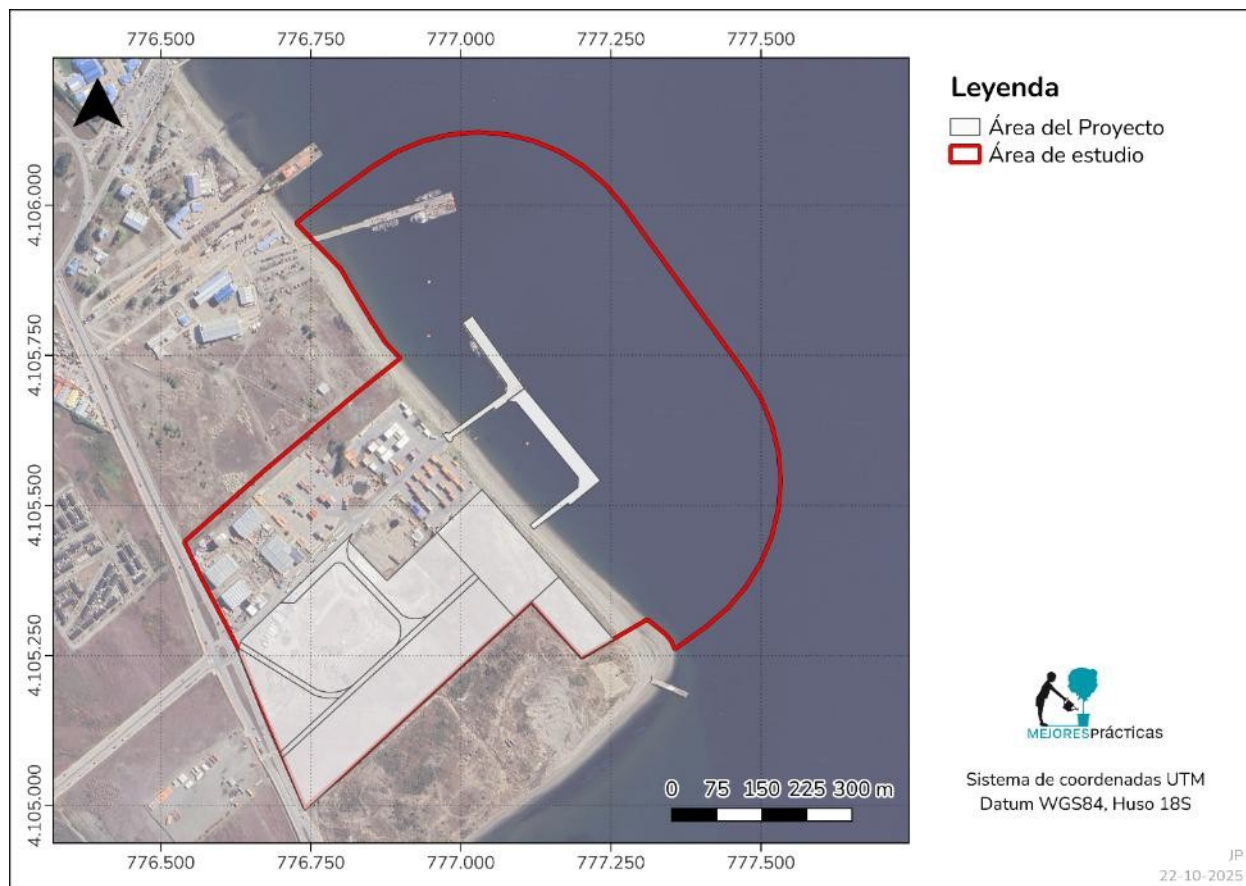


Figure 5-16: Study area of the biotic environment

Source: Prepared by the author based on information provided by the owner

In order to analyze terrestrial and marine fauna separately, the study area has been divided into two zones: the terrestrial zone, which includes the port area and future storage area, and the marine zone, which includes the surrounding sea and beach area.

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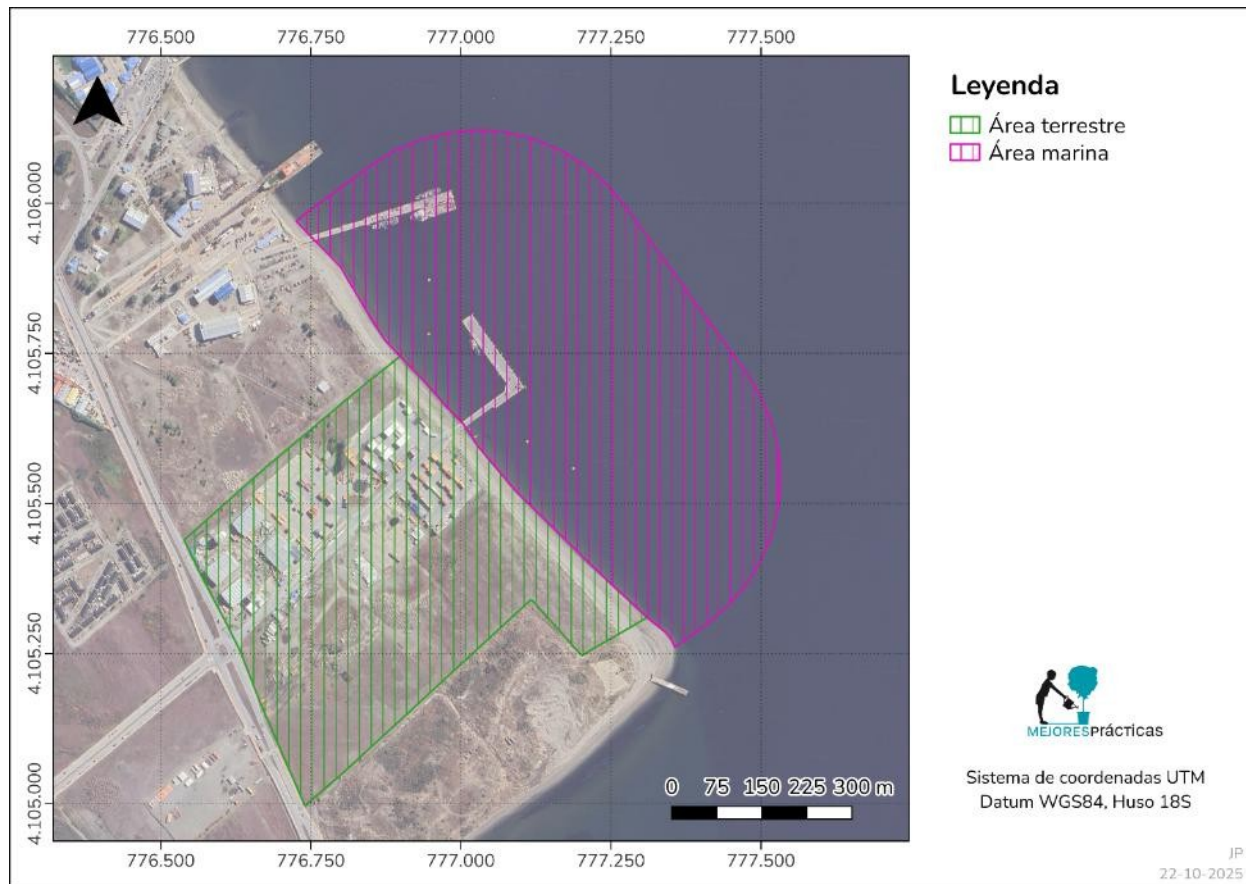


Figure 5-17: Terrestrial and marine areas

Source: Prepared by the author based on information provided by the owner

5.3.2 Methodology

The characterization of the biotic environment of the study area is based on information compiled from secondary bibliographic sources, such as studies or environmental impact statements from other projects in the area and public baselines.

In the case of projects evaluated in the Environmental Impact Assessment System, information collected in the Environmental Impact Assessment (EIA) of the project "Expansion of the New Port of Punta Arenas, XII Region. Stages II and III" was used.

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With regard to public baselines, there are two registers recognized by the Ministry of the Environment: the National Species Inventory of the Ministry of the Environment (MMA)⁸ and the Global Biodiversity Information Facility (GBIF)⁹.

At the same time, the conservation status classification according to the Chilean Ministry of the Environment and the Red List of Threatened Species of the International Union for Conservation of Nature (IUCN) were consulted in order to identify whether the project area corresponds to a critical habitat for threatened or critically endangered species.

The species identified for the relevant subcomponents are shown below.

5.3.3 Terrestrial fauna

In the EIA for the project "Expansion of the New Port of Punta Arenas, XII Region. Stages II and III," a field campaign was conducted to determine the presence of terrestrial fauna *in situ*. This was carried out in July 1996, in an area with a high degree of surrounding disturbance (industry and urban population), so a low animal presence was expected.

During two periods of daily observation, no sightings of terrestrial fauna were recorded in the project area, except for sporadic flights of seabirds. Likewise, no caves, dens, nests, or shelters were detected that would indicate the presence of resident or temporary activity of any type of fauna. Only a thick deposit of *Chloephaga* sp. (caiquén) feces was detected in a specific sector of the area, along with *Lepus europaeis* (hare) feces. With regard to invertebrate fauna, only two larval stages of *Noctuidae* (Lepidoptera) were detected.

On the other hand, there are records from 2001 to 2023 of bird sightings in the study area, which are available in the databases of the Ministry of the Environment, corresponding to the National Species Inventory and the Global Biodiversity Information System.

⁸ Available at: <https://apps.mma.gob.cl/visorsimbio>

⁹ Available at https://lineasdebasepublicas.mma.gob.cl/datos_abiertos/dataset/ocurrences_gbif_magallanes_continental and https://lineasdebasepublicas.mma.gob.cl/datos_abiertos/dataset/ocurrences_gbif_maritimo_nacional

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Table 5-10 below shows the species observed in the terrestrial environment of the study area, as well as their conservation status according to the MMA's Classification of Species by Conservation Category¹⁰ and the IUCN Red List¹¹. It can be seen that all species are in the category of least concern or have no information in the IUCN Red List. On the other hand, according to the MMA classification, *Macronectes giganteus* (Giant Petrel) is in the Vulnerable category in the study area, and *Spheniscus magellanicus* (Magellanic Penguin) is in the Near Threatened category. The rest of the species are in the Least Concern category or have no information.

¹⁰ Available at: <https://clasificacionespecies.mma.gob.cl/>

¹¹ Available at: <https://www.iucnredlist.org/es>

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Table 5-10: Public observations of wildlife in the terrestrial environment of the study area

Phylum	Class	Order	Family	Species	Common name	Biogeographic origin	MMA Conservation Category	IUCN Red List
Chordata	Birds	Anseriformes	Anatidae	<i>Tachyeres patachonicus</i>	Flying quetru	Native	LC	LC
Chordata	Birds	Anseriformes	Anatidae	<i>Lophonetta specularioides</i>	Juarjuar duck	Native	-	LC
Chordata	Birds	Charadriidae	Charadrius	<i>Accipiter bicolor</i>	Peuquito, Chilean Sparrowhawk	Native	LC	LC
Chordata	Birds	Charadriiformes	Laridae	<i>Leucophaeus scoresbii</i>	Southern gull	Native	-	LC
Chordata	Birds	Charadriiformes	Laridae	<i>Chroicocephalus maculipennis</i>	Black-headed Gull	Native	-	-
Chordata	Birds	Charadriiformes	Stercorariidae	<i>Stercorarius chilensis</i>	Chilean skua	Native	-	LC
Chordata	Birds	Charadriiformes	Haematopodidae	<i>Haematopus leucopodus</i>	Southern oystercatcher	Native	-	LC
Chordata	Birds	Charadriiformes	Thinocoridae	<i>Thinocorus rumicivorus</i>	Little Partridge	Native	LC	LC
Chordata	Birds	Charadriiformes	Charadriidae	<i>Charadrius falklandicus</i>	Double-collared plover, Double-collared plover, Double-collared	Native	VU (XV-X); LC (XI-XII)	LC
Chordata	Aves	Charadriiformes	Laridae	<i>Larus dominicanus</i>	Dominican gull	Native	-	LC
Chordata	Birds	Charadriiformes	Scolopacidae	<i>Calidris bairdii</i>	Baird's sandpiper	Native	-	LC
Chordata	Birds	Charadriiformes	Charadriidae	<i>Vanellus chilensis</i>	Queltehue	Native	-	LC

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Phylum	Class	Order	Family	Species	Common name	Biogeographic origin	Conservation category Conservation	IUCN Red List
Chordata	Aves	Charadriiformes	Laridae	<i>Sterna hirundinacea</i>	South American tern	Native	-	LC
Chordata	Birds	Columbiformes	Columbidae	<i>Columba livia</i>	Domestic pigeon	Introduced	-	LC
Chordata	Aves	Falconiformes	Falconidae	<i>Falco sparverius</i>	Peregrine falcon	Native	LC	LC
Chordata	Birds	Falconiformes	Falconidae	<i>Falco peregrinus</i>	Peregrine falcon	Native	LC	LC
Chordata	Birds	Passeriformes	Passerellidae	<i>Zonotrichia capensis</i>	Chincol	Native	-	LC
Chordata	Birds	Passeriformes	Fringillidae	<i>Spinus barbatus</i>	Goldfinch	Native	-	LC
Chordata	Birds	Passeriformes	Tyrannidae	<i>Lessonia rufa</i>	Schoolboy	Native	-	LC
Chordata	Birds	Passeriformes	Hirundinidae	<i>Tachycineta leucopyga</i>	Chilean Swallow	Native	-	LC
Chordata	Birds	Pelecaniformes	Ardeidae	<i>Nycticorax nycticorax</i>	Huairavo	Native	-	LC
Chordata	Birds	Procellariiformes	Pelecanoididae	<i>Pelecanoides magellani</i>	Magellanic cormorant	Native	-	LC
Chordata	Birds	Procellariiformes	Procellariidae	<i>Macronectes giganteus</i>	Giant Antarctic petrel	Native	VU	LC
Chordata	Birds	Procellariiformes	Diomedidae	<i>Thalassarche melanophris</i>	Black-browed albatross	Native	LC	LC
Chordata	Birds	Procellariiformes	Procellariidae	<i>Fulmarus glacialis</i>	Southern Fulmar	Native	-	LC

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Phylum	Class	Order	Family	Species	Common name	Biogeographic origin	Conservation category Conservation	IUCN Red List
Chordata	Aves	Sphenisciformes	Spheniscidae	<i>Spheniscus magellanicus</i>	Magellanic penguin	Native	NT	LC
Chordata	Birds	Sphenisciformes	Spheniscidae	<i>Pygoscelis papua</i>	Papua	Native	LC	LC
Chordata	Birds	Suliformes	Phalacrocoracidae	<i>Leucocarbo atriceps</i>	Imperial Cormorant	Native	-	LC

Conservation categories: Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), Extinct (EX).

Source: Prepared by the authors based on the National Species Inventory of the Ministry of the Environment (MMA) and the Global Biodiversity Information Facility.

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5.3.4 Marine aquatic biota

The EIA for the project "Expansion of the New Port of Punta Arenas, XII Region. Stages II and III" includes a baseline for marine biota that describes the following communities: intertidal communities, subtidal communities, marine mammals, and seabirds, for which only field studies were conducted for intertidal and subtidal communities.

With regard to intertidal communities, the EIA mentions that despite sampling efforts, no living organisms were found in the coastal benthos, which is consistent with previously consulted documentary evidence. However, animal remains were found on the beach carried by the tide, such as *Mytilus chilensis* (mussel), *Clamys patagonicus* (southern scallop), and *Eurypodius latrellei* (a species of inedible crab).

On the other hand, in the sampling of subtidal communities, carried out by scuba diving, 135 organisms belonging to four main taxa were collected: *Annelida*, *Nemertea*, *Crustacea*, and *Mollusca*. The dominant group was polychaete annelids with 11 different species, which in turn represent 79% of the total organisms collected, with the polychaete *Lumbrinereis magallensis* standing out. Table 5-11 below lists the species and/or genera found.

Table 5-11: Subtidal species observations made for the EIA "Expansion of the New Port of Punta Arenas, XII Region. Stages II and III."

Phylum	Class	Order	Family	Species
Annelida	Pleistoannelida	Phyllodocida	Nephtyidae	<i>Aglaophamus sp.</i>
Annelida	Pleistoannelida	Eunicida	Lumbrineridae	<i>Lumbrineris magallensis</i>
Annelida	Pleistoannelida	Eunicida	Lumbrineridae	<i>Lumbrinerida sp1</i>
Annelida	Pleistoannelida	Eunicida	Lumbrineridae	<i>Lumbrinerida sp2</i>
Annelida	Pleistoannelida	Terebellida	Cirratulidae	-
Annelida	Pleistoannelida	Terebellida	Pectinariidae	<i>Pectinaria sp.</i>
Annelida	Pleistoannelida	Phyllodocida	Nephtyidae	-
Annelida	Pleistoannelida	-	Cossuridae	-

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Phylum	Class	Order	Family	Species
Annelida	Pleistoannelida	Sabellidae	Sabellidae	-
Annelida	Pleistoannelida	Phyllodocida	Phyllodocidae	
Nemertea	-	-	-	-
Arthropoda	Malacostraca	Amphipoda	Phoxocephalidae	-
Mollusk	Bivalvia	Venerida	Veneridae	<i>Eurhomalea sp.</i>

Source: EIA "Expansion of the New Port of Punta Arenas, XII Region. Stages II and III"

According to the records available in the Ministry of the Environment's databases, corresponding to the National Species Inventory and the Global Information System, there is data from 1954 to 2023 on sightings of birds, one species of mollusk, and one arthropod in the area.

Only two of the species recorded are classified as Vulnerable, according to the Ministry of the Environment: the Caiquén (*Chloephaga picta*) and the Giant Antarctic Petrel (*Macronectes giganteus*).

The following table shows the records from this database corresponding to the project's study area.

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Table 5-12: Public observations of wildlife in the marine environment of the study area

Phylum	Class	Order	Family	Species	Common name	Conservation category MMA	List IUCN
Mollusca	Bivalvia	Veneridae	Veneridae	<i>Eurhomalea exalbida</i>	-	-	LC
Arthropoda	Crustacea	Decapoda	Paguridae	<i>Pagurus comptus</i>	Crab hermit	-	-
Chordata	Birds	Anseriformes	Anatidae	<i>Chloephaga picta</i>	Caiquén, Common Cauquén	VU	LC
Chordata	Birds	Anseriformes	Anatidae	<i>Lophonetta specularioides</i>	Juarjuar duck	-	LC
Chordata	Aves	Anseriformes	Anatidae	<i>Tachyeres patachonicus</i>	Flying quetru	LC	LC
Chordata	Birds	Anseriformes	Anatidae	<i>Tachyeres pteneres</i>	Quetru no non-flying	NT	LC
Chordata	Birds	Charadriiformes	Charadriidae	<i>Charadrius falklandicus</i>	Double-collared plover Double-collared Plover	"VU (XV-X); LC (XI-XII)"	LC
Chordata	Aves	Charadriiformes	Charadriidae	<i>Charadrius modestus</i>	Chilean Plover	LC	LC
Chordata	Birds	Charadriiformes	Charadriidae	<i>Vanellus chilensis</i>	Queltehue	-	LC
Chordata	Birds	Charadriiformes	Laridae	<i>Chroicocephalus maculipennis</i>	Gull	-	-
Chordata	Birds	Charadriiformes	Laridae	<i>Larus dominicanus</i>	Seagull dominicana	-	LC
Chordata	Birds	Charadriiformes	Laridae	<i>Leucophaeus scoresbii</i>	Southern gull	-	LC

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Phylum	Class	Order	Family	Species	Common name	Conservation category MMA	Red List IUCN
Chordata	Birds	Charadriiformes	Laridae	<i>Sterna hirundinacea</i>	South American South American	-	LC
Chordata	Birds	Charadriiformes	Stercorariidae	<i>Stercorarius chilensis</i>	Skimmer chileno	-	LC
Chordata	Birds	Falconiformes	Falconidae	<i>Falco sparverius</i>	Hawk peregrine	LC	LC
Chordata	Birds	Procellariiformes	Diomedidae	<i>Thalassarche melanophris</i>	Black-browed albatross Black-browed	LC	LC
Chordata	Birds	Procellariiformes	Pelecanoididae	<i>Pelecanoides magellani</i>	Magellanic Magellan	-	LC
Chordata	Birds	Procellariiformes	Procellariidae	<i>Macronectes giganteus</i>	Giant petrel Antarctic	VU	LC
Chordata	Birds	Suliformes	Phalacrocoracidae	<i>Leucocarbo atriceps</i>	Cormorant imperial	-	LC

Conservation categories: Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), Extinct (EX).

Source: Prepared by the authors based on the National Species Inventory of the Ministry of the Environment (MMA) and the Global Biodiversity Information Facility

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5.3.5 Identification of critical habitats

The criteria and guidelines of the Inter-American Development Bank (IDB) Environmental and Social Performance Standards (ESPS) have been followed to identify critical habitats, in particular ESPS 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources.

First, the environments and habitats identified within the study area are classified based on the characterizations of the different components of the biotic environment. The classification comprises two types of environments or habitats, as indicated in the following table:

Table 5-13 Classification of habitat types in the study area

Habitat type	Description	Groups of species present
Terrestrial habitat	Coastal area, flat with sparse vegetation cover, mostly exotic, and port infrastructure.	Hare, Birds, <i>Noctuidae</i> (Lepidoptera)
Marine habitat	Marine sector adjacent to the terrestrial coastal edge, with port infrastructure and navigation.	Aquatic birds, marine vertebrates and invertebrates

According to performance standard NDAS 6, critical habitats correspond to areas with high biodiversity values, based on the following criteria:

- i. Habitats of relevance or significant importance for threatened species, classified in the categories Critically Endangered, Endangered, Vulnerable, or Near Threatened.
- ii. Habitats of relevance or significant importance for endemic or restricted distribution species.
- iii. Habitats that support a significant global concentration of migratory or congregating species.
- iv. Highly threatened or unique ecosystems.
- v. Areas associated with key evolutionary processes.
- vi. Areas that are legally protected or internationally recognized for their high biodiversity value.

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These criteria are analyzed based on species recorded in the study area and their unique characteristics. In particular, the guidelines and thresholds established in Guidance Note 6 of the International Finance Corporation: Conservation of Biodiversity and Sustainable Management of Living Natural Resources were followed.

Habitats of relevance or significant importance for threatened species, classified in the categories Critically Endangered, Endangered, Vulnerable, or Near Threatened.

Only two species have been recorded in the defined study area as being threatened: the Antarctic giant petrel (*Macronectes giganteus*) and the South American pelican (*Chloephaga picta*), both classified as Vulnerable. However, the sector is a developed area with port infrastructure, which is not known for hosting large populations of this species. Therefore, no critical habitat of importance for threatened species has been identified in the sector.

Habitats of relevance or significant importance for endemic or restricted distribution species.

The distribution of species was reviewed in official sources such as the databases of species classified by the Ministry of the Environment, the database of the Fisheries Development Institute and bird field guides.

None of the species recorded in the study area are restricted in distribution or endemic to Chile. Therefore, based on this criterion, no critical habitat is considered to exist in the project study area.

The following indicates the biogeographic origin and distribution of the species recorded.

¹² https://clasificacionespecies.mma.gob.cl/?utm_source=chatgpt.com

¹³ <https://www.ifop.cl/macropauna/>

¹⁴ Couve, E. & Vidal, C. 2003. Birds of Patagonia, Tierra del Fuego and the Antarctic Peninsula, Falkland Islands and South Georgia. Editorial Fantástico Sur Birding Ltda. 656 p. and Portal Aves de Chile (<https://www.avesdechile.cl/>).

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Table 5-14: Biogeographic origin and distribution of species recorded in the terrestrial study area

Species	Common name	Origin Distribution	Distribution
<i>Lophonetta specularioides</i>	Juarjuar duck	Native	From Talca to Cape Horn.
<i>Tachyeres patachonicus</i>	Flying quetru	Native	Ñuble to Tierra del Fuego, including channels and coasts.
<i>Accipiter bicolor</i>	Peuquito, Gavilán chileno	Native	Talca to Cape Horn
<i>Charadrius falklandicus</i>	Double-collared plover	Native	From the Los Lagos Region to Magallanes, including Tierra del Fuego.
<i>Vanellus chilensis</i>	Queltehue	Native	From the Arica and Parinacota Region to Magallanes.
<i>Haematopus leucopodus</i>	Southern oystercatcher	Native	Southern coast, from Chiloé to Tierra del Fuego.
<i>Chroicocephalus maculipennis</i>	Chilitan	Native	From the northern coast to Tierra del Fuego.
<i>Larus dominicanus</i>	Larus dominicana	Native	Present on all the coasts of Chile, from Arica to Cape Horn.
<i>Leucophaeus scoresbii</i>	Southern seagull	Native	Los Lagos to Tierra del Fuego, Argentina
<i>Sterna hirundinacea</i>	South American South American	Native	From Coquimbo to Tierra del Fuego.
<i>Calidris bairdii</i>	Baird's sandpiper Baird	Native	Migratory, observed in wetlands and beaches from Arica to Magallanes.
<i>Chilensis</i>	Chilean skua	Native	From Chiloé to Tierra del Fuego.
<i>Thinocorus rumicivorus</i>	Little partridge	Native	From Coquimbo to Magallanes.
<i>Columba livia</i>	Domestic pigeon	Introduced	Introduced; present in urban centers throughout Chile.
<i>Falco peregrinus</i>	Peregrine falcon	Native	From Arica to Magallanes, including mountain range and coast.
<i>Falco sparverius</i>	Peregrine falcon	Native	From Arica to Tierra del Fuego.
<i>Spinus barbatus</i>	Goldfinch	Native	Copiapó to Tierra del Fuego
<i>Tachycineta leucopyga</i>	Swallow Chilean	Native	From Atacama to Magallanes.
<i>Zonotrichia capensis</i>	Chincol	Native	Throughout most of the country, from Arica to Magallanes.
<i>Lessonia rufa</i>	Schoolboy	Native	From the Biobío Region to Magallanes.
<i>Night Heron</i>	Huairavo	Native	From Arica to Magallanes.

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Species	Common name	Origin Biogeographic	Distribution
<i>Thalassarche melanophris</i>	Black-browed albatross	Native	Southern Ocean, observed off the southern coast of Chile. Widely distributed, also in the Atlantic.
<i>Pelecanoides magellani</i>	Magellanic Magellan	Native	Chiloé to Cape Horn
<i>Fulmarus glacialis</i>	Southern Petrel	Native	Southern waters of Chile, mainly around Tierra del Fuego. Also South Atlantic.
<i>Macronectes giganteus</i>	Giant Petrel Antarctic	Native	From the Aysén Region to Cape Horns.
<i>Pygoscelis papua</i>	Papua	Native	Subantarctic islands, rarely observed on Magellanic coasts. Antarctic Peninsula. Antarctic Peninsula.
<i>Spheniscus magellanicus</i>	Magellanic penguin Magellanic	Native	From Valparaíso to Cape Horn.
<i>Leucocarbo atriceps</i>	Imperial imperial	Native	Coastal areas of the extreme south, from Chiloé to Tierra del Fuego.

Source: own elaboration.

Table 5-15: Biogeographic origin and distribution of species recorded in the marine study area

Species	Common name	Origin Biogeographic	Distribution
<i>Eurhomalea exalbida</i>	-	Native	Chiloé to Cape Horn, Brazil, Argentina
<i>Pagurus comptus</i>	Hermit crab hermit crab	Native	Valparaíso to the Falkland Islands, Uruguay, Argentina
<i>Chloephaga picta</i>	Caiquén	Native	Maule to Magallanes, Argentina.
<i>Lophonetta specularioides</i>	Juarjuar duck	Native	Talca to Cape Horn
<i>Tachyeres patachonicus</i>	Flying quetru	Native	Southernmost mainland and Tierra del Fuego, including channels and coasts.
<i>Tachyeres pteneres</i>	Flightless quetru	Native	Chiloé to Cape Horn
<i>Charadrius falklandicus</i>	Double-collared plover Plovers	Native	From the Los Lagos Region to Magallanes, including Tierra del Fuego.
<i>Charadrius modestus</i>	Chilean plover	Native	Los Lagos to Tierra del Fuego, Argentina
<i>Vanellus chilensis</i>	Queltehue	Native	Maule to Magallanes, Argentina.

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Species	Common name	Origin Biogeographic	Distribution
<i>Chroicocephalus maculipennis</i>	Crested Gull	Native	From the northern coast to Tierra del Fuego.
<i>Larus dominicanus</i>	Gaviota dominicana	Native	Found along all the coasts of Chile, from Arica to Cape Horn.
<i>Leucophaeus scoresbii</i>	Southern seagull	Native	Los Lagos to Tierra del Fuego, Argentina
<i>Sterna hirundinacea</i>	South American South American	Native	From Coquimbo to Tierra del Fuego.
<i>Stercorarius chilensis</i>	Chilean skua	Native	From Chiloé to Tierra del Fuego.
<i>Falco sparverius</i>	Peregrine falcon	Native	From Arica to Tierra del Fuego.
<i>Thalassarche melanophris</i>	Black-browed albatross	Native	Southern Ocean, observed off the southern coast of Chile. Widely distributed, also in the Atlantic.
<i>Pelecanoides magellani</i>	Magellanic Magellan	Native	Chiloé to Cape Horn
<i>Macronectes giganteus</i>	Giant petrel Antarctic	Native	From the Aysén Region to Cape Horns.
<i>Leucocarbo atriceps</i>	Imperial Cormorant	Native	Coastal areas of the extreme south, from Chiloé to Tierra del Fuego.

Source: own elaboration.

Habitats that support a significant global concentration of migratory or congregating species.

The species recorded were checked to see if they are listed in the appendices of the Convention on the Conservation of Migratory Species of Wild Animals¹⁵ (CMS).

Of the species recorded in the study area, only the peregrine falcon (*Falco peregrinus*) is listed in Appendix II, which corresponds to a list of species that require international cooperation for their conservation. However, this species has been recorded infrequently in the sector, according to a review of the databases consulted. On the other hand, the sector is a developed area with port infrastructure, which is not known for hosting large populations of this species.

¹⁵ Reviewed at: <https://www.cms.int/es/node/28677>

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Therefore, no critical habitat is identified in the sector due to the concentration of migratory species.

Highly threatened or unique ecosystems

According to Pliscoff (2015)¹⁶, terrestrial ecosystems in the Magallanes Region are not classified as threatened or at risk of collapse, following application of the methodology for assessing ecosystem condition defined by the IUCN Red List of Ecosystems.

¹⁶ Pliscoff, P. 2015. *Application of the International Union for Conservation of Nature (IUCN) criteria for the risk assessment of Chile's terrestrial ecosystems. Technical report prepared by Patricio Pliscoff for the Ministry of the Environment. 63 p. Santiago, Chile.*

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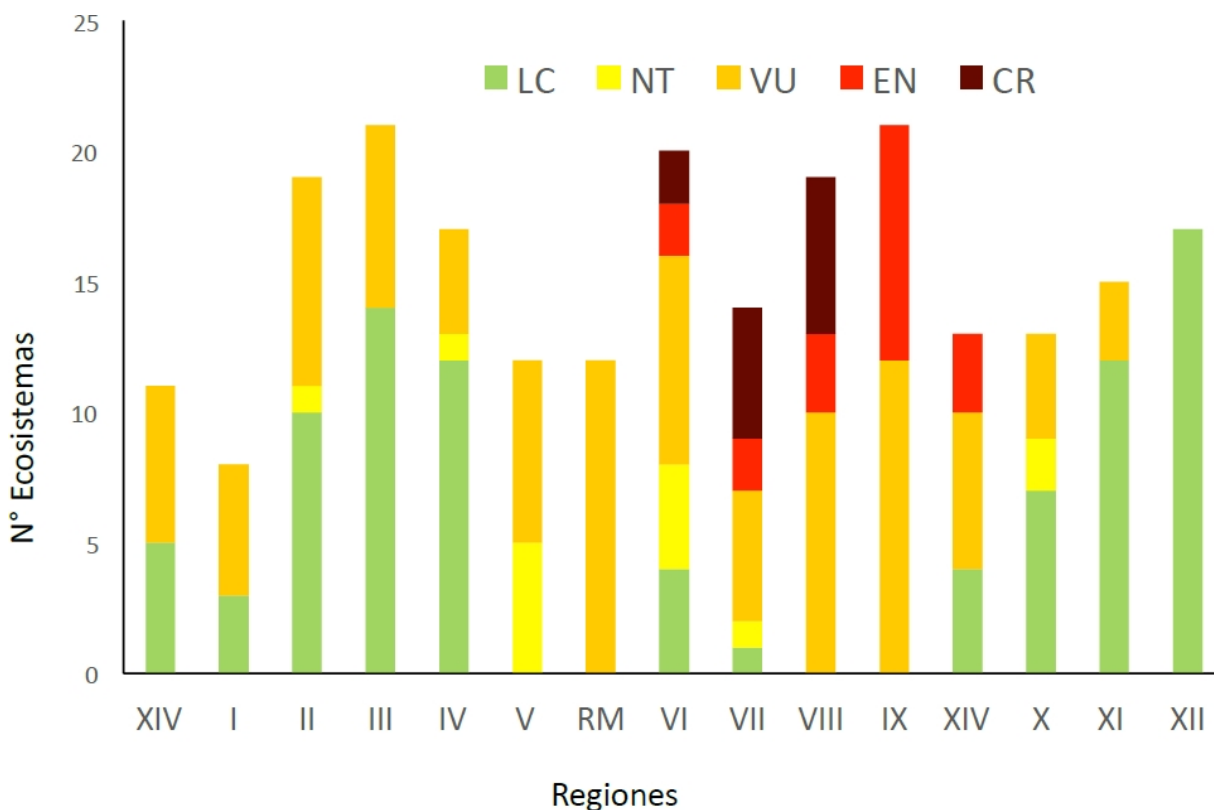


Figure 5-18: Regional distribution of categories resulting from the application of the IUCN ecosystem conservation status assessment methodology

Source: Plischoff, P. 2015.

Therefore, it can be stated that the habitats identified in the study area are not highly threatened, and this criterion for defining critical habitat is not met.

Areas associated with key evolutionary processes

Located in a coastal zone, the defined study area is characterized as an *ecotone*, or transition between terrestrial and marine environments. The recorded fauna, mainly seabirds, corresponds to a group that makes use of this ecotone, carrying out activities both on land and at sea.

It should be noted that the geography of the surrounding area, consisting of fjords, channels, and islands, makes the landscape surrounding the study area highly heterogeneous, which could be

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considered a driving force in speciation and, therefore, an area associated with key evolutionary processes.

Several scientific publications refer to important evolutionary processes, genetic differentiation, speciation, and diversification in the Magallanes Region and sub-Antarctic areas. For example, Mancilla et al. (2012)¹⁷ describe the sub-Antarctic ecoregion of Magallanes as a unique area for studying climate change and its effects on biota. They highlight that the channels and fjords show high levels of genetic differentiation and that the region constitutes a natural laboratory for the study of evolutionary processes.

A significant area of the region is protected by reserves, national and marine parks, nature sanctuaries, among others. All these protected areas are located far from the Project, more than 1.6 km away.

As mentioned above, the study area corresponds to an area that has already been developed, with existing port activity. There is no evidence to suggest that the study area can be considered an area where key evolutionary processes occur.

Areas legally protected or internationally recognized for their high biodiversity value

The area where the project is being developed corresponds to a highly developed industrial area, which is not legally protected or recognized for its high biodiversity value. In this regard, the protected area closest to the project, located 1.6 km away, is the Tres Puentes Urban Wetland, declared as such on December 1, 2021, by R.E. No. 1,339 of the Ministry of the Environment.

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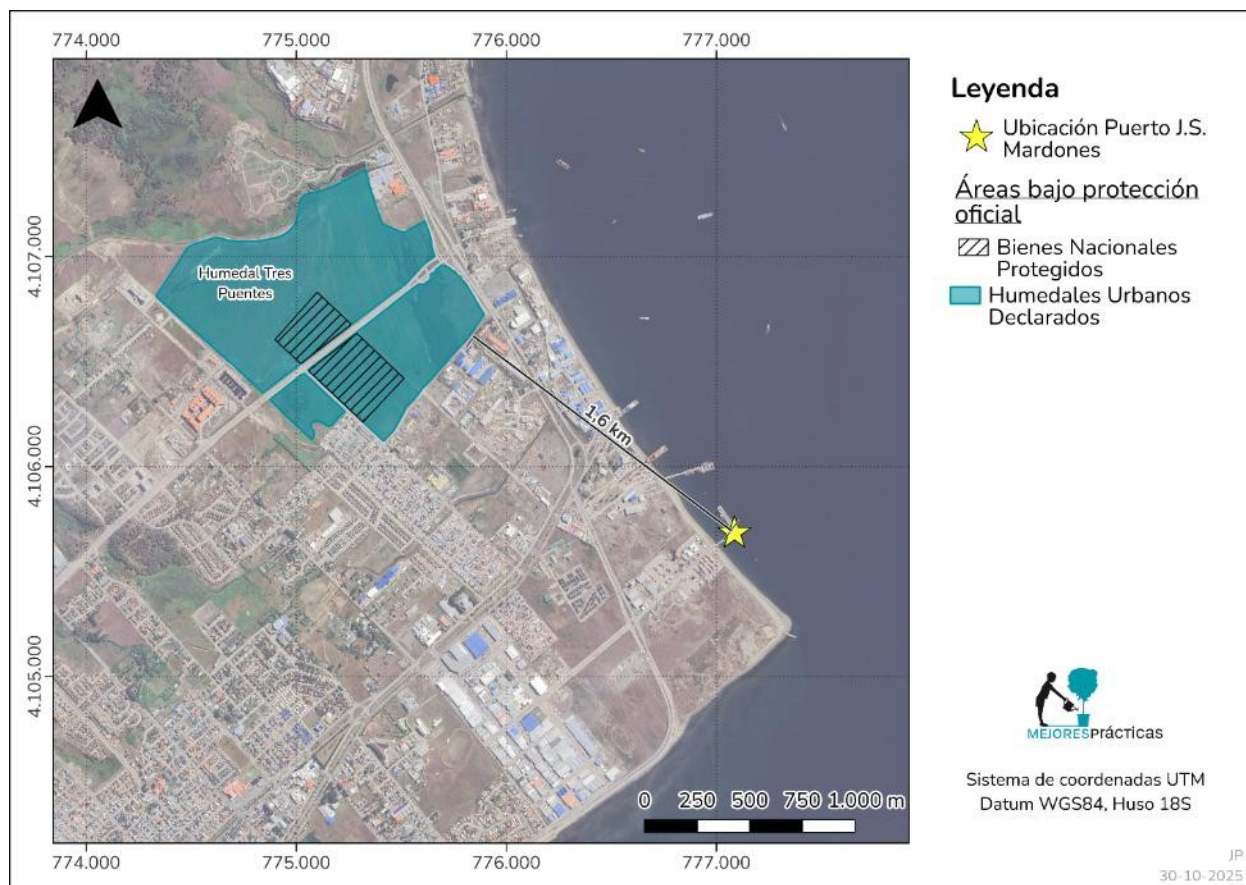


Figure 5-19: Location of the Tres Puentes Urban Wetland

Source: Prepared by the authors

The Tres Puentes Urban Wetland is a permanent lake and marsh wetland. It has two permanent shallow lagoons, where during the 1990s the waters of the Llau Llau Canal (the wetland's main tributary) were diverted to the Bitsch estuary, draining areas that were filled with debris. Additionally, it is fragmented by Frei Avenue. Despite the high levels of intervention, a high diversity has been identified, with a total of 91 bird species recorded, some such as the Chilean flamingo (*Phoenicopterus chilensis*), classified as Near Threatened, the Coscoroba swan (*Coscoroba coscoroba*) and the Black-necked swan (*Cygnus melancoryphus*), classified as Least Concern, and some of them critically endangered.

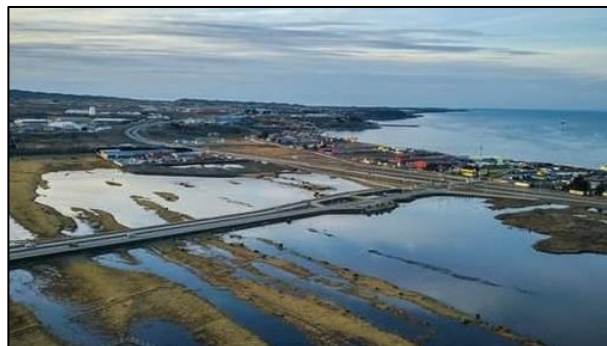
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extinction, as in the case of the ruddy-headed goose (*Chloephaga rubidiceps*), a species that has a Species Recovery, Conservation, and Management Plan¹⁸.



Photograph 5-5: Tres Puentes Wetland

Source: Own work



Photograph 5-6: Aerial view of the wetland

Source: Ministry of the Environment (undated). Descriptive sheet of urban wetland to be declared ex officio by the Ministry of the Environment, Tres Puentes Wetland.

The urban wetland is notable for the presence of permanent bodies of water that serve as a source of food and shelter for the aforementioned birds. In contrast, there are no continental bodies of water in the project area. Furthermore, given the works and actions considered in the project, carried out in the marine environment and in a previously intervened terrestrial area, it is not likely to cause impacts on the protected area or on the bodies of water that feed it.

On the other hand, the area of international recognition closest to the project corresponds to the Cabo de Hornos biosphere reserve, located 107 km away from the project, meaning that the latter is not capable of generating impacts on this critical habitat. Other areas of

¹⁸ Ministry of the Environment (n.d.). Descriptive sheet of urban wetland to be declared ex officio by the Ministry of the Environment, Tres Puentes Wetland. Available at: <https://sistemahumedales.mma.gob.cl/OficioHU/DetailsPublico/21>

Cárcamo, Jaime; Gómez, Humberto (2010). Guide of for Wetland 3 Bridges. Available at: <https://repositorioambiental.mma.gob.cl/wp-content/uploads/2019/09/Gui%CC%81a-de-campo-humedal-1.pdf>

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The existing internationally recognized sites in the region are located further away from the Project and include the Torres del Paine Biosphere Reserve, 112 miles away, and the Bahía Lomas Ramsar Site, 75 miles away.

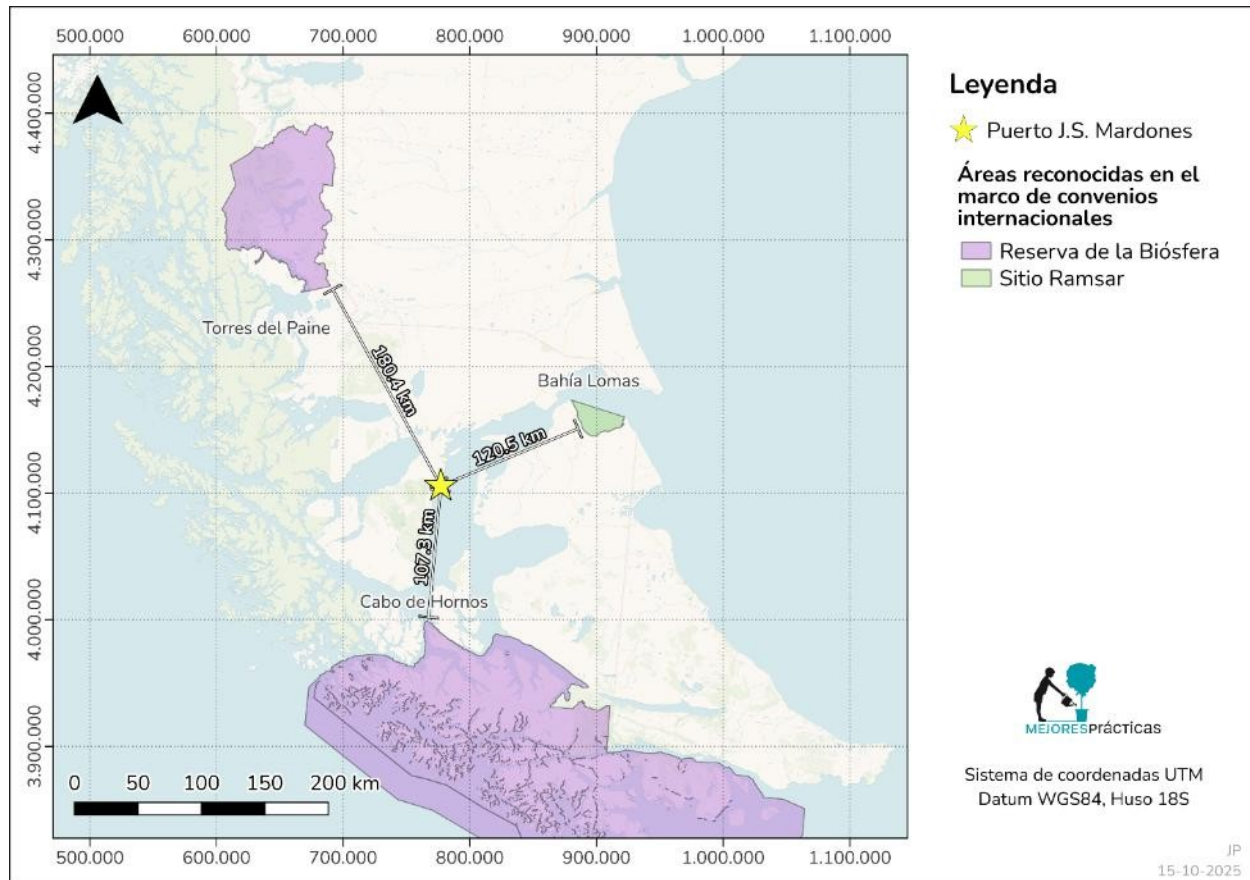


Figure 5-20: Areas recognized under international agreements

Source: Prepared by the authors based on public information

Considering the above, no critical habitats have been identified in the study area, as the two protected areas mentioned above are more than 1.6 km away.

5.3.6 Conclusions

Based on bibliographic information and biodiversity database records, the terrestrial fauna and marine aquatic biota in the project study area were characterized.

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With regard to terrestrial fauna, there are only records of 28 seabirds, of which one is classified as Vulnerable, the Giant Petrel (*Macronectes giganteus*), and one as Near Threatened, the Magellanic Penguin (*Spheniscus magellanicus*).

In marine aquatic biota, there are a total of 27 records, with 10 marine invertebrates and 17 seabirds, among the data compiled in the 1998 EIA carried out in the sector and the databases consulted. Two of the species recorded are classified as Vulnerable: the Caiquén (*Chloephaga picta*) and the Giant Petrel (*Macronectes giganteus*), while the flightless Quetru (*Tachyeres pteneres*) is classified as Near Threatened.

Finally, no critical habitats were identified in the study area. The area closest to the Project that meets critical habitat criteria is located more than 1.6 km away and corresponds to the Tres Puentes Urban Wetland: a legally protected area classified as an urban wetland.

5.4 Characterization of the Human Environment and Indigenous Peoples

The characterization of the component of Life Systems and Customs of Human Groups is based on secondary information from various sources detailed below. In addition, a field visit was made on October 13 and 14, 2025, which allowed the secondary information to be supplemented with qualitative and contextual inputs, enriching the analysis and understanding of the territory.

The main aspects of this component are described below.

5.4.1 Objectives

Based on the Inter-American Development Bank (IDB) document "*Social Impact Assessment: Integrating Social Issues into Development Projects*," it is understood that the characterization of the human environment is an essential component of the Social Impact Assessment (SIA) process for IDB-supported projects, with the aim of improving their quality and sustainability.

The overall objective of the characterization is to establish a detailed and up-to-date description of the social, economic, cultural, and demographic situation of the project's study area, serving as a verifiable record of the context.

As for its specific objectives, these are aimed at providing key information for project decision-making in relation to its location, design, operation, and mitigation measures

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mitigation measures against potential impacts. According to the Inter-American Development Bank (IDB), it is essential to integrate social considerations into the early stages of design, which allows for maximizing benefits, minimizing risks, and adding value to the proposed development.

One of the central purposes of the characterization is to establish the current situation of the project's study area, serving as a reference for ongoing monitoring and evaluation. This characterization should be detailed and consider temporal, geographic, ecological, social, political, and ethnic-cultural aspects, among others.

Characterization is also used to identify and assess project risks and impacts. The IDB's "Guidelines for the Environmental and Social Policy Framework" indicate that the baseline data provided by the characterization are essential inputs for project design, action plans, and management systems. This information allows for the proper application of the mitigation hierarchy (avoid, minimize, compensate, or offset) and defines the scope and level of effort required in the assessment.

Finally, characterization serves as a reference for ongoing project monitoring and evaluation. It is essential to have baseline data in order to make comparisons and assessments of project results and impacts (*Social Impact Assessment: Integrating Social Issues into Development Projects*. IDB. 2018).

5.4.2 Information gathering and secondary information analysis

The information gathering process is a fundamental step in identifying the potential impacts and risks of a project. This process must be based on secondary, up-to-date, and verifiable information, including a detailed description, in this case of the municipality of Punta Arenas and the study area defined for the project.

The use of secondary sources to characterize the project study area is acceptable and may come from "government agencies, non-governmental organizations (NGOs), and academic sources" (IDB, 2021). The secondary information used to gather data was quantitative and qualitative, and therefore the analysis process varied according to each type of information.

On the other hand, as part of the information gathering process, a field visit was conducted on October 13 and 14, which included direct observation of territorial and social dynamics. There was also a territorial survey to identify relevant elements of the

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landscape, infrastructure, and community organization. Photographic records were taken to serve as visual support for the findings and conditions observed.

Therefore, this activity allowed us to supplement the secondary information with qualitative and contextual inputs, enriching the analysis and understanding of the territory.

Quantitative information in databases

The 2024 Population and Housing Census database was used to extract statistical information on geography, demographics, socioeconomic status, poverty and social vulnerability, anthropology and culture, well-being and basic services, and gender and inclusion. In addition to the 2024 Census data, the 2022 Casen Survey database was used to complement the description at the community level.

Qualitative information from literature review and public agencies

The bibliographic information analyzed was obtained from various sources, analyzing publications from public services, academic institutions, and research institutions. The information was subjected to content analysis, extracting the most relevant and pertinent information for the purposes of this characterization. The following is a detailed list of the sources analyzed:

- 2025 Community Statistical Reports, Library of the National Congress of Chile, Communities of Punta Arenas.
- Social Characterization Indicators 2022, Ministry of Social Development, Municipality of Punta Arenas.
- National Municipal Information System (SINIM), Municipality of Punta Arenas
- Internal Revenue Service. Business statistics. Business statistics by municipality and economic sector. 2023. Municipality of Punta Arenas
- Community Development Plan (Municipality of Punta Arenas).
- Punta Arenas Tourism Development Plan 2022-2026.
- Department of Health Statistics and Information (DEIS).
- National Health Services System (Ministry of Health).
- National Indigenous Development Corporation (CONADI) (Databases of current indigenous organizations)
- Environmental Impact Study "Green Hydrogen and Ammonia Production Project - H2 Magallanes" (Chapter 3.24 - Human Environment Baseline).

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5.4.3 Study area

The study area defined for this social characterization corresponds to the direct and indirect surroundings of the Mardones Terminal, located in the municipality of Punta Arenas, Magallanes and Chilean Antarctica Region. Specifically, it is limited to census areas 1 (Census District 1 – subarea 2) and census area 4 (Census District 1), according to the census division of the National Institute of Statistics (INE, 2017). This delimitation considers both the urban sector where the port terminal is located and the surrounding residential, commercial, and institutional areas that could experience direct or indirect influence from the project, whether due to the execution of works, variations in traffic flow, or possible impacts on local socioeconomic and environmental dynamics.

Below is the reference map of the study area, showing the location of the Mardones Terminal and its area of social influence within the aforementioned census boundaries. This figure provides territorial guidance that will enable the characterization of the human environment in the project area.

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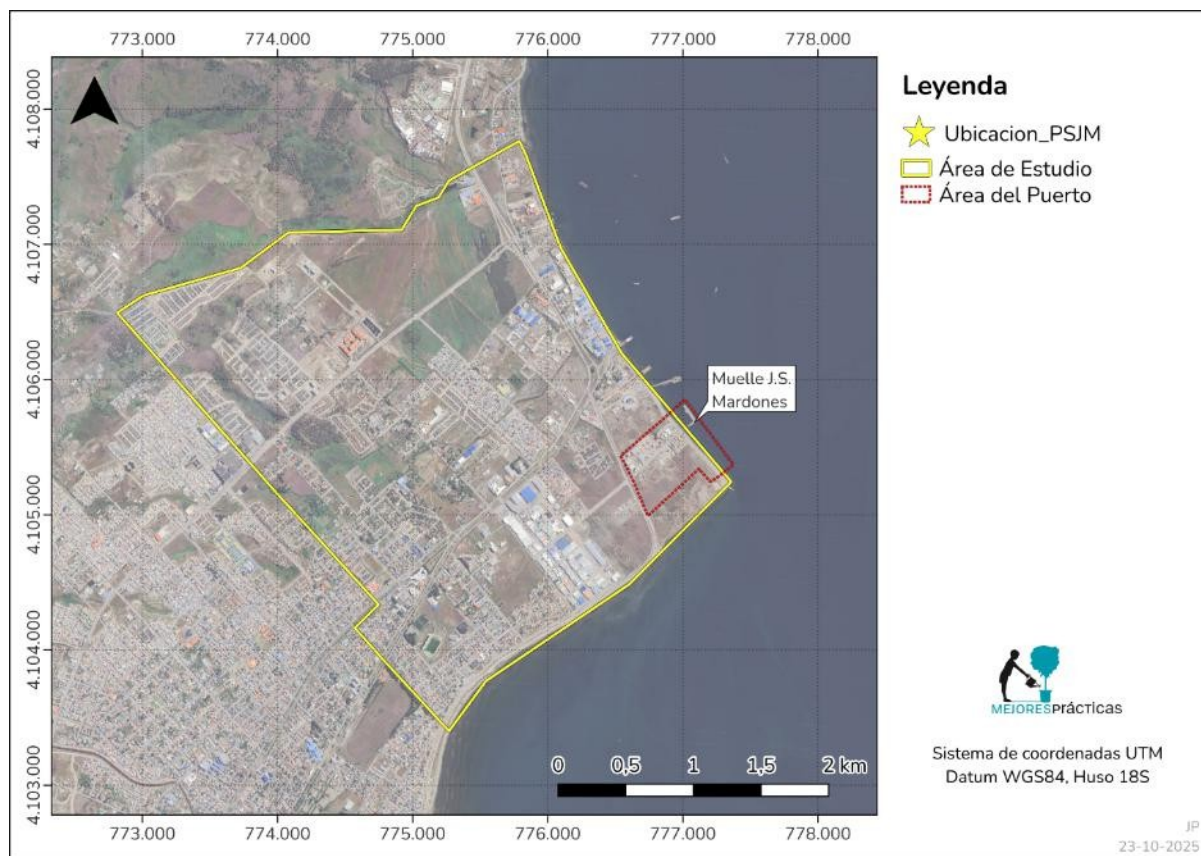


Figure 5-21: Study area for characterization of the human environment

Source: Prepared by the authors based on INE (2017) information

In addition, a community characterization is presented, within which the study area is inserted, with the aim of providing a more global context for each of the aspects analyzed.

5.4.4 Communal Characterization of Punta Arenas and Study Area

Population Structure

Community Level

The total population of the commune is 132,363 inhabitants according to the 2024 Census, where 65,028 (49.1%) people are male and 67,335 (50.9%) are female, resulting in a commune masculinity index of 96.6.

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This population figure for Punta Arenas represents 79.5% of the total population of the Magallanes Region. Compared to the 2017 census figures, the statistical bias of women over men is evident, as can be seen in the following table.

Table 5-16: Population by gender in the territorial unit

Territorial Unit	2017 Census		2024 Census		Masculinity Index (MI)	
	Men	Women	Men	Women	2017 Census	2024 Census
Municipality of Punta Arenas	65,538	66,054	65,028	67,335	99.2	96.6

Source: 2017 and 2024 Population and Housing Census, INE

On the other hand, according to the Punta Arenas PLADECO, the municipality has experienced steady population growth over the last 35 years. Furthermore, according to population projections prepared by the INE for the year 2035, it is estimated that the municipality of Punta Arenas will continue to experience steady population growth over the next 15 years, reaching a total population of 152,488 by that date, which means that the municipality would increase its population by 20,125 people between the 2024 Census and 2035.

The population by age group in the municipality shows a predominance of the 15 to 64 age group (68.7%), followed by the 0 to 14 age group and the 65 and over age group (16.4% and 14.9% respectively), indicating a predominantly young adult population.

Table 5-17: Population by age group in the municipality

Age group	Communal population by age group (N°)		Percentage of population by age group 2024 Census		
	2017 Census	2024 Census	Municipality	Region	Country
0 to 14	24,773	21,733	16.4	16.7	17.7
15 to 64	91,191	90,957	68.8	68.7	68.3
65 or older	15,628	19,673	14.9	14.5	14
Total	131,592	132,363	100	100	100

Source: 2017 and 2024 Population and Housing Census, INE

This trend is reflected in the Aging Index, which stands at 90.5 in the municipality; this means that there are 90.5 people over the age of 65 for every 100 under the age of 15. By way of comparison, the national index is 79, while in the Magallanes Region it is 87.1, which places the municipality above the national and regional average in terms of population aging. Likewise, if we compare the figures from the 2017 Census

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with those of the 2024 Census, there is a clear trend toward population aging, from 15,628 people aged 65 or older in 2017 to 19,673 in 2024.

Table 5-18: Elderly Population Index (EPI) by territorial unit. 2017 and 2024 censuses

Territorial Unit	Index of Older Adults (IAM)	
	2017 Census	2024 Census
Punta Arenas Municipality	63	90.5
Magallanes and Chilean Antarctica Region	62.7	87.1
Country	56.9	79

Source: 2017 and 2024 Population and Housing Census, INE

Study Area

The population of the Study Area totals 5,126 people, with a sex ratio of 99.6, showing a slightly higher proportion of women (50.1%) than men (49.9%).

Table 5-19: Population distribution by sex, Study Area.

Study Area	Men	Women	Total
Study	2,561	2,565	5,126

Source: 2017 Population and Housing Census, INE

The age structure of the study area has an aging rate of 8.3%, which means that there are 8.3 people over the age of 65 for every 100 inhabitants. In terms of distribution by age group, young people represent 15.8% of the population, while adults account for 75.9%.

In summary, the study area is characterized by a predominance of adults and a low proportion of young people. There is also a trend toward population aging and a decline in generational turnover.

Migration

Community level

According to the 2024 CENSUS, the international immigrant population in the municipality of Punta Arenas amounted to 7,991 people at the time of the census, corresponding to 6.04% of the total municipal population in 2024. As for the origin of the migrant population residing in Punta Arenas, most come from South American countries such as Argentina, Colombia, and Venezuela, which together account for 90.2% of the commune's migrants.

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Among the nationalities with the highest representation in the municipality, Venezuela stands out, with 2,705 people, representing 33.85% of migrants.

According to the Punta Arenas PLADECO, the phenomenon of international migration, which has had a significant impact on the country in recent years, is also evident in the municipality, although to a lesser extent than at the national level. Nationally, the international migrant population represents 8.8% of the total, equivalent to 1,608,650 people. These data show that, although the municipality participates in the international migration process, its magnitude is relatively smaller compared to the trends observed at the regional and national levels.

Study Area

According to census data, the Study Area has a small foreign population, mainly consisting of people from Colombia and Argentina, although they account for less than 1% of the total population.

Sociocultural Conditions

History and Legacy

Punta Arenas has a history marked by colonization, economic development, and profound demographic and cultural transformations, whose legacy is reflected in the social composition, urban structure, and current challenges of the commune. According to the Community Development Plan, PLADECO 2021-2025, before the modern city, the region was inhabited by indigenous peoples such as the Selk'nam, Yaganes, Aonikenk, and Kawésqar, who were adapted to the extreme conditions of Patagonia. The first European attempts at settlement, which began in 1584 and then with Fort Bulnes in 1843, failed due to the inhospitable conditions of the territory, until the official founding of Punta Arenas in 1848 by Sergeant Major José de los Santos Mardones.

The colonization process and the expansion of the sheep farming economy in the late 19th century led to direct conflict with the indigenous peoples, resulting in the ethnocide of the Selk'nam people in order to consolidate the productive model on their ancestral lands. The PLADECO of the commune highlights that, subsequently, the city became a cosmopolitan and commercial center, favored by its role as a port and the "gold rush," attracting European migrants, mainly Croatians and Spaniards, who left a cultural legacy that defines the identity of Punta Arenas.

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Relationship with the Land and Natural Resources

The municipality of Punta Arenas has a vast wealth of natural resources, with a territory that encompasses eight officially recognized protected areas: three national parks, three national reserves, two natural monuments, and one coastal marine protected area, totaling 921,833 hectares of protected land and sea. (Biodiversity Information and Monitoring System, SIMBIO).

In addition, there are six Protected National Assets in the municipality, including sites of great ecological and social value such as the Tres Puentes Wetland.

The protected area closest to the Project is the Tres Puentes Urban Wetland, located 1.6 km from the Mardones Pier. Within this wetland is the Protected National Asset of the same name. This protected area is located within the study area but outside the Project area.

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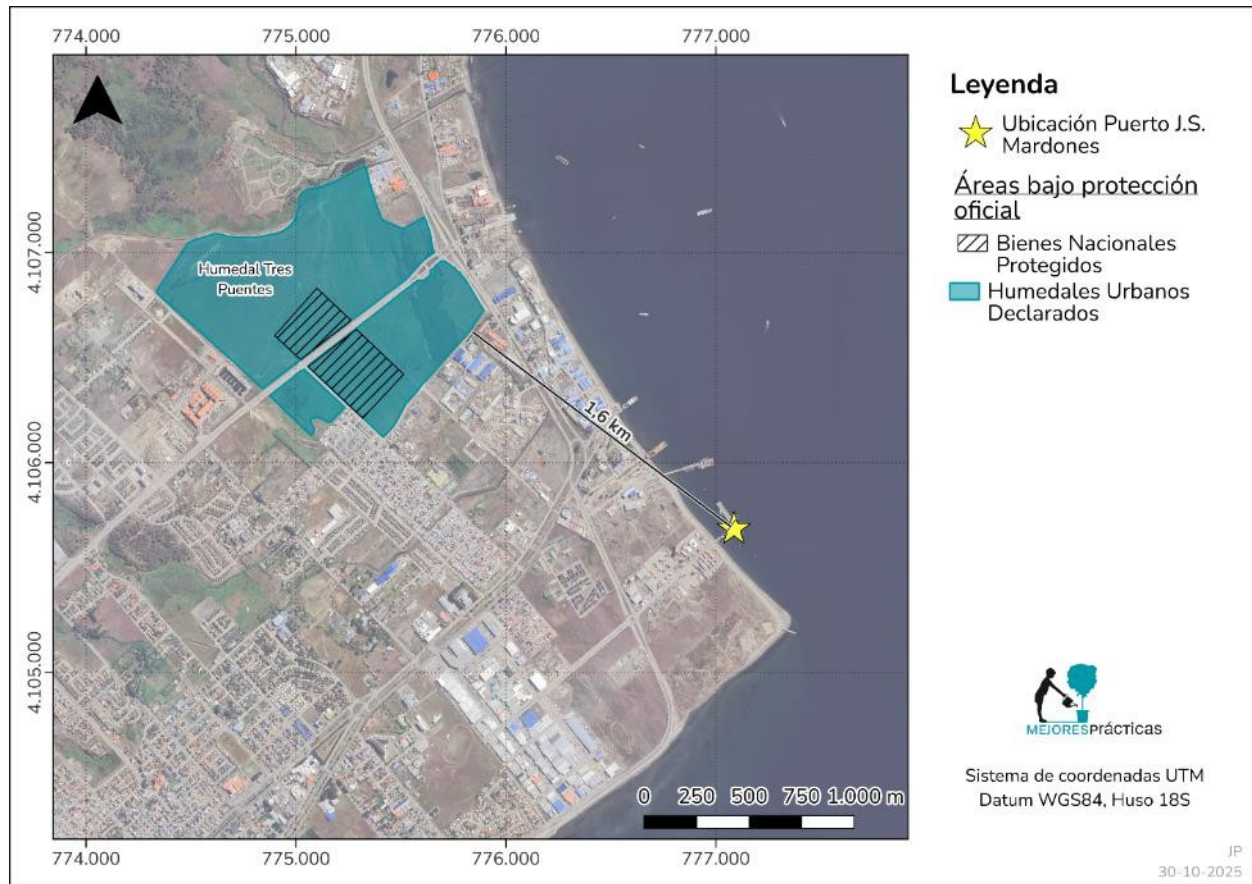


Figure 5-22: Location of the project in relation to the Tres Puentes National Asset and Urban Wetland

Source: Prepared internally based on public information

Below is a photograph showing a view of the Tres Puentes Wetland.

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Figure 5-23: View of the Tres Puentes Wetland

Source: Best Practices, 2025.

Indigenous population

Communal level

According to the results of the 2024 Census, there are a total of 29,419 inhabitants in the municipality who declare themselves to belong to an Indigenous People, corresponding to 22.2% of the total population of the municipality; of these, 95.2% belong to the Mapuche People and 1.8% declare themselves to belong to the Kawésqar People.

Based on the above information, 2.5%, or 744 people, declare themselves to belong to another Indigenous People. Among these peoples are: the Aymara People with 0.6%, the Diaguita People with 0.5%, and the Yagán People with 0.4%.

On the other hand, according to CONADI's database of indigenous communities and associations, updated on August 12, 2025, there are 11 indigenous communities and 19 indigenous groups currently active. Punta Arenas has the largest number of indigenous groups in the region.

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Table 5-20: Indigenous Communities in Punta Arenas

Name of Community
Kawashkar Resident in Punta Arenas
Kawashkar "Southern Canoeists"
Kawesqar Patagonian Hunters
Kawésqar From Ancón Without Exit
Atap
Dawn Yagán Lom Sapakuta
Kawésqar Nomadic Family Groups of the Sea
Kawésqar Dawson Island
Kawasqar "Jetarkte"
Kawesqar Gabriel Valdez Channel
Kawesqar Cenak Apala Southern Point

Table 5-21: Indigenous Associations Punta Arenas

Name of Associations
Mapuche Huilliche Rañintuleufu Indigenous Association
Mapuche Huilliche Huilli Rupe Indigenous Association
Mapuche Huilliche Indigenous Association of Independent Workers Huilli Relmu
Mapuche Huilliche Pukem Indigenous Association
Kawashkar Indigenous Artisans Association
Mapuche Huilliche Pewu Antu Indigenous Association
Futa Coyan Indigenous Association of Punta Arenas
Antilco
Waywen Indigenous Association of Agricultural Producers of Punta Arenas
Ñuke Ruka Urban Indigenous Association
Reuquen Willi Lafken Indigenous Association of Punta Arenas
Ketrawe Mapu Indigenous Association
Indigenous Association "Weche Pepiukelen"
Aucapan Indigenous Association
Mochulla Folil Indigenous Association
Küme Kürrüf Indigenous Association
Willi Mapu

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Name of Associations
Huilliche Indigenous Association "Ellicuin Chilhue Ye"
Mapuche Kawesqar Yagan Alowikces Intercultural Indigenous Association

Study Area

According to the National Registry of Indigenous Communities and Associations, there are no formally constituted indigenous organizations in the study area.

Regarding the ethnic affiliation declared by the population, the 2017 Population and Housing Census indicates that, in the study area, 14.5% of people stated that they belonged to an indigenous people. Among those who did identify as belonging to an indigenous people, the majority (76.5%) identified as Mapuche, followed by 2.4% who declared themselves Kawésqar and 16.6% who mentioned belonging to other indigenous peoples.

In summary, the Study Area denotes membership of a minority indigenous people, with no formally constituted communities, no recognized indigenous lands, and no sites of indigenous cultural significance.

Socioeconomic Conditions

Employment

Community Level

According to data obtained from Casen 2022, 56.67% of the population in the commune is employed, 40.67% is inactive, and 2.66% is unemployed.

On the other hand, it can be seen that among those who were working, the highest percentage worked in the service sector and as salespeople in shops and markets (18.4%), followed by artisans and skilled workers (16.1%), and, in third place, professionals, scientists, and intellectuals (14.8%).

When analyzing the same point by gender, it is found that women mainly work as service workers and salespeople in shops and markets, and as professionals, scientists, and intellectuals, with 26.6% and 20% respectively. Meanwhile, men mainly work as craftspeople and plant operators, machine operators, and assemblers, with 23.9% and 16.9% respectively.

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On the other hand, with regard to those who were not working or had not looked for work in the last four weeks at the time of the survey, 36.1% said they were retired, receiving a pension, or receiving retirement benefits; 24.1% were studying; and 10.7% were engaged in household chores.

Study Area

In the Study Area, there is a high level of participation in the labor market, with a higher proportion of men within the economically active population.

With regard to the economically active population, the economically active population of the Study Area represents approximately 61.9% of the total, with a predominance of males (57.2%) over females (42.8%). The majority of the economically active population is working for income, following the trend observed in both areas.

The economically inactive population in the Study Area represents approximately 38.1% of the total. Females predominate (60.4%) over males (39.6%). Among the inactive population, the main categories are those who study (38.9% of the inactive population) and those who perform household chores (30.3% of the inactive population).

Among those who study, the distribution by gender is almost balanced: 51.1% men and 48.9% women.

Women clearly predominate in household chores, accounting for 97.6%, while men represent only 2.4%.

In summary, both areas have high labor participation rates, with a greater male presence and inactivity mainly associated with study or women dedicated to the home.

Economic activity and occupational category

In terms of economic participation, the study area shows a clear predominance of the tertiary sector, followed by the secondary sector and, to a lesser extent, the primary sector.

Of the total population, 79.8% work in the tertiary sector, 9.1% in the secondary sector, and 4.7% in the primary sector, while 6.4% did not declare their branch of activity.

In the primary sector, productive activities are heavily male-dominated, with 81.4% of workers being men and 18.6% women. This sector is mainly focused on mining and quarrying and, to a lesser extent, agriculture, livestock farming, forestry, and fishing.

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In the secondary sector, there is also a large male majority (79.3%), concentrated in construction and manufacturing, which are the most important branches within this category.

For its part, the tertiary sector is the most representative and balanced in terms of gender, with 53.2% men and 46.8% women. This sector covers a variety of services, including public administration and defense, social security plans, wholesale and retail trade, repair of motor vehicles and motorcycles, as well as services related to transportation and accommodation.

Companies by economic activity.

To analyze economic activities in the municipality of Punta Arenas, information from the Internal Revenue Service (SII) for the year 2023 was used, focusing on the number of companies registered by economic sector.

The data shows that the highest concentration of companies is in the wholesale and retail trade, repair of motor vehicles and motorcycles sector, with a total of 3,634 registrations. This is followed by the transport and storage sectors (1,390 companies), construction (1,234), manufacturing (1,170), and finally agriculture, livestock, forestry, and fishing, with 897 companies. This distribution shows a predominance of commercial and service activities, which characterizes the economic profile of the municipality.

According to Punta Arenas' 2021–2025 Community Development Plan (PLADECO), the municipality has a constantly growing business base. In 2019, there were 10,858 economic units registered, representing 0.8% of the national total, but a highly significant proportion at the regional level, equivalent to 74.2% of the companies in the Magallanes Region. In the provincial context, Punta Arenas accounts for 99.4% of the economic units in the Province of Magallanes, which demonstrates its central role in the territory's economic activity.

Port Activity

Community Level

The city, strategically located on the Strait of Magellan, has historically been a key point of connection between the Atlantic and Pacific oceans, prior to the opening of the Panama Canal. This position has driven the development of significant port infrastructure,

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notably the Arturo Prat Pier, the José de los Santos Mardones Pier, and the Tres Puentes Ramp, all managed by Empresa Portuaria Austral (EPA Austral).

The José de los Santos Mardones Pier's main activity is cargo transfer and services to container ships. It also serves industrial fishing vessels, smaller ships, and cargo ships, which carry smaller loads but make more frequent calls. During the tourist season, it occasionally serves international passenger ships.

The Prat Pier is equipped to receive international cruise ships, fishing vessels, scientific vessels, and military ships.

For its part, the Tres Puentes Ramp, also in the north of the city, specializes in ferry routes to the islands of Tierra del Fuego, Magdalena, Navarino, and to Porvenir and Puerto Williams, providing key access to tourist and environmental destinations such as the Los Pingüinos Natural Monument.

In 2019, Punta Arenas received 72 cruise ships, with a total of 75,057 passengers and 37,458 crew members, figures that represented an increase over 2018. This growth translated into an 11.5% increase in total visitors.

Overall, according to the municipal PLADECO, the port infrastructure of Punta Arenas is in optimal operating condition and is valued by the local community and economic agents as a fundamental asset for the region's tourism and logistics development.

Study Area

Economic activities in the study area are concentrated in the industrial, commercial, and transportation sectors, with the Tres Puentes pier standing out as key infrastructure for connectivity to Porvenir and Tierra del Fuego. Also noteworthy is the presence of companies such as ASMAR (Astilleros y Maestranzas de la Armada), EPAustral (Empresa Portuaria Austral), and the Zona Franca Austral. These companies define the use of port and commercial land in the sector, consolidating the importance of industrial and port activity in the local economy.

The study area combines residential uses with productive, industrial, and commercial activities such as the Free Trade Zone, making it a vital point for maritime transport. The territorial planning of this area includes a Productive Activities Zone 1 classified as a Port Sector.

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The Tres Puentes Pier is a key piece of infrastructure located in the industrial zone of the study area. This pier is vitally important as it transports passengers, cars, and other types of vehicles to Porvenir, Tierra del Fuego Island, keeping the island and mainland connected. The crossings to Tierra del Fuego connect the Tres Puentes pier (Punta Arenas) and Bahía Chilota (Porvenir) via the ships of the TABSA company and the Austral Broom company.



Photograph 5-7: View of the José Santos Mardones Terminal, Study Area

Source: Best Practices, 2025.

On the other hand, the study area is characterized by its urban condition, which includes residential areas, but is strongly marked by the presence of large industrial and port companies, as well as logistics companies, land used for warehouses, cargo storage, machinery, and Free Trade Zone facilities.

The Southern Free Trade Zone, located on a 53-hectare site, is a strategic platform for trade and business in the region. Its infrastructure includes warehouses for dry and refrigerated cargo, public storage facilities, a shopping center with more than 100 stores, areas and yards for the sale and display of vehicles, as well as land suitable for commercial and industrial projects. The presence of these facilities reinforces the logistical and commercial role of the Free Trade Zone, especially with regard to imports and regional economic dynamism.

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For their part, the companies ASMAR (Astilleros y Maestranzas de la Armada) and EPAustral (Empresa Portuaria Austral) carry out port or docking activities, interacting with the coastline of Catalina Bay. Land use in the area includes the Port Activities Zone, which refers specifically to the land comprising the ASMAR company and the José Santos Mardones Terminal.

Overall, the Study Area is defined as a strategic territory for the port and industrial dynamics of Punta Arenas, integrating logistics, residential, and service functions. The area is therefore structured around the coastline of the Strait of Magellan, consolidating itself as an operational hub for maritime connectivity, both to the mainland and to Tierra del Fuego Island.



Photograph 5-8: View of the José Santos Mardones Terminal, Study Area

Source: Best Practices, 2025.

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Access to housing at

the community level

According to data provided by the 2024 Census, the community has 48,834 homes. Overcrowding affected 4.2% of homes in 2024, a rate lower than the national (5.2) and regional (4.4%) rates.

Study Area

There are a total of 1,503 homes in the study area.



Photograph 5-9: View of Neighborhoods, Study Area

Source: Best Practices, 2025.

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Photograph 5-10: View of Villa las Nieves neighborhood, Study Area

Source: *Best Practices*, 2025.

Type of dwelling

Community level

According to the 2024 Census, the predominant type of housing in the region is houses, accounting for 91.38%, followed by apartments in buildings, accounting for 8.14%, as shown in the following table.

Table 5-22: Type of housing in the municipality of San Antonio

Type of Housing	Number of dwellings	Percentage
House	44,624	91.38
Apartment in a building	3,977	8.14
Traditional indigenous housing (ruka or other)	2	0.00
Room in an old house or tenement	60	0.12
Temporary housing, improvements, emergency housing, etc.	35	0.07
Mobile	8	0.02
Other type	128	0.26
Total	48,834	100

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Source: 2017 and 2024 Population and Housing Census, INE



Photograph 5-11: View of Villa El Golf, Study Area

Source: *Best Practices*, 2025.

Housing

Materiality

Community Level

According to data provided by the 2024 Census, the predominant material used for walls is plasterboard lined on both sides (78.8%), followed by reinforced concrete (10.4%) and masonry (8.4%); the predominant material used for floors is parquet or laminate flooring, ceramic, wood, carpet, flexit, floor covering, or similar (97.3%); and finally, the predominant material used for ceilings is metal sheets (zinc, copper, etc.), accounting for 87.2%.

Local level

With regard to the study area, there are a total of 1,503 dwellings. The predominant material used for walls is double-sided partitioning (wood or steel), present in 84.9% of dwellings, followed by cement block, stone, or brick masonry, with 6.7%.

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With regard to flooring materials, the use of coverings such as parquet, laminate flooring, ceramic tiles, wood, carpet, or similar materials is widespread, accounting for 98.2% of homes, while cement tiles are present in 1.3%.

As for roofing, 81.1% of homes have metal or fiber cement (slate-type) sheets, followed by those with tiles or shingles (clay, metal, wood, or other materials), which represent 17.9% of the total.

Access to basic services: Electricity Community

Level

According to data from the 2024 Census, 99.8% of homes in the community have electricity.

Local Level

In terms of electrical infrastructure, the Study Area has consolidated coverage that is dependent on the regional distribution system.

It was found that electricity is supplied by Empresa Eléctrica de Magallanes S.A. (EDELMA), belonging to the Compañía General de Electricidad. This coverage allows for the supply of both residential sectors and productive and industrial activities carried out in the area.

Access to basic services: Drinking water at the

community level

According to the 2024 Census, 92.3% of the commune's inhabitants have access to drinking water from the public distribution network; 1.2% obtain water from rivers, springs, canals, etc.; and 0.8% have drinking water from wells or waterwheels.

With regard to water and sanitation, the information collected in the municipality's 2021-2025 PLADECO (Local Action Plan for Development and Environmental Quality) indicates that the service is provided by the company Aguas Magallanes S.A., which has a wastewater treatment plant located in the north of the city. The drinking water network ensures wide coverage in urban areas; however, in peripheral and rural areas, such as Pampa Redonda, Llaullau, and some areas of Río Seco and Leñadura, access problems persist, forcing the population to depend on water trucks, wells, or watercourses.

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Furthermore, according to the Casen 2024 survey, 99.2% of households in the municipality have a waste disposal system in their homes, with 95.7% connected to the sewerage network and 3.9% to a septic tank system.

Local level

In terms of drinking water supply, the study area has virtually universal coverage through the public network, managed by Aguas Magallanes S.A. A minimal percentage uses wells or waterwheels (0.1%).

In addition, this area has a sewerage service, whose system carries wastewater to the Wastewater Treatment Plant, located in the northern part of Punta Arenas, ensuring the proper management of urban effluents.

Access to basic services: Heating

According to data from the 2024 Census, 94.9% of homes in the municipality use gas as their main source of energy or fuel for heating their homes. On the other hand, 2.5% use firewood as a heating method.

Access to health services

Communal level

In terms of healthcare, PLADECO 2021-2025 indicates that the municipality has 77 healthcare facilities, including 5 CESFAMs, 3 CECOSFs, 4 hospitals, and 4 clinics. Primary care is administered by the Municipal Corporation of Punta Arenas (CORMUPA), complemented by a Community Pharmacy that offers low-cost medicines. In addition, the municipal government has promoted initiatives such as the "Punta Arenas te Cuida" home care program, aimed at people in situations of dependency.

Table 5-23: **Health facilities in the municipality of Punta Arenas**

Type of facility (Unit)	Official Name	Administrative Administrative	Level of Service
Rural Health Post (PSR)	Agua Fresca Rural Health Center	Municipal	Primary
Community Center for Family Health Community Center (CECOSF)	CECOSF STRENGTHENING LIVES	Municipal	Primary
Community Center for Mental Health (COSAM)	COSAM Punta Arenas	Municipal	Secondary

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Type of Establishment (Unit)	Official Name	Dependency Administrative	Level of Care
High-Resolution Primary Emergency Care Service High Resolution (SAR)	SAR Dr. Juan Damianovic	Municipal	Primary
Family Health Center (CESFAM)	Dr. Juan Damianovic Family Health Center Damianovic	Municipal	Primary
Private Health Center	CChC Mutual Health Center Punta Arenas	Private	Secondary
Health Unit Civil Servants	Health Unit Official S.S Magallanes	Health Service	Secondary
Health Service Directorate	Activities managed by the Service Directorate to support the Network (Magallanes Health Service)	Health Service	Not applicable
Comprehensive Health Care Repair and Comprehensive Health Care Program (PRAIS)	PRAIS (Magallanes Health Service)	Health Service	Not applicable
Primary Primary Emergency Care (SAPU)	SAPU 18 de Septiembre	Municipal	Primary
Family Health Center (CESFAM)	Family Health Center 18 September	Municipal	Primary
Vaccination Center	Vaccination Center SEREMI of Health Magallanes	Regional Ministerial Secretariat of Health	Primary
Clinic	Recovery Clinic Home of John Paul II	Private	Not applicable
Private Health Center	Diagnostic Center Clinic Magallanes	Private	Secondary
Private Health Center	MegaSalud Medical and Dental Center S.A Punta Arenas	Private	Not applicable
Private Health Center	Medvital Medical Center	Private	Secondary
Private Health Center	Armed Forces Polyclinic and Law Enforcement	Armed Forces and Law Enforcement (FFAA)	Secondary
Clinic	Croatia Clinic	Private	Not applicable
Private Health Center	Sarmiento Medical Institute	Private	Secondary

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Type of Establishment (Unit)	Official Name	Administrative Administrative	Level of Care
Family Health Center (CESFAM)	Carlos Ibáñez Family Health Center Ibáñez	Municipal	Primary
Primary Primary Emergency Care Service (SAPU)	SAPU Carlos Ibañez	Municipal	Primary
Hospital	Armed Forces Hospital Surgeon Guzmán	Armed Forces and Law Enforcement (FFAA)	Tertiary
Family Health Center (CESFAM)	Dr. Thomas Fenton Family Health Center Thomas Fenton	Municipal	Primary
Private Health Center	Rehabilitation Center Club de Leones Cruz del Sur	Private	Secondary
Family Health Center (CESFAM)	Dr. Mateo Family Health Center Bencur	Municipal	Primary
Primary Emergency Care Service (SAPU)	SAPU Dr. Mateo Bencur	Municipal	Primary
Private Health Center	AChS Polyclinic (Punta Arenas)	Private	Secondary
Clinic	Magallanes Clinic	Private	Tertiary
Private Health Center	Care Center Institute of Worker Safety Center Punta Arenas	Private	Secondary
Private Health Center	IMET Clinic	Private	Secondary
Community Center for Family Health (CECOSF)	Sandra Vargas CECOSF	Municipal	Primary
Hospital	Magallanes Clinical Hospital Dr. Lautaro Navarro Avaria	Health Service	Tertiary
Community Center for Family Health (CECOSF)	Río Seco Family Health Community Center Río Seco	Municipal	Primary
Private Health Center	Occupational Safety Institute	Private	Secondary

Source: Department of Health Statistics and Information (DEIS), MINSAL.

Study Area

The study area contains a significant portion of the healthcare infrastructure of the Magallanes and Chilean Antarctica Region, notably the Magallanes Clinical Hospital.

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Dr. Lautaro Navarro Avaría Hospital, a highly complex facility that meets the specialized healthcare needs of the entire region. Next to this facility is the IMET Clinic, located on Avenida Presidente Manuel Bulnes, opposite the University of Magallanes and Villa Torres del Paine, reinforcing the urban, institutional, and service-oriented character of the area.



Photograph 5-12: View of the Doctor Lautaro Navarro Avaría Clinical Hospital, Study Area

Source: Best Practices, 2025.

[Access to educational establishments at the](#)
community level

According to the Ministry of Education, there are a total of 61 educational establishments in the municipality of Punta Arenas. Of these establishments, 24 are subsidized private institutions, 29 are Local Education Services, and 8 are private institutions.

Table 5-24. Educational establishments in the Punta Arenas community

Administrative Dependency	Commune	
	2022	2024
Municipal	30	0
Private Subsidized	24	24
Private Paid	8	8

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Administrative Agency	Municipality	
	2022	2024
Delegated Administration Corporation	0	0
Local Education Service	0	29
Total	62	61

Source: Center for Studies, MINEDUC

Area of study

The Study Area offers a diverse range of educational opportunities, from early childhood education to university level, combining public, institutional, and higher education establishments. At the school level, the Villa Las Nieves School stands out. This public institution was created to serve the local population in the area and currently has an enrollment of 593 students. It defines itself as an inclusive school, with a management team, generalist and specialist teachers, as well as a multidisciplinary team, psychosocial duo, and teaching assistants, which reinforces its comprehensive nature. Next to the school is the Villa Las Nieves Kindergarten, under the supervision of the National Board of Kindergartens (JUNJI), which complements the early childhood education offered in the area.

The area is also home to the main campus of the University of Magallanes (UMAG), which houses the faculties of Medicine, Engineering, Science, Education and Social Sciences, Economics and Law, and Health Sciences. The university has a range of facilities and support infrastructure for its students, consolidating its position as the main center of higher education in the region. Likewise, the Chilean Air Force (FACH) premises are home to the "Nido Azul" nursery and kindergarten, intended for the children of Armed Forces and Carabineros personnel.

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Photo 5-13: View of the University of Magallanes, Study Area

Source: Best Practices, 2025.

Schooling and level of education

Community level

According to the 2024 census, the average number of years of schooling in the community is 12.5 years. The gender breakdown of the average schooling situation shows that it is currently balanced, with a slight predominance of men (12.6%) over women (12.5%).

With regard to the population's level of education, and considering the highest grade passed according to data from the 2024 Census, 37.9% of people have secondary education as their highest level of education, while 34.1% have accessed higher education.

Study Area

With regard to educational attainment, the scientific-humanistic level represents 17.2% of the total population, with an equal distribution between men and women. Meanwhile, the professional level (four or more years) accounts for 24.2%, making it the most representative group within the study area. At this level, there is a higher participation of women (54%) than men (46%).

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Meanwhile, the higher technical level (1 to 3 years) represents 6.8% of the total, with a predominance of men (70%).

In general terms, the Study Area has an educational structure with a significant proportion of the population having accessed secondary and higher education. The scientific-humanistic and professional levels have the highest percentages, reflecting a solid educational foundation. Likewise, there is a greater female presence at the professional levels, while men predominate in higher technical education, which highlights gender differences in educational trajectories.

Transportation

Community

Level

In terms of transportation, the municipal PLADECO details that the urban public transportation system, called "RED Punta Arenas," has 8 routes and 287 stops. In addition, there are 10 intraregional rural routes and 3 interregional routes. The municipality also has Carlos Ibáñez del Campo International Airport and three port terminals: Arturo Prat Pier, José de los Santos Mardones Pier, and Tres Puentes Pier. The urban routes connect the outlying residential areas with the commercial and service areas in the city center; however, there are still areas without adequate coverage, such as Pampa Redonda, the extension of Avenida Martínez de Aldunate, and the Bicentenario neighborhood, the latter characterized by low service frequency.

On the other hand, the community-level bike path infrastructure in Punta Arenas is characterized by its development, currently with seven operational routes. These routes are generally linked to the city's road network.

The distribution of this network is mainly concentrated along the coastline of the downtown area and in the interior of the northern and southern sectors.

Municipal planning includes the design, construction, and development of new bike lanes to connect the existing ones. The aim is for the network to take advantage of the potential of the main roads to connect all sectors, with an ambitious projection that the network will cover 75% of the commune's sectors. In the medium term, Punta Arenas is expected to complete 60 kilometers of bike lanes.

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Photo 5-14: View of a section of the bike path

Source: Best Practices, 2025.

Study Area

In terms of access and connectivity, the Study Area has a strategic road and port infrastructure that facilitates both internal mobility and connections with the rest of Punta Arenas and the region.

The main access roads to this area are Route 9 North - Punta Arenas - Puerto Natales - Río Baguales - and Avenida Presidente Eduardo Frei Montalva. Both roads are in good condition, paved, and have two lanes in each direction. Another important street in the area is Avenida Presidente Manuel Bulnes, which crosses the territory from east to west, intersecting with Route 9 North near the Tres Puentes pier.

The Study Area has adequate accessibility, supported by a well-structured and paved road network. Its main access roads are Route 9 North (Punta Arenas–Puerto Natales–Río Baguales) and Avenida Presidente Eduardo Frei Montalva, both in good condition and with two lanes in each direction.

Another important thoroughfare is Avenida Presidente Manuel Bulnes, which crosses the territory from east to west and intersects with Route 9 North near the Tres Puentes pier. This avenue, together with Avenida Costanera del Estrecho de Magallanes, forms one of the

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main structural axes of the sector, oriented north-south and paved along its entire length.

Avenida Presidente Manuel Bulnes also serves as a connecting link within the city, connecting the northern access (Route 9 North) with the Plaza de Armas and the urban center of Punta Arenas. Along its route, it is home to important urban landmarks and facilities, including the Sara Braun Municipal Cemetery, the Equestrian Club, the Antonio Rísoli Díaz Stadium, the central campus of the University of Magallanes, the Austral Free Trade Zone, various health centers, and other spaces of relevance to the social and economic life of the regional capital.



Photo 5-15: View of Presidente Manuel Bulnes Avenue, Study Area

Source: Best Practices, 2025.

With regard to transportation dynamics, public transportation is available for residents of the area, which includes buses and minibuses. On the other hand, he comments that the most common trips made by the local population are to the city center, the free trade zone, the hospital, and the northern part of the municipality. With regard to the Tres Puentes Pier, a crossing point for ferries and barges to Porvenir in Tierra del Fuego, there are daily crossings to the island connecting the

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Tres Puentes pier (Punta Arenas) and Bahía Chilota (Porvenir) via TABSA and Austral Boom ferries.

The José Santos Mardones Terminal is also located in this area of the city, on the shores of Catalina Bay.

Furthermore, the Study Area benefits from this bicycle path infrastructure, which is located in the central reservation of Avenida Presidente Manuel Bulnes.

Tourism Activity at

the Community Level

Tourism in the municipality of Punta Arenas is a priority and strategic economic sector, consolidated as the main distribution center for visitors to the Magallanes and Chilean Antarctica Region, according to the municipal PLADECO.

Based on the information contained in the municipality's PLADETUR for 2022-2026, its economic relevance is significant, contributing an estimated 10% to regional GDP, a figure considerably higher than the national average of 3.3%. In addition, it is noted that the tourism business sector is robust, with 1,754 establishments registered in 2019, representing 16.2% of all local businesses. In 2020, the accommodation, food, transport, and storage sectors employed more than 8,500 people, and the destination "Punta Arenas and Strait of Magellan" received more than 280,000 visitors in accommodation establishments in 2019.

The municipality offers a diverse range of tourist attractions, notable for its rich natural and cultural heritage (PLADETUR 2022-2026). Natural sites account for more than 50% of registered attractions, and Punta Arenas is recognized as the "Gateway Community" for Patagonia's protected areas. Both the PLADECO and PLADETUR plans for the municipality mention that among the most important natural attractions are the internationally renowned Los Pingüinos Natural Monument, the Laguna Parrillar and Magallanes National Reserves, and the Francisco Coloane Marine Park.

Cultural heritage is equally important, with a well-preserved historic district featuring European architecture, the Sara Braun Municipal Cemetery, and a network of museums such as the Maggiorino Borgatello Salesian Museum and the Magallanes Regional Museum.

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Photo 5-16: View of historic buildings in Plaza de Armas, Punta Arenas

Source: Best Practices, 2025.

Events such as the Winter Carnival and other traditional festivals complement the cultural offerings. Cruise tourism is also a major activity; in 2019, the city received 72 cruise ships with more than 75,000 passengers and 37,000 crew members.

Study Area

The Study Area is a focal point for tourism and cultural activity, centered on ecotourism, historical heritage, and commerce. The Tres Puentes Wetland stands out, renowned for its great diversity of birdlife and considered a must-see for local, national, and foreign birdwatchers, thanks to its proximity to the city center. The Punta Arenas Museum of Memory, part of the Patagonia Institute, is located in the same area and functions as a heritage preservation center with themed pavilions dedicated to the region's livestock and maritime history. Likewise, the adjacent coastline is designated by the Community Regulatory Plan as an area of tourist interest.

On the other hand, tourism in the area is also closely linked to trade, with the Southern Free Trade Zone being its main attraction due to the competitive prices it offers

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compared to other regions of the country. In addition, the Ernesto Livacic Auditorium at the University of Magallanes (UMAG) is an important center for cultural dissemination, with a program that includes musical concerts, dance performances, and literary talks. Finally, the Regional Coastal Zone Zoning Plan identifies this section of the coastline as an Area of Tourist Interest, reinforcing its relevance within the local tourist circuit.



Photograph 5-17: View of the Free Trade Zone, Study Area

Source: Best Practices, 2025.

Poverty and Social Vulnerability

According to the 2022 CASEN Survey, multidimensional poverty is understood as a situation in which households face simultaneous deprivation in various areas that are essential for a dignified life. This measurement complements income poverty by incorporating areas such as education, health, work, and social security, in addition to housing. In the municipality of Punta Arenas, the majority of the population is not in a situation of multidimensional poverty (92.3%), while 6.8% have deficiencies that place them in this category. However, this figure is lower than the national average, which was 16.9%.

On the other hand, as documented in the 2021-2025 Community Development Plan (PLADECO), different population groups in Punta Arenas are considered vulnerable due to factors such as gender, age, disability, and poverty, among other conditions.

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With regard to gender, sexual orientation, and gender identity, PLADECO notes that women and people with diverse sexual orientations and gender identities constitute groups that may require special protection measures. The female population has increased its demographic weight, reaching 50.9% in 2024, while households headed by women accounted for 55.4% of the total number of households registered in the Social Household Registry (RSH).

The Social Household Registry (RSH) is the main instrument at the community level for classifying social vulnerability and targeting social benefits and programs, classifying households according to their income level and vulnerability.

With regard to age, the PLADECO 2021-2025 PUNTA ARENAS indicates that children and adolescents under the age of 18 represented 22.7% of those registered in the RSH in January 2021, of whom 59.7% were in the most vulnerable bracket. At the same time, the elderly population has shown sustained growth. In Punta Arenas, the aging index is higher than the national average, and 19.9% of those registered in the RSH were people aged 65 or older. Within this group, 52.6% were in the most vulnerable segment, while households with an older adult as head of household represented 30.4% of the total.

With regard to disability, the same document indicates that in 2021, 857 people with moderate or severe dependency were registered in the RSH, of whom 54.3% belonged to the most vulnerable group (0-40%).

With regard to poverty and landlessness, the PLADECO 2021-2025 PUNTA ARENAS states that, according to January 2021 records, the vulnerable population—defined as those in the 0-40% RSH bracket—totaled 46,863 people, corresponding to 47.7% of those registered.

Priority Ecosystem Services

The analysis of ecosystem services is fundamental to sustainable development, as it recognizes the benefits that people and communities derive from ecosystems. These services include both tangible products and intangible benefits, and their proper management is essential to prevent adverse impacts and ensure the resilience of ecosystems in the face of development projects.

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Identification of Ecosystem Services at the

Community Level

Ecosystem services in Punta Arenas are classified according to type:

Provisioning services are those products that people obtain directly from ecosystems. Among the most relevant for the municipality are fresh water from basins such as the Las Minas River and Laguna Parrillar, which is essential for human consumption and irrigation; fishery resources, such as crab, sea urchin, and mussels, which sustain artisanal fishing; and sheep farming products, a traditional economic activity. (PLADECO 2021-2025 PUNTA ARENAS).

Regulatory services derive from the capacity of ecosystems to maintain natural processes. Peatlands, which cover large areas of the municipality, play a key role in regulating the hydrological cycle and water quality. Forests and wetlands, such as Tres Puentes, contribute to flood and erosion control, while the surrounding vegetation improves air quality, enhanced by Patagonian winds (PLADECO 2021-2025 PUNTA ARENAS).

Ecosystems provide intangible benefits related to leisure, recreation, and cultural identity. Patagonian landscapes, national reserves such as Laguna Parrillar and Magallanes, and wildlife viewing sites such as Los Pingüinos Natural Monument support tourism, a key economic source for the region (PLADECO 2021-2025 PUNTA ARENAS).

Supporting services are those that include processes that maintain other ecosystem services. Biodiversity conservation, through national parks such as Kawésqar and Alberto de Agostini, protects endangered species and ensures the continuity of ecological processes. Wetlands and forests provide habitat for migratory and resident birds, supporting the stability of local ecosystems (PLADECO 2021-2025 PUNTA ARENAS).

Study Area

No productive activities dependent on the extraction or direct use of natural resources, such as artisanal fishing, are recorded in the study area. This area is characterized by its strong urban and industrial profile.

CHAPTER 5 – SOCIO-ENVIRONMENTAL CHARACTERIZATION – INTRODUCTION

Economic activities in the study area are concentrated in the industrial, commercial, and transportation sectors. Therefore, the study area has a strong industrial and commercial presence, with no significant extractive activities or direct use of natural resources. The local economy is mainly oriented toward the tertiary sector, with an emphasis on commerce, services, transportation, and port activities.

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[PH2M_Cap 3.24_SEIA.pdf](#)

5.5 Gender Equality

5.5.1 Introduction

This section is developed taking into account the elements indicated in Performance Standard 9 on Gender Equality of the Inter-American Development Bank (IDB).

The IDB's Environmental and Social Performance Standard 9 (ESPS 9) recognizes gender equality as an intrinsic value and a driver of sustainable development. Its main objective is to:

- Anticipate and prevent risks and adverse impacts based on gender, sexual orientation, and gender identity.
- Ensure that people of all genders, sexual orientations, and gender identities are included in the benefits derived from the project.
- Prevent the exacerbation of sexual and gender-based violence (SGBV) and respond to such incidents promptly.
- Promote safe and equitable participation in consultation processes.

5.5.2 Information gathering and secondary information analysis

The information gathering process is a fundamental step in identifying the potential impacts and risks of a project. This process must be based on secondary, up-to-date, and verifiable information, including a detailed description, in this case of the municipality of Punta Arenas and the study area defined for the project.

The use of secondary sources to characterize the project study area is acceptable and may come from "government agencies, nongovernmental organizations (NGOs), and academic sources" (IDB, 2021). The secondary information used to collect baseline data was quantitative and qualitative, and therefore the analysis process varied according to each type of information.

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I. Quantitative information in databases.

The 2024 Population and Housing Census database was used to extract statistical information on geography, demographics, socioeconomic status, poverty and social vulnerability, anthropology and culture, well-being and basic services, and gender and inclusion, in the context of NDAS 9: Gender Equality. In addition to the 2024 Census data, the 2022 Casen Survey database was used as a complement for the community-level description.

II. Qualitative information from literature reviews and public agencies.

The bibliographic information analyzed was obtained from various sources, analyzing publications from public services, academic institutions, and research institutions. The information was subjected to content analysis, extracting the most relevant and pertinent information for the purposes of this analysis. The sources of information consulted are indicated below:

- 2025 Community Statistical Reports, Library of the National Congress of Chile, Communities of Punta Arenas.
- Social Characterization Indicators 2022, Ministry of Social Development, Municipality of Punta Arenas.
- Community Development Plan (Municipality of Punta Arenas).
- National Indigenous Development Corporation (CONADI) (Databases of current indigenous organizations)
- National Institute of Statistics. (2024). 2024 Census Results.
- Epaustral Equity, Inclusion, and Diversity Policy. (2022)
- Environmental Impact Study “Green Hydrogen and Ammonia Production Project - H2 Magallanes” (Chapter 3.24 - Human Environment Baseline).

5.5.3 Study area

The study area defined for this characterization corresponds to the direct and indirect surroundings of the Mardones Terminal, located in the municipality of Punta Arenas, Magallanes and Chilean Antarctica Region. Specifically, it is limited to census areas 1 (Census District 1 – subarea 2) and census area 4 (Census District 1), according to the census division of the National Institute of Statistics (INE, 2017). This delimitation considers both the urban sector where the

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It locates the port terminal and the surrounding residential, commercial, and institutional areas that could be directly or indirectly affected by the project, whether due to the execution of works, changes in traffic flow, or possible impacts on local socioeconomic and environmental dynamics.

Below is a reference map of the study area, showing the location of the Mardones Terminal and its area of social influence within the aforementioned census boundaries. This figure provides territorial guidance that will enable the characterization of the human environment in the project area.

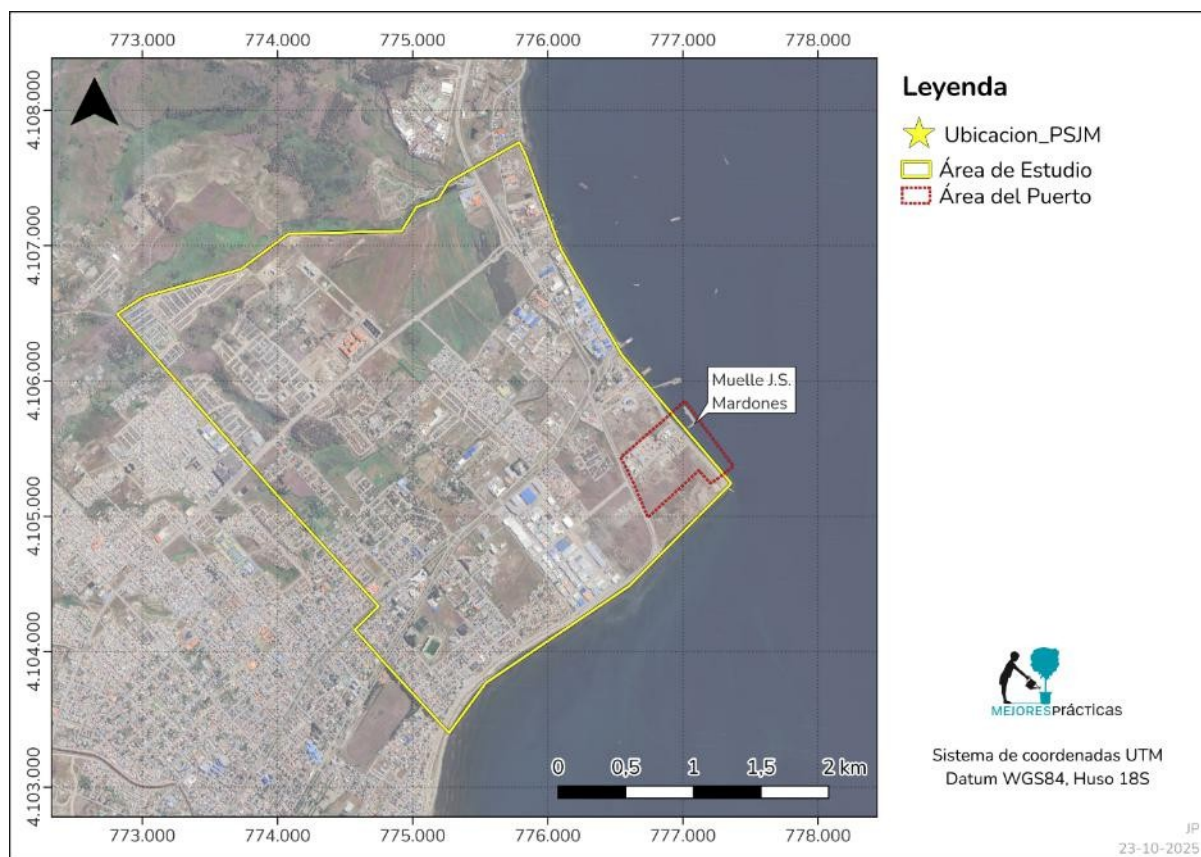


Figure 5-24: Study area for characterization of the human environment

Source: Prepared by the authors based on INE (2017) information

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5.5.4 Characterization of the Municipality of Punta Arenas and Study Area

Population Distribution by Sex

Communal Level

According to the 2024 Census, the total population of the Punta Arenas Commune is 132,363 inhabitants. The demographic structure shows a slight predominance of the female population, with 50.9% women and 49.1% men in 2024, resulting in a commune masculinity index of 96.6.

This female predominance has been growing over time, from 47.8% in 1982 to exceeding men today.

Study Area

The total population is 5,126. The distribution by sex is practically equal, with 2,561 men and 2,565 women.

Inactive Population and Caregiving Responsibilities

Community Level

In 2021, 55.4% of households registered in the RSH had female heads, which reflects the high economic and care responsibilities assumed by women, especially considering that 54.7% of these households belong to section 40 of the RSH, the most socially vulnerable.

The high proportion of female-headed households, together with data indicating that 97.6% of the total inactive population due to "household chores" are women and only 2.3% are men, confirms that domestic work falls mainly on women, restricting their available time for professional development and social participation.

Area of Study

Analysis of the inactive population reveals a marked division of gender roles in the domestic sphere. Of the total of 1,626 inactive persons, 631 (38.8%) are men and 995 (61.2%) are women, which shows a higher prevalence of inactivity among the female population.

Among the reasons for inactivity, 30.3% (492 people) indicate that it is due to doing "household chores." When broken down by sex, it can be seen that, of these 492

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Of these individuals, only 12 are men, while 480 are women, highlighting a significant imbalance in the assumption of domestic and caregiving responsibilities by women in this area.

It is worth mentioning that this area has several childcare centers, such as the Villa Las Nieves Kindergarten, founded in 2016 and administered by the National Board of Kindergartens (JUNJI). There is also the Girasol Kindergarten, located next to the Dr. Lautaro Navarro Avaría Clinical Hospital. On the other hand, the Nido Azul nursery and kindergarten, located at the Bahía Catalina Air Base, is intended for the children of Armed Forces and Carabineros personnel.

This childcare infrastructure is a factor that potentially facilitates women's participation in the workforce, especially in roles linked to fiscal or military entities.

Economic and Sectoral Participation

Community Level

Economic participation in Punta Arenas is high, but there is clear gender segregation.

The growth of the service sector has been a factor that has facilitated greater access to the labor market, which also explains the attraction and retention of the female population in the municipality.

There is a strong concentration of women in the tertiary sector (services). The areas with a predominance of women in dependent jobs are Health (78.4%), Education (73.5%), and Public Administration and Defense (66.5%). In contrast, women are underrepresented in the primary and secondary sectors (industry, mining, construction).

Study Area

The economically active population in the study area represents approximately 61.9% of the total, with men (57.2%) outnumbering women (42.8%).

In terms of economic participation, the primary and secondary sectors show a marked male predominance, while the tertiary sector shows greater gender equity.

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In the primary sector, 81.4% of employed persons are men and 18.6% are women. This gap reflects a male concentration in extractive and agricultural activities, such as mining and quarrying, agriculture, livestock farming, forestry, and fishing.

The secondary sector also shows a male predominance (79.3%), mainly linked to the construction industry, while female participation reaches 20.7%.

The tertiary sector is the most balanced, with 53.2% men and 46.8% women. This sector accounts for the largest proportion of economic activities in the study area, with women participating most notably in services related to education, accommodation, and food.

Schooling and Level of Education

Community Level

The educational level of the community population is high. The average number of years of schooling for the population of Punta Arenas is 12.5 years. The gender differentiation in the average level of schooling shows that it is currently balanced, with a slight predominance of men (12.6%) over women (12.5%).

Field of Study

In the area of study, there is a trend toward gender equality at the middle levels of education and a greater female presence in higher professional education.

At the professional level, women represent 53.9% and men 46.1%, confirming greater female participation in university education. At the secondary level, the distribution tends toward equilibrium, while in technical training, men predominate. The scientific-humanities level remains almost balanced (441 men and 411 women), while at the advanced technical level (1 to 3 years), men are in the majority (70%) compared to 30% women.

In summary, the study area presents a relatively balanced educational structure in terms of gender, with women having an advantage in higher professional education and men having a greater presence at the technical levels, reflecting a general trend toward educational parity, with slight differences depending on the type of training.

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Indigenous Peoples

Communal Level

NDAS 9 requires analysis of how gender inequalities overlap with ethnicity (intersectionality), especially considering the vulnerability of indigenous peoples (NDAS 7).

According to the 2024 Census, 29,419 people in Punta Arenas declared themselves to belong to an indigenous people, equivalent to 22.2% of the total community population.

The Mapuche people are the most numerous, constituting 95.2% of the indigenous population. The second largest group is the Kawésqar (1.8%).

The distribution is balanced, with a slight majority of women (15,310) versus men (14,109) among the indigenous or native population.

Study Area

Of the 738 people who declared themselves to belong to an indigenous or native people, there is a slight majority of women at 52% (384) over men, who represent 48% (354). The predominant affiliation is to the Mapuche people with 567 people, meaning that 77% belong to this native people.

Risks of Gender Violence and Vulnerability

In the municipality, to address situations of gender violence, the Municipal Women's Office leads local efforts through the Prevention and Redress for Victims of Violence Against Women hotline, offering comprehensive psychosocial and legal assistance and conducting prevention workshops. Likewise, the Women's Center, in agreement with SERNAMEG, provides assistance to women over the age of 18 who are experiencing or have experienced gender-based violence in the context of a current or former relationship, without the requirement of having previously filed a complaint.

At the programmatic level, municipal management of women's issues, led by the Municipal Women's Office under DIDECO, seeks to promote participation, information, education, and the exercise of rights, taking into account the diversity and needs of women, with a view to promoting equity, development, and physical, economic, and decision-making autonomy. Within this framework, the municipality implements programs in agreement with SERNAMEG, such as Women, Sexuality, and Motherhood; Women Heads of Household; as well as the Women Heads of Household Program, promoted jointly by the municipality and the Ministry of Women and Gender Equality.

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On the other hand, there is an institutional gender policy on the part of the project owner, Empresa Portuaria Austral (EPASustral), which appears to be a fundamental element linked to Environmental and Social Performance Standard 9 (ESPS 9).

EPAustral, as an autonomous state-owned company, has a Gender Equality, Diversity, and Inclusion Policy, approved on December 12, 2023, and is mandated to contribute to the realization of the country's commitments to sustainability, inclusion, diversity, and gender equality, with a focus on preventing and mitigating gender risks and promoting equality.

The policy establishes a commitment to not allow any type of abuse, harassment, or arbitrary discrimination, and to promote equal opportunities without distinction based on sex, age, social status, religion, sexual orientation, race, color, ethnic group, or any other condition.

The policy ensures that EPAustral's people management processes seek to remove barriers to recruitment, development, and performance, ensuring equality between men and women.

It also defines gender violence as any behavior or gesture that violates dignity and physical or emotional integrity on the basis of gender, and undertakes to punish workplace and sexual harassment. EPAustral's commitment is essential to establishing a safe working environment in its port facilities and promoting actions in this area with its users, suppliers, and contractors, which is vital given the industrial and port nature of the Study Area.

Indeed, EPAustral's Equity, Inclusion, and Diversity Policy provides a robust institutional framework that strengthens the borrower's capacity to meet the objectives of NDAS 9, ensuring that gender risks identified in the commune and Study Area (such as violence, unequal access to resources, and exclusion of vulnerable groups) are proactively managed and integrated into the design and implementation of the project.

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5.6 Characterization of Cultural Heritage

The characterization of the cultural heritage of the study area is based on bibliographically reviewed information on national monuments, archaeological and paleontological records. The database of the National Monuments Council was reviewed, as well as baselines from other projects located in the municipality of Punta Arenas, in addition to the background information described in the EIA for the project "Expansion of the New Port of Punta Arenas. XII Region, Stages II and III" from 1998.

The main aspects of these components are described below.

5.6.1 Background National Monuments Council

According to information available from the National Monuments Council, there are 30 recognized elements of cultural heritage in the municipality of Punta Arenas: two Architectural Heritage Conservation Areas, 15 historical monuments, one Typical or Picturesque Area, two Public Libraries, seven Museums, and three museum exhibition halls. The following table shows the list of heritage elements and their distance from the Project works. None of these elements coincide with the location of the Project works. The heritage elements closest to the Project works are the Museo Del Recuerdo Punta Arenas, located 1.6 km away, and the Sitio de Memoria Estadio Fiscal de Punta Arenas, 2.3 km away.

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Table 5-25: Cultural Heritage Elements in the Municipality of Punta Arenas

Name	Category	Distance to Project (km)
ZH	ZH Architectural Heritage Conservation Area Architectural Heritage	4.2
ZH	ZH Architectural Heritage Conservation Area Architectural Heritage	5
Plaza Muñoz Gamero and surrounding buildings surround it	Typical or Picturesque Area	5
Bahía Félix Lighthouse	Historical Monument	216
Prison Camp in Río Chico, the Chapel of San Rafael, the Chimney, and old ovens from the Puerto Harris sawmill on Dawson Island	Historic Monument	83
Memorial Site Punta Fiscal Stadium Arenas	Memorial Site Fiscal Stadium Punta Arenas	2,3
Municipal Cemetery of Punta Arenas Sara Braun	Historic Monument	3.5
Regional Headquarters Building of the Punta Arenas Gendarmerie	Historical Monument	5
Local Penitentiary of Punta Arenas	Historic Monument	5
Punta Arenas Police Headquarters	Historic Monument	5
San Isidro Lighthouse	Historical Monument	73
House of Human Rights - Residence Beaulier	Historical Monument	4.7
Sara Braun Palace	Historic Monument	5
Mauricio Braun Menéndez House	Historic Monument	5
Kon - Aikén Cemetery	Historical Monument	27
Magdalena Lighthouse	Historic Monument	30
Ruins of Ciudad Rey don Felipe (Port of Hunger)	Historical Monument	53
Fort Bulnes and Punta Santa Ana Peninsula	Historical Monument	56
Puerto Harris Cemetery	Historical Monument	83
Governor Viel	Public Library	3
Río Seco	Public Library	8
Hall of Honor and Museum First Company of Punta Arenas	Museum exhibition hall	5
Nao Victoria Site Museum (Ship of)	Museum	2.5
Punta Arenas Naval Museum	Museum	5

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Name	Category	Distance to Project (km)
Río Seco Natural History Museum	Museum	7
Punta Arenas Museum of Memories	Museum	1.6
Maggiorino Borgatello Salesian Museum	Museum	4.3
Magallanes Regional Museum	Museum	5
Keu Ken Ethnic Park	Museum exhibition hall	44
Paleontological Collection of Antarctica and Patagonia	Museum	5
Magellan Strait Park	Museum exhibition hall	53

Source: own elaboration.

The information provided by the National Monuments Council also addresses the presence of elements of Intangible Cultural Heritage corresponding to *customs, representations, expressions, knowledge, and techniques—along with the instruments, objects, artifacts, and cultural spaces inherent to them—that communities, groups, and in some cases individuals recognize as an integral part of their cultural heritage*. In the municipality of Punta Arenas, shipbuilding in Magallanes and the traditional Chilean circus are recognized as part of the intangible cultural heritage.

The following figure shows the location of national monuments and areas of intangible cultural heritage. Although the figure shows that the project is located within the area of traditional shipbuilding in Magallanes, given the industrial use of the port, the presence of traditional shipbuilding in the project study area is ruled out.

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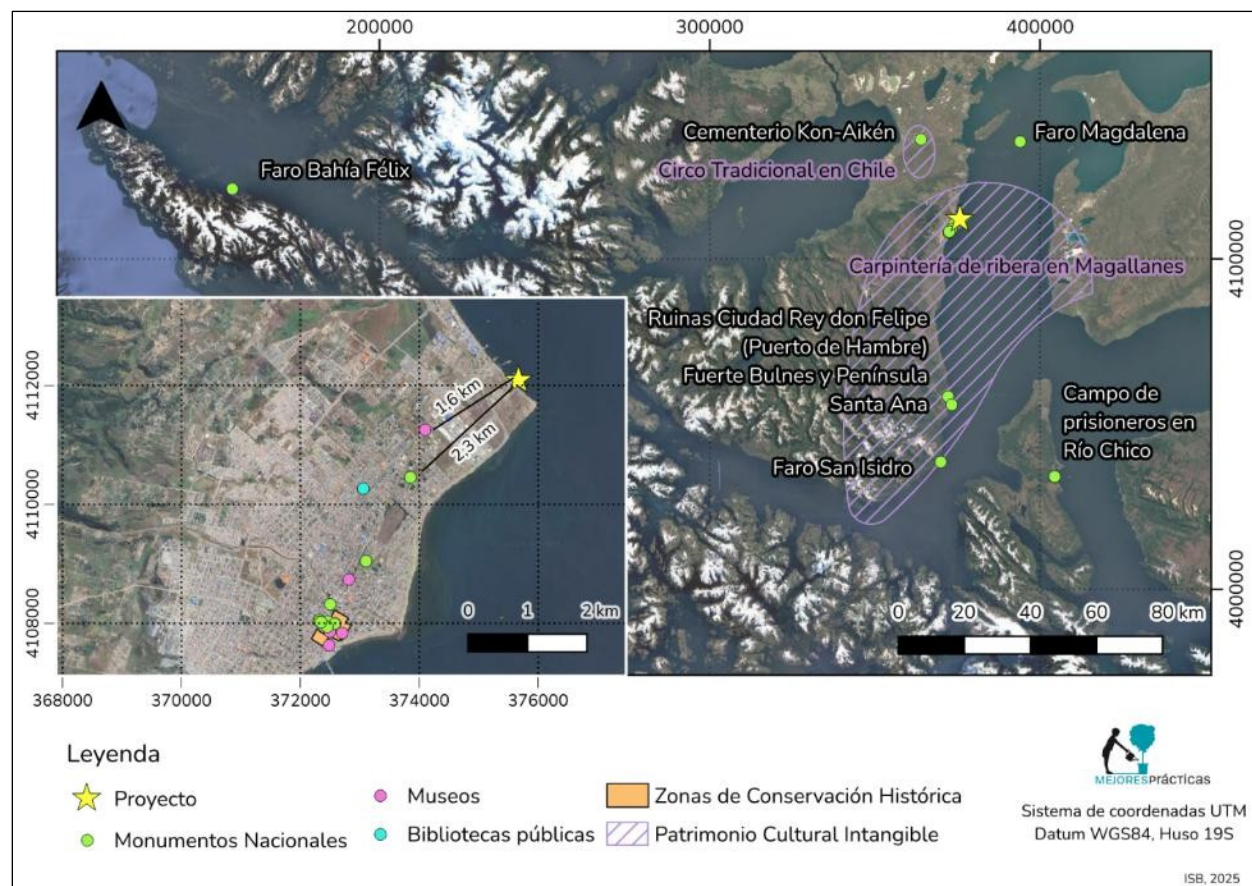


Figure 5-25: Location of National Monuments and Intangible Cultural Heritage in the municipality of Punta Arenas

Source: own elaboration.

5.6.2 Local background

As part of the evaluation process for the 1998 project "Expansion of the New Port of Punta Arenas. XII Region, Stages II and III," an archaeological baseline survey was conducted at the site of the planned works, with no archaeological finds identified.

However, records from other projects in the municipality submitted to the SEIA in the last five years, located within a 10 km radius of the Project works, have detected both archaeological and paleontological sites and findings. For example, the "Edificio Torre O'Higgins" project, submitted to the SEIA in 2024, detected archaeological sites and isolated finds within the urban area of Punta Arenas, while the "Hydraulic and mechanical study of the Las Minas River and sediment control works" project, from 2024, identified finds.

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paleontological remains on the surface corresponding to bivalves and gastropods in the vicinity of the Las Minas River.

With regard to underwater cultural heritage, it is important to note that there is evidence of archaeological remains that attest to historical occupation by marine hunter-gatherers in the Strait of Magellan. Noteworthy are the archaeological sites in the town of Punta Santa Ana and the archaeological sites in the Francisco Coloane Marine Protected Area as well as the records of archaeological sites attributed to canoeists on the southeastern edge of the Brunswick Peninsula in the Strait of Magellan and in the Seno ^{Otway area}. These sites do not overlap with the Project works.

5.6.3 Conclusions

The Project works do not overlap with any officially recognized historical or archaeological monuments or elements of tangible cultural heritage.

With regard to intangible cultural heritage, although the Project is located within the reference area of shipbuilding in Magallanes, given the industrial use of the port, the presence of shipbuilding in the Project study area is ruled out.

The background information on the survey conducted in the area in 1998 (EIA for the project "Expansion of the New Port of Punta Arenas. XII Region, Stages II and III") indicates that no archaeological findings were recorded.

¹⁹ MORELLO, FLAVIA, TORRES, JIMENA, MARTÍNEZ, ISMAEL, RODRIGUEZ, KARINA, ARROYO-KALIN, MANUEL, FRENCH, CHARLES, SIERPE, VICTOR, & SAN ROMÁN, MANUEL. (2012). Archaeology of Punta Santa Ana: reconstruction of occupation sequences of marine hunter-gatherers in the Strait of Magellan, Southern Patagonia, Chile. *Magallania* (Punta Arenas), 40(2), 129-149. <https://dx.doi.org/10.4067/S0718-22442012000200008>

²⁰ Center for the Study of Southern Man - Patagonia Institute, University of Magallanes. (2008) Survey and Diagnosis of the Cultural Heritage of the Francisco Coloane Multiple-Use Marine Coastal Protected Area; XII Region of Magallanes and Antártica. Available at: https://metadatos.mma.gob.cl/sinia/Linea_de_base_de_los_recursos_culturales_y_antecedentes_historicos_del_AMC_PMU_Francisco_Coloane.pdf

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It should be noted that the Project works are located in an area with port and industrial activity and correspond to areas that have been developed, as confirmed during the site visit carried out on October 13 and 14, 2025.

PROJECT TO SUPPORT THE IMPLEMENTATION OF THE MAGALLANES H2V PROJECT: DEVELOPMENT OF ENABLING PORT INFRASTRUCTURE - CHILE - CH- L1191

CHAPTER 6 – ASSESSMENT AND MANAGEMENT OF ENVIRONMENTAL AND SOCIAL RISKS AND IMPACTS

Report prepared for EPAustral

Report 929 – 2025

November 2025

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Chapter 6 - Assessment and Management of Environmental and Social Risks and Impacts

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EPAustral

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Version	Rev.1	
Date	November 7, 2025	
Status	Document for dissemination	
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6 ASSESSMENT AND MANAGEMENT OF RISKS AND ENVIRONMENTAL AND SOCIAL IMPACTS

6.1 Impact Assessment

The environmental impact assessment for the Project was carried out in accordance with the guidelines set forth in the documents *"Environmental, Health, and Safety Guidance for Ports, Port Areas, and Terminals"* (IFC, 2017) and *"Environmental, Health, and Safety Guidance for Maritime Transport"* (IFC, 2007). The main environmental issues related to the construction and operation of ports and terminals include the following:

- Biodiversity and alteration of terrestrial and aquatic habitats
- Resilience to climate change
- Water quality
- Air emissions
- Waste management
- Management of hydrocarbons and hazardous materials
- Noise and vibrations (including underwater)

Each of the topics listed above is analyzed below. In addition, topics related to cultural heritage, the human environment, and indigenous peoples are also analyzed.

6.1.1 Biodiversity and alteration of terrestrial and aquatic habitats

The following table evaluates the fundamental characteristics of biodiversity in relation to the Project, as indicated in Table 2 of the document *"Guidelines for assessing and managing impacts and risks to biodiversity in projects supported by the Inter-American Development Bank"* (IDB, 2015).

It is important to note that no dredging or explosive activities are planned during the construction phase or the operational phase. In addition, the pier expansion and associated construction activities were submitted for consultation to the environmental authority, which indicated that mandatory entry into the Environmental Impact Assessment System was not required.

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Table 6-1: Analysis of fundamental characteristics of biodiversity and their relationship to the Project

Characteristics of fundamental characteristics of biodiversity	Relationship with the Project
Existing or proposed protected areas in the country	The Project is located more than 1.6 km away from the nearest protected area, called Humedal Urbano Tres Puentes (see Figure 6-1)
Areas that have been recognized under international agreements, such as Ramsar sites, World Heritage sites, and Biosphere Reserves	The Project is located more than 107 km away from the nearest area recognized under international agreements, known as the Cabo de Hornos Biosphere Reserve (see Figure 6-2).
Areas with a high probability of containing endemic species with restricted distribution or genetically isolated species that could be important for evolutionary change	The Project is being developed in a previously disturbed, highly anthropized area (see Photo 6-1), so it does not correspond to areas with a high probability of containing endemic species with restricted distribution or genetically isolated species.
Routes used by migratory species	The Project is being developed in a previously disturbed, highly anthropized area (see Photo 6-1), where port activities are currently taking place, so no change in activities that could alter migratory species routes.
Vulnerable habitats subject to degradation in the past and in recent periods; loss of cover and fragmentation	The Project is being developed in a previously intervened, highly anthropized area (see Photograph 6-1), where port activities are currently carried out. Therefore, no modification of activities that could alter habitats is planned.
Terrestrial, aquatic, and marine biological corridors to ensure genetic connectivity	The Project is being developed in a previously disturbed, highly anthropized area (see Photo 6-1), where port activities are currently carried out, so no modification of activities that could alter potential terrestrial, aquatic, and marine biological corridors.
Important spawning or breeding areas or areas where individuals of a particular species congregate or aggregate.	The Project is being developed in a previously intervened, highly anthropized area (see Photo 6-1), where port activities are currently carried out. Therefore, no modification of activities that could alter potential spawning or breeding areas.

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Characteristics of the fundamental characteristics of biodiversity	Relationship with the Project
Large terrestrial or marine landscapes with minimal human influence and contiguous unaltered habitats	The Project is being developed in a previously intervened, highly anthropized site (see Photo 6-1), where port activities are currently carried out, and therefore will not cause any alteration to large terrestrial or marine landscapes with minimal human influence.
Important areas for ecosystem services, including carbon, water, wildlife, and fisheries	The project is being developed in a previously intervened, highly anthropized area (see Photo 6-1), where port activities are currently carried out. Therefore, no modification of activities that could alter ecosystem services is planned. ecosystem services.

6.1.1.1 Protected areas

The following figure shows the protected areas closest to the project. The closest is the Tres Puentes Urban Wetland, 1.6 km from the Mardones Pier. Within this area is the National Protected Property of the same name.

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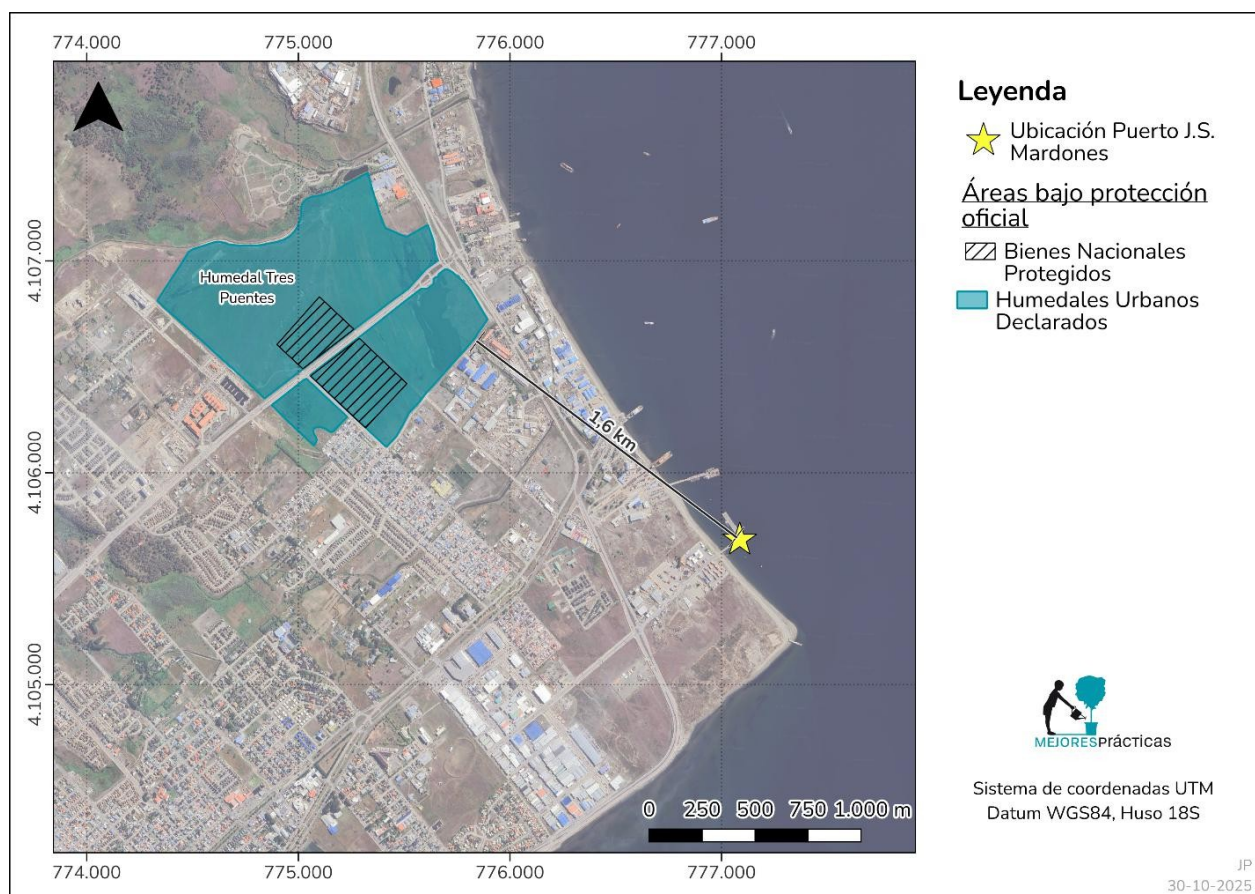


Figure 6-1: Protected areas closest to the project

Source: Prepared by the author based on public information

6.1.1.2 Areas recognized under international agreements

The following figure shows the areas recognized under international agreements closest to the Project. The closest is the Cabo de Hornos Biosphere Reserve, 107 km from the Project.

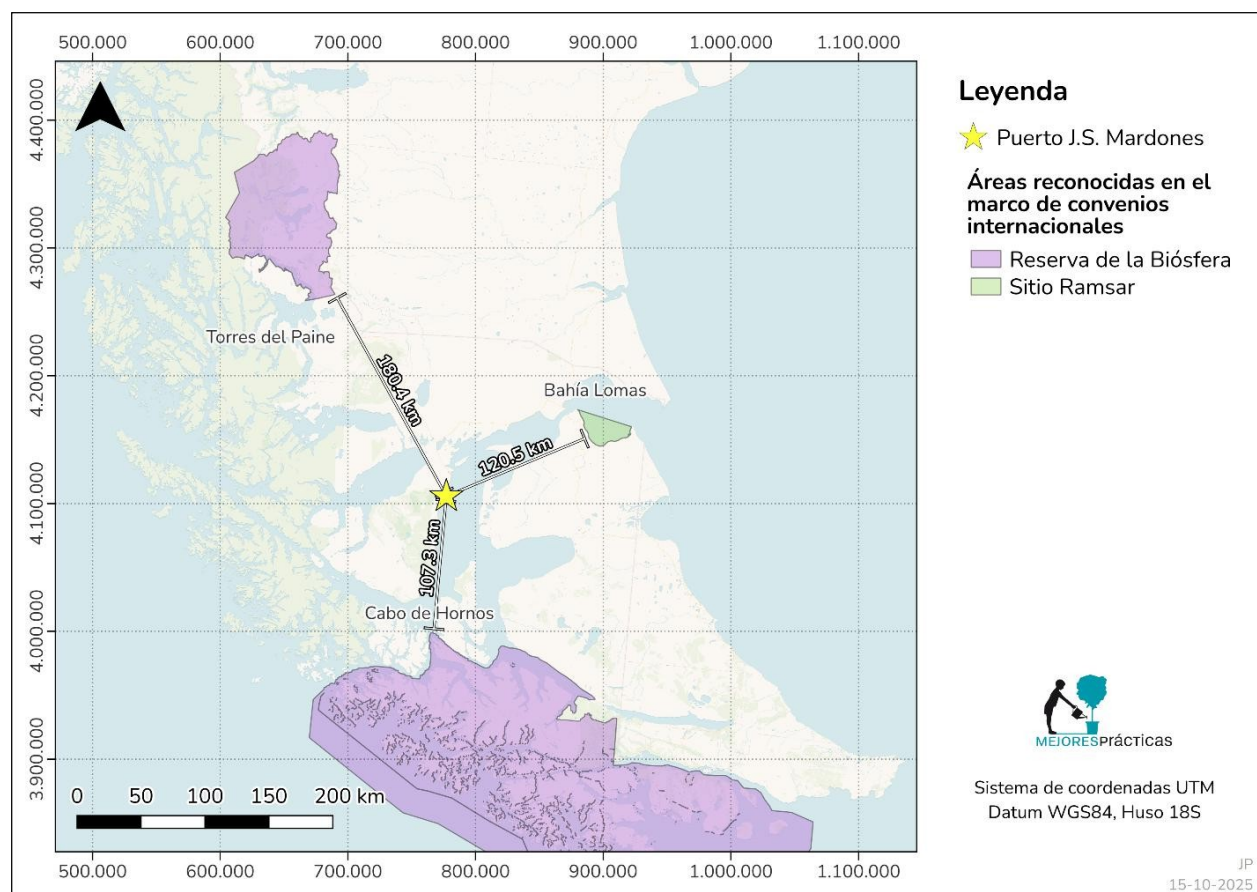


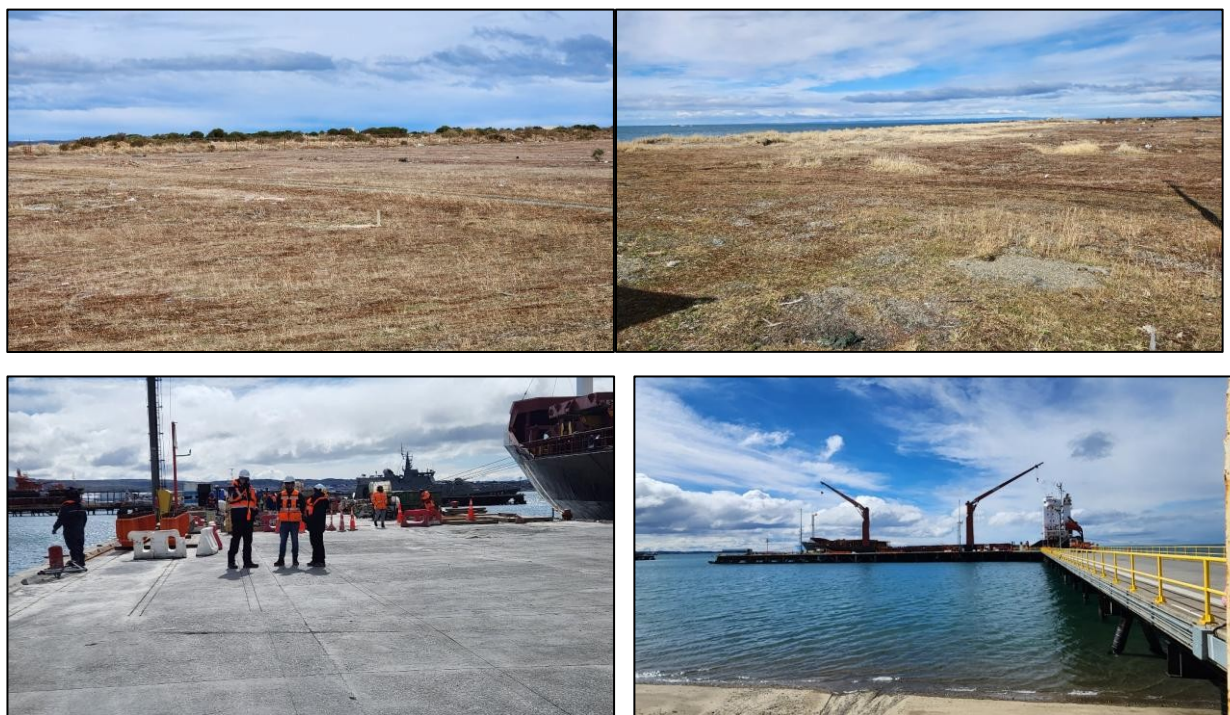
Figure 6-2: Areas recognized under international agreements

Source: Prepared by the authors based on public information

6.1.1.3 Areas to be affected by the Project

In the following photographs, which were taken by Mejores Prácticas professionals during a field visit on October 13, 2025, it can be seen that both the terrestrial and marine areas to be affected by the Project correspond to previously affected, highly anthropized areas.

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Photograph 6-1: Highly anthropized areas to be intervened

Source: Own elaboration

6.1.2 Resilience to climate change

To determine the project's relationship with climate change, the ARClm platform of the Chilean Ministry of the Environment was consulted, specifically the quantification of the risk of coastal infrastructure closing due to bad weather events. In this regard, the source consulted has no information on the Magallanes region, the closest being Puerto San Vicente, more than 1,800 km from the project.

On the other hand, the document "Diagnosis of the Status and Trends of Biodiversity: Magallanes Region and Chilean Antarctica" (MMA, 2015) states:

Pliscoff (2015) assessed the conservation status of terrestrial ecosystems using, among other criteria, estimates of environmental degradation over the next 50 years (criterion C, subcriterion C2), developed from a stress index that considers water stress, summer heat stress, and winter heat stress.

According to the study, there are no terrestrial ecosystems in the region threatened by this criterion."

6.1.3 Water quality

The following figure shows that there are no continental surface watercourses that could be affected by the Project.

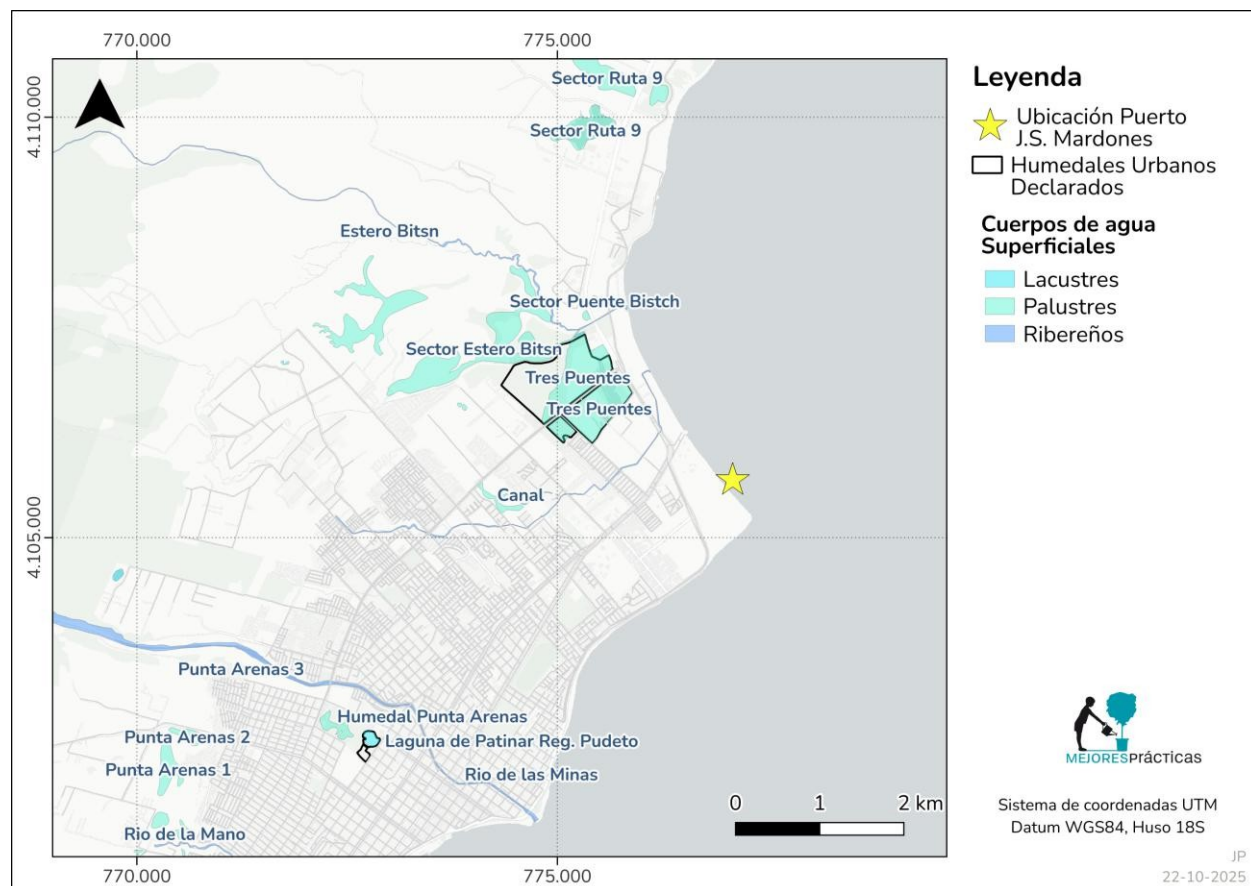


Figure 6-3: Water bodies near the project

Source: Prepared internally based on public information

With regard to the quality of the marine environment, the Project considers the execution of works in this environment; the main one corresponds to the driving of piles. For the execution of construction activities in the marine environment, it is considered that a temporary alteration in water quality could eventually occur. To prevent spills of construction materials, such as concrete debris, during the slab concreting process, the installation of spill collection trays under the pier beams is contemplated to minimize the fall of any debris. The mixer trucks used will not be washed at the port facilities, but rather at the facilities of the concrete supplier, so no liquid waste that could affect water quality is expected.

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6.1.4 Emissions to the atmosphere

The construction phase involves the use of machinery that will generate air emissions, as well as certain activities related to the improvement of the storage area that will generate air emissions. An increase in air emissions could potentially alter air quality levels.

During the operational phase, atmospheric emissions associated with the operation of the warehouses and the port will be generated, which is already currently the case.

Given the temporary and limited nature of the construction phase, it is considered that no significant atmospheric emissions will be generated that could substantially alter air quality levels. The machinery used will undergo regular technical inspections, and materials will be transported in covered trucks to prevent materials from falling and dust from being released during transport.

Likewise, the possible increase in atmospheric emissions associated with the expansion of the terminal is estimated to be minor, so there will be no alteration in air quality levels.

6.1.5 Waste management

The types of waste that will be generated during the construction and operation phases, as well as their management, are indicated below:

Construction phase

- Liquid waste: Wastewater will be generated by workers involved in the construction of the works. Portable toilets will be provided, which will be maintained by authorized companies and whose effluents will be disposed of in an authorized location.
- Non-hazardous solid waste: Waste such as rubble, scrap metal, plastics, etc. will be generated. It will be temporarily stored in authorized locations at the work site within the port premises, to be later removed and disposed of by authorized companies.
- Hazardous waste: Waste such as oil-contaminated rags, paint residues, etc. will be generated. It will be temporarily stored in authorized locations at the work site within the port area, and later removed and disposed of by authorized companies.

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Operation phase

- Liquid waste: Wastewater will be generated by workers. Existing sanitary facilities will be used, which are connected to the public sewer system.
- The bilge water from the ships' operations may be discharged, for which a procedure is being considered, and will be discharged at the facilities specially designated for this purpose in the port.
- Ballast water will not be discharged in the port area, in compliance with existing regulations on this matter.
- Non-hazardous solid waste: waste such as plastics, food scraps, etc. will be generated. It will be temporarily stored in authorized locations for subsequent removal and disposal by authorized companies.
- Hazardous waste: waste such as oil spills with hydrocarbon residues, paint residues, etc. will be generated. It will be temporarily stored in authorized locations and subsequently removed and disposed of by authorized companies.

Based on the above, it is concluded that waste management will be adequate and therefore no environmental impacts associated with waste management will be generated.

6.1.6 Management of hydrocarbons and hazardous materials

The Project considers the refueling of ships in the Port as required, which is carried out by means of a fuel truck provided by authorized third parties that comes to the dock and refuels the respective ship directly. Fuel storage in the Port is not considered.

It should be noted that Puerto Mardones has a Contingency Plan for the control of spills of hydrocarbons, their derivatives, and other harmful liquid substances that may cause contamination, which was approved by the Chilean Navy through DGTm and MM Ord No. 12600/05/165 on February 9, 2023. The aforementioned Plan contains the basic guidelines recommended by the International Maritime Organization and the General Directorate of Maritime Territory and Merchant Marine to ensure a timely and effective response to the occurrence of a spill of liquid hydrocarbon products that are polluting or likely to pollute.

With regard to hazardous materials, it should be noted that the Port has a temporary storage facility for dangerous goods, which has the corresponding authorization (CPPA Ordinario

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No. 12,600/164, dated June 7, 2005). In addition, EPAustral has a "Contingency Plan for Emergencies that may occur in the dangerous cargo storage area of the José de Los Santos Mardones Terminal" (2019), which aims to regulate operating procedures within the terminal in order to minimize the risks arising from the handling, transport, and operations involving dangerous goods, protecting the safety and health of workers, the environment, and port infrastructure.

In accordance with the above, the handling of hydrocarbons and dangerous goods is considered to be adequately managed, and therefore no significant impacts associated with these activities will be generated.

6.1.7 Noise and vibrations

The Project considers different construction, land, and marine activities that could generate an increase in noise and vibration levels.

Considering that the Project is being developed in an area that is already in use and has permanent port activity, noise monitoring is not considered necessary. However, actions are recommended for the construction and operation phases to minimize noise emissions associated with the Project.

6.1.8 Calculation of greenhouse gas emissions

The Project does not have a quantification of greenhouse gases (GHG), so this information is not included in this document. EPAustral will make an estimate of the atmospheric emissions associated with the construction phase and will report it once it has been carried out, which will be included in the PGAS.

6.1.9 Cultural Heritage

The Project works do not overlap with any historical or archaeological monuments or officially recognized elements of tangible cultural heritage. The heritage elements closest to the Project works are the Punta Arenas Museum of Remembrance, located 1.6 km away, and the Punta Arenas Fiscal Stadium Memorial Site, 2.3 km away (Figure 6-4).

With regard to intangible cultural heritage, although the Project is located within the reference area of shipbuilding in Magallanes, given the industrial use of the port, the presence of shipbuilding in the Project study area is ruled out.

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The project is located in an area that has previously been developed, so the Project will not have an impact on cultural heritage. During the construction phase, in the event of an archaeological find, EPAustral will comply with the provisions of Law 17,288 on National Monuments, which in Article 26 states that any natural or legal person who, when excavating anywhere in the national territory and for any purpose, and finds ruins, sites, pieces, or objects of a historical, anthropological, archaeological, or paleontological nature, is obliged to immediately report the discovery to the Provincial Governor, who will order the Carabineros to take responsibility for its surveillance until the National Monuments Council takes charge of it. At the same time, the requirements of NDAS 8 on cultural heritage will be complied with.

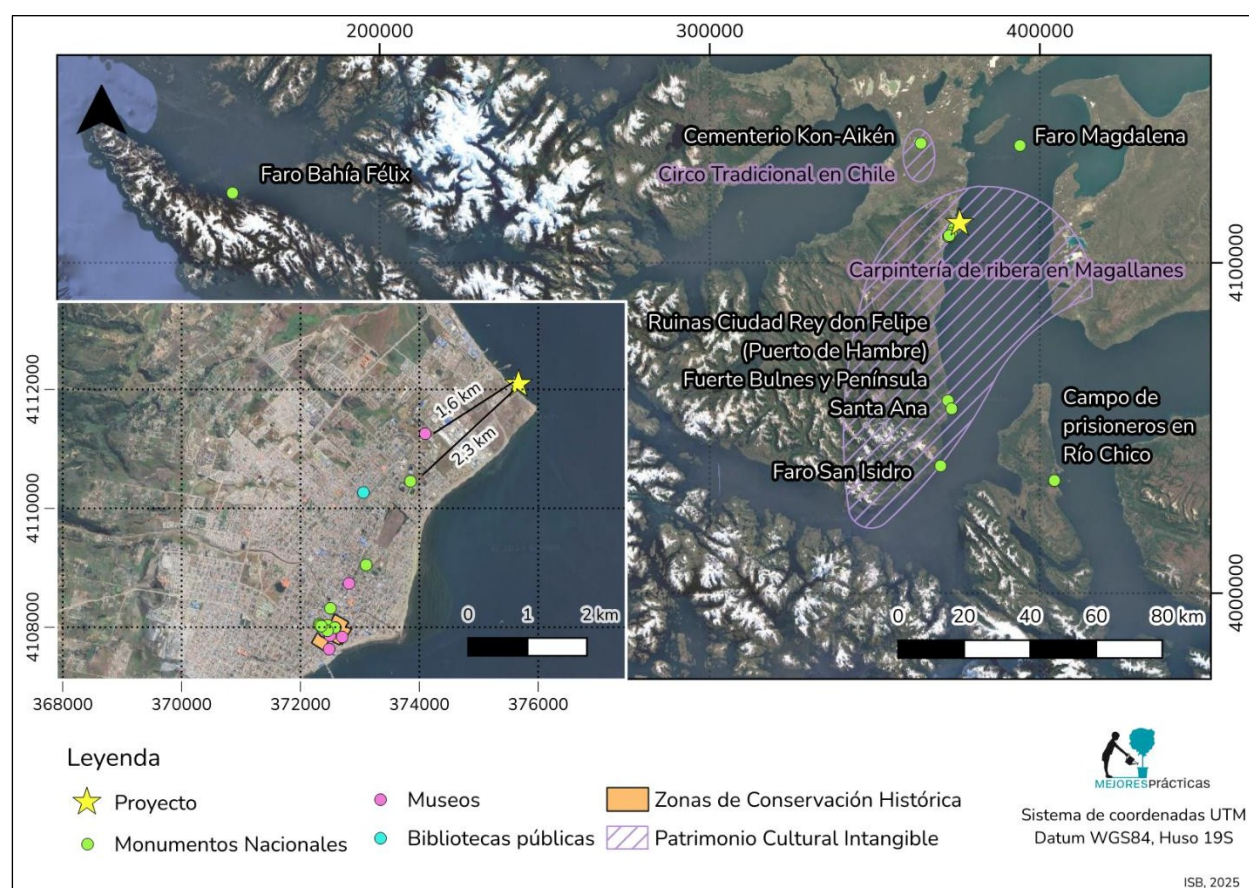


Figure 6-4: Location of National Monuments and Intangible Cultural Heritage in the municipality of Punta Arenas
 Source: own elaboration.

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6.1.10 Human Environment

Based on the study conducted, no activities, works, or parts of the project that could negatively impact the human environment, communities, or their territory were identified. Notwithstanding the foregoing, some elements that are worth noting in order to rule out any potential impact are detailed below:

- The study shows that the Mardones pier complements the services provided by Prat for receiving deep-sea fishing vessels, i.e., those that carry out industrial fishing in waters far from the coast, outside the area reserved for artisanal fishing.

In addition to the above, no activities or infrastructure related to artisanal fishing were observed. In conversations with port personnel during the site visit on October 13 and 14, 2025, it was confirmed that artisanal fishing is practiced in the Barranco Amarillo fishing cove, approximately 3.7 kilometers north of the Mardones pier. Therefore, it can be concluded that there will be no economic displacement of fishermen as a result of the activities planned for the pier.

- Furthermore, no activities or uses of any kind by the community have been identified in the areas to be affected by the project.
- With regard to infrastructure and services in the study area, it should be noted that in terms of access and connectivity, there is a strategic road and port infrastructure that facilitates both internal mobility and connection with the rest of Punta Arenas and the region.

In this context, it has been identified that the intersection of Avenida Presidente Manuel Bulnes, which crosses the territory from east to west, with Route 9 North represents a complex point for maneuvers by trucks with oversized loads, as they require traveling through the central median. In this regard, the State is conducting a feasibility study to evaluate alternatives for improving the turning radius of oversized trucks, given the public nature of these roads.

6.1.11 Indigenous Peoples' Groups (NDAS 7)

At the community level, 11 indigenous communities and 19 associations have been identified in Punta Arenas.

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In the study area, there is a minority (14.5%) of the population that identifies as belonging to an indigenous people, with no formally constituted communities or associations, no recognized indigenous lands, and no sites of indigenous cultural significance in the study area. In addition, no activities related to indigenous peoples were recorded in the areas to be affected by the project.

Consequently, it is ruled out that the project could have a negative impact on groups belonging to indigenous groups.

6.1.12 Gender Equality (NDAS 9)

In the project area, there are no significant differences between men and women in terms of population distribution, educational levels, or membership of indigenous peoples. At the same time, a similar proportion of women as men work in economic activities linked to the tertiary sector, services, which largely characterize the activities carried out in the study area, such as commerce, health, education, ports, among others.

Where they clearly differ is in caregiving and domestic chores, with a higher proportion of women.

From the project's point of view, it has been confirmed that EPAustral is committed to gender equality, as since 2023 it has had a policy of gender equality, diversity, and inclusion whose overall objective is *"...to promote capabilities aimed at preventing, investigating, and punishing workplace and sexual harassment and abuse, along with gender discrimination within Empresa Portuaria Austral, promoting gender equality, recognizing the diversity of people, and protecting victims within its sphere of competence, fostering a safe working environment for all people involved in the Company, regardless of their sex, gender, identity, and sexual orientation, within the framework of current law and guaranteeing equality and inclusion in all its forms."* In addition, EPAustral has a Code of Conduct, one of whose ethical principles is "Respect and fair treatment," promoting policies that generate equal opportunities for each and every EPAustral employee.

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Based on the study conducted, no risks or impacts associated with the project have been identified on the grounds of gender, sexual orientation, or gender identity.

6.2 Risk Analysis

6.2.1 Cumulative Risks and Impacts

Chapter 2 of this EIAS details the four green hydrogen projects that are currently undergoing environmental review through an Environmental Impact Study, i.e., they generate significant impacts, their significant impacts, and measures to manage these impacts. The information on other projects presented in the chapter shows that:

- Significant impacts on wildlife are mainly associated with the presence of wind turbines, which is not relevant to the Project under analysis, and therefore a cumulative impact analysis is not applicable for this component.
- Significant impacts on flora and vegetation are local and specific to each project, and as mentioned above, this Project is being implemented on areas that have already been developed and anthropized, so no cumulative impacts will be generated for this component.
- Significant impacts on cultural heritage and economic activities are local and specific to each Project, and as mentioned above, this Project is being implemented on areas that have already been developed and anthropized, so no cumulative impacts will be generated for these components.
- With regard to the significant impacts associated with road issues (increases in travel times), each project addresses and manages these impacts through various measures, such as night transport, a communication plan, a road management plan, etc. Considering the above, no cumulative impacts are expected as long as the impacts of the H2V projects are addressed and adequately managed.

It should be noted that the nearest green hydrogen project is located 20 km from Puerto Mardones, so no cumulative impacts are expected.

6.2.2 Indirect risks and impacts

Given that the project is small in scale and consists of expanding the existing port in an area that has already been developed, there are no negative indirect impacts associated with it.

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A positive indirect impact is the improvement of the local economy, mainly due to the use of goods and services associated with an increase in the number of cargo and container ships calling at the port.

6.2.3 Risks associated with climate change

As noted in section 6.1.2, the document "Diagnosis of the Status and Trends of Biodiversity: Magallanes and Chilean Antarctica Region" (MMA, 2015) states:

Plischoff (2015) assessed the conservation status of terrestrial ecosystems using, among other criteria, an estimate of environmental degradation over the next 50 years (criterion C, subcriterion C2), developed from a stress index that considers water stress, summer heat stress, and winter heat stress.

According to the study, there are no terrestrial ecosystems in the region threatened by this criterion."

In accordance with the above, it is considered that this analysis is not applicable to the Project.

6.2.4 Simplified disaster risk assessment (step 2)

This section addresses disaster risk analysis in the project study area through the application of the "Disaster Risk and Climate Change Assessment Methodology for IDB Projects" (IDB, 2019).

The Methodology consists of a systematic and iterative phased process. Each phase is adapted to the level of information available on the project and its study area

6.2.4.1 Step 1: Assessment of exposure to hazards and initial risk classification Review of existing studies and applicable regulatory framework

The following table lists some existing public studies that address disaster risk in the study area.

Table 6-2: Existing public studies addressing disaster risk

Type of Study / Report	Name of Study	Year	Source / Author	Content related to the Project
Territorial Planning Instrument	Strategic Natural Risk System of the Regional Territorial Planning Plan	2012	Regional Government of Magallanes and Chilean Antarctica	Regional zoning of natural hazards, including seismic hazards, volcanic hazards, and hydrometeorological hazards

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Type of Study / Report	Name of the Study	Year	Source / Author	Content related to the Project
Municipal-level study	Tsunami evacuation plan	2023	SENAPRED	Map showing flood risk areas in the city of Punta Arenas, as well as as evacuation routes

The aforementioned studies identify that the project area is located in an area at risk from tsunamis and volcanic ash deposits from the Burney and Reclus volcanoes, although Punta Arenas is outside the volcanic risk area for lahars and lava. Additionally, as with the rest of Chile, the risk of earthquakes is recognized.

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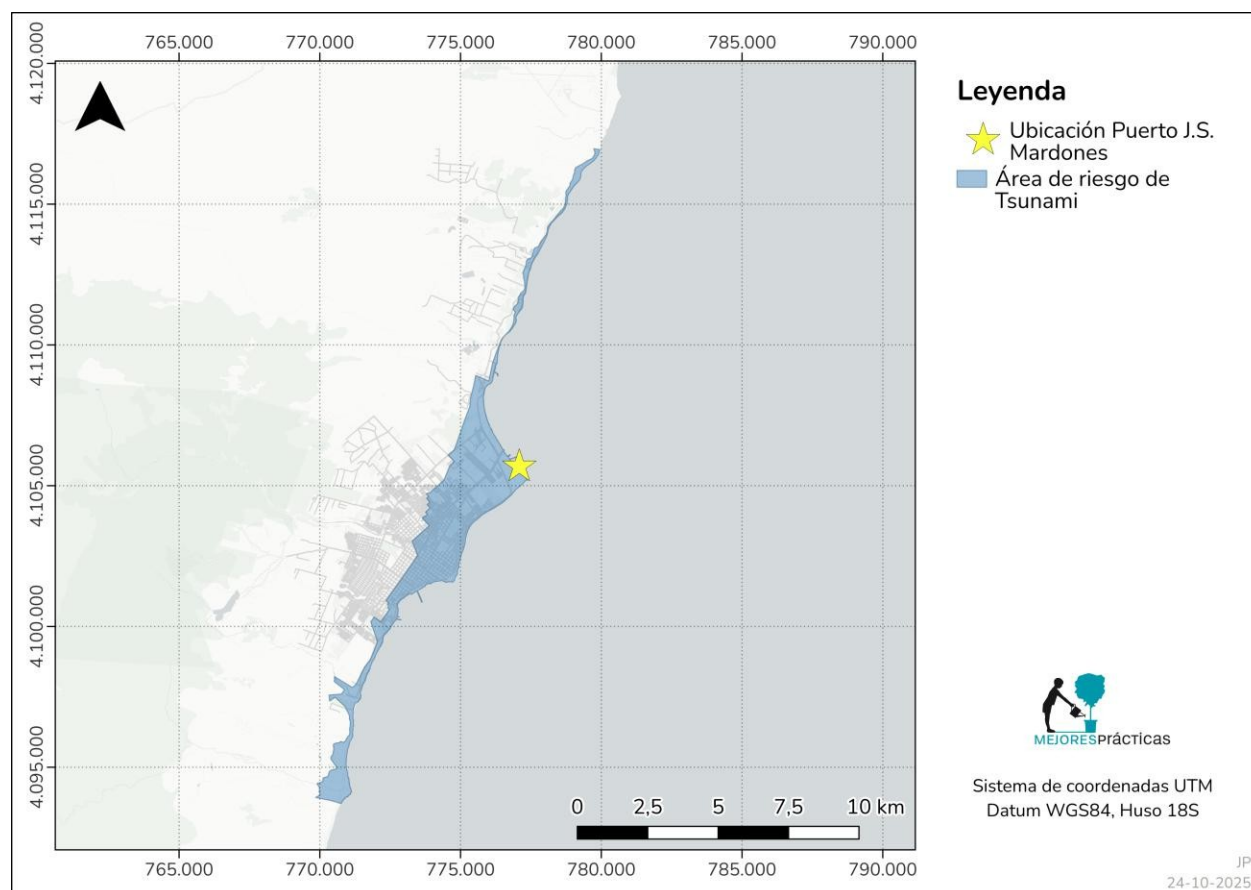


Figure 6-5: Tsunami flood risk

Source: Prepared internally based on SENAPRED evacuation plans¹

⁽¹⁾ SENAPRED: Evacuation plans: Magallanes and Chilean Antarctica Region Available at: <https://web.senapred.cl/plan-de-evacuacion-magallanes-y-antartica-chilena/>

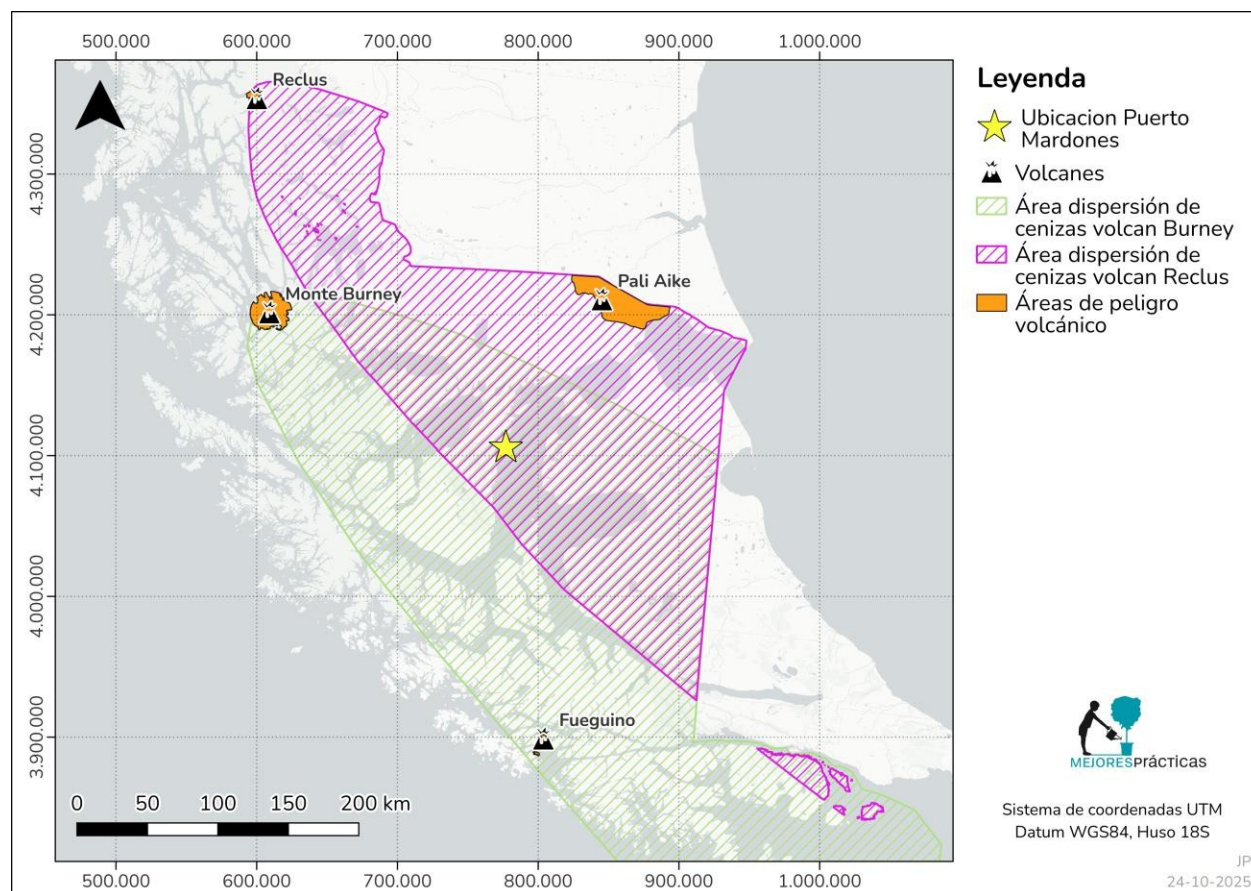


Figure 6-6: Volcanic risks

Source: Prepared by the authors based on the Strategic Natural Risk System (2012) of the Regional Government of Magallanes and Chilean Antarctica²

It should be noted that Puerto Mardones is located outside the flood risk zone defined for the Las Minas River, based on the areas affected by the event that occurred in 2012. Additionally, following the incident, the Ministry of Public Works carried out a series of sediment control works on the Las Minas River, including the construction of the first sediment control barrier upstream of the Frei Bridge and drainage channels.

²Regional Government of Magallanes and Chilean Antarctica (2012). Strategic Natural Risk System. Available at: <https://www.goremagallanes.cl/wp-content/uploads/2022/02/00-INFORME-DE-AMENAZAS-NATURALES-PROT.pdf>

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on both banks of the Las Minas River, the construction of 77 linear meters of concrete walls, and the construction of 200 m of reinforced concrete slab and its drainage system³.

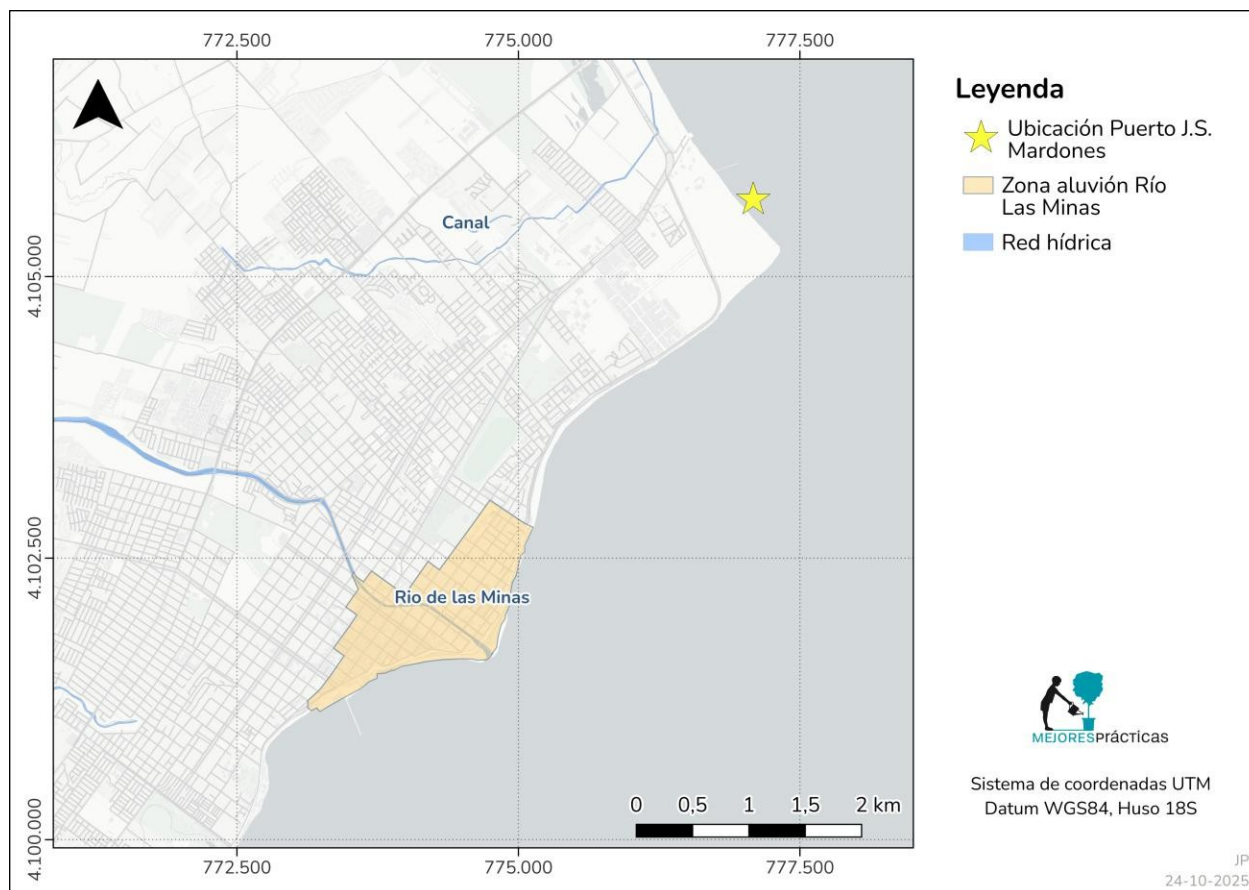


Figure 6-7: Flood risk

Source: Prepared by the author based on the Strategic Natural Risk System (2012) of the Regional Government of Magallanes and Chilean Antarctica⁴

On the other hand, the following table shows the studies carried out for this specific project.

³ SEREMI MOP (2020). MOP began sediment control works on the Las Minas River. Available at: <https://magallanes.mop.gob.cl/mop-inicio-obras-de-control-sedimentologico-en-el-rio-las-minas/>

⁴ Regional Government of Magallanes and Chilean Antarctica⁴ (2012). Strategic Natural Risk System. Available at: <https://www.goremagallanes.cl/wp-content/uploads/2022/02/00-INFORME-DE-AMENAZAS-NATURALES-PROT.pdf>

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Table 6-3: Studies conducted for the Project

Type of Study / Report	Name of Study	Year	Source / Author	Content related to the Project
Calculation report	Calculation report for projected head	2024	RFA Engineers	The study incorporates earthquake and wind variables to determine the structure of the projected head.
Public ordinary	C.P.P.A ORD No. 12600/282 Authorizes the operation of the José de Los Santos Mardones	2024	DIRECTEMAR	Establishes operational limits for the José de Los Santos Mardones pier, considering wind speed and direction.

The following are the regulatory instruments applicable to the Project, related to disaster risk.

Table 6-4: Regulatory framework applicable to the Project

Regulation considered	Application in Project
General Law on Urban Planning and Construction, DL 47, 1992 Decree 61 approves regulations establishing seismic design standards for buildings, Ministry of Housing and Urban Development, 2011 NCh 430, Reinforced Concrete Design NCh 433, Seismic Design Standard (1972) NCh 2.369, Standard establishing requirements for the seismic design of industrial structures and facilities NCh 3.357 Seismic design of non-structural components and elements NCh 3.359 Requirements for strategic and community service buildings community service	The structures considered in the project must comply with regulations and calculation reports that verify compliance.
Law 19.525 regulates evacuation and drainage systems systems	The project design must comply with this regulation.
General Ordinance on Urban Planning and Construction	Regulates the type and quantity of in relation to occupancy load
NCh 935/1 and NCh 935/2	Standards related to fire resistance

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Regulations considered	Application in Project
Punta Arenas Community Regulatory Plan	Zoning and specific regulations for land use land and restricted areas
Guide to the Design, Construction, Operation, and Maintenance of Coastal Maritime Works (DOP, 2013)	The project must be guided by the recommended criteria for the design of maritime projects and works, such as layout requirements, shelter conditions, operation of ships, dimensions, among others.
Recommendations for Maritime Works (ROM)	The project must be guided by the recommended criteria for the construction, maintenance, and operation of maritime works.

Summary of threats to which the Project is exposed

The following table summarizes the information gathered on the threats that may affect the project under analysis, given its geographical location. The initial risk classification considers the following categories: high, medium, and low.

Hydrometeorological threats that consider climate change were not addressed as there is no information available for this purpose.

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Table 6-5: Summary of threats to which the Project is exposed and initial risk classification

Threat	Source and description	Exposure	Initial risk classification risk
Earthquakes	The area where the city of Punta Arenas is located is influenced by the contact between the Antarctic, Scotia, and Fagnano-Magallanes fault plates.	YES	Moderate
Tsunami	As it is located in a coastal area at risk of earthquakes, it is also considered a high-risk area for tsunamis. Likewise, the project area is located within the tsunami evacuation zone defined by the public agency known as SENAPRED (National Service for Disaster Prevention and Response).	SI	High
Landslide land	The project is located in a mostly flat area.	NO	-
Volcanic eruption	Although the infrastructure is located outside the danger zones associated with lahars and lava from the volcanoes (located more than 100 km away), the project is located in an area of ash dispersion.	YES	Moderate
Winds/Typhoons	Port activity is vulnerable to strong winds, which can affect its operation. Additionally, the municipality of Punta Arenas, given its location and various environmental factors, such as atmospheric circulation, atmospheric influence, and the relief of the territory, is prone to strong winds, with gusts that can reach 140 kilometers per hour. The area is not affected by typhoons.	YES	Moderate
River flooding	The project is located far from watercourses, especially the Las Minas River, where flooding events have occurred. To a lesser extent, there are records of flooding in the Llau-Llau Estuary, which is closer to the project, approximately 960 m ⁽⁶⁾ away. In this regard, the works covered by this Project under analysis are outside the flood risk area of the Llau Llau Estuary according to the Community Regulation Plan. Community Regulatory Plan.	YES	Low
Storm flooding	No information related to this threat has been identified	NO	-
Drought	No background information related to this threat has been identified.	NO	-

⁽⁵⁾ Municipality of Punta Arenas (2023). Punta Arenas Community Climate Change Action Plan.

⁽⁶⁾ Municipality of Punta Arenas (2023). Punta Arenas Community Climate Change Action Plan.

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Threat	Source and description	Exposure	Initial risk classification risk
Heat Wave / Cold Wave	Extreme temperatures (cold or heat) could cause operational problems, mainly related to the exposure of operators working outdoors. However, compared to other municipalities in the country, the temperature ranges in Punta Arenas are not as extreme.	YES	Low
Fires	In Punta Arenas, fires are usually associated with the spread of fire in vegetation on rural land or near homes. The project is located in an industrial area with little vegetation, so the threat is considered to be low.	YES	Low
Storm surges	Over the last 40 years, storm surges have increased in frequency and intensity throughout the country, a period long enough to link this phenomenon to climate change ⁷ . However, according to data from DIRECTEMAR, Puerto Mardones has closed only 15 times in the period 2008-2019 due to this threat.	YES	Low
Changes in precipitation due to climate change	Existing projections (ARCLim) indicate that there will be no major changes in the amount of precipitation or the number of days of heavy rainfall ⁸ . The projections of atmospheric conditions for the Magallanes region in 2050, as set out in the National Climate Change Adaptation Plan, indicate that, in a scenario of greenhouse gas emissions without mitigation policies (known as the IPCC RCP 8.5 scenario), rainfall will increase by around 10%(9) . IPCC RCP 8.5 scenario), precipitation will increase by around 10% ⁹	NO	-
Sea level rise	As infrastructure located on the coast, it is exposed to the possible rise in sea level caused by climate change. Existing projections (CIGIDEN) indicate that sea level rise during this century could be between 40 and 80 cm	Moderate	Moderate

⁷ DIRECTEMAR (2020). The storm surges arrived to stay. Available at: <https://www.directemar.cl/directemar/noticias-y-comunicaciones/noticias/2020/las-marejadas-llegaron-para-que-darse>

⁸ ARCLim. Threat Explorer. Available at: <https://arclim.mma.gob.cl/amenazas/>

⁹ Center for Dynamic Research on High Latitude Marine Ecosystems (IDEAL), (2019). The Magallanes Region and Chilean Antarctica in the face of global change. Available at: <https://centroideal.cl/wp-content/uploads/2022/04/Reporte-IDEAL-CHILE-boceto-2911-web.pdf>

Chapter 6 - Assessment and Management of Environmental and Social Risks and Impacts

The table above shows that this first step results in a high risk classification; however, this is associated with the geographical location of the project. In this regard, it is important to consider that, as indicated in Table 2.1 of the document "Disaster Risk and Climate Change Assessment Methodology for IDB Projects" (IDB, 2019), according to Directive A.2 of the Disaster Risk Management Policy, there are two different "risk scenarios":

- Type 1 = "The project is likely to be exposed to natural hazards due to geographical location."
- Type 2: "The project itself has the potential to exacerbate the risk of threats to human life, property, the environment, or the project itself."

In this case, this high risk classification is associated with the project site and not with the project itself. Section 6.2.4.2 below assesses the project's potential to exacerbate the risk of harm to human life, property, the environment, or the project itself.

6.2.4.2 Step 2: Criticality and vulnerability assessment

This second step is designed to reflect the criticality and vulnerability levels specific to the project and to complement the result of the previous step in order to obtain a disaster and climate change risk classification that is representative of the operation itself and not simply of the threats.

According to the document "Methodology for assessing disaster risk and climate change for IDB projects" (IDB, 2019), "Criticality" refers to the degree of importance of a structure or system in a broader context due to the type and scale of the services or functionality it provides, while the concept of "Vulnerability" refers to the inherent qualities that determine the susceptibility of a structure (or system) to damage.

There are three relevant aspects to address in order to carry out this analysis:

- Project scope: provides guidance on the elements that need to be considered in the analysis, focusing on the existence (or lack thereof) of infrastructure. In this regard, this project corresponds to improvements and expansions of infrastructure that is already in operation.
- Useful life: According to the aforementioned document, the typical useful life of transportation infrastructure is between 50 and 75 years (range established based on the useful life of asphalt roads, gravel roads, bridges, and tunnels; maritime transport is not mentioned).

Chapter 6 - Assessment and Management of Environmental and Social Risks and Impacts

- What are the possible consequences of the project's failure, including on surrounding communities and the environment? To address this point, the aforementioned document recommends analyzing the questions listed in the following table.

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Table 6-6: Criticality and vulnerability assessment

Characteristics	Low	Moderate	High
How many people will benefit from the project? If it fails, how many people would lose a critical service?	The project seeks to improve the operation of the Mardones dock, increasing its capacity and improving the safety conditions of its maritime operations. A positive effect is expected for the development of different projects in the region. If it fails, some projects may be delayed or discouraged from being carried out. There are other terminals in the region that could receive some of the ships that arrive at this terminal		
If the project fails, is there a possibility of loss of life associated with the failure?	Mainly related to the operators working at the terminal.		
Is there redundant infrastructure that can be used in the event of project failure?	There are other terminals in the region that could receive some of the ships arriving at this terminal.		
Would there be a significant loss of ecosystem services?	The project is located in an area that has already been developed, where port facilities and operations currently exist. No significant loss of ecosystem services.		
Could the construction or existence of the project exacerbate the risk associated with any of the threats to the surrounding communities?	The project is located in an area that has already been developed, where port facilities and operations currently exist. No exacerbation of risks associated with threats to surrounding communities is anticipated.		

Source: Prepared by the author based on the document "Methodology for assessing disaster risk and climate change for IDB projects" (IDB, 2019).

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From the above analysis, it is concluded that, as a result of the exposure assessment (Step 1), and complemented by the criticality and vulnerability analysis (Step 2) of the Project, it is classified overall as Low, considering the aspects specific to the Project and not only the threats, and therefore it is not appropriate to proceed to the next phase of the methodology.

6.3 Work and working conditions (NDAS 2)

6.3.1 Occupational health and safety mitigation and control measures

According to the information analyzed by the cabinet and in the field, no occupational health and safety mitigation and control measures are required for our own workers and/or contractors.

However, EPAustral has standards and mechanisms in place to protect the life, safety, and health of its own workers and contractors, namely:

- Internal Health and Safety Regulations – RIOHS (Art. 153 of the Labor Code);
- Special Regulations for Contracting Companies – RE-EECC (Art. 11 DS 76/07 MTPS).

With regard to RIOHS, it considers the following aspects in working conditions, health and safety standards for workers, and compensation mechanisms:

- Code of Conduct;
- Rules for the use of company vehicles;
- Rules governing labor relations between members;
- Fair working conditions rules;
- Health and Safety Rules;
- Rules for reporting workplace accidents and occupational illnesses and for investigating accidents;
- Health monitoring rules to prevent occupational accident risks;
- Rules on the obligation to report occupational risks;
- Fire protection and emergency response regulations;
- Worker safety regulations in hazardous and emergency situations (Law No. 21,012);
- Protocol on minimum standards for the development of programs to monitor hearing loss due to noise exposure in the workplace (protocol on occupational exposure to noise, PREXOR);

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- Standards for the identification and assessment of risk factors for work-related musculoskeletal disorders (TMERT);
- Protocol for monitoring psychosocial risks;
- Regulations and measures to be applied in relation to COVID-19;
- Establishment and operation of Joint Health and Safety Committees and Work Committees (Art. 66 Law No. 16,744/69 MTPS and DS No. 54/69 MTPS); and
- Monitoring system that includes control mechanisms to safeguard access and places considered risky for workers, customers, and the public.

With regard to RE-EECC, consider the following aspects in working conditions, health and safety standards for workers, and compensation mechanisms:

- Occupational health and safety management system;
- Establishment of a Risk Prevention Department;
- Establishment of a Joint Worksite Committee (Art. 66 Law No. 16,744/69 MTPS and DS No. 54/69 MTPS);
- Regular risk prevention meetings;
- Occupational Health and Safety Program;
- Planned inspections and observations;
- Emergency Plan;
- Procedure in case of accidents or incidents;
- Notification in case of serious or fatal accidents;
- Obligations of contractors and subcontractors; and
- Prohibitions for contractors and subcontractors.

6.4 Community Health and Safety (NDAS 4)

6.4.1 Specific risks to the community and vulnerable groups

According to the information gathered during the site visit carried out on October 13 and 14, 2025, by professionals from Mejores Prácticas, the project's emissions, effluents, and waste correspond to:

Emissions

- Particulate Matter (PM_{10} and $PM_{2.5}$).
- Gases (CO, NO_x, SO₂).
- Noise from machinery

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- Vibrations from machinery.

Effluents

- Wastewater.
- Bilge water
- Ballast water.

Waste

- Solid domestic waste and similar to domestic waste.
- Non-hazardous industrial waste.
- Hazardous industrial waste.

It should be noted that, as indicated above, construction activities and associated machinery will generate atmospheric emissions that could alter air quality and noise levels (risk to public health).

Given the temporary and limited nature of the construction phase, it is considered that no significant atmospheric emissions will be generated that could substantially alter air quality levels. Likewise, no significant alteration in noise levels is anticipated.

However, it is suggested that measures be implemented to minimize the Project's atmospheric and acoustic emissions, as indicated in Chapter 7 of this document.

In conclusion, the Project does not generate significant negative impacts on any component, in any of the Project phases.

PROJECT TO SUPPORT THE IMPLEMENTATION OF THE MAGALLANES H2V PROJECT: DEVELOPMENT OF ENABLING PORT INFRASTRUCTURE - CHILE - CH- L1191

CHAPTER 7 – ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Report prepared for EPAustral

Report 929 – 2025

November 2025

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CHAPTER 7 – ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

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Version	Rev.1	
Date	November 7, 2025	
Status	Document for dissemination	
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7 ACTION PLAN

7.1 Introduction

This chapter contains the Environmental and Social Management Plan (ESMP) for the Project's works and activities, which includes the specific environmental management measures required by the EIA. It should be noted that, according to the analysis in Chapter 6, the Project does not generate significant environmental or social impacts, and therefore no mitigation, compensation, or remediation measures are required.

7.2 Roles and responsibilities in implementation

7.2.1 Pre-construction and construction phase

The different roles and responsibilities of each of the actors involved in the implementation of the Project are indicated below.

- EPAustral must indicate in its bidding terms and conditions for the implementation of the works covered by this Project the PGAS measures that must be implemented by the Contractors, and request from the bidders a specific budget associated with the implementation of the measures, which will ensure compliance with applicable national regulations and the IDB's NDAS.
- During the construction phase, the Contractors will be responsible for having the infrastructure and carrying out the relevant environmental and occupational health and safety activities to comply with current regulations and the IDB's NDAS. Below are examples of some aspects to be included: construction permits, permits for temporary waste storage, etc.
- Before the start of construction activities, each Contractor must submit a Construction PGAS to EPAustral, which must be reviewed and approved by EPAustral prior to the start of work, and will then be sent by EPAustral to the IDB for "No Objection." This Construction PGAS must contain the information indicated in section 7.3 of this document.
- Once the respective Contractor's Construction PGAS has been approved, each Contractor company will be responsible for its compliance.
- Each Contractor shall:

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- Have an Environmental and Social Manager and a Health and Safety Manager, who will lead the implementation of the Construction PGAS.
- Comply with, and extend compliance to operators and subcontractors, the provisions indicated in the Construction PGAS.
- Prepare monthly reports indicating the actions and results of the implementation of the Construction PGAS. These reports must be sent monthly to EPAustral.
- Prepare quarterly environmental and social monitoring reports, which must be sent to EPAustral.
- EPAustral shall be responsible for the supervision, control, and monitoring of the Construction PGAS, and may conduct inspection visits, prepare reports for internal use, and define and impose corrective measures to ensure compliance with the provisions of the contract with the Contractor.
- EPAustral shall prepare and send semi-annual environmental and social monitoring reports to the IDB.
- At the end of each project, each Contractor must submit a Final Environmental and Social Report, which shall contain information on the implementation of the Construction ESMP, including records of the implementation of measures and compliance with the relevant environmental and social indicators, as applicable.

7.2.2 Operation phase

During the operational phase, EPAustral will be responsible for the operation and maintenance of the installed infrastructure, in accordance with its internal procedures and current environmental and social management systems.

EPAustral's Environmental and Social Manager will be responsible for supervising and monitoring environmental and social issues during this phase, including aspects related to information and communication (Complaints and Claims Handling Mechanism).

7.2.3 Role of the IDB

The IDB's tasks in the development of this project are as follows:

- Review and supervise EPAustral's implementation of the socio-environmental management system required for the environmental and social monitoring of the Project.

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- Evaluation and Non-Objection of the Environmental and Social Technical Specifications to be included in the tenders (including the Construction ESMP guidelines) prior to the tendering of the works, and of the Construction ESMPs submitted by the contracting companies.
- Evaluate the implementation of the ESMP and compliance with the measures established therein, in order to ensure compliance with the NDAS. This includes reviewing and approving the environmental and social compliance reports submitted by EPAustral, as well as conducting environmental and social monitoring missions. This monitoring will be carried out during all phases of the Project.

7.3 Environmental and Social Management Plan

7.4 Construction ESMP

The guidelines for the Construction PGAS will be part of the Environmental and Social Technical Specifications of the bidding documents to be prepared by EPAustral for the execution of the works.

The preparation of the Construction PGAS, as well as its implementation, is the responsibility of the respective contractor. Approval of the Construction PGAS is the responsibility of EPAustral, with supervision by the IDB.

The PGAS will consist of a series of programs and subprograms. The following table provides a guide to the programs that should be included in the Construction PGAS.

Table 7-1: Construction PGAS Programs

Program number	Program
1	Monitoring and Control of Compliance with Measures
2	Installation of construction sites and activities
3	Air Quality
4	Water quality
5	Noise
6	Cultural Heritage
7	Pest and Vector Control
8	Waste management plan for construction sites

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Program number	Program
9	Socio-environmental training for workers
10	Occupational and Community Health and Safety

The following table shows the guidelines for each of the aforementioned programs of the Construction PGAS. These guidelines must be adapted to the specific characteristics of each project in the respective bidding documents.

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Table 7-2: Construction ESMP

Environmental and social impacts to prevent	Measures	Responsible	Monitoring/Follow-up	
			Indicators	Methodology
Program 1: Monitoring and Control of Compliance with Measures				
Deviations in the implementation of measures	Plan and maintain an up-to-date "control panel" to be used to supervise the execution of each of the measures planned for the Construction Phase. It shall indicate, at a minimum: i) actions to be implemented, ii) necessary material resources iii) personnel responsible iv) time milestones v) indicators of compliance with goals and frequency of monitoring for the defined measures.	Contractor	Number of ESHS (environmental, social, and health and safety) non-conformities identified during the month through inspections, visits, observations, and other mechanisms employed.	Document review and site visit
	If deemed necessary, work will be halted in order to implement measures to prevent potential environmental, social, and occupational health and safety impacts arising from the development of the works.	Contractor	- Number of ESHS non-conformities closed on time, as defined in the Corrective Action Plan. - Number of ESHS inspections carried out per month/Number of scheduled inspections for the month.	
	Verify that the sectoral permits required for the works have been obtained and are being complied with.	Contractor	Resolutions or other administrative acts of the authority granting the sectoral permits corresponding	Documentary review
	If, during the execution of the Project, non-compliance with the IDB NDAs, the Project Inspector will define, together with the	EPAustral/ Contractor	Corrective action plan	Review

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Environmental and social impacts to prevent	Measures	Responsible	Monitoring/Follow-up	
			Indicators	Methodology
	contractor and other authorities involved, an action plan for correction. This plan must contain at least: a description of the non-compliance found, corrective action, responsible party, date of implementation, compliance indicator, and necessary resources.			Documentary and site visit
Program 2: Installation of construction sites and activities				
Minimizing environmental impacts of the Contractor's facilities	Must include: Lighting, portable toilets for construction personnel, material storage area, spill containment equipment, construction signs, waste storage area, signage for heavy equipment and truck entry and exit, first aid kit, and electric generator with waterproof base, if necessary use them	Contractor	Measures of management measures implemented	Document review and site visit
	The telephone numbers of the relevant agencies and institutions must be available to deal with emergencies (fire department, hospitals, etc.).	Contractor		
	Have a fire protection system that is appropriate for the construction elements present on site and the materials stored. Personnel must be trained in the use of these elements and in first aid practices first aid.	Contractor		
	Implementation of portable toilets for workers, which will be maintained by an authorized company.	Contractor		
	The management of liquid effluents, whether wastewater, rainwater with possible contamination, or others that may be generated during the construction phase, must comply with the guidelines indicated in the PGAS	Contractor		
	Solid waste management (domestic, industrial, hazardous, and non-hazardous) will be carried out as indicated in the corresponding PGAS programs.	Contractor		
	The area for pedestrians, vehicles, and heavy machinery must be properly signposted.	Contractor		

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Environmental and			Monitoring/Follow-up	
to be prevented	Measures	Responsible	Indicators	Methodology
	At the end of construction activities, all remaining materials from the areas occupied by the Contractor must be removed.	Contractor		
	Drinking water for construction personnel will be provided by a water distribution company in bottles. The water required during the execution of the works will be provided by connection to the network or by tanker trucks.	Contractor		
	tankers			
Program 3: Air quality				
Minimize atmospheric emissions	Implementation of the following actions to minimize atmospheric emissions associated with the Project: - Trucks will be covered to prevent dust emissions. - In the port area, cranes and trucks will be regularly checked for abnormal emissions of pollutants, especially combustion gases. - Vehicles will not be allowed to run with their engines idling. - Periodic maintenance will be performed on machinery and equipment to control atmospheric emissions.		Measures of management measures implemented	Document review and site visit
	Estimate the greenhouse gases (GHG) that will be generated during the construction phase of the project, before the start of the construction phase.	Contractor	Report with GHG estimate	Document review
Program 4: Water quality				
Minimizing effects on marine water quality	Quarterly monitoring of marine water quality in the study area during the construction phase of the works. The purpose of this measure is to verify that construction activities in the marine environment will not cause significant changes in water quality. Prior to the start of construction, water quality monitoring will be carried out to gather information prior to the start of the works.	Contractor	Water quality monitoring report	Document review
Program 5: Noise				

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Environmental and social impacts to prevent	Measures	Responsible	Monitoring/Follow-up	
			Indicators	Methodology
Minimize increase of noise levels	Implementation of the following actions to minimize noise emissions associated with the Project: • Proper maintenance of vehicles. • Priority will be given to avoiding the simultaneous use of machinery and/or tools that may generate high noise levels. Likewise, priority will be given to carrying out these tasks during daylight hours. • Night work that generates low noise levels will be considered. • Trucks and equipment will be equipped with mufflers.		• Measures of Applicable management measures implemented	Document review and site visit
Program 6: Cultural Heritage				
Protocol for archaeological and/or paleontological finds	In the event of any archaeological and/or paleontological finds that may occur as a result of the project's construction activities, the owner shall proceed in accordance with Articles 26 and 27 of Law No. 17,288 on National Monuments and Article 23 of Regulation D.S. No. 484 on archaeological, anthropological, and paleontological excavations and/or surveys. Should the above situation arise, the owner shall halt work at the site of the find(s) and immediately notify the National Monuments Council in writing so that this body may take the necessary steps	Contractor	• Notice to Council of National Monuments • Measures indicated by authority implemented	Document review and site visit
Program 7: Pest and vector control				
Spread of pests and vectors	Hiring of an authorized company, whose responsibility will be carrying out pest disinfection,	Contractor	• Number of pest and vector disinfection and control applications carried out / Total number of pest and vector disinfection and control applications planned in the Program.	Document review
	Request and monitor the protocols for the products used for pest elimination.	Contractor		
	Manage waste generated by disinfection activities, ensuring that the company responsible for the activity removes the containers used	Contractor		

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Environmental and social impacts to prevent	Measures	Responsible	Monitoring/Follow-up	
			Indicators	Methodology
			- Certificates of disinfection - Proof of removal of containers	Di
Program 8: Waste management plan for construction sites				
Improper waste management of waste	Contractors shall submit a Construction Waste Management Plan to EPAustral for approval, which shall contain the method of handling and disposal of each type of waste generated during the construction phase.	Contractor	- Volume of each type of waste managed in accordance with defined standards / Total volume of each type of waste generated. - Waste transport and waste disposal	Document review.
	The contractor must dispose of waste using an authorized company, in compliance with local regulations.			
Program 9: Socio-environmental training for workers				
Missing of knowledge about the role of workers in caring for the environment and occupational safety in the performance of their duties.	Provide training to workers through a Training Program, with content tailored to the requirements of different jobs with environmental implications, and emergency response drills.	Contractor	- Percentage of personnel trained in accordance with the Training Program. - Percentage of training courses delivered out of the total number of training courses required in accordance with the Training Program. - Training Program. - Environmental training record sheets for construction personnel.	Document review.
	Code of Conduct			

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Environmental and social impacts to prevent	Measures	Responsible	Monitoring/Follow-up	
			Indicators	Methodology
	Develop and implement a Code of Conduct for Workers to be included in employment contracts (Contractor and Subcontractors). This Code prohibits harassment, violence or exploitation, and racism. Annex 2 includes a model code of conduct.	Contractor	Code of Conduct signed by all workers.	Document review.
	Arbitrate the necessary measures and precautions to avoid the generation of gender, social, political, cultural, or racial conflicts, and to prevent riots or disturbances by construction personnel and employees hired by them or by their subcontractors, as well as to preserve order, protect residents, and ensure the safety of public and private property within the project area.	Contractor		
	Apply sanctions, fines, or dismissals for non-compliance or violation of the established rules of conduct, depending on the severity of the offense.	Contractor		
	All construction personnel, regardless of their level in the hierarchy, must attend to talks and training sessions on the Code.	Contractor		
	Carry out at least two activities on non-discrimination and gender equality for all workers during the course of the project, focusing on the following topics: 1) Sexual exploitation of children and adolescents, including labor and criminal consequences; and 2) Relationships between men and women in the workplace.	Contractor		
Program 10: Occupational and Community Health and Safety				
Accidents and incidents affecting occupational and community safety and health	Driving measures			
	Mark off work areas and restrict operations to trained and authorized personnel in order to minimize the occurrence of possible accidents associated with the use of heavy machinery and equipment.	Contractor	Accident record s h e e t s	Document review
	Mark normal and emergency exits necessary for possible emergencies, in accordance with relevant regulations.	Contractor		
	All vehicles used for the transport of materials must comply with traffic regulations, tare weight, cargo transport permits, and all other applicable regulations.	Contractor		
	Industrial Health and Safety Subprogram			

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Environmental and social impacts to prevent	Measures	Responsible	Monitoring/Follow-up	
			Indicators	Methodology
	Before starting activities each day, conduct a risk assessment for each activity, "safe work analysis - ATS," and inform workers of the control measures and coordination that must be implemented to mitigate the identified risks.	Contractor	- Accident record sheets - PPE delivery record sheets	Document review
	Hold 5-minute safety talks every day before work begins. The topics will be scheduled according to the risks of the activities carried out as the work progresses. These talks will inform all personnel about unsafe acts and conditions detected the previous day, and about the root causes of any accidents that may have occurred.	Contractor		
	Procedures for carrying out activities safely.	Contractor		
	Check and inspect the proper functioning of safety and risk control equipment (e.g., fire protection equipment).	Contractor		
	Provide the appropriate personal protective equipment (PPE) necessary for all workers on the site.	Contractor		
	Delimit and demarcate work areas, storage areas, and traffic routes and sign exits, emergency exits, and facilities that pose any kind of danger.	Contractor		
	Personal Protective Equipment (PPE), Tools, and Equipment			
	Personal protective equipment (PPE) is mandatory and must be worn on construction sites in accordance with the risks of each activity.	Contractor	- Number of personnel using PPE according to the risk of the activity / Total number of personnel. - Training record sheets on the use of PPE.	Document review
	Provide PPE and conduct an induction for workers on the types of PPE available and their proper use. The induction will be conducted before starting work on the construction sites.	Contractor		
	The PPE to be supplied must comply with minimum safety specifications and no employee will be allowed to work without all the required PPE.	Contractor		

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Environmental and social impacts to prevent	Measures	Responsible	Monitoring/Follow-up	
			Indicators	Methodology
	Daily checks will be carried out to ensure that staff are wearing their Personal Protective Equipment in perfect condition. This will be one of the conditions for starting daily work.			
	Worker Complaint Mechanism			
	A mechanism for handling worker complaints and claims must be implemented. The contracting company must develop and implement a mechanism for receiving and responding to complaints and claims from direct workers and ensure that subcontractors have a similar mechanism in place. similar mechanism.	Contractor	Worker complaint mechanisms	Document review

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7.4.1 Reference index of minimum content for Construction PGAS

Below is a guide to the minimum content index for the preparation of Construction PGAS.

1. Cover
 - Name and location of the project and program
 - Name of the Work
 - Contractor's signature
 - Date of preparation of the Construction PGAS
 - Company environmental representative (responsible for implementing the PGAS): name, signature
 - Version control: table indicating revision date, person responsible for preparation, date and person responsible for approval, and main changes in the version
2. Table of Contents, including a list of all annexes
3. Introduction:
 - Objective and scope of the PGAS
 - Company, project, and location details
 - Company environmental, social, quality, and occupational health and safety policy
 - Code of Conduct for company employees, including, among other topics, the explicit prohibition of harassment or violence against women and children in the community and female employees of the company.
 - Professional responsible for implementing the PGAS (name, contact details)
 - Definitions of technical terms and acronyms used throughout the PGAS
4. Project description
 - Objective and components of the project
 - Scope and descriptive report of the work, construction methods
 - Basic description of environmental and social characteristics at the work sites
5. Legal regulations applicable to the project
6. Identification of environmental, social, and occupational health and safety risks and impacts during the construction phase
7. Measures. The measures identified must include:

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- Associated impact or risk
 - Monitoring and follow-up indicators
 - Target performance level values
 - Corrective actions in case of deviations
 - Timeline (when measures are activated, duration)
8. Detailed PGAS Environmental Management Programs (at the construction level)
9. Implementation and Operation
- Resources required for PGAS implementation (budget, materials, equipment, and human resources).
 - Roles: functional organizational chart for the project, function of each key position in terms of PGAS responsibility (Project Manager, Environmental Manager, Occupational Health and Safety Manager, Supervisors and Managers, Operational Staff, Subcontractors, and Suppliers).
 - Documentation: guidelines for the preparation, review, approval, and filing of documents related to the environmental and social management of the project.
10. Operational supervision
- Responsibilities for monitoring the implementation of the PGAS
 - Schedule for periodic review of the PGAS
 - Control and measurements: control measures to be implemented
 - Compliance assessment: accepted limit values, criteria
 - Requirements for reporting non-conformities, preventive, mitigating, corrective, and compensatory actions
 - Verification of the execution and effectiveness of preventive, mitigating, corrective, and compensatory actions
 - Reporting requirements
 - Record control
 - Audits
 - Reports on PGAS compliance indicators by contractor.
11. Appendices
- Environmental procedures
 - Model registration and control forms
 - Model form for internal environmental and social audits

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7.5 Operational PGAS

The following table indicates the minimum requirements that the Environmental and Social Management Plan must meet for the Operation Phase.

During this Phase, EPAustral will be responsible for the operation and maintenance of the infrastructure to be built, and will be responsible for the preparation and implementation of an EMS, in accordance with its Environmental Policy and the guidelines set out below.

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Table 7-3: ESMP for the Operation Phase

Plan/Program	Impact to be avoided	Minimum Measures	Responsible	Indicators and Compliance, Records
Safety Program and Occupational Health	Occupational risks due to maintenance tasks and facilities and equipment	- Compliance with current national and local regulations. - Adopt international best practices for occupational health and safety risk management systems.	EPAustral	Index of accident of accidents
Complaints and Claims Program	Impact on the local community and workers due to failure to address complaints and claims.	An efficient tool must be in place for receiving, recording, following up on, and resolving complaints related to the Project.	EPAustral	Spreadsheet of for complaints and grievances
Air of Air	Increase in atmospheric emissions	Implementation of measures to minimize atmospheric emissions associated with the Project. These measures are: - Trucks will be covered to prevent dust emissions. - In the port area, cranes and trucks will be regularly checked for abnormal emissions of pollutants, especially combustion gases. - Vehicles will not be allowed to run with their engines idling. - Periodic maintenance will be carried out on machinery and equipment to control atmospheric emissions.	EPAustral	Applicable management measures implemented
Noise	Increased noise levels	Implementation of actions to minimize noise emissions associated with the project. These actions are: - Use of low-noise machinery. - Proper maintenance of vehicles. - Proper maintenance of mufflers on mobile and stationary engines. - Preference will be given to the non-simultaneous use of machinery and/or tools that may generate high noise levels.	EPAustral	Applicable management measures implemented

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Plan/Program	Impact to be avoided	Minimum measures	Responsible	Indicators and Compliance, Records
Management Program of Pests a nd Pesticides (PMPP)	Pest pests of	A Pesticide and Pest Management Program (PMPP) will be implemented for the management of significant pests or activities that may lead to significant pesticide and pest management problems. The PMPP should include performance targets in its implementation monitoring and be monitored throughout the life of the project.	EPAustral	- Pest and Pesticide Management Program (PMPP) - Number of pest control applications carried out / Total number of pest control applications de planned in the Program.
Waste Management Plan	Inadequate waste management	An Internal Waste Management Plan will be developed, which must include the method of management and disposal of each type of waste generated during the operational phase. This includes both solid and liquid waste, hazardous and non-hazardous.	EPAustral	- Internal Waste Management Plan - Volume of each type of waste managed in accordance with defined standards / Total volume of each type of waste generated. - Certificates for transport and disposal of waste
washing Reefer containers		A guardrail will be installed for washing Reefer containers, as well as a plan for managing this water to ensure its proper handling.	EPAustral	- Railing installed - Washwater Management Plan - Certificates for the transport and disposal of waste in the event of applicable

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7.6 ESMP Budget

The following table includes the estimated costs and responsible parties for monitoring the Environmental and Social Management Plans for the Project under analysis.

Table 7-4: Reference costs and responsible parties for PGAS implementation

Measure	Description	Estimated Cost	Responsible
Incorporation of socio-environmental clauses in the bidding terms and conditions	Inclusion of socio-environmental clauses in the bidding terms and conditions	Included in EPAustral's operating budget	EPAustral
Obtaining of sectoral permits	Management of sectoral permits	1.5% of the cost of the work	Contractor
Implementation of PGAS Construction Measures and Programs	Preparation of the Construction PGAS and implementation during construction and socio-environmental monitoring of the project		
Implementation of PGAS Measures and Programs for the Operational Phase	Preparation of the PGAS for the Operation Phase	1.0% of the cost of the work	EPAustral

The cost of implementing the PGAS measures and programs indicated in the table above is for reference purposes only. In the case of the Construction PGAS, the Contractor, as the party contractually responsible for its preparation and implementation, will use a cost estimate based on its experience, cost structure, and final detailed engineering designs.

With regard to the Operation PGAS, EPAustral shall make a cost estimate based on its experience and cost structure.

The cost indicated does not constitute a prescriptive element of contractual obligation, since the implementation of the PGAS is monitored exclusively in terms of its performance (results), and not in terms of the inputs used (resources invested by the Contractor and EPAustral). However, the minimum percentage of funds to be allocated to the socio-environmental management of each of the projects must never be less than 1% of the total amount of the Project.

PROJECT TO SUPPORT THE IMPLEMENTATION OF THE MAGALLANES H2V PROJECT: DEVELOPMENT OF ENABLING PORT INFRASTRUCTURE - CHILE - CH- L1191

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Report prepared for EPAustral

Report 929 – 2025

November 2025

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CHAPTER 8 - SUMMARY AND CONCLUSIONS

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Version	Rev.1	
Date	November 7, 2025	
Status	Document for dissemination	
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8 SUMMARY AND CONCLUSIONS

The following is a summary of the Environmental and Social Impact Assessment (ESIA) for the Magallanes Project: Development of Enabling Port Infrastructure, together with its conclusions.

8.1 General Background

The José de los Santos Mardones Port (hereinafter Puerto Mardones) is a maritime terminal located in the city of Punta Arenas, Magallanes Region, Chile, and its main activity is associated with cargo transfer and services to container ships. It also serves smaller ships and cargo ships, which carry lower levels of cargo but make more frequent calls, and during the tourist season it occasionally serves international passenger ships.

This project seeks to improve the operation of the Mardones dock, increasing its capacity by extending the berthing area to meet future demand and improve safety conditions in its maritime operations.

The main elements of the project were analyzed in order to properly assess its environmental and social impacts, in accordance with its nature, scale, and level of potential risks and impacts, and to verify compliance with applicable national legislation and the Sustainability Policies of the IDB and IDB Invest.

8.2 Project Description

8.2.1 General background

The project consists of the following:

- Acquisition of two port cranes, which will increase loading and unloading speed, reduce ship turnaround time, and consequently optimize the terminal's operational capacity.
- To implement the aforementioned cranes, work is being carried out to reinforce the slab, which consists of installing steel beams.

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- Extension of the pier head by 200 linear meters and 25 meters in width, incorporating a new access bridge at the southern end of the projected pier head, 120 meters long.
- Enabling of a cargo storage area.

The project does not include dredging activities.

8.3 Compliance with Chilean regulations and those of the IDB Group.

The regulatory compliance analysis included the applicable Chilean legal framework, particularly the Environmental Impact Assessment System (SEIA). This is the main preventive environmental management tool, and it allows for determining whether a project complies with current environmental legislation, as well as whether it addresses potential environmental impacts. It is established by Law 19,300 on General Environmental Principles, enacted on March 1, 1994, and amended by Law 20,417 of November 13, 2010. With regard to the SEIA, Law 19,300 is regulated by Supreme Decree 40/12, Regulations of the Environmental Impact Assessment System (RSEIA).

Furthermore, Article 26 of the RSEIA states that project owners may contact the Regional Director or Executive Director of the Service *"to request a ruling on whether, based on the information provided for this purpose, a project or activity, or its modification, must be submitted to the Environmental Impact Assessment System."* This mechanism is called the Consultation on Relevance of Entry, and it corresponds to the mechanism used by the Project to determine that it does not require mandatory entry into the SEIA.

The Project submitted three Admissibility Consultations to the Environmental Assessment Service (SEA), one for each pier extension alternative and one for the installation of a crane and reinforcement of the slab. The inquiry submitted for alternative 1 was filed on May 2, 2024, and was resolved by Res. Ex. No. 20241210199. The inquiry submitted for alternative 2 was filed on September 12, 2024, and was resolved by Res. Ext. No. 202412101175, while the inquiry regarding the installation of the crane and reinforcement of the slab was submitted on February 5, 2020, and was resolved by Res. Ext. No. 101/2020/556. In all three resolutions, the authority concluded that the Project does not require mandatory submission to the SEIA.

On the other hand, various additional regulatory bodies are also applicable to the Project, each of which was analyzed in terms of its applicability to the project, and the

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how the Project complies with these regulations. The topics covered include the following: environmental assessment; environmental oversight; marine environment; air; noise; solid waste; liquid waste; drinking water; natural or artificial waterways; hazardous substances; radioactive substances; explosives; fuels; roads and transportation; electrical energy and liquid fuels; flora and vegetation; fauna; cultural heritage and landscape; and land use and territorial planning.

In addition, the IDB Group's policies applicable to the PE project were analyzed and reviewed, including the IDB's Environmental and Social Policy Framework (hereinafter MPAS), in force since 2021, and its ten environmental and social performance standards; the IDB Invest sustainability policy, in force since 2020, including its five commitments and the eight performance standards of the International Finance Corporation (IFC) referred to in this policy.

8.4 Diagnosis and socio-environmental characterization of the area of influence

The diagnosis and characterization of the project's area of influence was carried out for the following environmental components:

- a) Physical environment: The characterization of the physical environment of the study area is based on secondary information collected on the components of climate and meteorology, air quality, risks, vibration levels, hydrology, hydrogeology, and marine water resources.
- b) Biotic environment: The characterization of the biotic environment of the study area is based on information collected on the components of wildlife and marine biota.
- c) Critical habitats: As part of the characterization of the biological environment, critical habitats were identified following the criteria and guidelines of the Inter-American Development Bank (IDB) Environmental and Social Performance Standards (ESPS), in particular ESPS 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources. No critical habitats were identified in the study area. The area closest to the Project that meets critical habitat criteria is located more than 1.6 km away and corresponds to the Tres Puentes Urban Wetland: a legally protected area classified as an urban wetland.
- d) Human environment: The contents of the characterization of the human environment and indigenous peoples component address the following topics: Population Structure, Migration,

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sociocultural conditions, socioeconomic conditions, poverty and social vulnerability, and priority ecosystem services.

- e) Cultural heritage: The characterization of the cultural heritage of the study area was based on secondary information on the terrestrial archaeology component.

8.5 Impact assessment

The environmental impact assessment of the Project was carried out in accordance with the guidelines set out in the documents "*Environmental, Health, and Safety Guidelines for Ports, Port Areas, and Terminals*" (IFC, 2017) and "*Environmental, Health, and Safety Guidelines for Maritime Transport*" (IFC, 2007). The main environmental issues relevant to the construction and operation of ports and terminals include the following:

- Biodiversity and alteration of terrestrial and aquatic habitats
- Resilience to climate change
- Water quality
- Air emissions
- Waste management
- Management of hydrocarbons and hazardous materials
- Noise and vibrations

In addition, issues related to cultural heritage, the human environment, and indigenous peoples are analyzed.

As a result of the analysis carried out, it was determined that no significant impacts will be generated in any of the phases of the Project.

In addition, an assessment of the Project's disaster risks was carried out, taking into account the IDB's Environmental and Social Policy Framework (ESPF) and Environmental and Social Performance Standards (ESPS).

The disaster risk analysis indicated that, as a result of the exposure assessment (Step 1), supplemented by the criticality and vulnerability analysis (Step 2) of the Project, it is classified overall as Low.

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Notwithstanding that the Project does not generate significant impacts, environmental measures were established to be incorporated into the construction and operation phases of the Project, which are presented in Chapter 7 of the EIAS: Action Plan.

8.6 Plan of Measures

With the objectives of: safeguarding environmental quality or minimizing negative effects in the project study area; comply with environmental laws and regulations applicable to the project; ensure that the development of the venture is carried out in an environmentally responsible manner; and anticipate and implement explicit and specific actions to prevent or correct the potential environmental impacts identified, a Plan of Measures was established, the details of which are presented in Chapter 7 of the EIAS and consider the following aspects:

- Air Quality
- Water Quality
- Noise
- Cultural Heritage
- Pest and Pesticide Management
- Waste Management at Construction Sites
- Waste Management in Operation
- Reefer Container Wash Water Management
- Code of Conduct Update
- Complaints and Claims Management Mechanism for Workers
- Emergency Plan Update
- Budget for measures

8.7 General conclusions

From the analysis of the potential environmental, social, gender, occupational health and safety, and disaster risk impacts, the following general conclusions were reached:

1. No significant impacts were identified that would require the establishment of mitigation, remediation, and compensation measures.
2. A detailed review of the legislation applicable to the Project, both at the local level and that applicable as a result of financing by the IDB and IDB Invest, confirmed that the Project is aware of the applicable regulatory framework and has

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presented sufficient evidence to guarantee compliance during the different stages of the Project.

3. All identified impacts are managed through appropriate measures.
4. The Project identified the stakeholders and developed an appropriate participation plan for them, as well as a consultation process to comply with IDB and IDB Invest policies.

In summary, based on a review of the background information available for the Project and as a result of the assessment of the environmental and social impacts reviewed, all of which are detailed in this EIAS, it can be concluded that the Project has implemented the impact mitigation hierarchy approach, prioritizing the avoidance of impacts, then minimizing them, and finally managing residual risks and impacts in the environmental, social, gender, and health and safety areas through various measures.

As a result of the above, if the Action Plan detailed in this EIAS is implemented, it will allow for the proper implementation of measures at different stages of the Project, enabling its execution in an environmentally and socially sustainable manner.