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|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  | |
| | ÁREA DE INFLUENCIAE | Page 1 of 15 | |
| | GAT-391-15-CA-AM-PIO-01 | Review: | |

AREA OF INFLUENCE

| | | | | | |
|---------------|-------------|--------------------|---|-----------------|---------------------|
| B | 14/10/2015 | Area of influence | Janeth Viviana Pérez, July Bibiana Salazar, Isabel Panesso, Andrea Fontecha | Esteban Rendón | María Andrea Patiño |
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| REVIEW | DATE | DESCRIPTION | ELABORATED | REVIEWED | APPROVED |

Review A: Issued for Customer Comments

Review B: Issued for Client Approval

Review 0: Approved for Basic Engineering





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|---|---|---|--|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  | |
| | ÁREA DE INFLUENCIAE | Page 2 of 15 | |
| | GAT-391-15-CA-AM-PIO-01 | Review: | |

TABLE OF CONTENTS

| | Page. |
|--|--------------------------------------|
| 4.1 Definition, identification and delimitation of the area of influence ¡Error! Marcador no definido. | |
| 4.1.1 Abiotic environment | ¡Error! Marcador no definido. |
| 4.1.2 Biotic environment | ¡Error! Marcador no definido. |
| 4.1.3 Socioeconomic Environment | ¡Error! Marcador no definido. |

| | | | |
|---|---|---|--|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  | |
| | ÁREA DE INFLUENCIAE | Page 3 of 15 | |
| | GAT-391-15-CA-AM-PIO-01 | Review: | |

LIST OF FIGURES

Page.

Figure No. 1.1 Area of influence for the abiotic environment – component geology geomorphology and geotechnics..... **¡Error! Marcador no definido.**

Figure No. 4.2 Area of influence for the abiotic environment – soil components, landscape, water quality and continental and marine sediments... **¡Error! Marcador no definido.**

Figure No. 4.3 Area of influence for the abiotic environment – atmospheric component **¡Error! Marcador no definido.**

Figure No. 4.4 Area of influence for the biotic environment..... **¡Error! Marcador no definido.**

Figure No. 4.5 Area of social influence..... **¡Error! Marcador no definido.**



LIST OF TABLES

Page.

Table No. 1.1 Area (ha) of vegetation cover present in the area of biotic land influence **¡Error! Marcador no definido.**

LIST OF MAPS

| Map Name | Topic |
|-----------------------|---------------------------|
| MOD_LA_PTO_ANT_03_AIA | Abiotic area of influence |
| MOD_LA_PTO_ANT_04_AIB | Biotic area of influence |



| | | | |
|---|---|---|--|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  | |
| | ÁREA DE INFLUENCIAE | Page 4 of 15 | |
| | GAT-391-15-CA-AM-PIO-01 | Review: | |

Map Name

MOD_LA_PTO_ANT_05_AIS

Topic

Socioeconomic area of influence

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|---|---|---|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  |
| | ÁREA DE INFLUENCIAE | Page 5 of 15 |
| | GAT-391-15-CA-AM-PIO-01 | Review: |

4. AREA OF INFLUENCE

In accordance with the terms of reference for the preparation of the Environmental Impact Study - EIA in construction projects or expansion and operation of deep sea ports (MM-INA-05), the area of influence was raised according to the unit minimum that is going to be analyzed. Below are the areas of influence for each abiotic, biotic and socioeconomic environment.



However, it is important to clarify that in the present delimitation of the area of influence, the routes of mobilization of the vessels that would carry out the deepening dredging towards the dump area were not considered. Given that based on the regulations of the IMO (International Maritime Organization) and within its agreements to ensure the safety of human life at sea, the rules of that authority were reviewed to establish possible routes for the mobilization of these boats. Within the revised standards are: The SOLAS (Safety of Life at Sea) and the COLREG (International Regulations for Preventing Collisions at Sea).

Based on the SOLAS regulations and especially chapter V, which applies to all ships and on any trip, it is related to the safety of navigation, where Rule 34, "Safe navigation and avoiding dangerous situations", for which will describe a defeat (Maritime Corridor) at the discretion and verification of the Captain of the vessel, in which the following criteria will be taken into account:

1. Relevant maritime traffic management systems.
2. Have enough space at sea to ensure the safe transit of the ship during the trip.
3. Procedures for prevention against all navigational hazards (known) and adverse weather conditions.
4. Consider the measures of protection of the marine environment applicable and avoid, actions and activities that may cause damage to the environment.

Within the regulations of COLREG in its part A, rule 1, it is indicated that these rules apply to all ships on the high seas and in all waters that have communication with it and are navigable by sea-going vessels.

In this regard, as a contribution to the criterion for the definition of possible navigation routes and alternative routes are the following considerations:

| | | | |
|---|---|---|--|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  | |
| | ÁREA DE INFLUENCIAE | Page 6 of 15 | |
| | GAT-391-15-CA-AM-PIO-01 | Review: | |

From the point of view of maritime navigation, it is not possible to define a specific navigation route for vessels, since it is the faculty and responsibility of the Captain and the navigation officers of the vessel to determine the safest corridor based on IMO regulations.

Maritime routes cannot be defined corridors, since these are defined by the ship on behalf of the Captain and can be modified at any time if the captain (according to meteorological conditions and / or any condition that represents some danger to the navigation or human life) provides for the safety of people, the ship and the environment.

4.1 Definition, identification and delimitation of the area of influence



4.1.1 Abiotic environment

The areas of influence were defined by component and group of components with the minimum unit of analysis according to the activities and/or works that will be executed in the modification of the environmental license for the construction and operation of the Port Terminal of Solid Bulk in the Municipality of Turbo, which are associated by the relationship of the manifestations of the environmental impacts in the area of intervention and the magnitude of the affectation that the construction of the infrastructure for the port terminal (Onshore and Offshore) can generate, the realignment and improvement of the access road from the Nueva Colonia township to the access to the Onshore Terminal, the jetty over the León River, the bridge and the viaduct that crosses a dense high mangrove area.

In this sense, criteria were defined by component and group of components, subsequently the layers of some components were superimposed and a total of three (3) areas of influence for the abiotic environment were delimited (map MOD_LA_PTO_ANT_03_AIA).



Below are the criteria for the components and / or groups of components considered for the delimitation of the abiotic area of influence of the project.

- *Components Geology, geomorphology and geotechnics*

| | | | |
|---|---|---|--|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  | |
| | ÁREA DE INFLUENCIAE | Page 7 of 15 | |
| | GAT-391-15-CA-AM-PIO-01 | Review: | |

The area of influence for these components is comprised by 2,233 ha (Figure No. 1.1), which was delimited based on the geological units contained in the intervention areas of the project, both Onshore and marine, however, given that the units identified for the project are very extensive such as alluvial deposits (Qal), recent Fluvial marine deposits (Qfm) and marine deposits (Qm) which will not be affected in their entirety by the construction of the project, the units were bounded to an area that allow to relate the geological, geomorphological and geotechnical characteristics of the study area, taking into account the formations of the beaches and being able to show the evolution of the coastline closest to the project.

In this regard, it was delimited to the North-East with the geological unit Alluvial Deposits (Qal) before beginning the settlement of the houses in the Nueva Colonia district of the municipality of Turbo - Antioquia and the NN ravine that passes through the east side of the township New Colonia until reaching the mouth of Bahía Colombia. To the South - West with a unit Recent fluvial marine deposits (Qfm) up to the end of the coastline and the delta of the León River and to the west were delimited with the unit Marine deposits (Qm) where the marine wharf will be built and the activities of dredged with a dispersion halo of 450 m and the dump area.

| | | | |
|---|---|---|--|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  | |
| | ÁREA DE INFLUENCIAE | Page 8 of 15 | |
| | GAT-391-15-CA-AM-PIO-01 | Review: | |

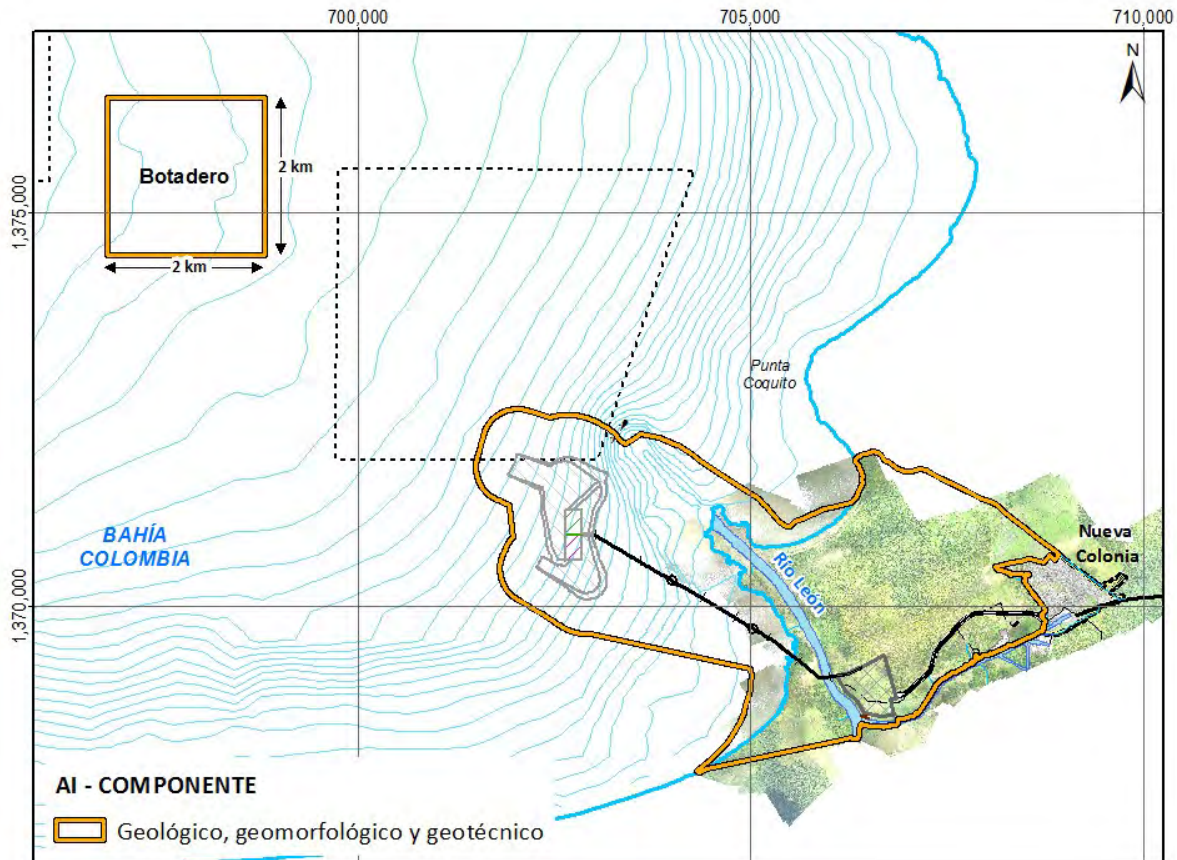




Figure No. 1.1 Area of influence for the abiotic environment - component geology, geomorphology and geotechnics
Source: Aqua & Terra Consultores Asociados S.A.S., 2015

- *Components of soils and land uses, landscape, water quality and continental and marine sediments*

The area of influence for these components is comprised of 1,313.2 ha (Figure No. 4.2), which was delimited using the cartographic units with the crossing of the existing land cover in the intervention area. The cartographic units correspond to the Jetty Consociation (EM), Bihao Consociation (BI), Honda Association (LH) and Carepa Consociation (CE), prevailing the landscape of marine plain, lacustrine and alluvial fluvial. In terms of land cover, it was identified that most of them correspond to plantain and banana crops and clean pastures, and in smaller strips there is

| | | | |
|---|---|---|--|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  | |
| | ÁREA DE INFLUENCIAE | Page 9 of 15 | |
| | GAT-391-15-CA-AM-PIO-01 | Review: | |

gallery forest, open shrubs, secondary high and low vegetation, fragmented forests, vegetation high secondary and dense high mangrove.



The delimited area has an East-West direction until the township of Nueva Colonia and limits to the South with the left bank of the León River and Nueva Colonia canal and to the West it is delimited by the right margin of the León River to Bahía Colombia.

The fluvial area of influence is composed in a South - North direction by the León River, which is delimited by a section of the river section with a water round of 30 m from the mouth of the Nueva Colonia canal to the León River, until downstream of the bridge over the Leon River, parallel to the high dense mangrove covers. This strip of the river was considered, since the area is currently intervened with constant dredging of cleaning for navigability for commercial purposes for the transit of banana boats, on the other hand, it was considered that intervention activity on the León River by construction and operation of the pier and the bridge will not generate considerable alterations in the ecosystem.

For the section of the viaduct in the Offshore zone the area approved by the National Authority of Environmental Licenses - ANLA was maintained by Resolution 0032 with a buffer of 30 m on each side measured from the axis of the viaduct.

For the marine intervention area by the dock (offshore water terminal) and deepening dredging, a buffer of 450 m was considered from the deepening dredging area considering the design slopes where the maneuvering activities will be executed, berthing boats and access channels.

For the area where the deepening dredging material called "Botadero" will be deposited, it was delimited according to the perimeter of the dump, 1.4 km long and 1.4 km wide, with a halo of 300 meters for a polygon end of 2 km in length by 2 km in width.

| | | | |
|---|---|---|--|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  | |
| | ÁREA DE INFLUENCIAE | Page 10 of 15 | |
| | GAT-391-15-CA-AM-PIO-01 | Review: | |

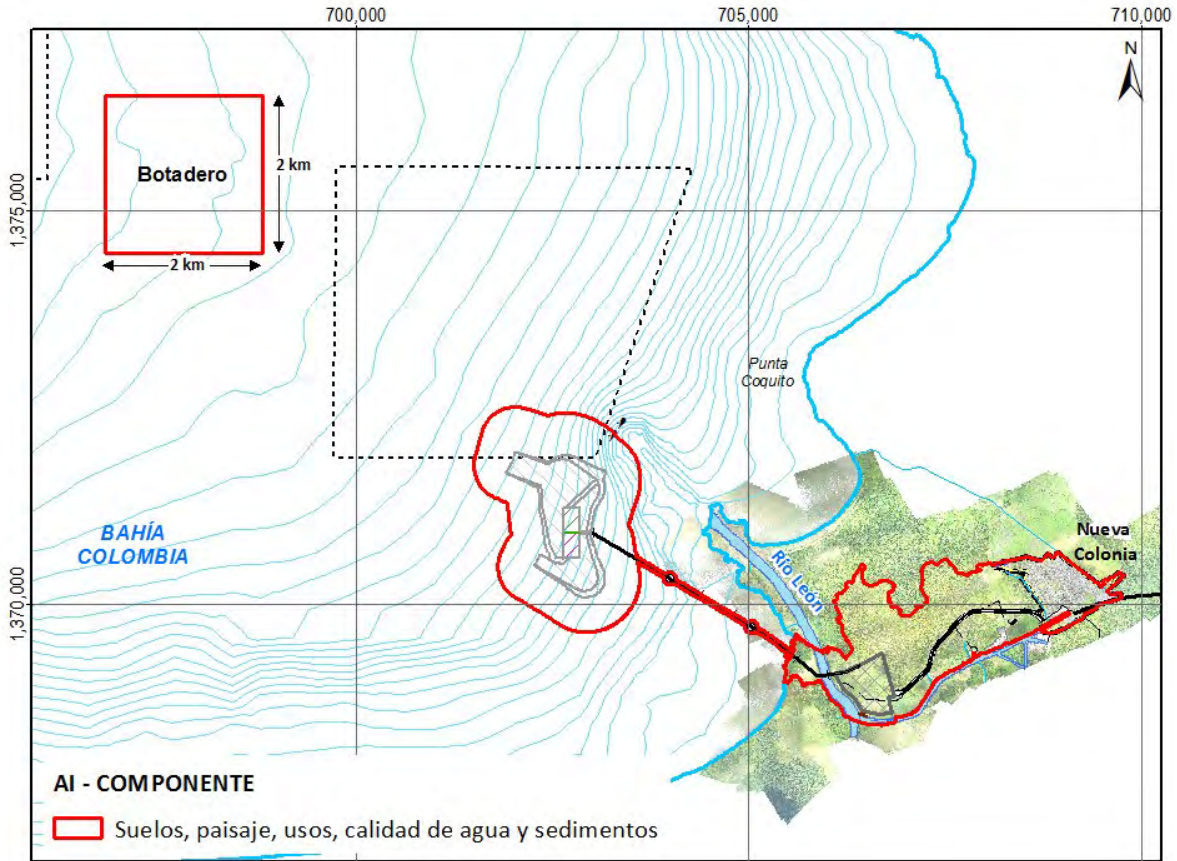




Figure No. 4.2 Area of influence for the abiotic environment - soil components, landscape, water quality and continental and offshore sediments
Source: Made by Aqua & Terra Consultores Asociados S.A.S., 2015

- *Atmospheric component*

The area of influence of the atmospheric component is comprised of 1,681.0 ha (Figure No. 4.3), which was delimited according to the environmental noise modeling performed for the viaduct that starts at the terminal on land to the terminal in seawater and for the access road from the Nueva Colonia township to the Project site.

In this regard, it was delimited by means of the tool Geographical Information System - SIG with the crossing of the diurnal and nocturnal isophones, having as limit the maximum level allowed by the norm, which corresponds to 45 dB at night for the Sector D. Suburban or rural zone of tranquility and moderate noise, which is the

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|---|---|---|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  |
| | ÁREA DE INFLUENCIAE | Page 11 of 15 |
| | GAT-391-15-CA-AM-PIO-01 | Review: |

most restrictive of Colombian regulations, as established in Resolution 627 of 2006; additionally, the limit to the dispersion halo of the area that was considered in the marine part was considered. It will be dredged for the deepening of the maneuvering zone, embarkation and disembarkation and access channel.

It is worth mentioning that air quality modeling was not considered, since the concentrations of the criteria pollutants (NO₂, SO₂, CO, PM₁₀) presented very low levels of contamination, comparing them with the Colombian regulations, namely Resolution 610 of 2010, which comply with the maximum limits established and the areas are contained within the isophones.

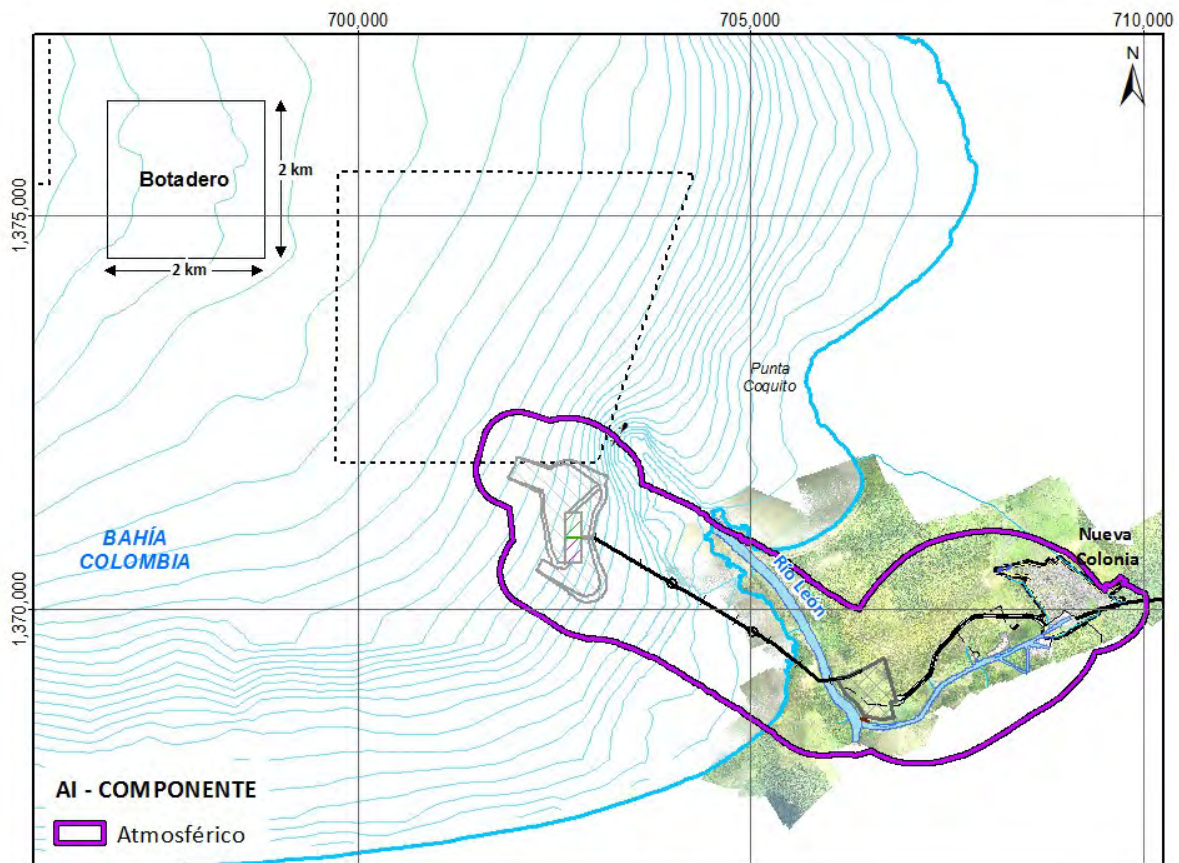




Figure No. 4.3 Area of influence for the abiotic environment - Atmospheric component
Source: Aqua & Terra Consultores Asociados S.A.S., 2015

| | | | |
|---|---|---|--|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  | |
| | ÁREA DE INFLUENCIAE | Page 12 of 15 | |
| | GAT-391-15-CA-AM-PIO-01 | Review: | |

4.1.2 Biotic environment

In accordance with the terms of reference for the preparation of the environmental impact study - EIA in construction projects or expansion and operation of deep sea ports (MM-INA-05), the area of influence must be proposed based on the minimum unit to be analyzed. Following the foregoing, the area of influence of the biotic environment in the Onshore portion of the project was delimited using as a minimum unit of analysis the present vegetation cover, with the New Colonia canal as the arcifinius limit. The identified vegetation coverings are the following: open shrub, arracachal, gallery and / or riparian forest, fern, dense wooded land with wooded and non-wooded land, dense flooded grassland, high dense mangrove, palm groves, wooded and clean pastures, plantation of hardwoods, banana and banana and high and low secondary vegetation. Table No. 4.1 shows the area (ha) that each coverage presents.



Table No. 4.1 Area (ha) of vegetation cover present in the area of biotic land influence

| Vegetable cover | Area (ha) |
|------------------------------------|---------------|
| Palm grove | 147,59 |
| Clean pastures | 92,33 |
| Dense flooded herbage not wooded | 51,31 |
| Plantain and banana | 11,17 |
| Gallery and / or riparian forest | 9,06 |
| High dense mangrove | 6,98 |
| Dense grassland wooded ground | 4,87 |
| Open shrub | 4,26 |
| High secondary vegetation | 4,12 |
| Low secondary vegetation | 3,80 |
| Arracachal | 2,81 |
| Dense grassland of non-wooded land | 2,12 |
| Woodland pastures | 0,79 |
| Fern | 0,60 |
| Plantation of hardwoods | 0,04 |
| TOTAL | 341,85 |

Source: Made by Aqua & Terra Consultores Asociados S.A.S., 2015

To define the area of influence in the coastal aquatic part, the principle of coverage was maintained by splicing these on both banks of the León River, comprising part of the Nueva Colonia canal up to the mouth of the León River.

To define the area of marine influence, the area approved by the National Authority of Environmental Licenses - ANLA in Resolution 0032 was maintained, which states

| | | | |
|---|---|---|--|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  | |
| | ÁREA DE INFLUENCIAE | Page 13 of 15 | |
| | GAT-391-15-CA-AM-PIO-01 | Review: | |

that "... which comprises the 60 m wide strip, measured 30 m each side of the axis ... " For the platform that will be built in the marine part, the dredging polygon was used as a criterion. This is because in this area the sediments are mostly made of fine material, mainly clay, silt, and sand, and from studies conducted in areas where the dredging material is similar to that presented in Bahía Colombia, it can be estimated that the dispersion of sediments is at the mouth of the dredger, so that the impact on marine diversity will occur punctually in the place where the dredging process will take place.

Following the above, in Figure No. 4.4 (map MOD_LA_PTO_ANT_04_AIB) the Biological Influence Area (AI) is presented.

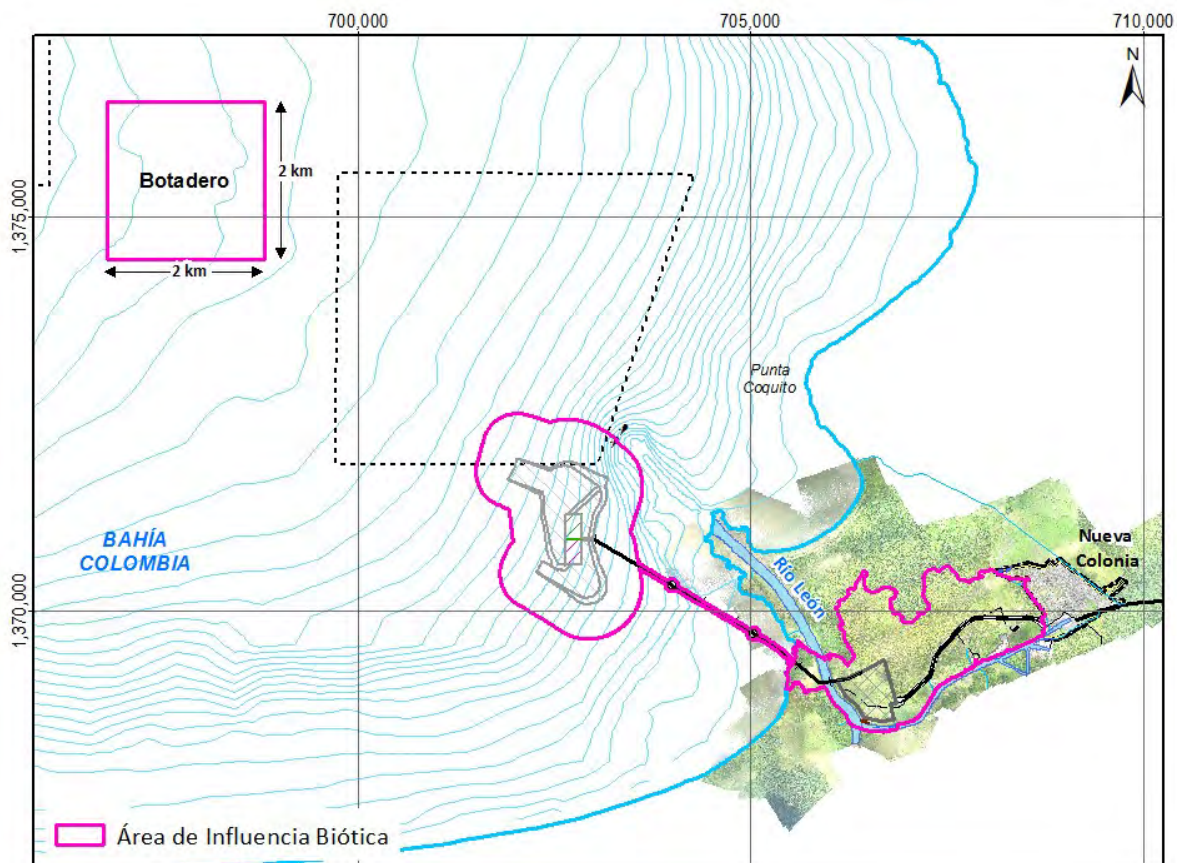




Figure No. 4.4 Area of influence for the biotic environment
Source: Aqua & Terra Consultores Asociados S.A.S., 2015

| | | | |
|---|---|---|--|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  | |
| | ÁREA DE INFLUENCIAE | Page 14 of 15 | |
| | GAT-391-15-CA-AM-PIO-01 | Review: | |

4.1.3 Socioeconomic Environment

To define the area of influence of the Construction and Operation Project of a Port Terminal of Solid Grids in the Municipality of Turbo in the socioeconomic component, it is proposed to have the information contained in the baseline of the environmental impact study carried out in 2012 by the company Araujo Ibarra Asociados SA, as well as the requirements made by the environmental authority -ANLA- set forth in Resolution 0032 of 2012, supplemented with the information collected in the field visits made to the project area and the analysis of the modifications that will be made to the project.



The area of influence of the project is defined as the town center of the Township de Nueva Colonia and the section of the road that connects the town center with the area where the construction of the port is planned. Its clear influence only corresponds to the path that will be rectified.

Additionally, a marine area that corresponds to the polygon where the marine wharf is planned is incorporated within the area of socioeconomic influence. This area is included due to the eventual presence of population carrying out artisanal fishing activities in the area.

Regarding the interference or affectation to the artisanal fishing routes, it is necessary to consider that currently in the area loading and unloading operations are carried out in the authorized anchorage areas and, therefore, the fishermen are accustomed to the navigation and presence of larger vessels.

Additionally, artisanal fishing activities, once the information corresponding to the fishing grounds identified by INVEMAR has been reviewed and the monitoring and fishing effort activities have been carried out; It is concluded that in the possible routes of transit of vessels that would carry out the deepening dredging, no fishing grounds were identified.

Following the above, in Figure No. 4.5 (map MOD_LA_PTO_ANT_05_AIS) the Social Influence Area (AS) is presented.

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|---|---|---|--|
|  | MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO |  | |
| | ÁREA DE INFLUENCIAE | Page 15 of 15 | |
| | GAT-391-15-CA-AM-PIO-01 | Review: | |

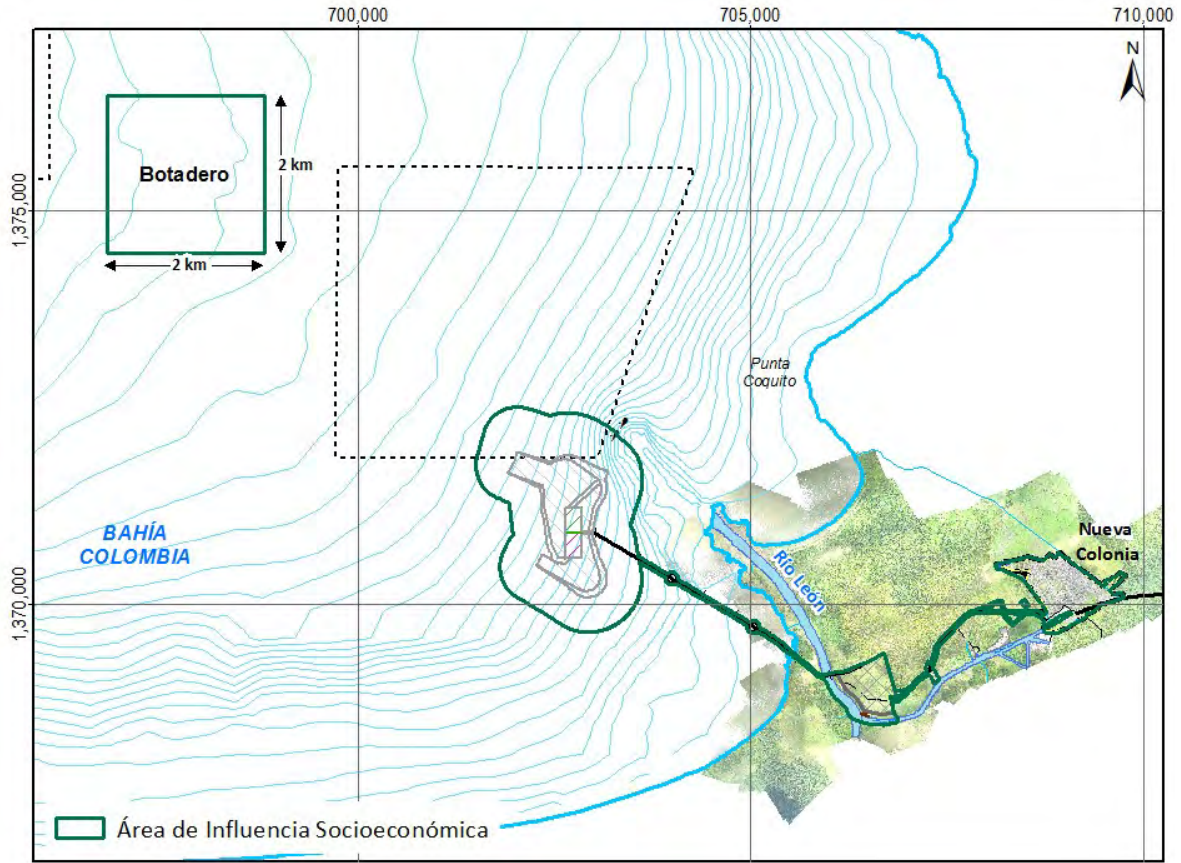


Figure No. 4.5 Area of Social Influence
Source: Aqua & Terra Consultores Asociados S.A.S.