ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT, PUERTO BOLÍVAR PROJECT – PHASE 1

– PROJECT PRESENTATION AND DESCRIPTION –

Prepared for:

YILPORT TERMINAL OPERATIONS, YILPORTECU S.A.

Prepared by:

ECOSAMBITO C.LTDA.

December 2020

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DATASHEET

SPONSOR INFORMATION	
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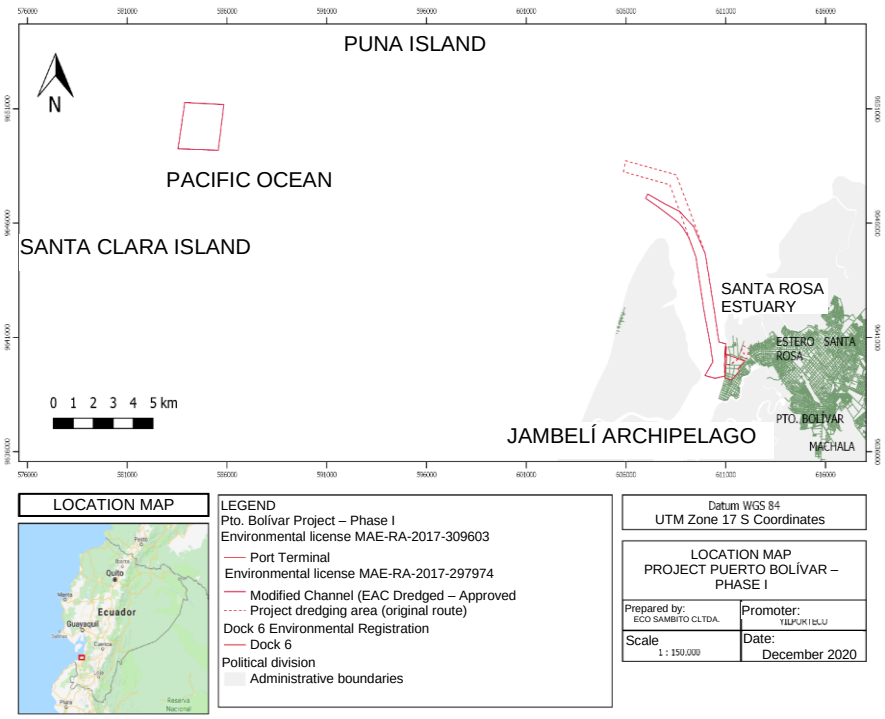
Company type	Public-Private Partnership

PROJECT DATA	
Project name	ENVIRONMENTAL AND SOCIAL ASSESSMENT OF THE PUERTO BOLÍVAR PROJECT – PHASE 1
Environmental permits	• MAE-RA-2017-309603 • MAE-RA-2017-297974 • MAE-SUIA-RA-DPAEO-2019-215758
Project phase	Construction and operation
Principal activities (CCAN Code) [National Environmental Catalog Classification]	• Commercial port construction and operation • River and/or ocean source dredging works construction and/or operation
Location	Parroquia Puerto Bolívar, Machala – El Oro

Location Map



Coordinates

Access channel, maneuvering area, docks and sediment deposit basin, as stated in the Intersection Certificate of the current Environmental License.

Universal Transverse Mercator Projection U.T.M. WGS 84 World Geodesic Reference System - Zone 17 South

Points	Latitude (X)	Longitude (Y)	Description
1	610956	9639311	Polygon 1
2	610478	9639203	Polygon 1
3	609957	9639327	Polygon 1
4	610347	9639925	Polygon 1
5	610216	9640713	Polygon 1
6	609917	9642098	Polygon 1
7	609498	9644527	Polygon 1
8	608686	9646508	Polygon 1
9	608189	9647676	Polygon 1
10	605878	9648244	Polygon 1
11	605974	9648726	Polygon 1
12	608511	9648113	Polygon 1
13	609175	9646587	Polygon 1
14	609970	9644652	Polygon 1
15	610433	9642109	Polygon 1
16	610654	9640792	Polygon 1
17	611014	9640712	Polygon 1
18	610931	9639816	Polygon 1
19	611233	9639806	Polygon 1

Port Terminal

20	611697	9640103	Polygon 1
21	611804	9640152	Polygon 1
22	611854	9640142	Polygon 1
23	611923	9640297	Polygon 1
24	611766	9640387	Polygon 1
25	611866	9640633	Polygon 1
26	612023	9640556	Polygon 1
27	612171	9640506	Polygon 1
28	612139	9640341	Polygon 1
29	612088	9640197	Polygon 1
30	612036	9640065	Polygon 1
31	611852	9640125	Polygon 1
32	611804	9640149	Polygon 1
33	611699	9640100	Polygon 1
34	611234	9639805	Polygon 1
35	610931	9639814	Polygon 1
36	610956	9639311	Polygon 1
1	583544	9649248	Polygon 2
2	583880	9651278	Polygon 2
3	585837	9651184	Polygon 2
4	585560	9649187	Polygon 2
5	583544	9649248	Polygon 2

Dock 6

Points	Latitude (X)	Longitude (Y)	Description
1	611290	9639124	Polygon 1
2	610952	9639220	Polygon 1
3	610966	9639464	Polygon 1
4	611047	9640244	Polygon 1
5	611941	9639964	Polygon 1
6	611608	9639609	Polygon 1
7	611680	9639532	Polygon 1
8	611290	9639124	Polygon 1

Points	Latitude (X)	Longitude (Y)	Description
1	610967	9640593	Polygon 1
2	611029	9640590	Polygon 1
3	611010	9640219	Polygon 1
4	611048	9640217	Polygon 1
5	611044	9640138	Polygon 1
6	610944	9640144	Polygon 1

	7	610967	9640593	Polygon 1

CONSULTING COMPANY	
Company name	ECOSAMBITO C. LTDA.
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CONSULTANT TEAM		
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PRESENTATION

This document is to comply with the requirements set forth by the International Finance Corporation (IFC) based on Environmental and Social Performance Standards and the Equator Principles, taking into account the Performance Standard Guidance Notes.

This environmental and social assessment is therefore presented in chapters which will comply with IFC requirements. Following is the document structure:

I. Project Presentation and Description

II. Area of Influence and Sensitive Areas

III. Environmental and Social Baseline

IV. Complementary Studies

V. Environmental and Social Impacts Assessment

VI. Alternatives Analysis

VII. Environmental and Social Management Plan

VIII. Consultation and Information Disclosure

APPENDIXES

INTRODUCTION

The Phase 1 Puerto Bolívar Port Terminal Expansion Project (hereinafter Puerto Bolívar Project – Phase 1, or the Project) is seeking to finance the capital expense required for the first stage of an investment plan for the Puerto Bolívar port terminal modernization, operation and maintenance tasks. It is located in the province of El Oro, Ecuador. The investment will expand the port containerization capacity from 120,000 TEU to 600,000 TEU annually and will modernize infrastructure and technology for more efficient operation. The total Project cost is not expected to exceed USD 350 million, which will be financed with loan A from the IDB Group up to USD 100 million. The financing plan will be completed through participation of other commercial banks and/or multilateral organizations and with capital contributions from the Project sponsor and sole shareholder, Yilport Holding S.A.

Ecuador is one of the largest worldwide exporters of bananas and shrimp. It is estimated that almost half of Ecuador's annual banana exports could be captured by Puerto Bolívar due to its strategic location on the Pacific Ocean. Shrimp is a very strategic product for the country, and for the first time in 2017 it was positioned as the most significant product in terms of value contribution (USD 3.038 million compared to USD 3.035 million for bananas) to exports (among those not related to petroleum) of the country. The increase in containerization capacity contributed by this Project will be essential to improve export capacity of the region and the country, especially considering that refrigerated containers (reefers) must be kept empty, and processing prior to shipping occurs in Ecuador.

The Project is part of a public-private partnership process of the Puerto Bolívar Port Authority (APPB – Autoridad Portuaria de Puerto Bolívar) whereby Yilport Terminal Operations, Yilportecu S.A. – Ecuador, acquired the 50-year concession to operate the existing port terminal facilities and to carry out modernization and maintenance. At the end of the concession period, the facilities will be transferred to the Puerto Bolívar Port Authority.

The Project has the environmental regularizations issued by the respective Environmental Authority in charge as required in each case. These are (Environmental Assessments may be found in the appendix section:

- Environmental License No. MAE-RA-2017-309603 for the Project "CONSTRUCTION AND OPERATION OF THE PUERTO BOLÍVAR PORT TERMINAL, OPERATED BY YILPORT TERMINAL OPERATIONS, YILPORTECU S.A." issued by the El Oro Provincial Government under Resolution No. GADPEO-2018-009363-SUIA dated 03 April 2018.
- Environmental License No. MAE-RA-2017-297974 for "DREDGING OF PUERTO BOLÍVAR DOCKS 1, 2, 3, 4, 5 AND 6, MANEUVERING ZONE AND ACCESS CHANNEL" Project issued by the El Oro Provincial Environmental Administration under Resolution No. MAE-DPAEO-2017-009 dated December

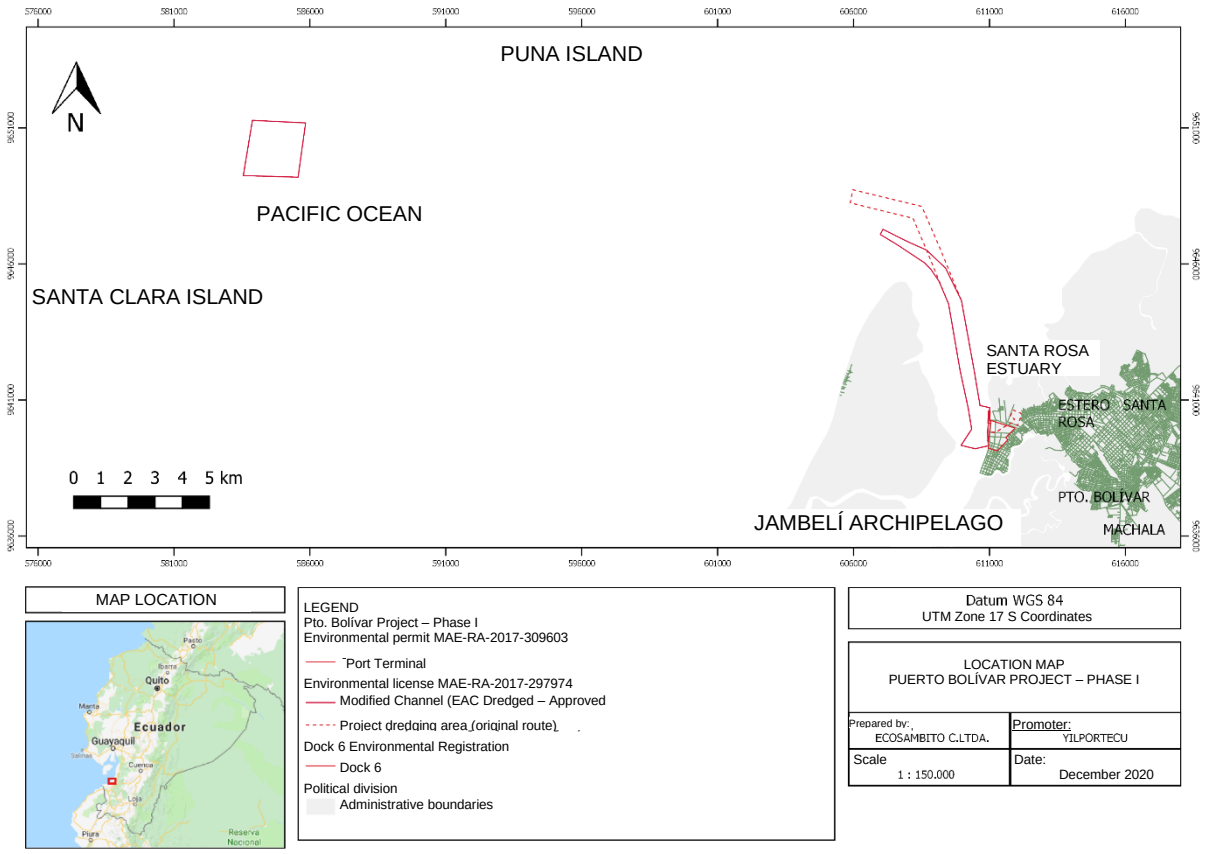
19, 2017.

- Environmental Registration No. 239660 for the “CONSTRUCTION, OPERATION AND ABANDONMENT OF PUERTO BOLÍVAR PORT TERMINAL DOCK # 6” Project, issued on 16 December 2019 by the Undersecretary for Environmental Quality of the Ministry of the Environment.

The first project phase will take approximately 3 years and includes dredging works to increase the basin depth to 16.50 meters, a new 450-meter dock and acquisition of new cargo handling equipment

Illustration 1 shows the Project location and emplacement area.

Illustration 1. Project Location and Emplacement Areas



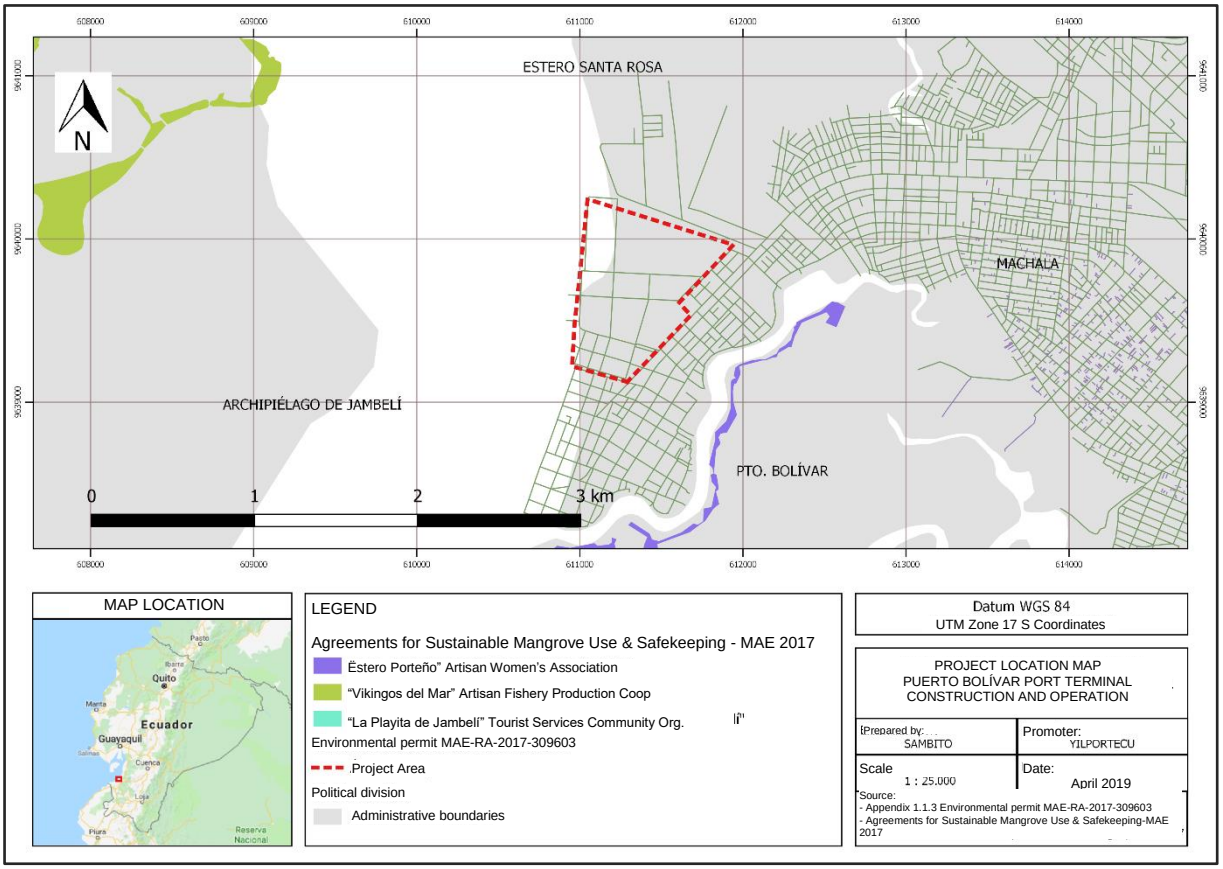
Source: Yilportecu S.A.
Prepared by: Ecosambito, 2020.

1. Port Terminal

The exceptional location of Puerto Bolívar on the Santa Rosa Channel, sheltered by Jambelí Island, offers natural protection for the port and makes it a safe site for vessel mooring and operation in the province of El Oro. The Santa Rosa Estuary channel is 200 m wide, is marked by luminous buoys and provides access to the port and the anchoring area.

If we take into account the total cargo moved nationally during 2017 (including port authorities and all operating port terminals, except oil and gas terminals), Puerto Bolívar contributed 8% of the total cargo moved nationally, almost entirely banana exports (1,617,712 MT) (Ministerio de Transporte y Obras Públicas, 2018).

Illustration 2. Location of the Puerto Bolívar Port Terminal Construction and Operation Project, operated by YILPORT TERMINAL OPERATIONS YILPORTECU S.A.



Source: Yilportecu S.A.
Prepared by: Ecosambito, 2020.

The Project execution area is located on the Santa Rosa estuary and pertains to the navigation axis line to access the Puerto Bolívar Maritime Terminal, maneuvering area and quay of docks 1 through 6 (see Illustration 2), at the following coordinates:

Table 1. Project Coordinates

Points	Latitude (X)	Longitude (Y)
1	611290	9639124
2	610952	9639220
3	610966	9639464
4	611047	9640244
5	611941	9639964
6	611608	9639609
7	611680	9639532
8	611290	9639124

Source: Environmental License No. MAE-RA-2017-309603
Prepared by: Ecosambito, 2020

1.1 Organization and Personnel

YILPORTECU S.A. personnel are described in the following table:

Table 2. Co-workers from YILPORTECU

Department	Number
General management	2
Legal department	1
Operations	72
Human resources	4
Administrative	2
Financial department	4
Project technician	3
Maintenance	11
Sales and marketing	4
Industrial safety	2
Information technology	2
Purchasing	2
Security	17
Total	**126**

Source: Yilportecu S.A.
Prepared by: Ecosambito, 2020

1.2 Existing infrastructure

The Puerto Bolívar Port Authority owns an area of 72 hectares that is completely fenced and delimited, occupied by warehouses, industrial ships, administrative offices, storage yards, internal roads, maneuvering and parking yards, docks and other infrastructure.

1.2.1 Docks

The ocean front of the port area includes 920 meters of mooring line divided into five docks located as follows:

A. Jetty pier with two docks, each with a 130-m apron that is 30 m wide with a 12.5-m draft, which is connected to land by a 100-m concrete walkway that is 14 m wide, for simultaneous mooring of 2 vessels up to 20,000 DWT (Docks No. 1 and No. 2)

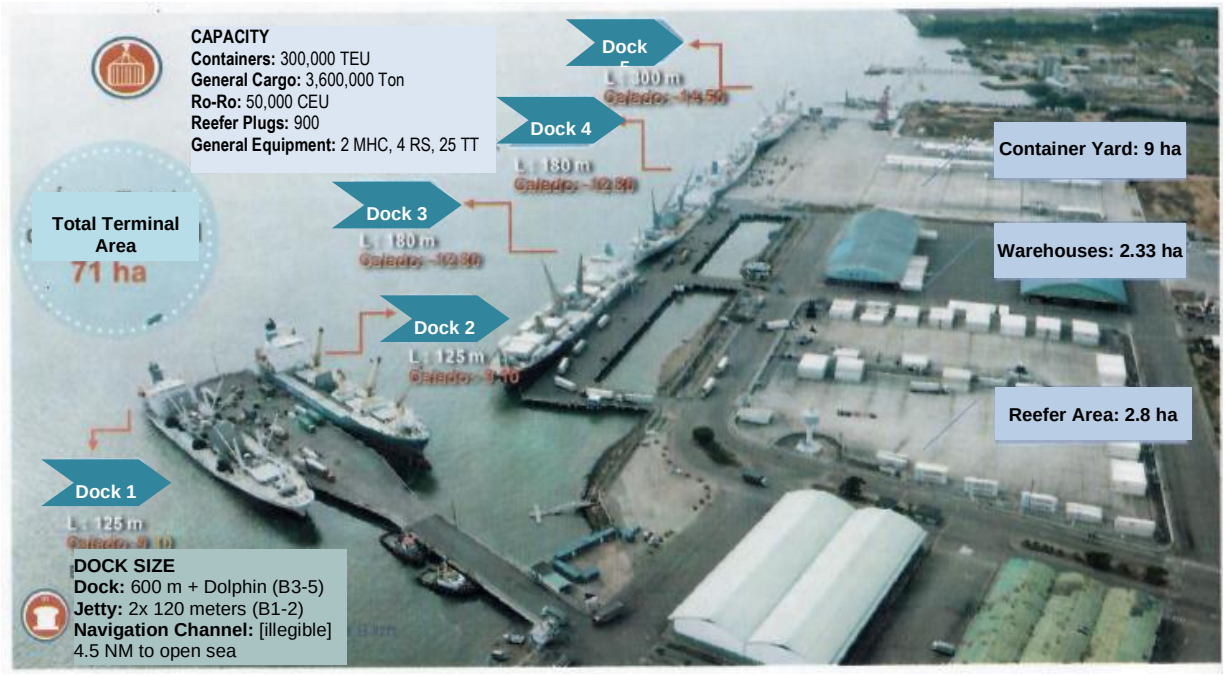
B. Secondary dock, with piles and reinforced concrete slab situated parallel to the coastline, which is 360 m long, 26 m wide and a designed draft of 12.5 m, connected to land by a 3 40-m walkways that are 14 m wide – forming two water mirrors – where 2 vessels up to 20,000 DWT can tie up simultaneously (Docks No. 3 and No. 4)

C. A recent 300-m secondary dock that is 40 m wide with 14.5 m draft connected to land by a continuous, 60-m platform to the storage area (Dock No. 5).

D. “Duque de Alba” for mooring of large vessels (aligned with Dock No. 5).

The Puerto Bolívar Port Terminal also has areas reserved for future development of storage and cargo handling capacity.

Illustration 3. Current Port Terminal Infrastructure Operated by Yilport



Source: Yilportecu S.A.
Prepared by: Ecosambito, 2020

1.2.2 Yards and Warehouses

Port terminal Storage capacity consists of 218,240 m^2 in warehouses and yards.

The open and closed warehouses cover a total area of 26,054 m^2 which is 11.94% of the total storage area and 3.68% total port area (see Table 3).

Open warehouses cover 14,592 m^2 (6.7% of the total), and closed ones cover 11.462 m^2 (5.3%).

Table 3. Storage Warehouses

Name	Area (m2)	Use
Warehouse 1	1,944	General cargo and other products
Warehouse 2	1,993	General cargo and other products
Warehouse 3	2,016	General cargo and other products
Warehouse 4	2,016	General cargo and other products
Warehouse 5	1,140	General cargo and other products
Warehouse 6	324	General Cargo
Warehouse 7	324	General Cargo
Warehouse 8	2,400	Palletized bananas
Warehouse 9	2,400	Palletized bananas
Warehouse 10	2,880	Palletized bananas
Warehouse 11	2,880	Palletized bananas
Warehouse 12	3,694	Palletized bananas and other
Warehouse 13	2,043	General Cargo
Total	**26,054**	

Source: Yilportecu S.A.
Prepared by: Ecosambito, 2020

The port terminal has 9 yards occupying 192,186 m^2, which is 88.06% of the port area dedicated to storage and 26.7% of the total port area. Surface finishes in the yards may be paved (53.77%) and ballasted (46.23%).

1.2.3 Access Roads

Locally Puerto Bolívar is 10 minutes by highway from downtown Machala. The current system connecting Machala and its port with neighboring areas, production centers, adjacent provinces and the rest of the country is a network in good operating condition.

The main access road to the port is Avenida Bolívar Madero Vargas which, added to Circunvalación Norte and Circunvalación Sur roads, makes up a circulation network that connects the Port Terminal to Av. 25 de Junio and then to the national highway network:

- Crossroad Guayaquil – Machala (Ruta E40 y Ruta E25, distance 197 km, 3h17)
- Crossroad Tumbes – Machala (Ruta E25 y Ruta E50, distance 185 km, 3h)
- Crossroad Cuenca – Machala (Ruta E59 y E50, distance 168 km, time 3h17)
- Crossroad Loja – Machala (Ruta E35, E50 y E25, distance 233 km, time 4h20)

- Crossroad Quito – Machala (Ruta E25 y E87), distance 521 km, time 9h)
- The Puerto Bolívar – Machala – Pasaje – Girón – Cuenca – Paute – Amaluza – Méndez – Puerto Morona highway
- The Puerto Bolívar – Machala – Santa Rosa - Balsas - Chaguarpamba – Loja – Zamora – Yantzatza - El Pangui - Gral. Leonidas Plaza y Méndez route

The port terminal hinterland borders the southern equatorial region, efficiently serving the provinces of El Oro, Azuay, Loja, Cañar, Zamora, the sector closest to the provinces of Guayas and Morona Santiago and northern Peru.

1.2.4 Port Services

Activities performed at the Puerto Bolívar terminal include general services like container handling and specific services like those provided for the banana industry. See Appendix 1 of this document with the complete list of services currently provided at the terminal.

A brief description of the services generally provided by the terminal is provided below. Access and anchoring facility use

1.2.4.1 Use of access facilities and anchorage

Navigability is available for safe vessel entry to the port while offering the use of a safe, protected zone while waiting for a dock, cargo availability or for reasons justified by the competent authority that permits anchoring.

1.2.4.2 Use of docks by ships

This consists of use of docks, apron and facilities of a site to service the ship, craft or naval vessel requested by ship owners, ship agents or their representatives.

1.2.4.3 Full container transfer

Combination of loading or unloading, securing or unfastening, embarkation or disembarkation, internal transport, storage, document issuance for receipt or dispatch of full containers, ship-to-gate, gate-to-ship, ship-to-yard and transshipment container transfer (ship-to-yard-to-ship), and this administration and handling will include all resources and activities necessary to provide such services.

1.2.4.4 General cargo transfers

Includes loading and unloading, securing and unfastening, embarkation and disembarkation, internal transport, storage, document issuance for receipt or dispatch of general cargo (*ship-to-gate and ship-to-yard*) including administration and handling and all resources and activities necessary to provide such services.

1.2.4.5 Banana Cargo Transfer (gate-to-ship)

Combination of activities that includes unloading from land transport, receipt, preparation for embarkation, carriage, embarkation, loading and securing for export bananas not moved in containers.

1.2.4.6 Container Storage

This includes storage for containers which is a retention and custodial service provided by YILPORT for cargo that will remain in fixed storage sites until delivery to the consignee or whoever represents them, or for storage, a service consisting of taking care of the cargo for the period in which it remains in company custody pursuant to current law.

1.2.4.7 General Cargo Storage in the Yard

YILPORT retention and custody service provided for cargo that remains in the fixed storage sites until delivery to consignees or their representatives and for storage, a service consisting of taking care of cargo while it is in custody, pursuant to current law, from the time at which it is received until delivery to the consignee or their representative.

1.2.4.8 Storage of Non-containerized General Cargo in Warehouses

Non-containerized general cargo storage that is the retention and custody service provided by YILPORTECU S.A. for cargo in the fixed storage warehouses until delivery to consignees or their representatives and for storage, a service consisting of taking care of cargo while it is in custody of the company from the time it is received until it is delivered to the consignee or their representative.

1.2.4.9 Storage of Non-containerized General Cargo in Special Warehouses

This is the non-containerized general cargo storage site and is the retention and custody service provided for cargo in special warehouses until delivery to consignees or their representatives; and storage, a service consisting of taking care of the cargo while it is in the custody of YILPORTECUA S.A. which will be responsible for custody of the cargo pursuant to current law from the time it is received until it is delivered to the consignee or their representative.

1.2.4.10 Transfer of Empty Containers

A set of loading and unloading, securing and unfastening, embarkation and disembarkation, internal transport, storage, issuance of reception or dispatch documents for empty containers, including administration and handling and all resources and activities necessary to provide such services.

1.2.4.11 Container Restow

Restow via dock: Set of operational activities and the resources necessary to rearrange cargo that must be moved off the ship to the dock and from the dock to the ship. This service varies depending on the condition of cargo, i.e. full or empty containers with a final disembarkation other than the Puerto Bolívar port terminal, issuance of documents that confirm the new location or loading plans, including administration and handling and all resources and activities necessary to provide those services.

Restow on board: Set of operational activities and the resources necessary to rearrange the cargo that must be moved on board the vessel for operational reasons. This service will vary depending on the condition of the cargo, i.e. full or empty containers.

1.2.4.12 Weighing Vehicles

Set of activities for weighing trucks or other transport vehicles, with or without cargo, using a properly calibrated scale and issuance of documents confirming or certifying the weight recorded, including administration and handling. Includes all resources and activities necessary to provide the services.

1.2.4.13 Container Consolidation and Stripping

Consists of providing operational actions and resources necessary to fill, load and secure any type of cargo in a container and will include issuance of documents that confirm the operation. This service generally consists of:

i. Provide an area within the port to perform these operations.
ii. Receipt of cargo in the area provided prior to beginning the operation whenever legal formalities are complete.
iii. Must include personnel and equipment sufficient to fill the container and secure the cargo inside.

The container stripping service consists of the set of activities related to unfastening, unloading and emptying any type of cargo found within a container and includes issuance of documents that certify the operation. This service consists generally of:

i. Provide an area within the port to carry out these operations.
ii. In case of direct delivery of unconsolidated merchandise, cargo may be delivered on a truck platform of the consignee or, if indirect delivery, the merchandise will enter the warehouse for storage.
iii. The container is received in the area provided prior to beginning the operation only when legal formalities are completed.
iv. There must be sufficient personnel and equipment to empty the container.
v. Cutting/removal of security seals on the containers.

1.2.4.14 Power Supplied to Reefers

Consists of connecting and disconnecting reefers with a power source, provision of electricity and monitoring, including issuance of documents that certify the operation, its administration and handling, and all resources and activities necessary to provide these services.

1.2.4.15 Operation to Appraise or Inspect Non-containerized or Containerized General Cargo

This service consists of providing the facilities necessary for physical inspection of merchandise by the cargo owners, their representatives or corresponding authorities and includes equipment, personnel and areas necessary to perform the operation.

This service applies to the following types of cargo: general cargo (AFG) or containerized (AFC). The latter includes opening the container, possible stripping, filling and closing the container.

1.2.4.16 General Cargo or Container Transport

Internal transport or carriage is general (TPG) or containerized cargo (TPC) movement or transport, including collection or removal, loading and offloading in yards and warehouses carried out within the terminal, including all resources and activities necessary to providing the service.

1.2.4.17 Container Reception and Dispatch

Reception: Action of taking containers of ISO dimensions from a means of land transport, moving them and placing them in their storage or collection site(s), including all resources necessary to provide the service.

Dispatch: This means taking containers of ISO dimensions from their storage or collection site(s), moving them and placing them on a means of land transport, including all the resources necessary to provide the service. Securing the containers on the means of transport is the responsibility of the hauler designated by the end customer.

Hazardous cargo, described as such in the system, which does not bear the corresponding labels (one per container side) is not allowed within port facilities.

1.2.4.18 General Cargo Reception and Dispatch

Reception: Action of taking general cargo from a means of land transport, moving it and placing it in its storage or collection site, including all the resources necessary for providing the service.

Dispatch: This means taking general cargo from its storage or collection site and moving it and placing it on a means of land transport, including all resources necessary to provide the

service. Securing the loads on the means of transport is the responsibility of the hauler designated by the end customer.

YILPORTECU receive and deliver cargo at the storage site where they will issue the document of transfer of responsibilities called delivery / receipt certificate wherein the status of the cargo at the time of the exchange is indicated.

No IMO class cargo may enter Yilport without being labeled. At the client's request, the service of labeling the IMO containers or packages may be performed.

No refrigerated cargo may enter YILPORTECU S.A. if it does not have the temperature load issued by the exporter which contains instructions regarding cold chain maintenance and/or preservation of the merchandise.

No refrigerated cargo may enter YILPORTECU S.A. if it does not have the temperature load issued by the exporter which contains instructions regarding cold chain maintenance and/or preservation of the merchandise.

1.2.4.19 Use of Tugboat Facilities

This service consists of placing infrastructure and facilities at the disposal of tugboat operators to provide their services to vessels arriving at the terminal. While at the terminal, tugboats will use only the docks provided for this purpose.

1.2.4.20 Additional Services

YILPORTECU S.A. uses specialized subcontractor companies for operation of the port terminal to provide the services described below.

Ship Port Operators (Operadores Portuarios de Buque – OPBs)

These are companies authorized to provide services to ships. They include handling and carrying out activities to assist vessels for access to, stay at and departure from the port, approach and anchoring zone that are necessary for correct navigation and stay.

Cargo Port Operators (Operadores Portuarios de Carga – OPCs)

OPCs are authorized to provide cargo services consisting of handling and operation of cargo movement and storage in port areas and their related activities.

Port Related Service Companies (Empresas de Servicios Portuarios Conexos – ESCs)

These provide support or accompaniment for port services, including provision of supplies, fuel, cleaning and maintenance, hazardous waste handling, and the like.

The number of outside laborers with the service providers ranges from 900 to 1200, depending on the season and demand for services.

1.2.5 Machinery and Equipment

The following machinery and equipment are utilized in providing port services at the terminal.

Table 4. Machinery and Equipment

Type	Number	Description	Capacity
MHC Cranes	4	Gottwald Mobile Harbor Cranes (MHC)	100 t
Tugboat	1	Jubones	1500 HP per motor (2 motors)
	1	Puna	900 HP per motor (2 motors)
	1	Tomebamba	750 HP per motor (2 motors)
	1	Arenillas	400 HP per motor (2 motors)
Container Ship	1	Container ship	45 t
	4	Container ship	35 t
	1	Container ship	10 t
Terminal Truck	1	Truck and platform	35 t
	12	Truck and platform	30 t
	10	Truck and platform	20 t
Forklift	23	electric	2 t
Carretilla Pallet Forklifts	21	Carretilla Pallet	1 t
	12	Forklift CPQYD 30	3 t
	4	Forklift GP30-G/LP	2.8 t
	46	Forklift 6FGU25	2.5 t
	6	Forklift 5FDC20	2 t

Source: Yilportecu S.A.
Prepared by: Ecosambito, 2020

1.2.6 Materials and Supplies

Generally, the materials used for port terminal operation include fuel used for transporting and moving cargo within the terminal, lubricants and additives used for crane equipment maintenance. The remainder of materials used includes office supplies (paper, printer toner, hygiene supplies and others) and those used to maintain working conditions in the terminal, including lights, batteries and various parts.

1.2.7 Waste Management

1.2.7.1 Solid Waste

Management of solid waste generated at the port terminal is handled by a contractor (OPERLIMP S.A.) which performs the following activities:

- Sweeping and collecting waste in buildings and on roads, sorting recyclables from non-recyclables
- Collection of beach waste from dock 1 (dragged by the current from outside the port terminal)
- Recyclable waste, mainly plastic beverage bottles, is manually compacted, packaged and delivered to a recycler.
- The remaining waste (non-recyclable and organic) is taken daily to the municipal landfill by a hauler employed by YILPORTECU.

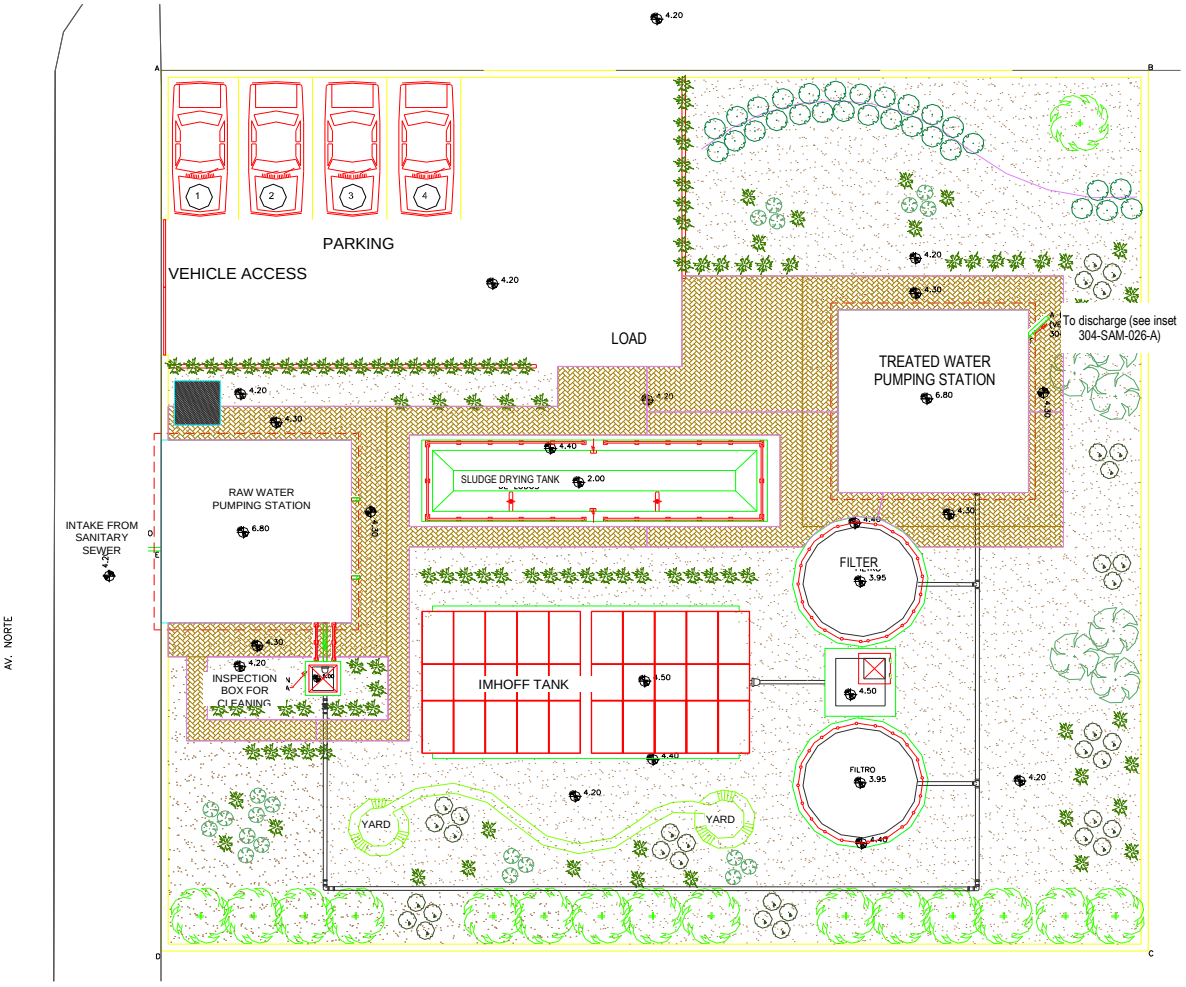
1.2.7.2 Gray Water and Sewage

Wastewater generated by restrooms and toilets as well as the dining room is collected by the wastewater pipe system (as shown in the Hydrosanitary Plan, internal document 304-SAN-002-C) and taken to the current primary treatment plant.

This plant is located in a 728.0-m^2 area and has a collection tank, an IMHOF tank, two wastewater filter tanks and sludge dryer. The wastewater treatment plant (WWTP, PTAR in Spanish) was built in 2009 and was maintained and updated in 2012 and 2013; the facility is fenced with metal mesh with two tube doors and folding metal mesh in good condition. It has two reinforced concrete chambers, the first with bath and three-pump pumping facilities with a raw water tank connected to a pumping system for two pumps with an aluminum and glass partition divider and the other with a clarification system due to lack of liquid chlorine, and a treated water tank. The outside area has an IMHOF chamber with a reinforced concrete tank and lids in a 32-m^2 area where dissolved solids are precipitated, and a sludge dryer with a reinforced concrete tank and a metal structure with a foldable, two-piece metal top, aluminum mosquito netting. The system is complete with two cylindrical gravity tank filters with metal tops.

At the Treatment Plant outflow, wastewater is chlorinated and then piped to the discharge point in the breakwater area of Dock 4.

Illustration 4. Location Diagram of the Primary Wastewater Treatment Plant



Source: Yilportecu S.A.
Prepared by: Ecosambito, 2020

1.2.7.3 Hazardous and Special Waste

For proper management of both liquid and solid hazardous and special waste, Project administration possesses their Hazardous Waste Generator Registry No. SUIA-11-2018-MAE-DPAEO-00446 and has worked on implementing daily logs (for internal hazardous and special waste management and transport); however, they have not yet adopted their own Unique Manifests but use those generated by the authorized environmental agent. This is justified to a degree because of the low hazardous waste generation (see Table 5).

Table 5. 2018 Hazardous Waste Generated

Area Generated	Identification of Waste		Annual Waste Generated		
	Identification of Waste [1]	Key [1]	Year 2018	Year 2019	Year 2020
	Used tires or parts thereof	ES-04			3,728
MN	Unused electric and electronic equipment that have not been disassembled, with components or constituent elements separated	ES-06	0.003	0.002	0.000
MN	Used or spent mineral oil	NE-03	1.045	5.943	5.057
MN	Used lead-acid batteries	NE-07	0.236	0.059	0.000
SAX	Active biohazard waste from medical care provided in company medical centers	NE-10			0.096
MN	Containers contaminated with hazardous materials	NE-27	0.002	0.010	0.181
MN	Personal protective equipment contaminated with hazardous materials	NE-30			0.120
MN	Used mineral oil filters	NE-32	0.300	0.142	0.639
MN	Used or off-spec oil, grease and wax	NE-34			0.150
MN	Lights, bulbs, fluorescent tubes, used power-saving bulbs containing mercury	NE-40	0.023	0.115	0.033
MN	Absorbent material contaminated with petroleum products: wipes, cloth, rags, sawdust, absorbent barriers and other solid absorbent material	NE-42	0.135	0.943	0.698
MN	Absorbent material contaminated with hazardous chemical substances: wipes, cloth, rags, sawdust, absorbent barriers and other solid absorbent material	NE-43			0.250
MN	Oily mixtures, petroleum-water emulsions, cutting fluid waste	NE-45			20.000
MN	Parts of electric and electronic equipment containing electric and electronic assemblies …	NE-46	0.265	0.065	0.000
SAX	Used printer ink or toner cartridges	NE-53	0.072	0.068	0.070

[1] *According to the national list of hazardous and special waste.*

Source: Yilportecu S.A.
Prepared by: Ecosambito, 2020

The main hazardous waste generated by maintenance activities are MHC crane oil and grease followed by used lead-acid batteries and solids saturated with petroleum.

Hazardous waste management of vessels arriving at the port is handled directly from the storage tanks of the respective vessels to the tanker authorized by the environmental agent within the port terminal without using the Yilport hazardous waste storage facilities.

Specifically for the port terminal, collection of hazardous waste is carried out in three warehouses:

i. Warehouse next to Agrocalidad where electronic and printer toner waste is stored
ii. Hazardous waste warehouse (neighboring the generator area) where varied solid waste is stored (capacitors, batteries, light bulbs, air filters)
iii. Collection Center where liquid waste, grease and oil, solids saturated by petroleum products and oil filters are stored

1.3 New Services

In order to expand their service offerings for the import and export sectors, Yilport is developing new services:

1.3.1 Export of Mineral Concentrates

Mining industry service. Export of sealed containerized copper concentrate is anticipated in a first phase (2019-2021), i.e., the usual container handling with required prevention measures. The option of handling big bags of the material placed in containers is also being considered.

Implementation of rotating containers or rotainers is anticipated in a second phase (2020 and on) to enable bulk cargo in bulk carriers using a spreader that allows flipping the container inside the ship's hold. This technology has a mist system that sprays water particles to avoid raising dust in the environment.

An estimated 136,092 metric tons of concentrate will be moved during the first phase, which represents a monthly load of approximately 12,000 metric tons. Meanwhile in the second phase (beginning in 2022), an increase to 360,000 metric tons annually is anticipated, which represents a monthly load of 30,000 metric tons.

In cases of both containerized and rotainer cargo, no additional infrastructure is required in the terminal to provide the described services other than use of the available storage yards.

1.3.2 Handling Bulk Solids

Yilport may consider building different silos with 45,000 MT capacity for bulk storage and distribution, which would expand up to 75,000 MT if there is demand. Initially dump truck

and hopper trucks will be used for horizontal vessel-silo transport (import) changing to conveyor belts later as demand increases.

Open air storage will be used for coal, cement, pet coke or similar bulk products, with tarps for covering if necessary. This will evolve to closed probably dome type silos when justified by demand.

1.3.3 Ro-Ro

Reception and storage of vehicles for southern Ecuador.

2. Port Facility Expansion

The first development phase will strengthen current operational capacity, acquiring new dock and yard equipment, information systems, improved processes and developed of dock length and storage yards. The terminal will increase their annual container capacity to 600,000 TEUs.

The principal characters of the works to be implemented in this phase include:

2.1 Infrastructure

2.1.1 Dock and Maritime Zones

- Dock #6 of 450 m with 16.5-m draft
- Access channel dredged to 14.5 m
- Current storage yards prepared
- Development of new container yards with RTG blocks
- Construction of a refrigerated warehouse for bananas, shrimp and other perishable products

2.1.2 Equipment

- Dock equipment: Acquisition of mobile cranes (MHC) and STS (ship to shore) cranes
- Yard equipment: Incorporation of RTG crane and auxiliary equipment (front loader for empties, reach stackers, tractors with platforms)
- Tugboats: Yilport will supply a new tugboat to improve port operations

In addition, the latest generation of terminal management system technology will be implemented and processes reengineered to improve terminal efficiency. The technology will be described in greater detail in later chapters.

2.1.3 Cold Store

Cold Store of 5600 m^2 with storage capacity up to 3 pallets high that will be constructed in the current reefer yard and will be dedicated to handling and storage of perishable products like banana and shrimp

2.1.4 Services Infrastructure

Generally, in order to ensure operational capacity to provide port services, the following infrastructure will be built at the terminal:

Terminal yard

i. Cleaning and demolition
ii. Yard excavation
iii. Water system piping (potable, sewer, firefighting system)
iv. Electric system cabling
v. Terminal yard fill works
vi. Terminal yard and dock paving
vii. Building area paving

Electric Building and Minor Works

i. Main substation construction
ii. Other substation construction
iii. Light post foundations
iv. Firefighting water tank and pump house foundation
v. Reefer platforms
vi. RTG Sink and settling tank
vii. Gas station
viii. Emergency generator station
ix. Perimeter wall and interior fence

Water Systems

i. Firefighting water tank installation
ii. Pump installation
iii. Tests and drills

Electric Systems

i. Main substation installation

ii. Other substation installation
iii. Light post installation
iv. Tests and drills

Entry Gates

i. Entry gate construction
i. Electric wiring installation
ii. Concrete Works for scales
iii. Scale installation
iv. OCR installation

2.1.5 Machinery and Equipment

Based on the investment plan and purchases completed, the following equipment will arrive at the terminal:

Table 6. Machinery and Equipment to Arrive

Type	Number	Description	Capacity
STS Cranes	2	Ship to shore Cranes	22 lines
	4	Ship to shore Cranes *	24 lines
RTG Cranes	18	Rubber tired gantry cranes **	
ECH Cranes	2	Electric chain cranes	
RS	2	Front loader (reach stacker)	
Tractor	1	Terminal tractor tra*iler*	
Remolcador	1	Tugboat	

**2 units are in advance of Phase II.*
*** 6 units are in advance of Phase II.*

Source: Yilportecu S.A.
Prepared by: Ecosambito, 2020

2.2 Project Life Cycle

The project was conceived for a 50-year life cycle.

2.3 Work Methods

The Dock 6 Construction Project contractor's work methodology is described below. Details of the work method are in Appendix 7.

2.3.1 Camps and Temporary Works

The following facilities are anticipated during the project construction phase:

- Offices for operational personnel, employer and engineer
- Cafeteria for workers
- Bathrooms and dressing rooms
- Storehouses
- Temporary piling and prefabricated concrete element storage
- Hazardous waste dump with its respective dikes and roofs
- Storage areas
- Fuel and electric plants
- Cement plant for elements cast on site

- Concrete and aggregate sampling laboratory

Offices will be built for the consortium with all their facilities, including all services like electricity, telephone, internet, heating, hygiene services, etc., as well as furniture of a quality that will last for the entirety of the Project.

Preliminarily, a modular 20' container was proposed as a solution for the offices.

The areas for the Contractor, Employer, Engineer and Subcontractors will also be equipped with bathrooms and showers for administrative personnel. In addition, all operational support areas must be equipped with sanitary facilities.

All work areas must have chemical toilets taking into account that there is a considerable distance from those points to principal facilities, which includes area of maritime work (platform and barges).

Specifications for all toilets and clothing changing facilities are anticipated as follows:

- Containers for shower and bath
- Main area: 7 units (men) + 1 unit (women)
- Prefabricated yard: 1 unit
- Steel yard: 1 unit
- Laboratories area: 1 unit

Bathroom containers (male and female)

- Contractor area: 2 units;
- Employer area: 1 unit;
- Engineer's area: 1 unit;
- Subcontractor area: 1 unit.

Showers

- Contractor area: 1 unit;
- Employer area: 1 unit;
- Engineer's area: 1 unit;
- Subcontractor area: 1 unit.

Dressing room facilities

- Principal area: 1unit (female) y 6 units (male)

Workforce Housing

Housing is planned for administrative and operational personnel in the city of Machala near the Project area, taking into account hotel infrastructure and possible dwellings that would serve as accommodations for foreign personnel.

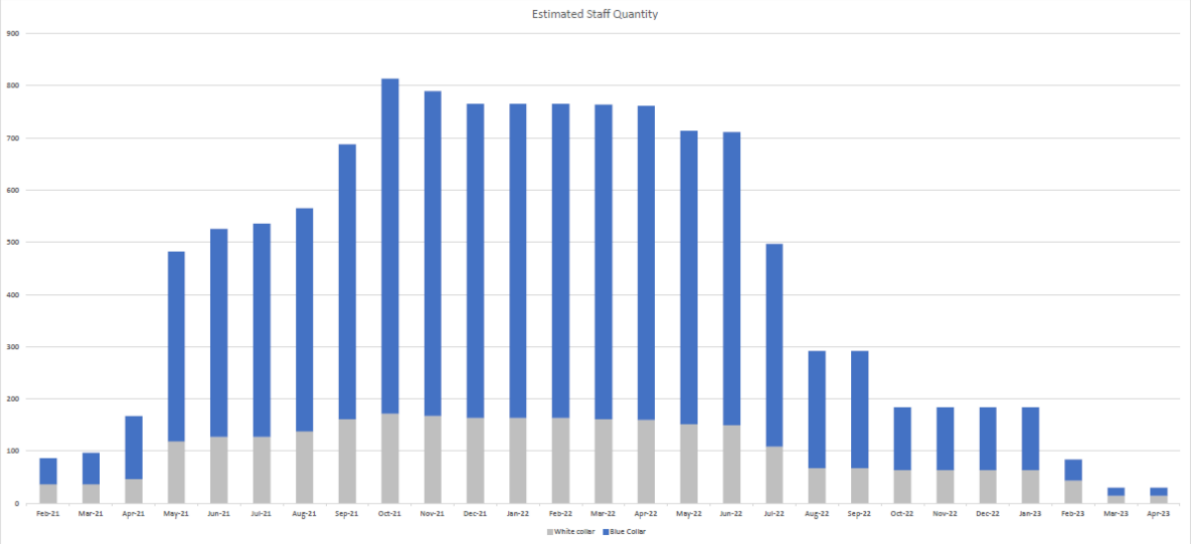
2.3.2 Resource Use for the Construction Stage

2.3.2.1Labor

The labor estimate for the construction stage is shown in Illustration 5. Estimated Labor for the Construction Stage. The stacked bars show the number of blue collar workers (laborers) and white collar workers (technical chiefs and administrative workers)

The peak labor demand is estimated between the months of September 2021 and June 2022.

Illustration 5. Estimated Labor for the Construction Stage



2.3.2.2 Water

Estimated water use is19,000 m^3 during the construction stage.

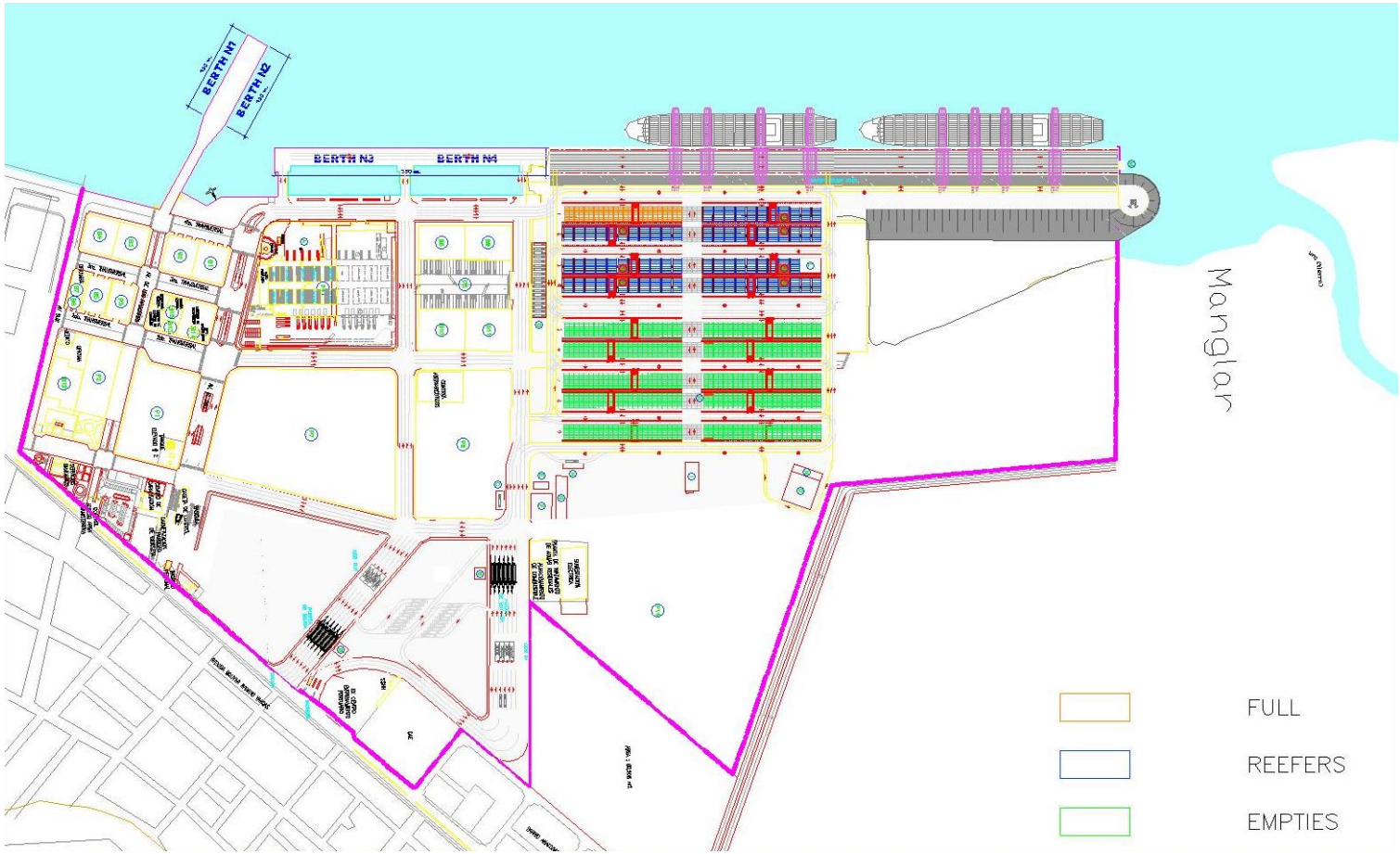
2.3.2.3Electricity

Estimated electricity use is 2,460,000 kWh

2.3.3 Schedule of Construction Activities

The Project execution plan and estimated schedule of the Construction Project Contractor for Dock 6 is shown in Appendix 8.

Illustration 6. Pto. Bolívar - Phase 1 Project Implementation Diagram



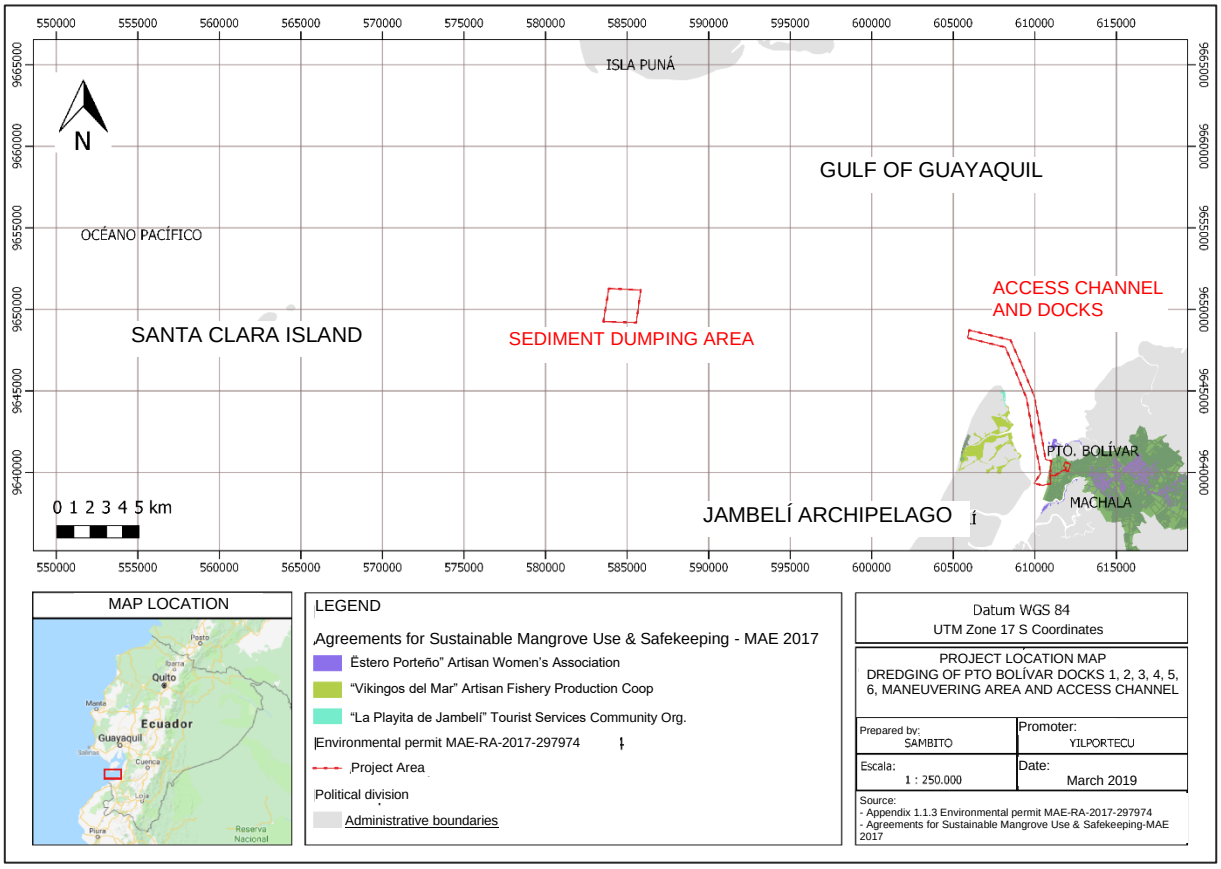
Source: Yilportecu S.A.

3. Project Progress

3.1 Dredging of Puerto Bolívar Docks 1, 2, 3, 4, 5 and 6, Maneuvering Zone, Access Channel

The dredging project includes dredging docks 1, 2, 3, 4, 5 and 6 (9.0 ha) and dredging the maneuvering zone and the port access channel (473.57 ha). The area located in the Santa Rosa Estuary corresponds to the navigation axis line to reach the Puerto Bolívar Maritime Terminal as well as an area for ship anchorage and maneuvering.

Illustration 7. Location of the sediment dumping basin at sea



Prepared by: Ecosambito, 2020

Illustration 8. Dock Dredging Area

Source: (ECOSFERA CÍA.LTDA., 2017)

Photograph taken with MAVIC drone (7 km transmission range, flying speed 64km/h)

Prepared by: *Ecosfera Cia. Ltda., 2017*

Location: *Puerto Bolívar – Machala, El Oro*

Date: *28 April 2017*

Dredging Area _____

Illustration 9. Dredging Area in the Maneuvering Zone

Source: (ECOSFERA CÍA.LTDA., 2017)

Photograph taken with MAVIC drone (7 km transmission range, flying speed 64km/h)

Prepared by: *Ecosfera Cia. Ltda., 2017*

Location: *Puerto Bolívar – Machala, El Oro*

Date: *28 April 2017*

Dredging Area _____

Illustration 10. Dredging Area of the Access Channel

Source: (ECOSFERA CÍA.LTDA., 2017)

Photograph taken with MAVIC drone (7 km transmission range, flying speed 64km/h)

Prepared by: *Ecosfera Cia. Ltda., 2017*

Location: *Puerto Bolívar – Machala, El Oro*

Date: *28 April 2017*

3.1.1 Stages Completed and Volume Dredged

Progress of dredging project is described below:

i. First dredging period completed from March 29 through May 31, 2018

iii. The second dredging period was carried out from April 10, 2019 through Mary 31, 2019

The volume of sediment removed during the first and second stages of Phase I is shown in Table 7.

Table 7. Dredging Progress During the AAC Assessment Period (Phase 1)

Areas	Initial Design Volumes (m^3)		Volume Dredged (m^3)	
	Design Rev 01 pending 1/6	Over-dredged Design Rev01 pending 1/6	Phase I First Stage	Phase I Second Stage
DOCK 1	72,644.7	80,886.2		
DOCK 2	28,584.9	30,316.2	7,428.0	11,564.5
DOCK 3	95,775.4	104,858.0	99,859.1	32,679.5
DOCK 4	63,160.6	70,952.8	66,646.4	19,748.3
DOCK 5	99,502.0	111,876.3	104,755.7	28,637.6
DOCK 6	461,419.5	516,798.4	203,729.3	78,448.4
TURNING AREA	1,231,522.5	1,507,364.3	1,131,061.6	273,589.1
INTERNAL CHANNEL	1.863.196,1	2.180.637,4	1.869.410,3	733.288,1
EXTERNAL CHANNEL	3,677,720.9	4,192,796.4	3,785,636.5	1,386,146.8
TOTAL (m^3)	**7,593,526.6**	**8,796,486.0**	**7,268,526.9**	**2,564,102.3**

Source: COMPLETED WORK TECHNICAL REPORT, DREDGING WORKS PHASE I – SECOND STAGE Puerto Bolívar Port Terminal, Flanders Dredging Corporation 2019.

3.1.2 Sediment Dump Basin

3.1.2.1 Dump Basin at Sea

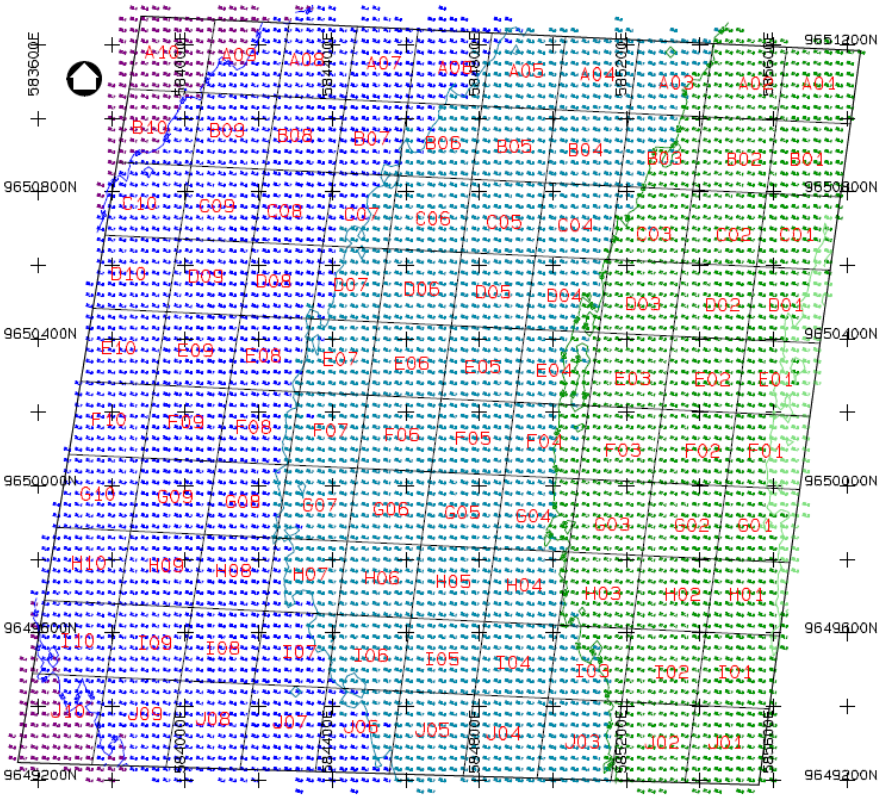
The dump site is located in the Jambelí Channel in the Gulf of Guayaquil located 13.75 nautical miles from the original Access Channel Ocean Buoy alignment and heading 274° RV (true course) where depths range from 26.0 m to 32.0 m and covers an area of 4 km^2. To date all sediment extracted in the first and second stage of Phase 1 dredging is dumped at this site.

The dump area, based on dynamic characteristics of the area such as current speeds, wind, tide, depths and the like, can easily receive the material dredged from the dock area, maneuvering area and access channel, ruling out any impact around the entire area of influence.

An area divider every 200 meters was defined for dumping the dredged material in order to determine a discharge plan for each dredging run and the process will consist of dumping the sediment in each grid defined by coordinates (number, letter), thus ensuring a uniform and equal distribution of material throughout the area, avoiding accumulation of this material at a single site, which was controlled by periodic bathymetric measurements in order to adjust the dumping plan based on those results, if necessary.

The methodology of dumping the material by cells also aids in avoiding possible accidents among dredgers that sail to the site simultaneously. Illustration 11 shows the scale of the division diagram for distribution of the material in the dump area.

Illustration 11. High Seas Sediment Dump Area



Source: FDC Insurvey Dump Area.

3.1.3 Sediment Pools

Sediment pools cover an area of approximately 12.9 hectares located northeast of the port terminal at the old sites of the ISSFA.

However, as anticipated in the Project EIA, these pools have not been used for the purposes described, and technical assessments completed (SURCONSUL, 2017) demonstrate the potential risk of seepage in the east wall of Pool No. 2, that is bordered by an informal urban settlement installed as a result of grading and filling the land where it is located.

These pools are unused and allow an accumulation of rainwater during the winter season.

Photograph Record 1. Sediment Pool Area

General view of sediment pool no. 1

General view of sediment pool nos. 1 and 2

General view of sediment pool no. 3

Source: Yilportecu S.A.

3.1.4 Dredging Methodology

Dredging project activities completed include:

i. **Dredging Preparation -** includes maintenance activities on all equipment (dredgers, pump bank, pipes, couplings, and the like) following manufacturer recommendations to ensure the equipment operates correctly and to reduce their contribution of pollution to the environment as much as possible. The maintenance on mobile equipment must take place at authorized sites that have the respective control equipment and final disposal of waste generated. Pipe maintenance will be planned depending on the dredger operation. Lubricating oil will be changed every 500 hours of work for principal machinery as well as generators, or according to maintenance required by the manufacturer. Used oil generated due to general maintenance of the dredger will be stored in air tight metal containers with later final disposal carried out.

ii. **Fuel Supply** - This operation will be carried out directly with the dredger at the work site, assisted by boats used for this activity. The fuel supplier shall have a contingency plan for oil and gas supply.

iii. **Dredging and storage of sediment material in hopper -** Suction pipes descend to the bottom of the water and their heads are “dragged” over the seabed, suctioning material while the vessel slowly advances (dragging). The dredger head, finally connected to the lowest part of the suction tube, sucks the dredged sediment using teeth and/or water under pressure. The dredger may use different types of heads, depending on floor conditions. A submerged dredging pump pumps the mixture of water and sediment from the seafloor to the hopper, and if required, from the hopper to land. The hopper, which is the ship’s hold, receives the mixture and allows evacuation of excess water through the overflow system. The dredged material stays in the hopper during transport until it is dumped.

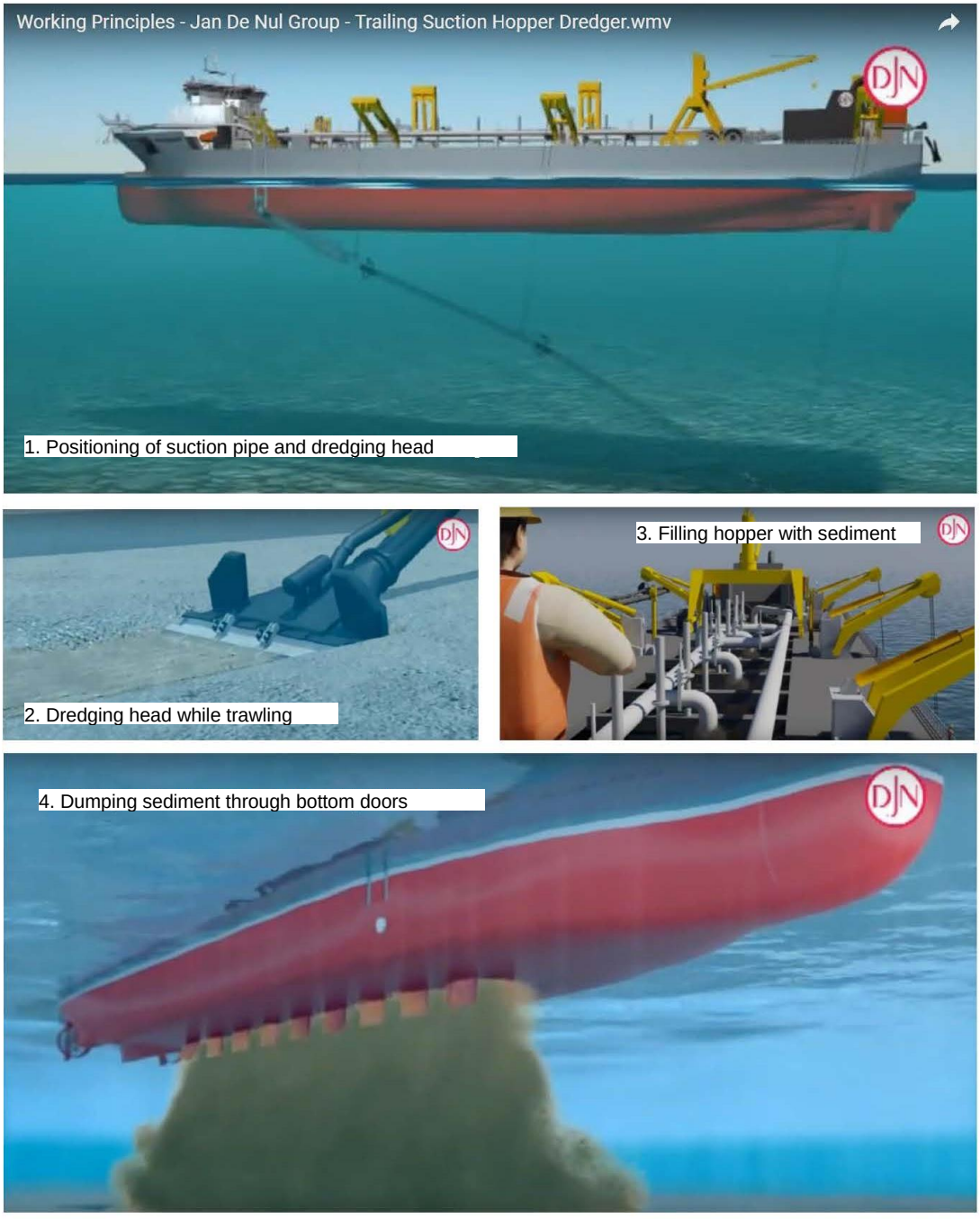
i. **Sailing to the designated point for the dump area on the high seas -** As described in the previous section, sediment is dumped using geo-referencing in the sub-area assigned for the dredger being operated. Once the hoppers are filled with extracted sediment, the ship raises its dredger system (head) to then sail to the sediment dump point indicated in the section.

ii. **Disposal or dumping dredged material (sediment) on the high seas -** Once the hoppers are filled with extracted sediment, the TSHD type dredger raises its dredger system (head) to then sail to the sediment dumping point indicated in the previous section, and once at the site, the dredger opens its discharge doors on the bottom. Once the hoppers are emptied, the vessel returns to the dredging site to begin a new operating cycle.

iii. **Control Bathymetry** - To verify compliance with the level to be reached by the dredging activity, bathymetric measurements are taken at the sites that have been dredged; if the results of the engineering study show that the expected level was not reached, the dredging process must continue.

Illustration 12 shows a graphic representative of the dredging process.

Illustration 12. Sediment Dredging and Dumping Process

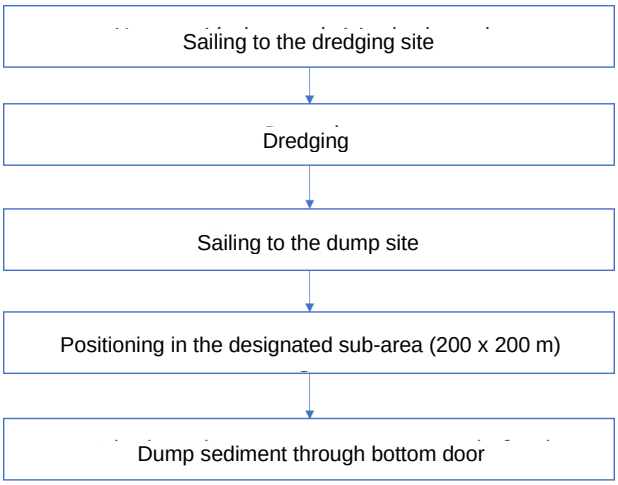


Source: Working Principles - Jan De Nul Group - Trailing Suction Hopper Dredger.wmv, available at https://www.youtube.com/watch?v=shxlh0gFgLw

Prepared by: Ecosambito, 2020

Illustration 13 shows schematically the flow of activities in carrying out dredging

Illustration 13. Flow Diagram of Dredging Activities Carried Out



Source: Document No. FDC1819.MES.81.01.e.01 Method Statement Dredging Operations
Prepared by: ECOSAMBITO C.LTDA.

3.1.5 Sediment Dispersion Model

Sediment dispersion modeling carried out as part of the Environmental Impact Assessment for environmental regularization of the Project considered horizontal and vertical movement of particles by tidal action that affects each level of depth, stratifying three levels:

- 0 – 9 m (surface layer)
- 9 – 18 m (middle layer)
- 18 – 27 m (bottom layer)

It was concluded, based on the results of the sediment dispersion modeling, that the area required for settling fine material under extreme and conservative tidal conditions would not interfere with the activities related to use of the water resource on the shoreline near the dump site area, such as shrimping, since the sediment would move as follows:

- a distance of 1.48 km from the dump site when the tide is in a state of flow at the surface level
- 1.46 km for fine sediment at the mid-level depth

- 1.84 Km at the bottom level due to the characteristics of fine sediment

Similar behavior is evident when modeling the ebb tide state, demonstrating approximate fine sediment displacement of about 6.02 km from the dump site.

3.1.6 Project Life Cycle

The Project to dredge Docks 1, 2, 3, 4, 5 and 6, maneuvering zone and Puerto Bolivar access channel has a life cycle defined by the volume of sediment accumulated in the areas dredged.

Table 8 shows the dredging activities and execution times for each area defined based on type and capacity of the dredger used.

Table 8. Project Life Cycle

Activity	Completion Period	Dump Site	Volume (m^3)
Dock 6	**	Jambelí channel	71,192.40
Maneuvering zones	**	Jambelí channel	1,840,482.60
Access channel	**	Jambelí channel	4,131,787.30

* *Dredging is not carried out from June to October because it is a period when humpback whales (Megaptera novaeangliae) travel through and reproduce.*
Prepared by: ECOSAMBITO C. Ltda.
** *Depends on the type and capacity of the dredger used.*

The Project was planned for completion in two stages, in one of which dredging is performed to a level of 14.5 m MLWS with respect to the level of the syzygy tide and a width of 200 m on the bottom while in the stage 2 dredging will go to a level of 16.5 m MLWS with respect to the syzygy tide and a width of 270 m on the bottom.

As mentioned, new dredging in these areas is anticipated in 2023 among the Port Terminal maintenance operations based on the level of sedimentation detected during future measurements.

3.1.7 Machinery and Equipment

The trailing suction hopper dredging (TSHD) underway is classified as hydraulic dredging and includes dredging equipment that utilizes centrifugal pumps, at least for the dredged material transport process while removing it out of the water or transporting it horizontally to another site. TSHDs are used for a large variety of maritime construction and maintenance

projects, such as maintenance dredging in ports and access channels, removing sediment to achieve the required depth. It is used primarily to dredge loose material like sand, clay or gravel.

Normally, a TSHD is equipped with one or two suction pipes to which suction heads are connected that work like huge vacuum cleaners.

The main parts of this type of dredger are:

- Standard installation on the ship: motors, cabins and navigation bridge
- Dredger head connected at the end of the lowest part of the suction pipe
- Submerged dredging pump
- Suction pipe and piping on deck by which the mixture is transported
- The hopper, which is the ship's hold

The main technical characteristics of the THSD dredgers participating in the Project are shown in Table 9.

Table 9. Technical Specifications of THSD Dredgers

Technical Specifications	Filippo Brunelleschi	Pedro Alvares Cabral (PAC	Charles Darwin
Hopper capacity:	11,300 m³	14,000 m³	30,500 m³
Deadweight:	18,620 ton	26,530 ton	54,140 ton
Overall length:	142.5 m	147.8 m	183.2 m
Beam:	27.5 m	30.0 m	40.0 m
Draft with cargo:	9.1 m	11.20 m	13 m
Maximum dredging depth:	38 / 57.5 / 77 m	43.8 / 52 m	93.5 m
Suction pipe diameter:	1,200 mm	1,300 mm	2 x 3,400 kW
Pump power (trailing):	3,400 kW	4,000 kW	2 x 3,400 kW
Pump power (discharge):	7,500 kW	8,500 kW	15,000 kW
Propulsion power:	2 x 5,750 kW	2 x 7,200 kW	2 x 10,800 kW
Total installed diesel power:	13,110 kW	15,960 kW	23,600 kW
Speed:	15.3 kn	15.7 kn	16 kn
Accommodations:	34	33	42
Built in:	2003	2012	2011

Source: Technical Specifications, available at:
- https://www.jandenul.com/sites/default/files/equipment-item/pdfs/01.tshd_en_-_v2013-2_-_pedro_alvares_cabral.pdf
- https://www.jandenul.com/sites/default/files/equipment-item/pdfs/01.tshd_en_-_v2013-2_-_filippo_brunelleschi_0.pdf

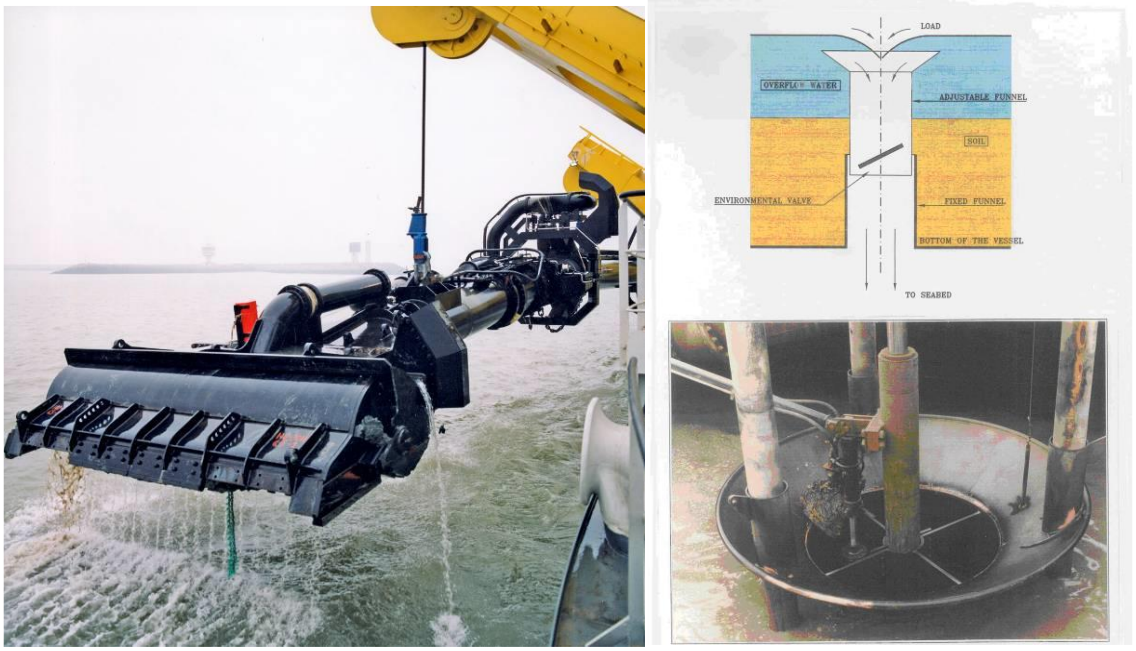
- https://www.jandenul.com/sites/default/files/2020-10/Charles%20Darwin%20%28EN%29.pdf
Prepared by: Ecosambito, 2020

Movement of these vessels does not represent an obstacle for others transiting the navigation channel because the dredgers described have their own propulsion and autonomous movement.

The dredging operation is carried out using the following systems: winches, cables and pulleys, hydraulic jacks, pumping system (electric motor and pump), suction system (head and injectors), water under pressure, and hopper doors.

TSHD dredgers that participated in the dredging have overflow funnels (vertical pipes within the hopper used to drain excess water from the hopper through the keel and thus maximize the load in the hopper) with an anti-turbidity valve or “green valve” which is a hydraulic valve installed within the overflow and drastically reduces turbidity caused by excess water drained through the overflow funnels by containing the flow of the mixture entering through the funnel. Thus the height from which it falls into the water is diminished, reducing the amount of air mixed in the overflow and reducing suspension of fine particles (see Illustration 14).

Illustration 14. Dredger Vessel Equipment



Dredger Head

Overflow and "green valve"

Suction pipe

Sediment Hopper

Source: Document No. FDC1819.MES.81.01.e.01 Method Statement Dredging
Prepared by: Ecosambito, 2020

Photograph Record 2. General view of the Pedro Alvares Cabral *dredging vessel anchored at Posorja*

Source: Yilportecu S.A.
Location: Pedro Alvares Cabral dredging vessel, Posorja – Guayas, 04 February 2019

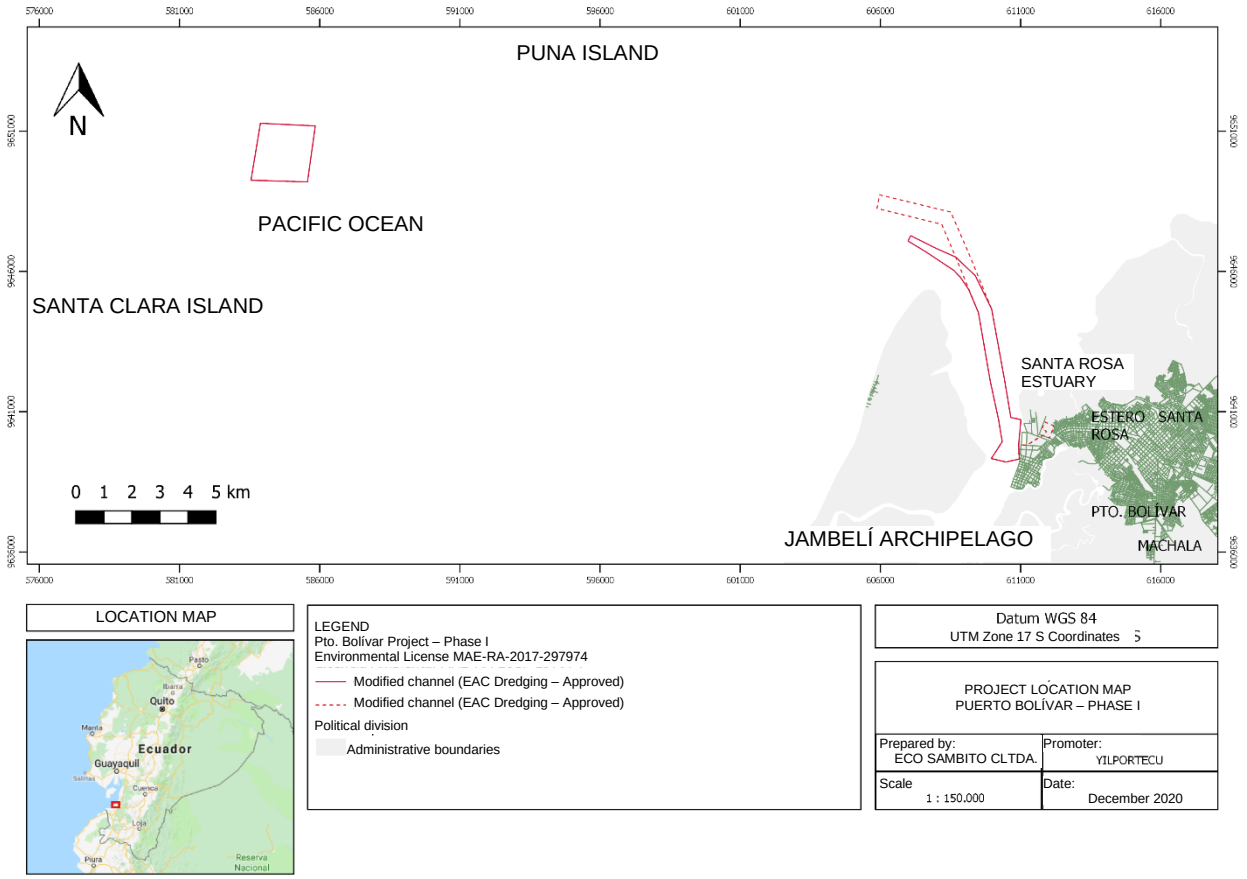
3.2 Modifications to the Dredging Project

Based on sedimentation studies completed by the Dredging Project technical advisor (Royal Haskoning N.V.), YILPORTECU submitted a Complementary Environmental Study (Estudio Ambiental Complementario – EAC) to the Ministry of the Environment (under code MAE-RA-2019-440688), the objective of which was the following modifications to the current Environmental License:

- Change in the navigation channel axis
- Elimination of sediment pools on land from the entire Project area

These changes are reflected in the Project implementation area (see Illustration 15) and the list of coordinates in the area involved (see Table 10).

Illustration 15. Map of the Modified Area Involved in the Previous Complementary Environmental Study



Source: COMPLEMENTARY ENVIRONMENTAL IMPACT STUDY "DREDGING OF PUERTO BOLÍVAR DOCKS 1, 2, 3, 4, 5 AND 6, MANEUVERING ZONE AND ACCESS CHANNEL" PROJECT.

Prepared by: Ecosambito, 2020

Table 10. Coordinates of the Modified Area Involved

ID	X	Y
1	610956	9639311
2	610478	9639203
3	609957	9639327
4	610347	9639925
5	610216	9640713
6	609917	9642098

ID	X	Y
7	609498	9644527
8	609145	9645361
9	608856	9645786
10	608625	9646030
11	607618	9646698
12	606983	9647082
13	607082	9647271
14	607989	9646818
15	608686	9646508
16	609387	9645842
17	609970	9644652
18	610433	9642109
19	610654	9640792
20	611014	9640712
21	610931	9639816
22	610931	9639814
23	610956	9639311
1	583544	9649248
2	583880	9651278
3	585837	9651184
4	585560	9649187
5	583544	9649248

Source: COMPLEMENTARY ENVIRONMENTAL IMPACT STUDY “DREDGING OF PUERTO BOLÍVAR DOCKS 1, 2, 3, 4, 5 AND 6, MANEUVERING ZONE AND ACCESS CHANNEL” PROJECT.

Prepared by: Ecosambito, 2020

The EAC is approved by the Ministry of the Environment and Water (Ministerio del Ambiente y Agua – MAAE), and assignment of the Facility by the MAAE is pending to carry out the Citizen Participation Process.

3.3 Dredging Management Plan

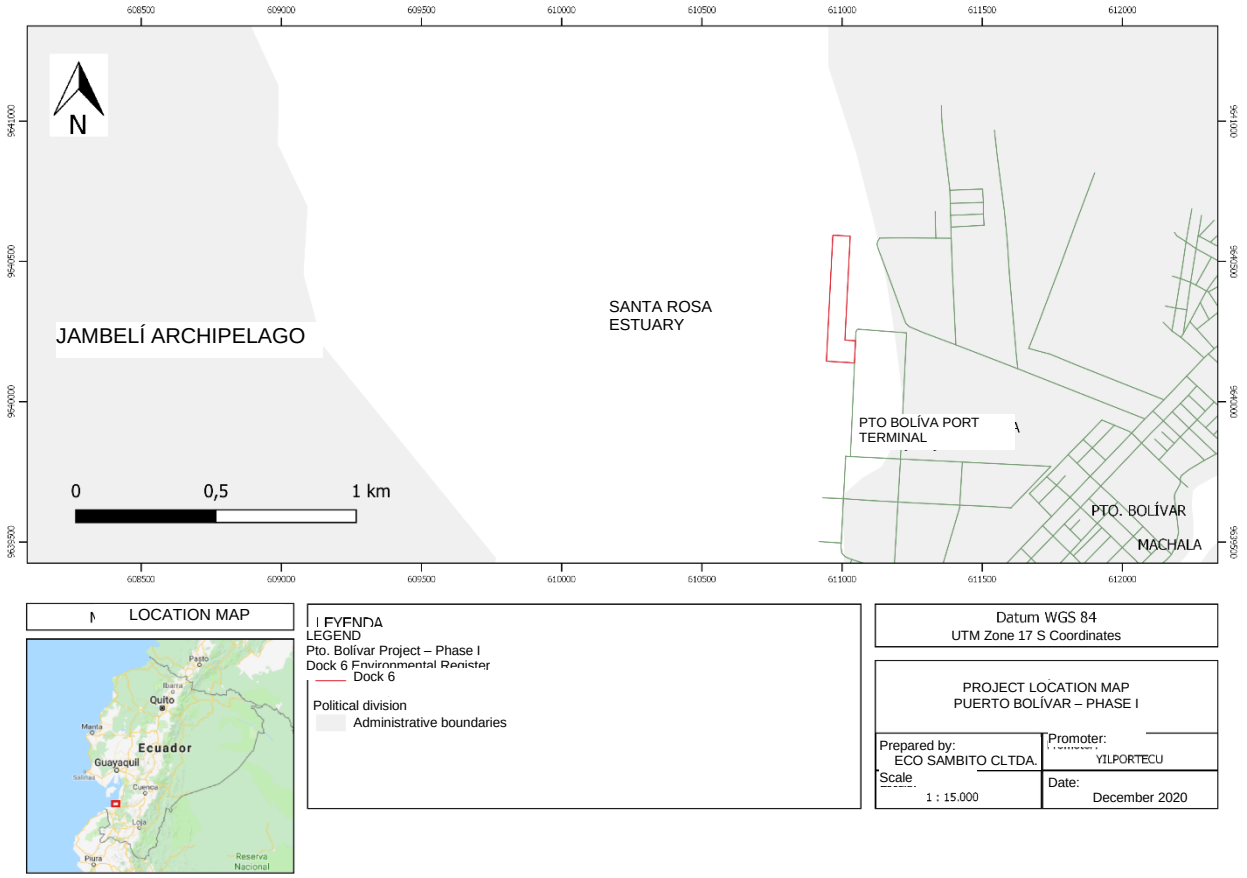
Details of the Dredging Management Plan carried out by the contract company in the dredging activity are found in Appendix 9 and Appendix 10.

3.4 Dock 6

This 450-m dock, designed to receive Post-Panamax vessels, will be connected directly with the current Dock 5 and will be used for container storage and handling.

This new dock will increase the annual container handling capacity to 900,000 TEUs. Moreover, the container yard capacity will be expanded to provide room for them.

Illustration 16. Map of Dock 6 Emplacement Area



Source: Yilportecu S.A.

Prepared by: Ecosambito, 2020

Facility and equipment expansion will be planned based on the amount of demand and its requirements.

3.4.1 Characteristics

The dock's structural configuration is based on a concrete platform supported by steel pilings. The structural configuration is based on lengthwise and crosswise beams to provide sufficient strength to receive container ships with a 197,000-ton deadweight.

The total length of the dock is 450 m and is considered in five 90-m segments which are connected crosswise with each other using shear keys. Total dock width is 62 m.

Structural arrangement of the platform was completed based on anticipated operations and expected cargo including:

- General cargo, containers and bulk cargo using MHC Mobile Port Cranes and small pneumatic unloaders
- STS (ship-to-shore) cranes used for container handling
- Earthquake loads

Piling location must follow in principle the location of large cargos and that control the design.

Ship-To-Shore cranes are normally the equipment causing the greatest off-loading reactions and determine piling alignment position. With a 2.75-m edge beam and rail separation of 30.48 m (100 feet), these rows of pilings must be perfectly defined (with uniform spacing). There are 5 bays of pilings between rails. Therefore, transverse spacing is 30.48/6 = 6.096 m.

Lengthwise spacing of the pilings was defined as 3.0 m for pilings located in the position of the rail beams and 6.0 m for other positions.

The platform over the pilings was designed with the principal beams spaced lengthwise over each line of pilings. The lengthwise beams are 1.50 m high with a variable width of 1.8-m at the lowest point and 2.8 m at the highest. However, these sizes may be modified during final design before building the works.

The 1.5-m height is related to the beam capacity to take vertical loads from the platform while a variable thickness is related to the reduction of the transverse span of the slabs. A slab of 0.60 m is considered between lengthwise beams. Position of the lengthwise beams assures vertical load transmission to the pilings, transverse loads are only required for specific loads such as mooring and berthing loads or to improve capacity of the structure transversally.

In terms of docking loads, it is necessary to consider a transverse beam between the axis on the ocean side of the platform and the first row of pilings. The objective of this is to provide support for defense and transmit loads to the structure.

The function of the shear keys is to avoid differential transverse displacements between dock segments causing mis-alignment between the rails of the STS cranes. Transverse displacement tolerance in the expansion joint is 0.30 m in order to prevent separation of the structural bodies crashing against each other during an earthquake.

Four shear key connections to allow the shear (horizontal loads) to be transferred through the joints and to connect the structures. This load transfer transversally ensures that the different structures work together and have the same horizontal displacement when they are subject to large horizontal loads that can occur during an earthquake. Each shear key consists of one tongue and groove connection.

4. Bibliography

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5. Appendixes

APPENDIX 1. List of Port Services

APPENDIX 2. Environmental Impact Assessment of the "CONSTRUCTION AND OPERATION OF THE PUERTO BOLÍVAR PORT TERMINAL, OPERATED BY YILPORT TERMINAL OPERATIONS, YILPORTECU S.A." Project

APPENDIX 3. Environmental Impact Assessment of the "DREDGING OF PUERTO BOLÍVAR DOCKS 1, 2, 3, 4, 5 AND 6, MANEUVERING ZONE AND ACCESS CHANNEL" Project

APPENDIX 4. Environmental Registration of the "CONSTRUCTION, OPERATION AND ABANDONMENT OF PUERTO BOLÍVAR PORT TERMINAL DOCK # 6" Project

APPENDIX 5. Environmental Audit of the "CONSTRUCTION AND OPERATION OF THE PUERTO BOLÍVAR PORT TERMINAL, OPERATED BY YILPORT TERMINAL OPERATIONS, YILPORTECU S.A." Project

APPENDIX 6. Environmental audit of the "DREDGING OF PUERTO BOLÍVAR DOCKS 1, 2, 3, 4, 5 AND 6, MANEUVERING ZONE AND ACCESS CHANNEL" Project

APPENDIX 7. JV PBO 4.2.1 l) Arrangements & Construction Methods Statements

APPENDIX 8. Execution Plan and Schedule

APPENDIX 9. FDC6808.MES.01.01.e.00-Method Statement

APPENDIX 10. FDC6808.MES.61.01.s.01-Survey Method Statement