Pakistan Gas Port Consortium Limited

Terminal and Cargo Operations Manual Outline

Port Qasim Pakistan

PGPCL LNG IMPORT TERMINAL

TERMINAL & CARGO HANDLING MANUAL OUTLINE (DOCUMENT)

1 INTRODUCTION

This document contains outline of information in respect of port, FSRU and terminal for shipowners, masters and crew of the ships destined to the Terminal. Detailed terminal rules/regulations will be prepared after

The information comprised in this document come from reliable sources and are correct to the best of their extent. Pakistan Gasport Consortium Limited (PGPCL) must not be held accountable for errors or omissions in this Document since the present document is intended only to supplement – as opposed to substituting or altering – official legislation, instructions, guidelines or publications, either national or international. Therefore, any information herein which either thoroughly or partly contradicts any official document or publication shall be disregarded.

Ship operations at the PGPCL Terminal must comply with the recommendations by the International Safety Guide for Oil Tankers Terminals (Isgott), the International Maritime Organization (IMO) conventions and with the Terminal's operating standards.

PGPCL reserves the right to alter any of its operational characteristics presented herein without prior notice.

2 PORT INFORMATION

The Port Muhammad Bin Qasim also known as Port Qasim, is a deep-water seaport at Karachi, Sindh, Pakistan, on the coastline of the Arabian Sea. It is Pakistan's second busiest port, handling about 40% of the nation's cargo (19 million tons per annum). Port Qasim and Karachi Port, the busiest port of country, together handle more than 90% of all external trade of Pakistan.

The total area of the port comprises 3,520 acres (14.2 km²) with an adjacent 13,000 acres (52 km²) industrial estate wherein many industrial zones operate. In addition to the Pakistan Steel Mills (PSM) and KESC Bin Qasim Power Plant, around 80% of the Pakistan's automotive industry is located at Port Qasim. The port also provides direct waterfront access to two major nearby industrial areas, Export Processing Zone (Landhi) and Korangi Industrial Area. Approximately 60% of country's export andimport is originated from these areas. Port Qasim is managed by Port Qasim Authority, a semi- autonomous government body.

In the 1970s, as a part of Pakistani Prime Minister Zulfiqar Ali Bhutto's program for economic reforms and establishment of heavy industries, the country's first steel mill (Pakistan Steel Mills) was established near the southern city of Karachi. A purpose-built specialised port facility was also decided to be established for bulk handling of the massive imports of raw materials for steel production. In addition to the future economic demands and strategic needs, this port was also meant to relieve congestion at Karachi Port, the only established seaport of the country. Port Qasim was named as Port Muhammad bin Qasim (also known as Port Qasim), after the Muslim General Muhammad bin Qasim who conquered Daybul and the coastal areas of Sindh around 712 CE.

Port Qasim is located, adjacent to the Bin Qasim town, in the southern part of Malir district, Karachi division, in Sindh. It is located in an old channel of the Indus River at a distance of 22 miles (35 km) east of Karachi city center. The geographic position of the Port Qasim places it in close proximity to major shipping routes. The approach to the port is along a 24 nm (45 km) long Navigation Channel which provides safe navigation for vessels up to approximately 100,000 tonnes deadweight (DWT).

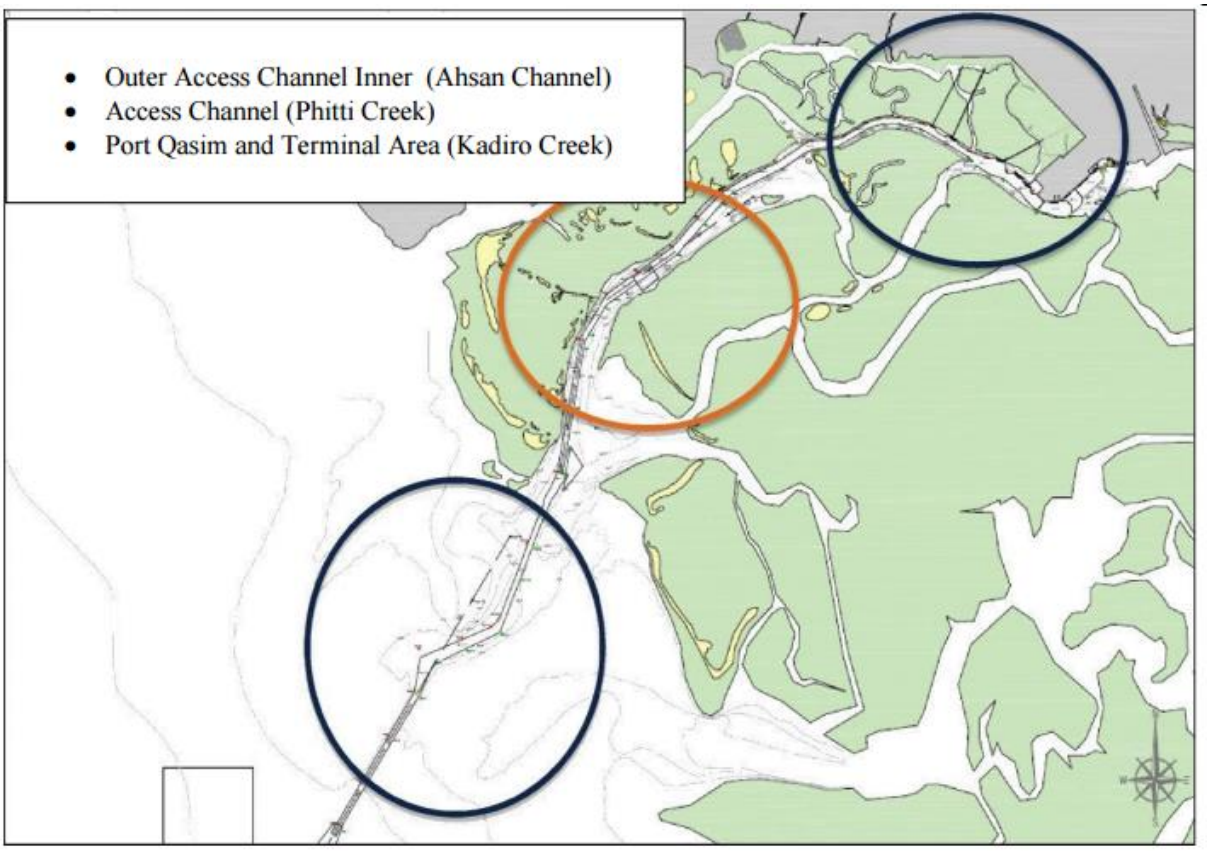
Location of the Port Qasim makes it very well connected to the transportation infrastructure of the country. It is at distance of only 9 miles (15 km) from the national highway, providing direct access to the hinterland through road. A further 8.5 miles (14 km) of railway track inside the terminal links it to the national railway network through railway tracks. Jinnah International Airport is also very near, at a distance of 13.5 miles (22 km).

Port Qasim is located on the northwest edge of the Indus Delta system. The system is characterised by long and narrow creeks, mud flats and the Indus River Delta-Arabian Sea mangroves, one of the largest mangrove forest ecosystems found in an arid climate.

3 PORT LAYOUT

The port area stretches from the start of the navigation channel, which leads from the open sea to the port terminals. The channel has two main sections: the outer channel and the inner channel. The PGPCL terminal is located in Chara Creek, Mazhar Point.

The seaward end of the outer channel is defined by a fairway lighted buoy, which marks the channel entrance, and stretches to Phitti Creek, which is the entrance to the inner navigation channel. The outer channel leads from the entrance through shallow flats or bar. This section of the outer channel is known as the Ahsan Channel. The inner channel is a continuation of the outer channel via Phitti Creek and Kadiro Creek.



Ahsan Channel

This waterway comprises the entire outer channel from the fairway lighted buoy to buoy-pair B1-B2 at the entrance to Phitti Creek. According to British Admiralty Chart 59 (published 2013) this stretch has a depth of 15.3 m. In this stretch, a depth of 15.3 meters is dredged by the Port Qasim Authority.

The minimum width of the Ahsan Channel is 200 m from buoy-pair NO1-NO2 to buoy- pair NO7-NO8 and from buoy-pair NO12A-NO13 to buoy-pair B1-B2. The Ahsan Channel bend is located between buoys NO7-NO8 and NO12-NO13, where the channel width increases to 565 m.

Phitti Creek

This waterway comprises the beginning of the inner channel, from the beginning of Phitti Creek (buoy- pair B1-B2) to the start of Kadiro Creek near Hasan Point (buoy-pair K4-K5). According to British Admiralty Chart 59 (2013) this stretch has a dredged depth of 14.0 m.

The minimum width of the Phitti Creek channel is 200 m from buoy-pair B1-B2 to buoy-pair B11-B12. From here onwards the width of the channel increases to between 280 m and 312 m, except in the vicinity of buoy P11 where it narrows to 225 m.

Kadiro Creek

This waterway comprises the last part of the inner channel, from the start of Kadiro Creek (marked by buoy-pair K4-K5) to the Port Qasim terminal area. According to British Admiralty Chart 59 (2013) the depth is 14.0 m.

The minimum width of the channel is 200 m on the Kadiro Bend, from buoy- pair K4-K5 to buoy-pair G2-G3. From here onwards the channel widens to provide access to the turning basin and then narrows to the channel opposite the EETL terminal with a width of 250 m. At the end of this channel the basin for container carriers is located, with a dredged depth of 15.0 m. The container terminal basin may be considered an alternative turning basin for future use.

4. OTHER INFORMATION

Information in respect of Approach, Pre-Arrival Information, Anchorage, Pilotage, Towage, Radio Frequency etc. or any other details may be taken from *Port Qasim Port Guide, Standard Operating Procedures for LNG Vessels, Port Qasim and other relevant port Regulations.*

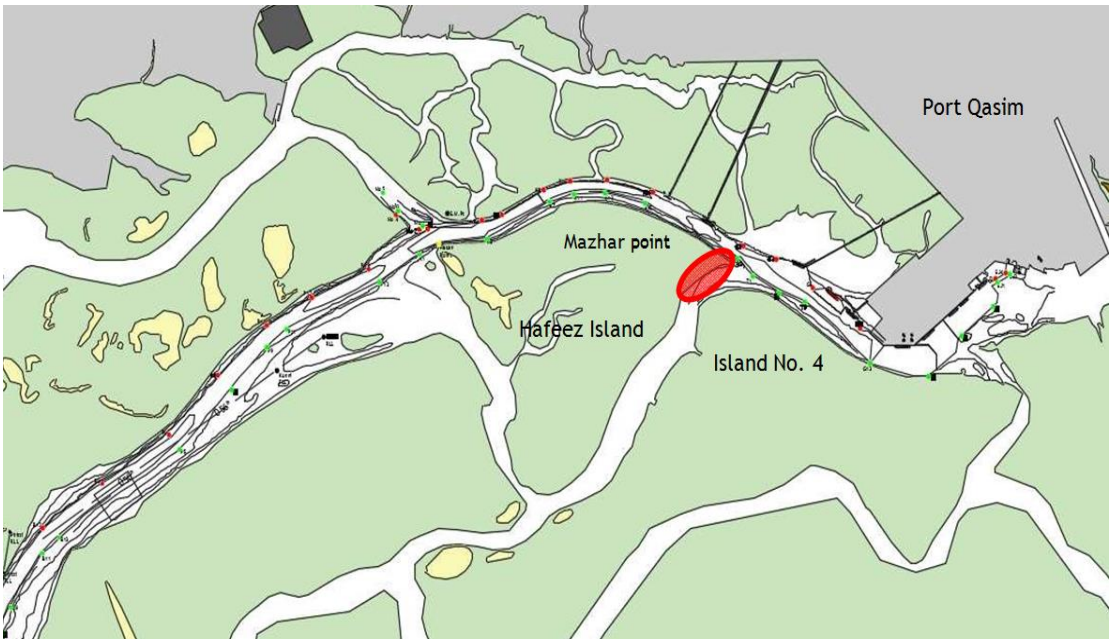
5. FSRU BW INTEGRITY PARTICULARS

BW INTEGRITY	
PORT OF REGISTRY:	Singapore
FLAG:	Singapore
CALL SIGN:	TBA
IMO NUMBER:	TBA
OFFICIAL NUMBER:	TBA
MANAGEMENT:	BW FLEET MANAGEMENT AS
E-Mail ADDRESS:	integrity@bwfleet.com
INM.-FBB ID NO.: VOICE, FAX	TBA
INMARSAT – C ID NO.1 & NO.2:	TBA
MMSI:	TBA
BUILD YEAR:	2017
BUILD YARD:	Samsung Heavy Ind. CO., LTD. Korea
PLACE OF BUILD:	Geoje Shipyard, Korea
CLASS:	DNV-GL
CLASSIFICATION DESIGNATION:	+1A1, Tanker for liquefied gas ship type 2G (Membrane tank, Maximum pressure 70kPaG, Minimum temperature -163 C and specific Gravity 500kg/m3, NAUTICUS (Newbuilding) E0, BIS, TMON, COAT-PSPC(B), NAUT-0C, GAS FUELLED, COMF-V(3)C(3), CSA-2, CLEAN, Recyclable, REGAS-2
TYPE OF VESSEL:	LNG FSRU/ LNG Carrier
LIGHTSHIP:	33077,9 mt
GROSS REGISTERED TONNAGE:	106793
NET REGISTERED TONNAGE:	33219
SUEZ GROSS / NET TONNAGE:	110840.54 / 108434.67
SHIPS CRANE:	1 x port provision crane SWL 5 ton 1 x stb provision crane SWL 10 ton 2 x hose handling crane SWL 5 ton 1 x Regas Service crane SWL 10 ton
LOA:	292.571 m
LBP:	281.000 m
BREADTH MOULDED:	43.40 m
DEPTH MOULDED:	26.60 m
SUMMER DRAFT:	12,3 m
SUMMER DEADWEIGHT:	87233.5 mt
MAX HEIGHT FROM KEEL:	55,10 m
MAIN ENGINE:	Diesel Electric
TYPE OF PROPELLER:	5 – Blade, Fixed Pitch Propeller

BOW THRUSTER:	NA
SERVICE SPEED:	19.5 kts
CARGO CAPACITY:	170,212.8 m3 at 100%, 167,659.6 M3 at 98.5%
FUEL CAPACITY:	HFO: 4759.9cbm, MDO 1364.2 cbm
BALLAST:	58393.8 cbm
FRESH WATER:	502.6 cbm
LUBRICATING OIL:	445.9 cbm

6. DETAILS OF THE TERMINAL

PGPCL LNG Terminal is located at Chara Creek, Mazhar Point, as shown below:



PGPL Terminal Location

The terminal is approximately 500 meters from the main navigation channel. An approach channel with minimum depth of -14 meters for the LNG carrier will be available from the existing Kadiro Creek (navigation channel) up to the location of the FSRU Jetty, as shown in attached drawings.

The Terminal is designed to moor FSRU and LNGCs in double banking arrangement.The facility consists of a steel piled and concrete capped jetty which encompasses berthing and mooring facilities for a 170,000 m3 Floating Storage and Regasification Unit (FSRU) and LNGCs upto Qmax size. The re-gasification capacity of the FSRU is 750 MMcfd. The terminal jetty fendering and mooring arrangements are designed to moor the FSRU by using the vessels existing mooring system fitted with conventional mooring wires with tails in accordance with OCIMF guidelines. The design of the berth permits two (2) vessels to be moored in a double-banked configuration while conducting LNG STS transfer operations with the outboard LNGC discharging into the FSRU and the FSRU conducting regasification of LNG and delivering high pressure natural gas into a purpose built high pressure gas marine unloading arm.

A 30 inch diameter, 15 KM long pipeline for transportation of RLNG will be laid from the jetty upto the on shore delivery point. The pipeline will comprise of sub-merged, trestle mounted and buried sections.

7. DOCUMENTATION REQUIREMENTS

The required documentation for the Ship Crew, to enter Pakistan is of the responsibility of the Masters and are advised to check with their local agents for the most up to-date list of required port entry documents. PGPCL shall not be liable for any delay or to be hold responsible for any claim in respect of non-fulfilment of such above requirements

8. PORT DUES

LNGC shall be obliged to pay port dues for using the port facilities. The PQA shall establish the types of port dues, their maximum amounts, and the principles of application of the dues.

9. STANDARD OPERATING PROCEDURES FOR LNG VESSELS

Based on recommendations of simulation study carried out at “SiPORT 21” in February 2015, the LNG vessels of up to 217,000 m3 cargo capacity having maximum LOA of 315 meters and maximum Beam of 50 meters with arrival laden drafts varying from 10.8 meters to 11.50meters were considered. The corresponding wave heights at these drafts were limited between 2.0 meters to 1.2 meters respectively prevailing at the mouth of the channel entrance (Ahsan channel).

Other factors including the existing port regulations, practices and traffic patterns of the port were also considered in the development of these SOPs. These SOPs are to be read in conjunction with the existing Port Qasim Regulations 1981 and PQA act 1973 and are to be incorporated in the comprehensive Operations Manual to be prepared, duly approved by the PQA and issued by each of the LNG Terminals located within the jurisdiction of Port Qasim Authority.

Based on the results of the navigation simulations with LNG vessels up to 217,000 m3 cargo capacity, the following procedures for entering and navigating the three legs of the channel have been developed and to be complied with:

a. The LNG carrier to enter the Ahsan channel about one hour prior to the top of the High Water provided the transit through the channel to the berth can be completed during daylight hours.

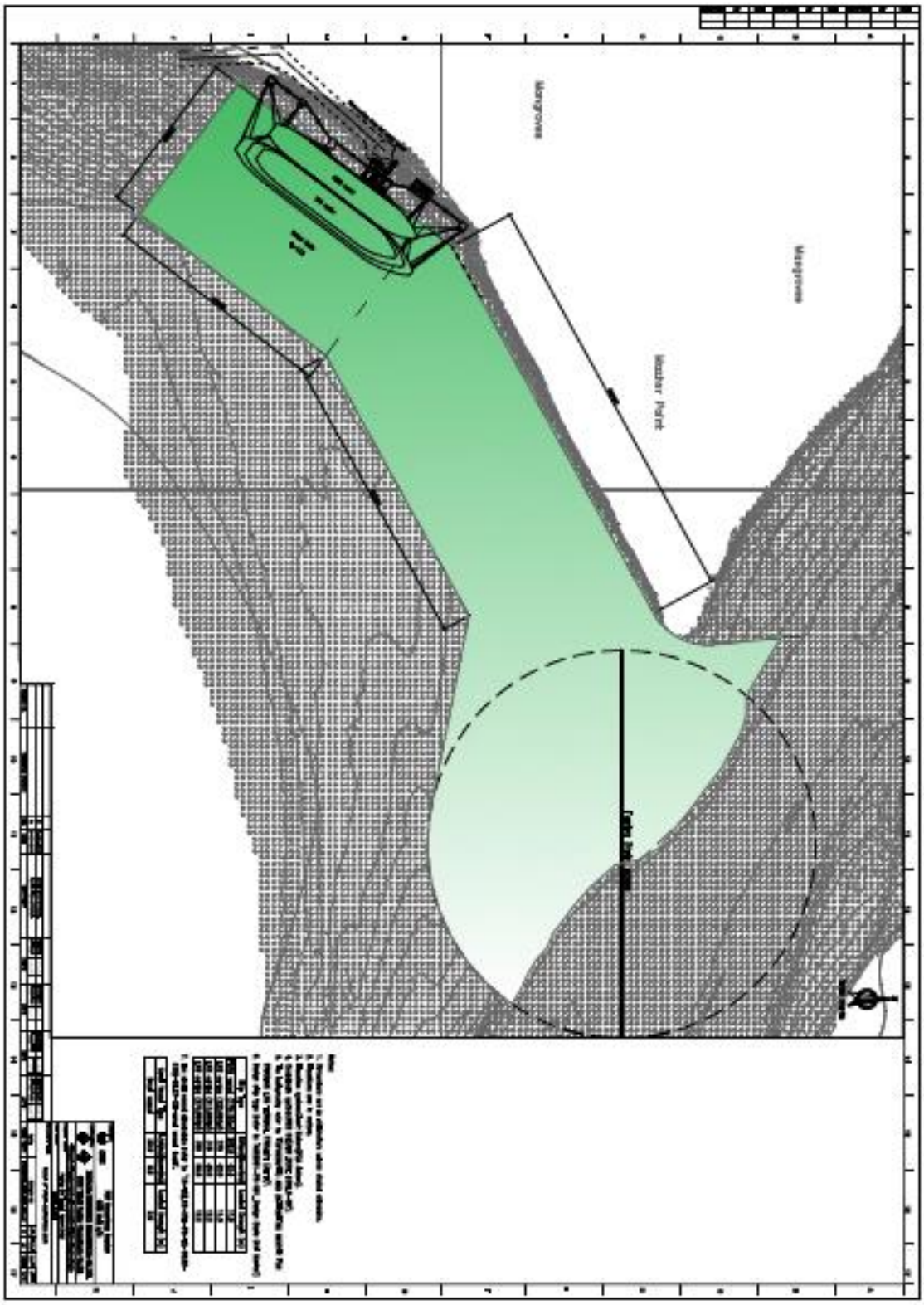
b. The LNG carrier is allowed to enter the channel all-round the year including the South West Monsoons (approximately 15th May – 15th September) under controlled and closely monitored conditions.

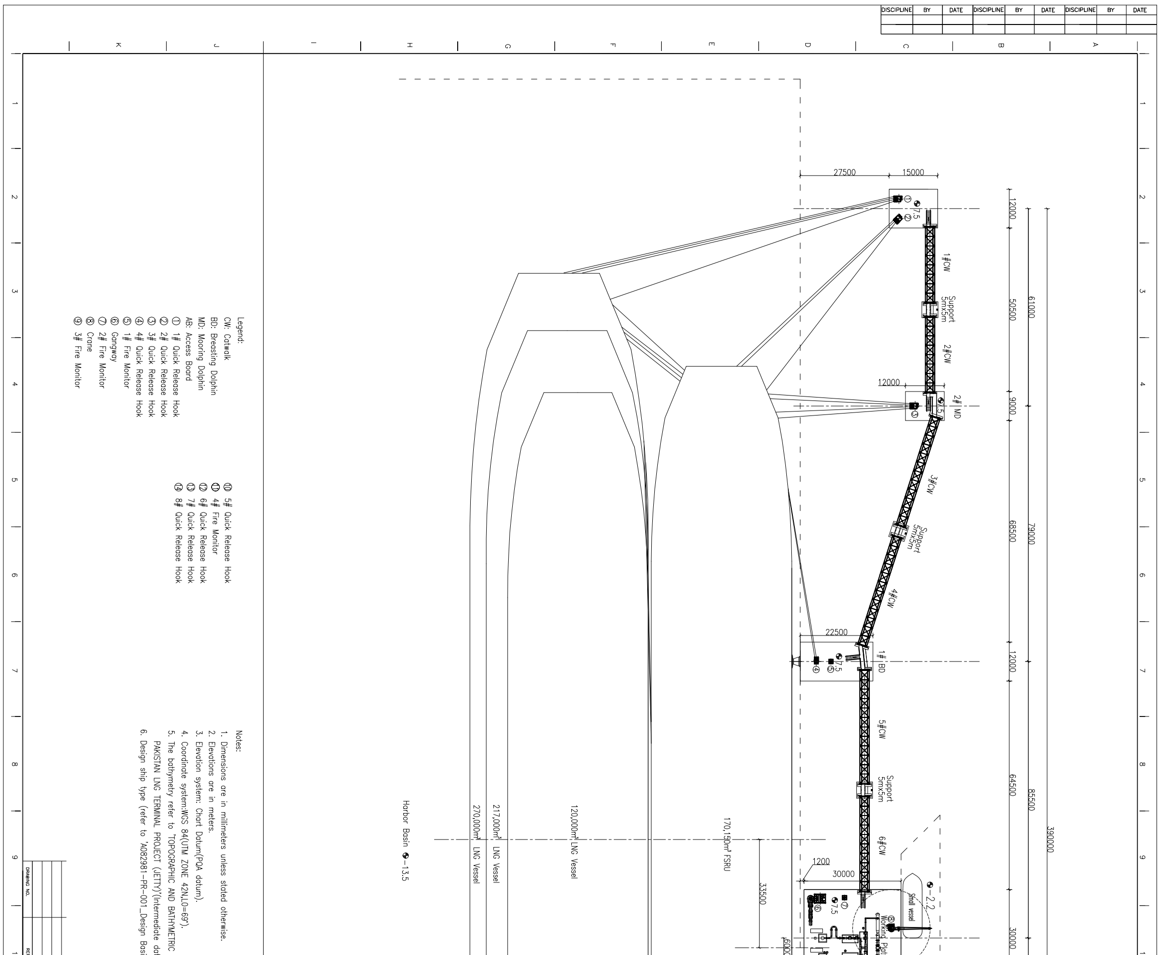
c. The water density of the PQA channel varies with the location and environment ranging between 1.023 to 1.027.

d. Draft of the vessels have to be controlled to meet the PIANC guidelines for the channel which gives the guidance for under-keel clearance depending on High Water Level linked to the height of waves that can exceed 2 meters during the SW Monsoon season. After boarding of the Pilots and prior to commencing the passage in Ahsan channel, the escort tugs to be in attendance at the astern. For the tugs to render effectively they have to operate during wave heights limited to 2 meters. A second escort Tug will lead ahead of the vessel to keep the channel clear and render any required assistance in case of emergencies.

The draft of the LNG vessel has to be maintained between 11.5 meters to 10.8 meters at the starting point of Ahsan Channel according to the following scale of wave heights:

i. Wave Height 2.0 Meters ……. Arrival Draft 10.8 meters
ii. Wave Height 1.2 Meters……Arrival Draft 11.5 meter


Mangroves
Mangroves
Water Park


True North
To Turning Basin
Harbor Basin -13.5
170,150m³ FSRU
120,000m³ LNG Vessel
217,000m³ LNG Vessel
270,000m³ LNG Vessel
Working Platform
Building Platform
Control Building
Small vessel
Pipe to shore(Draft)
Legend:
CW: Catwalk
BD: Breasting Dolphin
MD: Mooring Dolphin
AB: Access Board
① 1# Quick Release Hook
② 2# Quick Release Hook
③ 3# Quick Release Hook
④ 4# Quick Release Hook
⑤ 1# Fire Monitor
⑥ Gangway
⑦ 2# Fire Monitor
⑧ Crane
⑨ 3# Fire Monitor
⑩ 5# Quick Release Hook
⑪ 4# Fire Monitor
⑫ 6# Quick Release Hook
⑬ 7# Quick Release Hook
⑭ 8# Quick Release Hook
Notes:
1. Dimensions are in millimeters unless stated otherwise.
2. Elevations are in meters.
3. Elevation system: Chart Datum(PQA datum).
4. Coordinate system:WGS 84(UTM ZONE 42N,L0=69°).
5. The bathymetry refer to 'TOPOGRAPHIC AND BATHYMETRIC SURVEY FOR PAKISTAN LNG TERMINAL PROJECT (JETTY)'(Intermediate data).
6. Design ship type (refer to 'A082981-PR-001_Design Basis Civil Marine')
Ship Type | LOA(m) | Beam(m) | Loaded Draught (m)
FSRU vessel (170,150m³) | 292.5 | 43.4 | 11.9
LNG carrier (120,000m³) | 275 | 42.0 | 11.0
LNG carrier (213,000m³) | 315 | 45.0 | 12.2
LNG carrier (270,000m³) | 350 | 55.0 | 12.2
7. The location of the working platform is refer to the 'HN2118_GA_Prov (20160525)_Reference only COWI markup for XPE confirmation' and 8-TQ(LNG-XPE-PG-TQ-16.09-009) MLA drawings.
8. The small vessel dimensions refer to '18-TQ(LNG-XPE-PG-TQ-16.09-019)-09.27-SH-small vessel berth'.
Samll Vessel Type | LOA(m) | Beam(m) | Loaded Draught (m)
Small vessel | 20.0 | 6.0 | 2.0
PGP Consortium Limited
COWI Gulf A/S
XINJIANG PETROLEUM ENGINEERING CO.,LTD.
CCCC Third Harbor Consultants Co.,Ltd
Pakistan LNG Terminal Project (Jetty)
GENERAL LAYOUT
LAYOUT OF JETTY