Draft Environmental Impact Assessment

Project Number: 48307-001
January 2015

PAK: Engro Fast Track LNG Regasification Project

(Addendum)

Prepared by Environmental Management Consultants (EMC) and Engro Elengy Terminal Private Limited (EETPL) for the Asian Development Bank

PREFACE

This document supplements the Environmental Impact Assessment prepared by Environmental Management Consultants (EMC) and Engro Elengy Terminal Private Limited (EETPL) which was disclosed on the Asian Development Bank website on July 2014.

The amendments and/or supplementary information are presented to clarify the discussions presented in the original document. They do not substantively alter the nature of the aspects or impacts of the project. The information is presented by Chapters and Sections as can be found in the page(s) of the original document when such addendum is required on the relevant Chapter/Section.

This addendum should be read in addition to the draft originally posted in July 2014 available on http://www.adb.org/projects/documents/engro-vopak-fast-track-lng-regasification-project-eia.

CHAPTER 1: INTRODUCTION & OBJECTIVES

Under Section 1.4 Overview of Siting Process (p. 5 of 9) - (A brief discussion on why option 3 was the identified location for the project is presented).

Four siting options were considered including Options 1 and 2 at greenfield sites located on Khiprianwala Island, and Options 3 and 4, brownfield sites associated with the existing Engro Vopak terminal (EVTL) jetty. The following provides supplemental information on the decision to proceed with Option 3.

Option 3 was chosen because the Jetty is near the pipeline network of SSGC gas pipeline for Port Qasim; moreover the site is less exposed to open sea because of the location of the jetty in the adjoining basin.

Option 3 site considers minimal disturbance to ecosystem especially of the mangroves and other aquatic flora and fauna. Furthermore, Construction period for Option 3 is 11 months compared with 18-24 months for option 1 & 2 and 1.0 million cubic meters dredging is involved while 3-2.5 million cubic meters for option 1 & 2. Also cost for Option 3 is 120 to 125 million USD while for option 1 & 2 is 225-250 million USD.

CHAPTER 2: LEGISLATIVE & ADMINISTRATIVE FRAMEWORK (NO ADDENDUM)

CHAPTER 3: DESCRIPTION OF THE PROJECT

Under Section 3.3 Pipeline Connection to Gas Network (p. 19 of 29) - Figure 3.15 is corrected to reflect the clarification that the pipeline route outside the Port Qasim Area is only on government land and no land acquisition will be involved.

Figure 3.15: Pipeline connection (enlarge view - section 2)

Figure 3.15: Pipeline connection (enlarge view - section 3)

Figure 3.15: Pipeline connection (enlarge view - section 3)

CHAPTER 4: SCREENING OF ALTERNATIVES &/OR SUBSEQUENT EXPANSIONS

Under 4.2.3 Other Considerations (p. 5 of 15) – (An explanation of why Option 2 was rejected is presented).

The Option 2 site has been rejected due to safety and security concerns as the site is critically expose to open sea, tsunamis and wave action.

CHAPTER 5: DESCRIPTION OF PHYSICAL AND BIOLOGICAL ENVIRONMENT

Under Section 5.2 Natural Environmental Baseline (p. 8, 9, 10 and 20 of 55) – (Tables 5.2, 5.3, 5.4, 5.5, 5.6 and 5.9 are updated to reflect data up to 2013)

Table 5.2: Mean Monthly Maximum Temperature °C

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2001	27.2	29.6	33.1	34.6	35.1	34.9	32.2	32.3	33.1	36.0	33.5	30.4	32.7
2002	27.0	28.2	33.3	35.4	35.6	35.1	32.2	31.6	31.4	36.5	32.7	28.1	32.3
2003	27.6	28.5	32.4	36.6	35.7	34.9	34.1	32.6	32.5	37.0	32.2	28.3	32.7
2004	26.6	29.9	36.2	35.4	36.8	35.6	33.8	32.7	32.8	33.7	33.1	29.4	33.0
2005	24.9	26.3	31.5	35.3	35.4	36.0	33.2	32.2	34.2	35.2	33.1	28.4	32.1
2006	26.0	31.3	31.8	34.0	34.6	35.3	33.8	31.0	34.2	35.0	33.4	26.3	32.2
2007	26.9	29.4	31.4	37.7	36.0	36.4	N/A	N/A	N/A	N/A	N/A	N/A	33.0
2008	24.4	26.9	34.3	34.4	33.9	35.1	33.5	31.9	34.7	35.5	32.5	27.2	32.0
2009	26.2	29.8	33.0	36.0	36.8	35.7	34.5	33.0	32.8	35.9	33.0	28.6	32.9
2010	27.5	29.2	34	35.7	36.5	34.7	34.6	33.2	34.5	35.9	32.7	28	33.0
2011	26.9	28.5	33.2	35.8	35.3	35.3	34.2	32.8	32.9	N/A	N/A	N/A	N/A
2012	25.7	26.9	31.7	35.1	35.5	34.6	33.2	32.7	33.2	35.0	32.7	28.2	32.0
2013	26.7	28.0	33.3	34.0	35.1	36.5	33.8	32.1	33.0	35.7	32.3	28.3	32.4

Source: Pakistan Meteorological Department

Table 5.3: Mean Monthly Minimum Temperature °C

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2001	11.5	14.9	19.6	23.8	28.1	29.0	27.1	26.5	25.9	24.4	18.6	15.8	22.1
2002	12.8	13.8	19.5	23.9	27.0	28.2	29.6	25.6	24.8	22.5	17.7	14.9	21.7
2003	12.7	16.9	19.8	24.2	26.5	28.2	23.6	27.0	25.3	20.9	15.2	12.0	21.0
2004	12.9	14.5	19.1	24.8	27.3	28.8	27.5	26.3	25.3	22.4	18.0	15.4	21.9
2005	12.3	11.3	20.3	23.0	26.4	28.3	27.2	26.6	26.6	22.9	18.9	13.0	21.4
2006	11.7	18.1	19.6	24.5	27.5	28.5	28.3	26.3	26.8	25.7	19.4	14.0	22.5
2007	13.0	17.3	19.7	24.7	27.6	28.6	N/A	N/A	N/A	N/A	N/A	N/A	21.8
2008	10.1	11.1	19.6	24.0	27.3	29.1	27.9	26.8	26.6	23.8	17.6	14.9	21.6
2009	14.7	16.5	20.8	23.8	27.6	28.7	28.1	27.5	26.5	22.6	17.0	13.9	22.3
2010	12.2	14.7	21.3	25.1	28	28.2	28.3	27.2	25.8	23.9	17.4	11.1	21.9
2011	11	14.5	19.7	23.1	27.1	28.8	27.8	28.6	26.5	N/A	N/A	N/A	N/A
2012	11.2	11.9	19.1	24.5	27.2	28.0	27.9	26.9	26.4	22.7	18.6	14.2	21.5
2013	11.6	15.1	19.2	24.2	27.1	29.3	28.0	26.6	25.5	25.4	18.1	13.0	21.9

Source: Pakistan Meteorological Department

Table 5.4: Monthly Amount of Precipitation (mm) at Karachi Air Port

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2001	0.0	0.0	0.0	0.0	0.0	10.6	73.6	16.2	N/A	0.0	0.0	0.0	100.4
2002	0.0	2.4	0.0	0.0	0.0	N/A	N/A	52.2	N/A	0.0	0.5	0.4	55.5
2003	6.4	21.8	0.0	0.0	0.0	16.3	270.4	9.8	N/A	0.0	0.2	0.0	324.9
2004	13.7	0.0	0.0	0.0	0.0	N/A	3.0	5.6	N/A	39.3	0.0	4.3	65.9
2005	6.6	12.8	N/A	0.0	0.0	N/A	N/A	0.3	54.9	0.0	0.0	17.1	91.7
2006	N/A	0.0	N/A	0.0	0.0	0.0	66.2	148.6	21.9	0.0	3.1	61.3	301.1
2007	0.0	13.2	33.4	0.0	0.0	110.2	N/A	N/A	N/A	N/A	N/A	N/A	156.8
2008	8.0	Trace	1.1	0.0	0.0	0.0	54.0	37.5	Trace	0.0	0.0	21.0	121.6
2009	3.0	Trace	0.0	Trace	0.0	2.6	159.9	44.0	68.9	0.0	0.0	1.5	279.9
2012	0.2	0.0	0.0	0.0	0.0	Trace	Trace	8.1	121.0	0.0	0.0	22.8	152.1
2013	Trace	20.0	2.8	30.0	0.0	Trace	5.5	105.4	4.0	1.2	0.0	0.0	168.9

Source: Pakistan Meteorological Department

Table 5.5: Wind Speed (m/s) at 12:00 UTS

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2001	2.6	3.4	4.3	5.6	7.5	8.1	6.8	7.3	5.5	3.7	2.0	2.4	4.9
2002	3.6	3.9	4.0	6.5	8.5	8.2	9.8	7.3	7.7	3.3	2.9	3.2	5.7
2003	4.0	5.0	5.4	5.2	7.7	8.8	6.7	7.1	6.0	3.2	3.1	3.0	5.4
2004	3.4	3.7	4.0	6.0	8.0	9.0	10.0	9.5	7.3	3.8	1.0	2.5	5.7
2005	3.6	4.2	4.8	5.1	7.1	7.5	9.0	6.9	6.4	3.9	2.0	1.5	5.2
2006	2.0	3.0	3.0	6.2	8.0	7.7	8.3	6.2	4.7	4.2	2.2	3.0	4.9
2007	2.0	3.7	4.0	4.0	6.0	6.3	N/A	N/A	N/A	N/A	N/A	N/A	4.3
2008	4.3	7.6	8.2	10.5	12.6	7.6	11.0	9.3	8.7	6.6	5.1	3.9	7.9
2009	7.0	7.2	7.9	9.3	9.8	9.7	9.5	9.3	9.1	6.1	5.0	3.9	7.8
2012	5.8	6.6	9.3	9.8	12.3	12.8	13.1	11.2	8.4	7.1	5.7	5.8	9.0
2013	5.2	6.9	9.0	10.3	11.5	10.8	12.0	11.2	10.3	7.7	5.1	4.5	8.7

Source: Pakistan Meteorological Department

Table 5.6: Wind Direction at 12:00 UTS

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2001	S54W	S43W	S42W	S45W	S46W	S45W	N52W	S59W	S44W	N56W	S45W	S06W
2002	S67W	S52W	S51W	S55W	S51W	S42W	S54W	S45W	S48W	S56W	N54W	S41W
2003	S60W	N50W	S45W	S48W	S45W	S68W	S60W	S47W	S43W	S54W	S50W	S27W
2004	N27E	S46W	S53W	S49W	S52W	S54W	S54W	S62W	S56W	S47W	S45W	N86E
2005	N63E	S51W	S50W	S52W	S63W	S48W	S54W	S49W	S87W	S54W	S52W	N23W
2006	S48W	S62W	S50W	S57W	S64W	S60W	S67W	S78W	S51W	S53W	S49W	N79E
2007	S30W	S62W	S47W	S55W	S58W	S47W	S41W	S55W	S60W	S48W	S48W	N45E
2008	N45E	S47W	S54W	S51W	S52W	S39W	S50W	S52W	S46W	S39W	S38W	N
2009	N45E	S45W	S41W	S58W	S46W	S46W	S56W	S49W	S56W	S42W	S39W	S45E
2012	S3E	N56E	S62W	S46W	S61W	S51W	S66W	S51W	S53W	S41W	S41W	N9W
2013	N39W	S54W	S56W	S54W	S61W	S40W	S53W	S52W	S55W	S47W	S17W	N50W

Source: Pakistan Meteorological Department

Table 5.9: CYCLONES & STORMS DURING LAST 15 YEARS

Sr. No.	Year	Type/ Location of Cyclone	Wind Speed Range (km/h)
1	November 1993	Tropical Cyclone/ Northeast Arabian Sea	62 - 88
2.	June 1996	Cyclonic Storm /East Central Arabian Sea	62 - 88
3.	October 1996	Tropical Storm /Southeast Arabian Sea	62 - 88
4.	June 1998	Cyclonic Storm /Southeast Arabian Sea	62 - 88
5.	October 1998	Cyclonic Storm /East Central Arabian Sea	62 - 88
6.	May 1999	Very Severe Cyclonic Storm /East Central Arabian Sea	> 118
7.	May 2001	Very Severe Cyclonic Storm /East Central Arabian Sea	> 118
8.	September 2001	Cyclonic Storm /East Central Arabian Sea	62 - 88
9.	May 2002	Tropical Cyclone /West Central Arabian Sea	62 - 88
10.	May 2004	Very Severe Cyclonic Storm /Southeast Arabian Sea	> 118
11.	October 2004	Severe Cyclonic Storm /Northeast Arabian Sea	89 - 117
12.	September 2006	Tropical Cyclone /East Central Adjoining Northeast Arabian Sea	62 - 88
13.	02 June 2007	Tropical Cyclone /East Central Arabian Sea	62 - 88
14.	07 June 2007	Very Severe Cyclonic Storm /Northwesterly of East Central Arabian Sea	> 118
15.	21 June 2007	Tropical Cyclone (Deep Depression) /Northeast Arabian Sea	> 50
16	07 June 2010	Tropical Cyclone /Northeast Arabian Sea	> 50
17	31 October 2014	Tropical Cyclone	> 15

Source: AEDB

Under Section 5.2.8 Biological Environment (p. 34 of 53) - (Additional Baseline Characterization for Zooplankton is provided)

Zooplanktons are surface dwellers. Studies undertaken on the zooplankton abundance indicate that copepods, chaetognaths, *Coelenterata medusa* (jelly-fishes), pteropods (mollusks), krill (euphausiids), fish-eggs and larvae (Icthyoplankton), crab larvae (Zoea) and shrimp larvae (Zoea and Mysis) are the most common groups of zooplankton found in the coastal waters of Pakistan including the project area (DHA, circa 2007).

It is also evident from these studies that the Arabian Sea zooplankton biomass remains high throughout the year. However, the distribution and abundance of zooplankton may be influenced by the two monsoons (southwest and northeast monsoons) which prevail in this region (DHA, circa 2007). From project point of view, since zooplanktons have a very short regeneration time (14 days), any disruption in the zooplankton population will be replenished within a short period of time. The 2007 study was a comprehensive study and given the relatively unchanging nature of the project area prior to construction and the limited potential for adverse project impacts is considered appropriate to use for baseline data.

Under Section 5.3.3 Discussion on Ambient Air and Noise Quality Results (p. 50 of 53) – (Additional figures on sampling locations are provided)

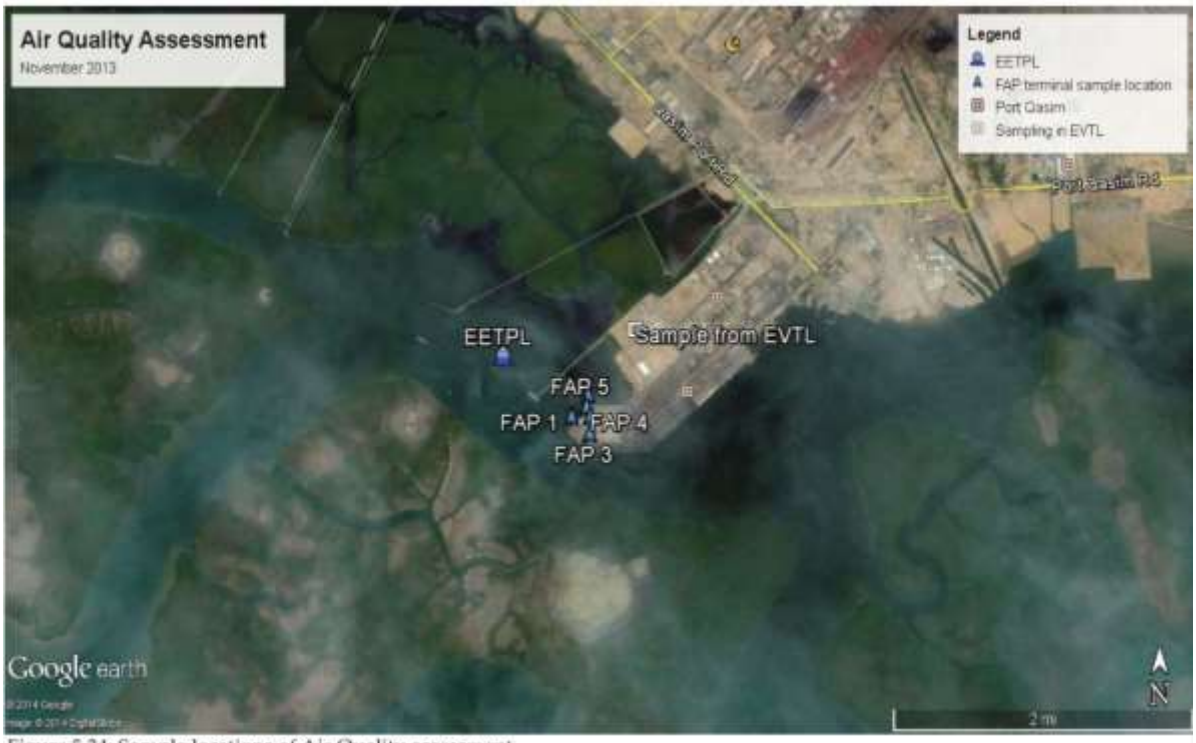

Figure 5.34: Sample locations of Air Quality assessment

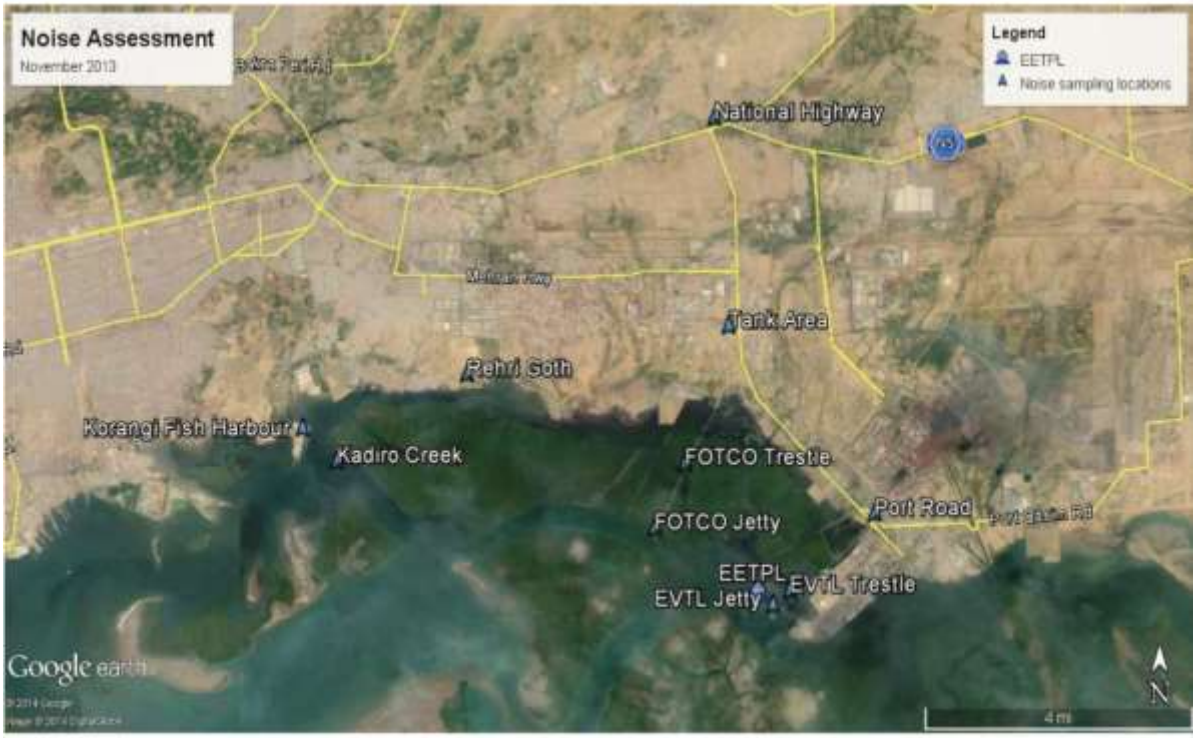

Figure 5.35: Sample locations of Noise assessment

CHAPTER 6: SOCIOECONOMIC PROFILE OF THE ENVIRONMENT

Under Section 6.1.1 Demography (p. 3 of 6) – A clarification is given that Table 6.2: Column on Population is valid as of year 2012.

CHAPTER 7: PUBLIC/STAKEHOLDERS CONSULTATION AND INFORMATION DISCLOSURE

Under Section 7.8 Community Engagement Responsibilities (p. 17 of 21) – (A table presenting the inclusive dates and location of the consultation meetings and FGD is presented, as shown below)

Table 7.3: Inclusive dates and the locations for the consultation meetings and FGD

Consultation Meeting	Venue	Date
Public hearing	Local Hotel karachi	April 09, 2011
Experts Committee	Environmental Protection Meeting Agency, Sindh Office, Karachi	May 26, 2011
FGD with local Fisher	At Rehri Goth, Port folks Qasim, Karachi	August 18, 2014
FGD with local Fisher	Office of Mr. Adil folksJamote at the Korangi Fish Harbor	Sept. 17, 2014

Under Section 7.10 Grievance Redress Mechanism (GRM) (p. 18 of 21) – (A GRM procedure necessary to address the stakeholders' complaints in a timely and transparent manner during the construction and operation of the project is expounded below).

EETL has adopted the Community GRM Procedure outlined below, which requires interaction, consultation, targeted information and timely resolution of legitimate grievances. This approach is aimed at building a reputation of responsiveness, concern and responsibility among the community, with a view to building and sustaining acceptance and support for the construction and operation of the project.

Field level grievances will be addressed through a local grievance redress committee (GRC) to be formally constituted. The GRC will consist of a specially recruited grievance officer – selected by EETL, fisher folks, locally present NGO. Women will be members of the GRC. The GRC will be formally notified and established at the project sites. The GRCs' will function as open forums for hearing complaints and exploring quick resolutions to conflicts. The GRC will be required to develop an outreach program including links to the provincial ombudsman's office. Each GRC

will record its deliberations and inform the concerned parties of a resolution within 1 month of its findings and recommendations. If the GRC cannot resolve the grievance, they will be facilitated to take their complaints to the provincial ombudsmen or relevant environmental tribunal.

The recruited grievance officer will place a complaint register at an accessible location (Union Council office, mosque, or at camp site) for respective community so anyone can register their complaint in this register and on weekly basis, it will be checked by the GRC. EETL and its Contractor(s) shall foster a sense of working with the local community and demonstrate that the Project takes a proactive stance to grievances.

EETL's grievance management system and database will comply with and has the flexibility to feed information into the Community Grievance Procedure. EETL will also provide all Contractor(s) teams with training in Community Grievance Procedures. In implementing EETL's Community Grievance Procedure, the Contractor(s) shall:

- Record all grievances using a template Grievance Form;
- Assess and advise the resolution of the grievance in the time frame required by the assessment.

All grievances will be investigated and a response (outlining a resolution) provided by EETL/Contractor(s) as soon as possible and not more than 30 days after receiving the grievance. If more time is required for resolution, the person raising the grievance and EETL shall be kept informed.

While the Contractor(s) is not prevented from initiating the grievance resolution, any corrective action taken must be in coordination with EETL. EETL, through the CLO, will ensure that the details of the Community Grievance Procedure are publicized at community meetings and via posters and other means to all communities in the vicinity of the project.

In addition, EETL and its Contractor(s) shall ensure that the local populations working/residing in the macroenvironment of the project area receive necessary information for contacting and initiating a grievance through meetings, pamphlets and similar community outreach programs under the direction of the CLO.

EETL and its Contractor(s) shall ensure sufficient resources are allocated on an ongoing basis to achieve effective implementation of this Plan. The Contractor Plan shall describe the resources allocated to and responsibility for the execution of each task and requirement contained therein, and shall describe how roles and responsibilities are communicated to relevant personnel.

Annex-XI Methodology of Consultation & Disclosure is also added which details the methodology of FGDs, date and list of individuals who were interviewed during the FGDs.

CONSULTATION AND DISCLOSURE

1.1 General

Public Consultation and Public Participation are two effective tools of social interaction. Public Consultation is an important tool to build up confidence between the stakeholders and the project formulators to minimize the risk of delay of project implementation. It would help the concerned authority to make an assessment of public opinion about the project and nature and extent of opposition likely to occur during implementation stage.

Public Participation, on the other hand, would help the project implementation to a great extent. The purpose of involving general and project affected persons in particular, in decision making process is to have a fair interaction with all community groups and ensuring them that every attempts would be made to minimize negative impact of the project and that adequate mitigation measures would be taken to compensate the loss of the affected persons, if any. Thus, it would ensure partnering of project between community and project implementing authority leading to timely completion of the project with least social cost.

1.2 ADB View on Consultation

a) The ADB Safeguard Policy Statement highlights that consultation and participation, and in particular consultation, is central to achieving safeguard policy objectives. "ADB requires borrowers/clients to engage with communities, groups, or people affected by proposed projects, and with civil society through information disclosure, consultation, and informed participation in a manner commensurate with the risks to and impacts on affected communities."

Source: ADB. 2009. Safeguard Policy Statement

b) Meaningful consultation refers to a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

Source: ADB. 2009. Safeguard Policy Statement

1.3 Objectives of Consultation Process

- Create awareness among local people about the project in general and its potential impacts (both positive and negative) on the community, involve them in the decision making process from the very inception of the project with a view to build trust.

- To identify public concerns with a view to reduction of public resistance during implementation of the project. Make them feel that they are not ignored. Take them in confidence by providing them a role in decision making process.
- Educate potentially affected communities/persons about the proposed course of action and viable project alternatives.
- To solicit the views of affected communities on socioeconomic aspects of impacts of the project. This will serve as an important tool for collection of information on both natural and human environment, which would not be possible through traditional approach of data collection.
- To produce a suitable plan by incorporating the felt needs and preferences of project affected persons as evolved through community interactions.

1.4 Methodology for Consultation Process

1.4.1 Key Stakeholders

The key stakeholders are identified in main report in table 7.1.

1.4.2 Focus Group Discussion (FGD)

Semi-structured qualitative discussions (also referred to as Focus Group discussions Ref: Strengthening participation for development results: ADB Guide to participation) (5-10 people) aiming at community awareness and consultation regarding the project's likely impacts were held with the fisher folk. Two separate FGDs were held:

i. In Rehri Goth on 18 August 2014.

ii. In the office of Mr. Adil Jamote at the Korangi Fish Harbor in 17 September 2014.

Reason of being conducting FGDs was to create confortable environment for the members those not used to formal meetings like fishermen.

1.4.3 Information Dissemination during FGDs

A stakeholder communication strategy was developed for information sharing during FGD. The following are the key steps that were followed:

A. **Objectives**

Following key objectives are set and shared in FGDs:

i. Involuntary resettlement will be avoided

ii. Alternatives of project will be considered to avoid disturbance to Mangroves and fishing grounds

B. **Key Risks/Challenges**

Following are the risks/challenges were considered during FGDs:

i. Communities are worried about the disturbance to habitat they rely on

ii. Literacy issues – most of the participants are illiterate

iii. Poverty / Expectations from the project – What expectation may come up during FGDs and how to manage these expectations

C. **Messages**

Following key massages were shared with the participants of FGDs:

i. Project details and plans

ii. Main impacts due to the project

iii. Disclosure of Project timeline

iv. Key project benefits due to the project

v. Employment of IMC for project monitoring

D. **Means of Communication**

Two (02) facilitators from consultant were arranged who were experienced in doing the communication and information sharing and were fluent in native language so that language barrier to be avoided. The location was selected by mutual coordination with community members. The theme of the FGDs was set as first the information (key objectives, key risks, and message) about the Project was presented by facilitators followed by a Question/Answer session. The meetings last for about two hours.

List of Participants in FGD held on 18 August, 2014.

S#	Name	Status
1.	Salamat Magsi	Fisherman
2.	Ahmed Mirani	Fisherman
3.	Amb Khoso	Fisherman
4.	Nabi Bux	Fisherman
5.	Ayaz Latif Jokhio	Fisherman
6.	Usman Chaki	Fisherman
7.	Mitho Buledi	Fisherman
8.	Mohammad Salim	Fisherman
9.	Mir Mohd	Fisherman
10.	Hamza Khaskheli	Fisherman
11.	Manthar Solang	Fisherman
12.	Fazal Magsi	Fisherman
		

List of Participants in FGD held on 17 September, 2014.

S#	Name	Status
13.	Adil Jamote	Fisherman
14.	Amjad Ali Khaskheli	Fisherman
15.	Shah BuxMakrani	Fisherman
16.	Khan MohdKambrani	Fisherman
17.	Abid Ali Khaskheli	Fisherman
18.	FaisanChiani	Fisherman
19.	Jalil ur Rehman Chang	Fisherman
20.	Mohammad Bacha,	Fisherman
21.	Mohd Omer Baloch	Fisherman
22.	WalidBux	Fisherman
23.	Mohd Omer Baloch	Fisherman
24.	Mohd Omer Mangrio	Fisherman
		

Outcome of FGDs is presented in chapter 7.0 in the main report.

CHAPTER 8: POTENTIAL ENVIRONMENTAL IMPACTS OF THE PROPOSED DEVELOPMENT AND RECOMMENDED MITIGATION MEASURES

Under Section 8.3.2 LNG Terminal Operations – clarification that the project site is in a restricted area unable to be accessed by fisherfolk, and also regarding mangrove replanting.

Construction activities and vessel traffic have no impact with local fishing activity because no fishing takes place in the area due to its restricted access status as further confirmed in discussions with local fisherfolk.

Under Section 8.3.2 LNG Terminal Operations – clarification on the ratio of mangrove replanting.

Any loss of mangrove habitat will be compensated with the ratio of 1:10 that means by plantation/replantation of 10 mangrove trees for the loss of each tree. The number of trees to be planted was determined in consultation with IUCN and as discussed in sec 7.0.

Under Section 8.3.2 LNG Terminal Operations – clarification regarding sewage treatment.

A package type sewerage treatment plant available in the market will be installed at site for sewage discharges from toilets.

Under Section 8.3.7 Natural Hazards - Mitigation Measures for Natural Hazards (p.14 of 44) – (A definition of Category 4 and Category 5 hurricanes is provided below)

Severity is linked with wind speed of hurricane. Category 4 hurricane = (wind speed 209-251 km/h) while Category 5 hurricane = (wind speed 252 km/h or higher).

Additional sections that provide clarification on the anticipated impacts and mitigation measures for (a) generation of solid waste, (b) occupational health and safety, and (c) community health and safety, are presented (p. 33 of 44).

Section 8.3.11 Generation of Solid Waste

8.3.11.1 Construction Waste

During the construction it is possible that construction materials would either be lost accidentally or dumped intentionally into the aquatic environment. Although materials like rock, concrete, plastics, etc. are relatively inert, other materials such as metals, fuels, etc. can cause deleterious effects on the water quality.

It is further anticipated that the piling operations associated with the proposed terminal construction will produce small spoil material. Samples of the spoil material produced from mud flats will be tested for contamination and, if found heavily contaminated, will be disposed off-site.

The dumping of this spoil otherwise would be restricted to the areas immediately adjacent to the terminal construction site. The estimated quantity is considerably low and unlikely to cause adverse impact on long-term basis.

Mitigation Measures

In order to minimize any impacts from losses of site materials and wastes during construction, the contractor undertaking the construction will ensure that there are no access of potentially polluting materials to the water and that any spillages on land are removed and cleaned up immediately. A clause to ensure that this takes effect needs to be included within the contract package of the construction works. In addition, before commencing any work that could involve spillages of polluting materials, the contractor will produce an effective plan of prevention and clean-up measures.

A further clause in the construction contract will be to ensure that the contractor keeps all working areas, storage areas, waterways etc. clear of any rubbish, debris and obstructions at all times. All debris and rubbish will be regularly removed from the site.

8.3.11.2 Ship Waste

MARPOL 73/78 seeks to prevent the discharge of polluting substances from ships into the marine environment. MARPOL 73/78 contains several annexes with restrictions on the discharge of wastes including:

Annex V, Garbage: Prohibits discharge of ships' food waste, sludge, packaging etc. to sea under certain conditions. Any discharge of plastic wastes is banned.

The discharge of ship's garbage causes the collection of waste products on the shoreline. In addition to the adverse aesthetic impact, garbage such as plastics and glass are not biodegradable.

Mitigation Measures

The ships calling on proposed LNG terminal will be required to follow MARPOL 73/78. As no facilities for reception of ships bilge water, solid waste and their treatment are proposed at the Terminal, the ships will be advised accordingly.

Section 8.3.12 Occupational Health & Safety

Safety is the top most priority and prime concern of Engro’s culture. To maintain the same integrity, Engro has a grievance policy of reporting every unsafe act and/or condition prevailing at the Site. Health, Safety & Environment is a first line Management responsibility in Engro and for this every individual in the project are mandate to perform Management Safety Audits which resulted in safe and disciplined work practice at every site of LNG Project.

According to Environmental & Social Compliance Audit, every Incident and near-misses reported at Site are logged, recommendations against the executors are being generated and proper closure is also acknowledged by the Area Engineer on each clause. Safety vigilance is round the clock on every construction site. Dedicated Safety Inspectors has been deputed in day and night shift for conducting respective jobs in their areas with full supervision. For workers

and supervisors motivation, EETL SHE has stimulated in-site 'Best Performance Award' ceremony and has rewarded with gifts and awards to pave the work at their full wavelength.

For manpower skill development and training, Project team has a practice of conducting B-level and D-level meetings on regular basis periodically with every client and contract personnel. PEP sessions, Tool box talks, Safework practice orientations, On Site- Field training have also been given to every personnel involved in constructional activities.

All equipment at site is checked by third party and fitness certificates are present. All drivers and riggers are trained and have relevant licenses for operating the equipment. Appropriate PPE is provided to the workers and usage is monitored. Safety signage is present at site. The EETL management conducts regular audits of the site and corrective actions are identified and compliance checked.

According to the audit, Project SHE compliance Plan is in place and an SHE officer is present at site to check compliance and SHE compliance is included in the contract with M/s CHEC. A total of 80 workers will be employed at the site. Orientation training is provided to all workers before they start work at the site. Tool box talks are held before start of work on specific topics.

Engro Elengy Terminal team has completed sixth months of Project execution, achieving 594,923 man-hours without any Lost Workday Injury (LWI).

Since the construction camp is located inside the premises of EVTL, no social compliance issues are present.

8.3.13 Community Health & Safety

8.3.13.1 Boating Accidents & Injuries

Traffic accidents involving fishing boats and Project vessels (including LNG, Oil and Containers carriers and transport boats of supplies and workers) have no impact on fishing boats.

It is to be noted that as clarified earlier and also per the latest consultation with fishermen in presence of ADB in October, Port Channel and area is a secure area where unauthorized vessels are not allowed even fisherman. Same was witnessed by the ADB team that the project site is within the commercial port and no fishing activity is carried out or allowed by the Port.

Therefore no mitigation measure is required.

8.3.13.2 Exposure to Environmental Contaminants

Residents, particularly fishermen that come within closer distance to the project activities, are at risk for exposure to project emissions and discharges to the air and water.

Mitigation Measures

During the operation of the ENGRO LNG facility, environmental pollution controls will be in placed to limit harmful air emissions and water quality impacts. In addition, the Project will implement a Hazardous Materials Management Plan, which includes procedures for proper storage, transport and safe disposal of medical/clinical wastes and hazardous wastes.

8.3.13.3 Spread of Infectious Diseases

The potential for transmission of infectious diseases (including TB) may occur through direct worker-community interactions, such as during rotation of crews between onshore locations to and from the offshore Project site; or indirectly through the influx of new comers(e.g., jobseekers) into the local communities. Population influx can lead to potential water and sanitation related diseases (e.g. diarrhea) associated with increased pressures on inadequate community sewage and wastewater systems.

Mitigation Measures

EETL is engaging unskilled labour from the local population in the surrounding localities for the construction and mangrove removal activities.

An introductory section that provides discussion on the risk assessment and impact ratings matrix is presented (p. 34).

8.3.14 Environmental Risk Assessment

The purpose of the following assessment is to identify, assess and control environmental aspects in a systematic way that is consistent, relevant and applicable to EETL LNG facility. This includes to:

- Identify all ENVIRONMENTAL ASPECTS and analyze their associated ENVIRONMENTAL IMPACTS.
- Evaluate the relative risks and environmental impacts using the risk assessment criterion and prioritize them.
- Reduce the risks by controlling the hazards and environmental aspects using appropriate engineering and administrative controls.

Risk ranking exercise is conducted to evaluate the significance of each of the identified aspect. Control measures are identified and put in place for mitigation of possible impacts. The identified 'significant aspects/hazards and their impacts' are linked either with objectives and targets or controls will be suggested to reduce the impacts.

The source of Impact ratings and Risk Criteria is British Petroleum Pakistan.

CHAPTER 9: POTENTIAL SOCIAL IMPACTS OF PROPOSED DEVELOPMENT AND RECOMMENDED MITIGATION MEASURES (NO ADDENDUM)

CHAPTER 10: PRELIMINARY CUMULATIVE IMPACT ASSESSMENT

Under Section 10.1.6 Impacts on Ecology – clarification regarding Mangrove Impacts.

Mangroves will be cleared for the construction of PIBT and FOTCO LNG facilities and were cleared during construction of remaining 06 projects in operation. Mangroves provide multiple important ecological functions such as shoreline protection and erosion control, water filtration and nutrient sink, nursery habitat for commercially important fish species, and feeding, roosting and breeding habitat for birds.

Mangroves are important environmental component in the Port Qasim's project area as mangroves serve as natural protection barrier from natural disasters such as storms and storm surges of the land, people and the general environment within its immediate vicinities. Mangroves likewise provide valuable services to fisherman as it serves as habitat to a large variety of fish, crab, shrimp, and mollusk species thus providing sustainable source of foods for hundreds of people. This important aspect of the environment must be taken care of by all means because of its beneficial environmental/ecological and economic services.

The Port vicinity is characterized by the presence mangrove forest specifically in the coastal front line of Bundal and Buddo Islands and creeks lining the Port side. However, the entire Phitti-Kadiro-Gharo creek system is designated for development of the Port related infrastructure and industries. In this case, a balance between economic developments against mangrove protection must be considered in the overall port area development.

There is no denial that a small portion of the mangrove forest will be inevitably affected or damaged during Port project implementation. One of the options that can be explored to compensate the project's potential environmental damage is the observance of the policy on mangrove tree replacement. Under this policy, for each mangrove tree that may be felled, an equivalent 10 mangrove trees must be planted as replacement trees in order to compensate this loss of mangrove tree.

As part of an institutional implementation for mangrove tree replacement, soliciting the services of an NGO or a third party entities are actively engaged in protection of mangrove forest and mangrove afforestation who are knowledgeable of the IUCN and WWF Pakistan mangrove protection operational policies may be tapped as one of the partner entity in said mangrove replacement initiatives. As such, (1) all affected mangrove trees within the 50-hectare must be compensated in order to avoid any adverse impact on the local micro and macro environment and, (2) although the 50-ha area containing mangrove forest is demarcated for development and operation of Port activities under PQA Master plan, the ecological services of any affected mangroves must be maintained through mangrove tree replacement or mangrove reforestation.

CHAPTER 11: ENVIRONMENTAL MANAGEMENT PLAN

Under Section 11.3 Scope of the EMP (p. 1 of 39) – The scope of the EMP is expanded to include occupational as well as community health and safety to wit:

- Occupational health and safety includes hazards from construction and operation of LNG terminal to construction workers and employees and its risk assessment and control.
- Community health and safety includes the risk associated with LNG carriers, communicable diseases and hazards with pollution.

Under Section 11.12.2 E. on Monitoring and Review (p. 20 of 39). – (Additional Column on Monitoring Location is Added in Table 11.4 as presented below)

Table 11.4: Environmental Monitoring Plan

Stage	Monitoring areas	Parameters and techniques	Monitoring frequency	Reason to monitor parameter	Responsibility	Monitoring Location
Construction	Dredging	• Benthic Community • Erosion and Sedimentation • Vegetation • Disposal of Dredge Material	Daily	• Dredging results in disturbance of benthic community. • Causes soil erosion and sedimentation.	SHE Department.	At dredging site, at cofferdam site
	Marine Ecology	• Biodiversity	Daily	Unmitigated operations may result in loss of biodiversity	SHE Department	At dredging site, at cofferdam site, along the route of Pipeline
	Air Quality	• CO • SO_x • NO_x • PM_{10} • $PM_{2.5}$ • SPM	• Before start of construction activity • Monthly monitoring during construction and operation	Emissions from construction machinery and power production and operation of FSRU may result in deterioration of air quality	Independent Monitoring Consultant (IMC)	02 samples at dredging site, 02 samples at cofferdam site, 01 sample every 4km along pipeline route and camp.
	Solid Waste	Solid waste quality and quantity	Daily	Improper disposal may result in deterioration of marine ecology	SHE Department.	At construction camp and at cofferdam site.
	Wastewater	Primary Pollutants of NEQS	Monthly	Improper disposal may result in deterioration of marine ecology	Independent Monitoring Consultant (IMC)	At construction camp site.
	Noise	Noise Intensity	• Start of construction • Monthly	Uncontrolled noise may cause nuisance	Independent Monitoring Consultant (IMC)	Same as for air emissions
	Soil	• Soil contamination • Soil erosion • Soil sedimentation	Monthly	Surface and sea water pollution	SHE Department	At dredging site, at cofferdam site, along the route of Pipeline
	Occupational Safety	• Accidents • PPEs • Annoyance	Daily	Occupational safety and legal obligations	SHE Department	At construction camp and every construction site.
	Land reclamation	• Soil Quality	Daily	Legal obligations and structure protections. Prevention of soil erosion and sedimentation to the port.	SHE Department	At dredging site, at cofferdam site, along the route of Pipeline

Table 11.4: Environmental Monitoring Plan

Stage	Monitoring areas	Parameters and techniques to monitor	Monitoring frequency	Reason to monitor parameter	Responsibility	Monitoring Location
End of construction	Restoration of sites	• Visual analysis • Photographic records	End of construction	Compliance of Environmental Approval Conditions	SHE Department.	At all construction sites.
Operations	Waste water	• Waste water minimisation • Storage and handling • Recycling and reuse • Treatment before disposal • Primary Pollutants of NEQS	Monthly	Compliance of Environmental Approval Conditions	SHE Department Independent Monitoring Consultant (IMC)	Collected from outlet of treatment plant, from outlet of vessels
	Solid waste	• Solid waste quality and quantity • Solid waste disposal	Monthly	Compliance of Environmental Approval Conditions	SHE Department	At LNG terminal Site.
	Fire & Safety	• Fire Hazards & • Safety Protocols	Daily	Compliance of Environmental Approval Conditions	SHE Department	At LNG terminal Site and along pipeline route.
	Air Emissions	• CO • SOX • NOX • PM10 • PM2.5 • SPM	Monthly	Compliance of Environmental Approval Conditions	Independent Monitoring Consultant (IMC)	03 samples at LNG terminal, 01 sample at Trestle, 01 sample near power generation source.
	Noise	Noise intensity measurement	Monthly	Compliance of Environmental Approval Conditions	Independent Monitoring Consultant (IMC)	Same as air emissions.
	Hazardous spill	• Spill on Land • Spill on Water	Daily	Compliance of Environmental Approval Conditions	SHE Department	At the terminal site
	Traffic management	Standard Operating Procedures	Daily	Compliance of Environmental Approval Conditions	SHE Department	Along the junction of project roads and other roads.
	Compliance monitoring	• EIA Commitments • Mitigation Measures • Conditions of Environmental Approval • SOPs	Monthly	• EIA Commitments • Mitigation Measures • Conditions of Environmental Approval • SOPs	Independent Monitoring Consultant (IMC)	
	Post Operation Surveys	• Thermal Discharge point, all parameters of wastewater incl Temp. • Ambient sea temperature monitoring • Site Audits	Temp. Daily, Monthly Daily Monthly	• Compliance of NEQS for thermal discharge • Site Audits to compliance is being met and corrective actions taken.	Independent Monitoring Consultant (IMC)	At discharge locations and in seawater along the plume dispersion

Under Section D - Risk management – I. Evacuation Plan (p. 15 of 39) – (Emergency contacts have been provided in the table below)

Emergency Contacts	Phone No.	Address
PQA Safety & Environment Dept.	99272111 Ext 4447 / 4202	
PQA Ambulance	99272111Ext 4275	
Edhi (City Control Office)	0213-2310066, 0213-2310077, 115	
Post-Incident Contacts		
Fire Station PQA	99272111 Ext 4444, 4445	
Police Station	0213-4750271 Ext 4224	Bin Qasim Town
FIRE STATIONS / BRIGADE	0213-4750272 EXT 4444	Steel Mills
PQA TOWER CONTROL Harbor Master	99272111 Ext 4294	
PQA TOWER CONTROL Security office	99272111 Ext 4482, 4206 (Dock Sec.)	at PQA gate
Emergency Resources:		
Al-Mumtaz Hospital	0213-4404040, 0213-4404026	Malir
100 Bed Hospital	0213-4718589, 99264111	Steel Town ship

Under Section E - Monitoring and Review (p. 19 of 39) – The reporting requirements of ADB and SEPA are emphasized below:

As required for category A projects based on ADB's SPS 2009, semiannual environmental monitoring report during construction phase and annual reports during operation phase will be submitted to ADB. Also, quarterly monitoring reports during operation and construction phases will be submitted to Sindh EPA.

Under Section F - Recording & Reporting – I. Daily Environmental Inspection Checklist (p. 33 of 39) – (A sample checklist for monitoring is presented as an Annex).

ANNEX XII

The following checklist is a sample and for reference purposes. The actual checklist will be prepared by SHE department of EETPL.

Project : _____ Site Location : _____

Construction stage / status during inspection : _____

Inspection Date : _____ Inspection Time : _____

Inspected by : _____ Weather : _____

Inspection Items	Implemented?		N/A	Remarks (i.e. specify location, good practices, problem observed, possible cause of nonconformity and/or proposed corrective/preventative actions)
	Yes	No*		
1. Air Pollution Control				
1.1. Are the construction sites watered to minimize dust generation?				
1.2. Are stockpiles of dusty materials covered or watered?				
1.3. Are all vehicles carrying dusty loads covered/watered over prior to leaving the site?				
1.4. Are dusty roads paved and/or sprayed with water?				
1.5. Are plant and equipment well maintained? (any black smoke observed, please indicate the plant/equipment and location)				
1.6. Are there enclosures around the main dust-generating activities? (e.g. grout mixing)				
1.7. Hoarding provided along boundaries and properly maintained (any damage / opening observed, please indicate the location).				
1.8. Are speed control measures applied? (e.g. speed limit sign)				
1.9. Is the staff using Personal Protective Equipment?				
1.10. Others (please specify)				
2. Water Pollution Control				
2.1. Are wastewater treatment system being used and properly maintained on site?				
2.2. Are there any wastewater discharged to the sea? Is the wastewater being treated?				
2.3. Are sedimentation traps and tanks free of silt and sediment?				

ANNEX XII

Inspection Items	Implemented?		N/A	Remarks (i.e. specify location, good practices, problem observed, possible cause of nonconformity and/or proposed corrective/preventative actions)
	Yes	No*		
2.4. Are sandbags/earth bund adopted to prevent washing away of sand/silt and wastewater to drains, catchpit, public road and footpath?				
2.5. Are vehicles and plants cleaned before leaving the site?				
2.6. Is the public road/area around the site entrance and site hoarding kept clean and free of muddy water?				
2.7. Is domestic water directed to septic tanks?				
2.8. Others (please specify)				
3. Noise Control				
3.1. Do air compressors and generators operate with doors closed?				
3.2. Any noise mitigation measures adopted (e.g. use noise barrier / enclosure)?				
3.3. Are silenced equipments utilized?				
3.4. Others (please specify)				
4. Soil pollution Control				
4.1. Are construction activities performed within designated buffer zone?				
4.2. Is the particular area after completion is restored?				
5. Waste Management				
5.1. Is the site kept clean and tidy? (e.g. litter free, good housekeeping)				
5.2. Are separated labelled containers areas provided for facilitating recycling and waste segregation?				
5.3. Are construction wastes / recyclable wastes and general refuse removed off site regularly?				
5.4. Are construction wastes collected and disposed of properly by licensed collectors?				
5.5. Are chemical wastes, if any, collected and disposed of properly by licensed collectors?				

ANNEX XII

Inspection Items	Implemented?		N/A	Remarks (i.e. specify location, good practices, problem observed, possible cause of nonconformity and/or proposed corrective/preventative actions)
	Yes	No*		
5.6. Are chemical wastes properly stored and labelled?				
5.7. Are oil drums and plants/equipments provided with drip trays?				
5.8. Are drip trays free of oil and water?				
5.9. Is there any oil spillage? Clean-up the contaminated soil immediately?				
5.10. Is litter, foam or other objectionable matters in nearby water drain/sea cleaned?				
5.11. Others (please specify)				
6. Protection of Flora, Fauna and Historical Heritage				
6.1. Are disturbance to terrestrial/marine flora minimized (e.g. mangroves, plants to be preserved)?				
6.2. Are disturbance to terrestrial/ marine fauna minimized (if rare species identified)?				
6.3. Any historical heritage exists on site? If yes, ensure appropriate measures taken to preserve it				
6.4. Is No Hunting, No Trapping and No Capturing policy enforced by the contractor?				
6.5. Others (please specify)				
7. Community Health & Safety				
7.1. Is project site/pipeline route properly fenced to prevent trespassing?				
7.2. Are project activities displayed in the form of hording?				
7.3. Is safety signage in place?				
7.4. Is emergency response plan in enforced by the contractor?				
7.5. Are the diversion / alternate routes provided during working on community roads?				
7.6. Others (please specify)				

ANNEX XII

Inspection Items	Implemented?		N/A	Remarks (i.e. specify location, good practices, problem observed, possible cause of nonconformity and/or proposed corrective/preventative actions)
	Yes	No*		
8. Occupational Health & Safety				
8.1. Are HSE protocols enforced by Contractor?				
8.2. Are fire extinguishers / fighting facilities properly maintained and not expired? Escape not blocked / obstructed?				
8.3. Are accidents and incidents reported and reviewed, and corrective & preventive actions identified and recorded?				
8.4. Others (please specify)				

Any "No" recorded represents the potential breach of regulation or improvement needed and details of nonconformity (NC) shall be recorded in the **Remarks.*

* Report NC in the following forms. Each NC should make reference into the checklist as coded. The responsible personnel shall identify the root cause of NC and adopt appropriate corrective and preventive actions (CPA) for mitigation. Confirmation of the effectiveness of the CPA shall be verified by SHE Manager within an agreed time.

Signature of SHE Officer _____ Date _____

Reviewed by SHE Manager _____ Date _____

CHAPTER 12: CONCLUSION

Second paragraph (p. 1 of 2) – (The statement is expanded to mention that the ESIA is also part of the requirement of ADB in addition to that of national and other Lenders' requirements).

This Environmental & Social Impact Assessment (ESIA) evaluates the potential environmental, social, economic, cultural, and natural impacts of the proposed Liquefied Natural Gas (LNG) Import Terminal Project. This assessment has been carried out to fulfill the regulatory requirements of Pakistan Environmental Protection Act, 1997, to satisfy the evaluation criteria of the International Finance Corporation (IFC) and it is also part of requirement of ADB.