# IRAQ OIL TERMINAL PROJECT

# Environmental and Social Impact Assessment Scoping Report

On behalf of:
Waterway Trading & Petroleum Services LLC

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# Contents

# Acronyms

| | |
|---|---|
| BIOGH | Basra International Oil and Gas Hub |
| CEMP | Construction Environmental Management Plan |
| CSSF | Common Seawater Supply Facility |
| DWB | Deeper Water Berth |
| DETR | Department for the Environment, Transport and the Regions |
| DoE | Department of Environment |
| DWT | Deadweight Tonnage |
| EAME | Earth & Marine Environmental Consultants |
| EIA | Environmental Impact Assessment |
| ES | Environmental Statement |
| ESIA | Environmental and Social Impact Assessment |
| GCPI | General Company Ports of Iraq |
| Ha | Hectares |
| HSSE | Health, Safety, Security and Environment |
| IBA | Important Bird Area |
| IDCF | Iraqi Defence Coastal Force |
| IEEM | Institute of Ecology and Environmental Management |
| IEMA | Institute of Environmental Management and Assessment |
| IPA | Iraqi Port Authority |
| IUCN | International Union for Conservation of Nature |
| KAZ | Khor Al-Zubair |
| km | Kilometres |
| LER | Local Equipment Rooms |
| LPG | Liquefied Petroleum Gas |
| LNG | Liquefied Natural Gas |
| m | Metres |
| $m^3$ | Cubic Metres |
| MoC | Ministry of Culture |

| | |
|---|---|
| MoEn | Ministry of Environment |
| MoH | Ministry of Health |
| MoO | Ministry of Oil |
| MoT | Ministry of Transport |
| MoWR | Ministry of Water Resources |
| NGOs | Non-governmental Organisation |
| NTS | Non-Technical Summary |
| ROPME | Regional Organisation for Protecting the Marine Environment |
| SKA | SKA Energy |
| SWMP | Site Waste Management Plan |
| UAE | United Arab Emirates |
| USACE | United States Army Corps of Engineers |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme |
| UXO | Unexploded Ordnance |
| WTPS | Waterway Trading and Petroleum Services LLC |

# 1 Introduction

## 1.1 Proposed Development

Waterway Trading and Petroleum Services LLC (WTPS) intends to construct a new marine terminal on the Khor Al-Zubair River, close to the Khor Al-Zubair Port (KAZ Port) in Southern Iraq.

The terminal will provide berthing facilities, storage infrastructure, truck loading/unloading facilities and all associated utility and support systems. The terminal will provide multiple berths capable of discharging vessels up to 47,000 deadweight tonnage (DWT). The construction of the terminal will be phased: the first phase being a single deeper water berth and associated pipeline connection to the existing SKA terminal; subsequent additional phases will include storage tanks and associated utilities, with the potential to accommodate storage capacity up to 300,000$m^3$. The terminal will be constructed to the appropriate international industry standards using reliable and proven technology and will be operated in accordance with standards and practices generally prevailing in the petroleum marine terminal and storage industry.

Before the project is implemented the WTPS wishes to undertake an Environmental (and Social) Impact Assessment (ESIA). This is a detailed study of the environmental and social conditions in the project area and an assessment of how the project may change these conditions. If these changes are deemed to be negative and severe, the study will define measures to reduce or eliminate these impacts.

## 1.2 Purpose of the Scoping Report

This document is a Scoping Report. It is intended to describe to the public and potential Stakeholders the project proposals, the ESIA process and how it will be performed for this specific project and confirms the specific environmental and social aspects that will be considered.

This Scoping Report is written to include the final phase but identifies the first phase as design work has commenced for this phase.

Stakeholders are invited to make comments and suggestions on this scope and to highlight any pertinent information that they may hold which can be made available for the assessment.

There is no requirement under Iraqi law for a Scoping Report, however, in accordance with international best practice, the developer has requested that one is prepared and issued to relevant stakeholders.

## 1.3 Need for the Development

The Terminal Project is required to help accommodate Iraq's current and future import and export requirements for refined petroleum products.

As a result of armed conflicts, trade sanctions and isolation from the international community, Iraq does not presently have the resources to provide refined petroleum products at a sufficient rate to meet demand. As such the import of these products is required and the proposed terminal will enable this.

Furthermore, Iraq has a distinct lack of suitable export facilities for refined products. Therefore, when the country's refining capability has reached levels that it is able to export refined products, the proposed terminal will help to meet these future export ambitions.

It is envisaged that the proposed terminal will aid the continued recovery and development of southern Iraq by providing modern facilities to boost the local and national economy as well as providing jobs and knowledge transfer to local people.

# 2 Proposed Development

## 2.1 Proposed Development Location

The proposed development is located on the western bank of the Khor Al-Zubair, adjacent to the Khor Al-Zubair Port and the Khor Al-Zubair Port Freezone. Umm Qasr Port is 14km south of the site, Basra City Centre is 37km to the north and the border crossing into Kuwait at Safwan is located 19km to the south-west of the site (*Figure 2.1* and *Figure 2.2*).

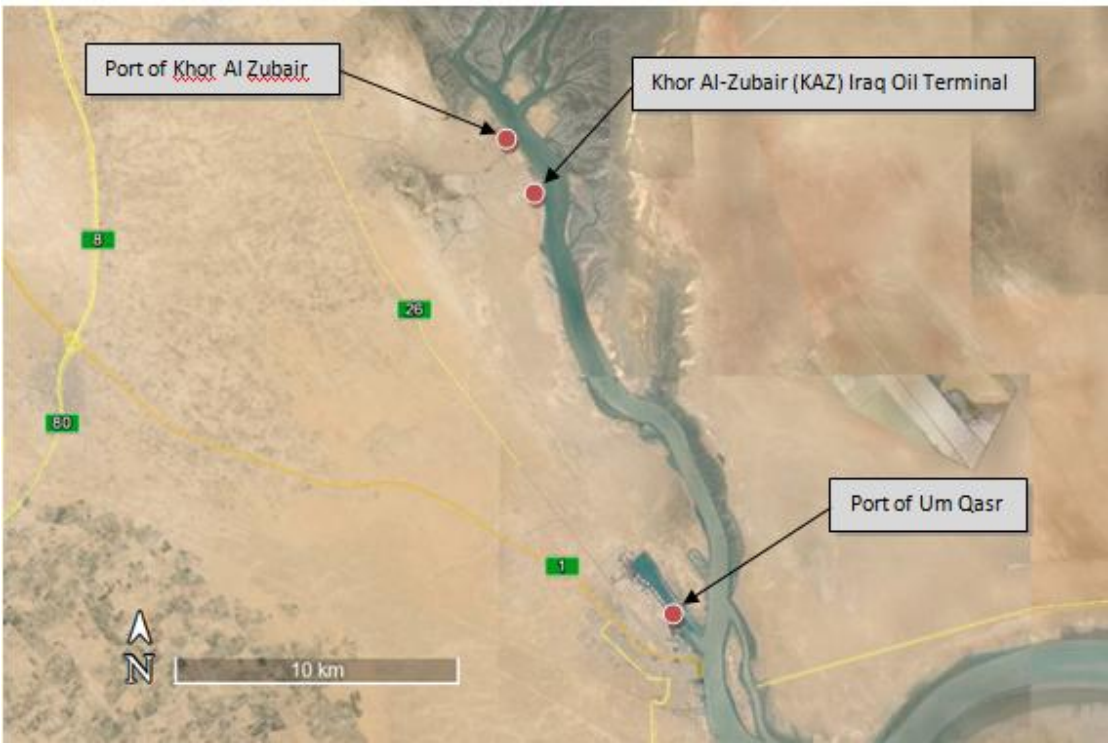


**Figure 2.1:** *Location of the proposed terminal development*

Google Earth Pro Imaging with the permission of Google Licensed to Earth and Marine Environmental Consultants Ltd


**Figure 2.2***: Proposed site outline*

Google Earth Pro Imaging with the permission of Google Licensed to Earth and Marine Environmental Consultants Ltd

**Photograph 2.1**: *View of the site from the adjacent SKA terminal (please note the surface water ponding is temporary after heavy rain).*

The following activities constitute the main components of the proposed terminal development:

The first phase will involve:

- Installation of a deeper water berth;
- Partial site preparation, levelling and compaction along the East side;
- Installation of the temporary construction facilities;
- Provision of a fully functioning temporary residential accommodation;
- Installation of the security fence/barrier;
- Offshore piling for the berth and jetty trestle
- Possibly localised piling of the East side of site;
- Installation of a road along the East side;
- Construction of equipment, tank and pipe sleeper/pipe rack concrete foundations, sumps etc. for a single pipeline and onshore power generation and fire-fighting facilities;
- Fabrication/installation of structural and support steelwork;
- Construction/installation of two small buildings;
- Fabrication/installation/corrosion protection and thermal insulation/hydro testing of the single 20" pipeline ;
- Installation of utilities/plant/equipment including vendor skids/packages;
- Installation of passive fire protection to equipment and steelwork;
- Installation of substation/Local Equipment Rooms (LER);
- Installation/testing of all electrical equipment and cabling;
- Installation/calibration of instrumentation devices and cabling (including testing of loops); and
- Pre-commissioning and commissioning of the facility.

Subsequent phases will include:

- Extension of the deeper water berth;

- Full Site preparation, levelling and compaction;
- More extensive piling of the site for tank foundations;
- Installation of a network of roads;
- Construction of equipment, tank and pipe sleeper/pipe rack concrete foundations, sumps etc. for the storage tanks and associated pumping facilities;
- Fabrication/installation of structural and support steelwork;
- Construction/installation of all building for the project;
- Fabrication/installation/corrosion protection and thermal insulation/hydro testing of above and below ground piping;
- Expansion of utilities/plant/equipment including vendor skids/packages;
- Expansion of passive fire protection to equipment and steelwork;
- Installation/testing of all electrical equipment and cabling;
- Installation/calibration of instrumentation devices and cabling (including testing of loops); and
- Pre-commissioning and commissioning of the final phase of the expanded facility.

# 3 Legislative and Regulatory Requirements

## 3.1 Requirement for Environmental and Social Impact Assessment

In the absence of formally established ESIA protocols and guidance in Iraq, World Bank Policies and Standards[1] or equivalent are normally applied as these are the standards that would be expected by the funders of any major infrastructure project.

[1] World Bank (1999), OP 4.01 – Environmental Assessment

# 4 General Approach to the ESIA

## 4.1 Background

The ESIA will consider the likely significant environmental effects of the terminal. Based on the findings of the studies undertaken as part of the ESIA, measures to prevent, reduce, or offset significant adverse effects (known as mitigation measures) as well as the methods to enhance any beneficial effects, will be set out in each relevant technical chapter of the Environmental Statement (ES).

The ES will be a comprehensive report that will, as a minimum address the following:

- A description of the development (construction and operation);
- A description of the aspects of the environment likely to be affected by the proposed terminal;
- A description of the likely significant effects of the development on the environment, including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects;
- A description of the forecasting methods used to assess the effects on the environment;
- A description of the measures envisaged to avoid, reduce and where possible offset any significant environmental effects associated with the development (mitigation measures);
- An outline of the main site selection and design alternatives considered by the WTPS and the reasons for the selection of the preferred site, taking into account environmental effects;
- A description of any technical difficulties, any lack of data or other uncertainties associated with the ESIA; and
- A Non-Technical Summary (NTS) summarising, in non-technical language, the key findings of the ESIA.
- Each ES chapter will provide an Introduction, description of the methodology, baseline environmental and social conditions, discussion of the predicted impacts and recommendations for mitigating or eliminating those impacts found to be potentially significant.

### 4.1.1 Cumulative and Combined Effects

The cumulative and combined effects of the terminal development itself, along with other planned or committed developments in the local area, will be addressed on a topic-by-topic basis and reported in a subsection of each technical chapter.

Combined effects (sometimes referred to as Type 1 cumulative effects) occur when two or more different environmental effects from the proposed development (e.g. dust, noise, traffic etc.) act together to produce a different level of effect/ impact experienced by a particular receptor. These combined effects can be additive or synergistic such that the sum of the impacts can be less or more than the individual impacts (i.e. because they may exacerbate or neutralise one another). For example, two large construction projects occurring at the same time in an area could have greater dust emissions than either one alone.

Cumulative effects (or Type 2 effects) are those that accrue over time and space from a number of different development activities and projects in geographical proximity to one another. The ESIA will consider all cumulative effects arising from terminal which are:

a. of a type, duration and scale that have the potential to cause significant environmental effects in their own right; and

b. are reasonably foreseeable in terms of delivery. The cumulative schemes to be considered through this process will be agreed through consultation with relevant stakeholders.

The cumulative effects of other developments in the vicinity of the proposed site will also be assessed including the following potential projects:

- Common Seawater Supply Facility (CSSF);
- SKA terminal expansion;
- Basra International Oil and Gas Hub (BIOGH) development;
- Rail infrastructure upgrades;
- Gas pipeline refurbishment/replacement at LPG/LNG Terminal;
- Port expansion activities at Khor Al-Zubair and Umm Qasr Ports;
- Fao Grand Port project; and
- Navy base terminal development at Umm Qasr.

The list of relevant cumulative projects will be developed and updated throughout the ESIA process and agreed with the relevant authorities prior to the submission of the ESIA.

## 4.2 Principal Matters to be Addressed by the ESIA

### 4.2.1 Baseline and Assessment Years

For the purposes of the ESIA, the Baseline Year will be established, which is the period for which the most up to date environmental baseline information is available for the site and surrounding environment. Most of the data will come from field studies planned for August and September 2014.

## 4.3 Consultation

A programme of consultation will be undertaken with relevant stakeholders and their potential issues of concern. *Table 4.1* presents a list of potential known stakeholders, however, as the ESIA progresses; additional organisations will be identified and consulted. This Scoping Report is the first stage in this consultation process.

**Table 4.1: Identified Stakeholders and Potential Issues of Concern**

| Identified Stakeholders | Potential Issues of Concern to Stakeholder |
|---|---|
| South Oil Company (SOC) | Economic |
| Tribal/Community Representatives | Socio-economic, cultural |
| Research and Academic Institutions | Educational |
| Fishing Union | Loss of fishing areas |
| Local Residents | Economic, environmental |
| Local Businesses | Economic |
| Iraqi Navy | Increased marine traffic, criminal activity |
| Iraqi Coastal Defence Force (ICDF) | Increased marine traffic, criminal activity |
| GCPI | Increased marine traffic, criminal activity |
| Iraqi Port Authority (IPA) i.e. GCPI | Increased marine traffic, criminal activity |
| MoEn | Environmental |
| MoO | Economic |
| Local Chamber of Commerce | Economic |

| Table 4.1: Identified Stakeholders and Potential Issues of Concern | |
|---|---|
| **Identified Stakeholders** | **Potential Issues of Concern to Stakeholder** |
| Local Police | Increased criminal activity |
| Local Schools and Colleges | Socio-economic |
| Ministry of Health (MoH) | Health concerns |
| Regional Organisation for Protecting the Marine Environment (ROPME) | Environmental, pollution incidents |
| United Nations Environment Programme (UNEP) | Environmental |
| United Nations Development Programme (UNDP) | Socio-economic |
| CSSF | Economic |
| BIOGH | Economic |
| MoT | Increased number of road users, upgrade of Basra and Baghdad railway line |
| Umm Qasr and Khor Al-Zubair Port operators such as Martrade Logistics | Economic, H&S, increased marine traffic |
| United States Army Corps of Engineers (USACE) (USACE are the project managers for the navy base development at Umm Qasr Port) | H&S, increased marine traffic |
| Various international and national Non-governmental Organisations (NGOs) | Humanitarian |
| MoC | Cultural |

# 5 Environmental Impacts

## 5.1 Introduction

This section addresses each of the environmental and social aspects which are proposed to be formally included within the ESIA.

The key environmental and social aspects were identified in the Iraq Terminal Project Environmental and Social Pre-Screening Report[2], this report was produced to assist in the identification of potentially significant impacts. Early identification of these potential impacts provides an early understanding of the key environmental and social issues. It results in a list of prioritised potential impacts that are likely to require either further detailed assessment and/or management throughout the lifecycle of the project. Furthermore, the pre-screening report has identified the information gaps that are required to be addressed during the Scoping Phase.

This chapter provides a description of key impacts subject to further impact assessment, existing baseline conditions and the proposed methodology to be utilised. It should be noted that this section purely identifies the character of the potential effects and is not an assessment of those impacts.

## 5.2 Socio-economics

### 5.2.1 Potential Effects

Effects upon the local, regional and national economy, including:

- Employment, potentially through the potential creation of temporary and permanent jobs;
- Local economy, potentially positively and negatively during construction;
- Local economy, potentially positively as workers will spend money within the local area; and
- Community investment and benefits.

### 5.2.2 Approach and Methodology

There is no prescribed methodology or standard guidance for assessing socio-economic and related effects in ESIA. The method to be adopted will, therefore, be one of determining the

[2] *Iraq Terminal Project - Environmental and Social Pre-Screening Report*, RSK Environmental Ltd, REF: 180714, 19th April 2013

existing circumstances (the baseline conditions) through desk-based analysis and field observations where necessary. The potential effects of the proposed terminal on this baseline will then be identified and, where relevant, mitigation measures proposed. Professional judgement will be applied to determine the significance of any predicted residual effects. The assessment will focus on the potential impacts as identified above and will be predominantly qualitative in nature.

### 5.2.3 Summary of Required Studies

- Desk-based collation of socio-economic data; and
- Consultation with key stakeholders.

## 5.3 Coastal Processes

### 5.3.1 Baseline Environment and Receptors

The Khor Al-Zubair is a tidal inlet approximately 18km in length and around 300m wide and dredged to a maximum depth of 12.5m[3] in the navigation channel. Until recently, the Khor Al-Zubair could be described as an elongated marine lagoon environment[4], an ancient extension of the River Euphrates which, as a result of tectonic disturbances caused the uplift of the surrounding lands and propagation of sea level, disconnected the river course and thus become a marine lagoon[5]. However, since 1983, this water body was connected to the freshwater Almassab Ala'am River by the Shatt Al-Basrah Canal, changing the environment of the Khor from hypersaline to estuarine[6]. At low tide, significant areas of intertidal mudflats are exposed, dominantly on the eastern bank of the Khor Al-Zubair. The riverbanks are of low profile and, as such, frequently inundated. The rate of sedimentation in the Khor Al-Zubair is significant and requires constant maintenance to keep the channel navigable.

The site is currently undeveloped and comprises desert conditions typical for this region with saltpans and halophytic vegetation noted on the eastern elevation of the site. Fly tipping of domestic, and potentially industrial, waste was noted during a recent site visit.

[3] *Final Report For Special Assistance for Project Formation (SAPROF) on Port sector Rehabilitation Project in the Republic of Iraq*, Japan Bank for International Cooperation (JBIC), 2005

[4] *Khor Al Zubair Classification and Possibility to Detection Dimensions during Stages of Different Tectonic Development*, Third Symposium about Marine Natural of Khor Al Zubair, Marine Sciences Centre, Basrah University, 1991

[5] *Some Geotechnical Soil Properties of Western Bank of Khor Al Zubair Channel Coast at Khor Al Zubair Port Location, Southern Basrah, Iraq*, Mesopotamian Journal of Marine Science, Volume 25, 2010

[6] *Influence of Hydrographic Conditions on the Interaction Between Ichthyoplankton and Macrozooplankton at Khor Al Zubair Lagoon, Iraq, Arabian Gulf*, Qatar University Science Journal, Volume 18, 1999

### 5.3.2 Potential Effects

The proposed development involves the construction of a deeper water berth, which has the potential to alter the hydrodynamic and sedimentary regime:

- Release and fate of fine sediment during construction activities;
- Potential for localised erosion and accretion; and
- Potential for siltation leading to increased dredging requirements.

### 5.3.3 Approach and Methodology

- Review of existing data and reports by the project ESIA team;
- Water and sediment sampling;
- Establishment of a meteorological station; and
- Review of tidal information.

The ESIA chapter will:

- Describe the existing baseline conditions in terms of tidal flows;
- Identify the potential impacts on the local tidal flows, wave conditions, sediment transport regime and suspended sediments arising from the proposed development; and
- Make a comparison of the tidal currents, wave conditions and sediment transport regime using the pre-construction bathymetry and the bathymetry post construction.

### 5.3.4 Summary of Required Studies

- Baseline data collation relating to water level, water quality, meteorological, wave, bathymetry and sediment quality; and
- Comparison of sediment and water quality data to relevant guideline values.

## 5.4 Surface Water Effects

### 5.4.1 Baseline Environment and Receptors

EAME have observed that during heavy rainfall, the site becomes heavily waterlogged with substantial standing water being formed. Consequently, surface water drainage could be a

key environmental issue so we would expect consideration of drainage management and flood risk (or more precisely management of flood waters) to be included within the ESIA. With the exception of the Khor Al-Zubair, there are no other permanent surface water features located on or near thesite. An effluent channel from the nearby fertiliser plant is located to the south of the site.

The National Geospatial-Intelligence Agency (NGA) Nautical Chart: Region 6 - Eastern Africa, Southern Asia (Chart Name: Khawr Shatanah and Approaches to Umm Qasr and Az Zubayr) highlights the eastern elevation of the site as *'land subject to inundation'*.

### 5.4.2 Potential Effects

This ESIA chapter will examine the potential effects on the landside hydrological regimes, including surface water quality, drainage and the risk of flooding.

The proposed terminal has the potential to result in the following effects to some extent, all of which will be considered in the ESIA:

- surface water contamination during construction;
- surface water management during operation,
- routine water quality and pollution control; and
- water demand and sewage/wastewater treatment.

An assessment of impacts in relation to surface water quality (chemical and biological), flood risk and water resource availability for the construction, operational and decommissioning phases of the development will be undertaken. Recommendations on any mitigation measures that are required to reduce or eliminate significant effects on water resources will also be provided in the ESIA report.

### 5.4.3 Approach and Methodology

The surface hydrological regime at the proposed terminal will be investigated in detail by way of the baseline data gathering.

Water sampling of the Khor Al-Zubair within the project area will be undertaken from a small survey boat using a Niskin Water sampler. Niskin Water Samplers are cylindrical bottles with remotely operated caps (or stoppers held in place by springs) on the top and bottom of the bottle. Prior to deployment, the sampler will be prepared by locking the stoppers in an open position. The open sampler will be lowered on a line by hand to the desired depth for sampling. To collect the sample, a small weight (called the messenger) attached to the line

will be released and allowed to drop to the sampler. When the weight hits the sampler, the stoppers will be released and allowed to close on the sampler, collecting water inside. The bottle will be pulled out of the water by hand to the vessel deck. Water will be poured from the sampler into sample containers via a small sampling port on the side of the water sampler.

All recovered water samples will be placed in laboratory provided containers appropriate to the type of analysis being undertaken and labelled with site-specific sample identification information.

The site drainage will be taken into account (pre and post development), alongside any sustainability measures proposed to attenuate run off. The assessment will also examine the potential for construction activities to result in sediment and contaminant release to surface waters and comment on the effectiveness of the measures contained in the proposed Construction Environmental Management Plan (CEMP) to avoid or minimise such occurrences.

A preliminary Flood Risk Assessment (FRA) has been undertaken and the FRA will be appended to the ESIA.

### 5.4.4 Summary of Required Studies

- Desk based baseline data collation relating to key surface water features, groundwater regimes, abstractions and discharges, and flood risk;
- Collection of water samples from the Khor Al-Zubair (at two different depths); and
- Installation of automatic level recorders in the boreholes, this will determine if the groundwater regime is tidally influenced.

## 5.5 Marine Ecology

### 5.5.1 Baseline Environment and Receptors

The Khor Al-Zubair has the potential to be an important fish and shellfish spawning and bursary area for shrimp, fish and shark species, furthermore, the intertidal area may support sensitive habitats of high biodiversity value such as crab species, mudskippers and crab plovers.

### 5.5.2 Potential Effects

During the construction phase of the development possible issues and impacts could include:

- Potential effect on fish from construction activities including noise and vibration caused by dredging (if necessary), piling, shipping movement disturbance and lights which may alter fish movement and behaviour;
- Disturbance to sediments resulting in the increased mobilisation of contaminants associated with bottom sediments;
- Introduction of non-native species from discharges such as ballast waters;
- Short-term changes in dissolved oxygen linked to disturbance of bottom sediments; and
- Disturbance to commercial and recreational fisheries by increased shipping movements, dredging (if required), piling and noise pollution.

Potential fishery issues associated with the operation phase include:

- Change in benthic species as a result of a change in hydrodynamic regime as well as the colonisation of hard structures (such as the DWB);
- Potential change in species abundance and composition due to change in light levels from the terminal operations; and
- Introduction of chlorination/biocidal products used to prevent fouling of ship hulls. Biocides are toxic and may cause avoidance reactions in fish.

During the construction phase of the development, potential effects on benthic and sub-tidal habitats and species include:

- Direct loss of habitats from within the footprint of the proposed terminal;

- Introduction of non-native species from discharges such as ballast waters and on hard surfaces;
- Release of contaminants bound in sediments during construction works; and
- Visual, noise and light disturbance to intertidal and sub-tidal species during construction.

During the operation phase of the development, possible issues and impacts could include:

- Introduction of chlorination/biocidal products used to prevent fouling of ship hulls;
- Change in hydrodynamic regime and sediment transport leading to changes in habitats such as scour effects; and
- Colonisation of structures leading to a change in the intertidal and sub-tidal ecology and possibly an increase in biodiversity.

Particular consideration will be given to intertidal and sub-tidal resources within and in the immediate vicinity of the potential development footprint area and those within the tidal excursion.

It should be noted that the Khor Al-Zubair is dredged on a regular basis and, as such, any effects from any current or future dredging operations will be ignored.

### 5.5.3 Approach and Methodology

In order to establish the ecological significance of the project area and to characterise bio-diversity within the project area, it is proposed that a terrestrial ecological desk-based literature review with associated Remote Sensing GIS Habitat mapping is undertaken.

The purpose of the literature review and assessment of remote sensing information (where available) will be to ascertain species of conservation importance, legally designated areas of ecological importance, International Union for Conservation of Nature (IUCN) Red List Species and potentially sensitive ecological receptors present in the area. In addition, the remote sensing data, satellite imagery and existing information should enable zoning of the project area into habitat types.

*Phytoplankton*

At each location a phytoplankton sample will be collected at the surface and bottom depth (1m above the river bed) using a 5l Niskin Sampler and were preserved with 1.5% buffered formalin solution (150ml formalin for every 10l of water sample). The samples shall be visually assessed using microscopes equipped with Differential Interface Contrast, and

species identified using up-to-date identification keys. The number of phytoplankton cells per 10l of water will be counted to contribute to future quantitative comparison if required.

*Zooplankton*

Quantitative collections of Zooplankton will be undertaken using a 0.5m bongo net. The net will be lowered to approximately 1m above the bottom and then immediately hauled back onto the boat. The contents of the net will then be rinsed down into a collection bottle and then preserved with 5% buffered formalin.

At the laboratory, the examination of samples will be made by means of stereo microscopes and the identification of species of the different groups using appropriate published keys and literature. The species density will be determined by taking sub-samples of 10ml to a Bogrov tray for counting. All species will be identified and counted and the number of individuals/$m^3$ calculated using volume of water the net was hauled through.

*Benthic Animals*

Sampling for benthic organisms will be undertaken using a 2l Van Veen Sediment Sampler. Three grab samples will be taken at each of the five sampling locations to obtain sufficient volume of sample for examination and the colour and visual appearance of the sediment samples will be recorded. The sediment samples will then be sieved through a 0.5mm mesh and preserved with 4% formalin solution. The samples are then refrigerated and stored prior to despatch to the laboratory for analysis (identification and species count).

*Fish Eggs and Larvae*

Quantitative collection of fish eggs and larvae will be undertaken using a single ring trawl net 1:5 aspect ratio (270 microns mesh, 85cm diameter, length 125cm) using double-oblique tows.

The net will be placed at the surface with the vessel in forward motion at approximately 2 knots for 5 minutes, while keeping the towing line at a fixed angle for approximately 300m. The sampler will then be hauled back, the contents of the net rinsed into a collection bottle and preserved with 5% buffered formalin. Identification will be made at the laboratory following the most appropriate identification keys.

*Animals, Sea Birds and Reptiles*

During the off-shore sampling surveys, all survey staff will remain vigilant for the appearance of marine mammals, reptiles and sea-birds. A record of all such sightings and a description of the mammals and birds observed will be made, however, based upon our previous experience in the area we have low expectations of seeing marine mammals in this area and

in-water surveys are not practicable due to the strong currents, hazardous conditions and very low visibility.

### 5.5.4 Summary of Required Studies

- Comprehensive desk based baseline data collation (inclusive of consultations with key stakeholders); and
- Collection of ecological samples in the vicinity of the DWB.

## 5.6 Terrestrial Ecology

### 5.6.1 Baseline Environment and Receptors

The Mesopotamian Marshlands were once the third largest wetlands in the works, originally extending between 12,000 and 15,00km$^2$. A rare aquatic landscape in the desert, the Marshlands provides a habitat for important populations of wildlife including endemic and endangered species, and although, the Marshlands have been heavily affected by recent conflicts, they do have a significant impact on the ecology of Southern Iraq.

The proposed terminal is located within Khor Az-Zubayr Important Bird Area (IBA) (ref: IQ081) as classified by BirdLife International. The IBA has an estimated population of 20,000 water birds.

### 5.6.2 Potential Effects

The potential impacts of the construction and operation of the terminal may include:

- Direct habitat loss;
- Habitat fragmentation and deterioration;
- Disturbance to species;
- Introduction of new habitats; and
- Pollution of land and watercourses.

Impacts to wildlife beyond the immediate terminal boundary are likely to include:

- Disturbance associated with lighting;
- Disturbance caused by movements (such as traffic); and

- Disturbance associated with noise.

### 5.6.3 Approach and Methodology

The assessment will include the following:

- definition of key habitat types likely to exist on the project site and immediate environs;
- identification of observable species of flora and fauna within site area boundaries and accessible surrounds;
- assessment of Proximity to Protected Areas and IBA;
- provision of habitat mapping of the survey areas;
- identification of any ecological sensitivities at each location;
- identification of designated nature reserves and protected sites; and
- provision of an assessment of any species that could be affected by the development proposals.

*Fieldwork*

All fieldwork will be undertaken in accordance with International Best Practice. A single terrestrial ecology survey of the site and immediate surrounds will be undertaken. The survey will aim at identifying:

- representative habitats on the site;
- species of flora present;
- species of fauna present; and
- any rare or endangered species of special conservation interest or habitats that might sustain such (IUCN red list species specifically).

*Habitats and Flora*

The vegetation of the site will be recorded by identifying the main habitat types and their plant communities. The site will be surveyed using a combination of driven and walked transects, with ecological hotspots identified during the literature review visited. Any areas of interest will be surveyed using quadrats to record all plant species present. In addition,

quadrats, approximately 10m x 10m, will be randomly chosen during the survey to achieve wider representative coverage.

*Fauna*

Mammals within the survey area will be recorded by visual sightings. Signs such as tracks, burrows and scats, if identifiable, will be recorded by GPS and plotted. If possible, evening's survey using high powered torches will be undertaken to identify nocturnal mammal species present in the area.

Sites identified as providing suitable habitats for birds will be monitored briefly during the survey. Monitoring will include 15 minute surveys to identify any activity, namely calling, singing, nesting and flight. Areas considered favourable for bird species will be visited to record any breeding activity, subject to the survey season.

Reptile surveys will be undertaken during the driven transects and quadrats across the survey area. An effort will be made to search under discarded plywood sheets and other anthropogenic debris as well as under more natural shelters such as rocks and dead wood. If possible, evening surveys will be undertaken to identify nocturnal species such as gecko and snake. Additionally, bucket traps will be placed around suitable areas for nocturnal trapping of species.

Incidental sightings of invertebrates will be recorded. Species will be photographed and identified to species level, where possible. All species identified will be photographed, if possible, and their protection status provided. Furthermore, a GPS tracklog of transects and quadrats (a $1m^2$ frame used to enable comparable samples to obtained from areas of consistent size and shape) will be mapped providing spatial coverage of the site.

The ecology and nature conservation elements of the project would be in line with current best practice for ecological EIA in the UK following the guidelines developed by the Institute for Ecology and Environmental Management (IEEM)[7] and Byron (2000)[8]. These guidelines provide a robust, systematic approach to identifying potential ecological issues, gathering sufficient baseline data, impact assessment and development of comprehensive mitigation and compensation strategies. Such an approach is also accepted as best practice in the international arena

[7] Institute for Ecology and Environmental Management (2006), Guidelines for Ecological Impact Assessment in the United Kingdom, 26 June 2006

[8] Byron, H (2000) Biodiversity Impact – Biodiversity and environmental impact assessment: a good practice guide for road schemes. The RSPB, WWF-UK, English Nature and the Wildlife Trusts, Sandy

### 5.6.4 Summary of Required Studies

- Comprehensive desk-based baseline data collation relating to key species and habitats known to be present on or near to the terminal; and
- A habitat survey will be completed for the terrestrial habitats within and adjacent to the site.

## 5.7 Archaeology and Cultural Heritage

### 5.7.1 Baseline Environment and Receptors

The pre-screening report indicates that the area is unlikely to be highly significant from a cultural heritage perspective.

### 5.7.2 Potential Effects

- Damage to possible cultural heritage artefacts

### 5.7.3 Approach and Methodology

The desk study will include identification of:

- Expeditions or archaeological works or sites within the project area;
- Sites of religious significance;
- Historic structures;
- Historic districts;
- Historic or cultural landscape; and
- Artefacts; and
- Methods of protection.

The primary sources of information will be the Iraqi Ministry of Culture and the State Board of Antiquities and Heritage, but as part of the stakeholder engagement exercise and social impact research within the potentially affected local communities, this would be a key topic for discussion and research during direct face to face consultation processes.

### 5.7.4 Summary of Required Studies

- Desk-based assessment of the cultural and archaeological heritage of the project area.

## 5.8 Land and Marine Traffic

### 5.8.1 Baseline Environment and Receptors

The access road to Khor Al-Zubair Port is frequently used by tankers waiting to load up and can lead to congestion on the road (Highway 26) between Umm Qasr and Basra. Furthermore, this is exacerbated by heavy traffic congestion (often with double parking on both carriageways) at Umm Qasr.

### 5.8.2 Potential Effects

The following are considered to be the key potential effects with respect to traffic and transport:

- Effects upon the road network resulting in delays and disruption to traffic flows;
- Effects upon the condition and structure of the road network;
- Environmental effects resulting from associated noise, vibration and air pollution;
- Effects upon pedestrians and other similar users in terms of delays and severance/amenity impacts (e.g. due to physical barriers or the effects of increased traffic flows);
- Road safety and the potential for accidents;
- The effects of abnormal loads on the road network;
- Effects upon and use of public transport; and
- Ensuring the safe operation of the terminal with particular respect to existing marine traffic.

With respect to marine traffic, during construction there is the potential for incidents to occur as a result of the presence of dredging (if required) and other construction plant in the water. As with all construction works taking place in the marine environment, measures will need to be put in place to reduce the navigation risk to other vessels.

During the operational phase, the potential for navigation incidents will be associated with the increase in vessel traffic generated by the terminal facilities.

### 5.8.3 Approach and Methodology

Current guidance for assessing the environmental effects of road traffic is set out in '*Guidelines for the Environmental Assessment of Road Traffic, Guidance Note No. 1*', published by the IEMA. The guidelines are based on the forecast increase in traffic on a link resulting from proposed development and sets out thresholds upon which more detailed assessments should be undertaken.

The guidelines suggest that more detailed assessments should be undertaken for links where traffic flows, or the numbers of HGVs are predicted to increase by more than 30% as a result of proposed development. The guidelines also recommend that in sensitive locations a 10% threshold for traffic flows should be used as a basis for undertaking assessments in more detail.

The environmental effect of road traffic resulting from the proposals will be assessed upon the local and wider highway network in accordance with the above IEMA guidelines. Assessments will be undertaken across a typical working day and each hour will be considered together with 12-hour and 24-hour traffic flows.

***Construction Assessment***

Given the nature (size and character) of the final phase of the proposed terminal, it is probable that the construction phase will generate considerable numbers of HGV and other vehicle movements.

Construction traffic movements resulting from the works will be estimated using the construction programme and the predicted number of construction workers on site at any one time. The estimated number of vehicles throughout the working day will be assigned onto the adjacent Highway 26 and be assessed in accordance with current guidance. Where any increase in excess of the 30% threshold is predicted, a more detailed assessment will be undertaken, as set out above. If significant effects are identified then suitable mitigation measures will be identified to reduce or moderate these traffic flows and related effects.

To ensure that construction of the terminal is carried out in a safe manner and all associated risks are managed appropriately (which have the potential to result in fatality, pollution or asset damage to the vessel or shore development), a preliminary identification and assessment of the risks will be undertaken. This will form a baseline for the project. A technical report will be prepared to outline the findings of this initial safety review.

A hazard workshop will be held to with relevant stakeholders and will demonstrate that the mitigation of the identified risks is "as low as reasonably practicable" (ALARP). A report will

be prepared detailing the findings of the works. This process will be applied to both phases of the development (construction and operation).

***Operational Assessment***

The likely net change in traffic movements to and from the terminal, as a result of the operation of the facility will be estimated and assessed within a formal Transport Assessment in line with current guidance. The assessment will take account of the hours of operation of the terminal. All trips likely to be associated with the facility will be taken into account; however, it is considered that the greatest number will be freight transport to and from the terminal. To that end, HGV traffic movements to and from the terminal will provide the key focus for the assessment, with particular attention paid to potential abnormal loads. Other vehicle movements will include visitors to the site, office supplies, catering and general deliveries.

The ESIA chapter on traffic and transport will focus on the potential environmental effects associated with predicted changes in traffic resulting from the development, during both construction and operation.

### 5.8.4 Summary of Required Studies

The land traffic assessment will encompass the following scope of works:

- Review of base traffic data (where available);
- Collection of sample traffic data (via manual counting) at key intersections that would be used by traffic accessing the site;
- Derivation of construction/operational traffic volume and type per week and month during the project term;
- Identification of key receptors;
- Determination of vehicular traffic trip ends and distribution;
- Determination of traffic increase per impacted route;
- Assessment of construction related impacts (if necessary);
- Identification of traffic related mitigation measures (if necessary); and
- Identification of residual effects.

The results of the assessment will be reported in the ESIA report along with any associated development constraints.

EAME have recently completed a preliminary marine traffic survey which included the installation of Automatic Identification System (AIS) receivers at both Khor Al-Zubair and Umm Qasr Ports. As such this information and the planned operations at the terminal will be used to undertake a marine traffic impact assessment as part of the ESIA. This will include:

- Review of base traffic data;
- Ongoing review of the AIS data from the devices installed at Umm Qasr and Khor Al Zubair Ports; and
- Assessment of the likely implications of current traffic levels and routes for the development and potential impacts of the proposed terminal development on the current marine traffic activity.

## 5.9 Air Quality

### 5.9.1 Baseline Environment and Receptors

The increase of motor vehicles (predominantly using leaded gasoline), the lack of controls regarding emissions, marine traffic, flaring form the oil and gas fields, frequent dust and sand storms and the burning of waste are the main sources of air pollution in the vicinity of the terminal.

### 5.9.2 Potential Effects

Due to the locality of the project, there is the potential for nuisance dust effects to arise during various activities and stages of the construction work. In addition, there is also the potential for air quality effects from emissions associated with changes in the traffic flow characteristics on the local road network and from marine vessels. This is considered likely to have the greatest implication for air quality for the proposed terminal and will provide the key focus of the assessment.

Furthermore, the operation of the terminal could result in the emission of volatile organic compounds (VOCs).

The proposed master-plan for the final phases of the terminal is not finalised at present and whilst it is considered that operations that eventually establish are unlikely to result in significant effects, the ESIA will take into account of possible effects as far as is practicable. Cumulative effect with other committed developments will also be considered during the ESIA.

### 5.9.3 Approach and Methodology

In accordance with the IFC standards[9], the principal pollutants that will be monitored will include:

- Nitrogen oxides (NOx);
- Oxides of Sulphur (SOx);
- Carbon monoxide (CO);
- Particulates ($PM_{10}$ and $PM_{2.5}$); and
- Volatile Organic Compounds (VOC).

It should be noted that given the generally undeveloped nature of this region, it is anticipated that some of the determinants will be 'below reporting thresholds'.

The purpose of the air quality assessment is to establish baseline air quality conditions at the project site and to assess the background levels of key pollutants. This will differentiate between existing ambient conditions and project-related impacts.

The traffic emissions associated with the operational activities will also be considered in the ESIA and a qualitative assessment made of the scale and nature of impacts that might occur along with mitigation measures where these are deemed to be potentially significant.

### 5.9.4 Summary of Required Studies

- Five locations across the project area will be sampled for the aforementioned parameters in order to provide an environmental baseline for the project; and
- Air emissions generated primarily by vehicles (with a focus on operational movements) will be assessed against relevant criteria and, where exceeded a screening level assessment will be completed to determine whether further detailed assessment (modelling) will be required.

[9] International Finance Corporation (IFC) (2007), Environmental, Health, and Safety Guidelines, Onshore Oil and Gas Development, April 30, 2007

## 5.10 Noise Assessment

### 5.10.1 Baseline Environment and Receptors

There are no residential properties within a 5km radius of the site and as such, there is unlikely to be any affected by any noise from the terminal. Furthermore, any noise from the terminal is unlikely to exceed that already produced from the adjacent Freezone and port.

### 5.10.2 Potential Effects

Potential noise effects could arise during different stages of the development depending on the type of activities taking place. The greatest potential for noise and vibration is likely to occur during the site preparation, piling and construction works as well as other activities involving heavy plant, percussive activities and peaks in construction HGV traffic movements.

Operational noise effects are likely to be fixed and mobile plant associated with the terminal buildings (e.g. external heating and air conditioning plant, dust extraction, electricity sub-stations etc) together with internal site transport systems, the movement of marine vessels and HGV's both within and outside of the site.

***Effects on Terrestrial Ecology***

Potential effects on animal species are anticipated to include:

- Construction Effects: Infrequent, short, sharp 'percussive' noises have the potential to cause the greatest disturbance to wildlife. Such noises are considered most likely to be generated during the construction phases, and be a comparatively uncommon event during the operation of the proposed terminal facility; and

- Operational Effects: The effects of plant noise and ongoing terminal activities on noise sensitive receptors. It is generally thought that birds may habituate to continual noise so long as there is no large-amplitude 'startling' component.

It is proposed that the assessment of the significance of noise effects on wildlife will be reported in the Terrestrial Ecology Chapter of the ESIA.

***Effects on Marine Mammals and Fish***

Potential effects on marine animal species are anticipated to include:

- Noise generated by vessels during construction and maintenance;

- Noise generated by piling operations to fix the structures to the seabed; and
- Noise generated by dredging (however, dredging is already regularly undertaken on the Khor Al-Zubair) and may not actually be required for the project

It is proposed that the assessment of the significance of noise effects on wildlife will be reported in the Marine Ecology Chapter of the ESIA.

### 5.10.3 Approach and Methodology

Measurement positions were selected that were considered representative of the ambient noise conditions and important local receptors surrounding the required survey area. Care was taken to ensure that the locations of the measurement positions were not immediately adjacent to any dominant local noise sources.

All noise measurements will be measured on an open site, well away from any existing buildings, and between 1.2 - 1.5m above ground. Levels of noise from road traffic are often specified at 1m from a facade, and these facade levels should be assumed to be 3 dB(A) higher than levels measured away from any buildings, unless a more accurate figure is available.

The noise level measured at a monitoring point may be affected by wind speed and direction, and temperature gradients, particularly when the monitoring point is remote (*i.e.* >30m) from the source. The size of these effects is hard to predict, and so measurements (or predictions) should be made under reasonably stable conditions. A suitable condition for monitoring is a light wind with a vector component up to 2 $ms^{-1}$ from source to receiver; this will increase the noise level by about 2 dB(A) compared with the no wind case.

A survey log of environmental conditions (*i.e.* observations of noise sources, observations of intermittent noise peaks, climatic conditions, weather conditions, atmospheric conditions and traffic levels) was kept during the monitoring.

**Measurement Parameters**

Traditionally, different indices have been used to describe noise from different sources, and limits have been set over different time periods. This has caused confusion, therefore all measurements (as advocated in BS 7445: 1991) will be expressed in terms of LAeq,T as the best general purpose index for environmental noise. For road traffic noise LA10,18h is still widely used; and to describe background noise LA90,T is considered appropriate.

The following acoustic statistical parameters will be recorded for each time period (T):

- LA10,T – the A weighted level of noise exceeded for 10% of the specified measurement period (T). It gives an indication of the upper limit of fluctuating noise such as that from road traffic.
- LA10,18h – is the arithmetic average of the 18 hourly LA10,1h values from 06.00 to 24.00.
- LA90,T – the A weighted noise level exceeded for 90% of the specified measurement period (T).
- LAeq,T – the equivalent continuous sound level -the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). LAeq,T is used to describe many types of noise and can be measured directly with an integrating sound level meter.
- LAmax – the highest A weighted noise level recorded during a noise event.
- Fast time weighting to measure 1/3 octave bands.

### 5.10.4 Summary of Required Studies

- Key human noise receptors for the proposal will be identified sufficient to represent the likely noise sensitive receptors (NSR) in and around the site. Noise monitoring will then be undertaken for each location.
- An appropriate model will then be used to predict the likely propagation of noise from the terminal; and
- For marine receptors, the assessment will be informed by ecological field studies in terms of focussing on the species of key concern. No baseline monitoring is proposed.

## 5.11 Ground Conditions and Contamination

### 5.11.1 Baseline Environment and Receptors

This chapter of the ESIA would assess the impacts on geology, soils and any ground contamination resulting from construction and operation of the terminal. It is understood that the site has not been subject to significant development, there are a number of facilities in the vicinity of the terminal that discharge into the Khor Al-Zubair.

### 5.11.2 Potential Effects

Potential effects relating to ground conditions and contamination are as follows:

- Mobilisation of contaminated soils, groundwater, surface water and sediments during construction activities and dredging (if required);
- Related pollution events from the mobilisation of contaminated soils, waters and sediment (if encountered) including implications for the environment, and flora and fauna;
- Effects on construction workers from contaminated soils, groundwater, surface water and sediments (if encountered);
- Effects on human health;
- Disposal of contaminated materials; and
- Construction derived risks of contamination and their control.

### 5.11.3 Approach and Methodology

This chapter will identify whether any environmental effects could derive from the exposure, excavation, mobilisation and disposal or treatment of contamination encountered on-site, based on the following:

- Interpretation of site investigation data;
- Comparison of soil and groundwater data with appropriate screening criteria;
- Construction of a refined Conceptual Site Model based on site specific data;
- Generic quantitative risk assessment for the site to establish the risk posed by any identified contamination; and
- Contamination risk to human health and Waters.

The environmental assessment will include an evaluation of ground conditions and the nature of any contamination present. A conceptual model for the site will be constructed and a generic quantitative risk assessment undertaken based on the data in line with industry best practice and guidance. The assessment will also incorporate a review of data obtained from the Geotechnical Investigation.

### 5.11.4 Summary of Required Studies

- A desk-based assessment will be completed for the terminal; this will include consideration of all historic land uses and existing activities in and around the terminal, a site visit and a review of the geotechnical ground investigation that has been

undertaken. This will give early indicative information on the likely presence, extent and nature of any contaminated ground (if encountered); and

- Further detailed investigation during the ESIA including the excavation of boreholes, soil, groundwater, surface water and sediment sampling.

## 5.12 Waste

The proposed development will generate various domestic, commercial and industrial wastes. The construction process will also create waste that will require careful management.

### 5.12.1 Potential Effects

The ESIA will consider the waste anticipated to be generated from construction and operation of the proposed terminal including quantity and type. Consideration will be given to:

- Specific waste handling, storage and recycling facilities to be incorporated into the terminal; and
- Capacity of existing waste disposal facilities to receive waste from the terminal (according to type and regulatory requirements).

### 5.12.2 Approach and Methodology

The ESIA will assess the effects of waste generated during construction and operation (as far as anticipated operations can be defined due to the phased development of the site). The ESIA will identify and quantify all waste streams arising and identify appropriate mitigation by way of waste reduction, re-use and recycling wherever feasible.

The implementation of operational management manage and reduce waste disposal will be assessed. The assessment will comprise:

- Identification and quantification of all waste streams produced at the terminal;
- Review of activities likely to be undertaken at the facility specific to waste generation, to identify the potential for waste reduction;
- An outline of the Site Waste Management Plan (SWMP) required for the construction phases; and
- Assessment of waste legal compliance requirements for the facility.

The assessment will consider all major waste-generating activities during the planned construction and operation of the terminal. In addition, reference will be made to the national, regional and local waste policies and hierarchy (if they exist) and an assessment will be made of the terminal's compliance with such policies.

### 5.12.3 Summary of Required Studies

No specific studies are required for the purposes of this environmental aspect other than to establish the waste streams likely to evolve from the construction and operation of the terminal and the availability of capacity to deal with such waste as part of the impact assessment process.

# 6 Scoped Out Issues

## 6.1 Introduction

In consideration of appropriate EIA guidance which requires that the ESIA must only identify the "likely significant environmental effects" of a development, the following topic areas are considered to be 'non-significant' issues and, therefore, are not going to be assessed as part of the ESIA.

## 6.2 Landscape and Visual Assessment

There are no residential buildings in close vicinity of the site nor is the site located within any national or local designations with respect to landscape and/or visual environment. Furthermore, the local area is characterised by industrial land uses. As such, the development is unlikely to have an effect on the general landscape character of the surround area.

## 6.3 Microclimate

There are no residential buildings with a 5km radius of the site as such, it is not considered likely that the construction and operation of the terminal will have an effect on the lighting and wind conditions at any of these residential locations.

## 6.4 Telecommunications

Large physical structures can impede radio and TV signals, but the proposed terminal development will not be significantly greater than the existing structures in the local area which includes industrial buildings, cranes and a navigation tower. As such, on the basis of professional judgement, it is considered that the development would not adversely affect radio and telecommunication transmissions.

## 6.5 Recreation and Amenity

The site and Khor Al-Zubair are not extensively used for recreation and amenity uses and, therefore, it is not intended to be assessed.

# 7 Proposed Schedule

The proposed schedule to undertake the ESIA is presented in *Table 7.1*:

**Table 7.1: Project Timescales**

| Week | Task |
|---|---|
| Week 0 | CONTRACT AWARD |
| Week 1 | Project Inception - Kick-off meeting (production of inception report/Execution Plan Draft) [Thursday 5th June 2014] |
| Week 2 | List of permits, regulations and statutory bodies to be contacted<br>Start of desk-based research<br>Stakeholder identification |
| Week 3 | Obtain all necessary consents, licenses and permits for entry into required areas |
| Week 4 | Scoping document issue.<br>Issue of HSSE plan for field work studies |
| Week 5 | Seek Scoping Responses |
| Week 6 | **Field Surveys**<br>Stakeholder engagement survey, Traffic survey, Air quality and noise monitoring<br>Soil, groundwater , surface water and river sediment sampling, Ecological field surveys |
| Week 7 | |
| Week 8 | |
| Week 9 | |
| Week 10 | Commence reporting of field observations and continue Stakeholder Engagement |
| Week 11 | Draft ESIA Report (inc. Environmental & Social Management and Monitoring Plan) |
| Week 12 | NTS Report (Arabic and English) |
| Week 13 | Client Review and Comment |
| Week 14 | ESIA Report (English) |
| Week 15 | Client Review & Comment |
| Week 16 | ESIA Report – main body (Arabic and English) |