Chapter 3 – Project Desciption

Contents

3 Project Description

3.1 Introduction

This chapter of the ESIA describes the planned activities and operations that the Project will entail in relation to construction, commissioning, operation, maintenance and decommissioning of the Terminal and related infrastructure. It should be noted that at this stage, the descriptions relate to the current base case for the proposed Project design and implementation. This base case is subject to refinement and potential change during the detailed engineering phase, although any changes are expected to be of a localised nature relating to operational detail and construction and operation practicalities. A fundamental change in scale, form, location or concept for the development is not anticipated.

3.2 Overview

Waterway Trading & Petroleum Services LLC (WTPS) intends to construct a new marine terminal on the Khor Al-Zubair River, close to the Khor Al-Zubair Port (KZP) in Southern Iraq. The Project is required to help accommodate Iraq's current and future import and export requirements for refined petroleum products.

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, with a final storage capacity currently anticipated to be in the region of 300,000m^3. Ultimately facilitating the import of up to 900,000m^3 per month of distillate products.

The Terminal will feature truck racks enabling discharging and loading which will expand the site's flexibility and allow for the import and export of products from the same facilities. Pumps and heating facilities will be provided to allow for the handling of a variety of petroleum products and modern firefighting and security systems as well as emergency response equipment will be installed to ensure that the site will be operated to international Health, Safety, Security and Environment (HSSE) standards.

In summary, the Terminal will allow for the following:

- *Increased cargo sizes:* The river frontage allows the construction of dedicated purpose-built deeper water oil berths allowing increased cargo sizes and improved freight economics;

- *Provision of Storage Tanks:* Import into tankage (rather than direct into trucks) will further improve economics by providing buffer storage between vessel discharge and truck loading, thereby, shortening ship discharge times and reducing demurrage costs; and

- *Truck Loading Racks:* Installation of truck loading racks will enable high storage turnover rates and facilitate high terminal throughputs.

3.3 Project Location

The proposed development is located on the western bank of the Khor Al-Zubair river, adjacent to (to (south of) the KZP and the KZP 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 see (*Figure 3.1* and *Figure 3.2*).

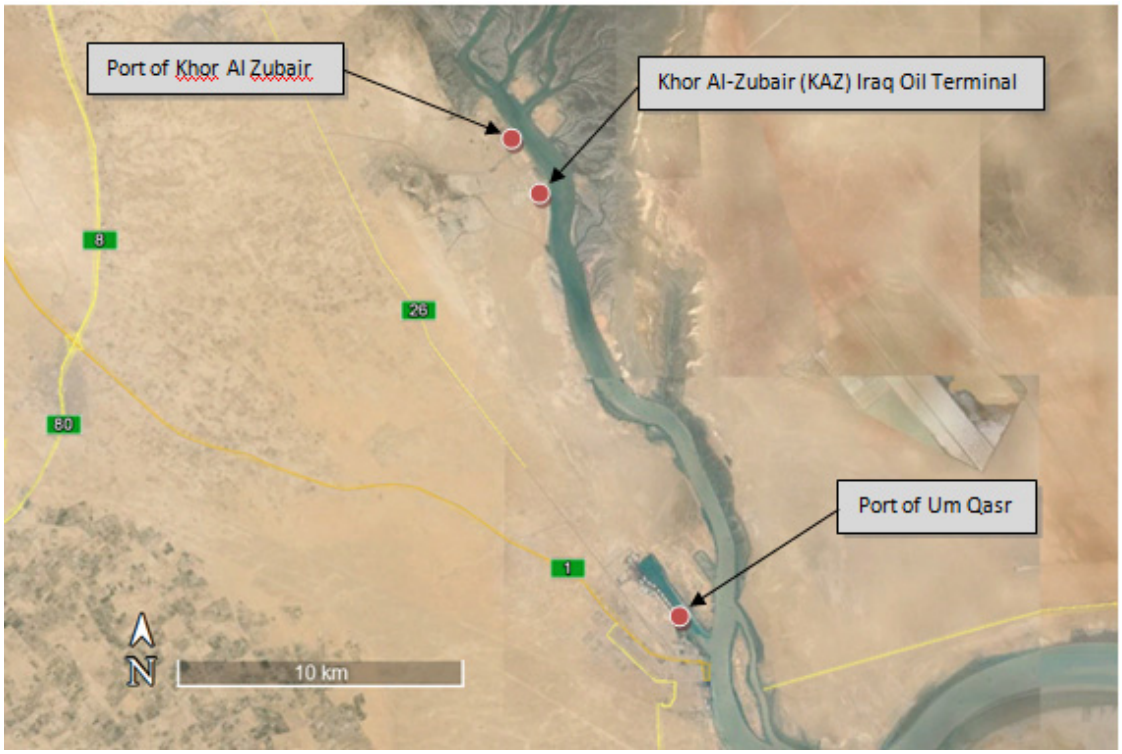

Figure 3.1: *Location of the proposed Terminal development*

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

Figure 3.2*: Proposed site outline*

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

3.4 Site Description

The site outwith the port curtilage is presently unoccupied and unfenced (although access to the site from the port is via a locked gate). The site can be characterised as a partially (sparsely) vegetated sabhka environment with a corresponding foreshore of intertidal mudflats subject to daily tidal inundation.

There is presently no built development on the site and no infrastructure of any kind (other than around Berth 1 which is part of the Port). Furthermore, there is nothing to demarcate the site from the surrounding land in terms of visible boundaries or fencing (other than at the Port boundary). There is no discernible difference between the site and surrounding land, which stretches for many kilometres with little change in relief or features. Other than a narrow strip of intertidal vegetation that is exposed at low tide (approximately 20m wide) and patches of sabhka vegetation, the site is featureless and characterised by dry silty sand with salt encrustation. There is evidence of disturbance of some of the soils by heavy plant and some accumulations of earth mounds from earthworks activities. Also there is an earth bank road running along the site parallel to the shoreline with two smaller earth bank roads extending to the water line. Typical views of the site are presented in the photographs overleaf:

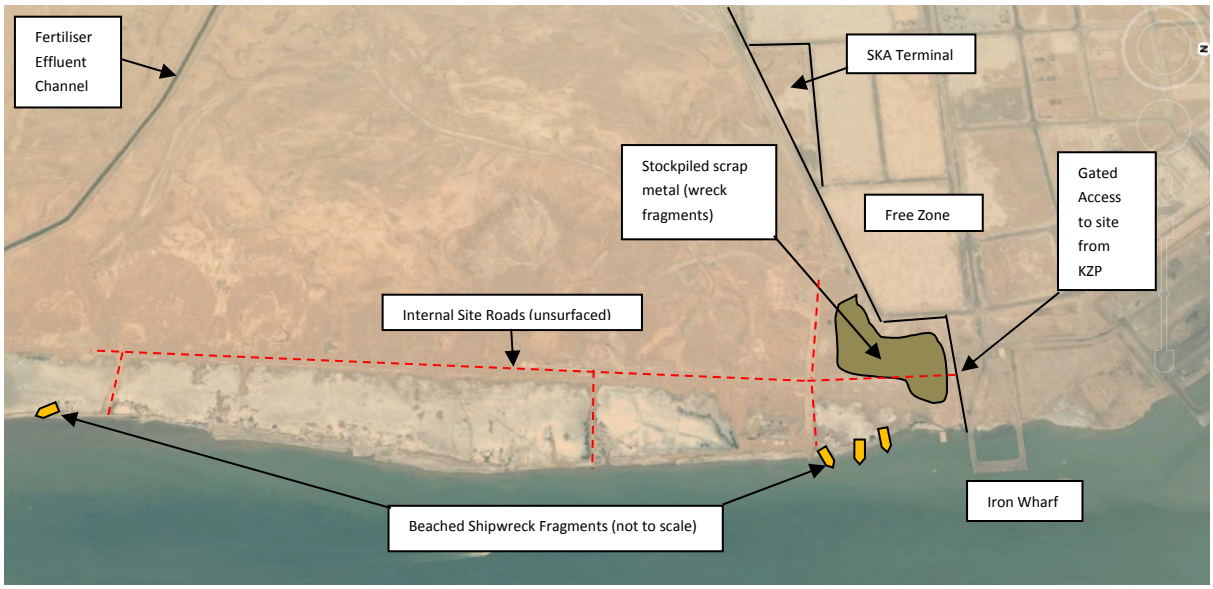

Figure 3.3: *Notable site features*

Photograph 3.1: *Aerial photograph of the site and surrounding area*

Photograph 3.2: *Distant view of site from the SKA terminal (note wreck fragments on shoreline)*

Photograph 3.3: *Shipwreck scrap fragments deposited on-site*

Photograph 3.4: *View across the site from southern boundary*

Photograph 3.5: *View along foreshore towards LPG Terminal at low tide*

Photograph 3.6: *View along foreshore towards KZP at low tide*

Photograph 3.7: *View to the project site from KZP Berth 1*

Photograph 3.8: *View of the site from Khor Al-Zubair at low tide*

Photograph 3.9: *Shipwreck debris on the shoreline on the Project site*

3.5 Project Rationale

Over the coming years and in particular the near to mid-term (next 5 – 10 years), Iraq is expected to become increasingly short of refined petroleum products due to the lag between oil production capacity and installed modern refining capacity. These shortfalls will eventually be met by the construction of new refineries and the expansion and upgrade of existing refineries, to the extent that the expectation is that Iraq will eventually become a net exporter of refined products. In the meantime, however, there is a demonstrable import need to assist in the reconstruction effort and economic growth of Iraq and associated improvements in living standards. At present, there are no suitable import/export oil product storage facilities in Southern Iraq, with KZP acting in such a capacity at present but with limited equipment, resources and capacity (and no holding capacity). As such, the Terminal will allow for the poorly maintained and inefficient infrastructure at KZP to be abandoned and the berths returned to their original design purpose of dry cargo import and export. Furthermore, once Iraq has developed its refinery infrastructure to an extent that a surplus is generated and can be exported, the Terminal will become a strategic export hub for Iraq.

The development of an import/export facility with direct sea access is also Iraq's only way of importing and exporting such products without having to go through neighbouring states (or now the highly unstable and insecure Islamic State (IS) region). In this respect it is a nationally strategic asset for a nation that derives over 90% of its Gross Domestic Product (GDP) from oil (and eventually oil products).

The National Development Plan 2013 - 2017, published in January 2013, has stipulated the following relevant goals with regards to development:

- Boost crude oil exports from the level of 2.6 million barrels per day in 2012 to 6 million barrels per day in 2017;
- Gradually increase crude oil storage capacity in export warehouse form 10,987 million barrels to 30.357 million barrels in 2017;
- Increase current refinery capacity of 600 thousand barrels per day in 2012 to 950 thousand barrels per day in 2017;
- Boost storage capacity for oil products to secure storage equivalent to 40 days consumption each for gasoline, gas oil, and liquid gas and 100 days consumption for white oil;

- Improving ports and building new ports meeting all environmental and health requirements with a sustainable capacity sufficient to absorb planned export quantities; and

- Protect the environmental and pollution and treatment environmental problems resulting from the oil and gas industry.

In summary, 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 (and fuel growth and modernisation). 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.

3.6 No Development Alternative

If the project does not go ahead, there will evidently be no environmental and socio-economic impacts from construction or operation of such a facility, however, the potential positive benefits would also be lost, including:

- Loss of dedicated import and export facilities for refined petroleum products;

- The continued use of inefficient and poorly maintained infrastructure at KZP which prevent its reversion to its original design use of dry cargo (for which there is also a pressing requirement); and

- Loss of the social benefits of the employment opportunities and economic stimulus that the Project would generate.

Other than for the storage of large fragments of shipwreck scrap, the site is unused and unoccupied and alternate potentially beneficial uses are not presently proposed. The most likely use of the site would be as similar port/logistics related facilities with similar attributes and impacts as those proposed for the current project.

3.7 Location Alternatives

Prior to identifying and agreeing the location of the proposed Terminal site, other alternatives were actively assessed (including consideration of the potential environmental and social impacts). However, it is important to appreciate the location specific constraints

represented by the Iraqi coastline (*i.e*. only 58km in length) and the presence of only two navigable rivers suitable for the location of a terminal project.

The proposed site is ideal for this project as adjacent to it is the SKA Terminal, an existing small capacity, newly built terminal located inside the KZP Freezone. A joint arrangement has been made with SKA to provide WTPS with access to the existing gasoil storage facilities and associated trucking loading racks. The SKA Terminal may potentially meet the short term gasoil demand without the immediate requirement for storage and truck loading facilities on the proposed site. However, the SKA Terminal will not be able to entirely fulfil the long term requirements particularly as there is little room for expansion. It does, however, allow for considerable operational benefits, but must necessarily have the berth terminals located close to it.

Furthermore, from early bathymetric studies of the area, it seems that the channel maintains a natural scoured minimum depth of 12m in this location, which means it forms a natural deeper water location for a loading berth, with minimal dredging requirements. It is also close (with direct access to) the port distributor roads which in turn connect to the main highway to Basra and the various development zones of the Southern Region.

The opposite bank of the Khor Al-Zubair is largely undeveloped and has no established transport infrastructure, so the construction project and logistics would be considerably larger than a development on the west side of the channel (as might the related impacts).

The alternate channel which could receive relatively large ships is the Shatt Al-Arab Waterway, however, there is a sandbar on the entrance to the channel that dries on certain tides (limiting accessibility times) and the channel has been neglected for many years in terms of maintenance dredging so is only around 8 – 10m in depth. Furthermore, there are many shipwrecks in the channel. Consequently, the Shatt Al-Arab Waterway would not be suitable for such a development, even if there was surrounding infrastructure to support it.

Considering the Khor Al-Zubair, therefore, the only logical option for such a berth, the only zone that is reachable from the navigable channel and accessible to transport infrastructure is the west bank. The area between KZP and the Liquefied Petroleum Gas (LPG) Terminal is the most suitable area for such a development and within that zone, the tie in with the existing and useful SKA Terminal determines that the facility should be close to this, which is also advantageous from a natural draught perspective.

Bearing the above discussion in mind, the selected site is the most practical site strategically and offers the opportunity for development with less construction, logistics, natural, environmental and social constraints than other locations.

3.8 Feasibility Studies

WorleyParsons (WP) have undertaken a feasibility study for the development of the proposed Terminal, the primary focus of which was on the alternative options for the marine facilities including:

- Upgrade of the existing Berth 1; and
- Development of a new Deeper Water Berth (DWB) either as a new Multi-Buoy Mooring (MBM) facility or a new jetty (with a single or double berth).

The key recommendation from the study was to build a single DWB as part of the first phase of the project. This recommendation was the basis for the technical development of the onshore terminal options. As such WTPS, identified a basic concept requirement for a phased development up to approximately 300,000m^3 product storage with all associated truck loading/unloading facilities and all other required utility and safety systems and supporting terminal infrastructure. The final Terminal development should be able to handle a product throughput of approximately 900,000m^3 per month utilising two berths.

3.9 Project Activities and Design

The onshore elements of the project includes:

- Tankage, of up to 300,000m^3, over three plots of land for the importation of gasoline and gasoil and the export of naphtha, Straight Run Fuel Oil (SRFO) and Vacuum Residue (VR);
- Associated process, pipelines, power generation, utilities, trucking facilities; and
- Civil and structural works such as earthworks, roads, flood protection, buildings and foundations.

The Terminal has been designed to handle up to five different products: gasoline, gasoil, naphtha, SRFO and VR. Gasoline and gasoil will be imported by marine tankers and offloaded into the tank farm before being exported via road tanks. Simultaneous truck loading and marine tanker unloading will be employed to increase the efficiency of the Terminal. Naphtha, SRFO and VR will be brought to the Terminal via road tankers and loaded onto marine tankers for export.

Gasoline, gasoil and naphtha will be stored in floating roof storage tanks while SRFO and VR will be stored in fixed roof storage tanks with a heating system and recirculation pumps to ensure a homogeneous temperature inside the tanks. Heat tracing will also be provided on

all pipework which may contain VR. Road tank facilities will be sited in close proximity to the storage facilities, which will segregated into dedicated bays to prevent cross contamination.

The offshore elements of the project include:

- Jetty facility providing two berths of vessels ranging from 5,000 to 47,000 DWT;
- Access trestle to the jetty; and
- Topside elements to facilitate the import and export of products.

The jetty facilities will be designed to allow for unloading and loading of different products with from a maximum of two vessels at any one time.

3.10 Footprint and Land Requirements

The onshore proportion of the site covers a parcel of land approximately 1,500m by 500m, covering a total area of approximately 0.95km^2 (95 ha) with a perimeter of roughly 4,944m. It is understood that WTPS have secured a 25 year access/licence agreement with General Company for Ports of Iraq (GCPI) to develop the site.

When the Terminal is fully operational, it is envisaged that the site will comprise twenty-three buildings, six generic building types and in the region of thirty tanks totalling approximately 300,000m^3 of storage, as indicated in the layout below.

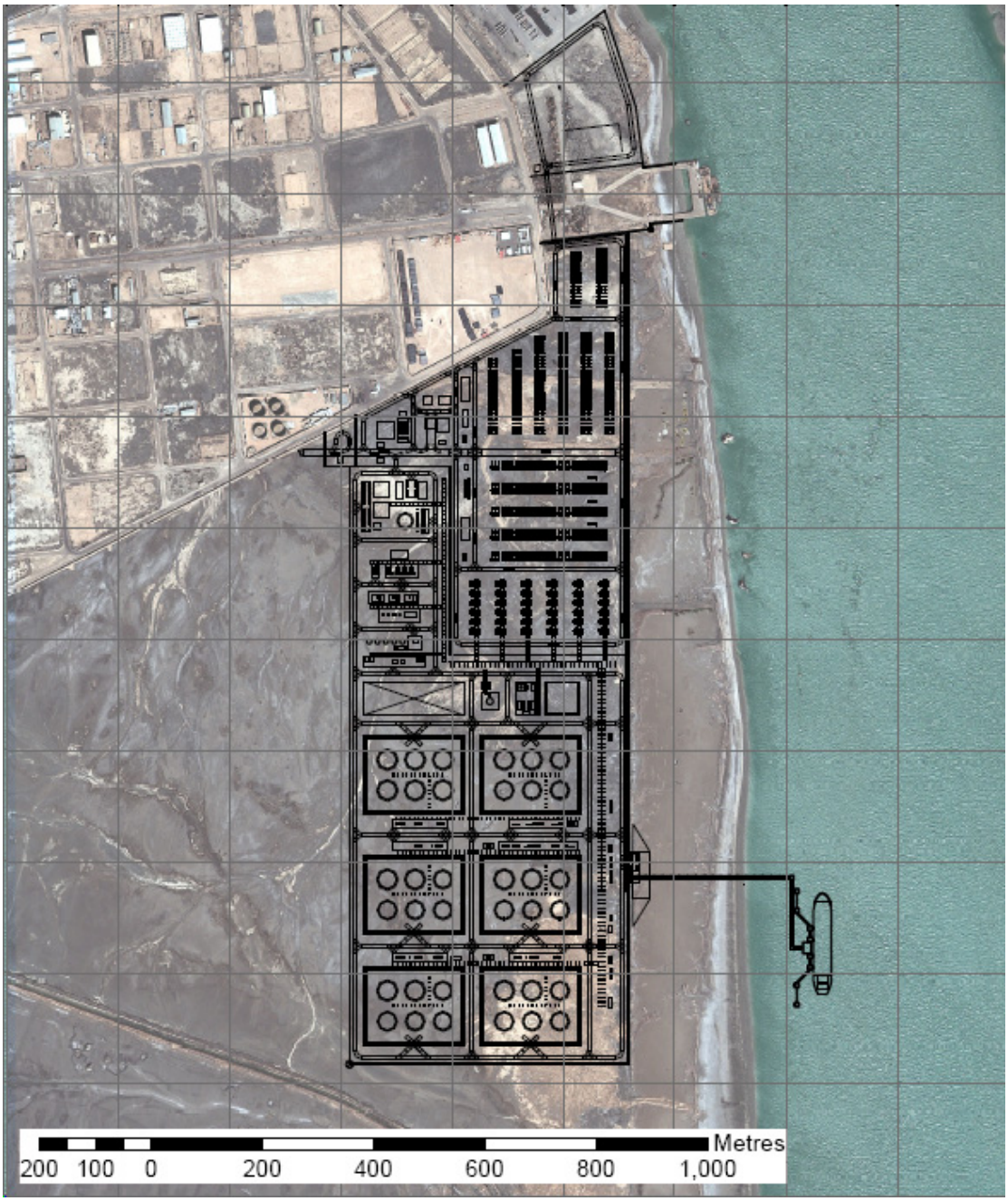

Figure 3.4: *Proposed final layout*

3.11 Construction Strategy

The Construction Strategy comprises the following elements:

- the facility will be built and commissioned in phases;

- It is anticipated that the facility would be stick built, utilising modularisation and Vendor Skids/Packages where it is deemed practical and beneficial to the project;
- Assessments will be utilised throughout the project to ensure construction risks are removed wherever possible; and
- The plant design will ensure that any impact on on-going operations is minimised during future expansion phases of the facilities.

To ensure minimal impacts to site operations during further expansion phases, some pre-investment will be undertaken so that subsequent phases can be completed efficiently. This will include:

- Early installation of tie-in isolation valves between the different phases of the facilities;
- A modular construction approach will be reviewed for the piperacks and construction of the jetty;
- Standardisation of design;
- Civil engineering works will be split between site preparation and bulk earthworks, followed by main civil works;
- Civil works will be planned to be completed ahead of the main mechanical and engineering and installation works;
- Construction of temporary facilities will be planned to be substantially complete prior to the start of the main construction activities;
- Dedicated project temporary facilities; and
- Dedicated residential and transport to be arranged for the construction workforce.

3.11.1 Phase 1

The project will be completed in a phased approach, Phase 1 will comprise the construction of the DWB, 1.5km tie-in 20” pipeline and rack to the SKA Terminal.

3.11.2 Subsequent Phases

Subsequent phases will include:

- Extension of the DWB;

- 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.

3.12 Temporary Facilities

Temporary facilities will be required in order to support the construction of the Terminal. At present the land to the west of the site, owned by the Ministry of Finance, is likely to be used for such a purpose. It is envisaged that the construction camp will be approximately 0.3km^2 in size and accommodate 2,000 workers. The indicative arrangements are shown below.

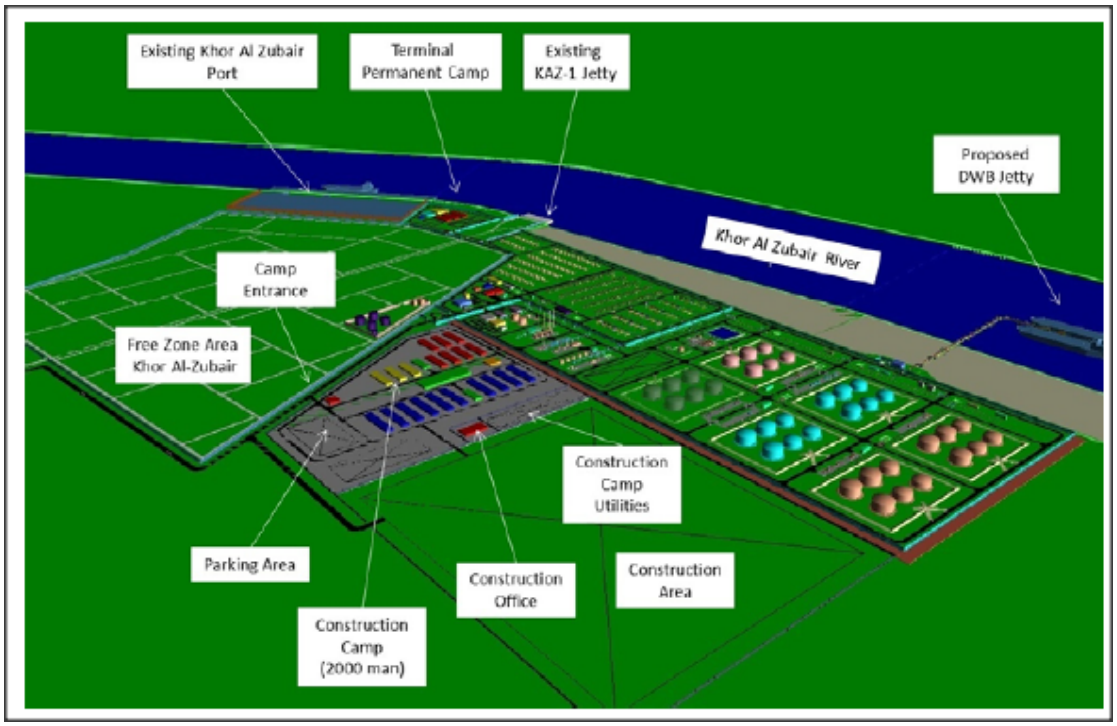

Figure 3.5: *Concept design for the temporary facilities*

The temporary facilities are likely to include:

- Fully functional temporary construction offices;
- IT and communications;
- HSE Induction and training centre;
- First Aid and emergency response centre
- Effluent water treatment and disposal;
- Temporary warehousing facilities;
- Material storage/laydown areas;
- Temporary fabrication shops and construction facilities;
- Pre-assembly area;
- Site parking lots for vehicles and plant;

- Temporary power generation and distribution to all facilities;
- Potable water system;
- Construction water system;
- Oxygen/acetylene supply/storage;
- Concrete batch plant (if required);
- Security gatehouse and guard posts;
- Security fencing;
- Construction accommodation with utilities and recreational facilities; and
- Construction offices.

3.13 Schedule

A phased construction approach will be adopted for this project and the construction schedule shall be part of the overall project schedule. The construction schedule will follow a Work Break Down Structure/Work Pack philosophy.

Construction milestones shall be included within the Construction Schedule, the milestones will be used to demonstrate and monitor that the project target completion dates are being achieved.

The precise schedule has not been specified at this stage as political disruption in Baghdad associated with the IS insurgency and change of government has places some uncertainty on the anticipated date of approvals to start, but construction works for Phase 1 are expected to commence in 2015.

3.14 Logistics Alternatives

Equipment will be imported into Iraq via ship. Ship is a safer and more efficient mode of freight transport than road haulage as it can transport substantially greater volumes of material per transit, involves less interaction with other users, is more fuel efficient, has lower emissions and causes less noise (due to distances from receptors) and less general nuisance.

Aggregates and general construction equipment sourced within Iraq will be transported within by road. There is rail infrastructure close to the site but this been damaged and inactive for many years and will not be serviceable within the timescale of the project.

Transport of materials and equipment by air has been discounted with the exception for emergency response and rapid evacuation personnel movements and small items of specialist equipment.

3.15 Commissioning

The equipment that will have been installed at the facilities, in most cases, will have undergone rigorous testing for certification by the manufacturer before it is delivered to the site.

After confirming that all systems and sub-systems have been built, aligned and documented in accordance with the design specification, drawings, codes, safety standards and statutory requirements, a dedicated commissioning team will undertake a commissioning programme that aims to prove that the facility functions as expected. The commissioning programme also provides an opportunity for the operational staff to become familiar with the operation of the new equipment.

3.16 Operation and Maintenance

The facility will be operated under international standard operating protocols and associated Health, Safety and Environmental Management Systems. An Environmental and Social Management and Monitoring Plan (ESMMP) has also been developed as part of the ESIA process that will be applied and audited periodically during the site operations.

The developer has substantial experience of designing, commissioning and operating such facilities over many years and has well developed training, management, monitoring, audit and review systems as well as sophisticated and detailed operational manuals and standard operating procedures. These are all subjected to external auditing programmes and monitoring systems.

Nonetheless, there is always the potential for accidental releases and malicious damage so the operator will also have in place Emergency Response Plans and Resources to deal with any such incidents. These are discussed in more detail under potential impacts later in this report.

3.17 Decommissioning

The Terminal is expected to operate for at least 25 years. Upon definitive cessation of operations, however, (which may also occur in phases or partially), a decommissioning plan will be implemented. This will set out the measures, techniques and resource requirements for de-polluting any storage and conveyance systems prior to their dismantling and will also set out measures for dealing with contamination that may have arisen as a result of the project activities. Prior to decommissioning, an environmental risk assessment will be undertaken to identify the final contaminative status of the site, with the intention being to remediate the site back to the baseline conditions that existed at the time of commencement of operations.

The exact details of how the site will be decommissioned will be determined as and when required and it is not possible to determine at what techniques will be used. However, these will be in accordance with industry and international standards and in accordance with tried and tested established decommissioning protocols used by WTPS and its stakeholders at other similar facilities.

The overall objective of the decommissioning programme will be to leave the site in a condition whereby there is little or no risk of the plant and equipment causing contamination of the soil and groundwater on the site or presenting a risk of harm to the natural and human environment in terms of residual materials at the facility.